

Prüfbericht-Nr.: <i>Test report no.:</i>	NN2087KU 001	Auftrags-Nr.: <i>Order no.:</i>	168282489	Seite 1 von 27 <i>Page 1 of 27</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2020-09-21	
Auftraggeber: <i>Client:</i>	SHENZHEN FENDA TECHNOLOGY CO., LTD. Fenda Hi-Tech Park, Zhoushi Road, Shiyan Town, Baoan District, Shenzhen, China			
Prüfgegenstand: <i>Test item:</i>	2.0 Channel Soundbar with HDMI-ARC connectivity			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	NS-HTSB22 (Trademark: INSIGNIA)			
Auftrags-Inhalt: <i>Order content:</i>	FCC and IC approval			
Prüfgrundlage: <i>Test specification:</i>	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 2.1091			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2020-09-22	Please refer to photo documents		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A002907635-001, 002			
Prüfzeitraum: <i>Testing period:</i>	2020-09-23 – 2020-10-15			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	genehmigt von: <i>authorized by:</i>			
Datum: <i>Date:</i> 2020-11-13			Ausstellungsdatum: <i>Issue date:</i> 2020-11-13	
Stellung / Position	Alex Lan / Senior Project Engineer		Stellung / Position Winnie Hou / Technical Certifier	
Sonstiges / Other:				
FCC ID: HBO-NSHTSB22 IC: 10550A-NSHTSB22 HVIN: Main Unit				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged:</i>		
* 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>				

V05

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*

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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

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wireless Connectivity Tester	Rohde & Schwarz	CMW270	101375	2021-08-30
Signal Analyzer	Rohde & Schwarz	FSV 40	101441	2021-08-30
Vector Signal Generator	Rohde & Schwarz	SMBV100A	263301	2021-08-30
Signal Generator	Rohde & Schwarz	SMB100A	115186	2021-08-30
OSP	Rohde & Schwarz	OSP 150	101017	2020-12-20
Control PC	DELL	OptiPlex 7050	FTJZ9P2	N/A
Test Software	Rohde & Schwarz	WMS32 (V10.40.10)	N/A	N/A
Power Meter	Rohde & Schwarz	NRP2	107105	2020-12-20
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	105350	2020-12-20
Unwanted Emission Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Signal Generator	Rohde & Schwarz	SMB100A	180840	2021-08-30
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	165339	2021-08-30
Signal Analyzer	Rohde & Schwarz	FSV 40	101440	2021-08-30
System Controller Interface	Rohde & Schwarz	SCI-100	S10010036	N/A
Filterbank	Rohde & Schwarz	CDMA	100751	2021-08-30
Filterbank	Rohde & Schwarz	GSM	100811	2021-08-30
OSP	Rohde & Schwarz	OSP 120	102041	N/A
OSP	Rohde & Schwarz	OSP 150	101385	N/A
Pre-amplifier	Rohde & Schwarz	SCU08F1	08320030	2021-08-30
Amplifier	Rohde & Schwarz	SCU-18F	180079	2021-08-30
Amplifier	Rohde & Schwarz	SCU40A	100450	2021-09-03
Trilog Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VULB9162	192	2021-09-02

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Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218719	2021-09-02
Wideband Ridged Horn Antenna (12-18 GHz)	Steatite	QMS-00208	18312	2021-09-02
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19066	2021-09-02
Biconical Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VUBA 9117	357	2021-09-02
Double Ridged Broadband Horn Antenna (1 – 18 GHz)	Schwarzbeck	BBHA 9120 D	01760	2021-09-02
Broadband Horn Antenna (15 – 40 GHz)	Schwarzbeck	BBHA 9170	00862	2021-09-02
Test software	Rohde & Schwarz	EMC32 (V10.40.00)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NW9P2	N/A
Conducted Emissions				
EMI Test Receiver	R&S	ESR3	102428	2021-09-01
Artificial Mains Network	R&S	ENV216	102333	2021-08-19
Artificial Mains Network	R&S	ENV432	101411	2021-08-19
Impedance Stabilisation Network	R&S	ENY81	100323	2021-08-19
Impedance Stabilisation Network	R&S	ENY81-CA6	101810	2021-08-20
Current Probe	R&S	EZ-17	101247	2021-08-19
Voltage Probe	R&S	ESH2-Z3	100557	2021-08-19
Attenuator	R&S	ESH2Z31	100300	2021-08-19
EMC32 test software	R&S	EMC32(Ver.10.50.01)	N/A	N/A
Click test software	R&S	Click Rate Analyzer 2.4.2	N/A	N/A
Radiated Emissions				
3m SAC	ETS	SAC3	CT001632-Q1362	2021-08-23
EMI Test Receiver	R&S	ESR7	102111	2021-01-13
Horn Antenna	R&S	HF907	102706	2021-09-01
Preamplifier	FIT	SCU-18F	180077	2021-08-19
Active magnetic loop antenna	SCHWARZBECK	FMZB1519B	00080	2021-08-19
Trilog-Broadband antenna	SCHWARZBECK	VULB9168	0945	2021-09-12
Switching Controller Interface	R&S	OSP 120	102039	N/A
EMC32 test software	R&S	EMC32(Ver.10.50.01)	N/A	N/A

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 2.0 Channel Soundbar with HDMI-ARC connectivity 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

Technical Specification	Value
Kind of Equipment	2.0 Channel Soundbar with HDMI-ARC connectivity
Type Designation	NS-HTSB22
Trademark	INSIGNIA
FCC ID	HBO-NSHTSB22
IC	10550A-NSHTSB22
HVIN	Main Unit
Operating Voltage	AC 100-240V, 50/60Hz, 0.7A
Testing Voltage	AC 120V, 60Hz
Technical Specification of Bluetooth (BDR & EDR)	
Operating Frequency band	2402 – 2480 MHz
Channel Number	79 channels
Channel separation	1MHz
Extreme Temperature Range	0°C to +45°C
Modulation	GFSK, 8DPSK, $\pi/4$ DQPSK
Antenna Type	Internal Antenna
Antenna Gain	2.0 dBi

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	--	--

Table 4: Frequency Hopping Information

Technical Specification	Description
Hopping Range	Hereby we declare that the frequency range of this device is 2402-2480MHz. This is according the Bluetooth Core Specification V5.0 for devices which will be operated in the USA. This was checked during the Bluetooth Qualification tests.
Hopping Sequence	Example of a 79 hopping sequence in data mode: 33,04,21,44,23,42,53,46,55,48,40,59,72,29,76,31,08,73,07,75,09,45,60,39,58,13,47,11,77,52,35,50,65,54,67,56,69,62,71,64, 7,25,27,66,57,70,74,61,78,63,10,41,05,43,15,44,64,68,02,70,06,01,51,03,55,05,03,66,53,49,36,47..
Receiver input bandwidth	The input bandwidth of the receiver is 1MHz. In every connection one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings. Repeating of a packer has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

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 5: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Mobile Phone	HTC	D626w	N/A
DVD Player	GIEC	BDP-G3606	N/A
Notebook	Lenovo	ThinkPad 260	PC0GP71G

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 1GHz)

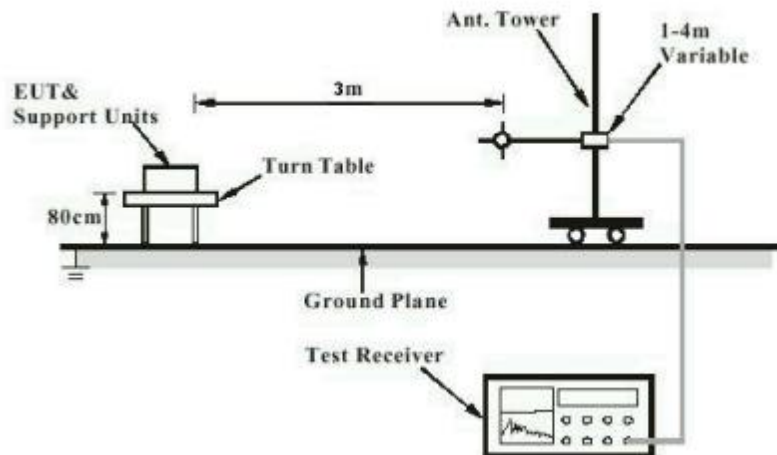


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

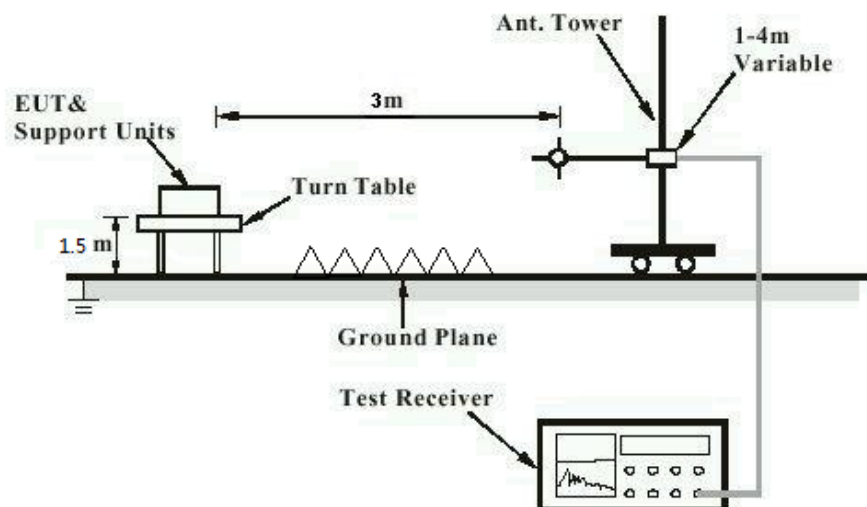


Diagram of Measurement Configuration for Mains Conduction Measurement

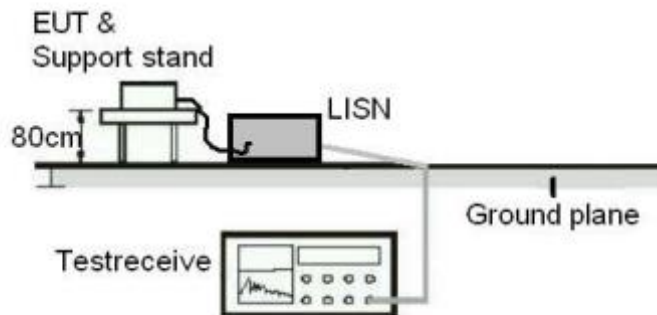
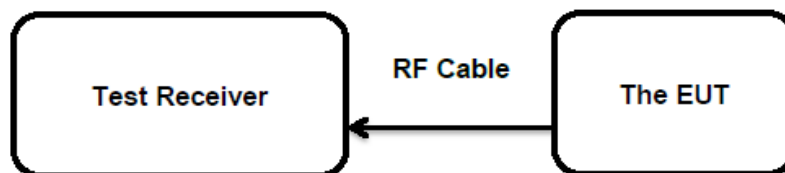


Diagram of Measurement Configuration for Conducted Transmitter Measurement



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

According to the manufacturer declared, the EUT has an integral antenna, the directional gain of antenna is 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.

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	: 23.09.2020
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 Maximum Peak Conducted Output Power

Test Mode	Channel Frequency (MHz)	Measured Peak Output Power		Limit (W)
		(dBm)	(W)	
BDR	2402	0.5	0.00112	< 0.125
	2441	2.7	0.00186	
	2480	5.0	0.00316	
EDR	2402	-2.5	0.00056	< 0.125
	2441	-0.8	0.00083	
	2480	2.0	0.00158	

Note: The cable loss is taken into account in results and the maximum e.i.r.p. is 7 dBm less than 4W(36dBm).

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 : 23.09.2020
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 99% Bandwidth

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

For the measurement records, refer to the appendix B

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	: 23.09.2020
Input voltage	: AC 120V/60Hz
Operation mode	: A.1, B
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.

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	: 27.09.2020
Input voltage	: AC 120V/60Hz
Operation mode	: A.1
Test channel	: Low / Middle / High
Ambient temperature	: 23 °C
Relative humidity	: 55 %
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 harmonic.

For the measurement records, refer to the appendix C.

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 : 23.09.2020

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 8: 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	925	616.667	
	2480	930	620.000	
EDR	2402	1270	846.667	/
	2441	1270	846.667	
	2480	1270	846.667	

For the measurement records, refer to the appendix B.

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	:	23.09.2020
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 9: Test Result of Carrier Frequency Separation

Test Mode	Channel	Channel Frequency (MHz)	Measured Channel Separation (MHz)	Limit (kHz)	Result
BDR	Low Channel	2401.995050	1.009900	≥ 25kHz or 2/3 of 20dB bandwidth	Pass
	Adjacency Channel	2403.004950			
	Middle Channel	2440.995050	1.009900		Pass
	Adjacency Channel	2442.004950			
	High Channel	2478.995050	1.009900		Pass
	Adjacency Channel	2480.004950			
EDR	Low Channel	2401.995050	1.039603	≥ 25kHz or 2/3 of 20dB bandwidth	Pass
	Adjacency Channel	2403.034653			
	Middle Channel	2440.995050	1.039603		Pass
	Adjacency Channel	2442.034653			
	High Channel	2478.995050	0.846667		Pass
	Adjacency Channel	2480.034653			

Note:

The limit is maximum 2/3 of the 20 dB bandwidth: 616.667 KHz.

For the measurement records, refer to the appendix B.

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 : 23.09.2020
Input voltage : AC 120V/60Hz
Operation mode : B
Ambient temperature : 25 °C
Relative humidity : 56 %
Atmospheric pressure : 101 kPa

Table 10: 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.

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	:	23.09.2020
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 11: Test Result of Time of Occupancy

Test Mode	Channel	Data Packet	Pulse width (ms)	Measured Dwell time(s)	Limit (s)
BDR	2441	DH1	0.435	0.139	< 0.4s
		DH3	1.652	0.264	
		DH5	2.870	0.306	
EDR	2441	2DH1	0.435	0.139	< 0.4s
		2DH3	1.681	0.269	
		2DH5	2.928	0.312	

Note:

$$\text{Dwell time} = \text{Pulse width} \times (\text{Hopping rate} / \text{Number of channels}) \times \text{Period}$$

Period = 0.4×79 (channel) = 31.6 seconds

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	: 15.10.2020
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.

6 Safety Human Exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Pass****Test Specification**

Test standard : CFR47 FCC Part 2.1091
RSS-102 Issue 5 March 2015
FCC KDB Publication 447498 v06

Limit : CFR47 FCC Part 1.1310

The separation distance of the EUT should be 50mm. The measured maximum conducted power of the EUT is 5dBm $\approx$ 3.16 mW, which is far below the SAR exclusion threshold level 96mW (Appendix A, 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 separation distance of the EUT should be 50mm. The measured maximum specified e.i.r.p of the EUT is 7dBm $\approx$ 5.01mW, which is far below the SAR exclusion threshold level 309mW, 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.

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Appendix B

Test Results of Conducted Testing

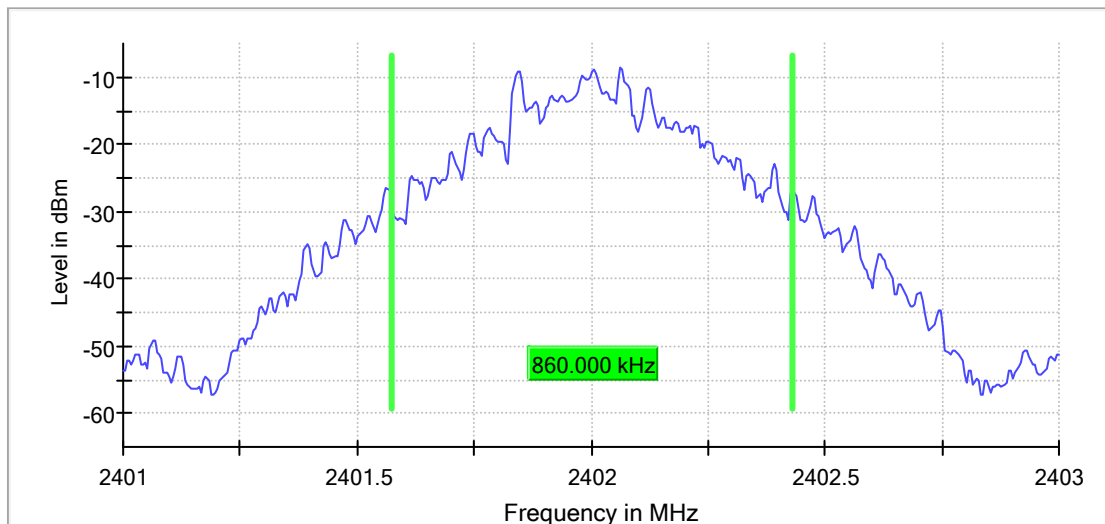
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Appendix B.1: Test Plots of 99% Bandwidth

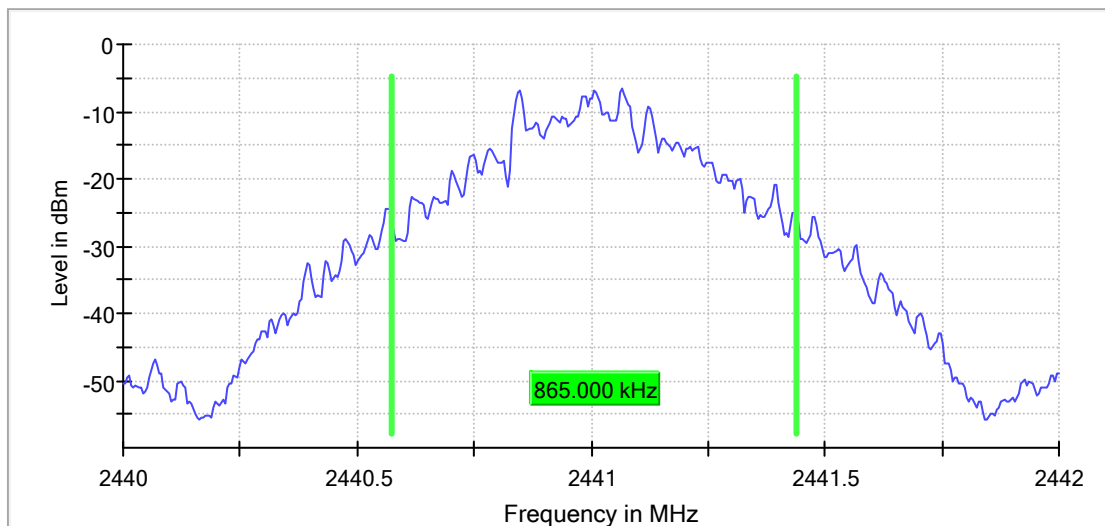
BDR Mode, DH1

RBW=10KHz, VBW=30KHz

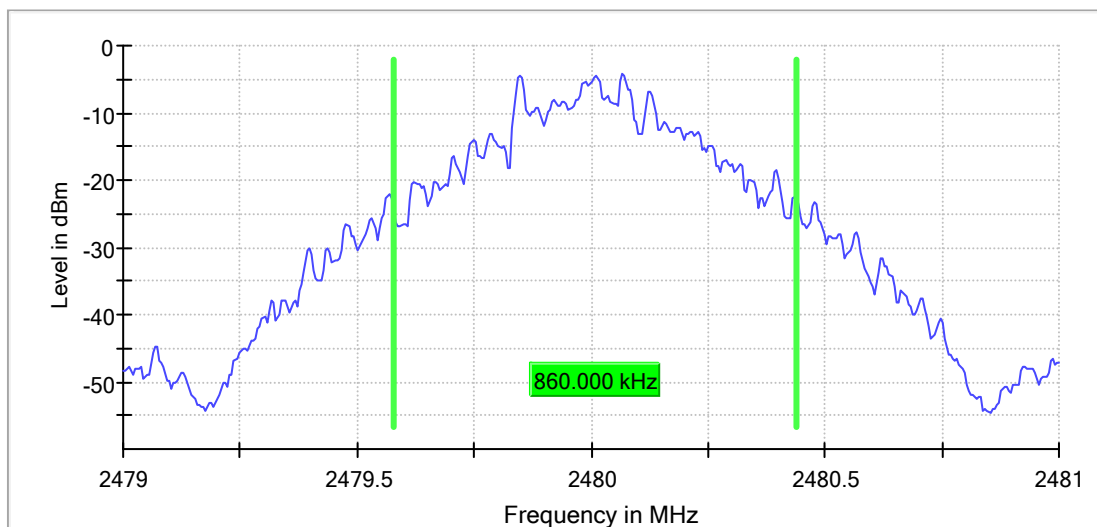
99 % Bandwidth



99 % Bandwidth



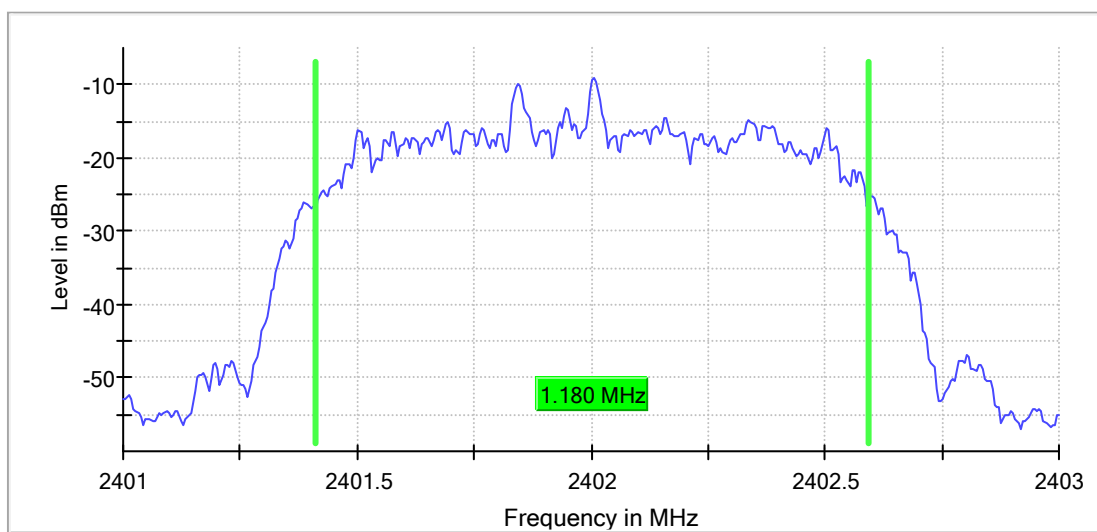
99 % Bandwidth



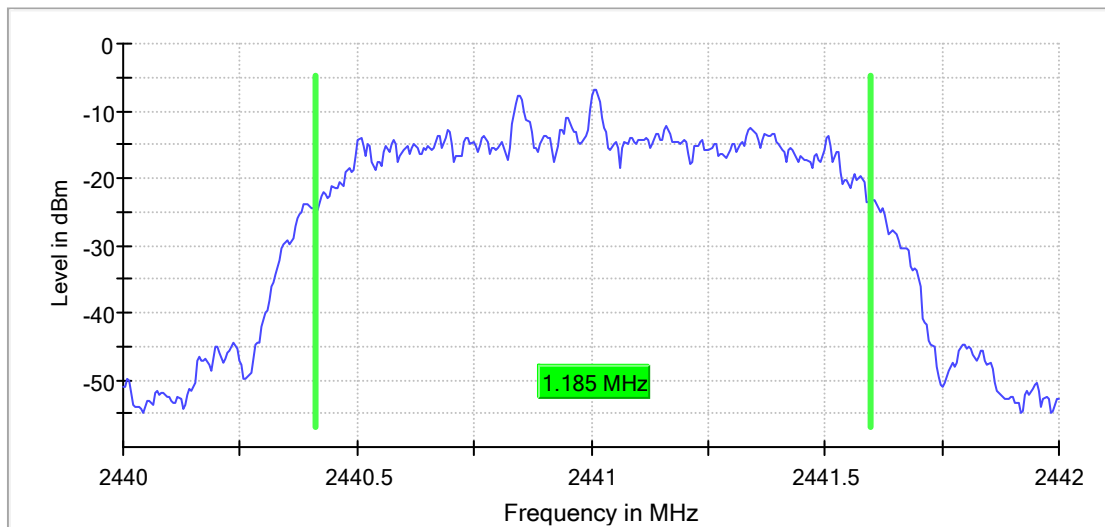
EDR Mode, 3DH1

RBW=30KHz VBW=100KHz

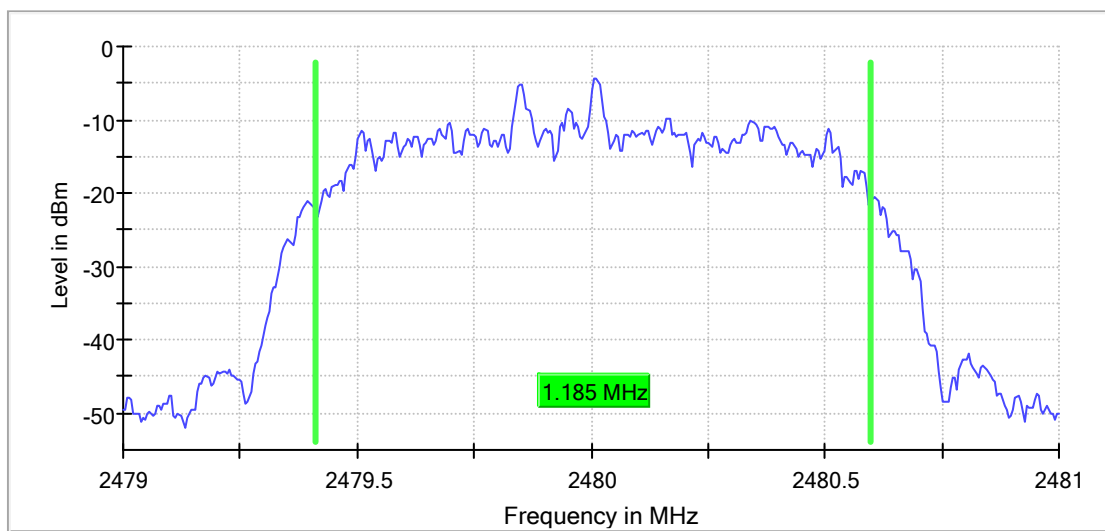
99 % Bandwidth



99 % Bandwidth



99 % Bandwidth

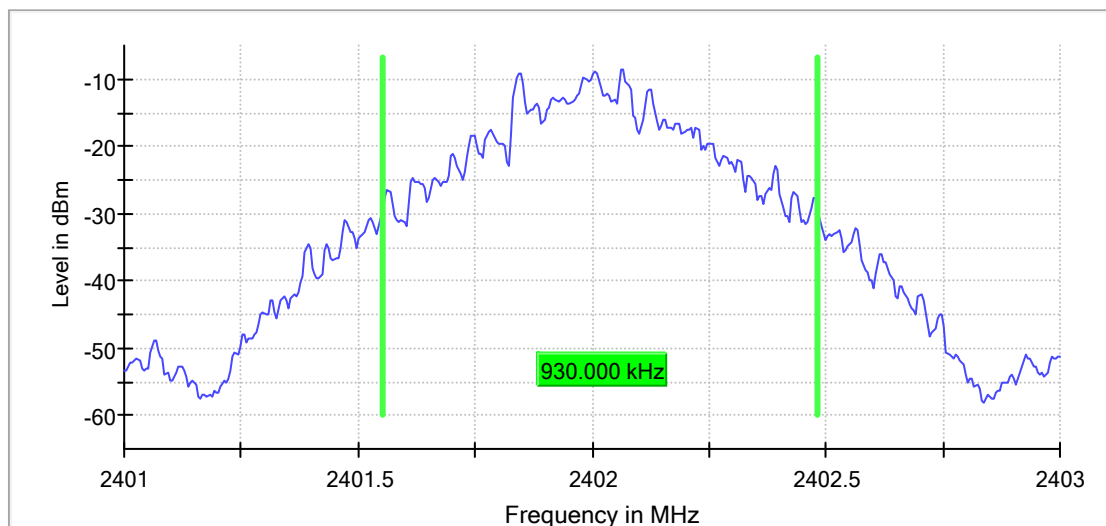


Appendix B.2: Test Plots of 20dB Bandwidth

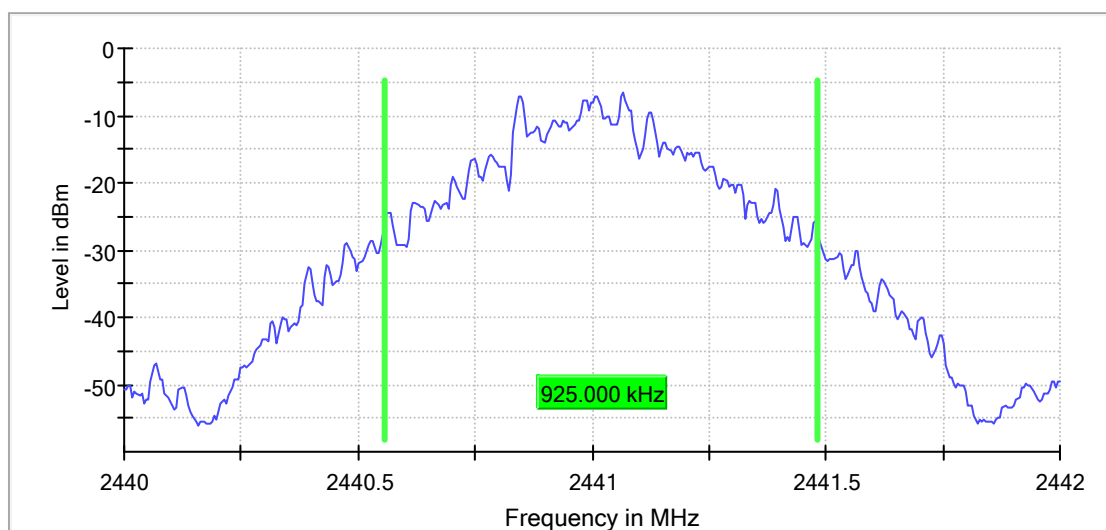
BDR Mode, DH1

RBW=10KHz VBW=30KHz

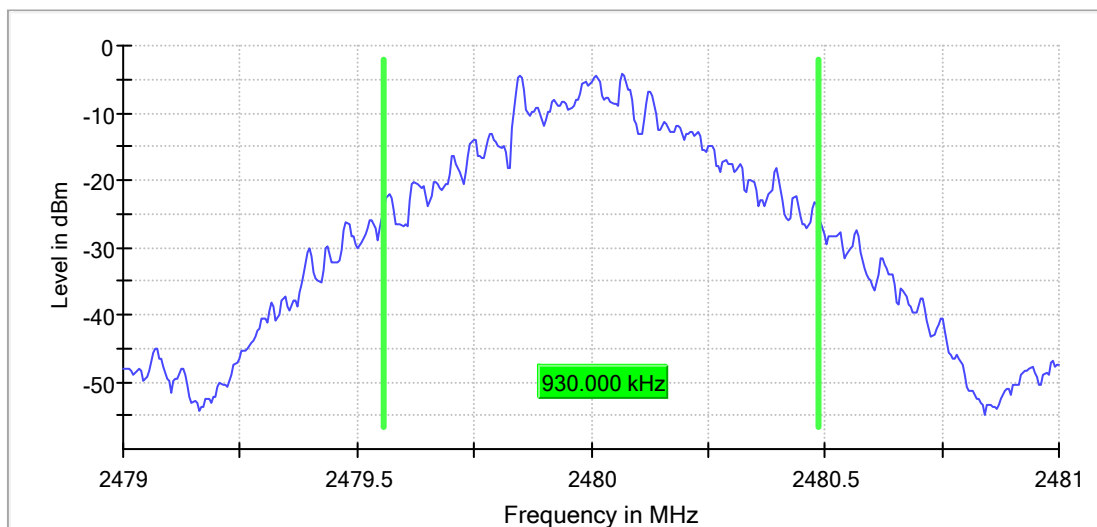
20 dB Bandwidth



20 dB Bandwidth



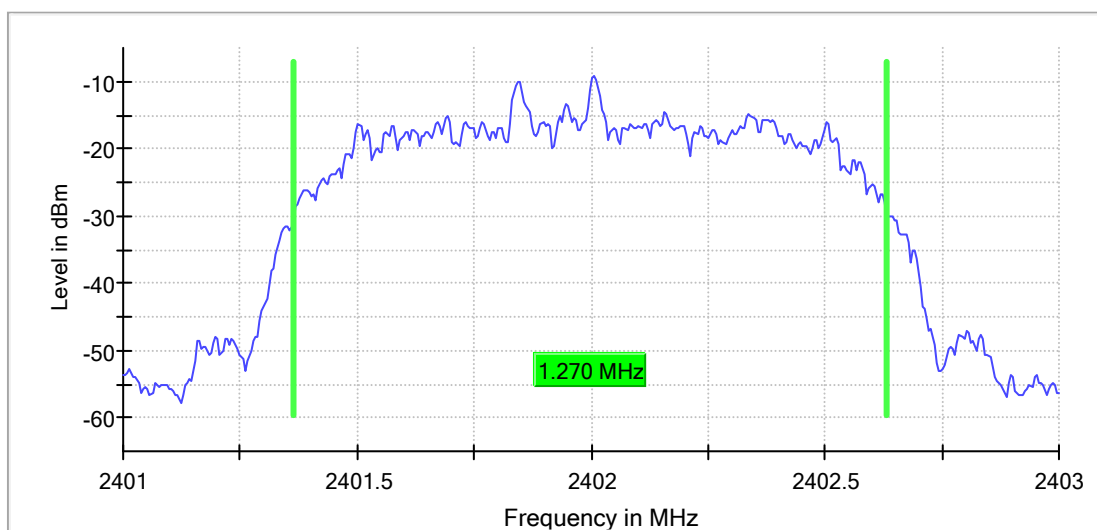
20 dB Bandwidth



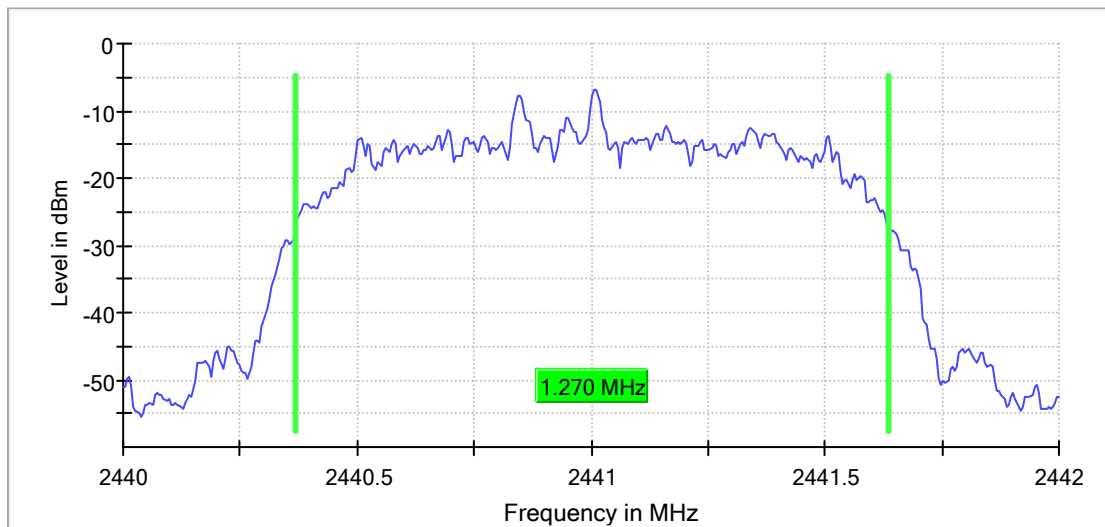
EDR Mode, 3DH1

RBW=30KHz VBW=100KHz

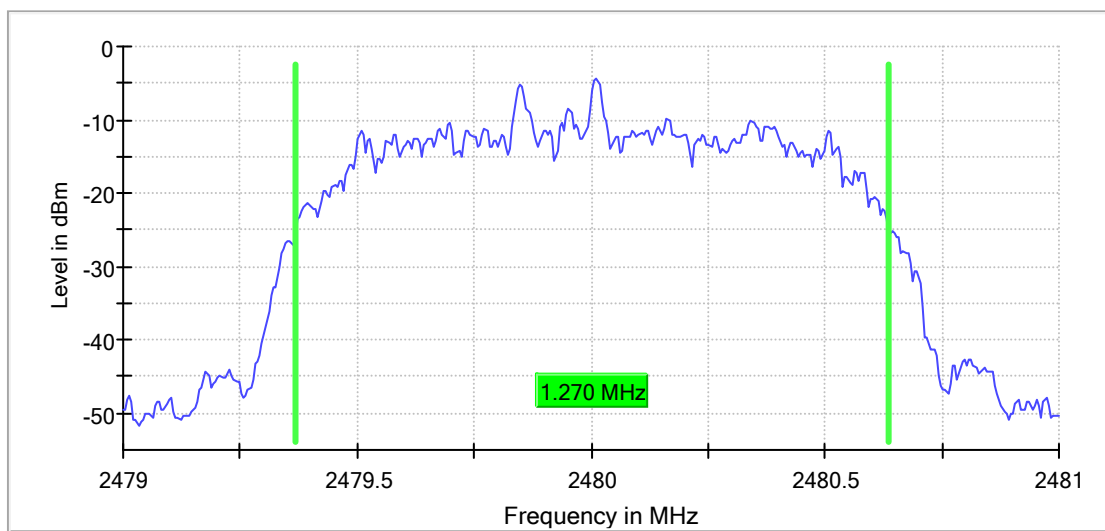
20 dB Bandwidth



20 dB Bandwidth

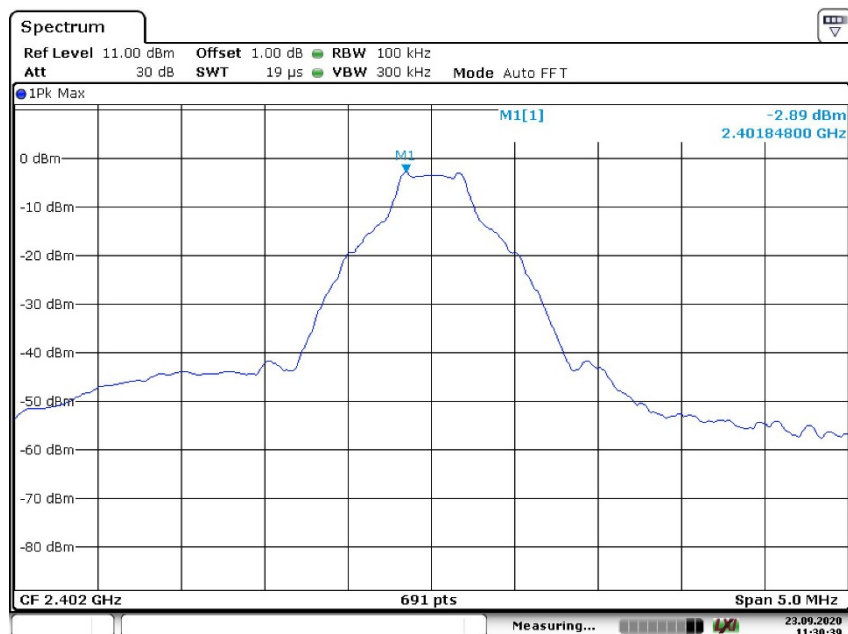


20 dB Bandwidth

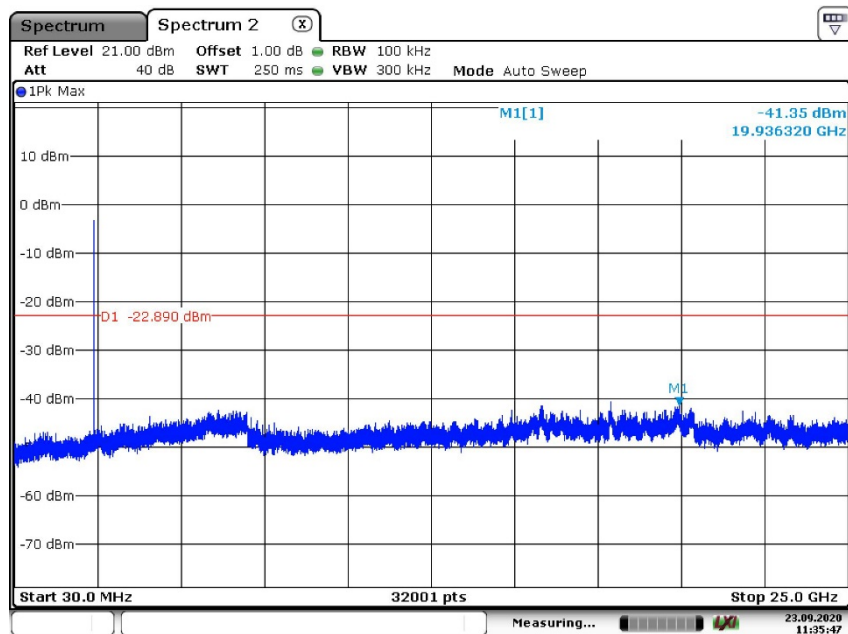


Appendix B.3: Test Plots of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

BDR Mode, Low Channel

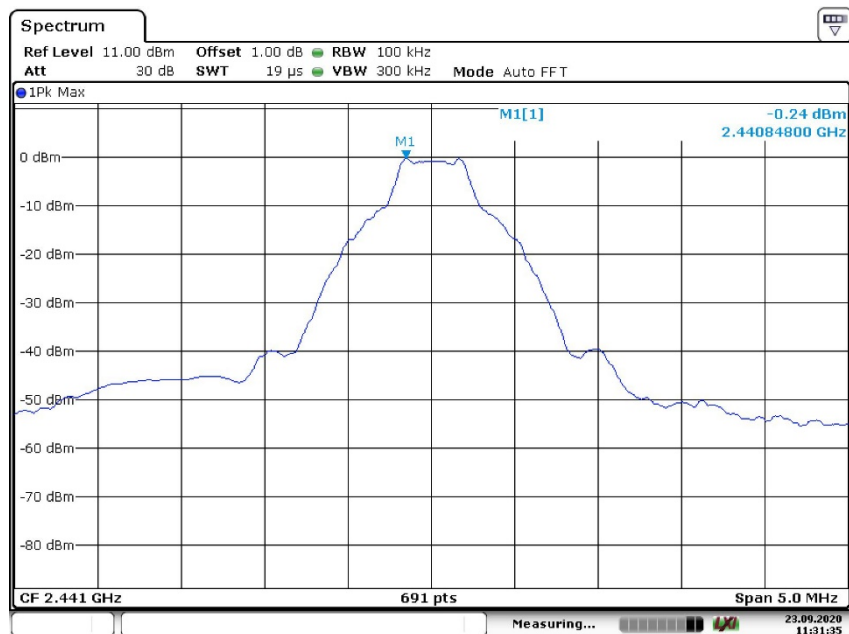


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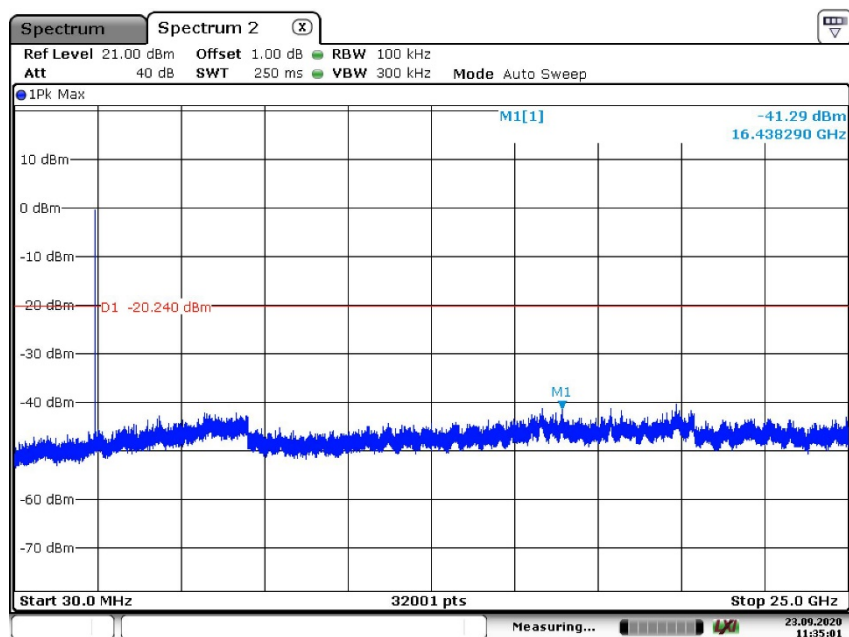


Date: 23.SEP.2020 11:35:46

BDR Mode, Middle Channel

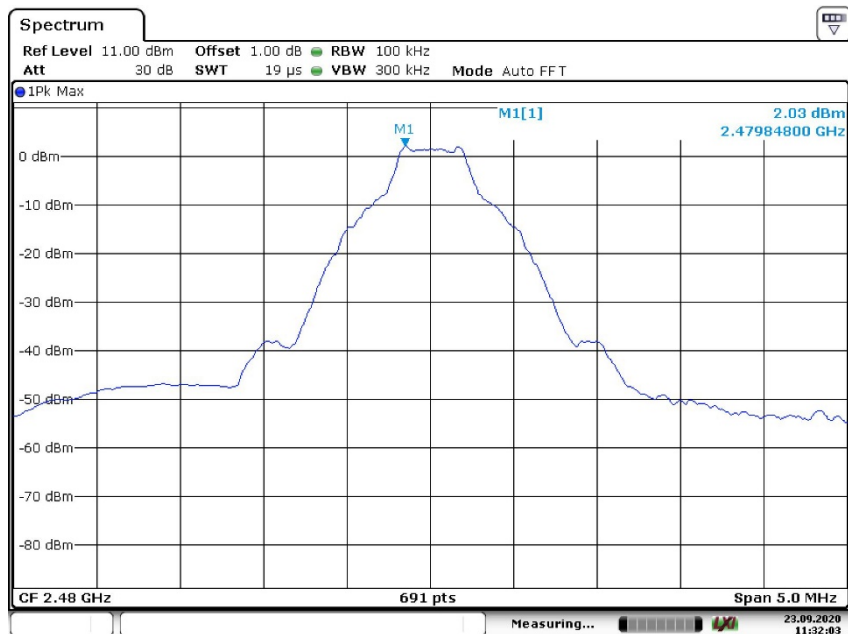


Date: 23.SEP.2020 11:31:35

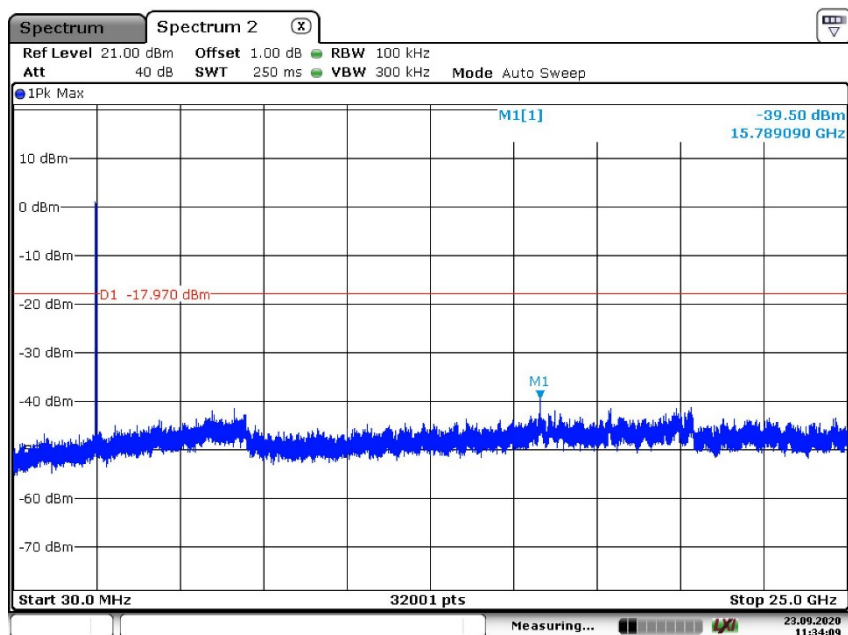


Date: 23.SEP.2020 11:35:01

BDR Mode, High Channel

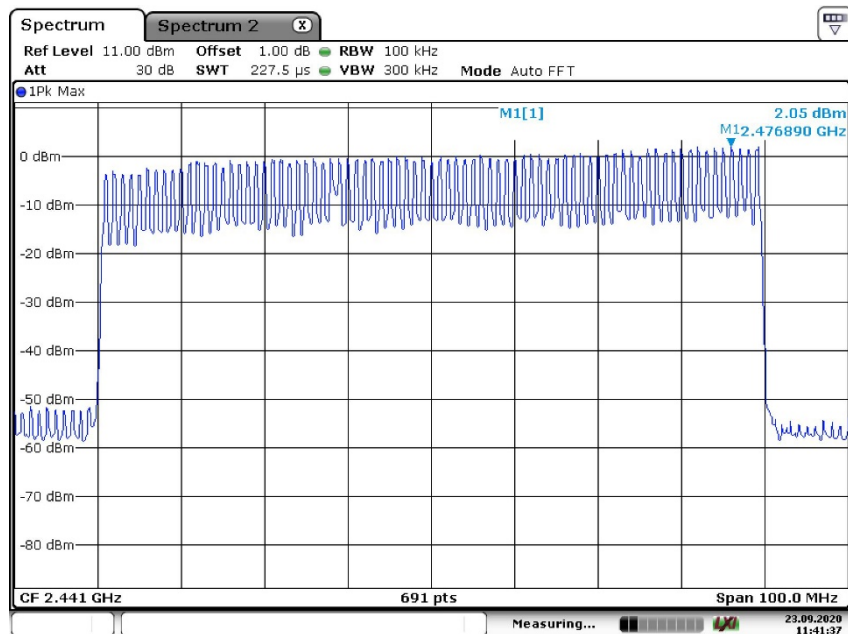


Date: 23.SEP.2020 11:32:02

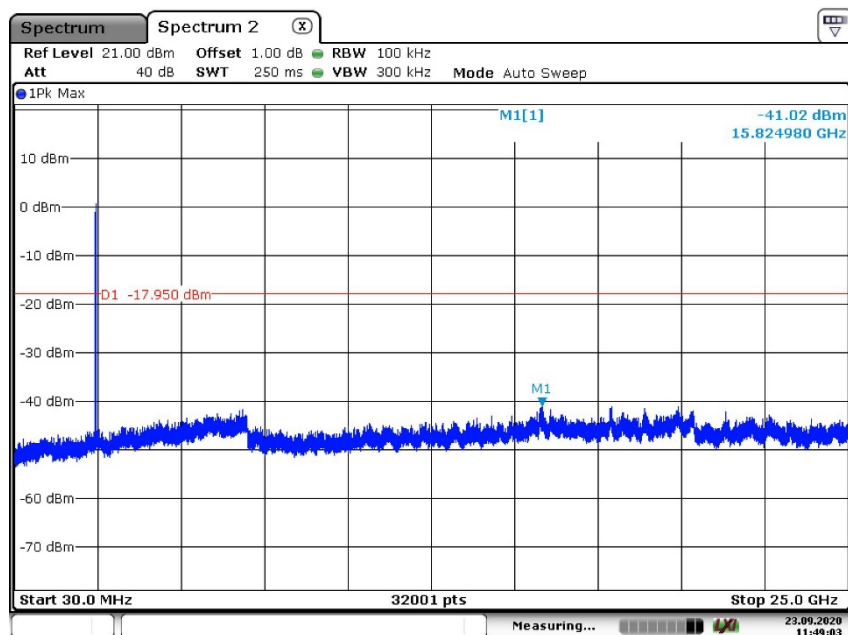


Date: 23.SEP.2020 11:34:09

BDR, Hopping

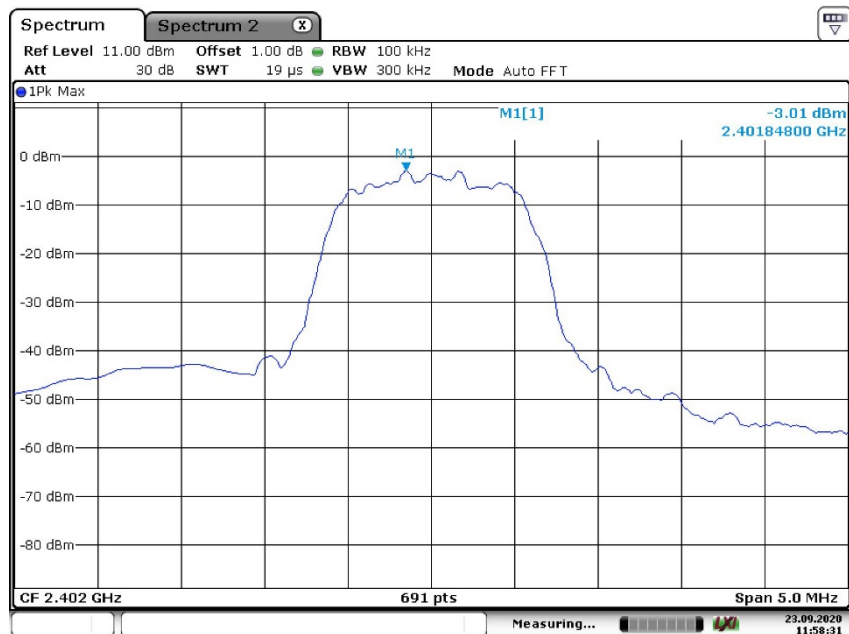


Date: 23.SEP.2020 11:41:37

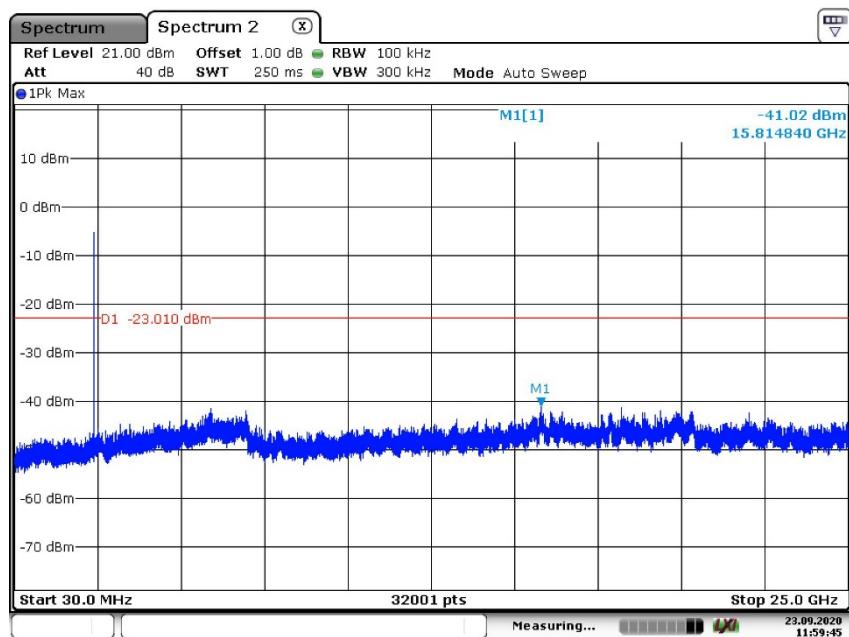


Date: 23.SEP.2020 11:49:03

EDR Mode, Low Channel

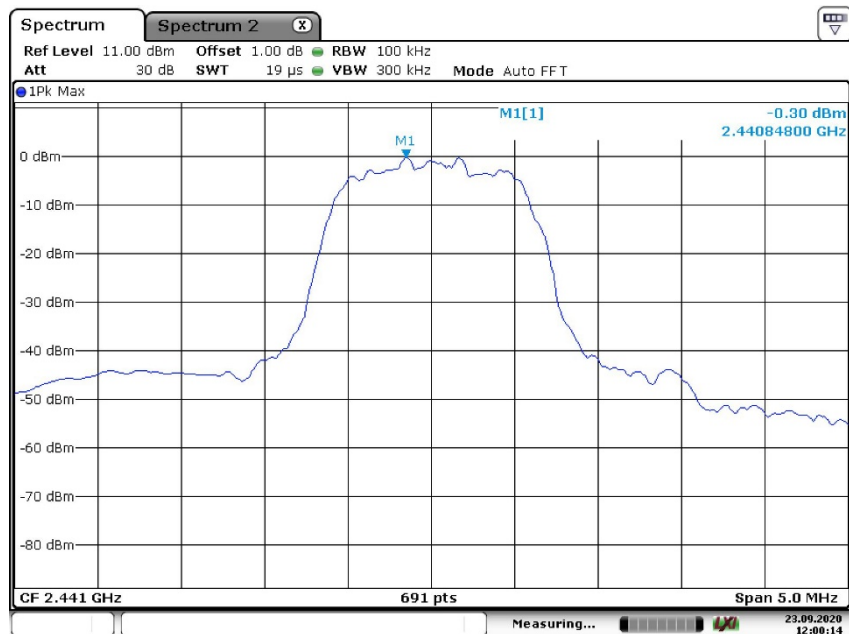


Date: 23.SEP.2020 11:58:30

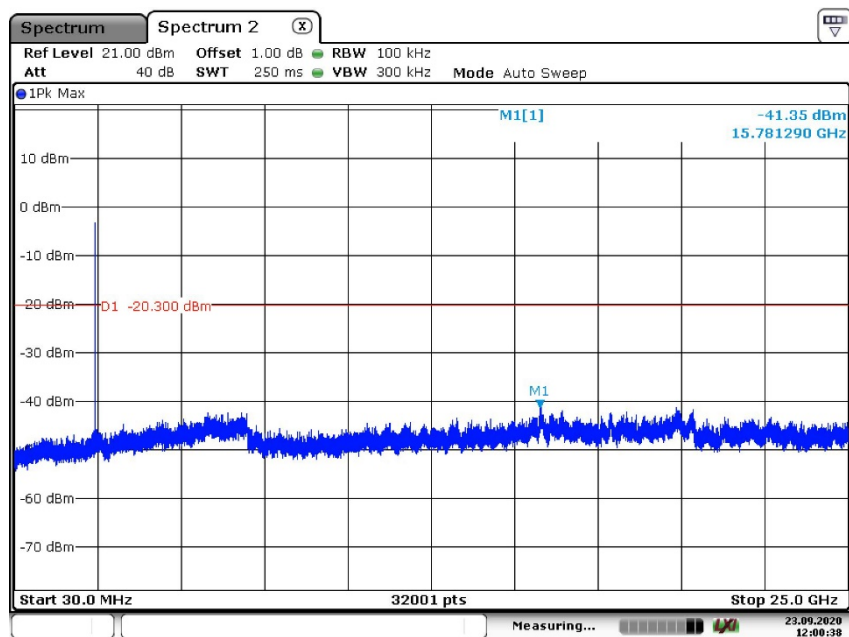


Date: 23.SEP.2020 11:59:45

EDR Mode, Middle Channel

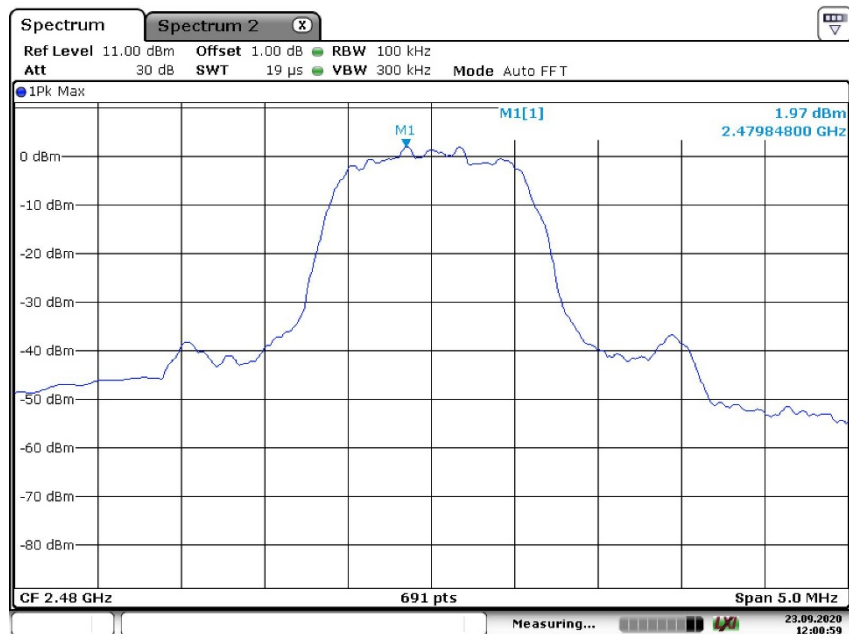


Date: 23.SEP.2020 12:00:14

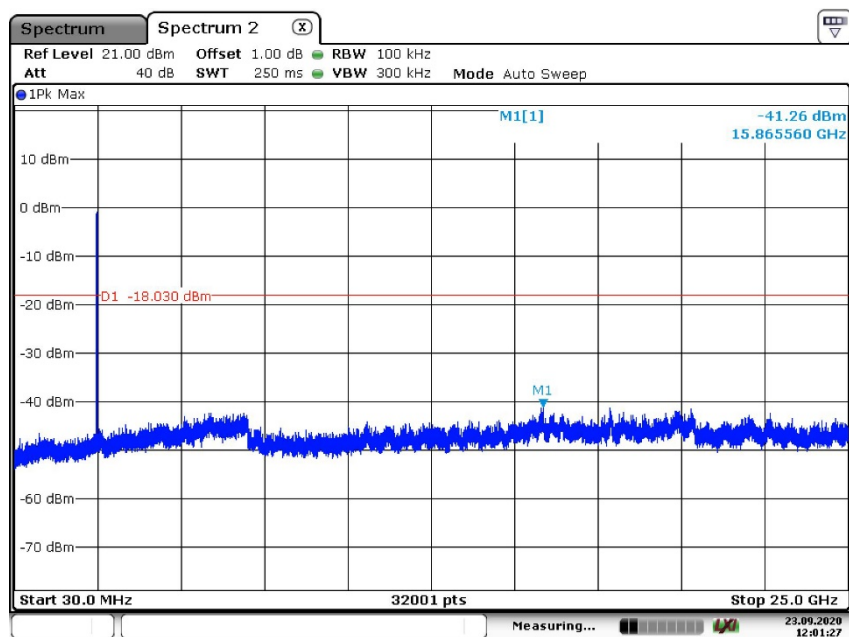


Date: 23.SEP.2020 12:00:38

EDR Mode, High Channel

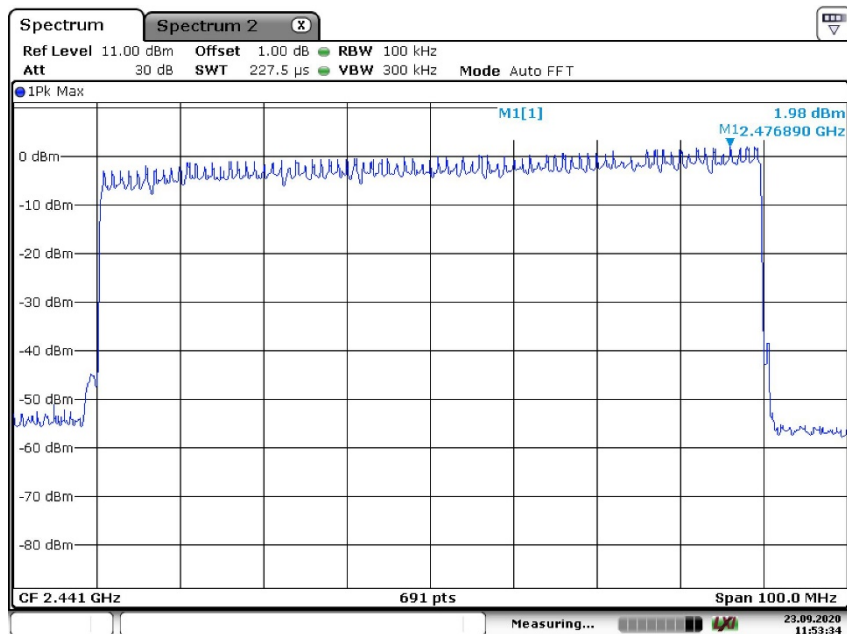


Date: 23.SEP.2020 12:00:58

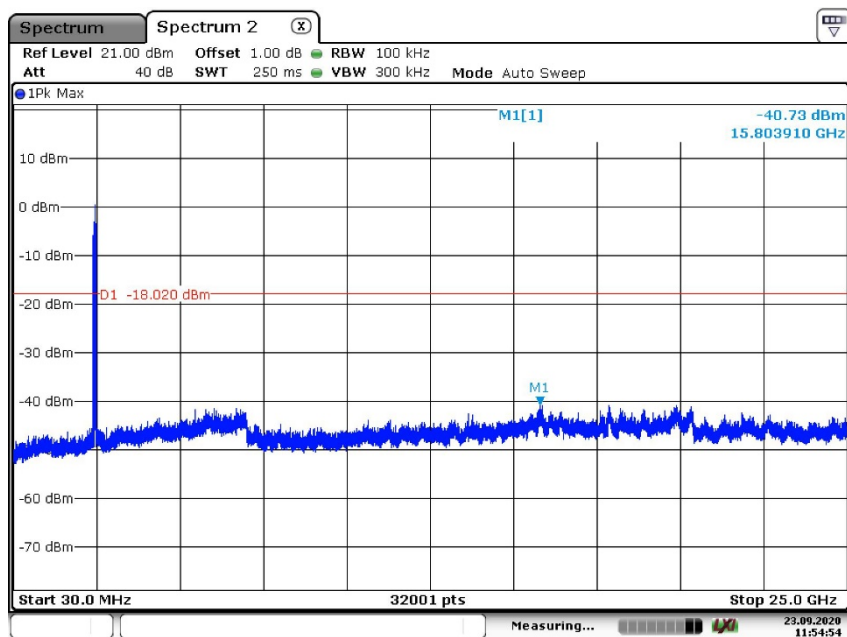


Date: 23.SEP.2020 12:01:27

EDR, Hopping

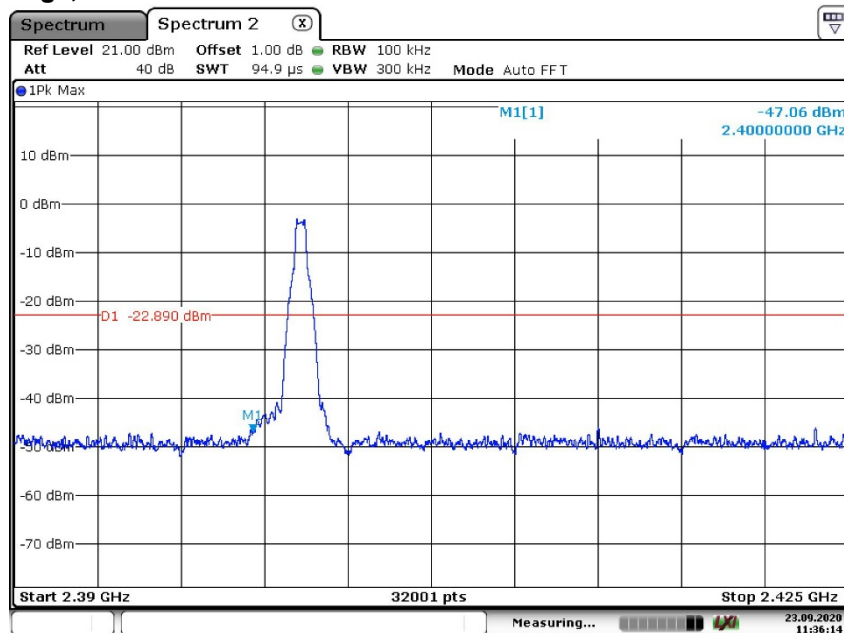


Date: 23.SEP.2020 11:53:34



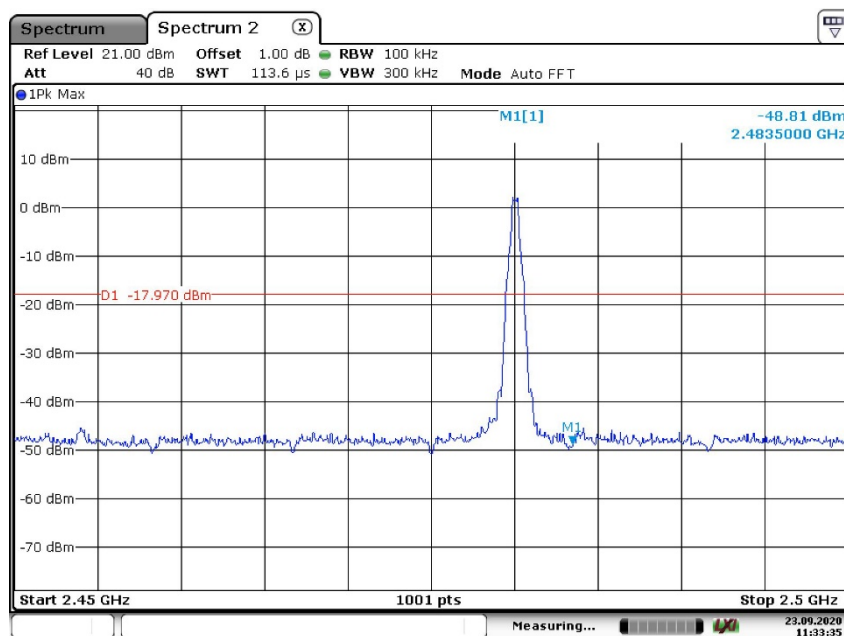
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BDR Mode, Band Edge, Low Channel



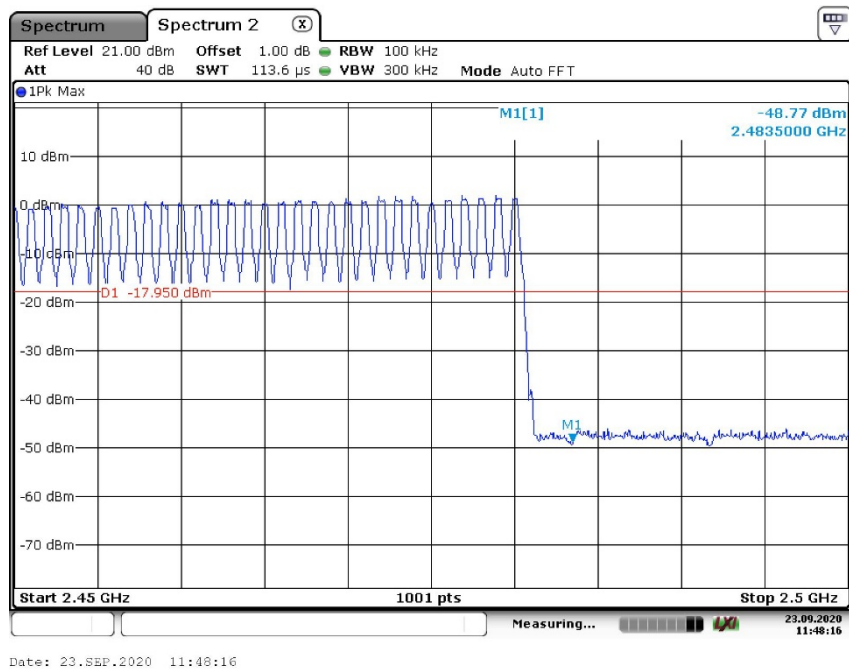
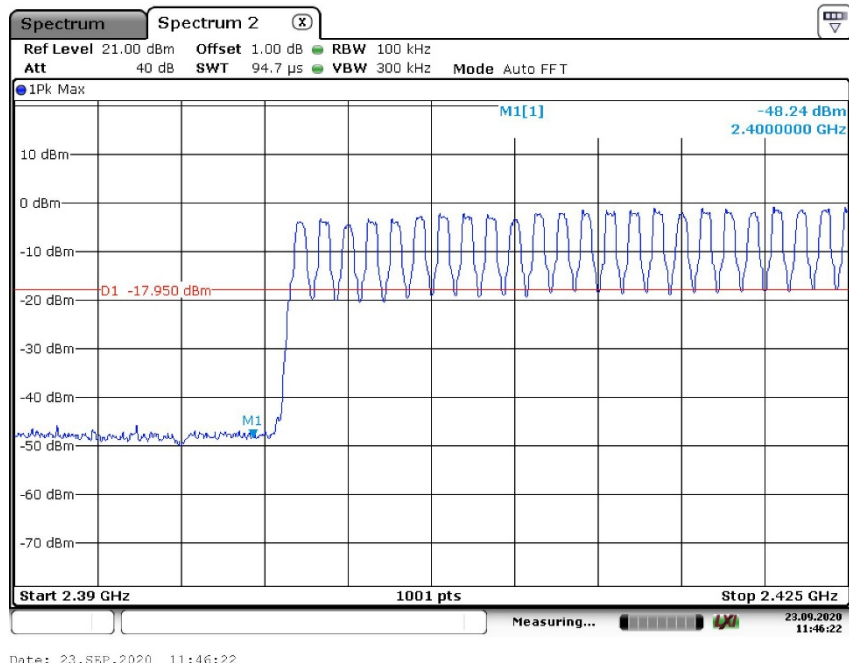
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BDR Mode, Band Edge, High Channel

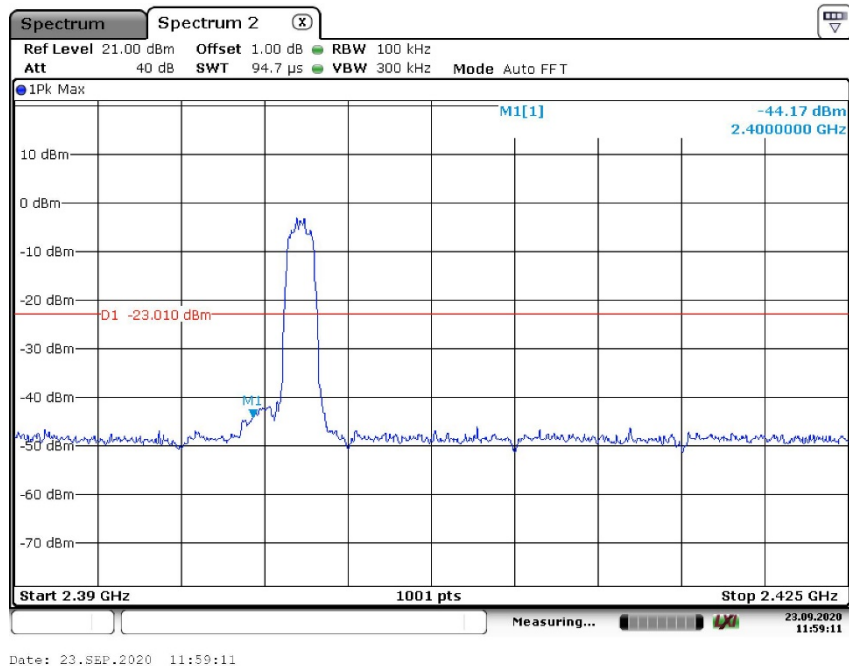


Date: 23.SEP.2020 11:33:35

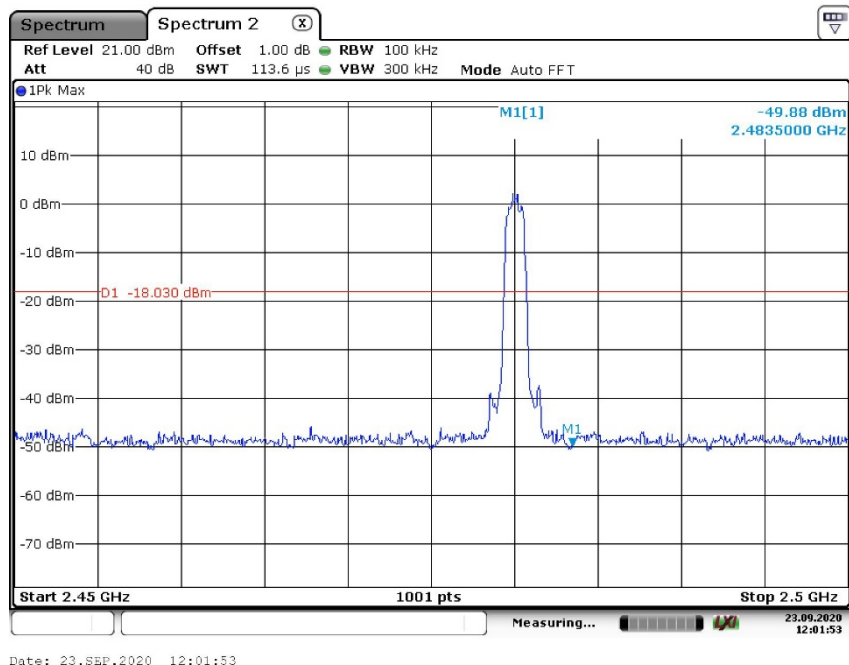
BDR Mode, Hopping Band Edge



EDR Mode, Band Edge, Low Channel



EDR Mode, Band Edge, High Channel



EDR Mode, Hopping Band Edge

