

Prüfbericht-Nr.: Test report no.:	CN21XT9W 001	Auftrags-Nr.: Order no.:	168295932	Seite 1 von 26 Page 1 of 26
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2020-12-23	
Auftraggeber: Client:	BlueAnt Wireless Suite 6 , 861 Doncaster Road, Doncaster East, Victoria 3109, Australia			
Prüfgegenstand: Test item:	BlueAnt X3 Powerful Bluetooth speaker			
Bezeichnung / Typ-Nr.: Identification / Type no.:	X3 (Trademark: BlueAnt)			
Auftrags-Inhalt: Order content:	Type test			
Prüfgrundlage: Test specification:	CFR47 FCC Part 15: Subpart C Section 15.247 RSS-247 Issue 2 February 2017 CFR47 FCC Part 15: Subpart C Section 15.207 RSS-Gen Issue 5 March 2019 CFR47 FCC Part 15: Subpart C Section 15.209 RSS-102 Issue 5 March 2015 CFR47 FCC Part 2.1093			
Wareneingangsdatum: Date of sample receipt:	2020-12-24	Refer to photos document		
Prüfmuster-Nr.: Test sample no.:	A002883872 -003 to 004			
Prüfzeitraum: Testing period:	2021-01-04 – 2021-01-13			
Ort der Prüfung: Place of testing:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by:			genehmigt von: authorized by:	
Datum: Date: 2021-02-25	Signed by: Alex Lan		Ausstellungsdatum: Issue date: 2021-02-25	Signed by: Sam Lin
Stellung / Position	Senior Project Engineer		Stellung / Position	Department Manager
Sonstiges / Other:	FCC ID: VHF-BLUEANT-X3 IC: 7252A-X3 HVIN: X3			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged:			
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

Prüfbericht - Nr.: CN21XT9W 001
Test report no.

Seite 2 von 26
Page 2 of 26

Test Summary

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER

RESULT: Pass

5.1.3 99% BANDWIDTH

RESULT: Pass

5.1.4 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHz BANDWIDTH

RESULT: Pass

5.1.5 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.6 20dB BANDWIDTH

RESULT: Pass

5.1.7 CARRIER FREQUENCY SEPARATION

RESULT: Pass

5.1.8 NUMBER OF HOPPING FREQUENCY

RESULT: Pass

5.1.9 TIME OF OCCUPANCY

RESULT: Pass

5.1.10 CONDUCTED EMISSION ON AC MAINS

RESULT: Pass

6.1.1 ELECTROMAGNETIC FIELDS

RESULT: Pass

Contents

1	GENERAL REMARKS	5
1.1	COMPLEMENTARY MATERIALS	5
2	TEST SITES	5
2.1	TEST FACILITIES	5
2.2	LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	6
2.3	TRACEABILITY	8
2.4	CALIBRATION	8
2.5	MEASUREMENT UNCERTAINTY.....	8
2.6	LOCATION OF ORIGINAL DATA.....	8
2.7	STATUS OF FACILITY USED FOR TESTING.....	8
3	GENERAL PRODUCT INFORMATION	9
3.1	PRODUCT FUNCTION AND INTENDED USE.....	9
3.2	RATINGS AND SYSTEM DETAILS	9
3.3	INDEPENDENT OPERATION MODES	11
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS.....	11
3.5	SUBMITTED DOCUMENTS.....	11
4	TEST SET-UP AND OPERATION MODES	12
4.1	PRINCIPLE OF CONFIGURATION SELECTION	12
4.2	TEST OPERATION AND TEST SOFTWARE	12
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	12
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE	12
4.5	TEST SETUP DIAGRAM	13
5	TEST RESULTS	15
5.1	TRANSMITTER REQUIREMENT & TEST SUITES	15
5.1.1	Antenna Requirement	15
5.1.2	Maximum Peak Conducted Output Power	16
5.1.3	99% Bandwidth	17
5.1.4	Conducted Spurious Emissions Measured in 100 kHz Bandwidth	18
5.1.5	Radiated Spurious Emission	19
5.1.6	20dB Bandwidth	20
5.1.7	Carrier Frequency Separation.....	21
5.1.8	Number of Hopping Frequency	22
5.1.9	Time of Occupancy	23
5.1.10	Conducted Emission on AC Mains	24
6	SAFETY HUMAN EXPOSURE	25
6.1	RADIO FREQUENCY EXPOSURE COMPLIANCE	25
6.1.1	Electromagnetic Fields	25
7	PHOTOGRAPHS OF THE TEST SET-UP	26

Prüfbericht - Nr.: CN21XT9W 001
Test report no.

Seite 4 von 26
 Page 4 of 26

8	LIST OF TABLES.....	26
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Prüfbericht - Nr.: CN21XT9W 001
Test report no.

Seite 5 von 26
Page 5 of 26

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results of Conducted Testing

Appendix C: Test Results of Radiated Testing & AC Mains Conducted Emission

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, People's Republic of China

FCC Registration No.: 694916

IC Registration No.: 25069

Prüfbericht - Nr.: CN21XT9W 001
Test report no.

Seite 6 von 26
Page 6 of 26

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

TÜV Rheinland (Shenzhen) Co., Ltd.

Conducted Emissions				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR3	102680	19.05.2021
Artificial Mains Network	R&S	ENV216	101445	19.05.2021
EMC32 test software	R&S	EMC32(Ver.10.50.01)	N/A	N/A
Radio Spectrum Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wireless Connectivity Tester	R&S	CMW270	101375	10.08.2021
Signal Analyzer	R&S	FSV 40	101441	10.08.2021
Vector Signal Generator	R&S	SMBV100A	263301	10.08.2021
Signal Generator	R&S	SMB100A	115186	10.08.2021
OSP	R&S	OSP 150	101017	10.12.2021
Control PC	DELL	OptiPlex 7050	FTJZ9P2	N/A
Test Software	R&S	WMS32 (V11.00.00)	N/A	N/A
Power Meter	R&S	NRP2	107105	10.12.2021
Power Sensor	R&S	NRP-Z81	105677	10.09.2021
Humid & Temp Programmable Tester	BOST	NTH090-60	19040801	10.04.2021
Shielding Room 8#	Albatross	SR8	APC17151-SR8	23.07.2021
Unwanted Emission Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR 7	102021	11.08.2021
Signal Analyzer	R&S	FSV 40	101439	10.08.2021
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	10.08.2021
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	10.08.2021
Amplifier	R&S	SCU-18F	180070	10.08.2021
Amplifier	R&S	SCU40A	100475	10.09.2021
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	08.08.2022
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	08.08.2022
Wideband Ridged Horn Antenna (18-	Steatite	QMS-00880	19067	08.08.2022

Prüfbericht - Nr.: CN21XT9W 001

Test report no.

Seite 7 von 26

Page 7 of 26

40 GHz)				
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	13.09.2022
Wideband Ridged Horn Antenna (12-18 GHz)	Steatite	QMS-00208	18313	02.09.2021
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	06.07.2021

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table

Item		Extended Uncertainty
Conducted Emission		± 2.74 dB
Radiated Emission (30-1000MHz)	Field strength (dB μ V/m)	4.27dB
Radiated Emission (above 1000MHz)	Field strength (dB μ V/m)	4.46dB
Radio Spectrum		± 1.5 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B & C of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, People's Republic of China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a BlueAnt X3 Powerful Bluetooth speaker which supports Bluetooth 5.0 (BDR&EDR) technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	BlueAnt X3 Powerful Bluetooth speaker
Type Designation	X3
Trade Mark	BlueAnt
FCC ID	VHF-BLUEANT-X3
IC	7252A-X3
HVIN	X3
Operating Voltage	DC 5V, 3A via AC/DC Adapter DC 10.8V, 3200mAh, 34.56Wh via internal Li-ion battery
Testing Voltage	AC 120V, 60Hz
AC/DC Adapter	Model: SOY-0500300-090 Rated Input: AC 100-240V, 50/60Hz, 0.5A Rated Output: DC 5V, 3A 15.0W
Technical Specification of Bluetooth	
Technical Specification	Value
Operating Frequency	2402 - 2480 MHz
Type of Modulation	GFSK, $\pi/4$ DQPSK, 8DPSK
Channel Number	BDR & EDR mode:79 channels
Channel Separation	BDR & EDR mode:1MHz
Wireless Technology	Bluetooth 5.0
Antenna Type	Integral Antenna
Max. Antenna Gain	1.20 dBi

Prüfbericht - Nr.: CN21XT9W 001

Test report no.

Seite 10 von 26

Page 10 of 26

Table 3: RF Channel and Frequency of Bluetooth

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
00	2402.00	20	2422.00	40	2442.00	60	2462.00
01	2403.00	21	2423.00	41	2443.00	61	2463.00
02	2404.00	22	2424.00	42	2444.00	62	2464.00
03	2405.00	23	2425.00	43	2445.00	63	2465.00
04	2406.00	24	2426.00	44	2446.00	64	2466.00
05	2407.00	25	2427.00	45	2447.00	65	2467.00
06	2408.00	26	2428.00	46	2448.00	66	2468.00
07	2409.00	27	2429.00	47	2449.00	67	2469.00
08	2410.00	28	2430.00	48	2450.00	68	2470.00
09	2411.00	29	2431.00	49	2451.00	69	2471.00
10	2412.00	30	2432.00	50	2452.00	70	2472.00
11	2413.00	31	2433.00	51	2453.00	71	2473.00
12	2414.00	32	2434.00	52	2454.00	72	2474.00
13	2415.00	33	2435.00	53	2455.00	73	2475.00
14	2416.00	34	2436.00	54	2456.00	74	2476.00
15	2417.00	35	2437.00	55	2457.00	75	2477.00
16	2418.00	36	2438.00	56	2458.00	76	2478.00
17	2419.00	37	2439.00	57	2459.00	77	2479.00
18	2420.00	38	2440.00	58	2460.00	78	2480.00
19	2421.00	39	2441.00	59	2461.00	--	--

3.3 Independent Operation Modes

The basic operation modes are:

- A. On
 - 1. Bluetooth transmitting mode (BDR & EDR mode)
 - a) Low Channel
 - b) Middle Channel
 - c) High Channel
- B. On, Transmitting on Hopping channel
- C. On, Bluetooth connecting mode
- D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- | | |
|-------------------------|----------------------------------|
| - Application Form | - FCC/IC Label and Location Info |
| - Block Diagram | - Photo Document |
| - Schematics | - User Manual |
| - Technical Description | |

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

4.3 Special Accessories and Auxiliary Equipment

Table 4: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Mobile Phone	HTC	D626w	N/A
Notebook	Lenovo	ThinkPad X260	N/A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 30MHz)

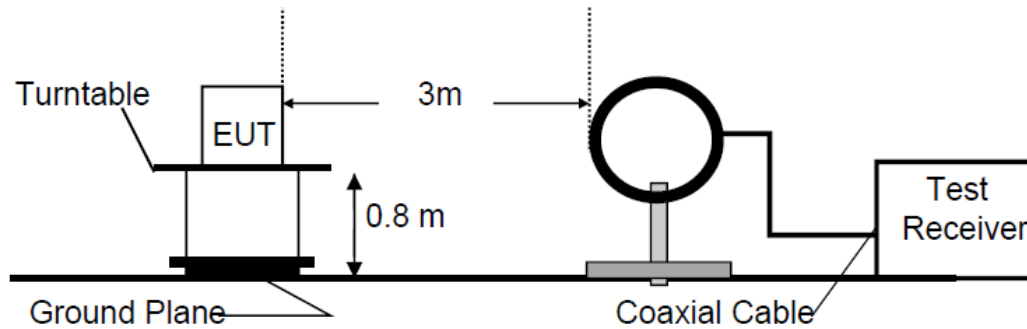


Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

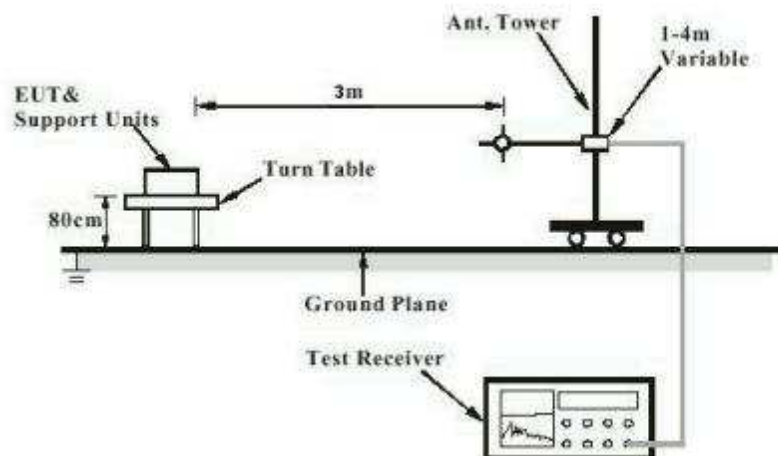


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

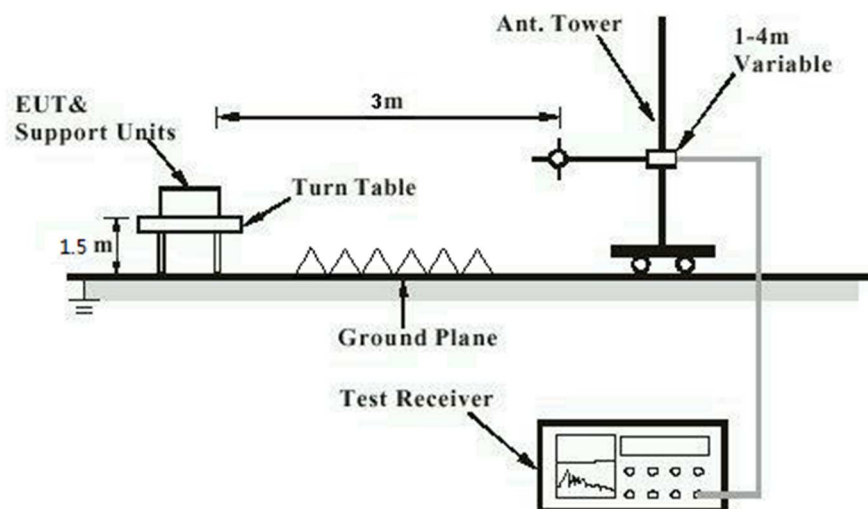


Diagram of Measurement Configuration for Mains Conduction Measurement

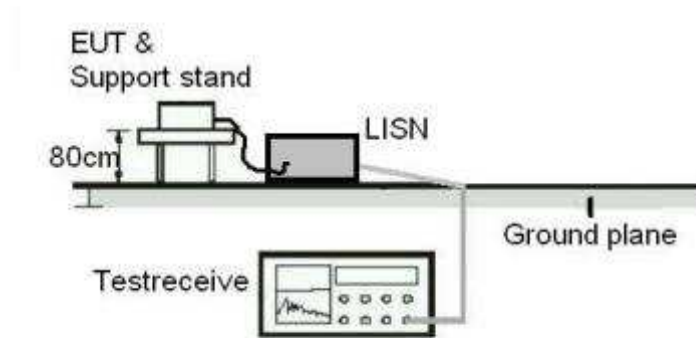
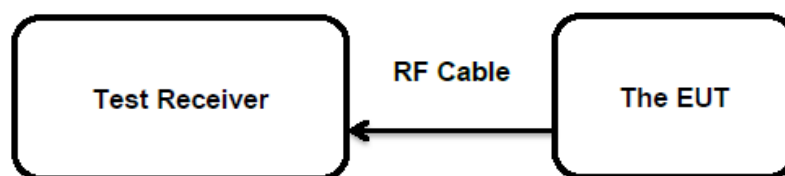


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203
RSS-Gen Clause 8.3

According to the manufacturer declared, the EUT has an integral antenna, the directional gain of antenna is 1.2 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

Prüfbericht - Nr.: CN21XT9W 001

Test report no.

Seite 16 von 26

Page 16 of 26

5.1.2 Maximum Peak Conducted Output Power

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.247(b)(1)
RSS-247 Clause 5.4(b)
Basic standard : ANSI C63.10: 2013
FHSS<0.125W(Maximum peak conducted output
Limits : power)
< 4 W (e.i.r.p.)
Kind of test site : Shielded Room

Test Setup

Date of testing : 11.01.2021
Input voltage : AC 120V, 60Hz
Operation mode : A.1
Test channel : Low / Middle / High
Ambient temperature : 25 °C
Relative humidity : 56 %
Atmospheric pressure : 101 kPa

Table 5: Test Result of Maximum Peak Conducted Output Power

Test Mode	Channel Frequency (MHz)	Measured Peak Output Power		Limit (W)
		(dBm)	(W)	
BDR	2402	-1.0	0.00079	< 0.125
	2441	-0.3	0.00093	
	2480	0.4	0.00110	
EDR	2402	2.6	0.00182	< 0.125
	2441	3.3	0.00214	
	2480	4.1	0.00257	

Note: The cable loss is taken into account in results and the maximum e.i.r.p. is 5.3 dBm less than 4W(36dBm).

Prüfbericht - Nr.: CN21XT9W 001
Test report no.

Seite 17 von 26
Page 17 of 26

5.1.3 99% Bandwidth

RESULT:

Pass

Test Specification

Test standard : RSS-Gen Clause 6.7
Basic standard : ANSI C63.10: 2013
Kind of test site : Shielded Room

Test Setup

Date of testing : 11.01.2021
Input voltage : AC 120V, 60Hz
Operation mode : A.1
Test channel : Low / Middle / High
Ambient temperature : 25 °C
Relative humidity : 56 %
Atmospheric pressure : 101 kPa

Table 6: Test Result of 99% Bandwidth

Test Mode	Channel Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)
BDR	2402	865	/
	2441	860	
	2480	860	
EDR	2402	1185	/
	2441	1180	
	2480	1185	

For the measurement records, refer to the appendix B

Prüfbericht - Nr.: CN21XT9W 001

Test report no.

Seite 18 von 26

Page 18 of 26

5.1.4 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT:

Pass

Test Specification

Test standard	: FCC Part 15.247(d) RSS-247 Clause 5.5
Basic standard	: ANSI C63.10: 2013
Limits	: 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power);
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 11.01.2021
Input voltage	: AC 120V, 60Hz
Operation mode	: A.1
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to following test plot, and compliance is achieved as well.

For the measurement records, refer to the appendix B.

Prüfbericht - Nr.: CN21XT9W 001

Test report no.

Seite 19 von 26

Page 19 of 26

5.1.5 Radiated Spurious Emission

RESULT:

Pass

Test Specification

Test standard	: FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3
Basic standard	: ANSI C63.10: 2013
Limits	: Refer to 15.209(a) of FCC part 15.247(d) RSS-Gen Table 6 & Table 7
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: 04.01.2021 - 06.01.2021
Input voltage	: AC 120V, 60Hz
Operation mode	: A.1
Test channel	: Low / Middle / High
Ambient temperature	: 24 °C
Relative humidity	: 47 %
Atmospheric pressure	: 101 kPa

Remark:

During the pretest the EUT was rotated through three orthogonal axes to determine the attitude that maximizes the emissions. After that the EUT was manually handled to find the orientation that has the maximum emission, which is the orientation shown in the test set-up photos.

Testing was carried out within frequency range 9kHz to the tenth harmonics.

For the measurement records, refer to the appendix C.

Prüfbericht - Nr.: CN21XT9W 001
Test report no.

Seite 20 von 26
Page 20 of 26

5.1.6 20dB Bandwidth

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.247(a)(1)
RSS-247 Clause 5.1(a)
Basic standard : ANSI C63.10: 2013
Kind of test site : Shielded Room

Test Setup

Date of testing : 11.01.2021
Input voltage : AC 120V, 60Hz
Operation mode : A.1
Test channel : Low / Middle / High
Ambient temperature : 25 °C
Relative humidity : 56 %
Atmospheric pressure : 101 kPa

Table 7: Test Result of 20dB Bandwidth

Test Mode	Channel Frequency (MHz)	20dB Bandwidth (kHz)	2/3 of 20dB Bandwidth (kHz)	Limit (MHz)
BDR	2402	930	620.000	/
	2441	930	620.000	
	2480	930	620.000	
EDR	2402	1265	843.333	/
	2441	1270	846.667	
	2480	1270	846.667	

For the measurement records, refer to the appendix B.

Prüfbericht - Nr.: CN21XT9W 001

Test report no.

Seite 21 von 26

Page 21 of 26

5.1.7 Carrier Frequency Separation

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.247(a)(1)
RSS-247 Clause 5.1(b)
Basic standard : ANSI C63.10: 2013
Limits : $\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth, whichever is greater
Kind of test site : Shielded Room

Test Setup

Date of testing : 11.01.2021
Input voltage : AC 120V, 60Hz
Operation mode : B
Test channel : Low / Middle / High
Ambient temperature : 25 °C
Relative humidity : 56 %
Atmospheric pressure : 101 kPa

Table 8: Test Result of Carrier Frequency Separation

Test Mode	Channel	Channel Frequency (MHz)	Measured Channel Separation (MHz)	Limit (kHz)	Result
BDR	Low Channel	2401.995050	0.980198	≥ 25kHz or 2/3 of 20dB bandwidth	Pass
	Adjacency Channel	2402.975248			
	Middle Channel	2440.995050	0.980198		Pass
	Adjacency Channel	2441.975248			
	High Channel	2478.995050	1.009900		Pass
	Adjacency Channel	2480.004950			
EDR	Low Channel	2402.024752	0.980198	≥ 25kHz or 2/3 of 20dB bandwidth	Pass
	Adjacency Channel	2403.004950			
	Middle Channel	2441.024752	0.980198		Pass
	Adjacency Channel	2442.004950			
	High Channel	2479.024752	1.009901		Pass
	Adjacency Channel	2480.034653			

Note:

The limit is maximum $2/3$ of the 20 dB bandwidth: 846.667 KHz.

For the measurement records, refer to the appendix B.

Prüfbericht - Nr.: CN21XT9W 001

Test report no.

Seite 22 von 26

Page 22 of 26

5.1.8 Number of Hopping Frequency

RESULT:

Pass

Test Specification

Test standard : FCC part 15.247(a)(1)(iii)
RSS-247 Clause 5.1(d)
Basic standard : ANSI C63.10: 2013
Limits : ≥ 15 non-overlapping channels
Kind of test site : Shielded Room

Test Setup

Date of testing : 11.01.2021
Input voltage : AC 120V, 60Hz
Operation mode : B
Ambient temperature : 25 °C
Relative humidity : 56 %
Atmospheric pressure : 101 kPa

Table 9: Test Result of Number of Hopping Frequency

Frequency Range	Measured Quantity of Hopping Channel	Limit	Result
2402 to 2480 MHz	79	≥ 15	Pass

For the measurement records, refer to the appendix B.

Prüfbericht - Nr.: CN21XT9W 001

Test report no.

Seite 23 von 26

Page 23 of 26

5.1.9 Time of Occupancy

RESULT:

Pass

Test Specification

Test standard : FCC part 15.247(a)(1)(iii)
RSS-247 Clause 5.1(d)
Basic standard : ANSI C63.10: 2013
Limits : < 0.4s
Kind of test site : Shielded Room

Test Setup

Date of testing : 11.01.2021
Input voltage : AC 120V, 60Hz
Operation mode : B
Test channel : Low / Middle / High
Ambient temperature : 25 °C
Relative humidity : 56 %
Atmospheric pressure : 101 kPa

Table 10: Test Result of Time of Occupancy

Test Mode	Channel	Data Packet	Pulse width (ms)	Measured Dwell time(s)	Limit (s)
BDR	2441	DH1	0.382	0.122	< 0.4s
		DH3	1.638	0.262	
		DH5	2.886	0.308	
EDR	2441	2DH1	0.391	0.125	< 0.4s
		2DH3	1.639	0.262	
		2DH5	2.892	0.308	

Note:

Dwell time = Pulse width x (Hopping rate / Number of channels) x Period

Period = 0.4 x 79 (channel) = 31.6 seconds

Prüfbericht - Nr.: CN21XT9W 001
Test report no.

Seite 24 von 26
Page 24 of 26

5.1.10 Conducted Emission on AC Mains

RESULT:

Pass

Test Specification

Test standard	: FCC Part 15.207(a) RSS-Gen Clause 8.8
Basic standard	: ANSI C63.10: 2013
Frequency range	: 0.15 – 30MHz
Limits	: FCC Part 15.207(a) RSS-Gen Table 4
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 13.01.2021
Input voltage	: AC 120V/60Hz
Operation mode	: C
Earthing	: Not connected
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix C.

Prüfbericht - Nr.: CN21XT9W 001
Test report no.

Seite 25 von 26
Page 25 of 26

6 Safety Human Exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:

Pass

Test Specification

Test standard : CFR47 FCC Part 2.1093
RSS-102 Issue 5 March 2019
FCC KDB Publication 447498 v06
Limit : CFR47 FCC Part 1.1310

The measured maximum conducted output power of the EUT is 4.1dBm $\approx$ 2.57 mW, which is below the SAR exclusion threshold level 10mW (SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and $\leq$ 50 mm), hence the EUT is excluded from SAR evaluation according to FCC KDB publication 447498 D01: Mobile and Portable RF Exposure. Guidance v06.

The measured maximum specified e.i.r.p of the EUT is 5.3dBm $\approx$ 3.39mW, which is below the SAR exclusion threshold level 4mW, hence the EUT is excluded from SAR evaluation according to RSS-102 Issue 5 section 2.5.1.

7 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

8 List of Tables

Table 1: List of Test and Measurement Equipment.....	6
Table 2: Technical Specification of EUT	9
Table 3: RF Channel and Frequency of Bluetooth	10
Table 4: List of Accessories and Auxiliary Equipment.....	12
Table 5: Test Result of Maximum Peak Conducted Output Power.....	16
Table 6: Test Result of 99% Bandwidth	17
Table 7: Test Result of 20dB Bandwidth.....	20
Table 8: Test Result of Carrier Frequency Separation	21
Table 9: Test Result of Number of Hopping Frequency	22
Table 10: Test Result of Time of Occupancy	23

Appendix B

Test Results of Conducted Testing

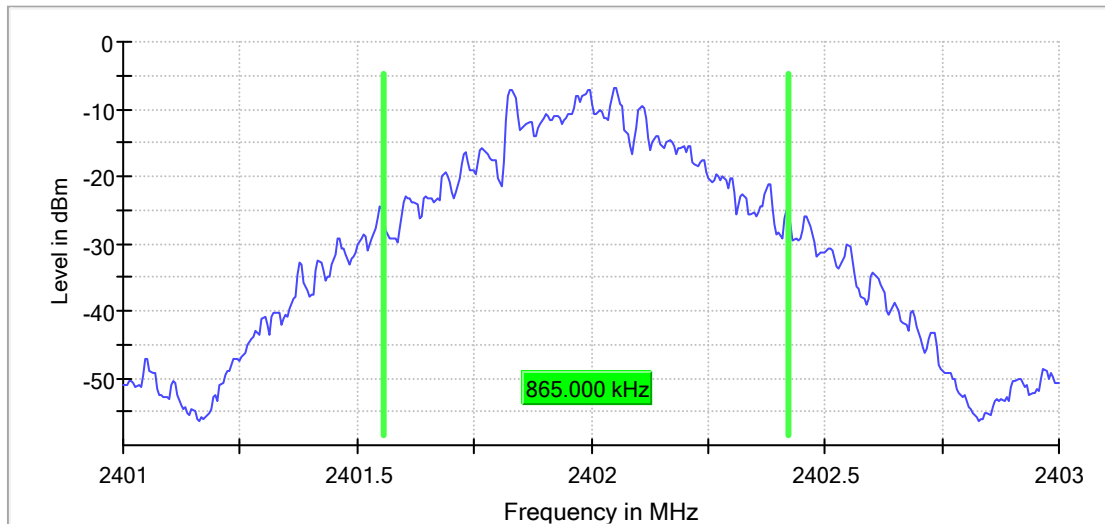
APPENDIX B	1
APPENDIX B.1: TEST PLOTS OF 99% BANDWIDTH	2
<i>BDR Mode, DH1</i>	2
<i>EDR Mode, 3DH1</i>	3
APPENDIX B.2: TEST PLOTS OF 20dB BANDWIDTH	5
<i>BDR Mode, DH1</i>	5
<i>EDR Mode, 3DH1</i>	6
APPENDIX B.3: TEST PLOTS OF CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 kHz BANDWIDTH	8
<i>BDR Mode, Low Channel</i>	8
<i>BDR Mode, Middle Channel</i>	9
<i>BDR Mode, High Channel</i>	10
<i>BDR, Hopping</i>	11
<i>EDR Mode, Low Channel</i>	12
<i>EDR Mode, Middle Channel</i>	13
<i>EDR Mode, High Channel</i>	14
<i>EDR, Hopping</i>	15
<i>BDR Mode, Band Edge, Low Channel</i>	16
<i>BDR Mode, Band Edge, High Channel</i>	16
<i>BDR Mode, Hopping Band Edge</i>	17
<i>EDR Mode, Band Edge, Low Channel</i>	18
<i>EDR Mode, Band Edge, High Channel</i>	18
<i>EDR Mode, Hopping Band Edge</i>	19
APPENDIX B.4: TEST PLOTS OF CARRIER FREQUENCY SEPARATION	20
<i>BDR, Low Channel</i>	20
<i>BDR, Middle Channel</i>	20
<i>BDR, High Channel</i>	21
<i>EDR, Low Channel</i>	21
<i>EDR, Middle Channel</i>	22
<i>EDR, High Channel</i>	22
APPENDIX B.5: TEST PLOTS OF NUMBER OF HOPPING FREQUENCY	23
<i>BDR, Hopping</i>	23
<i>EDR, Hopping</i>	23
APPENDIX B.6: TEST PLOTS OF TIME OF OCCUPANCY	24
<i>BDR Mode, DH1, Middle Channel</i>	24
<i>BDR Mode, DH3, Middle Channel</i>	24
<i>BDR Mode, DH5, Middle Channel</i>	25
<i>EDR Mode, 3DH1, Middle Channel</i>	25
<i>EDR Mode, 3DH3, Middle Channel</i>	26
<i>EDR Mode, 3DH5, Middle Channel</i>	26

Appendix B.1: Test Plots of 99% Bandwidth

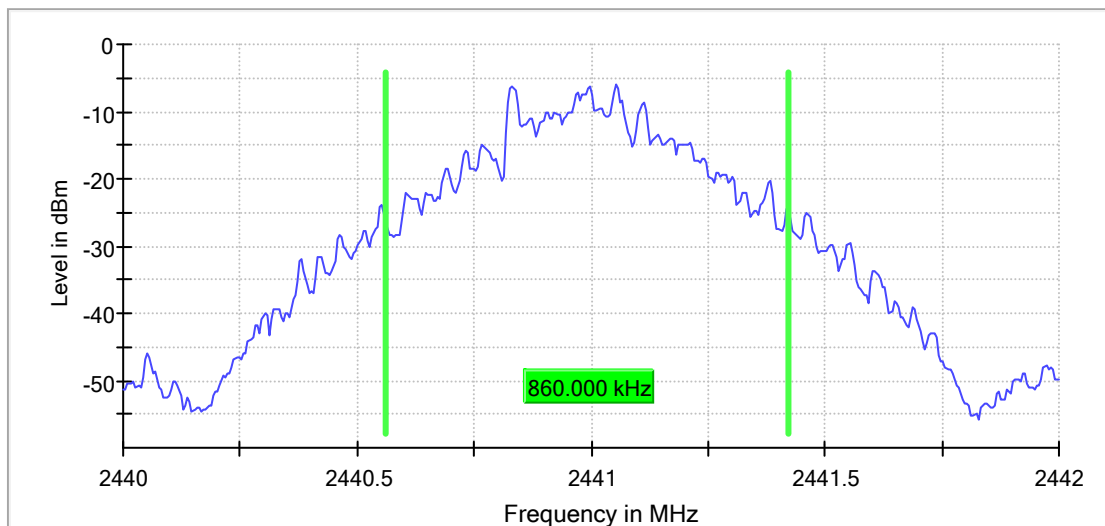
BDR Mode, DH1

RBW=10KHz, VBW=30KHz

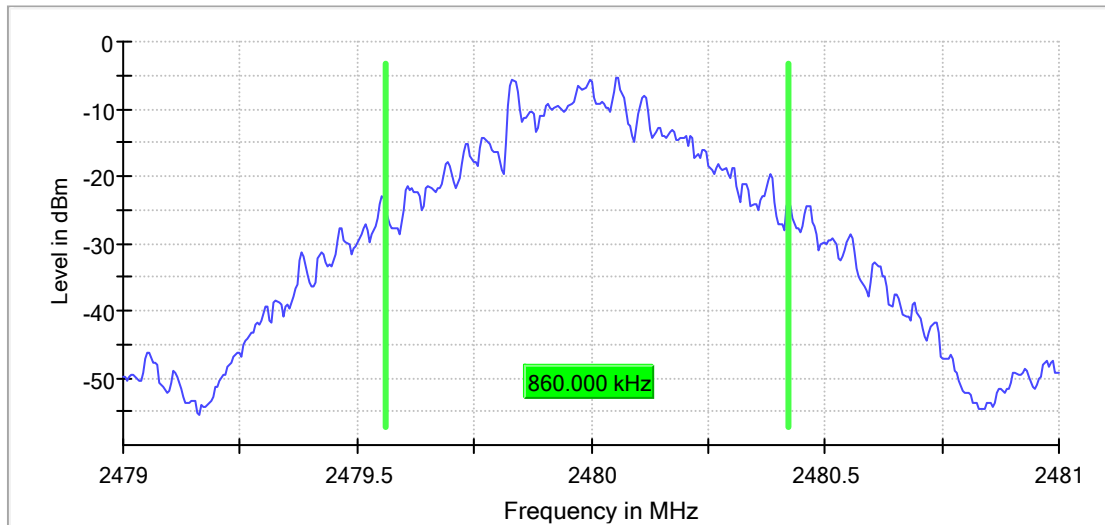
99 % Bandwidth



99 % Bandwidth



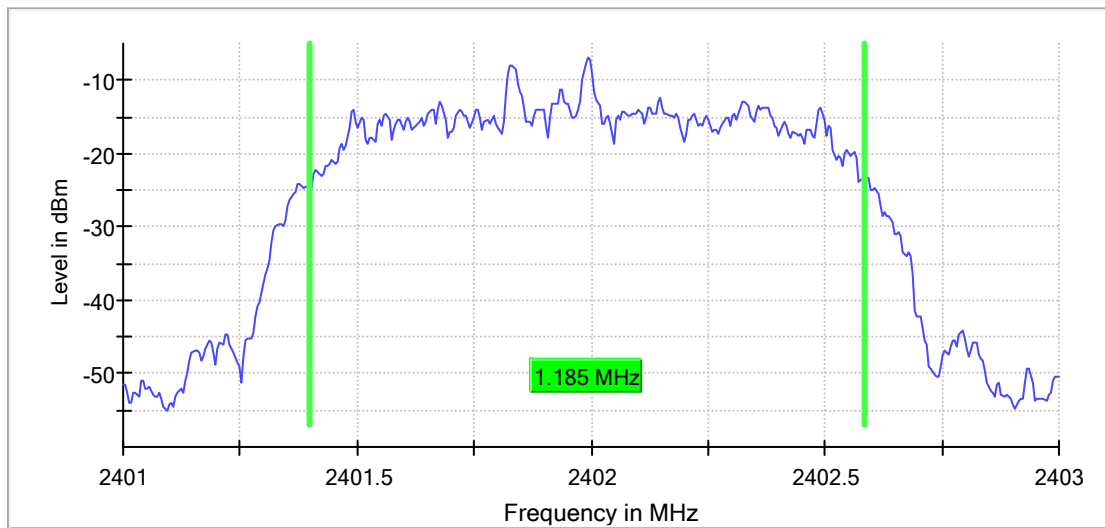
99 % Bandwidth



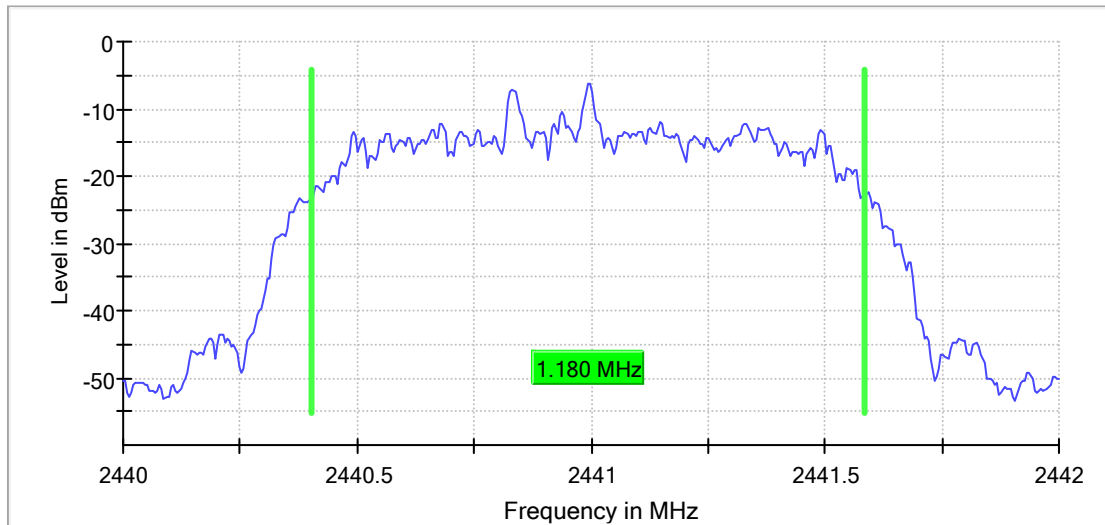
EDR Mode, 3DH1

RBW=30KHz VBW=100KHz

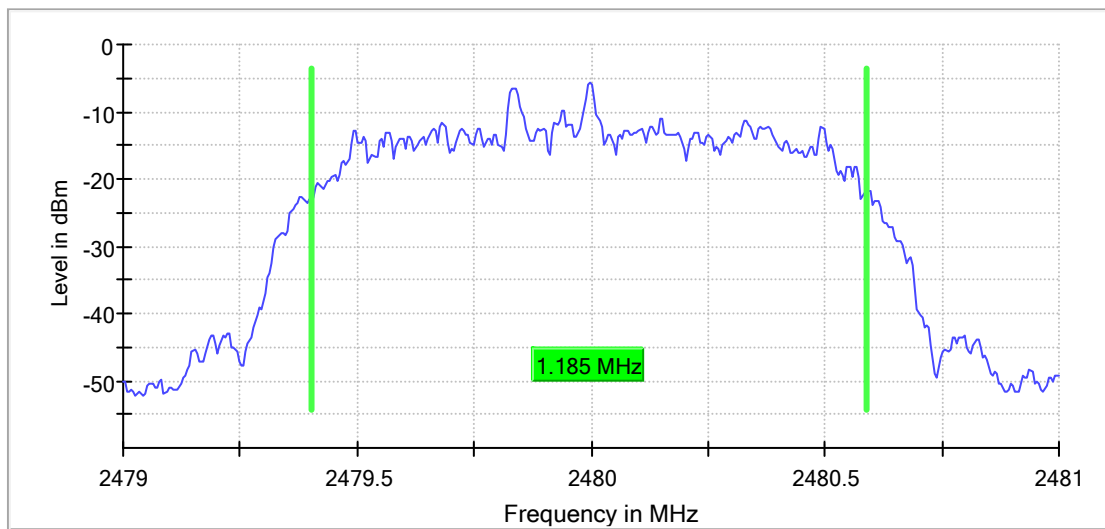
99 % Bandwidth



99 % Bandwidth



99 % Bandwidth

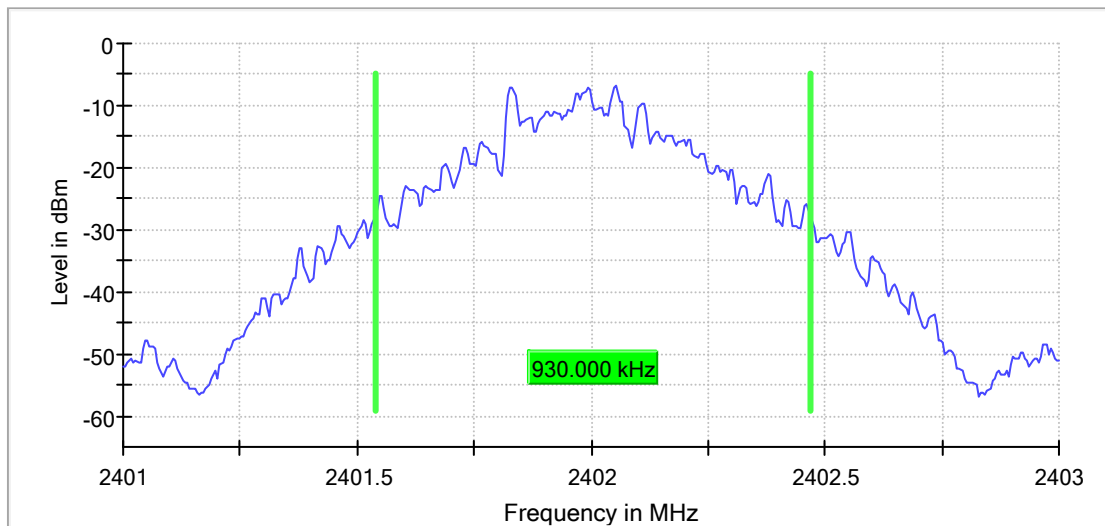


Appendix B.2: Test Plots of 20dB Bandwidth

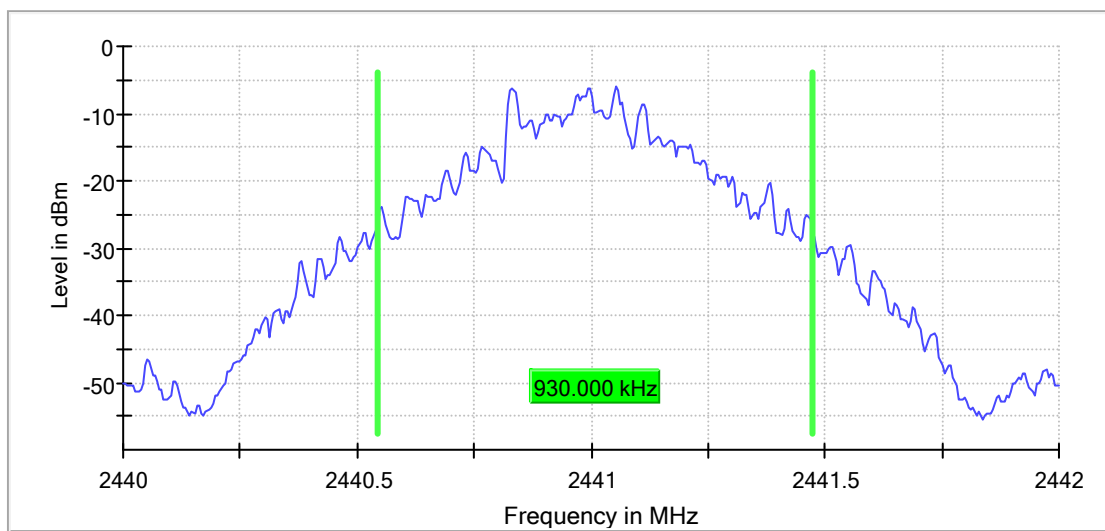
BDR Mode, DH1

RBW=10KHz VBW=30KHz

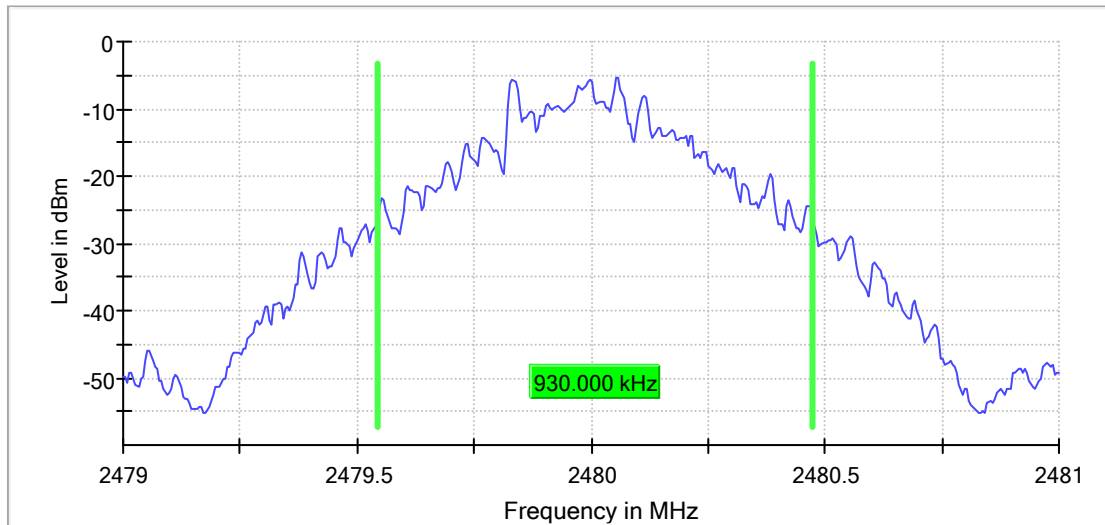
20 dB Bandwidth



20 dB Bandwidth



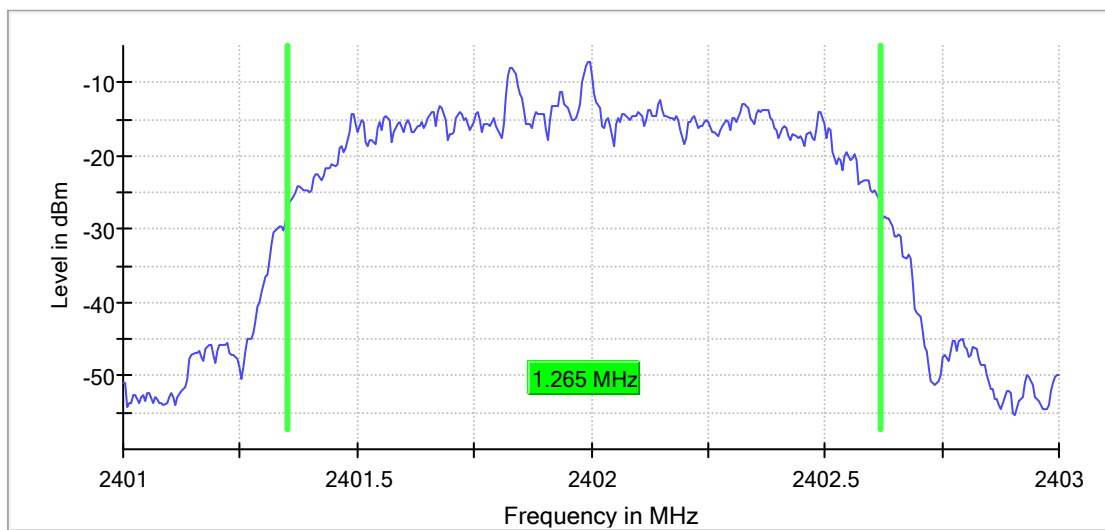
20 dB Bandwidth



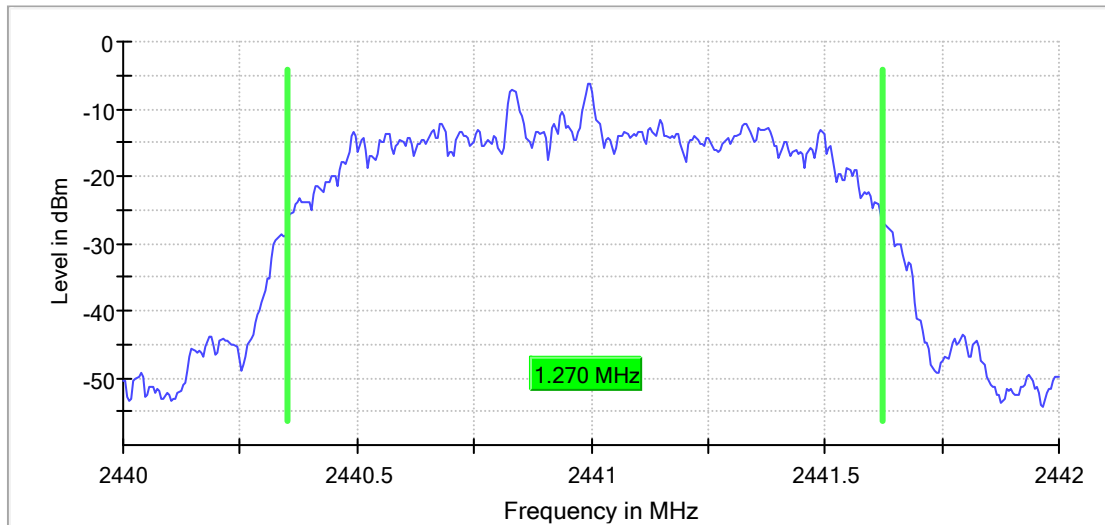
EDR Mode, 3DH1

RBW=30KHz VBW=100KHz

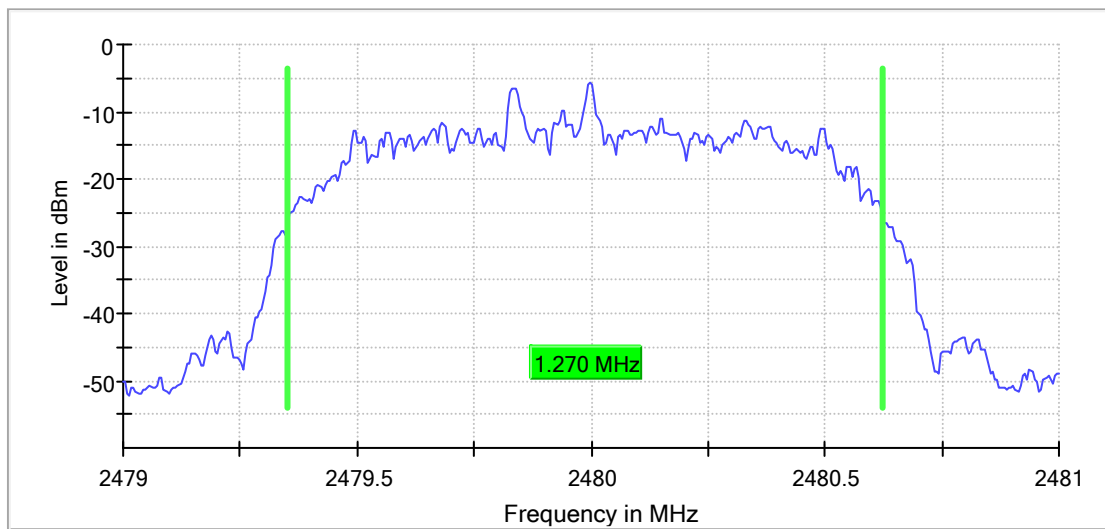
20 dB Bandwidth



20 dB Bandwidth

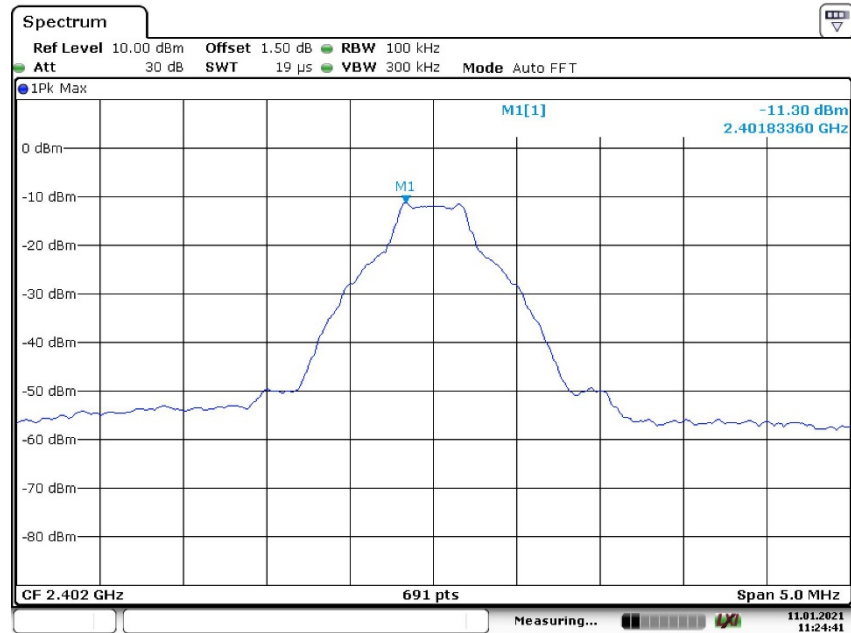


20 dB Bandwidth

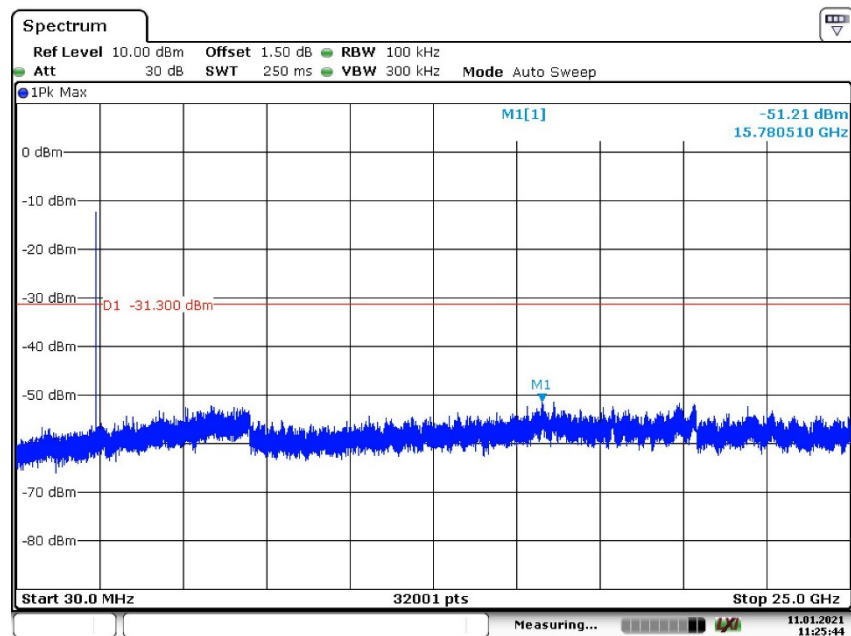


Appendix B.3: Test Plots of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

BDR Mode, Low Channel

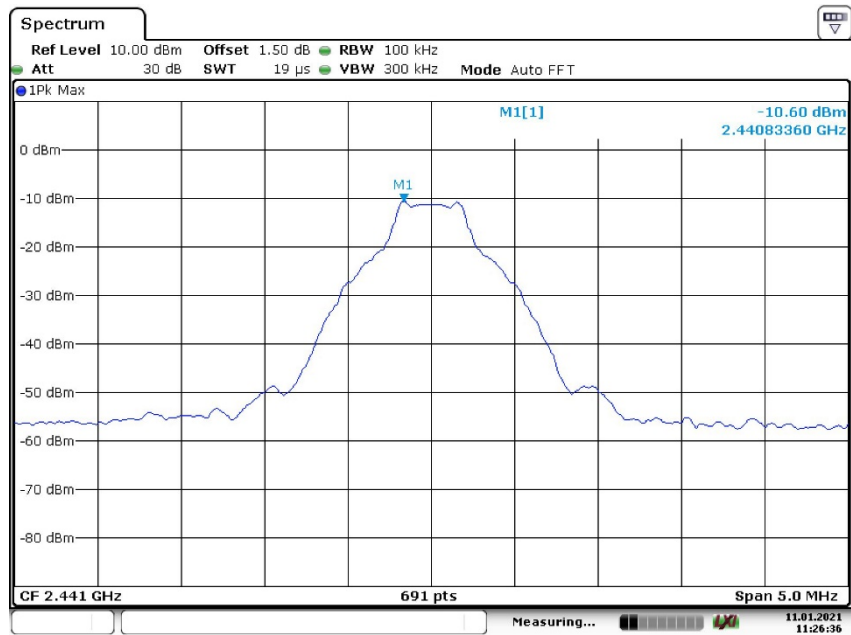


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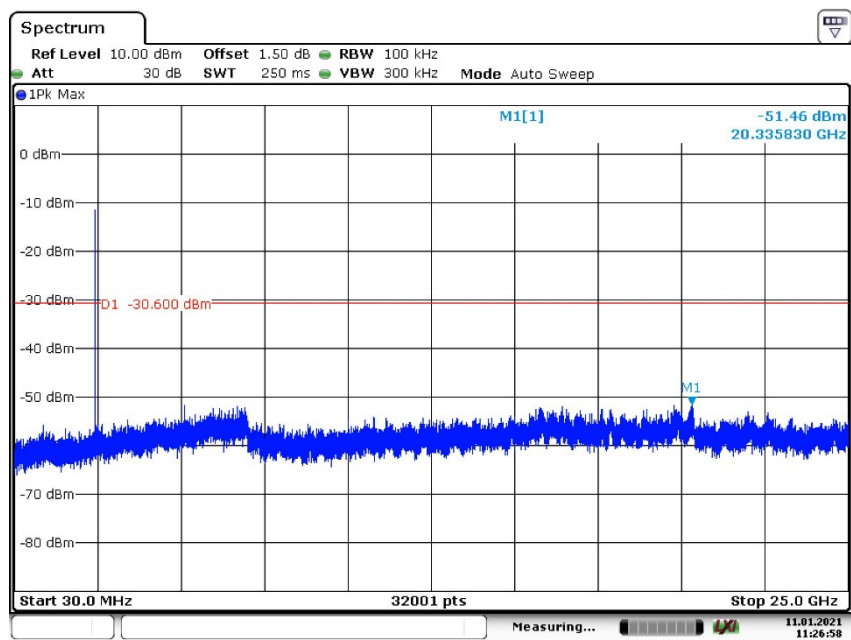


Date: 11.JAN.2021 11:25:44

BDR Mode, Middle Channel

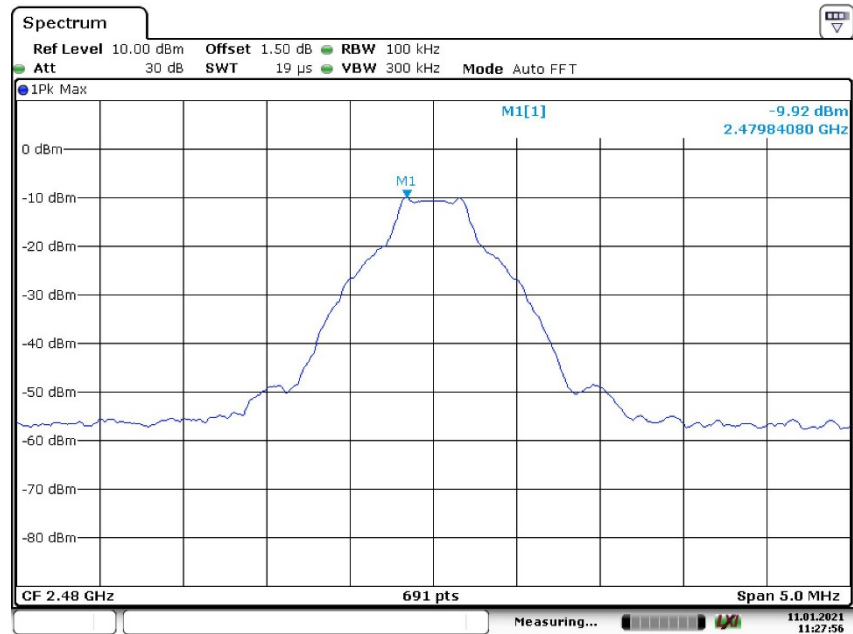


Date: 11.JAN.2021 11:26:37

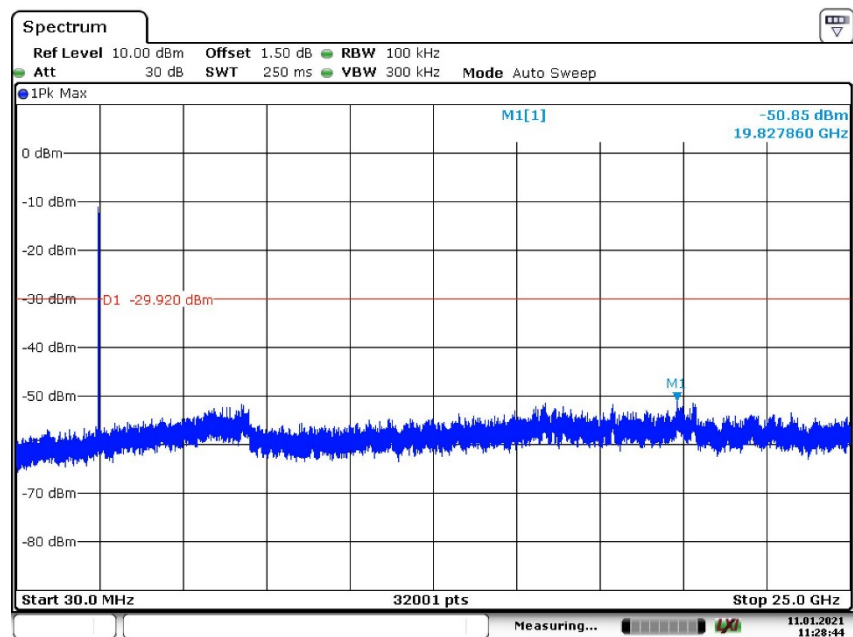


Date: 11.JAN.2021 11:26:58

BDR Mode, High Channel

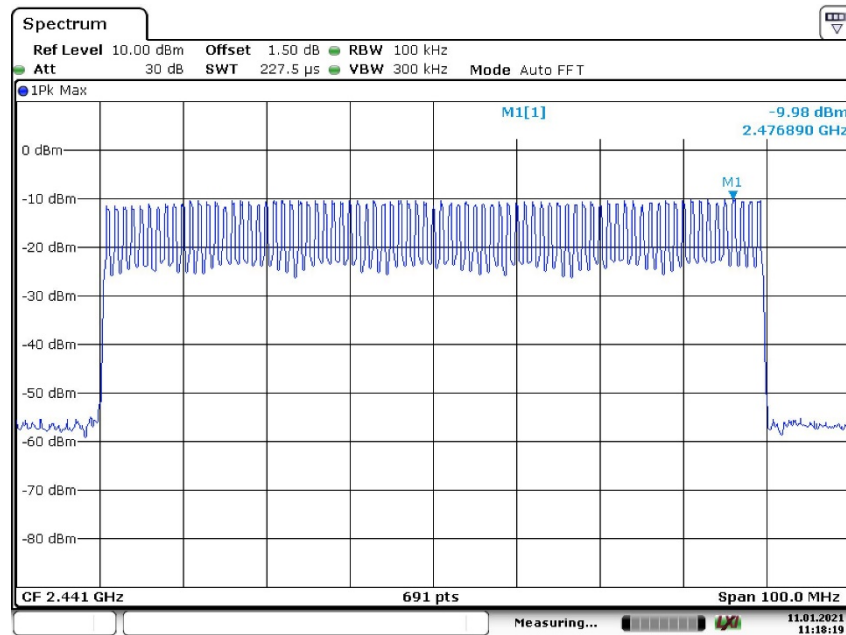


Date: 11.JAN.2021 11:27:57

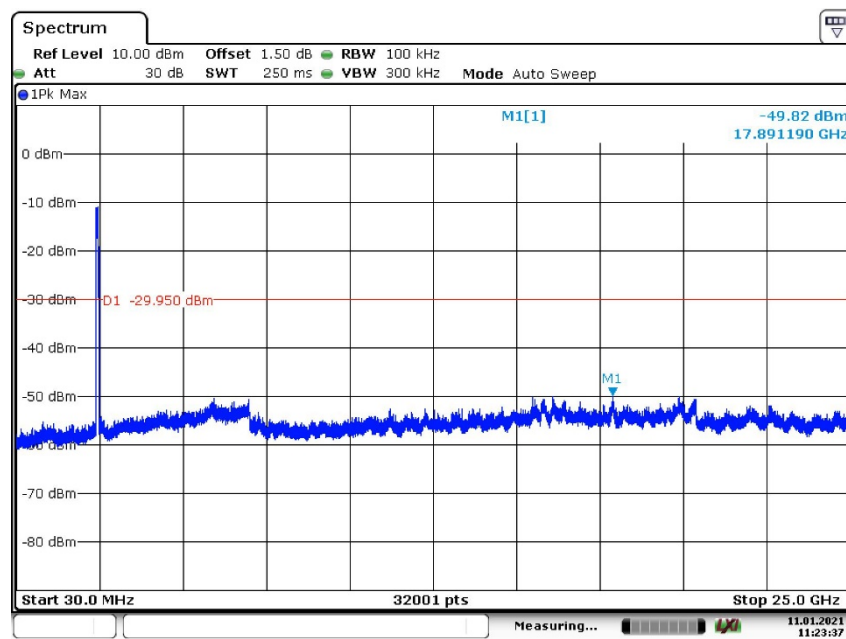


Date: 11.JAN.2021 11:28:45

BDR, Hopping

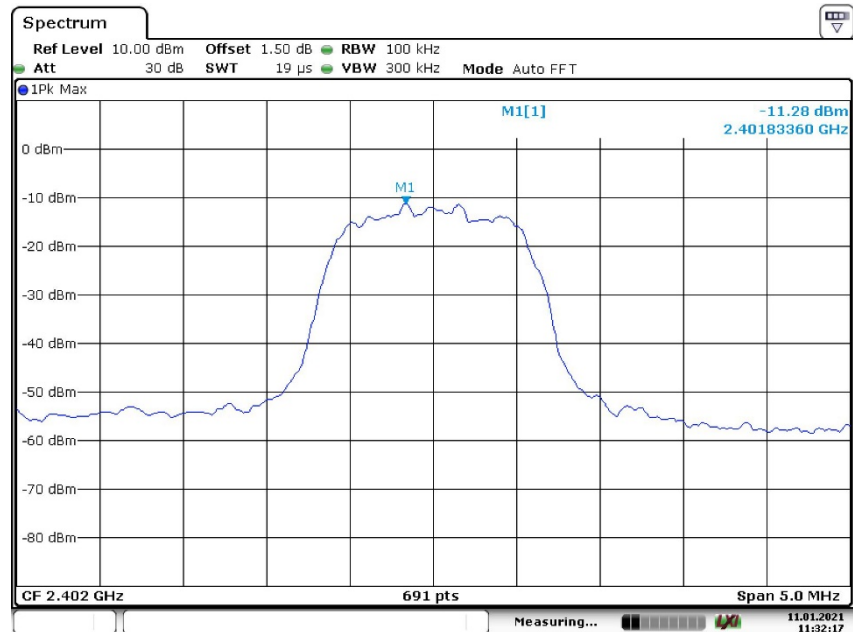


Date: 11.JAN.2021 11:18:19

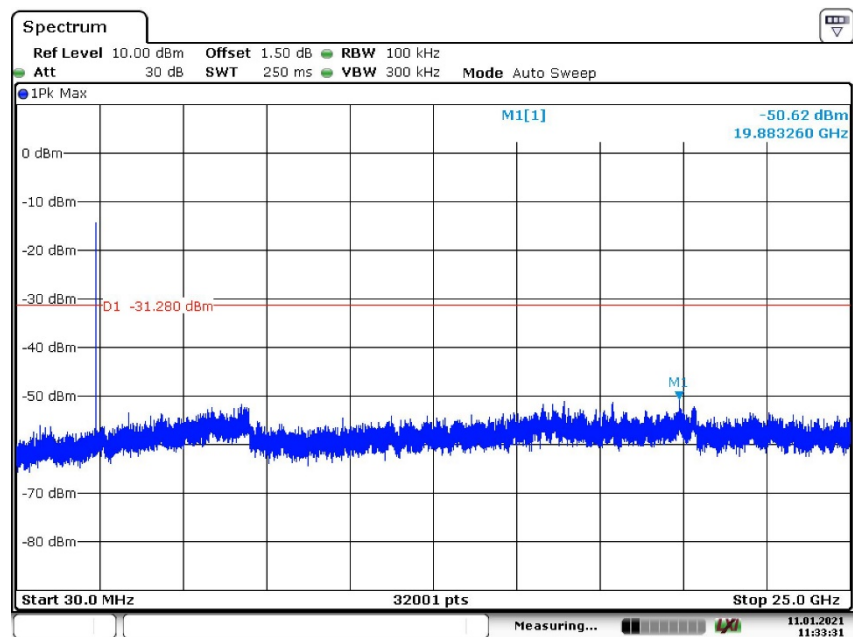


Date: 11.JAN.2021 11:23:37

EDR Mode, Low Channel

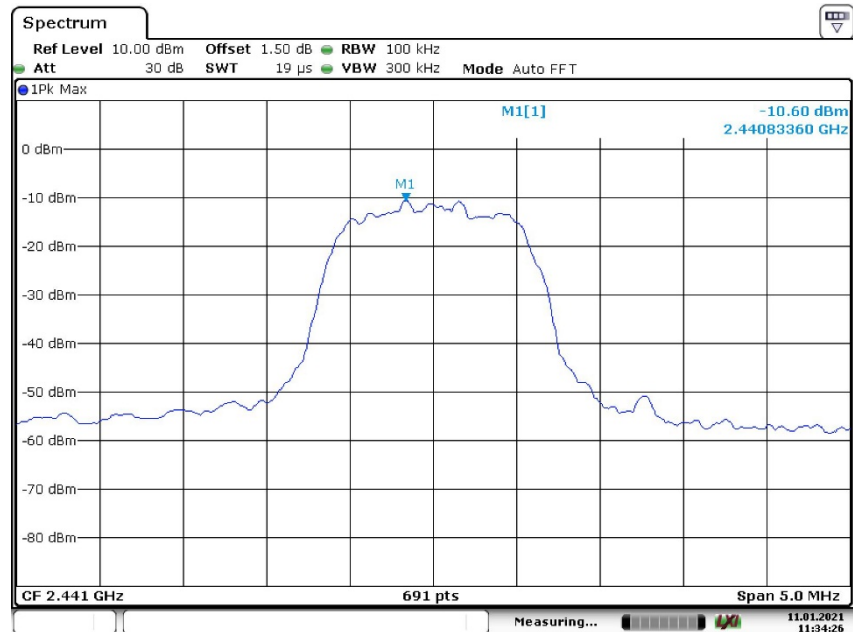


Date: 11.JAN.2021 11:32:18

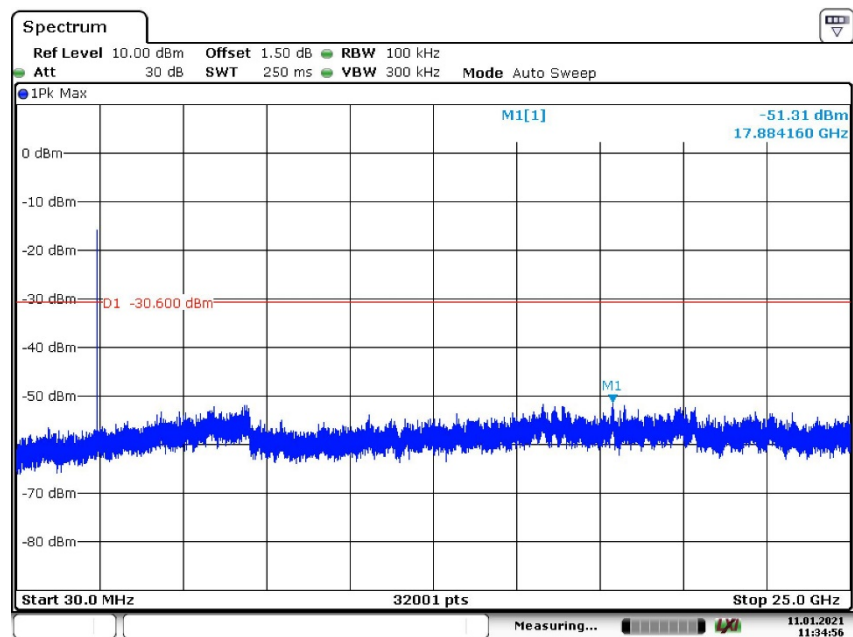


Date: 11.JAN.2021 11:33:32

EDR Mode, Middle Channel

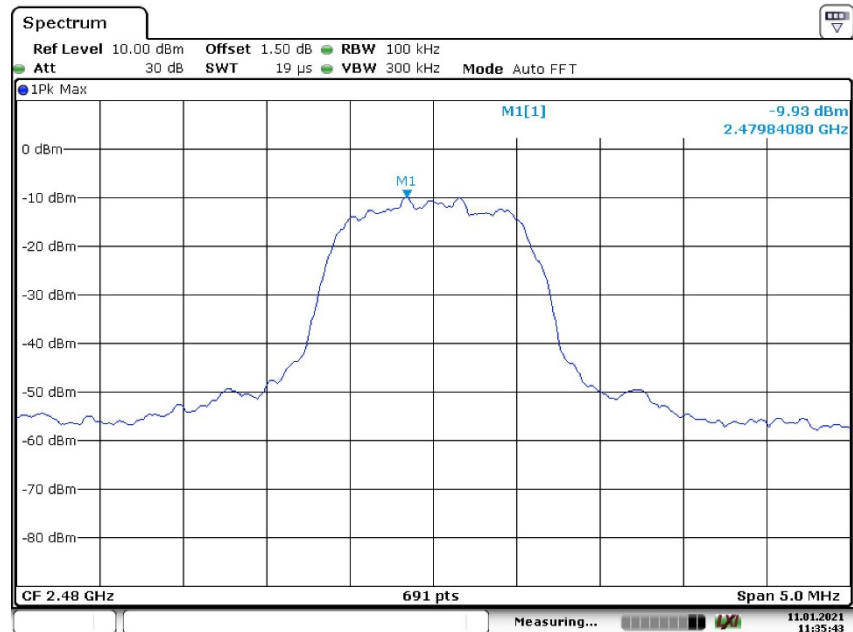


Date: 11.JAN.2021 11:34:27

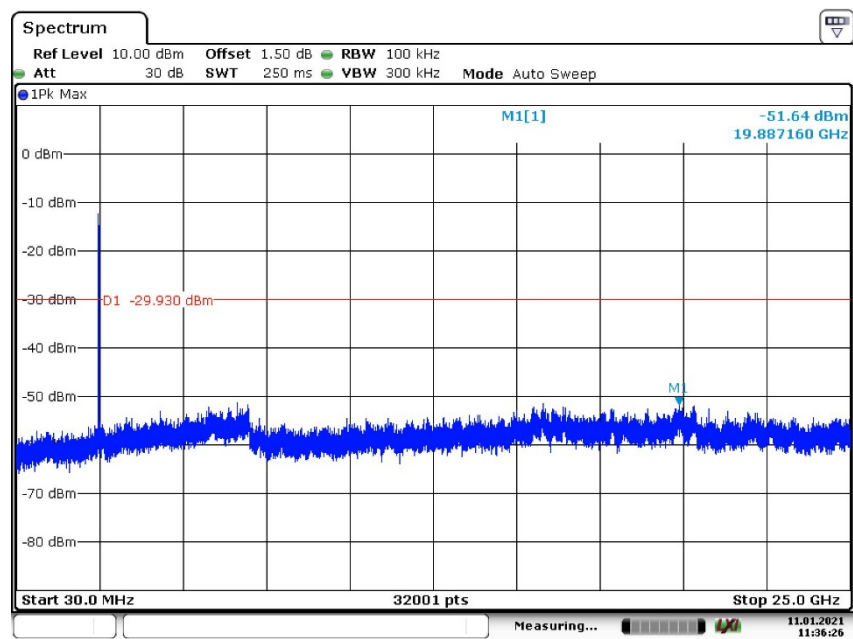


Date: 11.JAN.2021 11:34:57

EDR Mode, High Channel

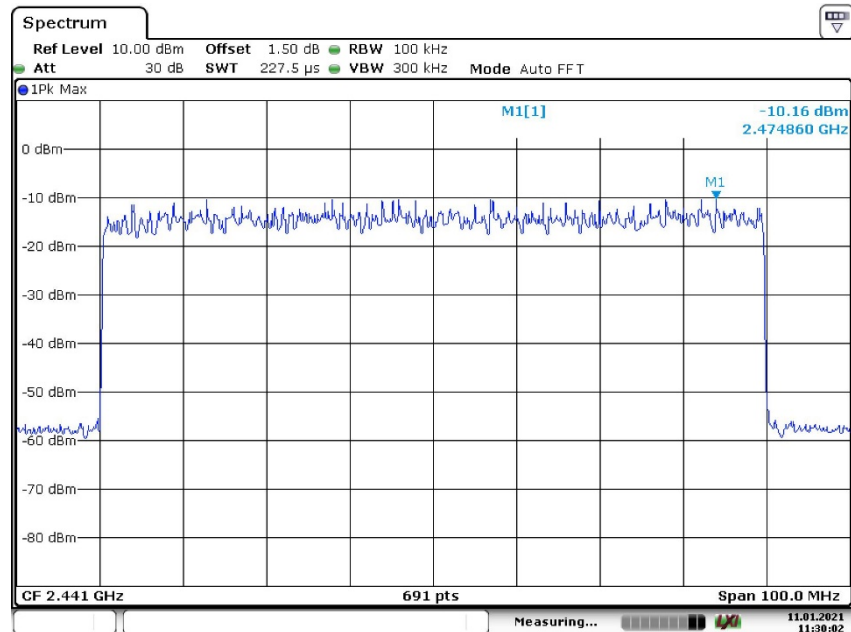


Date: 11.JAN.2021 11:35:43

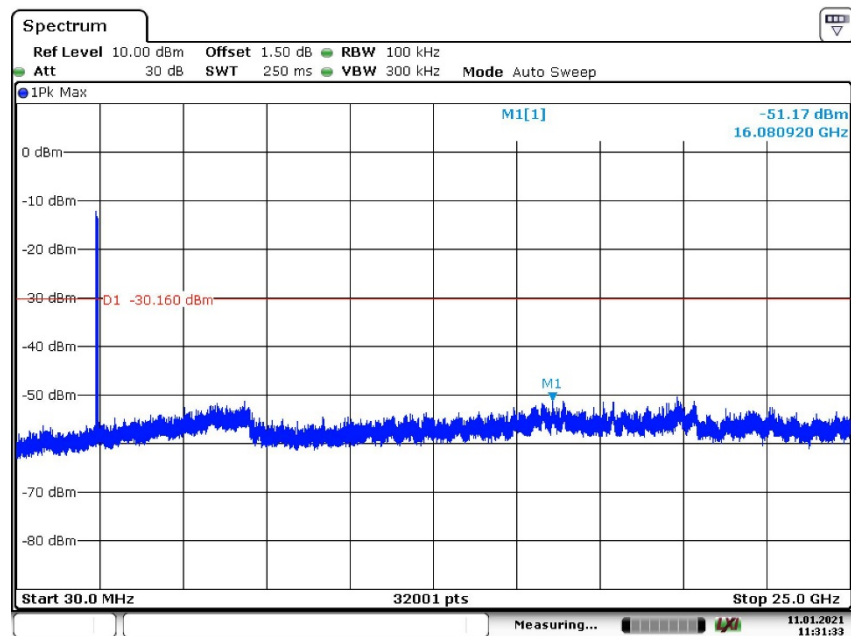


Date: 11.JAN.2021 11:36:26

EDR, Hopping

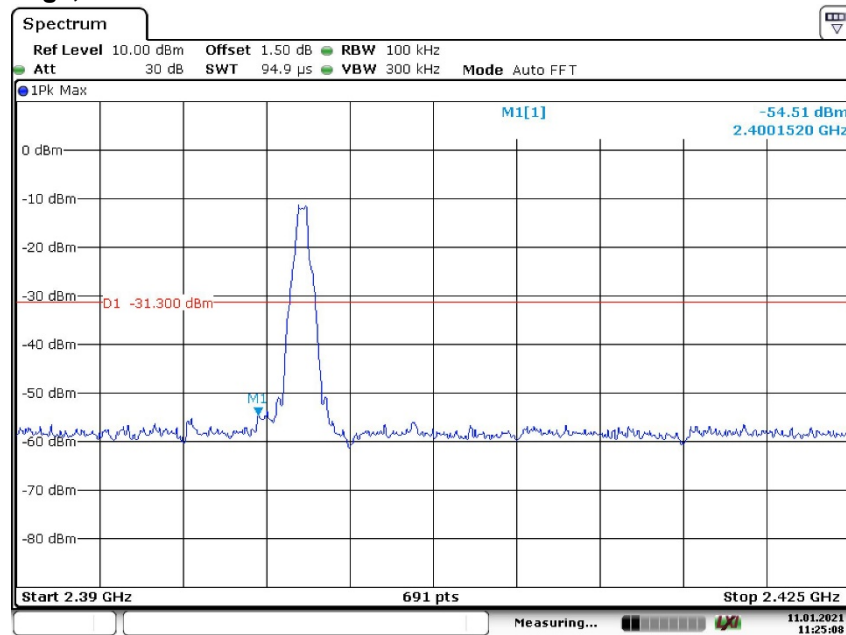


Date: 11.JAN.2021 11:30:03



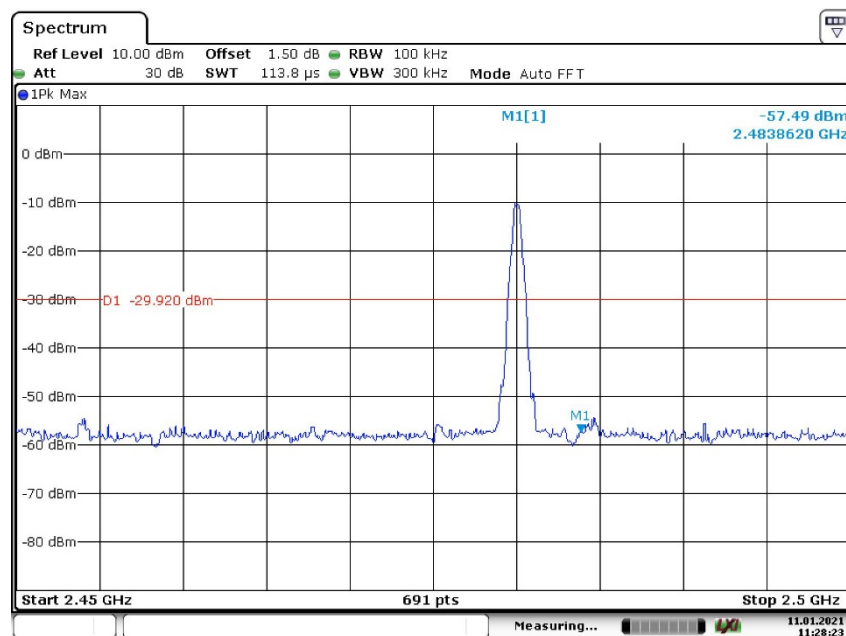
Date: 11.JAN.2021 11:31:34

BDR Mode, Band Edge, Low Channel



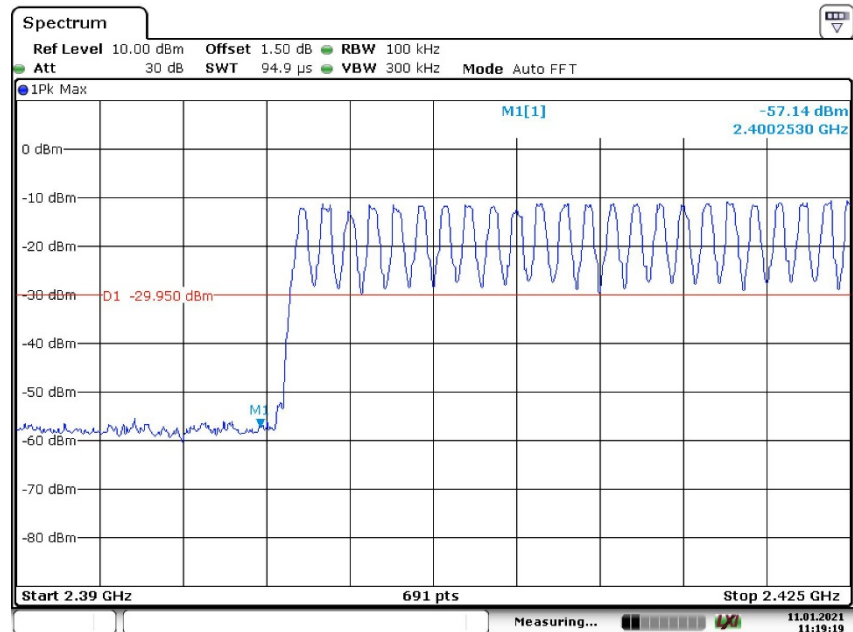
Date: 11.JAN.2021 11:25:09

BDR Mode, Band Edge, High Channel

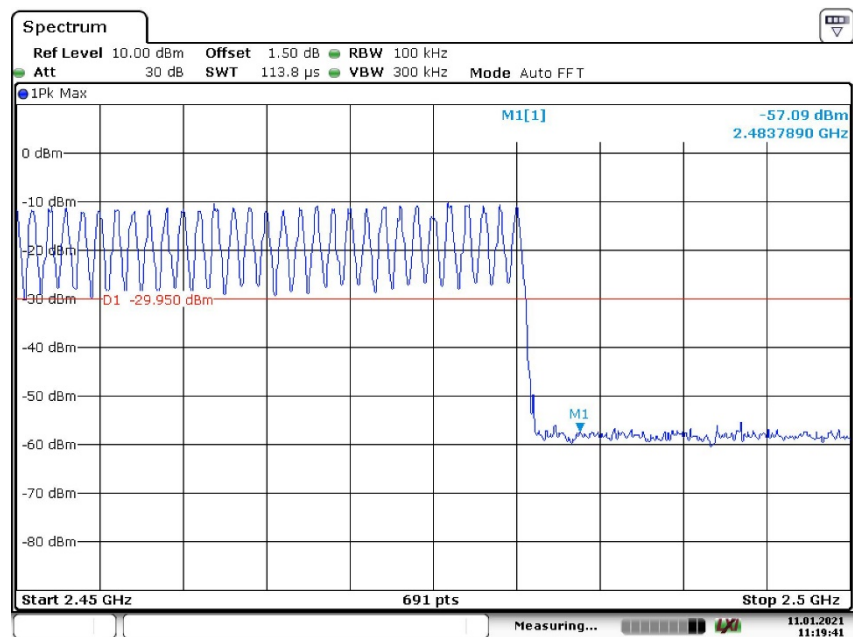


Date: 11.JAN.2021 11:28:24

BDR Mode, Hopping Band Edge

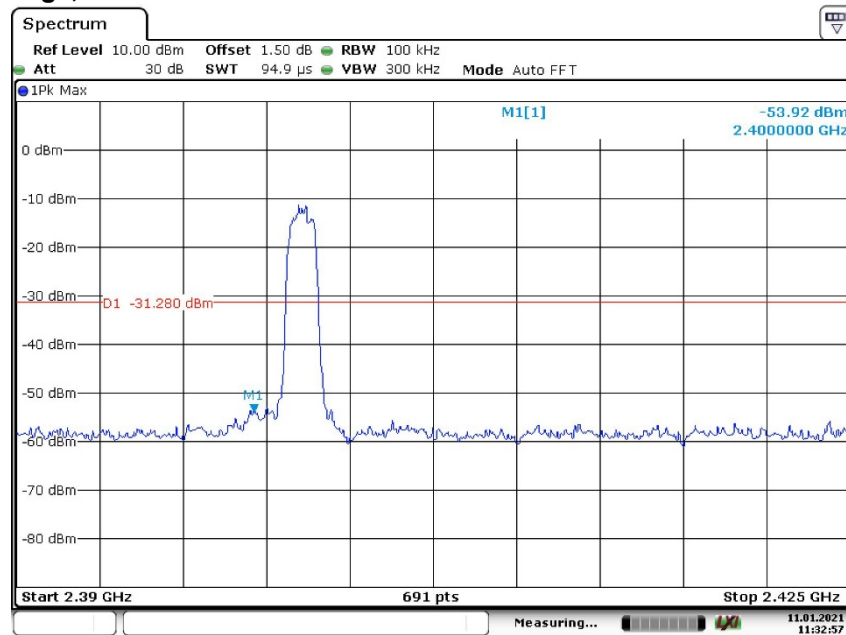


Date: 11.JAN.2021 11:19:19



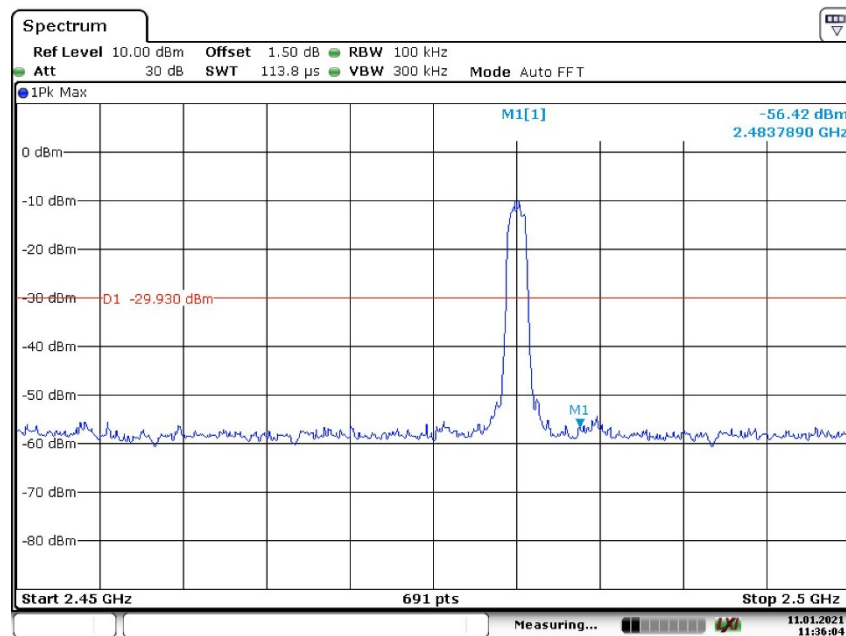
Date: 11.JAN.2021 11:19:42

EDR Mode, Band Edge, Low Channel



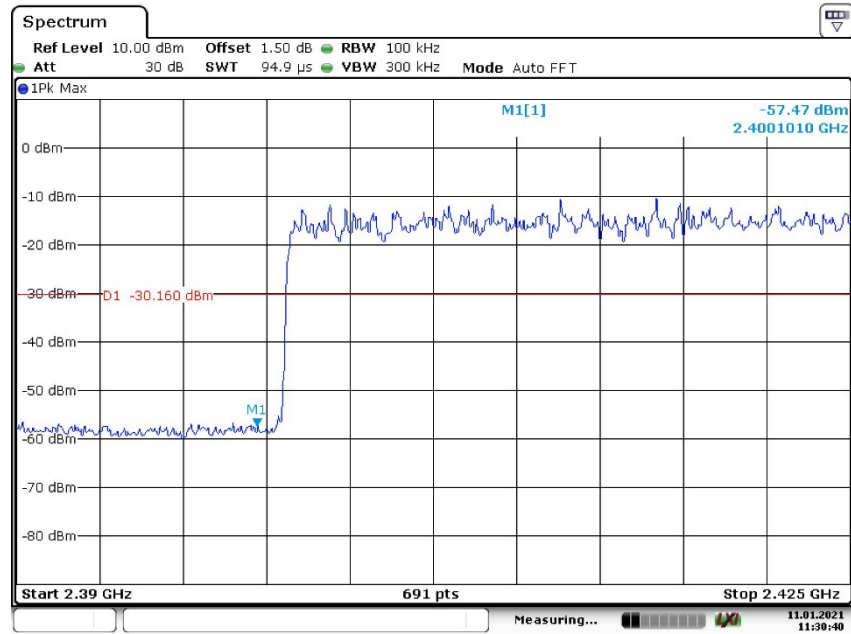
Date: 11.JAN.2021 11:32:57

EDR Mode, Band Edge, High Channel

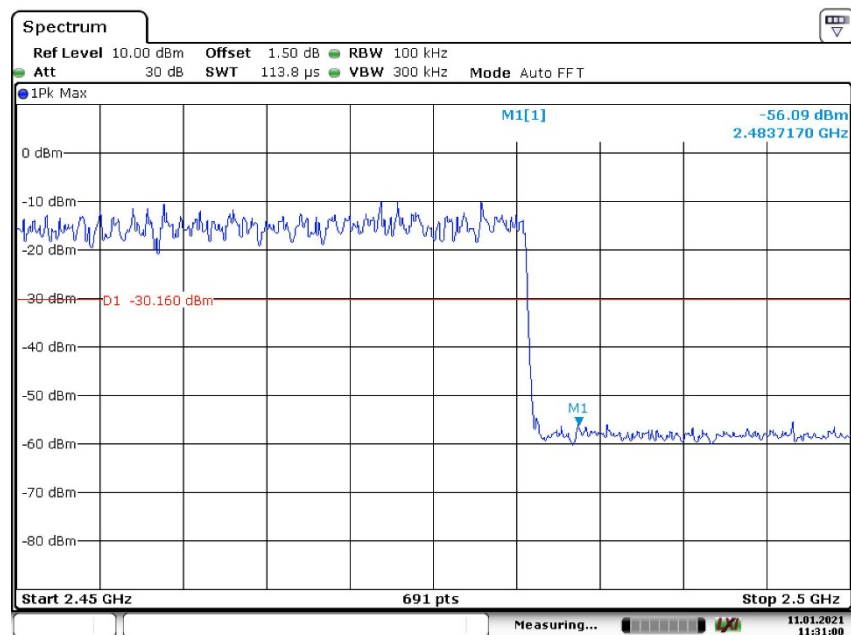


Date: 11.JAN.2021 11:36:05

EDR Mode, Hopping Band Edge



Date: 11.JAN.2021 11:30:41



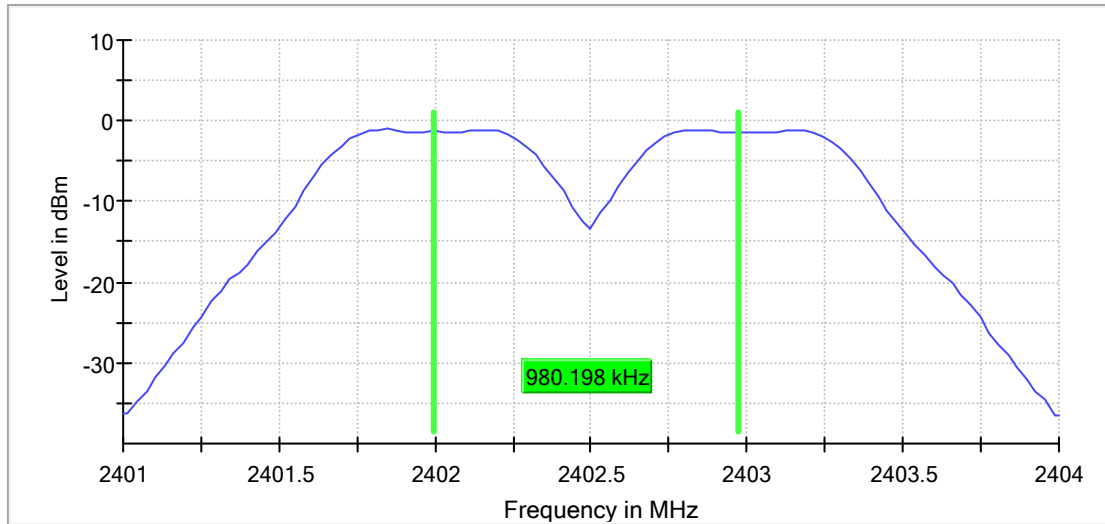
Date: 11.JAN.2021 11:31:01

Appendix B.4: Test Plots of Carrier Frequency Separation

BDR, Low Channel

RBW=300KHz, VBW=300KHz

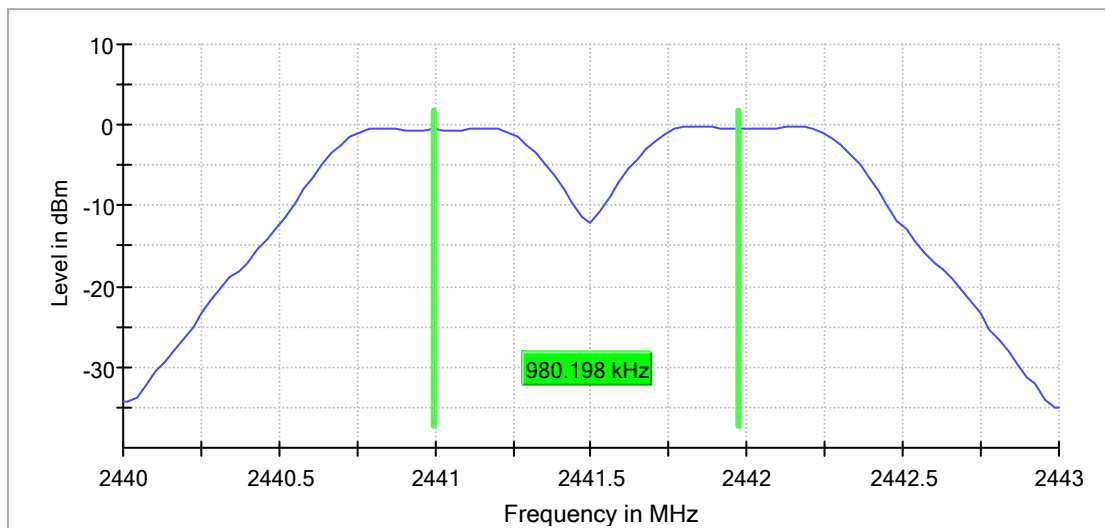
CFS



BDR, Middle Channel

RBW=300KHz, VBW=300KHz

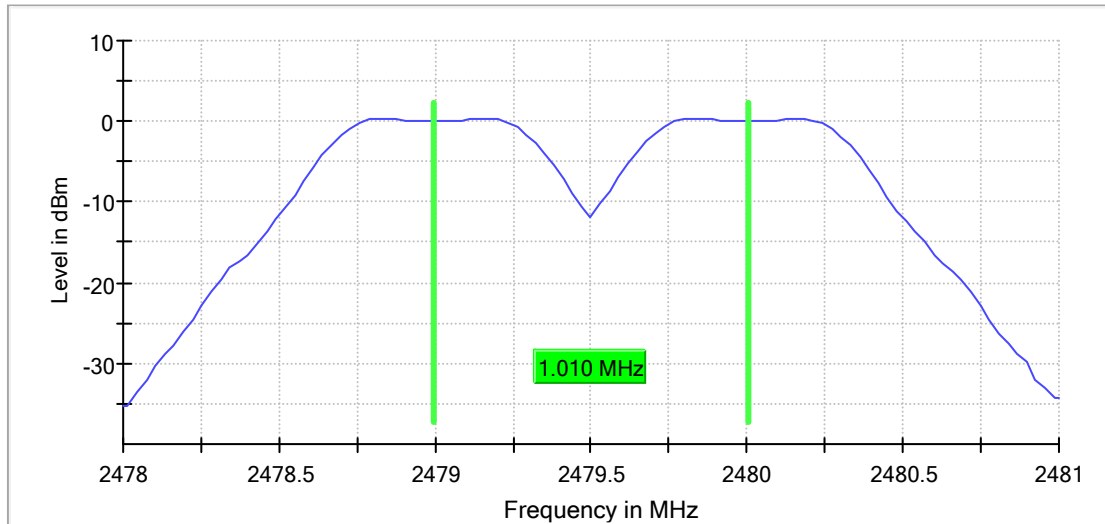
CFS



BDR, High Channel

RBW=300KHz, VBW=300KHz

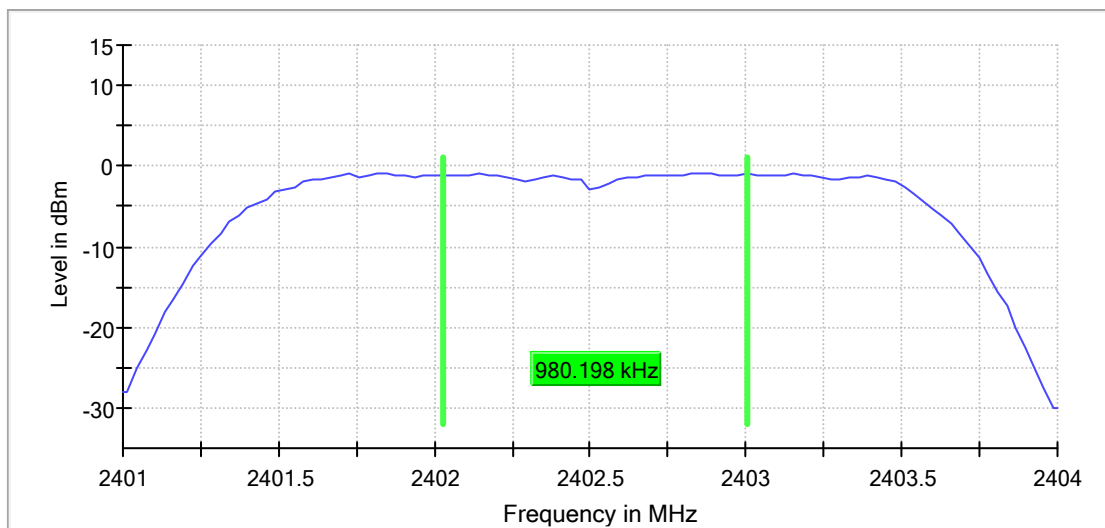
CFS



EDR, Low Channel

RBW=300KHz, VBW=300KHz

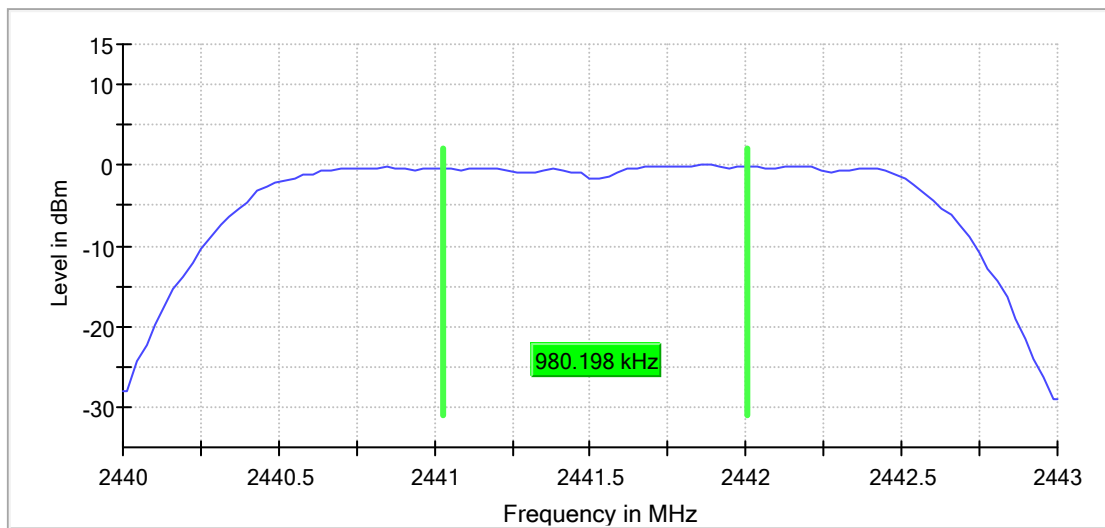
CFS



EDR, Middle Channel

RBW=300KHz, VBW=300KHz

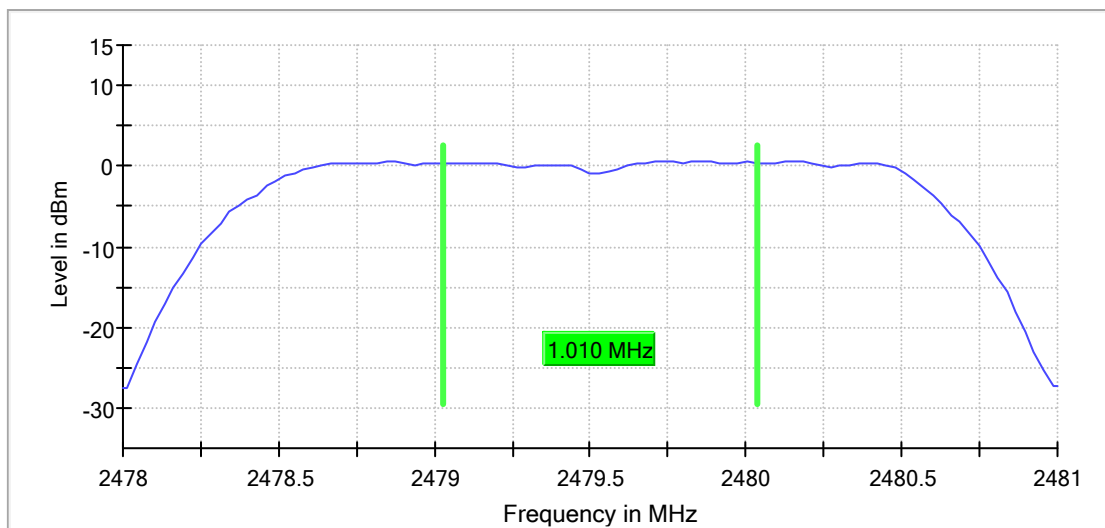
CFS



EDR, High Channel

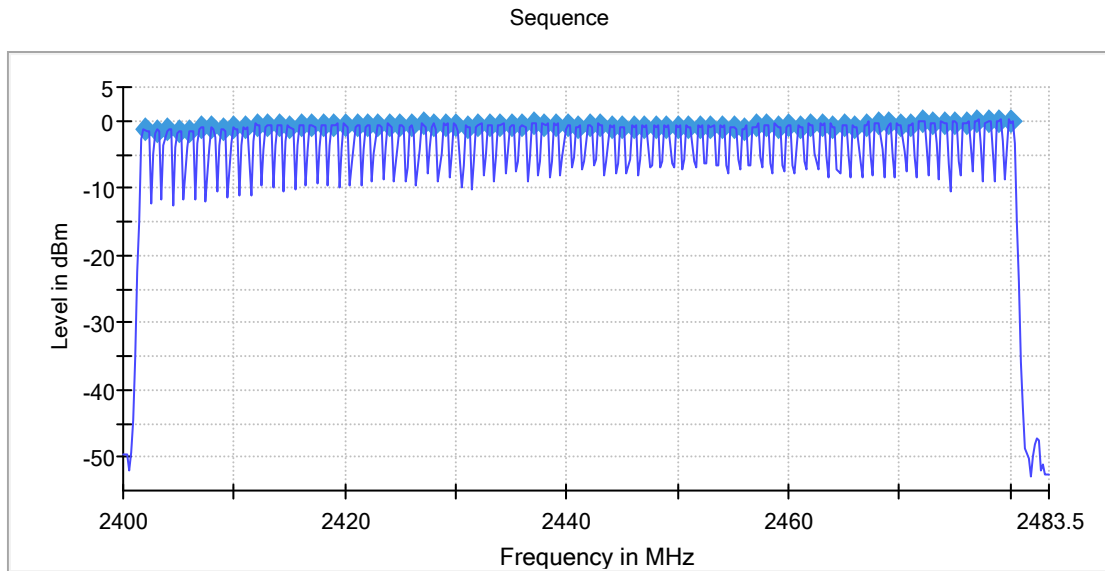
RBW=300KHz, VBW=300KHz

CFS

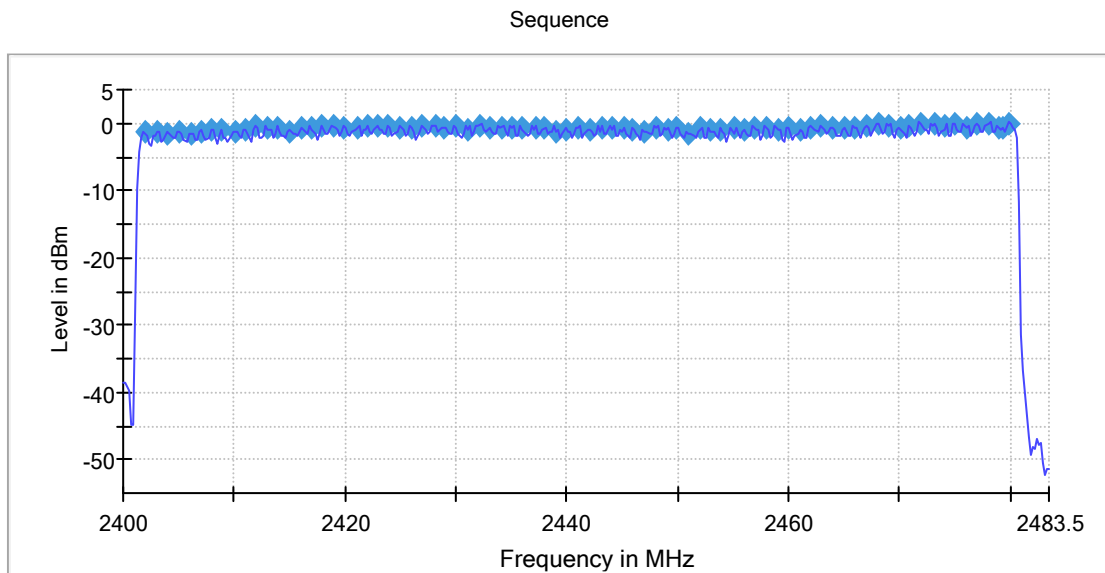


Appendix B.5: Test Plots of Number of Hopping Frequency

BDR, Hopping



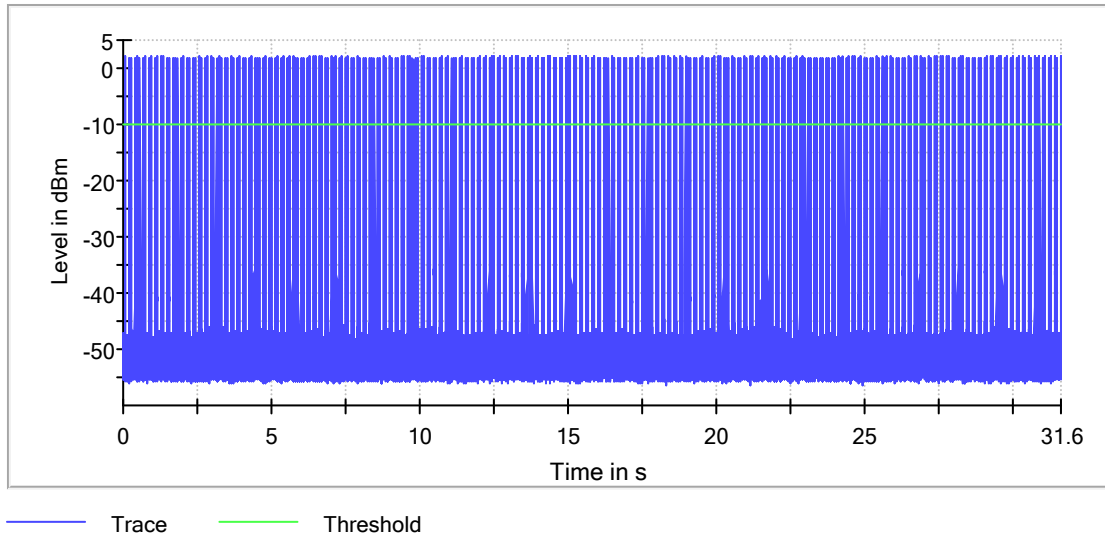
EDR, Hopping



Appendix B.6: Test Plots of Time of Occupancy

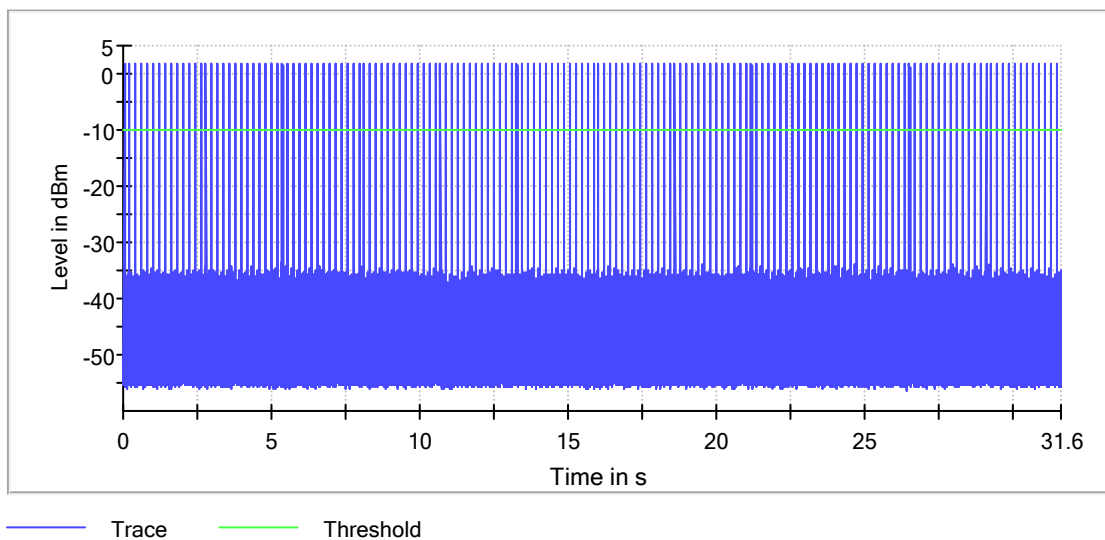
BDR Mode, DH1, Middle Channel

Time of Channel Occupancy



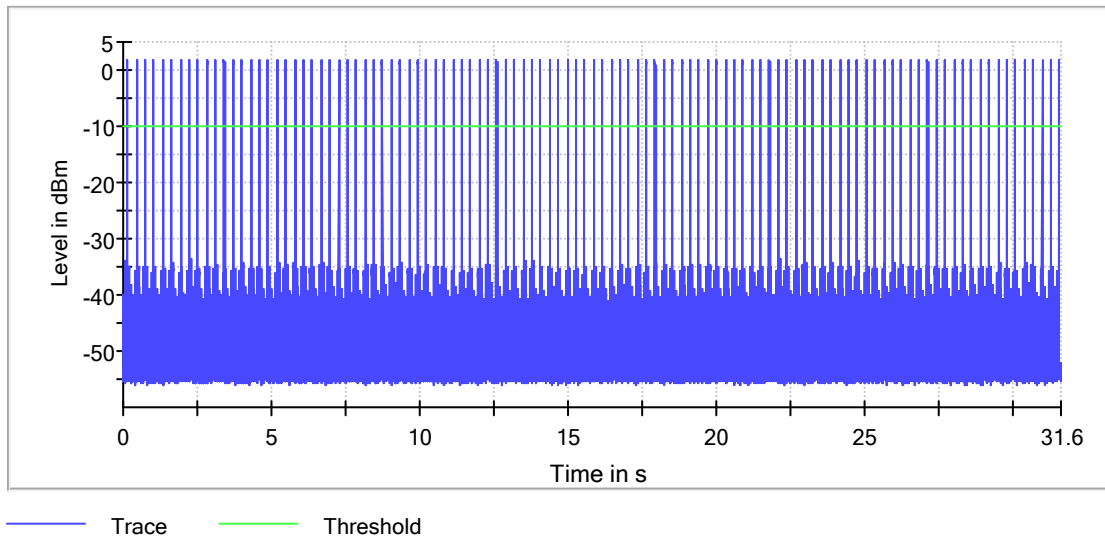
BDR Mode, DH3, Middle Channel

Time of Channel Occupancy(2)



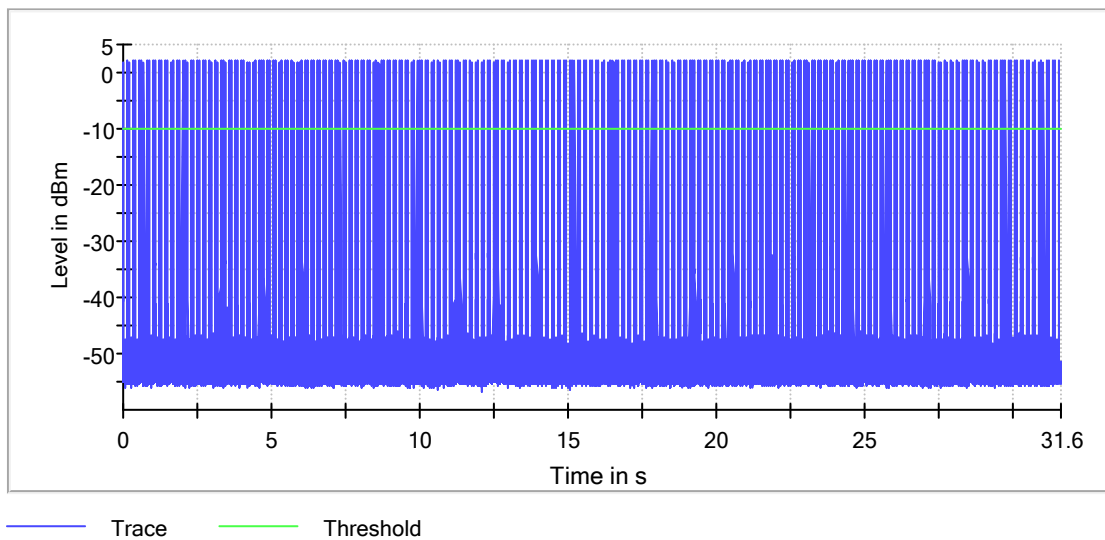
BDR Mode, DH5, Middle Channel

Time of Channel Occupancy(3)



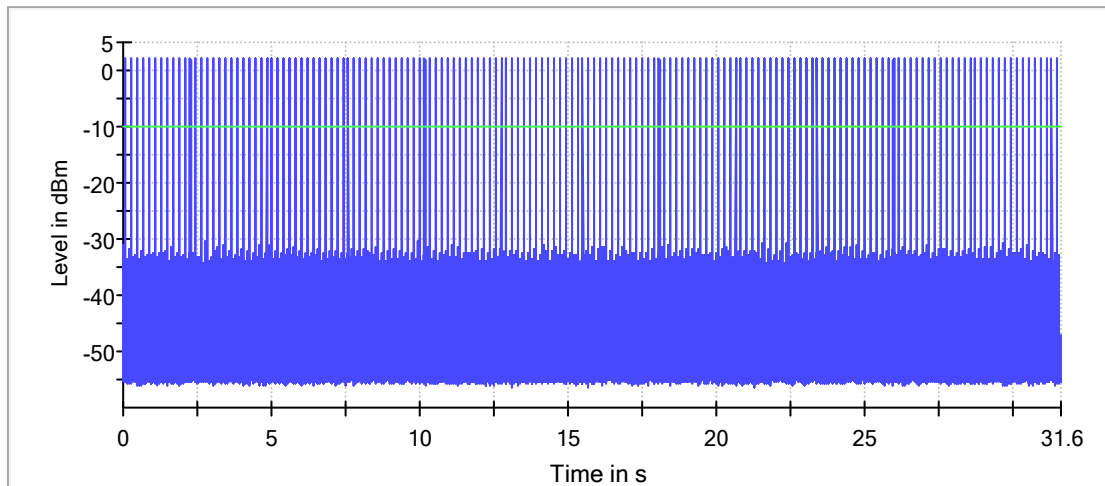
EDR Mode, 3DH1, Middle Channel

Time of Channel Occupancy



EDR Mode, 3DH3, Middle Channel

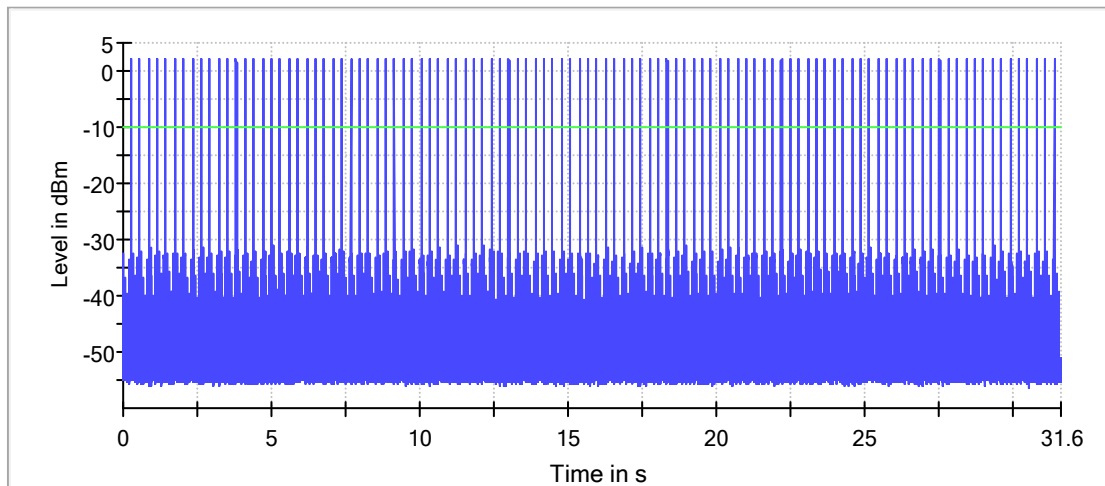
Time of Channel Occupancy(2)



Trace Threshold

EDR Mode, 3DH5, Middle Channel

Time of Channel Occupancy(3)



Trace Threshold

Appendix C

Test Results of Radiated Emission & AC Mains Conducted Emission

APPENDIX C	1
APPENDIX C.1: TEST PLOTS OF RADIATED SPURIOUS EMISSION	2
<i>BDR mode, 30MHz - 1GHz</i>	2
<i>BDR mode, 1GHz - 6.2GHz</i>	6
<i>BDR mode, 6.2GHz - 18GHz</i>	12
APPENDIX C.2: TEST PLOTS OF BAND EDGE (RADIATED)	18
<i>BDR mode, Low Channel</i>	18
<i>BDR mode, High Channel</i>	20
APPENDIX C.3: TEST PLOTS OF AC MAINS CONDUCTED EMISSION	22

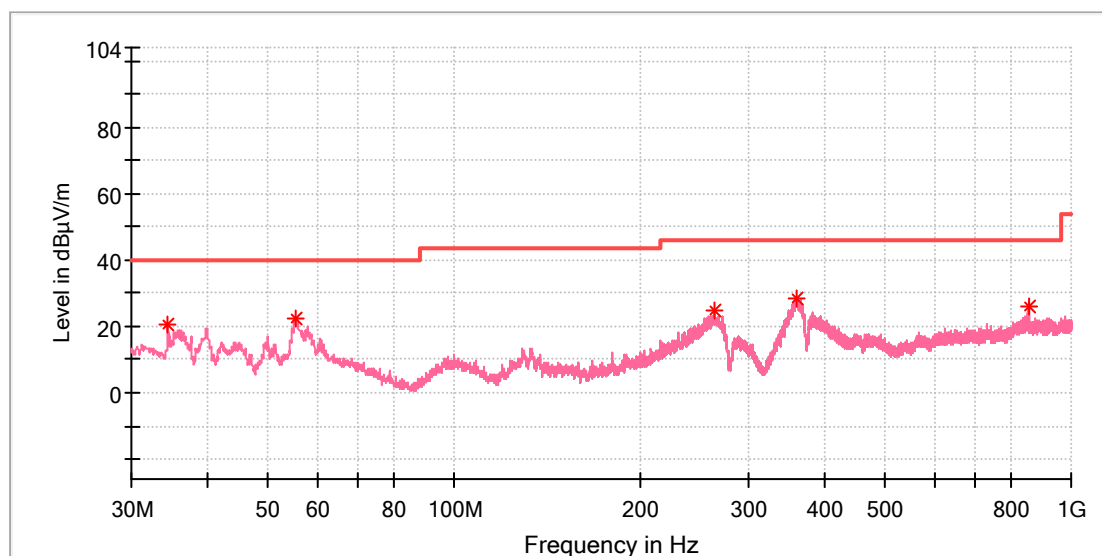
Note: The radiated spurious emission were measured from 9KHz to 26.5GHz, the measurement results below 30MHz and above 18GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

Appendix C.1: Test Plots of Radiated Spurious Emission

BDR mode, 30MHz - 1GHz

EUT Information

EUT Name:	Powerful Bluetooth speaker
Model:	X3
Test Mode:	TX_DH5_Low CH
Test Voltage::	Battery
Remark:	Temp 23 Humi:47%
Test Standard:	FCC 15.247
Tested By:	Alano Qu
Reviewed By:	Terry Yin

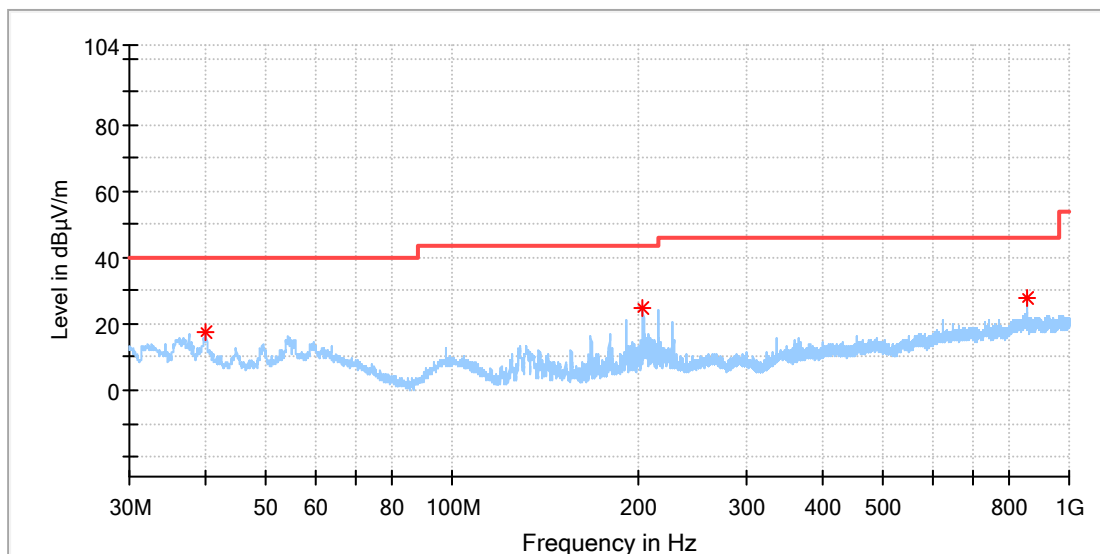


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.316500	20.61	---	40.00	19.39	100.0	V	164.0	-22.5
55.268500	22.28	---	40.00	17.72	100.0	V	13.0	-18.8
263.964000	24.77	---	46.00	21.23	100.0	V	84.0	-17.4
358.199500	28.60	---	46.00	17.40	100.0	V	154.0	-15.0
851.590000	26.25	---	46.00	19.75	100.0	V	274.0	-5.9

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_Low CH
Test Voltage:: Battery
Remark: Temp 23 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

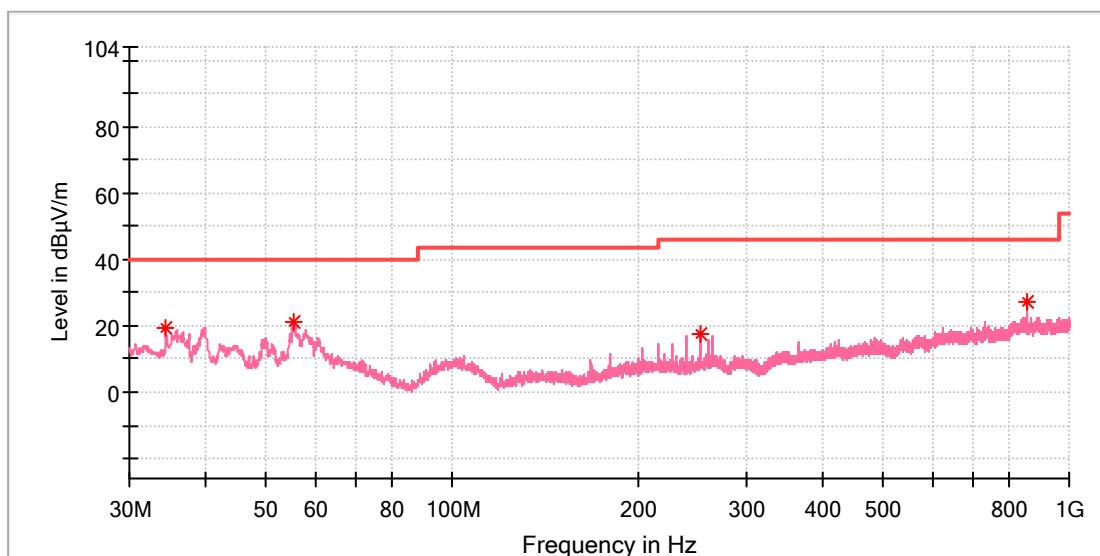


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.894000	17.33	---	40.00	22.67	100.0	H	348.0	-20.4
203.969500	24.97	---	43.50	18.53	100.0	H	220.0	-19.3
852.560000	27.52	---	46.00	18.48	100.0	H	320.0	-5.9

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_High CH
Test Voltage:: Battery
Remark: Temp 23 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

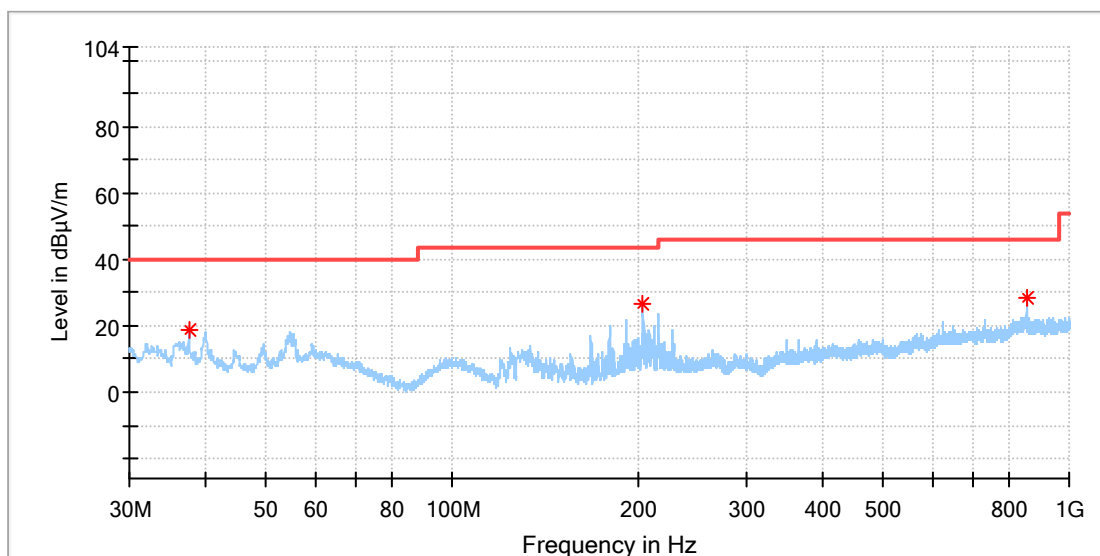


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.365000	19.16	---	40.00	20.84	100.0	V	282.0	-22.5
55.220000	20.90	---	40.00	19.10	100.0	V	105.0	-18.8
252.033000	17.70	---	46.00	28.30	100.0	V	311.0	-17.6
852.560000	27.51	---	46.00	18.49	100.0	V	271.0	-5.9

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_High CH
Test Voltage:: Battery
Remark: Temp 23 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



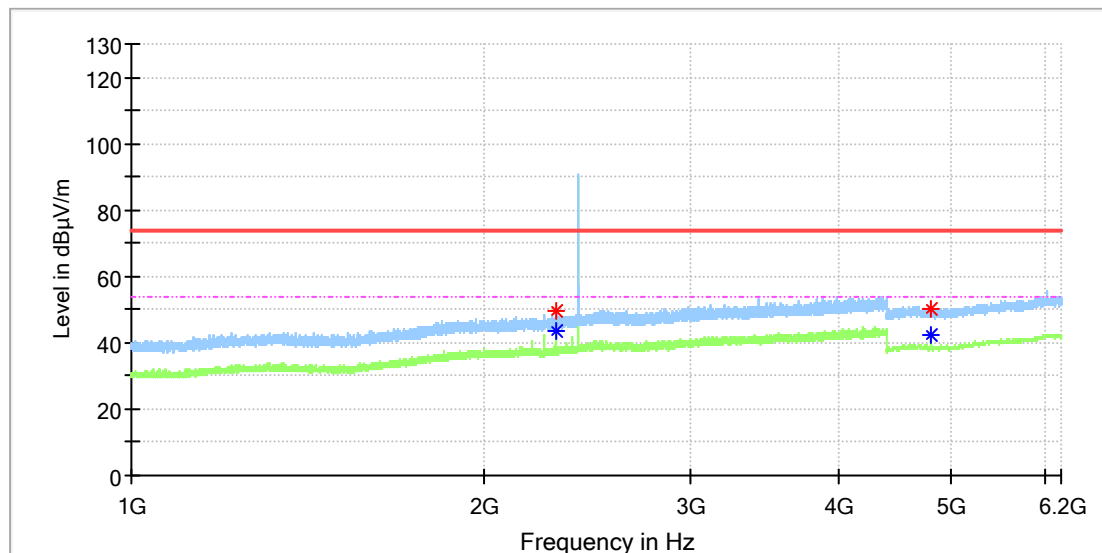
Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
37.469000	18.92	---	40.00	21.08	100.0	H	328.0	-21.3
203.969500	26.82	---	43.50	16.68	100.0	H	189.0	-19.3
852.560000	28.62	---	46.00	17.38	100.0	H	200.0	-5.9

BDR mode, 1GHz - 6.2GHz

EUT Information

EUT Name:	Powerful Bluetooth speaker
Model:	X3
Test Mode:	TX_DH5_Low CH
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.247
Tested By:	Alano Qu
Reviewed By:	Terry Yin

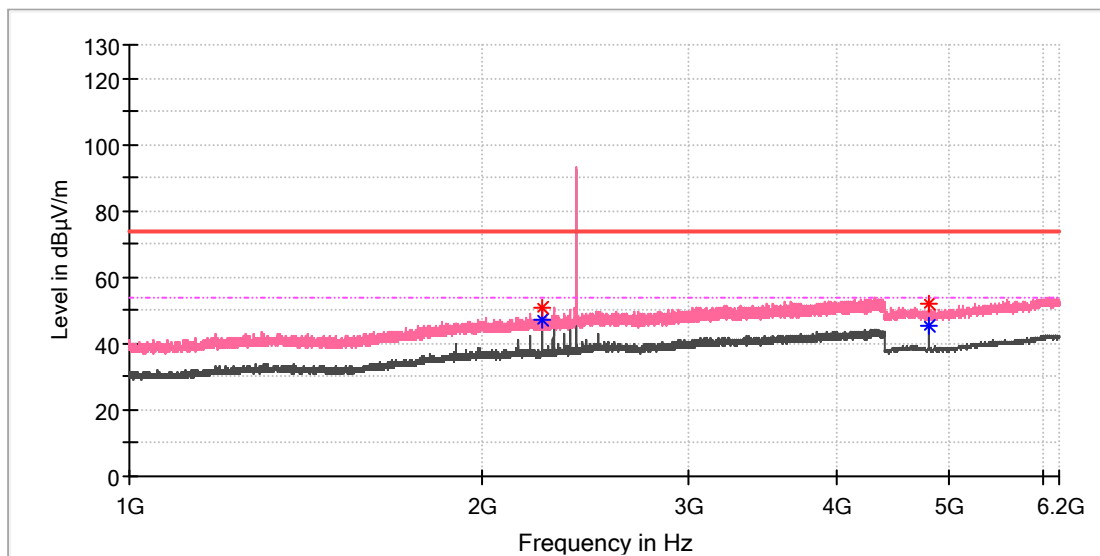


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2297.610000	49.56	---	74.00	24.44	100.0	H	284.0	6.4
2297.950000	---	43.69	54.00	10.31	100.0	H	305.0	6.4
4803.500000	---	42.40	54.00	11.60	100.0	H	94.0	11.8
4804.000000	50.39	---	74.00	23.61	100.0	H	94.0	11.8

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_Low CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

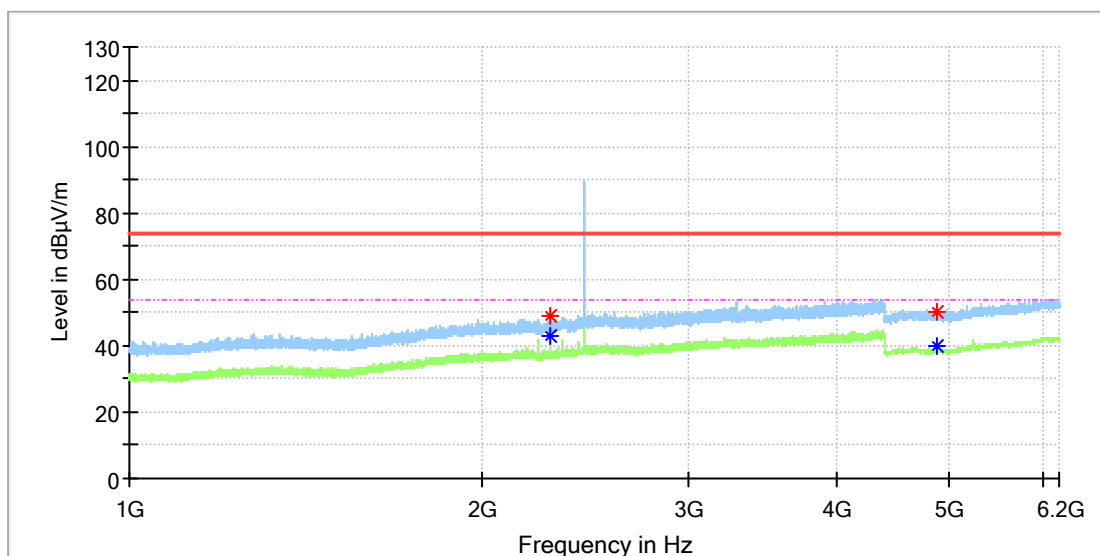


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2246.100000	50.85	---	74.00	23.15	100.0	V	141.0	6.4
2246.100000	---	47.27	54.00	6.73	100.0	V	141.0	6.4
4804.000000	51.74	---	74.00	22.26	100.0	V	211.0	11.8
4804.000000	---	45.33	54.00	8.67	100.0	V	211.0	11.8

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_Mid CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

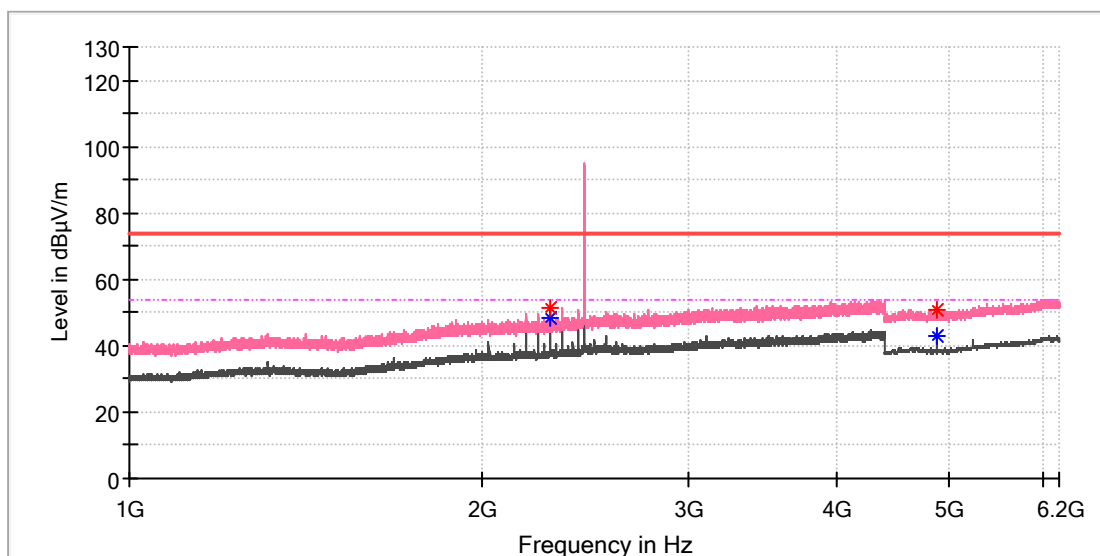


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2284.860000	49.12	---	74.00	24.88	100.0	H	281.0	6.4
2284.860000	---	43.15	54.00	10.85	100.0	H	281.0	6.4
4880.000000	50.15	---	74.00	23.85	100.0	H	34.0	11.8
4881.500000	---	40.15	54.00	13.85	100.0	H	89.0	11.8

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_Mid CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

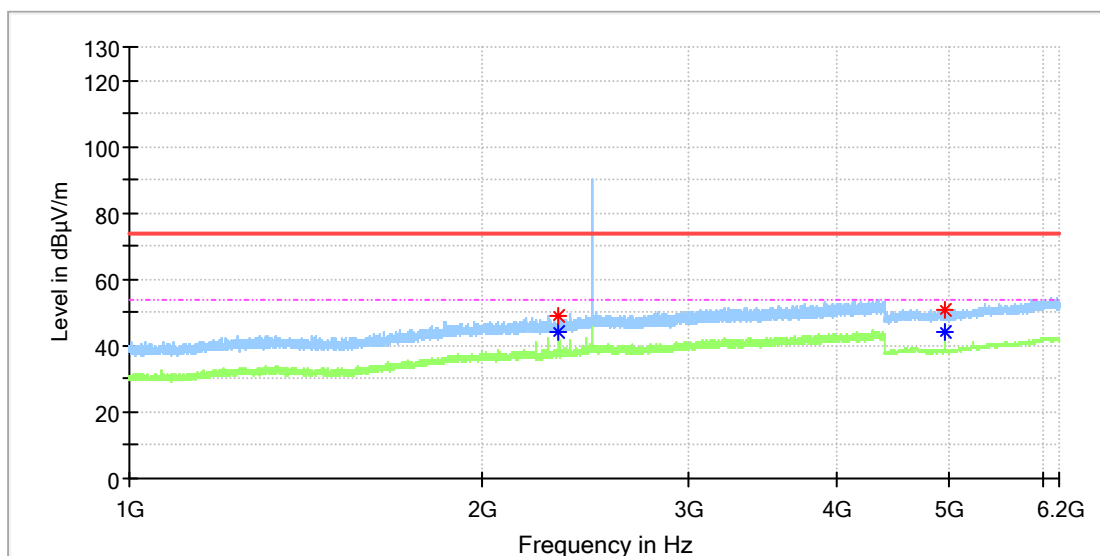


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2284.860000	51.67	---	74.00	22.33	100.0	V	197.0	6.4
2284.860000	---	48.27	54.00	5.73	100.0	V	197.0	6.4
4881.500000	50.63	---	74.00	23.37	100.0	V	213.0	11.8
4881.500000	---	42.93	54.00	11.07	100.0	V	213.0	11.8

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_High CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

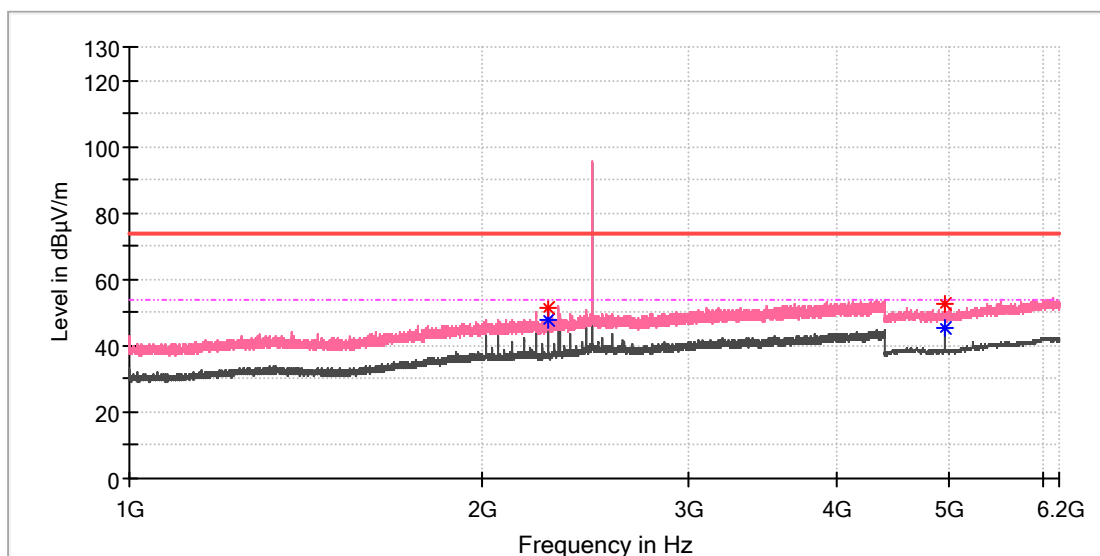


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2323.790000	49.10	---	74.00	24.90	100.0	H	261.0	6.6
2323.790000	---	43.98	54.00	10.02	100.0	H	261.0	6.6
4960.000000	50.94	---	74.00	23.06	100.0	H	91.0	11.8
4960.000000	---	44.11	54.00	9.89	100.0	H	91.0	11.8

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_High CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



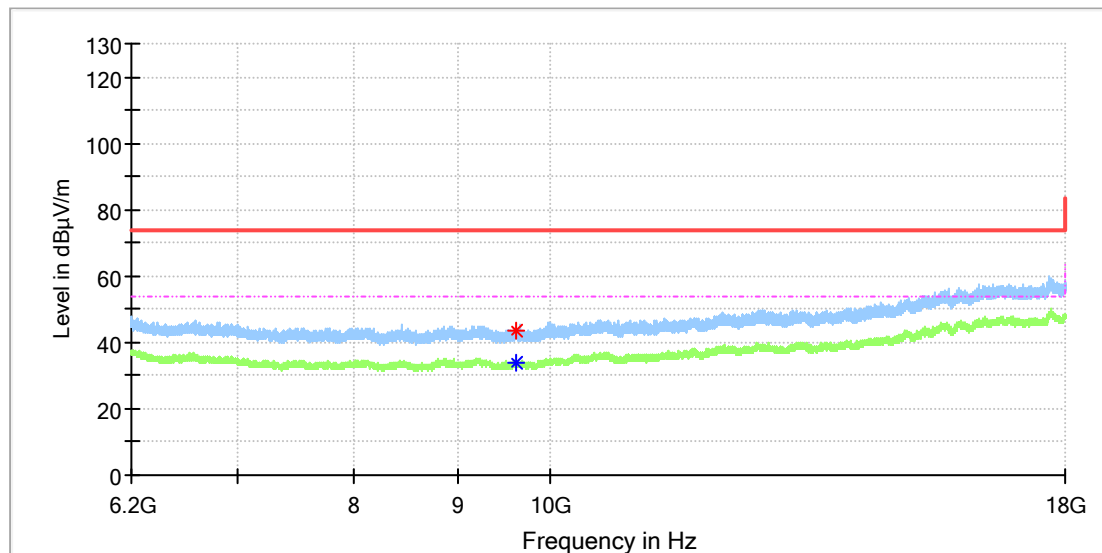
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2271.940000	51.42	---	74.00	22.58	100.0	V	149.0	6.4
2272.110000	---	48.02	54.00	5.98	100.0	V	138.0	6.4
4959.000000	52.85	---	74.00	21.15	100.0	V	209.0	11.8
4960.000000	---	45.48	54.00	8.52	100.0	V	216.0	11.8

BDR mode, 6.2GHz - 18GHz

EUT Information

EUT Name:	Powerful Bluetooth speaker
Model:	X3
Test Mode:	TX_DH5_Low CH
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.247
Tested By:	Alano Qu
Reviewed By:	Terry Yin

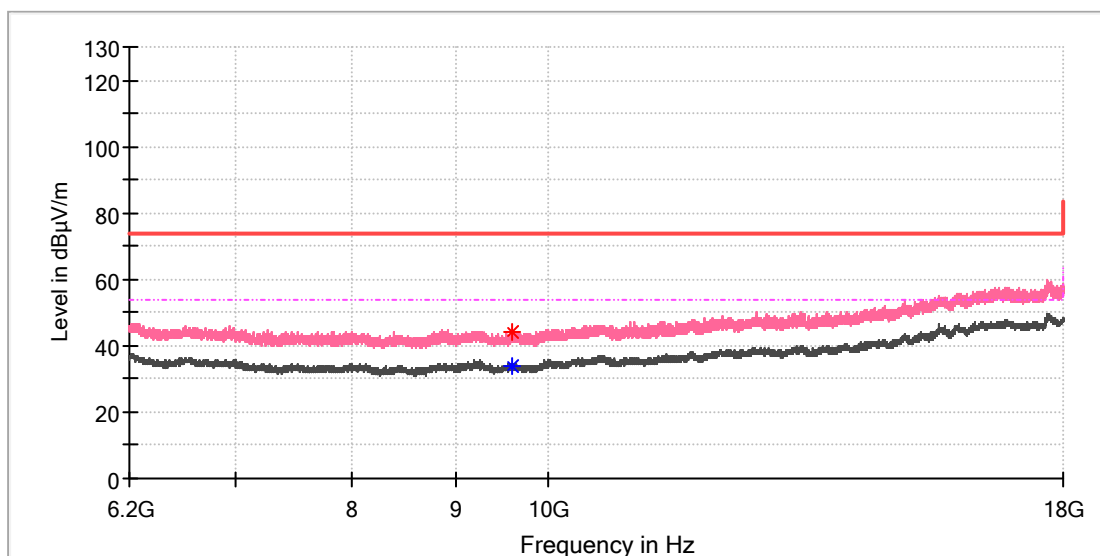


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
9609.708333	43.74	---	74.00	30.26	100.0	H	68.0	10.4
9609.708333	---	33.96	54.00	20.04	100.0	H	68.0	10.4

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_Low CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

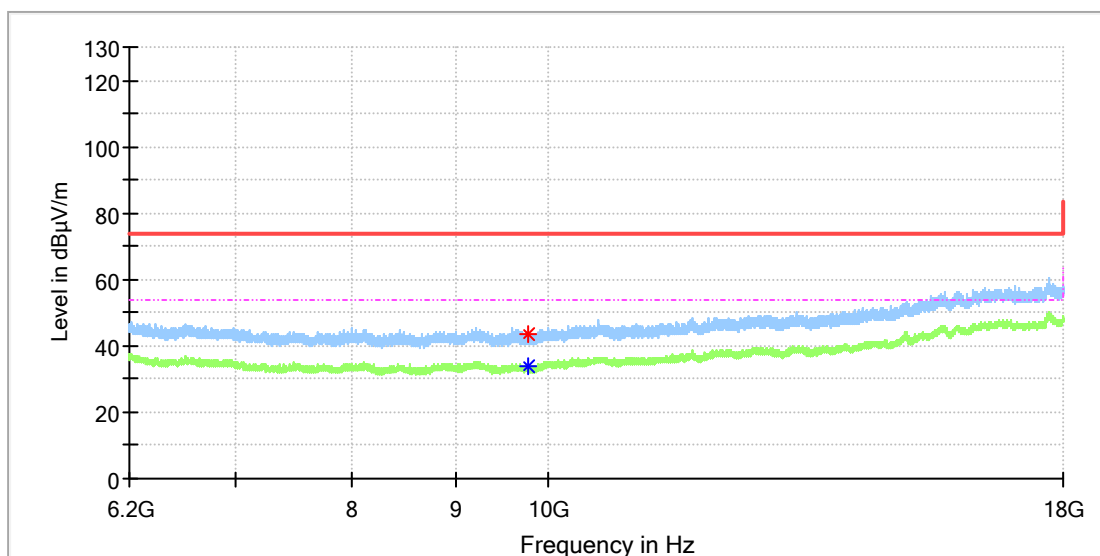


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
9604.791667	---	33.88	54.00	20.12	100.0	V	307.0	10.4
9605.775000	44.18	---	74.00	29.82	100.0	V	358.0	10.4

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_Mid CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

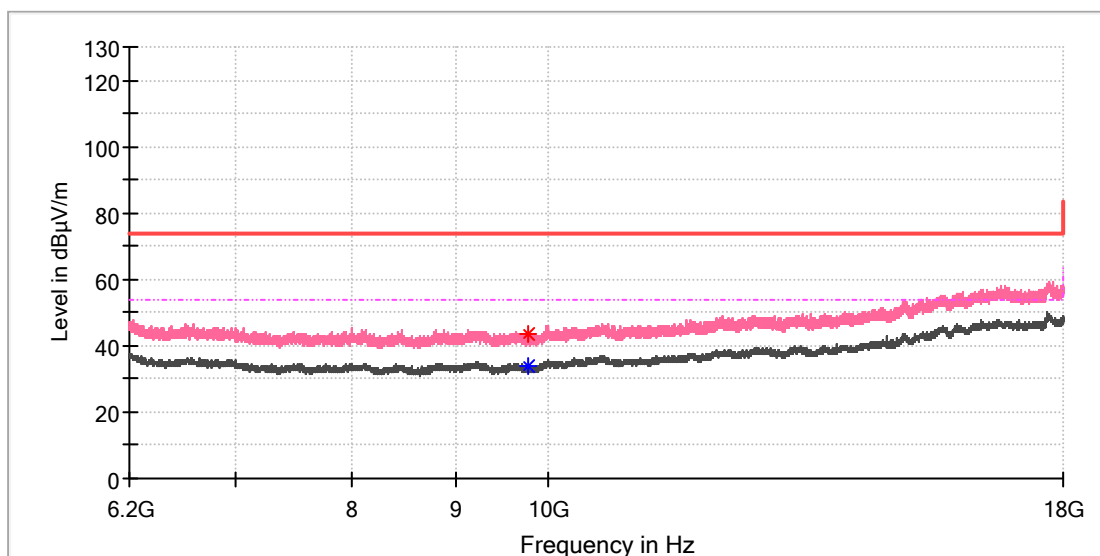


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
9766.058333	43.49	---	74.00	30.51	100.0	H	358.0	10.4
9767.041667	---	33.66	54.00	20.34	100.0	H	154.0	10.4

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_Mid CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

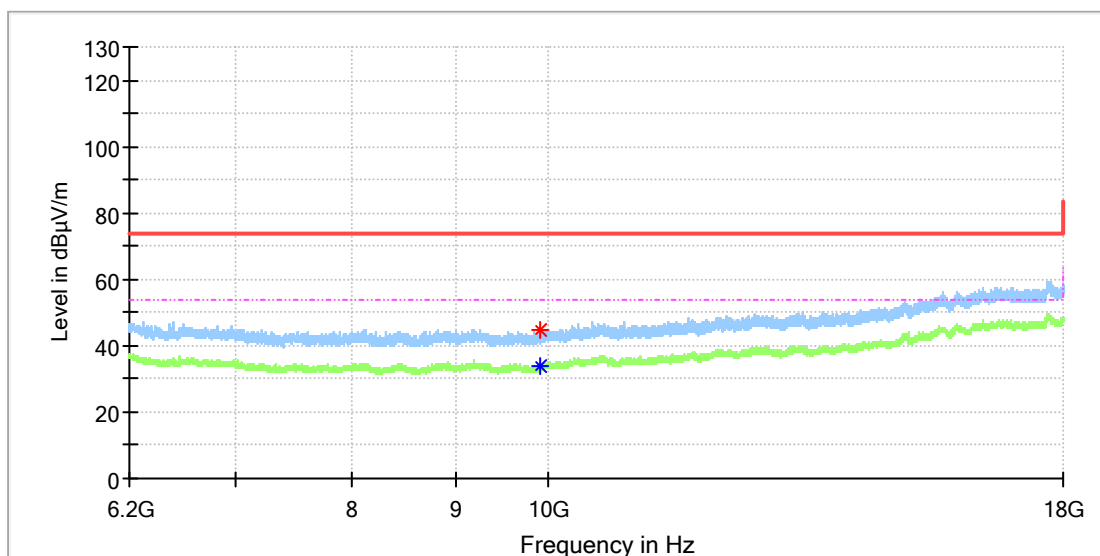


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
9766.058333	43.33	---	74.00	30.67	100.0	V	97.0	10.4
9766.058333	---	33.79	54.00	20.21	100.0	V	97.0	10.4

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_High CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

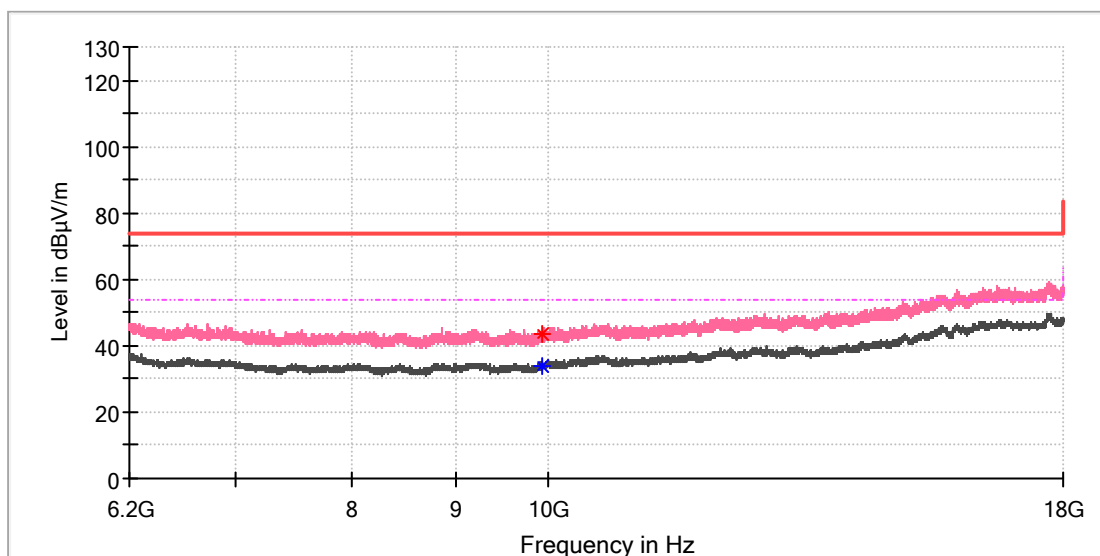


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
9916.016667	44.69	---	74.00	29.31	100.0	H	13.0	10.8
9919.458333	---	33.73	54.00	20.27	100.0	H	322.0	10.8

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_High CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



Critical_Freqs

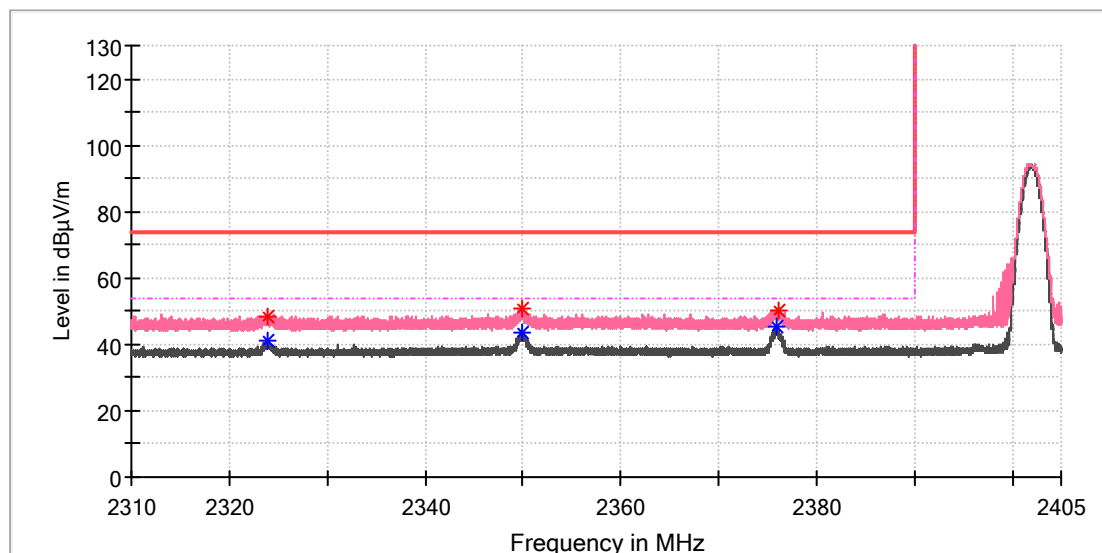
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
9921.916667	---	34.07	54.00	19.93	100.0	V	264.0	10.8
9922.900000	43.36	---	74.00	30.64	100.0	V	69.0	10.8

Appendix C.2: Test Plots of Band Edge (Radiated)

BDR mode, Low Channel

EUT Information

EUT Name:	Powerful Bluetooth speaker
Model:	X3
Test Mode:	TX_DH5_Low CH
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.247
Tested By:	Alano Qu
Reviewed By:	Terry Yin

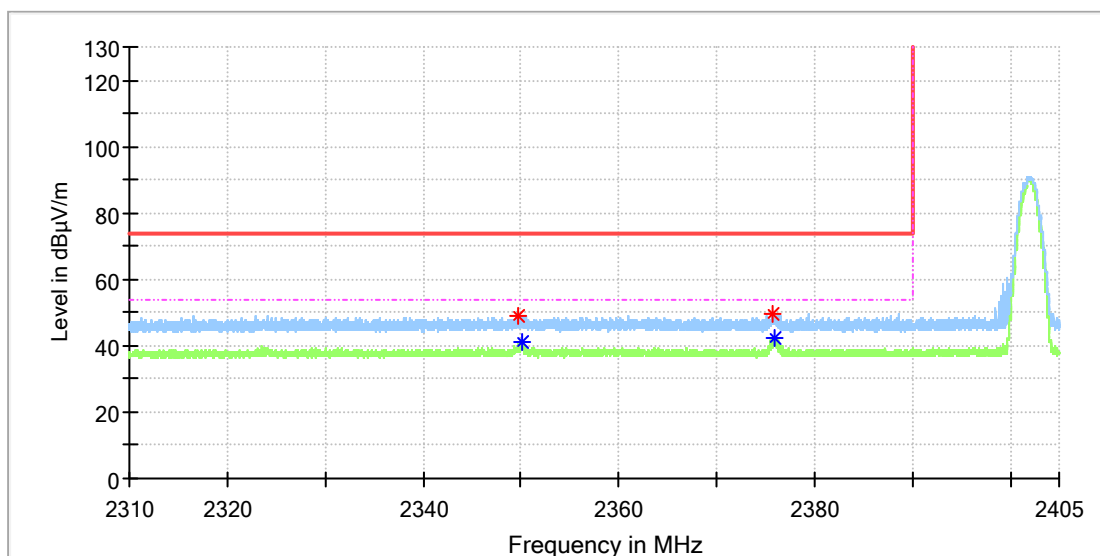


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2323.860500	48.41	---	74.00	25.59	100.0	V	193.0	6.6
2323.884250	---	41.13	54.00	12.87	100.0	V	137.0	6.6
2349.843000	---	43.53	54.00	10.47	100.0	V	159.0	6.9
2349.980750	50.75	---	74.00	23.25	100.0	V	171.0	6.9
2375.858750	---	45.21	54.00	8.79	100.0	V	159.0	6.9
2376.148500	50.24	---	74.00	23.76	100.0	V	171.0	6.9

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_Low CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



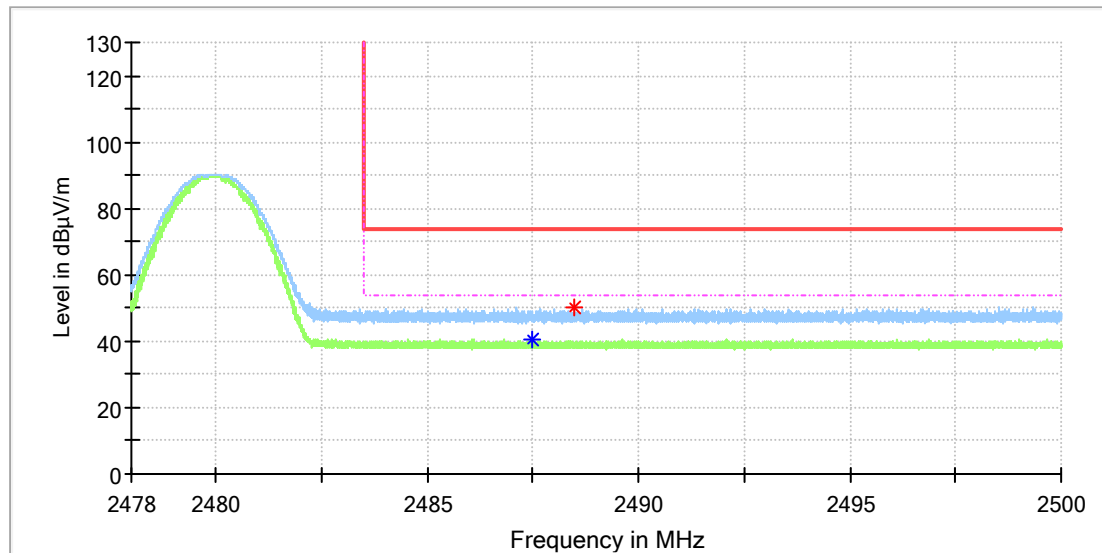
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2349.747750	49.25	---	74.00	24.75	100.0	H	262.0	6.9
2350.073250	---	41.05	54.00	12.95	100.0	H	272.0	6.9
2375.724750	49.57	---	74.00	24.43	100.0	H	262.0	6.9
2375.845500	---	42.60	54.00	11.40	100.0	H	262.0	6.9

BDR mode, High Channel

EUT Information

EUT Name:	Powerful Bluetooth speaker
Model:	X3
Test Mode:	TX_DH5_High CH
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.247
Tested By:	Alano Qu
Reviewed By:	Terry Yin

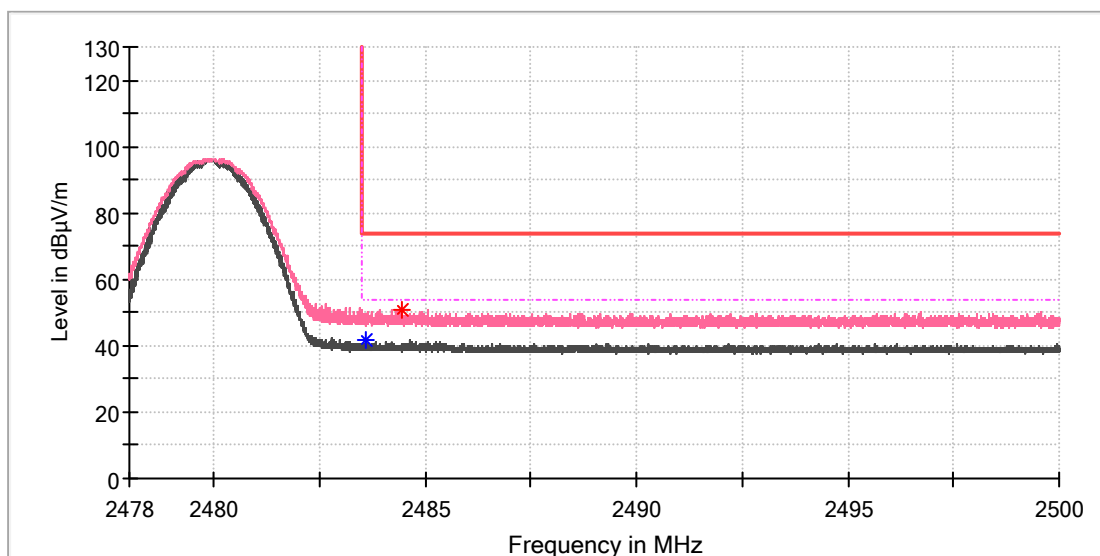


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2487.466500	---	40.28	54.00	13.72	100.0	H	305.0	7.4
2488.492000	50.29	---	74.00	23.71	100.0	H	134.0	7.4

EUT Information

EUT Name: Powerful Bluetooth speaker
Model: X3
Test Mode: TX_DH5_High CH
Test Voltage:: Battery
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



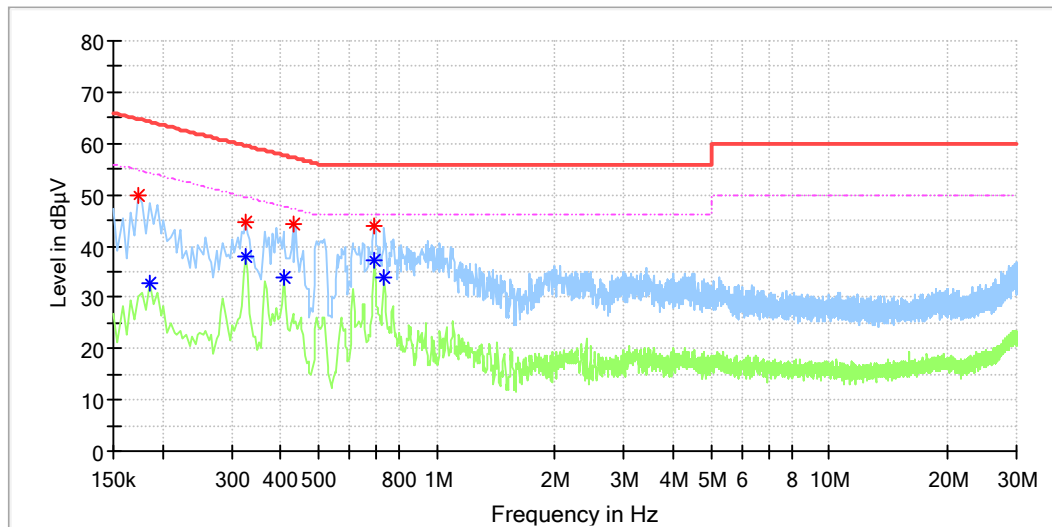
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.592000	---	41.61	54.00	12.39	100.0	V	186.0	7.4
2484.461750	51.01	---	74.00	22.99	100.0	V	255.0	7.4

Appendix C.3: Test Plots of AC Mains Conducted Emission

EUT Information

EUT Name: BlueAnt X3 Powerful Bluetooth speaker
Model: X3
Test Model: BT
Test Voltage: AC 120V/60Hz
Test By: Ouyang Wang
Review By: Gary Chen
Remark: SR2

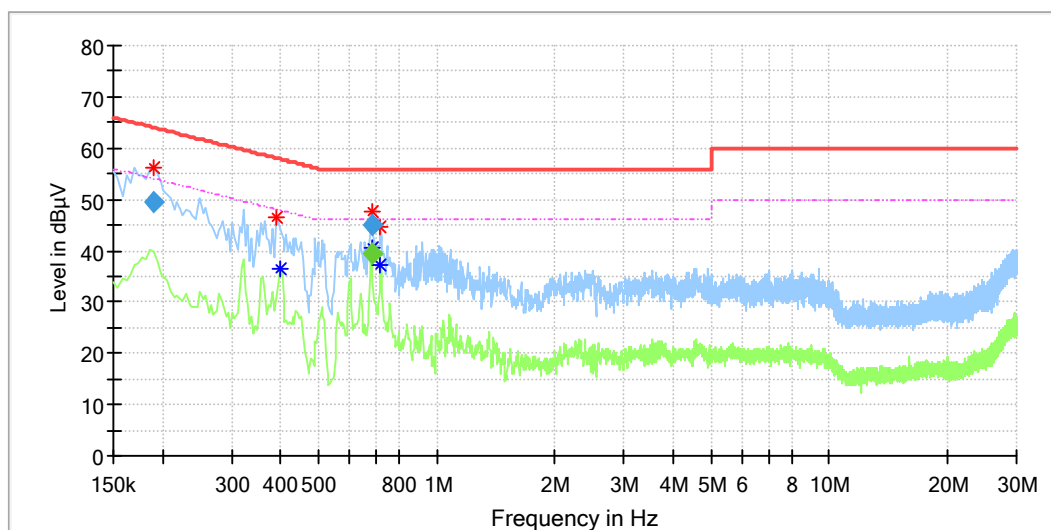


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line
0.174000	49.77	---	64.77	14.99	---	L1
0.186000	---	32.60	54.21	21.61	---	L1
0.326000	44.53	---	59.55	15.03	---	L1
0.326000	---	37.83	49.55	11.72	---	L1
0.410000	---	33.89	47.65	13.76	---	L1
0.430000	44.35	---	57.25	12.90	---	L1
0.690000	43.73	---	56.00	12.27	---	L1
0.694000	---	37.30	46.00	8.70	---	L1
0.734000	---	33.73	46.00	12.27	---	L1

EUT Information

EUT Name: BlueAnt X3 Powerful Bluetooth speaker
Model: X3
Test Model: BT
Test Voltage: AC 120V/60Hz
Test By: Ouyang Wang
Review By: Gary Chen
Remark: SR2



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line
0.189500	56.27	---	64.04	7.77	---	N
0.390000	46.36	---	58.06	11.70	---	N
0.398000	---	36.58	47.90	11.31	---	N
0.686500	47.46	---	56.00	8.54	---	N
0.686500	---	40.56	46.00	5.44	---	N
0.718000	---	37.13	46.00	8.87	---	N
0.718000	44.61	---	56.00	11.39	---	N

Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.189500	49.35	---	64.06	14.71	1000.0	9.000	N
0.686500	---	39.48	46.00	6.52	1000.0	9.000	N
0.686500	44.92	---	56.00	11.08	1000.0	9.000	N