TEST REPORT

Application No.:	KSCR2408001626AT
FCC ID:	2ASCB-DH055TLB
Name of Testing Laboratory preparing the Report:	Compliance Certification Services (Kunshan) Inc.
Address of Testing Laboratory preparing the Report:	No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.
Applicant:	D2G Group LLC
Address of Applicant:	81 Commerce Drive Fall River, MA 02720 USA
Manufacturer:	D2G Group LLC
Address of Manufacturer:	81 Commerce Drive Fall River, MA 02720 USA
Factory:	Zhejiang Uniview System Technology Co., Ltd.
Address of Factory:	No.1277 Qingfeng South Road (South), Tongxiang Economic Development Zone, Tongxiang City, Jiaxing City, 314500, Zhejiang, China
Equipment Under Test (EUT):	
EUT Name:	Digital Signage
Model No.:	DH055TLB, DH055NLB ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2024-08-23
Date of Test:	2024-09-12 to 2024-10-12
Date of Issue:	2024-10-15
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Revision Record			
Version	**Description**	***Date***	***Remark***
00	Original	2024-10-15	/

Authorized for issue by:				
Tested By				
		Maker Qi /Project Engineer		
Approved By				
		Terry Hou /Reviewer		

2 Test Summary

Radio Spectrum Technical Requirement					
Item	**Standard**	**Method**	**Requirement**	**Result**	**Test Lab***
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Customer Declaration	N/A

Radio Spectrum Matter Part					
Item	**Standard**	**Method**	**Requirement**	**Result**	**Test Lab***
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass	B
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	B
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	B
Radiated Spurious Emissions Above 1GHz		ANSI C63.10 (2013) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	B
Conducted Peak Output Power		ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass	A
Minimum 6dB Bandwidth		ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass	A
Power Spectrum Density		ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass	A
Conducted Band Edges Measurement		ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass	A
Conducted Spurious Emissions		ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass	A

Note: There are series models mentioned in this report and they are the Identical in electrical and electronic characters. Only the model DH055TLB was tested since their differences were the model number and appearance.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	AC 120V/60Hz
Test voltage:	AC 120V/60Hz
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	Dipole Antenna
Antenna Gain:	3dBi (Provided by the manufacturer)

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Notebook	LENOVO	K27	EB24537645

4.3 Power level setting using in test

Channel	BLE 1M	BLE 2M
	Ant 1	Ant 1
0	default	default
19	default	default
39	default	default

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%
Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

4.5 Test Location

Lab A:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

Lab B:

Conducted Emissions at AC Power Line (150kHz-30MHz); Radiated Emissions; Radiated Emissions which fall in the restricted bands test at:

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.

South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).

2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

3. Sample source: sent by customer.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

Lab A:

• A2LA

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• ISED

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

• VCCI

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

Lab B:

• A2LA (Certificate No. 6336.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• Innovation, Science and Economic Development Canada

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• FCC –Designation Number: CN1312

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

Lab A:

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
RF Conducted Test						
1	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	08/24/2024	08/23/2025
2	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	08/24/2024	08/23/2025
3	Spectrum Analyzer	Keysight	N9030B	KSEM021-1	01/15/2024	01/14/2025
4	Signal Generator	R&S	SMBV100B	KSEM032	03/19/2024	03/18/2025
5	Signal Generator	R&S	SMW200A	KSEM020-1	08/24/2024	08/23/2025
6	Signal Generator	Agilent	N5182A	KUS2001M001-1	08/24/2024	08/23/2025
7	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	08/24/2024	08/23/2025
8	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	03/19/2024	03/18/2025
9	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	08/24/2024	08/23/2025
10	Switcher	TST	FY562	KUS2001M001-4	01/15/2024	01/14/2025
11	AC Power Source	EXTECH	6605	KS301178	N.C.R	N.C.R
12	DC Power Supply	Aglient	E3632A	KS301180	N.C.R	N.C.R
13	Conducted Test Cable	Thermax	RF01-RF04	CZ301111-CZ301120	01/15/2024	01/14/2025
14	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KS301190	08/24/2024	08/23/2025
15	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	03/19/2024	03/18/2025
16	Software	BST	TST-PASS	/	NCR	NCR

Lab B:

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
Conducted Emission at Mains Terminals						
1	Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2/1/2024	1/31/2025
2	Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2/8/2024	2/7/2025
3	Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-03	2/4/2024	2/3/2025
4	Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-04	2/4/2024	2/3/2025
5	Measurement Software	Tonscend	JS32-CE	SUWI-02-09-05	NCR	NCR
RF Radiated Test						
1	Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-02	6/3/2023	6/2/2026
2	Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-13	2/8/2024	2/7/2025
3	Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	5/8/2024	5/7/2025
4	Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-06	11/21/2023	11/20/2024
5	Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2/1/2024	1/31/2025
6	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9168	SUWI-01-11-04	11/25/2023	11/24/2024
7	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9120D	SUWI-01-11-05	11/25/2023	11/24/2024
8	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9170	SUWI-01-11-03	5/12/2023	5/11/2025
9	Active Loop Antenna	SCHWRZBECK MESS-ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	5/13/2023	5/12/2025
10	Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2/1/2024	1/31/2025
11	Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	2/1/2024	1/31/2025
12	Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	2/1/2024	1/31/2025
13	Measurement Software	Tonscend	JS32-RE	SUWI-02-09-04	NCR	NCR
14	Measurement Software	Tonscend	JS32-RSE	SUWI-02-09-06	NCR	NCR

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is Dipole Antenna on the main PCB and no consideration of replacement. The best case gain of the antenna is 3dBi.

Antenna location: Refer to internal photo.

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207
Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

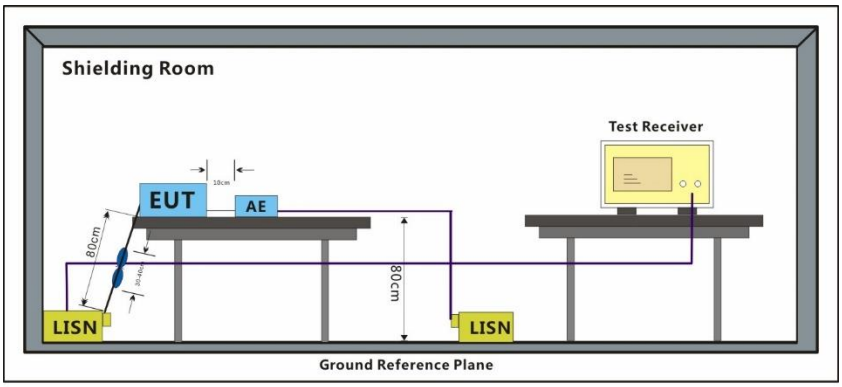
7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 23.1 °C Humidity: 53.3 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

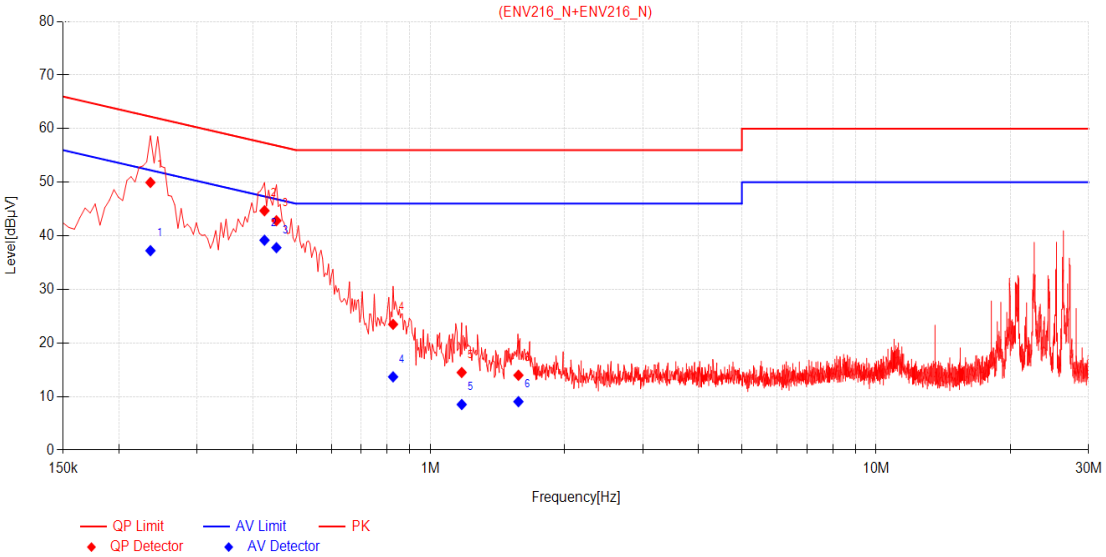
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

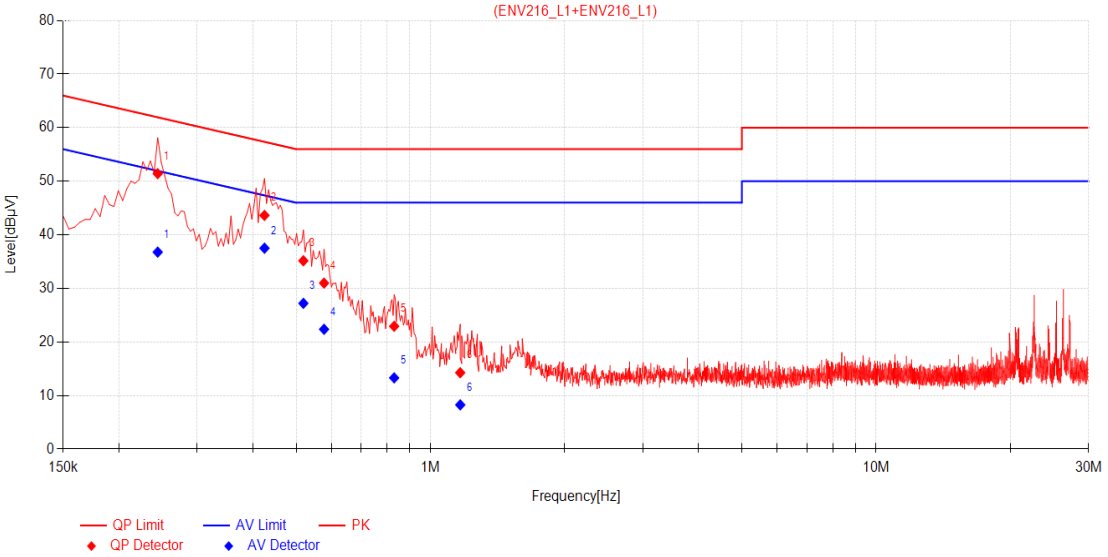
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: Level=Read Level+ Cable Loss+ LISN Factor



Final Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.2355	10.16	39.80	49.96	62.25	12.29	27.07	37.23	52.25	15.02	PASS
2	0.4245	10.16	34.52	44.68	57.36	12.68	29.02	39.18	47.36	8.18	PASS
3	0.4515	10.16	32.67	42.83	56.85	14.02	27.63	37.79	46.85	9.06	PASS
4	0.8250	10.15	13.33	23.48	56.00	32.52	3.53	13.68	46.00	32.32	PASS
5	1.1760	10.09	4.40	14.49	56.00	41.51	-1.58	8.51	46.00	37.49	PASS
6	1.5765	10.12	3.85	13.97	56.00	42.03	-1.07	9.05	46.00	36.95	PASS



Final Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.2445	10.16	41.26	51.42	61.94	10.52	26.61	36.77	51.94	15.17	PASS
2	0.4245	10.17	33.46	43.63	57.36	13.73	27.34	37.51	47.36	9.85	PASS
3	0.5190	10.18	24.98	35.16	56.00	20.84	17.03	27.21	46.00	18.79	PASS
4	0.5775	10.19	20.80	30.99	56.00	25.01	12.18	22.37	46.00	23.63	PASS
5	0.8295	10.14	12.79	22.93	56.00	33.07	3.16	13.30	46.00	32.70	PASS
6	1.1670	10.08	4.18	14.26	56.00	41.74	-1.82	8.26	46.00	37.74	PASS

7.2 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.10.5
Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/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
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

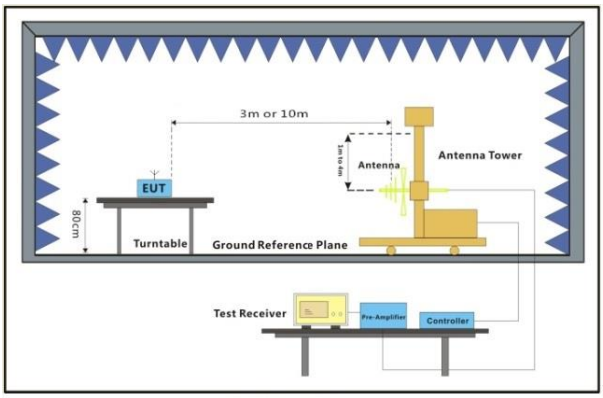
7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 23 °C Humidity: 46 % RH Atmospheric Pressure: 1010 mbar

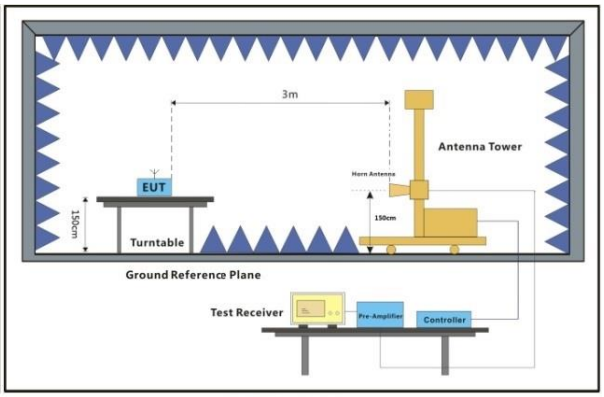
7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.2.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.2.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1:

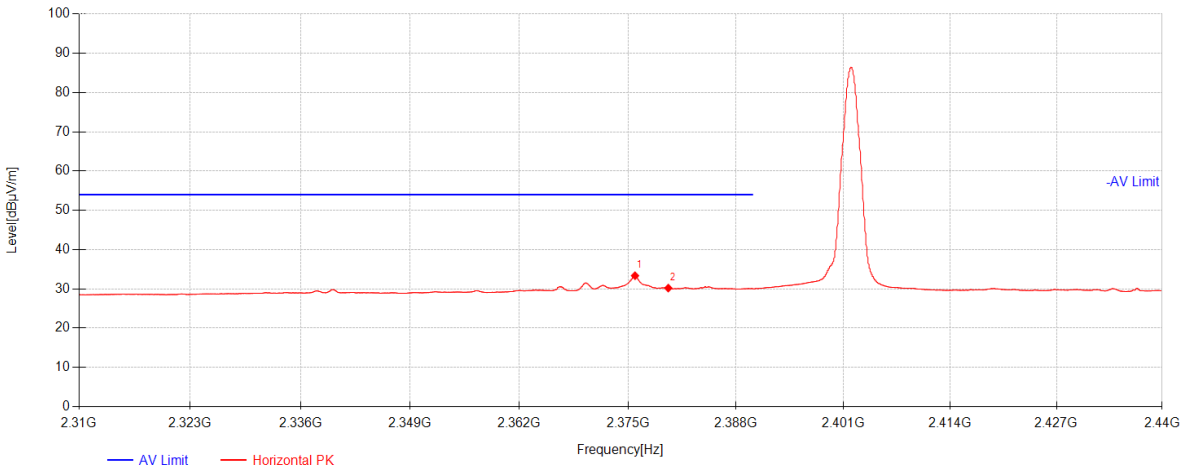
1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.

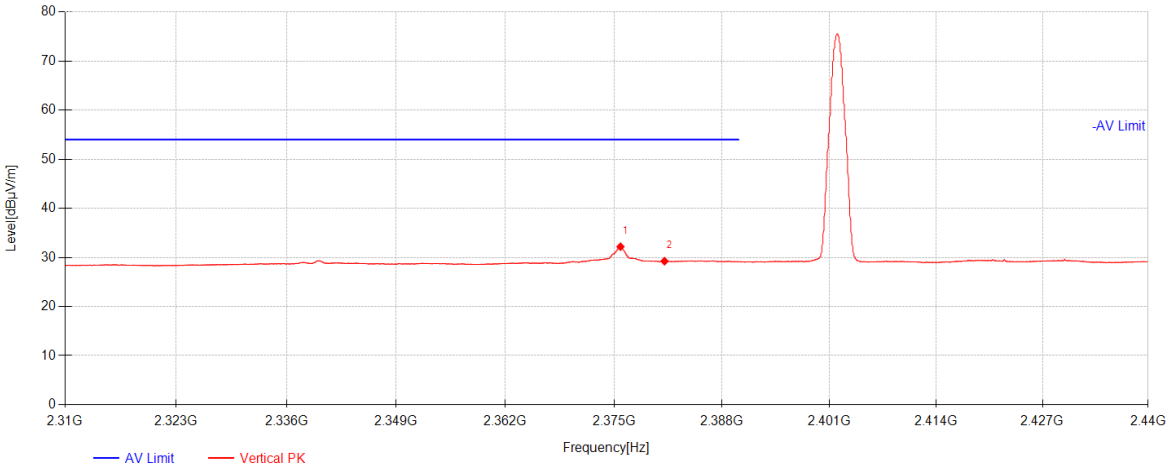
4. For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geqslant$1/T (Duty cycle$<$98%) or 10Hz (Duty cycle$\geqslant$98%) for Average detection (AV) at frequency above 1GHz.

BLE 1M_Channel 00



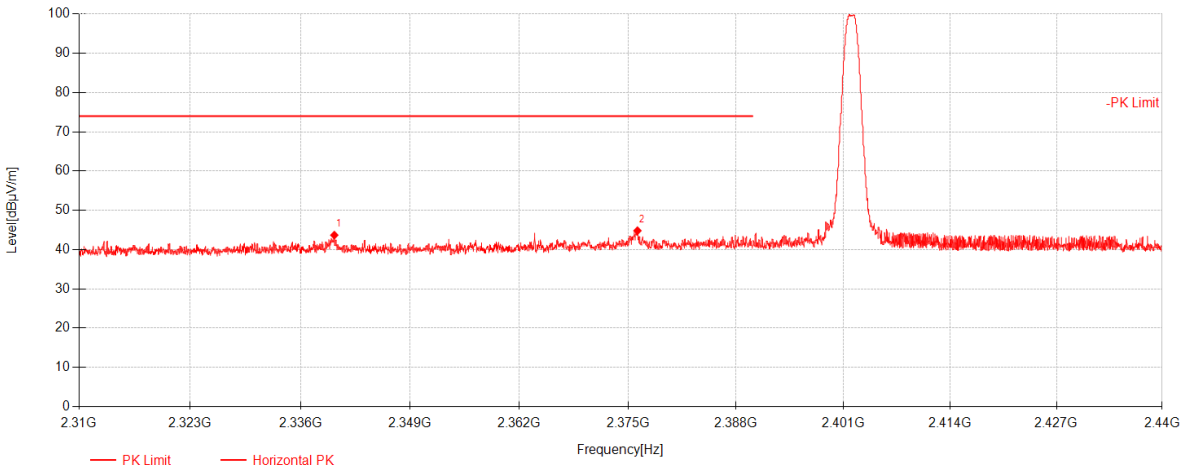
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2375.845	29.97	26.95	-23.57	33.35	54.00	20.65	Horizontal
2	2379.8425	26.81	26.96	-23.57	30.20	54.00	23.80	Horizontal

BLE 1M_Channel 00



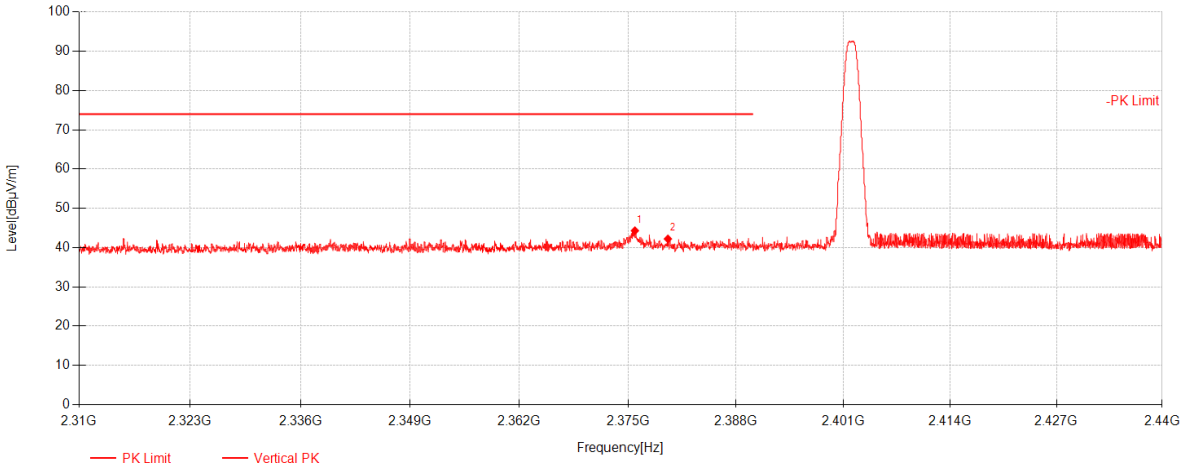
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2375.78	28.80	26.95	-23.57	32.18	54.00	21.82	Vertical
2	2381.0775	25.84	26.96	-23.57	29.23	54.00	24.77	Vertical

BLE 1M_Channel 00



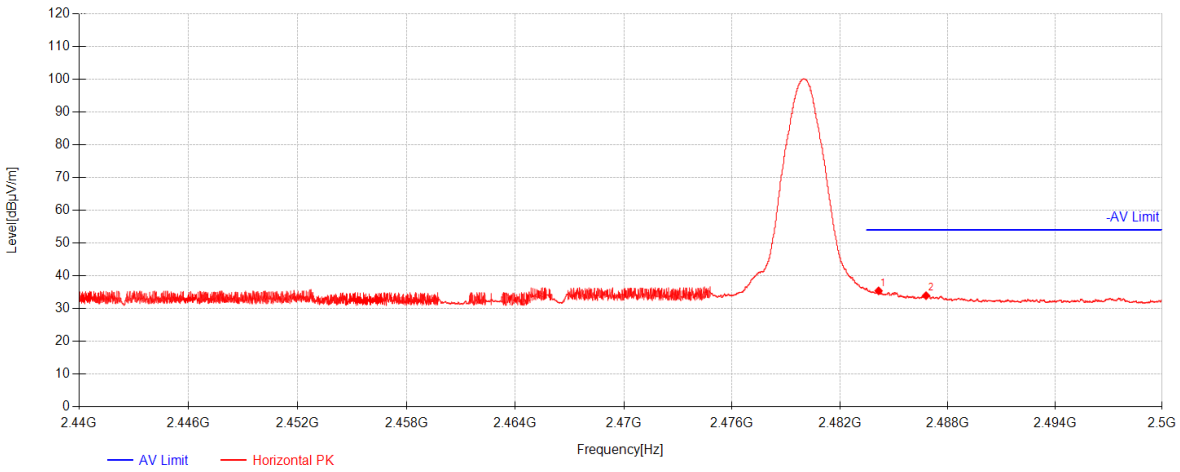
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2339.9975	40.38	26.88	-23.58	43.68	74.00	30.32	Horizontal
2	2376.1375	41.43	26.95	-23.57	44.81	74.00	29.19	Horizontal

BLE 1M_Channel 00



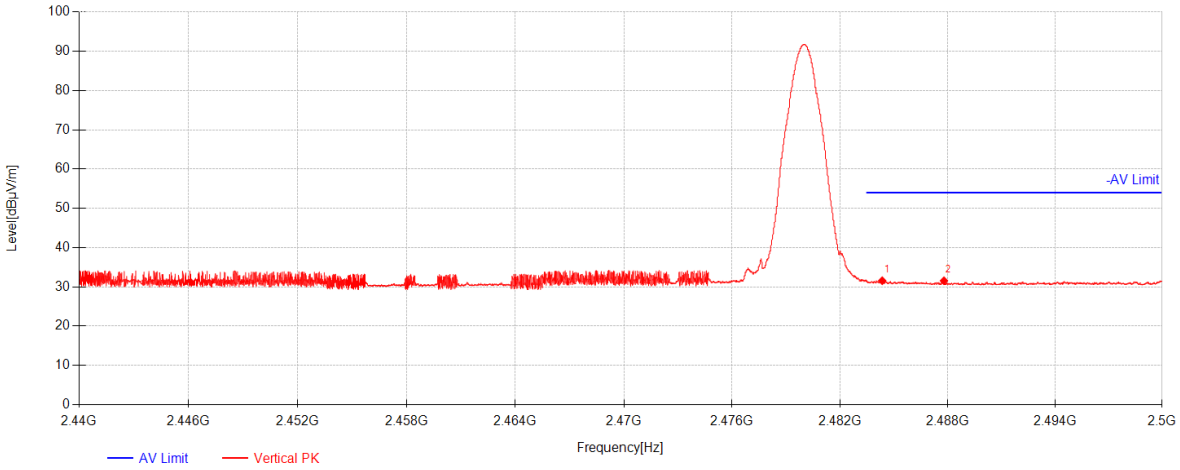
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2375.8288	40.92	26.95	-23.57	44.30	74.00	29.70	Vertical
2	2379.7938	38.83	26.96	-23.57	42.22	74.00	31.78	Vertical

BLE 1M_Channel 39



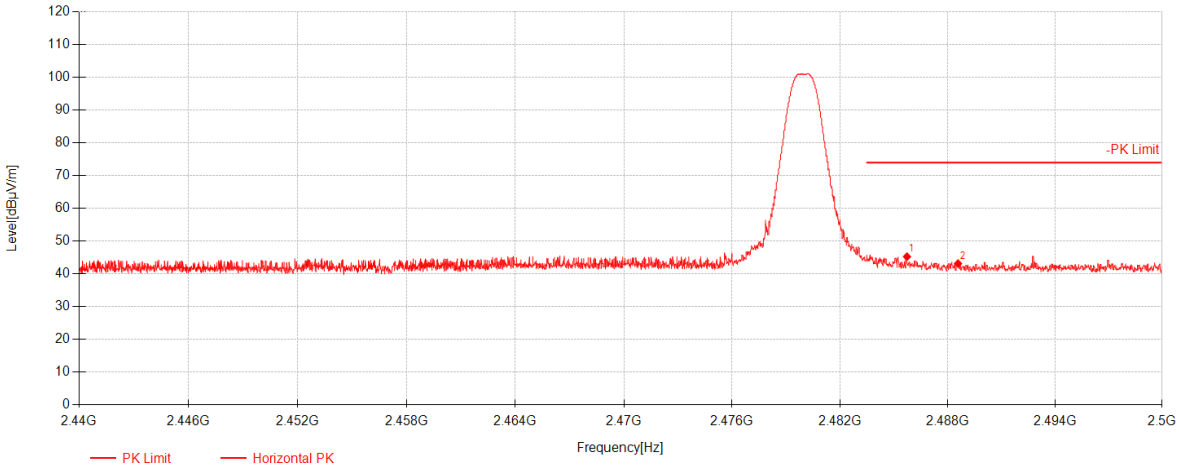
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2484.1525	31.77	27.17	-23.54	35.39	54.00	18.61	Horizontal
2	2486.8	30.29	27.17	-23.54	33.92	54.00	20.08	Horizontal

BLE 1M_Channel 39



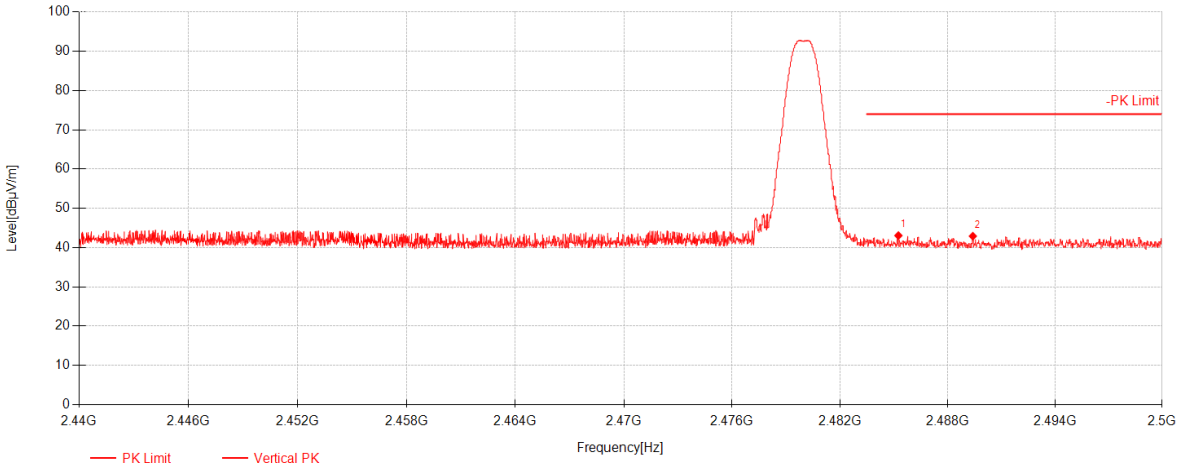
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2484.355	27.95	27.17	-23.54	31.57	54.00	22.43	Vertical
2	2487.7975	27.93	27.18	-23.54	31.56	54.00	22.44	Vertical

BLE 1M_Channel 39



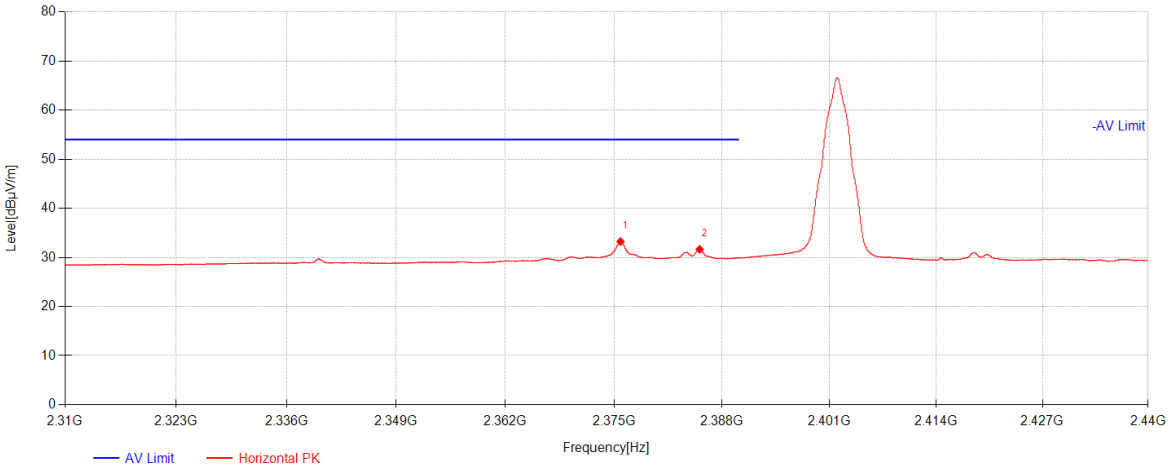
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2485.735	41.60	27.17	-23.54	45.23	74.00	28.77	Horizontal
2	2488.585	39.50	27.18	-23.54	43.13	74.00	30.87	Horizontal

BLE 1M_Channel 39



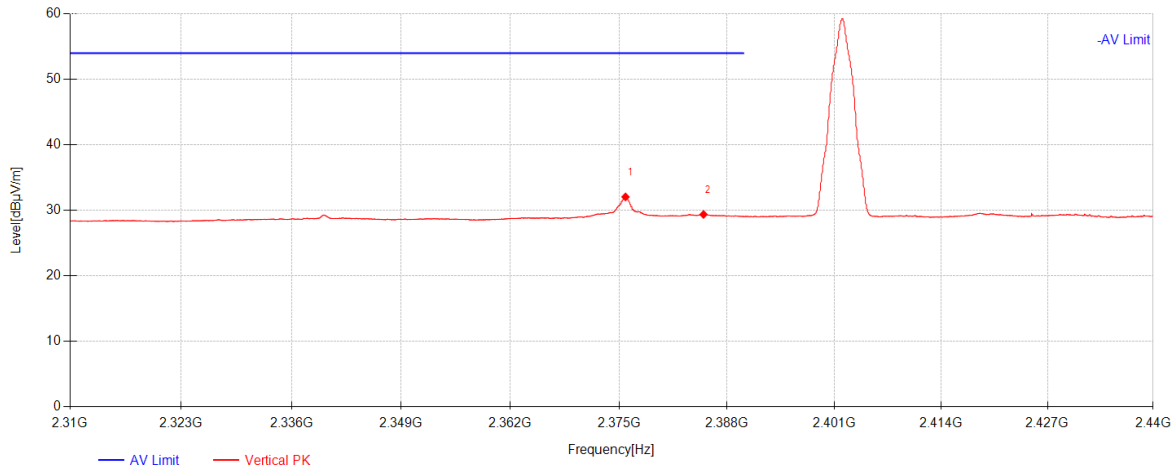
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2485.255	39.43	27.17	-23.54	43.06	74.00	30.94	Vertical
2	2489.41	39.27	27.18	-23.54	42.91	74.00	31.09	Vertical

BLE 2M_Channel 00



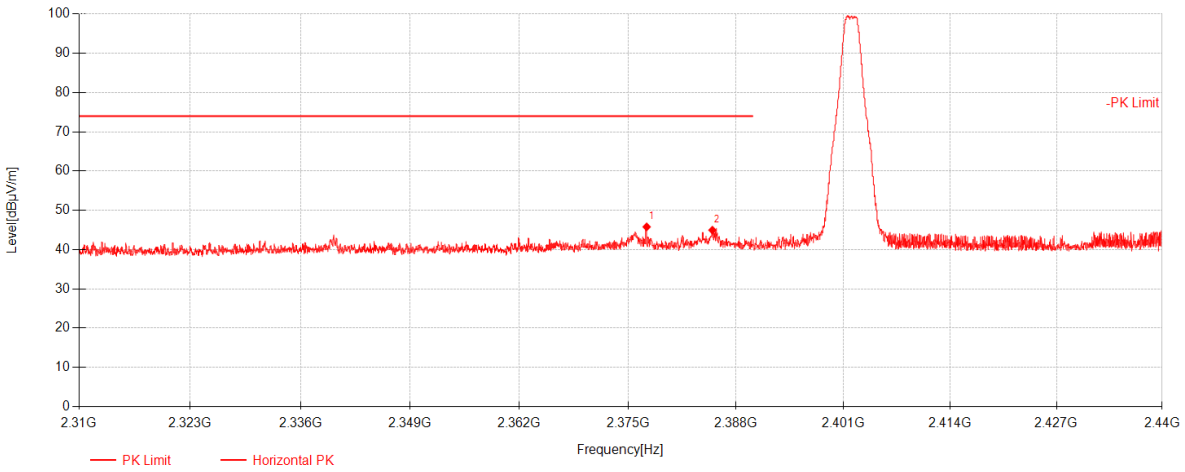
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2375.78	29.86	26.95	-23.57	33.24	54.00	20.76	Horizontal
2	2385.3025	28.24	26.97	-23.57	31.64	54.00	22.36	Horizontal

BLE 2M_Channel 00



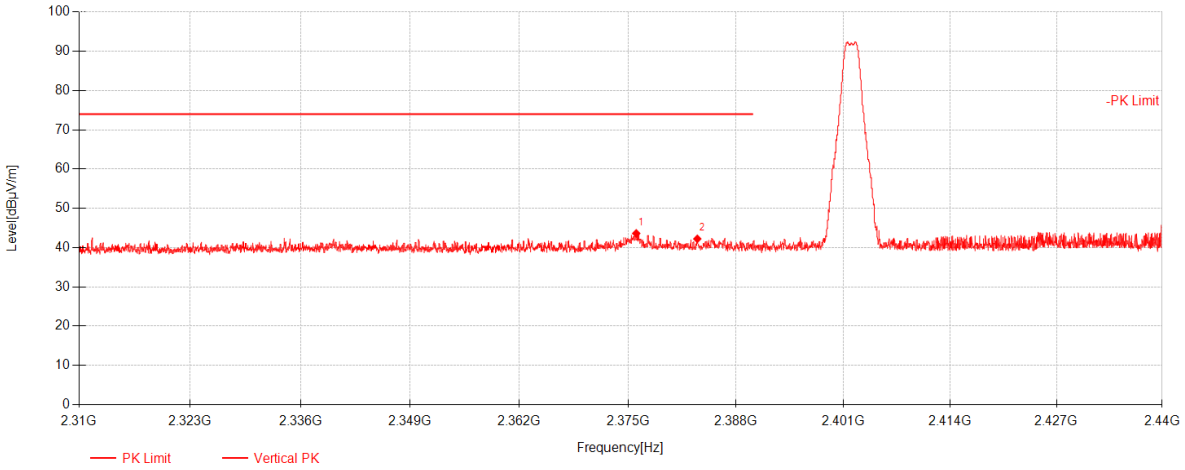
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2375.78	28.67	26.95	-23.57	32.05	54.00	21.95	Vertical
2	2385.1725	25.97	26.97	-23.57	29.37	54.00	24.63	Vertical

BLE 2M_Channel 00



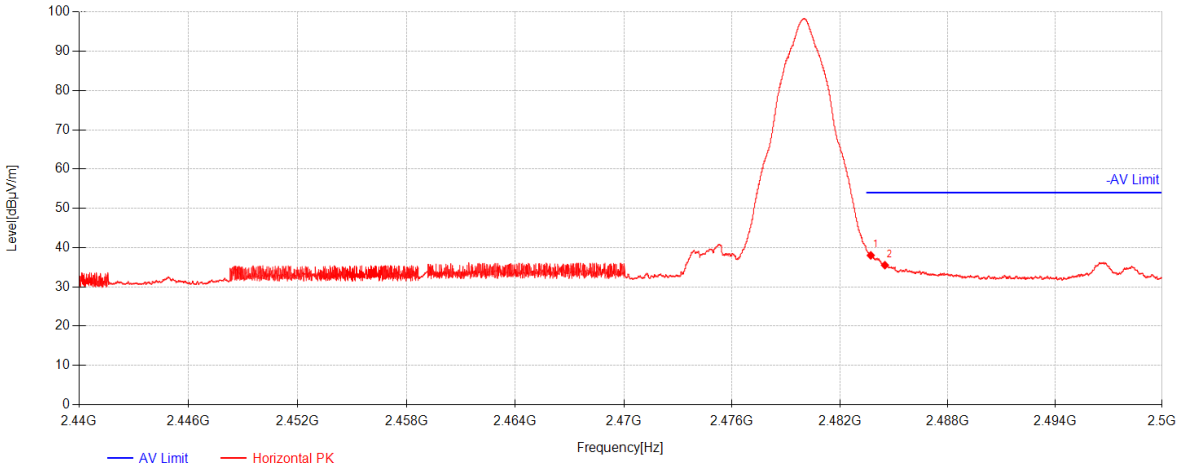
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2377.2425	42.41	26.95	-23.57	45.79	74.00	28.21	Horizontal
2	2385.1562	41.56	26.97	-23.57	44.96	74.00	29.04	Horizontal

BLE 2M_Channel 00



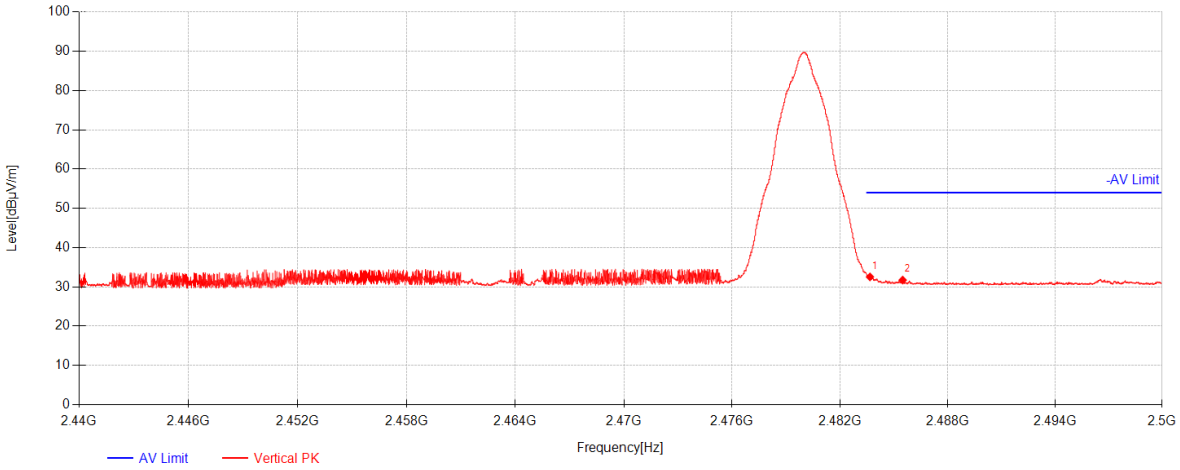
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2375.9912	40.23	26.95	-23.57	43.61	74.00	30.39	Vertical
2	2383.3362	38.83	26.97	-23.57	42.23	74.00	31.77	Vertical

BLE 2M_Channel 39



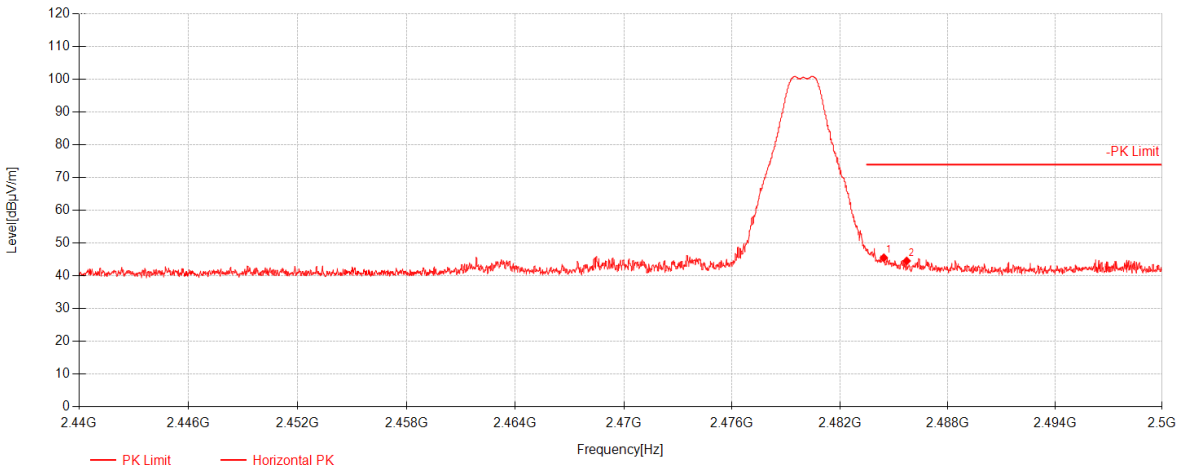
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2483.7175	34.40	27.17	-23.54	38.02	54.00	15.98	Horizontal
2	2484.505	31.91	27.17	-23.54	35.53	54.00	18.47	Horizontal

BLE 2M_Channel 39



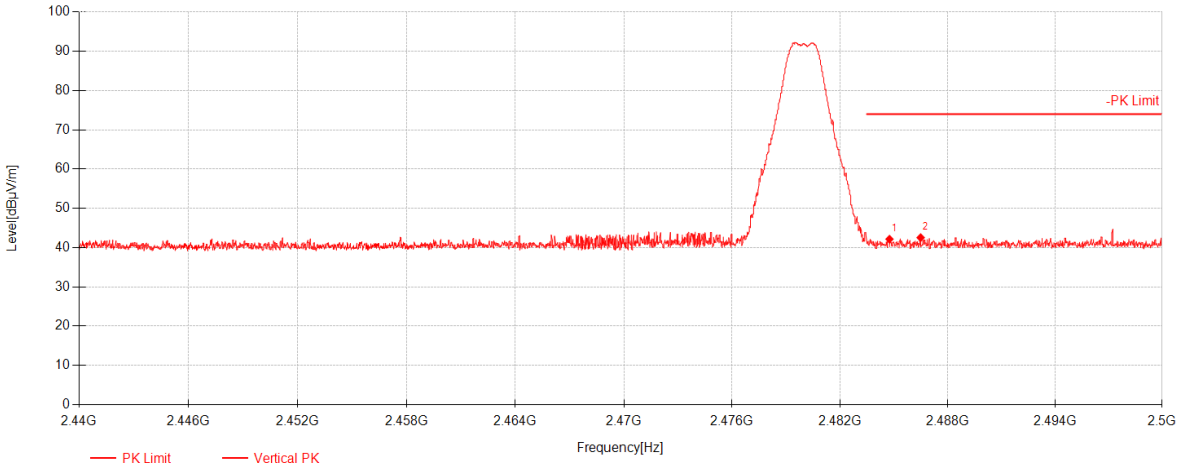
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2483.6725	28.92	27.17	-23.54	32.54	54.00	21.46	Vertical
2	2485.495	28.10	27.17	-23.54	31.73	54.00	22.27	Vertical

BLE 2M_Channel 39



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2484.445	41.90	27.17	-23.54	45.52	74.00	28.48	Horizontal
2	2485.72	40.91	27.17	-23.54	44.54	74.00	29.46	Horizontal

BLE 2M_Channel 39



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2484.76	38.53	27.17	-23.54	42.15	74.00	31.85	Vertical
2	2486.5	38.91	27.17	-23.54	42.54	74.00	31.46	Vertical

7.3 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4,6.5
Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/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
960-1000	500	3

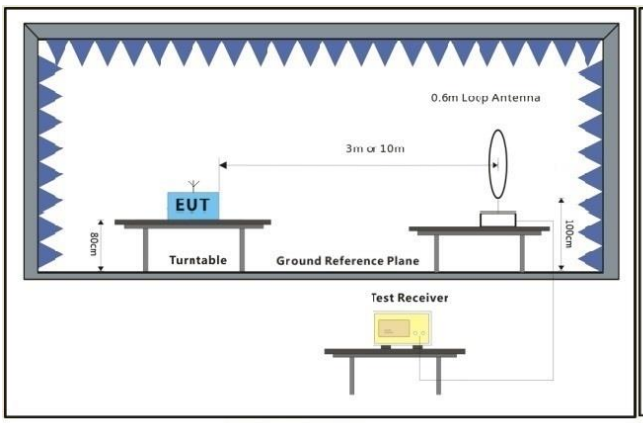
7.3.1 E.U.T. Operation

Operating Environment:
Temperature: 23 °C Humidity: 46 % RH Atmospheric Pressure: 1010 mbar

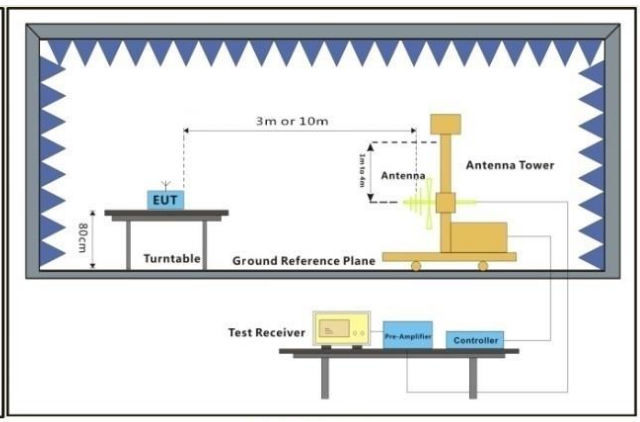
7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.3.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz

7.3.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

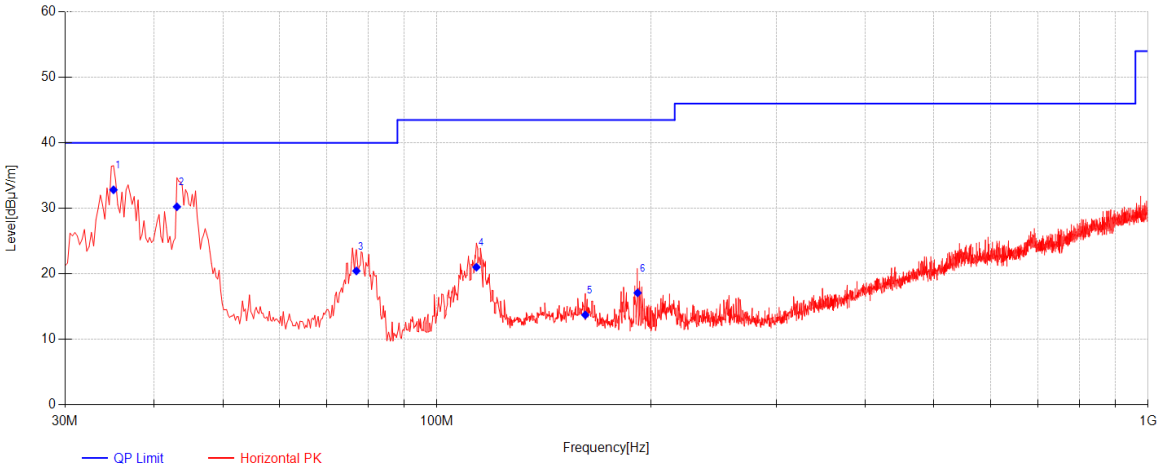
i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

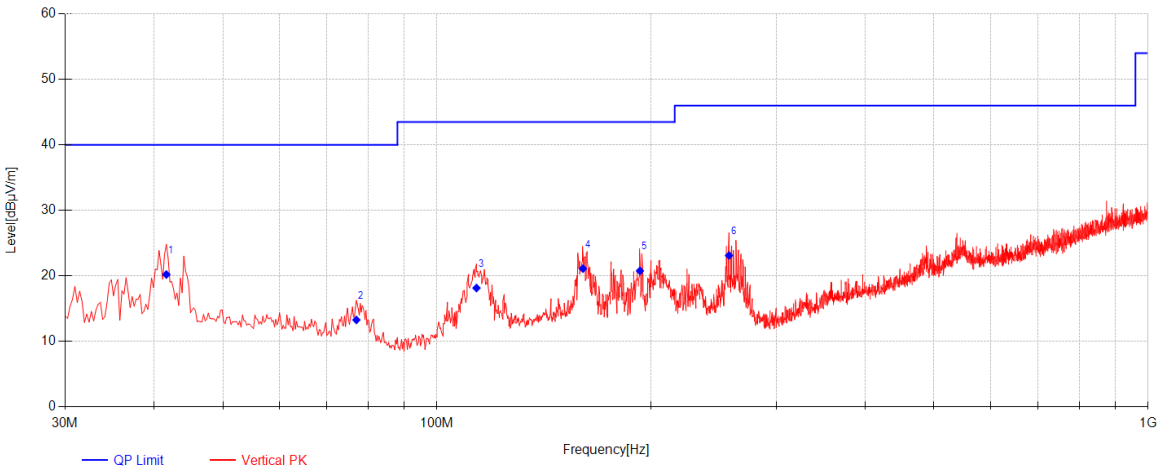
2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

LE 1M_Channel 39



Final Data List								
NO.	Frequency [MHz]]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity
1	35.0925	56.47	-42.36	18.72	32.83	40.00	7.17	Horizontal
2	43.095	53.20	-42.34	19.38	30.24	40.00	9.76	Horizontal
3	77.045	46.33	-41.90	16.00	20.43	40.00	19.57	Horizontal
4	113.6625	46.13	-41.77	16.66	21.01	43.50	22.49	Horizontal
5	161.6775	36.17	-40.81	18.35	13.71	43.50	29.79	Horizontal
6	191.505	42.20	-40.96	15.84	17.08	43.50	26.42	Horizontal

LE 1M_Channel 39



Final Data List								
NO.	Frequency [MHz]]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity
1	41.64	43.03	-42.33	19.49	20.19	40.00	19.81	Vertical
2	77.045	39.16	-41.90	16.00	13.26	40.00	26.74	Vertical
3	113.6625	43.25	-41.77	16.66	18.13	43.50	25.37	Vertical
4	160.465	43.43	-40.80	18.46	21.09	43.50	22.41	Vertical
5	192.96	46.00	-40.97	15.73	20.75	43.50	22.75	Vertical
6	257.465	46.23	-40.38	17.25	23.10	46.00	22.90	Vertical

7.4 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.6
Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

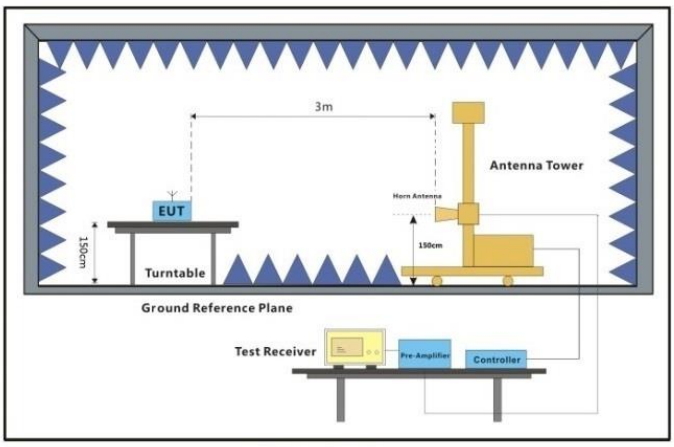
7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 23 °C Humidity: 46 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.4.3 Test Setup Diagram



Above 1GHz

7.4.4 Measurement Procedure and Data

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

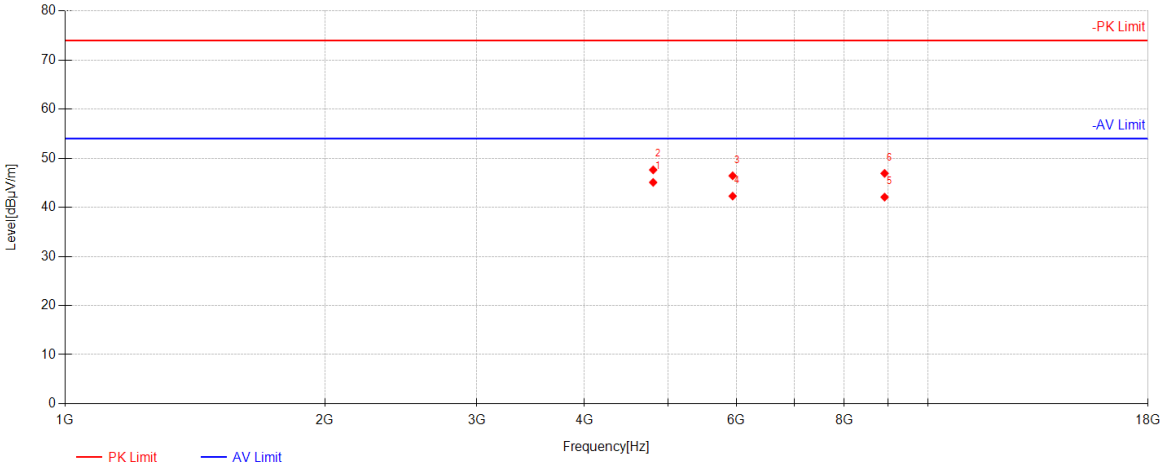
2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.

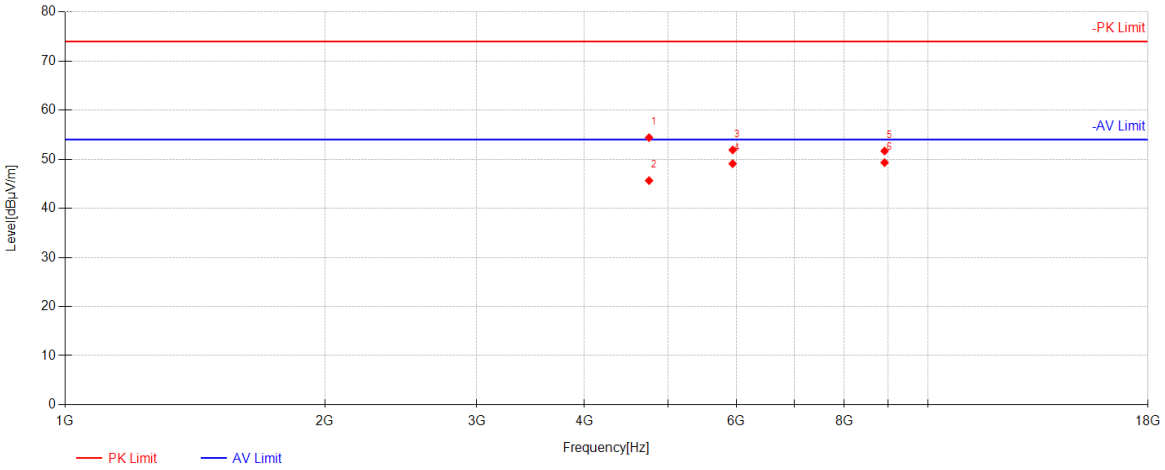
5. For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geqslant$1/T (Duty cycle$<$98%) or 10Hz (Duty cycle$\geqslant$98%) for Average detection (AV) at frequency above 1GHz.

BLE 1M_Channel 00



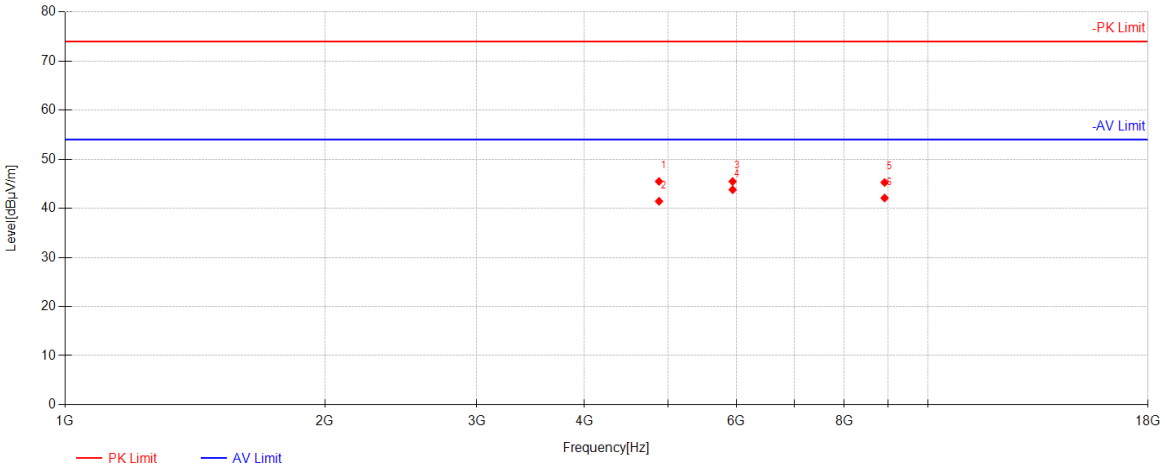
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4804.125	59.53	31.09	-45.54	45.08	54.00	8.92	Horizontal
2	4804.5	62.08	31.09	-45.54	47.63	74.00	26.37	Horizontal
3	5939.625	58.95	32.39	-44.91	46.42	74.00	27.58	Horizontal
4	5940	54.82	32.39	-44.91	42.29	54.00	11.71	Horizontal
5	8909.625	46.74	36.55	-41.22	42.08	54.00	11.92	Horizontal
6	8909.625	51.57	36.55	-41.22	46.91	74.00	27.09	Horizontal

BLE 1M_Channel 00



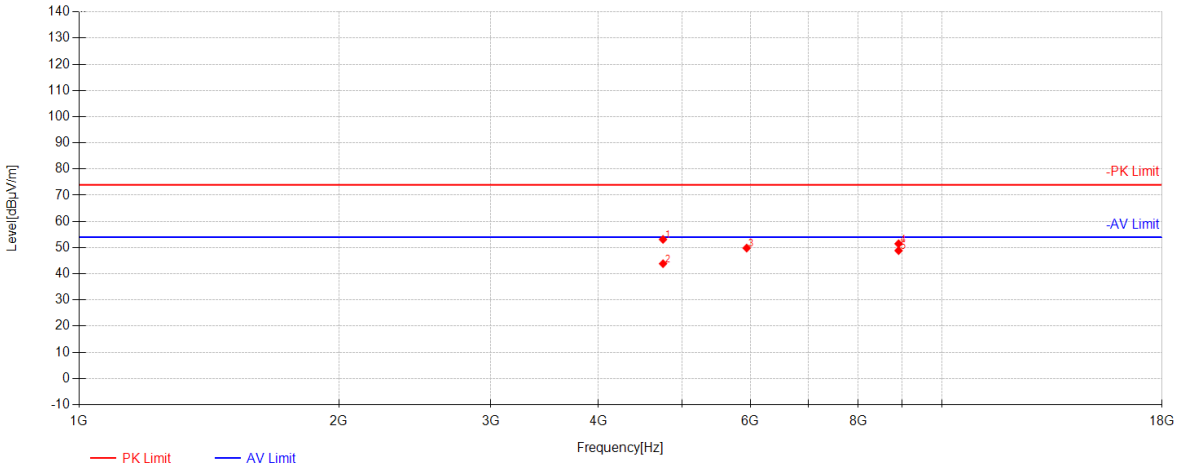
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4751.625	68.97	31.00	-45.57	54.40	74.00	19.60	Vertical
2	4752	60.22	31.00	-45.57	45.65	54.00	8.35	Vertical
3	5939.625	64.43	32.39	-44.91	51.90	74.00	22.10	Vertical
4	5940	61.62	32.39	-44.91	49.09	54.00	4.91	Vertical
5	8909.25	56.34	36.55	-41.22	51.68	74.00	22.32	Vertical
6	8909.625	53.97	36.55	-41.22	49.31	54.00	4.69	Vertical

BLE 1M_Channel 19



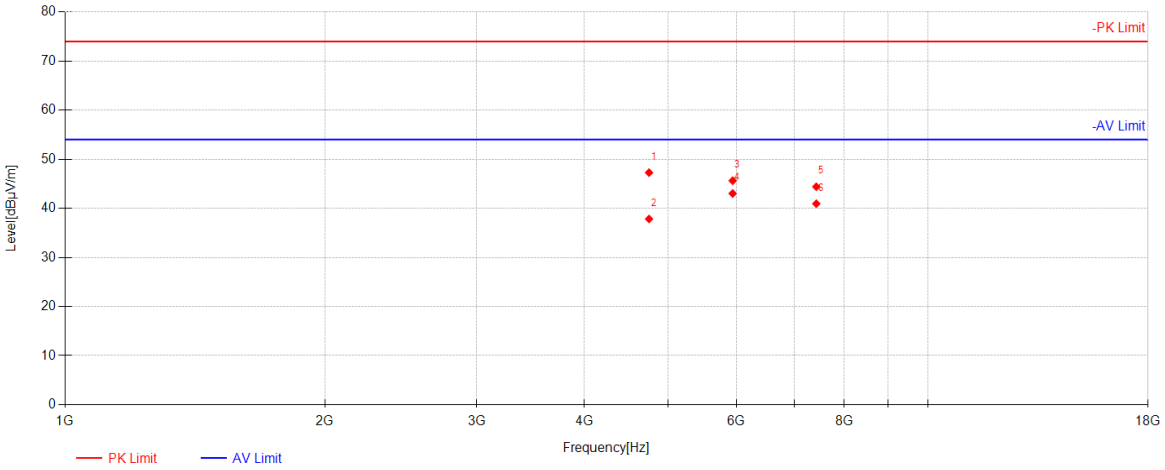
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4879.5	59.80	31.21	-45.53	45.48	74.00	28.52	Horizontal
2	4880.625	55.76	31.21	-45.53	41.44	54.00	12.56	Horizontal
3	5939.625	58.00	32.39	-44.91	45.47	74.00	28.53	Horizontal
4	5940	56.32	32.39	-44.91	43.79	54.00	10.21	Horizontal
5	8909.25	49.92	36.55	-41.22	45.26	74.00	28.74	Horizontal
6	8909.625	46.76	36.55	-41.22	42.10	54.00	11.90	Horizontal

BLE 1M_Channel 19



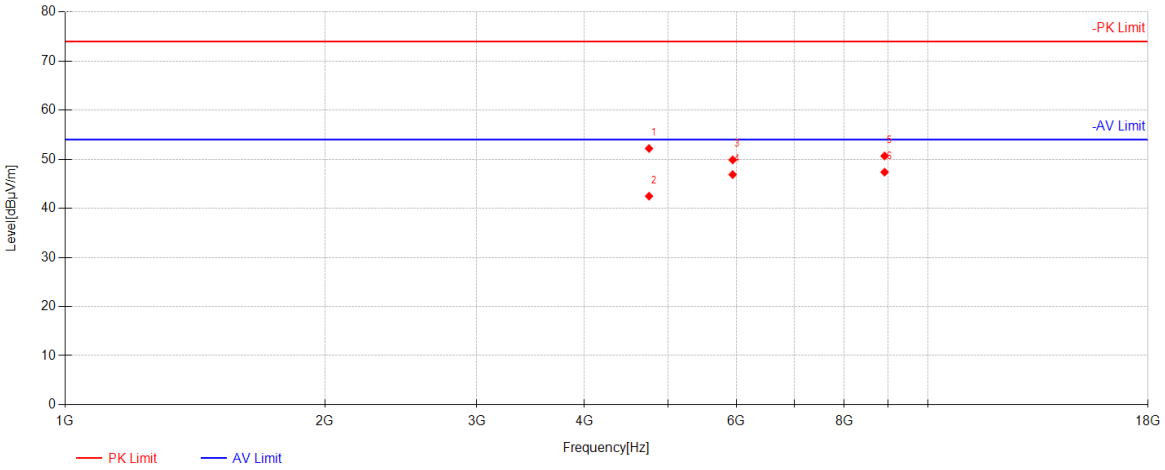
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4751.625	67.70	31.00	-45.57	53.13	74.00	20.87	Vertical
2	4751.625	58.42	31.00	-45.57	43.85	54.00	10.15	Vertical
3	5939.625	62.35	32.39	-44.91	49.82	74.00	24.18	Vertical
4	8909.25	56.14	36.55	-41.22	51.48	74.00	22.52	Vertical
5	8909.625	53.51	36.55	-41.22	48.85	54.00	5.15	Vertical

BLE 1M_Channel 39



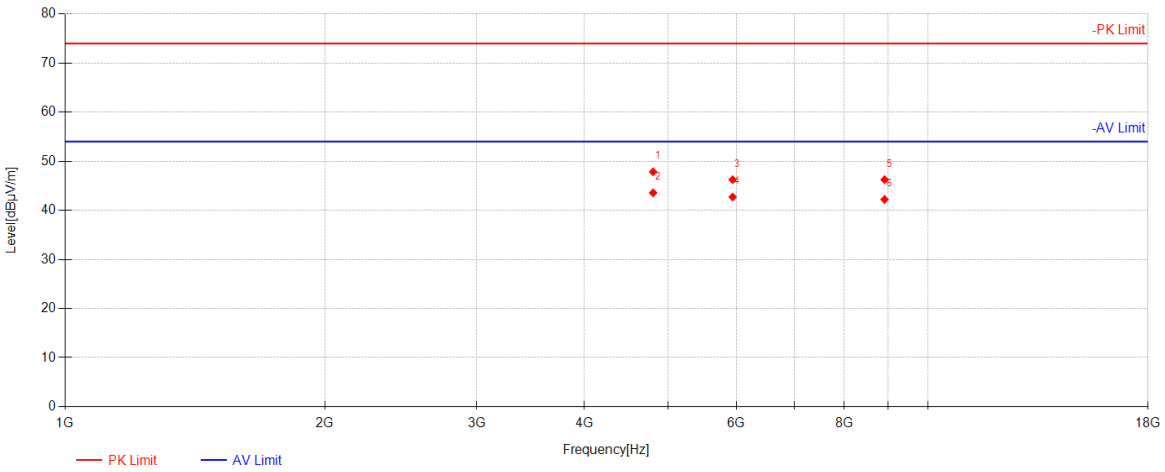
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4751.625	61.84	31.00	-45.57	47.27	74.00	26.73	Horizontal
2	4752	52.41	31.00	-45.57	37.84	54.00	16.16	Horizontal
3	5939.625	58.16	32.39	-44.91	45.63	74.00	28.37	Horizontal
4	5940	55.55	32.39	-44.91	43.02	54.00	10.98	Horizontal
5	7424.625	51.55	36.19	-43.34	44.40	74.00	29.60	Horizontal
6	7425	48.09	36.19	-43.34	40.94	54.00	13.06	Horizontal

BLE 1M_Channel 39



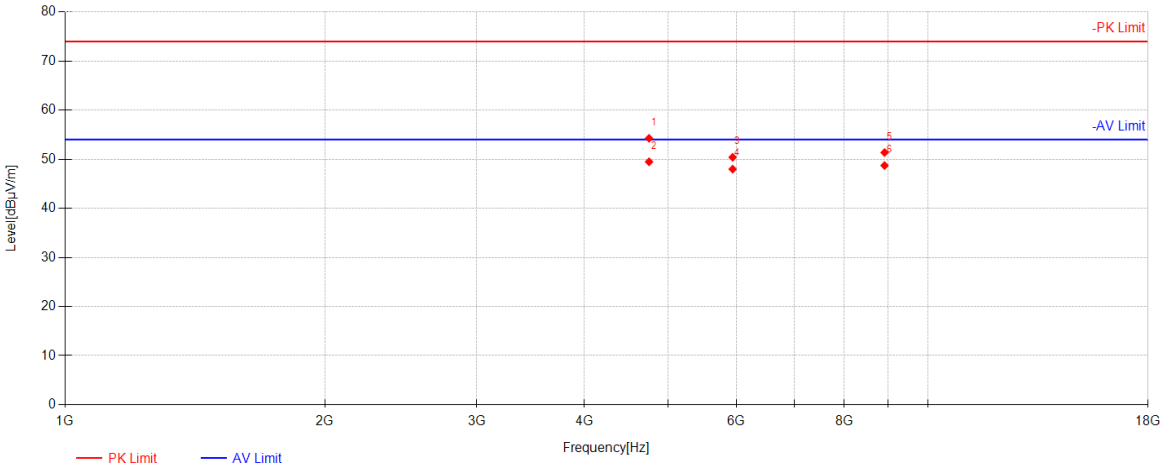
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4751.625	66.76	31.00	-45.57	52.19	74.00	21.81	Vertical
2	4752	57.05	31.00	-45.57	42.48	54.00	11.52	Vertical
3	5939.625	62.39	32.39	-44.91	49.86	74.00	24.14	Vertical
4	5940	59.40	32.39	-44.91	46.87	54.00	7.13	Vertical
5	8909.25	55.32	36.55	-41.22	50.66	74.00	23.34	Vertical
6	8909.625	52.03	36.55	-41.22	47.37	54.00	6.63	Vertical

BLE 2M_Channel 00



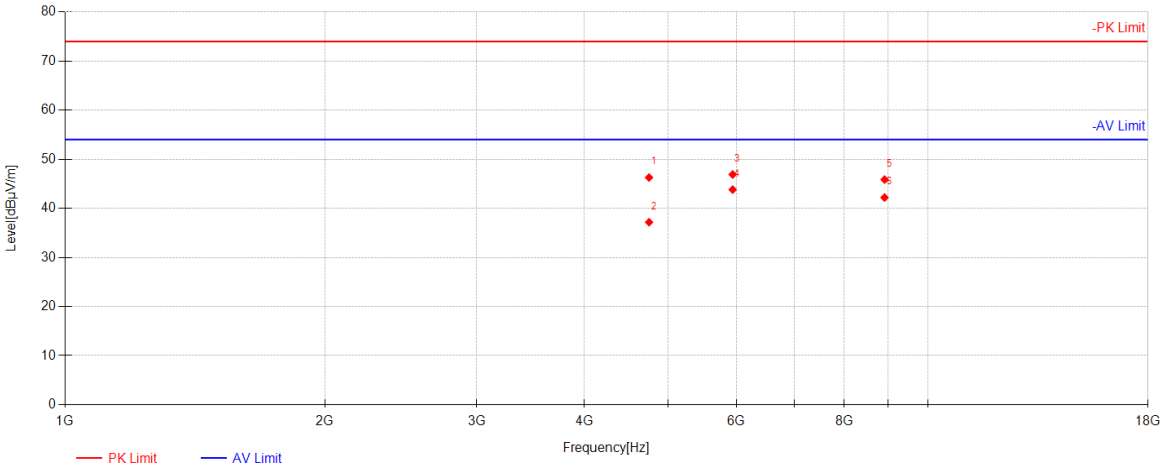
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4803	62.30	31.08	-45.54	47.85	74.00	26.15	Horizontal
2	4803.375	58.01	31.09	-45.54	43.56	54.00	10.44	Horizontal
3	5939.625	58.77	32.39	-44.91	46.24	74.00	27.76	Horizontal
4	5940	55.24	32.39	-44.91	42.71	54.00	11.29	Horizontal
5	8909.25	50.91	36.55	-41.22	46.25	74.00	27.75	Horizontal
6	8909.625	46.88	36.55	-41.22	42.22	54.00	11.78	Horizontal

BLE 2M_Channel 00



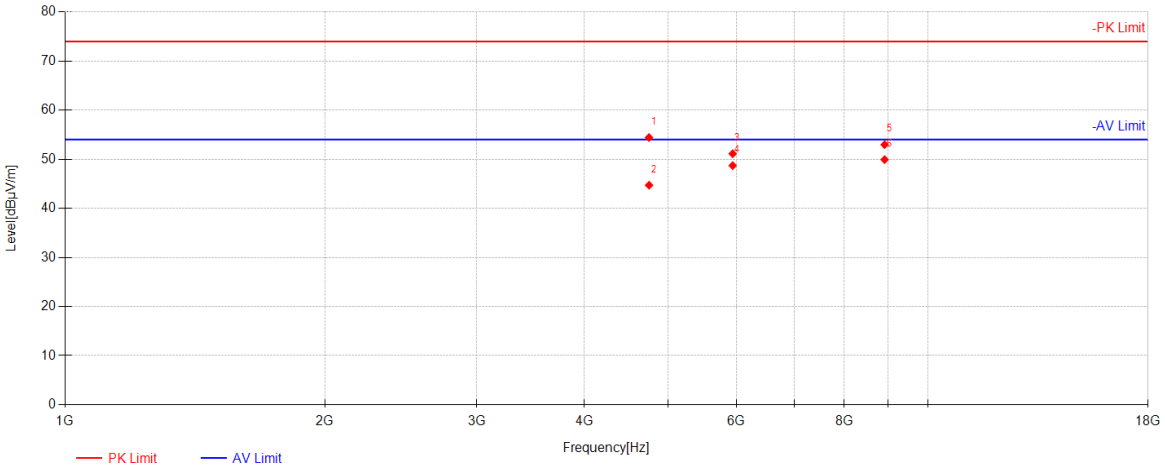
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4751.625	68.83	31.00	-45.57	54.26	74.00	19.74	Vertical
2	4752	64.05	31.00	-45.57	49.48	54.00	4.52	Vertical
3	5939.625	62.93	32.39	-44.91	50.40	74.00	23.60	Vertical
4	5940	60.51	32.39	-44.91	47.98	54.00	6.02	Vertical
5	8909.625	56.03	36.55	-41.22	51.37	74.00	22.63	Vertical
6	8909.625	53.38	36.55	-41.22	48.72	54.00	5.28	Vertical

BLE 2M_Channel 19



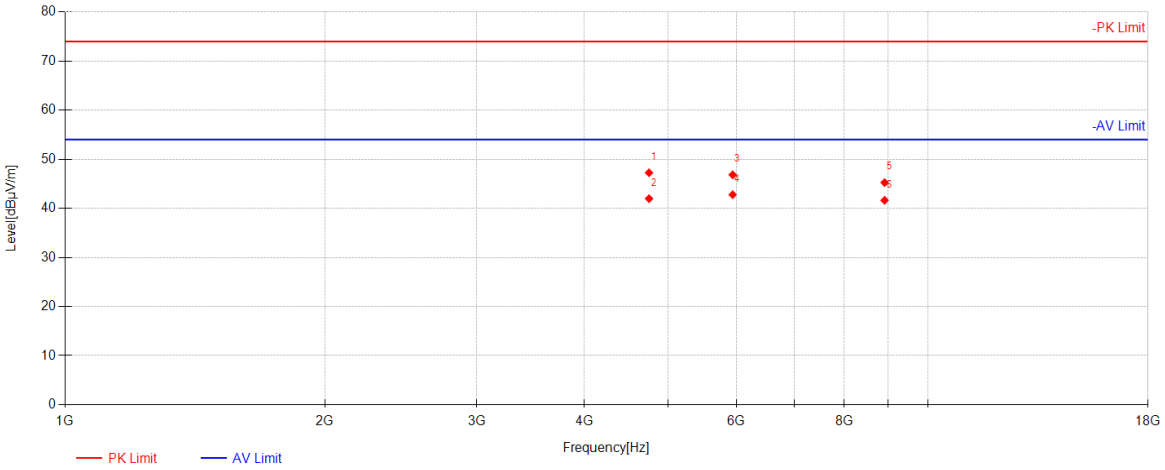
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4751.625	60.85	31.00	-45.57	46.28	74.00	27.72	Horizontal
2	4752	51.75	31.00	-45.57	37.18	54.00	16.82	Horizontal
3	5939.625	59.42	32.39	-44.91	46.89	74.00	27.11	Horizontal
4	5940	56.34	32.39	-44.91	43.81	54.00	10.19	Horizontal
5	8909.25	50.52	36.55	-41.22	45.86	74.00	28.14	Horizontal
6	8909.625	46.86	36.55	-41.22	42.20	54.00	11.80	Horizontal

BLE 2M_Channel 19



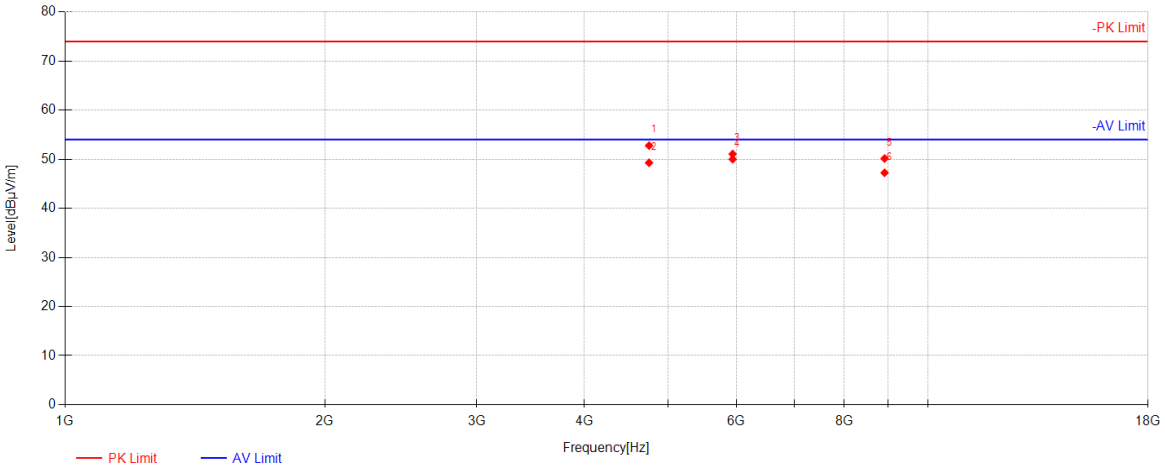
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4751.625	69.00	31.00	-45.57	54.43	74.00	19.57	Vertical
2	4752	59.28	31.00	-45.57	44.71	54.00	9.29	Vertical
3	5939.625	63.66	32.39	-44.91	51.13	74.00	22.87	Vertical
4	5940	61.24	32.39	-44.91	48.71	54.00	5.29	Vertical
5	8909.25	57.63	36.55	-41.22	52.97	74.00	21.03	Vertical
6	8909.625	54.59	36.55	-41.22	49.93	54.00	4.07	Vertical

BLE 2M_Channel 39



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4751.625	61.82	31.00	-45.57	47.25	74.00	26.75	Horizontal
2	4752	56.55	31.00	-45.57	41.98	54.00	12.02	Horizontal
3	5939.625	59.36	32.39	-44.91	46.83	74.00	27.17	Horizontal
4	5940	55.31	32.39	-44.91	42.78	54.00	11.22	Horizontal
5	8909.25	49.91	36.55	-41.22	45.25	74.00	28.75	Horizontal
6	8909.625	46.29	36.55	-41.22	41.63	54.00	12.37	Horizontal

BLE 2M_Channel 39



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4751.625	67.35	31.00	-45.57	52.78	74.00	21.22	Vertical
2	4752	63.86	31.00	-45.57	49.29	54.00	4.71	Vertical
3	5939.625	63.60	32.39	-44.91	51.07	74.00	22.93	Vertical
4	5940	62.53	32.39	-44.91	50.00	54.00	4.00	Vertical
5	8909.625	54.81	36.55	-41.22	50.15	74.00	23.85	Vertical
6	8909.625	51.90	36.55	-41.22	47.24	54.00	6.76	Vertical

7.5 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

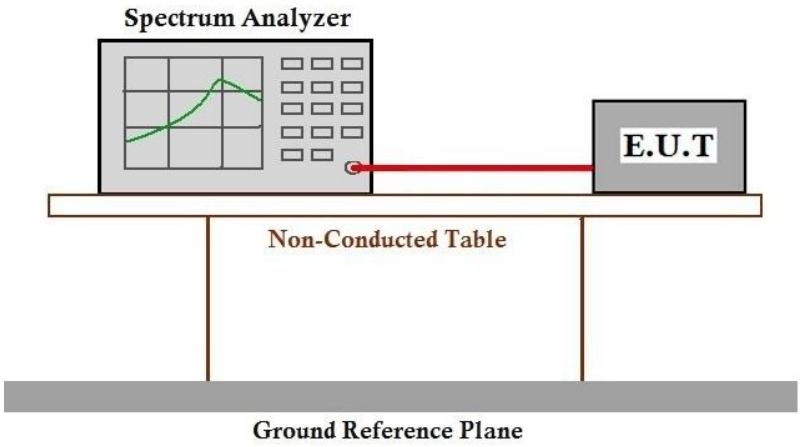
7.5.1 E.U.T. Operation

Operating Environment:
Temperature: 23.1 °C Humidity: 53.3 % RH Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details

7.6 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1

Limit:

≥500 kHz

7.6.1 E.U.T. Operation

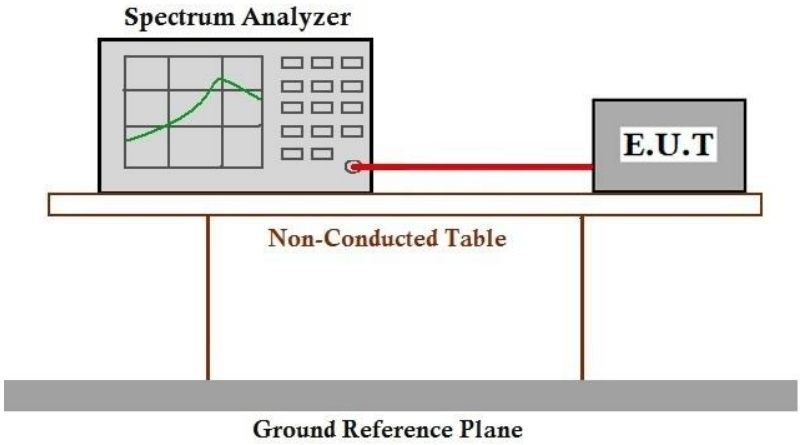
Operating Environment:

Temperature: 23.1 °C Humidity: 53.3 % RH Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit:
≤8dBm in any 3 kHz band during any time interval of continuous transmission

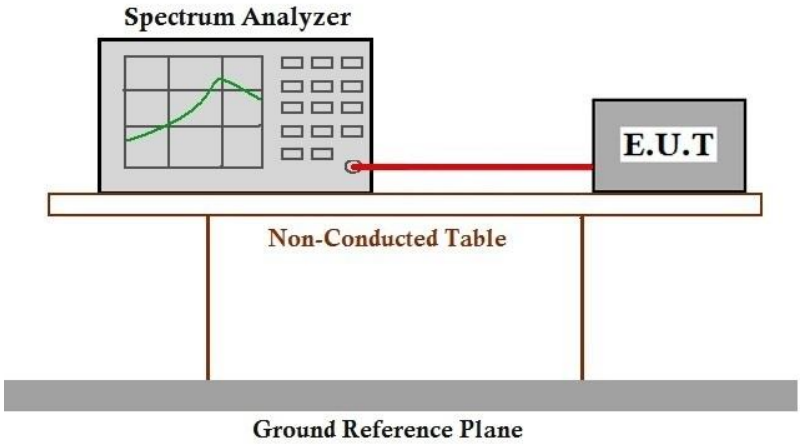
7.7.1 E.U.T. Operation

Operating Environment:
Temperature: 23.1 °C Humidity: 53.3 % RH Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.8 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit:

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).

7.8.1 E.U.T. Operation

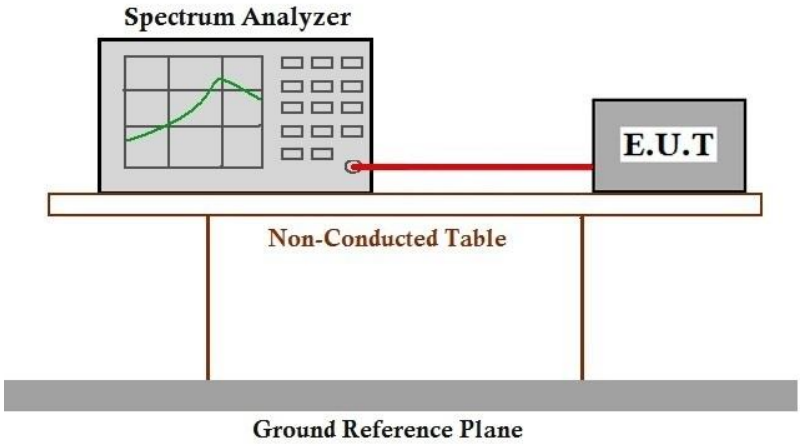
Operating Environment:

Temperature: 23.1 °C Humidity: 53.3 % RH Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.8.3 Test Setup Diagram



7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.9 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 11.11

Limit:

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).

7.9.1 E.U.T. Operation

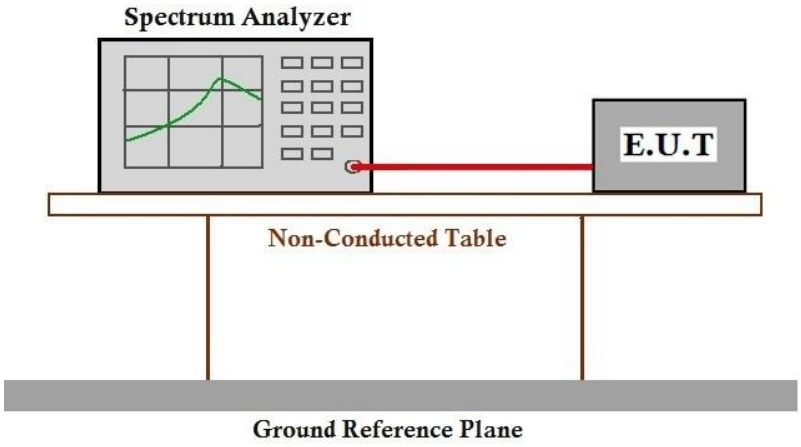
Operating Environment:

Temperature: 23.1 °C Humidity: 53.3 % RH Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	06	TX mode(1Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.
Final test	07	TX mode(2Mbps)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.9.3 Test Setup Diagram



7.9.4 Measurement Procedure and Data

Please Refer to Appendix for Details

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2408001626AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2408001626AT

10 Appendix

1. Duty Cycle

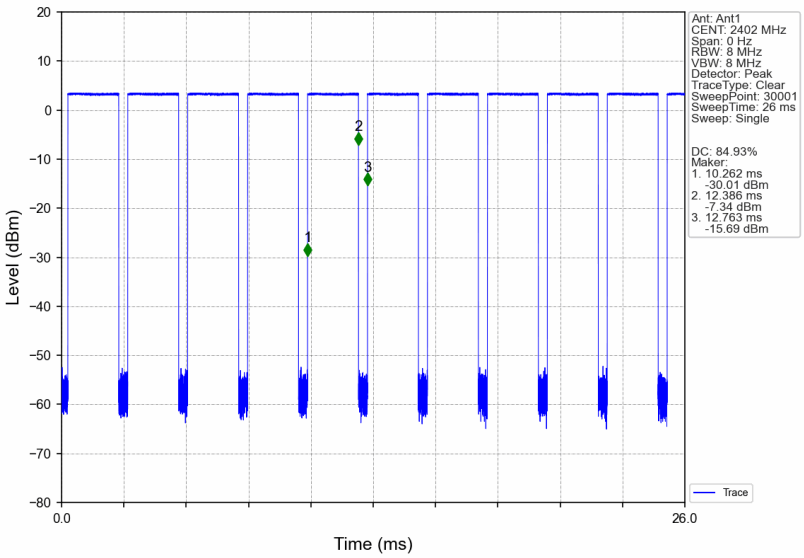
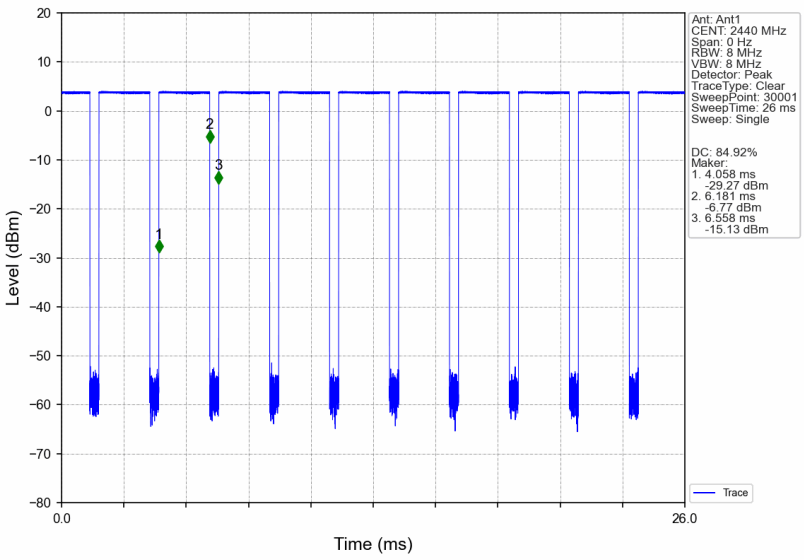
1.1 Test Result

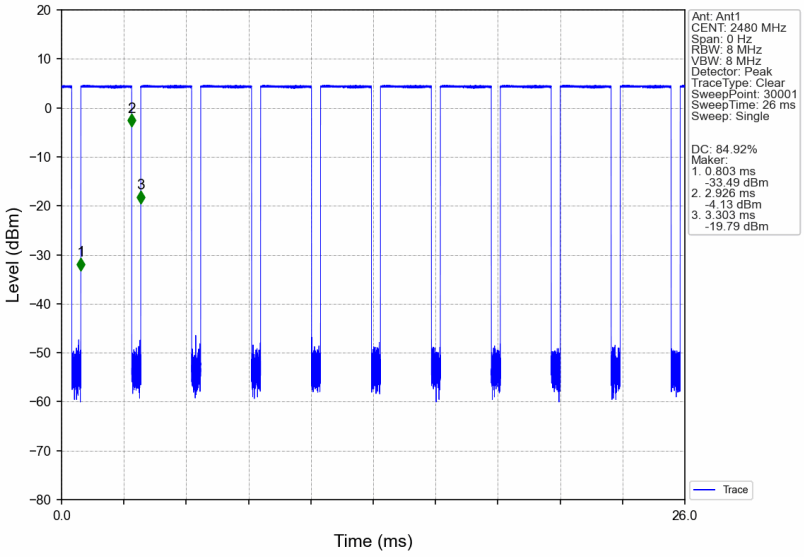
1.1.1 Ant1

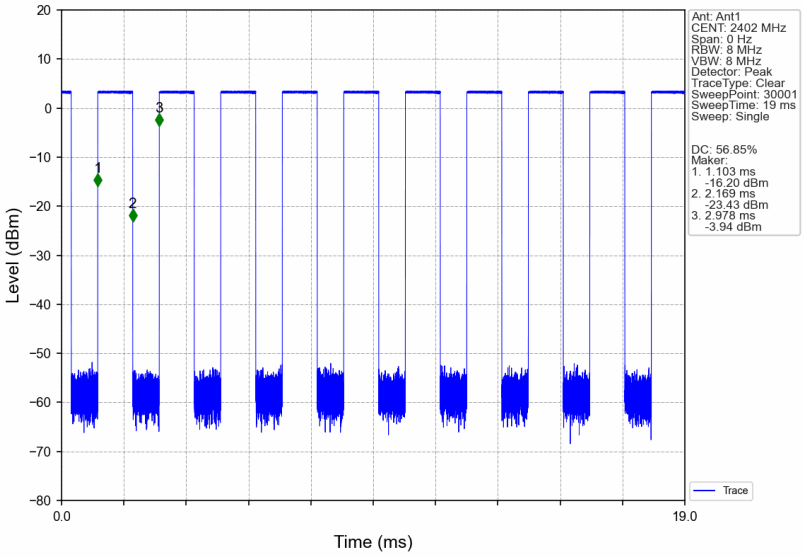
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	2.124	2.501	84.93	0.71	0.03
		2440	2.123	2.500	84.92	0.71	0.03
		2480	2.123	2.500	84.92	0.71	0.03
2M	SISO	2402	1.066	1.875	56.85	2.45	0.02
		2440	1.065	1.875	56.80	2.46	0.01
		2480	1.065	1.875	56.80	2.46	0.03

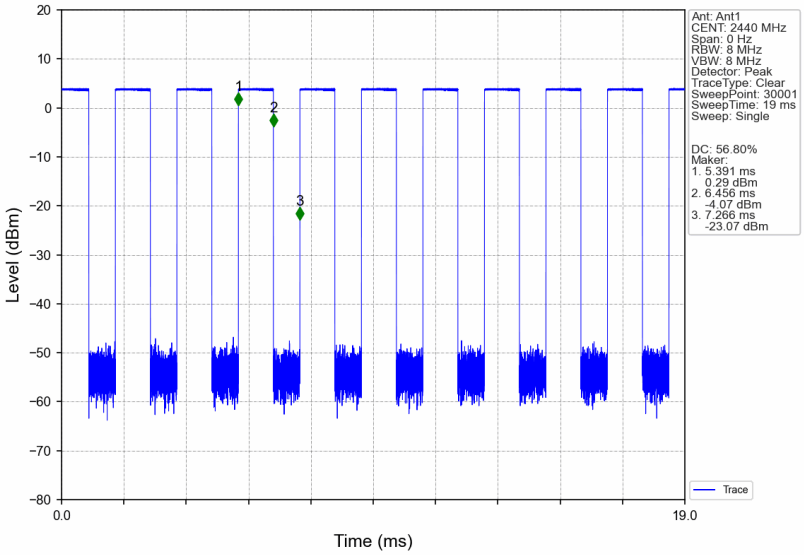
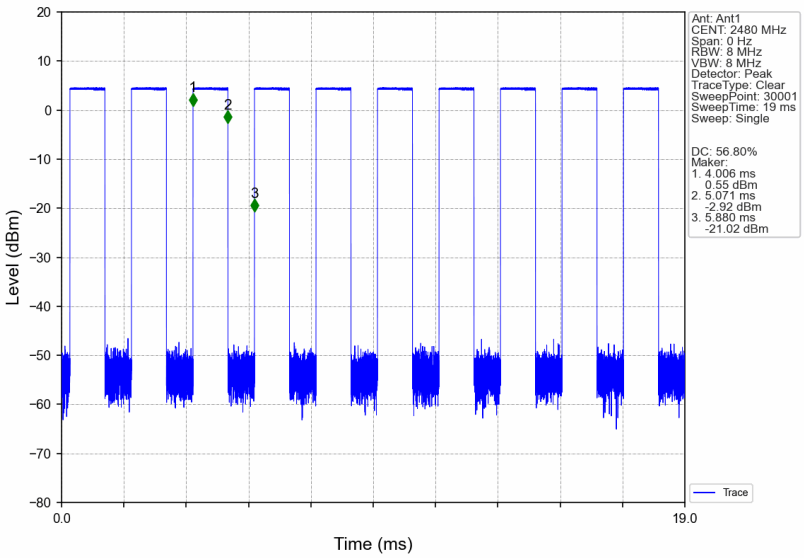
1.2 Test Graph

1.2.1 Ant1

1M_LCH_2402MHz_Ant1_NTNV

1M_MCH_2440MHz_Ant1_NTNV


1M_HCH_2480MHz_Ant1_NTNV


2M_LCH_2402MHz_Ant1_NTNV


2M_MCH_2440MHz_Ant1_NTNV

2M_HCH_2480MHz_Ant1_NTNV


2. Bandwidth

2.1 Test Result

2.1.1 OBW

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	1.038	/	Pass
		2440	1	1.039	/	Pass
		2480	1	1.040	/	Pass
2M	SISO	2402	1	2.074	/	Pass
		2440	1	2.075	/	Pass
		2480	1	2.078	/	Pass

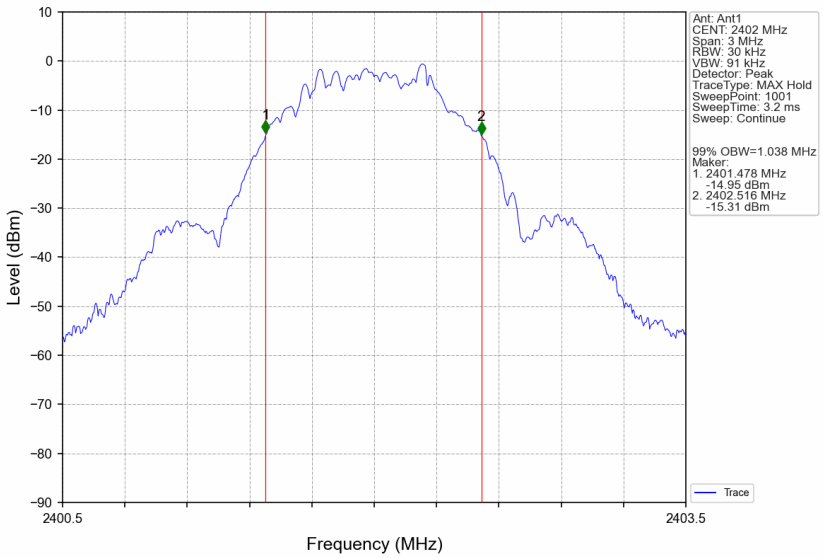
2.1.2 6dB BW

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.666	>=0.5	Pass
		2440	1	0.669	>=0.5	Pass
		2480	1	0.669	>=0.5	Pass
2M	SISO	2402	1	1.205	>=0.5	Pass
		2440	1	1.188	>=0.5	Pass
		2480	1	1.266	>=0.5	Pass

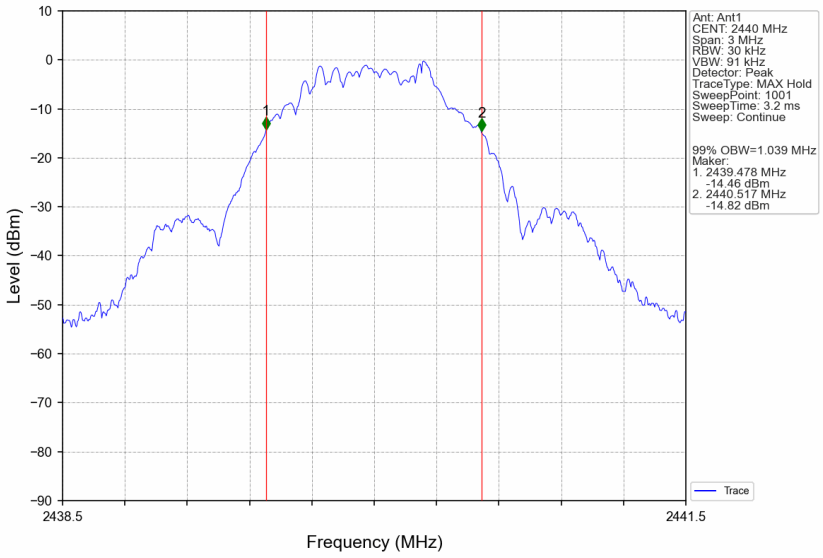
2.2 Test Graph

2.2.1 OBW

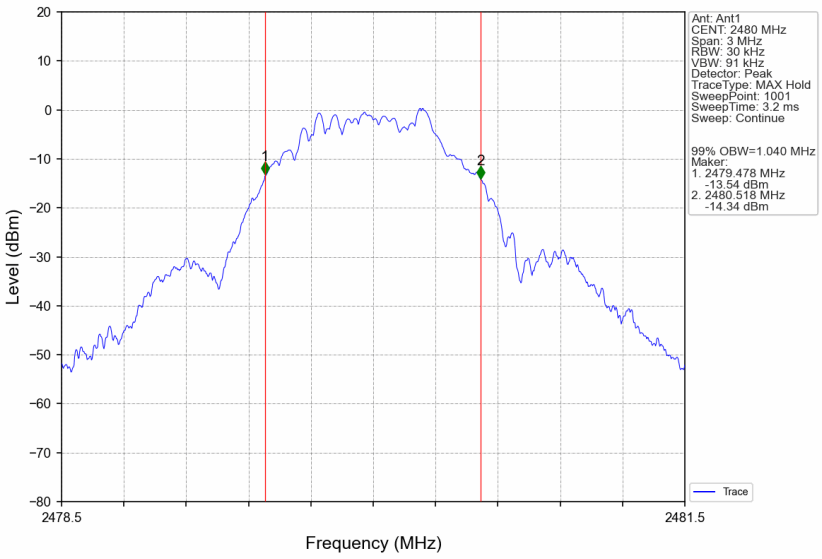
1M_LCH_2402MHz_Ant1_NTNV



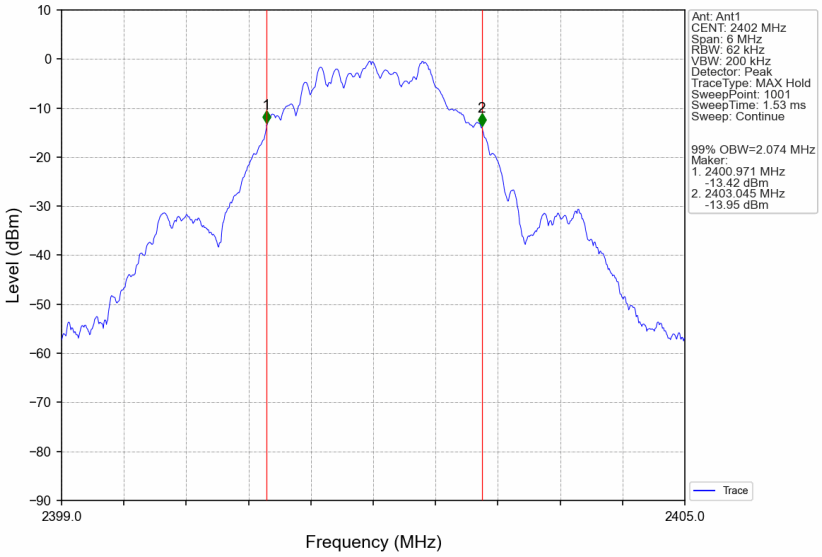
1M_MCH_2440MHz_Ant1_NTNV



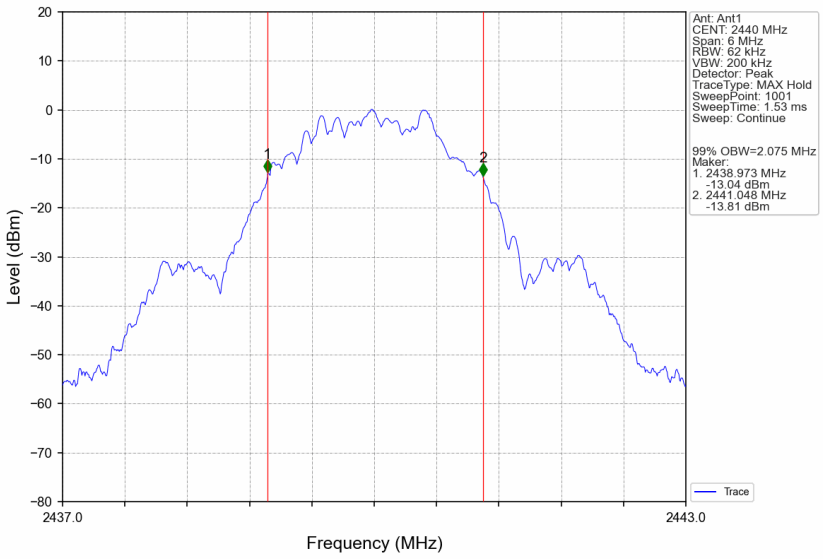
1M_HCH_2480MHz_Ant1_NTNV



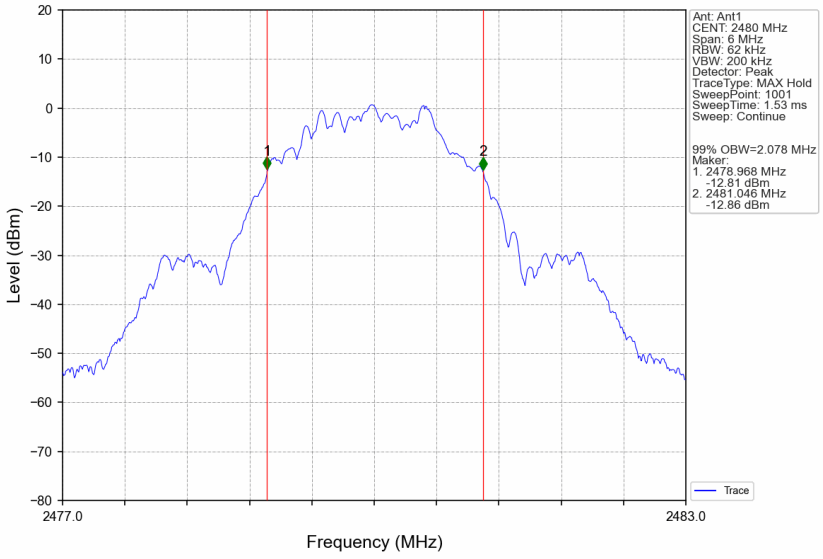
2M_LCH_2402MHz_Ant1_NTNV



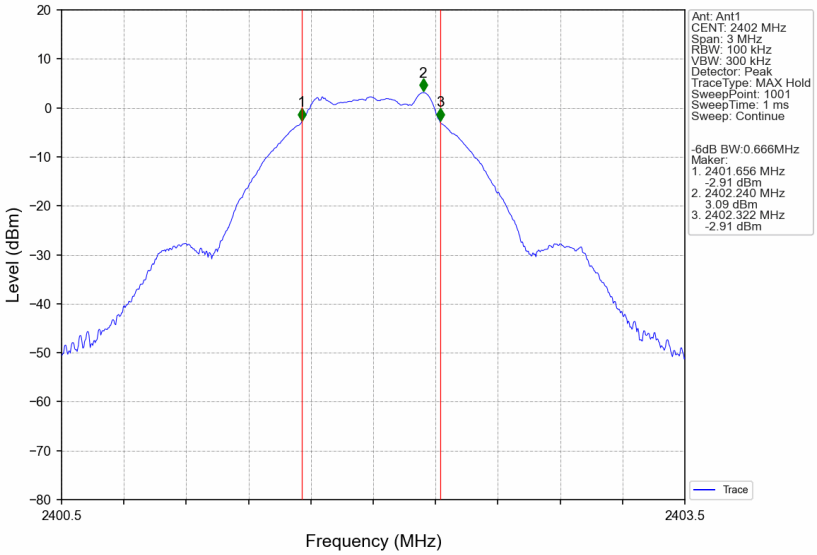
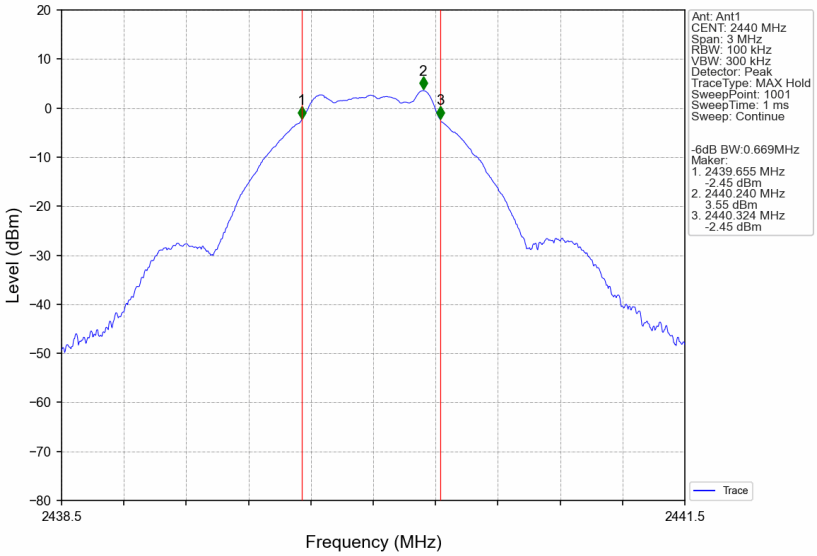
2M_MCH_2440MHz_Ant1_NTNV



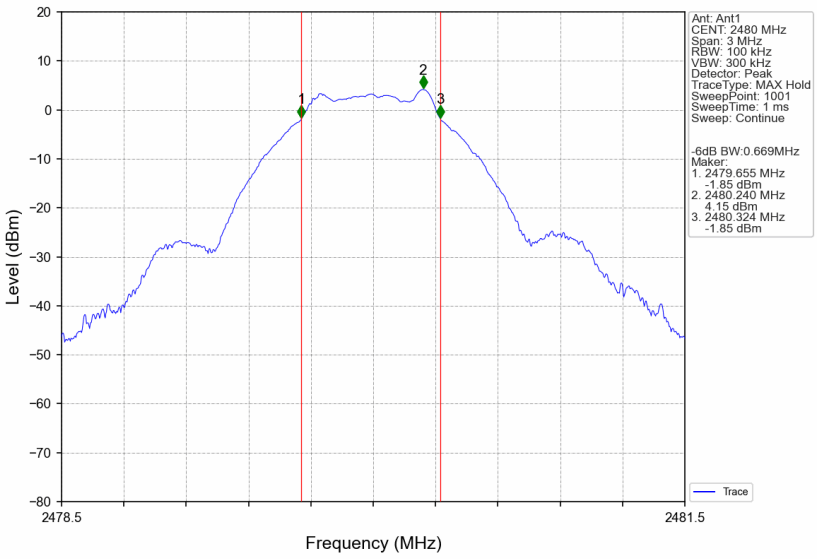
2M_HCH_2480MHz_Ant1_NTNV



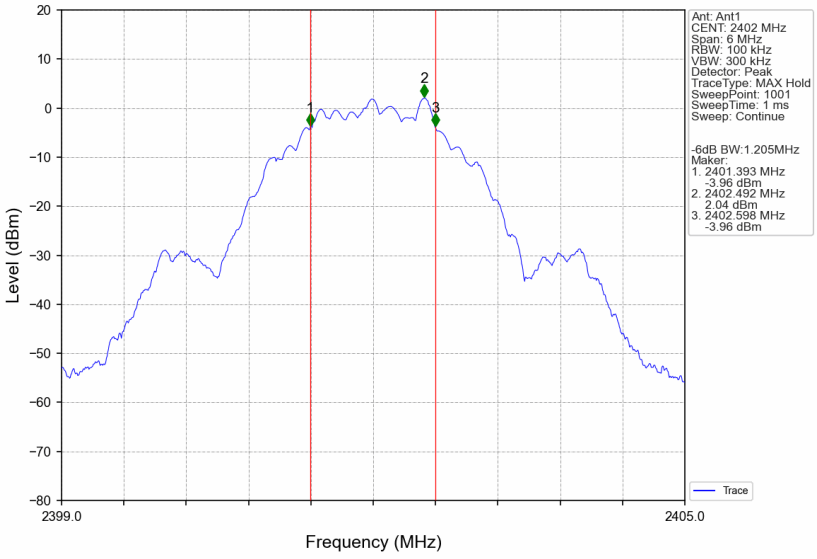
2.2.2 6dB BW

1M_LCH_2402MHz_Ant1_NTNV

1M_MCH_2440MHz_Ant1_NTNV


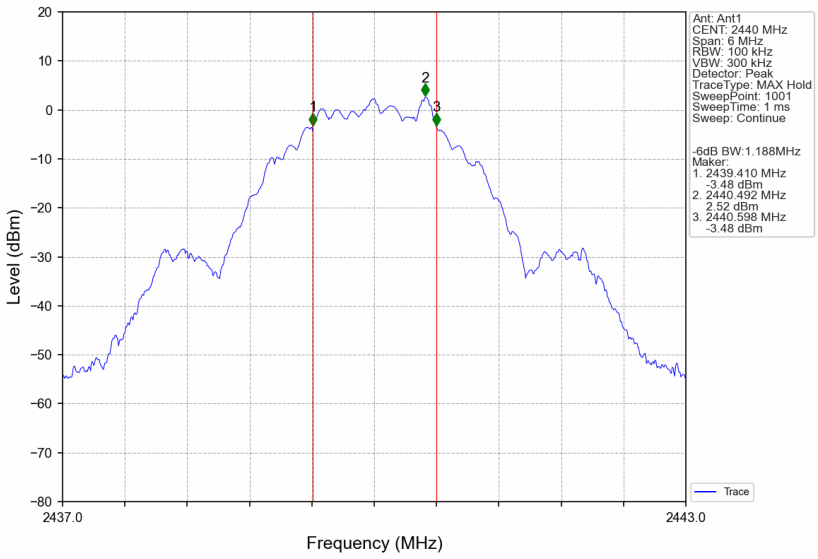
1M_HCH_2480MHz_Ant1_NTNV



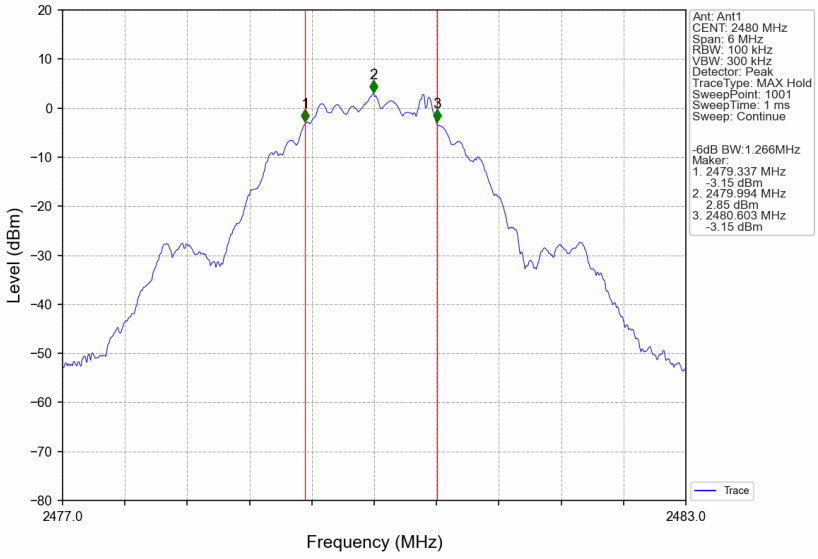
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

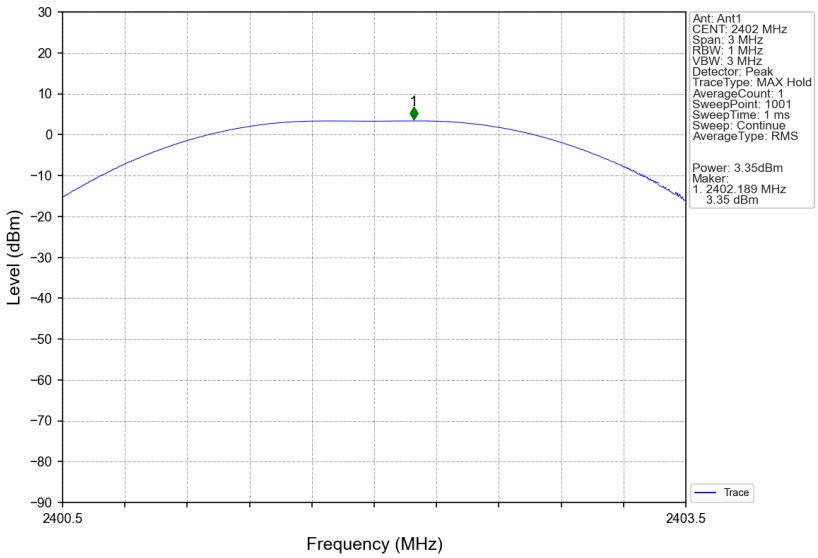
3.1.1 Power

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	3.35	<=30	Pass
		2440	3.79	<=30	Pass
		2480	4.42	<=30	Pass
2M	SISO	2402	3.28	<=30	Pass
		2440	3.80	<=30	Pass
		2480	4.43	<=30	Pass
Note1: Antenna Gain: Ant1: 3.00dBi;					

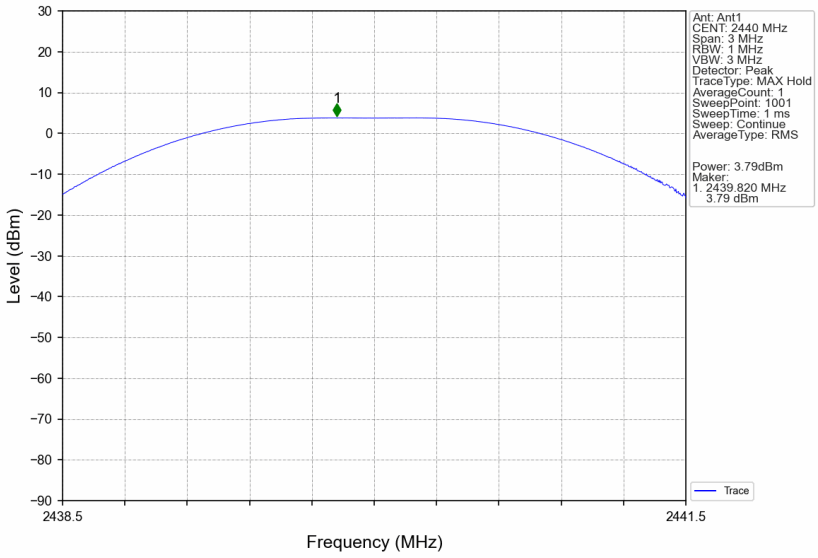
3.2 Test Graph

3.2.1 Power

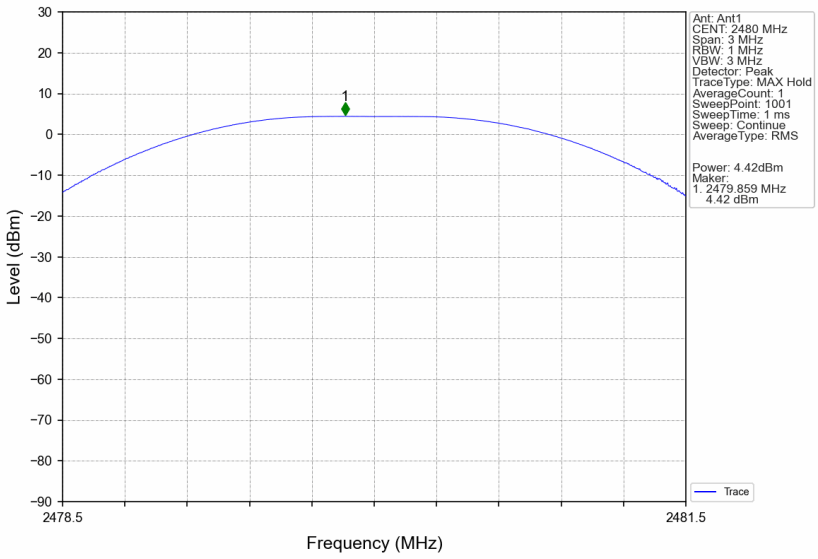
1M_LCH_2402MHz_Ant1_NTNV



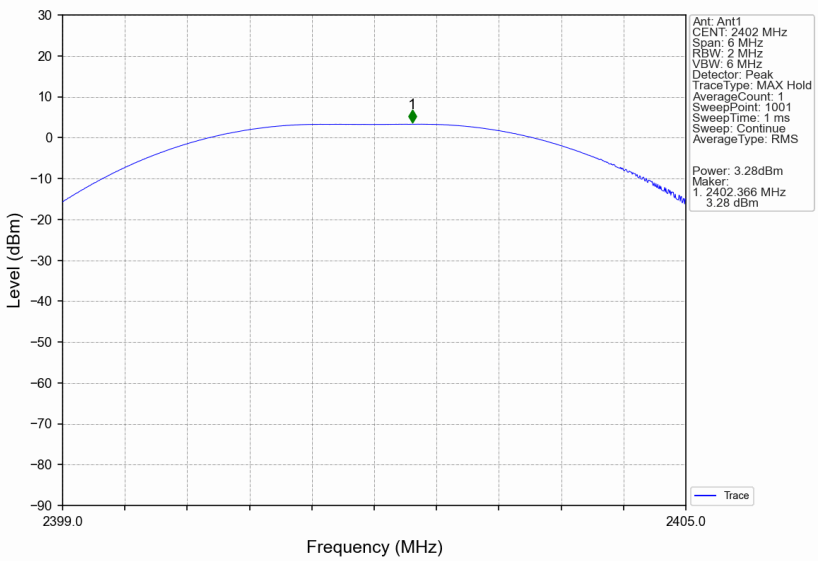
1M_MCH_2440MHz_Ant1_NTNV

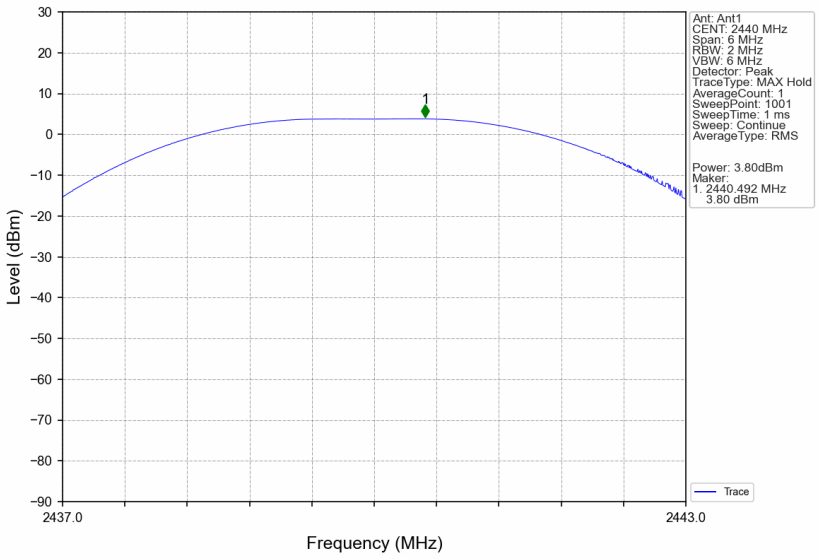


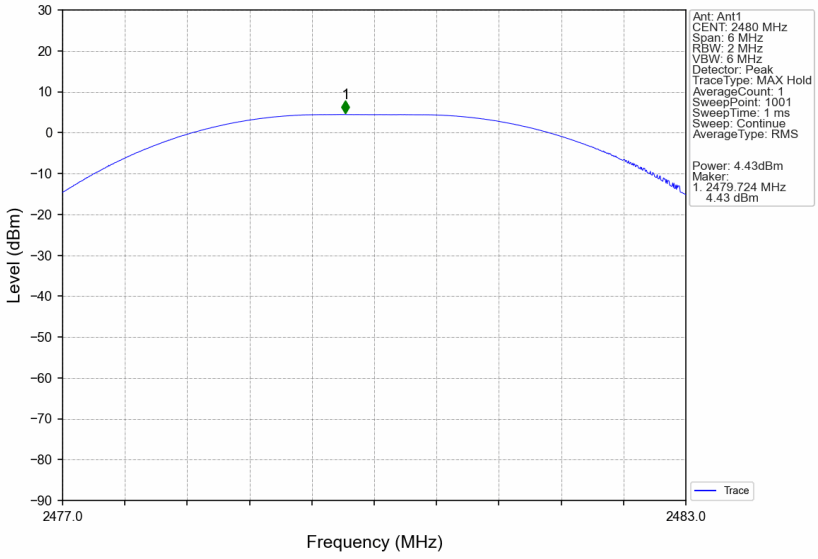
1M_HCH_2480MHz_Ant1_NTNV



2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV


2M_HCH_2480MHz_Ant1_NTNV


4. Maximum Power Spectral Density

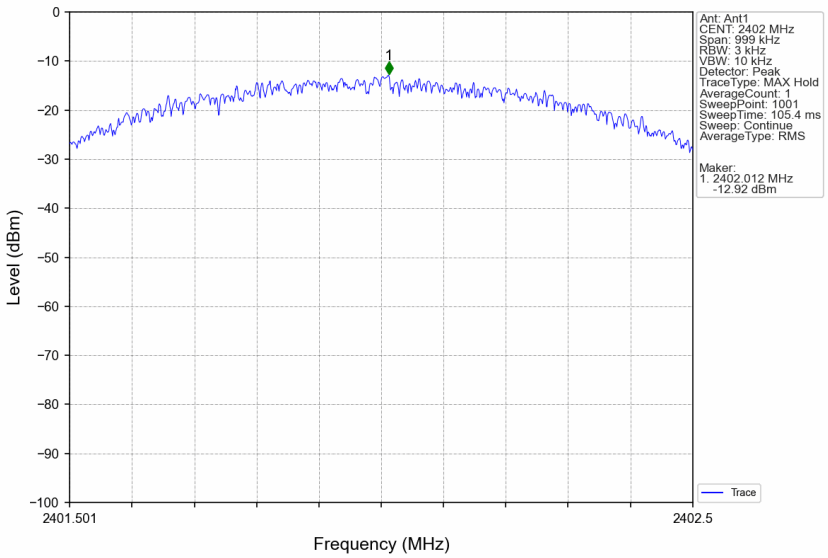
4.1 Test Result

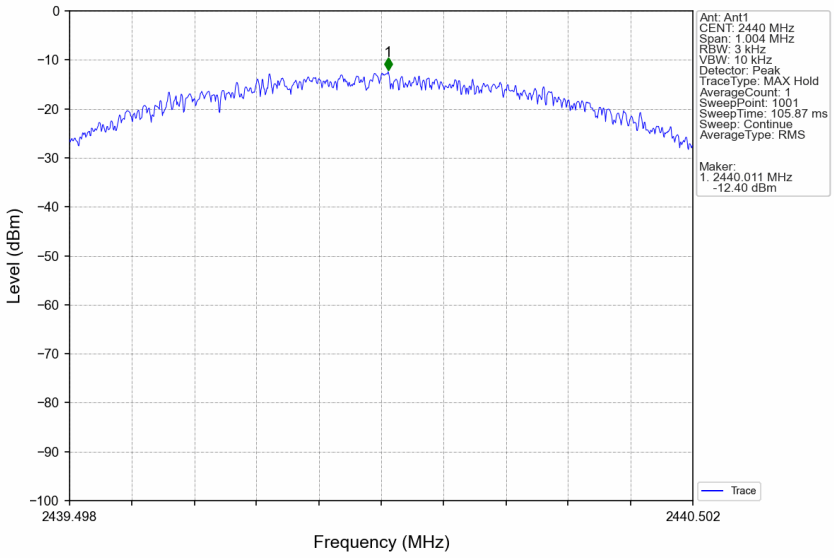
4.1.1 PSD

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
1M	SISO	2402	-12.92	<=8	Pass
		2440	-12.40	<=8	Pass
		2480	-12.03	<=8	Pass
2M	SISO	2402	-16.12	<=8	Pass
		2440	-15.74	<=8	Pass
		2480	-15.93	<=8	Pass
Note1: Antenna Gain: Ant1: 3.00dBi;					

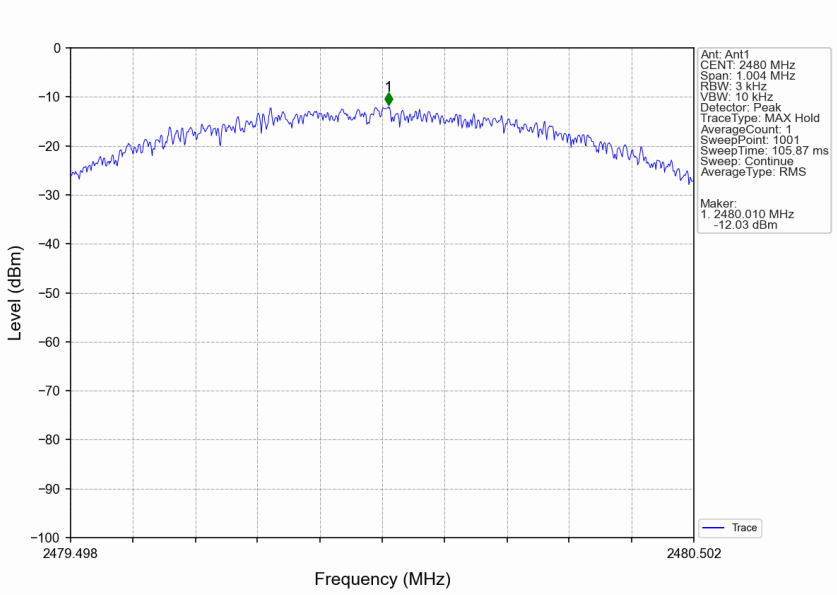
4.2 Test Graph

4.2.1 PSD

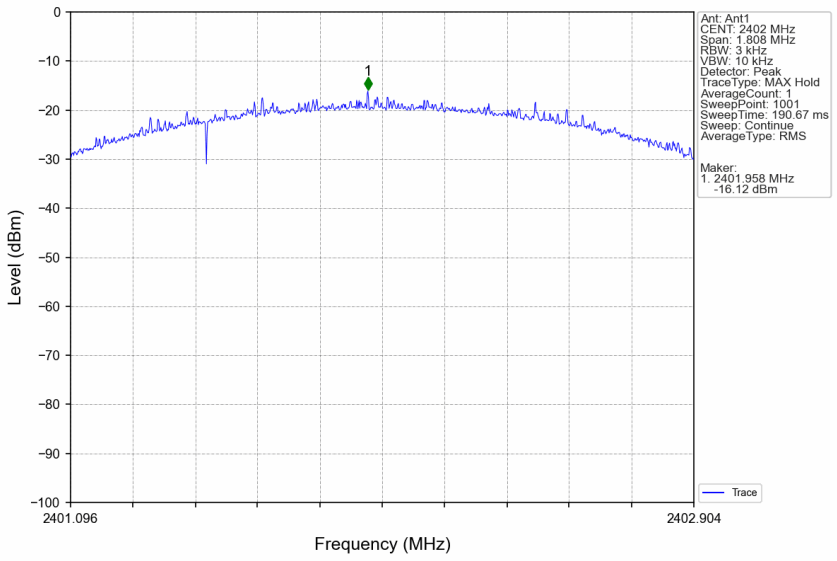
1M_LCH_2402MHz_Ant1_NTNV


1M_MCH_2440MHz_Ant1_NTNV


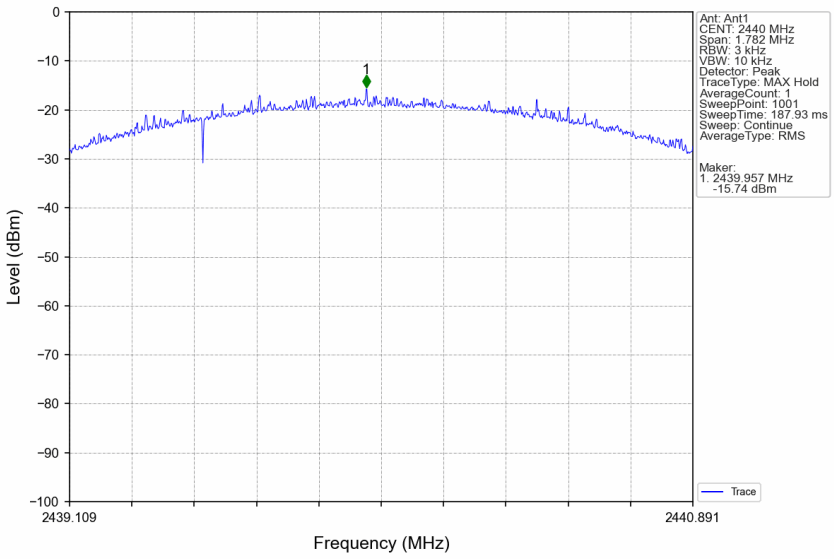
1M_HCH_2480MHz_Ant1_NTNV



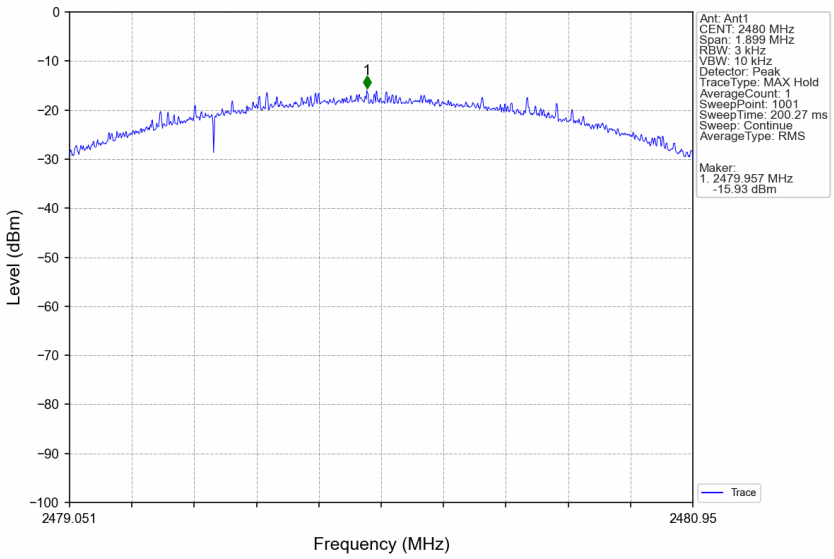
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Test Result

5.1.1 Ref

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	3.11
		2440	1	3.56
		2480	1	**4.13**
2M	SISO	2402	1	1.94
		2440	1	2.42
		2480	1	**2.97**
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.				

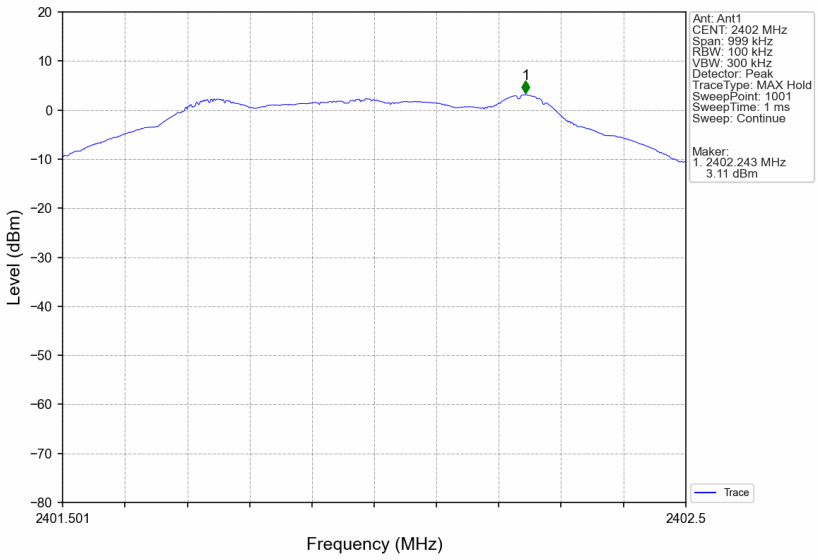
5.1.2 CSE

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	4.13	-15.87	Pass
		2440	1	4.13	-15.87	Pass
		2480	1	4.13	-15.87	Pass
2M	SISO	2402	1	2.97	-17.03	Pass
		2440	1	2.97	-17.03	Pass
		2480	1	2.97	-17.03	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.						

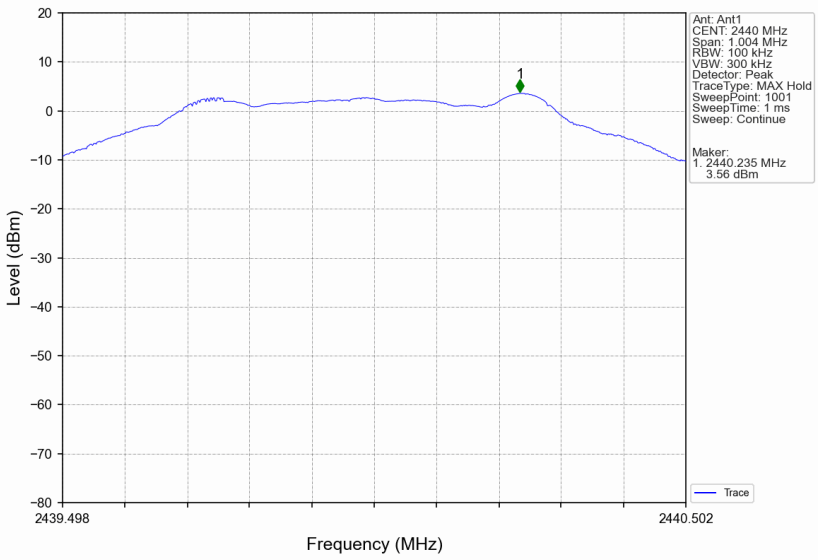
5.2 Test Graph

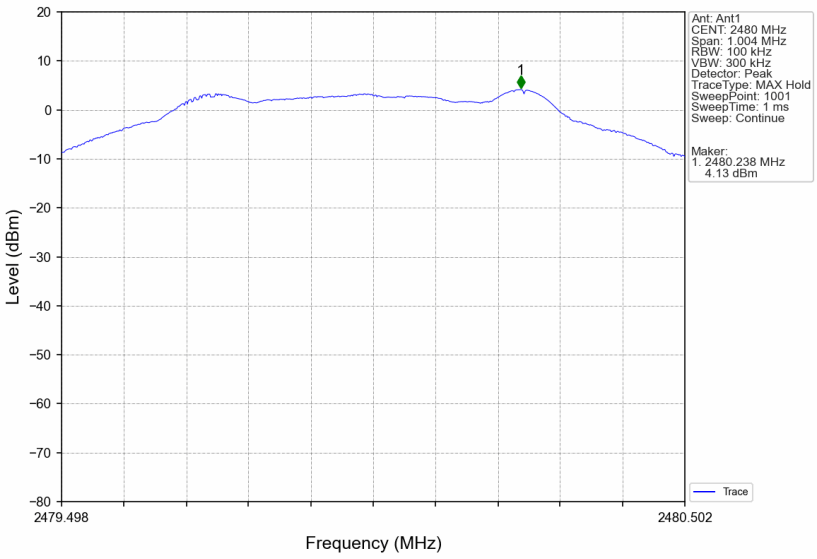
5.2.1 Ref

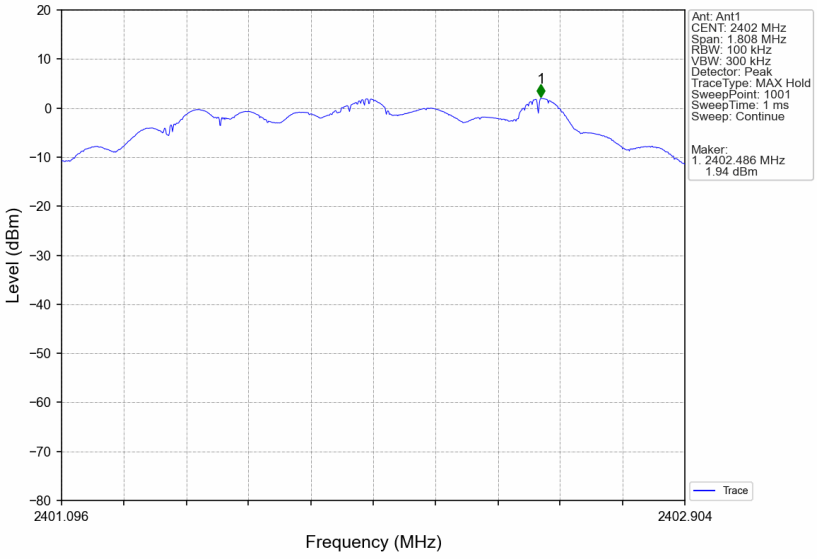
1M_LCH_2402MHz_Ant1_NTNV



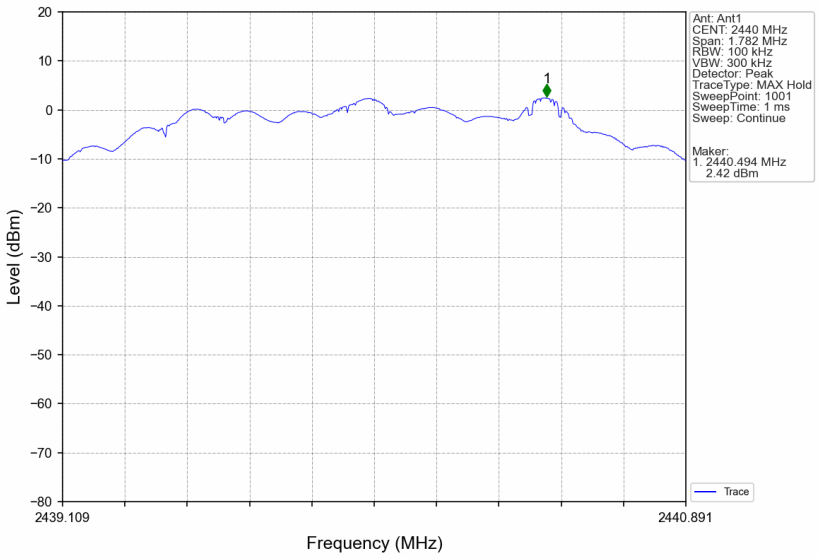
1M_MCH_2440MHz_Ant1_NTNV



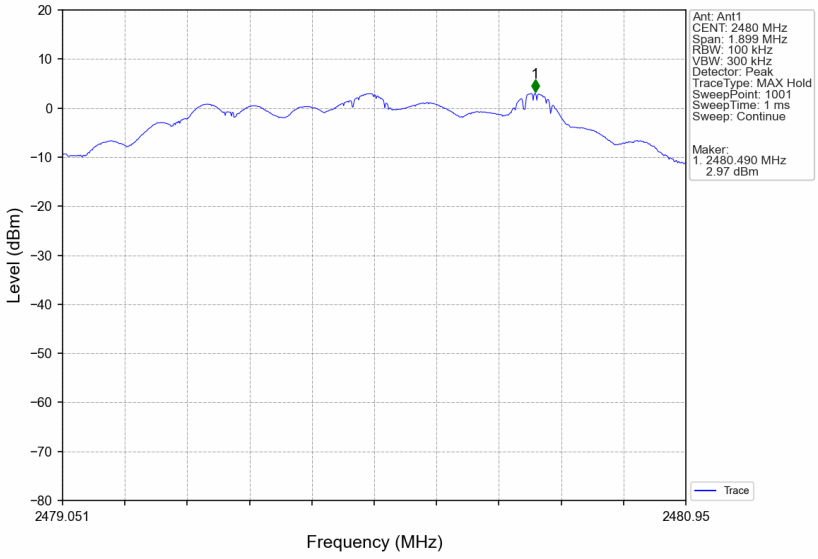
1M_HCH_2480MHz_Ant1_NTNV


2M_LCH_2402MHz_Ant1_NTNV


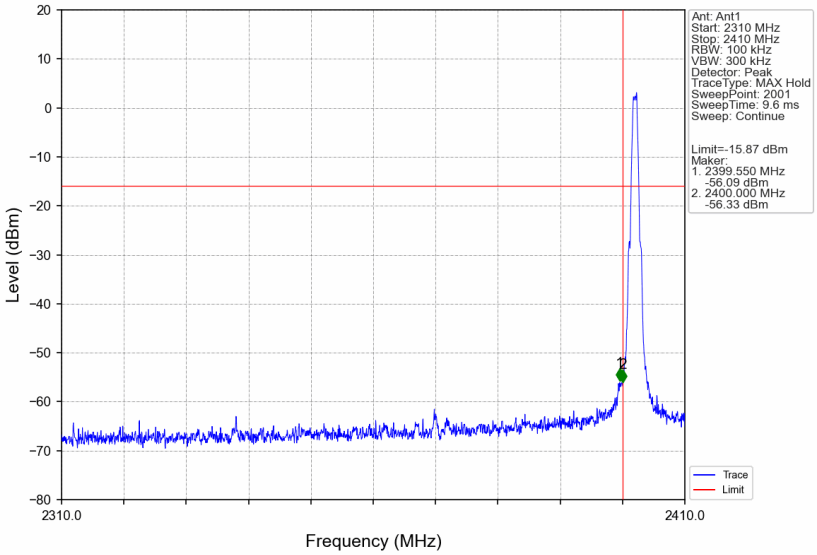
2M_MCH_2440MHz_Ant1_NTNV

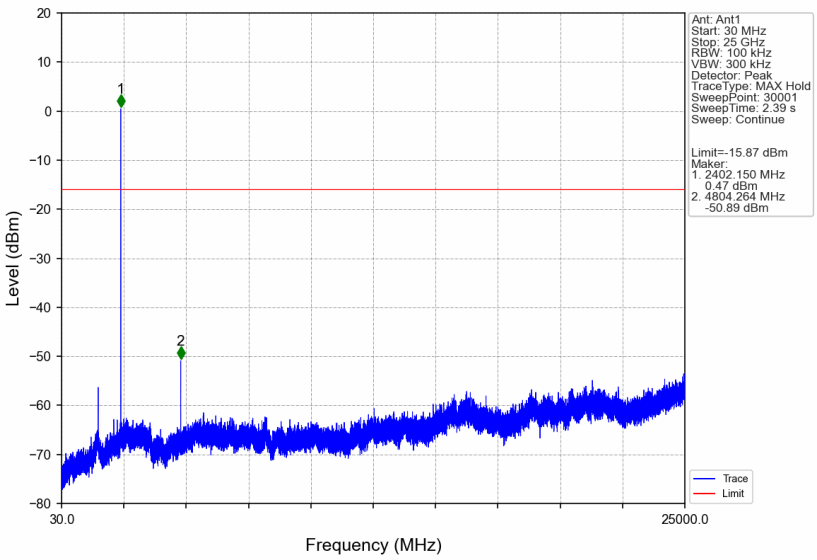


2M_HCH_2480MHz_Ant1_NTNV

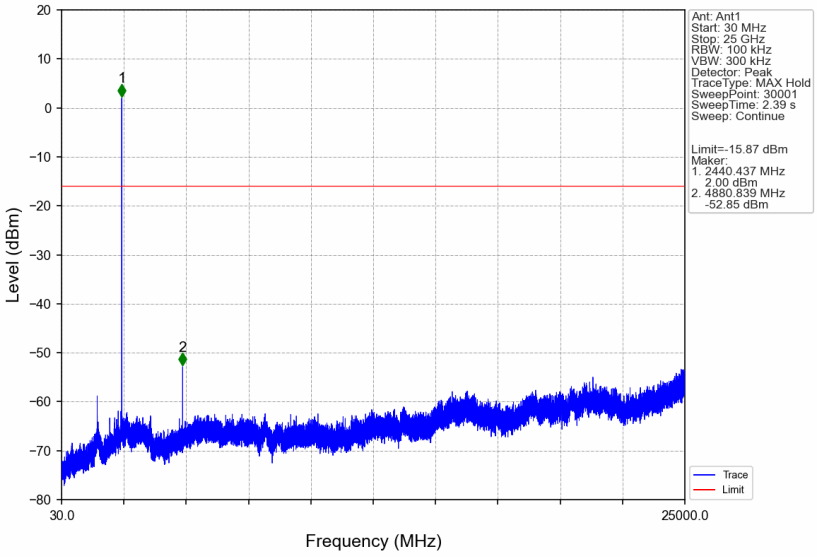


5.2.2 CSE

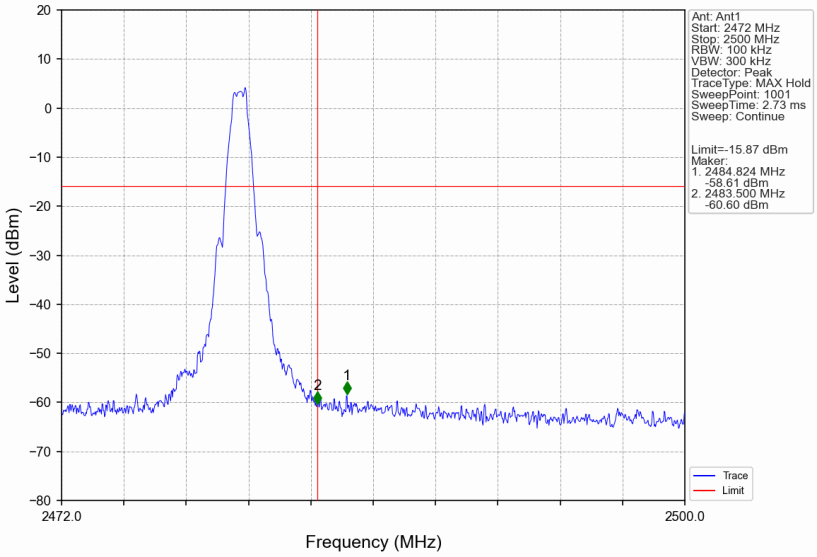
1M_LCH_2402MHz_Ant1_NTNV


1M_LCH_2402MHz_Ant1_NTNV


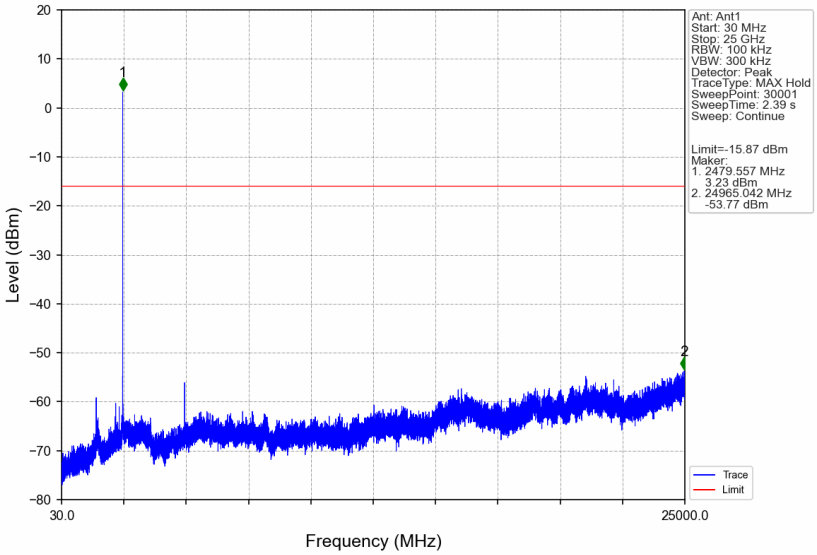
1M_MCH_2440MHz_Ant1_NTNV



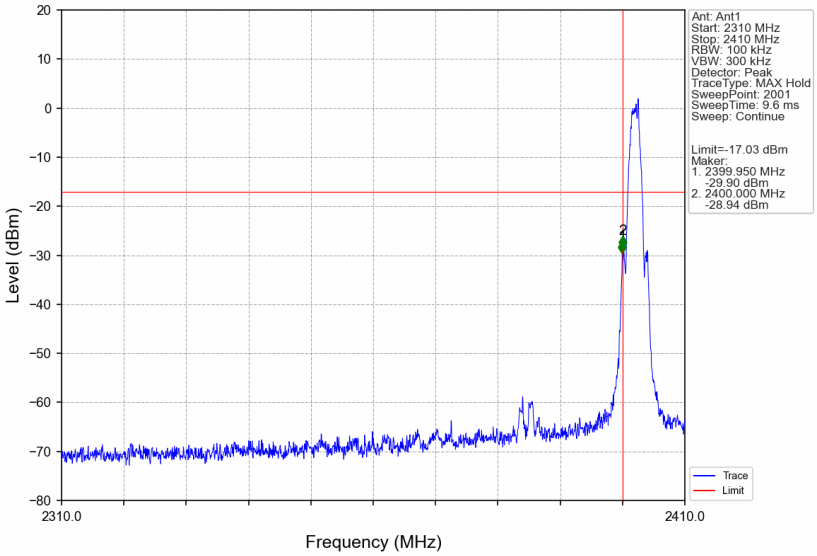
1M_HCH_2480MHz_Ant1_NTNV



1M_HCH_2480MHz_Ant1_NTNV



2M_LCH_2402MHz_Ant1_NTNV



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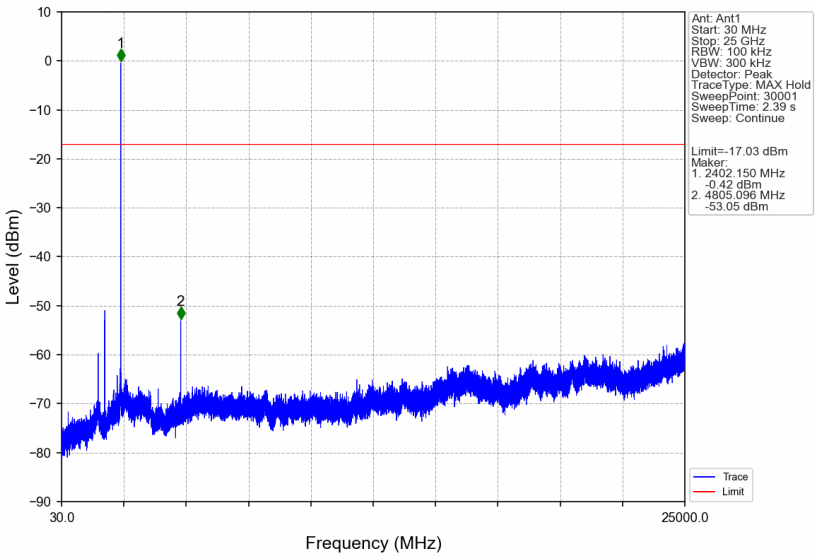
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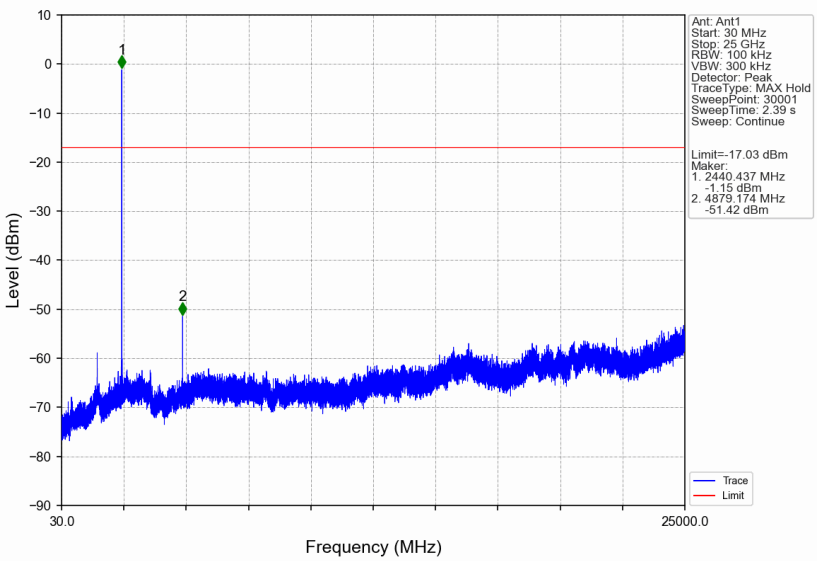
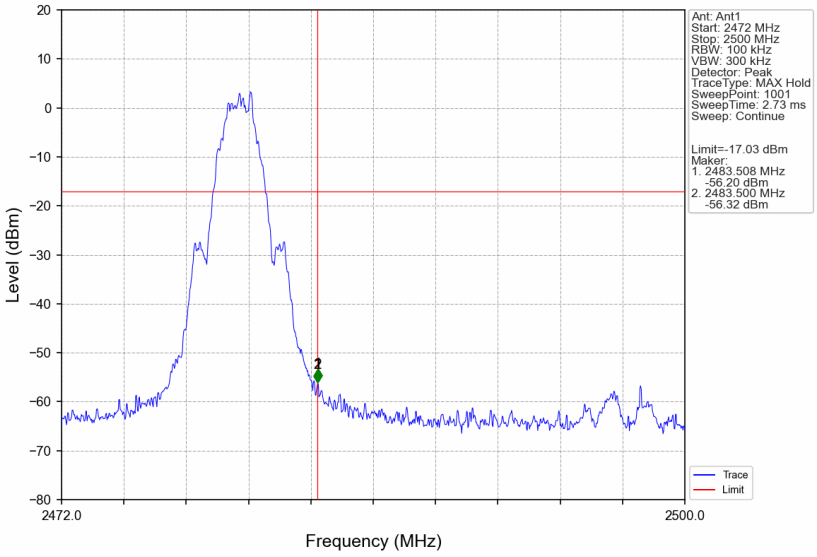


2M_HCH_2480MHz_Ant1_NTNV



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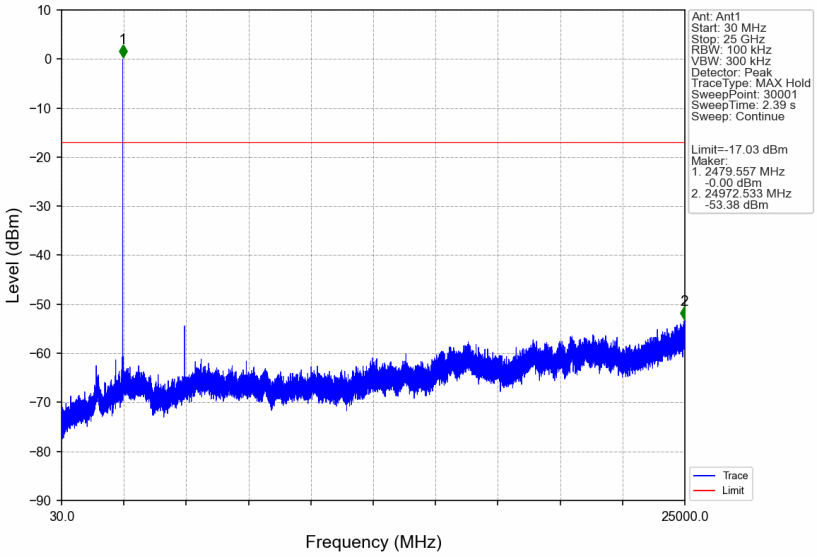

- End of the Report -