Technical Construction File

IEC 62368-1

Audio/video, information and communication technology equipment

Part 1: Safety requirements

Report Number..... :	TRBJ24052958471
Tested by (name + signature)..... …..:	Stephen Zhang / Test Engineer
Approved by (+ signature) ..... :	Kosco Vent / Project Manager
Date of issue ..... :	May 31, 2024
Total number of pages ..... :	76 pages
Applicant's name ..... :	**MODE CHINA**
Address ..... :	Room 01.8/f#7 Tower. 4th Area, No. 186, South 4th Ring west Road.Fengtai District, Beijing, China
Test specification:	
Standard ..... :	EN IEC 62368-1:2020+A11:2020
Test procedure..... :	EN test report
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	**IEC62368_1B**
Test Report Form(s) Originator..... :	UL (US)
Master TRF ..... :	2018-03

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description.....	Free Hoist
Trade Mark.....	/
Manufacturer.....	Zhuozhou Mude Industrial Technology Co., Ltd No.C55, Zhongguaneun Hegu Innovatien Industrial Park, Chaoyang EastRoad,ZhuozhouDevelopment Zone, BaodingCity, Hebei Province
Model/Type reference.....	Free Hoist
Ratings.....	/

List of Attachments (including a total number of pages in each attachment):

Attachment No. 1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES for IEC 62368-1:2014 (Second Edition).

Attachment No. 2: Photos of the product

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
The submitted samples were tested and found to comply with the requirements of: - EN IEC 62368-1:2020+A11:2020	Shanghai Global Testing Services Co., Ltd. Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China.

Summary of compliance with National Differences:

List of countries addressed: See the attachment No. 1 of National and Group Differences for details.

☒ **The product fulfils the requirements of** IEC 62368-1:2018

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective Certification Bodies that own these marks.

/

Remark:

1.Since similar label used, only label for models above listed to represent other similar ones.

2.The height dimension of CE mark should not less than 5mm, the height dimension of WEEE symbol should not less than 7mm.

POSSIBLE TEST CASE VERDICTS:	
- test case does not apply to the test object ..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
TESTING:	
Date of receipt of test item ..... :	May 28, 2024
Date (s) of performance of tests..... :	May 28, 2024 to May 31, 2024
GENERAL REMARKS:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a ☐ comma / ☒ point is used as the decimal separator. The official TRF used for this evaluation has not been updated to include CTF information. As a temporary solution the NCB included missing CTF page and informed IECEE Secretariat about the required TRF update.	
Name and address of factory (ies)..... :	Same as applicant
GENERAL PRODUCT INFORMATION:	
Product Description – Free Hoist, model: Chemi Dog Ultra manufacturer by Shanghai Tanon Life Science Co.,Ltd. 1. The product's rear enclosure is secured to front enclosure by screws.	
Model Differences: All models have the same constructions, circuit diagram and PCB layout.	
Additional application considerations – (Considerations used to test a component or sub-assembly) – 1. The Maximum operating temperature is 40°C. 2. Clearance was evaluated for operating altitude up to 2000m above sea level.	

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Clause	Requirement + Test	Result - Remark	Verdict
4	**General Requirements**		**P**
4.1.1	Acceptance of materials, components and subassemblies		P
4.1.2	Use of components		P
4.1.3	Equipment design and construction		P
4.1.15	Markings and instructions..... :		P
4.4.4	Safeguard robustness		P
4.4.4.2	Steady force tests..... :		P
4.4.4.3	Drop tests ..... :		N/A
4.4.4.4	Impact tests ..... :		P
4.4.4.5	Internal accessible safeguard enclosure and barrier tests..... :		N/A
4.4.4.6	Glass Impact tests ..... :		N/A
4.4.4.7	Thermoplastic material tests ..... :		P
4.4.4.8	Air comprising a safeguard..... :	Considered, but no such barrier or enclosure provided	N/A
4.4.4.9	Accessibility and safeguard effectiveness	After tests of 4.4.4.2, 4.4.4.4, 4.4.4.7, no safeguard damaged.	P
4.5	Explosion	No explosion occurs during normal/abnormal operation and single fault conditions	P
4.6	Fixing of conductors		P
4.6.1	Fix conductors not to defeat a safeguard		P
4.6.2	10 N force test applied to ..... :	Internal primary wire and internal component. Internal wires on PCB fixed by connector or soldering and glue additionally.	P
4.7	Equipment for direct insertion into mains socket - outlets	No such apparatus	N/A
4.7.2	Mains plug part complies with the relevant standard..... :		N/A
4.7.3	Torque (Nm) ..... :		N/A
4.8	Products containing coin/button cell batteries	No coin/button cell batteries used.	N/A
4.8.2	Instructional safeguard		N/A
4.8.3	Battery Compartment Construction		N/A
	Means to reduce the possibility of children removing the battery..... :		—
4.8.4	Battery Compartment Mechanical Tests ..... :		N/A
4.8.5	Battery Accessibility		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.9	Likelihood of fire or shock due to entry of conductive object..... :	(See Annex P)	P

5	**Electrically-caused injury**		**P**
5.2.1	Electrical energy source classifications ..... :		P
5.2.2	ES1, ES2 and ES3 limits		P
5.2.2.2	Steady-state voltage and current ..... :		P
5.2.2.3	Capacitance limits ..... :		P
5.2.2.4	Single pulse limits..... :	No single pulse introduced	N/A
5.2.2.5	Limits for repetitive pulses..... :	No repetitive pulses introduced	N/A
5.2.2.6	Ringing signals ..... :	No means for connection to telephone network and no ringing signal generated	N/A
5.2.2.7	Audio signals ..... :	See Annex E	P
5.3	Protection against electrical energy sources	See below	P
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons	See only 4.3 and 5.3 to 5.5 which applies to protection between the accessible parts and hazardous parts of other circuits.	P
5.3.2.1	Accessibility to electrical energy sources and safeguards	Only ES1 circuit can be accessed for this product.	P
5.3.2.2	Contact requirements	No openings allowing entry of a probe. No access with test probe to any ES3 circuit or parts.	P
	a) Test with test probe from Annex V..... :	Clearances distance>10mm	P
	b) Electric strength test potential (V) ..... :		N/A
	c) Air gap (mm) ..... :	The appropriate test probe from Annex V cannot contact a bare internal conductive part.	P
5.3.2.4	Terminals for connecting stripped wire	No stripped wire terminal used.	N/A
5.4	Insulation materials and requirements		P
5.4.1.2	Properties of insulating material	The choice and application have taken into account as specified in this Clause 5 and Annex T and natural rubber, hygroscopic materials or asbestos are not used as insulation.	P
5.4.1.3	Humidity conditioning ..... :	No hygroscopic insulation	N/A
5.4.1.4	Maximum operating temperature for insulating materials ..... :		P
5.4.1.5	Pollution degree ..... :	Pollution degree 2 considered	—

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.1.5.2	Test for pollution degree 1 environment and for an insulating compound		N/A
5.4.1.5.3	Thermal cycling		N/A
5.4.1.6	Insulation in transformers with varying dimensions	No such transformer.	N/A
5.4.1.7	Insulation in circuits generating starting pulses	No such starting pulses.	N/A
5.4.1.8	Determination of working voltage		P
5.4.1.9	Insulating surfaces		P
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted	Bobbin materials of transformer PT2 are phenolic that is accepted without further tests.	P
5.4.1.10.2	Vicat softening temperature ..... :		N/A
5.4.1.10.3	Ball pressure ..... :		P
5.4.2	Clearances	The highest value of 5.4.2.2 and 5.4.2.3 should be used.	P
5.4.2.2	Determining clearance using peak working voltage		P
5.4.2.3	Determining clearance using required withstand voltage ..... :		P
	a) a.c. mains transient voltage..... :	2500 Vpeak considered for Overvoltage Cat. II	—
	b) d.c. mains transient voltage ..... :	--	—
	c) external circuit transient voltage..... :	--	—
	d) transient voltage determined by measurement :	--	—
5.4.2.4	Determining the adequacy of a clearance using an electric strength test		P
5.4.2.5	Multiplication factors for clearances and test voltages ..... :	Clearance was evaluated for altitude up to 2000m above sea level only	N/A
5.4.3	Creepage distances ..... :		P
5.4.3.1	General		P
5.4.3.3	Material Group :	Material group IIIb is assumed to be used	—
5.4.4	Solid insulation	See below	P
5.4.4.2	Minimum distance through insulation ..... :	(See appended table 5.4.4.2)	P
5.4.4.3	Insulation compound forming solid insulation	No such insulation applied.	N/A
5.4.4.4	Solid insulation in semiconductor devices	See table 4.1.2 for detail for optical isolator details	P
5.4.4.5	Cemented joints		N/A
5.4.4.6	Thin sheet material	See below	P
5.4.4.6.1	General requirements	Two layers as reinforced insulation around transformer.	P

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.4.6.2	Separable thin sheet material	Where two layers are provided as basic insulation any one layer passed the electric strength test for reinforced insulation.	P
	Number of layers (pcs) ..... :	2 layers	P
5.4.4.6.3	Non-separable thin sheet material	No such insulation used within the EUT	N/A
5.4.4.6.4	Standard test procedure for non-separable thin sheet material..... :		N/A
5.4.4.6.5	Mandrel test		N/A
5.4.4.7	Solid insulation in wound components	(See Annex G.6)	P
5.4.4.9	Solid insulation at frequencies >30 kHz ..... :	See appended table 5.4.9.	P
5.4.5	Antenna terminal insulation	Test applied between AC mains and secondary terminals	P
5.4.5.1	General		P
5.4.5.2	Voltage surge test	10KV, 50 times	P
	Insulation resistance (MΩ) ..... :	Between L/N and secondary terminals:>1000 MΩ	—
5.4.6	Insulation of internal wire as part of supplementary safeguard..... :	No such insulation of internal wire as part of supplementary safeguard.	N/A
5.4.7	Tests for semiconductor components and for cemented joints		N/A
5.4.8	Humidity conditioning		P
	Relative humidity (%) ..... :	93%	—
	Temperature (°C) ..... :	40°C	—
	Duration (h) ..... :	120h (tropical climate)	—
5.4.9	Electric strength test..... :		P
5.4.9.1	Test procedure for a solid insulation type test		P
5.4.9.2	Test procedure for routine tests		N/A
5.4.10	Protection against transient voltages between external circuit	No transient voltage from external circuit	N/A
5.4.10.1	Parts and circuits separated from external circuits		N/A
5.4.10.2	Test methods		N/A
5.4.10.2.1	General		N/A
5.4.10.2.2	Impulse test ..... :		N/A
5.4.10.2.3	Steady-state test ..... :		N/A
5.4.11	Insulation between external circuits and earthed circuitry ..... :	No such external circuit.	N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.11.2	Requirements		N/A
	Rated operating voltage Uop (V)..... :		—
	Nominal voltage Upeak (V) ..... :		—
	Max increase due to variation Usp ..... :		—
	Max increase due to ageing ΔUsa ..... :		—
	Uop= Upeak + Δ Usp + ΔUsa..... :		—
5.5	Components as safeguards		P
5.5.1	General	See below.	P
5.5.2	Capacitors and RC units	(See appended table 4.1.2)	P
5.5.2.1	General requirement		P
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector ..... :	(See appended table 5.5.2.2)	P
5.5.3	Transformers	(See Annex G.5.3)	P
5.5.4	Optocouplers	(See sub-clause 5.4 or Annex G.12)	P
5.5.5	Relays	No such component provided	N/A
5.5.6	Resistors	No such component provided	N/A
5.5.7	SPD's	No such component provided	N/A
5.5.7.1	Use of an SPD connected to reliable earthing		N/A
5.5.7.2	Use of an SPD between mains and protective earth		N/A
5.5.8	Insulation between the mains and external circuit consisting of a coaxial cable ..... :		N/A
5.6	Protective conductor		N/A
5.6.2	Requirement for protective conductors		N/A
5.6.2.1	General requirements		N/A
5.6.2.2	Colour of insulation		N/A
5.6.3	Requirement for protective earthing conductors		N/A
	Protective earthing conductor size (mm^2) .....:		—
5.6.4	Requirement for protective bonding conductors		N/A
5.6.4.1	Protective bonding conductors		N/A
	Protective bonding conductor size (mm2).....:		—
	Protective current rating (A) ..... :		—
5.6.4.3	Current limiting and overcurrent protective devices	No such devices.	N/A
5.6.5	Terminals for protective conductors		N/A
5.6.5.1	Requirement		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Conductor size (mm2), nominal thread diameter (mm). .....:		N/A
5.6.5.2	Corrosion		N/A
5.6.6	Resistance of the protective system		N/A
5.6.6.1	Requirements		N/A
5.6.6.2	Test Method Resistance:	(See appended table 5.6.6.2)	N/A
5.6.7	Reliable earthing		N/A
5.7	Prospective touch voltage, touch current and protective conductor current		P
5.7.2	Measuring devices and networks		P
5.7.2.1	Measurement of touch current .....:	(See appended table 5.2 or 5.7.4)	P
5.7.2.2	Measurement of prospective touch voltage	(See appended Table 5.2)	P
5.7.3	Equipment set-up, supply connections and earth connections		P
	System of interconnected equipment (separate connections/single connection) .....:	No interconnected equipment	—
	Multiple connections to mains (one connection at a time/simultaneous connections).....:	No multiple connection	—
5.7.4	Earthed conductive accessible parts.....:	See appended table 5.7.4	N/A
5.7.5	Protective conductor current	Current not exceeding ES2. See appended table 5.7.4	N/A
	Supply Voltage (V) .....:		—
	Measured current (mA) .....:		—
	Instructional Safeguard .....:		N/A
5.7.6	Prospective touch voltage and touch current due to external circuits		N/A
5.7.6.1	Touch current from coaxial cables		N/A
5.7.6.2	Prospective touch voltage and touch current from external circuits		N/A
5.7.7	Summation of touch currents from external circuits		N/A
	a) Equipment with earthed external circuits Measured current (mA) .....:		N/A
	b) Equipment whose external circuits are not referenced to earth. Measured current (mA).....:		N/A

6	**Electrically- caused fire**	**P**
6.2	Classification of power sources (PS) and potential ignition sources (PIS)	P

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Clause	Requirement + Test	Result - Remark	Verdict
6.2.2	Power source circuit classifications	PS (power source) classification determined by measuring the maximum power in Figures 34 and 35 for load and power source circuits.	P
6.2.2.1	General	See the following details.	P
6.2.2.2	Power measurement for worst-case load fault.. :	(See appended table 6.2.2)	P
6.2.2.3	Power measurement for worst-case power source fault..... :	(See appended table 6.2.2)	P
6.2.2.4	PS1 ..... :	(See appended table 6.2.2)	P
6.2.2.5	PS2 ..... :	(See appended table 6.2.2)	P
6.2.2.6	PS3 ..... :	(See appended table 6.2.2)	P
6.2.3	Classification of potential ignition sources	See the following details.	P
6.2.3.1	Arcing PIS ..... :	(See appended table 6.2.3.1)	P
6.2.3.2	Resistive PIS ..... :	(See appended table 6.2.3.1)	P
6.3	Safeguards against fire under normal operating and abnormal operating conditions		P
6.3.1 (a)	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials..... :	No ignition and no such temperature attained within the equipment. (See appended table 5.4.1.4, 6.3.2, 9.0, B.2.6)	P
6.3.1 (b)	Combustible materials outside fire enclosure		N/A
6.4	Safeguards against fire under single fault conditions		P
6.4.1	Safeguard Method	Method of Reduction of the likelihood of ignition under single fault conditions and control fire spread used	P
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits		N/A
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits		N/A
6.4.3.1	General		N/A
6.4.3.2	Supplementary Safeguards		N/A
	Special conditions if conductors on printed boards are opened or peeled		N/A
6.4.3.3	Single Fault Conditions ..... :		N/A
	Special conditions for temperature limited by fuse		N/A
6.4.4	Control of fire spread in PS1 circuits		P
6.4.5	Control of fire spread in PS2 circuits		P
6.4.5.2	Supplementary safeguards ..... :	(See appended tables 4.1.2 and Annex G)	P
6.4.6	Control of fire spread in PS3 circuit		P

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Clause	Requirement + Test	Result - Remark	Verdict
6.4.7	Separation of combustible materials from a PIS		N/A
6.4.7.1	General..... :	See tables 6.2.3.1 and 6.2.3.2)	N/A
6.4.7.2	Separation by distance		N/A
6.4.7.3	Separation by a fire barrier		N/A
6.4.8	Fire enclosures and fire barriers	See below.	P
6.4.8.1	Fire enclosure and fire barrier material properties	Rear plastic enclosure of back cover provided as fire enclosure.	P
6.4.8.2.1	Requirements for a fire barrier		N/A
6.4.8.2.2	Requirements for a fire enclosure	The V-0 material is used for the fire enclosure.	P
6.4.8.3	Constructional requirements for a fire enclosure and a fire barrier	See below	P
6.4.8.3.1	Fire enclosure and fire barrier openings	Figure 41 and Figure 42 considered, detail see 6.4.8.3.3 and 6.4.8.3.4.	P
6.4.8.3.2	Fire barrier dimensions		N/A
6.4.8.3.3	Top Openings in Fire Enclosure: dimensions (mm) .....:	Any top openings size is 0.97 mm in width on external plastic enclosure	P
	Needle Flame test		N/A
6.4.8.3.4	Bottom Openings in Fire Enclosure, condition met a), b) and/or c) dimensions (mm) .....:	All bottom openings size is 0.97 mm in width on external plastic enclosure	P
	Flammability tests for the bottom of a fire enclosure .....:		N/A
6.4.8.3.5	Integrity of the fire enclosure, condition met: a), b) or c) ..... :		N/A
6.4.8.4	Separation of PIS from fire enclosure and fire barrier distance (mm) or flammability rating.....:	Fire enclosure is V-0 material.	P
6.5	Internal and external wiring		P
6.5.1	Requirements		P
6.5.2	Cross-sectional area (mm2) .....:	(See appended table 4.1.2).	—
6.5.3	Requirements for interconnection to building wiring……..:		N/A
6.6	Safeguards against fire due to connection to additional equipment	All power delivering output connectors complied with Annex Q.1	P
	External port limited to PS2 or complies with Clause Q.1	See above.	P

7	**INJURY CAUSED BY HAZARDOUS SUBSTANCES**		**N/A**
7.2	Reduction of exposure to hazardous substances	No hazardous chemicals within the equipment.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.3	Ozone exposure	No ozone production within the equipment.	N/A
7.4	Use of personal safeguards (PPE)		N/A
	Personal safeguards and instructions ..... :		—
7.5	Use of instructional safeguards and instructions		N/A
	Instructional safeguard (ISO 7010) ..... :		—
7.6	Batteries.....:	Only alkaline batteries used in remote control	N/A
8	**/ANICALLY-CAUSED INJURY**		**P**
8.1	General	No moving parts in the equipment – see below regarding edges and corners.	P
8.2	Mechanical energy source classifications		P
8.3	Safeguards against mechanical energy sources		P
8.4	Safeguards against parts with sharp edges and corners	Edges and corners of the enclosure are rounded.	P
8.4.1	Safeguards	Sharp edges and corners of accessible parts: MS1	N/A
8.5	Safeguards against moving parts	No such parts	N/A
8.5.1	MS2 or MS3 part required to be accessible for the function of the equipment		N/A
8.5.2	Instructional Safeguard ..... :		—
8.5.4	Special categories of equipment comprising moving parts		N/A
8.5.4.1	Large data storage equipment		N/A
8.5.4.2	Equipment having electromechanical device for destruction of media		N/A
8.5.4.2.1	Safeguards and Safety Interlocks .....:		N/A
8.5.4.2.2	Instructional safeguards against moving parts		N/A
	Instructional Safeguard .....:		—
8.5.4.2.3	Disconnection from the supply		N/A
8.5.4.2.4	Probe type and force (N).....:		N/A
8.5.5	High Pressure Lamps		N/A
8.5.5.1	Energy Source Classification		N/A
8.5.5.2	High Pressure Lamp Explosion Test.....:		N/A
8.6	Stability		N/A
8.6.1	Product classification		N/A
	Instructional Safeguard .....:		—

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Clause	Requirement + Test	Result - Remark	Verdict
8.6.2	Static stability		N/A
8.6.2.2	Static stability test		N/A
	Applied Force .....:		—
8.6.2.3	Downward Force Test		N/A
8.6.3	Relocation stability test		N/A
	Unit configuration during 10 tilt ..... :		—
8.6.4	Glass slide test		N/A
8.6.5	Horizontal force test (Applied Force) ..... :		N/A
	Position of feet or movable parts ..... :		—
8.7	Equipment mounted to wall or ceiling		P
8.7.1	Mounting Means (Length of screws (mm) and mounting surface) ..... :	4pcs screw hole: 12mm length for each one, M5 screw used, wall mounted more than 2m.	P
8.7.2	Direction and applied force ..... :	Weight:6.7kg*4*9.8N/Kg=262.64N Test 2: 65.66N for each point of four directions, inward and outward directed force. Test 3: 1.2Nm for each screw, tested and complied. (After the test of the clause T.8 , there is also an assessment.)	P
8.8	Handles strength		N/A
8.8.1	Classification		N/A
8.8.2	Applied Force ..... :		N/A
8.9	Wheels or casters attachment requirements		N/A
8.9.1	Classification		N/A
8.9.2	Applied force ..... :		—
8.10	Carts, stands and similar carriers		N/A
8.10.1	General		N/A
8.10.2	Marking and instructions		N/A
	Instructional Safeguard ..... :		—
8.10.3	Cart, stand or carrier loading test and compliance		N/A
	Applied force ..... :		—
8.10.4	Cart, stand or carrier impact test		N/A
8.10.5	Mechanical stability		N/A
	Applied horizontal force (N) ..... :		—
8.10.6	Thermoplastic temperature stability (C) .....:		N/A
8.11	Mounting means for rack mounted equipment	Not such equipment	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.11.1	General		N/A
8.11.2	Product Classification		N/A
8.11.3	Mechanical strength test, variable N .....:		N/A
8.11.4	Mechanical strength test 250N, including end stops		N/A
8.12	Telescoping or rod antennas	No such parts.	N/A
	Button/Ball diameter (mm) .....:		—
9	**Thermal burn injury**		**P**
9.2	Thermal energy source classifications	TS1: accessible parts	P
9.3	Safeguard against thermal energy sources		N/A
9.4	Requirements for safeguards		N/A
9.4.1	Equipment safeguard		N/A
9.4.2	Instructional safeguard .....:		N/A
10	**RADIATION**		**P**
10.2	Radiation energy source classification	RS1	P
10.2.1	General classification	See the following details.	P
10.3	Protection against laser radiation	No laser radiation.	N/A
	Laser radiation that exists equipment:		—
	Normal, abnormal, single-fault ..... :		N/A
	Instructional safeguard ..... :		—
	Tool..... :		—
10.4	Protection against visible, infrared, and UV radiation		N/A
10.4.1	General		N/A
10.4.1.a)	RS3 for Ordinary and instructed persons ..... :		N/A
10.4.1.b)	RS3 accessible to a skilled person ..... :		N/A
	Personal safeguard (PPE) instructional safeguard..... :		—
10.4.1.c)	Equipment visible, IR, UV does not exceed RS1. :		P
10.4.1.d)	Normal, abnormal, single-fault conditions ..... :		N/A
10.4.1.e)	Enclosure material employed as safeguard is opaque……..:		N/A
10.4.1.f)	UV attenuation……..:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
10.4.1.g)	Materials resistant to degradation UV ..... :		N/A
10.4.1.h)	Enclosure containment of optical radiation……..:		N/A
10.4.1.i)	Exempt Group under normal operating conditions……..:		N/A
10.4.2	Instructional safeguard……:		N/A
10.5	Protection against x-radiation		N/A
10.5.1	X- radiation energy source that exists equipment :		N/A
	Normal, abnormal, single fault conditions		N/A
	Equipment safeguards ..... :		N/A
	Instructional safeguard for skilled person.....:		N/A
10.5.3	Most unfavourable supply voltage to give maximum radiation .....:		—
	Abnormal and single-fault condition ..... :		N/A
	Maximum radiation (pA/kg) ..... :		N/A
10.6	Protection against acoustic energy sources	Not portable equipment.	N/A
10.6.1	General		N/A
10.6.2	Classification		N/A
	Acoustic output, dB(A)..... :		N/A
	Output voltage, unweighted r.m.s..... :		N/A
10.6.4	Protection of persons		N/A
	Instructional safeguards ..... :		N/A
	Equipment safeguard prevent ordinary person to RS2..... :		—
	Means to actively inform user of increase sound pressure..... :		—
	Equipment safeguard prevent ordinary person to RS2..... :		—
10.6.5	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.5.1	Corded passive listening devices with analog input		N/A
	Input voltage with 94 dB(A) LAeq acoustic pressure output..... :		—
10.6.5.2	Corded listening devices with digital input		N/A
	Maximum dB(A)..... :		—
10.6.5.3	Cordless listening device		N/A
	Maximum dB(A)..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
B	**NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS**		**P**
B.2	Normal Operating Conditions		P
B.2.1	General requirements..... :	(See summary of testing for tested models, each loaded according to its output ratings. See also appended table B.2.5.)	P
	Audio Amplifiers and equipment with audio amplifiers ..... :	(See Annex E.1)	N/A
B.2.3	Supply voltage and tolerances	+10 % and −10 % considered.	P
B.2.5	Input test..... :	(See appended table B.2.5)	P
B.3	Simulated abnormal operating conditions		P
B.3.1	General requirements..... :	(See appended table B.3 & B.4)	P
B.3.2	Covering of ventilation openings		P
B.3.3	D.C. mains polarity test		N/A
B.3.4	Setting of voltage selector ..... :		N/A
B.3.5	Maximum load at output terminals .....:	(See appended table B.3 & B.4)	P
B.3.6	Reverse battery polarity		N/A
B.3.7	Abnormal operating conditions as specified in Clause E.2.		P
B.3.8	Safeguards functional during and after abnormal operating conditions	All safeguards remained effective.	P
B.4	Simulated single fault conditions		P
B.4.2	Temperature controlling device open or short-circuited ..... :	No such device used.	N/A
B.4.3	Motor tests	No such device used	N/A
B.4.3.1	Motor blocked or rotor locked increasing the internal ambient temperature ..... :	No such device used	N/A
B.4.4	Short circuit of functional insulation	See below.	P
B.4.4.1	Short circuit of clearances for functional insulation	(See appended table B.4)	P
B.4.4.2	Short circuit of creepage distances for functional insulation	(See appended table B.4)	P
B.4.4.3	Short circuit of functional insulation on coated printed boards	No coated printed boards used.	N/A
B.4.5	Short circuit and interruption of electrodes in tubes and semiconductors	(See appended table B.4 for faults on semiconductor components)	P
B.4.6	Short circuit or disconnect of passive components	(See appended table B.4)	P
B.4.7	Continuous operation of components	The EUT is continuous operating type and no such components intended for short time operation or intermittent operation	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
B.4.8	Class 1 and Class 2 energy sources within limits during and after single fault conditions		P
B.4.9	Battery charging under single fault conditions ... :	Only alkaline battery used in remote controller.	N/A
C	**UV RADIATION**		**N/A**
C.1	Protection of materials in equipment from UV radiation	No UV generated from the equipment.	N/A
C.1.2	Requirements	See above.	N/A
C.1.3	Test method	See above.	N/A
C.2	UV light conditioning test	See above.	N/A
C.2.1	Test apparatus	See above.	N/A
C.2.2	Mounting of test samples	See above.	N/A
C.2.3	Carbon-arc light-exposure apparatus	See above.	N/A
C.2.4	Xenon-arc light exposure apparatus	See above.	N/A
D	**TEST GENERATORS**		**P**
D.1	Impulse test generators		N/A
D.2	Antenna interface test generator	(See sub-clause 5.4.5)	P
D.3	Electronic pulse generator		N/A
E	**TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS**		**P**
E.1	Audio amplifier normal operating conditions		P
	Audio signal voltage (V) ..... :	(See appended table B.2.5)	--
	Rated load impedance (Ω) ..... :	(See appended table 4.1.2)	--
E.2	Audio amplifier abnormal operating conditions	(See appended table B.3)	P
F	**EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS**		**P**
F.1	General requirements	See below.	P
	Instructions – Language .....:	English version checked	—
F.2	Letter symbols and graphical symbols		P
F.2.1	Letter symbols according to IEC60027-1	Letter symbols for quantities and units are complied with IEC 60027-1.	P
F.2.2	Graphic symbols IEC, ISO or manufacturer specific	Graphical symbols are complied with IEC 60417, ISO 3864-2, ISO 7000 or ISO 7010.	P
F.3	Equipment markings		P

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Clause	Requirement + Test	Result - Remark	Verdict
F.3.1	Equipment marking locations	The required marking is located on the enclosure of the equipment and is easily visible.	P
F.3.2	Equipment identification markings	See copy of marking plate.	P
F.3.2.1	Manufacturer identification ..... :	See copy of marking plate.	—
F.3.2.2	Model identification ..... :	See copy of marking plate.	—
F.3.3	Equipment rating markings	See the following details.	P
F.3.3.1	Equipment with direct connection to mains	The equipment is direct connected to AC mains, see F.3.3.3 to F.3.3.6.	P
F.3.3.2	Equipment without direct connection to mains		N/A
F.3.3.3	Nature of supply voltage .....:	AC	—
F.3.3.4	Rated voltage .....:	See copy of marking plate.	—
F.3.3.4	Rated frequency .....:	See copy of marking plate.	—
F.3.3.6	Rated current or rated power .....:	See copy of marking plate.	—
F.3.3.7	Equipment with multiple supply connections	Only one mains supply connection provided.	N/A
F.3.4	Voltage setting device	No voltage setting device.	N/A
F.3.5	Terminals and operating devices	See below.	P
F.3.5.1	Mains appliance outlet and socket-outlet markings ..... :	No outlet used.	N/A
F.3.5.2	Switch position identification marking ..... :	No such switch used.	N/A
F.3.5.3	Replacement fuse identification and rating markings ..... :	“PF1 T5AL 250V” marked on PCB near the fuse	P
F.3.5.4	Replacement battery identification marking ..... :	Only alkaline batteries used in remote control and the battery type was mentioned on the user manual	N/A
F.3.5.5	Terminal marking location		N/A
F.3.6	Equipment markings related to equipment classification	See below.	P
F.3.6.1	Class I Equipment		N/A
F.3.6.1.1	Protective earthing conductor terminal		N/A
F.3.6.1.2	Neutral conductor terminal		N/A
F.3.6.1.3	Protective bonding conductor terminals		N/A
F.3.6.2	Class II equipment (IEC60417-5172)	Class II equipment	P
F.3.6.2.1	Class II equipment with or without functional earth		N/A
F.3.6.2.2	Class II equipment with functional earth terminal marking		N/A
F.3.7	Equipment IP rating marking ..... :	IPX0.	—
F.3.8	External power supply output marking	See copy of marking plate.	P

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Clause	Requirement + Test	Result - Remark	Verdict
F.3.9	Durability, legibility and permanence of marking	Marking is considered to be legible and easily discernible. See also the following details.	P
F.3.10	Test for permanence of markings	After the test, the marking remains legible.	P
F.4	Instructions		P
	a) Equipment for use in locations where children not likely to be present - marking		N/A
	b) Instructions given for installation or initial use	See user manual	P
	c) Equipment intended to be fastened in place		P
	d) Equipment intended for use only in restricted access area		N/A
	e) Audio equipment terminals classified as ES3 and other equipment with terminals marked in accordance F.3.6.1	No such terminals provided.	N/A
	f) Protective earthing employed as safeguard		N/A
	g) Protective earthing conductor current exceeding ES2 limits		N/A
	h) Symbols used on equipment		P
	i) Permanently connected equipment not provided with all-pole mains switch	Not permanently connected equipment.	N/A
	j) Replaceable components or modules providing safeguard function	No such markings.	N/A
F.5	Instructional safeguards	No instructional safeguard is considered as necessary.	N/A
	Where “instructional safeguard” is referenced in the test report it specifies the required elements, location of marking and/or instruction	No instructional safeguard required in the equipment.	N/A

G	**COMPONENTS**		**P**
G.1	Switches		N/A
G.1.1	General requirements	No switch used.	N/A
G.1.2	Ratings, endurance, spacing, maximum load		N/A
G.2	Relays		N/A
G.2.1	General requirements	No relay used.	N/A
G.2.2	Overload test		N/A
G.2.3	Relay controlling connectors supply power		N/A
G.2.4	Mains relay, modified as stated in G.2		N/A
G.3	**Protection Devices**		**P**
G.3.1	Thermal cut-offs	No thermal cut-off used.	N/A
G.3.1.1a) &b)	Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.3.1.1c)	Thermal cut-outs tested as part of the equipment as indicated in c)		N/A
G.3.1.2	Thermal cut-off connections maintained and secure		N/A
G.3.2	Thermal links		N/A
G.3.2.1a)	Thermal links separately tested with IEC 60691	No thermal link used.	N/A
G.3.2.1b)	Thermal links tested as part of the equipment		N/A
	Aging hours (H) ..... :		—
	Single Fault Condition ..... :		—
	Test Voltage (V) and Insulation Resistance (Ω). :		—
G.3.3	PTC Thermistors		N/A
G.3.4	Overcurrent protection devices	Current fuse complying with IEC 60127 as overcurrent protection device.	P
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.4		N/A
G.3.5.1	Non-resettable devices suitably rated and marking provided		N/A
G.3.5.2	Single faults conditions.....:		N/A
G.4	Connectors		P
G.4.1	Spacings	See below	P
G.4.2	Mains connector configuration ..... :	Approved power plug used.	P
G.4.3	Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely		P
G.5	Wound Components		P
G.5.1	Wire insulation in wound components.....	Approved TIW used as secondary winding of transformer (PT2)	P
G.5.1.2 a)	Two wires in contact inside wound component, angle between 45° and 90°	Separated by insulation tube and tape used in the transformer (PT2)	P
G.5.1.2 b)	Construction subject to routine testing		N/A
G.5.2	Endurance test on wound components		N/A
G.5.2.1	General test requirements		N/A
G.5.2.2	Heat run test		N/A
	Time (s) ..... :		—
	Temperature (°C) ..... :		—
G.5.2.3	Wound Components supplied by mains		N/A
G.5.3	**Transformers**		**P**
G.5.3.1	Requirements applied (IEC61204-7, IEC61558-1/-2, and/or IEC62368-1) ..... :	The transformer meets the requirements given in G.5.3.2 and G.5.3.3.	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Position..... :	PT2	—
	Method of protection ..... :	See G.5.3.3.	—
G.5.3.2	Insulation	Primary windings and secondary windings are separated by Reinforced insulation	P
	Protection from displacement of windings.....:	By bobbin and tape	—
G.5.3.3	Overload test ..... :	(See appended table B.3)	P
G.5.3.3.1	Test conditions	Tested in the complete equipment.	P
G.5.3.3.2	Winding Temperatures testing in the unit	(See appended table B.3)	P
G.5.3.3.3	Winding Temperatures - Alternative test method	Alternative test method was not considered.	N/A
G.5.4	Motors		N/A
G.5.4.1	General requirements	No such device provided	N/A
	Position ..... :		—
G.5.4.2	Test conditions		N/A
G.5.4.3	Running overload test		N/A
G.5.4.4	Locked-rotor overload test		N/A
	Test duration (days) ..... :		—
G.5.4.5	Running overload test for d.c. motors in secondary circuits		N/A
G.5.4.5.2	Tested in the unit		N/A
	Electric strength test (V) ..... :		—
G.5.4.5.3	Tested on the Bench - Alternative test method; test time (h) ..... :		N/A
	Electric strength test (V) ..... :		—
G.5.4.6	Locked-rotor overload test for d.c. motors in secondary circuits		N/A
G.5.4.6.2	Tested in the unit		N/A
	Maximum Temperature ..... :		N/A
	Electric strength test (V) ..... :		N/A
G.5.4.6.3	Tested on the bench - Alternative test method; test time (h) ..... :		N/A
	Electric strength test (V) ..... :		N/A
G.5.4.7	Motors with capacitors		N/A
G.5.4.8	Three-phase motors		N/A
G.5.4.9	Series motors		N/A
	Operating voltage ..... :		—
G.6	**Wire Insulation**		**P**

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Clause	Requirement + Test	Result - Remark	Verdict
G.6.1	General	Triple insulation wire used as reinforced insulation	P
G.6.2	Solvent-based enamel wiring insulation		P
G.7	Mains supply cords		P
G.7.1	General requirements		P
	Type.....:	(See appended table 4.1.2)	—
	Rated current (A).....:	(See appended table 4.1.2)	—
	Cross-sectional area (mm2), (AWG)..... :	(See appended table 4.1.2)	—
G.7.2	Compliance and test method		P
G.7.3	Cord anchorages and strain relief for non-detachable power supply cords		P
G.7.3.2	Cord strain relief		P
G.7.3.2.1	Requirements		P
	Strain relief test force (N) ..... :	100N, 25 times& 0.25Nm, 1minute test applied, displacement <2mm	—
G.7.3.2.2	Strain relief mechanism failure		N/A
G.7.3.2.3	Cord sheath or jacket position, distance (mm).... :		—
G.7.3.2.4	Strain relief comprised of polymeric material		N/A
G.7.4	Cord Entry ..... :	After G.7.3.2.1 test, cord insulation accordance with 5.4.9.1	P
G.7.5	Non-detachable cord bend protection		N/A
G.7.5.1	Requirements		N/A
G.7.5.2	Mass (g) ..... :		—
	Diameter (m) ..... :		—
	Temperature (C).....:		—
G.7.6	Supply wiring space		N/A
G.7.6.2	Stranded wire		N/A
G.7.6.2.1	Test with 8 mm strand		N/A
G.8	Varistors		N/A
G.8.1	General requirements		N/A
G.8.2	Safeguard against shock	(see appended table 4.1.2)	N/A
G.8.3	Safeguard against fire		N/A
G.8.3.2	Varistor overload test .....:		N/A
G.8.3.3	Temporary overvoltage .....:		N/A
G.9	Integrated Circuit (IC) Current Limiters		N/A
G.9.1 a)	Manufacturer defines limit at max. 5A.	No IC current limiter provided within the equipment.	N/A
G.9.1 b)	Limiters do not have manual operator or reset		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.9.1 c)	Supply source does not exceed 250 VA ..... :		--
G.9.1 d)	IC limiter output current (max. 5A) ..... :		--
G.9.1 e)	Manufacturers' defined drift ..... :		--
G.9.2	Test Program 1		N/A
G.9.3	Test Program 2		N/A
G.9.4	Test Program 3		N/A
G.10	Resistors		N/A
G.10.1	General requirements	No such bridging resistors	N/A
G.10.2	Resistor test		N/A
G.10.3	Test for resistors serving as safeguards between the mains and an external circuit consisting of a coaxial cable	No resistors bridging insulation.	N/A
G.10.3.1	General requirements		N/A
G.10.3.2	Voltage surge test		N/A
G.10.3.3	Impulse test		N/A
G.11	Capacitor and RC units		P
G.11.1	General requirements	Capacitors used in accordance with their rating and complied with subclasses of IEC 60384-14. (see appended table 4.1.2)	P
G.11.2	Conditioning of capacitors and RC units	(see appended table 4.1.2)	P
G.11.3	Rules for selecting capacitors	The selection followed with tables G.9 and G.12.	P
G.12	Optocouplers		P
	Optocouplers comply with IEC 60747-5-5:2007 Spacing or Electric Strength Test (specify option and test results).....:	The optocoupler complied with standard IEC/EN 60747-5-5. (see appended table 4.1.2)	P
	Type test voltage Vini ..... :	Considered	—
	Routine test voltage, Vini,b ..... :	Considered	—
G.13	Printed boards		P
G.13.1	General requirements	See the following details.	P
G.13.2	Uncoated printed boards	The insulation between conductors on the outer surfaces of an uncoated printed board complied with the minimum clearance and creepage requirements	P
G.13.3	Coated printed boards		P
G.13.4	Insulation between conductors on the same inner surface		N/A
	Compliance with cemented joint requirements (Specify construction)..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
G.13.5	Insulation between conductors on different surfaces		N/A
	Distance through insulation.....:		N/A
	Number of insulation layers (pcs) ..... :		—
G.13.6	Tests on coated printed boards		N/A
G.13.6.1	Sample preparation and preliminary inspection		N/A
G.13.6.2a)	Thermal conditioning		N/A
G.13.6.2b)	Electric strength test		N/A
G.13.6.2c)	Abrasion resistance test		N/A
G.14	Coating on components terminals		N/A
G.14.1	Requirements .....:	No coating on component terminals considered to affect creepage or clearances.	N/A
G.15	Liquid filled components		N/A
G.15.1	General requirements	No such device provided within the equipment.	N/A
G.15.2	Requirements		N/A
G.15.3	Compliance and test methods		N/A
G.15.3.1	Hydrostatic pressure test		N/A
G.15.3.2	Creep resistance test		N/A
G.15.3.3	Tubing and fittings compatibility test		N/A
G.15.3.4	Vibration test		N/A
G.15.3.5	Thermal cycling test		N/A
G.15.3.6	Force test		N/A
G.15.4	Compliance		N/A
G.16	IC including capacitor discharge function (ICX)		N/A
a)	Humidity treatment in accordance with sc5.4.8 – 120 hours		N/A
b)	Impulse test using circuit 2 with Uc = to transient voltage ..... :		N/A
C1)	Application of ac voltage at 110% of rated voltage for 2.5 minutes		N/A
C2)	Test voltage ..... :		—
D1)	10,000 cycles on and off using capacitor with smallest capacitance resistor with largest resistance specified by manufacturer		N/A
D2)	Capacitance ..... :		—
D3)	Resistance ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
H	**CRITERIA FOR TELEPHONE RINGING SIGNALS**		**N/A**
H.1	General	No telephone ringing signal generated within the equipment.	N/A
H.2	Method A		N/A
H.3	Method B		N/A
H.3.1	Ringing signal		N/A
H.3.1.1	Frequency (Hz) .....:		—
H.3.1.2	Voltage (V) .....:		—
H.3.1.3	Cadence; time (s) and voltage (V) .....:		—
H.3.1.4	Single fault current (mA):.....:		—
H.3.2	Tripping device and monitoring voltage .....:		N/A
H.3.2.1	Conditions for use of a tripping device or a monitoring voltage complied with		N/A
H.3.2.2	Tripping device		N/A
H.3.2.3	Monitoring voltage (V) .....:		—
J	**INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION**		**N/A**
	General requirements		N/A
K	**SAFETY INTERLOCKS**		**N/A**
K.1	General requirements	No safety interlock provided.	N/A
K.2	Components of safety interlock safeguard mechanism		N/A
K.3	Inadvertent change of operating mode		N/A
K.4	Interlock safeguard override		N/A
K.5	Fail-safe		N/A
	Compliance .....:		N/A
K.6	Mechanically operated safety interlocks		N/A
K.6.1	Endurance requirement		N/A
K.6.2	Compliance and Test method .....:		N/A
K.7	Interlock circuit isolation		N/A
K.7.1	Separation distance for contact gaps & interlock circuit elements (type and circuit location) .....:		N/A
K.7.2	Overload test, Current (A) .....:		N/A
K.7.3	Endurance test		N/A
K.7.4	Electric strength test .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
L	**DISCONNECT DEVICES**		**P**
L.1	General requirements	Plug as disconnect device.	P
L.2	Permanently connected equipment		N/A
L.3	Parts that remain energized		N/A
L.4	Single phase equipment	The disconnect device disconnects both poles simultaneously.	P
L.5	Three-phase equipment		N/A
L.6	Switches as disconnect devices		N/A
L.7	Plugs as disconnect devices		P
L.8	Multiple power sources		N/A
M	**EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS**		**P**
M.1	General requirements	Only alkaline batteries used in remote control.	P
M.2	Safety of batteries and their cells		N/A
M.2.1	Requirements		N/A
M.2.2	Compliance and test method (identify method) .. :		--
M.3	Protection circuits		N/A
M.3.1	Requirements		N/A
M.3.2	Tests		N/A
	- Overcharging of a rechargeable battery		N/A
	- Unintentional charging of a non-rechargeable battery		N/A
	- Reverse charging of a rechargeable battery		N/A
	- Excessive discharging rate for any battery		N/A
M.3.3	Compliance ..... :		--
M.4	Additional safeguards for equipment containing secondary lithium battery		N/A
M.4.1	General		N/A
M.4.2	Charging safeguards		N/A
M.4.2.1	Charging operating limits		N/A
M.4.2.2a)	Charging voltage, current and temperature .....:		--
M.4.2.2 b)	Single faults in charging circuitry .....:		--
M.4.3	Fire Enclosure		N/A
M.4.4	Endurance of equipment containing a secondary lithium battery		N/A
M.4.4.2	Preparation		N/A
M.4.4.3	Drop and charge/discharge function tests		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Drop		N/A
	Charge		N/A
	Discharge		N/A
M.4.4.4	Charge-discharge cycle test		N/A
M.4.4.5	Result of charge-discharge cycle test		N/A
M.5	Risk of burn due to short circuit during carrying		N/A
M.5.1	Requirement		N/A
M.5.2	Compliance and Test Method (Test of P.2.3)		N/A
M.6	Prevention of short circuits and protection from other effects of electric current		N/A
M.6.1	Short circuits		N/A
M.6.1.1	General requirements		N/A
M.6.1.2	Test method to simulate an internal fault		N/A
M.6.1.3	Compliance (Specify M.6.1.2 or alternative method) ..... :		--
M.6.2	Leakage current (mA) ..... :		--
M.7	Risk of explosion from lead acid and NiCd batteries		N/A
M.7.1	Ventilation preventing explosive gas concentration		N/A
M.7.2	Compliance and test method		N/A
M.8	Protection against internal ignition from external spark sources of lead acid batteries		N/A
M.8.1	General requirements		N/A
M.8.2	Test method		N/A
M.8.2.1	General requirements		N/A
M.8.2.2	Estimation of hypothetical volume Vz (m3/s) ..... :		--
M.8.2.3	Correction factors..... :		--
M.8.2.4	Calculation of distance d (mm) ..... :		--
M.9	Preventing electrolyte spillage		N/A
M.9.1	Protection from electrolyte spillage		N/A
M.9.2	Tray for preventing electrolyte spillage		N/A
M.10	Instructions to prevent reasonably foreseeable misuse (Determination of compliance: inspection, data review; or abnormal testing) :	Mentioned in user manual	P

N	**ELECTROCHEMICAL POTENTIALS**		**P**
	Metal(s) used ..... :	Considered.	—

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
O	**MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES**		**P**
	Figures O.1 to O.20 of this Annex applied ..... :	Considered.	—
P	**SAFEGUARDS AGAINST ENTRY OF FOREIGN OBJECTS AND SPILLAGE OF INTERNAL LIQUIDS**		**P**
P.1	General requirements		P
P.2.2	Safeguards against entry of foreign object		P
	Location and Dimensions (mm) ..... :	Any openings size is 0.97 mm in width on external plastic enclosure	—
P.2.3	Safeguard against the consequences of entry of foreign object		N/A
P.2.3.1	Safeguards against the entry of a foreign object		N/A
	Openings in transportable equipment		N/A
	Transportable equipment with metalized plastic parts ..... :		N/A
P.2.3.2	Openings in transportable equipment in relation to metallized parts of a barrier or enclosure (identification of supplementary safeguard) ..... :		N/A
P.3	Safeguards against spillage of internal liquids	No such liquids.	N/A
P.3.1	General requirements		N/A
P.3.2	Determination of spillage consequences		N/A
P.3.3	Spillage safeguards		N/A
P.3.4	Safeguards effectiveness		N/A
P.4	Metallized coatings and adhesive securing parts		N/A
P.4.2 a)	Conditioning testing		N/A
	Tc (°C) ..... :		—
	Tr (°C) ..... :		—
	Ta (°C)..... :		—
P.4.2 b)	Abrasion testing ..... :		N/A
P.4.2 c)	Mechanical strength testing ..... :		N/A
Q	**CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING**		**P**
Q.1	Limited power sources	See appended table Q.1	P
Q.1.1 a)	Inherently limited output		N/A
Q.1.1 b)	Impedance limited output		P
	- Regulating network limited output under normal operating and simulated single fault condition	A regulating network limits the output in compliance with table Q.1 both under normal operating conditions and after any single fault.	P

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
Q.1.1 c)	Overcurrent protective device limited output		N/A
Q.1.1 d)	IC current limiter complying with G.9		N/A
Q.1.2	Compliance and test method	See appended table Q.1	P
Q.2	Test for external circuits – paired conductor cable		N/A
	Maximum output current (A) ..... :		--
	Current limiting method ..... :		--
R	**LIMITED SHORT CIRCUIT TEST**		**N/A**
R.1	General requirements	No such consideration.	N/A
R.2	Determination of the overcurrent protective device and circuit		N/A
R.3	Test method Supply voltage (V) and short-circuit current (A)). ..... :		N/A
S	**TESTS FOR RESISTANCE TO HEAT AND FIRE**		**N/A**
S.1	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W	Approved fire enclosure used.	N/A
	Samples, material ..... :		—
	Wall thickness (mm)..... :		—
	Conditioning (°C)..... :		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	- Material not consumed completely		N/A
	- Material extinguishes within 30s		N/A
	- No burning of layer or wrapping tissue		N/A
S.2	Flammability test for fire enclosure and fire barrier integrity		N/A
	Samples, material ..... :		—
	Wall thickness (mm)..... :		—
	Conditioning (°C)..... :		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	Test specimen does not show any additional hole		N/A
S.3	Flammability test for the bottom of a fire enclosure		N/A
	Samples, material ..... :		—
	Wall thickness (mm)..... :		—
	Cheesecloth did not ignite		N/A
S.4	Flammability classification of materials		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
S.5	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material ..... :		—
	Wall thickness (mm)..... :		—
	Conditioning (test condition), (°C) ..... :		—
	Test flame according to IEC 60695-11-20 with conditions as set out		N/A
	After every test specimen was not consumed completely		N/A
	After fifth flame application, flame extinguished within 1 min		N/A
T	**/ANICAL STRENGTH TESTS**		**P**
T.1	General requirements		P
T.2	Steady force test, 10 N .....:	(See appended table T.2)	P
T.3	Steady force test, 30 N .....:		N/A
T.4	Steady force test, 100 N .....:		N/A
T.5	Steady force test, 250 N .....:	(See appended table T.5)	P
T.6	Enclosure impact test	(See appended table T.6)	P
	Fall test	A 500 g steel sphere ball fell freely from rest through a vertical distance of 1300 mm onto the sample.	P
	Swing test		N/A
T.7	Drop test .....:		N/A
T.8	Stress relief test .....:	(See appended table T8)	P
T.9	Impact Test (glass)	No glass used.	N/A
T.9.1	General requirements		N/A
T.9.2	Impact test and compliance		N/A
	Impact energy (J) .....:		—
	Height (m) .....:		—
T.10	Glass fragmentation test .....:		N/A
T.11	Test for telescoping or rod antennas	No such antennas provided within the equipment.	N/A
	Torque value (Nm) .....:		—
U	**/ANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFECTS OF IMPLOSION**		**N/A**
U.1	General requirements	No CRT provided.	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
U.2	Compliance and test method for non-intrinsically protected CRTs		N/A
U.3	Protective Screen ..... :		N/A
V	**DETERMINATION OF ACCESSIBLE PARTS (FINGERS, PROBES AND WEDGES)**		**P**
V.1	Accessible parts of equipment	No access with test probes to any hazardous parts	P
V.2	Accessible part criterion		P

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.1.2	TABLE: List of critical components	P

Serial No.	Object/part No.	manufacturer/ trademark	Type/model	Technical data	Standard	Certificate No.
1	Power supply unit	Shenzhen Hikeen Technology Co., Ltd.	HK.T.RT2874 P739	INPUT:100-240Vac 50/60Hz, 2.0A Max.	IEC 62368-1	Test with apparatus
2	AC connector (XW1)	Yueqing Hongchang Radio Co., Ltd.	HC39601-3AW2P	250VAC, 7A, 85°C	EN 61984 UL 1977	TUV Rheinland :R 50405942 UL:E500327
3-1	Fuse (FW1)	XC Electronics (Shen Zhen) Corp. Ltd.	5TE	5AL, 250VAC	IEC/EN 60127-1 IEC/EN 60127-3 UL 248-1	VDE:40029550 VDE:40036821 UL:E249609
3-2	Fuse (FW1) (Alternative)	Dongguan Better Electronics Technology Co., Ltd.	932	5A L, 250VAC	IEC/EN 60127-1 IEC/EN 60127-3 UL 248-1	VDE:40033369 UL:E300003
4-1	Thermistor (RTW1,RTW2)	NANJING KE MIN ELECTRONICS CO LTD	NSP102R55	2.5R,5A at 25°C	UL 1434 EN 60539-1	UL:E312488 TUV SUD:B 18 06 93844 003
4-2	Thermistor (RTW1,RTW2) (Alternative)	NANJING SHIHENG ELECTRONICS CO LTD	MF72 2.5D11 MF72-2.5D11	2.5R,5A at 25°C	UL 1434 EN 60539-1	UL:E241319 TUV Rheinland :R 50245892
9	VDR (RVW1)	Cerglass MFG Inc	10D681K	420VAC,125°C, Coating: V-0, 6KV/3KA	IEC/EN 61051-1 IEC/EN 61051-2 UL1449	VDE:40028836 UL:E317616
5-1	X-capacitor (CX1)	GUANGZHOU YES ELECTRONIC TECHNOLOGY CO LTD	MPX/MKP	0.47uF, 310 VAC, X2 type,110°C	IEC/EN 60384-14 UL 60384-14	VDE:40043020 UL:E355933
5-2	X-capacitor (CX1) (Alternative)	SHENZHEN SINCERITY TECHNOLOGY CO LTD	MPX/MKP	0.47uF, 320 VAC, X2 type,110°C	IEC/EN 60384-14 UL 60384-14	VDE:40028812 UL:E319615

5-3	X-capacitor (CX1) (Alternative)	SHENZHEN SHANRUI ELECTRONICS CO LTD	MPX	0.47uF, 310 VAC, X2 type,110°C	IEC/EN 60384-14 UL 60384-14	VDE:40039043 UL:E364138
5-4	X-capacitor (CX1) (Alternative)	GUANGDONG FENGMING ELECTRONIC TECH CO LTD	MKP-X2	0.47uF, 275 VAC, X2 type,105°C	IEC/EN 60384-14 UL 60384-14	VDE:40025702 UL:E345487
6-1	Y-capacitor (CY3)	Yinan Don's Electronic Component Co., Ltd	CT81	1000pF, 400VAC, Y1, 125°C	IEC/EN 60384-14 UL 60384-14	VDE:135256 UL:E145038
6-2	Y-capacitor (CY3) (Alternative)	GUANGZHOU YES ELECTRONIC TECHNOLOGY CO LTD	AR Series	1000pF, 500VAC, Y1, 125°C	IEC/EN 60384-14 UL 60384-14	VDE:40046170 UL:E355933
6-3	Y-capacitor (CY3) (Alternative)	GUANGDONG SOUTH HONGMING ELECTRONIC SCIENCE & TECHNOLOGY CO LTD	F	1000pF, 400VAC, Y1, 125°C	IEC/EN 60384-14 UL 60384-14	VDE:40036393 UL:E154899
7-1	Y-capacitor (CY6,CY7)	Yinan Don's Electronic Component Co., Ltd	CT81	470pF, 400VAC, Y1, 125°C	IEC/EN 60384-14 UL 60384-14	VDE:135256 UL:E145038
7-2	Y-capacitor (CY6,CY7) (Alternative)	GUANGZHOU YES ELECTRONIC TECHNOLOGY CO LTD	AR Series	470pF, 500VAC, Y1, 125°C	IEC/EN 60384-14 UL 60384-14	VDE:40046170 UL:E355933
7-3	Y-capacitor (CY6,CY7) (Alternative)	GUANGDONG SOUTH HONGMING ELECTRONIC SCIENCE & TECHNOLOGY CO LTD	F	470pF, 400VAC, Y1, 125°C	IEC/EN 60384-14 UL 60384-14	VDE:40036393 UL:E154899
8-1	Line filter (LW2)	ENDELA ELECTRONICS(SHENZHEN) CO LTD	LD102KAMLETGX	Class B	IEC 62368-1	Tested with appliance
	-Base	CHANG CHUN PLASTICS CO LTD	T375HF	V-0, 150 ºC	UL 94	UL:E59481
	-Magnet wire	SHENZHEN CHENGWEI INDUSTRY CO LTD	2UEW-B	130 ºC	UL 1446	UL:E227475
	-Magnet wire (Alternative)	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEW/U	130 ºC	UL 1446	UL:E201757
	-Magnet wire (Alternative)	SHENZHEN JIAZHENGXIN INDUSTRIAL CO LTD	2UEW/130	130 ºC	UL 1446	UL:E334055
	-Magnet wire (Alternative)	GUANGZHOU WANBAO ENAMELLED WIRE CO LTD	XUEW-130	130 ºC	UL 1446	UL:E167402
	-Triple insulation wire	SHENZHEN KAIZHONG HEDONG NEW MATERIAL CO LTD	TIW-B	130 ºC	UL 2353 IEC/EN62368-1	UL:E357240 VDE:40038861
	-Triple insulation wire (Alternative)	SHANGHAI XIANGXIANG ELECTRON CO LTD	TKW-B	130 ºC	UL 2353 IEC/EN62368-1	UL:E308908 VDE:40026588

	-Triple insulation wire (Alternative)	SUZHOU YUSHENG ELECTRONIC CO LTD	TIW-B	130 ºC	UL 2353 IEC/EN62368-1	UL:E332529 VDE:40033527
	-Epoxy	DONGGUAN EATTO ELECTRONIC MATERIAL CO LTD	3300A-1/3300B-1	130 ºC	UL 1446	UL:E218090
	-Tube	CHANGYUAN ELECTRONICS GROUP CO LTD	CB-HFT	600V, 125 ºC	UL 224	UL:E180908
	-Tube (Alternative)	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	RSFR-H	600V, 125 ºC	UL 224	UL:E203950
	-Varnish	ZHUHAI CHANGXIAN NEW MATERIALS TECHNOLOGY CO LTD	E962	130 ºC	UL 1446	UL:E335405
	-Varnish (Alternative)	YUEYANG GREEN TECHNOLOGY CO LTD	YYG-130-1	130 ºC	UL 1446	UL:E328930
8-2	Line filter (LW2) (Alternative)	SHEN ZHEN XIN SHUO TECHNOLOGY CO LTD	LD102KAMLETGX	Class B	IEC 62368-1	Tested with appliance
	-Base	CHANG CHUN PLASTICS CO LTD	T375HF	V-0, 150 ºC	UL 94	UL:E59481
	-Magnet wire	DONG GUAN YIDA INDUSTRIAL CO LTD	xUEW/155, QA-x/155	155 ºC	UL 1446	UL:E344055
	-Magnet wire (Alternative)	ZHEJIANG HONGBO TECHNOLOGY CO LTD	AQ@-x/155	155 ºC	UL 1446	UL:E221719
	-Triple insulation wire	SUZHOU YUSHENG ELECTRONIC CO LTD	TIW-B	130 ºC	UL 2353 IEC/EN62368-1	UL:E332529 VDE:40033527
	-Epoxy	DONGGUAN EATTO ELECTRONIC MATERIAL CO LTD	3300A-1/3300B-1	130 ºC	UL 1446	UL:E218090
	-Tube	DONGGUAN SALIPT CO LTD	SALIPT S-901-600	VW-1, 125 ºC	UL 224	UL:E209436
	-Varnish	QUALIPOLY CHEMICAL CORP	V821*	155 ºC	UL 1446	UL:E213437
9	Line filter (LW1)	BO LUO DA XIN ELECTRONIC CO LTD	UC19-9.0mH	Class B	IEC 62368-1	Tested with appliance
	-Base	CHANG CHUN PLASTICS CO LTD	T375HF	V-0, 150 ºC	UL 94	UL:E59481
	-Magnet wire	SUNTEK HOLDINGS LIMITED	@*xUEW180	180 ºC	UL 1446	UL:E234867
	-Magnet wire (Alternative)	YANTAI TOMO PRECISION WIRE CO LTD	UEW/180	180 ºC	UL 1446	UL:E477046
	-Magnet wire (Alternative)	WELL ASCENT ELECTRONIC (GANZHOU) CO LTD	SFT-UEWH	180 ºC	UL 1446	UL:E318511
	-Magnet wire (Alternative)	HUIZHOU GOLDEN OCEAN MAGNET WIRE FACTORY	x-EIW, x-EIW/NY	180 ºC	UL 1446	UL:E225143
	-Varnish	ZHUHAI CHANGXIAN NEW MATERIALS TECHNOLOGY CO LTD	E962	130 ºC	UL 1446	UL:E335405

	-Varnish (Alternative)	SUZHOU TAIHU ELECTRIC ADVANCED MATERIAL CO LTD	T-4260(a)	130 ºC	UL 1446	UL:E228349
	-Varnish (Alternative)	SHENZHEN XINGSHIDA SCIEN TECH PROD CO LTD	SD-1181	130 ºC	UL 1446	UL:E327170
5-1	Optocoupler (NW1)	EVERLIGHT ELECTRONICS CO LTD	EL817	Cr≥7.6 mm, Cl≥7.6 mm Di≥0.4 mm,110°C	IEC 60747-5-5 UL 1577	VDE:132249 UL:E214129
5-2	Optocoupler (NW1) (Alternative)	Bright Led Electronics Corp	BPC-817 B	Cr≥7.6 mm, Cl≥7.6 mm, Di≥0.4 mm,100°C	IEC 60747-5-5 UL 1577	VDE:40007240 UL:E236324
10	Transformer (TW1)	SHENZHEN YUXUAN ELECTRONICS CO LTD	T.EQ3314.PH 1236A	Class B	IEC 62368-1	Tested with appliance
	- Insulation system	YUEYANG GREEN TECHNOLOGY CO LTD	YYG-130-2	Class B,130 ºC	UL 1446	UL:E328930
	-Bobbin	CHANG CHUN PLASTICS CO LTD	T375HF	V-0, 150 ºC	UL 94	UL:E59481
	-Magnet wire	GUANGZHOU WANBAO ENAMELLED WIRE CO LTD	xUEW-155	155 ºC	UL 1446	UL:E167402
	-Magnet wire (Alternative)	ZHEJIANG HONGBO TECHNOLOGY CO LTD	AQ@-x/155	155 ºC	UL 1446	UL:E221719
	-Tape	XINYU SHENGDAFENG ELECTRIC CO LTD	SDF-312	130 ºC	UL 510	UL:E317896
	-Triple Insulation Wire	FURUKAWA ELECTRIC CO LTD	TEX-E	130°C	UL 2353 IEC/EN62368-1	UL:E206440 VDE:006735
	-Varnish	YUEYANG GREEN TECHNOLOGY CO LTD	JX-1150*	130 ºC	UL 1446	UL:E303754
	-Epoxy	DONGGUAN LIGU ELECTRONIC MATERIAL CO LTD	8004/9001	V-0, 130 ºC	UL 1446	UL:E305307
11-1	PCB	MEI ZHOU HENG HUI TECHNOLOGY CO LTD	HH-2	V-0, 130 °C	UL 796	UL:E312177
11-2	PCB (Alternative)	JIANGXI XUSHENG ELECTRONICS CO	XS-D	V-0, 130 °C	UL 796	UL:E503744
11-3	PCB (Alternative)	HUIZHOU PRIDE ELECTRONICS CO LTD	PLD002	V-0, 130 °C	UL 796	UL:E337041
11-4	PCB (Alternative)	JIANGMEN BENLIDA PRINTED CIRCUIT CO.,LTD	BLD-B	V-0, 130 °C	UL 796	UL:E203640
11-5	PCB (Alternative)	SHENZHEN XINMANDA INDUSTRIAL CO LTD	1	V-0, 130 °C	UL 796	UL:E308011
11-6	PCB (Alternative)	DONGGUAN RUOMEI ELECTRONIC TECHNOLOGY CO LTD	RM-01	V-0, 130 °C	UL 796	UL:E214887
11-7	PCB (Alternative)	SUIZHOU KANGMEI ELECTRONICS CO LTD	KM-D1	V-0, 130 °C	UL 796	UL:E511140

11-8	PCB (Alternative)	SHENZHEN HOPESEARCH PCB MANUFACTURING CO LTD	F-M	V-0, 130 °C	UL 796	UL:E351308
11-9	PCB (Alternative)	ZHUHAI KINGSUN ELECTRONICS AND TECHNOLOGY CO LTD	KS-D1	V-0, 130 °C	UL 796	UL:E465853
11-10	PCB (Alternative)	MEIZHOU RUIJIEXIN ELECTRONIC CO LTD	RJX-D	V-0, 130 °C	UL 796	UL:E493761
12-1	Mylar film	SUZHOU OMAY OPTICAL MATERIAL CO LTD	SE42B	V-0, 80°C	UL 94	UL:E249605
12-2	Mylar film (Alternative)	SICHUAN DONGFANG INSULATING MATERIAL CO LTD	DFR3716A	V-0, 120°C	UL 94	UL:E199019
12-3	Mylar film (Alternative)	CHENGDU KANGLONGXIN PLASTICS CO LTD	KLX FRPC-1880B	V-0, 125°C	UL 94	UL:E315185
13	Bleeder Resistor (RW1,RW2,RW3,RW4)	GUANGDONG FENGHUA ADVANCED TECHNOLOGY HOLDING CO LTD	1206	1.2 MΩ, 1/4 W	IEC 62368-1	Test with apparatus
14	Electrolytic capacitors (CW1)	Interchangeable	Interchangeable	Min. 100μF, Min. 450V, 105°C	IEC 62368-1	Test with apparatus
15	Rectifier diode (DW1,DW2,DW3,DW4)	Interchangeable	Interchangeable	Min. 2.5A, min. 800V	IEC 62368-1	Test with apparatus
16	Mosfet (QW1)	Interchangeable	Interchangeable	Min.7.0A, min. 650V	IEC 62368-1	Test with apparatus

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.8.4, 4.8.5	**TABLE: Lithium coin/button cell batteries mechanical tests**		**N/A**
(The following mechanical tests are conducted in the sequence noted.)			
4.8.4.2	TABLE: Stress Relief test		—

Part	Material	Oven Temperature (°C)	Comments

4.8.4.3	TABLE: Battery replacement test	—
Battery part no. .....:		—

Battery Installation/withdrawal	Battery Installation/Removal Cycle	Comments
	1	
	2	
	3	
	4	
	5	
	6	
	8	
	9	
	10	

4.8.4.4	Table: Drop test	—

Impact Area	Drop Distance	Drop No.	Observations
		1	
		2	
		3	

4.8.4.5	TABLE: Impact	—

Impacts per surface	Surface tested	Impact energy (Nm)	Comments

4.8.4.6	TABLE: Crush test	—

Test position	Surface tested	Crushing Force (N)	Duration force applied (s)

Supplementary information:

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.8.5	TABLE: Lithium coin/button cell batteries mechanical test result		N/A
Test position	Surface tested	Force (N)	Duration force applied (s)
Supplementary information:			

5.2	**Table: Classification of electrical energy sources**					**P**
5.2.2.2 – Steady State Voltage and Current conditions						
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions 1)	Parameters		ES Class
				U (Vrms or Vpk)	I (Apk or Arms) / Hz	
1	264 VAC 60 Hz	All internal circuits except output terminal	Normal: --	--	-- / --	ES3 (declared)
			Abnormal: --	--	-- / --	
			Single fault: --	--	-- / --	
2	264 VAC 60 Hz	LED output"+" to "-"	Normal:	77.9V	-- / DC	ES2
			Abnormal: Ventilation blocked	77.9V	-- / DC	ES2
			Abnormal: Max. non-clipped output power	77.9V	-- / DC	ES2
			Abnormal: speaker short circuit	77.9V	-- / DC	ES2
			Single fault: (PU110 pin 1-2 SC)	0	-- / --	ES1
			Single fault: (PU110 pin 3-4 SC)	0	-- / --	ES1
			Single fault: (PU110 pin 1 OC)	0	-- / --	ES1
			Single fault: (PU110 pin 3 OC)	0	-- / --	ES1

IEC 62368-1							
Clause	Requirement + Test			Result - Remark			Verdict
			Single fault: (PR624SC)	0	--	--	ES1
3	264 VAC 60 Hz	LED output“+”/“-” to earth	Normal	--	0.08mA	60	ES1
			Abnormal (Ventilation blocked)	--	0.08mA	60	ES1
			Abnormal (Max. non-clipped output power)	--	0.08mA	60	ES1
			Abnormal (speaker short circuit)	--	0.08mA	60	ES1
			Single fault: (PU110 pin 1-2 SC)	--	0.08mA	60	ES1
			Single fault: (PU110 pin 3-4 SC)	--	0.08mA	60	ES1
			Single fault: (PU110 pin 1 OC)	--	0.08mA	60	ES1
			Single fault: (PU110 pin 3 OC)	--	0.08mA	60	ES1
			Single fault: (PR624 SC)	--	0.10mA	60	ES1
4	264 VAC 60 Hz	USB output “+” to “-”	Normal	5.08V	--	DC	ES1
			Abnormal (Ventilation blocked)	5.08V	--	DC	ES1
			Abnormal (Max. non-clipped output power)	5.08V	--	DC	ES1
			Abnormal (speaker short circuit)	5.08V	--	DC	ES1
			Single fault: (PU110 pin 1-2 SC)	0	--	--	ES1

IEC 62368-1							
Clause	Requirement + Test			Result - Remark			Verdict
			Single fault: (PU110 pin 3-4 SC)	0	--	--	ES1
			Single fault: (PU110 pin 1 OC)	0	--	--	ES1
			Single fault: (PU110 pin 3 OC)	0	--	--	ES1
			Single fault: (PR624 SC)	0	--	--	ES1
5	264 VAC 60 Hz	USB output “+”/“-” to earth	Normal	--	0.08mA	60	ES1
			Abnormal (Ventilation blocked)	--	0.08mA	60	ES1
			Abnormal (Max. non-clipped output power)	--	0.08mA	60	ES1
			Abnormal (speaker short circuit)	--	0.08mA	60	ES1
			Single fault: (PU110pin 1-2 SC)	--	0.08mA	60	ES1
			Single fault: (PU110 pin 3-4 SC)	--	0.08mA	60	ES1
			Single fault: (PU110 pin 1 OC)	--	0.08mA	60	ES1
			Single fault: (PU110pin 3 OC)	--	0.08mA	60	ES1
			Single fault: (PR624 SC)	--	0.10mApk	60	ES1
6	264 VAC 60 Hz	ANT output “+” to “-”	Normal	125.3Vpk	--	60	ES2
			Abnormal (Ventilation blocked)	125.3Vpk	--	60	ES2

IEC 62368-1							
Clause	Requirement + Test			Result - Remark			Verdict
			Abnormal (Max. non-clipped output power)	125.3Vpk	--	60	ES2
			Abnormal (speaker short circuit)	125.3Vpk	--	60	ES2
			Single fault: (PU110 pin 1-2 SC)	0	--	--	ES1
			Single fault: (PU110 pin 3-4 SC)	0	--	--	ES1
			Single fault: (PU110 pin 1 OC)	0	--	--	ES1
			Single fault: PU110 pin 3 OC)	0	--	--	ES1
			Single fault: (PR624SC)	0	--	--	ES1
7	264 Vac 60 Hz	ANT output “+”/“-” to earth	Normal	--	0.05mA	60	ES1
			Abnormal (Ventilation blocked)	--	0.05mA	60	ES1
			Abnormal (Max. non-clipped output power)	--	0.05mA	60	ES1
			Abnormal (speaker short circuit)	--	0.05mA	60	ES1
			Single fault: (PU110 pin 1-2 SC)	--	0.05mA	60	ES1
			Single fault: (PU110 pin 3-4 SC)	--	0.05mA	60	ES1
			Single fault: (PU110 pin 1 OC)	--	0.05mA	60	ES1

IEC 62368-1							
Clause	Requirement + Test			Result - Remark			Verdict
			Single fault: (PU110 pin 3 OC)	--	0.05mA	60	ES1
			Single fault: (PR624SC)	--	0.05mA	60	ES1
8	264Va.c. 60Hz	Power board output terminal JAGE1+" to "-"	Normal	12.33V	--	DC	ES1
			Abnormal (Ventilation blocked)	12.33V	--	DC	ES1
			Abnormal (Max. non-clippe output power)	12.33V	--	DC	ES1
			Abnormal (speaker short circuit)	12.33V	--	DC	ES1
			Single fault: (PU110 pin 1-2 SC)	0	--	--	ES1
			Single fault: (PU110 pin 3-4 SC)	0	--	--	ES1
			Single fault: (PU110 pin 1 OC)	0	--	--	ES1
			Single fault: (PU110pin 3 OC)	0	--	--	ES1
			Single fault: (PR624 SC)	0	--	--	ES1
9	264Va.c. 60Hz	Power board output terminal JAGE1 "+"/"-" to earth	Normal	--	0.08mA	60	ES1
			Abnormal (Ventilation blocked)	--	0.08mA	60	ES1
			Abnormal (Max. non-clipped output power)	--	0.08mA	60	ES1
			Abnormal (speaker short circuit)	--	0.08mA	60	ES1

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

			Single fault: (PU110 pin 1-2 SC)	--	0.08mA	60	ES1
			Single fault: (PU110 pin 3-4 SC)	--	0.08mA	60	ES1
			Single fault: (PU110 pin 1 OC)	--	0.08mA	60	ES1
			Single fault: (PU110 pin 3 OC)	--	0.08mA	60	ES1
			Single fault: (PR624SC)	--	0.10mA	60	ES1

5.2.2.3 - Capacitance Limits

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters		ES Class
				Capacitance, nF	Upk (V)	
1	264Va.c, 60Hz	AC inlet L&N pin	normal	430	356	ES3
			Abnormal	--	--	--
			Single fault	--	--	--

Overall capacity: PCX3 = 0.33 uF ,PCX4= 0.1 uF (±20% tolerance);

Limit: ES1=60V; ES2=120V.

5.2.2.4 - Single Pulses

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Duration (ms)	Upk (V)	Ipk (mA)	
--	--	--	Normal	--	--	--	--
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	

5.2.2.5 - Repetitive Pulses

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Off time (ms)	Upk (V)	Ipk (mA)	
--	--	--	Normal	--	--	--	--
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Test Conditions:

Normal – Full load and no load.

Abnormal – Overload output

Supplementary information: SC=Short Circuit, OC=Open Circuit

5.4.1.4, 6.3.2, 9.0, B.2.6	**TABLE: Temperature measurements**			**P**
	Supply voltage (V) .....:	90V/60Hz	264V/50Hz	—
	Ambient Tmin (°C) .....:	--	--	—
	Ambient Tmax (°C) .....:	--	--	—
	Tma (°C) .....:	See below	See below	—
Maximum measured temperature T of part/at:		T (°C)		Allowed Tmax (°C)
AC connector body(PCON1)		61.7	58.9	85
Thermistor (PNTC2)		90.6	71.8	Ref
Varistor(PVR1)		58.3	56.5	85
X-CAP (PCX3)		72.5	64.3	100
Chock (PLF1)winding		89.0	67.5	130
Chock (PL18)winding		91.5	95.9	130
E-CAP(PEC15)		73.5	66.7	105
E-CAP(PC398)		69.1	65.6	105
Transformer (PT2)coil		91.9	89.6	110
Transformer (PT2)core		88.2	87.3	110
Y-CAP(PCY3)		68.3	67.6	125
Optocoupler（PU110）		72.0	74.2	100
PCB near PD17		78.6	76.2	130
PCB near PQ246		85.2	80.7	130
PCB near PD297		80.6	79.8	130
PCB near USB		56.8	57.2	130
Enclosure inside transformer PT2 top		60.7	60.3	Ref. for 5.4.1.10.2
Ambient		40.0	40.0	--
Touch temperature for accessible parts				
Plastic enclosure outside near PT2 (> 1s and < 10 s)		36.2	36.5	77
Plastic enclosure outside near ventilation opening (> 1s and < 10 s)		43.1	44.7	77
USB port (> 1s and < 10 s)		33.8	34.2	60
Button (> 1s and < 10 s)		27.2	27.5	77
Metal enclosure outside near PT2(> 1s and < 10 s)		34.6	34.2	60

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Clause	Requirement + Test	Result - Remark	Verdict

Screen (> 1s and < 10 s)	30.9	30.6	71
Ambient	25.0	25.0	--

Supplementary information:
- The maximum operating temperature is 40°C
- Worked at HDMI mode, 1/8 Max. non-clipped output power of speaker, standard signal input.

Temperature T of winding:	t1 (°C)	R1 (Ω)	t2 (°C)	R2 (Ω)	T (°C)	Allowed Tmax (°C)	Insulation class
--	--	--	--	--	--	--	--

5.4.1.10.2	**TABLE: Vicat softening temperature of thermoplastics**		**N/A**
Penetration (mm).....			—
Object/ Part No./Material	Manufacturer/trademark	T softening (°C)	
--	--	--	
supplementary information:			

5.4.1.10.3	**TABLE: Ball pressure test of thermoplastics**		**P**
Allowed impression diameter (mm) ..... :	≤ 2 mm		—
Object/Part No./Material	Manufacturer/trademark	Test temperature (°C)	Impression diameter (mm)
PCON1 connector	Ref. for 4.1.2	125	1.0
Supplementary information: Other materials of transformer bobbin are no need to conduct this test., see appended table 4.1.2.			

5.4.2.2, 5.4.2.4 and 5.4.3	TABLE: Minimum Clearances/Creepage distance	P

Clearance (cl) and creepage distance (cr) at/of/between:	Up (V)	U r.m.s. (V)	Frequency (kHz)1	Required cl (mm)	cl (mm) 2	Required 3 cr (mm)	cr (mm)
L to N before fuse (BI)	420	250	0.06	1.3	3.7	2.5	3.7
Different polarity of fuse (BI)	420	250	0.06	1.3	3.2	2.5	3.2
Live part to accessible plastic enclosure (RI)	420	250	0.06	2.6	11.0	5.0	10.0
Live part to accessible metal enclosure(RI)	420	250	0.06	2.6	8.0	5.0	8.0
Primary trace to secondary trace of PCB under (PCY4,PCY5) (shortest distance) (RI)	420	250	0.06	2.6	8.1	5.0	8.1
Primary trace to secondary trace of PCB underPCY13) (shortest distance) (RI)	420	250	0.06	2.6	8.0	5.0	8.0

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Clause	Requirement + Test	Result - Remark	Verdict

Primary trace to secondary trace of PCB under (PU110 (RI)	420	250	0.06	2.6	6.8	5.0	6.8
Primary trace to secondary trace of transformer PT2 (RI)	644	353	81.6	2.6	8.0	7.2	8.0
PT2 primary winding to secondary winding (RI)	644	353	81.6	2.6	8.5	7.2	8.5
PT2 core to secondary pins (RI)	644	353	81.6	2.6	9.7	7.2	9.7

Supplementary information:

Note 1: means that the frequency above and below 30kHz;

Note 2: See table 5.4.2.4 if this is based on electric strength test

Note 3: Provide Material Group IIIa/IIIb;

Note 4: BI: basic insulation; SI: supplementary insulation; DI: double insulation; RI: reinforced insulation;

Note 5: Core of transformer PT2 was considered as primary part;

Note 6: At least 2 layers insulation tapes were wrapped on the transformer of PT2

5.4.2.3	**TABLE: Minimum Clearances distances using required withstand voltage**		**P**
	Overvoltage Category (OV):		II
	Pollution Degree:		2

Clearance distanced between:	Required withstand voltage	Required cl (mm)	Measured cl (mm)
Refer to table 5.4.2.2, 5.4.2.4 and 5.4.3 for details (Reinforced insulation)	2500 Vpeak	3.0	Refer to table 5.4.2.2, 5.4.2.4 and 5.4.3 for details
Refer to table 5.4.2.2, 5.4.2.4 and 5.4.3 for details (Basic and supplementary insulation)	2500 Vpeak	1.5	Refer to table 5.4.2.2, 5.4.2.4 and 5.4.3 for details

Supplementary information:

Core of transformer PT1 consider as secondary. Secondary winding is magnet wire and the primary winding is TIW.

Unless otherwise specified, the worst conditions of Cl. & Cr. in above mentioned locations have been considered and listed.

5.4.2.4	**TABLE: Clearances based on electric strength test**		**N/A**
Test voltage applied between:	Required cl (mm)	Test voltage (kV) peak/ r.m.s. / d.c.	Breakdown Yes / No
--	--	--	--
--	--	--	--

Supplementary information: Using procedure 2 to determine the clearance.

5.4.4.2, 5.4.4.5 c) 5.4.4.9	**TABLE: Distance through insulation measurements**	**P**

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Clause	Requirement + Test	Result - Remark	Verdict

Distance through insulation di at/of:	Peak voltage (V)	Frequency (Hz)	Material	Required DTI (mm)	DTI (mm)
Enclosure	644	85.6K	1)	0.4	1)
Bobbin of PT1	644	85.6K	1)	0.4	1)
Optocoupler PU110	370	60	1)	0.4	1)
Mylar	644	85.6K	1)	0.4	1)
Supplementary information: 1). See appended table 4.1.2 for details.					

5.4.1.8 Table: Determination of working voltage

Location	RMS voltage (V)	Peak voltage (V)	Frequency (Hz)	Comments
PT2 pin1-7	305	424	85.6K	
PT2 pin1-8,11	306	464	85.6K	
PT2 pin1-10	309	524	85.6K	
PT2 pin3-7	**353**	**644**	85.6K	Max. Vpeak &Vrms
PT2 pin1-8,11	346	624	85.6K	
PT2 pin1-10	335	612	85.6K	
PT2 pin5-7	174	388	85.6K	
PT2 pin5-8,11	173	352	85.6K	
PT2 pin5-10	174	368	85.6K	
PT2 pin6-7	173	356	85.6K	
PT2 pin6-8,11	175	368	85.6K	
PT2 pin6-10	179	392	85.6K	
Pin primary & secondary of PCY13	174	356	60Hz	
Pin primary & secondary of PCY5	122	192	60Hz	
Pin primary & secondary of PCY4	122	196	60Hz	
PU110 pin 1-3	240	370	60Hz	
PU110 pin 1-4	241	370	60Hz	
PU110 pin 2-3	240	371	60Hz	
PU110 pin 2-4	241	371	60Hz	
Supplementary information: 1. The following terminals were connected to earth: pin secondary of CYB3 and Primary Neutral. 2. Test voltage: 240 Vac 60 Hz.				

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.4.9	TABLE: Electric strength tests			P
Test voltage applied between:		Voltage shape (AC, DC)	Test voltage (Vpeak)	Breakdown Yes / No
Functional:				
--		--	--	--
Basic/supplementary:				
Different polarity of power supply (fuse disconnect)		DC	2500	No
Accessible metal enclosure to hazardous live parts		DC	4000	No
Reinforced:				
Accessible terminals and hazardous live parts		DC	4000	No
Accessible plastic enclosure to hazardous live parts		DC	4000	No
Transformer PT2 primary to secondary		DC	4000	No
Transformer PT2 core to secondary		DC	4000	No
1 layer insulation tape of transformer PT2		DC	4000	No
Mylar		DC	4000	No
Supplementary information: Core of transformer was considered as secondary. Test after humidity treatment, heating test, and for unit primary to secondary, primary to plastic enclosure electric strength after each fault condition test. Tests were performed on product with each source listed in table 4.1.2. The DC voltage source was performed on all testing once in forward and once in reverse.				

5.5.2.2	TABLE: Stored discharge on capacitors					P
Supply Voltage (V), Hz	Test Location	Operating Condition (N, S)	Switch position On or off	Measured Voltage (after 2 seconds)	ES Classification	
264Vac, 60Hz	Phase to Neutral	N	--	16V	ES1	
264Vac, 60Hz	Phase to Neutral	S (PR6)	--	24V	ES1	

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

The end system may be pluggable equipment type A. Limit of ES1 applied for mains terminal as accessible part.

X-capacitors installed for testing are: PCX3 = 0.33 uF ,PCX4= 0.1 uF

☒ bleeding resistor rating: PR1= PR2=PR3=PR4= 1.2MΩ

Notes:

A. Test Location:

Phase to Neutral; Phase to Phase; Phase to Earth; and/or Neutral to Earth

B. Operating condition abbreviations:

N – Normal operating condition (e.g., normal operation, or open fuse);

S –Single fault condition (Bleeder Resistor open circuit)

5.6.6.2	**TABLE: Resistance of protective conductors and terminations**			**N/A**
Accessible part	Test current (A)	Duration (min)	Voltage drop (V)	Resistance (Ω)
Supplementary Information:				

5.7.2.2, 5.7.4	**TABLE: Earthed accessible conductive part**	**N/A**
Supply voltage..... :	264Vac, 60Hz	—
Location	Test conditions specified in 6.1 of IEC 60990 or Fault Condition No in IEC 60990 clause 6.2.2.1 through 6.2.2.8, except for 6.2.2.7	Touch current (mApeak)
Measured to earthed point	1	N/A
Measured to output terminal		N/A
Measured to earthed point	2*	N/A
Measured to output terminal		N/A
Metal enclosure to earth		N/A
Measured to earthed point	3	N/A
Measured to output terminal	4	N/A
	5	N/A
	6	N/A
	7	N/A

Supplementary information:

Notes:

[1] Supply voltage is the anticipated maximum Touch Voltage.

[2] Earthed neutral conductor [Voltage differences less than 1% or more].

[3] Specify method used for measurement as described in IEC 60990 sub-clause 4.3.

[4] IEC60990, sub-clause 6.2.2.7, Fault 7 not applicable.

[5] (*) IEC60990, sub-clause 6.2.2.2 is not applicable if switch or disconnect device (e.g., appliance coupler) provided.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

6.2.2	Table: Electrical power sources (PS) measurements for classification				P
Source	Description	Measurement	Max Power after 3 s	Max Power after 5 s*)	PS Classification
A	All internal circuits except output terminal	Power (W) :	--		PS3 (declared)
		VA (V) :	--		
		IA (A) :	--		
#B	LED output "+" to "-"	Power (W) :	--	98.26	PS2
		VA (V) :	--	77.9	
		IA (A) :	--	3.4	
&C	LED output "+" to "-" (PU110 pin 1-2 SC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&D	LED output "+" to "-" (PU110 pin 3-4 SC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&E	LED output "+" to "-" (PU110 pin 1 OC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&F	LED output "+" to "-" (PU110 pin 3 OC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&G	LED output "+" to "-" (PR639 SC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
#H	Output of USB	Power (W) :	8.46	--	PS1
		VA (V) :	5.04	--	
		IA (A) :	1.8	--	
&I	Output of USB (PU110 pin 1-2 SC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&J	Output of USB (PU110 pin 3-4 SC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&K	Output of USB	Power (W) :	0$	--	PS1

IEC 62368-1					
Clause	Requirement + Test			Result - Remark	Verdict
	(PU110 pin 1 OC)	VA (V) :	0$	--	
		IA (A) :	0$	--	
&L	Output of USB (PU110 pin 3 OC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&M	Output of USB (SC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
#N	Output of ANT	Power (W) :	7.96	--	PS1
		VA (V) :	125.3	--	
		IA (A) :	0.05	--	
&O	Output of ANT (PU110 pin 1-2 SC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&P	Output of ANT (PU110 pin 3-4 SC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&Q	Output of ANT (PU110 pin 1 OC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&R	Output of ANT (PU110 pin 3 OC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
&S	Output of ANT (SC)	Power (W) :	0$	--	PS1
		VA (V) :	0$	--	
		IA (A) :	0$	--	
#T	Output of JAGE1	Power (W) :	--	57.27	PS2
		VA (V) :	--	12.3	
		IA (A) :	--	5.1	
&U	Output of JAGE1 (PU110 pin 1-2 SC)	Power (W) :	0$		PS1
		VA (V) :	0$		
		IA (A) :	0$		
&V	Output of JAGE1	Power (W) :	0$		PS1
		VA (V) :	0$		

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Clause	Requirement + Test	Result - Remark	Verdict

	(PU110 pin 3-4 SC)	IA (A) :	0$			
&W	Output of JAGE1 (PU110 pin 1 OC)	Power (W) :	0$			PS1
		VA (V) :	0$			
		IA (A) :	0$			
&X	Output of JAGE1 (PU110pin 3 OC)	Power (W) :	0$			PS1
		VA (V) :	0$			
		IA (A) :	0$			
&Y	Output of JAGE1 (PR639 SC)	Power (W) :	0$			PS1
		VA (V) :	0$			
		IA (A) :	0$			

Supplementary information:

(*) Measurement taken only when limits at 3 seconds exceed PS1 limits.

#: Test method-power measurement for worst-case fault.

&: Test method-power measurement for worst-case source fault.

Secondary HDMI terminal is data transfer used, can not load.

$: Unit shutdown immediately recoverable, no hazard.

#: Fuse opened immediately, no hazard.

6.2.3.1	Table: Determination of Potential Ignition Sources (Arcing PIS)				P
Location	Open circuit voltage After 3 s (Vp)	Measured r.m.s current (Irms)	Calculated value (Vp x Irms)	Arcing PIS? Yes / No	
All primary circuits and secondary circuits inside the equipment enclosure	*	*	*	Yes (declaration)	

Supplementary information:

An Arcing PIS requires a minimum of 50 V (peak) a.c. or d.c. An Arcing PIS is established when the product of the open circuit voltage (Vp) and normal operating condition rms current (Irms) is greater than 15.

* An Arcing PIS is considered to exist in primary circuits and secondary circuits.

6.2.3.2	Table: Determination of Potential Ignition Sources (Resistive PIS)				P
Circuit Location (x-y)	Operating Condition (Normal / Describe Single Fault)	Measured wattage or VA During first 30 s (W / VA)	Measured wattage or VA After 30 s (W / VA)	Protective Circuit, Regulator, or PTC Operated? Yes / No (Comment)	Resistive PIS? Yes/No

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

All primary circuits and secondary circuits inside the equipment enclosure	--	--	--	--	--

Supplementary Information:

A combination of voltmeter, VA and ammeter IA may be used instead of a wattmeter.

If a separate voltmeter and ammeter are used, the product of (VA x IA) is used to determine Resistive PIS classification.

A Resistive PIS: (a) dissipates more than 15 W, measured after 30 s of normal operation, or (b) under single fault conditions has either a power exceeding 100 W measured immediately after the introduction of the fault if electronic circuits, regulators or PTC devices are used, or has an available power exceeding 15 W measured 30 s after introduction of the fault.

* A Resistive PIS is considered to exist in primary circuits and secondary circuits.

8.5.5	**TABLE: High Pressure Lamp**	**N/A**
Description	Values	Energy Source Classification
Lamp type.....:		—
Manufacturer .....:		—
Cat no. .....:		—
Pressure (cold) (MPa) .....:		MS_
Pressure (operating) (MPa) .....:		MS_
Operating time (minutes) .....:		—
Explosion method .....:		—
Max particle length escaping enclosure (mm):		MS_
Max particle length beyond 1 m (mm) .....:		MS_
Overall result .....:		
Supplementary information:		

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						P
U (Vac)/Freq (Hz)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No.	I fuse (A)	Condition/status
HDMI input mode							
90/50Hz	0.847		75.7	--	PF1	0.847	Three vertical bar signal input, Maximum brightest and contrast 1/8 non-clipped output power to speakers. Two USB2.0 load: 5Vdc, 0.5A
90/60Hz	0.849		75.7	--	PF1	0.849	
100/50Hz	0.765		75.5	90	PF1	0.765	
100/60Hz	0.767		75.5	90	PF1	0.767	
240/50Hz	0.361		75.3	90	PF1	0.361	
240/60Hz	0.362		75.3	90	PF1	0.362	
264/50Hz	0.336		75.3	--	PF1	0.336	
264/60Hz	0.338		75.4	--	PF1	0.338	
TV Input mode							
90/50Hz	0.843		75.3	--	PF1	0.843	Three vertical bar signal input, Maximum brightest and contrast 1/8 non-clipped output power to speakers. Two USB2.0 load: 5Vdc, 0.5A
90/60Hz	0.842		75.4	--	PF1	0.842	
100/50Hz	0.760		75.1	90	PF1	0.760	
100/60Hz	0.761		75.1	90	PF1	0.761	
240/50Hz	0.356		75.0	90	PF1	0.356	
240/60Hz	0.357		75.0	90	PF1	0.357	
264/50Hz	0.330		75.0	--	PF1	0.330	
264/60Hz	0.331		75.1	--	PF1	0.331	
AV input mode							
90/50Hz	0.845		75.5	--	PF1	0.845	Three vertical bar signal input, Maximum brightest and contrast 1/8 non-clipped output power to speakers. Two USB2.0 load: 5Vdc, 0.5A
90/60Hz	0.844		75.5	--	PF1	0.844	
100/50Hz	0.763		75.3	90	PF1	0.763	
100/60Hz	0.764		75.3	90	PF1	0.764	
240/50Hz	0.360		75.2	90	PF1	0.360	
240/60Hz	0.361		75.2	90	PF1	0.361	
264/50Hz	0.333		75.2	--	PF1	0.333	
264/60Hz	0.336		75.2	--	PF1	0.336	

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Clause	Requirement + Test	Result - Remark	Verdict

YPBPR input mode							
90/50Hz	0.844		75.3	--	PF1	0.844	Three vertical bar signal input, Maximum brightest and contrast 1/8 non-clipped output power to speakers. Two USB2.0 load: 5Vdc, 0.5A
90/60Hz	0.843		75.3	--	PF1	0.843	
100/50Hz	0.762		75.1	90	PF1	0.762	
100/60Hz	0.763		75.1	90	PF1	0.763	
240/50Hz	0.358		75.0	90	PF1	0.358	
240/60Hz	0.359		75.0	90	PF1	0.359	
264/50Hz	0.329		75.0	--	PF1	0.329	
264/60Hz	0.331		75.0	--	PF1	0.331	
Supplementary information: The measured input current at rated voltage shall be less than or equal to 110 % of rated current.							

B.3	**TABLE: Abnormal operating condition tests**								**P**
Ambient temperature (oC) .....:							25℃, if not specified		—
Power source for EUT: Manufacturer, model/type, output rating .:							--		—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (oC)	Observation	
HDMI mode									
One speaker	s-c	264	2h08min	PF1	0.323	See right	PT2 winding: 75.4°C Plastic Enclosure outside near PT2:44.6°C LED panel surface:30.6°C Ambient: 25.0°C	Unit operated normally, no damage, no hazards. Touch voltage (+ /- to earth): 0.08mA	
Ventilation	block	264	1h56min	PF1	0.336	See right	PT2 winding:81.6°C Plastic Enclosure outside near PT2:46.6°C LED panel surface:31.3°C Ambient: 25.0°C	Unit operated normally, no damage, no hazards. Touch voltage (+ /- to earth): 0.08mA	

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Clause	Requirement + Test	Result - Remark	Verdict

Speaker output	MAX. non-clipped	264	2h14min	PF1	0.392	See right	PT2 winding: 80.5°C Plastic Enclosure outside near PT2:46.2°C LED panel surface:31.0°C Ambient: 25.0°C	Unit operated normally, no damage, no hazards. Touch voltage (+ /- to earth): 0.08mA peak;
USB Output	o-l	264	5h34min	PF1	0.336 → 0.345 → 0.368 → 0.032	See right	PT2 winding: 78.8°C Plastic Enclosure outside near PT2:45.7°C LED panel surface:30.8°C Ambient: 25.0°C	Output overload to 1.7A and unit shutdown at 1.8A,Recoverable when fault removed and no hazards observed, Touch voltage (+ /- to earth): 0.08mA
Transformer after (PD297)	o-l	264	4h52min	PF1	0.336 → 0.386 → 0.445 → 0.032	See right	PT2 winding:86.5°C Plastic Enclosure outside near PT2:49.1°C LED panel surface:32.3°C Ambient: 25.0°C	Transformer output overload to 3.6A and unit shutdown at 3.7A,Recoverable when fault removed and no hazards observed, Touch voltage (+ /- to earth): 0.08mA

Supplementary information:

1) Test table is provided to record abnormal and fault conditions for all applicable energy sources including Thermal burn injury. Column “Abnormal/Fault.” Specify if test condition by indicating “Abnormal” then the condition for a Clause B.3 test or “Single Fault” then the condition for Clause B.4.

- O-L = overload.
- T1 winding limit: 165°C (class B), External enclosure limit: 87°C (> 1 s and < 10 s).

B.4	**TABLE: Fault condition tests**							**P**
Ambient temperature (oC) .....:				25oC, if not specified				—
Power source for EUT: Manufacturer, model/type, output rating .:				--				—
Component No.	Fault Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (oC)	Observation

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Clause	Requirement + Test	Result - Remark	Verdict

PD13	s-c	264	1s	PF1	0	--	--	Fuse (PF1) open immediately, NB, NC, NT. ASRE.
PEC15	s-c	264	1s	PF1	0	--	--	Fuse (PF1) open immediately, NB, NC, NT. ASRE.
PQ245 pin G-S	s-c	264	10min	PF1	0.032	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.
PQ245 pin G-D	s-c	264	1s	PF1	0	--	--	Fuse (PF1) open immediately, NB, NC, NT. ASRE.
PQ245 pin S-D	s-c	264	1s	PF1	0	--	--	Fuse (PF1) open immediately, NB, NC, NT. ASRE.
USB terminal	s-c	264	10min	PF1	0.032		--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.-
PT2 pin 1-3	s-c	264	10min	PF1	0.032	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.
PT2 pin 5-6	s-c	264	10min	PF1	0.032	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.
PT2 pin 8-10	s-c	264	10min	PF1	0.032	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.
PT1 pin 7-11	s-c	264	10min	PF1	0.032	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.
PU110 pin1-2	s-c	264	10min	PF1	0.032	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.
PU110 pin3-4	s-c	264	10min	PF1	0.034	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.
PU110 pin1	o-c	264	10min	PF1	0.029	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.
PU110 pin3	o-c	264	10min	PF1	0.032	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.
PC398	s-c	264	10min	PF1	0.032	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.

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Clause	Requirement + Test	Result - Remark	Verdict

PC368	s-c	264	10min	PF1	0.032	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.
LED terminal output “+” to “-”	s-c	264	30min	PF1	0.034	--	--	Unit shut down immediately, Recoverable. No damage. NB, NC, NT. ASRE.

Supplementary information:
Test table is provided to record abnormal and fault conditions for all applicable energy sources including Thermal burn injury. Column “Abnormal/Fault.” Specify if test condition by indicating “Abnormal” then the condition for a Clause B.3 test or “Single Fault” then the condition for Clause B.4.

1) s-c: Short-circuited; o-c: Open-circuited; o-l: Overloaded.
2) The test result shown all safeguards remained effective and didn’t lead to a single fault condition during abnormal operating condition; In addition all safeguards complied with applicable requirements in this standard after restoration of normal operating conditions.
3) The test result showed no Class 1 or 2 energy source become Class 3 level during and after single fault condition.
4) The same as result test conducted on all fuse sources, all fuse sources see table 4.1.2 for details.

Results Key:
IP = Internal protection operated (Component indicated); CT = Constant temperatures were obtained;
TW = Transformer winding opened; CD = Components damaged (damaged components indicated);
NB = No indication of dielectric breakdown; YB = Dielectric breakdown (time and location indicated);
NC = Cheesecloth remained intact; YC = Cheesecloth charred or flamed;
NT = Tissue paper remained intact; YT = Tissue paper charred or flamed.
TV = Touch voltage measured; ASRE = All safeguards remained effectively.

Annex M	**TABLE: Batteries**									**N/A**
The tests of Annex M are applicable only when appropriate battery data is not available										
Is it possible to install the battery in a reverse polarity position? :										
	Non-rechargeable batteries			Rechargeable batteries						
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging		
	Meas. current	Manuf. Specs.		Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	
Max. current during normal condition										
Max. current during fault condition										

Test results:		Verdict
- Chemical leaks		
- Explosion of the battery		
- Emission of flame or expulsion of molten metal		
- Electric strength tests of equipment after completion of tests		
Supplementary information:		

Annex M.4	Table: Additional safeguards for equipment containing secondary lithium batteries				N/A
Battery/Cell No.	Test conditions	Measurements			Observation
		U	I (A)	Temp (C)	

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Clause	Requirement + Test	Result - Remark	Verdict

	Normal				
	Abnormal				
	Single fault –SC/OC				
	Normal				
	Abnormal				
	Single fault – SC/OC				
Supplementary Information:					

Battery identification	Charging at Tlowest (°C)	Observation	Charging at Thighest (°C)	Observation
Supplementary Information:				

Annex Q.1	**TABLE: Circuits intended for interconnection with building wiring (LPS)**					**P**
Note: Measured UOC (V) with all load circuits disconnected:						
Output Circuit	Components	Uoc (V)	Isc (A)		S (VA)	
			Meas.	Limit	Meas.	Limit
USB output	Normal	5.04	1.8	8	8.46	100
USB output	Single fault PU110 pin 1-2 SC	0*	0*	8	0*	100
USB output	Single fault PU110 pin 3-4 SC	0*	0*	8	0*	100
USB output	Single fault PU110 pin 1 OC	0*	0*	8	0*	100
USB output	Single fault PU110 pin 3 OC	0*	0*	8	0*	100
USB output	PR639 SC	0#	0#	8	0#	100
ANT output	Normal	125.3	0.05	8	7.96	100
ANT output	Single fault PU110 pin 1-2 SC	0*	0*	8	0*	100
ANT output	Single fault PU110 pin 3-4 SC	0*	0*	8	0*	100
ANT output	Single fault PU110 pin 1 OC	0*	0*	8	0*	100
ANT output	Single fault PU110 pin 3 OC	0*	0*	8	0*	100

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Clause	Requirement + Test	Result - Remark	Verdict

ANT output	PR15 SC	0#	0#	8	0#	100

Supplementary Information:
SC=Short circuit, OC=Open circuit

Note:

*: Unit shutdown immediately recoverable, no hazard.

#: Fuse opened immediately., no hazard.

T.2, T.3, T.4, T.5	TABLE: Steady force test				P
Part/Location	Material	Thickness (mm)	Force (N)	Test Duration (sec)	Observation
Plastic enclosure (T.5)	Plastic*	See table 4.1.2	250	5	Enclosure remained intact, no crack/ opening developed. Internal ES3, TS3 were not accessible after test. No insulation breakdown.
Internal components (T.2)	--	--	10	5	No reduction the clearances and creepage distances
Supplementary information: *Test were performed on product with each source listed in table 4.1.2.					

T.6, T.9	TABLE: Impact tests			P
Part/Location	Material	Thickness (mm)	Vertical distance (mm)	Observation
Plastic enclosure	Plastics*	See table 4.1.2	1300	Enclosure remained intact, no crack/ opening developed. Internal ES3, TS3 were not accessible after test. No insulation breakdown.
Supplementary information: *Test were performed on product with each source listed in table 4.1.2.				

T.7	TABLE: Drop tests			N/A
Part/Location	Material	Thickness (mm)	Drop Height (mm)	Observation
--	--	--	--	--
Supplementary information: *Test were performed on product with each source listed in table 4.1.2				

T.8	TABLE: Stress relief test				P
Part/Location	Material	Thickness (mm)	Oven Temperature (°C)	Duration (h)	Observation

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Clause	Requirement + Test	Result - Remark	Verdict

Plastic Enclosure	Plastics*	See table 4.1.2	70	7	Enclosure remained intact, no cracking/opening developed in the enclosure joint. Internal ES3, TS3 were not accessible after test. No insulation breakdown.
Supplementary information: *Test were performed on product with each source listed in table 4.1.2					

IEC 62368_1B ATTACHMENT

Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT
IEC 62368-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
(Audio/video, information and communication technology equipment - Part 1: Safety requirements)

Differences according to..... : EN 62368-1:2014/A11:2017

Attachment Form No. ..... : EU_GD_IEC62368_1B_II

Attachment Originator..... : Nemko AS

Master Attachment ..... : Date 2017-09-22

	CENELEC COMMON MODIFICATIONS (EN)	P
	Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2018 are prefixed “Z”.	P
CONTENTS	Add the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions Annex ZC (informative) A-deviations Annex ZD (informative) IEC and CENELEC code designations for flexible cords	P
	Delete all the “country” notes in the reference document (IEC 62368-1:2018) according to the following list:	P

0.2.1	Note	1	Note 3	4.1.15	Note
4.7.3	Note 1 and 2	5.2.2.2	Note	5.4.2.3.2.2 Table 13	Note c
5.4.2.3.2.4	Note 1 and 3	5.4.2.5	Note 2	5.4.5.1	Note
5.5.2.1	Note	5.5.6	Note	5.6.4.2.1	Note 2 and 3
5.7.5	Note	5.7.6.1	Note 1 and 2	10.2.1 Table 39	Note 2, 3 and 4
10.5.3	Note 2	10.6.2.1	Note 3	F.3.3.6	Note 3

	For special national conditions, see Annex ZB.		P
1	Add the following note: NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.		P

IEC 62368_1B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
4.Z1	Add the following new subclause after 4.9: To protect against excessive current, short-circuits and earth faults in circuits connected to an a.c. mains, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c): a) except as detailed in b) and c), protective devices necessary to comply with the requirements of B.3.1 and B.4 shall be included as parts of the equipment; b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation; c) it is permitted for pluggable equipment type B or permanently connected equipment, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for pluggable equipment type A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.		P
5.4.2.3.2.4	Add the following to the end of this subclause: The requirement for interconnection with external circuit is in addition given in EN 50491-3:2009.		N/A
10.2.1	Add the following to c) and d) in table 39: For additional requirements, see 10.5.1.		N/A

IEC 62368_1B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.5.1	Add the following after the first paragraph: For RS 1 compliance is checked by measurement under the following conditions: In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any object such as a tool or a coin, and those internal adjustments or presets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made. NOTE Z1 Soldered joints and paint lockings are examples of adequate locking. The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm^2, at any point 10 cm from the outer surface of the apparatus. Moreover, the measurement shall be made under fault conditions causing an increase of the high-voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made. For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level. NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.		N/A
10.6.1	Add the following paragraph to the end of the subclause: EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.		N/A
10.Z1	Add the following new subclause after 10.6.5. 10.Z1 Non-ionizing radiation from radio frequencies in the range 0 to 300 GHz The amount of non-ionizing radiation is regulated by European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz). For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body-mounted devices, attention is drawn to EN 50360 and EN 50566		N/A
G.7.1	Add the following note: NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.		

IEC 62368_1B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Bibliography	Add the following standards: Add the following notes for the standards indicated: IEC 60130-9 NOTE Harmonized as EN 60130-9. IEC 60269-2 NOTE Harmonized as HD 60269-2. IEC 60309-1 NOTE Harmonized as EN 60309-1. IEC 60364 series. NOTE some parts harmonized in HD 384/HD 60364 IEC 60601-2-4 NOTE Harmonized as EN 60601-2-4. IEC 60664-5 NOTE Harmonized as EN 60664-5. IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (not modified). IEC 61508-1 NOTE Harmonized as EN 61508-1. IEC 61558-2-1 NOTE Harmonized as EN 61558-2-1. IEC 61558-2-4 NOTE Harmonized as EN 61558-2-4. IEC 61558-2-6 NOTE Harmonized as EN 61558-2-6. IEC 61643-1 NOTE Harmonized as EN 61643-1. IEC 61643-21 NOTE Harmonized as EN 61643-21. IEC 61643-311 NOTE Harmonized as EN 61643-311. IEC 61643-321 NOTE Harmonized as EN 61643-321. IEC 61643-331 NOTE Harmonized as EN 61643-331.		P
ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		N/A
4.1.15	Denmark, Finland, Norway and Sweden To the end of the subclause the following is added: Class I pluggable equipment type A intended for connection to other equipment or a network shall, if safety relies on connection to reliable earthing or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment shall be connected to an earthed mains socket-outlet. The marking text in the applicable countries shall be as follows: In Denmark: “Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord.” In Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan" In Norway: “Apparatet må tilkoples jordet stikkontakt” In Sweden: “Apparaten skall anslutas till jordat uttag”		N/A
4.7.3	United Kingdom To the end of the subclause the following is added: The torque test is performed using a socket-outlet complying with BS 1363, and the plug part shall be assessed to the relevant clauses of BS 1363. Also see Annex G.4.2 of this annex		N/A

IEC 62368_1B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.2.2.2	Denmark After the 2nd paragraph add the following: A warning (marking safeguard) for high touch current is required if the touch current exceeds the limits of 3,5 mA a.c. or 10 mA d.c.		N/A
5.4.11.1 and Annex G	Finland and Sweden To the end of the subclause the following is added: For separation of the telecommunication network from earth the following is applicable: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either • two layers of thin sheet material, each of which shall pass the electric strength test below, or • one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that clearances and creepage distances do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition • passes the tests and inspection criteria of 5.4.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 5.4.9 shall be performed using 1,5 kV), and • is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5kV. It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2. A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions: • the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in 5.4.11; • the additional testing shall be performed on all the test specimens as described in EN 60384-14; the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14.		N/A

IEC 62368_1B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.5.2.1	Norway After the 3rd paragraph the following is added: Due to the IT power system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V).		N/A
5.5.6	Finland, Norway and Sweden To the end of the subclause the following is added: Resistors used as basic safeguard or bridging basic insulation in class I pluggable equipment type A shall comply with G.10.1 and the test of G.10.2.		N/A
5.6.1	Denmark Add to the end of the subclause Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. Justification: In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.		N/A
5.6.4.2.1	Ireland and United Kingdom After the indent for pluggable equipment type A, the following is added: – the protective current rating is taken to be 13 A, this being the largest rating of fuse used in the mains plug.		N/A
5.6.5.1	To the second paragraph the following is added: The range of conductor sizes of flexible cords to be accepted by terminals for equipment with a rated current over 10 A and up to and including 13 A is: 1,25 mm2 to 1,5 mm2 in cross-sectional area.		N/A
5.7.5	Denmark To the end of the subclause the following is added: The installation instruction shall be affixed to the equipment if the protective conductor current exceeds the limits of 3,5 mA a.c. or 10 mA d.c.		N/A

IEC 62368_1B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.7.6.1	Norway and Sweden To the end of the subclause the following is added: The screen of the television distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation needs to be isolated from the screen of a cable distribution system. It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example. The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in: “Apparatus connected to the protective earthing of the building installation through the mains connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system therefore has to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)” NOTE In Norway, due to regulation for CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min. Translation to Norwegian (the Swedish text will also be accepted in Norway): “Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et koaksialbasert kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av apparater til kabel-TV nett installeres en galvanisk isolator mellom apparatet og kabel-TV nettet.” Translation to Swedish: ”Apparater som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av apparaten till kabel-TV nät galvanisk isolator finnas mellan apparaten och kabel-TV nätet.”.		N/A

IEC 62368_1B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.7.6.2	Denmark To the end of the subclause the following is added: The warning (marking safeguard) for high touch current is required if the touch current or the protective current exceed the limits of 3,5 mA .		N/A
B.3.1 and B.4	Ireland and United Kingdom The following is applicable: To protect against excessive currents and short-circuits in the primary circuit of direct plug-in equipment, tests according to Annexes B.3.1 and B.4 shall be conducted using an external miniature circuit breaker complying with EN 60898-1, Type B, rated 32A. If the equipment does not pass these tests, suitable protective devices shall be included as an integral part of the direct plug-in equipment, until the requirements of Annexes B.3.1 and B.4 are met		N/A
G.4.2	Denmark To the end of the subclause the following is added: Supply cords of single phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to DS 60884-2-D1:2011. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a. If a single-phase equipment having a RATED CURRENT exceeding 13 A or if a poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2. Mains socket outlets intended for providing power to Class II apparatus with a rated current of 2,5 A shall be in accordance DS 60884-2-D1:2011 standard sheet DKA 1-4a. Other current rating socket outlets shall be in compliance with Standard Sheet DKA 1-3a or DKA 1-1c. Mains socket-outlets with earth shall be in compliance with DS 60884-2-D1:2011 Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a Justification: Heavy Current Regulations, Section 6c		N/A

IEC 62368_1B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
G.4.2	United Kingdom To the end of the subclause the following is added: The plug part of direct plug-in equipment shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16, and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.		N/A
G.7.1	United Kingdom To the first paragraph the following is added: Equipment which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord shall be fitted with a 'standard plug' in accordance with the Plugs and Sockets etc (Safety) Regulations 1994, Statutory Instrument 1994 No. 1768, unless exempted by those regulations. NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.		N/A
G.7.1	Ireland To the first paragraph the following is added: Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, "13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. S.I. 525 provides for the recognition of a standard of another Member State which is equivalent to the relevant Irish Standard		N/A
G.7.2	Ireland and United Kingdom To the first paragraph the following is added: A power supply cord with a conductor of 1,25 mm2 is allowed for equipment which is rated over 10 A and up to and including 13 A.		N/A

IEC 62368_1B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		N/A
10.5.2	Germany The following requirement applies: For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking. Justification: German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM. NOTE Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int +49-531-592-6320, Internet: http://www.ptb.de		N/A

※※※※※END OF REPORT※※※※※

EMC Technical Construction File

Report No: TRBJ24052958471

Issued for

MODE CHINA

Room 01.8/f#7 Tower. 4th Area, No. 186, South 4th Ring west Road.Fengtai District, Beijing, China

Product Name:	Free Hoist
Brand Name:	/
Main Name:	Free Hoist
Series Model:	Free Hoist
Test Standard:	ETSI EN 301 489-1 V2.2.3(2019-11), ETSI EN 301 489-17 V3.2.4 (2020-09)

TEST REPORT CERTIFICATION

Applicant's name ..... :	MODE CHINA
Address ..... :	Room 01.8/f#7 Tower. 4th Area, No. 186, South 4th Ring west Road.Fengtai District, Beijing, China
Manufacturer's Name ..... :	Zhuozhou Mude Industrial Technology Co., Ltd
Address ..... :	No.C55, Zhongguaneun Hegu Innovatien Industrial Park, Chaoyang EastRoad,ZhuozhouDevelopment Zone, BaodingCity, Hebei Province

Product description

Product name ..... :	Free Hoist
Main Name	Free Hoist
Series Model ..... :	Free Hoist
Standards..... :	ETSI EN 301 489-1 V2.2.3(2019-11), ETSI EN 301 489-17 V3.2.4 (2020-09)

This device described above has been tested by GTS, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Directive Art.3.2 requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test ..... :

Date (s) of performance of GTS..... :	May 28, 2024 to May 31, 2024
Date of Issue..... :	May 31, 2024
Test Result ..... :	**Pass**

Testing Engineer : Kein Shan
(Kein Shan)

Technical Manager : Johnson Lai
(Fohnson Lai)

Authorized Signatory : Johnson Lai
(Fohnson Lai)

GLOBAL TESTING SERVICES CO., LTD. GTS CERTIFICATION

TABLE OF CONTENTS

Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	May 31, 2024	TRBJ24052958471	ALL	Initial Issue

Note: **Format version** of the report -V01

1. TEST SUMMARY

Test procedures according to the technical standards:

EMI Test				
Test Item	Test Requirement	Test Method	Application	Result
Radiated Emission	ETSI EN 301 489-17	ETSI EN301 489-1	Enclosure	Pass
Conducted Emission	ETSI EN 301 489-17	ETSI EN301 489-1	AC port	Pass
Conducted Emission	ETSI EN 301 489-17	ETSI EN301 489-1	Telecommunication port	Pass*
Harmonic Current Emissions	ETSI EN 301 489-17	ETSI EN301 489-1	AC port	Pass
Voltage Fluctuations and Flicker	ETSI EN 301 489-17	ETSI EN301 489-1	AC port	Pass
EMS Test				
ESD (Electrostatic Discharge)	ETSI EN 301 489-17	EN 61000-4-2	Enclosure	Pass
Radio frequency electromagnetic field (80 MHz to 6 000 MHz)	ETSI EN 301 489-17	EN 61000-4-3	Enclosure	Pass
EFT (Electrical Fast Transients	ETSI EN 301 489-17	EN 61000-4-4	AC port	Pass
EFT (Electrical Fast Transients	ETSI EN 301 489-17	EN 61000-4-4	Telecommunication port	Pass*
Surge Immunity	ETSI EN 301 489-17	EN 61000-4-5	AC port	Pass
Surge Immunity	ETSI EN 301 489-17	EN 61000-4-5	Telecommunication port	Pass*
Radio frequency, common mode	ETSI EN 301 489-17	EN 61000-4-6	AC port	Pass
Radio frequency, common mode	ETSI EN 301 489-17	EN 61000-4-6	Telecommunication port	Pass*
Voltage Dips and Interruptions	ETSI EN 301 489-17	EN 61000-4-11	AC port	Pass

Remark:
Pass: The EUT complies with the essential requirements in the standard. N/A: Not applicable.
* Reference to the EN 55032 & EN 55035 test report

1.1 TEST FACTORY

Company Name:	Shanghai Global Testing Services Co., Ltd.
Address:	Floor 2nd, Building D- 1, No. 128, Shenfu Road, Minhang District, Shanghai, China.
Telephone:	+86-021-33637866
Fax:	+86-021-33637858

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U，(dB)	NOTE
GTSC01	ANSI	9KHz-150KHz	2.88	
		150 KHz ~ 30MHz	2.67	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U，(dB)	NOTE
GTSC02	ANSI	30MHz ~ 200MHz	3.73	
		200MHz ~ 1000MHz	3.92	
		1GHz ~ 6 GHz	3.31	

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name	Free Hoist
Brand Name	/
Main Name	Free Hoist
Series Model	/
Model Difference	/
Product Description	/
Hardware version number	N/A
Software version number	N/A

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	BT Mode

For Radiated Test	
Final Test Mode	Description
Mode 1	BT Mode

For EMS Test	
Final Test Mode	Description
Mode 1	BT Mode

Note: The test modes were carried out for all operation modes(include link and idle).
The final test mode of the EUT was the for Mode 1, and its test data was showed.

2.3 DESCRIPTION OF TEST SETUP

2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the teGTS.

Item	Equipment	Mfr/Brand	Model/Type No.
N/A	N/A	N/A	N/A

Item	Shielded Type	Ferrite Core	Length
N/A	N/A	N/A	N/A

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

(3) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.

2.5 MEASUREMENT INSTRUMENTS LIST

2.5.1 RADIATED TEST SITE

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
EMI Test Receiver	R&S	ESCI	102086	2023.10.15	2024.10.14
Bilog Antenna	TESEQ	CBL6111D	34678	2023.10.15	2024.10.14
Horn Antenna	SCHWARZBECK	BBHA 9120D	1343	2023.10.15	2024.10.14
Spectrum Analyzer	Agilent	E4407B	MY50140340	2023.10.15	2024.10.14
Pre-mplifier(1G-18G)	Agilent	8449B	60538	2023.10.15	2024.10.14
Spectrum Analyzer	Agilent	N9020A	MY49100060	2023.10.15	2024.10.14
Pre-mplifier(0.1M-3GHz)	EM	EM330	--	2023.10.15	2024.10.14

2.5.2 ESD

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
ESD TEST GENERATOR	HAEFELY	ONYX 16	173835	2023.10.15	2024.10.14

2.5.3 RS

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
RF Relay matrix tsj	TSJ	RFM-S621	04261	2023.10.15	2024.10.14
Power meter	Agilent	E4419B	QB4331226	2023.10.15	2024.10.14
Power Sensor	Agilent	8481A	MY41092622	2023.10.15	2024.10.14
Power Sensor	Agilent	8481A	US37296783	2023.10.15	2024.10.14
Signal Generator	Agilent	N5182A	MY46240556	2023.10.15	2024.10.14
Power Amplifier	MICOTOP	MPA-80-1000-250	1711489	2023.10.15	2024.10.14
Power Amplifier	MICOTOP	MPA-1000-3000-75	1711488	2023.10.15	2024.10.14
Power Amplifier	MICOTOP	MPA-3000-6000-50	MPA1706275	2023.10.15	2024.10.14
Logarithmic-periodic Antenna	Schwarzbeck	VULP9118E	820	2023.10.15	2024.10.14
Microwave Horn Antenna	Schwarzbeck	BBHA 9120LF	F01008	2023.10.15	2024.10.14

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION

(Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

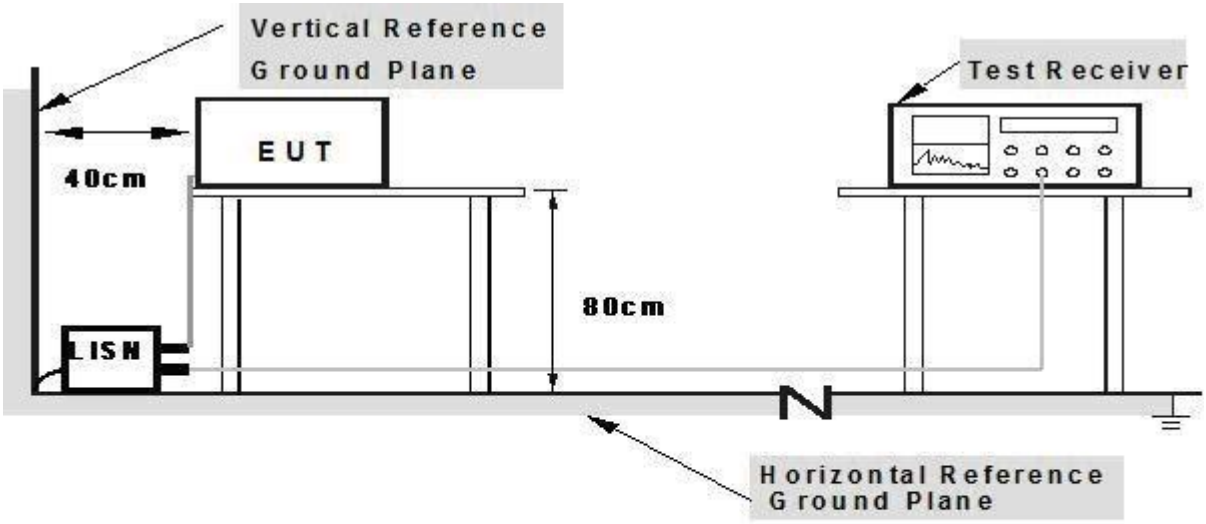
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

3.1.5 TEST RESULTS

Temperature:	26℃	Relative Humidity:	54%
Phase:	L/N	Test Mode:	N/A
Test Voltage:	/		

Note: DC 6V test is not applicable in this test report.

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	Class A		Class B	
	At 10m	At 3m	At 10m	At 3m
	dBuV/m	dBuV/m	dBuV/m	dBuV/m
30 – 230	40	50	30	40
230 – 1000	47	57	37	47

3.2.2 LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (at 3m) dBuV/m		Class B (at 3m) dBuV/m	
	Peak	Avg	Peak	Avg
1000-3000	76	56	70	50
3000-6000	80	60	74	54

Notes:

(1) The limit for radiated test was performed according to as following:CISPR 32.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.3 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.4 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz

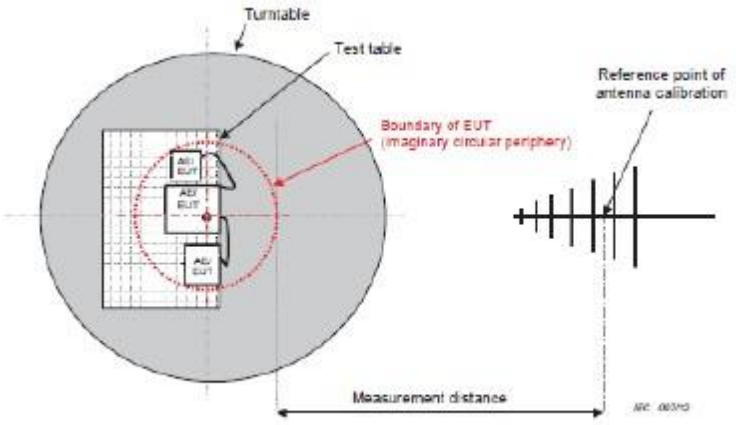


Figure C.1 – Measurement distance

(B) Radiated Emission Test Set-Up Frequency Above 1GHz

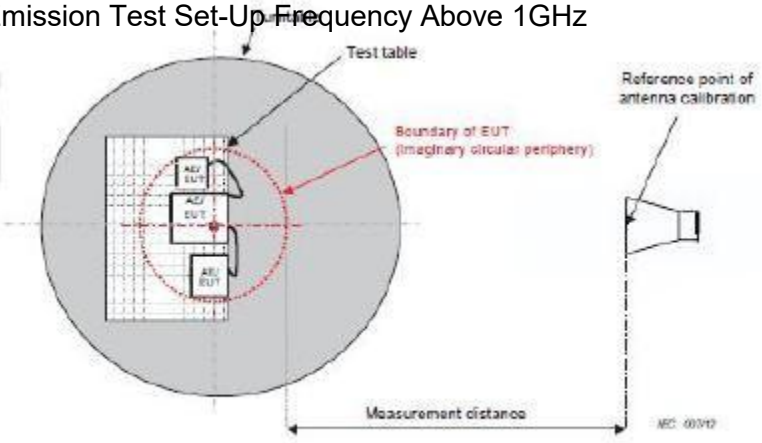


Figure C.1 – Measurement distance

3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS(30 - 1000 MHz)

Temperature:	25.7℃	Relative Humidity:	42%
Phase:	Horizontal	Test Mode:	Mode 1
Test Voltage:	/		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	47.3253	37.18	-20.10	17.08	40.00	-22.92	QP
2	68.6310	43.70	-24.14	19.56	40.00	-20.44	QP
3	102.7192	36.65	-18.96	17.69	40.00	-22.31	QP
4	150.0108	35.77	-17.97	17.80	40.00	-22.20	QP
5	316.5890	30.82	-14.28	16.54	47.00	-30.46	QP
6	408.9460	27.41	-11.08	16.33	47.00	-30.67	QP

Remark:
1. All readings are Quasi-Peak.
2. Margin = Result (Result =Reading + Factor)–Limit.
3. Factor= Cable Loss +Antenna Factor-Amplifier Gain

Temperature:	25.7℃	Relative Humidity:	42%
Phase:	Vertical	Test Mode:	Mode 1
Test Voltage:	/		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	47.9940	35.92	-20.45	15.47	40.00	-24.53	QP
2	66.9670	43.76	-24.17	19.59	40.00	-20.41	QP
3	105.2718	35.57	-18.74	16.83	40.00	-23.17	QP
4	175.0367	35.72	-19.38	16.34	40.00	-23.66	QP
5	501.1790	32.50	-8.90	23.60	47.00	-23.40	QP
6	896.9965	28.36	-2.30	26.06	47.00	-20.94	QP

Remark:
1. All readings are Quasi-Peak.
2. Margin = Result (Result =Reading + Factor)–Limit.
3. Factor= Cable Loss +Antenna Factor-Amplifier Gain

3.2.7 TEST RESULT (1000 - 6000 MHz)

Temperature:	24 ℃	Relative Humidity:	54 %
Test Mode:	Mode 1	Test Power:	/

Freq. (MHz)	Reading (dBuV)	Corr.Factor (dB)	Measured (dBuV/m)	Limits (dBuV/m)	Margins (dBuV/m)	Ant. H/V	Mark
2765.05	67.92	-11.02	56.90	70.00	-13.10	V	PK
2765.05	49.00	-11.02	37.97	50.00	-12.03	V	AVG
3702.46	74.57	-15.36	59.22	74.00	-14.78	V	PK
3702.46	53.33	-15.36	37.97	54.00	-16.03	V	AVG
2765.05	65.34	-11.02	54.31	70.00	-15.69	H	PK
2765.05	49.62	-11.02	38.59	50.00	-11.41	H	AVG
3702.46	74.69	-15.36	59.34	74.00	-14.66	H	PK
3702.46	53.44	-15.36	38.09	54.00	-15.91	H	AVG

Remark:
Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit

4. EMC IMMUNITY TEST

4.1 GENERAL PERFORMANCE CRITERIA

4.1.1 PERFORMANCE CRITERIA (Bluetooth)

According to **Draft ETSI EN 301 489-17** standard, the general performance criteria as following:

Criteria	During the test	After the test
A	Shall operate as intended May show degradation of performance (see note 1) Shall be no loss of function Shall be no unintentional transmissions	Shall operate as intended Shall be no degradation of performance (see note 2) Shall be no loss of function Shall be no loss of stored data or user programmable functions
B	May show loss of function (one or more) May show degradation of performance (see note 1) No unintentional transmissions	Functions shall be self-recoverable Shall operate as intended after recovering Shall be no degradation of performance (see note 2) Shall be no loss of stored data or user programmable functions
C	May be loss of function (one or more)	Functions shall be recoverable by the operator Shall operate as intended after recovering Shall be no degradation of performance (see note 2)

NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: no degradation of performance after the test is understood as any degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

PERFORMANCE FOR TT

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. TeGTS shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR TR

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR CT

The performance criteria A shall apply. TeGTS shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an Acknowledgement (ACK) or Not Acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR CR

The performance criteria A shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

4.1.2 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

4.2 ESD TESTING

4.2.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance	B
Discharge Voltage:	Air Discharge：2kV/4kV/8kV (Direct) Contact Discharge：2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

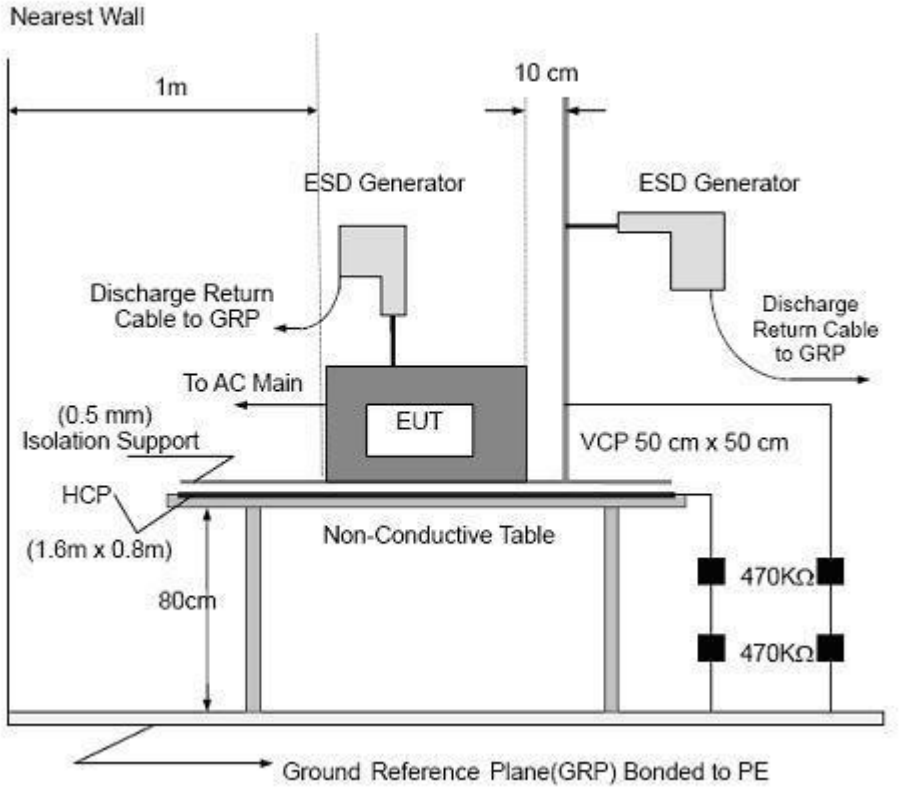
4.2.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. Contact discharge was applied to conductive surfaces and coupling planes of the EUT. During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges.
If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.
Vertical Coupling Plane (VCP):
The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.
Horizontal Coupling Plane (HCP):
The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

b. Air discharges at insulation surfaces of the EUT.
It was at least ten single discharges with positive and negative at the same selected point.

4.2.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

4.2.4 TEST RESULT

Temperature:	23.9℃	Relative Humidity:	48%
Pressure:	1010hPa	Test Voltage:	/
Test Mode:	Mode 1		

BT TEST RESULT

Discharge Level	Polarity	Test Points	Contact Discharge	Air Discharge	Criterion	Test Result
4	+/-	VCP/HCP	NOTE	N/A	A	PASS
2,4,8	+/-	1-5	N/A	NOTE	A	PASS

Note: The EUT function was correct during the test.
Red Dot —Air Discharged
Blue Dot —Contact Discharged

4.3 RS TESTING

4.3.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance	A
Frequency Range:	80 MHz - 6000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds

4.3.2 TEST PROCEDURE

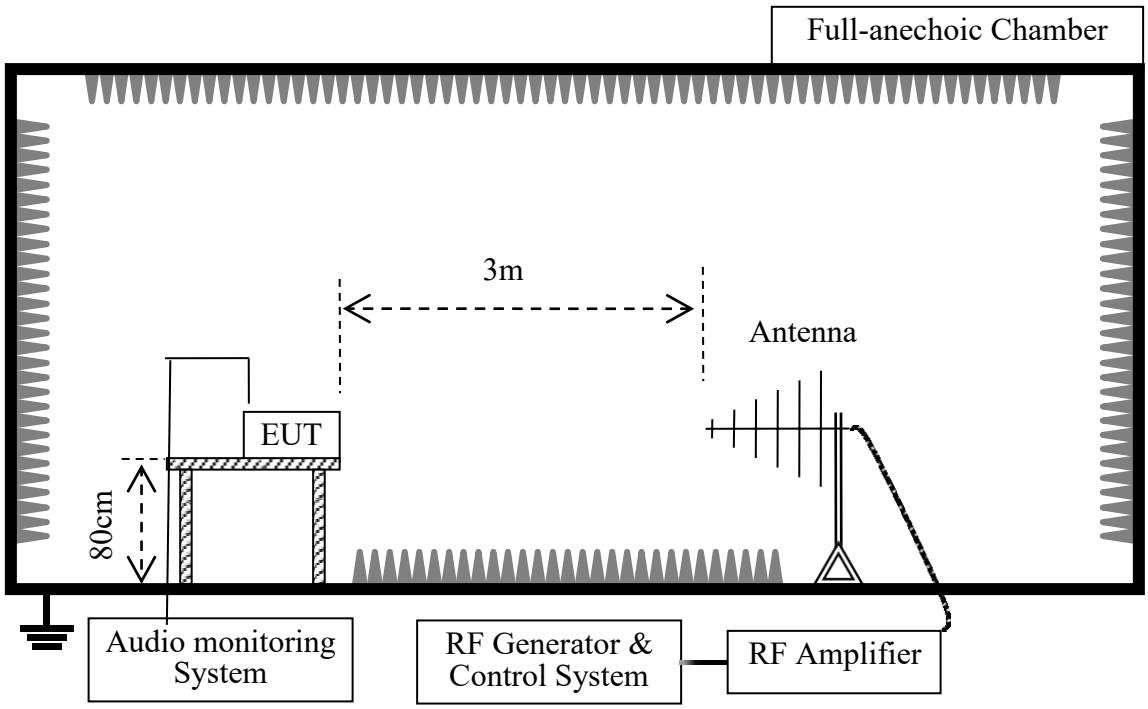
The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters.

The other condition as following manner:

a. The frequency range is swept from 80 MHz to 6000 MHz with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5x 10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
b. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
c. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.3.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

4.3.4 TEST RESULTS

Temperature:	24.9℃	Relative Humidity:	50%
Test Voltage:	/	Test Mode:	Mode 1

BT TEST RESULTS

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observation	Perform. Criteria	Results	Judgment
80~6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	**CT,CR**	**A**	**A**	**PASS**
			Rear				
			Left				
			Right				

Note: “A” stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

Note:

1) N/A - denotes test is not applicable in this test report.

2) Criteria A: There was no change operated with initial operating during the test.

3) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

4) Criteria C: The system shut down during the test.

※※※※※END OF THE REPORT※※※※※

RF TEST REPORT

Applicant	MODE CHINA
Product	Free Hoist
Brand	/
Model	Free Hoist
Report No.	TRBJ24052958471
Issue Date	May 31, 2024

Shanghai Global Testing Services Co., Ltd. tested the above equipment in accordance with the requirements in **ETSIEN 300 440 V2.2.1**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Prepared by: Bruce Lin

Approved by: Cristine Fang

Shanghai Global Testing Services Co., Ltd.

Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China.
TEL: +86-021-33637866
FAX: +86-021-33637858

TABLE OF CONTENT

Version	Revision description	Issue Date
Rev.0	Initial issue of report.	May 31, 2024
Rev.1	Update information.	May 31, 2024
Note: This revised report (Report No. TRBJ24052958471) supersedes and replaces the previously issued report (Report No. TRFJ23060547361-R6). Please discard or destroythe previously issued report and dispose of it accordingly.		

Summary of measurement results

No.	Test Case	Clause (EN 300 440)	Conclusion
1	Equivalent Isotropically Radiated Power	4.2.2	PASS
2	Permitted Range of Operating Frequencies	4.2.3	PASS
3	Unwanted emissions in the spurious domain	4.2.4	PASS
4	Duty Cycle	4.2.5	PASS
5	Additonal requirement for FHSS equipment	4.2.6	NA
6	Spectrum access techniques	4.4	NA
7	GBSAR antenna pattern	4.6 4	NA
8	Adjacent Channel Selectivity	4.3.3	NA
9	Blocking or Desensitization	4.3.4	PASS
10	Spurious Emissions	4.3.5	PASS

Date of Testing: June 05, 2023 ~May 31, 2024
Date of Sample Received: June 05, 2023

Note: NA=Not applicable
All indications of Pass/Fail in this report are opinions expressed by Shanghai Global Testing Services Co., Ltd based on interpretations and/or observations of test results. Measurement Uncertainties were not takeninto account and are published for informational purposes only.

1. Test Laboratory

1.1. Notes of the test report

This report shall not be reproduced in full or partial, without the written approval of **Shanghai Global Testing Services Co., Ltd** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Test facility

/

1.3. Testing Location

Company: Shanghai Global Testing Services Co., Ltd

Address: Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China.
City: Shanghai
Post code:201201
Country: P. R. China
Telephone: +86-021-33637866
Fax: +86-021-33637858
Website: http://www.gts-lab.com

2. General Description of Equipment under Test

2.1. Applicant and Manufacturer Information

Applicant	MODE CHINA
Applicant address	Room 01.8/f#7 Tower. 4th Area, No. 186, South 4th Ring west Road.Fengtai District, Beijing, China
Manufacturer	Zhuozhou Mude Industrial Technology Co., Ltd
Manufacturer address	No.C55, Zhongguaneun Hegu Innovatien Industrial Park, Chaoyang EastRoad,ZhuozhouDevelopment Zone, BaodingCity, Hebei Province

2.2. General information

EUT Description	
Model	Free Hoist
IMEI	/
HW Version	V1.0
SW Version	V1.0
Antenna Type	Internal Antenna
Antenna Gain	/
Receiver Category	/
Test Mode(s)	/
Operating Frequency	/
Operating temperature range:	2 dBi
Operating voltage range:	NA
Rated Power Supply Voltage	Free Hoist
EUT Accessory	
Adapter	/
Battery	/
RJ45&DB9_wire	/
Note: The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.	

3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards
ETSI EN 300 440 V2.2.1 (2018-07)

4. Test Configuration

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). The worst cases were recorded in this report.

5. The Case Results

5.1. Equivalent isotropically radiated power (e.i.r.p.)

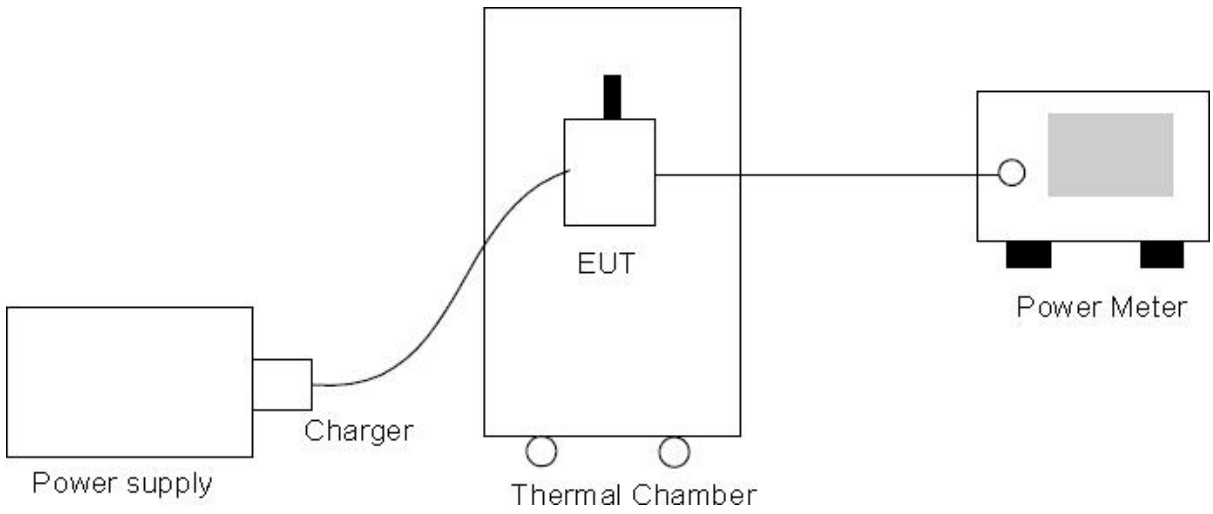
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~26°C	45%~50%	101.5kPa

Methods of Measurement

1. Placing the EUT in thermal chamber.
2. The transmitter output port was connected to the power meter.
3. Connecting the charger to power supply.
4. Setting thermal chamber temperature and power supply voltage at suitable value.
5. The conducted power is equal to the reading on power meter plus cable loss.
6. The EIRP is equal to the conducted power plus the antenna gain.
7. Repeating step 4 to 6 at different condition and different channel.

Test Setup



Limit

The transmitter maximum e.i.r.p. under normal and extreme test conditions shall not exceed 25mW.

Test Results

Mode	Duty cycle	Duty cycle correction Factor (dB)
802.11a	0.97	0.14
802.11n HT20	0.96	0.16
802.11n HT40	0.95	0.21
802.11ac VHT20	0.97	0.13
802.11ac VHT40	0.95	0.23
802.11ac VHT80	0.92	0.35

Power Index								
Channel	802.11a	802.11n HT20	802.11ac VHT20	Channel	802.11n HT40	802.11ac VHT40	Channel	802.11ac VHT80
CH149	12.00	12.00	12.00	CH151	12.00	12.00	CH155	12.00
CH157	12.00	12.00	12.00	CH159	12.00	12.00	/	/
CH165	12.00	12.00	12.00	/	/	/	/	/

NVNT

Network Standards	Carrier frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	EIRP (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	11.82	11.96	13.96	14	PASS
	157/5785	11.81	11.95	13.95	14	PASS
	165/5825	11.74	11.88	13.88	14	PASS
802.11n HT20	149/5745	11.44	11.60	13.60	14	PASS
	157/5785	11.65	11.81	13.81	14	PASS
	165/5825	11.57	11.73	13.73	14	PASS
802.11n HT40	151/5755	11.54	11.75	13.75	14	PASS
	159/5795	11.47	11.68	13.68	14	PASS
802.11ac VHT20	149/5745	11.46	11.59	13.59	14	PASS
	157/5785	11.68	11.81	13.81	14	PASS
	165/5825	11.63	11.76	13.76	14	PASS
802.11ac VHT40	151/5755	11.53	11.76	13.76	14	PASS
	159/5795	11.67	11.90	13.90	14	PASS
802.11ac VHT80	155/5775	11.35	11.70	13.70	14	PASS
Note: 1) Measured average power has offset cable loss and duty factor. 2) Average EIRP Power = Average Conducted Power with duty factor + Antenna Gain						

HTHV

Network Standards	Carrier frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	EIRP (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	11.36	11.50	13.50	14	PASS
	157/5785	11.38	11.52	13.52	14	PASS
	165/5825	11.45	11.58	13.58	14	PASS
802.11n HT20	149/5745	11.02	11.18	13.18	14	PASS
	157/5785	11.30	11.46	13.46	14	PASS
	165/5825	11.32	11.47	13.47	14	PASS
802.11n HT40	151/5755	11.22	11.43	13.43	14	PASS
	159/5795	10.97	11.18	13.18	14	PASS
802.11ac VHT20	149/5745	11.01	11.14	13.14	14	PASS
	157/5785	11.59	11.71	13.71	14	PASS
	165/5825	11.45	11.58	13.58	14	PASS
802.11ac VHT40	151/5755	11.50	11.73	13.73	14	PASS
	159/5795	11.34	11.57	13.57	14	PASS
802.11ac VHT80	155/5775	11.21	11.56	13.56	14	PASS
Note: 1) Measured average power has offset cable loss and duty factor. 2) Average EIRP Power = Average Conducted Power with duty factor + Antenna Gain						

LTLV

Network Standards	Carrier frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	EIRP (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	11.58	11.72	13.72	14	PASS
	157/5785	11.39	11.52	13.52	14	PASS
	165/5825	11.62	11.76	13.76	14	PASS
802.11n HT20	149/5745	11.34	11.50	13.50	14	PASS
	157/5785	11.18	11.33	13.33	14	PASS
	165/5825	11.31	11.47	13.47	14	PASS
802.11n HT40	151/5755	11.42	11.63	13.63	14	PASS
	159/5795	11.21	11.42	13.42	14	PASS
802.11ac VHT20	149/5745	11.29	11.42	13.42	14	PASS
	157/5785	11.41	11.53	13.53	14	PASS
	165/5825	11.50	11.63	13.63	14	PASS
802.11ac VHT40	151/5755	11.52	11.75	13.75	14	PASS
	159/5795	11.55	11.78	13.78	14	PASS
802.11ac VHT80	155/5775	11.34	11.69	13.69	14	PASS
Note: 1) Measured average power has offset cable loss and duty factor. 2) Average EIRP Power = Average Conducted Power with duty factor + Antenna Gain						

LTHV

Network Standards	Carrier frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	EIRP (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	11.51	11.65	13.65	14	PASS
	157/5785	11.48	11.62	13.62	14	PASS
	165/5825	11.44	11.58	13.58	14	PASS
802.11n HT20	149/5745	10.96	11.12	13.12	14	PASS
	157/5785	11.35	11.51	13.51	14	PASS
	165/5825	11.51	11.67	13.67	14	PASS
802.11n HT40	151/5755	11.52	11.73	13.73	14	PASS
	159/5795	11.43	11.64	13.64	14	PASS
802.11ac VHT20	149/5745	11.15	11.28	13.28	14	PASS
	157/5785	11.58	11.70	13.70	14	PASS
	165/5825	11.61	11.73	13.73	14	PASS
802.11ac VHT40	151/5755	11.53	11.76	13.76	14	PASS
	159/5795	11.41	11.64	13.64	14	PASS
802.11ac VHT80	155/5775	11.10	11.44	13.44	14	PASS
Note: 1) Measured average power has offset cable loss and duty factor. 2) Average EIRP Power = Average Conducted Power with duty factor + Antenna Gain						

HTLV

Network Standards	Carrier frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	EIRP (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	11.43	11.57	13.57	14	PASS
	157/5785	11.74	11.88	13.88	14	PASS
	165/5825	11.63	11.77	13.77	14	PASS
802.11n HT20	149/5745	11.13	11.29	13.29	14	PASS
	157/5785	11.52	11.68	13.68	14	PASS
	165/5825	11.44	11.60	13.60	14	PASS
802.11n HT40	151/5755	11.29	11.50	13.50	14	PASS
	159/5795	11.21	11.42	13.42	14	PASS
802.11ac VHT20	149/5745	11.07	11.19	13.19	14	PASS
	157/5785	11.61	11.74	13.74	14	PASS
	165/5825	11.19	11.32	13.32	14	PASS
802.11ac VHT40	151/5755	11.50	11.73	13.73	14	PASS
	159/5795	11.37	11.60	13.60	14	PASS
802.11ac VHT80	155/5775	11.33	11.68	13.68	14	PASS

Note: 1) Measured average power has offset cable loss and duty factor.
2) Average EIRP Power = Average Conducted Power with duty factor + Antenna Gain

5.2. Permitted Range of Operating Frequencies

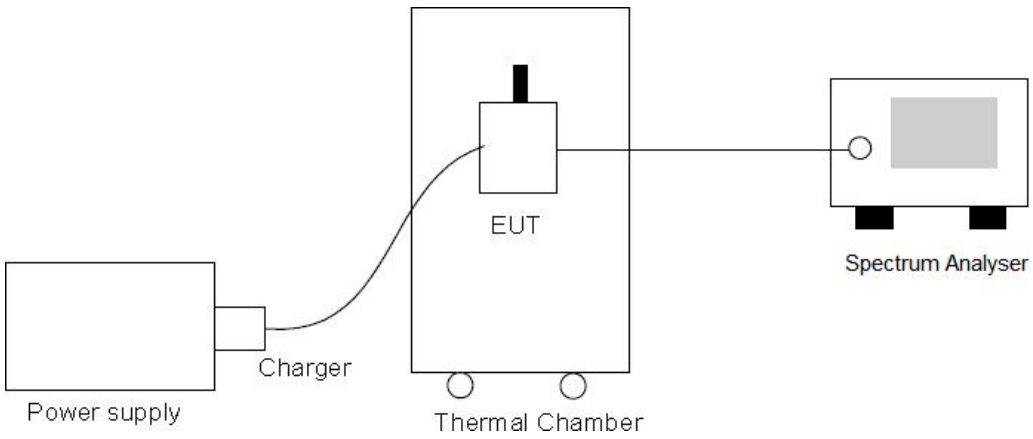
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~26°C	45%~50%	101.5kPa

Methods of Measurement

The measurement procedure shall be as follows:
a) put the spectrum analyser in video averaging mode with a minimum of 50 sweeps selected;
b) select the lowest operating frequency of the equipment under test and activate the transmitter with modulation applied. The RF emission of the equipment shall be displayed on the spectrum analyser;
c) using the marker of the spectrum analyser, find the lowest frequency below the operating frequency at which the spectral power density drops below the level given in clause 4.2.3. This frequency shall be recorded in the test report;
d) select the highest operating frequency of the equipment under test and find the highest frequency at which the spectral power density drops below the value given in clause 4.2.3. This frequency shall be recorded in the test report;
e) the difference between the frequencies measured in steps c) and d) is the operating frequency range. It shall be recorded in the test report.

Test Setup



Limit

The width of the power spectrum envelope is fH -fL for a given operating frequency. In equipment that allows adjustment or selection of different operating frequencies, the power envelope takes up different positions in the allowed band. The frequency range is determined by the lowest value of fL and the highest value of fH resulting from the adjustment of the equipment to the lowest and highest operating frequencies.

Test Results

NTNV

Network Standards	Channel/ Frequency (MHz)	Permitted Range of Operating Frequencies(MHz)		FH-FL (MHz)	99% OCB (MHz)	Conclusion
		FL	FH			
Frequency Range Limit (ppm)		Within band 5725-5850MHz				
802.11a	149/5745	5736.3549	5753.7682	17.4133	16.386	Pass
	157/5785	5776.2469	5793.5582	17.3113	16.390	Pass
	165/5825	5816.4479	5833.3902	16.9423	16.390	Pass
802.11n HT20	149/5745	5735.9859	5754.0201	18.0342	17.590	Pass
	157/5785	5775.0000	5793.3432	18.3432	17.594	Pass
	165/5825	5815.9979	5833.9991	18.0012	17.602	Pass
802.11n HT40	151/5755	5736.6733	5773.3296	36.6563	36.180	Pass
	159/5795	5776.6778	5813.5141	36.8363	36.228	Pass
802.11ac VHT20	149/5745	5735.8149	5753.9991	18.1842	17.594	Pass
	157/5785	5775.8269	5794.1971	18.3702	17.594	Pass
	165/5825	5815.8089	5834.1731	18.3642	17.602	Pass
802.11ac VHT40	151/5755	5736.6733	5773.3296	36.6563	36.196	Pass
	159/5795	5776.5278	5813.3336	36.8058	36.204	Pass
802.11ac VHT80	155/5775	5736.6080	5813.3390	76.7310	76.264	Pass

HTHV

Network Standards	Channel/ Frequency (MHz)	Permitted Range of Operating Frequencies(MHz)		FH-FL (MHz)	99% OCB (MHz)	Conclusion
		FL	FH			
Frequency Range Limit (ppm)		Within band 5725-5850MHz				
802.11a	149/5745	5736.3546	5753.7679	17.4133	16.386	Pass
	157/5785	5776.2467	5793.5576	17.3109	16.390	Pass
	165/5825	5816.4478	5833.3898	16.9419	16.390	Pass
802.11n HT20	149/5745	5735.9855	5754.0194	18.0339	17.590	Pass
	157/5785	5774.9999	5793.3427	18.3427	17.594	Pass
	165/5825	5815.9976	5833.9987	18.0011	17.602	Pass
802.11n HT40	151/5755	5736.6728	5773.3288	36.6560	36.180	Pass
	159/5795	5776.6778	5813.5139	36.8361	36.228	Pass
802.11ac VHT20	149/5745	5735.8147	5753.9988	18.1841	17.594	Pass
	157/5785	5775.8269	5794.1971	18.3702	17.594	Pass
	165/5825	5815.8086	5834.1728	18.3641	17.602	Pass
802.11ac VHT40	151/5755	5736.6730	5773.3290	36.6560	36.196	Pass
	159/5795	5776.5276	5813.3334	36.8058	36.204	Pass
802.11ac VHT80	155/5775	5736.6079	5813.3386	76.7307	76.264	Pass

HTLV

Network Standards	Channel/ Frequency (MHz)	Permitted Range of Operating Frequencies(MHz)		FH-FL (MHz)	99% OCB (MHz)	Conclusion
		FL	FH			
Frequency Range Limit (ppm)		Within band 5725-5850MHz				
802.11a	149/5745	5736.3529	5753.7647	17.4118	16.386	Pass
	157/5785	5776.2426	5793.5520	17.3094	16.390	Pass
	165/5825	5816.4442	5833.3823	16.9381	16.390	Pass
802.11n HT20	149/5745	5735.9830	5754.0129	18.0299	17.590	Pass
	157/5785	5774.9983	5793.3369	18.3386	17.594	Pass
	165/5825	5815.9933	5833.9901	17.9968	17.602	Pass
802.11n HT40	151/5755	5736.6732	5773.3285	36.6552	36.180	Pass
	159/5795	5776.6738	5813.5079	36.8341	36.228	Pass
802.11ac VHT20	149/5745	5735.8139	5753.9967	18.1828	17.594	Pass
	157/5785	5775.8233	5794.1887	18.3654	17.594	Pass
	165/5825	5815.8070	5834.1662	18.3592	17.602	Pass
802.11ac VHT40	151/5755	5736.6718	5773.3245	36.6527	36.196	Pass
	159/5795	5776.5271	5813.3299	36.8028	36.204	Pass
802.11ac VHT80	155/5775	5736.6057	5813.3333	76.7275	76.264	Pass

LTLV

Network Standards	Channel/ Frequency (MHz)	Permitted Range of Operating Frequencies(MHz)		FH-FL (MHz)	99% OCB (MHz)	Conclusion
		FL	FH			
Frequency Range Limit (ppm)		Within band 5725-5850MHz				
802.11a	149/5745	5736.3545	5753.7677	17.4132	16.386	Pass
	157/5785	5776.2469	5793.5581	17.3112	16.390	Pass
	165/5825	5816.4479	5833.3899	16.9420	16.390	Pass
802.11n HT20	149/5745	5735.9855	5754.0192	18.0337	17.590	Pass
	157/5785	5774.9995	5793.3423	18.3427	17.594	Pass
	165/5825	5815.9975	5833.9984	18.0008	17.602	Pass
802.11n HT40	151/5755	5736.6730	5773.3288	36.6558	36.180	Pass
	159/5795	5776.6773	5813.5134	36.8361	36.228	Pass
802.11ac VHT20	149/5745	5735.8145	5753.9985	18.1840	17.594	Pass
	157/5785	5775.8269	5794.1970	18.3702	17.594	Pass
	165/5825	5815.8085	5834.1726	18.3641	17.602	Pass
802.11ac VHT40	151/5755	5736.6731	5773.3293	36.6562	36.196	Pass
	159/5795	5776.5278	5813.3331	36.8053	36.204	Pass
802.11ac VHT80	155/5775	5736.6080	5813.3389	76.7309	76.264	Pass

LTHV

Network Standards	Channel/ Frequency (MHz)	Permitted Range of Operating Frequencies(MHz)		FH-FL (MHz)	99% OCB (MHz)	Conclusion
		FL	FH			
Frequency Range Limit (ppm)		Within band 5725-5850MHz				
802.11a	149/5745	5736.3544	5753.7672	17.4128	16.386	Pass
	157/5785	5776.2468	5793.5579	17.3111	16.390	Pass
	165/5825	5816.4476	5833.3897	16.9421	16.390	Pass
802.11n HT20	149/5745	5735.9857	5754.0195	18.0338	17.590	Pass
	157/5785	5774.9998	5793.3429	18.3432	17.594	Pass
	165/5825	5815.9975	5833.9984	18.0010	17.602	Pass
802.11n HT40	151/5755	5736.6731	5773.3291	36.6560	36.180	Pass
	159/5795	5776.6775	5813.5136	36.8361	36.228	Pass
802.11ac VHT20	149/5745	5735.8145	5753.9985	18.1840	17.594	Pass
	157/5785	5775.8266	5794.1964	18.3698	17.594	Pass
	165/5825	5815.8086	5834.1725	18.3639	17.602	Pass
802.11ac VHT40	151/5755	5736.6729	5773.3291	36.6562	36.196	Pass
	159/5795	5776.5277	5813.3335	36.8058	36.204	Pass
802.11ac VHT80	155/5775	5736.6077	5813.3385	76.7308	76.264	Pass

5.3. Adjacent Channel Selectivity

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The adjacent channel selectivity is a measure of the capability of the receiver to operate satisfactorily in the presence of an unwanted signal that differs in frequency from the wanted signal by an amount equal to the adjacent channel separation for which the equipment is intended.

This measurement shall be conducted under normal conditions.
Two signal generators A and B shall be connected to the receiver via a combining network to the receiver, either:
a) via a test fixture or a test antenna to the receiver integrated, dedicated or test antenna; or
b) directly to the receiver permanent or temporary antenna connector.

Signal generator A shall be at the nominal frequency of the receiver, with normal modulation of the wanted signal.

Signal generator B shall be unmodulated and shall be adjusted to the adjacent channel centre frequency immediately above that of the wanted signal.

Initially signal generator B shall be switched off and using signal generator A the level that still gives sufficient response shall be established. The output level of generator A shall then be increased by 3 dB.

Signal generator B is then switched on and adjusted until the wanted criteria are met. This level shall be recorded.

The measurements shall be repeated with signal generator B unmodulated and adjusted to the adjacent channel centre immediately below the wanted signal.

The adjacent channel selectivity shall be recorded for the upper and lower adjacent channels as the level in dBm of the unwanted signal.

For tagging systems (e.g. RF identification, anti-theft, access control, location and similar systems) signal generator A may be replaced by a physical tag positioned at 70 % of the measured system range in metres.

In this case, the adjacent selectivity shall be recorded as the level in dBm of lowest level of the unwanted signal (generator B) resulting in a non-read of the tag.

Limit

The adjacent channel selectivity of the equipment under specified conditions shall not be less than -30 dBm + k.

The correction factor, k, is as follows:

$$k = -20\log f - 10\log BW$$

Where:

- *f* is the frequency in GHz;
- *BW* is the channel bandwidth in MHz.

The factor *k* is limited within the following:

-40 dB < k < 0 dB.

Test Results

This requirement applies to Equipment Category 1 receivers.

5.4. Blocking or Desensitization

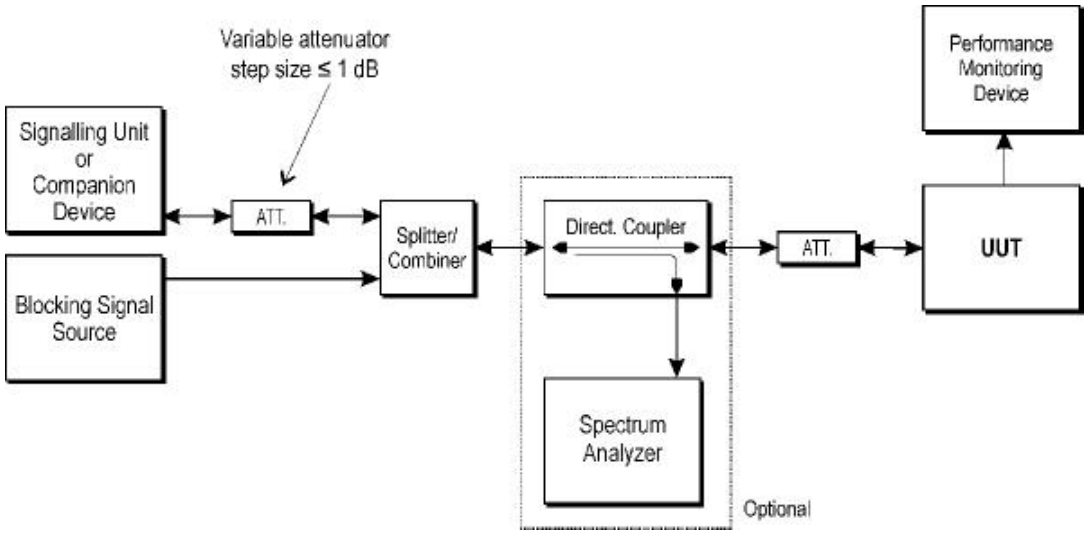
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

The test method and limits for this test item are based on the standard ETSI EN301 893 V2.1.1.

Method of Measurement

For systems using multiple receive chains only one chain need to be tested. All other receiver inputs shall be terminated.



The steps below define the procedure to verify the receiver blocking requirement as described in clause 4.2.8.

Step 1:

- The UUT shall be set to the first operating frequency to be tested (see clause 5.3.2).

Step 2:

- The blocking signal generator is set to the first frequency as defined in table 9.

Step 3:

- With the blocking signal generator switched off a communication link is set up between the UUT and the associated companion device using the test setup shown in figure 18. The attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria as specified in clause 4.2.8.3 is still met. The resulting level for the wanted signal at the input of the UUT is Pmin.
- This signal level (Pmin) is increased by 6 dB resulting in a new level (Pmin + 6 dB) of the wanted signal at the UUT receiver input.

Step 4:

· The level of the blocking signal at the UUT input is set to the level provided in table 9. It shall be verified and recorded in the test report that the performance criteria as specified in clause 4.2.8.3 is met.

Step 5:

· Repeat step 4 for each remaining combination of frequency and level as specified in table 9.

Step 6:

· Repeat step 2 to step 5 with the UUT operating at the other operating frequencies at which the blocking test has to be performed. See clause 5.3.2.

Limit

The adjacent channel selectivity of the equipment under specified conditions shall not be less than the levels of the unwanted signal as stated in table:

Receiver category	Limit
1	-30 dBm + k
2	-45 dBm + k
3	-60 dBm + k

The correction factor, k, is as follows:

$$k = -20\log f - 10\log BW$$

Where:

- *f* is the frequency in GHz;
- *BW* is the channel bandwidth in MHz.

The factor *k* is limited within the following:

-40 dB < k < 0 dB.

Test Results

Blocking signal power=SG power + Antenna gain-path cableloss

Wi-Fi 802.11a 6Mbps Channel 149 BW=20MHz Channel lower band edge frequency Fl=5735MHz Channel upper band edge frequency Fh=5755MHz				
Wanted signal from companion	**Blocking signal Frequency (MHz)**	**Minimum Blocking signal Power (dBm)**	**Measured Blocking signal Power (dBm)**	**Test Result (Pass/Fail)**
-87.6	4735(Fl-BW*50)	-88.1961	-7.80	Pass
	5335(Fl-BW*20)		-9.40	Pass
	5535(Fl-BW*10)		-15.50	Pass
	5955(Fh+BW*10)		-13.60	Pass
	6155(Fh+BW*20)		-9.90	Pass
	6755(Fh+BW*50)		-8.60	Pass
Pmin=	-90.6			

Wi-Fi 802.11a 6Mbps Channel 165 BW=20MHz Channel lower band edge frequency Fl=5815MHz Channel upper band edge frequency Fh=5835MHz				
Wanted signal from companion	**Blocking signal Frequency (MHz)**	**Minimum Blocking signal Power (dBm)**	**Measured Blocking signal Power (dBm)**	**Test Result (Pass/Fail)**
-86.9	4815(Fl-BW*50)	-88.3162	-6.10	Pass
	5415(Fl-BW*20)		-9.00	Pass
	5615(Fl-BW*10)		-11.10	Pass
	6035(Fh+BW*10)		-12.50	Pass
	6235(Fh+BW*20)		-10.90	Pass
	6835(Fh+BW*50)		-8.00	Pass
Pmin=	-89.9			

5.5. Transmitter Spurious Emissions

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Method of measurement conducted spurious components

This method of measurement applies to transmitters having a permanent antenna connector. Additional requirements for equipment employing FHSS modulation are given in clause 4.2.4.3.4:
a) The transmitter shall be connected to a measuring receiver through a test load, 50 Ω power attenuator, and if necessary, an appropriate filter to avoid overload of the measuring receiver. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in table 3, see clause 4.2.4.4. This bandwidth shall be recorded in the test report.
For the measurement of spurious emissions below the second harmonic of the carrier frequency, the filter used shall be a high "Q" (notch) filter centred on the transmitter carrier frequency, which attenuates this signal by at least 30 dB.
For the measurement of spurious emissions at and above the second harmonic of the carrier frequency the filter used shall be a high pass filter with a stop band rejection exceeding 40 dB. The cut-off frequency of the high pass filter shall be approximately 1,5 times the transmitter carrier frequency.
Precautions may be required to ensure that the test load does not generate or that the high pass filter does not attenuate, the harmonics of the carrier.
b) The transmitter shall be unmodulated and operating at the maximum limit of its specified power range. If modulation cannot be inhibited then the test shall be carried out with modulation (see clause 5.8.1) and this fact shall be recorded in the test report.
c) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25 MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25 MHz up to twice the carrier frequency, not exceeding 66 GHz. The frequency and level of every spurious emission found shall be noted.
The emissions within the channel occupied by the transmitter carrier and, for channelized systems its adjacent channels, shall not be recorded.
d) If the measuring receiver has not been calibrated in terms of power level at the transmitter output, the level of any detected components shall be determined by replacing the transmitter by the signal generator and adjusting it to reproduce the frequency and level of every spurious emission noted in step c). The absolute power level of each of the emissions shall be noted.
e) The frequency and level of each spurious emission measured and the bandwidth of the measuring receiver shall be recorded in the test report.
f) If a user accessible power adjustment is provided then the tests in steps c) to e) shall be repeated

at the lowest power setting available.

g) The measurement in steps c) to f) shall be repeated with the transmitter in the standby condition if this option is available.

Method of measurement radiated spurious components

This method of measurement applies to transmitters having an integral antenna.

Additional requirements for equipment employing FHSS modulation are given in clause 4.2.4.3.4:

a) A test site selected from Annex E which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver, through a suitable filter to avoid overloading of the measuring receiver if required.

The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver, after allowing for the coupling loss, is at least 6 dB below the spurious emission limit given in table 3, see clause 4.2.4.4. This bandwidth shall be recorded in the test report.

For the measurement of spurious emissions below the second harmonic of the carrier frequency the optional filter used shall be a high "Q" (notch) filter centred on the transmitter carrier frequency and attenuating this signal by at least 30 dB.

For the measurement of spurious emissions at and above the second harmonic of the carrier frequency the optional filter used shall be a high pass filter with a stop band rejection exceeding 40 dB. The cut-off frequency of the high pass filter shall be approximately 1,5 times the transmitter carrier frequency.

The transmitter under test shall be placed on the support in its standard position and shall be switched on without modulation. If modulation cannot be inhibited then the test shall be carried out with modulation (see clause 6.1) and this fact shall be recorded in the test report.

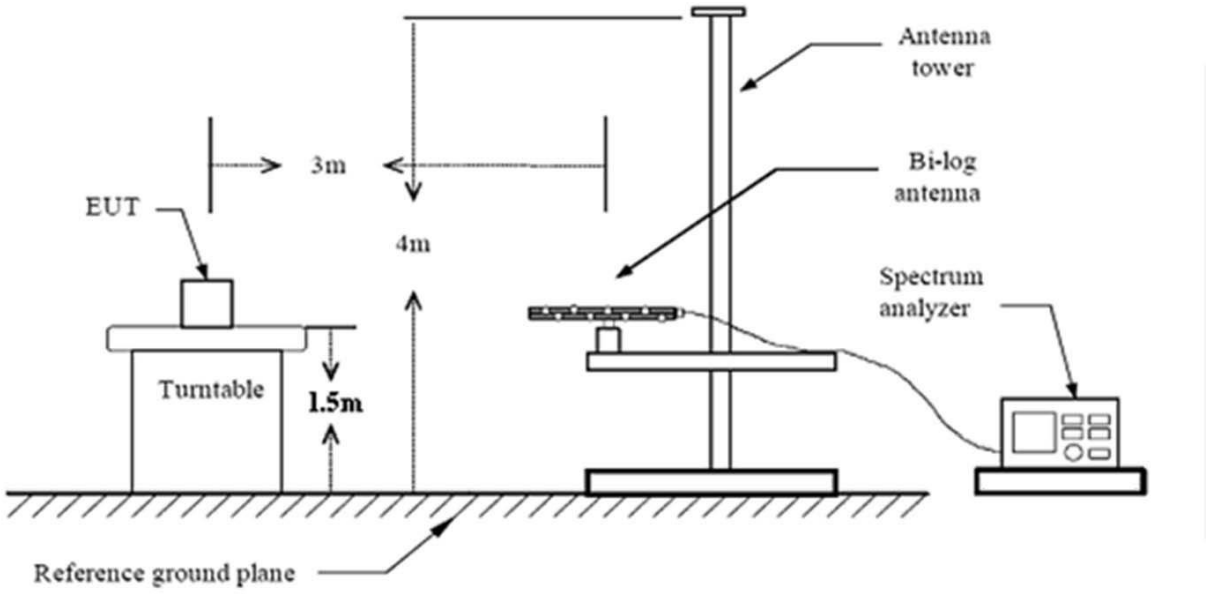
b) The same method of measurement as steps b) and k) of clause 4.2.4.3.2 shall be used.

Test Setup

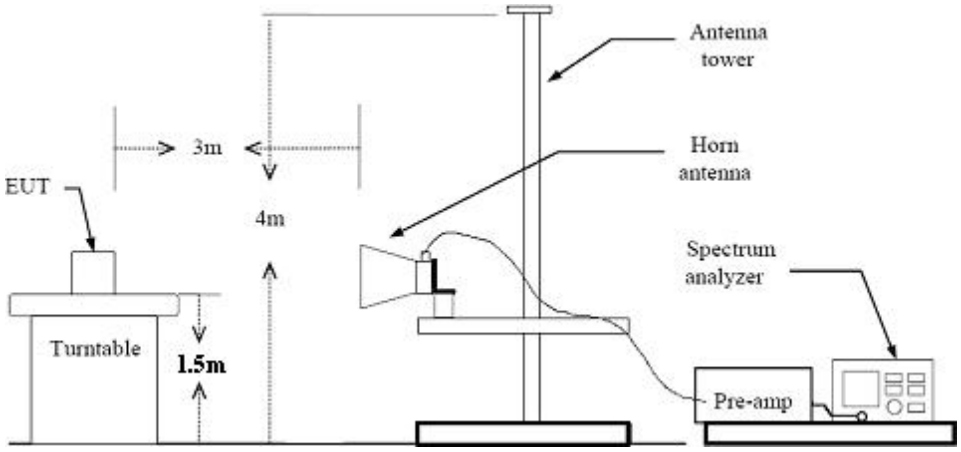
Conducted spurious components :

Radiated spurious components:

Below 3 GHz



Above 3 GHz



Limit

Frequency range	47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ⩽ 1 000 MHz	Frequencies > 1 000 MHz
State			
Operating	4 nW	250 nW	1 µW
Standby	2 nW	2 nW	20 nW

Transmitter Results

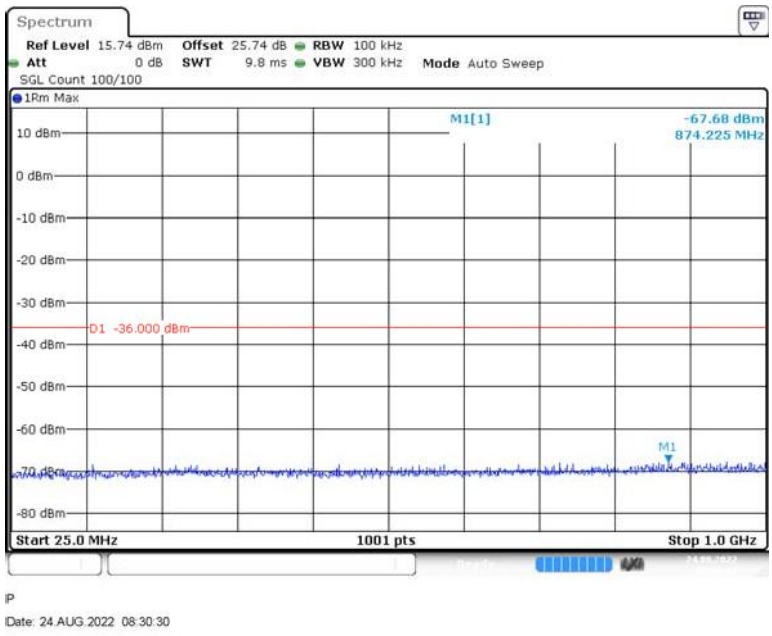
Sweep from 25MHz to 40GHz, and the emissions more than 20 dB below the permissible value are not reported.

Note: The signal beyond the limit is carrier

Conducted

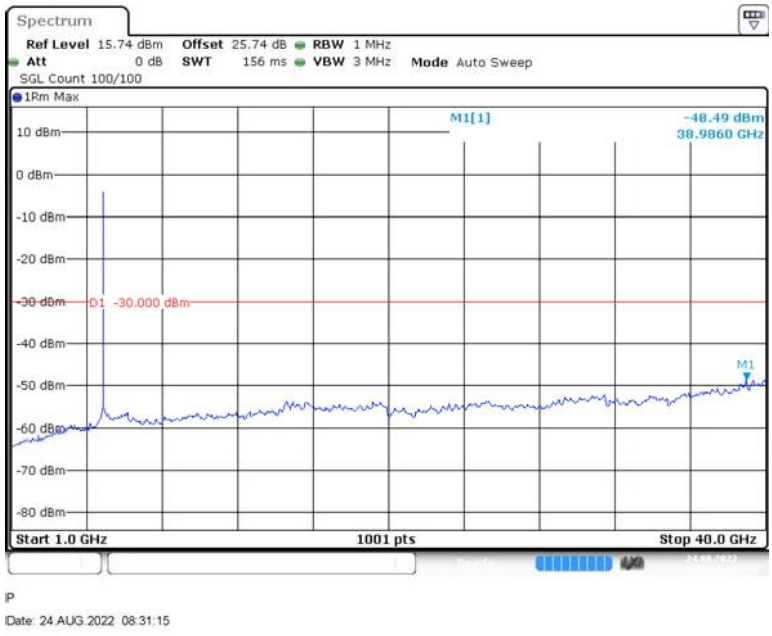
Conducted spurious Emissions

802.11a 5745MHz @ 25MHz-1000MHz



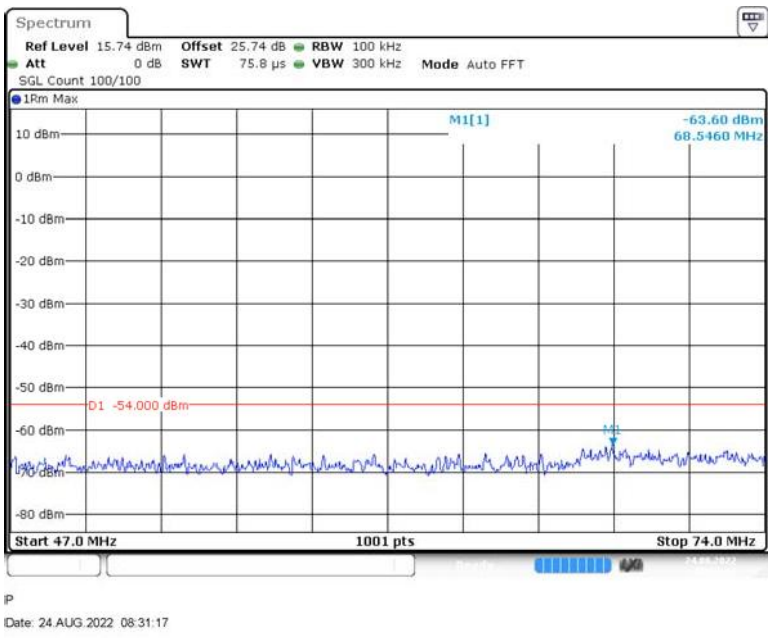
Conducted spurious Emissions

802.11a 5745MHz @ 1000MHz-40000MHz



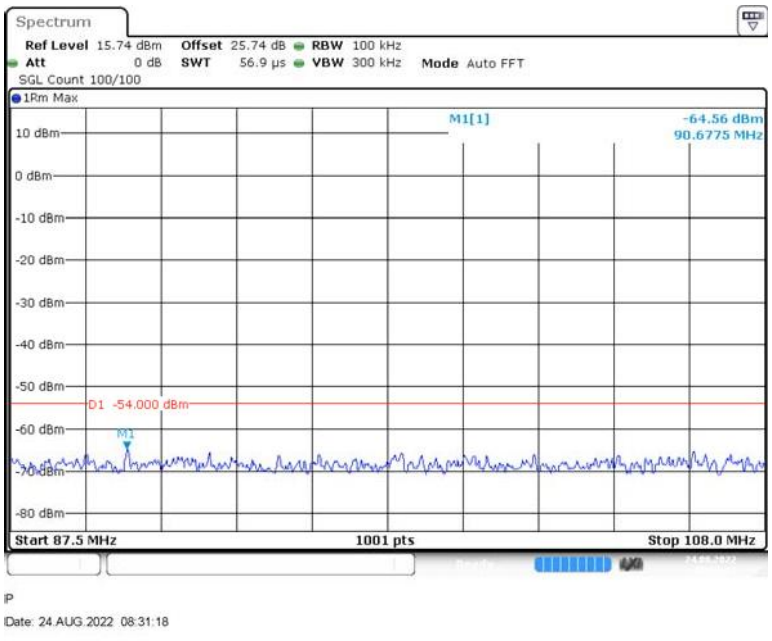
Conducted spurious Emissions

802.11a 5745MHz @ 47MHz-74MHz



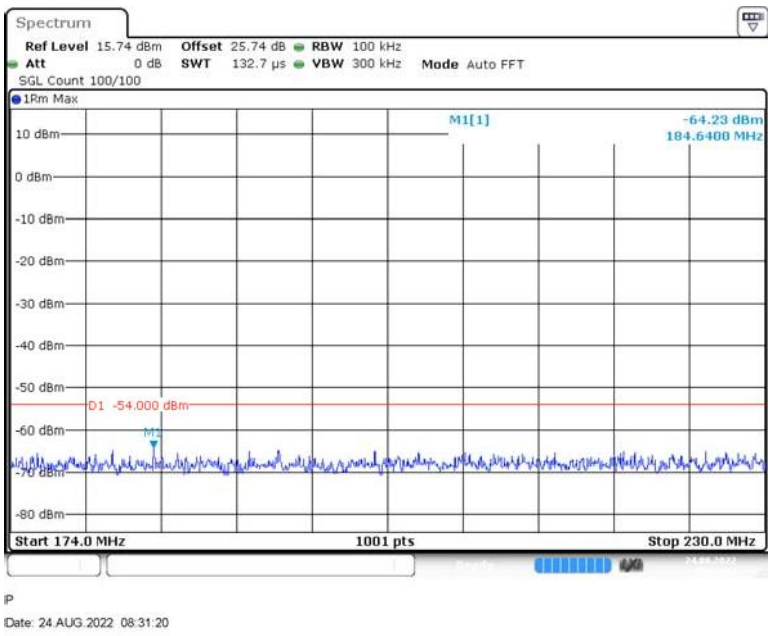
Conducted spurious Emissions

802.11a 5745MHz @ 87.5MHz-108MHz



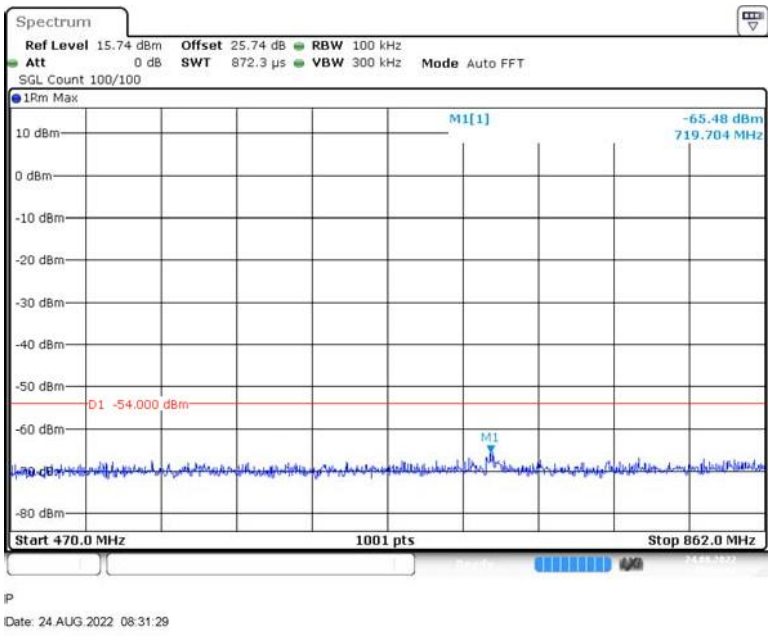
Conducted spurious Emissions

802.11a 5745MHz @ 174MHz-230MHz



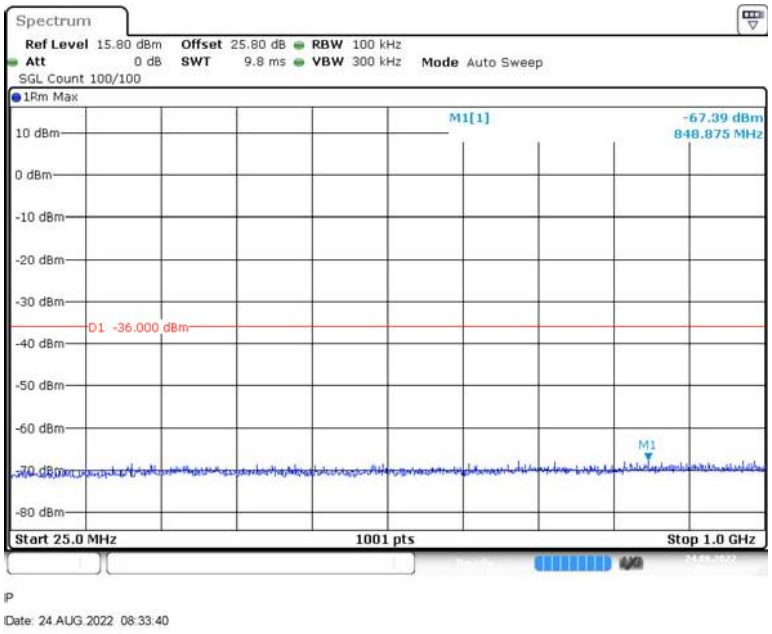
Conducted spurious Emissions

802.11a 5745MHz @ 470MHz-862MHz



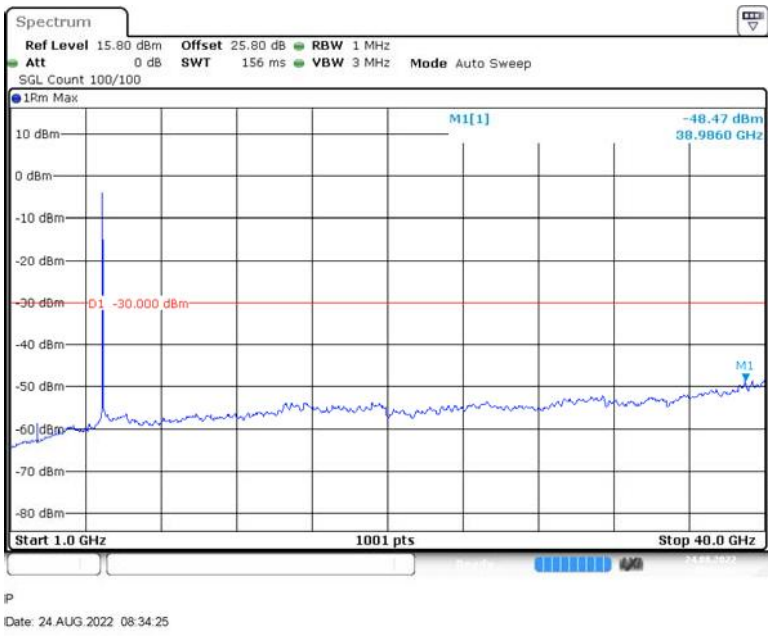
Conducted spurious Emissions

802.11a 5785MHz @ 25MHz-1000MHz



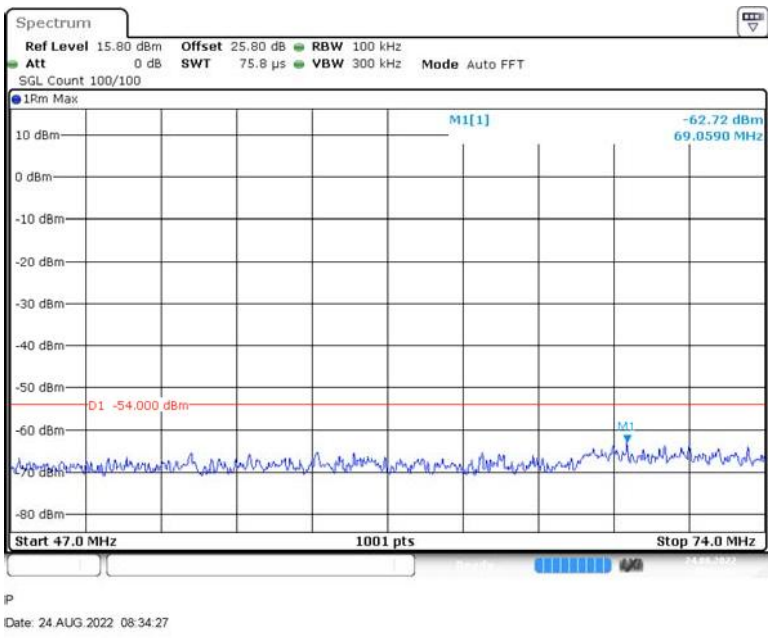
Conducted spurious Emissions

802.11a 5785MHz @ 1000MHz-40000MHz



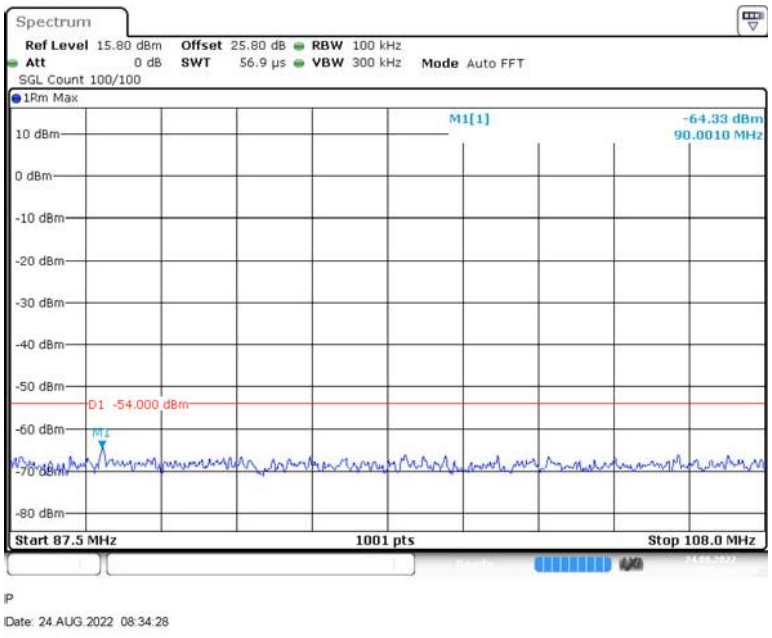
Conducted spurious Emissions

802.11a 5785MHz @ 47MHz-74MHz



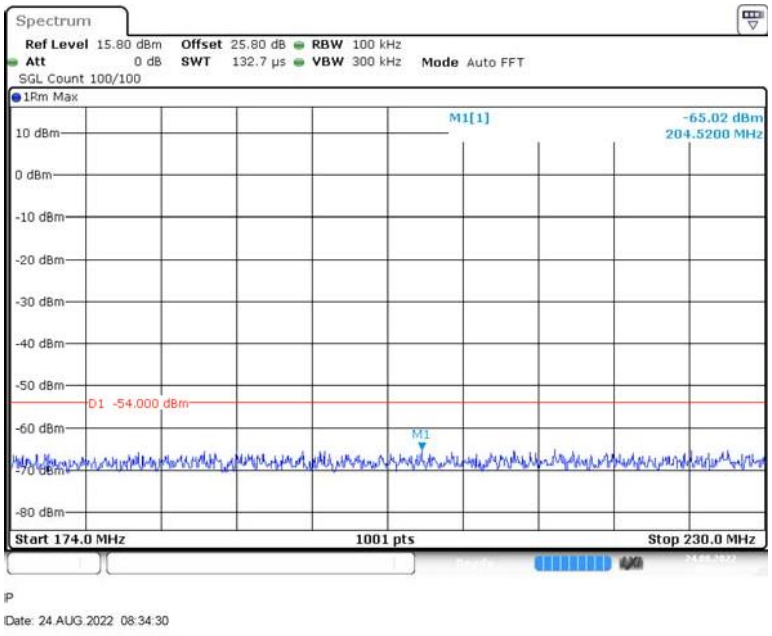
Conducted spurious Emissions

802.11a 5785MHz @ 87.5MHz-108MHz



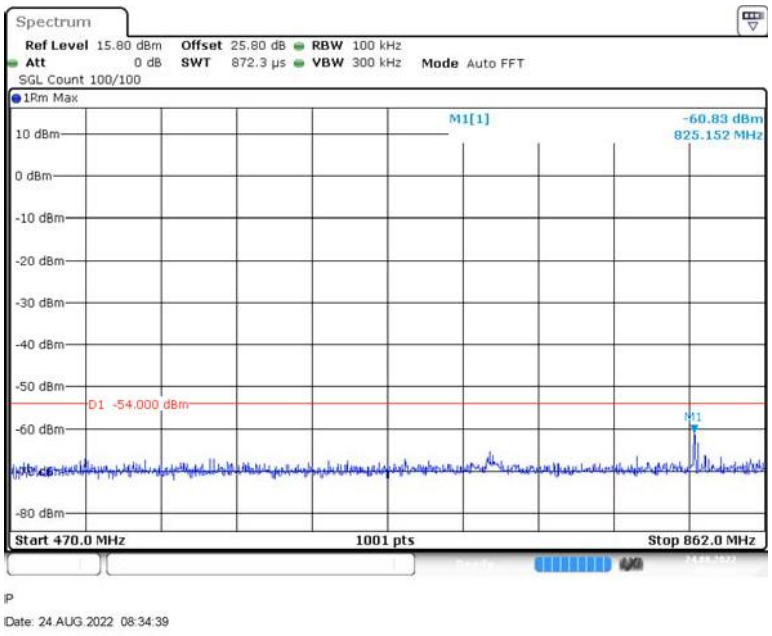
Conducted spurious Emissions

802.11a 5785MHz @ 174MHz-230MHz



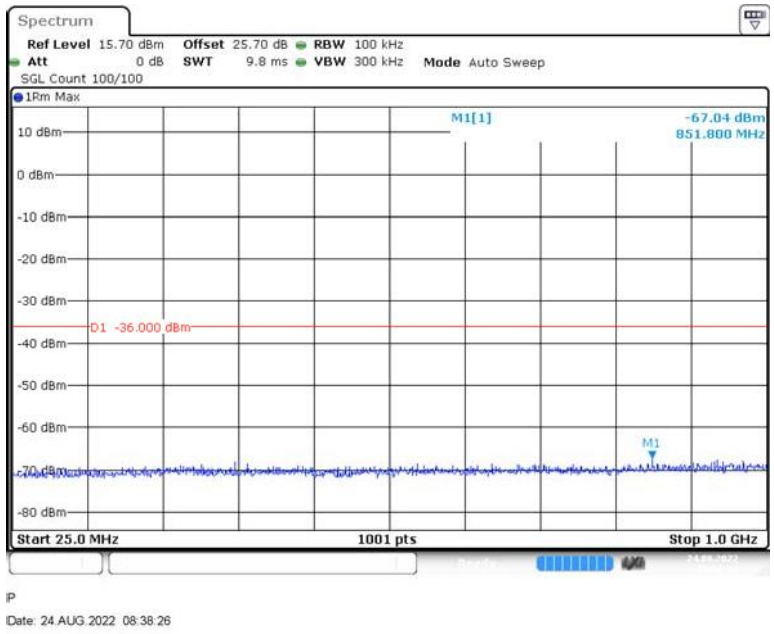
Conducted spurious Emissions

802.11a 5785MHz @ 470MHz-862MHz



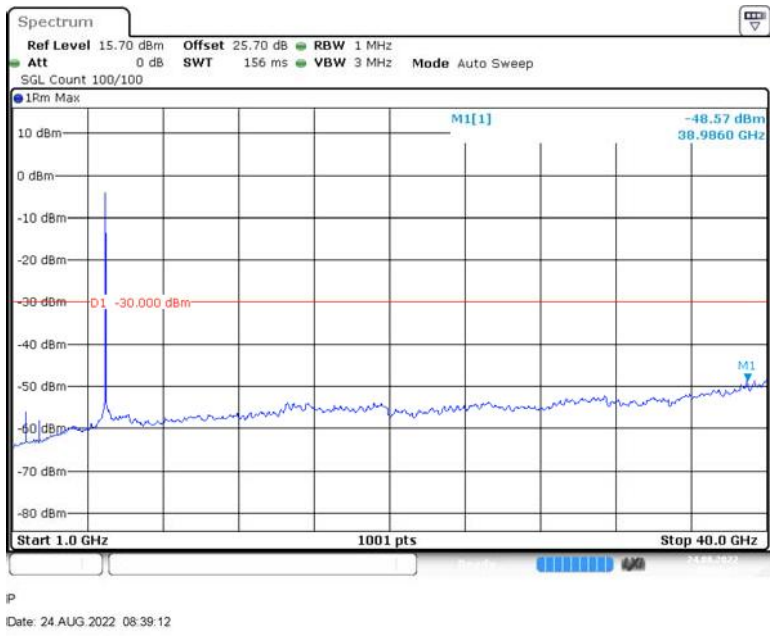
Conducted spurious Emissions

802.11a 5825MHz @ 25MHz-1000MHz



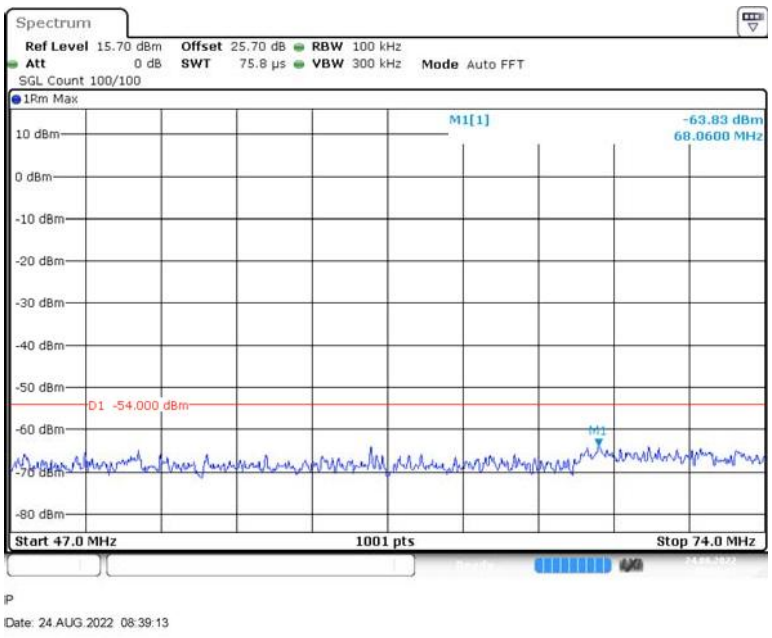
Conducted spurious Emissions

802.11a 5825MHz @ 1000MHz-40000MHz



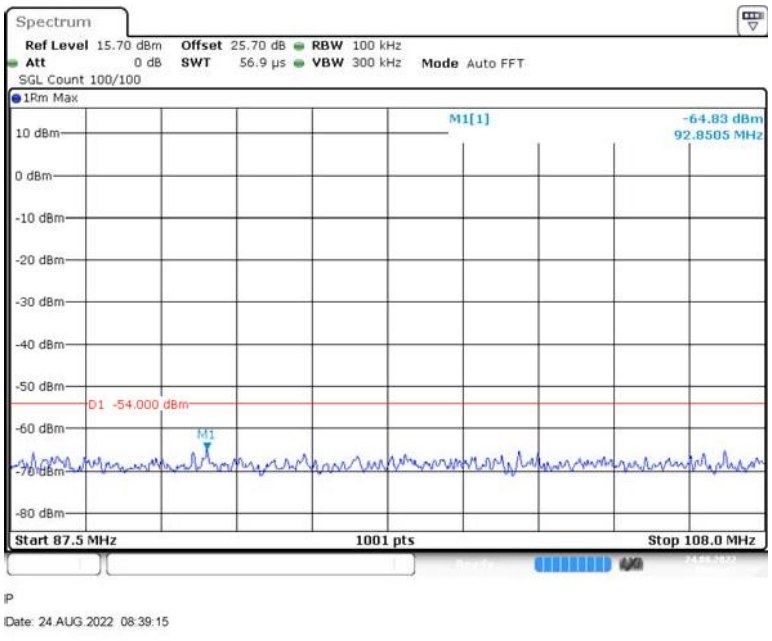
Conducted spurious Emissions

802.11a 5825MHz @ 47MHz-74MHz



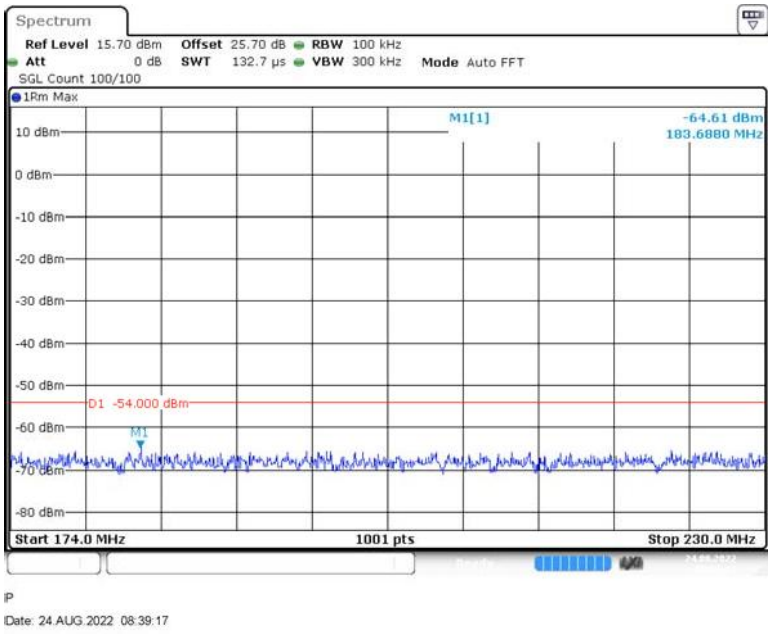
Conducted spurious Emissions

802.11a 5825MHz @ 87.5MHz-108MHz



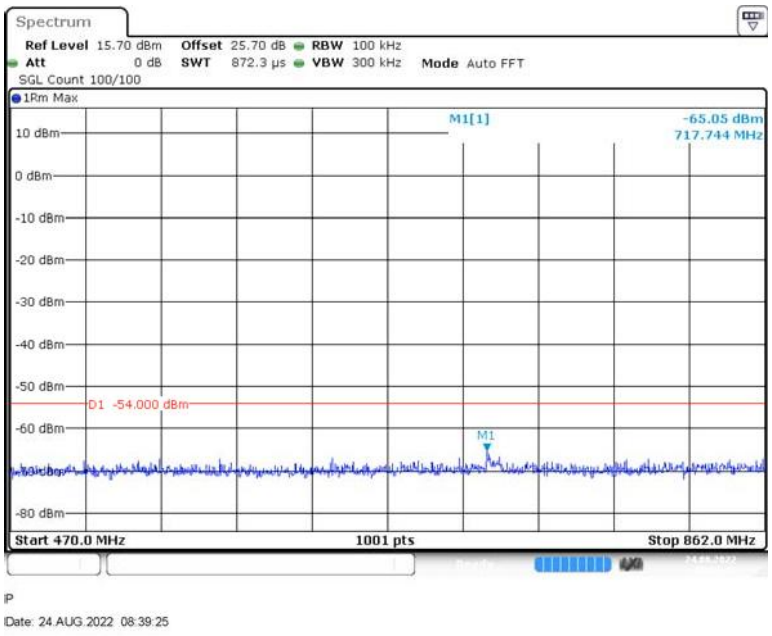
Conducted spurious Emissions

802.11a 5825MHz @ 174MHz-230MHz



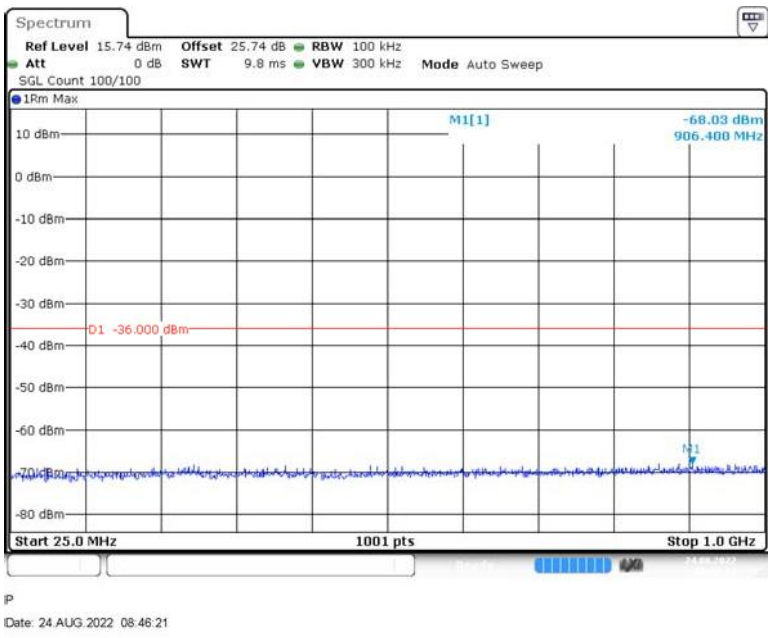
Conducted spurious Emissions

802.11a 5825MHz @ 470MHz-862MHz



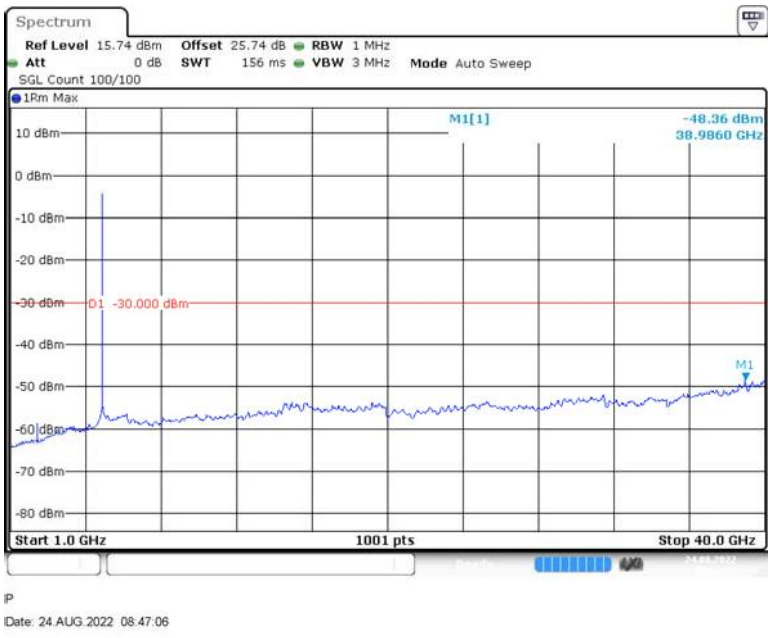
Conducted spurious Emissions

802.11ac(VHT20) 5745MHz @ 25MHz-1000MHz



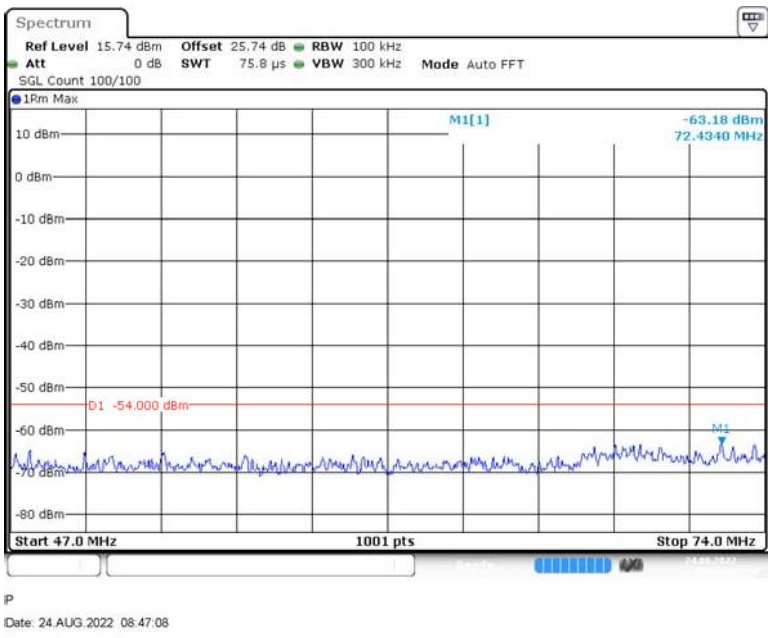
Conducted spurious Emissions

802.11ac(VHT20) 5745MHz @ 1000MHz-40000MHz



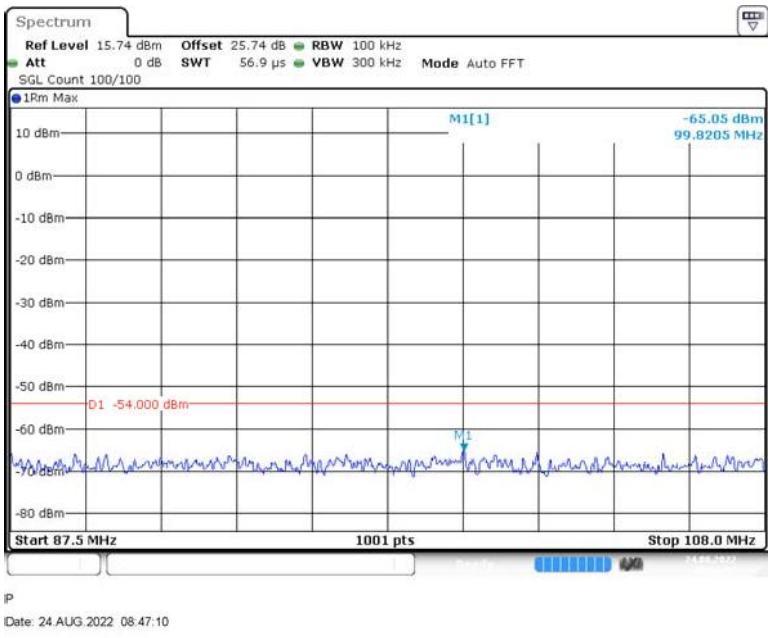
Conducted spurious Emissions

802.11ac(VHT20) 5745MHz @ 47MHz-74MHz



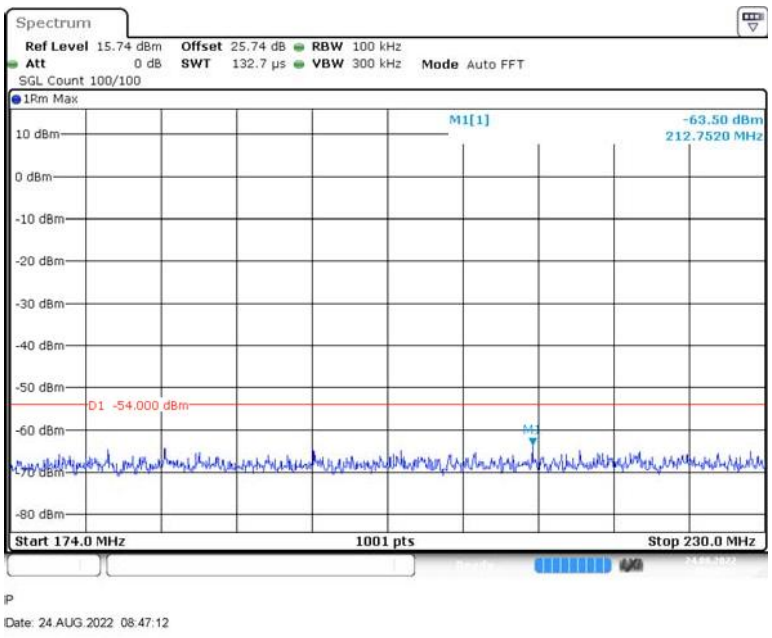
Conducted spurious Emissions

802.11ac(VHT20) 5745MHz @ 87.5MHz-108MHz



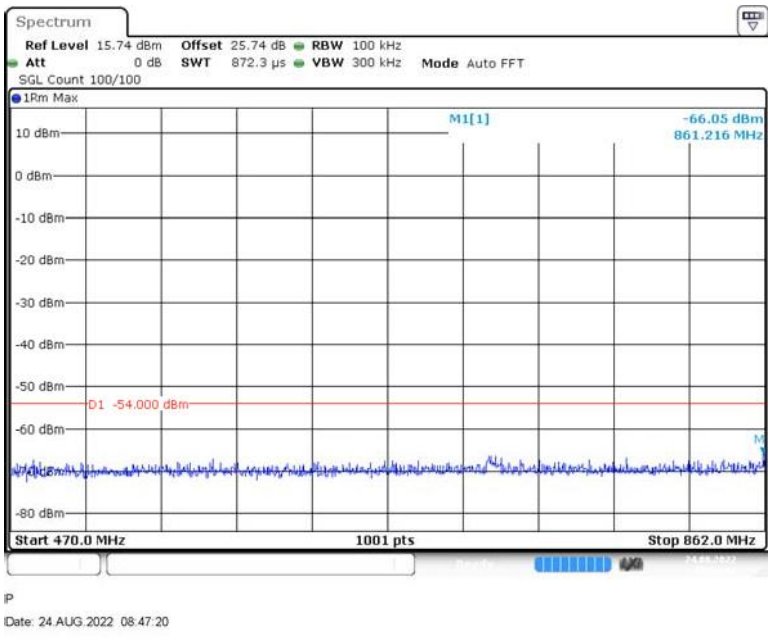
Conducted spurious Emissions

802.11ac(VHT20) 5745MHz @ 174MHz-230MHz



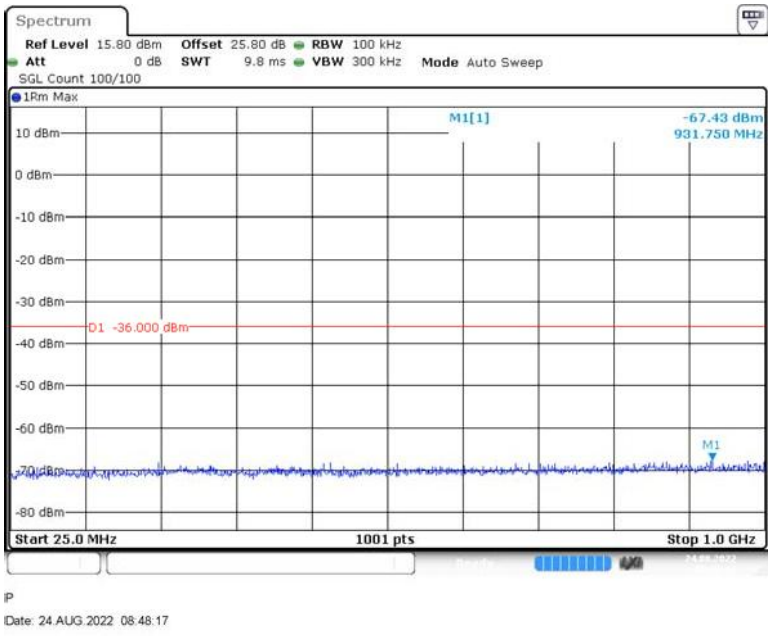
Conducted spurious Emissions

802.11ac(VHT20) 5745MHz @ 470MHz-862MHz



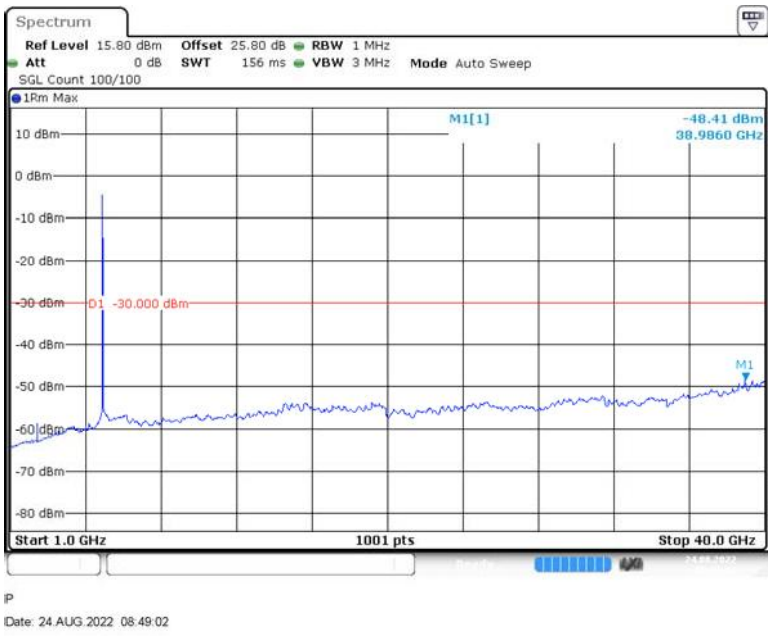
Conducted spurious Emissions

802.11ac(VHT20) 5785MHz @ 25MHz-1000MHz



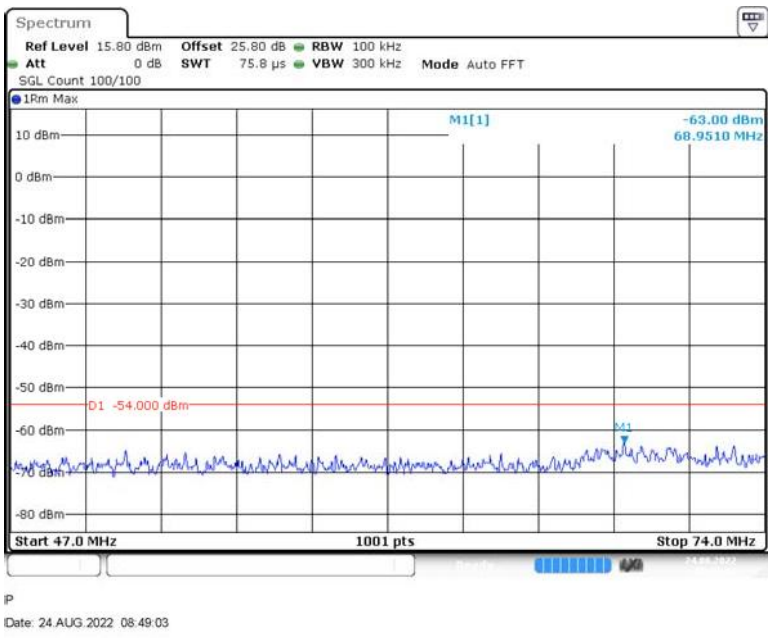
Conducted spurious Emissions

802.11ac(VHT20) 5785MHz @ 1000MHz-40000MHz



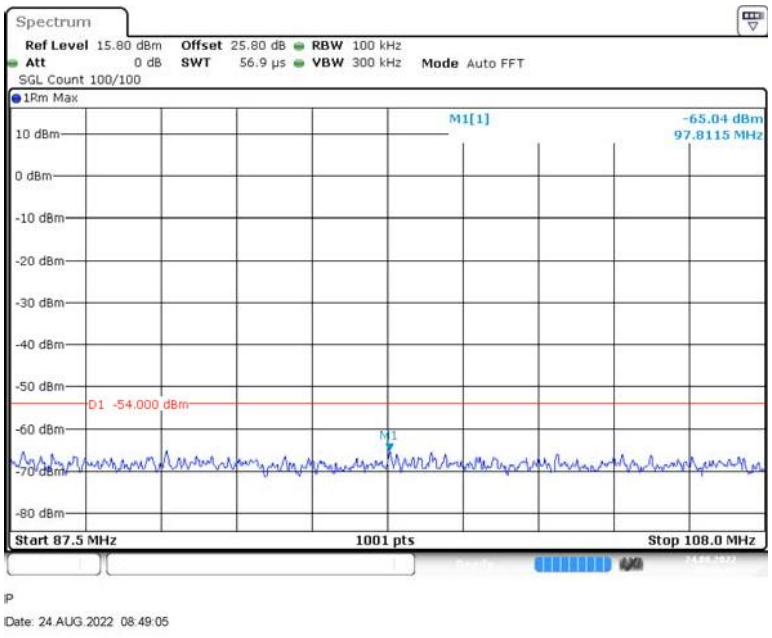
Conducted spurious Emissions

802.11ac(VHT20) 5785MHz @ 47MHz-74MHz



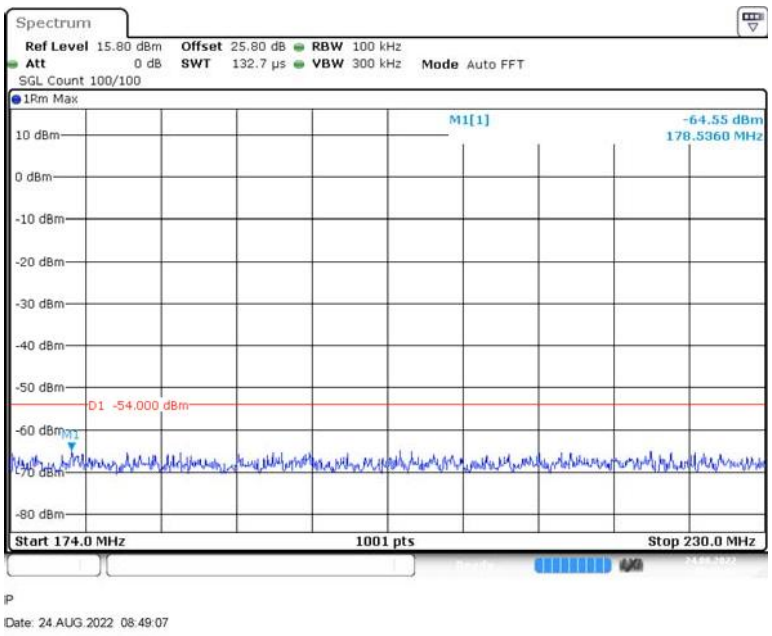
Conducted spurious Emissions

802.11ac(VHT20) 5785MHz @ 87.5MHz-108MHz



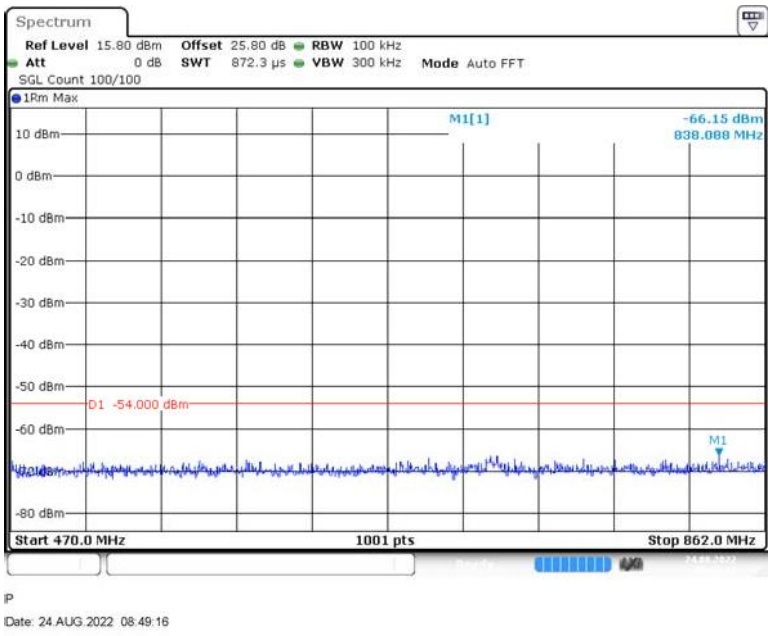
Conducted spurious Emissions

802.11ac(VHT20) 5785MHz @ 174MHz-230MHz



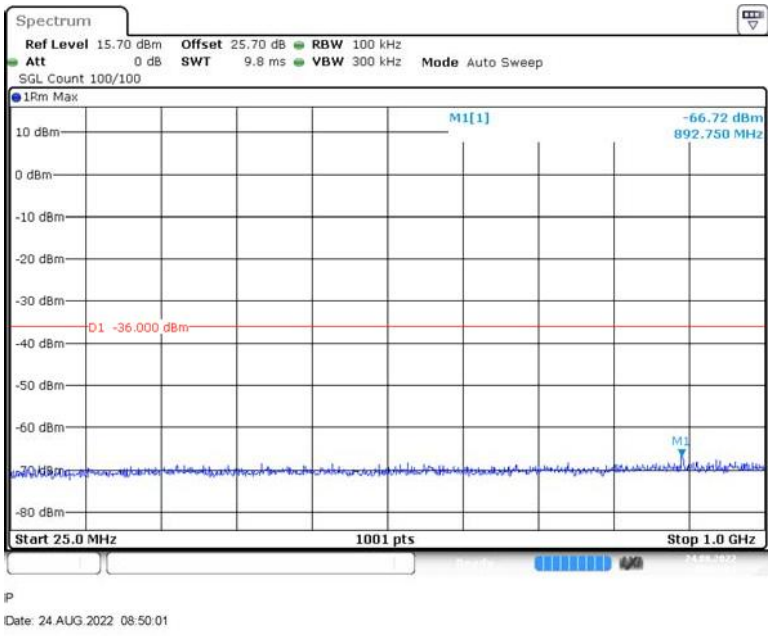
Conducted spurious Emissions

802.11ac(VHT20) 5785MHz @ 470MHz-862MHz



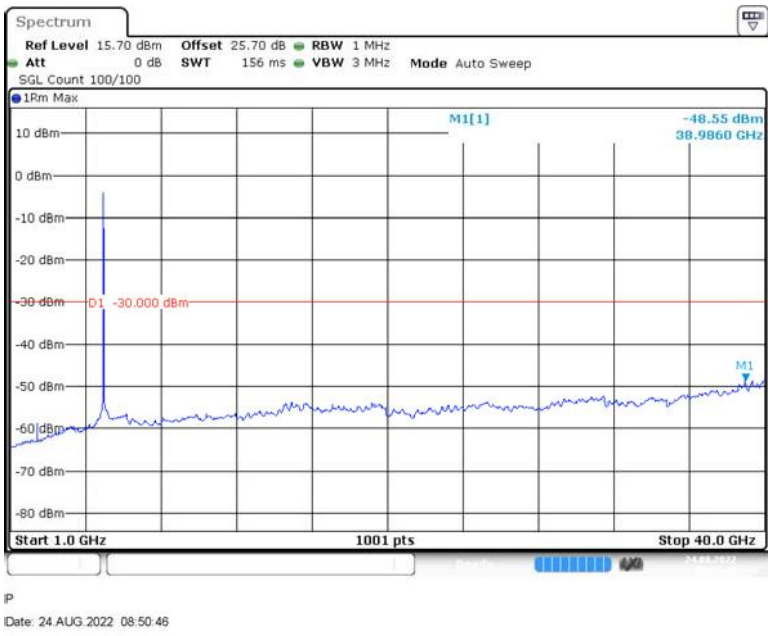
Conducted spurious Emissions

802.11ac(VHT20) 5825MHz @ 25MHz-1000MHz



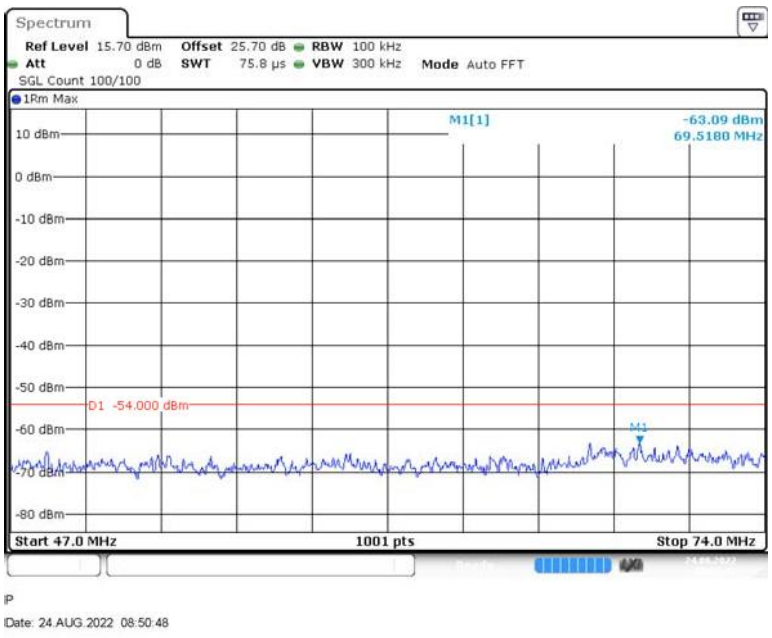
Conducted spurious Emissions

802.11ac(VHT20) 5825MHz @ 1000MHz-40000MHz



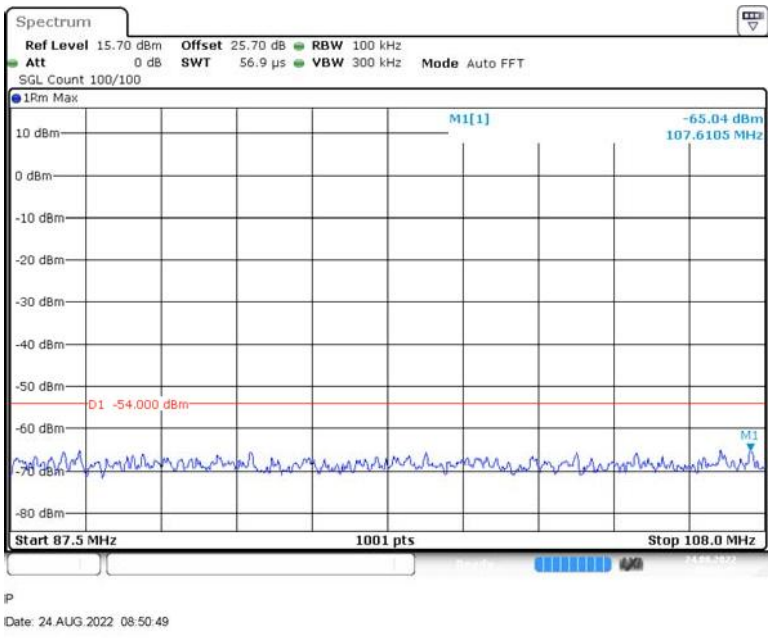
Conducted spurious Emissions

802.11ac(VHT20) 5825MHz @ 47MHz-74MHz



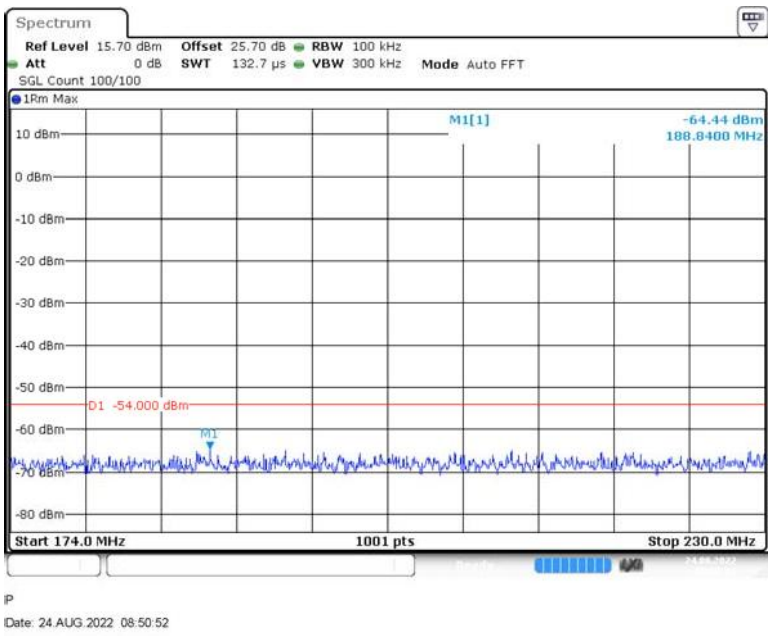
Conducted spurious Emissions

802.11ac(VHT20) 5825MHz @ 87.5MHz-108MHz



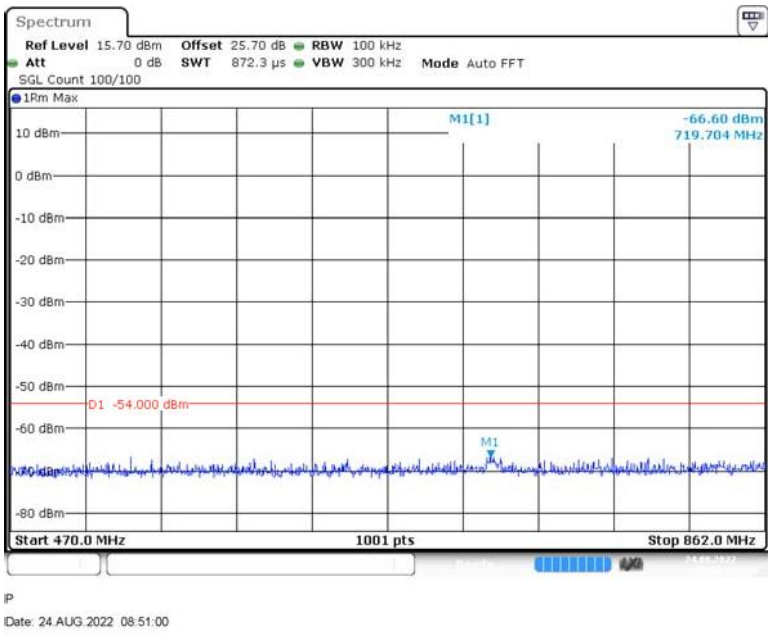
Conducted spurious Emissions

802.11ac(VHT20) 5825MHz @ 174MHz-230MHz



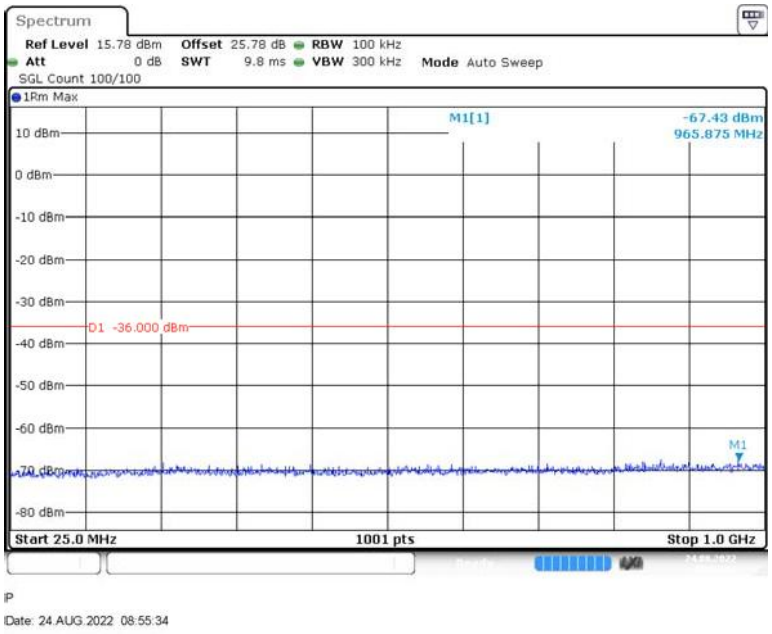
Conducted spurious Emissions

802.11ac(VHT20) 5825MHz @ 470MHz-862MHz



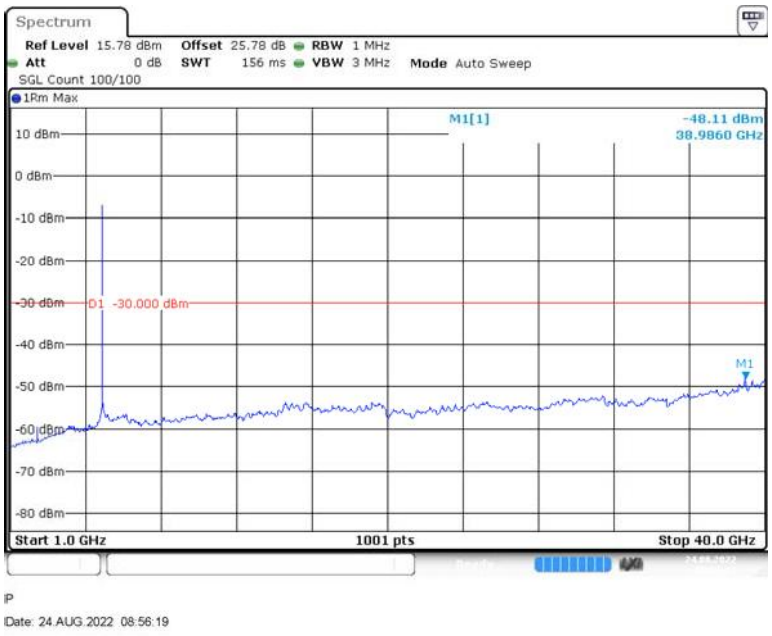
Conducted spurious Emissions

802.11ac(VHT40) 5755MHz @ 25MHz-1000MHz



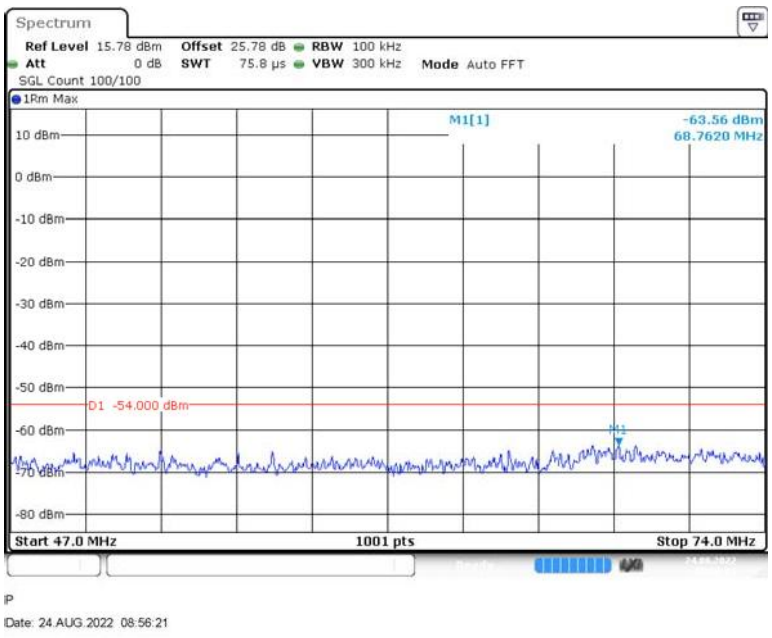
Conducted spurious Emissions

802.11ac(VHT40) 5755MHz @ 1000MHz-40000MHz



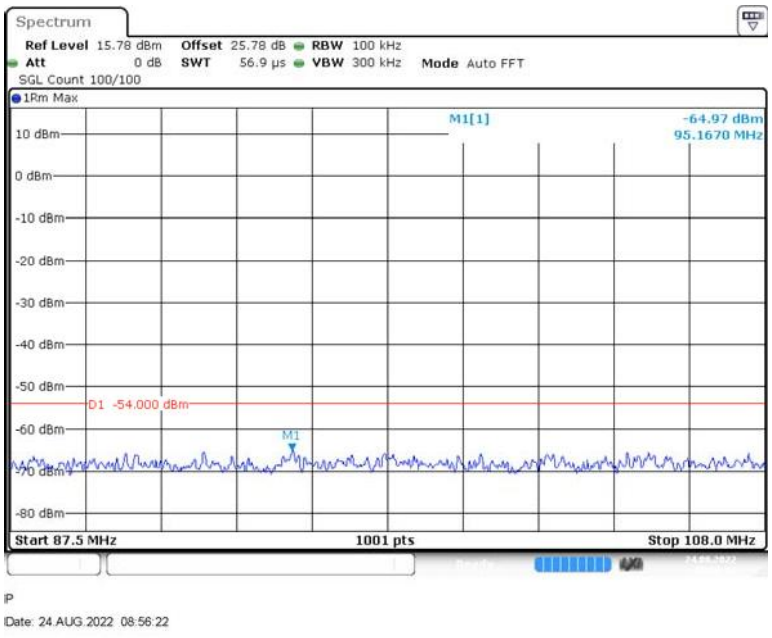
Conducted spurious Emissions

802.11ac(VHT40) 5755MHz @ 47MHz-74MHz



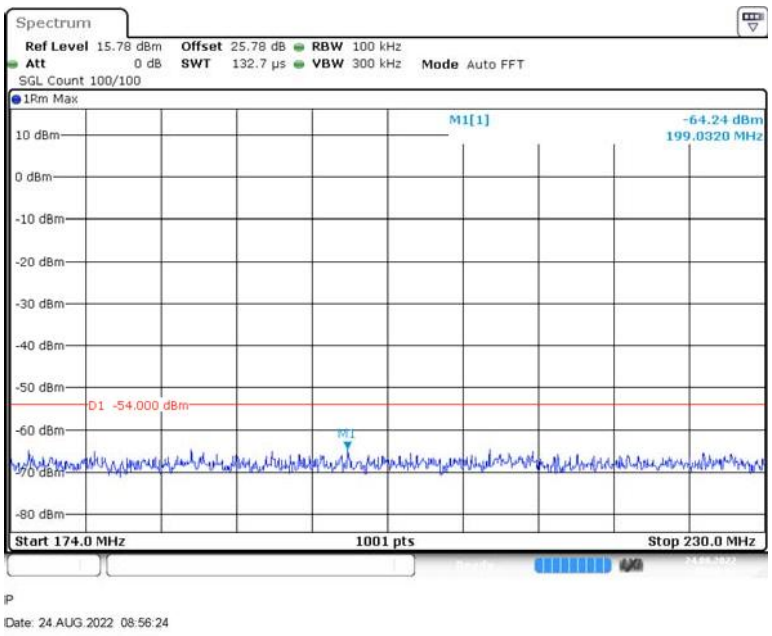
Conducted spurious Emissions

802.11ac(VHT40) 5755MHz @ 87.5MHz-108MHz



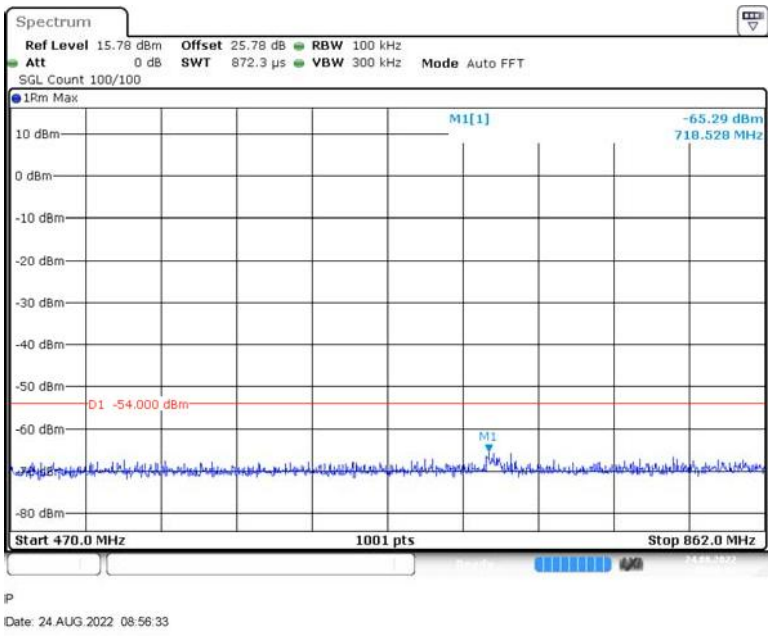
Conducted spurious Emissions

802.11ac(VHT40) 5755MHz @ 174MHz-230MHz



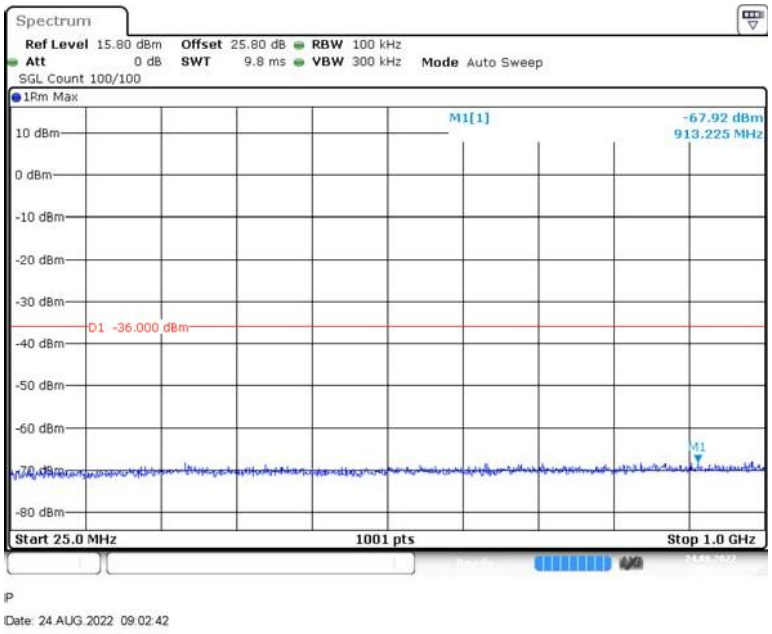
Conducted spurious Emissions

802.11ac(VHT40) 5755MHz @ 470MHz-862MHz



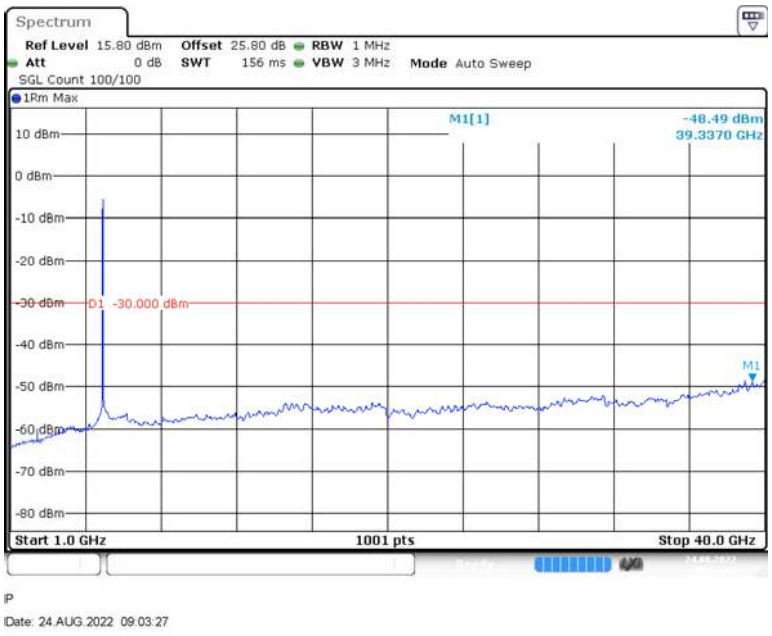
Conducted spurious Emissions

802.11ac(VHT40) 5795MHz @ 25MHz-1000MHz



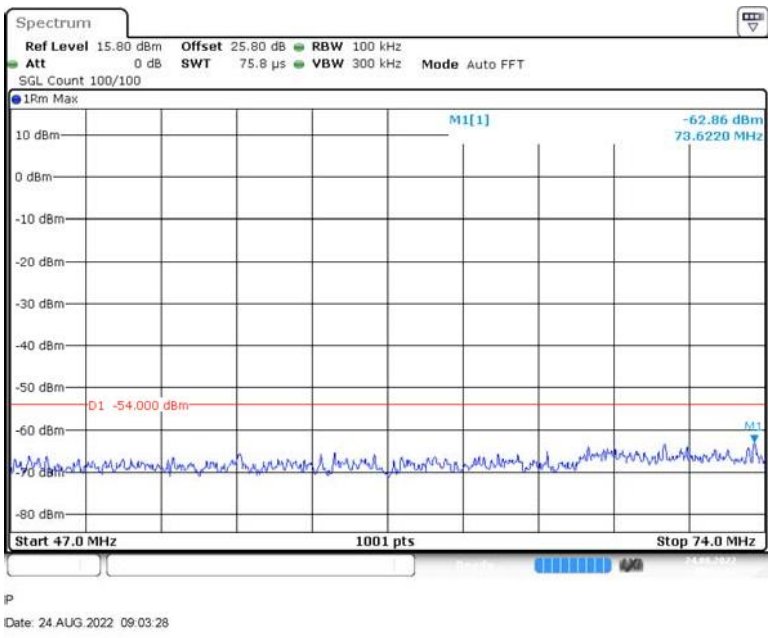
Conducted spurious Emissions

802.11ac(VHT40) 5795MHz @ 1000MHz-40000MHz



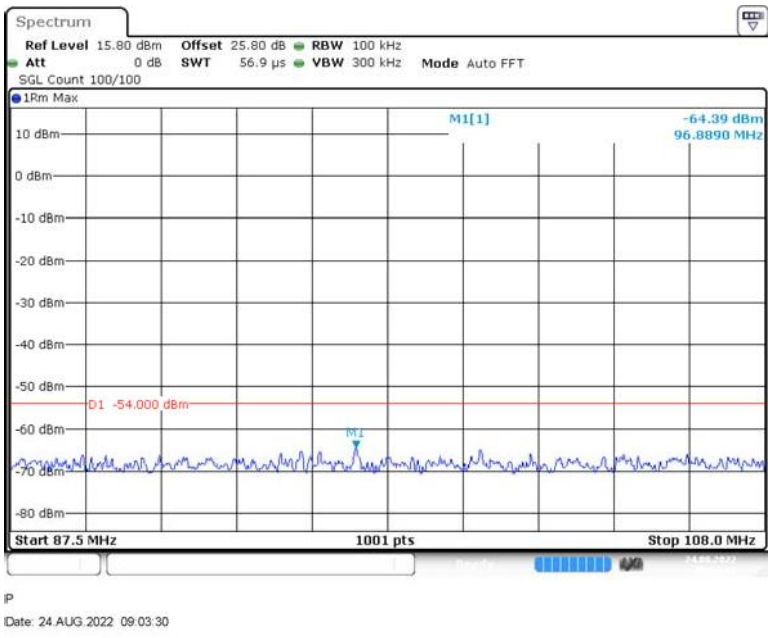
Conducted spurious Emissions

802.11ac(VHT40) 5795MHz @ 47MHz-74MHz



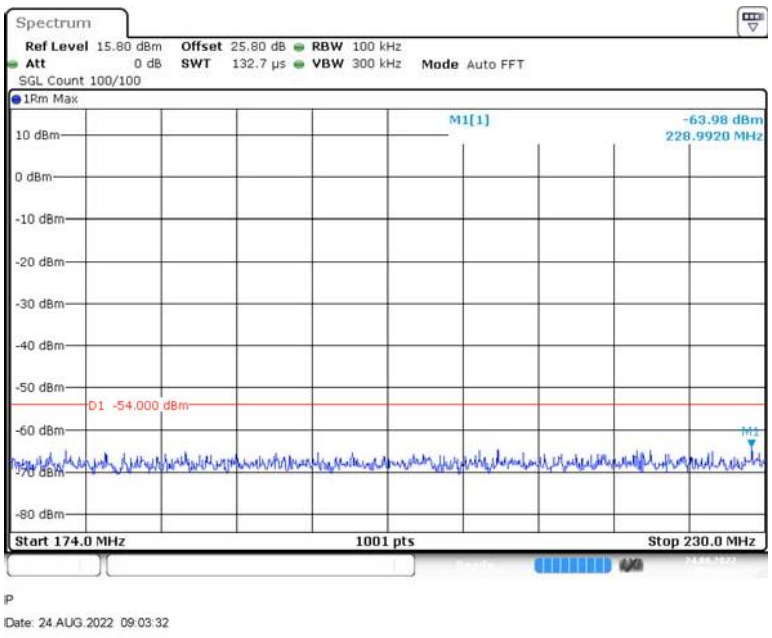
Conducted spurious Emissions

802.11ac(VHT40) 5795MHz @ 87.5MHz-108MHz



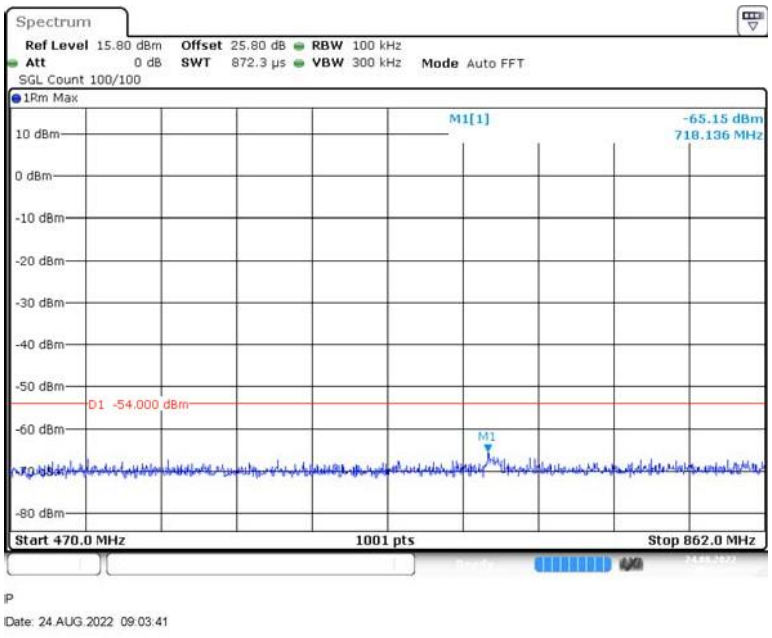
Conducted spurious Emissions

802.11ac(VHT40) 5795MHz @ 174MHz-230MHz



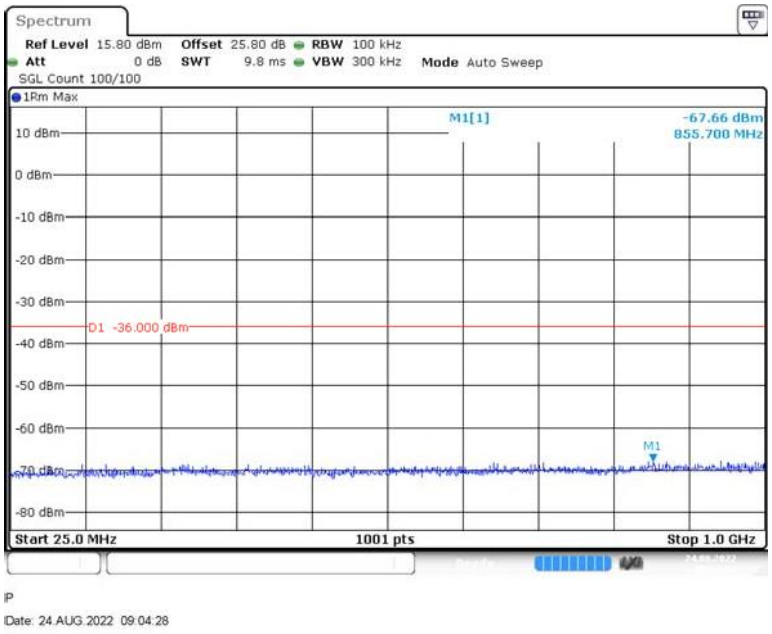
Conducted spurious Emissions

802.11ac(VHT40) 5795MHz @ 470MHz-862MHz



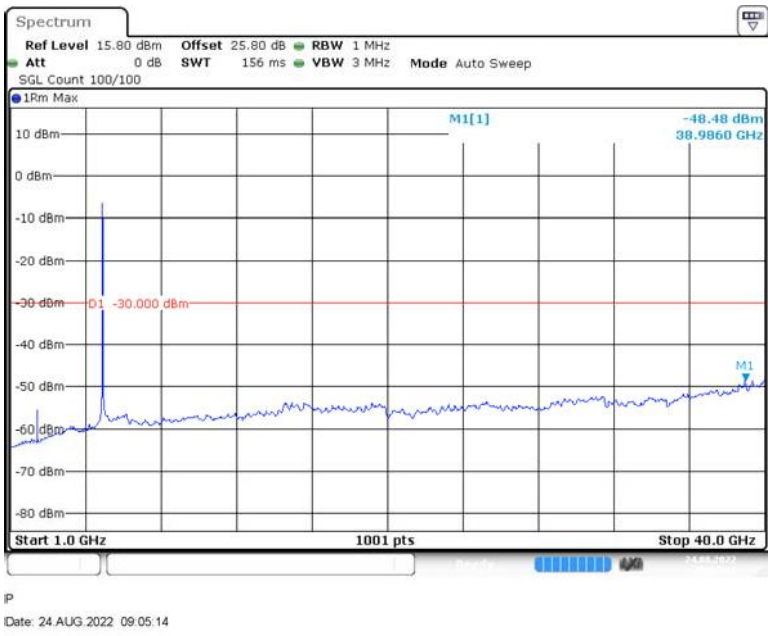
Conducted spurious Emissions

802.11ac(VHT80) 5775MHz @ 25MHz-1000MHz



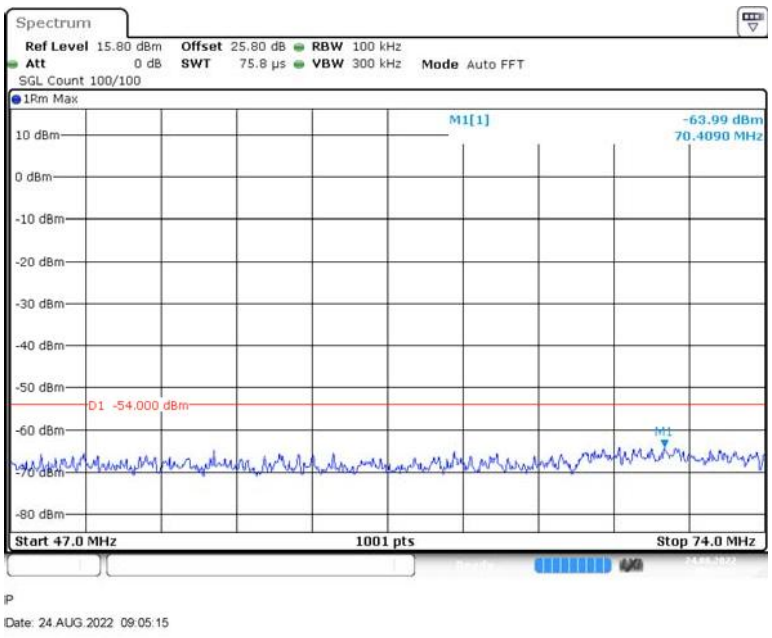
Conducted spurious Emissions

802.11ac(VHT80) 5775MHz @ 1000MHz-40000MHz



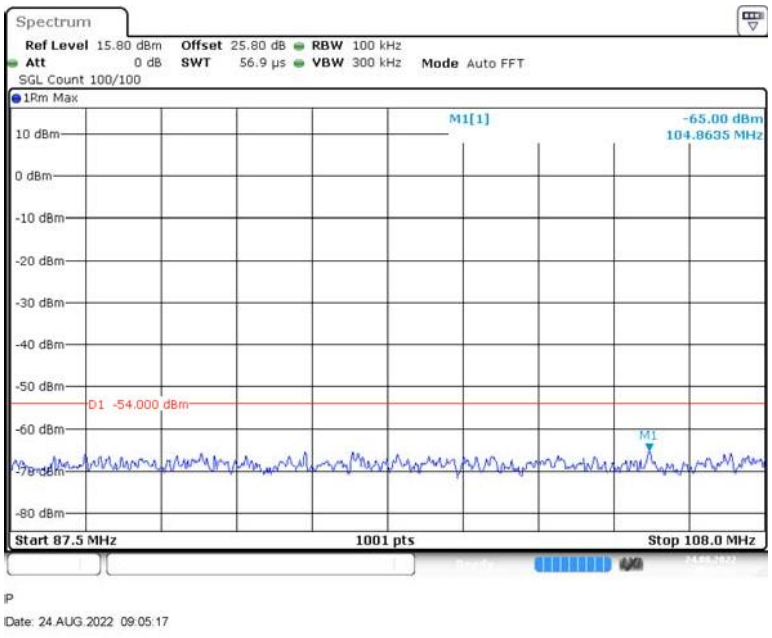
Conducted spurious Emissions

802.11ac(VHT80) 5775MHz @ 47MHz-74MHz



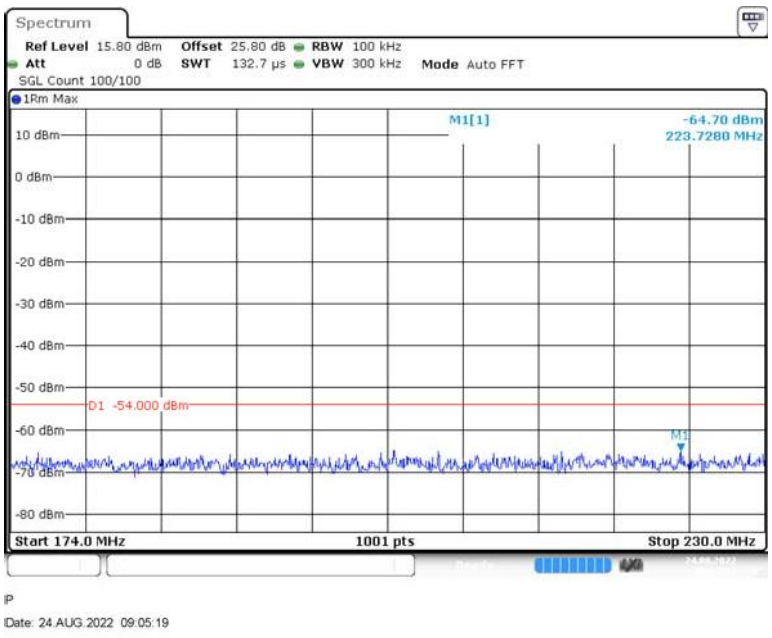
Conducted spurious Emissions

802.11ac(VHT80) 5775MHz @ 87.5MHz-108MHz



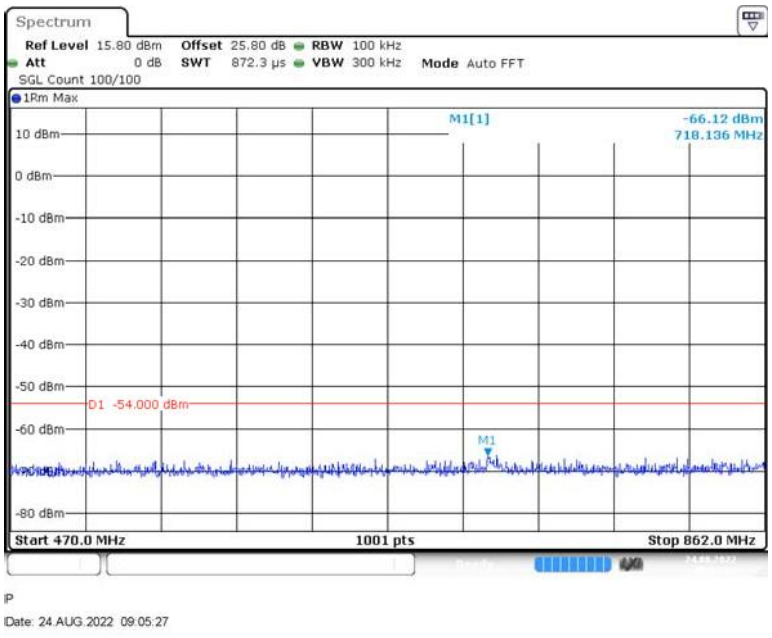
Conducted spurious Emissions

802.11ac(VHT80) 5775MHz @ 174MHz-230MHz



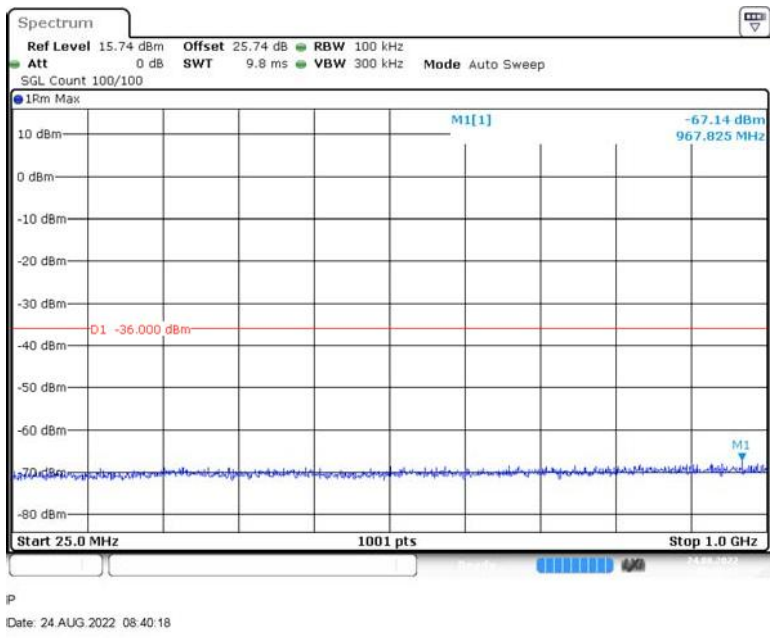
Conducted spurious Emissions

802.11ac(VHT80) 5775MHz @ 470MHz-862MHz



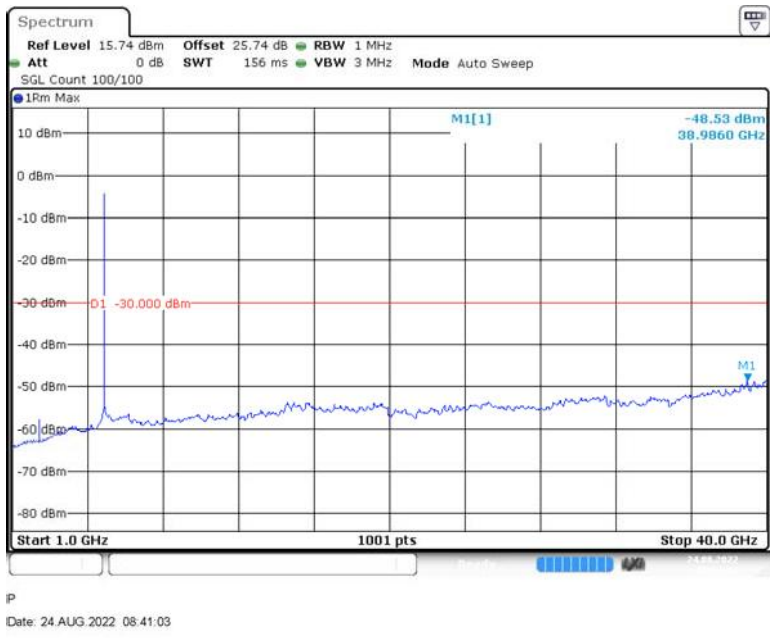
Conducted spurious Emissions

802.11n(HT20) 5745MHz @ 25MHz-1000MHz



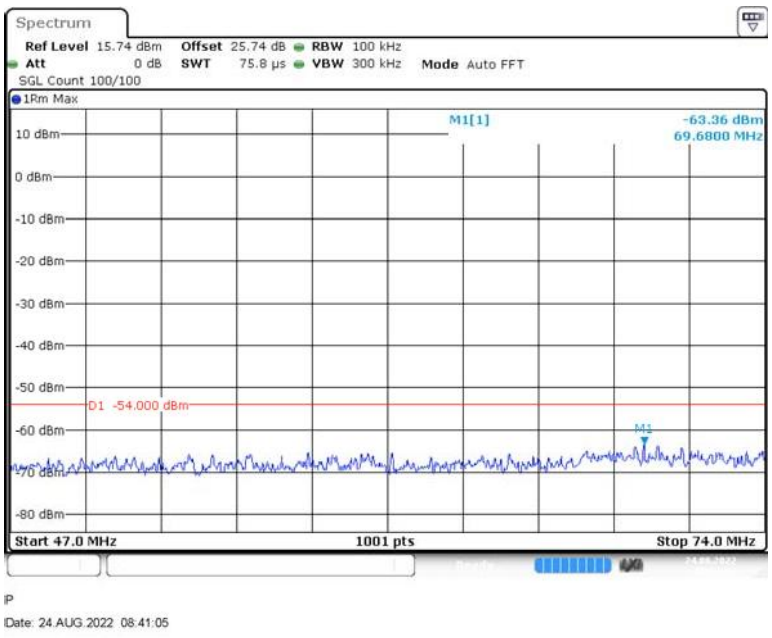
Conducted spurious Emissions

802.11n(HT20) 5745MHz @ 1000MHz-40000MHz



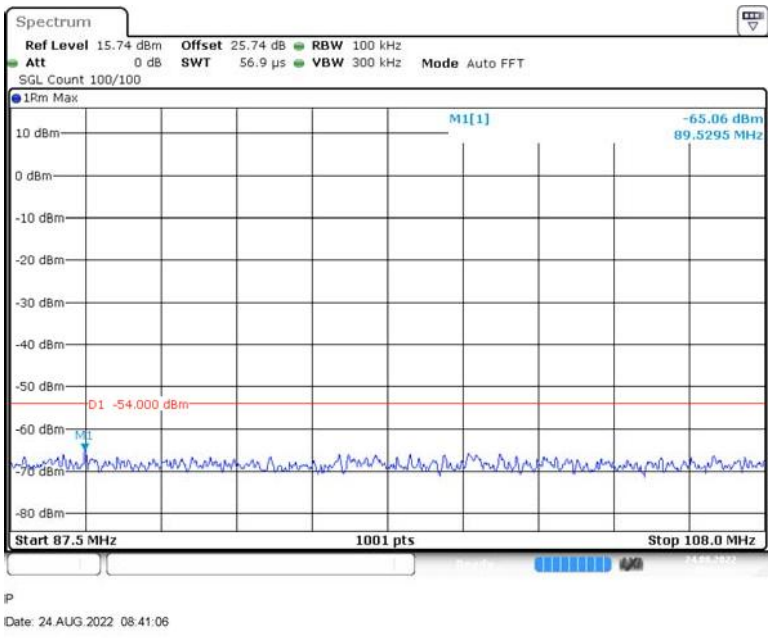
Conducted spurious Emissions

802.11n(HT20) 5745MHz @ 47MHz-74MHz



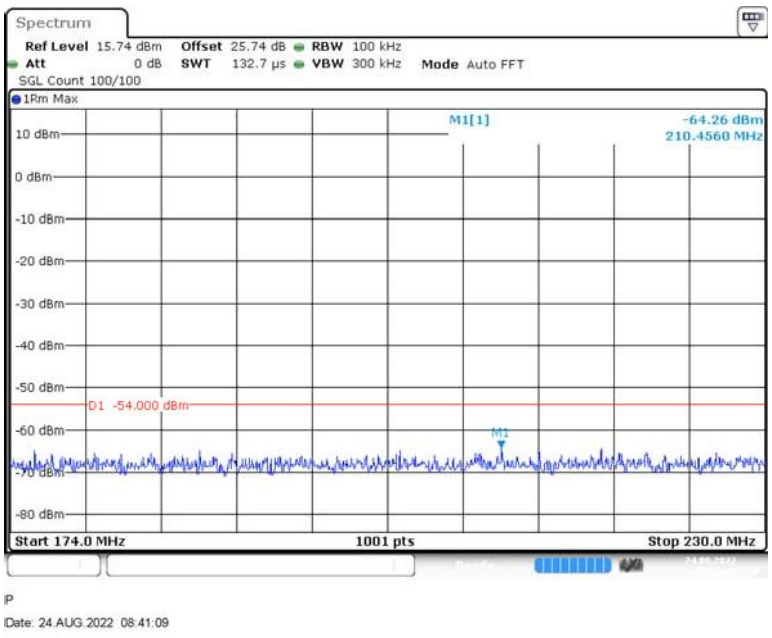
Conducted spurious Emissions

802.11n(HT20) 5745MHz @ 87.5MHz-108MHz



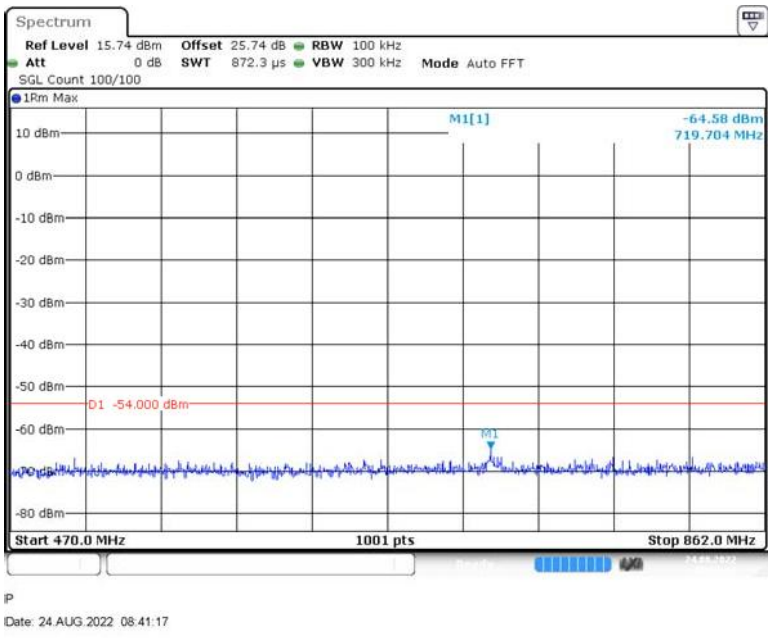
Conducted spurious Emissions

802.11n(HT20) 5745MHz @ 174MHz-230MHz



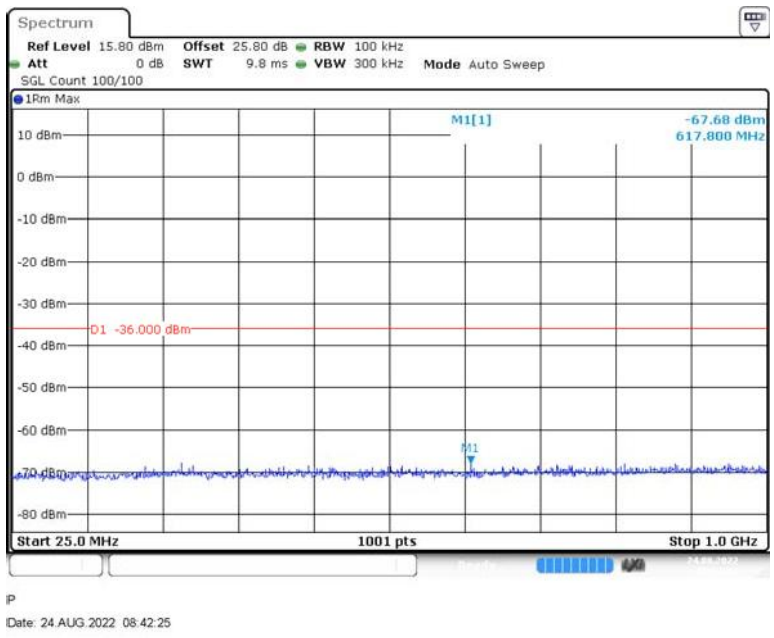
Conducted spurious Emissions

802.11n(HT20) 5745MHz @ 470MHz-862MHz



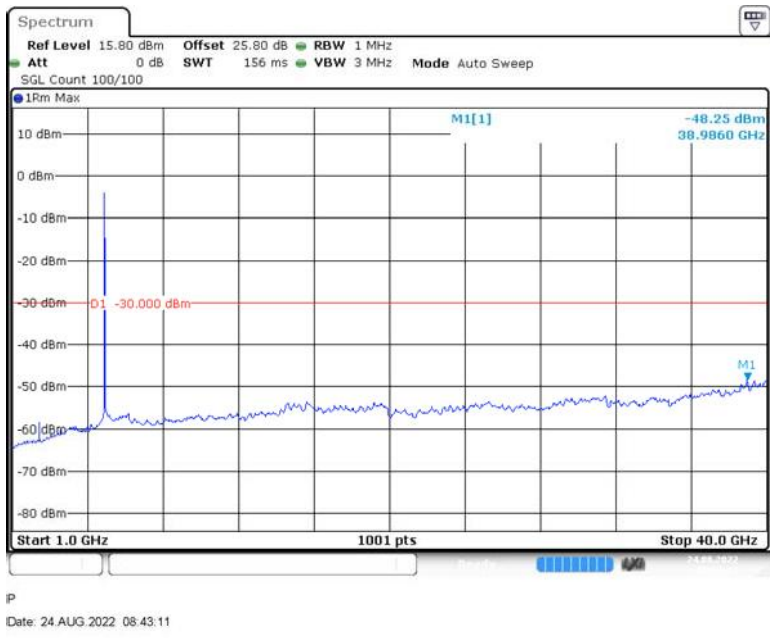
Conducted spurious Emissions

802.11n(HT20) 5785MHz @ 25MHz-1000MHz



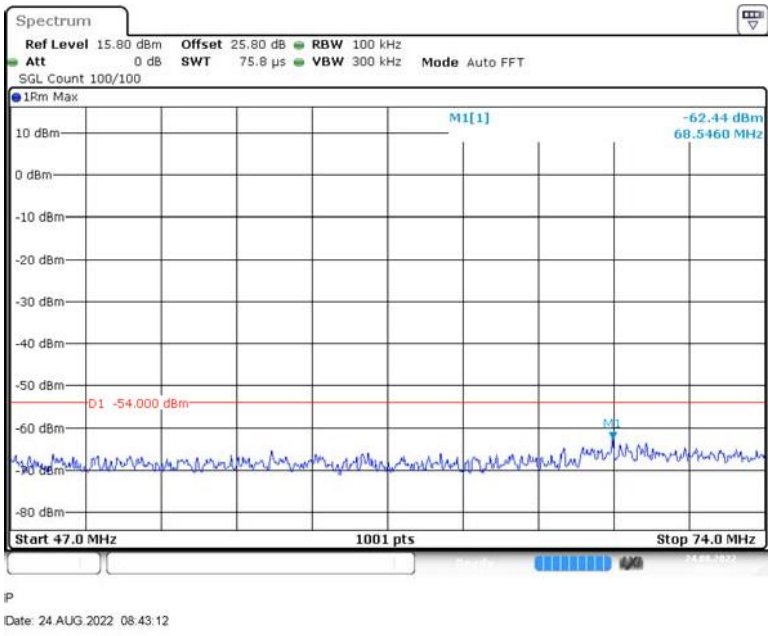
Conducted spurious Emissions

802.11n(HT20) 5785MHz @ 1000MHz-40000MHz



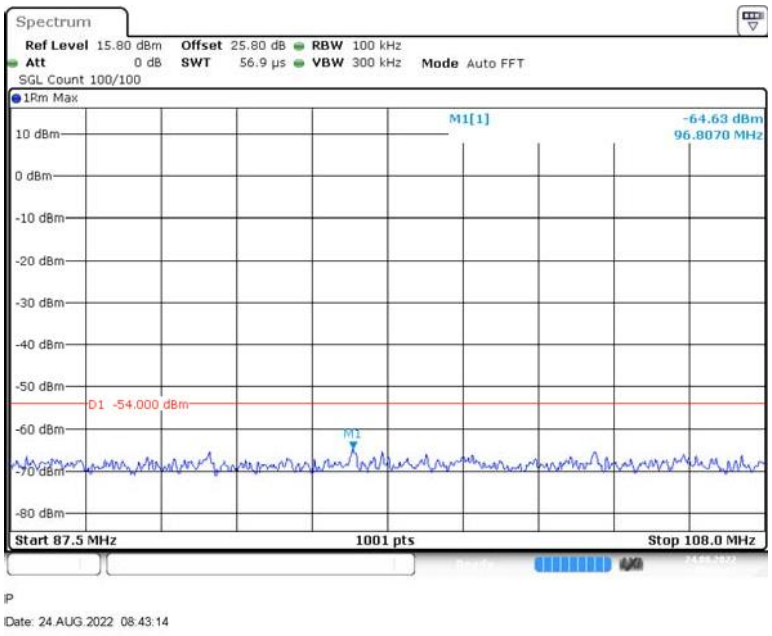
Conducted spurious Emissions

802.11n(HT20) 5785MHz @ 47MHz-74MHz



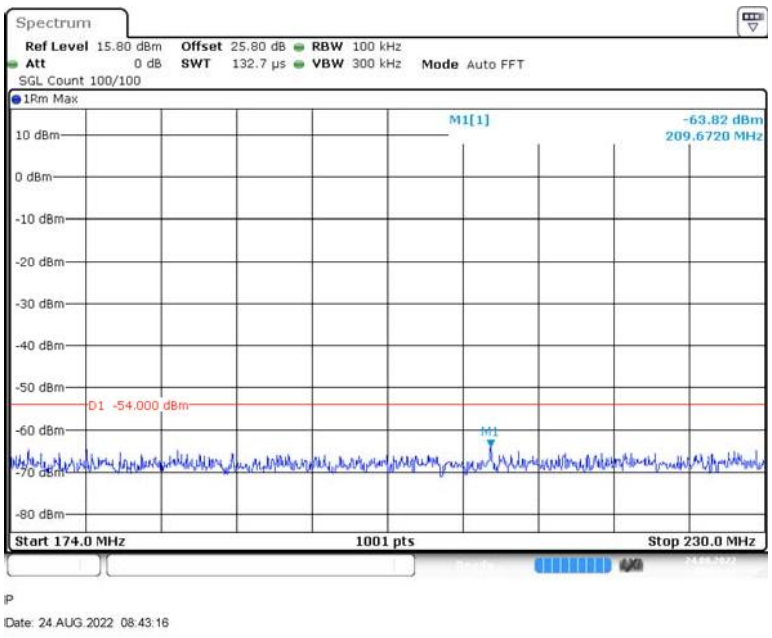
Conducted spurious Emissions

802.11n(HT20) 5785MHz @ 87.5MHz-108MHz



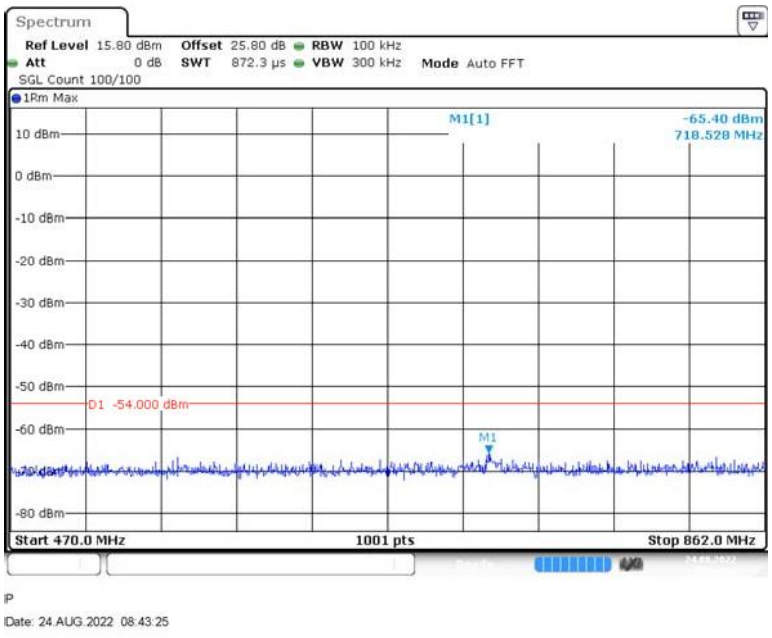
Conducted spurious Emissions

802.11n(HT20) 5785MHz @ 174MHz-230MHz



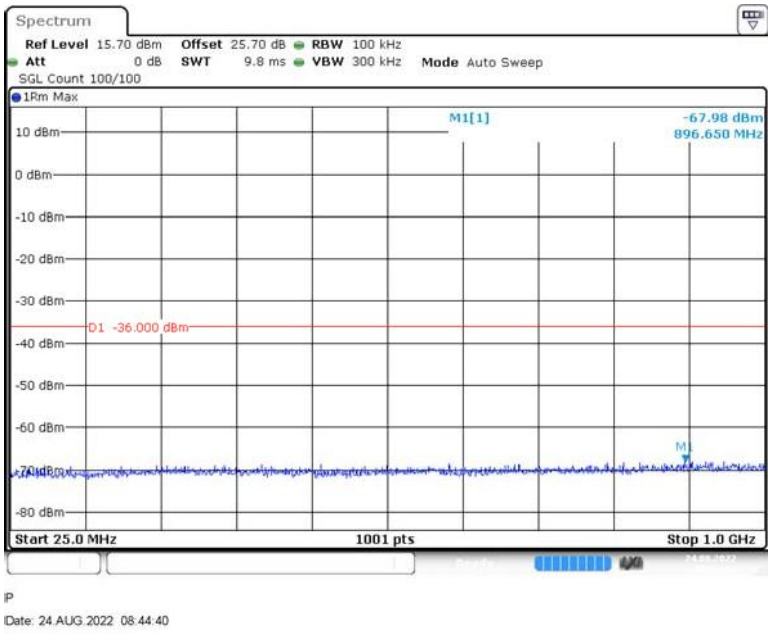
Conducted spurious Emissions

802.11n(HT20) 5785MHz @ 470MHz-862MHz



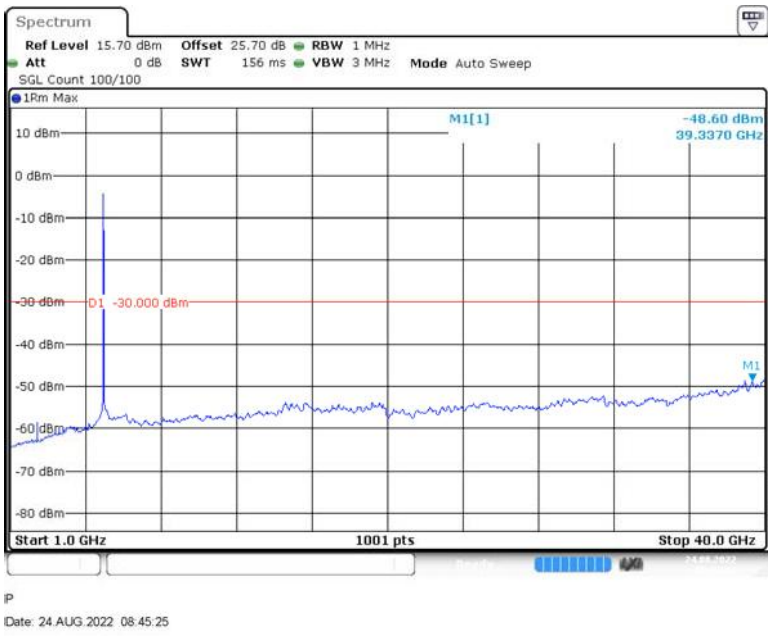
Conducted spurious Emissions

802.11n(HT20) 5825MHz @ 25MHz-1000MHz



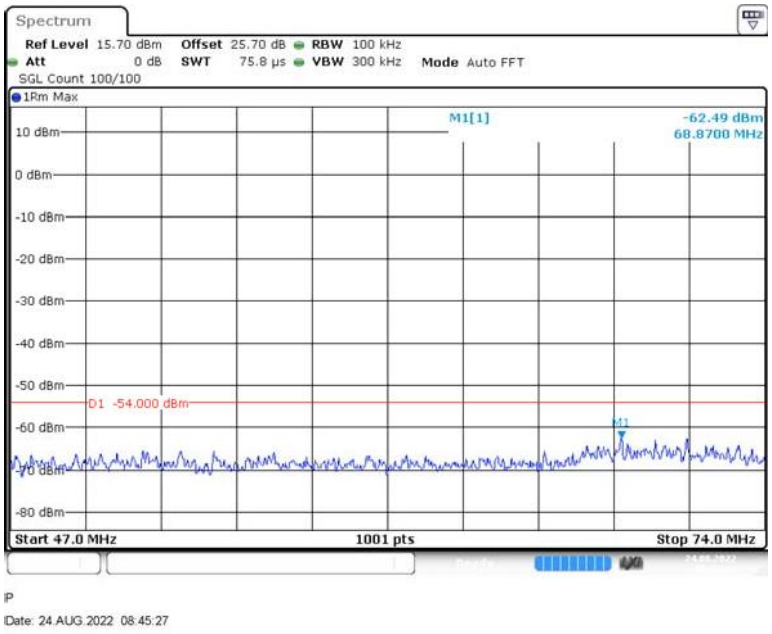
Conducted spurious Emissions

802.11n(HT20) 5825MHz @ 1000MHz-40000MHz



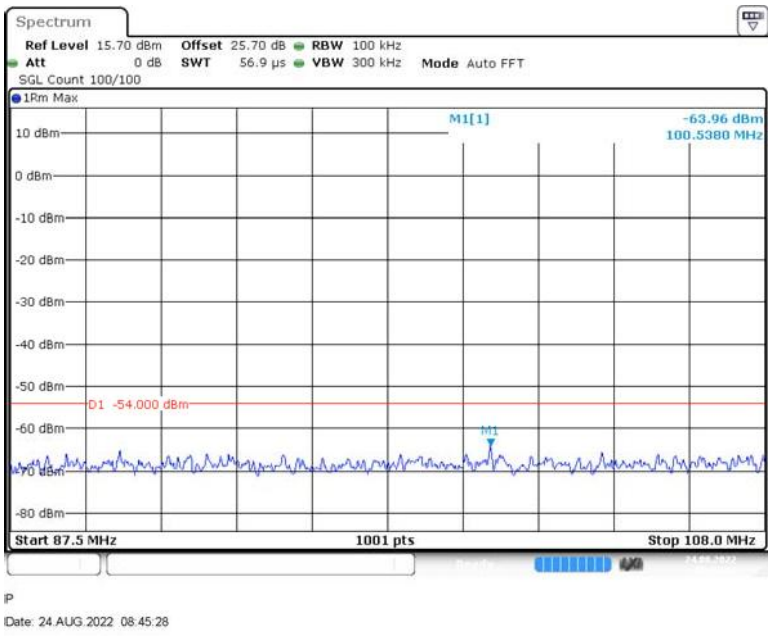
Conducted spurious Emissions

802.11n(HT20) 5825MHz @ 47MHz-74MHz



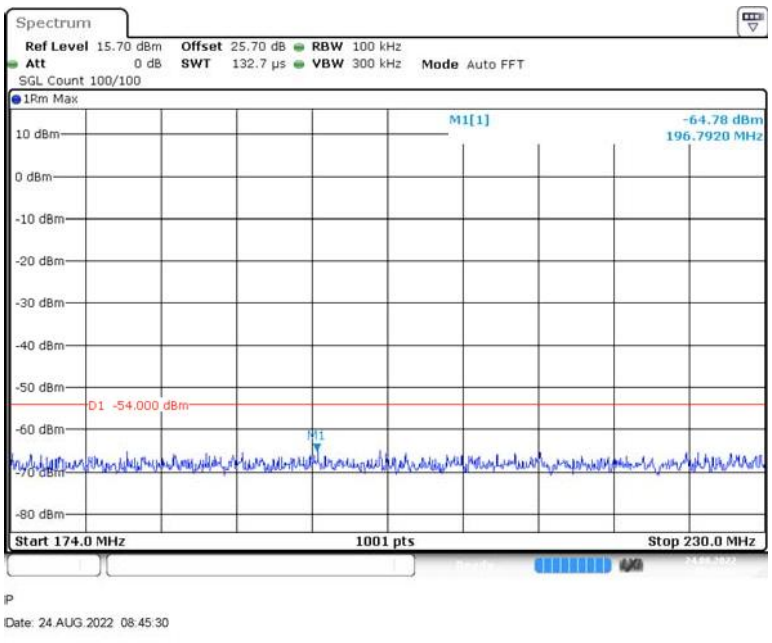
Conducted spurious Emissions

802.11n(HT20) 5825MHz @ 87.5MHz-108MHz



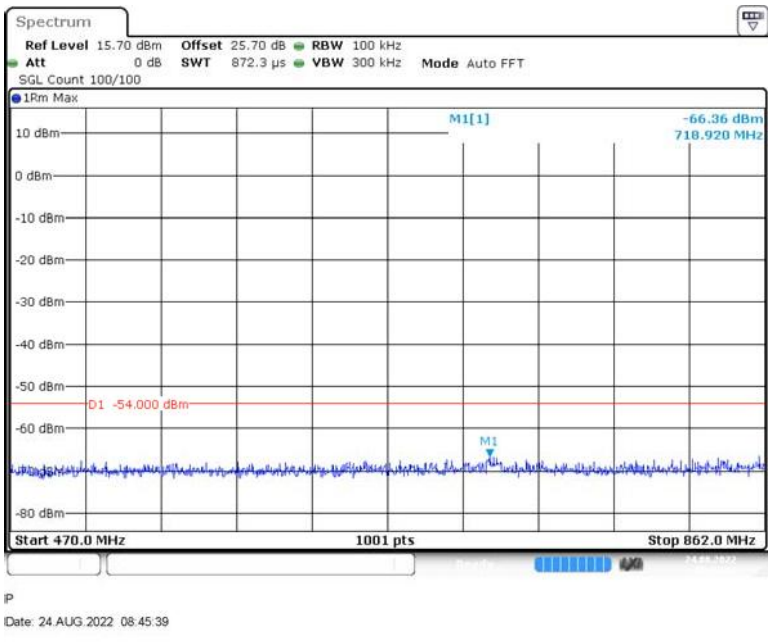
Conducted spurious Emissions

802.11n(HT20) 5825MHz @ 174MHz-230MHz



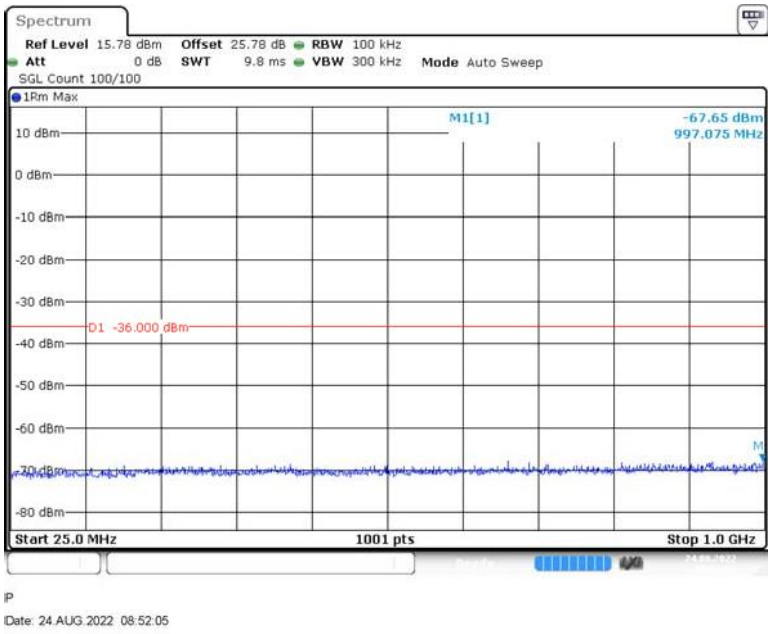
Conducted spurious Emissions

802.11n(HT20) 5825MHz @ 470MHz-862MHz



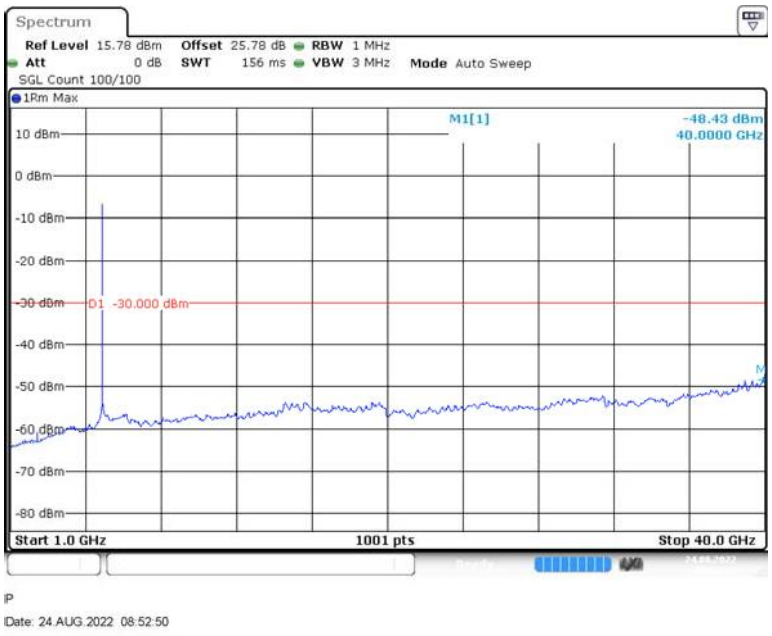
Conducted spurious Emissions

802.11n(HT40) 5755MHz @ 25MHz-1000MHz



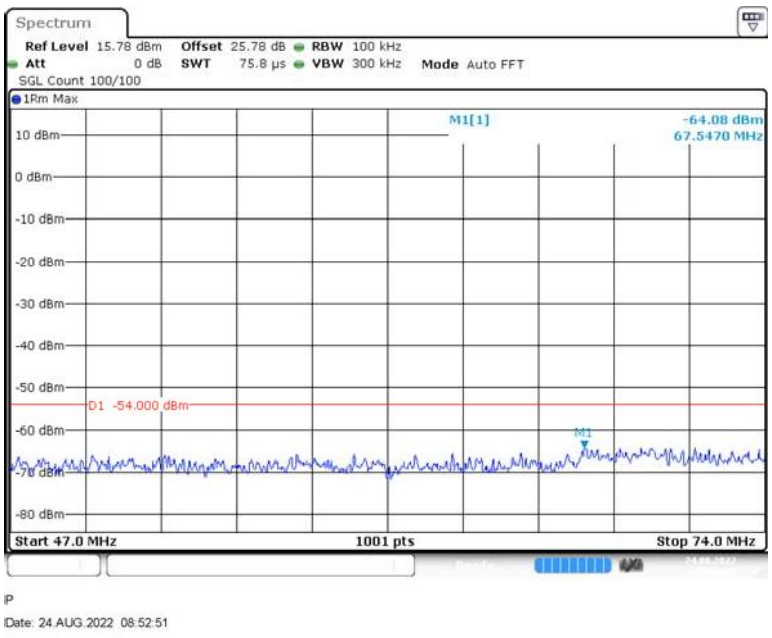
Conducted spurious Emissions

802.11n(HT40) 5755MHz @ 1000MHz-40000MHz



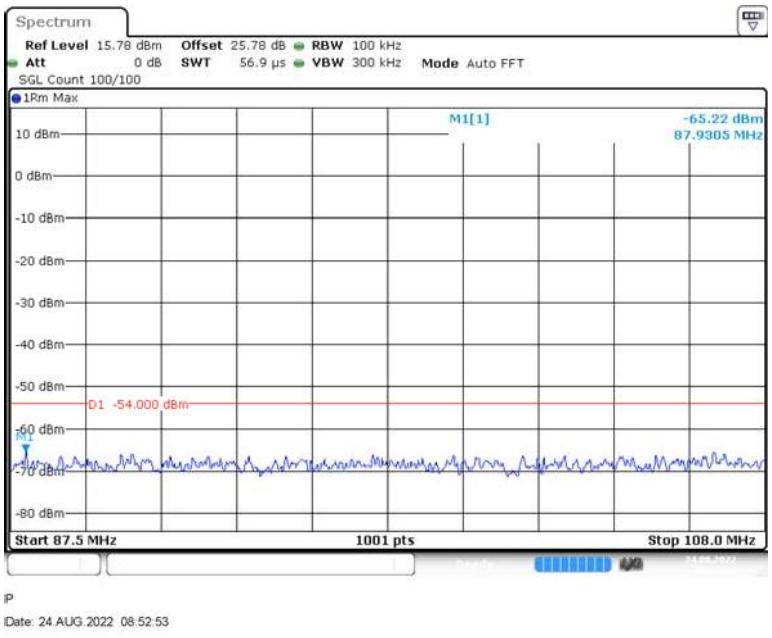
Conducted spurious Emissions

802.11n(HT40) 5755MHz @ 47MHz-74MHz



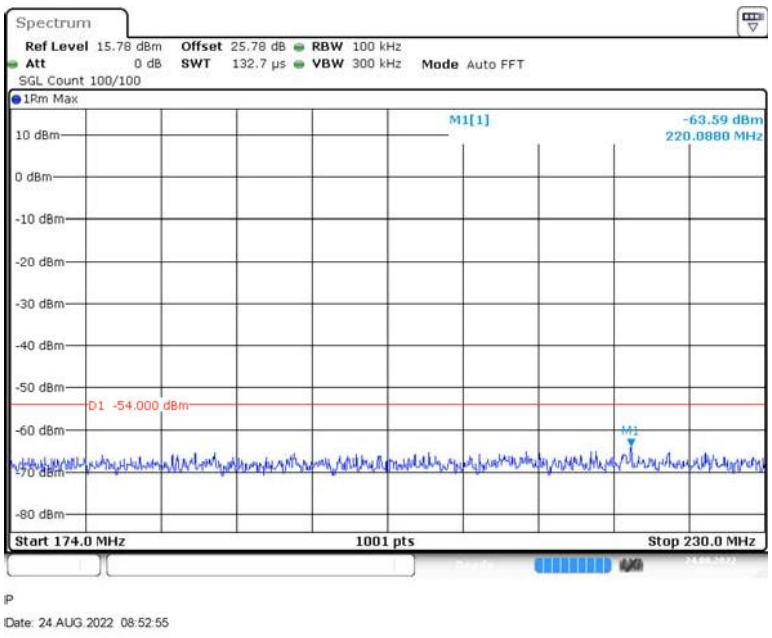
Conducted spurious Emissions

802.11n(HT40) 5755MHz @ 87.5MHz-108MHz



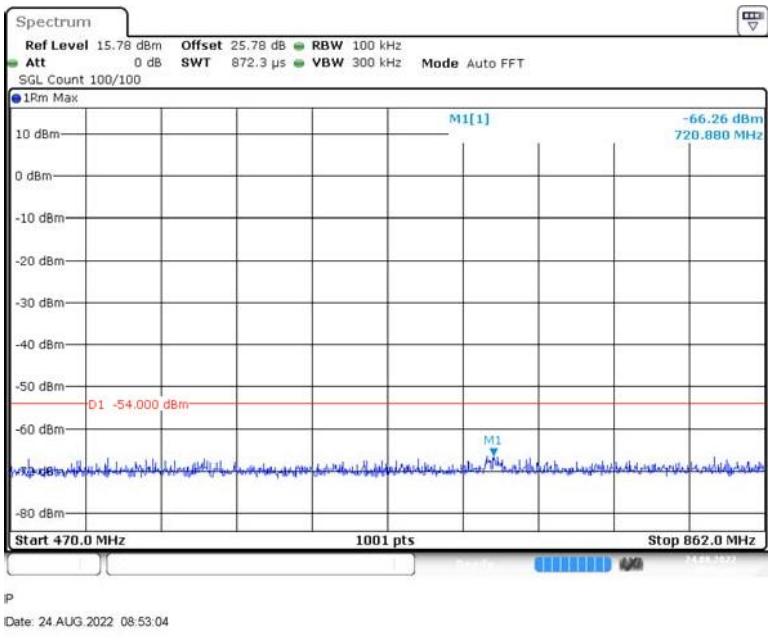
Conducted spurious Emissions

802.11n(HT40) 5755MHz @ 174MHz-230MHz



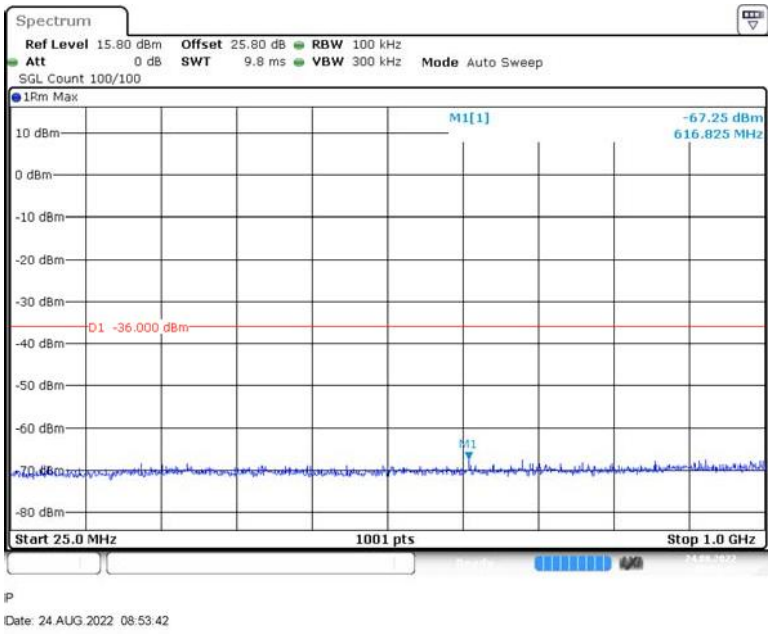
Conducted spurious Emissions

802.11n(HT40) 5755MHz @ 470MHz-862MHz



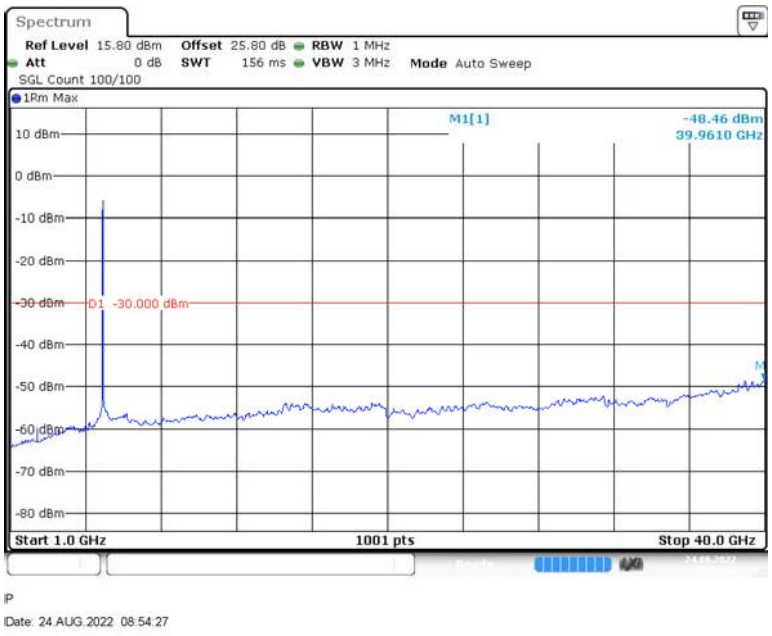
Conducted spurious Emissions

802.11n(HT40) 5795MHz @ 25MHz-1000MHz



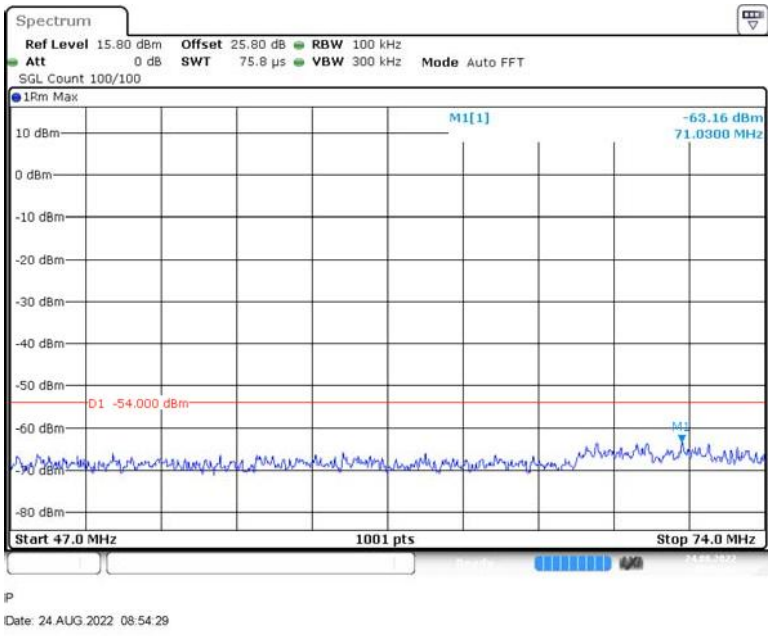
Conducted spurious Emissions

802.11n(HT40) 5795MHz @ 1000MHz-40000MHz



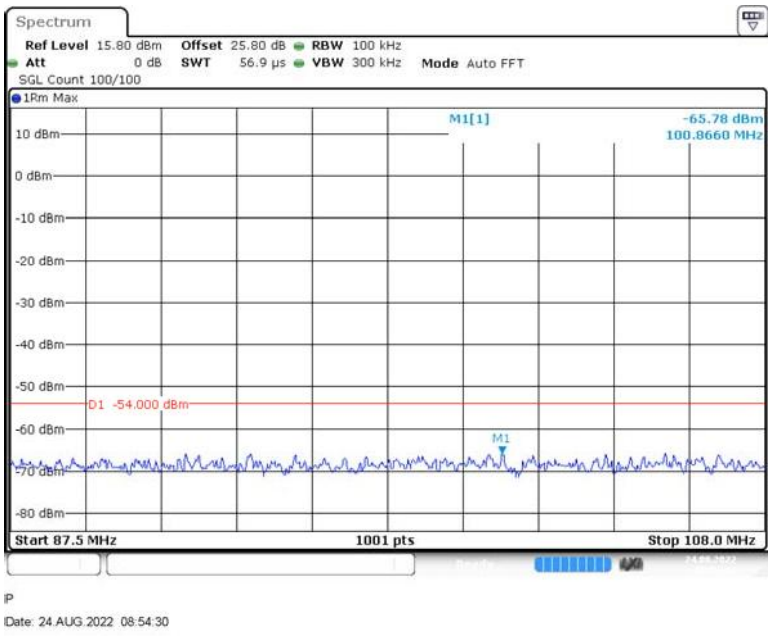
Conducted spurious Emissions

802.11n(HT40) 5795MHz @ 47MHz-74MHz



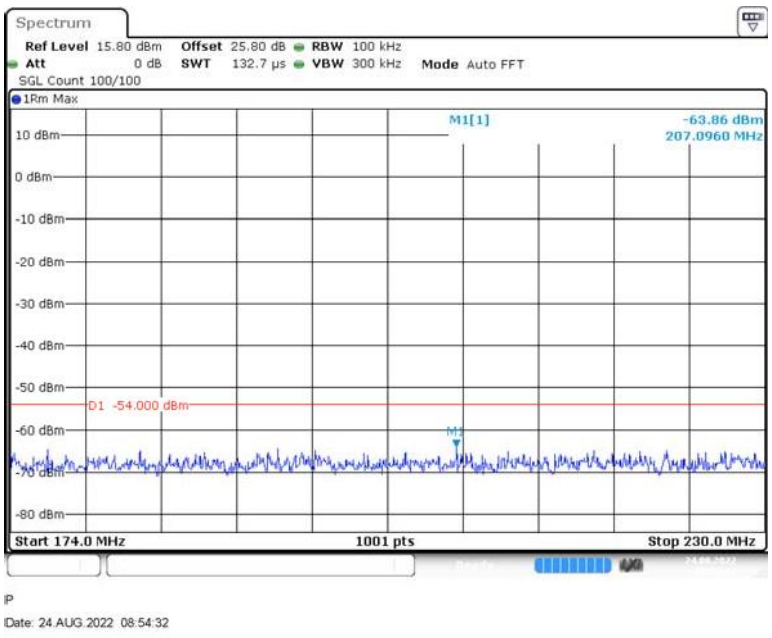
Conducted spurious Emissions

802.11n(HT40) 5795MHz @ 87.5MHz-108MHz



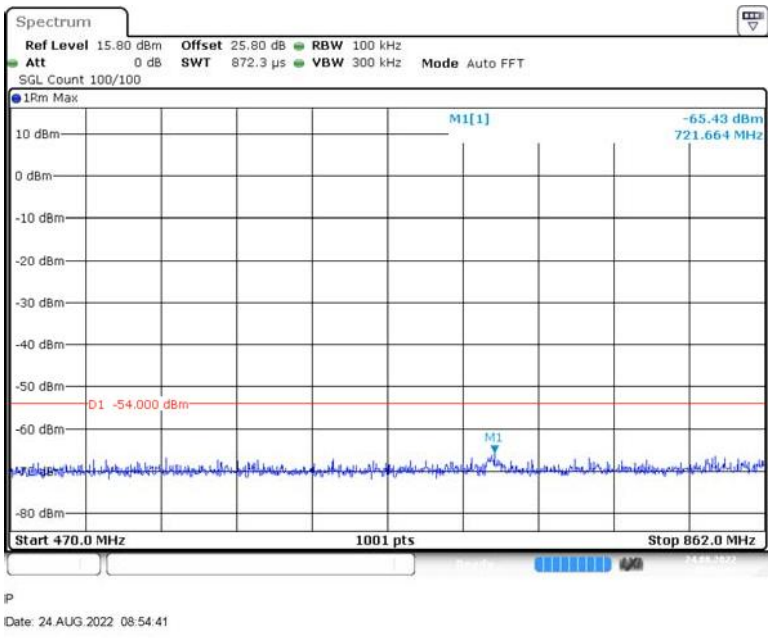
Conducted spurious Emissions

802.11n(HT40) 5795MHz @ 174MHz-230MHz

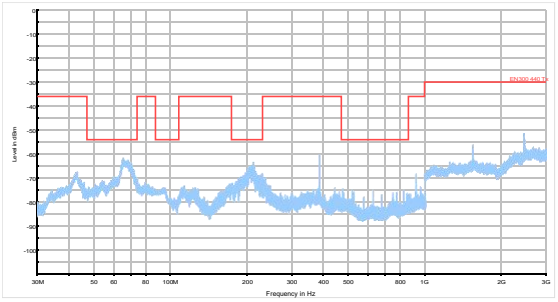
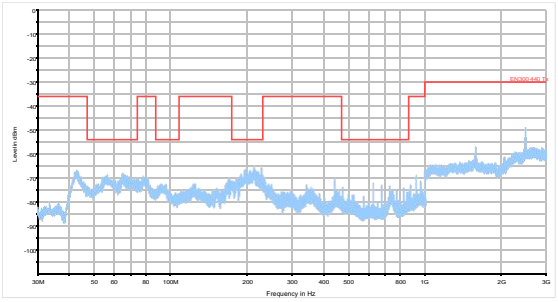
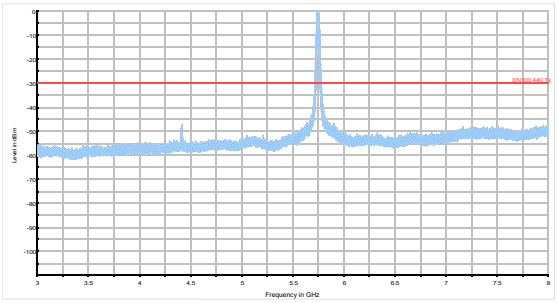
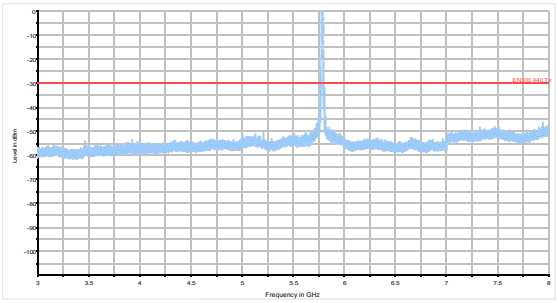
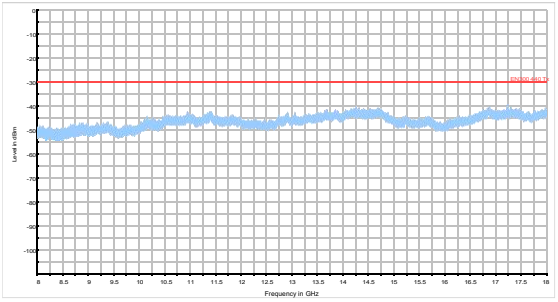
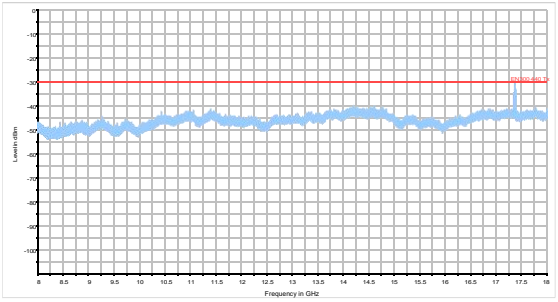


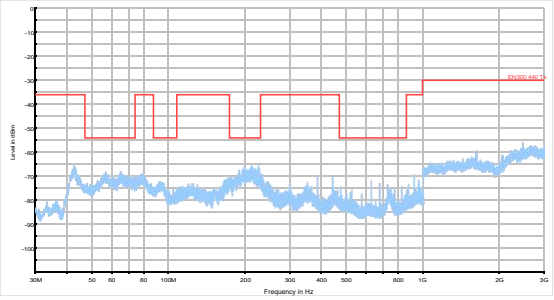
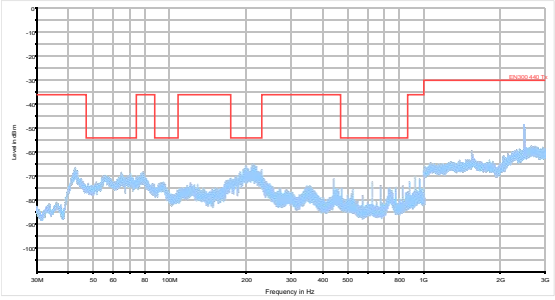
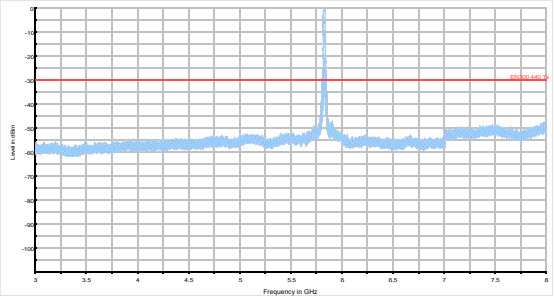
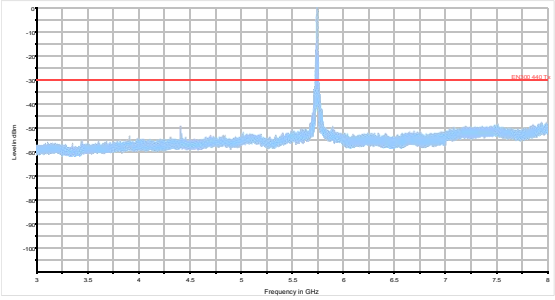
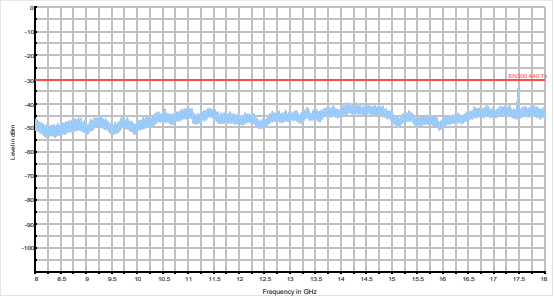
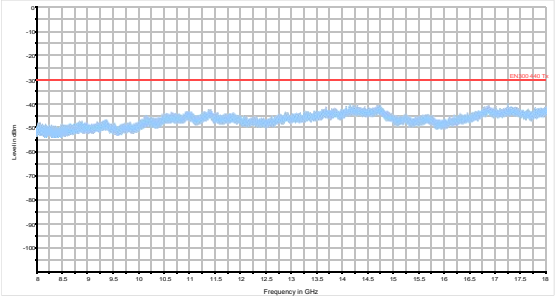
Conducted spurious Emissions

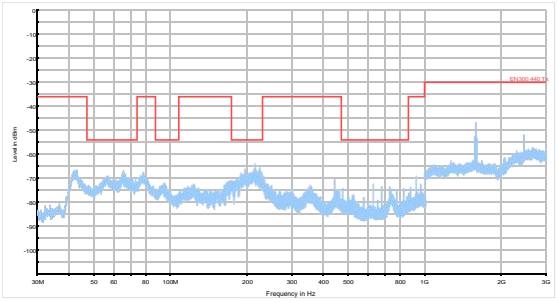
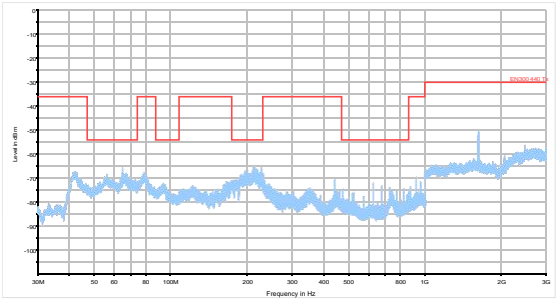
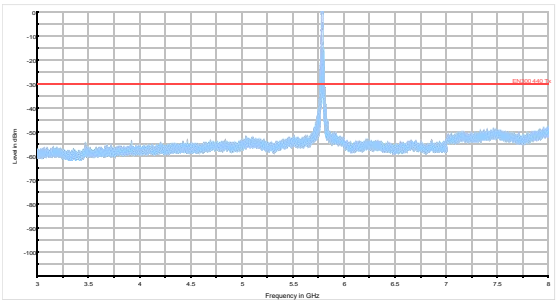
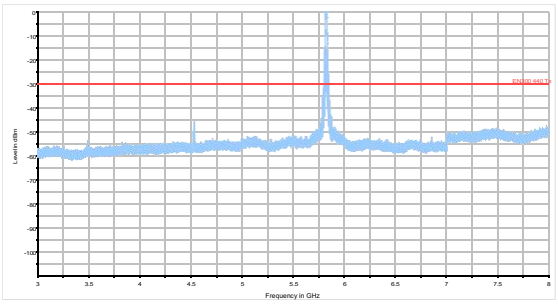
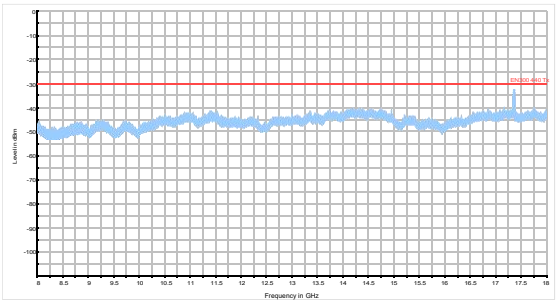
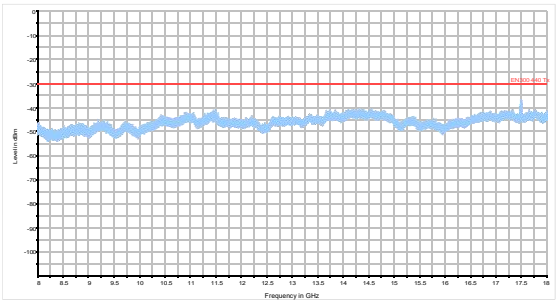
802.11n(HT40) 5795MHz @ 470MHz-862MHz

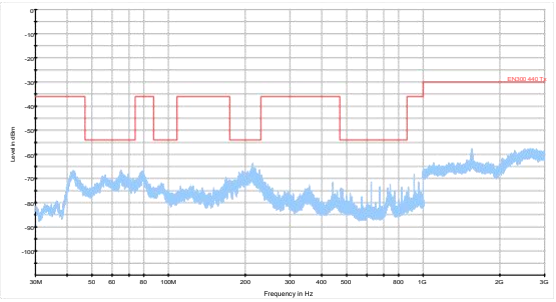
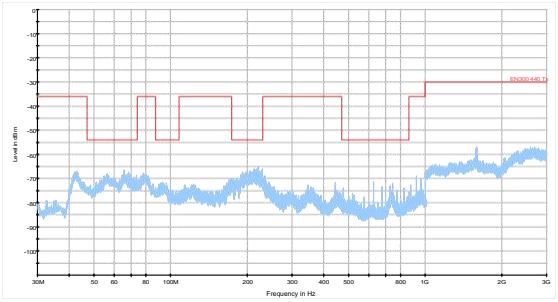
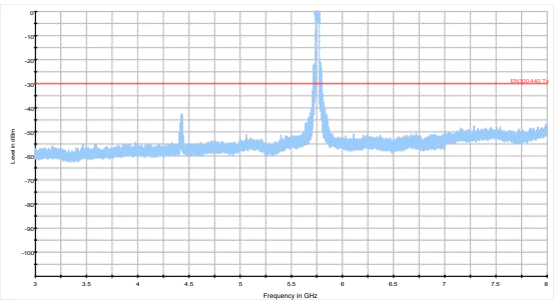
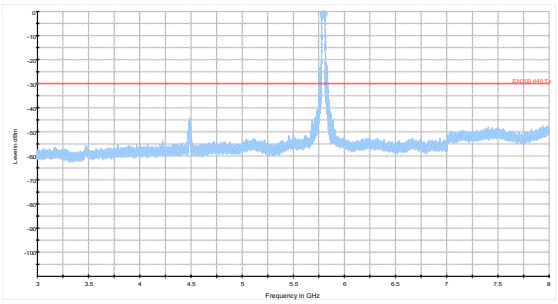
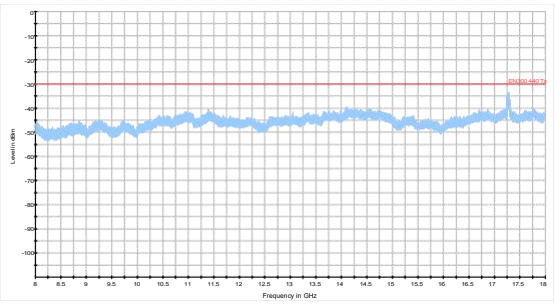
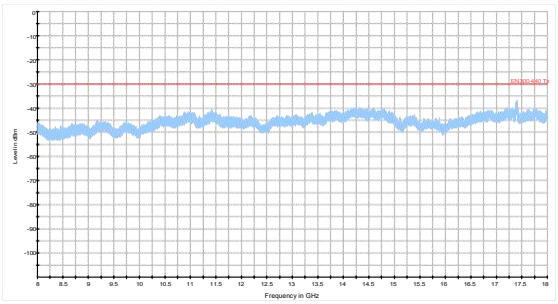


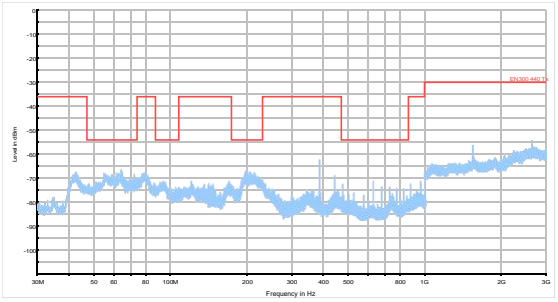
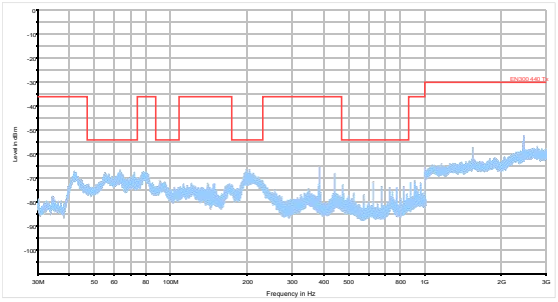
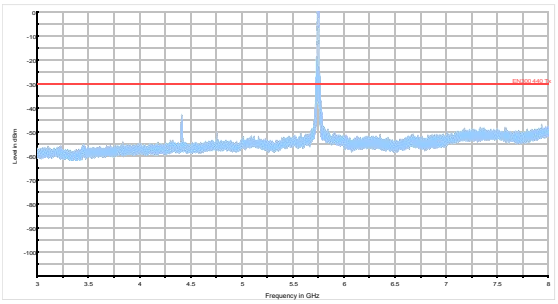
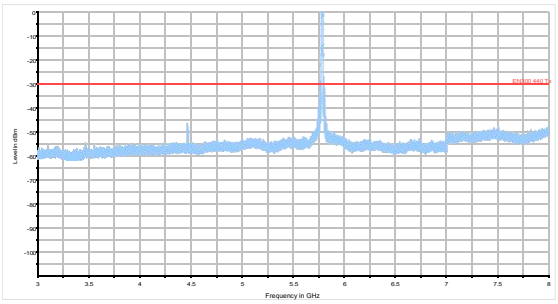
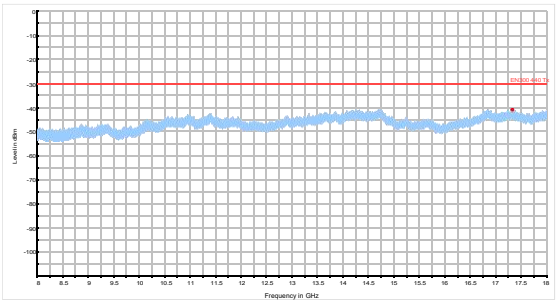
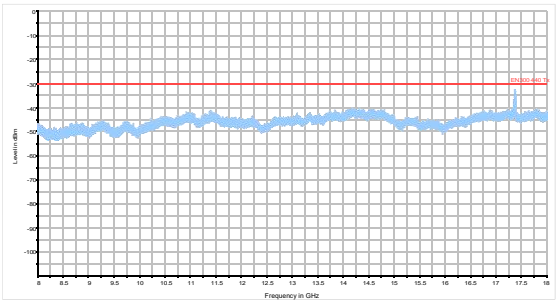
Radiated

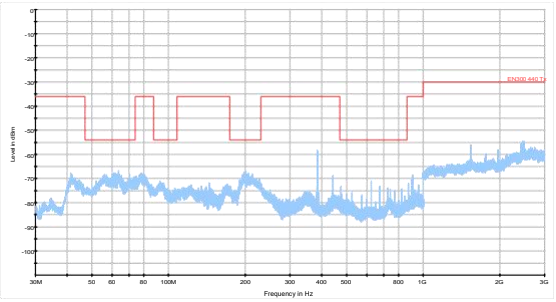
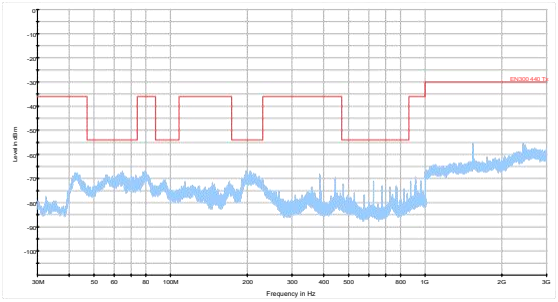
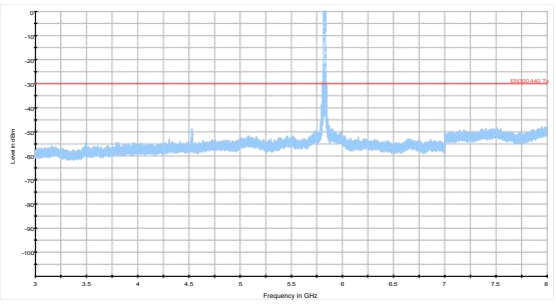
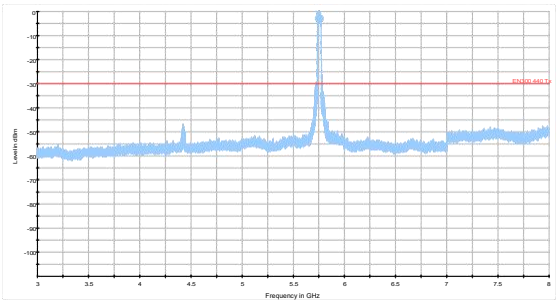
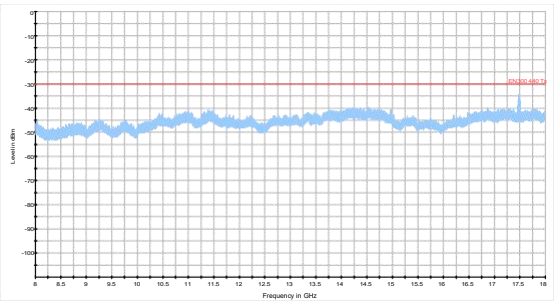
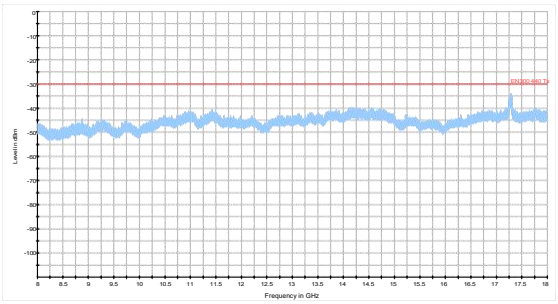
802.11a Channel 149	802.11a Channel 157
	
Radiated spurious Emissions 30MHz - 3GHz	Radiated spurious Emissions 30MHz - 3GHz
	
Radiated spurious Emissions 3GHz - 8GHz	Radiated spurious Emissions 3GHz - 8GHz
	
Radiated spurious Emissions 8GHz - 18GHz	Radiated spurious Emissions 8GHz - 18GHz

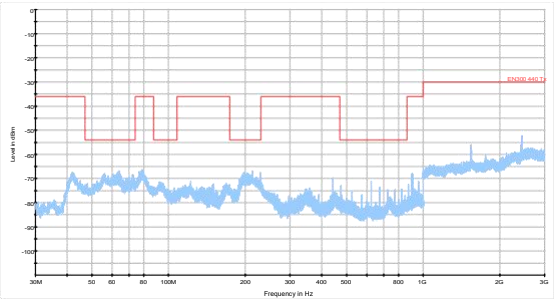
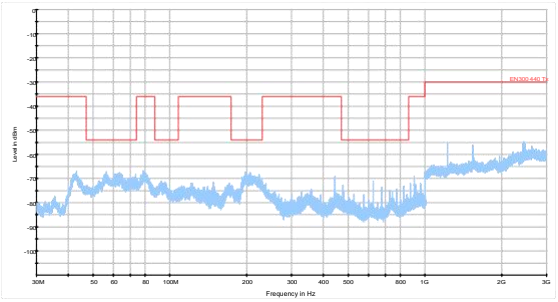
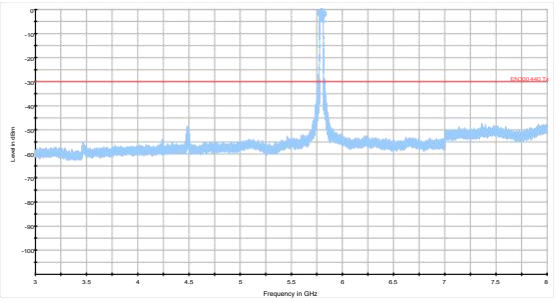
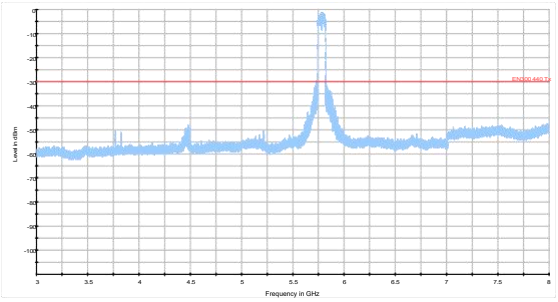
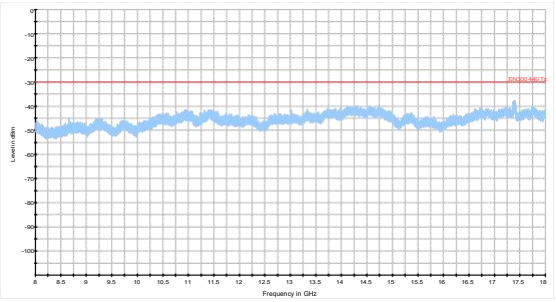
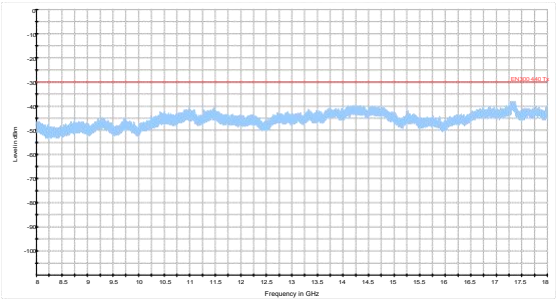
802.11a Channel 165	802.11n HT20 Channel 149
	
Radiated spurious Emissions 30MHz - 3GHz	Radiated spurious Emissions 30MHz - 3GHz
	
Radiated spurious Emissions 3GHz - 8GHz	Radiated spurious Emissions 3GHz - 8GHz
	
Radiated spurious Emissions 8GHz - 18GHz	Radiated spurious Emissions 8GHz - 18GHz

802.11n HT20 Channel 157	802.11n HT20 Channel 165
	
Radiated spurious Emissions 30MHz - 3GHz	Radiated spurious Emissions 30MHz - 3GHz
	
Radiated spurious Emissions 3GHz - 8GHz	Radiated spurious Emissions 3GHz - 8GHz
	
Radiated spurious Emissions 8GHz - 18GHz	Radiated spurious Emissions 8GHz - 18GHz

802.11n HT40 Channel 151	802.11n HT40 Channel 159
	
Radiated spurious Emissions 30MHz - 3GHz	Radiated spurious Emissions 30MHz - 3GHz
	
Radiated spurious Emissions 3GHz - 8GHz	Radiated spurious Emissions 3GHz - 8GHz
	
Radiated spurious Emissions 8GHz - 18GHz	Radiated spurious Emissions 8GHz - 18GHz

802.11ac VHT20 Channel 149	802.11ac VHT20 Channel 157
	
Radiated spurious Emissions 30MHz - 3GHz	Radiated spurious Emissions 30MHz - 3GHz
	
Radiated spurious Emissions 3GHz - 8GHz	Radiated spurious Emissions 3GHz - 8GHz
	
Radiated spurious Emissions 8GHz - 18GHz	Radiated spurious Emissions 8GHz - 18GHz

802.11ac VHT20 Channel 165	802.11ac VHT40 Channel 151
	
Radiated spurious Emissions 30MHz - 3GHz	Radiated spurious Emissions 30MHz - 3GHz
	
Radiated spurious Emissions 3GHz - 8GHz	Radiated spurious Emissions 3GHz - 8GHz
	
Radiated spurious Emissions 8GHz - 18GHz	Radiated spurious Emissions 8GHz - 18GHz

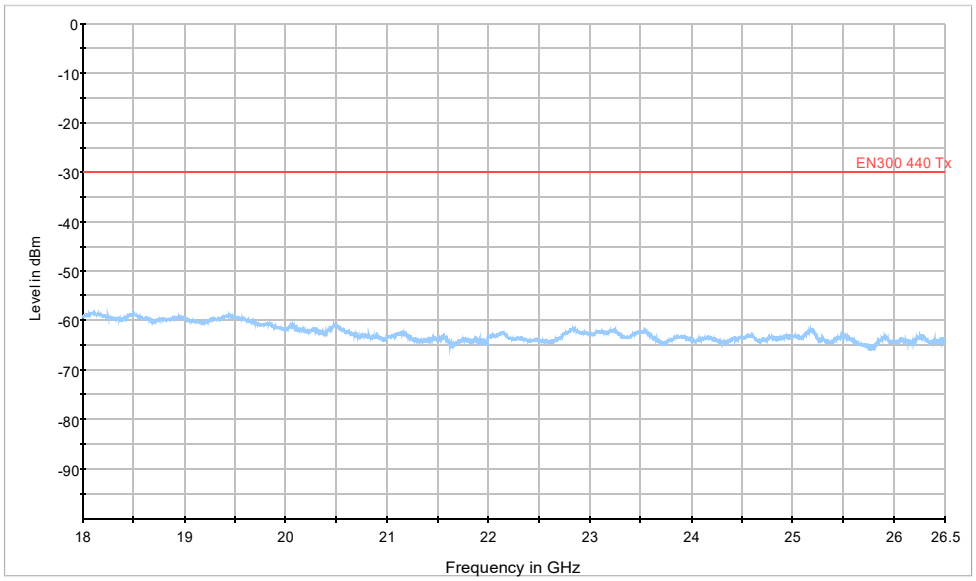
802.11ac VHT40 Channel 159	802.11ac VHT80 Channel 155
	
Radiated spurious Emissions 30MHz - 3GHz	Radiated spurious Emissions 30MHz - 3GHz
	
Radiated spurious Emissions 3GHz - 8GHz	Radiated spurious Emissions 3GHz - 8GHz
	
Radiated spurious Emissions 8GHz - 18GHz	Radiated spurious Emissions 8GHz - 18GHz

If disturbances were found more than 20dB below limit line, the mark is not required for the EUT.

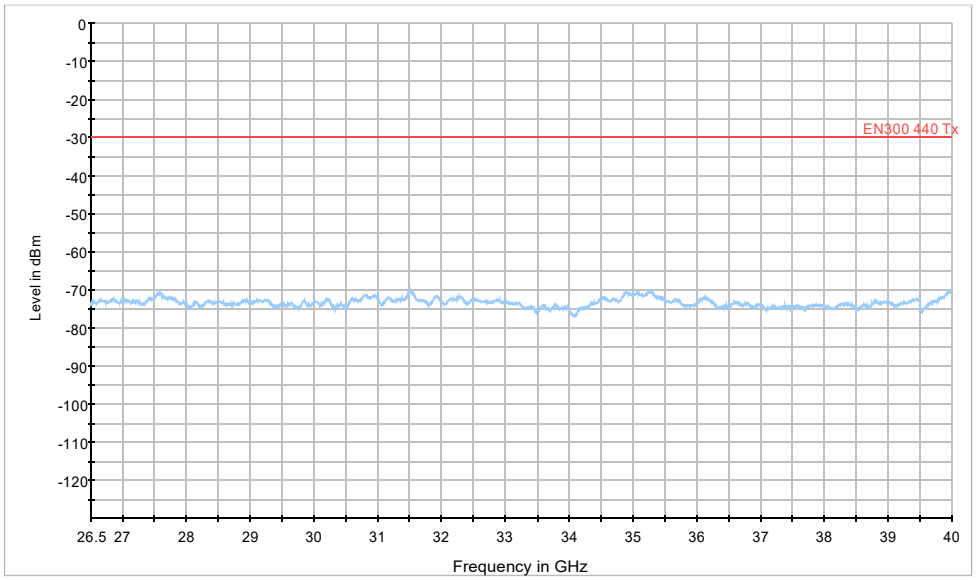
Test Data File Name	Frequency (MHz)	Maximum Value (dBm)	Limit (dB)	Margin (dB)	Degree
RSE_WIFI 5G_a CH149_VH_8-18GHz	17232.60	-39.46	-30.00	9.46	45
RSE_WIFI 5G_a CH149_VH_0.03-3GHz	65.21	-61.77	-54.00	7.77	90
RSE_WIFI 5G_a CH149_VH_3-8GHz	4416.00	-47.31	-30.00	17.31	180
RSE_WIFI 5G_a CH157_VH_0.03-3GHz	212.68	-65.50	-54.00	11.50	45
RSE_WIFI 5G_a CH157_VH_3-8GHz	7521.47	-49.20	-30.00	19.20	180
RSE_WIFI 5G_a CH157_VH_8-18GHz	17356.80	-30.13	-30.00	0.13	315
RSE_ WIFI 5G_a CH157_VH_18-26.5GHz	18111.00	-57.96	-47.00	10.96	90
RSE_WIFI 5G_a CH165_VH_0.03-3GHz	214.46	-66.30	-54.00	12.30	135
RSE_WIFI 5G_a CH165_VH_3-8GHz	7468.13	-48.42	-30.00	18.42	90
RSE_WIFI 5G_a CH165_VH_8-18GHz	17480.00	-33.83	-30.00	3.83	315
RSE_WIFI 5G_n(20M) CH149_VH_0.03-3GHz	213.65	-65.12	-54.00	11.12	90
RSE_WIFI 5G_n(20M) CH149_VH_3-8GHz	7357.07	-49.08	-30.00	19.08	180
RSE_WIFI 5G_n(20M) CH149_VH_8-18GHz	17234.80	-39.92	-30.00	9.92	45
RSE_WIFI 5G_n(20M) CH157_VH_0.03-3GHz	214.85	-63.99	-54.00	9.99	0
RSE_WIFI 5G_n(20M) CH157_VH_3-8GHz	7485.80	-49.23	-30.00	19.23	90
RSE_WIFI 5G_n(20M) CH157_VH_8-18GHz	17363.20	-32.53	-30.00	2.53	315
RSE_WIFI 5G_n(20M) CH165_VH_0.03-3GHz	211.97	-65.41	-54.00	11.41	180
RSE_WIFI 5G_n(20M) CH165_VH_3-8GHz	4536.10	-45.59	-30.00	15.59	270
RSE_WIFI 5G_n(20M) CH165_VH_8-18GHz	17470.40	-36.45	-30.00	6.45	315
RSE_WIFI 5G_n(40M) CH151_VH_0.03-3GHz	214.30	-64.09	-54.00	10.09	135
RSE_WIFI 5G_n(40M) CH151_VH_3-8GHz	4425.70	-42.59	-30.00	12.59	180
RSE_WIFI 5G_n(40M) CH151_VH_8-18GHz	17274.00	-33.28	-30.00	3.28	315
RSE_WIFI 5G_n(40M) CH159_VH_0.03-3GHz	219.28	-65.62	-54.00	11.62	135
RSE_WIFI 5G_n(40M) CH159_VH_3-8GHz	4489.00	-44.21	-30.00	14.21	90
RSE_WIFI 5G_n(40M) CH159_VH_8-18GHz	17393.40	-36.72	-30.00	6.72	315
RSE_WIFI 5G_ac(20M) CH149_VH_0.03-3GHz	64.08	-66.35	-54.00	12.35	315
RSE_WIFI 5G_ac(20M) CH149_VH_3-8GHz	4411.40	-42.96	-30.00	12.96	90
RSE_WIFI 5G_ac(20M) CH149_VH_8-18GHz	17324.60	-40.84	-30.00	10.84	90
RSE_WIFI 5G_ac(20M) CH157_VH_0.03-3GHz	63.59	-66.61	-54.00	12.61	45
RSE_WIFI 5G_ac(20M) CH157_VH_3-8GHz	4470.30	-46.32	-30.00	16.32	135
RSE_WIFI 5G_ac(20M) CH157_VH_8-18GHz	17351.40	-32.25	-30.00	2.25	315
RSE_WIFI 5G_ac(20M) CH165_VH_0.03-3GHz	63.75	-66.80	-54.00	12.80	45
RSE_WIFI 5G_ac(20M) CH165_VH_3-8GHz	7947.40	-47.98	-30.00	17.98	180

RSE_WIFI 5G_ac(20M) CH165_VH_8-18GHz	17475.20	-34.28	-30.00	4.28	315
RSE_WIFI 5G_ac(40M) CH151_VH_0.03-3GHz	196.87	-67.29	-54.00	13.29	315
RSE_WIFI 5G_ac(40M) CH151_VH_3-8GHz	4425.10	-46.85	-30.00	16.85	45
RSE_WIFI 5G_ac(40M) CH151_VH_8-18GHz	17281.40	-33.87	-30.00	3.87	315
RSE_WIFI 5G_ac(40M) CH159_VH_0.03-3GHz	64.24	-66.92	-54.00	12.92	135
RSE_WIFI 5G_ac(40M) CH159_VH_3-8GHz	7358.07	-47.49	-30.00	17.49	90
RSE_WIFI 5G_ac(40M) CH159_VH_8-18GHz	17371.60	-37.57	-30.00	7.57	315
RSE_WIFI 5G_ac(80M) CH155_VH_0.03-3GHz	56.09	-67.42	-54.00	13.42	45
RSE_WIFI 5G_ac(80M) CH155_VH_3-8GHz	9767.87	-47.90	-30.00	17.90	0
RSE_WIFI 5G_ac(80M) CH155_VH_8-18GHz	17335.60	-38.04	-30.00	8.04	315

During the test, the Radiates Emission from 18GHz to 40GHz was performed in all modes with all channels, 802.11a, Channel 157 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.



Radiated spurious Emissions 18GHz – 26.5GHz



Radiated spurious Emissions 26.5GHz – 40GHz

5.6. Receiver Spurious Emissions

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~26°C	45%~50%	101.5kPa

Methods of Measurement

Method of measurement conducted spurious components

This method of measurement applies to receivers having a permanent antenna connector.

A test load, 50 Ω power attenuator, may be used to protect the measuring receiver (see clause 6.5) against damage when testing a receiver combined in one unit with a transmitter.

The measuring receiver used shall have sufficient dynamic range and sensitivity to achieve the required measurement accuracy at the specified limit. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in clause 4.3.5.4. This bandwidth shall be recorded in the test report:

a) The receiver input terminals shall be connected to a measuring receiver having an input impedance of 50 Ω and the receiver is switched on.

b) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25 MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25 MHz up to twice the carrier frequency not exceeding 66 GHz. The frequency and the absolute power level of each of the spurious components found shall be noted.

c) If the detecting device is not calibrated in terms of power input, the level of any detected components shall be determined by replacing the receiver by the signal generator and adjusting it to reproduce the frequency and level of every spurious component noted in step b). The absolute power level of each spurious component shall be noted.

d) The frequency and level of each spurious emission measured and the bandwidth of the measuring receiver shall be recorded in the test report.

Method of measurement radiated spurious components

This method of measurement applies to receivers having an integral antenna.

a) A test site selected from Annex E which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in clause 4.3.5.4. This bandwidth shall be recorded in the test report.

The receiver under test shall be placed on the support in its standard position.

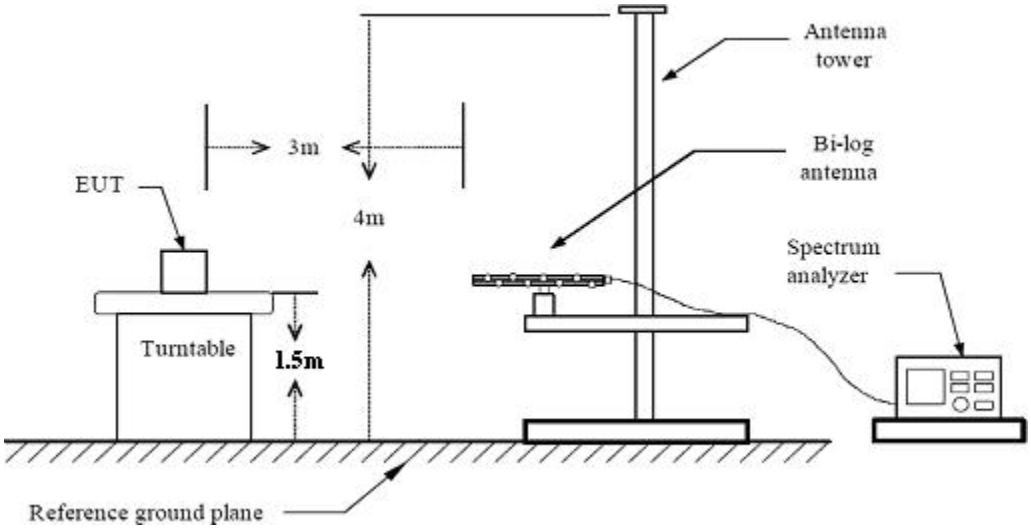
b) The same method of measurement as items b) to i) of clause 4.3.5.3.2 shall apply.

Test Setup

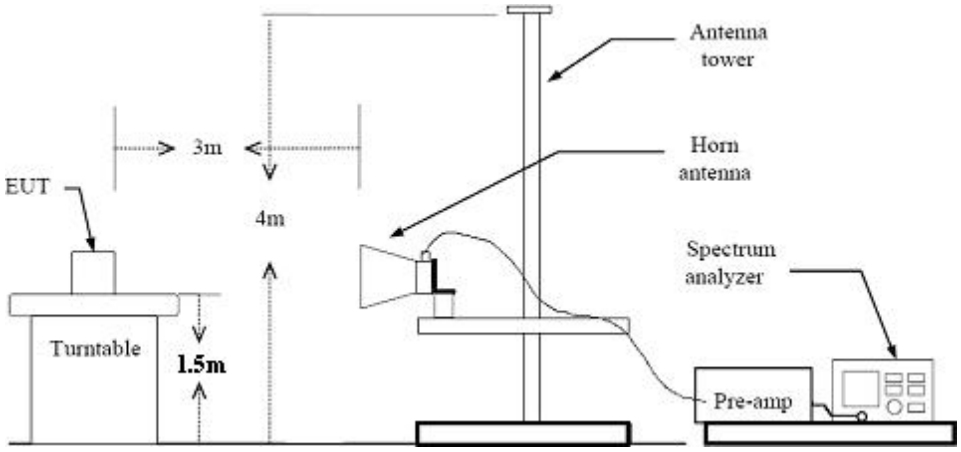
Conducted spurious components :

Radiated spurious components:

Below 1 GHz



Above 1 GHz



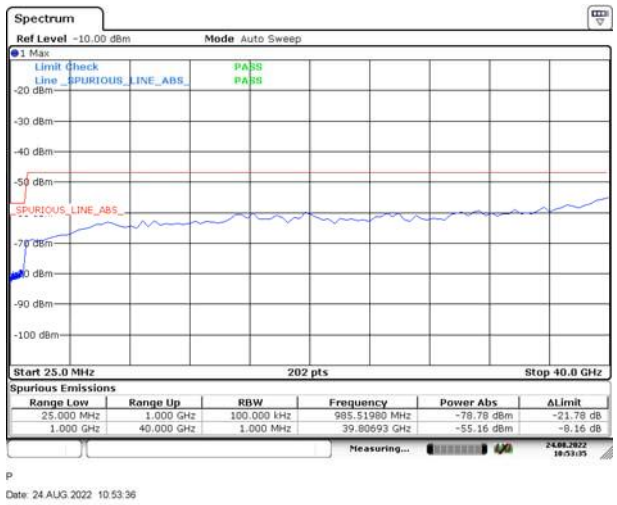
Limits

The power of any spurious emission shall not exceed 2 nW in the range 25 MHz to 1 GHz and shall not exceed 20 nW on frequencies above 1 GHz.

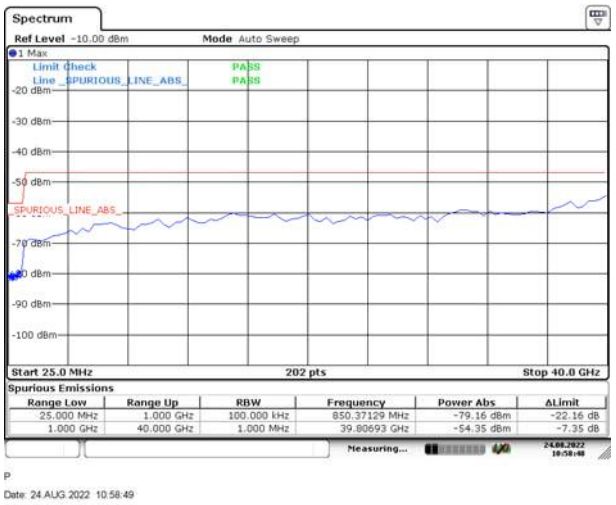
Test Results

Sweep from 25MHz to 40GHz, and the emissions more than 20 dB below the permissible value are not reported.

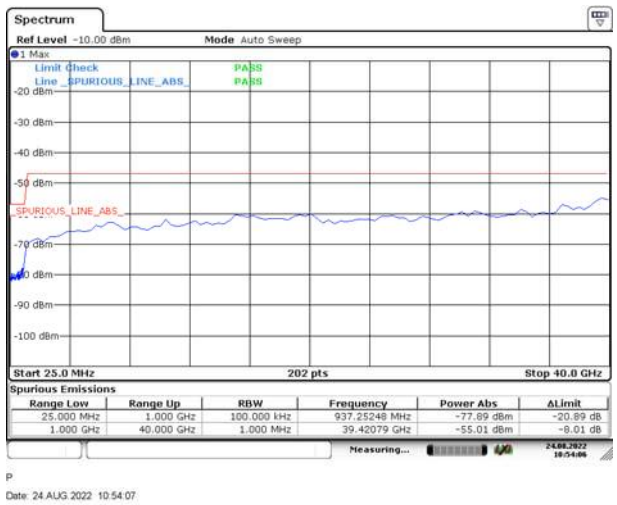
Conducted



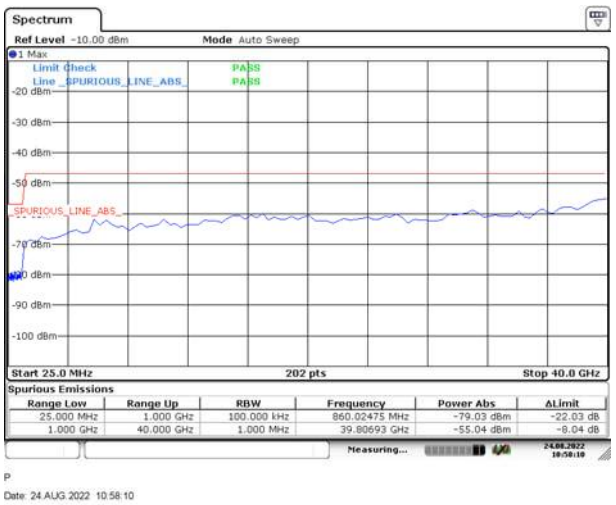
802.11a HT20 Channel 149



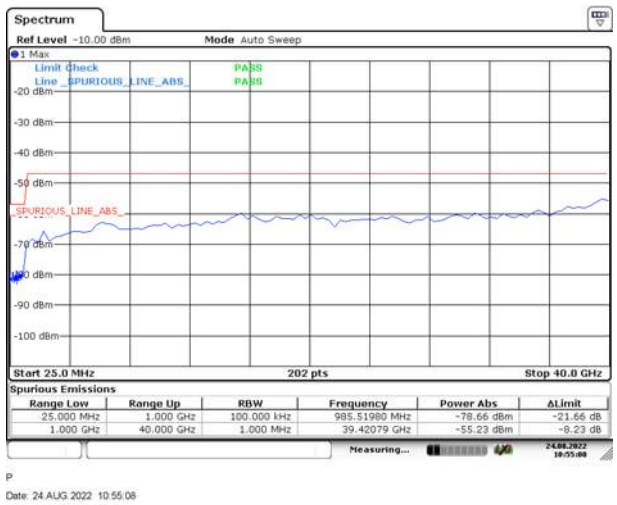
802.11n HT20 Channel 149



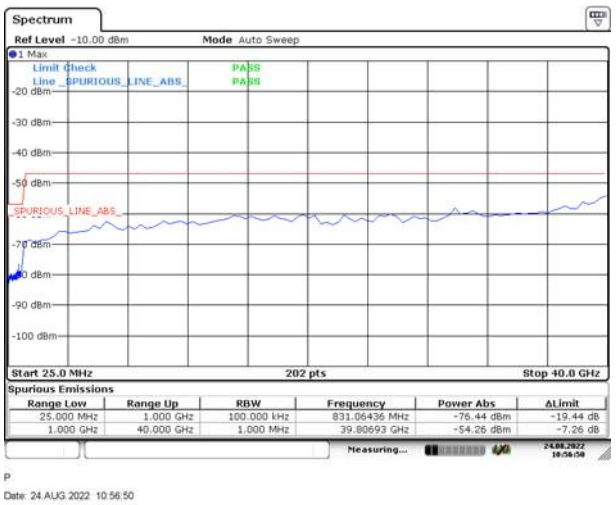
802.11a HT20 Channel 157



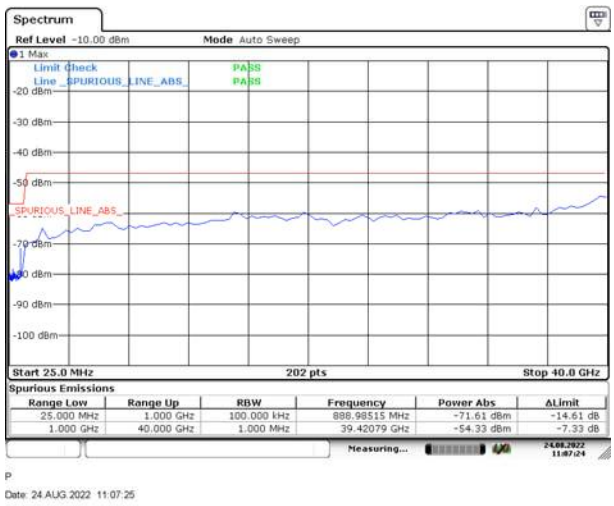
802.11n HT20 Channel 157



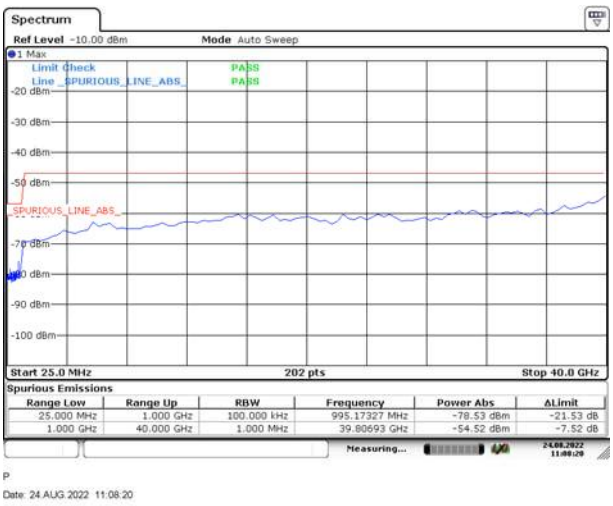
802.11a HT20 Channel 165



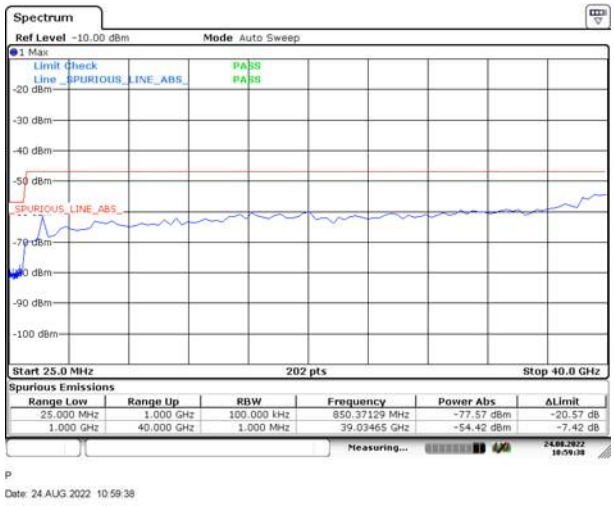
802.11n HT20 Channel 165



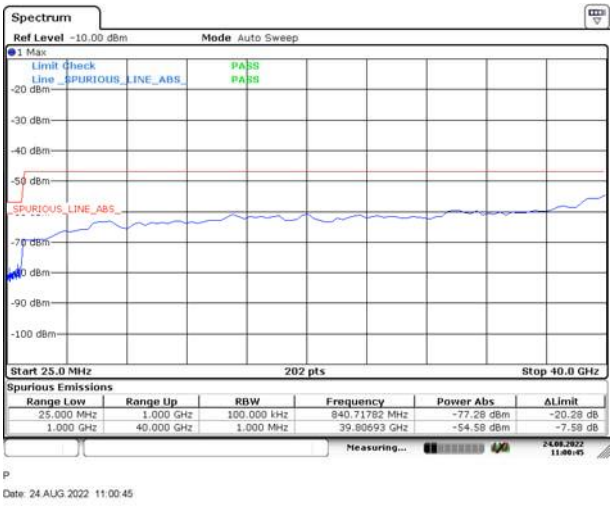
802.11n HT40 Channel 151



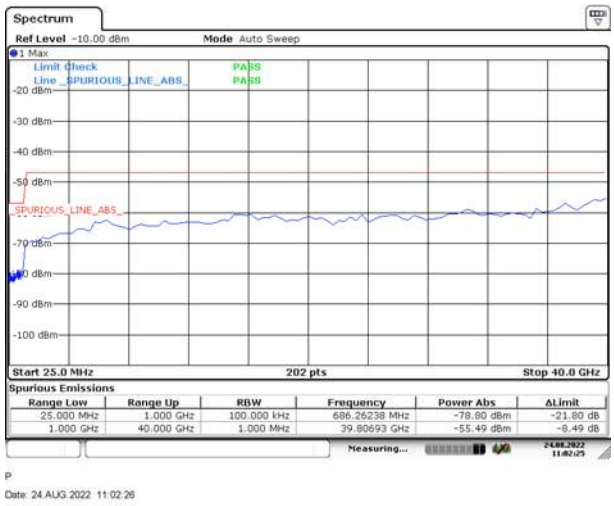
802.11n HT40 Channel 159



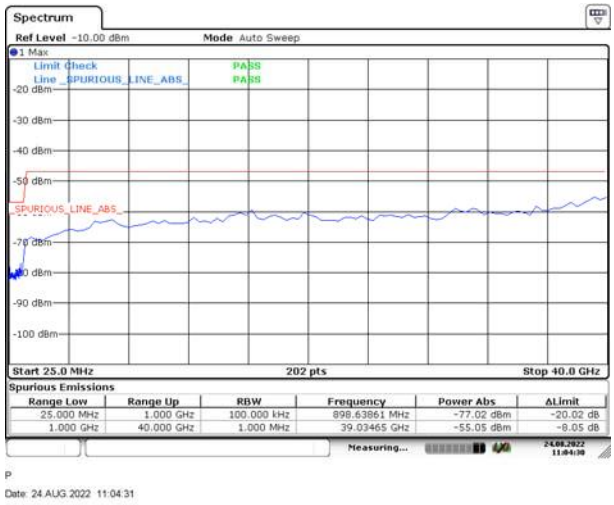
802.11ac VHT20 Channel 149



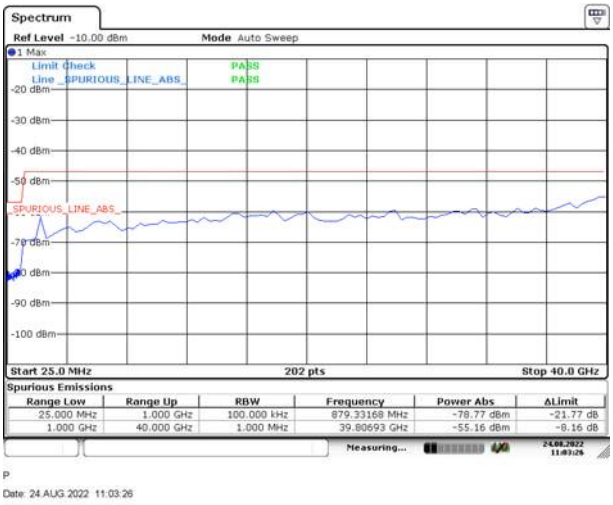
802.11ac VHT20 Channel 157



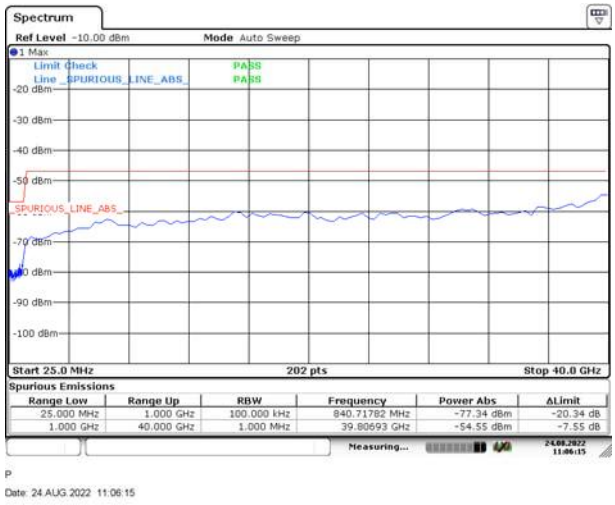
802.11ac VHT20 Channel 165



802.11ac VHT40 Channel 151



802.11ac VHT40 Channel 159

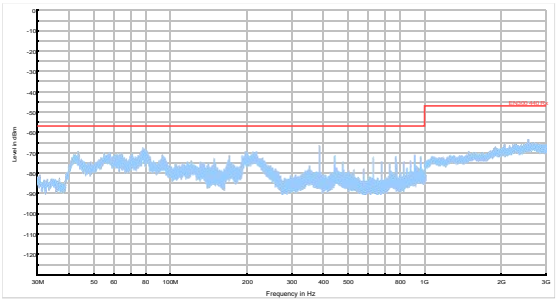


802.11ac VHT80 Channel 155

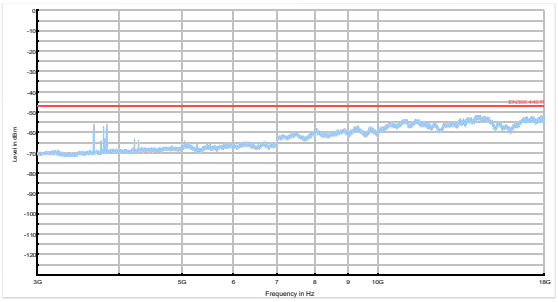
Radiated

Sweep the whole frequency band through the range from 30MHz to 40GHz, emissions more than 20 dB below the limit are not reported.

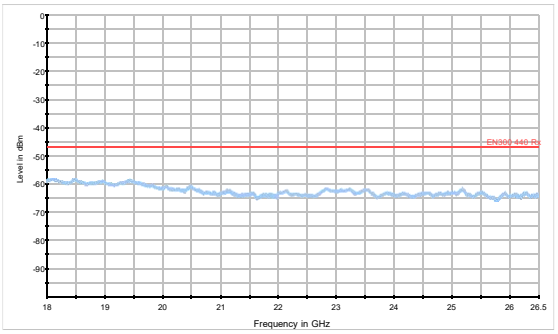
802.11a Channel 157 was selected as the worst condition. The test data of the worst-case condition was recorded in this report



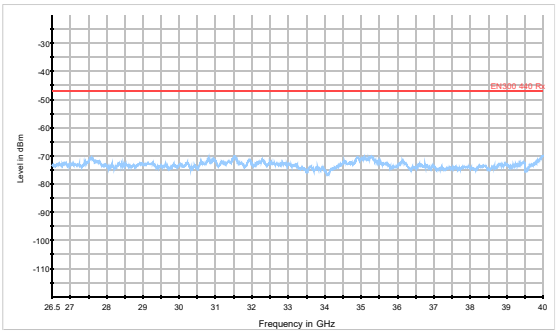
Radiated spurious Emissions 30MHz - 3GHz



Radiated spurious Emissions 3GHz - 18GHz



Radiated spurious Emissions 18GHz - 26.5GHz



Radiated spurious Emissions 26.5GHz - 40GHz

Test Data File Name	Frequency (MHz)	Maximum Value (dBm)	Limit (dB)	Margin (dB)	Degree
RSE_ WIFI 5G_a IDLE_VH_0.03-3GHz	384.02	-66.61	-57.00	9.61	180
RSE_ WIFI 5G_a IDLE_VH_3-18GHz	14309.50	-51.78	-47.00	4.78	0
RSE_ WIFI 5G_a IDLE_VH_18-26.5GHz	18105.50	-58.31	-47.00	11.31	270
RSE_ WIFI 5G_a IDLE_VH_26.5-40GHz	31527.04	-70.04	-47.00	23.04	0

6. Uncertainty Measurement

Parameter	Uncertainty
Radio frequency	±1 x 10^{-7}
RF power (conducted)	±1.5 dB
Radiated emission of transmitter, valid to 26.5 GHz	±6 dB
Radiated emission of transmitter, valid between 26.5 GHz and 66 GHz	±8 dB
Radiated emission of receiver, valid to 26.5 GHz	±6 dB
Radiated emission of receiver, valid between 26.5 GHz and 66 GHz	±8 dB

7. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Wireless Communication Tester	Anritsu	MT8862A	6261883605	2024-05-14	2025-05-13
Spectrum Analyzer	R&S	FSV40	101297	2023-12-12	2024-12-11
Power sensor	R&S	OSP-B157W8	101405	2023-12-12	2024-12-11
Vector Signal Generator	KEYSIGHT	N5182B-X07	MY51350303	2024-01-21	2024-01-20
Signal Generator	KEYSIGHT	N5171B	MY50140143	2024-05-14	2024-05-13
Spectrum Analyzer	Agilent	N9020A	MY54420163	2023-12-12	2024-12-11
Power Test Set	KEYSIGHT	X8750A	MY58000336	2024-05-14	2025-05-13
Signal Conditioning Test Set	KEYSIGHT	X8749A	TW61283517	2024-05-14	2025-05-13
Climate Chamber	WEISS	WT2040	58226124660050	2023-12-12	2024-12-11
Radiated Spurious Emissions					
Spectrum Analyzer	R&S	FSV40	100816	2023-12-12	2024-12-11
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	01439	2023-06-30	2024-06-29
Horn Antenna	Schwarzbeck	BBHA 9120D	1594	2023-12-17	2024-12-16
Horn Antenna	ETS-Lindgren	3160-09	00102643	2023-10-10	2024-10-09
Horn Antenna	STEATITE	QSH-SL-26-40 -K-15	16779	2023-12-24	2024-12-23
Software	R&S	EMC32	10.35.10	/	/

********END OF REPORT ********

RF TEST REPORT

Applicant	MODE CHINA
Product	Free Hoist
Brand	/
Model	Free Hoist
Report No.	TRBJ24052958471
Issue Date	May 31, 2024

Shanghai Global Testing Services Co., Ltd. tested the above equipment in accordance with the requirements in **ETSI EN301 893 V2.1.1**. The test results show that the equipment tested is capable of demonstrating compliance withthe requirements as documented in this report.

Prepared by:Bruce Lin *Approved by: Cristine Fang*

Shanghai Global Testing Services Co., Ltd.

Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China.
TEL: +86-021-31463566
FAX: +86-021-33637858

TABLE OF CONTENT

Version	Revision description	Issue Date
Rev.0	Initial issue of report.	May 31, 2024
Rev.1	Update information.	May 31, 2024
Note: This revised report (Report No. TRBJ24052958471) supersedes and replaces the previously issued report (Report No. TRFJ23060547361-R5). Please discard or destroy the previously issued report and dispose of it accordingly.		

Summary of Measurement Results

No.	Test Case	Clause (EN301 893)	Conclusion
1	Nominal Centre frequencies	4.2.1	PASS
2	Occupied Channel Bandwidth	4.2.2	PASS
3	RF output power	4.2.3	PASS
4	Power density	4.2.3	PASS
5	Transmitter unwanted emissions outside the 5GHz RLAN bands	4.2.4.1	PASS
6	Transmitter unwanted emissions within the 5GHz RLAN bands	4.2.4.2	PASS
7	Receiver spurious emissions	4.2.5	PASS
8	Adaptivity (Channel Access Mechanism)	4.2.7	PASS
9	Receiver Blocking	4.2.8	PASS
10	User Access Restrictions	4.2.9	PASS
11	Geo-location capability	4.2.10	NT
Date of Testing: June 05, 2023 ~May 31, 2024 Date of Sample Received: June 05, 2023			
Note: NT = Not test All indications of Pass/Fail in this report are opinions expressed by Shanghai Global Testing Services Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not takeninto account and are published for informational purposes only.			

1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **Shanghai Global Testing Services Co., Ltd** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test facility

/

1.3 Testing Location

Company: Shanghai Global Testing Services Co., Ltd

Address: Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China.

City: Shanghai

Post code: 201201

Country: P. R. China

Telephone: +86-021-33637866

Fax: +86-021-33637858

Website: http://www.gts-lab.com

2 General Description of Equipment under Test

2.1 Applicant and Manufacturer Information

Applicant	MODE CHINA
Applicant address	Room 01.8/f#7 Tower. 4th Area, No. 186, South 4th Ring west Road.Fengtai District, Beijing, China
Manufacturer	Zhuozhou Mude Industrial Technology Co., Ltd
Manufacturer address	No.C55, Zhongguaneun Hegu Innovatien Industrial Park, Chaoyang EastRoad,ZhuozhouDevelopment Zone, BaodingCity, Hebei Province

2.2 General information

EUT Description	
Model:	Free Hoist
IMEI:	/
HW Version:	V1.0
SW Version:	V1.0
Antenna Type:	Internal Antenna
MAX RF output power (EIRP):	/
Operating temperature range:	/
Operating voltage range:	/
Rated Power Supply Voltage:	/
Antenna Gain:	2 dBi
Beamforming gain:	NA
EUT Accessory	
Adapter	/
Battery	/
RJ45&DB9_wire	/
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.	

2.3 Information as required by ETSI EN 301 893 clause 5.4.1(Annex G)

Wireless Technology and Frequency Range

Wireless Technology		Bandwidth	Channel	Frequency
Wi-Fi	U-NII-1	20 MHz	36	5180MHz
			40	5200MHz
			44	5220MHz
			48	5240MHz
		40 MHz	38	5190MHz
			46	5230MHz
		80 MHz	42	5210MHz
	U-NII-2A	20 MHz	52	5260MHz
			56	5280MHz
			60	5300MHz
			64	5320MHz
		40 MHz	54	5270MHz
			62	5310MHz
		80 MHz	58	5290MHz
Does this device support TPC Function? ☐Yes ☒No				

Equipment Information	
The type of modulation used by the equipment	☐FHSS ☒other forms of modulation
Adaptive / non-adaptive equipment	☐non-adaptive Equipment ☒adaptive Equipment without the possibility to switch to a non-adaptive mode ☐adaptive Equipment which can also operate in a non-adaptive mode
Type of Equipment:	☒Stand-alone ☐Combined Equipment ☐Plug-in radio device ☐Other
Power Supply:	☒Battery ☒AC adapter ☐External Power Supply
Operating Frequency Range:	☒5150-5250MHz ☒5250-5350MHz ☐5470-5600MHz ☐5600-5650MHz ☒5650-5725MHz
Modulation:	☒WLAN 802.11a/n/ac: OFDM ☐WLAN 802.11 SU ax: OFDM ☐WLAN 802.11 MU ax: OFDMA
Devices TPC Supply:	☐Yes ☒No
DFS Functionality Mode:	☐Master ☐Slave with radar detection ☒Slave without radar detection
Occupied Channel Bandwidth:	☒20 MHz Wi-Fi (802.11a/n HT20/ac VHT20) ☒40 MHz Wi-Fi (802.11n HT40/ac VHT40) ☒80 MHz Wi-Fi (802.11ac VHT80)
Temporary RF connector provided:	Yes

3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards
ETSI EN301 893 V2.1.1 (2017-05)

4 Test Configuration

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). The worst cases were recorded in this report.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes.EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, horizontal polarization) and the worst case was recorded.

Band	**Data Rate**
802.11a	6 Mbps
802.11n HT20	MCS 0
802.11n HT40	MCS 0
802.11ac VHT20	MCS 0
802.11ac VHT40	MCS 0
802.11ac VHT80	MCS 0

5 Test Case Results

5.1 Nominal Centre frequencies

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Equipment operating without modulation

This test method requires that the UUT can be operated in an unmodulated test mode.

The UUT shall be connected to a suitable frequency measuring device (e.g. a frequency counter or a spectrum analyser) and operated in an unmodulated mode.

The result shall be recorded.

Equipment operating with modulation

This method is an alternative to the above method in case the UUT cannot be operated in an un-modulated mode.

The UUT shall be connected to spectrum analyser.

Max Hold shall be selected and the centre frequency adjusted to that of the UUT.

The peak value of the power envelope shall be measured and noted. The span shall be reduced and the marker moved in a positive frequency increment until the upper, (relative to the centre frequency), -10 dBc point is reached. This value shall be noted as f1.

The marker shall then be moved in a negative frequency increment until the lower, (relative to the centre frequency), -10 dBc point is reached. This value shall be noted as f2.

The centre frequency is calculated as (f1 + f2) / 2.

Limit

Standard	Limit
ETSI EN301893_Clause 4.2.1.3	**fc+/-20ppm**

Test Results

NTC

Network Standards	Channel/ Frequency (MHz)	Carrier frequency	Delta to CF (ppm)	Limit (ppm)	Conclusion
802.11a	36/5180	5180.02	3.86	+/-20	Pass
	64/5320	5320	0	+/-20	Pass
802.11n HT20	36/5180	5180.02	3.86	+/-20	Pass
	64/5320	5320	0	+/-20	Pass
802.11n HT40	38/5190	5190	0	+/-20	Pass
	62/5310	5310	0	+/-20	Pass
802.11ac VHT20	36/5180	5180	0	+/-20	Pass
	64/5320	5320.04	7.52	+/-20	Pass
802.11ac VHT40	38/5190	5190	0	+/-20	Pass
	62/5310	5310	0	+/-20	Pass
802.11ac VHT80	42/5210	5210	0	+/-20	Pass
	58/5290	5290	0	+/-20	Pass

HT

Network Standards	Channel/ Frequency (MHz)	Carrier frequency	Delta to CF (ppm)	Limit (ppm)	Conclusion
802.11a	36/5180	5180	0	+/-20	Pass
	64/5320	5320.04	7.52	+/-20	Pass
802.11n HT20	36/5180	5180	0	+/-20	Pass
	64/5320	5320	0	+/-20	Pass
802.11n HT40	38/5190	5190	0	+/-20	Pass
	62/5310	5310	0	+/-20	Pass
802.11ac VHT20	36/5180	5180.02	3.86	+/-20	Pass
	64/5320	5320.02	3.76	+/-20	Pass
802.11ac VHT40	38/5190	5190	0	+/-20	Pass
	62/5310	5310	0	+/-20	Pass
802.11ac VHT80	42/5210	5210	0	+/-20	Pass
	58/5290	5290	0	+/-20	Pass

LT

Network Standards	Channel/ Frequency (MHz)	Carrier frequency	Delta to CF (ppm)	Limit (ppm)	Conclusion
802.11a	36/5180	5180	0	+/-20	Pass
	64/5320	5319.98	-3.76	+/-20	Pass
802.11n HT20	36/5180	5179.98	-3.86	+/-20	Pass
	64/5320	5320	0	+/-20	Pass
802.11n HT40	38/5190	5190	0	+/-20	Pass
	62/5310	5310	0	+/-20	Pass
802.11ac VHT20	36/5180	5180	0	+/-20	Pass
	64/5320	5319.98	-3.76	+/-20	Pass
802.11ac VHT40	38/5190	5190	0	+/-20	Pass
	62/5310	5310	0	+/-20	Pass
802.11ac VHT80	42/5210	5209.92	-15.36	+/-20	Pass
	58/5290	5290	0	+/-20	Pass

5.2 Occupied Channel Bandwidth

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The measurement procedure shall be as follows:

Step 1:

• Connect the UUT to the spectrum analyser and use the following settings:

- Centre Frequency: The centre frequency of the channel under test
- Resolution Bandwidth: 100 kHz
- Video Bandwidth: 300 kHz
- Frequency Span: 2 × Nominal Bandwidth (e.g. 40 MHz for a 20 MHz channel)
- Sweep time: > 1 s; for larger Nominal Bandwidths, the sweep time may be increased untila value where the sweep time has no impact on the RMS value of the signal
- Detector Mode: RMS
- Trace Mode: Max Hold

Step 2:

• Wait for the trace to stabilize.

Step 3:

• Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

• Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.

The measurement described in step 1 to step 3 above shall be repeated in case of simultaneous transmissions in non-adjacent channels

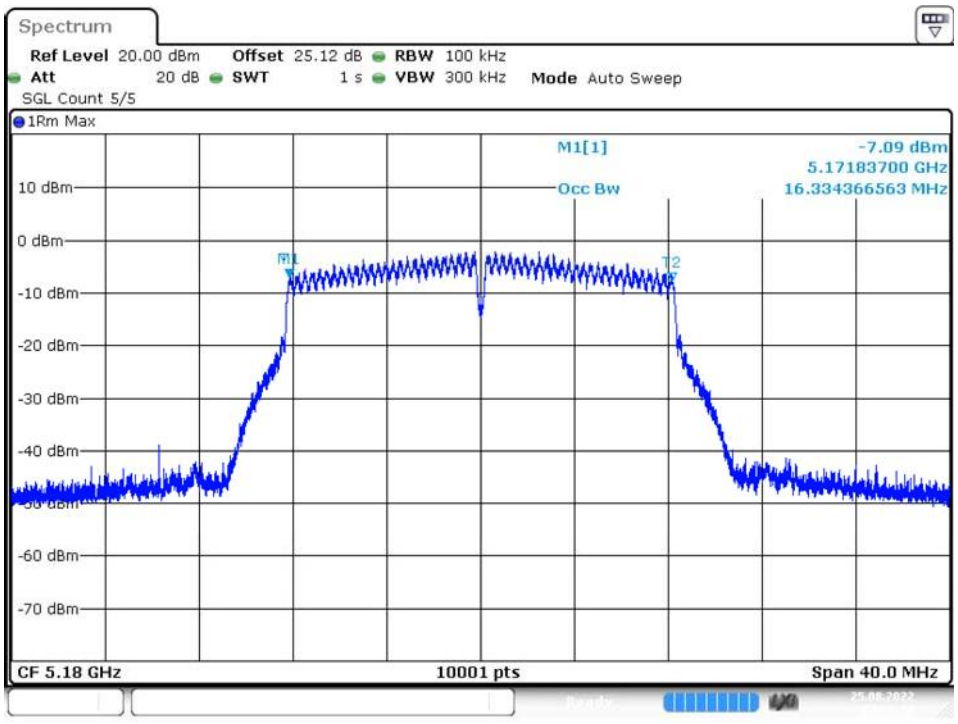
Limits

ETSI EN 301893_Clause 4.2.2.2	Between 80% and 100% of the declared normal BW

Test Result:

Network Standards	Channel/ Frequency (MHz)	Occupied channel Bandwidth (MHz)	Min Limit (MHz)	Max Limit (MHz)	Conclusion
802.11a	36/5180	16.334	16	20	PASS
	64/5320	16.326	16	20	PASS
802.11n HT20	36/5180	17.542	16	20	PASS
	64/5320	17.542	16	20	PASS
802.11n HT40	38/5190	35.900	32	40	PASS
	62/5310	35.900	32	40	PASS
802.11ac VHT20	36/5180	17.542	16	20	PASS
	64/5320	17.542	16	20	PASS
802.11ac VHT40	38/5190	35.892	32	40	PASS
	62/5310	35.876	32	40	PASS
802.11ac VHT80	42/5210	75.320	64	80	PASS
	58/5290	75.336	64	80	PASS

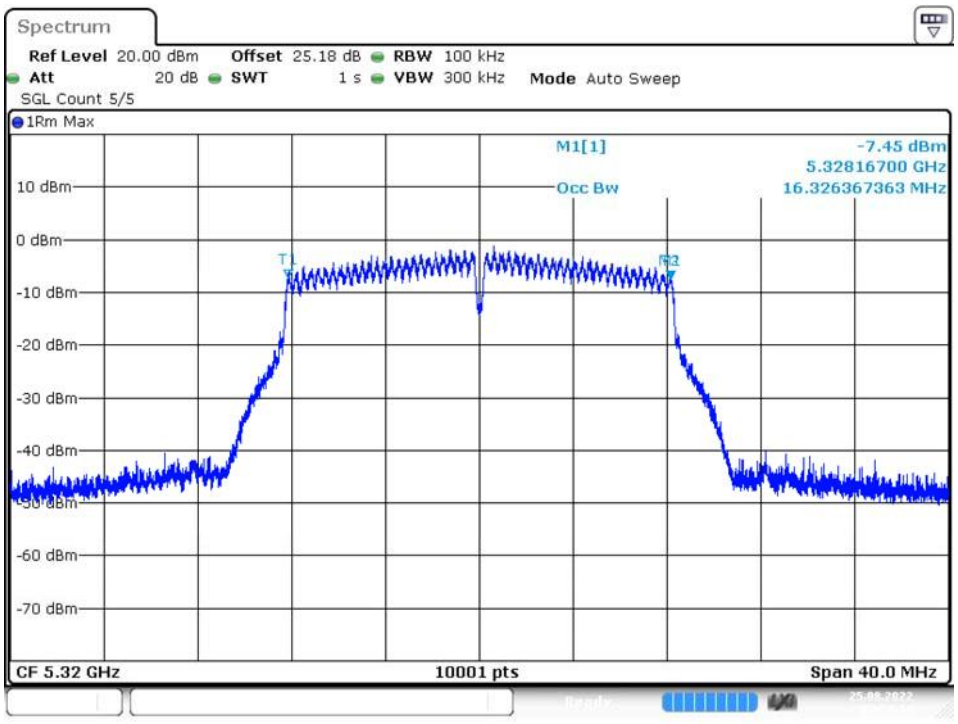
Test Graphs
OBW 802.11a 5180MHz



P

Date: 25.AUG.2022 02:57:32

OBW 802.11a 5320MHz



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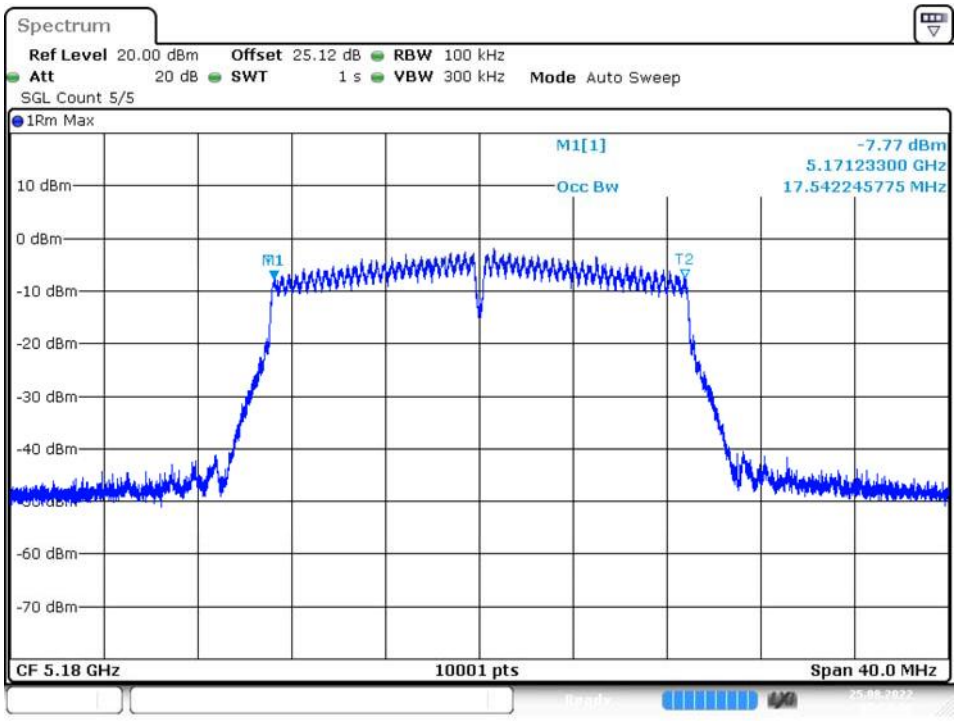
Date: 25.AUG.2022 02:59:33

OBW 802.11ac(VHT20) 5180MHz



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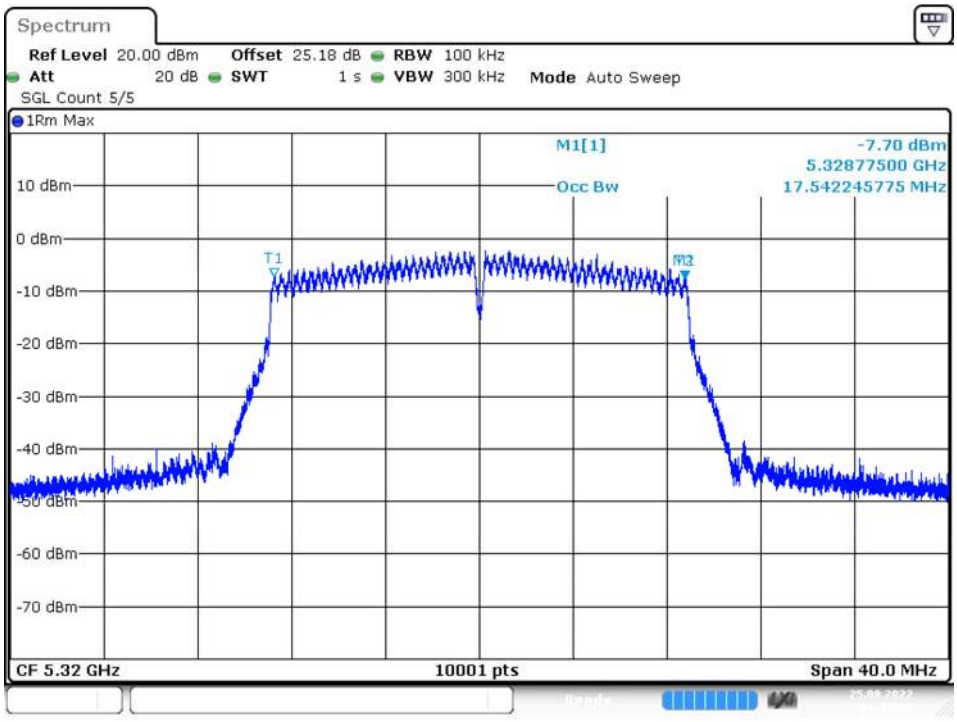
Date: 25.AUG.2022 08:58:00

OBW 802.11ac(VHT20) 5320MHz



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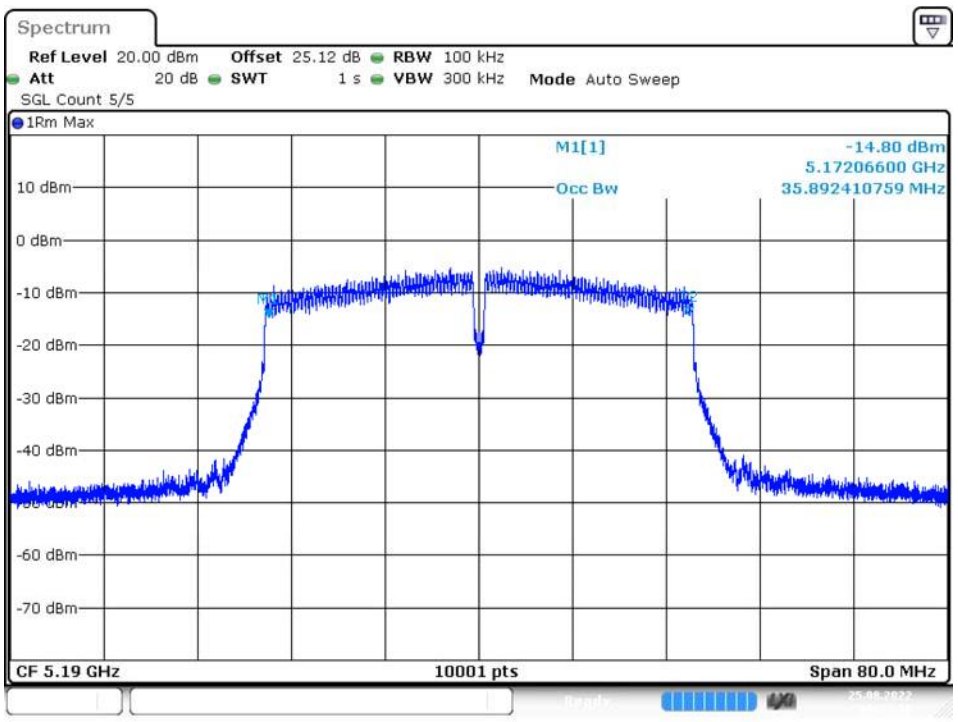
Date: 25.AUG.2022 09:00:59

OBW 802.11ac(VHT40) 5190MHz



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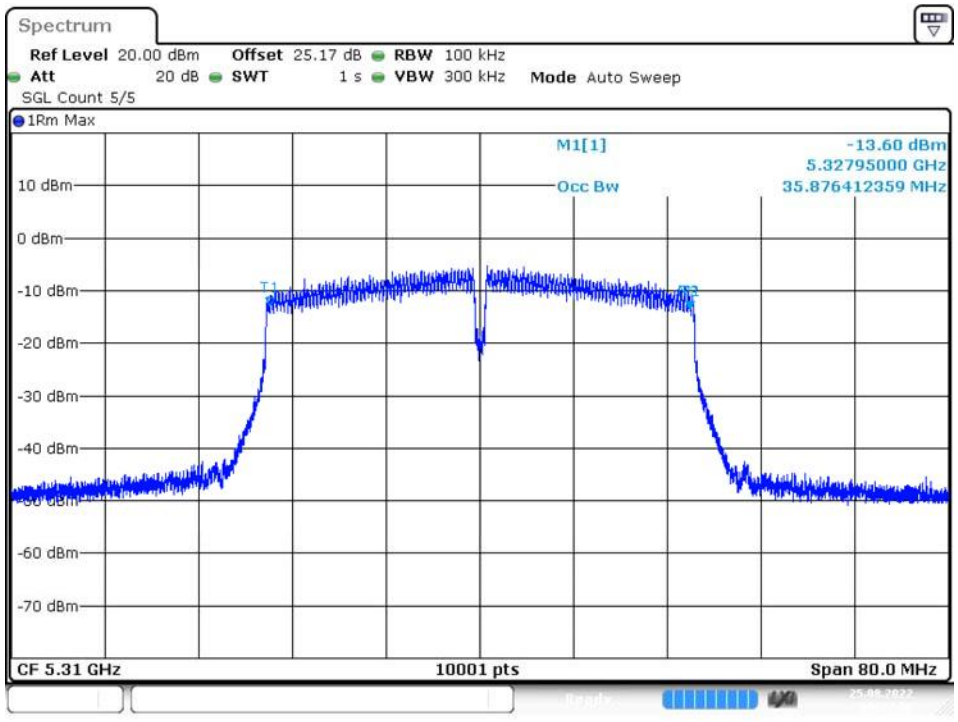
Date: 25.AUG.2022 09:11:36

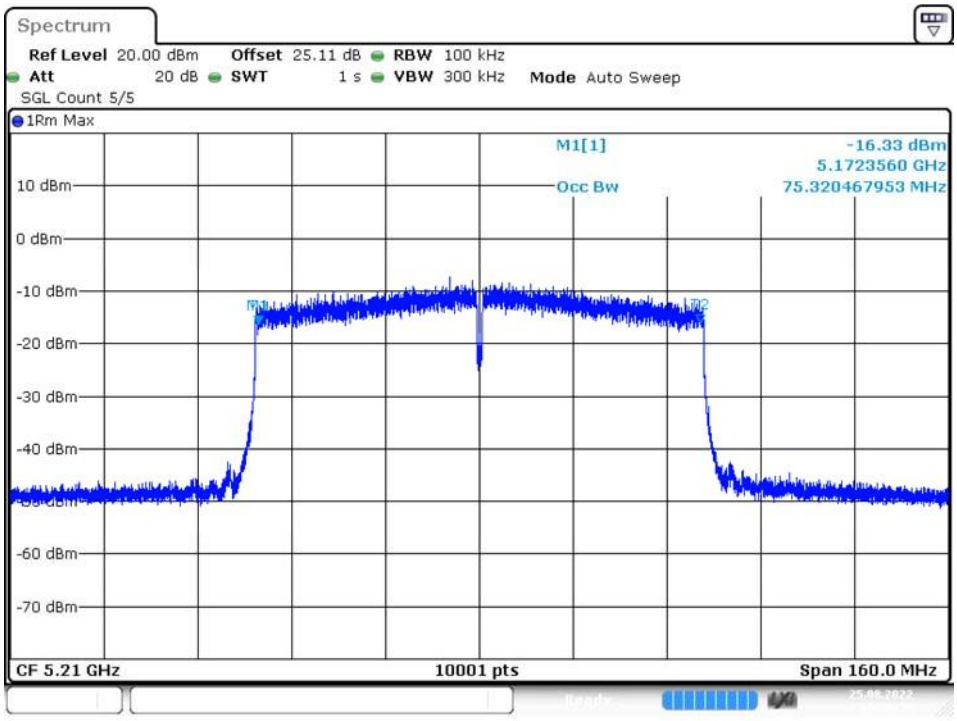
OBW 802.11ac(VHT40) 5310MHz



P

Date: 25.AUG.2022 09:14:08

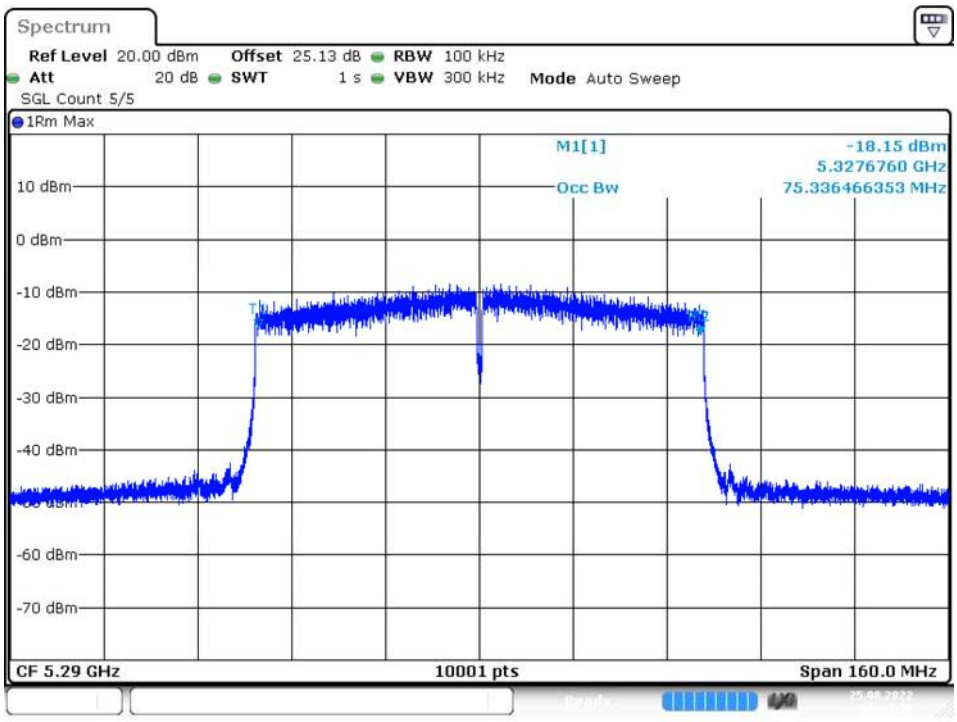
OBW 802.11ac(VHT80) 5210MHz



P

Date: 25.AUG.2022 09:16:24

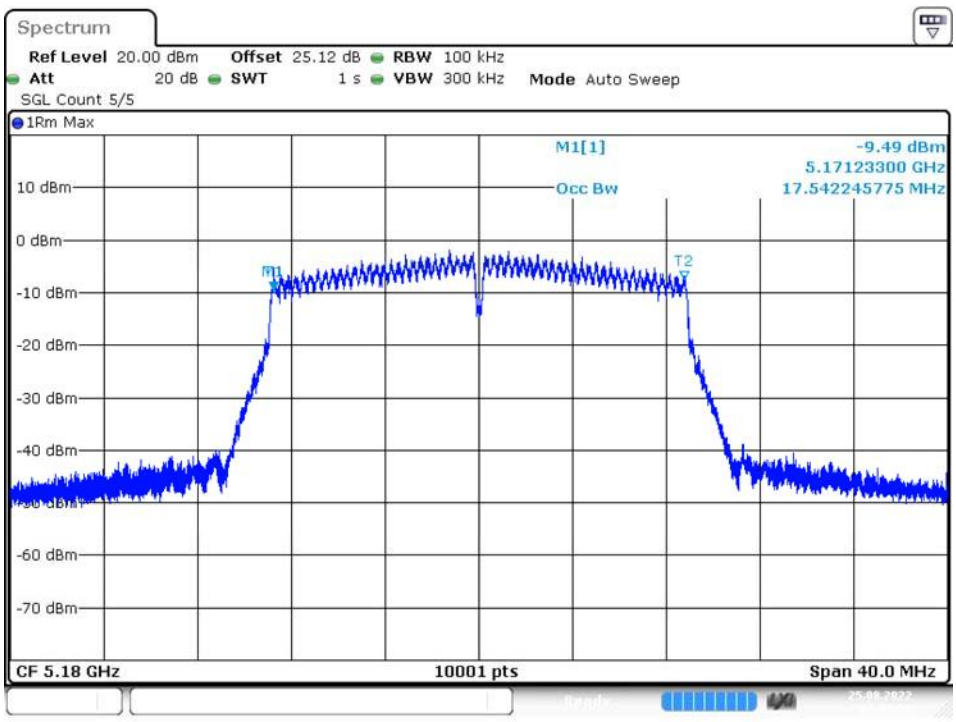
OBW 802.11ac(VHT80) 5290MHz



P

Date: 25.AUG.2022 09:19:27

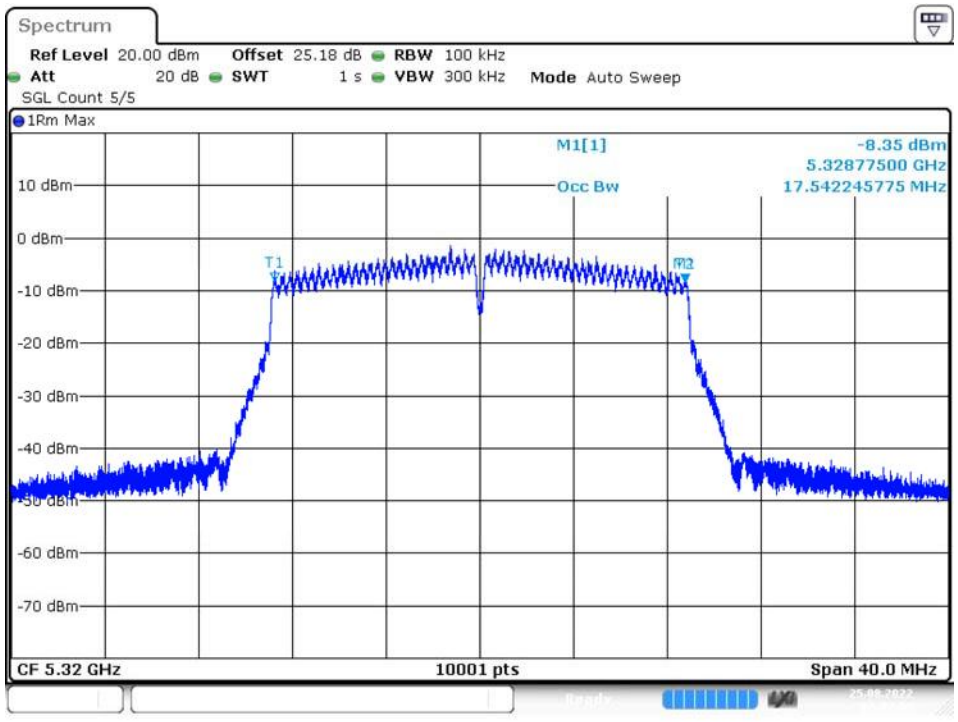
OBW 802.11n(HT20) 5180MHz



P

Date: 25.AUG.2022 03:01:59

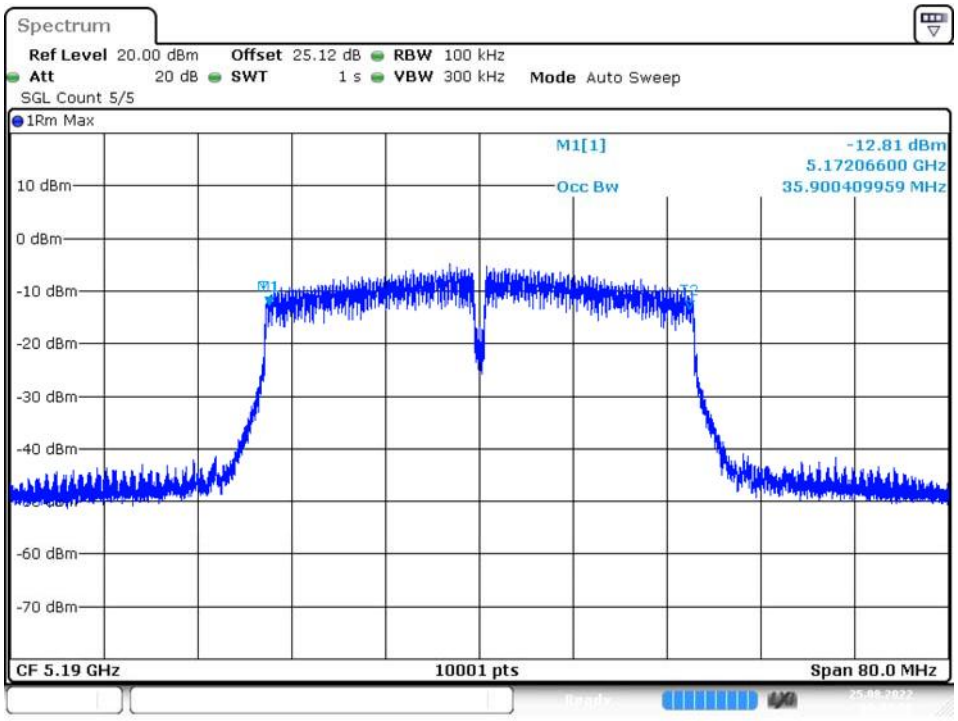
OBW 802.11n(HT20) 5320MHz



P

Date: 25.AUG.2022 03:04:05

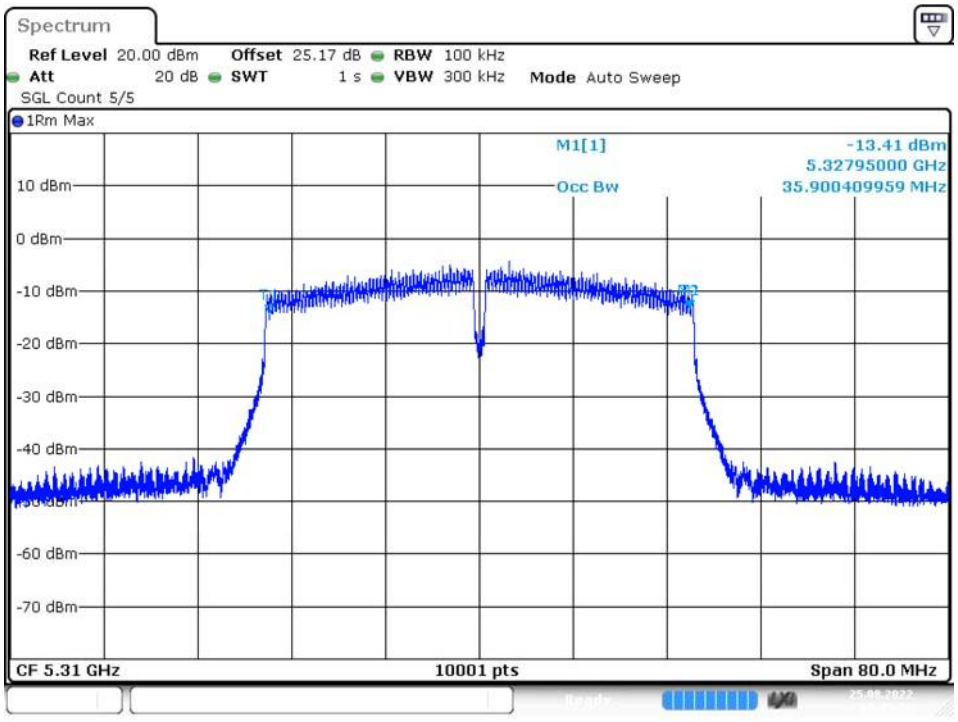
OBW 802.11n(HT40) 5190MHz



P

Date: 25.AUG.2022 09:03:57

OBW 802.11n(HT40) 5310MHz



P

Date: 25.AUG.2022 09:06:00

5.3 RF Output Power

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Option 1: For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment)

This option is for equipment that operates only in one sub-band or that is capable for operation in two sub-bands simultaneously but, for the purpose of the testing, the equipment can be configured to:

- operate in a continuous transmit mode or with a constant duty cycle (x), and
- operate only in one sub-band.

Step 1:

For equipment configured into a continuous transmit mode (x = 1), proceed immediately with step 2.

- The output power of the transmitter shall be coupled to a matched diode detector or equivalent thereof. The output of the diode detector shall be connected to the vertical channel of an oscilloscope.
- The combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the duty cycle of the transmitter output signal.
- The observed duty cycle of the transmitter (Tx on / (Tx on + Tx off)) shall be noted as x ($0 < x \leqslant 1$), and recorded in the test report.

Step 2:

- The RF output power shall be determined using a wideband RF power meter with a thermocouple detector or an equivalent thereof and with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be noted as A (in dBm).
- In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the output power of each transmit chain shall be measured separately to calculate the total power (value A in dBm) for the UUT.

Step 3:

- The RF output power at the highest power level P_H (e.i.r.p.) shall be calculated from the above measured power output A (in dBm), the observed duty cycle x, the stated antenna gain G in dBi and if applicable the beamforming gain Y in dB, according to the formula below. This value shall be recorded in the test report.

If more than one antenna assembly is intended for this power setting or TPC range, the gain of the antenna assembly with the highest gain shall be used.

$P_H = A + G + Y + 10 \times \log (1 / x)$ (dBm).

- This value P_H shall be compared to the applicable limit contained in table 2 of clause 4.2.3.2.2.

Limit:

Mean e.i.r.p limits for RF output power at the highest power level

Standard	Frequency Range	Mean e.i.r.p. limit for P_H (dBm)	
		with TPC	without TPC
ETSI EN 301893_Clause 4.2.3.2.2	5.15GHz~5.35GHz	≤23	≤20/23 (see note1)
	5.47GHz~5.725GHz	≤30 (see note2)	≤27 (see note2)

Note 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz, in which case the applicable limit is 23 dBm.
Note 2: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5250 MHz to 5350 MHz.

Mean e.i.r.p limits for RF output power at the lowest power level

Standard	Frequency Range	Mean e.i.r.p. limit for P_L (dBm)
ETSI EN 301893_Clause 4.2.3.2.3	5.25GHz~5.35GHz	≤17
	5.47GHz~5.725GHz	≤24 (see note1)

Note 1: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.
Note 2: For devices without TPC, the limits in table above do not apply.

Test Results

Power Index								
Channel	802.11a	802.11n HT20	802.11ac VHT20	Channel	802.11n HT40	802.11ac VHT40	Channel	802.11ac VHT80
CH36	16	16	16	CH38	16	16	CH42	16
CH64	16	16	16	CH62	16	16	CH58	16

Network Standards	Channel/ Frequency (MHz)	Average Output Power (dBm)			EIRP (dBm)			Limit (dBm)	Conclusion
		Test Condition							
		T_{nom}	T_{max}	T_{min}	T_{nom}	T_{max}	T_{min}		
802.11a	36/5180	15.25	15.19	14.81	17.25	17.19	16.81	23	PASS
	64/5320	14.84	14.54	14.35	16.84	16.54	16.35	20	PASS
802.11n HT20	36/5180	14.94	14.74	14.69	16.94	16.74	16.69	23	PASS
	64/5320	14.74	14.57	14.58	16.74	16.57	16.58	20	PASS
802.11n HT40	38/5190	15.08	14.76	14.85	17.08	16.76	16.85	23	PASS
	62/5310	14.08	13.64	13.60	16.08	15.64	15.60	20	PASS
802.11ac VHT20	36/5180	15.04	14.76	14.81	17.04	16.76	16.81	23	PASS
	64/5320	14.73	14.44	14.34	16.73	16.44	16.34	20	PASS
802.11ac VHT40	38/5190	15.06	14.74	14.68	17.06	16.74	16.68	23	PASS
	62/5310	14.66	14.38	14.22	16.66	16.38	16.22	20	PASS
802.11ac VHT80	42/5210	14.83	14.53	14.34	16.83	16.53	16.34	23	PASS
	58/5290	14.71	14.53	14.47	16.71	16.53	16.47	20	PASS

Note:1) EIRP = A (Output Power) + G(Antenna Gain).

2) T_{nom}= Normal Temperature/T_{max}= High Temperature/T_{min}=Low Temperature.

3) 12 bursts have been captured during every power measurements with the test tools.

5.4 Power Density

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Option 1: For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment)

Step 1:

• Connect the UUT to the spectrum analyser and use the following settings: - Centre Frequency: The centre frequency of the channel under test - RBW: 1 MHz - VBW: 3 MHz

- Frequency Span: 2 × Nominal Bandwidth (e.g. 40 MHz for a 20 MHz channel) - Detector Mode: Peak - Trace Mode: Max Hold

Step 2:

• When the trace is complete, find the peak value of the power envelope and record the frequency.

Step 3:

• Make the following changes to the settings of the spectrum analyser: - Centre Frequency: Equal to the frequency recorded in step 2 - Frequency Span: 3 MHz - RBW: 1 MHz - VBW: 3 MHz - Sweep Time: 1 minute - Detector Mode: RMS - Trace Mode: Max Hold

Step 4:

• When the trace is complete, the trace shall be captured using the "Hold" or "View" option on the spectrum analyser.

• Find the peak value of the trace and place the analyser marker on this peak. This level is recorded as the highest mean power (power density) D in a 1 MHz band.

• Alternatively, where a spectrum analyser is equipped with a function to measure spectral power density, this function may be used to display the power density D in dBm / MHz.

• In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the power density of each transmit chain shall be measured separately to calculate the total power density (value D in dBm / MHz) for the UUT.

Step 5:

• The maximum spectral power density e.i.r.p. is calculated from the above measured power density D, the observed duty cycle x (see clause 5.4.4.2.1.1.2, step 1), the applicable antenna assembly gain G in dBi and if applicable the beamforming gain Y in dB, according to the formula below. This value shall be recorded in the test report. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the highest gain shall be used: PD = D + G + Y + 10 × log (1 / x) (dBm / MHz) (14)

Limit:

Standard	Frequency Range	Mean e.i.r.p. density limit (dBm/MHz)	
		with TPC	without TPC
ETSI EN 301893_Clause 4.2.3.2.2	5.15GHz~5.35GHz	≤10	≤7/10(see note1)
	5.47GHz~5.725GHz	≤17(see note2)	≤14(see note2)

Note1: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.

Note2: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.

Test Result

Network Standards	Channel/ Frequency (MHz)	Output Power Density (dBm/MHz)	E.I.R.P. Spectral Density (dBm/MHz)	Limit (dBm/MHz)	Conclusion
802.11a	36/5180	4.65	6.65	10	PASS
	64/5320	4.27	6.27	7	PASS
802.11n HT20	36/5180	4.28	6.28	10	PASS
	64/5320	4.06	6.06	7	PASS
802.11ac VHT20	36/5180	4.39	6.39	10	PASS
	64/5320	4.10	6.10	7	PASS
Note:1)PD = D + G + Y , G=Gain, 2) Since the 20MHz Power is larger than other bandwidth, so the 20MHz bandwidth is the worst state, and 20MHz bandwidths are selected for PSD testing.					

5.5 Transmitter unwanted emissions outside the 5GHz RLAN bands

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Pre-scan

The UUT shall be connected to a spectrum analyser capable of RF power measurements.
This pre-scan test procedure shall be used to identify potential unwanted emissions of the UUT.

Step 1:

• The sensitivity of the spectrum analyser should be such that the noise floor is at least 12 dB below the limits given in clause 4.2.4.1.2, table 4.

Step 2:

• The unwanted emissions over the range 30 MHz to 1 000 MHz shall be identified.
• Spectrum analyser settings:
- Resolution bandwidth: 100 kHz
- Video bandwidth: 300 kHz
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep Points: ⩾ 9 700

For spectrum analysers not supporting this number of sweep points, the frequency band may be segmented. For spectrum analysers capable of supporting twice this number of sweep points, the frequency adjustment in clause 5.4.5.2.1.2 (step 1, last bullet) may be omitted.

- Sweep time: For non-continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 100 kHz frequency step, the measurement time is greater than two transmissions of the UUT.

EXAMPLE 1: For non-continuous transmissions, if the UUT is using a test sequence as described in clause 5.3.1.1 with a transmitter on + off time of 2 ms, then the sweep time has to be greater than4 ms per 100 kHz.

• Allow the trace to stabilize. Any emissions identified that have a margin of less than 6 dB with respect to the limits given in clause 4.2.4.1.2, table 4 shall be individually measured using the procedure in clause 5.4.5.2.1.2and compared to the limits given in clause 4.2.4.1.2, table 4.

Step 3:

• The unwanted emissions over the range 1 GHz to 26 GHz shall be identified.
• Spectrum analyser settings:
- Resolution bandwidth: 1 MHz
- Video bandwidth: 3 MHz
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep points: ⩾ 25 000

For spectrum analysers not supporting this number of sweep points, the frequency band may be

segmented. For spectrum analysers capable of supporting twice this number of sweep points, the frequency adjustment in clause 5.4.5.2.1.2 (step 1, last bullet) may be omitted.
- Sweep time: For non-continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 1 MHz frequency step, the measurement time is greater than two transmissions of the UUT.
EXAMPLE 2: For non-continuous transmissions, if the UUT is using a test sequence as described in clause 5.3.1.1 with a transmitter on + off time of 2 ms, then the sweep time has to be greater than4 ms per 1 MHz.
• Allow the trace to stabilize. Any emissions identified that have a margin of less than 6 dB with respect to thelimits given in clause 4.2.4.1.2, table 4 shall be individually measured using the procedure in clause 5.4.5.2.1.2and compared to the limits given in clause 4.2.4.1.2, table 4.

Measurement of the emissions identified during the pre-scan

The limits for transmitter unwanted emissions in clause 4.2.4.1 refer to average power levels.
The steps below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements above.
Continuous transmit signals:
For continuous transmit signals, a simple measurement using the RMS detector of the spectrum analyser is permitted.
The measured values shall be recorded and compared with the limits in clause 4.2.4.1.2, table 4.
Non-continuous transmit signals:
For non-continuous transmit signals, the measurement shall be made only over the "on" part of the burst.
Step 1:
• The level of the emissions shall be measured in the time domain, using the following spectrum analyser settings:
- Centre Frequency: Frequency of emission identified during the pre-scan
- RBW: 100 kHz (< 1 GHz) / 1 MHz (> 1 GHz)
- VBW: 300 kHz (< 1 GHz) / 3 MHz (> 1 GHz)
- Frequency Span: 0 Hz
- Sweep mode: Single Sweep
- Sweep Time: Suitable to capture one transmission burst. Additional measurements may be needed to identify the length of the transmission burst. In case of continuous signals, the Sweep Time shall be set to 30 ms
- Sweep points: Sweep time [µs] / 1 µs with a maximum of 30 000
- Trigger: Video (burst signals) or Manual (continuous signals)
- Detector: RMS
- Trace Mode: Clear/Write
• Adjust the centre frequency (fine tune) to capture the highest level of one burst of the emission to be measured.
This fine tuning can be omitted for spectrum analysers capable of supporting twice this number of sweep points required in step 2 and step 3 from the pre-scan procedure in clause 5.4.5.2.1.1.
Step 2:
• Adjust the trigger level to select the transmissions with the highest power level.
• Set a window (start and stop lines) to match with the start and end of the burst and in which the

RMS power shall be measured using the Time Domain Power function. If the spurious emission to be measured is a continuous signal, the measurement window shall be set to match the start and stop times of the sweep.

• Select RMS power to be measured within the selected window and note the result which is the RMS power of this particular spurious emission. Compare this value with the applicable limit provided by clause 4.2.4.1.2,table 4.

Repeat this procedure for every emission identified during the pre-scan. The values and corresponding frequencies shall be recorded.

In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), the measurements shall be repeated for each of the active transmit chains. Comparison with the applicable limits shall bedone using either of the options given below:

• Option 1: the results for each of the transmit chains for the corresponding 1 MHz segments shall be added and compared with the limits provided by table 4 in clause 4.2.4.1.2.

• Option 2: the results for each of the transmit chains shall be individually compared with the limits provided by table 4 in clause 4.2.4.1.2 after these limits have been reduced by 10 × log10 (Tch) (number of active transmit chains).

Limit

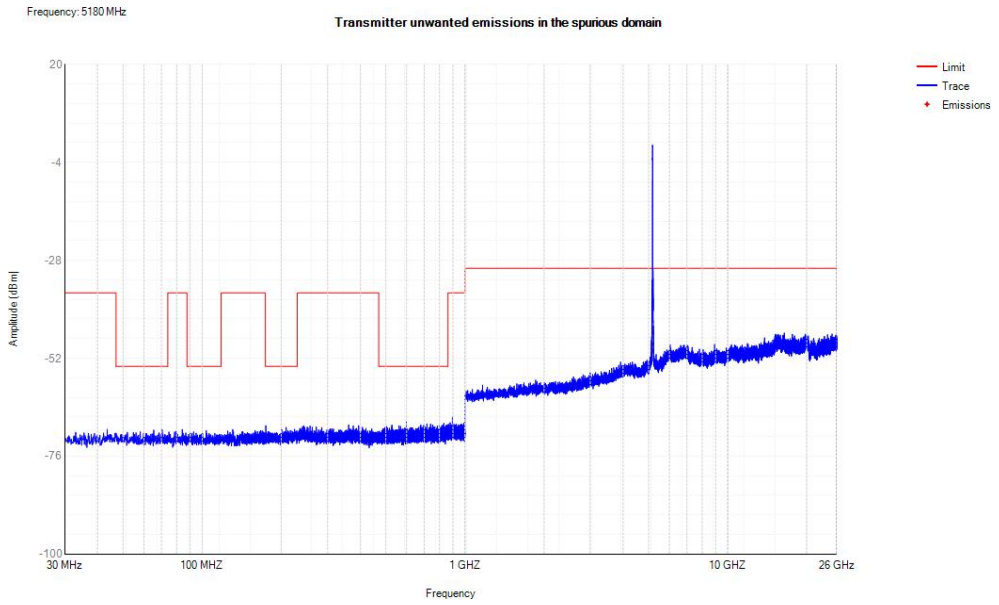
Transmitter unwanted Spurious emission

Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 5,15 GHz	-30 dBm	1 MHz
5,35 GHz to 5,47 GHz	-30 dBm	1 MHz
5,725 GHz to 26 GHz	-30 dBm	1 MHz

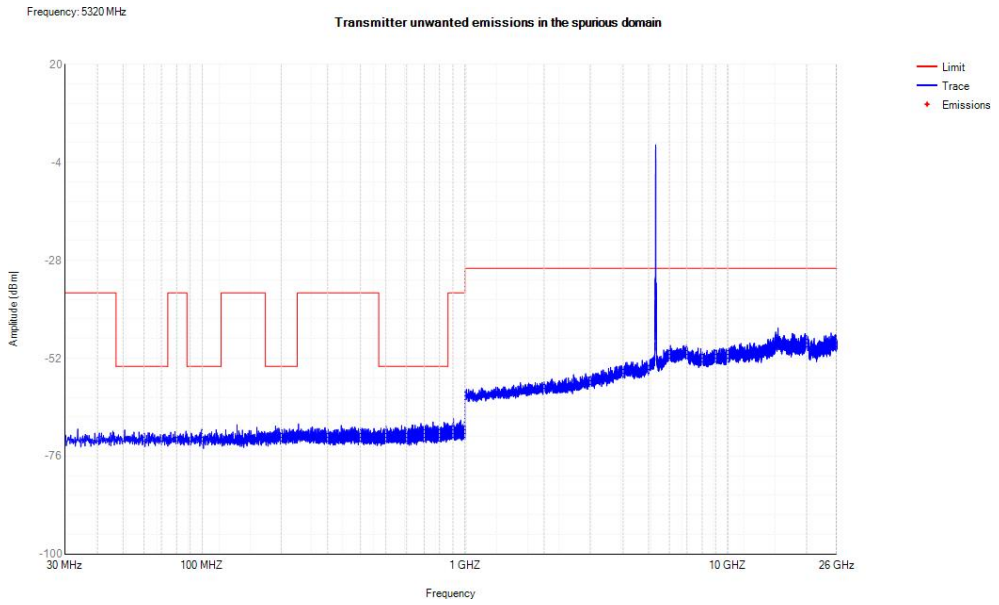
Conducted Results

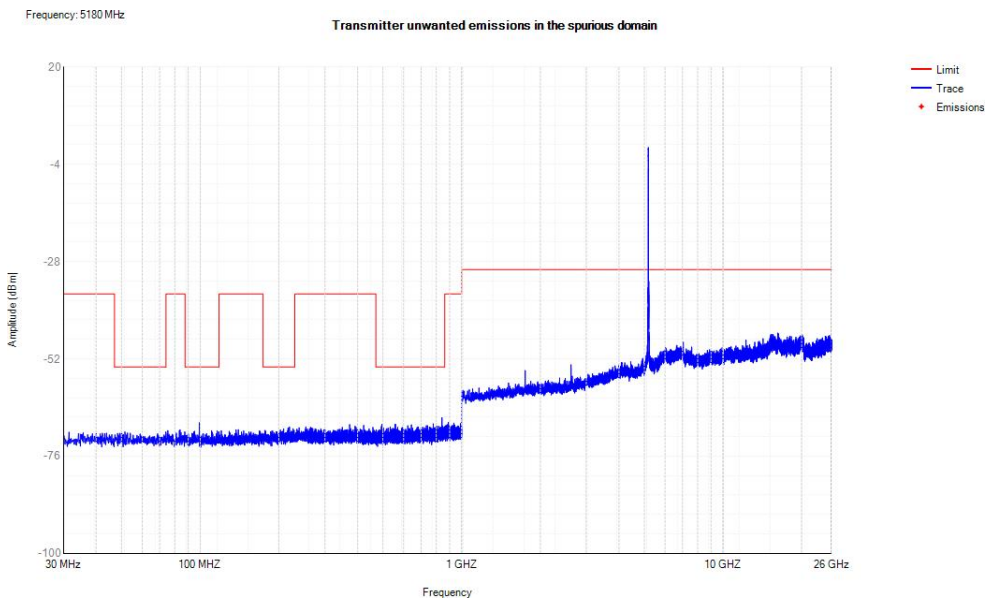
Note: The signal beyond the limit is carrier

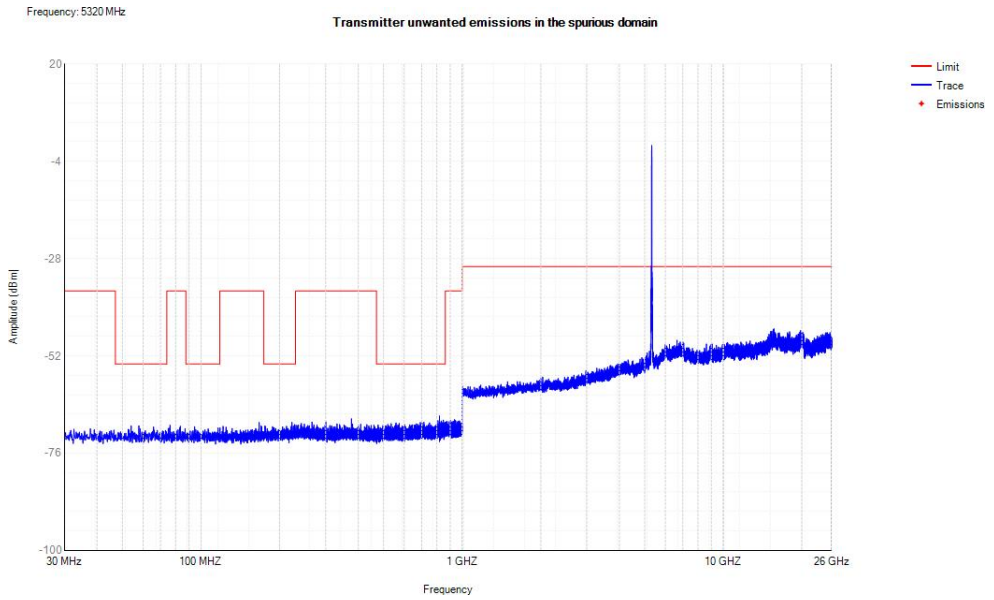
Test Graphs
Tx. Spurious 802.11a 5180MHz

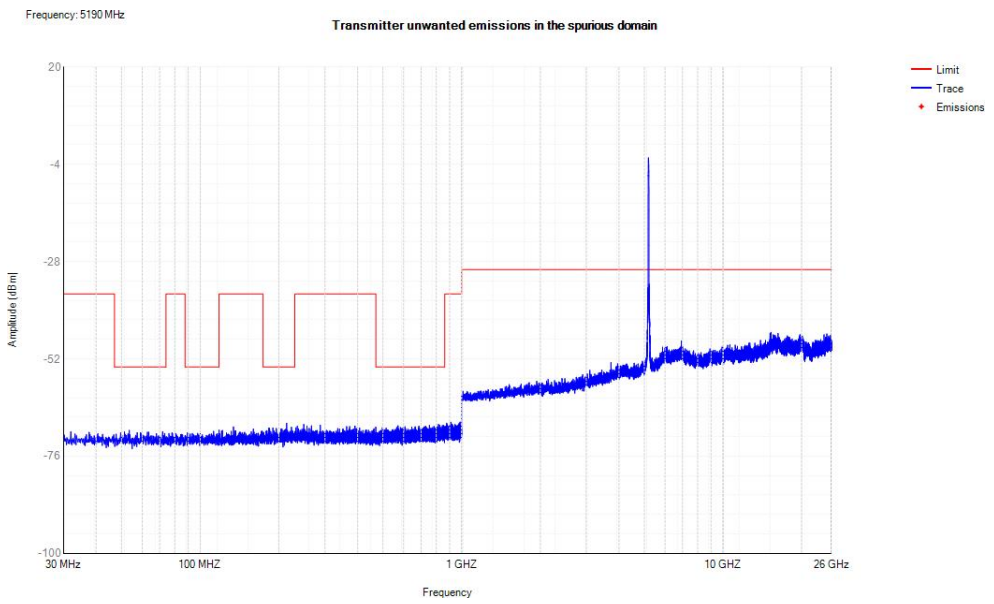


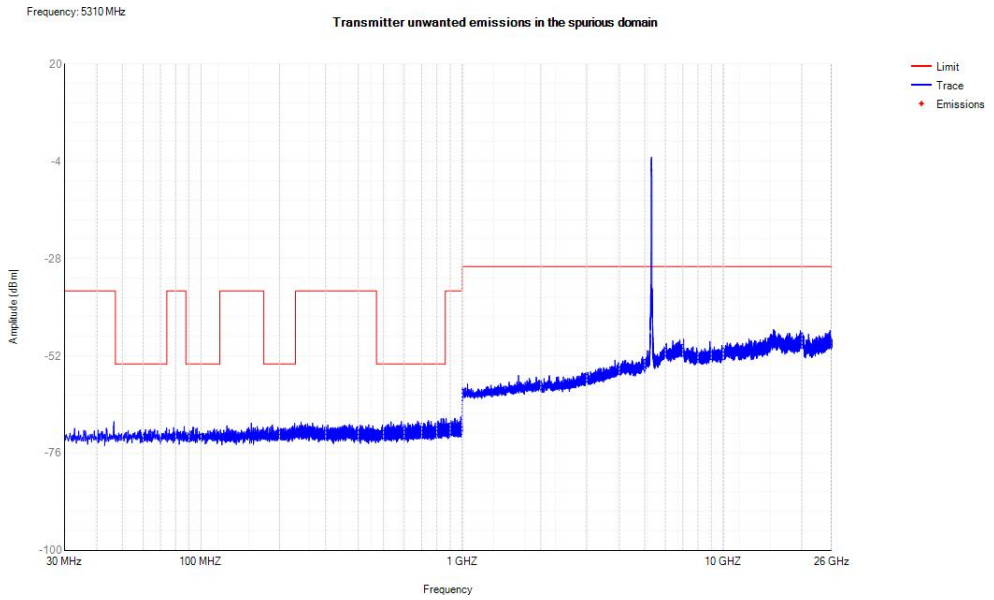
Tx. Spurious 802.11a 5320MHz

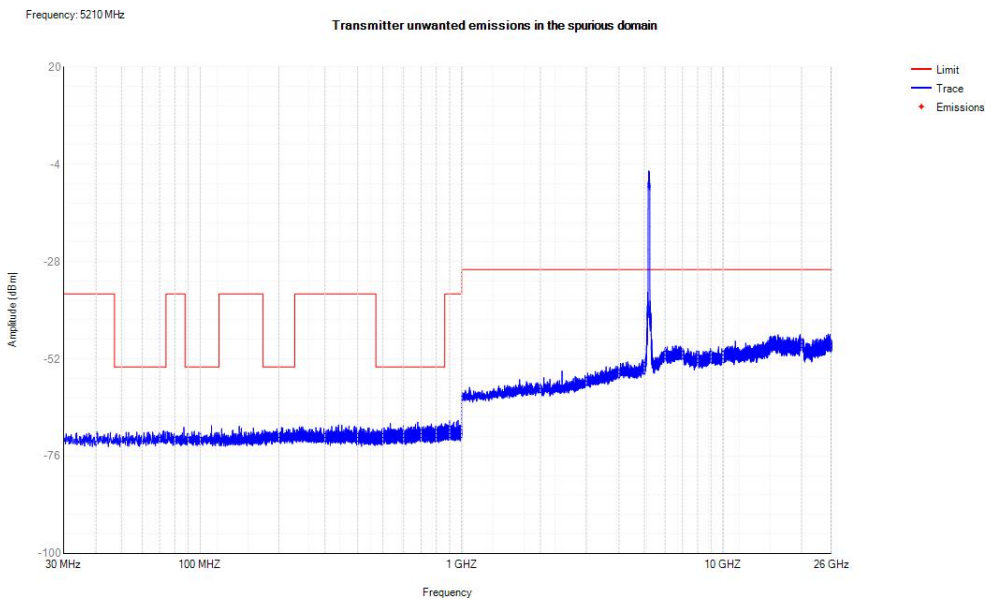


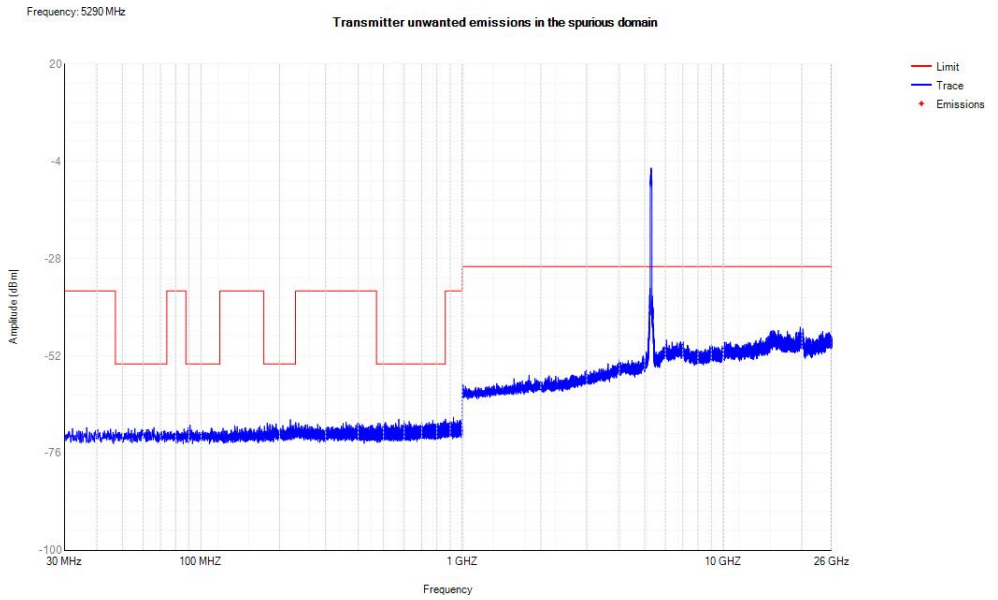
Tx. Spurious 802.11ac(VHT20) 5180MHz


Tx. Spurious 802.11ac(VHT20) 5320MHz


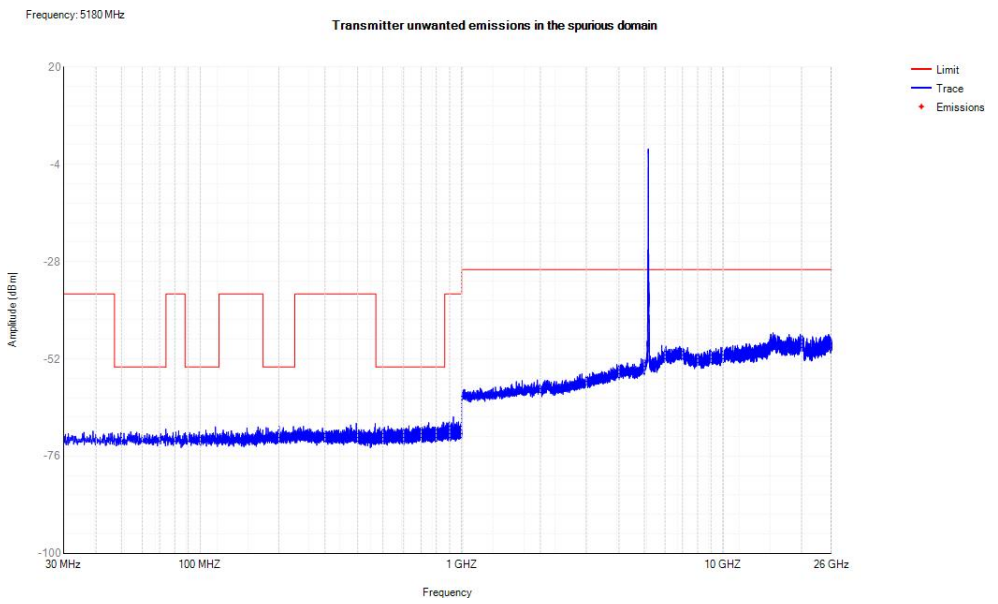
Tx. Spurious 802.11ac(VHT40) 5190MHz


Tx. Spurious 802.11ac(VHT40) 5310MHz


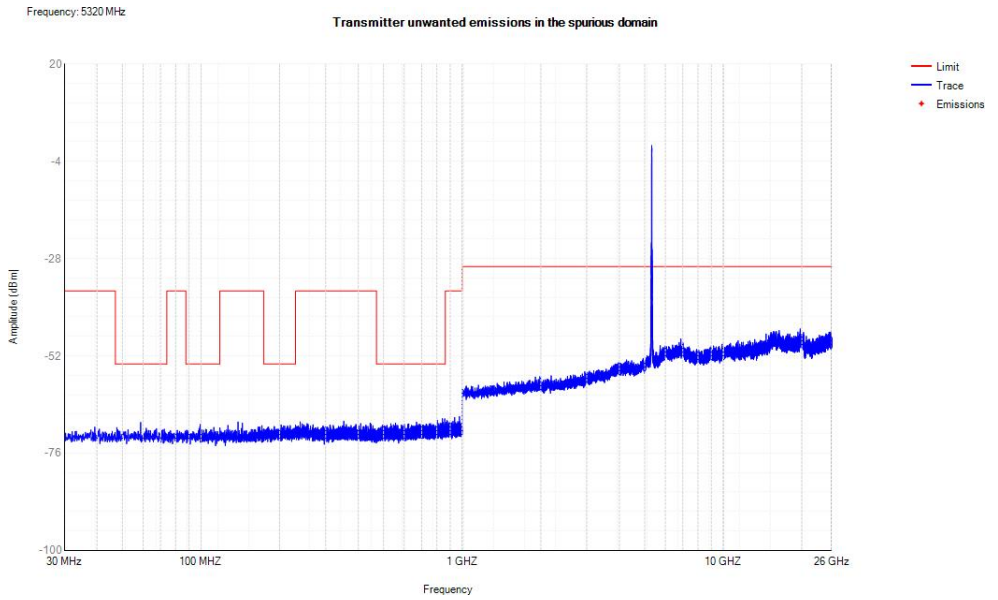
Tx. Spurious 802.11ac(VHT80) 5210MHz


Tx. Spurious 802.11ac(VHT80) 5290MHz


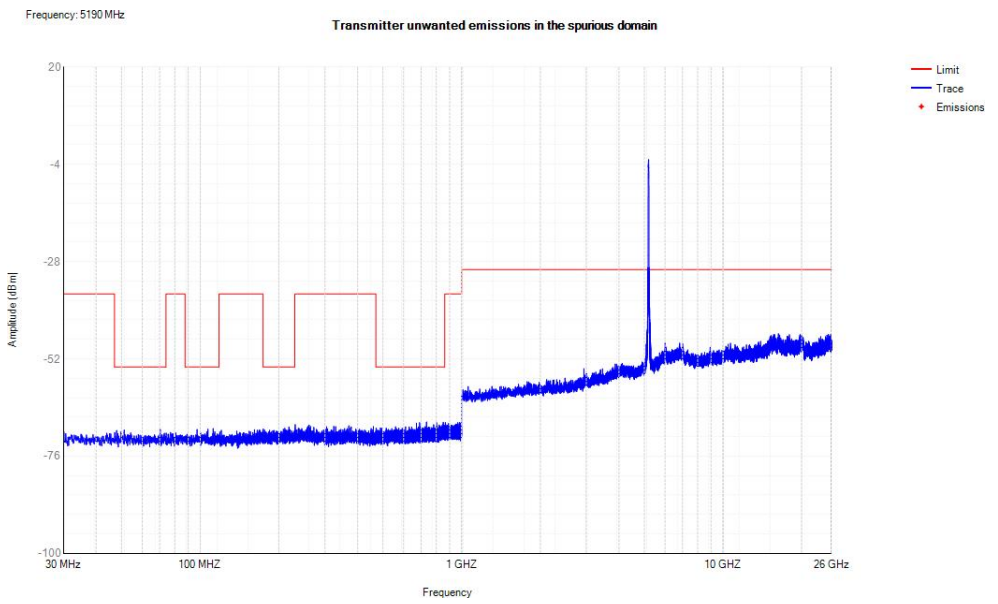
Tx. Spurious 802.11n(HT20) 5180MHz



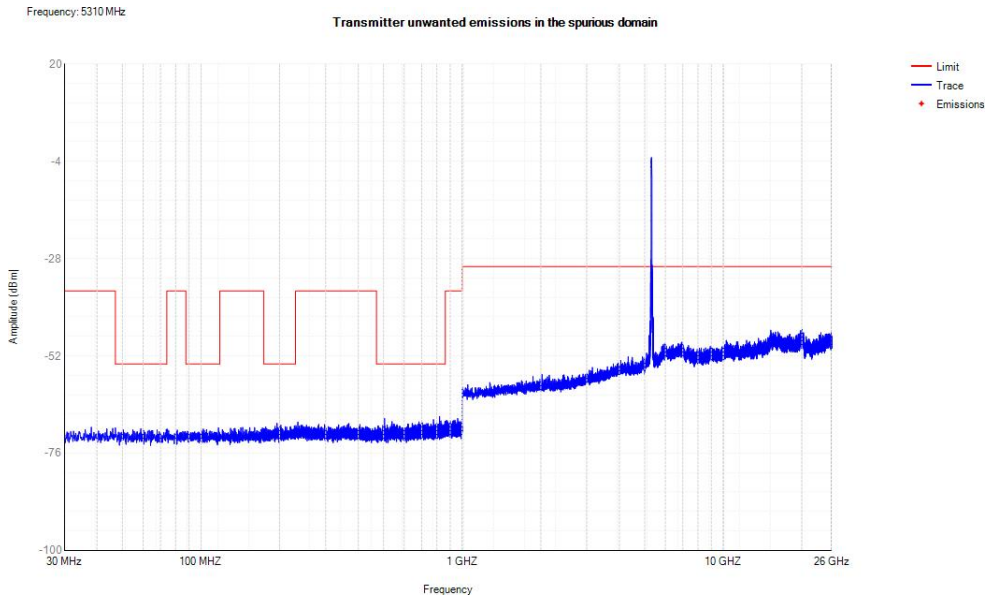
Tx. Spurious 802.11n(HT20) 5320MHz



Tx. Spurious 802.11n(HT40) 5190MHz



Tx. Spurious 802.11n(HT40) 5310MHz



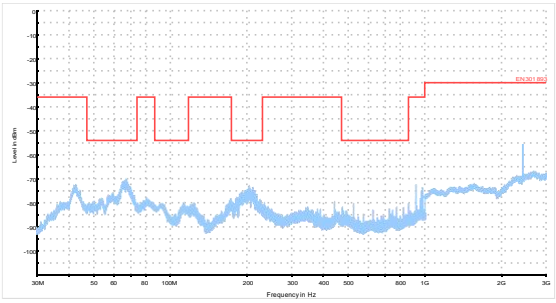
Radiated Results

Sweep the whole frequency band through the range from 30MHz to 26GHz, emissions more than 20 dB below the limit are not reported.

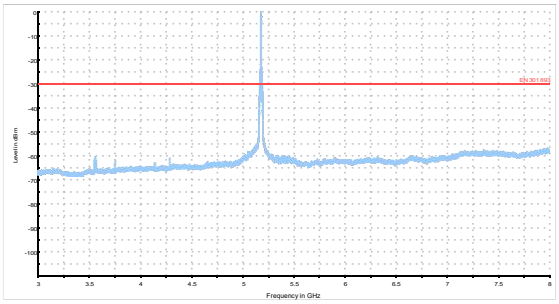
Note: The signal beyond the limit is carrier.

802.11a:

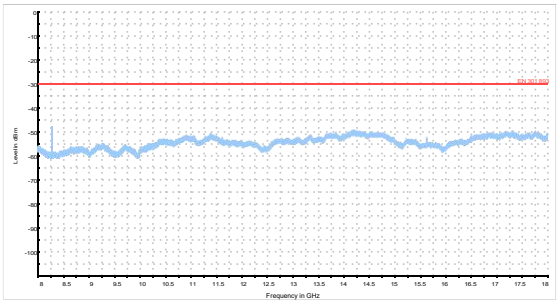
Channel 36



Radiated Spurious Emissions 30M-3GHz

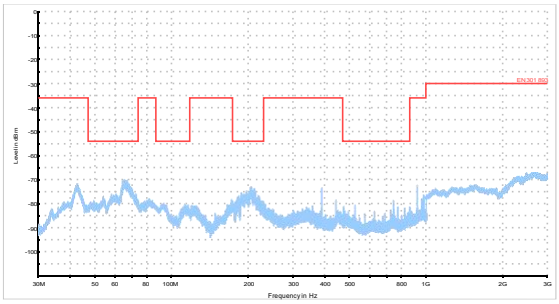
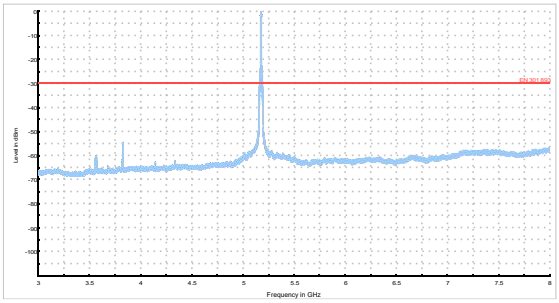
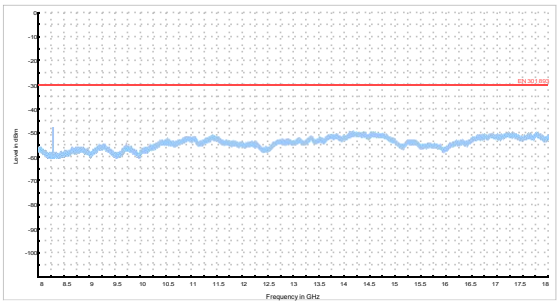


Radiated Spurious Emissions 3G-8GHz

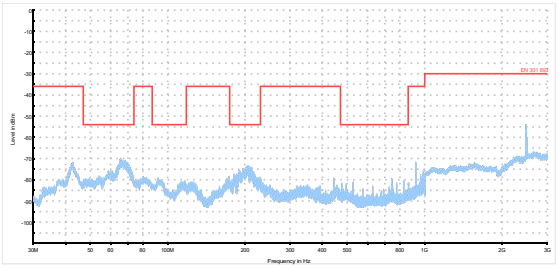
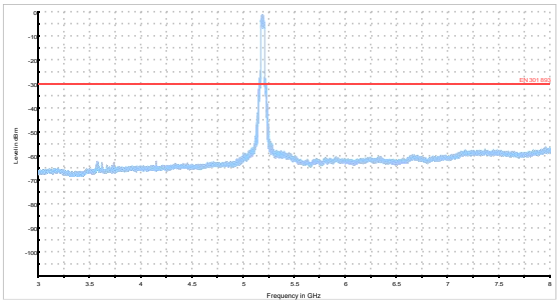
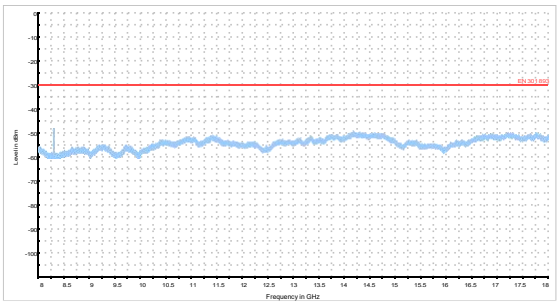


Radiated Spurious Emissions 8G-18GHz

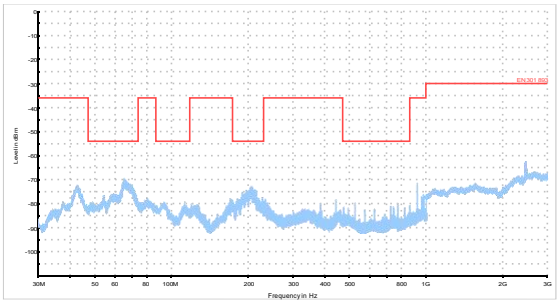
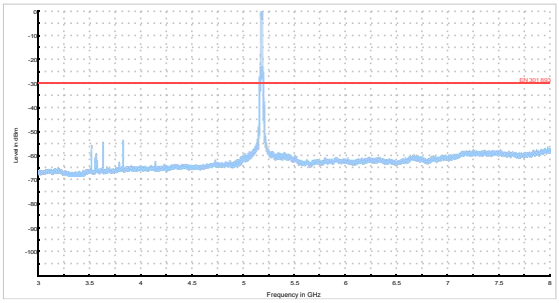
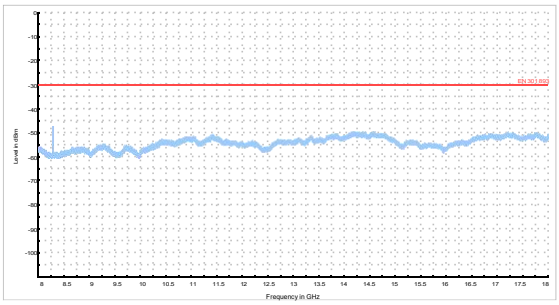
802.11n HT20:

Channel 36

Radiated Spurious Emissions 30M-3GHz

Radiated Spurious Emissions 3G-8GHz

Radiated Spurious Emissions 8G-18GHz

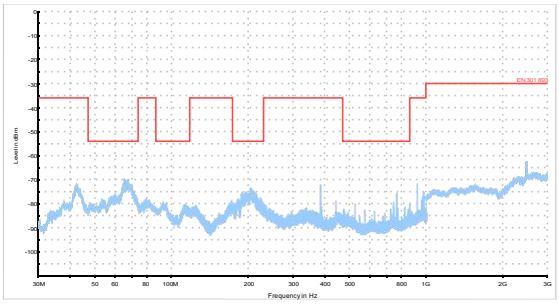
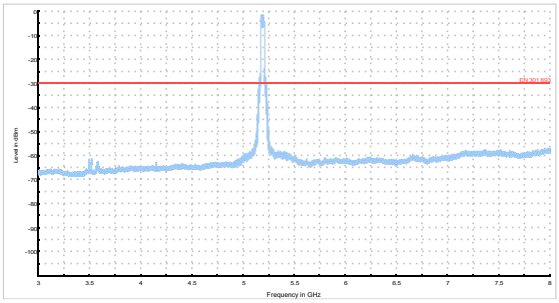
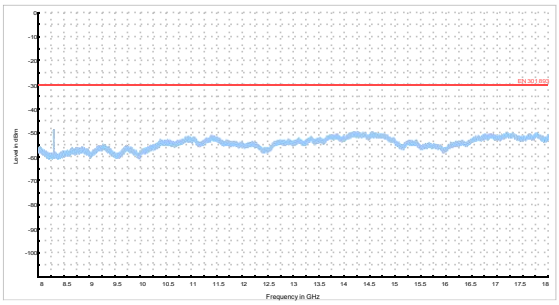
802.11n HT40:

Channel 38

Radiated Spurious Emissions 30M-3GHz

Radiated Spurious Emissions 3G-8GHz

Radiated Spurious Emissions 8G-18GHz

802.11ac VHT20:

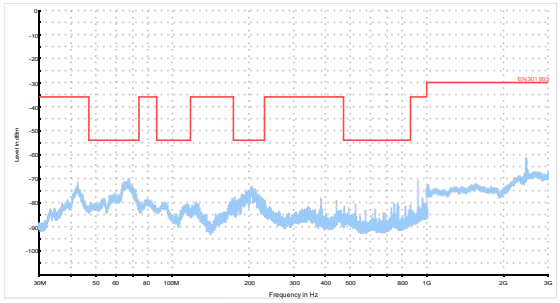
Channel 36

Radiated Spurious Emissions 30M-3GHz

Radiated Spurious Emissions 3G-8GHz

Radiated Spurious Emissions 8G-18GHz

802.11ac VHT40:

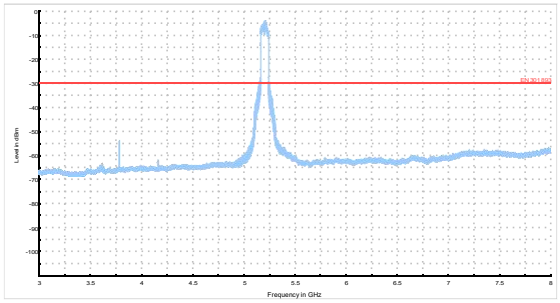
Channel 38

Radiated Spurious Emissions 30M-3GHz

Radiated Spurious Emissions 3G-8GHz

Radiated Spurious Emissions 8G-18GHz

802.11ac VHT80:

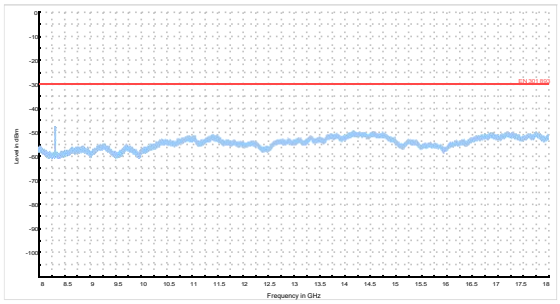
Channel 42



Radiated Spurious Emissions 30M-3GHz

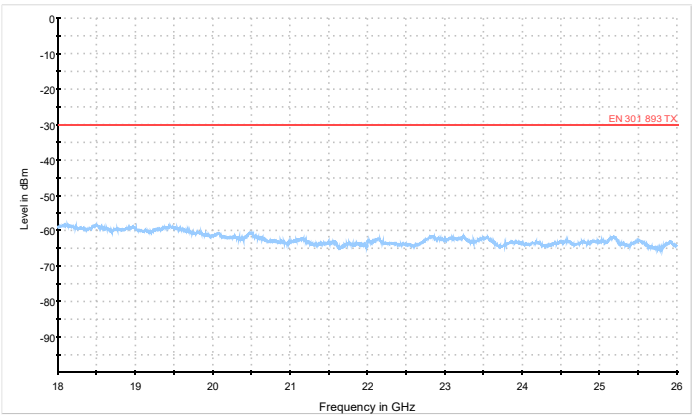


Radiated Spurious Emissions 3G-8GHz



Radiated Spurious Emissions 8G-18GHz

During the test, the Radiates Emission from 18GHz to 26GHz was performed in all modes with all channels, 802.11ac VHT40, Channel 38 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.



Radiated spurious Emissions 18GHz - 26GHz

If disturbances were found more than 20dB below limit line, the mark is not required for the EUT.

Test Data File Name	Frequency (MHz)	Maximum Value (dBm)	Limit (dB)	Margin (dB)	Degree
RSE_WIFI 5G_a CH36_HV_0.03-3GHz	67.25	-70.51	-54.00	16.51	0
RSE_WIFI 5G_n(20M) CH36_HV_0.03-3GHz	65.34	-70.26	-54.00	16.26	180
RSE_WIFI 5G_n(20M) CH36_HV_8-18GHz	14166.00	-49.63	-30.00	19.63	315
RSE_WIFI 5G_n(40M) CH38_HV_0.03-3GHz	205.80	-73.53	-54.00	19.53	270
RSE_WIFI 5G_n(40M) CH38_HV_8-18GHz	14172.80	-49.37	-30.00	19.37	90
RSE_WIFI 5G_ac(20M) CH36_HV_0.03-3GHz	65.53	-70.10	-54.00	16.10	90
RSE_WIFI 5G_ac(40M) CH38_HV_0.03-3GHz	65.31	-69.93	-54.00	15.93	315
RSE_WIFI 5G_ac(40M) CH38_HV_8-18GHz	14559.00	-49.96	-30.00	19.96	0
RSE_WIFI 5G_ac(80M) CH42_HV_0.03-3GHz	67.57	-70.01	-54.00	16.01	45
RSE_WIFI 5G_ac(80M) CH42_HV_8-18GHz	14170.40	-49.50	-30.00	19.50	180

5.6 Transmitter Unwanted Emission within the 5GHz RLAN Bands

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Option 1: For equipment with continuous transmission capability

The UUT shall be configured for continuous transmit mode (duty cycle equal to 100 %). If this is not possible, thenoption 2 shall be used.

Step 1: Determination of the reference average power level.

• Spectrum analyser settings:
- Resolution bandwidth: 1 MHz
- Video bandwidth: 30 kHz
- Detector mode: Peak
- Trace mode: Video Average
- Sweep Time: Coupled
- Centre Frequency: Centre frequency of the channel being tested
- Span: 2 × Nominal Channel Bandwidth

• Use the marker to find the highest average power level of the power envelope of the UUT. This level shall be used as the reference level for the relative measurements.

Step 2: Determination of the relative average power levels.

• Adjust the frequency range of the spectrum analyser to allow the measurement to be performed within the sub-bands 5 150 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz. No other parameter of the spectrum analyser should be changed.

• Compare the relative power envelope of the UUT with the limits defined in clause 4.2.4.2.2.

Option 2: For equipment without continuous transmission capability

This method shall be used if the UUT is not capable of operating in a continuous transmit mode (duty cycle less than100 %). In addition, this option can also be used as an alternative to option 1 for systems operating in a continuous transmit mode.

Step 1: Determination of the reference average power level.

• Spectrum analyser settings:
- Resolution bandwidth: 1 MHz
- Video bandwidth: 30 kHz
- Detector mode: RMS
- Trace Mode: Max Hold
- Sweep time: ≥ 1 min
- Centre Frequency: Centre frequency of the channel being tested
- Span: 2 × *Nominal Channel Bandwidth*

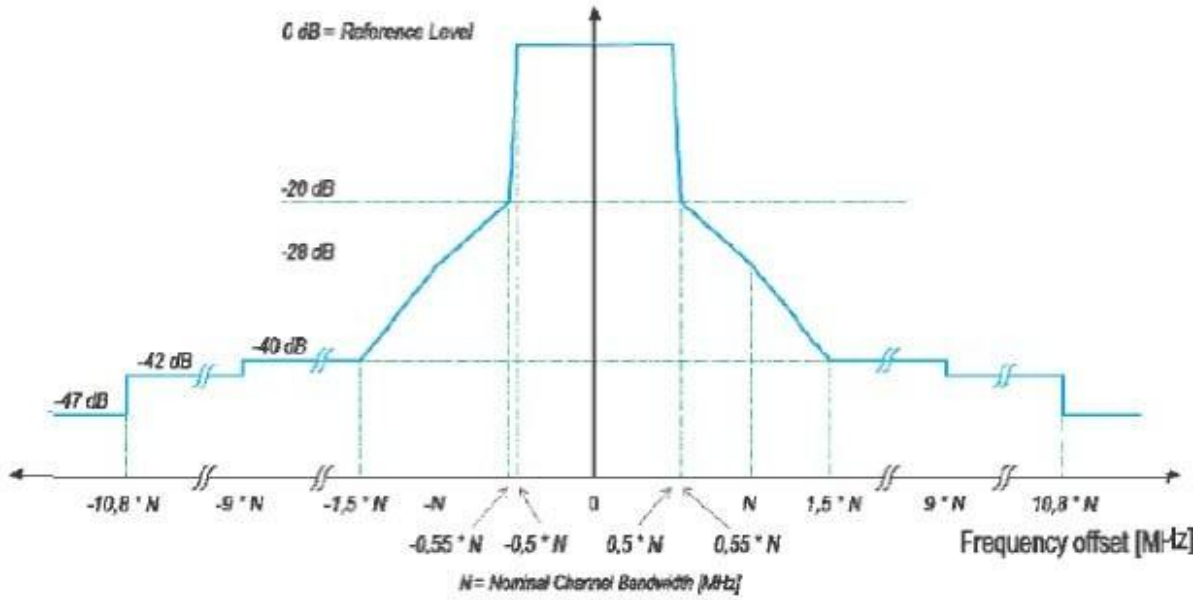
• Use the marker to find the highest average power level of the power envelope of the UUT. This level shall be used as the reference level for the relative measurements.

Step 2: Determination of the relative average power levels.

• Adjust the frequency range of the spectrum analyser to allow the measurement to be performed within the sub-bands 5 150 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz. No other parameter of the spectrum analyser should be changed.

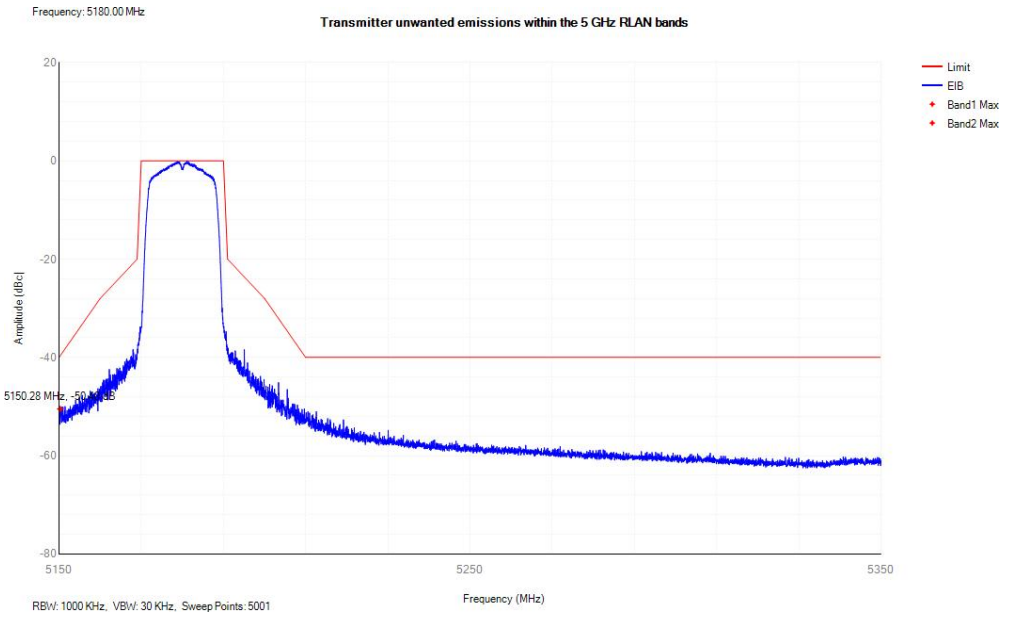
• Compare the relative power envelope of the UUT with the limits defined in clause 4.2.4.2.2.

Limit

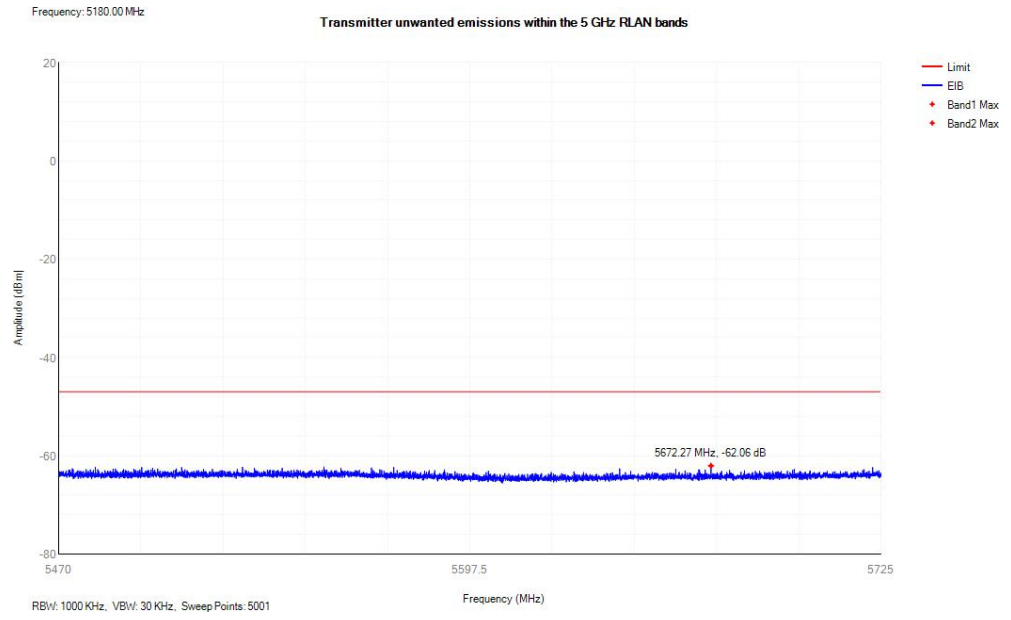


Results

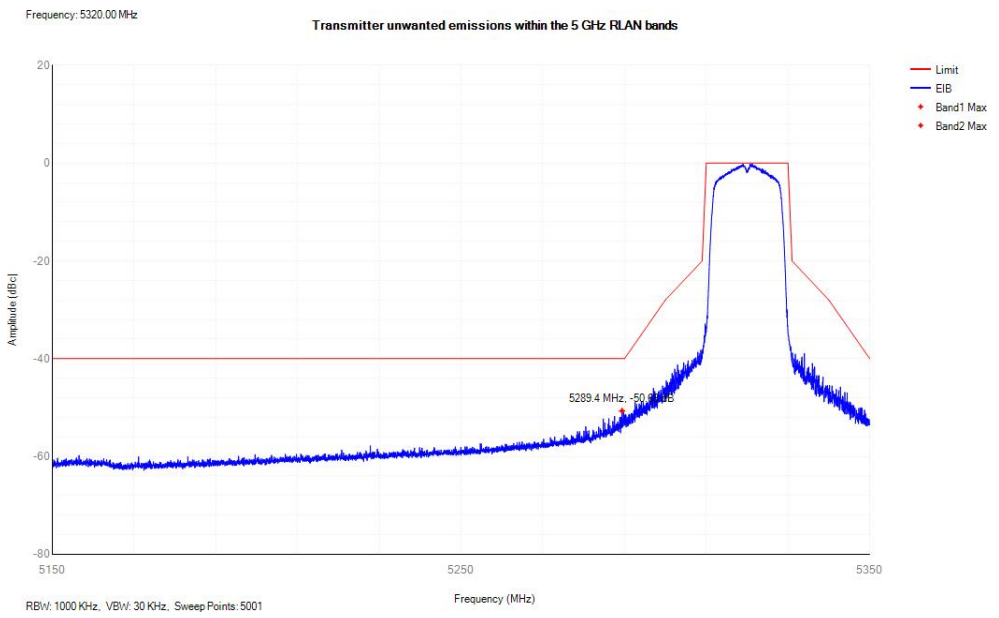
Test Graphs
Tx. Emissions EIB 802.11a 5180MHz Sub BanFree Hoist



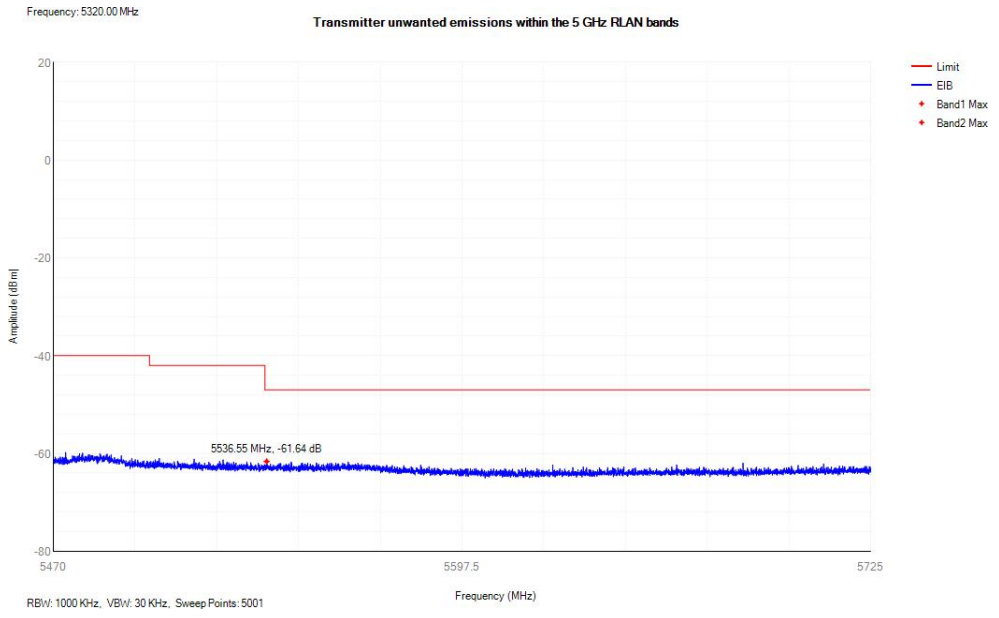
Tx. Emissions EIB 802.11a 5180MHz Sub Band2



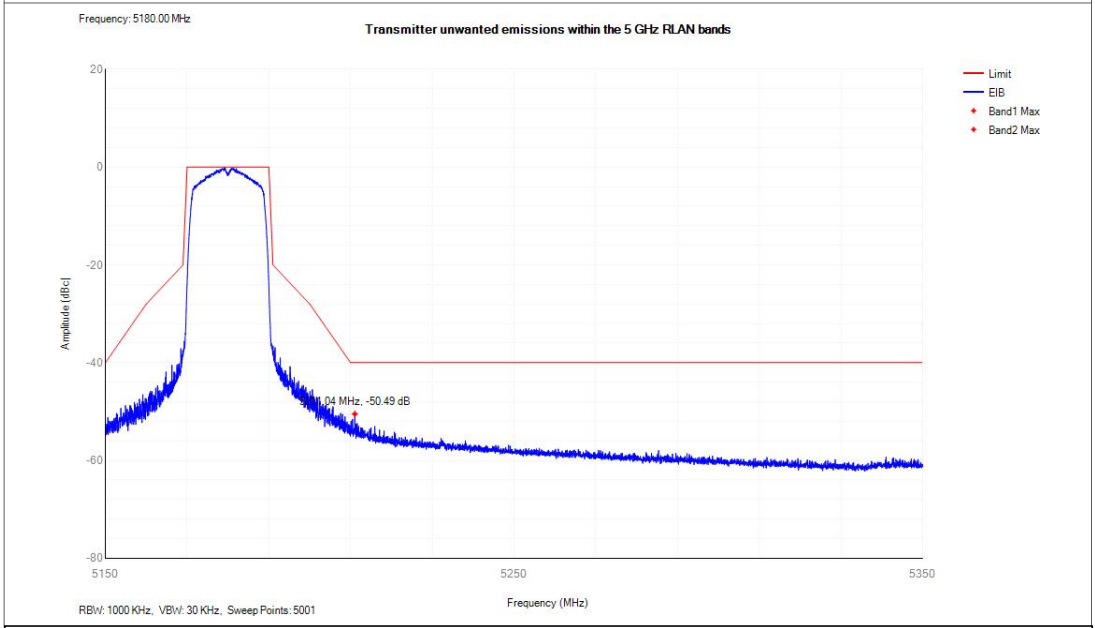
Tx. Emissions EIB 802.11a 5320MHz Sub Band1



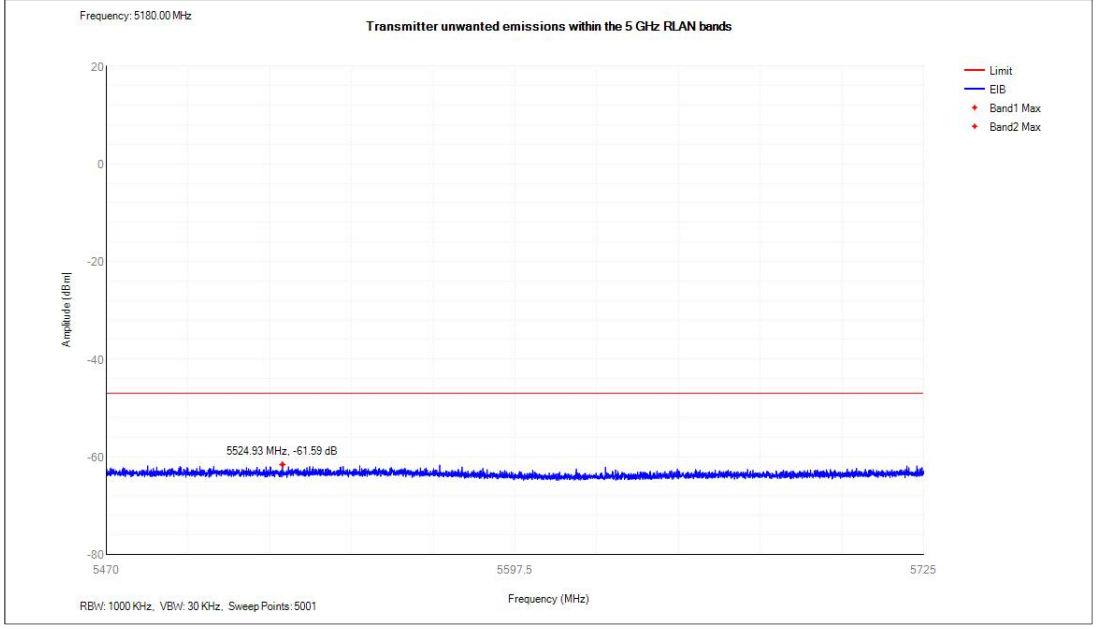
Tx. Emissions EIB 802.11a 5320MHz Sub Band2



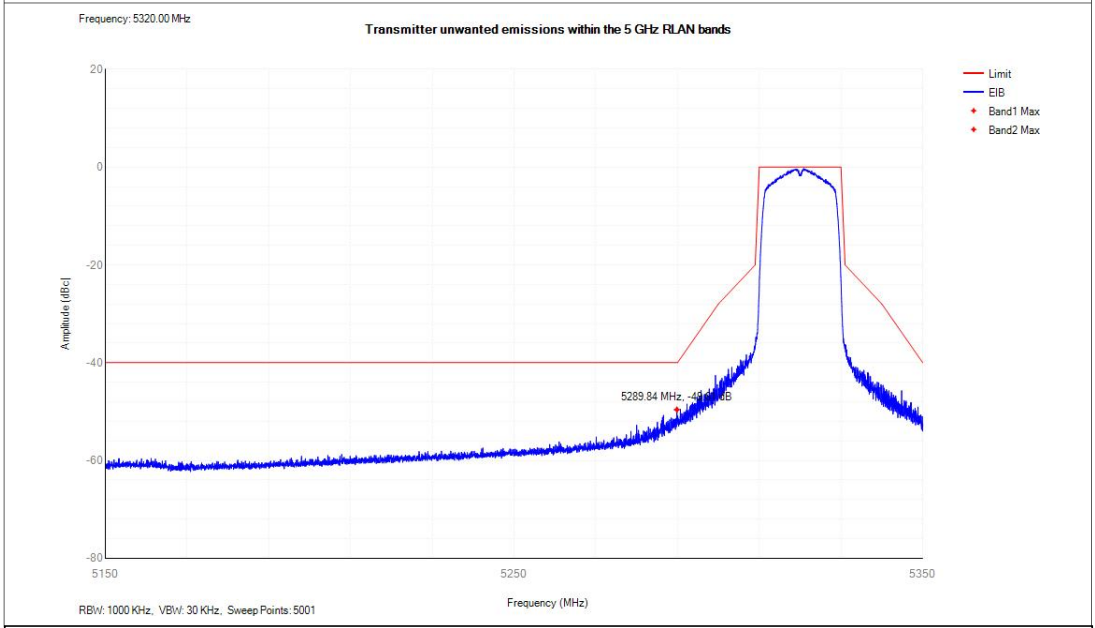
Tx. Emissions EIB 802.11ac(VHT20) 5180MHz Sub Band1



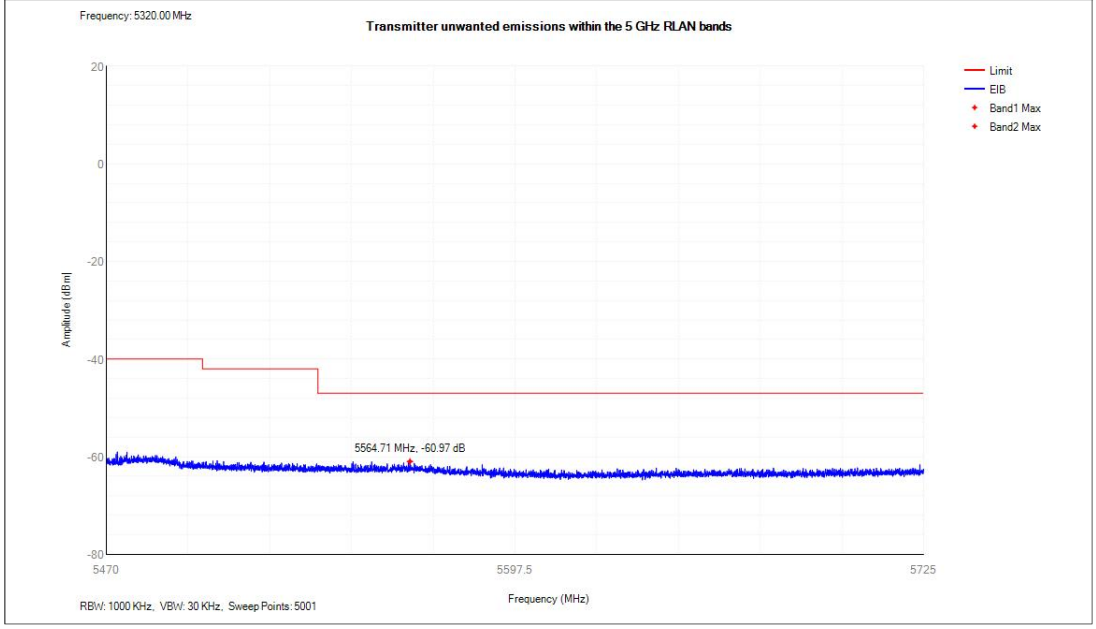
Tx. Emissions EIB 802.11ac(VHT20) 5180MHz Sub Band2



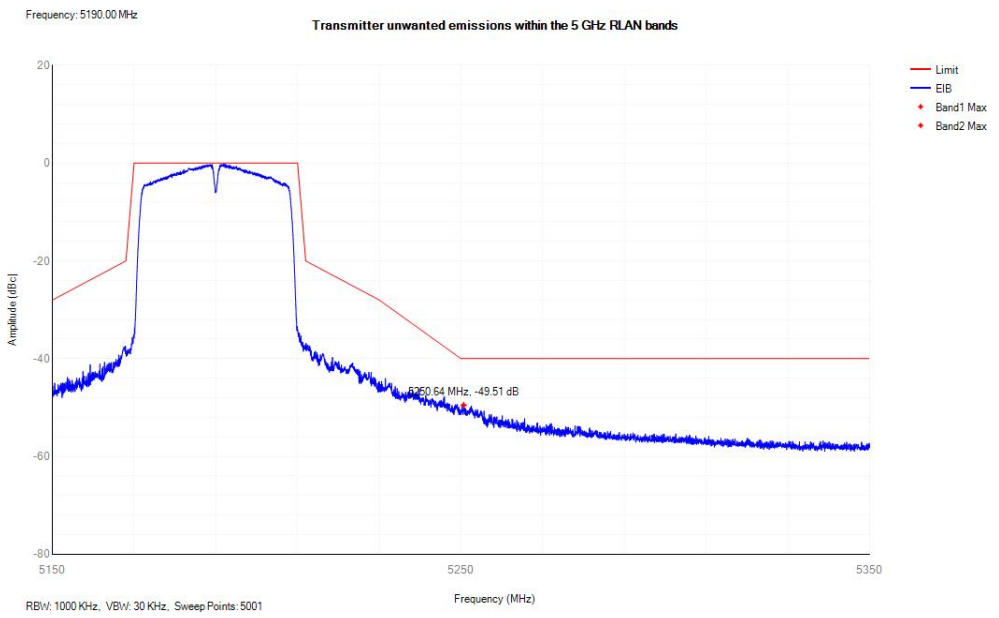
Tx. Emissions EIB 802.11ac(VHT20) 5320MHz Sub Band1



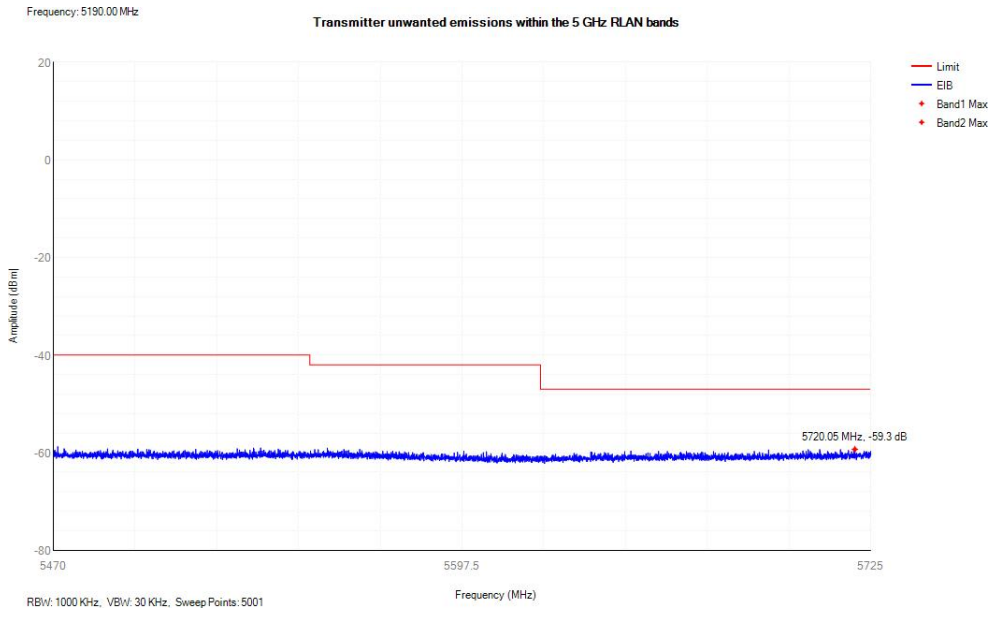
Tx. Emissions EIB 802.11ac(VHT20) 5320MHz Sub Band2



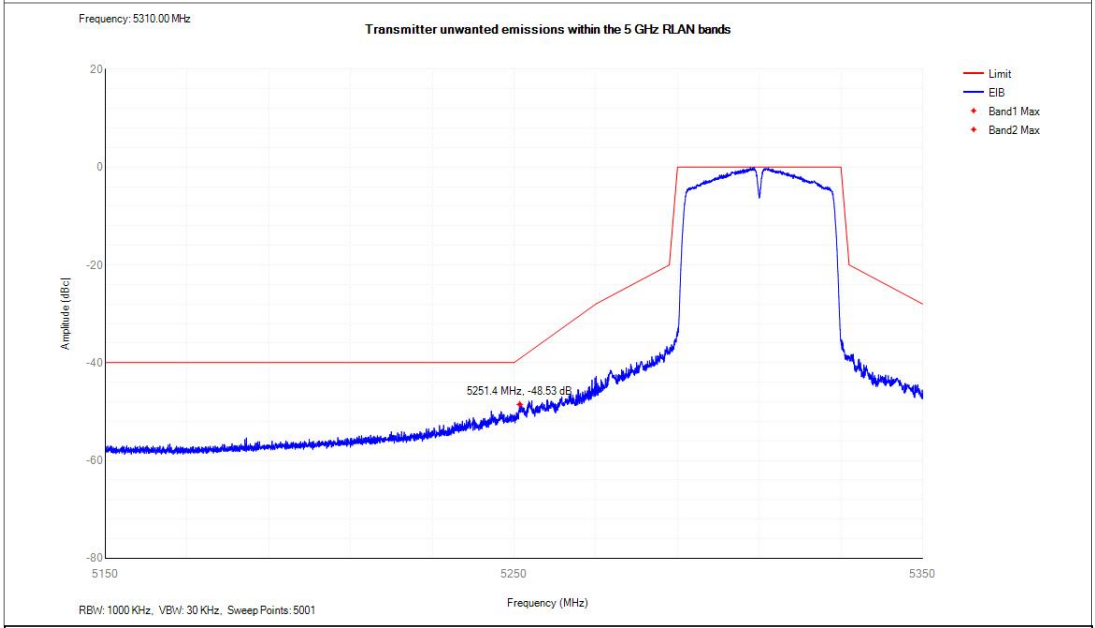
Tx. Emissions EIB 802.11ac(VHT40) 5190MHz Sub Band1



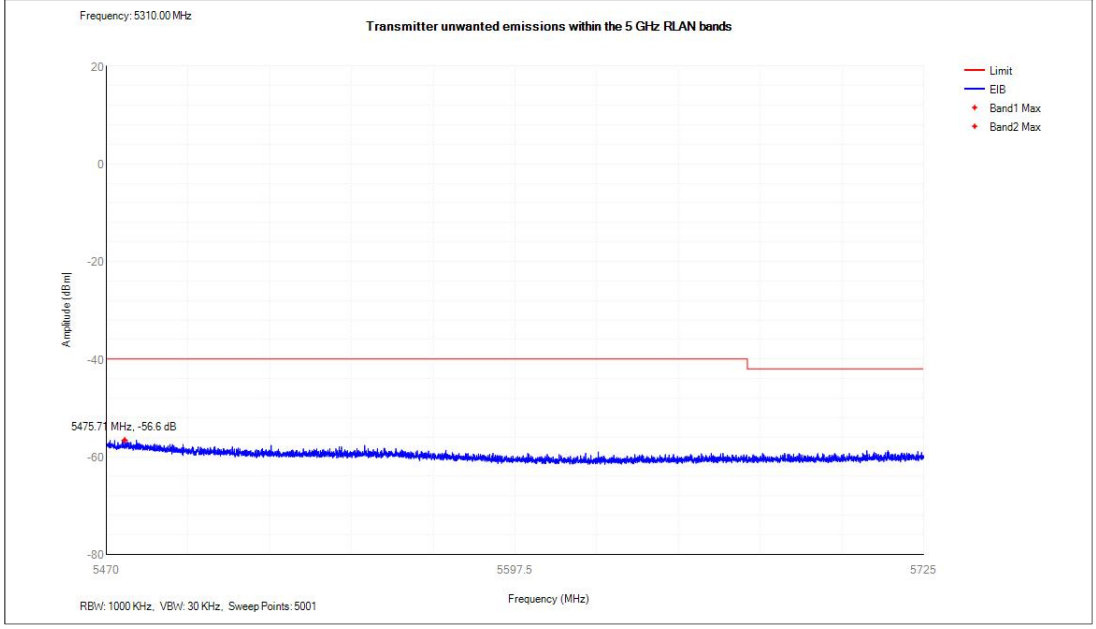
Tx. Emissions EIB 802.11ac(VHT40) 5190MHz Sub Band2



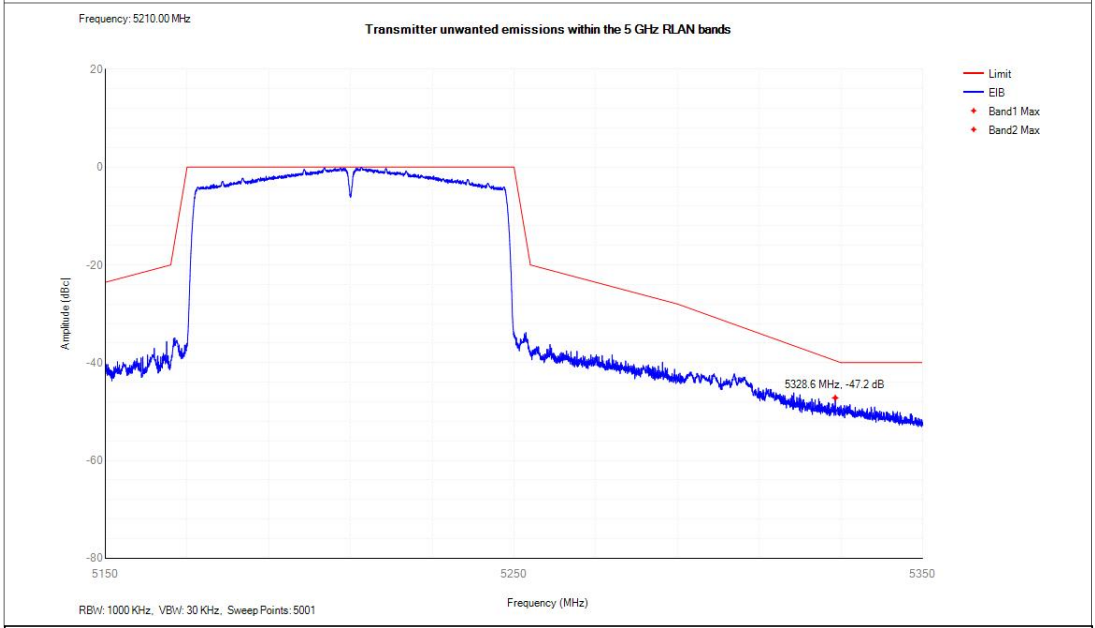
Tx. Emissions EIB 802.11ac(VHT40) 5310MHz Sub Band1



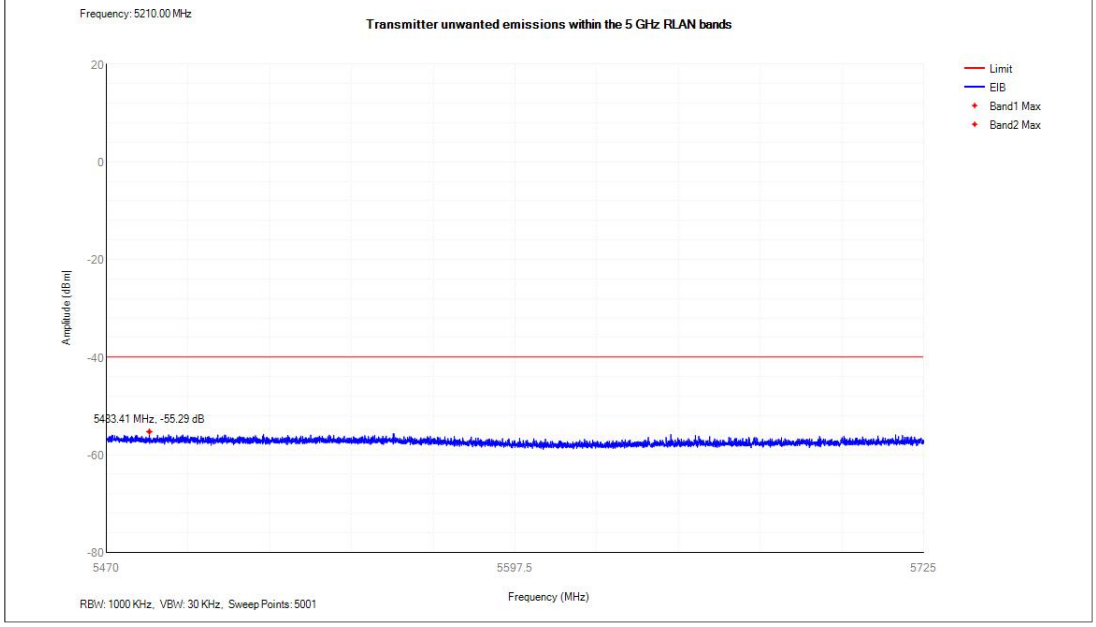
Tx. Emissions EIB 802.11ac(VHT40) 5310MHz Sub Band2



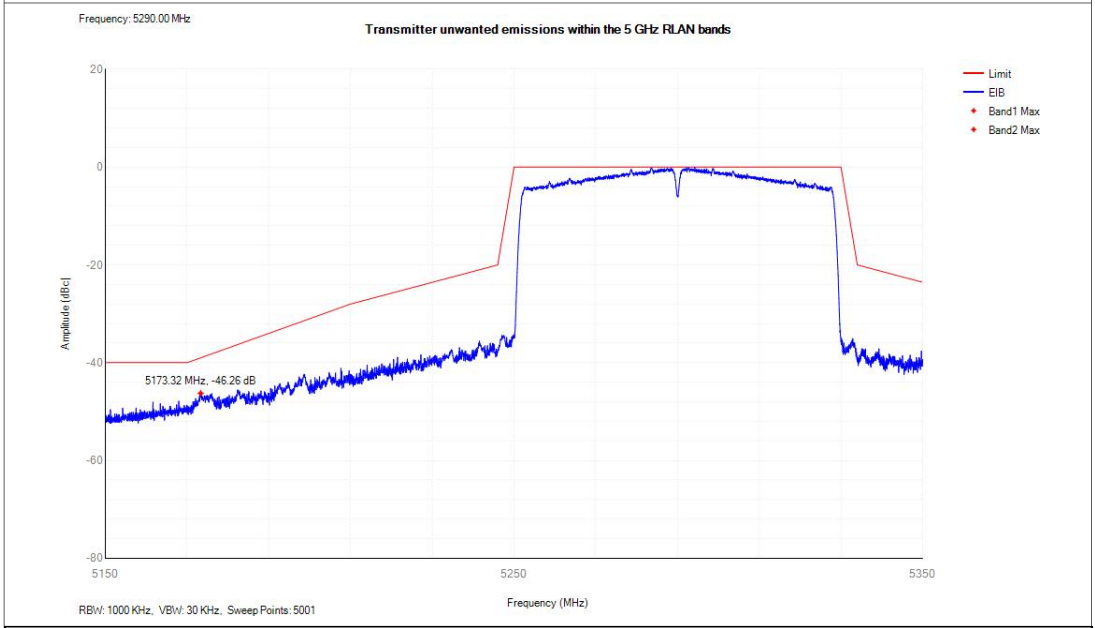
Tx. Emissions EIB 802.11ac(VHT80) 5210MHz Sub Band1



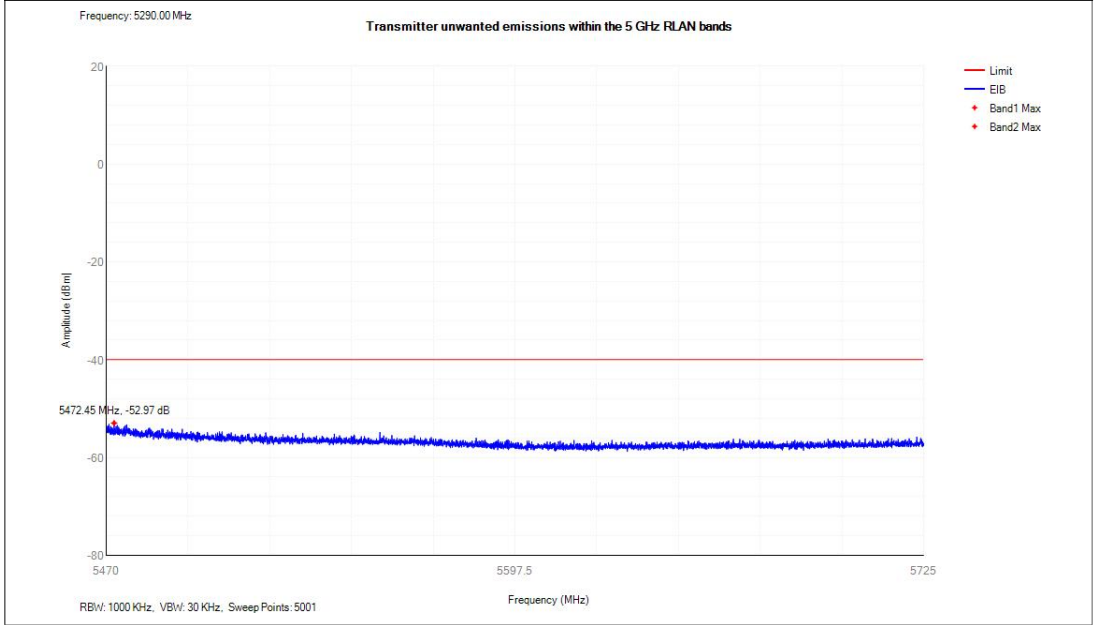
Tx. Emissions EIB 802.11ac(VHT80) 5210MHz Sub Band2



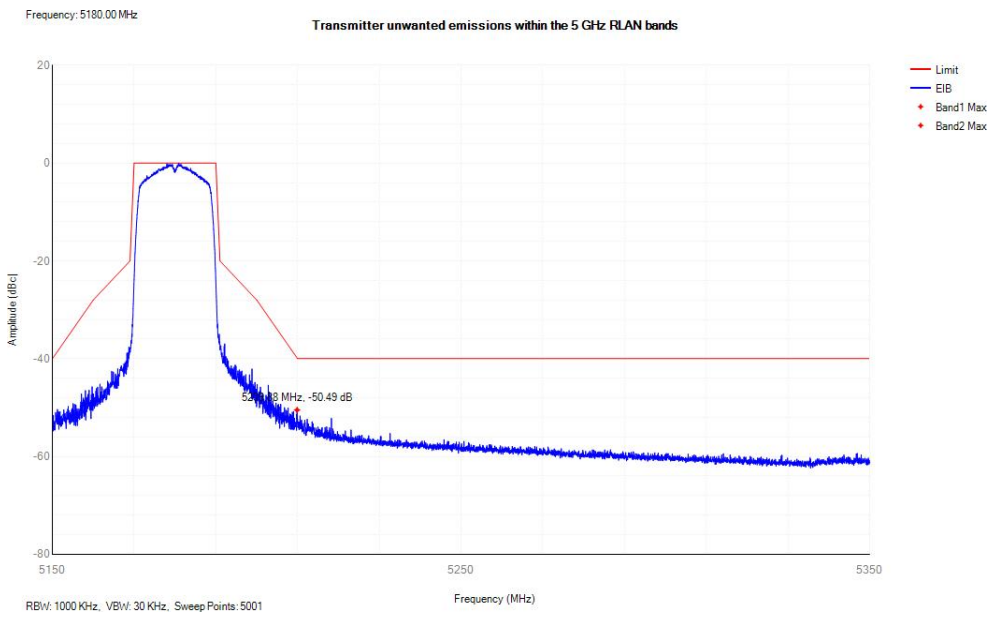
Tx. Emissions EIB 802.11ac(VHT80) 5290MHz Sub Band1



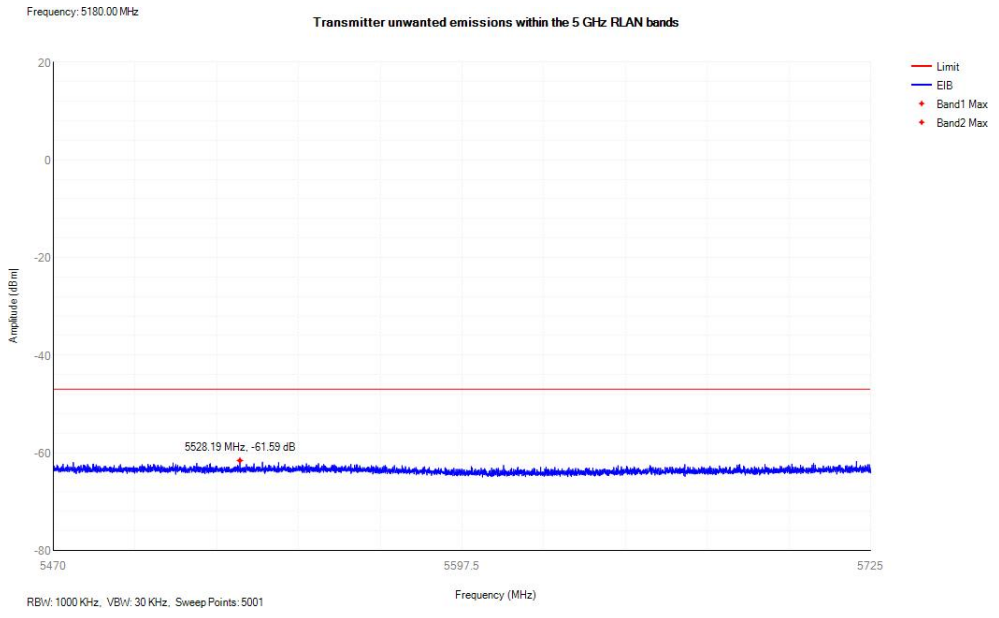
Tx. Emissions EIB 802.11ac(VHT80) 5290MHz Sub Band2



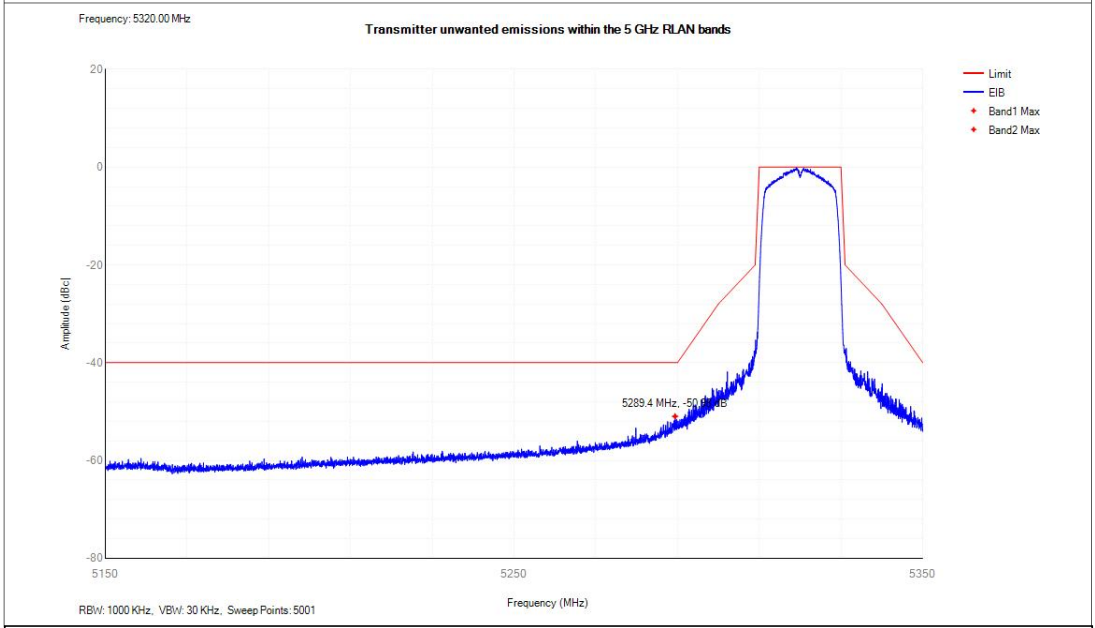
Tx. Emissions EIB 802.11n(HT20) 5180MHz Sub Band1



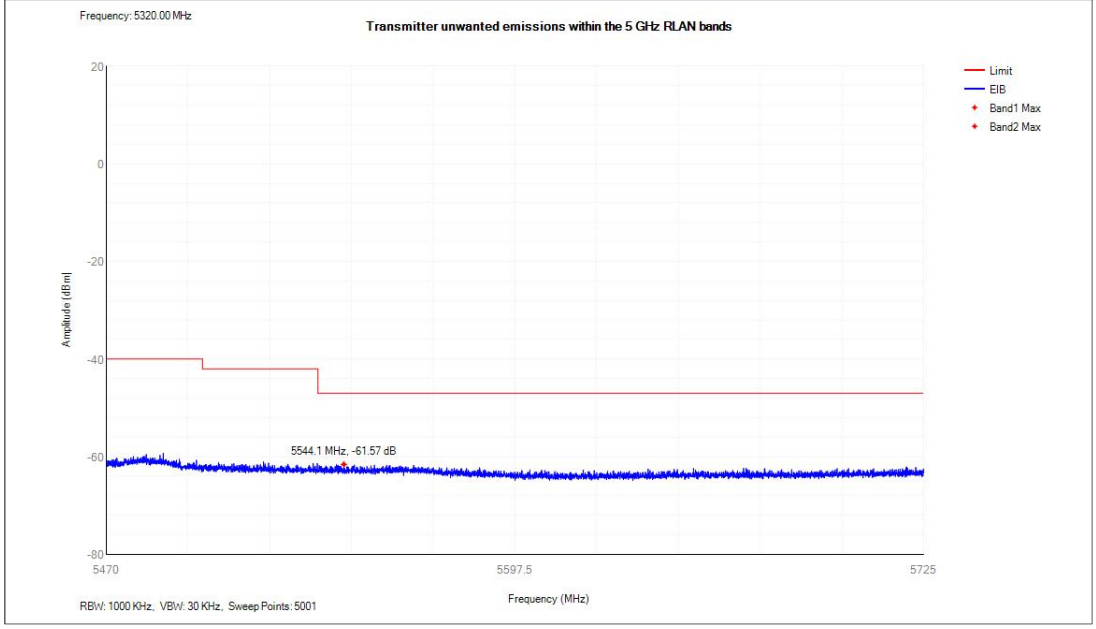
Tx. Emissions EIB 802.11n(HT20) 5180MHz Sub Band2



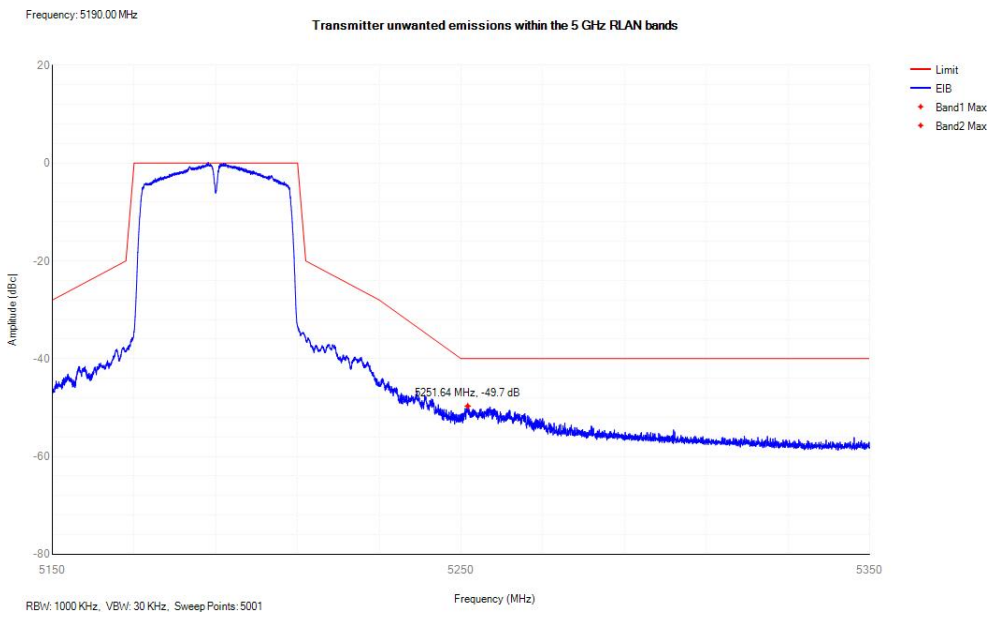
Tx. Emissions EIB 802.11n(HT20) 5320MHz Sub Band1



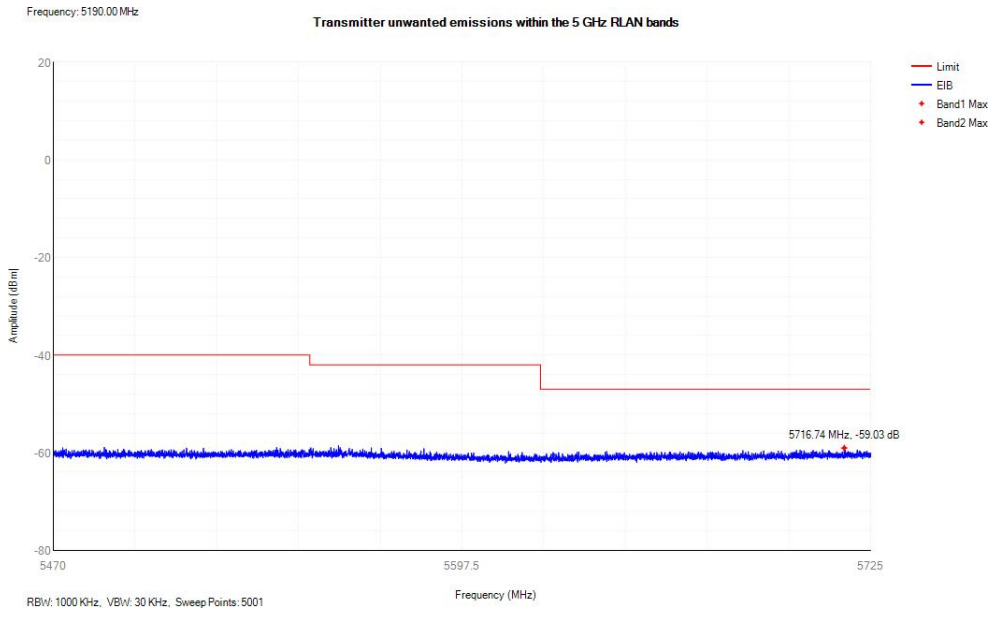
Tx. Emissions EIB 802.11n(HT20) 5320MHz Sub Band2



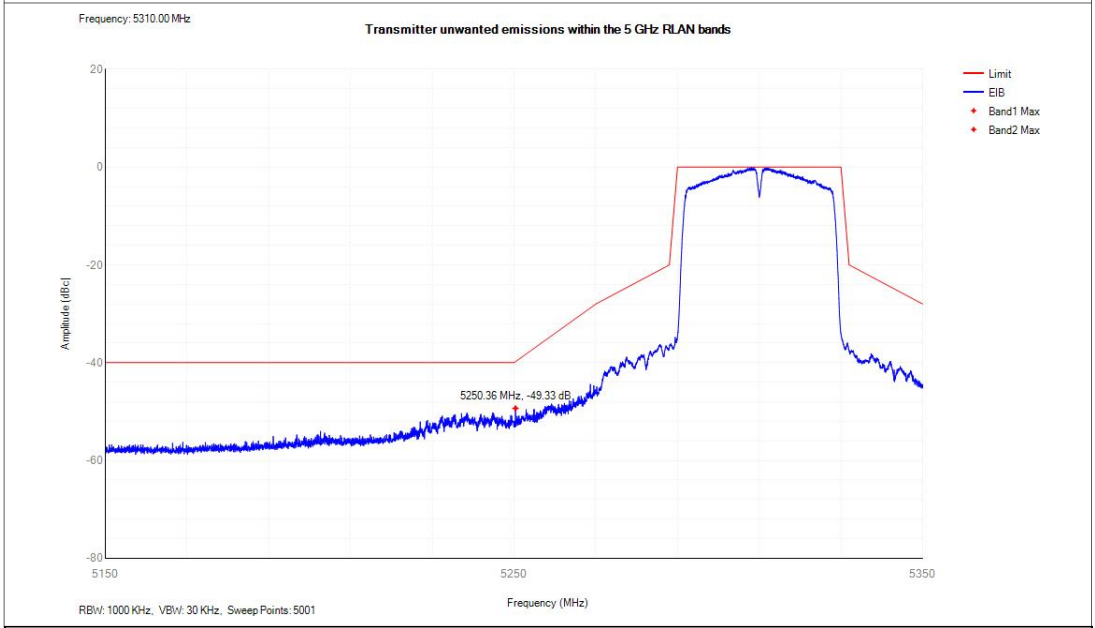
Tx. Emissions EIB 802.11n(HT40) 5190MHz Sub Band1



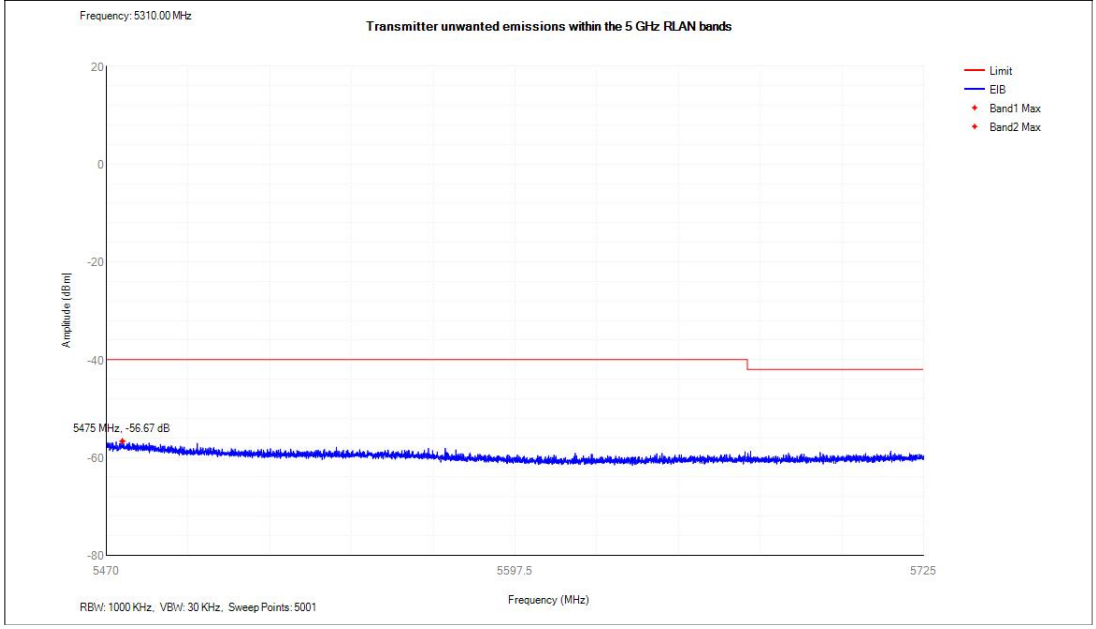
Tx. Emissions EIB 802.11n(HT40) 5190MHz Sub Band2



Tx. Emissions EIB 802.11n(HT40) 5310MHz Sub Band1



Tx. Emissions EIB 802.11n(HT40) 5310MHz Sub Band2



5.7 Receiver spurious emissions

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Pre-scan

The test procedure below shall be used to identify potential receiver spurious emissions of the UUT.

Step 1:

• The sensitivity of the spectrum analyser should be such that the noise floor is at least 12 dB below the limits given in clause 4.2.5.2, table 5.

Step 2:

• The emissions shall be measured over the range 30 MHz to 1 000 MHz.

• Spectrum analyser settings:

- Resolution bandwidth: 100 kHz
- Video bandwidth: 300 kHz
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep Points: ≥ 9 700

For spectrum analysers not supporting this number of sweep points, the frequency band may be segmented. For spectrum analysers capable of supporting twice this number of sweep points, the frequency adjustment in clause 5.4.7.2.1.2 (step 1, last bullet) may be omitted.

- Sweep time: Auto

• Wait for the trace to stabilize. Any emissions identified that have a margin of less than 6 dB with respect to the limits given in clause 4.2.5.2, table 5, shall be individually measured using the procedure in clause 5.4.7.2.1.2and compared to the limits given in clause 4.2.5.2, table 5.

Step 3:

• The emissions shall now be measured over the range 1 GHz to 26 GHz.

• Spectrum analyser settings:

- Resolution bandwidth: 1 MHz
- Video bandwidth: 3 MHz
- Detector mode: Peak
- Trace mode: Max Hold
- Sweep Points: ≥ 25 000

For spectrum analysers not supporting this high number of sweep points, the frequency band may need to be segmented. For spectrum analysers capableof supporting twice this number of sweep points, the frequency adjustment in clause 5.4.7.2.1.2 (step 1, last bullet) may be omitted.

- Sweep time: Auto

• Wait for the trace to stabilize. Any emissions identified that have a margin of less than 6 dB with respect to the limits given in clause 4.2.5.2, table 5, shall be individually measured using the

procedure in clause 5.4.7.2.1.2and compared to the limits given in clause 4.2.5.2, table 5.

Measurement of the emissions identified during the pre-scan

The limits for receiver spurious emissions in clause 4.2.5 refer to average power levels.

The steps below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements above. This method assumes the spectrum analyser has a Time Domain Power function.

Step 1:

• The level of the emissions shall be measured using the following spectrum analyser settings:

- Measurement Mode: Time Domain Power
- Centre Frequency: Frequency of the emission identified during the pre-scan
- Resolution Bandwidth: 100 kHz (emissions < 1 GHz) / 1 MHz (emissions > 1 GHz)
- Video Bandwidth: 300 kHz (emissions < 1 GHz) / 3 MHz (emissions > 1 GHz)
- Frequency Span: Zero Span
- Sweep mode: Single Sweep
- Sweep time: 30 ms
- Sweep points: ⩾ 30 000
- Trigger: Video (for burst signals) or Manual (for continuous signals)
- Detector: RMS

• Adjust the centre frequency (fine tune) to capture the highest level of one burst of the emission to be measured.

This fine tuning can be omitted for spectrum analysers capable of supporting twice this number of sweep points required in step 2 and step 3 from the pre-scan procedure in clause 5.4.7.2.1.1.

Step 2:

• Set a window where the start and stop indicators match the start and end of the burst with the highest level and record the value of the power measured within this window.

• If the spurious emission to be measured is a continuous transmission, the measurement window shall be set to the start and stop times of the sweep.

Step 3:

• In case of conducted measurements on smart antenna systems (equipment with multiple receive chains), step 2shall be repeated for each of the active receive chains.

• Sum the measured power (within the observed window) for each of the active receive chains.

Step 4:

• The value defined in step 3 shall be compared to the limits defined in clause 4.2.5.2, table 5.

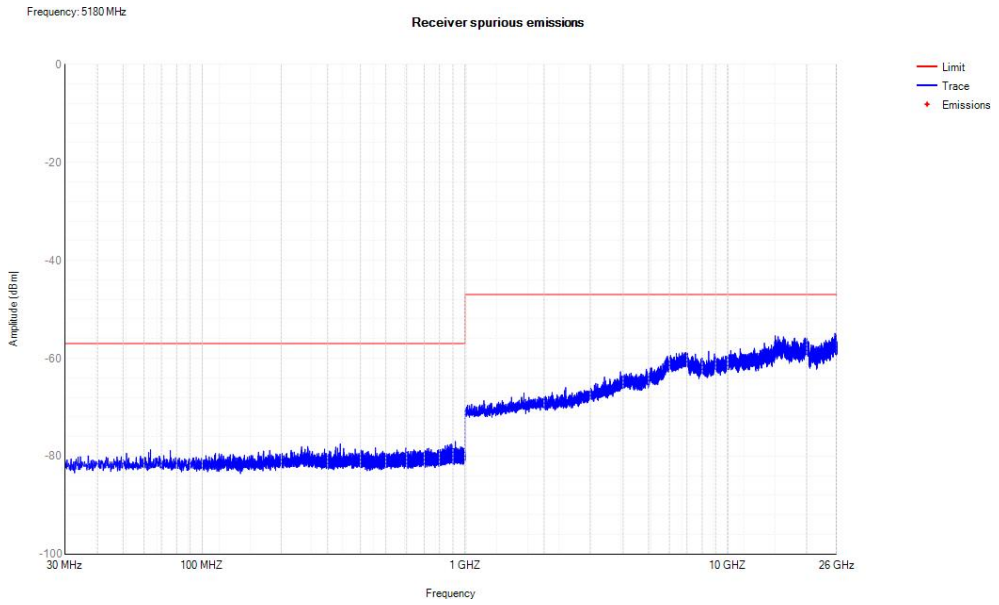
Limit

Receiver Spurious unwanted emission

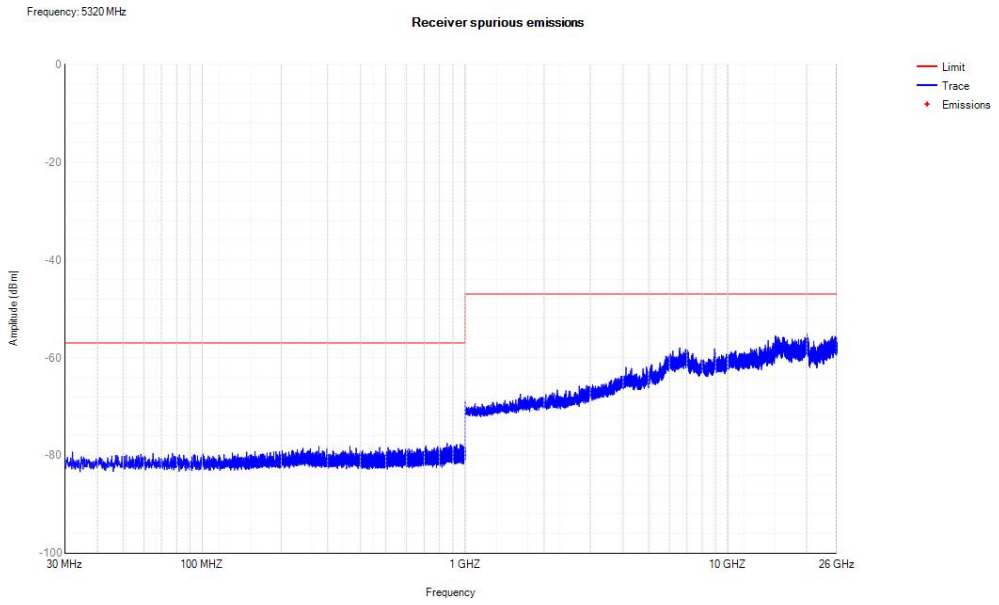
Frequency range	Maximum power	Measurement bandwidth
30MHz to 1GHz	-57dBm	100KHz
1GHz to 26GHz	-47dBm	1MHz

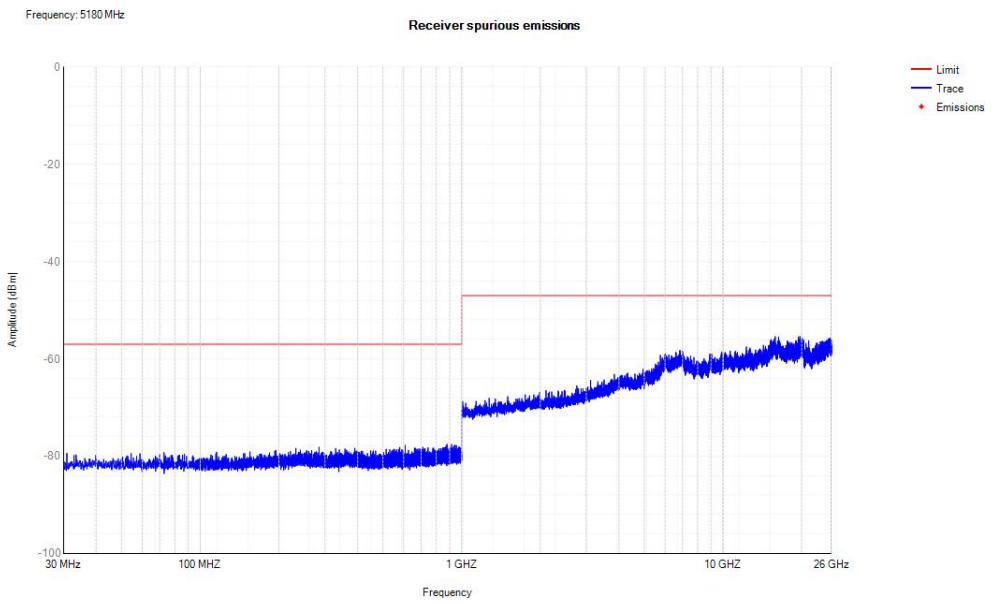
Conducted Results

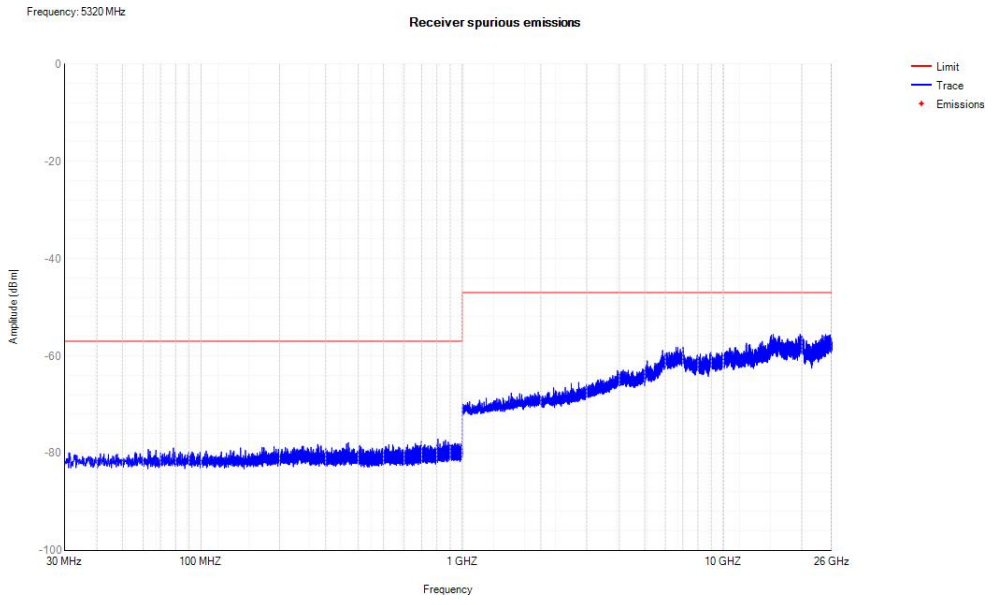
Test Graphs
Rx. Spurious 802.11a 5180MHz

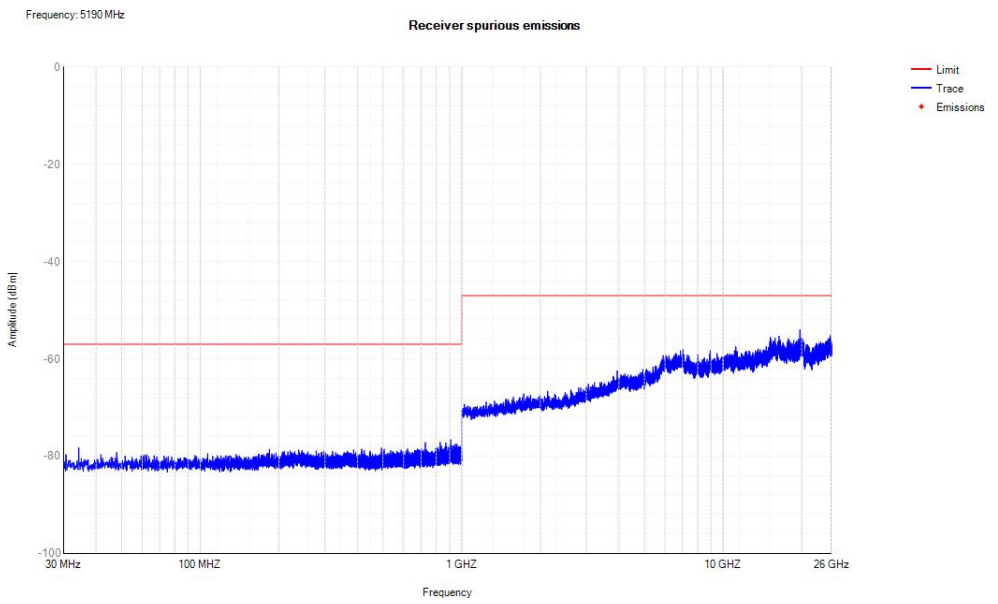


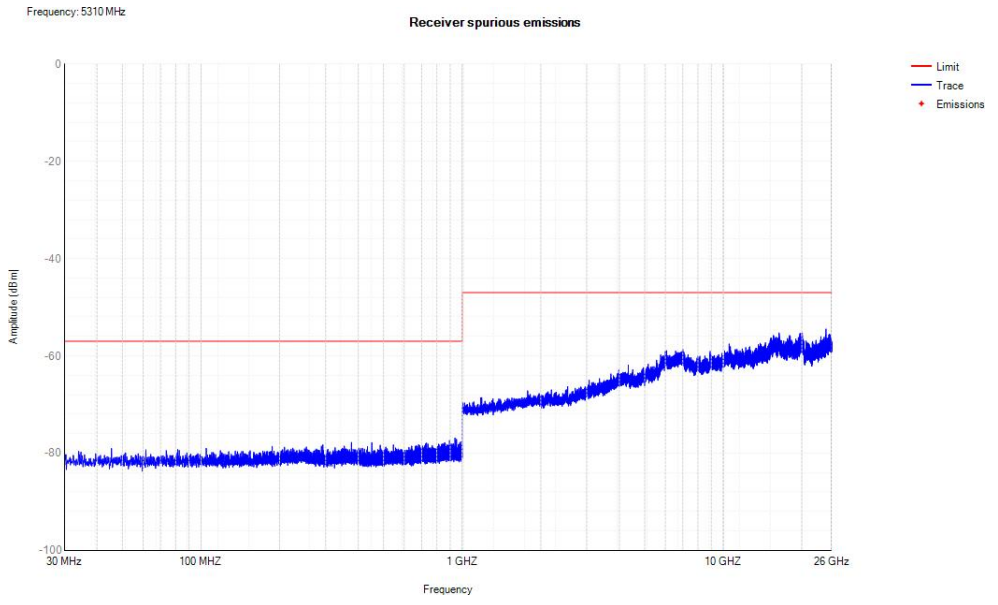
Rx. Spurious 802.11a 5320MHz

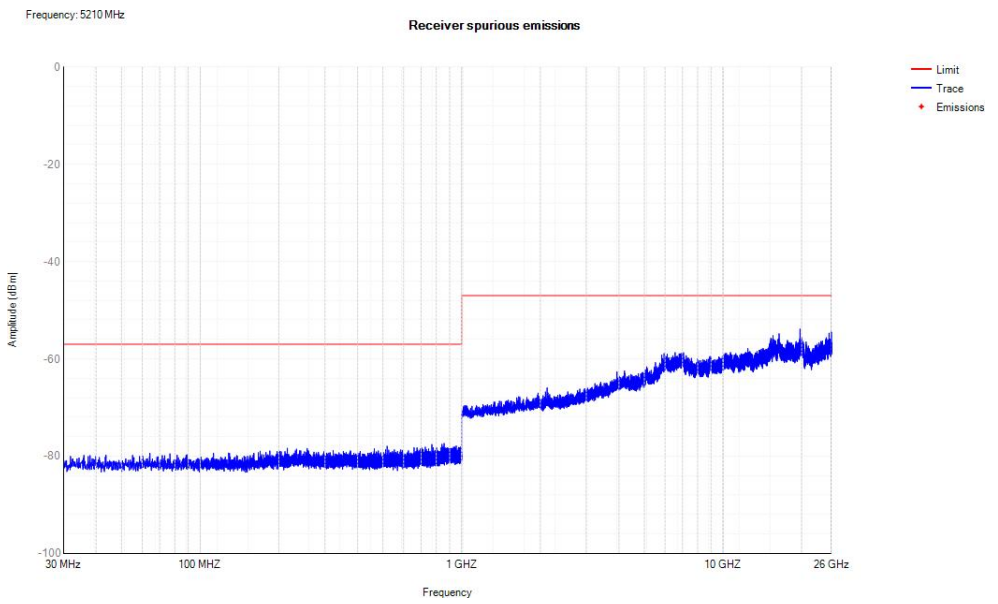


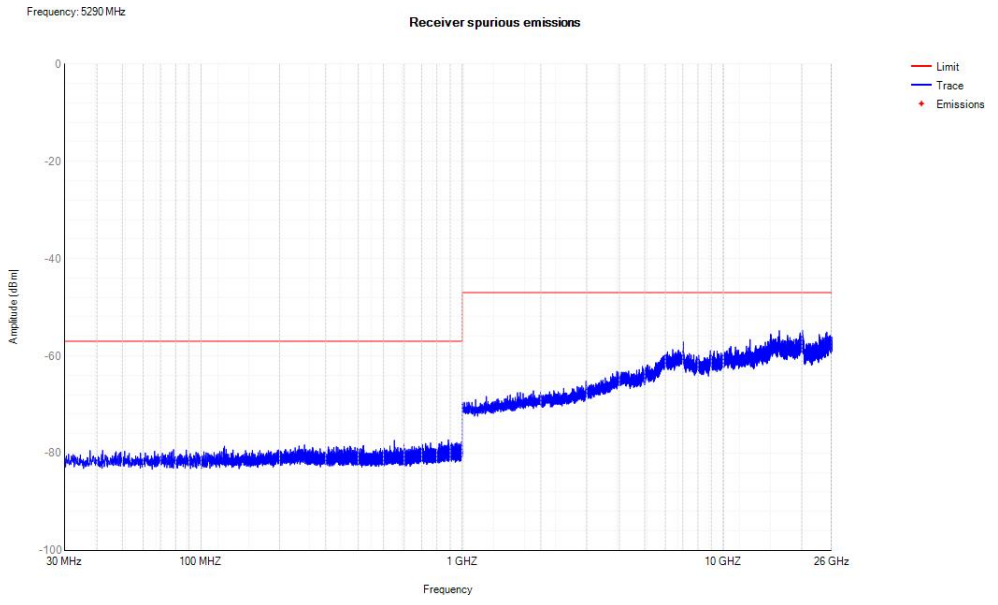
Rx. Spurious 802.11ac(VHT20) 5180MHz


Rx. Spurious 802.11ac(VHT20) 5320MHz


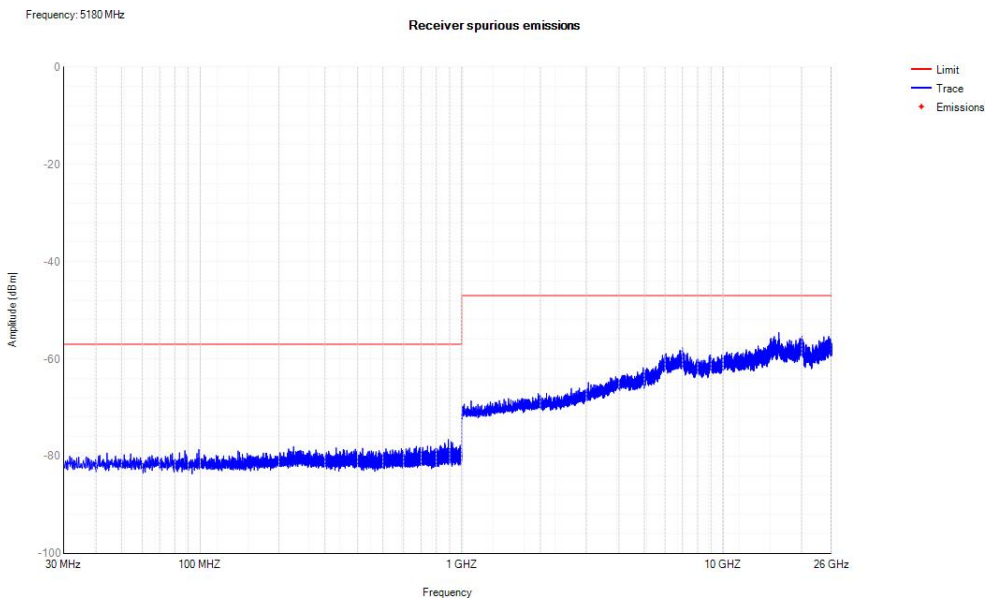
Rx. Spurious 802.11ac(VHT40) 5190MHz


Rx. Spurious 802.11ac(VHT40) 5310MHz


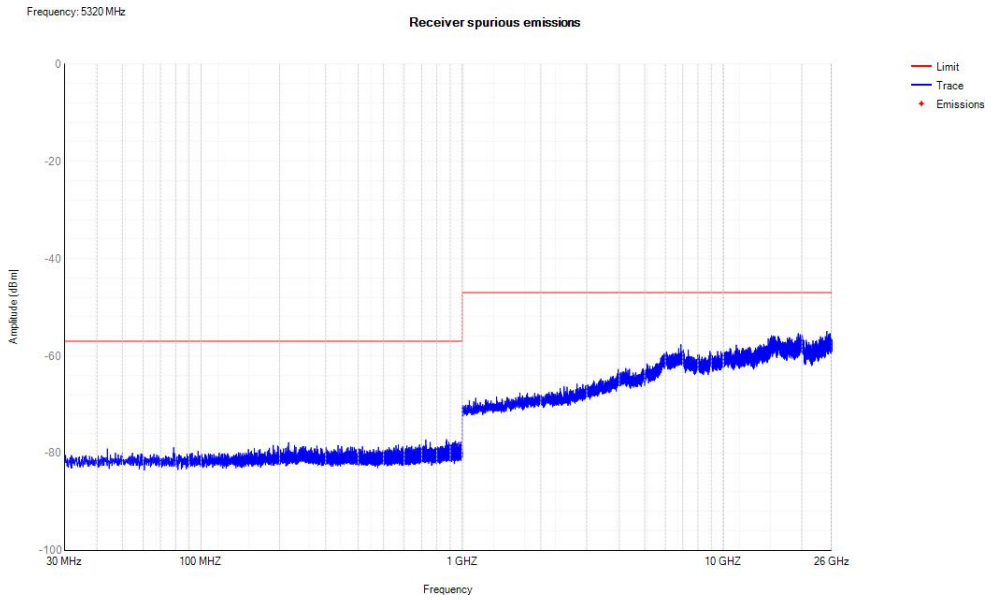
Rx. Spurious 802.11ac(VHT80) 5210MHz


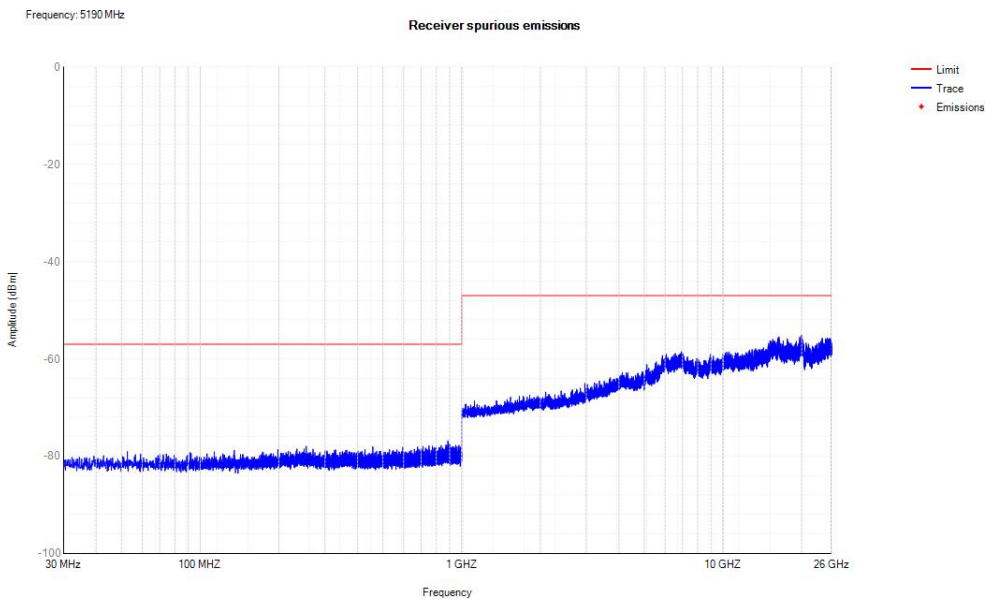
Rx. Spurious 802.11ac(VHT80) 5290MHz


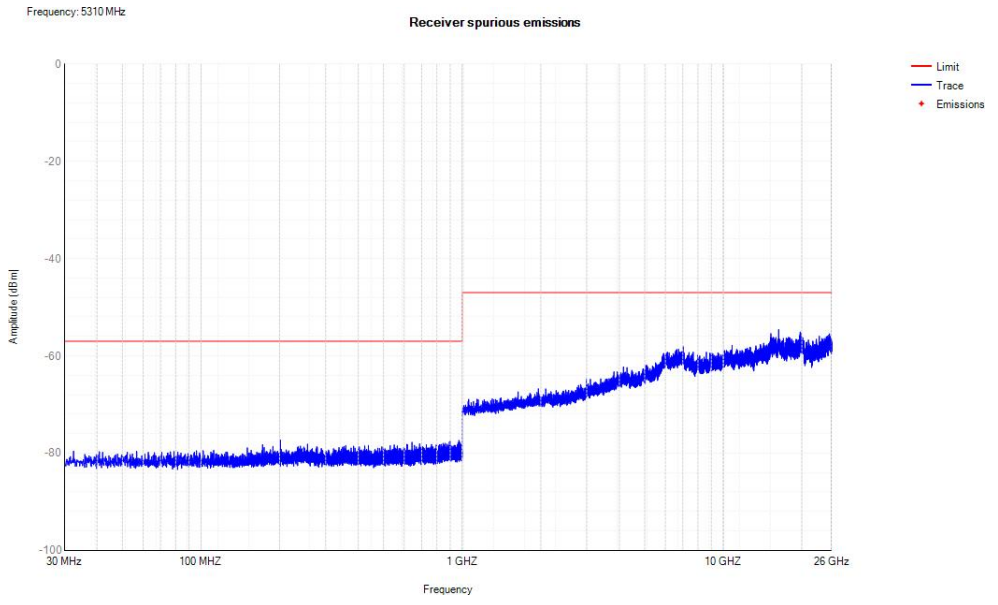
Rx. Spurious 802.11n(HT20) 5180MHz



Rx. Spurious 802.11n(HT20) 5320MHz



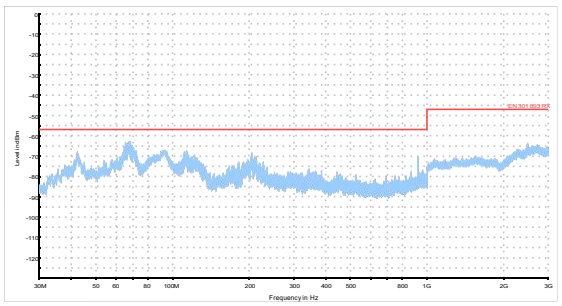
Rx. Spurious 802.11n(HT40) 5190MHz


Rx. Spurious 802.11n(HT40) 5310MHz


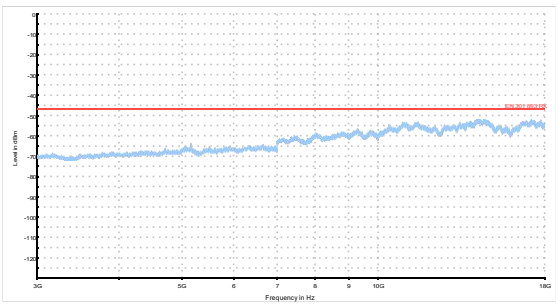
Radiated Results

Sweep the whole frequency band through the range from 30MHz to 26GHz, emissions more than 20 dB below the limit are not reported.

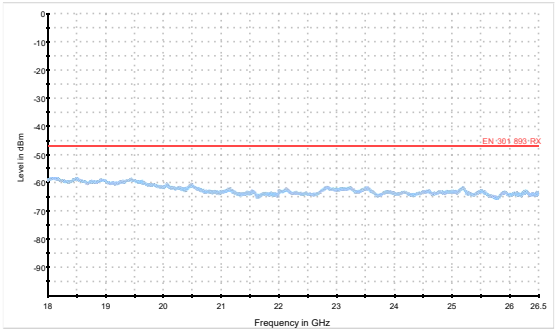
802.11a was selected as the worst condition. The test data of the worst-case condition was recorded in this report.



Radiated Spurious Emissions 30M-3GHz



Radiated Spurious Emissions 3G-18GHz



Radiated Spurious Emissions 18G-26GHz

If disturbances were found more than 20dB below limit line, the mark is not required for the EUT.

Test Data File Name	Frequency (MHz)	Maximum Value (dBm)	Limit (dB)	Margin (dB)	Degree
RSE_ WIFI 5G_a IDLE_HV_0.03-3GHz	67.77	-63.18	-57.00	6.18	45
RSE_ WIFI 5G_a IDLE_HV_3-18GHz	14183.50	-53.57	-47.00	6.57	90
RSE_ WIFI 5G_a IDLE_HV_18-26.5GHz	14198.00	-53.27	-47.00	6.27	0

5.8 Adaptivity (Channel Access Mechanism)

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The different steps below define the procedure to verify the efficiency of the adaptivity mechanism of the equipment.

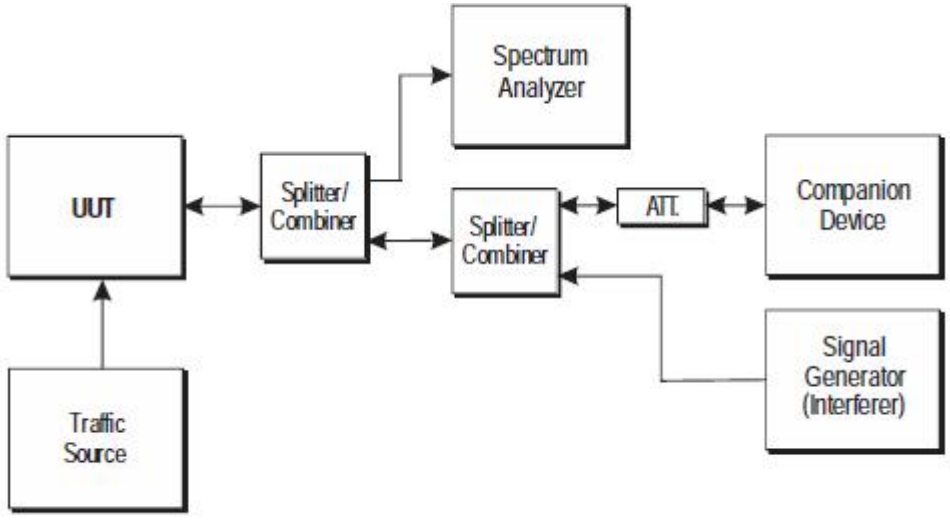


Figure 14: Example Test Set-up for verifying the adaptivity of an equipment

Additional test conditions

All measurements shall have temporal resolution of less than or equal to 1 μs.

The measurement equipment shall be able to observe the UUT be haviour for a duration of at least 250 ms at the aforementioned temporal resolution. If the data is recorded in segments then the Fixed Frame Periods shall be extracted from each data segment. The combined set of all Fixed Frame Periods shall be analysed as described in clause 5.4.9.2.2.4.

Initialization of the test:
See clause 5.4.9.3.2.1
Procedure to verify the capability to detect other RLAN transmissions on the Operating Channel when operating on a single channel
See clause 5.4.9.3.2.2
Equipment implementing Option 1 for multi-channel operation
See clause 5.4.9.3.2.3.1

See clause 5.4.9.3.2.1
Procedure to verify the capability to detect other RLAN transmissions in case of multichanneloperation

See clause 5.4.9.3.2.3

Equipment implementing Option 2 for multi-channel operationSee clause 5.4.9.3.2.3.2

Channel Access Mechanism: Option A: Procedure to verify the Medium Access Mechanism

See clause 5.4.9.3.2.4.1

Maximum Channel Occupancy Time(s)

Option A: Procedure to verify the maximum Channel Occupancy Time(s)

See clause 5.4.9.3.2.5.1

Generic test procedure for measuring channel/frequency usage

See clause 5.4.9.3.3

Equipment Information:						
☐	Non-Adaptive Equipment					
☐	Adaptive Equipment which can also operate in non-adaptive mode					
☒	Adaptive Equipment without the possibility to switch to a non-adaptive mode:					
	☐	The equipment has implemented an non-LBT based DAA mechanism				
	☐	The equipment can operate in more than one adaptive mode				
	☐	Adaptive Frequency Hopping using other forms of DAA (non-LBT based)				
	☒	The equipment has implemented an LBT based DAA mechanism:				
		☐	The equipment is Frame Based equipment			
		☒	The equipment is Load Based equipment			
			☒	The Load Based Equipment equipment operates as a Supervising Device		
				The Priority Classes implemented by the Load Based Equipment		
			☐	The Load Based Equipment equipment operates as a Supervised Device		
				The Priority Classes implemented by the Load Based Equipment		
			☐	The Load Based Equipment equipment can operate as a Supervising and as a Supervised Device		
			☐	The Load Based Equipment equipment makes use of note 1 in table 7 or note 1 in table 8 of ETSI EN 301 893 V2.1.1		
		☐	The equipment can switch dynamically between Frame Based and Load Based equipment			
☒	The Load Based Equipment					
	☒	equipment operates as an Innitiating Device				
	☐	equipment operates as an Responding Device				
	☐	equipment can operate as an Innitiating Device and as a Responding Device				
☒	With regard to Energy Detection Threshold, the Load Based Equipment has implemented either option 1 of clause 4.2.7.3.2.5 of ETSI EN 301 893 V2.1.1 or option 2 of clause 4.2.7.3.2.5 of ETSI EN 301 893 V2.1.1:					
	☒	Option 1				
	☐	Option 2				

Test Results

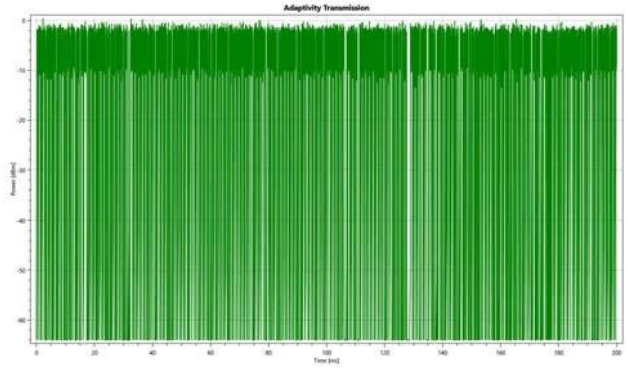
For Wi-Fi, Adaptivity testing is conforming under Load Based Equipment (CCA using "energy detect") Operational Mode.

Short Control Signalling Transmissions (SCST) are transmissions used by adaptive equipment to send control signals (e.g. ACK/NACK signals, etc.) without sensing the operating channel for the presence of other signals.

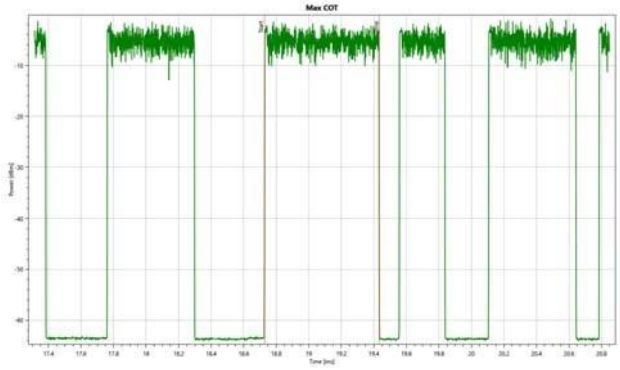
Mode	Carrier Frequency (MHz)	Interference Level (dBm/MHz)	Result
802.11a	5180/CH36	-75	Pass
802.11ac VHT40	5190/CH38	-75	Pass
802.11ac VHT80	5210/CH42	-75	Pass
Note: 1. Following the figures below, transmission shall stop with interference signal injected. There are also no Short Control Signalling while interference and blocking signal injected. So the SCST period values are zero for all the modes. 2. TL = -75 dBm/MHz (Option 1)			

802.11a CH36		
UUT Payload (%)	**Max COT (ms)**	**Priority Class**
62.12	0.707	2

UUT Payload

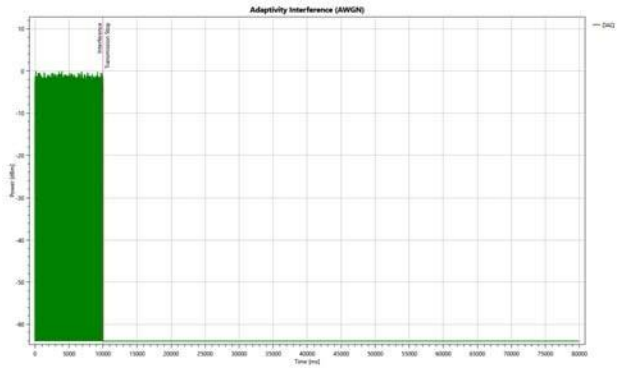


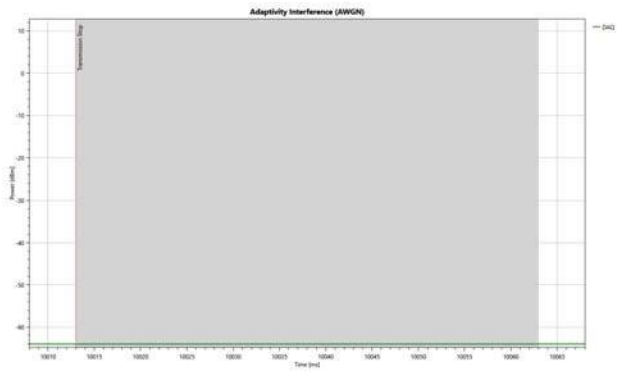
Max Channel Occupancy Time



Adaptivity Measurement
AWGN (Interference) Interference
dwell time ≥ 60 seconds

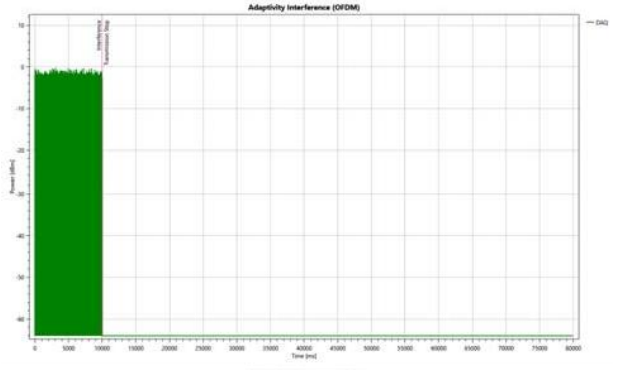
SCST TxOn / (TxOn + TxOff) (%)	0.00
Short Control Signalling Transmissions (us)	0.00

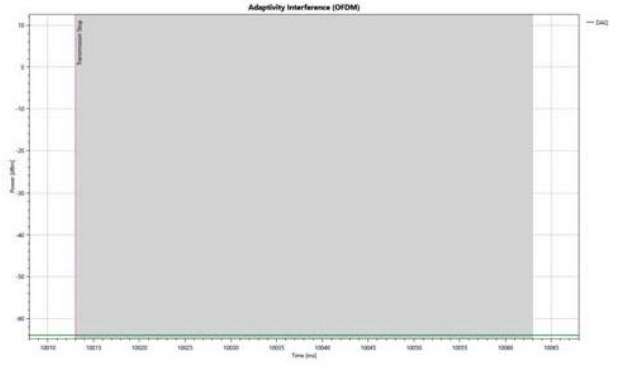




Adaptivity Measurement
OFDM (Interference) Interference
dwell time ≥ 60 seconds

SCST TxOn / (TxOn + TxOff) (%)	0.00
Short Control Signalling Transmissions (us)	0.00



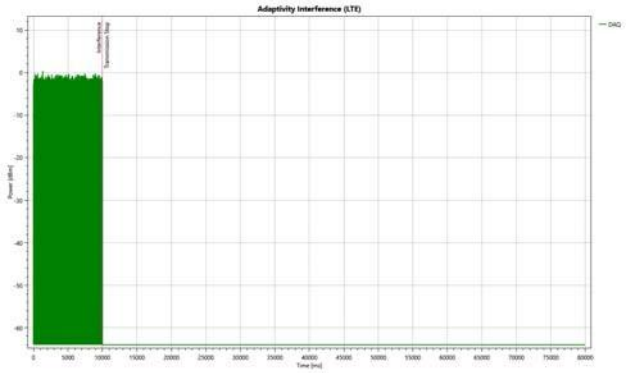


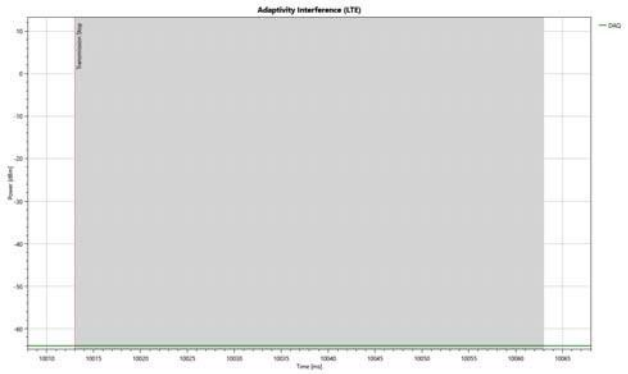
Adaptivity Measurement

LTE (Interference) Interference

dwell time ≥ 60 seconds

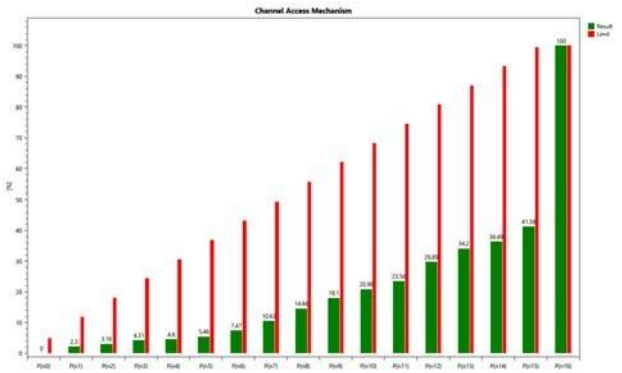
SCST TxOn / (TxOn + TxOff) (%)	0.00
Short Control Signalling Transmissions (us)	0.00





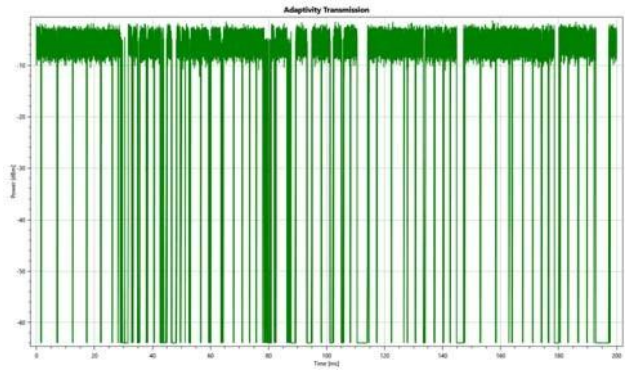
Total Idle Period Number

Pn	Result	Limit	Status
0	0.00	5.00	Pass
1	2.30	12.00	Pass
2	3.16	18.25	Pass
3	4.31	24.50	Pass
4	4.60	30.75	Pass
5	5.46	37.00	Pass
6	7.47	43.25	Pass
7	10.63	49.50	Pass
8	14.66	55.75	Pass
9	18.10	62.00	Pass
10	20.98	68.25	Pass
11	23.56	74.50	Pass
12	29.89	80.75	Pass
13	34.20	87.00	Pass
14	36.49	93.25	Pass
15	41.38	99.50	Pass
16	100.00	100.00	Pass

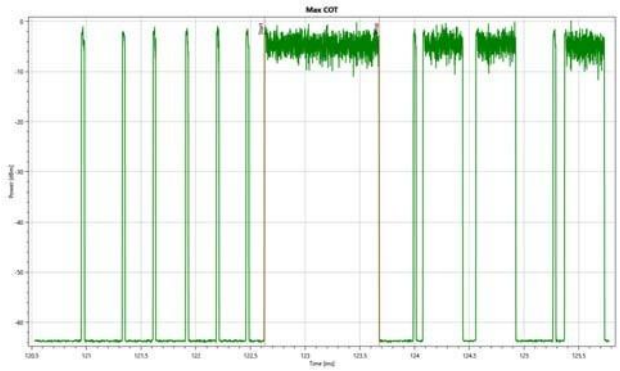


802.11n HT40 CH38		
UUT Payload (%)	**Max COT (ms)**	**Priority Class**
79.21	1.051	2

UUT Payload

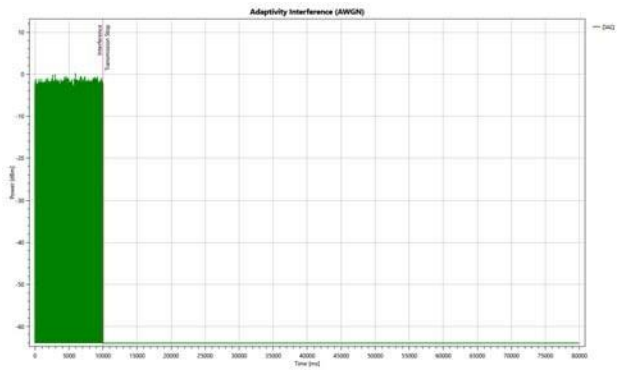


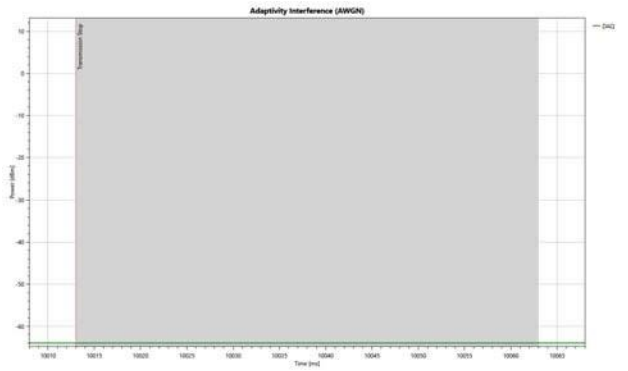
Max Channel Occupancy Time



Adaptivity Measurement
AWGN (Interference) Interference
dwell time ≥ 60 seconds

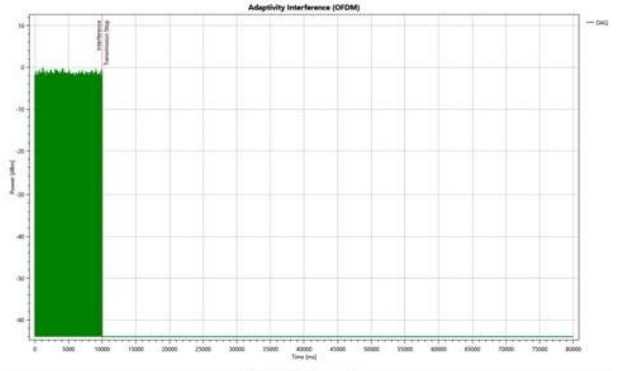
SCST TxOn / (TxOn + TxOff) (%)	0.00
Short Control Signalling Transmissions (us)	0.00

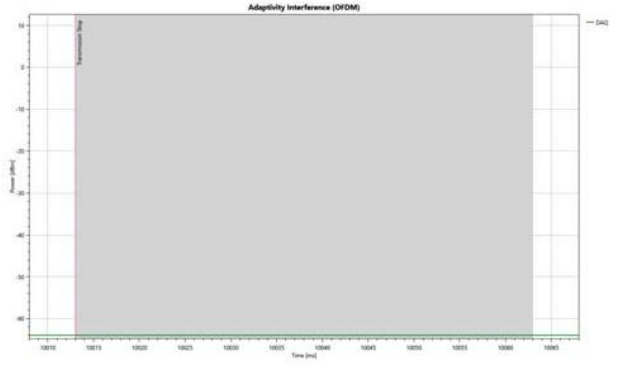




Adaptivity Measurement
OFDM (Interference) Interference
dwell time ≥ 60 seconds

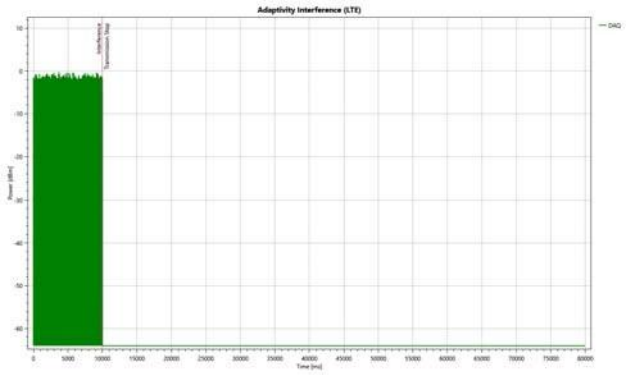
SCST TxOn / (TxOn + TxOff) (%)	0.00
Short Control Signalling Transmissions (us)	0.00





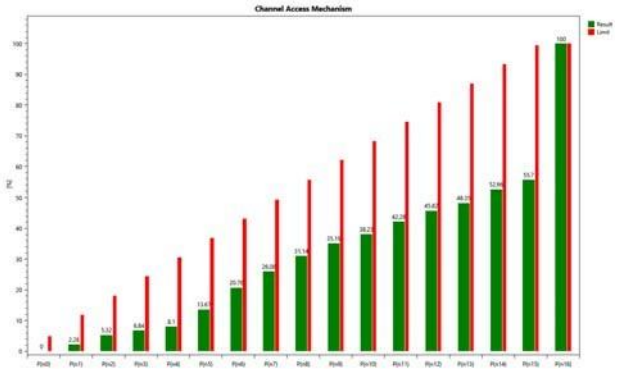
Adaptivity Measurement
LTE (Interference) Interference
dwell time ≥ 60 seconds

SCST TxOn / (TxOn + TxOff) (%)	0.00
Short Control Signalling Transmissions (us)	0.00



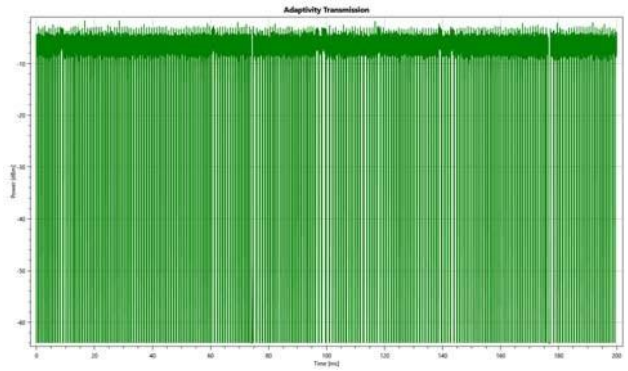
Total Idle Period Number

Pn	Result	Limit	Status
0	0.00	5.00	Pass
1	2.28	12.00	Pass
2	5.32	18.25	Pass
3	6.84	24.50	Pass
4	8.10	30.75	Pass
5	13.67	37.00	Pass
6	20.76	43.25	Pass
7	26.08	49.50	Pass
8	31.14	55.75	Pass
9	35.19	62.00	Pass
10	38.23	68.25	Pass
11	42.28	74.50	Pass
12	45.82	80.75	Pass
13	48.35	87.00	Pass
14	52.66	93.25	Pass
15	55.70	99.50	Pass
16	100.00	100.00	Pass

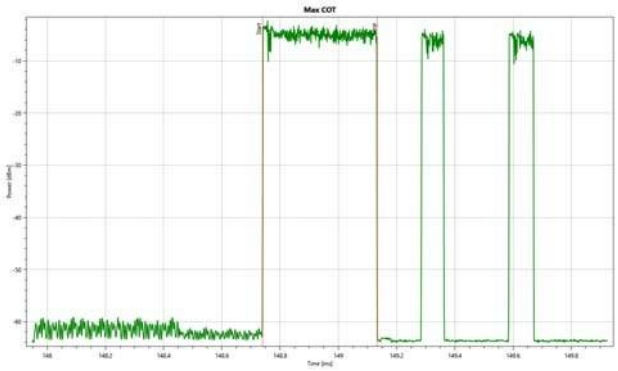


802.11ac VHT80 CH42		
UUT Payload (%)	**Max COT (ms)**	**Priority Class**
75.29	0.395	2

UUT Payload

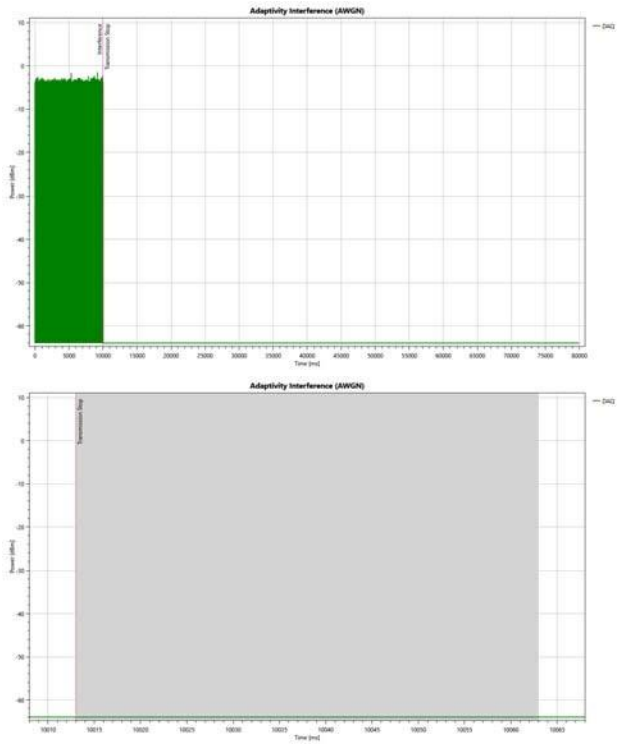


Max Channel Occupancy Time



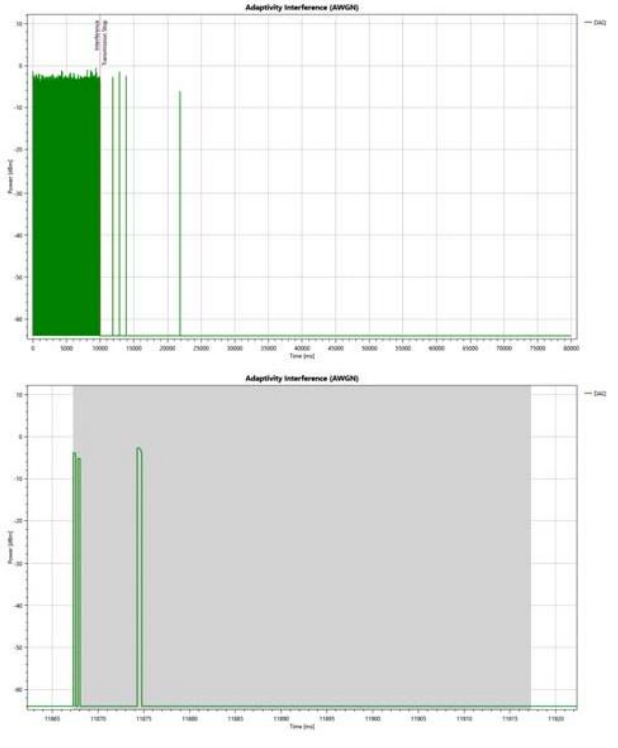
Adaptivity Measurement
AWGN 20MHz (Interference) Interference
dwell time ≥ 60 seconds

SCST TxOn / (TxOn + TxOff) (%)	0.00
Short Control Signalling Transmissions (us)	0.00

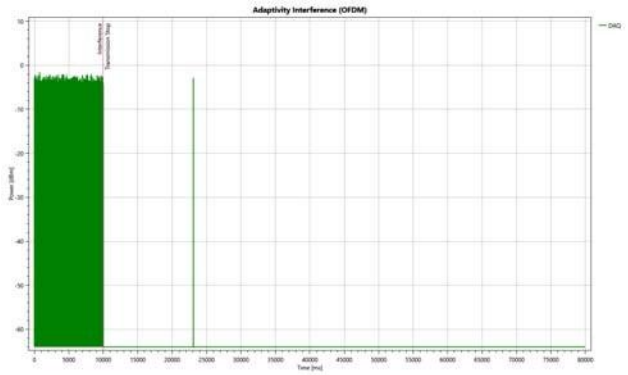


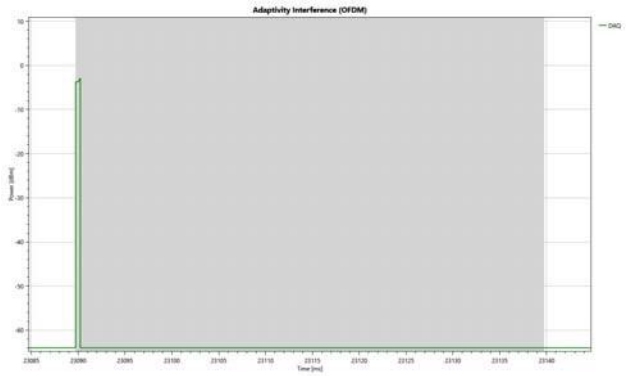
Adaptivity Measurement
AWGN 40MHz (Interference) Interference
dwell time ≥ 60 seconds

SCST TxOn / (TxOn + TxOff) (%)	2.00
Short Control Signalling Transmissions (us)	1.00

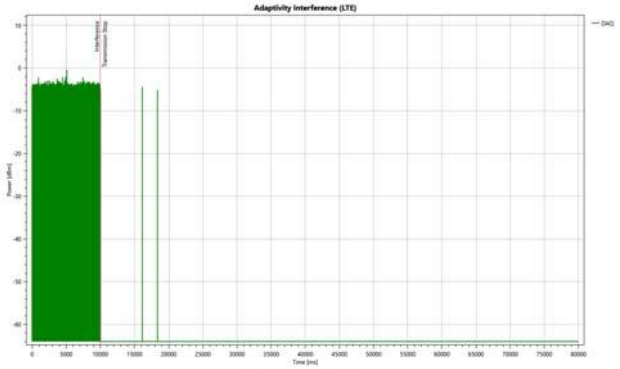


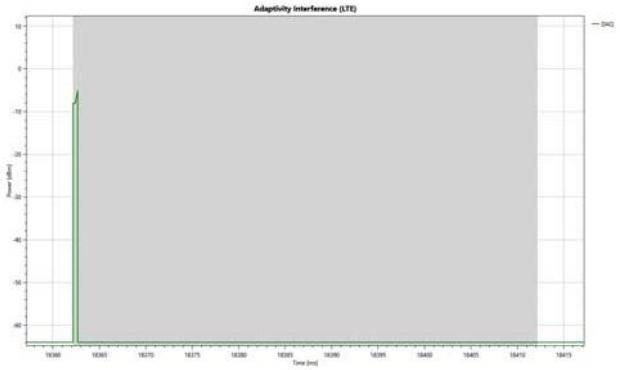
Adaptivity Measurement OFDM (Interference) Interference dwell time ≥ 60 seconds	
SCST TxOn / (TxOn + TxOff) (%)	0.9961
Short Control Signalling Transmissions (us)	0.4980





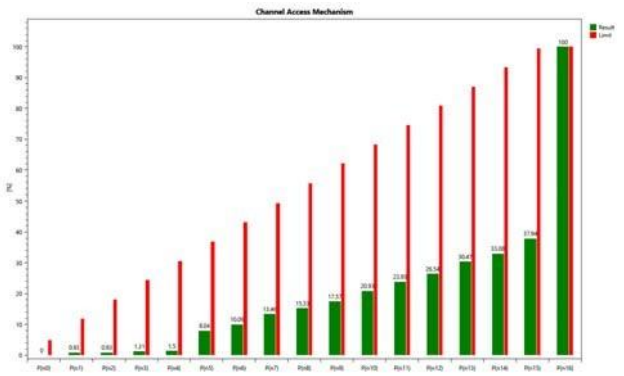
Adaptivity Measurement LTE (Interference) Interference dwell time ≥ 60 seconds	
SCST TxOn / (TxOn + TxOff) (%)	1.0000
Short Control Signalling Transmissions (us)	0.5000





Total Idle Period Number

Pn	Result	Limit	Status
0	0.00	5.00	Pass
1	0.93	12.00	Pass
2	0.93	18.25	Pass
3	1.31	24.50	Pass
4	1.50	30.75	Pass
5	8.04	37.00	Pass
6	10.09	43.25	Pass
7	13.46	49.50	Pass
8	15.33	55.75	Pass
9	17.57	62.00	Pass
10	20.93	68.25	Pass
11	23.93	74.50	Pass
12	26.54	80.75	Pass
13	30.47	87.00	Pass
14	33.08	93.25	Pass
15	37.94	99.50	Pass
16	100.00	100.00	Pass



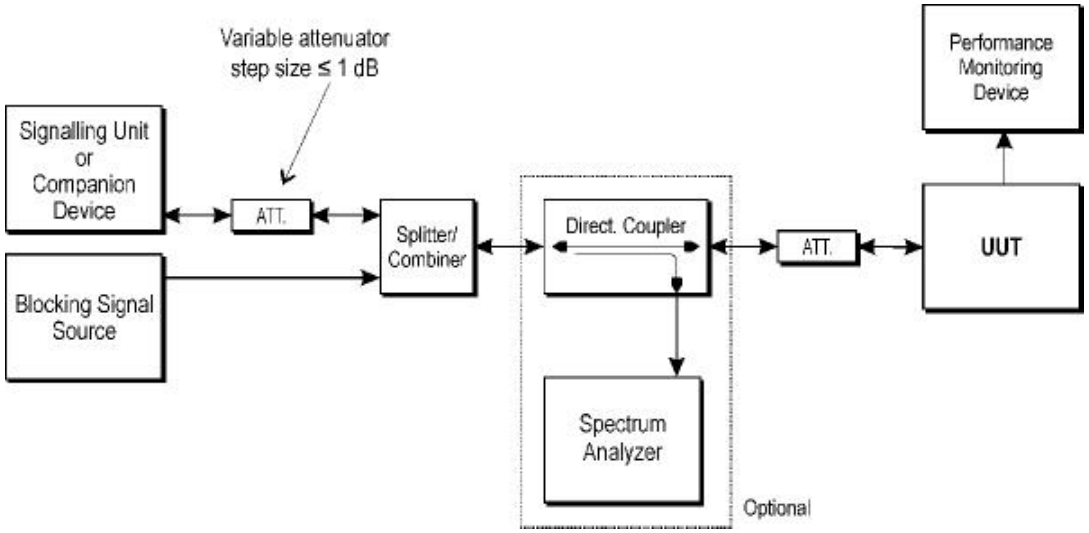
5.9 Receiver Blocking

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

For systems using multiple receive chains only one chain need to be tested. All other receiver inputs shall be terminated.



The steps below define the procedure to verify the receiver blocking requirement as described in clause 4.2.8.

Step 1:

· The UUT shall be set to the first operating frequency to be tested (see clause 5.3.2).

Step 2:

· The blocking signal generator is set to the first frequency as defined in table 9.

Step 3:

· With the blocking signal generator switched off a communication link is set up between the UUT and the associated companion device using the test setup shown in figure 18. The attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria as specified in clause 4.2.8.3 is still met. The resulting level for the wanted signal at the input of the UUT is Pmin.

· This signal level (Pmin) is increased by 6 dB resulting in a new level (Pmin + 6 dB) of the wanted signal at the UUT receiver input.

Step 4:

· The level of the blocking signal at the UUT input is set to the level provided in table 9. It shall be verified and recorded in the test report that the performance criteria as specified in clause 4.2.8.3 is met.

Step 5:

· Repeat step 4 for each remaining combination of frequency and level as specified in table 9.

Step 6:

· Repeat step 2 to step 5 with the UUT operating at the other operating frequencies at which the blocking test has to be performed. See clause 5.3.2.

Limit

The minimum performance criterion shall be a PER of less than or equal to 10 %.

While maintaining the minimum performance criteria as defined above, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined in table 9.

Table 9: Receiver Blocking parameters

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)		Type of blocking signal
		Master or Slave with radar detection (see table D.2, note 2)	Slave without radar detection (see table D.2, note 2)	
Pmin + 6 dB	5 100	-53	-59	Continuous Wave
Pmin + 6 dB	4 900 5 000 5 975	-47	-53	Continuous Wave
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.				

Test Results

Blocking signal power=SG power + Antenna gain-path cableloss

Mode	Channel	Pmin (dBm)	Wanted signal mean power (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	PER (%)	Verdict
802.11a	48	-90.6	-84.6	5100	-59	0	PASS
	48	-90.6	-84.6	4900	-53	0	PASS
	48	-90.6	-84.6	5000	-53	0	PASS
	48	-90.6	-84.6	5975	-53	0	PASS

5.10 User Access Restrictions

Definition:
User Access Restrictions are constraints implemented in the RLAN device to restrict access of the user to any hardware and/or software settings of the equipment, including software replacement(s), which may impact (directly or indirectly) the compliance of the equipment with the requirements in the present document.

NOTE: The user should be understood as the end user, the operator or any person not responsible for the compliance of the equipment against the requirements in the present document.

Requirement:
The equipment shall be so constructed that settings (hardware and/or software) related to DFS shall not be accessible to the user if changing those settings result in the equipment no longer being compliant with the DFS requirements in clause 4.2.6.
The above requirement includes the prevention of indirect access to any setting that impacts DFS.

Conclusion:
1: The DUT do not allow the user to change the country of operation and/or the operating frequency band if that results in the equipment no longer being compliant with the DFS requirements.

2: The DUT do not accept software and/or firmware which results in the equipment no longer being compliant with the DFS requirements, e.g.:
1) Software and/or firmware provided by the manufacturer but intended for other regulatory regimes;
2) Modified software and/or firmware where the software and/or firmware is available as open source code;
3) Previous versions of the software and/or firmware (downgrade).
4) Can be PASS the “user access restrictions”.

5.11 Geo-Location Capability

Applicability

This requirement only applies to equipment with Geo-Location Capacity.

Requirement

The geographical location determined by the equipment as defined in clause shall not be assessable to the user.

Test result：NT

EUT does not support Geo-Location Capacity.

6 Uncertainty Measurement

Conducted

Parameter	Uncertainty	TA report
Radio Frequency	±10 ppm	1.88
RF Power conducted	±1.5dB	1.13dB
Spurious Emission, conducted	±3dB	2.39dB
Humidity	±5%	2.10%
Temperature	±2°C	0.55°C
Time	±10%	0.59%

Radiated

The assessed measurement uncertainty to ensure 95％ confidence level for the normal distribution is with the coverage factor k = 1.96, U= 3.55 dB.

7 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Wireless Communication Tester	Anritsu	MT8862A	6261883605	2024-05-14	2024-05-13
Spectrum Analyzer	R&S	FSV40	101298	2024-05-14	2024-05-13
Vector Signal Generator	R&S	SMBV100A	262573	2024-05-14	2024-05-13
Signal Generator	R&S	SMB100A	114108	2024-05-14	2024-05-13
Wireless Communication Tester	R&S	CMW270	101201	2024-05-14	2024-05-13
Vector Signal Generator	KEYSIGHT	N5182B-X07	MY51350303	2024-01-21	2024-01-20
Signal Generator	KEYSIGHT	N5171B	MY50140143	2024-05-14	2024-05-13
Spectrum Analyzer	Agilent	N9020A	MY54420163	2024-12-12	2024-12-11
Power Test Set	KEYSIGHT	X8750A	MY58000336	2024-05-14	2024-05-13
Signal Conditioning Test Set	KEYSIGHT	X8749A	TW61283517	2024-05-14	2024-05-13
Wireless Router	ASUS	AX5400	LBICI4000943	/	/
Radiated Spurious Emissions					
Signal Analyzer	R&S	FSV30	100815	2023-12-12	2024-12-11
TRILOG Broadband Antenna	SCHWARZBECK	VULB9163	391	2023-12-16	2025-12-15
Horn Antenna	R&S	HF907	102723	2023-08-11	2024-08-10
Horn Antenna	ETS-Lindgren	3160-09	00102643	2023-10-10	2024-10-09
Software	R&S	EMC32	9.26.01	/	/

********END OF REPORT ********

1 Cover Page

RF Exposure Evaluation Report

Application No.:	TRBJ24052958471
Applicant:	MODE CHINA
Address of Applicant:	Room 01.8/f#7 Tower. 4th Area, No. 186, South 4th Ring west Road.Fengtai District, Beijing, China
Manufacturer:	Zhuozhou Mude Industrial Technology Co., Ltd
Address of Manufacturer:	No.C55, Zhongguaneun Hegu Innovatien Industrial Park, Chaoyang EastRoad,ZhuozhouDevelopment Zone, BaodingCity, Hebei Province

Equipment Under Test (EUT):

EUT Name:	Free Hoist
Model No.:	Free Hoist
Main Model:	Free Hoist
	Please refer to section 3 of this report which indicates which model was actually tested and which were electrically identical.
Standard(s) :	EN IEC 62311:2020
Date of Receipt:	May 28, 2024
Date of Test:	May 28, 2024 to May 31, 2024
Date of Issue:	May 31, 2024
Test Result:	**Pass***

2 Contents

3 General Information

3.1 General Description of EUT

Power supply:	/

3.2 Technical Specifications

13.56MHz

Operation Frequency	13.56MHz
Modulation Technique:	ASK
Antenna Type:	Loop Antenna
Number of Channel:	1

3.3 Test Location

All tests were performed at:

Shanghai Global Testing Services Co., Ltd.

Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China.

No tests were sub-contracted.

Note:

1. GTS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).

2. GTS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

3.4 Test Facility

N/A

4 Test Standards and Limits

The evaluation has been performed on the EUT, pursuant to the relevant requirements of the following document(s) and the harmonized EN standard(s) covering essential requirements under article 3.1a of the RED Directive (2014/53/EU).

Identity	Document Title	Version
Council Recommendation of 12 July 1999(1999/519/EC)	On the limitation of exposure of the general public to electromagnetic fields (0Hz to 300GHz)	1999
EN IEC 62311	Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)	2020

Limit: According to EN IEC 62311, the criteria listed in the below table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified table 2 of Council Recommendation 1999/519/EC.

Table 2

Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density S_{eq} (W/m²)
0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	4 000/f	5 000/f	—
0,025-0,8 kHz	250/f	4/f	5/f	—
0,8-3 kHz	250/f	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	0,73/f	0,92/f	—
1-10 MHz	$87/f^{1/2}$	0,73/f	0,92/f	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	f/200
2-300 GHz	61	0,16	0,20	10

Notes

1. f as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz, S_{eq}, E^2, H^2, and B^2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, S_{eq}, E^2, H^2, and B^2 are to be averaged over any $68/f^{1.05}$-minute period (f in GHz).
4. No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.

Note1: The limit of H-field strength for 13.56MHz is 0.073A/m.

5 Calculation Formula and Test Result

5.1 Calculation Formula

$Pd = (Pout*G) / 4\pi R^2$

Where:

Pd = Power density in W/m^2

Pout = Output power to antenna in W

G = Antenna Gain in linear scale

π = 3.14

R = distance to the center of radiation of antenna (in meter) = 0.2m

NOTE: Pd limit = $10 W/m^2$.

5.2 Test Results

For 13.56MHz:

Refer to the test report TRBJ24052958471, the measured maximum Magnetic Fields is 17.36dBuA/m (0.00000738A/m). This is below the max permitted sending level of 0.073A/m, so the device meets the requirements.

--The End of Report--

EMC REPORT

Product Name	:	Free Hoist
Model Name	:	Free Hoist

Prepared for:

MODE CHINA
Room 01.8/f#7 Tower. 4th Area, No. 186, South 4th Ring west Road.Fengtai District, Beijing, China

Prepared by:

Shanghai Global Testing Services Co., Ltd.
Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China.
TEL: 021-3363 7866
FAX: 021-3363 7858

File Number	:	TRBJ24052958471
Date of File	:	May 28, 2024 to May 31, 2024
Date of Issue	:	May 31, 2024

Notes：
The test results only relate to these samples which have been tested.
Partly using this report will not be admitted unless been allowed by GTS.
GTS is only responsible for the complete report with the reported stamp of GTS.

Applicant:	MODE CHINA
	Room 01.8/f#7 Tower. 4th Area, No. 186, South 4th Ring west Road.Fengtai District, Beijing, China
Manufacturer:	Zhuozhou Mude Industrial Technology Co., Ltd
	No.C55, Zhongguaneun Hegu Innovatien Industrial Park, Chaoyang EastRoad,ZhuozhouDevelopment Zone, BaodingCity, Hebei Province
Product Name:	Free Hoist
Brand Name:	/
Model Name:	Free Hoist
Rating:	/
Power Supply:	/
Date of Receipt:	May 28, 2024
Date of Review:	May 28, 2024 to May 31, 2024
Test Standard:	ETSI EN 300 328 V2.2.2 (2019-07)
Test Result:	PASS

Prepared by :

Approved by :

GLOBAL TESTING SERVICES CO.,LTD. CERTIFICATION

TABLE OF CONTENTS

1. General Information

1.1 Description of EUT

Product Name:	Free Hoist
Model Name:	Free Hoist
Serial Number:	N/A
Power Supply:	/
Applicant:	Shanghai Tanon Life Science Co.,Ltd. Room 01.8/f#7 Tower. 4th Area, No. 186, South 4th Ring west Road.Fengtai District, Beijing, China
Manufacturer:	Shanghai Tanon Life Science Co.,Ltd. Room 01.8/f#7 Tower. 4th Area, No. 186, South 4th Ring west Road.Fengtai District, Beijing, China

1.2 Description of Test Facility

Site Description:	Shanghai Global Testing Services Co., Ltd.
Name of Firm:	Shanghai Global Testing Services Co., Ltd.
Site Location:	Floor 2nd, Building D-1, No. 128, Shenfu Road, Minhang District, Shanghai, China.
The site and apparatus are constructed in conformance with the requirements of ANSI C63.4, CISPR 16-1-1 and other equivalent standards	

1.3 Measurement Uncertainty

No.	Item	Uncertainly
1	RF output power, conducted	±0.68dB
2	Unwanted Emissions, conducted	±2.988dB
3	All emissions, radiated below 1GHz	±2.26dB
4	All emissions, radiated 1GHz- 18GHz	±2dB
5	All emissions, radiated>18G	±2.88dB

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Equipment	Free Hoist
Brand Name	/
Model Name	Free Hoist
Model Difference	are same.
Receiver Frequency	1575.42±1.023MHz
Adapter	
Battery	/
Antenna	PIFA
Hardware version number	
Software version number	
Extreme Temperature	- 10°C / 55°C

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.2 TEST MODE

E-1 EUT

2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Shielded Type	Ferrite Core	Length	Note
N/A	N/A	N/A	N/A	N/A

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Bilog Antenna	TESEQ	CBL6111D	34678	2023.11.02	2023.11.1
Horn Antenna	SCHWARZBECK	BBHA 9120D(1201)	9120D-1343	2023.10.19	2023.10.18
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2023.10.09	2023.10.08
Pre-Amplifier (1G- 18GHz)	SKET	LNPA-01018G-45	SK2018080901	2023.10.09	2023.10.08
Signal Analyzer	Agilent	N9020A	MY51110105	2023.03.02	2023.03.01
Temperature & Humidity	HH660	Mieo	N/A	2023.10.12	2023.10.11
turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
AC Power Source	APC	KDF-11010G	F214050035	N.C.R	N.C.R
Test SW	BULUN	BL410-E/18.905			

RF Connected Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Signal Generator	Agilent	N5182A	MY46240556	2023.10.09	2023.10.08
Signal Analyzer	Agilent	N9020A	MY49100060	2023.10.09	2023.10.08
Wireless Communications Test Set	R&S	CMW 500	133884	2023.12.02	2023.12.01
Temperature & Humidity	HH660	Mieo	N/A	2023.10.12	2023.10.11
Temperature& Humidity test chamber	Safety test	GDS-250	171200018	2023.03.02	2023.03.01
Attenuator	HP	8494B	DC- 18G	2023.05.06	2023.05.05
AC Power Source	APC	KDF-11010G	F214050035	N.C.R	N.C.R
Test SW	FARAD	LZ-RF /LzRf-3A3			

3. SPURIOUS EMISSIONS – RECEIVER

3.1 LIMIT

Clause	Frequency(MHz)	Limit	Bandwidth
4.2.2.2	30- 1000	-57dBm	100KHz
	1000-8300	-47dBm	1MHz

3.2 TEST PROCEDURES

The following table is the setting of the Spectrum Analyzer.

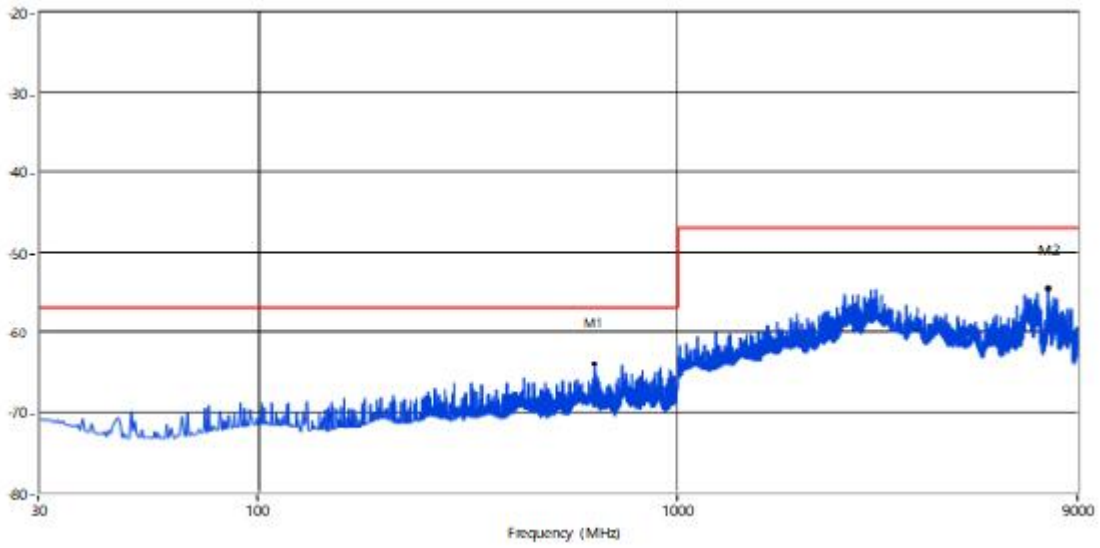
Spectrum Analyzer	Setting
Attenuation	Auto
Start Frequency	30 MHz
Stop Frequency	9000MHz
Detector	Positive Peak
Sweep Time	Auto
RB / VB	100 kHz / 300 kHz(below 1GHz) 1MHz/3MHz(Above 1GHz)

3.3 EUT OPERATION DURING TEST

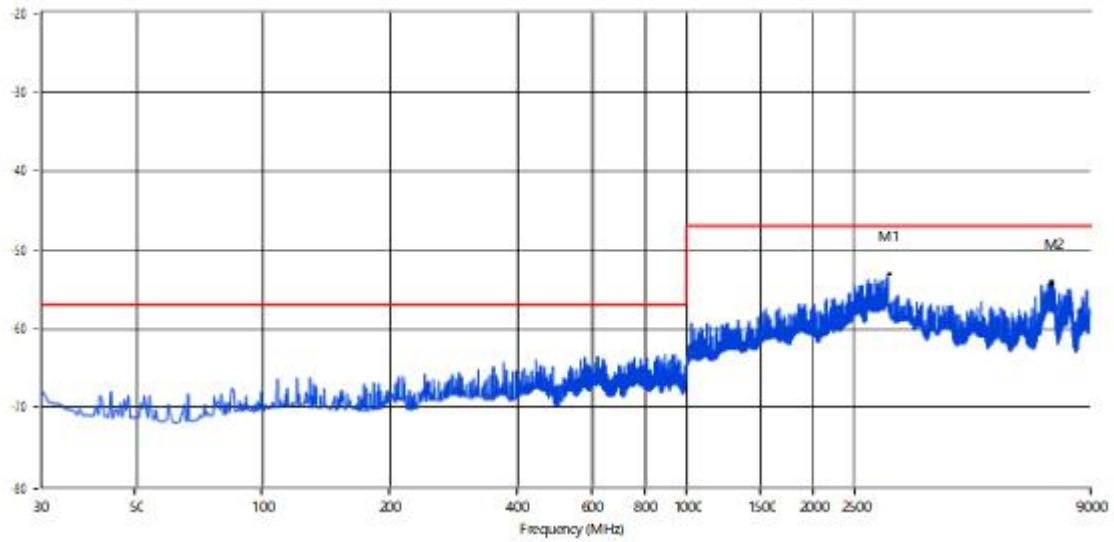
The EUT was programmed to be in continuously receiving mode.

3.4 TEST RESULTS

Horizontal



Vertical



4. ADJACENT SIGNAL SELECTIVITY

4.1 LIMIT

The C/N_0 metric reported by the GUE for all GNSS and GNSS signals given in table 4- 1 and supported by the GUE shall not degrade by more than the value given in equation 4- 1 when an adjacent frequency signal is applied. The adjacent frequency signal is defined in table 4-4, with the frequencies and power levels defined in table 4-2 and/or in table 4-3 depending on the RNSS bands supported by the GUE. Equation 4- 1: Maximum degradation in C/N_0

Table 4-1: GNSS, GNSS signals and RNSS frequency bands

GNSS	GNSS Signal Designations	RNSS Frequency Band (MHz)
BDS	B1I	1559 to 1610
Galileo	E1	1559 to 1610
	E5a	1164 to 1215
	E5b	1164 to 1215
	E6	1215 to 1300
GLONASS	G1	1559 to 1610
	G2	1215 to 1300
GPS	L1	1559 to 1610
	L2	1215 to 1300
	L5	1164 to 1215
SBAS	L1	1559 to 1610
	L5	1164 to 1215

Table 4-2: Frequency bands, adjacent frequency signal test point centre frequencies and power levels for the 1 559 MHz to 1 610 MHz RNSS band

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	Comments
1518 to 1525	1524	-65	MSS (space-to-Earth) band
1525 to 1549	1548	-95	MSS (space-to-Earth) band
1549 to 1559	1554	-105	MSS (space-to-Earth) band
1559 to 1610	GUE RNSS band under test		
1610 to 1626	1615	-105	MSS (space-to-Earth) band
1626 1640	1627	-85	MSS - -Earth)

Table 4-3: Frequency bands, adjacent frequency signal test point centre frequencies and power levels for the 1 164 MHz to 1 300 MHz RNSS band

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	Comments
960 to 1164	1154	-75	AM(R)S, ARNS band
1164 to 1215	GUE RNSS band under test		
1215 to 1260	GUE RNSS band under test		
1260 to 1300	GUE RNSS band under test		
1300 to 1350	1310	-85	Radiolocation, ARNS, RNSS (Earth-to-space) band

Table 4-4: Adjacent frequency signal

Parameter	Value	Comments
Frequency	See table 4-2 and table 4-3	
Power level	See table 4-2 and table 4-3	
Bandwidth	1 MHz	See clause B. 1 for details
Format	AWGN	

4.2 TEST PROCEDURES

1. Please refer to ETSI EN 303 328 (V1. 1. 1) clause 5.4.2. for the test conditions.
2. Please refer to ETSI EN 303 328 (V1. 1. 1) clause5.4.3 for the measurement method.

4.3 TEST SETUP

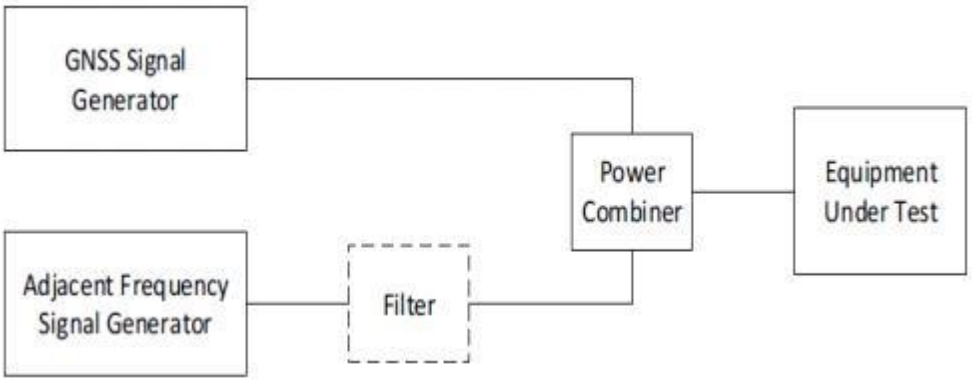


Figure 5-1: Conducted measurement setup for EUT adjacent frequency band selectivity

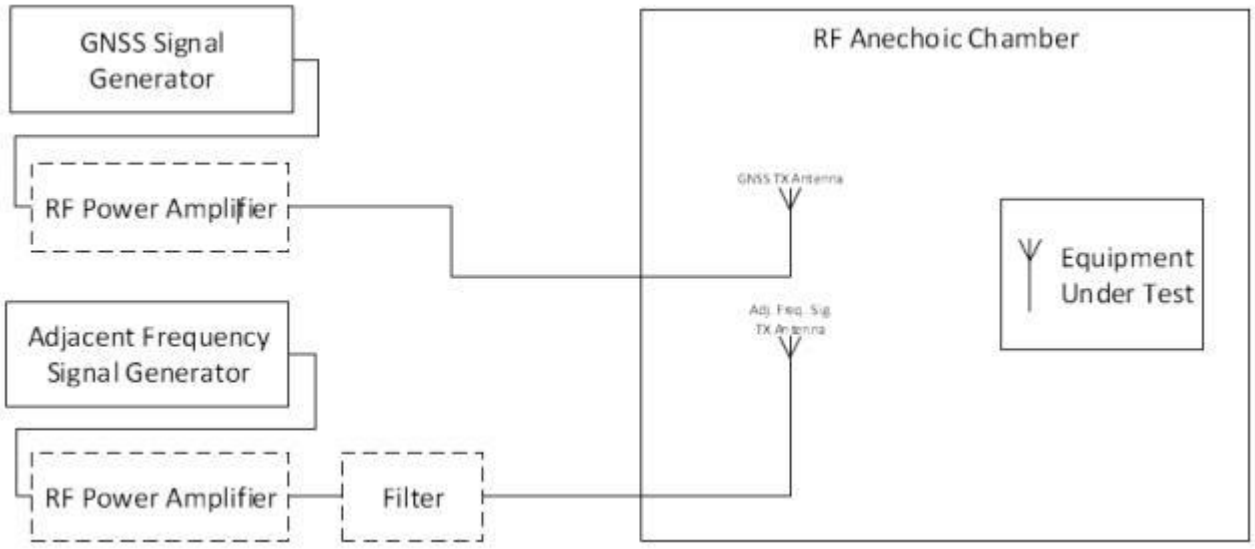


Figure 5-2: Radiated measurement setup for EUT adjacent frequency band selectivity performance

The EUT was programmed to be in continuously receive mode.

4.4 TEST RESULTS

Operating frequency (GHz)	Adjacent frequency (MHz)	Adjacent frequency signal power level (dBm)	Δ C/N0 (dB)	Limit (dB)
1.57542	1524	-65	0	≤ 1
	1548	-95	0	
	1554	-105	0	
	1615	-105	0	
	1627	-85	0	

----End of the report----