



CFR 47 FCC PART 15 SUBPART C
CERTIFICATION TEST REPORT

For

iDISPLAY 10.1" DISPLAY

MODEL NUMBER: UIT410B-C11, UIT410X-XYX

FCC ID: 2AO9X-T410

REPORT NUMBER: 4789508589-1

ISSUE DATE: June 30, 2020

Prepared for

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	06/30/2020	Initial Issue	



Summary of Test Results			
Clause	Test Items	FCC Rules	Test Results
1	6dB Bandwidth and 99% Occupied Bandwidth	FCC Part 15.247 (a) (2)	Pass
2	Peak Conducted Output Power	FCC Part 15.247 (b) (3)	Pass
3	Power Spectral Density	FCC Part 15.247 (e)	Pass
4	Conducted Bandedge and Spurious Emission	FCC Part 15.247 (d)	Pass
5	Radiated Bandedge and Spurious Emission	FCC Part 15.247 (d) FCC Part 15.209 FCC Part 15.205	Pass
6	Conducted Emission Test for AC Power Port	FCC Part 15.207	Pass
7	Antenna Requirement	FCC Part 15.203	Pass
<p>Note:</p> <p>1.This test report is only published to and used by the applicant, and it is not for evidence purpose in China.</p> <p>2. The measurement result for the sample received is <Pass> according to < CFR 47 FCC PART 15 SUBPART C >when <Accuracy Method> decision rule is applied.</p>			



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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Outform Science & Technology (Shenzhen) Co., Ltd.
Address: Unit 3, 1st Floor, Huada Building, Gongye 3rd Road, Yanshan Community, Zhaoshang Subdistrict, Nanshan District, Shenzhen, China518067

Manufacturer Information

Company Name: Outform Science & Technology (Shenzhen) Co., Ltd.
Address: Unit 3, 1st Floor, Huada Building, Gongye 3rd Road, Yanshan Community, Zhaoshang Subdistrict, Nanshan District, Shenzhen, China518067

EUT Information

EUT Name: iDISPLAY 10.1" DISPLAY
Model: UIT410B-C11
Series Model: UIT410X-XYX
Model difference: Please refer to section 5.1 for the detail.
Sample Received Date: June 3, 2020
Sample Status: Normal
Sample ID: 3102161
Date of Tested: June 4~29, 2020

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C	PASS

Prepared By:

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p>A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p>FCC (FCC Designation No.: CN1187) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules</p> <p>ISED (Company No.: 21320) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320.</p> <p>VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B, the VCCI registration No. is C-20012 and T-20011</p>
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Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OFS.



4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognize national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.62dB
Radiated Emission (Included Fundamental Emission) (9kHz ~ 30MHz)	2.2dB
Radiated Emission (Included Fundamental Emission) (30MHz ~ 1GHz)	4.00dB
Radiated Emission (Included Fundamental Emission) (1GHz to 26GHz)	5.78dB (1GHz ~ 18GHz)
	5.23dB (18GHz ~ 26GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	



5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name:	iDISPLAY 10.1" DISPLAY	
Model Name:	UIT410B-C11	
Series Model:	UIT410X-XYX	
Model difference:	UIT410X-XYX have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction with UIT410B-C11. The difference lies only the model number and colors. UIT410X-XYX The 1st "X" is letter from "A" to "Z". Stands for different colors. The 2nd "X" is letter form "A" to "Z", Stands for product code "YY" is client numbers from "01" to "99"	
Technology	Bluetooth - Low Energy	
Transmit Frequency Range	2402 MHz ~ 2480 MHz	
Modulation	GFSK	
Data Rate	BLE	1Mbps
Rated Input	AC120V,60Hz	

5.2. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	11	2424	22	2446	33	2468
1	2404	12	2426	23	2448	34	2470
2	2406	13	2428	24	2450	35	2472
3	2408	14	2430	25	2452	36	2474
4	2410	15	2432	26	2454	37	2476
5	2412	16	2434	27	2456	38	2478
6	2414	17	2436	28	2458	39	2480
7	2416	18	2438	29	2460	/	/
8	2418	19	2440	30	2462	/	/
9	2420	20	2442	31	2464	/	/
10	2422	21	2444	32	2468	/	/

5.3. MAXIMUM PEAK OUTPUT POWER

Bluetooth Mode	Frequency (MHz)	Channel Number	Maximum Peak Output Power (dBm)	Maximum EIRP (dBm)
BLE	2402 ~ 2480	0-39[40]	8.34	14.08

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
BLE	CH 0(Low Channel), CH 19(MID Channel), CH 39(High Channel)	2402MHz, 2440MHz, 2480MHz

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worst Case Power Setting Parameter under 2400 ~ 2483.5MHz Band				
Test Software		QRCT		
Modulation Type	Transmit Antenna Number	Test Software setting value		
		CH 0	CH 19	CH 39
GFSK(1Mbps)	1	default	default	default

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2402-2480	FPC	5.74

Test Mode	Transmit and Receive Mode	Description
BLE	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

Note: 1. The value of the antenna gain was declared by customer.

2. The customer declared that BT&WLAN 2.4G can't transmit simultaneously.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Specification	Series No.
1	USB DISK	Sandisk	/	8GB	/
2	USB DISK	Sandisk	/	16GB	/
3	USB DISK	Sandisk	/	128GB	/
4	USB DISK	Sandisk	/	8GB	/
5	Earphone	Sony	/	/	/
6	Earphone	Apple	/	/	/
7	Monitor	Lenovo	P2715Q	/	/
8	RJ45 Terminal load	Adafruit	485-4511	/	/

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	RJ 45	NO	NO	1.0m	/
2	Mini HDMI- HDMI	NO	YES	0.5m	/

Note: Cable 2 provide by customer.

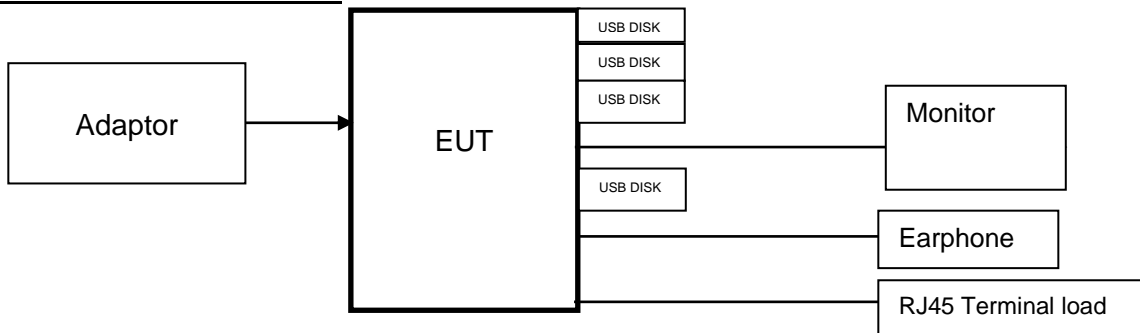
ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
1	SWITCHING ADAPTOR	/	FJ-SW1202000N	INPUT:100~240V,50/60Hz 0.6A Max OUTPUT:12Vdc,2000mA

TEST SETUP

The EUT can work in engineering mode with a software through a Laptop.

SETUP DIAGRAM FOR TESTS





6. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESR3	101961	Dec.05,2019	Dec.05,2020
<input checked="" type="checkbox"/>	Two-Line V- Network	R&S	ENV216	101983	Dec.05,2019	Dec.05,2020
Software						
Used	Description		Manufacturer	Name		Version
<input checked="" type="checkbox"/>	Test Software for Conducted disturbance		Farad	EZ-EMC		Ver. UL-3A1
Radiated Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Dec.06,2019	Dec.06,2020
<input checked="" type="checkbox"/>	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Sep.17, 2018	Sep.17, 2021
<input checked="" type="checkbox"/>	Preamplifier	HP	8447D	2944A09099	Dec.05,2019	Dec.05,2020
<input checked="" type="checkbox"/>	EMI Measurement Receiver	R&S	ESR26	101377	Dec.05,2019	Dec.05,2020
<input checked="" type="checkbox"/>	Horn Antenna	TDK	HRN-0118	130939	Sep.17, 2018	Sep.17, 2021
<input checked="" type="checkbox"/>	High Gain Horn Antenna	Schwarzbeck	BBHA-9170	691	Aug.11, 2018	Aug.11, 2021
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-0118	TRS-305- 00066	Dec.05,2019	Dec.05,2020
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-2	TRS-307- 00003	Dec.05,2019	Dec.05,2020
<input checked="" type="checkbox"/>	Loop antenna	Schwarzbeck	1519B	00008	Jan.07, 2019	Jan.07, 2022
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-001- 3000	TRS-302- 00050	Dec.5, 2019	Dec.5, 2020
<input checked="" type="checkbox"/>	Band Reject Filter	Wainwright	WRCJV8- 2350-2400- 2483.5- 2533.5- 40SS	4	Dec.05,2019	Dec.05,2020
<input checked="" type="checkbox"/>	High Pass Filter	Wi	WHKX10- 2700-3000- 18000-40SS	23	Dec.05,2019	Dec.05,2020
Software						
Used	Description		Manufacturer	Name		Version
<input checked="" type="checkbox"/>	Test Software for Radiated disturbance		Farad	EZ-EMC		Ver. UL-3A1



Other instruments						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec.06,2019	Dec.06,2020
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9020A	MY49100060	Dec.06,2019	Dec.06,2020
<input checked="" type="checkbox"/>	Power Meter	Keysight	N1911A	MY55416024	Dec.06,2019	Dec.06,2020
<input checked="" type="checkbox"/>	Power Sensor	Keysight	U2021XA	MY5100022	Dec.06,2019	Dec.06,2020



7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

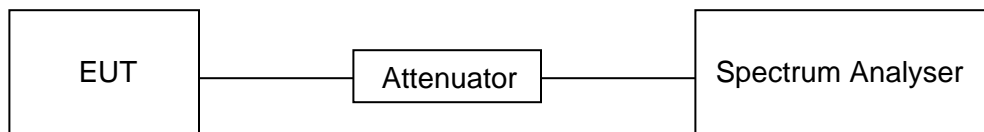
LIMITS

None; for reporting purposes only.

PROCEDURE

Refer to ANSI C63.10-2013 clause 11.6 Zero – Span Spectrum Analyzer method.

TEST SETUP



TEST ENVIRONMENT

Temperature	27.5°C	Relative Humidity	60.4%
Atmosphere Pressure	101kPa	Test Voltage	AC120V,60Hz

RESULTS

Test Result

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
BLE	0.3894	0.6245	0.6235	62.35	2.05	2.57	3

Note:

Duty Cycle Correction Factor=10log(1/x).

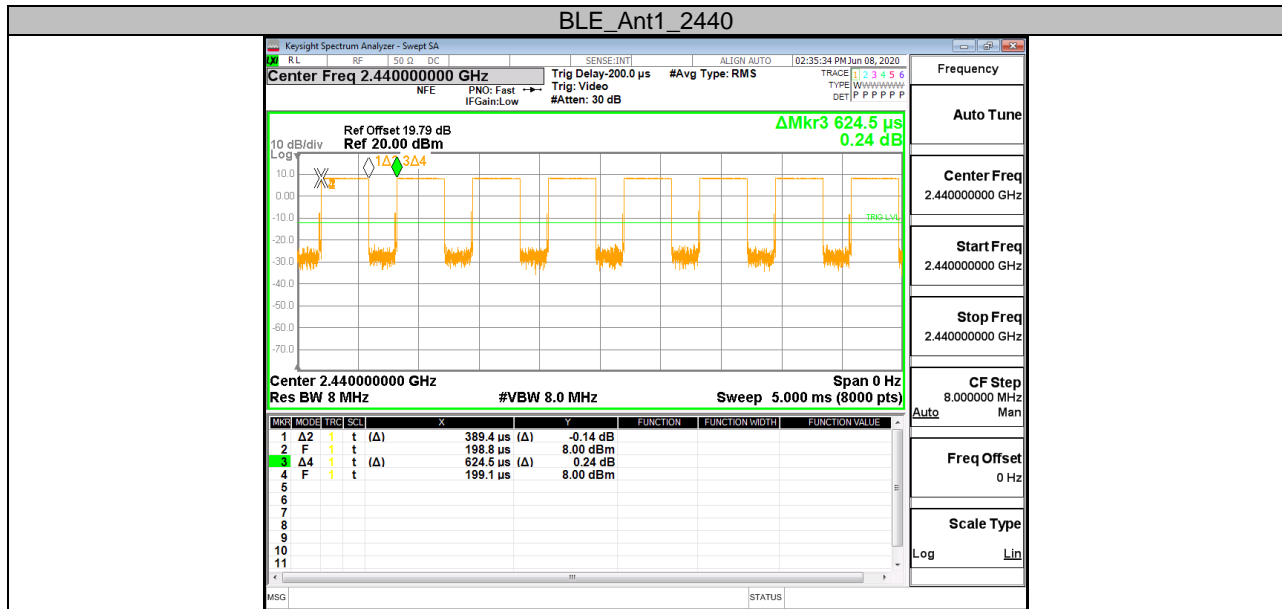
Where: x is Duty Cycle (Linear)

Where: T is On Time (transmit duration)

If that calculated VBW is not available on the analyzer then the next higher value should be used.



Test Graphs



7.2. 6 dB DTS BANDWIDTH AND 99% OCCUPIED BANDWIDTH

LIMITS

CFR 47FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2)	6dB Bandwidth	$\geq 500\text{kHz}$	2400-2483.5
ANSI C63.10 Clause 6.9.3	99% Occupied Bandwidth	None; for reporting purposes only.	2400-2483.5

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.8 for DTS bandwidth and clause 6.9 for Occupied Bandwidth.

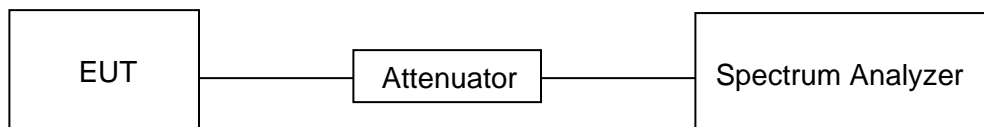
Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Frequency Span	Between 1.5 times and 5.0 times the OBW
Detector	Peak
RBW	For 6 dB Bandwidth: 100kHz For 99% Occupied Bandwidth: 1% to 5% of the occupied bandwidth
VBW	For 6dB Bandwidth: $\geq 3 \times \text{RBW}$ For 99% Occupied Bandwidth: $\geq 3 \times \text{RBW}$
Trace	Max hold
Sweep	Auto couple

a) Use the 99% power bandwidth function of the instrument, allow the trace to stabilize and report the measured bandwidth.

b) Allow the trace to stabilize and 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.

TEST SETUP





TEST ENVIRONMENT

Temperature	27.5°C	Relative Humidity	60.4%
Atmosphere Pressure	101kPa	Test Voltage	AC120V,60Hz

RESULTS

Please refer to appendix A & B.



7.3. CONDUCTED PEAK OUTPUT POWER

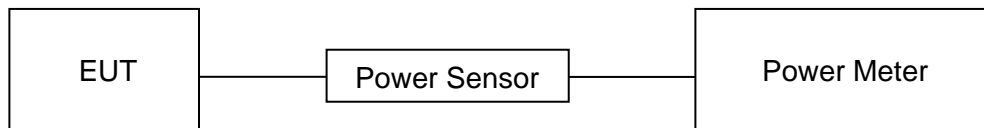
LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3)	Peak Conducted Output Power	1 watt or 30dBm	2400-2483.5

TEST PROCEDURE

Connect the EUT to a low loss RF cable from the antenna port to the power sensor (video bandwidth is greater than the occupied bandwidth).
Measure peak emission level, the indicated level is the peak output power, after any corrections for external attenuators and cables.

TEST SETUP



TEST ENVIRONMENT

Temperature	27.5°C	Relative Humidity	60.4%
Atmosphere Pressure	101kPa	Test Voltage	AC120V,60Hz

RESULTS

Please refer to appendix C.



7.4. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e)	Power Spectral Density	8 dBm in any 3 kHz band	2400-2483.5

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.10.

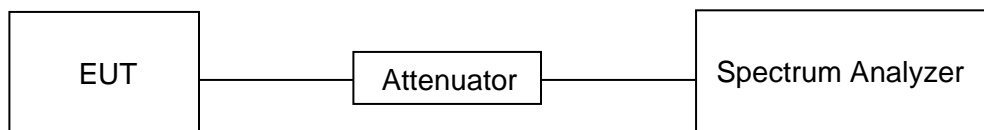
Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW	$\geq 3 \times \text{RBW}$
Span	$1.5 \times \text{DTS bandwidth}$
Trace	Max hold
Sweep time	Auto couple

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST SETUP



TEST ENVIRONMENT

Temperature	27.5°C	Relative Humidity	60.4%
Atmosphere Pressure	101kPa	Test Voltage	AC120V,60Hz



RESULTS

Please refer to appendix D.



7.5. CONDUCTED BANDEGE AND SPURIOUS EMISSIONS

LIMITS

CFR 47 FCC Part15 (15.247) Subpart C		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.11 and 11.13.

Connect the EUT to the spectrum analyser and use the following settings for reference level measurement:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

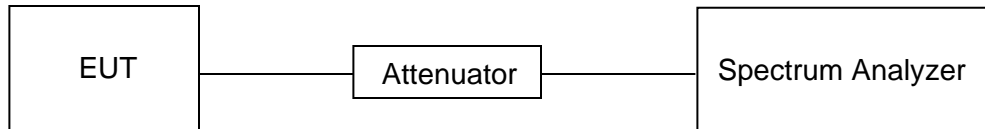
Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level.

Change the settings for emission level measurement:

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
measurement points	$\geq \text{span}/\text{RBW}$
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD 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.

TEST SETUP



TEST ENVIRONMENT

Temperature	27.5°C	Relative Humidity	60.4%
Atmosphere Pressure	101kPa	Test Voltage	AC120V,60HZ

RESULTS

Please refer to appendix E & F.



8. RADIATED TEST RESULTS

LIMITS

Please refer to CFR 47 FCC §15.205 and §15.209.

Please refer to ISSED RSS-GEN Clause 8.9 and Clause 8.10.

Radiation Disturbance Test Limit for FCC (Class B) (9kHz-1GHz)

Emissions radiated outside of the specified frequency bands above 30MHz			
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m	
		Quasi-Peak	
30 - 88	100	40	
88 - 216	150	43.5	
216 - 960	200	46	
Above 960	500	54	
Above 1000	500	Peak	Average
		74	54

FCC Emissions radiated outside of the specified frequency bands below 30MHz		
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

FCC Restricted bands of operation refer to FCC §15.205 (a):

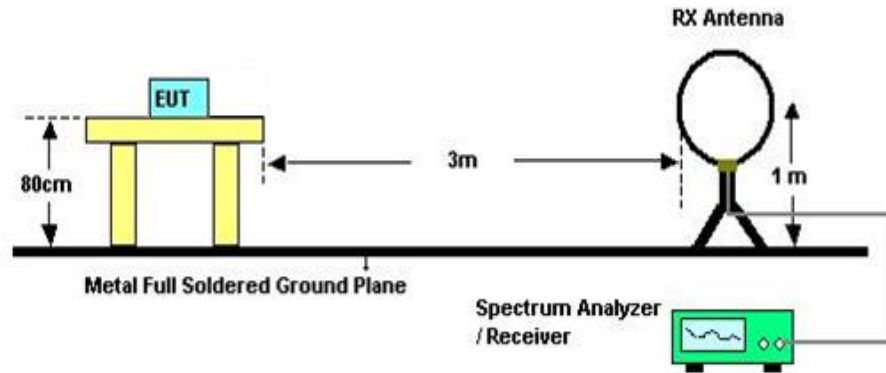
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

Note: ¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6c

TEST SETUP AND PROCEDURE

Below 30MHz

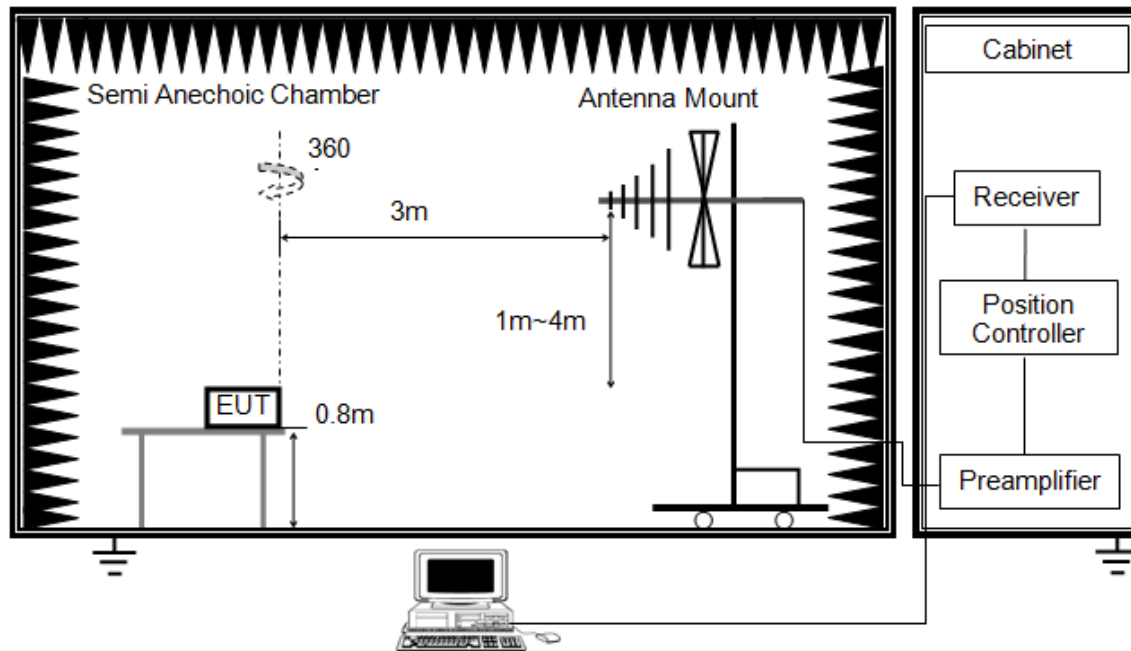


The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9kHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9kHz (From 0.15MHz to 30MHz)
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 11.11.
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
6. For measurement below 1GHz, 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 and average detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.
7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.

Below 1G and above 30MHz

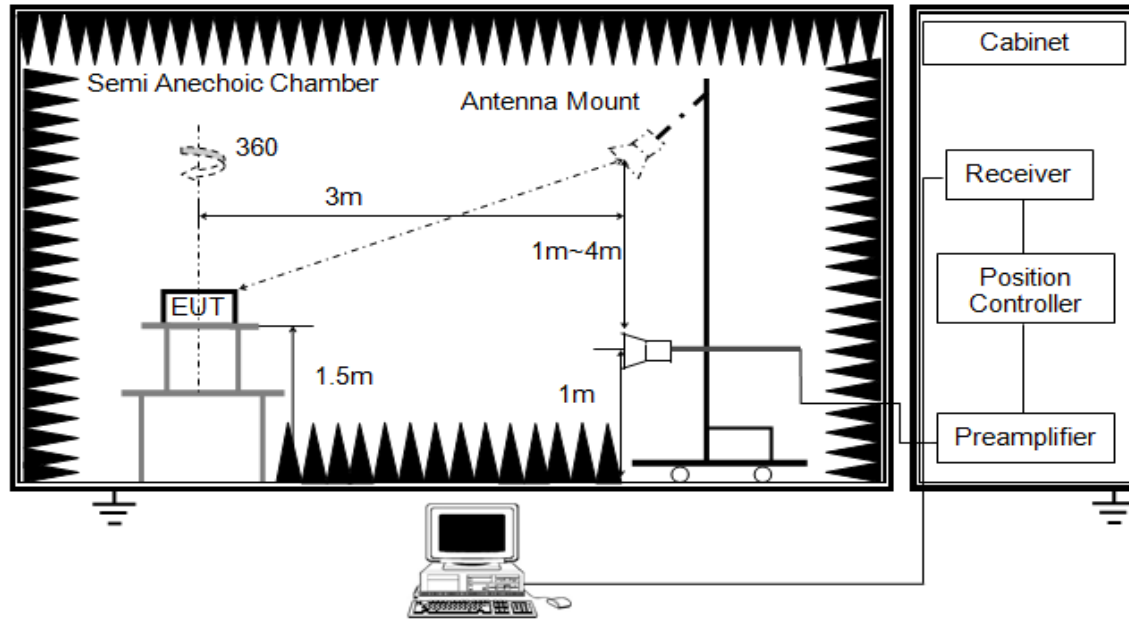


The setting of the spectrum analyser

RBW	120kHz
VBW	300kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 11.11.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement below 1GHz, 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 emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

Above 1G

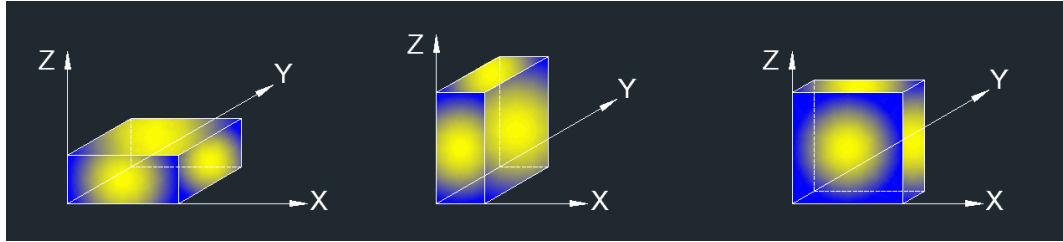


The setting of the spectrum analyser

RBW	1MHz
VBW	PEAK: 3MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 11.11 and 11.12.
2. The EUT was arranged to its worst case and then tune the antenna tower (1.5 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 1.5m above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.
6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 7.1.ON TIME AND DUTY CYCLE.

X axis, Y axis, Z axis positions:



Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

Note 2: The EUT was fully exercised with external accessories during the test. In the case of multiple accessory external ports, an external accessory shall be connected to one of each type of port.

TEST ENVIRONMENT

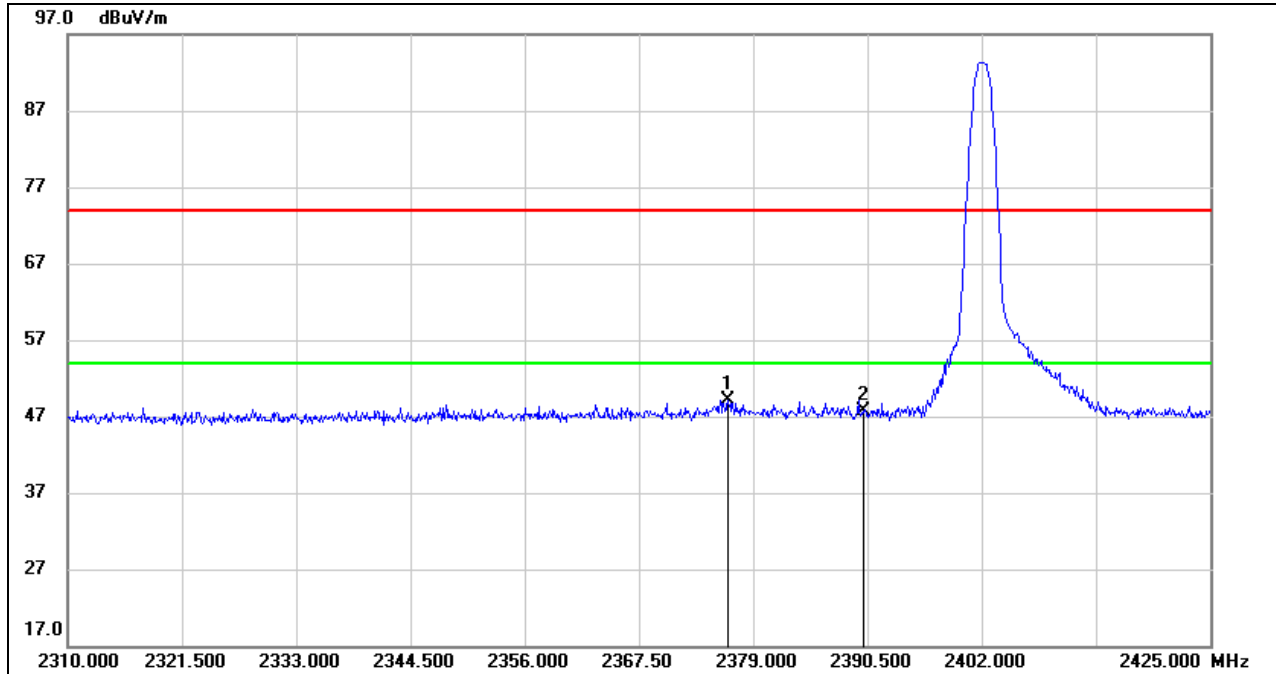
Temperature	27.5°C	Relative Humidity	60.4%
Atmosphere Pressure	101kPa	Test Voltage	AC120V,60Hz

RESULTS

8.1. RESTRICTED BANDEDGE

8.1.1. BLE MODE

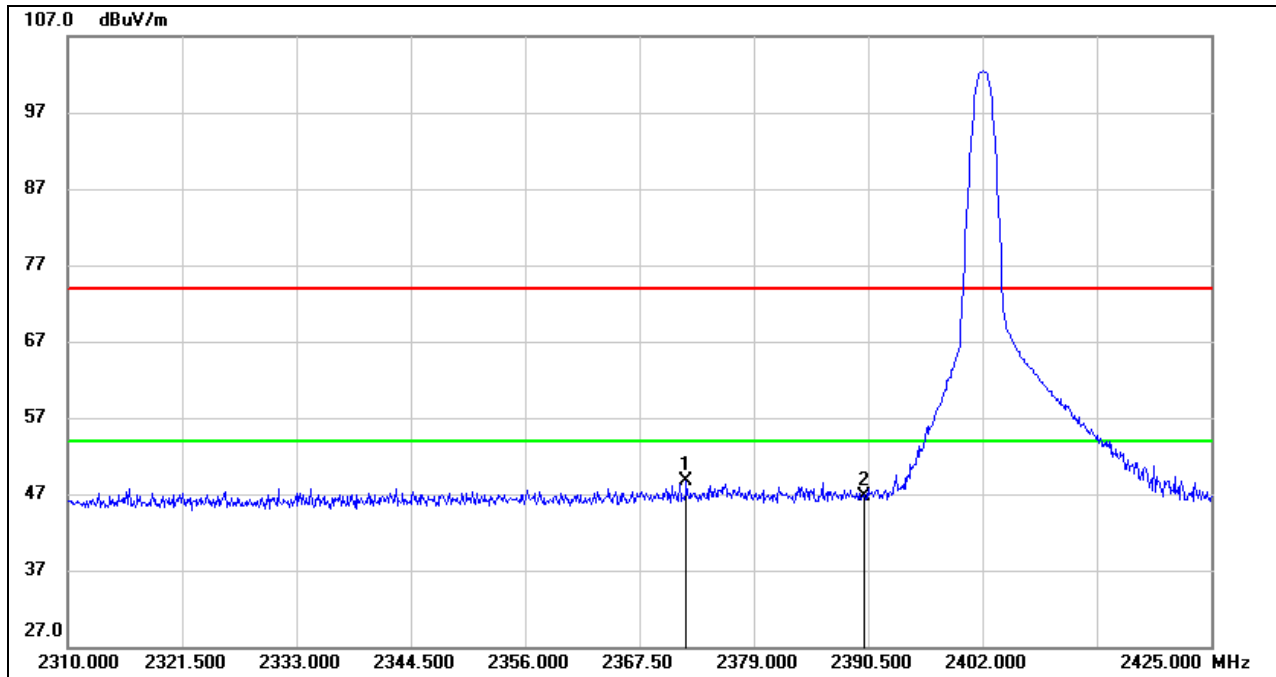
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2376.470	16.28	32.90	49.18	74.00	-24.82	peak
2	2390.000	14.70	32.94	47.64	74.00	-26.36	peak

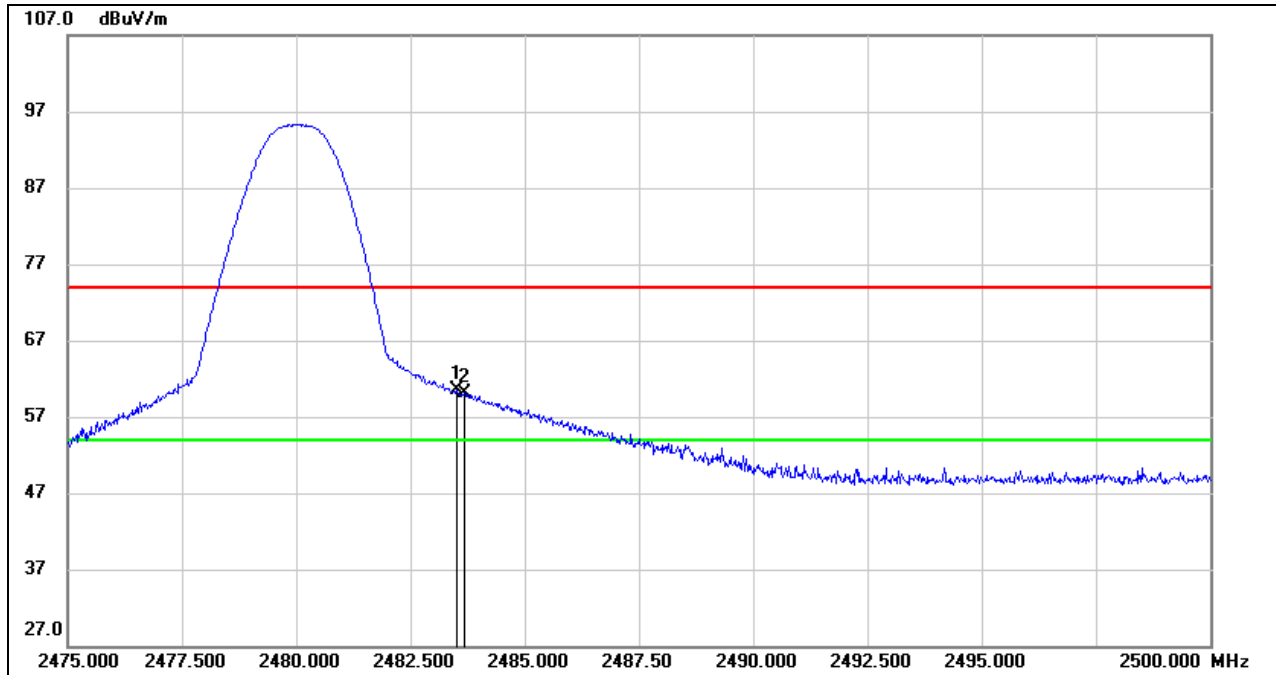
Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2372.215	15.72	32.89	48.61	74.00	-25.39	peak
2	2390.000	13.79	32.94	46.73	74.00	-27.27	peak

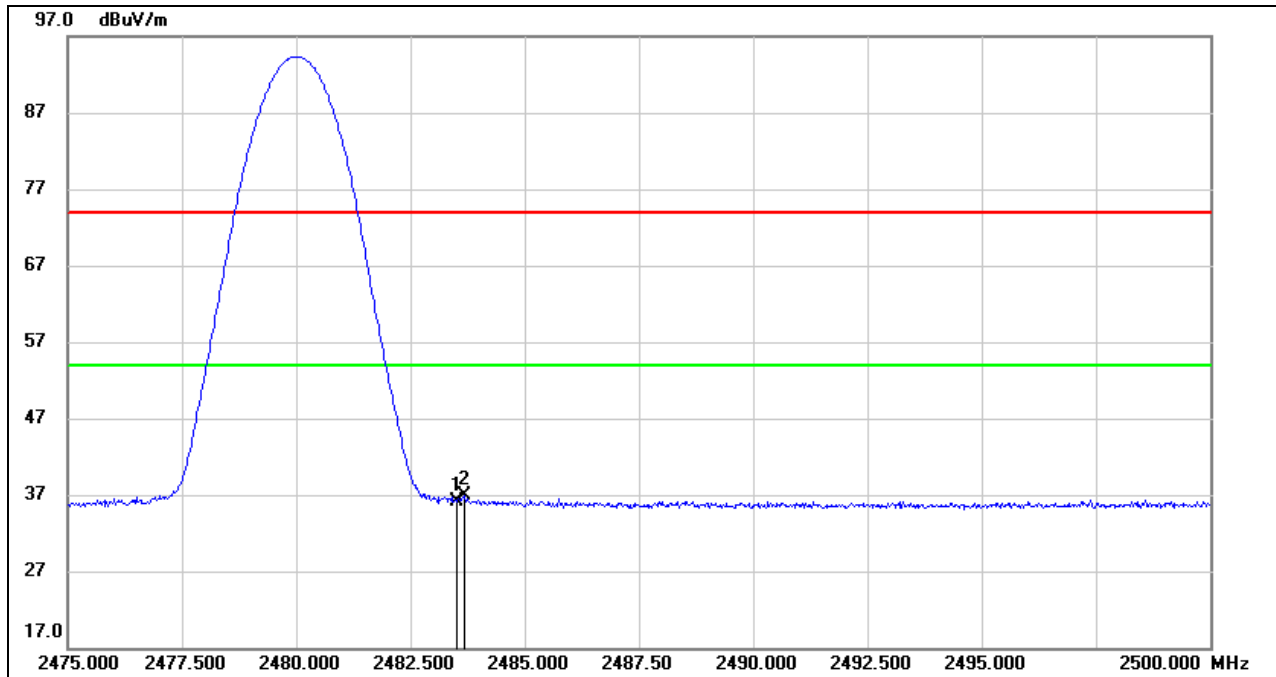
Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)****PEAK**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	26.91	33.58	60.49	74.00	-13.51	peak
2	2483.675	26.58	33.58	60.16	74.00	-13.84	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

AVG

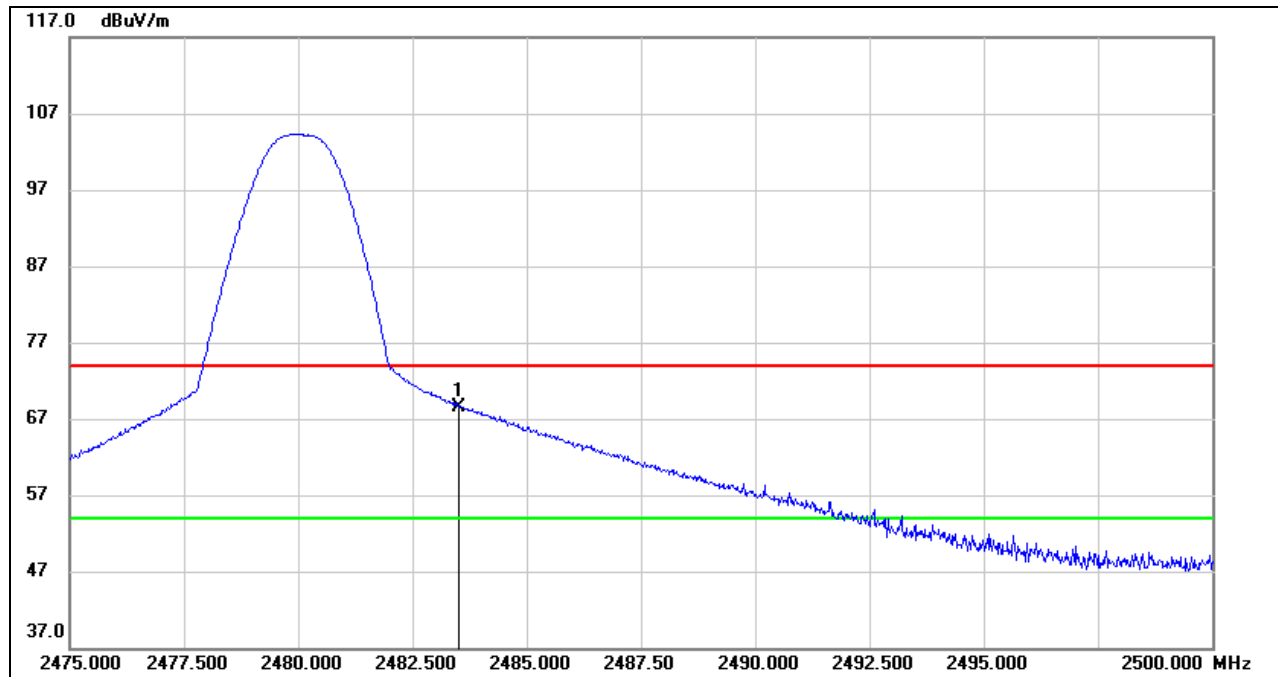


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	2.51	33.58	36.09	54.00	-17.91	AVG
2	2483.675	3.31	33.58	36.89	54.00	-17.11	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. AVG: $VBW=1/Ton$, where: Ton is the transmitting duration.
4. For the transmitting duration, please refer to clause 7.1.
5. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

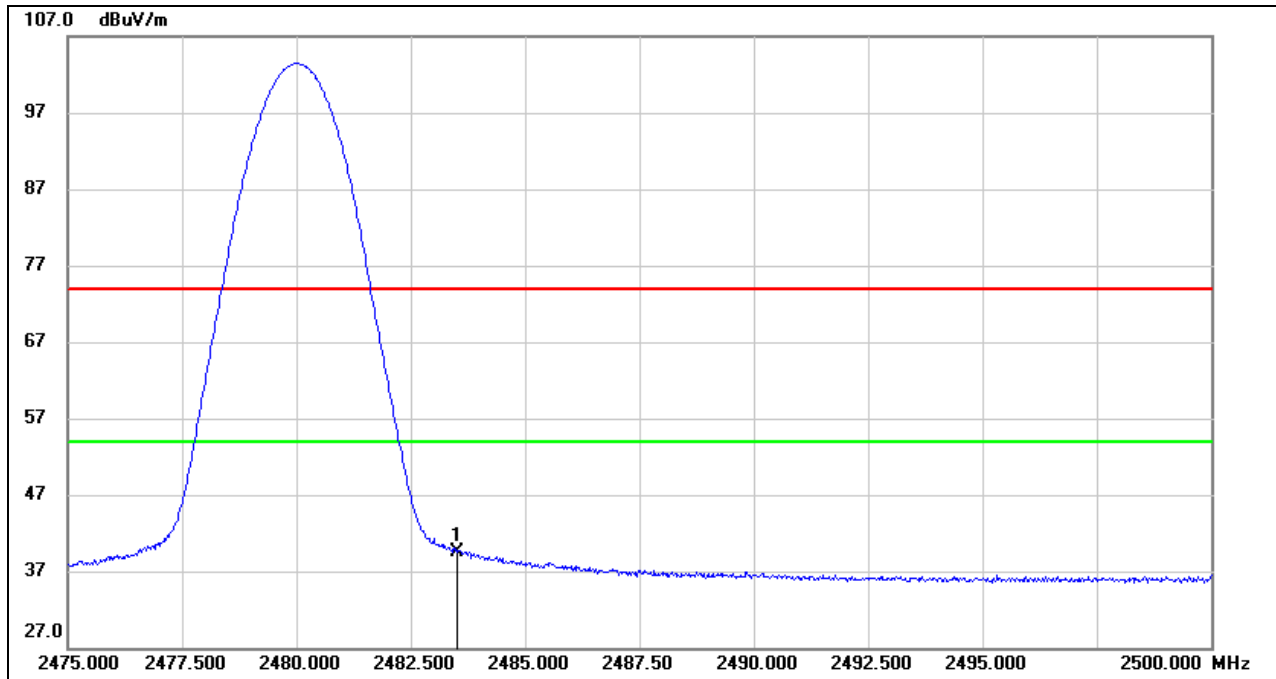
PEAK



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	35.02	33.58	68.60	74.00	-5.40	peak

- Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

AVG



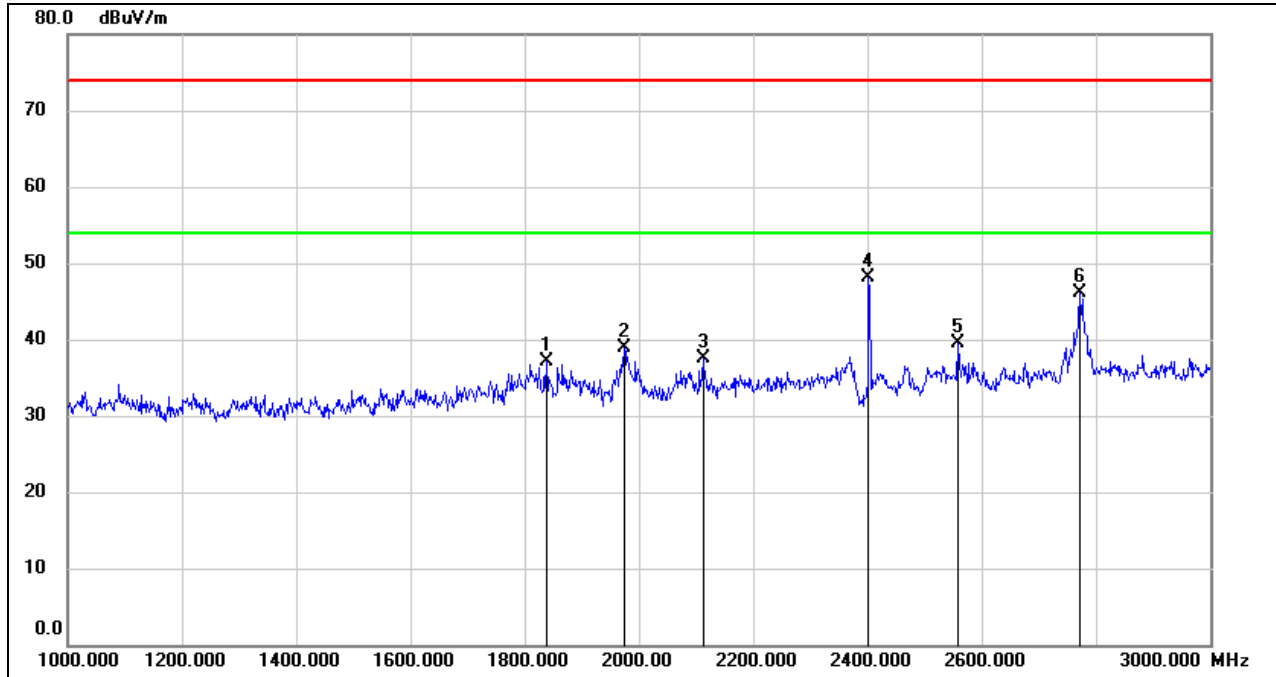
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	5.99	33.58	39.57	54.00	-14.43	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
 3. AVG: $VBW=1/T_{on}$, where: T_{on} is the transmitting duration.
 4. For the transmitting duration, please refer to clause 7.1.
 5. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

8.2. SPURIOUS EMISSIONS (1GHz ~ 3GHz)

8.2.1. BLE MODE

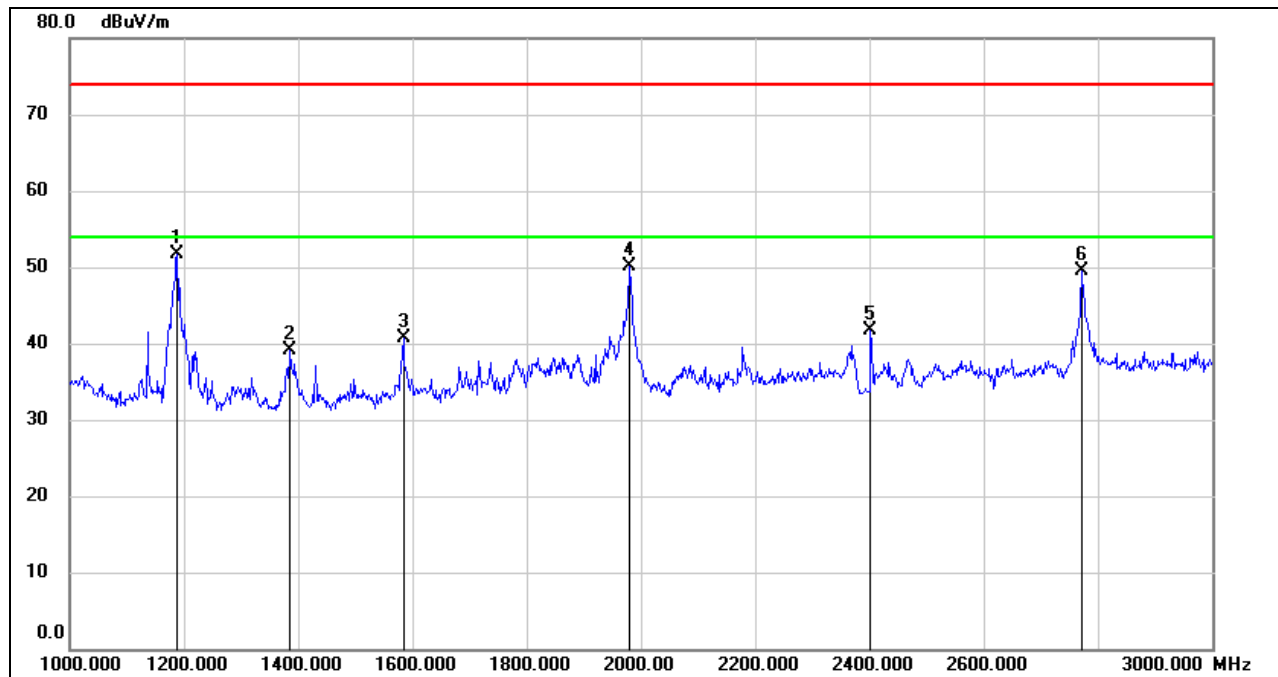
HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1838.000	47.09	-9.93	37.16	74.00	-36.84	peak
2	1974.000	48.74	-9.86	38.88	74.00	-35.12	peak
3	2112.000	46.61	-9.10	37.51	74.00	-36.49	peak
4	2402.000	55.86	-7.85	48.01	/	/	fundamental
5	2558.000	47.06	-7.47	39.59	74.00	-34.41	peak
6	2772.000	52.52	-6.35	46.17	74.00	-27.83	peak

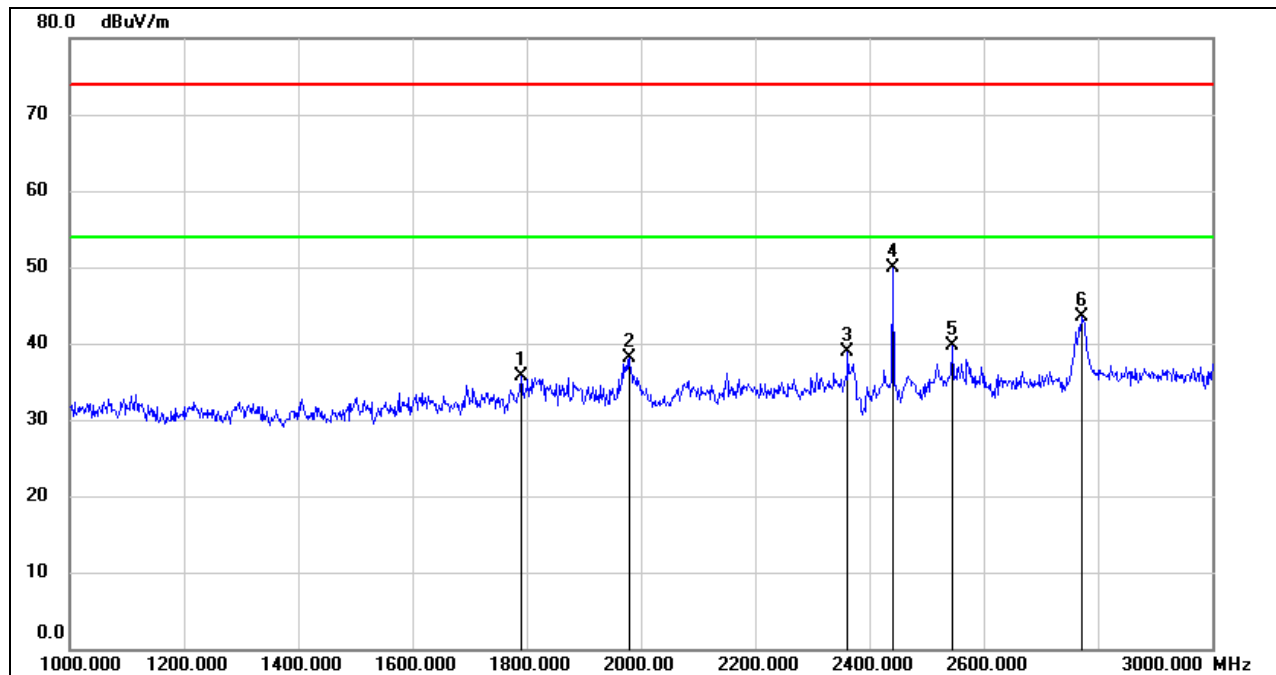
- Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1188.000	64.55	-12.77	51.78	74.00	-22.22	peak
2	1386.000	51.52	-12.38	39.14	74.00	-34.86	peak
3	1584.000	52.18	-11.53	40.65	74.00	-33.35	peak
4	1980.000	59.96	-9.85	50.11	74.00	-23.89	peak
5	2402.000	49.50	-7.85	41.65	/	/	fundamental
6	2772.000	55.94	-6.35	49.59	74.00	-24.41	peak

- Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for Band reject filter losses
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

**HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1790.000	45.62	-10.01	35.61	74.00	-38.39	peak
2	1980.000	47.93	-9.85	38.08	74.00	-35.92	peak
3	2362.000	46.88	-7.99	38.89	74.00	-35.11	peak
4	2440.000	57.56	-7.59	49.97	/	/	fundamental
5	2546.000	47.02	-7.41	39.61	74.00	-34.39	peak
6	2772.000	49.86	-6.35	43.51	74.00	-30.49	peak

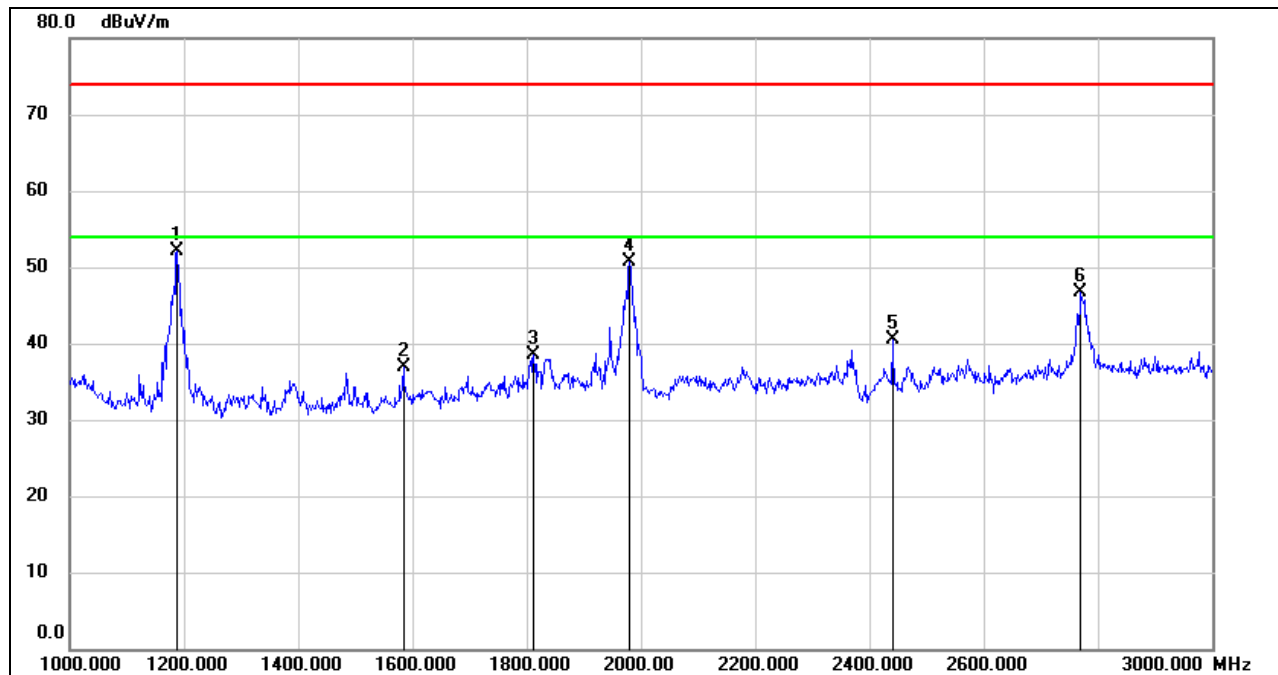
Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for Band reject filter losses.

5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

**HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1188.000	64.93	-12.77	52.16	74.00	-21.84	peak
2	1584.000	48.46	-11.53	36.93	74.00	-37.07	peak
3	1812.000	48.35	-9.92	38.43	74.00	-35.57	peak
4	1980.000	60.50	-9.85	50.65	74.00	-23.35	peak
5	2440.000	48.08	-7.59	40.49	/	/	fundamental
6	2770.000	53.08	-6.38	46.70	74.00	-27.30	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

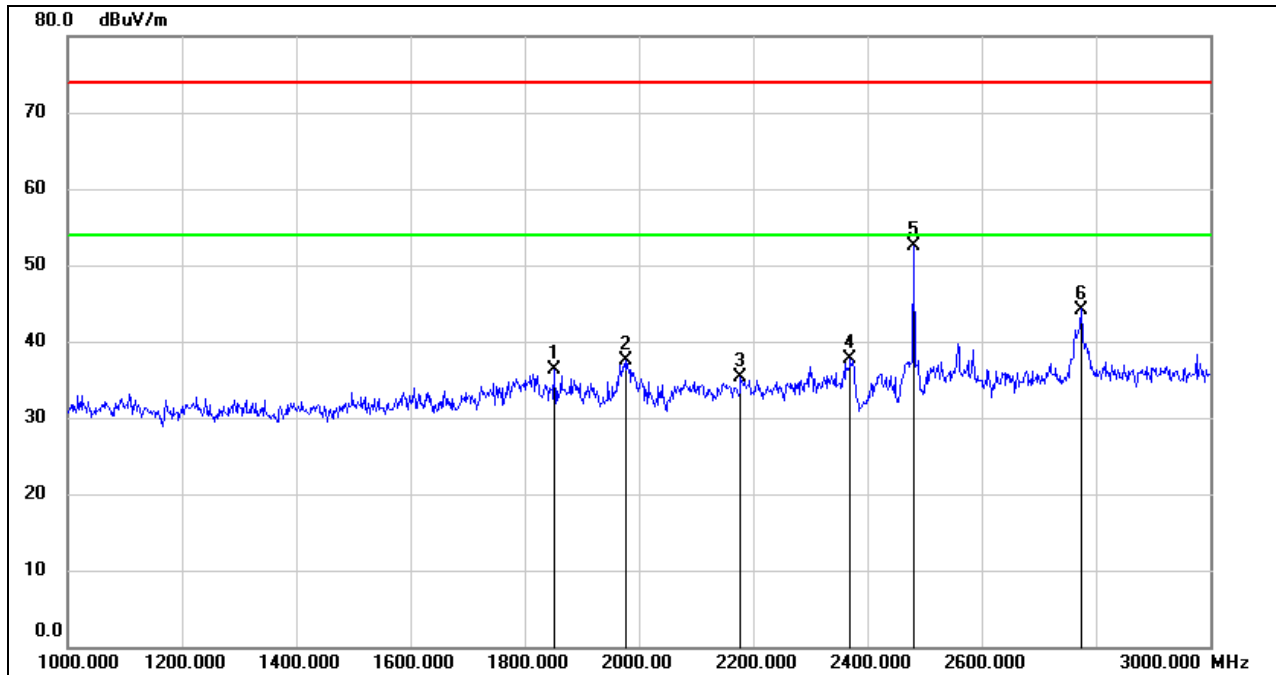
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for Band reject filter losses.

5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

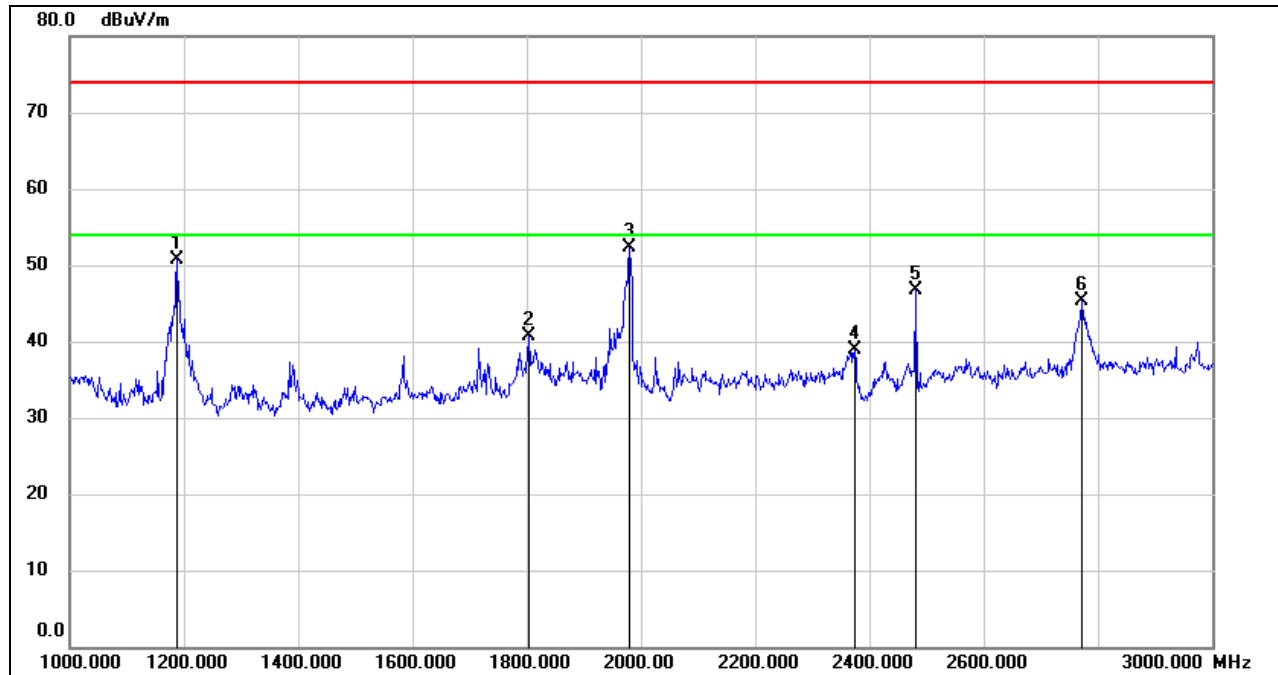
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1852.000	46.25	-9.93	36.32	74.00	-37.68	peak
2	1978.000	47.35	-9.85	37.50	74.00	-36.50	peak
3	2178.000	44.01	-8.78	35.23	74.00	-38.77	peak
4	2370.000	45.65	-7.95	37.70	74.00	-36.30	peak
5	2480.000	59.90	-7.31	52.59	/	/	fundamental
6	2774.000	50.53	-6.33	44.20	74.00	-29.80	peak

- Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



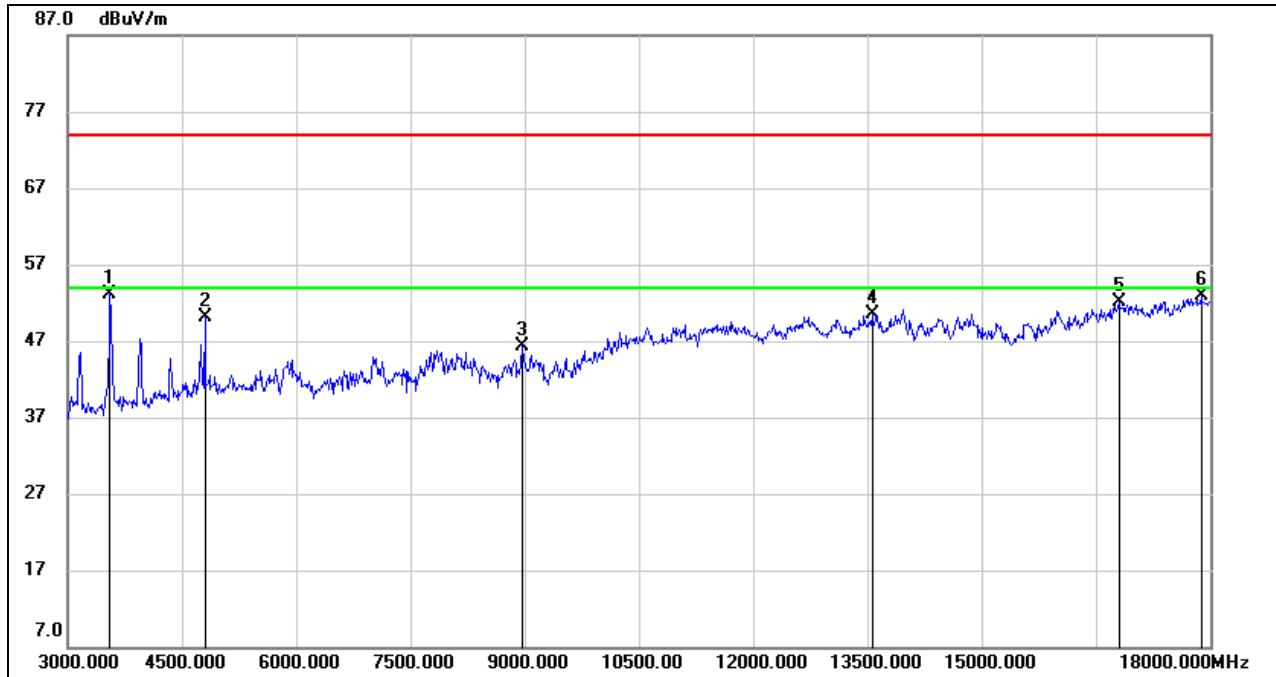
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1188.000	63.57	-12.77	50.80	74.00	-23.20	peak
2	1804.000	50.62	-9.91	40.71	74.00	-33.29	peak
3	1980.000	62.18	-9.85	52.33	74.00	-21.67	peak
4	2374.000	46.91	-7.95	38.96	74.00	-35.04	peak
5	2480.000	54.11	-7.31	46.80	/	/	fundamental
6	2772.000	51.62	-6.35	45.27	74.00	-28.73	peak

- Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

8.3. SPURIOUS EMISSIONS (3GHz ~ 18GHz)

8.3.1. BLE MODE

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3555.000	56.92	-3.72	53.20	74.00	-20.80	peak
2	4800.000	49.73	0.46	50.19	74.00	-23.81	peak
3	8970.000	37.34	9.00	46.34	74.00	-27.66	peak
4	13560.000	34.52	15.93	50.45	74.00	-23.55	peak
5	16800.000	32.13	19.95	52.08	74.00	-21.92	peak
6	17880.000	29.47	23.34	52.81	74.00	-21.19	peak

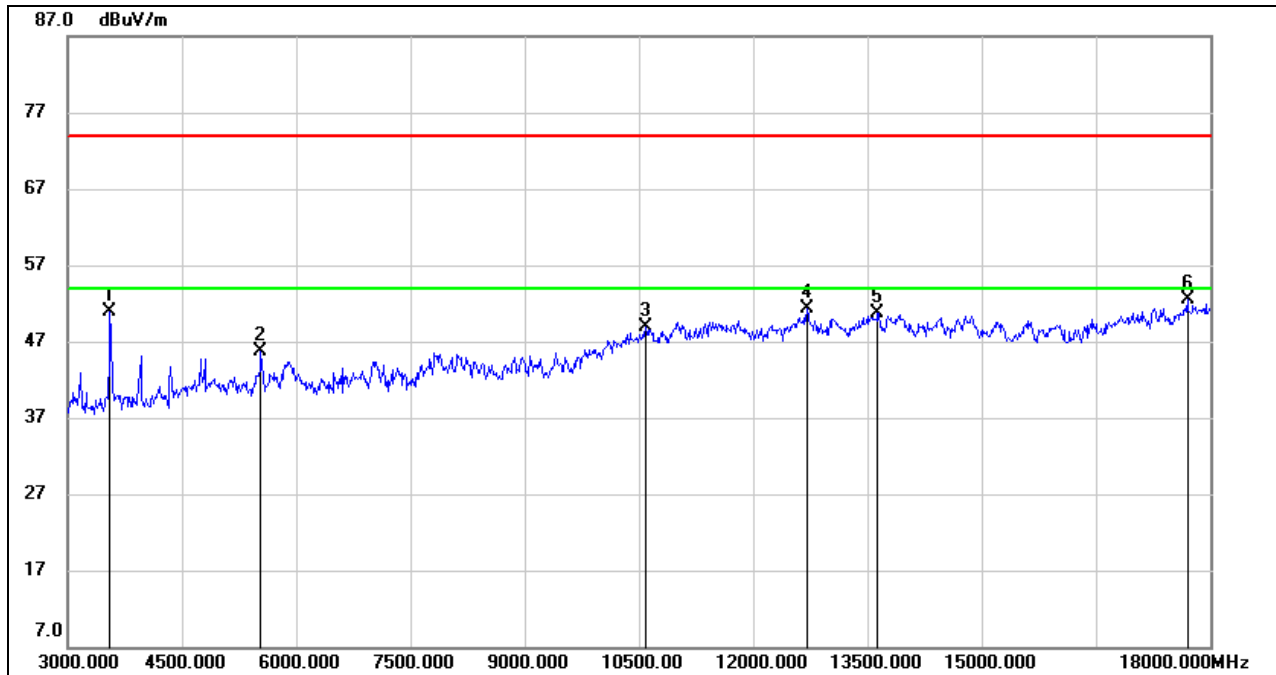
Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.

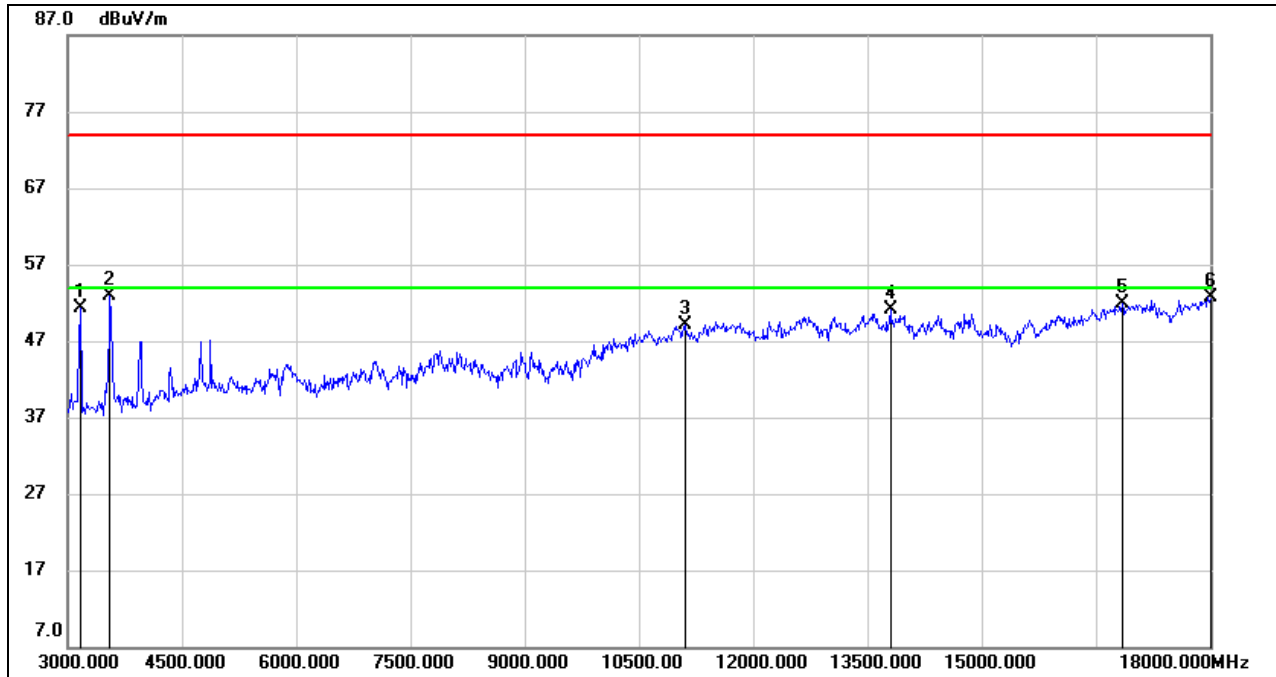
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

**HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3555.000	54.72	-3.72	51.00	74.00	-23.00	peak
2	5535.000	42.73	2.93	45.66	74.00	-28.34	peak
3	10590.000	37.02	11.88	48.90	74.00	-25.10	peak
4	12705.000	36.87	14.35	51.22	74.00	-22.78	peak
5	13635.000	34.78	15.97	50.75	74.00	-23.25	peak
6	17700.000	30.01	22.43	52.44	74.00	-21.56	peak

- Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3165.000	55.56	-4.23	51.33	74.00	-22.67	peak
2	3555.000	56.65	-3.72	52.93	74.00	-21.07	peak
3	11115.000	36.57	12.55	49.12	74.00	-24.88	peak
4	13800.000	33.97	17.10	51.07	74.00	-22.93	peak
5	16845.000	31.88	19.96	51.84	74.00	-22.16	peak
6	18000.000	29.31	23.46	52.77	74.00	-21.23	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

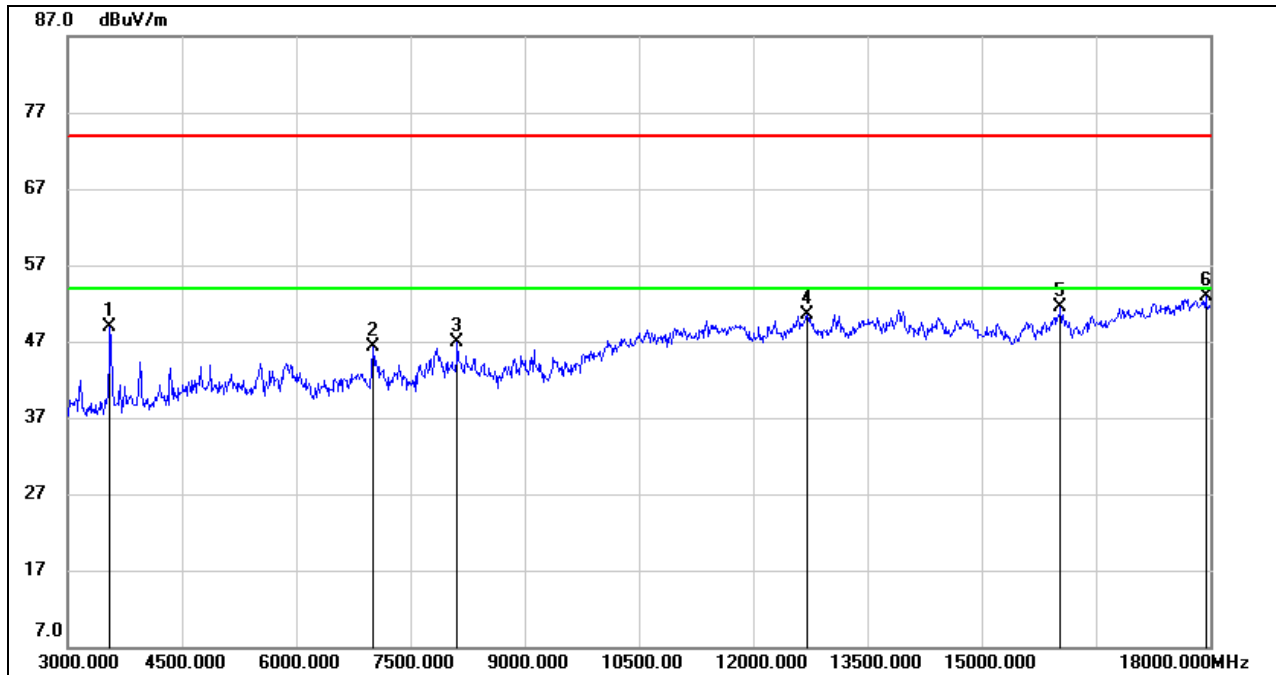
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.

5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3555.000	52.66	-3.72	48.94	74.00	-25.06	peak
2	7005.000	40.45	5.76	46.21	74.00	-27.79	peak
3	8115.000	39.04	7.90	46.94	74.00	-27.06	peak
4	12705.000	36.24	14.35	50.59	74.00	-23.41	peak
5	16035.000	33.61	17.85	51.46	74.00	-22.54	peak
6	17940.000	29.55	23.39	52.94	74.00	-21.06	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

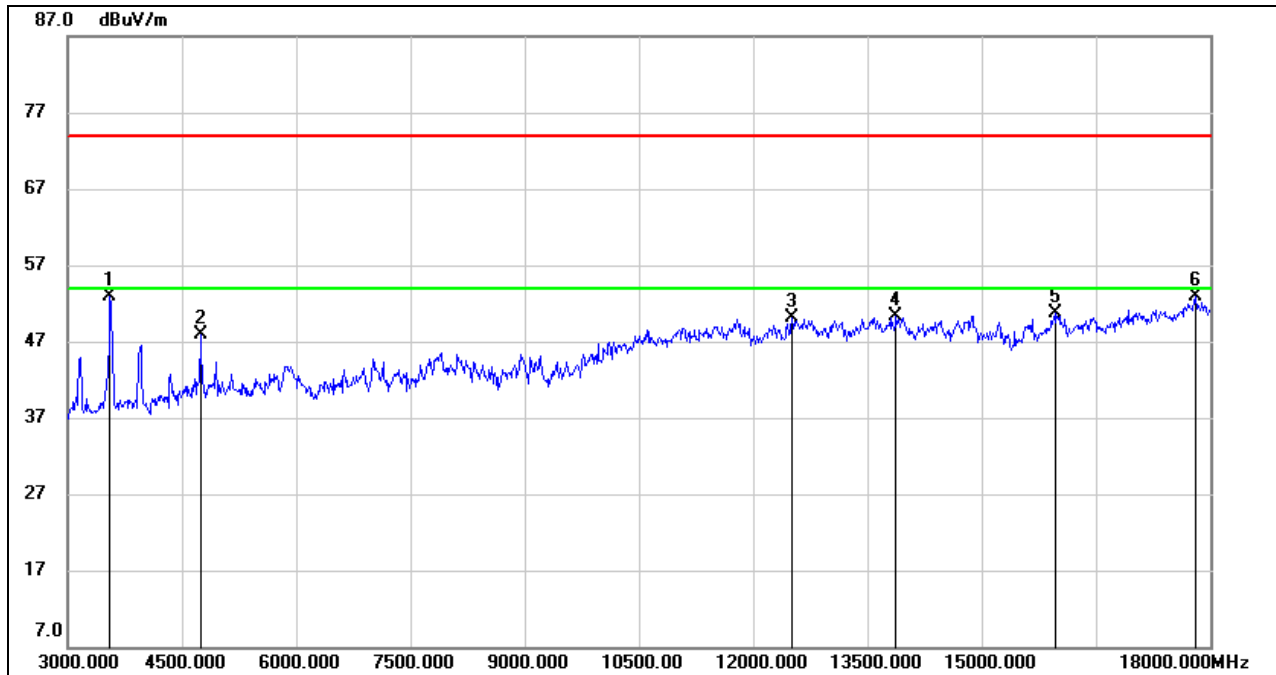
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.

5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3555.000	56.65	-3.72	52.93	74.00	-21.07	peak
2	4740.000	47.53	0.30	47.83	74.00	-26.17	peak
3	12510.000	35.58	14.51	50.09	74.00	-23.91	peak
4	13875.000	33.91	16.44	50.35	74.00	-23.65	peak
5	15960.000	33.09	17.63	50.72	74.00	-23.28	peak
6	17805.000	29.60	23.31	52.91	74.00	-21.09	peak

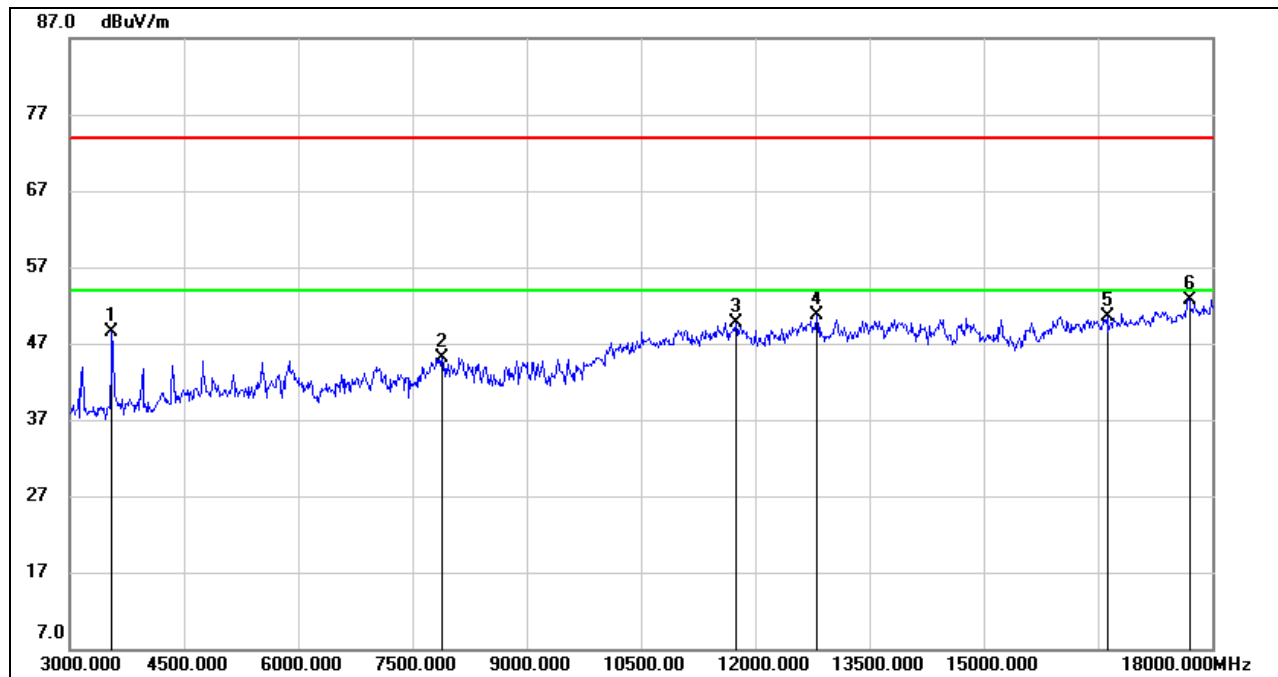
Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.

5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

**HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)**

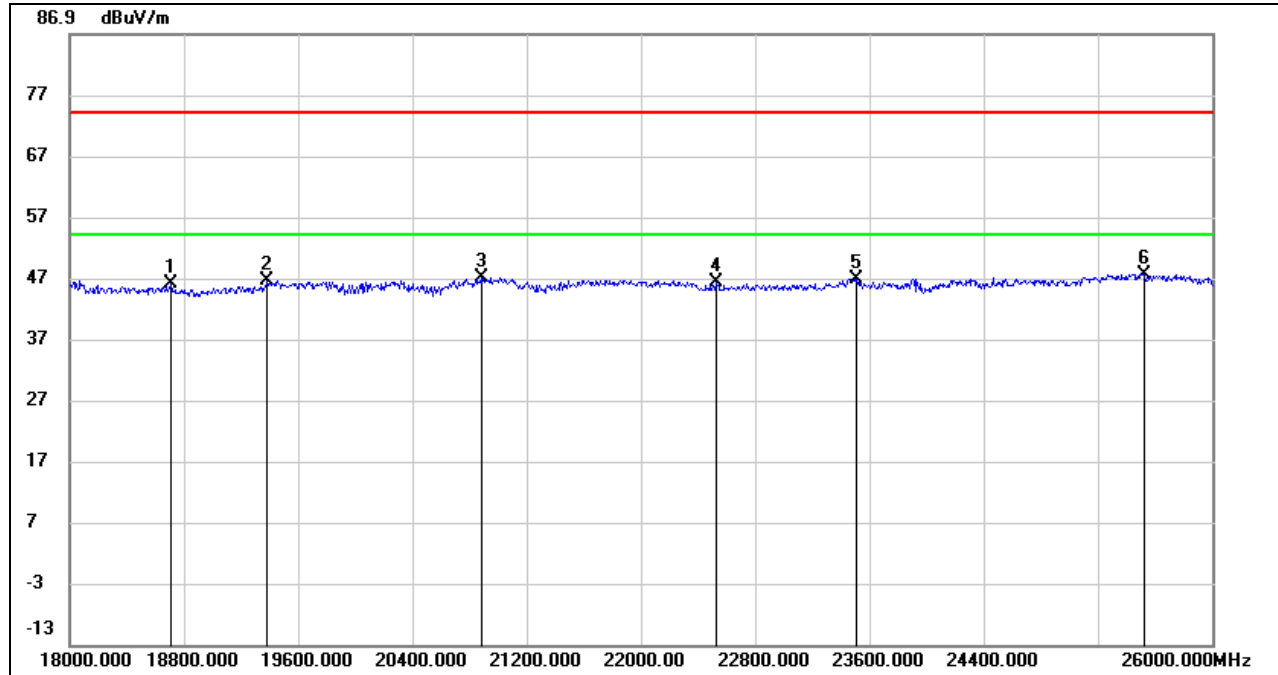
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3555.000	52.23	-3.72	48.51	74.00	-25.49	peak
2	7890.000	37.86	7.30	45.16	74.00	-28.84	peak
3	11745.000	36.57	13.05	49.62	74.00	-24.38	peak
4	12810.000	35.04	15.59	50.63	74.00	-23.37	peak
5	16620.000	31.03	19.56	50.59	74.00	-23.41	peak
6	17700.000	30.37	22.43	52.80	74.00	-21.20	peak

Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.

8.4. SPURIOUS EMISSIONS 18GHz ~ 26GHz

8.4.1. BLE MODE

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

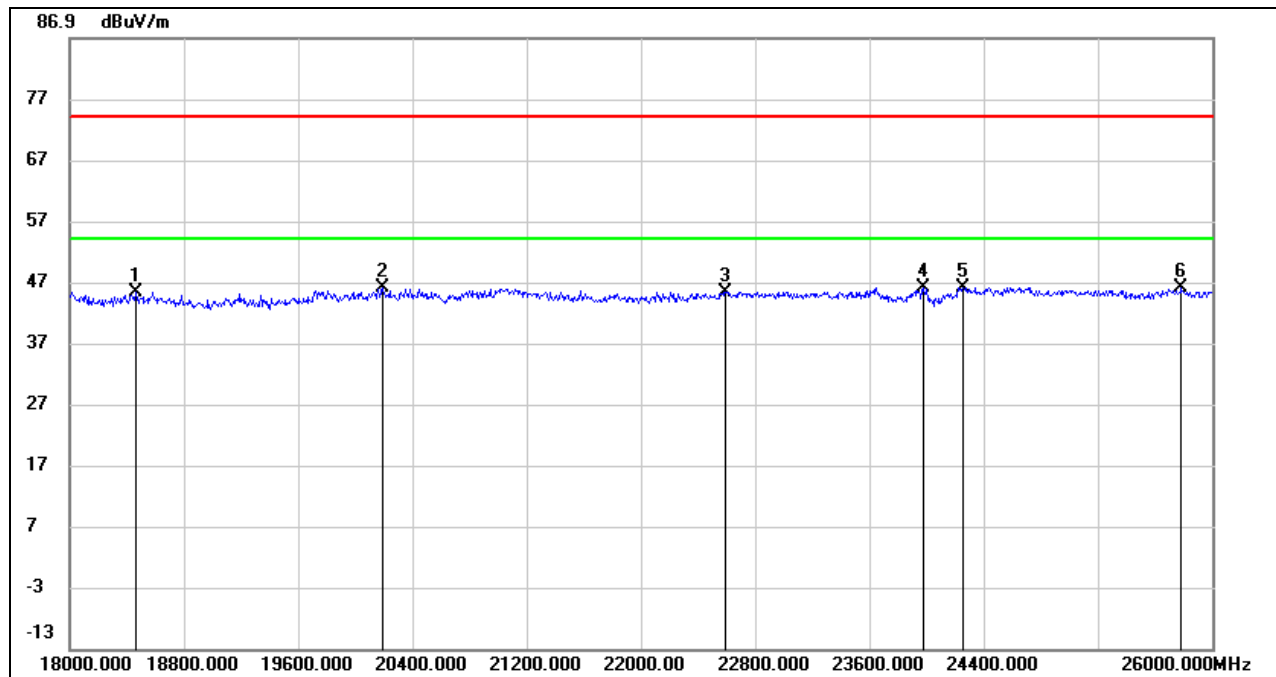


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18712.000	50.73	-4.76	45.97	74.00	-28.03	peak
2	19384.000	51.52	-4.91	46.61	74.00	-27.39	peak
3	20880.000	52.34	-5.21	47.13	74.00	-26.87	peak
4	22528.000	52.16	-5.79	46.37	74.00	-27.63	peak
5	23512.000	51.64	-4.76	46.88	74.00	-27.12	peak
6	25520.000	49.43	-1.78	47.65	74.00	-26.35	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

**SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18464.000	49.70	-4.39	45.31	74.00	-28.69	peak
2	20192.000	50.87	-4.76	46.11	74.00	-27.89	peak
3	22592.000	51.12	-5.77	45.35	74.00	-28.65	peak
4	23976.000	50.04	-4.08	45.96	74.00	-28.04	peak
5	24256.000	49.68	-3.56	46.12	74.00	-27.88	peak
6	25784.000	47.58	-1.49	46.09	74.00	-27.91	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

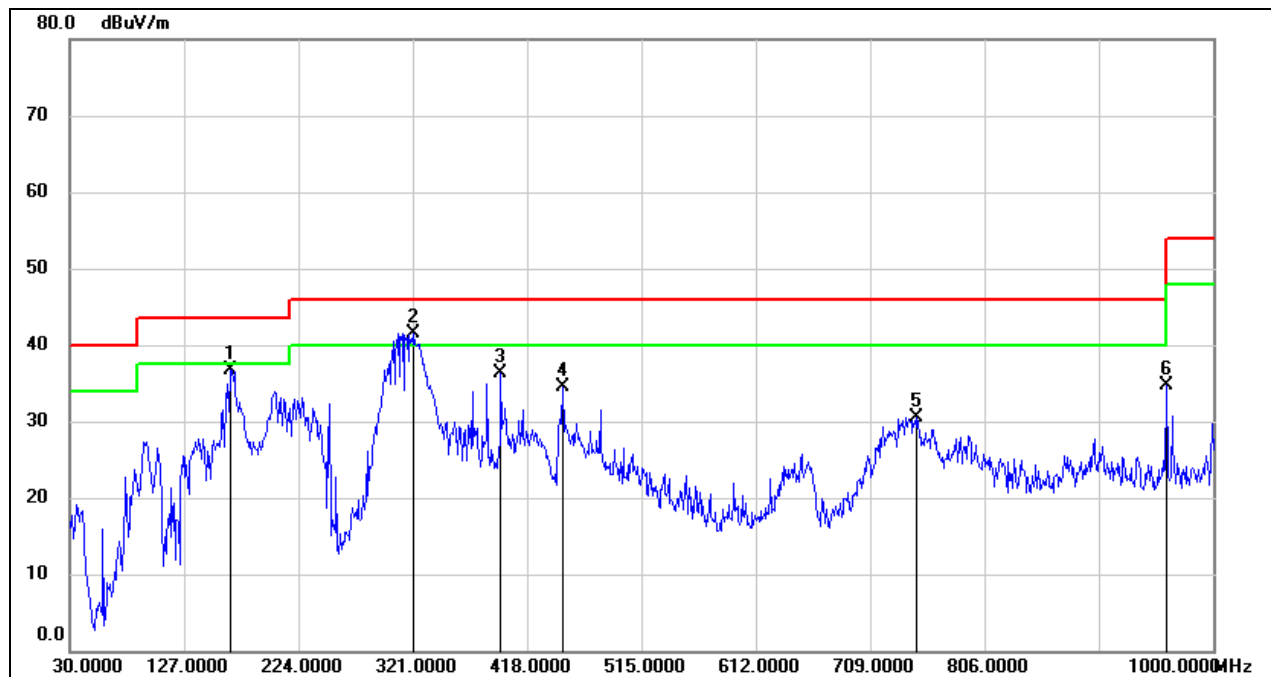
3. Peak: Peak detector.

Note: All the modes have been tested, only the worst data was recorded in the report.

8.5. SPURIOUS EMISSIONS 30MHz ~ 1GHz

8.5.1. BLE MODE

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

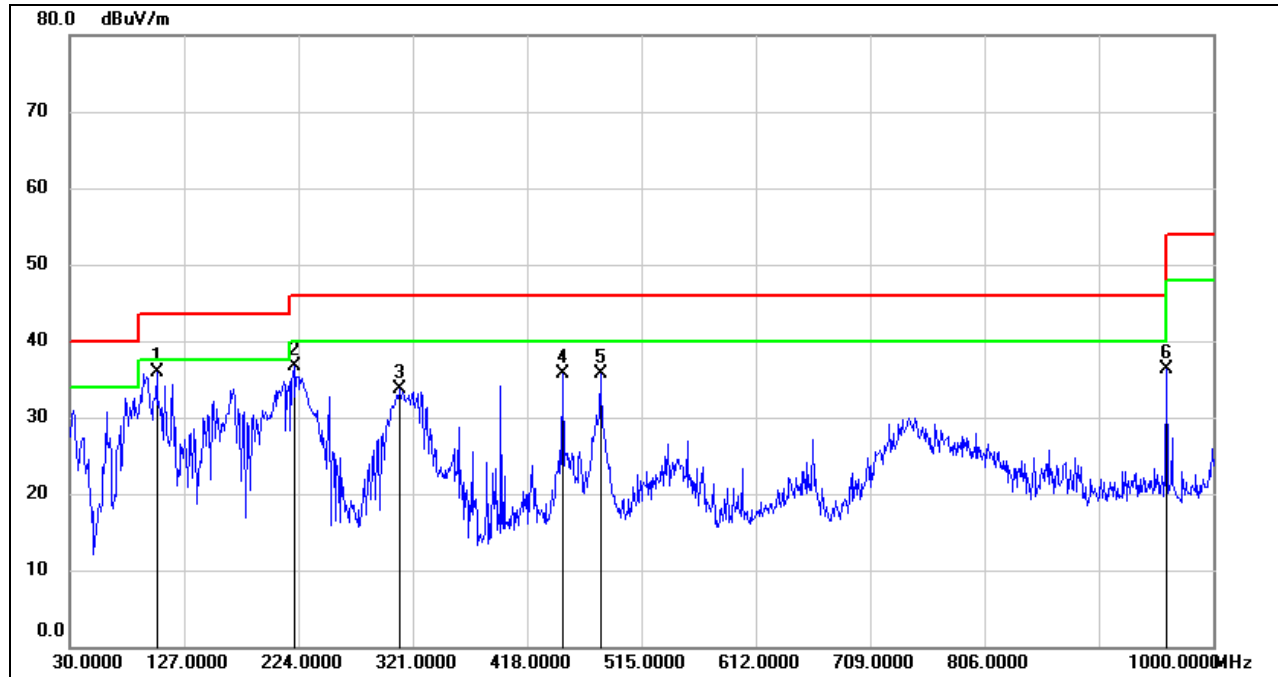


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	166.7700	54.32	-17.56	36.76	43.50	-6.74	QP
2	321.9700	56.61	-15.06	41.55	46.00	-4.45	QP
3	395.6900	49.79	-13.56	36.23	46.00	-9.77	QP
4	448.0700	47.10	-12.50	34.60	46.00	-11.40	QP
5	747.8000	38.93	-8.37	30.56	46.00	-15.44	QP
6	960.2300	39.80	-5.02	34.78	54.00	-19.22	QP

Note: 1. Result Level = Read Level + Correct Factor.

2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	103.7200	56.90	-21.01	35.89	43.50	-7.61	QP
2	220.1200	55.01	-18.39	36.62	46.00	-9.38	QP
3	310.3299	49.03	-15.38	33.65	46.00	-12.35	QP
4	448.0700	48.20	-12.50	35.70	46.00	-10.30	QP
5	480.0800	47.70	-11.98	35.72	46.00	-10.28	QP
6	960.2300	41.41	-5.02	36.39	54.00	-17.61	QP

Note: 1. Result Level = Read Level + Correct Factor.

2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

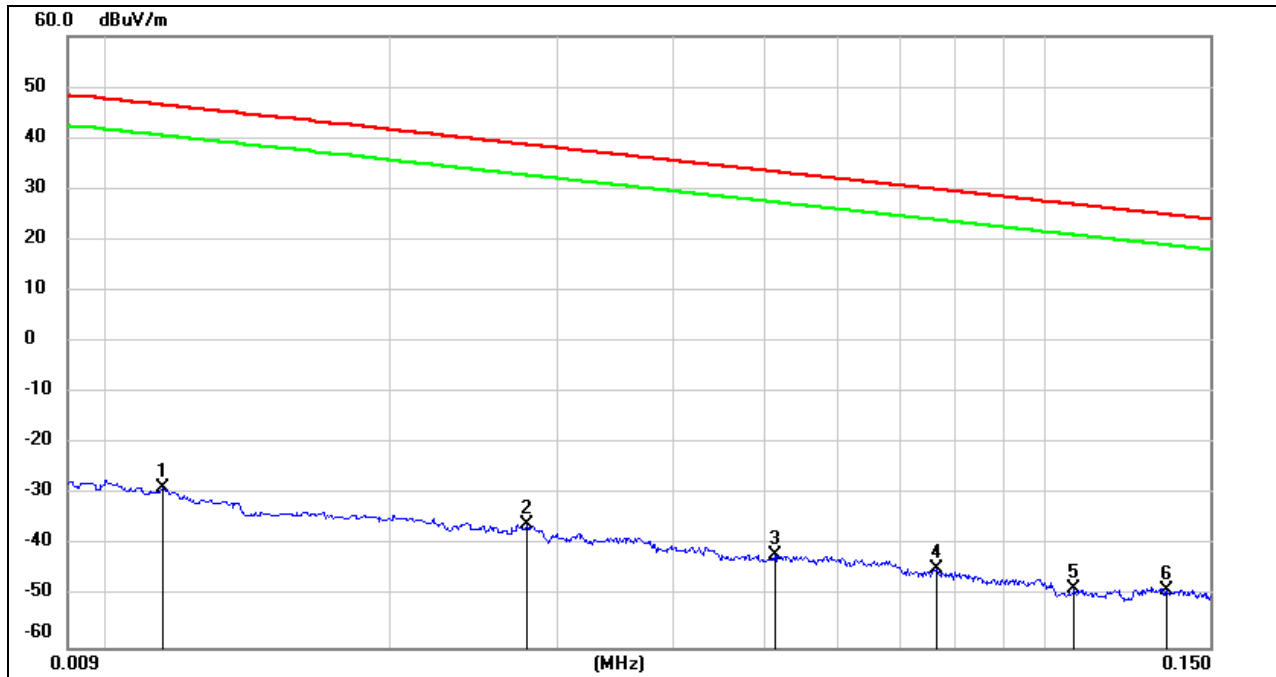
Note: All the modes have been tested, only the worst data was recorded in the report.

8.6. SPURIOUS EMISSIONS BELOW 30MHz

8.6.1. BLE MODE

SPURIOUS EMISSIONS (LOW CHANNEL, LOOP ANTENNA FACE ON TO THE EUT, WORST-CASE CONFIGURATION)

9kHz~ 150kHz



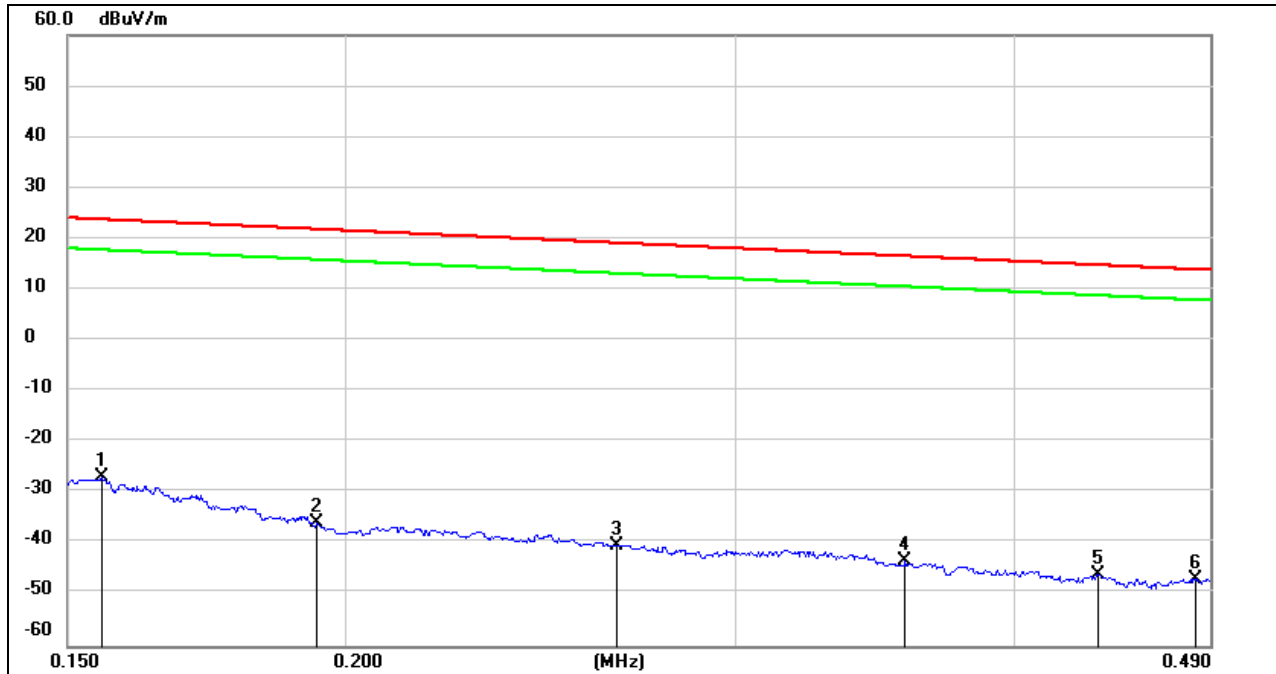
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0114	72.88	-101.40	-28.52	46.46	-74.98	peak
2	0.0279	65.67	-101.38	-35.71	38.69	-74.40	peak
3	0.0514	59.68	-101.48	-41.80	33.38	-75.18	peak
4	0.0767	57.09	-101.61	-44.52	29.91	-74.43	peak
5	0.1073	53.30	-101.77	-48.47	26.99	-75.46	peak
6	0.1348	52.91	-101.68	-48.77	25.01	-73.78	peak

Note: 1. Measurement = Reading Level + Correct Factor

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

150kHz ~ 490kHz



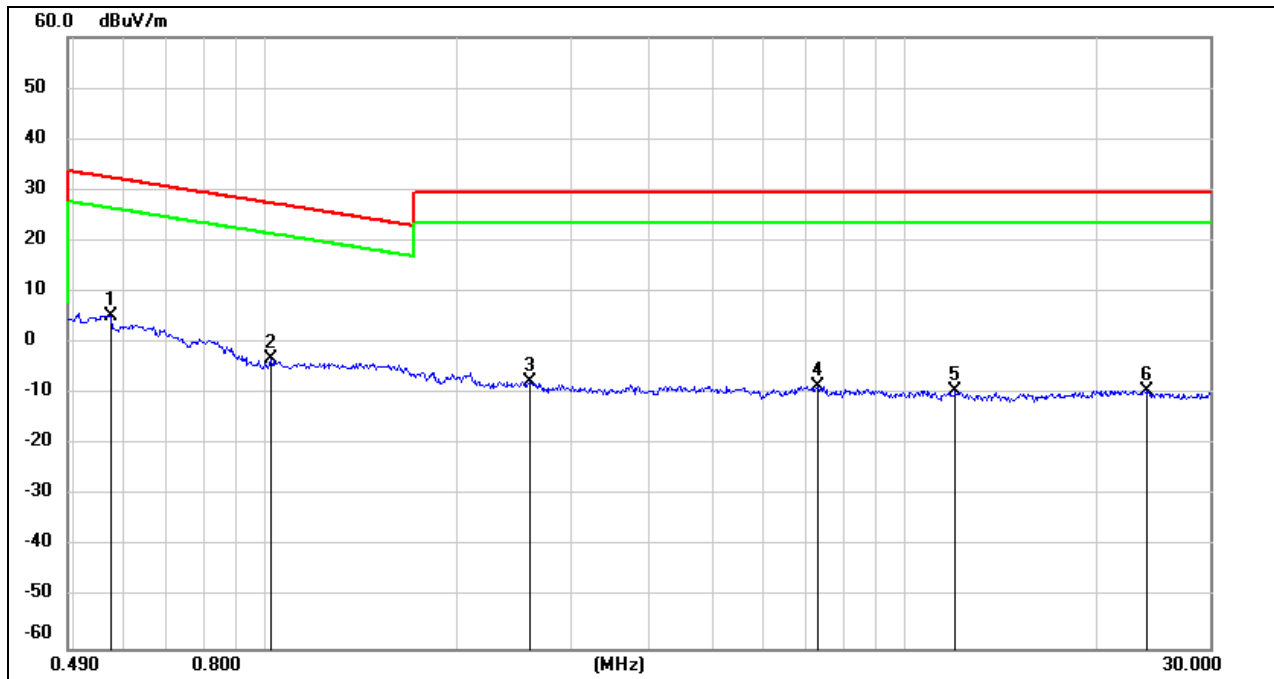
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1554	74.77	-101.65	-26.88	23.77	-50.65	peak
2	0.1942	65.81	-101.70	-35.89	21.84	-57.73	peak
3	0.2651	61.61	-101.82	-40.21	19.13	-59.34	peak
4	0.3573	58.58	-101.91	-43.33	16.54	-59.87	peak
5	0.4364	55.86	-101.99	-46.13	14.80	-60.93	peak
6	0.4823	55.19	-102.04	-46.85	13.94	-60.79	peak

Note: 1. Measurement = Reading Level + Correct Factor

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

490kHz ~ 30MHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.5725	67.38	-62.07	5.31	32.45	-27.14	peak
2	1.0212	58.99	-62.25	-3.26	27.42	-30.68	peak
3	2.5935	54.11	-61.68	-7.57	29.54	-37.11	peak
4	7.3361	52.58	-61.17	-8.59	29.54	-38.13	peak
5	12.0282	51.33	-60.89	-9.56	29.54	-39.10	peak
6	23.9800	51.17	-60.53	-9.36	29.54	-38.90	peak

Note: 1. Measurement = Reading Level + Correct Factor

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

Note: All the modes have been tested, only the worst data was recorded in the report.

9. AC POWER LINE CONDUCTED EMISSIONS

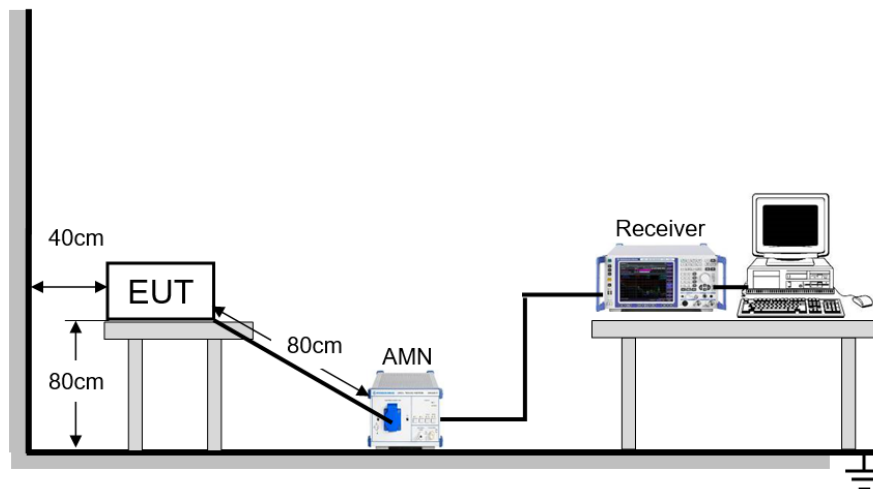
LIMITS

Please refer to CFR 47 FCC §15.207 (a).

FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

TEST SETUP AND PROCEDURE

Refer to ANSI C63.10-2013 clause 6.2.



The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

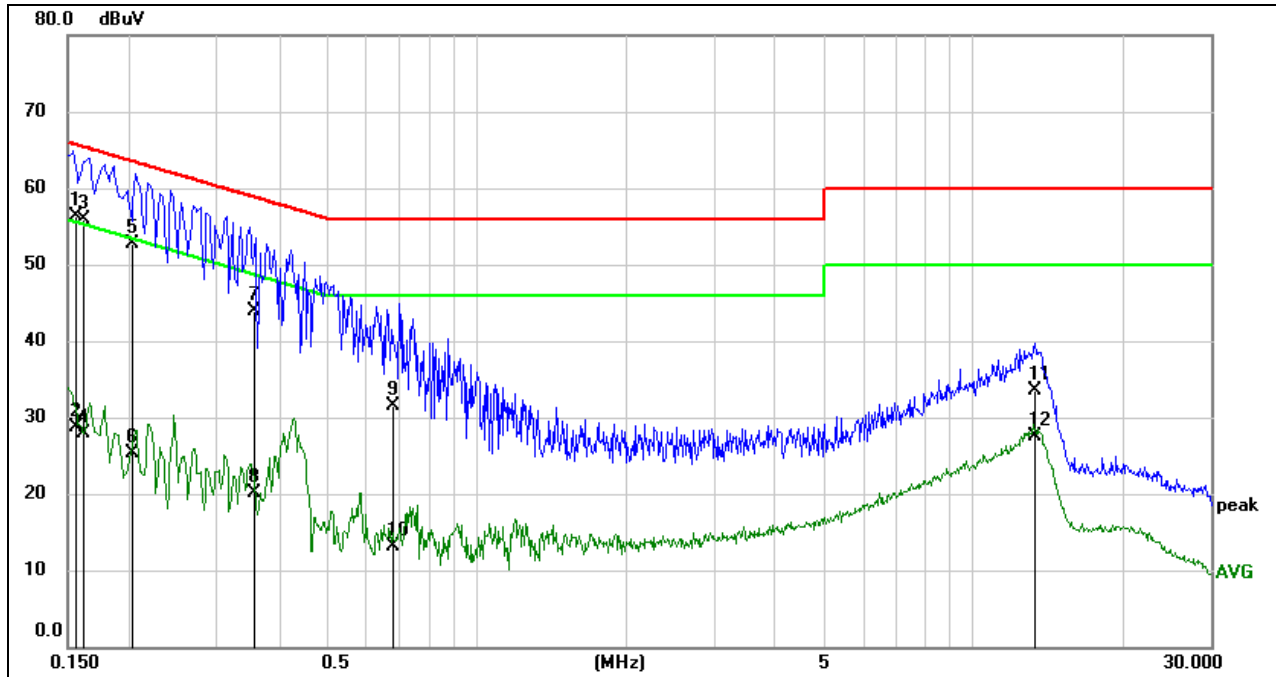
TEST ENVIRONMENT

Temperature	27.3°C	Relative Humidity	71.8%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V/ 60Hz

TEST RESULTS

9.1. BLE MODE

LINE L RESULTS (LOW CHANNEL, WORST-CASE CONFIGURATION)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1563	46.61	9.61	56.22	65.66	-9.44	QP
2	0.1563	19.02	9.61	28.63	55.66	-27.03	AVG
3	0.1620	46.29	9.61	55.90	65.36	-9.46	QP
4	0.1620	18.31	9.61	27.92	55.36	-27.44	AVG
5	0.2022	43.01	9.60	52.61	63.52	-10.91	QP
6	0.2022	15.68	9.60	25.28	53.52	-28.24	AVG
7	0.3553	34.33	9.60	43.93	58.84	-14.91	QP
8	0.3553	10.55	9.60	20.15	48.84	-28.69	AVG
9	0.6843	21.94	9.60	31.54	56.00	-24.46	QP
10	0.6843	3.52	9.60	13.12	46.00	-32.88	AVG
11	13.2648	23.74	9.82	33.56	60.00	-26.44	QP
12	13.2648	17.63	9.82	27.45	50.00	-22.55	AVG

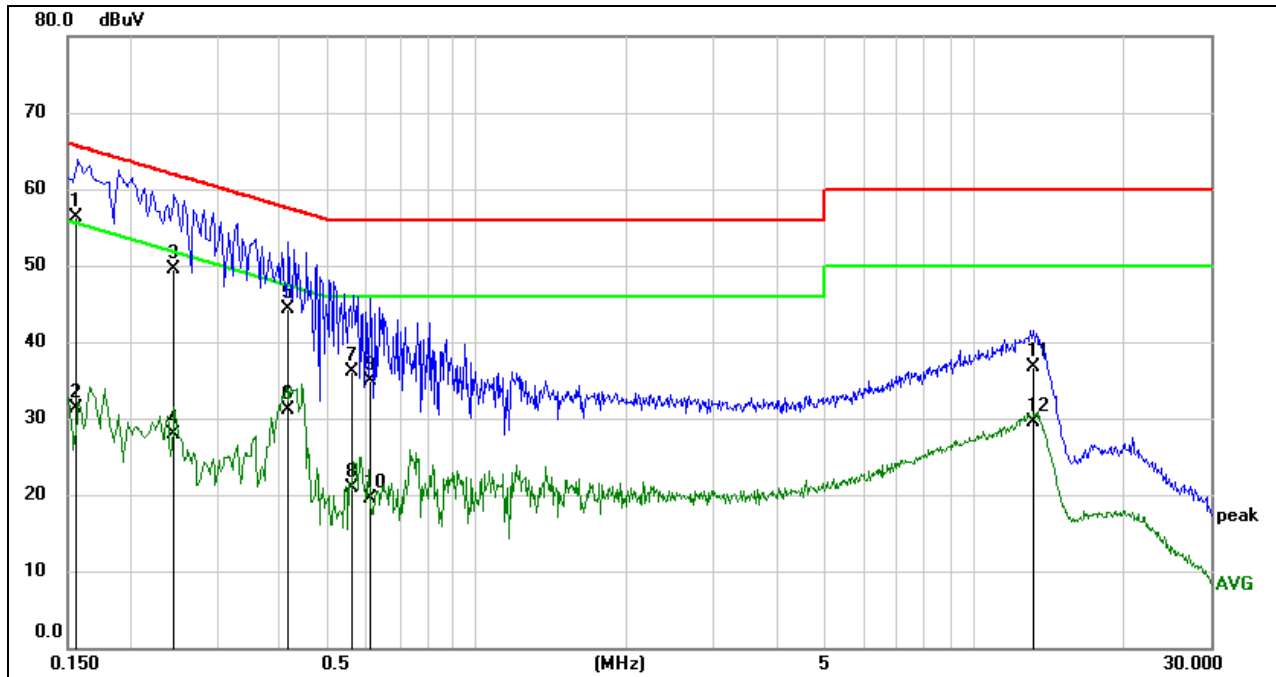
Note: 1. Result = Reading +Correct Factor.

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).

4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

LINE N RESULTS (LOW CHANNEL, WORST-CASE CONFIGURATION)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1556	46.65	9.60	56.25	65.70	-9.45	QP
2	0.1556	21.65	9.60	31.25	55.70	-24.45	AVG
3	0.2448	39.92	9.60	49.52	61.93	-12.41	QP
4	0.2448	18.22	9.60	27.82	51.93	-24.11	AVG
5	0.4142	34.64	9.60	44.24	57.56	-13.32	QP
6	0.4142	21.60	9.60	31.20	47.56	-16.36	AVG
7	0.5591	26.47	9.60	36.07	56.00	-19.93	QP
8	0.5591	11.26	9.60	20.86	46.00	-25.14	AVG
9	0.6068	25.29	9.60	34.89	56.00	-21.11	QP
10	0.6068	10.00	9.60	19.60	46.00	-26.40	AVG
11	13.2067	26.92	9.85	36.77	60.00	-23.23	QP
12	13.2067	19.61	9.85	29.46	50.00	-20.54	AVG

Note: 1. Result = Reading +Correct Factor.

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).

4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

Note: All the modes have been tested, only the worst data was recorded in the report.



10. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to FCC §15.203

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

Please refer to FCC §15.247(b)(4)

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.

RESULTS

Complies



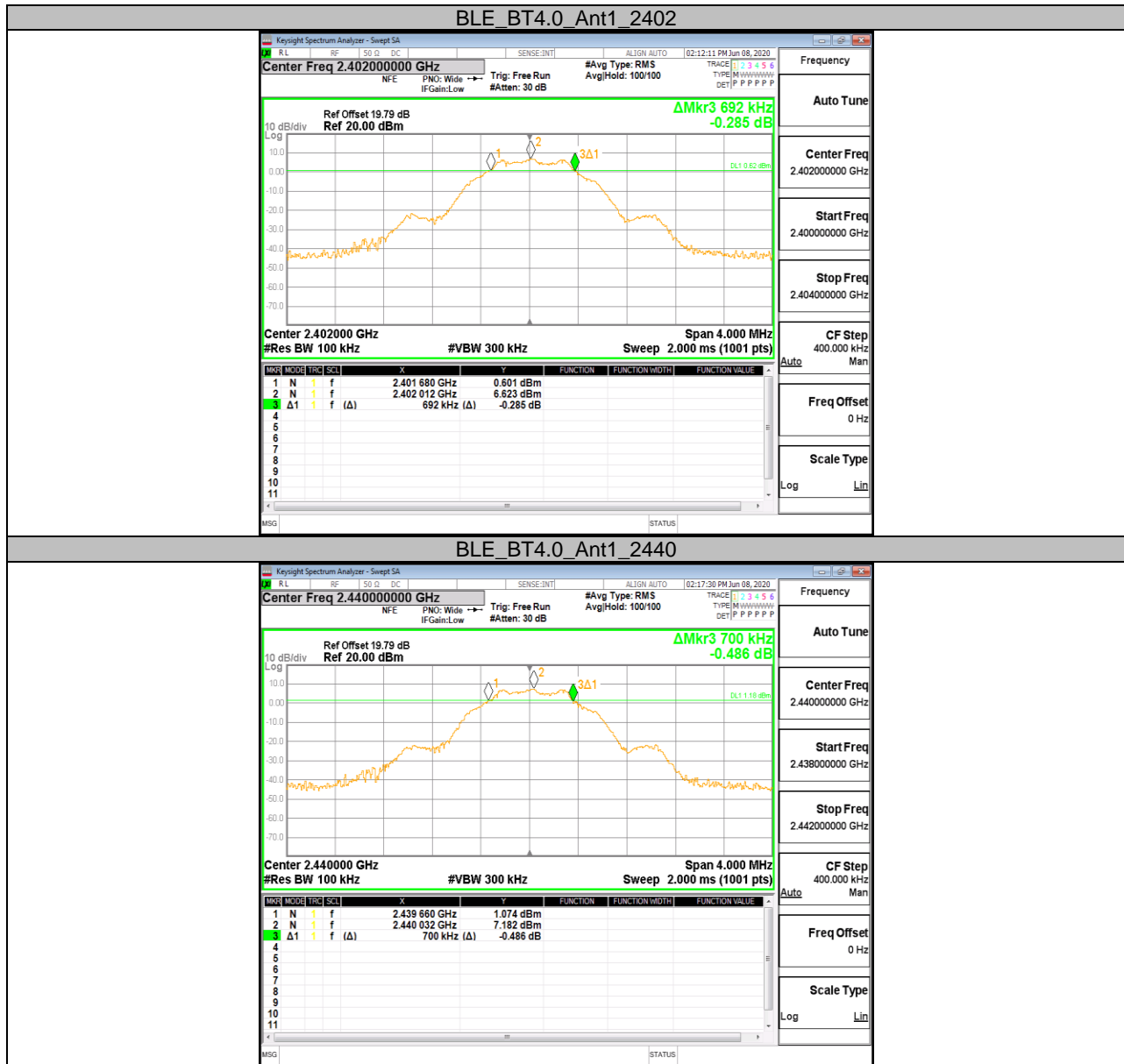
10.1. Appendix A: DTS Bandwidth

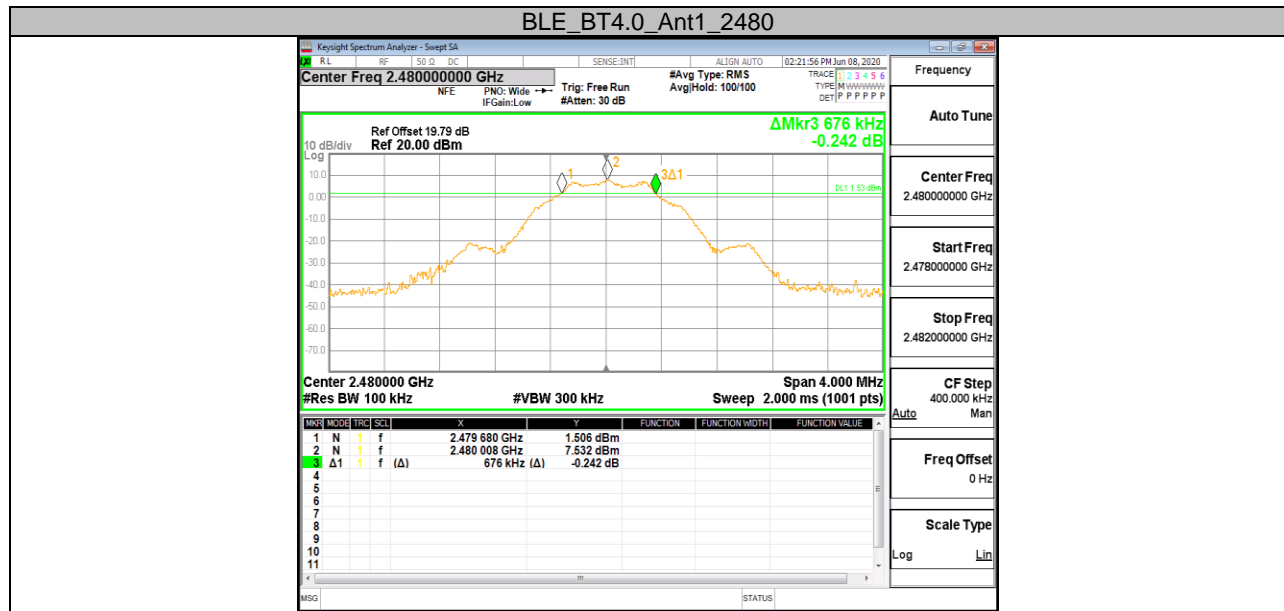
10.1.1. Test Result

Test Mode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_BT4.0	Ant1	2402	0.692	2401.680	2402.372	0.5	PASS
		2440	0.700	2439.660	2440.360	0.5	PASS
		2480	0.676	2479.680	2480.356	0.5	PASS



10.1.2. Test Graphs







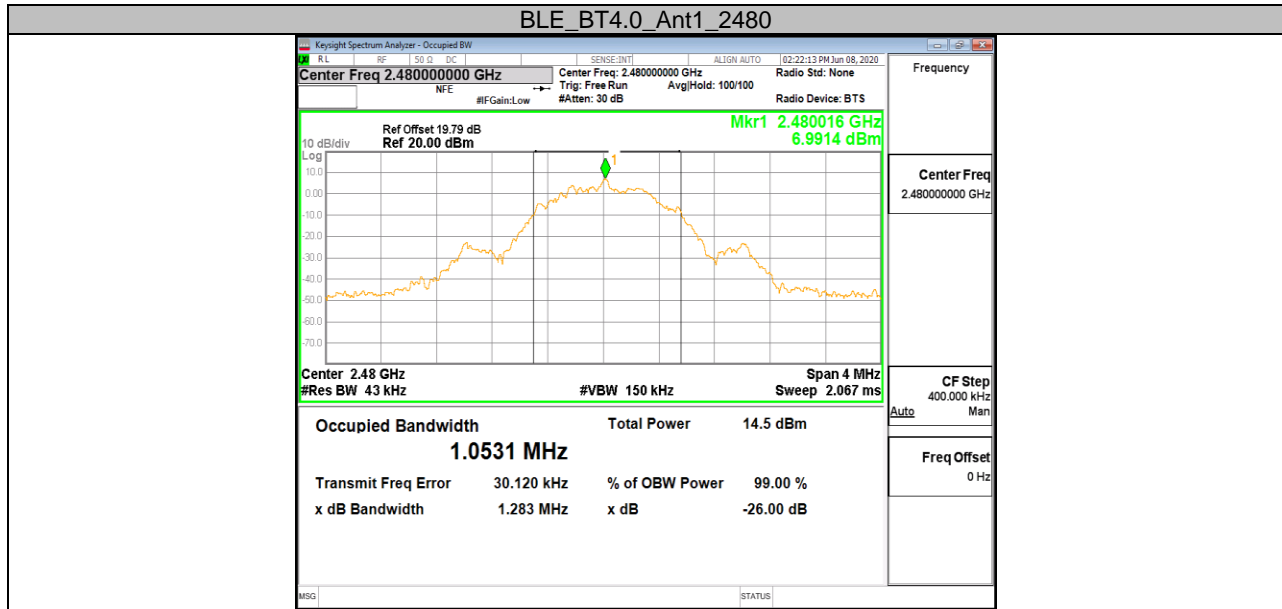
10.2. Appendix B: Occupied Channel Bandwidth

10.2.1. Test Result

Test Mode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_BT4.0	Ant1	2402	1.0563	2401.502	2402.558	---	PASS
		2440	1.0586	2439.499	2440.558	---	PASS
		2480	1.0531	2479.504	2480.557	---	PASS

10.2.2. Test Graphs







10.3. Appendix C: Maximum Peak conducted output power

10.3.1. Test Result

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_BT4.0	Ant1	2402	7.39	<=30	PASS
		2440	8.07	<=30	PASS
		2480	8.34	<=30	PASS



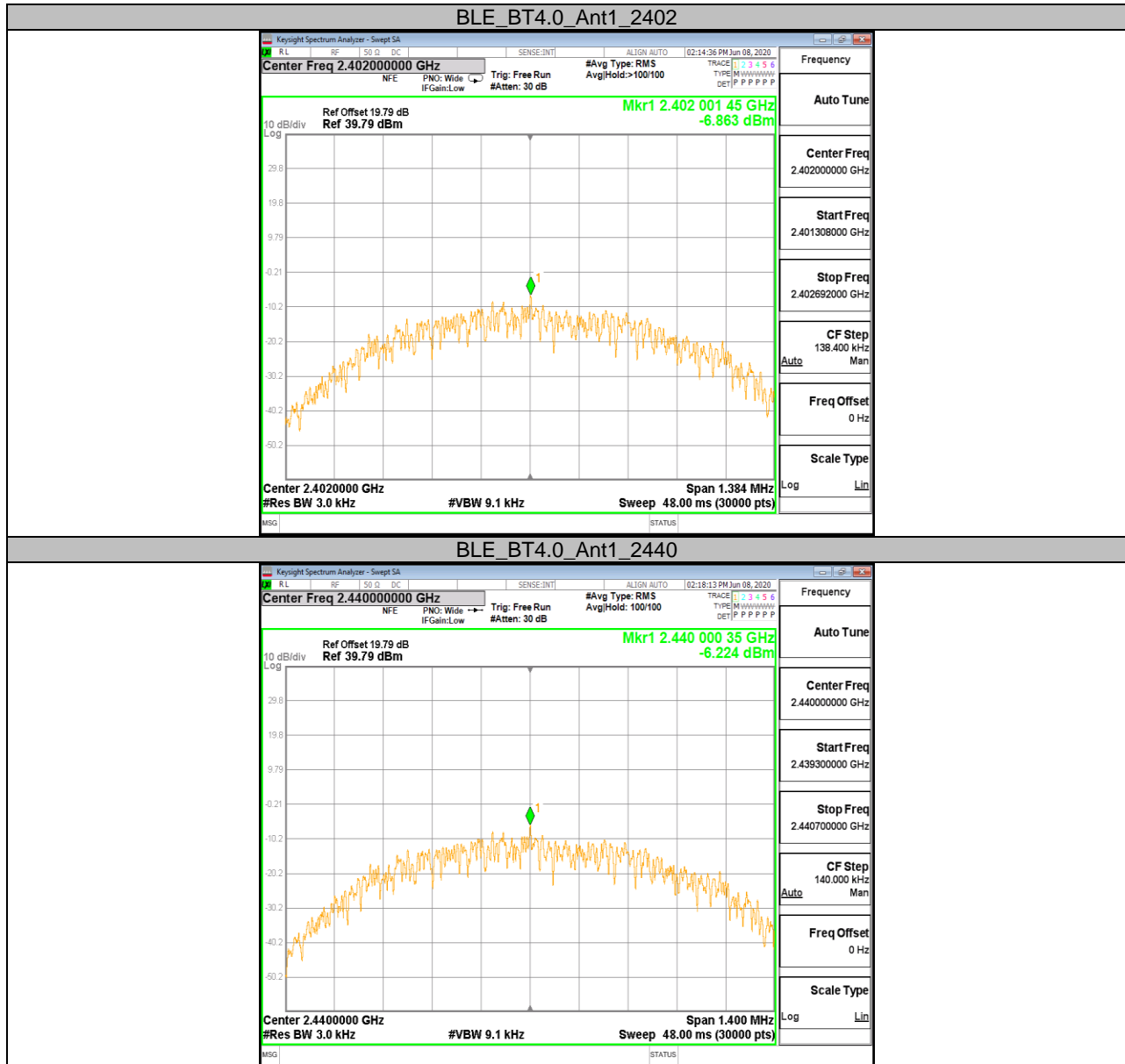
10.4. Appendix D: Maximum power spectral density

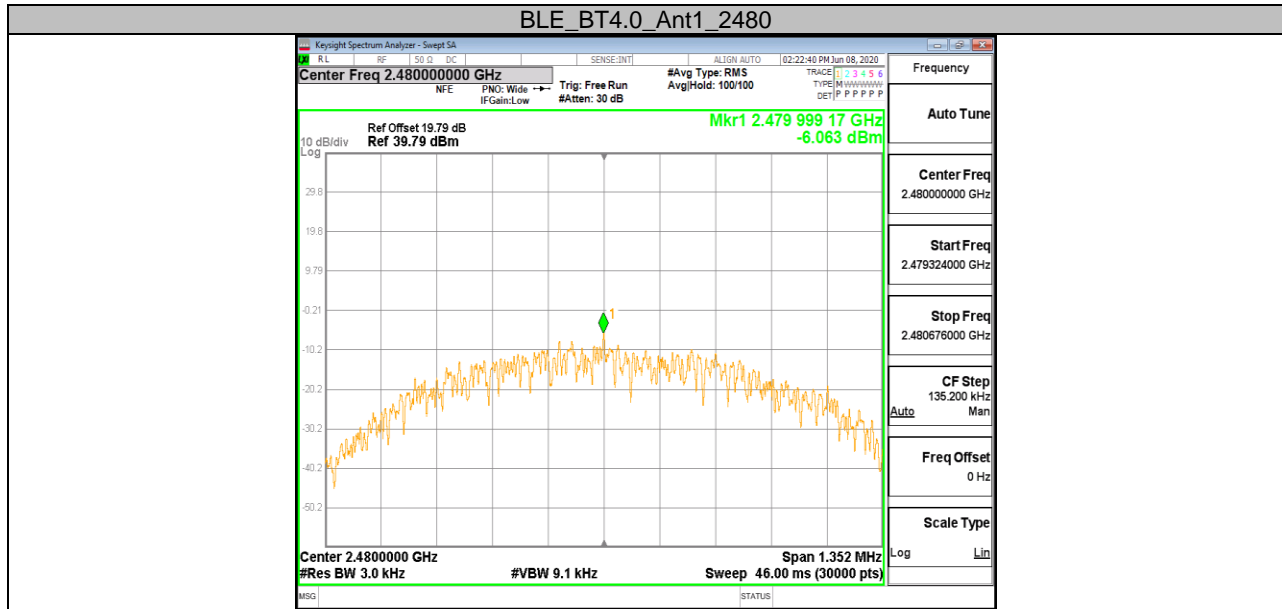
10.4.1. Test Result

Test Mode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_BT4.0	Ant1	2402	-6.86	<=8	PASS
		2440	-6.22	<=8	PASS
		2480	-6.06	<=8	PASS



10.4.2. Test Graphs







10.5. Appendix E: Band edge measurements

10.5.1. Test Result

Test Mode	Antenna	Chanel	Channel	Verdict
BLE_BT4.0	Ant1	Low	2402	PASS
		High	2480	PASS



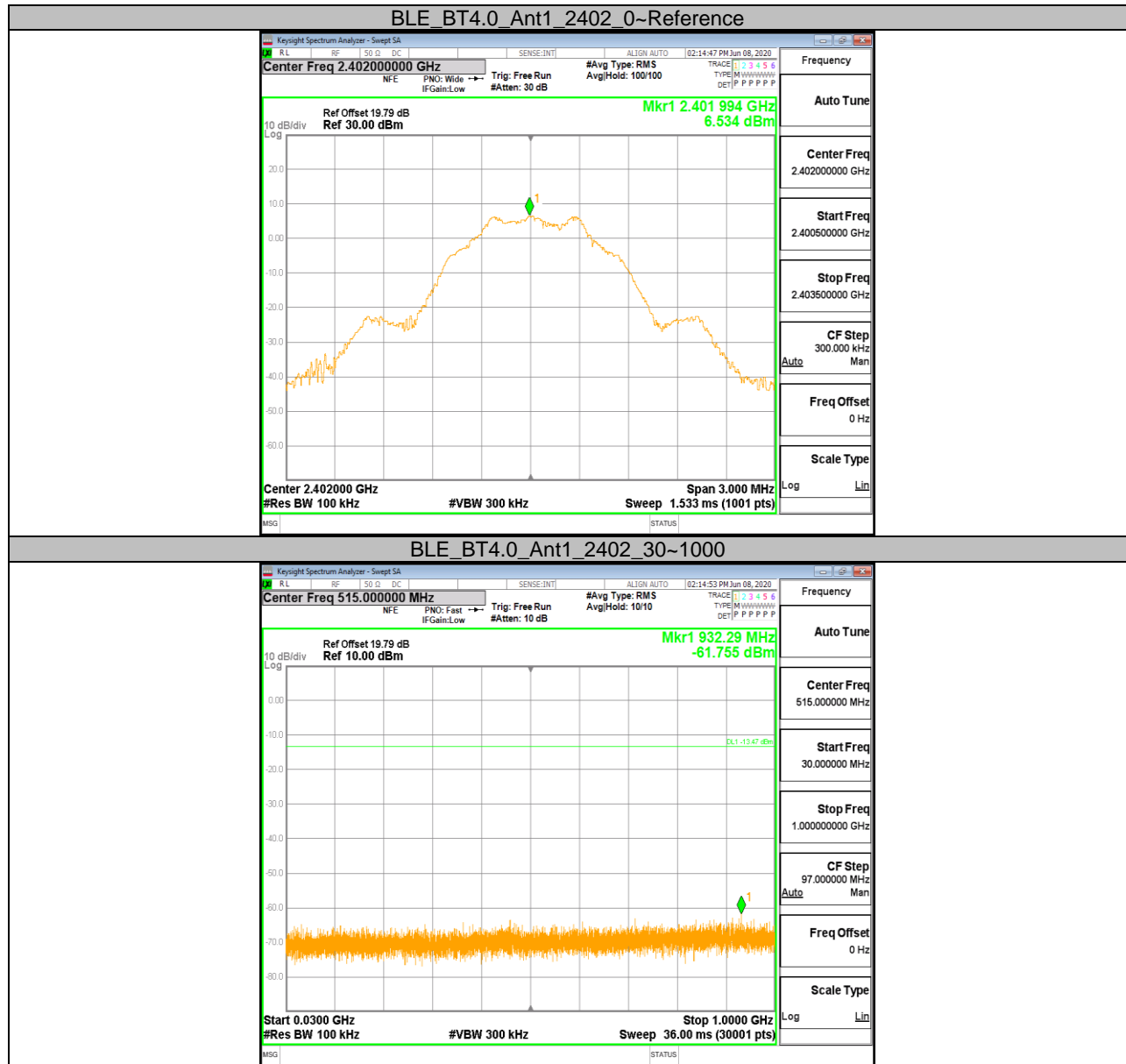
10.5.2. Test Graphs

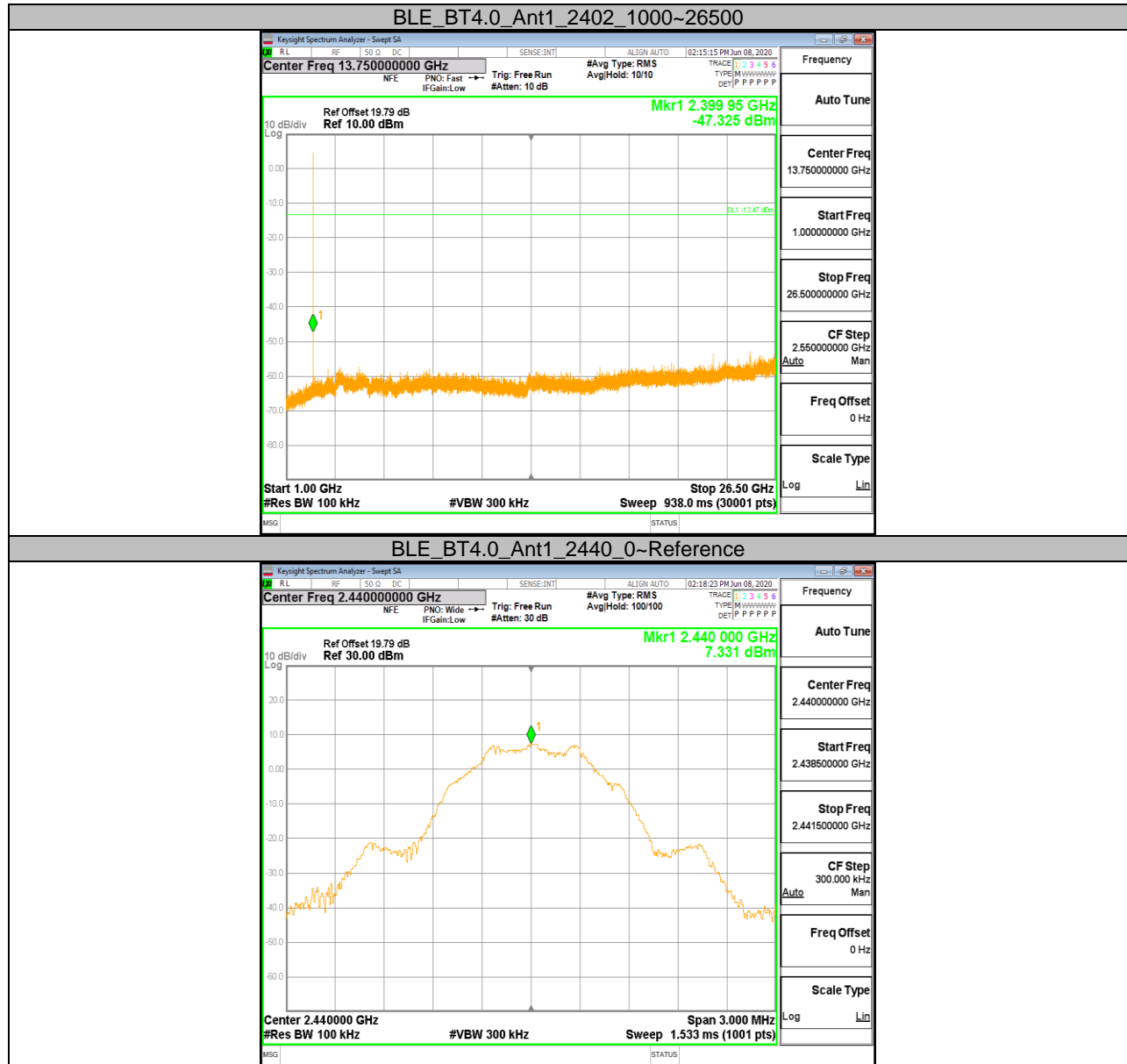


10.6. Appendix F: Conducted Spurious Emission**10.6.1. Test Result**

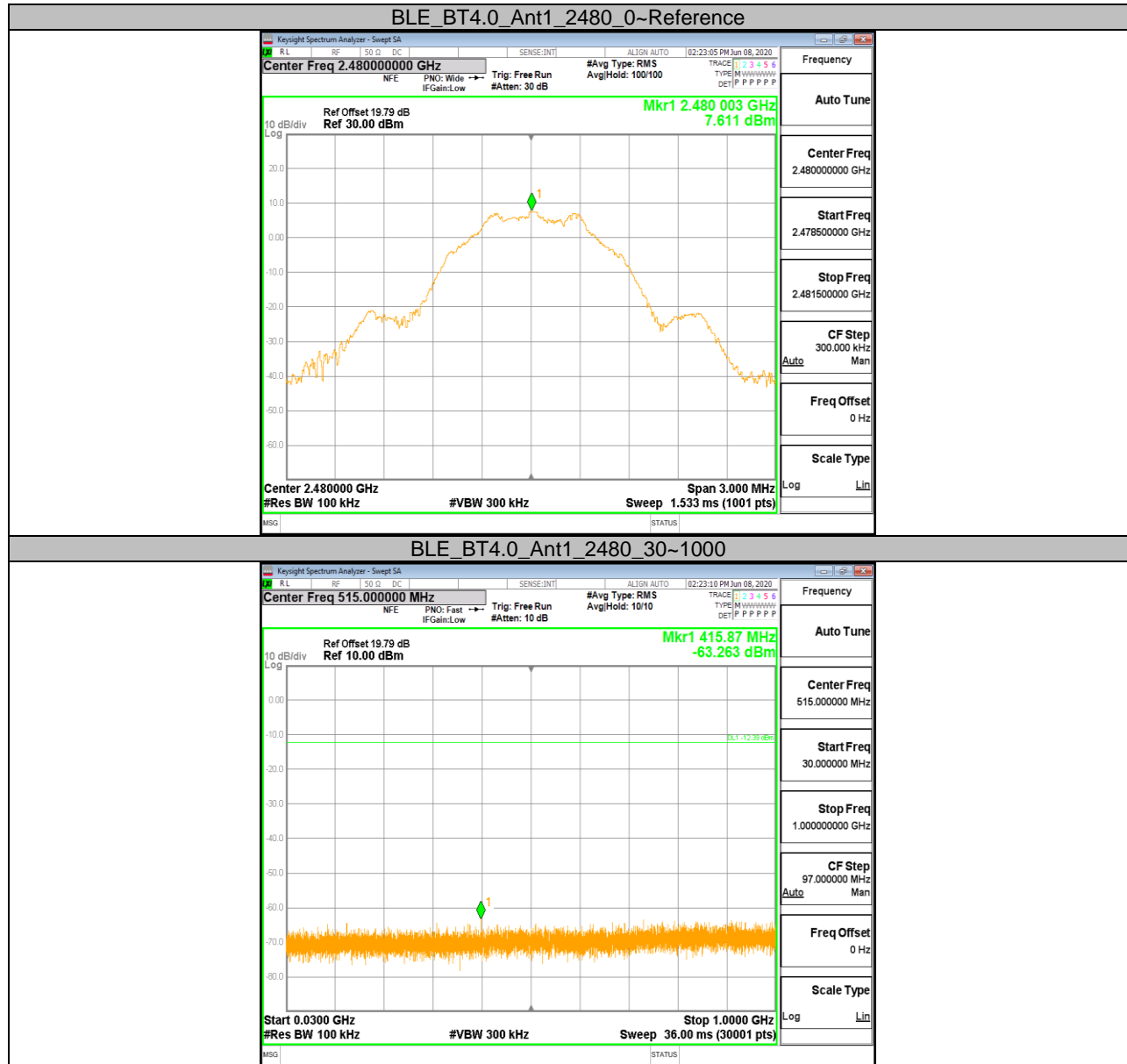
Test Mode	Antenna	Channel	Free-range [MHz]	Verdict
BLE_BT4.0	Ant1	2402	Reference	PASS
			30~1000	PASS
			1000~26500	PASS
		2440	Reference	PASS
			30~1000	PASS
			1000~26500	PASS
		2480	Reference	PASS
			30~1000	PASS
			1000~26500	PASS

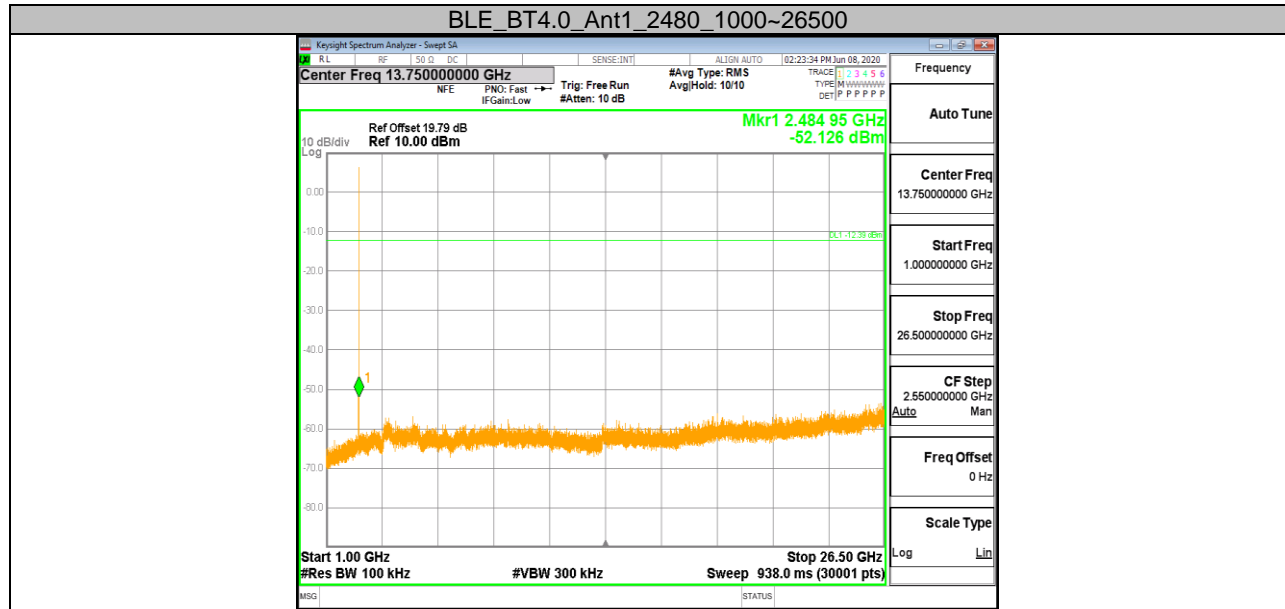
10.6.2. Test Graphs











END OF REPORT