# FCC PART 15.247

# TEST REPORT

For

## Jiaxing Shufude Electric Bed Co., Ltd.

East No. 07 Provincial Road, Tengyun Village Wangjiangjing Development Zone, Jiaxing, Zhejiang, China

## FCC ID: WKZBT40SA

| **Report Type:** | **Product Type:** |
|---|---|
| Original Report | BLUETOOTH 4.0 RECEIVER |

**Test Engineer:** Matt Yao

**Report Number:** RKS151012003-00A

**Report Date:** 2015-10-26

**Reviewed By:** Jesse Huang, EMC Manager

**Prepared By:** Bay Area Compliance Laboratories Corp. (Kunshan)
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**Note**: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

# TABLE OF CONTENTS

# GENERAL INFORMATION

## Product Description for Equipment under Test (EUT)

The Jiaxing Shufude Electric Bed Co., Ltd.'s product,Test model number: BT40SA (FCC ID: WKZBT40SA) or the "EUT" in this report was a BLUETOOTH 4.0 RECEIVER, which was measured approximately: 84mm (L) x 80mm (W) x 36mm (H), rated with charging voltage: DC 29V.

*Note: The manufacturer information:*
*Name: OKIN Refined Electric Technology Co., Ltd / Address: Plant 4, No. 410, xingyonglian Road, Wangjiangjing Development Zone, Jiaxing, Zhejiang, China*

**All measurement and test data in this report was gathered from production sample serial number: 20151012005. (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 20151012*

## Objective

This report is prepared on behalf of Jiaxing Shufude Electric Bed Co., Ltd.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, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

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

No related submittal(s).

## Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, 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. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.87 dB for 30MHz-1GHz, and 4.84 dB for above 1GHz, 1.85dB for conducted measurement.

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the Chenghu Road,Kunshan Development Zone No.248,Kunshan, Jiangsu, China.

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) 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, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. 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 engineer mode.

## EUT Exercise Software

Bluetest 3.

BLE: Power lever 4

## Special Accessories

No special accessory.

## Equipment Modifications

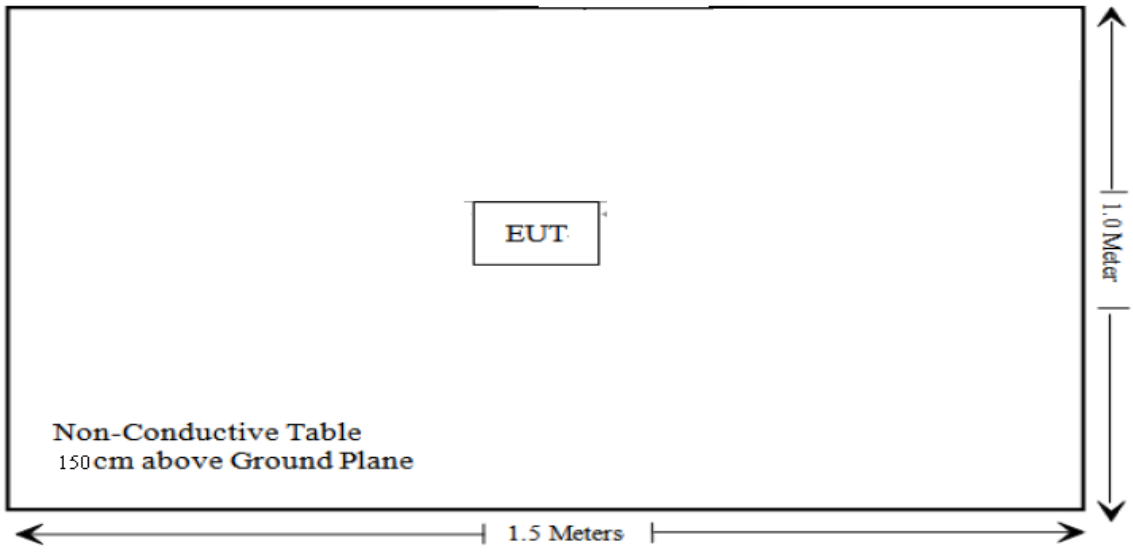
No modification was made to the EUT tested.

## External I/O Cable

| Cable Description | Length (m) | From Port | To |
|---|---|---|---|
| Un-shielding Detachable USB Cable | 0.9 | EUT | PC |

## Block Diagram of Test Setup

Radiation emission



# SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|---|---|---|
| FCC§15.247 (i), §1.1310& §2.1091 | RF Exposure | Compliance |
| §15.203 | Antenna Requirement | Compliance |
| §15.207 (a), | AC Line Conducted Emissions | Not Applicable* |
| §15.247(d) | Spurious Emissions at Antenna Port | Compliance |
| §15.205, §15.209, §15.247(d) | Spurious Emissions | Compliance |
| §15.247 (a)(2) | 6 dB Emission Bandwidth | Compliance |
| §15.247(b)(3) | Maximum Peak Output Power | Compliance |
| §15.247(d) | 100 kHz Bandwidth of Frequency Band Edge | Compliance |
| §15.247(e) | Power Spectral Density | Compliance |

* Not Applicable: the EUT was powered by button battery only and working in stand alone.

# 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) 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;

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. $mW/cm^2$);
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);

## Measurement Result

| Mode | Frequency (MHz) | Antenna Gain | | Target Power | | Evaluation Distance (cm) | Power Density ($mW/cm^2$) | MPE Limit ($mW/cm^2$) |
|---|---|---|---|---|---|---|---|---|
| | | (dBi) | (numeric) | (dBm) | (mW) | | | |
| BLE | 2440 | 4.5 | 2.818 | 0 | 1 | 20 | 0.0006 | 1 |

**Note:** The target power :-2dBm±2
Please refer to the Technical Specification, which declared by the Manufacturer.

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

# FCC §15.203 - ANTENNA REQUIREMENT

## Applied Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

## Antenna Connector Construction

The EUT has one integral antenna arrangement for bluetooth, which was permanently attached and the antenna gain is 4.5 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

**Result:** Compliant.

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

## Applied Standard

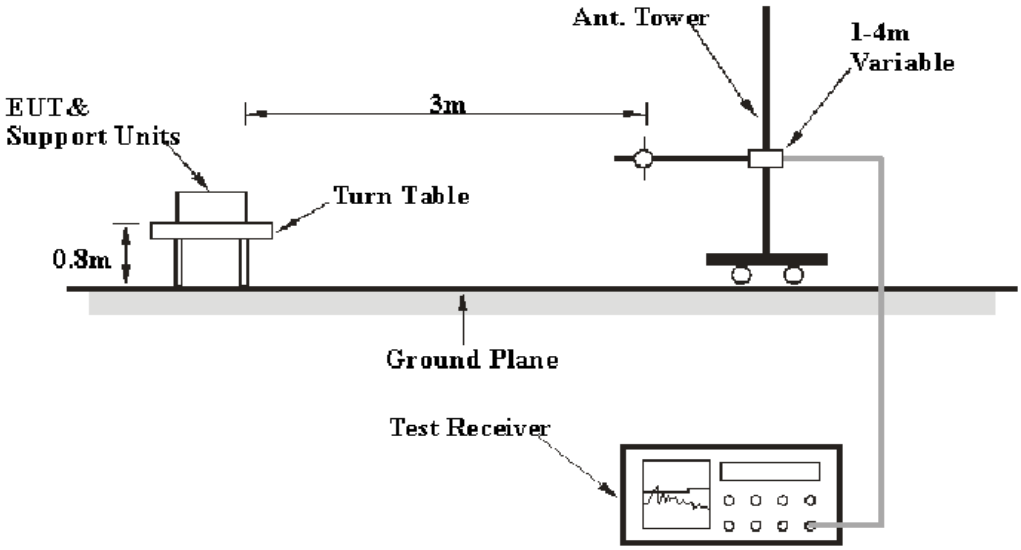
FCC §15.247 (d); §15.209; §15.205;

## Measurement Uncertainty

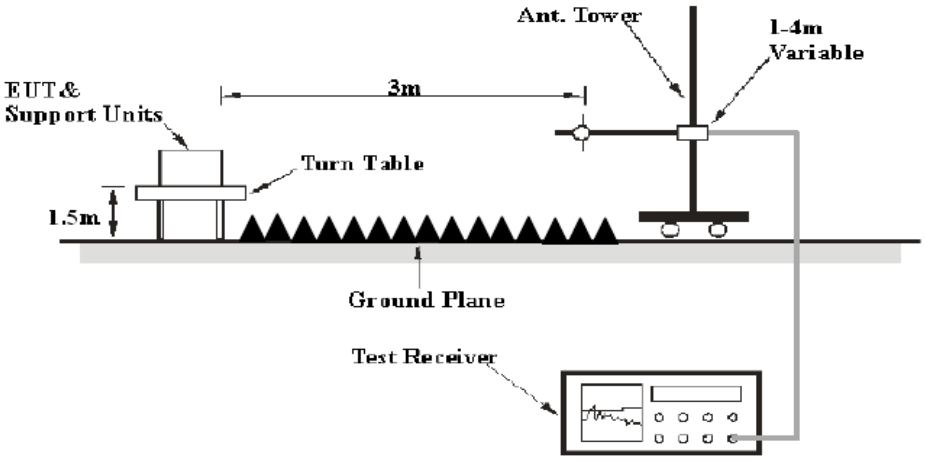
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency 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. (Kunshan) is 5.91 dB for 30MHz-1GHz, and 4.92 dB for above 1GHz. And this uncertainty will not be taken into consideration for the test data recorded in the report.

## EUT Setup



**Above 1GHz:**




The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

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 |
|---|---|---|---|---|
| 30 MHz – 1000 MHz | 100 kHz | 300 kHz | 120 kHz | QP |
| Above 1 GHz | 1 MHz | 3 MHz | / | PK |
| | 1 MHz | 10 Hz | / | Ave. |

## Test Procedure

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

## 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 Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Sonoma Instrunent | Amplifier | 330 | 171377 | 2015-9-16 | 2016-9-16 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100195 | 2015-5-20 | 2016-5-19 |
| Sunol Sciences | Broadband Antenna | JB3 | A090314-2 | 2014-11-7 | 2015-11-6 |
| ETS | Horn Antenna | 3115 | 6229 | 2014-11-7 | 2015-11-6 |
| Rohde & Schwarz | Signal Analyzer | FSIQ26 | 100048 | 2014-11-4 | 2015-11-3 |
| Mini | Pre-amplifier | ZVA-183-S+ | 857001418 | 2015-9-16 | 2016-9-16 |
| R&S | Auto test Software | EMC32 | V 09.10.0 | - | - |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to 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 Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, the worst margin reading as below:

**19.92 dB** at **50.173300 MHz** in the **vertical** polarization mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies 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

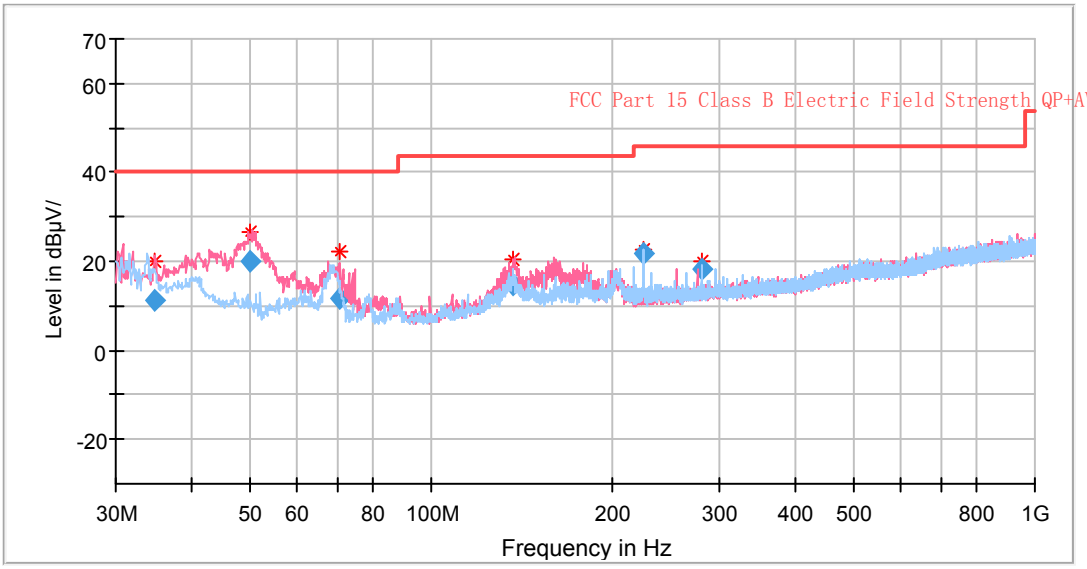
### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 27 ℃ |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 101.0 kPa |

*The testing was performed by Matt Yao on 2015-10-14*

*EUT operation mode: Normal operation*

### 30MHz-1GHz:




| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|---|---|---|---|---|---|---|---|
| 34.894100 | 11.30 | 40.00 | 28.70 | 200.0 | V | 338.0 | -10.3 |
| 50.173300 | 20.08 | 40.00 | 19.92 | 100.0 | V | 33.0 | -16.5 |
| 70.298800 | 11.53 | 40.00 | 28.47 | 100.0 | V | 163.0 | -17.0 |
| 136.697150 | 14.83 | 43.50 | 28.67 | 100.0 | V | 238.0 | -12.3 |
| 224.627150 | 21.73 | 46.00 | 24.27 | 100.0 | H | 159.0 | -12.1 |
| 279.904350 | 18.25 | 46.00 | 27.75 | 100.0 | H | 122.0 | -10.7 |

*EUT operation mode: Transmitting*

**1GHz-25 GHz**

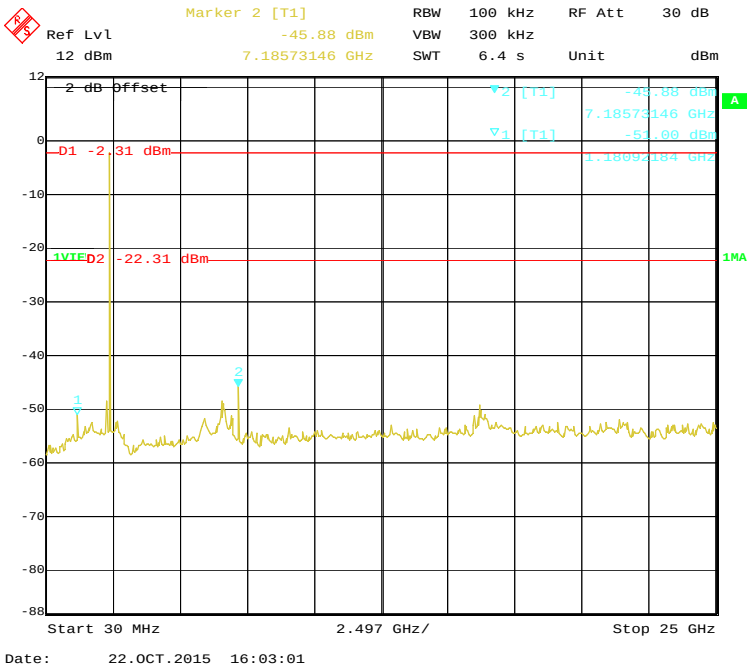
| Frequency (MHz) | Receiver | | Turntable Degree | Rx Antenna | | Corrected Factor (dB) | Corrected Amplitude (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | Detector (PK/QP/Ave.) | | Height (cm) | Polar (H/V) | | | | |
| Low Channel (2402MHz) | | | | | | | | | |
| 2402 | 98.42 | PK | 66 | 150 | H | 3.1 | 101.52 | / | / |
| 2402 | 95.64 | Ave | 66 | 150 | H | 3.1 | 98.74 | / | / |
| 2402 | 96.97 | PK | 200 | 150 | V | 3.1 | 100.07 | / | / |
| 2402 | 94.61 | Ave | 200 | 150 | V | 3.1 | 97.71 | / | / |
| 2320 | 53.16 | PK | 168 | 200 | H | 3 | 56.16 | 73.9 | 17.74 |
| 2320 | 35.2 | Ave | 168 | 200 | H | 3 | 38.2 | 53.9 | 15.7 |
| 2388 | 36.07 | PK | 78 | 200 | H | 3 | 39.07 | 73.9 | 34.83 |
| 2388 | 22.83 | Ave | 78 | 200 | H | 3 | 25.83 | 53.9 | 28.07 |
| 4804 | 51.51 | PK | 106 | 200 | V | 13.7 | 65.21 | 73.9 | 8.69 |
| 4804 | 30.22 | Ave | 106 | 200 | V | 13.7 | 43.92 | 53.9 | 9.98 |
| 6645 | 34.69 | PK | 33 | 150 | H | 18.7 | 53.39 | 73.9 | 20.51 |
| 6645 | 21.73 | Ave | 33 | 150 | H | 18.7 | 40.43 | 53.9 | 13.47 |
| 7206 | 39.87 | PK | 244 | 200 | V | 18.9 | 58.77 | 73.9 | 15.13 |
| 7206 | 21.62 | Ave | 244 | 200 | V | 18.9 | 40.52 | 53.9 | 13.38 |

| Frequency (MHz) | Receiver | | Turntable Degree | Rx Antenna | | Corrected Factor (dB) | Corrected Amplitude (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | Detector (PK/QP/Ave.) | | Height (cm) | Polar (H/V) | | | | |
| Middle Channel (2440MHz) | | | | | | | | | |
| 2440 | 96.65 | PK | 220 | 150 | H | 3.2 | 99.85 | / | / |
| 2440 | 92.91 | Ave | 139 | 150 | H | 3.2 | 96.11 | / | / |
| 2440 | 94.96 | PK | 189 | 150 | V | 3.2 | 98.16 | / | / |
| 2440 | 92.72 | Ave | 189 | 150 | V | 3.2 | 95.92 | / | / |
| 2300 | 52.16 | Ave | 26 | 150 | H | 3 | 55.16 | 73.9 | 18.74 |
| 2300 | 37.12 | PK | 26 | 150 | H | 3 | 40.12 | 53.9 | 13.78 |
| 2350 | 48.68 | PK | 11 | 200 | H | 3 | 51.68 | 73.9 | 22.22 |
| 2350 | 34.81 | Ave | 11 | 200 | H | 3 | 37.81 | 53.9 | 16.09 |
| 4880 | 48.48 | PK | 57 | 200 | H | 14.5 | 62.98 | 73.9 | 10.92 |
| 4880 | 27.73 | Ave | 57 | 200 | H | 14.5 | 42.23 | 53.9 | 11.67 |
| 6980 | 33.8 | PK | 78 | 200 | V | 19.8 | 53.6 | 73.9 | 20.3 |
| 6980 | 20.45 | Ave | 78 | 200 | V | 19.8 | 40.25 | 53.9 | 13.65 |
| 7320 | 33.65 | PK | 227 | 200 | V | 20.8 | 54.45 | 73.9 | 19.45 |
| 7320 | 22.43 | Ave | 227 | 200 | V | 20.8 | 43.23 | 53.9 | 10.67 |

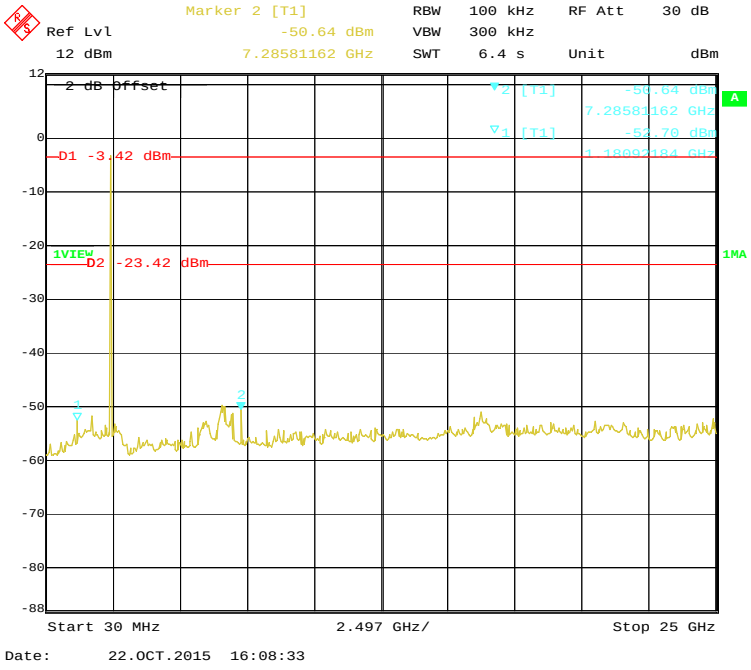
| Frequency (MHz) | Receiver | | Turntable Degree | Rx Antenna | | Corrected Factor (dB) | Corrected Amplitude (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| | Reading (dBμV) | Detector (PK/QP/Ave.) | | Height (cm) | Polar (H/V) | | | | |
| High Channel (2480 MHz) | | | | | | | | | |
| 2480 | 96.05 | PK | 121 | 150 | H | 3.3 | 99.35 | / | / |
| 2480 | 92.31 | Ave | 121 | 150 | H | 3.3 | 95.61 | / | / |
| 2480 | 94.36 | PK | 145 | 150 | V | 3.3 | 97.66 | / | / |
| 2480 | 92.12 | Ave | 145 | 150 | V | 3.3 | 95.42 | / | / |
| 2484 | 51.39 | PK | 264 | 150 | V | 3.3 | 54.69 | 73.9 | 19.21 |
| 2484 | 36.02 | Ave | 264 | 150 | V | 3.3 | 39.32 | 53.9 | 14.58 |
| 2490 | 47.35 | PK | 332 | 200 | V | 3.3 | 50.65 | 73.9 | 23.25 |
| 2490 | 33.06 | Ave | 332 | 200 | V | 3.3 | 36.36 | 53.9 | 17.54 |
| 4960 | 47.24 | Ave | 93 | 150 | H | 14.1 | 61.34 | 73.9 | 12.56 |
| 4960 | 29.4 | PK | 93 | 150 | H | 14.1 | 43.5 | 53.9 | 10.4 |
| 6980 | 31.7 | PK | 93 | 150 | H | 19.8 | 51.5 | 73.9 | 22.4 |
| 6980 | 17.88 | Ave | 93 | 150 | H | 19.8 | 37.68 | 53.9 | 16.22 |
| 7440 | 34.33 | PK | 296 | 200 | V | 21.2 | 55.53 | 73.9 | 18.37 |
| 7440 | 21.69 | Ave | 296 | 200 | V | 21.2 | 42.89 | 53.9 | 11.01 |

## Conducted Spurious Emissions at Antenna Port

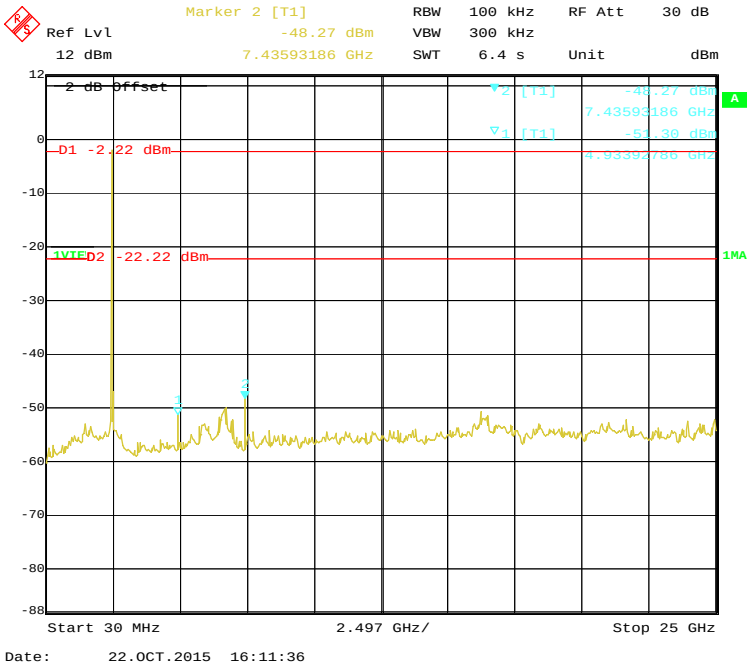
### Low Channel




### Middle Channel



## High Channel



# FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

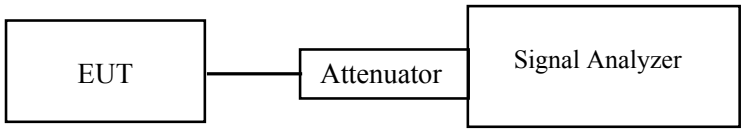
## Applied Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

## Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r03

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. Turn on the EUT and connect it to measurement instrument. 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 6 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 | EMI Test Receiver | ESCI | 100195 | 2015-5-20 | 2016-5-19 |

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

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 26 ℃ |
| **Relative Humidity:** | 55 % |
| **ATM Pressure:** | 101.0 kPa |

*The testing was performed by Matt Yao on 2015-10-22.*

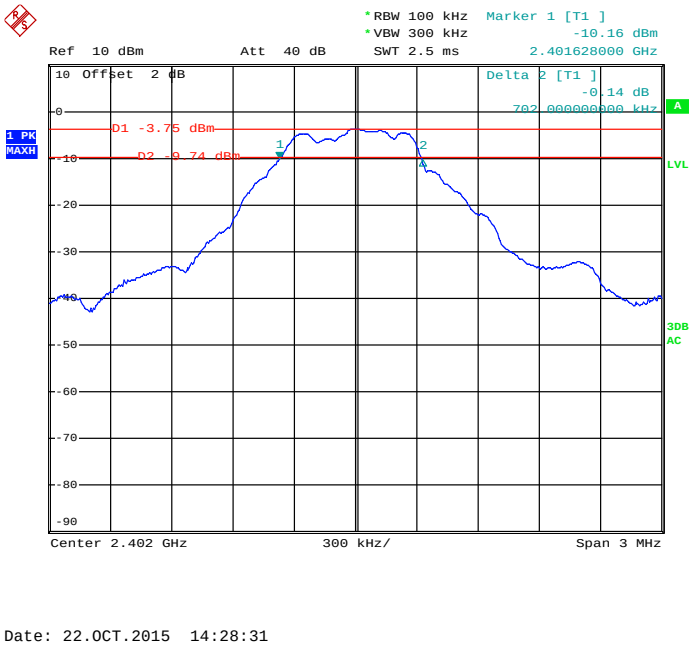
*EUT operation mode: Transmitting*

**Test Result:** Compliance

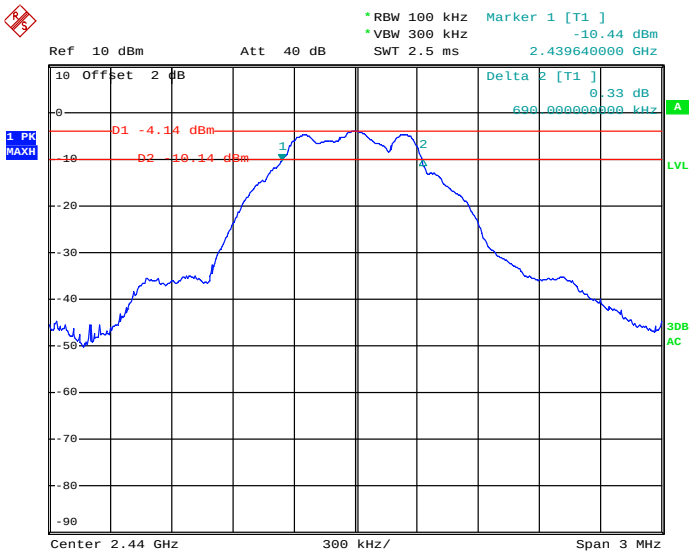
Please refer to the following tables and plots.

| Channel | Channel Frequency (MHz) | 6 dB Emission Bandwidth (MHz) | Limit (kHz) |
|---|---|---|---|
| Low | 2402 | 0.702 | ≥500 |
| Middle | 2440 | 0.690 | ≥500 |
| High | 2480 | 0.678 | ≥500 |

**Low Channel**



## Middle Channel

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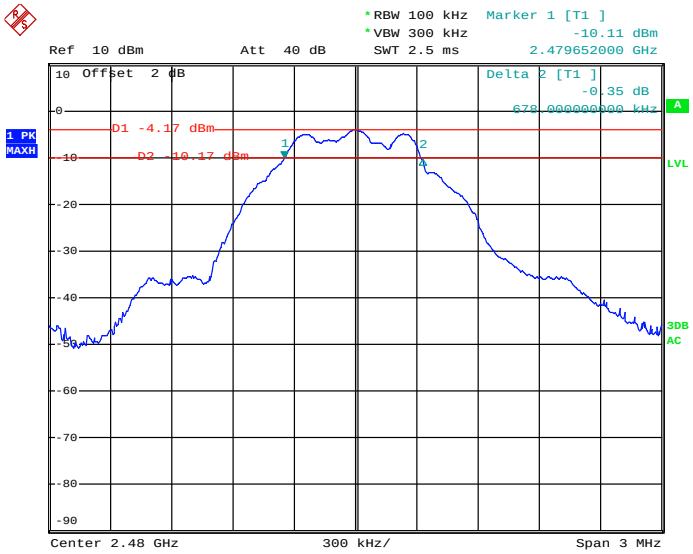
## High Channel

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# FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

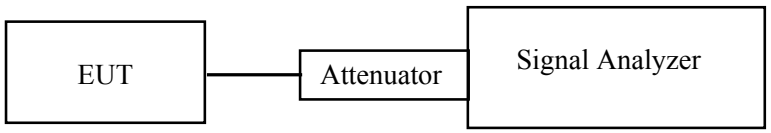
## Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

## Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r03

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 a test equipment.
3. Add a correction factor to the display.




## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
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*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

## Test Data

### Environmental Conditions

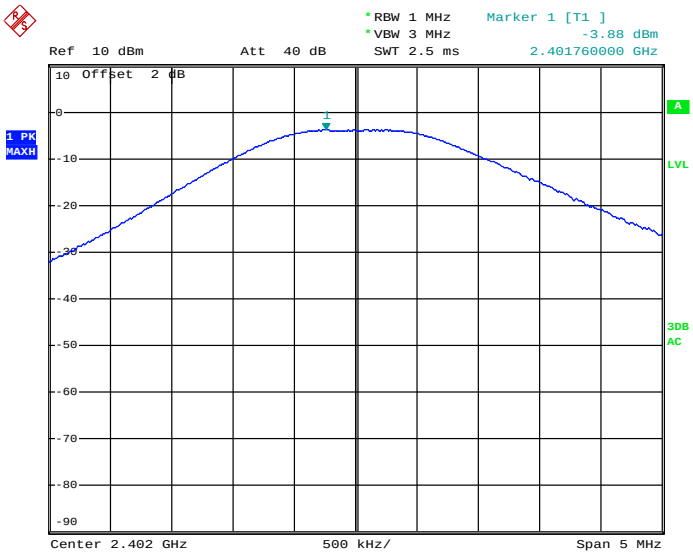
| | |
|---|---|
| **Temperature:** | 26 ℃ |
| **Relative Humidity:** | 55 % |
| **ATM Pressure:** | 101.0 kPa |

*The testing was performed by Matt Yao on 2015-10-22*

*EUT operation mode: Transmitting*

| Channel | Frequency (MHz) | Max Peak Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2402 | -3.88 | 30 | Pass |
| Middle | 2440 | -3.71 | 30 | Pass |
| High | 2480 | -4.15 | 30 | Pass |

**RF Output Power, Low Channel**

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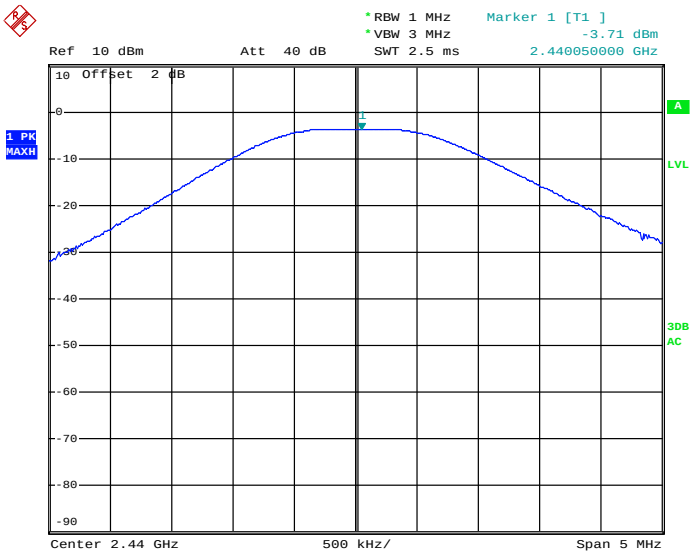
## RF Output Power, Middle Channel

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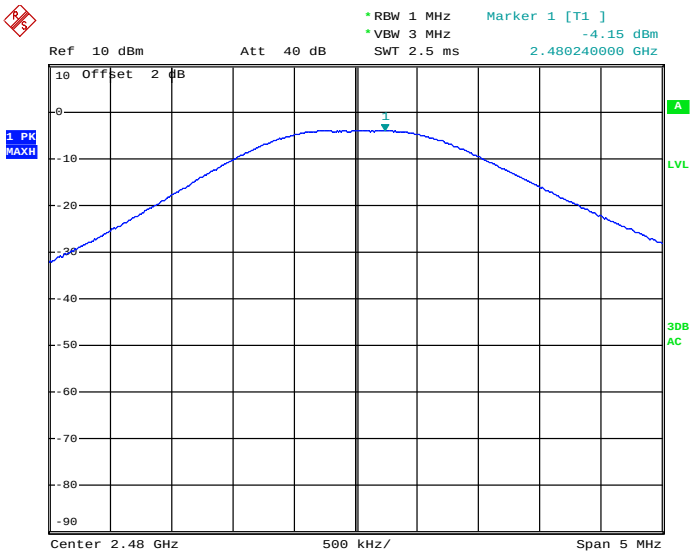
## RF Output Power, High Channel

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# FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

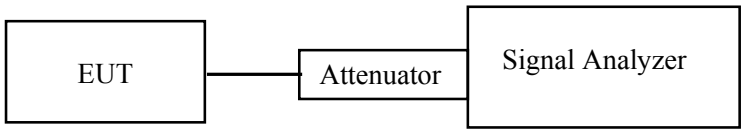
## Applied Standard

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

According to KDB 558074 D01 DTS Meas Guidance v03r03

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. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 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 |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100195 | 2015-5-20 | 2016-5-19 |

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

## Test Data

### Environmental Conditions

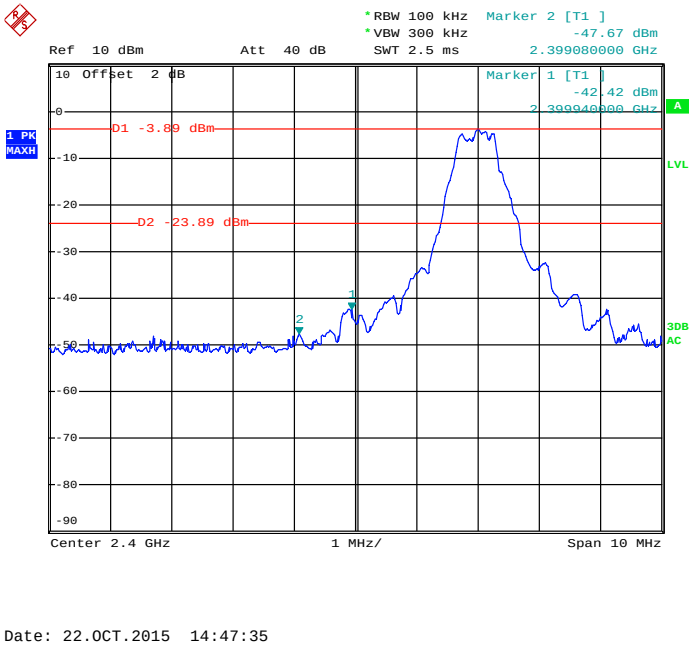
| | |
|---|---|
| **Temperature:** | 26 ℃ |
| **Relative Humidity:** | 55 % |
| **ATM Pressure:** | 101.0 kPa |

*The testing was performed by Matt Yao on 2015-10-22.*

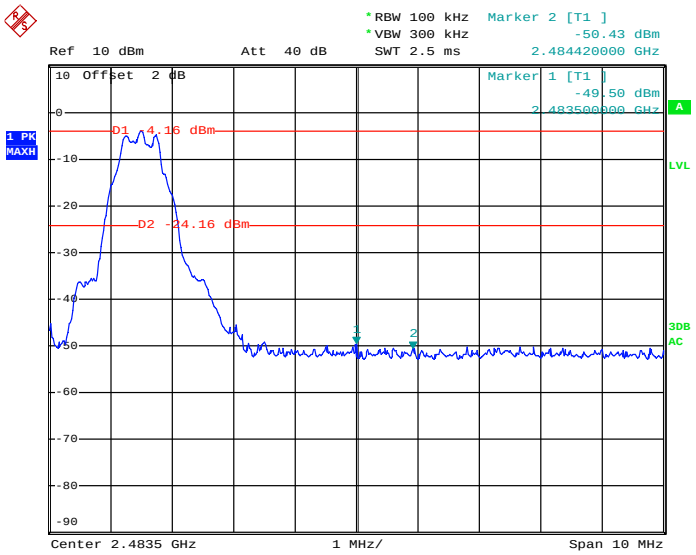
*EUT operation mode: Transmitting*

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

**Band Edge, Left Side**



## Band Edge, Right Side

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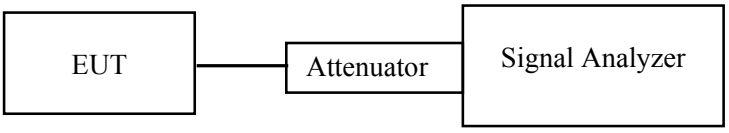
# FCC §15.247(e) - POWER SPECTRAL DENSITY

## Applied Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

## Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r03
1. Set analy center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measurement value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.




## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100195 | 2015-5-20 | 2016-5-19 |

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

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 26 ℃ |
| **Relative Humidity:** | 55 % |
| **ATM Pressure:** | 101.0 kPa |

*The testing was performed by Matt Yao on 2015-10-22.*

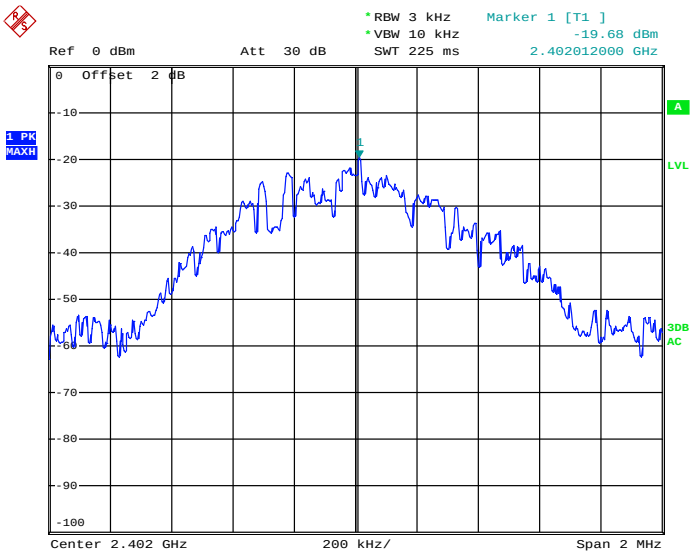
*EUT operation mode: Transmitting*

*Test Result: Pass.*

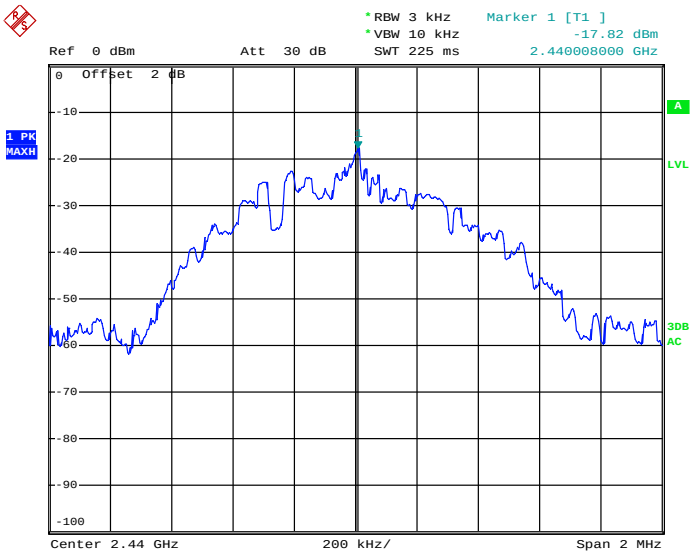
*Please refer to following table and plots.*

| Channel | Frequency (MHz) | Power spectral density (dBm/3kHz) | Limit (dBm/3kHz) |
|---|---|---|---|
| Low | 2402 | -19.68 | ≤8 |
| Middle | 2440 | -17.82 | ≤8 |
| High | 2480 | -18.04 | ≤8 |

**Low Channel**



## Middle Channel

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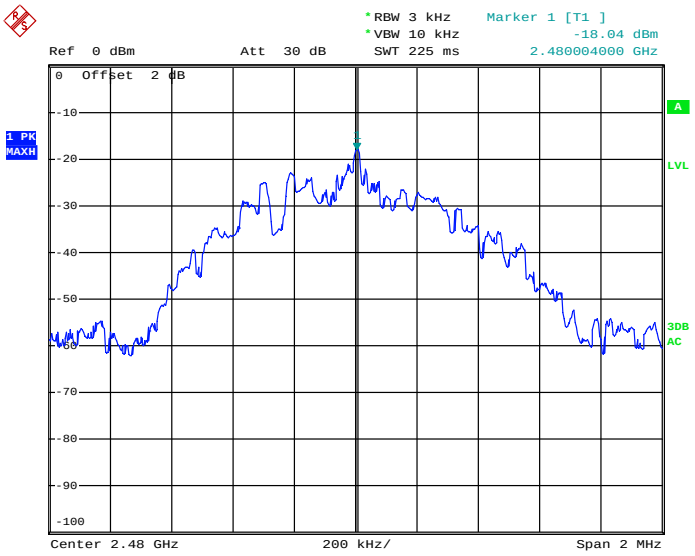
## High Channel

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