

# TEST REPORT

Applicant:	International Toy, Inc.
Address:	17922 Fitch STE 100, Irvine, CA 92614, USA

Manufacturer or Supplier	International Toy, Inc.
Address	17922 Fitch STE 100, Irvine, CA 92614, USA
Product:	Interactive Talking Olaf
Brand Name:	Disney
Model:	HH423HK05001
Additional Model & Model Difference	N/A
Date of tests:	Aug. 15, 2023 ~ Aug. 28, 2023

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 JJ Lin  
Project Engineer / EMC Department

Approved by Glyn He  
Assistant Manager / EMC Department




Date: Aug. 31, 2023

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Test Report No.: RF2308WDG0108

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF2308WDG0108	Original release	Aug. 31, 2023

## 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	N/A	Powered from battery
§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
Radiated emissions	9KHz ~ 30MHz	2.72dB
	30MHz ~ 1GMHz	4.24dB
	1GHz ~ 18GHz	4.78dB
	18GHz ~ 40GHz	4.50dB

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>	Interactive Talking Olaf
<b>MODEL NO.</b>	HH423HK05001
<b>ADDITIONAL MODEL</b>	N/A
<b>FCC ID</b>	2ACU8INT118
<b>NOMINAL VOLTAGE</b>	DC 4.5V(1.5V*AAA*3) from battery
<b>MODULATION TECHNOLOGY</b>	GFSK
<b>OPERATING FREQUENCY</b>	2412MHz ~ 2474MHz
<b>ANTENNA TYPE</b>	Wire Antenna, with -0.02dBi gain
<b>I/O PORTS</b>	N/A
<b>CABLE SUPPLIED</b>	N/A

**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.: 2308WDG0108) 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 Y 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	√	√	-	√	DC 4.5V from Battery

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	2412 MHz
Middle	2430 MHz
High	2474 MHz

#### Channel List

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	2412	7	2426	13	2452
2	2414	8	2428	14	2462
3	2416	9	2430	15	2464
4	2418	10	2436	16	2466
5	2420	11	2444	17	2470
6	2424	12	2448	18	2474

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	DC 4.5V from Battery	Ryker
BW	25deg. C, 56%RH	DC 4.5V from Battery	Ryker
PLC	-	-	-



Test Report No.: RF2308WDG0108

### 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 together without any other necessary accessories or support units

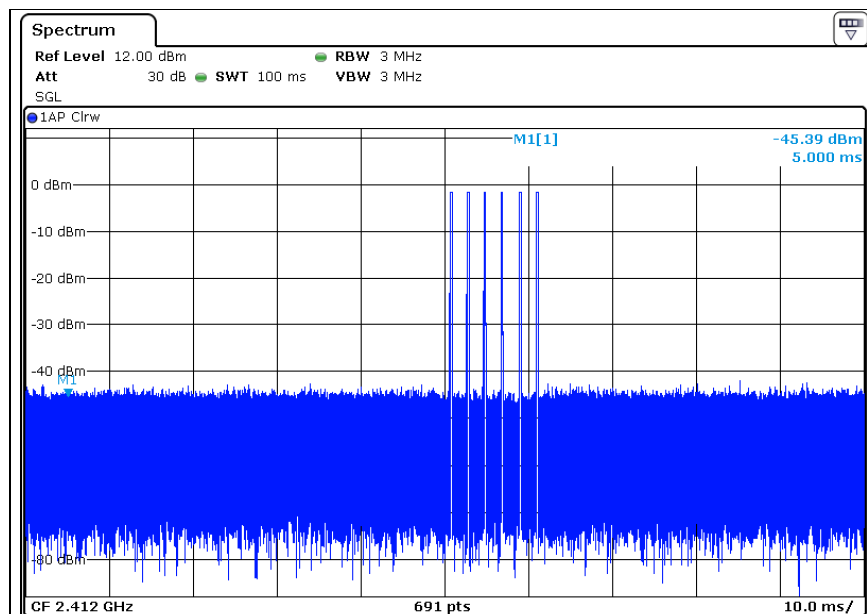
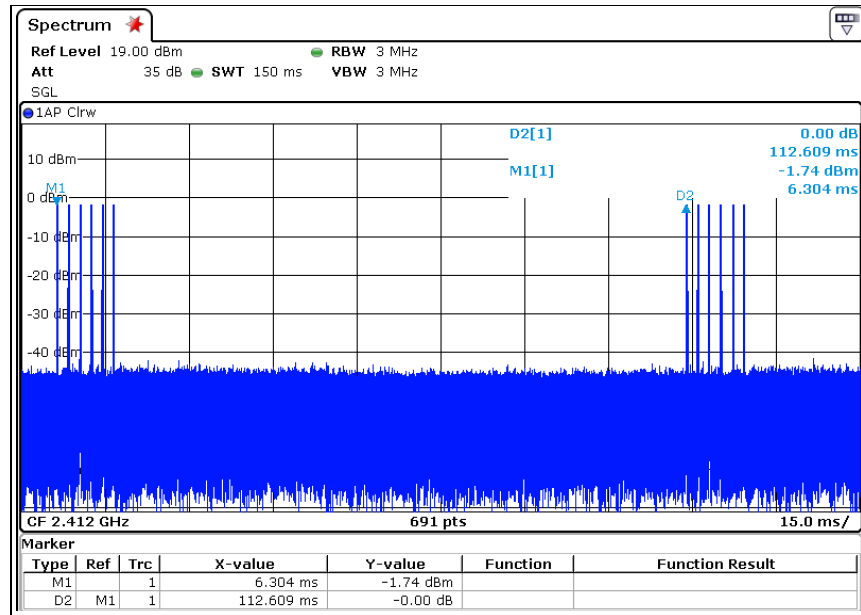
### 3.5 DUTY CYCLE OF TESET SIGNAL

$T_p = 112.609\text{ms}$

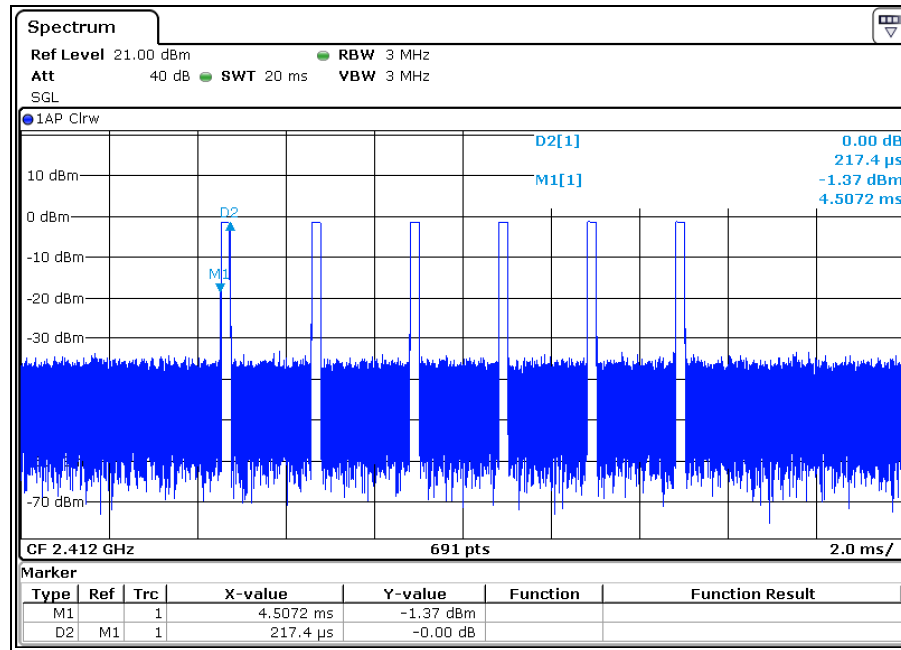
$T_{on} = 0.2174 \times 6 = 1.3044\text{ms}$

Duty Cycle =  $T_{on} / T_p \times 100\% = 1.3044 / 112.609 \approx 1.16\%$

AV factor =  $20 \log(\text{Duty cycle}) = 20 \log(1.16\%) \approx -37.69\text{dB}$







## 4. TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 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.



**4.1.2 TEST INSTRUMENTS**

<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Next Cal.</b>
Spectrum Analyzer	Rohde&Schwarz	FSV3044	101326	July 13, 24
EMI Test Receiver	Rohde&Schwarz	ESU8	100372	Apr. 06, 24
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-555	Jan. 08, 24
Pre-Amplifier	Agilent	8447D	2944A10488	July. 26, 24
3m Semi-anechoic Chamber	ETS-Lindgren	9m*6m*6m	D3040003DG-1	July 30, 24
Coaxial RF Cable	Joinfront	JFAA6-NMNM-8000	2100033742	July 10, 24
Coaxial RF Cable	Joinfront	JFAR-NMBNCM-2000	2100033742	July 10, 24
Coaxial RF Cable	Joinfront	JFAR-BNCMSMM-500	2100033742	July 10, 24
Test software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A
Horn Antenna	ETS-Lindgren	3117	00240041	May 06, 24
Horn Antenna	SCHWARZBECK	BBHA 9170	01024	Oct. 16, 23
Pre-Amplifier (1GHz-18GHz)	Rohde&Schwarz	SCU18	102265	Apr. 01, 24
Pre-Amplifier (18GHz-40GHz)	Rohde&Schwarz	SCU40	100437	Oct. 27, 23
Coaxial RF Cable	Joinfront	JFAA6-NMNM-8000	2100033742	July 10, 24
Coaxial RF Cable	Joinfront	JFAA6-NMSMM-2000	2100033742	July 10, 24
Coaxial RF Cable	Joinfront	JFAA6-NMSMM-800	2100033742	July 10, 24

**NOTES:**

1. The test was performed in 966 Chamber-3.
2. The calibration interval of the above test instruments are 12 /24months 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 above1 GHz if tested.
4. The FCC Site Registration No. is 749762.
5. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.

#### 4.1.3 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 1.3m 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. Average value =PK Emission +AV Factor.
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.

#### 4.1.4 DEVIATION FROM TEST STANDARD

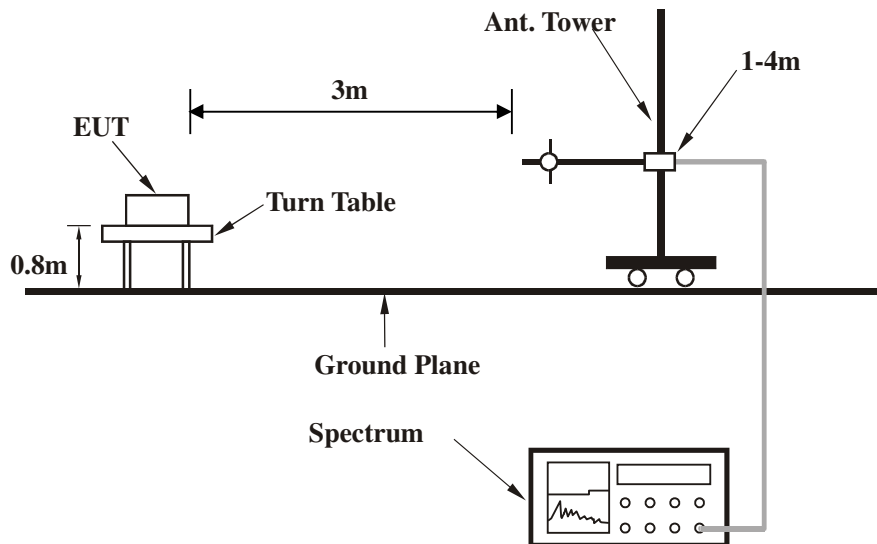
No deviation.

#### 4.1.5 TEST SETUP

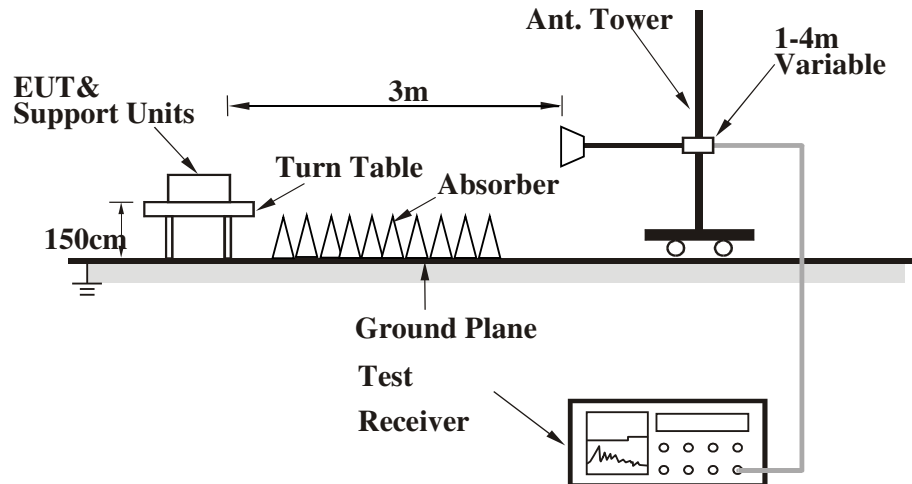
##### Below 30MHz test setup



##### Below 1GHz test setup



## Above 1GHz test setup



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

### 4.1.6 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.

#### 4.1.7 TEST RESULTS

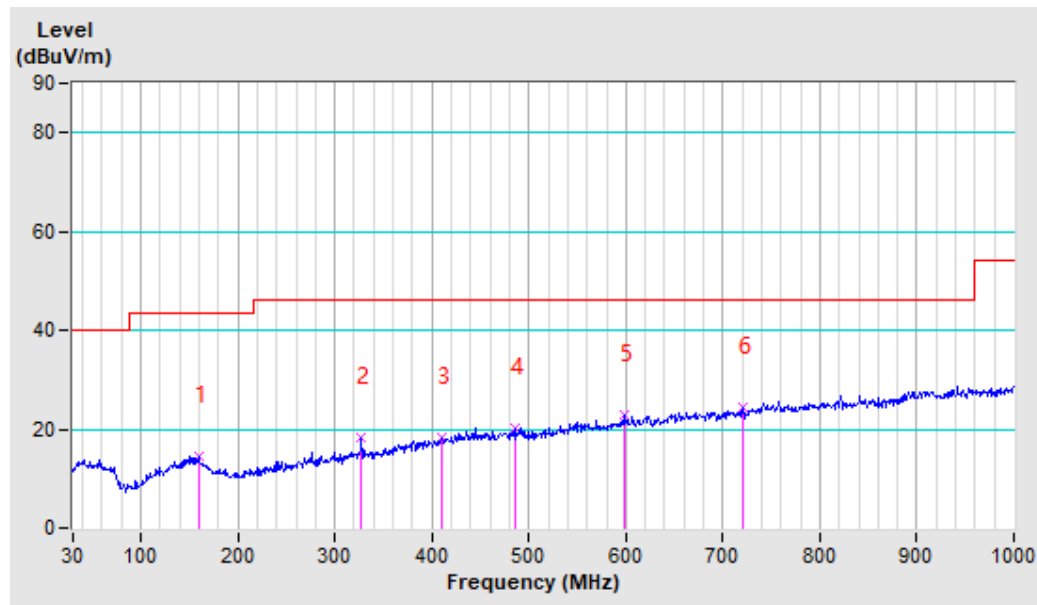
##### BELOW 1GHz WORST-CASE DATA

<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	159.01	14.48 QP	43.50	-29.02	1.45 H	306	27.28	-12.80
2	326.82	18.17 QP	46.00	-27.83	3.25 H	174	29.09	-10.92
3	411.21	18.40 QP	46.00	-27.60	1.56H	58	27.77	-9.37
4	484.93	20.30 QP	46.00	-25.70	2.89 H	183	28.63	-8.33
5	597.45	23.01 QP	46.00	-22.99	1.25H	177	28.94	-5.93
6	720.64	24.37 QP	46.00	-21.63	1.35 H	285	27.81	-3.44

##### 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.

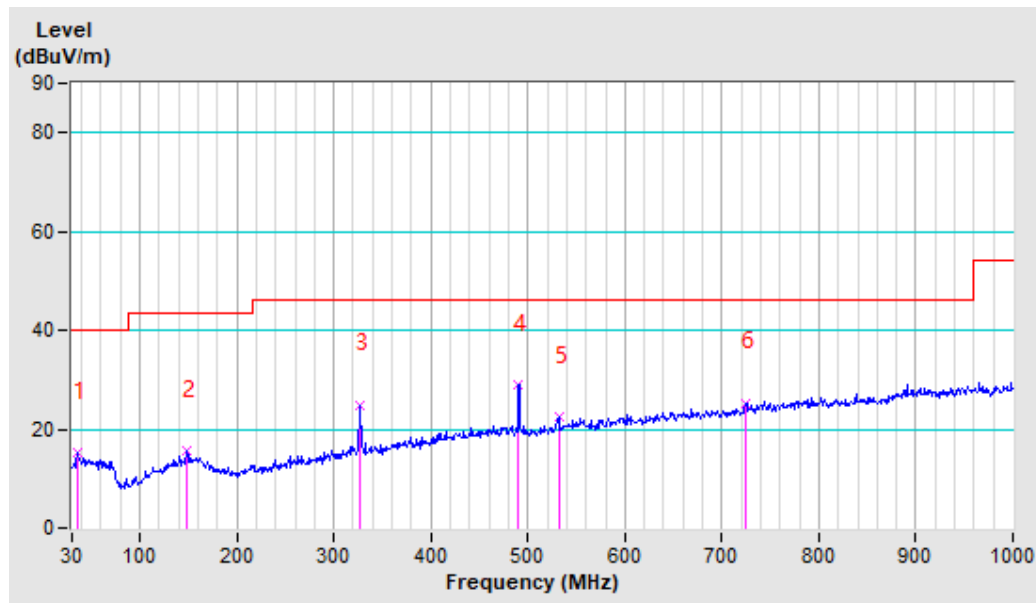


<b>CHANNEL</b>	TX Middle Channel	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9KHz ~ 1GHz		

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	34.85	15.08 QP	40.00	-24.92	1.45 V	158	29.42	-14.34
2	148.34	15.50 QP	43.50	-28.00	1.25 V	122	28.46	-12.96
3	326.82	24.96 QP	46.00	-21.04	1.78 V	212	35.88	-10.92
<b>4</b>	<b>489.78</b>	<b>28.89 QP</b>	<b>46.00</b>	<b>-17.11</b>	<b>1.87V</b>	<b>134</b>	<b>37.15</b>	<b>-8.26</b>
5	531.49	22.44 QP	46.00	-23.56	1.55 V	182	29.70	-7.26
6	724.52	25.33 QP	46.00	-20.67	1.77 V	262	28.67	-3.34

**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	46.73 PK	74.00	-27.27	1.30 H	140	49.95	-3.22
2	2400.00	9.04AV	54.00	-44.96	1.30 H	140	12.26	-3.22
3	*2412.00	93.87 PK	114.00	-20.13	1.30 H	140	97.05	-3.18
4	*2412.00	56.18 AV	94.00	-37.82	1.30 H	140	59.36	-3.18
5	4824.00	58.17 PK	74.00	-15.83	1.44 H	128	60.38	-2.21
6	4824.00	20.48 AV	54.00	-33.52	1.44 H	128	22.69	-2.21
7	7236.00	52.06 PK	74.00	-21.94	1.33 H	189	50.82	1.24
8	7236.00	14.37AV	54.00	-39.63	1.33 H	189	13.13	1.24

**ANTENNA POLARITY & TEST DISTANCE : VERTICAL AT 3 M**

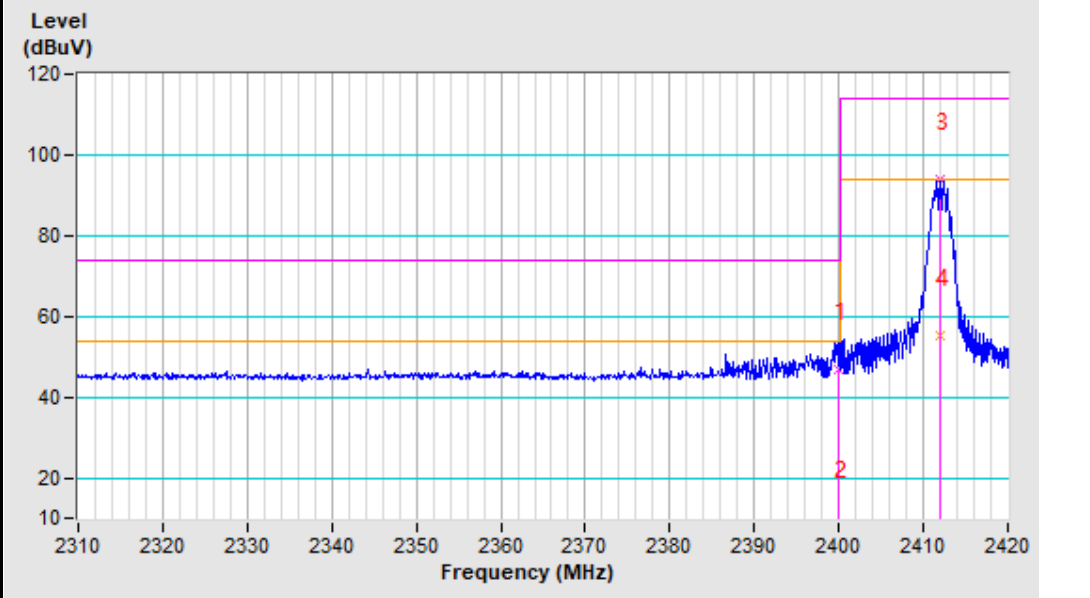
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2400.00	48.34 PK	74.00	-25.66	1.44 V	155	51.56	-3.22
2	2400.00	10.65 AV	54.00	-43.35	1.44 V	155	13.87	-3.22
3	*2412.00	89.13 PK	114.00	-24.87	1.44 V	155	92.31	-3.18
4	*2412.00	51.44 AV	94.00	-42.56	1.44 V	155	54.62	-3.18
5	4824.00	59.44 PK	74.00	-14.56	1.68 V	52	61.65	-2.21
6	4824.00	21.75AV	54.00	-32.25	1.68 V	52	23.96	-2.21
7	7236.00	52.57 PK	74.00	-21.43	1.22 V	150	51.33	1.24
8	7236.00	14.88 AV	54.00	-39.12	1.22 V	150	13.64	1.24

**REMARK:**

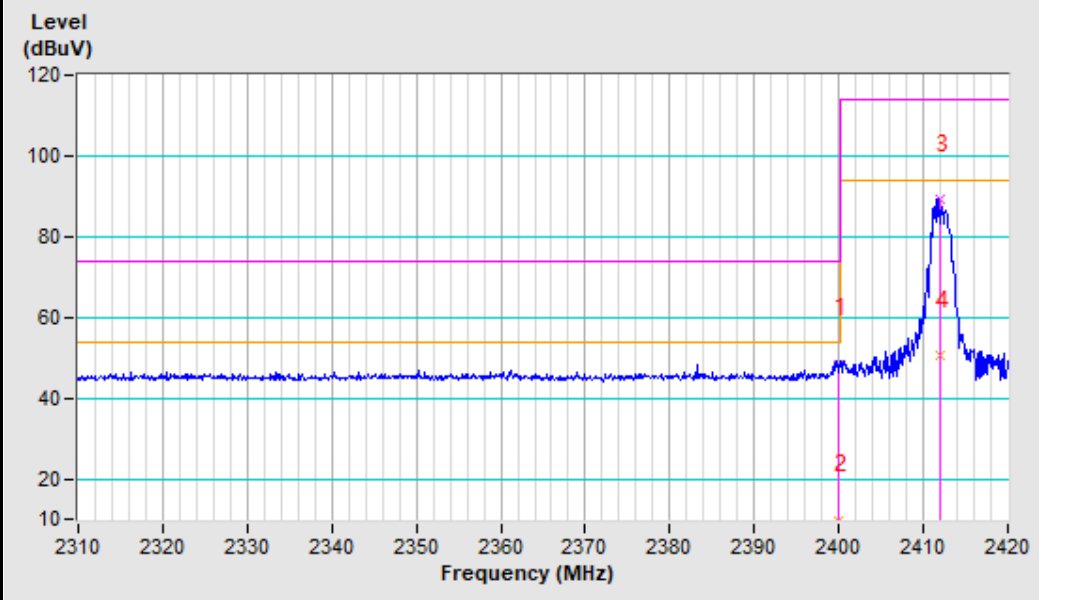
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* " : Fundamental frequency.
6. Average value = PK Emission + 20\*log(duty cycle) Where the duty factor is calculated from following formula:  $20 \log(\text{Duty cycle}) = 20 \log(1.3044\%) \approx -37.69 \text{dB}$ , Please see page 8 for plotted duty.

**Band edge Plot**

**2412MHz Horizontal**



**2412MHz 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	*2430.00	94.42 PK	114.00	-19.58	1.45 H	189	97.56	-3.14
2	*2430.00	56.73 AV	94.00	-37.27	1.45 H	189	59.87	-3.14
3	4860.00	58.70 PK	74.00	-15.30	1.56 H	320	60.89	-2.19
4	4860.00	21.01 AV	54.00	-32.99	1.56 H	320	23.20	-2.19
5	7290.00	52.24 PK	74.00	-21.76	1.62 H	44	51.24	1.00
6	7290.00	14.55AV	54.00	-39.45	1.62 H	44	13.55	1.00

**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	*2430.00	97.12 PK	114.00	-16.88	1.48 V	45	100.26	-3.14
2	*2430.00	<b>59.43AV</b>	<b>94.00</b>	<b>-34.57</b>	<b>1.48 V</b>	<b>45</b>	<b>62.57</b>	<b>-3.14</b>
3	4860.00	59.48 PK	74.00	-14.52	1.45 V	236	61.67	-2.19
4	4860.00	21.79 AV	54.00	-32.21	1.45 V	236	23.98	-2.19
5	7290.00	52.83 PK	74.00	-21.17	1.47 V	58	51.83	1.00
6	7290.00	15.14 AV	54.00	-38.86	1.47 V	58	14.14	1.00

**REMARKS:**

- Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
- Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- The emission levels of other frequencies were greater than 20dB margin.
- Margin value = Emission level – Limit value.
- " \* ": Fundamental frequency.
- Average value =PK Emission +20\*log(duty cycle)Where the duty factor is calculated from following formula:20 log (Duty cycle) = 20Log(1.3044%)≈ -37.69dB, Please see page 8 for plotted duty.

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

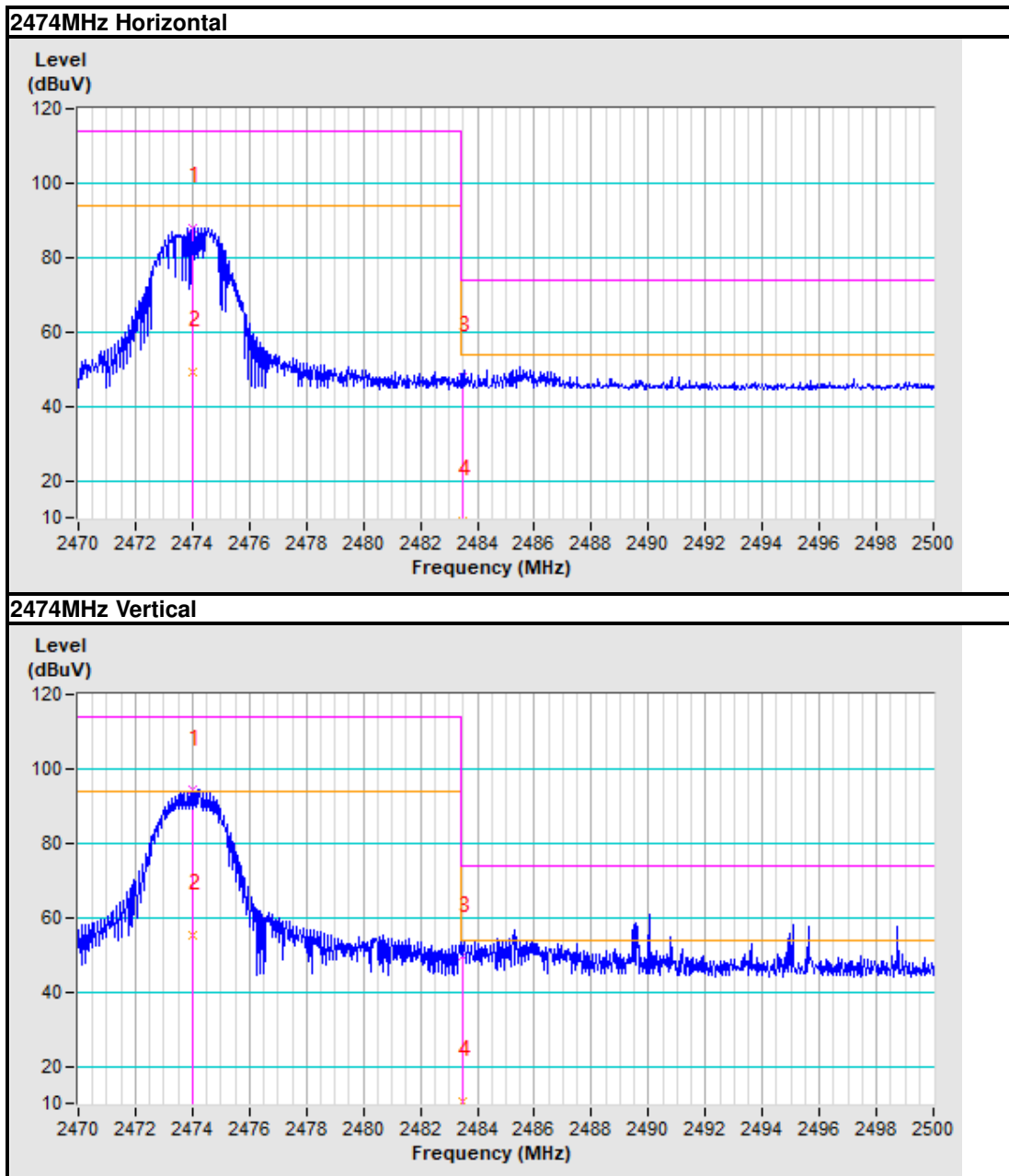
ANTENNA POLARITY & TEST DISTANCE : HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2474.00	87.94 PK	114.00	-26.06	1.48 H	120	90.97	-3.03
2	*2474.00	50.25 AV	94.00	-43.75	1.48 H	120	53.28	-3.03
3	2483.50	47.96 PK	74.00	-26.04	1.48 H	120	50.96	-3.00
4	2483.50	10.27AV	54.00	-43.73	1.48 H	120	13.27	-3.00
5	4948.00	58.63 PK	74.00	-15.37	1.44 H	198	60.79	-2.16
6	4948.00	20.94 AV	54.00	-33.06	1.44 H	198	23.10	-2.16
7	7422.00	53.28 PK	74.00	-20.72	1.11 H	269	52.87	0.41
8	7422.00	15.59 AV	54.00	-38.41	1.11 H	269	15.18	0.41
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	*2474.00	94.16 PK	114.00	-19.84	1.20 V	130	97.19	-3.03
2	*2474.00	56.47 AV	94.00	-37.53	1.20 V	130	59.50	-3.03
3	2483.50	49.40 PK	74.00	-24.60	1.20 V	130	52.40	-3.00
4	2483.50	11.71 AV	54.00	-42.29	1.20 V	130	14.71	-3.00
5	4948.00	58.23 PK	74.00	-15.77	2.00 V	144	60.39	-2.16
6	4948.00	20.54 AV	54.00	-33.46	2.00 V	144	22.70	-2.16
7	7442.00	52.47 PK	74.00	-21.53	1.20 V	322	52.15	0.32
8	7442.00	14.78 AV	54.00	-39.22	1.20 V	322	14.46	0.32

**REMARK:**

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.
6. Average value = PK Emission + 20\*log(duty cycle) Where the duty factor is calculated from following formula: 20 log (Duty cycle) = 20Log(1.3044%) ≈ -37.69dB, Please see page 8 for plotted duty.



### Band edge Plot



## 4.2 20dB BANDWIDTH MEASUREMENT

### 4.2.1 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.

### 4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Wireless Connectivity Tester	Rohde&Schwarz	CMW270	101601	Nov. 01, 23
Spectrum Analyzer	Rohde&Schwarz	FSV40	101003	Jan. 15, 24
Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Jan. 11, 24
Frequency Analyzer	Keysight	N9010B	MY60240432	Nov. 01, 23
Programmable Temperature&Humidity Chamber	Hongjin	HYC-TH-225DH	DG-180746	Jan. 11, 24
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A
DC Source	Agilent	E3640A	MY40004013	Feb. 08, 24
Test software	ADT	ADT_RF Test Software V6.6.5.3	N/A	N/A
Test software	ADT	ADT_RF Test Software V6.6.5.4	N/A	N/A

#### NOTES:

1. The test was performed in RF Test Shielded Room.
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.
3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.

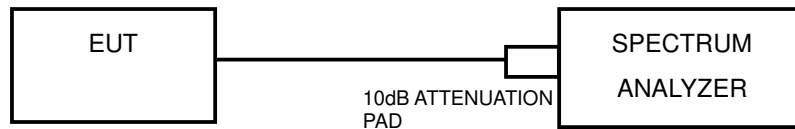
#### 4.2.3 TEST PROCEDURE

- 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.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 TEST SETUP



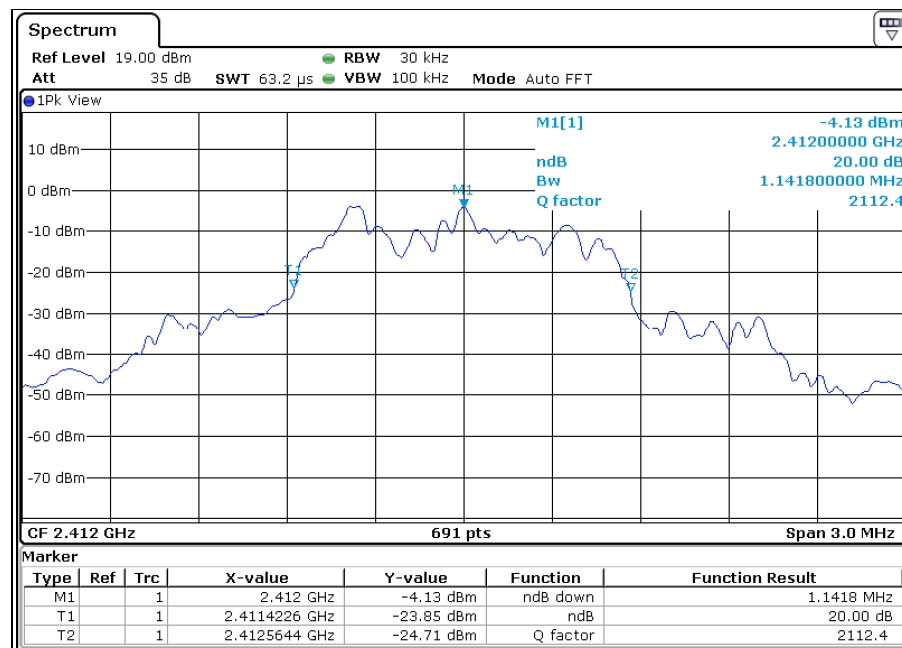
#### 4.2.6 EUT OPERATING CONDITIONS

- 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.

### 4.2.7 TEST RESULTS

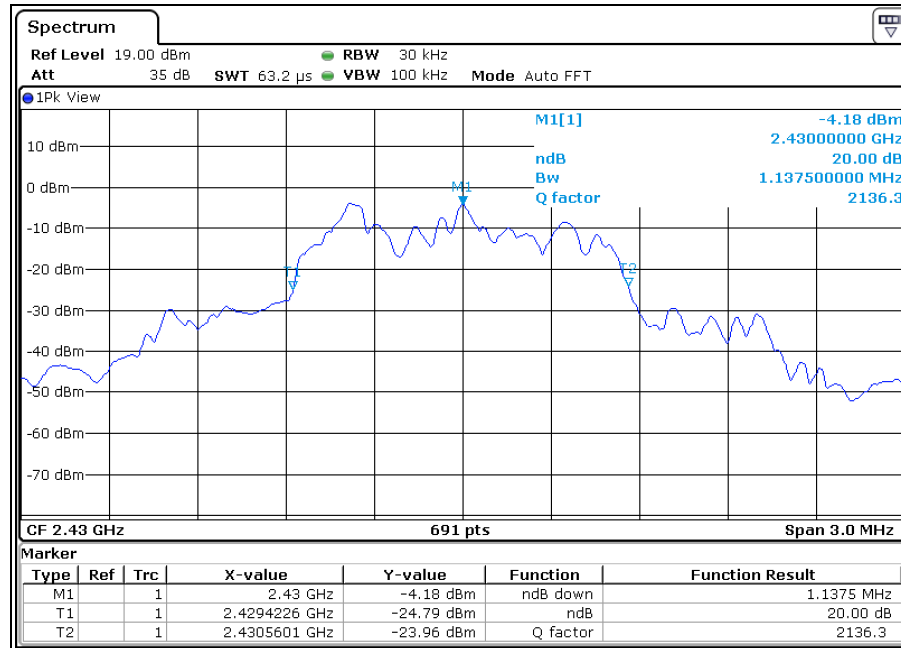
CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
Low	2412	1.1418
Middle	2430	1.1375
High	2474	1.1462

#### Test Data: Low channel

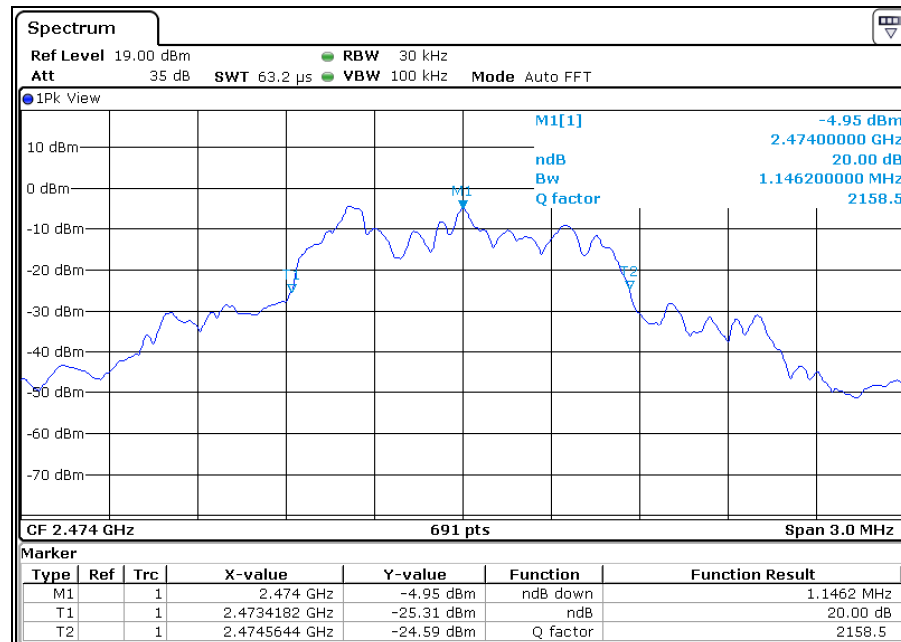




Test Data: Middle channel



Test Data: High channel





**BUREAU**  
**VERITAS**

Test Report No.: RF2308WDG0108

## 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---