Radio Test Report

FCC ID: XVG500106RTBT

IC: 6800A-500106RTBT

Report No.	:	TBR-C-202302-0069-5
Applicant	:	Amino Communications Ltd
Equipment Under Test (EUT)		
EUT Name	:	IPTV Receiver
Model(s) No.	:	Amigo 7Y, AMIGO 7Y, Amigo 7Yzzzzzzzz, AMIGO 7Yzzzzzzzz (zzzzzzzz can be combination of A-Z, a-z, 0-9, “-”, “/”, “blank” for marketing purpose)
Brand Name	:	AMINO
Sample ID	:	202302-0069-5-1#&202302-0069-5-2#
Receipt Date	:	2023-04-06
Test Date	:	2023-04-07 to 2023-12-23
Issue Date	:	2023-12-25
Standards	:	FCC Part 15 Subpart C 15.247 RSS-247 Issue 3 August 2023 RSS-Gen Issue 5 Amendment 2 February 2021
Test Method	:	ANSI C63.10: 2013 KDB 558074 D01 15.247 Meas Guidance v05r02
Conclusions	:	**PASS** In the configuration tested, the EUT complied with the standards specified above.

Witness Engineer	:	Seven Wu
Engineer Supervisor	:	Ivan Su
Engineer Manager	:	Ray Lai

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

1/F.,Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China
Tel: +86 75526509301 Fax: +86 75526509195

Contents

Revision History

Report No.	Version	Description	Issued Date
TBR-C-202302-0069-5	Rev.01	Initial issue of report	2023-12-25

1. General Information about EUT

1.1 Client Information

Applicant	:	Amino Communications Ltd
Address	:	1010 Cambourne Business Park, Cambourne, Cambridge, CB23 6DP, United Kingdom.
Manufacturer	:	Shenzhen SDMC Technology Co., Ltd.
Address	:	Room 1022, Floor 10, Building A, Customs Building, No. 2, Xin'an 3rd Road, Dalang Community, Xin'an Street, Bao'an District, Shenzhen, China

1.2 General Description of EUT (Equipment Under Test)

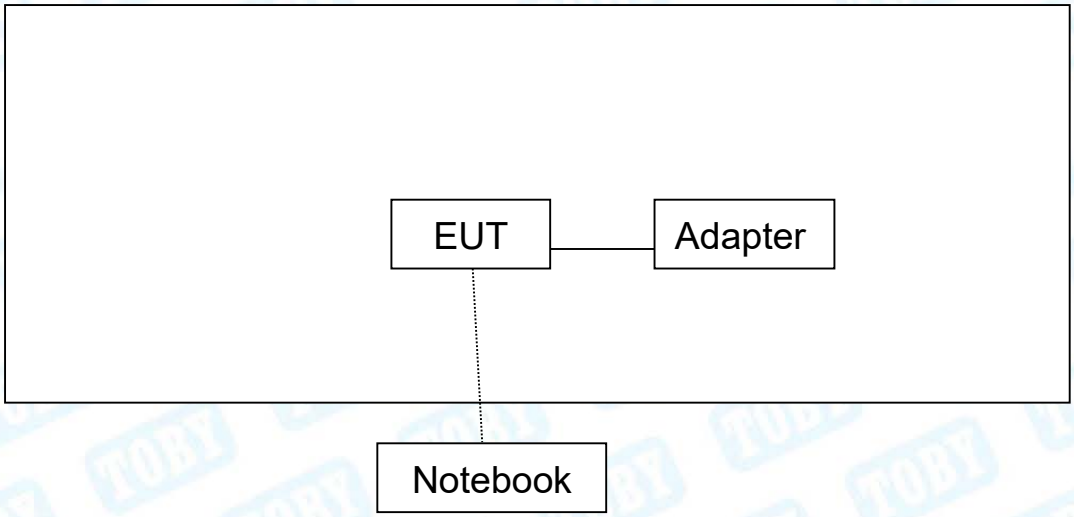
EUT Name		:	IPTV Receiver	
For IC	**Model No.**	:	AMIGO 7Y	
For FCC	**Models No.**	:	Amigo 7Y, Amigo 7Yzzzzzzzz, AMIGO 7Yzzzzzzzz (zzzzzzzz can be combination of A-Z, a-z, 0-9, “-”, “/”, “blank” for marketing purpose)	
	Model Different	:	All these models are identical in the same PCB, layout and electrical circuit, The only difference is model name for marketing purpose.	
Product Description		:	Operation Frequency:	Bluetooth 5.2(BLE): 2402MHz~2480MHz
			Number of Channel:	Bluetooth 5.2(BLE): 40 channels
			Antenna Gain:	0.85dBi PCB Antenna
			Modulation Type:	GFSK
			Bit Rate of Transmitter:	1Mbps&2Mbps
Power Rating		:	AC Adapter 1# (Model: SA12BV-120100U **SUNUN**): Input: 100-240V~50/60Hz, 0.4A Output: 12.0V⎓1.0A 12W AC Adapter 2# (Model: DCT12W120100US-A0 **DACHUAN**): Input: 100-240V~50/60Hz, 0.3A Max. Output: 12.0V⎓1.0A 12W	
Software Version		:	Android 12	
Hardware Version		:	MB.024.B	

Remark:
(1)The antenna gain and adapter provided by the manufacturer, the verified for the RF conduction test provided by TOBY test lab.
(2)For a more detailed features description, please refer to the manufacturer’s specifications or the User’s Manual.

(3)Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

1.3 Block Diagram Showing the Configuration of System Tested



1.4 Description of Support Units

Equipment Information				
Name	**Model**	**S/N**	**Manufacturer**	**Used "√"**
Notebook	Inspiron 5493	-----	DELL	√

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

For Conducted Test(AC POWER)	
Final Test Mode	**Description**
Mode 1	TX Mode
For Radiated and RF Conducted Test	
Final Test Mode	**Description**
Mode 2	TX Mode
Mode 3	TX 1Mbps Mode (Channel 00/19/39)
Mode 4	TX 2Mbps Mode (Channel 00/19/39)

Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

BLE Mode: GFSK Modulation Transmitting mode.

(2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.

(3) The EUT is considered a Mobile unit; in normal use it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

1.6 Description of Test Software Setting

During testing channel& Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of RF setting.

Test Software Version	**adb command**		
Frequency	2402 MHz	2440MHz	2480 MHz
BLE 1M	DEF	DEF	DEF
BLE 2M	DEF	DEF	DEF

1.7 Measurement Uncertainty

The reported uncertainty of measurement y±U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %.

Test Item	**Parameters**	**Expanded Uncertainty (U_{Lab})**
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	±3.50 dB ±3.10 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.50 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB

1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1/F.,Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)
The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01
The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351. Designation Number: CN1223.

IC Registration No.: (11950A)
The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A. CAB identifier: CN0056.

2. Test Summary

Standard Section		Test Item	Test Sample(s)	Judgment	Remark
FCC	IC				
FCC 15.207(a)	RSS-Gen 8.8	Conducted Emission	202302-0069-5-1#	PASS	N/A
FCC 15.209 & 15.247(d)	RSS-Gen 8.9 & RSS 247 5.5	Radiated Unwanted Emissions	202302-0069-5-1#	PASS	N/A
FCC 15.203	RSS-247 6.8	Antenna Requirement	202302-0069-5-2#	PASS	N/A
FCC 15.247(a)(2)	RSS-247 5.2(a)	6dB Bandwidth	202302-0069-5-1#	PASS	N/A
/	RSS-Gen 6.7	99% Occupied bandwidth	202302-0069-5-1#	PASS	N/A
FCC 15.247(b)(3)	RSS-247 5.4(d)	Peak Output Power and E.I.R.P	202302-0069-5-1#	PASS	N/A
FCC 15.247(e)	RSS-247 5.2(b)	Power Spectral Density	202302-0069-5-1#	PASS	N/A
FCC 15.247(d)	RSS-Gen 8.10& RSS-247 5.5	Band Edge Measurements	202302-0069-5-2#	PASS	N/A
FCC 15.207(a)	RSS-Gen 8.9 & RSS 247 5.5	Conducted Unwanted Emissions	202302-0069-5-2#	PASS	N/A
FCC 15.247(d)	RSS-Gen 8.10& RSS-247 5.5	Emissions in Restricted Bands	202302-0069-5-1#	PASS	N/A
/	/	On Time and Duty Cycle	202302-0069-5-1#	/	N/A

Note: N/A is an abbreviation for Not Applicable.

3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Conducted Emission	EZ-EMC	EZ	CDI-03A2
Radiation Emission	EZ-EMC	EZ	FA-03A2RE
Radiation Emission	EZ-EMC	EZ	FA-03A2RE+
RF Conducted Measurement	MTS-8310	MWRFtest	V2.0.0.0
RF Test System	JS1120	Tonscend	V3.2.22

4. Test Equipment

Conducted Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jun. 23, 2022	Jun. 22, 2023
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jun. 23, 2022	Jun. 22, 2023
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jun. 22, 2022	Jun. 21, 2023
LISN	Rohde & Schwarz	ENV216	101131	Jun. 22, 2022	Jun. 21, 2023
Radiation Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 01, 2022	Aug. 31, 2023
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jun. 23, 2022	Jun. 22, 2023
EMI Test Receiver	Rohde & Schwarz	ESU-8	100472/008	Feb. 22, 2023	Feb.22, 2024
Bilog Antenna	SCHWARZBECK	VULB 9168	1225	Dec. 05, 2021	Dec. 04, 2023
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2463	Feb. 26, 2022	Feb.25, 2024
Horn Antenna	SCHWARZBECK	BBHA 9170	1118	Jun. 26, 2022	Jun.25, 2024
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jun. 26, 2022	Jun.25, 2024
HF Amplifier	Tonscend	TAP9E6343	AP21C806117	Sep. 01, 2022	Aug. 31, 2023
HF Amplifier	Tonscend	TAP051845	AP21C806141	Sep. 01, 2022	Aug. 31, 2023
HF Amplifier	Tonscend	TAP0184050	AP21C806129	Sep. 01, 2022	Aug. 31, 2023
Pre-amplifier	HP	8449B	3008A00849	Feb. 22, 2023	Feb.22, 2024
Highpass Filter	CD	HPM-6.4/18G	---	N/A	N/A
Highpass Filter	CD	HPM-2.8/18G	---	N/A	N/A
Highpass Filter	XINBO	XBLBQ-HTA67(8-25G)	22052702-1	N/A	N/A
Antenna Conducted Emission					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jun. 23, 2022	Jun. 22, 2023
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 01, 2022	Aug. 31, 2023
Spectrum Analyzer	KEYSIHGT	N9020B	MY60110172	Sep. 01, 2022	Aug. 31, 2023
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 01, 2022	Aug. 31, 2023
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep. 01, 2022	Aug. 31, 2023
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep. 01, 2022	Aug. 31, 2023
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep. 01, 2022	Aug. 31, 2023
RF Control Unit	Tonsced	JS0806-2	21F8060439	Sep. 01, 2022	Aug. 31, 2023
Power Control Box	Tonsced	JS0806-4ADC	21C8060387	N/A	N/A

Conducted Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jun. 20, 2023	Jun. 19, 2024
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jun. 20, 2023	Jun. 19, 2024
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jun. 20, 2023	Jun. 19, 2024
LISN	Rohde & Schwarz	ENV216	101131	Jun. 20, 2023	Jun. 19, 2024
Radiation Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Spectrum Analyzer	Agilent	N9020A	MY49100060	Aug. 30, 2023	Aug. 29, 2024
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jun. 20, 2023	Jun. 19, 2024
EMI Test Receiver	Rohde & Schwarz	ESU-8	100472/008	Feb. 22, 2023	Feb.22, 2024
Bilog Antenna	SCHWARZBECK	VULB 9168	1225	Nov. 13, 2023	Nov. 12, 2025
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2463	Feb. 26, 2022	Feb.25, 2024
Horn Antenna	SCHWARZBECK	BBHA 9170	1118	Jun. 26, 2022	Jun.25, 2024
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jun. 26, 2022	Jun.25, 2024
HF Amplifier	Tonscend	TAP9E6343	AP21C806117	Aug. 30, 2023	Aug. 29, 2024
HF Amplifier	Tonscend	TAP051845	AP21C806141	Aug. 30, 2023	Aug. 29, 2024
HF Amplifier	Tonscend	TAP0184050	AP21C806129	Aug. 30, 2023	Aug. 29, 2024
Pre-amplifier	HP	8449B	3008A00849	Feb. 22, 2023	Feb.22, 2024
Highpass Filter	CD	HPM-6.4/18G	---	N/A	N/A
Highpass Filter	CD	HPM-2.8/18G	---	N/A	N/A
Highpass Filter	XINBO	XBLBQ-HTA67(8-25G)	22052702-1	N/A	N/A
Antenna Conducted Emission					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jun. 20, 2023	Jun. 19, 2024
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Aug. 30, 2023	Aug. 29, 2024
Spectrum Analyzer	KEYSIGHT	N9020B	MY60110172	Aug. 30, 2023	Aug. 29, 2024
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Aug. 30, 2023	Aug. 29, 2024
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Aug. 30, 2023	Aug. 29, 2024
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Aug. 30, 2023	Aug. 29, 2024
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Aug. 30, 2023	Aug. 29, 2024
RF Control Unit	Tonsced	JS0806-2	21F8060439	Aug. 30, 2023	Aug. 29, 2024
Power Control Box	Tonsced	JS0806-4ADC	21C8060387	N/A	N/A

5. Conducted Emission

5.1 Test Standard and Limit

5.1.1 Test Standard

RSS-Gen 8.8

FCC Part 15.207

5.1.2 Test Limit

Frequency	Maximum RF Line Voltage (dBμV)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

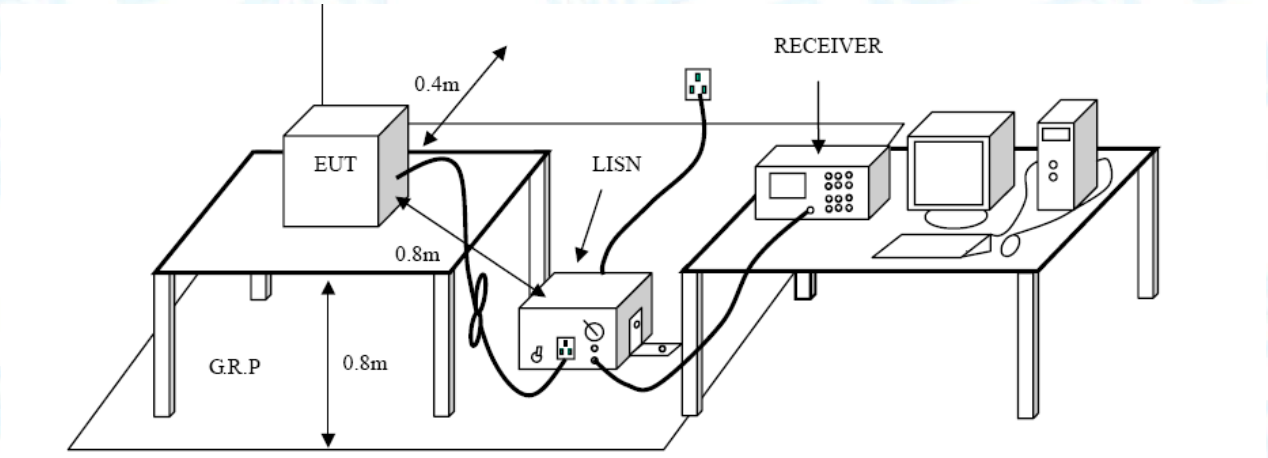
Notes:

(1) *Decreasing linearly with logarithm of the frequency.

(2) The lower limit shall apply at the transition frequencies.

(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.2 Test Setup



5.3 Test Procedure

●The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

●Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

●I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

●LISN at least 80 cm from nearest part of EUT chassis.

●The bandwidth of EMI test receiver is set at 9 kHz, and the test frequency band is from 0.15MHz to 30MHz.

5.4 Deviation From Test Standard

No deviation

5.5 EUT Operating Mode

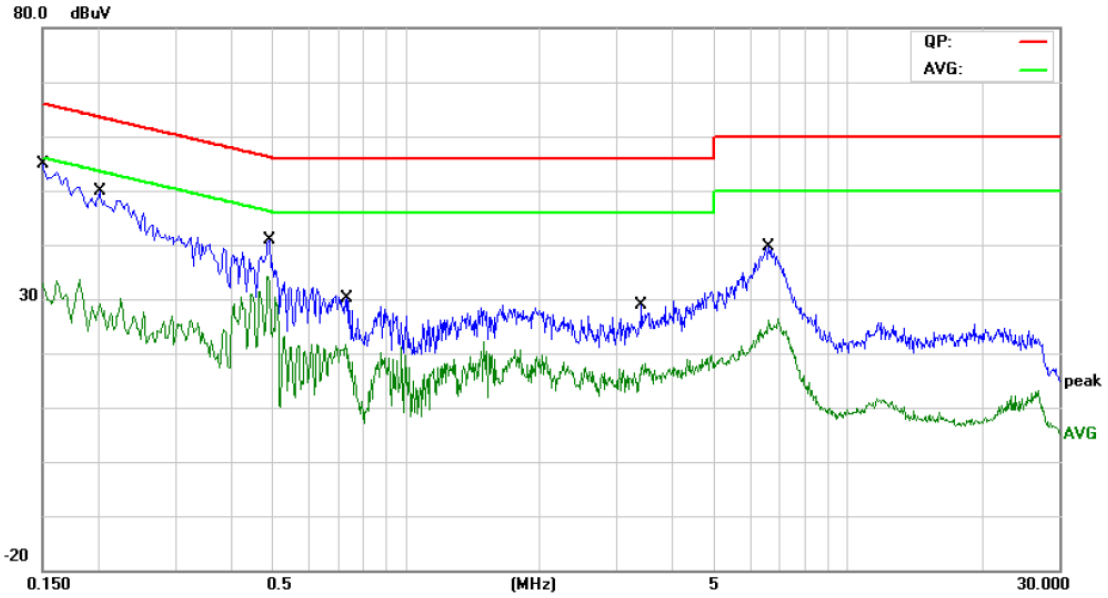
Please refer to the description of test mode.

5.6 Test Data

Please refer to the following pages.

---Test Data

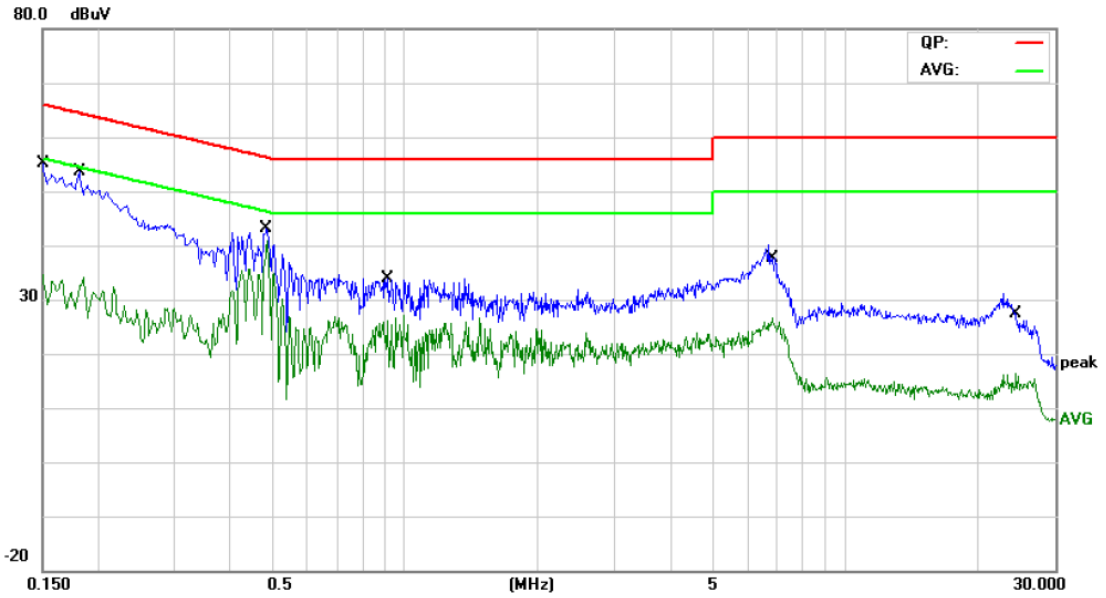
Temperature:	24.6℃	**Relative Humidity:**	42%
Test Voltage:	AC 120V/60Hz		
Terminal:	Line		
Test Mode:	Mode 1 with adapter 1#		
Remark:	Only worse case is reported.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1500	43.73	11.11	54.84	66.00	-11.16	QP
2		0.1500	22.16	11.11	33.27	56.00	-22.73	AVG
3		0.2020	38.81	11.00	49.81	63.53	-13.72	QP
4		0.2020	19.04	11.00	30.04	53.53	-23.49	AVG
5		0.4860	29.96	10.93	40.89	56.24	-15.35	QP
6		0.4860	23.18	10.93	34.11	46.24	-12.13	AVG
7		0.7300	19.27	10.86	30.13	56.00	-25.87	QP
8		0.7300	10.77	10.86	21.63	46.00	-24.37	AVG
9		3.4100	18.83	10.15	28.98	56.00	-27.02	QP
10		3.4100	7.94	10.15	18.09	46.00	-27.91	AVG
11		6.6140	29.63	10.03	39.66	60.00	-20.34	QP
12		6.6140	16.25	10.03	26.28	50.00	-23.72	AVG

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)

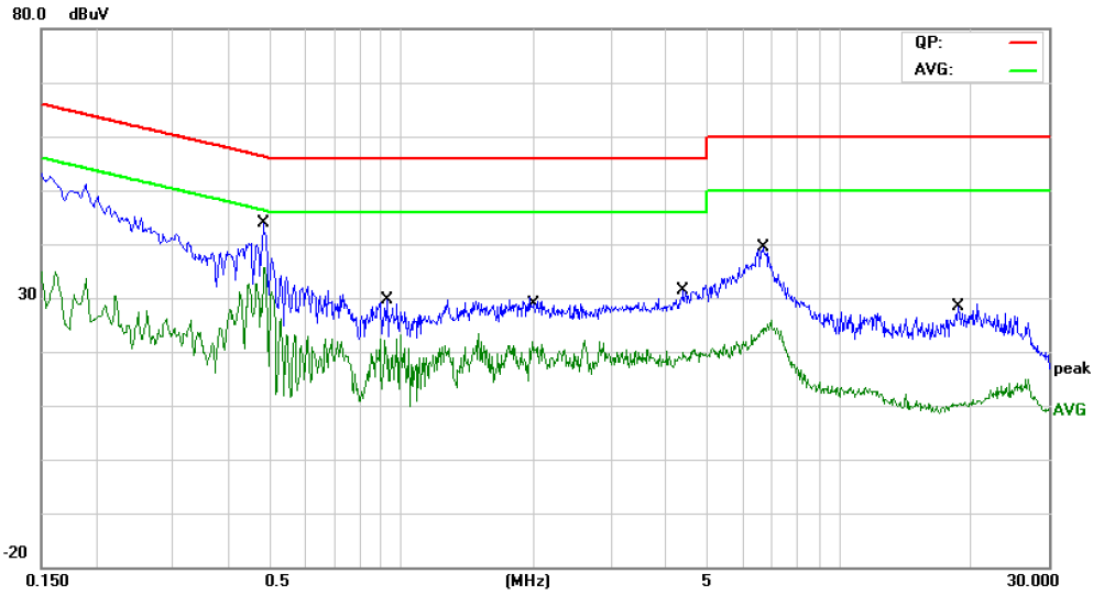
Temperature:	24.6℃	**Relative Humidity:**	42%
Test Voltage:	AC 120V/60Hz		
Terminal:	Neutral		
Test Mode:	Mode 1 with adapter 1#		
Remark:	Only worse case is reported.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1500	43.91	11.11	55.02	66.00	-10.98	QP
2		0.1500	23.48	11.11	34.59	56.00	-21.41	AVG
3		0.1819	42.53	11.04	53.57	64.40	-10.83	QP
4		0.1819	23.04	11.04	34.08	54.40	-20.32	AVG
5		0.4863	32.24	10.93	43.17	56.23	-13.06	QP
6	*	0.4863	30.05	10.93	40.98	46.23	-5.25	AVG
7		0.9100	23.23	10.74	33.97	56.00	-22.03	QP
8		0.9100	15.36	10.74	26.10	46.00	-19.90	AVG
9		6.8140	30.04	10.03	40.07	60.00	-19.93	QP
10		6.8140	16.55	10.03	26.58	50.00	-23.42	AVG
11		24.4420	20.44	10.81	31.25	60.00	-28.75	QP
12		24.4420	5.46	10.81	16.27	50.00	-33.73	AVG

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)

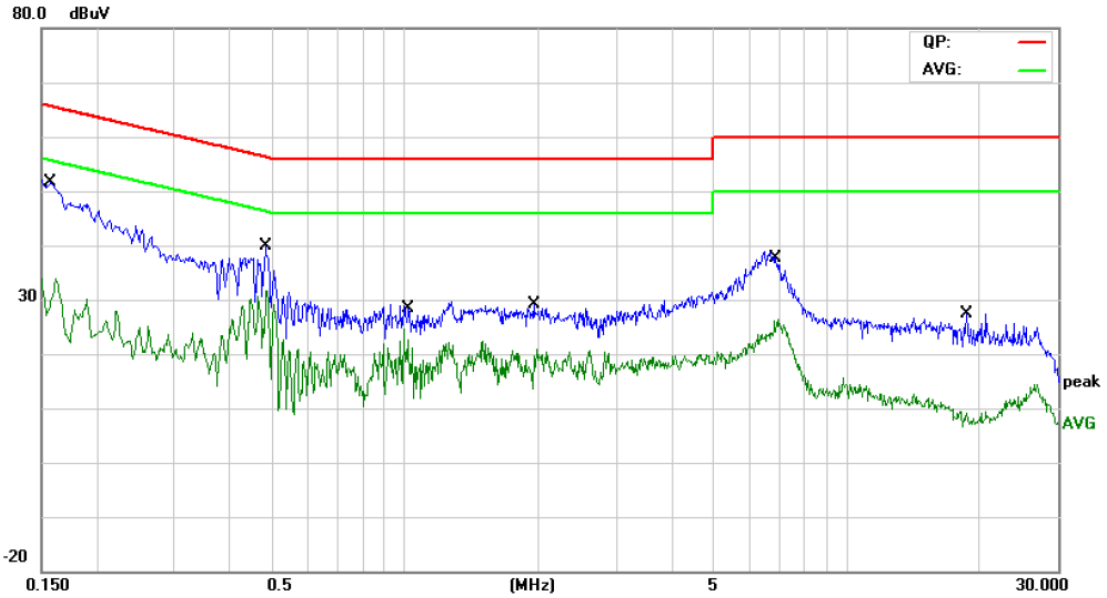
Temperature:	24.6℃	Relative Humidity:	42%
Test Voltage:	AC 120V/60Hz		
Terminal:	Line		
Test Mode:	Mode 1 with adapter 2#		
Remark:	Only worse case is reported.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.4820	32.85	10.93	43.78	56.30	-12.52	QP
2	*	0.4820	24.77	10.93	35.70	46.30	-10.60	AVG
3		0.9260	18.86	10.73	29.59	56.00	-26.41	QP
4		0.9260	12.33	10.73	23.06	46.00	-22.94	AVG
5		1.9900	19.55	10.50	30.05	56.00	-25.95	QP
6		1.9900	11.36	10.50	21.86	46.00	-24.14	AVG
7		4.3540	20.11	10.07	30.18	56.00	-25.82	QP
8		4.3540	10.34	10.07	20.41	46.00	-25.59	AVG
9		6.6820	29.31	10.03	39.34	60.00	-20.66	QP
10		6.6820	13.78	10.03	23.81	50.00	-26.19	AVG
11		18.6259	17.76	10.62	28.38	60.00	-31.62	QP
12		18.6259	0.24	10.62	10.86	50.00	-39.14	AVG

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)

Temperature:	24.6℃	**Relative Humidity:**	42%
Test Voltage:	AC 120V/60Hz		
Terminal:	Neutral		
Test Mode:	Mode 1 with adapter 2#		
Remark:	Only worse case is reported.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1580	40.56	11.09	51.65	65.57	-13.92	QP
2		0.1580	22.74	11.09	33.83	55.57	-21.74	AVG
3		0.4820	28.85	10.93	39.78	56.30	-16.52	QP
4		0.4820	20.77	10.93	31.70	46.30	-14.60	AVG
5		1.0140	18.90	10.68	29.58	56.00	-26.42	QP
6		1.0140	11.90	10.68	22.58	46.00	-23.42	AVG
7		1.9500	18.54	10.51	29.05	56.00	-26.95	QP
8		1.9500	10.35	10.51	20.86	46.00	-25.14	AVG
9		6.9660	28.81	10.03	38.84	60.00	-21.16	QP
10		6.9660	16.30	10.03	26.33	50.00	-23.67	AVG
11		18.6259	16.76	10.62	27.38	60.00	-32.62	QP
12		18.6259	0.61	10.62	11.23	50.00	-38.77	AVG

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)

6. Radiated and Conducted Unwanted Emissions

6.1 Test Standard and Limit

6.1.1 Test Standard

RSS-Gen 8.9 & RSS 247 5.5

FCC Part 15.209 & FCC Part 15.247(d)

6.1.2 Test Limit

General field strength limits at frequencies Below 30MHz			
Frequency (MHz)	**Field Strength (μA/m)***	**Field Strength (microvolt/meter)****	**Measurement Distance (meters)**
0.009~0.490	6.37/F (F in kHz)	2400/F(KHz)	300
0.490~1.705	63.7/F (F in kHz)	24000/F(KHz)	30
1.705~30.0	0.08	30	30
Note: 1, The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector. 2, *is for RSS Standard, **is for FCC Standard.			

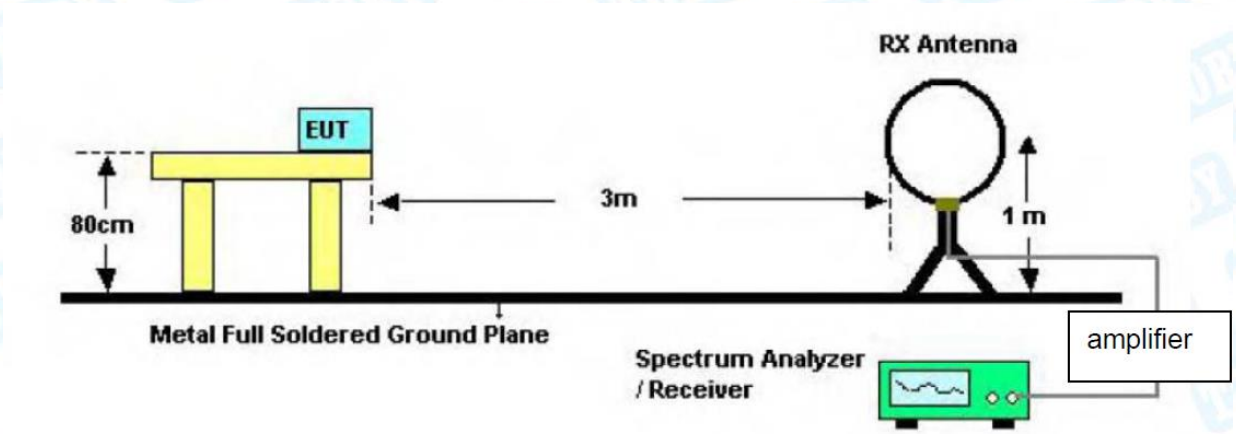
General field strength limits at frequencies above 30 MHz		
Frequency (MHz)	**Field strength (μV/m at 3 m)**	**Measurement Distance (meters)**
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

General field strength limits at frequencies Above 1000MHz		
Frequency (MHz)	**Distance of 3m (dBuV/m)**	
	Peak	**Average**
Above 1000	74	54
Note: (1) The tighter limit applies at the band edges. (2) Emission Level(dBuV/m)=20log Emission Level(uV/m)		

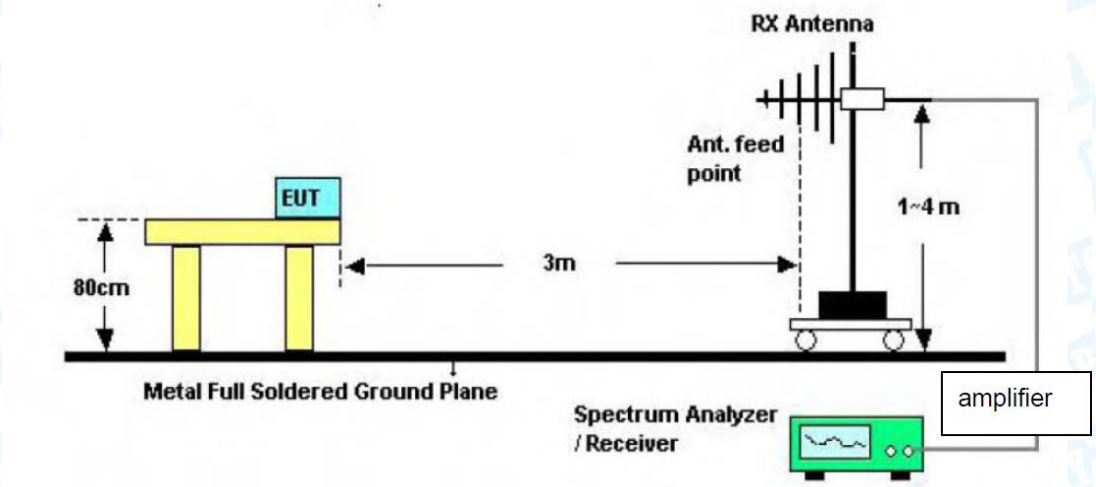
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either 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.

6.2 Test Setup

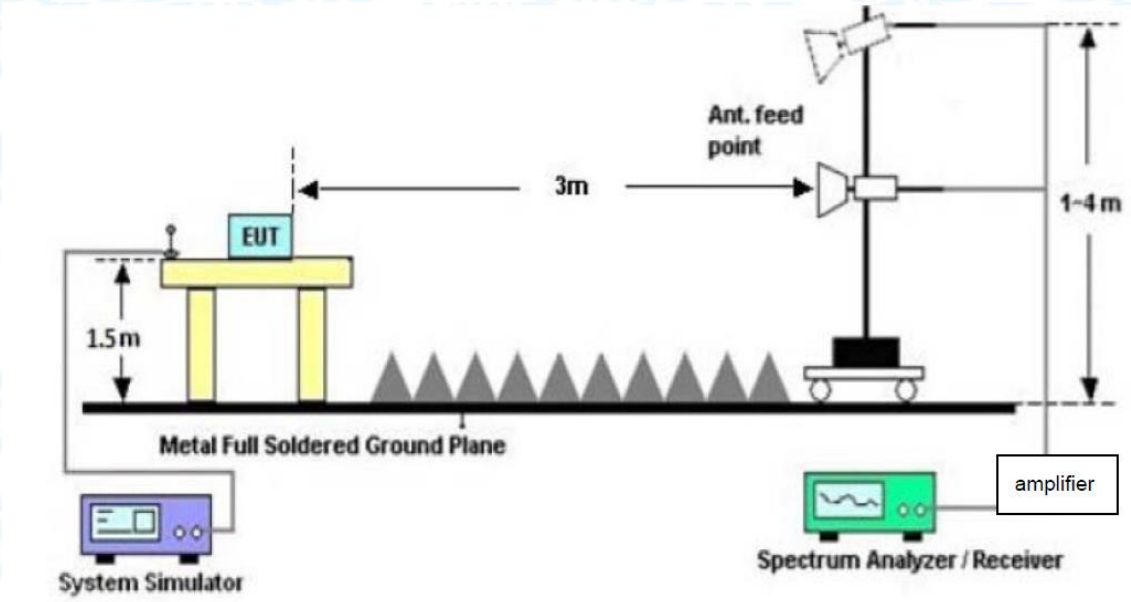
Radiated measurement



Below 30MHz Test Setup

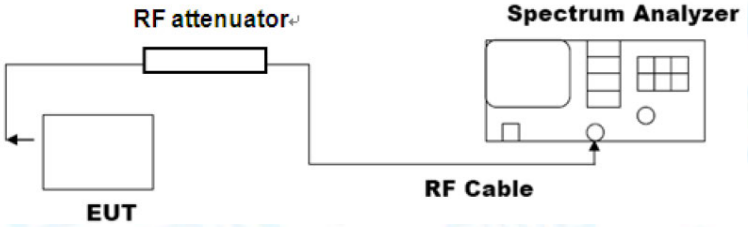


Below 1000MHz Test Setup



Above 1GHz Test Setup

Conducted measurement



6.3 Test Procedure

---Radiated measurement

● The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.

● Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.

● The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.

● The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

● If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Below 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.

● Testing frequency range 30MHz-1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection. Testing frequency range 9KHz-150Hz the measuring instrument use VBW=200Hz with Quasi-peak detection. Testing frequency range 9KHz-30MHz the measuring instrument use VBW=9kHz with Quasi-peak detection.

● Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

● For the actual test configuration, please see the test setup photo.

--- Conducted measurement

●Reference level measurement

Establish a reference level by using the following procedure:

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

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

c) Set the 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 PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

●Emission level measurement

Establish an emission level by using the following procedure:

a) Set the center frequency and span to encompass frequency range to be measured.

b) Set the RBW = 100 kHz.

c) Set the VBW≥[3*RBW].

d) Detector = peak.

e) Sweep time = auto couple.

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

h) 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.

6.4 Deviation From Test Standard

No deviation

6.5 EUT Operating Mode

Please refer to the description of test mode.

6.6 Test Data

Please refer to the following pages.

---Radiated Unwanted Emissions

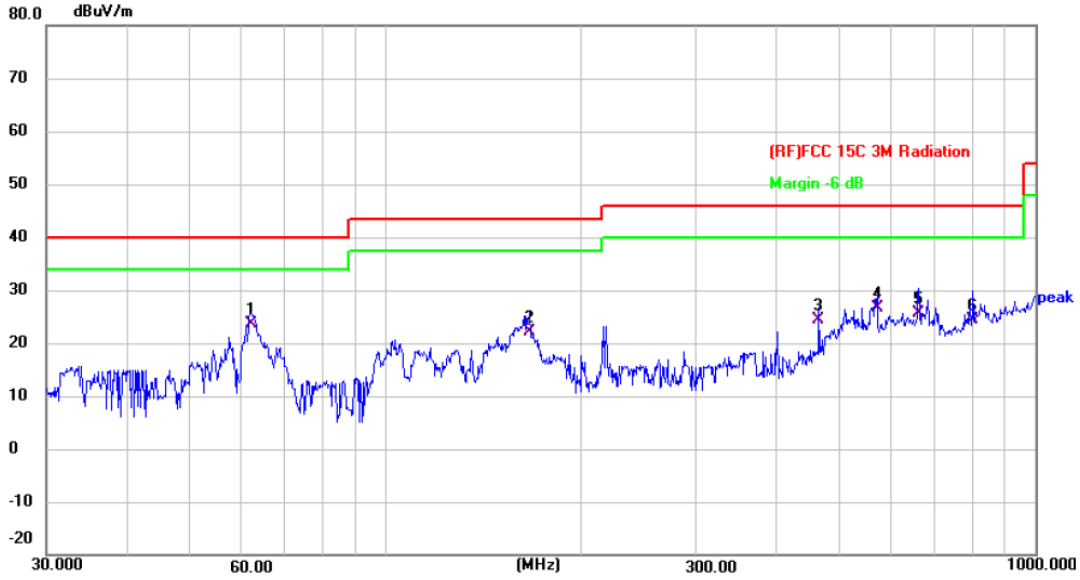
9 KHz~30 MHz

From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB Below the permissible value has no need to be reported.

30MHz~1GHz

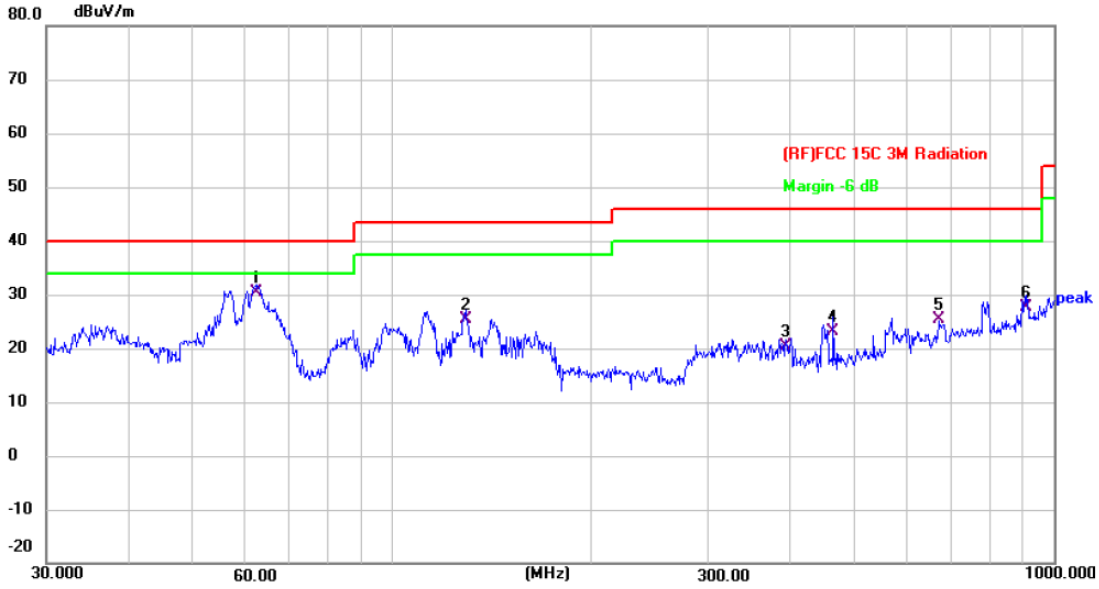
Temperature:	23.9℃	**Relative Humidity:**	44%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	Mode 2 with adapter 1#		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	61.9949	47.34	-23.80	23.54	40.00	-16.46	QP	P
2	166.6511	44.96	-22.71	22.25	43.50	-21.25	QP	P
3	463.9696	40.66	-16.29	24.37	46.00	-21.63	QP	P
4	570.6100	40.14	-13.56	26.58	46.00	-19.42	QP	P
5	661.1503	37.36	-11.78	25.58	46.00	-20.42	QP	P
6	801.7862	33.37	-9.02	24.35	46.00	-21.65	QP	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

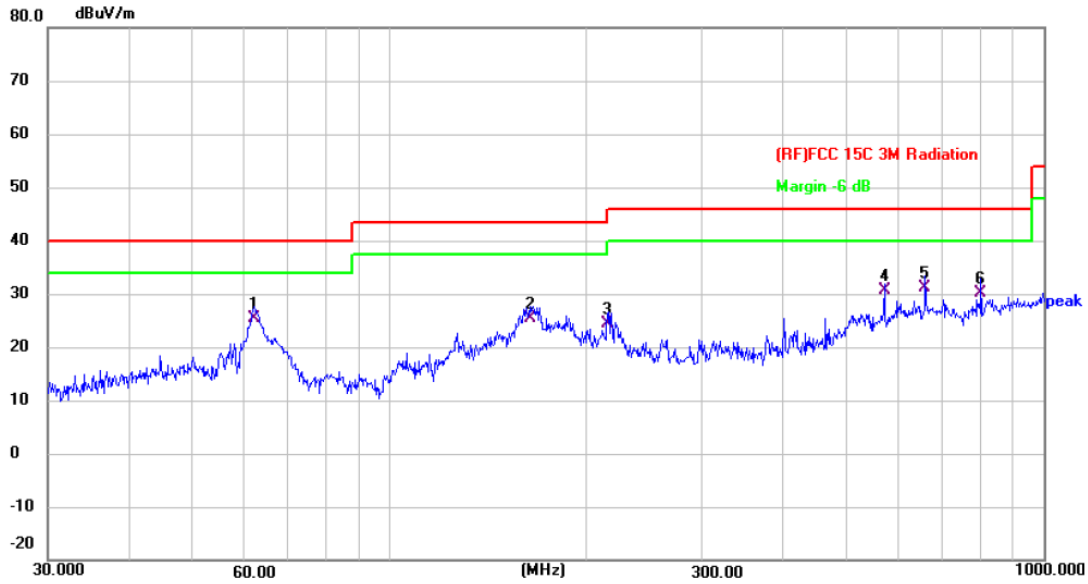
Temperature:	23.9℃	Relative Humidity:	44%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	Mode 2 with adapter 1#		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	62.2128	54.29	-23.82	30.47	40.00	-9.53	QP	P
2	129.0142	48.74	-23.30	25.44	43.50	-18.06	QP	P
3	393.4723	38.44	-18.06	20.38	46.00	-25.62	QP	P
4	463.9696	39.43	-16.29	23.14	46.00	-22.86	QP	P
5	670.4891	37.07	-11.72	25.35	46.00	-20.65	QP	P
6	909.6666	34.94	-7.39	27.55	46.00	-18.45	QP	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

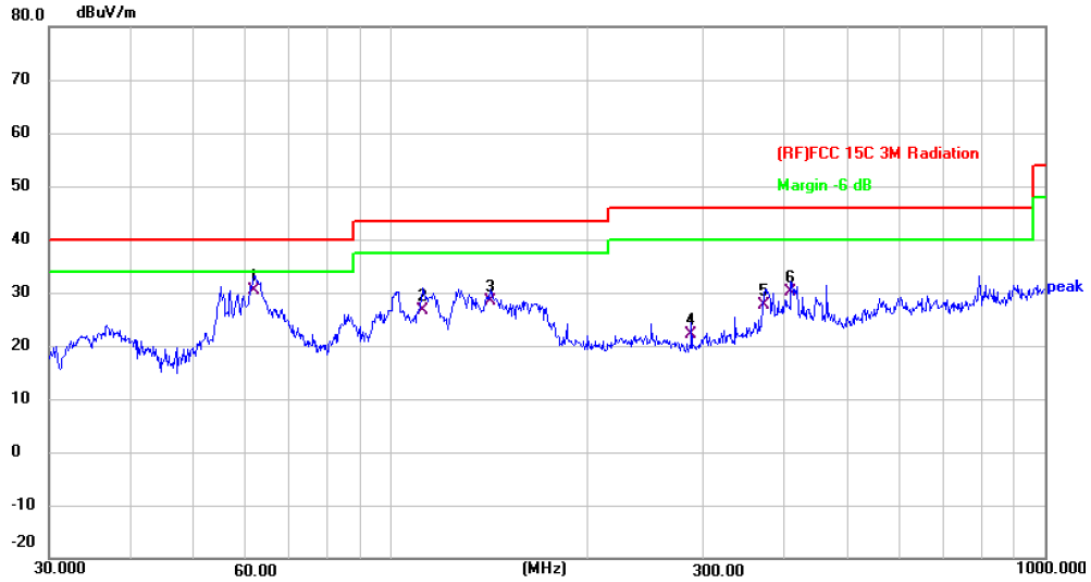
Temperature:	23.9℃	Relative Humidity:	44%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	Mode 2 with adapter 2#		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	61.9949	49.18	-23.80	25.38	40.00	-14.62	QP	P
2	163.7547	47.93	-22.46	25.47	43.50	-18.03	QP	P
3	215.2675	48.60	-24.16	24.44	43.50	-19.06	QP	P
4	570.6100	44.11	-13.56	30.55	46.00	-15.45	QP	P
5	658.8360	43.01	-11.81	31.20	46.00	-14.80	QP	P
6	801.7862	39.07	-9.02	30.05	46.00	-15.95	QP	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Temperature:	23.9℃	Relative Humidity:	44%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	Mode 2 with adapter 2#		
Remark:	Only worse case is reported.		

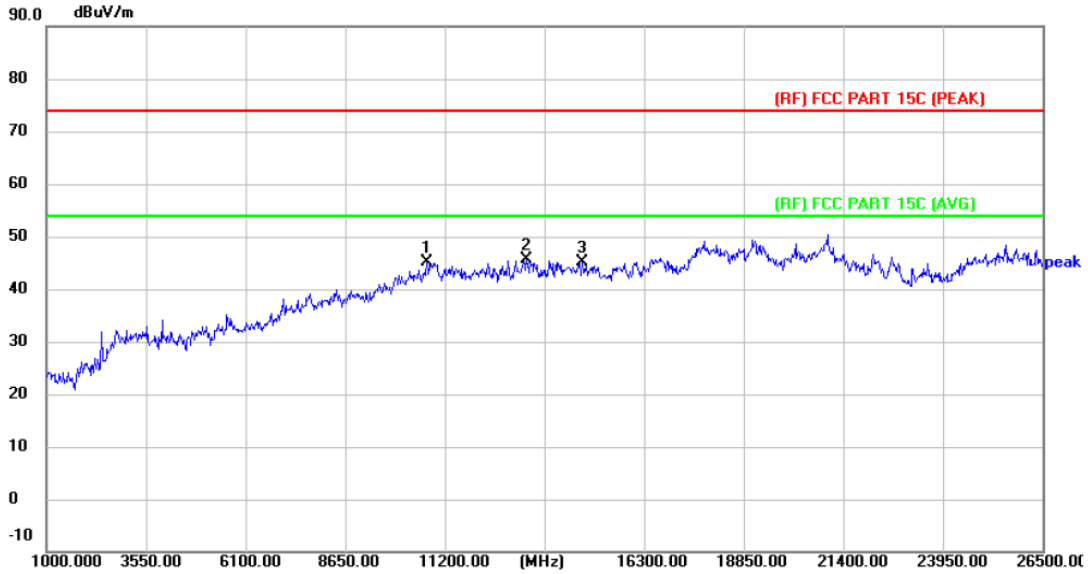


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1 *	61.7779	54.20	-23.79	30.41	40.00	-9.59	QP	P
2	111.7377	51.12	-24.57	26.55	43.50	-16.95	QP	P
3	141.8262	51.04	-22.63	28.41	43.50	-15.09	QP	P
4	287.9904	43.35	-21.24	22.11	46.00	-23.89	QP	P
5	373.3110	46.21	-18.68	27.53	46.00	-18.47	QP	P
6	408.9458	47.81	-17.67	30.14	46.00	-15.86	QP	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Above 1GHz

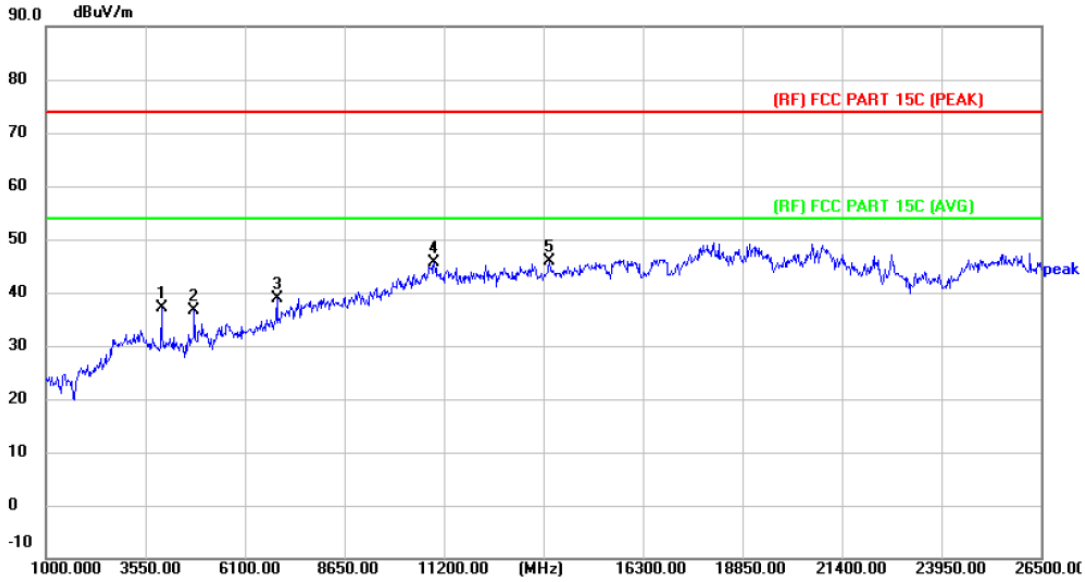
Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(1Mbps) Mode TX 2402 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	10741.000	41.81	3.32	45.13	74.00	-28.87	peak	P
2 *	13291.000	39.78	5.79	45.57	74.00	-28.43	peak	P
3	14719.000	38.27	6.82	45.09	74.00	-28.91	peak	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)
4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.
5. No report for the emission which more than 20dB below the prescribed limit.
6. The peak value＜average limit, So only show the peak value.

Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE(1Mbps) Mode TX 2402 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3958.000	54.01	-16.81	37.20	74.00	-36.80	peak	P
2	4799.500	50.70	-14.03	36.67	74.00	-37.33	peak	P
3	6916.000	48.27	-9.27	39.00	74.00	-35.00	peak	P
4	10945.000	41.45	4.20	45.65	74.00	-28.35	peak	P
5 *	13903.000	38.75	7.01	45.76	74.00	-28.24	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

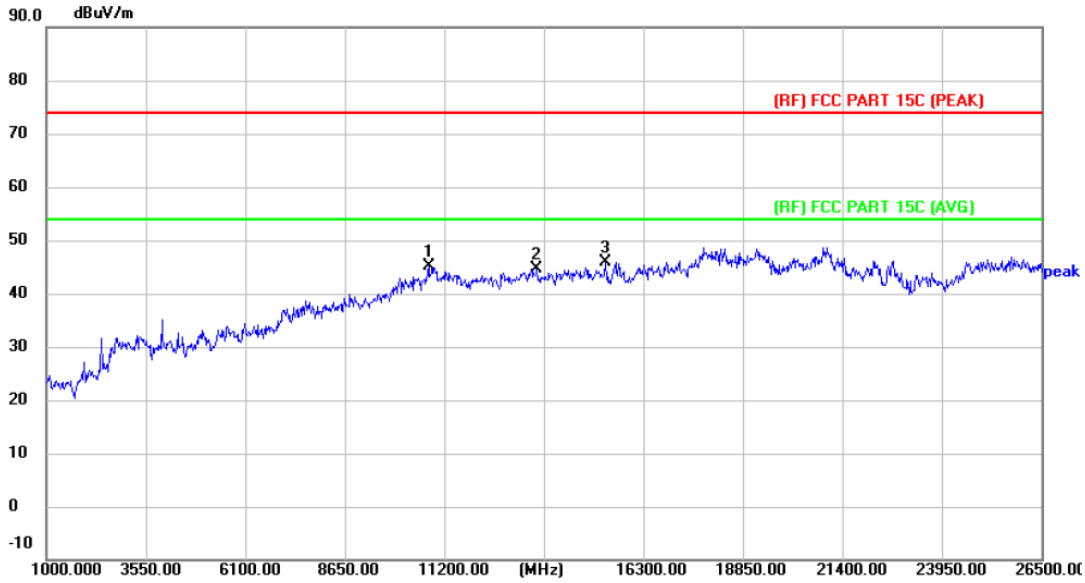
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.

5. No report for the emission which more than 20dB below the prescribed limit.

6. The peak value＜average limit, So only show the peak value.

Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(1Mbps) Mode TX 2440 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	10792.000	41.49	3.69	45.18	74.00	-28.82	peak	P
2	13571.500	38.74	5.98	44.72	74.00	-29.28	peak	P
3 *	15331.000	39.44	6.33	45.77	74.00	-28.23	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

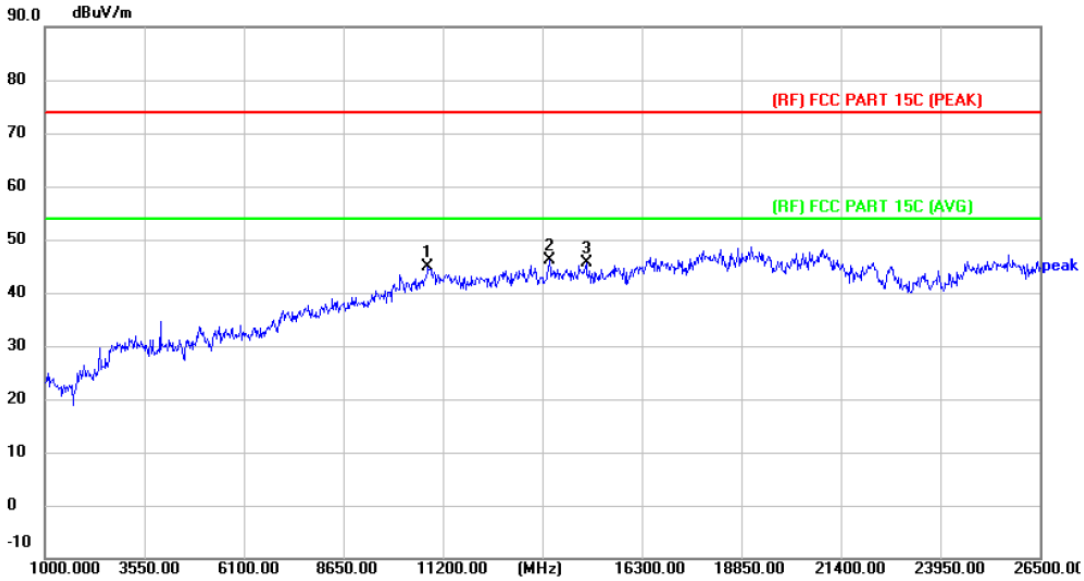
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.

5. No report for the emission which more than 20dB below the prescribed limit.

6. The peak value＜average limit, So only show the peak value.

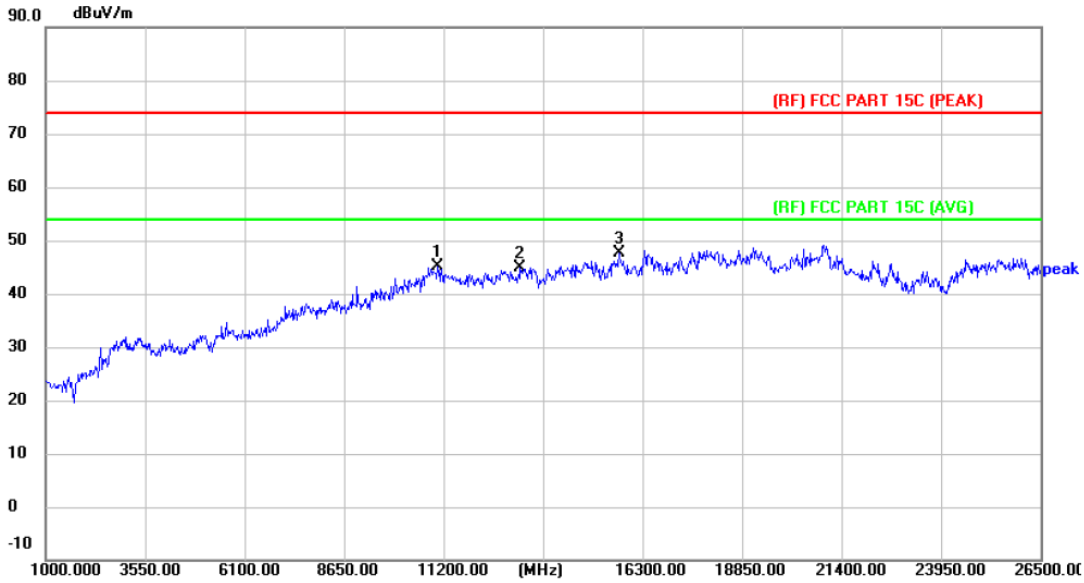
Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE(1Mbps) Mode TX 2440 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	10537.000	47.32	-3.56	43.76	74.00	-30.24	peak	P
2 *	13265.500	44.52	-0.20	44.32	74.00	-29.68	peak	P

Remark:
Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)
4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.
5. No report for the emission which more than 20dB below the prescribed limit.
6. The peak value＜average limit, So only show the peak value.

Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(1Mbps) Mode TX 2480 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	11047.000	41.16	3.98	45.14	74.00	-28.86	peak	P
2	13163.500	39.06	5.81	44.87	74.00	-29.13	peak	P
3 *	15688.000	43.40	4.23	47.63	74.00	-26.37	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

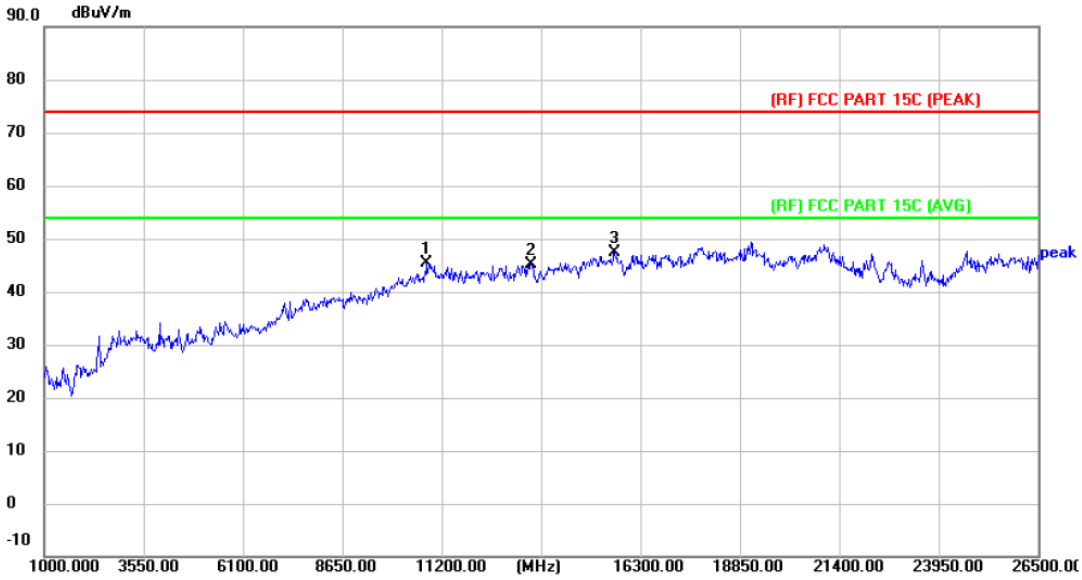
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.

5. No report for the emission which more than 20dB below the prescribed limit.

6. The peak value＜average limit, So only show the peak value.

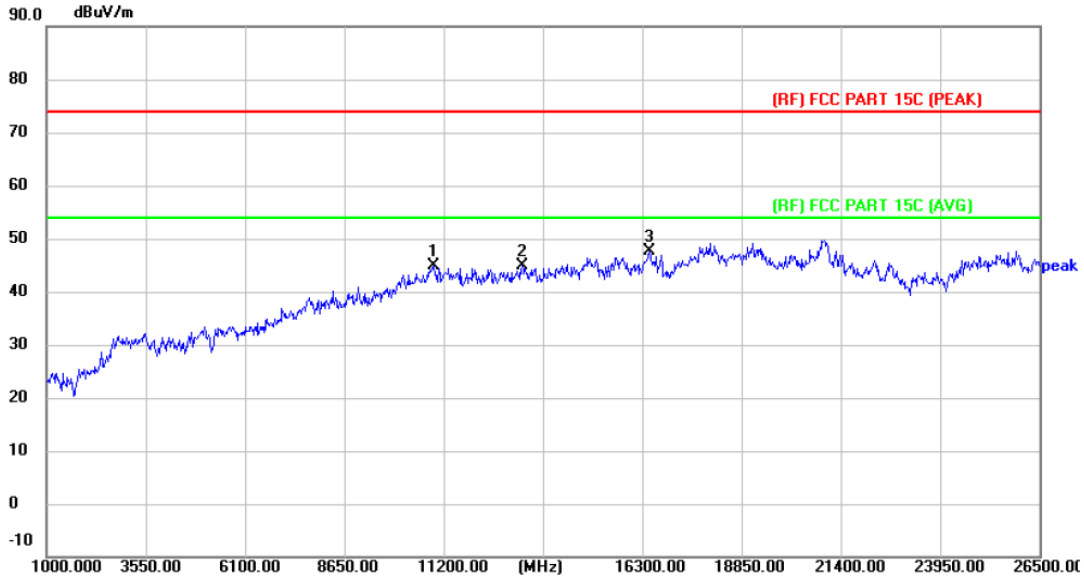
Temperature:	23.8℃	**Relative Humidity:**	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE(1Mbps) Mode TX 2480 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	10817.500	41.47	3.83	45.30	74.00	-28.70	peak	P
2	13495.000	39.06	6.11	45.17	74.00	-28.83	peak	P
3 *	15637.000	42.67	4.67	47.34	74.00	-26.66	peak	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)
4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.
5. No report for the emission which more than 20dB below the prescribed limit.
6. The peak value＜average limit, So only show the peak value.

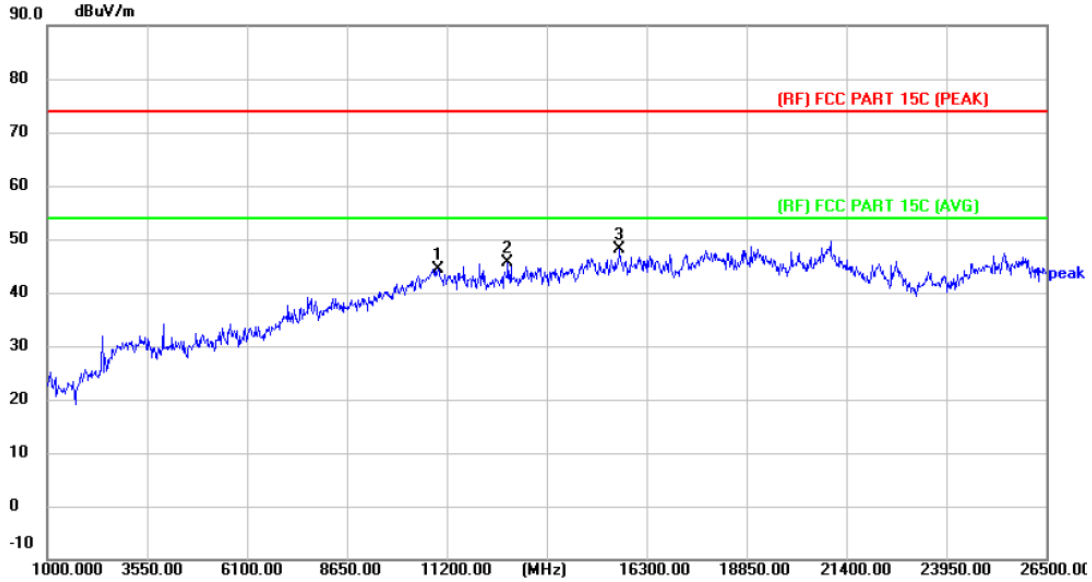
Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(2Mbps) Mode TX 2402 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	10945.000	40.59	4.20	44.79	74.00	-29.21	peak	P
2	13214.500	39.15	5.80	44.95	74.00	-29.05	peak	P
3 *	16478.500	42.61	5.08	47.69	74.00	-26.31	peak	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)
4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.
5. No report for the emission which more than 20dB below the prescribed limit.
6. The peak value＜average limit, So only show the peak value.

Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE(2Mbps) Mode TX 2402 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	10970.500	40.17	4.18	44.35	74.00	-29.65	peak	P
2	12755.500	40.05	5.49	45.54	74.00	-28.46	peak	P
3 *	15611.500	43.24	4.90	48.14	74.00	-25.86	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

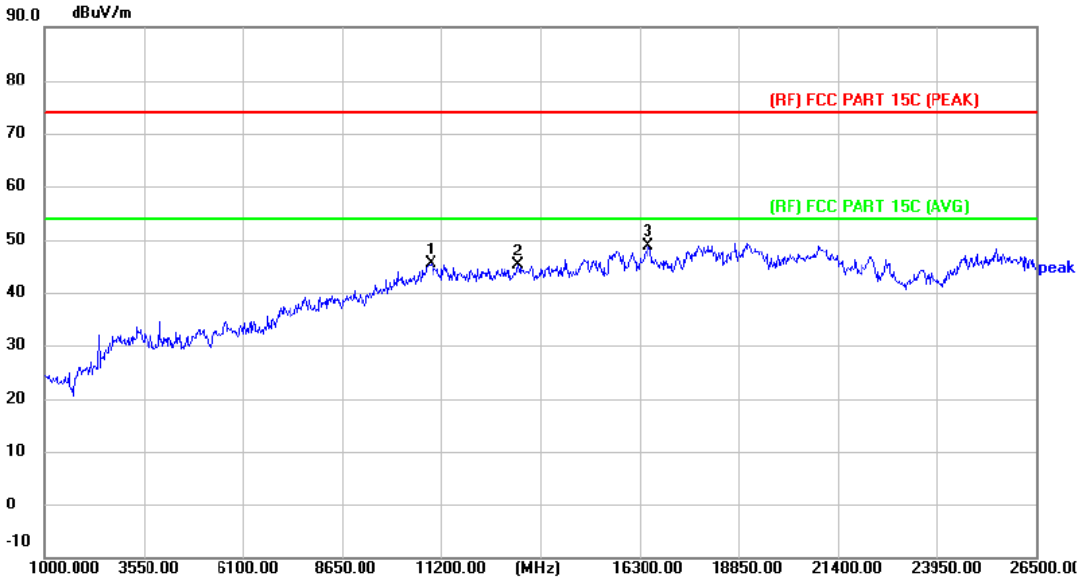
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.

5. No report for the emission which more than 20dB below the prescribed limit.

6. The peak value＜average limit, So only show the peak value.

Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(2Mbps) Mode TX 2440 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	10945.000	41.28	4.20	45.48	74.00	-28.52	peak	P
2	13189.000	39.35	5.81	45.16	74.00	-28.84	peak	P
3 *	16529.500	43.30	5.47	48.77	74.00	-25.23	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

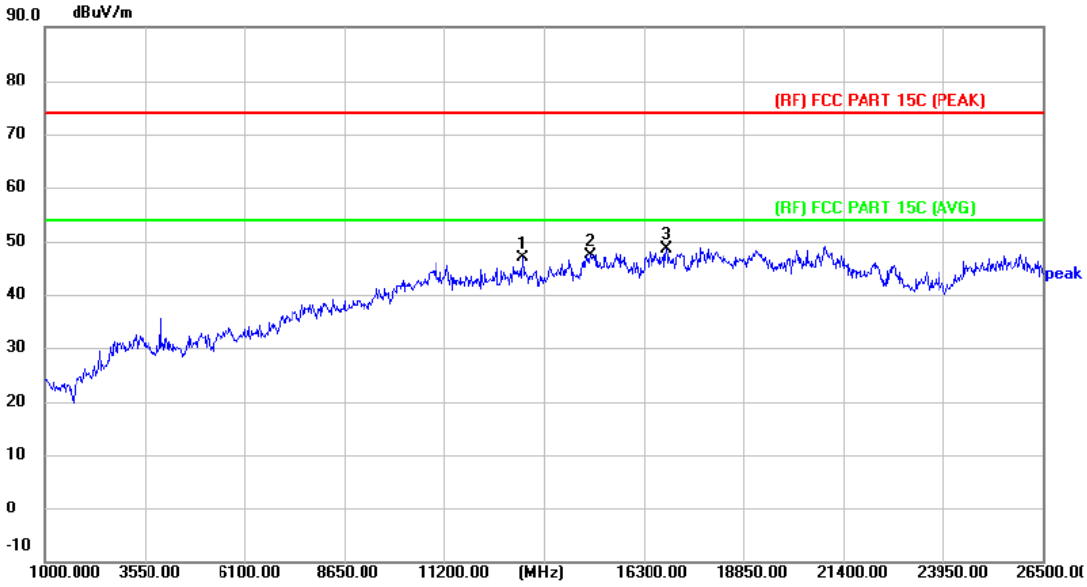
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.

5. No report for the emission which more than 20dB below the prescribed limit.

6. The peak value＜average limit, So only show the peak value.

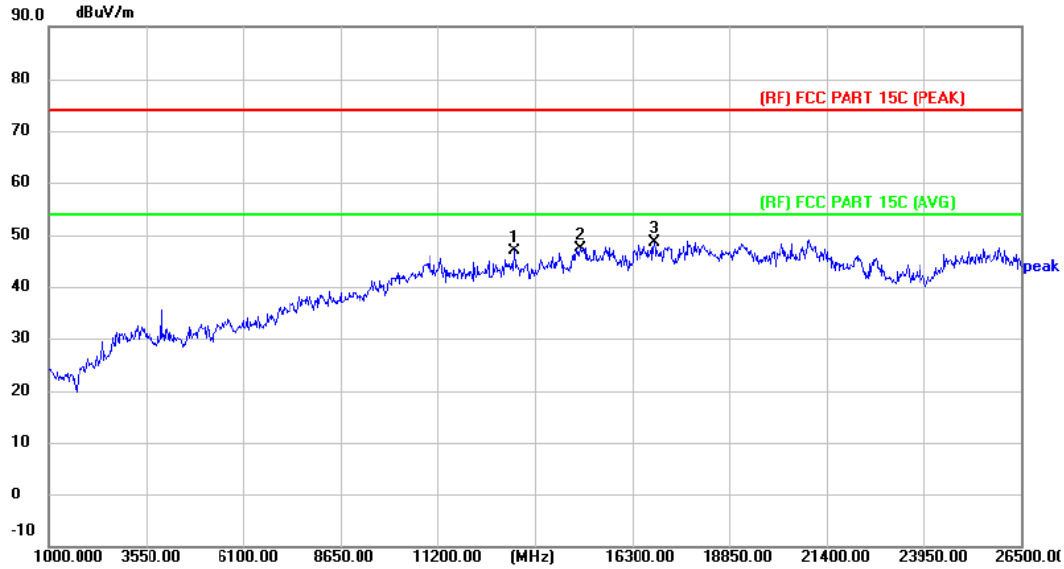
Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE(2Mbps) Mode TX 2440 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	13214.500	41.03	5.80	46.83	74.00	-27.17	peak	P
2	14948.500	40.00	7.37	47.37	74.00	-26.63	peak	P
3 *	16886.500	41.76	6.94	48.70	74.00	-25.30	peak	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)
4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.
5. No report for the emission which more than 20dB below the prescribed limit.
6. The peak value＜average limit, So only show the peak value.

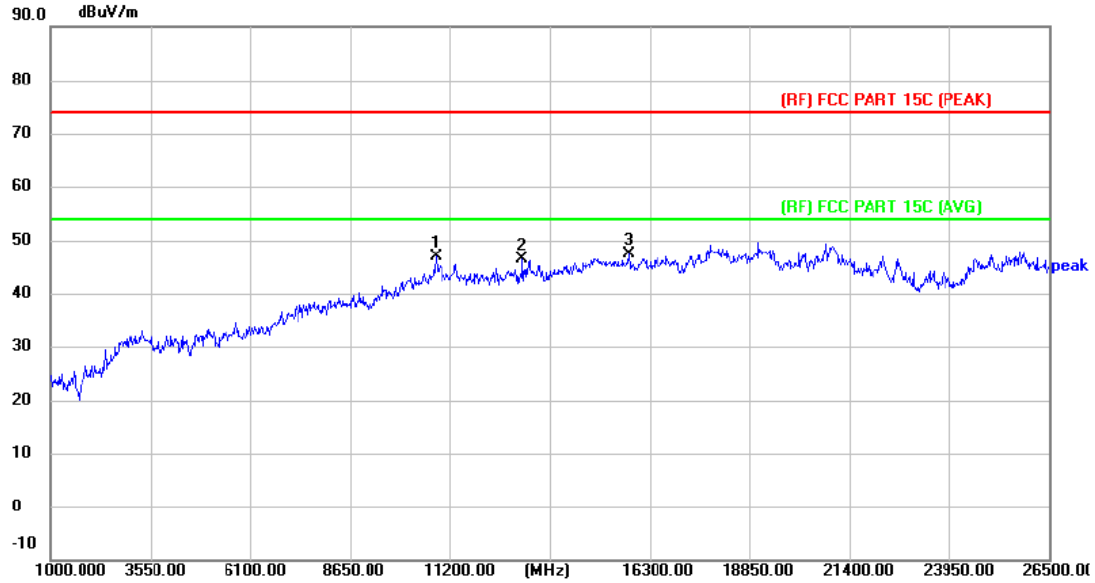
Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(2Mbps) Mode TX 2480 MHz		
Remark:	Only worse case is reported.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	13214.500	41.03	5.80	46.83	74.00	-27.17	peak	P
2	14948.500	40.00	7.37	47.37	74.00	-26.63	peak	P
3 *	16886.500	41.76	6.94	48.70	74.00	-25.30	peak	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)
4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.
5. No report for the emission which more than 20dB below the prescribed limit.
6. The peak value＜average limit, So only show the peak value.

Temperature:	23.8℃	Relative Humidity:	45%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE(2Mbps) Mode TX 2480 MHz		
Remark:	Only worse case is reported.		

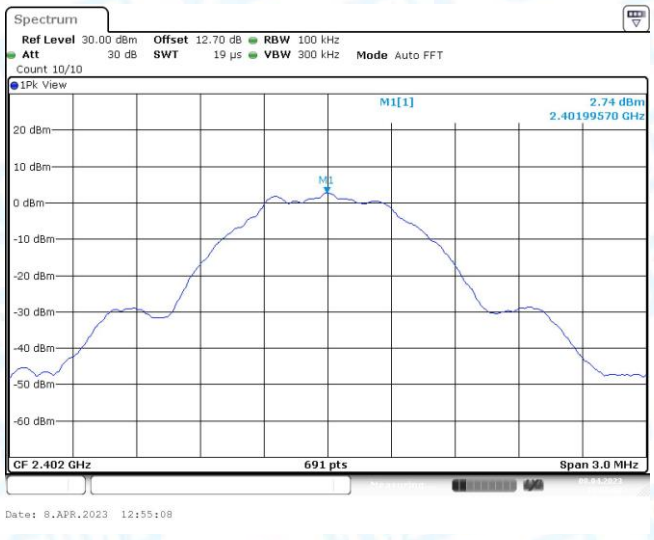


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	10843.000	42.99	3.96	46.95	74.00	-27.05	peak	P
2	13061.500	40.58	5.74	46.32	74.00	-27.68	peak	P
3 *	15764.500	43.20	4.22	47.42	74.00	-26.58	peak	P

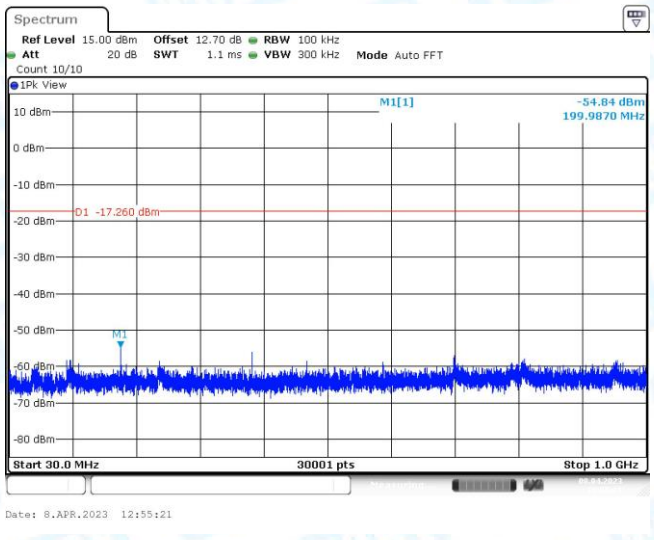
Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)
4. The tests evaluated 1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency. Test with highpass filter (Pass Frequency: 2.8-18G and 8-25G), and 18GHz-26.5GHz is the noise, No other signals were detected.
5. No report for the emission which more than 20dB below the prescribed limit.
6. The peak value＜average limit, So only show the peak value.

---Conducted Unwanted Emissions

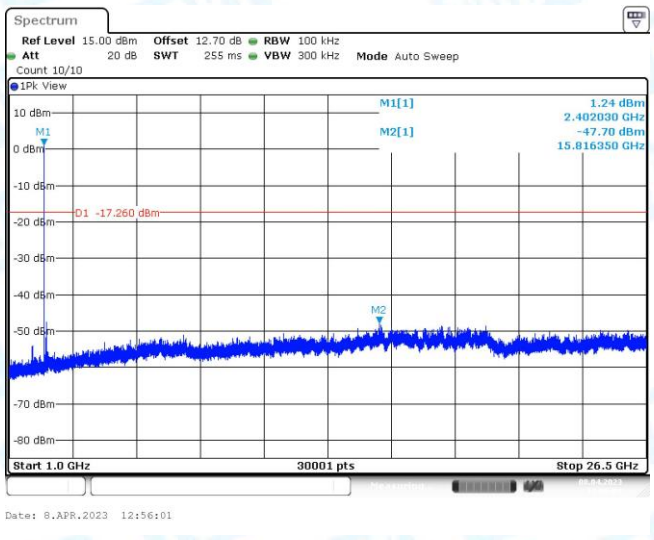
Test Mode	Channel	Freq. Range [MHz]	Ref. Level [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	2402	Reference	2.74	2.74	---	PASS
		30~1000	2.74	-54.84	≤-17.26	PASS
		1000~26500	2.74	-47.7	≤-17.26	PASS
	2440	Reference	3.35	3.35	---	PASS
		30~1000	3.35	-55.51	≤-16.65	PASS
		1000~26500	3.35	-47.97	≤-16.65	PASS
	2480	Reference	3.00	3.00	---	PASS
		30~1000	3.00	-54.48	≤-17	PASS
		1000~26500	3.00	-48.58	≤-17	PASS
BLE_2M	2402	Reference	2.69	2.69	---	PASS
		30~1000	2.69	-54.58	≤-17.31	PASS
		1000~26500	2.69	-48.24	≤-17.31	PASS
	2440	Reference	3.32	3.32	---	PASS
		30~1000	3.32	-54.97	≤-16.68	PASS
		1000~26500	3.32	-48.21	≤-16.68	PASS
	2480	Reference	2.97	2.97	---	PASS
		30~1000	2.97	-55.14	≤-17.03	PASS
		1000~26500	2.97	-40.77	≤-17.03	PASS



BLE_1M_2402_0~Reference

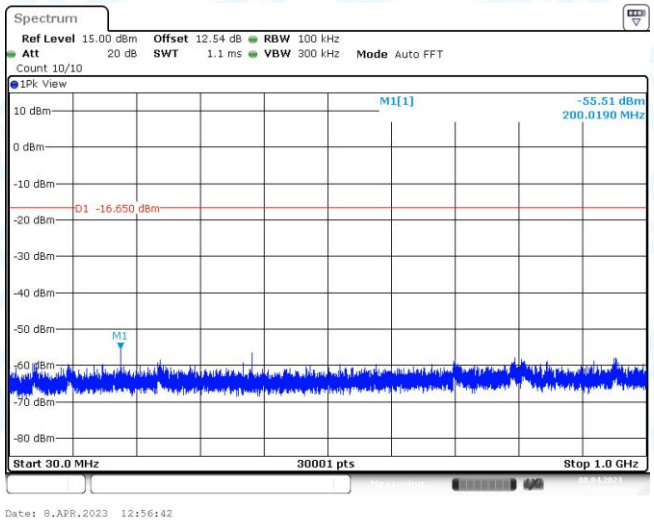


BLE_1M_2402_30~1000

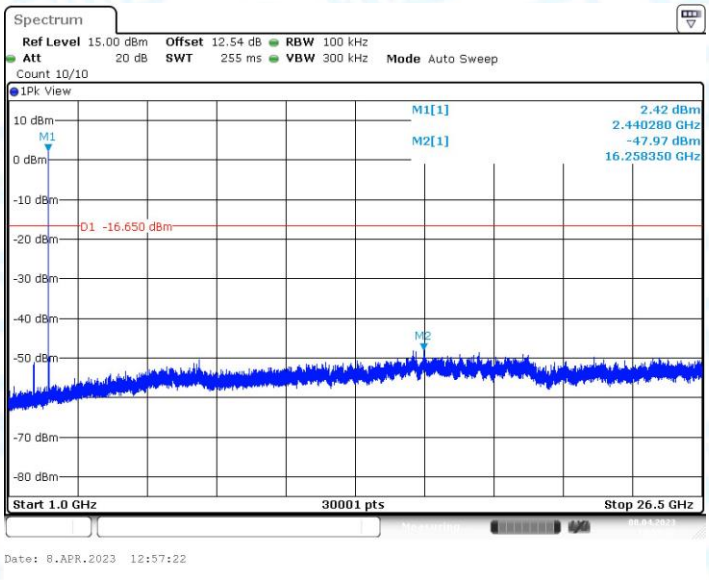


BLE_1M_2402_1000~26500

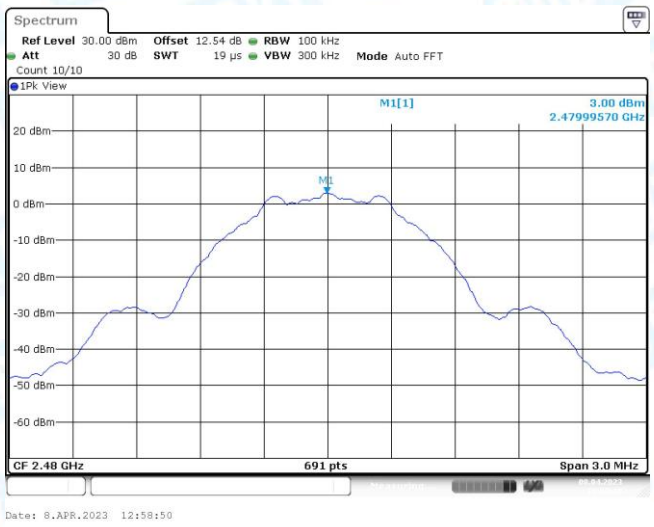
BLE_1M_2440_0~Reference



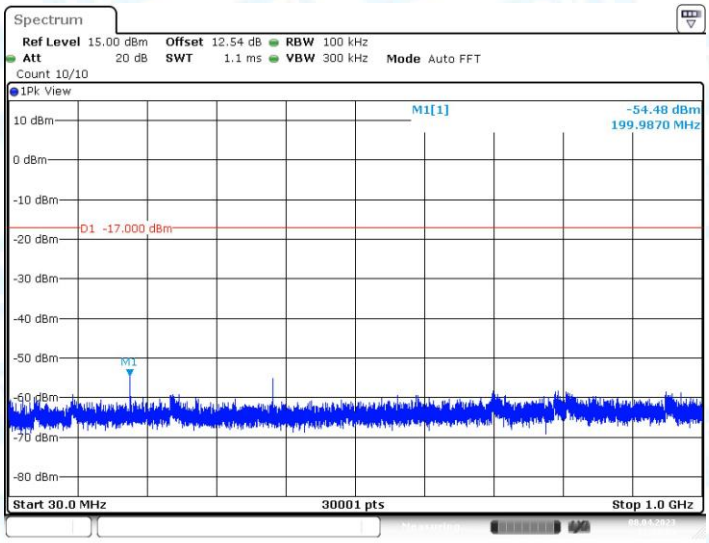
BLE_1M_2440_30~1000



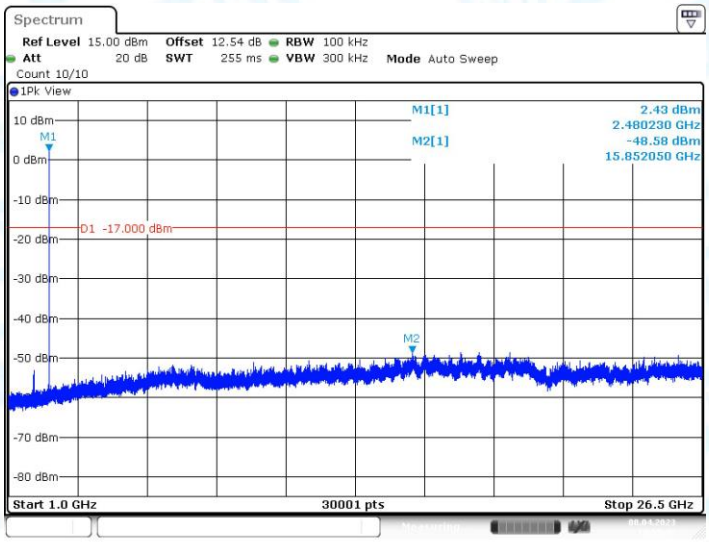
BLE_1M_2440_1000~26500



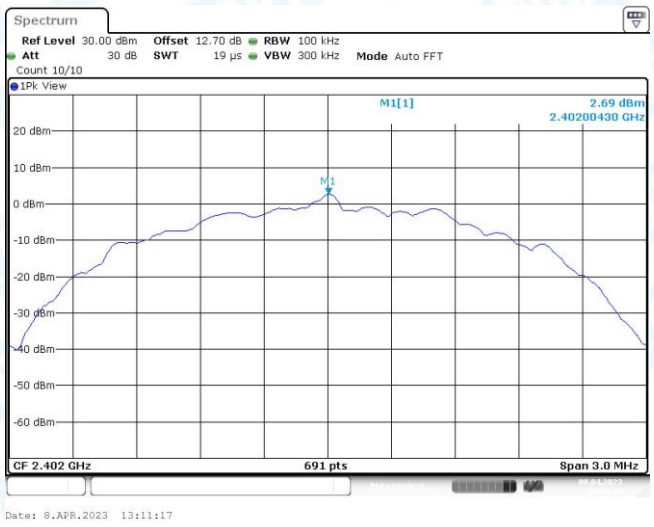
BLE_1M_2480_0~Reference



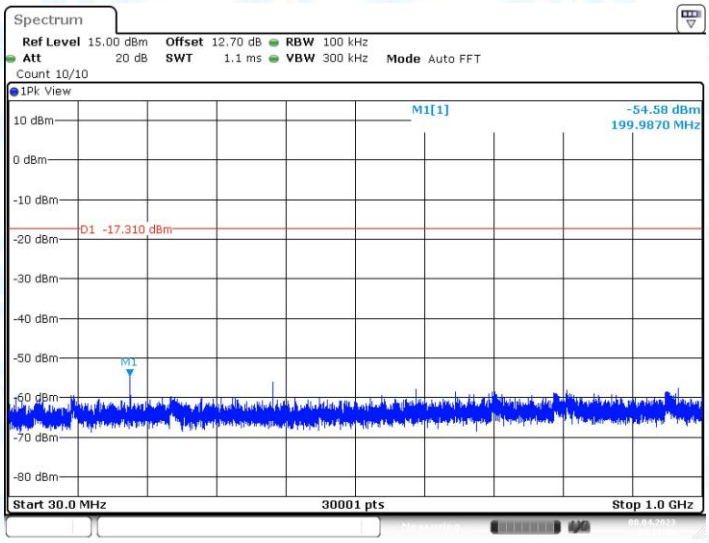
BLE_1M_2480_30~1000



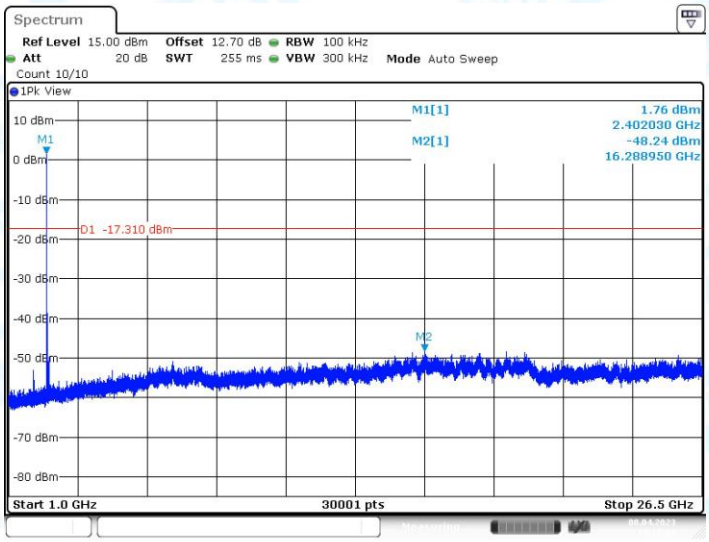
BLE_1M_2480_1000~26500



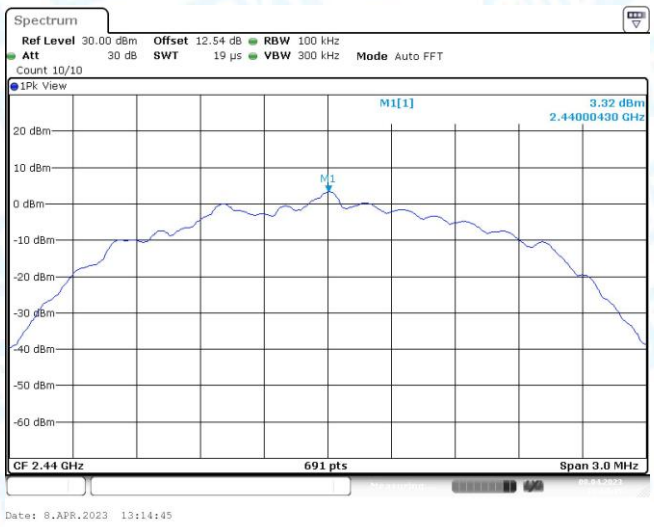
BLE_2M_2402_0~Reference



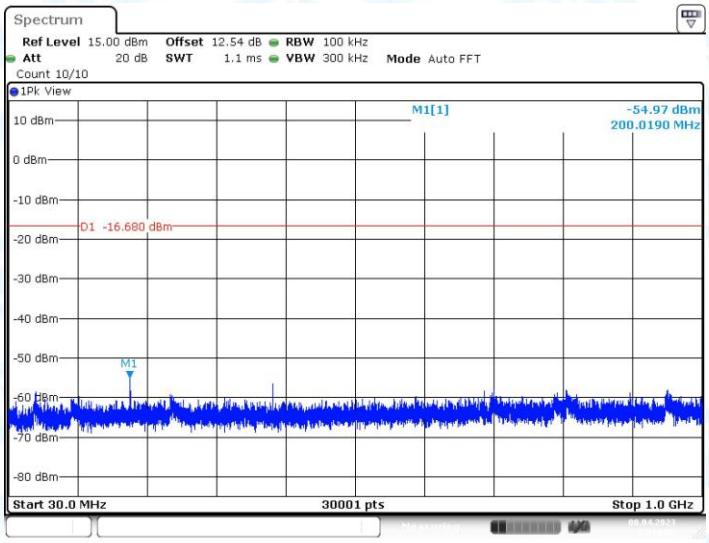
BLE_2M_2402_30~1000



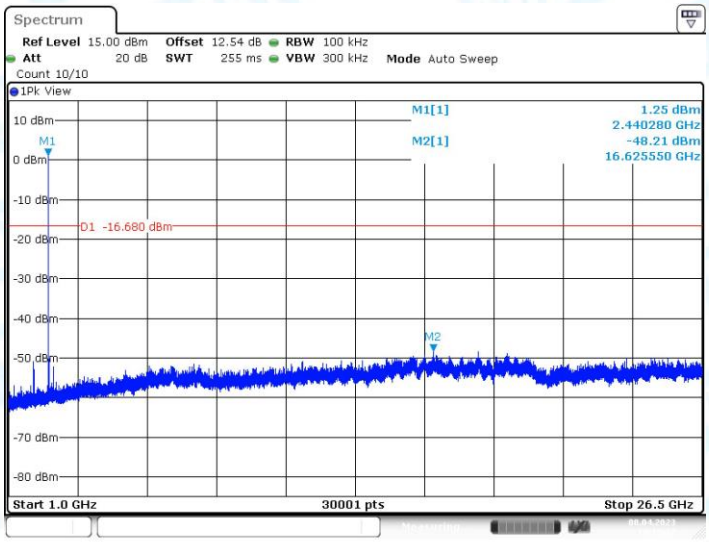
BLE_2M_2402_1000~26500



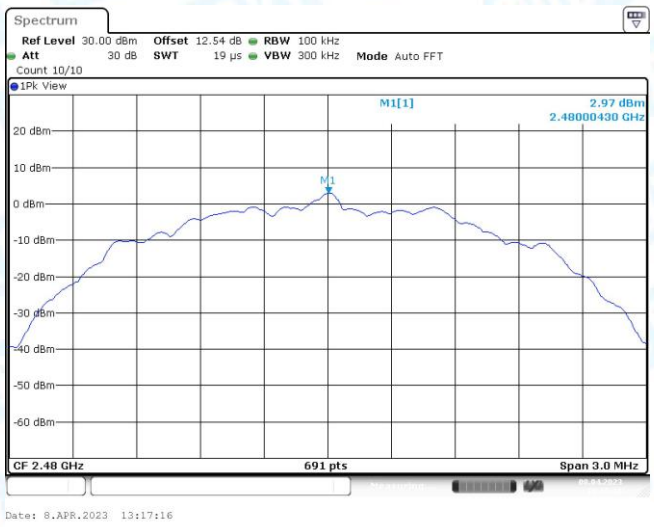
BLE_2M_2440_0~Reference



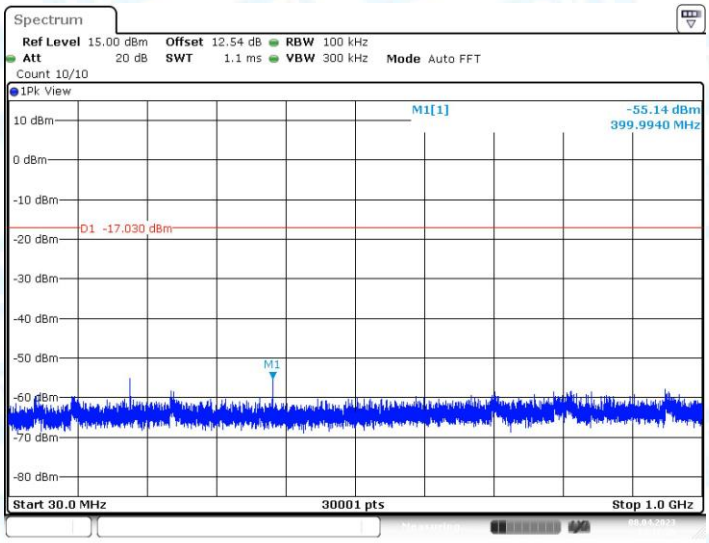
BLE_2M_2440_30~1000



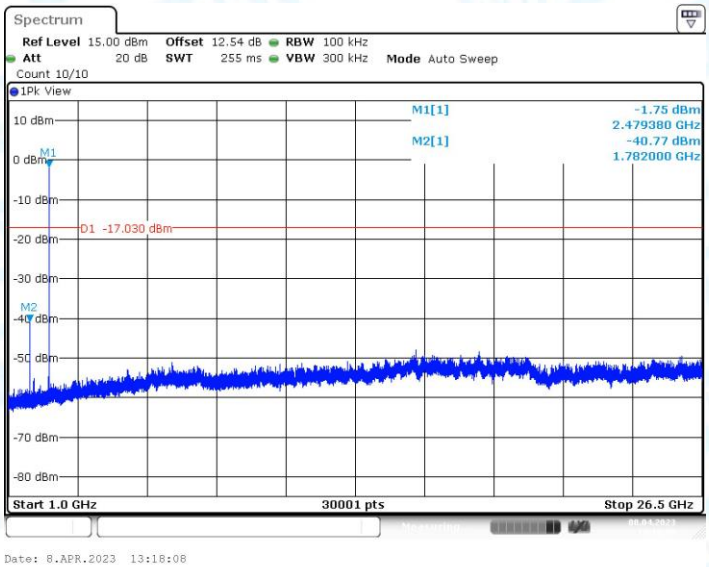
BLE_2M_2440_1000~26500



BLE_2M_2480_0~Reference



BLE_2M_2480_30~1000



BLE_2M_2480_1000~26500

7. Restricted Bands and Band Edge Requirement

7.1 Test Standard and Limit

7.1.1 Test Standard

RSS-Gen 8.10 & RSS 247 5.5

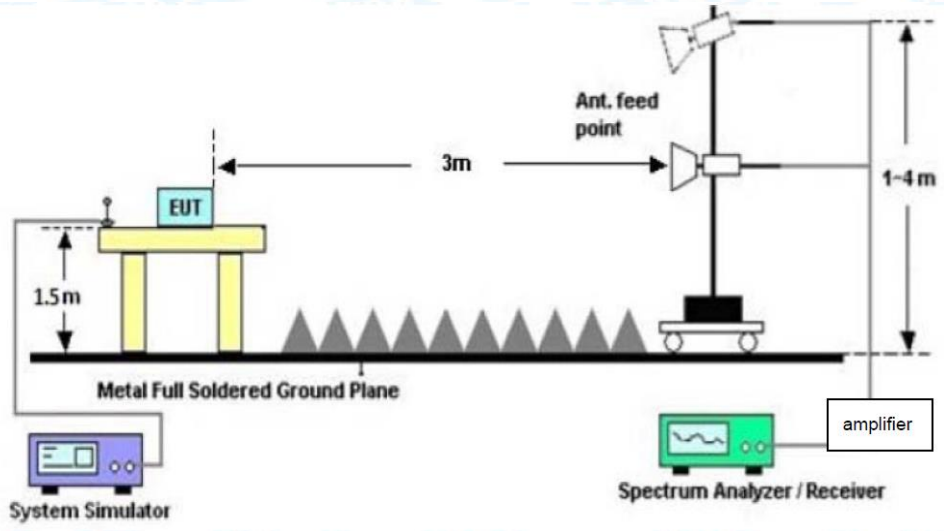
FCC Part 15.205 & FCC Part 15.247(d)

7.1.2 Test Limit

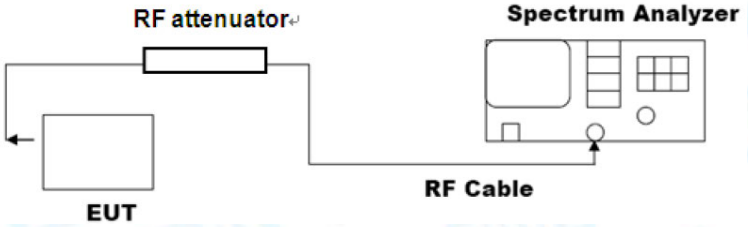
Restricted Frequency Band (MHz)	Distance Meters(at 3m)	
	Peak (dBuV/m)	Average (dBuV/m)
2310 ~2390	74	54
2483.5 ~2500	74	54
	Peak (dBm)see 7.3 e)	Average (dBm) see 7.3 e)
2310 ~2390	-21.20	-41.20
2483.5 ~2500	-21.20	-41.20
Note: According the ANSI C63.10 11.12.2 antenna-port conducted measurements may also be used as an alternative to radiated measurements for determining compliance in the restricted frequency bands requirements. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test forcabinet/case emissions is required.		
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.		

7.2 Test Setup

Radiated measurement



Conducted measurement



7.3 Test Procedure

---Radiated measurement

● Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.

● The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.

●The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

●The Peak Value and average value both need to comply with applicable limit above 1 GHz.

●Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

●For the actual test configuration, please see the test setup photo.

--- Conducted measurement

●Reference level measurement

Establish a reference level by using the following procedure:

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

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

c) Set the 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 PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

●Emission level measurement

Establish an emission level by using the following procedure:

a) Set the center frequency and span to encompass frequency range to be measured.

b) Set the RBW = 100 kHz.

c) Set the VBW≥[3*RBW].

d) Detector = peak.

e) Sweep time = auto couple.

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

h) 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.

7.4 Deviation From Test Standard

No deviation

7.5 EUT Operating Mode

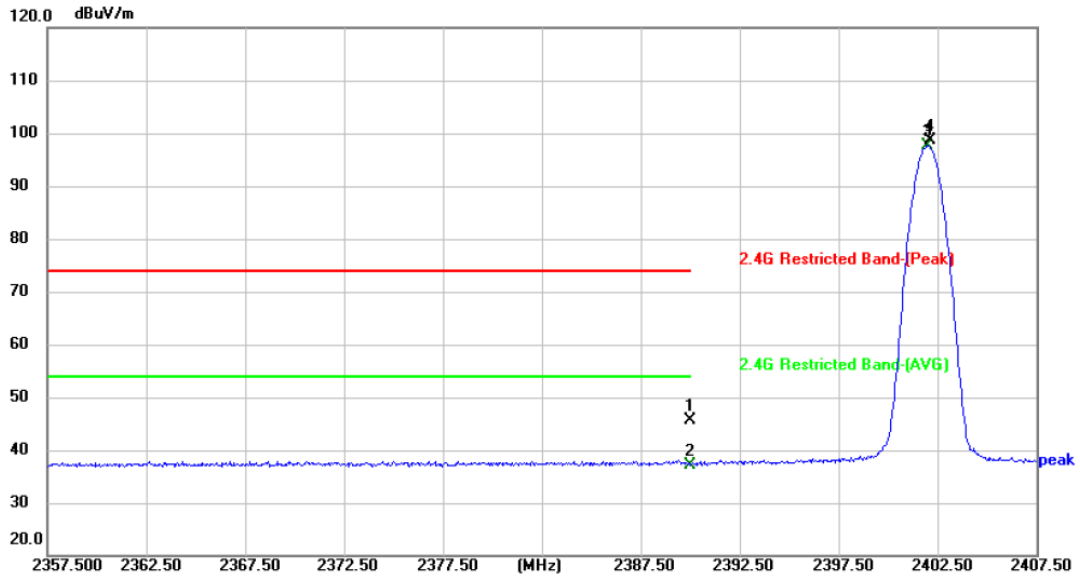
Please refer to the description of test mode.

7.6 Test Data

Please refer to the following pages.

--- Restricted Bands (Radiation Measurements)

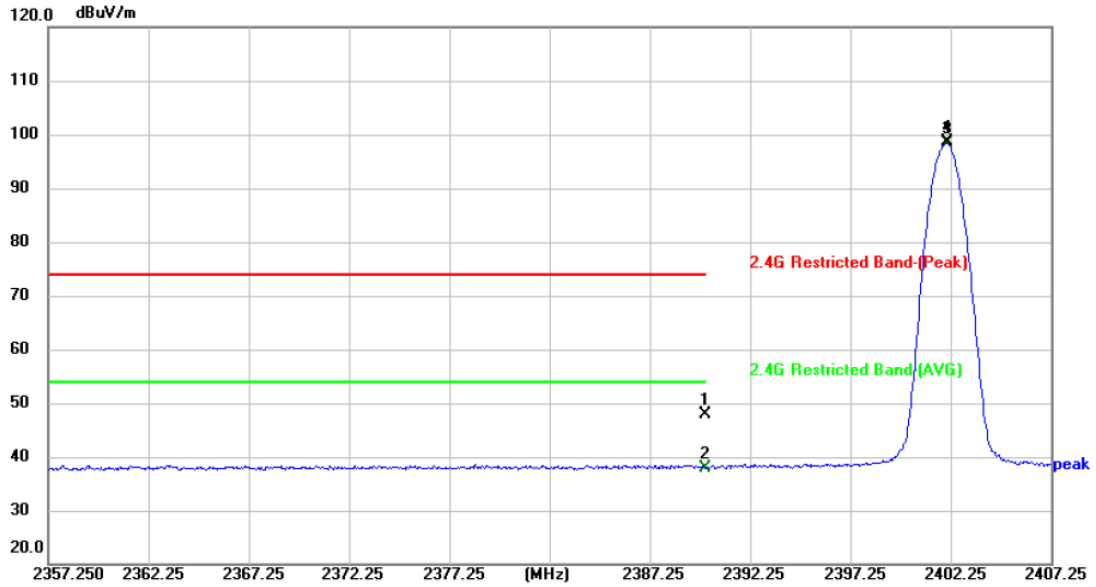
Temperature:	23.5 ℃	**Relative Humidity:**	57%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(1Mbps) Mode TX 2402 MHz		
Remark:	N/A		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2390.000	51.19	-5.66	45.53	74.00	-28.47	peak	P
2 *	2390.000	42.76	-5.66	37.10	54.00	-16.90	AVG	P
3	2402.000	103.18	-5.64	97.54			AVG	
4	2402.100	104.16	-5.64	98.52			peak	

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

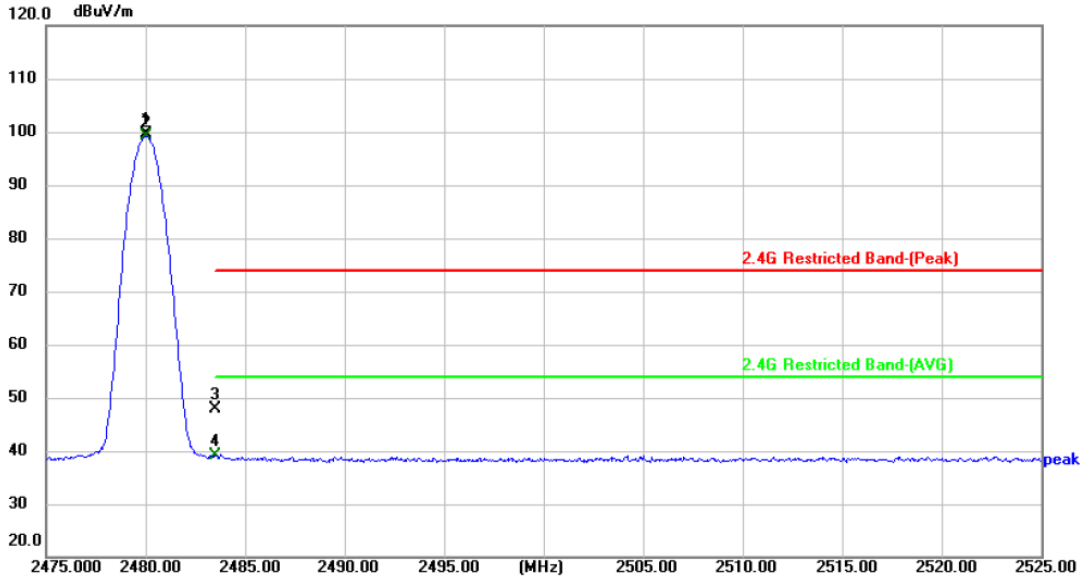
Temperature:	23.5 ℃	Relative Humidity:	57%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE(1Mbps) Mode TX 2402 MHz		
Remark:	N/A		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2390.000	53.61	-5.66	47.95	74.00	-26.05	peak	P
2 *	2390.000	43.62	-5.66	37.96	54.00	-16.04	AVG	P
3	2402.050	103.92	-5.64	98.28			AVG	
4	2402.100	104.30	-5.64	98.66			peak	

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

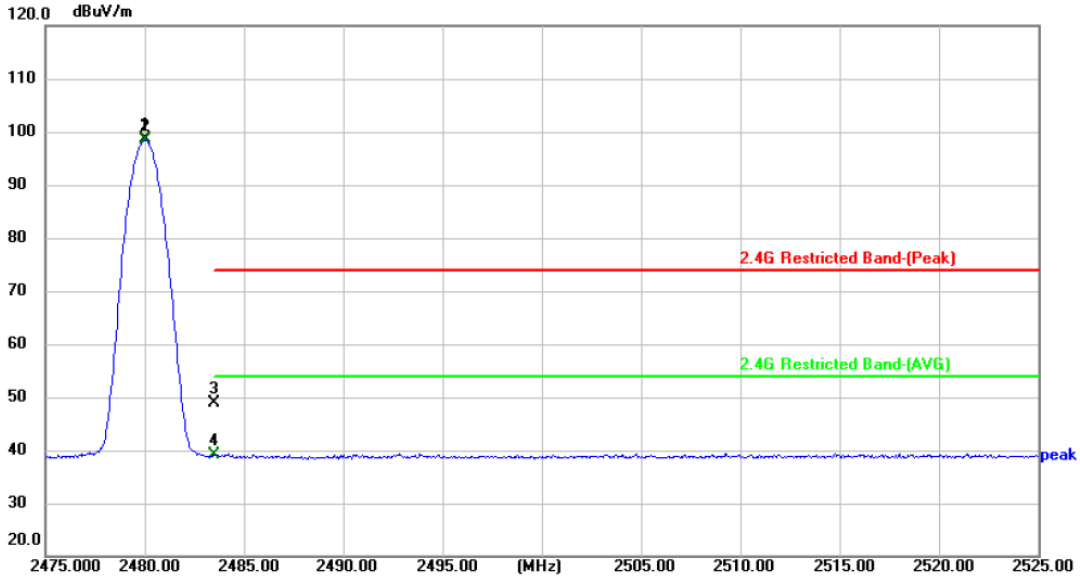
Temperature:	23.5 ℃	Relative Humidity:	57%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(1Mbps) Mode TX 2480 MHz		
Remark:	N/A		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2480.050	105.04	-5.37	99.67			peak	
2	2480.050	104.56	-5.37	99.19			AVG	
3	2483.500	53.33	-5.35	47.98	74.00	-26.02	peak	P
4 *	2483.500	44.53	-5.35	39.18	54.00	-14.82	AVG	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

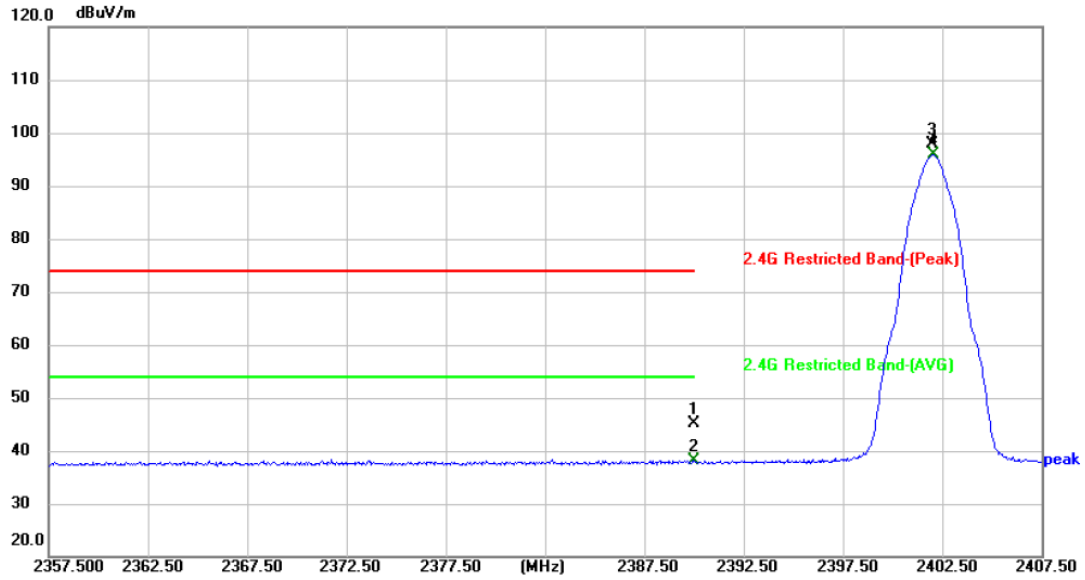
Temperature:	23.5 ℃	Relative Humidity:	57%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE(1Mbps) Mode TX 2480 MHz		
Remark:	N/A		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2480.000	104.06	-5.37	98.69			peak	
2	2480.050	103.75	-5.37	98.38			AVG	
3	2483.500	54.29	-5.35	48.94	74.00	-25.06	peak	P
4 *	2483.500	44.37	-5.35	39.02	54.00	-14.98	AVG	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

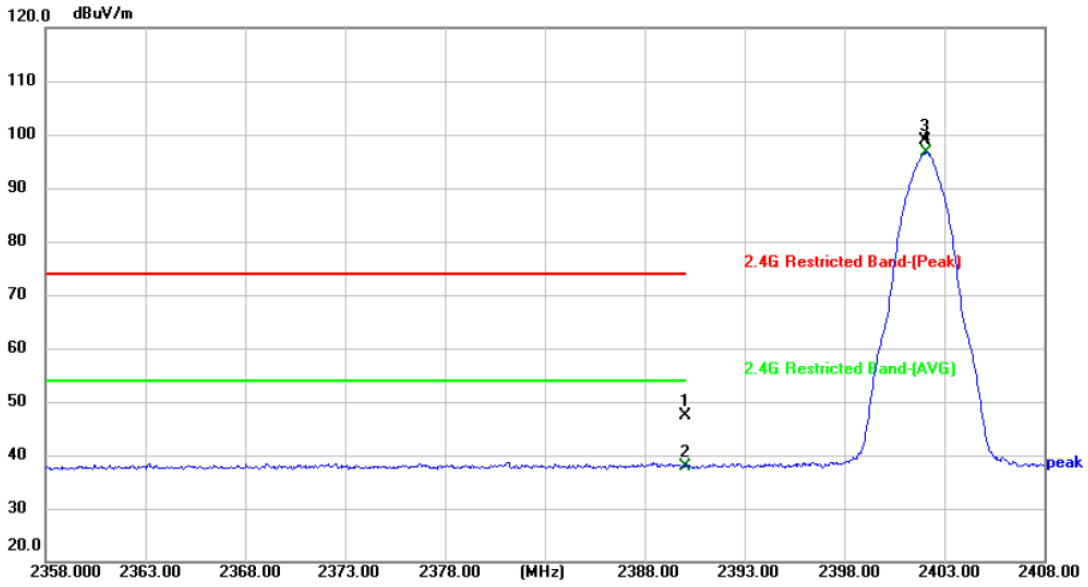
Temperature:	23.5 ℃	Relative Humidity:	57%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(2Mbps) Mode TX 2402MHz		
Remark:	N/A		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2390.000	50.68	-5.66	45.02	74.00	-28.98	peak	P
2 *	2390.000	43.72	-5.66	38.06	54.00	-15.94	AVG	P
3	2402.000	103.61	-5.64	97.97			peak	
4	2402.050	101.41	-5.64	95.77			AVG	

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

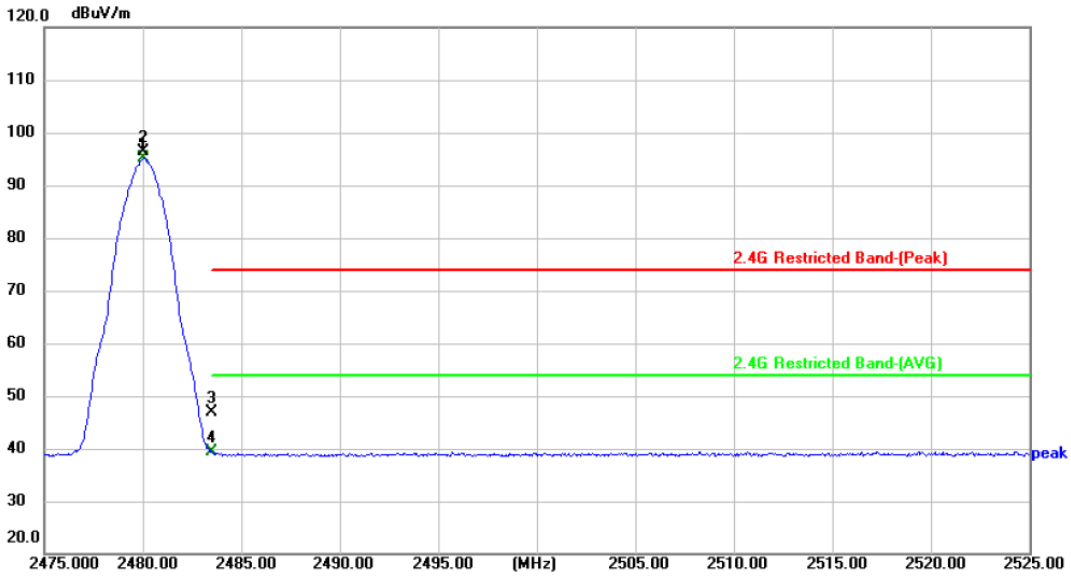
Temperature:	23.5 ℃	**Relative Humidity:**	57%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE(2Mbps) Mode TX 2402MHz		
Remark:	N/A		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2390.000	53.05	-5.66	47.39	74.00	-26.61	peak	P
2 *	2390.000	43.50	-5.66	37.84	54.00	-16.16	AVG	P
3	2402.000	104.62	-5.64	98.98			peak	
4	2402.100	102.19	-5.64	96.55			AVG	

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

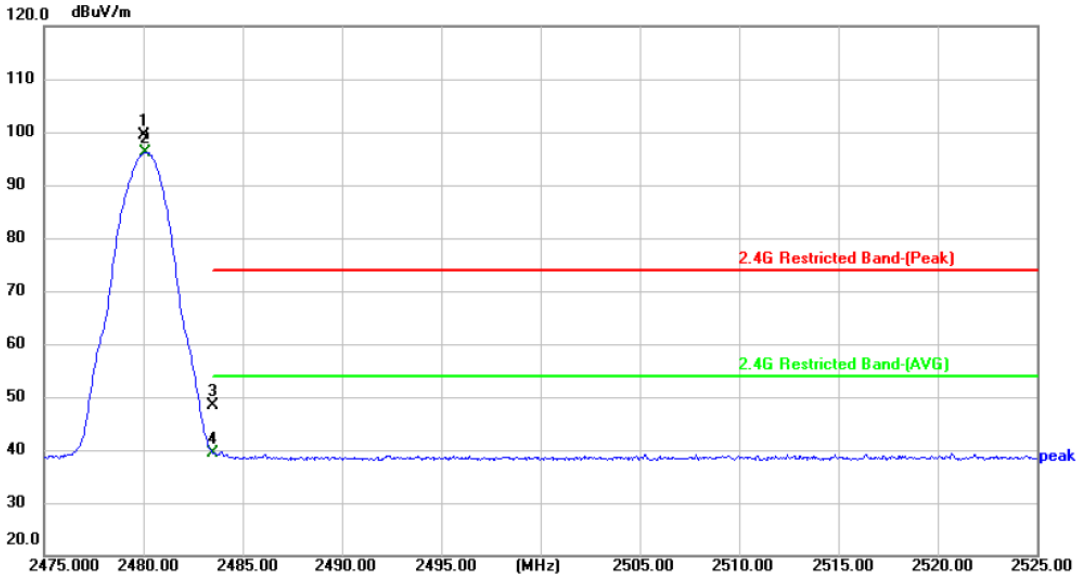
Temperature:	23.5 ℃	Relative Humidity:	57%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(2Mbps) Mode TX 2480MHz		
Remark:	N/A		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2480.000	100.42	-5.37	95.05			AVG	
2	2480.050	101.81	-5.37	96.44			peak	
3	2483.500	52.32	-5.35	46.97	74.00	-27.03	peak	P
4 *	2483.500	44.82	-5.35	39.47	54.00	-14.53	AVG	P

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

Temperature:	23.5 ℃	Relative Humidity:	57%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE(2Mbps) Mode TX 2480MHz		
Remark:	N/A		

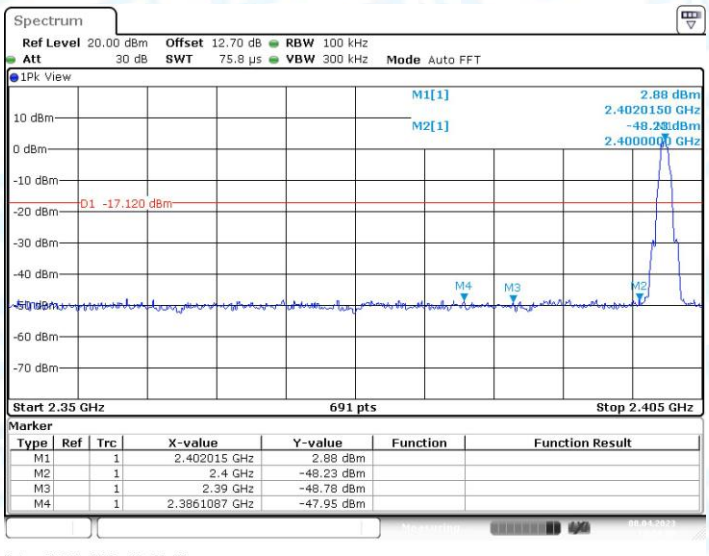


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2480.000	104.84	-5.37	99.47			peak	
2	2480.100	101.59	-5.37	96.22			AVG	
3	2483.500	53.76	-5.35	48.41	74.00	-25.59	peak	P
4 *	2483.500	44.84	-5.35	39.49	54.00	-14.51	AVG	P

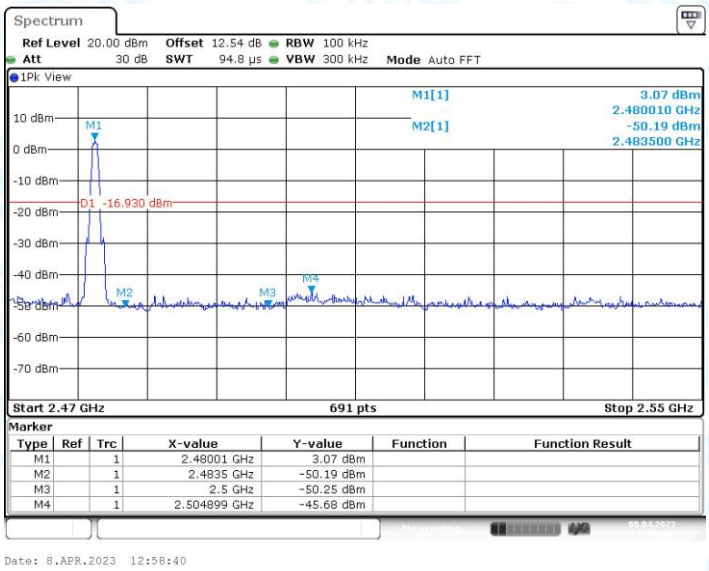
Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m)-Limit PK/AVG(dBμV/m)

---Band Edge (Conducted Measurements)

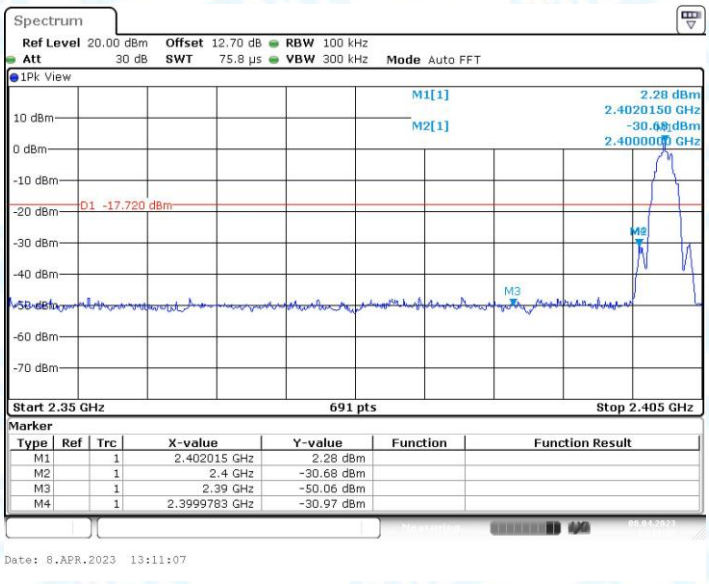
Test Mode	ChName	Channel	Ref.Level[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Low	2402	2.88	-47.95	≤-17.12	PASS
	High	2480	3.07	-45.68	≤-16.93	PASS
BLE_2M	Low	2402	2.28	-30.97	≤-17.72	PASS
	High	2480	2.96	-45.9	≤-17.04	PASS



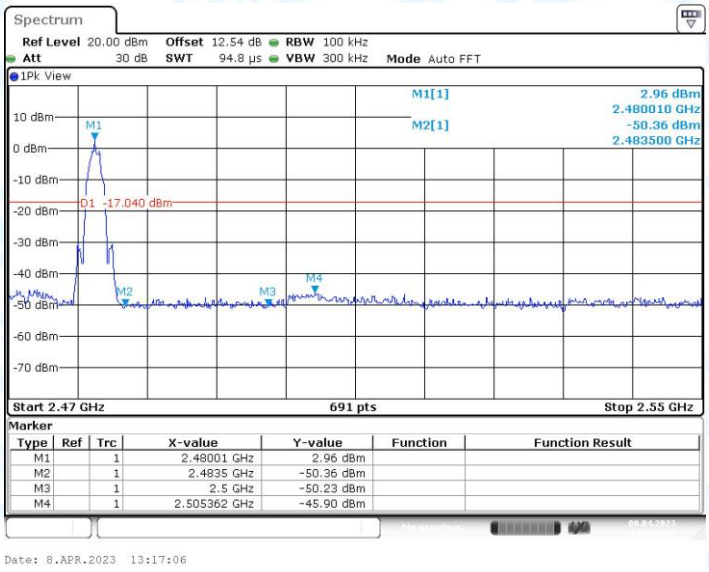
BLE_1M_Low_2402



BLE_1M_High_2480



BLE_2M_Low_2402



BLE_2M_High_2480

8. Bandwidth Test

8.1 Test Standard and Limit

8.1.1 Test Standard

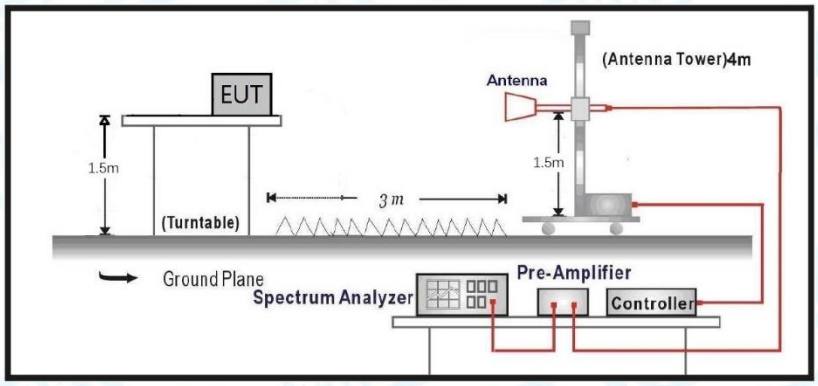
RSS-Gen 6.7 & RSS 247 5.2(a)

FCC Part 15.205 & FCC Part 15.247(d)

8.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
-6dB bandwidth (DTS bandwidth)	>=500 KHz	2400~2483.5
99% occupied bandwidth	/	2400~2483.5

8.2 Test Setup



8.3 Test Procedure

---DTS bandwidth

●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.

---occupied bandwidth

●The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring

99% power bandwidth:

a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.

c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.

d) Step a) through step c) might require iteration to adjust within the specified range.

e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.

g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power 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; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.

h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

8.4 Deviation From Test Standard

No deviation

8.5 EUT Operating Mode

Please refer to the description of test mode.

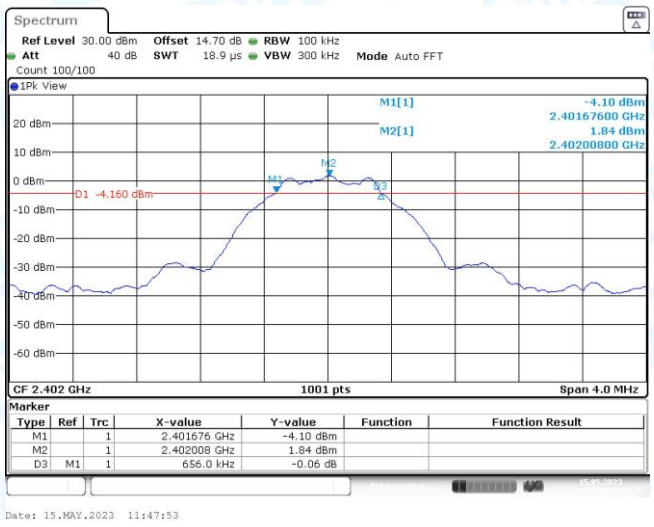
8.6 Test Data

Please refer to the following pages.

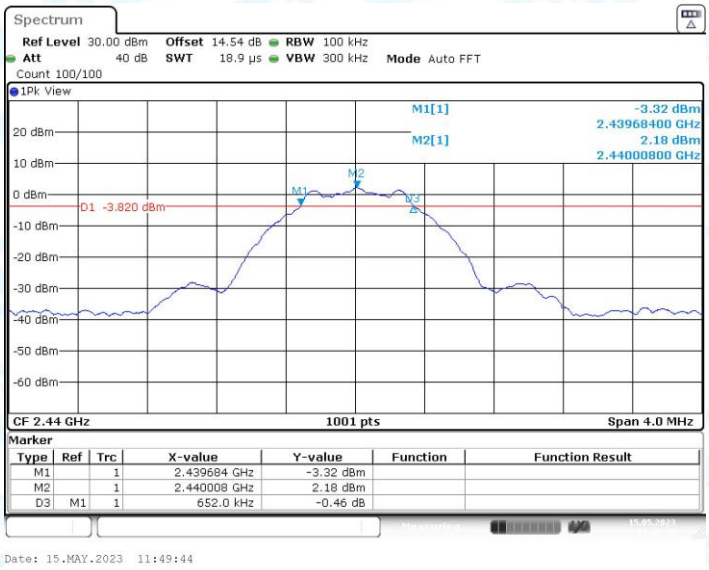
---99% and 6dB Bandwidth Test (Radiation Measurements)

Test Mode	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	2402	0.66	2401.68	2402.33	0.5	PASS
	2440	0.65	2439.68	2440.34	0.5	PASS
	2480	0.66	2479.68	2480.34	0.5	PASS
BLE_2M	2402	1.11	2401.46	2402.58	0.5	PASS
	2440	1.10	2439.46	2440.56	0.5	PASS
	2480	1.10	2479.47	2480.57	0.5	PASS

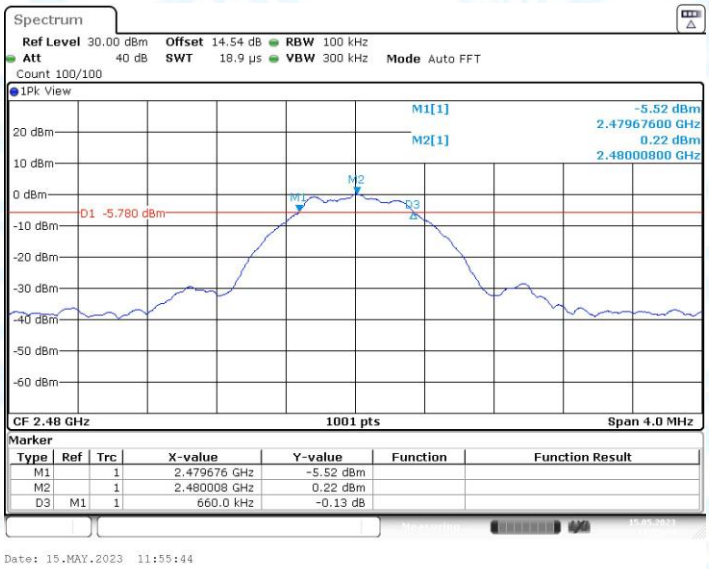
Test Mode	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	2402	1.031	2401.5005	2402.5315	---	---
	2440	1.039	2439.4885	2440.5275	---	---
	2480	1.047	2479.4885	2480.5355	---	---
BLE_2M	2402	2.062	2401.0050	2403.0669	---	---
	2440	2.054	2439.0090	2441.0629	---	---
	2480	2.058	2479.0130	2481.0709	---	---



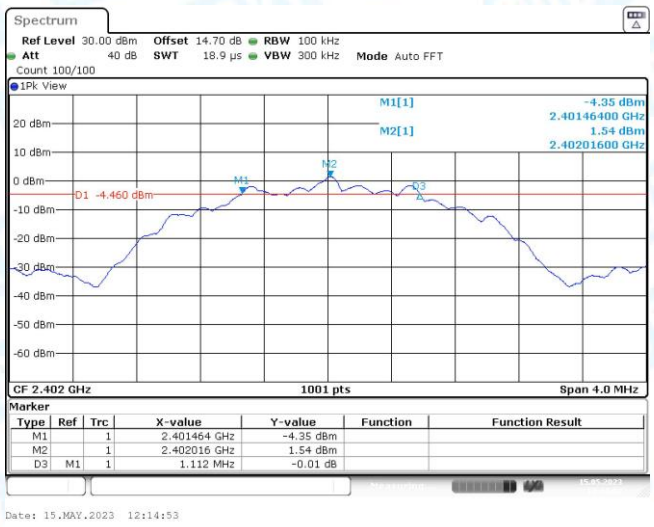
DTS-BLE_1M_2402



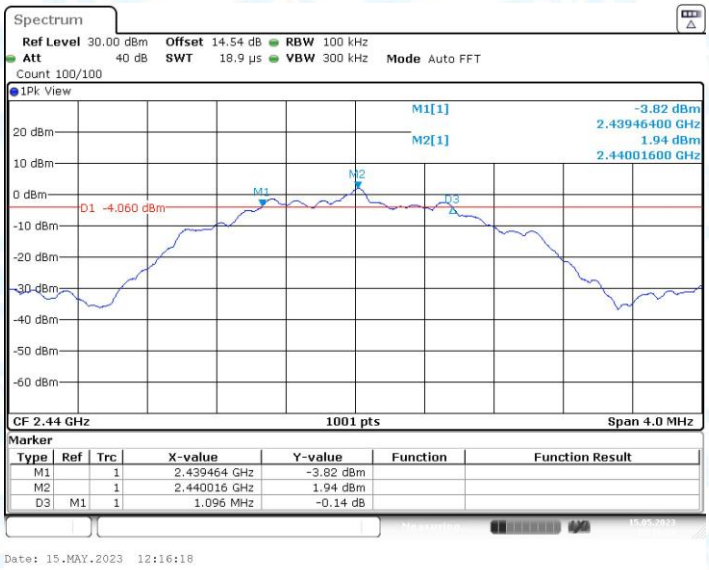
DTS-BLE_1M_2440



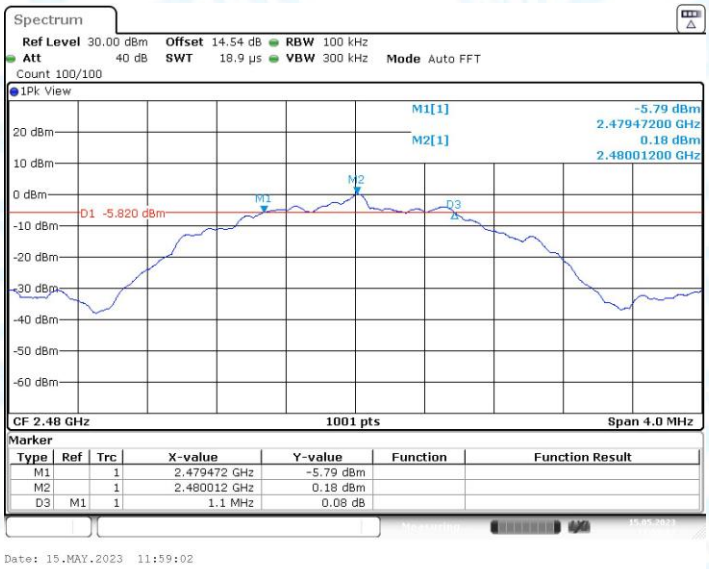
DTS-BLE_1M_2480



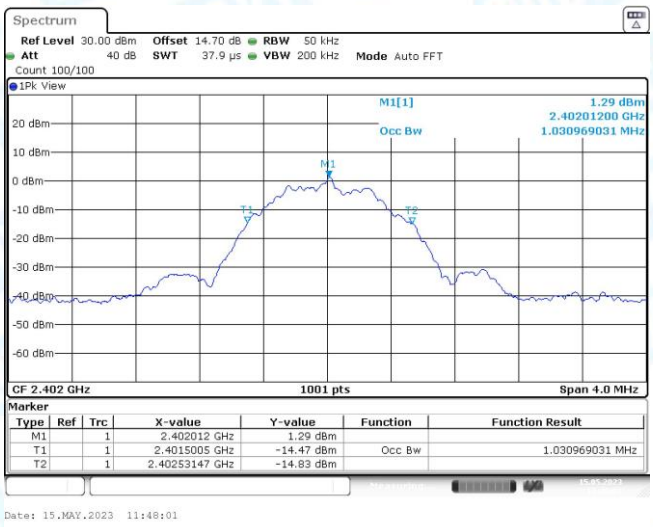
DTS-BLE_2M_2402



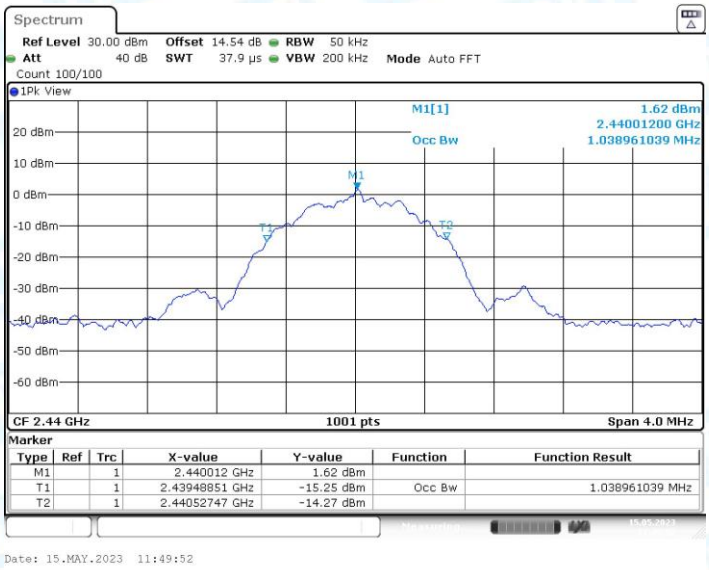
DTS-BLE_2M_2440



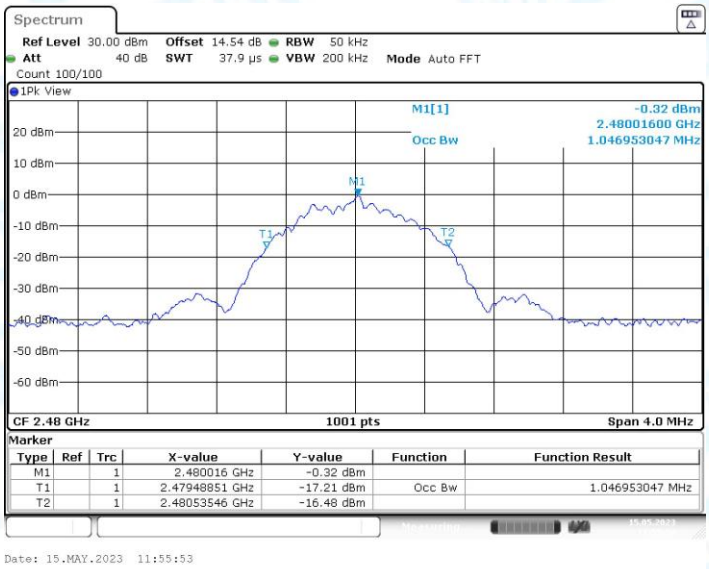
DTS-BLE_2M_2480



OCB-BLE_1M_2402



OCB-BLE_1M_2440



OCB-BLE_1M_2480