

## TEST REPORT



Applicant:	SILVERLIT TOYS MANUFACTORY LTD
Address:	Rm 1701-03, World Trade Ctr., 280 Gloucester Rd., Causeway Bay, Hongkong

Manufacturer or Supplier	SILVERLIT TOYS MANUFACTORY LTD
Address	Rm 1701-03, World Trade Ctr., 280 Gloucester Rd., Causeway Bay, Hongkong
Product:	BUMPER DRONE HD
Brand Name:	silverlit
Model:	84813
Additional Model & Model Difference	N/A
Date of tests:	Mar. 30, 2022 ~ Apr. 11, 2022

the tests have been carried out according to the requirements of the following standard:

**FCC Part 15, Subpart C, Section 15.249**

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

Tested by Andy Zhu Supervisor / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	
	Date: Apr. 14, 2022

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**BUREAU  
VERITAS**

Test Report No.: RF2203WDG0341-2

**6. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE  
EUT BY THE LAB ..... 32**



Test Report No.: RF2203WDG0341-2

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF2203WDG0341-2	Original release	Apr. 14, 2022

## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.249)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
§15.203	Antenna Requirement	PASS	No antenna connector is used
§15.207 (a)	Conducted Emission	PASS	Compliant
§15.205	Restricted Band of Operation	PASS	Compliant
§15.209 §15.249(a)	Radiated Emission	PASS	Compliant
§15.215(c)	20dB Bandwidth Test	PASS	Compliant

## 2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	0.15MHz ~ 30MHz	3.05dB
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GMHz	3.63dB
	1GHz ~ 18GHz	4.96dB
	18GHz ~ 40GHz	4.37dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	BUMPER DRONE HD
<b>MODEL NO.</b>	84813
<b>ADDITIONAL MODEL</b>	N/A
<b>FCC ID</b>	OYK-FCC84813
<b>NOMINAL VOLTAGE</b>	Plane: DC 3.7V from Li-ion Battery Battery Charging: DC 5V from USB Host Unit
<b>MODULATION TECHNOLOGY</b>	GFSK
<b>OPERATING FREQUENCY</b>	2405-2475MHz
<b>ANTENNA TYPE</b>	Wire Antenna, with 0dBi gain
<b>I/O PORTS</b>	Refer to user's manual
<b>CABLE SUPPLIED</b>	Battery Charging Cable: Unshielded, Detachable, 60cm

**NOTES:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions, but only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 2203WDG0341-2) for detailed product photo.

### 3.2 DESCRIPTION OF TEST MODES

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and packet type. The worst case was found when the EUT was positioned on X axis for radiated emission. The EUT was tested under the following mode.

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE<1G	RE≥1G	PLC	BW	
A	√	√	√	√	AC 120V/60Hz

Where **RE<1G**: Radiated Emission below 1GHz      **RE≥1G**: Radiated Emission above 1GHz  
**PLC**: Power Line Conducted Emission      **BW**: 20db bandwidth

**Note:** No need to concern of Conducted Emission due to the EUT is powered by battery.

Following channel(s) was (were) selected for the test as listed below.

TESTED CHANNEL	TESTED FREQUENCY
Low	2405 MHz
Middle	2433 MHz
High	2475 MHz



Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	2	2407	3	2411
4	2433	5	2435	6	2450
7	2460	8	2470	9	2472
10	2475				

Note: The more detailed channel, please refer to the product specifications

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE	25deg. C, 55%RH	AC 120V 60Hz	yoyo
BW	25deg. C, 56%RH	AC 120V 60Hz	yoyo



### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C, Section 15.249**

**ANSI C63.10-2013**

All test items have been performed and recorded as per the above standards.

### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit without any other necessary accessories or support units.

## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
  2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
  3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Mar. 07,23
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 07,23
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Mar. 07,23
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Aug. 05,22
Coaxial RF Cable	/	CE CABLE	C2310066DG	Jul. 27,22
Test software	ADT	ADT_Cond_V7.3 .7	N/A	N/A

**NOTES:**

1. The test was performed in shielded room 553. (Chen Wu)
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

#### 4.1.3 TEST PROCEDURES

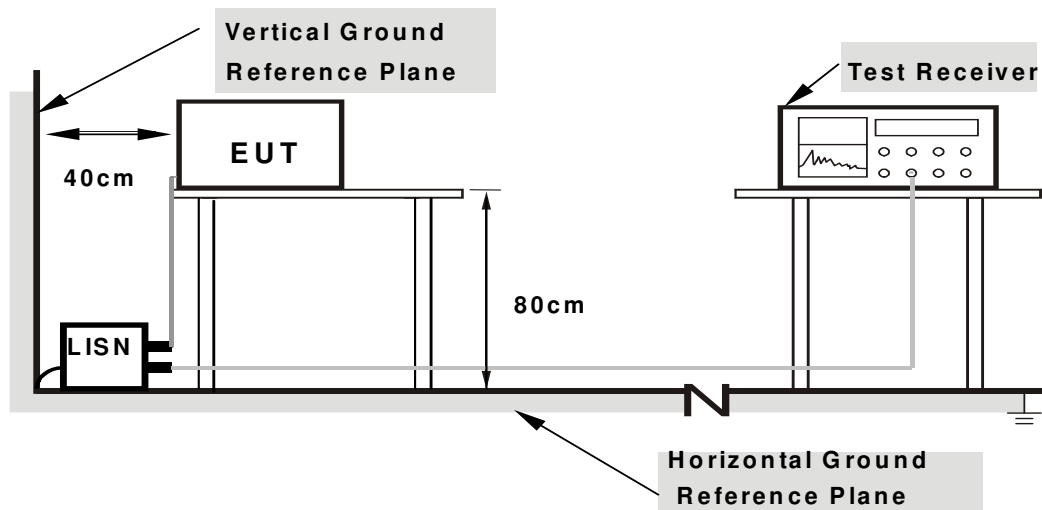
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.1.5 TEST SETUP



**Note: 1.Support units were connected to second LISN.**

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80  
from other units and other metal planes**

For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

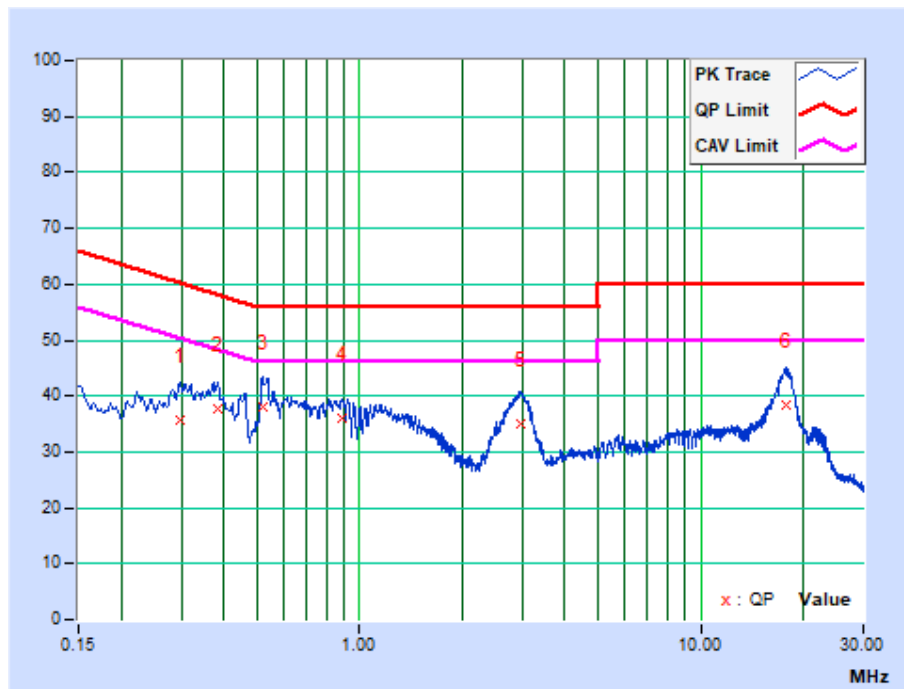
### 4.1.7 TEST RESULTS

**CONDUCTED WORST-CASE DATA:**

<b>PHASE</b>	Line	<b>6dB BANDWIDTH</b>	9kHz
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No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.29616	10.11	25.61	8.99	35.72	19.10	60.35	50.35	-24.63	-31.25
2	0.38463	10.14	27.59	13.93	37.73	24.07	58.18	48.18	-20.45	-24.11
3	0.51834	10.17	27.86	14.25	38.03	24.42	56.00	46.00	-17.97	-21.58
4	0.88358	10.25	25.63	13.25	35.88	23.50	56.00	46.00	-20.12	-22.50
5	2.96700	10.50	24.36	17.40	34.86	27.90	56.00	46.00	-21.14	-18.10
6	17.80800	10.68	27.55	15.04	38.23	25.72	60.00	50.00	-21.77	-24.28

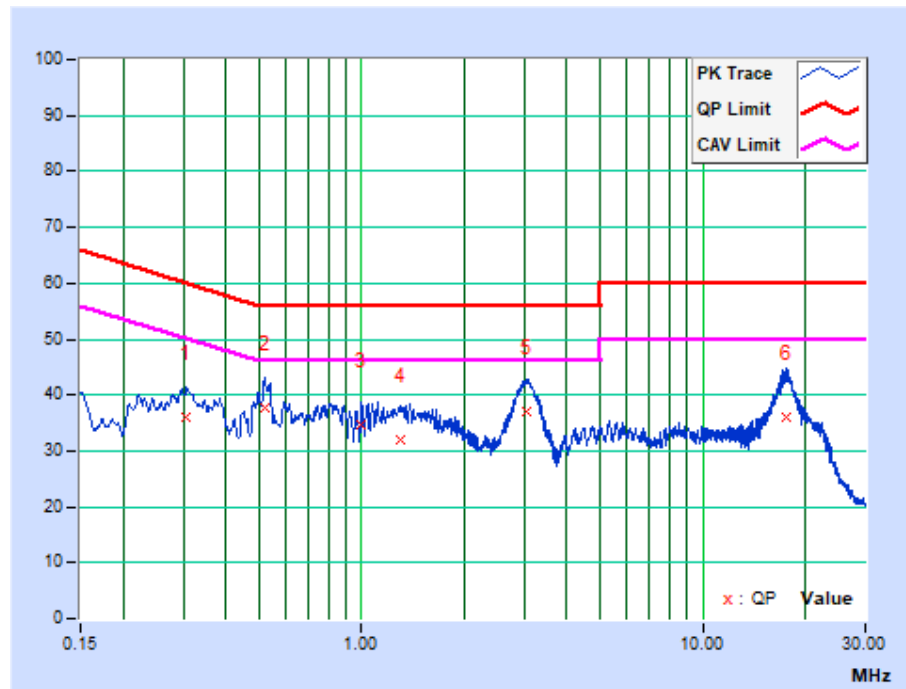
**REMARKS:** The emission levels of other frequencies were very low against the limit.



<b>PHASE</b>	Neutral	<b>6dB BANDWIDTH</b>	9kHz
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No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.30750	10.01	25.92	11.20	35.93	21.21	60.04	50.04	-24.11	-28.83
2	0.51834	10.03	27.59	15.88	37.62	25.91	56.00	46.00	-18.38	-20.09
3	1.00033	10.14	24.64	18.40	34.78	28.54	56.00	46.00	-21.22	-17.46
4	1.30259	10.16	21.78	12.73	31.94	22.89	56.00	46.00	-24.06	-23.11
<b>5</b>	<b>3.03450</b>	<b>10.33</b>	<b>26.74</b>	<b>18.25</b>	<b>37.07</b>	<b>28.58</b>	<b>56.00</b>	<b>46.00</b>	<b>-18.93</b>	<b>-17.42</b>
6	17.50427	10.66	25.53	15.81	36.19	26.47	60.00	50.00	-23.81	-23.53

**REMARKS:** The emission levels of other frequencies were very low against the limit.



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of harmonics (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

#### NOTES:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



#### 4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 07, 23
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	May 09, 22
Active Loop Antenna (9KHz -30MHz)	SCHWARZBECK	FMZB 1519B	1519B-045	May 20, 22
Amplifier (9KHz -1GHz)	Burgeon	BPA-530	100210	Mar. 13, 23
Bilog Antenna (20MHz -2GHz)	Teseq	CBL 6111D	30643	May 21, 22
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 21, 22
Horn Antenna (18GHz -40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	May 14, 22
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	May 22, 22
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	May 12, 22
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Jan. 10, 23
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	N/A

**NOTES:**

1. The test was performed in 966 Chamber.(Chen Wu)
2. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above1GHz if tested.
4. The FCC Site Registration No. is 749762.



#### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- g. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

#### **NOTES:**

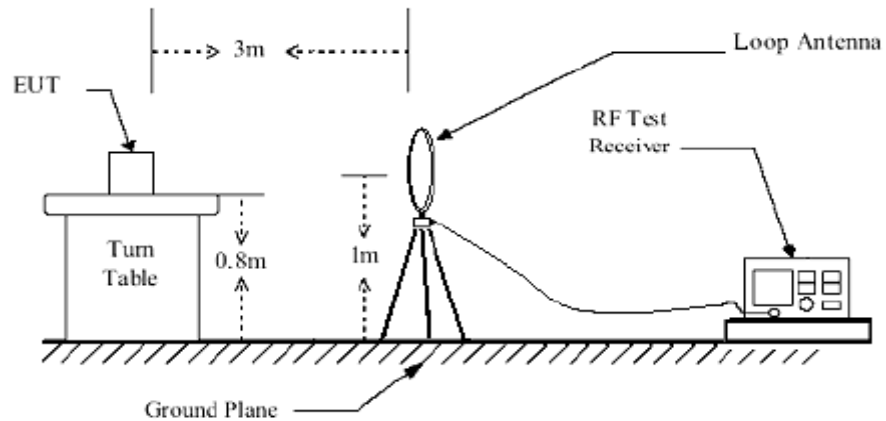
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

#### 4.2.4 DEVIATION FROM TEST STANDARD

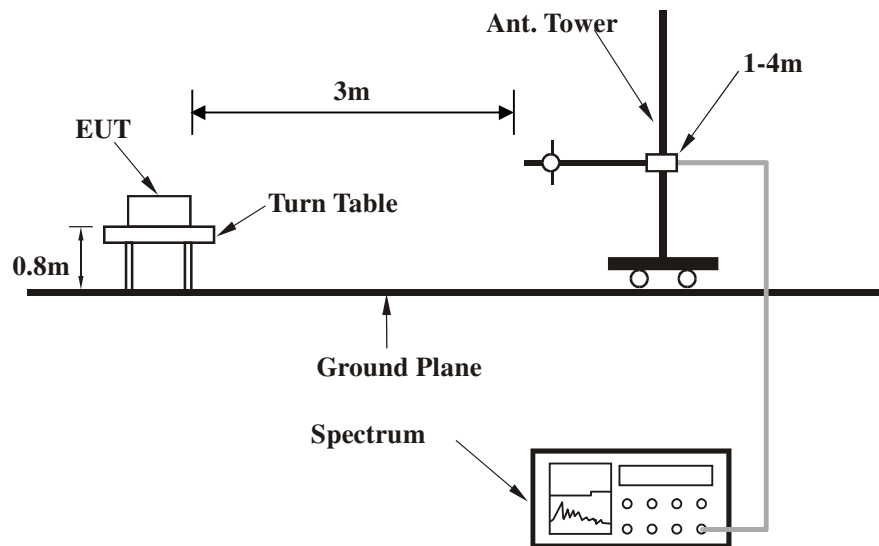
No deviation.

## 4.2.5 TEST SETUP

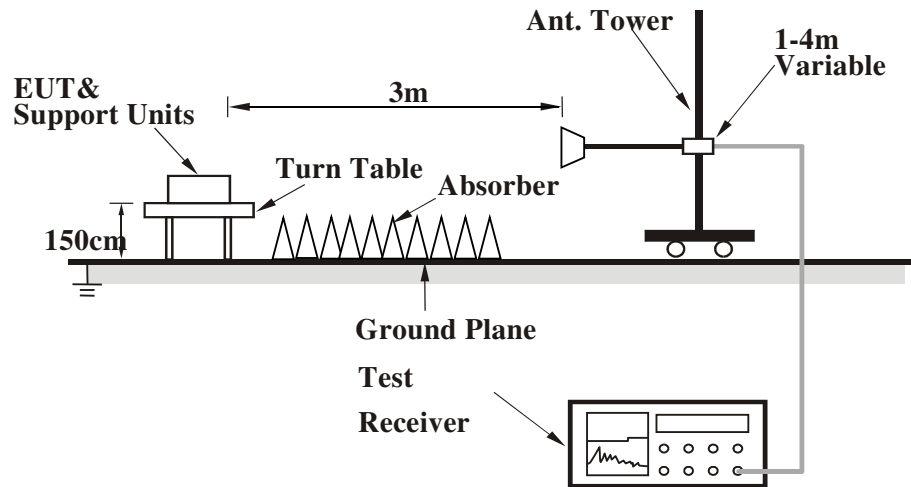
### Below 30MHz test setup



### Below 1GHz test setup



## Above 1GHz test setup



**Note:** For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 4.2.6 EUT OPERATING CONDITIONS

- c) Turned on the power of all equipment.
- d) EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

#### 4.2.7 TEST RESULTS

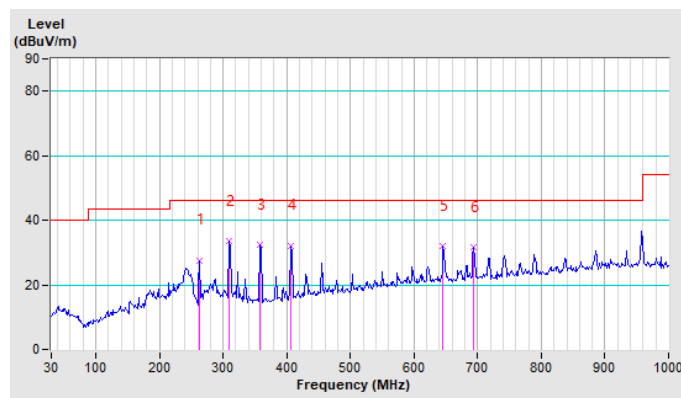
##### BELOW 1GHz WORST-CASE DATA

<b>CHANNEL</b>	TX Middle Channel	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	263.17	27.64 QP	46.00	-18.36	1.00 H	298	44.34	-16.70
2	309.81	33.44 QP	46.00	-12.56	1.00 H	288	48.65	-15.21
3	358.00	32.38 QP	46.00	-13.62	1.00 H	277	46.36	-13.98
4	406.19	32.21 QP	46.00	-13.79	1.00 H	267	44.89	-12.68
5	645.58	32.00 QP	46.00	-14.00	1.00 H	330	39.23	-7.23
6	693.77	31.52 QP	46.00	-14.48	1.00 H	340	38.10	-6.58

##### REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.

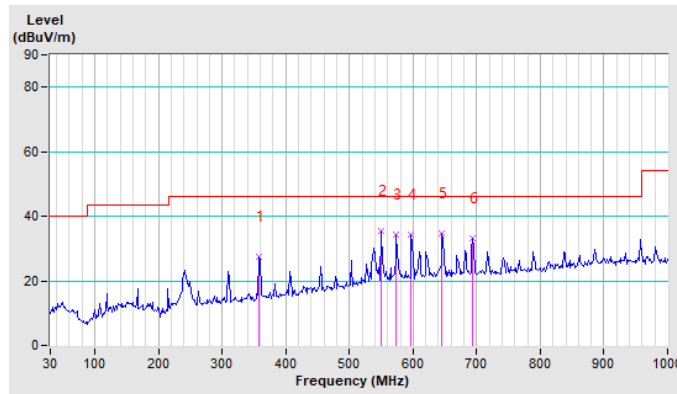


<b>CHANNEL</b>	TX Middle Channel	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9KHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	358.00	27.48 QP	46.00	-18.52	1.00 V	83	41.46	-13.98
2	550.75	35.32 QP	46.00	-10.68	1.00 V	134	44.28	-8.96
3	574.07	34.17 QP	46.00	-11.83	1.00 V	116	42.54	-8.37
4	597.39	34.45 QP	46.00	-11.55	1.00 V	161	42.24	-7.79
5	645.58	34.66 QP	46.00	-11.34	1.00 V	105	41.89	-7.23
6	693.77	33.24 QP	46.00	-12.76	1.00 V	95	39.82	-6.58

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.



**ABOVE 1GHz WORST-CASE DATA:**

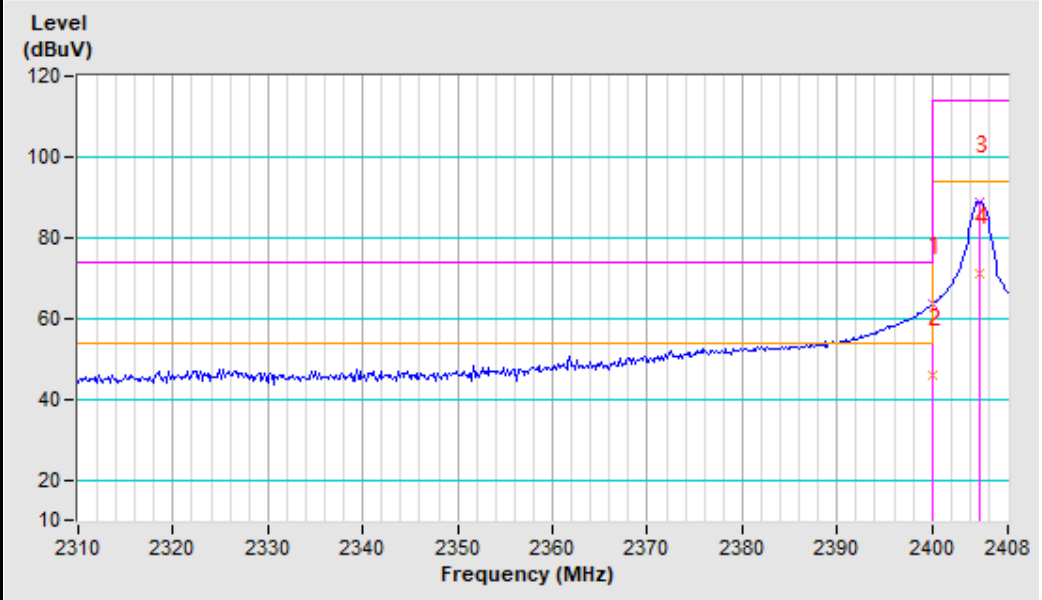
<b>CHANNEL</b>	TX Low Channel	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2400.00	63.52 PK	74.00	-10.48	1.02 H	286	61.54	1.98
2	2400.00	45.88 AV	54.00	-8.12	1.02 H	286	43.90	1.98
3	*2405.00	88.73 PK	114.00	-25.27	1.02 H	286	86.75	1.98
4	*2405.00	71.09 AV	94.00	-22.91	1.02 H	286	69.11	1.98
5	4810.00	46.19 PK	74.00	-27.81	1.05 H	219	41.28	4.91
6	4810.00	28.55 AV	54.00	-25.45	1.05 H	219	23.64	4.91
7	7215.00	47.22 PK	74.00	-26.78	1.00 H	48	37.62	9.60
8	7215.00	29.58 AV	54.00	-24.42	1.00 H	48	19.98	9.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2400.00	64.72 PK	74.00	-9.28	1.67 V	252	62.74	1.98
2	2400.00	47.08 AV	54.00	-6.92	1.67 V	252	45.10	1.98
3	*2405.00	90.21 PK	114.00	-23.79	1.67 V	252	88.23	1.98
4	*2405.00	72.57 AV	94.00	-21.43	1.67 V	252	70.59	1.98
5	4810.00	47.34 PK	74.00	-26.66	1.05 V	96	42.43	4.91
6	4810.00	29.70 AV	54.00	-24.30	1.05 V	96	24.79	4.91
7	7215.00	48.56 PK	74.00	-25.44	1.00 V	144	38.96	9.60
8	7215.00	30.92 AV	54.00	-23.08	1.00 V	144	21.32	9.60

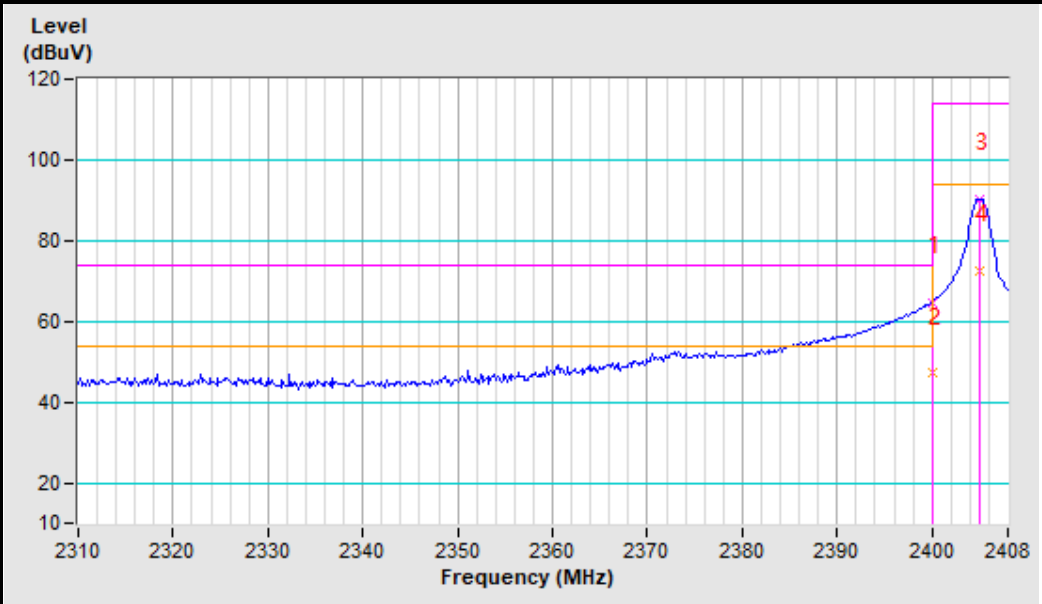
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* " : Fundamental frequency.

**Band edge Plot**

**2405MHz Horizontal**



**2405MHz Vertical**



<b>CHANNEL</b>	TX Middle Channel	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2433.00	88.51 PK	114.00	-25.49	1.32 H	102	86.52	1.99
2	*2433.00	70.87 AV	94.00	-23.13	1.32 H	102	68.88	1.99
3	4866.00	45.76 PK	74.00	-28.24	1.00 H	75	40.63	5.13
4	4866.00	28.12 AV	54.00	-25.88	1.00 H	75	22.99	5.13
5	7299.00	48.31 PK	74.00	-25.69	1.00 H	25	38.36	9.95
6	7299.00	30.67 AV	54.00	-23.33	1.00 H	25	20.72	9.95
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2433.00	86.25 PK	114.00	-27.75	1.04 V	152	84.26	1.99
2	*2433.00	68.61 AV	94.00	-25.39	1.04 V	152	66.62	1.99
3	4866.00	44.34 PK	74.00	-29.66	1.00 V	159	39.21	5.13
4	4866.00	26.70 AV	54.00	-27.30	1.00 V	159	21.57	5.13
5	7299.00	46.71 PK	74.00	-27.29	2.00 V	46	36.76	9.95
6	7299.00	29.07 AV	54.00	-24.93	2.00 V	46	19.12	9.95

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* " : Fundamental frequency.



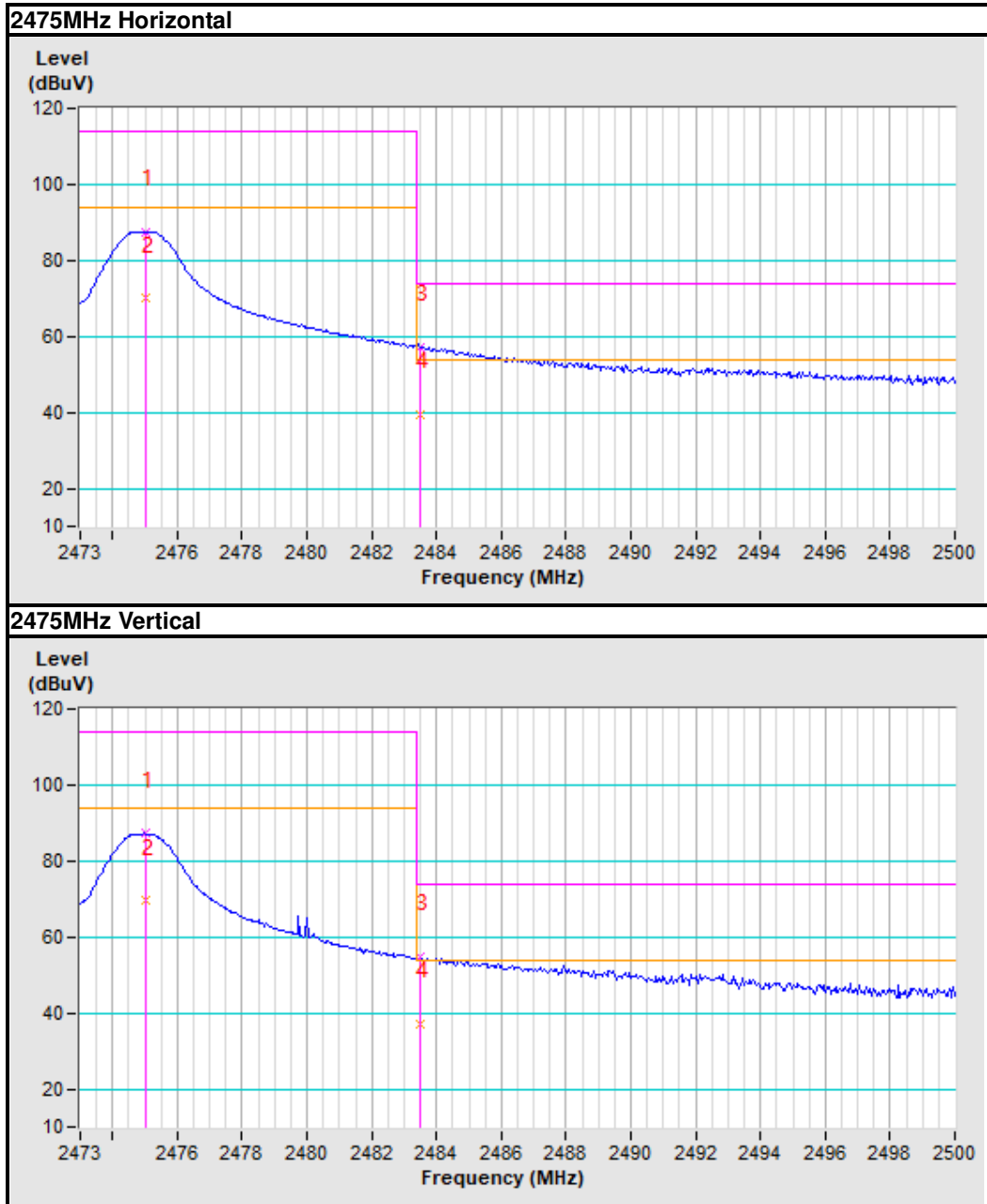
<b>CHANNEL</b>	TX High Channel	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2475.00	87.59 PK	114.00	-26.41	1.27 H	291	85.58	2.01
2	*2475.00	69.95 AV	94.00	-24.05	1.27 H	291	67.94	2.01
3	2483.50	57.06 PK	74.00	-16.94	1.27 H	291	55.03	2.03
4	2483.50	39.42 AV	54.00	-14.58	1.27 H	291	37.39	2.03
5	4950.00	45.29 PK	74.00	-28.71	1.05 H	49	39.84	5.45
6	4950.00	27.65 AV	54.00	-26.35	1.05 H	49	22.20	5.45
7	7425.00	47.37 PK	74.00	-26.63	1.00 H	214	36.91	10.46
8	7425.00	29.73 AV	54.00	-24.27	1.00 H	214	19.27	10.46
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2475.00	87.16 PK	114.00	-26.84	1.47 V	199	85.15	2.01
2	*2475.00	69.52 AV	94.00	-24.48	1.47 V	199	67.51	2.01
3	2483.50	54.64 PK	74.00	-19.36	1.47 V	199	52.61	2.03
4	2483.50	37.00 AV	54.00	-17.00	1.47 V	199	34.97	2.03
5	4950.00	44.16 PK	74.00	-29.84	1.09 V	98	38.71	5.45
6	4950.00	26.52 AV	54.00	-27.48	1.09 V	98	21.07	5.45
7	7425.00	46.25 PK	74.00	-27.75	1.00 V	74	35.79	10.46
8	7425.00	28.61 AV	54.00	-25.39	1.00 V	74	18.15	10.46

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.

**Band edge Plot**



### 4.3 20dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT

According to FCC 15.215(c), must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

#### 4.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Power Sensor	Keysight	U2021XA	MY57320002	Feb.23.23
Power Sensor	Keysight	U2021XA	MY55060018	May 09, 22
Power Meter	Anritsu	ML2495A	1139001	Feb. 24, 23
Power Sensor	Anritsu	MA2411B	1531155	Feb. 24, 23
Digital Multimeter	FLUKE	15B	A1220010DG	N/A
Humid & Temp Programmable Tester	Haida	HD-225T	110807201	Nov. 03, 22
Oscilloscope	Agilent	DSO9254A	MY51260160	Aug. 11, 22
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Jan. 16, 23
Signal Generator	Agilent	N5183A	MY50140980	Mar 23, 23
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Sep. 14, 22
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	N/A
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A
DC Source	Keysight	E3642A	MY56146098	N/A

#### NOTES:

1. The test was performed in RF Oven room.(Chen Wu)
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

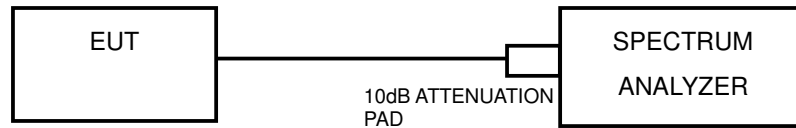
#### 4.3.3 TEST PROCEDURE

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.3.5 TEST SETUP



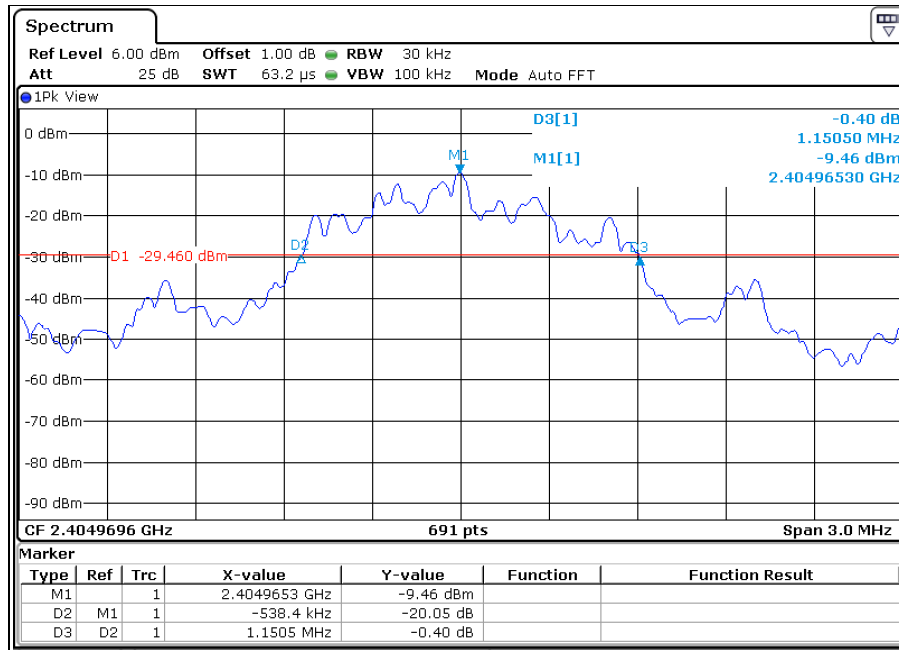
#### 4.3.6 EUT OPERATING CONDITIONS

- a) Turned on the power of all equipment.
- b) EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

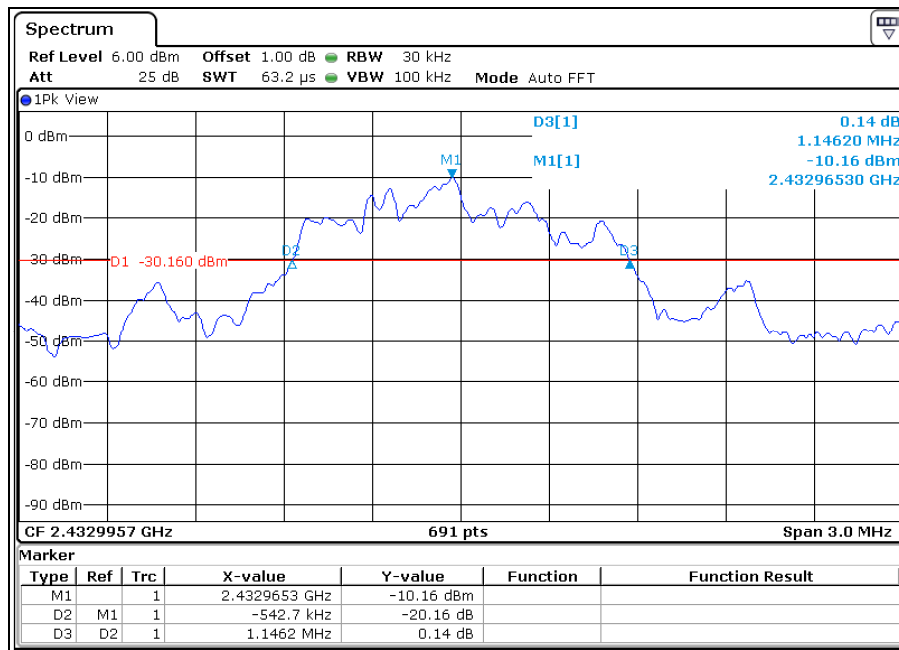
#### 4.3.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
Low	2405	1.1505
Middle	2433	1.1462
High	2475	1.1462

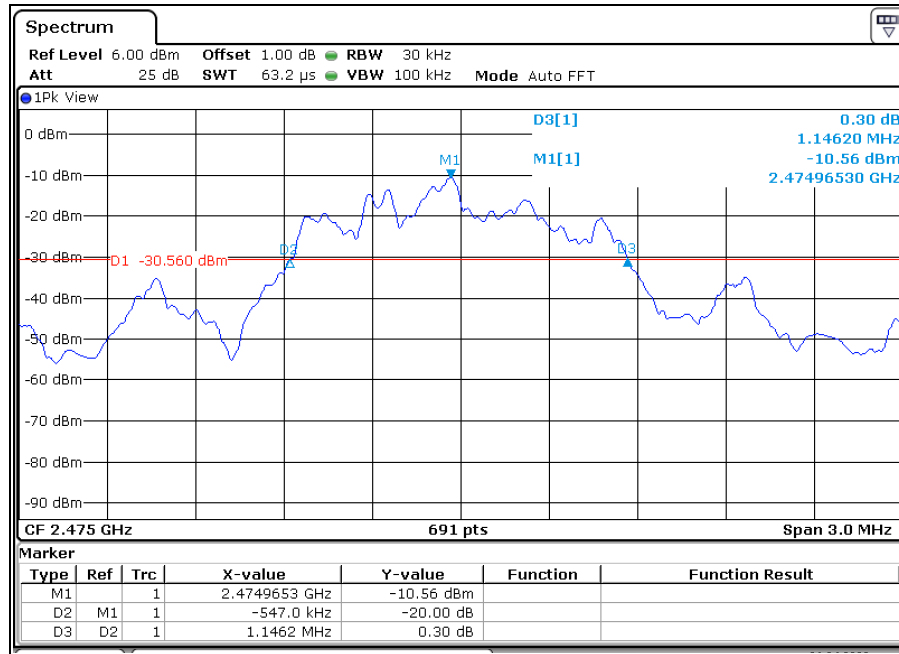
Test Data: Low channel



Test Data: Middle channel



Test Data: High channel





**BUREAU**  
**VERITAS**

Test Report No.: RF2203WDG0341-2

## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



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## 6. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---