# FCC PART 15.247

# TEST REPORT

For

# SVAT ELECTRONICS

4080 Montrose Rd, Niagara Falls, Ontario, Canada

## FCC ID: SMH32014

| Report Type: | Product Type: |
|---|---|
| Original Report | 2.4GHz Digital Video Baby Monitor (Baby Unit) |

| | |
|---|---|
| **Test Engineer:** | Gardon Zhang |
| **Report Number:** | RSZ130327004-00TX |
| **Report Date:** | 2014-01-08 |
| **Reviewed By:** | Alvin Huang<br>RF Leader |
| **Prepared By:** | Bay Area Compliance Laboratories Corp. (Shenzhen)<br>6/F, the 3rd Phase of WanLi Industrial Building<br>ShiHua Road, FuTian Free Trade Zone<br>Shenzhen, Guangdong, China<br>Tel: +86-755-33320018<br>Fax: +86-755-33320008<br>www.baclcorp.com.cn |

# TABLE OF CONTENTS

# GENERAL INFORMATION

## Product Description for Equipment under Test (EUT)

The *SVAT ELECTRONICS*'s product, model number: *32012 (FCC ID: SMH32014)* (the "EUT") in this report was a camera unit of *2.4GHz Digital Video Baby Monitor*, which was measured approximately: 9.7 cm (L) x 9.0 cm (W) x 11.5 cm (H), rated with input voltage: DC 6.0V from adapter.

Adapter Information: AC Adapter
Model: 5E-AD060080-U
Input: 100-240V~50/60 Hz 0.15A
Output: DC 6V 0.8A

*Note: The product 2.4GHz Digital Video Baby Monitor, models 20502, 22502, 20503, 22503, 20507, 22507, 32012, 32014 and 32016 are different in model numbers due to different combinations, trade name and packaging which have the same baby unit and parent unit, the difference among them was explained in the attached product similarity declaration letter provided by applicant. The model 32012 was selected for testing.*

** All measurement and test data in this report was gathered from production sample serial number: 1303107 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2013-03-27.*

## Objective

This report is prepared on behalf of *SVAT ELECTRONICS* 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 compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

## Related Submittal(s)/Grant(s)

Submitted with the parent unit of a system with FCC ID: SMH32012

## Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication 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 December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

# SYSTEM TEST CONFIGURATION

## Description of Test Configuration

The system was configured for testing in an engineering mode which was selected by manufacturer.

## EUT Exercise Software

No exercise software was used.

## Equipment Modifications

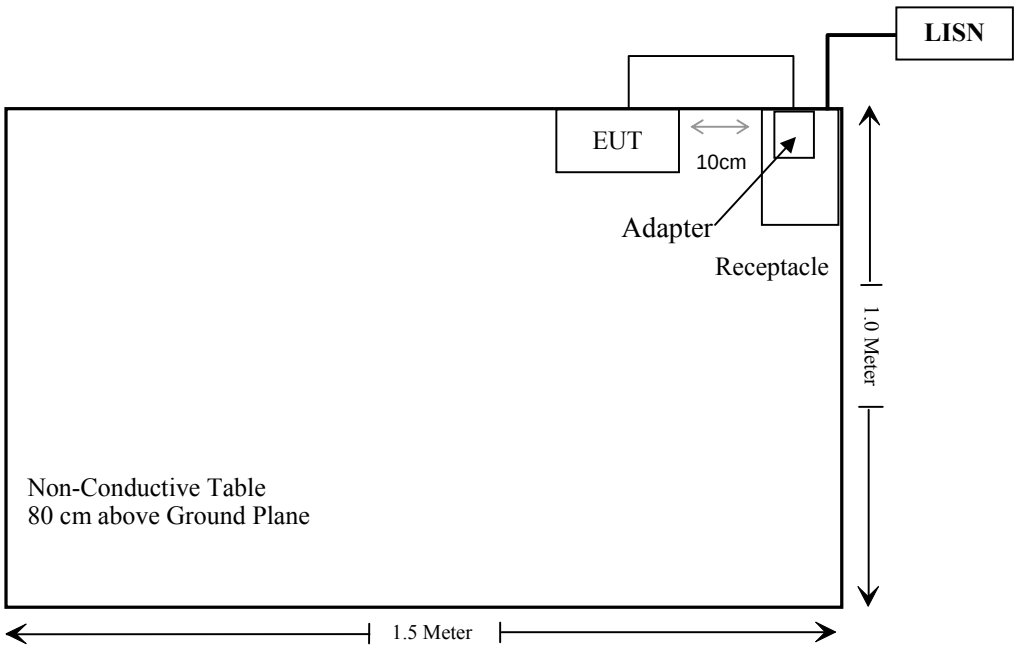
No modification was made to the EUT tested.

## External I/O Cable

| Cable Description | Length (m) | From/Port | To |
|---|---|---|---|
| Un-shielding Power Cable | 2.0 | EUT | Adapter |

## Block Diagram of Test Setup

For Conducted Emission



# SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|---|---|---|
| §15.247 (i), §1.1307 (b)(1), §2.1091 | Maximum Permissible Exposure (MPE) | Compliance |
| §15.203 | Antenna Requirement | Compliance |
| §15.207 (a) | AC Line Conducted Emissions | Compliance |
| §15.205, §15.209, §15.247(d) | Radiated Emissions | Compliance |
| §15.247 (a)(1) | 20 dB Emission Bandwidth | Compliance |
| §15.247(a)(1) | Channel Separation | Compliance |
| §15.247(a)(1)(iii) | Time of Occupancy (Dwell Time) | Compliance |
| §15.247(a)(1)(iii) | Quantity of hopping channel | Compliance |
| §15.247(b)(1) | Peak Output Power Measurement | Compliance |
| §15.247(d) | Band Edges | Compliance |

# FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## Applicable Standard

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

| Limits for General Population/Uncontrolled Exposure | | | | |
|---|---|---|---|---|
| **Frequency Range (MHz)** | **Electric Field Strength (V/m)** | **Magnetic Field Strength (A/m)** | **Power Density ($mW/cm^2$)** | **Averaging Time (Minutes)** |
| 0.3-1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34-30 | 824/f | 2.19/f | *($180/f^2$) | 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

## Result

### Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm2)
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)

| **Frequency (MHz)** | **Antenna Gain** | | **Conducted Power** | | **Evaluation Distance (cm)** | **Power Density ($mW/cm^2$)** | **MPE Limit ($mW/cm^2$)** |
|---|---|---|---|---|---|---|---|
| | **(dBi)** | **(numeric)** | **(dBm)** | **(mW)** | | | |
| 2471.625 | 2 | 1.585 | 12.56 | 18.03 | 20 | 0.00569 | 1 |

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

**Result: Compliance**

# FCC §15.203 – ANTENNA REQUIREMENT

## 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 one integral antenna which was permanently attached and the antenna gain is 2dBi, fulfill the requirement of this section. Please refer to the internal photos.

**Result:** Compliance.

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

## Applicable Standard

FCC §15.207

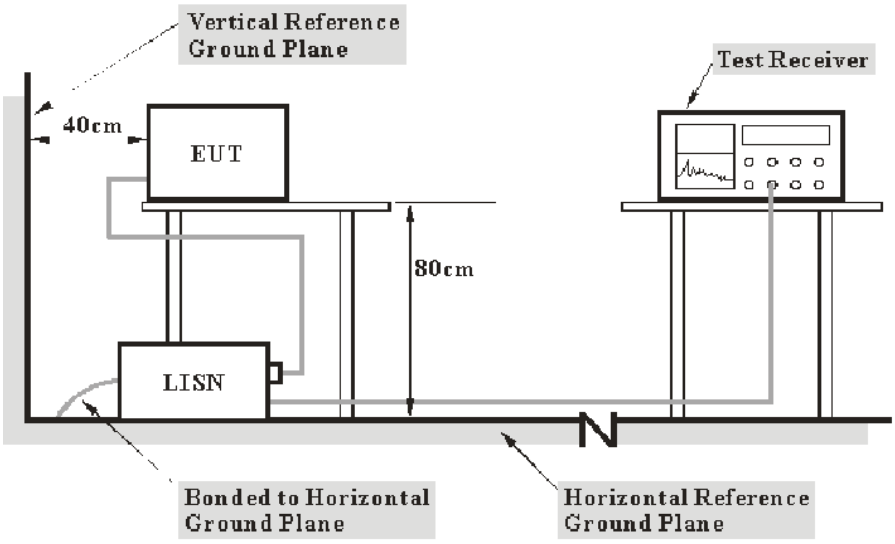
## Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

| Port | Measurement uncertainty |
|---|---|
| AC Mains | 3.26 dB (k=2, 95% level of confidence) |
| CAT 3 | 3.70 dB (k=2, 95% level of confidence) |
| CAT 5 | 3.86 dB (k=2, 95% level of confidence) |
| CAT 6 | 4.64 dB (k=2, 95% level of confidence) |

## 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 C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The adapter 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 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.

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCS30 | 100176 | 2012-11-24 | 2013-11-23 |
| Rohde & Schwarz | L.I.S.N. | ESH2-Z5 | 892107/021 | 2012-08-22 | 2013-08-21 |
| Rohde & Schwarz | Attenuator | ESH3Z2 | DE25985 | 2012-08-09 | 2013-08-08 |
| BACL | CE Test software | BACL-CE | V1.0 | - | - |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that 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:

**5.79 dB** at **0.330 MHz** in the **Line** conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

in BACL, $U_{(Lm)}$ is less than $U_{cispr}$, if $L_m$ is less than $L_{lim}$, it implies that the EUT complies with the limit.

## Test Data

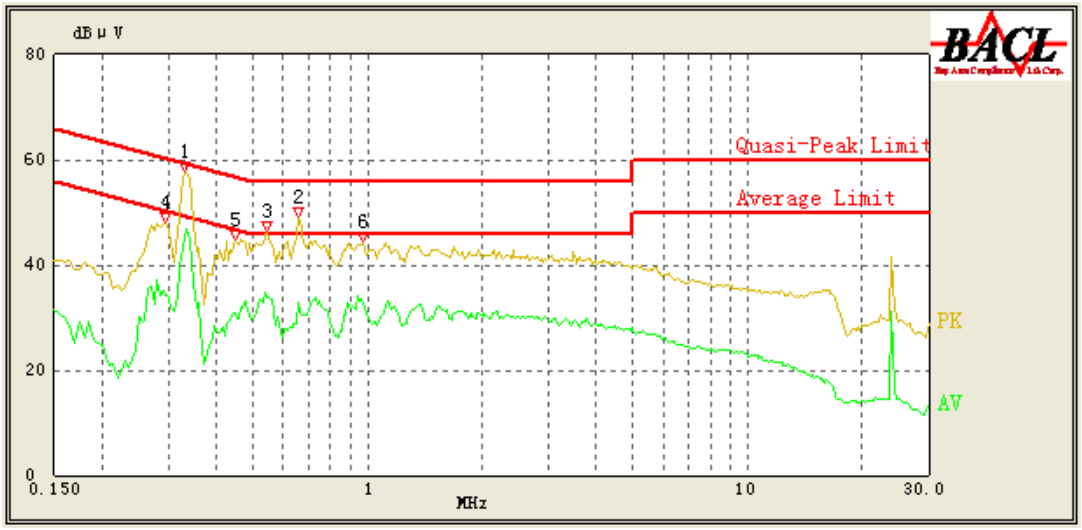
### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0 kPa |

*The testing was performed by Gardon Zhang on 2013-04-08.*

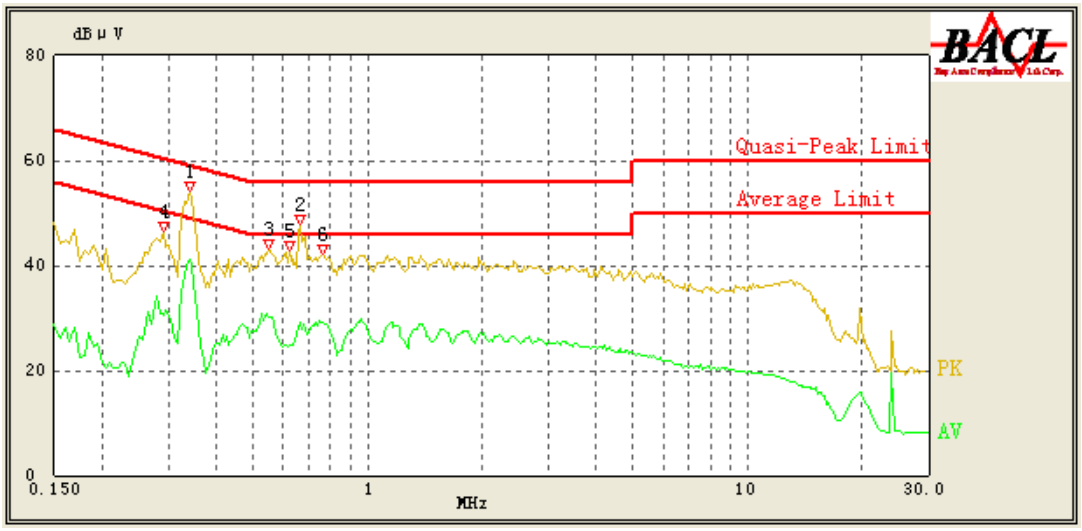
*Test Mode: Transmitting*

### AC 120 V, 60 Hz, Line:




| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/QP/Ave.) |
|---|---|---|---|---|---|
| 0.330 | 45.07 | 10.20 | 50.86 | 5.79 | Ave. |
| 0.330 | 54.07 | 10.20 | 60.86 | 6.79 | QP |
| 0.545 | 33.78 | 10.20 | 46.00 | 12.22 | Ave. |
| 0.660 | 43.42 | 10.20 | 56.00 | 12.58 | QP |
| 0.660 | 32.85 | 10.20 | 46.00 | 13.15 | Ave. |
| 0.545 | 42.51 | 10.20 | 56.00 | 13.49 | QP |
| 0.980 | 31.83 | 10.20 | 46.00 | 14.17 | Ave. |
| 0.450 | 30.91 | 10.20 | 47.43 | 16.52 | Ave. |
| 0.295 | 45.18 | 10.19 | 61.86 | 16.68 | QP |
| 0.450 | 40.69 | 10.20 | 57.43 | 16.74 | QP |
| 0.975 | 39.26 | 10.20 | 56.00 | 16.74 | QP |
| 0.295 | 34.25 | 10.19 | 51.86 | 17.61 | Ave. |

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




| Frequency (MHz) | Corrected Amplitude (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/QP/Ave.) |
|---|---|---|---|---|---|
| 0.340 | 41.13 | 10.10 | 50.57 | 9.44 | Ave. |
| 0.340 | 50.27 | 10.10 | 60.57 | 10.30 | QP |
| 0.550 | 30.24 | 10.20 | 46.00 | 15.76 | Ave. |
| 0.550 | 39.97 | 10.20 | 56.00 | 16.03 | QP |
| 0.755 | 29.24 | 10.20 | 46.00 | 16.76 | Ave. |
| 0.665 | 29.17 | 10.20 | 46.00 | 16.83 | Ave. |
| 0.760 | 38.07 | 10.20 | 56.00 | 17.93 | QP |
| 0.665 | 37.21 | 10.20 | 56.00 | 18.79 | QP |
| 0.625 | 36.07 | 10.20 | 56.00 | 19.93 | QP |
| 0.290 | 42.04 | 10.10 | 62.00 | 19.96 | QP |
| 0.625 | 24.81 | 10.20 | 46.00 | 21.19 | Ave. |
| 0.290 | 30.66 | 10.10 | 52.00 | 21.34 | Ave. |

**Note:**
1) Corrected Amplitude = Reading + Correction Factor
2) Correction Factor = LISN/ISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
3) Margin = Limit – Corrected Amplitude

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

## Applicable Standard

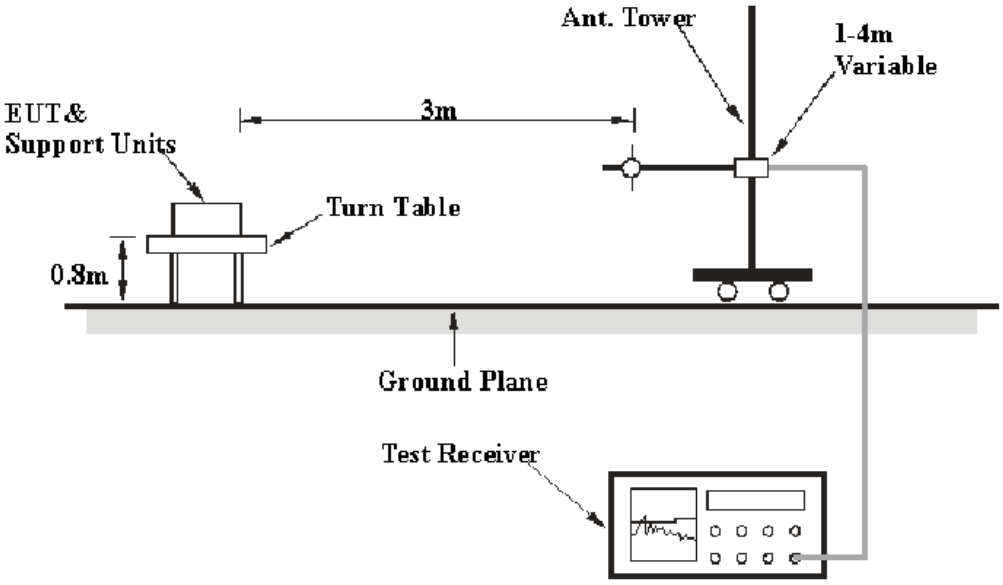
FCC §15.247 (d); §15.209; §15.205;

## Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) will not be taken into consideration for the test data recorded in the report

## EUT Setup




The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. 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 adapter 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 | 100 kHz | 300 kHz | 120kHz | QP |
| Above 1 GHz | 1MHz | 3 MHz | / | PK |
| | 1MHz | 10 Hz | / | Ave. |

## Test Procedure

For the radiated emissions test, the adapter was connected to the outlet of the LISN.

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 to 1GHz and peak and Average detection modes for frequencies above 1GHz.

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| HP | Amplifier | 8447E | 1937A01057 | 2012-11-24 | 2013-11-23 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 101122 | 2013-05-09 | 2014-05-09 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-2 | 2011-11-28 | 2014-11-27 |
| SUPER ULTRA | Amplifier | ZVA-213+ | N/A | 2012-11-24 | 2013-11-23 |
| Sunol Sciences | Horn Antenna | DRH-118 | A052304 | 2011-12-01 | 2014-11-30 |
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028 | 2012-11-24 | 2013-11-23 |
| Agilent | Spectrum Analyzer | 8564E | 3943A01781 | 2013-05-09 | 2014-05-09 |
| the electro-Mechanics Co. | Horn Antenna | 3116 | 9510-2270 | 2010-10-14 | 2013-10-13 |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that 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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit – 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, section 15.205, 15.209 and 15.247, with the worst margin reading of:

**8.3 dB** at **2489.6 MHz** in the **Vertical** polarization

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m ++ U_{(Lm)} \leq L_{lim} ++ U_{cispr}$$

in BACL, $U_{(Lm)}$ is less than + $U_{cispr}$, if $L_m$ is less than $L_{lim}$, it implies that the EUT complies with the limit.

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0 kPa |

*The testing was performed by Gardon Zhang on 2013-04-07 and 2013-08-12.*

*Test Mode: Transmitting*

**30 MHz -25 GHz:**

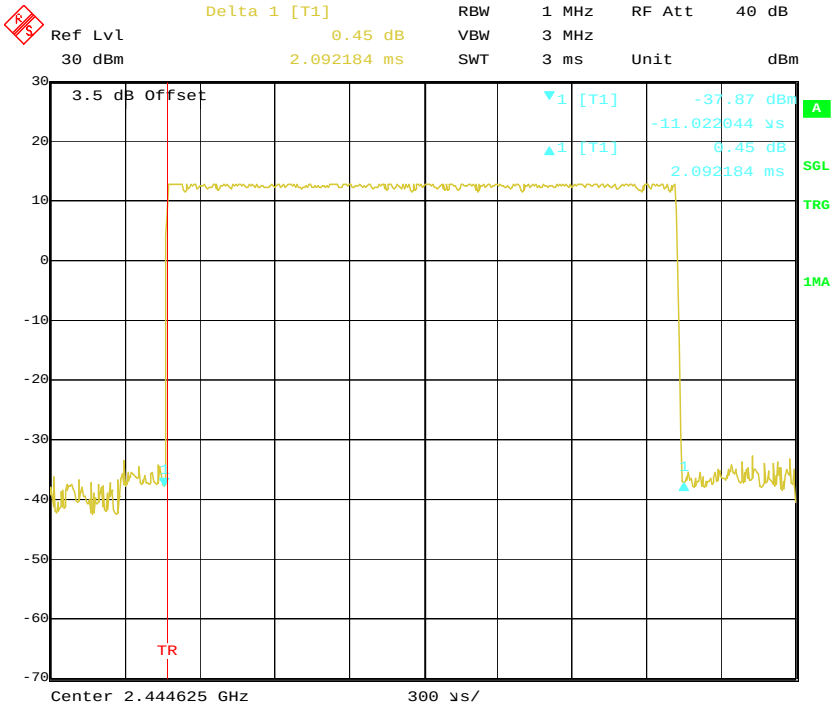
| Frequency (MHz) | Receiver | | Turn table Degree | Rx Antenna | | Corrected Factor (dB) | Corrected Amplitude (dBuV/m) | FCC Part 15.247/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | Detector (PK/QP/Ave.) | | Height (m) | Polar (H/V) | | | Limit (dBμV/m) | Margin (dB) |
| Low Channel (2410.875 MHz) | | | | | | | | | |
| 2410.875 | 96.06 | PK | 44 | 1.2 | H | 6.13 | 102.19 | / | / |
| 2410.875 | 101.29 | PK | 132 | 1.1 | V | 6.13 | 107.42 | / | / |
| 768.049 | 42.52 | QP | 220 | 1.2 | V | -5.9 | 36.62 | 46 | 9.38 |
| 9643.5 | 32.06 | PK | 233 | 1.1 | V | 19.29 | 51.35 | 74 | 22.65 |
| 7323.625 | 33.56 | PK | 121 | 1.2 | V | 16.49 | 50.05 | 74 | 23.95 |
| 4821.75 | 35.77 | PK | 13 | 1.1 | V | 12.40 | 48.17 | 74 | 25.83 |
| 2321.6 | 53.26 | PK | 100 | 1.2 | V | 5.50 | 58.76 | 74 | 15.24 |
| 2321.6 | 31.24 | Ave. | 100 | 1.2 | V | 5.50 | 36.74 | 54 | 17.26 |
| 2388.7 | 52.47 | PK | 75 | 1.3 | V | 6.13 | 58.60 | 74 | 15.40 |
| 2388.7 | 32.15 | Ave. | 75 | 1.3 | V | 6.13 | 38.28 | 54 | 15.72 |
| 2498.7 | 44.38 | PK | 120 | 1.3 | V | 7.21 | 51.59 | 74 | 22.41 |
| 2498.7 | 21.15 | Ave. | 120 | 1.3 | V | 7.21 | 28.36 | 54 | 25.64 |
| Middle Channel (2444.625 MHz) | | | | | | | | | |
| 2444.625 | 96.70 | PK | 32 | 1.2 | H | 7.21 | 103.91 | / | / |
| 2444.625 | 104.03 | PK | 351 | 1.0 | V | 7.21 | 111.21 | / | / |
| 768.049 | 42.88 | QP | 207 | 1.2 | V | -5.9 | 36.98 | 46 | 9.02 |
| 9778.5 | 31.73 | PK | 36 | 1.0 | H | 19.29 | 51.02 | 74 | 22.98 |
| 7333.875 | 32.11 | PK | 87 | 1.1 | H | 16.49 | 48.60 | 74 | 25.40 |
| 4889.25 | 35.98 | PK | 221 | 1.2 | V | 12.46 | 48.44 | 74 | 25.56 |
| 2351.2 | 52.47 | PK | 86 | 1.2 | V | 5.52 | 57.99 | 74 | 16.01 |
| 2351.2 | 29.36 | Ave. | 86 | 1.2 | V | 5.52 | 34.88 | 54 | 19.12 |
| 2326.5 | 41.68 | PK | 150 | 1.1 | H | 5.50 | 47.18 | 74 | 26.82 |
| 2326.5 | 20.69 | Ave. | 150 | 1.1 | H | 5.50 | 26.19 | 54 | 27.81 |
| 2496.4 | 47.54 | PK | 120 | 1.3 | V | 7.21 | 54.75 | 74 | 19.25 |
| 2496.4 | 24.36 | Ave. | 120 | 1.3 | V | 7.21 | 31.57 | 54 | 22.43 |

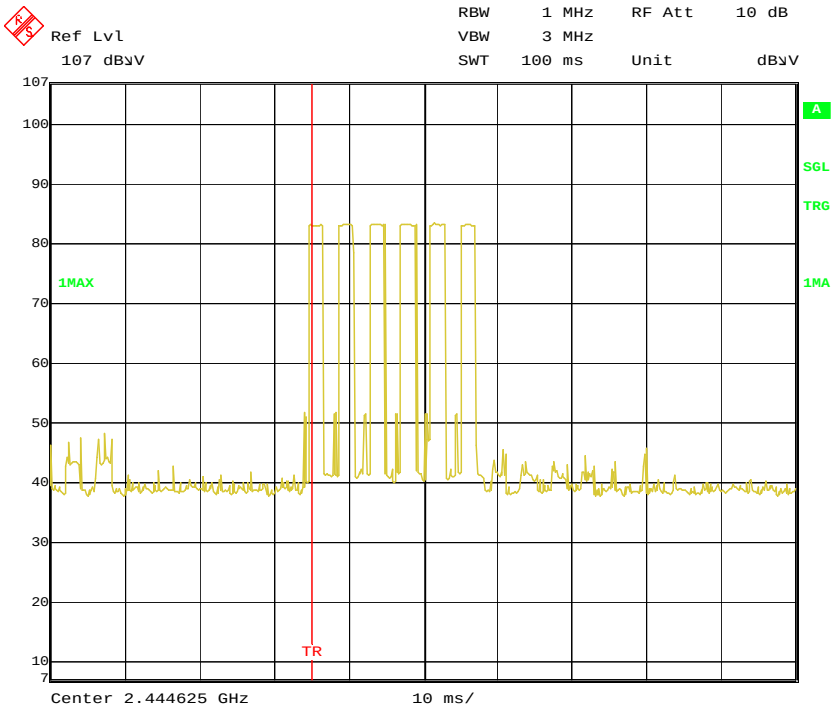
| Frequency (MHz) | Receiver | | Turn table Degree | Rx Antenna | | Corrected Factor (dB) | Corrected Amplitude (dBuV/m) | FCC Part 15.247/205/209 | |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBµV) | Detector (PK/QP/Ave.) | | Height (m) | Polar (H/V) | | | Limit (dBµV/m) | Margin (dB) |
| High Channel (2471.625 MHz) | | | | | | | | | |
| 2471.625 | 93.00 | PK | 135 | 1.1 | H | 7.21 | 100.21 | / | / |
| 2471.625 | 104.42 | PK | 22 | 1.2 | V | 7.21 | 111.63 | / | / |
| 768.049 | 43.02 | QP | 212 | 1.2 | V | -5.9 | 37.12 | 46 | 8.88 |
| 9886.5 | 31.72 | PK | 36 | 1.1 | V | 19.39 | 51.11 | 74 | 22.89 |
| 4943.25 | 36.92 | PK | 44 | 1.0 | V | 12.50 | 49.42 | 74 | 24.58 |
| 7414.875 | 32.53 | PK | 16 | 1.1 | V | 15.90 | 48.43 | 74 | 25.57 |
| 2329.6 | 54.67 | PK | 240 | 1.3 | V | 5.50 | 60.17 | 74 | 13.83 |
| 2329.6 | 32.15 | Ave. | 240 | 1.3 | V | 5.50 | 37.65 | 54 | 16.35 |
| 2379.8 | 53.87 | PK | 150 | 1.4 | V | 6.13 | 60.00 | 74 | 14.00 |
| 2379.8 | 31.65 | Ave. | 150 | 1.4 | V | 6.13 | 37.78 | 54 | 16.22 |
| 2489.6 | 58.49 | PK | 36 | 1.2 | V | 7.21 | 65.70 | 74 | 8.30 |
| 2489.6 | 35.24 | Ave. | 36 | 1.2 | V | 7.21 | 42.45 | 54 | 11.55 |

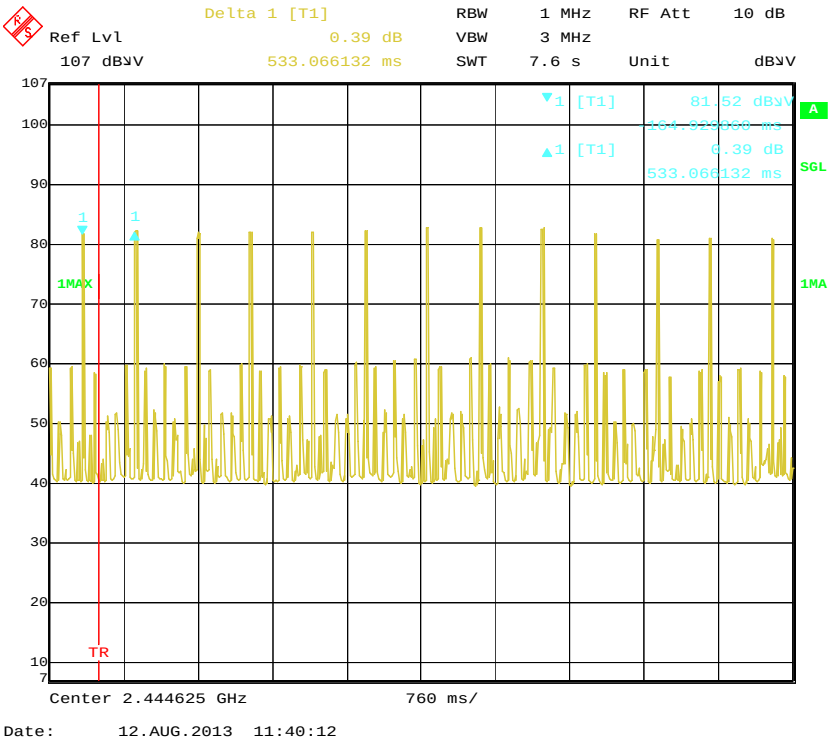
**Note:**
Corrected Amplitude = Corrected Factor + Reading
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Margin = Limit- Corr. Amplitude

| Field Strength of Radiated Emission Average | | | | | | | |
|---|---|---|---|---|---|---|---|
| Freq. (MHz) | Peak Corrected Amplitude. @3m (dBμV/m) | Polar (H/V) | Duty Cycle Factor (dB) | Corrected Amplitude. (dBμV/m) | FCC 15.247 | | Comment |
| | | | | | Limit (dBμV/m) | Margin | |
| Low Channel (2410.875 MHz) | | | | | | | |
| 2410.875 | 102.19 | H | -18.03 | 84.16 | / | / | Fundamental |
| 2410.875 | 107.42 | V | -18.03 | 89.39 | / | / | Fundamental |
| 4821.75 | 48.17 | V | -18.03 | 30.14 | 54 | 23.86 | Harmonic |
| 7323.625 | 50.05 | V | -18.03 | 32.02 | 54 | 21.98 | Harmonic |
| 9643.5 | 51.35 | V | -18.03 | 33.32 | 54 | 20.68 | Harmonic |
| Middle Channel (2444.625 MHz) | | | | | | | |
| 2444.625 | 103.91 | H | -18.03 | 85.88 | / | / | Fundamental |
| 2444.625 | 111.21 | V | -18.03 | 93.18 | / | / | Fundamental |
| 4889.25 | 48.44 | V | -18.03 | 30.41 | 54 | 23.59 | Harmonic |
| 7333.875 | 48.60 | H | -18.03 | 30.57 | 54 | 23.43 | Harmonic |
| 9778.5 | 51.02 | H | -18.03 | 32.99 | 54 | 21.01 | Harmonic |
| High Channel (2471.625 MHz) | | | | | | | |
| 2471.625 | 100.21 | H | -18.03 | 82.18 | / | / | Fundamental |
| 2471.625 | 111.63 | V | -18.03 | 93.6 | / | / | Fundamental |
| 4943.25 | 49.42 | V | -18.03 | 31.39 | 54 | 22.61 | Harmonic |
| 7414.875 | 48.43 | V | -18.03 | 30.40 | 54 | 23.60 | Harmonic |
| 9886.5 | 51.11 | V | -18.03 | 33.08 | 54 | 20.92 | Harmonic |

**Note:**
The field strength of average radiated emission is calculated by the following formula:
Ton=2.092*6ms=12.552ms
Tp=100ms
Duty Cycle = Ton/Tp*100%=(2.092*6)/100, 20*lg (Duty Cycle)= -18.03 dB
Ave. = PK+20* lg (Duty Cycle)


Delta 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
0.45 dB
VBW 3 MHz
30 dBm
2.092184 ms
SWT 3 ms
Unit dBm
3.5 dB Offset
1 [T1] -37.87 dBm
-11.022044 µs
1 [T1] 0.45 dB
2.092184 ms
A
SGL
TRG
1MA
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
TR
Center 2.444625 GHz
300 µs/
Date: 7.APR.2013 15:28:38


RBW 1 MHz
RF Att 10 dB
Ref Lvl
VBW 3 MHz
107 dBµV
SWT 100 ms
Unit dBµV
A
SGL
TRG
1MA
1MAX
107
100
90
80
70
60
50
40
30
20
10
7
TR
Center 2.444625 GHz
10 ms/
Date: 12.AUG.2013 11:41:12


Delta 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl
0.39 dB
VBW 3 MHz
107 dBµV
533.066132 ms
SWT 7.6 s
Unit dBµV
1 [T1]
81.52 dBµV
1 [T1]
0.39 dB
533.066132 ms
A
SGL
1MAX
1MA
TR
Center 2.444625 GHz
760 ms/
Date: 12.AUG.2013 11:40:12

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

## Applicable Standard

Frequency hopping systems shall have hoping 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 2400-2483.5 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 Procedure

1. Set the EUT in operating mode, RBW was set at 100 kHz,VBW≥ 3RBW maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace
3. Measure the channel separation.

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028 | 2012-11-24 | 2013-11-23 |

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

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0 kPa |

*The testing was performed by Gardon Zhang on 2013-04-03.*

**Test Result:** Compliance.

Please refer to following tables and plots

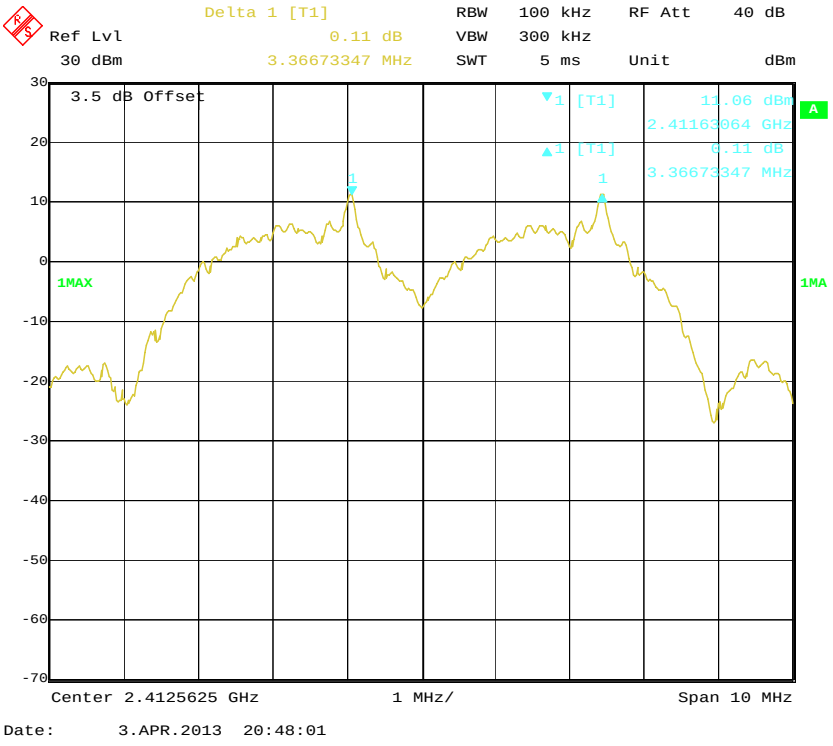
*Test Mode: Transmitting*

| Channel | Channel Frequency (MHz) | Channel Separation (MHz) | >Limit (MHz) | Result |
|---|---|---|---|---|
| Low | 2410.875 | 3.367 | 2.351 | Pass |
| Adjacent | 2414.250 | | | |
| Middle | 2444.625 | 3.367 | 2.351 | |
| Adjacent | 2448.000 | | | |
| High | 2471.625 | 3.367 | 2.351 | |
| Adjacent | 2468.250 | | | |

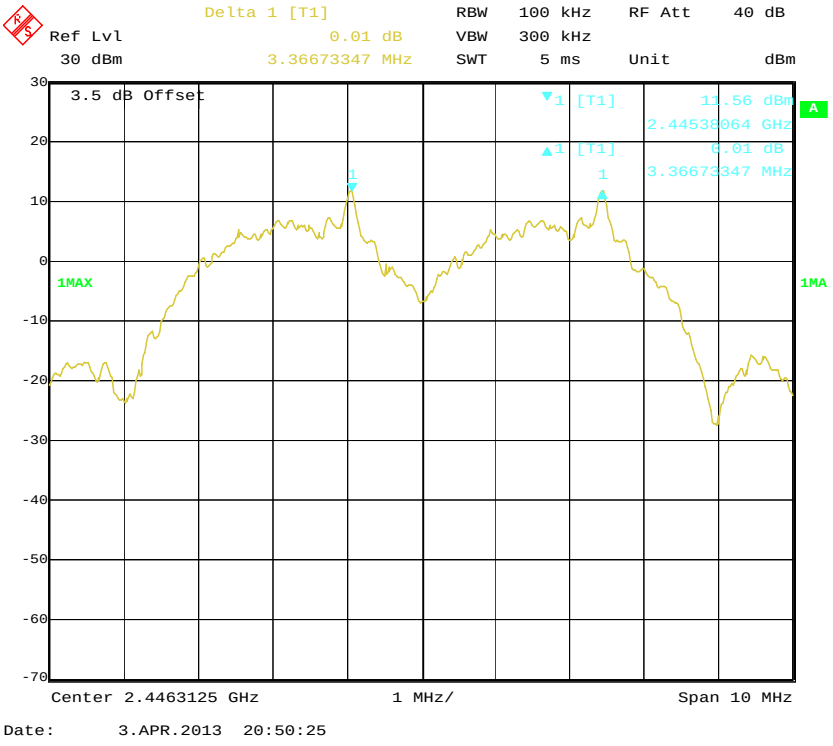
Note: limit =2/3 of bandwidth

Please refer to the following plots.

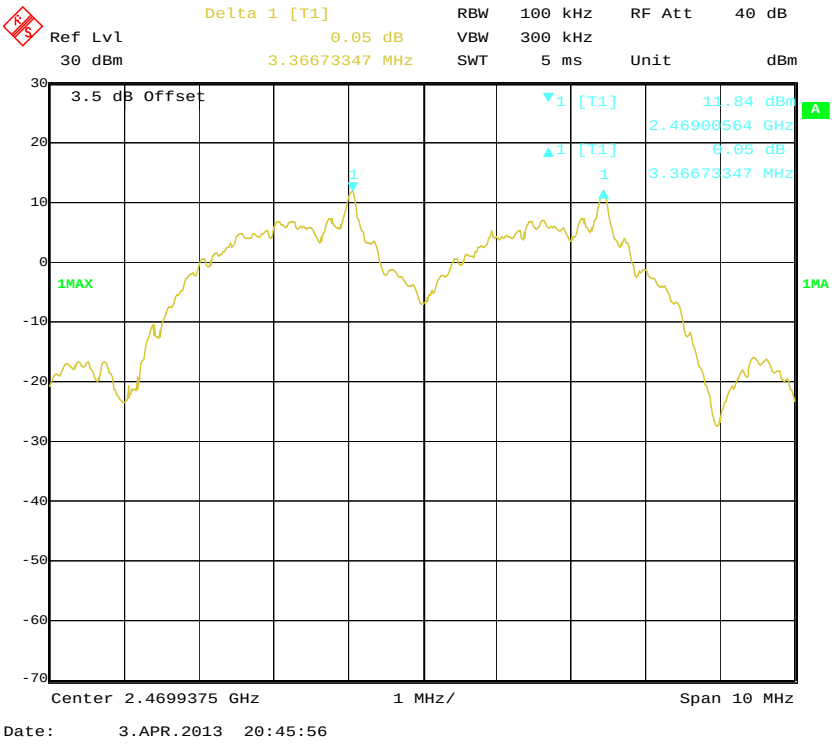
**Low Channel**



## Middle Channel




## High Channel



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

## 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 125mW.

## 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 |
|---|---|---|---|---|---|
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028 | 2012-11-24 | 2013-11-23 |

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

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0 kPa |

*The testing was performed by Gardon Zhang on 2013-04-03.*

**Test Result:** Compliance.

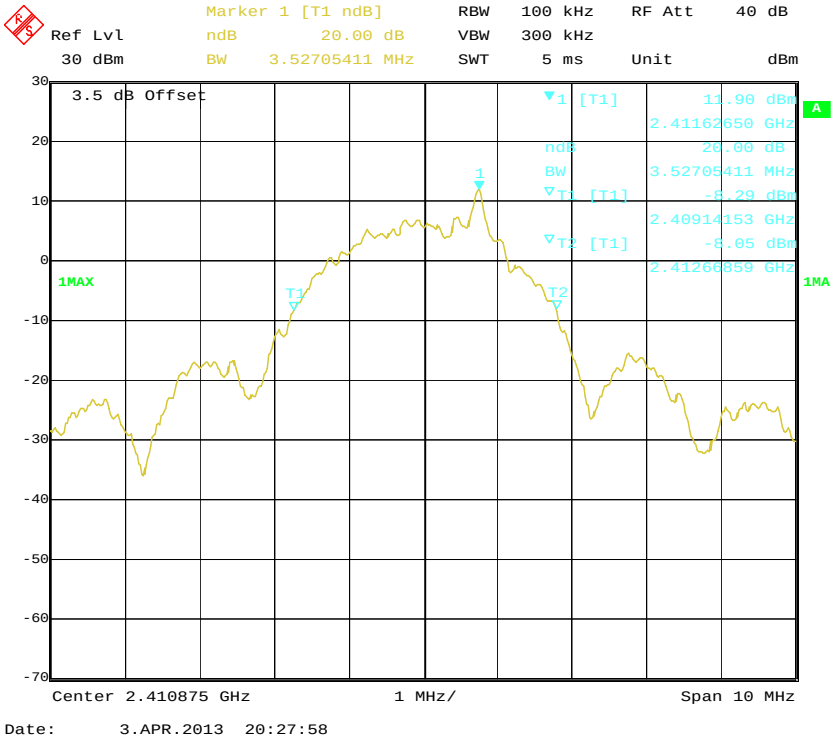
Please refer to following tables and plots

*Test Mode: Transmitting*

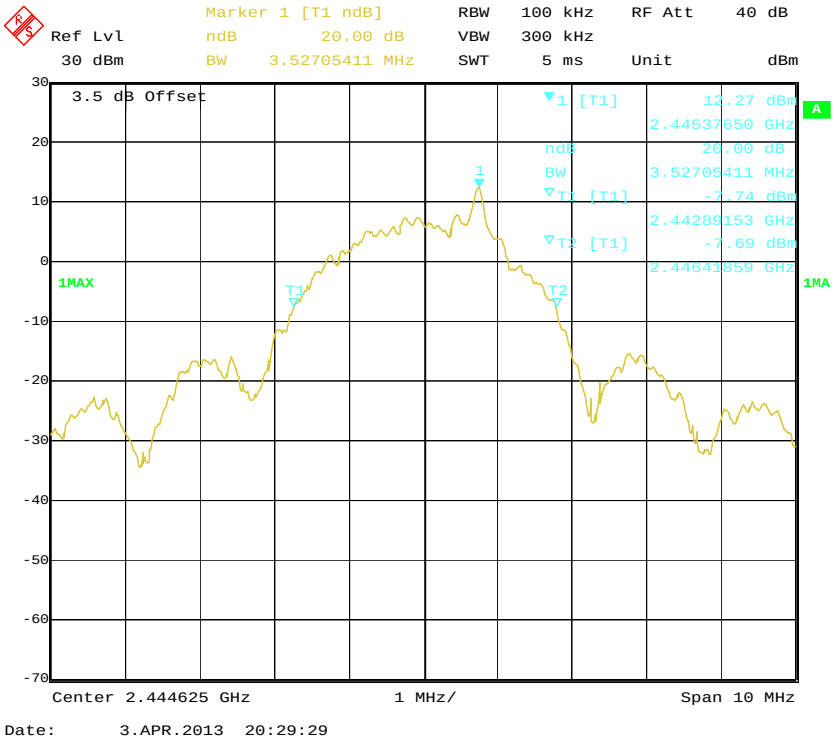
| Channel | Frequency (MHz) | 20 dB Emisson Bandwidth (MHz) |
|---|---|---|
| Low | 2410.875 | 3.527 |
| Middle | 2444.625 | 3.527 |
| High | 2471.625 | 3.527 |

Please refer to the following plots.

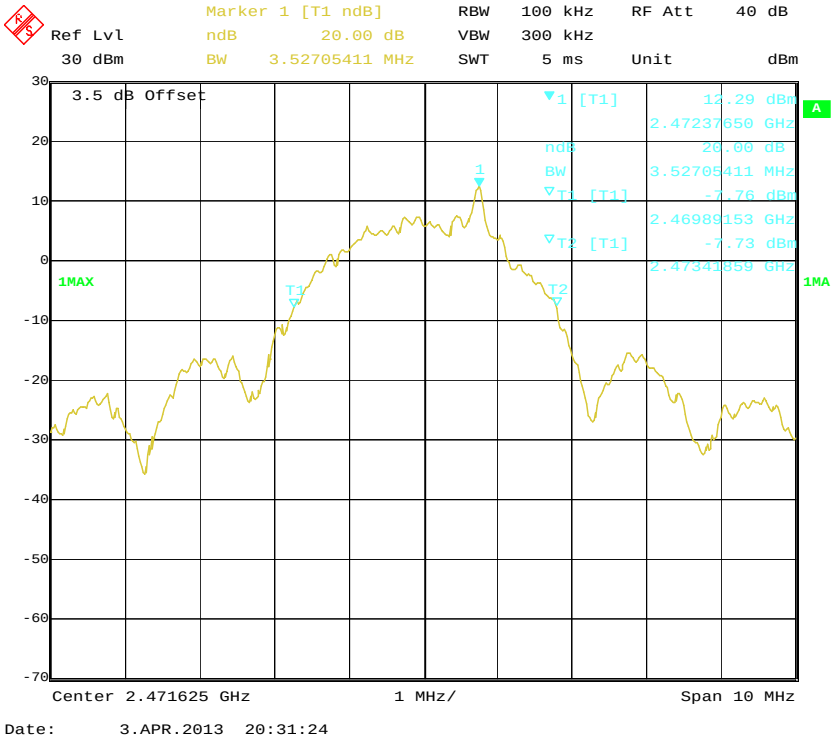
**Low Channel**



## Middle Channel




## High Channel



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

## 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 (SA) 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

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028 | 2012-11-24 | 2013-11-23 |

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

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0 kPa |

*The testing was performed by Gardon Zhang on 2013-04-07.*

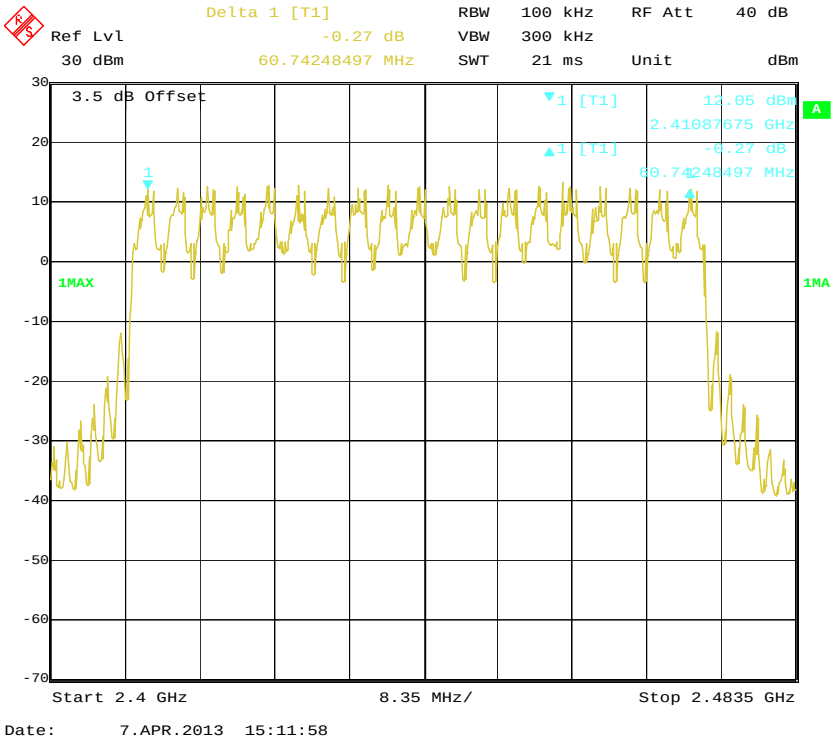
**Test Result:** Compliance.

Please refer to following tables and plots

*Test Mode: Transmitting*

| Frequency Range (MHz) | Number of Hopping Channel | Limit |
|---|---|---|
| 2400-2483.50 | 19 | ≥ 15 |

**Number of Hopping Channels**



# 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 X channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= Pulse time (ms) *6*13

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028 | 2012-11-24 | 2013-11-23 |

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

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0kPa |

*The testing was performed by Gardon Zhang on 2013-04-07 and 2013-08-12.*

**Test Result:** Compliance.

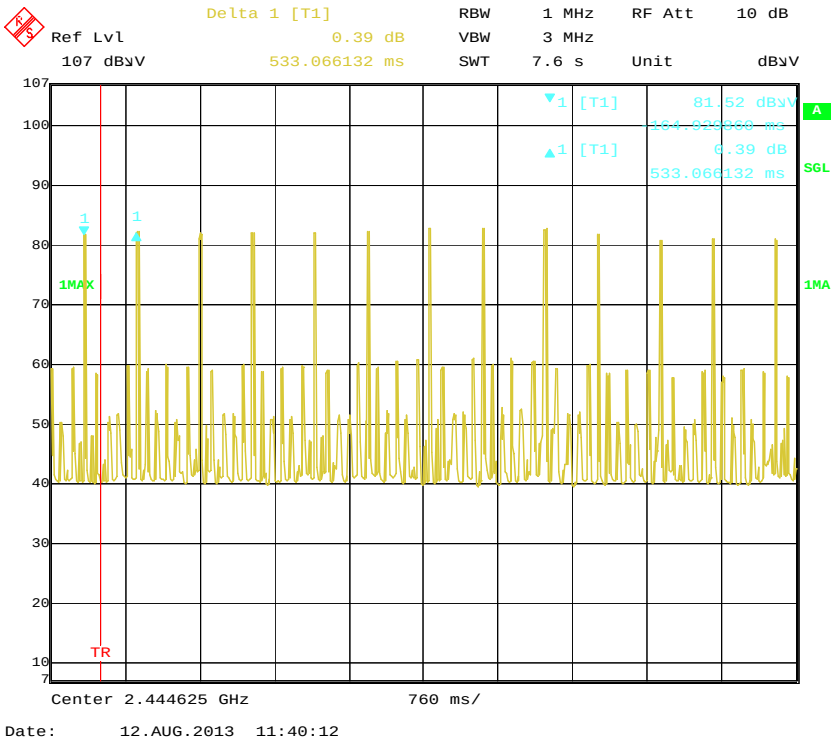
Please refer to following tables and plots

*Test Mode: Transmitting*

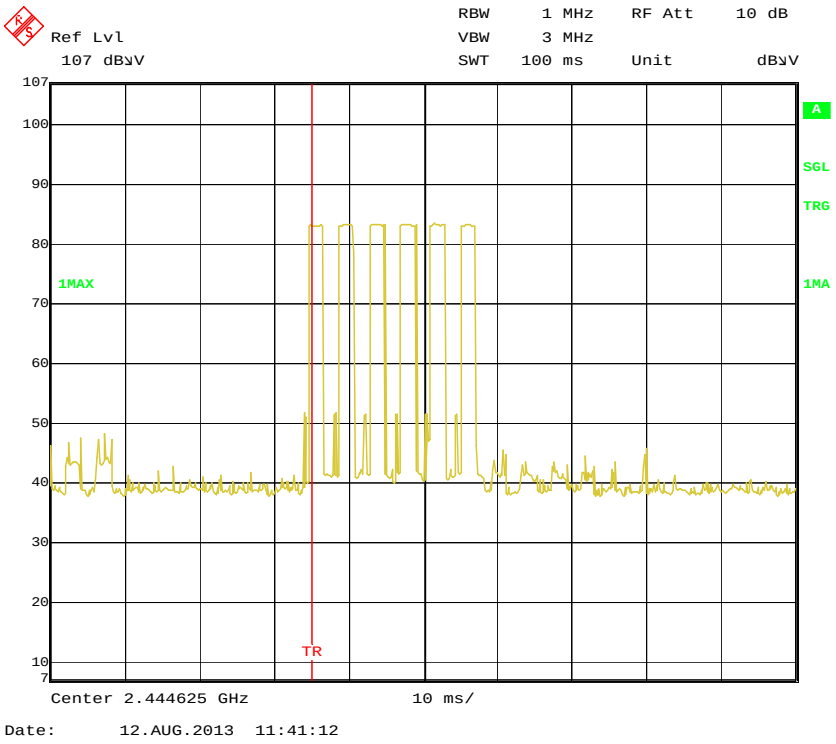
| Channel | Pulse Width (ms) | Dwell Time (S) | Limit (S) | Result |
|---|---|---|---|---|
| Low | 2.0922*6 | 0.163 | 0.4 | Pass |
| Middle | 2.0922*6 | 0.163 | 0.4 | Pass |
| High | 2.0922*6 | 0.163 | 0.4 | Pass |
| *Note: Dwell time = Pulse time*6*13S*<br>*Period =0.4S* number of hopping channels=0.4*19S=7.6S* | | | | |

Please refer to the following plots.

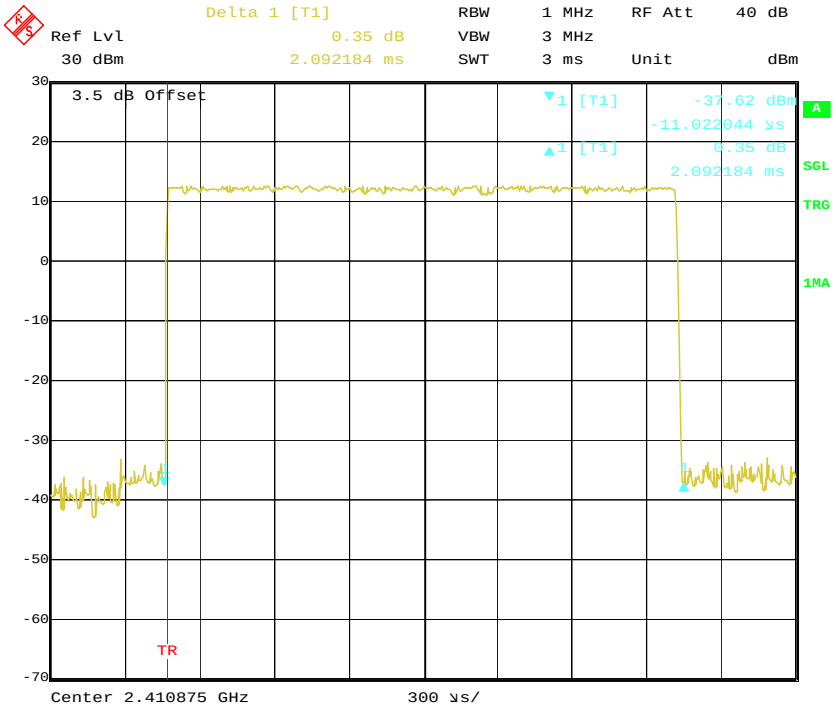
**7.6 S**



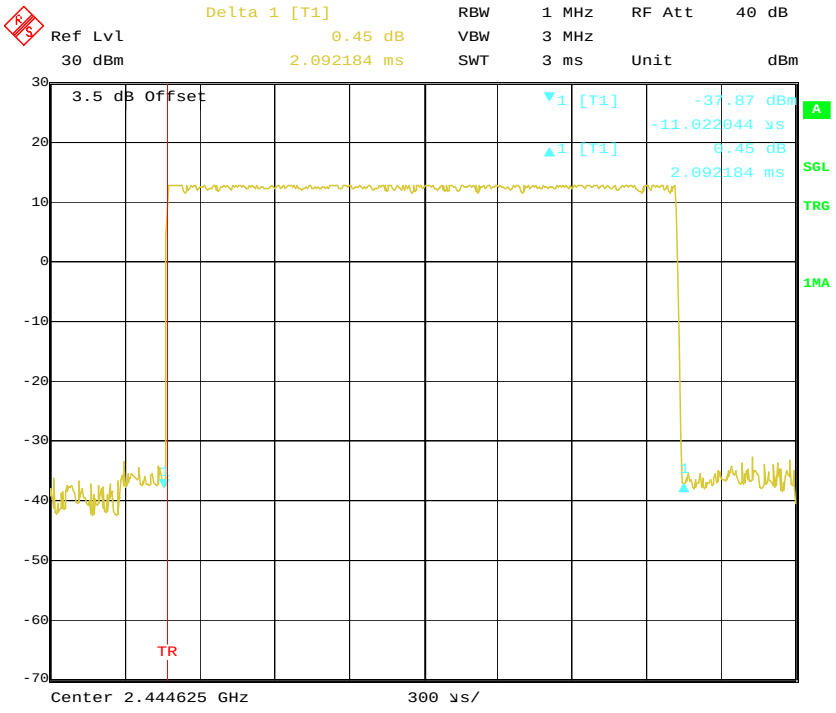
## 100 ms



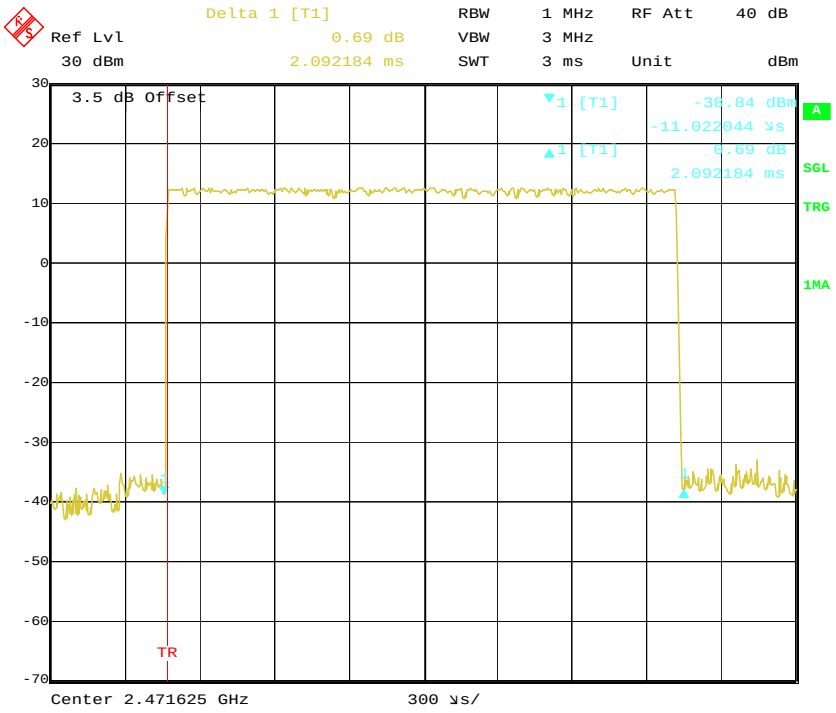

## Low Channel



## Middle Channel




## High Channel



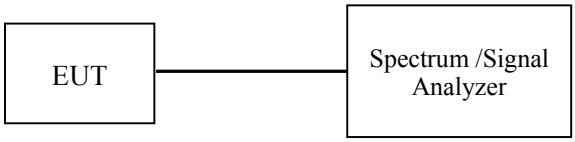
# FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

## 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 it 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

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028 | 2012-11-24 | 2013-11-23 |

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

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0kPa |

*The testing was performed by Gardon Zhang on 2013-04-03.*

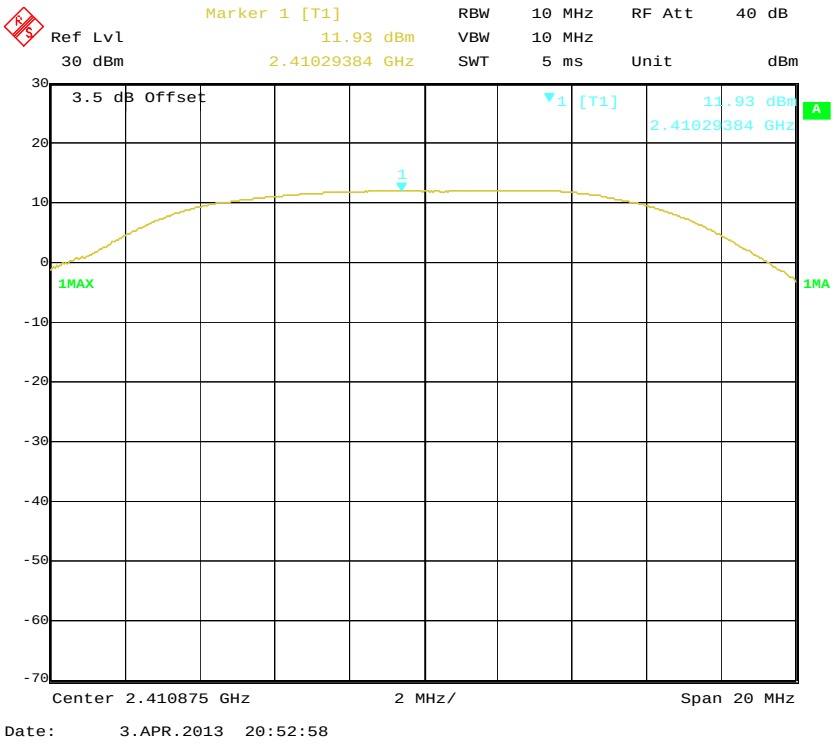
**Test Result:** Compliance.

*Test Mode: Transmitting*

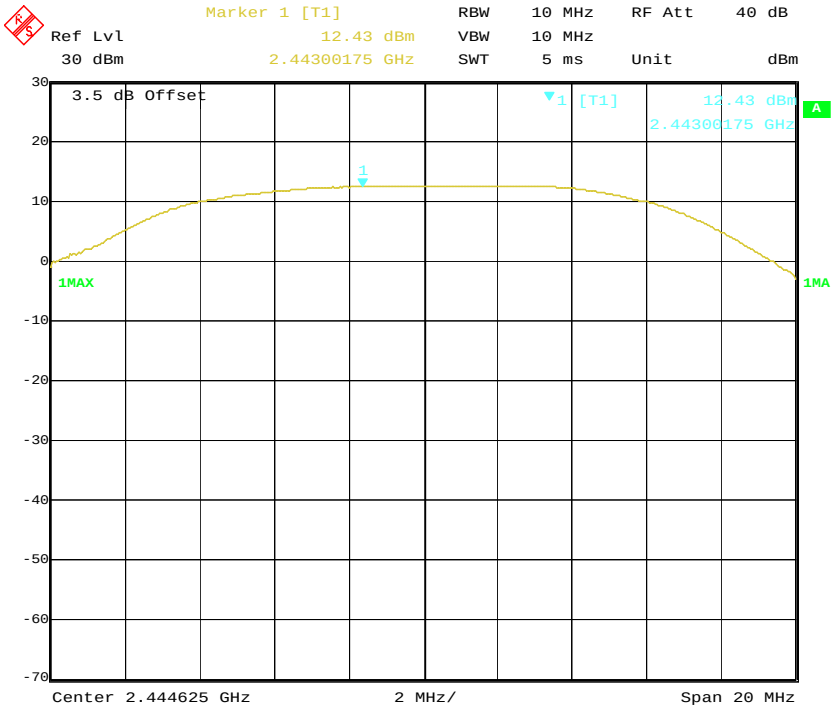
| Channel | Channel Frequency (MHz) | Peak Output Power (dBm) | Power Output (mW) | Limit (mW) |
|---|---|---|---|---|
| Low channel | 2410.875 | 11.93 | 15.60 | 125 |
| Middle channel | 2444.625 | 12.43 | 17.50 | 125 |
| High channel | 2471.625 | 12.56 | 18.03 | 125 |

**Note:** The data above was tested in conducted mode.

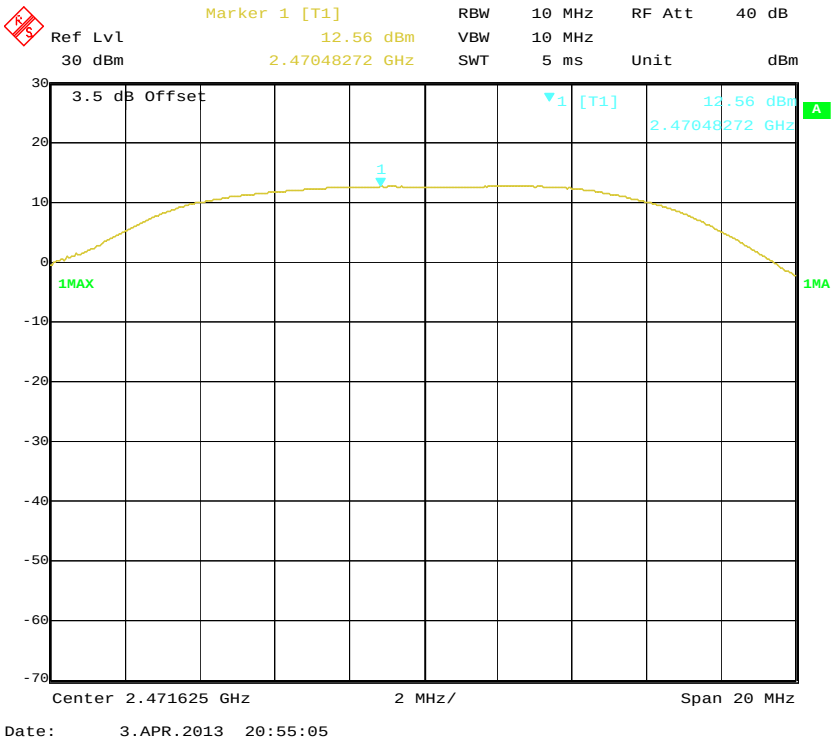
**Low Channel**



## Middle Channel




## High Channel



# FCC §15.247(d) - BAND EDGES

## 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. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in Operating 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. 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.
4. Repeat above procedures until all measured frequencies were complete.

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 8386001028 | 2012-11-24 | 2013-11-23 |

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

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0kPa |

*The testing was performed by Gardon Zhang on 2013-04-03.*

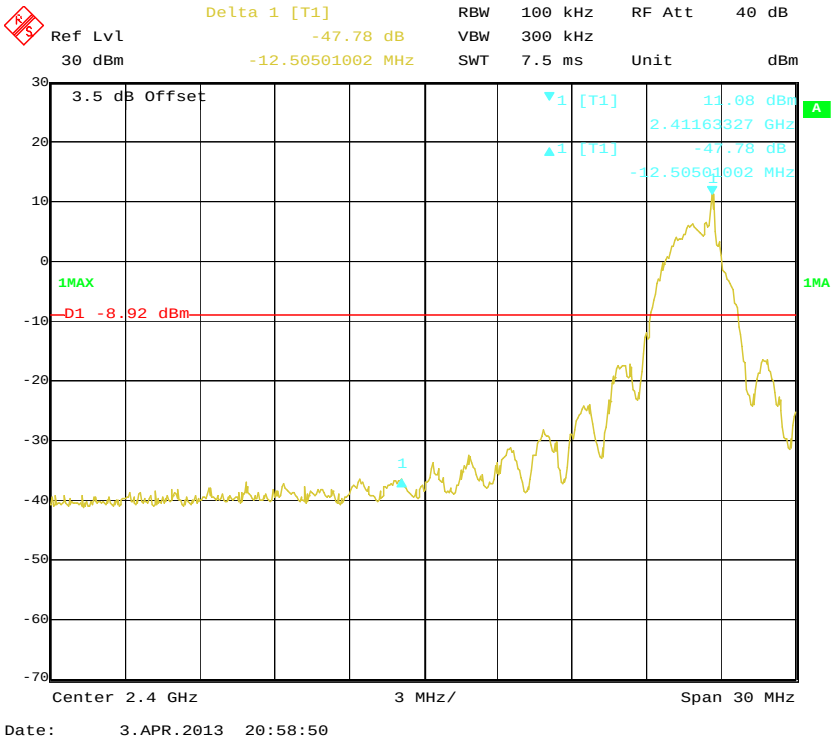
**Test Result:** Compliance.

*Test Mode: Transmitting*

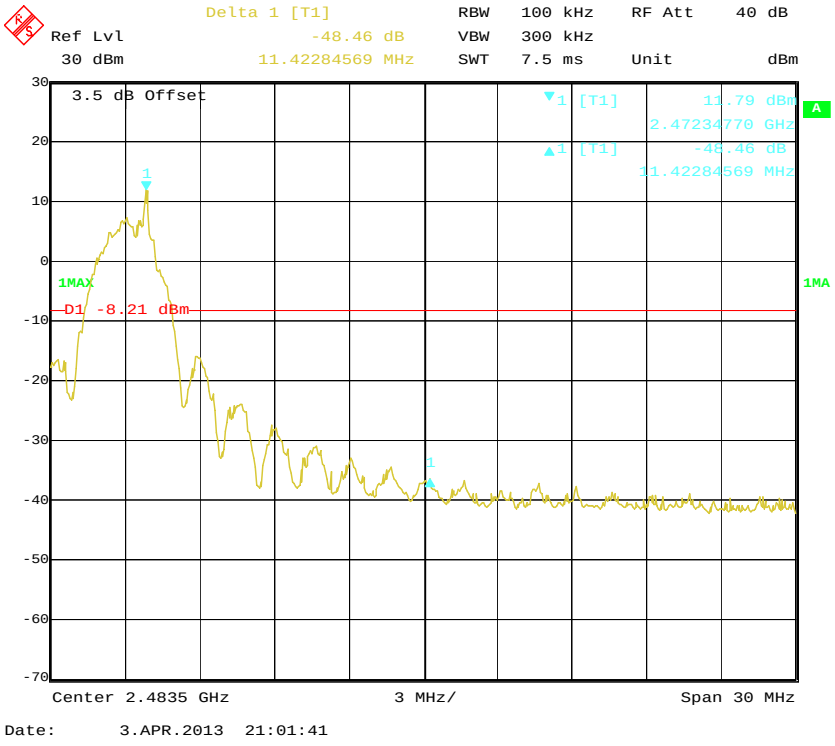
| Frequency Band | Delta Peak to Band Emission (dBc) | >Limit (dBc) |
|---|---|---|
| Left Band | 47.78 | 20 |
| Right Band | 48.46 | 20 |

Please refer to follow plots:

**Band Edge: Left Side**



## Band Edge: Right Side



# PRODUCT SIMILARITY DECLARATION LETTER

SVAT ELECTRONICS
4080 Montrose Road | Niagara Falls, ON | Canada L2H 1J9 | T. 905.353.0732 | F. 905.353.1701 | www.svat.com

Company: SVAT Electronics
Add: 4080 Montrose Rd, Niagara Falls, ON, Canada
Tel: 1.905.353.0732
Fax: 1.905.353.1701

2013-11-11

## Product Similarity Declaration Letter

To Whom It May Concern,

We, SVAT ELECTRONICS, hereby declare that our product 2.4GHz Digital Video Baby Monitor, the models 32012, 32014,32016,20502,22502,20503,22503,20507 and 22507 are different in model number due to different combinations, trade name and packaging, which have the same baby unit and parent unit on PCB layout and schematic, details as below:

| Model | Combination | Trade name | Remark |
|---|---|---|---|
| 32012 | 1 baby unit +1 parent unit | Levana | NA |
| 32014 | 1 baby unit | Levana | NA |
| 32016 | 2 baby units +1 parent unit | Levana | NA |
| 20502 | 1 baby unit +1 parent unit | Defender | Packaging ENGB |
| 22502 | 1 baby unit +1 parent unit | Defender | Packaging Eco |
| 20503 | 2 baby units +1 parent unit | Defender | Packaging ENGB |
| 22503 | 2 baby units +1 parent unit | Defender a | Packaging Eco |
| 20507 | 1 baby unit | Defender | Packaging ENGB |
| 22507 | 1 baby unit | Defender | Packaging Eco |

Model 32012 was tested by BACL.

Please contact me if you have any question.

Signature:

Andrea Mlinarevic
Assistant Product Manager

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