FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-247 ISSUE 2

CERTIFICATION TEST REPORT

For

Cubinote
MODEL NUMBER: CG1-80

FCC ID: 2AL4X0000G3
IC: 22723-0000G3

REPORT NUMBER: 4788064175.1-3

ISSUE DATE: August 23, 2017

Prepared for

Knectek Labs Inc.
9225Leslie Street, Suite 201 Richmond Hill, ON. L4B 3H6 Canada

Prepared by

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch
Room 101, Building 10, Innovation Technology Park,
Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
Tel: +86 769 33817100
Fax: +86 769 33244054
Website: www.ul.com

Revision History

Rev.	Issue Date	Revisions	Revised By
--	08/23/2017	Initial Issue	

Summary of Test Results			
Clause	Test Items	FCC/IC Rules	Test Results
1	6db DTS Bandwidth	FCC 15.247 (a) (2) IC RSS-247 Clause 5.1 (1)	Complied
2	Peak Conducted Power	FCC 15.247 (b) (3) IC RSS-247 Clause 5.4 (4)	Complied
3	Power Spectral Density	FCC 15.247 (3) IC RSS-247 Clause 5.2 (2)	Complied
4	Conducted Band edge And Spurious emission	FCC 15.247 (d) IC RSS-247 Clause 5.5	Complied
5	Radiated Band edges and Spurious emission	FCC 15.247 (d) FCC 15.209 FCC 15.205 IC RSS-247 Clause 5.5 IC RSS-GEN Clause 8.9	Complied
6	Conducted Emission Test For AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	Complied
7	Antenna Requirement	FCC 15.203 RSS-GEN Clause 8.3	Complied

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Knectek Labs Inc.
Address:	9225Leslie Street, Suite 201 Richmond Hill, ON. L4B 3H6 Canada

Manufacturer Information

Company Name:	Knectek Labs Inc.
Address:	9225Leslie Street, Suite 201 Richmond Hill, ON. L4B 3H6 Canada

EUT Description

Product Name	Cubinote
Brand Name	N/A
Model Name	CG1-80
Serial Number	N/A
Model Difference	N/A
Date Tested	July 20, 2017 ~ August 27, 2017

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	PASS
INDUSTRY CANADA RSS-247 Issue 2	PASS
INDUSTRY CANADA RSS-GEN Issue 4	PASS

Tested By: Check By:

Miller Ma
Engineer

Shawn Wen
Laboratory Leader

Approved By:

Stephen Guo

Laboratory Manager

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with 558074 D01 DTS Meas Guidance v04, 414788 D01 Radiated Test Site v01, ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

Test Location	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
Address	Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
Accreditation Certificate	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. The Certificate Registration Number is 4102.01. UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The Designation Number is CN1187. UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been registered and fully described in a report filed with Industry Canada. The Company Number is 21320.

Note: 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.

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 recognized 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
Uncertainty for Conduction emission test	2.90dB
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.52dB
Uncertainty for Radiation Emission test (1GHz to 26GHz)(include Fundamental emission)	5.04dB(1-6GHz)
	5.30dB (6GHz-18Gz)
	5.23dB (18GHz-26Gz)
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

Equipment	Cubinote		
Model Name	CG1-80		
Product Description (Bluetooth)	Operation Frequency	2402 MHz ~ 2480 MHz	
	Modulation Type		Data Rate
	GFSK		1Mbps
Power Adapter	Model:PS65B120Y4000S INPUT:100-240V~,50/60Hz,1.5A OUTPUT:12.0V/4000mA		
Bluetooth Version	BT4.0LE+EDR		
Hardware Version	N/A		
Software Version	N/A		

5.2. MAXIMUM OUTPUT POWER

Frequency Range (MHz)	Number of Transmit Chains (NTX)	Bluetooth Mode	Frequency (MHz)	Channel Number	Max PK Conducted Power (dBm)	EIRP (dBm)
2402-2480	1	BLE	2402-2480	0-39[40]	6.74	9.44

5.3. CHANNEL LIST

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

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
GFSK	CH 00, CH 19, CH 39	2402MHz, 2440MHz, 2480MHz

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band				
Test Software Version		RTLBTAPP		
Modulation Type	Transmit Antenna Number	Test Channel		
		CH 00	CH 19	CH 39
GFSK	1	7	7	7

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2402-2480	PCB Antenna	2.7

Test Mode	Transmit and Receive Mode	Description
GFSK	☒1TX, 1RX	Chain 1 can be used as transmitting/receiving antenna.

5.7. WORST-CASE CONFIGURATIONS

Bluetooth Mode	Modulation Technology	Modulation Type	Data Rate (Mbps)
BLE	DTS	GFSK	1Mbit/s

5.8. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	23 ~ 28°C
Voltage :	VL	N/A
	VN	AC120V/60Hz
	VH	N/A

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature

5.9. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	FCC ID
1	Laptop	ThinkPad	T460S	SL10K24796 JS
2	USB serial board	N/A	N/A	N/A

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(cm)	Remarks
1	USB	USB	shielded	1.2	N/A

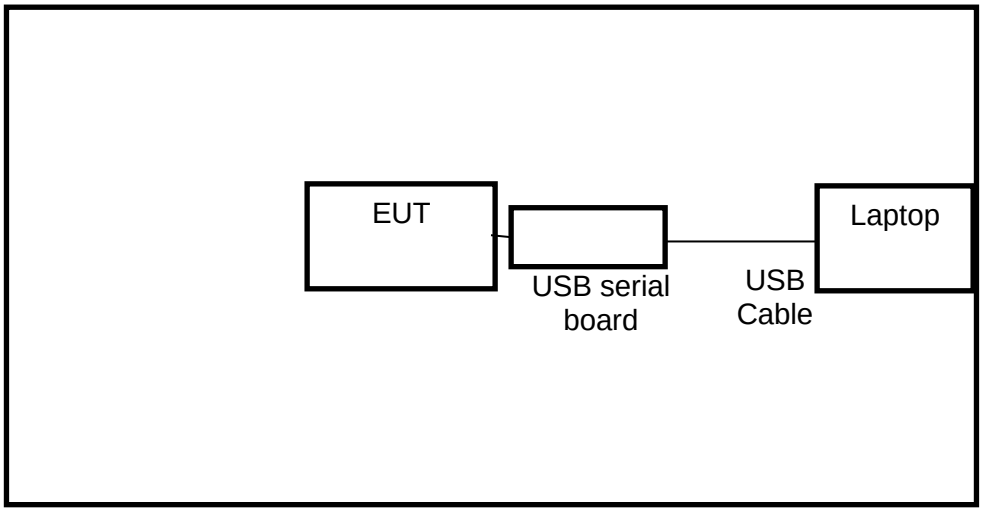
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	Switching Adapter	N/A	PS65B120Y4000S	INPUT:100-240V~,50/60Hz,1.5A OUTPUT:12.0V/4000mA

TEST SETUP

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

SETUP DIAGRAM FOR TESTS



5.10. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	EMI Test Receiver	R&S	ESR3	101961	Dec.20, 2016	Dec.19, 2017
☑	Two-Line V-Network	R&S	ENV216	101983	Dec.20, 2016	Dec.19, 2017
☑	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Feb.10, 2017	Feb.10, 2018
Software						
Used	Description		Manufacturer	Name	Version	
☑	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.
☑	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Feb. 24, 2017	Feb. 24, 2018
☑	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Jan.09, 2016	Jan.09, 2019
☑	Preamplifier	HP	8447D	2944A09099	Feb. 13, 2017	Feb. 13, 2018
☑	EMI Measurement Receiver	R&S	ESR26	101377	Dec. 20, 2016	Dec. 20, 2017
☑	Horn Antenna	TDK	HRN-0118	130939	Jan. 09, 2016	Jan. 09, 2019
☑	High Gain Horn Antenna	Schwarzbeck	BBHA-9170	691	Jan.06, 2016	Jan.06, 2019
☑	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Jan. 14, 2017	Jan. 14, 2018
☑	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec. 20, 2016	Dec. 20, 2017
☑	Loop antenna	Schwarzbeck	1519B	00008	Mar. 26, 2016	Mar. 25, 2019
Software						
Used	Description		Manufacturer	Name	Version	
☑	Test Software for Radiated disturbance		Farad	EZ-EMC	Ver. UL-3A1	
Other instruments						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec. 20, 2016	Dec. 20, 2017
	Power Meter	Keysight	N9031A	MY55416024	Feb. 13, 2017	Feb. 13, 2018
	Power Sensor	Keysight	N9323A	MY55440013	Feb. 13, 2017	Feb. 13, 2018

	DC Supply	Keysight	E36103A	MY55350020	Feb. 10, 2017	Feb. 10, 2018

6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

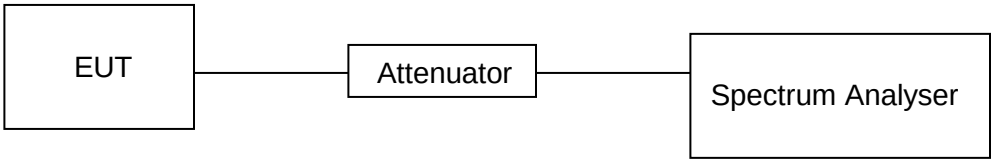
LIMITS

None; for reporting purposes only

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/B Minimum VBW (KHz)
GFSK	0.10513	0.62447	0.168356374	17	7.74	9.51

Note: Duty Cycle Correction Factor=10log(1/x).
Where: x is Duty Cycle(Linear)
Where: B is On Time

ON TIME AND DUTY CYCLE MID CH

6.2. 6 dB BANDWIDTH & 99% BANDWIDTH

LIMITS

FCC Part15 (15.247) Subpart C RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247(a)(2) RSS-247 5.2 (a)	6dB Bandwidth	>= 500KHz	2400-2483.5
RSS-Gen Clause 6.6	99% Bandwidth	For reporting purposes only.	2400-2483.5

TEST PROCEDURE

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

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth :100K For 99% Bandwidth :1% to 5% of the occupied bandwidth
VBW	For 6dB Bandwidth : ≥3 × RBW For 99% Bandwidth : approximately 3×RBW
Trace	Max hold
Sweep	Auto couple

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 and 99% relative to the maximum level measured in the fundamental emission.

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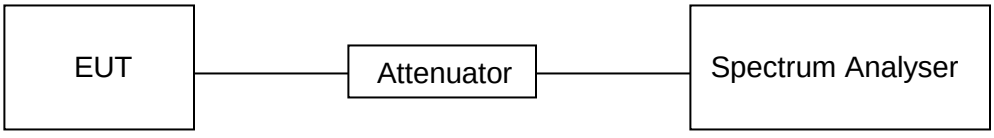
TEST SETUP

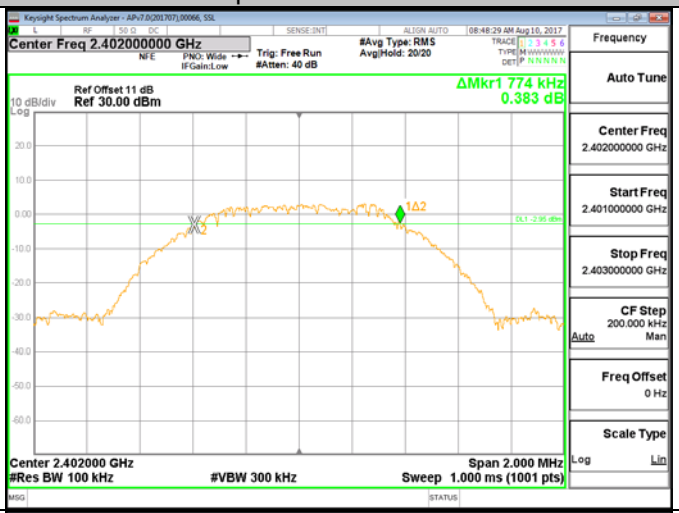
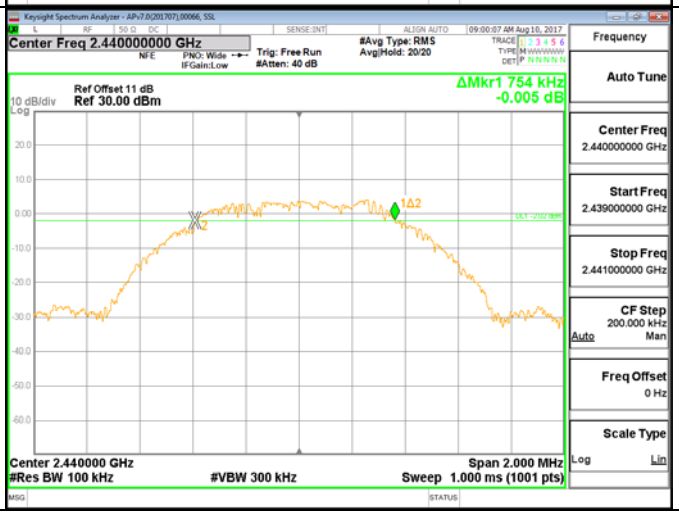


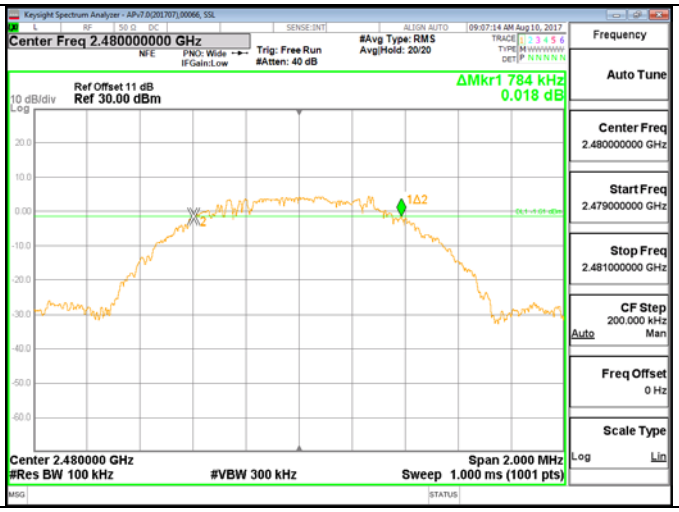
RESULTS

6.2.1. GFSK MODE

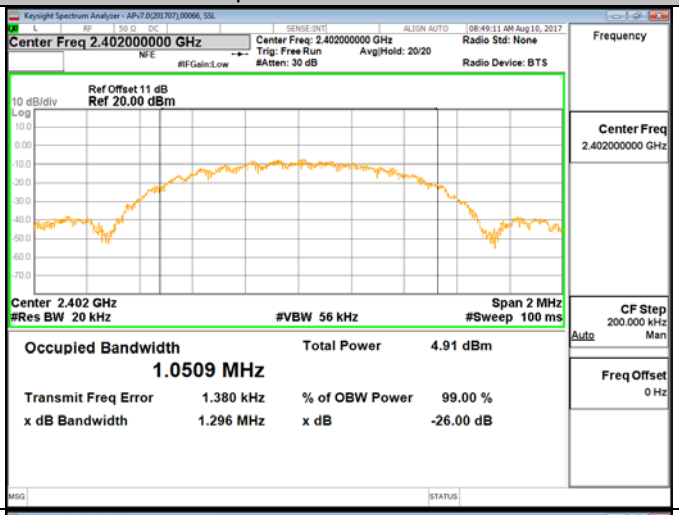
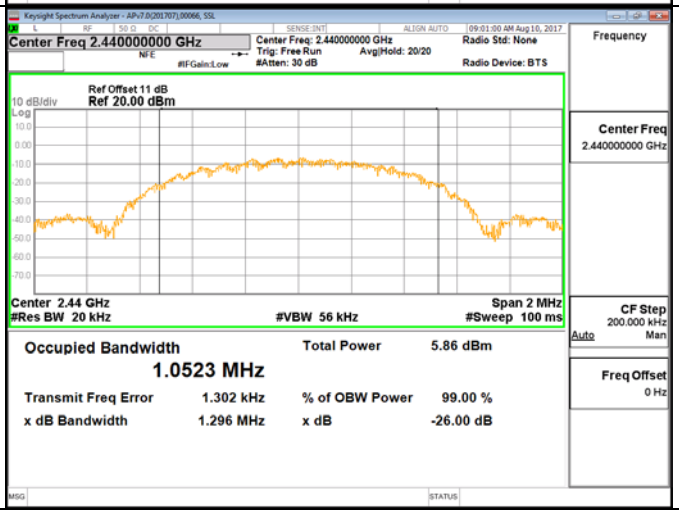
Channel	Frequency (MHz)	6dB bandwidth (MHz)	99% Bandwidth (MHz)	Result
Low	2402	0.774	1.051	Pass
Middle	2441	0.754	1.052	Pass
High	2480	0.784	1.051	Pass

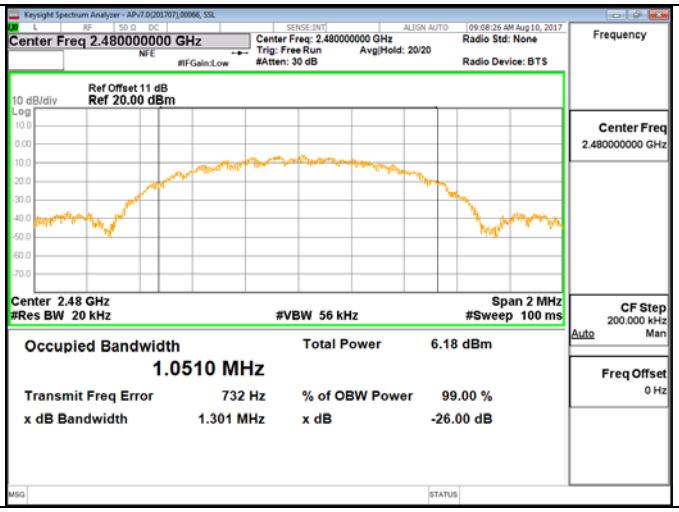
Test Graphs: 6dB bandwidth

Graphs			
LCH			
MCH			

HCH			

Test Graphs: 99% Bandwidth

Graphs			
LCH			
MCH			

HCH			

6.3. PEAK CONDUCTED OUTPUT POWER

LIMITS

FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247(b)(3) IC RSS-247 5.4 (4)	Peak Output Power	1 watt or 30dBm	2400-2483.5

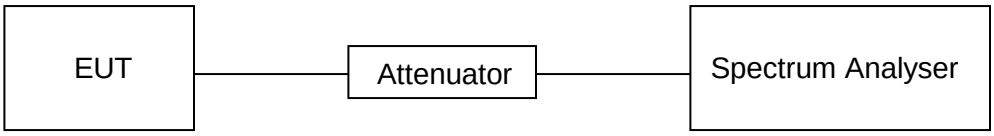
TEST PROCEDURE

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

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	≥DTS bandwidth(e.g. 1 MHz for BLE)
VBW	≥3 × RBW
Span	3 x RBW
Trace	Max hold
Sweep time	Auto couple.

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

TEST SETUP

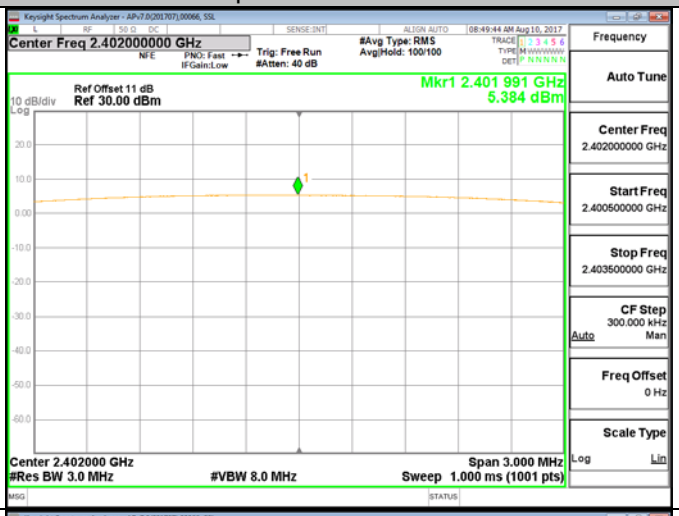
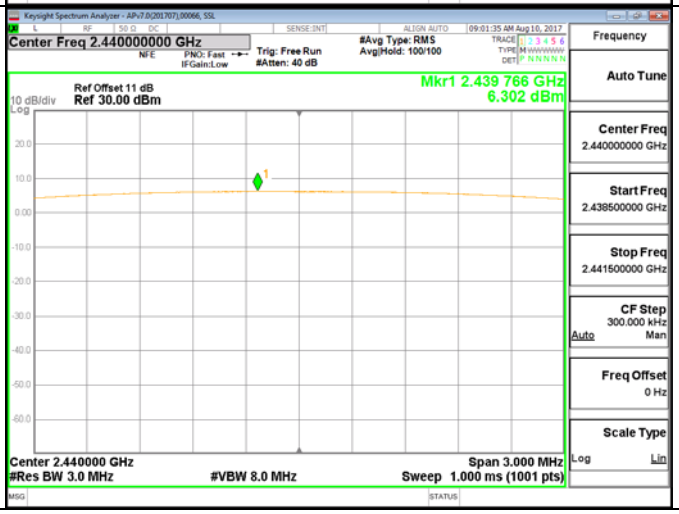


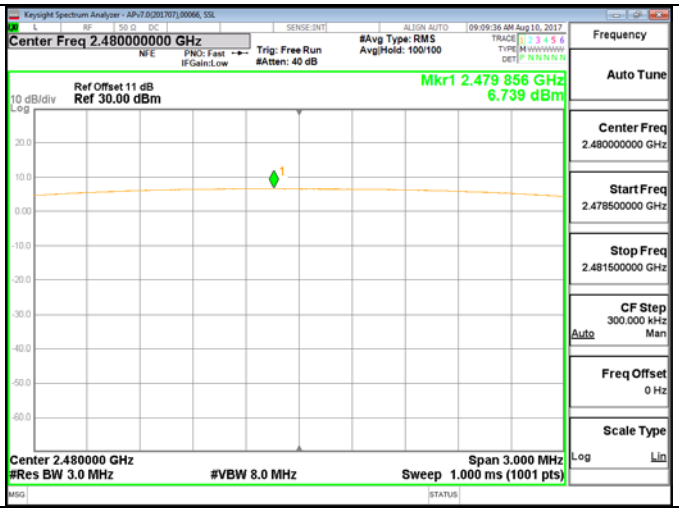
RESULTS

Test Channel	Frequency	Maximum Conducted Output Power(PK)	EIRP	LIMIT
	(MHz)	(dBm)	(dBm)	dBm
CH00	2402	5.38	8.08	30
CH19	2440	6.30	9.00	30
CH39	2480	6.74	9.44	30

Note: EIRP = Maximum Conducted Output Power (PK) + Antenna Gain

Test Graphs

Graphs		
LCH		
MCH		

HCH			

6.4. POWER SPECTRAL DENSITY

LIMITS

FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
FCC §15.247 (e) IC RSS-247 5.2 (2)	Power Spectral Density	8 dBm in any 3 kHz band	2400-2483.5

TEST PROCEDURE

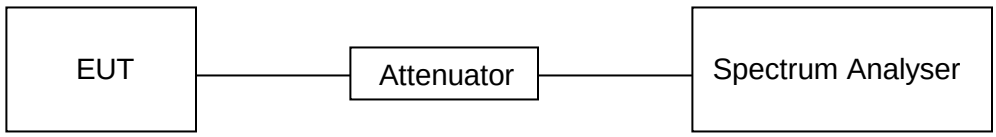
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	3 kHz ≤ RBW ≤ 100kHz
VBW	≥3 × 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 amplitude level within the RBW.

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

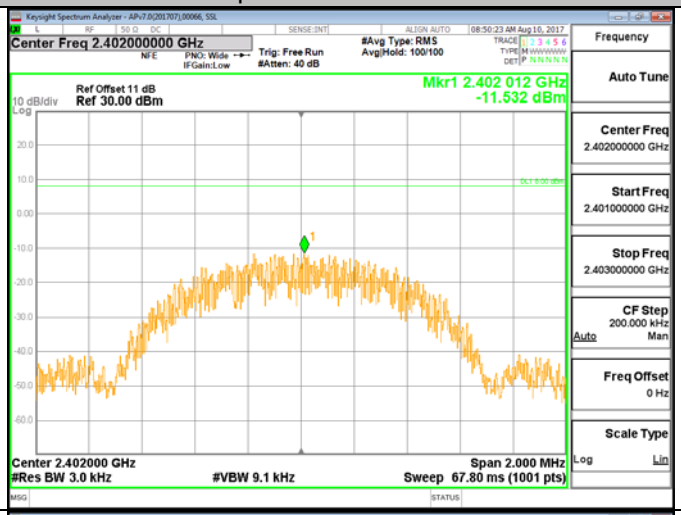
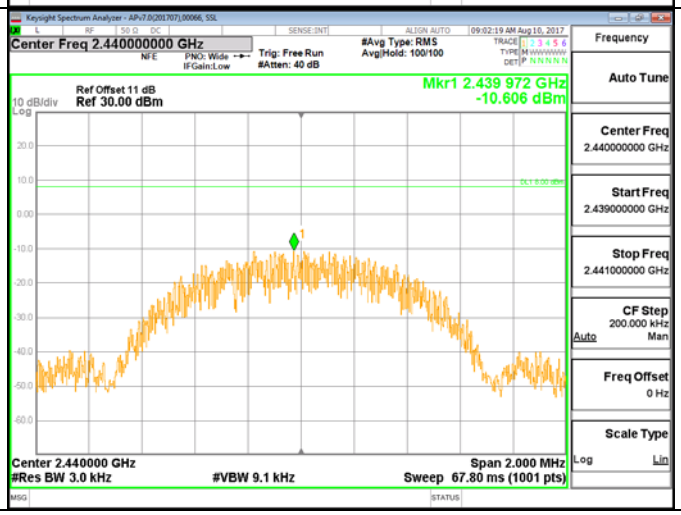
TEST SETUP

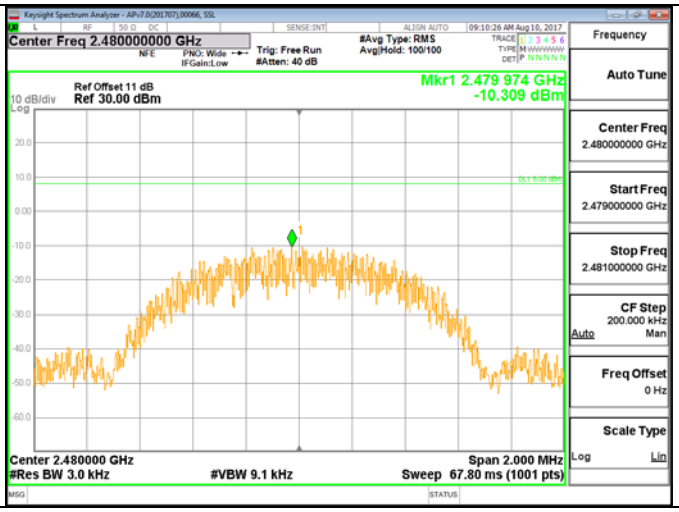


RESULTS

Frequency	Power Spectral Density (dBm)	Limit (dBm)	Result
2402 MHz	-11.53	8	PASS
2440 MHz	-10.61	8	PASS
2480 MHz	-10.31	8	PASS

Test Graphs

Graphs			
LCH			
MCH			

HCH			

6.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC Part15 (15.247) , Subpart C IC RSS-247 ISSUE 2		
Section	Test Item	Limit
FCC §15.247 (d) IC RSS-247 5.5	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

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

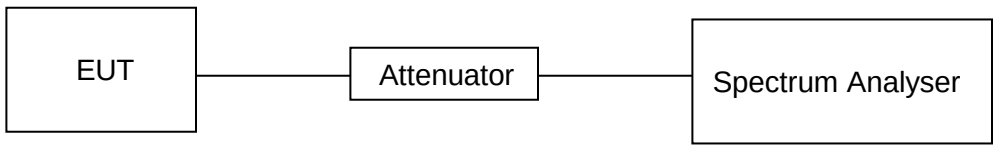
Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100K
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100K
VBW	≥3 × RBW
measurement points	≥span/RBW
Trace	Max hold
Sweep time	Auto couple.

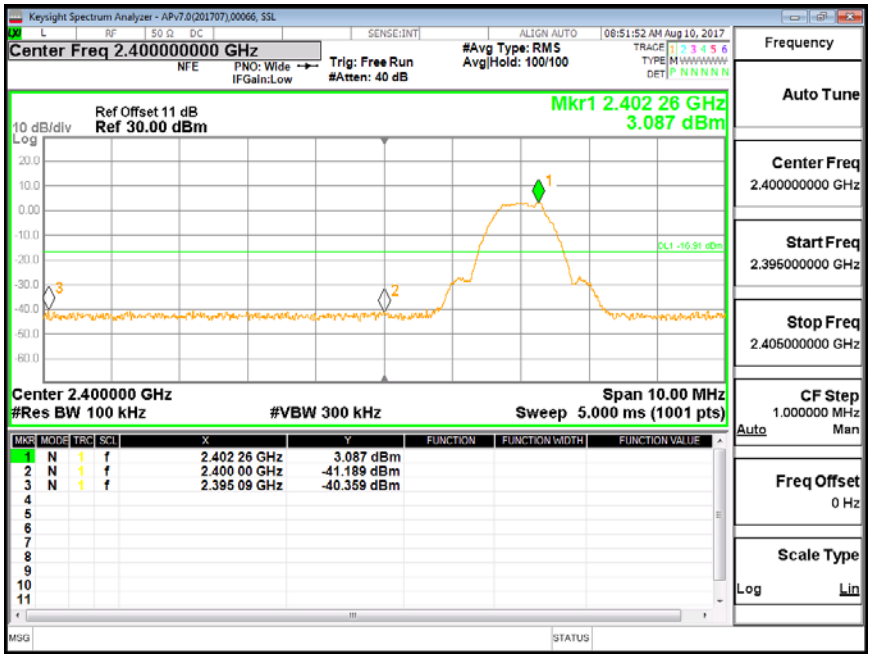
Use the peak marker function to determine the maximum amplitude level**.**

TEST SETUP

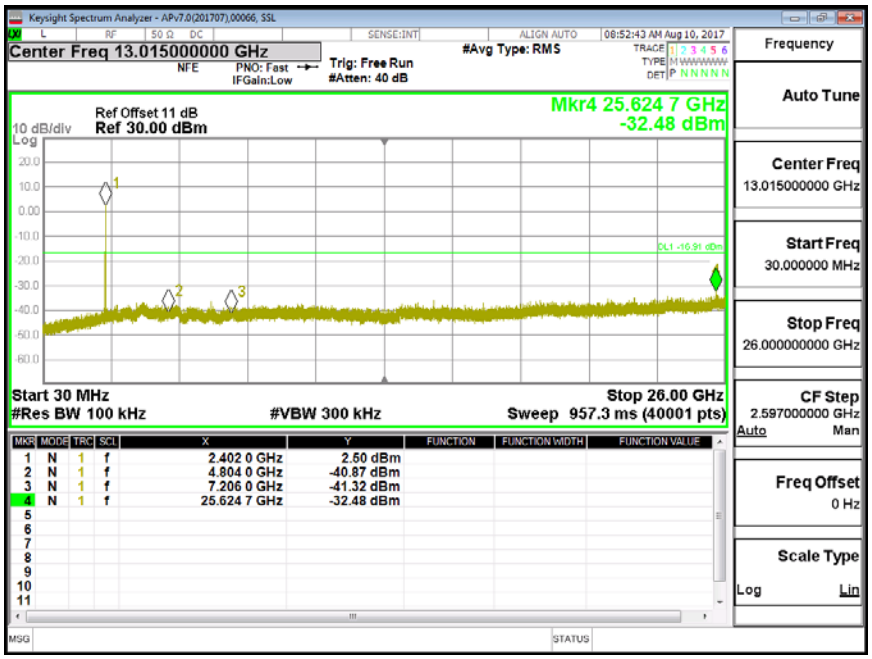


RESULTS

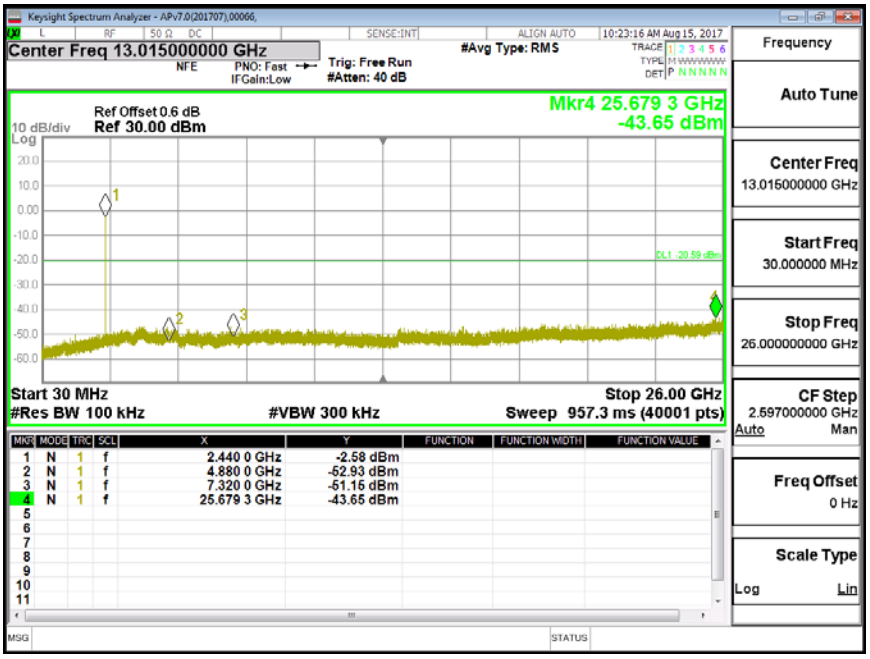
LOW CH BANDEDAGE



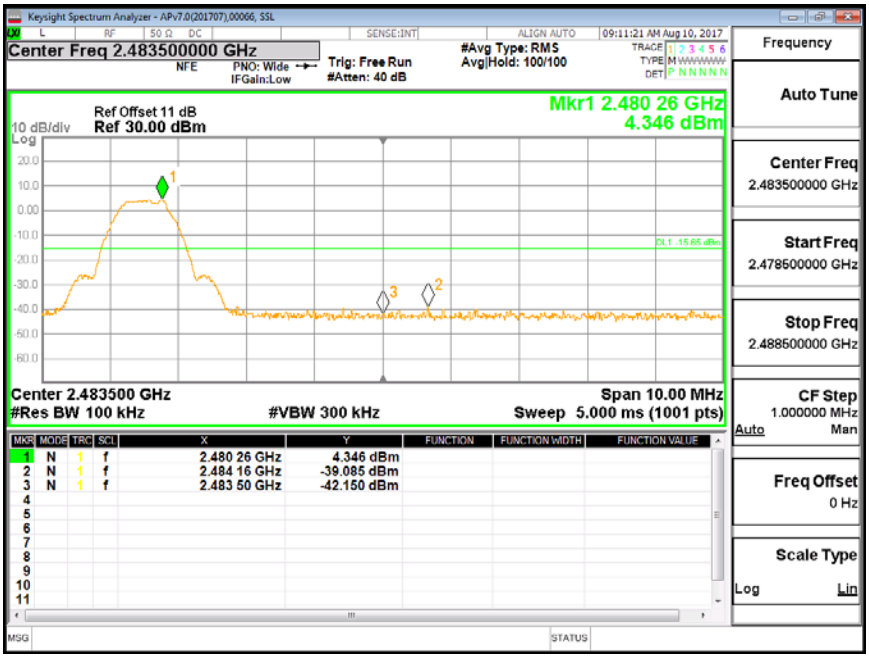
LOW CH SPURIOUS EMISSIONS 30M-26G



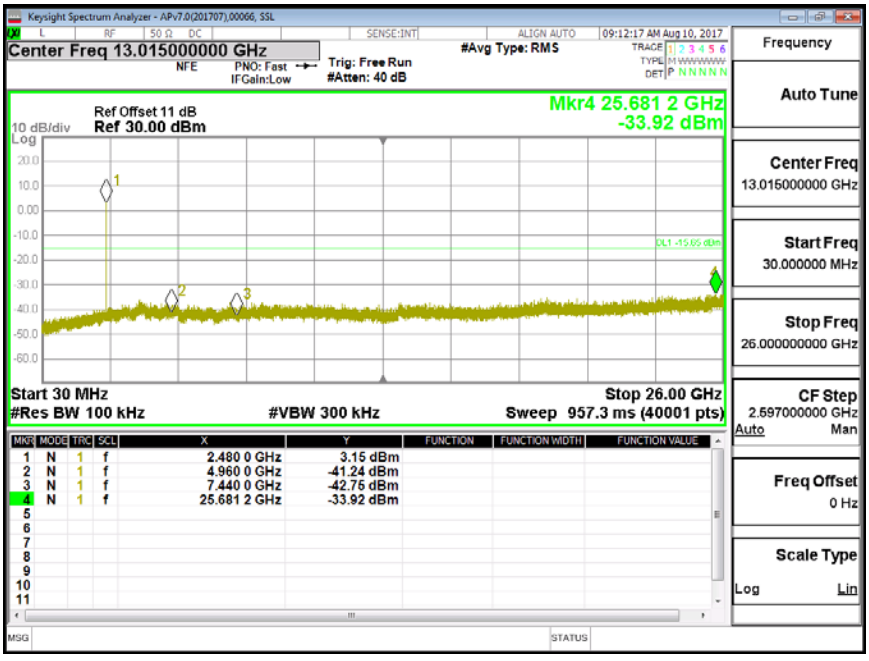
MID CH SPURIOUS EMISSIONS 30M-26G



HIGH CH BANDEDAGE



HIGH CH SPURIOUS EMISSIONS 30M-26G



7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

Please refer to FCC §15.205 and §15.209

Please refer to IC RSS-GEN Clause 8.9 (Transmitter)

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

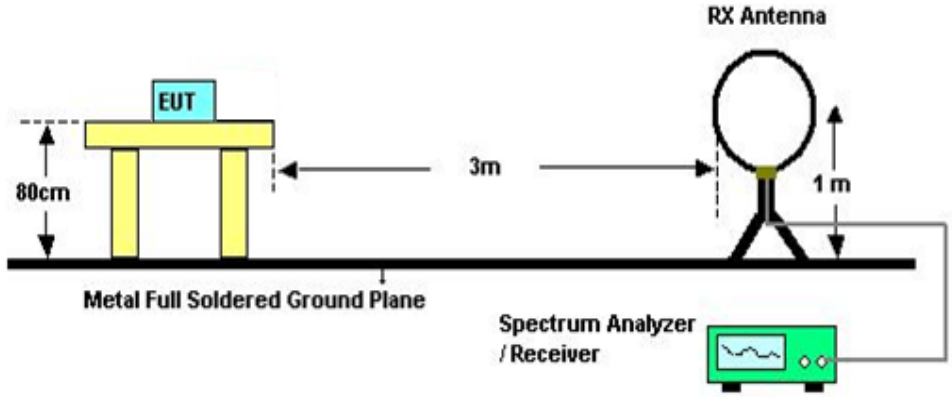
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Radiation Disturbance Test Limit for FCC (Above 1G)

Frequency (MHz)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

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
Detector	Peak/QP/ Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013

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 and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 0.8 meter above ground.

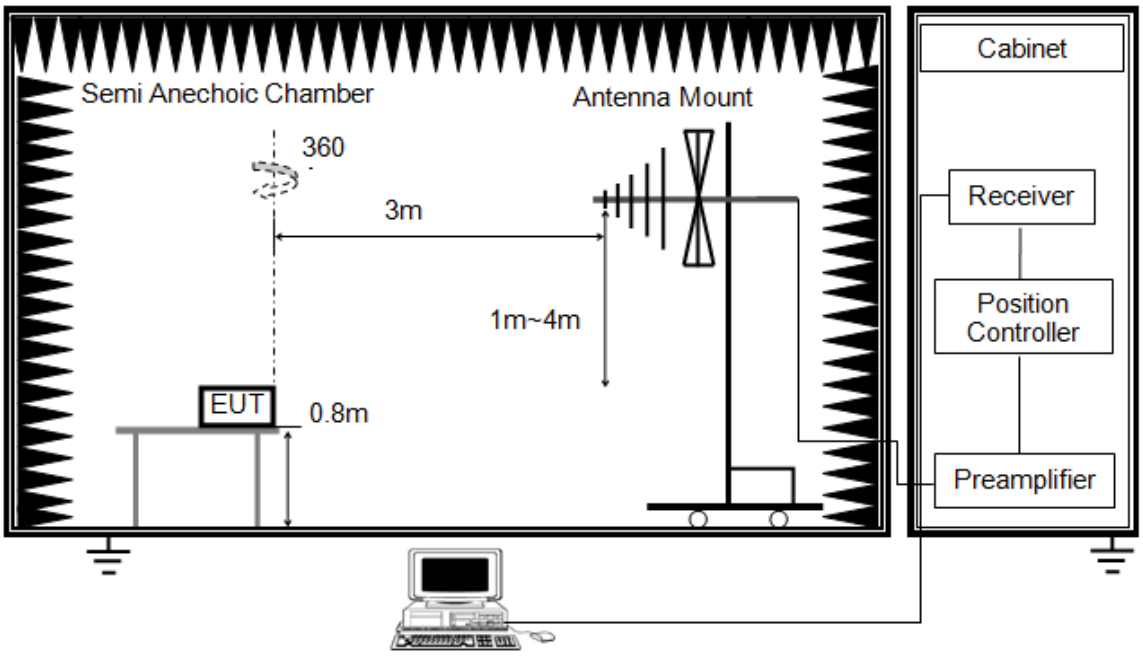
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

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 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.

7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

Below 1G



The setting of the spectrum analyser

RBW	120K
VBW	300K
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

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 0.8m above ground.

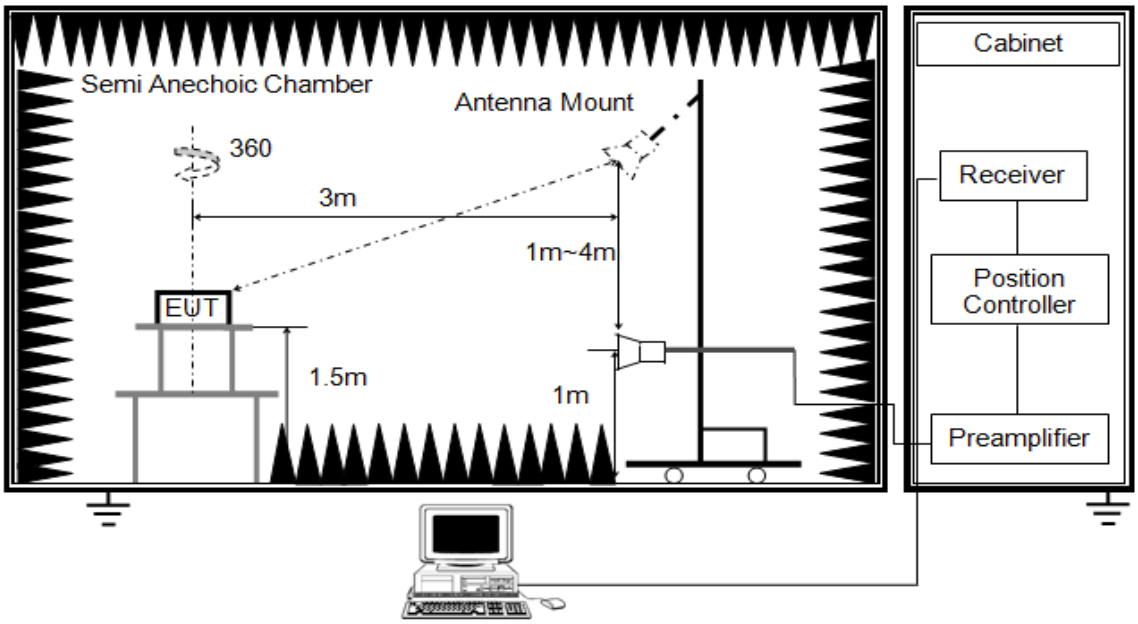
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

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 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.

7. For the actual test configuration, please refer to the related Item in this test report

ABOVE 1G



The setting of the spectrum analyser

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

1. The testing follows the guidelines in ANSI C63.10-2013.

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 1.5m above ground.

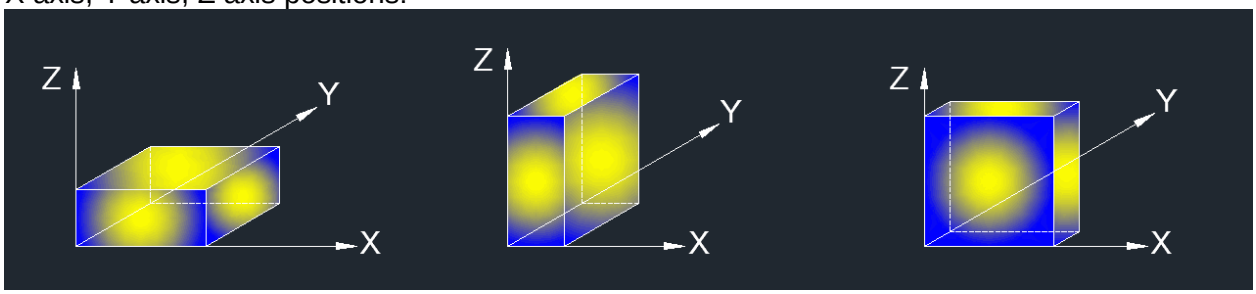
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

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 (9.51KHz) video bandwidth with peak detector，max hold to be run for at least 50 x (1/duty cycle) traces for average measurements.

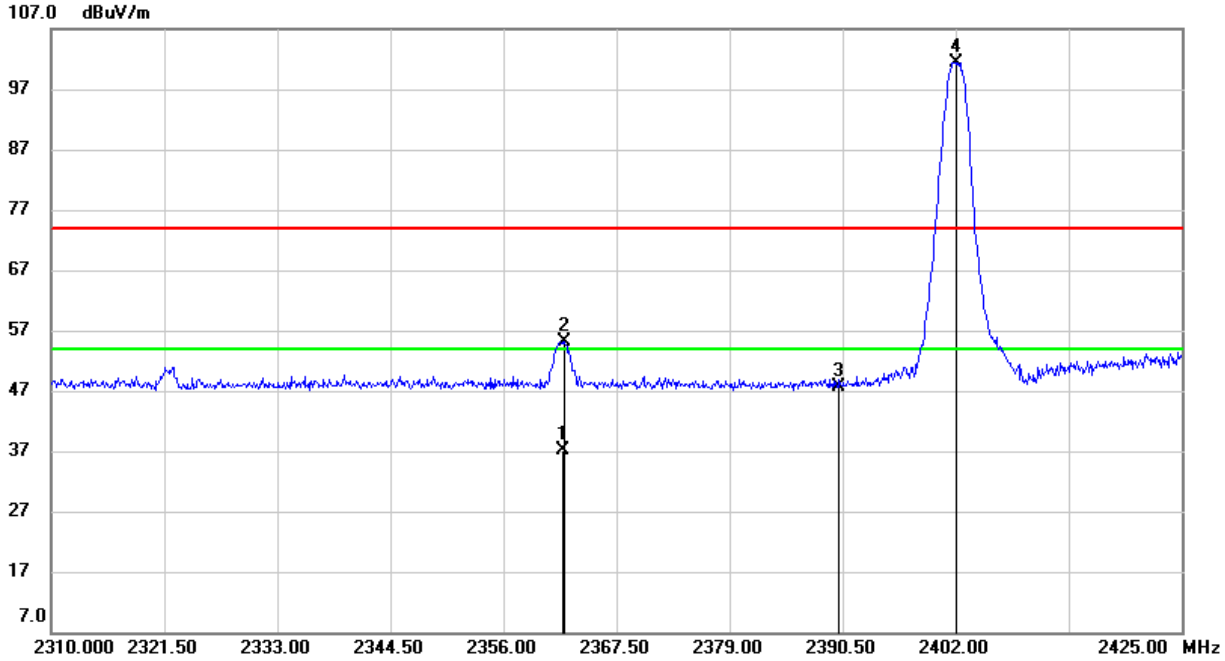
8. For the actual test configuration, please refer to the related item in this test report. (Photographs of the Test Configuration)

X axis, Y axis, Z axis positions:



7.2. RESTRICTED BANDEDGE

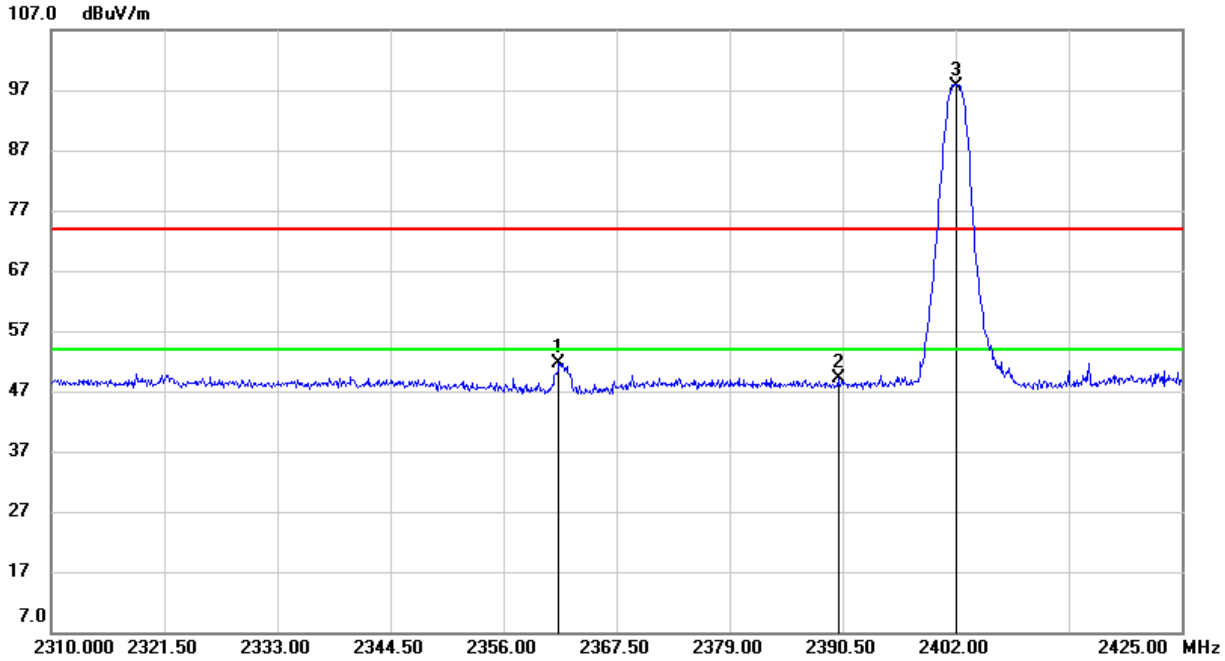
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2361.950	3.82	33.34	37.16	54.00	-16.84	AVG
2	2362.210	21.78	33.34	55.12	74.00	-18.88	peak
3	2390.000	14.50	33.14	47.64	74.00	-26.36	peak
4	2402.000	68.36	33.06	101.42			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. AVG: VBW=1/Ton where: ton is transmit duration.

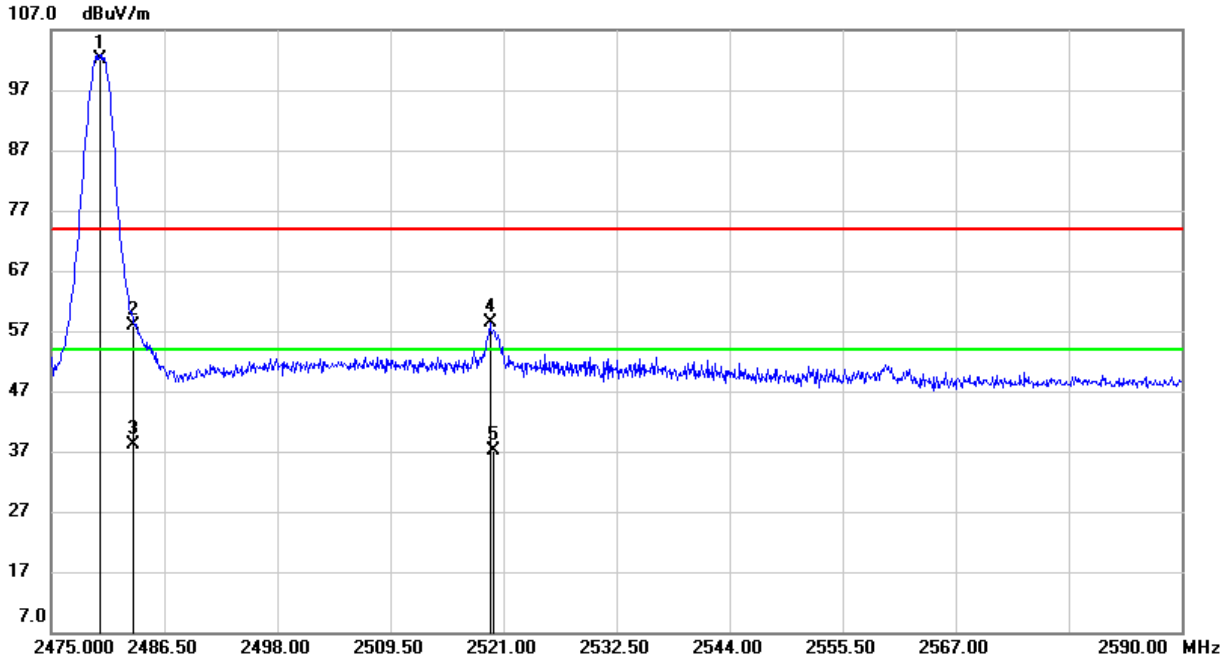
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2361.635	18.22	33.45	51.67	74.00	-22.33	peak
2	2390.000	15.86	33.24	49.10	74.00	-24.90	peak
3	2402.000	64.58	33.16	97.74			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. AVG: VBW=1/Ton where: ton is transmit duration.

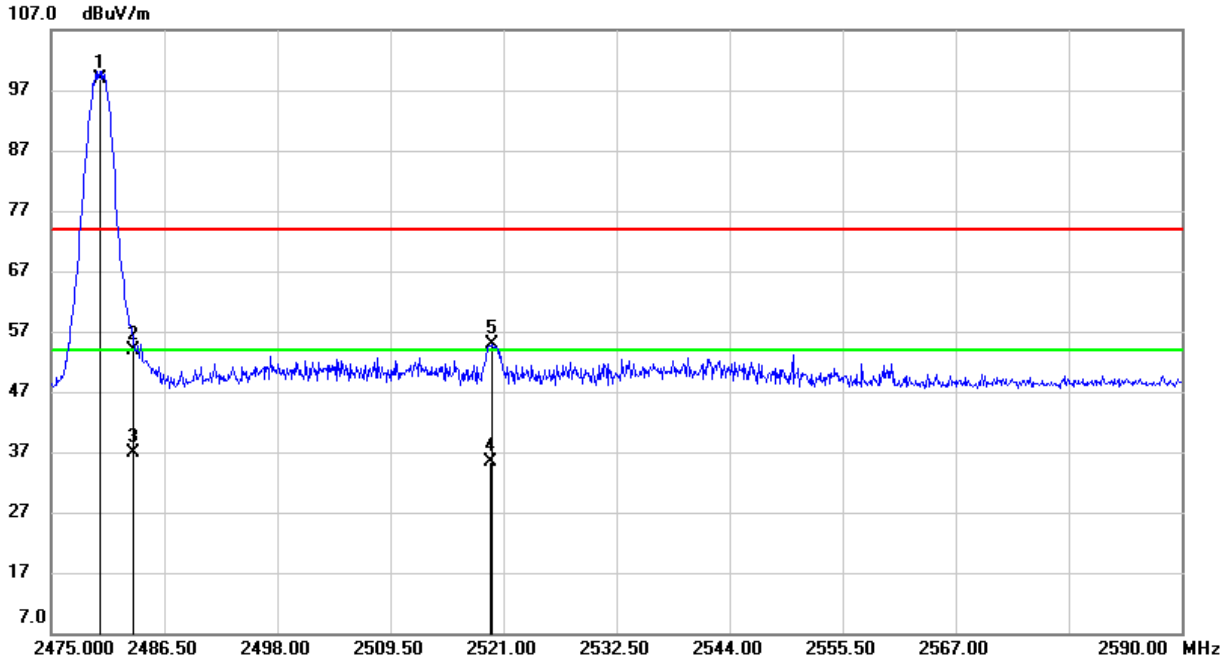
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	69.22	32.79	102.01			peak
2	2483.500	24.98	32.78	57.76	74.00	-16.24	peak
3	2483.500	5.28	32.78	38.06	54.00	-15.94	AVG
4	2519.620	25.54	32.80	58.34	74.00	-15.66	peak
5	2519.880	4.44	32.80	37.24	54.00	-16.76	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. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



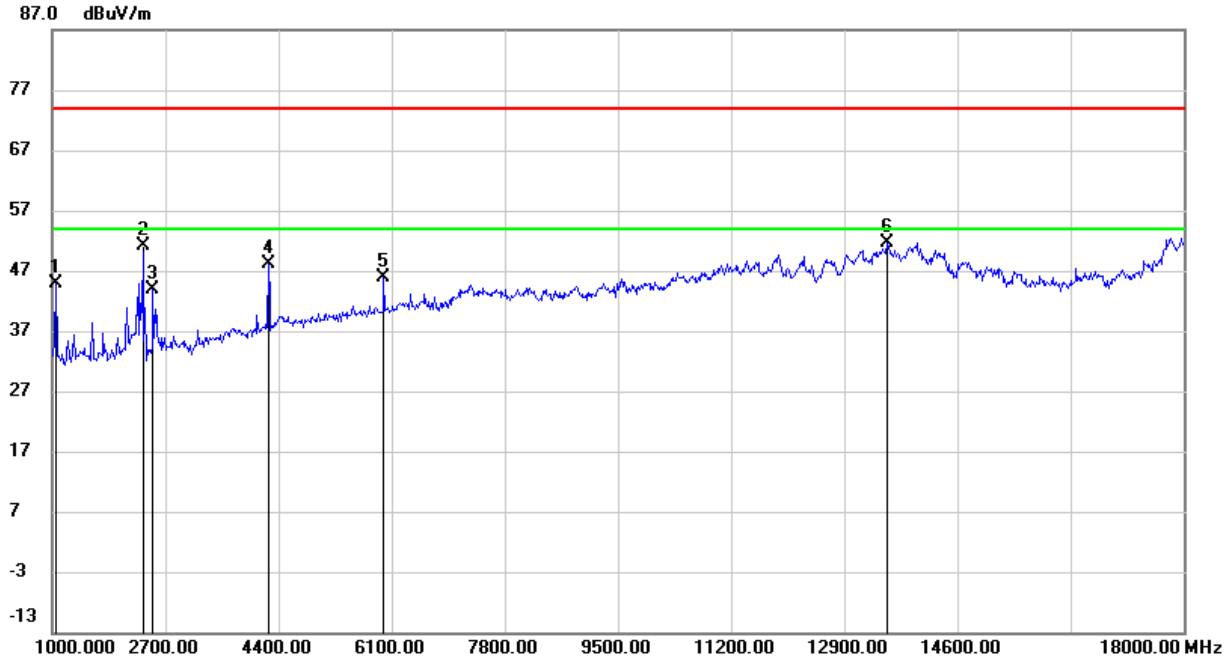
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	66.04	32.89	98.93			peak
2	2483.500	20.95	32.88	53.83	74.00	-20.17	peak
3	2483.500	3.98	32.88	36.86	54.00	-17.14	AVG
4	2519.630	2.39	32.90	35.29	54.00	-18.71	AVG
5	2519.850	22.01	32.90	54.91	74.00	-19.09	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. AVG: VBW=1/Ton where: ton is transmit duration.

7.3. SPURIOUS EMISSIONS (1~18GHz)

HARMONICS AND SPURIOUS EMISSIONS

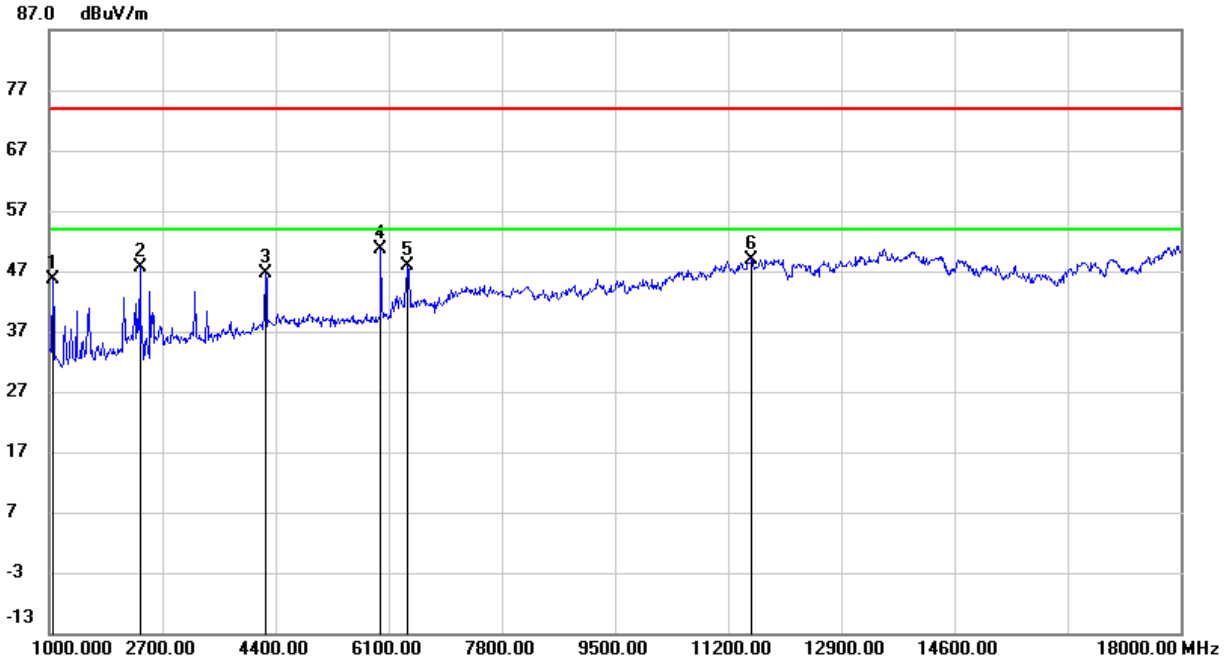
EUT:	Cubinote	Polarization :	Horizontal
Test Mode:	Low Chanel		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1051.000	58.98	-14.11	44.87	74.00	-29.13	peak
2	2360.000	59.88	-8.72	51.16	74.00	-22.84	peak
3	2513.000	53.12	-9.19	43.93	74.00	-30.07	peak
4	4247.000	51.41	-3.36	48.05	74.00	-25.95	peak
5	5981.000	43.89	1.89	45.78	74.00	-28.22	peak
6	13546.000	32.90	18.78	51.68	74.00	-22.32	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. AVG: VBW=1/Ton where: ton is transmit duration.

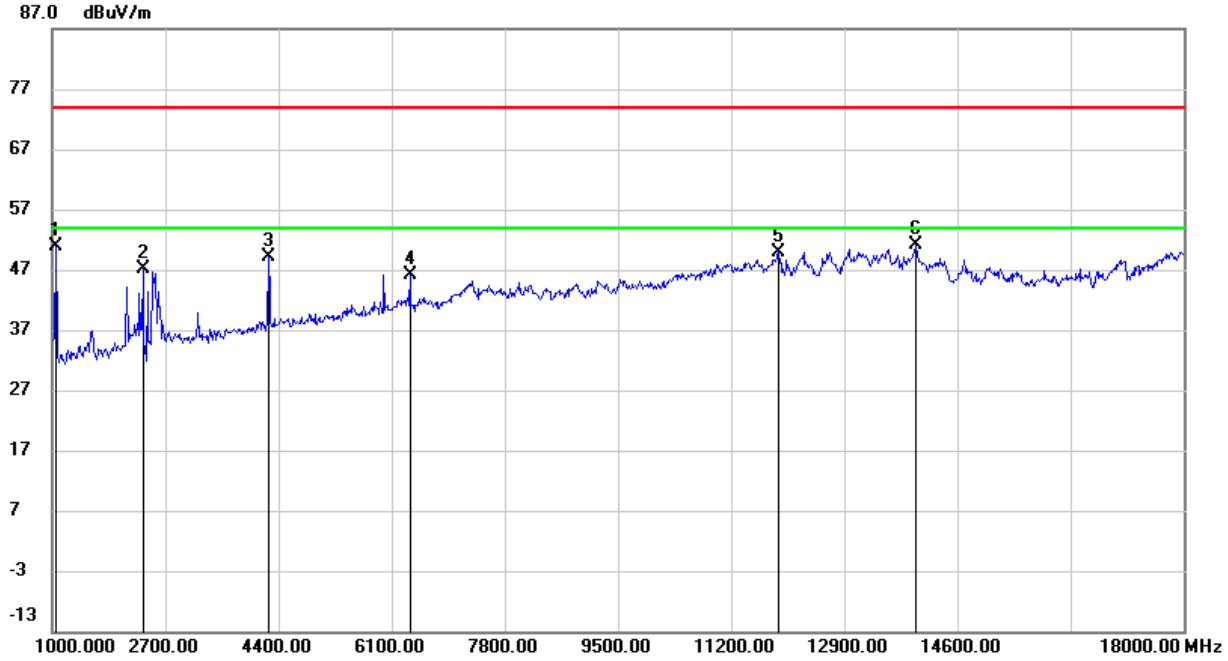
EUT:	Cubinote	Polarization :	Vertical
Test Mode:	Low Chanel		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1051.000	60.07	-14.41	45.66	74.00	-28.34	peak
2	2360.000	56.17	-8.62	47.55	74.00	-26.45	peak
3	4247.000	49.93	-3.26	46.67	74.00	-27.33	peak
4	5981.000	48.66	1.99	50.65	74.00	-23.35	peak
5	6389.000	44.76	3.11	47.87	74.00	-26.13	peak
6	11557.000	34.51	14.49	49.00	74.00	-25.00	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. AVG: VBW=1/Ton where: ton is transmit duration.

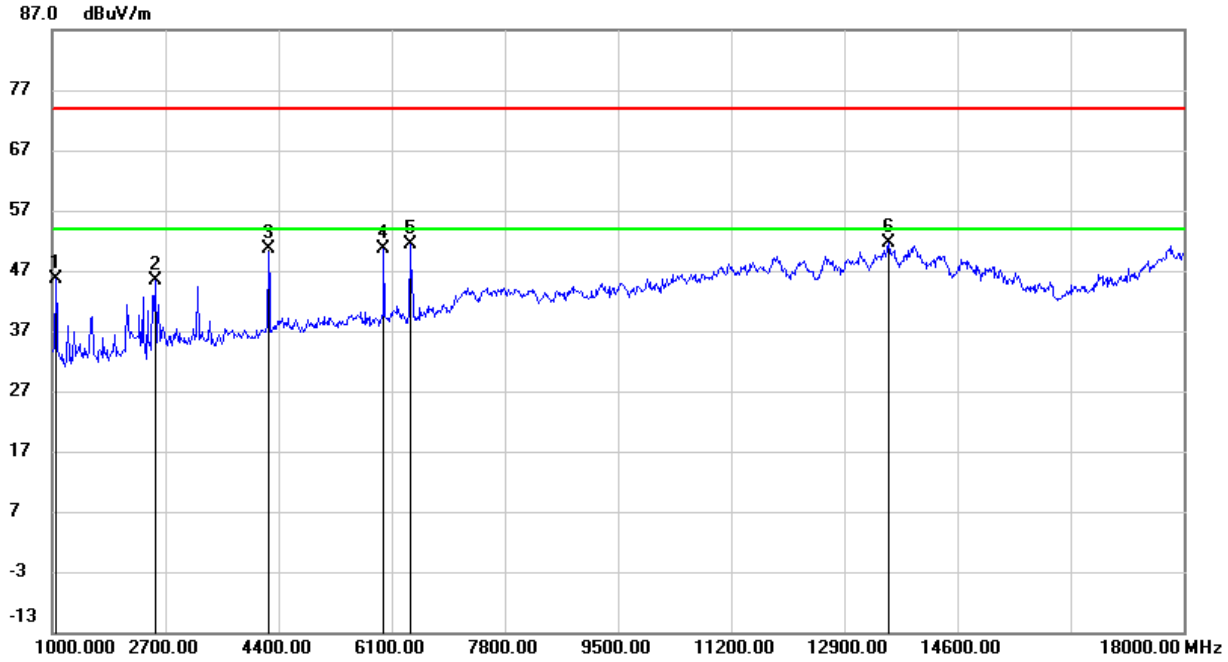
EUT:	Cubinote	Polarization :	Horizontal
Test Mode:	Middle Chanel		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1051.000	64.89	-14.11	50.78	74.00	-23.22	peak
2	2360.000	55.95	-8.72	47.23	74.00	-26.77	peak
3	4247.000	52.58	-3.36	49.22	74.00	-24.78	peak
4	6372.000	43.15	3.03	46.18	74.00	-27.82	peak
5	11914.000	34.54	15.37	49.91	74.00	-24.09	peak
6	13971.000	32.11	18.93	51.04	74.00	-22.96	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. AVG: VBW=1/Ton where: ton is transmit duration.

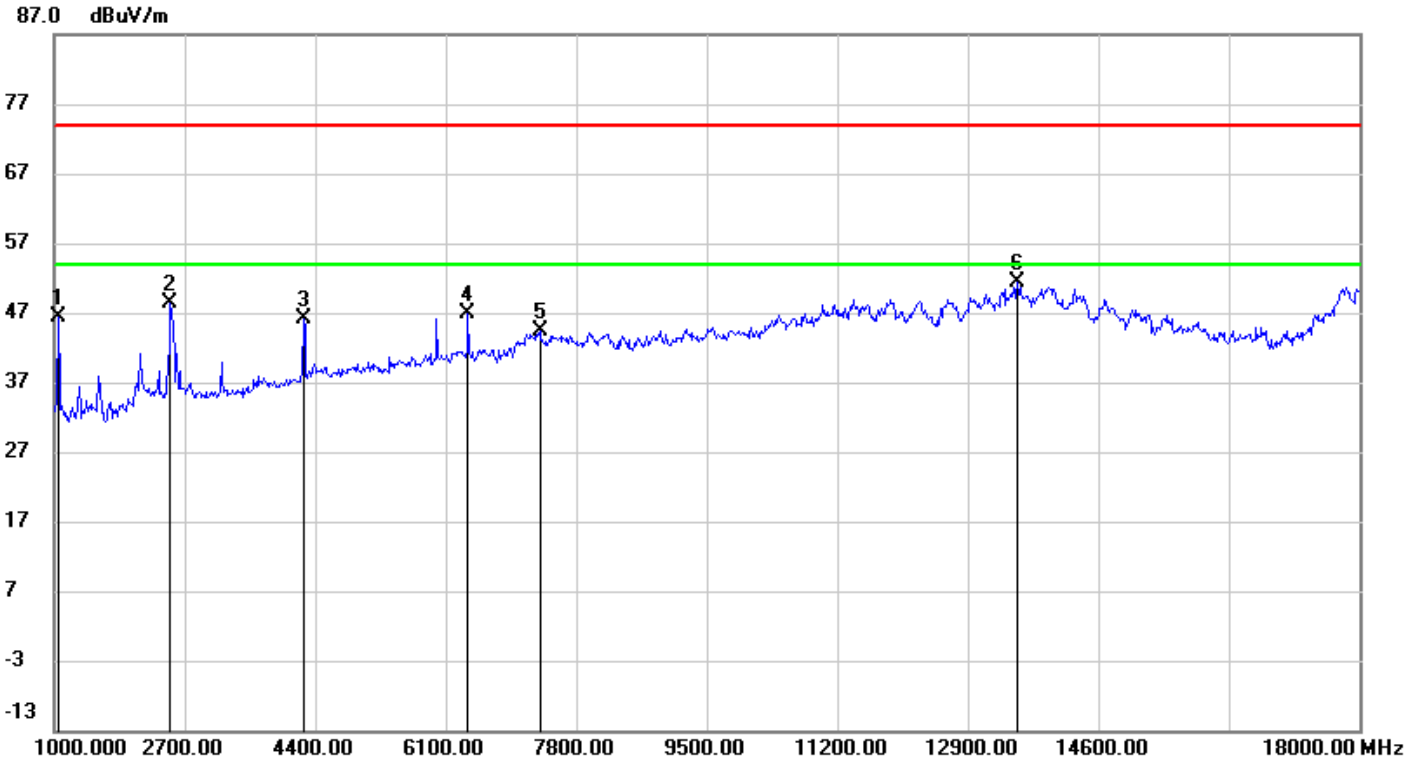
EUT:	Cubinote	Polarization :	Vertical
Test Mode:	Middle Chanel		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1051.000	60.12	-14.41	45.71	74.00	-28.29	peak
2	2547.000	54.36	-9.02	45.34	74.00	-28.66	peak
3	4247.000	53.89	-3.26	50.63	74.00	-23.37	peak
4	5981.000	48.61	1.99	50.60	74.00	-23.40	peak
5	6372.000	48.34	3.07	51.41	74.00	-22.59	peak
6	13563.000	32.28	19.25	51.53	74.00	-22.47	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. AVG: VBW=1/Ton where: ton is transmit duration.

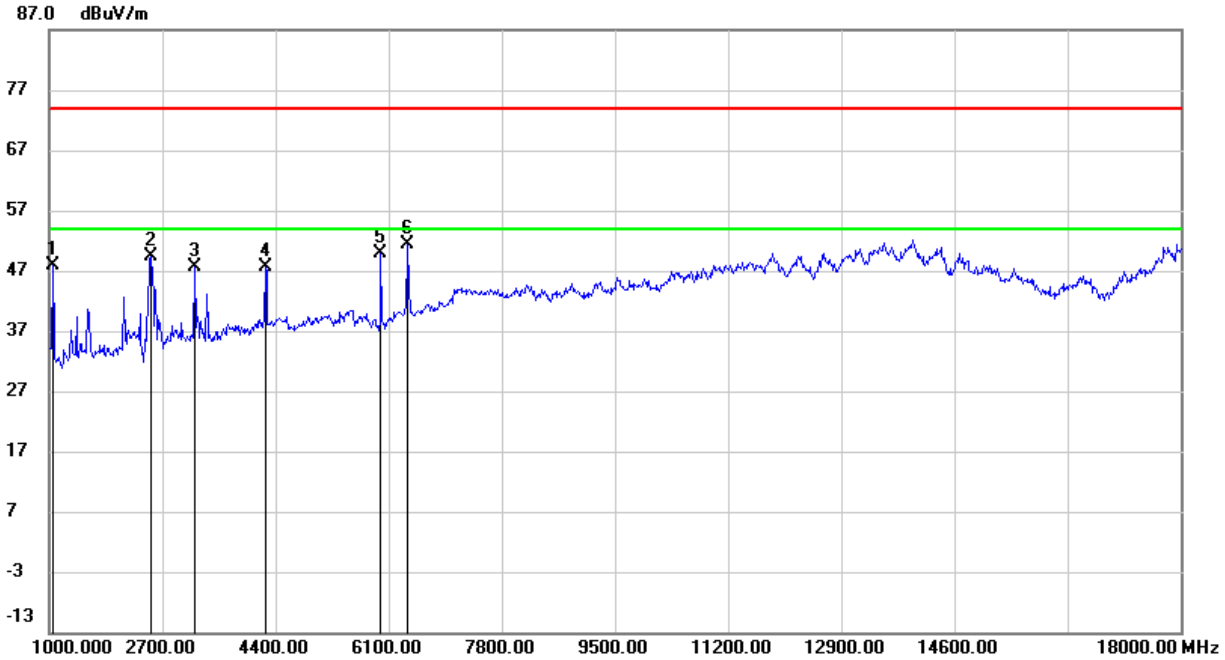
EUT:	Cubinote	Polarization :	Horizontal
Test Mode:	High Chanel		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1051.000	60.50	-14.11	46.39	74.00	-27.61	peak
2	2513.000	57.59	-9.19	48.40	74.00	-25.60	peak
3	4247.000	49.48	-3.36	46.12	74.00	-27.88	peak
4	6389.000	43.76	3.03	46.79	74.00	-27.21	peak
5	7324.000	38.57	5.72	44.29	74.00	-29.71	peak
6	13546.000	32.50	18.78	51.28	74.00	-22.72	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. AVG: VBW=1/Ton where: ton is transmit duration.

EUT:	Cubinote	Polarization :	Vertical
Test Mode:	High Chanel		



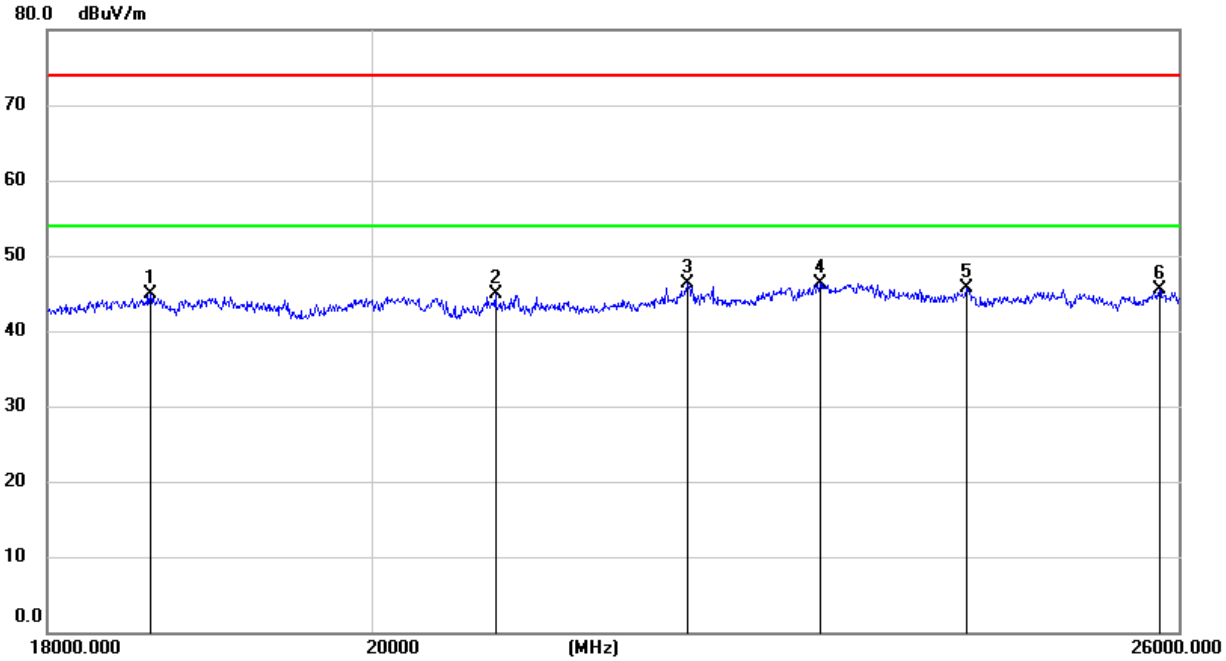
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1051.000	62.21	-14.41	47.80	74.00	-26.20	peak
2	2530.000	58.34	-9.05	49.29	74.00	-24.71	peak
3	3176.000	53.94	-6.42	47.52	74.00	-26.48	peak
4	4247.000	50.86	-3.26	47.60	74.00	-26.40	peak
5	5981.000	47.93	1.99	49.92	74.00	-24.08	peak
6	6389.000	48.27	3.11	51.38	74.00	-22.62	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. AVG: VBW=1/Ton where: ton is transmit duration.

7.4. SPURIOUS EMISSIONS (18~25GHz)

HARMONICS AND SPURIOUS EMISSIONS

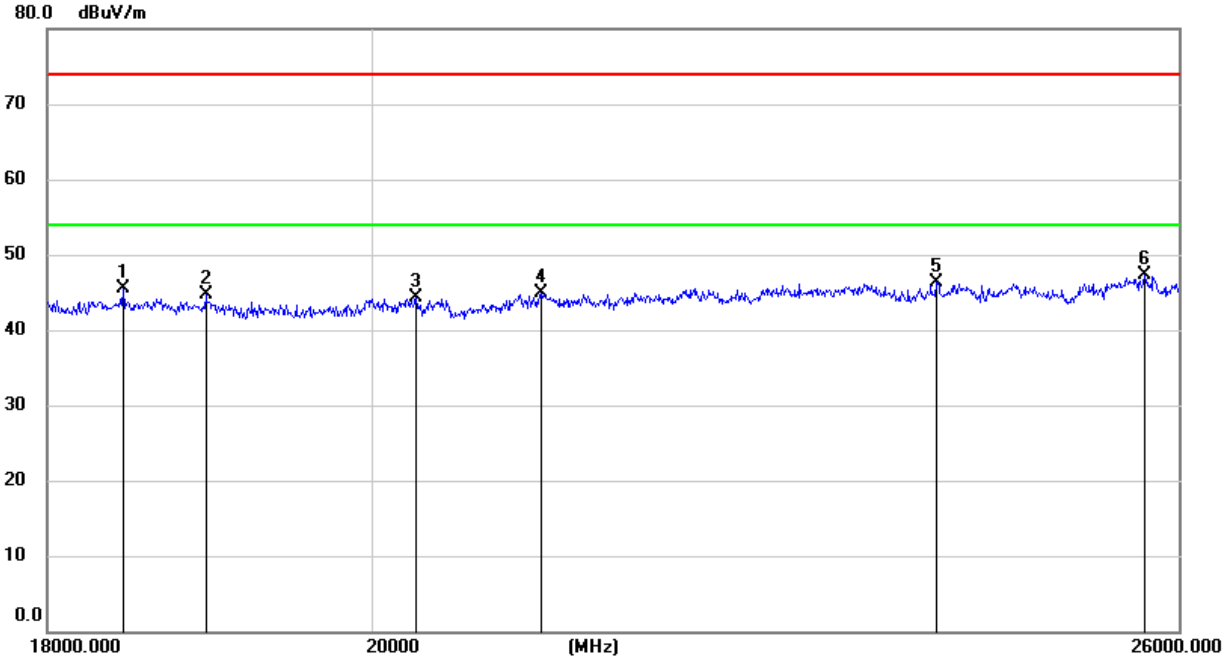
EUT:	Cubinote	Polarization :	Horizontal
Test Mode:	Middle Chanel		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18612.524	50.24	-5.34	44.90	74.00	-29.10	peak
2	20821.597	49.97	-5.04	44.93	74.00	-29.07	peak
3	22164.768	50.64	-4.31	46.33	74.00	-27.67	peak
4	23139.192	49.65	-3.40	46.25	74.00	-27.75	peak
5	24263.284	48.61	-2.81	45.80	74.00	-28.20	peak
6	25837.973	46.26	-0.76	45.50	74.00	-28.50	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. AVG: VBW=1/Ton where: ton is transmit duration.

EUT:	Cubinote	Polarization :	Vertical
Test Mode:	Middle Chanel		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18448.984	50.77	-5.32	45.45	74.00	-28.55	peak
2	18950.934	49.99	-5.26	44.73	74.00	-29.27	peak
3	20292.473	49.95	-5.57	44.38	74.00	-29.62	peak
4	21137.897	49.63	-4.82	44.81	74.00	-29.19	peak
5	24032.412	49.12	-2.75	46.37	74.00	-27.63	peak
6	25714.751	48.15	-0.77	47.38	74.00	-26.62	peak

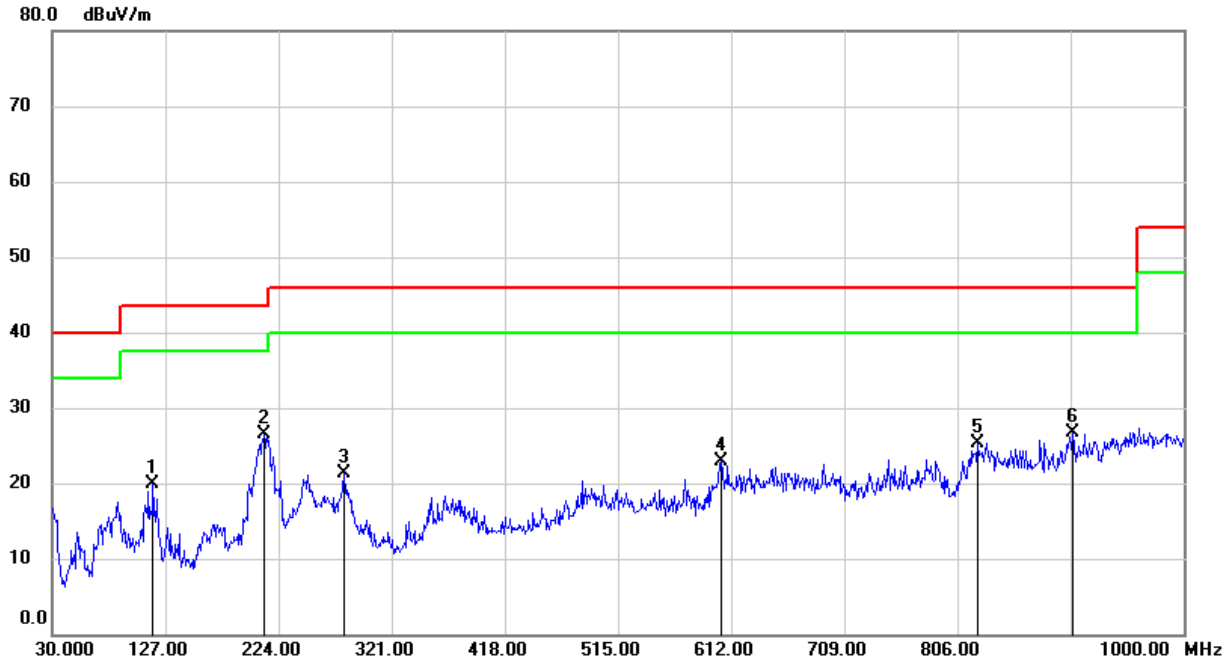
Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton where: ton is transmit duration.

Note: All the modulation and channels had been tested, but only the worst data recorded in the report.

7.5. SPURIOUS EMISSIONS 30M ~ 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

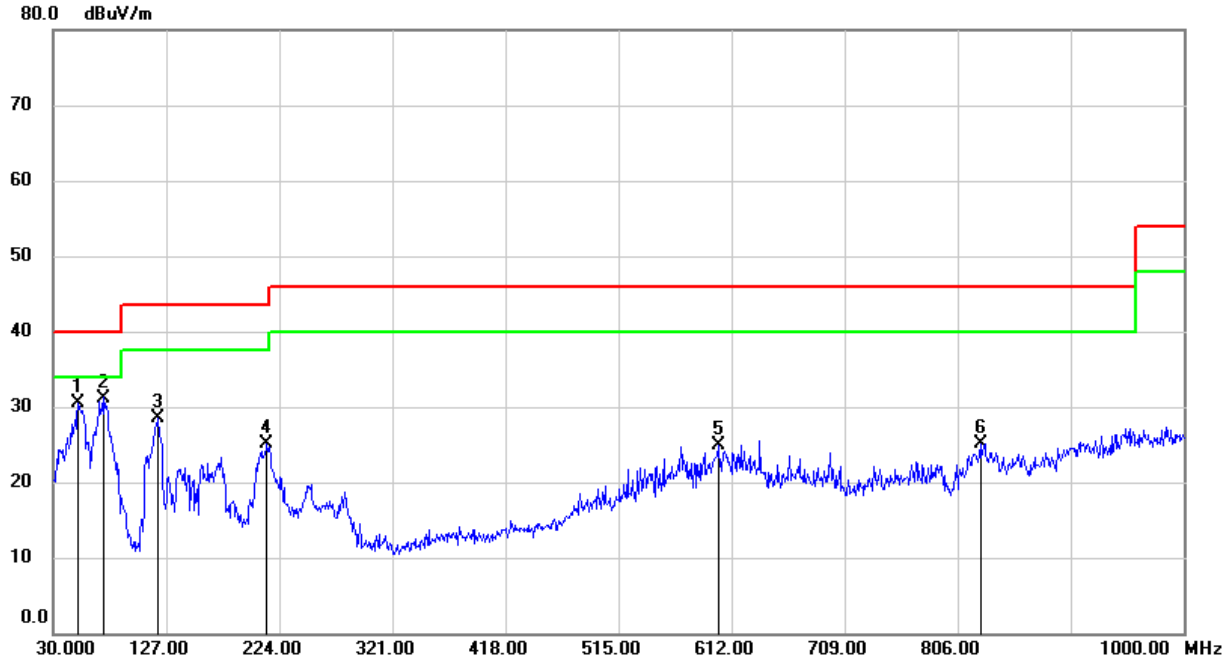
EUT:	Cubinote	Polarization :	Horizontal
Test Mode:	Middle Channel		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	116.3300	36.32	-16.42	19.90	43.50	-23.60	QP
2	211.3900	39.10	-12.69	26.41	43.50	-17.09	QP
3	280.2600	33.67	-12.39	21.28	46.00	-24.72	QP
4	603.2700	29.18	-6.23	22.95	46.00	-23.05	QP
5	823.4600	0.38	24.97	25.35	46.00	-20.65	QP
6	904.9400	1.39	25.37	26.76	46.00	-19.24	QP

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

EUT:	Cubinote	Polarization :	Vertical
Test Mode:	Middle Channel		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	51.3400	46.81	-16.38	30.43	40.00	-9.57	QP
2	72.6800	48.20	-17.00	31.20	40.00	-8.80	QP
3	120.2100	44.30	-15.86	28.44	43.50	-15.06	QP
4	213.3300	37.94	-12.79	25.15	43.50	-18.35	QP
5	600.3600	30.69	-5.88	24.81	46.00	-21.19	QP
6	825.4000	0.16	25.02	25.18	46.00	-20.82	QP

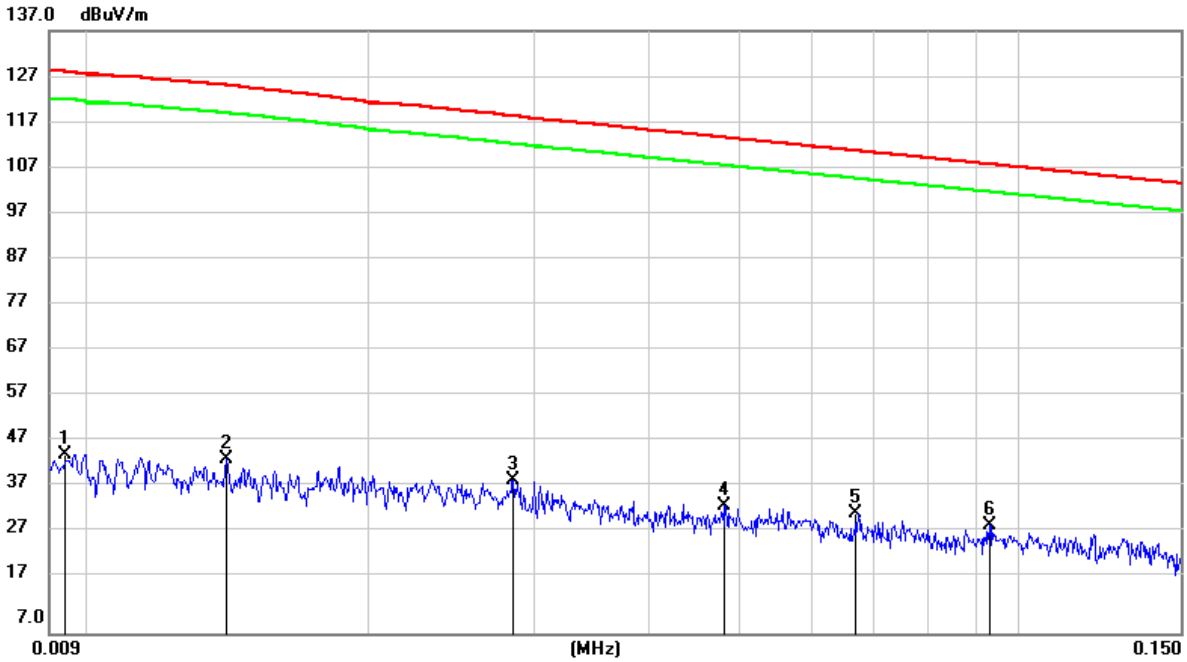
Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

Note: All the modulation and channels had been tested, but only the worst data recorded in the report.

7.6. SPURIOUS EMISSIONS BELOW 30M

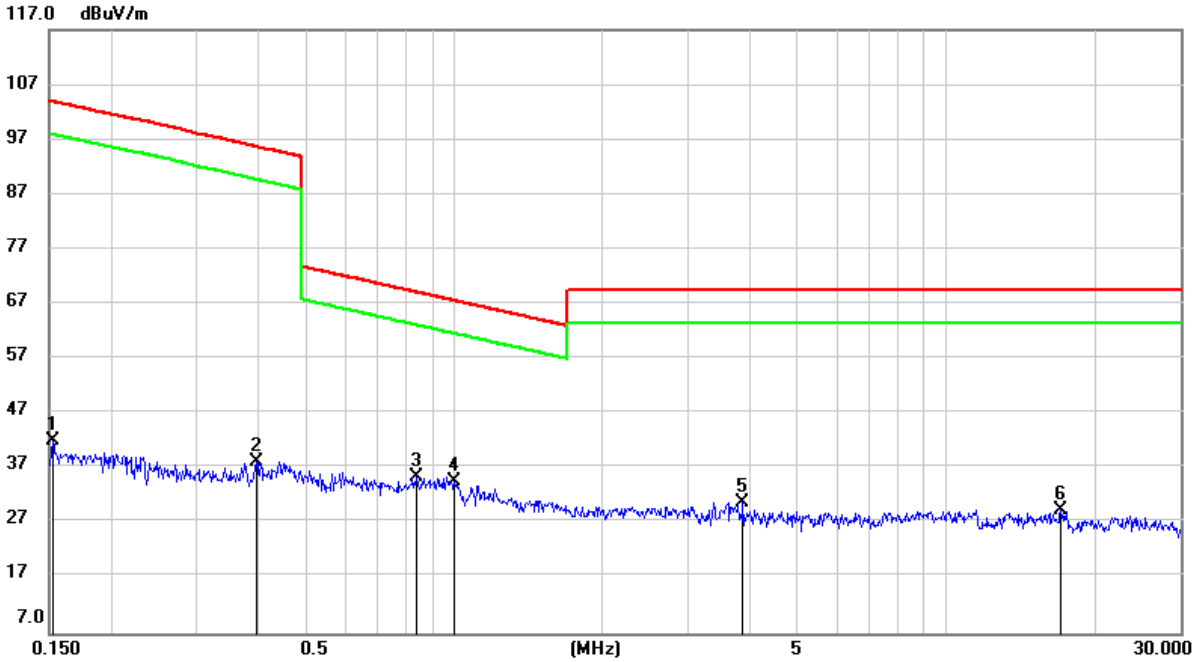
SPURIOUS EMISSIONS Below 30MHz (WORST-CASE CONFIGURATION)

EUT:	Cubinote	Polarization :	Horizontal
Test Mode:	Middle Channel		



No.	Frequency (KHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0094	25.26	20.26	45.52	128.06	-82.54	QP
2	0.0140	24.24	20.25	44.49	125.19	-80.70	QP
3	0.0285	19.83	20.31	40.14	118.59	-78.45	QP
4	0.0483	14.17	20.31	34.48	113.95	-79.47	QP
5	0.0670	12.48	20.31	32.79	111.10	-78.31	QP
6	0.0932	10.00	20.25	30.25	108.23	-77.98	QP

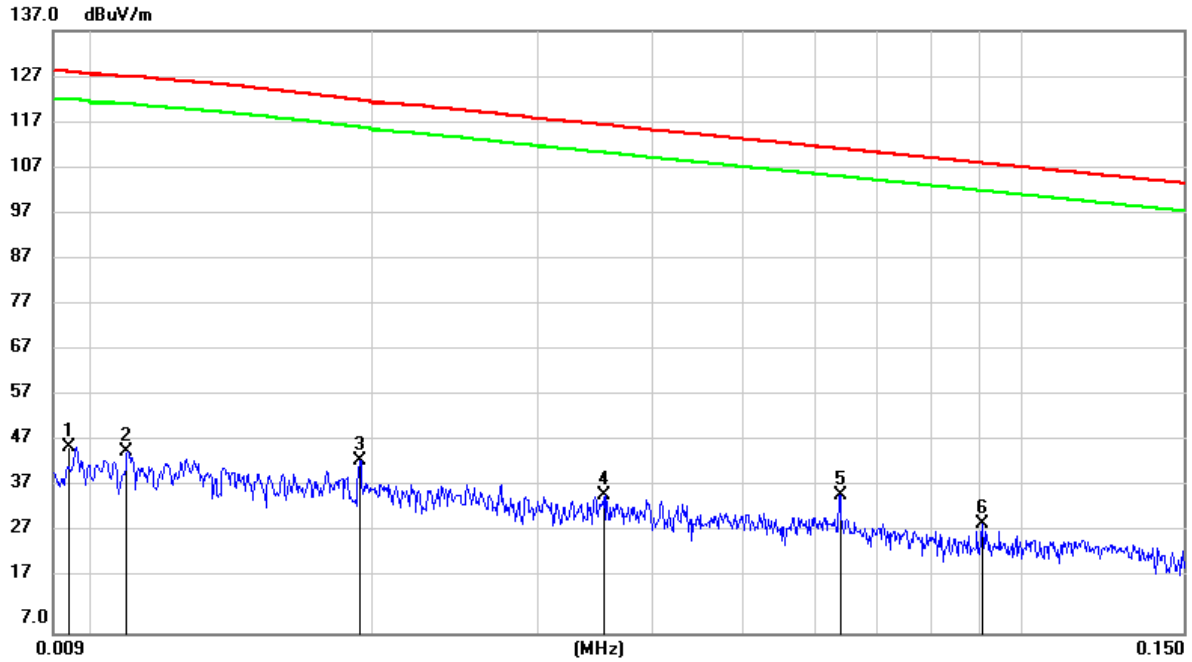
Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1524	21.66	20.42	42.08	103.95	-61.87	QP
2	0.3955	17.99	20.27	38.26	95.67	-57.41	QP
3	0.8393	15.16	20.36	35.52	69.14	-33.62	QP
4	0.9997	14.25	20.37	34.62	67.60	-32.98	QP
5	3.8603	9.74	21.04	30.78	69.54	-38.76	QP
6	17.1082	8.33	20.98	29.31	69.54	-40.23	QP

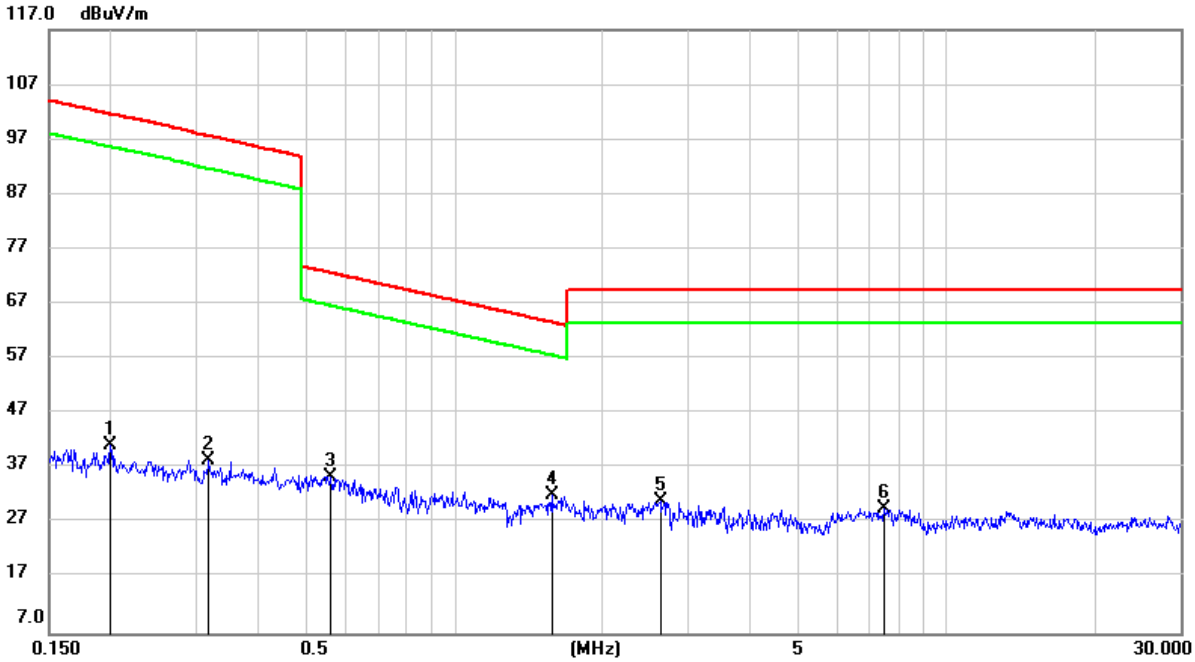
Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

EUT:	Cubinote	Polarization :	Horizontal
Test Mode:	Middle Channel		



No.	Frequency (KHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0094	26.97	20.26	47.23	128.06	-80.83	QP
2	0.0108	25.81	20.22	46.03	127.12	-81.09	QP
3	0.0193	24.03	20.30	44.33	122.00	-77.67	QP
4	0.0354	16.54	20.31	36.85	116.71	-79.86	QP
5	0.0637	16.45	20.31	36.76	111.54	-74.78	QP
6	0.0908	10.42	20.26	30.68	108.45	-77.77	QP

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1995	20.85	20.37	41.22	101.60	-60.38	QP
2	0.3165	18.07	20.30	38.37	97.65	-59.28	QP
3	0.5581	15.30	20.26	35.56	72.71	-37.15	QP
4	1.5766	11.49	20.58	32.07	63.65	-31.58	QP
5	2.6221	10.13	20.83	30.96	69.54	-38.58	QP
6	7.4858	8.69	20.94	29.63	69.54	-39.91	QP

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

Note: All the modulation and channels had been tested, but only the worst data recorded in the report.

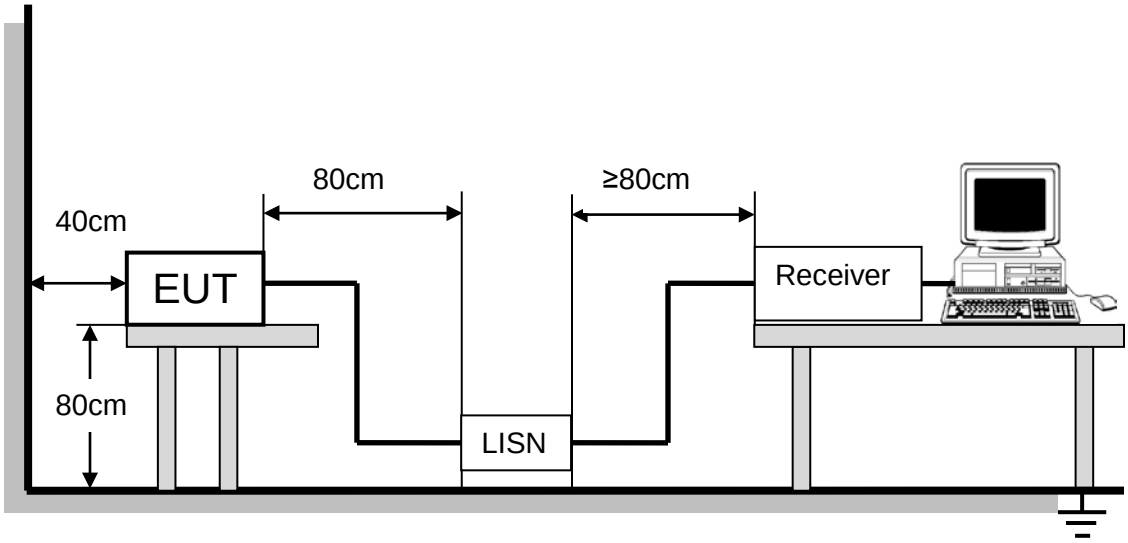
8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

Please refer to FCC §15.207 (a) and RSS-Gen Clause 8.8

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

TEST SETUP AND PROCEDURE

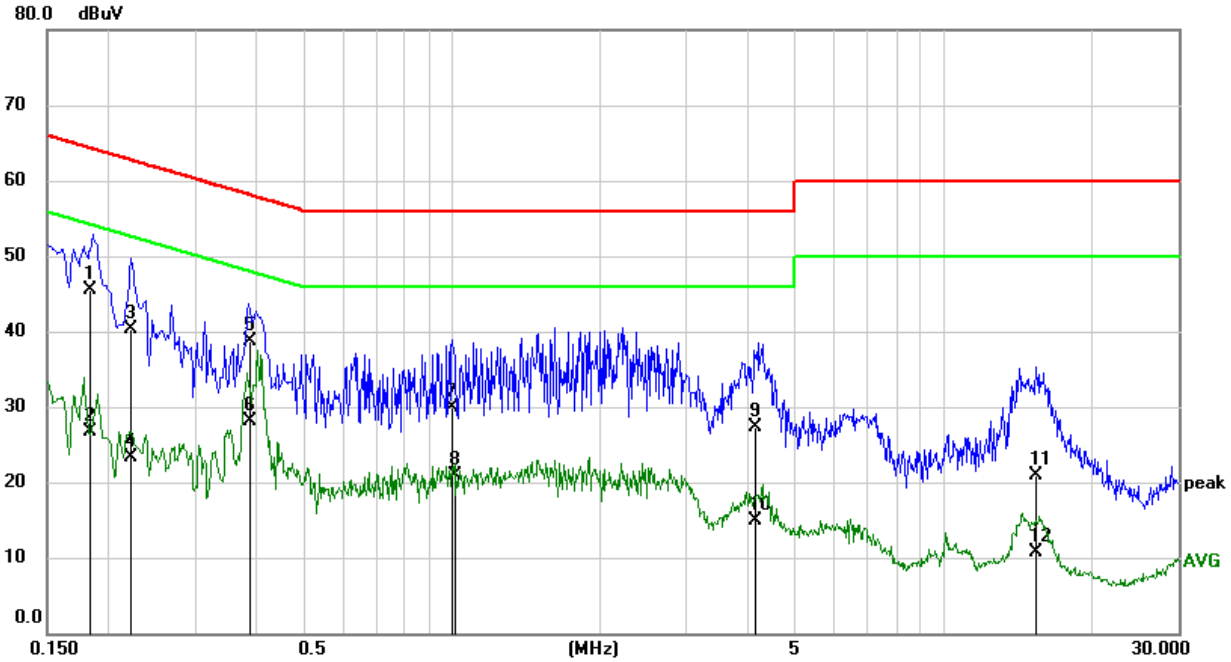


The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) 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 RESULTS (WORST-CASE CONFIGURATION)

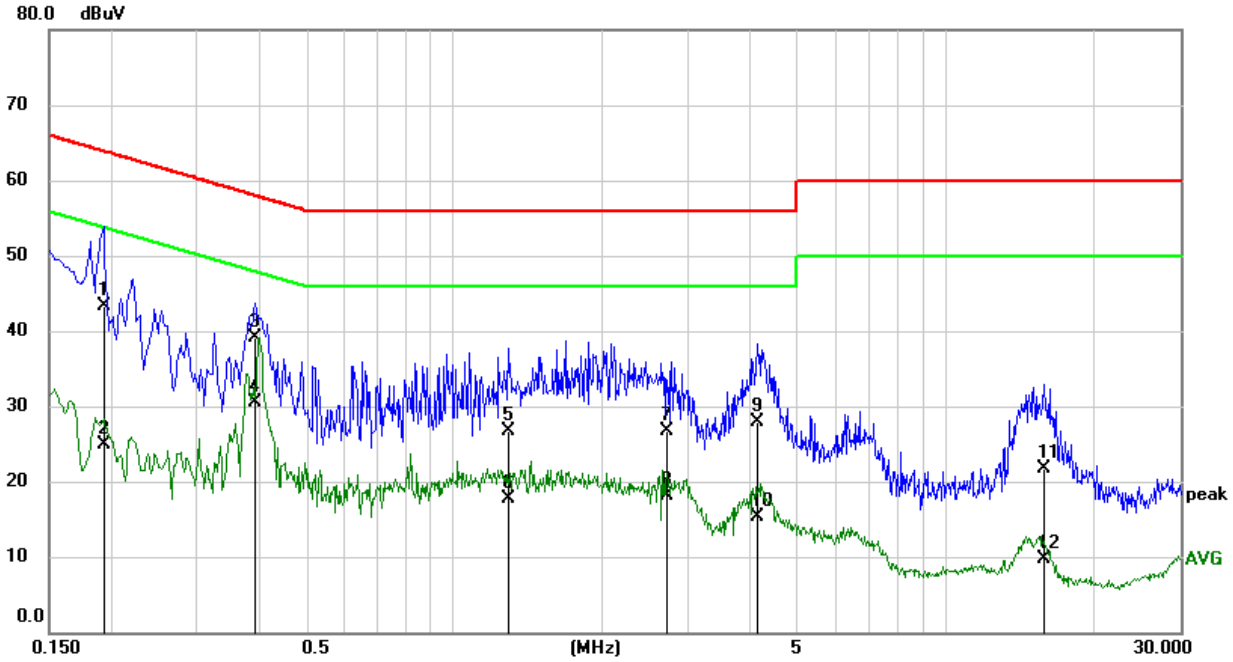
EUT:	Cubinote	Phase :	L
Test Mode:	Middle Channel		



No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1830	35.84	9.66	45.50	64.35	-18.85	QP
2	0.1830	16.96	9.66	26.62	54.35	-27.73	AVG
3	0.2229	30.56	9.65	40.21	62.71	-22.50	QP
4	0.2229	13.67	9.65	23.32	52.71	-29.39	AVG
5	0.3871	29.08	9.65	38.73	58.13	-19.40	QP
6	0.3871	18.36	9.65	28.01	48.13	-20.12	AVG
7	1.0020	20.18	9.66	29.84	56.00	-26.16	QP
8	1.0140	11.16	9.66	20.82	46.00	-25.18	AVG
9	4.1470	17.69	9.71	27.40	56.00	-28.60	QP
10	4.1470	5.12	9.71	14.83	46.00	-31.17	AVG
11	15.4378	11.13	9.82	20.95	60.00	-39.05	QP
12	15.4378	0.96	9.82	10.78	50.00	-39.22	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.

EUT:	Cubinote	Phase :	N
Test Mode:	Middle Channel		



No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1934	33.57	9.64	43.21	63.89	-20.68	QP
2	0.1934	15.17	9.64	24.81	53.89	-29.08	AVG
3	0.3940	29.51	9.65	39.16	57.98	-18.82	QP
4	0.3940	20.91	9.65	30.56	47.98	-17.42	AVG
5	1.2940	16.98	9.67	26.65	56.00	-29.35	QP
6	1.2940	8.06	9.67	17.73	46.00	-28.27	AVG
7	2.7177	16.97	9.69	26.66	56.00	-29.34	QP
8	2.7177	8.46	9.69	18.15	46.00	-27.85	AVG
9	4.1410	18.18	9.70	27.88	56.00	-28.12	QP
10	4.1410	5.55	9.70	15.25	46.00	-30.75	AVG
11	15.8144	11.93	9.85	21.78	60.00	-38.22	QP
12	15.8144	-0.10	9.85	9.75	50.00	-40.25	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 modulation and channels had been tested, but only the worst data recorded in the report.

9. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to FCC §15.203

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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 FCC rule.

ANTENNA CONNECTOR

EUT has a PCB antenna without antenna connector.

ANTENNA GAIN

The antenna gain of EUT is less than 6 dBi.

END OF REPORT