FCC Part 15.247
RSS-247, ISSUE 3, August 2023
RSS-GEN, ISSUE 5, February 2021 Amendment 2
TEST REPORT

For

YEALINK(XIAMEN) NETWORK TECHNOLOGY CO.,LTD.

No.666 Hu'an Rd,Huli District Xiamen City, Fujian, P.R. China

FCC ID: T2C-T44
IC: 10741A-T44W

Report Type:	**Product Type:**
Original Report	Ultra-elegant Gigabit IP Phone

Report Producer : Coco Lin

Report Number : RXZ231115070RF02

Report Date : 2023-12-28

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Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
0.0	RXZ231115070	RXZ231115070RF02	2023-12-28	Original Report	Coco Lin

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1 General Information

1.1 Product Description for Equipment under Test (EUT)

Applicant	YEALINK(XIAMEN) NETWORK TECHNOLOGY CO.,LTD.
	No.666 Hu'an Rd,Huli District Xiamen City, Fujian, P.R. China
Brand(Trade) Name	Yealink
Product (Equipment) / PMN	Ultra-elegant Gigabit IP Phone
Main Model Name	SIP-T44W
HVIN	T44W
Frequency Range	IEEE 802.11b/g / IEEE 802.11n HT20 Mode: 2412 ~ 2462 MHz
Conducted Peak Output Power	IEEE 802.11b Mode: 18.95 dBm IEEE 802.11g Mode: 17.95 dBm IEEE 802.11n HT20 Mode: 17.85 dBm
Modulation Technique	IEEE 802.11b Mode: DSSS IEEE 802.11g Mode: OFDM IEEE 802.11n HT20 Mode: OFDM
Power Operation (Voltage Range)	☒ AC 120V/60Hz ☒ Adapter I/P: 100-240V 50/60Hz 0.5A , O/P: 5Vdc, 2.0A ☐ By AC Power Cord ☒ PoE: DC 48V
Received Date	2023/11/16
Date of Test	2023/11/21 ~ 2023/12/22

*All measurement and test data in this report was gathered from production sample serial number:

RXZ231115070-01 (Assigned by BACL, New Taipei Laboratory).

1.2 Objective

This report is prepared on behalf of *YEALINK(XIAMEN) NETWORK TECHNOLOGY CO.,LTD.* in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commission's rules and RSS-247, Issue 3, August 2023, RSS-Gen, Issue 5, February 2021 Amendment 2 of the Innovation, Science and Economic Development Canada.

1.3 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 and KDB 558074 D01 15.247 Meas Guidance v05r02. And RSS-247, Issue 3, August 2023, RSS-Gen, Issue 5, February 2021 Amendment 2 of the Innovation, Science and Economic Development Canada.

1.4 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. (New Taipei Laboratory) is not responsible for the authenticity of the information provided by the applicant that affects the test results.

1.5 Measurement Uncertainty

Parameter		Uncertainty
AC Mains		+/- 2.53 dB
RF output power, conducted		+/- 3.74 dB
Power Spectral Density, conducted		+/- 0.58 dBm
Occupied Bandwidth		+/- 0.09 %
Unwanted Emissions, conducted		+/- 1.13 dBm
Emissions, radiated	30 MHz~1 GHz	+/- 4.99 dB
	1 GHz~18 GHz	+/- 7.56 dB
	18 GHz~40 GHz	+/- 5.06 dB
Temperature		+/- 0.79 °C
Humidity		+/- 0.44 %

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

1.6 Environmental Conditions

Test Site	Test Date	Temperature (℃)	Relative Humidity (%)	ATM Pressure (hPa)	Test Engineer
AC Line Conducted Emissions	2023/12/08	19.9	67	1010	Jomg
Radiation Spurious Emissions	2023/11/23~2023/12/22	16.8~24.3	60~69	1010	Aaron
Conducted Spurious Emissions	2023/11/21~2023/12/04	23.8~24.4	52~56	1010	Jing
Emission Bandwidth	2023/11/21	23.8	52	1010	Jing
Maximum Output Power	2023/11/21	23.8	52	1010	Jing
100 kHz Bandwidth of Frequency Band Edge	2023/11/21	23.8	52	1010	Jim
Power Spectral Density	2023/11/21	23.8	52	1010	Jing

1.7 Test Facility

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

☒70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3732) and the FCC designation No.TW3732 under the Mutual Recognition Agreement (MRA) in FCC Test.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: TW3732.

2 System Test Configuration

2.1 Description of Test Configuration

For WIFI 2.4GHz 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.

2.2 Equipment Modifications

No modification was made to the EUT.

2.3 EUT Exercise Software

The test software was used “AuthenticTool_1.2.21.0”

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

Test Frequency		Low	Middle	High
Power Level Setting	802.11b Mode	16	16	16
	802.11g Mode	8	8	8
	802.11n HT20 Mode	9	9	8

The worst case data rates are as follows:

802.11b: 1Mbps

802.11g: 6Mbps

802.11n HT20: MCS0

2.4 Support Equipment List and Details

Description	Manufacturer	Model Number
Adapter	Yealink	YLPS052000B1-US
Adapter	Yealink	YLPS052000C1-US
Adapter	Yealink	YLPS052000E1-US
NB	DELL	E6410
AP Router	NETGEAR	R7800
Handset	Yealink	N/A
Handset	Yealink	N/A
USB Storage	Transcend	8GB
USB Storage	Transcend	8GB
POE Adapter	Cisco	SB-PWR-INJ2

2.5 External Cable List and Details

Description	Manufacturer	Model Number
RJ-45 Cable	BACL	8m
RJ-45 Cable	BACL	8m
RJ-11 Cable	BACL	0.5m
RJ-11 Cable	BACL	0.5m

2.6 Test Mode

Pre-scan

AC Line Conducted Emissions and Radiated Spurious Emissions

Mode 1: SIP-T44W + Adapter (YLPS052000E1-US)

Mode 2: SIP-T44W + Adapter (YLPS052000C1-US)

Mode 3: SIP-T44W + Adapter (YLPS052000B1-US)

Mode 4: SIP-T44W + PoE

Worst case is the SIP-T44W + Adapter (YLPS052000E1-US)

Mode 1: SIP-T44W + Adapter (YLPS052000E1-US) tested all measure item.

Mode 4: SIP-T44W + PoE test Below 1GHz Radiated Spurious Emissions and AC Line Conducted Emissions.

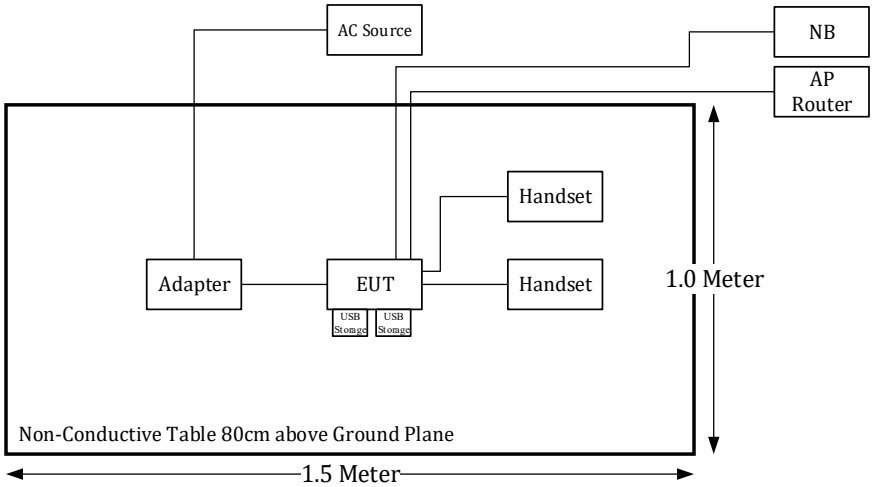
2.7 Block Diagram of Test Setup

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

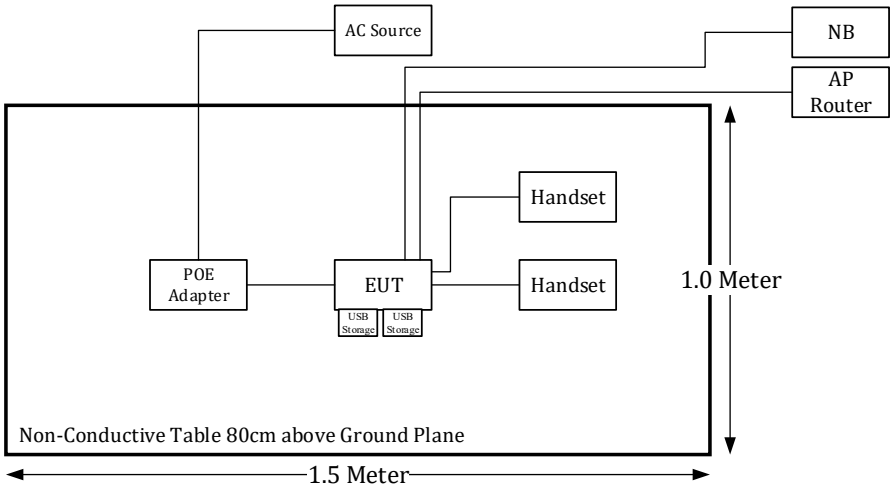
Radiation:

Below 1GHz

Adapter Mode:

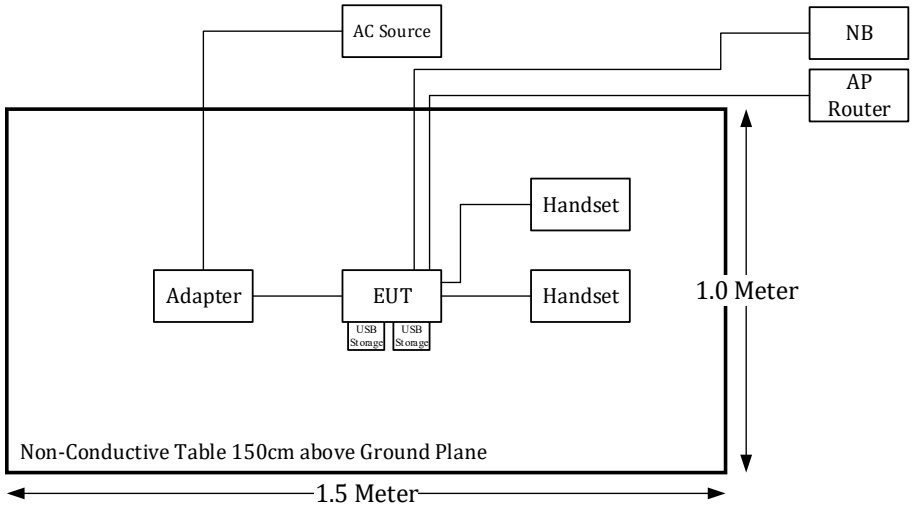


PoE Mode:



Above 1GHz:

Adapter Mode:



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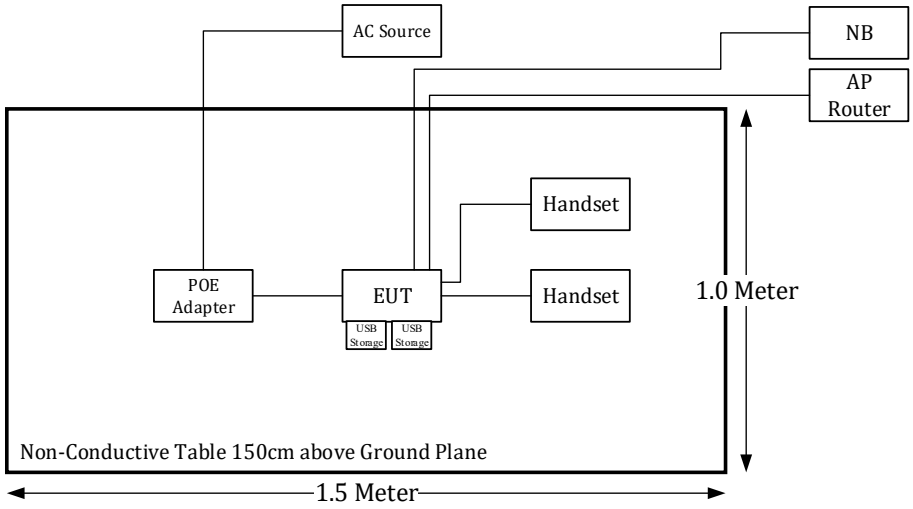
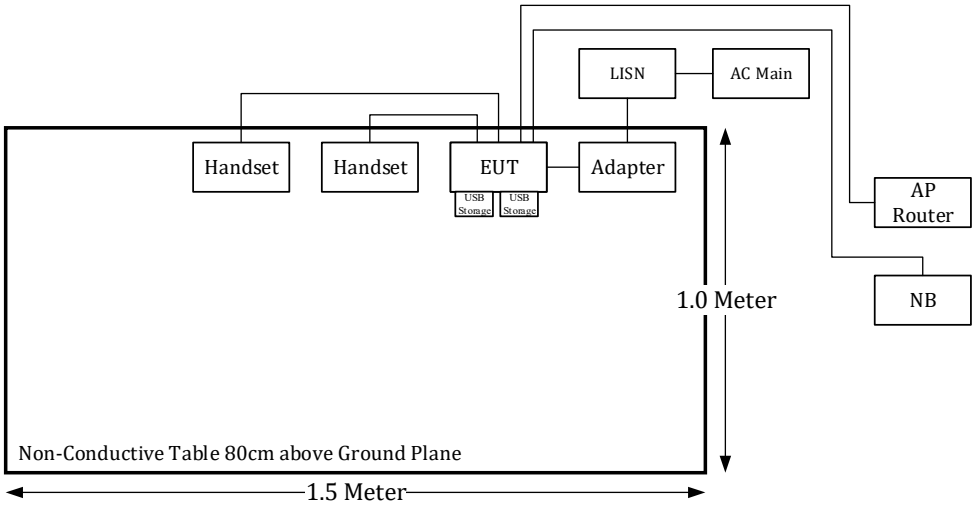
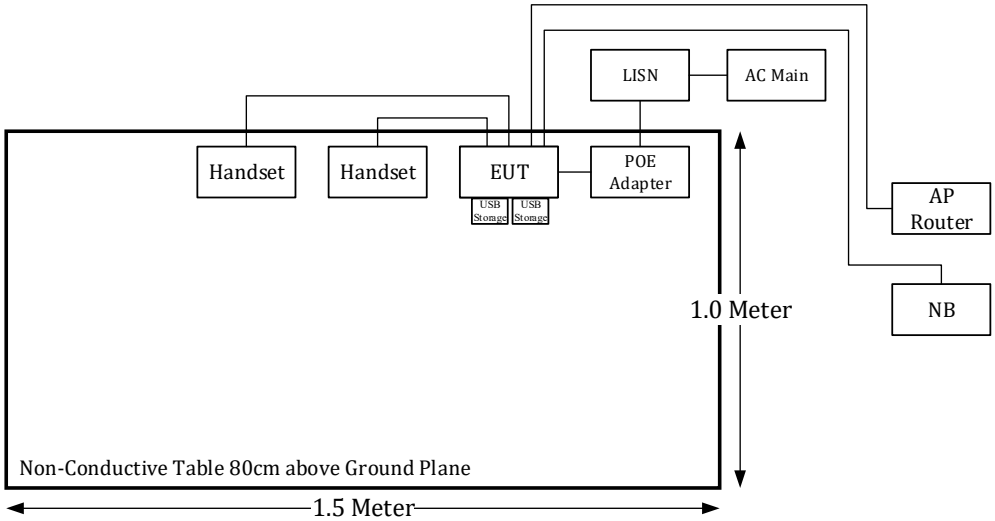


Conduction:

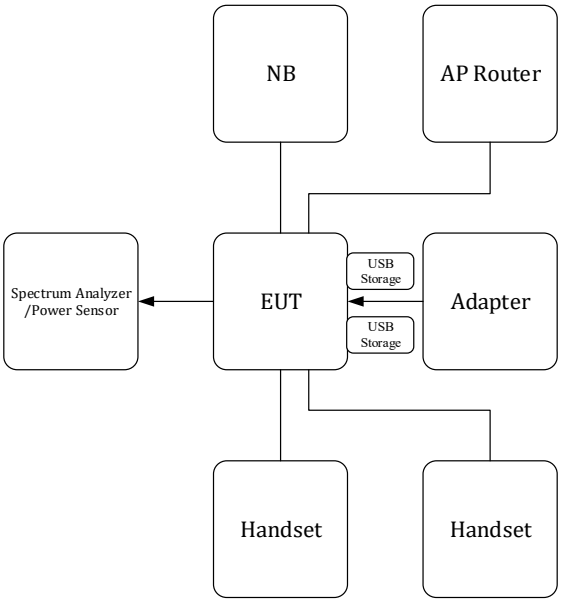
Adapter Mode:



PoE Mode:



Conducted:



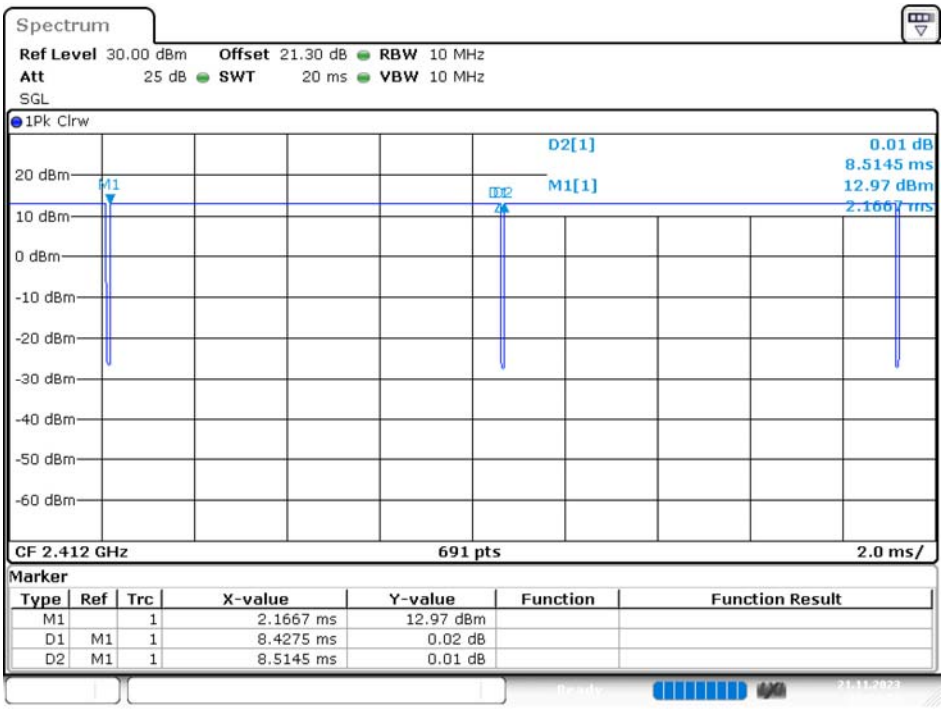
2.8 Duty Cycle

The duty cycle as below:

Radio Mode	On Time (ms)	Off Time (ms)	Duty Cycle (%)	1/T (kHz)	VBW Setting (kHz)
802.11b	8.4275	0.087	99	0.12	0.2
802.11g	1.3696	0.1304	91	0.73	1
802.11n20	1.2971	0.1449	90	0.77	1

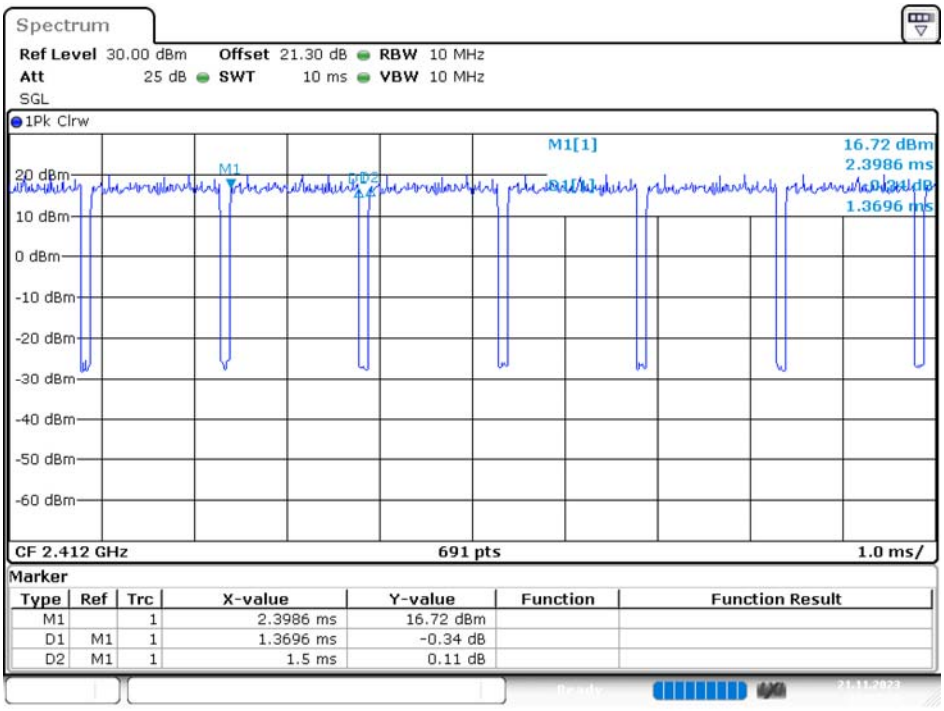
Please refer to the following plots.

B Mode



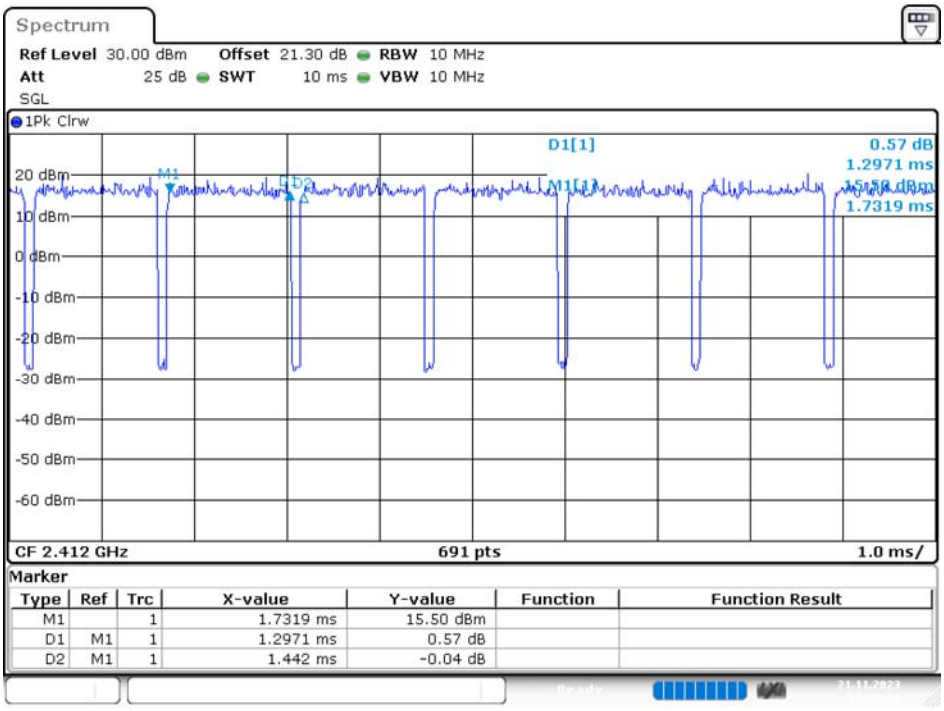
Date: 21.NOV.2023 13:14:54

G Mode



Date: 21.NOV.2023 13:17:39

N20 Mode



3 Summary of Test Results

Rules	Description of Test	Results
FCC §15.247(i), §1.1307(b)(3), §2.1091	RF Exposure	Compliance
RSS-102 §4	Exposure Limit	Compliance
FCC §15.203 RSS-Gen §6.8	Antenna Requirement	Compliance
FCC §15.207(a) RSS-Gen §8.8	AC Line Conducted Emissions	Compliance
FCC §15.205, §15.209, §15.247(d) RSS-247 §5.5 RSS-Gen §8.9 RSS-Gen §8.10	Spurious Emissions	Compliance
FCC §15.247(a)(2) RSS-247 §5.2(a) RSS-Gen §6.7	Emission Bandwidth	Compliance
FCC §15.247(b)(3) RSS-247 §5.4(d)	Maximum Peak Output Power	Compliance
FCC §15.247(d) RSS-247 §5.5	100 kHz Bandwidth of Frequency Band Edge	Compliance
FCC §15.247(e) RSS-247 §5.2(b)	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)					
LISN	Rohde & Schwarz	ENV216	101612	2023/2/2	2024/2/1
EMI Test Receiver	Rohde & Schwarz	ESW8	100947	2023/5/22	2024/5/20
Pulse Limiter	Rohde & Schwarz	ESH3Z2	TXZEM104	2023/5/18	2024/5/16
RF Cable	EMEC	EM-CB5D	1	2023/6/6	2024/6/4
Software	AUDIX	E3	V9.150826k	N.C.R	N.C.R
Radiation 3M Room (966-A)					
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/15542_01	2023/2/2	2024/2/1
Horn Antenna	EMCO	SAS-571	1020	2023/5/18	2024/5/17
Horn Antenna	ETS-Lindgren	3116	62638	2023/8/25	2024/8/24
Preamplifier	Sonoma	310N	130602	2023/6/16	2024/6/15
Preamplifier	Channel	ERA-100M-18G-01D1748	EC2300051	2023/04/01	2024/03/31
Microware Preamplifier	EM Electronics Corporation	EM18G40G	60656	2023/1/6	2024/1/5
Spectrum Analyzer	Rohde & Schwarz	FSV40	101435	2023/2/1	2024/1/31
EMI Test Receiver	Rohde & Schwarz	ESR3	102099	2023/6/16	2024/6/15
Micro flex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2023/1/24	2024/1/23
Coaxial Cable	COMMATE	PEWC	8Dr	2022/12/24	2023/12/23
Coaxial Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2023/1/24	2024/1/23
Coaxial Cable	JUNFLON	J12J102248-00-B-5	AUG-07-15-044	2022/12/24	2023/12/23
Cable	EMC	EMC105-SM-SM-10000	201003	2023/1/24	2024/1/23
Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-450CM	160309-1	2023/1/24	2024/1/23
Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-50CM	15120-1	2023/2/2	2024/2/1
Attenuator	MCL	BW-S10W5+	605	2023/1/18	2024/1/17
Band-stop filter	Woken	STI15-9831	STI15-9831-1	2023/10/20	2024/10/19
High-pass filter	XINGBOKEJI	XBLBQ-GTA54	200108-3-2	2023/10/20	2024/10/19
Software	AUDIX	E3	18621a	N.C.R	N.C.R
Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2023/2/10	2024/2/9
Cable	UTIFLEX	UFA210A	9435	2023/10/2	2024/9/30
Power Sensor	Boonton	RTP5006	11037	2023/5/23	2024/5/21
Attenuator	MCL	BW-S10W5+	1419	2023/2/1	2024/1/31

***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), §2.1091 - RF Exposure

5.1 Applicable Standard

According to subpart 15.247(i) and subpart §2.1091, 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

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

6

(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.

For multiple RF sources: Multiple RF sources are exempt if:

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\sum_{i=1}^{a}\frac{P_i}{P_{th,i}}+\sum_{j=1}^{b}\frac{ERP_j}{ERP_{th,j}}+\sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k}\leq 1$$

5.2 RF Exposure Evaluation Result

Project info

Band	Freq (MHz)	Tune-up Power (dBm)	Ant Gain (dBi)	Distances (mm)	Tune-up Power (mW)	ERP (dBm)	ERP (mW)
BT	2402-2480	11	4.94	200	12.59	13.79	23.93
WIFI 2.4GHz	2412-2462	19	4.94	200	79.43	21.79	151.01
WIFI 5GHz	5180-5825	16.5	3.43	200	44.67	17.78	59.98

§ 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
BT	2402	19.88	apply	768.00	exempt
WIFI 2.4GHz	2412	19.8	apply	768.00	exempt
WIFI 5GHz	5180	9.22	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

The BT and Wi-Fi can transmit simultaneously.

Simultaneous transmitting consideration (worst case):

The ratio=ERP_{BT}/limit + $ERP_{Wi\text{-}Fi}$/limit=23.93/768+151.01/768=0.23 < 1.0

So simultaneous exposure is compliant.

Result: The device compliant the MPE-Based Exemption at 20cm distances.

6 RSS-102 §4 – EXPOSURE LIMIT

6.1 Applicable Standard

According to RSS-102 §4:

For the purpose of this standard, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6.

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003-10[21]	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ $f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ $f^{0.25}$	0.1540/ $f^{0.25}$	8.944/ $f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 $f^{0.3417}$	0.008335 $f^{0.3417}$	0.02619 $f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$
150000-300000	0.158 $f^{0.5}$	4.21 x 10^{-4} $f^{0.5}$	6.67 x 10^{-5} f	616000/$f^{1.2}$

Note: f is frequency in MHz.
* Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

Calculated Formulary:

S = PG/4 π R^2 = power density (in appropriate units, e.g. W/m^2);
P = power input to the antenna (in appropriate units, e.g., W);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., m);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

6.2 RF Exposure Evaluation Result

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Power		Distances (mm)	Power Density (W/m^2)	RF Exp. Limit (W/m^2)
		(dBi)	(numeric)	(dBm)	(W)			
BT	2402-2480	4.94	3.119	11	0.013	200	0.0781	5.35
WIFI 2.4GHz	2412-2462	4.94	3.119	19	0.079	200	0.4929	5.37
WIFI 5GHz	5180-5825	3.43	2.203	16.5	0.045	200	0.1958	9.05

The BT and Wi-Fi can transmit simultaneously.

Simultaneous transmitting consideration (worst case):

The ratio=MPE_{BT}/limit + $MPE_{Wi\text{-}Fi}$/limit=0.0781/5.35+0.4929/5.37=0.11 < 1.0

So simultaneous exposure is compliant.

Result: The device compliant the MPE-Based Exemption at 20cm distances.

7 FCC §15.203 & RSS-GEN §6.8– Antenna Requirements

7.1 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.

According to RSS-Gen 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type

7.2 Antenna Information

Manufacturer	Model	Type	Antenna Gain	Impedance
YEALINK(XIAMEN) NETWORK TECHNOLOGY CO.,LTD.	T44WHOOKV11A	PCB Antenna	4.94 dBi	50Ω

The antenna is permanently connected to the EUT.

Result: Compliance

8 FCC §15.207(a) & RSS-GEN §8.8– AC Line Conducted Emissions

8.1 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.

According to RSS-GEN §8.8

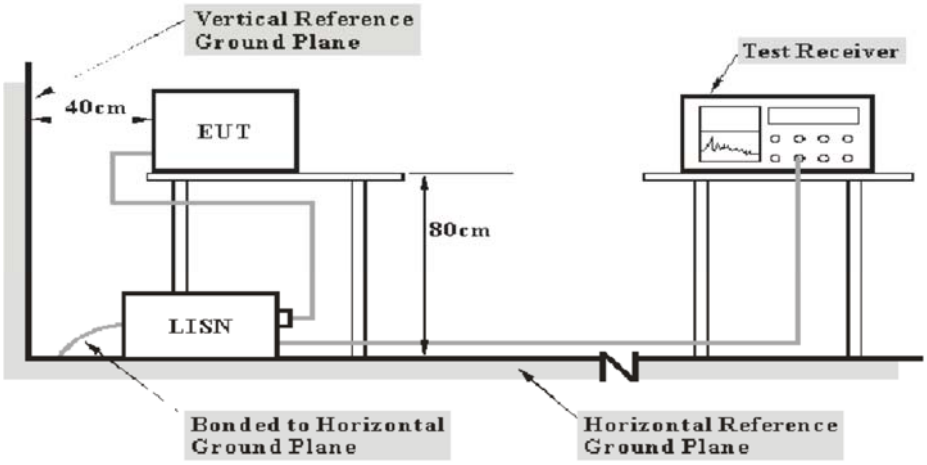
Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50 μH / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.

For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table 4 shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT. The lower limit applies at the boundary between the frequency ranges. The device used to power the EUT shall be representative of typical applications.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note 1	56 to 46 Note 1
0.5-5	56	46
5-30	60	50

Note 1: Decreases with the logarithm of the frequency.

8.2 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 and RSS-GEN limits.

8.3 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

8.4 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.

8.5 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 = Result – Limit Line

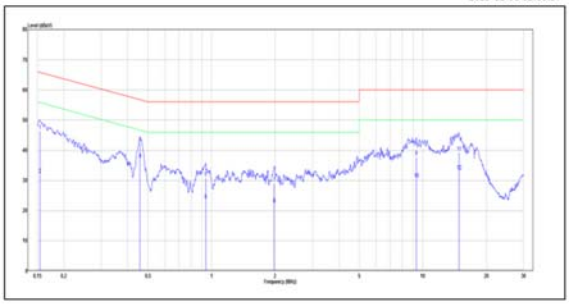
8.6 Test Results

Test Mode: Transmitting

Main: AC120 V, 60 Hz **(**Worst case is 802.11b mode High channel)

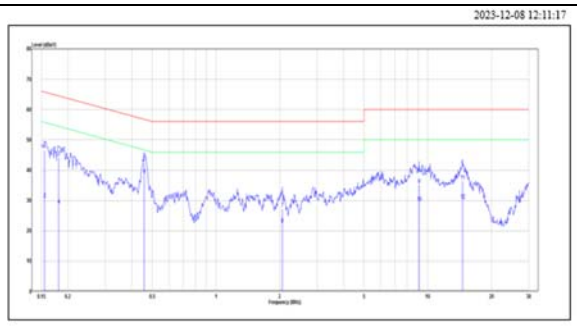
Adapter Mode:

Line



No.	Frequency (MHz)	Reading dBuV	Correct Factor(dB)	Result dBuV	Limit dBuV	Over limit (dB)	Remark	Phase
1	0.154	26.93	19.50	46.43	65.78	-19.35	QP	Line
2	0.154	12.43	19.50	31.93	55.78	-23.85	Average	Line
3	0.459	22.90	19.60	42.50	56.71	-14.22	QP	Line
4	0.459	17.48	19.60	37.08	46.71	-9.63	Average	Line
5	0.938	11.07	19.84	30.91	56.00	-25.09	QP	Line
6	0.938	3.56	19.84	23.39	46.00	-22.61	Average	Line
7	1.980	8.86	20.07	28.93	56.00	-27.07	QP	Line
8	1.980	2.12	20.07	22.18	46.00	-23.82	Average	Line
9	9.302	17.73	20.12	37.85	60.00	-22.15	QP	Line
10	9.302	10.32	20.12	30.44	50.00	-19.56	Average	Line
11	14.828	19.04	20.27	39.31	60.00	-20.69	QP	Line
12	14.828	12.82	20.27	33.09	50.00	-16.91	Average	Line

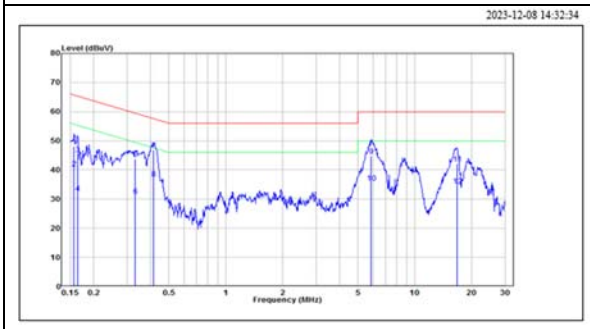
Neutral



No.	Frequency (MHz)	Reading dBuV	Correct Factor(dB)	Result dBuV	Limit dBuV	Over limit (dB)	Remark	Phase
1	0.155	27.02	19.50	46.52	65.74	-19.22	QP	Neutral
2	0.155	10.92	19.50	30.42	55.74	-25.31	Average	Neutral
3	0.181	24.82	19.50	44.32	64.46	-20.14	QP	Neutral
4	0.181	9.09	19.50	28.59	54.46	-25.87	Average	Neutral
5	0.459	22.97	19.61	42.58	56.71	-14.13	QP	Neutral
6	0.459	18.85	19.61	38.46	46.71	-8.26	Average	Neutral
7	2.055	7.15	20.07	27.22	56.00	-28.78	QP	Neutral
8	2.055	2.08	20.07	22.15	46.00	-23.85	Average	Neutral
9	9.107	15.06	20.14	35.21	60.00	-24.79	QP	Neutral
10	9.107	9.19	20.14	29.34	50.00	-20.66	Average	Neutral
11	14.594	16.19	20.31	36.49	60.00	-23.51	QP	Neutral
12	14.594	9.85	20.31	30.16	50.00	-19.84	Average	Neutral

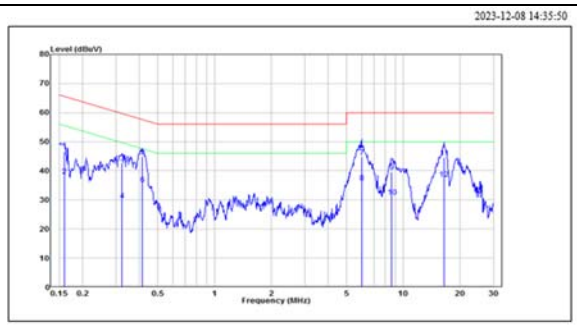
PoE Mode:

Line



No.	Frequency (MHz)	Reading dBuV	Correct Factor(dB)	Result dBuV	Limit dBuV	Over limit (dB)	Remark	Phase
1	0.157	28.53	19.50	48.03	65.60	-17.57	QP	Line
2	0.157	21.06	19.50	40.56	55.60	-15.04	Average	Line
3	0.164	25.97	19.50	45.47	65.25	-19.78	QP	Line
4	0.164	12.59	19.50	32.08	55.25	-23.17	Average	Line
5	0.330	24.22	19.55	43.76	59.44	-15.68	QP	Line
6	0.330	11.52	19.55	31.06	49.44	-18.38	Average	Line
7	0.413	27.22	19.58	46.80	57.59	-10.79	QP	Line
8	0.413	17.54	19.58	37.12	47.59	-10.47	Average	Line
9	5.836	24.73	20.14	44.88	60.00	-15.12	QP	Line
10	5.836	15.43	20.14	35.57	50.00	-14.43	Average	Line
11	16.661	21.86	20.34	42.20	60.00	-17.80	QP	Line
12	16.661	14.29	20.34	34.63	50.00	-15.37	Average	Line

Neutral



No.	Frequency (MHz)	Reading dBuV	Correct Factor(dB)	Result dBuV	Limit dBuV	Over limit (dB)	Remark	Phase
1	0.160	27.10	19.50	46.60	65.47	-18.87	QP	Neutral
2	0.160	18.79	19.50	38.29	55.47	-17.18	Average	Neutral
3	0.323	23.15	19.55	42.71	59.62	-16.91	QP	Neutral
4	0.323	10.30	19.55	29.85	49.62	-19.77	Average	Neutral
5	0.413	25.45	19.59	45.04	57.59	-12.55	QP	Neutral
6	0.413	15.80	19.59	35.39	47.59	-12.20	Average	Neutral
7	5.993	24.69	20.16	44.85	60.00	-15.15	QP	Neutral
8	5.993	15.95	20.16	36.11	50.00	-13.89	Average	Neutral
9	8.637	19.60	20.14	39.74	60.00	-20.26	QP	Neutral
10	8.637	11.03	20.14	31.17	50.00	-18.83	Average	Neutral
11	16.312	24.26	20.38	44.64	60.00	-15.36	QP	Neutral
12	16.312	16.89	20.38	37.27	50.00	-12.73	Average	Neutral

Note:

Result = Read Level + Factor

Over Limit = Result – Limit Line

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

9 FCC §15.209, §15.205, §15.247(d) & RSS-247 §5.5, RSS-GEN §8.9, §8.10 – Spurious Emissions

9.1 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 RSS-Gen 8.10,

Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

(a)The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).

(b)Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.

(c)Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

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) and RSS-GEN §8.9: 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.

According to ANSI C63.10-2013, section 5.3.3
Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field, and the emissions to be measured can be detected by the measurement equipment (see 4.3.4). Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. Measurements from 18 GHz to 40 GHz are typically made at distances significantly less than 3 m from the EUT. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade of distance (inverse of linear distance for field-strength measurements or inverse of linear distance-squared for power-density measurements).

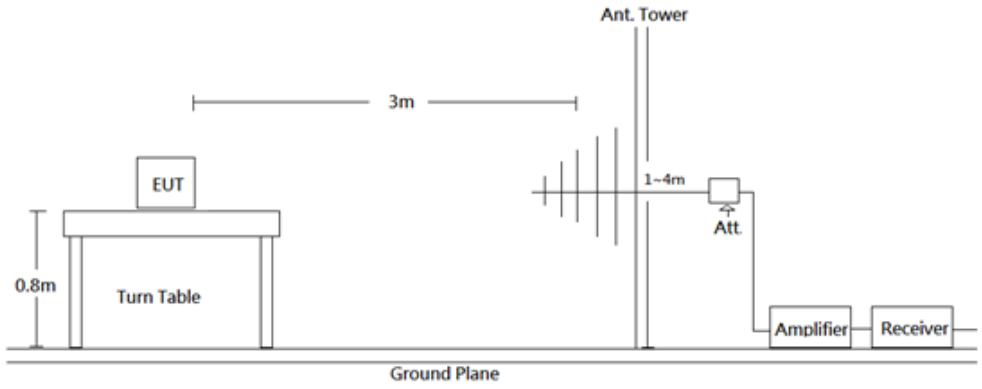
As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the 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).

As per RSS-247 5.5,
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the

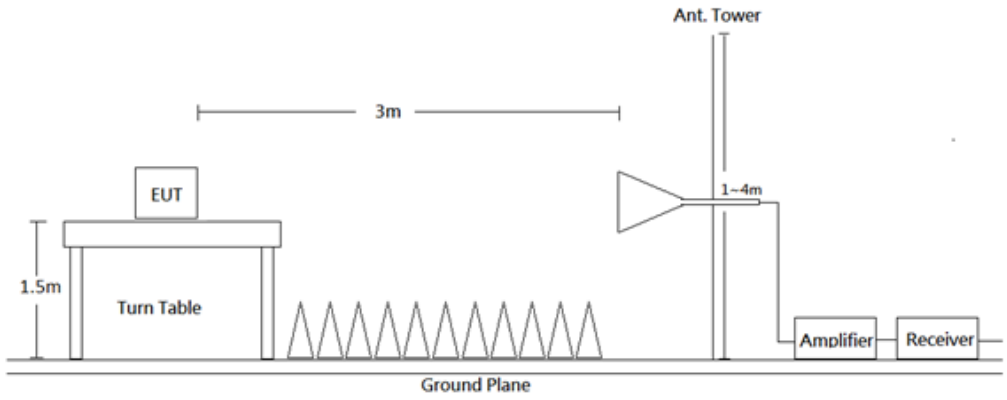
band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

9.2 EUT Setup

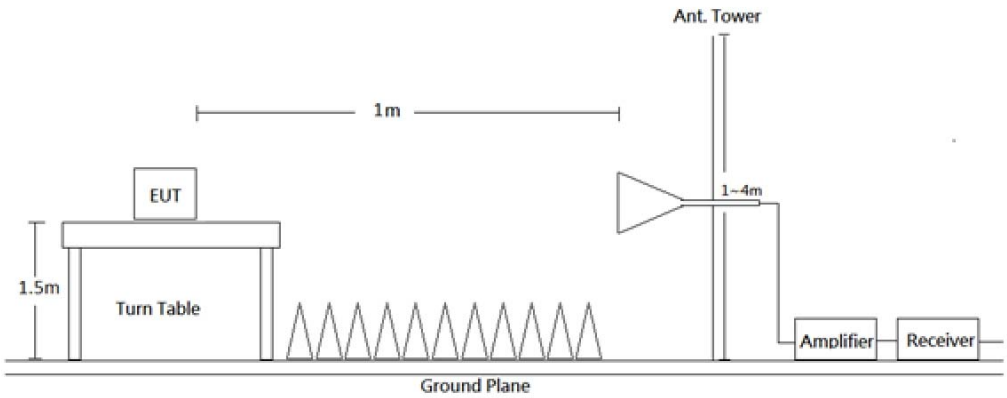
Below 1 GHz:



1-18 GHz:



18-26.5 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, FCC 15.247 and RSS-Gen, RSS-247 Limits.

9.3 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

9.4 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.

9.5 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 = Level – Limit

9.6 Test Results

Test Mode: Transmitting

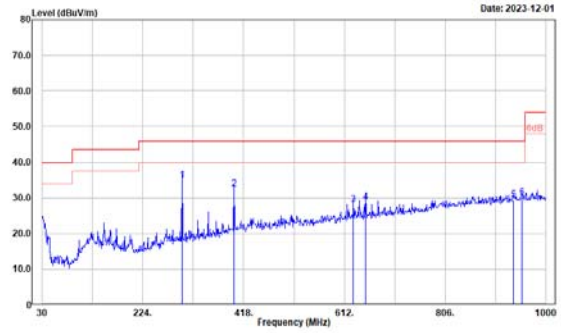
30MHz-1GHz:

(Worst case is 802.11b mode)

Adapter Mode:

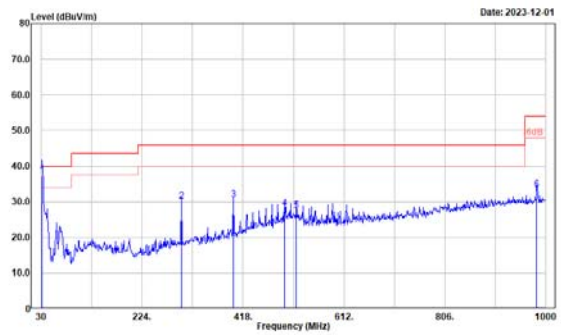
Low channel

Horizontal



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
299.660	43.99	-9.14	34.85	46.00	-11.15	100	169	QP
399.570	39.58	-7.02	32.56	46.00	-13.44	100	208	QP
629.460	31.27	-3.15	28.12	46.00	-17.88	100	3	QP
652.740	31.47	-2.56	28.91	46.00	-17.09	100	4	QP
937.920	26.98	2.51	29.49	46.00	-16.51	100	332	QP
954.410	27.40	2.79	30.19	46.00	-15.81	100	297	QP

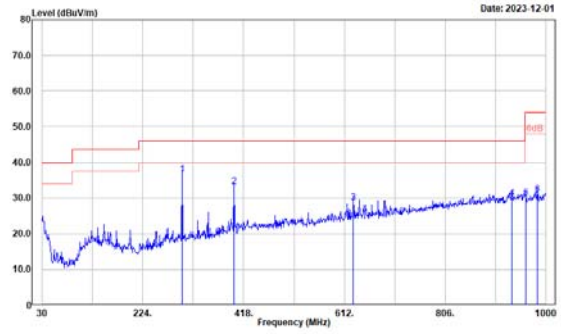
Vertical



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
31.940	41.83	-4.45	37.38	40.00	-2.62	100	329	QP
299.660	39.17	-9.14	30.03	46.00	-15.97	100	102	QP
399.570	37.55	-7.02	30.53	46.00	-15.47	100	279	QP
497.540	32.96	-4.78	28.18	46.00	-17.82	100	224	QP
520.820	32.09	-4.50	27.59	46.00	-18.41	100	94	QP
982.540	30.75	2.58	33.33	54.00	-20.67	100	248	QP

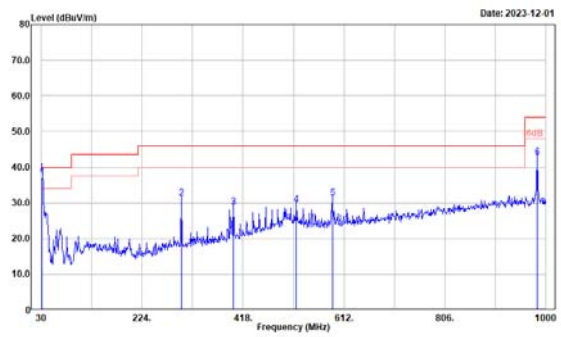
Middle channel

Horizontal



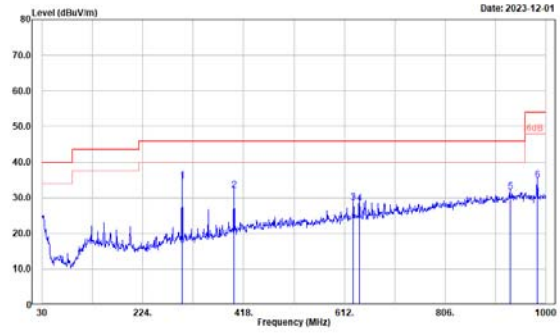
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
299.660	45.88	-9.14	36.74	46.00	-9.26	100	177	QP
399.570	40.19	-7.02	33.17	46.00	-12.83	100	181	QP
629.460	31.74	-3.15	28.59	46.00	-17.41	100	0	QP
935.010	27.39	2.43	29.82	46.00	-16.18	100	25	QP
961.200	27.08	2.76	29.84	54.00	-24.16	100	80	QP
983.510	28.46	2.59	31.05	54.00	-22.95	100	136	QP

Vertical

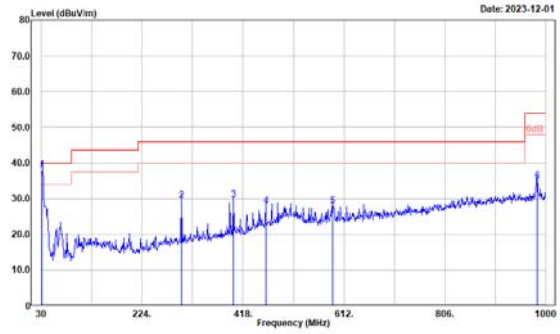


Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
31.940	41.55	-4.45	37.10	40.00	-2.90	100	90	QP
299.660	40.31	-9.14	31.17	46.00	-14.83	100	112	QP
399.570	35.77	-7.02	28.75	46.00	-17.25	100	162	QP
520.820	34.08	-4.50	29.58	46.00	-16.42	100	86	QP
589.690	34.74	-3.48	31.26	46.00	-14.74	100	317	QP
983.510	40.12	2.59	42.71	54.00	-11.29	100	321	QP

High channel	
Horizontal	**Vertical**



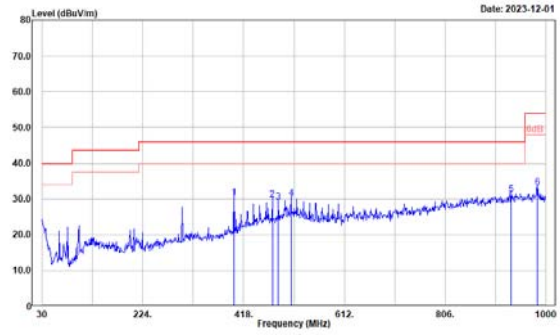
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
299.660	43.83	-9.14	34.69	46.00	-11.31	100	167	QP
399.570	39.14	-7.02	32.12	46.00	-13.88	100	190	QP
629.460	31.79	-3.15	28.64	46.00	-17.36	100	11	QP
641.100	31.09	-2.79	28.30	46.00	-17.70	100	0	QP
931.130	29.20	2.42	31.62	46.00	-14.38	100	292	QP
983.510	32.22	2.59	34.81	54.00	-19.19	100	304	QP



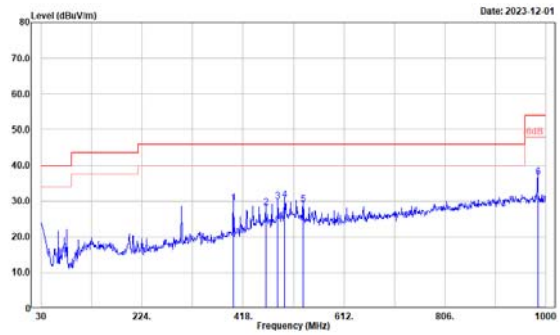
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
30.970	41.90	-3.87	38.03	40.00	-1.97	100	177	QP
299.660	38.52	-9.14	29.38	46.00	-16.62	100	107	QP
399.570	36.79	-7.02	29.77	46.00	-16.23	100	265	QP
461.650	33.51	-5.49	28.02	46.00	-17.98	100	138	QP
589.690	31.41	-3.48	27.93	46.00	-18.07	100	262	QP
983.510	32.36	2.59	34.95	54.00	-19.05	100	360	QP

PoE Mode:

Low channel	
Horizontal	**Vertical**



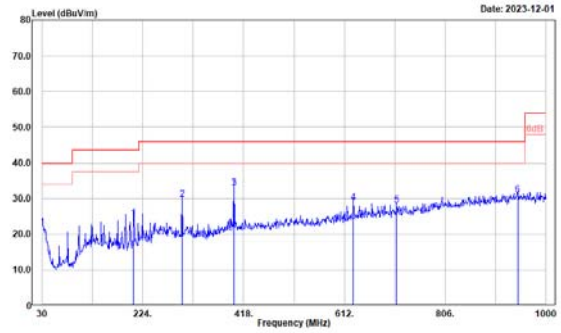
Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
399.570	37.35	-7.02	30.33	46.00	-15.67	100	242	QP
473.290	34.96	-5.28	29.68	46.00	-16.32	100	155	QP
484.930	34.07	-5.04	29.03	46.00	-16.97	100	158	QP
509.180	34.64	-4.61	30.03	46.00	-15.97	100	135	QP
933.070	28.77	2.43	31.20	46.00	-14.80	100	25	QP
983.510	30.51	2.59	33.10	54.00	-20.90	100	139	QP



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
399.570	36.50	-7.02	29.48	46.00	-16.52	100	257	QP
461.650	33.62	-5.49	28.13	46.00	-17.87	100	156	QP
484.930	34.93	-5.04	29.89	46.00	-16.11	100	141	QP
497.540	35.10	-4.78	30.32	46.00	-15.68	100	137	QP
533.430	33.69	-4.56	29.13	46.00	-16.87	100	152	QP
984.480	33.98	2.59	36.57	54.00	-17.43	100	257	QP

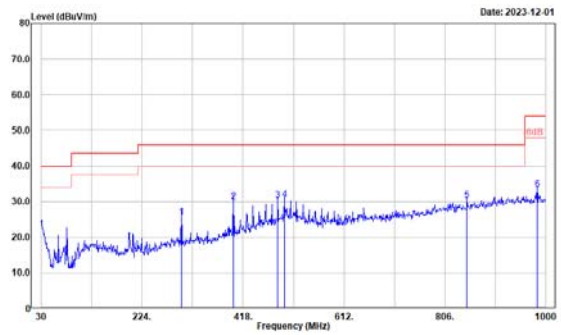
Middle channel

Horizontal



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
206.540	36.72	-12.27	24.45	43.50	-19.05	100	1	QP
299.660	38.84	-9.14	29.70	46.00	-16.30	100	339	QP
399.570	40.04	-7.02	33.02	46.00	-12.98	100	177	QP
629.460	32.05	-3.15	28.90	46.00	-17.10	100	2	QP
712.880	29.58	-1.43	28.15	46.00	-17.85	100	188	QP
945.680	28.40	2.67	31.07	46.00	-14.93	100	327	QP

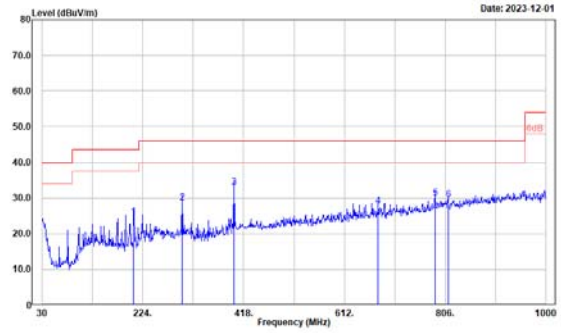
Vertical



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
299.660	34.76	-9.14	25.62	46.00	-20.38	100	74	QP
399.570	37.04	-7.02	30.02	46.00	-15.98	100	231	QP
484.930	35.38	-5.04	30.34	46.00	-15.66	100	139	QP
497.540	35.31	-4.78	30.53	46.00	-15.47	100	171	QP
848.680	29.29	1.12	30.41	46.00	-15.59	100	116	QP
983.510	30.74	2.59	33.33	54.00	-20.67	100	258	QP

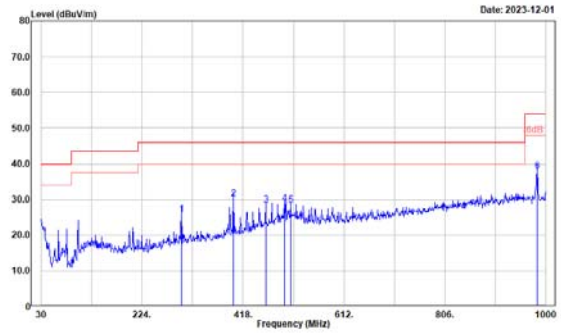
High channel

Horizontal



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
206.540	36.88	-12.27	24.61	43.50	-18.89	100	176	QP
299.660	37.86	-9.14	28.72	46.00	-17.28	100	330	QP
399.570	39.89	-7.02	32.87	46.00	-13.13	100	168	QP
676.990	29.81	-2.15	27.66	46.00	-18.34	100	192	QP
786.600	30.10	-0.13	29.97	46.00	-16.03	100	184	QP
811.820	29.17	0.34	29.51	46.00	-16.49	100	359	QP

Vertical



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
299.660	35.01	-9.14	25.87	46.00	-20.13	100	69	QP
399.570	37.20	-7.02	30.18	46.00	-15.82	100	248	QP
461.650	33.84	-5.49	28.35	46.00	-17.65	100	147	QP
497.540	33.57	-4.78	28.79	46.00	-17.21	100	151	QP
509.180	32.95	-4.61	28.34	46.00	-17.66	100	256	QP
983.510	35.34	2.59	37.93	54.00	-16.07	100	358	QP

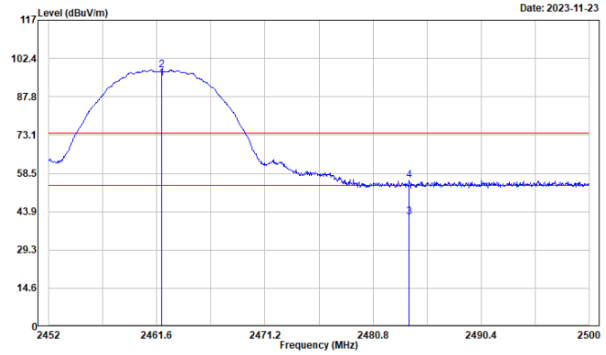
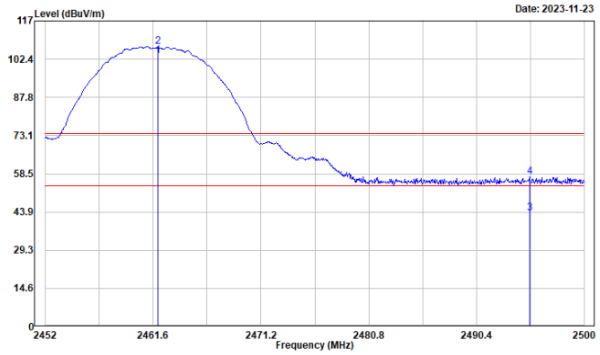
Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

(Worst case is 802.11b mode High channel)

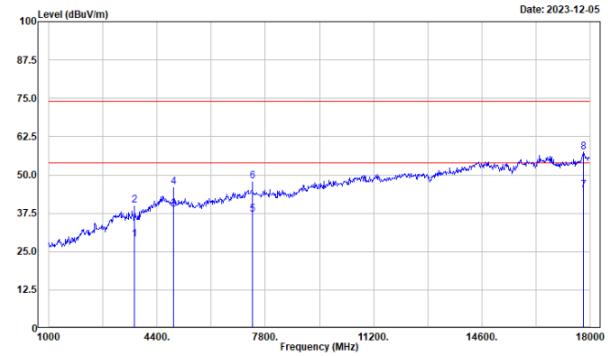
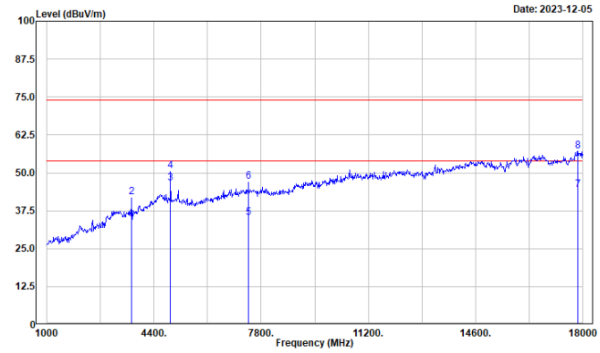
Band-Edge:

Horizontal	Vertical
	

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	105.49	-10.76	94.73			167	160	Average
2462.000	108.67	-10.76	97.91			167	160	Peak
2484.016	52.36	-10.47	41.89	54.00	-12.11	167	160	Average
2484.016	66.21	-10.47	55.74	74.00	-18.26	167	160	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	114.58	-10.76	103.82			147	357	Average
2462.000	117.88	-10.76	107.12			147	357	Peak
2495.104	53.72	-10.34	43.38	54.00	-10.62	147	357	Average
2495.104	67.65	-10.34	57.31	74.00	-16.69	147	357	Peak

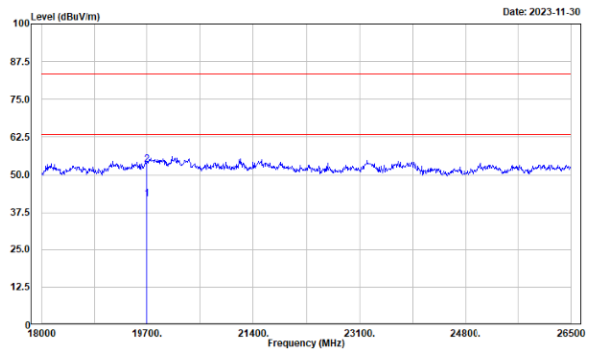
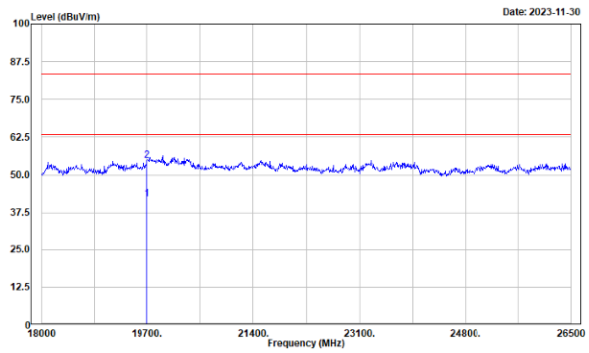
1GHz-18GHz:

Horizontal	Vertical
	

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3693.000	37.25	-8.24	29.01	54.00	-24.99	170	182	Average
3693.000	48.36	-8.24	40.12	74.00	-33.88	170	182	Peak
4924.000	42.47	-3.84	38.63	54.00	-15.37	177	189	Average
4924.000	49.87	-3.84	46.03	74.00	-27.97	177	189	Peak
7386.000	36.68	0.45	37.13	54.00	-16.87	152	189	Average
7386.000	47.40	0.45	47.85	74.00	-26.15	152	189	Peak
17796.000	32.11	12.85	44.96	54.00	-9.04	150	271	Average
17796.000	44.54	12.85	57.39	74.00	-16.61	150	271	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3693.000	41.92	-8.24	33.68	54.00	-20.32	214	240	Average
3693.000	50.25	-8.24	42.01	74.00	-31.99	214	240	Peak
4924.000	50.34	-3.84	46.50	54.00	-7.50	217	309	Average
4924.000	54.64	-3.84	50.80	74.00	-23.20	217	309	Peak
7386.000	34.75	0.45	35.20	54.00	-18.80	154	217	Average
7386.000	46.59	0.45	47.04	74.00	-26.96	154	217	Peak
17847.000	31.43	13.05	44.48	54.00	-9.52	150	54	Average
17847.000	44.19	13.05	57.24	74.00	-16.76	150	54	Peak

18GHz-26.5GHz:

Horizontal	Vertical
	

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19696.000	40.30	1.64	41.94	63.50	-21.56	151	124	Average
19696.000	51.75	1.64	53.39	83.50	-30.11	151	124	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19696.000	40.34	1.64	41.98	63.50	-21.52	157	245	Average
19696.000	53.08	1.64	54.72	83.50	-28.78	157	245	Peak

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Above 1GHz

802.11b Mode:

Low channel

Horizontal

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2341.136	52.15	-11.33	40.82	54.00	-13.18	145	158	Average
2341.136	66.63	-11.33	55.30	74.00	-18.70	145	158	Peak
2412.000	104.88	-10.94	93.94			145	158	Average
2412.000	108.14	-10.94	97.20			145	158	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3618.000	46.79	-8.12	38.67	54.00	-15.33	126	38	Average
3618.000	53.14	-8.12	45.02	74.00	-28.98	126	38	Peak
4824.000	36.65	-3.75	32.90	54.00	-21.10	185	190	Average
4824.000	47.44	-3.75	43.69	74.00	-30.31	185	190	Peak
7236.000	40.41	0.29	40.70	54.00	-13.30	172	196	Average
7236.000	48.44	0.29	48.73	74.00	-25.27	172	196	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2370.480	53.88	-11.14	42.74	54.00	-11.26	145	0	Average
2370.480	67.39	-11.14	56.25	74.00	-17.75	145	0	Peak
2412.000	114.69	-10.94	103.75			145	0	Average
2412.000	118.01	-10.94	107.07			145	0	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3618.000	49.35	-8.12	41.23	54.00	-12.77	133	261	Average
3618.000	54.76	-8.12	46.64	74.00	-27.36	133	261	Peak
4824.000	42.23	-3.75	38.48	54.00	-15.52	185	342	Average
4824.000	49.99	-3.75	46.24	74.00	-27.76	185	342	Peak
7236.000	37.11	0.29	37.40	54.00	-16.60	159	160	Average
7236.000	47.02	0.29	47.31	74.00	-26.69	159	160	Peak

Middle channel

Horizontal

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2437.000	105.44	-10.92	94.52			138	162	Average
2437.000	108.63	-10.92	97.71			138	162	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3655.500	41.31	-8.21	33.10	54.00	-20.90	124	40	Average
3655.500	49.96	-8.21	41.75	74.00	-32.25	124	40	Peak
4874.000	38.75	-3.86	34.89	54.00	-19.11	189	172	Average
4874.000	48.73	-3.86	44.87	74.00	-29.13	189	172	Peak
7311.000	38.22	0.18	38.40	54.00	-15.60	137	184	Average
7311.000	47.34	0.18	47.52	74.00	-26.48	137	184	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2437.000	115.05	-10.92	104.13			158	11	Average
2437.000	118.29	-10.92	107.37			158	11	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3655.500	45.82	-8.21	37.61	54.00	-16.39	130	243	Average
3655.500	52.45	-8.21	44.24	74.00	-29.76	130	243	Peak
4874.000	44.87	-3.86	41.01	54.00	-12.99	189	289	Average
4874.000	51.31	-3.86	47.45	74.00	-26.55	189	289	Peak
7311.000	35.09	0.18	35.27	54.00	-18.73	151	117	Average
7311.000	46.47	0.18	46.65	74.00	-27.35	151	117	Peak

High channel

Horizontal

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	105.49	-10.76	94.73			167	160	Average
2462.000	108.67	-10.76	97.91			167	160	Peak
2484.016	52.36	-10.47	41.89	54.00	-12.11	167	160	Average
2484.016	66.21	-10.47	55.74	74.00	-18.26	167	160	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3693.000	37.25	-8.24	29.01	54.00	-24.99	170	182	Average
3693.000	48.36	-8.24	40.12	74.00	-33.88	170	182	Peak
4924.000	42.47	-3.84	38.63	54.00	-15.37	177	189	Average
4924.000	49.87	-3.84	46.03	74.00	-27.97	177	189	Peak
7386.000	36.68	0.45	37.13	54.00	-16.87	152	189	Average
7386.000	47.40	0.45	47.85	74.00	-26.15	152	189	Peak
17796.000	32.11	12.85	44.96	54.00	-9.04	150	271	Average
17796.000	44.54	12.85	57.39	74.00	-16.61	150	271	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	114.58	-10.76	103.82			147	357	Average
2462.000	117.88	-10.76	107.12			147	357	Peak
2495.104	53.72	-10.34	43.38	54.00	-10.62	147	357	Average
2495.104	67.65	-10.34	57.31	74.00	-16.69	147	357	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3693.000	41.92	-8.24	33.68	54.00	-20.32	214	240	Average
3693.000	50.25	-8.24	42.01	74.00	-31.99	214	240	Peak
4924.000	50.34	-3.84	46.50	54.00	-7.50	217	309	Average
4924.000	54.64	-3.84	50.80	74.00	-23.20	217	309	Peak
7386.000	34.75	0.45	35.20	54.00	-18.80	154	217	Average
7386.000	46.59	0.45	47.04	74.00	-26.96	154	217	Peak
17847.000	31.43	13.05	44.48	54.00	-9.52	150	54	Average
17847.000	44.19	13.05	57.24	74.00	-16.76	150	54	Peak

Note:

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

802.11g Mode:

Low channel

Horizontal

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2375.744	53.02	-11.11	41.91	54.00	-12.09	167	148	Average
2375.744	66.19	-11.11	55.08	74.00	-18.92	167	148	Peak
2412.000	93.32	-10.94	82.38			167	148	Average
2412.000	102.78	-10.94	91.84			167	148	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3618.000	38.36	-8.12	30.24	54.00	-23.76	130	36	Average
3618.000	49.63	-8.12	41.51	74.00	-32.49	130	36	Peak
4824.000	32.94	-3.75	29.19	54.00	-24.81	153	157	Average
4824.000	45.22	-3.75	41.47	74.00	-32.53	153	157	Peak
7236.000	41.87	0.29	42.16	54.00	-11.84	156	215	Average
7236.000	48.62	0.29	48.91	74.00	-25.09	156	215	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2388.960	54.10	-11.03	43.07	54.00	-10.93	146	0	Average
2388.960	68.31	-11.03	57.28	74.00	-16.72	146	0	Peak
2412.000	103.34	-10.94	92.40			146	0	Average
2412.000	112.83	-10.94	101.89			146	0	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3618.000	42.11	-8.12	33.99	54.00	-20.01	220	239	Average
3618.000	52.19	-8.12	44.07	74.00	-29.93	220	239	Peak
4824.000	33.03	-3.75	29.28	54.00	-24.72	154	138	Average
4824.000	45.35	-3.75	41.60	74.00	-32.40	154	138	Peak
7236.000	38.83	0.29	39.12	54.00	-14.88	159	165	Average
7236.000	47.66	0.29	47.95	74.00	-26.05	159	165	Peak

Middle channel

Horizontal

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2437.000	92.87	-10.92	81.95			141	161	Average
2437.000	102.36	-10.92	91.44			141	161	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3655.500	34.19	-8.21	25.98	54.00	-28.02	157	76	Average
3655.500	44.44	-8.21	36.23	74.00	-37.77	157	76	Peak
4874.000	33.02	-3.86	29.16	54.00	-24.84	153	48	Average
4874.000	45.38	-3.86	41.52	74.00	-32.48	153	48	Peak
7311.000	39.02	0.18	39.20	54.00	-14.80	156	206	Average
7311.000	48.03	0.18	48.21	74.00	-25.79	156	206	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2437.000	101.28	-10.92	90.36			124	360	Average
2437.000	110.76	-10.92	99.84			124	360	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3655.500	37.90	-8.21	29.69	54.00	-24.31	210	249	Average
3655.500	48.90	-8.21	40.69	74.00	-33.31	210	249	Peak
4874.000	33.16	-3.86	29.30	54.00	-24.70	156	164	Average
4874.000	44.50	-3.86	40.64	74.00	-33.36	156	164	Peak
7311.000	36.19	0.18	36.37	54.00	-17.63	193	110	Average
7311.000	46.13	0.18	46.31	74.00	-27.69	193	110	Peak

High channel

Horizontal

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	94.32	-10.76	83.56			168	159	Average
2462.000	103.82	-10.76	93.06			168	159	Peak
2497.888	53.09	-10.30	42.79	54.00	-11.21	168	159	Average
2497.888	66.86	-10.30	56.56	74.00	-17.44	168	159	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3693.000	32.87	-8.24	24.63	54.00	-29.37	153	317	Average
3693.000	45.32	-8.24	37.08	74.00	-36.92	153	317	Peak
4924.000	33.21	-3.84	29.37	54.00	-24.63	154	223	Average
4924.000	46.36	-3.84	42.52	74.00	-31.48	154	223	Peak
7386.000	37.58	0.45	38.03	54.00	-15.97	151	344	Average
7386.000	46.94	0.45	47.39	74.00	-26.61	151	344	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	103.66	-10.76	92.90			199	360	Average
2462.000	113.04	-10.76	102.28			199	360	Peak
2492.032	53.81	-10.38	43.43	54.00	-10.57	199	360	Average
2492.032	67.18	-10.38	56.80	74.00	-17.20	199	360	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3693.000	34.31	-8.24	26.07	54.00	-27.93	155	327	Average
3693.000	45.03	-8.24	36.79	74.00	-37.21	155	327	Peak
4924.000	33.82	-3.84	29.98	54.00	-24.02	150	356	Average
4924.000	45.03	-3.84	41.19	74.00	-32.81	150	356	Peak
7386.000	34.39	0.45	34.84	54.00	-19.16	153	105	Average
7386.000	45.10	0.45	45.55	74.00	-28.45	153	105	Peak

Note:

Level = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

802.11n HT20 Mode:

Low channel

Horizontal

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2362.304	53.23	-11.18	42.05	54.00	-11.95	147	148	Average
2362.304	66.41	-11.18	55.23	74.00	-18.77	147	148	Peak
2412.000	93.79	-10.94	82.85			147	148	Average
2412.000	104.00	-10.94	93.06			147	148	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3618.000	38.29	-8.12	30.17	54.00	-23.83	126	63	Average
3618.000	50.64	-8.12	42.52	74.00	-31.48	126	63	Peak
4824.000	33.19	-3.75	29.44	54.00	-24.56	156	163	Average
4824.000	44.60	-3.75	40.85	74.00	-33.15	156	163	Peak
7236.000	41.81	0.29	42.10	54.00	-11.90	159	186	Average
7236.000	48.51	0.29	48.80	74.00	-25.20	159	186	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2387.504	54.42	-11.04	43.38	54.00	-10.62	144	360	Average
2387.504	68.51	-11.04	57.47	74.00	-16.53	144	360	Peak
2412.000	104.16	-10.94	93.22			144	360	Average
2412.000	114.41	-10.94	103.47			144	360	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3618.000	42.05	-8.12	33.93	54.00	-20.07	195	332	Average
3618.000	52.44	-8.12	44.32	74.00	-29.68	195	332	Peak
4824.000	33.02	-3.75	29.27	54.00	-24.73	153	6	Average
4824.000	45.14	-3.75	41.39	74.00	-32.61	153	6	Peak
7236.000	35.31	0.29	35.60	54.00	-18.40	172	45	Average
7236.000	45.90	0.29	46.19	74.00	-27.81	172	45	Peak

Middle channel

Horizontal

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2437.000	94.35	-10.92	83.43			142	159	Average
2437.000	103.83	-10.92	92.91			142	159	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3655.500	35.83	-8.21	27.62	54.00	-26.38	116	16	Average
3655.500	46.89	-8.21	38.68	74.00	-35.32	116	16	Peak
4874.000	33.09	-3.86	29.23	54.00	-24.77	157	211	Average
4874.000	46.01	-3.86	42.15	74.00	-31.85	157	211	Peak
7311.000	38.96	0.18	39.14	54.00	-14.86	220	138	Average
7311.000	47.21	0.18	47.39	74.00	-26.61	220	138	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2437.000	103.90	-10.92	92.98			162	6	Average
2437.000	113.48	-10.92	102.56			162	6	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3655.500	37.78	-8.21	29.57	54.00	-24.43	211	76	Average
3655.500	49.21	-8.21	41.00	74.00	-33.00	211	76	Peak
4874.000	33.20	-3.86	29.34	54.00	-24.66	152	261	Average
4874.000	45.10	-3.86	41.24	74.00	-32.76	152	261	Peak
7311.000	34.74	0.18	34.92	54.00	-19.08	156	291	Average
7311.000	47.31	0.18	47.49	74.00	-26.51	156	291	Peak

High channel

Horizontal

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	91.84	-10.76	81.08			172	145	Average
2462.000	102.87	-10.76	92.11			172	145	Peak
2497.648	53.02	-10.30	42.72	54.00	-11.28	172	145	Average
2497.648	66.49	-10.30	56.19	74.00	-17.81	172	145	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3693.000	33.87	-8.24	25.63	54.00	-28.37	153	19	Average
3693.000	46.12	-8.24	37.88	74.00	-36.12	153	19	Peak
4924.000	33.37	-3.84	29.53	54.00	-24.47	151	339	Average
4924.000	44.84	-3.84	41.00	74.00	-33.00	151	339	Peak
7386.000	36.13	0.45	36.58	54.00	-17.42	115	204	Average
7386.000	46.95	0.45	47.40	74.00	-26.60	115	204	Peak

Vertical

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	102.78	-10.76	92.02			200	360	Average
2462.000	113.08	-10.76	102.32			200	360	Peak
2487.136	53.78	-10.43	43.35	54.00	-10.65	200	360	Average
2487.136	66.71	-10.43	56.28	74.00	-17.72	200	360	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
3693.000	34.49	-8.24	26.25	54.00	-27.75	150	312	Average
3693.000	44.34	-8.24	36.10	74.00	-37.90	150	312	Peak
4924.000	33.16	-3.84	29.32	54.00	-24.68	156	268	Average
4924.000	45.51	-3.84	41.67	74.00	-32.33	156	268	Peak
7386.000	34.05	0.45	34.50	54.00	-19.50	157	244	Average
7386.000	46.61	0.45	47.06	74.00	-26.94	157	244	Peak

Note:

Level = Reading + Factor.

Margin = Level – Limit.

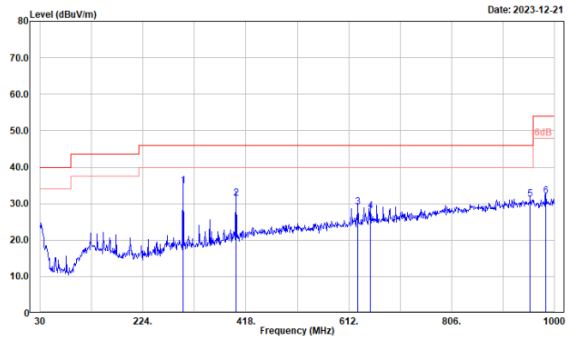
Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Transmitting simultaneously test:

WIFI 2.4GHz and BT Mode

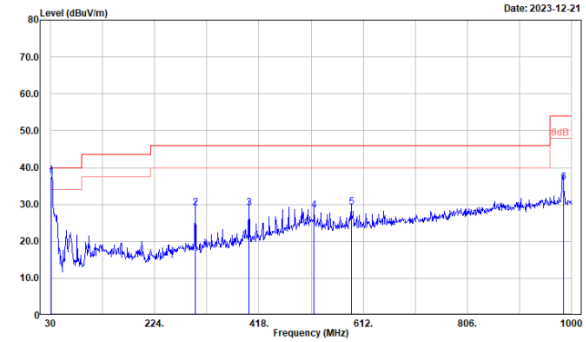
30MHz-1GHz

Horizontal



Freq. MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Height (cm)	Degree (°)	Remark
299.660	44.06	-9.14	34.92	46.00	-11.08	100	173	QP
399.570	38.40	-7.02	31.38	46.00	-14.62	100	188	QP
629.460	32.27	-3.15	29.12	46.00	-16.88	100	15	QP
652.740	30.47	-2.56	27.91	46.00	-18.09	100	15	QP
954.410	28.52	2.79	31.31	46.00	-14.69	100	46	QP
983.510	29.46	2.59	32.05	54.00	-21.95	100	205	QP

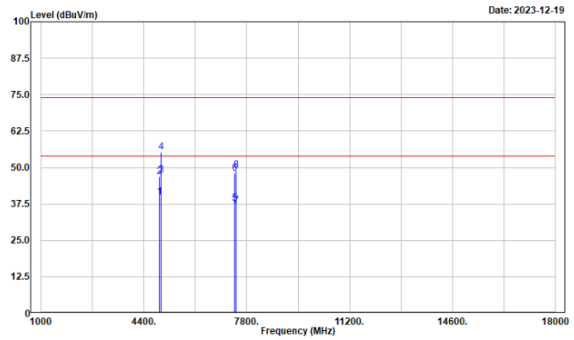
Vertical



Freq. MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Height (cm)	Degree (°)	Remark
31.940	41.91	-4.45	37.46	40.00	-2.54	100	191	QP
299.660	38.16	-9.14	29.02	46.00	-16.98	100	106	QP
399.570	36.01	-7.02	28.99	46.00	-17.01	100	5	QP
520.820	32.88	-4.50	28.38	46.00	-17.62	100	241	QP
589.690	32.72	-3.48	29.24	46.00	-16.76	100	276	QP
984.480	33.48	2.59	36.07	54.00	-17.93	100	180	QP

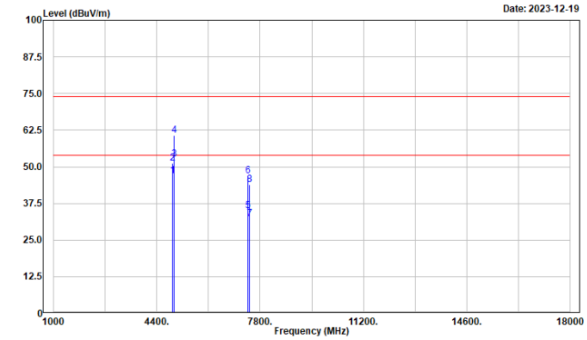
1GHz-18GHz

Horizontal



Freq. MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Height (cm)	Degree (°)	Remark
4924.000	43.69	-3.84	39.85	54.00	-14.15	164	177	Average
4924.000	50.64	-3.84	46.80	74.00	-27.20	164	177	Peak
4960.000	51.22	-3.77	47.45	54.00	-6.55	142	0	Average
4960.000	59.01	-3.77	55.24	74.00	-18.76	142	0	Peak
7386.000	37.10	0.45	37.55	54.00	-16.45	146	67	Average
7386.000	47.57	0.45	48.02	74.00	-25.98	146	67	Peak
7440.000	36.31	0.61	36.92	54.00	-17.08	211	173	Average
7440.000	48.51	0.61	49.12	74.00	-24.88	211	173	Peak

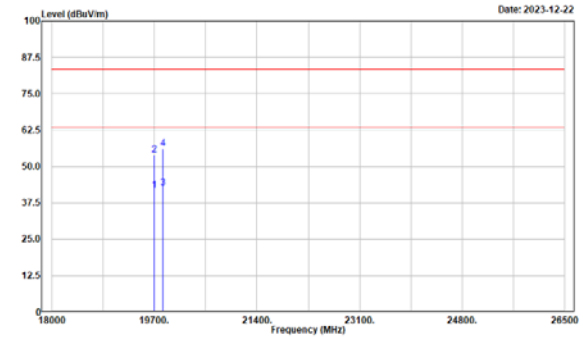
Vertical



Freq. MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Height (cm)	Degree (°)	Remark
4924.000	50.74	-3.84	46.90	54.00	-7.10	201	67	Average
4924.000	55.05	-3.84	51.21	74.00	-22.79	201	67	Peak
4960.000	56.28	-3.77	52.51	54.00	-1.49	121	130	Average
4960.000	64.51	-3.77	60.74	74.00	-13.26	121	130	Peak
7386.000	34.57	0.45	35.02	54.00	-18.98	151	235	Average
7386.000	46.32	0.45	46.77	74.00	-27.23	151	235	Peak
7440.000	31.51	0.61	32.12	54.00	-21.88	147	153	Average
7440.000	43.38	0.61	43.99	74.00	-30.01	147	153	Peak

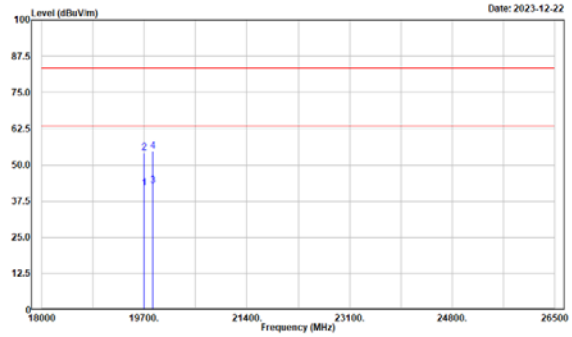
18GHz-26.5GHz

Horizontal



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19696.000	40.10	1.64	41.74	63.50	-21.76	151	53	Average
19696.000	52.38	1.64	54.02	83.50	-29.48	151	53	Peak
19840.000	40.90	1.72	42.62	63.50	-20.88	156	360	Average
19840.000	54.34	1.72	56.06	83.50	-27.44	156	360	Peak

Vertical



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
19696.000	40.25	1.64	41.89	63.50	-21.61	152	338	Average
19696.000	52.53	1.64	54.17	83.50	-29.33	152	338	Peak
19840.000	40.97	1.72	42.69	63.50	-20.81	155	276	Average
19840.000	52.95	1.72	54.67	83.50	-28.83	155	276	Peak

Note:

Level = Reading + Factor.

Margin = Level – Limit.

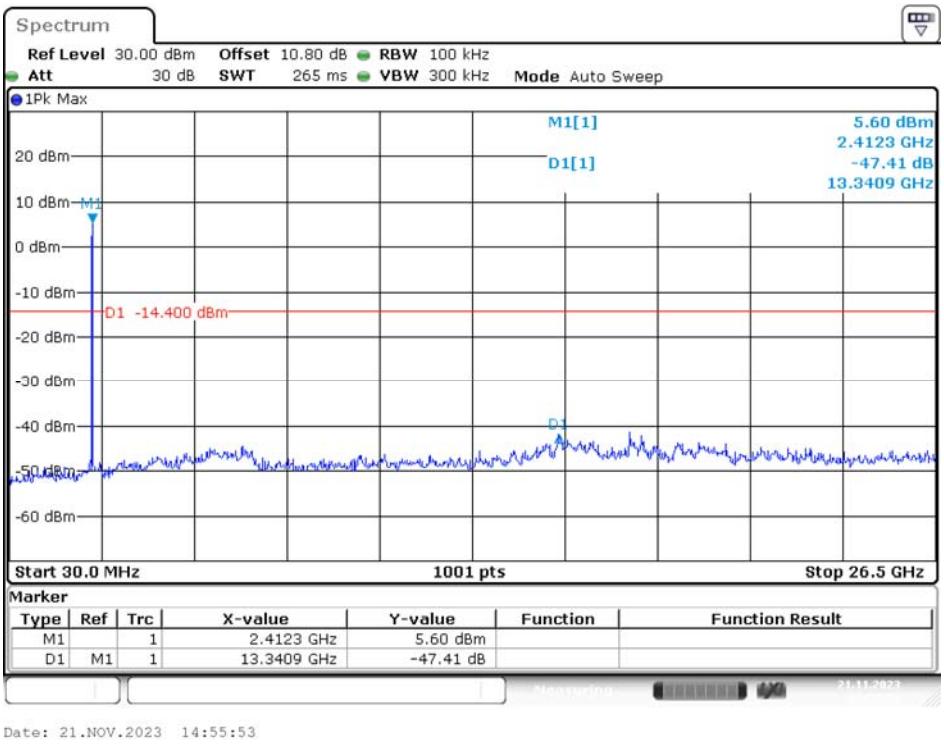
Factor = Antenna Factor + Cable Loss – Amplifier Gain.

Conducted Spurious Emissions:

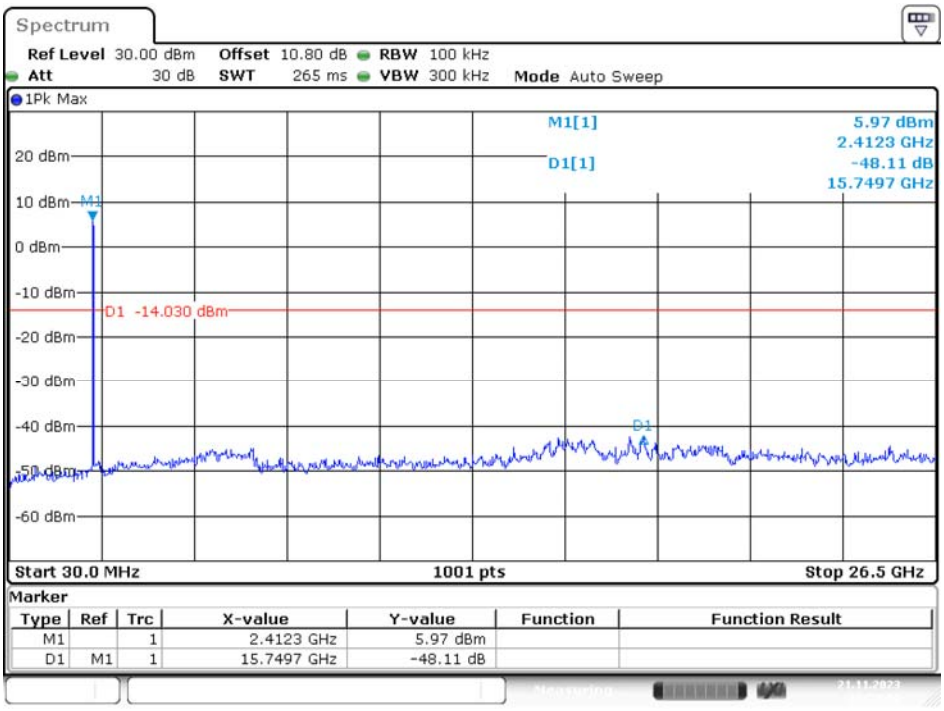
Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
B Mode				
Low	2412	47.41	≥ 20	PASS
Middle	2437	48.11	≥ 20	PASS
High	2462	47.49	≥ 20	PASS
G Mode				
Low	2412	34.22	≥ 20	PASS
Middle	2437	37.00	≥ 20	PASS
High	2462	35.24	≥ 20	PASS
N20 Mode				
Low	2412	36.60	≥ 20	PASS
Middle	2437	36.61	≥ 20	PASS
High	2462	36.73	≥ 20	PASS

B Mode

Low Channel



Middle Channel



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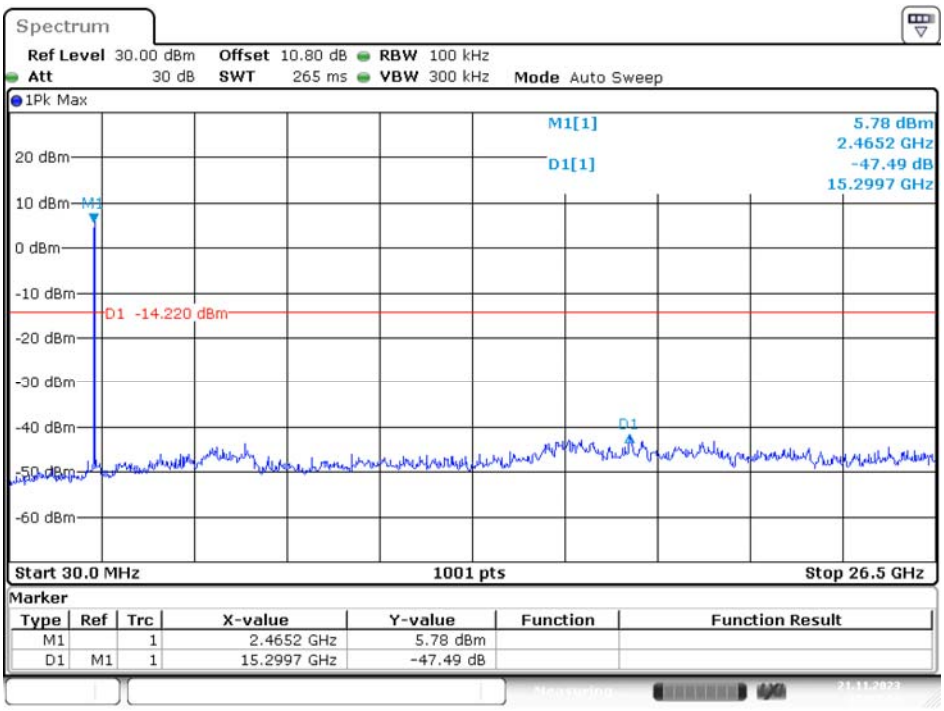
High Channel



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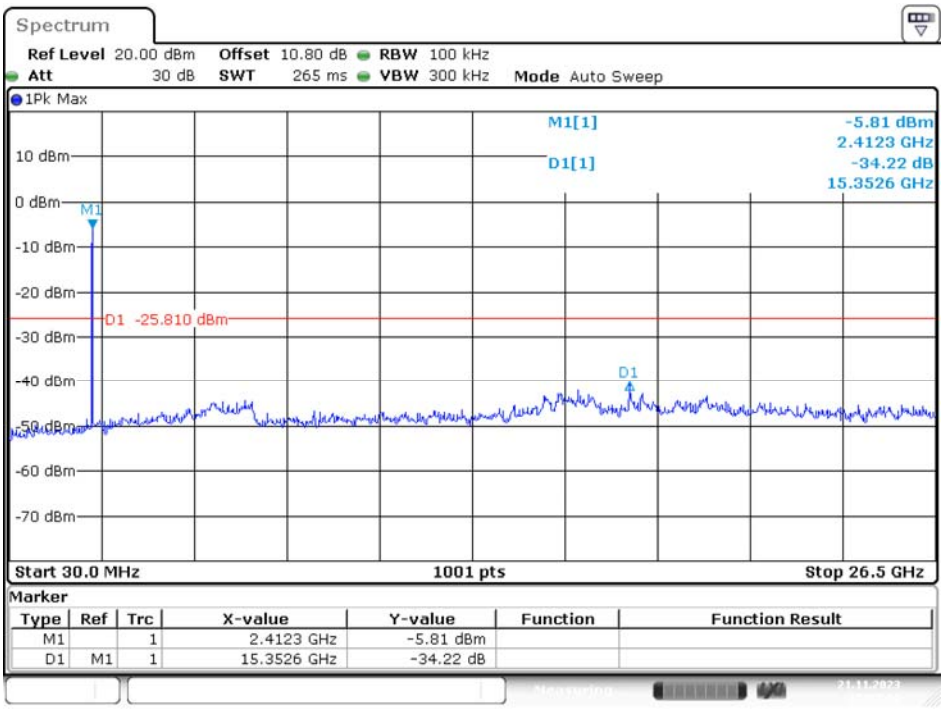
G Mode

Low Channel



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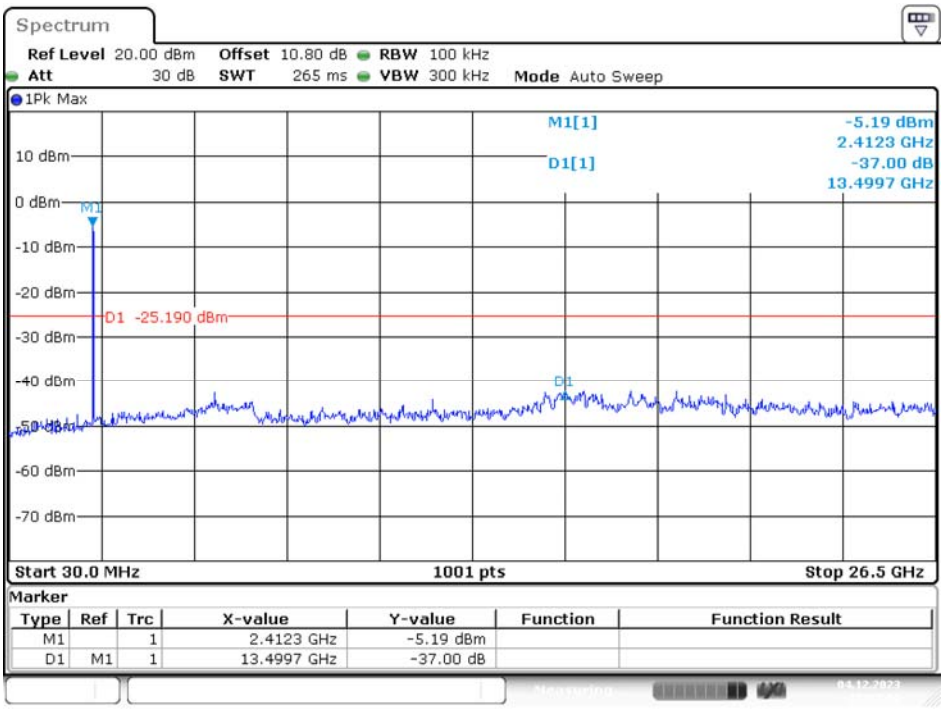
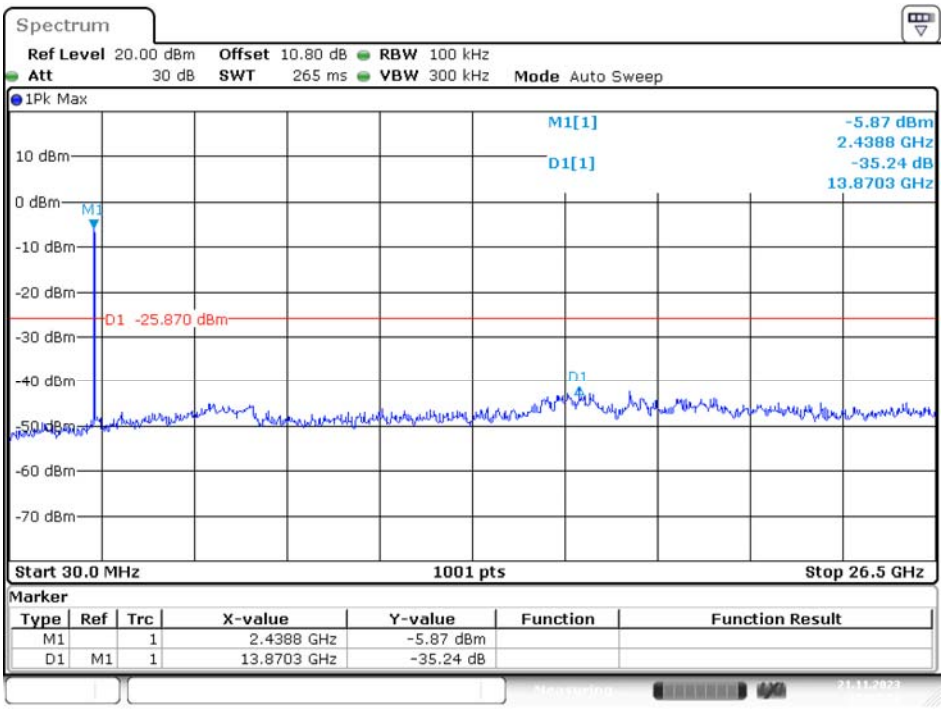
Middle Channel



Date: 4.DEC.2023 12:01:00

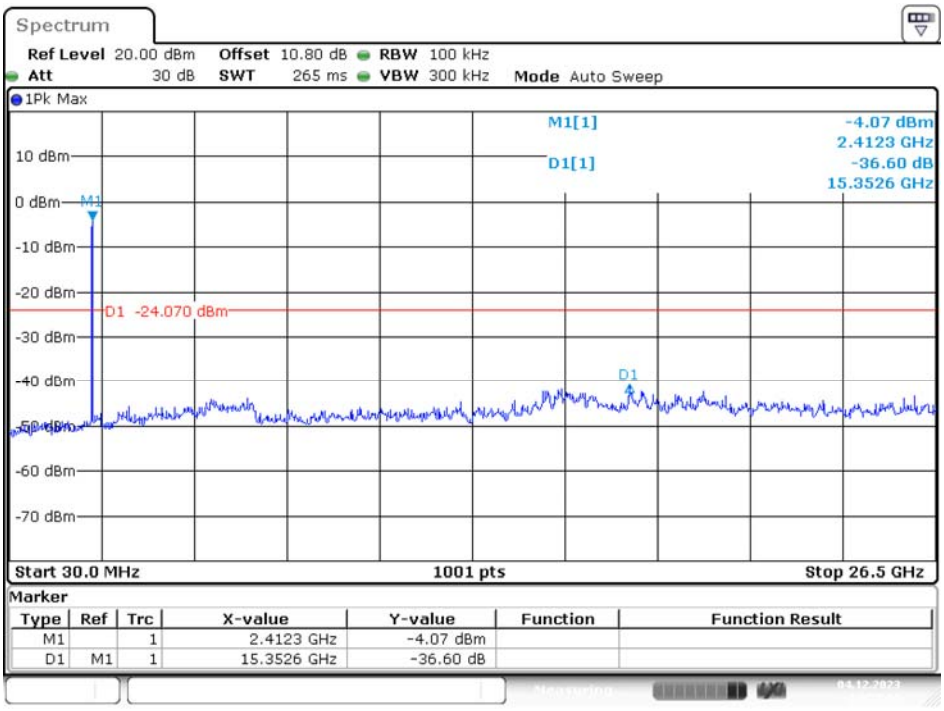
High Channel



Date: 21.NOV.2023 15:17:53

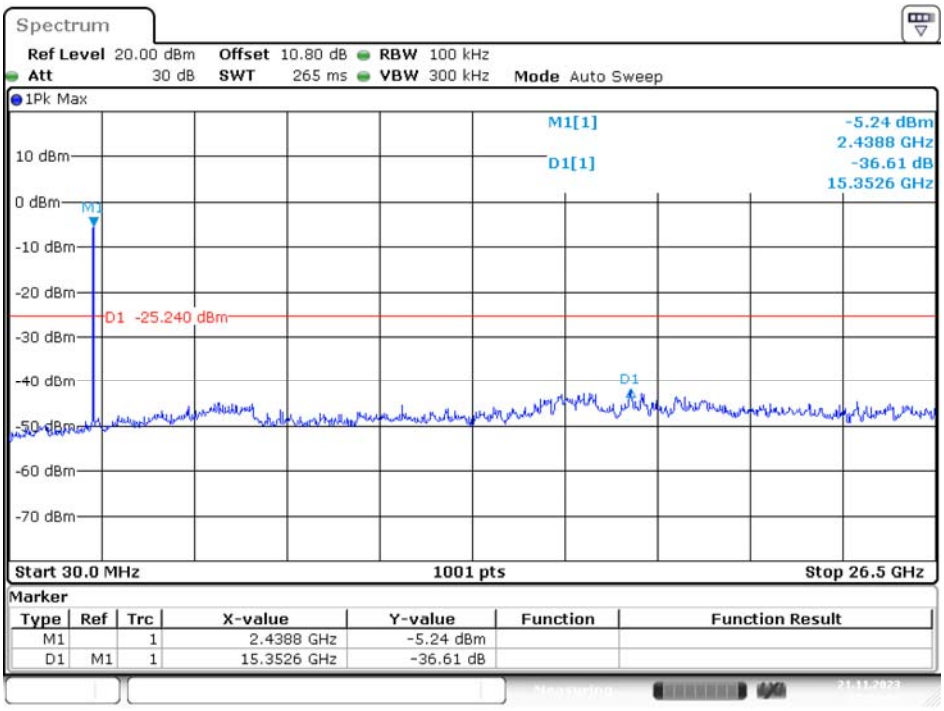
N20 Mode

Low Channel



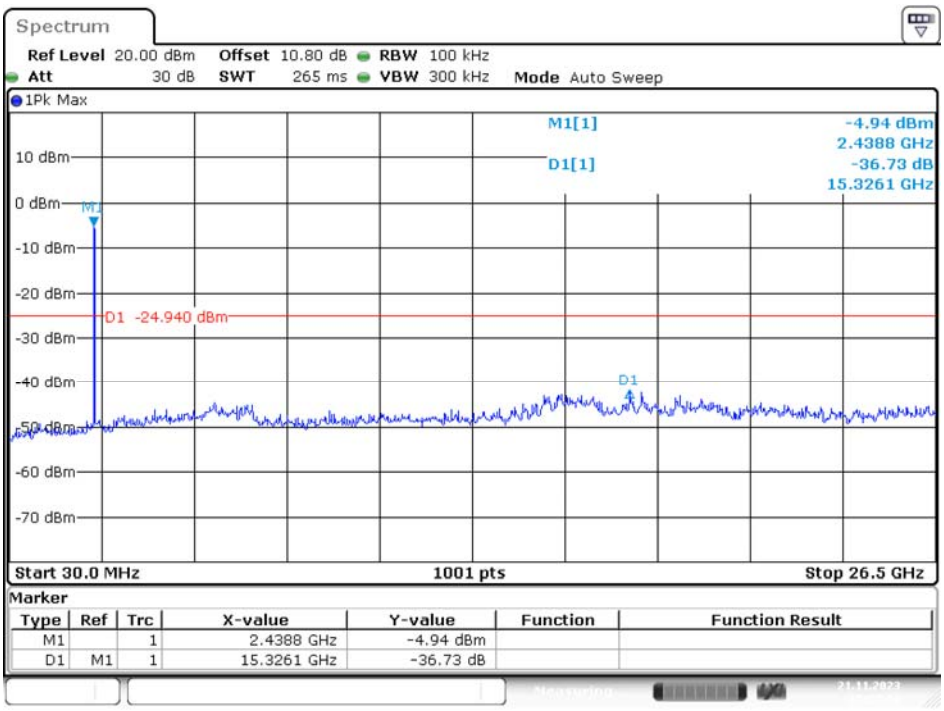
Date: 4.DEC.2023 14:53:41

Middle Channel



Date: 21.NOV.2023 15:24:45

High Channel



Date: 21.NOV.2023 15:27:12

10 FCC §15.247(a)(2) & RSS-247 §5.2(a), RSS-GEN §6.7 – 6 dB Emission Bandwidth & Occupied Bandwidth

10.1 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.

According to RSS-247 §5.2 (a)

The minimum 6 dB bandwidth shall be 500 kHz.

According to RSS-GEN §6.7

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

10.2 Test Procedure

According to ANSI C63.10-2013, section 11.8

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 emission.

According to ANSI C63.10-2013 Section 6.9.3

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

10.3 Test Results

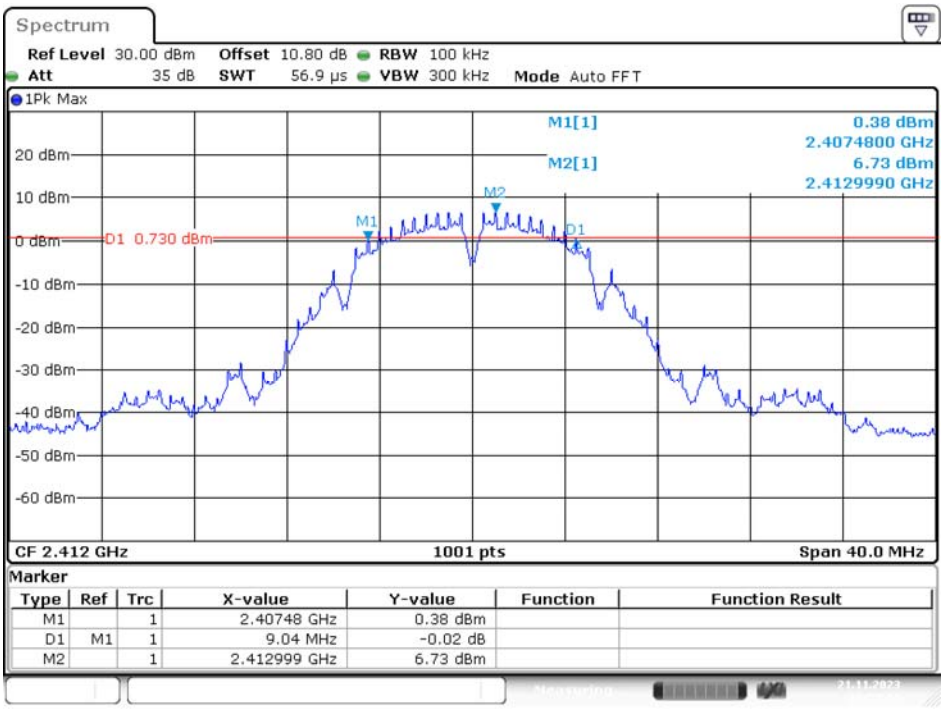
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
B Mode					
Low	2412	9.04	11.83	> 500	PASS
Middle	2437	8.52	11.83	> 500	PASS
High	2462	9.04	11.91	> 500	PASS
G Mode					
Low	2412	15.48	16.46	> 500	PASS
Middle	2437	16.32	16.66	> 500	PASS
High	2462	15.76	16.46	> 500	PASS
N20 Mode					
Low	2412	15.96	17.62	> 500	PASS
Middle	2437	17.56	17.70	> 500	PASS
High	2462	16.16	17.74	> 500	PASS

Please refer to the following plots

6 dB Emission Bandwidth

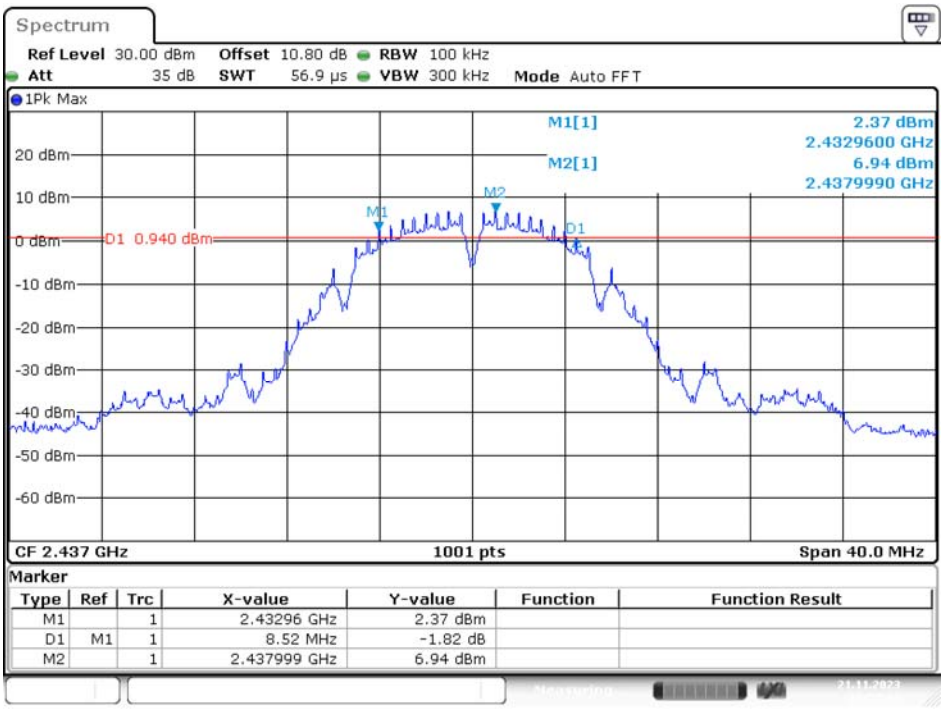
B Mode

Low Channel



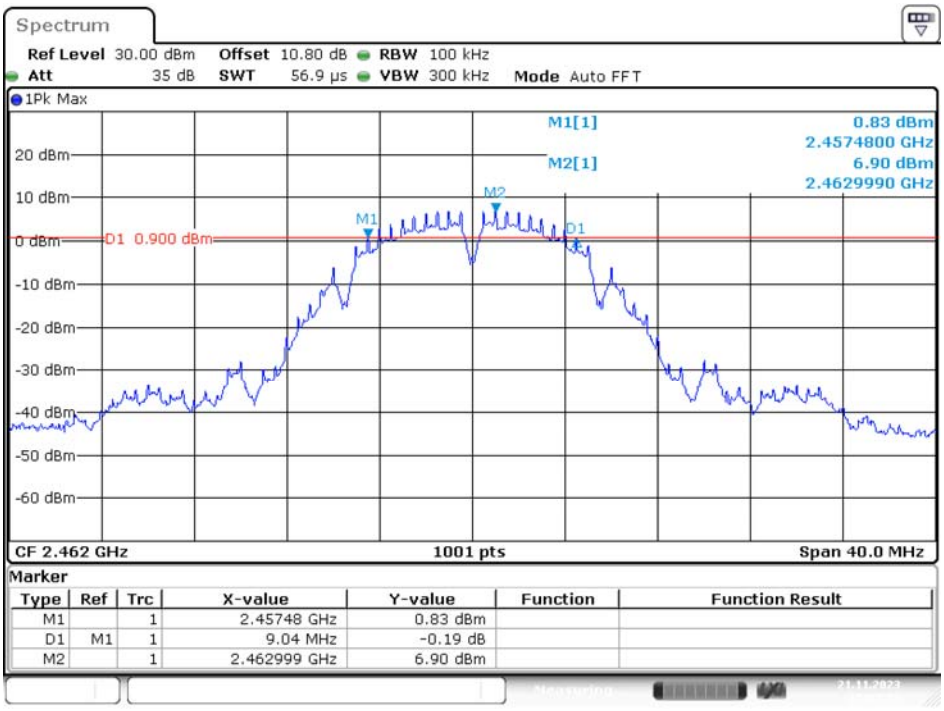
Date: 21.NOV.2023 14:55:12

Middle Channel



Date: 21.NOV.2023 14:57:43

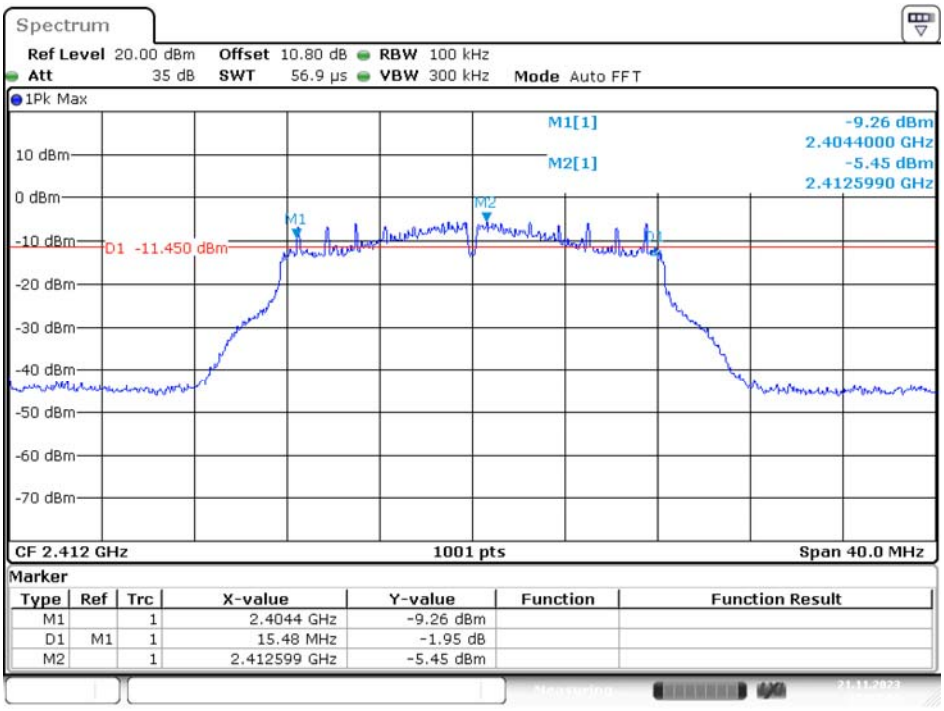
High Channel



Date: 21.NOV.2023 15:01:23

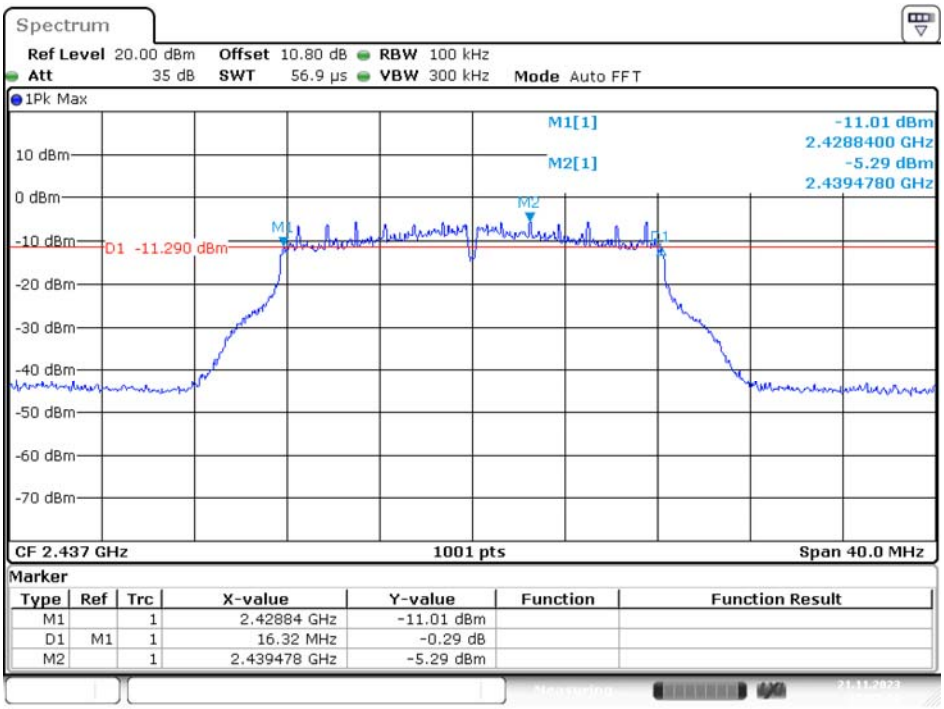
G Mode

Low Channel



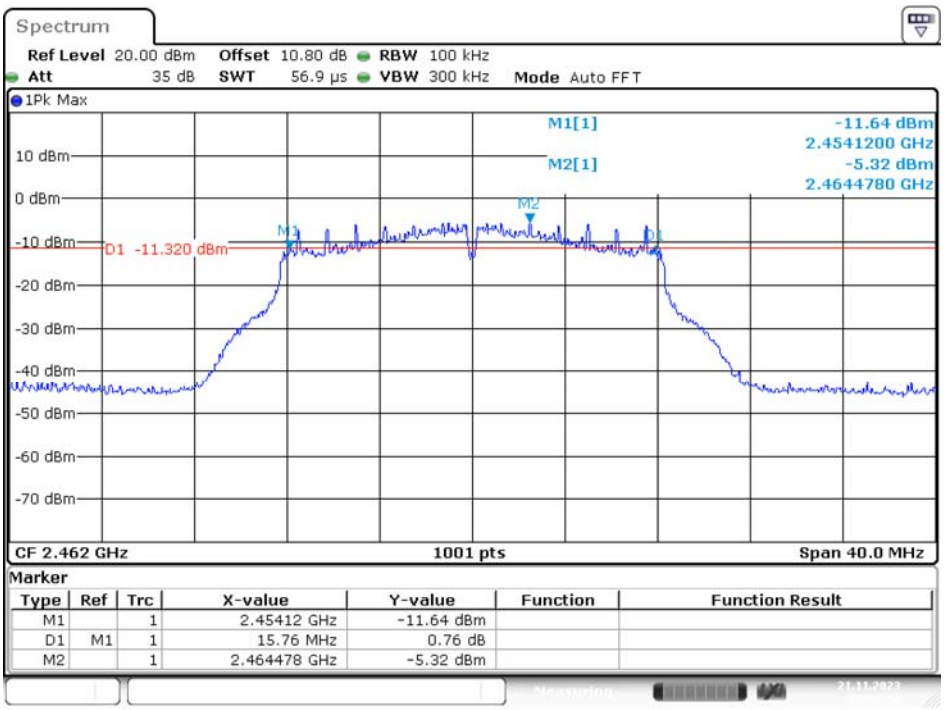
Date: 21.NOV.2023 15:13:08

Middle Channel



Date: 21.NOV.2023 15:15:16

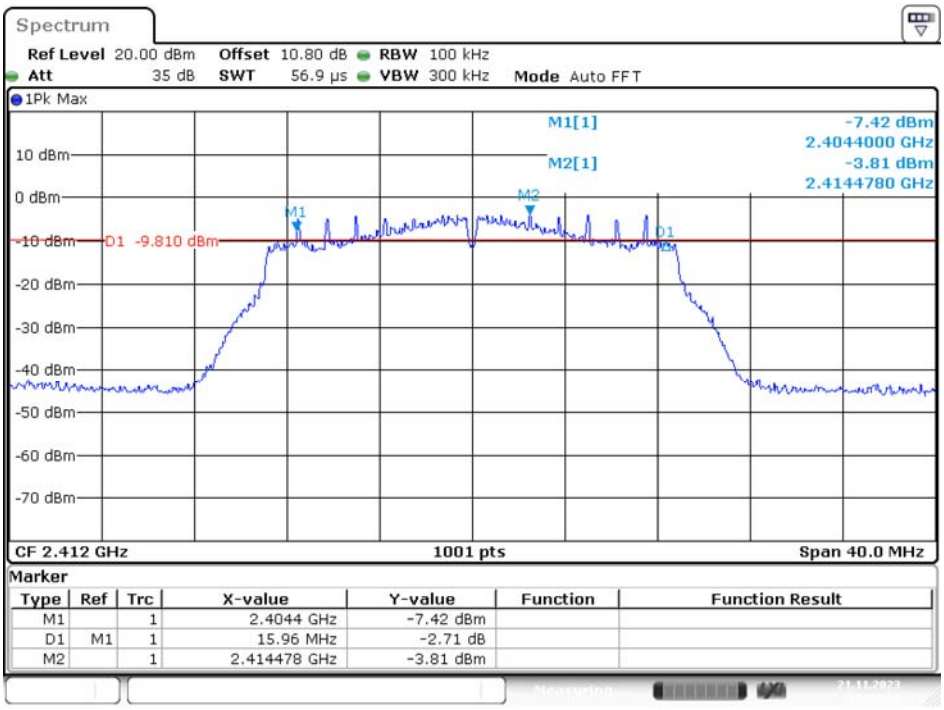
High Channel



Date: 21.NOV.2023 15:17:12

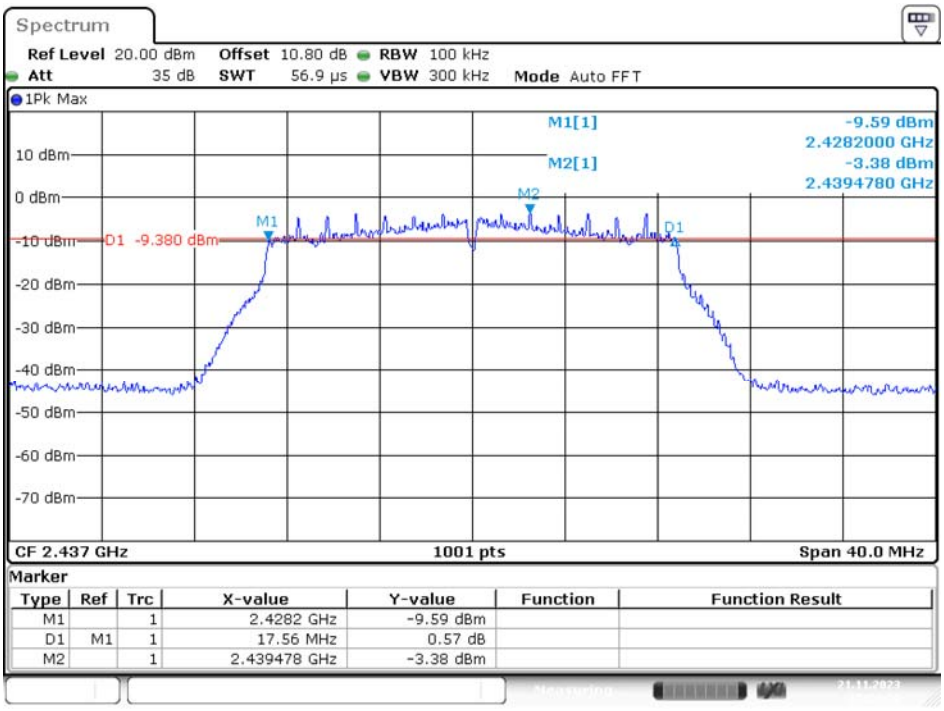
N20 Mode

Low Channel



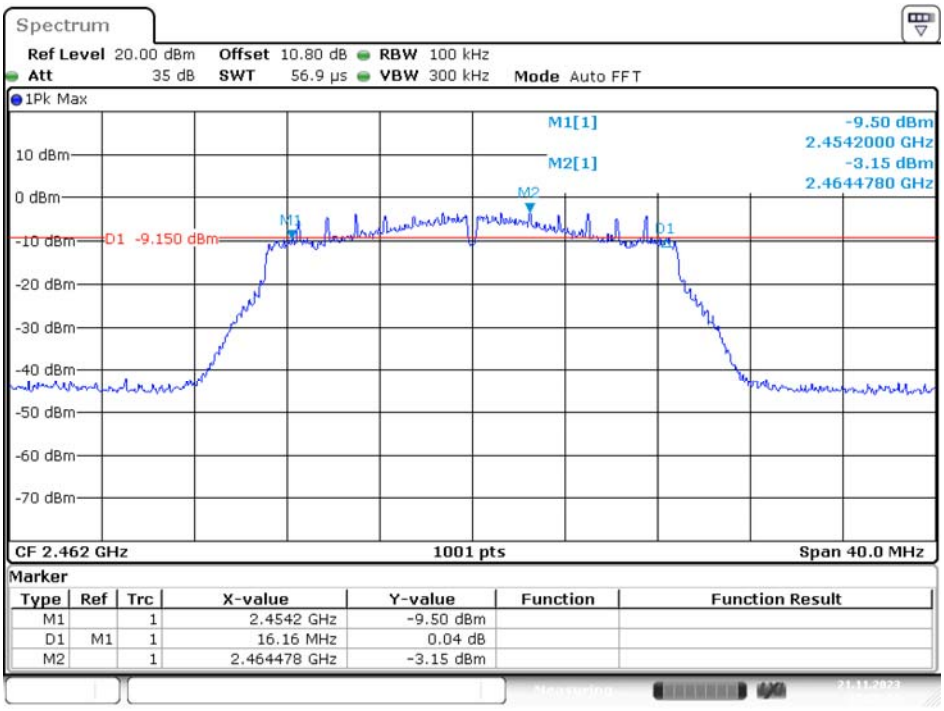
Date: 21.NOV.2023 15:19:30

Middle Channel



Date: 21.NOV.2023 15:24:20

High Channel

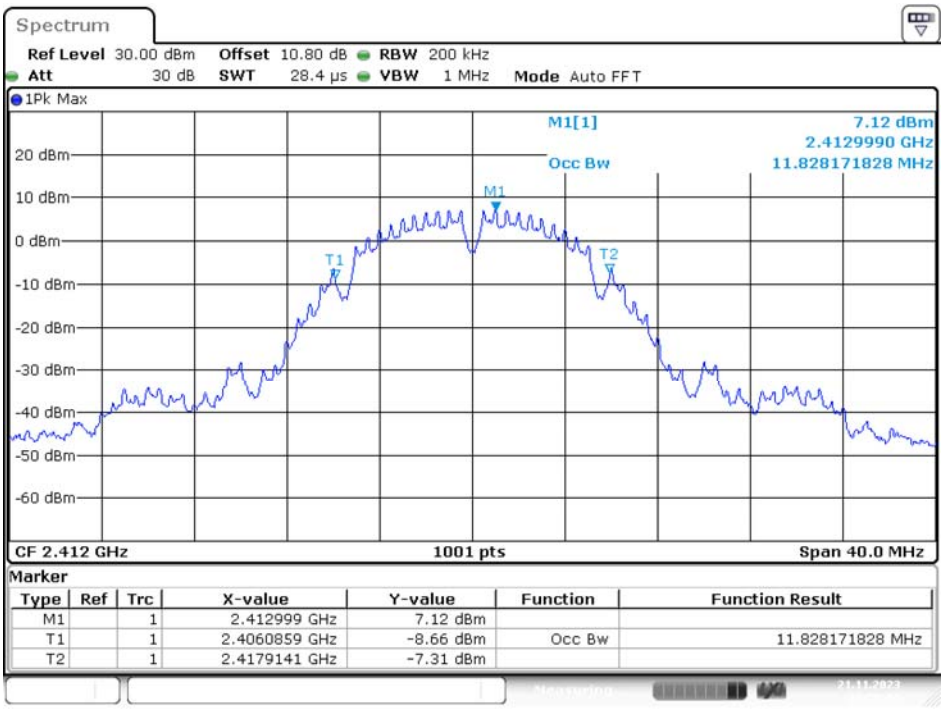


Date: 21.NOV.2023 15:26:32

99% Bandwidth

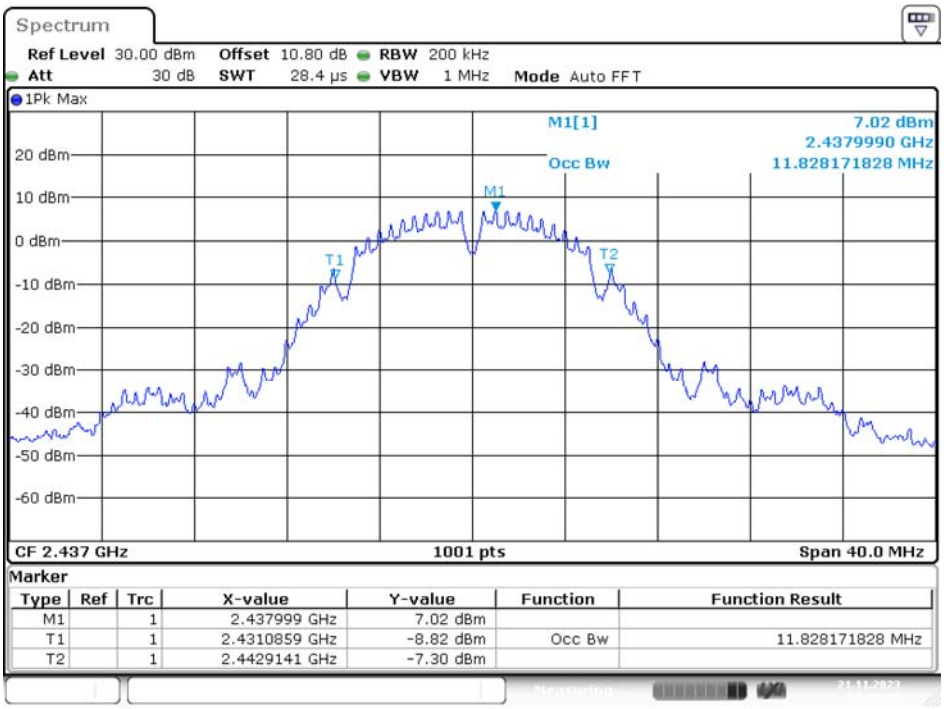
B Mode

Low Channel



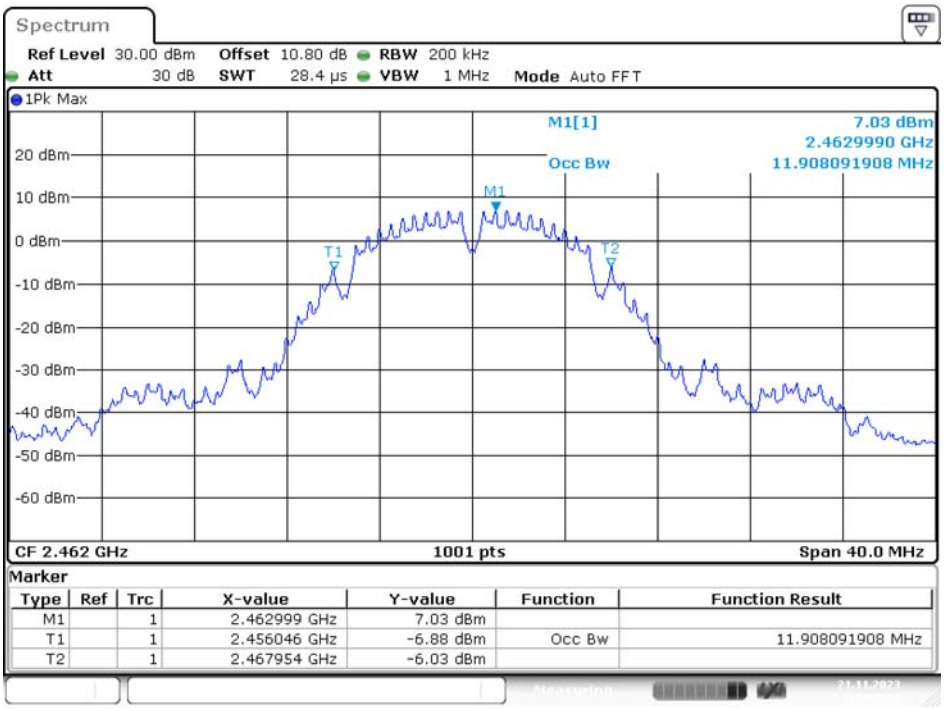
Date: 21.NOV.2023 14:56:08

Middle Channel



Date: 21.NOV.2023 14:58:23

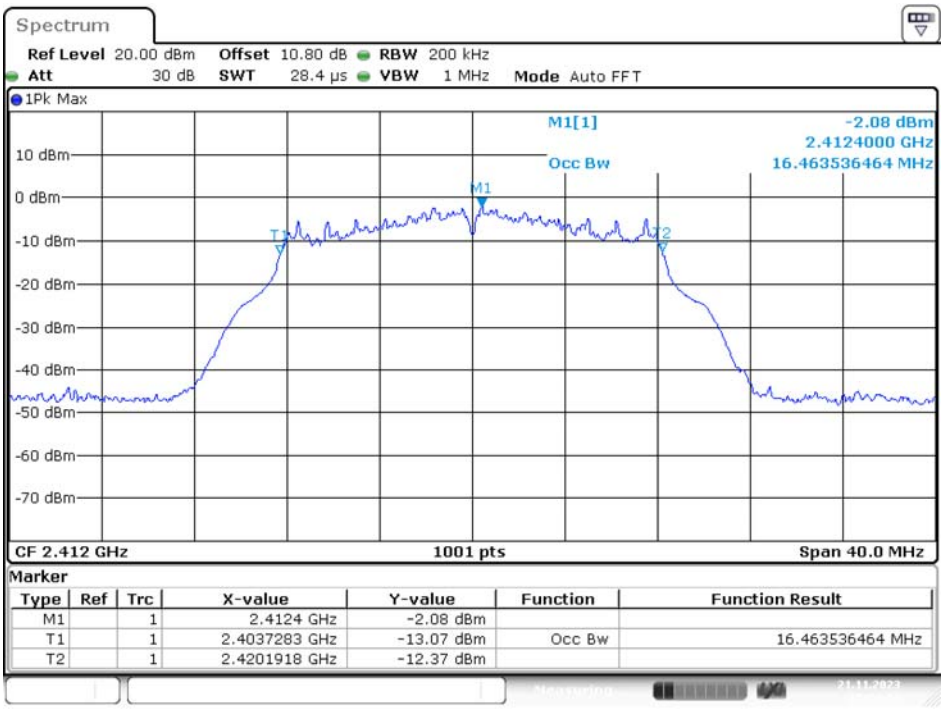
High Channel



Date: 21.NOV.2023 15:02:19

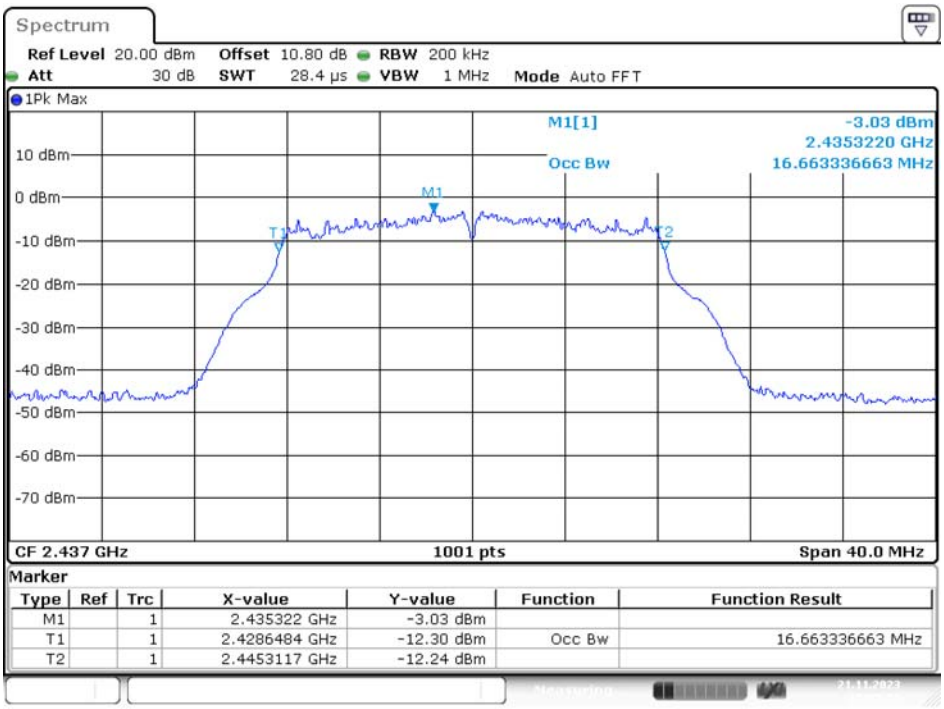
G Mode

Low Channel



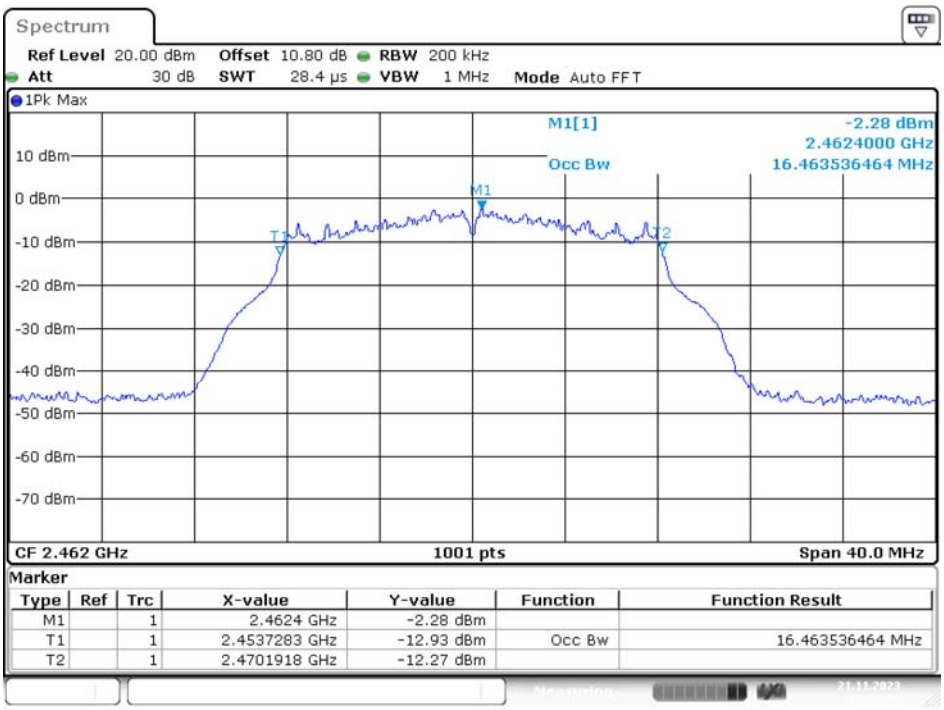
Date: 21.NOV.2023 15:14:03

Middle Channel



Date: 21.NOV.2023 15:15:56

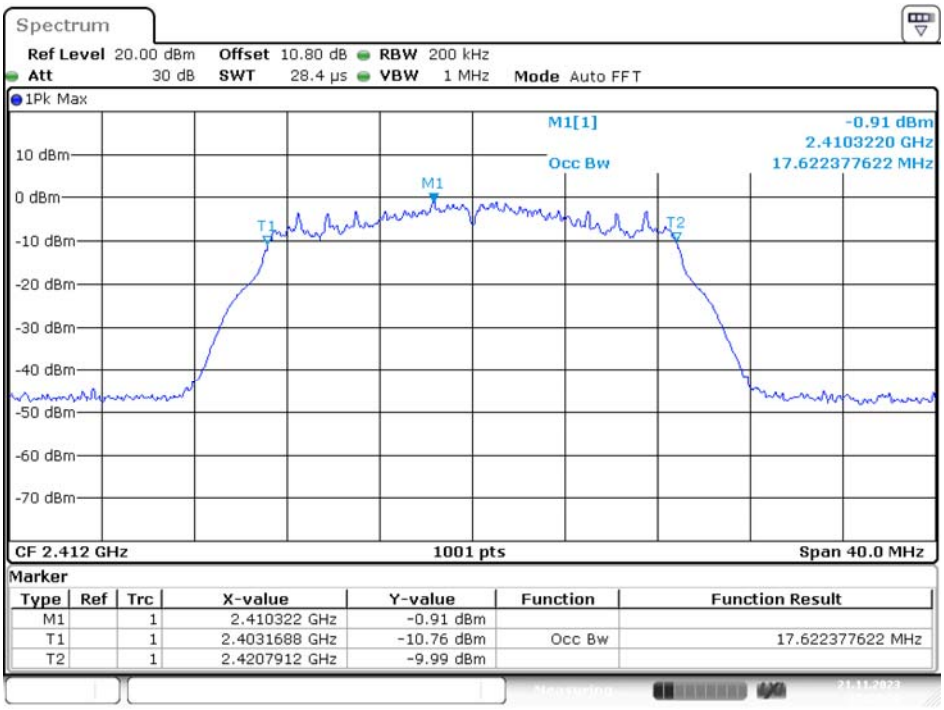
High Channel



Date: 21.NOV.2023 15:18:08

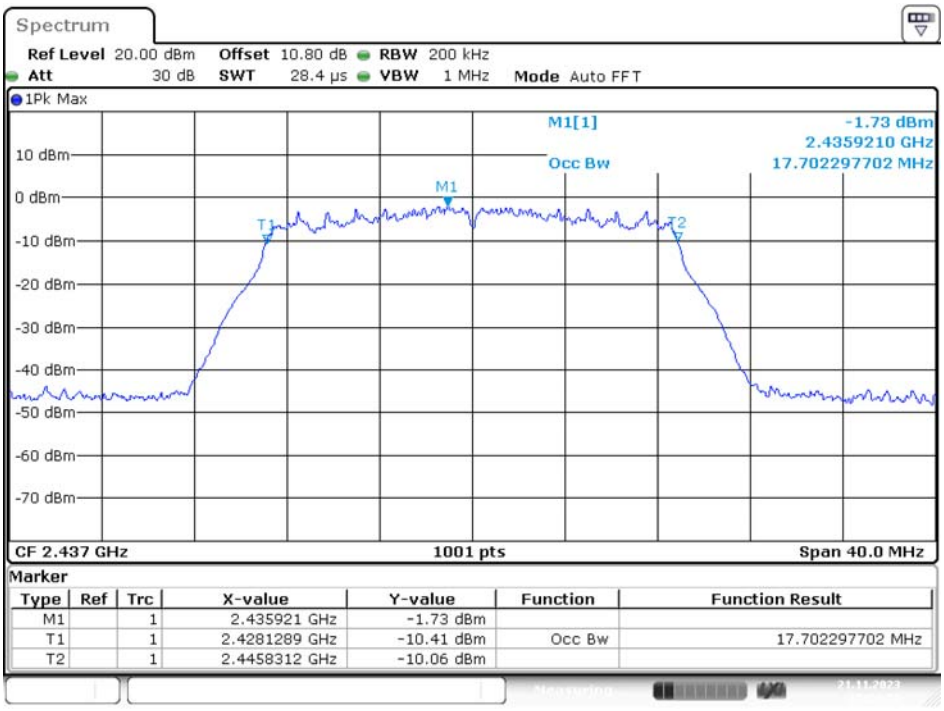
N20 Mode

Low Channel



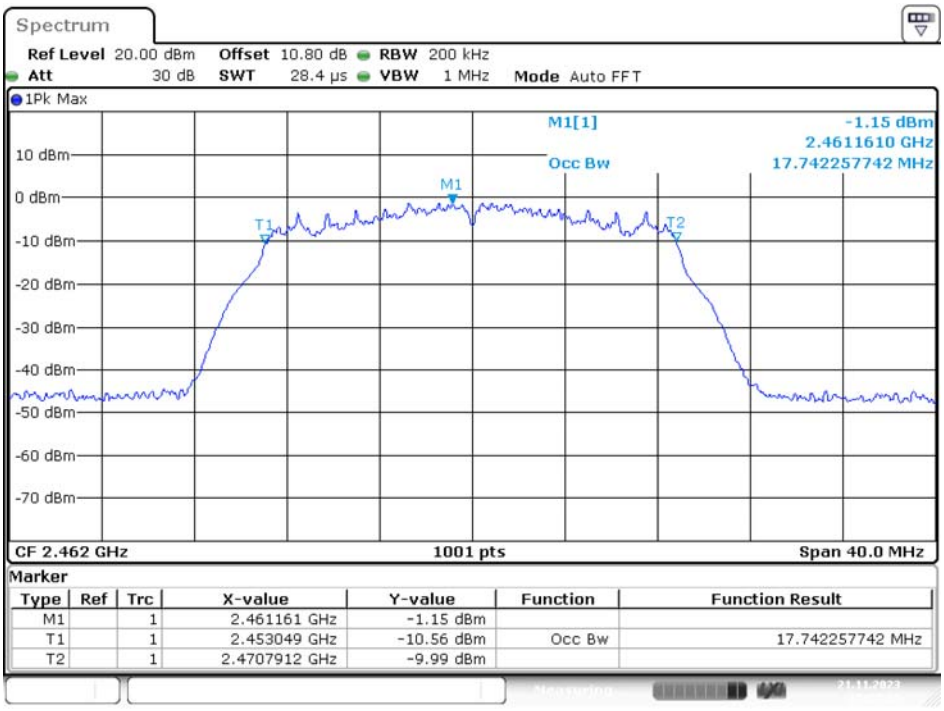
Date: 21.NOV.2023 15:20:26

Middle Channel



Date: 21.NOV.2023 15:25:00

High Channel



11 FCC §15.247(b)(3) & RSS-247 §5.4(d) – Maximum Output Power

11.1 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.

According to RSS-247 §5.4(d).

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling 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 transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

11.2 Test Procedure

According to ANSI C63.10-2013, section 11.9.1.3

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.

11.3 Test Results

Conducted Peak Output Power

Channel	Frequency (MHz)	Conducted Peak Output Power (dBm)	Limit (dBm)	Antenna Gain (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)
802.11b Mode						
Low	2412	18.95	30	4.94	23.89	36
Middle	2437	18.87	30	4.94	23.81	36
High	2462	18.91	30	4.94	23.85	36
802.11g Mode						
Low	2412	17.95	30	4.94	22.89	36
Middle	2437	17.85	30	4.94	22.79	36
High	2462	17.78	30	4.94	22.72	36
802.11n HT20 Mode						
Low	2412	17.85	30	4.94	22.79	36
Middle	2437	17.81	30	4.94	22.75	36
High	2462	17.55	30	4.94	22.49	36

12 FCC §15.247(d) & RSS-247 §5.5 – 100 kHz Bandwidth of Frequency Band Edge

12.1 Applicable Standard

According to 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)).

According to RSS-247 §5.5.

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

12.2 Test Procedure

According to ANSI C63.10-2013 Section 11.11

1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = 100 kHz.
3. Set the VBW ≥ [3 × RBW].
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

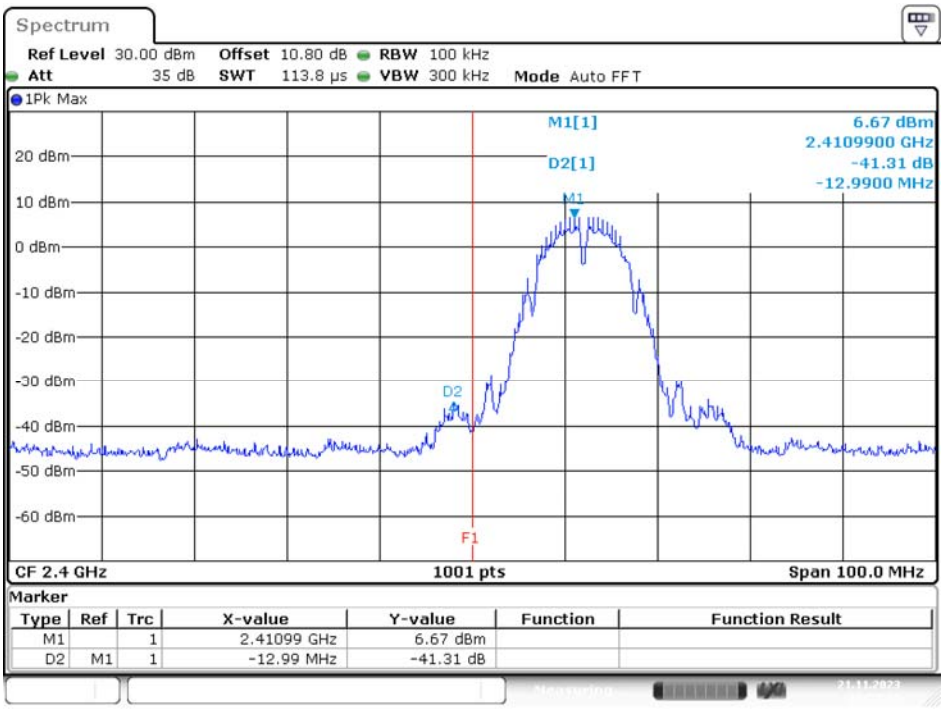
12.3 Test Results

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
B Mode				
Low	2412	41.31	≥ 20	PASS
High	2462	48.53	≥ 20	PASS
G Mode				
Low	2412	36.28	≥ 20	PASS
High	2462	37.42	≥ 20	PASS
N20 Mode				
Low	2412	38.96	≥ 20	PASS
High	2462	38.39	≥ 20	PASS

Please refer to the following plots

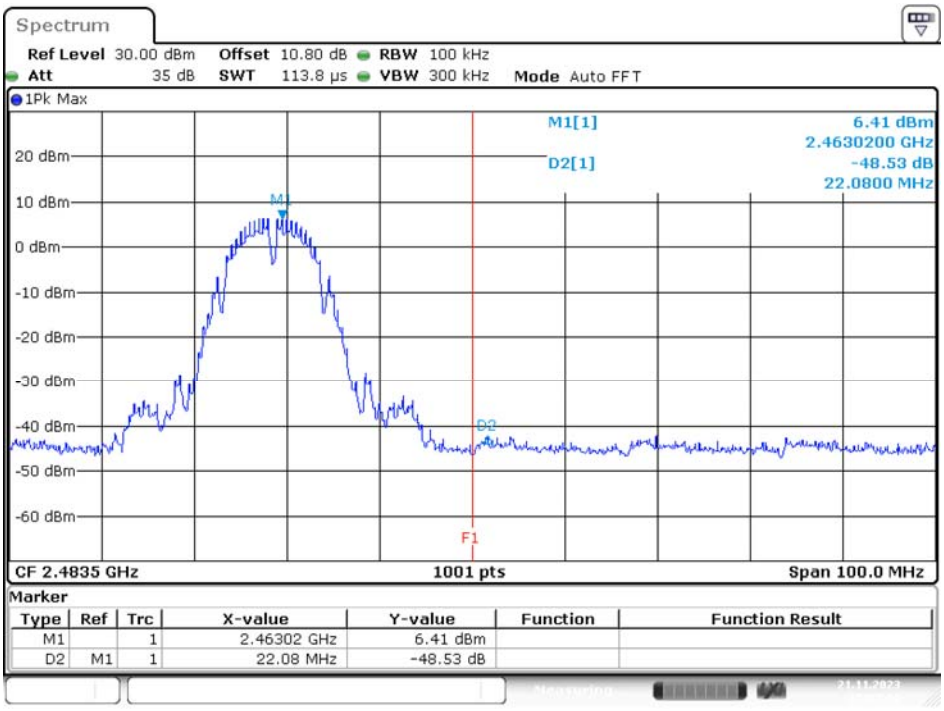
B Mode

Band Edge, Left Side



Date: 21.NOV.2023 14:55:37

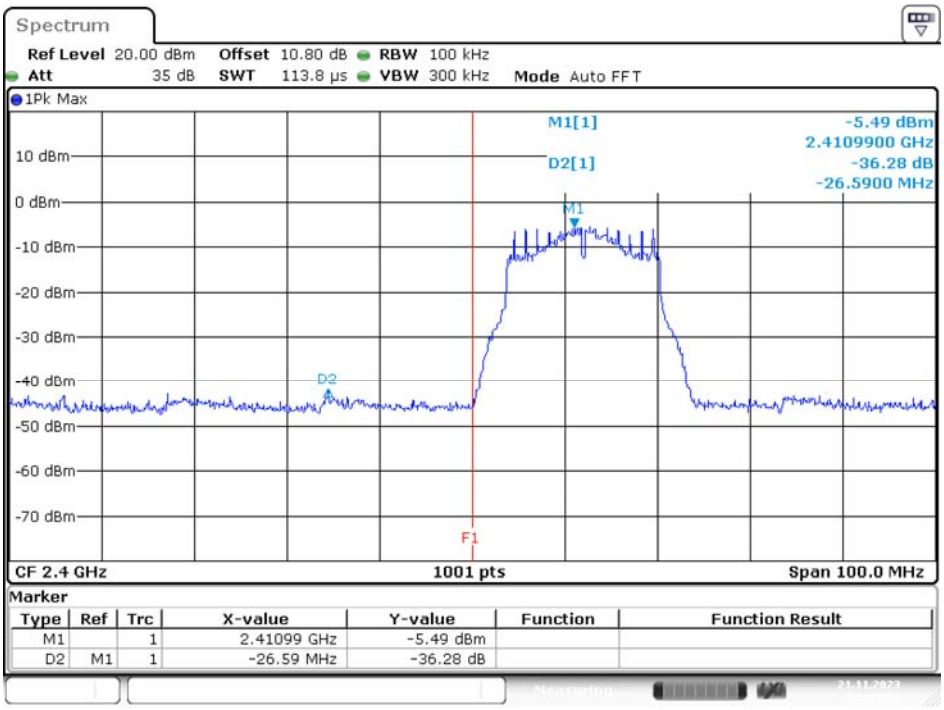
Band Edge, Right Side



Date: 21.NOV.2023 15:01:48

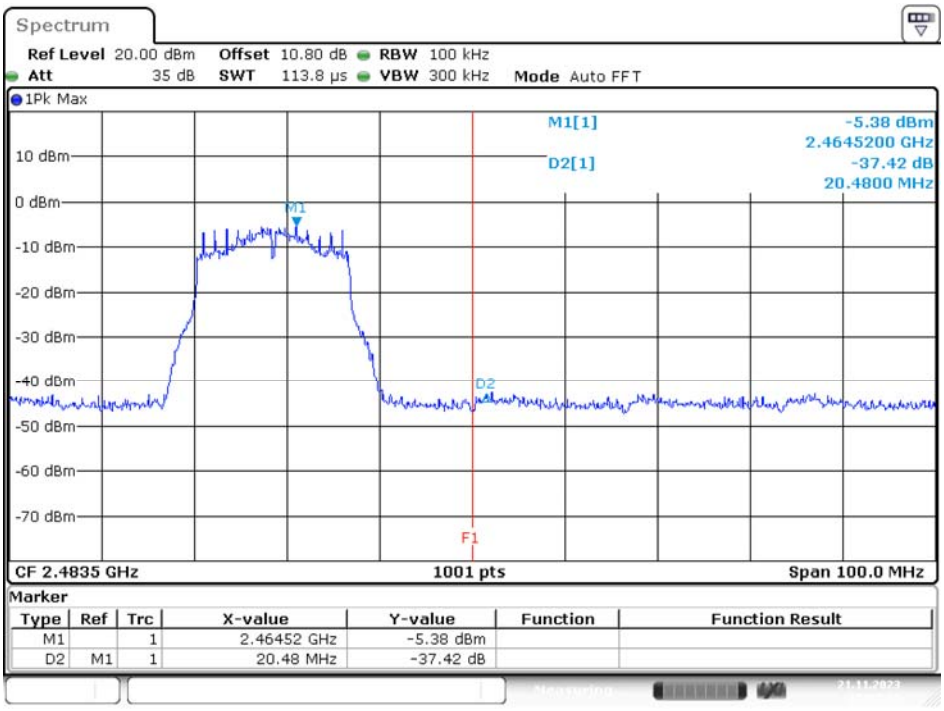
G Mode

Band Edge, Left Side



Date: 21.NOV.2023 15:13:33

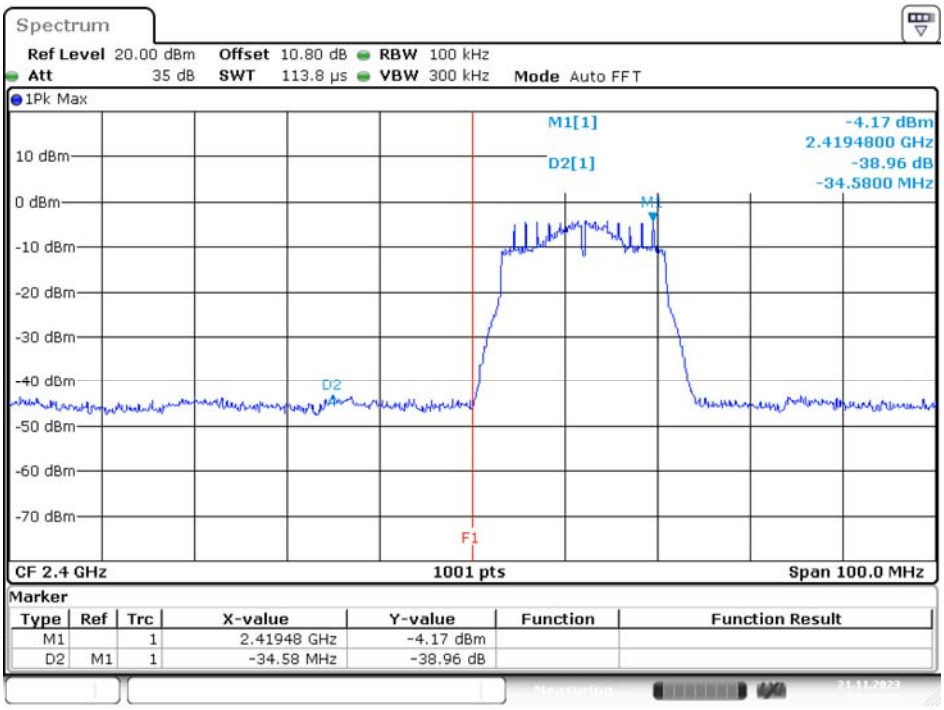
Band Edge, Right Side



Date: 21.NOV.2023 15:17:37

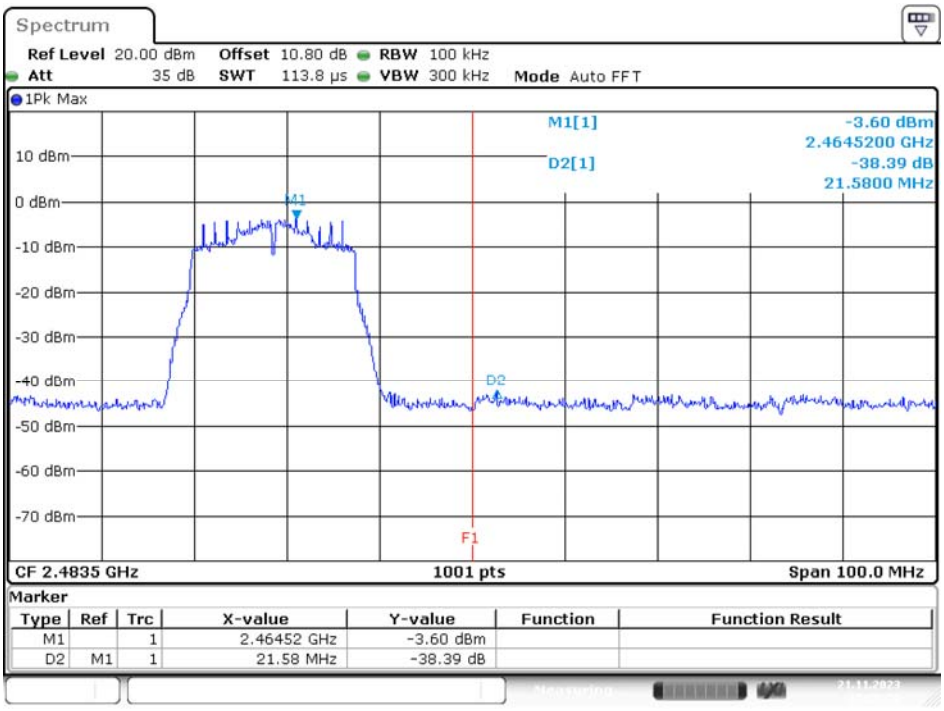
N20 Mode

Band Edge, Left Side



Date: 21.NOV.2023 15:19:55

Band Edge, Right Side



Date: 21.NOV.2023 15:26:56

13 FCC §15.247(e) & RSS-247 §5.2(b) – Power Spectral Density

13.1 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.

According to RSS-247 §5.2(b).

The transmitter power spectral density conducted from the transmitter 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 section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

13.2 Test Procedure

According to ANSI C63.10-2013, section 11.10.2

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ [3 × RBW].
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat

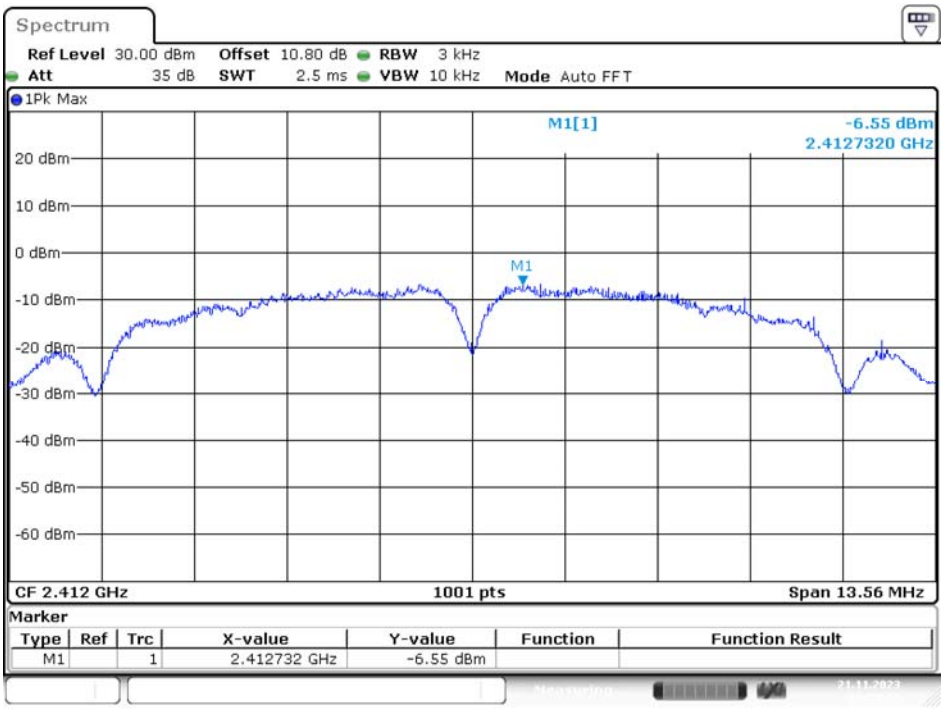
13.3 Test Results

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit (dBm/3 kHz)	Result
B Mode				
Low	2412	-6.55	8	PASS
Middle	2437	-5.34	8	PASS
High	2462	-5.22	8	PASS
G Mode				
Low	2412	-16.52	8	PASS
Middle	2437	-16.89	8	PASS
High	2462	-16.66	8	PASS
N20 Mode				
Low	2412	-14.41	8	PASS
Middle	2437	-15.32	8	PASS
High	2462	-14.76	8	PASS

Please refer to the following plots

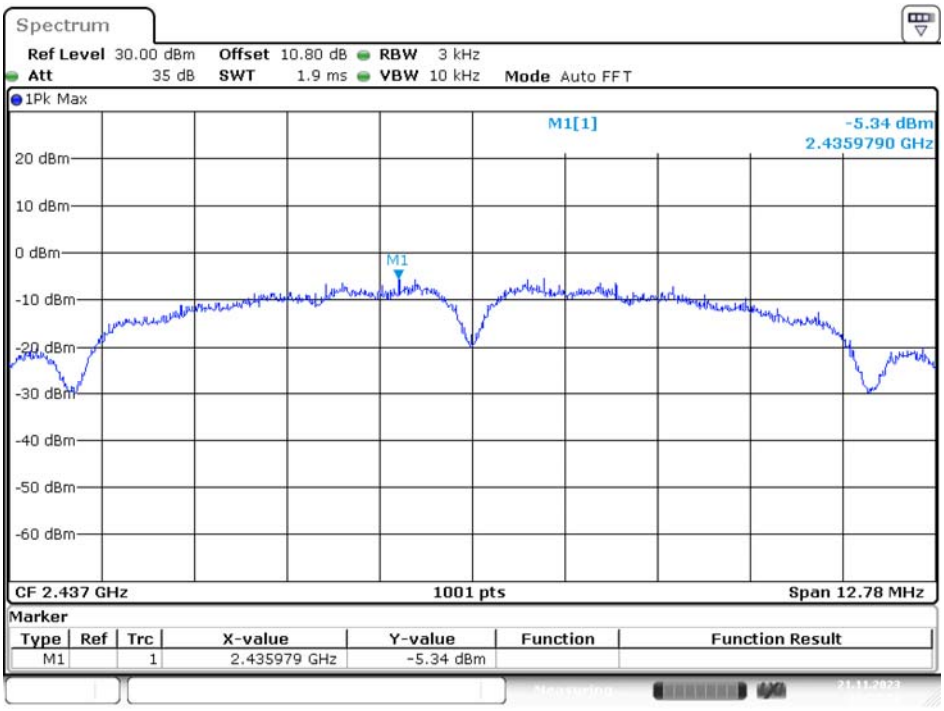
B Mode

Low Channel



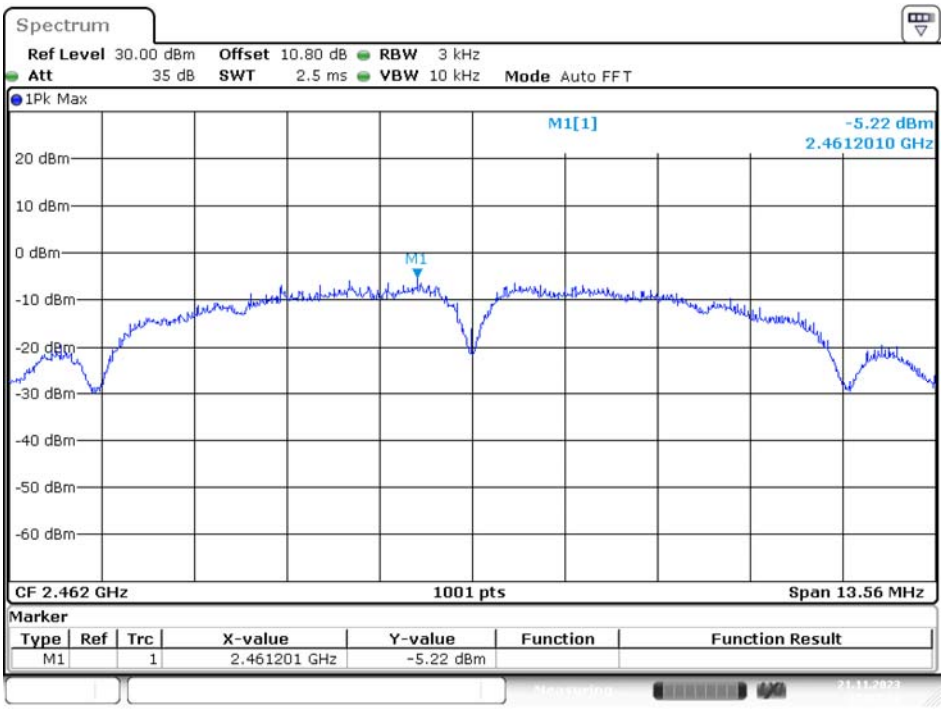
Date: 21.NOV.2023 14:55:21

Middle Channel



Date: 21.NOV.2023 14:57:52

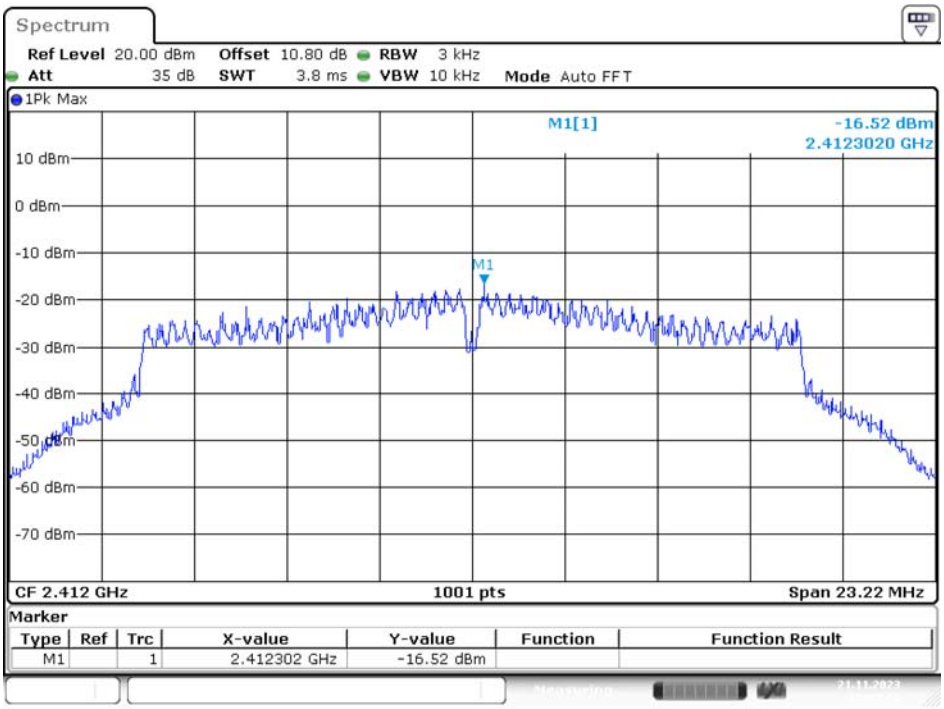
High Channel



Date: 21.NOV.2023 15:01:32

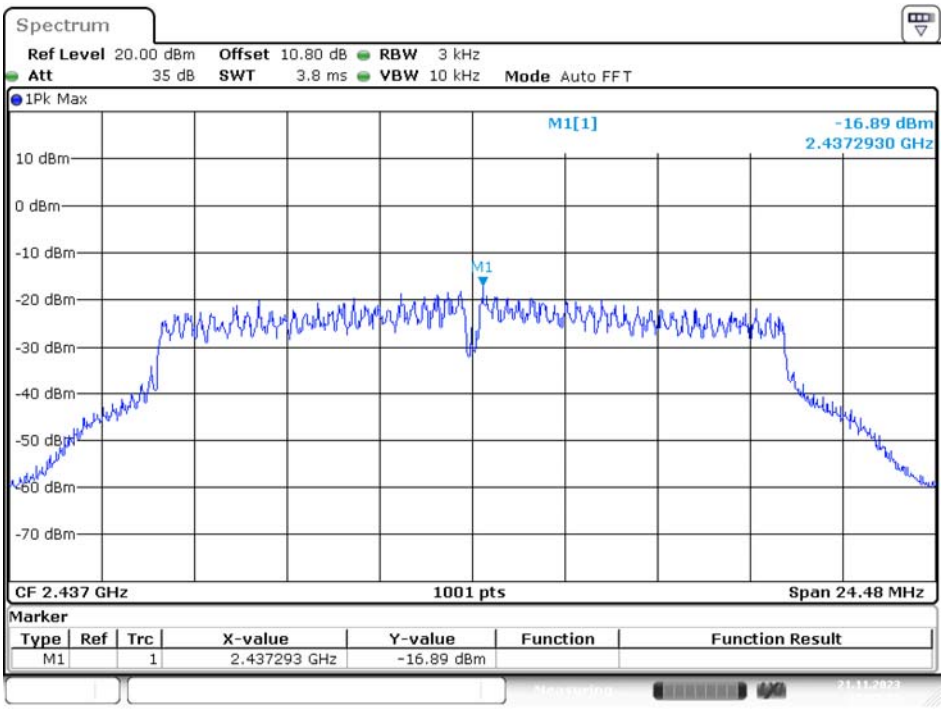
G Mode

Low Channel



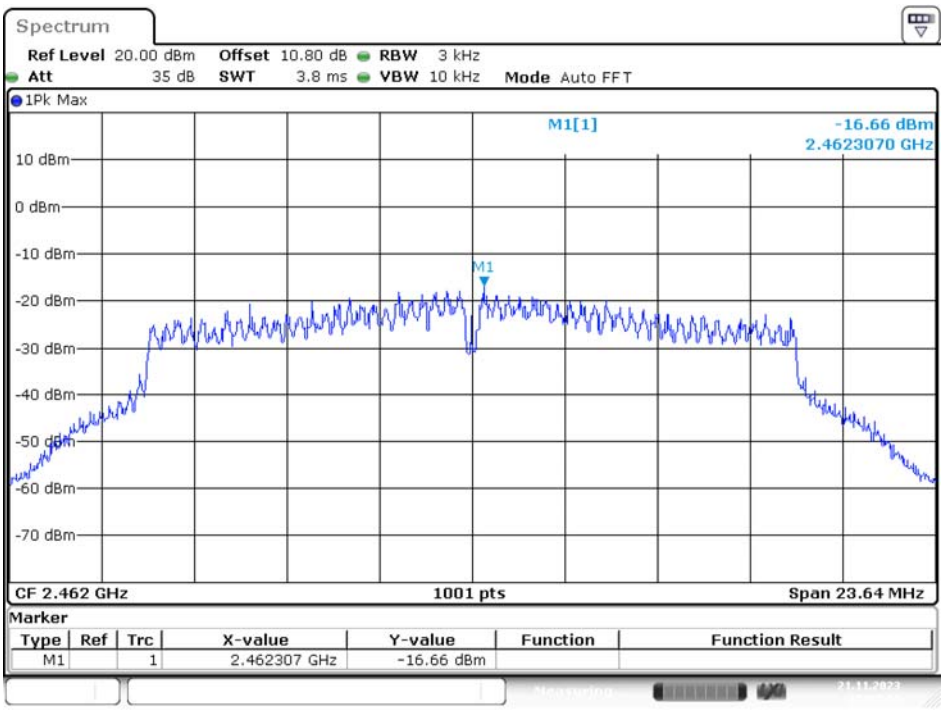
Date: 21.NOV.2023 15:13:17

Middle Channel



Date: 21.NOV.2023 15:15:25

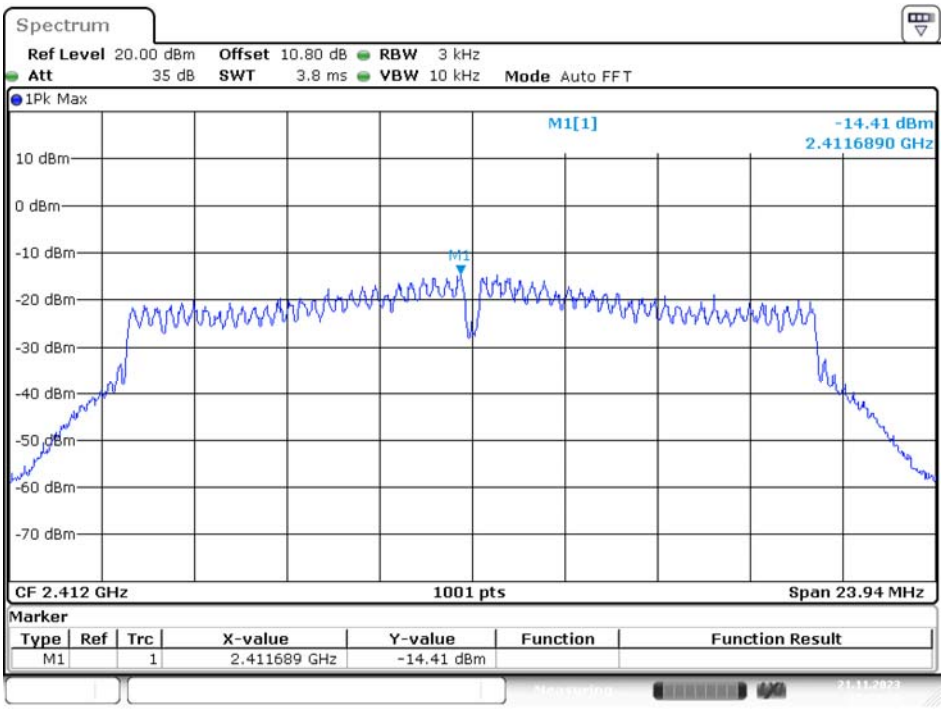
High Channel



Date: 21.NOV.2023 15:17:21

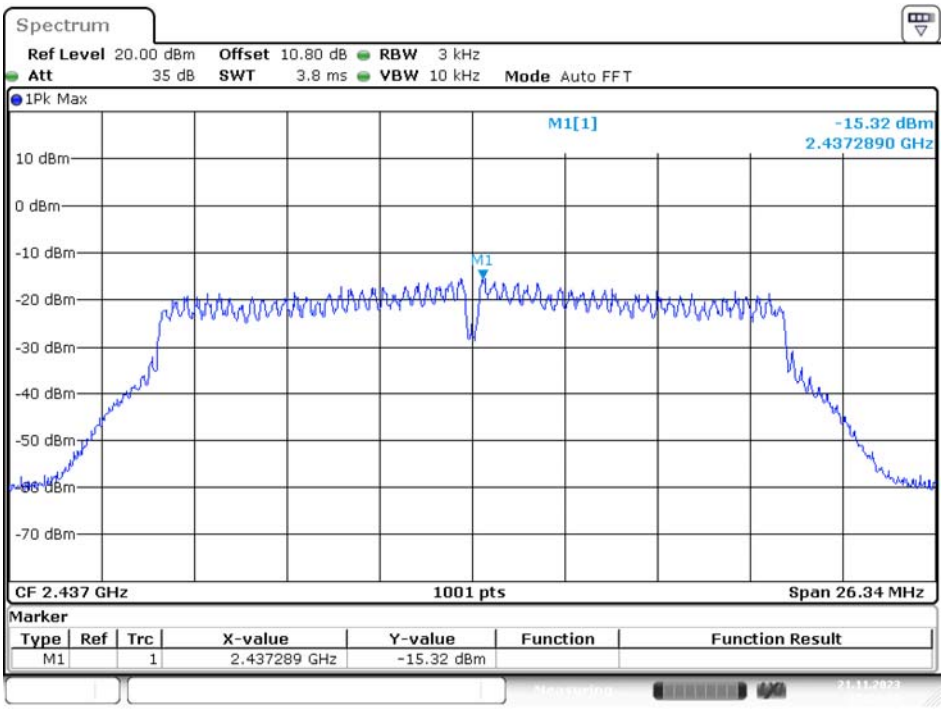
N20 Mode

Low Channel



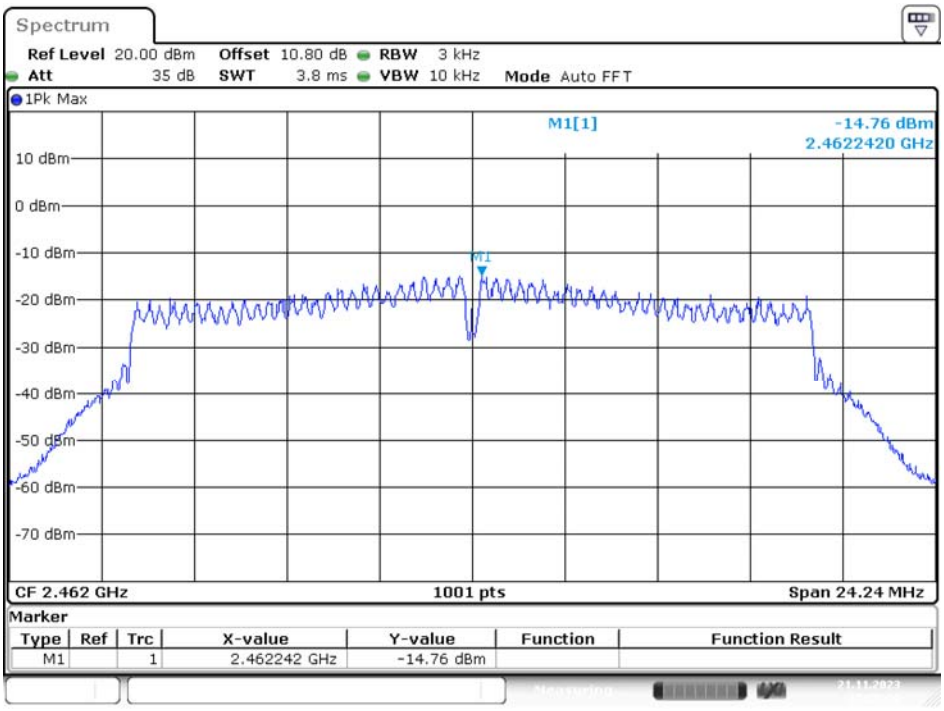
Date: 21.NOV.2023 15:19:39

Middle Channel



Date: 21.NOV.2023 15:24:29

High Channel



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