FCC Part 15.247

TEST REPORT

For

Egis Technology Inc.

30F, No. 118, Ciyun Rd., East Dist., Hsinchu City 300196, Taiwan (R.O.C.)

FCC ID: 2A84HEWB160031M

Report Type: Original Report	**Product Name:** IEEE 2.4GHz 1T1R Wi-Fi with BLE IoT

Report Producer : Coco Lin

Report Number : RXZ220922001RF02

Report Date : 2022-11-30

Reviewed By: Andy Shih

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Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
0.0	RXZ220922001	RXZ220922001RF02	2022-11-30	Original Report	Coco Lin

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1 General Information

1.1 Product Description for Equipment under Test (EUT)

Applicant	Egis Technology Inc.
	30F, No. 118, Ciyun Rd., East Dist., Hsinchu City 300196, Taiwan (R.O.C.)
Manufacturer	IOTTECH Corporation
	No.10-1, Shijian Rd, Hsinchu Industrial Park, Hukou, Hsinchu, Taiwan 303
Brand(Trade) Name	Egis
Product (Equipment)	IEEE 2.4GHz 1T1R Wi-Fi with BLE IoT
Main Model Name	EWB160031M
Series Model Name	N/A
Frequency Range	IEEE 802.11b Mode: 2412 ~ 2462 MHz BLE(1M): 2402 ~ 2480 MHz
Conducted Peak Output Power	IEEE 802.11b Mode: 11.09 dBm BLE(1M) Mode : 0.16 dBm
Modulation Technique	IEEE 802.11b Mode: DSSS BLE(1M) Mode: GFSK
Power Operation (Voltage Range)	☐ AC Type ☐ Adapter ☐ By AC Power Cord ☐ PoE
	☒ DC 3.3V ☐ Battery ☐ DC Power Supply ☐ External from USB Cable ☐ External DC Adapter
	☐ Host System
Received Date	2022/09/22
Date of Test	2022/09/30 ~ 2022/11/29

*All measurement and test data in this report was gathered from production sample serial number: RXZ220922001-01 (Assigned by BACL (New Taipei Laboratory).

1.2 Objective

This report is prepared on behalf of *Egis Technology Inc.* 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. (New Taipei 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		+/- 2.36 dB
RF output power, conducted		+/- 0.93 dB
Power Spectral Density, conducted		+/- 0.93 dBm
Occupied Bandwidth		+/- 0.35 MHz
Unwanted Emissions, conducted		+/- 1.69 dBm
Emissions, radiated	30 MHz~1GHz	+/- 5.22 dB
	1 GHz~18 GHz	+/- 6.12 dB
	18 GHz~40 GHz	+/- 4.99 dB
Temperature		+/- 1.27 °C
Humidity		+/- 3 %

1.7 Environmental Conditions

Test Site	Test Date	Temperature (℃)	Relative Humidity (%)	ATM Pressure (hPa)	Test Engineer
AC Line Conducted Emissions	2022/11/29	27.1	39	1010	Andy.Cheng
Radiation Spurious Emissions	2022/9/30~2022/10/14	22.1~23.5	60~70	1010	Jim.Chen
Conducted Spurious Emissions	2022/10/7~2022/11/29	23~25.4	55~72	1010	Jim.Chen
6 dB Emission Bandwidth	2022/10/7	23	72	1010	Jim.Chen
Maximum Output Power	2022/10/7	23	72	1010	Jim.Chen
100 kHz Bandwidth of Frequency Band Edge	2022/10/7	23	72	1010	Jim.Chen
Power Spectral Density	2022/10/7	23	72	1010	Jim.Chen

1.8 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.

2 System Test Configuration

2.1 Description of Test Configuration

For WIFI 2.4G 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 Modes were tested with channel 1, 6 and 11.

For BLE mode, there are totally 40 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	--	--
2	2406	--	--
3	2408	37	2476
--	--	38	2478
19	2440	39	2480

For BLE Modes were tested with channel 0, 19 and 39.

2.2 Equipment Modifications

No modification was made to the EUT.

2.3 EUT Exercise Software

The test software was used “Tera Term V4.71”

Test Frequency		Low	Middle	High
Power Level Setting	802.11 b Mode	192	192	192
	BLE 1M	default	default	default

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

BLE 1M : 1 Mbps

2.4 Test Mode

Model: EWB160031M for all test item.

2.5 Support Equipment List and Details

Description	Manufacturer	Model Number	S/N
NB	DELL	E6410	8N7PXN1
Fixture	iot Tech	EVB_D566_V1.0	N/A

2.6 External Cable List and Details

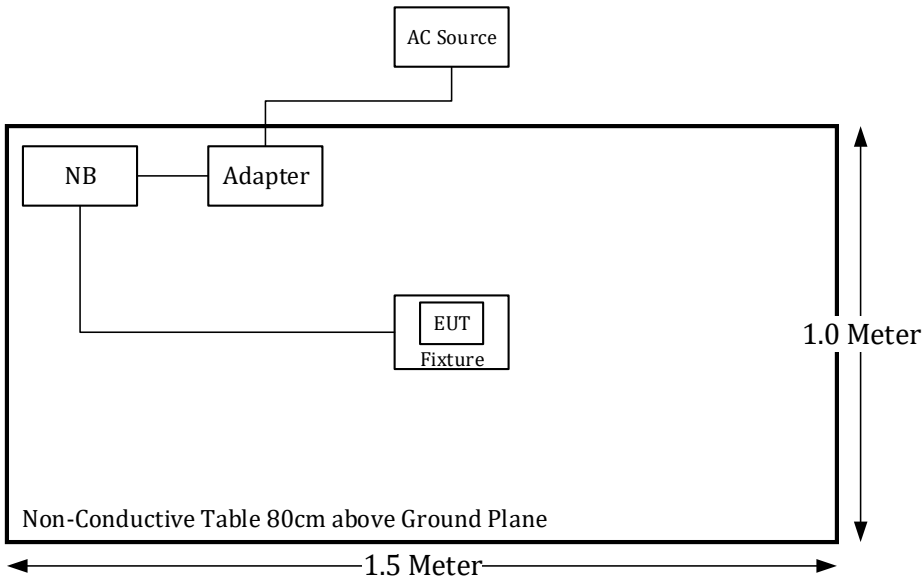
Cable Description	Length (m)	From	To
USB extension cable	1	NB	Fixture

2.7 Block Diagram of Test Setup

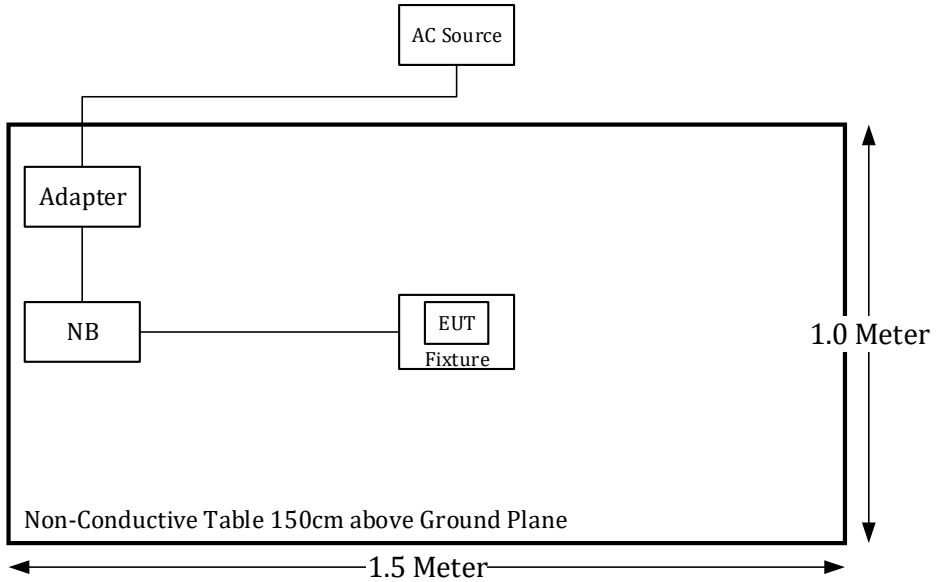
See test photographs attached in setup photos for the actual connections between EUT and support equipment.

Radiation:

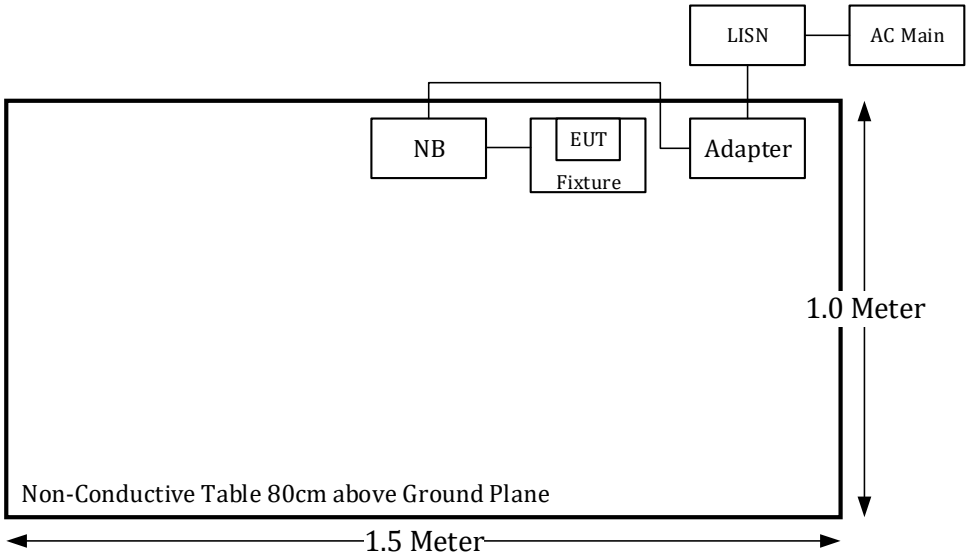
Below 1GHz:



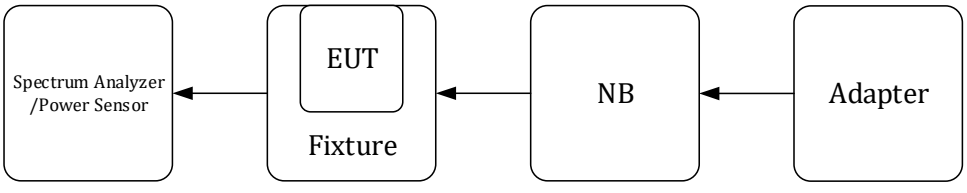
Above 1GHz:



Conduction:



Conducted:



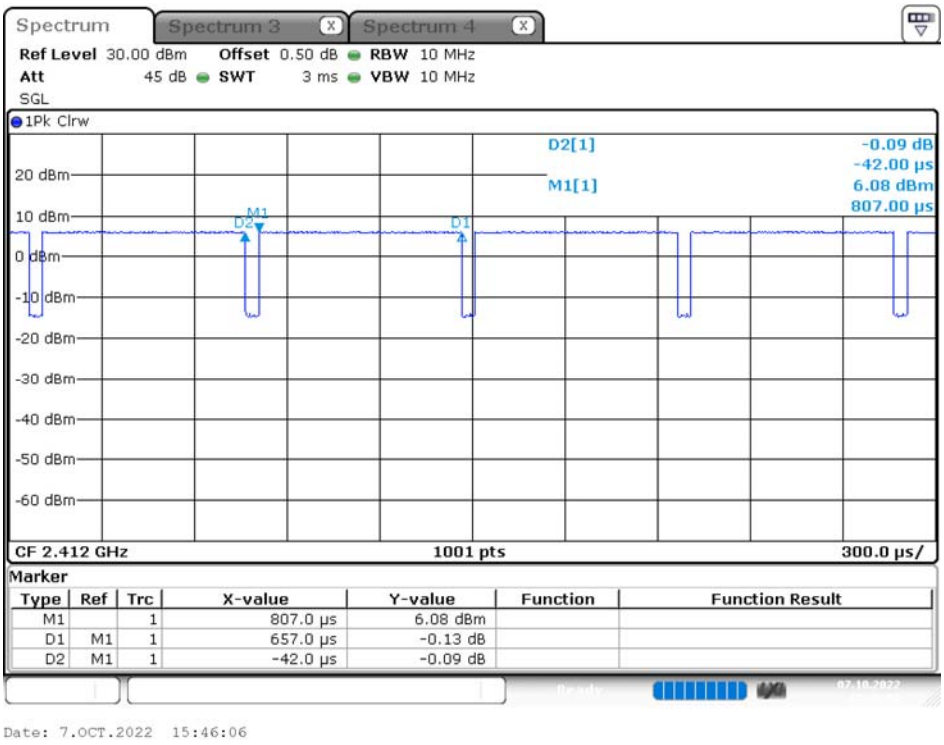
2.8 Duty Cycle

The duty cycle as below:

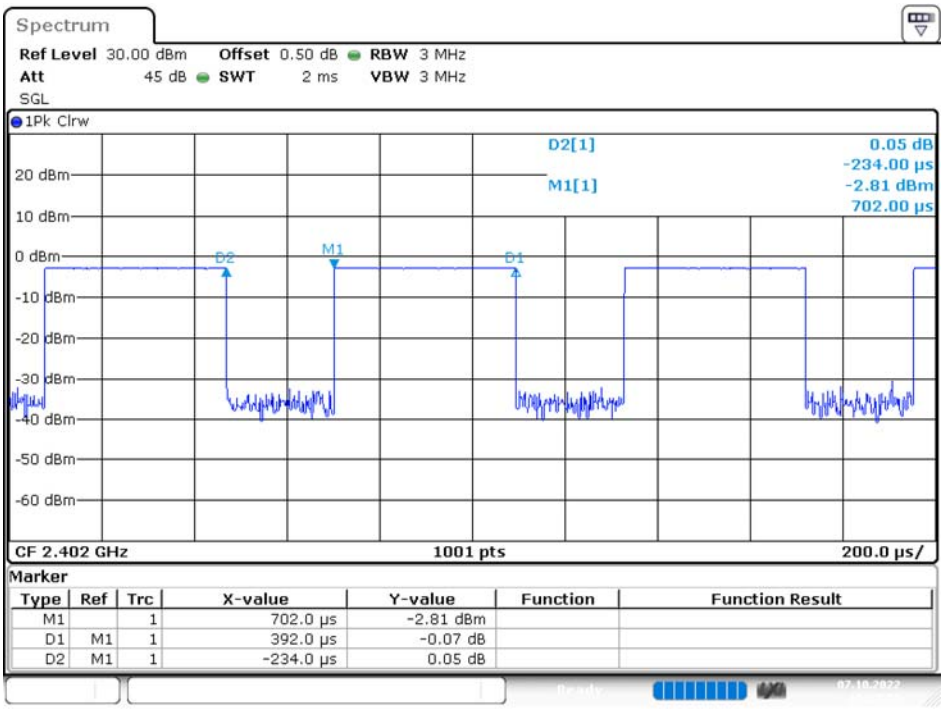
Radio Mode	T_{on} (ms)	$T_{on}+T_{off}$ (ms)	Duty Cycle (%)
802.11b	0.657	0.699	93
BLE(1M)	0.392	0.626	63

Please refer to the following plots.

B Mode



BLE(1M) Mode



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3 Summary of Test Results

FCC Rules	Description of Test	Results
§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)					
LISN	Rohde & Schwarz	ENV216	101612	2022/01/14	2023/01/13
EMI Test Receiver	Rohde & Schwarz	ESW8	100947	2022/07/27	2023/7/26
Pulse Limiter	Rohde & Schwarz	ESH3Z2	TXZEM104	2022/7/19	2023/7/18
RF Cable	EMEC	EM-CB5D	1	2022/6/7	2023/6/6
Software	AUDIX	E3	V9.150826k	N.C.R	N.C.R
Radiated Room (966-A)					
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/15542_01	2022/02/14	2023/02/13
Horn Antenna	EMCO	TXZM986	3115	2022/5/18	2023/5/17
Horn Antenna	ETS-Lindgren	3116	62638	2022/8/9	2023/8/8
Preamplifier	Sonoma	310N	130602	2022/6/8	2023/6/7
Preamplifier	A.H. system Inc.	PAM-0118P	466	2021/11/4	2022/11/3
Microware Preamplifier	EM Electronics Corporation	EM18G40G	60656	2021/12/27	2022/12/26
Spectrum Analyzer	Rohde & Schwarz	FSV40	101435	2021/12/27	2022/12/26
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2021/11/9	2022/11/8
Micro flex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2022/01/24	2023/01/23
Coaxial Cable	COMMATE	PEWC	8Dr	2021/12/24	2022/12/23
Coaxial Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2022/01/24	2023/01/23
Coaxial Cable	JUNFLON	J12J102248-00-B-5	AUG-07-15-044	2021/12/24	2022/12/23
Cable	EMC	EMC105-SM-SM-10000	201003	2022/01/24	2023/01/23
Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-450CM	160309-1	2022/01/24	2023/01/23
Coaxial Cable	ROSNOL	K1K50-UP0264-K1K50-50CM	15120-1	2022/02/11	2023/02/10

Software	AUDIX	E3	18621a	N.C.R	N.C.R
Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2022/02/18	2023/02/17
Power Sensor	KEYSIGHT	U2021XA	MY54080018	2022/01/24	2023/01/23
Attenuator	MINI-CIRCUITS	BW-S10W5+	1419	2022/02/11	2023/02/10

***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 §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

Project info

Band	Frequency (MHz)	Tune-up Power (dBm)	Antenna Gain (dBi)	Distances (mm)	Tune-up Power (mW)	ERP (dBm)	ERP (mW)
802.11b	2462	11.5	-0.27	200	14.13	9.08	8.09
BLE	2480	0.5	-0.27	200	1.12	-1.92	0.64

Note: the tune-up power declared by the customer

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

§ 1.1307(b)(3)(i)(C)

Band	Frequency (MHz)	λ/2π (mm)	Distances applies	ERP Limit (mW)	Result Option C
802.11b	2462	19.39	apply	768.00	exempt
BLE	2480	19.25	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	Type	Antenna Gain
iot Tech	ANT-D566	PCB	-0.27 dBi

Result: Compliance

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

7.1 Applicable Standard

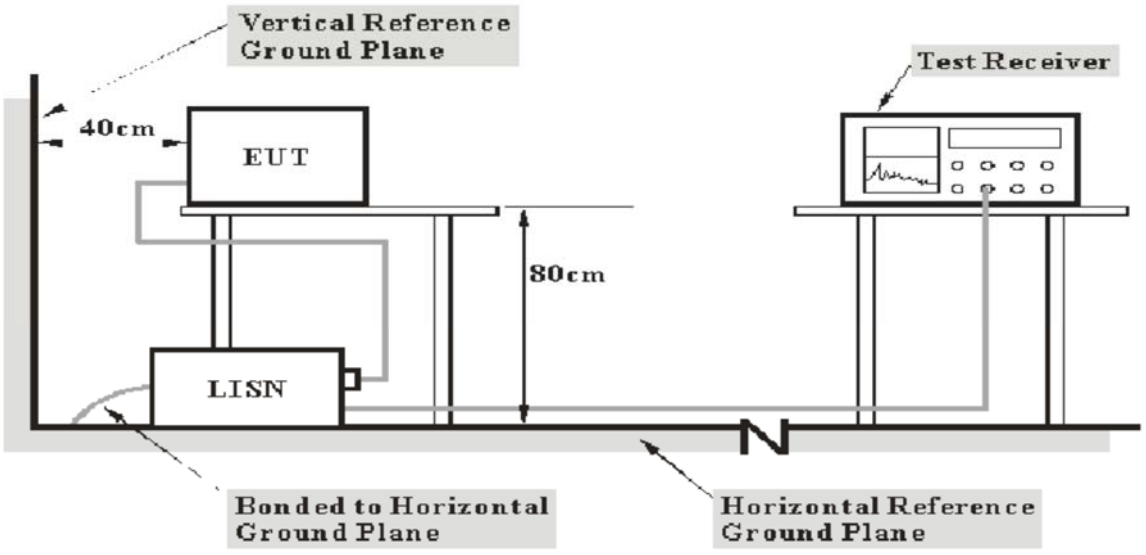
According to §15.207

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 1)	56 to 46 (Note 1)
0.5-5	56	46
5-30	60	50

Note 1: 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:

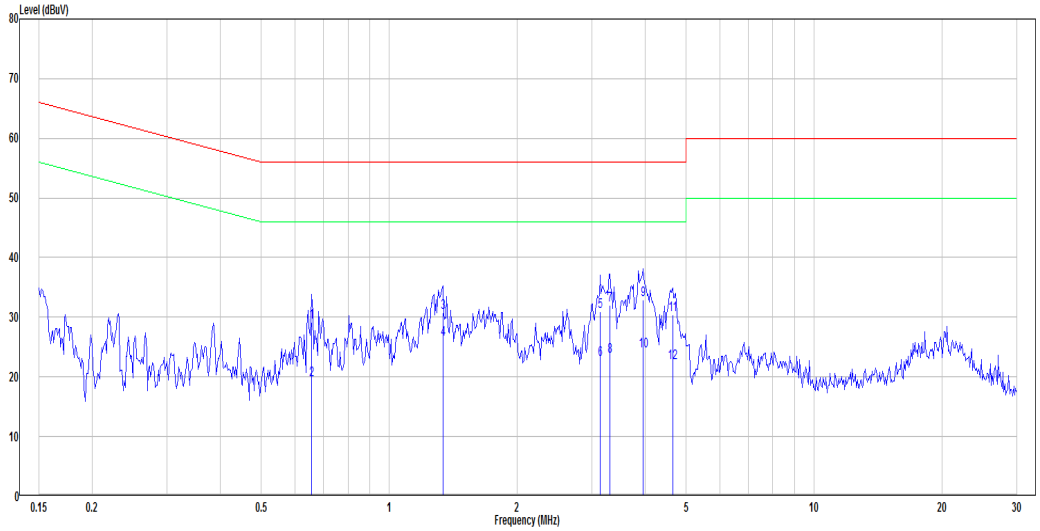
Over Limit = Result – Limit

7.6 Test Results

Test Mode: Transmitting

WIFI Mode (Worst case is 802.11b mode, High Channel)

Main: AC120 V, 60 Hz, Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBµV)	Factor(dB)	(dBµV)	(dBµV)	(dB)	
1	0.658	9.66	19.53	29.19	56.00	-26.81	QP
2	0.658	0.00	19.53	19.53	46.00	-26.47	Average
3	1.338	11.28	19.55	30.83	56.00	-25.17	QP
4	1.338	6.73	19.55	26.28	46.00	-19.72	Average
5	3.140	11.27	19.61	30.88	56.00	-25.12	QP
6	3.140	3.33	19.61	22.94	46.00	-23.06	Average
7	3.310	12.48	19.61	32.09	56.00	-23.91	QP
8	3.310	3.89	19.61	23.50	46.00	-22.50	Average
9	3.964	13.30	19.63	32.93	56.00	-23.07	QP
10	3.964	4.77	19.63	24.40	46.00	-21.60	Average
11	4.647	10.82	19.65	30.47	56.00	-25.53	QP
12	4.647	2.72	19.65	22.37	46.00	-23.63	Average

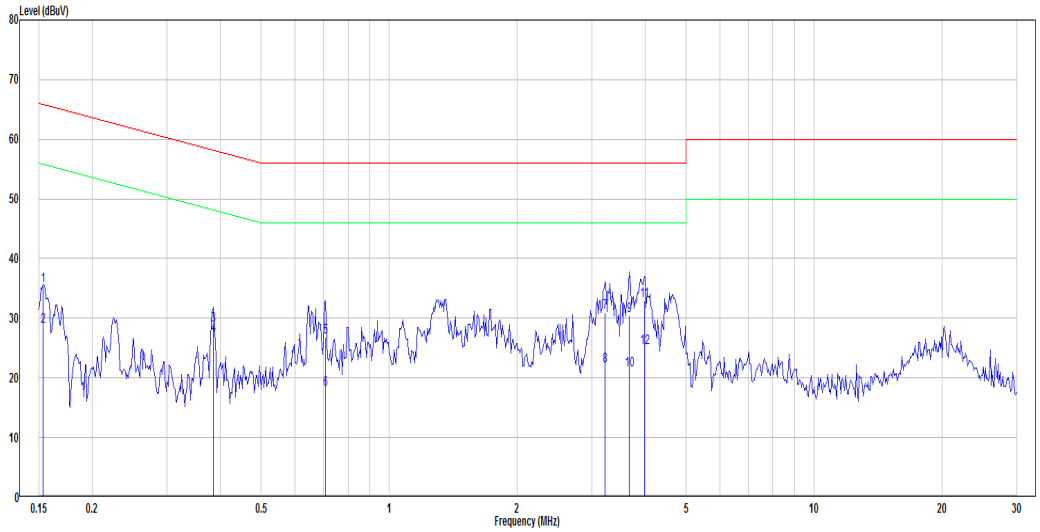
Note:

Level = Read Level + Factor

Over Limit = Result – Limit

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

Main: AC120 V, 60 Hz, Neutral



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBµV)	Factor(dB)	(dBµV)	(dBµV)	(dB)	
1	0.153	15.93	19.51	35.44	65.82	-30.38	QP
2	0.153	9.14	19.51	28.65	55.82	-27.17	Average
3	0.385	9.27	19.52	28.79	58.17	-29.38	QP
4	0.385	7.72	19.52	27.24	48.17	-20.93	Average
5	0.708	7.35	19.52	26.87	56.00	-29.13	QP
6	0.708	-1.40	19.52	18.12	46.00	-27.88	Average
7	3.224	11.30	19.61	30.91	56.00	-25.09	QP
8	3.224	2.47	19.61	22.08	46.00	-23.92	Average
9	3.681	10.77	19.62	30.39	56.00	-25.61	QP
10	3.681	1.72	19.62	21.34	46.00	-24.66	Average
11	3.985	13.32	19.63	32.95	56.00	-23.05	QP
12	3.985	5.45	19.63	25.08	46.00	-20.92	Average

Note:

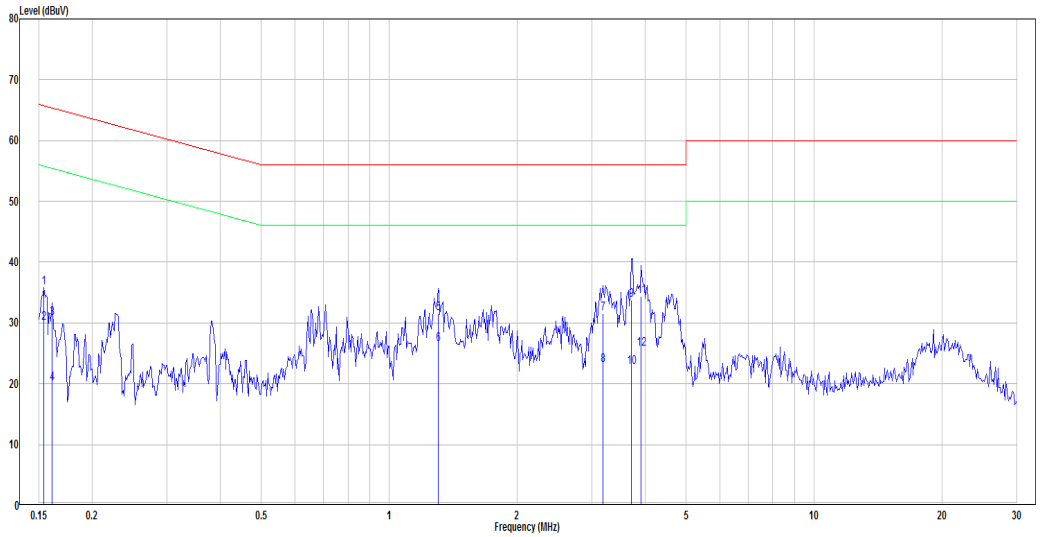
Level = Read Level + Factor

Over Limit = Result – Limit

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

BLE Mode (Worst case is BLE mode, Middle Channel)

Main: AC120 V, 60 Hz, Line



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBµV)	Factor(dB)	(dBµV)	(dBµV)	(dB)	
1	0.154	16.23	19.51	35.74	65.78	-30.04	QP
2	0.154	10.46	19.51	29.97	55.78	-25.81	Average
3	0.161	11.27	19.51	30.78	65.43	-34.65	QP
4	0.161	0.54	19.51	20.05	55.43	-35.38	Average
5	1.303	12.02	19.55	31.57	56.00	-24.43	QP
6	1.303	6.93	19.55	26.48	46.00	-19.52	Average
7	3.190	11.97	19.61	31.58	56.00	-24.42	QP
8	3.190	3.47	19.61	23.08	46.00	-22.92	Average
9	3.720	14.07	19.63	33.70	56.00	-22.30	QP
10	3.720	3.16	19.63	22.79	46.00	-23.21	Average
11	3.922	14.69	19.63	34.32	56.00	-21.68	QP
12	3.922	6.06	19.63	25.69	46.00	-20.31	Average

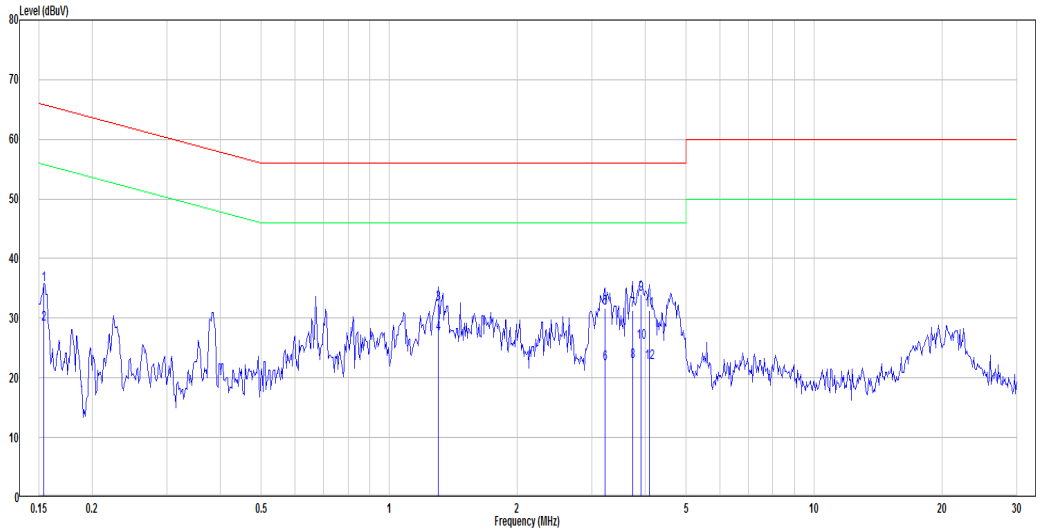
Note:

Level = Read Level + Factor

Over Limit = Result – Limit

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

Main: AC120 V, 60 Hz, Neutral



No.	Frequency	Reading	Correct	Result	Limit	Over limit	Remark
	(MHz)	(dBµV)	Factor(dB)	(dBµV)	(dBµV)	(dB)	
1	0.154	16.13	19.51	35.64	65.78	-30.14	QP
2	0.154	9.52	19.51	29.03	55.78	-26.75	Average
3	1.303	12.92	19.54	32.46	56.00	-23.54	QP
4	1.303	7.80	19.54	27.34	46.00	-18.66	Average
5	3.224	12.03	19.61	31.64	56.00	-24.36	QP
6	3.224	2.77	19.61	22.38	46.00	-23.62	Average
7	3.740	11.72	19.63	31.35	56.00	-24.65	QP
8	3.740	3.10	19.63	22.73	46.00	-23.27	Average
9	3.922	14.30	19.63	33.93	56.00	-22.07	QP
10	3.922	6.36	19.63	25.99	46.00	-20.01	Average
11	4.092	11.73	19.64	31.37	56.00	-24.63	QP
12	4.092	2.96	19.64	22.60	46.00	-23.40	Average

Note:

Level = Read Level + Factor

Over Limit = Result – Limit

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

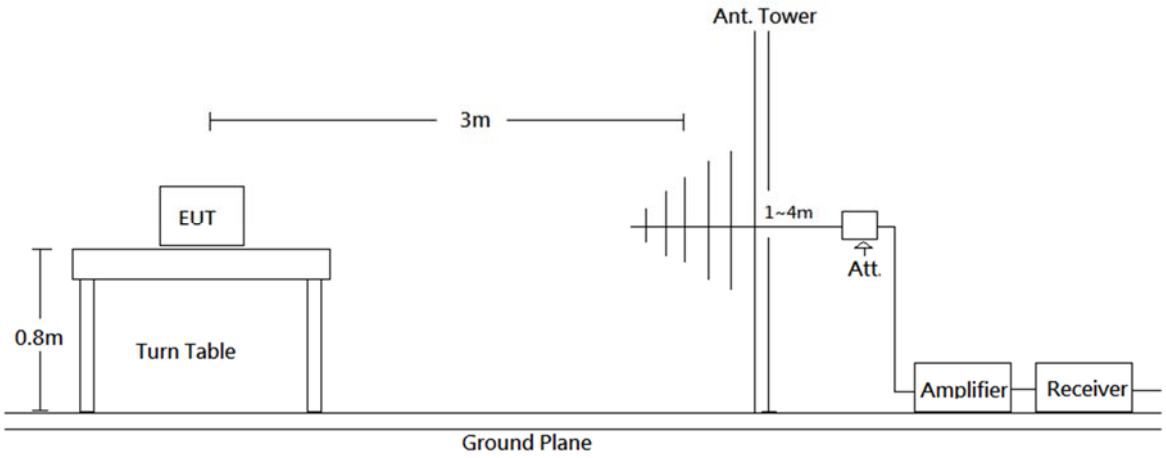
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this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

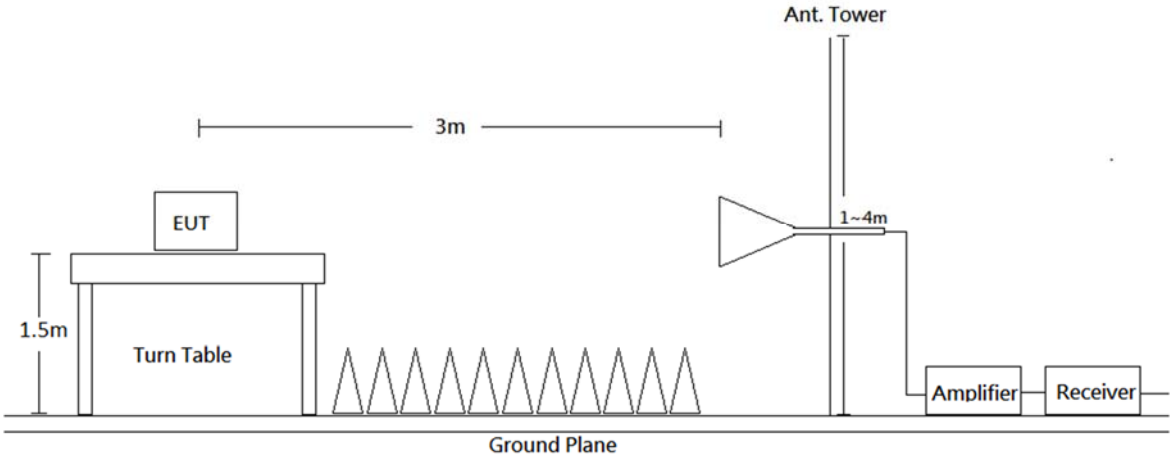
intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the 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 = Level – Limit

8.6 Test Results

Test Mode: Transmitting

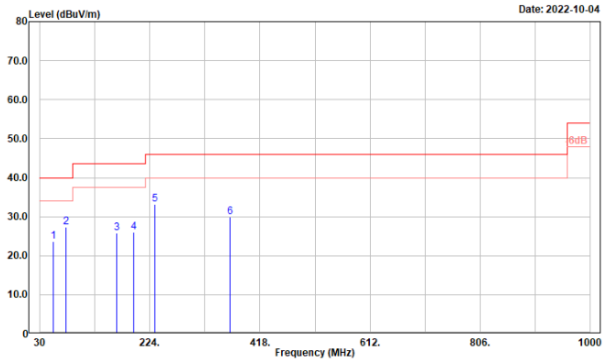
WIFI Mode

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

(worst case is 802.11b mode High channel)

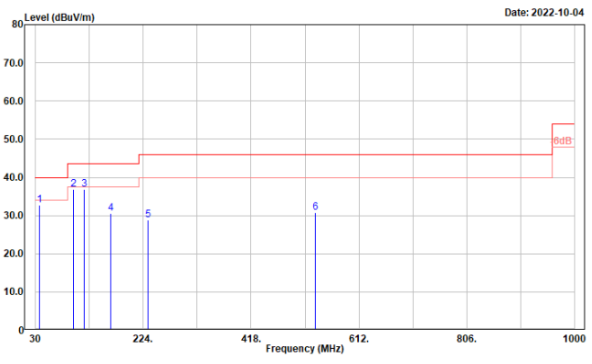
30MHz-1GHz:

Horizontal



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
53.303	38.63	-15.06	23.57	40.00	-16.43	100	36	QP
76.607	41.72	-14.37	27.35	40.00	-12.65	100	326	QP
165.936	35.40	-9.53	25.87	43.50	-17.63	100	0	QP
196.036	35.36	-9.30	26.06	43.50	-17.44	100	100	QP
232.933	42.89	-9.71	33.18	46.00	-12.82	100	62	QP
365.956	35.16	-5.33	29.83	46.00	-16.17	100	78	QP

Vertical



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
36.797	39.70	-7.00	32.70	40.00	-7.30	100	172	QP
98.939	48.93	-12.07	36.86	43.50	-6.64	100	26	QP
117.387	45.09	-8.33	36.76	43.50	-6.74	100	339	QP
164.965	40.08	-9.53	30.55	43.50	-12.95	100	83	QP
232.933	38.44	-9.71	28.73	46.00	-17.27	100	44	QP
532.963	32.25	-1.55	30.70	46.00	-15.30	100	44	QP

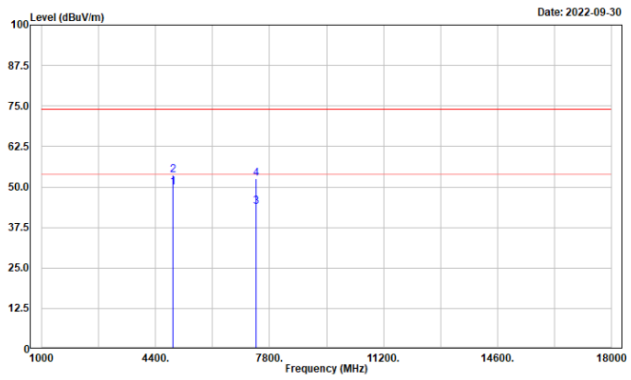
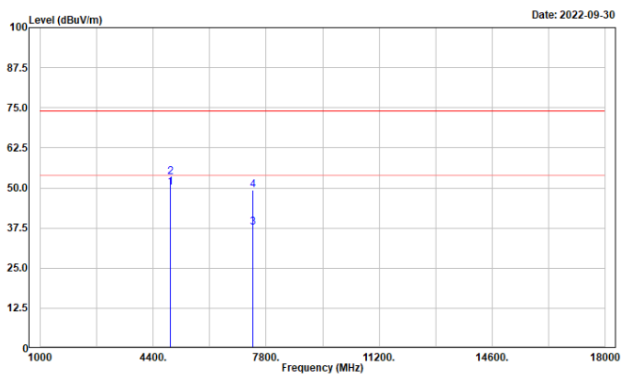
Level (Result) = Reading + Factor.

Margin = Level – Limit.

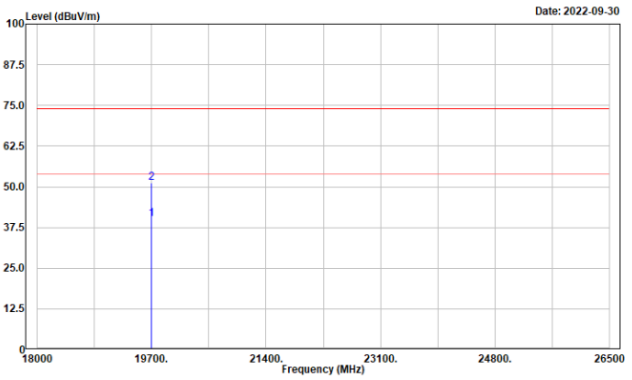
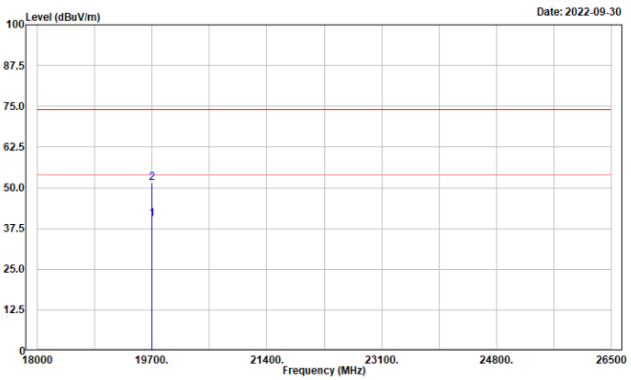
Factor = Antenna Factor + Cable Loss – Amplifier Gain.

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

1GHz-18GHz:

Horizontal	Vertical
	

18GHz-26.5GHz:

Horizontal	Vertical
	

Above 1GHz

Horizontal

Low channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2389.151	44.52	-4.60	39.92	54.00	-14.08	187	180	Average
2389.151	54.13	-4.60	49.53	74.00	-24.47	187	180	Peak
2412.000	100.11	-4.41	95.70			187	180	Average
2412.000	102.65	-4.41	98.24			187	180	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4824.000	40.51	3.43	43.94	54.00	-10.06	147	119	Average
4824.000	46.10	3.43	49.53	74.00	-24.47	147	119	Peak
7236.000	35.17	9.21	44.38	54.00	-9.62	152	332	Average
7236.000	43.74	9.21	52.95	74.00	-21.05	152	332	Peak

Middle channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4874.000	43.35	3.54	46.89	54.00	-7.11	148	143	Average
4874.000	47.75	3.54	51.29	74.00	-22.71	148	143	Peak
7311.000	35.89	9.25	45.14	54.00	-8.86	146	312	Average
7311.000	43.83	9.25	53.08	74.00	-20.92	146	312	Peak

High channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	98.47	-3.97	94.50			180	180	Average
2462.000	100.94	-3.97	96.97			180	180	Peak
2491.840	43.17	-3.57	39.60	54.00	-14.40	180	180	Average
2491.840	53.51	-3.57	49.94	74.00	-24.06	180	180	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4924.000	46.20	3.77	49.97	54.00	-4.03	152	295	Average
4924.000	49.86	3.77	53.63	74.00	-20.37	152	295	Peak
7386.000	34.57	9.23	43.80	54.00	-10.20	145	320	Average
7386.000	43.44	9.23	52.67	74.00	-21.33	145	320	Peak

Level (Result) = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

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

Vertical

Low channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2372.671	43.09	-4.75	38.34	54.00	-15.66	160	58	Average
2372.671	59.80	-4.75	55.05	74.00	-18.95	160	58	Peak
2412.000	95.44	-4.41	91.03			160	58	Average
2412.000	97.93	-4.41	93.52			160	58	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4824.000	42.74	3.43	46.17	54.00	-7.83	153	82	Average
4824.000	48.27	3.43	51.70	74.00	-22.30	153	82	Peak
7236.000	28.11	9.21	37.32	54.00	-16.68	152	74	Average
7236.000	40.12	9.21	49.33	74.00	-24.67	152	74	Peak

Middle channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4874.000	45.78	3.54	49.32	54.00	-4.68	154	329	Average
4874.000	49.62	3.54	53.16	74.00	-20.84	154	329	Peak
7311.000	28.04	9.25	37.29	54.00	-16.71	152	0	Average
7311.000	39.98	9.25	49.23	74.00	-24.77	152	0	Peak

High channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2462.000	94.08	-3.97	90.11			176	58	Average
2462.000	96.54	-3.97	92.57			176	58	Peak
2489.438	42.66	-3.60	39.06	54.00	-14.94	176	58	Average
2489.438	52.39	-3.60	48.79	74.00	-25.21	176	58	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4924.000	46.47	3.77	50.24	54.00	-3.76	153	300	Average
4924.000	49.64	3.77	53.41	74.00	-20.59	153	300	Peak
7386.000	28.54	9.23	37.77	54.00	-16.23	148	197	Average
7386.000	40.11	9.23	49.34	74.00	-24.66	148	197	Peak

Level (Result) = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

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

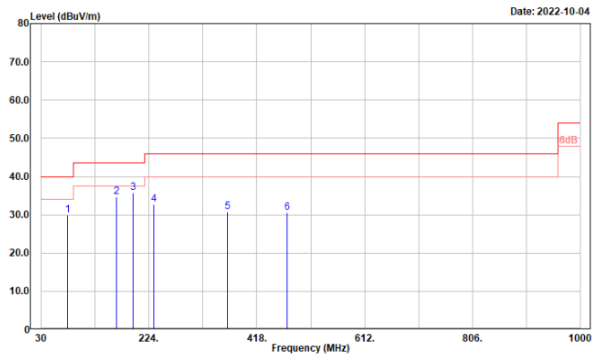
BLE(1M) Mode

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

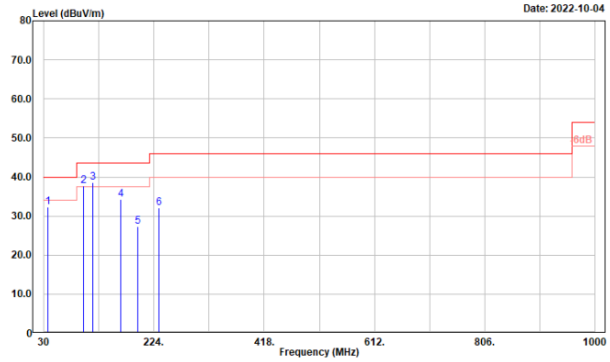
(worst case is BLE (1M) mode Middle channel)

30MHz-1GHz:

Horizontal	Vertical



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
77.578	44.51	-14.49	30.02	40.00	-9.98	100	117	QP
165.936	44.24	-9.53	34.71	43.50	-8.79	100	40	QP
195.065	45.33	-9.58	35.75	43.50	-7.75	100	117	QP
232.933	42.52	-9.71	32.81	46.00	-13.19	100	63	QP
365.956	36.09	-5.33	30.76	46.00	-15.24	100	63	QP
472.763	32.83	-2.30	30.53	46.00	-15.47	100	339	QP



Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
36.797	39.32	-7.00	32.32	40.00	-7.68	100	186	QP
99.910	49.48	-11.77	37.71	43.50	-5.79	100	126	QP
116.416	47.04	-8.50	38.54	43.50	-4.96	100	308	QP
165.936	43.85	-9.53	34.32	43.50	-9.18	100	81	QP
195.065	36.96	-9.58	27.38	43.50	-16.12	100	77	QP
232.933	41.88	-9.71	32.17	46.00	-13.83	100	61	QP

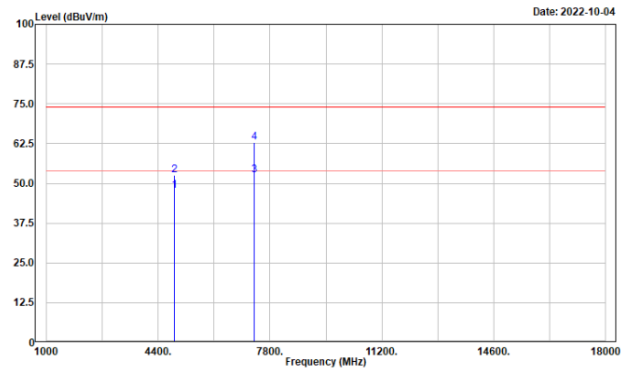
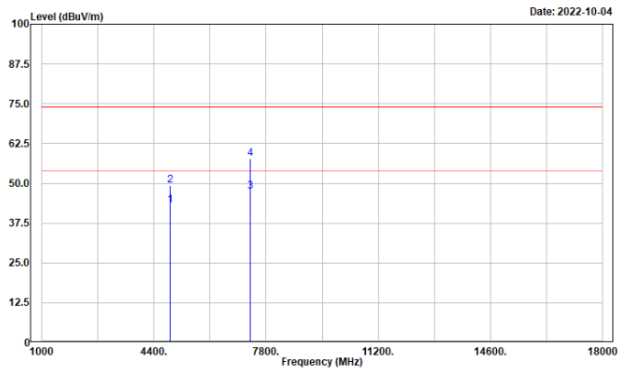
Level (Result) = Reading + Factor.

Margin = Level – Limit.

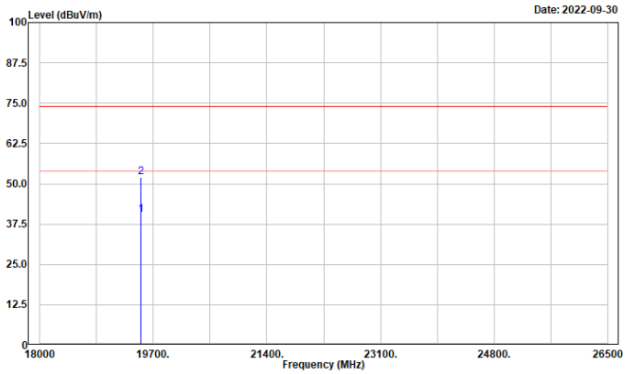
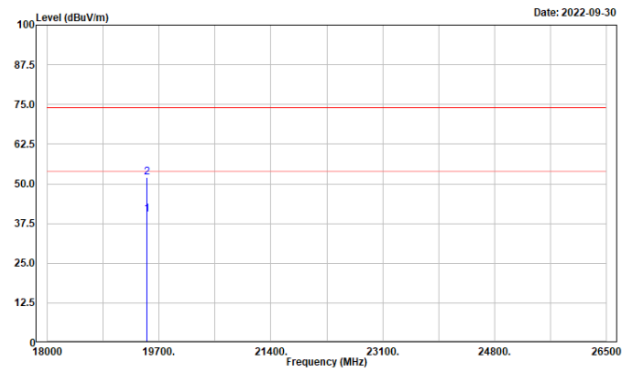
Factor = Antenna Factor + Cable Loss – Amplifier Gain.

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

1GHz-18GHz:

Horizontal	Vertical
	

18GHz-26.5GHz:

Horizontal	Vertical
	

Above 1GHz

Horizontal

Low channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2389.580	41.89	-4.59	37.30	54.00	-16.70	200	180	Average
2389.580	66.13	-4.59	61.54	74.00	-12.46	200	180	Peak
2402.000	102.15	-4.48	97.67			200	180	Average
2402.000	103.14	-4.48	98.66			200	180	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4804.000	41.81	3.45	45.26	54.00	-8.74	155	115	Average
4804.000	47.69	3.45	51.14	74.00	-22.86	155	115	Peak
7206.000	43.51	9.05	52.56	54.00	-1.44	152	296	Average
7206.000	53.40	9.05	62.45	74.00	-11.55	152	296	Peak

Middle channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4880.000	44.11	3.57	47.68	54.00	-6.32	146	114	Average
4880.000	48.90	3.57	52.47	74.00	-21.53	146	114	Peak
7320.000	43.37	9.25	52.62	54.00	-1.38	154	304	Average
7320.000	53.71	9.25	62.96	74.00	-11.04	154	304	Peak

High channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2480.000	99.65	-3.73	95.92			172	180	Average
2480.000	100.81	-3.73	97.08			172	180	Peak
2483.543	43.75	-3.69	40.06	54.00	-13.94	172	180	Average
2483.543	74.26	-3.69	70.57	74.00	-3.43	172	180	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4960.000	45.34	3.92	49.26	54.00	-4.74	149	114	Average
4960.000	49.15	3.92	53.07	74.00	-20.93	149	114	Peak
7440.000	40.50	9.42	49.92	54.00	-4.08	146	309	Average
7440.000	50.68	9.42	60.10	74.00	-13.90	146	309	Peak

Level (Result) = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

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

Vertical

Low channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2389.880	41.98	-4.59	37.39	54.00	-16.61	225	118	Average
2389.880	61.50	-4.59	56.91	74.00	-17.09	225	118	Peak
2402.000	97.12	-4.48	92.64			225	118	Average
2402.000	98.07	-4.48	93.59			225	118	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4804.000	38.79	3.45	42.24	54.00	-11.76	153	320	Average
4804.000	45.37	3.45	48.82	74.00	-25.18	153	320	Peak
7206.000	39.44	9.05	48.49	54.00	-5.51	147	269	Average
7206.000	49.37	9.05	58.42	74.00	-15.58	147	269	Peak

Middle channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4880.000	39.61	3.57	43.18	54.00	-10.82	148	312	Average
4880.000	45.74	3.57	49.31	74.00	-24.69	148	312	Peak
7320.000	38.19	9.25	47.44	54.00	-6.56	154	272	Average
7320.000	48.50	9.25	57.75	74.00	-16.25	154	272	Peak

High channel

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
2480.000	95.20	-3.73	91.47			131	104	Average
2480.000	96.37	-3.73	92.64			131	104	Peak
2483.626	41.94	-3.69	38.25	54.00	-15.75	131	104	Average
2483.626	69.16	-3.69	65.47	74.00	-8.53	131	104	Peak

Freq.	Reading	Factor	Level	Limit	Margin	Height	Degree	Remark
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	(cm)	(°)	
4960.000	41.44	3.92	45.36	54.00	-8.64	147	320	Average
4960.000	46.03	3.92	49.95	74.00	-24.05	147	320	Peak
7440.000	37.92	9.42	47.34	54.00	-6.66	145	134	Average
7440.000	47.90	9.42	57.32	74.00	-16.68	145	134	Peak

Level (Result) = Reading + Factor.

Margin = Level – Limit.

Factor = Antenna Factor + Cable Loss – Amplifier Gain.

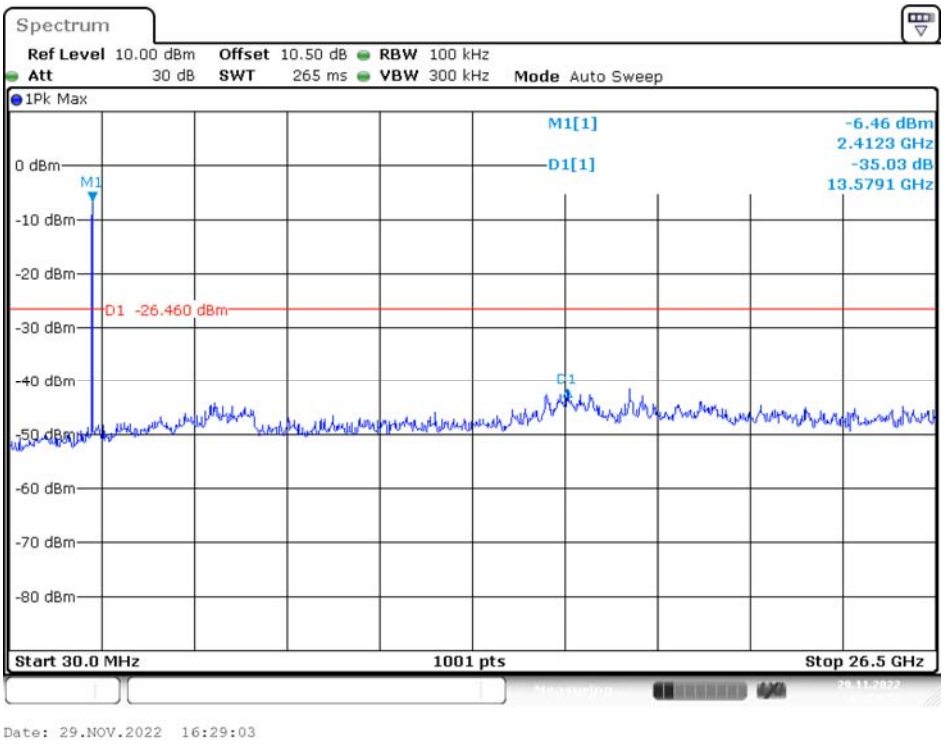
Spurious emissions more than 20 dB below the limit were not reported.

Conducted Spurious Emissions:

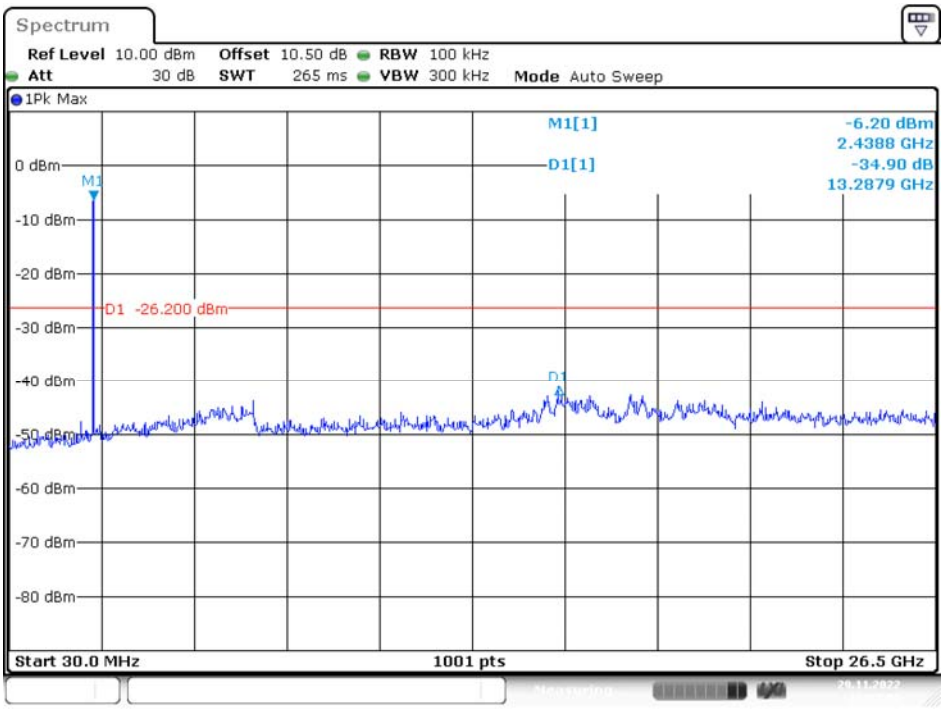
Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
B Mode				
Low	2412	35.03	≥ 20	PASS
Middle	2437	34.90	≥ 20	PASS
High	2462	36.62	≥ 20	PASS
BLE(1M) Mode				
Low	2402	31.29	≥ 20	PASS
Middle	2440	30.00	≥ 20	PASS
High	2480	30.39	≥ 20	PASS

B Mode

Low Channel

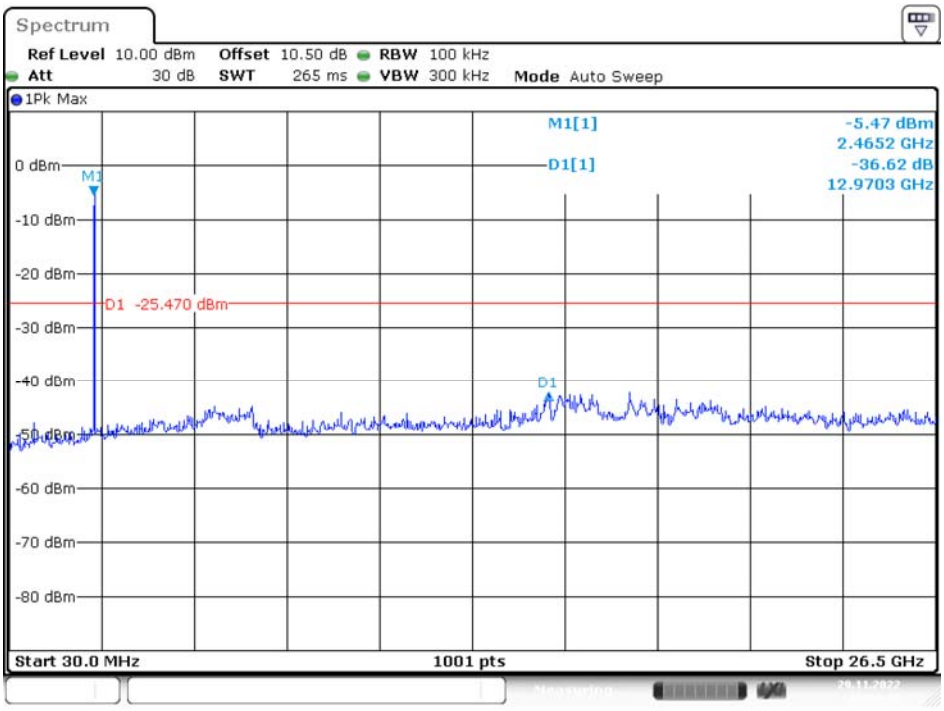


Middle Channel



Date: 29.NOV.2022 16:31:09

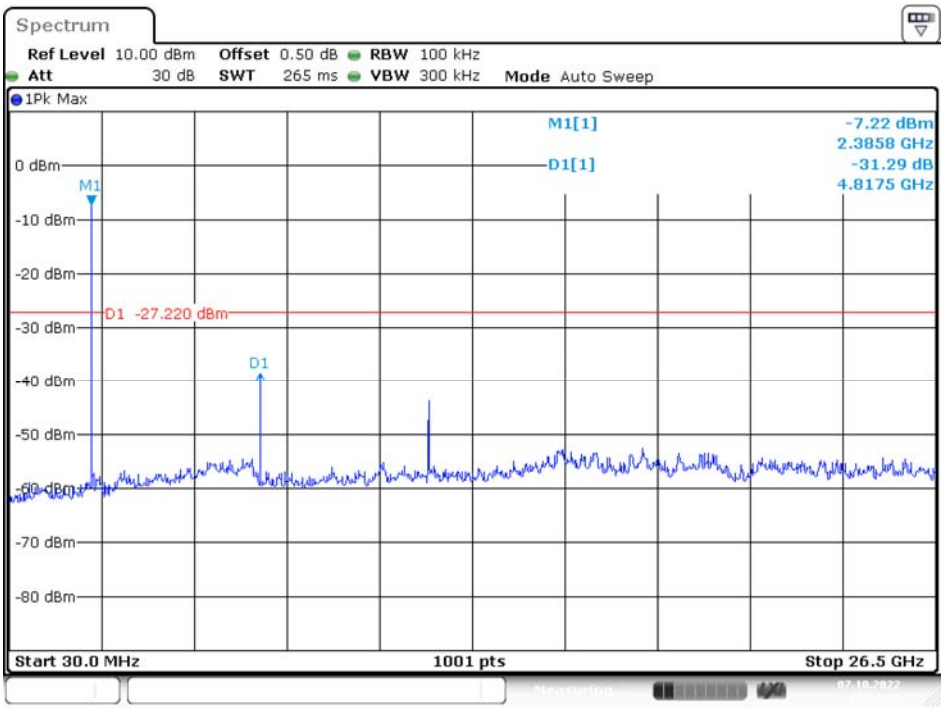
High Channel



Date: 29.NOV.2022 16:34:49

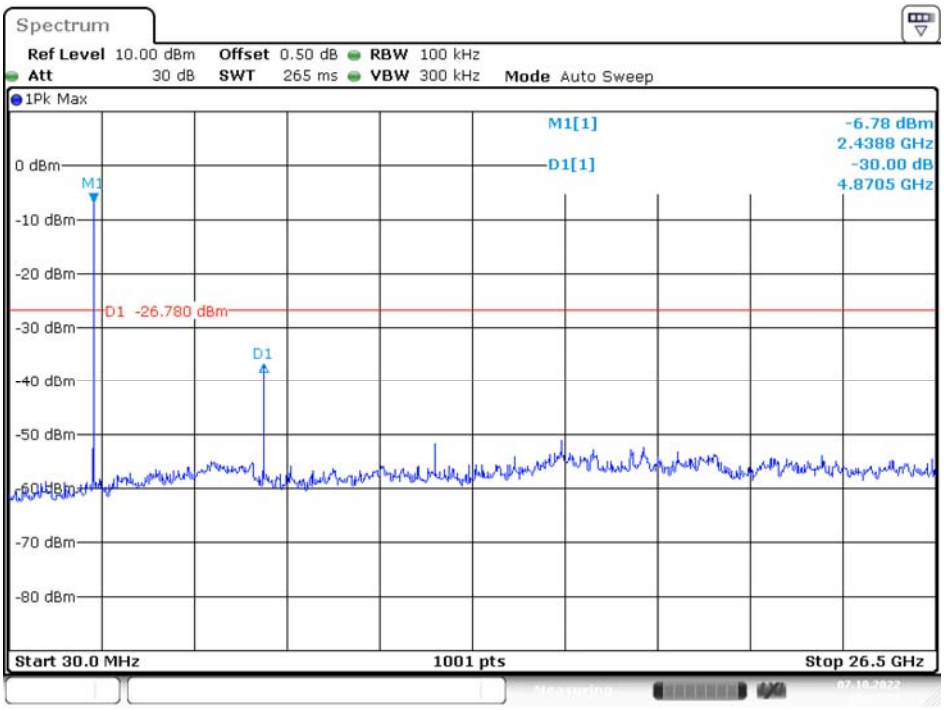
BLE(1M) Mode

Low Channel



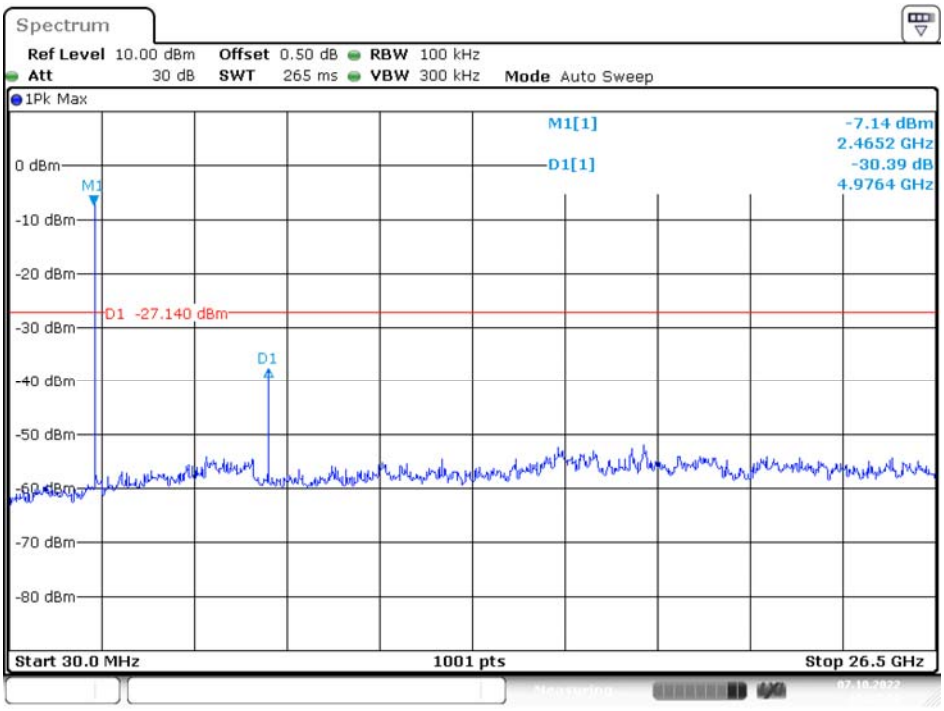
Date: 7.OCT.2022 16:14:46

Middle Channel



Date: 7.OCT.2022 16:23:55

High Channel



Date: 7.OCT.2022 16:27:19

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 emission.

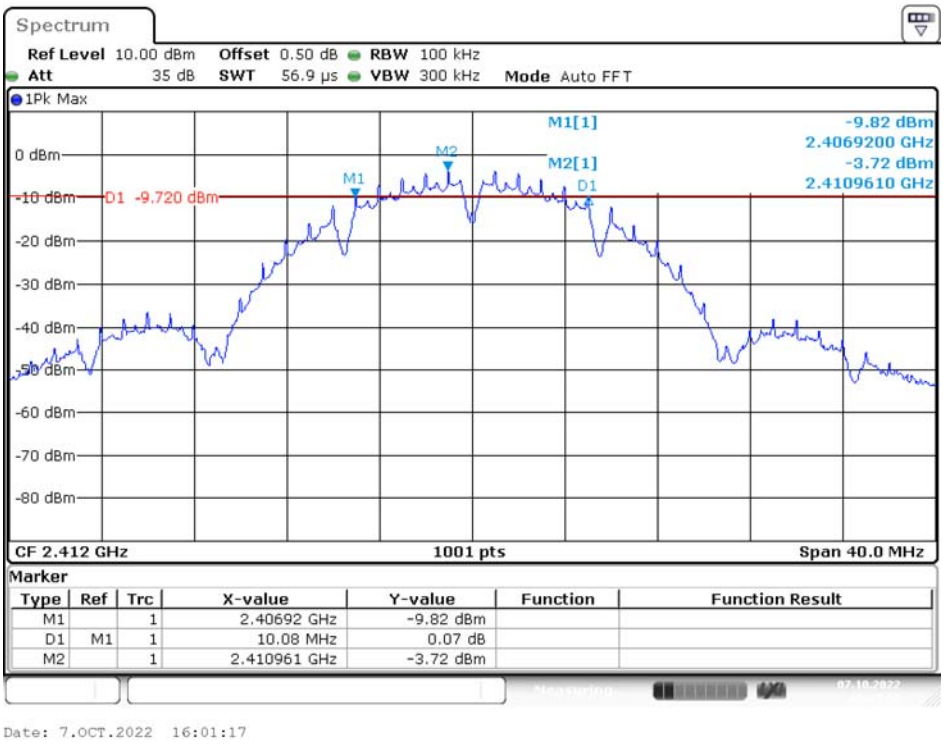
9.3 Test Results

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)	Result
B Mode				
Low	2412	10.08	> 500	PASS
Middle	2437	10.08	> 500	PASS
High	2462	10.08	> 500	PASS
BLE(1M) Mode				
Low	2402	0.68	> 500	PASS
Middle	2440	0.68	> 500	PASS
High	2480	0.69	> 500	PASS

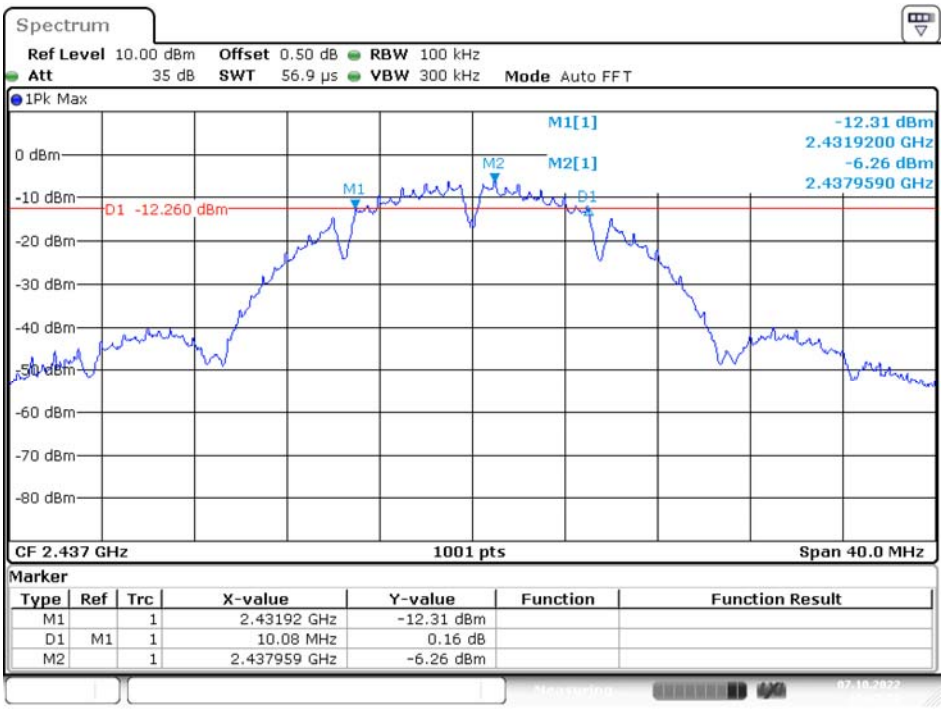
Please refer to the following plots

B Mode

Low Channel

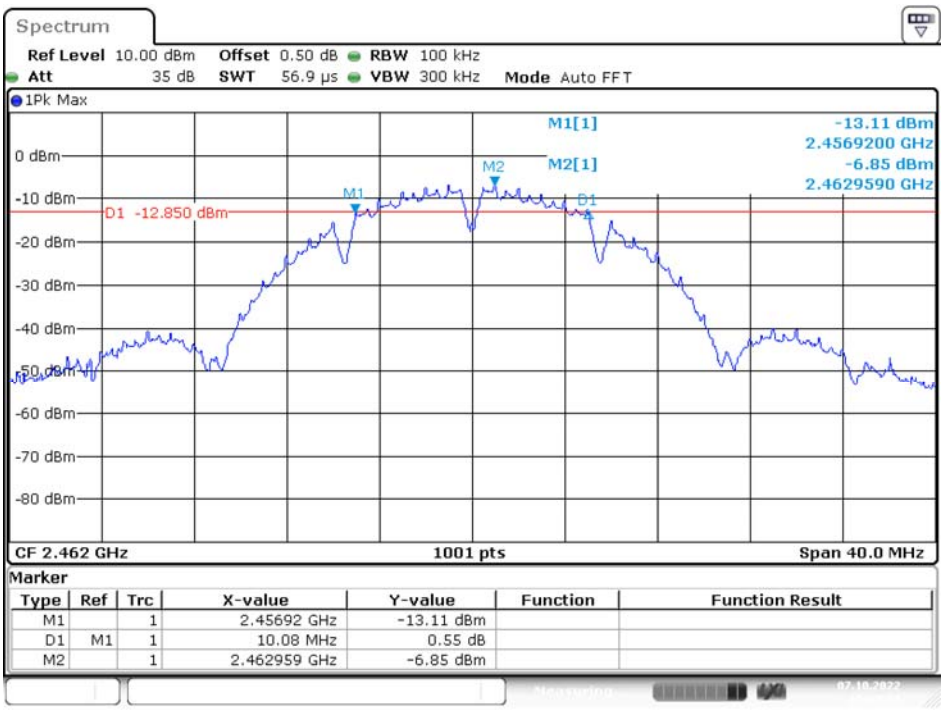


Middle Channel



Date: 7.OCT.2022 16:05:50

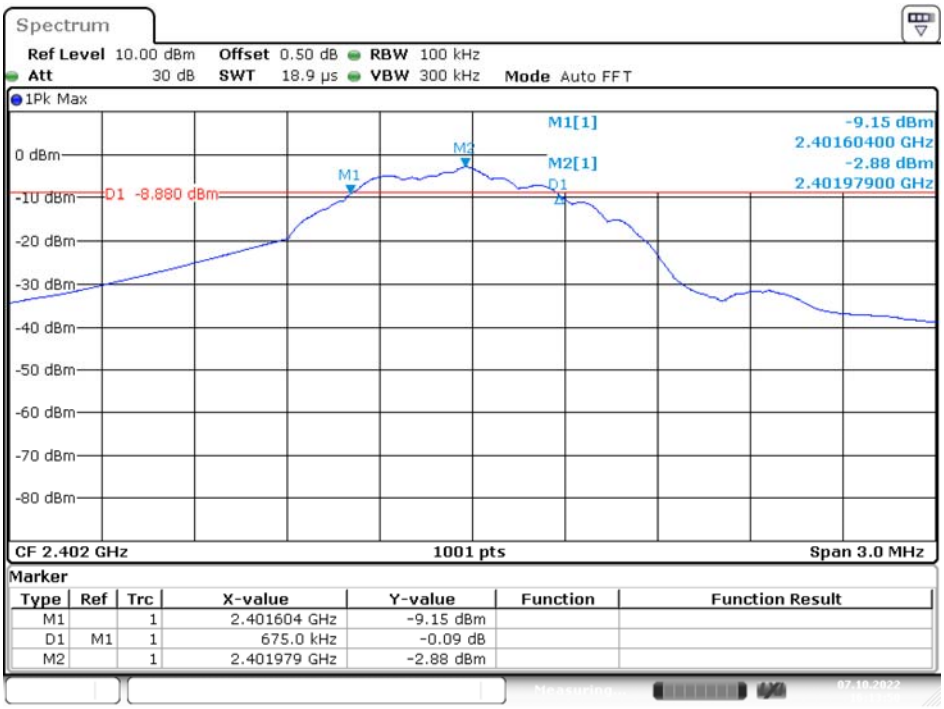
High Channel



Date: 7.OCT.2022 16:08:34

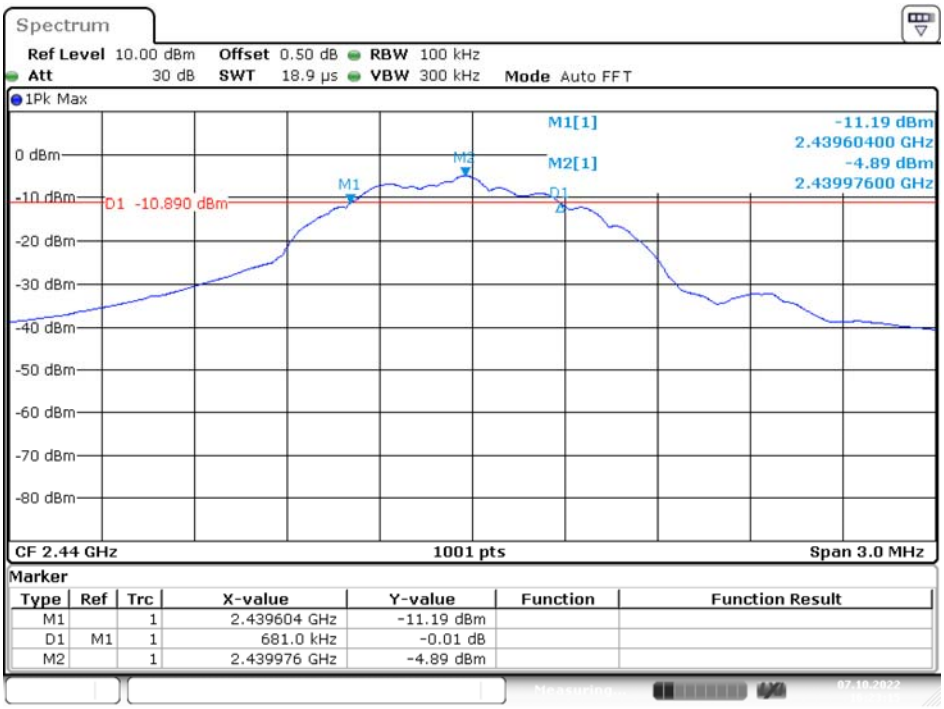
BLE(1M) Mode

Low Channel



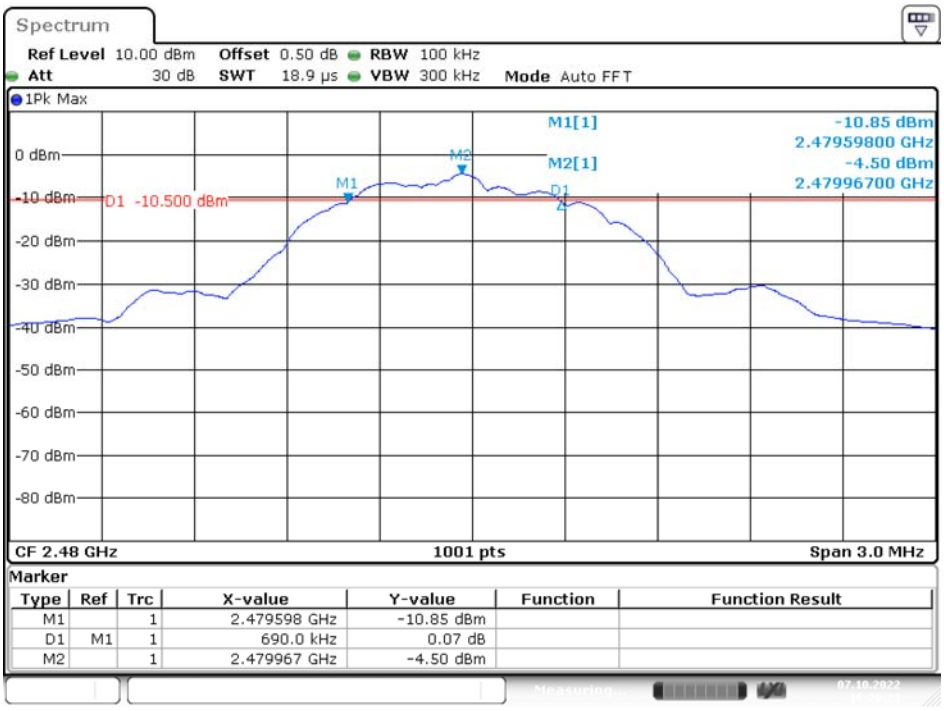
Date: 7.OCT.2022 16:13:50

Middle Channel



Date: 7.OCT.2022 16:23:15

High Channel



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)	Conducted Peak Output Power (dBm)	Power (W)	Limit (W)	Result
802.11b Mode					
Low	2412	11.09	0.013	1	PASS
Middle	2437	10.00	0.010	1	PASS
High	2462	9.37	0.009	1	PASS
BLE(1M) Mode					
Low	2402	0.16	0.001	1	PASS
Middle	2440	-0.28	0.001	1	PASS
High	2480	-0.21	0.001	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.

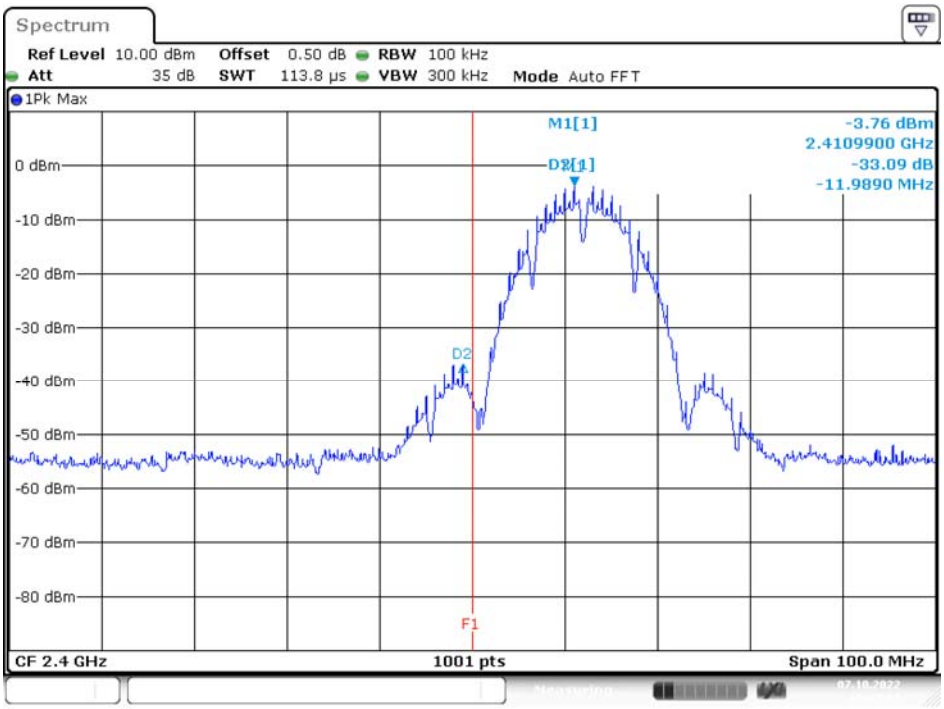
11.3 Test Results

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
B Mode				
Low	2412	33.09	≥ 20	PASS
High	2462	45.56	≥ 20	PASS
BLE(1M) Mode				
Low	2402	36.09	≥ 20	PASS
High	2480	42.23	≥ 20	PASS

Please refer to the following plots.

B Mode

Band Edge, Left Side



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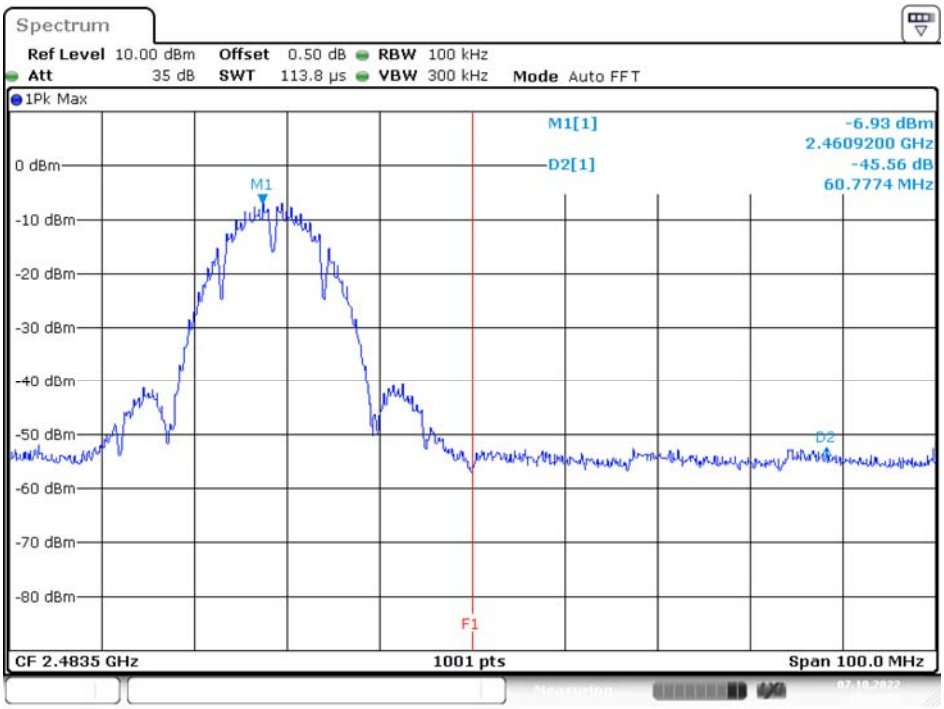
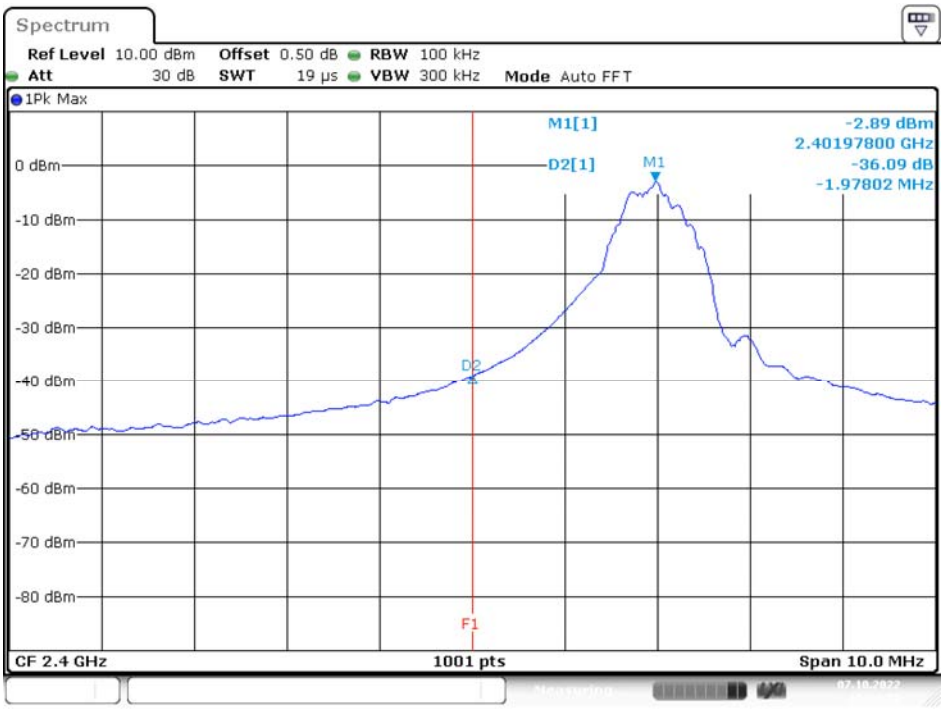
Band Edge, Right Side



Date: 7.OCT.2022 16:08:59

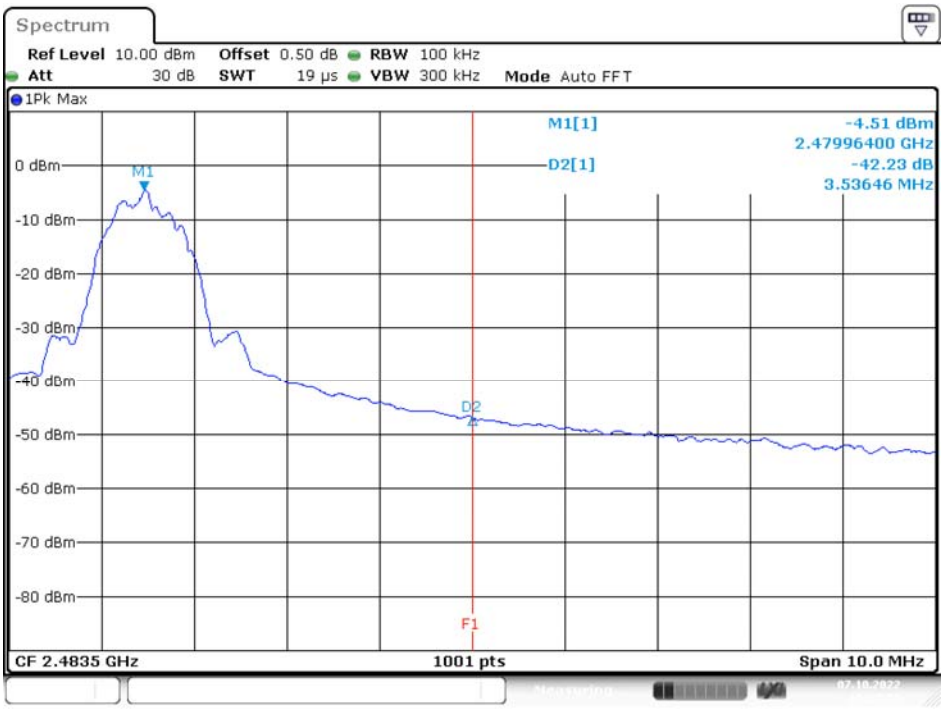
BLE(1M) Mode

Band Edge, Low Channel



Date: 7.OCT.2022 16:14:30

Band Edge, High Channel



Date: 7.OCT.2022 16:27:03

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

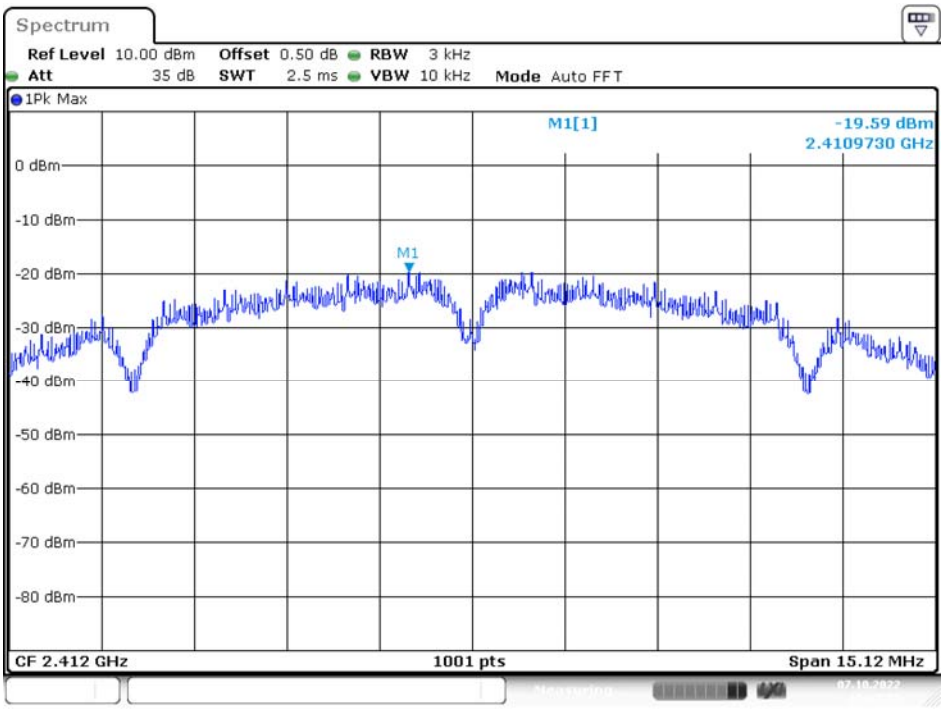
12.3 Test Results

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Limit (dBm/3 kHz)	Result
B Mode				
Low	2412	-19.59	8	PASS
Middle	2437	-20.76	8	PASS
High	2462	-21.30	8	PASS
BLE(1M) Mode				
Low	2402	-9.71	8	PASS
Middle	2440	-11.57	8	PASS
High	2480	-11.19	8	PASS

Please refer to the following plots

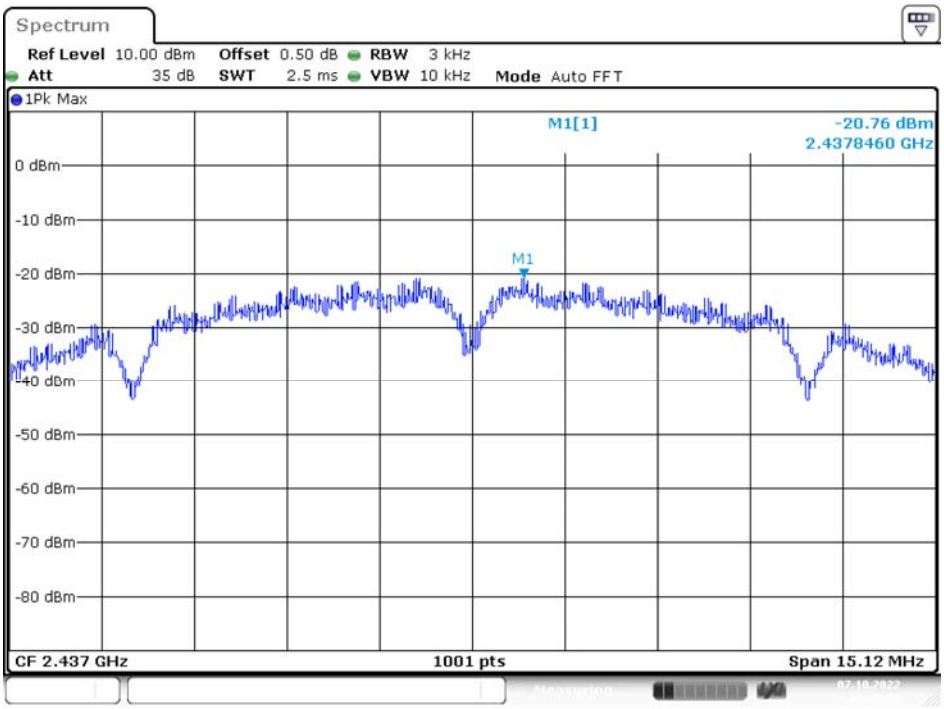
B Mode

Low Channel



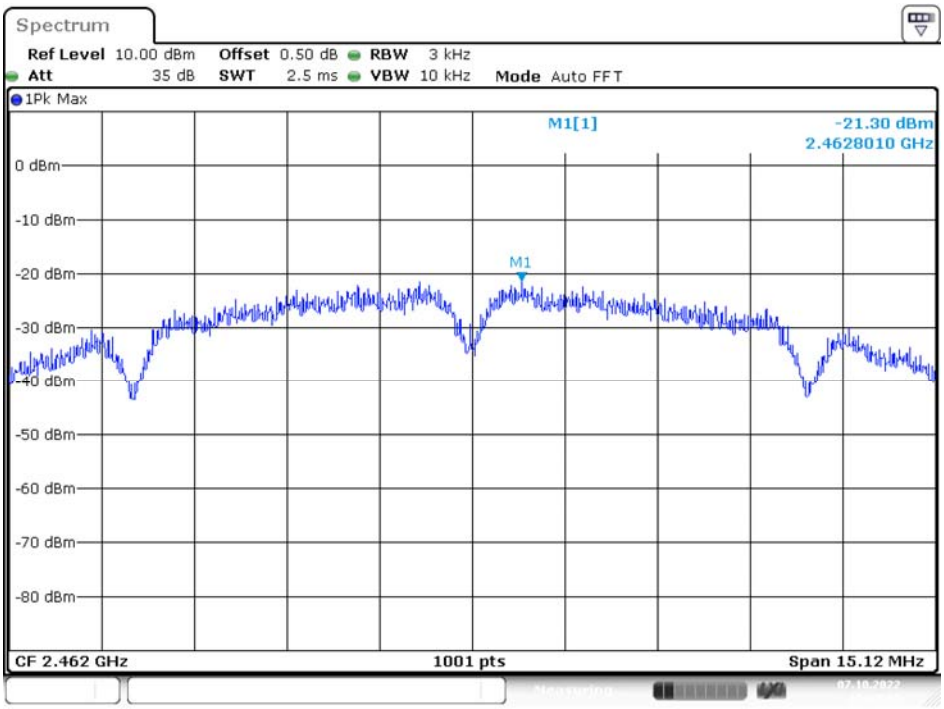
Date: 7.OCT.2022 16:01:26

Middle Channel



Date: 7.OCT.2022 16:05:59

High Channel



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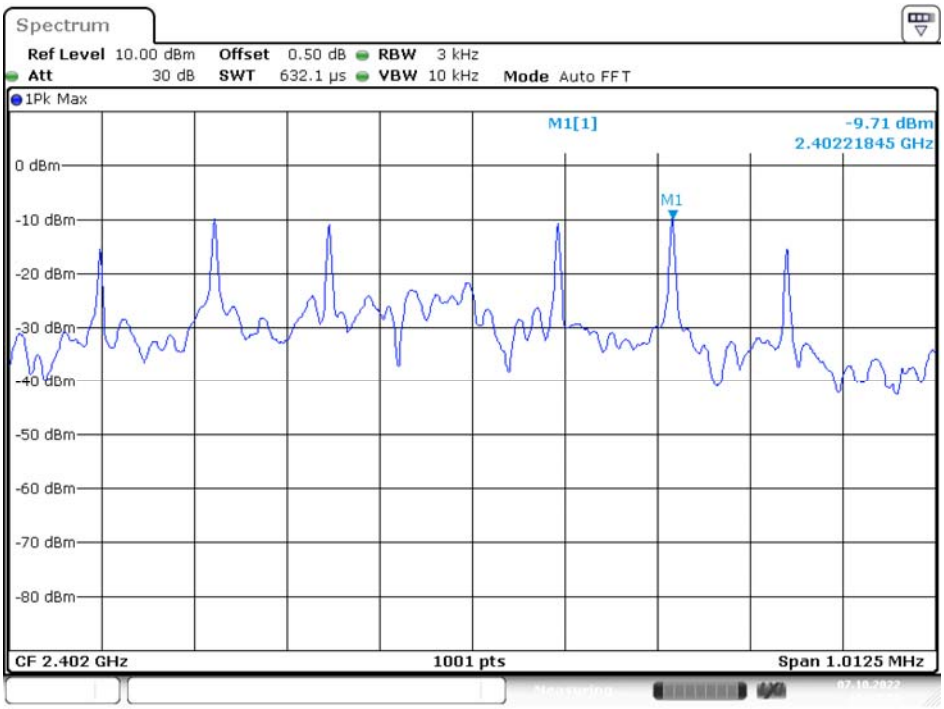
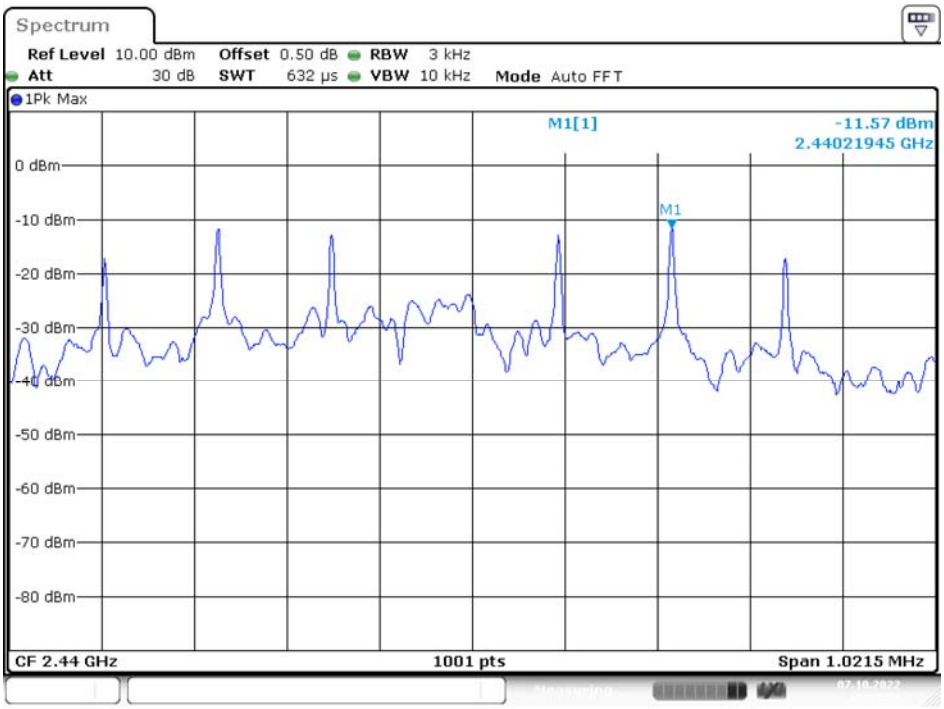
BLE(1M) Mode

Low Channel

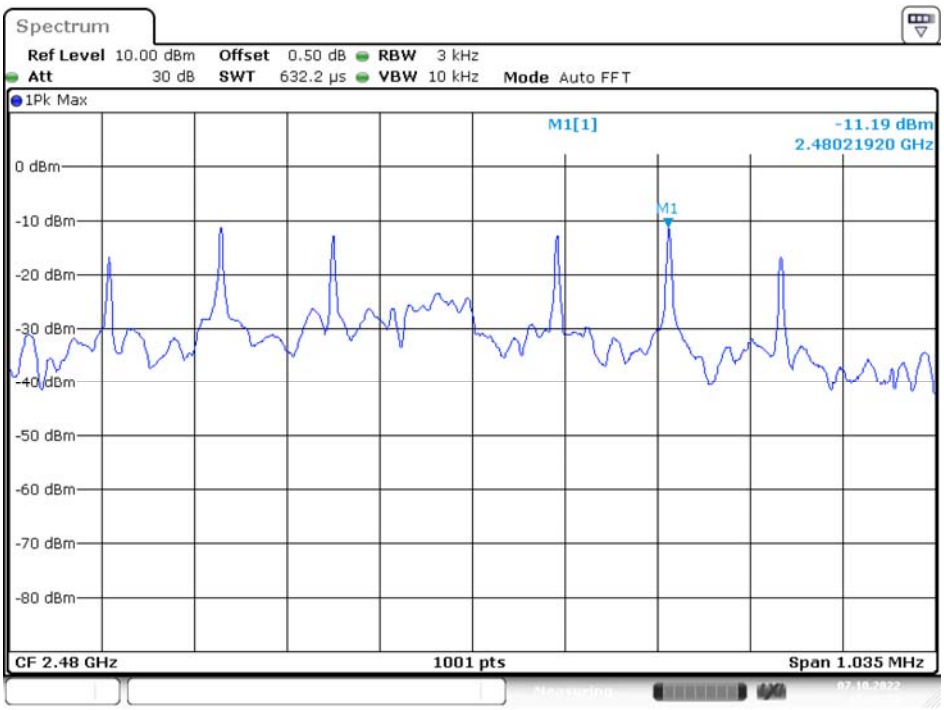


Date: 7.OCT.2022 16:13:59

Middle Channel



High Channel



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