

**CFR 47 FCC PART 15 SUBPART C  
ISED RSS-210 Issue 10**

**TEST REPORT**

*For*

**TOY Transmitter**

**MODEL NUMBER: 8720H**

**REPORT NUMBER: 4791205548-RF-1**

**ISSUE DATE: March 27, 2024**

**FCC ID: G6D8720H**

**IC: 9650A-8720H**

*Prepared for*

**NEW BRIGHT INDUSTRIAL CO., LTD  
9/F., NEW BRIGHT BUILDING, 11 SHEUNG YUET ROAD, KOWLOON BAY,  
KOWLOON, HONG KONG.**

*Prepared by*

**UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch**

**Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of China**

**Tel: +86 769 22038881**

**Fax: +86 769 33244054**

**Website: [www.ul.com](http://www.ul.com)**

## Revision History

Rev.	Issue Date	Revisions	Revised By
V0	March 27, 2024	Initial Issue	

Summary of Test Results			
Clause	Test Items	FCC/ISED Rules	Test Results
1	20dB Bandwidth and 99% Occupied Bandwidth	CFR 47 FCC §15.215 (c) ISED RSS-Gen Clause 6.7	Pass
2	Radiated Emission	CFR 47 FCC §15.249 (a)(d)(e) ISED RSS-210 Annex B B.10 CFR 47 FCC §15.205 and §15.209 RSS-GEN Clause 8.9 RSS-GEN Clause 8.10	Pass
3	Conducted Emission Test for AC Power Port	CFR 47 FCC §15.207 RSS-GEN Clause 8.8	Not Applicable
4	Antenna Requirement	CFR 47 FCC §15.203 ISED RSS-Gen Clause 6.3	Pass
<p>Note 1: This test report is only published to and used by the applicant, and it is not for evidence purpose in China.</p> <p>Note 2: The measurement result for the sample received is &lt;Pass&gt; according to &lt; CFR 47 FCC PART 15 SUBPART C, ISED RSS-210 ISSUE 10 &gt; when &lt;Accuracy Method&gt; decision rule is applied.</p> <p>Note 3: The EUT was powered by battery and can't be charged.</p>			

## CONTENTS

<b>1. ATTESTATION OF TEST RESULTS</b> .....	<b>5</b>
<b>2. TEST METHODOLOGY</b> .....	<b>6</b>
<b>3. FACILITIES AND ACCREDITATION</b> .....	<b>6</b>
<b>4. CALIBRATION AND UNCERTAINTY</b> .....	<b>7</b>
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i> .....	7
4.2. <i>MEASUREMENT UNCERTAINTY</i> .....	7
<b>5. EQUIPMENT UNDER TEST</b> .....	<b>8</b>
5.1. <i>DESCRIPTION OF EUT</i> .....	8
5.2. <i>CHANNEL LIST</i> .....	8
5.3. <i>MAXIMUM FIELD STRENGTH</i> .....	8
5.4. <i>TEST CHANNEL CONFIGURATION</i> .....	8
5.5. <i>THE WORSE CASE POWER SETTING PARAMETER</i> .....	8
5.6. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i> .....	9
5.7. <i>DESCRIPTION OF TEST SETUP</i> .....	10
<b>6. MEASURING EQUIPMENT AND SOFTWARE USED</b> .....	<b>11</b>
<b>7. ANTENNA PORT TEST RESULTS</b> .....	<b>12</b>
7.1. <i>20DB BANDWIDTH AND 99% OCCUPIED BANDWIDTH</i> .....	12
7.2. <i>DUTY CYCLE</i> .....	16
<b>8. RADIATED TEST RESULTS</b> .....	<b>18</b>
8.1. <i>RESTRICTED BANDEDGE</i> .....	28
8.2. <i>SPURIOUS EMISSIONS (1 GHZ ~ 3 GHZ)</i> .....	31
8.3. <i>SPURIOUS EMISSIONS (3 GHZ ~ 18 GHZ)</i> .....	37
8.4. <i>SPURIOUS EMISSIONS (9 KHZ ~ 30 MHZ)</i> .....	43
8.5. <i>SPURIOUS EMISSIONS (18 GHZ ~ 26 GHZ)</i> .....	46
8.6. <i>SPURIOUS EMISSIONS (30 MHZ ~ 1 GHZ)</i> .....	48

# 1. ATTESTATION OF TEST RESULTS

## Applicant Information

Company Name: NEW BRIGHT INDUSTRIAL CO., LTD  
Address: 9/F., NEW BRIGHT BUILDING, 11 SHEUNG YUET ROAD, KOWLOON BAY, KOWLOON, HONG KONG.

## Manufacturer Information

Company Name: NEW BRIGHT INDUSTRIAL CO., LTD  
Address: 9/F., NEW BRIGHT BUILDING, 11 SHEUNG YUET ROAD, KOWLOON BAY, KOWLOON, HONG KONG.

## EUT Information

EUT Name: TOY Transmitter  
Model: 8720H  
Sample Received Date: February 22, 2024  
Sample Status: Normal  
Sample ID: 6945394  
Date of Tested: March 18, 2024 to March 26, 2024

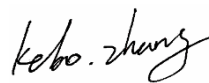
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C ISED RSS-210 Issue 10	Pass

Prepared By:



Denny Huang  
Senior Project Engineer

Checked By:



Kebo Zhang  
Senior Project Engineer

Approved By:



Stephen Guo  
Operations Manager

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 414788 D01 Radiated Test Site v01r01, FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, ISED RSS-210 ISSUE 10 and ISED RSS-GEN Issue 5.

## 3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p><b>A2LA (Certificate No.: 4102.01)</b>                  UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p><b>FCC (FCC Designation No.: CN1187)</b>                  UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules</p> <p><b>ISED (Company No.: 21320)</b>                  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 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046.</p> <p><b>VCCI (Registration No.: G-20192, C-20153, T-20155 and R-20202)</b>                  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-20192 and R-20202                  Shielding Room B, the VCCI registration No. is C-20153 and T-20155</p>
---------------------------	---

**Note 1:**

All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of 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 30 MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30 MHz 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 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
Conduction emission	3.62 dB
Radiated Emission (Included Fundamental Emission) (9 kHz ~ 30 MHz)	2.2 dB
Radiated Emission (Included Fundamental Emission) (30 MHz ~ 1 GHz)	4.00 dB
Radiated Emission (Included Fundamental Emission) (1 GHz to 26 GHz)	5.78 dB (1 GHz ~ 18 GHz)
	5.23 dB (18 GHz ~ 26 GHz)
Duty Cycle	±0.028%
20dB and 99% Occupied Bandwidth	±0.0196%
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	TOY Transmitter
Model	8720H

Product Description	Operation Frequency	2433 MHz ~ 2463 MHz
	Modulation Type	GFSK
Battery	DC 6.0 V	

### 5.2. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2433	5	2437	9	2441	13	2445
2	2449	6	2453	10	2457	14	2461
3	2435	7	2439	11	2443	15	2447
4	2451	8	2455	12	2459	16	2463

### 5.3. MAXIMUM FIELD STRENGTH

Test Mode	Frequency (MHz)	Channel Number	Max Peak field strength (dB $\mu$ V/m)
GFSK	2433 ~ 2463	1-16[16]	88.77

### 5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
GFSK	CH 1(Low Channel), CH 15(MID Channel), CH 16(High Channel)	2433 MHz, 2447 MHz, 2463 MHz

### 5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2433 MHz ~ 2463 MHz Band				
Test Software Version		/		
Modulation Type	Transmit Antenna Number	Test Channel		
		CH 1	CH 15	CH 16
GFSK	1	Default	Default	Default



## 5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2433 ~ 2463	Wire Antenna	2

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

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

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
/	/	/	/	/

### I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
/	/	/	/	/	/

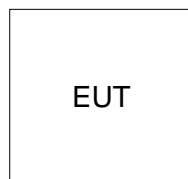
### ACCESSORY

Item	Equipment	Mfr/Brand	Model/Type No.	Specification	Series No.
/	/	/	/	/	/

### TEST SETUP

The EUT have the engineer mode inside.

### SETUP DIAGRAM FOR TEST



## 6. MEASURING EQUIPMENT AND SOFTWARE USED

Tonsend RF Test System					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
PXA Signal Analyzer	Keysight	N9030A	MY55410512	Oct.12, 2023	Oct.11, 2024
EXA Signal Analyzer	Keysight	N9010B	MY57110124	April 8, 2023	April 7, 2024
Software					
Description	Manufacturer	Name		Version	
Tonsend SRD Test System	Tonsend	JS1120-3 RF Test System		2.6.77.0518	

Radiated Emissions					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Oct.12, 2023	Oct.11, 2024
Hybrid Log Periodic Antenna	TDK	HLP-3003C	130959	Aug.02, 2021	Aug.01, 2024
Preamplifier	HP	8447D	2944A09099	Oct.12, 2023	Oct.11, 2024
EMI Measurement Receiver	R&S	ESR26	101377	Oct.12, 2023	Oct.11, 2024
Horn Antenna	TDK	HRN-0118	130940	July 20, 2021	July 19, 2024
Preamplifier	TDK	PA-02-0118	TRS-305-00067	Oct.12, 2023	Oct.11, 2024
Horn Antenna	Schwarzbeck	BBHA9170	697	July 20, 2021	July 19, 2024
Preamplifier	TDK	PA-02-2	TRS-307-00003	Oct.12, 2023	Oct.11, 2024
Preamplifier	TDK	PA-02-3	TRS-308-00002	Oct.12, 2023	Oct.11, 2024
Loop antenna	Schwarzbeck	1519B	00008	Dec.14, 2021	Dec.13, 2024
Preamplifier	TDK	PA-02-001-3000	TRS-302-00050	Oct.12, 2023	Oct.11, 2024
High Pass Filter	Wi	WHKX10-2700-3000-18000-40SS	23	Oct.12, 2023	Oct.11, 2024
Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	4	Oct.12, 2023	Oct.11, 2024
Software					
Description	Manufacturer	Name		Version	
Test Software for Radiated Emissions	Farad	EZ-EMC		Ver. UL-3A1	

## 7. ANTENNA PORT TEST RESULTS

### 7.1. 20DB BANDWIDTH AND 99% OCCUPIED BANDWIDTH

#### LIMITS

CFR 47 FCC Part15 (15.249) Subpart C RSS-Gen Issue 5			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.215 (c)	20dB Bandwidth	for reporting purposes only	2400-2483.5
ISED RSS-Gen Clause 6.7 Issue 5	99% Occupied Bandwidth	For reporting purposes only.	2400-2483.5

#### TEST PROCEDURE

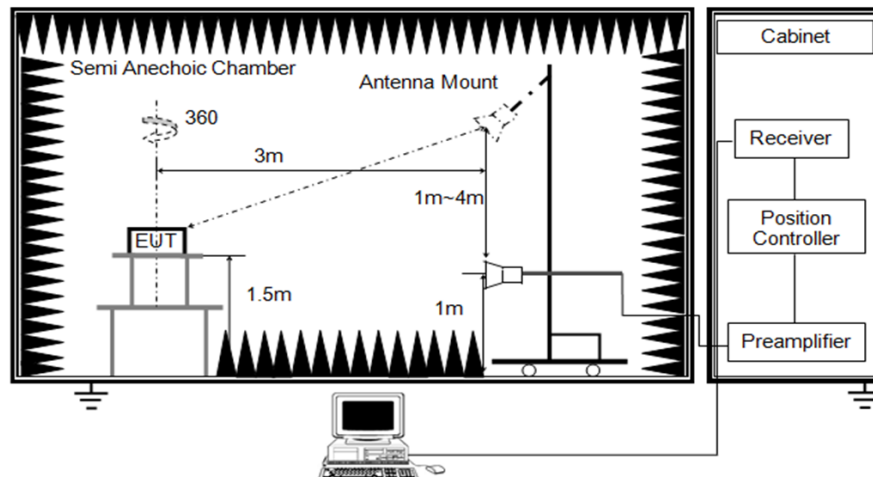
Connect the UUT to the spectrum analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	1% to 5% of the occupied bandwidth
VBW	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 20 dB/99% relative to the maximum level measured in the fundamental emission.

#### TEST SETUP

Above 1 GHz



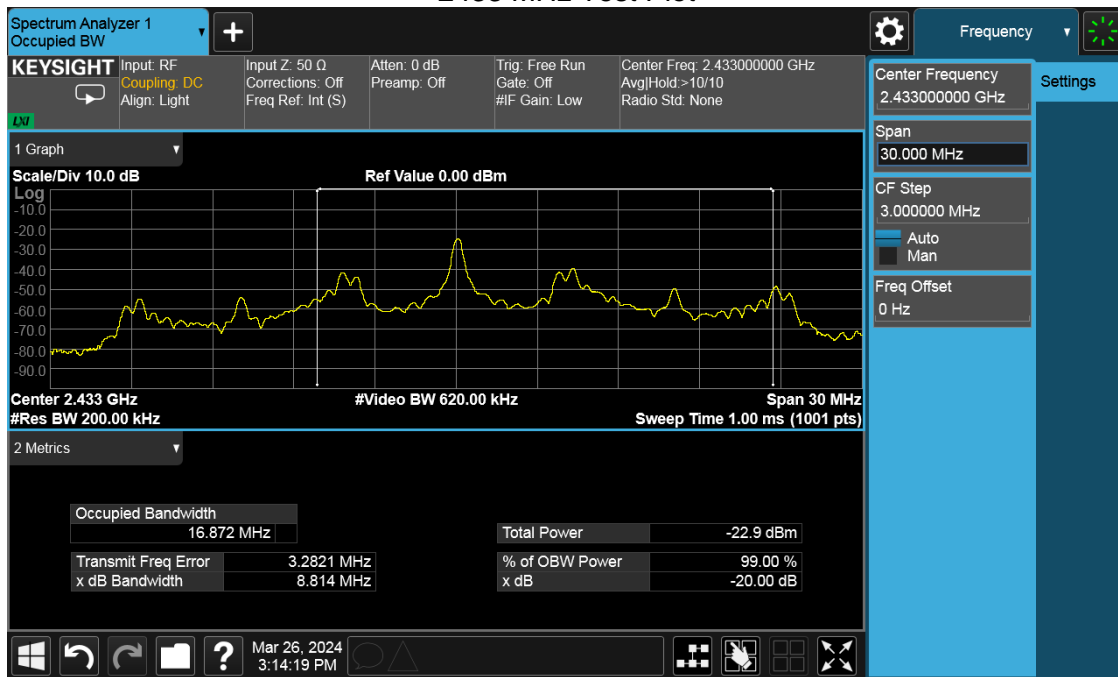
**TEST ENVIRONMENT**

Temperature	23.5 °C	Relative Humidity	59%
Atmosphere Pressure	101 kPa	Test Voltage	DC 3.0 V

**TEST RESULTS**

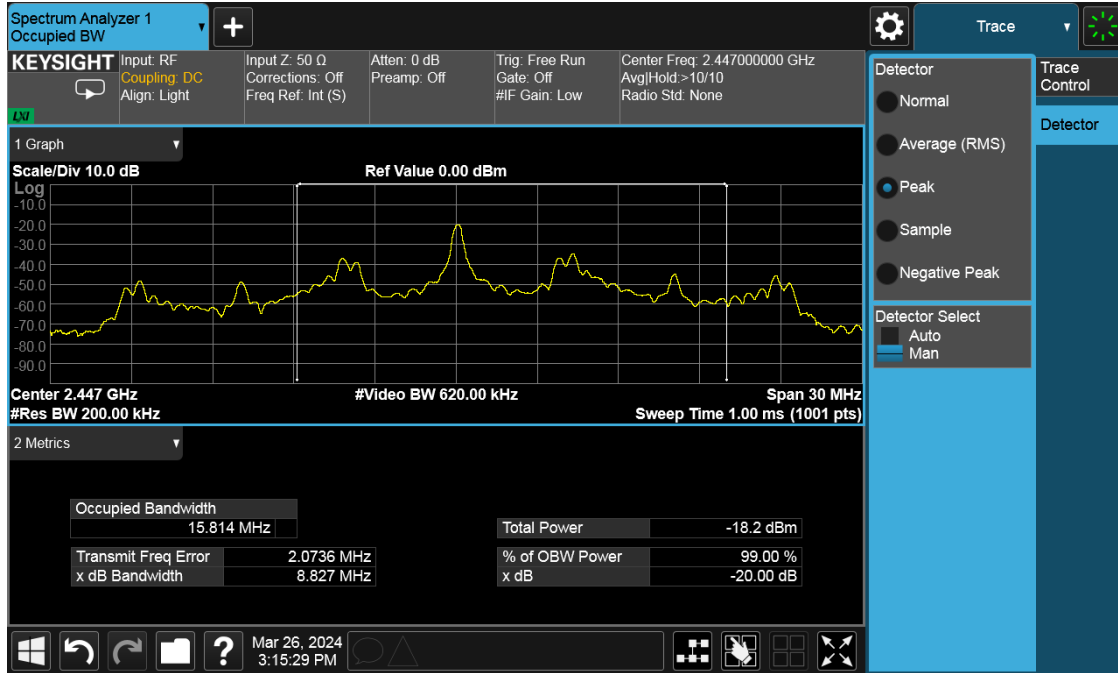
Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)	Result
2433	16.872	8.814	PASS

2433 MHz Test Plot



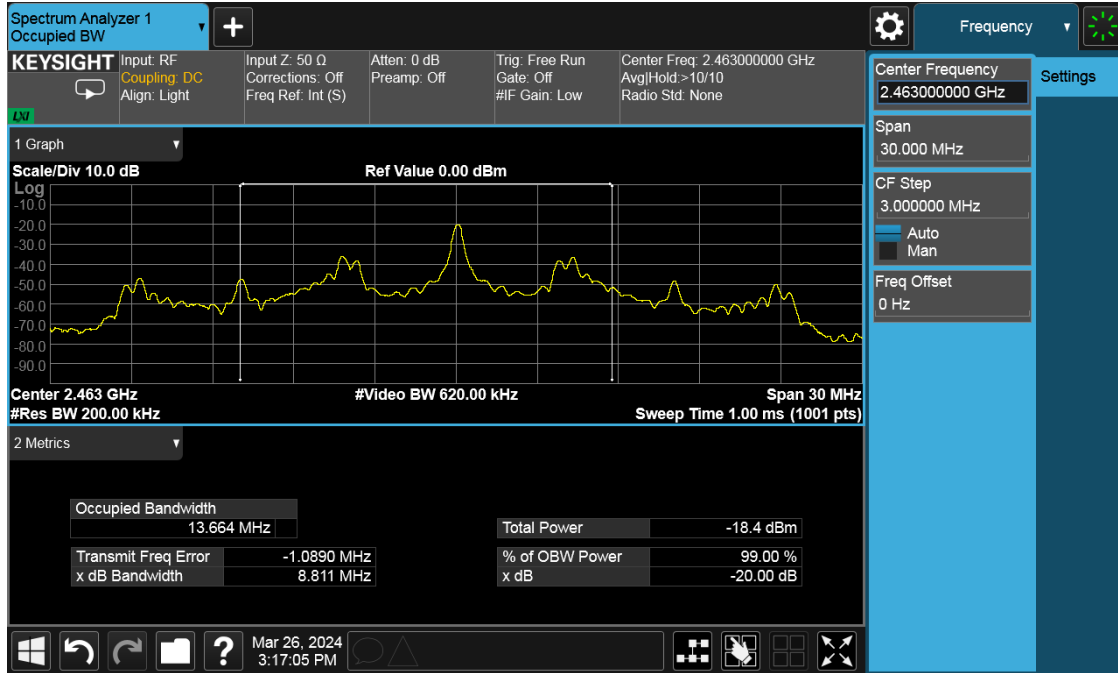
Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)	Result
2447	15.814	8.827	PASS

2447 MHz Test Plot



Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)	Result
2463	13.664	8.811	PASS

2463 MHz Test Plot



## 7.2. DUTY CYCLE

### LIMITS

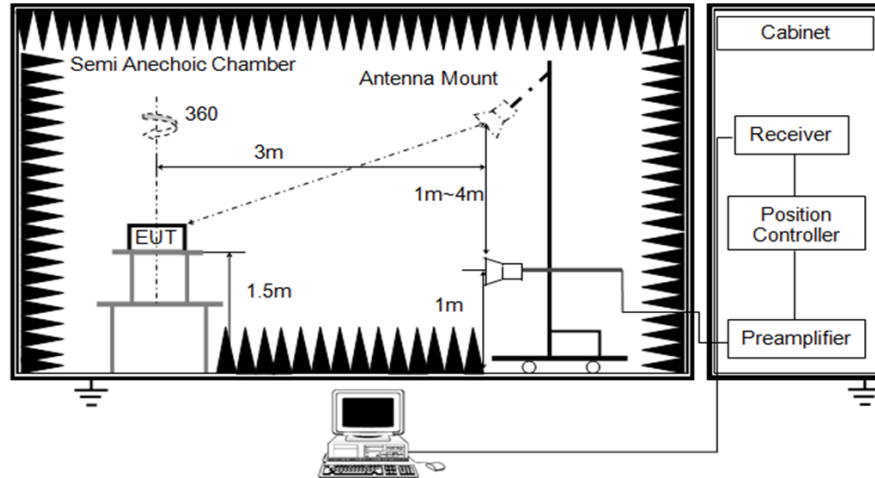
None; for reporting purposes only.

### TEST PROCEDURE

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

### TEST SETUP

Above 1 GHz



### TEST ENVIRONMENT

Temperature	23.5 °C	Relative Humidity	59%
Atmosphere Pressure	101 kPa	Test Voltage	DC 3.0 V

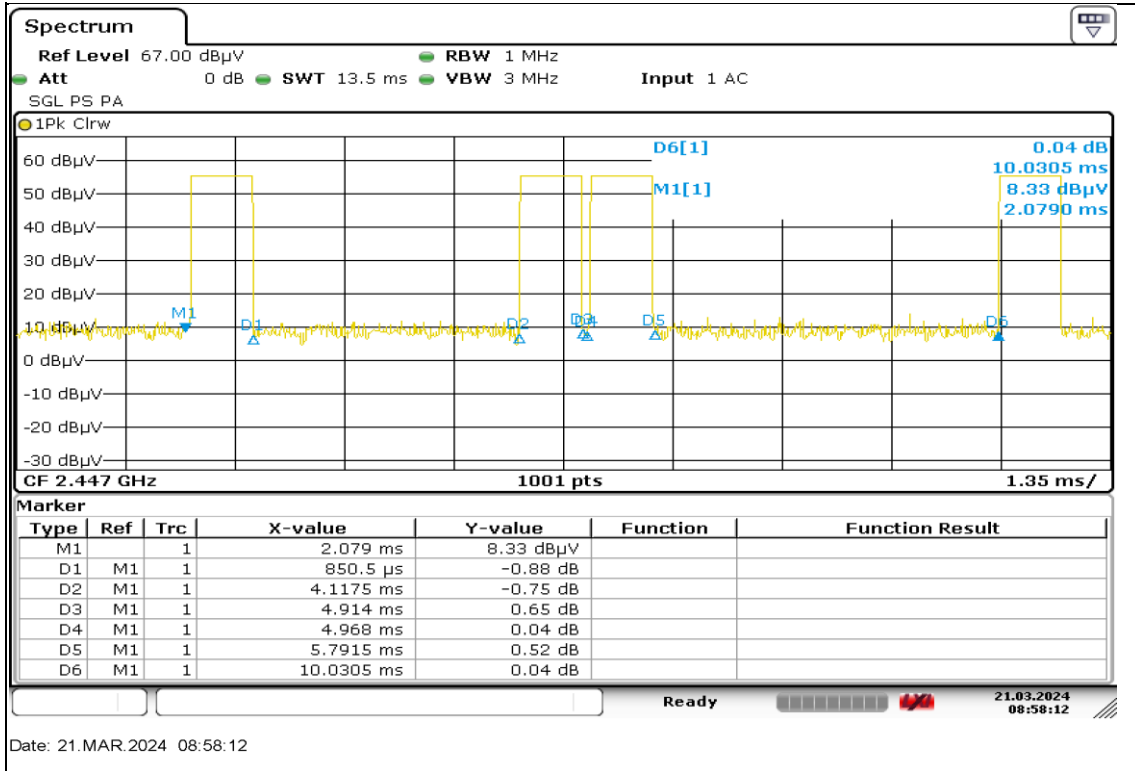
### TEST RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)
GFSK	25.56	100	0.2556	9.54	-11.85

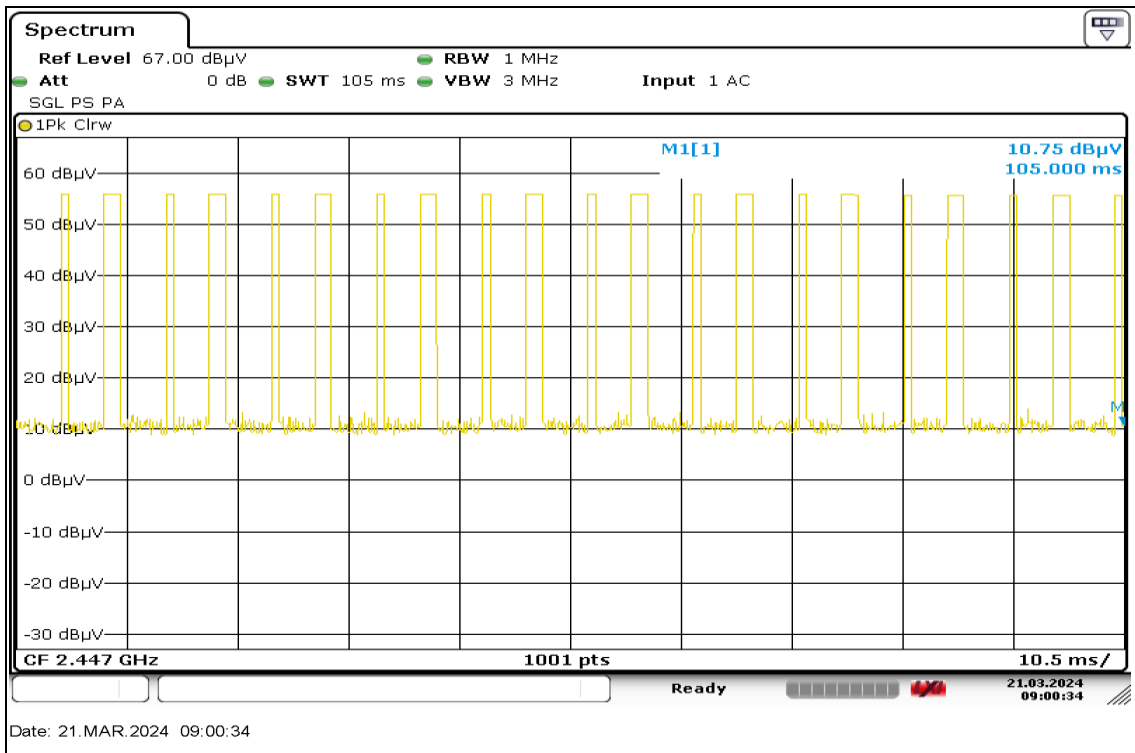
Note: Duty Cycle Correction Factor=20log(x).  
Where: x is Duty Cycle



### Duty Cycle Test Plot-1



### Duty Cycle Test Plot-2



## 8. RADIATED TEST RESULTS

### LIMITS

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

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

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

FCC field strength of emissions from intentional radiators operated within these frequency bands			
Frequency (MHz)	Field strength of Fundamental	Field strength of Harmonics	Distance (m)
902 - 928	50 mV/m (94 dBuV/m)	500 uV/m (54 dBuV/m)	3
2400 – 2483.5	50 mV/m (94 dBuV/m)	500 uV/m (54 dBuV/m)	3
5725 – 5875	50 mV/m (94 dBuV/m)	500 uV/m (54 dBuV/m)	3

The field strength of fundamental and harmonic emissions measured at 3 m shall not exceed the limits in table B2 for ISED.

Table B2 — Field strength limits at various frequencies		
Frequency bands (MHz)	Field strength (mV/m)	
	Fundamental emissions	Harmonic emissions
902-928	50	0.5
2400-2483.5	50	0.5
5725-5875	50	0.5
24000-24250	250	2.5

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

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

### ISED General field strength limits at frequencies below 30 MHz

Table 6 – General field strength limits at frequencies below 30 MHz		
Frequency	Magnetic field strength (H-Field) (µA/m)	Measurement distance (m)
9 - 490 kHz <sup>Note 1</sup>	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

**Note 1:** The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

### ISED Restricted bands please refer to ISED RSS-GEN Clause 8.10

Table 7 – Restricted frequency bands <sup>Note 1</sup>		
MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	158.52475 - 158.52525	9.3 - 9.5
2.1735 - 2.1905	158.7 - 158.9	10.6 - 12.7
3.020 - 3.028	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.877 - 5.883	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	980 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1828.5	36.43 - 38.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.0
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2855 - 2900	
13.36 - 13.41	3280 - 3287	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5480	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138		

**Note 1:** Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

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

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

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

<sup>2</sup>Above 38.6c

## TEST PROCEDURE

Below 30 MHz

The setting of the spectrum analyzer

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

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.4.
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 80 cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m height antenna tower.
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.
6. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak and average detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.
7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.
8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of  $377\Omega$ . For example, the measurement frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to  $Y-51.5 = Z$  dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

Below 1 GHz and above 30 MHz

The setting of the spectrum analyzer

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

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.5.
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 80 cm 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 1 GHz, 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.

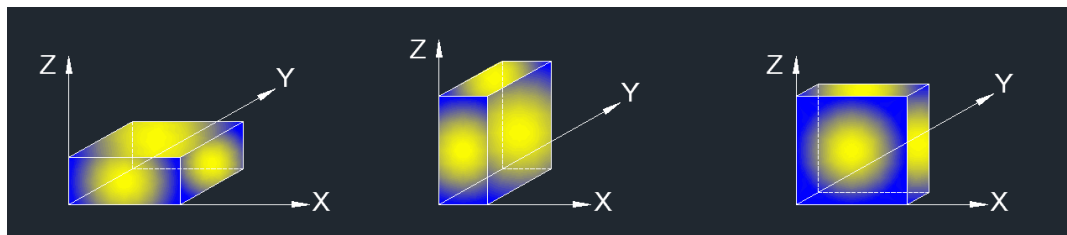
Above 1 GHz

The setting of the spectrum analyzer

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

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.6.
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 1.5 m 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 1 GHz, 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 7.5. ON TIME AND DUTY CYCLE.

X axis, Y axis, Z axis positions:



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

For Restricted Bandedge and field strength of intentional emission:

Note:

1. Measurement = Reading Level + Correct Factor.
2. If the peak values are less than the average limit of 54 dBuV/m, the average result is deemed to comply with average limit.
3. Peak: Peak detector.
4. AVG Result=Peak Result + Duty Cycle Correction Factor.
5. For the transmitting duration, please refer to clause 7.2.
6. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.
7. Both horizontal and vertical have been tested, only the worst data was recorded in the report.
8. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

For Radiate Spurious emission (9 kHz ~ 30 MHz):

Note:

1. Measurement = Reading Level + Correct Factor.
2. If the peak values are less than the QP limit, the QP result is deemed to comply with QP 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. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

For Radiate Spurious Emission (30 MHz ~ 1 GHz):

Note:

1. Result Level = Read Level + Correct Factor.
2. If the peak values are less than the QP limit, the QP result is deemed to comply with QP limit.
3. All modes, channels and antennas have been tested, only the worst data was recorded in the report.



For Radiate Spurious Emission (1 GHz ~ 3 GHz):

1. Measurement = Reading Level + Correct Factor.
2. If the peak values are less than the average limit of 54 dBuV/m, the average result is deemed to comply with average limit.
3. Peak: Peak detector.
4. AVG Result=Peak Result + Duty Cycle Correction Factor.
5. For the transmitting duration, please refer to clause 7.2.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

For Radiate Spurious Emission (3 GHz ~ 18 GHz):

Note:

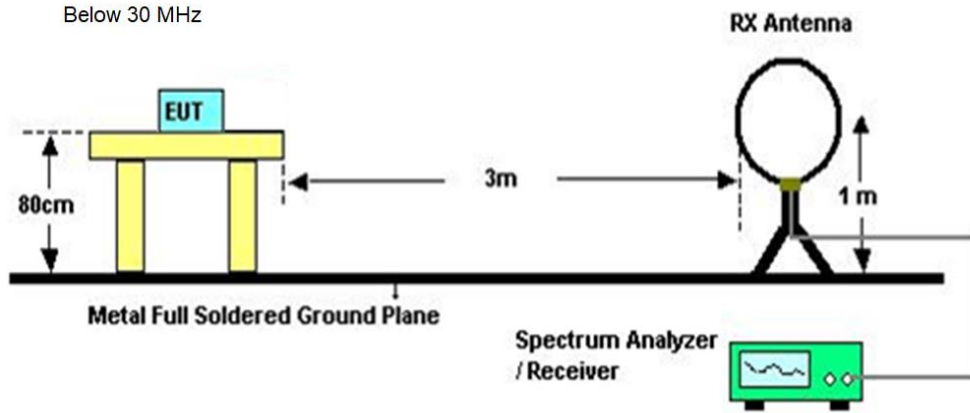
1. Peak Result = Reading Level + Correct Factor.
2. If the peak values are less than the average limit of 54 dBuV/m, the average result is deemed to comply with average limit.
3. Peak: Peak detector.
4. AVG Result=Peak Result + Duty Cycle Correction Factor.
5. For the transmitting duration, please refer to clause 7.2.
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. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

For Radiate Spurious emission (18 GHz ~ 26 GHz):

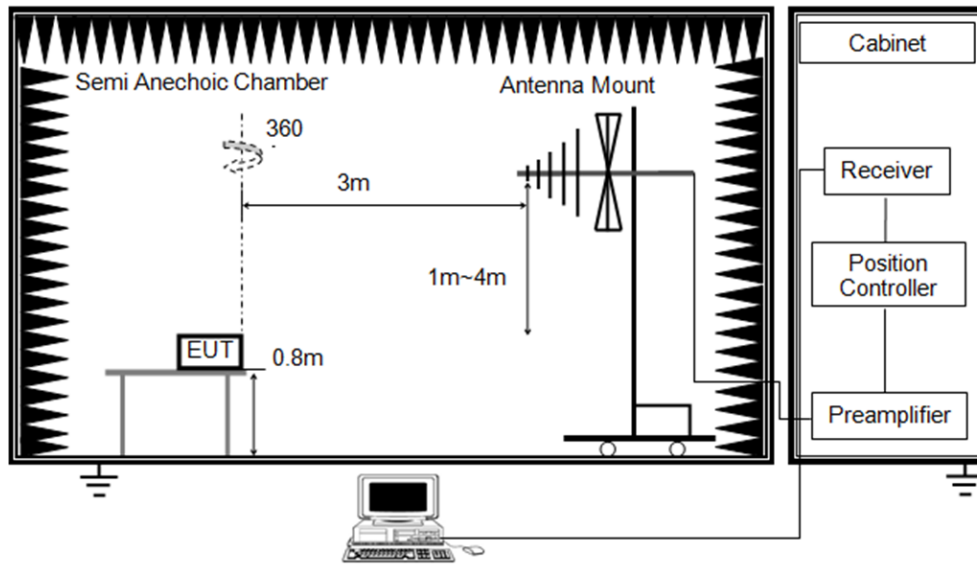
Note:

1. Measurement = Reading Level + Correct Factor.
2. If the peak values are less than the average limit of 54 dBuV/m, the average result is deemed to comply with average limit.
3. Peak: Peak detector.
4. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

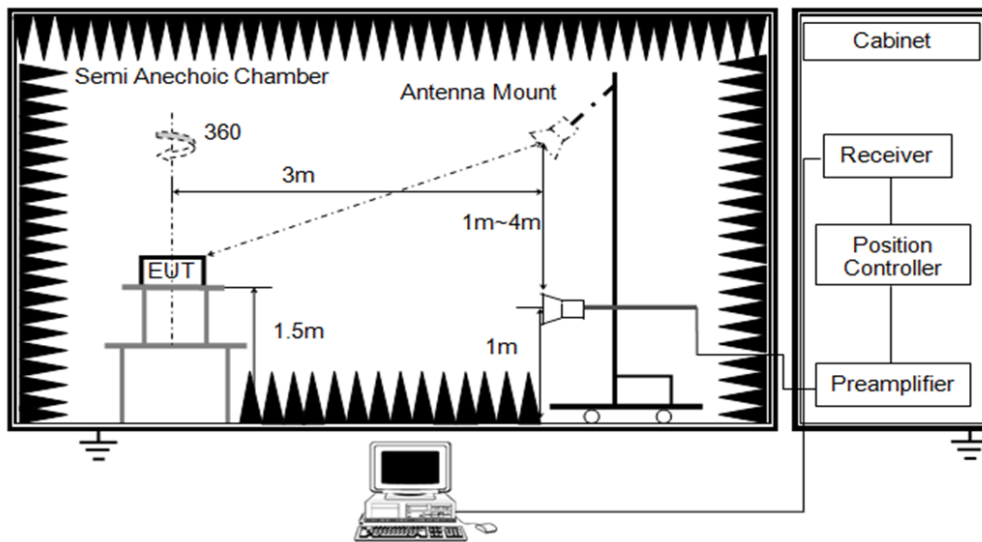
**TEST SETUP**



Below 1 GHz and above 30 MHz



Above 1 GHz



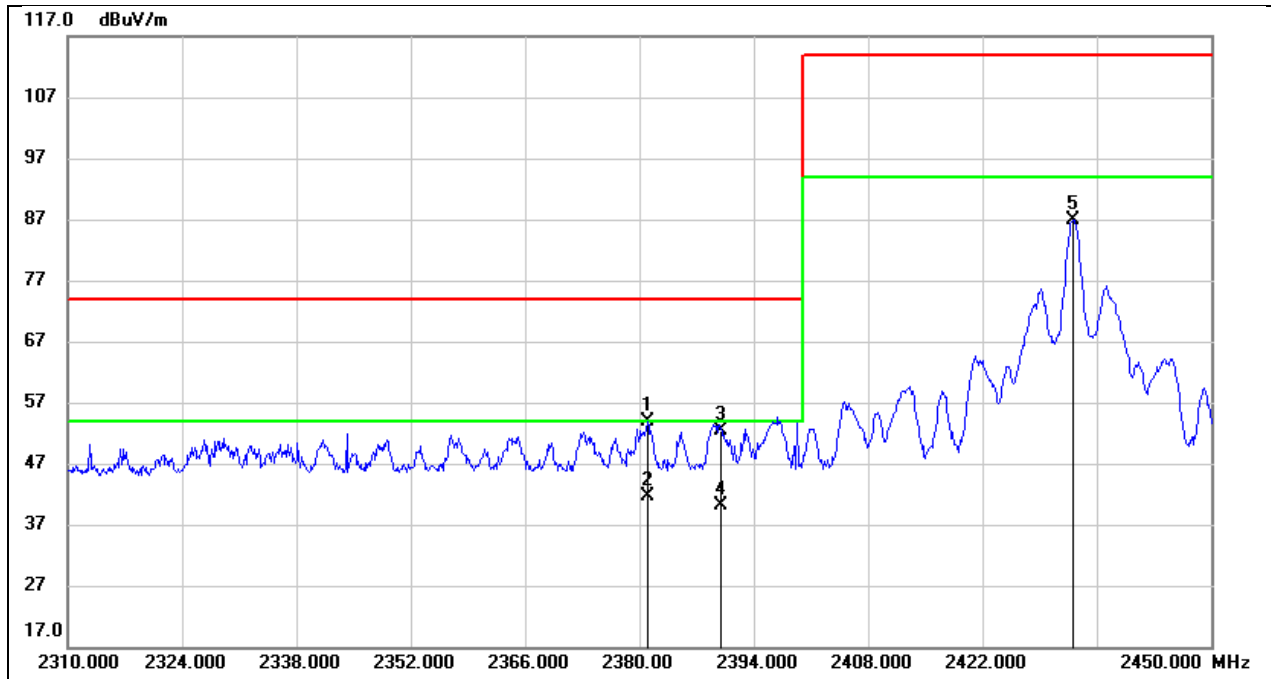
**TEST ENVIRONMENT**

Temperature	24.6 °C	Relative Humidity	57%
Atmosphere Pressure	101 kPa	Test Voltage	DC 3.0 V

**TEST RESULTS**

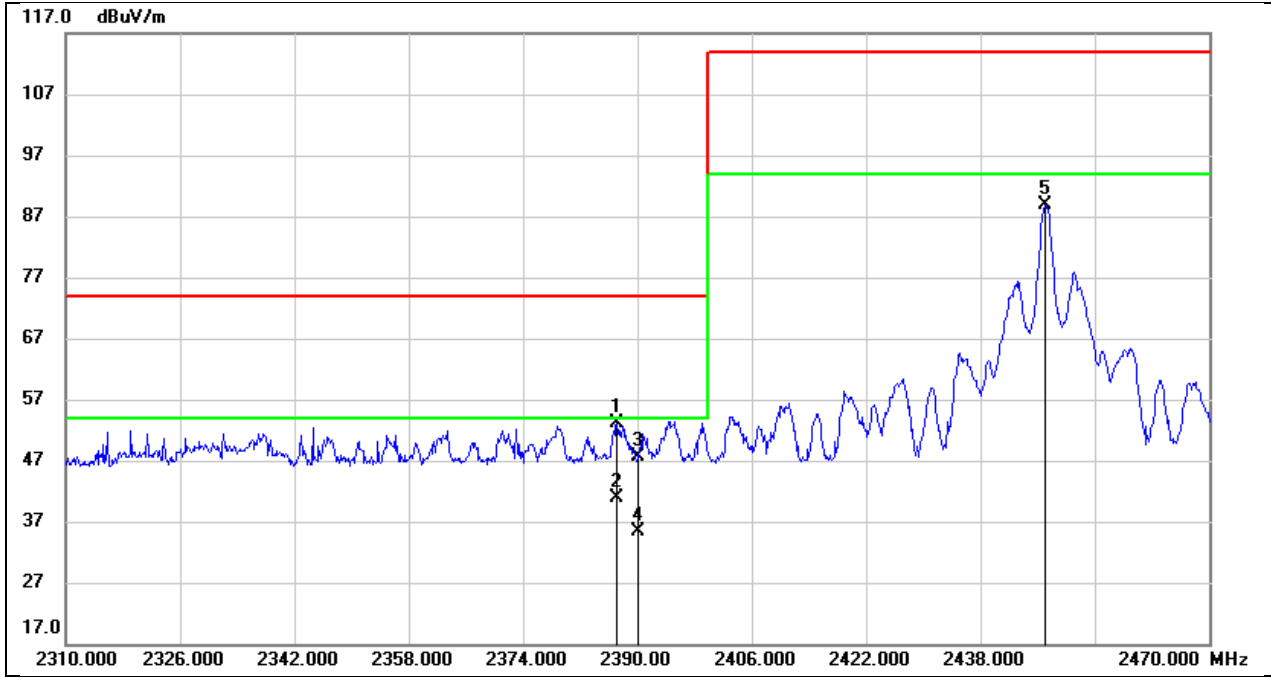
### 8.1. RESTRICTED BANDEDGE

Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2433
Polarity:	Vertical	Test Voltage:	DC 6 V



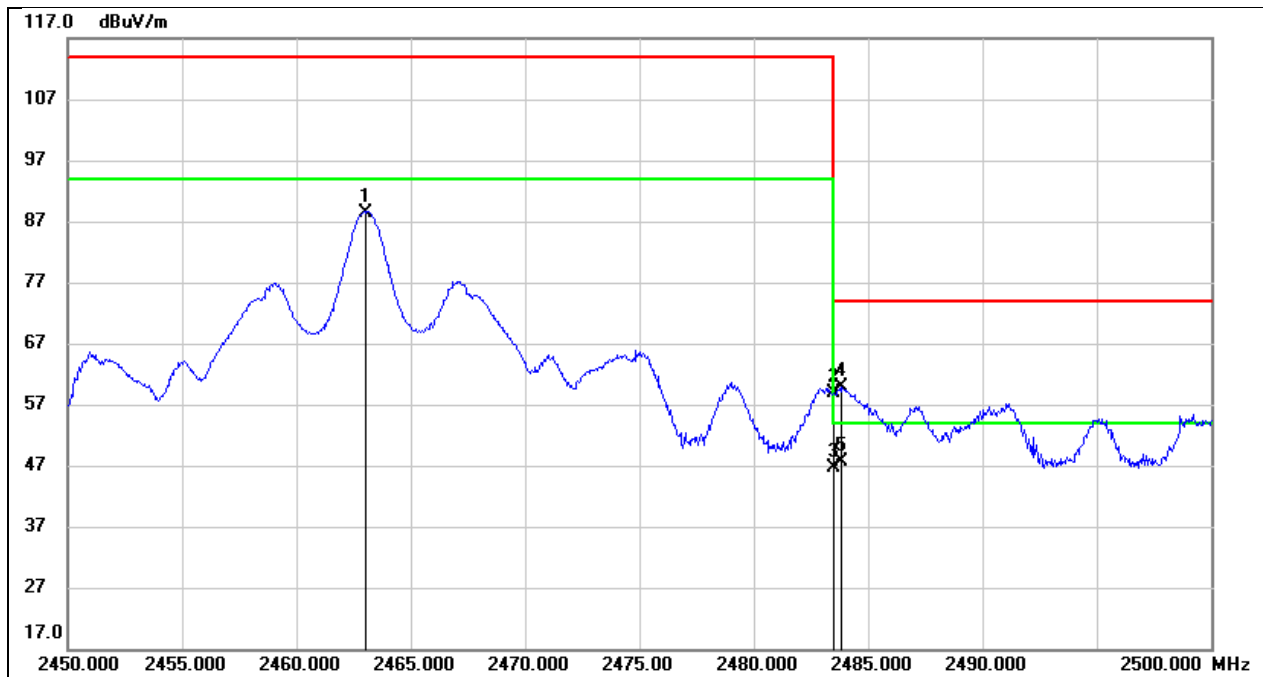
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2380.980	21.71	32.13	53.84	74.00	-20.16	peak
2	2380.980	/	/	41.99	54.00	-12.01	AVG
3	2390.000	20.20	32.16	52.36	74.00	-21.64	peak
4	2390.000	/	/	40.51	54.00	-13.49	AVG
5	2433.000	54.59	32.29	86.88	114.00	-27.12	Fundamental

Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2447
Polarity:	Vertical	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2387.120	20.19	32.91	53.10	74.00	-20.90	peak
2	2387.120	/	/	41.25	54.00	-12.75	AVG
3	2390.000	14.74	32.92	47.66	74.00	-26.34	peak
4	2390.000	/	/	35.81	54.00	-18.19	AVG
5	2447.000	55.82	32.95	88.77	114.00	-25.23	Fundamental

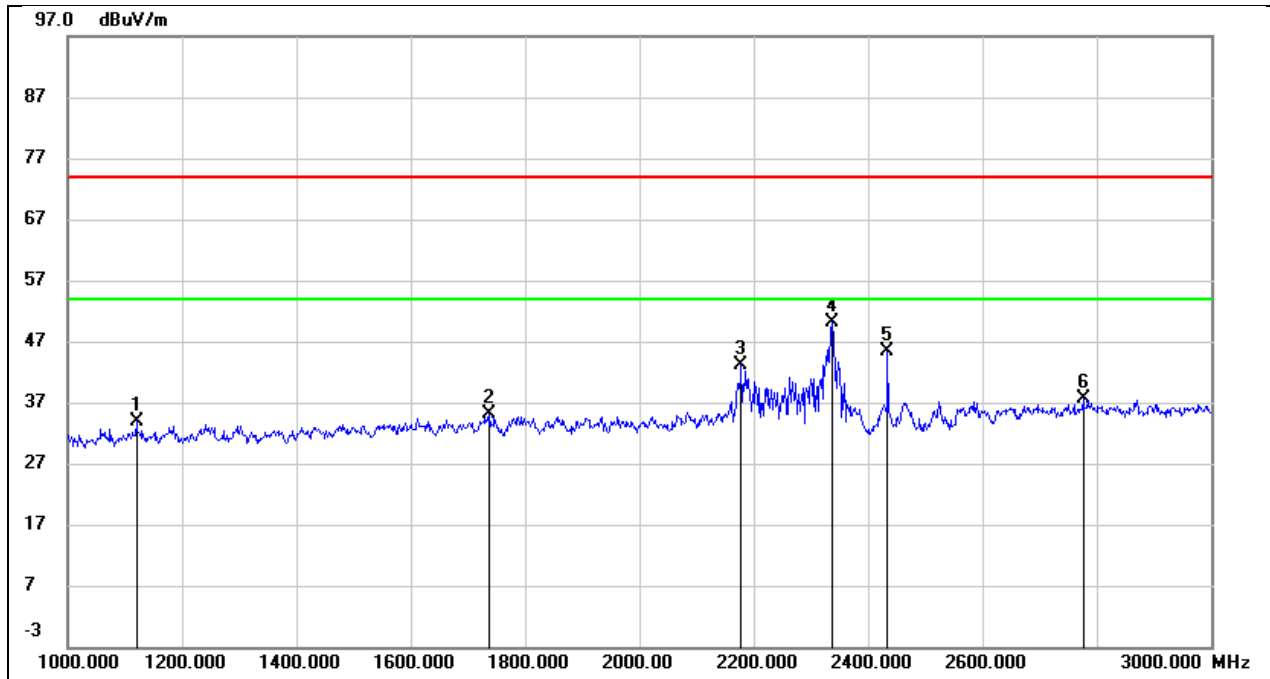
Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2463
Polarity:	Vertical	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.000	55.53	32.94	88.47	114.00	-25.53	Fundamental
2	2483.500	26.03	32.94	58.97	74.00	-15.03	peak
3	2483.500	/	/	47.12	54.00	-6.88	AVG
4	2483.800	26.84	32.94	59.78	74.00	-14.22	peak
5	2483.800	/	/	47.93	54.00	-6.07	AVG

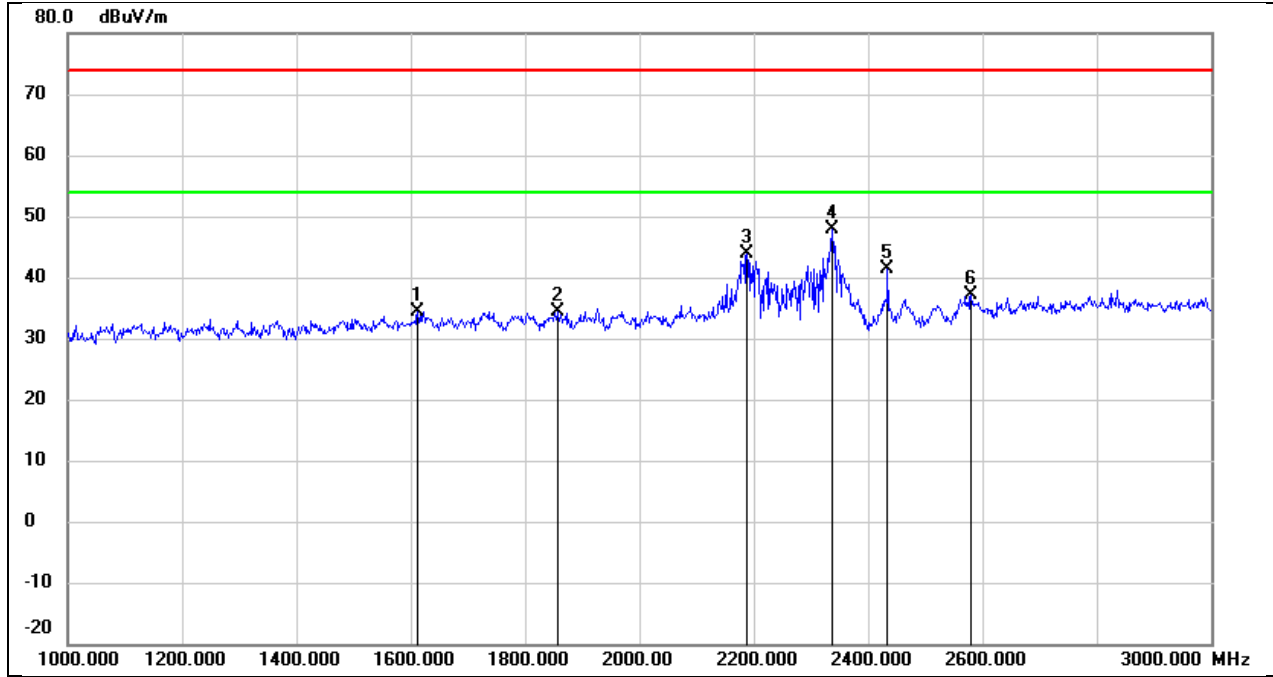
## 8.2. SPURIOUS EMISSIONS (1 GHZ ~ 3 GHZ)

Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2433
Polarity:	Horizontal	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1120.000	47.61	-13.68	33.93	74.00	-40.07	peak
2	1738.000	45.94	-10.81	35.13	74.00	-38.87	peak
3	2178.000	52.42	-9.26	43.16	74.00	-30.84	peak
4	2336.000	58.41	-8.28	50.13	74.00	-23.87	peak
5	2433.000	53.25	-7.88	45.37	/	/	Fundamental
6	2776.000	44.64	-7.04	37.60	74.00	-36.40	peak

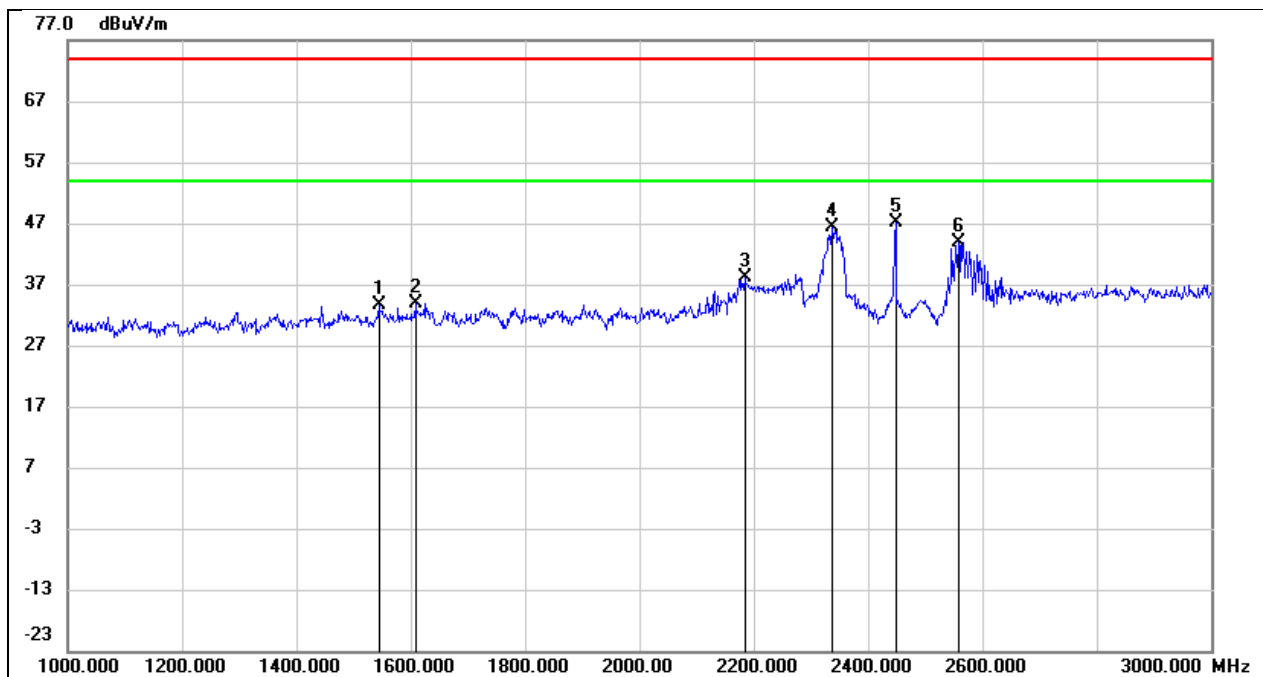
Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2433
Polarity:	Vertical	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1612.000	45.95	-11.45	34.50	74.00	-39.50	peak
2	1856.000	44.72	-10.46	34.26	74.00	-39.74	peak
3	2188.000	53.18	-9.19	43.99	74.00	-30.01	peak
4	2338.000	56.08	-8.26	47.82	74.00	-26.18	peak
5	2433.000	49.26	-7.88	41.38	/	/	Fundamental
6	2580.000	45.11	-7.93	37.18	74.00	-36.82	peak

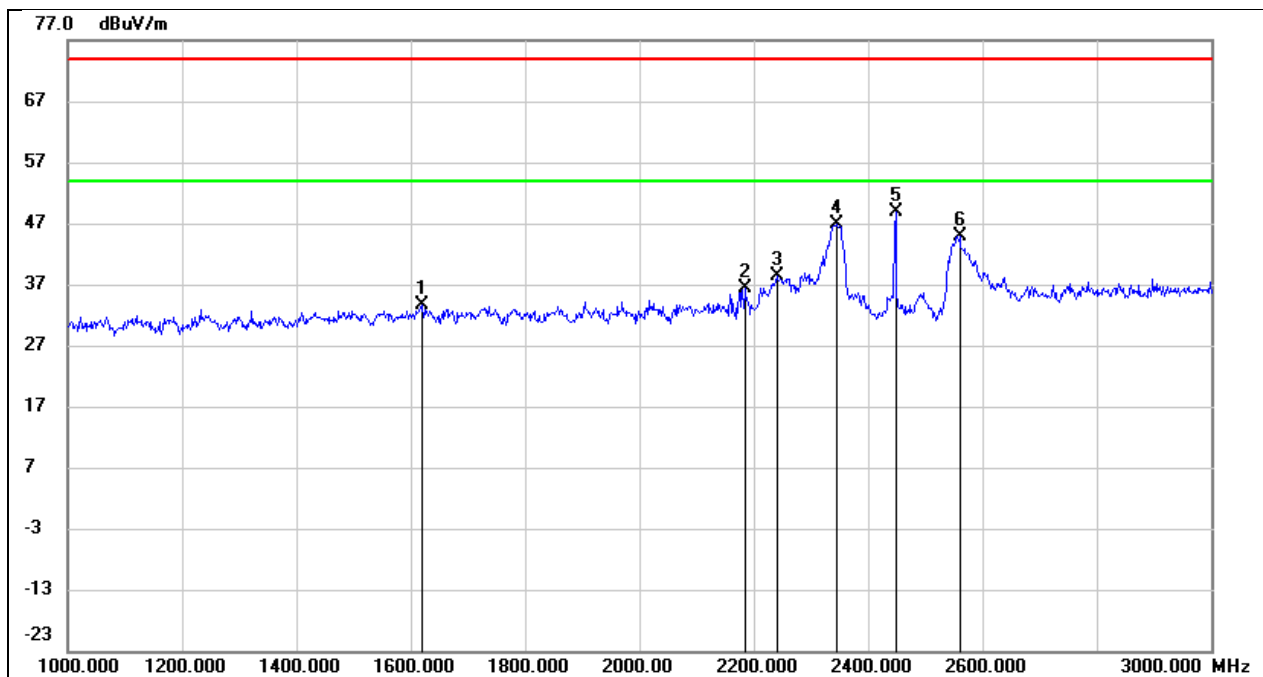


Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2447
Polarity:	Horizontal	Test Voltage:	DC 6 V



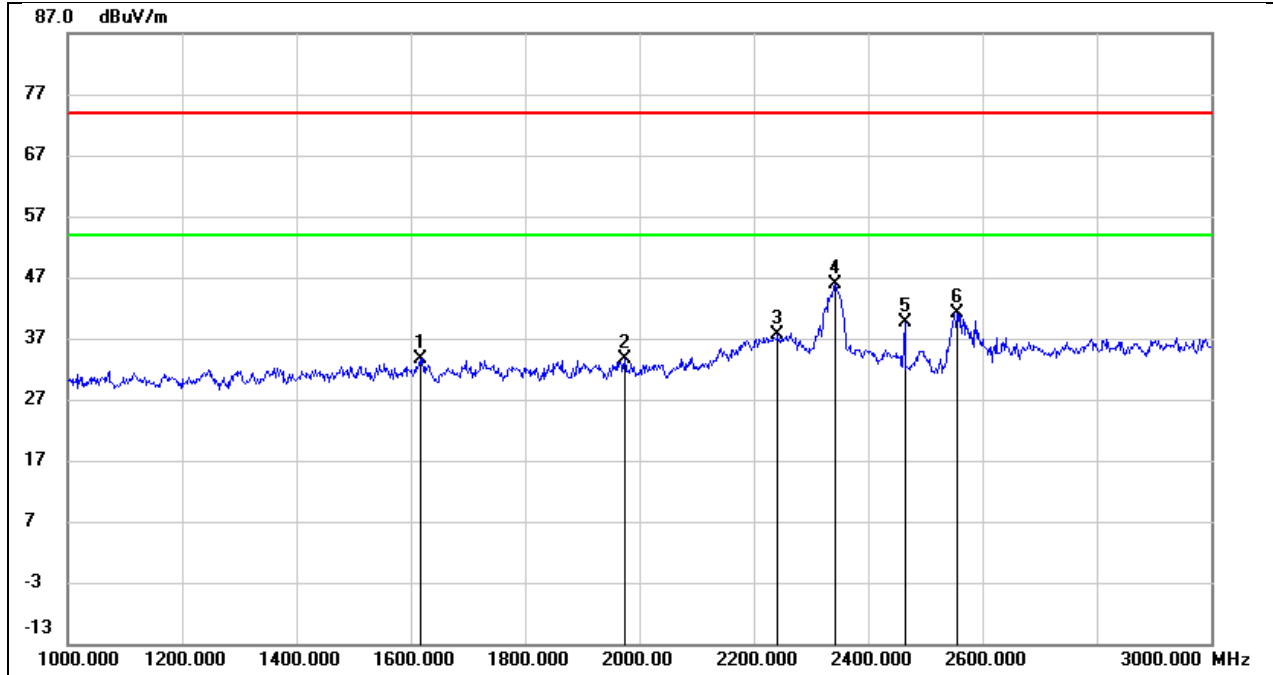
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1544.000	46.12	-12.56	33.56	74.00	-40.44	peak
2	1608.000	46.19	-12.35	33.84	74.00	-40.16	peak
3	2184.000	48.31	-10.11	38.20	74.00	-35.80	peak
4	2338.000	55.64	-9.32	46.32	74.00	-27.68	peak
5	2447.000	55.99	-8.77	47.22	/	/	Fundamental
6	2558.000	52.16	-8.20	43.96	74.00	-30.04	peak

Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2447
Polarity:	Vertical	Test Voltage:	DC 6 V



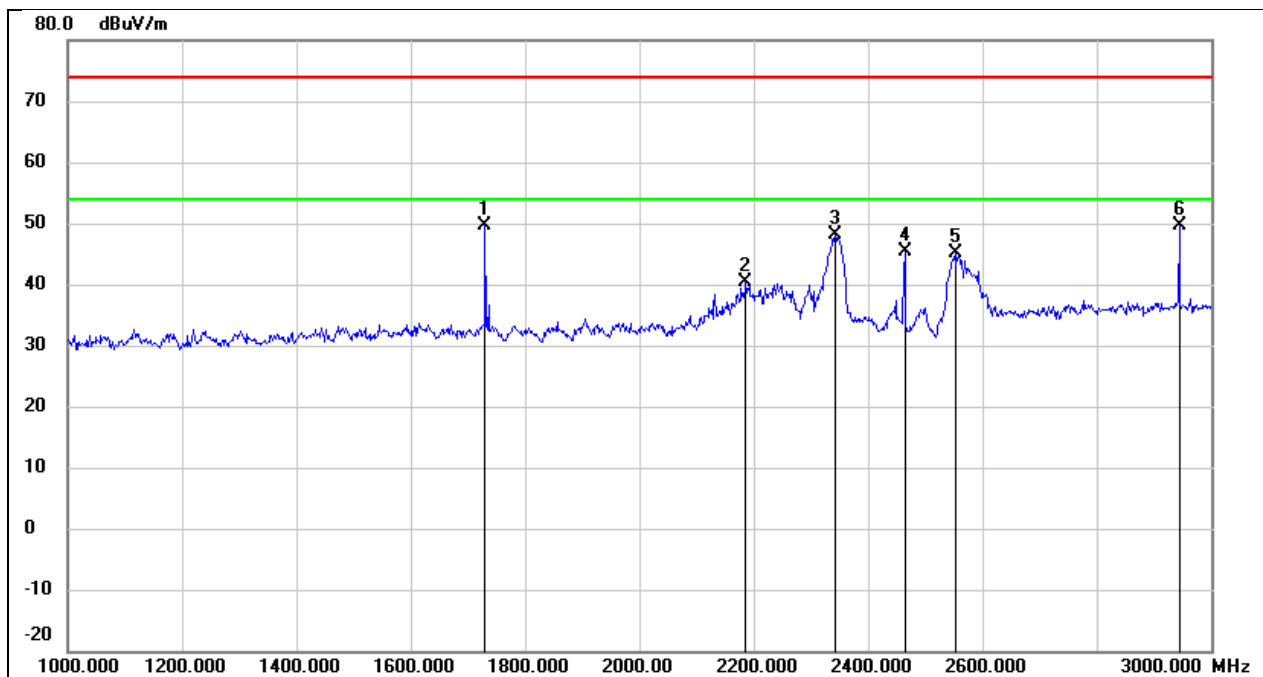
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1620.000	45.82	-12.31	33.51	74.00	-40.49	peak
2	2184.000	46.40	-10.11	36.29	74.00	-37.71	peak
3	2240.000	48.32	-9.83	38.49	74.00	-35.51	peak
4	2346.000	56.13	-9.28	46.85	74.00	-27.15	peak
5	2447.000	57.74	-8.77	48.97	/	/	Fundamental
6	2560.000	53.15	-8.19	44.96	74.00	-29.04	peak

Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2463
Polarity:	Horizontal	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1616.000	45.96	-12.33	33.63	74.00	-40.37	peak
2	1974.000	44.68	-11.14	33.54	74.00	-40.46	peak
3	2242.000	47.51	-9.81	37.70	74.00	-36.30	peak
4	2342.000	55.16	-9.30	45.86	74.00	-28.14	peak
5	2463.000	48.29	-8.68	39.61	/	/	Fundamental
6	2556.000	49.32	-8.21	41.11	74.00	-32.89	peak

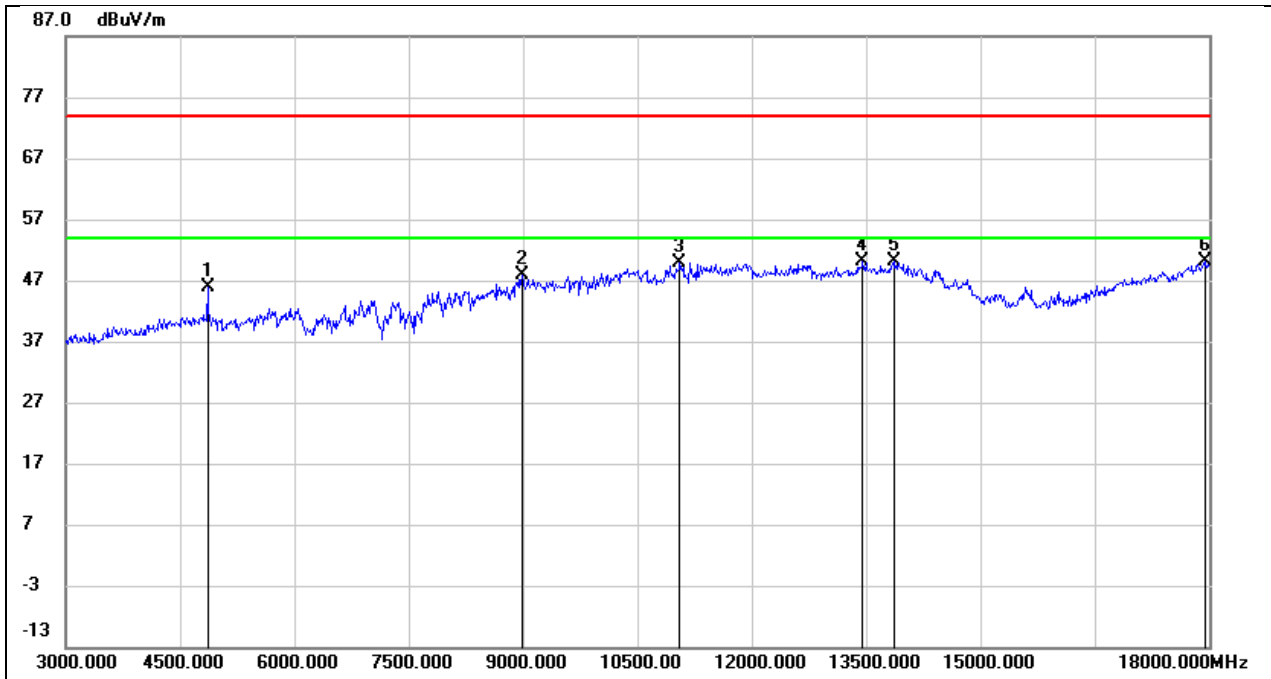
Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2463
Polarity:	Vertical	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1730.000	61.53	-11.95	49.58	74.00	-24.42	peak
2	2186.000	50.43	-10.11	40.32	74.00	-33.68	peak
3	2342.000	57.50	-9.30	48.20	74.00	-25.80	peak
4	2463.000	54.07	-8.68	45.39	/	/	Fundamental
5	2552.000	53.38	-8.23	45.15	74.00	-28.85	peak
6	2944.000	55.90	-6.26	49.64	74.00	-24.36	peak

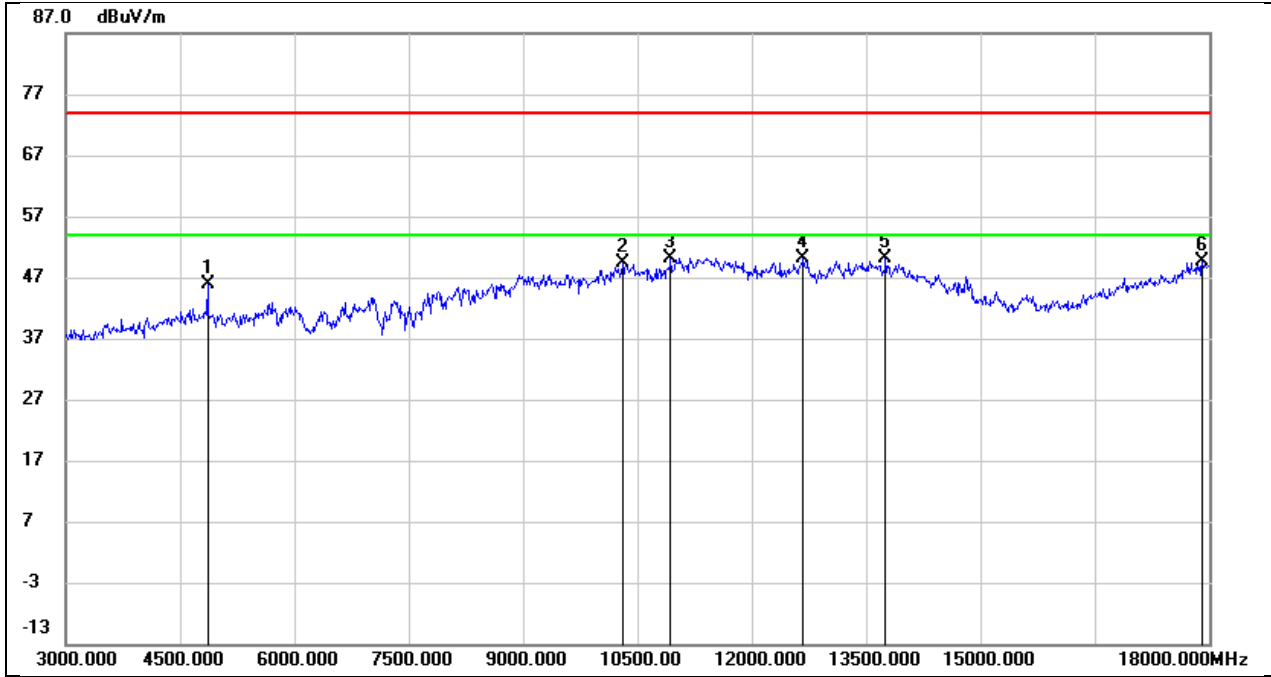
### 8.3. SPURIOUS EMISSIONS (3 GHZ ~ 18 GHZ)

Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2433
Polarity:	Horizontal	Test Voltage:	DC 6 V



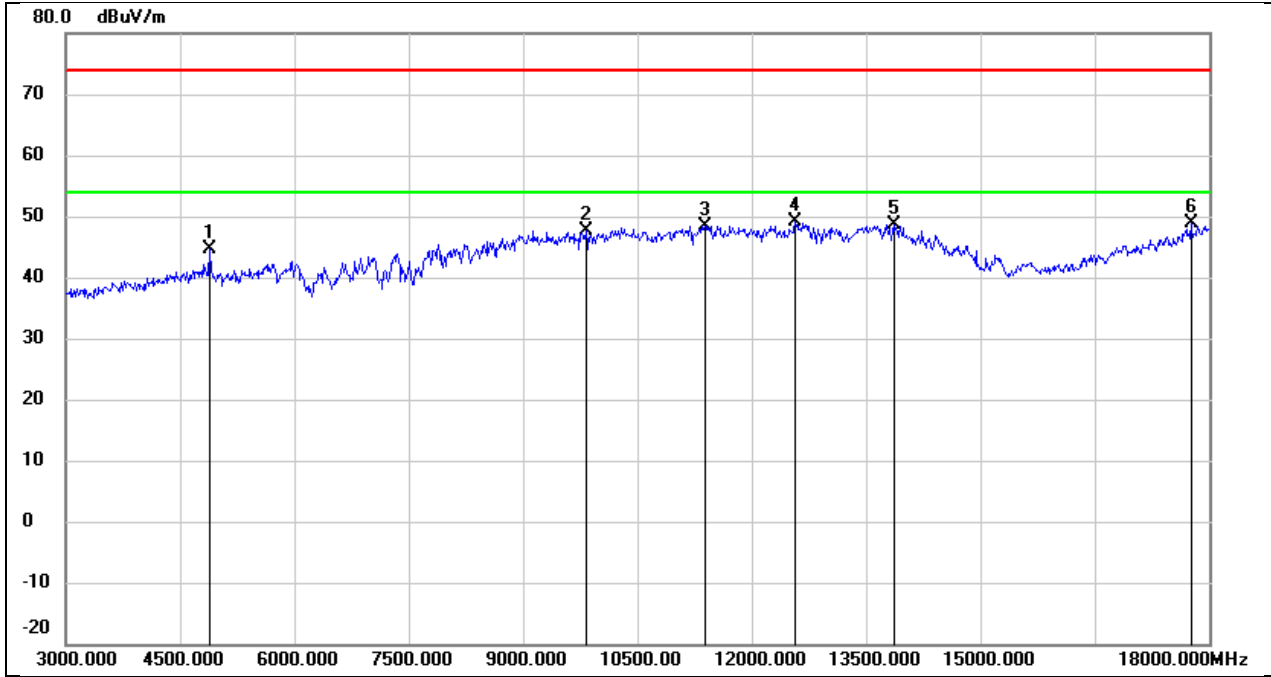
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4860.000	45.43	0.57	46.00	74.00	-28.00	peak
2	8985.000	36.86	10.97	47.83	74.00	-26.17	peak
3	11055.000	34.84	15.04	49.88	74.00	-24.12	peak
4	13455.000	28.55	21.58	50.13	74.00	-23.87	peak
5	13875.000	27.38	22.68	50.06	74.00	-23.94	peak
6	17940.000	23.57	26.61	50.18	74.00	-23.82	peak

Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2433
Polarity:	Vertical	Test Voltage:	DC 6 V



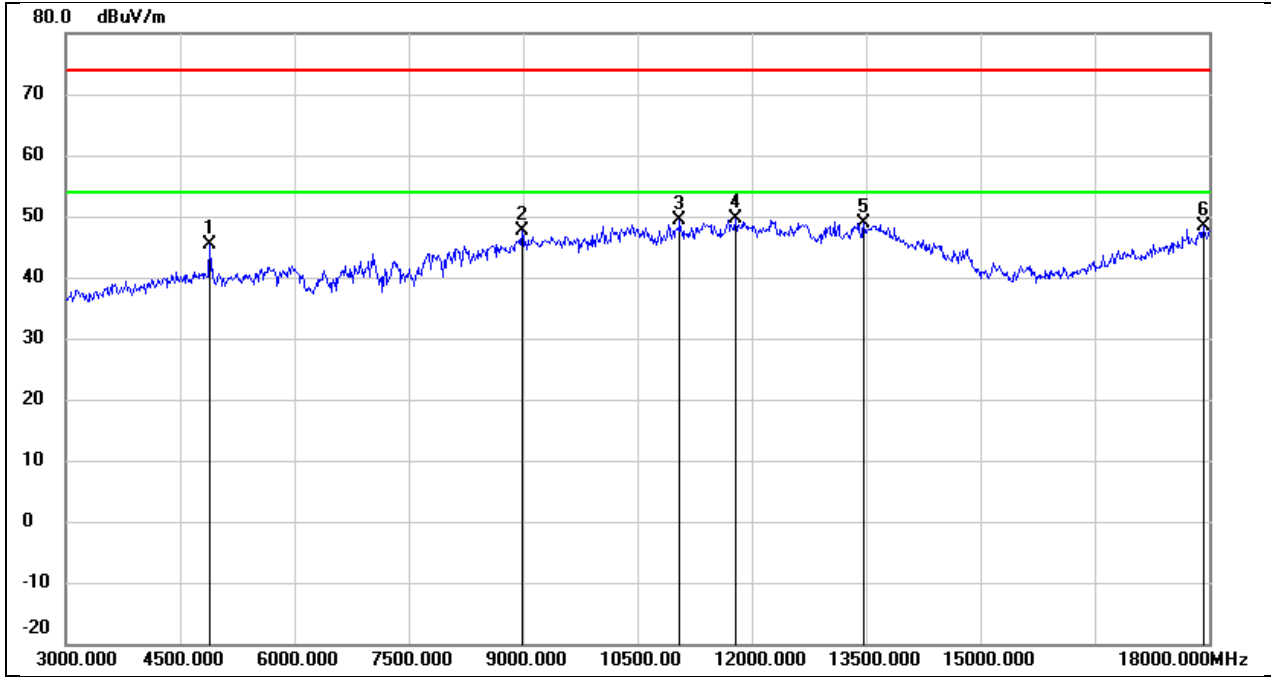
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4860.000	45.36	0.57	45.93	74.00	-28.07	peak
2	10305.000	36.47	13.00	49.47	74.00	-24.53	peak
3	10935.000	35.60	14.60	50.20	74.00	-23.80	peak
4	12675.000	31.62	18.54	50.16	74.00	-23.84	peak
5	13755.000	27.60	22.42	50.02	74.00	-23.98	peak
6	17910.000	23.08	26.50	49.58	74.00	-24.42	peak

Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2447
Polarity:	Horizontal	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4890.000	44.06	0.64	44.70	74.00	-29.30	peak
2	9825.000	35.96	11.65	47.61	74.00	-26.39	peak
3	11385.000	32.02	16.45	48.47	74.00	-25.53	peak
4	12570.000	30.72	18.34	49.06	74.00	-24.94	peak
5	13860.000	26.02	22.68	48.70	74.00	-25.30	peak
6	17760.000	23.15	25.72	48.87	74.00	-25.13	peak

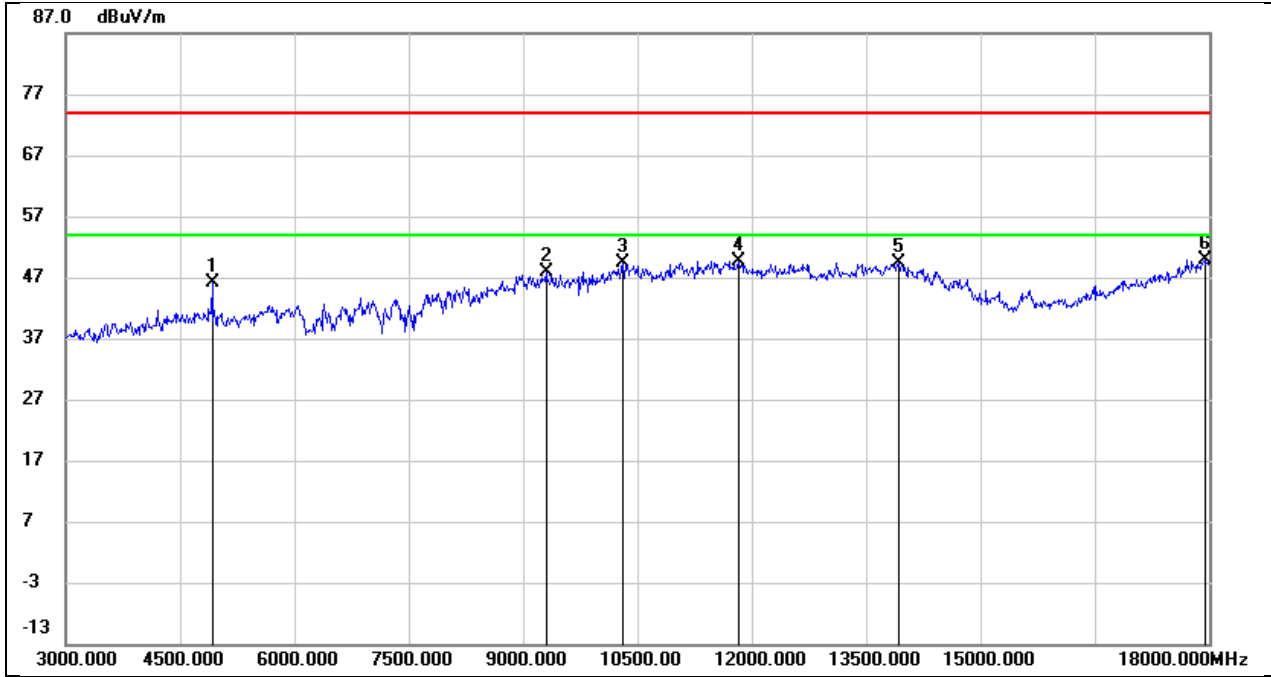
Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2447
Polarity:	Vertical	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4890.000	44.74	0.64	45.38	74.00	-28.62	peak
2	8985.000	36.62	10.97	47.59	74.00	-26.41	peak
3	11055.000	34.28	15.04	49.32	74.00	-24.68	peak
4	11790.000	32.05	17.60	49.65	74.00	-24.35	peak
5	13470.000	27.30	21.62	48.92	74.00	-25.08	peak
6	17925.000	21.82	26.55	48.37	74.00	-25.63	peak

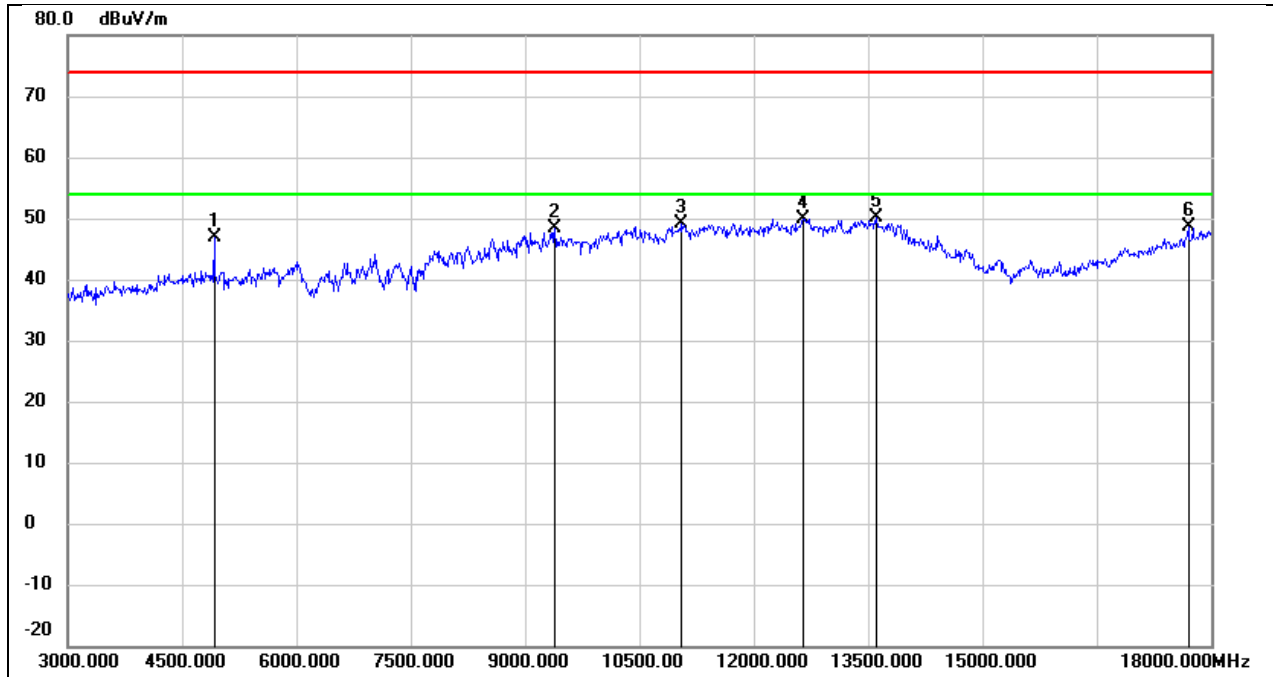


Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2463
Polarity:	Horizontal	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4920.000	45.44	0.69	46.13	74.00	-27.87	peak
2	9300.000	37.63	10.23	47.86	74.00	-26.14	peak
3	10305.000	36.34	13.00	49.34	74.00	-24.66	peak
4	11820.000	31.98	17.73	49.71	74.00	-24.29	peak
5	13920.000	26.74	22.71	49.45	74.00	-24.55	peak
6	17940.000	23.27	26.61	49.88	74.00	-24.12	peak

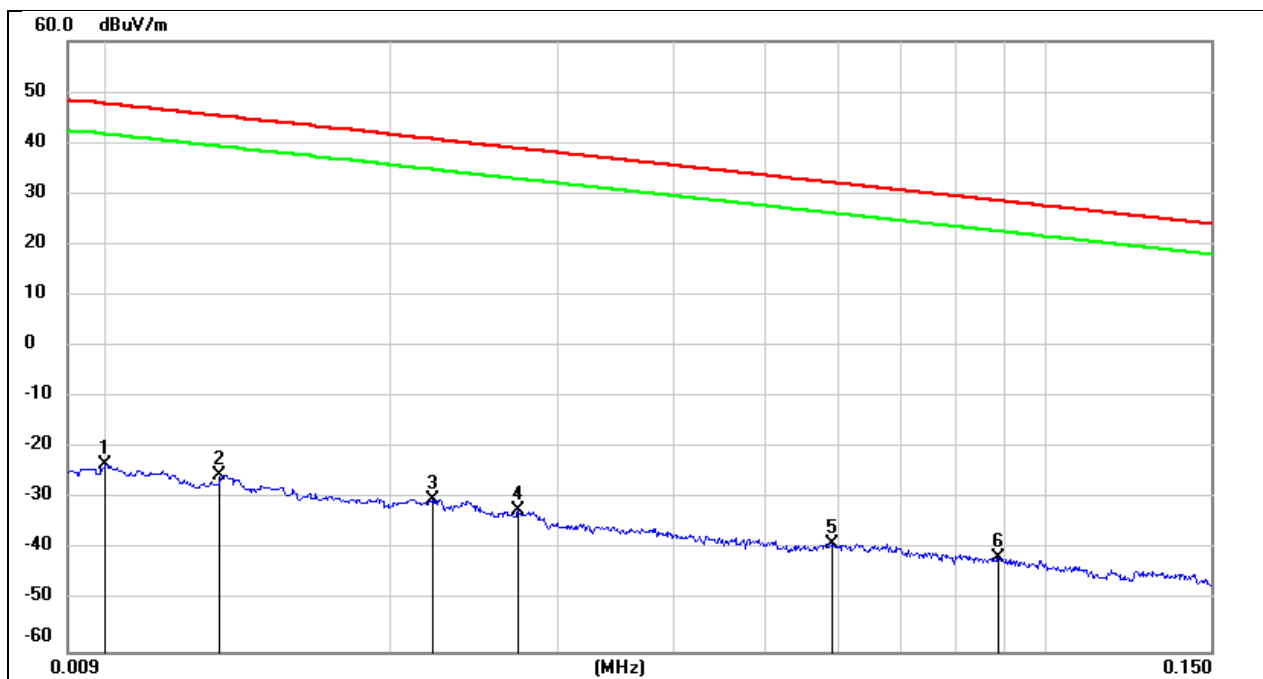
Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2463
Polarity:	Vertical	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4920.000	46.14	0.69	46.83	74.00	-27.17	peak
2	9390.000	37.84	10.43	48.27	74.00	-25.73	peak
3	11055.000	34.16	15.04	49.20	74.00	-24.80	peak
4	12645.000	31.53	18.44	49.97	74.00	-24.03	peak
5	13605.000	28.50	21.68	50.18	74.00	-23.82	peak
6	17700.000	23.49	25.17	48.66	74.00	-25.34	peak

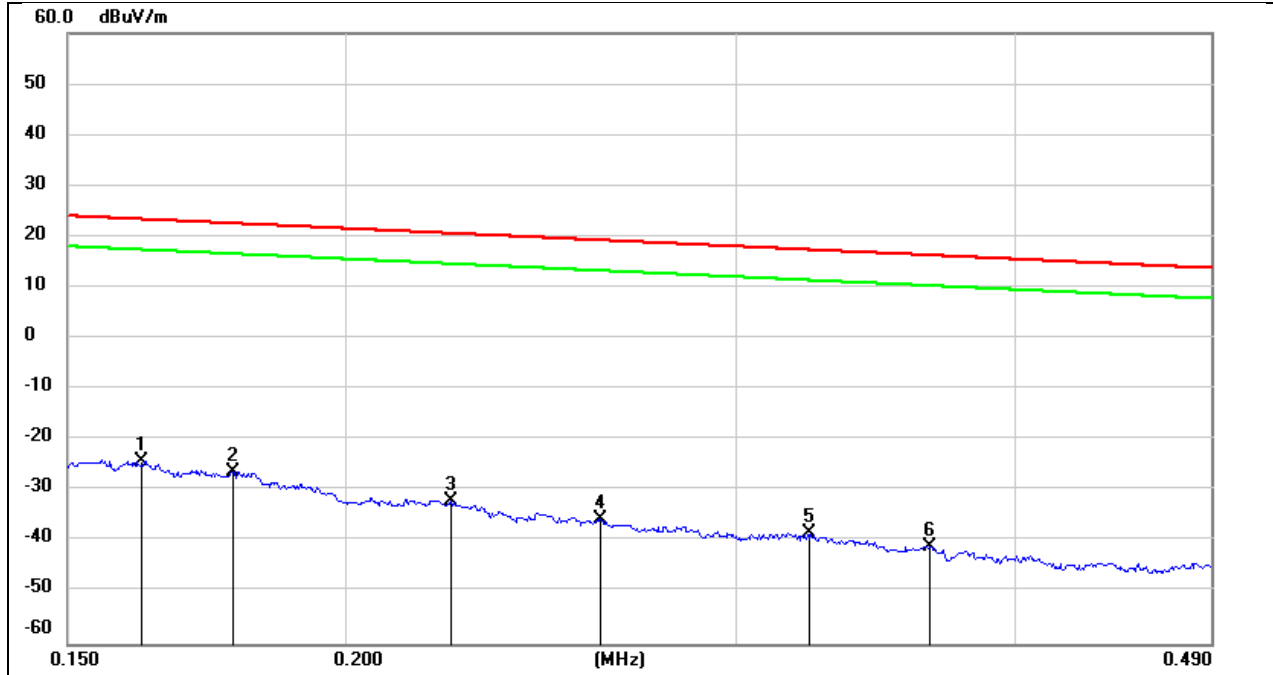
### 8.4. SPURIOUS EMISSIONS (9 KHZ ~ 30 MHZ)

Test Mode:	SRD 2.4G	Frequency(MHz):	2447
Polarity:	Loop Antenna Face On To The EUT	Test Voltage	DC 6 V



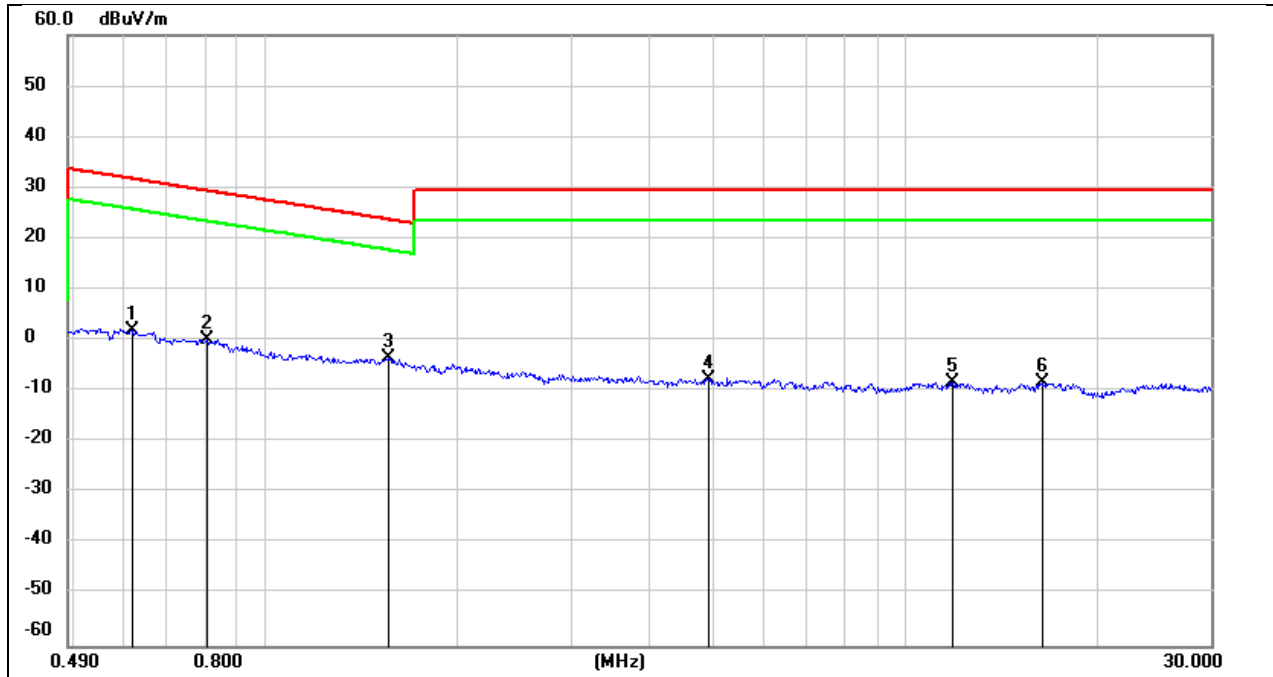
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Result (dBuA/m)	Limit (dBuV/m)	Limit (dBuA/m)	Margin (dB)	Remark
1	0.01	78.22	-101.4	-23.18	-74.68	47.6	-3.9	-70.78	peak
2	0.0131	75.97	-101.38	-25.41	-76.91	45.25	-6.25	-70.66	peak
3	0.0221	71.13	-101.35	-30.22	-81.72	40.71	-10.79	-70.93	peak
4	0.0273	68.99	-101.38	-32.39	-83.89	38.88	-12.62	-71.27	peak
5	0.0589	62.81	-101.52	-38.71	-90.21	32.2	-19.3	-70.91	peak
6	0.0889	60.27	-101.71	-41.44	-92.94	28.63	-22.87	-70.07	peak

Test Mode:	SRD 2.4G	Frequency(MHz):	2447
Polarity:	Loop Antenna Face On To The EUT	Test Voltage	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Result (dBuA/m)	Limit (dBuV/m)	Limit (dBuA/m)	Margin (dB)	Remark
1	0.1621	77.42	-101.65	-24.23	-75.73	23.41	-28.09	-47.64	peak
2	0.1781	75.37	-101.68	-26.31	-77.81	22.59	-28.91	-48.90	peak
3	0.223	69.79	-101.75	-31.96	-83.46	20.63	-30.87	-52.59	peak
4	0.2605	66.14	-101.81	-35.67	-87.17	19.28	-32.22	-54.95	peak
5	0.3234	63.48	-101.88	-38.4	-89.90	17.41	-34.09	-55.81	peak
6	0.3662	61.08	-101.93	-40.85	-92.35	16.33	-35.17	-57.18	peak

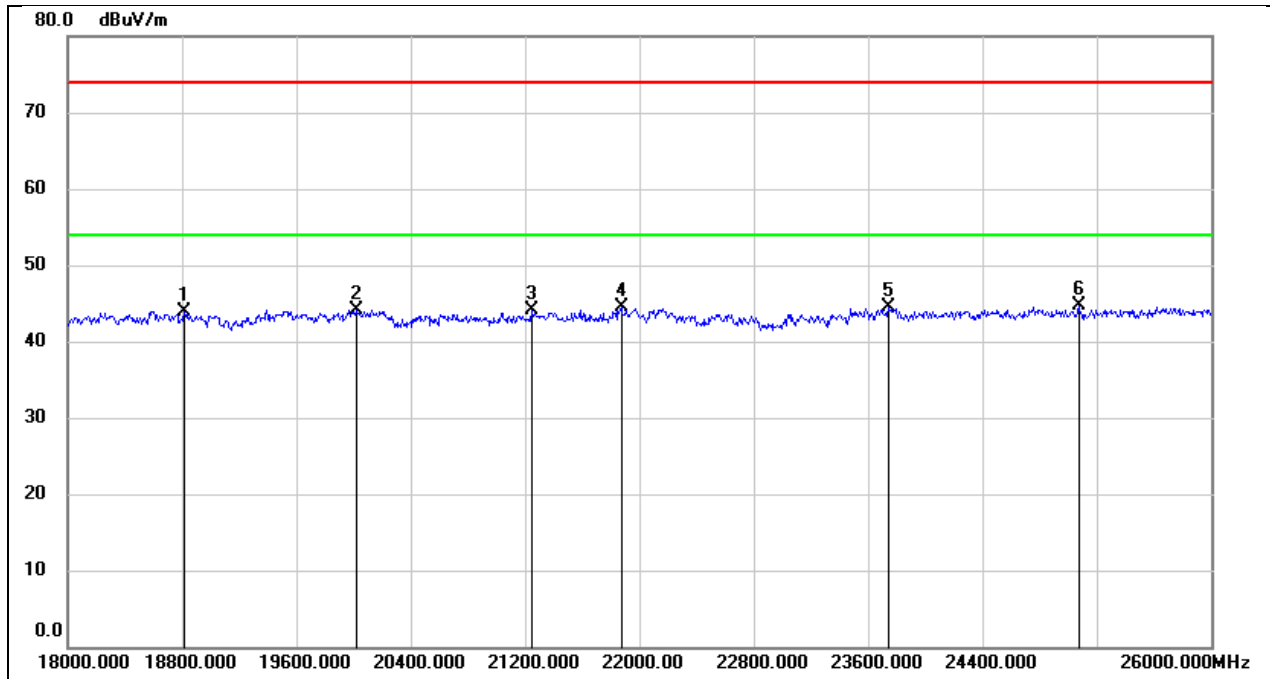
Test Mode:	SRD 2.4G	Frequency(MHz):	2447
Polarity:	Loop Antenna Face On To The EUT	Test Voltage	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Result (dBuA/m)	Limit (dBuV/m)	Limit (dBuA/m)	Margin (dB)	Remark
1	0.6169	64.05	-62.08	1.97	-49.53	31.8	-19.7	-29.83	peak
2	0.8094	62.25	-62.15	0.1	-51.40	29.44	-22.06	-29.34	peak
3	1.5564	58.68	-62.02	-3.34	-54.84	23.76	-27.74	-27.10	peak
4	4.9165	53.88	-61.48	-7.6	-59.10	29.54	-21.96	-37.14	peak
5	11.8513	52.56	-60.88	-8.32	-59.82	29.54	-21.96	-37.86	peak
6	16.3959	52.67	-60.96	-8.29	-59.79	29.54	-21.96	-37.83	peak

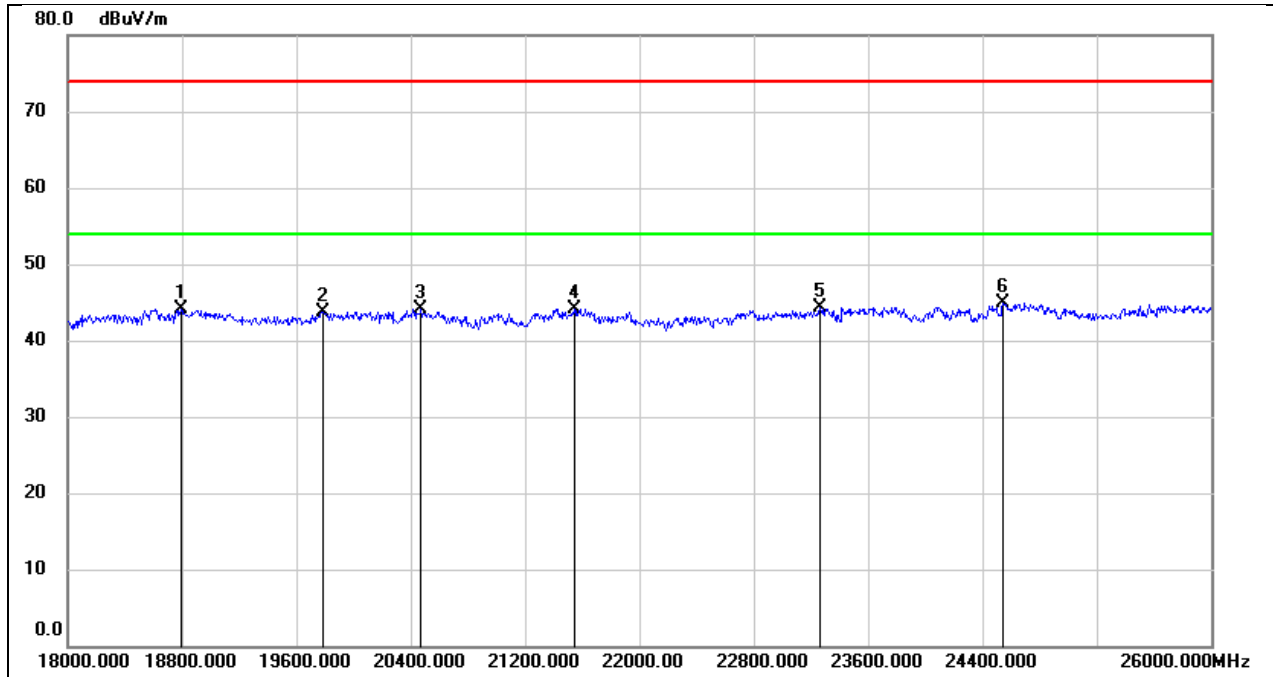
### 8.5. SPURIOUS EMISSIONS (18 GHZ ~ 26 GHZ)

Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2447
Polarity:	Horizontal	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18816.000	49.21	-5.38	43.83	74.00	-30.17	peak
2	20016.000	49.56	-5.47	44.09	74.00	-29.91	peak
3	21248.000	48.79	-4.77	44.02	74.00	-29.98	peak
4	21872.000	48.89	-4.40	44.49	74.00	-29.51	peak
5	23744.000	47.65	-3.20	44.45	74.00	-29.55	peak
6	25072.000	46.67	-1.97	44.70	74.00	-29.30	peak

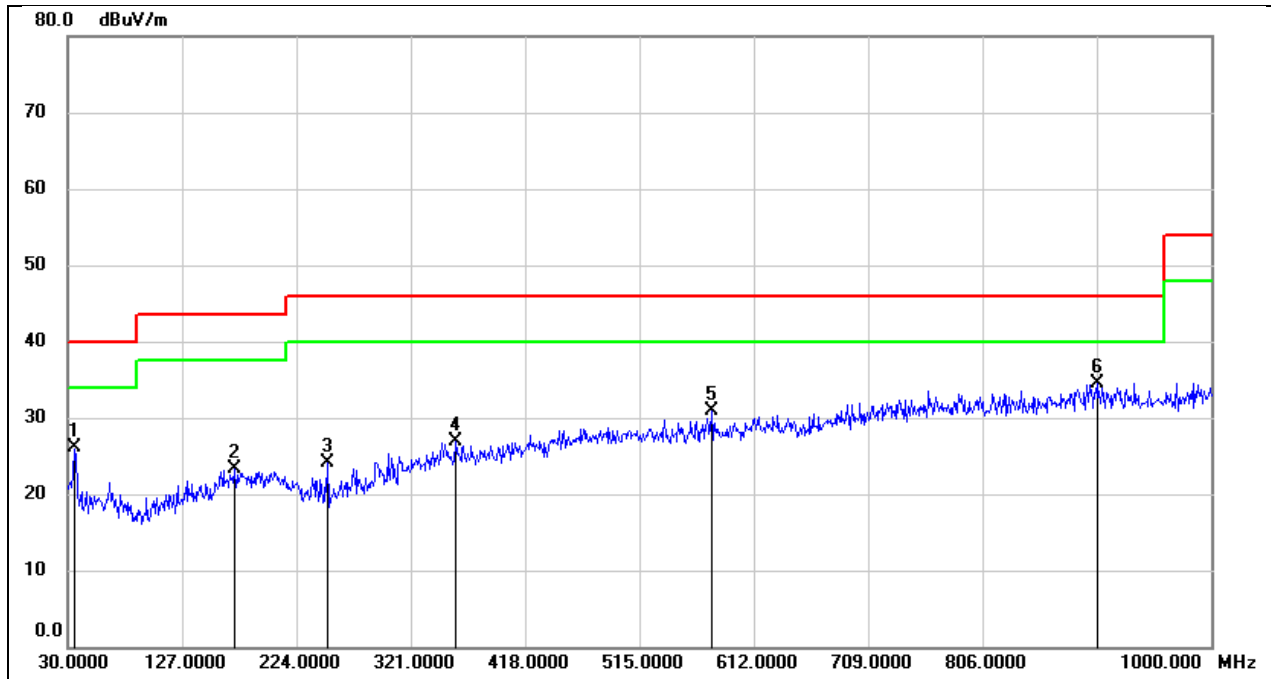
Test Mode:	SRD 2.4GHZ	Frequency(MHz):	2447
Polarity:	Vertical	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18792.000	49.45	-5.39	44.06	74.00	-29.94	peak
2	19784.000	49.07	-5.28	43.79	74.00	-30.21	peak
3	20472.000	49.57	-5.39	44.18	74.00	-29.82	peak
4	21544.000	48.76	-4.63	44.13	74.00	-29.87	peak
5	23264.000	47.76	-3.36	44.40	74.00	-29.60	peak
6	24544.000	47.19	-2.32	44.87	74.00	-29.13	peak

### 8.6. SPURIOUS EMISSIONS (30 MHZ ~ 1 GHZ)

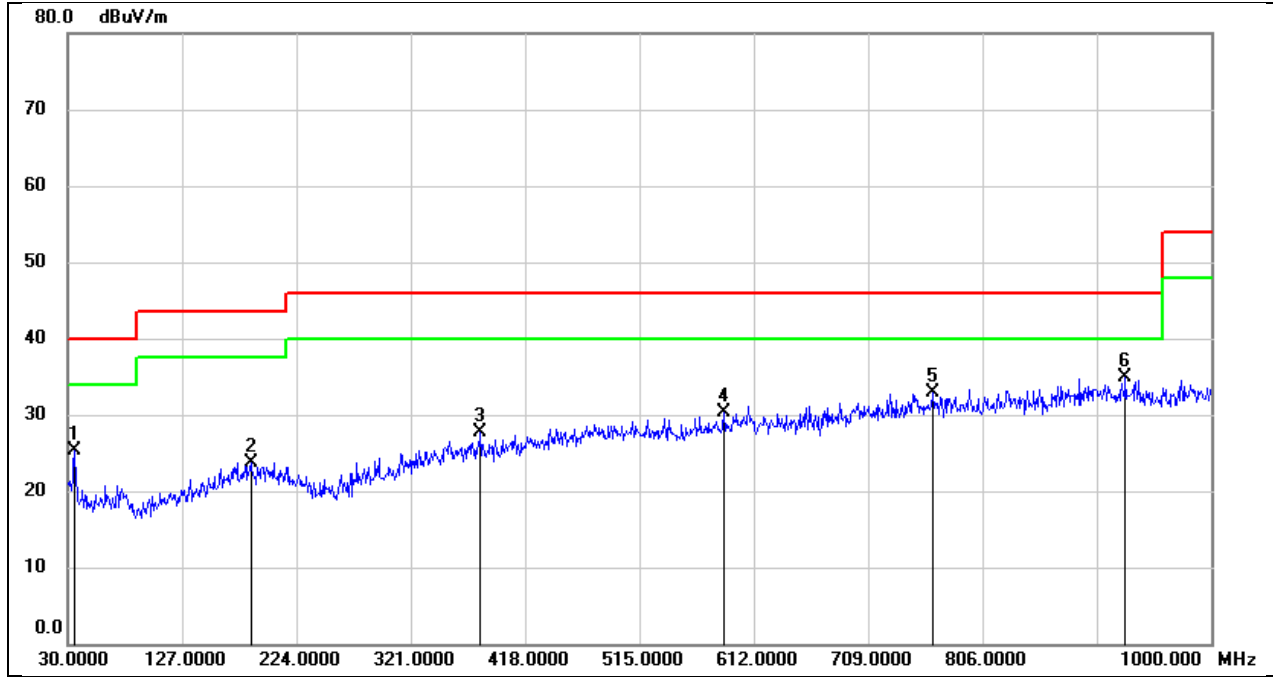
Test Mode:	BLE 1M	Frequency(MHz):	2447
Polarity:	Horizontal	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	35.8200	30.64	-4.63	26.01	40.00	-13.99	QP
2	171.6200	26.29	-2.97	23.32	43.50	-20.18	QP
3	250.1900	29.90	-5.73	24.17	46.00	-21.83	QP
4	358.8299	27.61	-0.79	26.82	46.00	-19.18	QP
5	576.1100	29.32	1.55	30.87	46.00	-15.13	QP
6	903.0000	27.71	6.77	34.48	46.00	-11.52	QP



Test Mode:	BLE 1M	Frequency(MHz):	2447
Polarity:	Vertical	Test Voltage:	DC 6 V



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	35.8200	29.98	-4.63	25.35	40.00	-14.65	QP
2	185.2000	26.61	-2.87	23.74	43.50	-19.76	QP
3	380.1700	28.63	-0.90	27.73	46.00	-18.27	QP
4	586.7800	28.55	1.79	30.34	46.00	-15.66	QP
5	764.2900	27.99	4.95	32.94	46.00	-13.06	QP
6	927.2500	28.37	6.50	34.87	46.00	-11.13	QP

**END OF REPORT**