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Report No.: GLEMR070802373RFT  
Page: 1 of 39  
FCC ID: PZK-02280T

FEDERAL COMMUNICATIONS COMMISSION  
Registration number: 282399

## TEST REPORT

**Application No. :** GLEMR070802373RF (SGS HK No.: 2014450/EE)  
**Applicant:** Summer Infant Inc.  
**FCC ID:** PZK-02280T  
**Fundamental Carrier Frequency :** 2.4060GHz to 2.4762GHz  
**Equipment Under Test (EUT):**  
**Name:** Digital Handheld Color Video Monitor w/ Crib Unit  
**Model No.:** PZK-02280T  
**Standards:** FCC PART 15, SUBPART C: 2007 (Section 15.247)  
**Date of Receipt:** 27 September 2007  
**Date of Test:** 27 September to 29 September 2007  
**Date of Issue:** 30 September 2007

<b>Test Result :</b>	<b>PASS *</b>
----------------------	---------------

\* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 2 of this report for further details.

Authorized Signature:

Stephen Guo  
Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Antenna Requirement	FCC PART 15 :2007	Section 15.247 (c)	PASS
Occupied Bandwidth	FCC PART 15 :2007	Section 15.247 (a1)	PASS
Carrier Frequencies Separated	FCC PART 15 :2007	Section 15.247(a)(1)	PASS
Hopping Channel Number	FCC PART 15 :2007	Section 15.247(a)(1)(iii)	PASS
Dwell Time	FCC PART 15 :2007	Section 15.247(a)(1)(iii)	PASS
Pseudorandom Frequency Hopping Sequence	FCC PART 15 :2007	Section 15.247(a)(1)	PASS
Maximum Peak Output Power	FCC PART 15 :2007	Section 15.247(b)(1)	PASS
RF Exposure Compliance Requirement	FCC PART 15 :2007	15.247(b)(4)& TCB Exclusion List (7 July 2002)	PASS
Conducted Emission	FCC PART 15 :2007	Section 15.207	PASS
Conducted Spurious Emission (30MHz to 25GHz)	FCC PART 15 :2007	Section 15.209 &15.247(d)	PASS
Radiated Spurious Emission (30MHz to 25GHz)	FCC PART 15 :2007	Section 15.209 &15.247(d)	PASS
Band Edges Measurement	FCC PART 15 :2007	Section 15.247 (d) &15.205	PASS



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## **4 General Information**

### **4.1 Client Information**

Applicant: Summer Infant Inc.  
Address of Applicant: 1275 Park East Drive, Woonsocket, RI 02895 USA

### **4.2 General Description of E.U.T.**

Name: Digital Handheld Color Video Monitor w/ Crib Unit  
Model No.: PZK-02280T  
Number of Channels 28  
Channel Separation 2.6MHz  
Type of Modulation FHSS (Frequency Hopping Spread Spectrum)  
Dwell time 331ms  
Antenna Type Integral  
Power Supply: AC adapter and Battery.  
Adapter and Battery information: Adapter:  
Model:HK-L105-U070;INPUT:120V~60Hz 0.22A;  
OUTPUT:DC 7V 0.75A  
Battery:  
DC 4.8V rechargeable battery packet for monitor.  
DC 6V 4x1.5V "Size C" battery for Crib Soother.  
Functions: Wireless Digital Handheld Color Video Monitor with Remote  
Controlled Crib Soother from summer infant.

### **4.3 Description of Support Units**

The EUT has been tested independently.

### **4.4 Standards Applicable for Testing**

The customer requested FCC tests for the EUT.  
The standard used was FCC PART 15, SUBPART C: 2007 (Section 15.247);  
FCC PART 15, SUBPART B: 2007.

### **4.5 Test Location**

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory, No.198 Kezhu Road, Science Town Economic& Technology Development District Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

### **4.6 Other Information Requested by the Customer**

None.



#### **4.7 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP – Lab Code: 200611-0**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **FCC – Registration No.: 282399**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002. With the above and NVLAP's accreditation, SGS-CSTC is an authorized test laboratory for the DoC process.



## 5 Equipments Used during Test

RE in Chamber/OATS						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	06-03-2007	06-03-2008
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	05-12-2006	05-12-2007
N/A	EMI Test Software	Audix	E3	N/A	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	04-12-2006	04-12-2007
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	12-08-2007	12-08-2008
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	12-08-2007	12-08-2008
EMC0517	Horn Antenna	Rohde & Schwarz	HF906	100095	12-08-2007	12-08-2008
EMC0040	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	05-12-2006	05-12-2007
EMC0520	0.1-1300 MHz Pre-Amplifier	HP	8447D OPT 010	2944A06252	28-03-2007	28-03-2008
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	28-03-2007	28-03-2008
EMC0523	Active Loop Antenna	EMCO	6502	00042963	09-08-2006	09-08-2008
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	22-08-2006	22-08-2007

Conducted Emission						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0306	Shielding Room	Zhong Yu	8 x 3 x 3.8 m <sup>3</sup>	N/A	N/A	N/A
EMC0102	LISN	Schaffner Chase	MNZ050D/1	1421	05-12-2006	05-12-2007
EMC0506	EMI Test Receiver	Rohde & Schwarz	ESCS30	100085	05-12-2006	05-12-2007
EMC0107	Coaxial Cable	SGS	2m	N/A	25-11-2006	25-11-2007
EMC0106	Voltage Probe	SGS	N/A	N/A	N/A	N/A



<b>6 Test Results</b>			
<b>6.1 E.U.T. test conditions</b>			
Power supply:	AC adapter and Battery.		
Type of antenna:	Integral		
Operating Environment:			
Temperature:	20.0 -25.0 °C		
Humidity:	38-48 % RH		
Atmospheric Pressure:	992 -1006 mbar		
Test frequencies:	According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:		
	Frequency range over which device operates	Number of frequencies	Location in the range of operation
	1 MHz or less	1	Middle
	1 to 10 MHz	2	1 near top and 1 near bottom
	More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

EUT channels and frequencies list:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
0	2406.0	14	2442.4
1	2408.6	15	2445.0
2	2411.2	16	2447.6
3	2413.8	17	2450.2
4	2416.4	18	2452.8
5	2419.0	19	2455.4
6	2421.6	20	2458.0
7	2424.2	21	2460.6
8	2426.8	22	2463.2
9	2429.4	23	2465.8
10	2432.0	24	2468.4
11	2434.6	25	2471.0
12	2437.2	26	2473.6
13	2439.8	27	2476.2

Test frequency is the lowest channel: 0 channel(2406.0MHz) , middle channel: 13 channel(2439.8MHz) and highest channel: 27 channel(2476.2MHz)

## **6.2 Antenna Requirement**

### **6.2.1 Standard requirement**

15.203 requirement:

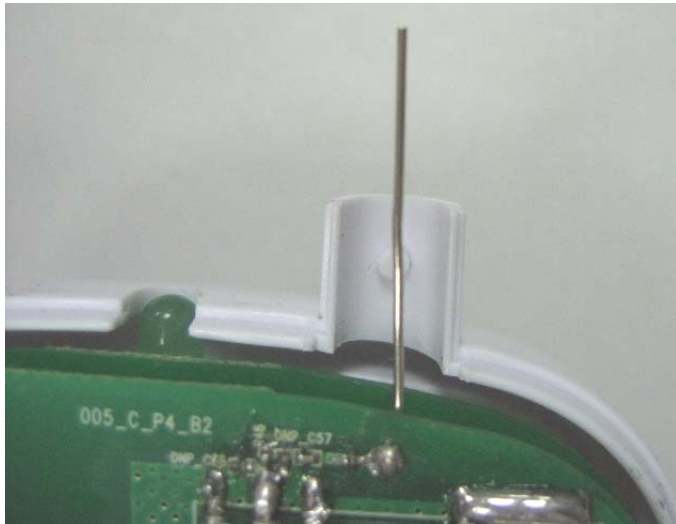
For intentional device, according to 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

### **6.2.2 EUT Antenna**

The antenna is integrated on the main PCB and no consideration of replacement. The gain of the antenna is less than 3dBi.



**TEST RESULTS: The unit does meet the FCC requirements.**



### 6.3 Occupied Bandwidth

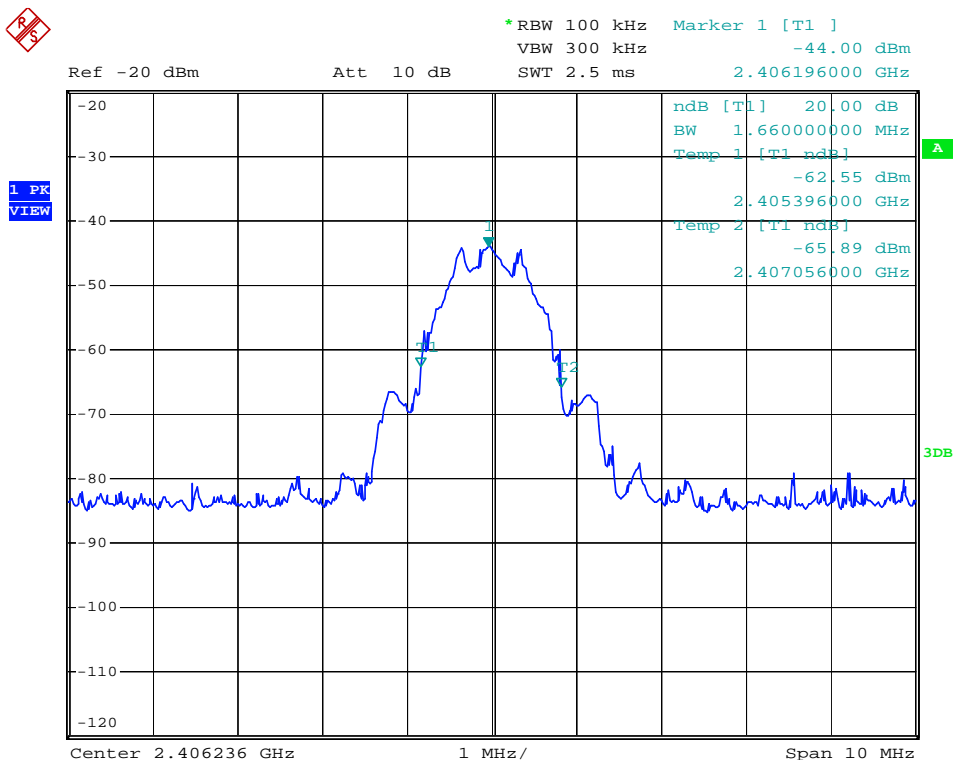
Test Requirement: FCC Part 15 C  
 Test Method: Based on FCC Part15 C Section 15.247:  
 Test Date: 29 September 2007  
 Test Status: Test lowest, middle, highest channel.  
 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: Span = enough to capture the 20dB bandwidth, centered on a hopping channel;
3. Set the spectrum analyzer: RBW  $\geq$  1% of the 20dB bandwidth (set 100kHz), VBW  $\geq$  RBW , Sweep = auto; Detector Function = Peak, Trace = Max Hold.
4. Mark the peak frequency and -20dB points.

**Test result:**

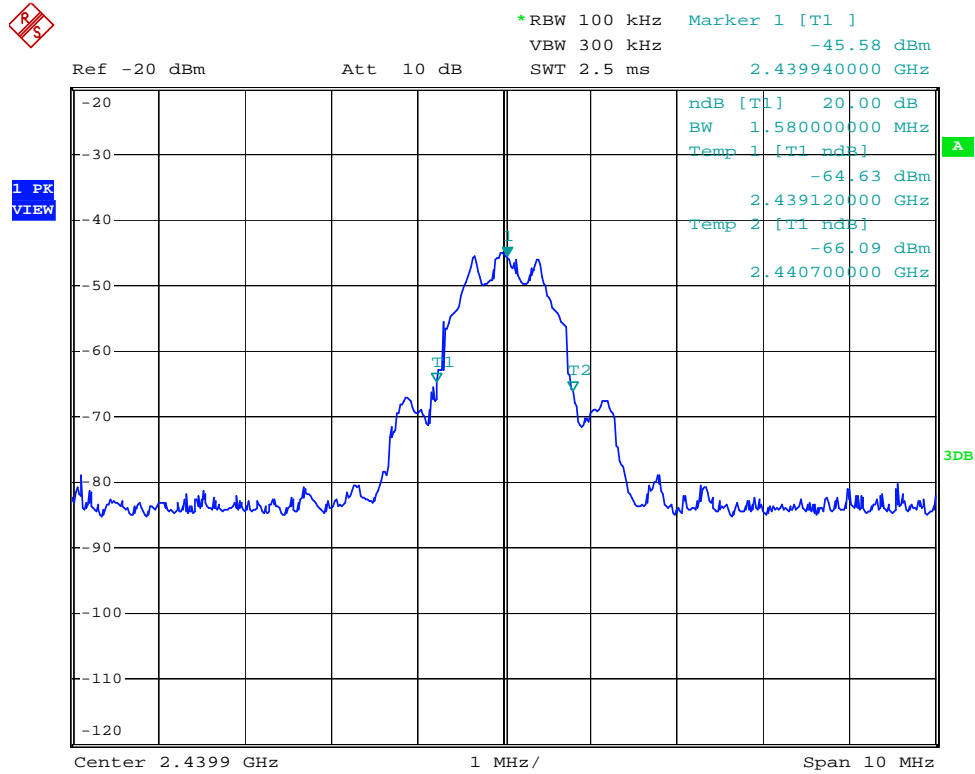
Test Channel	20 dB bandwidth
Lowest	1.66MHz
Middle	1.58MHz
Highest	1.48MHz

**Lowest Channel:**

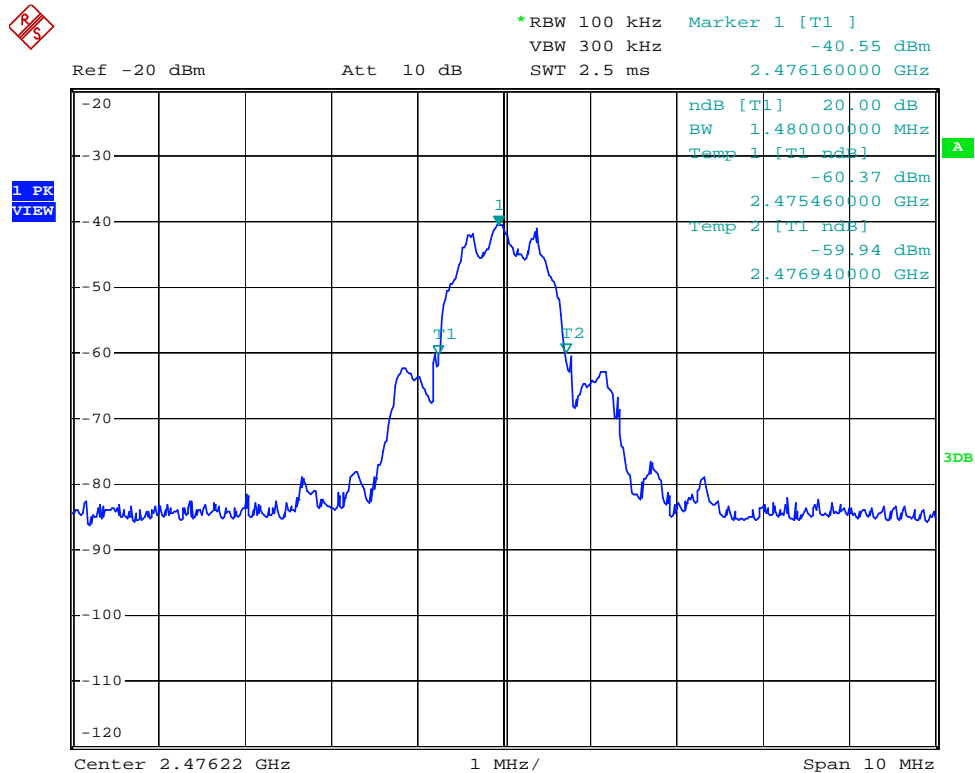




Middle Channel:



Highest Channel:





### 6.4 Carrier Frequencies Separated

Test Requirement: FCC Part 15 C  
 Test Method: Based on FCC Part15 C Section 15.247  
 Test Date: 27 September 2007  
 Test requirements: Regulation 15.247(a)(1) 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, provided the systems operate with an output power no greater than 125 mW.  
 Test Status: Hopping transmitting.

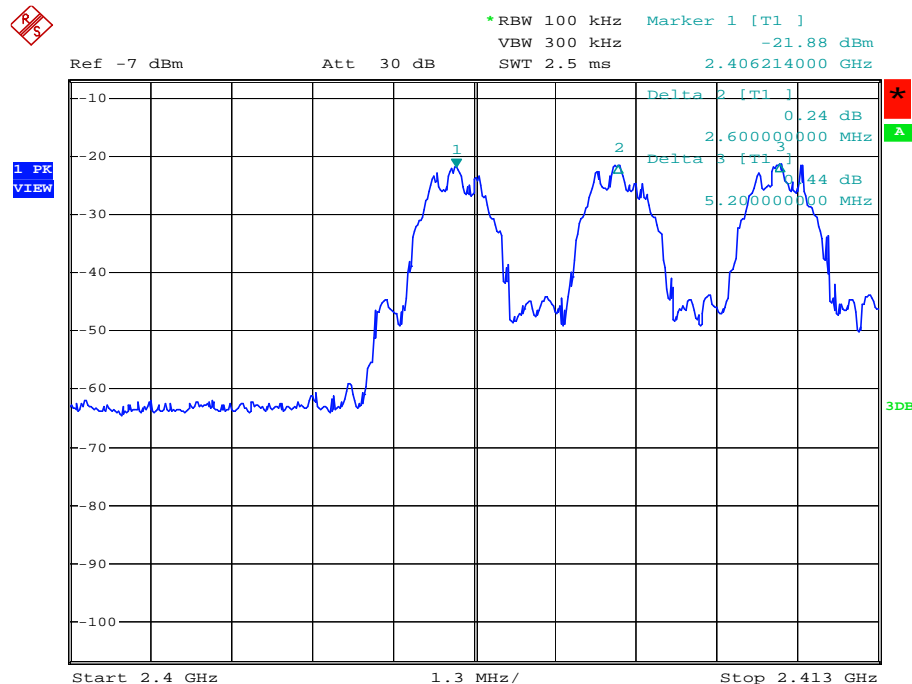
Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW >= 1% of the span (set 100KHz), VBW >= RBW (set 300KHz), Span = 10MHz, Sweep = auto; Detector Function = Peak ,Trace = Max. hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

Test result:

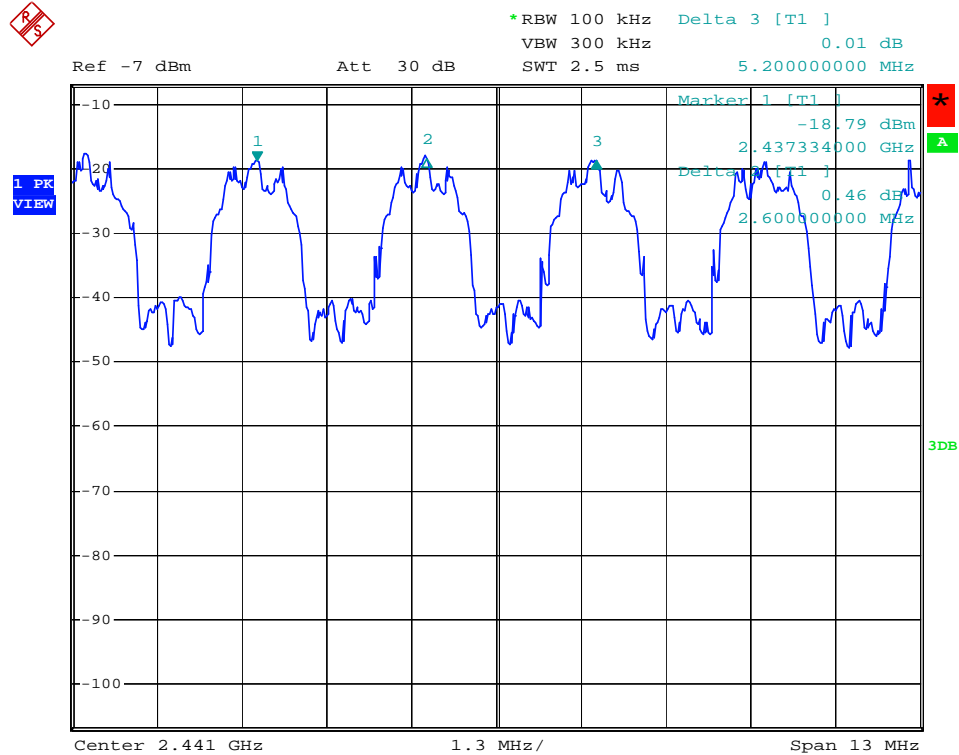
Test Channel	Carrier Frequencies Separated	PASS/FAIL
Lowest Channels (channel 0 and channel 1)	2.6MHz	Pass
Middle Channels (channel 13 and channel 14)	2.6MHz	Pass
Highest Channels (channel 26 and channel 27 )	2.6MHz	Pass

1. Lowest Channels: **Carrier Frequencies Separated**

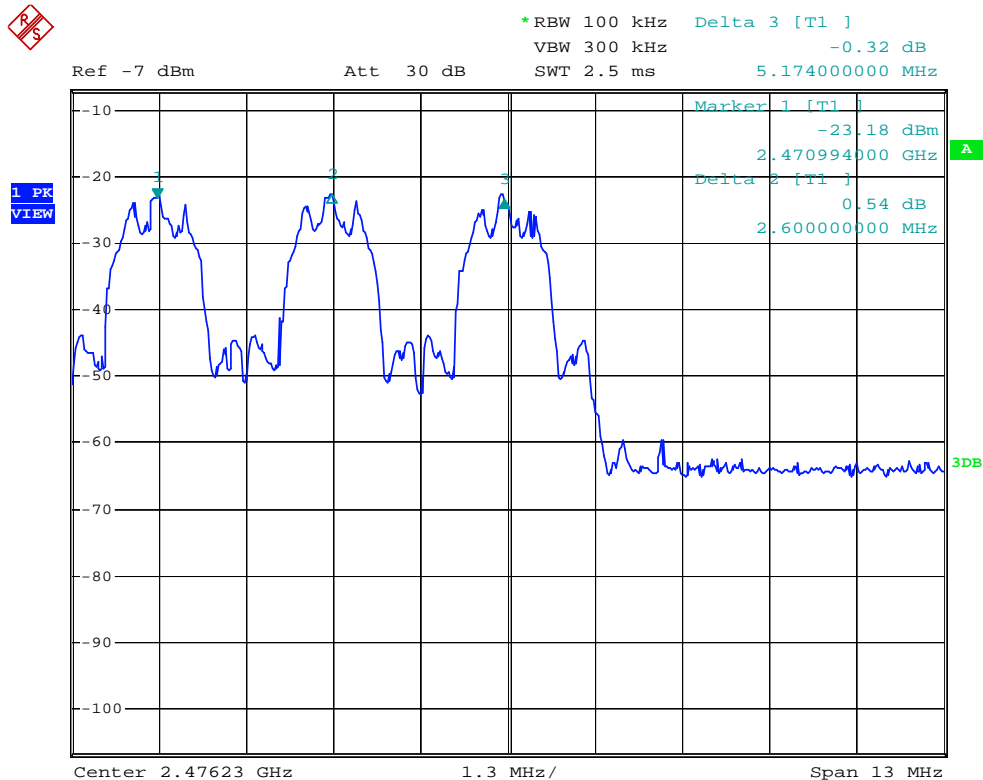




2. Middle Channels: Carrier Frequencies Separated



3. Highest Channels: Carrier Frequencies Separated



TEST RESULTS: The unit does meet the FCC requirements.

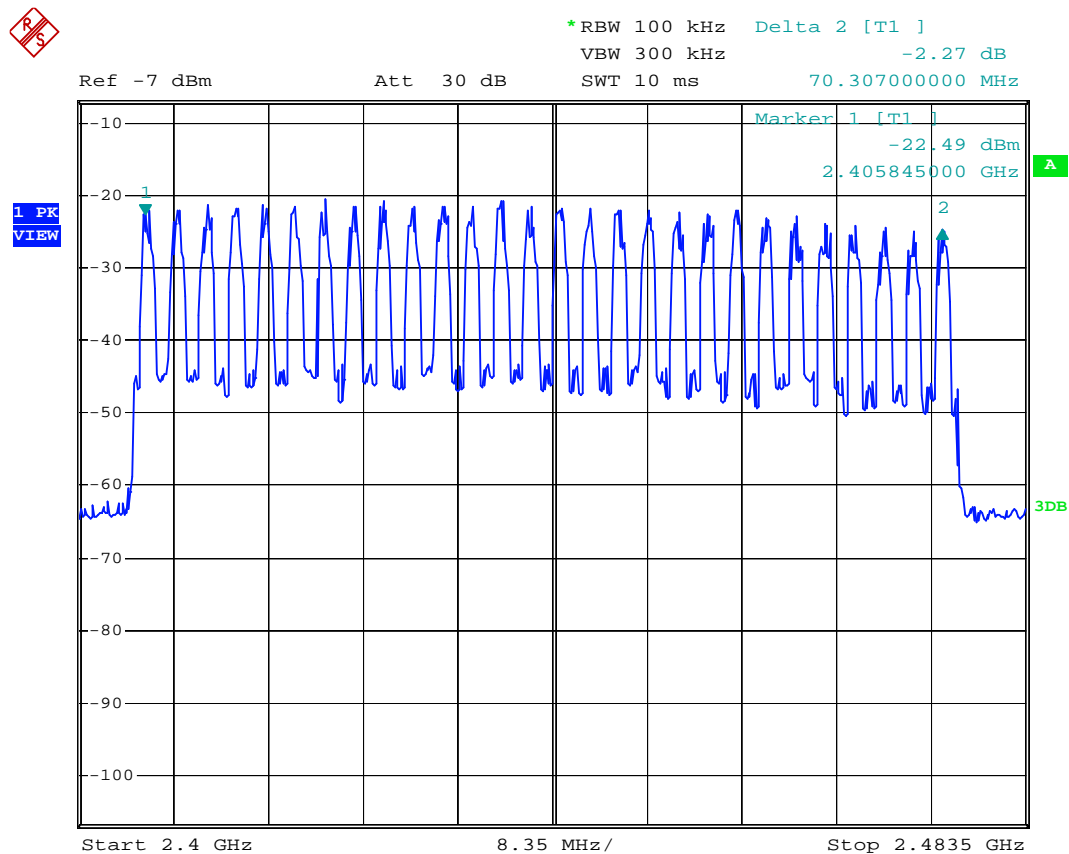
### 6.5 Hopping Channel Number

Test Requirement: FCC Part15 C  
 Test Method: Based on FCC Part15 C Section 15.247  
 Test Date: 27 September 2007  
 Requirements: Regulation 15.247 (a) (1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.  
 Test Status: Hopping transmitting.

Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100 kHz, VBW = 300 kHz, Sweep = auto; Detector Function = Peak, Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: start frequency = 2400MHz, stop frequency = 2483.5MHz. Submit the test result graph.

**Test result:** Total channels are 28 channels, channel 0 to channel 27.



**TEST RESULTS: The unit does meet the FCC requirements.**



## 6.6 Dwell Time

Test Requirement: FCC Part 15 C  
Test Method: Based on FCC Part15 C Section 15.247  
Test Date: 27 September 2007  
Test requirements: Regulation 15.247(a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Status: Hopping transmitting.

### Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set spectrum analyzer span = 0, centered on a hopping channel;
3. Set RBW = 1MHz and VBW = 3MHz, Sweep = as necessary to capture the entire dwell time per hopping channel, Detector Function = Peak, Trace = Max hold;
4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s). An oscilloscope may be used instead of a spectrum analyzer.

### Test Result:

Only one type data rate announced by the applicant and the test result as follows:

The test period:  $T = 0.4 \text{ Second/Channel} \times 28 \text{ Channel} = 11.2 \text{ s}$

1. **Channel 0:** 2.406GHz

RF Burst per channel: 0.62ms

Time between each RF burst on same RF channel: 21ms

Time of occupancy:  $((0.62/21) \times 0.4 \times 28) \text{ s} = 0.331 \text{ s}$

2. **Channel 13:** 2.440GHz

RF Burst per channel: 0.62ms

Time between each RF burst on same RF channel: 21ms

Time of occupancy:  $((0.62/21) \times 0.4 \times 28) \text{ s} = 0.331 \text{ s}$

3. **Channel 27:** 2.476GHz

RF Burst per channel: 0.62ms

Time between each RF burst on same RF channel: 21ms

Time of occupancy:  $((0.62/21) \times 0.4 \times 28) \text{ s} = 0.331 \text{ s}$

The results are not greater than 0.4 seconds.

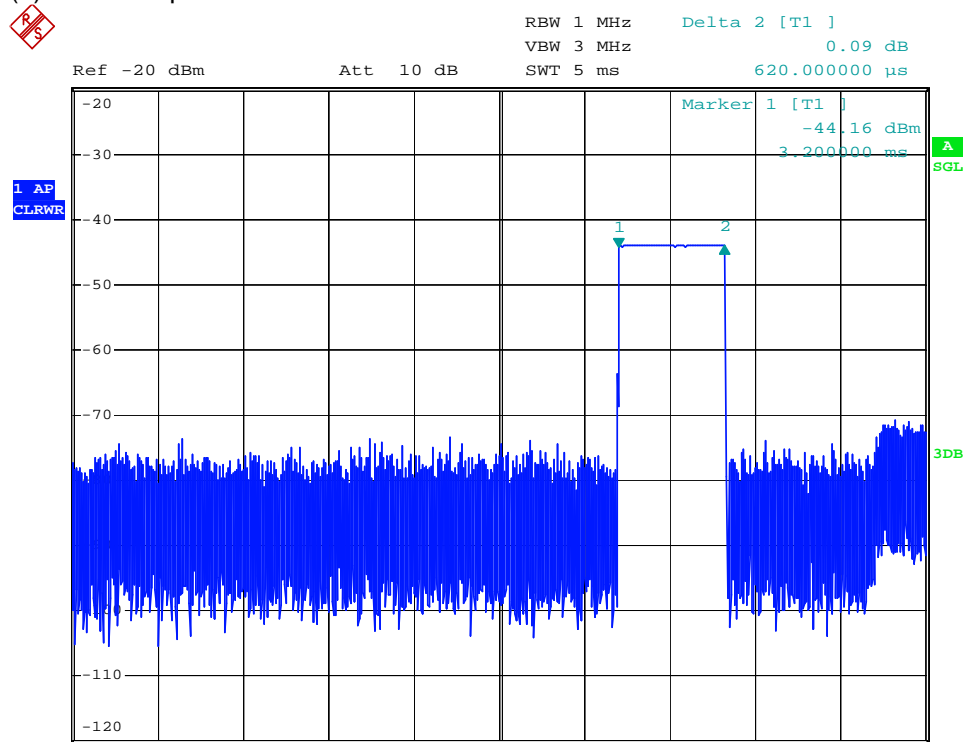
**TEST RESULTS: The unit does meet the FCC requirements.**



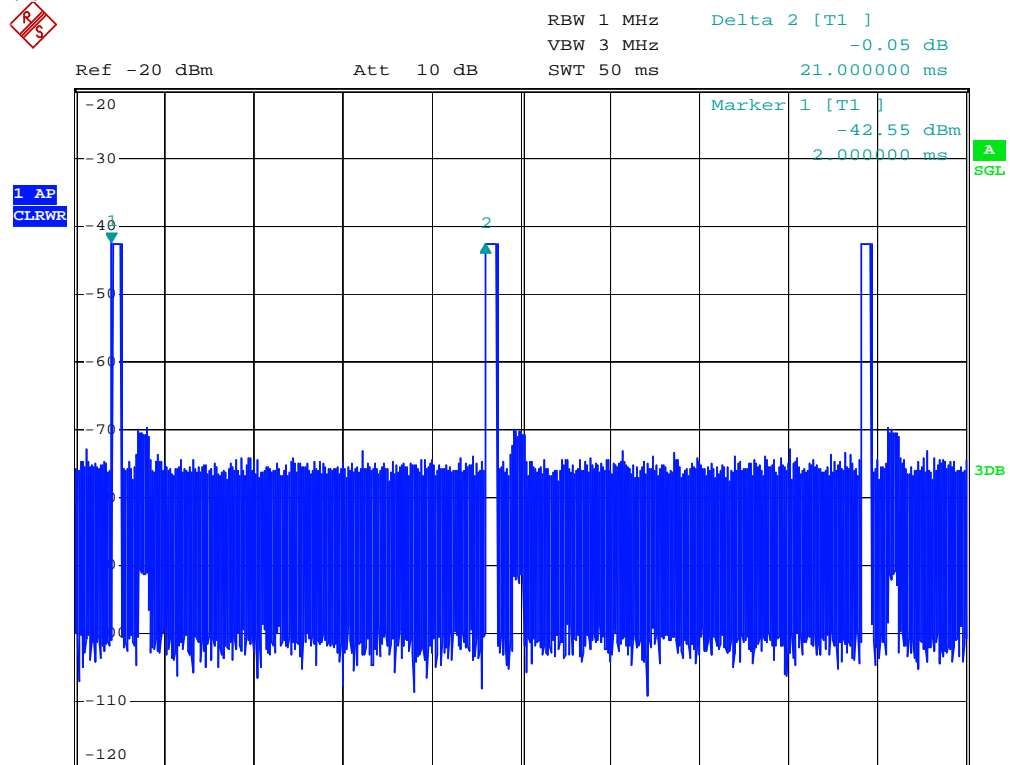
Please refer the graph as below:

1. Lowest channel (2.406 GHz):

(1). RF Burst per channel



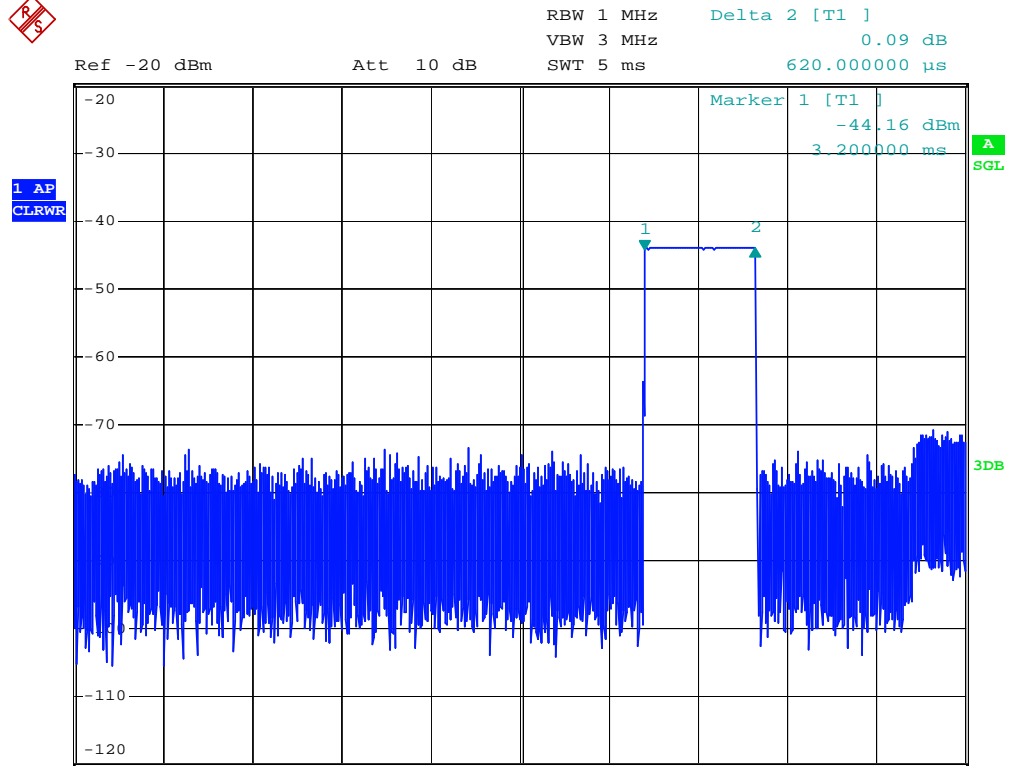
(2) Time between each RF burst on same RF channel



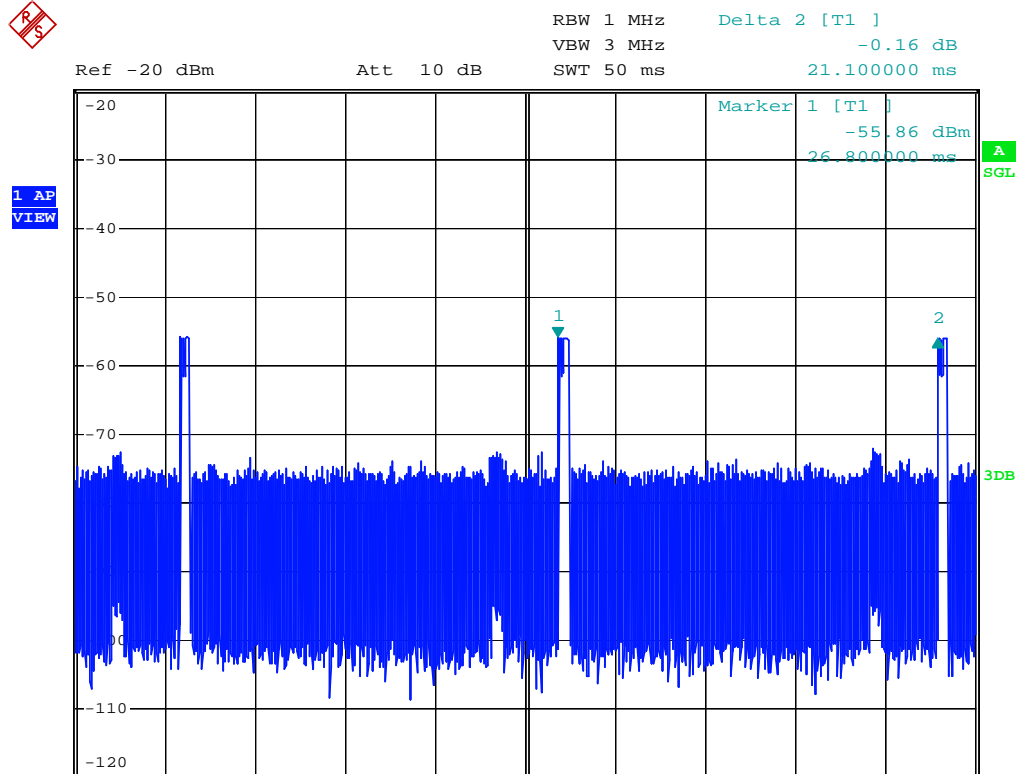


2. Middle channel (2.440 GHz):

(1). RF Burst per channel



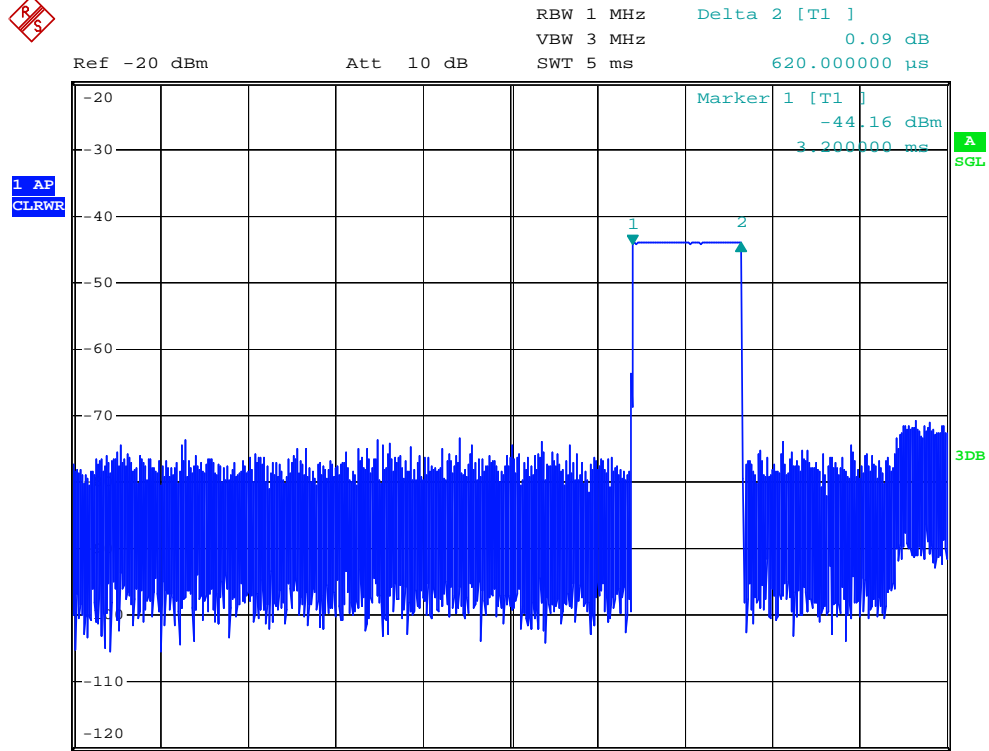
(2) Time between each RF burst on same RF channel



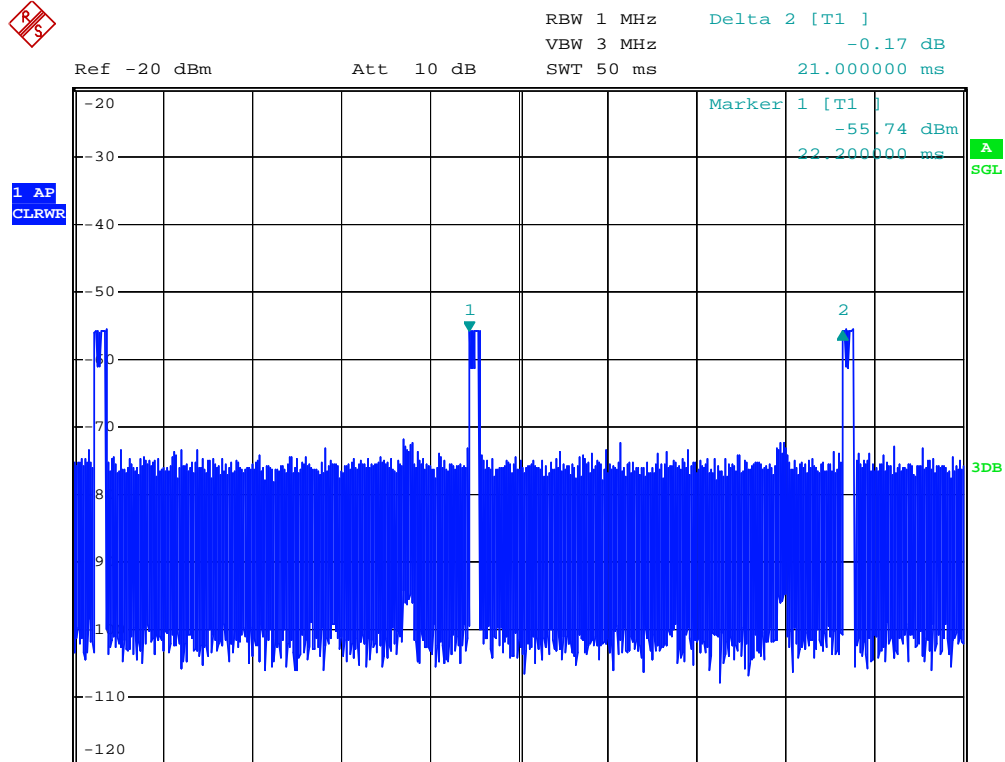


3. Highest channel (2.476GHz):

(1). RF Burst per channel



(2) Time between each RF burst on same RF channel





## 6.7 Pseudorandom Frequency Hopping Sequence

### 6.7.1 Standard requirement

15.247(a)(1) requirement:

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, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

### 6.7.2 EUT Pseudorandom Frequency Hopping Sequence

CH No.	Frequency (MHz)	Frequency Location	CH No.	Frequency (MHz)	Frequency Location
0	2406	1	14	2442.4	19
1	2408.6	3	15	2445	9
2	2411.2	11	16	2447.6	5
3	2413.8	26	17	2450.2	20
4	2416.4	27	18	2452.8	8
5	2419	12	19	2455.4	21
6	2421.6	28	20	2458	15
7	2424.2	10	21	2460.6	24
8	2426.8	6	22	2463.2	17
9	2429.4	2	23	2465.8	16
10	2432	25	24	2468.4	14
11	2434.6	4	25	2471	22
12	2437.2	7	26	2473.6	18
13	2439.8	13	27	2476.2	23

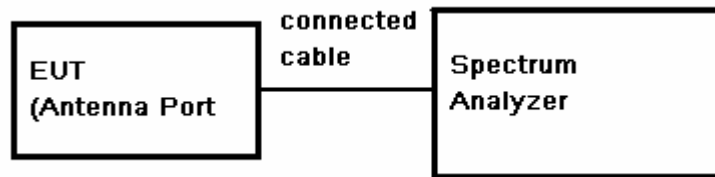
Each frequency used equally on the average by each transmitter.

The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

**6.8 Maximum Peak Output Power**

Test Requirement: FCC Part15 C  
 Test Method: Base on ANSI 63.4.  
 Test Date: 27 September 2007  
 Test Limit: Regulation 15.247 (b)(1)For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.  
 Refer to the result “Hopping channel number” of this document. The 0.125 watt limit applies.

Test mode: Test in transmitting mode.  
 Test Configuration:



- Test Procedure:
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
  2. Set the spectrum analyzer: RBW = 1 MHz, VBW = 3 MHz, Sweep = auto; Detector Function = Peak.
  3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

**Test Result:**

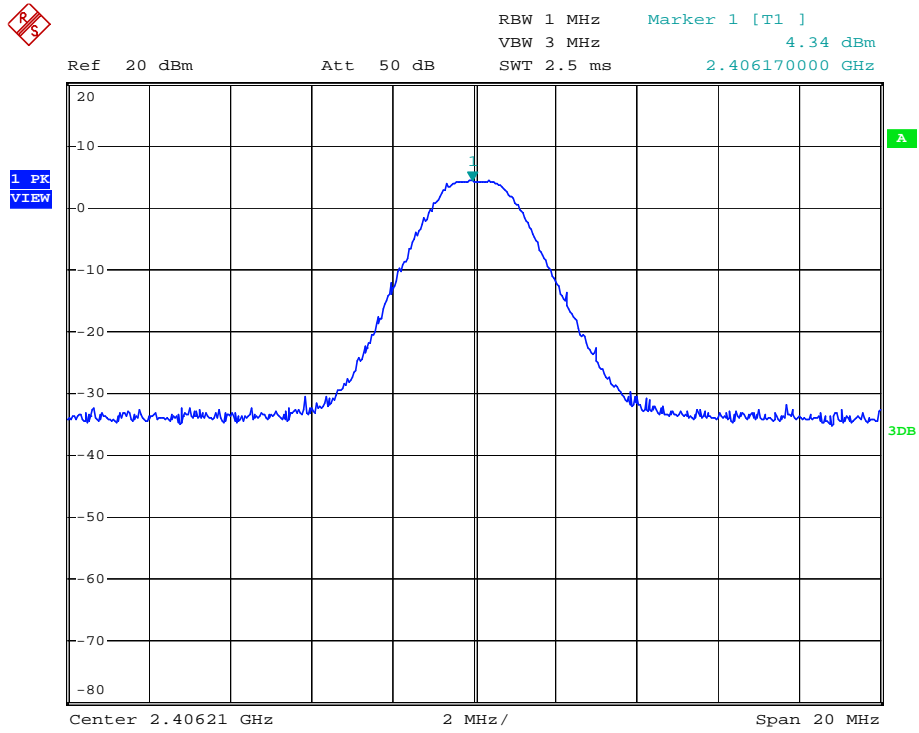
Test Channel	Fundamental Frequency (MHz)	Reading Power (dBm)	Cable Loss (dB)	Output Power (dBm)	Output Power (W)	Limit (W)	Margin (W)
Lowest	2.4060	4.2	0.2	4.4	0.003	0.125	0.122
Middle	2.4398	2.3	0.2	2.5	0.002	0.125	0.123
Highest	2.4762	0.7	0.2	0.9	0.001	0.125	0.124

**TEST RESULTS: The unit does meet the FCC requirements.**

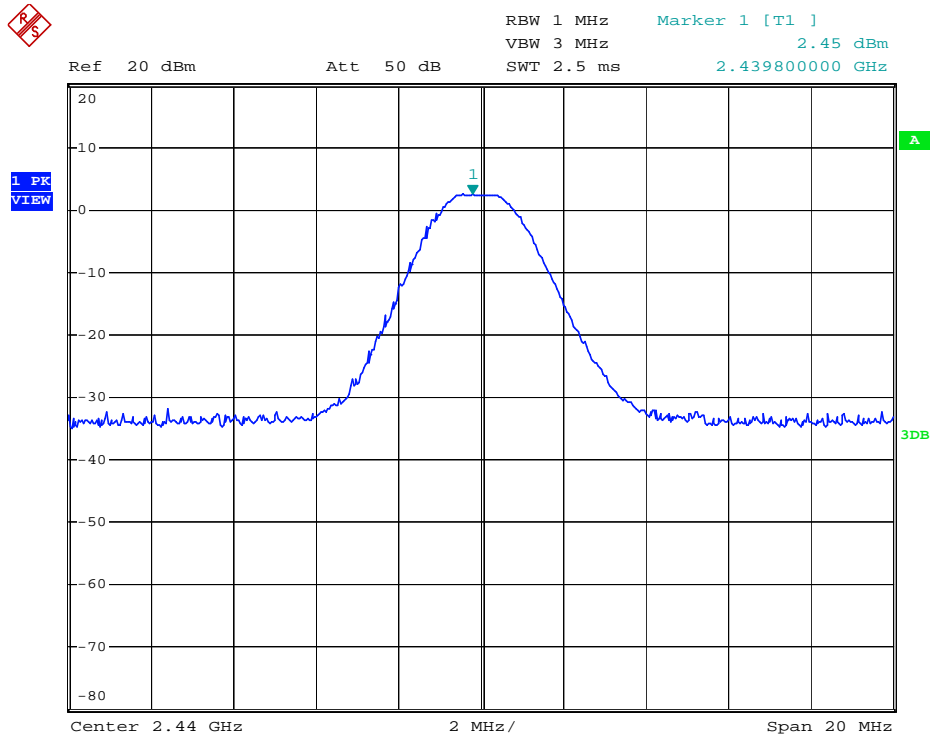
Test result plot as follows:



Lowest Channel :



Middle Channel :

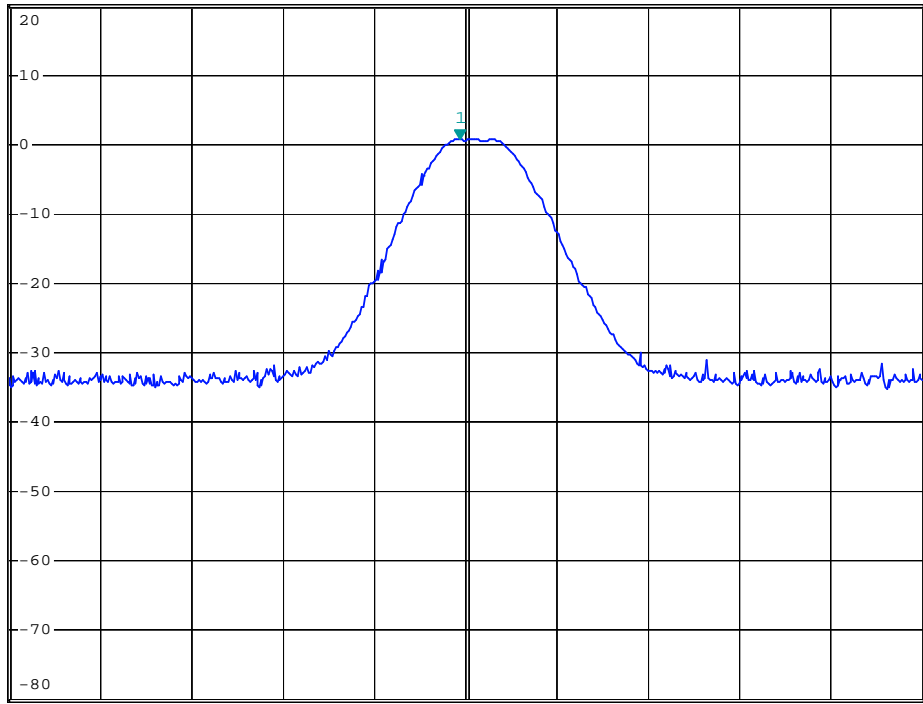


Highest Channel :



Ref 20 dBm      Att 50 dB      RBW 1 MHz      Marker 1 [T1 ]  
VBW 3 MHz      0.70 dBm  
SWT 2.5 ms      2.475880000 GHz

1 PK  
VIEW





### 6.9 RF Exposure Compliance Requirement

#### 6.9.1 Standard requirement

15.247(b)(4) requirement:

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TCB Exclusion List (7 July 2002)

Exposure category	low threshold	high threshold
general population	(60/fGHz) mW, $d < 2.5$ cm (120/fGHz) mW, $d \geq 2.5$ cm	(900/fGHz) mW, $d < 20$ cm
occupational	(375/fGHz) mW, $d < 2.5$ cm (900/fGHz) mW, $d \geq 2.5$ cm	(2250/fGHz) mW, $d < 20$ cm

#### 6.9.2 EUT RF Exposure

The Max Conducted Peak Output Power is **4.4dBm(2.8mW)** in channel 0;

The antenna is generally less than **3dBi** PCB integrated in the actual use. 3dB logarithmic terms convert to numeric result is nearly 2;

According to the formula, calculate the EIRP test result:

$$\text{EIRP} = P \times G = 1.4\text{mW} \times 2 = 2.8 \text{ mW} \text{ ①}$$

SAR requirement:

$$S = 120 / f(\text{GHz}) = 60 / 2.4 = 25\text{mW} \text{ ②} ;$$

$$\text{①} < \text{②},$$

So the SAR report is not required.

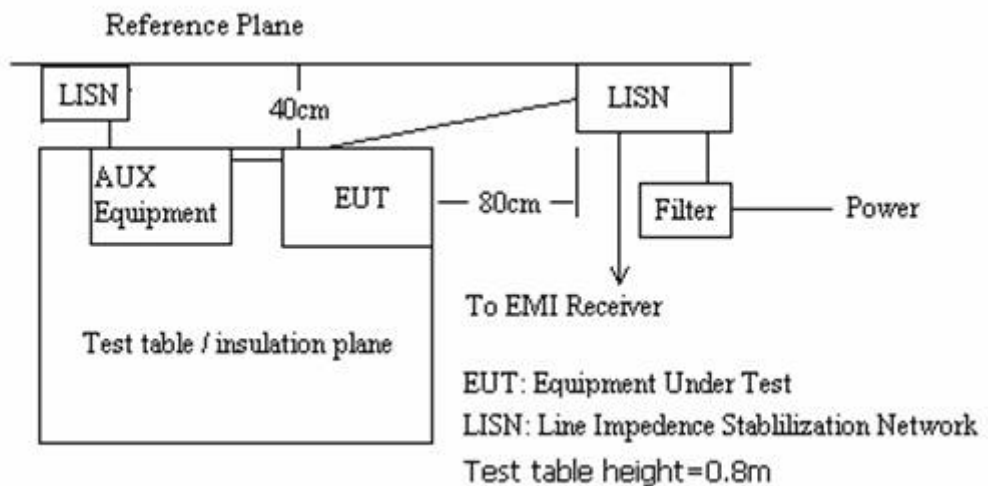
**6.10 Conducted Emissions Mains Terminals, 150 kHz to 30MHz**

Test Requirement: FCC Part15 C  
 Test Method: ANSI C63.4  
 Test Date: 27 September 2007  
 Frequency Range: 150KHz to 30MHz  
 Detector: Peak for pre-scan (9kHz Resolution Bandwidth)  
 Quasi-Peak if maximised peak within 6dB of Quasi-Peak limit  
 EUT Operation: Test the camera in transmitting mode.

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Plan View of Test Setup

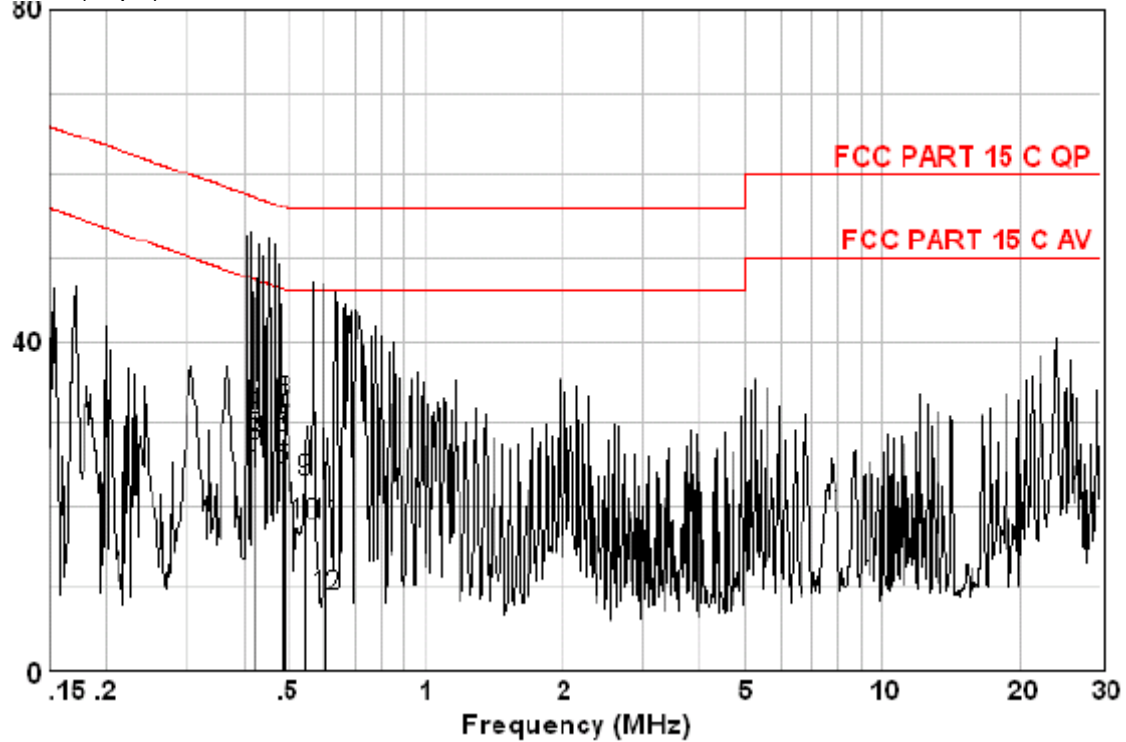




Live Line:

Peak Scan:

Level (dBµV)



Quasi-peak and Average measurement:

Freq	Read Level	Cable Loss	LISN Factor	Level	Limit Line	Over Limit	Remark
MHz	dBµV	dB	dB	dBµV	dBµV	dB	
0.425	23.69	0.00	0.10	23.79	47.35	-23.56	AVERAGE
0.425	28.21	0.00	0.10	28.31	57.35	-29.04	QP
0.426	27.13	0.00	0.10	27.23	47.33	-20.10	AVERAGE
0.426	30.80	0.00	0.10	30.90	57.33	-26.43	QP
0.486	24.24	0.00	0.10	24.34	46.23	-21.89	AVERAGE
0.486	28.11	0.00	0.10	28.21	56.23	-28.02	QP
0.489	29.02	0.00	0.10	29.12	46.19	-17.07	AVERAGE
0.489	32.47	0.00	0.10	32.57	56.19	-23.62	QP
0.547	22.79	0.00	0.07	22.86	56.00	-33.14	QP
0.547	17.57	0.00	0.07	17.64	46.00	-28.36	AVERAGE
0.608	17.53	0.00	0.04	17.57	56.00	-38.43	QP
0.608	8.90	0.00	0.04	8.94	46.00	-37.06	AVERAGE

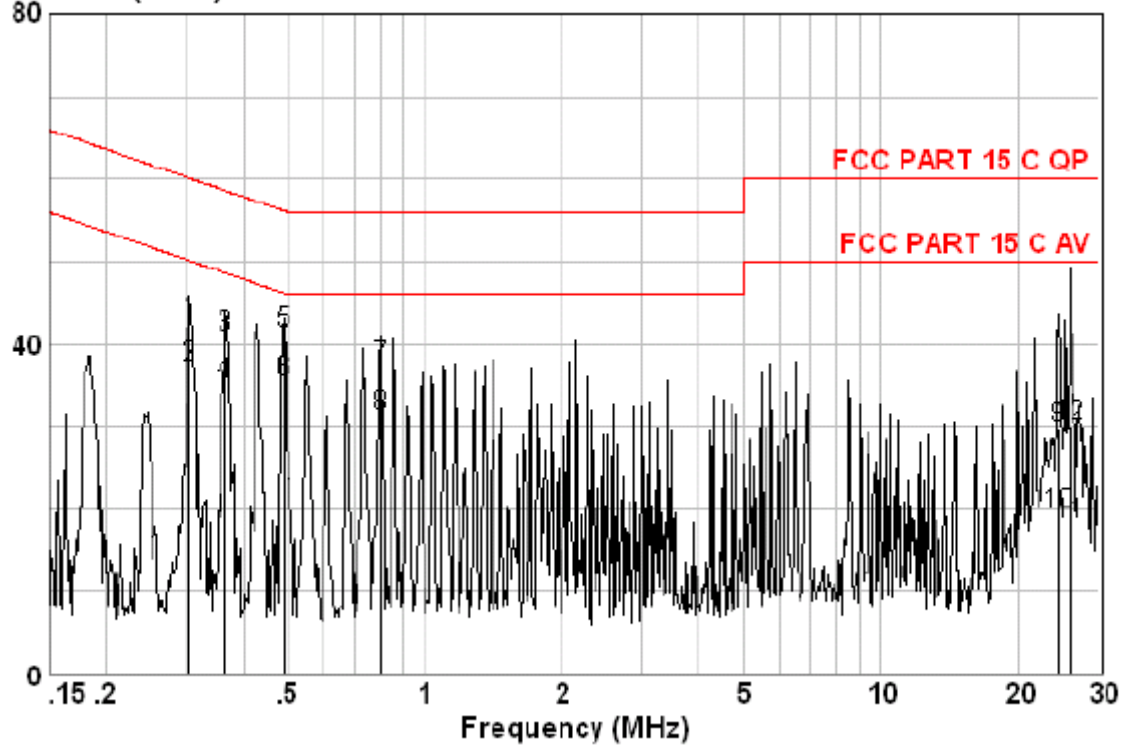




Neutral Line

Peak Scan:

Level (dB $\mu$ V)



Quasi-peak and Average measurement:

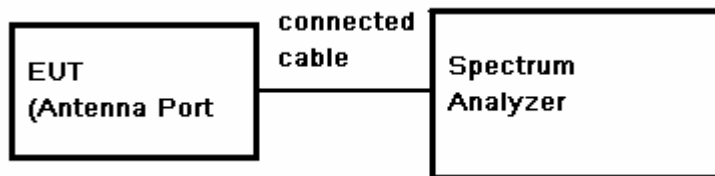
Freq MHz	Read Level dB $\mu$ V	Cable Loss dB	LISN Factor dB	Level dB $\mu$ V	Limit Line dB $\mu$ V	Over Limit dB	Remark
0.305	42.50	0.00	0.10	42.60	60.10	-17.50	QP
0.305	36.99	0.00	0.10	37.09	50.10	-13.01	AVERAGE
0.365	40.67	0.00	0.10	40.77	58.61	-17.84	QP
0.365	34.94	0.00	0.10	35.04	48.61	-13.57	AVERAGE
0.489	41.21	0.00	0.10	41.31	56.19	-14.88	QP
0.489	35.19	0.00	0.10	35.29	46.19	-10.90	AVERAGE
0.800	37.14	0.00	0.04	37.18	56.00	-18.82	QP
0.800	31.19	0.00	0.04	31.23	46.00	-14.77	AVERAGE
24.529	29.10	0.20	0.41	29.71	60.00	-30.29	QP
24.529	18.61	0.20	0.41	19.22	50.00	-30.78	AVERAGE
26.001	17.52	0.20	0.44	18.16	50.00	-31.84	AVERAGE
26.001	29.33	0.20	0.44	29.97	60.00	-30.03	QP

**TEST RESULTS: The unit does meet the FCC requirements.**

### 6.11 Conducted Spurious Emissions

Test Requirement: FCC Part 15 C  
 Test Method: Based on FCC Part15 C Section 15.247  
 Test Date: 27 September 2007.  
 Test requirements: (d) 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.  
 Test Status: Test the lowest, middle, highest channel.

Test Configuration:

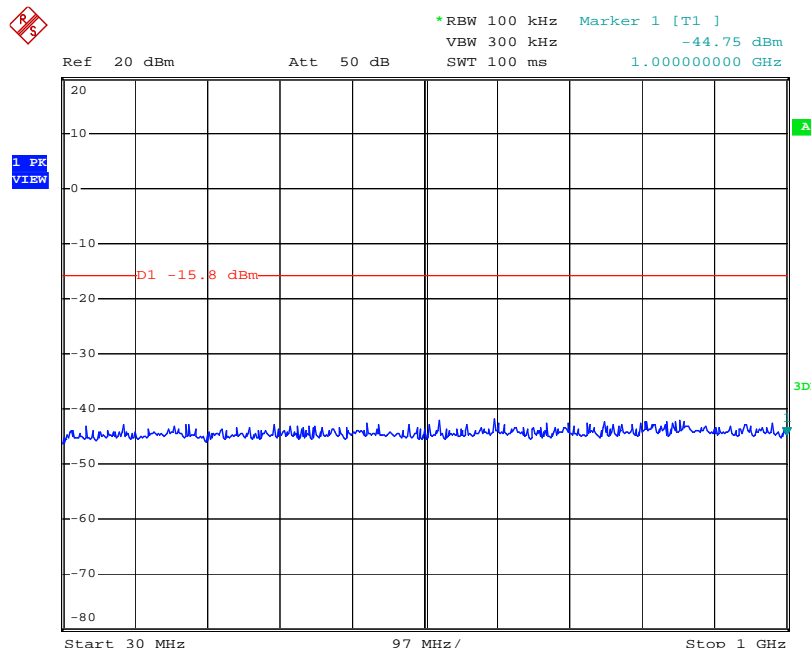


Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100KHz, VBW >= RBW (300KHz) , Sweep = auto; Detector Function = Peak (Max. hold).

Test result plot as follows:

Lowest Channel  
30M to 1GHz

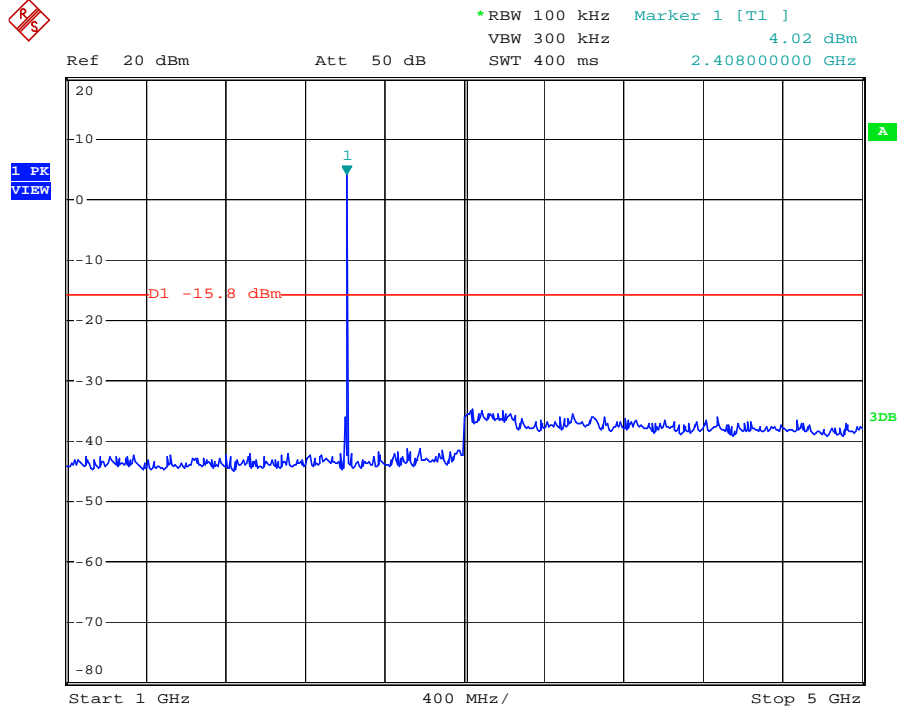




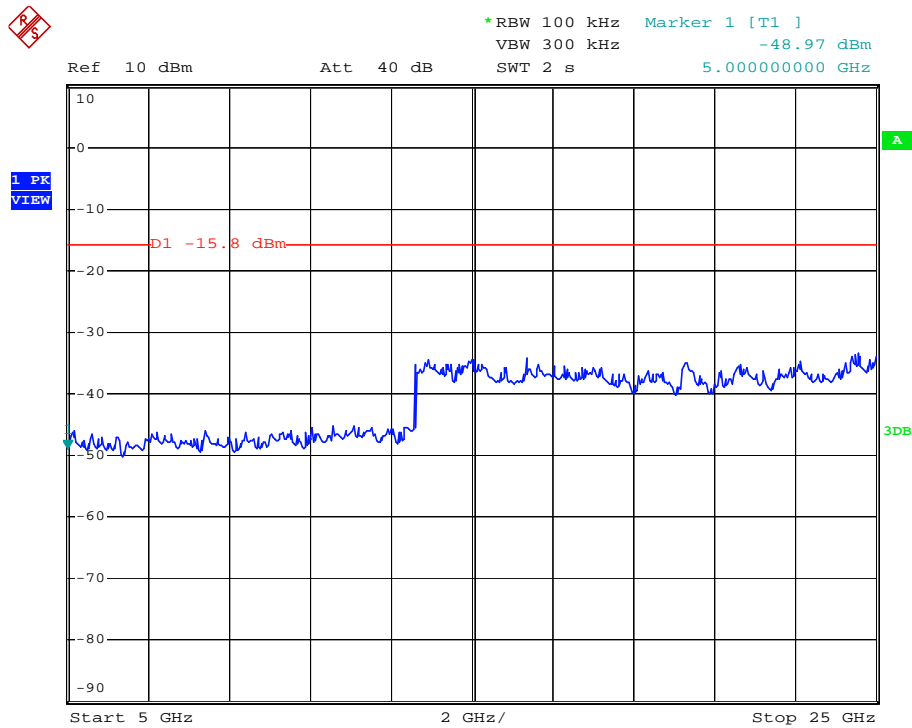
# SGS-CSTC Standards Technical Services Ltd.

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## 1G to 5GHz



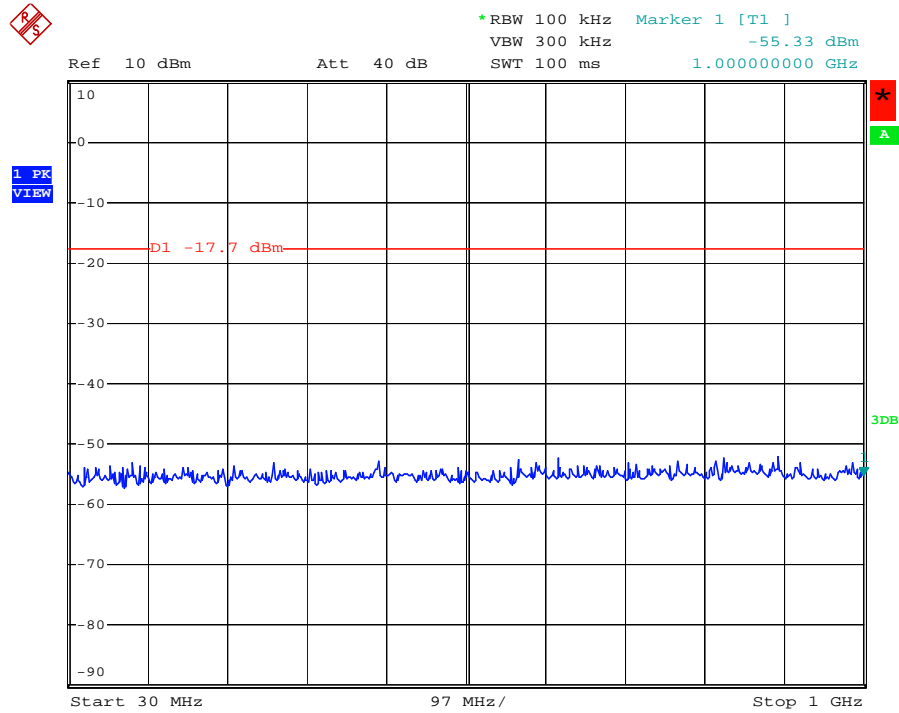
## 5G to 25GHz



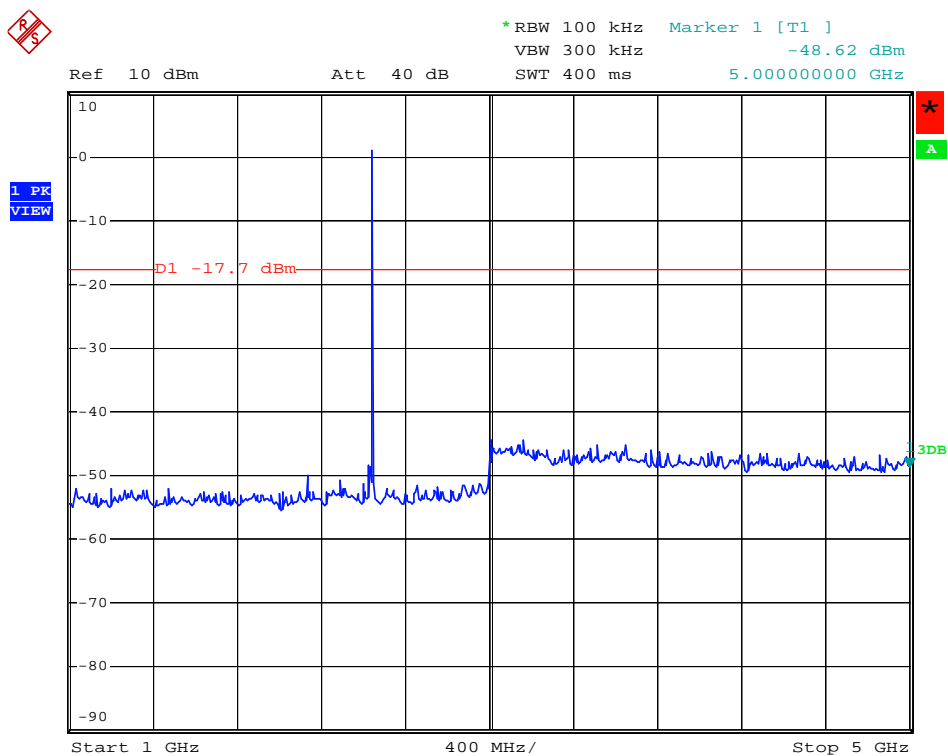


Middle Channel

30M to 1GHz



1G to 5GHz



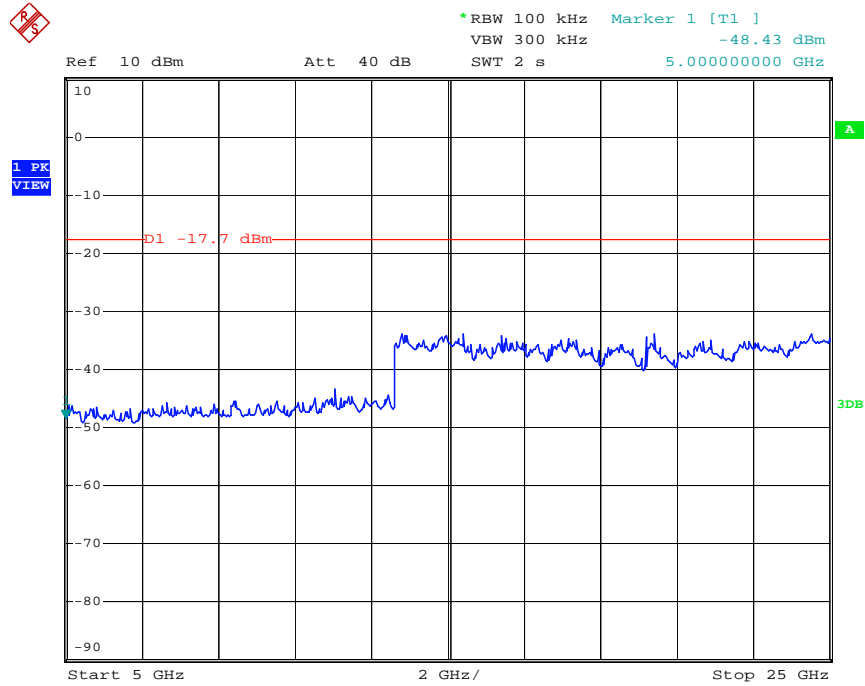


# SGS-CSTC Standards Technical Services Ltd.

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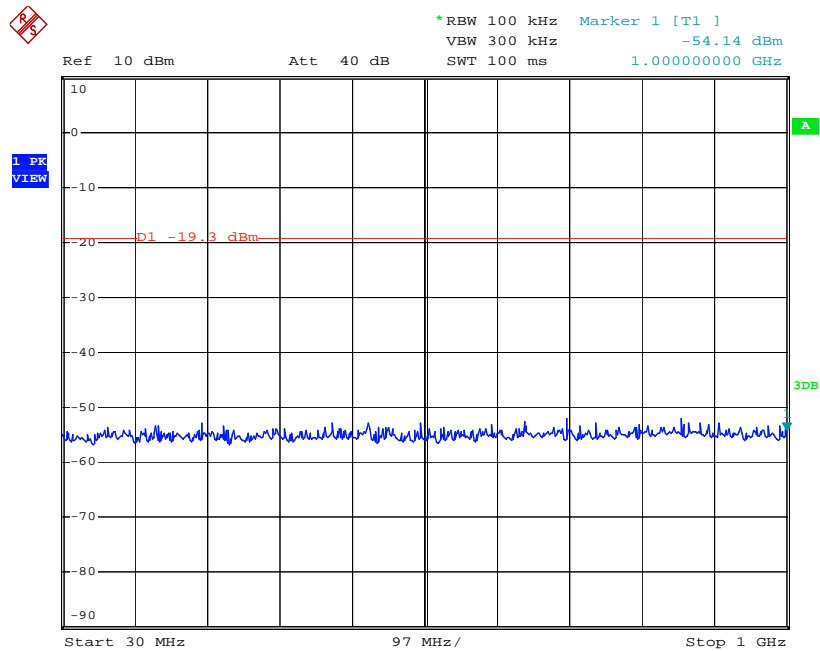
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## 5G to 25GHz



## Highest Channel

### 30M to 1GHz



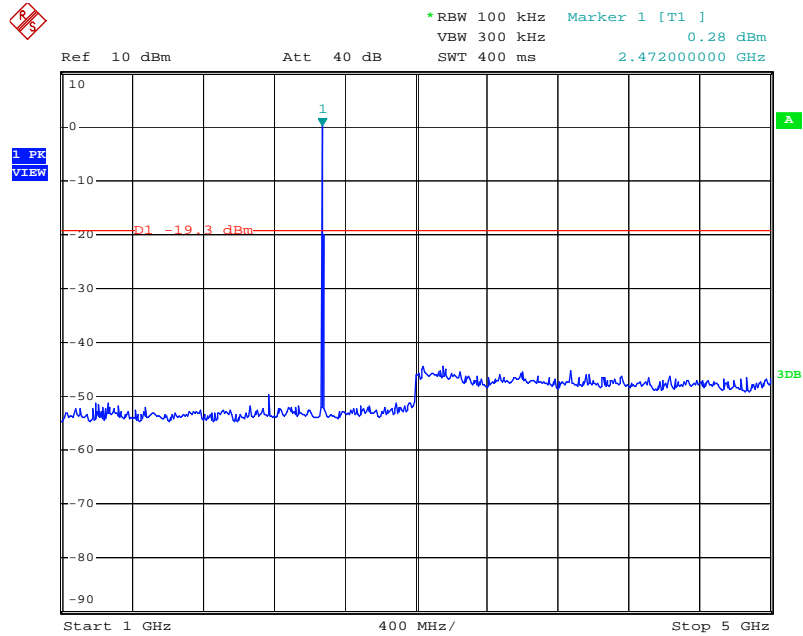
Date: 27.SEP.2007 16:32:07



# SGS-CSTC Standards Technical Services Ltd.

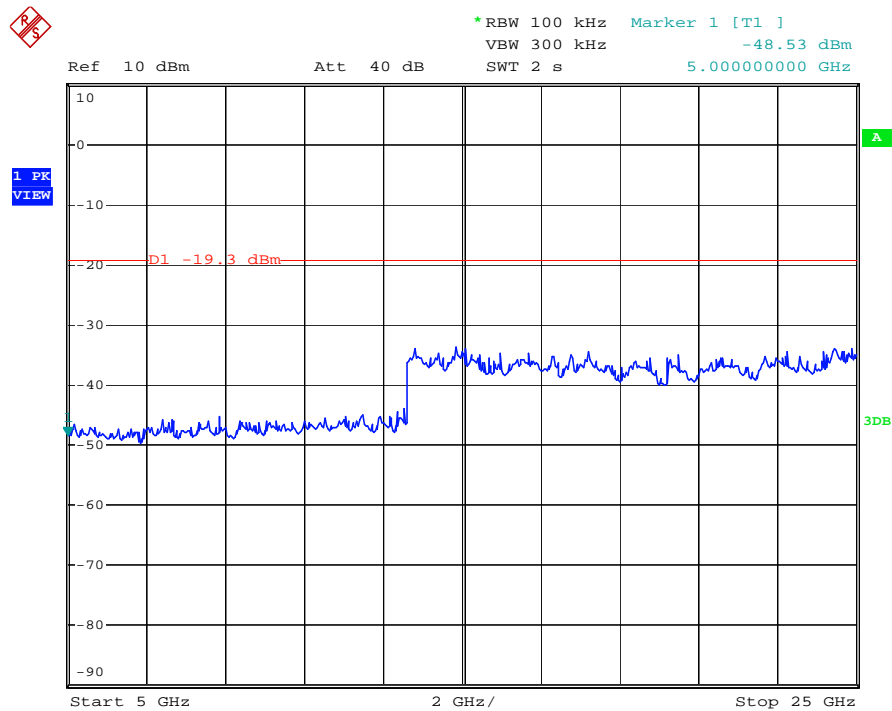
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## 1G to 5GHz



Date: 27.SEP.2007 16:30:46

## 5G to 25GHz



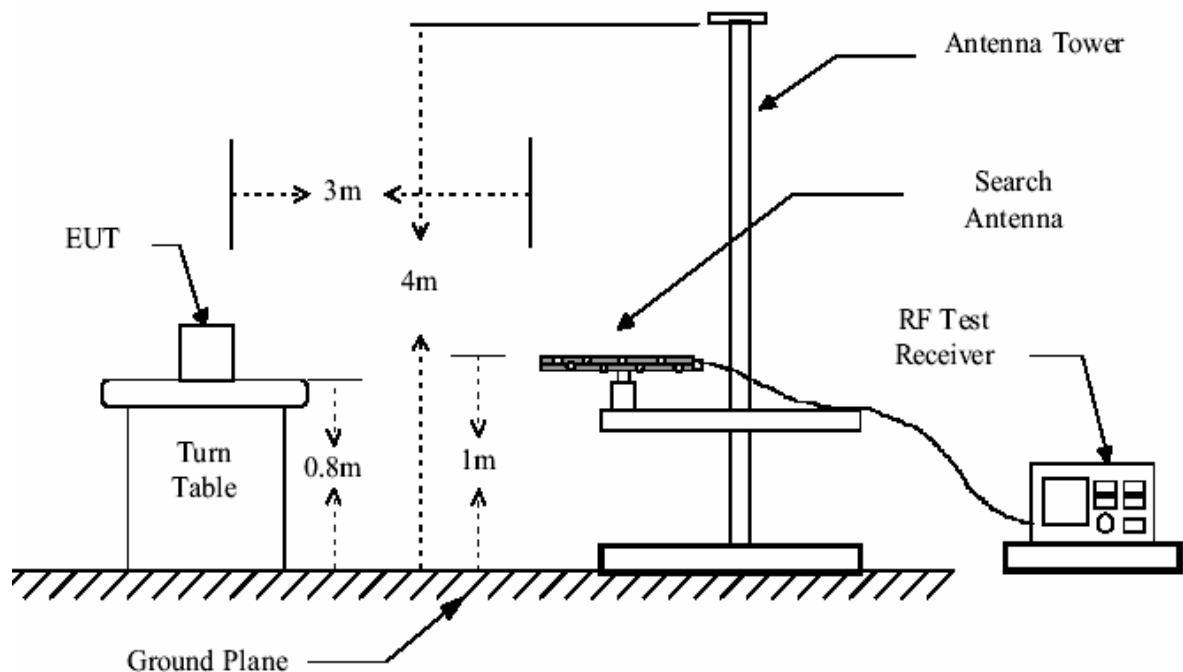
**6.12 Radiated Spurious Emissions**

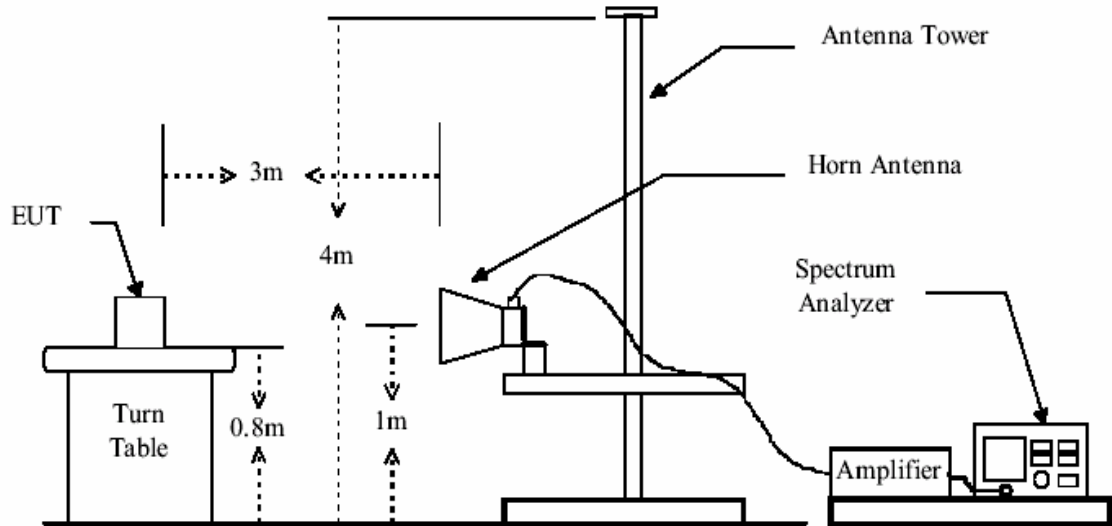
Test Requirement: FCC 15.247(d) & 15.209  
 Test Method: ANSI C63.4 section 8 & 13  
 Test Date: 27 September 2007  
 Test Status: Test lowest channel, middle, highest channel.  
 Test site: Measurement Distance: 3m (Semi-Anechoic Chamber)  
 Test instrumentation resolution bandwidth 120 kHz and Quasi-Peak detector applies (30 MHz - 1000 MHz), 1MHz resolution bandwidth and Peak and Average-Peak detector apply (1000 MHz – 25GHz).  
 Receive antenna scan height 1 m - 4 m, polarization Vertical / Horizontal

15.209 Limit:  
 40.0 dB $\mu$ V/m between 30MHz & 88MHz  
 43.5 dB $\mu$ V/m between 88MHz & 216MHz  
 46.0 dB $\mu$ V/m between 216MHz & 960MHz  
 54.0 dB $\mu$ V/m above 960MHz

15.247(d) limit: (d) 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

**Test Configuration:**





**Test Procedure:** The procedure used was ANSI Standard C63.4-2001. The receiver was scanned from 30MHz to 25GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Peramplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Peramplifier Factor}.$$

The following test results were performed on the EUT.





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**Transmitter:**

**Test in Channel 0 in transmitting status- Vertical polarization**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
30.000	32.1	24.4	0.6	25.5	31.6	40.0	-8.4	QP
58.590	48.8	12.0	0.9	25.1	36.5	40.0	-3.5	QP
371.440	24.1	16.3	2.4	24.9	17.9	46.0	-28.1	QP
4812.000	48.5	33.2	6.9	33.0	55.6	74.0	-18.4	PEAK
4812.000	38.8	33.2	6.9	33.0	45.8	54.0	-8.2	AVERAGE

**Test in Channel 0 in transmitting status- Horizontal polarization**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4812.000	51.9	33.2	6.9	33.0	59.0	74	-15.0	PEAK
4812.000	41.7	33.2	6.9	33	48.8	54	-5.2	AVERAGE



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### Test in Channel 13 in transmitting status- Vertical polarization

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4880	47.1	33.3	7.2	33.0	54.6	74	-19.4	PEAK
4880	34.2	33.3	7.2	33	41.7	54	-12.3	AVERAGE

### Test in Channel 13 in transmitting status- Horizontal polarization

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4880	50.8	33.3	7.2	33.0	58.3	74	-15.7	PEAK
4880	40.4	33.3	7.2	33	47.9	54	-6.1	AVERAGE

### Test in Channel 27 in transmitting status- Vertical polarization

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4952	47.9	33.3	7.5	32.9	55.8	74	-18.2	PEAK
4952	35.7	33.3	7.5	32.9	43.6	54	-10.4	AVERAGE

### Test in Channel 27 in transmitting status- Horizontal polarization

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4952	50.7	33.3	7.5	32.9	58.6	74	-15.4	PEAK
4952	37.1	33.3	7.5	32.9	45.0	54	-9.0	AVERAGE

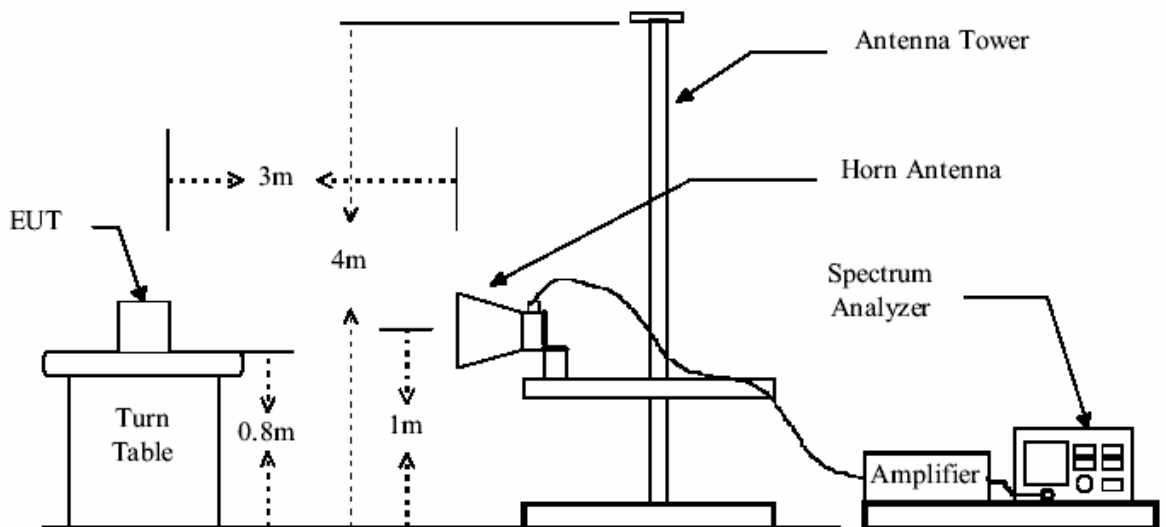
Remark: No other radiation has been found.

**TEST RESULTS: The unit does meet the FCC requirements.**

**6.12.1 Radiated Emissions which fall in the restricted bands**

Test Requirement:	Section 15.247 (d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method:	Base on ANSI 63.4.
Test Date:	27 September 2007
Measurement Distance:	3m (Semi-Anechoic Chamber)
Limit:	40.0 dB $\mu$ V/m between 30MHz & 88MHz 43.5 dB $\mu$ V/m between 88MHz & 216MHz 46.0 dB $\mu$ V/m between 216MHz & 960MHz 54.0 dB $\mu$ V/m above 960MHz
Detector:	Peak for pre-scan: 100kHz resolution bandwidth and 100kHz video bandwidth within 1GHz, 1MHz resolution bandwidth and 1MHz video bandwidth above 1GHz

**Test Configuration:**





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**Test Procedure:** The procedure used was ANSI Standard C63.4-2003. The receiver was scanned from 30MHz to 25GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

## Test Result:

### 1. Channel 0 ( 2.406GHz)

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
2390	46.9	28.6	4.6	34.8	45.3	74	-28.7	Peak
2390	33.3	28.6	4.6	34.8	31.7	54	-22.3	Average
2483.5	46	28.8	4.7	34.7	44.8	74	-29.2	Peak
2483.5	33.3	28.8	4.7	34.7	32.1	54	-21.9	Average

### 1. Channel 27 ( 2.476GHz)

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
2390	45.6	28.6	4.6	34.8	44.0	74	-30.0	Peak
2390	33.3	28.6	4.6	34.8	31.7	54	-22.3	Average
2483.5	45.6	28.8	4.7	34.7	44.4	74	-29.6	Peak
2483.5	33.4	28.8	4.7	34.7	32.2	54	-21.8	Average

Remark: No other radiation has been found.

**TEST RESULTS: The unit does meet the FCC requirements.**



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Section 15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section, 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
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	2655 - 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			



### **6.13 Band Edges Requirement**

Test Requirement: FCC Part 15 C  
Test Method: Based on ANSI 63.4  
Operation within the band 2400 – 2483.5 MHz  
Test Date: 27 September 2007  
Requirements: Section 15.247 (d) 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

#### **6.13.1 100 kHz Bandwidth Outside the Frequency Band**

Method of Measurement: Set RBW of spectrum analyzer to 100 kHz and VBW of spectrum analyzer to 300 kHz with suitable frequency span including 100 kHz bandwidth from band edge.  
The band edges was measured and recorded.

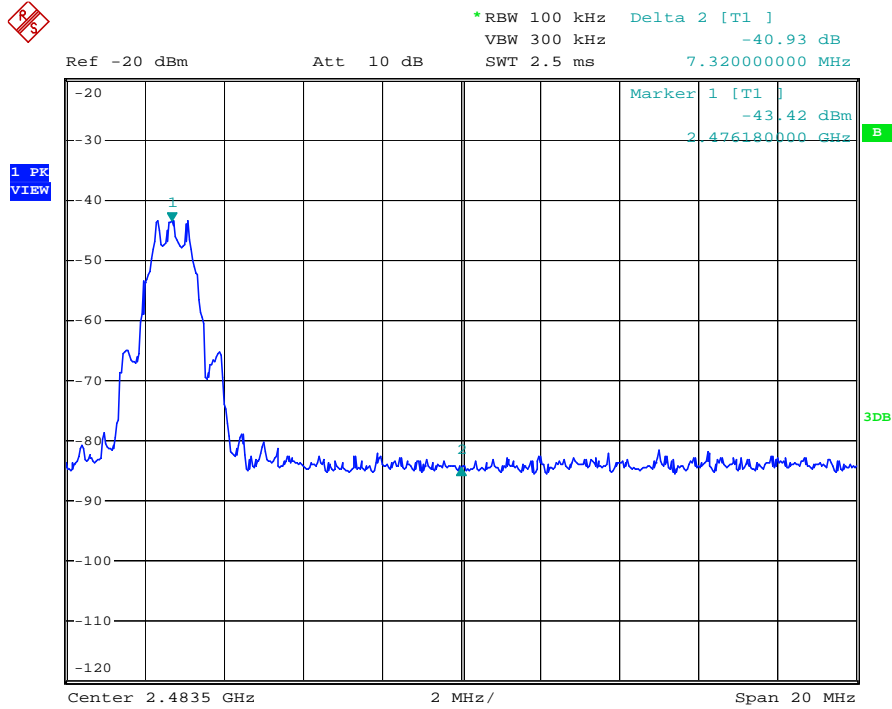
Test Result:

The Lower Edge 2.4000GHz: the value is -40.93dB that is attenuated more than 20dB.

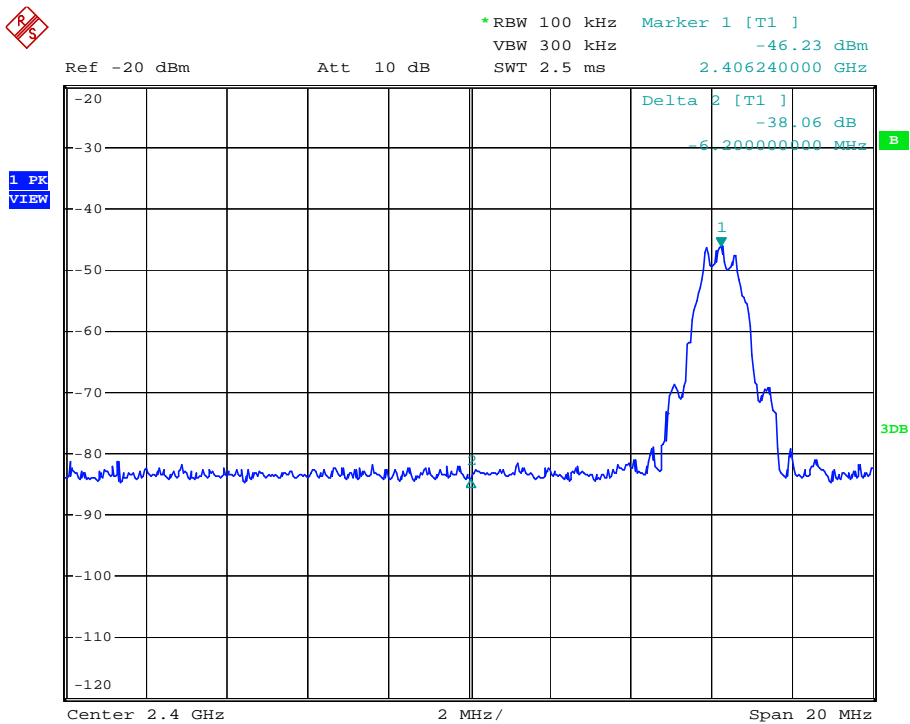
The Upper Edge 2.4835GHz: the value is -38.6dB that is attenuated more than 20dB.



Lowest Channel:



Highest Channel:



The unit does meet the FCC requirements.