

**FCC TEST REPORT**  
**for**  
**Launch Tech Co., Ltd.**  
**AUTOMOTIVE DIAGNOSIS COMPUTER**

Trade Name : LAUNCH

Model No. : X-431 TOOL C

FCC ID : XUJX431TOOLC

Operating Frequency : 2402MHz - 2480MHz

Antenna gain : -2dBi

Applicant : Launch Tech Co., Ltd.  
Launch Industrial Park, North Wuhe Avenue, Banxuegang  
Industrial Park, Longgang District, Shenzhen, China

Regulation : **FCC Part 15.247 Subpart C**

Prepared by : Shenzhen AOV Testing Technology Co., Ltd.  
2-6/F, No.5, Yuantou Lane , Tanglang, Taoyuan Street,  
Nanshan District, Shenzhen ,Guangdong, China

Test Date : August 01-09, 2011

Date of Report : August 10, 2011

## TABLE OF CONTENT

Description	Page
Test Report Declaration	
<b>1. GENERAL INFORMATION .....</b>	<b>5</b>
1.1 General Information.....	5
1.2 Test Facility.....	5
1.3 Test Instrument Used.....	6
<b>2. POWERLINE CONDUCTED EMISSION TEST .....</b>	<b>7</b>
2.1. Test Standard.....	7
2.2. Limits .....	7
2.3. Test Procedure.....	7
2.4. Test Result.....	7
<b>3. MAXIMUM PEAK OUTPUT POWER .....</b>	<b>10</b>
3.1. Rules Part No. ....	10
3.2. Limits .....	10
3.3. Test Procedure.....	10
3.4. Test Result.....	10
<b>4. HOPPING CHANNEL SEPARATION AND BANDWIDTH .....</b>	<b>11</b>
4.1. Test Standard.....	11
4.2. Limits .....	11
4.3. Test Procedure.....	11
4.4. Test Result.....	11
<b>5. NUMBER OF HOPPING FREQUENCY .....</b>	<b>14</b>
5.1. Test Standard.....	14
5.2. Limits .....	14
5.3. Test Procedure.....	14
5.4. Test Result.....	14
<b>6. BAND EDGE .....</b>	<b>16</b>
6.1. Rules Part No. ....	16
6.2. Limits .....	17
6.3. Test Procedure.....	17
6.4. Test Result.....	17
<b>7. DWELL TIME .....</b>	<b>20</b>
7.1. Rules Part No. ....	20
7.2. Limits .....	20
7.3. Test Procedure.....	20
7.4. Test Result.....	20
<b>8. RF ANTENNA CONDUCTED SPURIOUS EMISSIONS .....</b>	<b>23</b>
8.1. Rules Part No. ....	23
8.2. Limits .....	23
8.3. Test Procedure.....	23
8.4. Test Result.....	23
<b>9. 20DB BANDWIDTH .....</b>	<b>27</b>
9.1. Rules Part No. ....	27
9.2. Limits .....	27
9.3. Test Procedure.....	27

9.4. Test Result.....27

**10. RADIATION INTERFERENCE .....30**

10.1. Rules Part No.....30

10.2. Limits .....30

10.3. Test Procedure.....30

10.4. Test Result.....30

**11. RESTRICTED BANDS OF OPERATION .....33**

**12. ANTENNA REQUIREMENT .....34**

**13. PHOTOGRAPH OF TEST .....35**

## TEST REPORT DECLARATION

Applicant : Launch Tech Co., Ltd.  
Manufacturer : Launch Tech Co., Ltd.  
EUT Description : AUTOMOTIVE DIAGNOSIS COMPUTER

**Test Procedure Used:**  
**FCC Part 15.247 Subpart C**

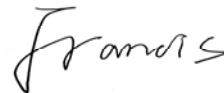
The E. U. T. listed below has been completed RF testing by Shenzhen AOV Testing Technology Co., Ltd at the test site of Bontek Compliance Testing Laboratory Ltd. And the Interference emissions can pass FCC CLASS B limitations.

The test configurations and the facility comply with the radiated test site criteria in **ANSI C63.4-2009**.

Date of Test:

August 01-09, 2011

Prepared by:



Project Engineer

Reviewer :



Project Manager

# 1. GENERAL INFORMATION

## 1.1 General Information

Applicant : Launch Tech Co., Ltd.  
Launch Industrial Park, North Wuhe Avenue, Banxuegang  
Industrial Park, Longgang District, Shenzhen, China

Manufacturer : Launch Tech Co., Ltd.  
Launch Industrial Park, North Wuhe Avenue, Banxuegang  
Industrial Park, Longgang District, Shenzhen, China

## 1.2 Test Facility

Test Firm : Bontek Compliance Testing Laboratory Ltd.  
Certificated by FCC, Registration No.: 338263  
Address : FL.1, Building H-3, Hua Qiao Cheng East Industrial Area  
Qiaocheng East Road, Nanshan, Shenzhen, P.R.China  
Tel : 86-755-86337020  
Fax : 86-755-86337028

## 1.3 Test Instrument Used

No.	Equipment	Manufacturer	Model No.	S/N	Cal. Date	Cal. Due Date
1.	EMI Test Receiver	R&S	ESPI	100097	2010-11-22	2011-11-22
2.	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2010-11-22	2011-11-22
3.	EMI Test Receiver	R&S	ESCI	100687	2010-11-22	2011-11-22
4.	EMI Test Receiver	R&S	FSU	BCT-019	2010-11-22	2011-11-22
5.	Amplifier	HP	8447D	1937A02492	2010-11-22	2011-11-22
6.	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2010-11-22	2011-11-22
7.	Horn Antenna	SCHWARZBECK	BBHA9120A	B08000991-0001	2010-11-22	2011-11-22
8.	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2010-11-22	2011-11-22
9.	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2010-11-22	2011-11-22
10.	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2010-11-22	2011-11-22
11.	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	D-69250	2010-11-22	2011-11-22
12.	Positioning Controller	C&C	CC-C-1F	MF7802113	2010-11-22	2011-11-22
13.	Triple-Loop Antenna	EVERFINE	LLA-2	607004	2010-11-22	2011-11-22
14.	10dB attenuator	SCHWARZBECK	MTAIMP-136	R65.90.0001#06	2010-11-22	2011-11-22

## 2. POWERLINE CONDUCTED EMISSION TEST

### 2.1. Test Standard

15.207

### 2.2. Limits

Frequency MHz	Limits (dB $\mu$ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes:

1. \*Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

### 2.3. Test Procedure

The EUT is put on the table that is 0.8m high above the ground and at least away from other Metallic surface 0.4m. The EUT is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohms coupling impedance for the testing equipment; and the peripheral equipment powers form other L.I.S.N. Please refer to the block diagram of the test setup and photographs. Both sides of AC line (Line & Neutral) are checked for maximum conducted interference. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables must be changed according to FCC part 15 B.

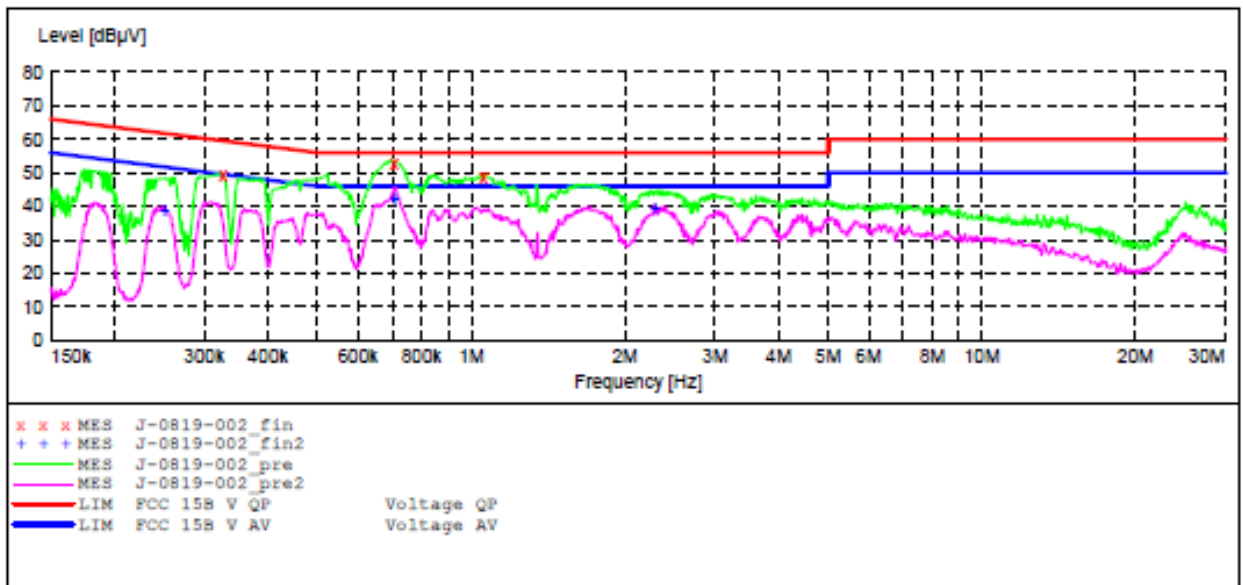
### 2.4. Test Result

**PASS**

Detailed information, Please refer to the following page.

### Power Line Conducted Emission

Engineer : Andy	
EUT :AUTOMOTIVE DIAGNOSIS COMPUTER	Time : 2011/08/04
Limit : FCC Part 15B	Comment : 22°C/55%
MN: X-431 TOOL C	Note : L
Power : AC 120V, 60HZ	



**MEASUREMENT RESULT:**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.326712	49.40	11.6	60	10.1	QP	L1	GND
0.703134	52.90	11.9	56	3.1	QP	L1	GND
1.056518	48.40	11.8	56	7.6	QP	L1	GND

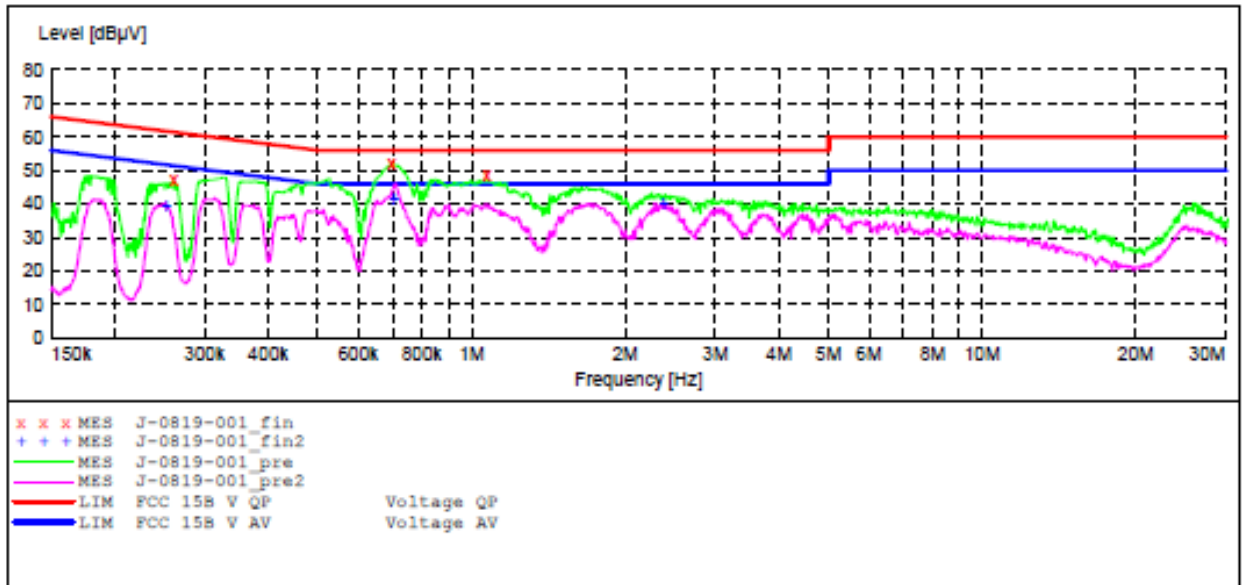
**MEASUREMENT RESULT:**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.250038	38.90	11.4	52	12.9	AV	L1	GND
0.708770	42.40	11.9	46	3.6	AV	L1	GND
2.282882	39.80	11.6	46	6.2	AV	L1	GND



### Power Line Conducted Emission

Engineer : Andy	
EUT :AUTOMOTIVE DIAGNOSIS COMPUTER	Time : 2011/08/04
Limit : FCC Part 15B	Comment : 22°C/55%
MN: X-431 TOOL C	Note : N
Power : AC 120V, 60HZ	



**MEASUREMENT RESULT:**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.261263	47.40	11.5	61	14.0	QP	N	GND
0.700333	51.20	11.9	56	3.8	QP	N	GND
1.069247	48.40	11.8	56	7.6	QP	N	GND

**MEASUREMENT RESULT:**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.252043	39.40	11.4	52	12.3	AV	N	GND
0.708770	42.70	11.9	46	3.3	AV	N	GND
2.375858	40.40	11.6	46	5.6	AV	N	GND

### 3. MAXIMUM PEAK OUTPUT POWER

#### 3.1. Rules Part No.

15.247(b)

#### 3.2. Limits

The maximum peak output power measurement is 0.126w (21dBm).

#### 3.3. Test Procedure

The antenna of the EUT was connected to the RF input cord of power meter with a coaxial cable, power was read directly from the meter and cable loss was added to the reading to obtain power at the EUT antenna terminal. The EUT output power was set to maximum to produce the worse case test result.

#### 3.4. Test Result

**PASS**

Channel	Frequency (MHz)	Peak output power (dBm)	Limit (dBm)
Low	2402	12.90	21
Middle	2441	13.01	21
High	2480	12.62	21

## 4. HOPPING CHANNEL SEPARATION AND BANDWIDTH

### 4.1. Test Standard

15.247(a)

### 4.2. Limits

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater,

### 4.3. Test Procedure

Record the respond of frequency waveform when the EUT was working by a spectrum analyzer or EMI Receiver.

### 4.4. Test Result

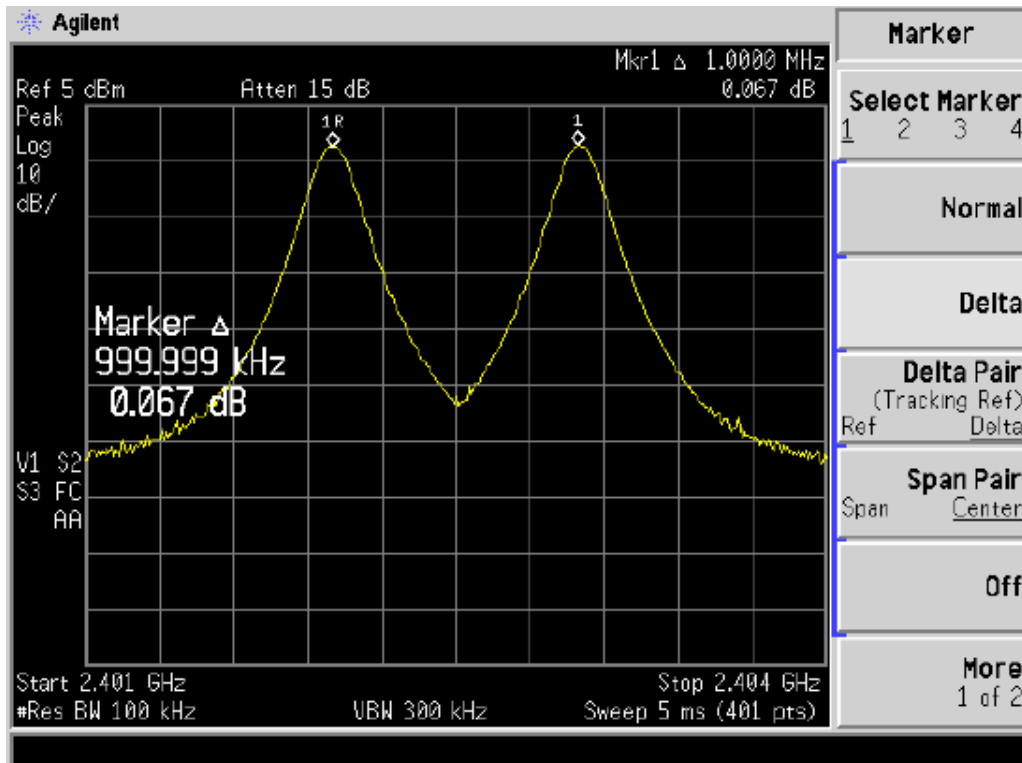
**PASS**

Channel	Frequency (MHz)	Channel Separation (MHz)
Low	2402	1.00
Middle	2441	1.00
High	2480	1.00

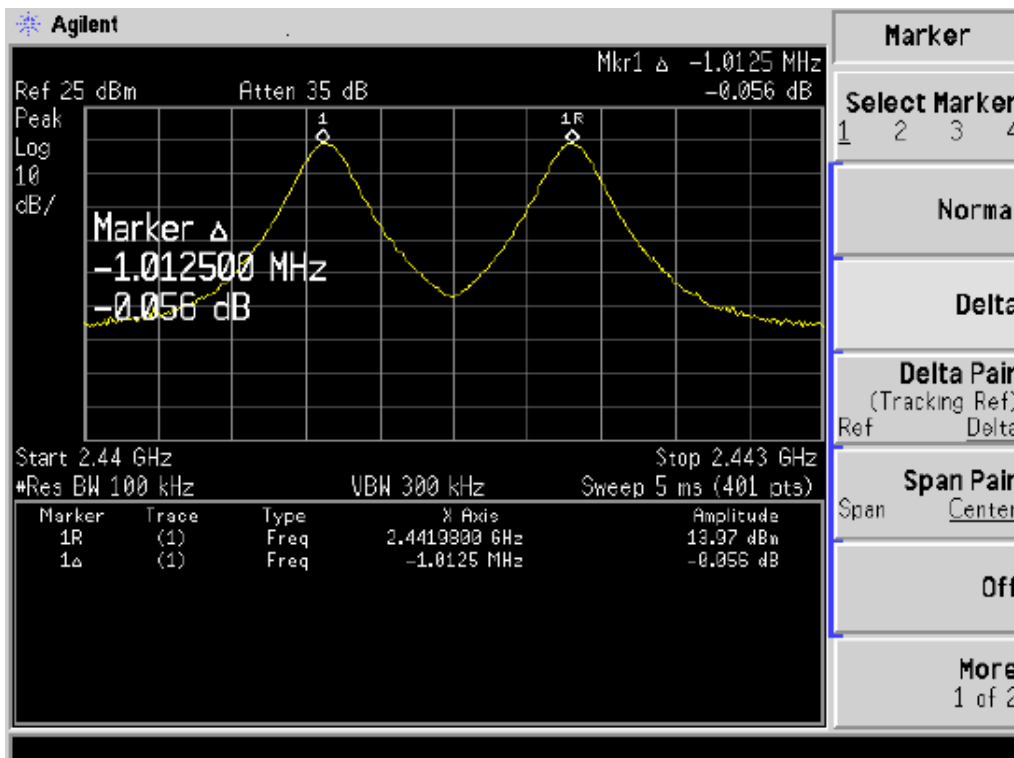
Channel Separation > 2/3 of 20dB Bangwidth

Detailed information, Please refer to the following page.

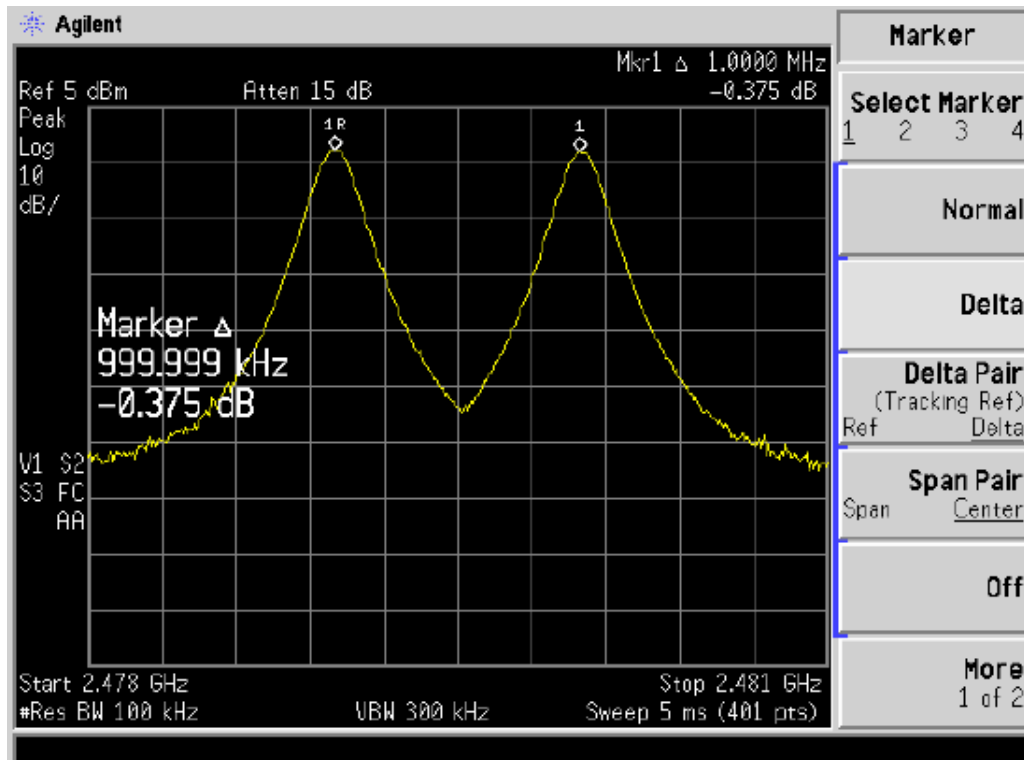
Low channel: 2402MHz



Middle Channel: 2441MHz



High channel: 2480MHz



## 5. NUMBER OF HOPPING FREQUENCY

### 5.1. Test Standard

15.247(b)

### 5.2. Limits

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels.

### 5.3. Test Procedure

Record the respond of frequency waveform when the EUT was working by a spectrum analyzer or EMI Receiver.

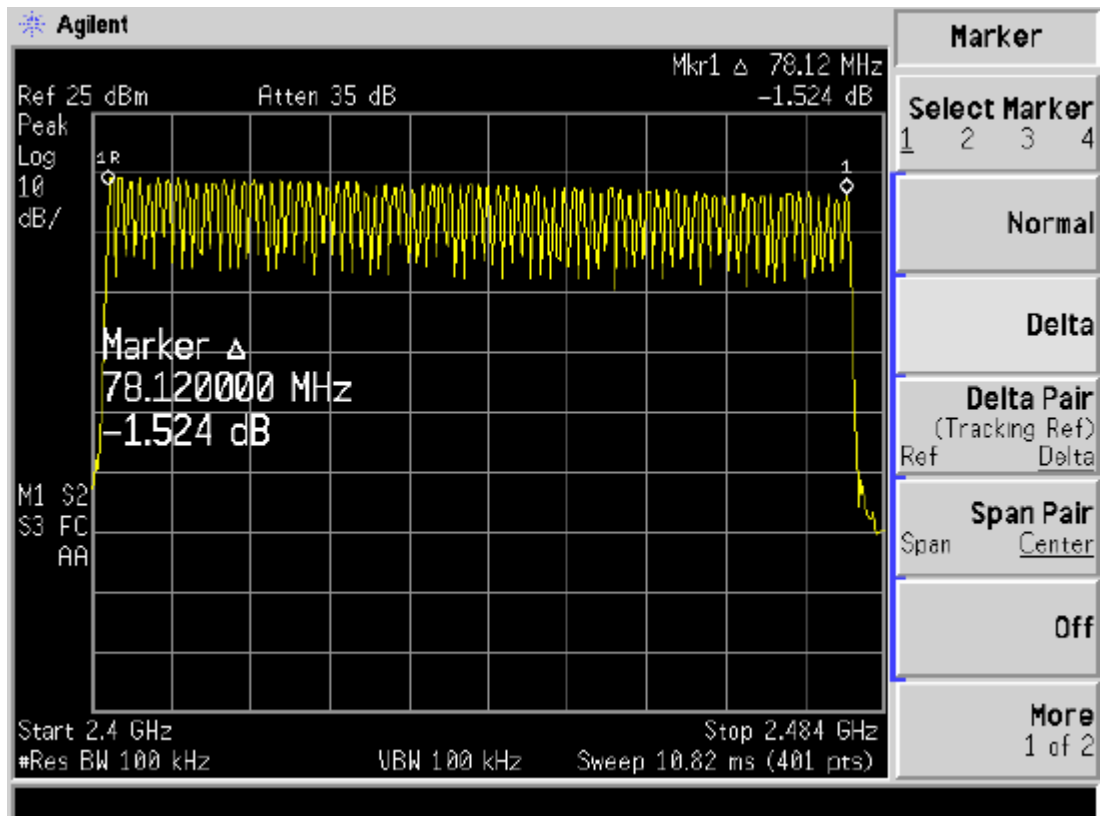
### 5.4. Test Result

**PASS**

Hopping Channel is 79.

Detailed information, Please refer to the following page.

2400-2480(MHZ)



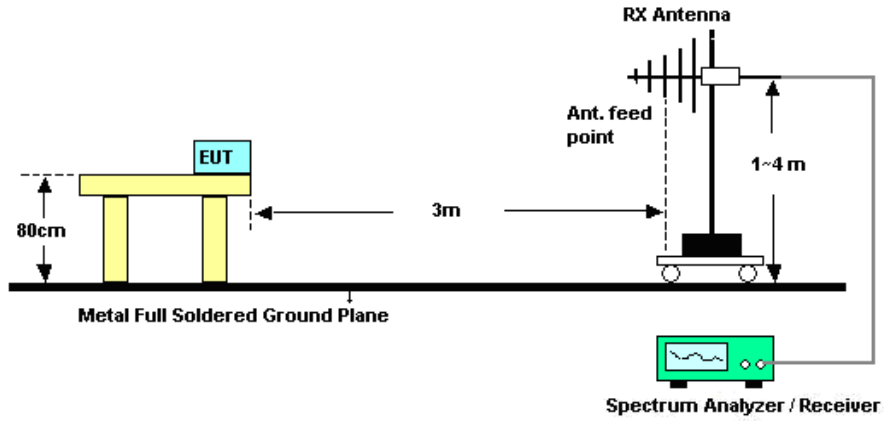
## 6. BAND EDGE

### 6.1. Rules Part No.

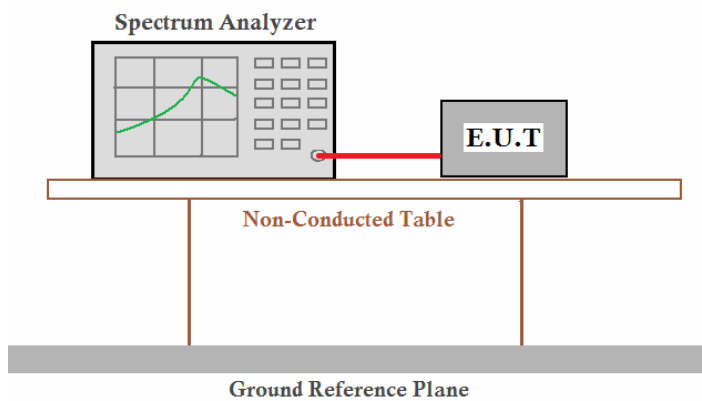
15.247(c) Test Method: ANSI C63.4:2003 and KDB DA00-705

Test setup:

#### <Radiated Band Edges>



#### <Conducted Band Edges>



Test mode: Transmitting mode

Temperature: 25~27°C

Relative Humidity: 48~51%



## 6.2.Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

## 6.3.Test Procedure

1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) = RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300k Hz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 1MHz, Sweep: Auto for Peak; set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto for Average. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

## 6.4.Test Result

**PASS**

Detailed information, Please refer to the following page.

## Test Result of Radiated Band Edges

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Limit Line ( dBuV/m )	Over Limit ( dB )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2398.03	31.10	54.00	-22.90	28.00	32.02	5.51	34.13	114	0	Average
2398.04	41.24	74.00	-32.76	41.13	32.02	5.51	34.13	114	0	Peak

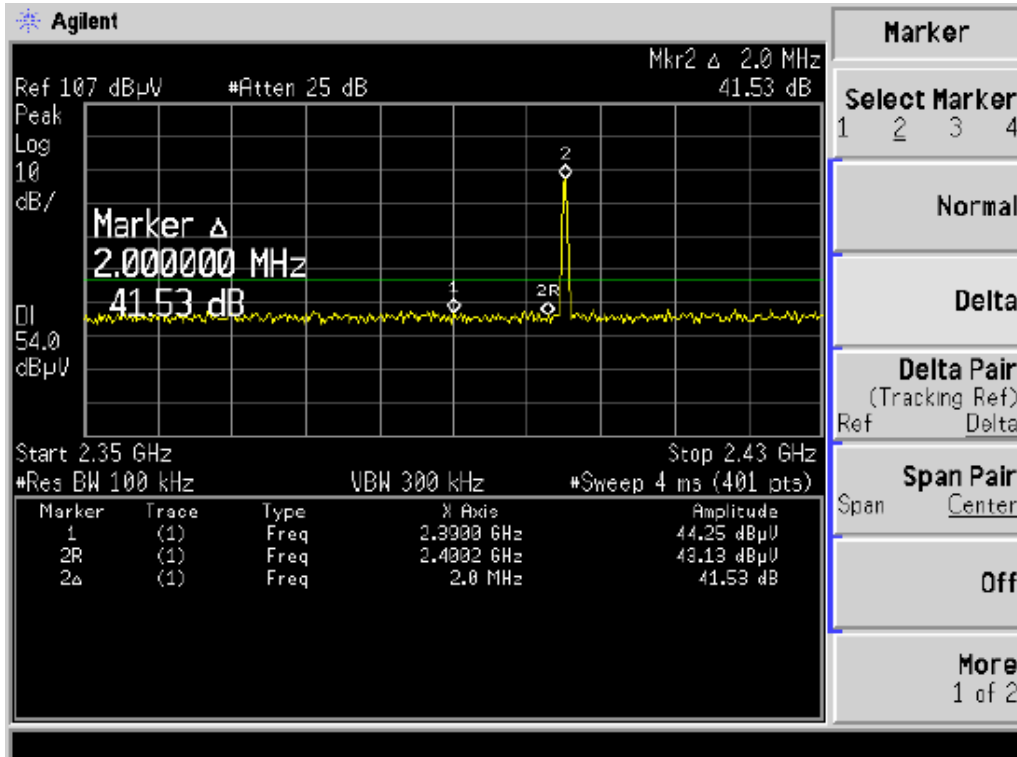
ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Limit Line ( dBuV/m )	Over Limit ( dB )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2398.03	32.02	54.00	-21.98	28.98	32.11	5.47	34.15	100	40	Average
2398.04	45.40	74.00	-28.60	42.00	32.11	5.47	34.15	100	40	Peak

ANTENNA POLARITY : HORIZONTAL										
Frequency ( MHz )	Level ( dBuV/m )	Limit Line ( dBuV/m )	Over Limit ( dB )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.02	32.70	54.00	-21.30	28.85	32.27	5.38	34.19	110	0	Average
2483.04	47.45	74.00	-26.55	44.55	32.27	5.38	34.19	110	0	Peak

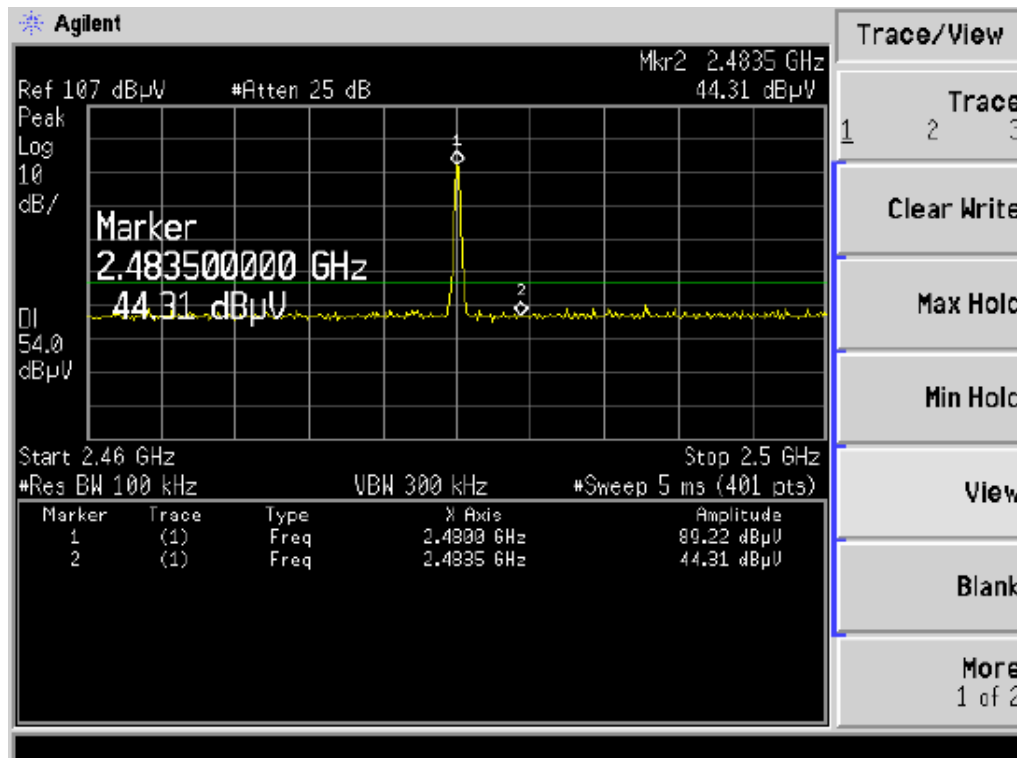
ANTENNA POLARITY : VERTICAL										
Frequency ( MHz )	Level ( dBuV/m )	Limit Line ( dBuV/m )	Over Limit ( dB )	Read Level ( dBuV )	Antenna Factor ( dB )	Cable Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
2483.02	33.12	54.00	-21.88	29.45	32.27	5.38	34.19	181	15	Average
2483.04	46.14	74.00	-27.86	43.84	32.27	5.38	34.19	181	15	Peak

### Test Result of Conducted Band Edges

Low channel: 2402MHz



High Channl: 2480MHz



## 7. DWELL TIME

### 7.1. Rules Part No.

15.247(a)

### 7.2. Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 7.3. Test Procedure

The transmitter output was connected to EMI receiver with a low lose cable, the band edge was measured and recorded.

### 7.4. Test Result

**PASS**

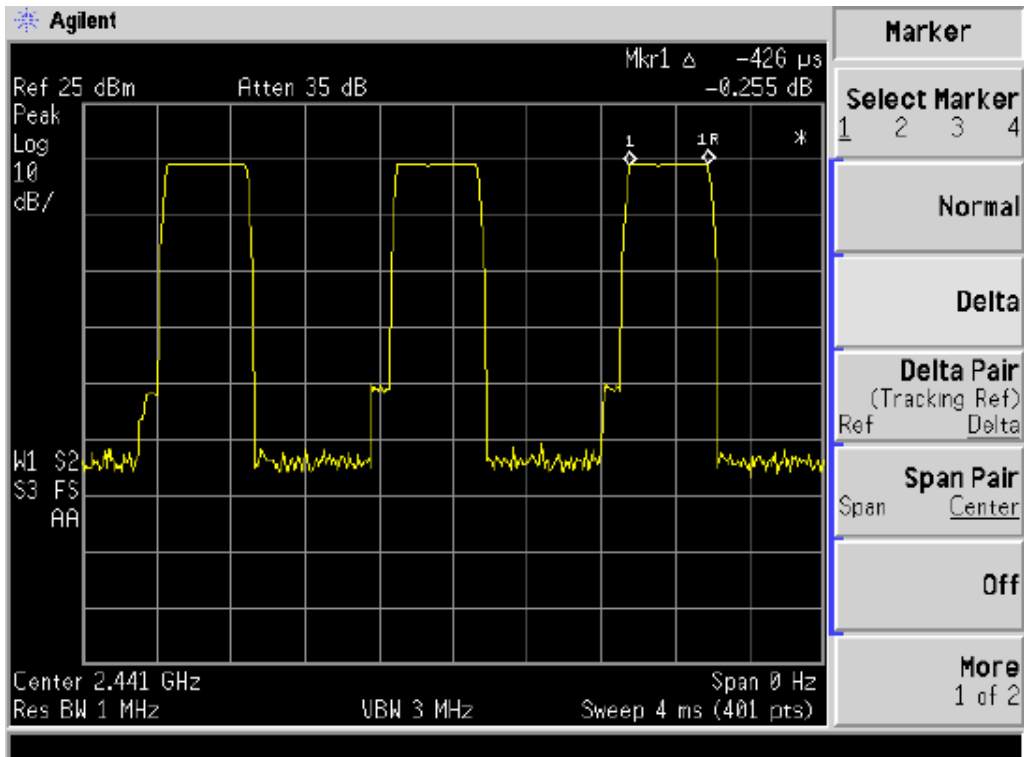
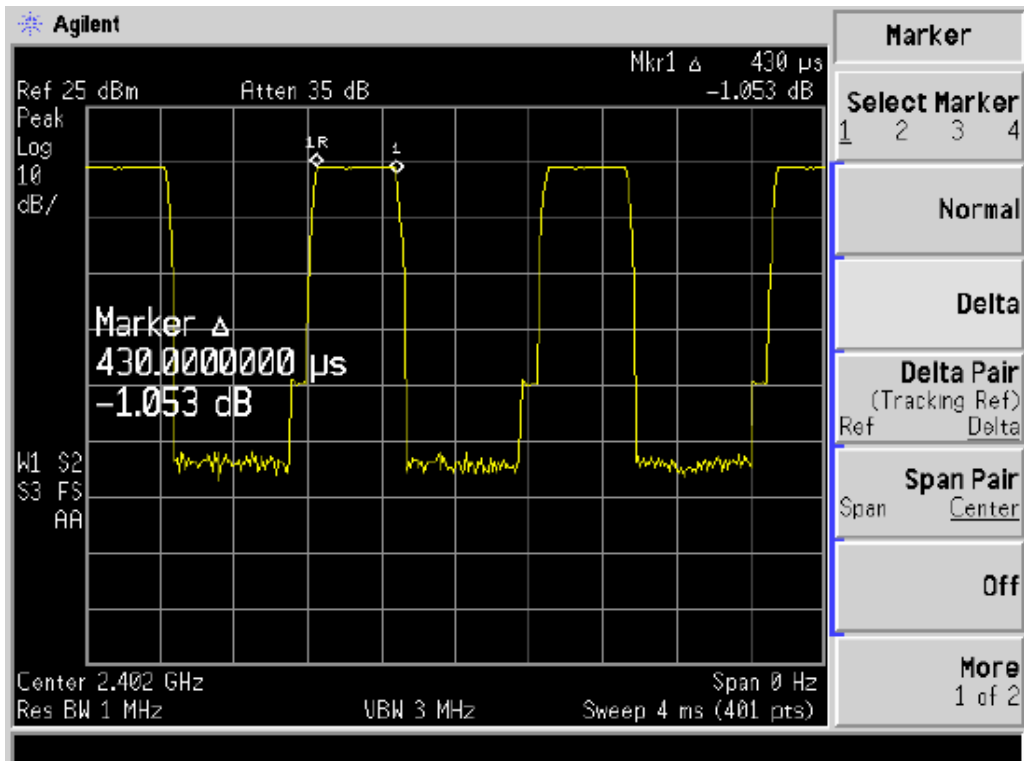
Channel	Frequency (MHz)	Pulse Width (msec)	Occupied Time (0.4 sec X 79)	Dwell Time (ms)	Limit (sec)
Low	2402	0.430	31.6	135.880	0.4
Middle	2441	0.426	31.6	134.616	0.4
High	2480	0.410	31.6	129.560	0.4

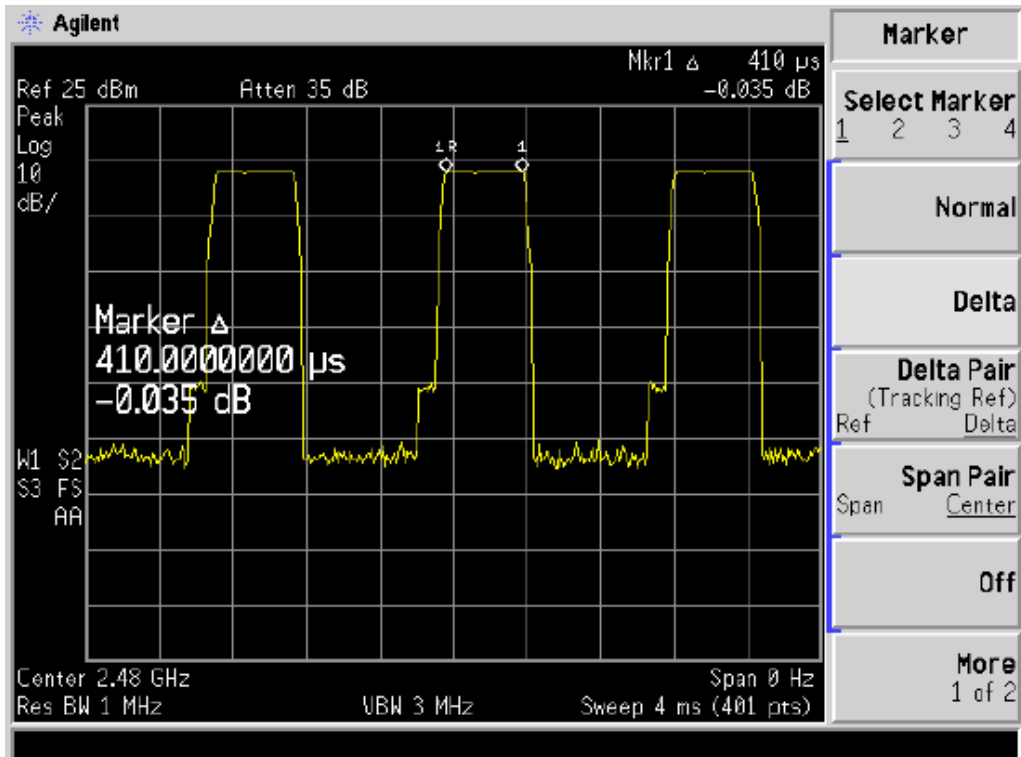
Detailed information, Please refer to the following page.

A period transmit time=  $79 * 0.4 = 31.6s$

Dwell time= Pulse time \* burst (in 1sec) \*31.6

Burst in 1 sec.=10 (Burst is 10 times be measured)





## 8. RF ANTENNA CONDUCTED SPURIOUS EMISSIONS

### 8.1. Rules Part No.

FCC Part15 C Section 15.247 (d)

### 8.2. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

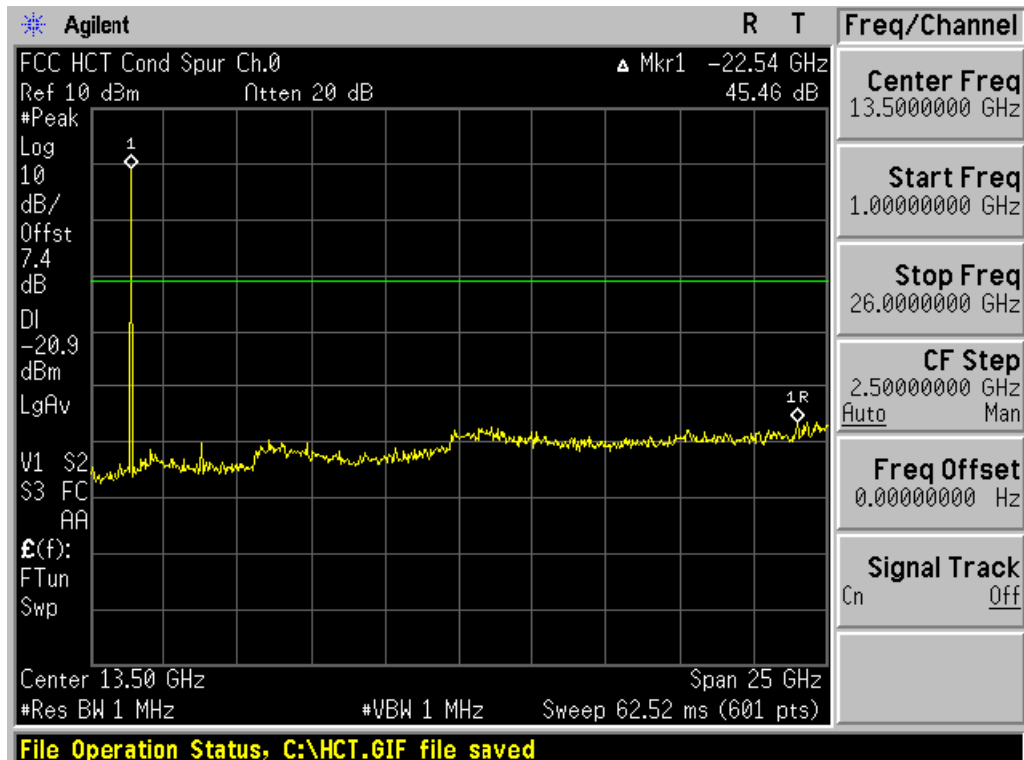
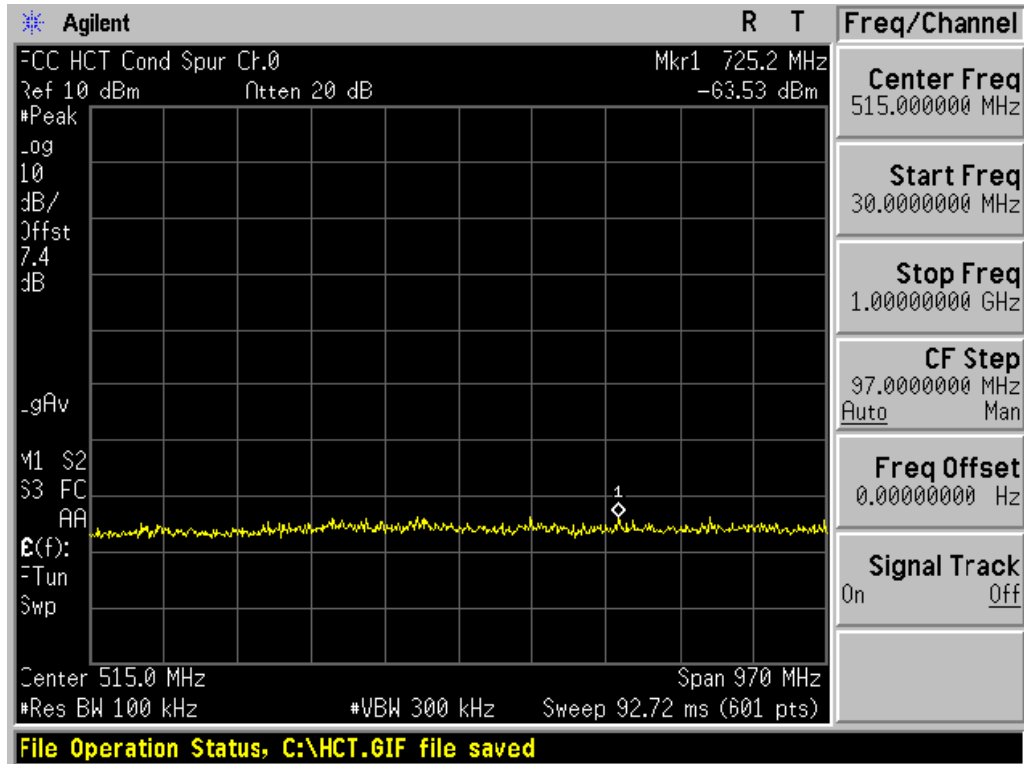
### 8.3. Test Procedure

- 1, Conducted Measurement EUT was set for low, mid, high channel with modulated mode and highest RF output power. The spectrum analyzer was connected to the antenna terminal.
2. Conducted Emissions Measurement Uncertainty All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is  $\pm 1.5$ dB.

### 8.4. Test Result

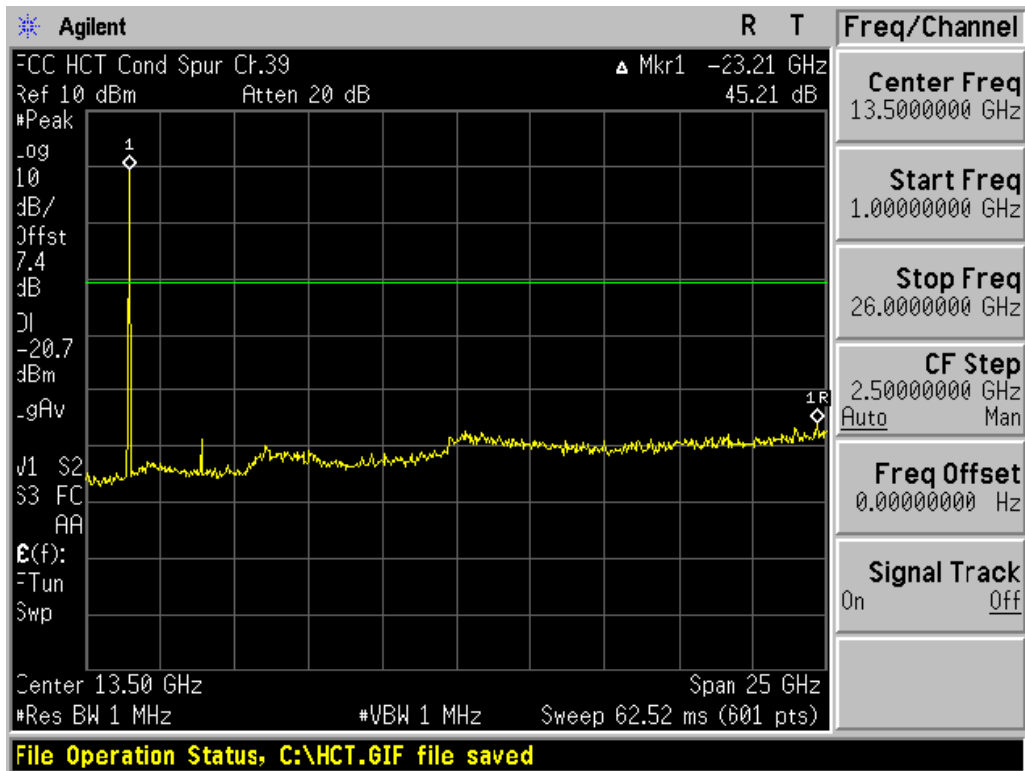
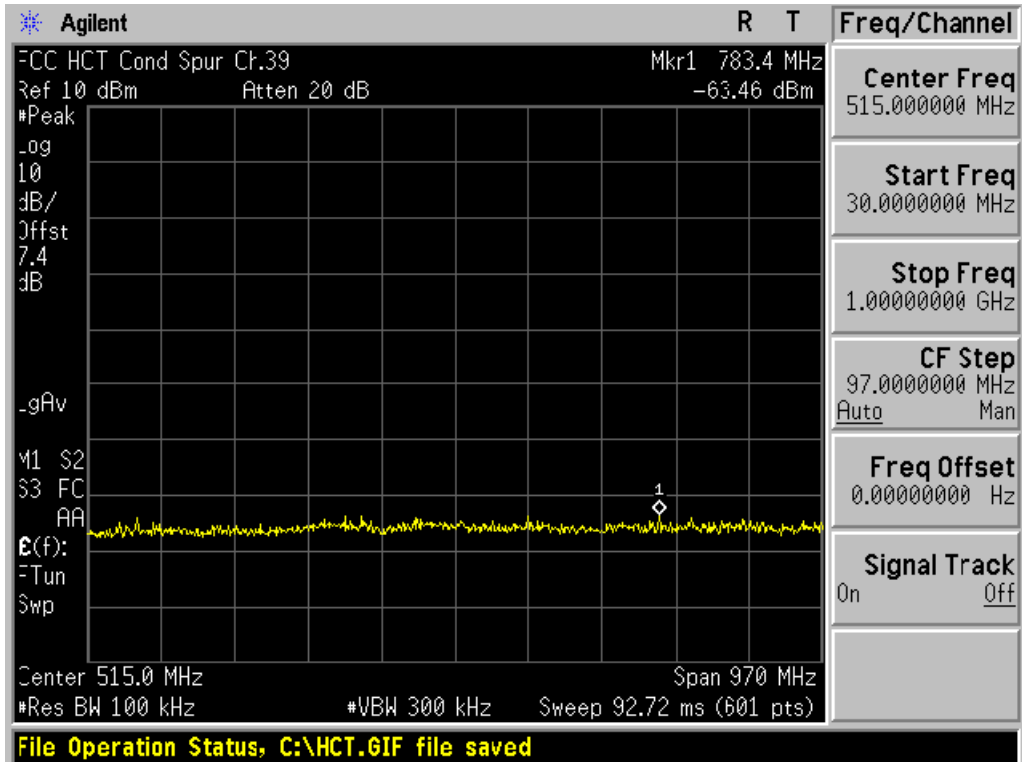
**PASS**

Low Channel:

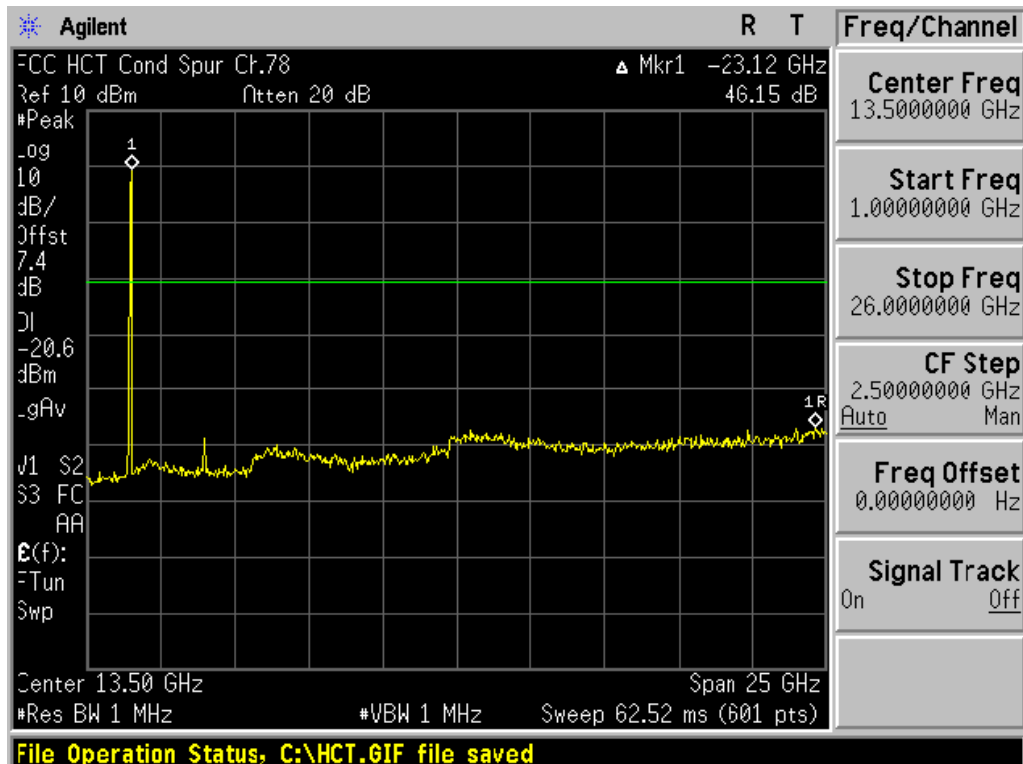
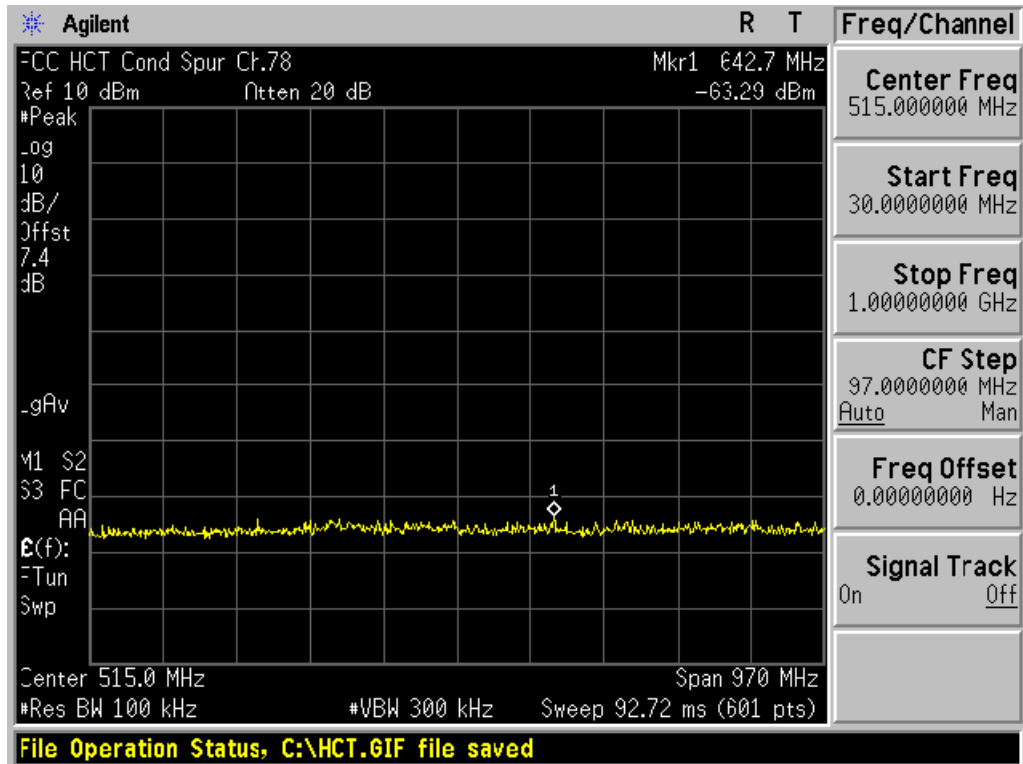




Middle Channel:



High Channel:



## 9. 20DB BANDWIDTH

### 9.1.Rules Part No.

FCC Part15 C Section 15.247 (a)(1)

### 9.2.Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier

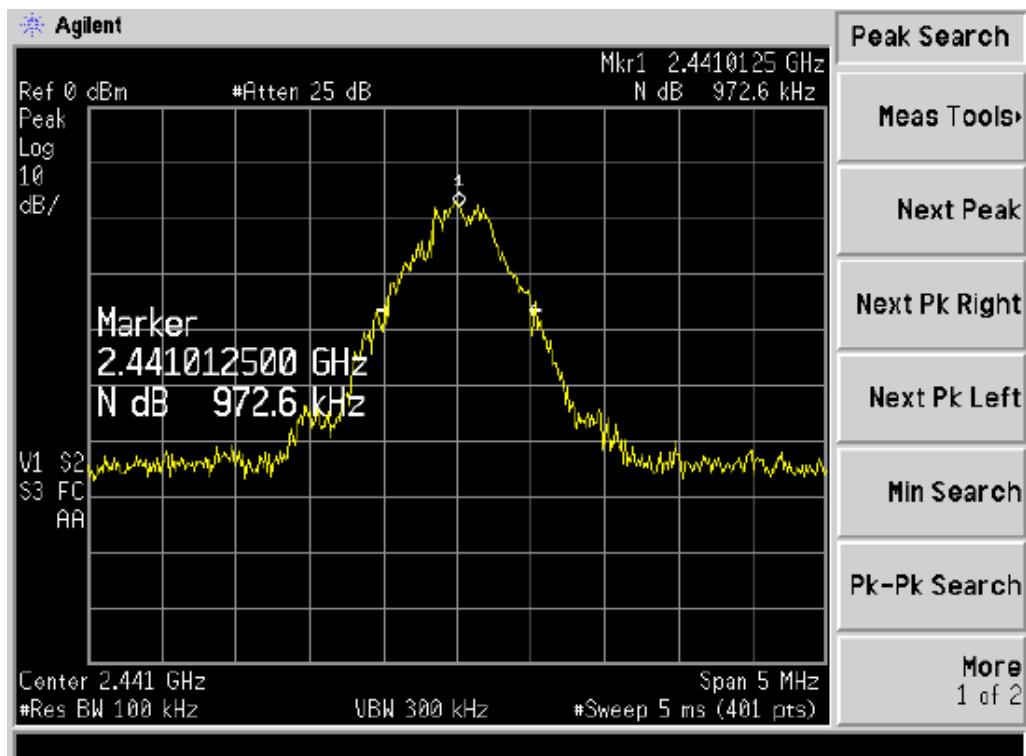
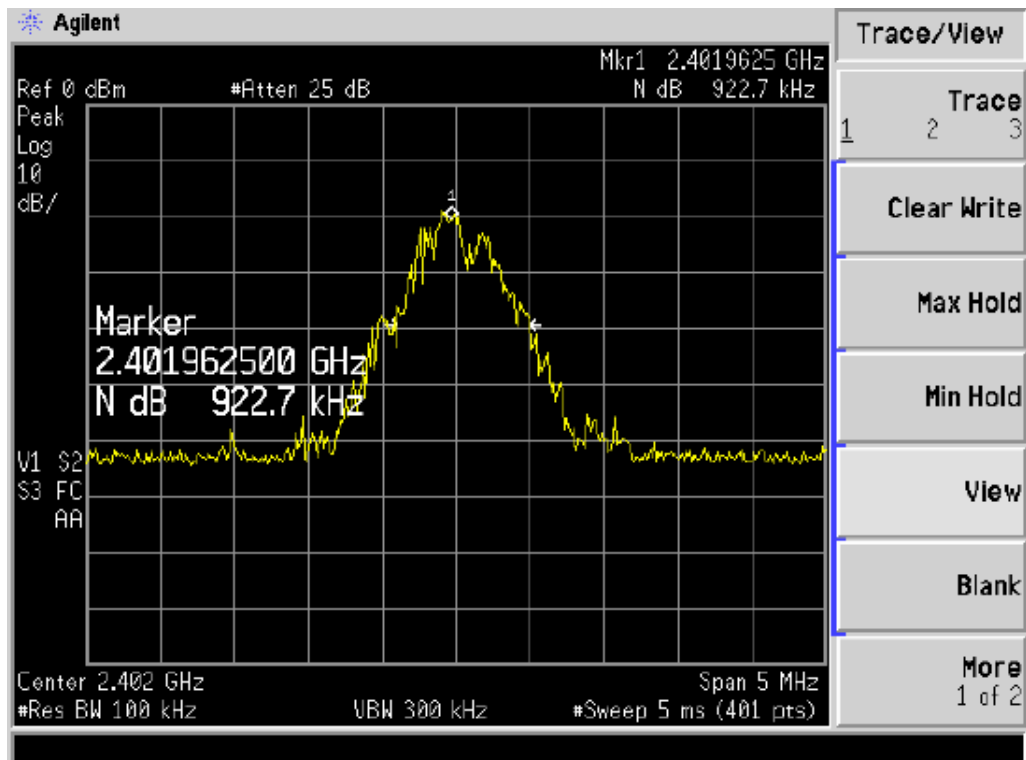
### 9.3.Test Procedure

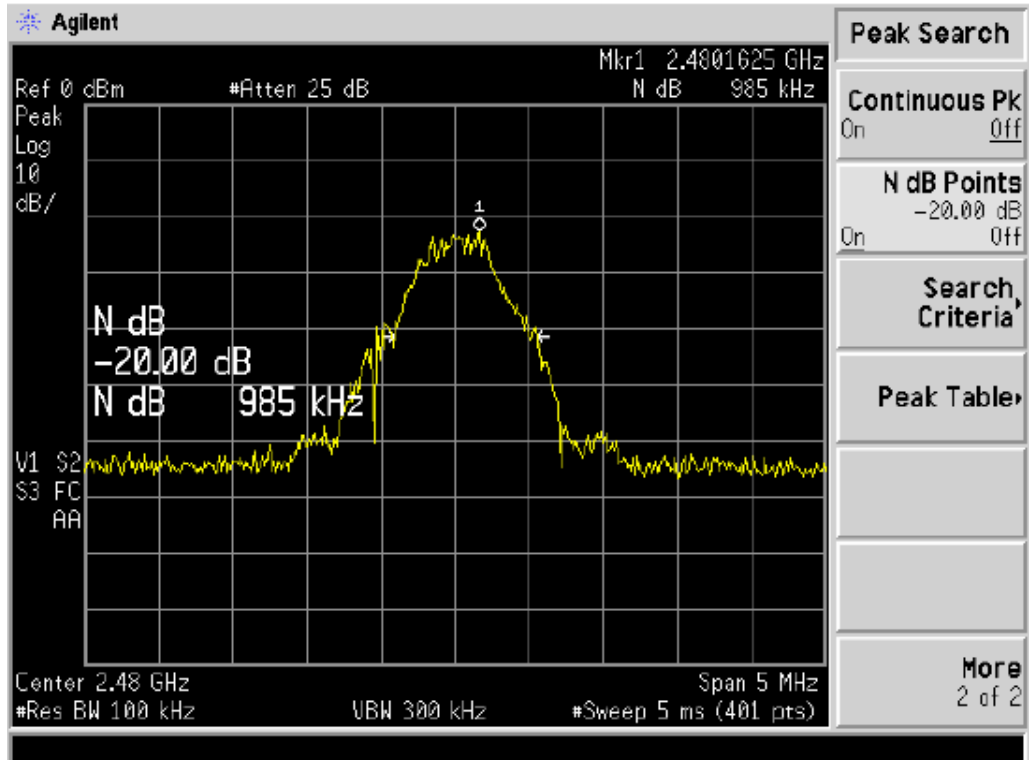
The transmitter output is connected to the spectrum analyzer, The spectrum analyzer Center frequency is set to the transmitter frequency, The RBW is set to 10K Hz and VBW is set 30 KHz

### 9.4.Test Result

#### **PASS**

Test channel	Low	Middle	High
20dB Occupy Bandwidth (KHz)	1104	1100	1104





## 10.RADIATION INTERFERENCE

### 10.1.Rules Part No.

15.209

### 10.2.Limits

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency of (MHz)	Emission Field Strength (microvolts/meter)
30 - 88	100 (40)
88 - 216	150 (43.5)
216 - 960	200 (46.0)
Above 960	500 (54.0)

### 10.3.Test Procedure

#### **ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES:**

The EUT is placed on a turned table that is 0.8 meter above the ground. The turned table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna that is mounted on the antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (log periodical antenna and horn antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz.

The spectrum was scanned from 30 MHz to 10th harmonic of the fundamental.

### 10.4.Test Result

#### **PASS**

The frequency range from 30MHz to 25GHz is investigated.

Detailed information, Please refer to the following page.

**Low Channel: 2402MHz**

Horizontal:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
33.580	35.80	32.90	40.0	7.10
51.760	34.20	31.70	40.0	8.30
900.250	36.70	34.50	46.0	11.50
4804.080	39.40	36.80	54.0	(AV)17.20
7205.330	39.90	37.90	54.0	(AV)16.10

Vertical:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
34.750	36.20	33.20	40.0	6.80
51.650	35.30	33.50	40.0	6.50
80.610	35.50	32.80	40.0	7.20
861.720	36.30	34.90	46.0	11.10
4804.300	39.80	37.60	54.0	(AV)16.40
7205.440	39.20	37.80	54.0	(AV)16.20

**Middle Channel: 2441MHz**

Horizontal:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
30.114	33.50	32.70	40.0	7.30
53.560	31.20	30.90	40.0	9.10
71.365	34.90	33.80	40.0	6.20
895.326	36.10	35.20	46.0	11.80
4882.014	37.60	35.90	54.0	(AV)18.10
7324.001	38.30	37.60	54.0	(AV)16.40

Vertical:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
32.125	37.20	33.40	40.0	6.60
57.865	33.60	31.60	40.0	8.40
76.457	34.60	33.50	40.0	6.50
899.220	37.60	35.80	46.0	10.20
4882.126	39.40	37.30	54.0	(AV)16.70
7314.022	40.90	38.40	54.0	(AV)15.60

**High Channel: 2480MHz**

Horizontal:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
31.240	35.80	32.60	40.0	7.40
59.564	33.70	31.70	40.0	8.30
72.540	34.20	32.80	40.0	7.20
908.191	39.30	37.20	46.0	8.80
4959.321	38.70	37.60	54.0	(AV)16.40
7440.200	42.30	39.40	54.0	(AV)14.60

Vertical:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
34.630	37.30	34.60	40.0	5.40
59.864	34.10	32.60	40.0	7.40
75.360	34.80	33.30	40.0	6.70
899.070	37.80	36.10	46.0	9.90
4960.170	42.10	39.30	54.00	(AV)14.70
7440.060	40.60	38.70	54.00	(AV)15.30



## 11.RESTRICTED BANDS OF OPERATION

Section 15.205:

Only spurious emissions are permitted in any of the frequency bands listed below:

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
2. 17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
2. 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 –	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.52525	2655 – 2900	22.01 – 23.12
8.41425 – 8.41475	156.7 – 156.9	3260 – 3267	23.6 – 24.0
12.29 – 12.293	162.0125 – 167.17	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	167.72 – 173.2	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	240 – 285	3600 – 4400	( <sup>2</sup> )
13.36 – 13.41	322 – 335.4		

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

<sup>2</sup> Above 38.6

## **12.ANTENNA REQUIREMENT**

According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. Antenna is fixed by PCB, can not be changed except take apart the product. Therefore the EUT complies with Section 15.203 of the FCC rules.

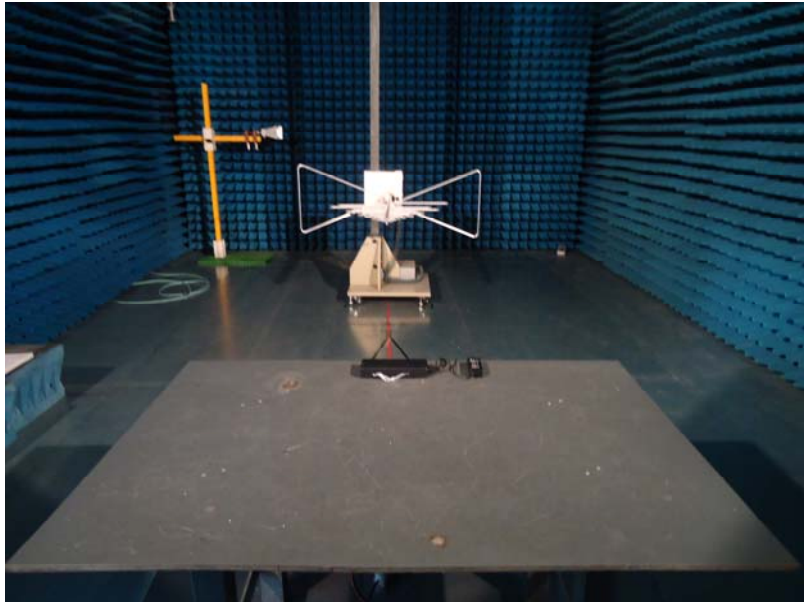
## 13. PHOTOGRAPH OF TEST

### 13.1 Powerline conducted emission



### 13.2 Radiated Emission

Below 1G



Above 1G

