



**MOBILE DEVICES BUSINESS**

**PRODUCT SAFETY AND COMPLIANCE  
EMC LABORATORY**

**EMC TEST REPORT - Addendum**

**Test Report Number** –23156-1BT

**Report Date** – 2009-06-29

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

Signature:

Name: Lei Yang

Title: EMC Project Manager

Test: 2009-06-20 to 2009-06-26

As the responsible test lab manager, I hereby declare that the model tested as specified in this report conforms to the requirements indicated.

Signature:

Name: Yilin Zhao

Title: Test Lab Manager

Date: 2009-06-29

This report must not be reproduced, except in full, without written approval from this laboratory.

FCC Registration Number: 177885

IC Registration Number: 109AW-1

ADR Testing Service location ADR BJ  
ISO/IEC-17025:2005 accredited by UKAS



**Table of Contents**

Test Report Details ..... 3

Applicable Standards ..... 4

Summary of Testing..... 5

General and Special Conditions..... 5

Equipment and Cable Configurations..... 6

Measuring Equipment and Calibration Information ..... 6

Description of Bluetooth (BT) Transmitter ..... 7

Measurement Procedures and Data..... 8

**FIELD STRENGTH OF SPURIOUS EMISSIONS**..... 8

        Measurement Procedure..... 8

        Measurement Results..... 8

            30 MHz – 18 GHz Low Channel Dual Polarization X ..... 9

            30 MHz – 18 GHz Low Channel Dual Polarization Y ..... 9

            30 MHz – 18 GHz Low Channel Dual Polarization Z..... 10

            30 MHz – 18 GHz Middle Channel Dual Polarization X..... 10

            30 MHz – 18 GHz Middle Channel Dual Polarization Y ..... 11

            30 MHz – 18 GHz Middle Channel Dual Polarization Z ..... 11

            30 MHz – 18 GHz High Channel Dual Polarization X ..... 12

            30 MHz – 18 GHz High Channel Dual Polarization Y ..... 12

            30 MHz – 18 GHz High Channel Dual Polarization Z..... 13

            18-26.5 GHz Low Channel Dual Polarization Y ..... 13

            18-26.5 GHz Middle Channel Dual Polarization Y..... 14

            18-26.5 GHz High Channel Dual Polarization Y ..... 14

**BAND-EDGE COMPLIANCE OF RF RADIATED EMISSIONS**..... 15

        Measurement Procedure..... 15

        Measurement Results ..... 15

            Authorized Band Emissions Low Channel Dual Polarization X..... 16

            Authorized Band Emissions Low Channel Dual Polarization Y..... 17

            Authorized Band Emissions Low Channel Dual Polarization Z ..... 18

            Authorized Band Emissions High Channel Dual Polarization X ..... 19

            Authorized Band Emissions High Channel Dual Polarization Y ..... 20

            Authorized Band Emissions High Channel Dual Polarization Z..... 21

**PICTURES**..... 22

## **Test Report Details**

Tests Performed By: Motorola (China) Technologies Ltd.  
Asia Global Compliance Labs  
No.1 Wang Jing East Road  
Chao Yang District  
Beijing, 100102, P. R. China  
Phone: +86 10 8473 2610  
FCC Registration Number: 177885  
IC Registration Number: 109AW-1

Tests Requested By: Motorola Inc.  
Mobile Devices business  
600 North US Hwy 45  
Libertyville, IL 60048

Product Type: Cell phone with embedded Bluetooth

Form Factor: Bar

Signaling Capability: CDMA 800/1900, CDMA 1X/EV-DO Release 0,  
aGPS, Bluetooth Class 2, Version 2.0+EDR

ESN: 809D9DA0

FCC ID: IHDP56KB1

Project number: 23156-1

Testing Complete Date: 06-26-2009

## Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

- Part 15 Subpart C – Intentional Radiators
- Part 22 Subpart H - Public Mobile Services
- Part 24 - Personal Communications Services
- Part 27 - Wireless Communications Service
- Part 90 - Private Land Mobile Radio Service

Applicable Standards: ANSI C63.4:2003, RSS-GEN, RSS-210 (Bluetooth).

The following tests were performed according to the regulations:

- The **spurious radiated emission** requirements of § **15.247(d) of CFR47 Part 15 2006**, specifically” 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)).
- Under this project only 30 to 1000 MHz, 1 to 26.5 GHz radiated emissions and radiated band-edge measurements were performed.
- For frequencies below 1 GHz a 100 kHz RBW (6 dB) is used and above 1 GHz a 1 MHz RBW (6 dB) is used.

**Summary of Testing**

| Test | Test Name                                     | Pass/Fail |
|------|---|-----------|
| 1    | Field Strength of Spurious Emissions          | Pass      |
| 2    | Band-edge Compliance of RF Radiated Emissions | Pass ( )  |

| Test | Test Name                                     | Results   |
|------|---|-----------|
| 1    | Field Strength of Spurious Emissions          | See plots |
| 2    | Band-edge Compliance of RF Radiated Emissions | See plots |

The margin with respect to the limit is the minimum margin for all modes and bands. ( ) indicates the margin at which the product exceeds the limit.

**General and Special Conditions**

The test sample was tested using a fully charged battery when applicable. Where a battery could not be used due to the need for a controlled variation of input voltage, an external power supply was utilized.

All testing was done in an indoor controlled environment with an average temperature of 25 ° C ± 1 ° C and relative humidity of 45 % ± 6 % over the dates used for testing.

## Equipment and Cable Configurations

The test sample was tested in a stand-alone configuration that is representative of typical use.

## Measuring Equipment and Calibration Information

Equipment related to the semi-anechoic chamber testing:

| Equipment                  | Model/type     | Serial number | Operational range  | Date of calibration |
|----------------------------|----------------|---------------|--|---------------------|
| EMI Receiver               | ESU 40         | 100036        | 20 Hz – 40 GHz   | 05.15.2009          |
| Pre Amplifiers             | PA-02-0001:    | 2007343       | 10 kHz – 3 GHz   | 06.26.2009          |
|                            | PA-02-218      | 2007344       | 3 GHz – 18 GHz   | 06.26.2009          |
|                            | PA-02-5        | 2007345       | 18 GHz – 40 GHz  | 06.26.2009          |
| Radio Communication Tester | CMU 200        | 112790        | GSM<br>850/900/1800/1900,<br>IS95,<br>UMTS, CDMA,<br>Bluetooth | N/A                 |
| Band Reject Filter         | WRCG           | N/A           | ISM band   | N/A                 |
|                            | 4N45-24241/3/6 | N/A           | WLAN   | N/A                 |

The antennas used in the various tests are listed in the below table.

| Antenna             | Type          | Serial number | Operational range | Date of calibration |
|---------------------|---------------|---------------|-------------------|---------------------|
| Hybrid-log periodic | TDK HLP 3003C | 130361        | 30 MHz – 3 GHz    | 11.07.08            |
| Double ridged Horn  | TDK HRN0118   | 130303        | 1 GHz – 18 GHz    | 03.26.09            |
| Double ridged Horn  | ETS HRN3116   | 00071938      | 18 GHz – 40 GHz   | 10.17.08            |

All equipment is on a one-year calibration cycle except for antennas

## **Description of Bluetooth (BT) Transmitter**

The 23156-1 cell phone sample offers Bluetooth as a feature. The Bluetooth spread-spectrum, frequency hopping transceiver is designed to operate between 2400 and 2483.5 MHz. The antenna installation is permanent. For a more thorough description of the functionality please refer to Exhibit 12 of this package.

As a Bluetooth transmitter, it is designed operate with other Bluetooth devices as defined by the industrial standard. In this application, the test sample is battery-operated.

## **Measurement Procedures and Data**

### **FIELD STRENGTH OF SPURIOUS EMISSIONS**

CFR Part 2.1053, 15.205, 15.209, 15.247

#### **Measurement Procedure**

The test sample is placed inside the semi-anechoic chamber on a polystyrene table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

For 30 MHz – 18 GHz:

Field Strength (dB $\mu$ V/m) = EMI Receiver Level (dB $\mu$ V) + Cable Loss (dB) -  
Amplifier Gain (dB) + Filter loss (dB) + Antenna  
Correction Factor (3/m)

For 18 GHz – 26.5 GHz:

Field Strength (dB $\mu$ V/m) = EMI Receiver Level (dB $\mu$ V) + Cable Loss (dB) -  
Amplifier Gain (dB) + Filter loss (dB) + Antenna  
Correction Factor (1/m)

A fully charged battery was used for the supply voltage.

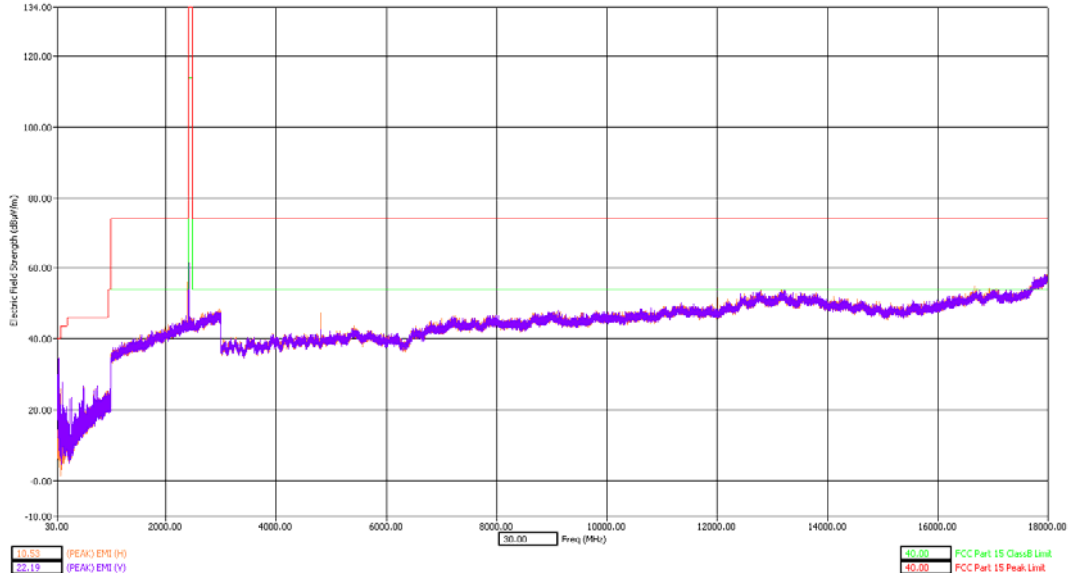
**The test sample was operated during the measurements under the following conditions:**

- Tests were performed at low, mid and high channels.
- Tests were performed in X, Y and Z polarizations.

#### **Measurement Results**

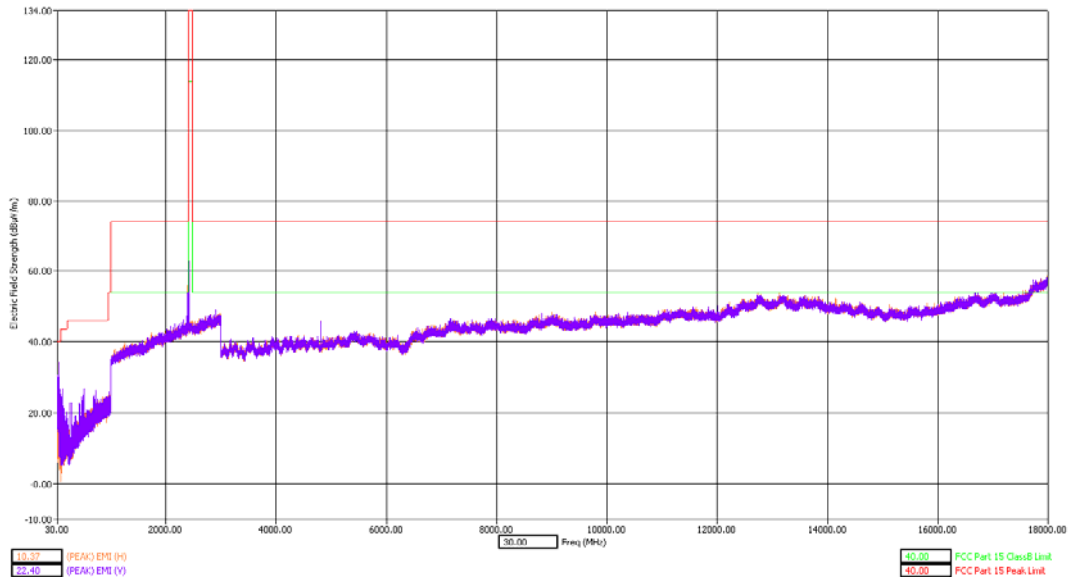
For peak emissions detected above 1 GHz, only those emissions that are higher than the AVG limit line plus 8 dB are selected for final emission analysis.

Test title: FCC 15.205, 15.209, 15.247  
Operator name: Hongfai Sun  
EUT type: Torch KONA L2H009090A0  
EUT condition: HW: P3  
Date: 6/26/2009  
Time: 5:21:25 PM  
Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
BT ch. 00 (2402 MHz) do in test mode. Orientation X=H  
HSP 3000C antenna (30 MHz - 3 GHz).  
HRN 0110 antenna (3 GHz-18 GHz) -  
Peak detector used.



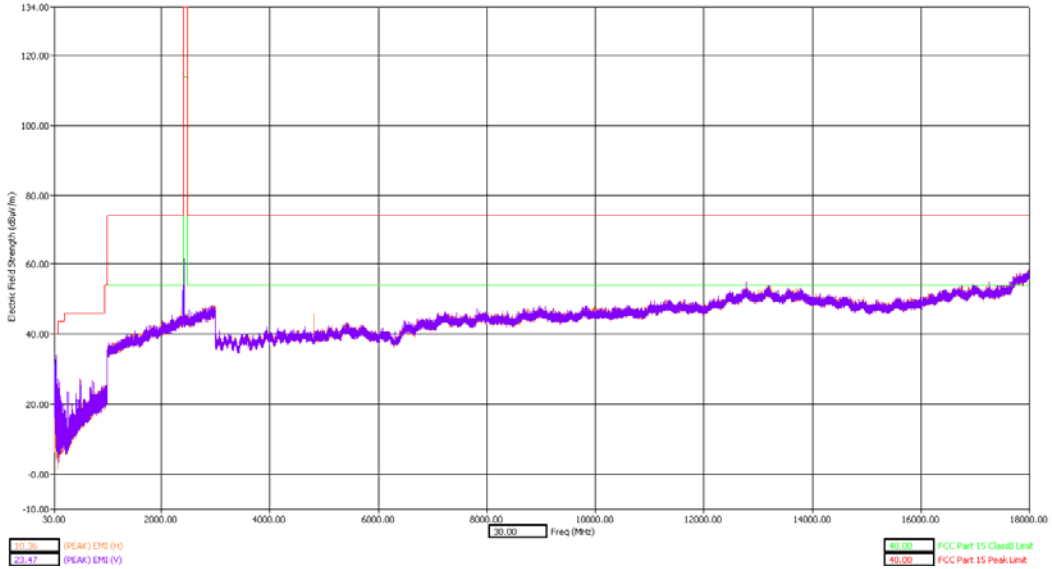
### 30 MHz – 18 GHz Low Channel Dual Polarization X

Test title: FCC 15.205, 15.209, 15.247  
Operator name: Hongfai Sun  
EUT type: Torch KONA L2H009090A0  
EUT condition: HW: P3  
Date: 6/26/2009  
Time: 5:30:09 PM  
Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
BT ch. 00 (2402 MHz) do in test mode. Orientation Y=V  
HSP 3000C antenna (30 MHz - 3 GHz).  
HRN 0110 antenna (3 GHz-18 GHz) -  
Peak detector used.



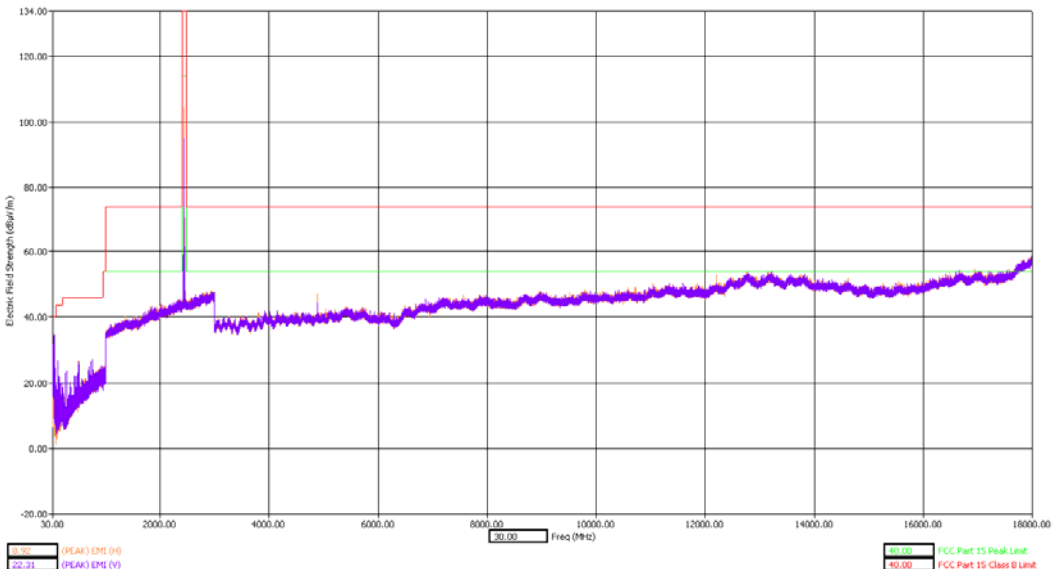
### 30 MHz – 18 GHz Low Channel Dual Polarization Y

Test title: FCC 15.205, 15.209, 15.247  
Operator name: Hongzhi Sun  
EUT type: Torch ROM, ESN:809D9DA0  
EUT condition: HW: P3  
Date: 6/26/2009  
Time: 5:07:18 PM  
Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
BT ch. 00 (2402 MHz) do in test mode. Orientation Zvw  
HLP 3000C antenna (30 MHz - 3 GHz).  
HRN 0110 antenna (3 GHz-18 GHz).  
Peak detector used.



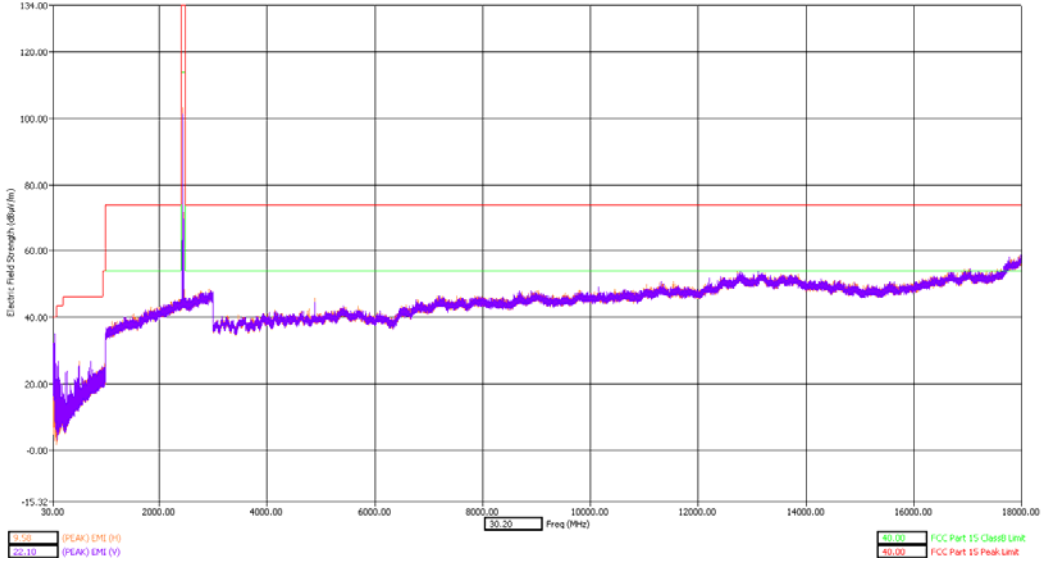
**30 MHz – 18 GHz Low Channel Dual Polarization Z**

Test title: FCC 15.205, 15.209, 15.247  
Operator name: Hongzhi Sun  
EUT type: Torch ROM, ESN:809D9DA0  
EUT condition: HW: P3  
Date: 6/26/2009  
Time: 3:45:45 PM  
Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
BT ch. 39 (2441 MHz) do in test mode. Orientation XwH  
HLP 3000C antenna (30 MHz - 3 GHz).  
HRN 0110 antenna (3 GHz-18 GHz).  
Peak detector used.



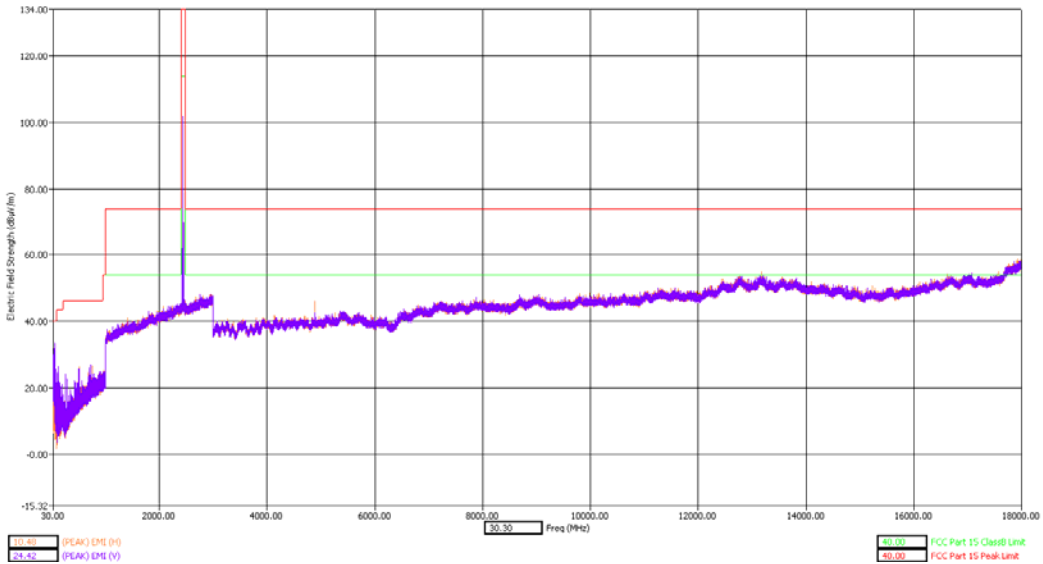
**30 MHz – 18 GHz Middle Channel Dual Polarization X**

Test title: FCC 15.205, 15.209, 15.247  
Operator name: Hongzhi Sun  
EUT type: Torch NOAA, ESN:80909040  
EUT condition: HW: P3  
Date: 6/26/2009  
Time: 6:52:36 PM  
Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
BT ch. 29 (2441 MHz) do in test mode. Orientation Y-Y  
HP 3033C antenna (30 MHz - 3 GHz).  
HRN 0118 antenna (3 GHz-18 GHz).  
Peak detector used.



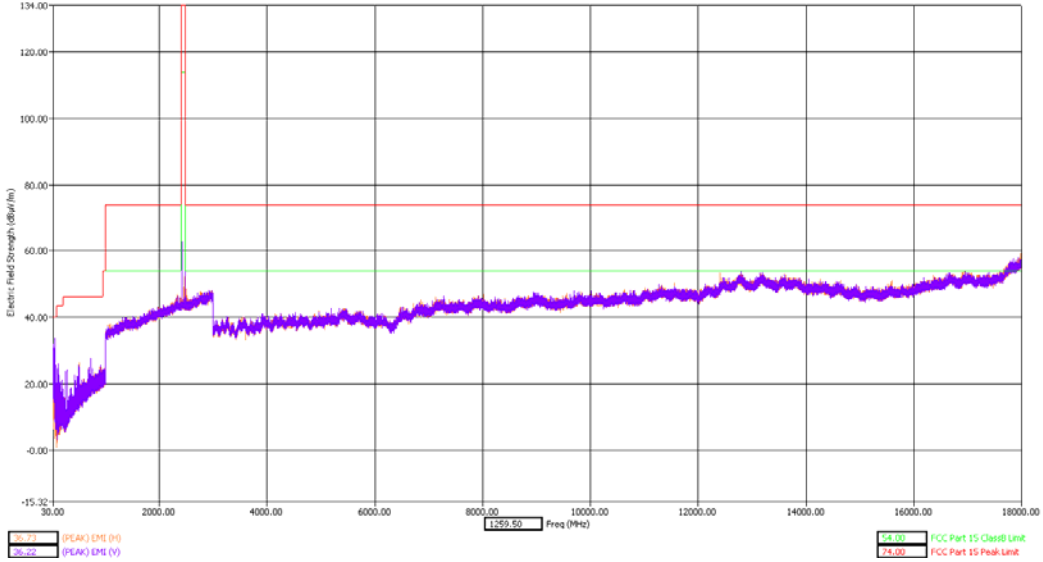
### 30 MHz – 18 GHz Middle Channel Dual Polarization Y

Test title: FCC 15.205, 15.209, 15.247  
Operator name: Hongzhi Sun  
EUT type: Torch NOAA, ESN:80909040  
EUT condition: HW: P3  
Date: 6/26/2009  
Time: 6:52:36 PM  
Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
BT ch. 29 (2441 MHz) do in test mode. Orientation Z-Y  
HP 3033C antenna (30 MHz - 3 GHz).  
HRN 0118 antenna (3 GHz-18 GHz).  
Peak detector used.



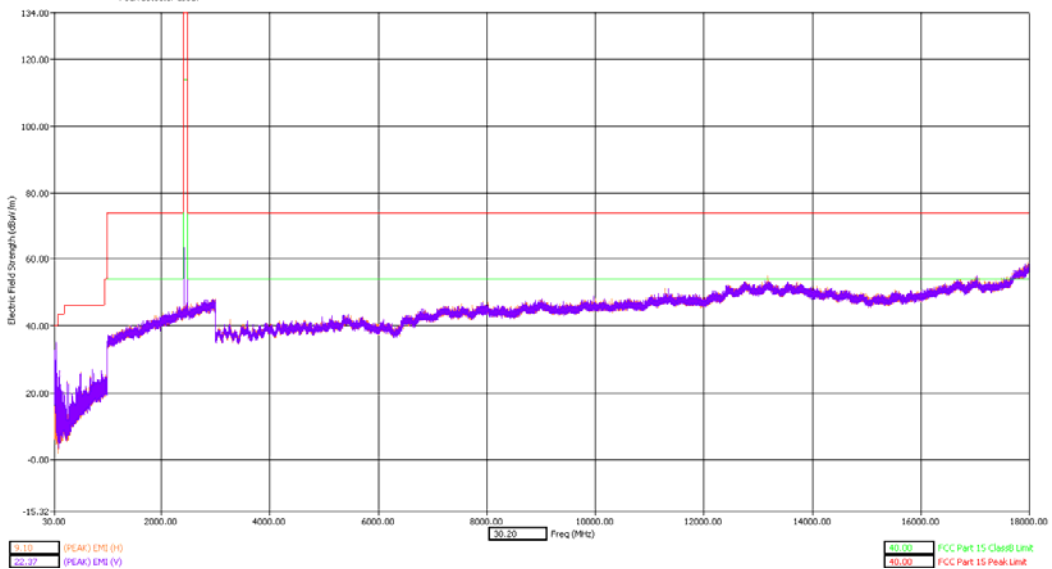
### 30 MHz – 18 GHz Middle Channel Dual Polarization Z

Test title: FCC 15.205, 15.209, 15.247  
Operator name: Hongzhi Sun  
EUT type: Torch ROBA, ESN:80909040  
EUT condition: HW: P3  
Date: 6/26/2009  
Time: 6:00:33 PM  
Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
BT ch. 78 (2480 MHz) do in test mode. Orientation Z=H  
H.F. 3003C antenna (30 MHz - 3 GHz).  
HRN 0118 antenna (3 GHz-18 GHz).  
Peak detector used.

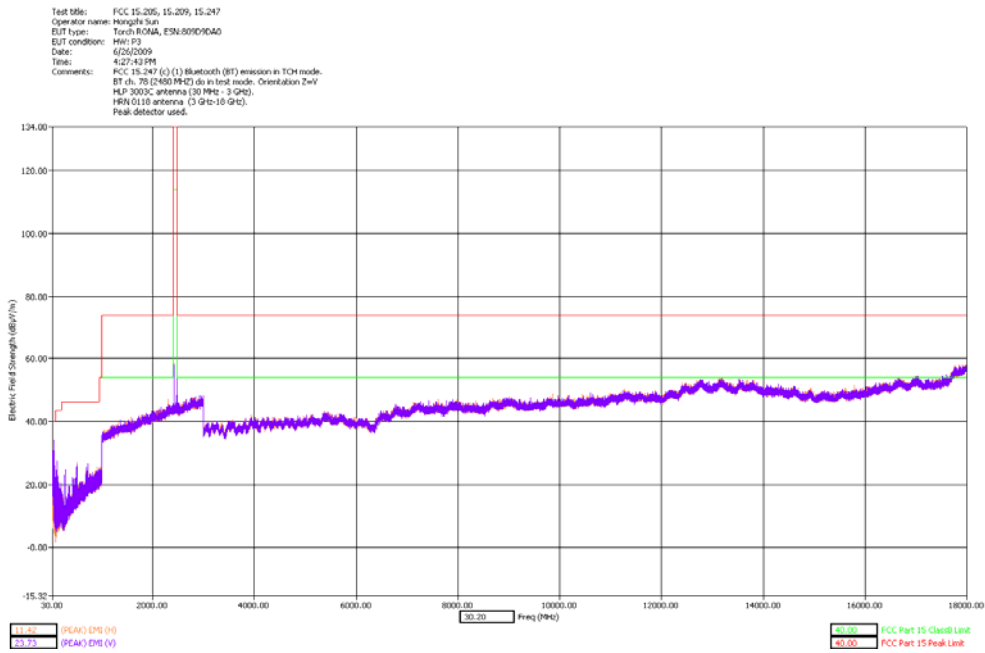


### 30 MHz – 18 GHz High Channel Dual Polarization X

Test title: FCC 15.205, 15.209, 15.247  
Operator name: Hongzhi Sun  
EUT type: Torch ROBA, ESN:80909040  
EUT condition: HW: P3  
Date: 6/26/2009  
Time: 6:04:36 PM  
Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
BT ch. 78 (2480 MHz) do in test mode. Orientation Y=V  
H.F. 3003C antenna (30 MHz - 3 GHz).  
HRN 0118 antenna (3 GHz-18 GHz).  
Peak detector used.



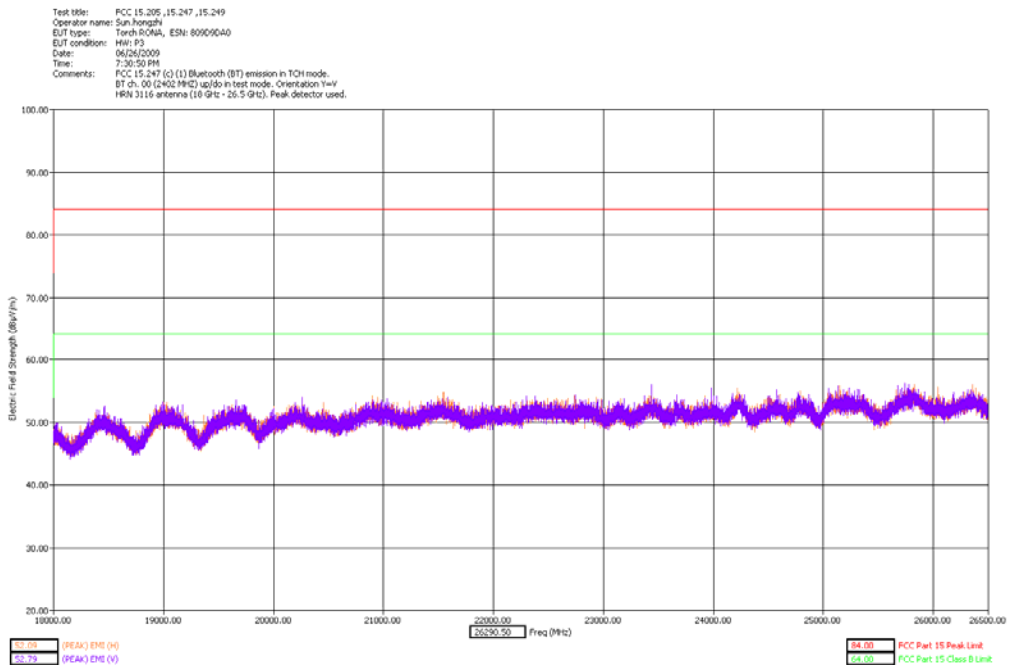
### 30 MHz – 18 GHz High Channel Dual Polarization Y



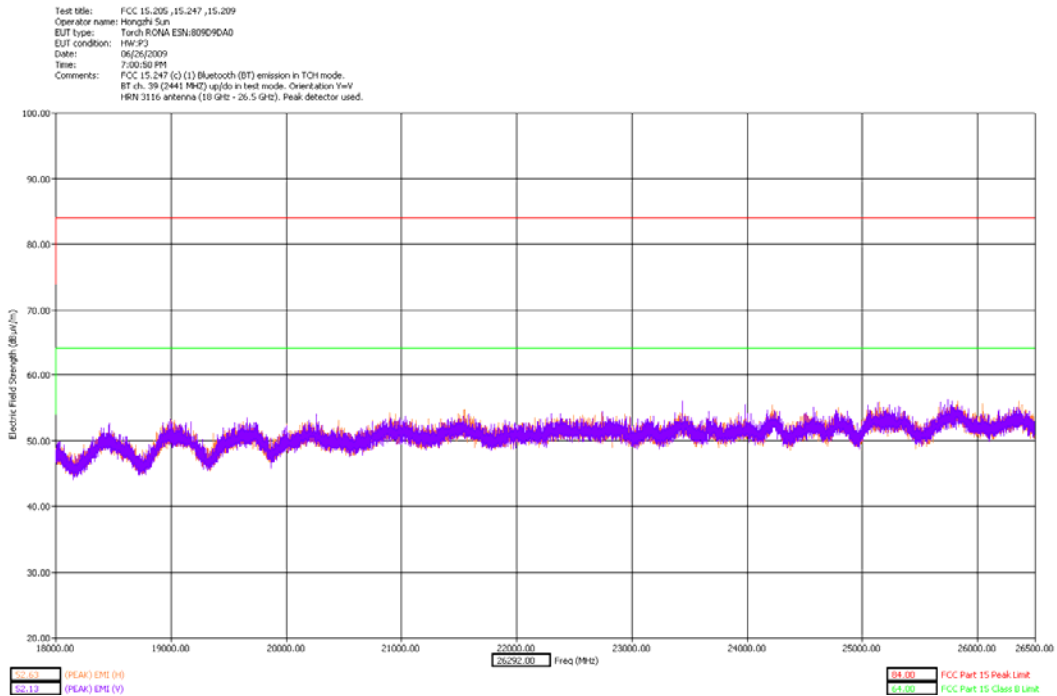
**30 MHz – 18 GHz High Channel Dual Polarization Z**

**There were no discernible emissions above the noise floor for 18 - 26.5 GHz for Low, Mid and High Channels and all polarizations in Bluetooth operation band. The distance between EUT and receiving antenna is 1m.**

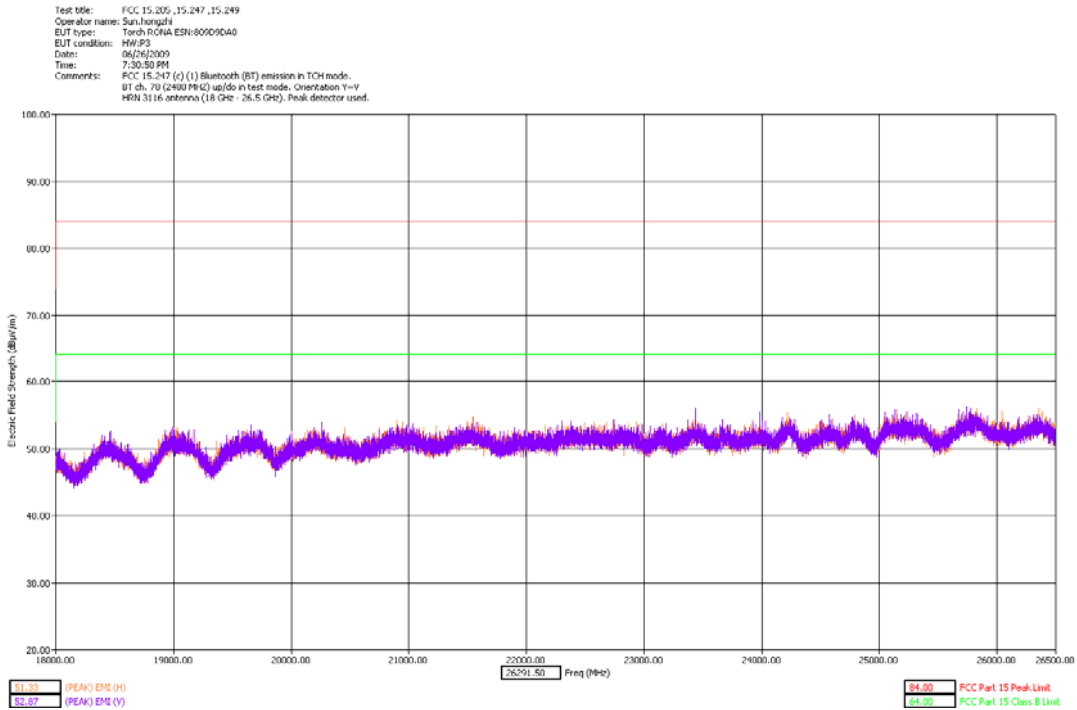
**Only polarization Y results are showed here:**



**18-26.5 GHz Low Channel Dual Polarization Y**



**18-26.5 GHz Middle Channel Dual Polarization Y**



**18-26.5 GHz High Channel Dual Polarization Y**

## **BAND-EDGE COMPLIANCE OF RF RADIATED EMISSIONS**

CFR Part 15.247

### **Measurement Procedure**

The test sample is placed inside the semi-anechoic chamber on a polystyrene table at the turntable center. Test is repeated for both horizontal and vertical polarizations of the receive antenna.

For 30 MHz – 18 GHz:

Field Strength (dB $\mu$ V/m) = EMI Receiver Level (dB $\mu$ V) + Cable Loss (dB) - Amplifier Gain (dB) + Filter loss (dB) + Antenna Correction Factor (3/m)

For 18 GHz – 26.5 GHz:

Field Strength (dB $\mu$ V/m) = EMI Receiver Level (dB $\mu$ V) + Cable Loss (dB) - Amplifier Gain (dB) + Filter loss (dB) + Antenna Correction Factor (1/m)

The test sample was operated in Bluetooth single channel test mode. A fully charged battery was used for the supply voltage.

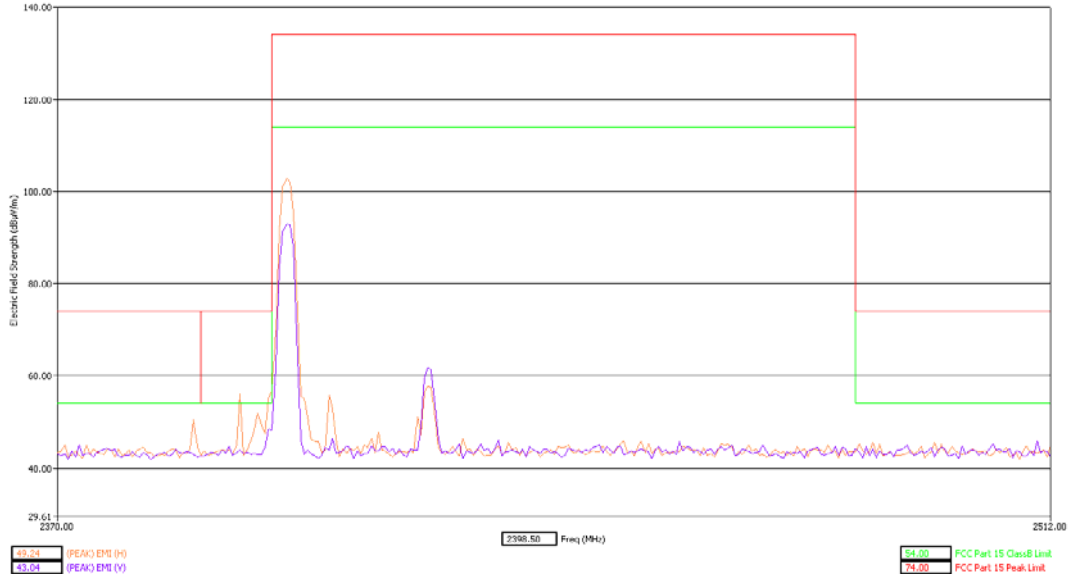
### **Measurement Results**

Comments:

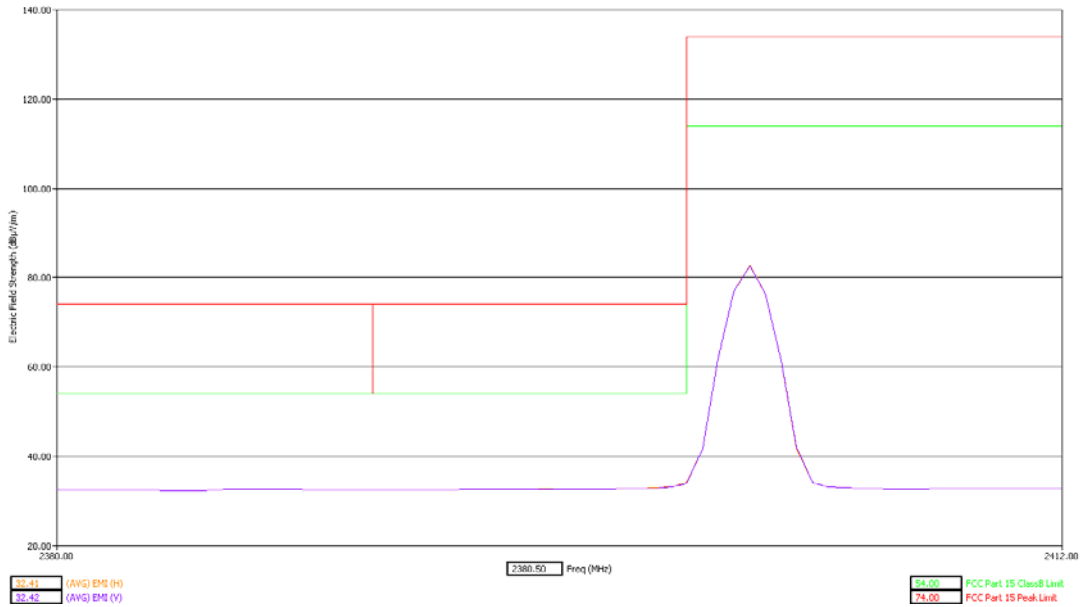
The band edge measurements crossing the corner for the low/high channel with respect to the average limit line is acceptable when applying the FCC rule specified in CFR 47 part 15.35(b) for the use of peak detector above 1 GHz. The peak detector limit line has been added to the graphical plots.

See below attached plots for the measurement results with both peak detector and average detector:

Test title: FCC 15.205, 15.209, 15.247  
 Operator name: Hongchi Sun  
 EUT type: Torch ROMA L2H:00909CA0  
 EUT condition: HW: P3  
 Date: 6/26/2009  
 Time: 3:21:25 PM  
 Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 00 (2402 MHz) do in test mode. Orientation X=H  
 HLP 3003C antenna (30 MHz - 3 GHz).  
 HRN 0115 antenna (3 GHz - 18 GHz).  
 Peak detector used.

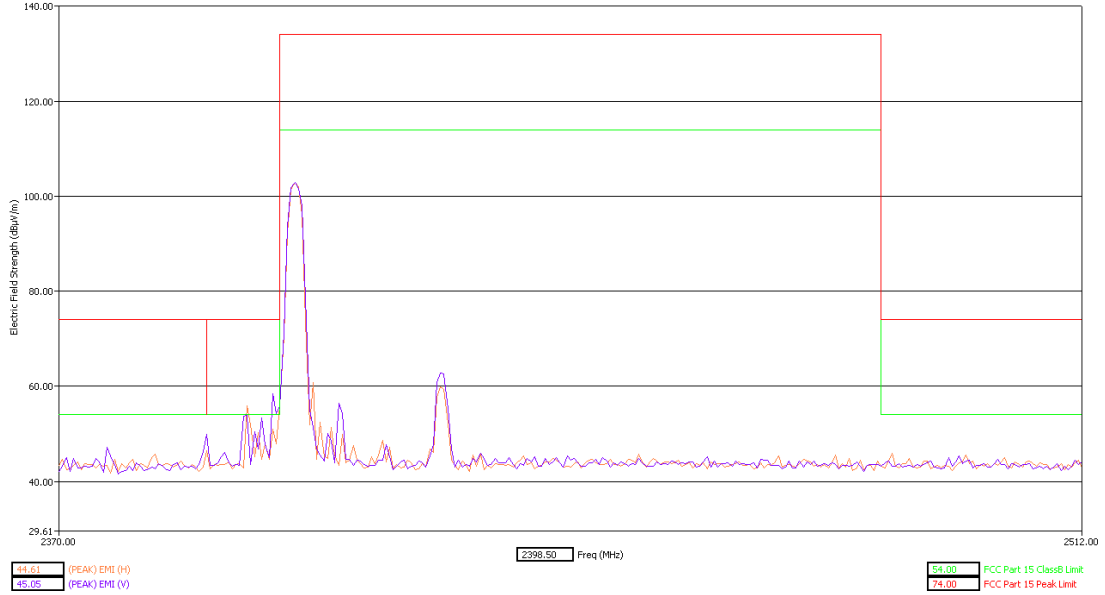


Test title: FCC 15.205, 15.209, 15.247  
 Operator name: Hongchi Sun  
 EUT type: Torch ROMA  
 EUT condition: HW: P3  
 Date: 6/26/2009  
 Time: 3:24:31 PM  
 Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 00 (2402 MHz) do in test mode. Orientation X=H  
 HLP 3003C antenna (30 MHz - 3 GHz). AVG detector used.

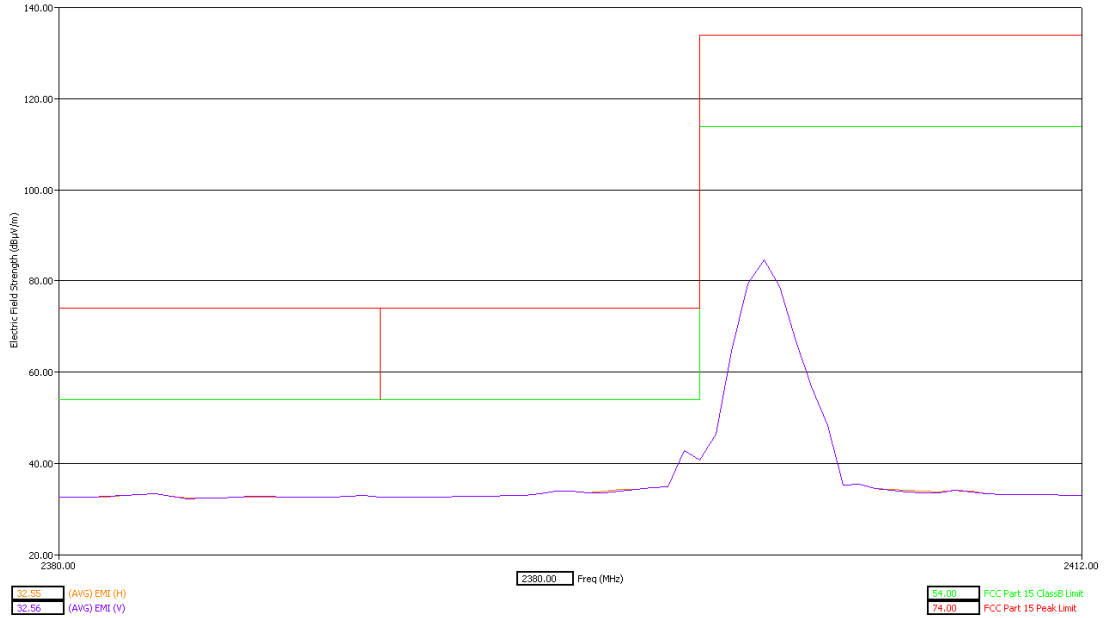


**Authorized Band Emissions Low Channel Dual Polarization X**

Test title: FCC 15.205, 15.209, 15.247  
Operator name: Hongzhi Sun  
EUT type: Torch RONA, ESN:809090A0  
EUT condition: HW: P3  
Date: 6/26/2009  
Time: 5:30:09 PM  
Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
BT ch\_00 (2402 MHz) do in test mode. Orientation Y=V  
HLP 3003C antenna (30 MHz - 3 GHz).  
HRN 0118 antenna (3 GHz-18 GHz).  
Peak detector used.

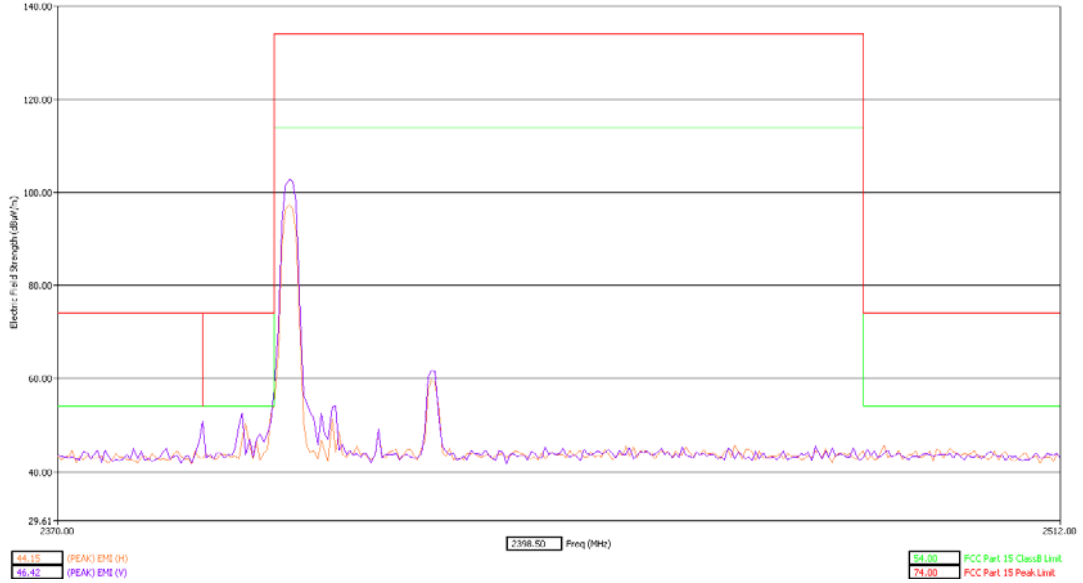


Test title: FCC 15.205, 15.209, 15.247  
Operator name: Hongzhi Sun  
EUT type: Torch RONA  
EUT condition: HW: P3  
Date: 6/26/2009  
Time: 5:43:48 PM  
Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
BT ch\_00 (2402 MHz) do in test mode. Orientation Y=V  
HLP 3003C antenna (30 MHz - 3 GHz). AVG detector used.

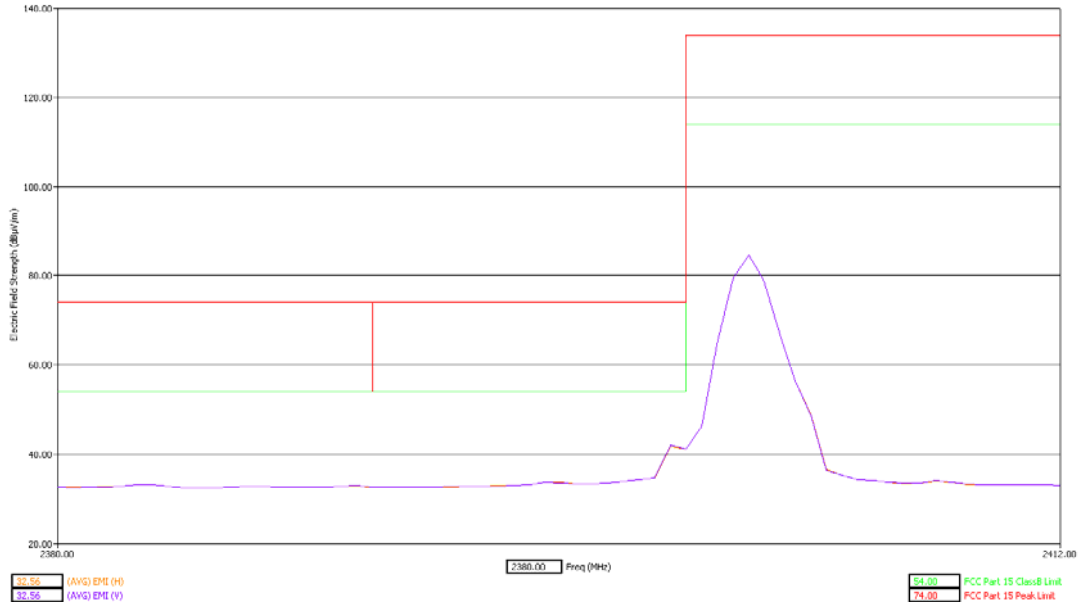


### Authorized Band Emissions Low Channel Dual Polarization Y

Test title: FCC 15.205, 15.209, 15.247  
 Operator name: Hongqi Sun  
 EUT type: Torch ROM, ESN:80907040  
 EUT condition: HW: P3  
 Date: 8/26/2009  
 Time: 5:20:34 PM  
 Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 00 (2402 MHz) do in test mode. Orientation Z=V  
 HLP 3003C antenna (30 MHz - 3 GHz).  
 HPS (0.18 antenna (3 GHz - 18 GHz) -  
 Peak detector used).

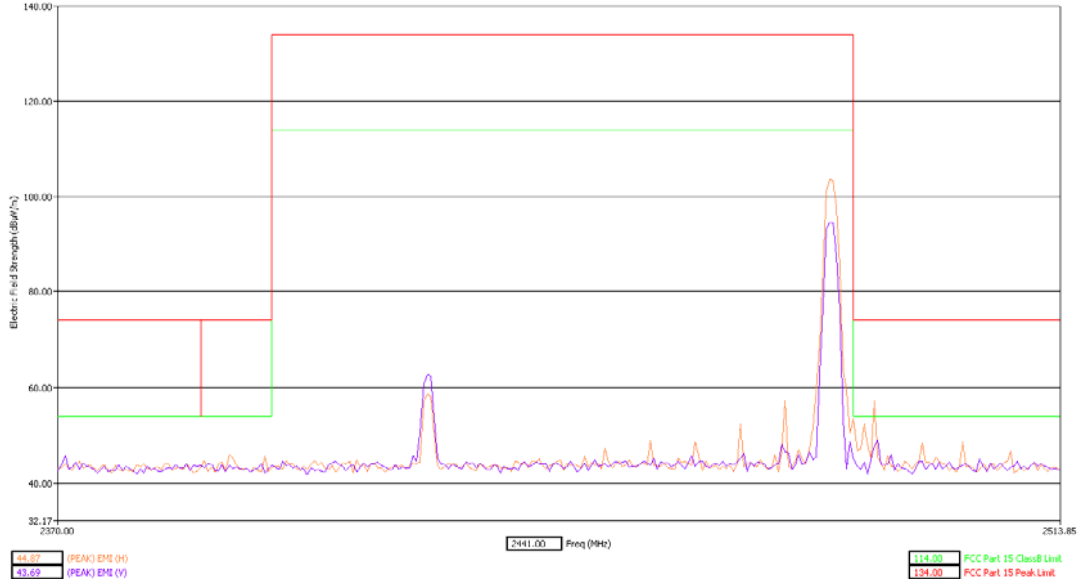


Test title: FCC 15.205, 15.209, 15.247  
 Operator name: Hongqi Sun  
 EUT type: Torch ROM  
 EUT condition: HW: P3  
 Date: 8/26/2009  
 Time: 5:20:34 PM  
 Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 00 (2402 MHz) do in test mode. Orientation Z=V  
 HLP 3003C antenna (30 MHz - 3 GHz). AVG detector used.

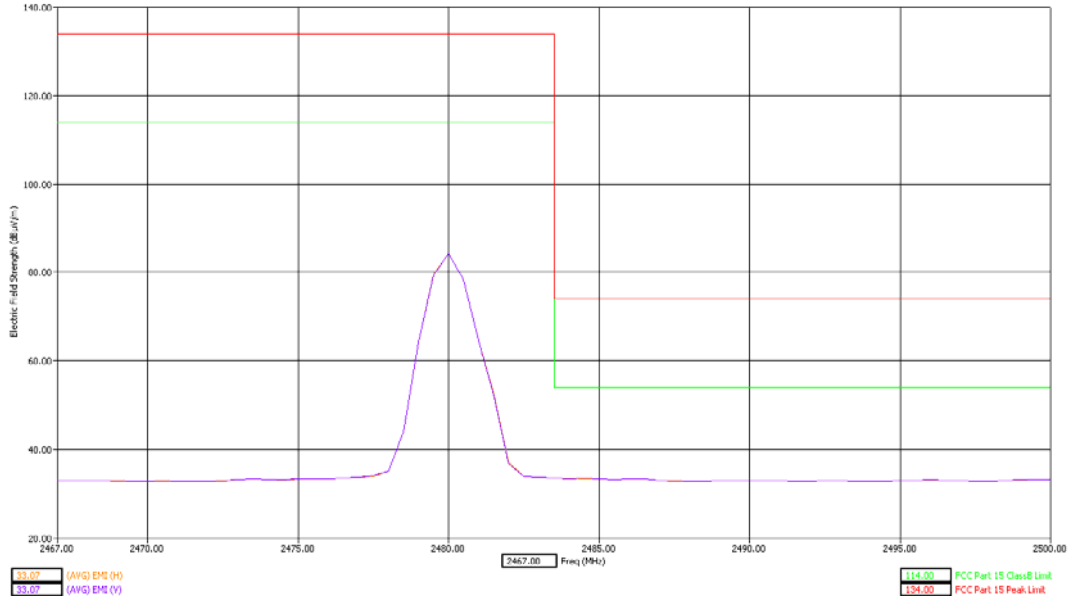


**Authorized Band Emissions Low Channel Dual Polarization Z**

Test title: FCC 15.205, 15.209, 15.247  
 Operator name: Hongqi Sun  
 EUT type: Torch RCNA, E5H809D9CA0  
 EUT condition: HW: P3  
 Date: 6/26/2009  
 Time: 4:00:31 PM  
 Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 70 (2400 MHz) do in test mode. Orientation X=H  
 HLP 3003C antenna (30 MHz ~ 3 GHz).  
 HSN 0118 antenna (3-Chr 18-Chr).  
 Peak detector used.

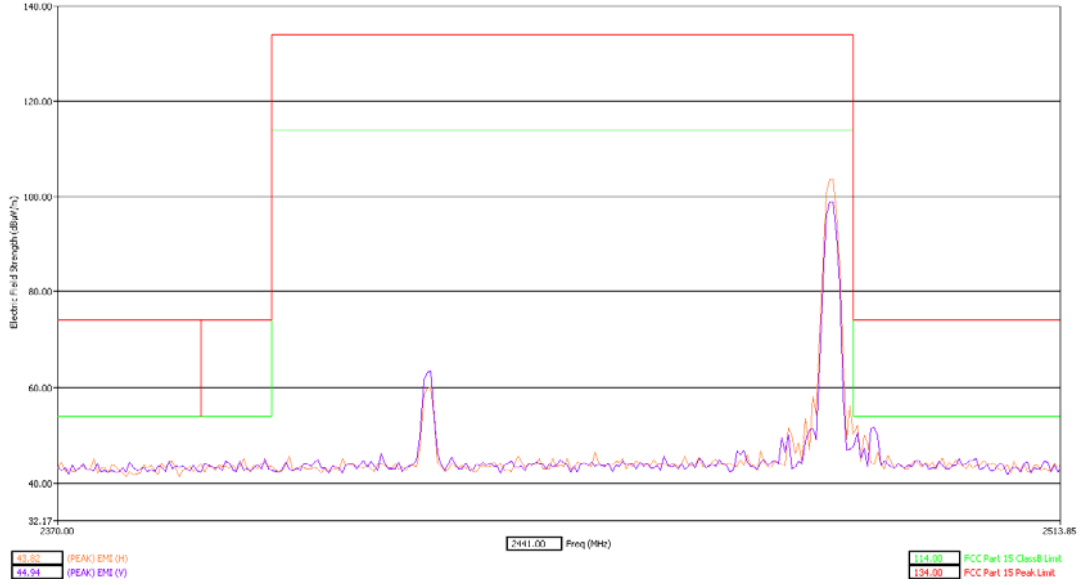


Test title: FCC 15.205, 15.209, 15.247  
 Operator name: Hongqi Sun  
 EUT type: Torch RCNA  
 EUT condition: HW: P3  
 Date: 6/26/2009  
 Time: 4:18:33 PM  
 Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 70 (2470 MHz) do in test mode. Orientation X=H  
 HLP 3003C antenna (30 MHz ~ 3 GHz). AVG detector used.

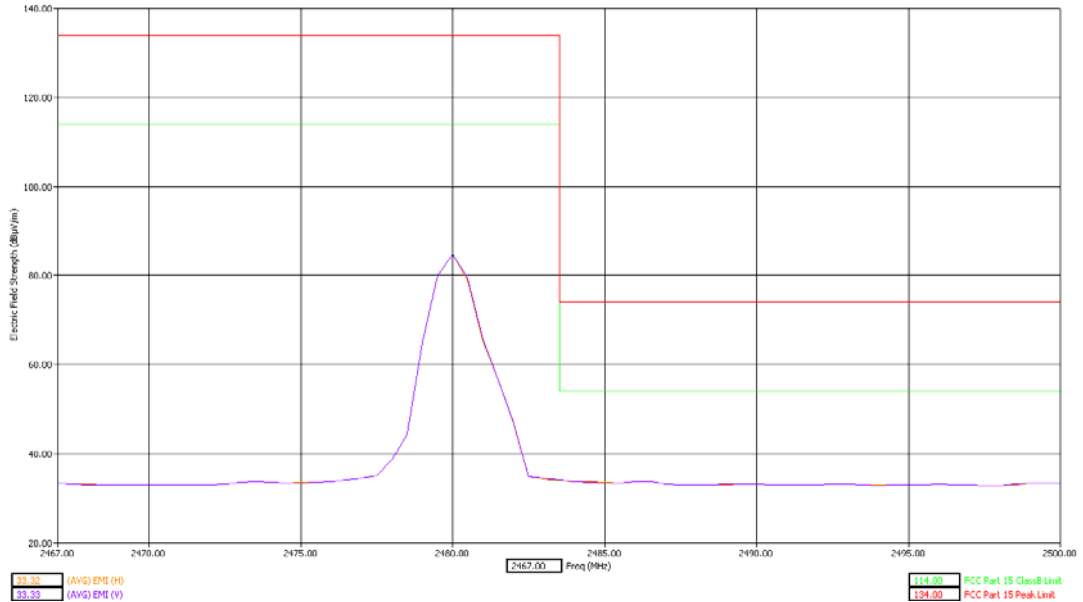


**Authorized Band Emissions High Channel Dual Polarization X**

Test title: FCC 15.205, 15.209, 15.247  
 Operator name: Hongqi Sun  
 EUT type: Torch RONA, F5H809D9CA0  
 EUT condition: HW: P3  
 Date: 6/26/2009  
 Time: 6:04:36 PM  
 Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 70 (2400 MHz) do in test mode. Orientation Y=V  
 H.P. 3003C antenna (30 MHz ~ 3 GHz).  
 HPSN (11.8 antenna (3 GHz ~ 18 GHz)).  
 Peak detector used.

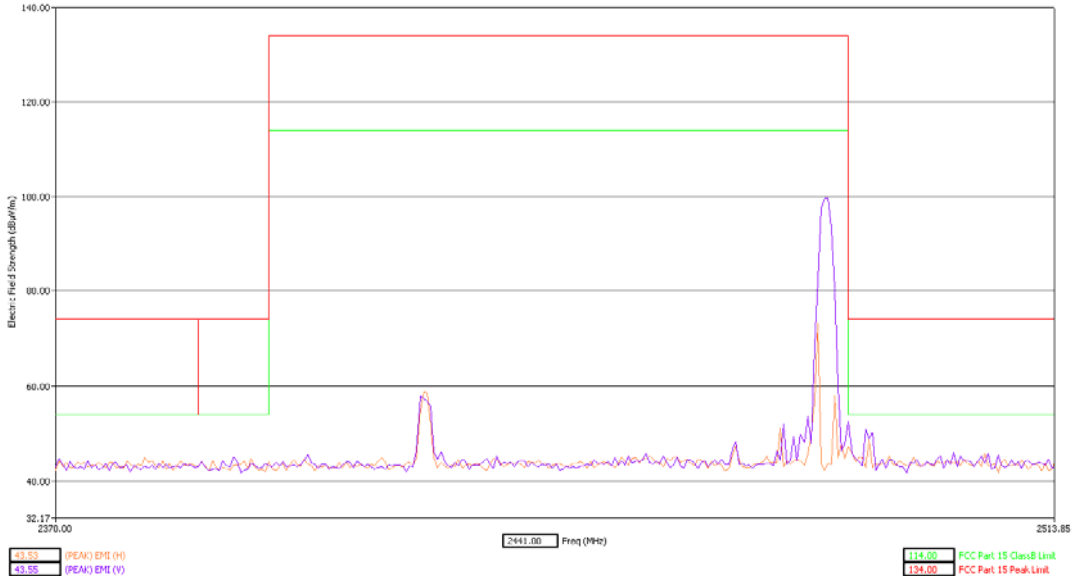


Test title: FCC 15.205, 15.209, 15.247  
 Operator name: Hongqi Sun  
 EUT type: Torch RONA  
 EUT condition: HW: P3  
 Date: 6/26/2009  
 Time: 6:19:53 PM  
 Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 70 (2470 MHz) do in test mode. Orientation Y=V  
 H.P. 3003C antenna (30 MHz ~ 3 GHz). AVG detector used.

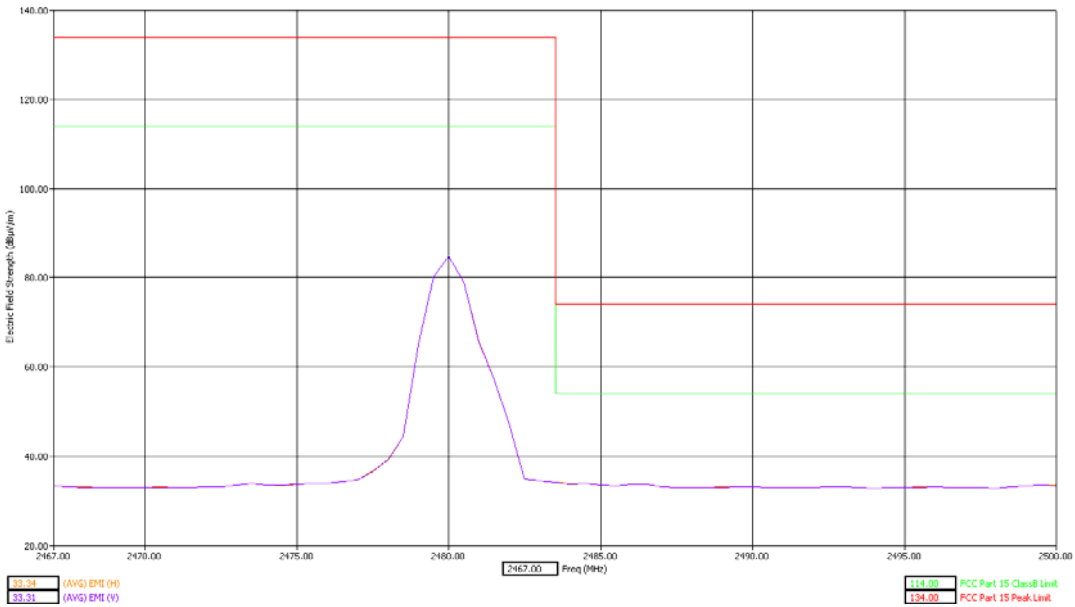


**Authorized Band Emissions High Channel Dual Polarization Y**

Test title: FCC 15.205, 15.209, 15.247  
 Operator name: Hongzhi Sun  
 EUT type: Torch RONA, E5N005D9040  
 EUT condition: HW; P3  
 Date: 6/26/2009  
 Time: 4:27:43 PM  
 Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 78 (2480 MHz) do in test mode. Orientation Z=V  
 HLP 3003C antenna (30 MHz - 3 GHz).  
 HFN Q118 antenna (2 GHz - 18 GHz).  
 Peak detector used.



Test title: FCC 15.205, 15.209, 15.247  
 Operator name: Hongzhi Sun  
 EUT type: Torch RONA  
 EUT condition: HW; P3  
 Date: 6/26/2009  
 Time: 4:41:37 PM  
 Comments: FCC 15.247 (c) (1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 79 (2470 MHz) do in test mode. Orientation Z=V  
 HLP 3003C antenna (30 MHz - 3 GHz). AVG detector used.



**Authorized Band Emissions High Channel Dual Polarization Z**

## **PICTURES**

The pictures related to the above test results are placed in the associated report denoted as EXHIBIT 7A2.

**End of Test Report**