FCC Part 15.247

TEST REPORT

For

ZHEJIANG EBOY TECHNOLOGY CO., LTD.

No. 568, Huabao street, Qianyuan Town, Deqing County Huzhou City, Zhejiang Province, 313200 China

FCC ID: 2AJ3WEBEBAW569

Report Type:	**Product Type:**
Original Report	LED LAMP

Report Producer : Allen Cheng

Report Number : RLK220915004RF01

Report Date : 2022-10-26

Reviewed By: Andy Shih

Prepared By:

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Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
0.0	RLK220915004	RLK220915004RF01	2022-10-26	Original Report	Allen Cheng

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1 General Information

1.1 Product Description for Equipment under Test (EUT)

Applicant	ZHEJIANG EBOY TECHNOLOGY CO., LTD.
	No. 568, Huabao street, Qianyuan Town, Deqing County Huzhou City, Zhejiang Province, 313200 China
Manufacturer	ZHEJIANG EBOY TECHNOLOGY CO., LTD
	No. 568, Huabao street, Qianyuan Town, Deqing County Huzhou City, Zhejiang Province, 313200 China
Brand(Trade) Name	N/A
Product (Equipment)	LED LAMP
Main Model Name	EBE-BAW569
Series Model Name	EBE-BAW569-A
Model Discrepancy	The major electrical and mechanical constructions of series models are identical to the basic model, The main difference is Market segmentation. The model, EBE-BAW569 is the testing sample, and the final test data are shown on this test report.
Frequency Range	IEEE 802.11b/g / IEEE 802.11n HT20 Mode: 2412 ~ 2462 MHz IEEE 802.11n HT40 Mode: 2422 ~ 2452 MHz
Conducted Peak Output Power	IEEE 802.11b Mode: 17.31 dBm IEEE 802.11g Mode: 19.87 dBm IEEE 802.11n HT20 Mode: 18.26 dBm IEEE 802.11n HT40 Mode: 17.40 dBm
Modulation Technique	IEEE 802.11b Mode: DSSS IEEE 802.11g Mode: OFDM IEEE 802.11n HT20 Mode: OFDM IEEE 802.11n HT40 Mode: OFDM
Power Operation (Voltage Range)	☒ AC 120V/60Hz ☐ Adapter ☒ By AC Power Cord ☐ PoE
	☐ DC Type ☐ Battery ☐ DC Power Supply ☐ External from USB Cable ☐ External DC Adapter
	☐ Host System
Received Date	2022/9/15
Date of Test	2022/10/4 ~ 2022/10/7

*All measurement and test data in this report was gathered from production sample serial number: RLK220915004 (Assigned by BACL, Linkou Laboratory).

1.2 Objective

This report is prepared on behalf of *ZHEJIANG EBOY TECHNOLOGY CO., LTD.* in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commission's rules.

1.3 Related Submittal(s)/Grant(s)

N/A.

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01 15.247 Meas Guidance v05r02

1.5 Statement

Decision Rule: No, (The test results do not include MU judgment)

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
The determination of the test results does not require consideration of the uncertainty of the measurement, unless the assessment is required by customer agreement, regulation or standard document specification.
Bay Area Compliance Laboratories Corp. (Linkou Laboratory) is not responsible for the authenticity of the information provided by the applicant that affects the test results.

1.6 Measurement Uncertainty

Parameter		Uncertainty
AC Mains		+/- 3.39 dB
RF output power, conducted		+/- 0.77 dB
Power Spectral Density, conducted		+/- 1.05 dBm
Occupied Bandwidth		+/- 0.94 MHz
Unwanted Emissions, conducted		+/- 1.05 dBm
Emissions, radiated	30 MHz~1GHz	+/- 5.48 dB
	1 GHz~18 GHz	+/- 5.53 dB
	18 GHz~40 GHz	+/- 4.45 dB
Temperature		+/- 0.401 °C
Humidity		+/- 2.6 %

1.7 Environmental Conditions

Test Site	Test Date	Temperature (℃)	Relative Humidity (%)	ATM Pressure (hPa)	Test Engineer
AC Line Conducted Emissions	2022/10/07	26	57	1010	Alex Huang
Radiation Spurious Emissions	2022/10/04~2022/10/06	22.0~22.3	45~48	1010	Alex Huang
Conducted Spurious Emissions	2022/10//5	21	54	1010	Allen Cheng
6 dB Emission Bandwidth	2022/10//5	21	54	1010	Allen Cheng
Maximum Output Power	2022/10//5	21	54	1010	Allen Cheng
100 kHz Bandwidth of Frequency Band Edge	2022/10//5	21	54	1010	Allen Cheng
Power Spectral Density	2022/10//5	21	54	1010	Allen Cheng

1.8 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Linkou Laboratory) to collect test data is located on

☒ No.6, Wende 2Rd., Guishan Dist., Taoyuan City 33382, Taiwan (R.O.C.).

Bay Area Compliance Laboratories Corp. (Linkou Laboratory) Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3546) and the FCC designation No.TW3546 under the Mutual Recognition Agreement (MRA) in FCC Test.

2 System Test Configuration

2.1 Description of Test Configuration

For WIFI mode, there are totally 11 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

For 802.11 b/g/n20 Modes were tested with channel 1, 6 and 11.

For 802.11n40 Mode were tested with channel 3, 6 and 9.

The system was configured for testing in engineering mode, which was provided by manufacturer.

2.2 Equipment Modifications

No modification was made to the EUT.

2.3 EUT Exercise Software

Used “Wifi Test Tool v1.6.0 release.exe” software.

Test Frequency		Low	Middle	High
Power Level Setting	802.11b Mode	Auto	Auto	Auto
	802.11g Mode	Auto	Auto	Auto
	802.11n HT20 Mode	Auto	Auto	Auto
	802.11n HT40 Mode	Auto	Auto	Auto

The EUT was configured for testing in an engineering mode which was provided by the manufacturer. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

802.11b: 1Mbps

802.11g: 6Mbps

802.11n HT20: MCS0

802.11n HT40: MCS0

2.4 Test Mode

Mode 1: Full System (model: EBE-BAW569) for all test item.

2.5 Support Equipment List and Details

Description	Manufacturer	Model Number	S/N
Lamp holder	Double-sun	WK-3503	N/A

2.6 External Cable List and Details

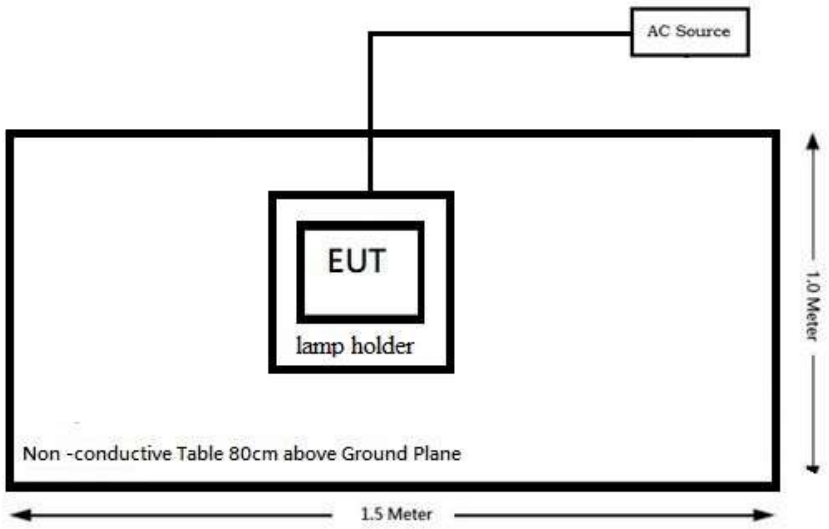
N/A

2.7 Block Diagram of Test Setup

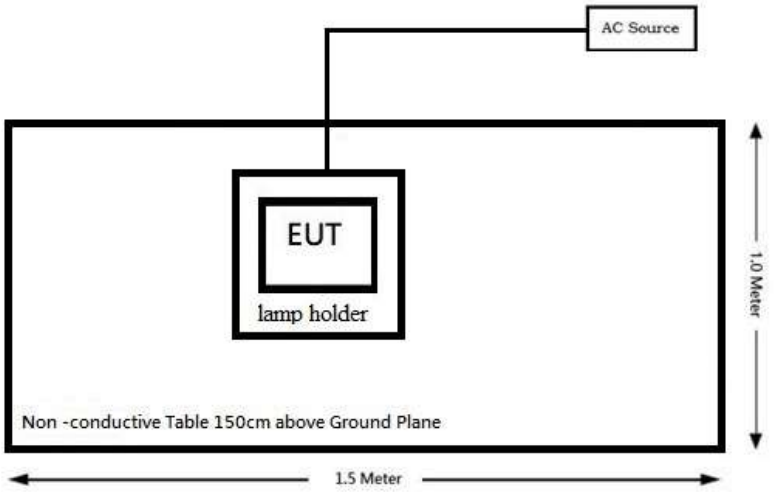
See test photographs attached in setup photos for the actual connections between EUT and support equipment.

Radiation:

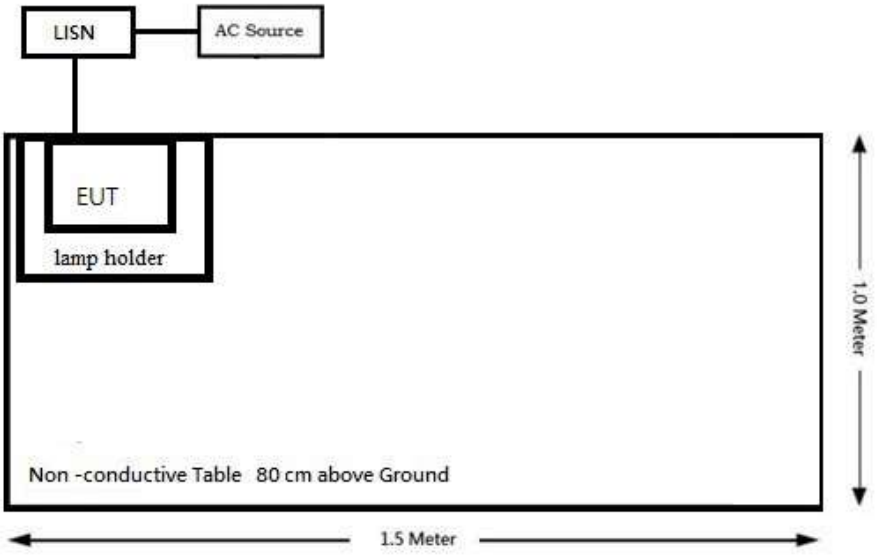
Below 1GHz:



Above 1GHz:



Conduction:



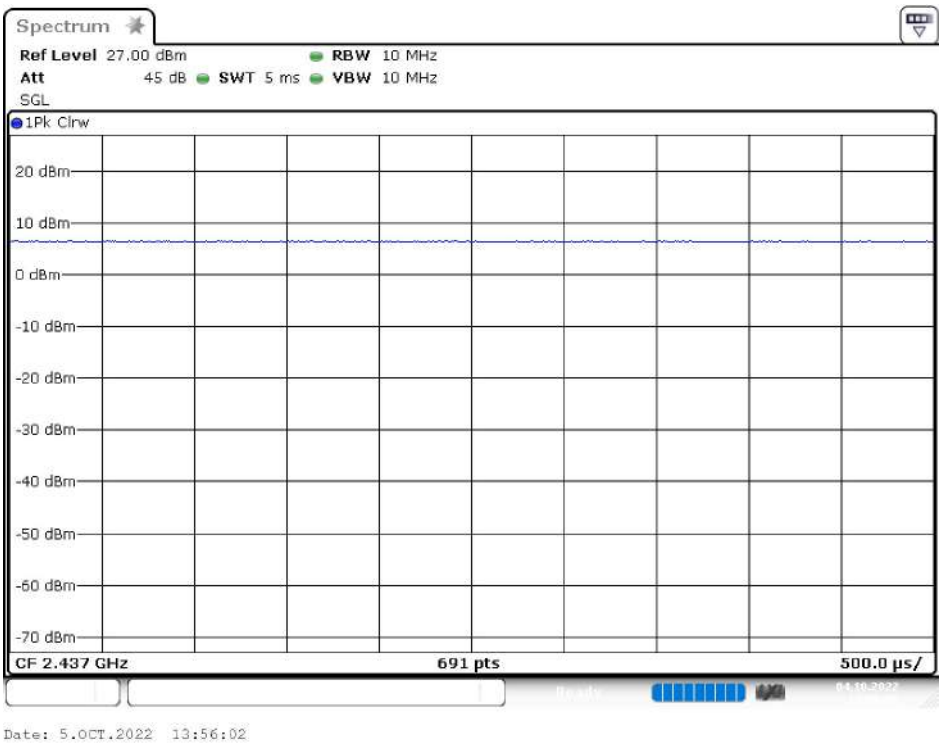
2.8 Duty Cycle

The duty cycle as below:

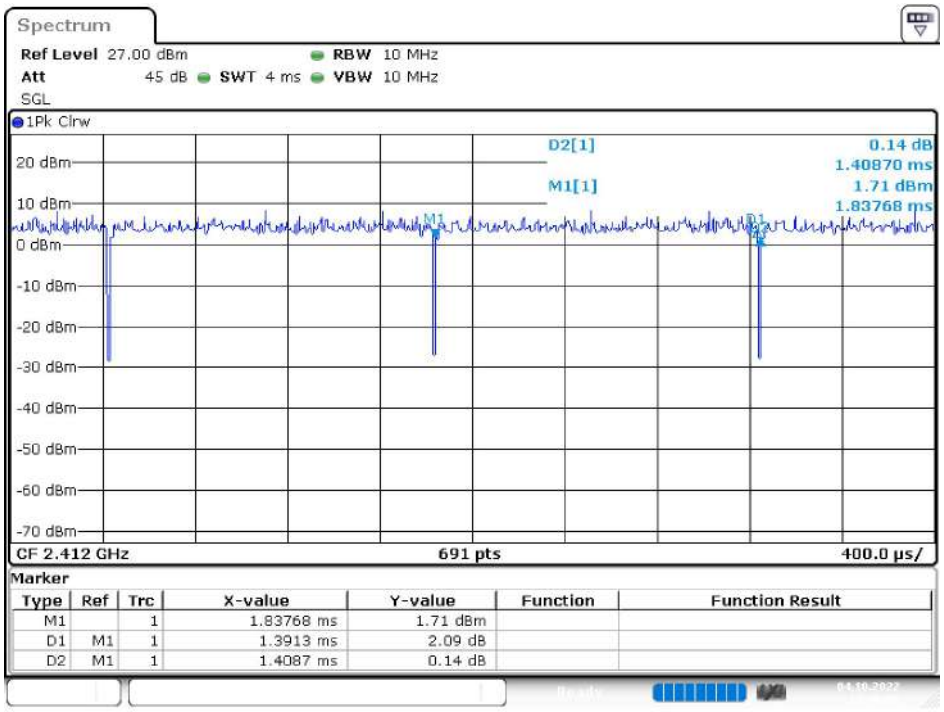
Radio Mode	Ton (ms)	Ton+Toff (ms)	Duty Cycle (%)
802.11b	/	/	100
802.11g	1.391	1.409	99
802.11n20	1.304	1.316	99
802.11n40	0.649	0.655	99

Please refer to the following plots.

B Mode



G Mode



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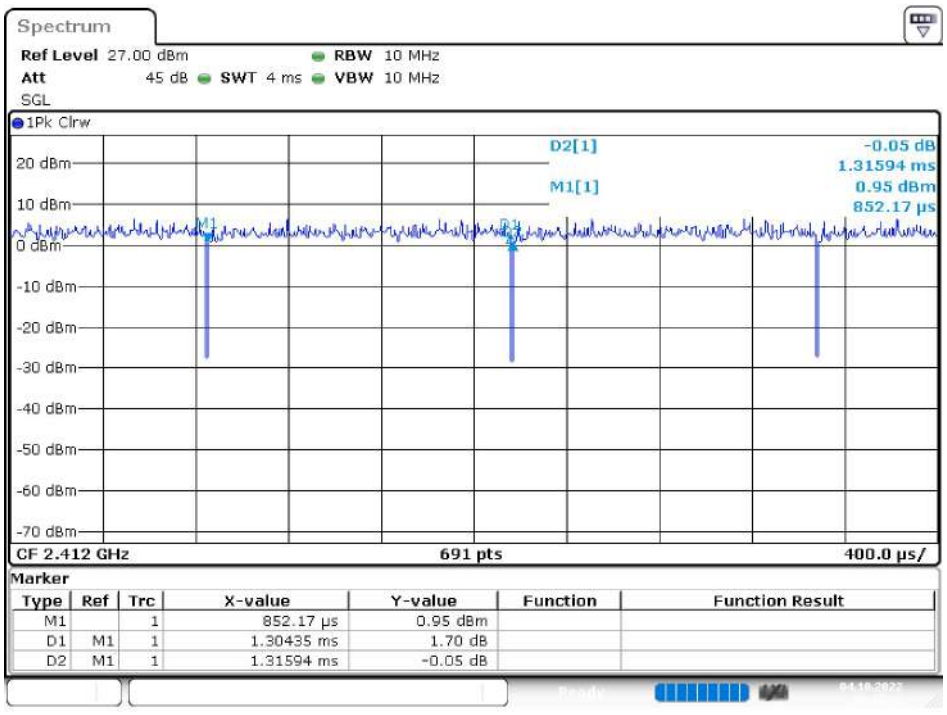
N20 Mode



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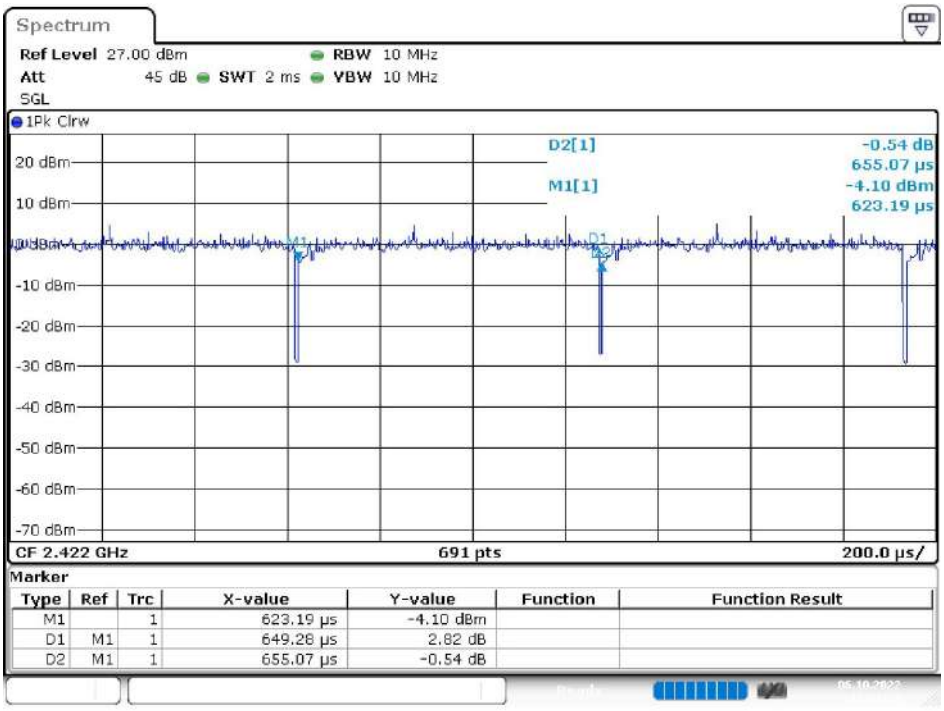
N40 Mode



3 Summary of Test Results

FCC Rules	Description of Test	Results
§15.247(i), §1.1307(b)(3)(i)	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247(a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

4 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conduction Room (CON-A)					
Two-Line-V-Network	Rohde & Schwarz	ENV216	100010	2022/09/06	2023/09/05
EMI Test Receiver	Rohde & Schwarz	ESR3	102430	2022/04/28	2023/04/27
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00432	2022/08/31	2023/08/30
RF Cable	EMCI	EMCCFD300-BM-BM-8000	180526	2022/08/16	2023/08/15
Software	AUDIX	E3 V9	E3LK-03	N.C.R	N.C.R
Radiated Room (966-A)					
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & EMCI	JB3 & N-6-06	A111513 & AT-N0668	2022/4/11	2023/4/10
Horn Antenna	ETS-Lindgren	3115	109141	2022/7/13	2023/7/12
Horn Antenna	ETS-Lindgren	3160-09	123852	2022/7/15	2023/7/14
Preamplifier	A.H. Systems	PAM-0118P	470	2022/3/23	2023/3/22
Preamplifier	A.H. Systems	PAM-1840P	551122	2022/3/23	2023/3/22
Spectrum Analyzer	Rohde & Schwarz	FSV40	101940	2021/12/15	2022/12/14
ESR EMI Test Receiver	Rohde & Schwarz	ESR3	102448	2022/3/18	2023/3/18
Microflex Cable	UTIFLEX	W6103	LKTE381	2022/6/30	2023/6/29
Microflex Cable	EMCI	EMC106-SM-SM-2000	180515	2022/8/5	2023/8/4
Microflex Cable	UTIFLEX	UFA210A-1-3149-300300	MFR 64639 232490-001	2022/8/5	2023/8/4
Software	AUDIX	E3 V9	E3LK-01	N.C.R	N.C.R
Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102248	2022/9/13	2023/9/12
Cable	MTJ	MT40S	620620-MT40S-100	2021/12/22	2022/12/21
Power Sensor	KEYSIGHT	U2021XA	MY54080011	2022/09/01	2023/08/31
Attenuator	MCL	BW-S10W5+	605	2022/3/9	2023/3/8

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements

5 FCC §15.247(i), §1.1307(b)(3)(i) - RF Exposure

5.1 Applicable Standard

According to subpart 15.247(i) and subpart §1.1307(b)(3)(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

(C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

The sequence to apply for single portable RF sources includes the following steps:

1) determination of 1 mW blanket exemption under § 1.1307(b)(3)(i)(A)

2) determination of exemption under the MPE-based § 1.1307(b)(3)(i)(C) if 1) is not met

3) determination of exemption under the SAR-based § 1.1307(b)(3)(i)(B) if both 1) and 2) are not met

5.2 RF Exposure Evaluation Result

The EUT selecting the worst mode for evaluation.

Project info

Band	Freq (MHz)	Tune-up (dBm)	Ant Gain (dBi)	Distances (mm)	Duty (%)	Tune-up (mW)	ERP (dBm)	ERP (mW)
WIFI 2.4G	2462	20	1	200	100%	100.00	18.85	76.74

§ 1.1307(b)(3)(i)(A) method is not applicable.

§ 1.1307(b)(3)(i)(C)

Band	Freq (MHz)	λ/2π (mm)	Distances applies	ERP Limit (mW)	Result Option C
WIFI 2.4G	2462	19.39	apply	768.00	exempt

The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates

ERP (watts) is no more than the calculated value prescribed for that frequency

R must be at least $\lambda/2\pi$

λ is the free-space operating wavelength in meters

Result: The EUT meets exemption requirement

6 FCC §15.203 – Antenna Requirements

6.1 Applicable Standard

According to § 15.203,

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna does not exceed 6dBi.

6.2 Antenna List and Details

Manufacturer	Model	Antenna Type	Antenna Gain
Hangzhou Tuya Information Technology Co., Ltdd	WB2L	PCB Antenna	1 dBi

Result: Compliance

7 FCC §15.207(a) – AC Line Conducted Emissions

7.1 Applicable Standard

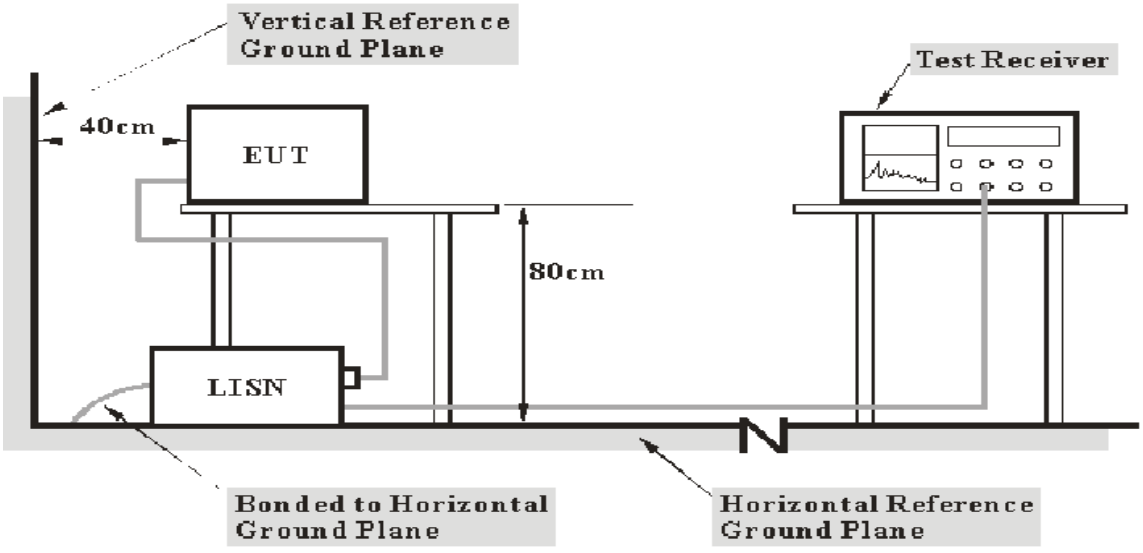
According to §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note	56 to 46 Note
0.5-5	56	46
5-30	60	50

Note : Decreases with the logarithm of the frequency.

7.2 EUT Setup



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

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

7.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations

Frequency Range	IF B/W
150kHz – 30MHz	9kHz

7.4 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

7.5 Corrected Factor & Margin Calculation

The factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

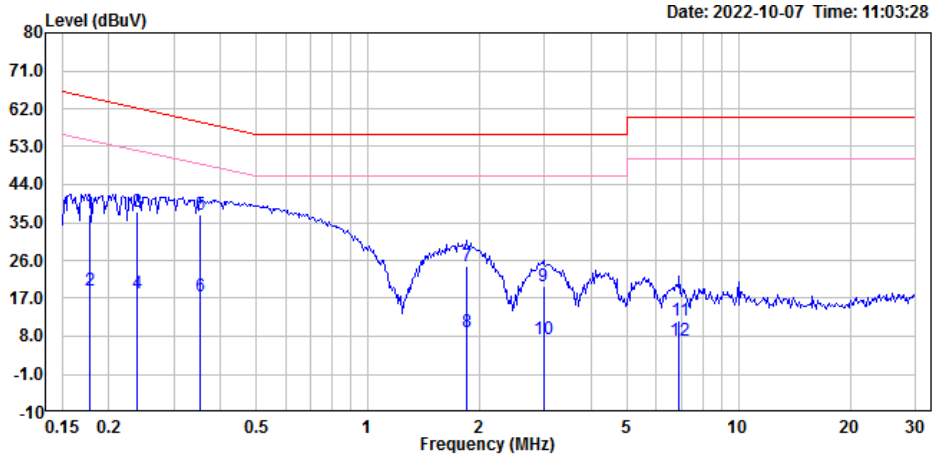
The “Over Limit” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for Over Limit calculation is as follows:

Over Limit = Level – Limit Line

7.6 Test Results

Test Mode: Transmitting

Main: AC120 V, 60 Hz, Line



Site : Conduction
Condition: Line
Job No : RLK220915004
Company : ZHEJIANG EBOY TECHNOLOGY CO., LTD.
Mode : WIFI_2.4G
Power : 120V/60Hz
Note : EBE-BAW569
Temp.(℃)/Hum.(%RH): 26/57

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.177	16.99	36.83	19.84	64.61	-27.78	QP
2	0.177	-1.09	18.75	19.84	54.61	-35.86	Average
3	0.238	17.78	37.63	19.85	62.16	-24.53	QP
4	0.238	-1.57	18.28	19.85	52.16	-33.88	Average
5 *	0.352	16.98	36.84	19.86	58.92	-22.08	QP
6 *	0.352	-2.26	17.60	19.86	48.92	-31.32	Average
7	1.845	4.83	24.75	19.92	56.00	-31.25	QP
8	1.845	-10.89	9.03	19.92	46.00	-36.97	Average
9	2.976	-0.20	19.75	19.95	56.00	-36.25	QP
10	2.976	-12.66	7.29	19.95	46.00	-38.71	Average
11	6.925	-8.22	11.80	20.02	60.00	-48.20	QP
12	6.925	-13.04	6.98	20.02	50.00	-43.02	Average

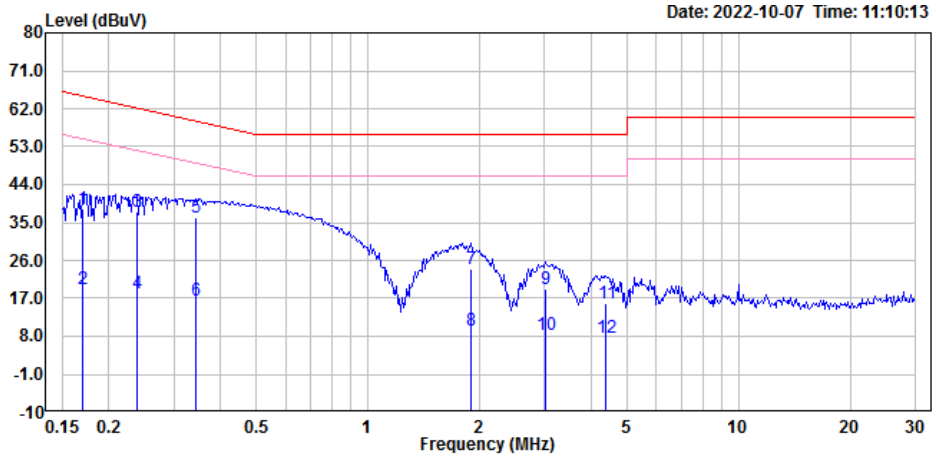
Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

Main: AC120 V, 60 Hz, Neutral



Site : Conduction
Condition: Neutral
Job No : RLK220915004
Company : ZHEJIANG EBOY TECHNOLOGY CO., LTD.
Mode : WIFI_2.4G
Power : 120V/60Hz
Note : EBE-BAW569
Temp.(℃)/Hum.(%RH): 26/57

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.170	18.25	38.09	19.84	64.94	-26.85	QP
2	0.170	-0.59	19.25	19.84	54.94	-35.69	Average
3	0.238	17.82	37.67	19.85	62.16	-24.49	QP
4	0.238	-1.69	18.16	19.85	52.16	-34.00	Average
5 *	0.344	16.47	36.33	19.86	59.12	-22.79	QP
6 *	0.344	-3.23	16.63	19.86	49.12	-32.49	Average
7	1.905	3.95	23.87	19.92	56.00	-32.13	QP
8	1.905	-10.69	9.23	19.92	46.00	-36.77	Average
9	3.024	-0.80	19.15	19.95	56.00	-36.85	QP
10	3.024	-11.74	8.21	19.95	46.00	-37.79	Average
11	4.398	-4.23	15.75	19.98	56.00	-40.25	QP
12	4.398	-12.20	7.78	19.98	46.00	-38.22	Average

Note:

Level = Read Level + Factor

Over Limit = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

8 FCC §15.209, §15.205 , §15.247(d) – Spurious Emissions

8.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	608 – 614	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	960 – 1240	5. 35 – 5. 46
2.1735 – 2.1905	16.80425 – 16.80475	1300 – 1427	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1435 – 1626.5	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1645.5 – 1646.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1660 – 1710	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1718.8 – 1722.2	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	2200 – 2300	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2310 – 2390	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2483.5 – 2500	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2690 – 2900	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	3260 – 3267	22.01 – 23.12
8.41425 – 8.41475	162.0125 –167.17	3.332 – 3.339	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3 3458 – 3 358	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3.600 – 4.400	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4		Above 38.6
13.36 – 13.41	399.9 – 410		

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

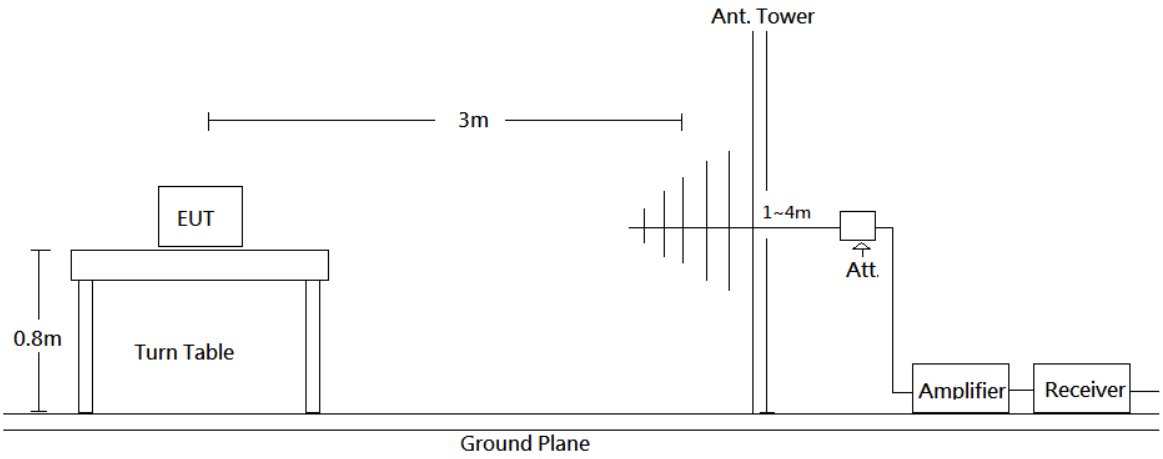
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC §15.247 (d) 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

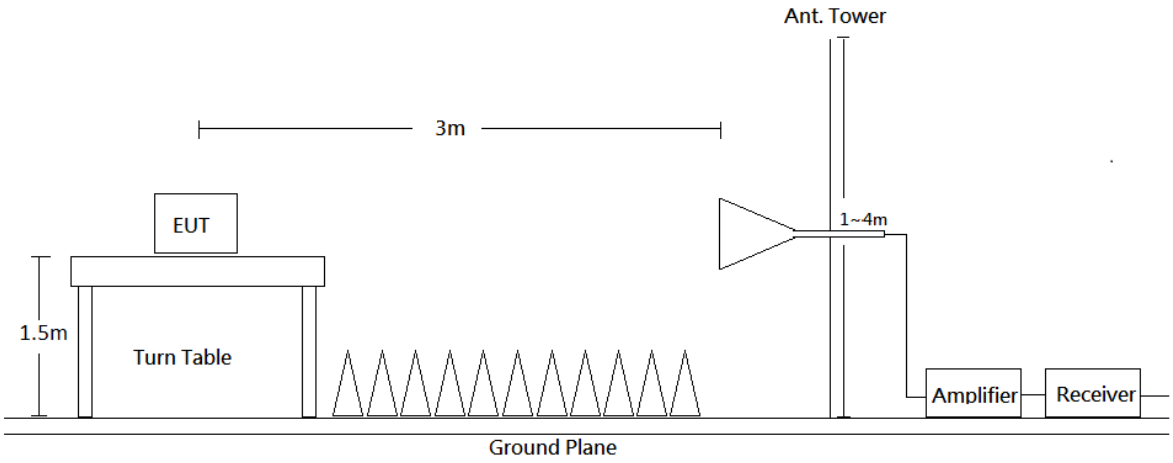
highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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) (see §15.205(c).

8.2 EUT Setup

Below 1 GHz:



Above 1 GHz:



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.247 Limits.

8.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	VBW	Duty cycle	Measurement method
30-1000 MHz	120 kHz	/	/	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	>98%	Ave
	1 MHz	1/T	<98%	Ave

Note: T is minimum transmission duration

8.4 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

8.5 Corrected Factor & Margin Calculation

The Correct Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Result – Limit

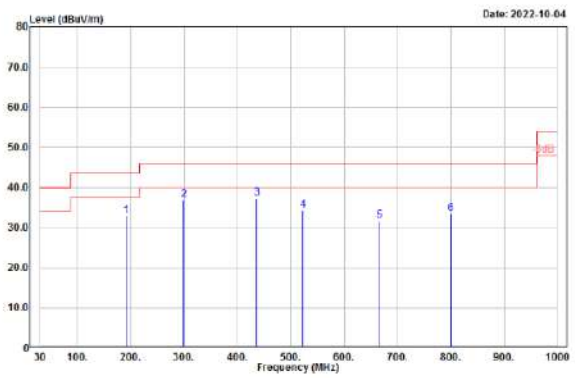
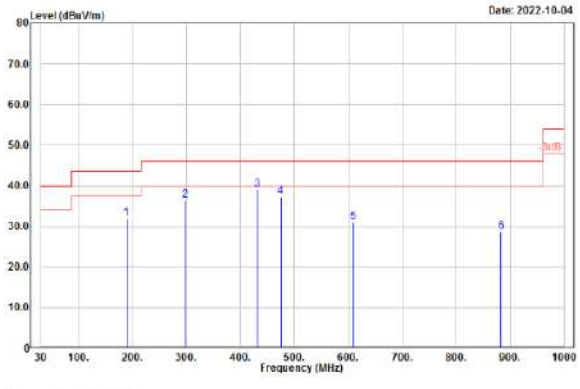
8.6 Test Results

Test Mode: Transmitting

(Pre-scan with three orthogonal axis, and worse case as Z axis.)

(worst case is 802.11g mode high channel)

30MHz-1GHz:

Horizontal	Vertical
	

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	191.020	32.88	43.50	-10.62	53.92	-21.04	QP
2	298.690	36.85	46.00	-9.15	56.70	-19.85	QP
3	436.430	37.37	46.00	-8.63	54.19	-16.82	QP
4	521.790	34.19	46.00	-11.81	49.21	-15.02	QP
5	666.320	31.64	46.00	-14.36	44.31	-12.67	QP
6	800.180	33.37	46.00	-12.63	44.45	-11.08	QP

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	189.080	31.77	43.50	-11.73	53.00	-21.23	QP
2	297.720	36.45	46.00	-9.55	56.30	-19.85	QP
3	430.610	38.94	46.00	-7.06	55.88	-16.94	QP
4	474.260	37.19	46.00	-8.81	53.23	-16.04	QP
5	608.120	31.06	46.00	-14.94	44.69	-13.63	QP
6	882.630	28.56	46.00	-17.44	38.39	-9.83	QP

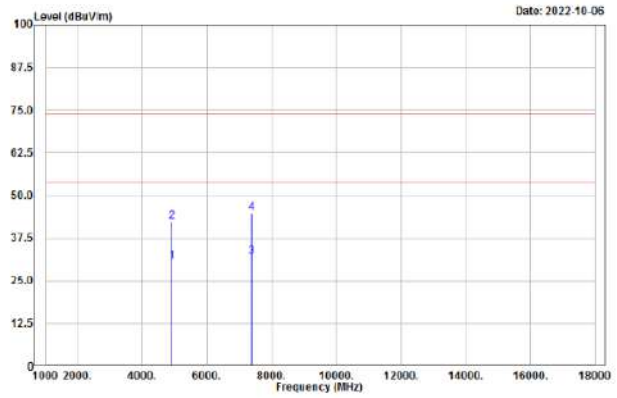
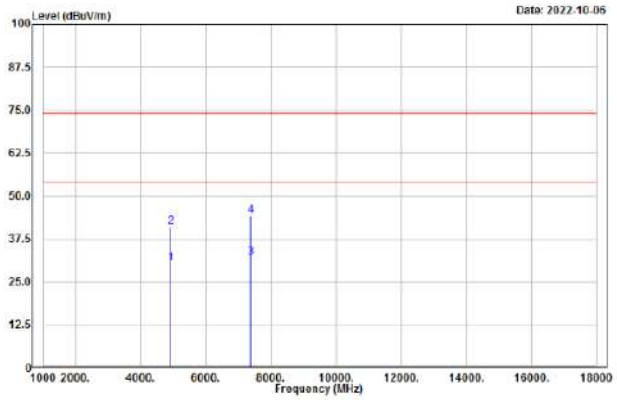
Level (Result) = Reading + Factor.

Over Limit = Level – Limit.

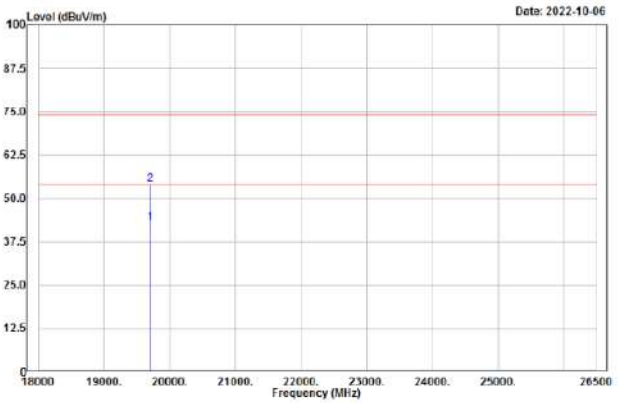
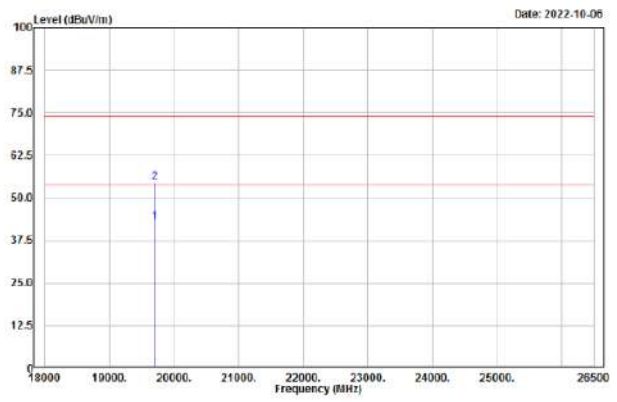
Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

1GHz-18GHz:

Horizontal	Vertical
	

18GHz-26.5GHz:

Horizontal	Vertical
	

Above 1GHz:

802.11b Mode

Low channel

Horizontal

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	!	4824.000	37.50	54.00	-16.50	39.85	-2.35	Average
2		4824.000	43.47	74.00	-30.53	45.82	-2.35	Peak
3		7236.000	31.43	54.00	-22.57	28.40	3.03	Average
4		7236.000	44.39	74.00	-29.61	41.36	3.03	Peak

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1		2347.408	31.13	54.00	-22.87	40.59	-9.46	Average
2		2347.408	44.78	74.00	-29.22	54.24	-9.46	Peak
3	*	2412.000	85.07	54.00			-9.20	Average
4	*	2412.000	87.23	74.00			-9.20	Peak

Vertical

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	!	4824.000	37.54	54.00	-16.46	39.89	-2.35	Average
2		4824.000	43.46	74.00	-30.54	45.81	-2.35	Peak
3		7236.000	31.61	54.00	-22.39	28.58	3.03	Average
4		7236.000	44.39	74.00	-29.61	41.36	3.03	Peak

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1		2336.880	30.96	54.00	-23.04	40.45	-9.49	Average
2		2336.880	44.81	74.00	-29.19	54.30	-9.49	Peak
3	*	2412.000	82.98	54.00			-9.20	Average
4	*	2412.000	86.74	74.00			-9.20	Peak

Middle channel

Horizontal

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1		4874.000	32.75	54.00	-21.25	34.97	-2.22	Average
2		4874.000	40.05	74.00	-33.95	42.27	-2.22	Peak
3		7311.000	32.18	54.00	-21.82	28.94	3.24	Average
4		7311.000	44.62	74.00	-29.38	41.38	3.24	Peak

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	*	2437.000	84.24	54.00			-9.10	Average
2	*	2437.000	86.90	74.00			-9.10	Peak

Vertical

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	!	4874.000	36.30	54.00	-17.70	38.52	-2.22	Average
2		4874.000	43.34	74.00	-30.66	45.56	-2.22	Peak
3		7311.000	32.16	54.00	-21.84	28.92	3.24	Average
4		7311.000	43.88	74.00	-30.12	40.64	3.24	Peak

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	*	2437.000	83.27	54.00			-9.10	Average
2	*	2437.000	85.92	74.00			-9.10	Peak

High channel

Horizontal

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	!	4924.000	37.05	54.00	-16.95	39.13	-2.08	Average
2		4924.000	42.10	74.00	-31.90	44.18	-2.08	Peak
3		7386.000	31.86	54.00	-22.14	28.43	3.43	Average
4		7386.000	43.42	74.00	-30.58	39.99	3.43	Peak

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	*	2462.000	84.21	54.00			-9.00	Average
2	*	2462.000	88.41	74.00			-9.00	Peak
3		2484.448	32.05	54.00	-21.95	40.96	-8.91	Average
4		2484.448	44.39	74.00	-29.61	53.30	-8.91	Peak

Vertical

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	!	4924.000	39.46	54.00	-14.54	41.54	-2.08	Average
2		4924.000	44.36	74.00	-29.64	46.44	-2.08	Peak
3		7386.000	32.01	54.00	-21.99	28.58	3.43	Average
4		7386.000	43.57	74.00	-30.43	40.14	3.43	Peak

		Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	*	2462.000	83.56	54.00			-9.00	Average
2	*	2462.000	85.58	74.00			-9.00	Peak
3		2483.776	31.29	54.00	-22.71	40.20	-8.91	Average
4		2483.776	44.80	74.00	-29.20	53.71	-8.91	Peak

Level (Result) = Reading + Factor.

Over Limit = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

802.11g Mode

Low channel

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4824.000	29.61	54.00	-24.39	31.96	-2.35	Average
2	4824.000	41.59	74.00	-32.41	43.94	-2.35	Peak
3	7236.000	31.36	54.00	-22.64	28.33	3.03	Average
4	7236.000	44.81	74.00	-29.19	41.78	3.03	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	2357.488	31.41	54.00	-22.59	40.83	-9.42	Average
2	2357.488	43.29	74.00	-30.71	52.71	-9.42	Peak
3 *	2412.000	86.77	54.00			-9.20	Average
4 *	2412.000	89.33	74.00			-9.20	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4824.000	29.76	54.00	-24.24	32.11	-2.35	Average
2	4824.000	41.12	74.00	-32.88	43.47	-2.35	Peak
3	7236.000	31.34	54.00	-22.66	28.31	3.03	Average
4	7236.000	44.51	74.00	-29.49	41.48	3.03	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	2389.072	31.37	54.00	-22.63	40.65	-9.28	Average
2	2389.072	44.64	74.00	-29.36	53.92	-9.28	Peak
3 *	2412.000	86.98	54.00			-9.20	Average
4 *	2412.000	89.13	74.00			-9.20	Peak

Middle channel

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4874.000	29.48	54.00	-24.52	31.70	-2.22	Average
2	4874.000	40.25	74.00	-33.75	42.47	-2.22	Peak
3	7311.000	32.16	54.00	-21.84	28.92	3.24	Average
4	7311.000	43.67	74.00	-30.33	40.43	3.24	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2437.000	80.75	54.00			-9.10	Average
2 *	2437.000	89.58	74.00			-9.10	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4874.000	29.71	54.00	-24.29	31.93	-2.22	Average
2	4874.000	40.98	74.00	-33.02	43.20	-2.22	Peak
3	7311.000	32.18	54.00	-21.82	28.94	3.24	Average
4	7311.000	45.01	74.00	-28.99	41.77	3.24	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2437.000	80.57	54.00			-9.10	Average
2 *	2437.000	89.94	74.00			-9.10	Peak

High channel

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4924.000	30.69	54.00	-23.31	32.77	-2.08	Average
2	4924.000	42.30	74.00	-31.70	44.38	-2.08	Peak
3	7386.000	31.92	54.00	-22.08	28.49	3.43	Average
4	7386.000	44.74	74.00	-29.26	41.31	3.43	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2462.000	82.53	54.00			-9.00	Average
2 *	2462.000	91.26	74.00			-9.00	Peak
3	2499.088	32.04	54.00	-21.96	40.89	-8.85	Average
4	2499.088	45.94	74.00	-28.06	54.79	-8.85	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4924.000	30.44	54.00	-23.56	32.52	-2.08	Average
2	4924.000	40.91	74.00	-33.09	42.99	-2.08	Peak
3	7386.000	31.87	54.00	-22.13	28.44	3.43	Average
4	7386.000	44.05	74.00	-29.95	40.62	3.43	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2462.000	77.93	54.00			-9.00	Average
2 *	2462.000	90.68	74.00			-9.00	Peak
3	2486.992	31.89	54.00	-22.11	40.79	-8.90	Average
4	2486.992	45.33	74.00	-28.67	54.23	-8.90	Peak

Level (Result) = Reading + Factor.

Over Limit = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

802.11n HT20 Mode

Low channel

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4824.000	29.38	54.00	-24.62	31.73	-2.35	Average
2	4824.000	40.86	74.00	-33.14	43.21	-2.35	Peak
3	7236.000	31.37	54.00	-22.63	28.34	3.03	Average
4	7236.000	43.26	74.00	-30.74	40.23	3.03	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	2364.320	31.47	54.00	-22.53	40.85	-9.38	Average
2	2364.320	44.52	74.00	-29.48	53.90	-9.38	Peak
3 *	2412.000	80.57	54.00			-9.20	Average
4 *	2412.000	88.97	74.00			-9.20	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4824.000	27.24	54.00	-26.76	29.59	-2.35	Average
2	4824.000	42.17	74.00	-31.83	44.52	-2.35	Peak
3	7236.000	31.34	54.00	-22.66	28.31	3.03	Average
4	7236.000	43.75	74.00	-30.25	40.72	3.03	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	2383.360	31.20	54.00	-22.80	40.51	-9.31	Average
2	2383.360	44.01	74.00	-29.99	53.32	-9.31	Peak
3 *	2412.000	78.74	54.00			-9.20	Average
4 *	2412.000	88.32	74.00			-9.20	Peak

Middle channel

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4874.000	30.16	54.00	-23.84	32.38	-2.22	Average
2	4874.000	42.17	74.00	-31.83	44.39	-2.22	Peak
3	7311.000	32.27	54.00	-21.73	29.03	3.24	Average
4	7311.000	46.34	74.00	-27.66	43.10	3.24	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2437.000	78.57	54.00			-9.10	Average
2 *	2437.000	88.00	74.00			-9.10	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4874.000	29.01	54.00	-24.99	31.23	-2.22	Average
2	4874.000	40.58	74.00	-33.42	42.80	-2.22	Peak
3	7311.000	32.16	54.00	-21.84	28.92	3.24	Average
4	7311.000	44.12	74.00	-29.88	40.88	3.24	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2437.000	78.34	54.00			-9.10	Average
2 *	2437.000	87.82	74.00			-9.10	Peak

High channel

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4924.000	30.80	54.00	-23.20	32.88	-2.08	Average
2	4924.000	42.45	74.00	-31.55	44.53	-2.08	Peak
3	7386.000	31.84	54.00	-22.16	28.41	3.43	Average
4	7386.000	44.66	74.00	-29.34	41.23	3.43	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2462.000	77.72	54.00			-9.00	Average
2 *	2462.000	88.66	74.00			-9.00	Peak
3	2492.128	31.96	54.00	-22.04	40.85	-8.89	Average
4	2492.128	45.57	74.00	-28.43	54.46	-8.89	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4924.000	29.40	54.00	-24.60	31.48	-2.08	Average
2	4924.000	41.62	74.00	-32.38	43.70	-2.08	Peak
3	7386.000	31.85	54.00	-22.15	28.42	3.43	Average
4	7386.000	44.43	74.00	-29.57	41.00	3.43	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2462.000	80.53	54.00			-9.00	Average
2 *	2462.000	89.15	74.00			-9.00	Peak
3	2499.472	32.19	54.00	-21.81	41.04	-8.85	Average
4	2499.472	45.05	74.00	-28.95	53.90	-8.85	Peak

Level (Result) = Reading + Factor.

Over Limit = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Spurious emissions more than 20 dB below the limit were not reported.

802.11n HT40 Mode

Low channel

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4844.000	27.26	54.00	-26.74	29.55	-2.29	Average
2	4844.000	40.62	74.00	-33.38	42.91	-2.29	Peak
3	7266.000	31.51	54.00	-22.49	28.38	3.13	Average
4	7266.000	43.02	74.00	-30.98	39.89	3.13	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 !	2386.692	34.78	54.00	-19.22	44.08	-9.30	Average
2	2386.692	49.22	74.00	-24.78	58.52	-9.30	Peak
3 *	2422.000	75.17	54.00			-9.16	Average
4 *	2422.000	85.66	74.00			-9.16	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4844.000	27.28	54.00	-26.72	29.57	-2.29	Average
2	4844.000	40.11	74.00	-33.89	42.40	-2.29	Peak
3	7266.000	31.55	54.00	-22.45	28.42	3.13	Average
4	7266.000	42.99	74.00	-31.01	39.86	3.13	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	2389.332	33.23	54.00	-20.77	42.51	-9.28	Average
2	2389.332	51.41	74.00	-22.59	60.69	-9.28	Peak
3 *	2422.000	77.07	54.00			-9.16	Average
4 *	2422.000	86.25	74.00			-9.16	Peak

Middle channel

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4874.000	27.68	54.00	-26.32	29.90	-2.22	Average
2	4874.000	40.85	74.00	-33.15	43.07	-2.22	Peak
3	7311.000	31.88	54.00	-22.12	28.64	3.24	Average
4	7311.000	44.66	74.00	-29.34	41.42	3.24	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2437.000	73.55	54.00			-9.10	Average
2 *	2437.000	84.63	74.00			-9.10	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4874.000	28.63	54.00	-25.37	30.85	-2.22	Average
2	4874.000	40.56	74.00	-33.44	42.78	-2.22	Peak
3	7311.000	31.93	54.00	-22.07	28.69	3.24	Average
4	7311.000	44.14	74.00	-29.86	40.90	3.24	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2437.000	75.97	54.00			-9.10	Average
2 *	2437.000	85.34	74.00			-9.10	Peak

High channel

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4904.000	27.92	54.00	-26.08	30.05	-2.13	Average
2	4904.000	40.29	74.00	-33.71	42.42	-2.13	Peak
3	7356.000	32.15	54.00	-21.85	28.79	3.36	Average
4	7356.000	44.18	74.00	-29.82	40.82	3.36	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2452.000	78.07	54.00			-9.04	Average
2 *	2452.000	87.06	74.00			-9.04	Peak
3 !	2484.768	35.51	54.00	-18.49	44.42	-8.91	Average
4	2484.768	50.07	74.00	-23.93	58.98	-8.91	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	4904.000	28.15	54.00	-25.85	30.28	-2.13	Average
2	4904.000	41.15	74.00	-32.85	43.28	-2.13	Peak
3	7356.000	32.03	54.00	-21.97	28.67	3.36	Average
4	7356.000	44.19	74.00	-29.81	40.83	3.36	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 *	2452.000	73.90	54.00			-9.04	Average
2 *	2452.000	84.72	74.00			-9.04	Peak
3 !	2483.544	35.39	54.00	-18.61	44.30	-8.91	Average
4	2483.544	50.60	74.00	-23.40	59.51	-8.91	Peak

Level (Result) = Reading + Factor.

Over Limit = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

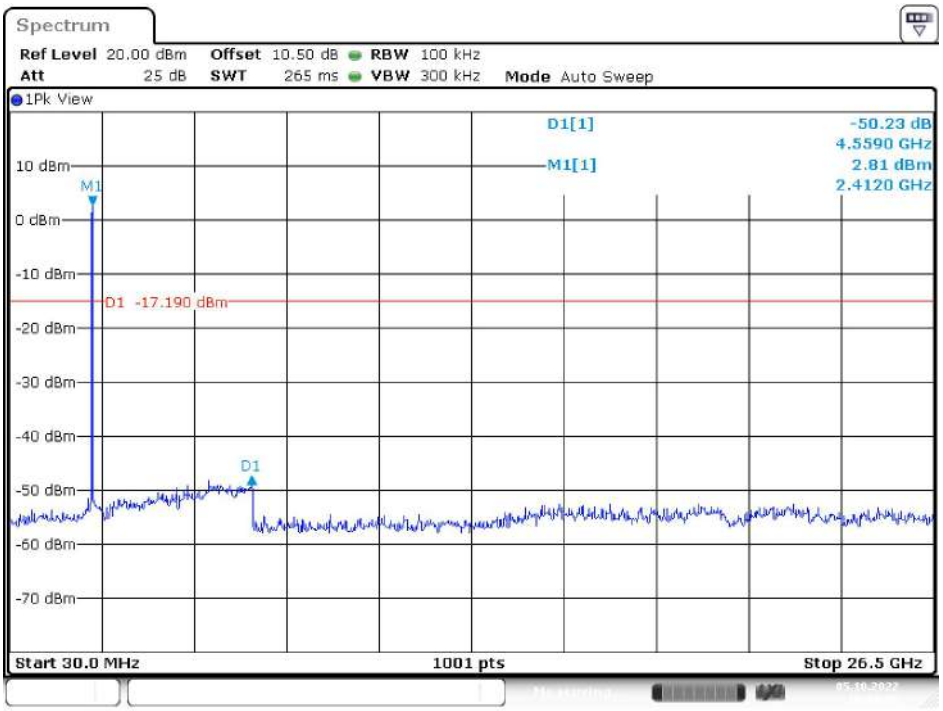
Spurious emissions more than 20 dB below the limit were not reported.

Conducted Spurious Emissions:

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
B Mode				
Low	2412	50.23	≥ 20	PASS
Middle	2437	50.43	≥ 20	PASS
High	2462	51.35	≥ 20	PASS
G Mode				
Low	2412	43.90	≥ 20	PASS
Middle	2437	47.00	≥ 20	PASS
High	2462	44.85	≥ 20	PASS
N20 Mode				
Low	2412	46.21	≥ 20	PASS
Middle	2437	41.52	≥ 20	PASS
High	2462	42.03	≥ 20	PASS
N40 Mode				
Low	2422	39.30	≥ 20	PASS
Middle	2437	39.09	≥ 20	PASS
High	2452	42.43	≥ 20	PASS

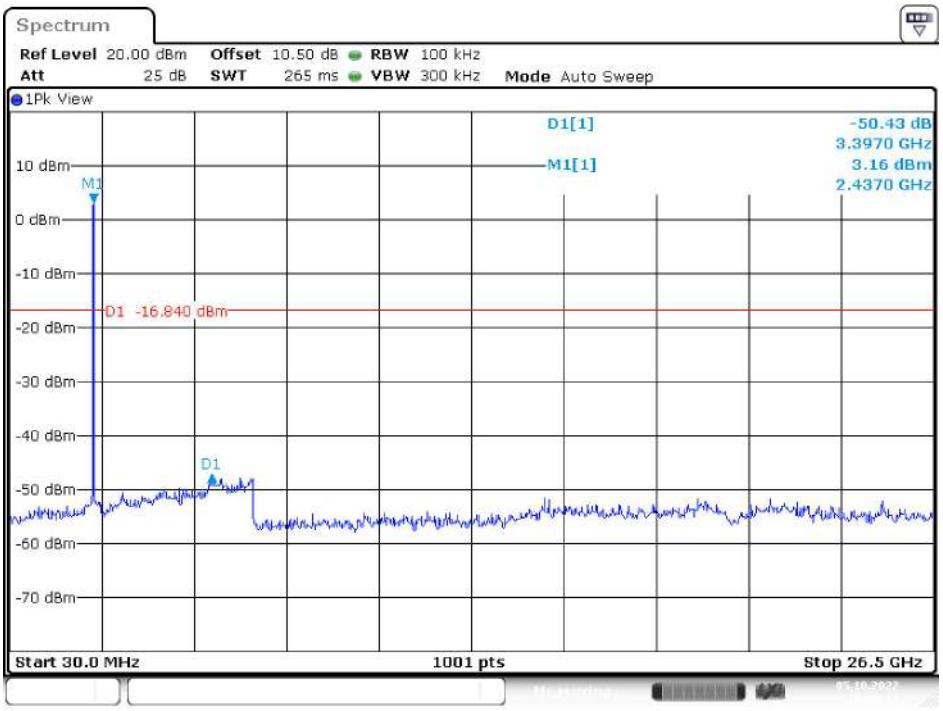
B Mode

Low Channel



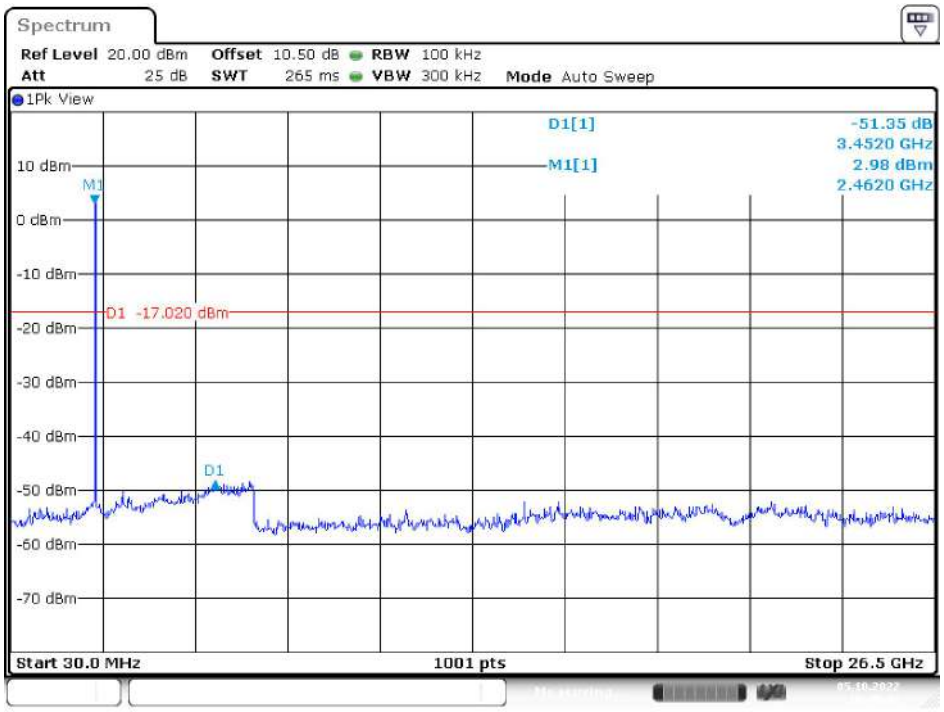
Date: 5.OCT.2022 10:34:56

Middle Channel



Date: 5.OCT.2022 10:36:13

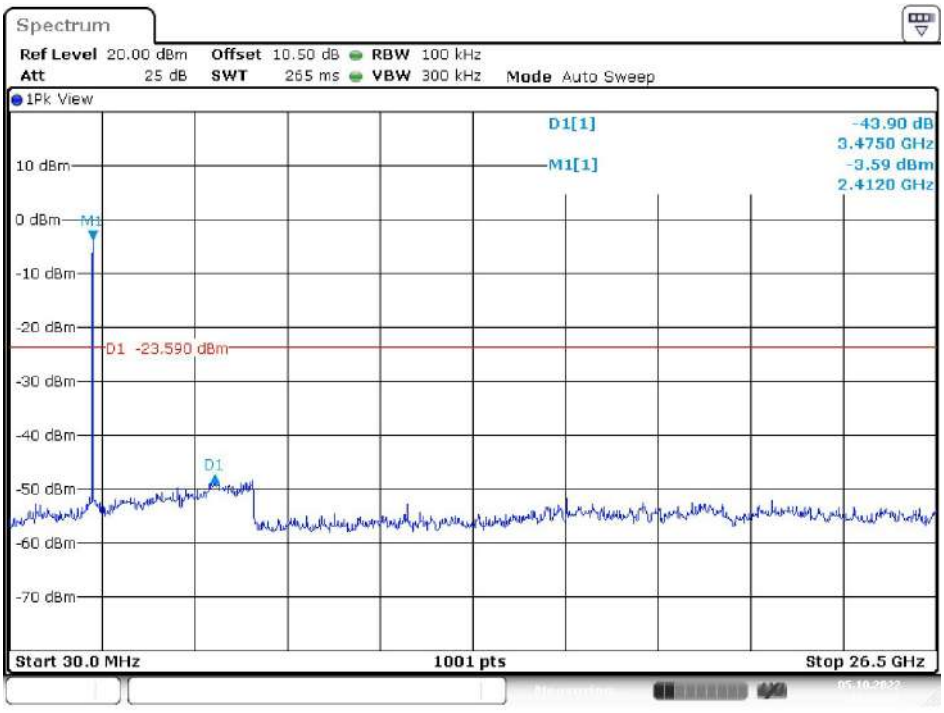
High Channel



Date: 5.OCT.2022 10:45:41

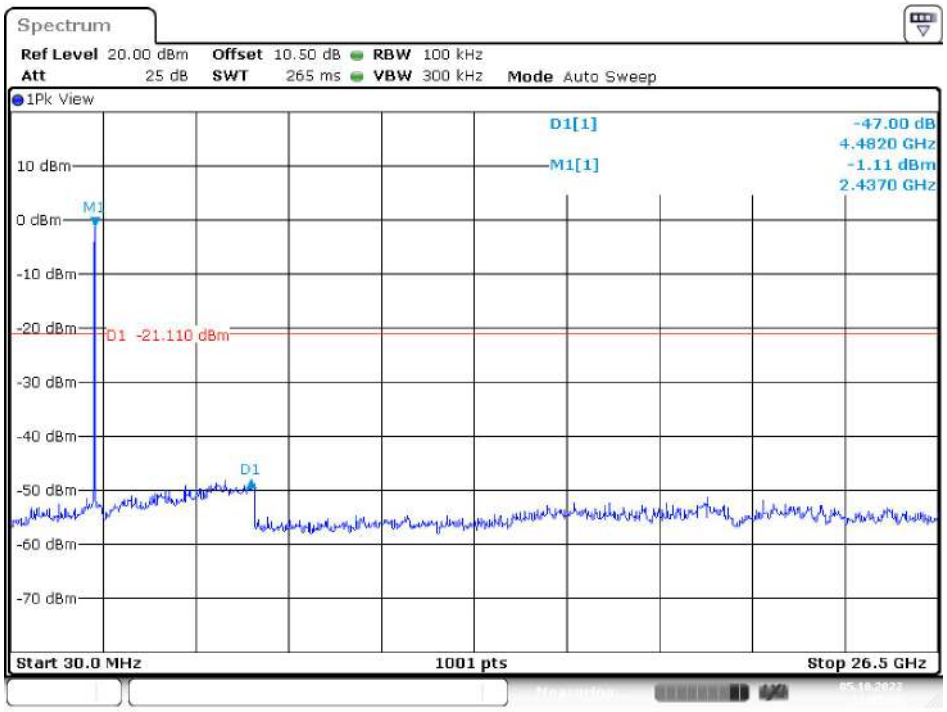
G Mode

Low Channel



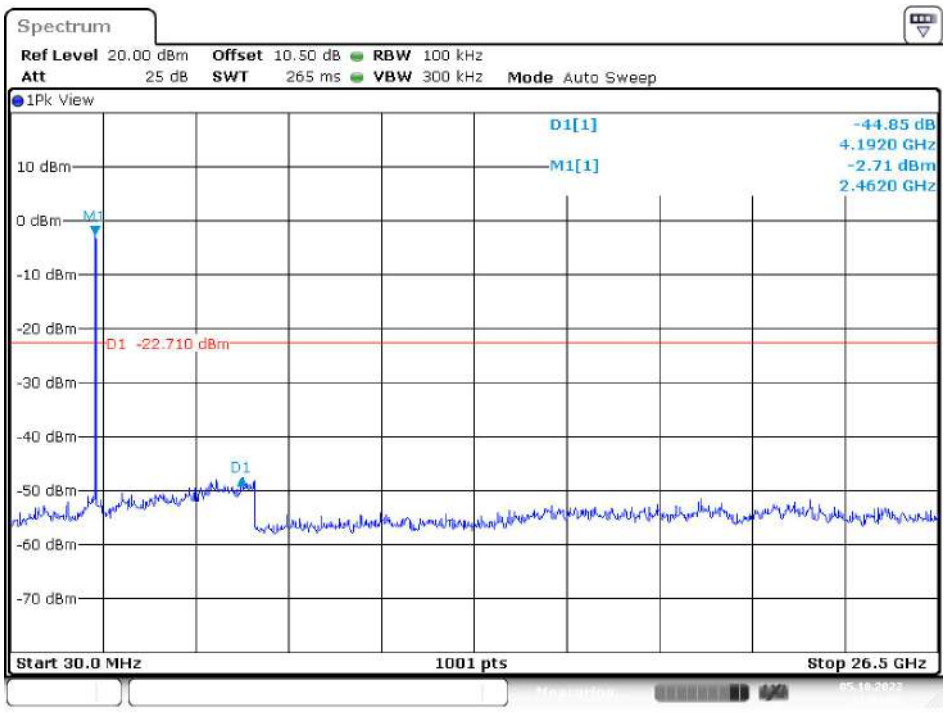
Date: 5.OCT.2022 10:50:35

Middle Channel



Date: 5.OCT.2022 11:05:28

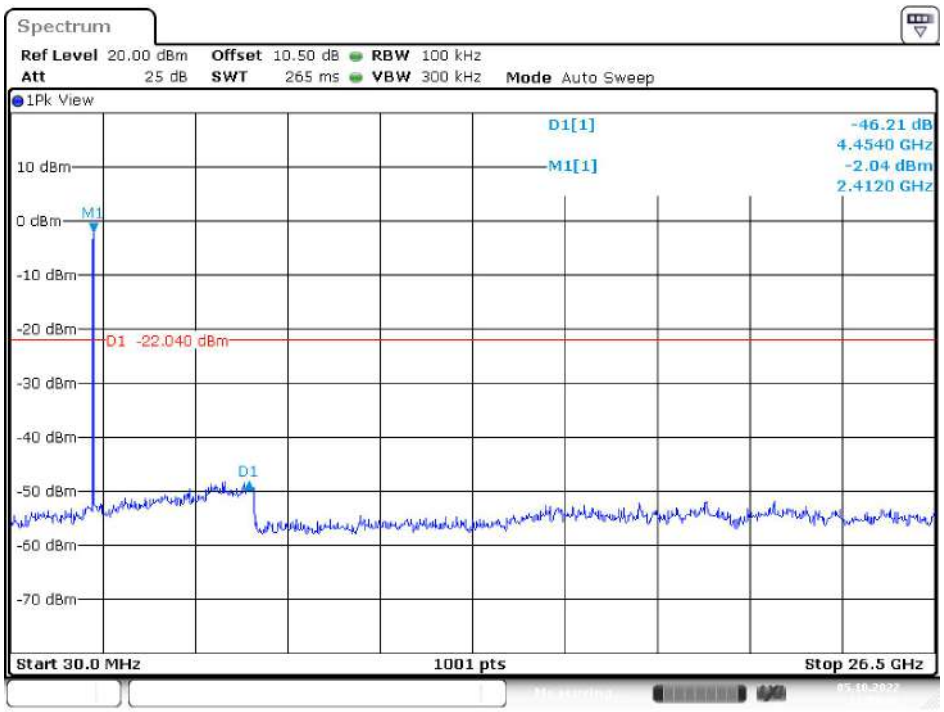
High Channel



Date: 5.OCT.2022 11:06:24

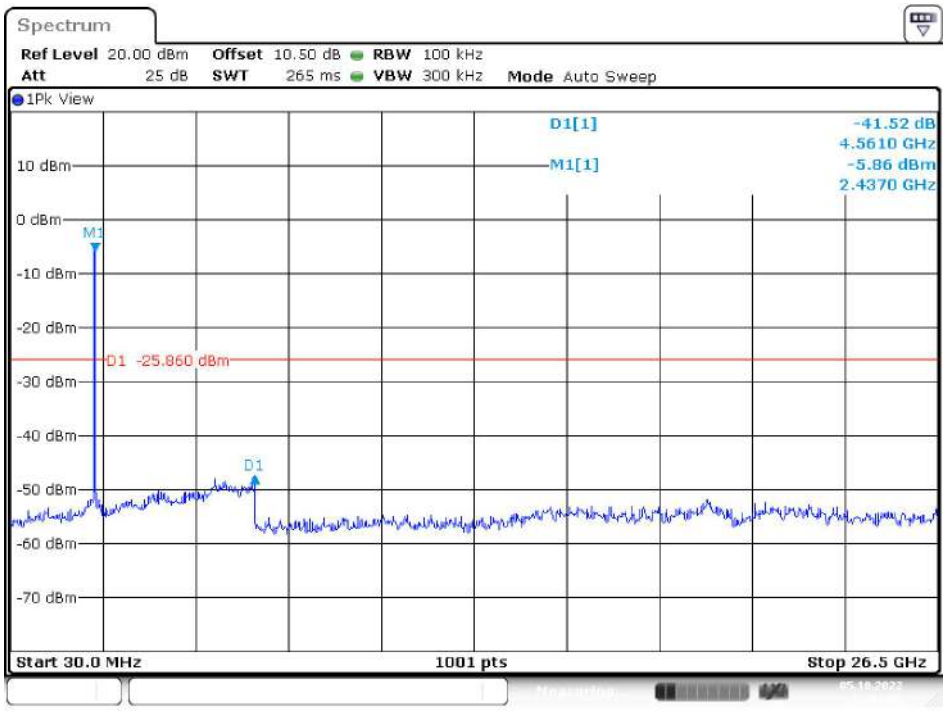
N20 Mode

Low Channel



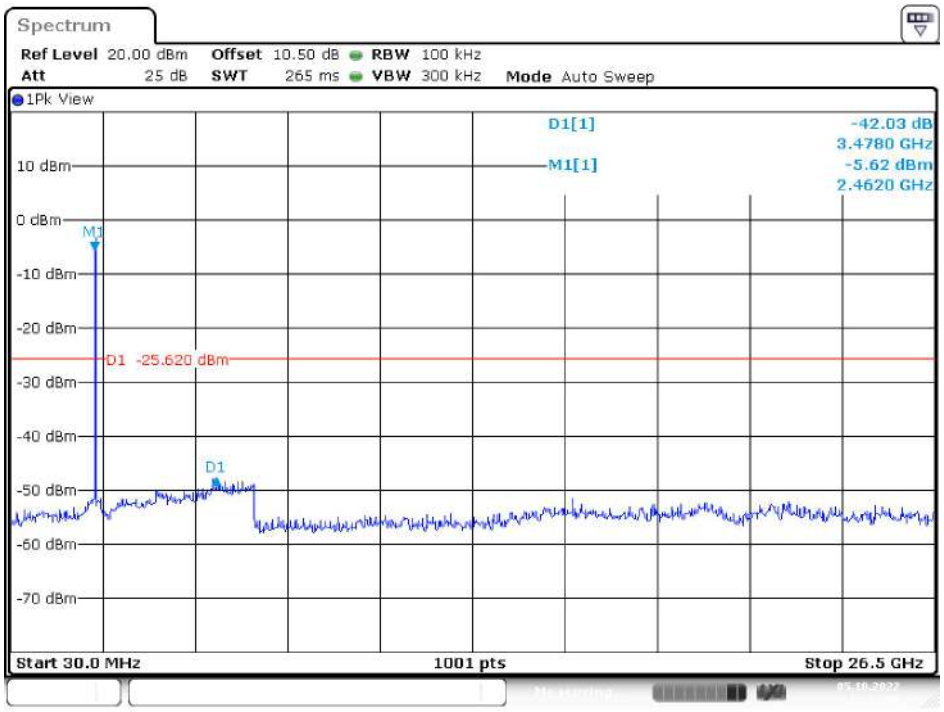
Date: 5.OCT.2022 11:57:32

Middle Channel



Date: 5.OCT.2022 12:03:39

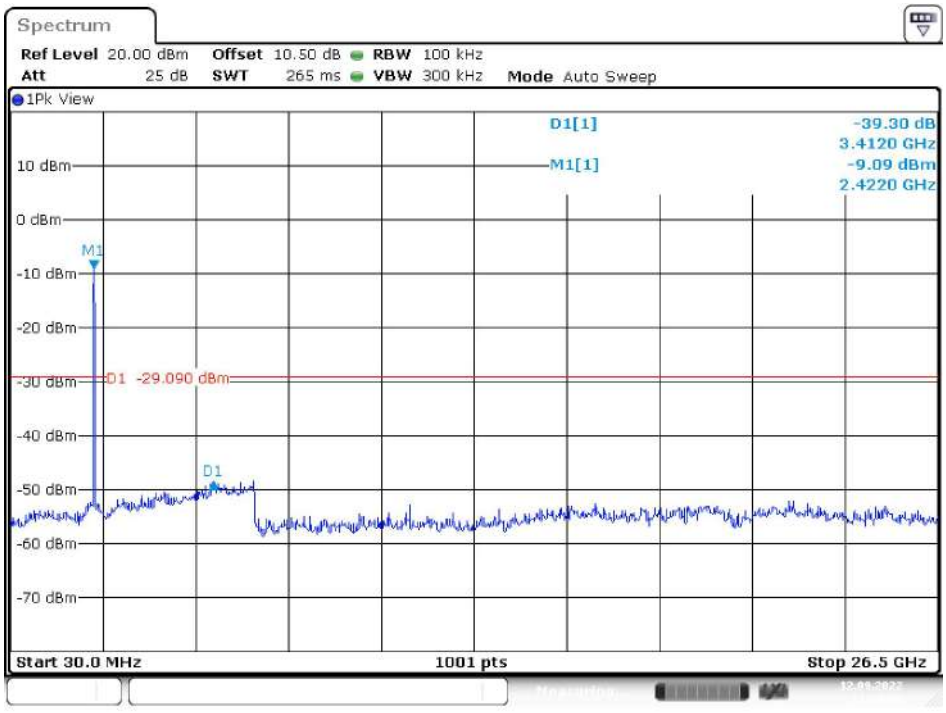
High Channel



Date: 5.OCT.2022 12:12:30

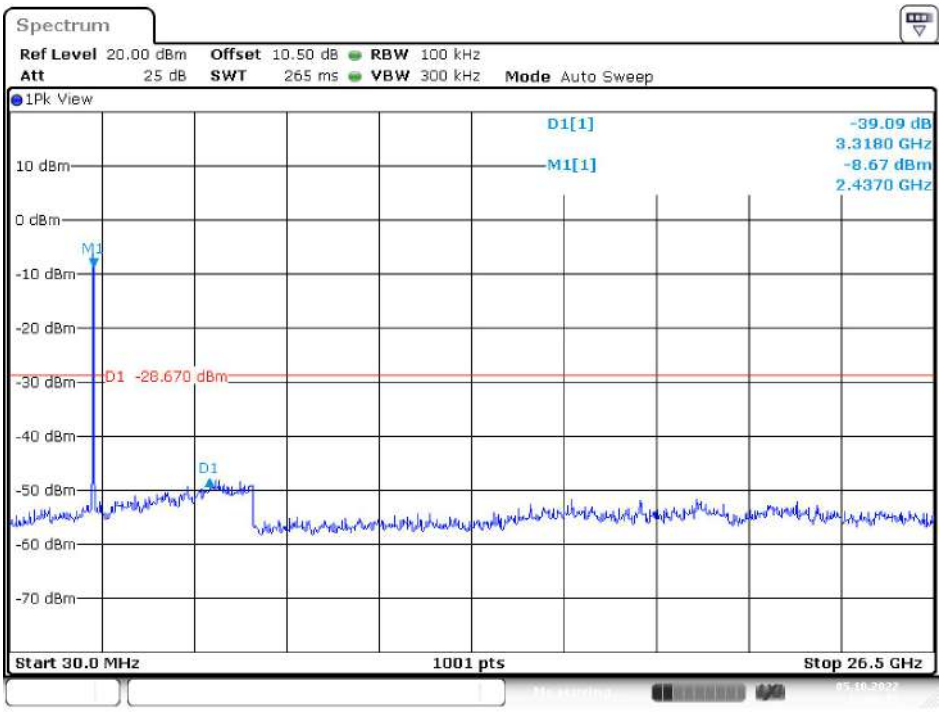
N40 Mode

Low Channel



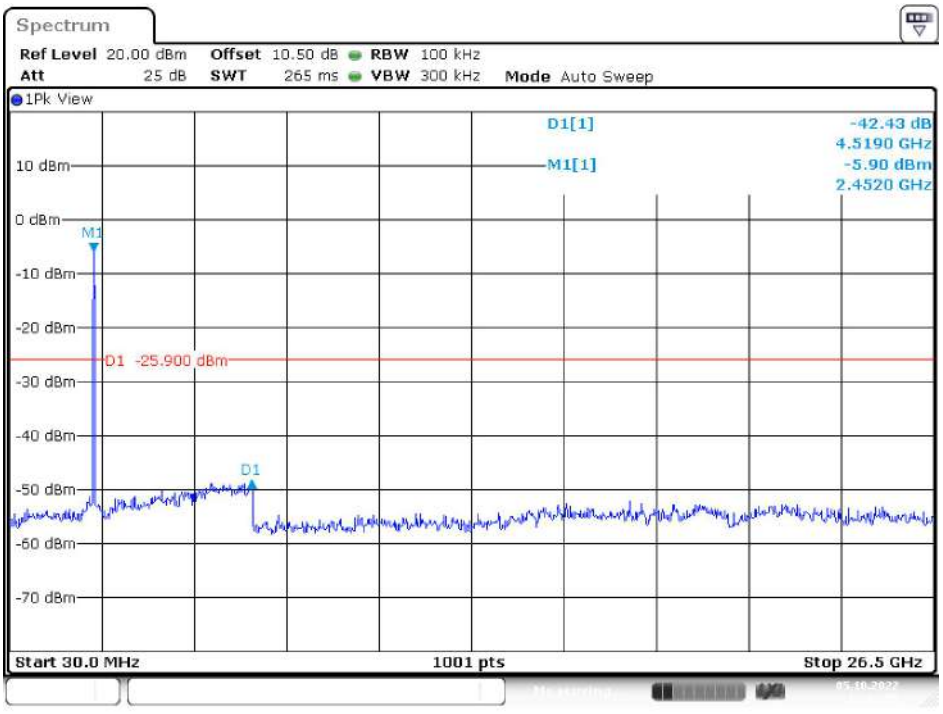
Date: 5.OCT.2022 12:28:38

Middle Channel



Date: 5.OCT.2022 12:36:16

High Channel



Date: 5.OCT.2022 12:42:24

9 FCC §15.247(a)(2) – 6 dB Emission Bandwidth

9.1 Applicable Standard

According to FCC §15.247(a)(2).

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

9.2 Test Procedure

The steps for the first option are as follows:

a) Set RBW = 100 kHz.

b) Set the VBW ≥ [3 × RBW].

c) Detector = peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emissio

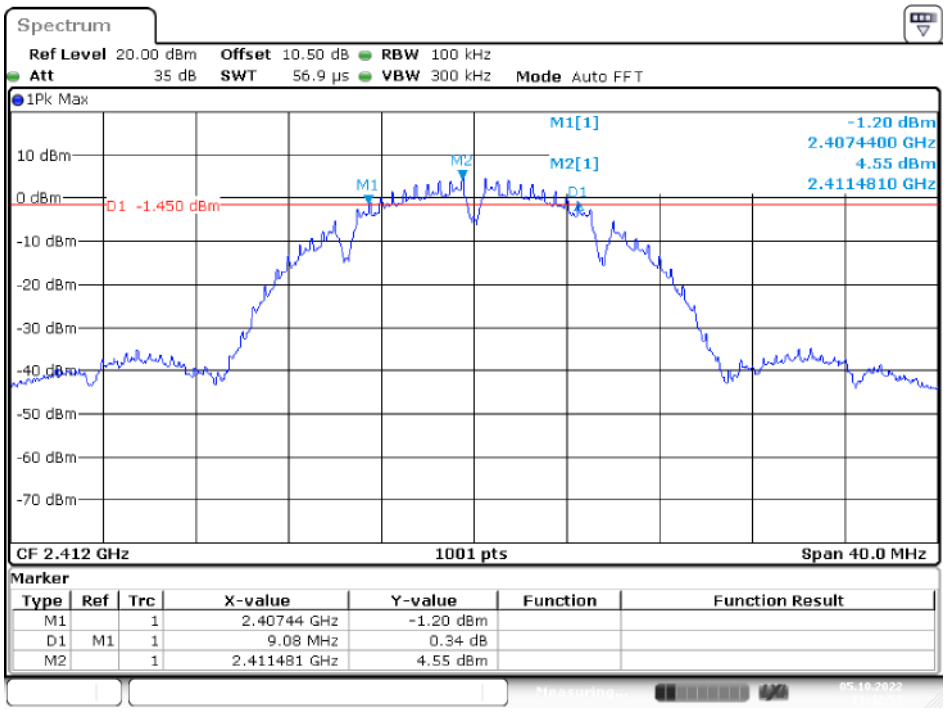
9.3 Test Results

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)	Result
B Mode				
Low	2412	9.08	> 500	PASS
Middle	2437	9.08	> 500	PASS
High	2462	9.08	> 500	PASS
G Mode				
Low	2412	10.12	> 500	PASS
Middle	2437	11.28	> 500	PASS
High	2462	10.08	> 500	PASS
N20 Mode				
Low	2412	10.12	> 500	PASS
Middle	2437	10.08	> 500	PASS
High	2462	11.28	> 500	PASS
N40 Mode				
Low	2422	31.28	> 500	PASS
Middle	2437	31.28	> 500	PASS
High	2452	30.08	> 500	PASS

Please refer to the following plots

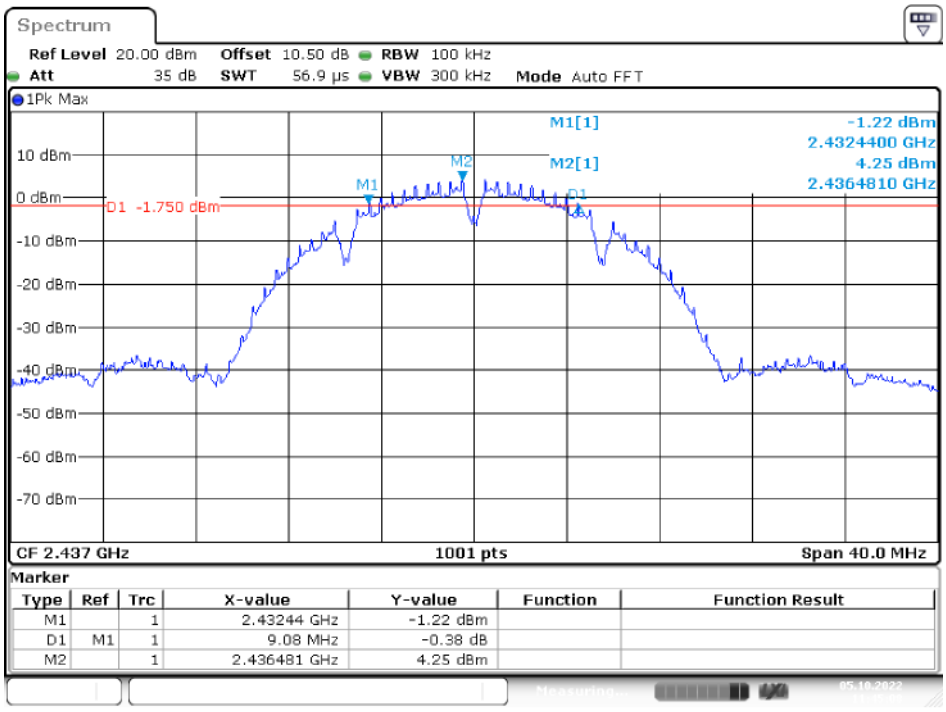
B Mode

Low Channel



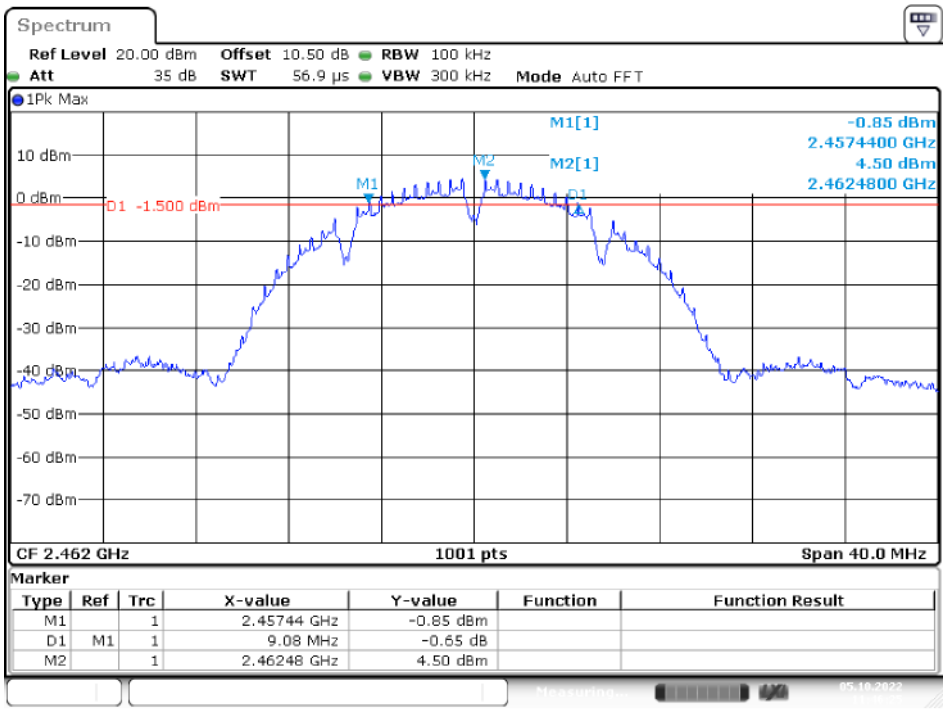
Date: 5.OCT.2022 11:42:52

Middle Channel



Date: 5.OCT.2022 11:45:07

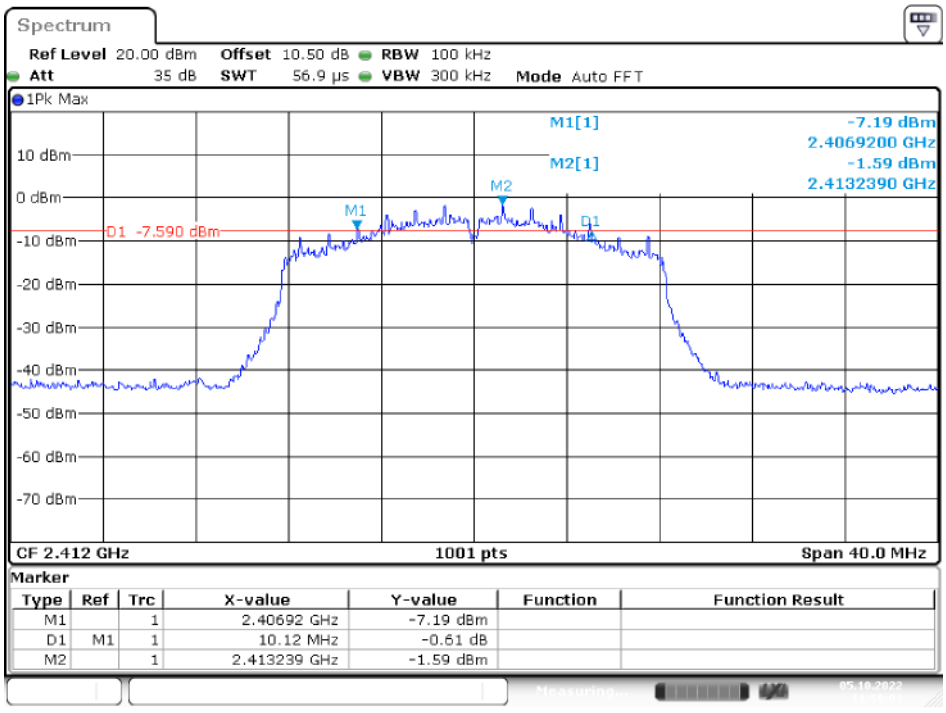
High Channel



Date: 5.OCT.2022 11:46:26

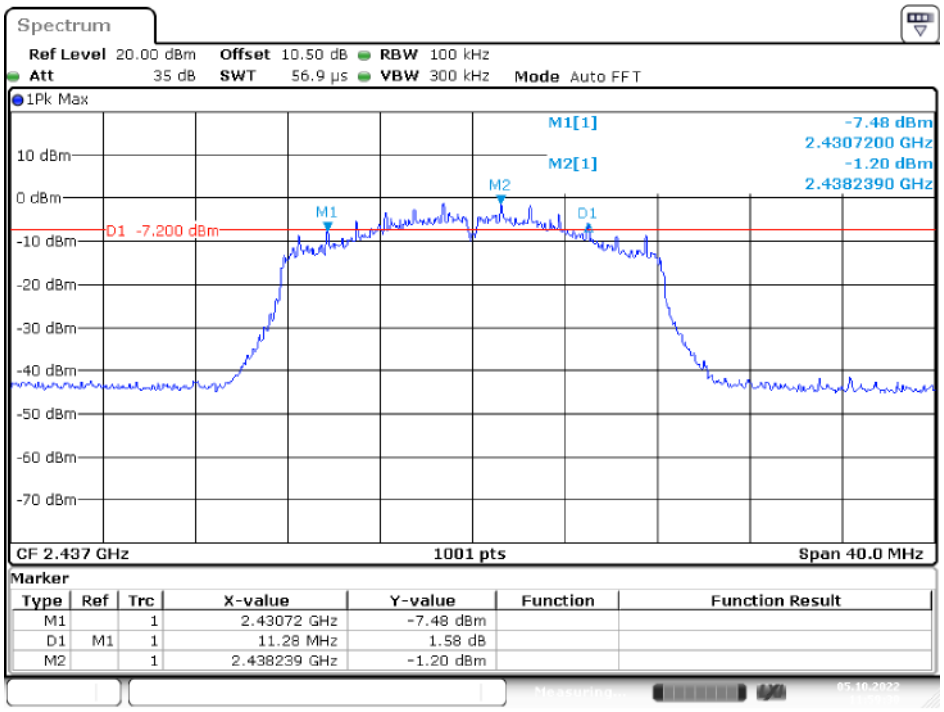
G Mode

Low Channel



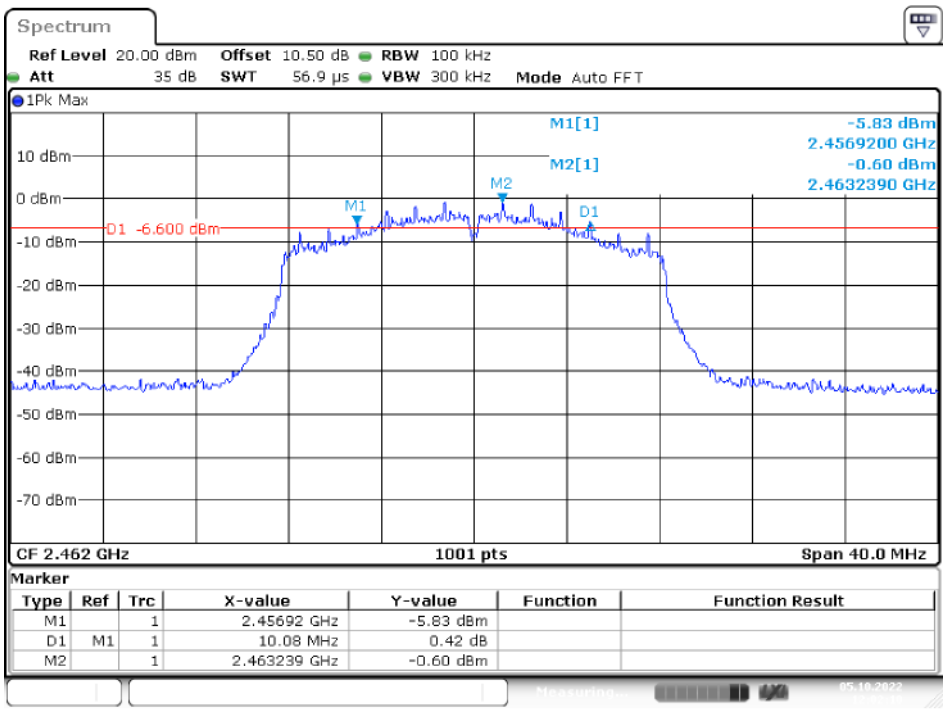
Date: 5.OCT.2022 11:58:02

Middle Channel



Date: 5.OCT.2022 11:59:31

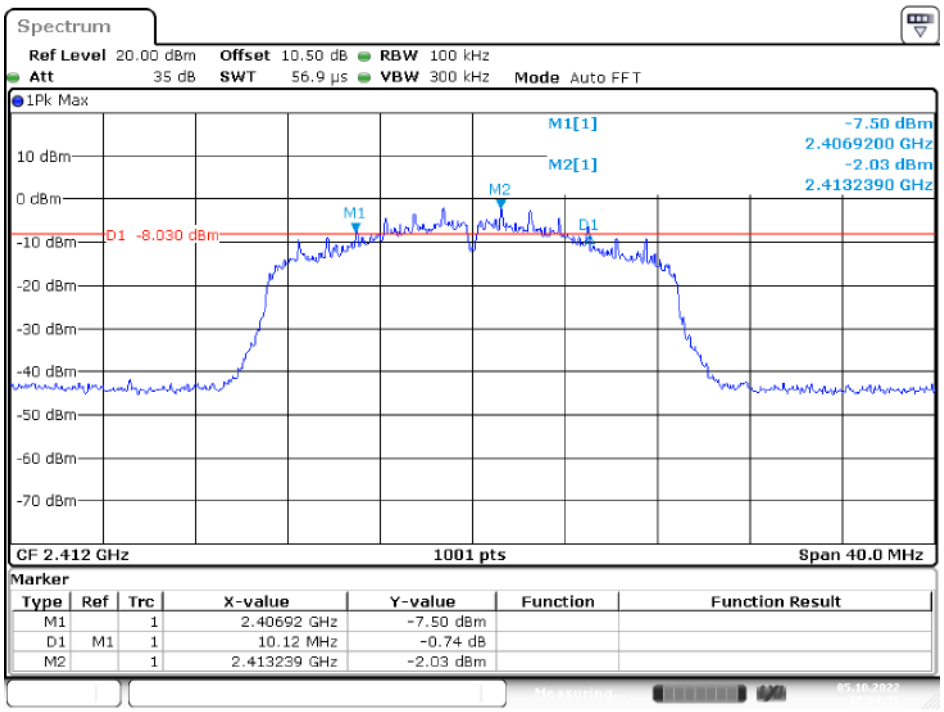
High Channel



Date: 5.OCT.2022 12:02:11

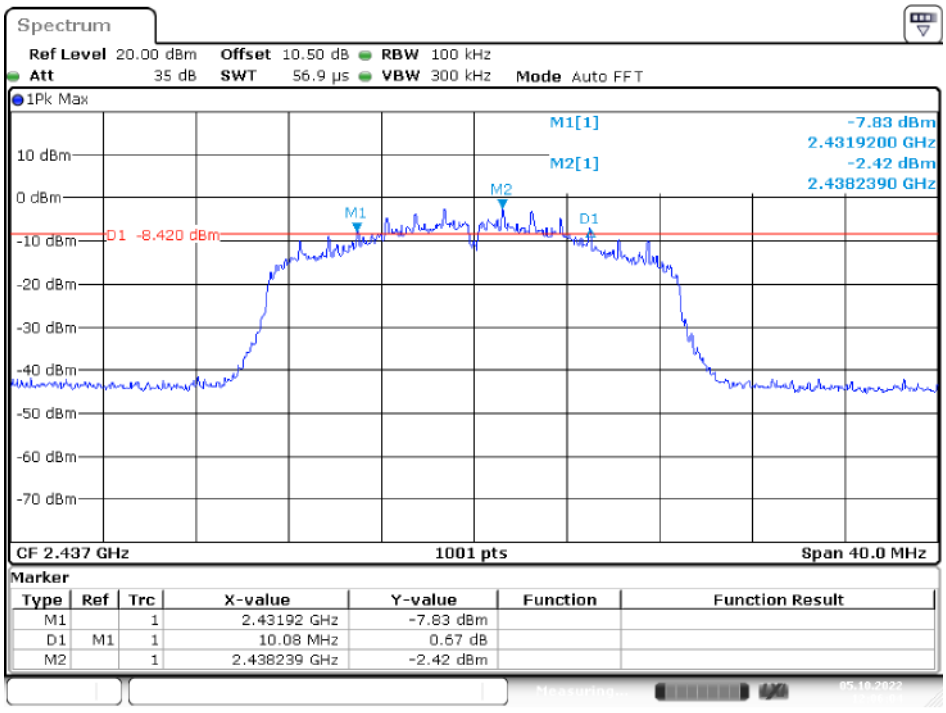
N20 Mode

Low Channel



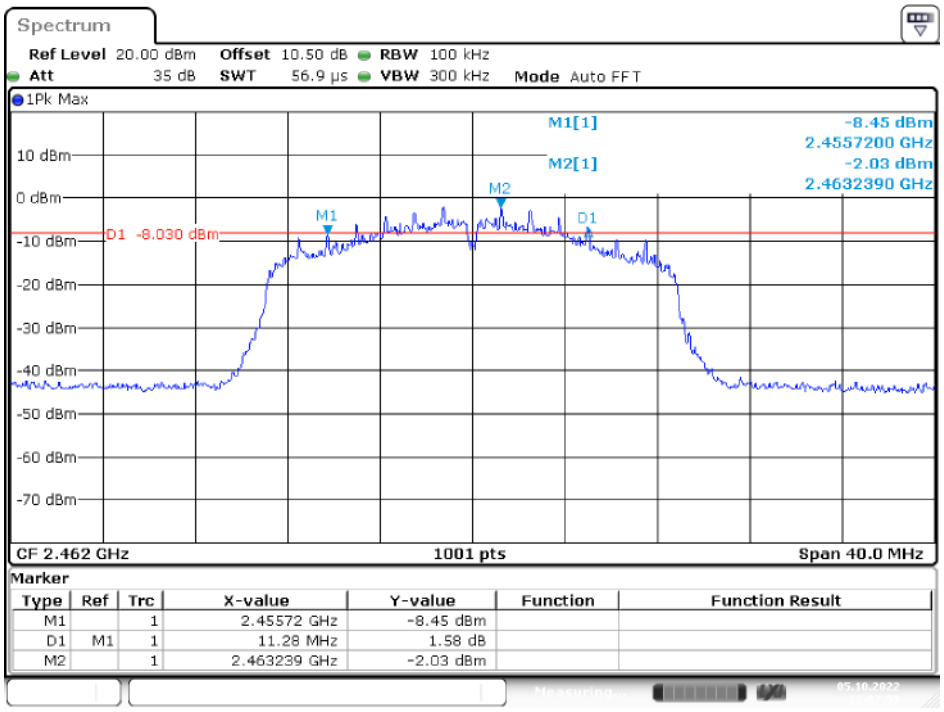
Date: 5.OCT.2022 12:04:32

Middle Channel



Date: 5.OCT.2022 12:06:04

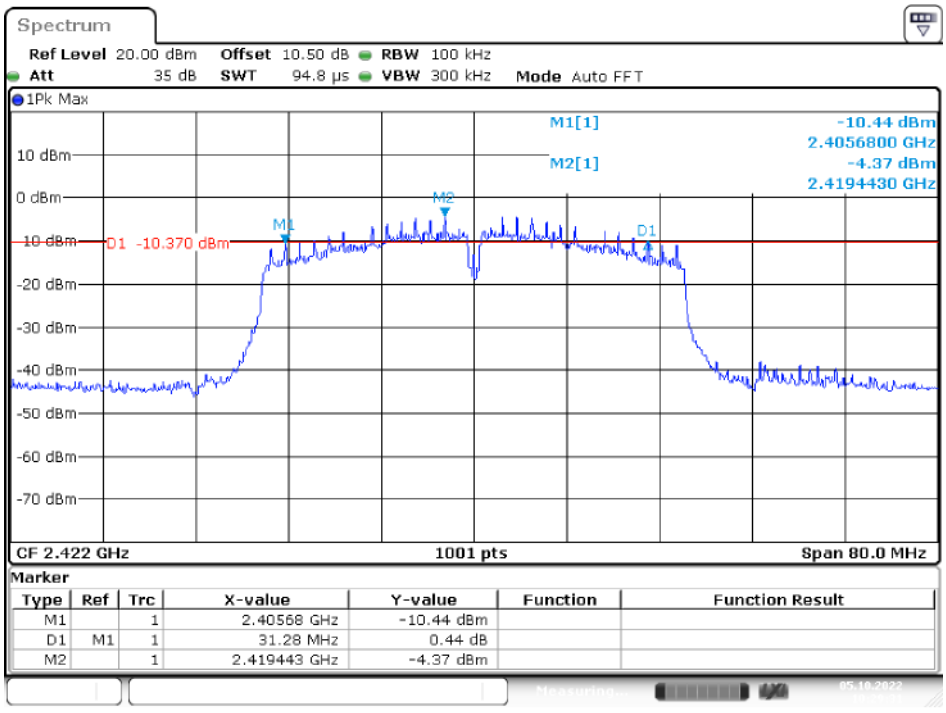
High Channel



Date: 5.OCT.2022 12:08:00

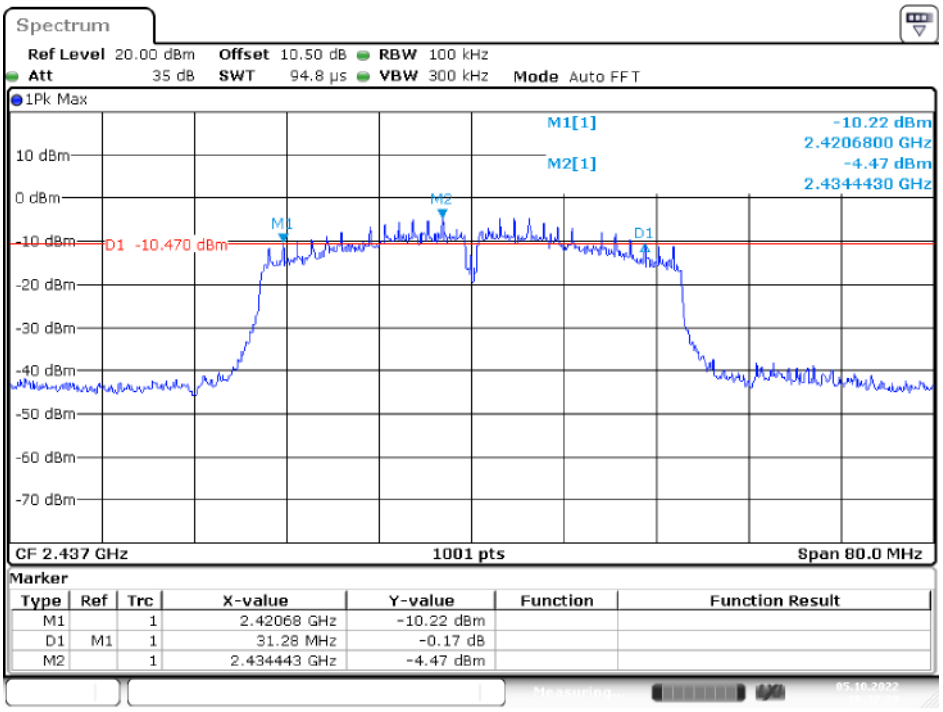
N40 Mode

Low Channel



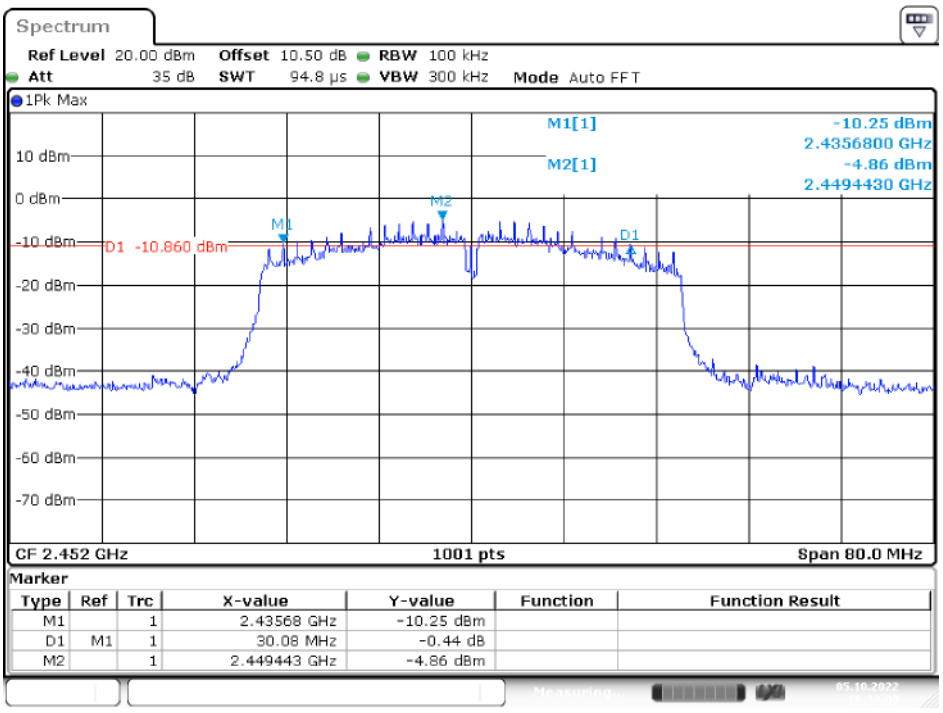
Date: 5.OCT.2022 10:29:30

Middle Channel



Date: 5.OCT.2022 10:32:30

High Channel



Date: 5.OCT.2022 10:34:10

10 FCC §15.247(b)(3) – Maximum Output Power

10.1 Applicable Standard

According to FCC §15.247(b) (3).

Systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

10.2 Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.

2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to measuring equipment.

10.3 Test Results

Conducted Peak Output Power

Channel	Frequency (MHz)	Power (dBm)	Power (W)	Limit (W)	Result
802.11b Mode					
Low	2412	16.39	0.044	1	PASS
Middle	2437	16.82	0.048	1	PASS
High	2462	17.31	0.054	1	PASS
802.11g Mode					
Low	2412	19.13	0.082	1	PASS
Middle	2437	19.72	0.094	1	PASS
High	2462	19.87	0.097	1	PASS
802.11n HT20 Mode					
Low	2412	17.35	0.054	1	PASS
Middle	2437	18.03	0.064	1	PASS
High	2462	18.26	0.067	1	PASS
802.11n HT40 Mode					
Low	2422	17.32	0.054	1	PASS
Middle	2437	17.38	0.055	1	PASS
High	2452	17.40	0.055	1	PASS

11 FCC§15.247(d) – 100 kHz Bandwidth of Frequency Band Edge

11.1 Applicable Standard

According to FCC §15.247(d).

In any 100kHz 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 20dB below that in the 100kHz 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required. 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) (see §15.205(c)).

11.2 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.

3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.

4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

5. Repeat above procedures until all measured frequencies were complete.

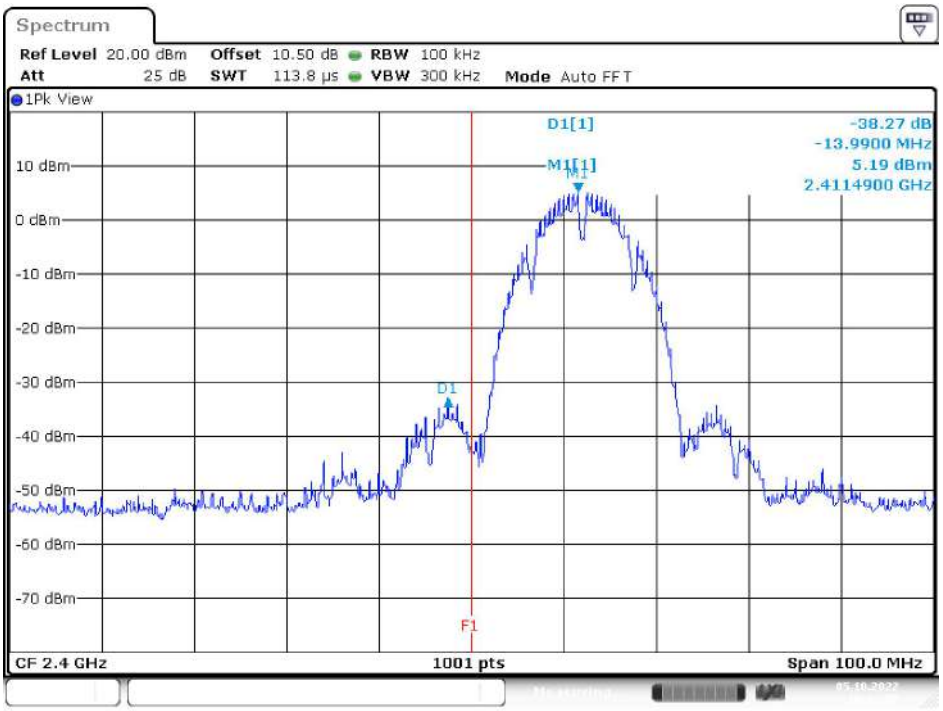
11.3 Test Results

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
B Mode				
Low	2412	38.27	≥ 20	PASS
High	2462	56.00	≥ 20	PASS
G Mode				
Low	2412	47.17	≥ 20	PASS
High	2462	50.35	≥ 20	PASS
N20 Mode				
Low	2412	48.37	≥ 20	PASS
High	2462	48.71	≥ 20	PASS
N40 Mode				
Low	2422	41.75	≥ 20	PASS
High	2452	44.99	≥ 20	PASS

Please refer to the following plots.

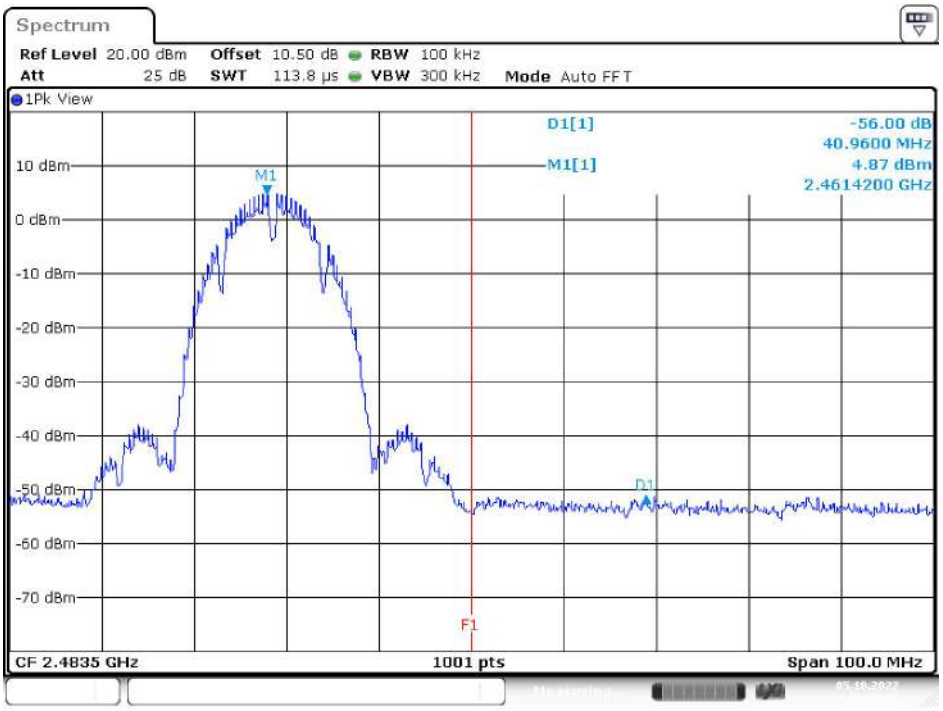
B Mode

Band Edge, Left Side



Date: 5.OCT.2022 10:32:37

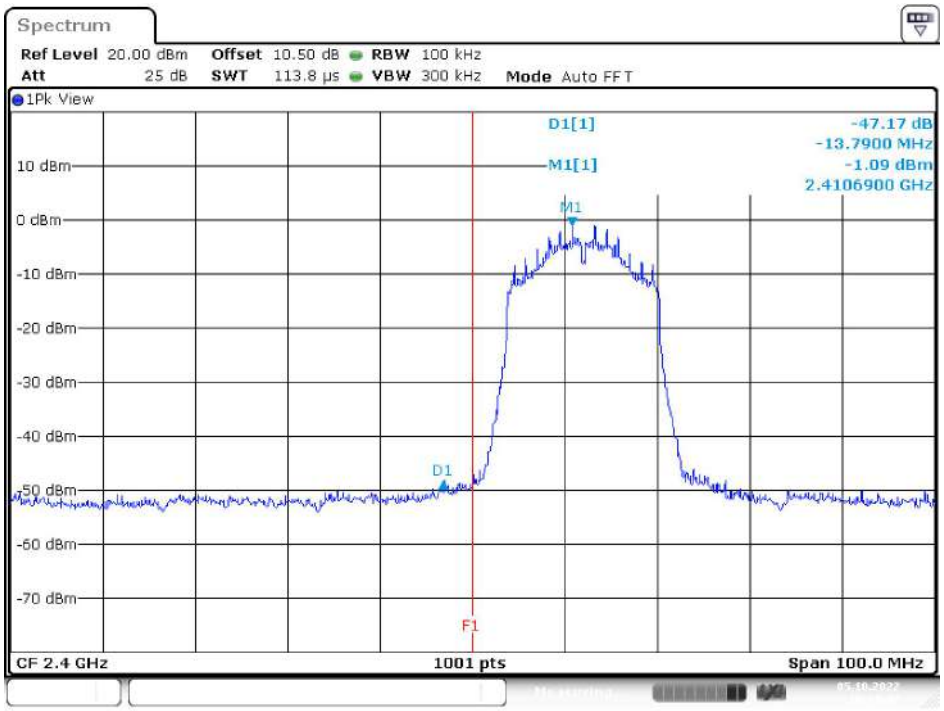
Band Edge, Right Side



Date: 5.OCT.2022 10:46:36

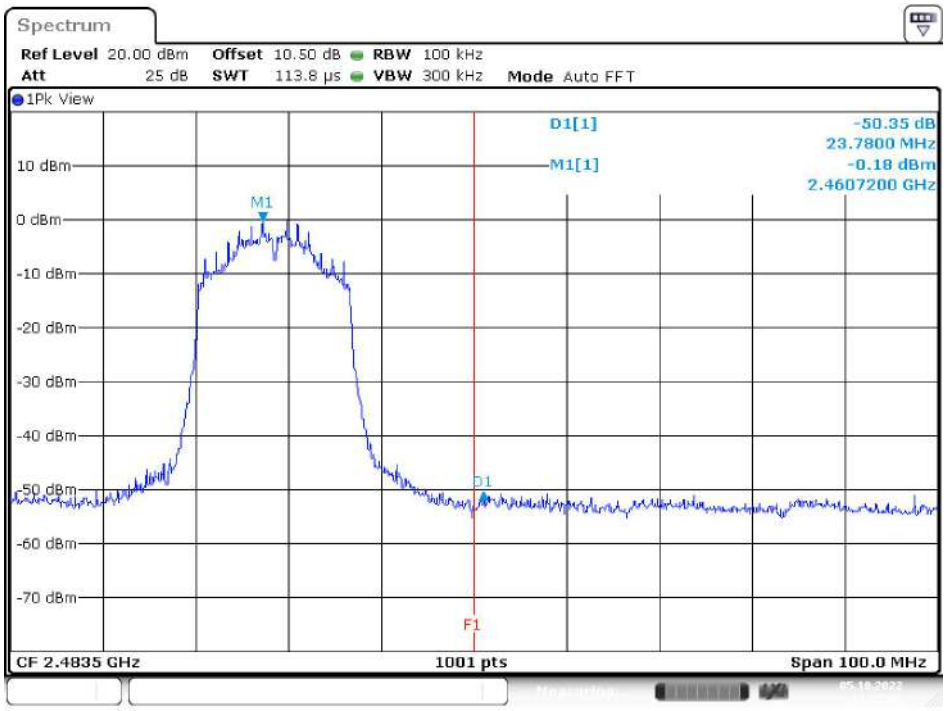
G Mode

Band Edge, Left Side



Date: 5.OCT.2022 10:49:47

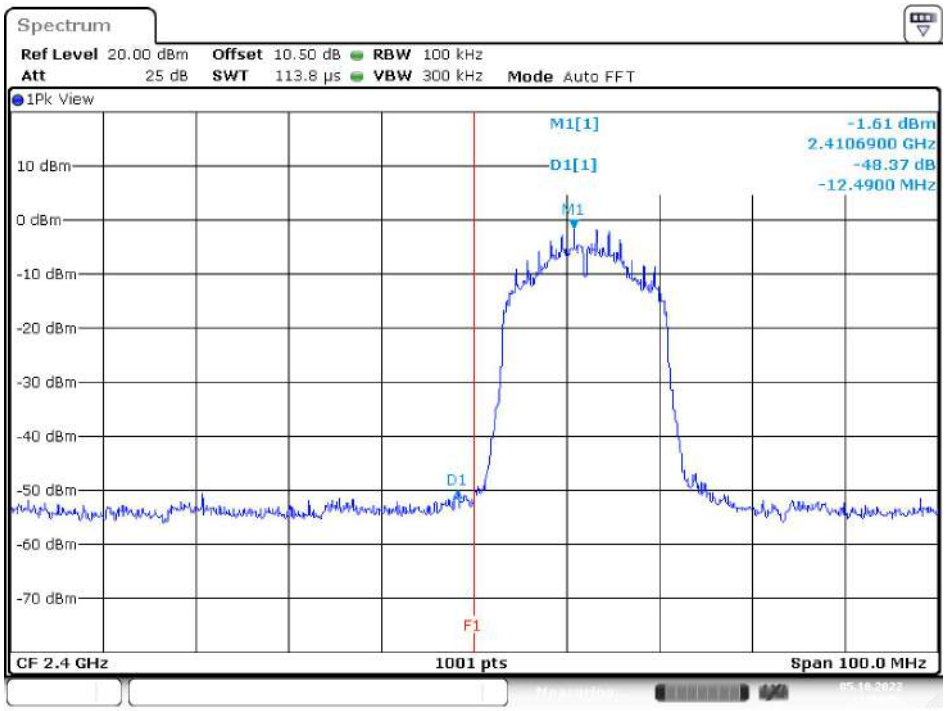
Band Edge, Right Side



Date: 5.OCT.2022 11:17:40

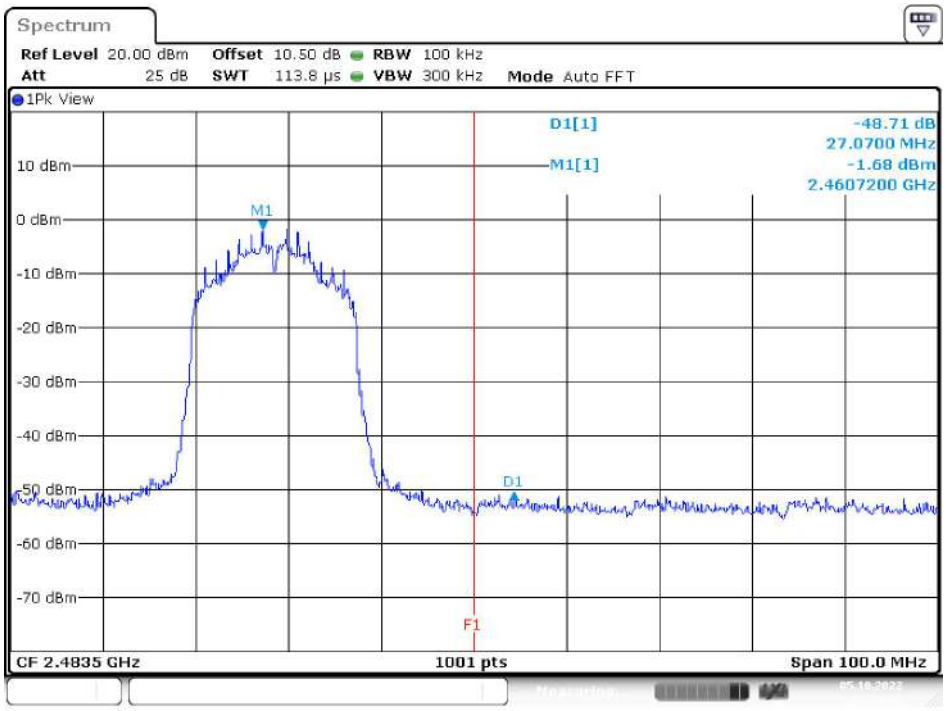
N20 Mode

Band Edge, Left Side



Date: 5.OCT.2022 11:58:53

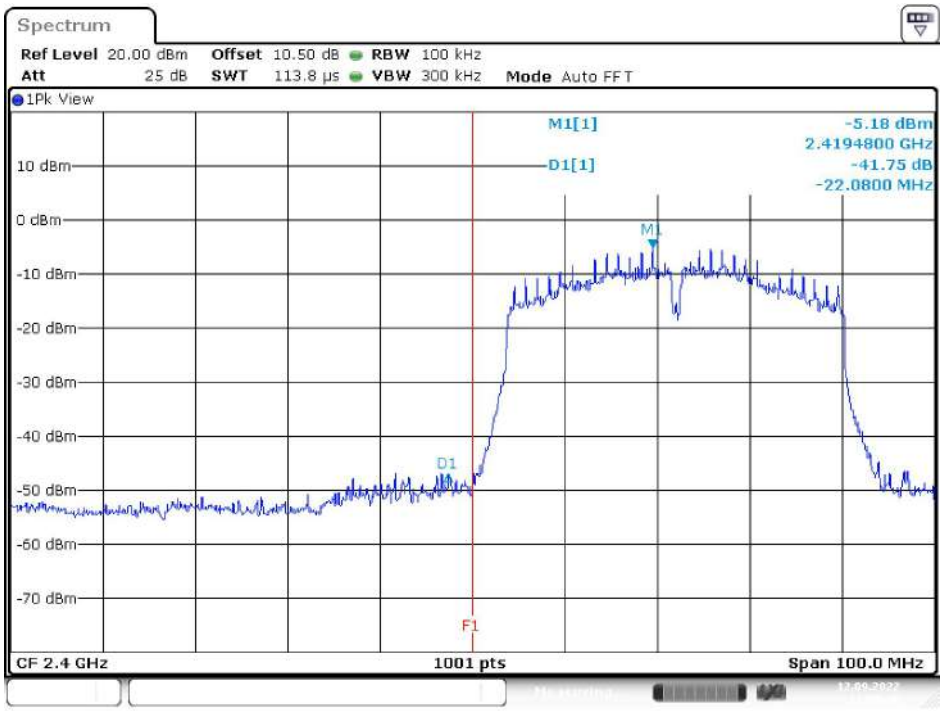
Band Edge, Right Side



Date: 5.OCT.2022 12:13:29

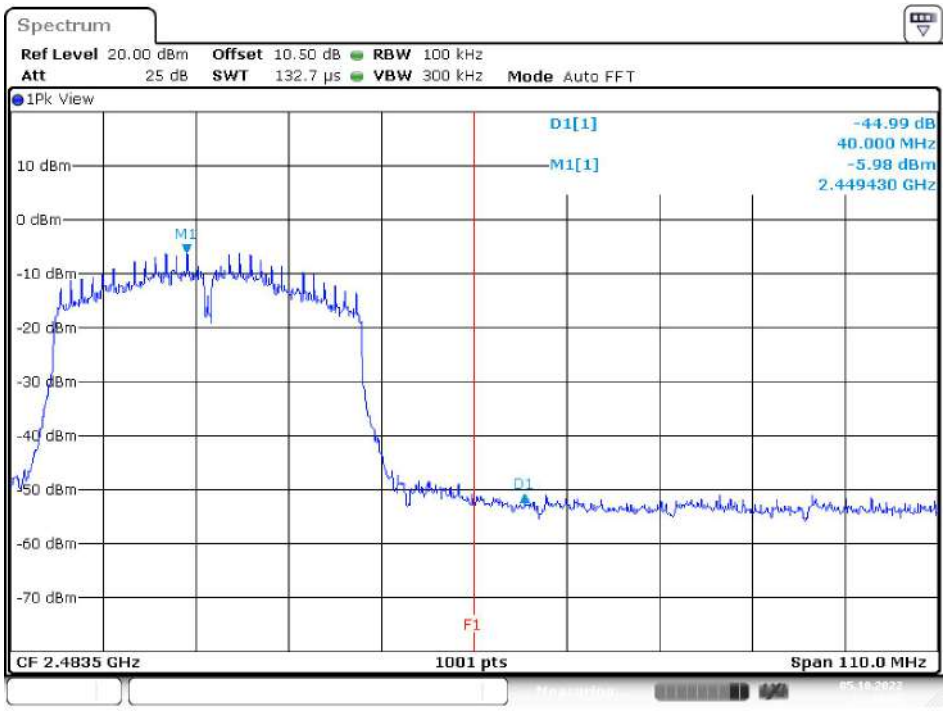
N40 Mode

Band Edge, Left Side



Date: 5.OCT.2022 12:29:46

Band Edge, Right Side



Date: 5.OCT.2022 12:48:38

12 FCC §15.247(e) – Power Spectral Density

12.1 Applicable Standard

According to FCC §15.247(e).

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

12.2 Test Procedure

a) Set analyzer center frequency to DTS channel center frequency.

b) Set the span to 1.5 times the DTS bandwidth.

c) Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.

d) Set the VBW ≥ [3 × RBW].

e) Detector = peak.

f) Sweep time = auto couple.

g) Trace mode = max hold.

h) Allow trace to fully stabilize.

i) Use the peak marker function to determine the maximum amplitude level within the RBW.

j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat

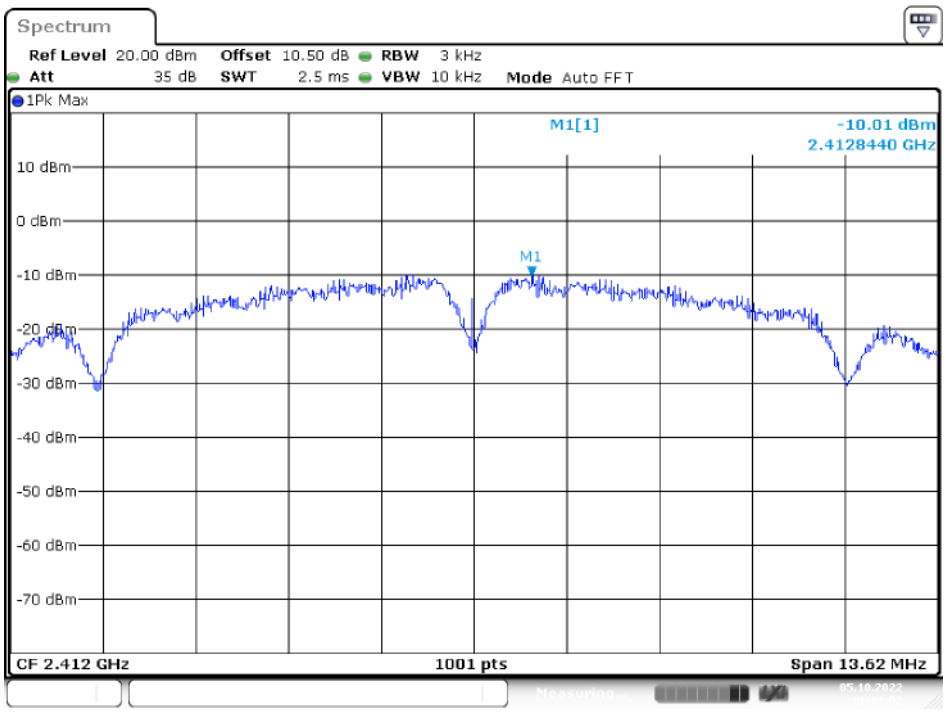
12.3 Test Results

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit (dBm/3 kHz)	Result
B Mode				
Low	2412	-10.01	8	PASS
Middle	2437	-10.03	8	PASS
High	2462	-9.74	8	PASS
G Mode				
Low	2412	-16.43	8	PASS
Middle	2437	-16.02	8	PASS
High	2462	-15.29	8	PASS
N20 Mode				
Low	2412	-16.74	8	PASS
Middle	2437	-17.17	8	PASS
High	2462	-16.79	8	PASS
N40 Mode				
Low	2422	-18.15	8	PASS
Middle	2437	-18.25	8	PASS
High	2452	-16.87	8	PASS

Please refer to the following plots

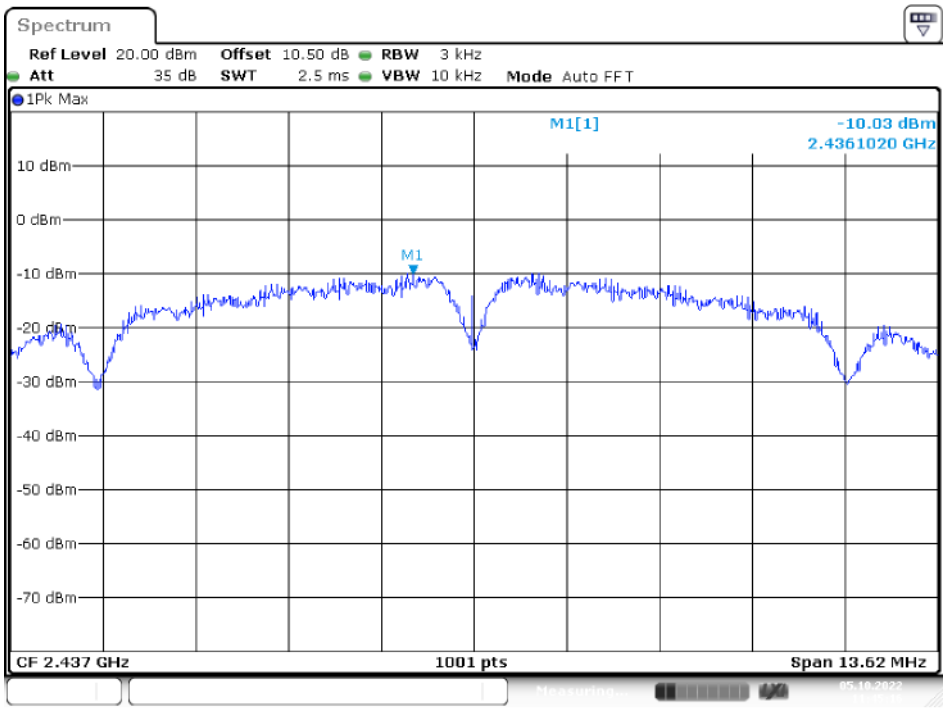
B Mode

Low Channel



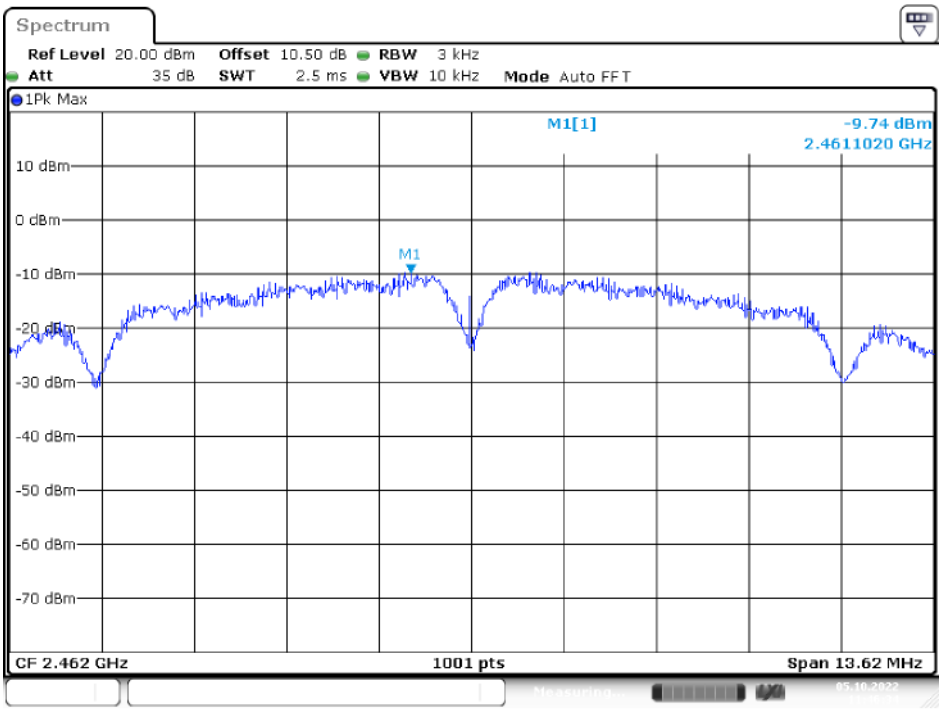
Date: 5.OCT.2022 11:43:01

Middle Channel



Date: 5.OCT.2022 11:45:16

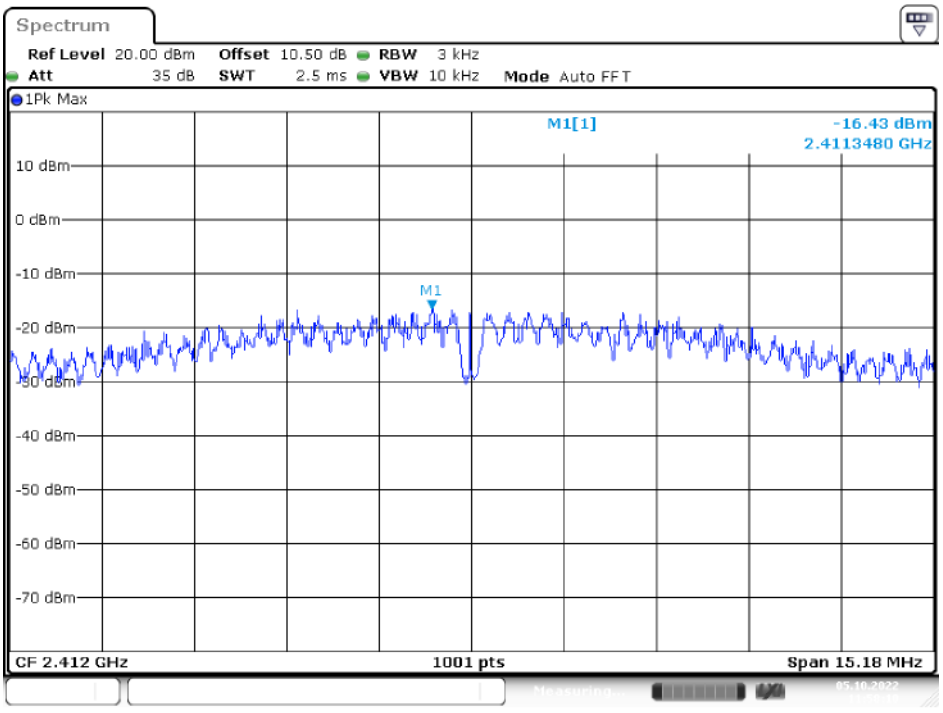
High Channel



Date: 5.OCT.2022 11:46:35

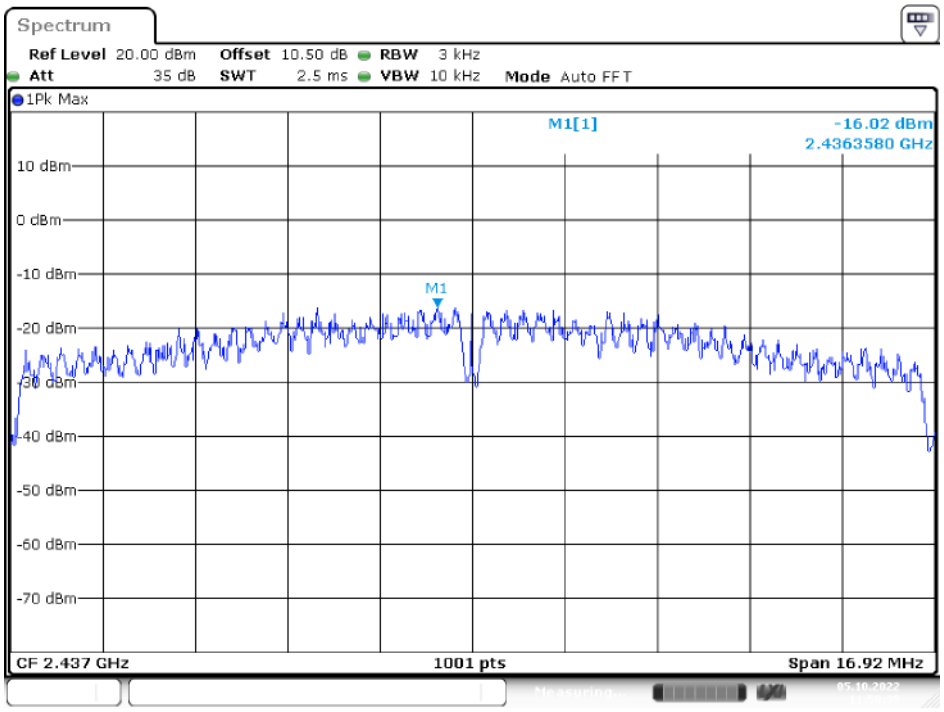
G Mode

Low Channel



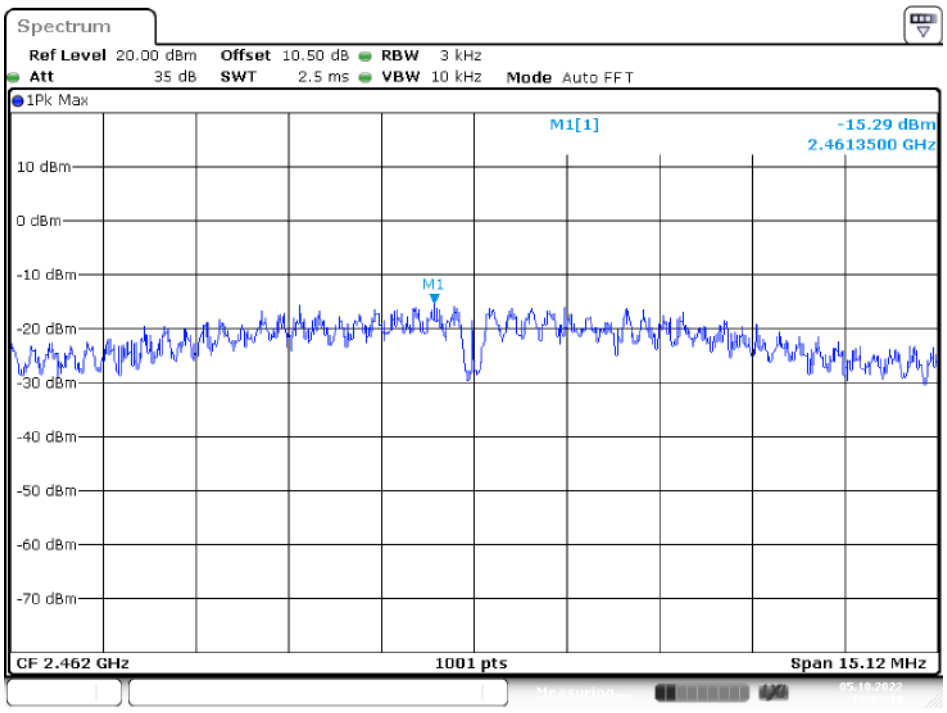
Date: 5.OCT.2022 11:50:11

Middle Channel



Date: 5.OCT.2022 11:59:40

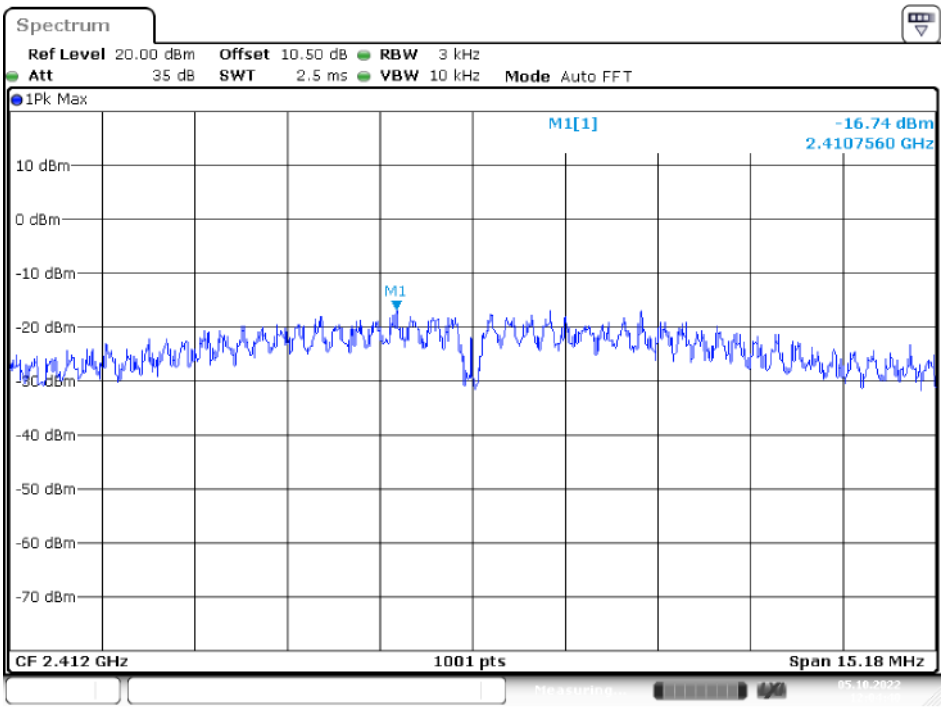
High Channel



Date: 5.OCT.2022 12:02:20

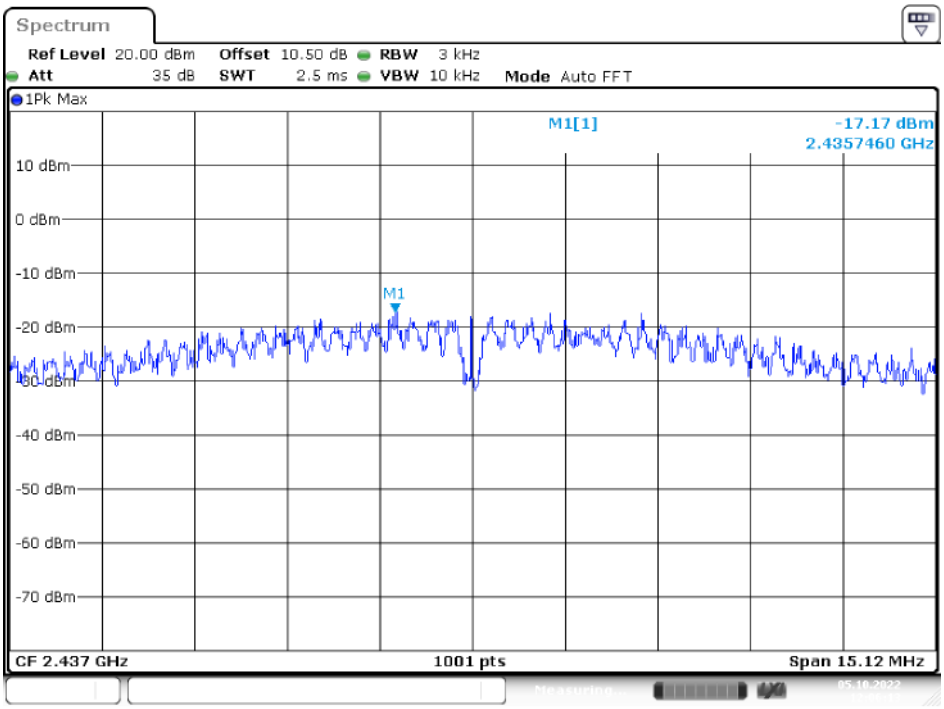
N20 Mode

Low Channel



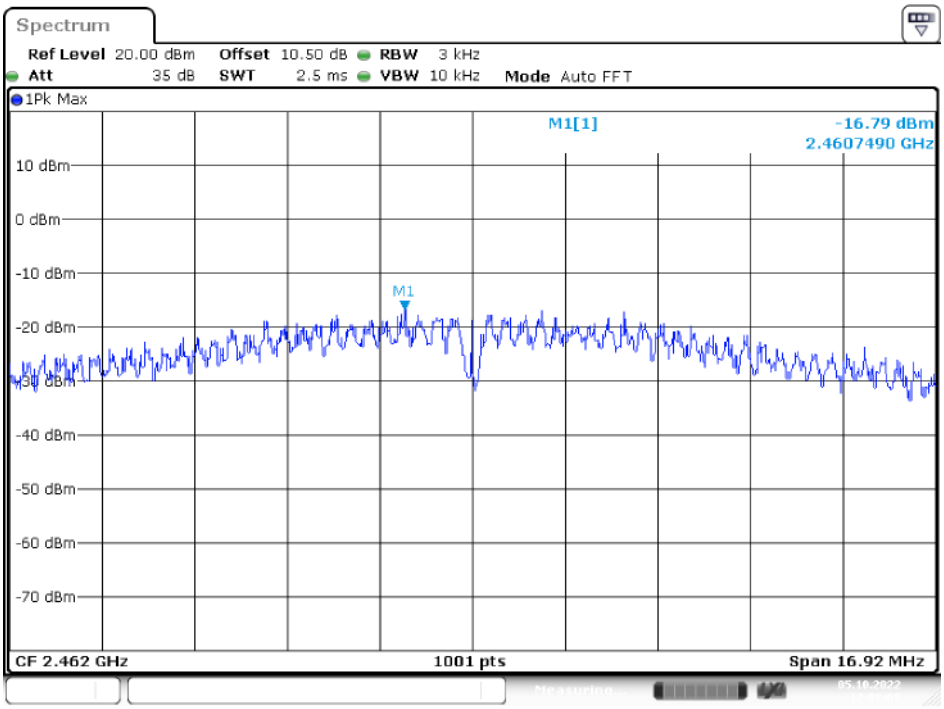
Date: 5.OCT.2022 12:04:41

Middle Channel



Date: 5.OCT.2022 12:06:13

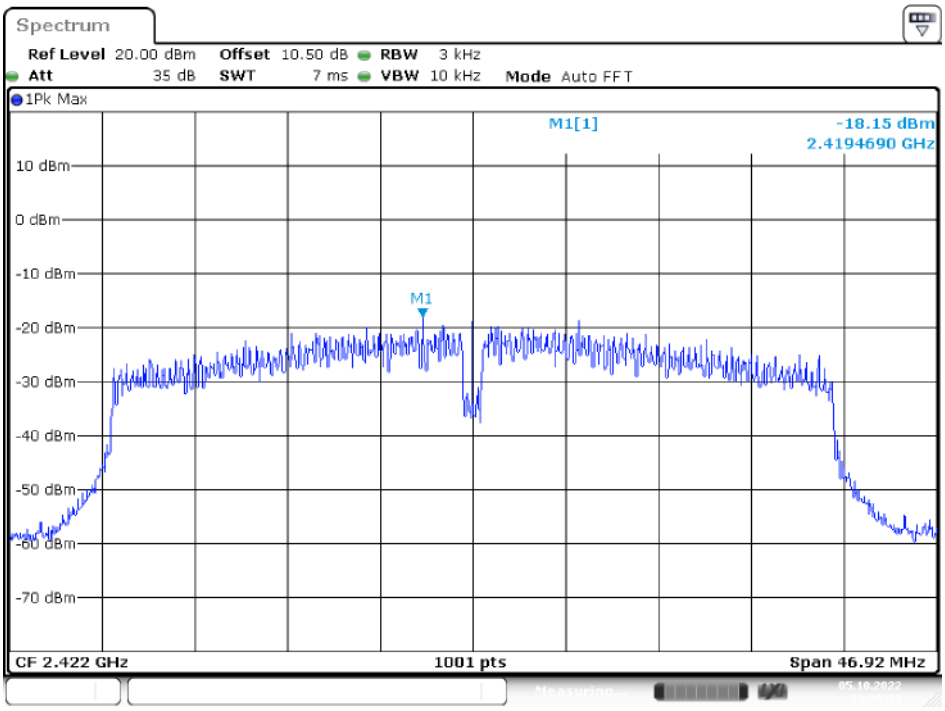
High Channel



Date: 5.OCT.2022 12:08:09

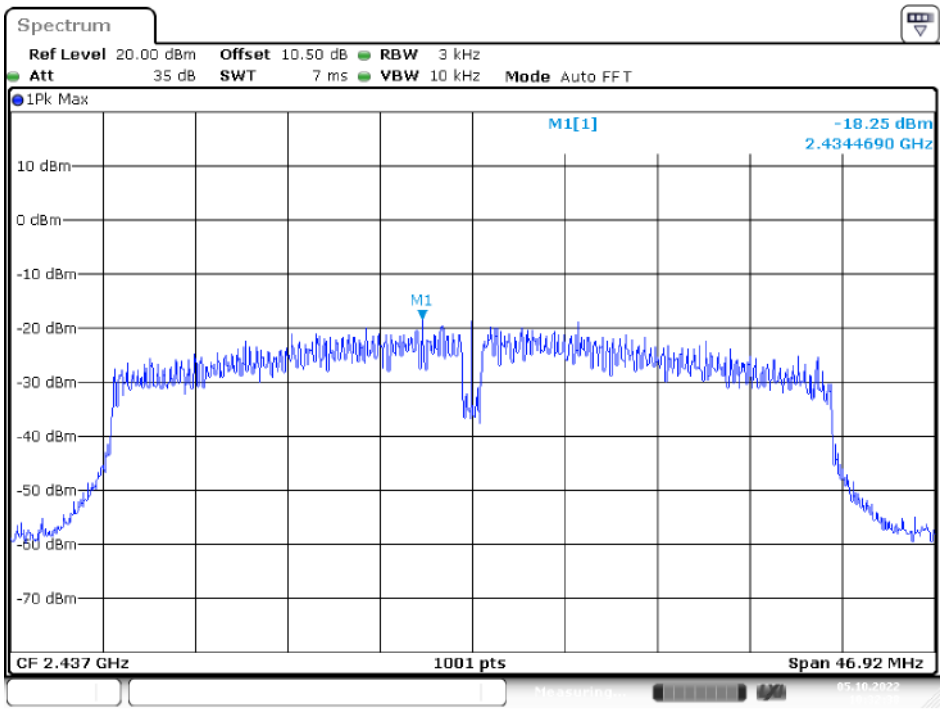
N40 Mode

Low Channel



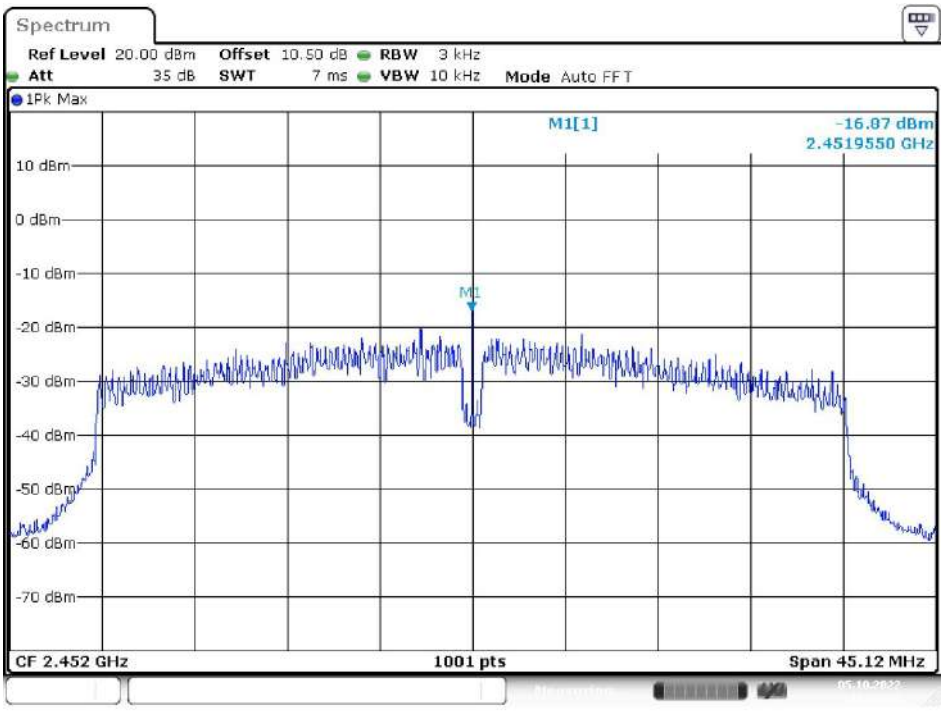
Date: 5.OCT.2022 10:29:40

Middle Channel



Date: 5.OCT.2022 10:32:39

High Channel



Date: 5.OCT.2022 10:29:01

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