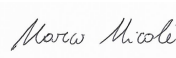
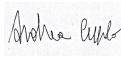


FCC Part 15C TEST REPORT

Report Number		047/23/02961/FCC	Rev. 01
Date of document		2024-03-07	
Total number of pages		Pag. 56	
OBJECT		FCC Part15C	
CUSTOMER		PROTOS GmbH	
EQUIPMENT UNDER TEST - DESCRIPTION		Bluetooth Headset	
MODEL		BTCOM	
SUMMARY			
1	OBJECT OF THE TESTS		3
2	IDENTIFICATION		3
3	EQUIPMENT UNDER TEST (EUT)		3
4	STANDARDS AND TEST METHODS		4
5	EUT OPERATING CONDITIONS DURING TESTS		6
6	TEST RESULTS		7
7	EUT MODIFICATIONS		51
Annex B	Test Instrumentations		02 pag
Annex D	Auxiliary Instrumentations		01 pag
Annex F	Judgment of compliance and measurements uncertainty		02 pag
Tested by (Name + Signature)	MARCO NICOLE' Test engineer		Documento firmato da: NICOLE' MARCO 15.03.2024 15:03:04 UTC
Verified by (Name + Signature)	ANDREA CUPIDO Lab Manager		Documento firmato da: CUPIDO ANDREA 18.03.2024 07:45:53 UTC
Approved and issued by (Name + Signature)	ALESSANDRO ZUCCATO Lab Director		Documento firmato da: ZUCCATO ALESSANDRO 18.03.2024 11:32:58 UTC

History sheet of test Report

Report Number	Rev.	Date	Description of modification
047/23/02961/RED	R00	2023-04-13	Initial Test report
047/23/02961/RED	R01	2024-03-07	Removed BLE part (for changes see the black sidebars in the document)

1 OBJECT OF THE TESTS

The objective of the tests is the evaluation of the conformity of the EUT to the requirements of the standards and test methods specified on par. 4 of present Test Report.

2 IDENTIFICATION

2.1 Laboratory

Name : Kiwa Creiven S.r.l.
Street: Corso Spagna, 12
City : 35127 Padova - ITALY
Phone : +39.049.8704036
Fax: +39.049.8707037
E-mail : info.creiven@kiwa.com

FCC Designation

number: IT0016

ISED CAB Identifier: IT0007

2.2 Customer

Customer: PROTOS GmbH
Street: Herrschaftswiesen 11
City: 6842 Koblach - Austria
Phone: +43 59 50 50-200
Refer to : Anton Armin Pfanner

3 EQUIPMENT UNDER TEST (EUT)

3.1 EUT identification (declared under responsibility of the customer)

EUT Description: Bluetooth Headset
Model: BTCOM
Code: --
Serial N°: P2P4Z, P2P41
Software release: 2.1
Size: 220 x 110 x 40 [mm]
Supply voltage: 4.1 V c.c.
Rated Electrical Power: 0.41 W
Rated input current: 400 mA
FCC ID: 2A98QBTCOM

3.2 EUT classifications

The manufacture declared the following classification:

Object	Descriptions
Operating Frequency	2,4 – 2,4835 GHz
Equipment type	Bluetooth classic
Channel spacing	1 MHz (BT classic)
Number of Channels	80 for Bluetooth classic
Antenna Type	Integrated antenna PIFA
Antenna Peak Gain	1.3 dBi
Frequency Hopping Spread Spectrum	YES
Extreme Temperature Range	0°C ÷ +50°C
Manufacturer declaration	03005LP
In case of FHSS modulation	In case of Adaptive Frequency Hopping Equipment: The maximum number of Hopping Frequencies: 80 (BT) The minimum number of Hopping Frequencies: 20 The (average) Dwell Time: 6.25 ms
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

3.3 EUT additional information

Object	Descriptions
Classification of installation and use	☐ Stand-alone ☒ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment) ☐ Plug-in radio device (Equipment intended for a variety of host systems) ☐ Other
Means for connection to the supply:	☐ Supply cord fitted with a plug ☐ Supply cord without plug (for permanently connection to fixed wiring) ☒ Appliance inlet ☐ Appliance provided with a set of terminals allowing the connection of cables or fixed wiring
Date of receipt of test item	2023-02-06
Date(s) of performance of tests	See the data specified in test results details

3.4 EUT cables

The EUT has been configured by the manufacturer with the following input / output cables:

Classification	Description	Cable		note
		Shielded	Specified max. length	
DC power port (used only for the recharge)	d.c. input cable	☐	☐ none ☒ ≤ 1m ☐ ≤ 3m ☐ ≤ 10m ☐ ≤ 30m	type of power source: ☐ Internal Power Supply ☐ External Power Supply or AC/DC adapter ☒ Battery ☐ Other

3.5 EUT Auxiliary Equipments (AEs)

To ensure the correct functioning of the EUT, it has been necessary to make use of the following auxiliary equipment (AE):

Auxiliary Equipment AE N°01

Description : DC power supply
 Model: LABPS3003
 Manufacturer: VELLEMAN

Auxiliary Equipment AE N°02

Description : Laptop + debugger
 Model: --
 Manufacturer: ASUS

3.6 Sampling and adopted criteria

Equipment used for testing was selected by the customer. Sampling criteria adopted by the customer is unknown to Kiwa Creiven laboratory.

3.7 EUT documents

The following documentations have been provided by the customer

Kiwa Creiven document reference	Descriptions
03005LP	Manufacturer declaration

4 STANDARDS AND TEST METHODS

4.1 Reference standards

DOCUMENT	DATE	OBJECT
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

Note: KDB 558074 D01 v05r02 taken into consideration.

4.1.1 Test summary

The following table specifies the tests required by the reference standard and test performed on EUT.

TEST	FCC Rule	Note	Results
20 dB Bandwidth	§15.215 (c)	---	Complies
Channel Separation	§15.247 (a)(1)	---	Complies
Minimum Hopping Channel	§15.247 (a)(1)(iii)	---	Complies
Dwell Time	§15.247 (a)(1)(iii)	---	Complies
Peak Output Power (Conduction)	§15.247 (b)(3)	---	Complies
Spurious Emissions (Radiation)	§15.209	---	Complies
Band edge measurement	§15.247 (d)	---	Complies
Power-line conducted emissions	§15.207	---	Complies

4.2 Test methods

DOCUMENT	DATE	METHOD	ACCREDIA accreditation	Test Sequence (See Note 1)
C63.10	2013	20 dB Bandwidth	Yes	01
C63.10	2013	Channel Separation	Yes	03
C63.10	2013	Minimum Hopping Channel	Yes	04
C63.10	2013	Dwell Time	Yes	07
C63.10	2013	Peak Output Power (Conduction)	Yes	05
C63.10	2013	Spurious Emissions (Radiation)	Yes	02
C63.10	2013	Band edge measurement	Yes	06
C63.10	2013	Standard test method for ac power-line conducted emissions from unlicensed wireless devices	Yes	08

Note :

1) The tests have been carried out in the order specified in this column

4.3 Deviation from test methods

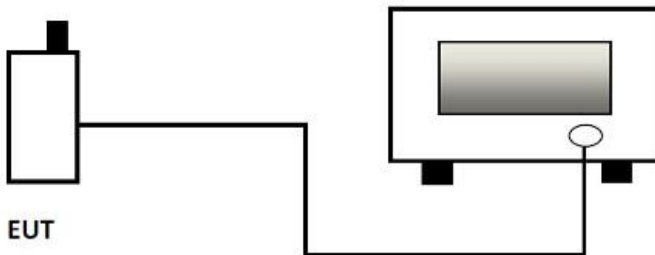
None.

5 EUT OPERATING CONDITIONS DURING TESTS

The EUT was set to function as indicated in Table 1, in compliance with the manufacturer's prescriptions and with that which is stated in the applied standards, test methods and procedures.

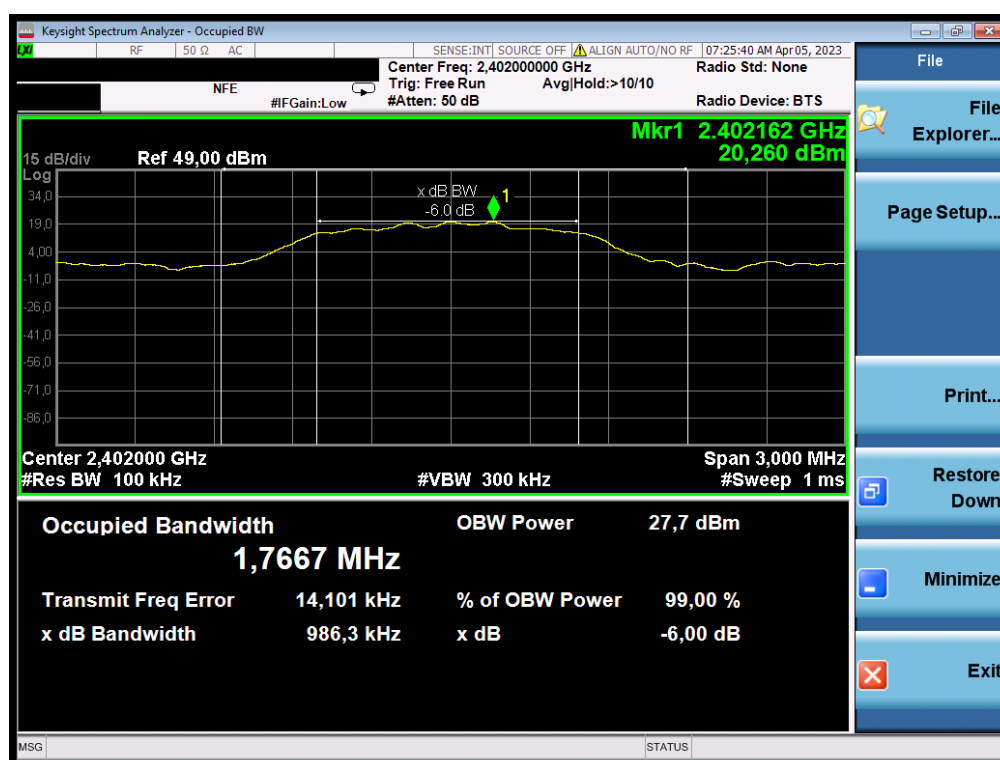
OPERATING CONDITION	DESCRIPTION OF FUNCTIONING
TX01	<u>EUT details : during the test the EUT</u> - was powered at 4.1 Vdc - was in continuous working state/ Device operated in standard continuous transmit mode (Cont TX function) Lowest frequency activated (2402 MHz) – Classic Bluetooth - Was set packet type DH5 or 2-DH5 or 3-DH5 and was report the worst case - Was set TX power to 20 dBm - Was set Ext 255 and Int 50 <u>AE details : during the test the Auxiliary Equipment (AE), connected to EUT, was :</u> - AE N°01 connected to Power supply of EUT - AE N°02 connected only to set the device
TX02	<u>EUT details : during the test the EUT</u> - was powered at 4.1 Vdc - was in continuous working state/ Device operated in standard continuous transmit mode (Cont TX function) Medium frequency activated (2441 MHz) – Classic Bluetooth - Was set packet type DH5 or 2-DH5 or 3-DH5 and was report the worst case - Was set TX power to 20 dBm - Was set Ext 255 and Int 50 <u>AE details : during the test the Auxiliary Equipment (AE), connected to EUT, was :</u> - AE N°01 connected to Power supply of EUT - AE N°02 connected only to set the device
TX03	<u>EUT details : during the test the EUT</u> - was powered at 4.1 Vdc - was in continuous working state/ Device operated in standard continuous transmit mode (Cont TX function) Highest frequency activated (2480 MHz) – Classic Bluetooth - Was set packet type DH5 or 2-DH5 or 3-DH5 and was report the worst case - Was set TX power to 20 dBm - Was set Ext 255 and Int 50 <u>AE details : during the test the Auxiliary Equipment (AE), connected to EUT, was :</u> - AE N°01 connected to Power supply of EUT - AE N°02 connected only to set the device
TX07	<u>EUT details : during the test the EUT</u> - was powered at 4.1 Vdc - was in continuous working state/ Device operated in hopping mode Classic Bluetooth activated - Was set TX power to 20 dBm - Was set Ext 255 and Int 50 <u>AE details : during the test the Auxiliary Equipment (AE), connected to EUT, was :</u> - AE N°01 connected to Power supply of EUT - AE N°02 connected only to set the device
OC09	<u>EUT details : during the test the EUT</u> - was in recharge mode (AE N°01 powered with 120V @60Hz) - Radio transmission not activated <u>AE details : during the test the Auxiliary Equipment (AE), connected to EUT, was :</u> - EUT connected via USB to AE N°02

6 TEST RESULTS

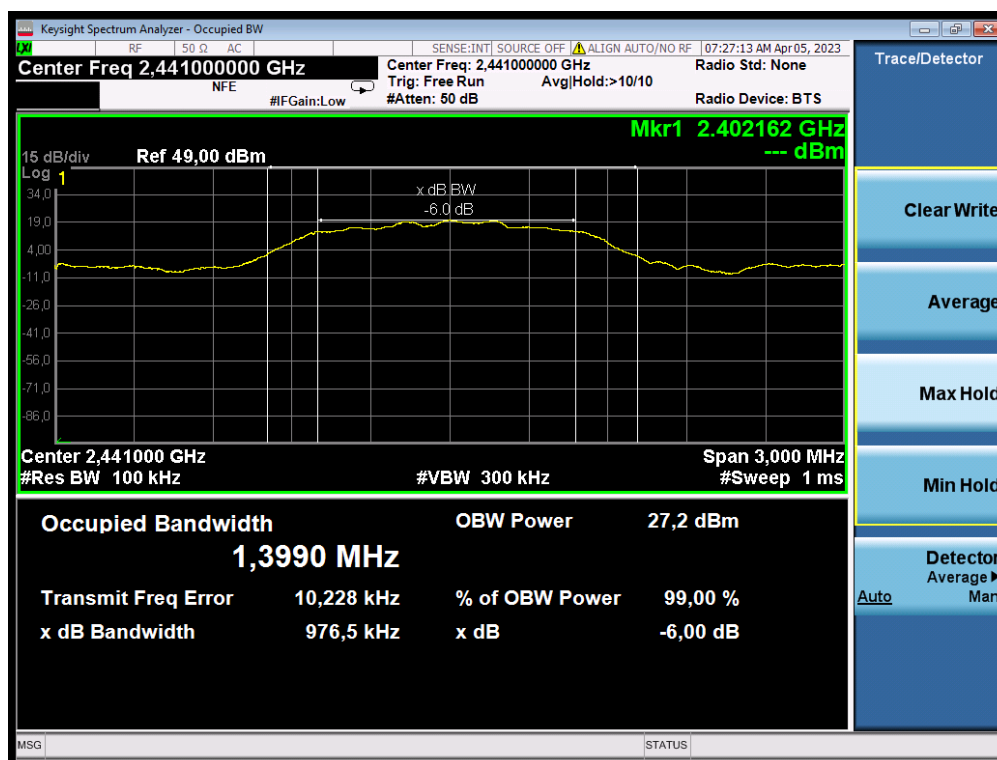
Test method:	FCC part 15 C - §15.215 (c) 20 dB Bandwidth For details see par. 4 of this report	
Operator	Marco Nicolè	
Test Date	2023-02-23	
Test Temperature	21 °C	
Test Humidity	30 %	
Test Pressure	1001 hPa	
Electrical wiring	<i>Cable</i>	<i>Length [m]</i>
	D.c. input cable	3.0
Operating conditions	TX01; TX02; TX03	
	See par. 5 of this report	
Auxiliary equipment (AE)	See par. 3.5 of this report	
Limits	The minimum 20 dB bandwidth shall be at least 500 kHz.	
Test set up	 The diagram illustrates the test setup. On the left, a rectangular box labeled 'EUT' (Equipment Under Test) has a vertical line extending upwards from its top. A horizontal line connects the right side of the EUT box to the left side of a larger rectangular box representing the 'Spectrum analyzer'. The 'Spectrum analyzer' box contains a smaller rectangle representing its screen. A line extends from the bottom of the 'Spectrum analyzer' box, loops around, and then connects back to the bottom of the 'EUT' box, forming a closed loop.	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	

Operating condition	20 dB bandwidth	LIMIT	RESULT
TX01	986.3 kHz	At least 500 kHz	COMPLIES
TX02	976.5 kHz	At least 500 kHz	COMPLIES
TX03	981.4 kHz	At least 500 kHz	COMPLIES
Test Procedure	Use the following spectrum analyser settings: RBW = 100kHz VBW $\geq 3 \times$ RBW Sweep = auto Detector function = peak Trace = max hold The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.		
EUT modification during this test	None		

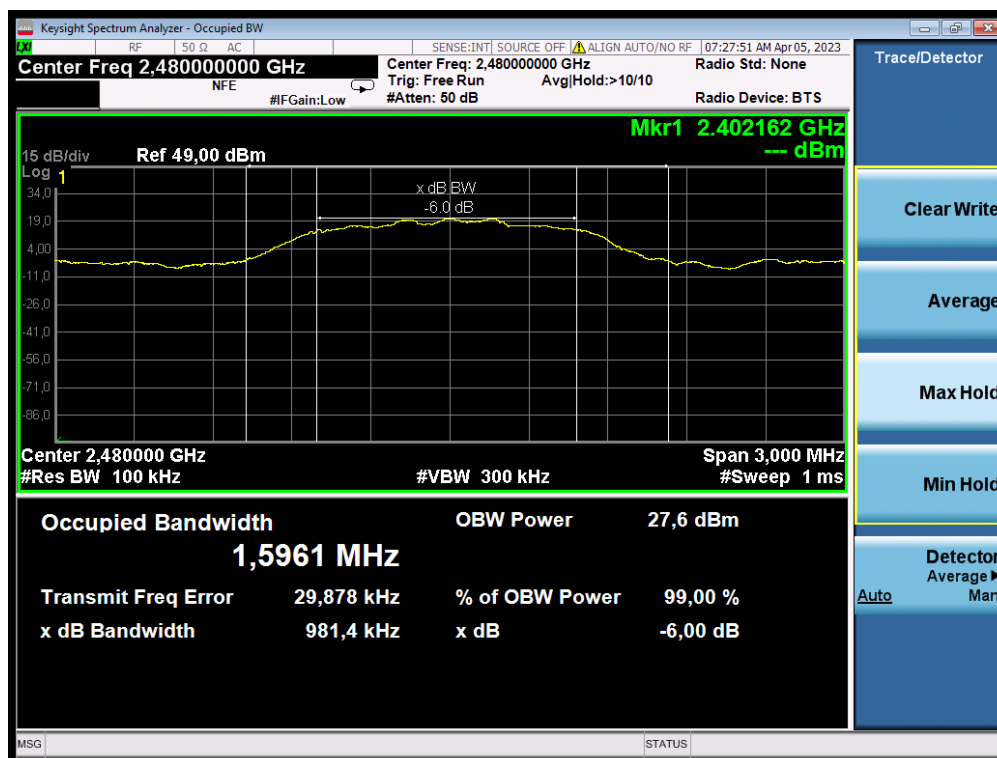
Test result TX01

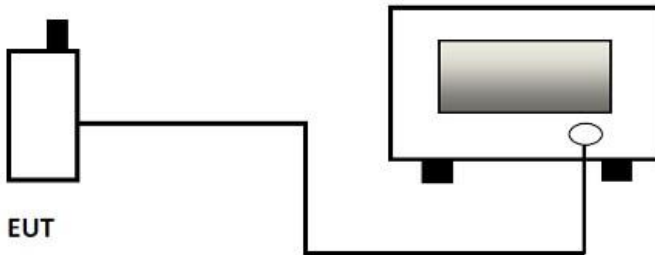


Test result TX02



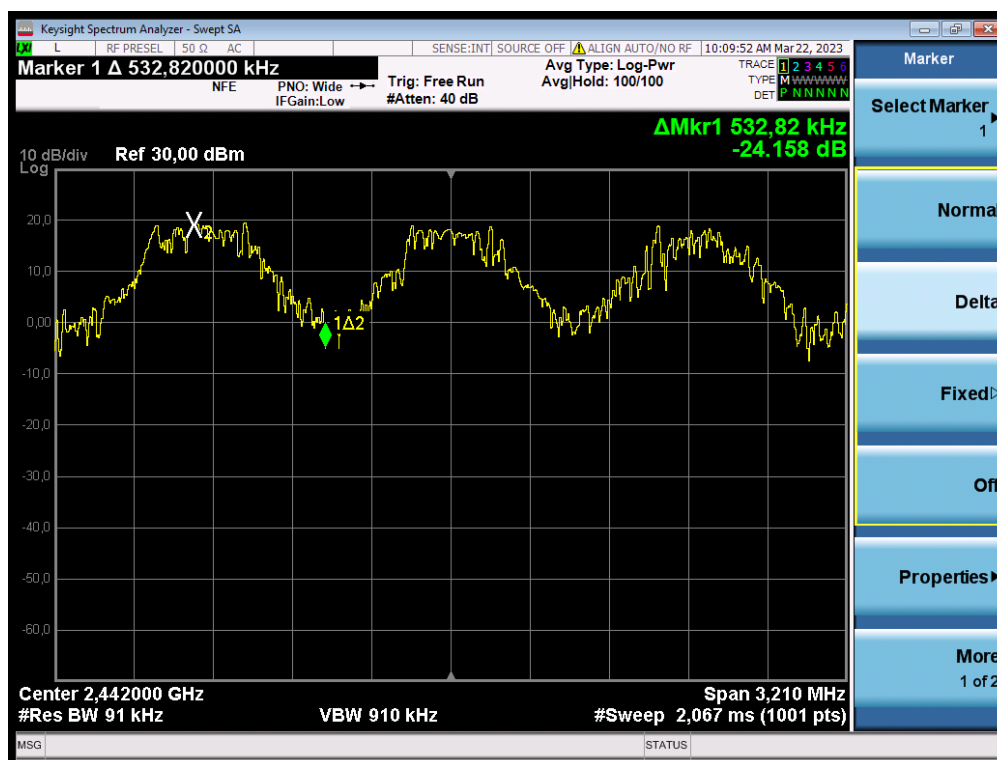
Test result TX03



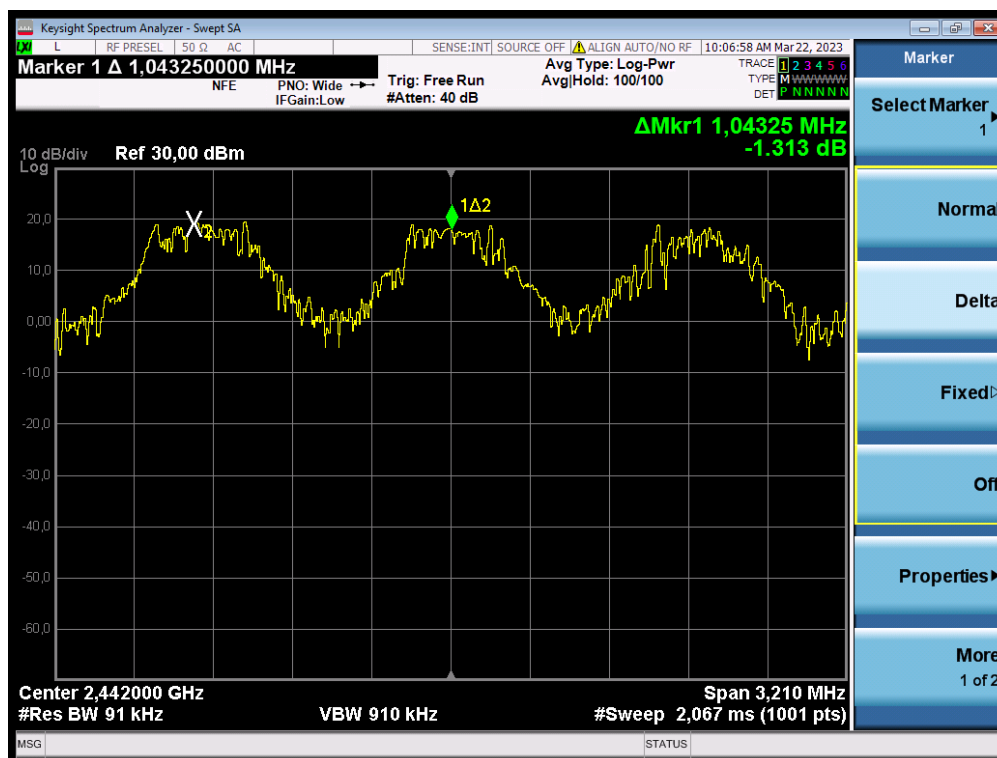
Test method:	FCC part 15 C - §15.247 (a)(1) Channel Separation For details see par. 4 of this report	
Operator	Marco Nicolè	
Test Date	2023-03-22	
Test Temperature	23 °C	
Test Humidity	41 %	
Test Pressure	1009 hPa	
Electrical wiring	Cable	Length [m]
	D.c. input cable	3.0
Operating conditions	TX07 See par. 5 of this report	
Auxiliary equipment (AE)	See par. 3.5 of this report	
Limits	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater	
Test set up	 The diagram illustrates the test setup. On the left, a rectangular box labeled 'EUT' (Equipment Under Test) is shown. A horizontal line connects the EUT to a larger rectangular box on the right labeled 'Spectrum analyzer'. The Spectrum analyzer box contains a smaller rectangle representing a screen and has two small circles at the bottom representing ports or feet. A cable is shown connecting the EUT to the Spectrum analyzer.	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	

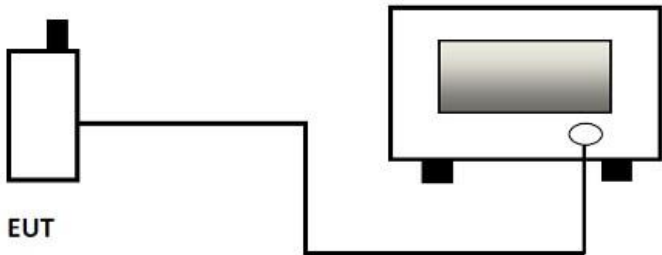
Test result	Operative condition	Channel separation value [dB]	LIMIT [dB]	RESULT
1	TX07	24.158	20	COMPLIES
Test result	Operative condition	Channel separation value [kHz]	LIMIT [kHz]	RESULT
3	TX07	1043	25	COMPLIES
Test Procedure	The EUT have its hopping function enabled. Use the following spectrum analyser settings: Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth (RBW) $\geq$ 1% of the span Video (or Average) Bandwidth (VBW) $\geq$ RBW Sweep = auto Detector function = peak Trace = max hold Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.			
EUT modification during this test	None			

Test result 1



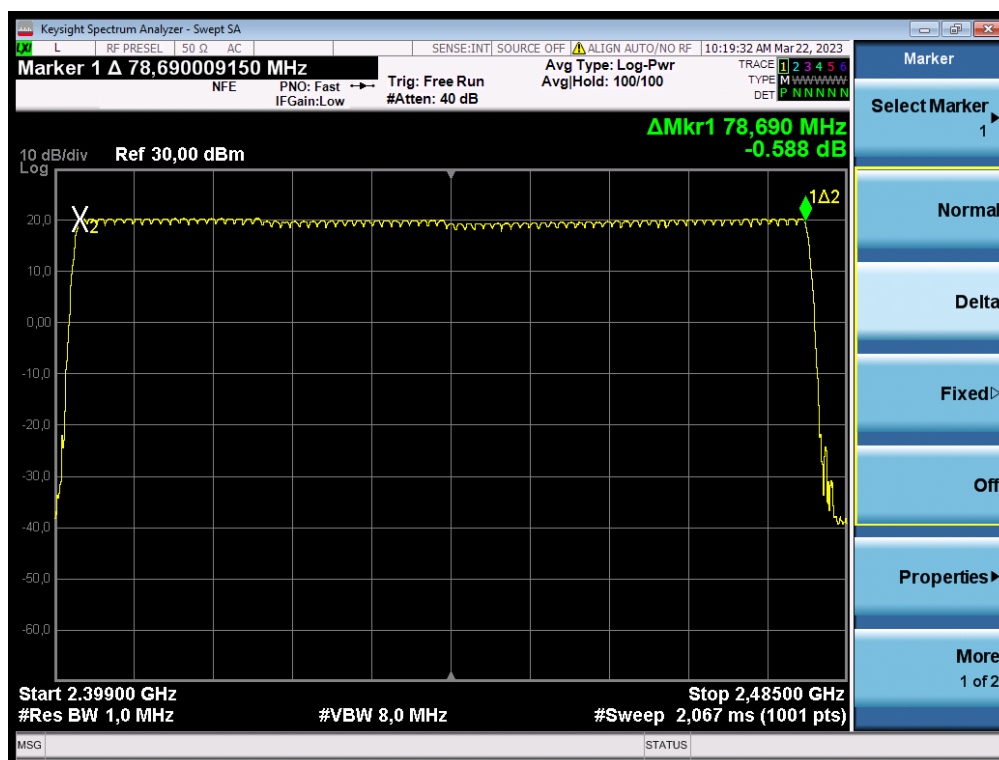
Test result 3

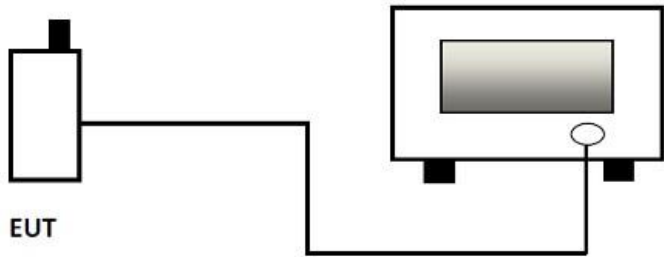


Test method:	FCC part 15 C - §15.247 (a)(1)(iii) Minimum Hopping Channels For details see par. 4 of this report	
Operator	Marco Nicolè	
Test Date	2023-03-22	
Test Temperature	23 °C	
Test Humidity	41 %	
Test Pressure	1009 hPa	
Electrical wiring	Cable	Length [m]
	D.c. input cable	3.0
Operating conditions	TX07 See par. 5 of this report	
Auxiliary equipment (AE)	See par. 3.5 of this report	
Limits	Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels	
Test set up	 The diagram illustrates the test setup. On the left, a rectangular box labeled 'EUT' (Equipment Under Test) is shown. A horizontal line connects the EUT to a larger rectangular box on the right labeled 'Spectrum analyzer'. The Spectrum analyzer box contains a smaller rectangle representing a screen and has a small circle at the bottom right, connected to the EUT by a line. The entire setup is labeled 'Test set up' on the left.	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	

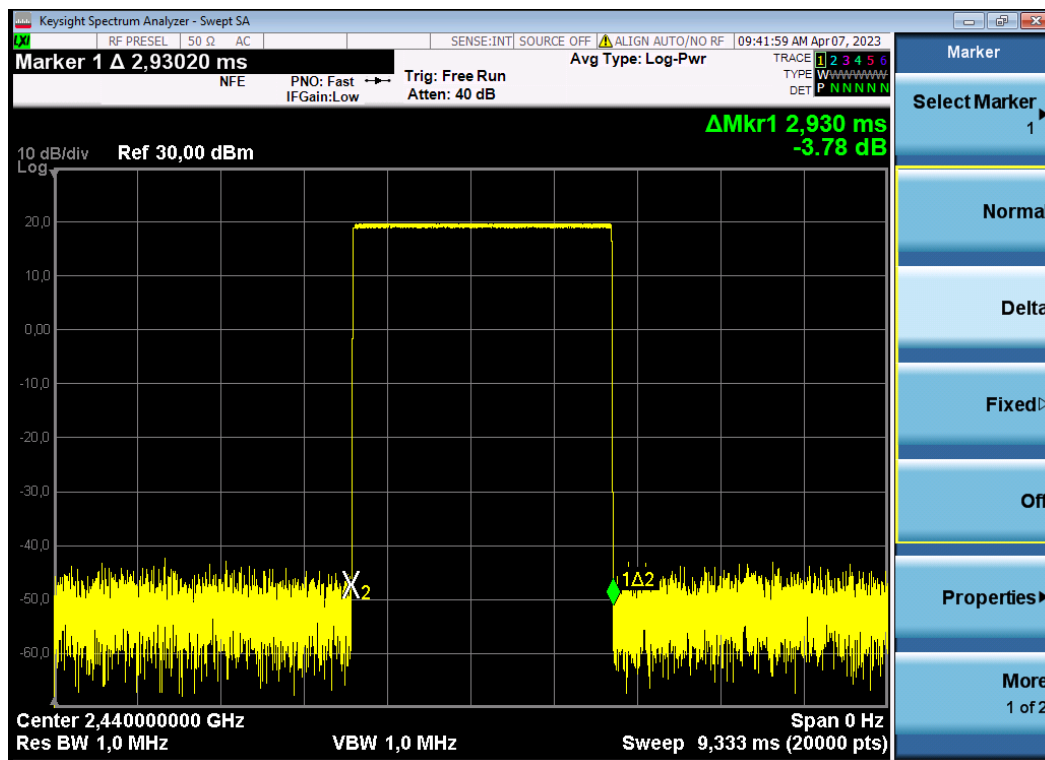
Test result	Operative condition	Hopping Channel	Minimum hopping channels	RESULT
1	TX07	79	15	COMPLIES
Test Procedure	The EUT have its hopping function enabled. Use the following spectrum analyser settings: Span = the frequency band of operation RBW $\geq$ 1% of the span VBW $\geq$ RBW Sweep = auto Detector function = peak Trace = max hold Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies.			
EUT modification during this test	None			

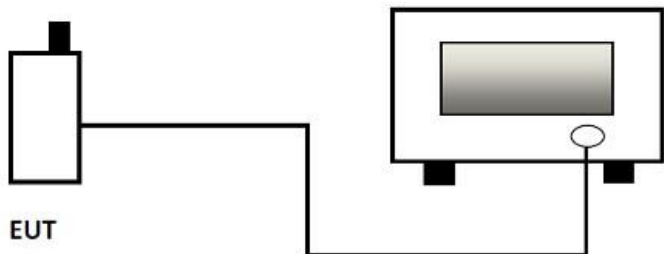
Test result 1



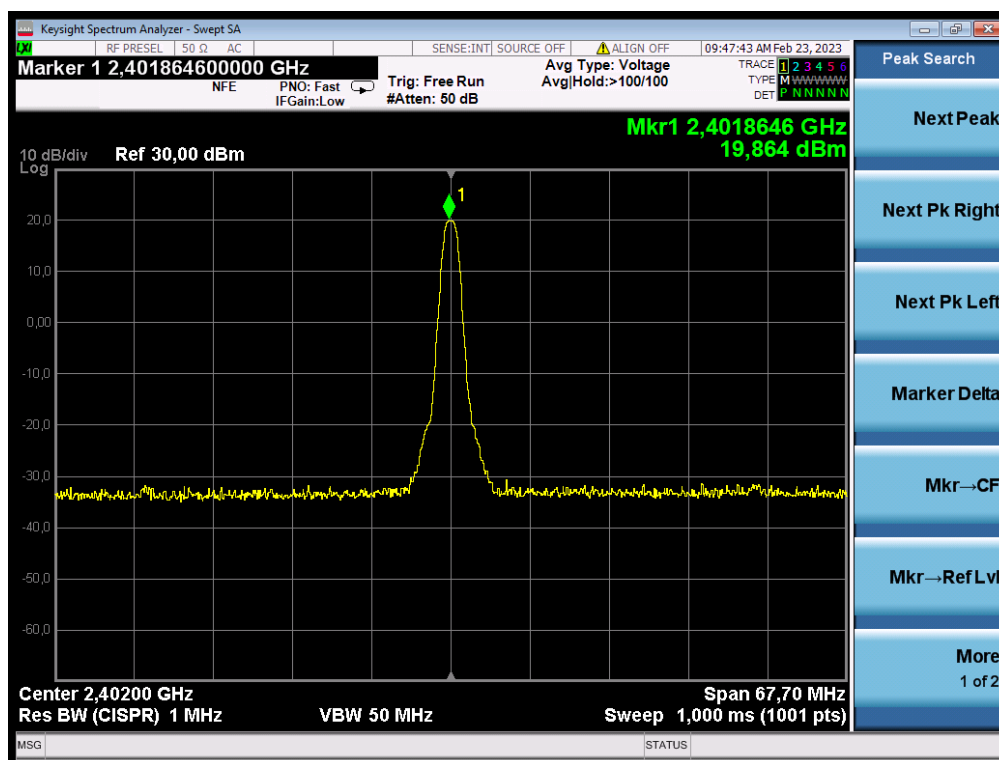
Test method:	FCC part 15 C - §15.247 (a)(1)(iii) Dwell Time For details see par. 4 of this report					
Operator	Marco Nicolè					
Test Date	2023-04-07					
Test Temperature	21 °C					
Test Humidity	31 %					
Test Pressure	1009 hPa					
Electrical wiring	Cable D.c. input cable					Length [m] 3.0
Operating conditions	OC07 See par. 5 of this report					
Auxiliary equipment (AE)	See par. 3.5 of this report					
Limits	The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed					
Test set up						
Test instrumentations	See Annex B					
Measurement Uncertainty (k=2)	See Annex F					
Packet Type	Size	N	Measured time duration of transmission [ms]	Calculation formula	Final value	RESULT
DH5	339	6	2.93	$(1600 / 6) * 2.93 < 1$	$0.781 < 1$	COMPLIES
Test Procedure	The EUT must have its hopping function enabled. Use the following spectrum analyser settings: Span = zero span, centred on a hopping channel RBW ≤ Channel Separation Sweep = as necessary to capture the entire dwell time per hopping channel Detector function = peak Trace = max hold If possible, use the marker-delta function to determine the dwell time.					
EUT modification during this test	None					

Spectral Plot

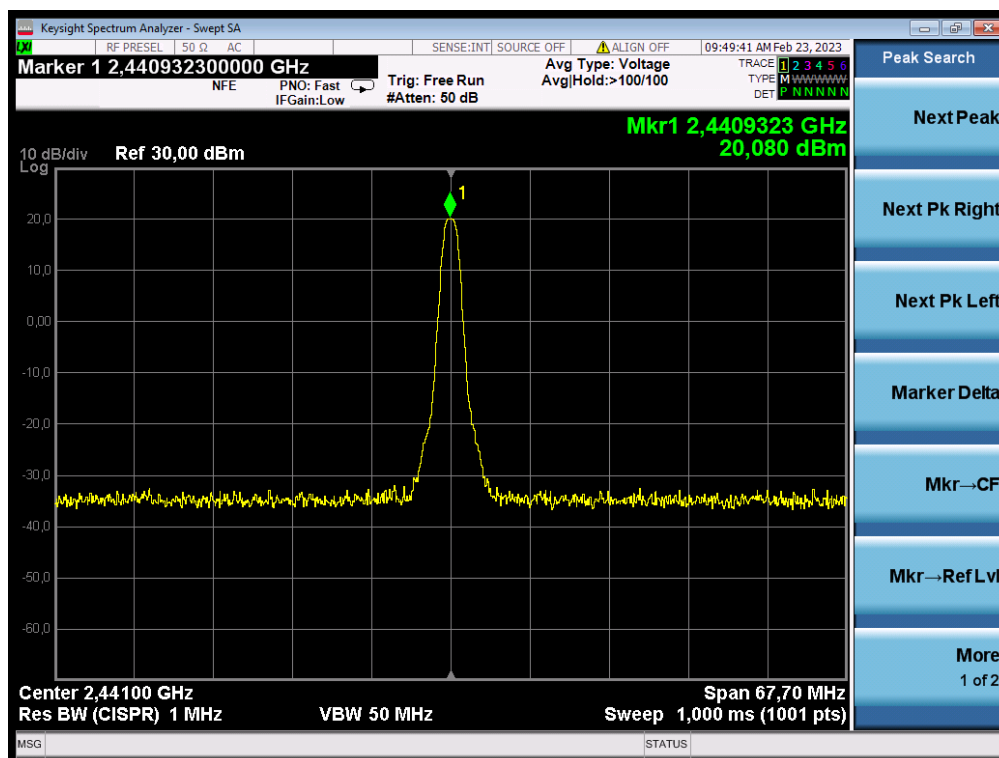


Test method:	FCC part 15 C - §15.247 (b)(3) Peak Output Power For details see par. 4 of this report				
Operator	Marco Nicolè				
Test Date	2023-02-23				
Test Temperature	21 °C				
Test Humidity	30 %				
Test Pressure	1001 hPa				
Electrical wiring	Cable				Length [m]
	D.c. input cable				3.0
Operating conditions	TX01; TX02; TX03 See par. 5 of this report				
Auxiliary equipment (AE)	See par. 3.5 of this report				
Limits	For systems using digital modulation in the 2400–2483.5 MHz bands: - 1 Watt (for device with channels > 75) - 0.125 Watt (for device with channels < 75)				
Test set up	 The diagram shows a rectangular box labeled 'EUT' on the left, connected by a horizontal line to a larger rectangular box labeled 'Spectrum analyzer' on the right. A cable is shown connecting the two boxes.				
Test instrumentations	See Annex B				
Measurement Uncertainty (k=2)	See Annex F				
BLUETOOTH CLASSIC					
OPERATING CONDITION	FREQUENCY [MHz]	Peak Power [dBm]	LIMIT [dBm]	LIMIT [W]	RESULT
TX01	2401	+19.864	+30	1	COMPLIES
TX02	2440	+20.080	+30	1	COMPLIES
TX03	2479	+19.759	+30	1	COMPLIES
Test Procedure	The measurement will be conducted at three channels: Bluetooth: Low, middle and High, Set the spectrum analyzer as RBW = 1MHz, VBW =50MHz, Span = >10MHz, Sweep=auto Detector = Peak, Trace mode = max hold				
EUT modification during this test	None				

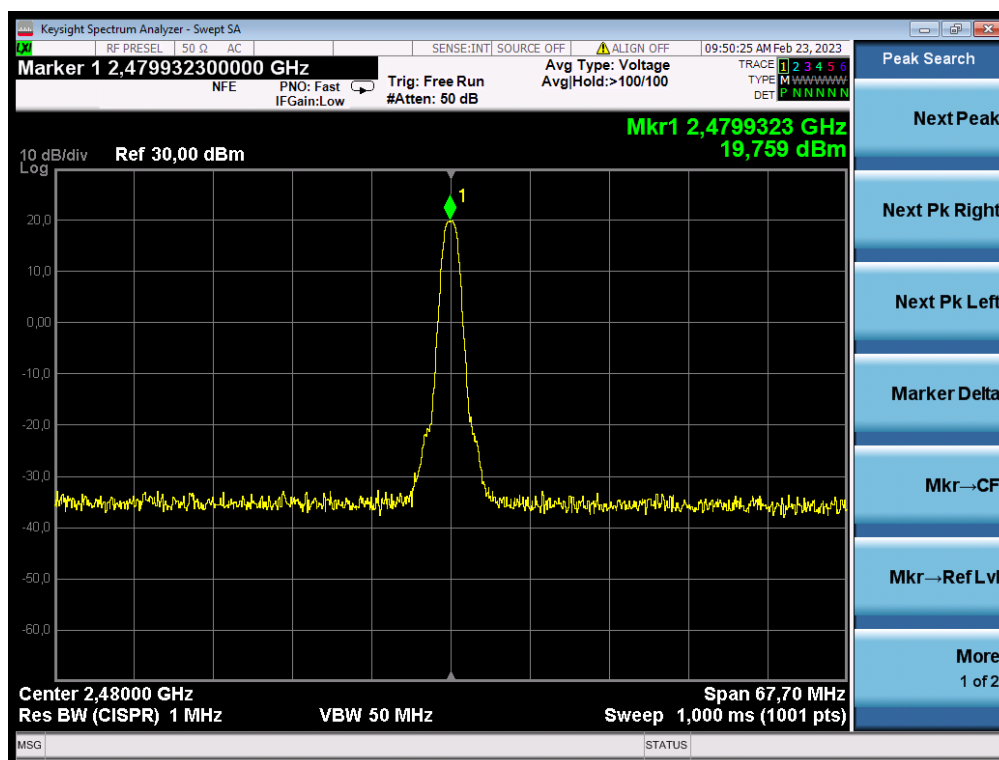
Test result TX01

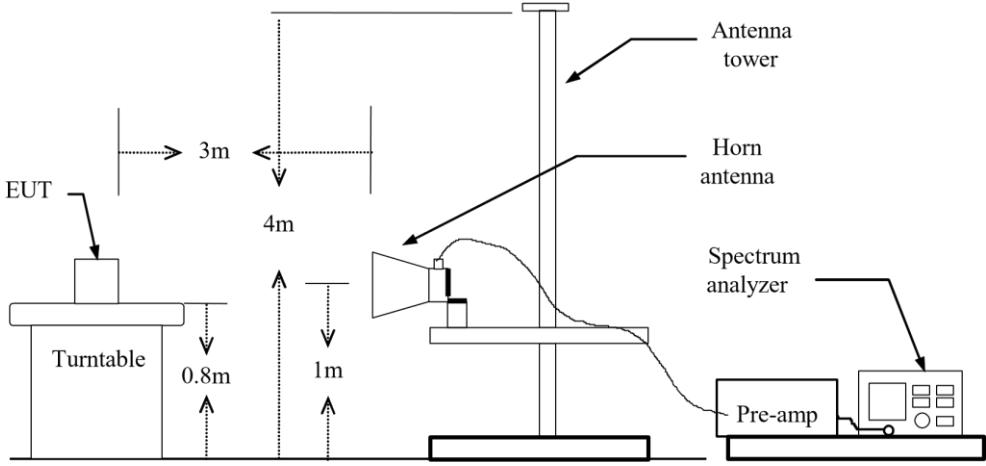


Test result TX02

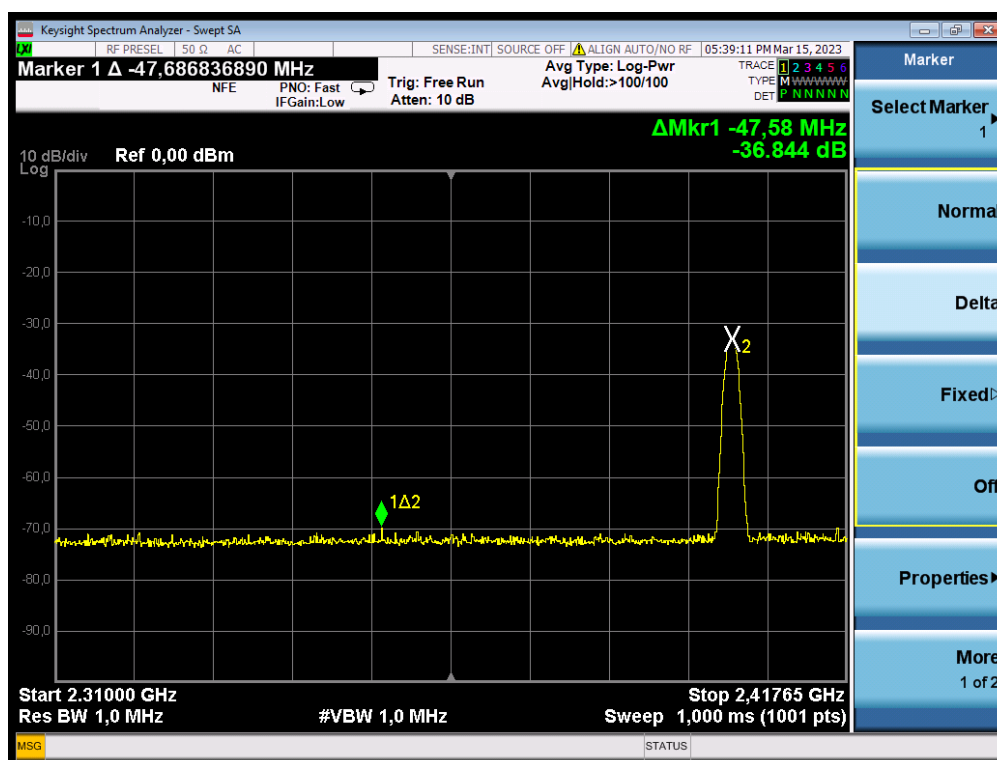


Test result TX03

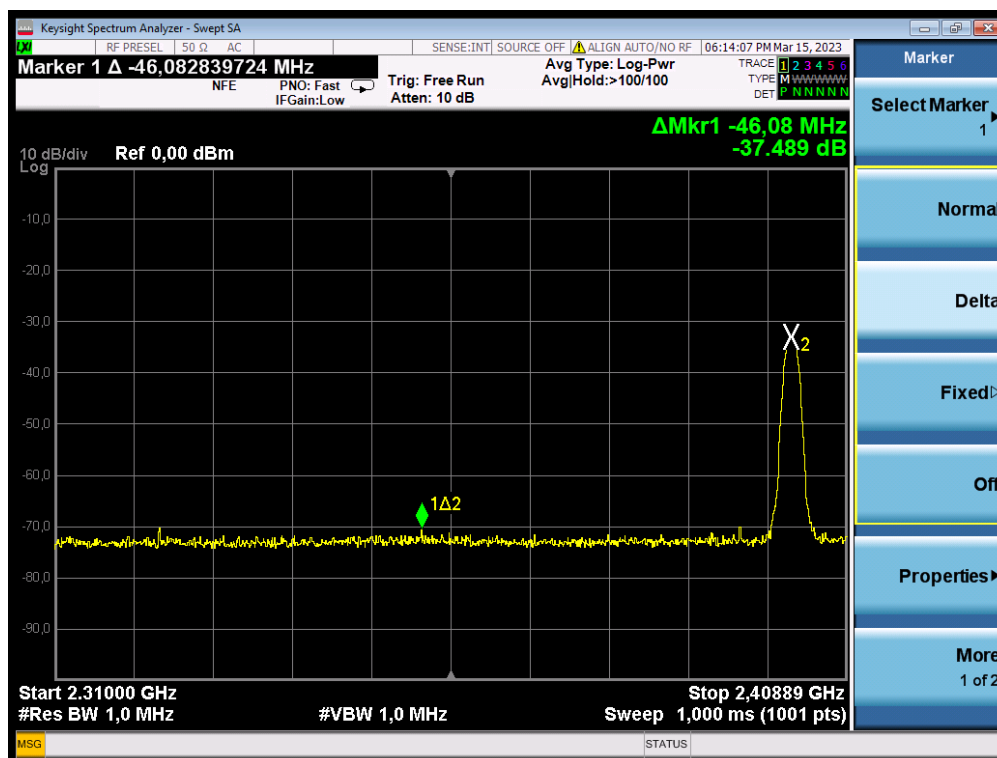


Test method:	FCC part 15 C - §15.247 (d) Band Edge measurement For details see par. 4 of this report	
Operator	Marco Nicolè	
Test Date	2023-03-22	
Test Temperature	22 °C	
Test Humidity	35 %	
Test Pressure	1007 hPa	
Electrical wiring	Cable	Length [m]
	a.c. input cable	3.0
Operating conditions	TX01; TX03	
Auxiliary equipment (AE)	See par. 5 of this report	
	See par. 3.5 of this report	
Limits	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).	
Test set up		
Measuring distance in the anechoic chamber	3 m	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	
Result	COMPLIES	
Test Procedure	The EUT is placed on a turntable, which is 1.5 m above the ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission. Set the spectrum analyser in the following setting in order to capture the lower and upper band-edges of the emission: RBW=VBW=1MHz / Sweep=AUTO Repeat the procedures in the other POLARIZATION.	
Note	The worst condition between X, Y and Z axis was checked	
EUT modification during this test	None	

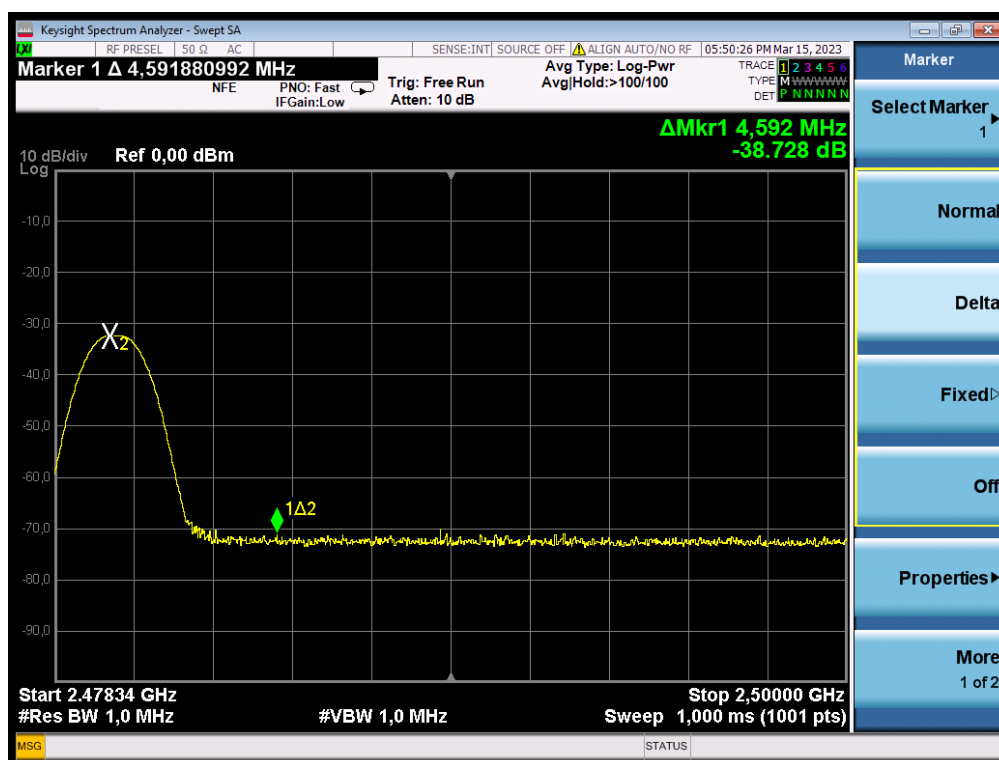
Test result TX01 – BAND EDGE LEFT SIDE
Vertical polarization



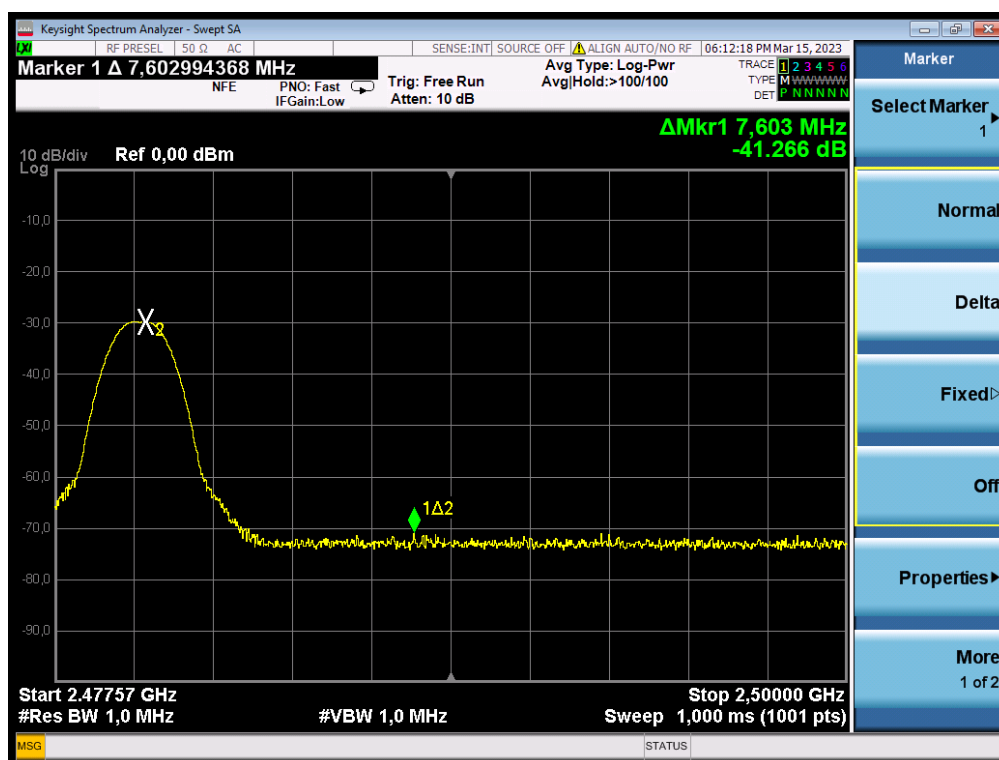
Test result TX01 – BAND EDGE LEFT SIDE
Horizontal polarization



**Test result TX03 – BAND EDGE RIGHT SIDE
Vertical polarization**



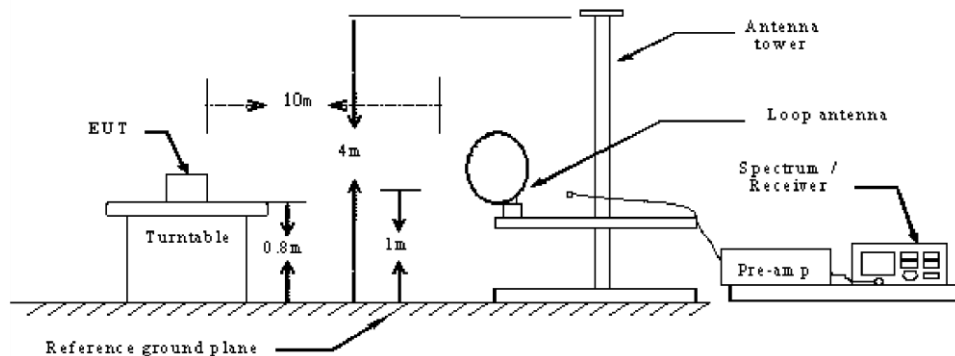
**Test result TX03 – BAND EDGE RIGHT SIDE
Horizontal polarization**



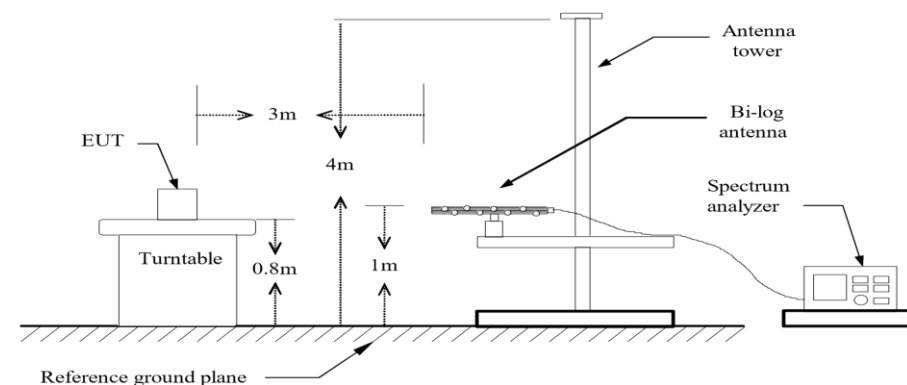
Test method:	FCC part 15 C - § 15.209 Spurious Emission (Radiation) For details see par. 4 of this report			
Operator	Marco Nicolè			
Test Date	2023-02-23			
Test Temperature	23 °C			
Test Humidity	35 %			
Test Pressure	1009 hPa			
EUT Classification	None.			
Electrical wiring	Cable			Length [m]
	d.c. input cable			1.5
Operating conditions	TX01; TX02; TX03 See par. 5 of this report			
Auxiliary equipment (AE)	See par. 3.5 of this report			
Limits	Frequency (MHz)	Limits (dBuV/m)	Detector	Measured distance (m)
	30~88	40	PK	3
	88~216	43.5	PK	
	216-960	46	PK	
	Above 960	54	PK	
	Frequency (GHz)	Limits (dBuV/m)	Detector	Measured distance (m)
	1 - 40	54	AVG	3
	1-40	74	PK	3

Test set up

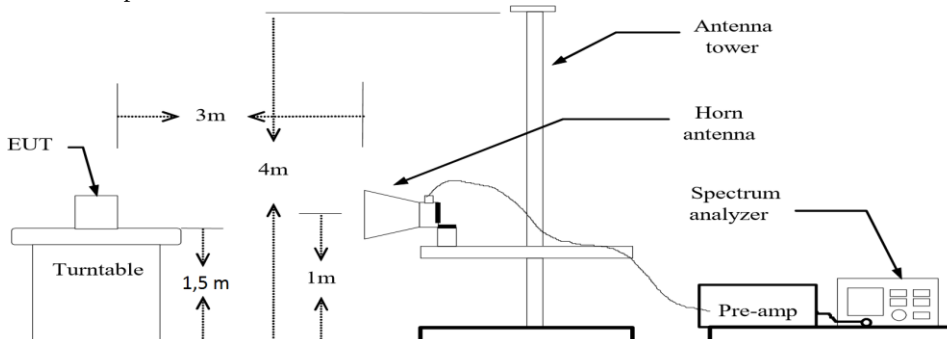
Radiated Spurious Measurement: below 30MHz



Radiated Spurious Measurement: below 1GHz



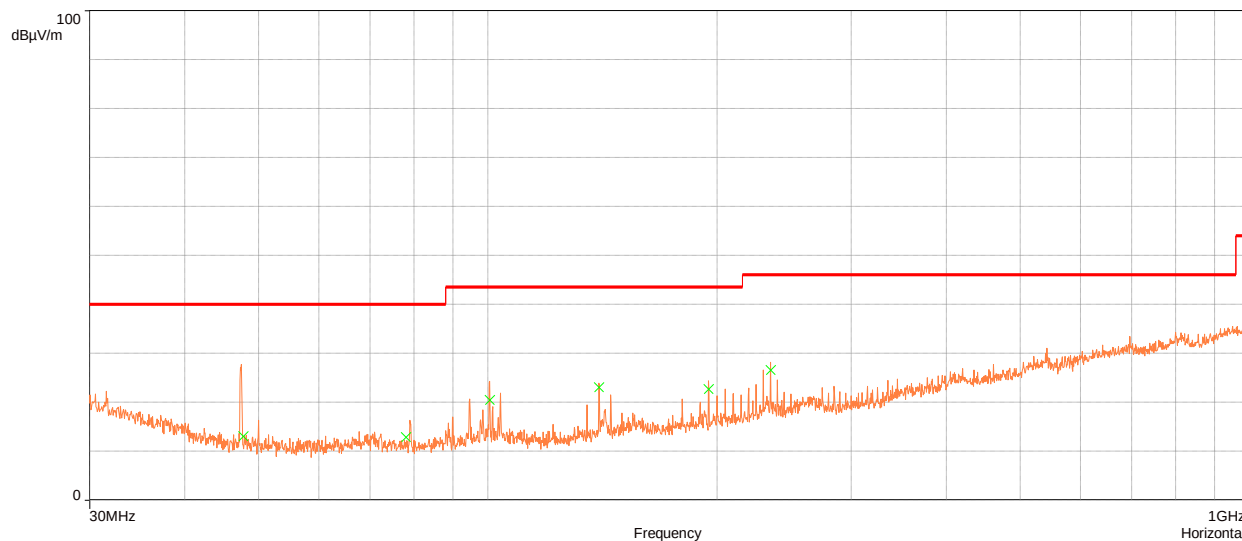
Radiated Spurious Measurement: above 1GHz



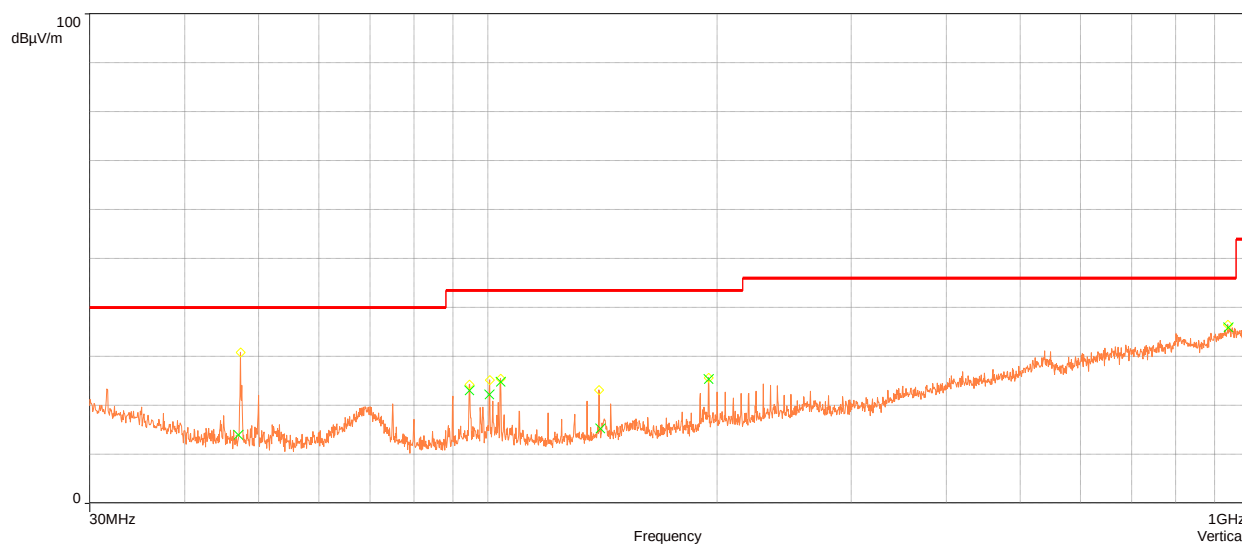
Frequency range	from 30 MHz up through the 10th harmonic
Measuring distance in the anechoic chamber	3 m
Test instrumentations	See Annex B
Measurement Uncertainty (k=2)	See Annex F

Test Procedure	Radiated Emission (30 MHz – 1000 MHz) : The preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT. The EUT configuration (in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements. The measurement is carried out using a spectrum analyser or receiver. The Quasi-peak detector is used and RBW is set to 120kHz .The antenna height and turn table rotation is adjusted until the maximum power value is founded on spectrum analyser or receiver. Radiated Emission (Above 1 GHz) : The preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT. The EUT configuration (in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements. The measurement is carried out using a spectrum analyser or receiver. The spectrum analyser scans from 1GHz to 25GHz (higher than the 10th harmonic of the carrier). The peak detector is used for Peak limit and RBW is set to 1MHz ,VBW $\geq$ 3RBW. The peak detector is used for Average limit and RBW is set to 1MHz ,VBW is not smaller than 1/T, T = to the shortest pulse width. The antenna height and turn table rotation is adjusted until the maximum power value is founded on spectrum analyser or receiver.
Note	The worst condition between X, Y and Z axis was checked
EUT modification during this test	None

BLUETOOTH CLASSIC
Horizontal polarization
TX01
Range 30 MHz – 1 GHz

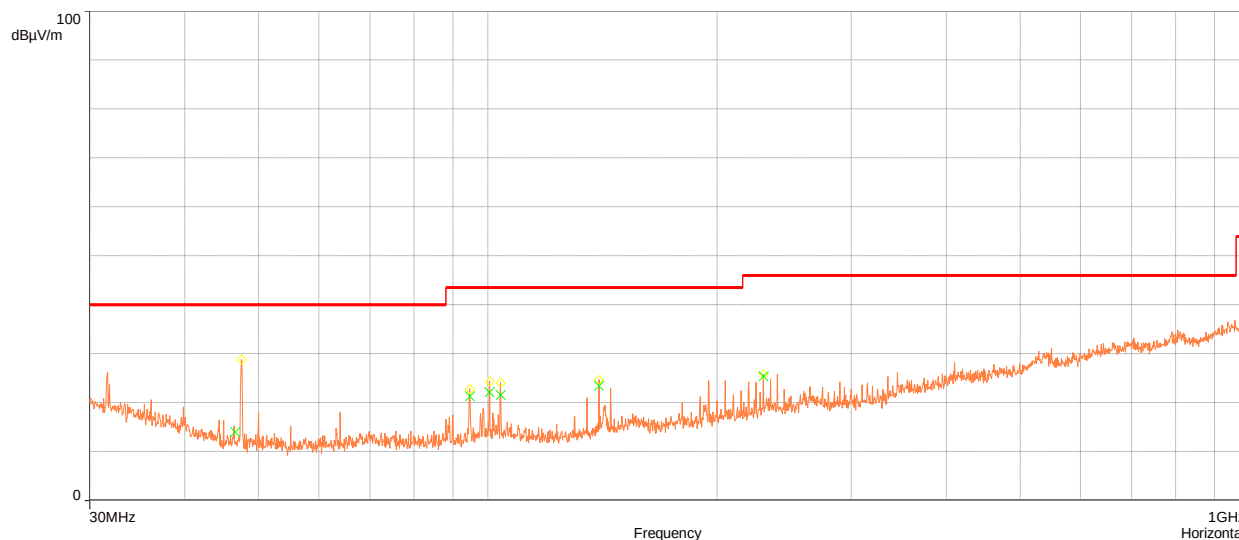


BLUETOOTH CLASSIC
Vertical polarization
TX01
Range 30 MHz – 1 GHz

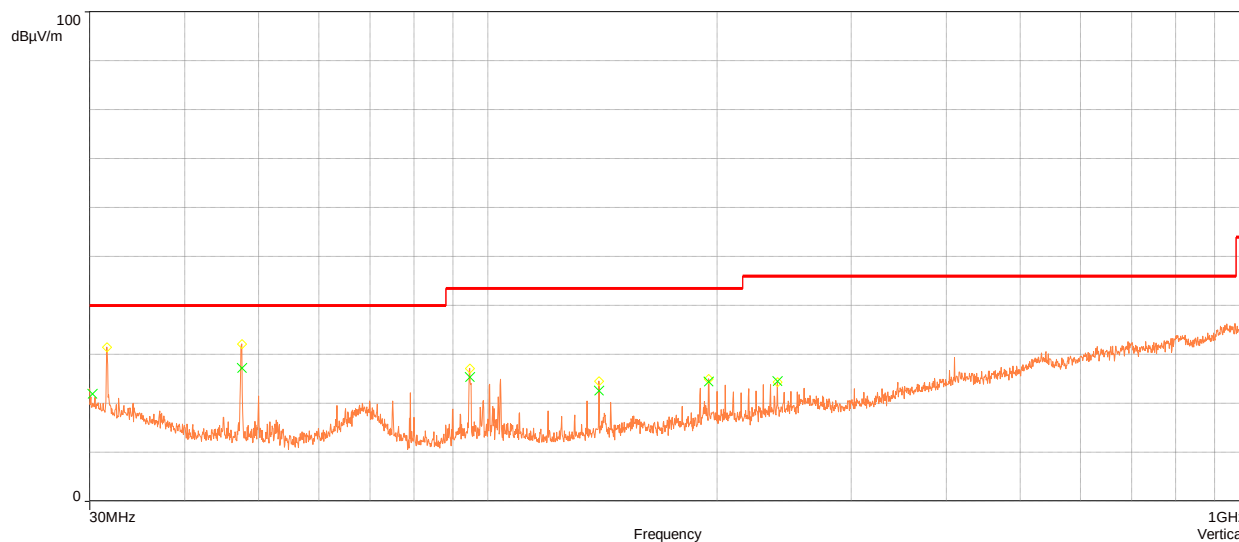


Frequency (MHz)	SR	Peak (dBμV/m)	QPeak (dBμV/m)	LimQPeak (dBμV/m)	Delta (dB)	Polarization	Height (m)	Angle (deg)
47.755	1	27.70	13.09	40.00	-26.91	Horizontal	2.67	29.90
78.0155	1	16.26	12.87	40.00	-27.13	Horizontal	1.13	150.30
100.535	1	23.99	20.44	43.52	-23.08	Horizontal	3.18	0.10
139.975	1	23.91	23.09	43.52	-20.43	Horizontal	2.05	300.00
194.9955	1	24.31	22.71	43.52	-20.81	Horizontal	1.43	210.10
235.015	1	28.18	26.57	46.00	-19.43	Horizontal	1.37	300.00
47.035	2	30.89	14.01	40.00	-25.99	Vertical	1.01	300.20
94.5555	2	24.24	23.05	43.52	-20.47	Vertical	3.96	240.40
100.455	2	25.22	22.23	43.52	-21.29	Vertical	1.98	330.30
103.915	2	25.46	24.81	43.52	-18.71	Vertical	2.06	359.80
140.4755	2	23.19	15.31	43.52	-28.21	Vertical	1.02	240.40
194.9955	2	25.69	25.42	43.52	-18.10	Vertical	1.00	29.90
937.1755	2	36.51	35.97	46.00	-10.03	Vertical	2.49	180.20

BLUETOOTH CLASSIC
Horizontal polarization
TX02
Range 30 MHz – 1 GHz

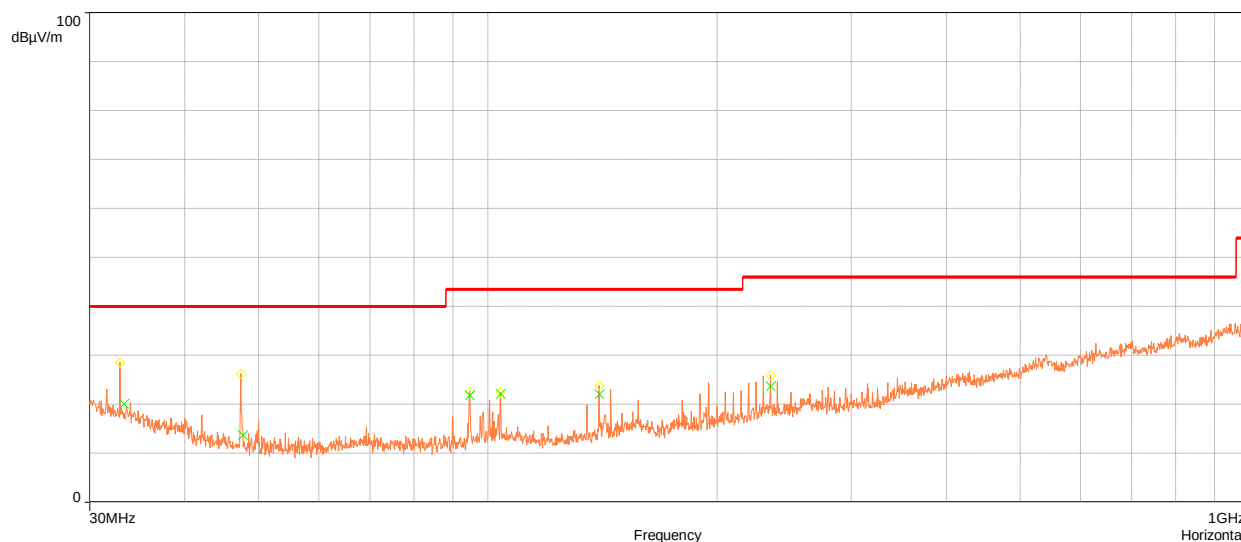


BLUETOOTH CLASSIC
Vertical polarization
TX02
Range 30 MHz – 1 GHz

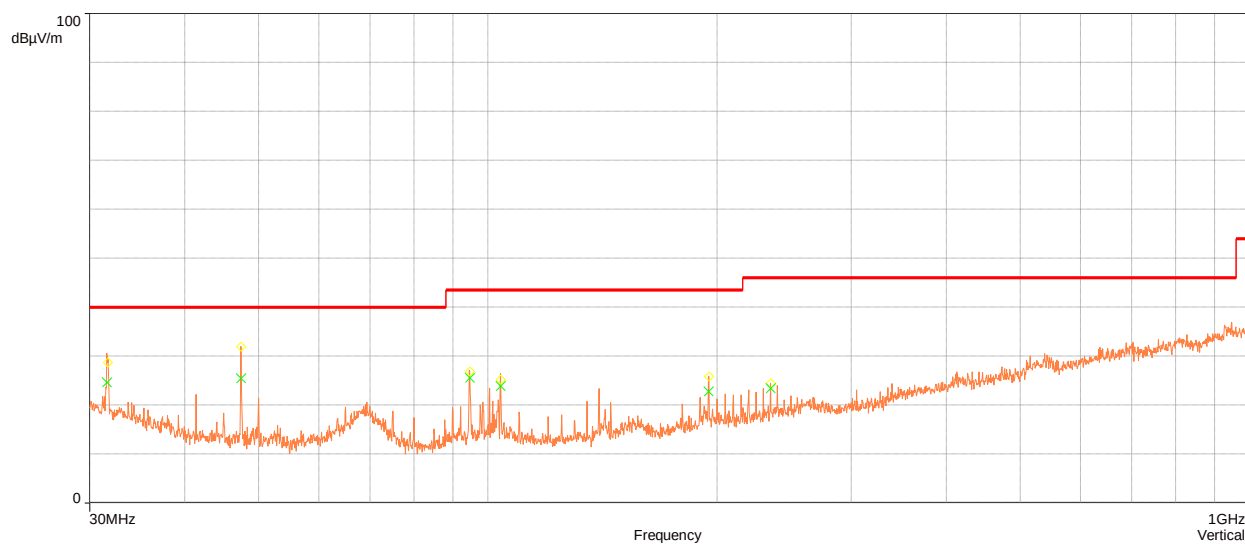


Frequency (MHz)	SR	Peak (dB μ V/m)	QPeak (dB μ V/m)	LimQPeak (dB μ V/m)	Delta (dB)	Polarization	Height (m)	Angle (deg)
46.5555	1	28.79	13.98	40.00	-26.02	Horizontal	3.79	120.30
94.6155	1	22.82	21.34	43.52	-22.18	Horizontal	3.10	240.10
100.4555	1	24.39	22.14	43.52	-21.38	Horizontal	3.27	210.10
103.9555	1	24.06	21.55	43.52	-21.97	Horizontal	2.70	210.10
139.9755	1	24.63	23.42	43.52	-20.10	Horizontal	1.81	300.20
229.975	1	25.83	25.35	46.00	-20.65	Horizontal	1.15	300.20
30.215	2	31.46	21.97	40.00	-18.03	Vertical	1.00	180.20
47.515	2	32.09	27.21	40.00	-12.79	Vertical	1.15	300.30
94.6155	2	27.11	25.39	43.52	-18.13	Vertical	1.16	270.40
139.975	2	24.54	22.59	43.52	-20.93	Vertical	1.00	270.40
194.9955	2	24.97	24.49	43.52	-19.03	Vertical	1.00	210.10
239.995	2	24.36	24.55	46.00	-21.45	Vertical	1.00	300.30

BLUETOOTH CLASSIC
Horizontal polarization
TX03
Range 30 MHz – 1 GHz

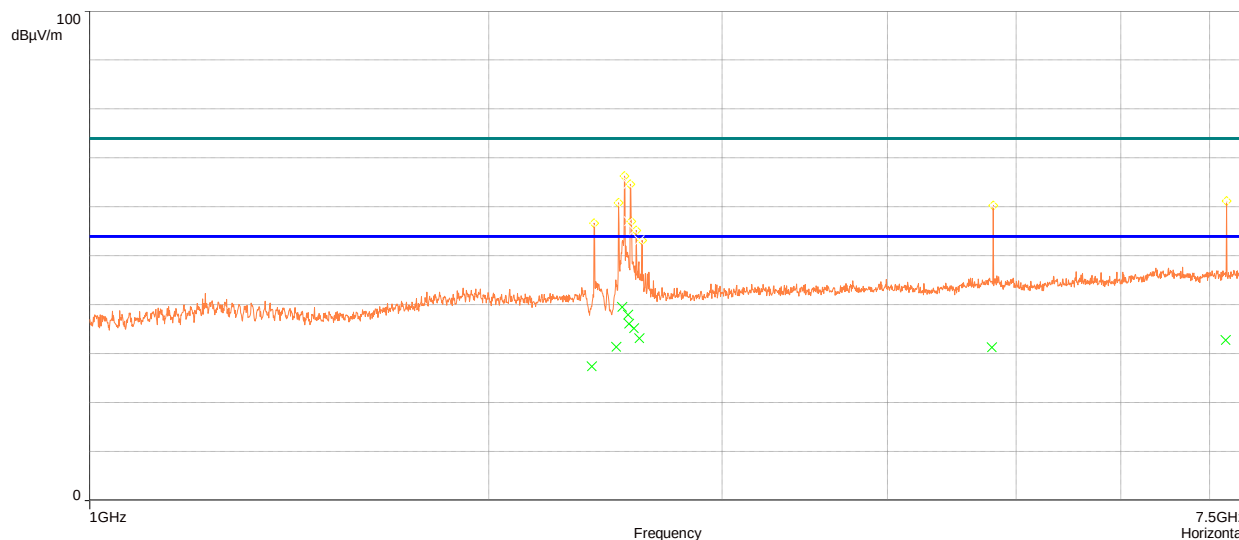


BLUETOOTH CLASSIC
Vertical polarization
TX03
Range 30 MHz – 1 GHz

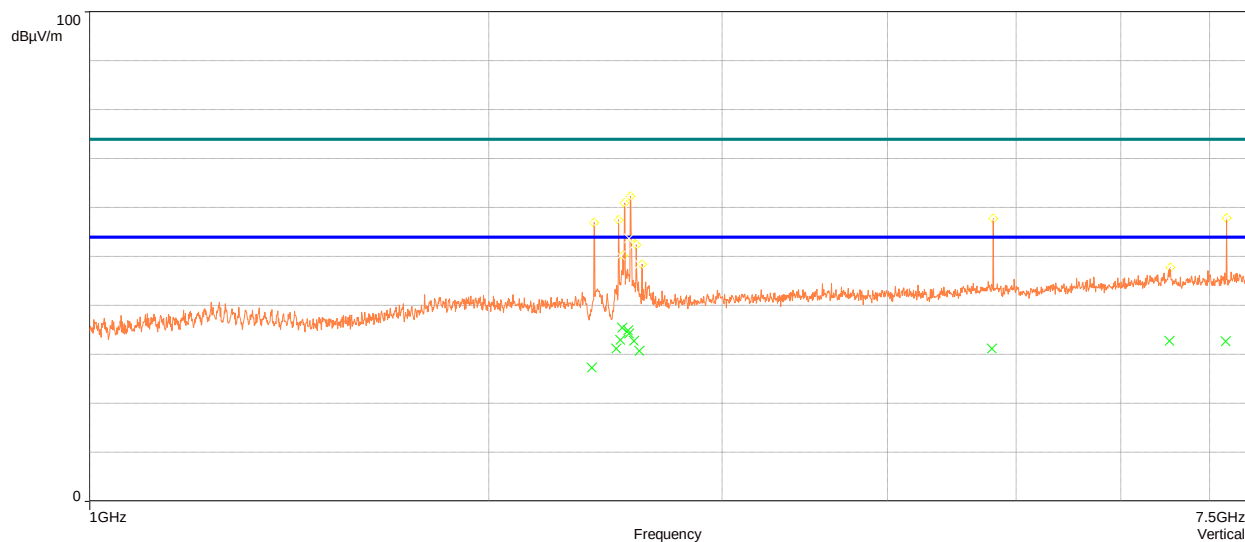


Frequency (MHz)	SR	Peak (dBμV/m)	QPeak (dBμV/m)	LimQPeak (dBμV/m)	Delta (dB)	Polarization	Height (m)	Angle (deg)
33.2755	1	28.55	20.09	40.00	-19.91	Horizontal	1.74	269.90
47.6955	1	26.19	13.68	40.00	-26.32	Horizontal	2.91	180.20
94.615	1	22.69	21.85	43.52	-21.67	Horizontal	3.40	359.90
103.9155	1	22.37	22.18	43.52	-21.34	Horizontal	2.69	29.90
140.035	1	23.80	22.02	43.52	-21.50	Horizontal	2.23	300.40
235.055	1	25.96	23.69	46.00	-22.31	Horizontal	1.38	300.40
31.6	2	28.71	24.60	40.00	-15.40	Vertical	1.16	89.90
47.3955	2	31.91	25.43	40.00	-14.57	Vertical	1.40	359.80
94.615	2	26.85	25.52	43.52	-18.00	Vertical	1.00	29.90
103.9755	2	25.21	23.86	43.52	-19.66	Vertical	2.03	270.40
194.9555	2	25.88	22.81	43.52	-20.71	Vertical	1.00	89.90
235.0155	2	24.49	23.43	46.00	-22.57	Vertical	1.00	60.20

BLUETOOTH CLASSIC
Horizontal polarization
TX01
Range 1 GHz – 7.5 GHz

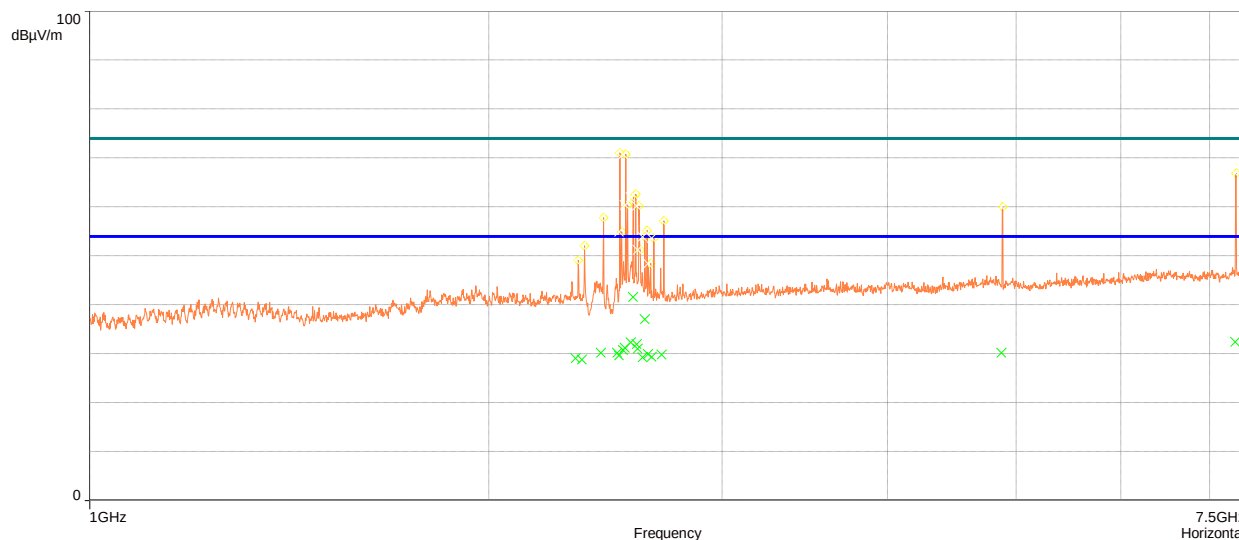


BLUETOOTH CLASSIC
Vertical polarization
TX01
Range 1 GHz – 7.5 GHz

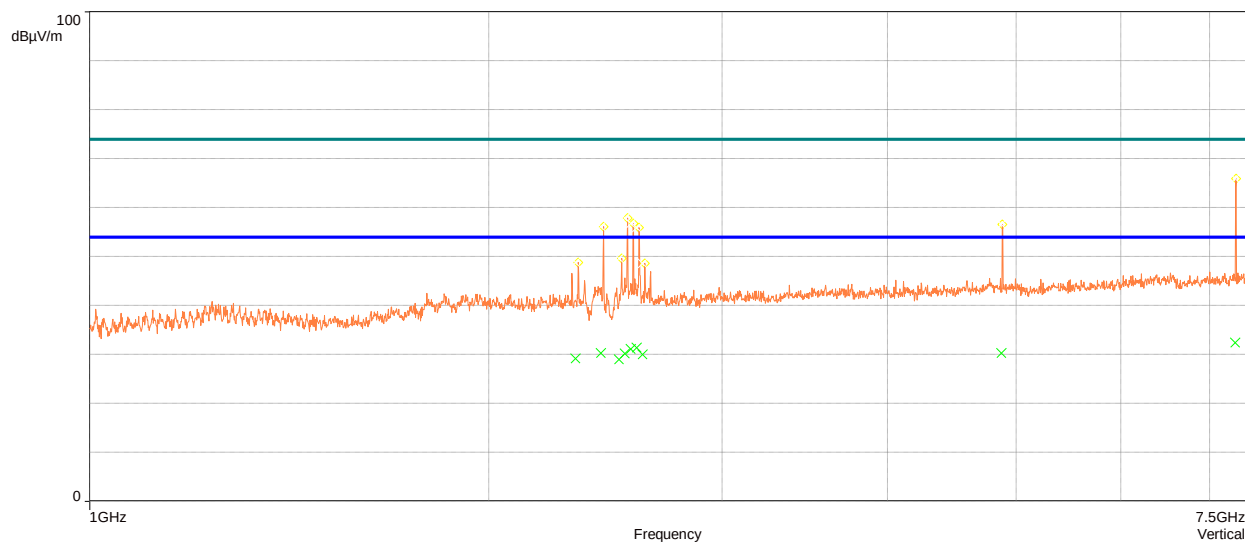


Frequency (MHz)	SR	Peak (dBμV/m)	LimPeak (dBμV/m)	Delta (dB)	CISPR AVG (dBμV/m)	Lim AVG (dBμV/m)	Delta AVG (dB)	Angle (deg)
2391	1	56.66	74.00	46.59	27.41	54.00	26.59	330.30
2495	1	60.85	74.00	42.61	31.39	54.00	22.61	330.30
2521	1	66.27	74.00	34.46	39.54	54.00	14.46	330.30
2547	1	64.62	74.00	36.01	37.99	54.00	16.01	330.30
2551	1	57.09	74.00	37.84	36.16	54.00	17.84	330.30
2573	1	55.21	74.00	38.78	35.22	54.00	18.78	330.30
2599	1	53.17	74.00	40.83	33.17	54.00	20.83	330.30
4793	1	60.32	74.00	42.73	31.27	54.00	22.73	300.20
7195.5	1	61.17	74.00	41.25	32.75	54.00	21.25	240.10
2391	2	56.98	74.00	46.63	27.36	54.00	26.64	210.10
2495	2	57.55	74.00	42.83	31.17	54.00	22.83	240.10
2514	2	50.15	74.00	41.00	32.98	54.00	21.02	180.40
2521	2	60.95	74.00	38.56	35.44	54.00	18.56	90.10
2547	2	62.36	74.00	39.08	34.92	54.00	19.08	240.10
2550.5	2	53.69	74.00	39.77	34.23	54.00	19.77	240.10
2573.5	2	52.43	74.00	41.19	32.81	54.00	21.19	210.10
2599	2	48.46	74.00	43.21	30.79	54.00	23.21	240.10
4792.5	2	57.83	74.00	42.77	31.23	54.00	22.77	120.40
6525.5	2	47.80	74.00	41.17	32.83	54.00	21.17	150.30
7195	2	57.89	74.00	41.35	32.65	54.00	21.35	359.80

BLUETOOTH CLASSIC
Horizontal polarization
TX02
Range 1 GHz – 7.5 GHz

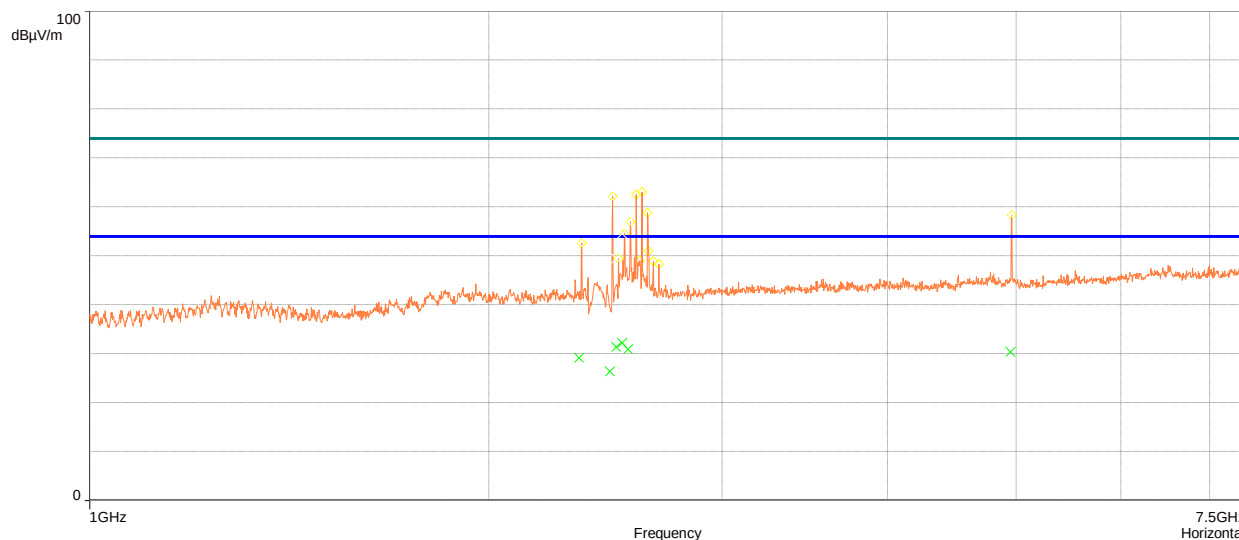


BLUETOOTH CLASSIC
Vertical polarization
TX02
Range 1 GHz – 7.5 GHz

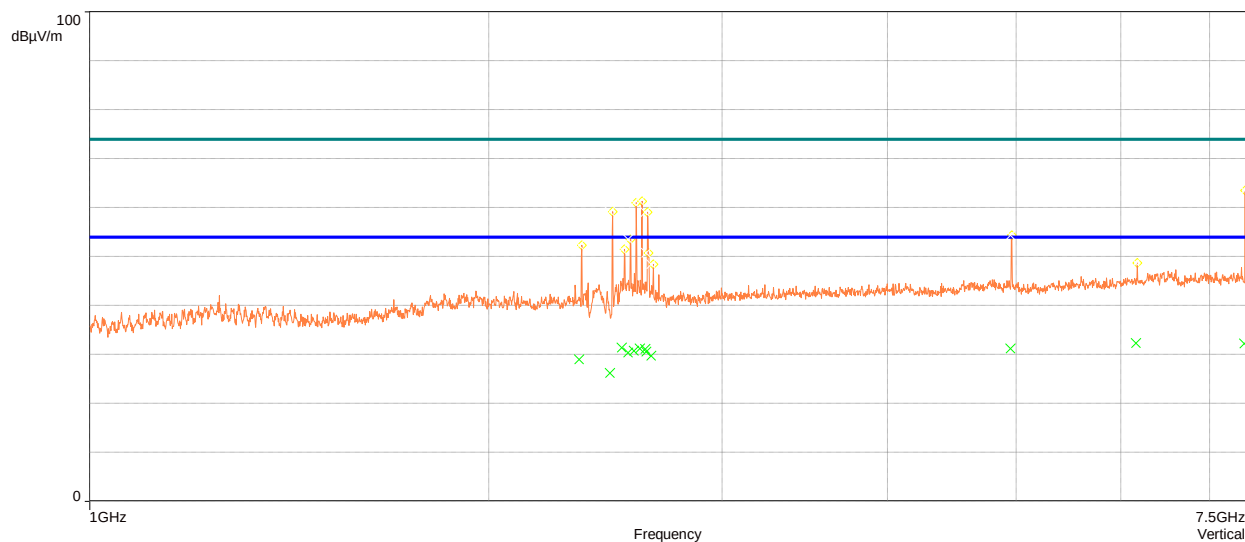


Frequency (MHz)	SR	Peak (dBμV/m)	LimPeak (dBμV/m)	Delta (dB)	CISPR AVG (dBμV/m)	Lim AVG (dBμV/m)	Delta AVG (dB)	Angle (deg)
2326	1	49.10	74.00	44.93	29.07	54.00	24.93	300.40
2351.5	1	52.07	74.00	45.16	28.84	54.00	25.16	359.80
2430	1	57.82	74.00	43.83	30.17	54.00	23.83	330.10
2500	1	71.07	74.00	43.84	30.16	54.00	23.84	330.10
2508	1	54.96	74.00	44.35	29.65	54.00	24.35	330.10
2526	1	70.79	74.00	43.25	30.75	54.00	23.25	180.20
2534	1	60.36	74.00	42.82	31.18	54.00	22.82	330.10
2560	1	61.99	74.00	41.69	32.31	54.00	21.69	330.10
2570.5	1	62.59	74.00	32.46	41.54	54.00	12.46	60.20
2585.5	1	60.19	74.00	42.08	31.92	54.00	22.08	330.10
2590.5	1	51.22	74.00	42.95	31.05	54.00	22.95	330.10
2612	1	53.90	74.00	44.76	29.24	54.00	24.76	210.20
2623	1	55.16	74.00	36.94	37.06	54.00	16.94	359.80
2638	1	48.45	74.00	44.08	29.92	54.00	24.08	330.10
2654	1	53.57	74.00	44.60	29.40	54.00	24.60	300.40
2700.5	1	57.12	74.00	44.14	29.86	54.00	24.14	60.20
4871.5	1	60.02	74.00	43.82	30.18	54.00	23.82	300.40
7312.5	1	66.86	74.00	41.62	32.38	54.00	21.62	240.20
2326	2	48.83	74.00	44.83	29.17	54.00	24.83	210.20
2430	2	56.11	74.00	43.72	30.28	54.00	23.72	90.20
2508.5	2	49.66	74.00	45.02	28.98	54.00	25.02	240.30
2534	2	57.84	74.00	43.78	30.22	54.00	23.78	240.30
2560	2	56.75	74.00	42.86	31.14	54.00	22.86	240.30
2586	2	55.97	74.00	42.57	31.43	54.00	22.57	210.20
2612	2	48.58	74.00	44.02	29.98	54.00	24.02	240.30
4871	2	56.60	74.00	43.70	30.30	54.00	23.70	120.30
7311.5	2	65.94	74.00	41.55	32.45	54.00	21.55	359.90

BLUETOOTH CLASSIC
Horizontal polarization
TX03
Range 1 GHz – 7.5 GHz

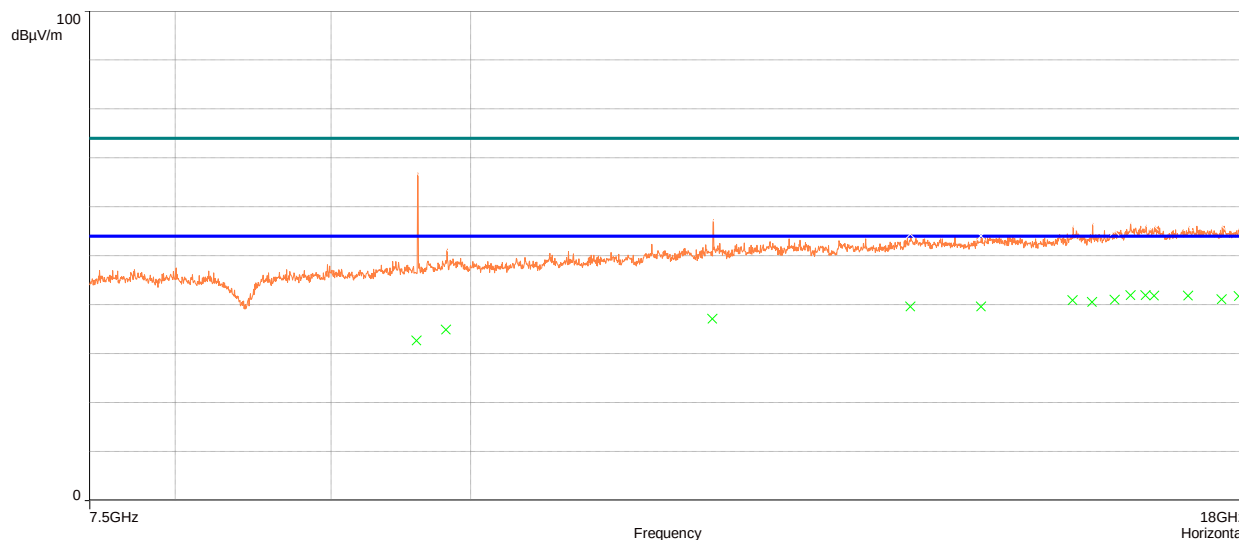


BLUETOOTH CLASSIC
Vertical polarization
TX03
Range 1 GHz – 7.5 GHz

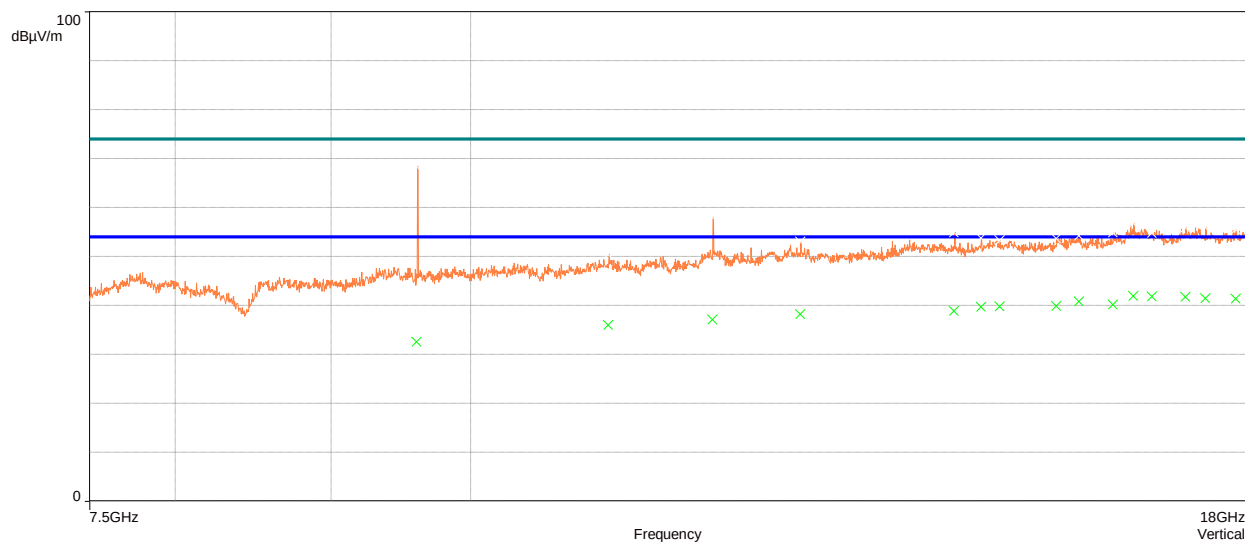


Frequency (MHz)	SR	Peak (dBμV/m)	LimPeak (dBμV/m)	Delta (dB)	CISPR AVG (dBμV/m)	Lim AVG (dBμV/m)	Delta AVG (dB)	Angle (deg)
2339	1	52.56	74.00	44.81	29.18	54.00	24.82	300.30
2469	1	62.09	74.00	47.63	26.37	54.00	27.63	330.30
2495.5	1	49.41	74.00	42.62	31.38	54.00	22.62	330.30
2521	1	54.54	74.00	41.79	32.21	54.00	21.79	330.30
2547	1	56.98	74.00	43.04	30.96	54.00	23.04	330.30
4949.5	1	58.30	74.00	43.62	30.38	54.00	23.62	330.30
7428.5	1	62.71	74.00	41.70	32.30	54.00	21.70	240.20
2339	2	52.35	74.00	44.97	29.03	54.00	24.97	90.10
2469	2	59.20	74.00	47.82	26.18	54.00	27.82	270.30
2520.5	2	51.52	74.00	42.65	31.35	54.00	22.65	240.20
2547	2	53.50	74.00	43.64	30.36	54.00	23.64	240.20
2573	2	61.04	74.00	43.28	30.72	54.00	23.28	210.20
2599.5	2	61.31	74.00	42.76	31.24	54.00	22.76	240.20
2625	2	59.07	74.00	42.90	31.10	54.00	22.90	240.20
2629	2	50.71	74.00	43.43	30.57	54.00	23.43	210.20
2651.5	2	48.40	74.00	44.23	29.77	54.00	24.23	270.30
4949	2	54.31	74.00	42.79	31.21	54.00	22.79	90.10
6157	2	48.75	74.00	41.72	32.28	54.00	21.72	359.90
7429.5	2	63.48	74.00	41.75	32.25	54.00	21.75	270.30

BLUETOOTH CLASSIC
Horizontal polarization
TX01
Range 7.5 GHz – 18 GHz

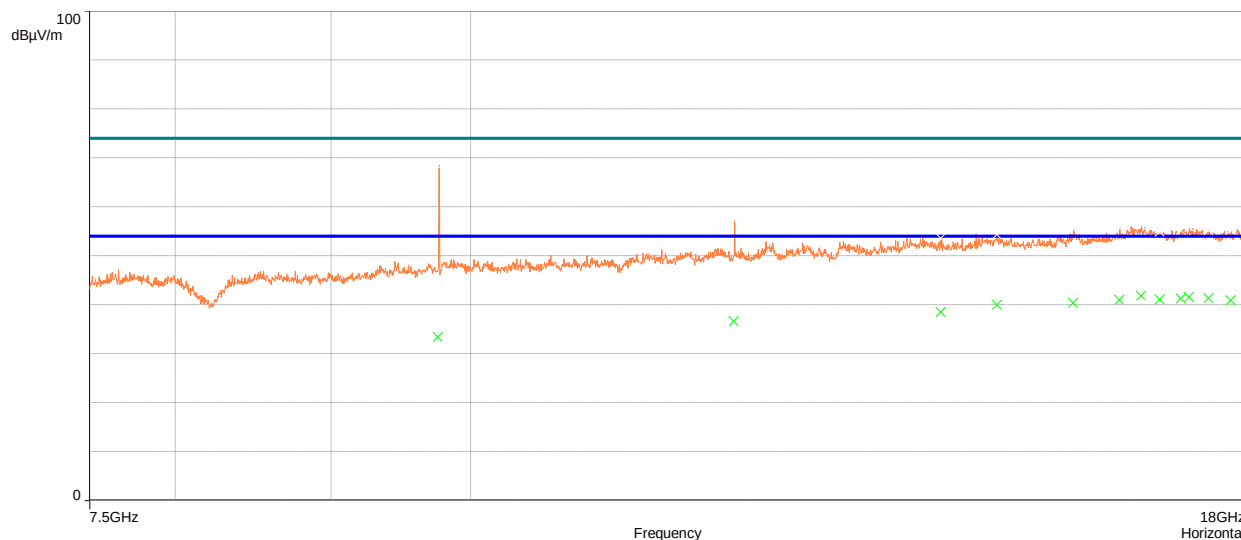


BLUETOOTH CLASSIC
Vertical polarization
TX01
Range 7.5 GHz – 18 GHz

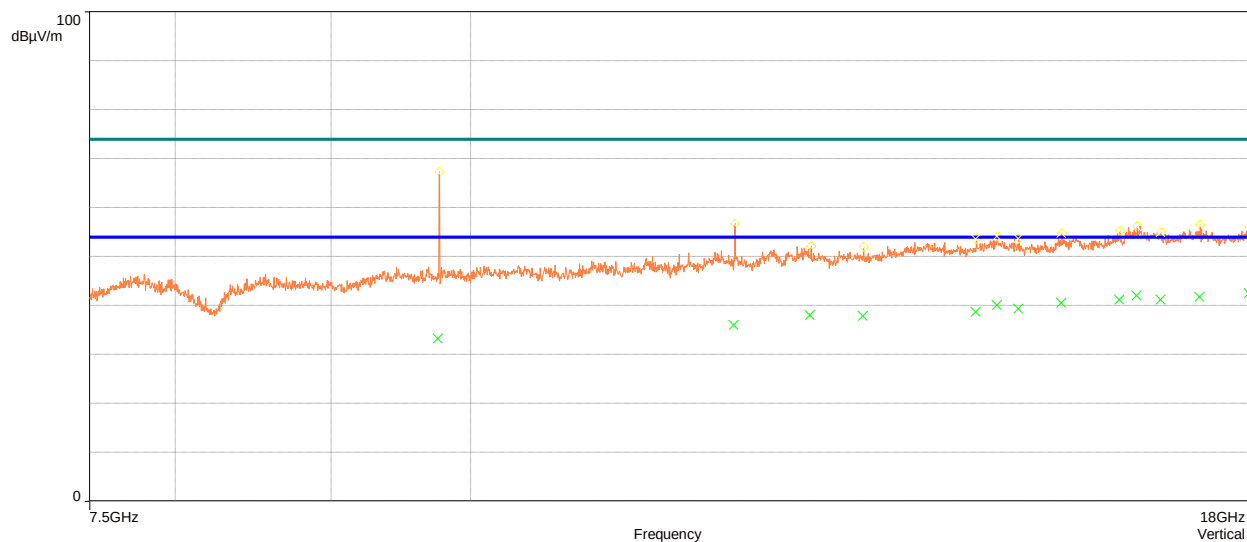


Frequency (MHz)	SR	Peak (dBμV/m)	LimPeak (dBμV/m)	Delta (dB)	CISPR AVG (dBμV/m)	Lim AVG (dBμV/m)	Delta AVG (dB)	Angle (deg)
9597.5	1	66.91	74.00	41.28	32.72	54.00	21.28	330.30
9812	1	51.36	74.00	39.07	34.93	54.00	19.07	180.20
11998.5	1	57.45	74.00	36.90	37.10	54.00	16.90	330.30
13933	1	54.49	74.00	34.38	39.62	54.00	14.38	150.30
14698	1	54.06	74.00	34.37	39.63	54.00	14.37	30.00
15745.5	1	56.15	74.00	33.07	40.93	54.00	13.07	270.40
15979.5	1	56.71	74.00	33.48	40.52	54.00	13.48	270.40
16255.5	1	55.11	74.00	32.97	41.03	54.00	12.97	240.30
16449.5	1	56.75	74.00	32.05	41.95	54.00	12.05	240.30
16637.5	1	56.29	74.00	32.08	41.92	54.00	12.08	150.30
16745	1	56.16	74.00	32.16	41.84	54.00	12.16	89.90
17185	1	56.03	74.00	32.13	41.87	54.00	12.13	300.20
17623.5	1	56.15	74.00	32.93	41.08	54.00	12.92	30.00
17852.5	1	55.82	74.00	32.20	41.80	54.00	12.20	359.90
9597.5	2	68.48	74.00	41.39	32.61	54.00	21.39	240.30
11092	2	50.47	74.00	37.99	36.00	54.00	18.00	120.20
11999.5	2	58.08	74.00	36.90	37.10	54.00	16.90	210.20
12821.5	2	53.09	74.00	35.71	38.29	54.00	15.71	330.30
14400	2	54.87	74.00	35.07	38.93	54.00	15.07	359.90
14696	2	53.80	74.00	34.29	39.71	54.00	14.29	270.00
14903.5	2	53.31	74.00	34.14	39.85	54.00	14.15	359.90
15555	2	53.75	74.00	34.06	39.94	54.00	14.06	120.20
15825.5	2	54.28	74.00	33.15	40.85	54.00	13.15	60.30
16233	2	54.94	74.00	33.77	40.23	54.00	13.77	180.00
16485	2	56.73	74.00	32.07	41.92	54.00	12.08	29.90
16718	2	54.82	74.00	32.12	41.88	54.00	12.12	330.30
17148.5	2	55.92	74.00	32.27	41.73	54.00	12.27	29.90
17410	2	55.91	74.00	32.49	41.51	54.00	12.49	270.00
17809	2	55.58	74.00	32.64	41.36	54.00	12.64	180.00

BLUETOOTH CLASSIC
Horizontal polarization
TX02
Range 7.5 GHz – 18 GHz

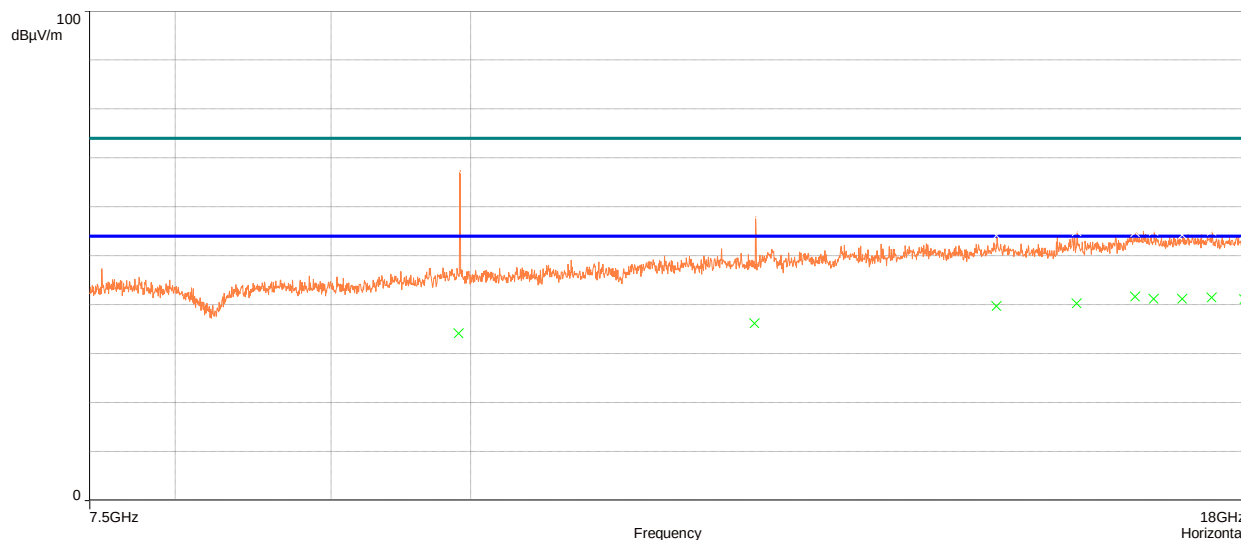


BLUETOOTH CLASSIC
Vertical polarization
TX02
Range 7.5 GHz – 18 GHz

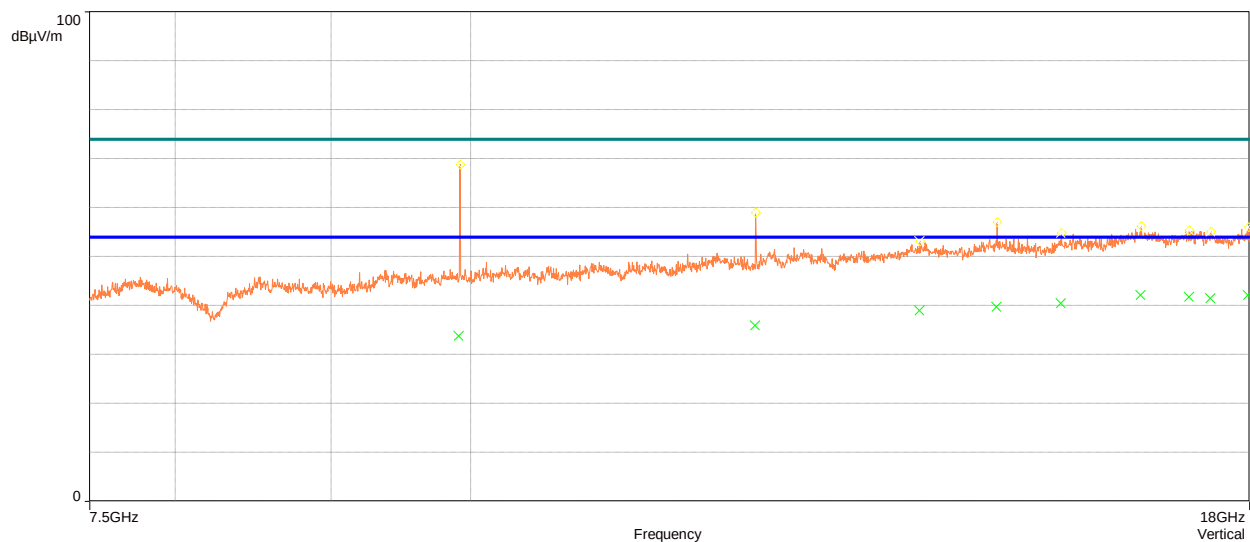


Frequency (MHz)	SR	Peak (dBμV/m)	LimPeak (dBμV/m)	Delta (dB)	CISPR AVG (dBμV/m)	Lim AVG (dBμV/m)	Delta AVG (dB)	Angle (deg)
9753.5	1	68.42	74.00	40.58	33.42	54.00	20.58	359.90
12195	1	57.35	74.00	37.36	36.64	54.00	17.36	60.00
14257.5	1	53.64	74.00	35.49	38.51	54.00	15.49	330.30
14874	1	54.40	74.00	34.00	40.00	54.00	14.00	90.10
15751.5	1	55.54	74.00	33.62	40.38	54.00	13.62	300.20
16314.5	1	55.72	74.00	33.00	41.00	54.00	13.00	120.20
16582.5	1	56.28	74.00	32.17	41.83	54.00	12.17	120.20
16817.5	1	54.96	74.00	32.89	41.11	54.00	12.89	300.20
17089	1	55.33	74.00	32.73	41.27	54.00	12.73	210.10
17196.5	1	55.90	74.00	32.37	41.60	54.00	12.40	120.20
17450	1	55.15	74.00	32.61	41.39	54.00	12.61	240.10
17744	1	55.27	74.00	33.03	40.97	54.00	13.03	270.30
9753.5	2	67.36	74.00	40.79	33.21	54.00	20.79	90.10
12193	2	56.76	74.00	38.02	35.98	54.00	18.02	90.10
12915.5	2	52.10	74.00	35.91	38.09	54.00	15.91	29.90
13440.5	2	52.00	74.00	36.16	37.83	54.00	16.17	180.30
14634.5	2	53.59	74.00	35.25	38.75	54.00	15.25	90.10
14875	2	54.17	74.00	33.87	40.13	54.00	13.87	150.30
15116	2	53.74	74.00	34.62	39.38	54.00	14.62	330.30
15614	2	54.84	74.00	33.44	40.56	54.00	13.44	359.70
16311.5	2	55.25	74.00	32.75	41.25	54.00	12.75	330.30
16526.5	2	56.24	74.00	31.99	42.01	54.00	11.99	240.30
16829.5	2	55.04	74.00	32.76	41.24	54.00	12.76	270.30
17329.5	2	56.52	74.00	32.26	41.74	54.00	12.26	150.30
17988.5	2	56.04	74.00	31.53	42.47	54.00	11.53	180.30

BLUETOOTH CLASSIC
Horizontal polarization
TX03
Range 7.5 GHz – 18 GHz

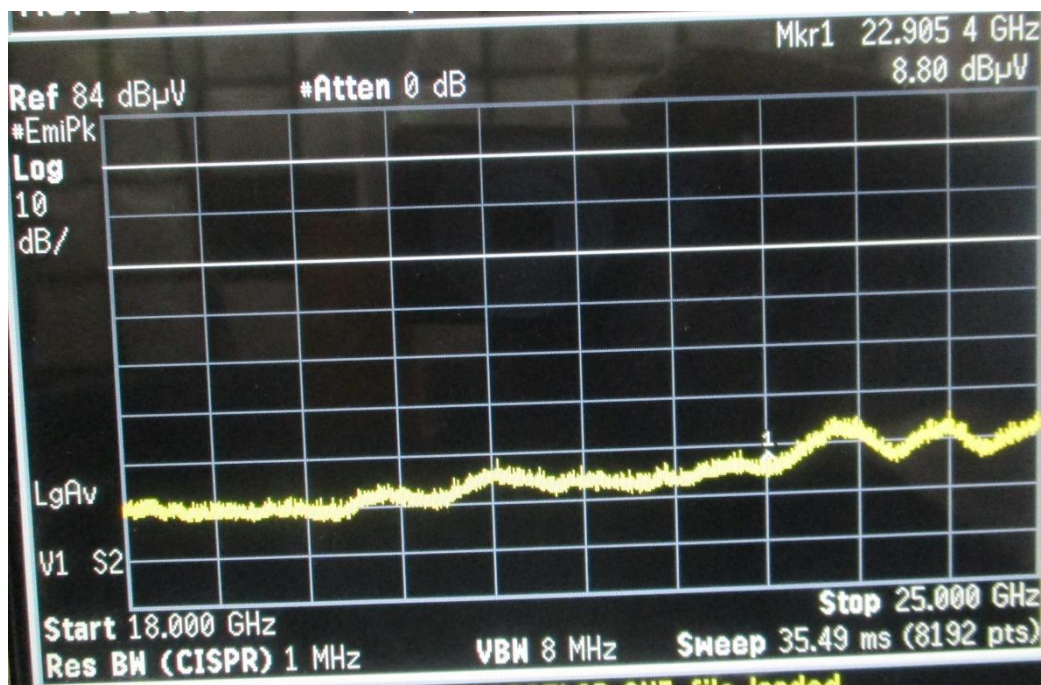


BLUETOOTH CLASSIC
Vertical polarization
TX03
Range 7.5 GHz – 18 GHz

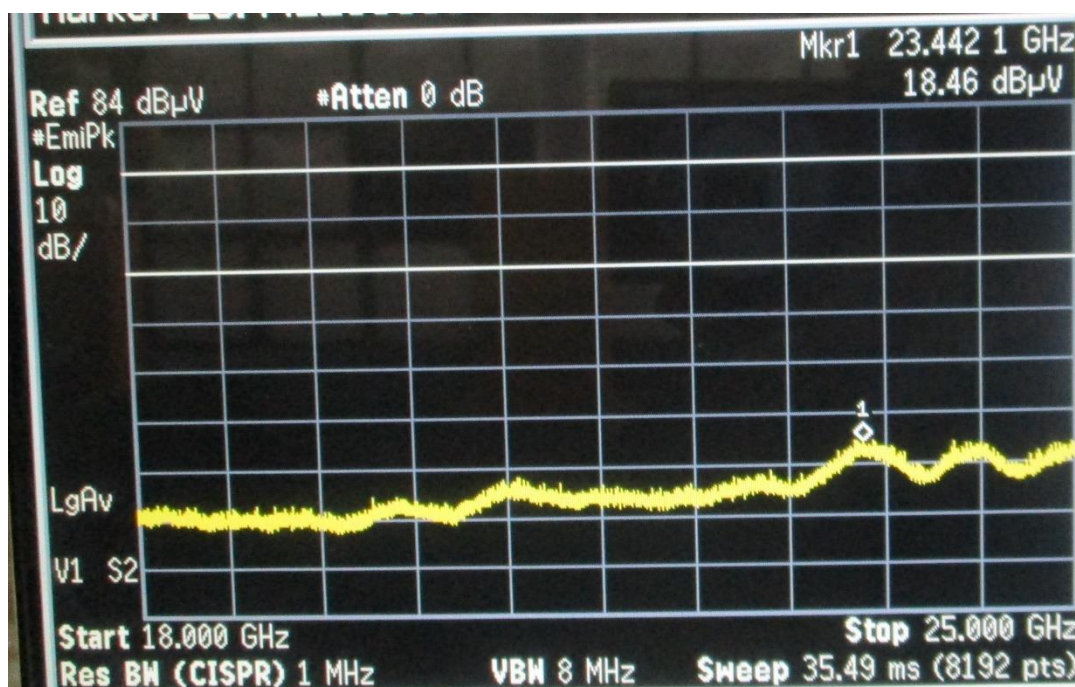


Frequency (MHz)	SR	Peak (dBμV/m)	LimPeak (dBμV/m)	Delta (dB)	CISPR AVG (dBμV/m)	Lim AVG (dBμV/m)	Delta AVG (dB)	Angle (deg)
9908.5	1	67.46	74.00	39.83	34.17	54.00	19.83	359.90
12388	1	58.02	74.00	37.76	36.24	54.00	17.76	359.90
14868	1	54.19	74.00	34.25	39.75	54.00	14.25	359.90
15795	1	55.00	74.00	33.72	40.28	54.00	13.72	359.90
16510.5	1	54.85	74.00	32.29	41.71	54.00	12.29	359.90
16740.5	1	55.13	74.00	32.78	41.22	54.00	12.78	359.90
17106	1	54.26	74.00	32.80	41.20	54.00	12.80	359.90
17489.5	1	55.09	74.00	32.52	41.48	54.00	12.52	359.90
17925.5	1	54.38	74.00	32.87	41.13	54.00	12.87	359.90
9908.5	2	68.84	74.00	40.23	33.77	54.00	20.23	60.30
12389.5	2	58.99	74.00	38.07	35.93	54.00	18.07	60.30
14027.5	2	53.18	74.00	34.98	39.02	54.00	14.98	90.20
14868	2	57.06	74.00	34.30	39.70	54.00	14.30	60.30
15608	2	54.86	74.00	33.57	40.43	54.00	13.57	150.30
16575.5	2	56.22	74.00	31.87	42.13	54.00	11.87	180.30
17191	2	55.38	74.00	32.20	41.80	54.00	12.20	180.30
17472.5	2	55.13	74.00	32.55	41.45	54.00	12.55	150.30
17976	2	56.03	74.00	31.83	42.17	54.00	11.83	120.30

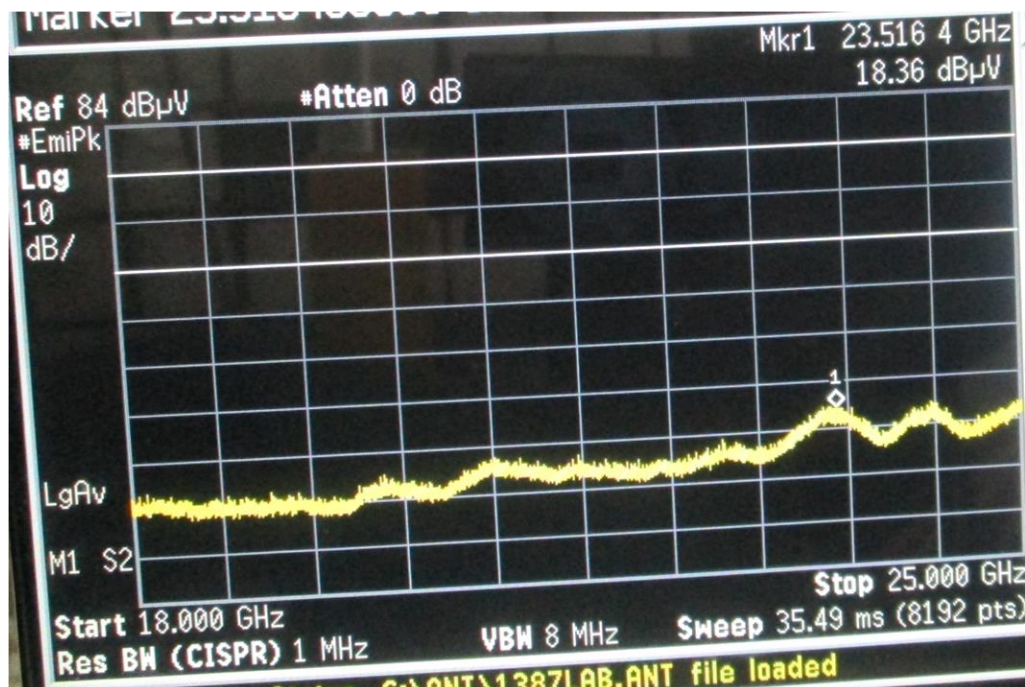
BLUETOOTH CLASSIC
Horizontal polarization
TX01
Range 18 GHz – 25 GHz



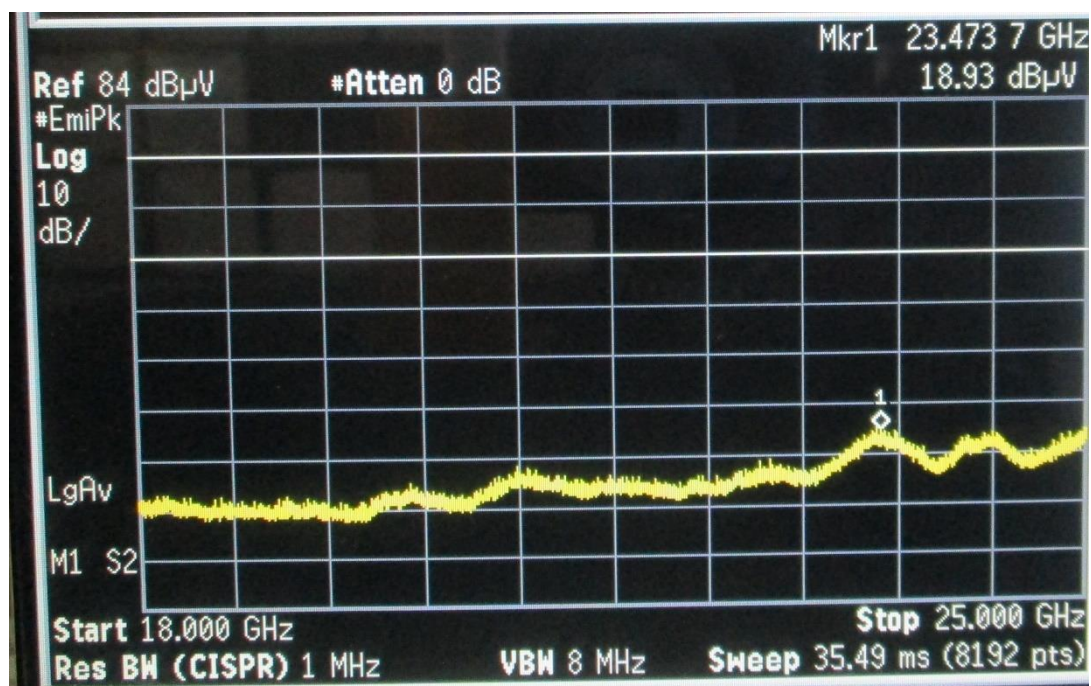
BLUETOOTH CLASSIC
Vertical polarization
TX01
Range 18 GHz – 25 GHz



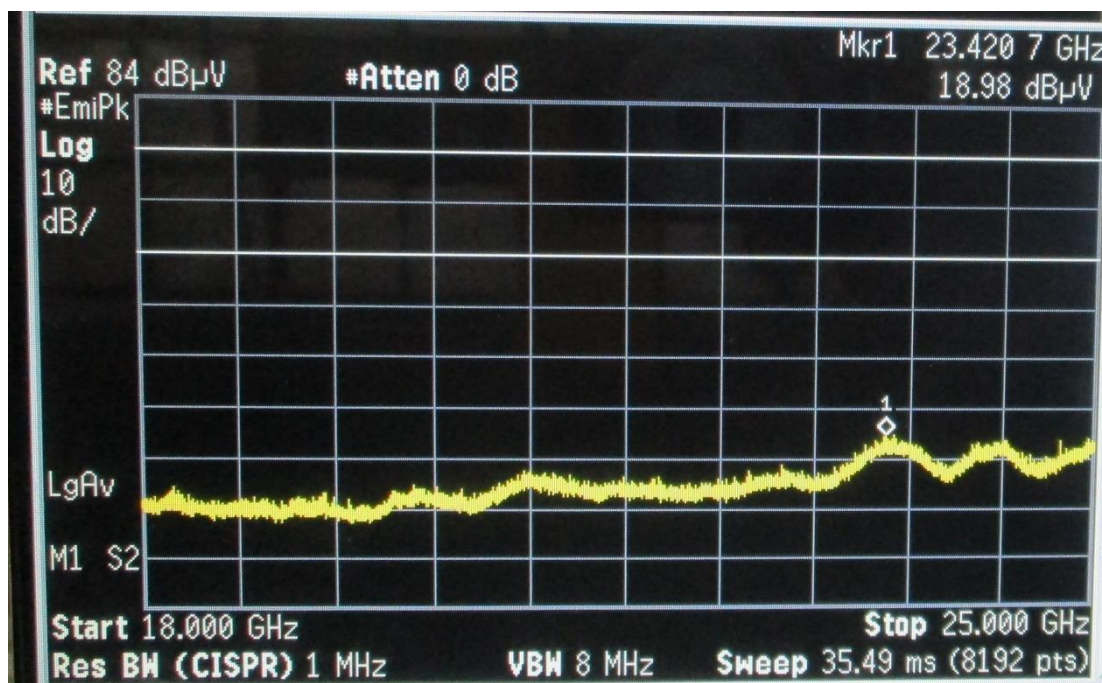
BLUETOOTH CLASSIC
Horizontal polarization
TX02
Range 18 GHz – 25 GHz



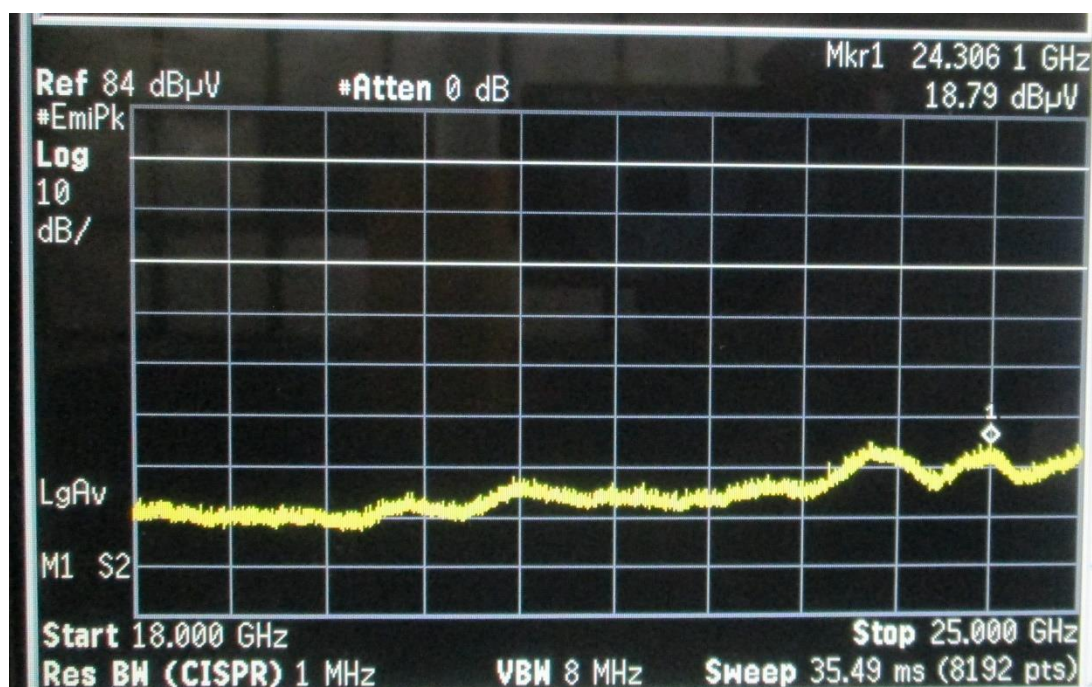
BLUETOOTH CLASSIC
Vertical polarization
TX02
Range 18 GHz – 25 GHz



BLUETOOTH CLASSIC
Horizontal polarization
TX03
Range 18 GHz – 25 GHz



BLUETOOTH CLASSIC
Vertical polarization
TX03
Range 18 GHz – 25 GHz



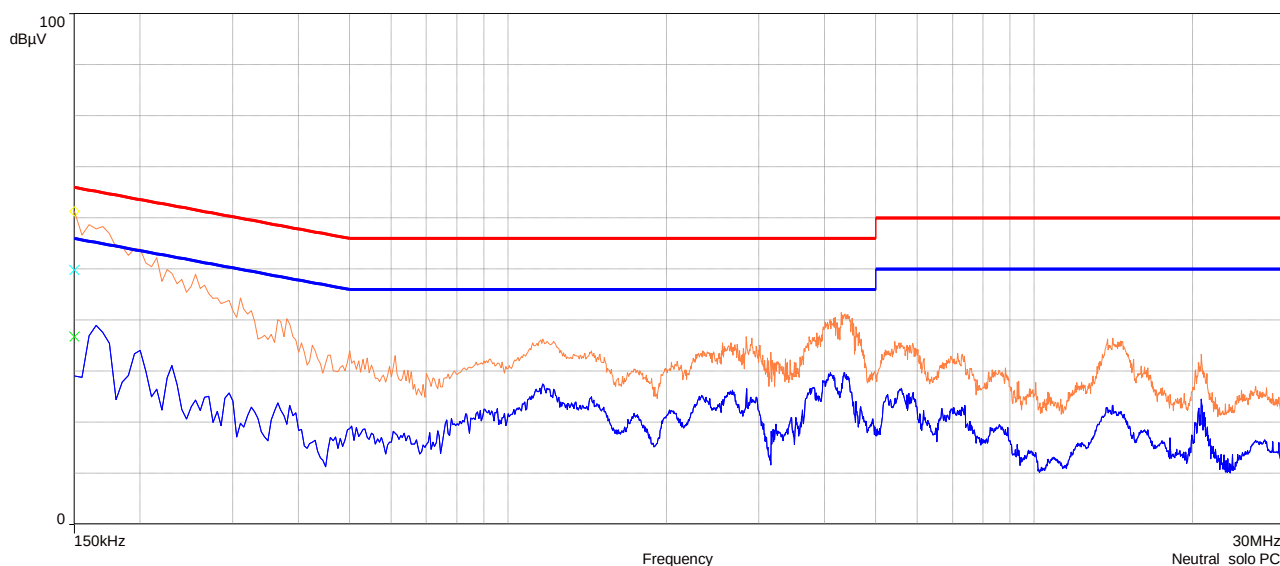
Test method:	FCC part 15 C - § 15.207 Standard test method for ac power-line conducted emissions from unlicensed wireless devices For details see par. 4 of this report	
Operator	Marco Nicolè	
Test Date	2023-04-12	
Test Temperature	21 °C	
Test Humidity	32 %	
Test Pressure	996 hPa	
Electrical wiring	Cable	Length [m]
	USB cable	0.2
	Ac input cable (power supply of laptop)	1.3
Operating conditions	OC09 See par. 6 of this report	
Additional information	None	
Auxiliary equipment (AE)	See par. 3.4 of this report	
Frequency range	150 kHz ÷ 30 MHz	
Test set up	☐ Floor standing set up ☒ Table top set up	
Test method	The EUT is placed on the table, which is 0.8 m above ground plane. According to the requirements in Section 13.1.3 of ANSI C63.4 Conducted emission from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes	
Port	A.C. Input - LISN measurements	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	
EUT modification during this test	None	
Result	COMPLIES	
Note	The measure was performed to understand which is the contribution of the device under test when it is connect to the laptop. So, for first was measure only the laptop, and then the laptop with the headphone connected to the USB port.	

TEST GRAPHS AND MEASUREMENTS

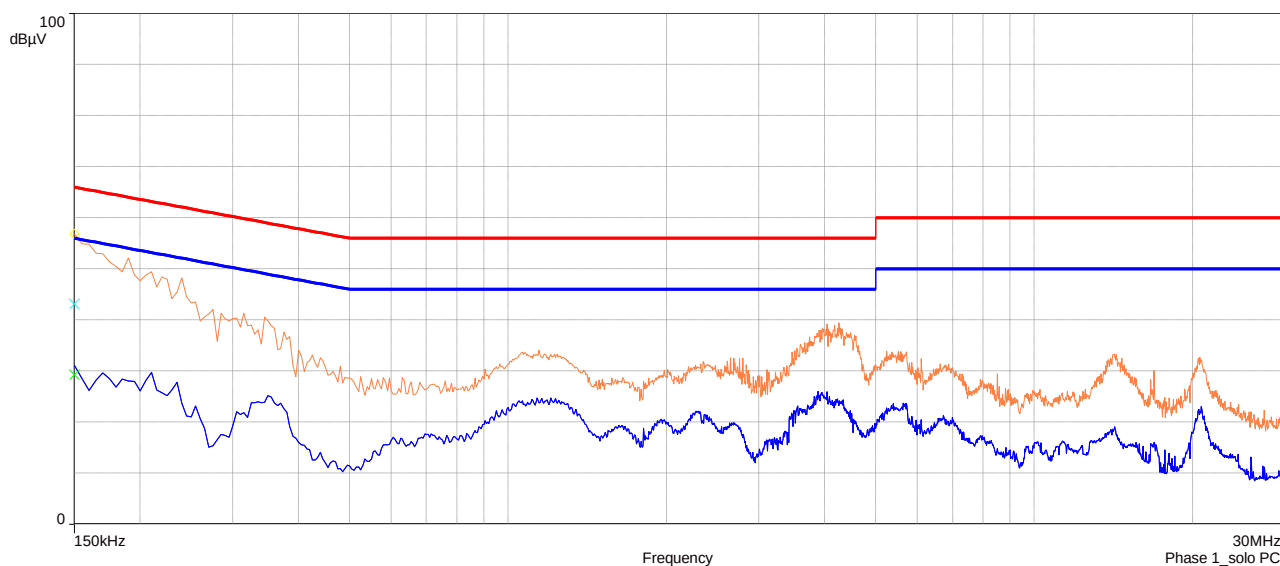
All traces have been acquired with PK Peak detector (orange trace) and AVG Average detector (blue trace)
If PK trace exceeds QP Quasi-Peak limit, QP measurements are performed at discrete frequencies where the limit is exceeded. Measurement time for QP measurements is 15 s.

If the general level of the disturbance is not steady, also the AVG disturbance voltage level is observed for 15 s per frequency; results are reported in a specific table below the graph.

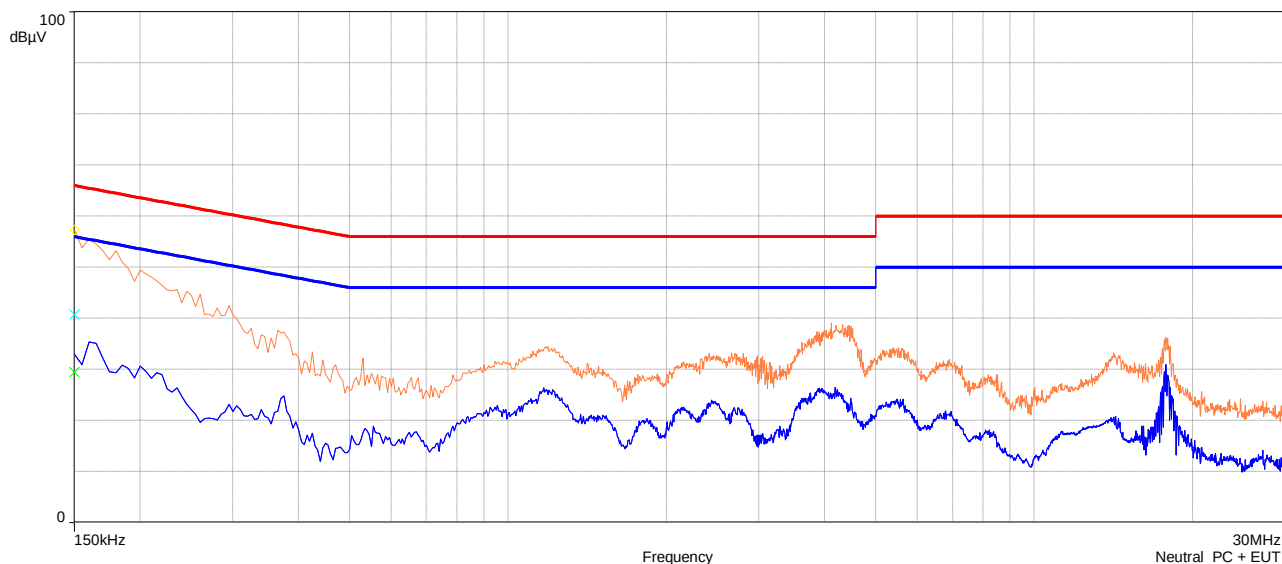
Measurement 01
A.C. Input - LISN measurements
Line: Neutral
Operating Condition: Groundnoise (EUT not connected, AE02 on)



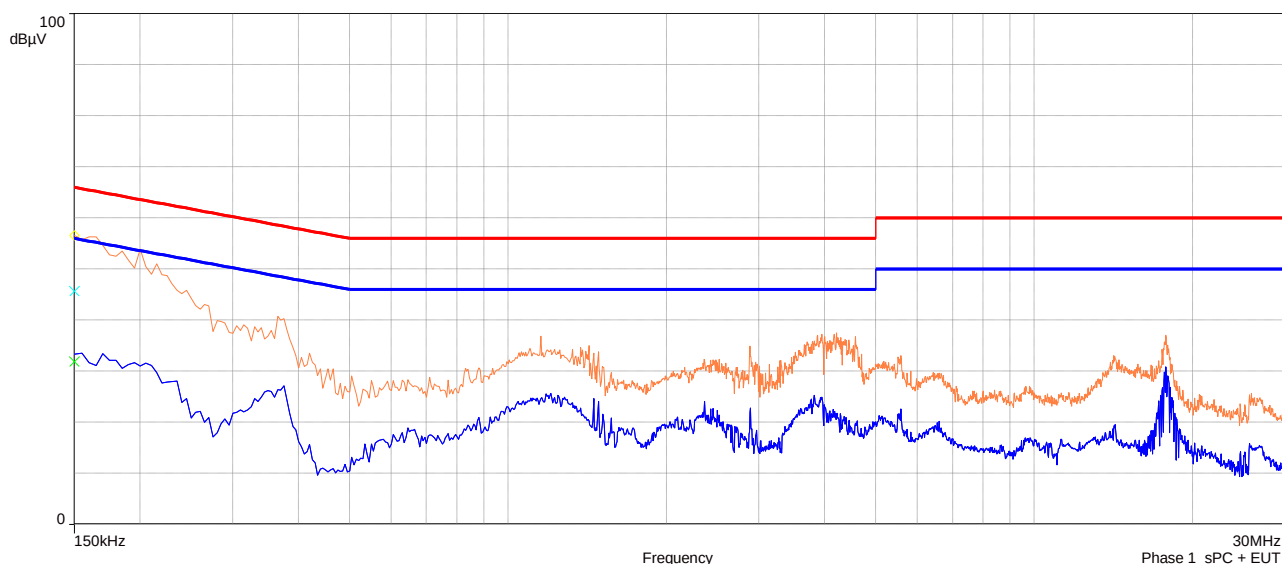
Measurement 02
A.C. Input - LISN measurements
Line: Phase 1
Operating Condition: Groundnoise (EUT not connected, AE02 on)



Measurement 03
A.C. Input - LISN measurements
Line: Neutral
Operating Condition: OC09



Measurement 04
A.C. Input - LISN measurements
Line: Phase 1
Operating Condition: OC09



Frequency (MHz)	SR	AVG (dBμV)	QPeak (dBμV)	Lim AVG (dBμV)	Lim QPeak (dBμV)	AVG Margin (dB)	QPeak Margin (dB)	Line
0.15	1	36.73	49.83	56.00	66.00	-19.27	-16.17	Neutral
0.15	2	29.24	43.19	56.00	66.00	-26.76	-22.81	Phase 1
0.15	3	29.41	40.79	56.00	66.00	-26.59	-25.21	Neutral
0.15	4	31.86	45.69	56.00	66.00	-24.14	-20.31	Phase 1

7 EUT MODIFICATIONS

None.

Annex B Test instrumentations

FCC Part15

Description	Manufacturer	Model	Identifier	Cal data	Cal due
EMI Receiver - PSA Spectrum Analyzer	Agilent Technologies	E4446A	740/LAB	2022-08-09	2023-08-09
			Rapporto 5817		
Antenna - Horn Antenna 18 GHz ÷ 40 GHz	ETS-LINDGREN	3116	779/LAB	2020-11-03	2023-11-03
			Rapporto 5178		
Antenna - BiConiLog Antenna 30MHz÷ 6 GHz	ETS-LINDGREN	3142E	1508/LAB	2020-12-18	2023-12-18
			Rapporto 5222		
Pre-Amplifier 18 GHz ÷ 40 GHz	Spin Electronics	PRE-1840-35	759/LAB	2021-03-25	2023-03-25
			Rapporto 5325		
RF Cable - set of RF cables 769/LAB + 791/LAB + 938/LAB + Pre-Amplifier 758/LAB with cables			803/LAB	2022-04-06	2023-04-06
			Rapporto 5661		
RF cable - set of RF cables (760/LAB + 804/LAB + 805/LAB)			806/LAB	2022-04-06	2023-04-06
			Rapporto 5662		
Antenna - Horn Antenna 1 GHz ÷ 18 GHz	ETS-LINDGREN	3117	778/LAB	2020-11-03	2023-11-03
			Rapporto 5177		
LISN 32A	ROHDE&SCHWARZ	ESH2-Z5	033L/CS	2022-07-14	2023-07-14
			Rapporto 5765		
Software BAT-EMC	Nexio	BAT-EMC	1910/LAB	--	--
RF Cable - N-N 5m	INTERCOND	M17/74 RG 213	225/LAB	2022-08-31	2023-08-31
			Rapporto 5818		



Kiwa Creiven

Code 047/23/02961/RED R01



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Annex B Test instrumentations

RF Cable - N-N 1,8m	Siva Cables Italy	RG 58A/U	243/LAB	2022-08-31	2023-08-31
Rapporto 5819					
Filter PB	G. De PAOLI	BPF.0.15-30MHz	268/LAB	2022-08-31	2023-08-31
Rapporto 5820					
Pulse Limiter ESH3-Z2	ROHDE&SCHWARZ Gmbh	ESH3-Z2	528/LAB	2022-08-31	2023-08-31
Rapporto 5821					
EMI Receiver - MXE	Keysight Technologies	N9038A	1444/LAB	2023-03-01	2024-02-29
Rapporto 5985					
RF cable - set of RF cables (771/LAB + 791/LAB + 937/LAB)			802/LAB	2023-01-27	2024-01-27
Rapporto 5990					
EMI Receiver	ROHDE&SCHWARZ	ESHS10 9kHz...30MHz	030L/CS	2022-05-19	2023-05-19
Rapporto 5687					



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LAB N° 0259 L

Code 047/23/02961/RED R01

Annex D Auxiliary instrumentations

<i>Application</i>	<i>Description</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Identifier</i>	<i>Cal. data</i>	<i>Cal. due</i>
Monitoring of environmental conditions	Climatic Sensor (pri site) - 739/LAB Emission Anec	HW group	HWg-STE	1299/LAB	2022-07-25	2023-07-25
Monitoring of environmental conditions	Climatic Sensor (pri site) - 051L/CS Shielded Cham	HW group	HWg-STE	1300/LAB	2022-07-25	2023-07-25
Monitoring of environmental conditions	Pressure Transducer	COMET	T7410	1530/LAB	2021-10-14	2023-10-14
Distance monitoring	Metro Laser	Leica	DISTO A2	1094/LAB	2021-11-11	2023-11-11

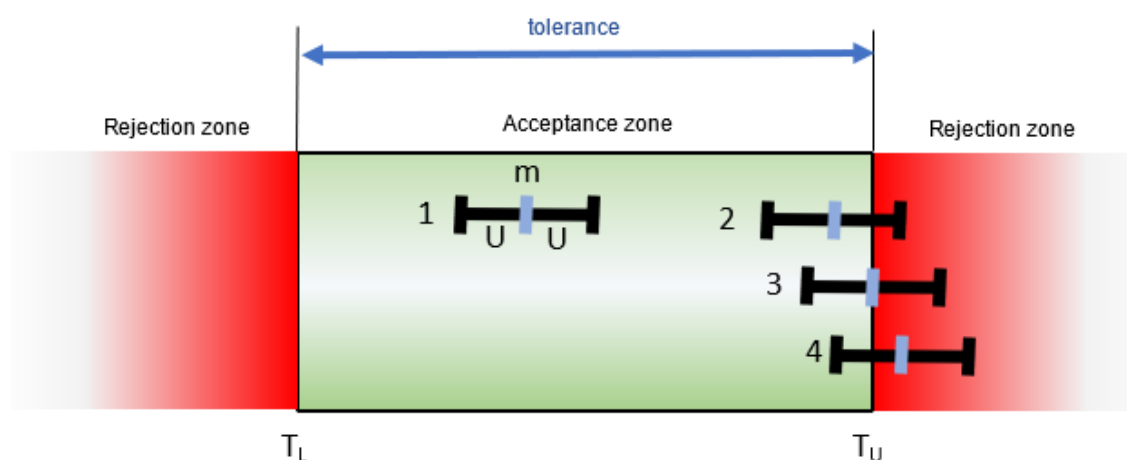
Annex F Compliance Decision Rule and measurements uncertainty

F1: Decision Rule

- A decision rule defines the role of uncertainty in assessing the conformity of measured values with respect to specification limits.
- The Kiwa Creiven decision rule uses the “simple acceptance” method minimizing the “supplier risk” (type 1 risk or alpha risk), that is the risk of refusing a compliant product.
- The probability distribution of the measurement uncertainty is assumed to be Gaussian,

Nomenclature

- m: measured value
- P: probability of correct acceptance, (1-P: probability of refusing a compliant product)
- Tu: upper tolerance limit
- TL: lower tolerance limit
- Tolerance: interval of width equal to $T_u - T_L$



Case	Decision Rule	Note
Case 1, 2, 3	Measurement complies with specifications	$T_L \leq m \leq T_U$; the probability P of correct acceptance is: $50\% \leq P \leq 100\%$
Case 4	Measurement NOT complies with specifications	$m > T_U$ (or $m < T_L$): the probability P of correct acceptance is lower than 50%

Note about qualitative tests: The uncertainty balance is applicable only to tests whose result is numerical. For the qualitative tests, are verified the tolerance and repeatability of the quantities that stimulate the EUT. Tolerances and repeatability of these quantities are part of the instrumentation calibration.

In accordance with:

- IEC Guide 115 Application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector
- ILAC-G8 Guidelines on the Reporting of Compliance with Specification
- JGCM guide 106

Annex F Compliance Decision Rule and measurements uncertainty

F.2 Measurements uncertainty

	<i>Uncertainty (k=2)</i>
Frequency Readout – Conducted Test	
Test Uncertainty [kHz]	10.3
Frequency Readout – Radiated Test	
Test Uncertainty [kHz]	10.6
Effective radiated power ERP (30 MHz to 1000 MHz)	
Test Uncertainty [dB]	6.4
Effective radiated power EIRP (above 1 GHz)	
Test Uncertainty [dB]	6.6
Radiated receiver blocking tests (above 1 GHz)	
Test Uncertainty [dB]	4.9
Conducted spurious emissions	
Test Uncertainty [dB]	3.3
Radiated spurious emissions	
Test Uncertainty [dB]	5.8
Channel power	
Test Uncertainty [dB]	2.6
Adjacent channel power	
Test Uncertainty [dB]	2.2
RF Output power (EIRP)	
Test Uncertainty [dB]	2.3
Occupied Channel Bandwidth	
Test Uncertainty [Hz]	[span/600]