



FCC PART 15.247  
TEST REPORT

For

**Baby's Journey, Inc.**

999 Main Street, Unit 703, Pawtucket, Rhode Island, United States

**FCC ID: PJF-5F62146TX**

<b>Report Type:</b> Original Report	<b>Product Type:</b> 2.4" Color Video Monitor(Baby Unit)
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<b>Report Number:</b> R2DG140122001-00A	
<b>Report Date:</b> 2014-03-07	
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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *Baby's Journey, Inc.*'s product, model number: 5F62146TX (FCC ID: PJF-5F62146TX) (the "EUT") in this report was a 2.4" Color Video Monitor (Baby Unit), which was measured approximately: 7.5 cm (L) x 7.5cm (W) x 15 cm (H), rated input voltage: DC5V from adapter.

Adapter information:

Model: 3H-5V1A-R1

Input: 100-240V AC, 50/60Hz, 0.2A

Output: DC 5V, 1.0A

Manufacturer: Footsteps Technology Limited

*All measurement and test data in this report was gathered from production sample serial number: 140122001 (Assigned by BACL, Dongguan). The EUT was received on 2014-01-22.*

### Objective

This report is prepared on behalf of *Baby's Journey, Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules

The tests were performed in order to determine the Bluetooth of EUT compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Dongguan) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 500069-0).



The current scope of accreditations can be found at <http://ts.nist.gov/standards/scopes/5000690.htm>

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer. The system configured the maximum power and switched mode by keys in the engineering mode.

40 hopping channels were provided for test, the channels as below table:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	15	2430	29	2458
02	2404	16	2432	30	2460
03	2406	17	2434	31	2462
04	2408	18	2436	32	2464
05	2410	19	2438	33	2466
06	2412	20	2440	34	2468
07	2414	21	2442	35	2470
08	2416	22	2444	36	2472
09	2418	23	2446	37	2474
10	2420	24	2448	38	2476
11	2422	25	2450	39	2478
12	2424	26	2452	40	2480
13	2426	27	2454	/	/
14	2428	28	2456	/	/

EUT was tested with frequency Channel 01, 20 and 40.

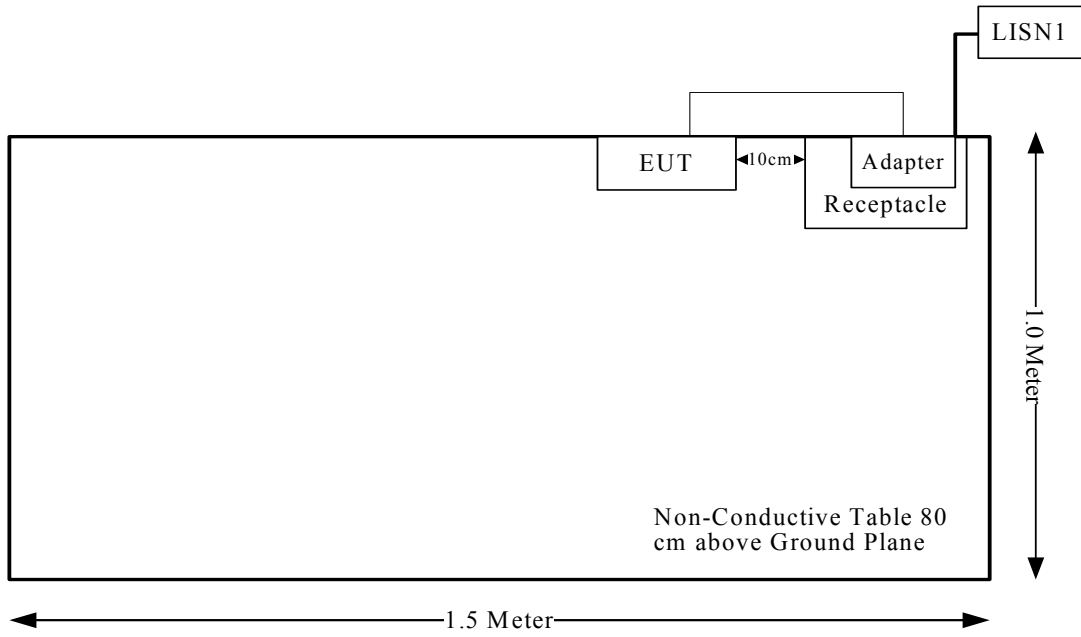
### Equipment Modifications

No modification was made to the EUT.

### External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
DC Power Line	No	No	1.80	adapter	EUT

**Block Diagram of Test Setup**



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissible Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliance
§15.247 (a)(1)	20 dB Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance



## FCC §15.247 (i) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### Applicable Standard

According to subpart 15.247(i) and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission’s guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; \* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

### Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$  = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

### Calculated Data:

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
	(dBi)	(numeric)	(dBm)	(mW)			
2402	0.5	1.12	13.1	20.42	20.00	0.00456	1.0
2440	0.5	1.12	11.51	14.16	20.00	0.00316	1.0
2480	0.5	1.12	8.09	6.44	20.00	0.00144	1.0

**Result:** The device meet FCC MPE at 20 cm distance

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## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to FCC § 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### **Antenna Connector Construction**

The EUT has an internal antenna, which was permanently attached to the EUT. The maximum gain is 0.5 dBi. Please refer to the internal photos.

**Result:** Compliance.

**FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS**

**Applicable Standard**

FCC§15.207

**Measurement Uncertainty**

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cispr}$  of Table 1, then:

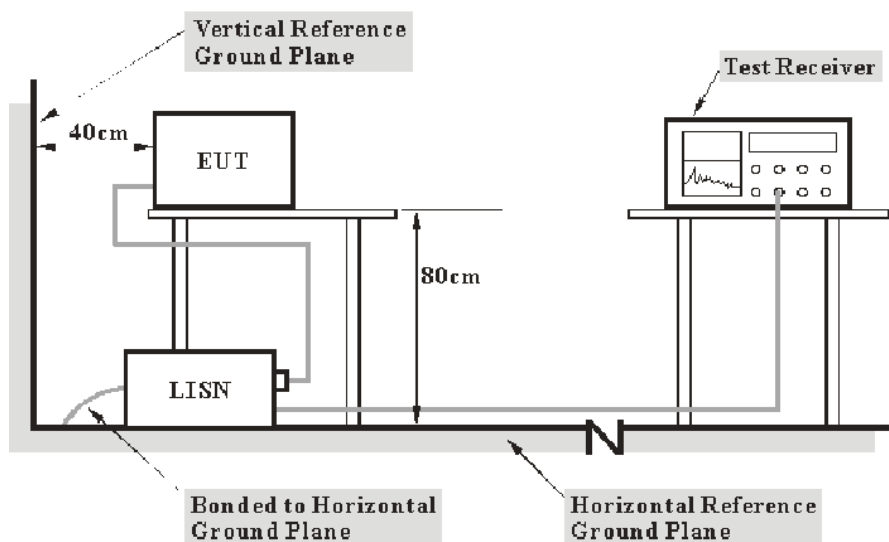
- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of  $U_{cispr}$

Measurement	$U_{cispr}$
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

**EUT Setup**



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter of EUT was connected to a 120 VAC/60 Hz power source

### EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

### Test Procedure

During the conducted emission test, the adapter of EUT was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

### Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

Herein,

$V_C$ : corrected voltage amplitude

$V_R$ : reading voltage amplitude

$A_C$ : attenuation caused by cable loss

$VDF$ : voltage division factor of AMN or ISN

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECEIVER	ESCS 30	830245/006	2013-11-20	2014-11-19
R&S	Two-line V-network	ENV216	3560.6550.12	2014-1-22	2015-1-21
R&S	L.I.S.N	ESH3-Z5	100113	N/A	N/A
BACL	Test Software	BACL-EMC	V1.0-2010	N/A	N/A

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

### Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

**8.35 dB at 0.510 MHz** in the **Line** conducted mode

### Test Data

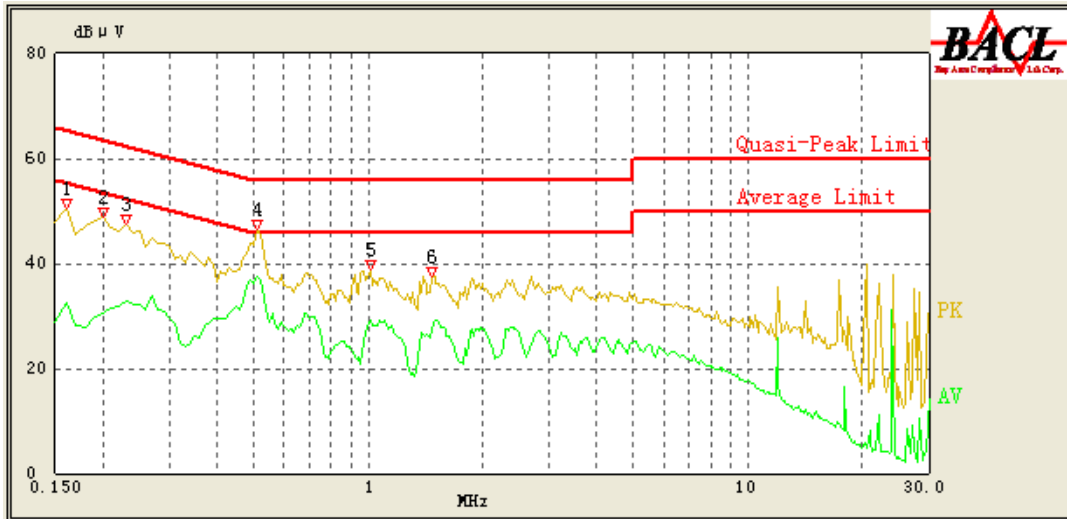
#### Environmental Conditions

<b>Temperature:</b>	19.2 °C
<b>Relative Humidity:</b>	39 %
<b>ATM Pressure:</b>	101.8 kPa

*The testing was performed by Ares Liu on 2014-01-23.*

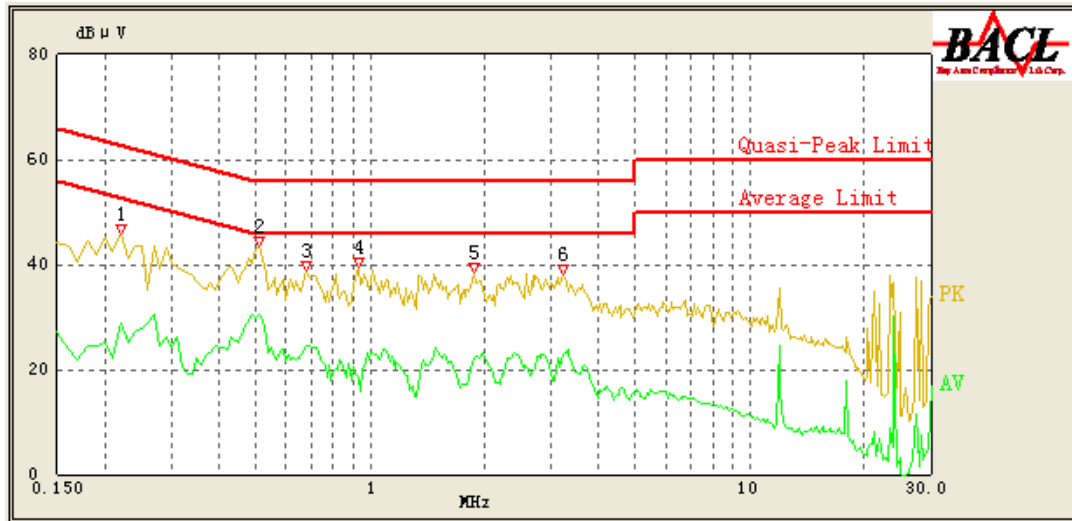
Test Mode: Transmitting

120 V, 60 Hz, Line:



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.160	43.30	0.16	65.46	22.16	QP
0.160	32.41	0.16	55.46	23.05	AV
0.200	40.79	0.14	63.61	22.82	QP
0.200	30.41	0.14	53.61	23.20	AV
0.230	39.74	0.15	62.45	22.71	QP
0.230	32.72	0.15	52.45	19.73	AV
0.510	42.87	0.20	56.00	13.13	QP
0.510	37.65	0.20	46.00	8.35	AV
1.020	33.90	0.20	56.00	22.10	QP
1.020	29.02	0.20	46.00	16.98	AV
1.470	33.73	0.21	56.00	22.27	QP
1.480	28.44	0.21	46.00	17.56	AV

**120 V, 60 Hz, Neutral:**



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.220	37.94	0.33	62.82	24.88	QP
0.220	28.85	0.33	52.82	23.97	AV
0.510	39.30	0.29	56.00	16.70	QP
0.510	30.45	0.29	46.00	15.55	AV
0.680	33.45	0.31	56.00	22.55	QP
0.680	24.51	0.31	46.00	21.49	AV
0.930	31.87	0.32	56.00	24.13	QP
0.930	18.44	0.32	46.00	27.56	AV
1.870	32.34	0.34	56.00	23.66	QP
1.870	22.18	0.34	46.00	23.82	AV
3.220	33.08	0.39	56.00	22.92	QP
3.220	22.88	0.39	46.00	23.12	AV

**FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS**

**Applicable Standard**

FCC §15.247 (d); §15.209; §15.205;

**Measurement Uncertainty**

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cispr}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:

30M~200MHz: 5.0 dB

200M~1GHz: 6.2 dB

1G~6GHz: 4.45 dB

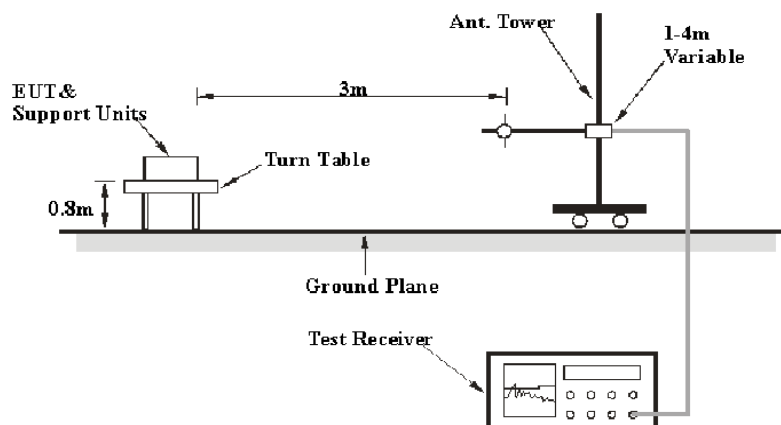
6G~18GHz: 5.23 dB

Table 1 – Values of  $U_{cispr}$

Measurement	$U_{cispr}$
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

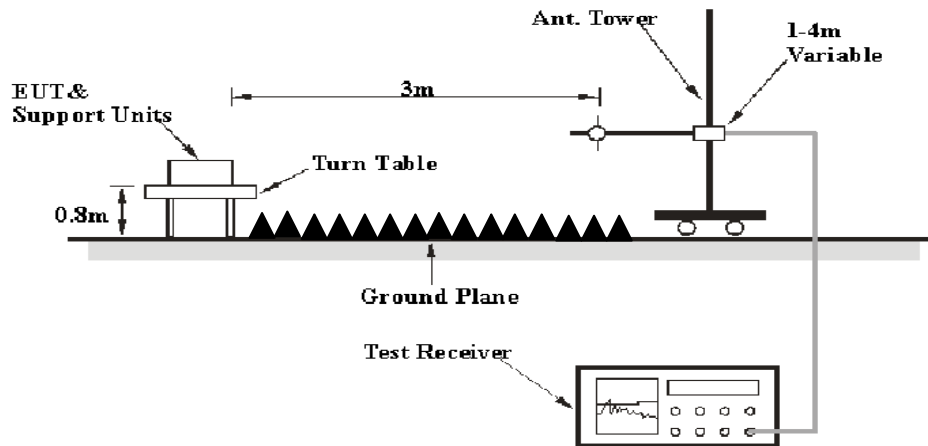
**EUT Setup**

**Below 1GHz:**





**Above 1GHz:**



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter of EUT was connected to a 120 VAC/60 Hz power source

**EMI Test Receiver & Spectrum Analyzer Setup**

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

**Test Procedure**

During the radiated emissions, the adapter of EUT was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz - 1 GHz, peak and Average detection modes for frequencies above 1 GHz.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECEIVER	ESCI	100224	2013-5-6	2014-5-5
Sunol Sciences	Antenna	JB3	A060611-1	2011-9-6	2014-9-5
HP	Amplifier	8447E	2434A02181	2013-09-06	2014-09-05
R&S	Spectrum analyzer	FSEM	DE31388	2013-5-7	2014-5-6
ETS LINDGREN	horn antenna	3115	000 527 35	2012-9-6	2015-9-5
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2013-02-19	2014-02-18
R&S	Spectrum analyzer	FSP 38	100478	2013-6-16	2014-6-15
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-02-1304	2013-6-16	2014-6-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2013-09-06	2014-09-05

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

**Corrected Amplitude & Margin Calculation**

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

**Test Results Summary**

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, and section 15.205, 15.209 and 15.247, with the worst margin reading of:

**2.23 dB at 4880 MHz in the Vertical polarization**

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	20.5 °C
<b>Relative Humidity:</b>	53 %
<b>ATM Pressure:</b>	102.1 kPa

*The testing was performed by Ares Liu on 2014-01-22*

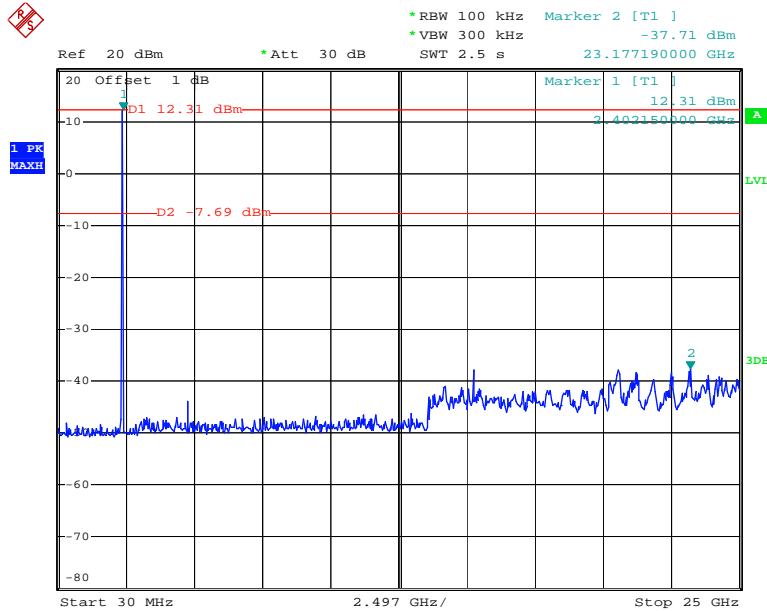
Operation Mode: Transmitting:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	FCC 15.247	
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)
Low Channel: 2402 MHz									
2402	68.82	PK	H	25.65	4.42	0.00	98.89	N/A	N/A
2402	60.29	AV	H	25.65	4.42	0.00	90.36	N/A	N/A
2402	77.00	PK	V	25.65	4.42	0.00	107.07	N/A	N/A
2402	68.55	AV	V	25.65	4.42	0.00	98.62	N/A	N/A
2390	34.76	PK	V	25.61	4.39	0.00	64.76	74.00	9.24
2390	20.00	AV	V	25.61	4.39	0.00	50.00	54.00	4.00*
4804	59.90	PK	V	30.59	5.98	27.26	69.21	74.00	4.79
4804	33.45	AV	V	30.59	5.98	27.26	42.76	54.00	11.24
7206	42.43	PK	V	34.09	7.45	26.30	57.67	74.00	16.33
7206	21.16	AV	V	34.09	7.45	26.30	36.40	54.00	17.60
9608	33.96	PK	V	35.96	8.80	26.22	52.50	74.00	21.50
9608	19.15	AV	V	35.96	8.80	26.22	37.69	54.00	16.31
1721.3	32.73	PK	V	24.04	3.52	26.97	33.32	74.00	40.68
1721.3	18.74	AV	V	24.04	3.52	26.97	19.33	54.00	34.67
576.2	35.70	QP	V	19.39	2.89	22.21	35.77	46.00	10.23
Middle Channel: 2440 MHz									
2440	66.05	PK	H	25.74	4.40	0.00	96.19	N/A	N/A
2440	57.65	AV	H	25.74	4.40	0.00	87.79	N/A	N/A
2440	73.37	PK	V	25.74	4.40	0.00	103.51	N/A	N/A
2440	65.62	AV	V	25.74	4.40	0.00	95.76	N/A	N/A
4880	62.16	PK	V	30.79	6.08	27.26	71.77	74.00	2.23*
4880	35.72	AV	V	30.79	6.08	27.26	45.33	54.00	8.67
7320	43.01	PK	V	34.37	7.51	26.53	58.36	74.00	15.64
7320	22.2	AV	V	34.37	7.51	26.53	37.55	54.00	16.45
9760	34.6	PK	V	36.32	8.83	25.63	54.12	74.00	19.88
9760	19.4	AV	V	36.32	8.83	25.63	38.92	54.00	15.08
1721.3	32.49	PK	V	24.04	3.52	26.97	33.08	74.00	40.92
1721.3	18.69	AV	V	24.04	3.52	26.97	19.28	54.00	34.72
2231.5	33.46	PK	V	25.20	4.19	27.24	35.61	74.00	38.39
2231.5	18.7	AV	V	25.20	4.19	27.24	20.85	54.00	33.15
576.3	34.9	QP	V	19.40	2.90	22.21	34.99	46.00	11.01
High Channel: 2480 MHz									
2480	63.53	PK	H	25.85	4.48	0.00	93.86	N/A	N/A
2480	55.55	AV	H	25.85	4.48	0.00	85.88	N/A	N/A
2480	70.64	PK	V	25.85	4.48	0.00	100.97	N/A	N/A
2480	61.89	AV	V	25.85	4.48	0.00	92.22	N/A	N/A
2483.5	40.54	PK	V	25.86	4.49	0.00	70.89	74.00	3.11*
2483.5	21.18	AV	V	25.86	4.49	0.00	51.53	54.00	2.47*
4960	55.22	PK	V	31.00	5.90	27.27	64.85	74.00	9.15
4960	38.84	AV	V	31.00	5.90	27.27	48.47	54.00	5.53
7440	39.28	PK	V	34.66	7.58	26.56	54.96	74.00	19.04
7440	20.45	AV	V	34.66	7.58	26.56	36.13	54.00	17.87
9920	35.28	PK	V	36.71	8.87	25.50	55.36	74.00	18.64
9920	18.57	AV	V	36.71	8.87	25.50	38.65	54.00	15.35
1721.3	33.26	PK	V	24.04	3.52	26.97	33.85	74.00	40.15
1721.3	18.48	AV	V	24.04	3.52	26.97	19.07	54.00	34.93
576.1	35.3	QP	V	19.39	2.89	22.21	35.37	46.00	10.63

\*Within measurement uncertainty!

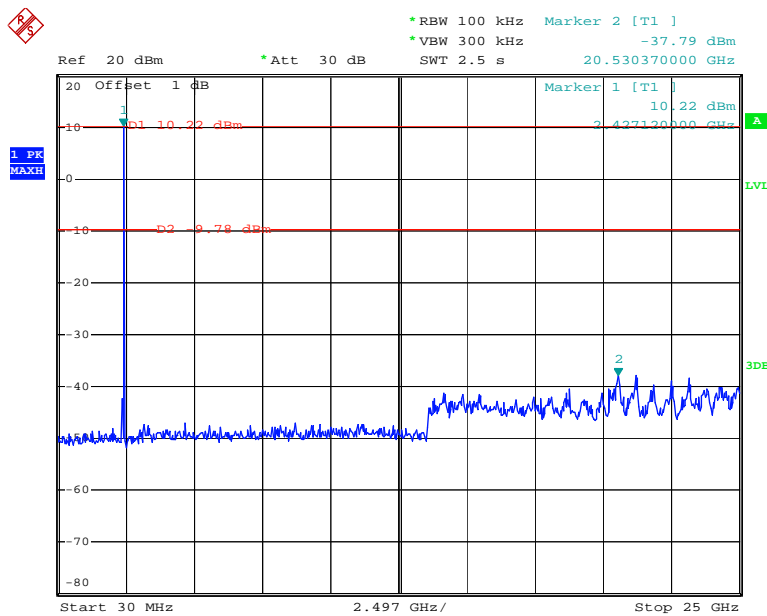
### Conducted Spurious Emissions at Antenna Port

#### Low Channel



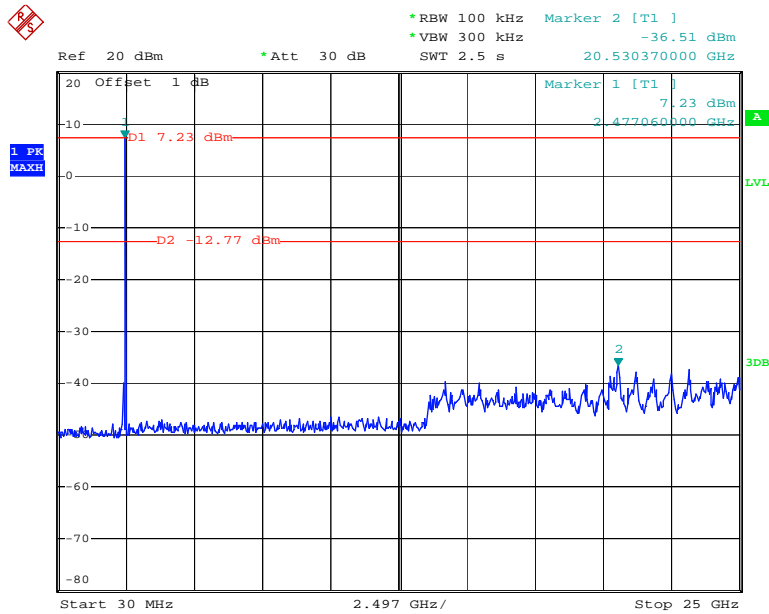
Date: 22.JAN.2014 19:54:25

#### Middle Channel



Date: 22.JAN.2014 19:55:10

### High Channel



Date: 22.JAN.2014 19:57:57

## FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

### Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.50 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	FSP 38	100478	2013-6-16	2014-6-15

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

### Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 30 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

### Test Data

#### Environmental Conditions

Temperature:	23.5 °C~23.6 °C
Relative Humidity:	51 %~52 %
ATM Pressure:	101.4 kPa~101.6 kPa

\* The testing was performed by Ares Liu on 2014-01-26 and 2014-03-07.

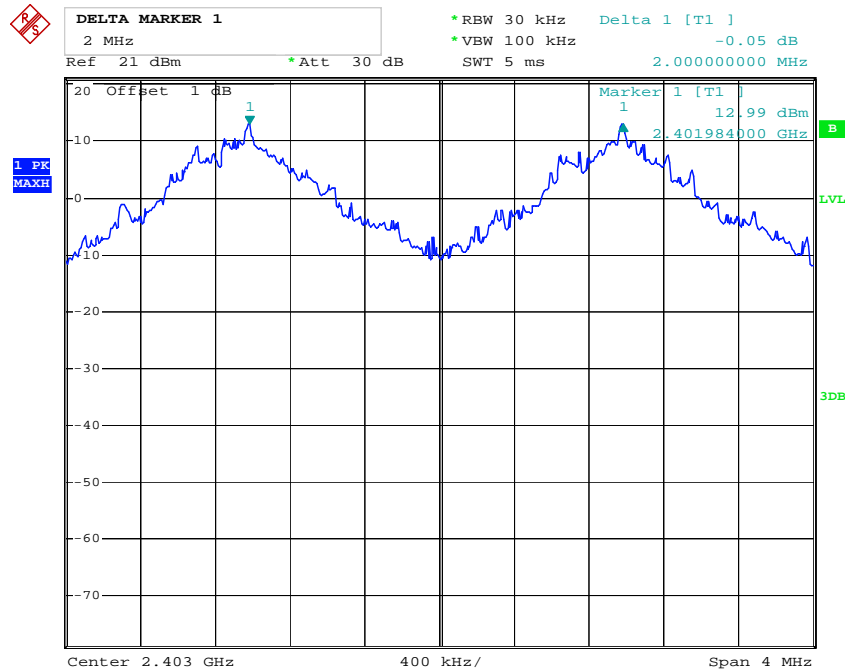
**Test Result:** Compliance.

Please refer to following tables and plots

Test Mode: Hopping

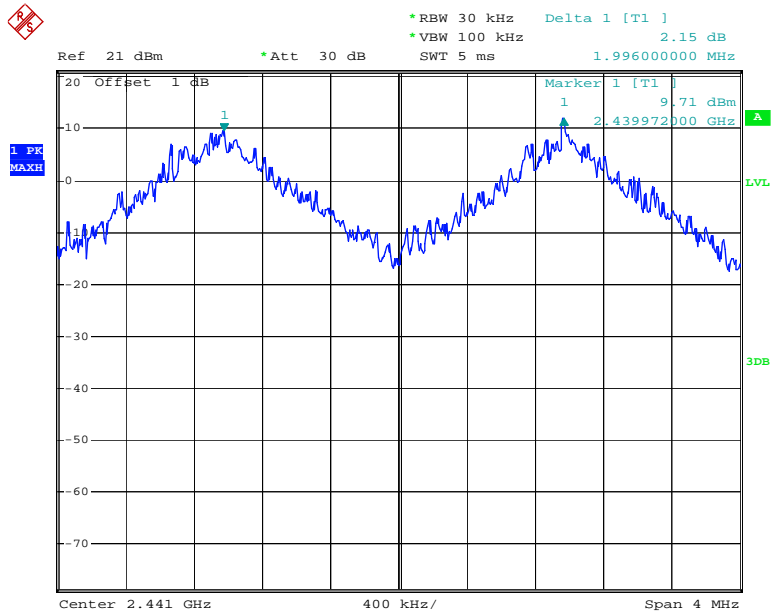
Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low	2402	2.000	1.553	Pass
Adjacent	2404			
Middle	2440	1.996	1.340	Pass
Adjacent	2442			
High	2478	2.000	1.067	Pass
Adjacent	2480			

Low Channel



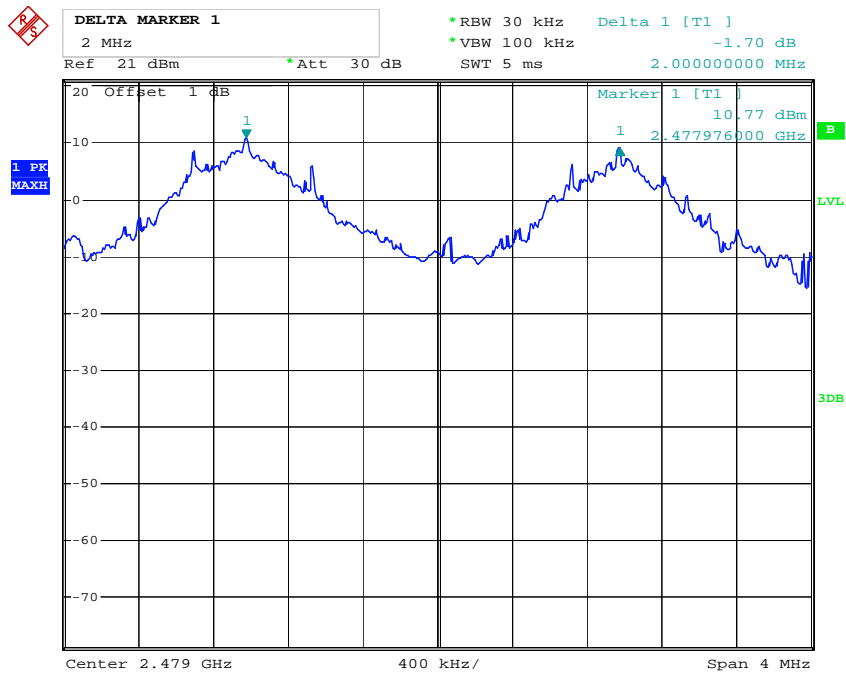
Date: 26.JAN.2014 09:55:25

### Middle Channel



Date: 7.MAR.2014 17:46:16

### High Channel



Date: 26.JAN.2014 09:52:38



## FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING

### Applicable Standard

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 Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. 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.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	FSP 38	100478	2013-6-16	2014-6-15

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

Temperature:	20.8 °C
Relative Humidity:	33 %
ATM Pressure:	102.1 kPa

\* The testing was performed by Ares Liu on 2014-01-22.

**Test Result:** Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	2.33
Middle	2440	2.01
High	2480	1.60

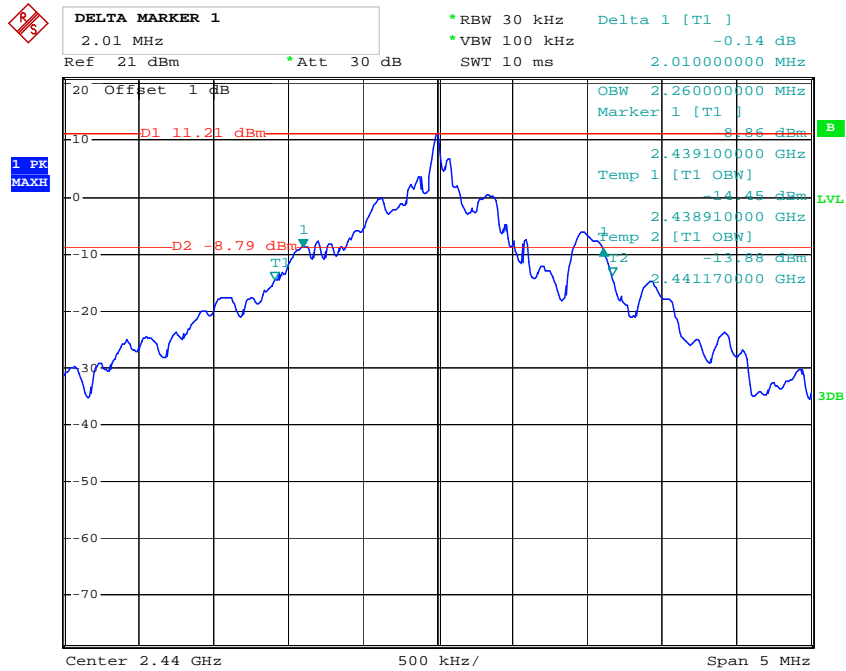
Please refer to the following plots.

Low Channel



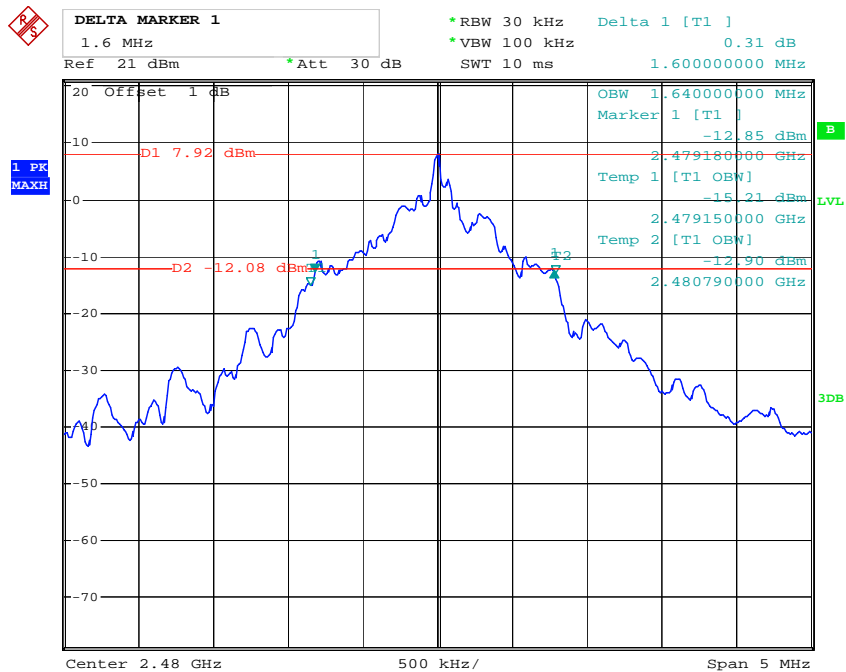
Date: 22.JAN.2014 21:02:31

### Middle Channel



Date: 22.JAN.2014 21:00:12

### High Channel



Date: 22.JAN.2014 20:56:25

## **FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST**

### **Applicable Standard**

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 Procedure**

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

### **Test Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
R&S	Spectrum analyzer	FSP 38	100478	2013-6-16	2014-6-15

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

### **Test Data**

#### **Environmental Conditions**

<b>Temperature:</b>	20.4 °C
<b>Relative Humidity:</b>	32 %
<b>ATM Pressure:</b>	101.8 kPa

\* The testing was performed by Ares Liu on 2014-01-23.

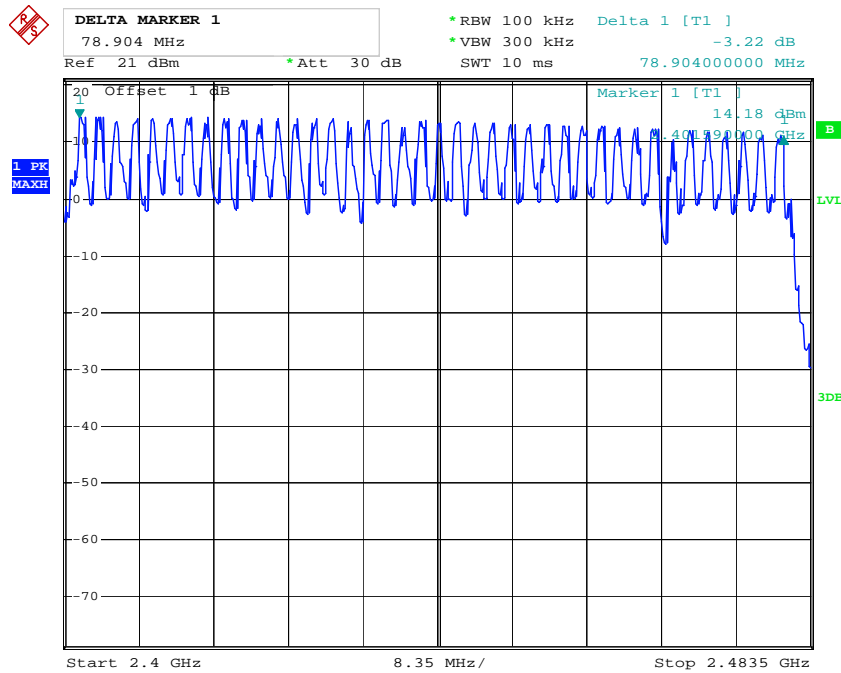
**Test Result:** Compliance.

Please refer to following tables and plots

Test Mode: Hopping

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	40	≥15

Number of Hopping Channels



Date: 23.JAN.2014 15:55:26

**FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)****Applicable Standard**

Frequency hopping systems in the 2400-2483.5 MHz 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 Procedure**

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 \* channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell time=pulse width\*hopping rate/hopping numbers\*hopping numbers\*0.4

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	FSP 38	100478	2013-6-16	2014-6-15

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

**Test Data****Environmental Conditions**

<b>Temperature:</b>	20.4 °C
<b>Relative Humidity:</b>	32 %
<b>ATM Pressure:</b>	101.4kPa

\* The testing was performed by Ares Liu on 2014-01-23.

**Test Result:** Compliance. Please refer to following tables and plots

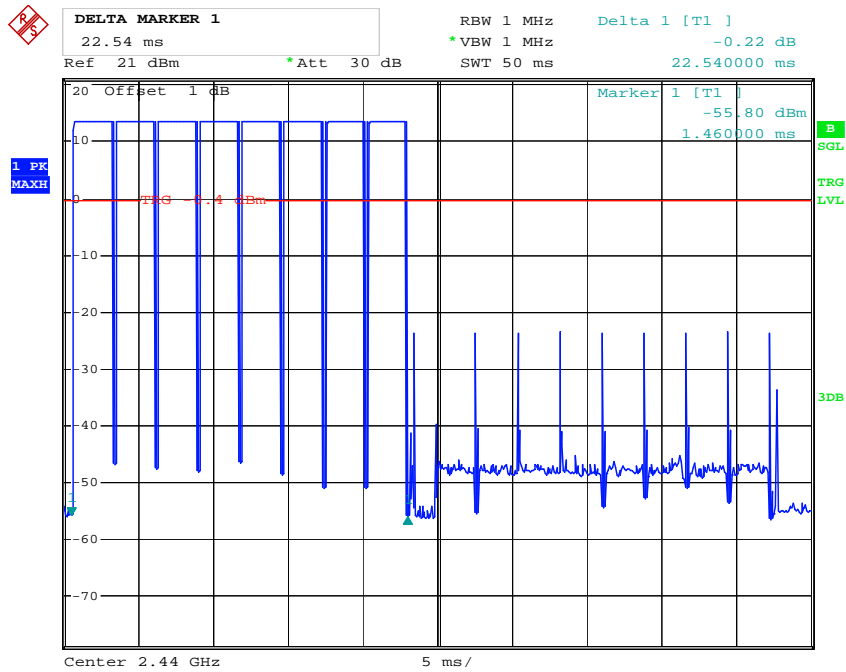
*Test Mode: Hopping*

Frequency (MHz)	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
2440	2.680	0.343	0.4	Pass

Note 1: the hopping rate was 40 times per second, which was declared by the manufacturer.

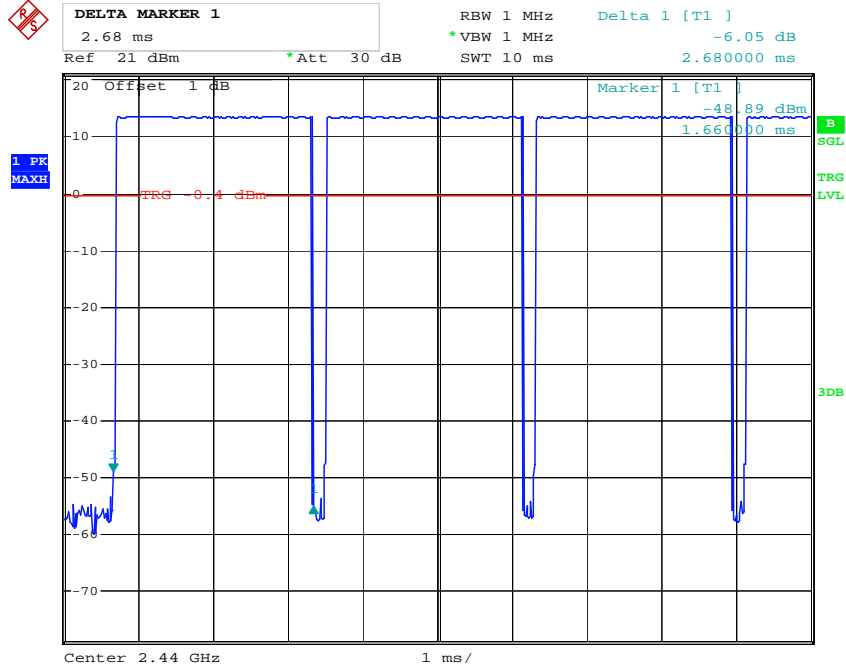
Note 2: 8 pulse in a hopping, so the hopping rate: total pulse per second is 8\*40=320pulse/s

### 8 pulse in a hopping



Date: 23.JAN.2014 15:43:31

### Pulse Width



Date: 23.JAN.2014 15:42:42

## **FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT**

### **Applicable Standard**

According to §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

### **Test Procedure**

1. Place the EUT on a bench and set in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI test receiver.
3. Add a correction factor to the display.

### **Test Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
R&S	Spectrum analyzer	FSP 38	100478	2013-6-16	2014-6-15

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

### **Test Data**

#### **Environmental Conditions**

<b>Temperature:</b>	20.8 °C
<b>Relative Humidity:</b>	39 %
<b>ATM Pressure:</b>	102.1 kPa

\* The testing was performed by Ares Liu on 2014-01-22.

**Test Result:** Compliance.

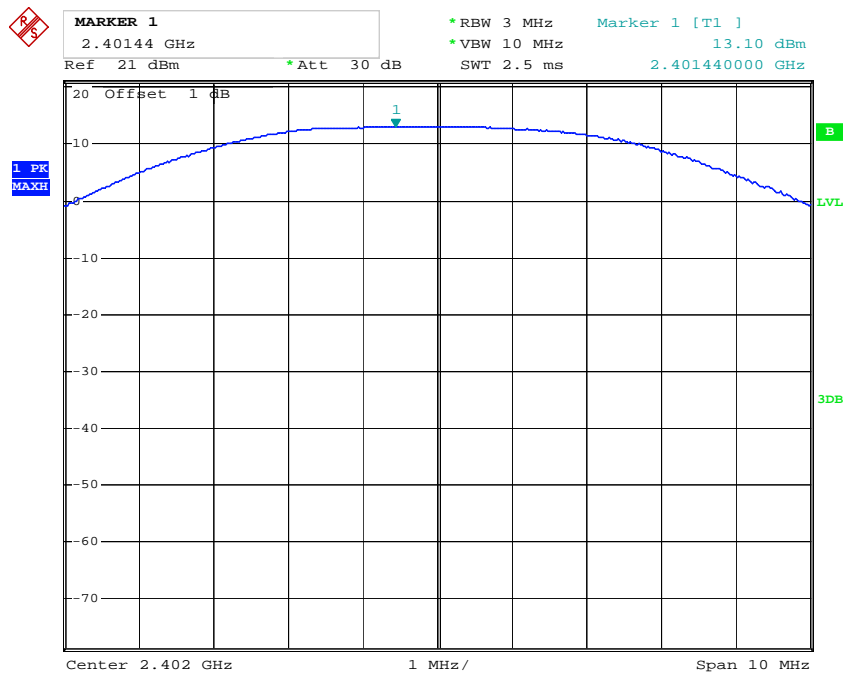


Test Mode: Transmitting

Channel	Frequency (MHz)	Output power (dBm)	Limit (dBm)
Low	2402	13.10	21
Middle	2440	11.51	21
High	2480	8.09	21

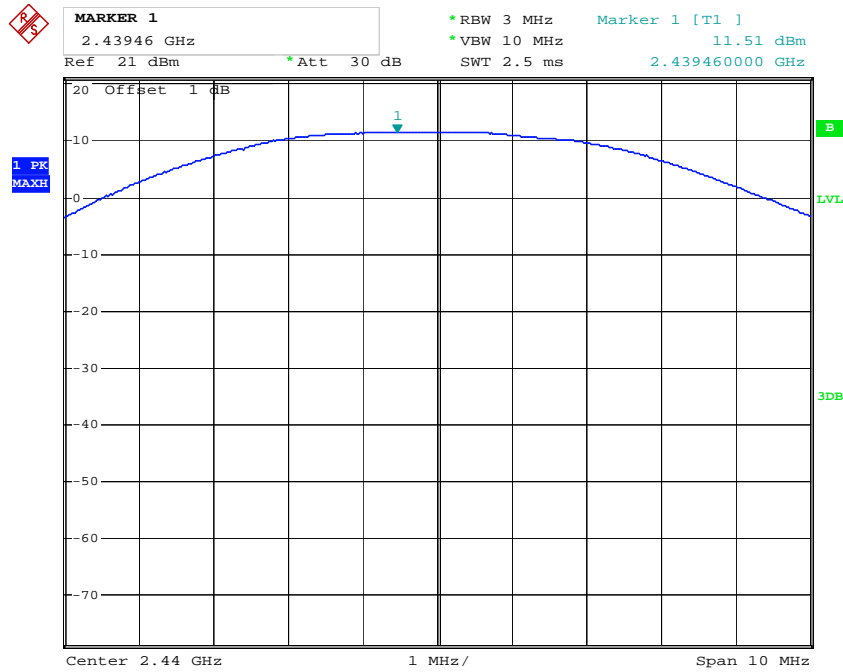
Note: The data above was tested in conducted mode.

### Output Power, Low



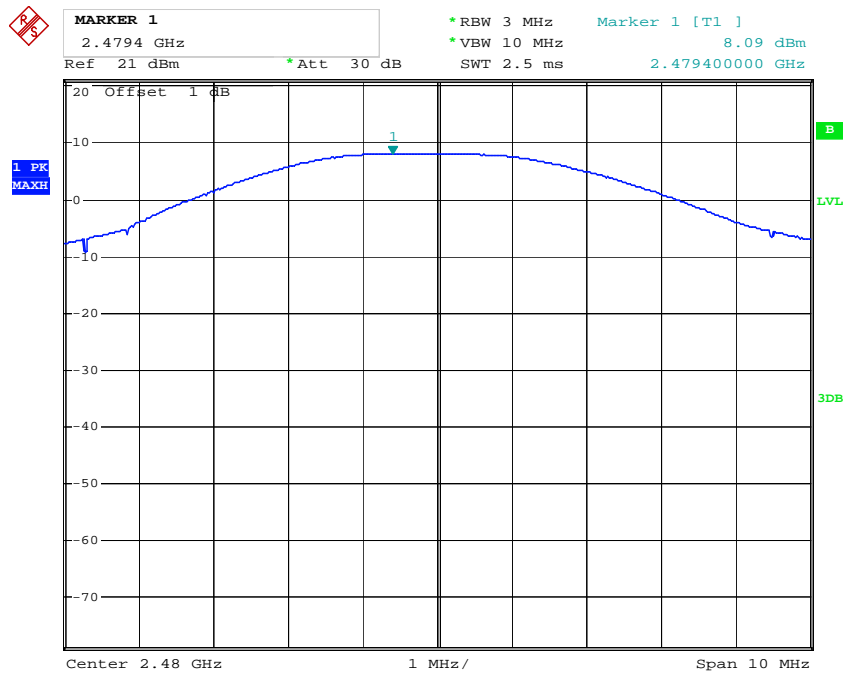
Date: 22.JAN.2014 21:04:02

### Output Power, Middle



Date: 22.JAN.2014 21:04:21

### Output Power, High



Date: 22.JAN.2014 21:04:36

## FCC §15.247(d) - BAND EDGES TESTING

### Applicable Standard

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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	FSP 38	100478	2013-6-16	2014-6-15

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

### Test Data

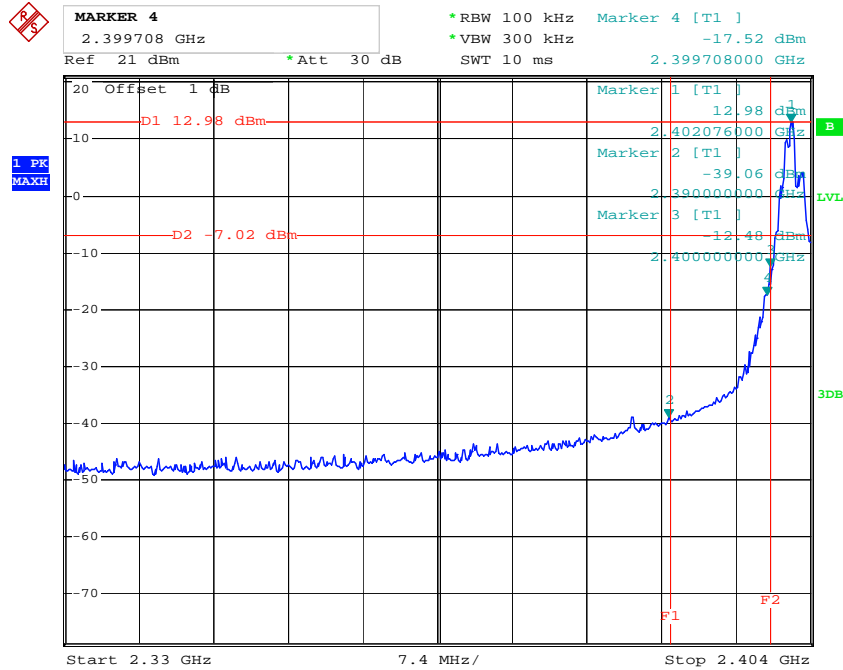
#### Environmental Conditions

Temperature:	20.8 °C
Relative Humidity:	39 %
ATM Pressure:	102.1 kPa

\* The testing was performed by Ares Liu on 2014-01-22.

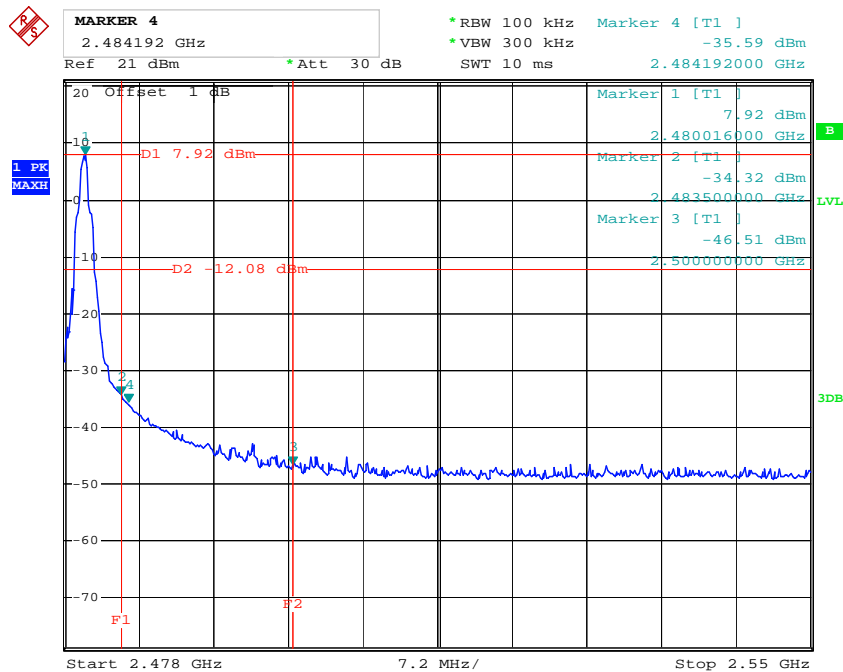
Test Result: Compliance

Band Edge, Left Side



Date: 22.JAN.2014 21:10:30

Band Edge, Right Side



Date: 22.JAN.2014 21:08:50

\*\*\*\*\* END OF REPORT \*\*\*\*\*