CFR 47 FCC PART 15 SUBPART E
ISED RSS-247 ISSUE 2

TEST REPORT

For

Wireless Subwoofer Adapter

MODEL NUMBER: KW1

FCC ID: UXD204020

IC: 21561-204020

REPORT NUMBER: 4789125554-2

ISSUE DATE: May 26, 2020

Prepared for

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Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	5/26/2020	Initial Issue	

Summary of Test Results			
Clause	Test Items	FCC/IC Rules	Test Results
1	6dB/26dB Bandwidth	FCC 15.407 (a)&(e) RSS-247 Clause 6.2	PASS
2	99% Occupied Bandwidth	RSS-Gen Clause 6.7	PASS
3	Maximum Conducted Output Power	FCC 15.407 (a) RSS-247 Clause 6.2	PASS
4	Power Spectral Density	FCC 15.407 (a) RSS-247 Clause 6.2	PASS
5	Radiated Bandedge and Spurious Emission	FCC 15.407 (b) FCC 15.209 FCC 15.205 RSS-247 Clause 6.2 RSS-GEN Clause 8.9	PASS
6	Conducted Emission Test For AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	PASS
7	Frequency Stability	FCC 15.407 (g)	PASS
8	Antenna Requirement	FCC 15.203 RSS-GEN Clause 8.3	PASS
Note: This test report is only published to and used by the applicant, and it is not for evidence purpose in China.			

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	GP Electronics (HK) Limited
Address:	9/F, Building 12W, 12 Science Park West Avenue Hong Kong Science Park, Pak Shek Kok New Territories, Hong Kong

Manufacturer Information

Company Name:	GP Electronics (HK) Limited
Address:	9/F, Building 12W, 12 Science Park West Avenue Hong Kong Science Park, Pak Shek Kok New Territories, Hong Kong

EUT Description

EUT Name:	Wireless Subwoofer Adapter
Model:	KW1
Sample Status:	Normal
Sample ID:	2981309
Sample Received Date:	April 13, 2020
Date of Tested:	April 13, 2020~ May 26, 2020

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 FCC PART 15 SUBPART E	PASS
ISED RSS-247 Issue 2	PASS
ISED RSS-GEN Issue 5	PASS

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, CFR 47 FCC Part 2, CFR 47 FCC Part 15, KDB 789033 D02 v02r01, RSS-GEN Issue 5, RSS-247 Issue 2, KDB414788 D01 Radiated Test Site v01.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**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. **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 Delcaration of Conformity (DoC) and Certification rules **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. **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

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
Uncertainty for Conduction emission test	3.62dB
Uncertainty for Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	2.2dB
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.00dB
Uncertainty for Radiation Emission test (1GHz to 26GHz)(include Fundamental emission)	5.78dB (1GHz-18Gz)
	5.23dB (18GHz-26Gz)
	5.64dB (26GHz-40Gz)
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	Wireless Subwoofer Adapter
Model	KW1
Operation frequency	5157MHz ~ 5243MHz /5729MHz ~ 5839MHz
Modulation	FSK
Power Supply	DC 5V

5.2. MAXIMUM EIRP

Test Mode	Number of Transmit chains (NTX)	Frequency (MHz)	Max Power (dBm)	Max EIRP (dBm)
TX 5.2G	1	5157-5243	1.489	3.059
TX 5.8G	1	5729-5839	6.126	7.696

5.3. CHANNEL LIST

5.2G

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5157	13	5181	25	5205	37	5229
2	5159	14	5183	26	5207	38	5231
3	5161	15	5185	27	5209	39	5233
4	5163	16	5187	28	5211	40	5235
5	5165	17	5189	29	5213	41	5237
6	5167	18	5191	30	5215	42	5239
7	5169	19	5193	31	5217	43	5241
8	5171	20	5195	32	5219	44	5243
9	5173	21	5197	33	5221	/	/
10	5175	22	5199	34	5223	/	/
11	5177	23	5201	35	5225	/	/
12	5179	24	5203	36	5227	/	/

5.8G

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5729	16	5759	31	5789	46	5819
2	5731	17	5761	32	5791	47	5821
3	5733	18	5763	33	5793	48	5823
4	5735	19	5765	34	5795	49	5825
5	5737	20	5767	35	5797	50	5827
6	5739	21	5769	36	5799	51	5829
7	5741	22	5771	37	5801	52	5831
8	5743	23	5773	38	5803	53	5833
9	5745	24	5775	39	5805	54	5835
10	5747	25	5777	40	5807	55	5837
11	5749	26	5779	41	5809	56	5839
12	5751	27	5781	42	5811	/	/
13	5753	28	5783	43	5813	/	/
14	5755	29	5785	44	5815	/	/
15	5757	30	5787	45	5817	/	/

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency(MHz)
TX 5.2G	Low	5157
	Middle	5199
	High	5243
TX 5.8G	Low	5729
	Middle	5783
	High	5839

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter			
Test Software	Stereo I2C Tool		
Frequency Band	mode	channel	setting
5157MHz ~ 5243MHz	TX 5.2G	Low	default
		Middle	default
		High	default
5729MHz ~ 5839MHz	TX 5.8G	Low	default
		Middle	default
		High	default

5.6. THE WORSE CASE CONFIGURATIONS

Worst-case data rates as provided by the client were:
5.2G TX mode
5.8G TX mode

5.7. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna No.	Frequency (MHz)	Antenna Type	Max Antenna Gain (dBi)
1	5157-5839	IFA antenna	1.57
2	5157-5839	IFA antenna	1.57

TX MODE	Transmit and Receive Mode	Description
5.2G	☒1TX, 1RX	ANT 2 can be used as transmitting antenna；ANT 1 can be used as receiving antenna.
5.8G	☒1TX, 1RX	ANT 2 can be used as transmitting antenna；ANT 1 can be used as receiving antenna.

5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	PC	Dell	Vostro 3902	8KNDDB2
2	USB TO UART	/	/	/
3	DVD	Pioneer	DV-410V-K	HGKD001867CN
4	Subwoofer	KEF	Kubel	/
5	Adapter	SAMSUNG	ETA0U83CBC	DW2G720OS/A

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB	/	/	1.0	/

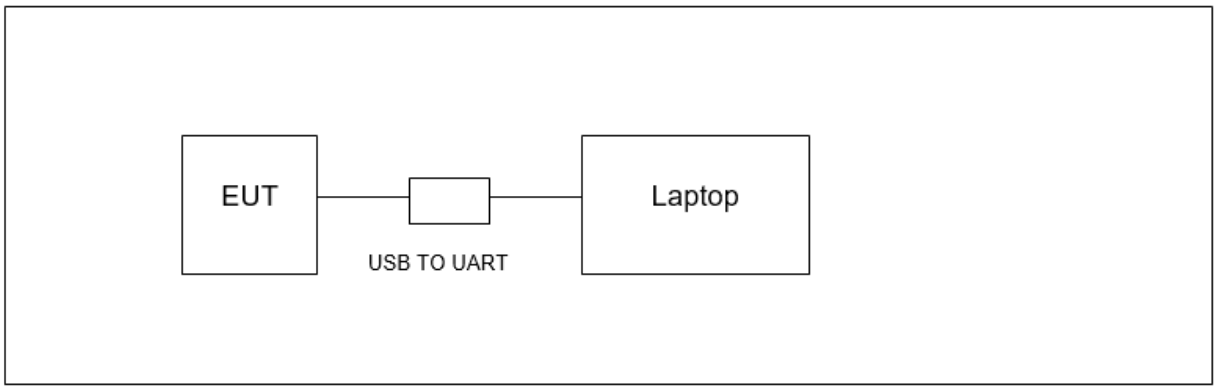
ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
/	/	/	/	/

TEST SETUP

The EUT can work in engineering mode with a software.

SETUP DIAGRAM FOR TESTS



6. 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.05,2019	Dec.05,2020
☑	Two-Line V-Network	R&S	ENV216	101983	Dec.05,2019	Dec.05,2020
☑	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Dec.05,2019	Dec.05,2020
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	Dec.06,2019	Dec.06,2020
☑	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Sep.17, 2018	Sep.17, 2021
☑	Preamplifier	HP	8447D	2944A09099	Dec.05,2019	Dec.05,2020
☑	EMI Measurement Receiver	R&S	ESR26	101377	Dec.05,2019	Dec.05,2020
☑	Horn Antenna	TDK	HRN-0118	130939	Sep.17, 2018	Sep.17, 2021
☑	High Gain Horn Antenna	Schwarzbeck	BBHA-9170	691	Aug.11, 2018	Aug.11, 2021
☑	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Dec.05,2019	Dec.05,2020
☑	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec.05,2019	Dec.05,2020
☑	Preamplifier	TDK	PA-02-3	TRS-308-00002	Dec.05,2019	Dec.05,2020
☑	Loop antenna	Schwarzbeck	1519B	00008	Jan.07, 2019	Jan.07, 2022
☑	Band Reject Filter	Wainwright	WRCJV12-5695-5725-5850-5880-40SS	4	Dec.05,2019	Dec.05,2020
☑	Band Reject Filter	Wainwright	WRCJV20-5120-5150-5350-5380-60SS	2	Dec.05,2019	Dec.05,2020
☑	Band Reject Filter	Wainwright	WRCJV20-5440-	1	Dec.05,2019	Dec.05,2020

			5470-5725-5755-60SS			
☑	High Pass Filter	Wainwright	WHKX10-5850-6500-1800-40SS	4	Dec.05,2019	Dec.05,2020

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.06,2019	Dec.06,2020
☑	Power sensor, Power Meter	R&S	OSP120	100921	Dec.06,2019	Dec.06,2020

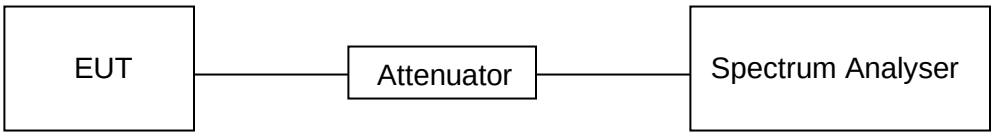
7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only

TEST SETUP



TEST ENVIRONMENT

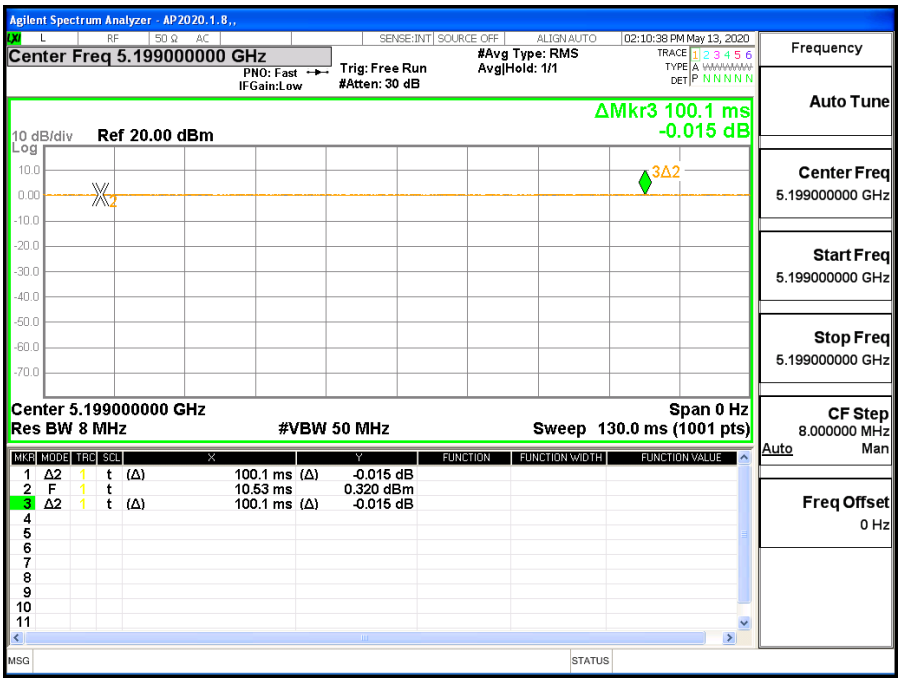
Temperature	24.2°C	Relative Humidity	53%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

RESULTS

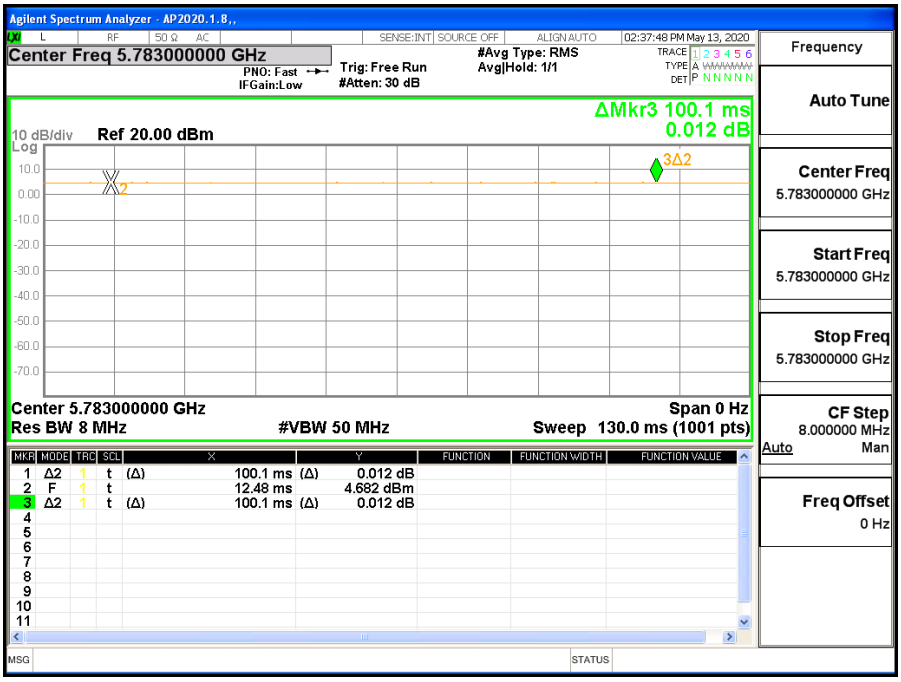
Mode	ON Time (ms)	Period (ms)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (KHz)	Final setting For VBW (kHz)
5.2G	100	100	1	100%	0	0.01	0.01
5.8G	100	100	1	100%	0	0.01	0.01

Note:
Duty Cycle Correction Factor=10log (1/x).
Where: x is Duty Cycle (Linear)
Where: T is On Time
If that calculated VBW is not available on the analyzer then the next higher value should be used.

5.2G



5.8G



7.2. 6/26/99% dB BANDWIDTH

LIMITS

CFR 47 FCC Part15, Subpart E ISED RSS-247		
Test Item	Limit	Frequency Range (MHz)
Bandwidth	26 dB Bandwidth	5150-5250
	26 dB Bandwidth	5250-5350
	26 dB Bandwidth	For FCC:5470-5725 For IC:5470-5600 5650-5725
	Minimum 500kHz 6dB Bandwidth	5725-5850

ISED RSS-247		
RSS-Gen Clause 6.7	99% Bandwidth	For reporting purposes only.

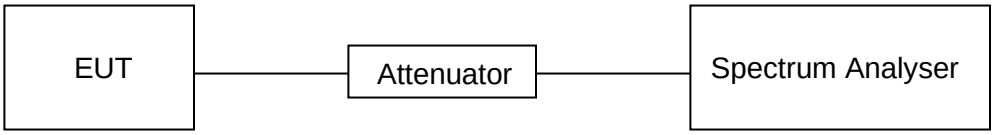
TEST PROCEDURE

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

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	For 6dB Bandwidth: RBW=100kHz For 26dB Bandwidth: approximately 1%~5% of the emission bandwidth. For 99% Occupied Bandwidth: approximately 1%~5% of the emission bandwidth.
VBW	For 6dB Bandwidth : ≥3×RBW For 26dB Bandwidth : approximately 3×RBW For 99% Occupied Bandwidth: ≥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 6dB/26dB&99% Occupied Bandwidth relative to the maximum level measured in the fundamental emission.

TEST SETUP



TEST ENVIRONMENT

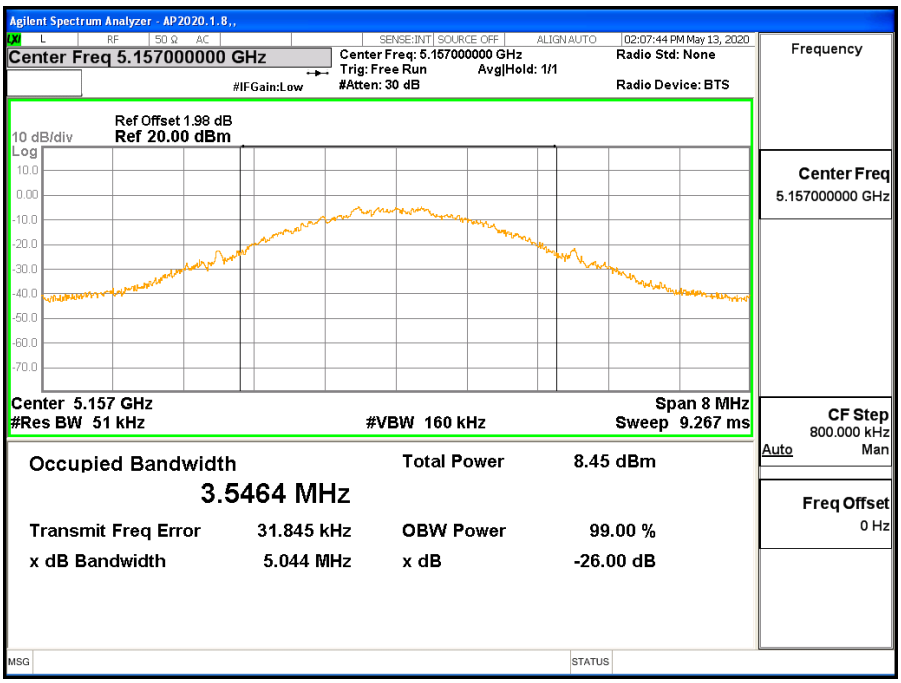
Temperature	24.2°C	Relative Humidity	53%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

RESULTS

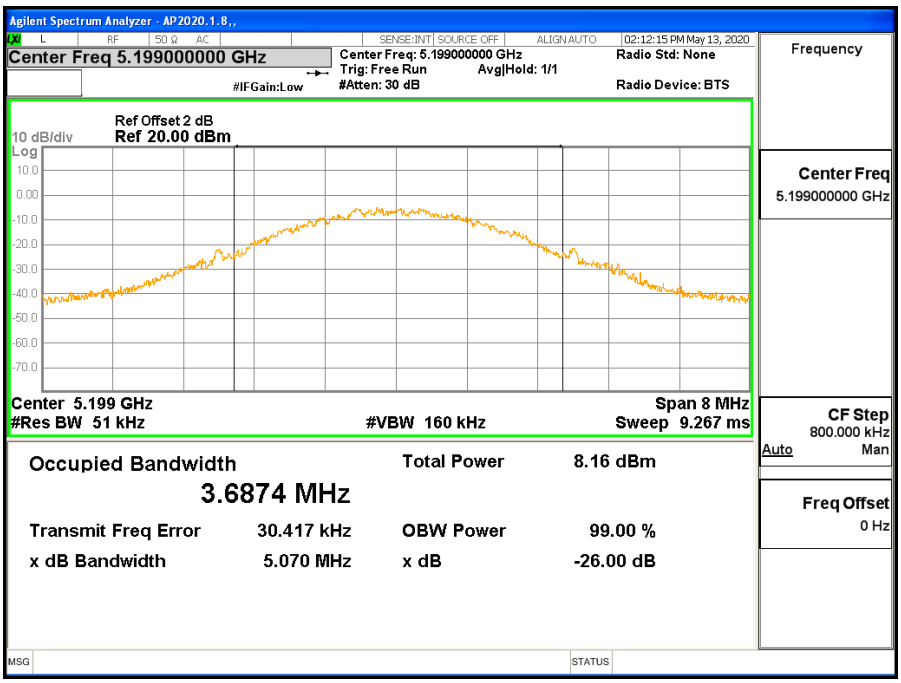
7.2.1. 5.2G

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
Low	5157	5.044	3.5464
Mid	5199	5.070	3.6874
High	5243	5.069	3.7862

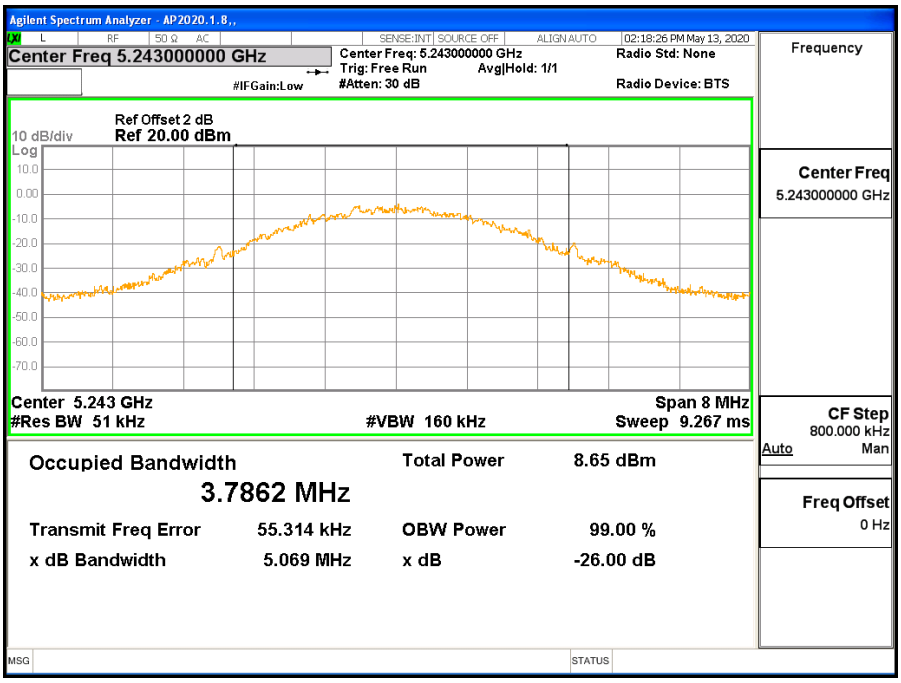
26 dB and 99% BW LOW CHANNEL



26 dB and 99% BW MID CHANNEL



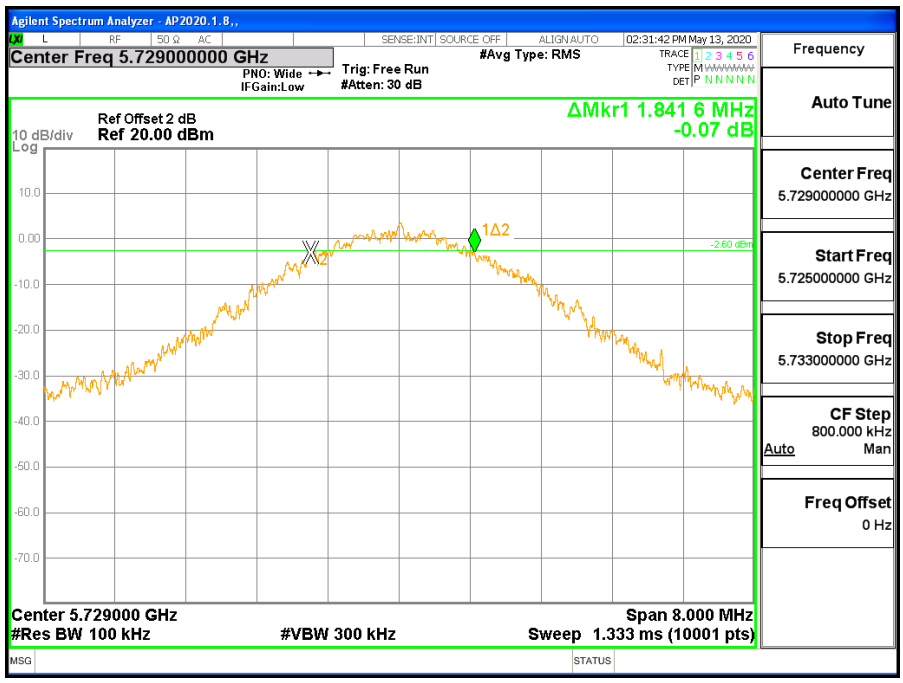
26 dB and 99% BW HIGH CHANNEL



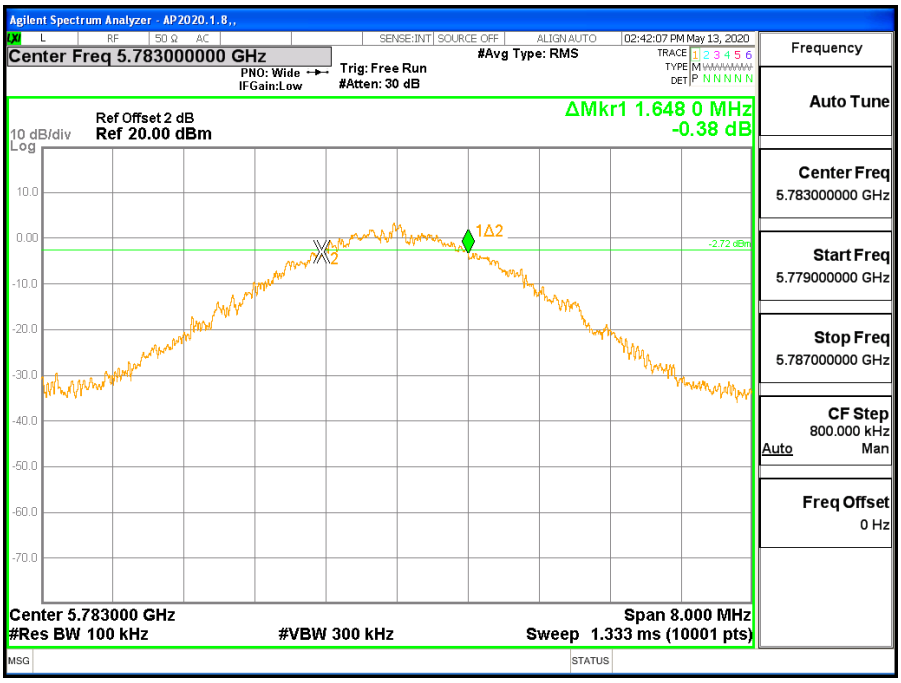
7.2.2. 5.8G

Channel	Frequency (MHz)	6 dB BW (MHz)	99% BW (MHz)	Limit For 6dB BW (KHz)	Result
Low	5729	1.842	3.7486	500	PASS
Mid	5783	1.648	3.8675	500	PASS
High	5839	1.994	3.8668	500	PASS

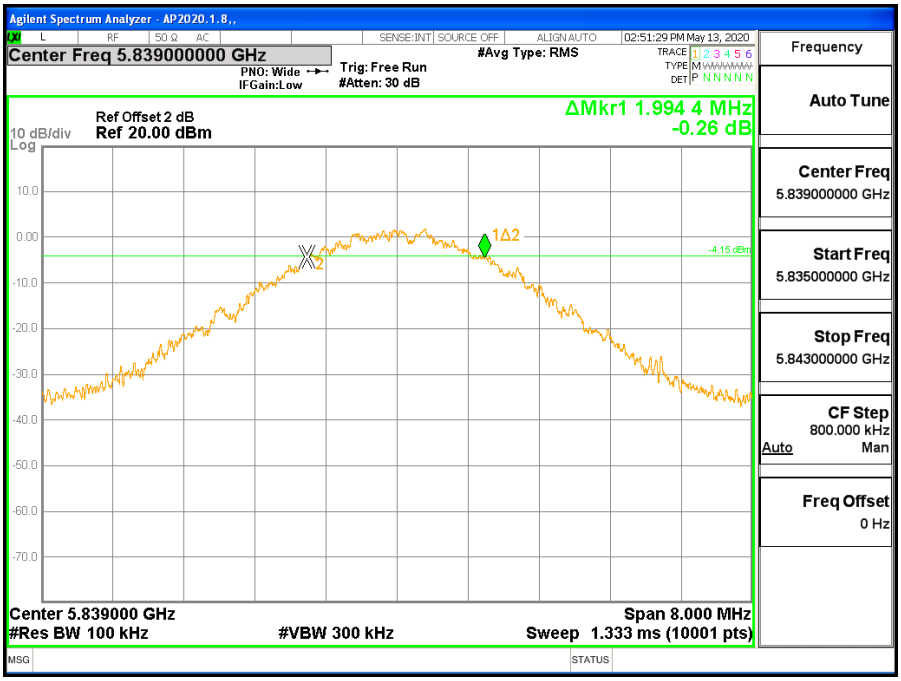
6 dB BW LOW CHANNEL



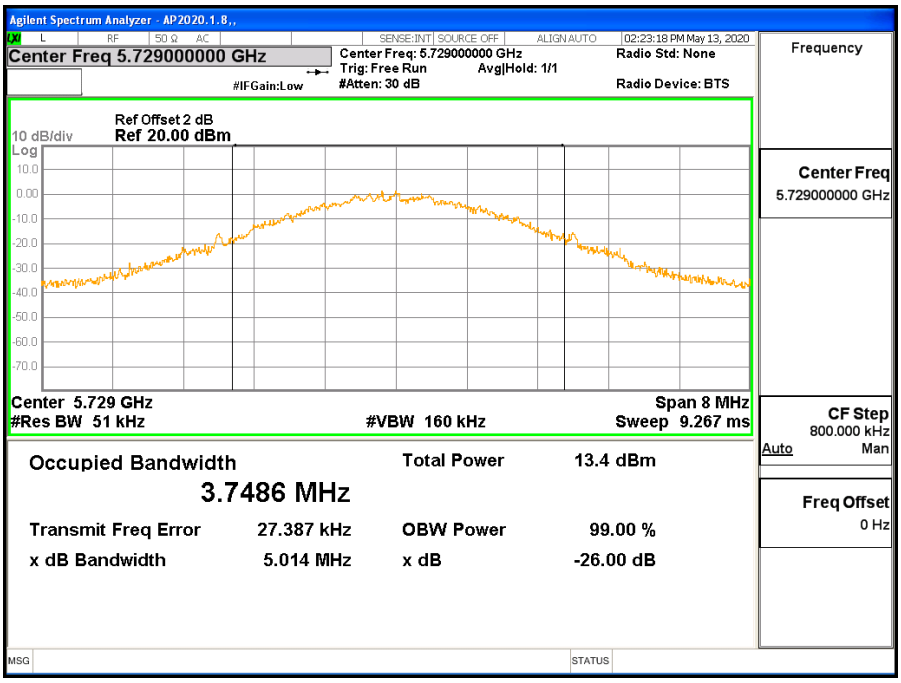
6 dB BW MID CHANNEL



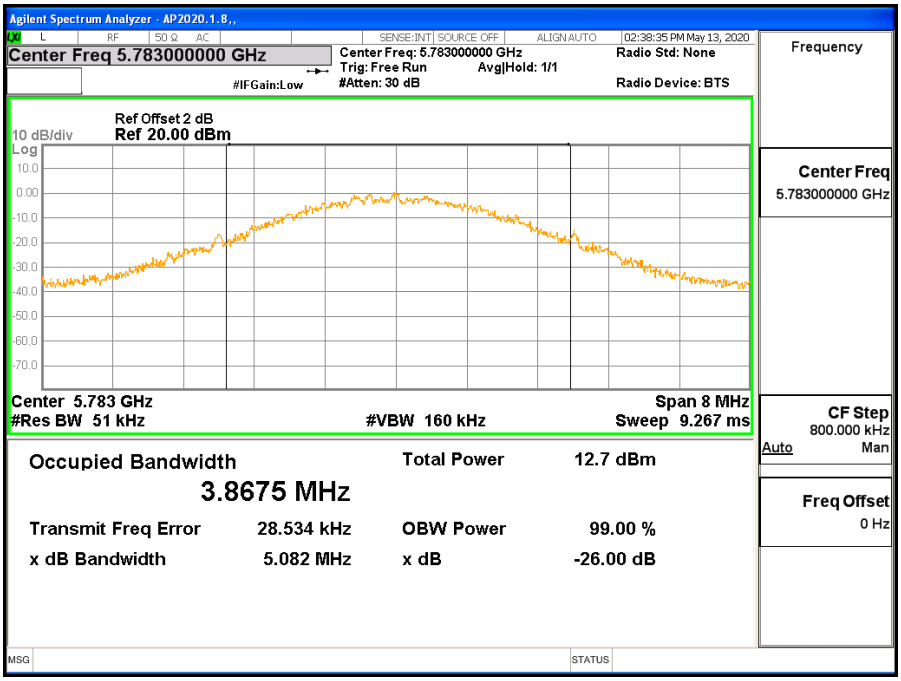
6 dB BW HIGH CHANNEL



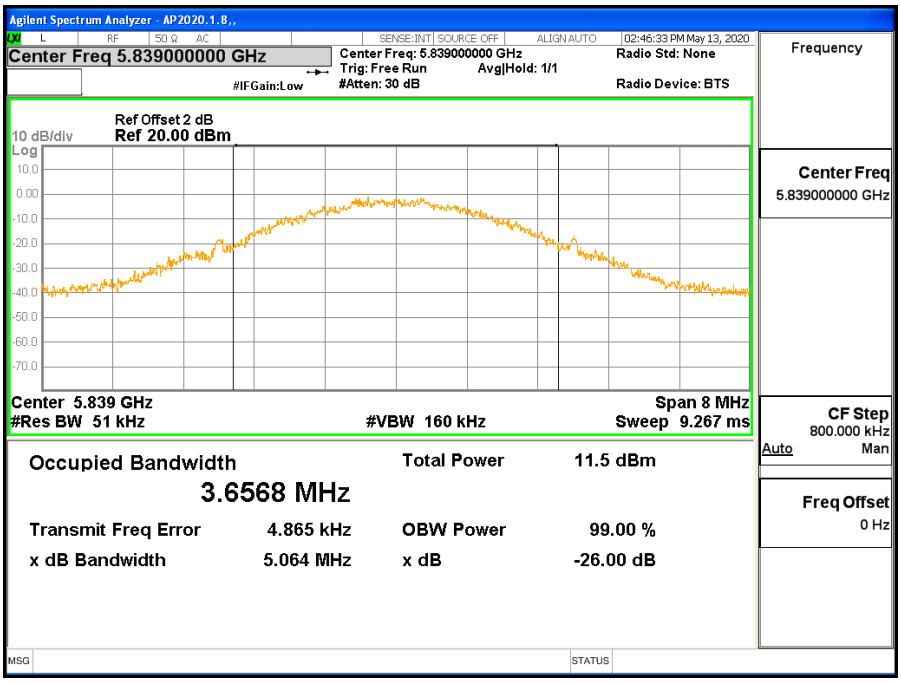
99% BW LOW CHANNEL



99% BW MID CHANNEL



99% BW HIGH CHANNEL



Note: All the modes and antenna ports had been tested, only the worst data recorded in the report.

7.3. MAXIMUM CONDUCTED OUTPUT POWER

LIMITS

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	For FCC client devices:250mW (24dBm)	5150-5250
	1 Watt (30dBm)	5725-5850

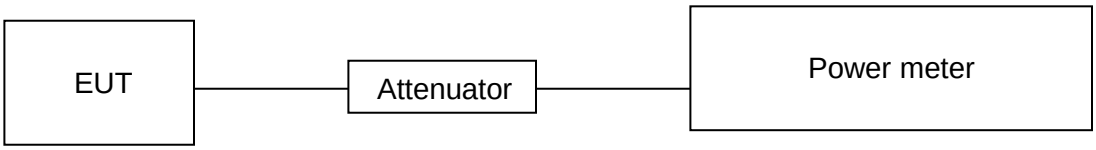
ISED RSS-247		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	Maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever is less where B is the 99% emission bandwidth in megahertz	5150-5250
	1 Watt (30dBm)	5725-5850

Note: If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

TEST PROCEDURE

Refer to KDB 789033 D02 General UNII Test Procedures New Rules v02r01
Connect the EUT to the a broadband average RF power meter, the power meter shall have a video bandwidth that is greater than or equal to the bandwidth and shall utilize a fast-responding diode detector.

TEST SETUP



TEST ENVIRONMENT

Temperature	24.2°C	Relative Humidity	53%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

RESULTS

Mode	Frequency (MHz)	Antenna	CONDUCTED POWER (dBm)	FCC Limit (dBm)	EIRP (dBm)	ISED EIRP Limit (dBm)	Result
5.2G	5157	0	0.970	24	2.540	15.50	PASS
	5199	0	1.056	24	2.626	15.50	PASS
	5243	0	1.489	24	3.059	15.50	PASS

Mode	Frequency (MHz)	Antenna	CONDUCTED POWER (dBm)	Limit (dBm)	Result
5.8G	5729	0	6.126	30	PASS
	5783	0	5.712	30	PASS
	5839	0	5.207	30	PASS

Note: 1.Conducted Power=Meas. Level+ Correction Factor
2.EIRP=conducted Power + Antenna Gain
3. The test results have already included the duty cycle correction factor. About correction Factor please refer to section 7.1

7.4. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15, Subpart E ISED RSS-247		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	For FCC: Other than Mobile and portable:17dBm/MHz Mobile and portable:11dBm/MHz	5150-5250
	For RSS: e.i.r.p. 10dBm/MHz	
	30dBm/500kHz	5725-5850
Note: 1. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.		

TEST PROCEDURE

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

For U-NII-1, U-NII-2A and U-NII-2C band:

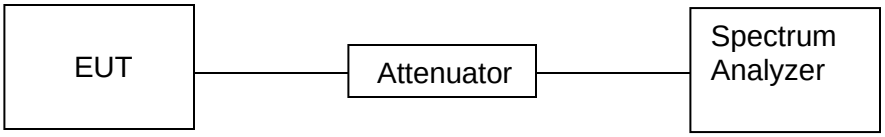
Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	1MHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

For U-NII-3:

Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	500kHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

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

TEST SETUP



TEST ENVIRONMENT

Temperature	24.2°C	Relative Humidity	53%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

RESULTS

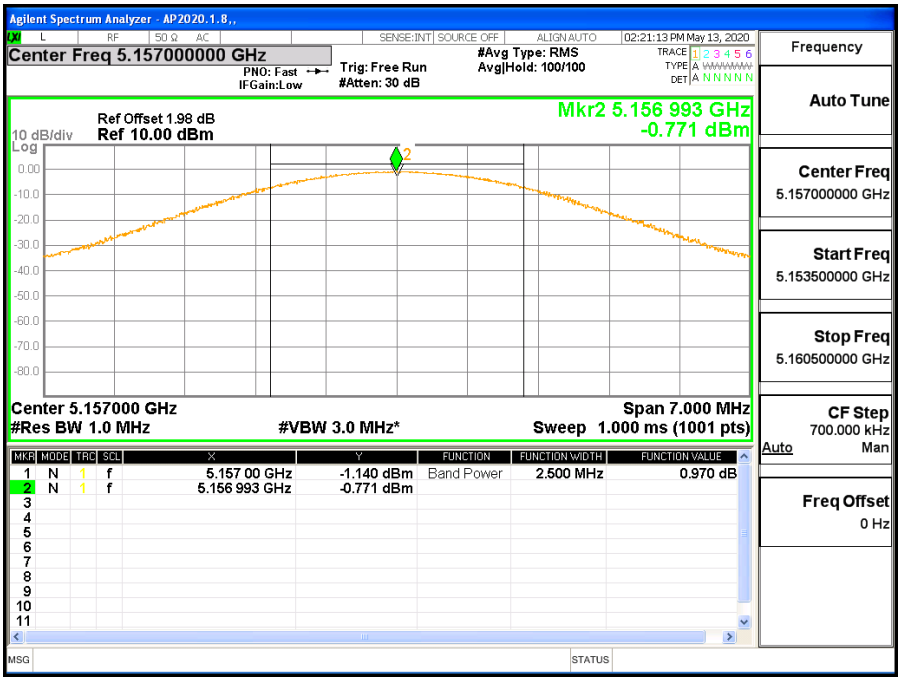
7.4.1. 5.2G

Test Channel	Frequency (MHz)	ANT	DCCF (dB)	PSD Result (dBm/MHz)	FCC Limit (dBm/MHz)	EIRP Result (dBm/MHz)	ISED EIRP Limit (dBm/MHz)
Low	5157	0	0	-0.771	11	0.799	10
Mid	5199	0	0	-0.776		0.794	
High	5243	0	0	-0.391		1.179	

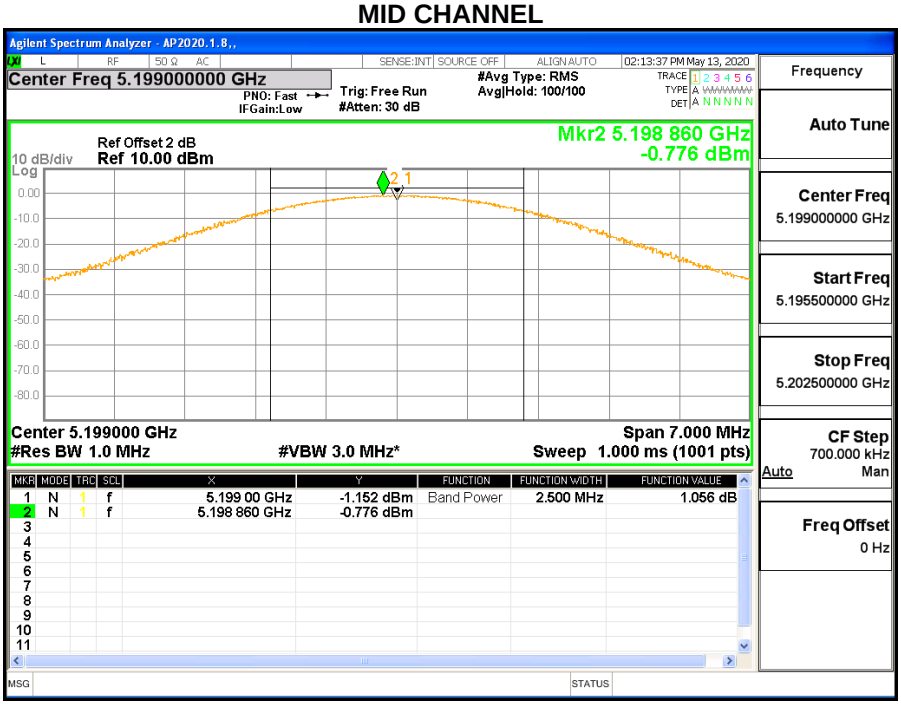
Note:

1. For test plots, it does not include the duty cycle correction factor.
2. PSD result=Test plots result+ Duty Cycle Correction Factor
3. The test results have already included the duty cycle correction factor. About correction Factor please refer to section 7.1.

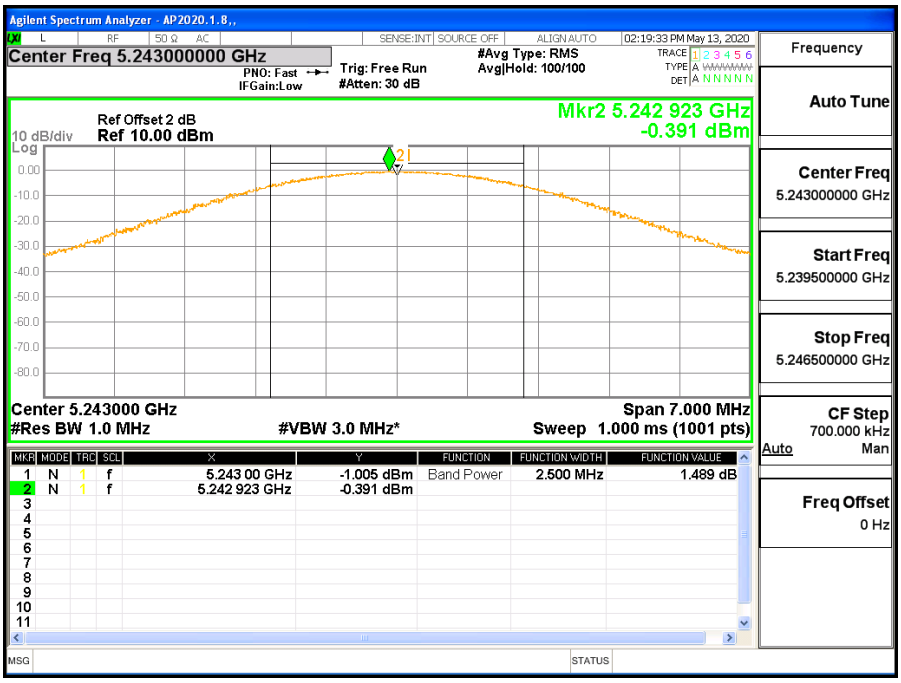
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



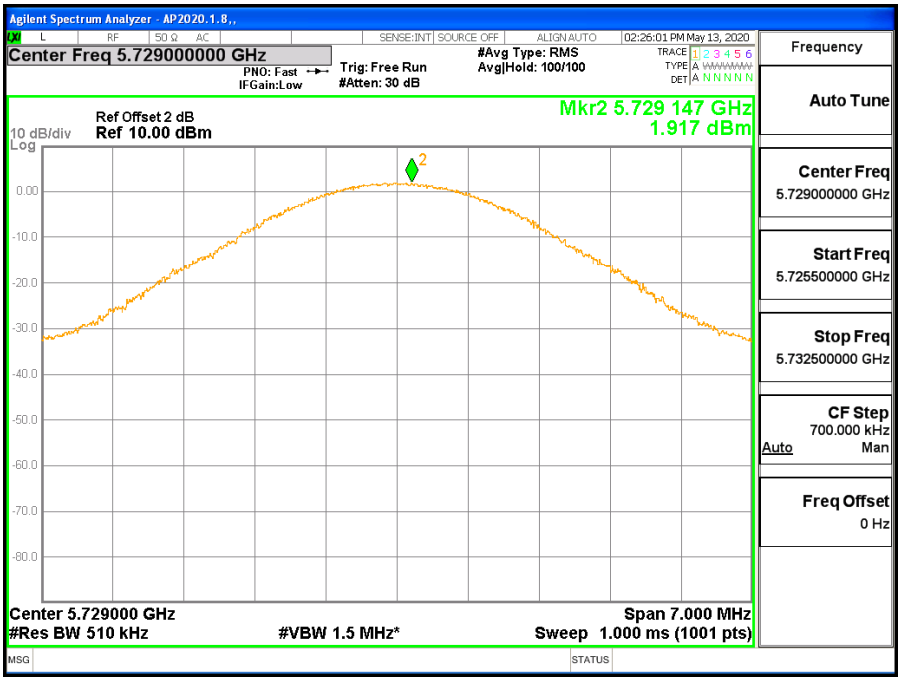
7.4.2. 5.8G

Test Channel	Frequency (MHz)	ANT	DCCF (dB)	PSD Result (dBm/500KHz)	Limit (dBm/500KHz)
Low	5729	0	0	1.917	30
Mid	5783	0	0	1.621	
High	5839	0	0	1.015	

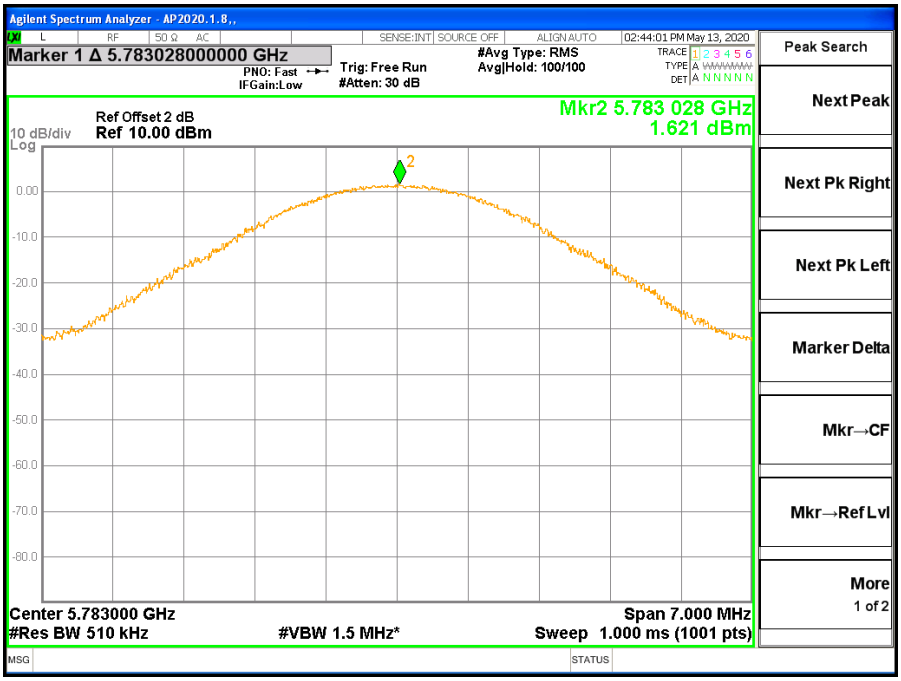
Note:

4. For test plots, it does not include the duty cycle correction factor.
5. PSD result=Test plots result+ Duty Cycle Correction Factor
6. The test results have already included the duty cycle correction factor. About correction Factor please refer to section 7.1.

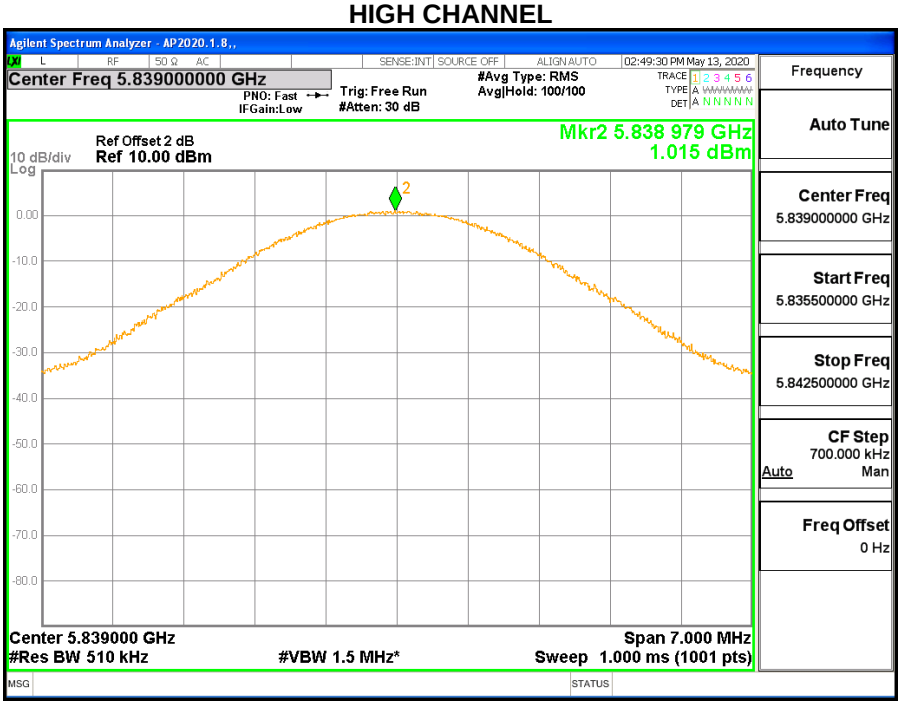
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8. RADIATED TEST RESULTS

LIMITS

Please refer to CFR 47 FCC §15.205, §15.209 and §15.407(b) (4)

Please refer to ISED RSS-GEN Clause 8.9

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

Note: 1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.

IC Restricted bands please refer to ISED RSS-GEN Clause 8.10.
FCC Restricted bands please refer to CFR 47 FCC 15.209.

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

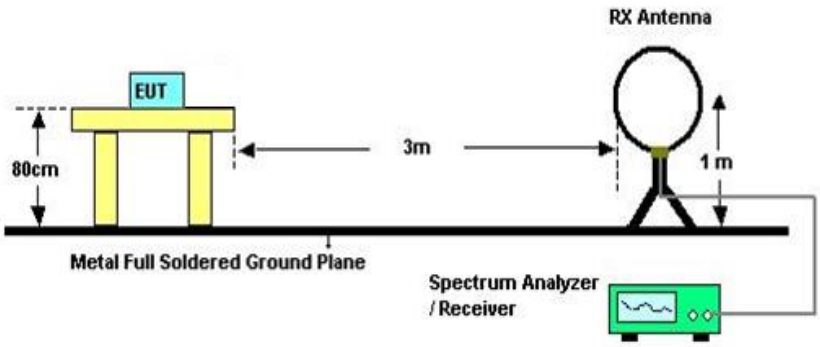
LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1GHz)			
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m	
		Quasi-Peak	
30 - 88	100	40	
88 - 216	150	43.5	
216 - 960	200	46	
Above 960	500	54	
Above 1000	500	Peak	Average
		74	54

Limits of unwanted emission out of the restricted bands

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1GHz)		
Frequency Range (MHz)	EIRP Limit	Field Strength Limit (dBuV/m) at 3 m
5150~5250 MHz	PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)
5250~5350 MHz		
5470~5725 MHz		
5725~5850 MHz	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2(dBµV/m) *1 PK:105.2 (dBµV/m) *2 PK: 110.8(dBµV/m) *3 PK:122.2 (dBµV/m) *4
Note: *1 beyond 75 MHz or more above of the band edge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.		

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, Face-on and Face-off polarizations of the antenna are set to make the measurement.

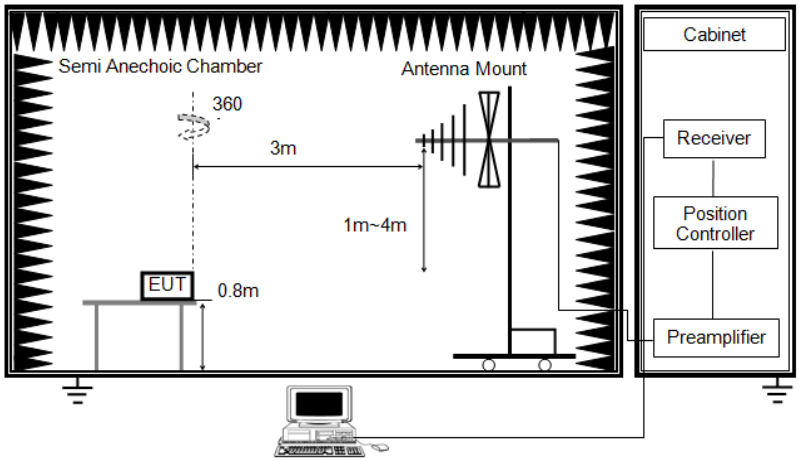
3. The EUT was placed on a turntable with 0.8 meter above ground.

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. 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.

6. 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



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.

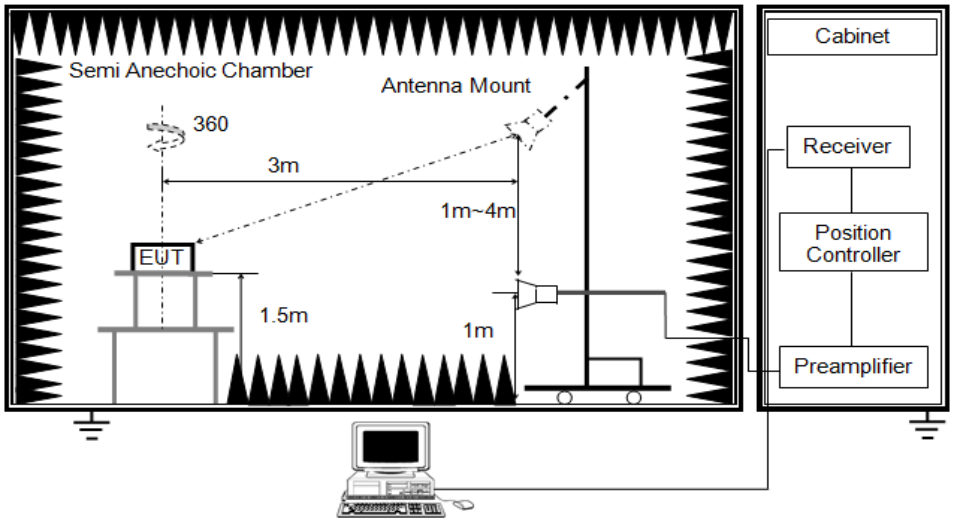
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 0.8 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. 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.

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.

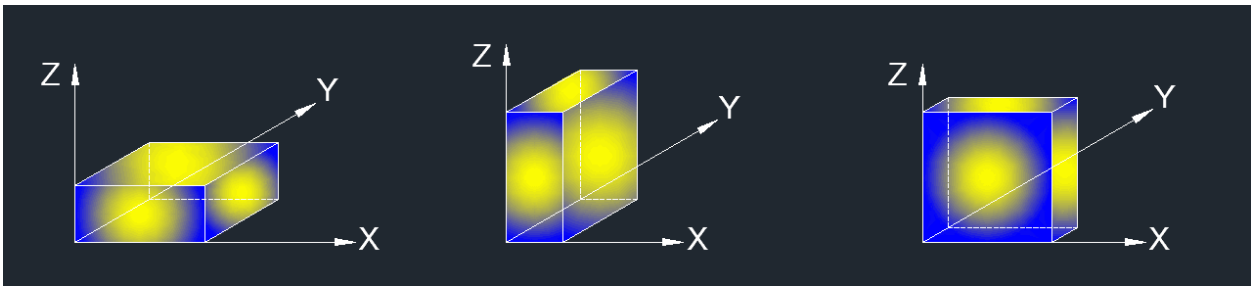
3. The EUT was placed on a turntable with 1.5m above ground.

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 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 (Y 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.

Note 3: The EUT does not support simultaneous transmission.

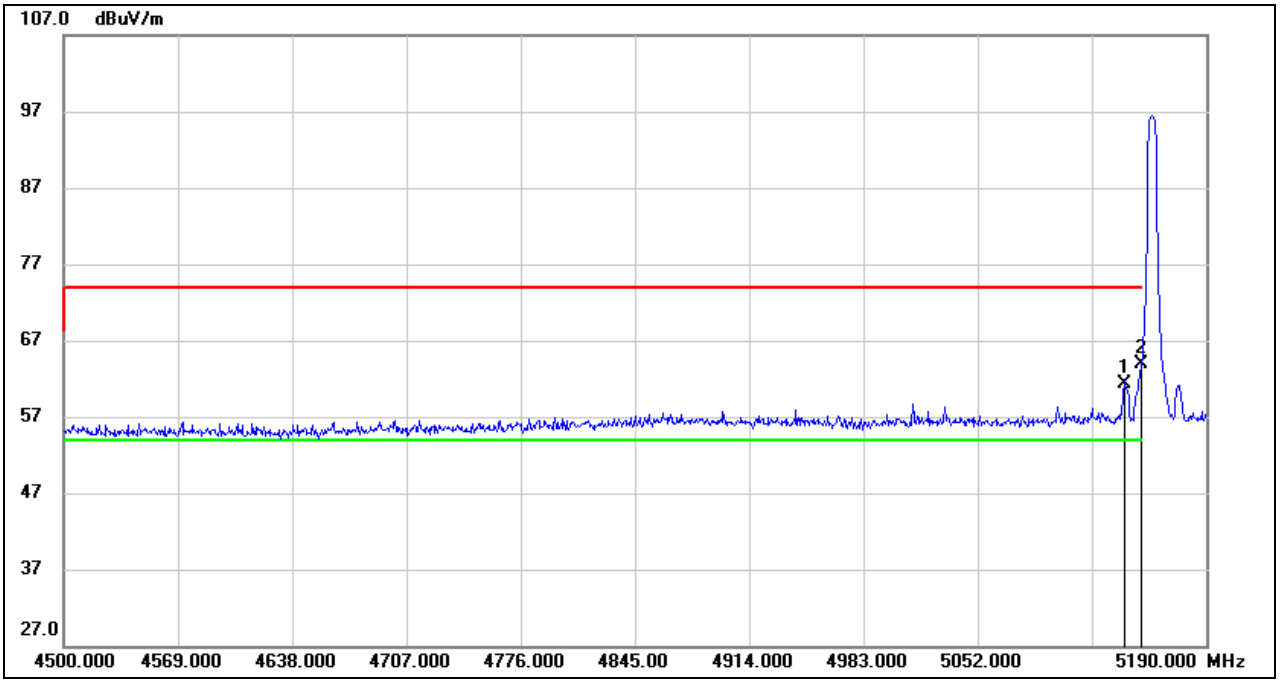
TEST ENVIRONMENT

Temperature	23.4°C	Relative Humidity	54%
Atmosphere Pressure	101kPa	Test Voltage	DC 5V

8.1. 5.2G TX MODE

RESTRICTED BANDEDGE LOW CHANNEL

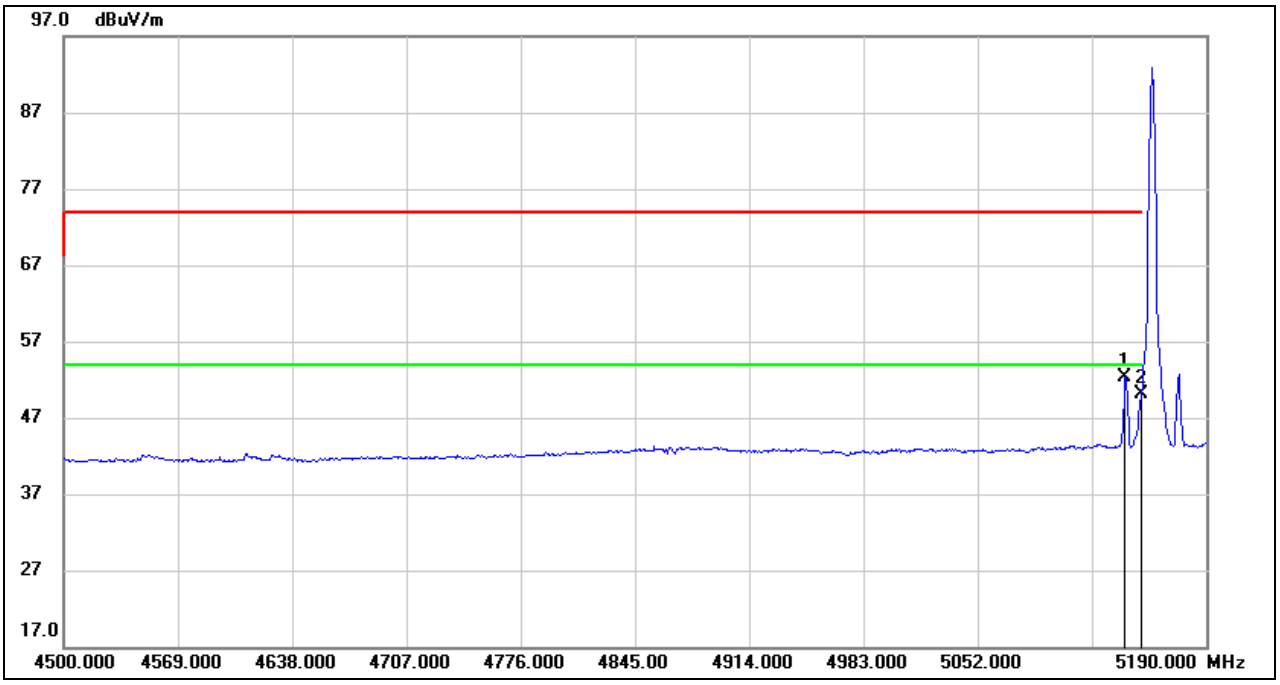
HORIZONTAL RESULTS
PEAK



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5141.010	20.88	40.41	61.29	74.00	-12.71	peak
2	5150.000	23.35	40.46	63.81	74.00	-10.19	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 case emission will be recorder, if it complies with the limit, the other emissions deemed to comply with the limit.

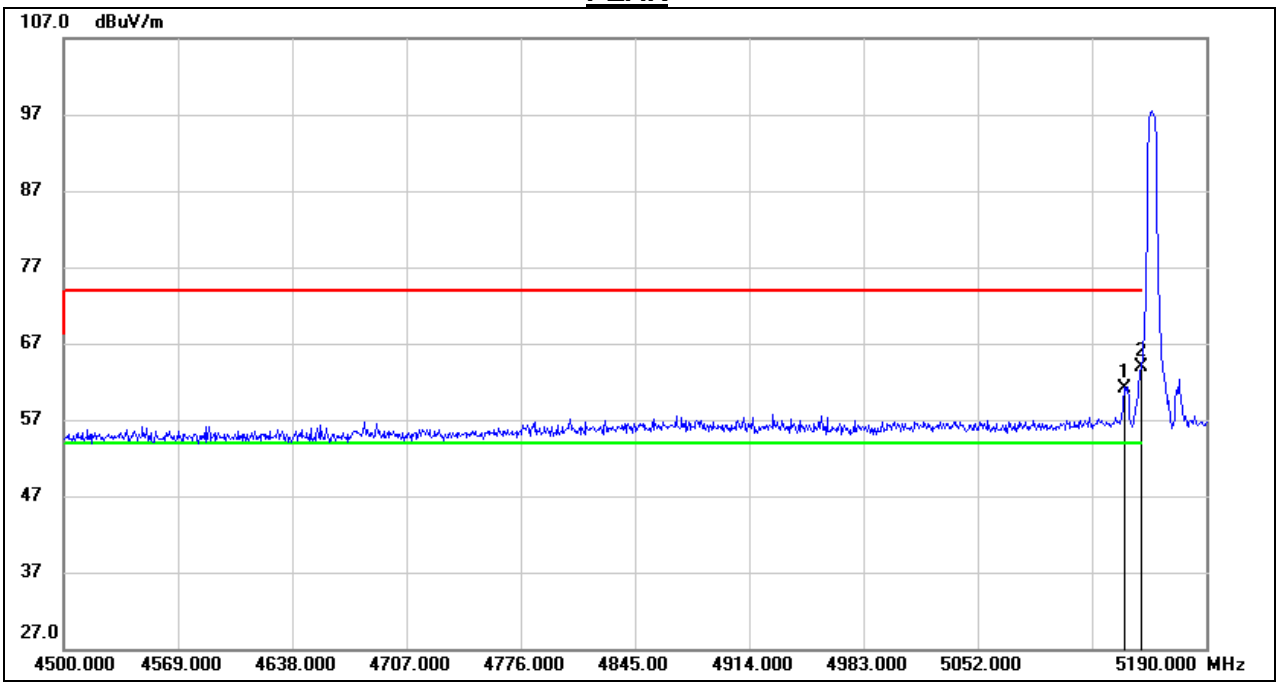
AVG



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5141.010	11.88	40.41	52.29	54.00	-1.71	AVG
2	5150.000	9.63	40.46	50.09	54.00	-3.91	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: VBW=1/Ton where: ton is transmit duration.
3. For duty cycle, please refer to clause 7.1.
4. Only the worst case emission will be recorder, if it complies with the limit, the other emissions deemed to comply with the limit.

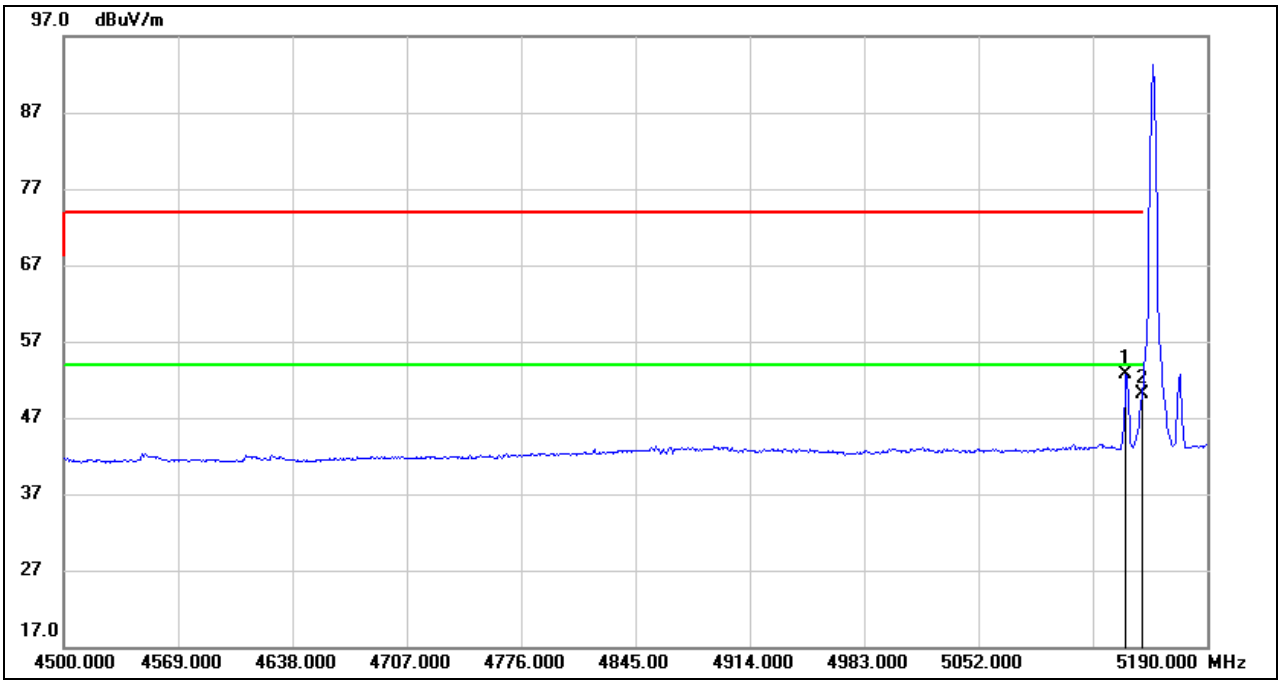
VERTICAL RESULTS
PEAK



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5141.010	20.61	40.41	61.02	74.00	-12.98	peak
2	5150.000	23.43	40.46	63.89	74.00	-10.11	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 case emission will be recorder, if it complies with the limit, the other emissions deemed to comply with the limit.

AVG

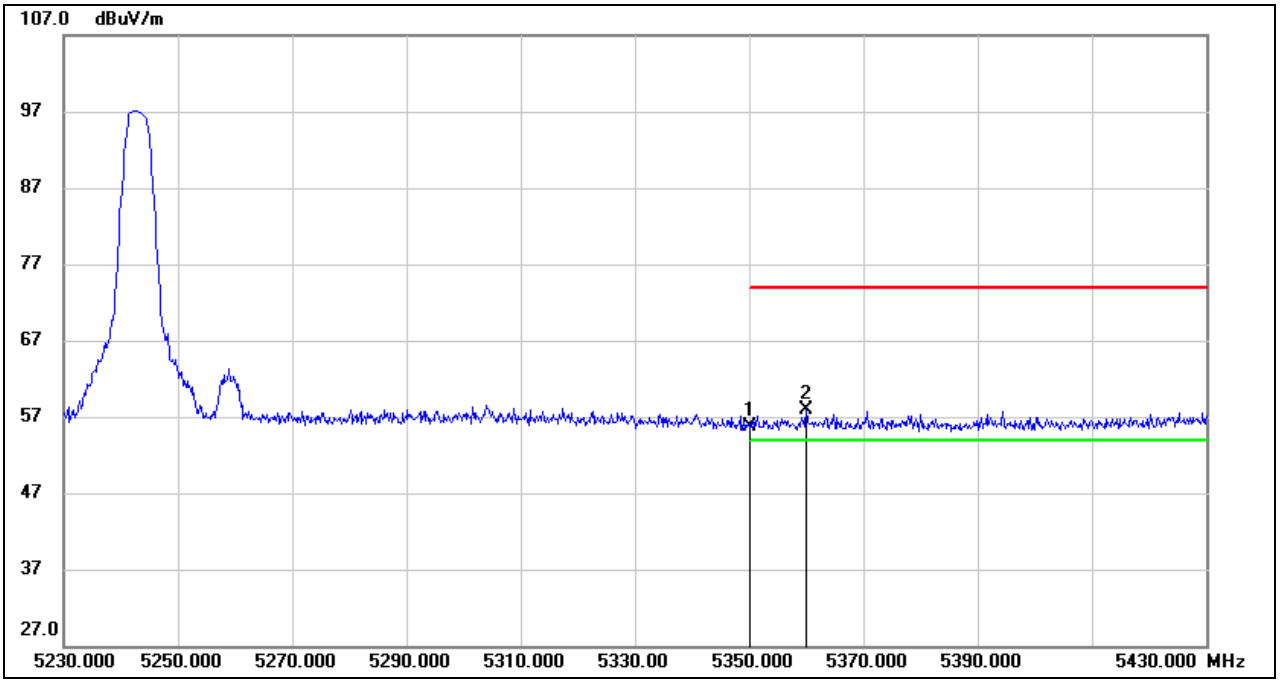


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5141.010	12.22	40.41	52.63	54.00	-1.37	AVG
2	5150.000	9.73	40.46	50.19	54.00	-3.81	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: VBW=1/Ton where: ton is transmit duration.
3. For duty cycle, please refer to clause 7.1.
4. Only the worst case emission will be recorder, if it complies with the limit, the other emissions deemed to comply with the limit.

RESTRICTED BANDEDGE HIGH CHANNEL

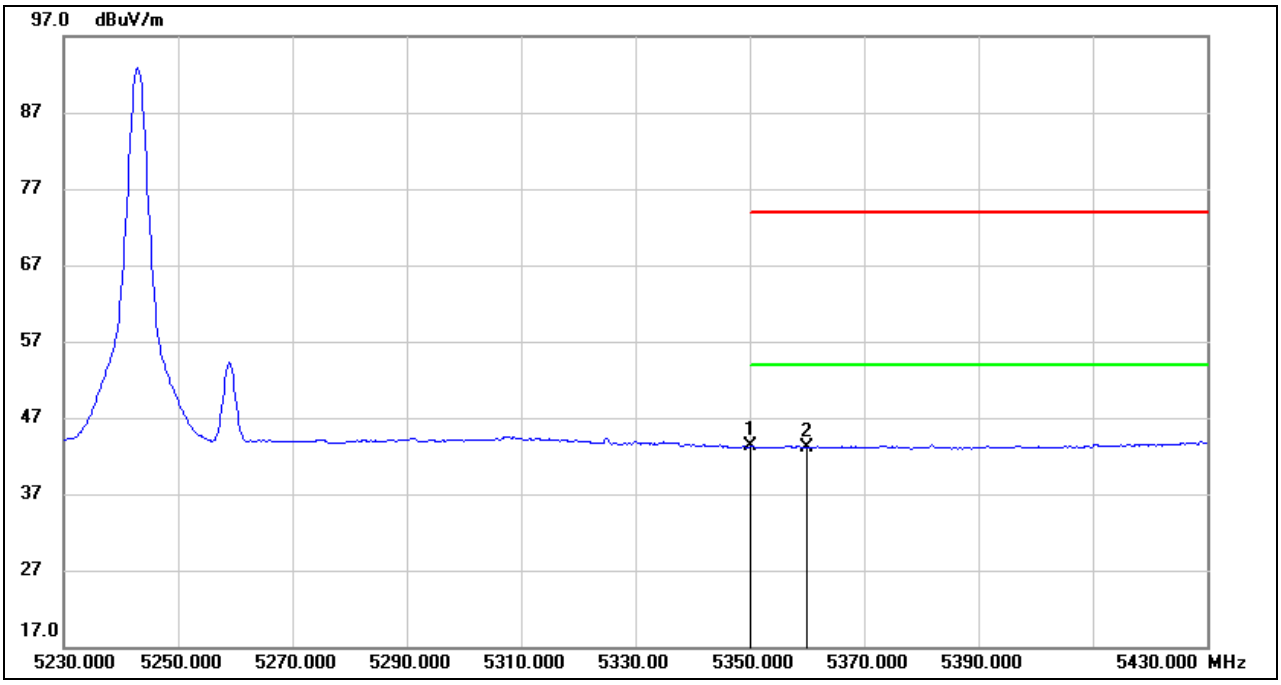
HORIZONTAL RESULTS
PEAK



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	15.07	40.64	55.71	74.00	-18.29	peak
2	5360.000	17.26	40.61	57.87	74.00	-16.13	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 case emission will be recorder, if it complies with the limit, the other emissions deemed to comply with the limit.

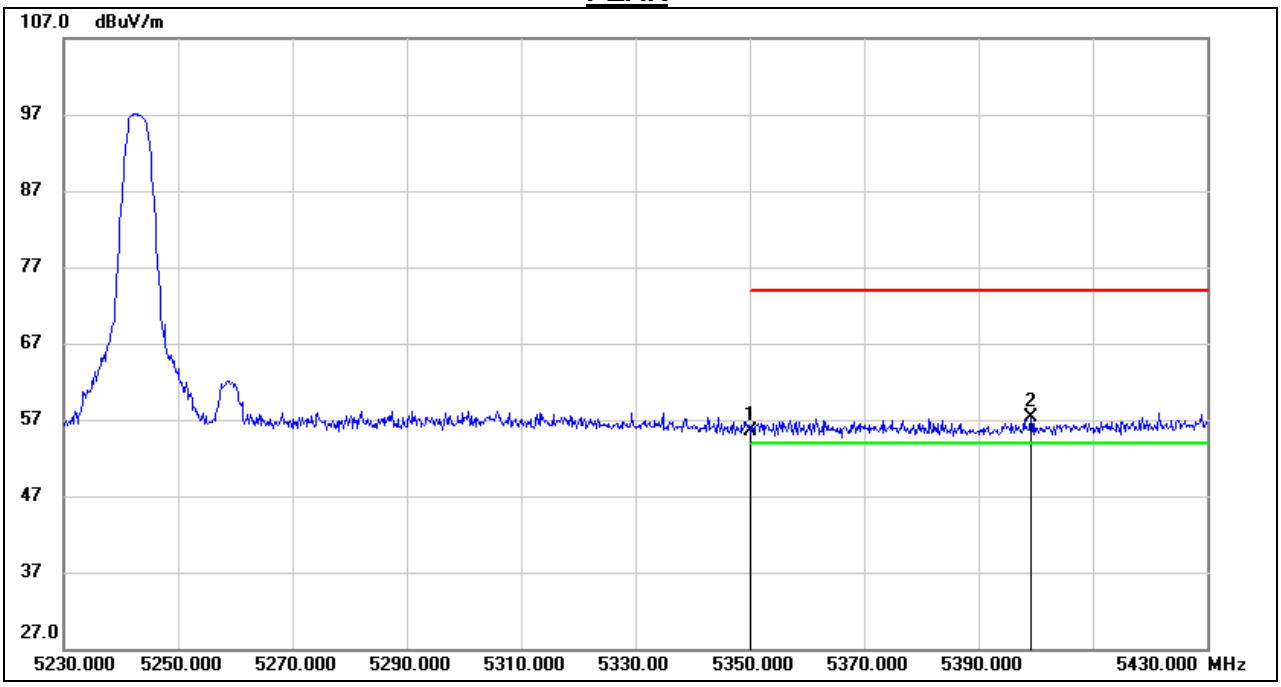
AVG



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	2.62	40.64	43.26	54.00	-10.74	AVG
2	5360.000	2.54	40.61	43.15	54.00	-10.85	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: VBW=1/Ton where: ton is transmit duration.
3. For duty cycle, please refer to clause 7.1.
4. Only the worst case emission will be recorder, if it complies with the limit, the other emissions deemed to comply with the limit.

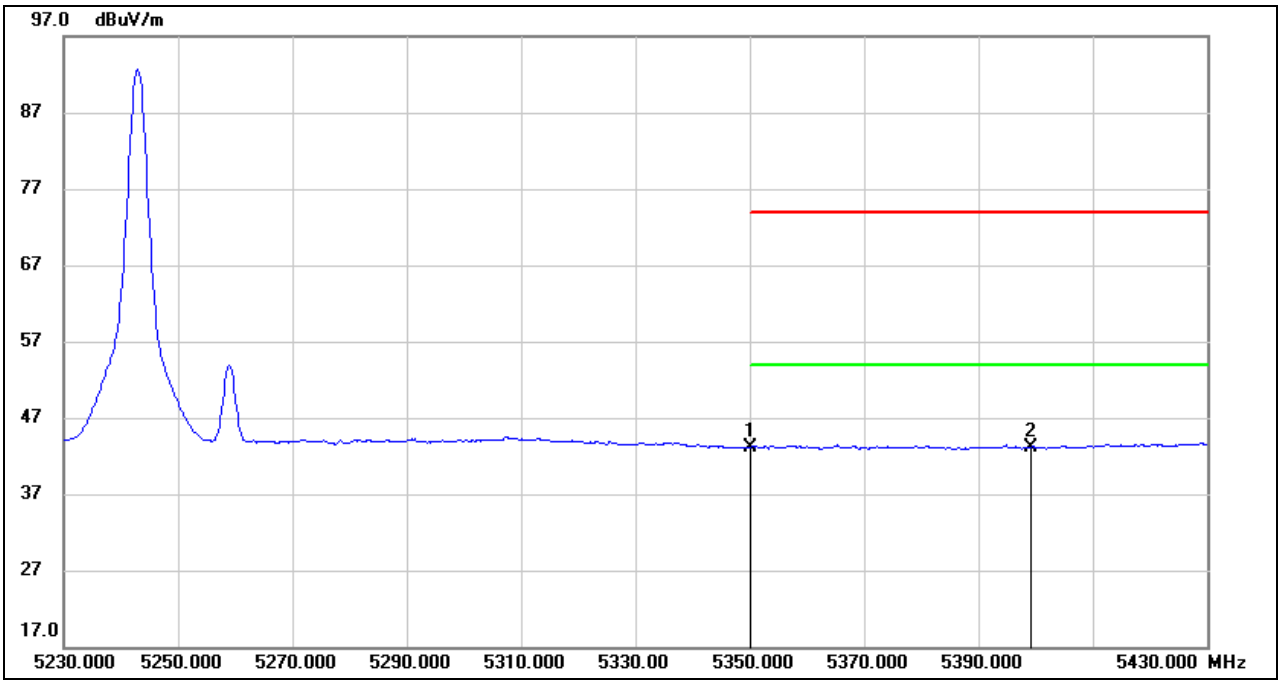
VERTICAL RESULTS
PEAK



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	14.95	40.64	55.59	74.00	-18.41	peak
2	5399.200	16.78	40.51	57.29	74.00	-16.71	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 case emission will be recorder, if it complies with the limit, the other emissions deemed to comply with the limit.

AVG

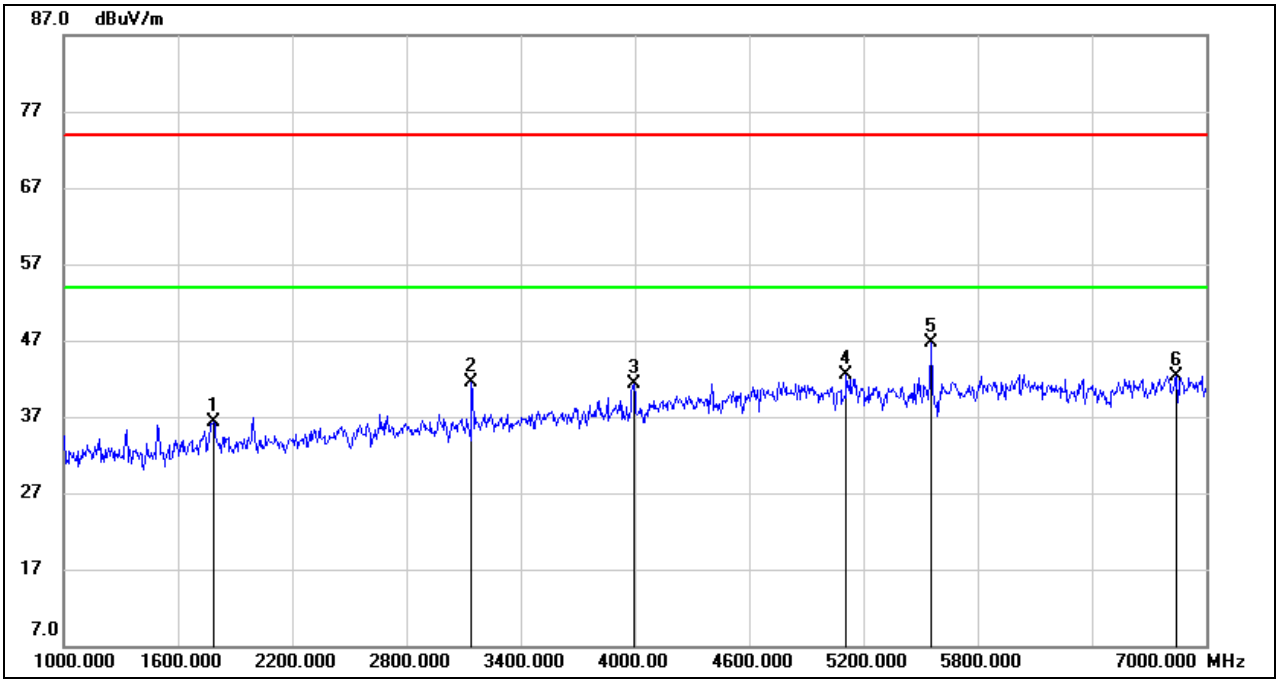


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	2.51	40.64	43.15	54.00	-10.85	AVG
2	5399.200	2.57	40.51	43.08	54.00	-10.92	AVG

Note: 1. Measurement = Reading Level + Correct Factor.
2. AVG: VBW=1/Ton where: ton is transmit duration.
3. For duty cycle, please refer to clause 7.1.
4. Only the worst case emission will be recorder, if it complies with the limit, the other emissions deemed to comply with the limit.

HARMONICS AND SPURIOUS EMISSIONS LOW CHANNEL

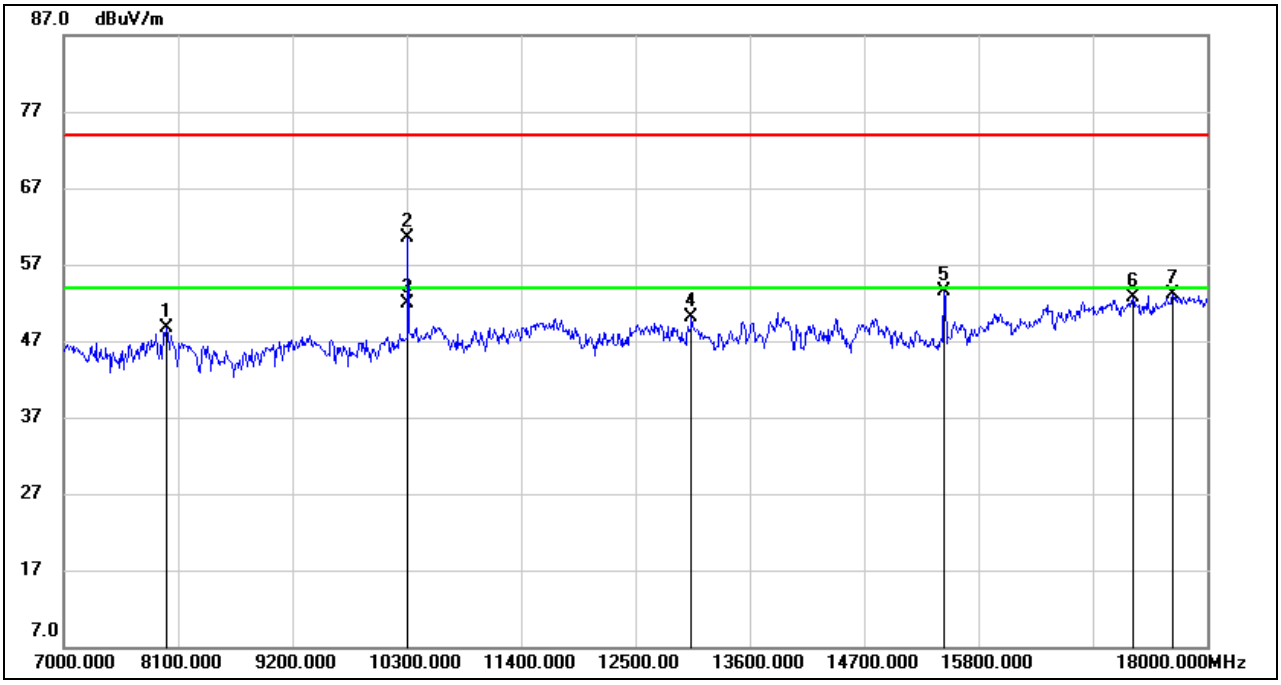
HORIZONTAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1786.000	46.61	-10.21	36.40	74.00	-37.60	peak
2	3142.000	47.30	-5.79	41.51	74.00	-32.49	peak
3	3994.000	44.96	-3.73	41.23	74.00	-32.77	peak
4	5110.000	41.06	1.43	42.49	74.00	-31.51	peak
5	5554.000	44.84	1.92	46.76	74.00	-27.24	peak
6	6844.000	37.85	4.55	42.40	74.00	-31.60	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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

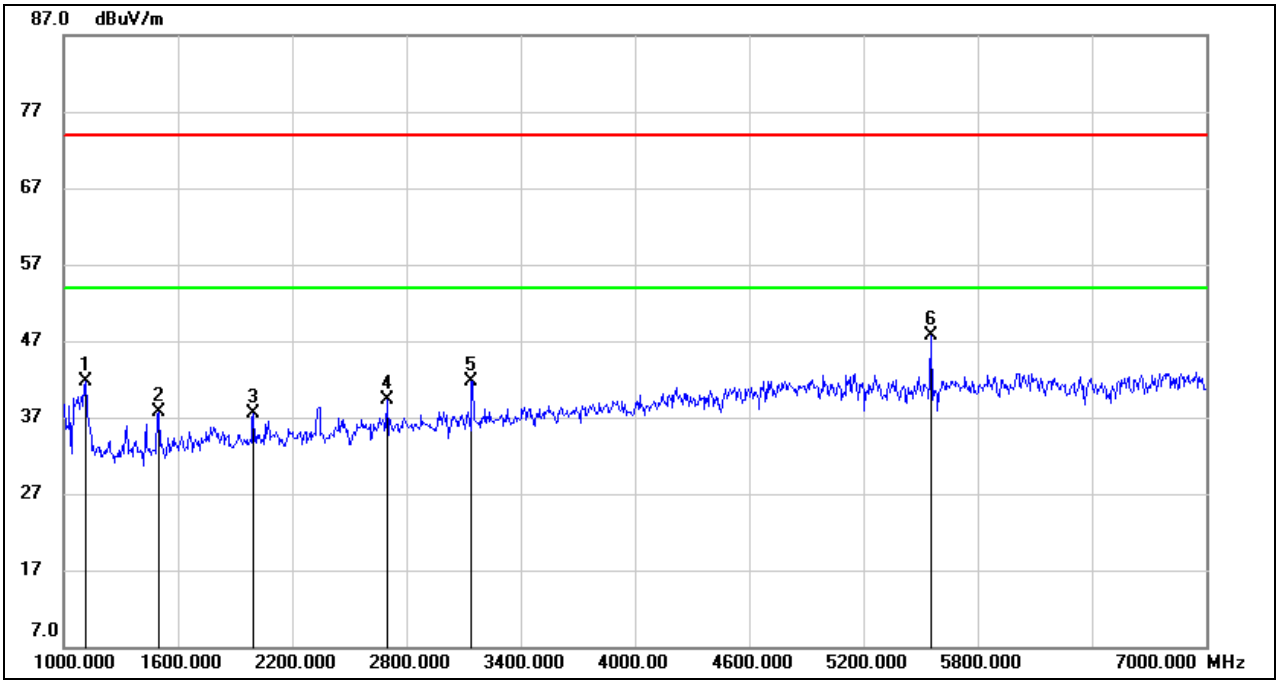
HORIZONTAL RESULTS
7-18GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7990.000	41.31	7.45	48.76	74.00	-25.24	peak
2	10311.000	49.31	11.29	60.60	68.20	-7.60	peak
3	10311.000	40.71	11.29	52.00	68.20	-16.20	AVG
4	13039.000	34.98	15.16	50.14	74.00	-23.86	peak
5	15470.000	37.10	16.42	53.52	74.00	-20.48	peak
6	17285.000	30.91	21.79	52.70	74.00	-21.30	peak
7	17670.000	30.74	22.30	53.04	74.00	-20.96	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

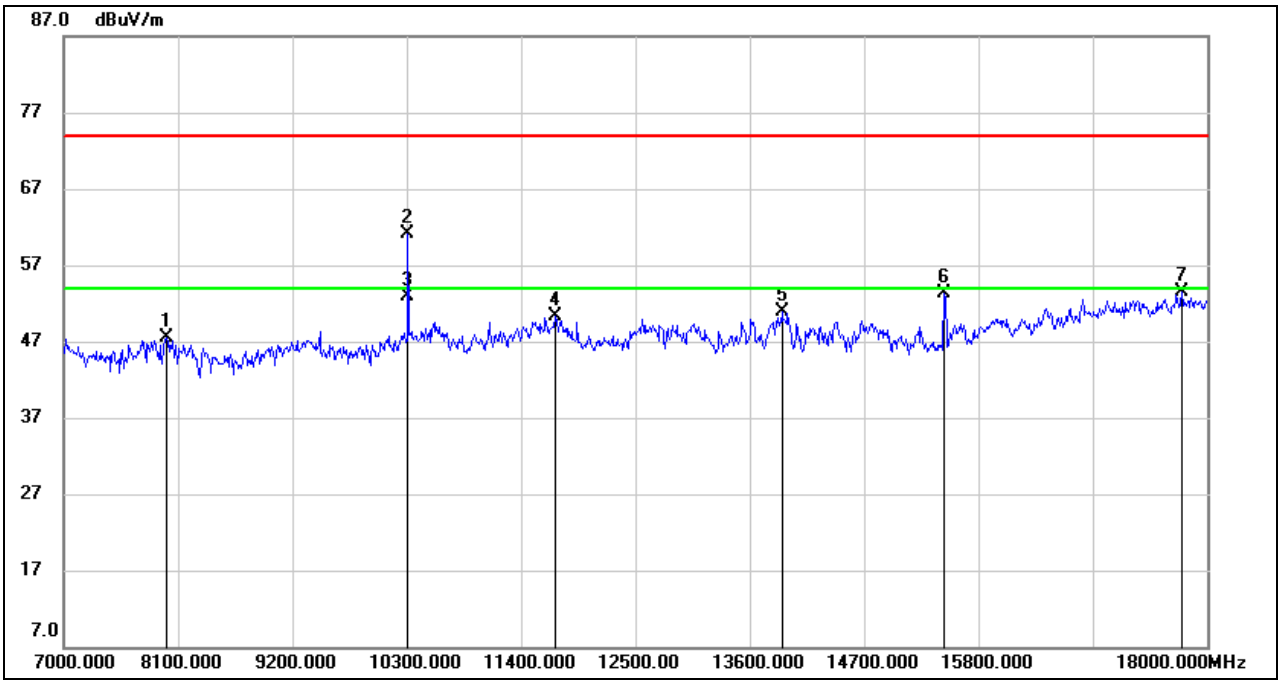
VERTICAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1114.000	55.27	-13.49	41.78	74.00	-32.22	peak
2	1498.000	49.98	-12.30	37.68	74.00	-36.32	peak
3	1996.000	47.82	-10.24	37.58	74.00	-36.42	peak
4	2698.000	46.96	-7.57	39.39	74.00	-34.61	peak
5	3142.000	47.56	-5.79	41.77	74.00	-32.23	peak
6	5554.000	45.74	1.92	47.66	74.00	-26.34	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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

7-18GHz

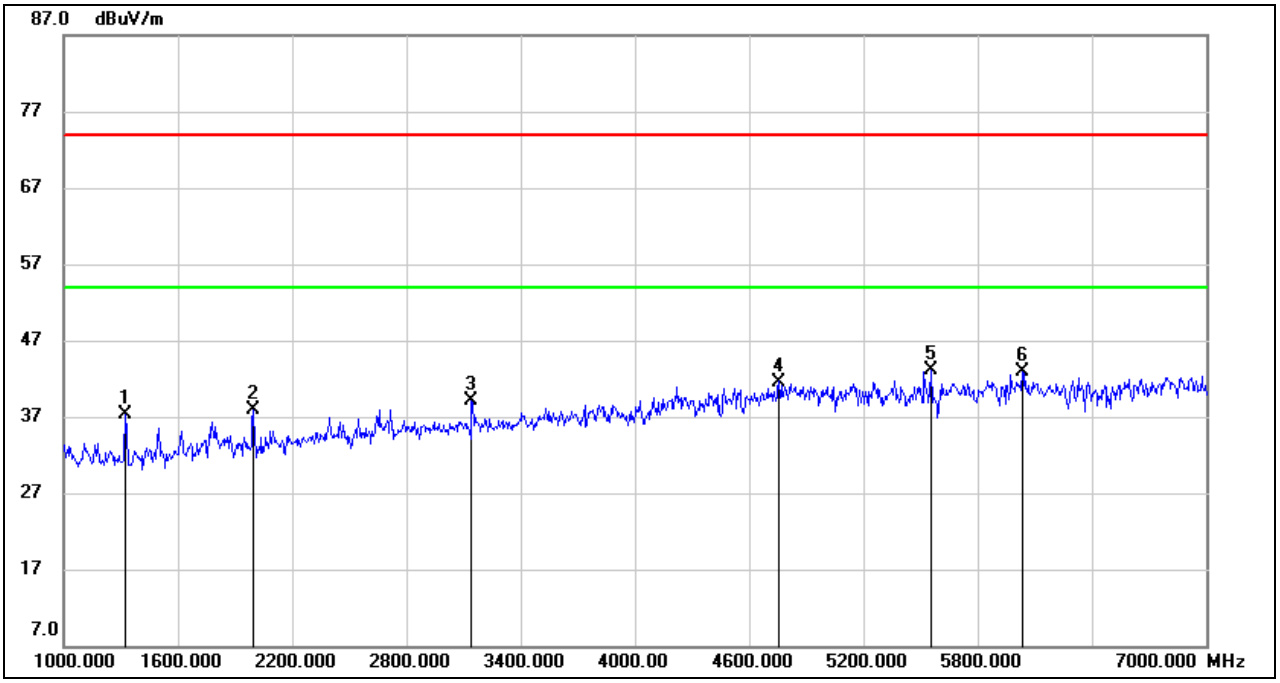


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7990.000	40.12	7.45	47.57	74.00	-26.43	peak
2	10311.000	49.82	11.29	61.11	68.20	-7.09	peak
3	10311.000	41.52	11.29	52.81	68.20	-15.39	AVG
4	11730.000	37.12	13.11	50.23	74.00	-23.77	peak
5	13908.000	34.78	16.16	50.94	74.00	-23.06	peak
6	15470.000	36.94	16.42	53.36	74.00	-20.64	peak
7	17758.000	30.46	23.03	53.49	74.00	-20.51	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

HARMONICS AND SPURIOUS EMISSIONS MID CHANNEL

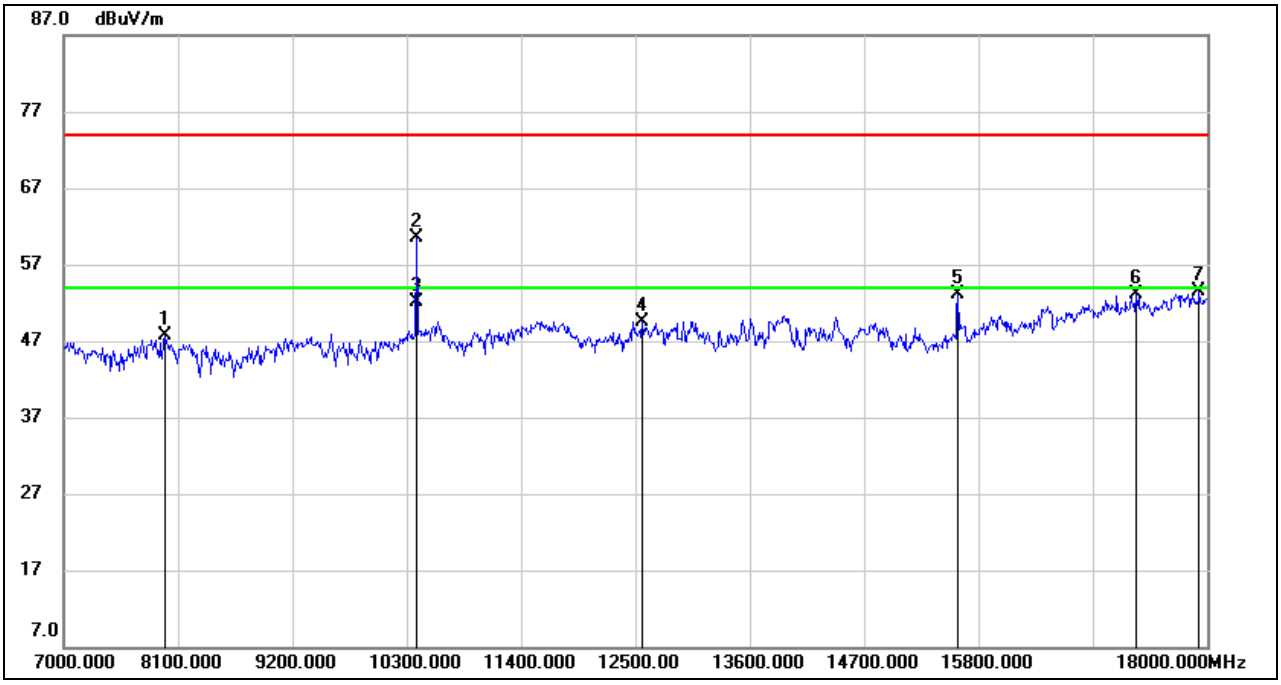
HORIZONTAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1324.000	50.27	-12.89	37.38	74.00	-36.62	peak
2	1996.000	48.06	-10.24	37.82	74.00	-36.18	peak
3	3142.000	44.85	-5.79	39.06	74.00	-34.94	peak
4	4756.000	41.34	0.26	41.60	74.00	-32.40	peak
5	5554.000	41.09	1.92	43.01	74.00	-30.99	peak
6	6034.000	40.38	2.58	42.96	74.00	-31.04	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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

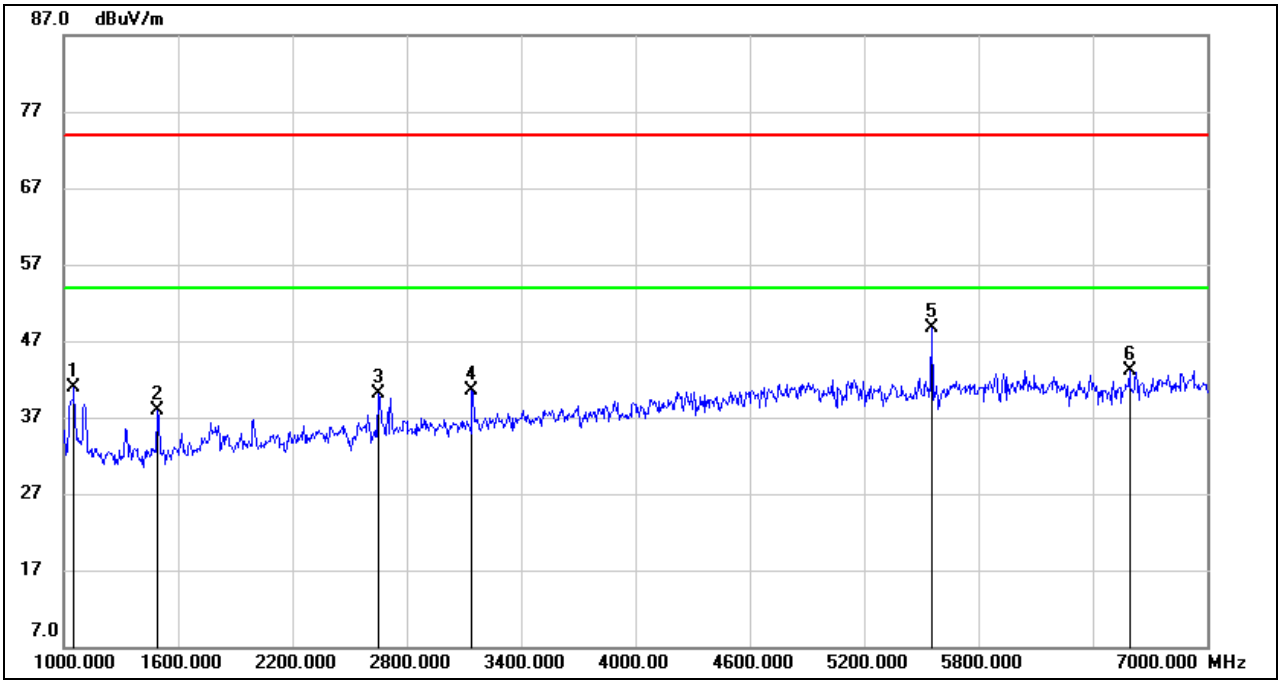
HORIZONTAL RESULTS
7-18GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7968.000	40.28	7.49	47.77	74.00	-26.23	peak
2	10399.000	49.36	11.17	60.53	68.20	-7.67	peak
3	10399.000	40.94	11.17	52.11	68.20	-16.09	AVG
4	12566.000	35.14	14.42	49.56	74.00	-24.44	peak
5	15602.000	36.02	17.11	53.13	74.00	-20.87	peak
6	17318.000	31.32	21.82	53.14	74.00	-20.86	peak
7	17923.000	30.00	23.42	53.42	74.00	-20.58	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

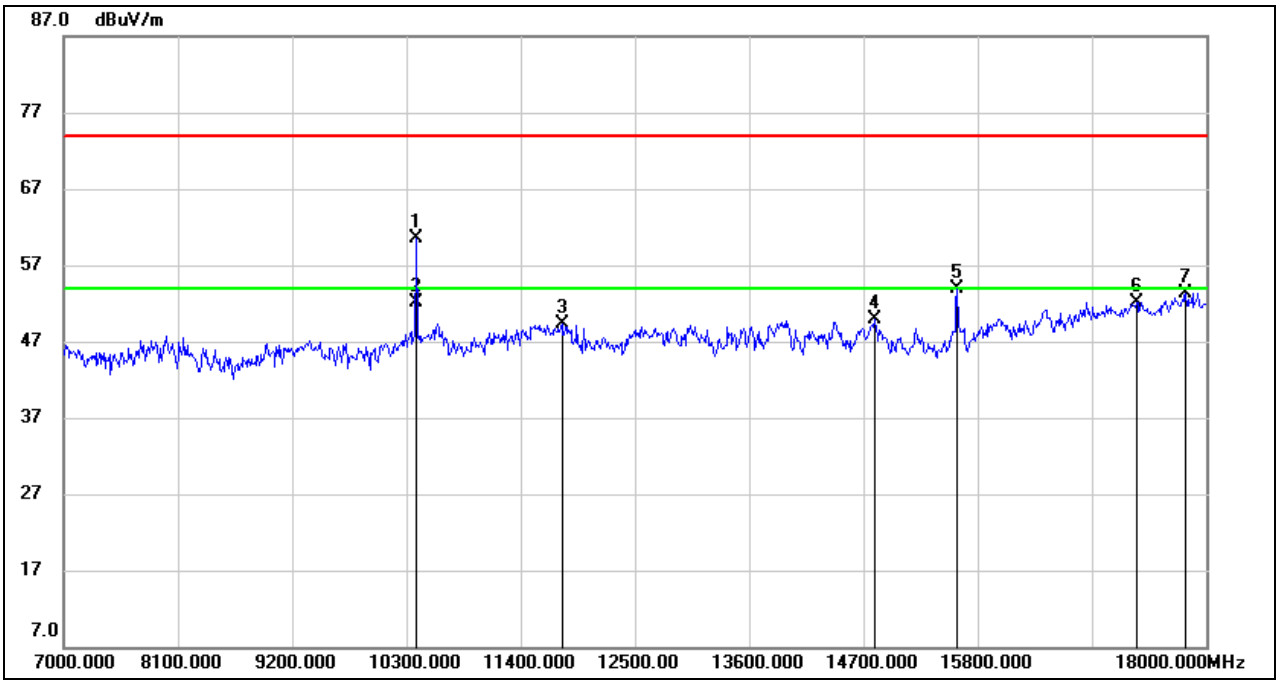
VERTICAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1054.000	54.73	-13.79	40.94	74.00	-33.06	peak
2	1492.000	50.27	-12.33	37.94	74.00	-36.06	peak
3	2650.000	48.06	-7.87	40.19	74.00	-33.81	peak
4	3142.000	46.24	-5.79	40.45	74.00	-33.55	peak
5	5554.000	46.80	1.92	48.72	74.00	-25.28	peak
6	6592.000	38.73	4.44	43.17	74.00	-30.83	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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

7-18GHz

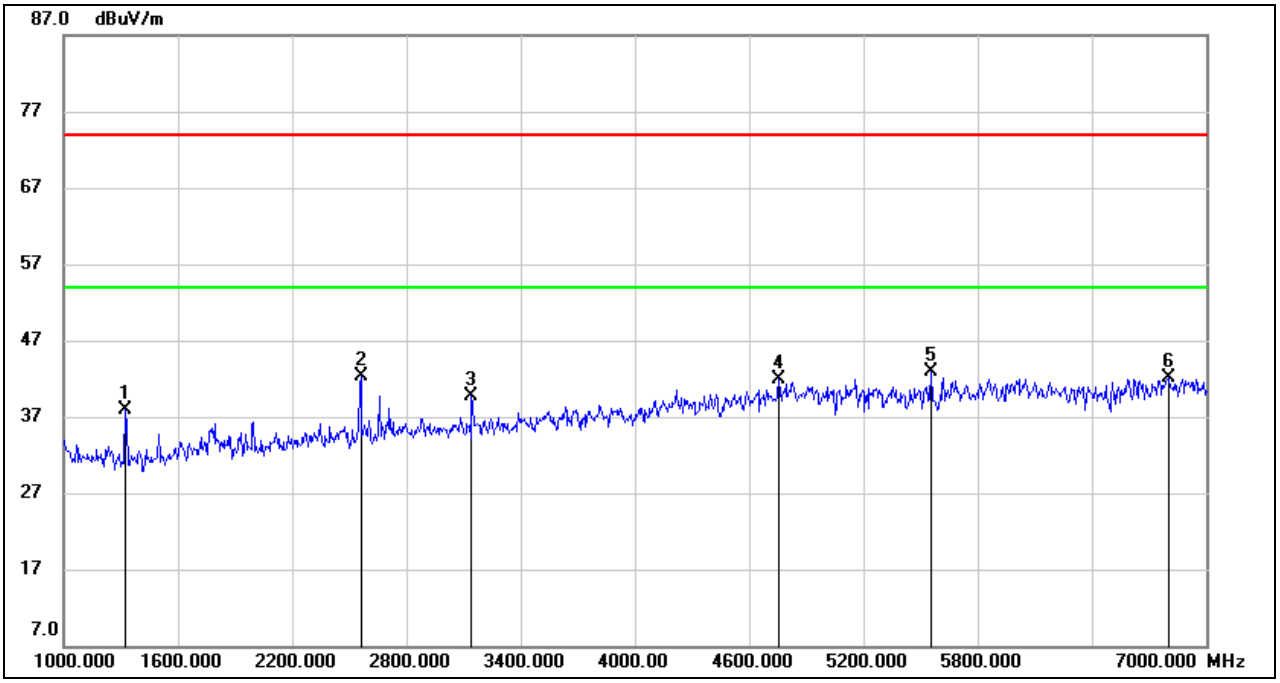


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	10399.000	49.30	11.17	60.47	68.20	-7.73	peak
2	10399.000	40.87	11.17	52.04	68.20	-16.16	AVG
3	11796.000	36.04	13.26	49.30	74.00	-24.70	peak
4	14810.000	33.75	16.07	49.82	74.00	-24.18	peak
5	15602.000	36.80	17.11	53.91	74.00	-20.09	peak
6	17329.000	30.42	21.78	52.20	74.00	-21.80	peak
7	17802.000	29.87	23.41	53.28	74.00	-20.72	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

HARMONICS AND SPURIOUS EMISSIONS HIGH CHANNEL

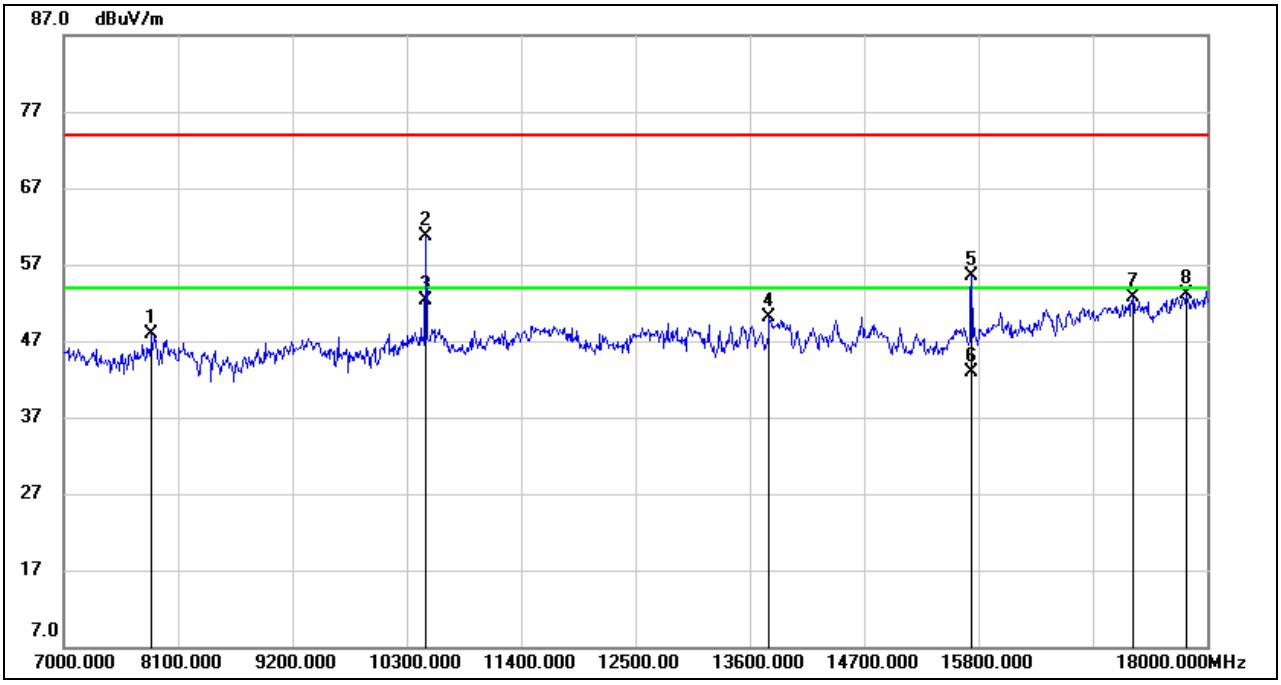
HORIZONTAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1324.000	50.88	-12.89	37.99	74.00	-36.01	peak
2	2560.000	50.68	-8.29	42.39	74.00	-31.61	peak
3	3142.000	45.56	-5.79	39.77	74.00	-34.23	peak
4	4756.000	41.70	0.26	41.96	74.00	-32.04	peak
5	5554.000	41.07	1.92	42.99	74.00	-31.01	peak
6	6802.000	37.65	4.44	42.09	74.00	-31.91	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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

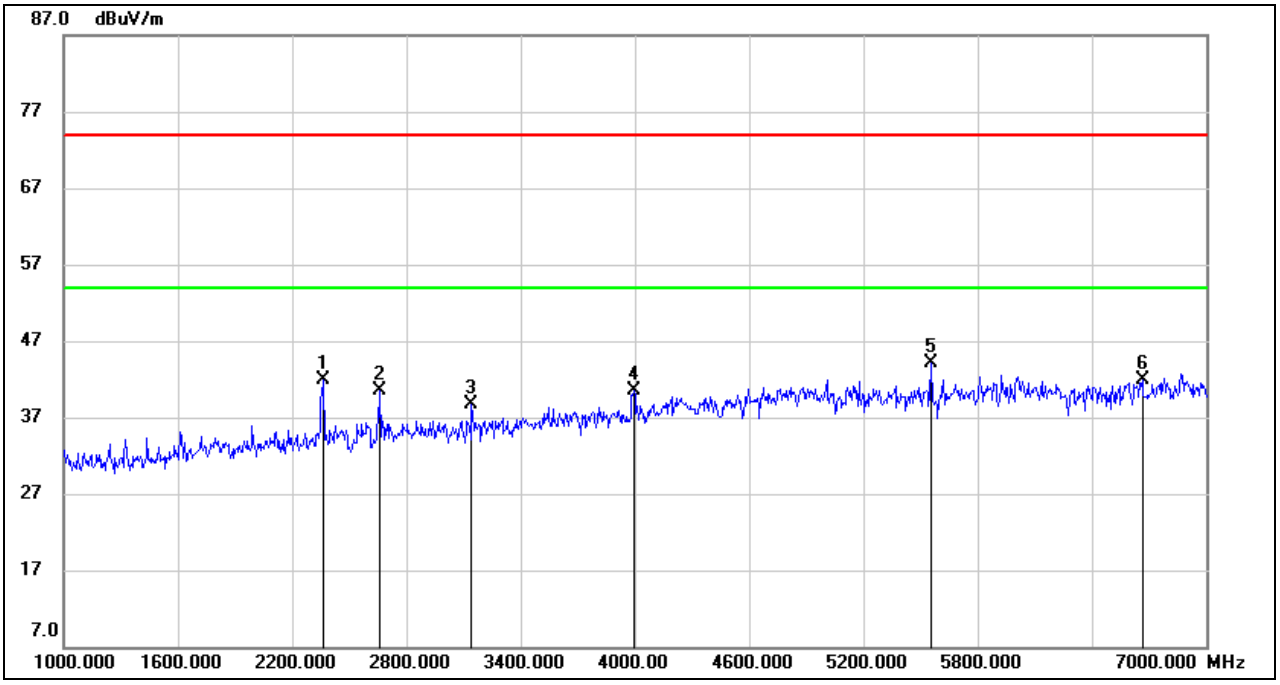
HORIZONTAL RESULTS
7-18GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7847.000	40.04	7.91	47.95	74.00	-26.05	peak
2	10487.000	49.32	11.33	60.65	68.20	-7.55	peak
3	10487.000	40.89	11.33	52.22	68.20	-15.98	AVG
4	13787.000	33.19	16.94	50.13	74.00	-23.87	peak
5	15734.000	38.53	16.93	55.46	74.00	-18.54	peak
6	15734.000	25.92	16.93	42.85	54.00	-11.15	AVG
7	17285.000	30.90	21.79	52.69	74.00	-21.31	peak
8	17802.000	29.76	23.41	53.17	74.00	-20.83	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

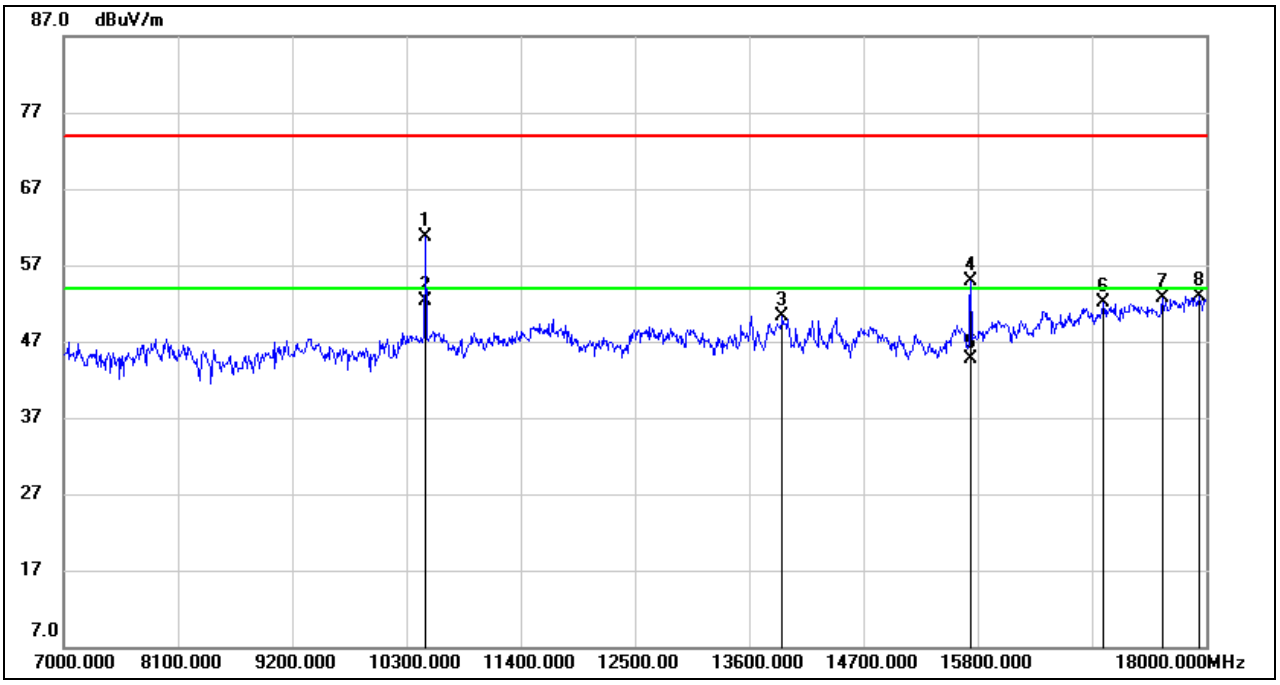
VERTICAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2362.000	50.62	-8.73	41.89	74.00	-32.11	peak
2	2662.000	48.33	-7.80	40.53	74.00	-33.47	peak
3	3142.000	44.49	-5.79	38.70	74.00	-35.30	peak
4	3994.000	44.27	-3.73	40.54	74.00	-33.46	peak
5	5554.000	42.17	1.92	44.09	74.00	-29.91	peak
6	6664.000	37.43	4.47	41.90	74.00	-32.10	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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

7-18GHz



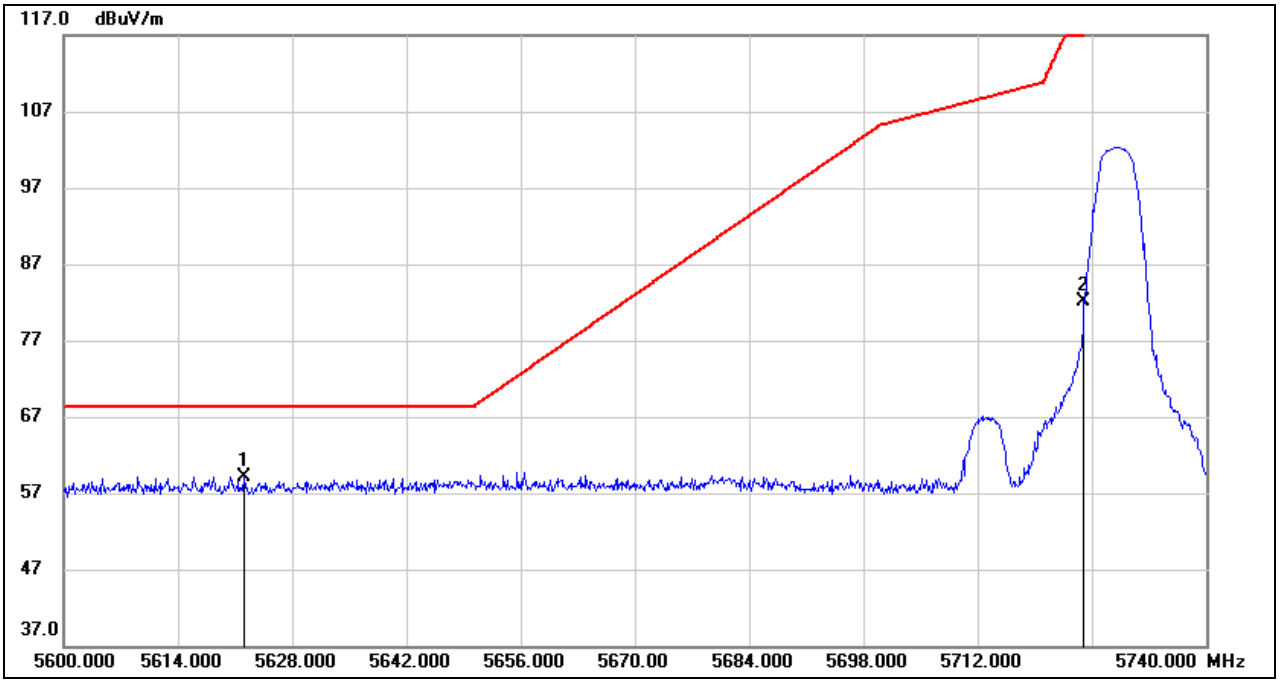
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	10487.000	49.32	11.33	60.65	68.20	-7.55	peak
2	10487.000	40.98	11.33	52.31	68.20	-15.89	AVG
3	13919.000	34.21	16.16	50.37	74.00	-23.63	peak
4	15734.000	37.92	16.93	54.85	74.00	-19.15	peak
5	15734.000	27.83	16.93	44.76	54.00	-9.24	AVG
6	17010.000	31.43	20.67	52.10	74.00	-21.90	peak
7	17582.000	30.98	21.78	52.76	74.00	-21.24	peak
8	17934.000	29.46	23.45	52.91	74.00	-21.09	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

8.2. 5.8G TX MODE

RESTRICTED BANDEDGE LOW CHANNEL

HORIZONTAL RESULTS
PEAK



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5622.120	17.72	41.47	59.19	68.20	-9.01	peak
2	5725.000	40.56	41.61	82.17	122.20	-40.03	peak

Note: 1. Measurement = Reading Level + Correct Factor.

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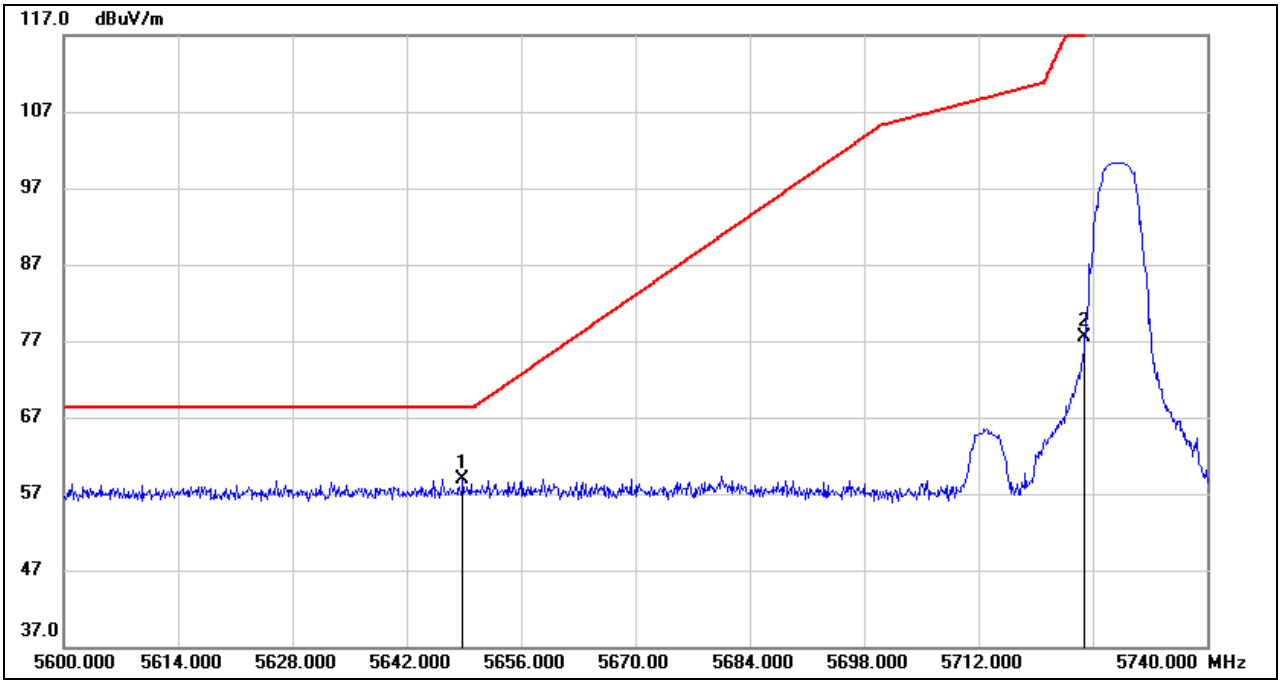
VERTICAL RESULTS
PEAK

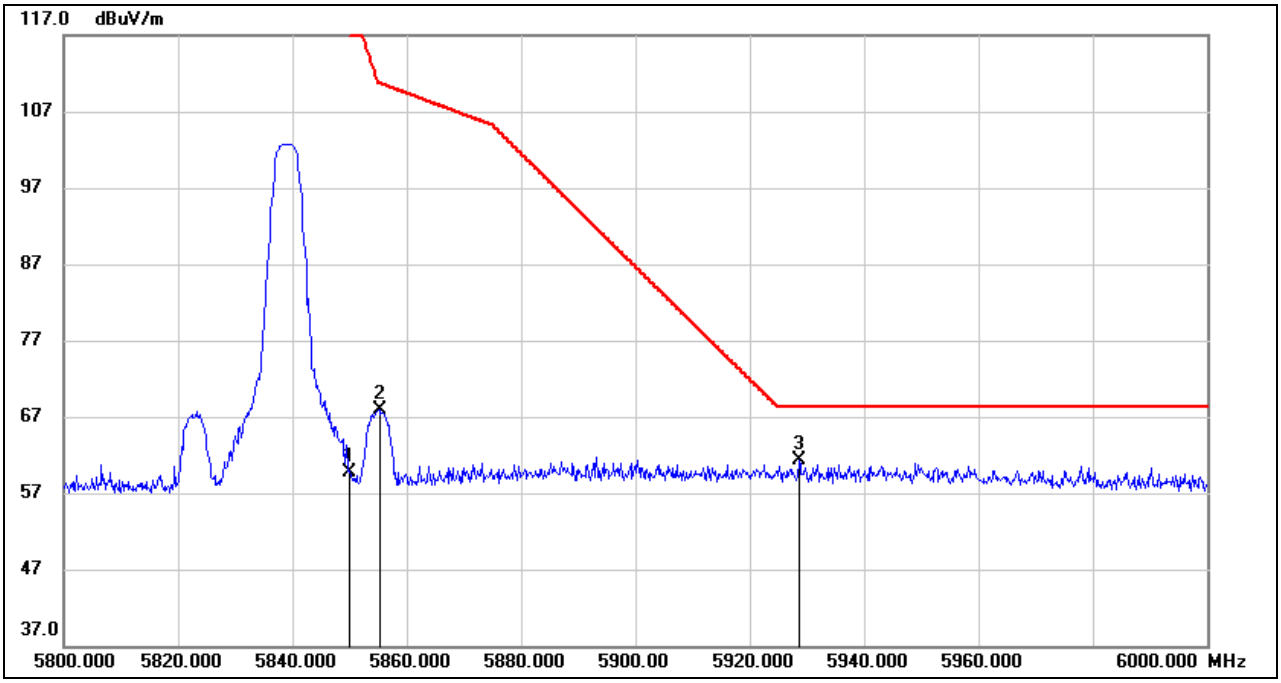


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5648.860	17.36	41.48	58.84	68.20	-9.36	peak
2	5725.000	35.98	41.61	77.59	122.20	-44.61	peak

Note: 1. Measurement = Reading Level + Correct Factor.

RESTRICTED BANDEDGE HIGH CHANNEL

HORIZONTAL RESULTS
PEAK



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	16.91	42.89	59.80	122.20	-62.40	peak
2	5855.200	24.90	42.99	67.89	110.74	-42.85	peak
3	5928.600	17.99	43.36	61.35	68.20	-6.85	peak

Note: 1. Measurement = Reading Level + Correct Factor.

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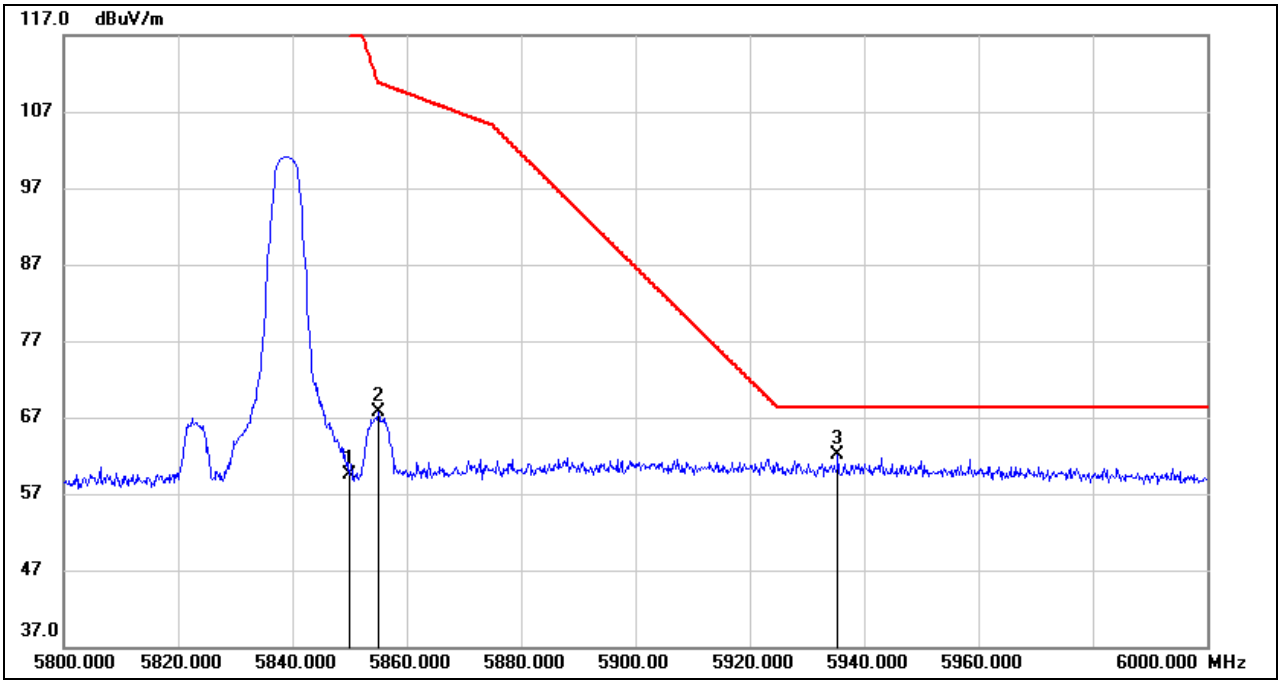
VERTICAL RESULTS
PEAK

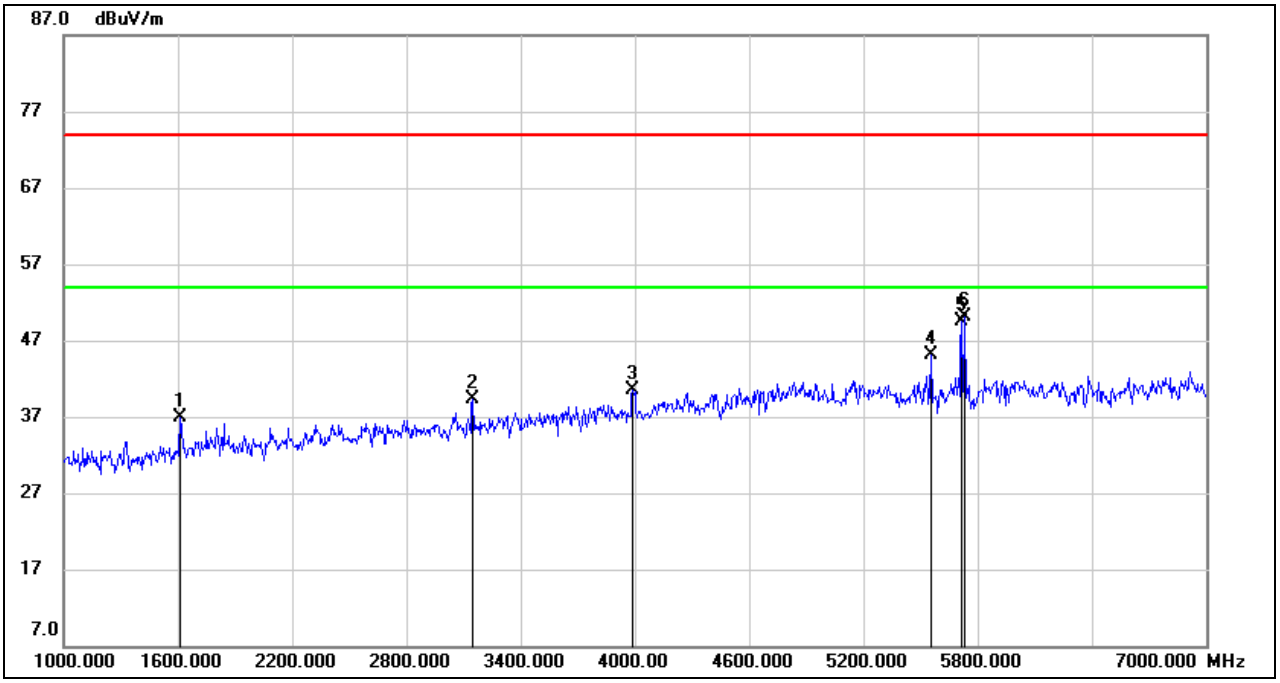


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	16.70	42.89	59.59	122.20	-62.61	peak
2	5855.000	24.69	42.99	67.68	110.80	-43.12	peak
3	5935.400	18.87	43.24	62.11	68.20	-6.09	peak

Note: 1. Measurement = Reading Level + Correct Factor.

HARMONICS AND SPURIOUS EMISSIONS LOW CHANNEL

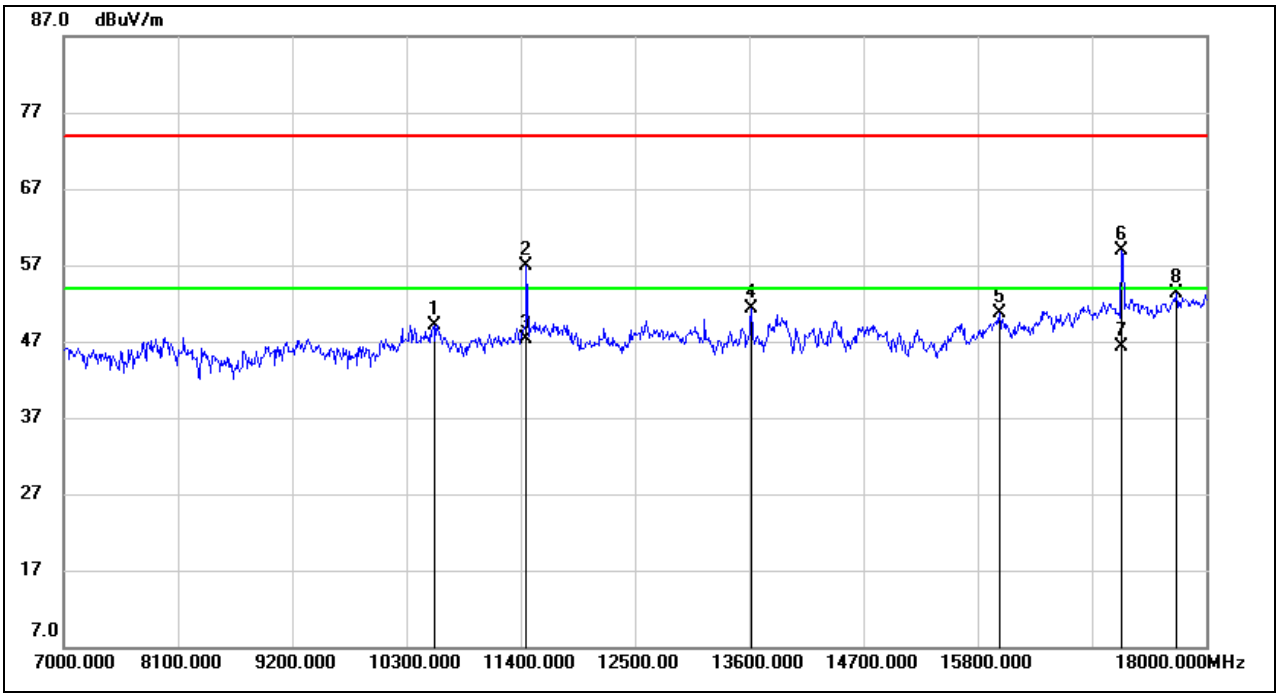
HORIZONTAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1612.000	48.45	-11.52	36.93	74.00	-37.07	peak
2	3148.000	45.07	-5.77	39.30	74.00	-34.70	peak
3	3988.000	44.28	-3.72	40.56	74.00	-33.44	peak
4	5554.000	43.24	1.92	45.16	74.00	-28.84	peak
5	5716.000	47.62	1.97	49.59	74.00	-24.41	peak
6	5729.000	48.07	1.97	50.04	/	/	fundamental

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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

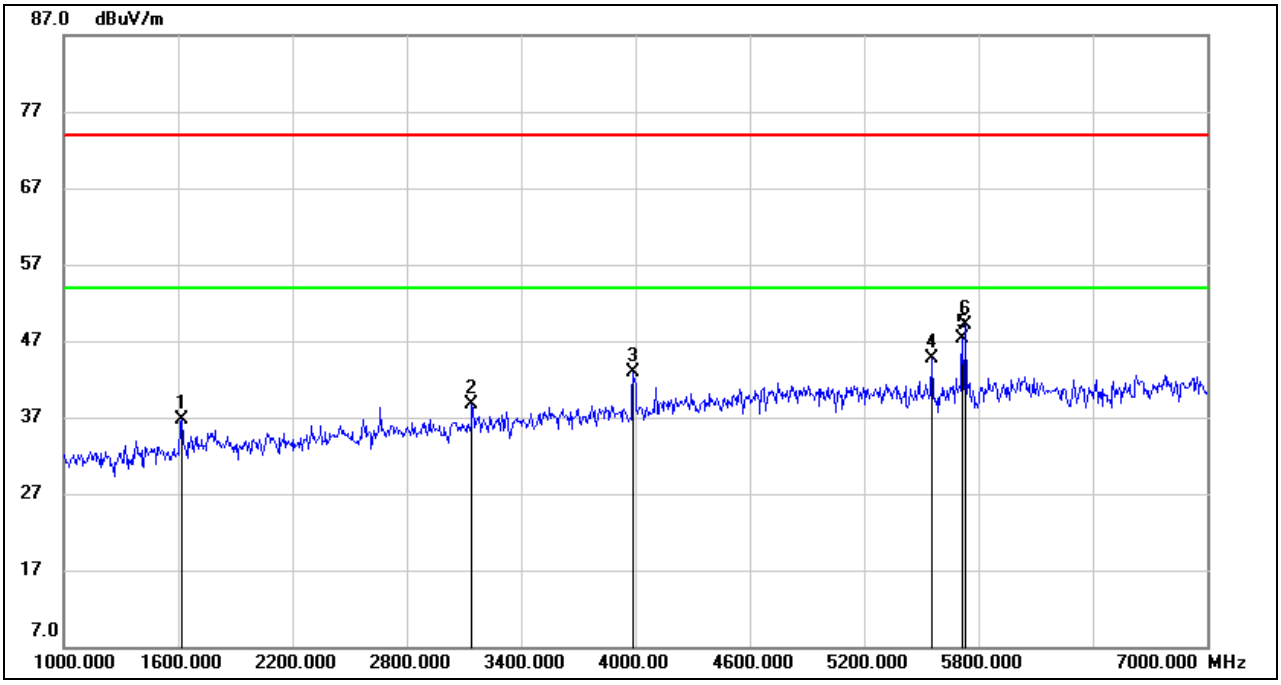
HORIZONTAL RESULTS
7-18GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	10564.000	37.10	12.06	49.16	74.00	-24.84	peak
2	11455.000	43.82	13.08	56.90	74.00	-17.10	peak
3	11455.000	34.23	13.08	47.31	54.00	-6.69	AVG
4	13622.000	35.13	16.08	51.21	74.00	-22.79	peak
5	16009.000	32.89	17.85	50.74	74.00	-23.26	peak
6	17186.000	37.67	21.16	58.83	68.20	-9.37	peak
7	17186.000	25.20	21.16	46.36	68.20	-21.84	AVG
8	17714.000	30.64	22.62	53.26	74.00	-20.74	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

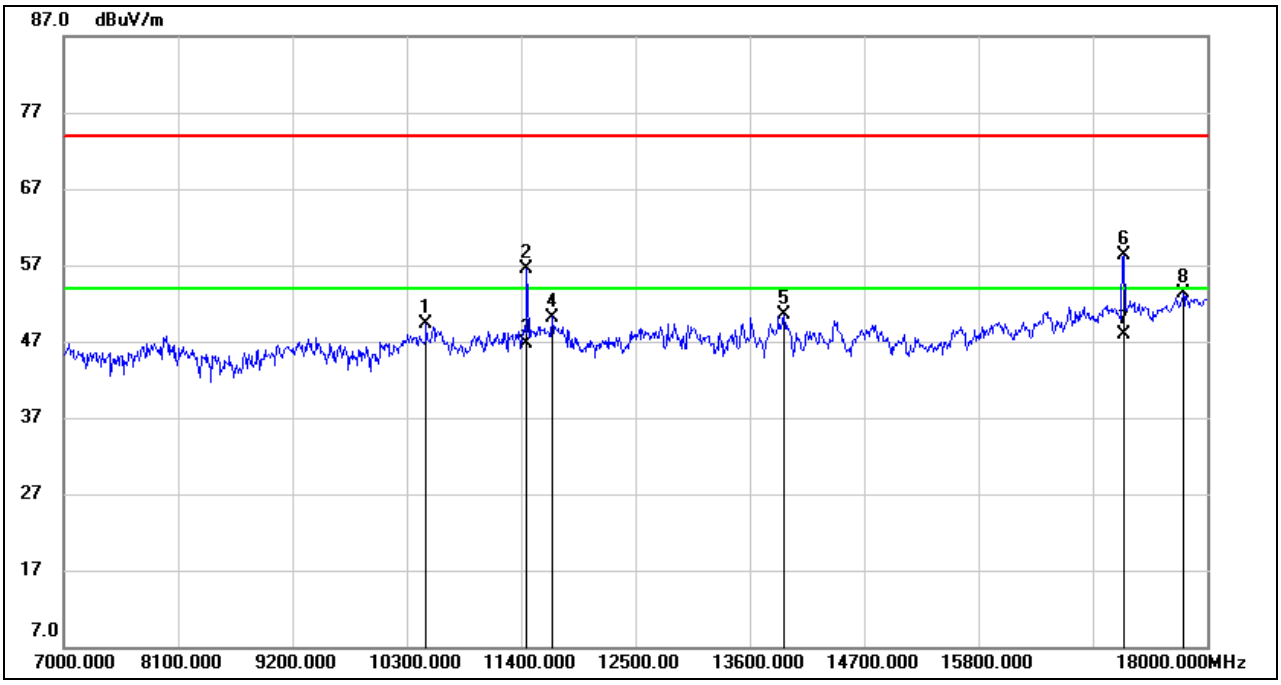
VERTICAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1618.000	48.16	-11.48	36.68	74.00	-37.32	peak
2	3142.000	44.44	-5.79	38.65	74.00	-35.35	peak
3	3988.000	46.62	-3.72	42.90	74.00	-31.10	peak
4	5554.000	42.86	1.92	44.78	74.00	-29.22	peak
5	5716.000	45.42	1.97	47.39	74.00	-26.61	peak
6	5729.000	47.12	1.97	49.09	/	/	fundamental

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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

7-18GHz

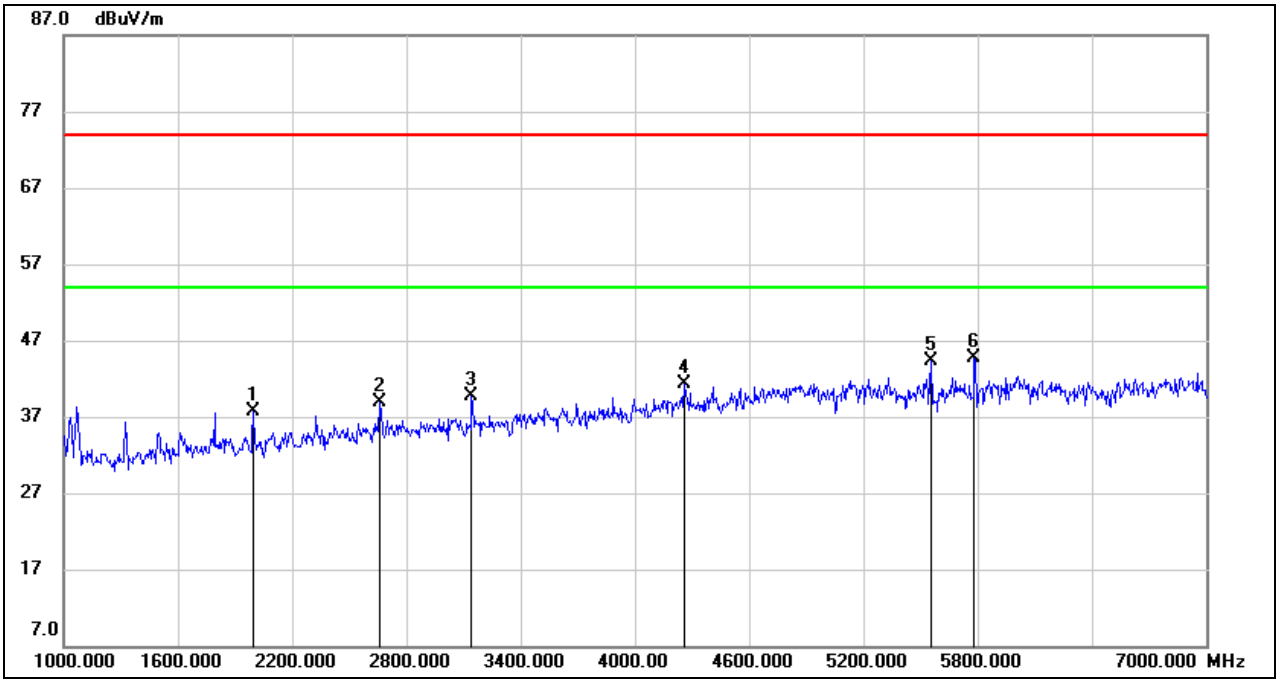


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	10487.000	37.93	11.33	49.26	74.00	-24.74	peak
2	11455.000	43.44	13.08	56.52	74.00	-17.48	peak
3	11455.000	33.55	13.08	46.63	54.00	-7.37	AVG
4	11697.000	37.14	13.06	50.20	74.00	-23.80	peak
5	13930.000	34.38	16.17	50.55	74.00	-23.45	peak
6	17197.000	37.16	21.20	58.36	68.20	-9.84	peak
7	17197.000	26.72	21.20	47.92	68.20	-20.28	AVG
8	17769.000	30.09	23.12	53.21	74.00	-20.79	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

HARMONICS AND SPURIOUS EMISSIONS MID CHANNEL

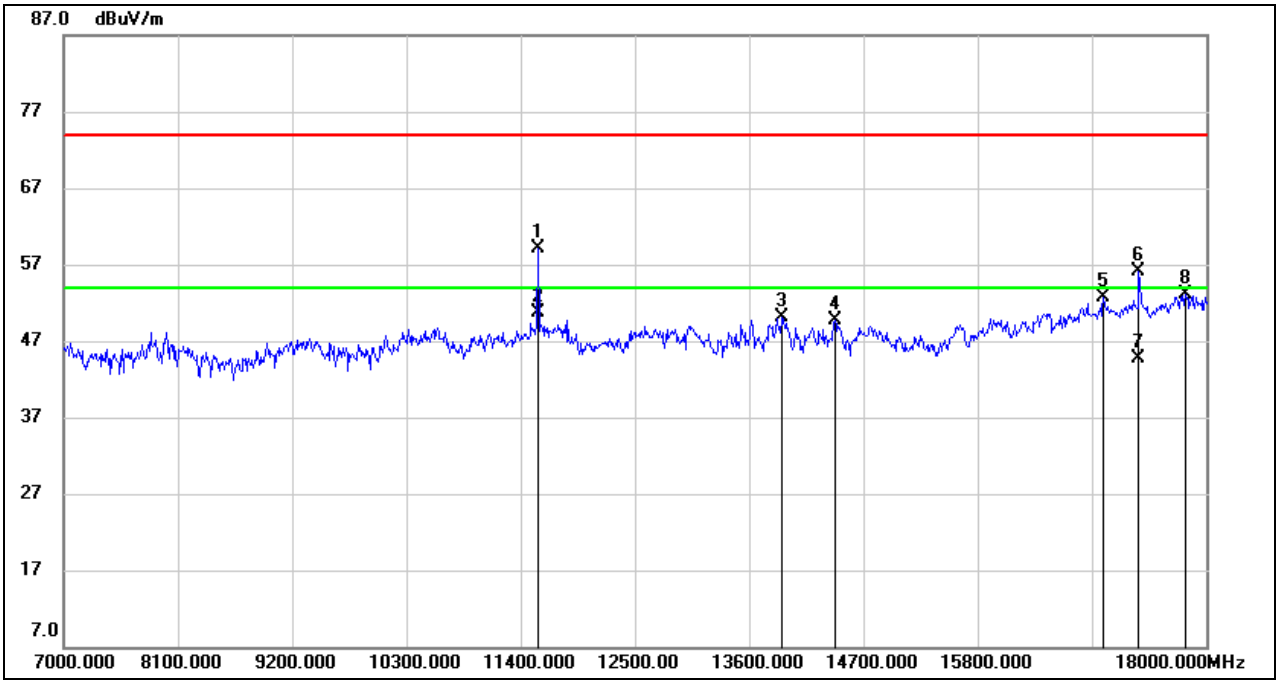
HORIZONTAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1996.000	47.95	-10.24	37.71	74.00	-36.29	peak
2	2656.000	46.79	-7.83	38.96	74.00	-35.04	peak
3	3142.000	45.58	-5.79	39.79	74.00	-34.21	peak
4	4258.000	43.08	-1.84	41.24	74.00	-32.76	peak
5	5554.000	42.48	1.92	44.40	74.00	-29.60	peak
6	5783.000	42.79	1.95	44.74	/	/	fundamental

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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

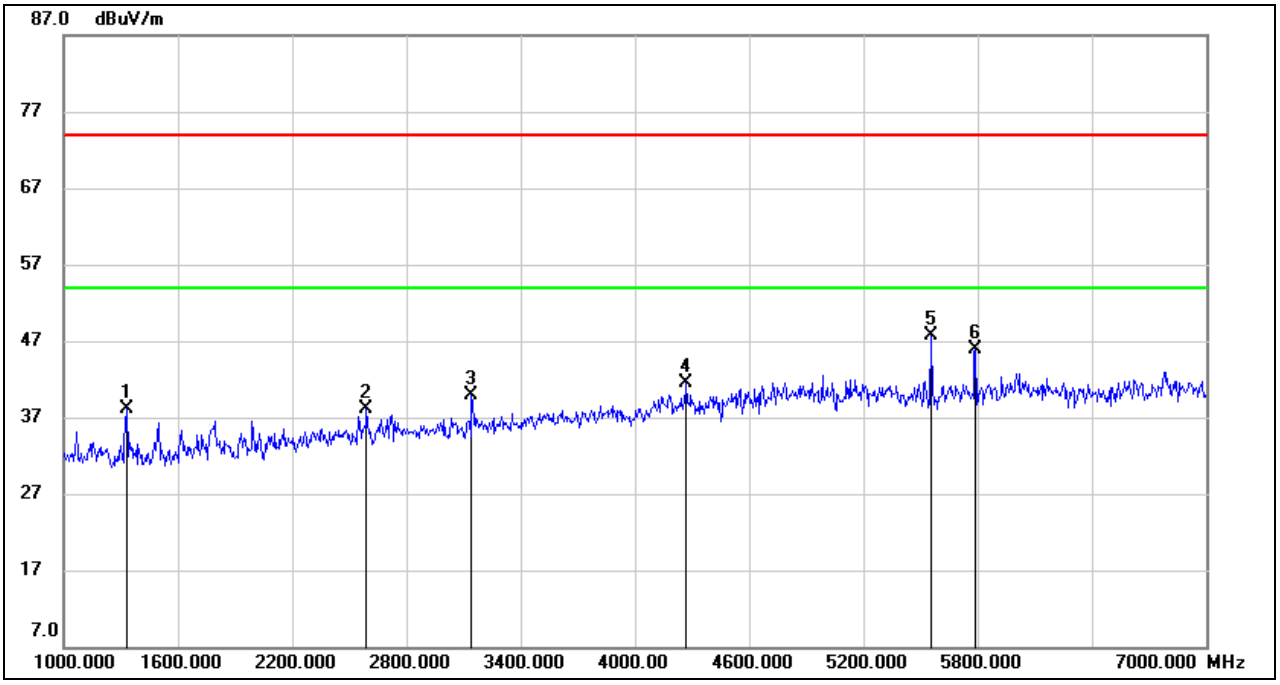
HORIZONTAL RESULTS
7-18GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	11565.000	45.69	13.47	59.16	74.00	-14.84	peak
2	11565.000	37.15	13.47	50.62	54.00	-3.38	AVG
3	13919.000	33.89	16.16	50.05	74.00	-23.95	peak
4	14425.000	33.00	16.65	49.65	74.00	-24.35	peak
5	17010.000	31.94	20.67	52.61	74.00	-21.39	peak
6	17351.000	34.37	21.71	56.08	68.20	-12.12	peak
7	17351.000	22.90	21.71	44.61	68.20	-23.59	AVG
8	17802.000	29.65	23.41	53.06	74.00	-20.94	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

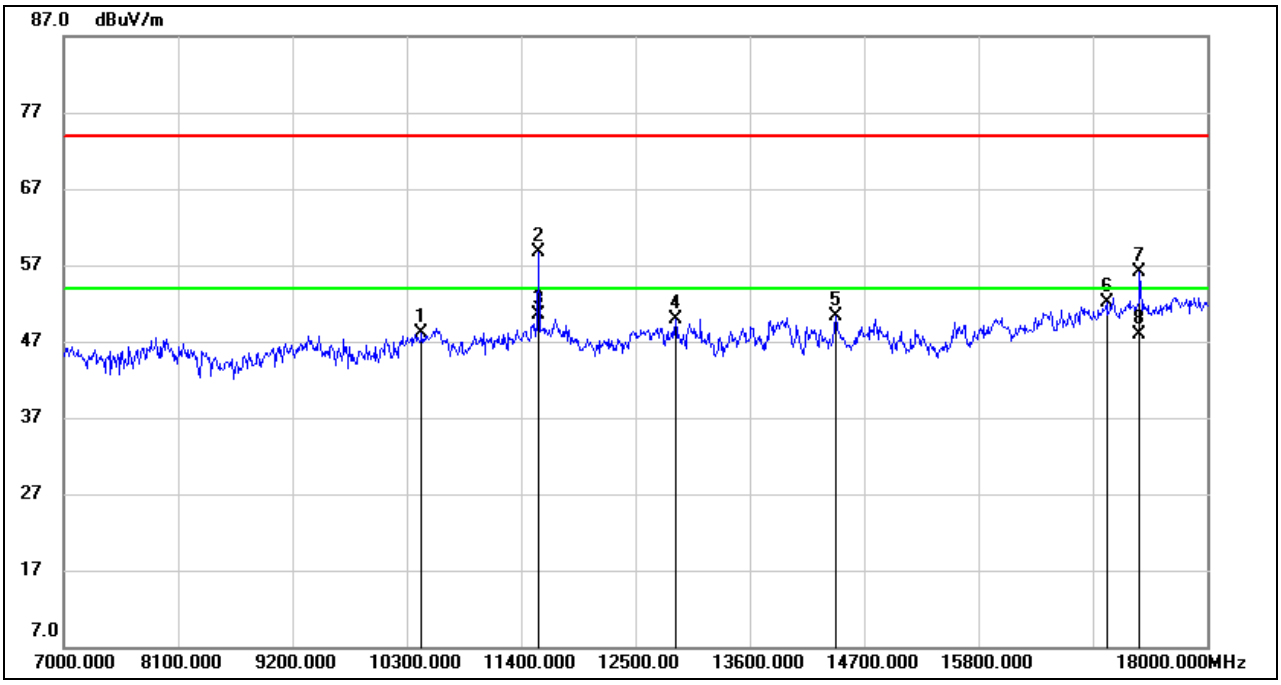
VERTICAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1330.000	50.96	-12.88	38.08	74.00	-35.92	peak
2	2590.000	46.30	-8.21	38.09	74.00	-35.91	peak
3	3142.000	45.76	-5.79	39.97	74.00	-34.03	peak
4	4270.000	43.30	-1.84	41.46	74.00	-32.54	peak
5	5554.000	45.81	1.92	47.73	74.00	-26.27	peak
6	5783.000	43.91	1.95	45.86	/	/	fundamental

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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

7-18GHz

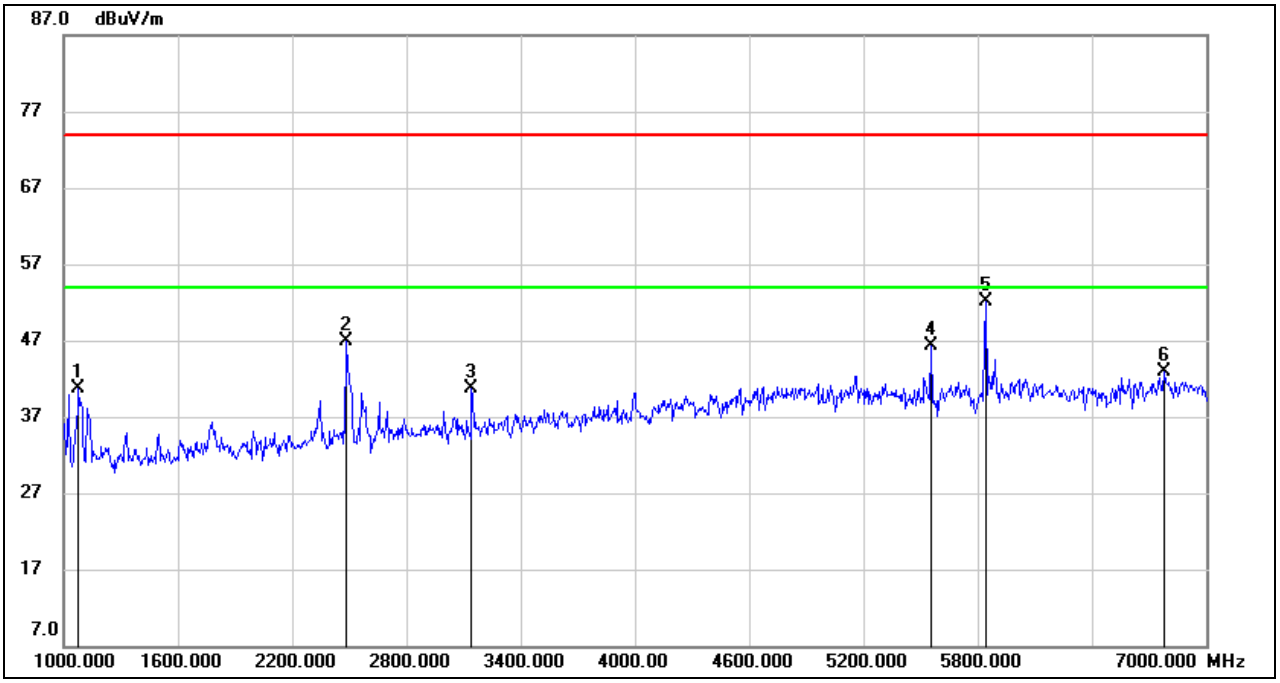


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	10443.000	36.90	11.25	48.15	74.00	-25.85	peak
2	11565.000	45.22	13.47	58.69	74.00	-15.31	peak
3	11565.000	36.96	13.47	50.43	54.00	-3.57	AVG
4	12885.000	34.63	15.26	49.89	74.00	-24.11	peak
5	14425.000	33.68	16.65	50.33	74.00	-23.67	peak
6	17032.000	31.38	20.72	52.10	74.00	-21.90	peak
7	17351.000	34.30	21.71	56.01	68.20	-12.19	peak
8	17351.000	26.18	21.71	47.89	68.20	-20.31	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

HARMONICS AND SPURIOUS EMISSIONS HIGH CHANNEL

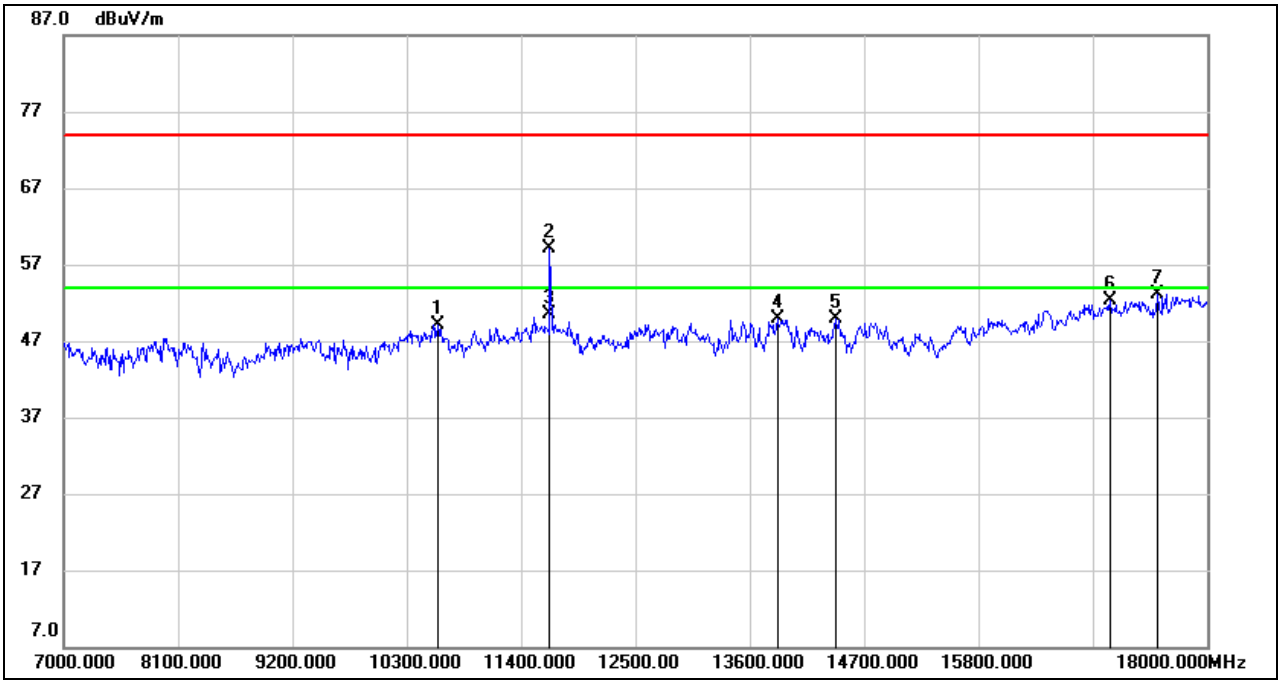
HORIZONTAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1078.000	54.30	-13.67	40.63	74.00	-33.37	peak
2	2482.000	55.46	-8.50	46.96	74.00	-27.04	peak
3	3142.000	46.50	-5.79	40.71	74.00	-33.29	peak
4	5554.000	44.30	1.92	46.22	74.00	-27.78	peak
5	5839.000	50.04	2.08	52.12	/	/	fundamental
6	6778.000	38.43	4.44	42.87	74.00	-31.13	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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

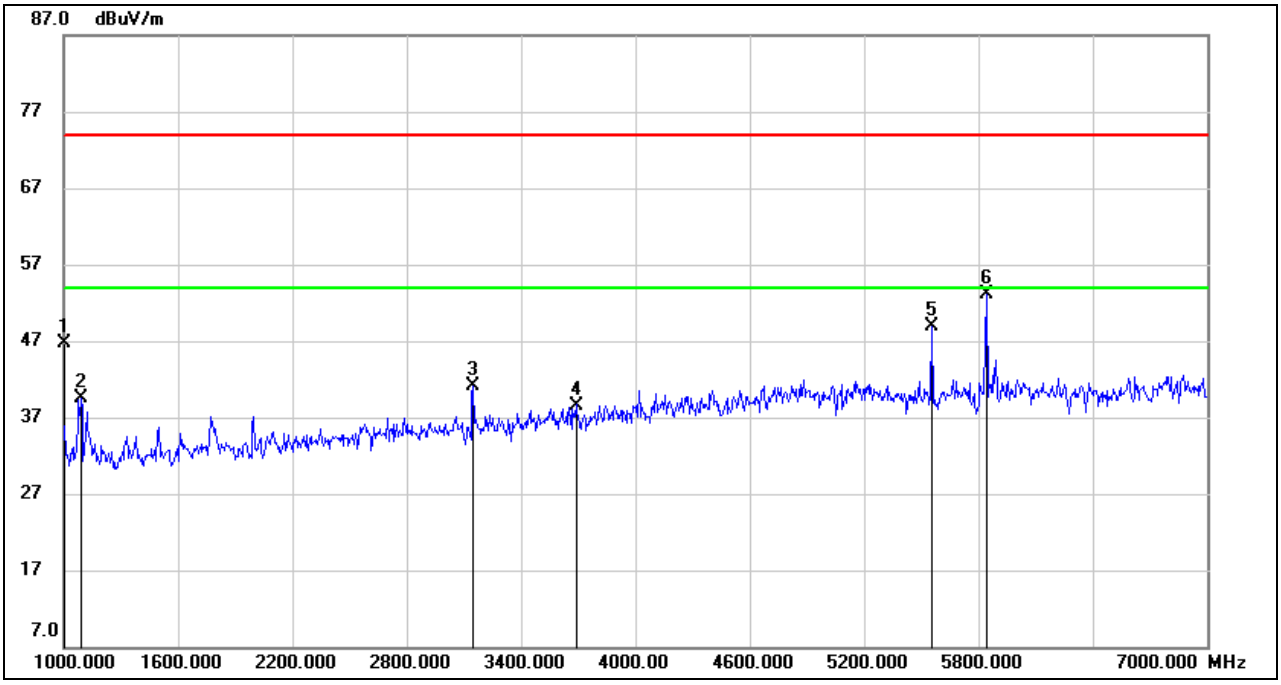
HORIZONTAL RESULTS
7-18GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	10597.000	36.72	12.43	49.15	74.00	-24.85	peak
2	11675.000	46.00	13.16	59.16	74.00	-14.84	peak
3	11675.000	37.28	13.16	50.44	54.00	-3.56	AVG
4	13864.000	33.38	16.48	49.86	74.00	-24.14	peak
5	14425.000	33.31	16.65	49.96	74.00	-24.04	peak
6	17065.000	31.46	20.79	52.25	74.00	-21.75	peak
7	17527.000	31.64	21.55	53.19	74.00	-20.81	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

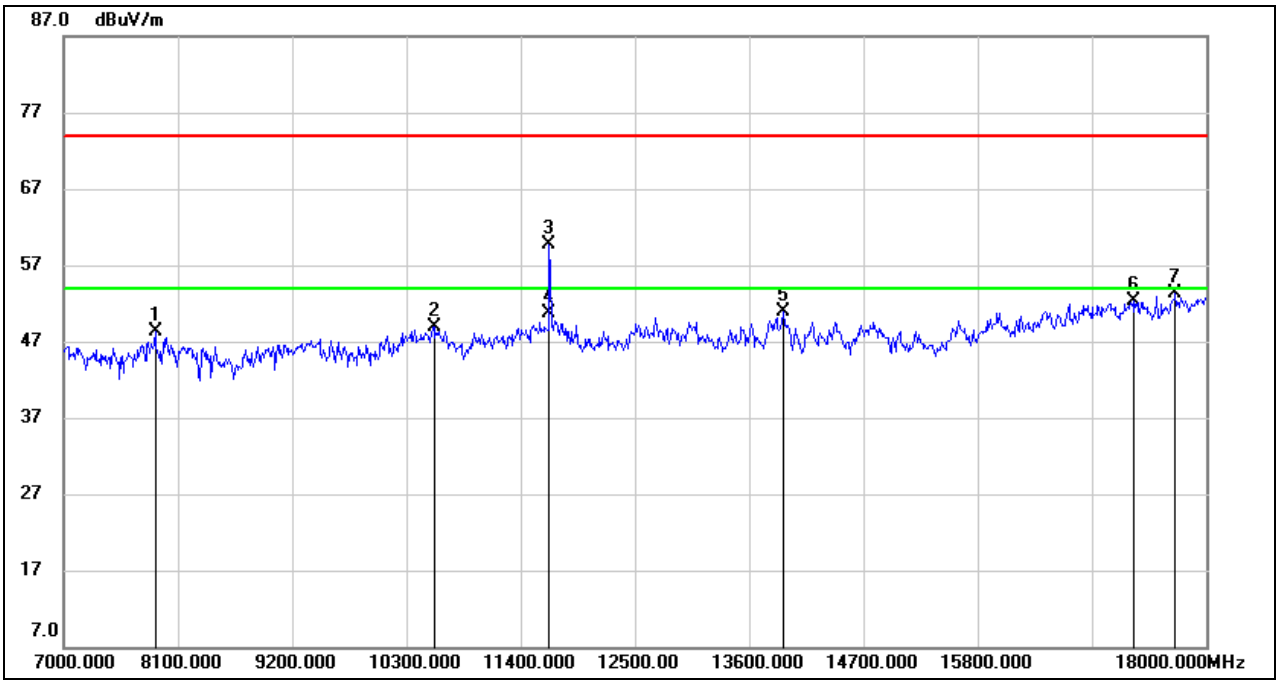
VERTICAL RESULTS
1-7GHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1000.0000	60.73	-14.06	46.67	74.00	-27.33	peak
2	1090.000	53.19	-13.62	39.57	74.00	-34.43	peak
3	3148.000	46.79	-5.77	41.02	74.00	-32.98	peak
4	3688.000	42.62	-4.02	38.60	74.00	-35.40	peak
5	5554.000	46.98	1.92	48.90	74.00	-25.10	peak
6	5839.000	50.97	2.08	53.05	/	/	fundamental

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. Filter losses were only considered in the 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.
6. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

7-18GHz



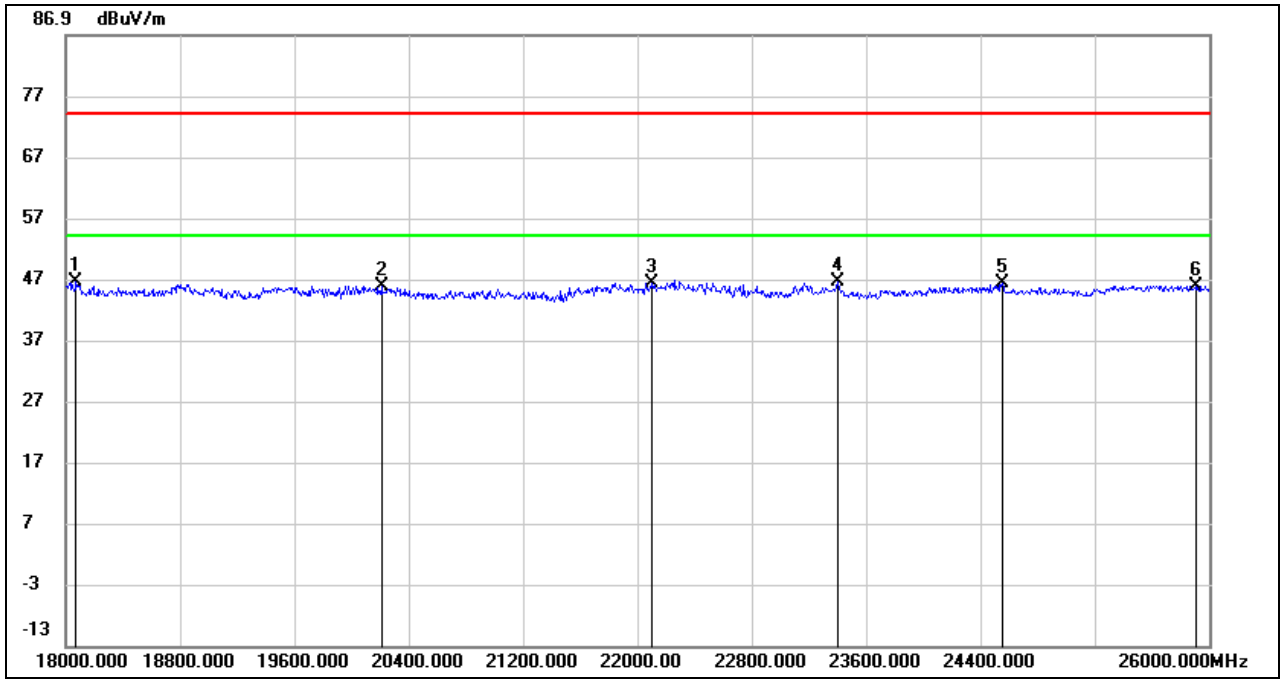
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7880.000	40.50	7.72	48.22	74.00	-25.78	peak
2	10564.000	36.93	12.06	48.99	74.00	-25.01	peak
3	11675.000	46.51	13.16	59.67	74.00	-14.33	peak
4	11675.000	37.56	13.16	50.72	54.00	-3.28	AVG
5	13930.000	34.65	16.17	50.82	74.00	-23.18	peak
6	17296.000	30.48	21.86	52.34	74.00	-21.66	peak
7	17703.000	30.72	22.52	53.24	74.00	-20.76	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.
5. For transmit duration, please refer to clause 7.1.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Owing to the highest peak level of unwanted emission out of the restricted bands complies with the lowest limit(54dBuV/m), so all the test point were deemed to comply with the limits list in the standard.

8.3. SPURIOUS EMISSIONS 18~26GHz

8.3.1. 5.2G MODE

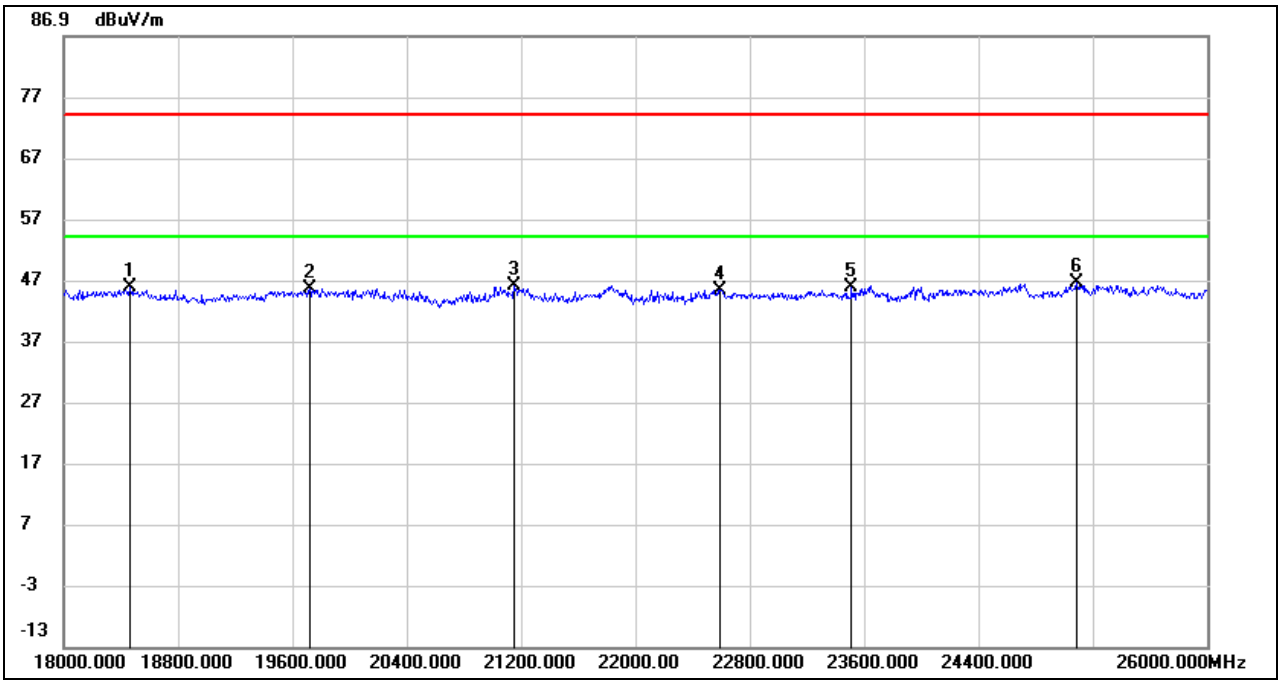
SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL, WORST-CASE CONFIGURATION)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18072.000	50.55	-4.02	46.53	74.00	-27.47	peak
2	20208.000	50.60	-4.79	45.81	74.00	-28.19	peak
3	22096.000	52.53	-6.18	46.35	74.00	-27.65	peak
4	23400.000	51.42	-4.96	46.46	74.00	-27.54	peak
5	24552.000	48.64	-2.46	46.18	74.00	-27.82	peak
6	25912.000	47.94	-2.06	45.88	74.00	-28.12	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.

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



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18464.000	50.20	-4.39	45.81	74.00	-28.19	peak
2	19720.000	50.00	-4.39	45.61	74.00	-28.39	peak
3	21152.000	51.56	-5.42	46.14	74.00	-27.86	peak
4	22592.000	51.12	-5.77	45.35	74.00	-28.65	peak
5	23512.000	50.51	-4.76	45.75	74.00	-28.25	peak
6	25088.000	47.63	-1.12	46.51	74.00	-27.49	peak

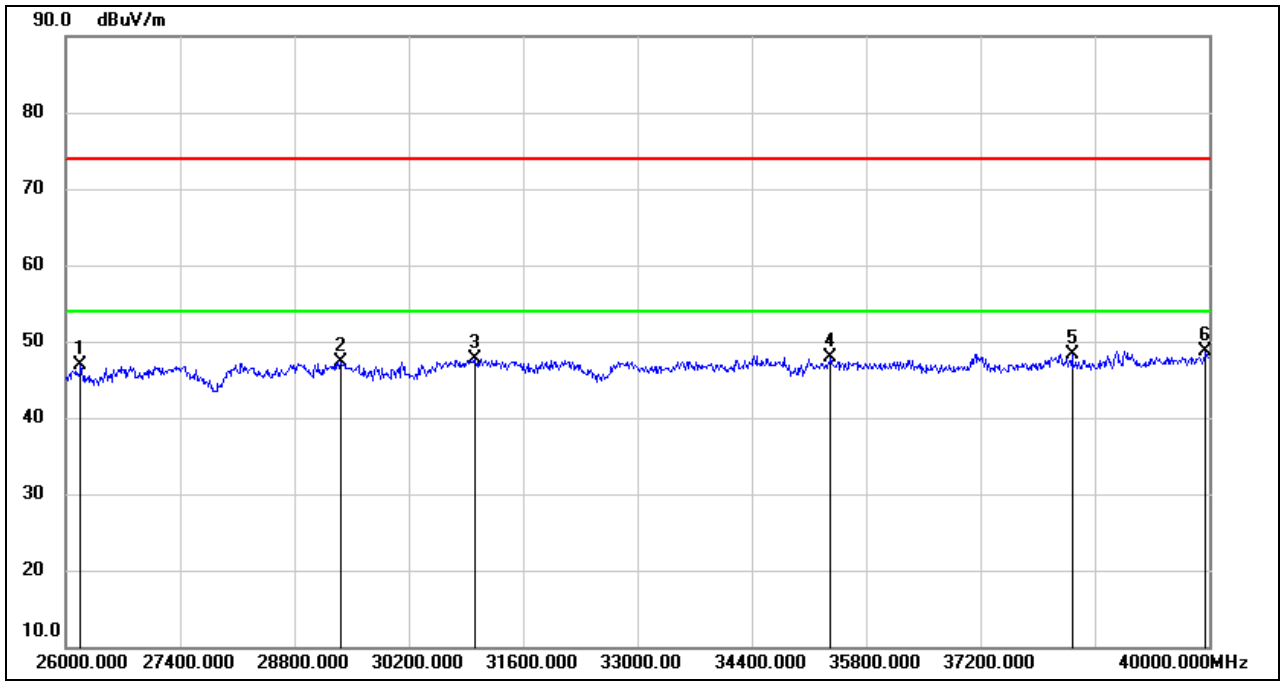
Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.

Note: All the test modes have been tested, only the worst data record in the report.

8.4. SPURIOUS EMISSIONS 26~40GHz

8.4.1. 5.2G MODE

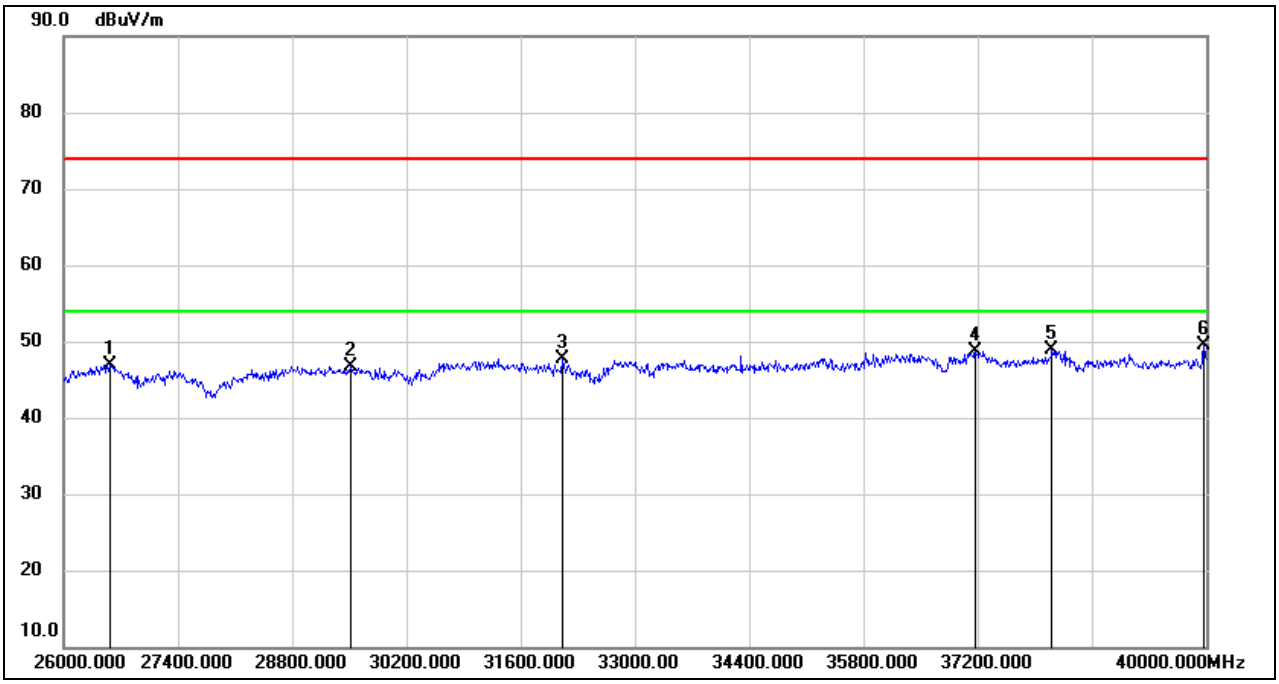
SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL, WORST-CASE CONFIGURATION)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	26182.000	52.50	-5.57	46.93	74.00	-27.07	peak
2	29374.000	48.18	-0.87	47.31	74.00	-26.69	peak
3	31012.000	48.33	-0.71	47.62	74.00	-26.38	peak
4	35366.000	45.40	2.59	47.99	74.00	-26.01	peak
5	38320.000	44.56	3.77	48.33	74.00	-25.67	peak
6	39958.000	43.58	5.12	48.70	74.00	-25.30	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. Proper operation of the transmitter prior to adding the filter to the measurement chain.

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



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	26560.000	51.67	-4.76	46.91	74.00	-27.09	peak
2	29514.000	47.41	-0.73	46.68	74.00	-27.32	peak
3	32104.000	49.49	-1.75	47.74	74.00	-26.26	peak
4	37172.000	45.62	3.16	48.78	74.00	-25.22	peak
5	38110.000	45.33	3.53	48.86	74.00	-25.14	peak
6	39972.000	44.45	5.13	49.58	74.00	-24.42	peak

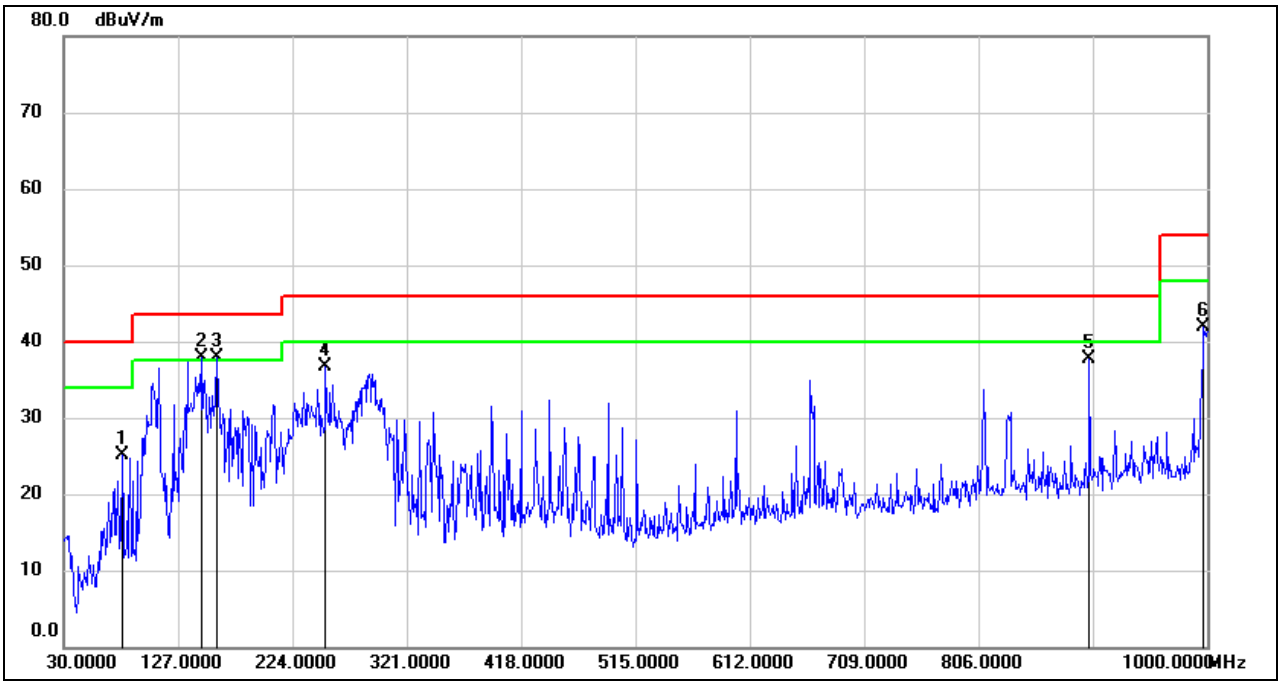
Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Proper operation of the transmitter prior to adding the filter to the measurement chain.

Note: All the test modes have been tested, only the worst data record in the report.

8.5. SPURIOUS EMISSIONS 30M ~ 1 GHz

8.5.1. 5.2G MODE

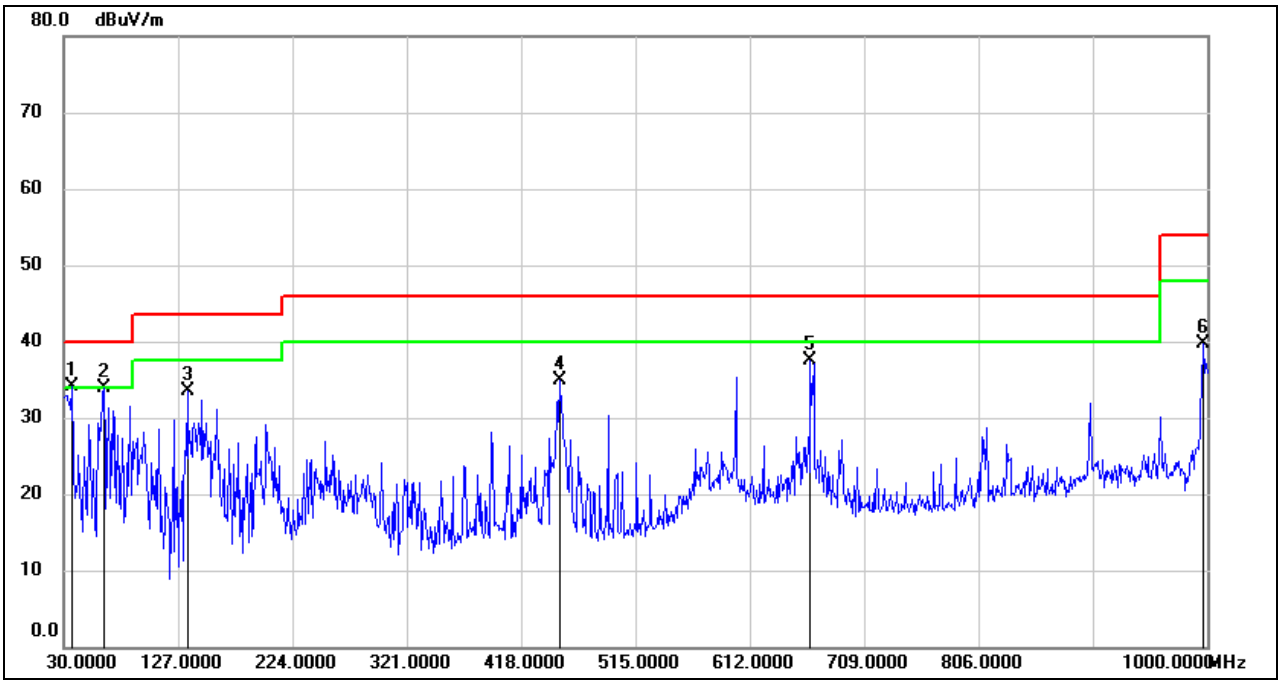
SPURIOUS EMISSIONS (HIGH CHANNELHORIZONTAL, WORST-CASE CONFIGURATION)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	79.4700	45.63	-20.48	25.15	40.00	-14.85	QP
2	147.3700	56.40	-18.53	37.87	43.50	-5.63	QP
3	159.9800	55.63	-17.81	37.82	43.50	-5.68	QP
4	252.1300	52.91	-16.30	36.61	46.00	-9.39	QP
5	900.0900	41.98	-4.25	37.73	46.00	-8.27	QP
6	997.0900	45.27	-3.28	41.99	54.00	-12.01	QP

Note: 1. Result Level = Read 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.

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



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	36.7900	51.84	-17.65	34.19	40.00	-5.81	QP
2	63.9500	53.54	-19.61	33.93	40.00	-6.07	QP
3	134.7600	52.89	-19.40	33.49	43.50	-10.01	QP
4	450.9800	46.71	-11.81	34.90	46.00	-11.10	QP
5	663.4099	45.24	-7.68	37.56	46.00	-8.44	QP
6	997.0900	42.91	-3.28	39.63	54.00	-14.37	QP

Note: 1. Result Level = Read 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

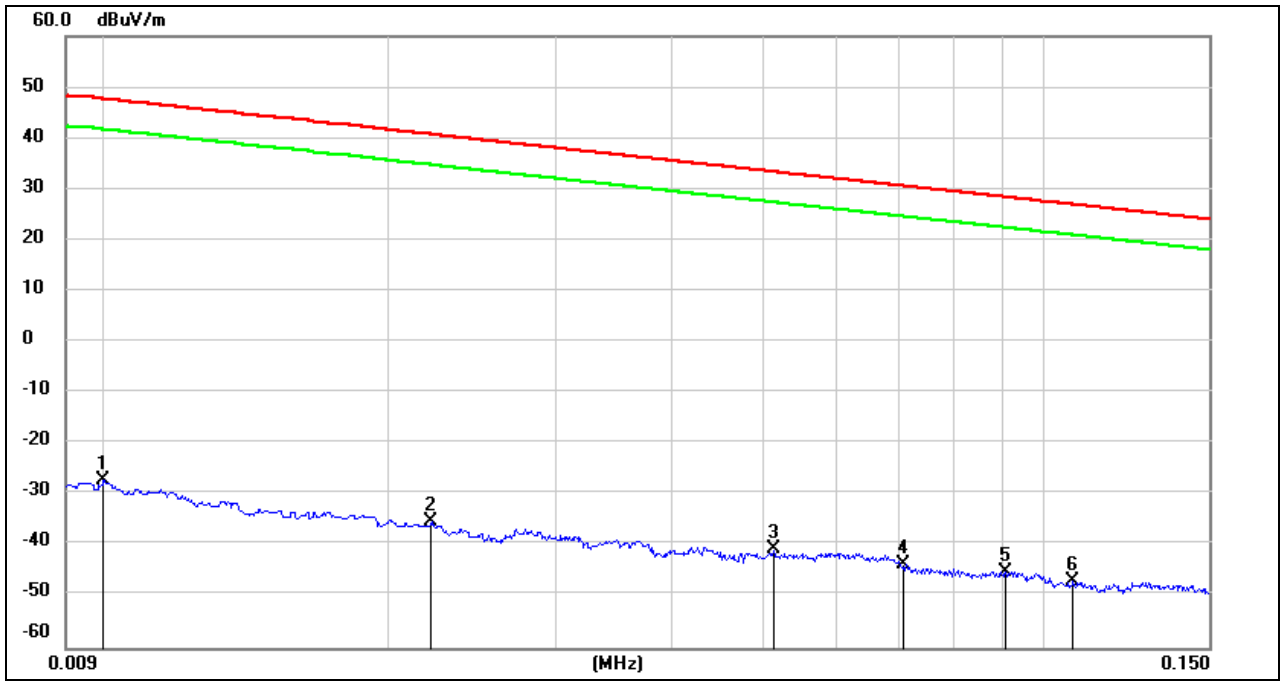
Note: All the test modes have been tested, only the worst data record in the report.

8.6. SPURIOUS EMISSIONS BELOW 30M

8.6.1. 5.2G MODE

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

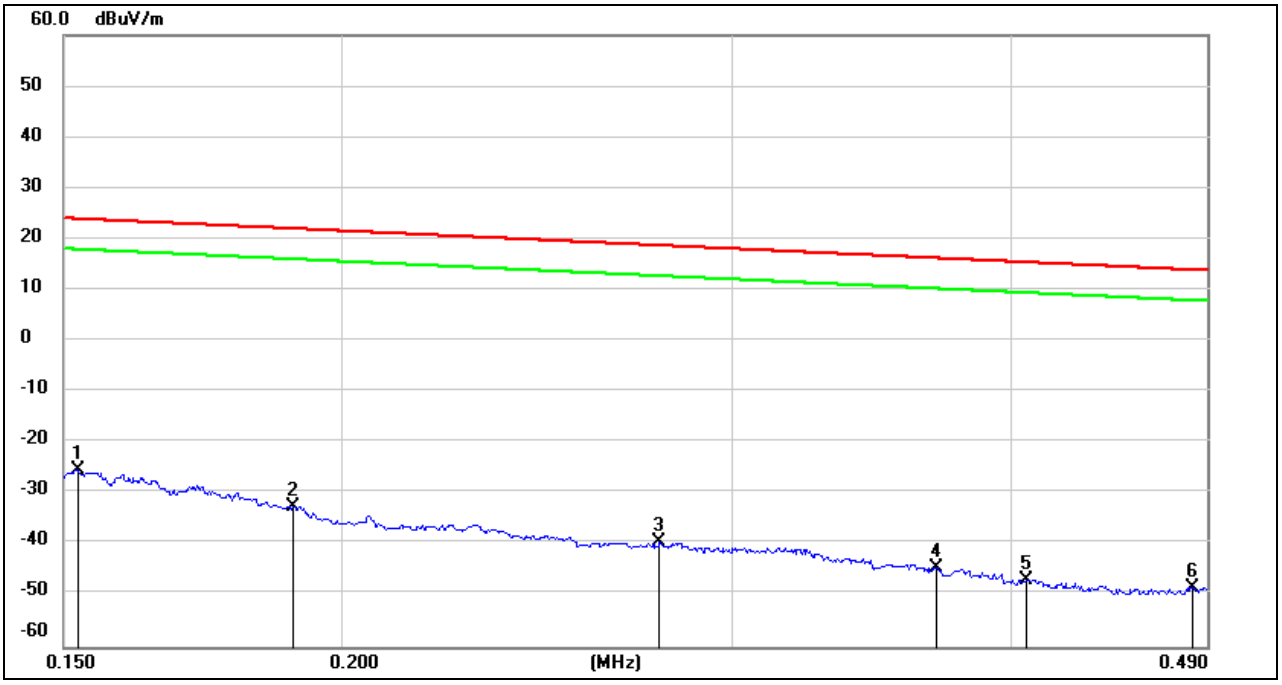
9kHz~ 150kHz



No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.0100	74.22	-101.40	-27.18	47.60	-78.68	-3.9	-74.78	peak
2	0.0221	66.13	-101.35	-35.22	40.71	-86.72	-10.79	-75.93	peak
3	0.0514	60.68	-101.48	-40.80	33.38	-92.3	-18.12	-74.18	peak
4	0.0709	57.91	-101.57	-43.66	30.59	-95.16	-20.91	-74.25	peak
5	0.0911	56.61	-101.72	-45.11	28.41	-96.61	-23.09	-73.52	peak
6	0.1073	54.80	-101.77	-46.97	26.99	-98.47	-24.51	-73.96	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.
4. dBuA/m = dBuV/m – 20log10(120π) = dBuV/m -51.5

150kHz ~ 490kHz



No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.1524	76.30	-101.63	-25.33	23.94	-76.83	-27.56	-49.27	peak
2	0.1900	69.11	-101.70	-32.59	22.03	-84.09	-29.47	-54.62	peak
3	0.2782	62.29	-101.83	-39.54	18.71	-91.04	-32.79	-58.25	peak
4	0.3703	57.41	-101.93	-44.52	16.23	-96.02	-35.27	-60.75	peak
5	0.4062	55.14	-101.96	-46.82	15.43	-98.32	-36.07	-62.25	peak
6	0.4823	53.69	-102.04	-48.35	13.94	-99.85	-37.56	-62.29	peak

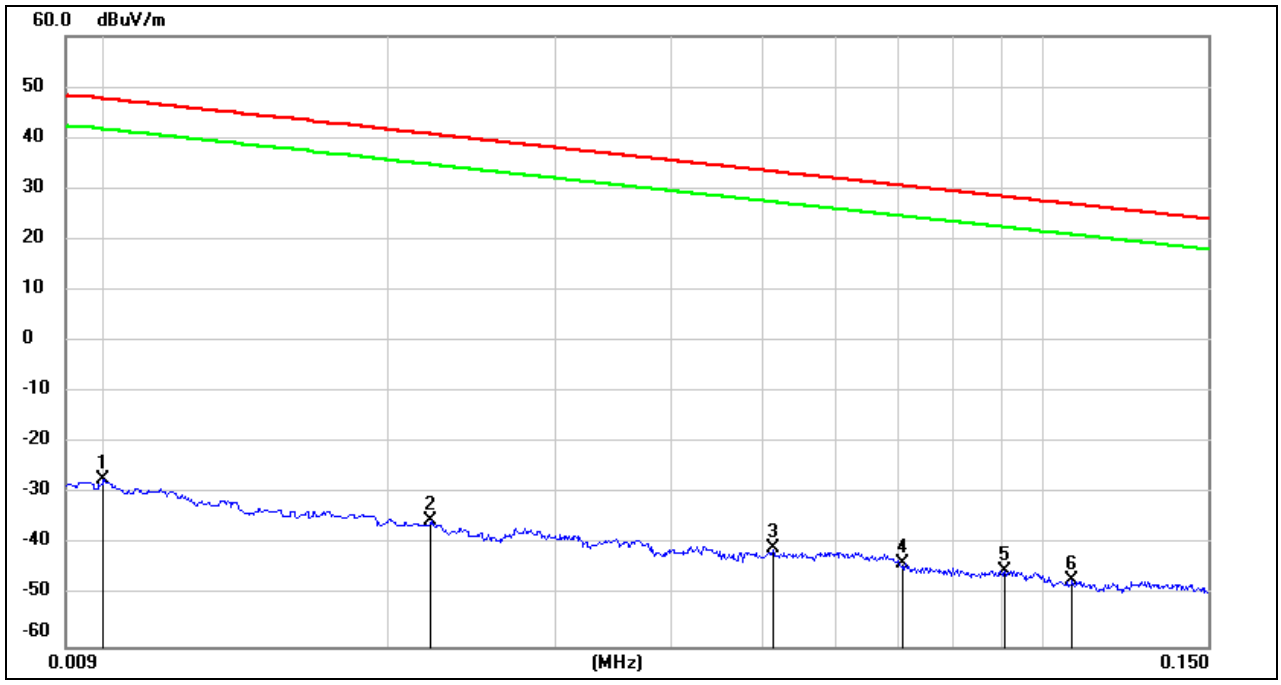
Note: 1. Measurement = Reading Level + Correct Factor.

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.

4. dBuA/m = dBuV/m – 20log10(120π) = dBuV/m -51.5

490kHz ~ 30MHz



No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.0100	74.22	-101.40	-27.18	47.60	-78.68	-3.9	-74.78	peak
2	0.0221	66.13	-101.35	-35.22	40.71	-86.72	-10.79	-75.93	peak
3	0.0514	60.68	-101.48	-40.80	33.38	-92.3	-18.12	-74.18	peak
4	0.0709	57.91	-101.57	-43.66	30.59	-95.16	-20.91	-74.25	peak
5	0.0911	56.61	-101.72	-45.11	28.41	-96.61	-23.09	-73.52	peak
6	0.1073	54.80	-101.77	-46.97	26.99	-98.47	-24.51	-73.96	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.
4. dBuA/m = dBuV/m – 20log10(120π) = dBuV/m -51.5

Note: All the test modes have been tested, only the worst data record in the report.

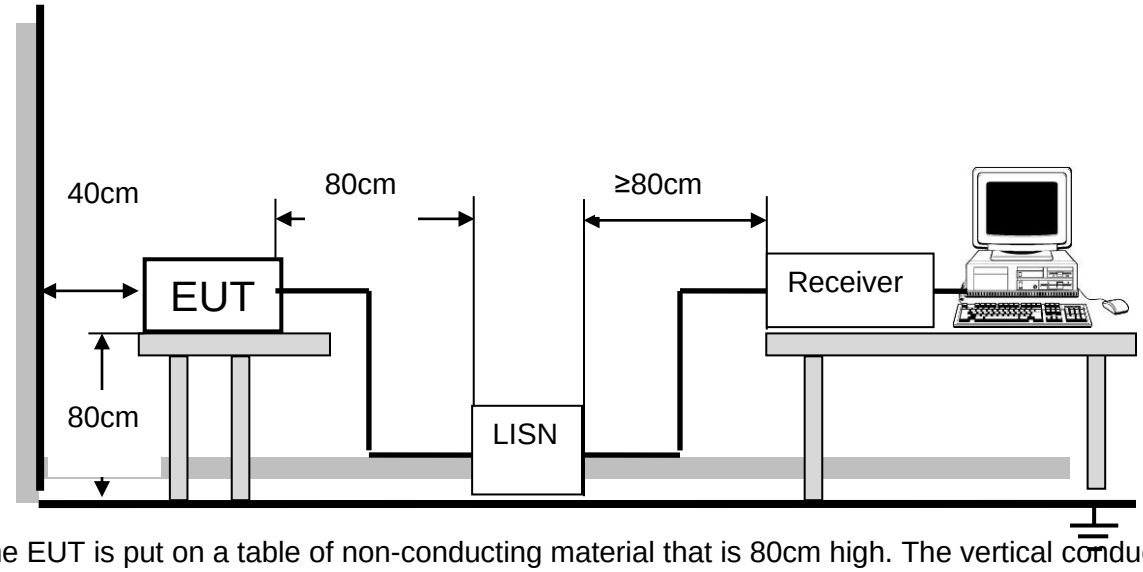
9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

Please refer to CFR 47 FCC §15.207 (a) and ISED 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 an 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

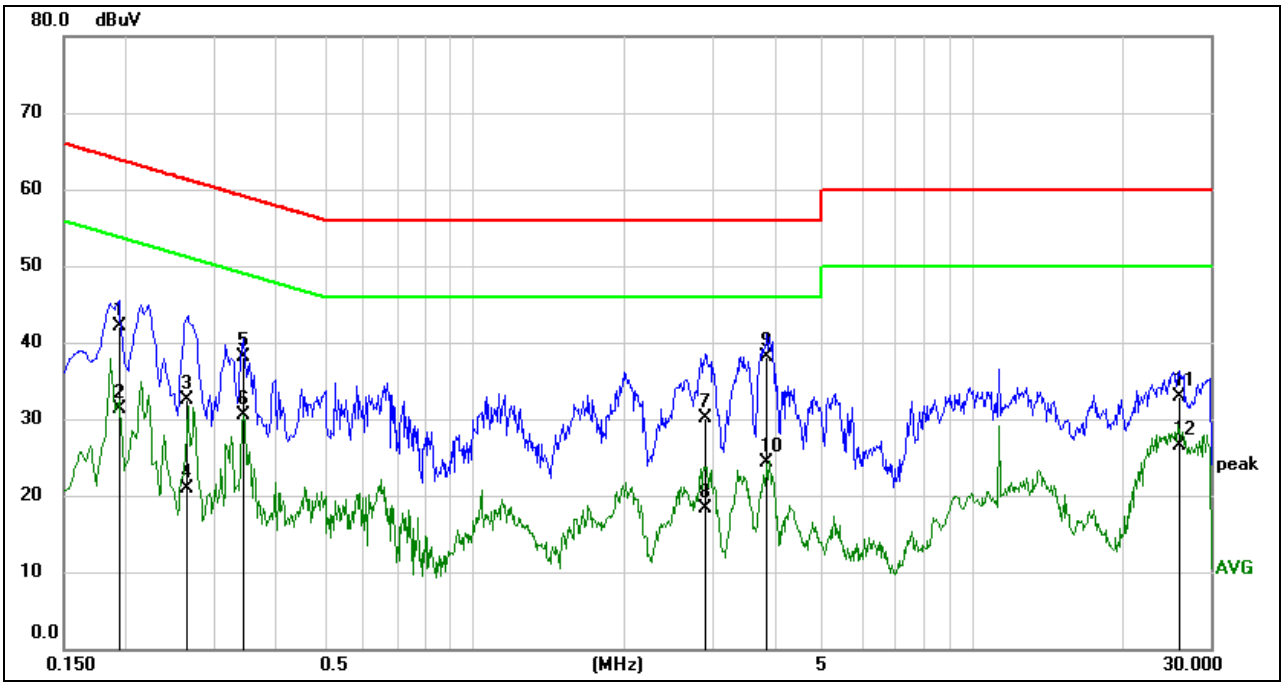
Temperature	25°C	Relative Humidity	62%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V_60Hz

TEST RESULTS

9.1.1. 5.2G MODE

(WORST-CASE CONFIGURATION)

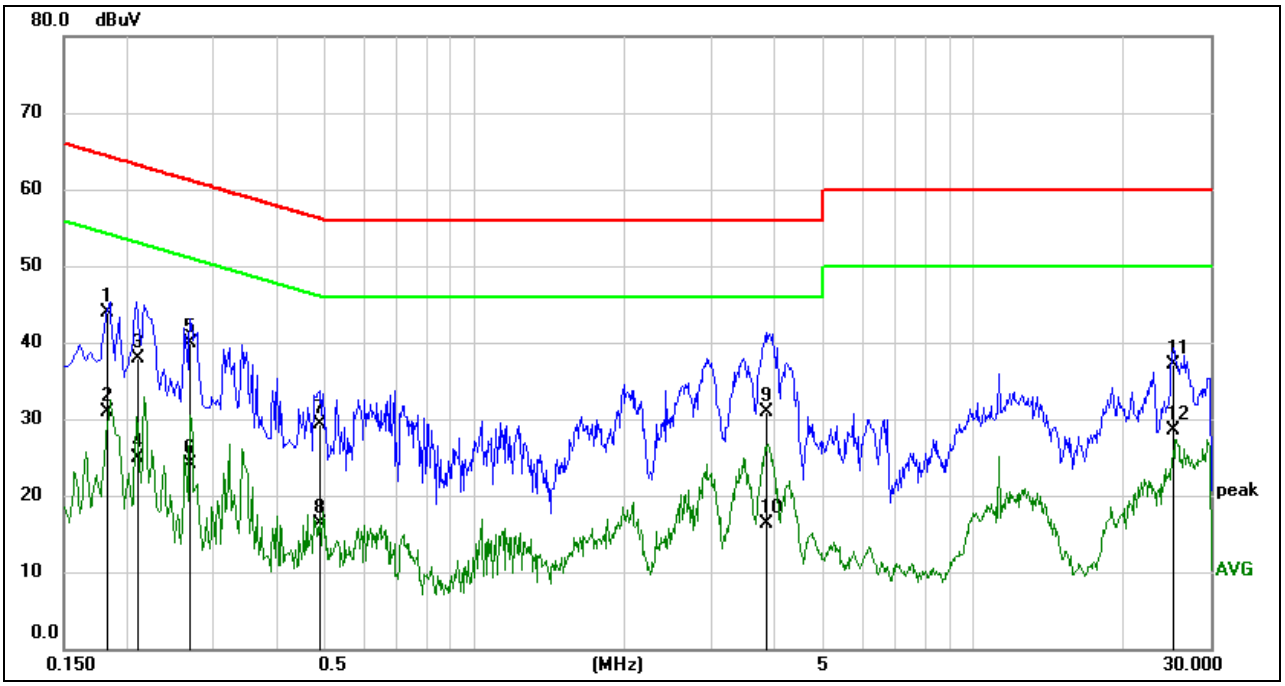
LINE N RESULTS (LOW CHANNEL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1924	32.60	9.60	42.20	63.93	-21.73	QP
2	0.1924	21.80	9.60	31.40	53.93	-22.53	AVG
3	0.2643	22.87	9.60	32.47	61.30	-28.83	QP
4	0.2643	11.33	9.60	20.93	51.30	-30.37	AVG
5	0.3430	28.42	9.60	38.02	59.13	-21.11	QP
6	0.3430	20.98	9.60	30.58	49.13	-18.55	AVG
7	2.9033	20.55	9.65	30.20	56.00	-25.80	QP
8	2.9033	8.64	9.65	18.29	46.00	-27.71	AVG
9	3.8577	28.54	9.66	38.20	56.00	-17.80	QP
10	3.8577	14.67	9.66	24.33	46.00	-21.67	AVG
11	26.1282	22.97	10.03	33.00	60.00	-27.00	QP
12	26.1282	16.42	10.03	26.45	50.00	-23.55	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 L RESULTS (LOW CHANNEL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1833	34.22	9.61	43.83	64.33	-20.50	QP
2	0.1833	21.24	9.61	30.85	54.33	-23.48	AVG
3	0.2116	28.22	9.60	37.82	63.14	-25.32	QP
4	0.2116	15.27	9.60	24.87	53.14	-28.27	AVG
5	0.2691	30.38	9.60	39.98	61.15	-21.17	QP
6	0.2691	14.57	9.60	24.17	51.15	-26.98	AVG
7	0.4887	19.79	9.60	29.39	56.19	-26.80	QP
8	0.4887	6.75	9.60	16.35	46.19	-29.84	AVG
9	3.8578	21.29	9.66	30.95	56.00	-25.05	QP
10	3.8578	6.57	9.66	16.23	46.00	-29.77	AVG
11	25.2780	27.17	9.95	37.12	60.00	-22.88	QP
12	25.2780	18.47	9.95	28.42	50.00	-21.58	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 test modes have been tested, only the worst data record in the report.

10. FREQUENCY STABILITY

LIMITS

The frequency of the carrier signal shall be maintained within band of operation

TEST SETUP AND PROCEDURE

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

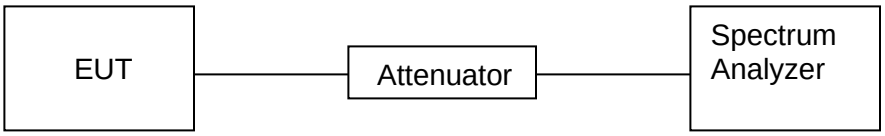
Center Frequency	The center frequency of the channel under test
Detector	PEAK
RBW	10kHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Allow the trace to stabilize, find the peak value of the power envelope and record the frequency, then calculated the frequency drift.

The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.

User manual temperature is 0°C~40°C.

TEST SETUP



	Normal Test Conditions	Extreme Test Conditions
Temperature	NT(Normal Temperature): 23.4°C	LT(Low Temperature): 0°C
		HT(High Temperature): 40°C
Supply Voltage	NV(Normal Voltage): DC 5V	LT(Low Voltage): DC 4.25V
		HT(High Voltage): DC 5.75V

TEST RESULTS

Frequency Error vs. Voltage									
5.2G:5199MHz									
Temp.	Volt.	0 Minute		2 Minute		5 Minute		10 Minute	
		Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)
TN	VL	5199.02948	5.67	5199.0378	7.27	5199.02566	4.94	5199.03156	6.07
TN	VN	5199.03563	6.85	5199.02861	5.50	5199.04541	8.74	5199.03364	6.47
TN	VH	5199.02925	5.63	5199.0386	7.42	5199.0366	7.04	5199.04487	8.63

Frequency Error vs. Temperature									
5.2G:5199MHz									
Temp.	Volt.	0 Minute		2 Minute		5 Minute		10 Minute	
		Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)
70	VN	5199.04283	8.24	5199.037	7.12	5199.03619	6.96	5199.02204	4.24
60	VN	5199.03253	6.26	5199.03919	7.54	5199.02224	4.28	5199.02489	4.79
50	VN	5199.0397	7.64	5199.02593	4.99	5199.0264	5.08	5199.03388	6.52
40	VN	5199.03667	7.05	5199.02748	5.29	5199.03273	6.29	5199.03014	5.80
30	VN	5199.02664	5.12	5199.03686	7.09	5199.04443	8.55	5199.04417	8.50
20	VN	5199.0216	4.15	5199.0221	4.25	5199.02977	5.73	5199.04526	8.71
10	VN	5199.02241	4.31	5199.04305	8.28	5199.03685	7.09	5199.03919	7.54
0	VN	5199.0264	5.08	5199.04596	8.84	5199.02975	5.72	5199.03104	5.97

Frequency Error vs. Voltage									
5.8G:5783MHz									
Temp.	Volt.	0 Minute		2 Minute		5 Minute		10 Minute	
		Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)
TN	VL	5783.02841	4.91	5783.03799	6.57	5783.0287	4.96	5783.03096	5.35
TN	VN	5783.04204	7.27	5783.02324	4.02	5783.02347	4.06	5783.03606	6.24
TN	VH	5783.02655	4.59	5783.02699	4.67	5783.03535	6.11	5783.04546	7.86

Frequency Error vs. Temperature									
5.8G:5783MHz									
Temp.	Volt.	0 Minute		2 Minute		5 Minute		10 Minute	
		Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)
70	VN	5783.04393	7.60	5783.02426	4.19	5783.02942	5.09	5783.02365	4.09
60	VN	5783.02523	4.36	5783.03375	5.84	5783.0416	7.19	5783.04521	7.82

50	VN	5783.03346	5.79	5783.04004	6.92	5783.02342	4.05	5783.0456	7.89
40	VN	5783.0313	5.41	5783.03731	6.45	5783.04251	7.35	5783.02725	4.71
30	VN	5783.03029	5.24	5783.04354	7.53	5783.03914	6.77	5783.02452	4.24
20	VN	5783.03356	5.80	5783.03175	5.49	5783.04076	7.05	5783.03357	5.81
10	VN	5783.0237	4.10	5783.04675	8.08	5783.02915	5.04	5783.02618	4.53
0	VN	5783.04232	7.32	5783.03105	5.37	5783.03111	5.38	5783.04431	7.66

Note: All the test modes have been tested, only the worst data record in the report.

11. 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

END OF REPORT