# FCC RF TEST REPORT

**REPORT NO.:** SEFC1610009-A

**MODEL NO.:** LHT-V16S

**RECEIVED:** Oct. 13, 2016

**ISSUED:** Oct.19, 2016

**APPLICANT:** Le Shi Zhi Xin Electronic Technology (Tian jin) Limited

**ADDRESS:** 201-427 2F B1 District, Anime building,No.126 Anime Middle Road, Eco-city Tianjin, China

**MANUFACTURER:** Le Shi Zhi Xin Electronic Technology (Tian jin) Limited

**ADDRESS:** 201-427 2F B1 District, Anime building,No.126 Anime Middle Road, Eco-city Tianjin, China

**ISSUED BY:** BUREAU VERITAS ADT (Shanghai) Corporation

**ADDRESS:** 2F, Building C, No.1618, Yishan rd., 201103, Shanghai, China

# Contents

# History of this Test Report

| Report No. | Version | Issue Date | Description |
|---|---|---|---|
| SEFC1610009-A | Rev 01 | Oct.19, 2016 | Original. |
| | | | |
| | | | |
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| | | | |
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# 1.CERTIFICATION

| | |
|---|---|
| **PRODUCT:** | LeEco Soundbar |
| **MODEL NO.:** | LHT-V16S |
| **APPLICANT:** | Le Shi Zhi Xin Electronic Technology (Tian jin) Limited |
| **MANUFACTURER:** | 201-427 2F B1 District, Anime building,No.126 Anime Middle Road, Eco-city Tianjin, China |
| **TESTED:** | Oct. 13, 2016~ Oct. 19, 2016 |
| **STANDARDS:** | FCC Part 15: 2015, Subpart C |

**PREPARED BY :** _____ , **DATE:** Oct. 19, 2016

Bing YE

Testing Engineer

**TECHNICAL ACCEPTANCE :** _____ , **DATE:** Oct. 19, 2016

Joy ZHU

Testing Manager

**APPROVED BY :** _____ , **DATE:** Oct. 19, 2016

Zhaoqian YU

Lab Manager

## 2. Report of Measurements and Examinations

| Reference STD | | Description of Test | Compliance results |
|---|---|---|---|
| 1 | FCC Rules §15.207(a); | AC Conducted Emission | PASS |
| 2 | FCC Rules §15.209(a) | Radiated Emission | PASS |
| 3 | FCC Rules §15.247(a)(2); | 6dB Bandwidth | PASS |
| 4 | FCC Rules §15.247(b)(3); | Output Power | PASS |
| 5 | FCC Rules §15.247(e) | Power Spectral Density | PASS |
| 6 | FCC Rules §15.247(d) | Conducted Band Edge and Out-of-Band Emissions | PASS |
| 7 | FCC Rules §15.247(d); | Radiated Emission Band Edges | PASS |

# 3. General Inf

## 3.1 Description of wireless module

| | |
|---|---|
| WIFI Module | TBM-C830 |
| BT Specification | Version 4.1 |
| Spreading | V4.1: GFSK |
| Frequency Range | 2402~2480MHz |
| Number of Channels | V4.1: 40 |
| Data Rate | V4.1: 1Mbps(GFSK) |
| BT Channel Separation | V4.1: 2MHz |
| Antenna Type | See antenna requirement |

Note: For more details, please refer to the EUT User manual.

## 3.2 Description of Antenna

| Antenna | Peak Gain |
|---|---|
| PCB Antenna | 2dBi for 2.40~2.50GHz band |

### 3.3 Carrier Frequency of Channels

| Bluetooth Working Frequency of Each Channel: (For V4.1) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 00 | 2402 MHz | 01 | 2404 MHz | 02 | 2406 MHz | 03 | 2408 MHz |
| 04 | 2410 MHz | 05 | 2412 MHz | 06 | 2414 MHz | 07 | 2416 MHz |
| 08 | 2418 MHz | 09 | 2420 MHz | 10 | 2422 MHz | 11 | 2424 MHz |
| 12 | 2426 MHz | 13 | 2428 MHz | 14 | 2430 MHz | 15 | 2432 MHz |
| 16 | 2434 MHz | 17 | 2436 MHz | 18 | 2438 MHz | 19 | 2440 MHz |
| 20 | 2442 MHz | 21 | 2444 MHz | 22 | 2446 MHz | 23 | 2448 MHz |
| 24 | 2450 MHz | 25 | 2452 MHz | 26 | 2454 MHz | 27 | 2456 MHz |
| 28 | 2458 MHz | 29 | 2460 MHz | 30 | 2462 MHz | 31 | 2464 MHz |
| 32 | 2466 MHz | 33 | 2468 MHz | 34 | 2470 MHz | 35 | 2472 MHz |
| 36 | 2474 MHz | 37 | 2476 MHz | 38 | 2478 MHz | 39 | 2480 MHz |

### 3.4 EUT Exercise Software

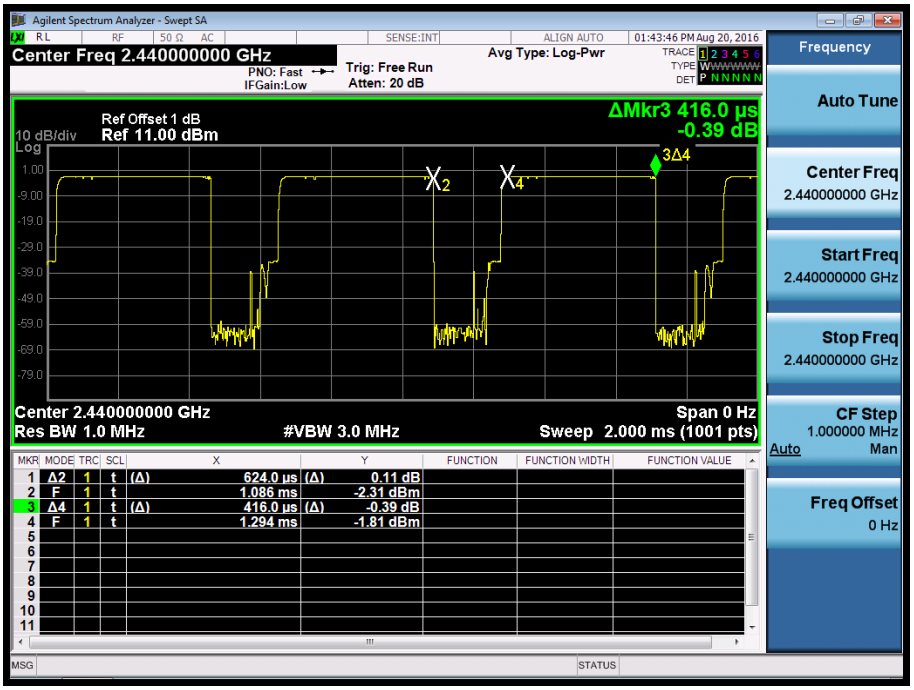
| | |
|---|---|
| 1 | Turn on the power of equipment. |
| 2 | Set the test mode and channel, then press OK to start continue transmit. |

## 3.5 Duty cycle

| Test Item | Duty cycle |
|---|---|

| Mode | Frequency (MHz) | Measurement (%) |
|---|---|---|
| BLE | 2440 | 66.7 |

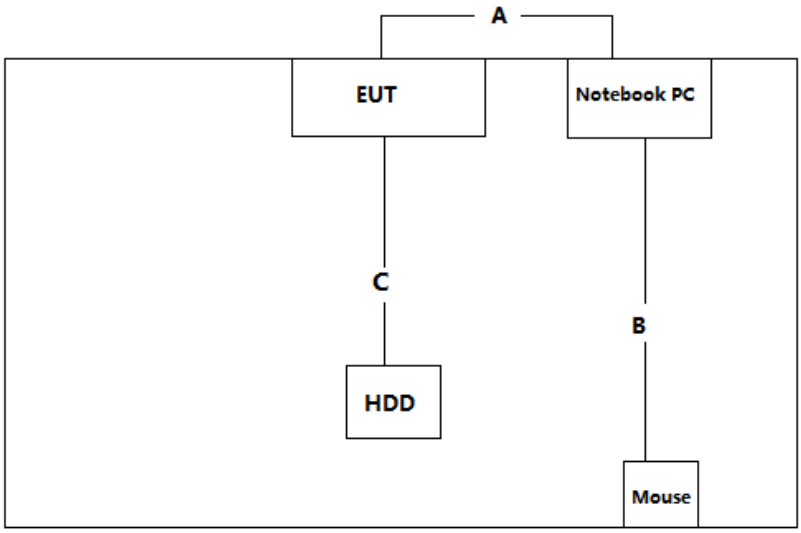
BLE (2440MHz)



## 3.6 Support equipment

| No | Device | Manufacturer | Model No. | Description |
|---|---|---|---|---|
| 1 | Notebook PC | SONY | PCG-71811P | Non-Shielded,1.5m (R33021) |
| 2 | Mouse | DELL | G0K02XYK | R41108 |
| 3 | HDD | SSK | N/A | N/A |

Connection Diagram




| Signal Cable Type | | Signal cable Description |
|---|---|---|
| A | HDMI Cable | Non-Shielded>0.8 m |
| B | USB Cable | Non-Shielded>0.8 m |
| C | USB Cable | Non-Shielded,0.8 m |

# 4. General Information of Test Site

## 4.1 Information of Test Site

| | |
|---|---|
| Test Site | Cerpass Technology(Suzhou) Co., Ltd. |
| Test Site Location | No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China |
| NVLAP LAB Code | 200814-0 |
| FCC Registration Number | 916572, 331395 |
| IC Registration Number | 7290A-1, 7290A-2 |
| VCCI Registration Number | T-1945 for Telecommunication Test<br>C-2919 for Conducted emission test<br>R-2670 for Radiated emission test below 1GHz<br>G-227 for Radiated emission test above 1GHz |

## 4.2 Measuring Equipment

| RF Conducted Measuring Equipment-AC104 | | | | | |
|---|---|---|---|---|---|
| Instrument/Ancillary | Manufacturer | Model No. | Serial No. | Calibration Date | Valid Date. |
| Peak Power Sensor | Booton | 55006 | 9778 | 2016.06.08 | 2017.06.07 |
| Series Power Meter | ANRITSU | ML2495A | 1224005 | 2016.03.27 | 2017.03.26 |
| Spectrum Analyzer | N9010A | Agilent | MY53400169 | 2016.11.11 | 2017.11.11 |
| Spectrum Analyzer | E4407B | Agilent | MY44211883 | 2016.10.15 | 2017.10.14 |
| Temperature/Humidity Meter | Zhicheng | ZC1-11 | CEP-TH-003 | 2016.03.31 | 2017.03.30 |

| AC Conducted Emission Measuring Equipment-SR101 | | | | | |
|---|---|---|---|---|---|
| Instrument/Ancillary | Manufacturer | Model No. | Serial No. | Calibration Date | Valid Date. |
| EZ-EMC | Fala | Ver CT3A1 | N/A | N/A | N/A |
| EMI Test Receiver | R&S | ESCI | 100565 | 2016.03.26 | 2017.03.25 |
| Artifical-Mains-Network | R&S | ESH2-Z5 | 100182 | 2016.08.31 | 2017.08.30 |
| Line Impedance Stabilization Network | FCC | FCC-LISN-50-200-2-02 | 112087 | 2016.08.31 | 2017.08.30 |
| Temperature/ Humidity Meter | Zhicheng | ZC1-11 | CEP-TH-004 | 2016.03.29 | 2017.03.28 |

| Radiated Measuring Equipment-AC102 | | | | | |
|---|---|---|---|---|---|
| Instrument/Ancillary | Manufacturer | Model No. | Serial No. | Calibration Date | Valid Date. |
| Loop Antenna | R&S | HFH2-Z2 | 100150 | 2016.08.31 | 2017.08.30 |
| Bilog Antenna | Sunol Science | JB1 | A072414-1 | 2016.04.16 | 2017.04.15 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-619 | 2016.07.16 | 2017.07.15 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA9170 | 9170-348 | 2016.05.07 | 2017.05.06 |
| Preamplifier | HP | 8447F | 3113A05582 | 2016.03.26 | 2017.03.25 |
| Preamplifier | EMCI | EMC-051835 | 980085 | 2016.09.06 | 2017.09.05 |
| Preamplifier | COM-POWER | PA-840 | 711885 | 2016.03.26 | 2017.03.25 |
| EMI Test Receiver | R&S | ESCI-3 | 101183 | 2016.06.29 | 2017.06.28 |
| Spectrum Analyzer | N9010A | Agilent | MY53400169 | 2016.11.11 | 2017.11.11 |
| Spectrum Analyzer | R&S | FS040 | 100324 | 2016.03.26 | 2017.03.25 |
| Temperature/ Humidity Meter | Zhicheng | ZC1-11 | CEP-TH-002 | 2016.03.31 | 2017.03.30 |

## 4.3 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2).

**RF Conducted Measurement**

| Test Item | | Uncertainty | Limit |
|---|---|---|---|
| Radio Frequency | | ±8.7X10$^{-7}$ | ±1X10$^{-5}$ |
| RF output power, conducted | | ±0.63dB | ±1.5dB |
| Power density, conducted | | ±1.21dB | ±3dB |
| Unwanted emissions, conducted | 30-1000MHz | ±0.51dB | ±3dB |
| | 1-12.75GHz | ±0.67dB | ±3dB |
| All emissions, radiated | 30-1000MHz | ±2.28dB | ±6dB |
| | 1-12.75GHz | ±2.59dB | ±6dB |
| Temperature | | ±0.8℃ | ±1℃ |
| Humidity | | ±3% | ±5% |
| DC and low frequency voltages | | ±3% | ±3% |

**AC Conducted Measurement**

| Measurement | Frequency | Uncertainty |
|---|---|---|
| Conducted emissions(LINE) | 9KHz-30MHz | +/- 0.7738 dB |
| Conducted emissions(NEUTRAL) | 9KHz-30MHz | +/- 0.7886 dB |
| Conducted emissions(10Mbps) | 150KHz-30MHz | +/- 1.3013dB |
| Conducted emissions(100Mbps) | 150KHz-30MHz | +/- 1.3197 dB |
| Conducted emissions(1000Mbps) | 150KHz-30MHz | +/- 1.2987 dB |

**Radiated Measurement**

| Measurement | Polarity | Frequency | Uncertainty |
|---|---|---|---|
| Radiated emissions | Horizontal | below 1GHz | +/- 3.8936 dB |
| | Vertical | below 1GHz | +/- 3.8928 dB |
| | Horizontal | above 1GHz | +/- 5.18858dB |
| | Vertical | above 1GHz | +/- 5.18928 dB |

# 5. AC Conducted Emission Measurement

## 5.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.10-2013 Section 6.2. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 6.2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

| Frequency (MHz) | Quasi Peak (dB μ V) | Average (dB μ V) |
|---|---|---|
| 0.15 – 0.5 | 66-56* | 56-46* |
| 0.5 – 5.0 | 56 | 46 |
| 5.0 – 30.0 | 60 | 50 |

*Decreases with the logarithm of the frequency.

## 5.2 Test Standard

ANSI C63.10-2013 Section 6.2.

## 5.3 Test Procedures

a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.

b. Connect EUT to the power mains through a line impedance stabilization network (LISN).

c. All the support units are connecting to the other LISN.

d. The LISN provides 50 ohm coupling impedance for the measuring instrument.

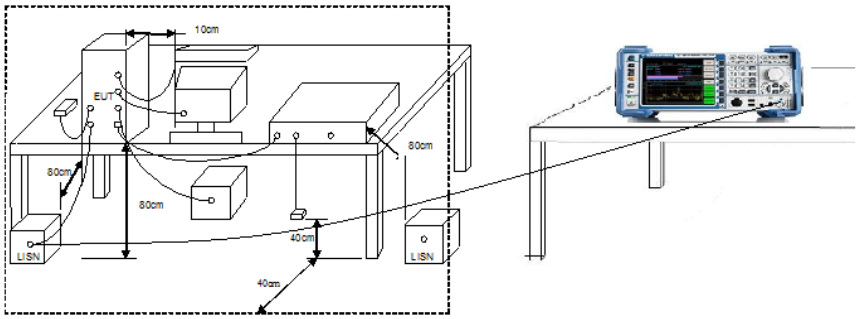
e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.

f. Both sides of AC line were checked for maximum conducted interference.

g. The frequency range from 150 kHz to 30 MHz was searched.

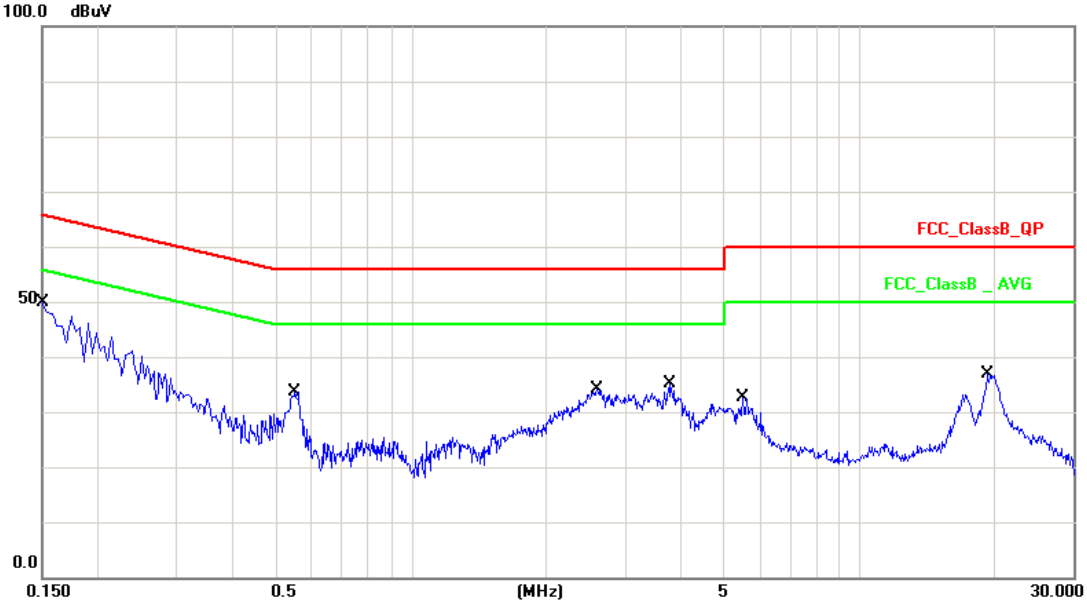
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

## 5.4 Test Setup Layout



## 5.5 Test Result

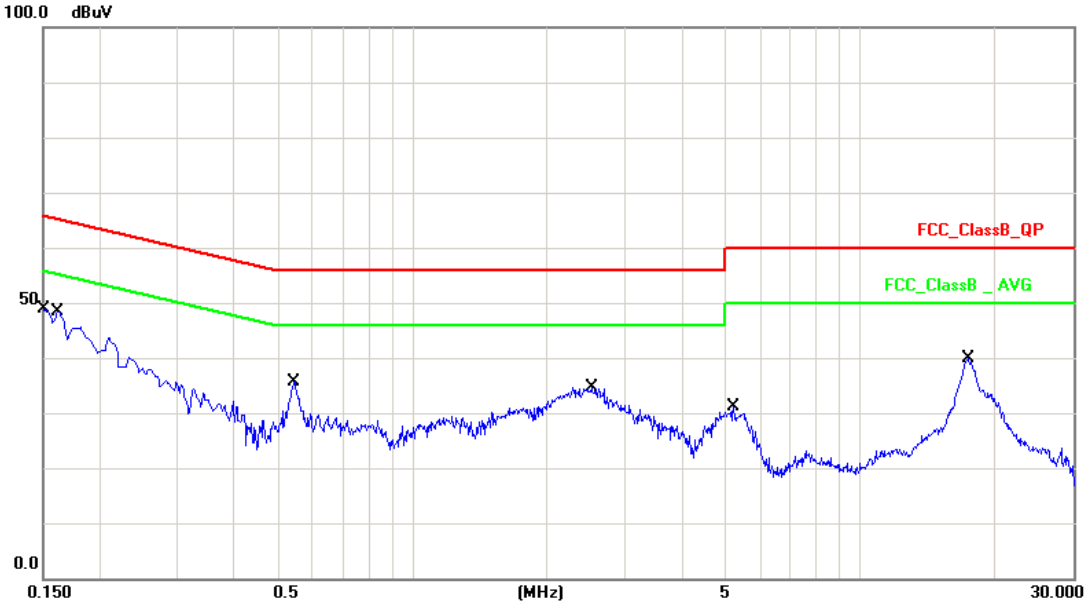
| Test Mode : | Mode 1: Normal Operation with BLE on | | |
|---|---|---|---|
| AC Power : | AC 120V/60Hz | Phase: | LINE |
| Temperature : | 26°C | Humidity: | 60% |
| Pressure(mbar) : | 1002 | Date: | 2016/08/15 |




| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.1500 | 10.13 | 35.71 | 45.84 | 65.99 | -20.15 | QP |
| 2 | 0.1500 | 10.13 | 16.70 | 26.83 | 55.99 | -29.16 | AVG |
| 3 | 0.5500 | 10.16 | 21.51 | 31.67 | 56.00 | -24.33 | QP |
| 4 | 0.5500 | 10.16 | 15.21 | 25.37 | 46.00 | -20.63 | AVG |
| 5 | 2.6020 | 10.18 | 20.43 | 30.61 | 56.00 | -25.39 | QP |
| 6 | 2.6020 | 10.18 | 14.10 | 24.28 | 46.00 | -21.72 | AVG |
| 7 | 3.7820 | 10.20 | 17.06 | 27.26 | 56.00 | -28.74 | QP |
| 8 | 3.7820 | 10.20 | 9.93 | 20.13 | 46.00 | -25.87 | AVG |
| 9 | 5.5020 | 10.25 | 15.24 | 25.49 | 60.00 | -34.51 | QP |
| 10 | 5.5020 | 10.25 | 9.13 | 19.38 | 50.00 | -30.62 | AVG |
| 11 | 19.3860 | 10.37 | 20.53 | 30.90 | 60.00 | -29.10 | QP |
| 12 | 19.3860 | 10.37 | 13.71 | 24.08 | 50.00 | -25.92 | AVG |

Note: Measurement Level = Reading Level + Correct Factor

| Test Mode : | Mode 1: Normal Operation with BLE on | | |
|---|---|---|---|
| AC Power : | AC 120V/60Hz | Phase : | NEUTRAL |
| Temperature : | 26°C | Humidity : | 60% |
| Pressure(mbar) : | 1002 | Date: | 2016/08/15 |




| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.1500 | 10.13 | 35.26 | 45.39 | 65.99 | -20.60 | QP |
| 2 | 0.1500 | 10.13 | 17.62 | 27.75 | 55.99 | -28.24 | AVG |
| 3 | 0.1620 | 10.13 | 33.57 | 43.70 | 65.36 | -21.66 | QP |
| 4 | 0.1620 | 10.13 | 16.87 | 27.00 | 55.36 | -28.36 | AVG |
| 5 | 0.5460 | 10.15 | 23.13 | 33.28 | 56.00 | -22.72 | QP |
| 6 | 0.5460 | 10.15 | 16.16 | 26.31 | 46.00 | -19.69 | AVG |
| 7 | 2.5260 | 10.19 | 21.57 | 31.76 | 56.00 | -24.24 | QP |
| 8 | 2.5260 | 10.19 | 15.89 | 26.08 | 46.00 | -19.92 | AVG |
| 9 | 5.2340 | 10.26 | 14.94 | 25.20 | 60.00 | -34.80 | QP |
| 10 | 5.2340 | 10.26 | 6.62 | 16.88 | 50.00 | -33.12 | AVG |
| 11 | 17.5220 | 10.48 | 24.65 | 35.13 | 60.00 | -24.87 | QP |
| 12 | 17.5220 | 10.48 | 19.07 | 29.55 | 50.00 | -20.45 | AVG |

Note: Measurement Level = Reading Level + Correct Factor

# 6. Radiated Emission Measurement

## 6.1 Test Limit

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

| FREQUENCIES (MHz) | FIELD STRENGTH (micro volts/meter) | MEASUREMENT DISTANCE (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(kHz) | 300 |
| 0.490~1.705 | 24000/F(kHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the above table.

| Frequency (MHz) | Distance Meters | Radiated (dB μV/ M) |
|---|---|---|
| 30-230 | 10 | 30 |
| 230-1000 | 10 | 37 |

## 6.2 Test Standard

ANSI C63.10-2013 Section 6.5 & Section 6.6

## 6.3 Test Procedures

Peak Field Strength Measurements:

Analyzer center frequen was set to the frequency of the radiated spurious emission of interest

1. RBW=As specified in Table 1
2. VBW=3×RBW
3. Detector=Peak
4. Trace mode=Max hold
5. Sweep time=Auto couple
6. Allow the trace to stabilize

Table 1-RBW as a function of frequency

| Frequency | RBW |
|---|---|
| 9 ~ 150kHz | 200 ~ 300Hz |
| 0.15 ~ 30MHz | 9 ~ 10kHz |
| 30 ~ 1000MHz | 100 ~ 120kHz |
| ＞ 1000MHz | 1MHz |

AVE Field Strength Measurements:

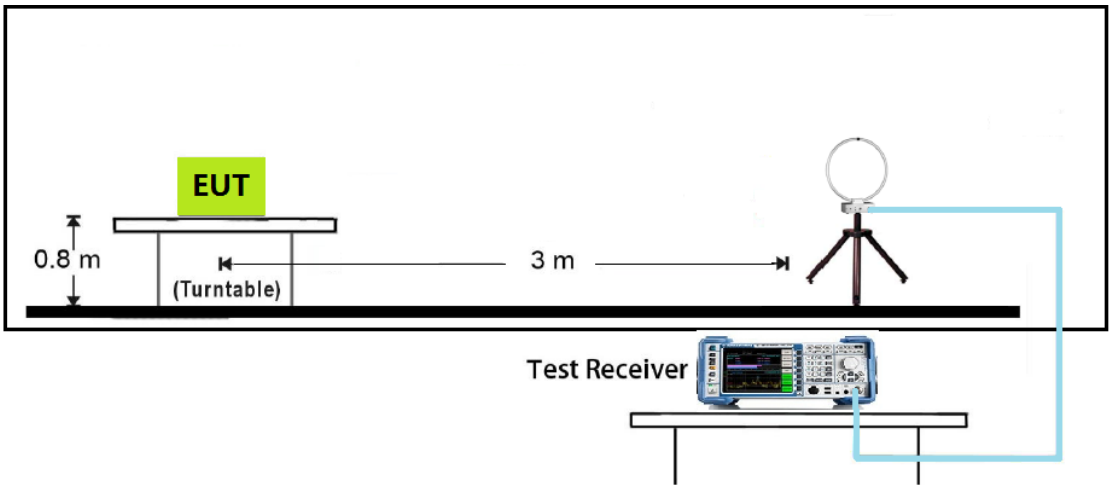
Analyzer center frequen was set to the frequency of the radiated spurious emission of interest

1. RBW= 1MHz
2. VBW≥1/T
3. Detector=Peak
4. Trace mode=Max hold
5. Sweep time=Auto couple
6. Allow max hold to run for at least 50 times(1/duty cycle) trace

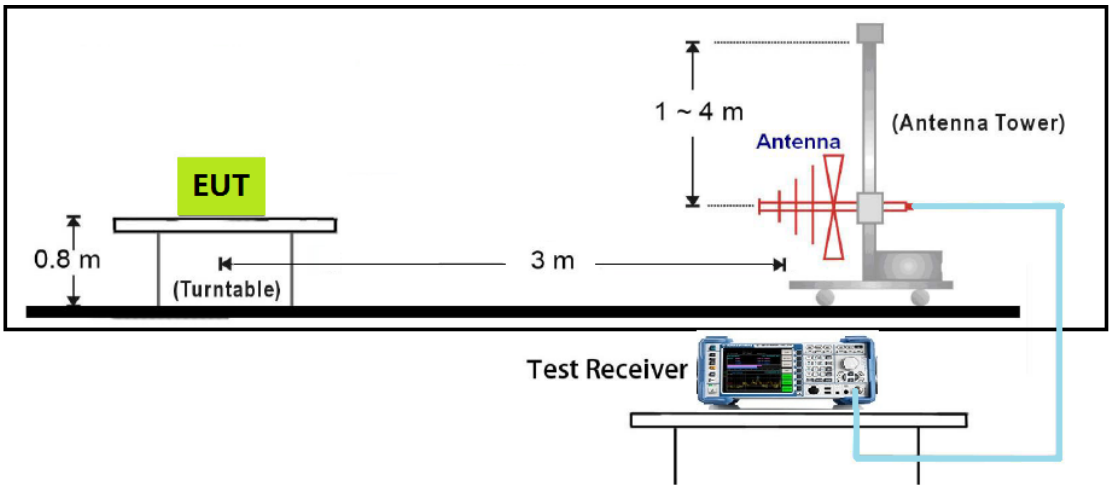
Do as an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to “Voltage” regardless of the display mode

## 6.4 Test Setup Layout

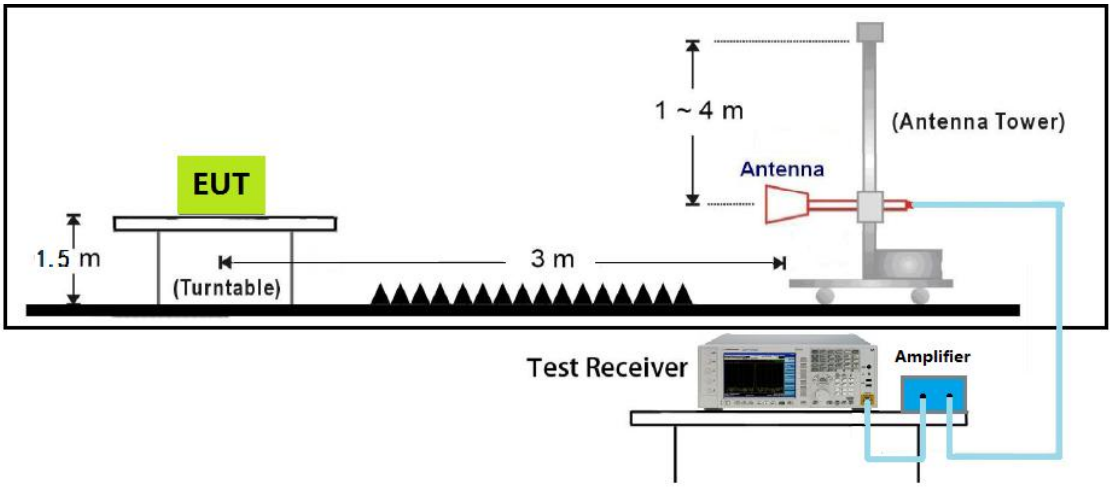
9kHz~30MHz Test Setup



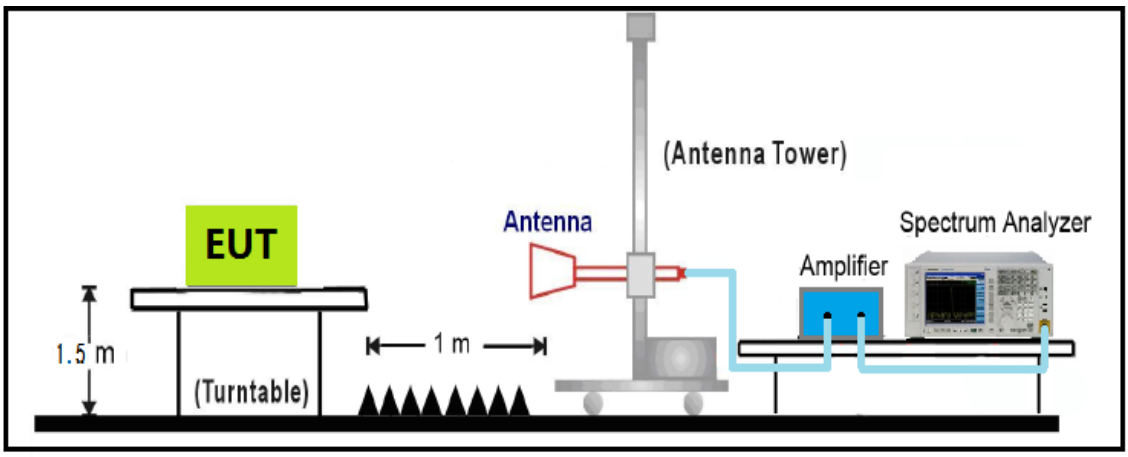

30MHz~1GHz Test Setup



1GHz~18GHz Test Setup




18GHz~40GHz Test Setup



## 6.5 Test Result

**The worst case of Radiated Emission below 1GHz:**

| | |
|---|---|
| **Engineer :Ternence** | **Site : EMC Lab AC 102** |
| **Limit : FCC_CLASS_B_03M_QP** | **Margin : 6** |
| **EUT: LEECO SOUNDBAR** | **Probe : VERTICAL/ HORIZONTAL** |
| **Power : AC 120V/60Hz** | **Note : Normal Link** |

| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | AntPol. H/V |
|---|---|---|---|---|---|---|---|---|
| 1 | 30.9699 | -2.85 | 29.24 | 26.39 | 40.00 | -13.61 | QP | H |
| 2 | 322.9399 | -6.29 | 37.29 | 31.00 | 46.00 | -15.00 | QP | H |
| 3 | 432.5500 | -4.61 | 43.44 | 38.83 | 46.00 | -7.17 | QP | H |
| 4 | 720.6399 | 1.39 | 31.28 | 32.67 | 46.00 | -13.33 | QP | H |
| 5 | 792.4198 | 0.74 | 35.17 | 35.91 | 46.00 | -10.09 | QP | H |
| 6 | 828.3099 | 1.17 | 36.09 | 37.26 | 46.00 | -8.74 | QP | H |

| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | AntPol. H/V |
|---|---|---|---|---|---|---|---|---|
| 1 | 143.4900 | -7.77 | 32.72 | 24.95 | 43.50 | -18.55 | QP | V |
| 2 | 352.0400 | -6.74 | 33.84 | 27.10 | 46.00 | -18.90 | QP | V |
| 3 | 432.5500 | -4.61 | 43.91 | 39.30 | 46.00 | -6.70 | QP | V |
| 4 | 630.4298 | -1.66 | 31.04 | 29.38 | 46.00 | -16.62 | QP | V |
| 5 | 720.6399 | 1.39 | 29.98 | 31.37 | 46.00 | -14.63 | QP | V |
| 6 | 831.2199 | 1.24 | 33.21 | 34.45 | 46.00 | -11.55 | QP | V |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or AVG measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

**Radiated Emission above 1GHz:**

| | |
|---|---|
| **Engineer : Ternence** | **Site : EMC Lab AC 102** |
| **Limit : FCC_15_03M_PK** | **Margin : 6** |
| **EUT: LEECO SOUNDBAR** | **Probe : VERTICAL/ HORIZONTAL** |
| **Power : AC 120V/60Hz** | **Note : Transmit BLE at 2402MHz** |

| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | AntPol. H/V |
|---|---|---|---|---|---|---|---|---|
| 1 | 4804.00 | -3.89 | 48.87 | 44.98 | 74.00 | -29.02 | peak | H |
| 2 | 7206.00 | 0.54 | 47.09 | 47.63 | 74.00 | -26.37 | peak | H |
| 3 | 4804.00 | -3.89 | 47.42 | 43.53 | 74.00 | -30.47 | peak | V |
| 4 | 7206.00 | 0.54 | 45.55 | 46.09 | 74.00 | -27.91 | peak | V |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or AVG measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

| | |
|---|---|
| **Engineer : Ternence** | **Site : EMC Lab AC 102** |
| **Limit : FCC_15_03M_PK** | **Margin : 6** |
| **EUT: LEECO SOUNDBAR** | **Probe : VERTICAL/ HORIZONTAL** |
| **Power : AC 120V/60Hz** | **Note : Transmit BLE at 2440MHz** |

| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | AntPol. H/V |
|---|---|---|---|---|---|---|---|---|
| 1 | 4880.00 | -3.84 | 45.85 | 42.01 | 74.00 | -31.99 | peak | H |
| 2 | 7320.00 | 0.81 | 43.95 | 44.76 | 74.00 | -29.24 | peak | H |
| 3 | 4880.00 | -3.84 | 46.07 | 42.23 | 74.00 | -31.77 | peak | V |
| 4 | 7320.00 | 0.81 | 43.98 | 44.79 | 74.00 | -29.21 | peak | V |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or AVG measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

| | |
|---|---|
| **Engineer : Ternence** | **Site : EMC Lab AC 102** |
| **Limit : FCC_15_03M_PK** | **Margin : 6** |
| **EUT: LEECO SOUNDBAR** | **Probe : VERTICAL/ HORIZONTAL** |
| **Power : AC 120V/60Hz** | **Note : Transmit BLE at 2480MHz** |

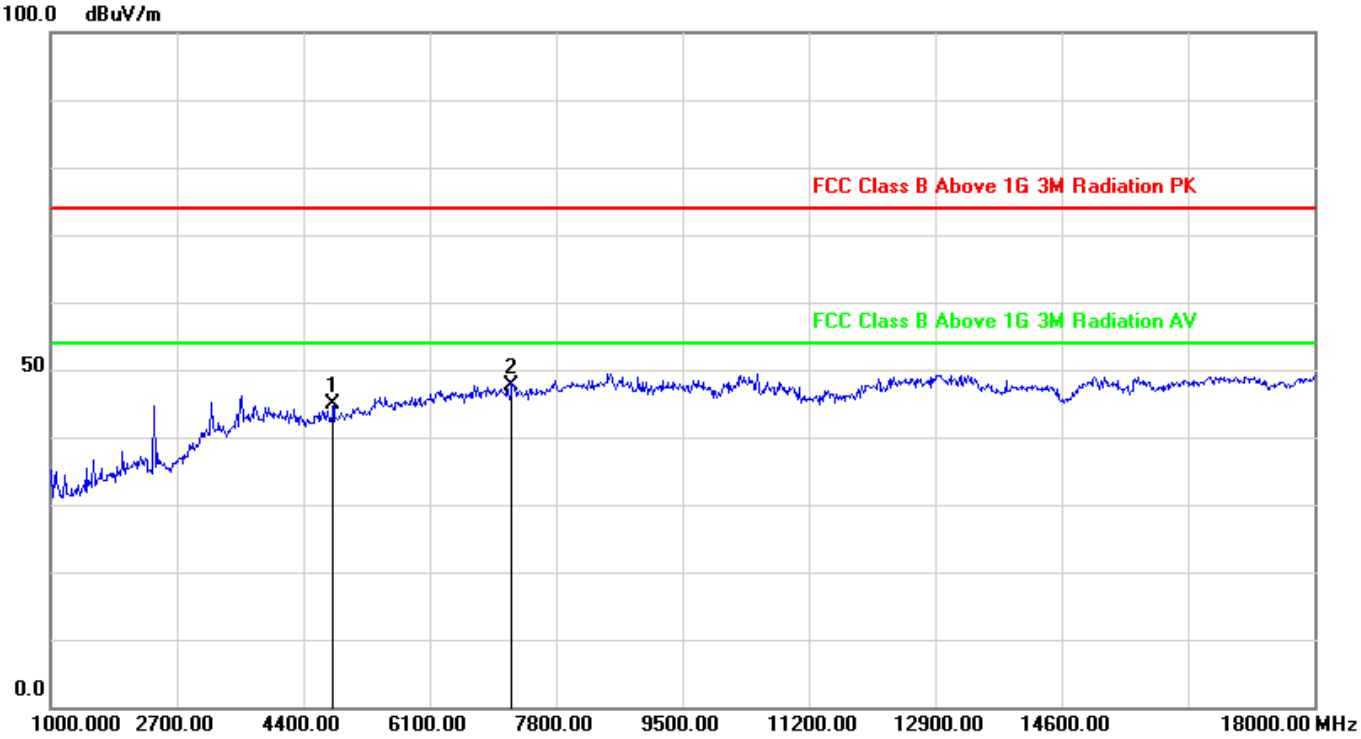
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | AntPol. H/V |
|---|---|---|---|---|---|---|---|---|
| 1 | 4960.00 | -3.79 | 45.95 | 42.16 | 74.00 | -31.84 | peak | H |
| 2 | 7440.00 | 1.10 | 43.58 | 44.68 | 74.00 | -29.32 | peak | H |
| 3 | 4960.00 | -3.79 | 45.57 | 41.78 | 74.00 | -32.22 | peak | V |
| 4 | 7440.00 | 1.10 | 43.50 | 44.60 | 74.00 | -29.40 | peak | V |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or AVG measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

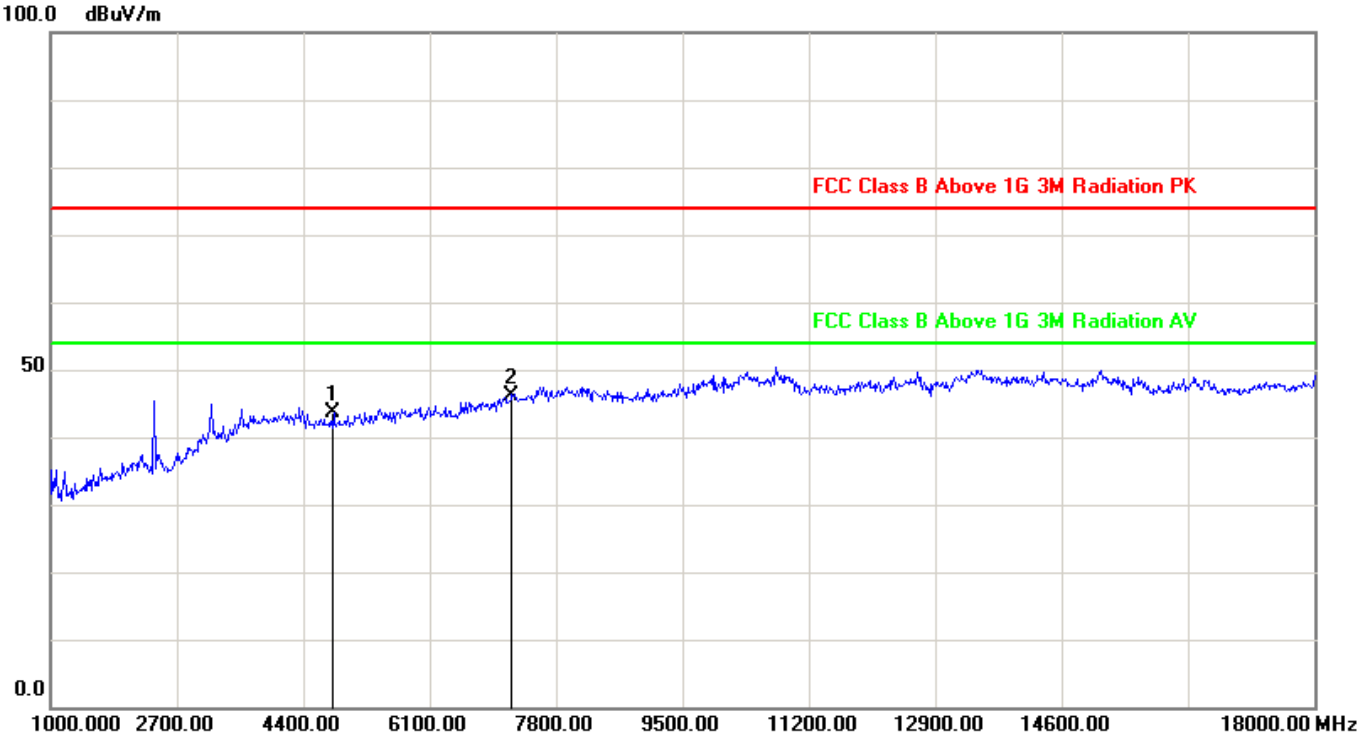
**The worst case of Radiated Emission 1~18GHz:**

| | |
|---|---|
| Site: AC102 | Time: 2016/10/20 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: N/A | Polarity: Horizontal |
| EUT: LEECO SOUNDBAR | Power: AC 120V/60Hz |
| Note: Mode:Transmit BLE at 2402MHz | |




| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 4804.000 | -3.89 | 48.87 | 44.98 | 74.00 | -29.02 | peak |
| 2 | 7206.000 | 0.54 | 47.09 | 47.63 | 74.00 | -26.37 | peak |

| | |
|---|---|
| Site: AC102 | Time: 2016/10/20 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: N/A | Polarity: Vertical |
| EUT: LEECO SOUNDBAR | Power: AC 120V/60Hz |
| Note: Mode:Transmit BLE at 2402MHz | |




| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 4804.000 | -3.89 | 47.42 | 43.53 | 74.00 | -30.47 | peak |
| 2 | 7206.000 | 0.54 | 45.55 | 46.09 | 74.00 | -27.91 | peak |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or AVG measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor
3. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~40GHz), therefore no data appear in the report.

# 7. 6dB Bandwidth Measurement

## 7.1 Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz..

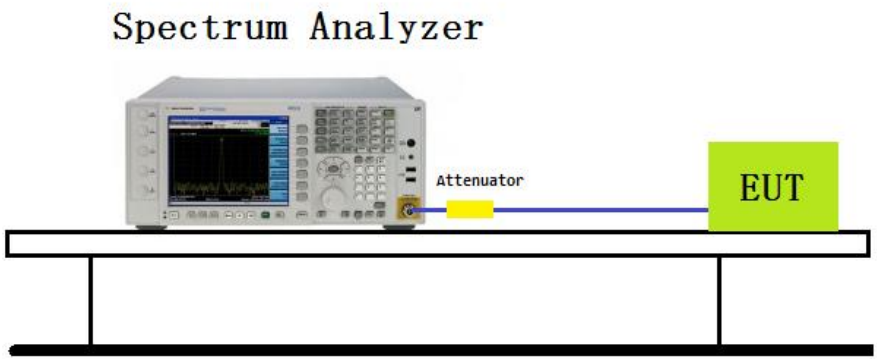
## 7.2 Test Standard

KDB 558074 D01v03r05 – Section 8.2 Option 2

## 7.3 Test Procedures

1. Set RBW=100KHz
2. VBW≥3×RBW
3. Detector=Peak
4. Trace mode=Max hold
5. Sweep time=Auto couple
6. Allow the trace to stabilize
7. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.

## 7.4 Test Setup Layout

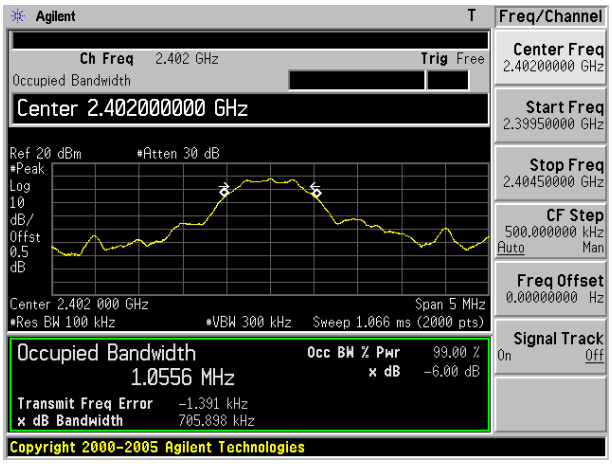


## 7.5 Test Result

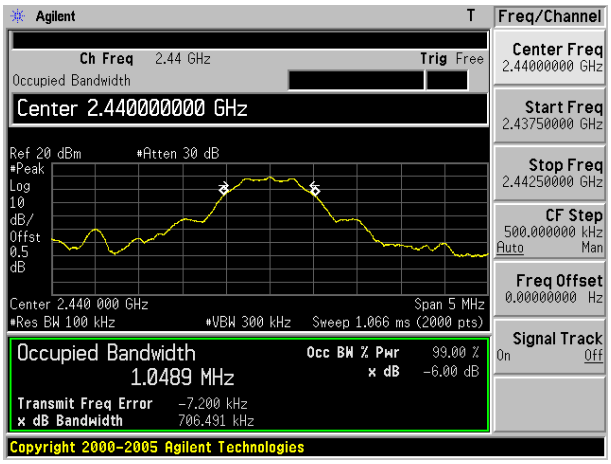
| Test Item | Occupied Bandwidth |
|---|---|
| Test Mode | Mode 1: Transmit by BLE |

| Channel No. | Frequency(MHz) | 6dB Bandwidth(kHz) | 99% Bandwidth(kHz) |
|---|---|---|---|
| 00 | 2402 | 705.9 | 1.0556 |
| 19 | 2440 | 706.5 | 1.0489 |
| 39 | 2480 | 702.0 | 1.0458 |

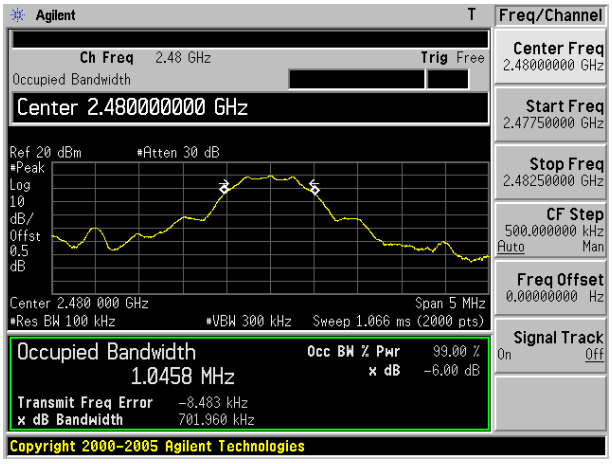
Channel 00 (2402MHz)




Channel 19 (2440MHz)




Channel 39 (2480MHz)



# 8. Output Power Measurement

## 8.1 Test Limit

The Maximum Output Power Measurement is 1W (30dBm).

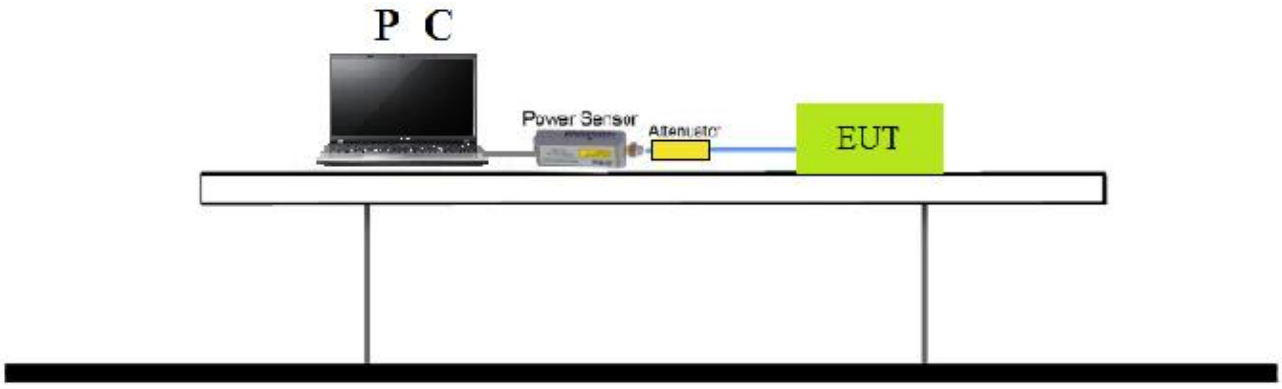
## 8.2 Test Standard

KDB 558074 D01v03r05 - Section 9.1.2 PKPM1 Peak Power Method (for signals with BW ≤50MHz)

## 8.3 Test Procedures

Out power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The pulse sensor employs a VBW = 50MHz so this method was only used for signals whose DTS bandwidth was less than or equal to 50MHz.

## 8.4 Test Setup Layout



## 8.5 Test Result

**For Peak Power :**

| Test Mode | Channel No. | Frequency (MHz) | Peak Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| BLE | 00 | 2402 | 6.51 | 30 | Pass |
| | 19 | 2440 | 7.88 | 30 | Pass |
| | 39 | 2480 | 8.15 | 30 | Pass |

**For Average Power :**

| Test Mode | Channel No. | Frequency (MHz) | Average Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| BLE | 00 | 2402 | 3.47 | 30 | Pass |
| | 19 | 2440 | 4.25 | 30 | Pass |
| | 39 | 2480 | 4.09 | 30 | Pass |

# 9. Power Spectral Density Measurement

## 9.1 Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

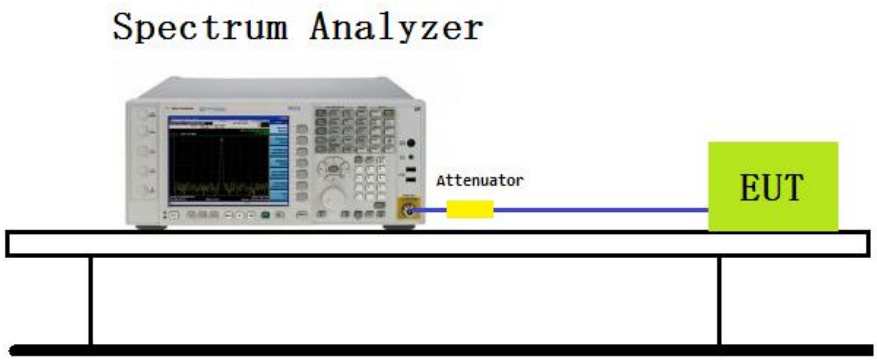
## 9.2 Test Standard

KDB 558074 D01v03r05 - Section 10.2 Method PKPSD

## 9.3 Test Procedures

1. Set RBW=3kHz
2. Set RBW=10kHz
3. Span = 1.5 times the DTS channel bandwidth
4. Detector=Peak
5. Trace mode=Max hold
6. Sweep time=Auto couple
7. Allow the trace to stabilize
8. Analyzer was set to the center frequency of the DTS channel under investigation.

## 9.4 Test Setup Layout

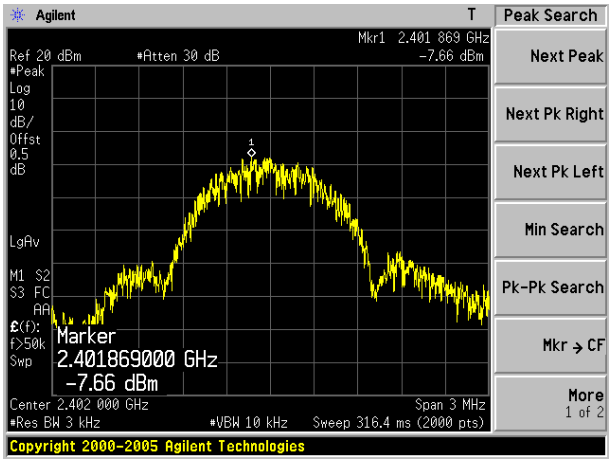


## 9.5 Test Result

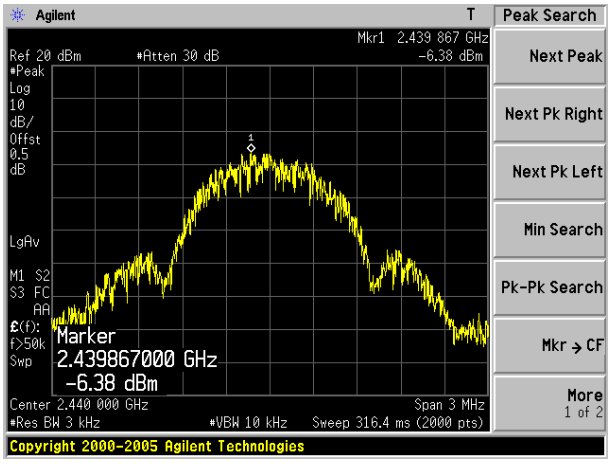
| Test Item | Power Spectral Density |
|---|---|
| Test Mode | Mode 1: Transmit by BLE |

| Channel No. | Frequency(MHz) | Power Spectral Density (dBm/3kHz) | Limit (dBm/3kHz) | Result |
|---|---|---|---|---|
| 00 | 2402 | -7.66 | 8 | Pass |
| 19 | 2440 | -6.38 | 8 | Pass |
| 39 | 2480 | -6.09 | 8 | Pass |

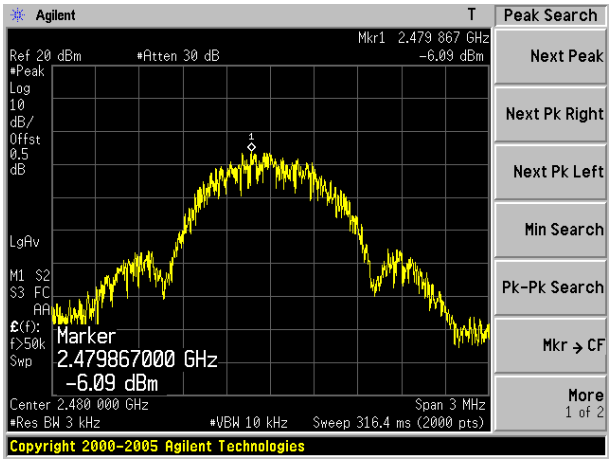
Channel 00 (2402MHz)




Channel 19 (2440MHz)




Channel 39 (2480MHz)



# 10. Conducted Band Edge and Out-of-Band Emissions Measurement

## 10.1 Test Limit

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 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) of FCC part 15 is not required.

## 10.2 Test Standard

KDB 558074 D01v03r05 - Section 11.2 & Section 11.3

## 10.3 Test Procedures

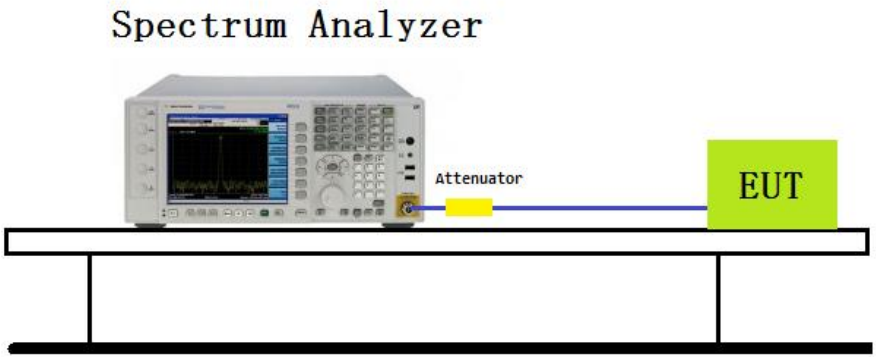
### Reference level measurement:

1. Set the RBW = 100 kHz
2. Set the VBW ≥ 3 x RBW
3. Set the span to ≥ 1.5 times the DTS bandwidth
4. Detector = peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. Allow trace to fully stabilize
8. Set instrument center frequency to DTS channel center frequency

### Emission level measurement:

1. RBW = 100kHz
2. VBW = 300kHz
3. Detector = Peak
4. Trace mode = max hold
5. Sweep time = auto couple
6. The trace was allowed to stabilize
7. Set the center frequency and span to encompass frequency range to be measured

## 10.4Test Setup Layout

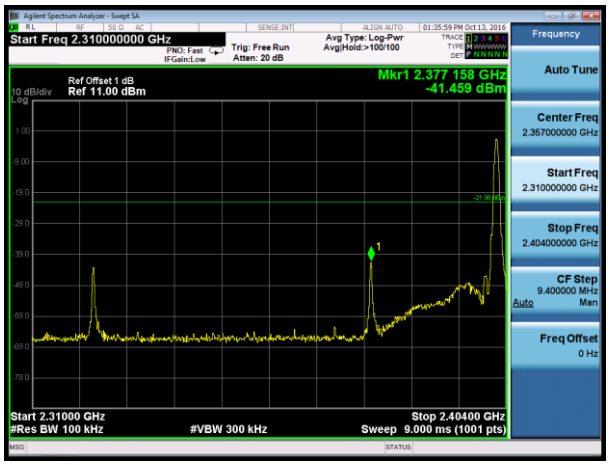


## 10.5 Test Result

| Test Mode | Channel No. | Frequency (MHz) | Limit | Result |
|---|---|---|---|---|
| BLE | 00 | 2402 | 20dBc | Pass |
| | 19 | 2440 | 20dBc | Pass |
| | 39 | 2480 | 20dBc | Pass |

| | | |
|---|---|---|
| Test Item | : | Conducted Band Edge and Out-of-Band Emissions |
| Test Mode | : | Mode 1: Transmit by BLE |

Mode 1: Transmit by BLE (2402MHz)


Mode 1: Transmit by BLE (2440MHz)



Mode 1: Transmit by BLE (2480MHz)



# 11. Radiated Emission Band Edge Measurement

## 11.1 Test Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) of FCC part 15.

## 11.2Test Standard

ANSI C63.10-2013 Section 6.10.5

## 11.3 Test Procedure

Peak Field Strength Measurements:

Analyzer center frequen was set to the frequency of the radiated spurious emission of interest

7. RBW=As specified in Table 1
8. VBW=3×RBW
9. Detector=Peak
10. Trace mode=Max hold
11. Sweep time=Auto couple
12. Allow the trace to stabilize

Table 1-RBW as a function of frequency

| Frequency | RBW |
|---|---|
| 9 ~ 150kHz | 200 ~ 300Hz |
| 0.15 ~ 30MHz | 9 ~ 10kHz |
| 30 ~ 1000MHz | 100 ~ 120kHz |
| ＞ 1000MHz | 1MHz |

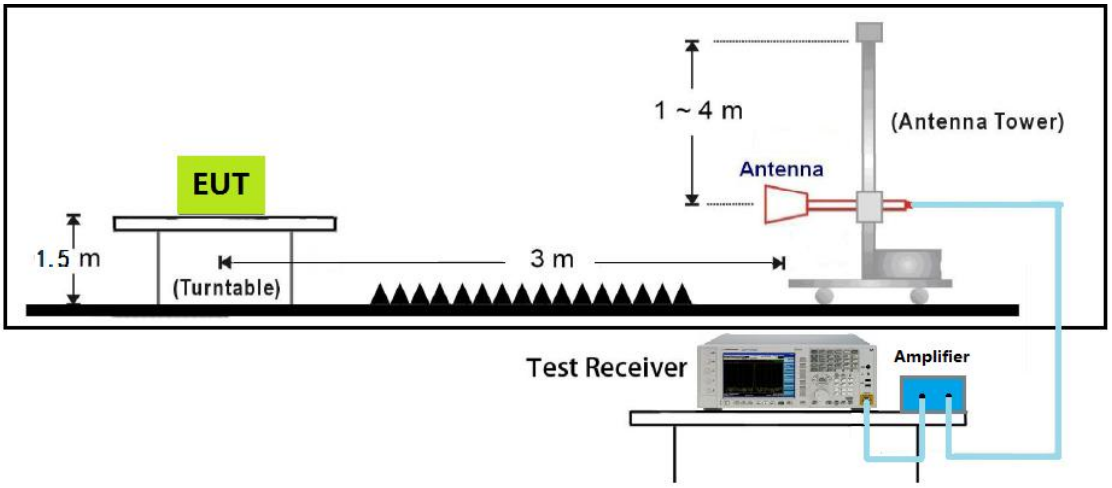
AVE Field Strength Measurements:

Analyzer center frequen was set to the frequency of the radiated spurious emission of interest

7. RBW= 1MHz
8. VBW≥1/T
9. Detector=Peak
10. Trace mode=Max hold
11. Sweep time=Auto couple
12. Allow max hold to run for at least 50 times(1/duty cycle) trace

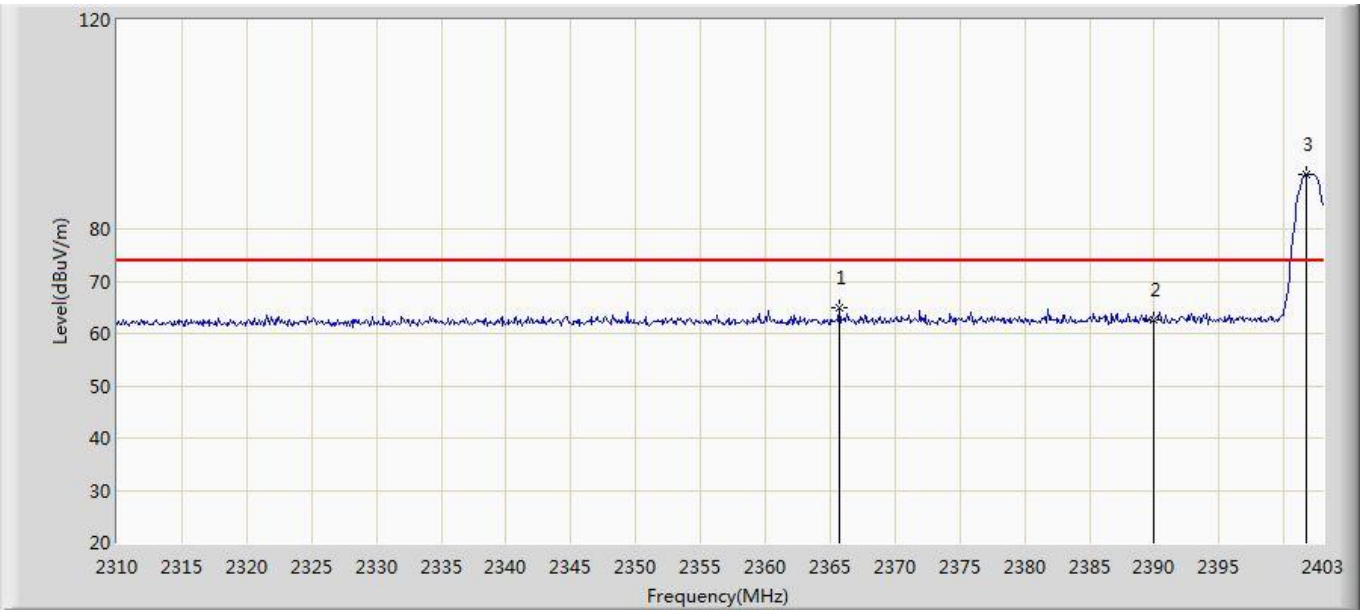
Do as an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to “Voltage” regardless of the display mode

## 11.4 Test Setup Layout



## 11.5 Test Result

| | |
|---|---|
| Site: AC102 | Time: 2016/10/19 - 13:06 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: N/A | Polarity: Vertical |
| EUT: LEECO SOUNDBAR | Power:AC 120V/60Hz |
| Note: Mode 1: Transmit BLE at 2402MHz | |

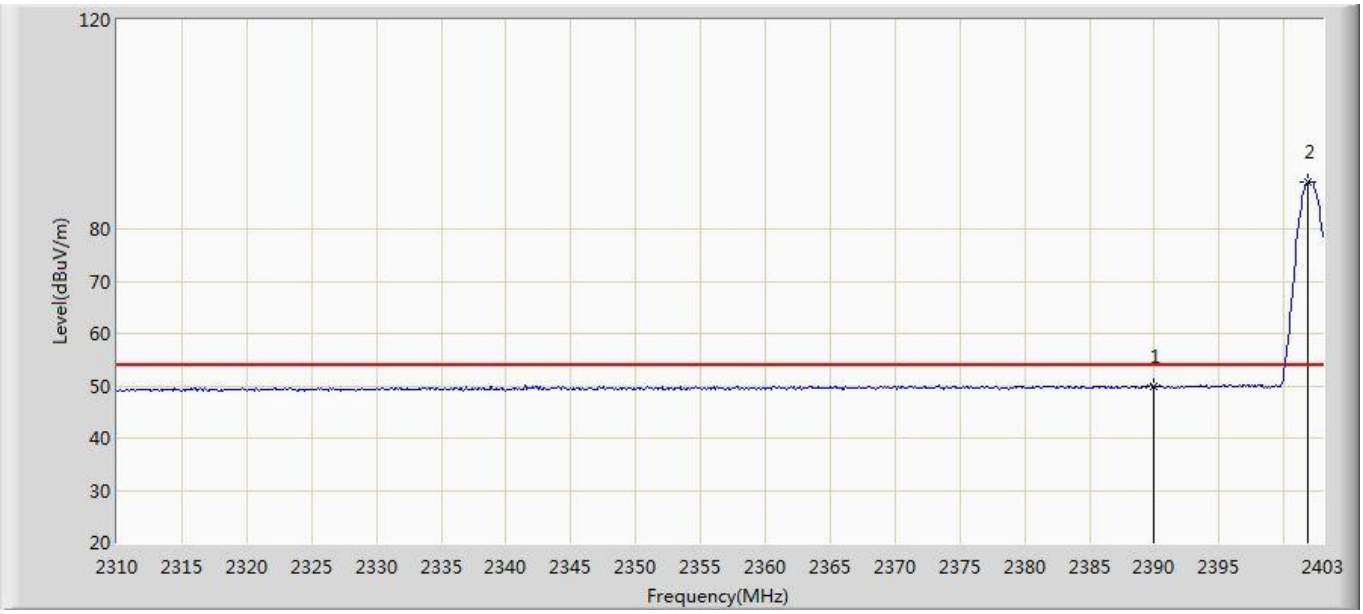



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|
| 1 | | 2365.707 | 64.860 | 31.848 | -9.140 | 74.000 | 33.013 | PK |
| 2 | | 2390.000 | 62.634 | 29.523 | -11.366 | 74.000 | 33.111 | PK |
| 3 | * | 2401.698 | 90.401 | 57.242 | N/A | N/A | 33.159 | PK |

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

| | |
|---|---|
| Site: AC102 | Time: 2016/10/19 - 13:13 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: N/A | Polarity: Vertical |
| EUT: LEECO SOUNDBAR | Power:AC 120V/60Hz |
| Note: Mode 1: Transmit BLE at 2402MHz | |

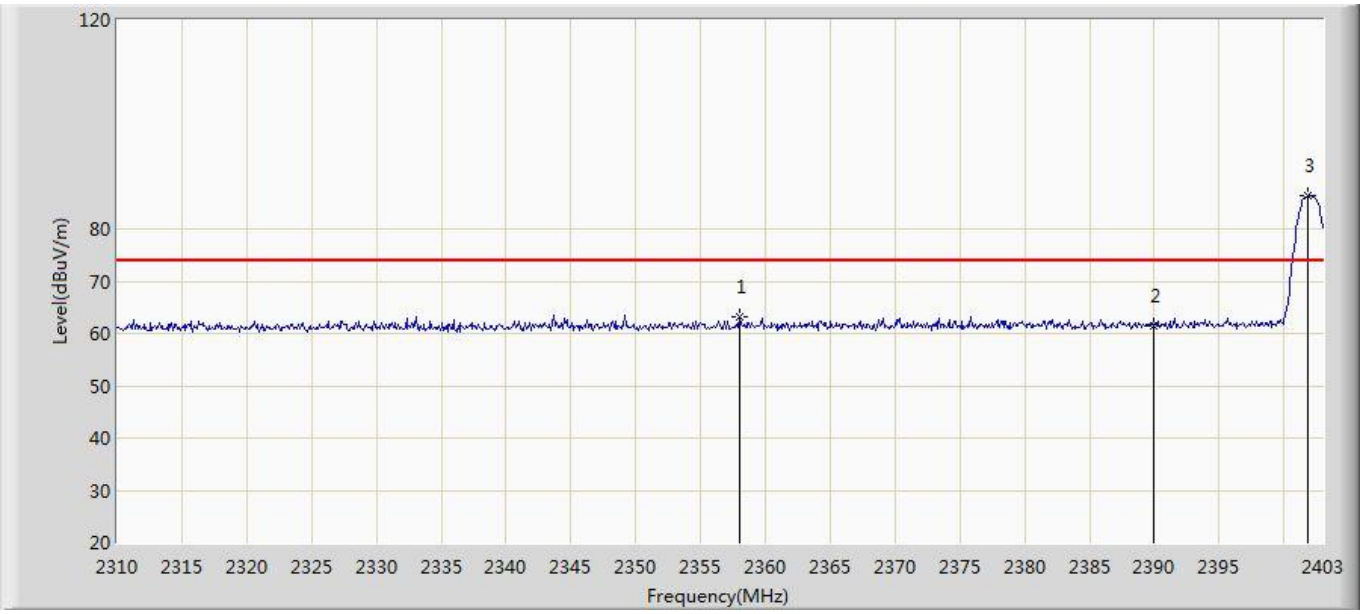



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|
| 1 | | 2390.000 | 49.871 | 16.760 | -4.129 | 54.000 | 33.111 | AV |
| 2 | * | 2401.884 | 89.023 | 55.863 | N/A | N/A | 33.160 | AV |

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

| | |
|---|---|
| Site: AC102 | Time: 2016/10/19 - 13:17 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: N/A | Polarity: Horizontal |
| EUT: LEECO SOUNDBAR | Power:AC 120V/60Hz |
| Note: Mode 1: Transmit BLE at 2402MHz | |

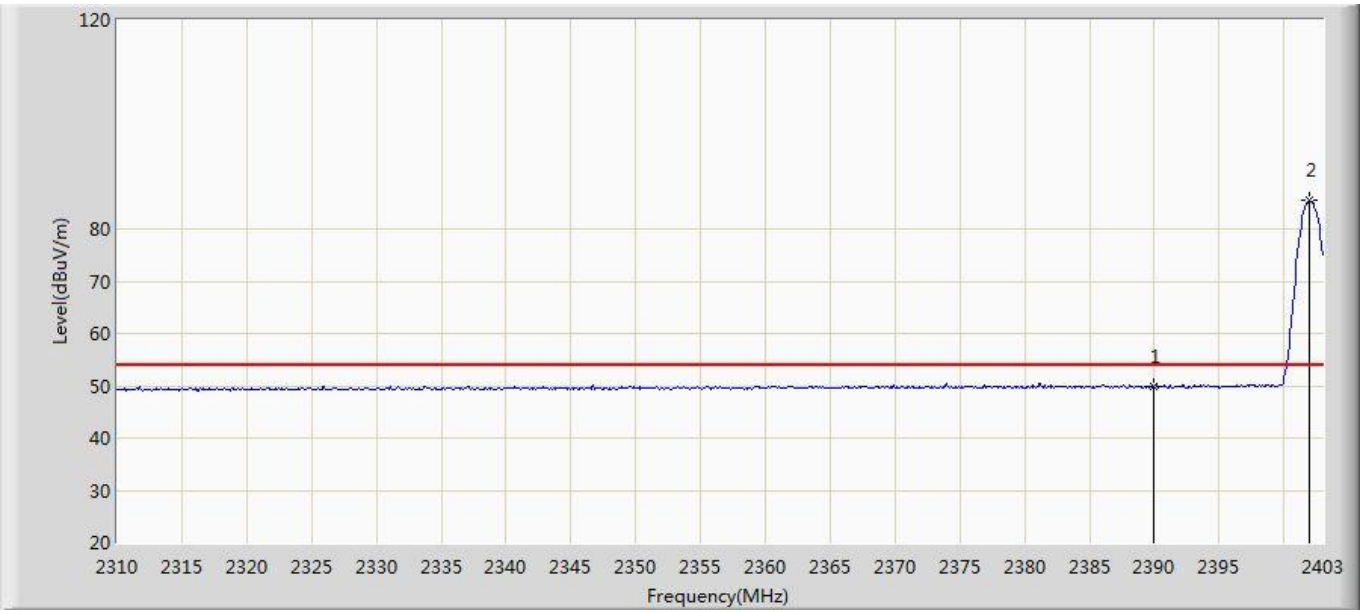



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|
| 1 | | 2357.988 | 63.218 | 30.238 | -10.782 | 74.000 | 32.980 | PK |
| 2 | | 2390.000 | 61.574 | 28.463 | -12.426 | 74.000 | 33.111 | PK |
| 3 | * | 2401.884 | 86.323 | 53.163 | N/A | N/A | 33.160 | PK |

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

| | |
|---|---|
| Site: AC102 | Time: 2016/10/19 - 13:23 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: N/A | Polarity: Horizontal |
| EUT: LEECO SOUNDBAR | Power:AC 120V/60Hz |
| Note: Mode 1: Transmit BLE at 2402MHz | |

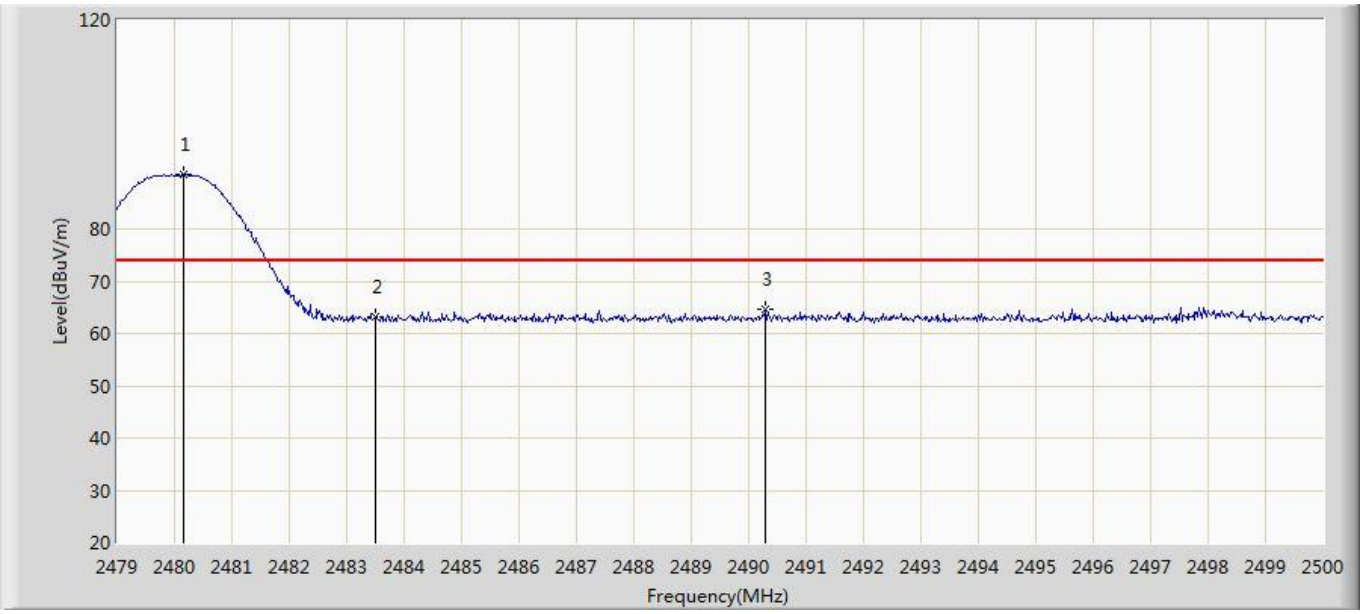



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|
| 1 | | 2390.000 | 49.806 | 16.695 | -4.194 | 54.000 | 33.111 | AV |
| 2 | * | 2401.977 | 85.376 | 52.216 | N/A | N/A | 33.161 | AV |

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

| | |
|---|---|
| Site: AC102 | Time: 2016/10/19 - 13:24 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: N/A | Polarity: Horizontal |
| EUT: LEECO SOUNDBAR | Power:AC 120V/60Hz |
| Note: Mode 1: Transmit BLE at 2480MHz | |

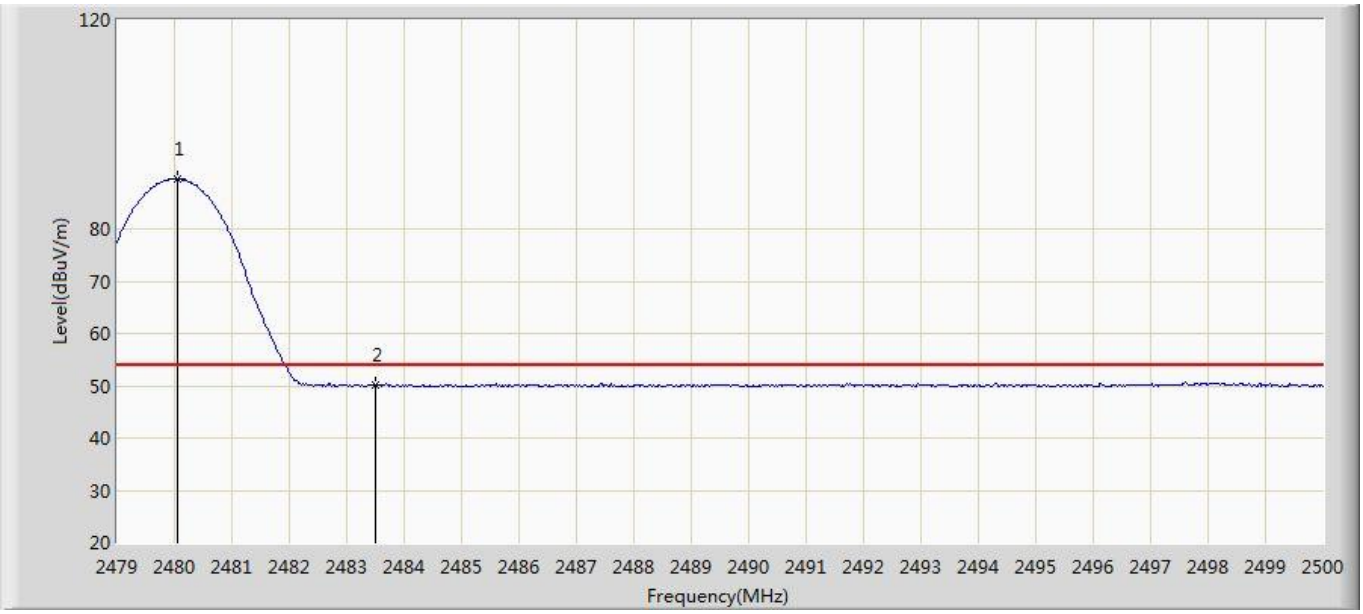



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|
| 1 | * | 2480.155 | 90.372 | 56.893 | N/A | N/A | 33.479 | PK |
| 2 | | 2483.500 | 63.133 | 29.641 | -10.867 | 74.000 | 33.493 | PK |
| 3 | | 2490.298 | 64.595 | 31.075 | -9.405 | 74.000 | 33.520 | PK |

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

| | |
|---|---|
| Site: AC102 | Time: 2016/10/19 - 13:29 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: N/A | Polarity: Horizontal |
| EUT: LEECO SOUNDBAR | Power:AC 120V/60Hz |
| Note: Mode 1: Transmit BLE at 2480MHz | |

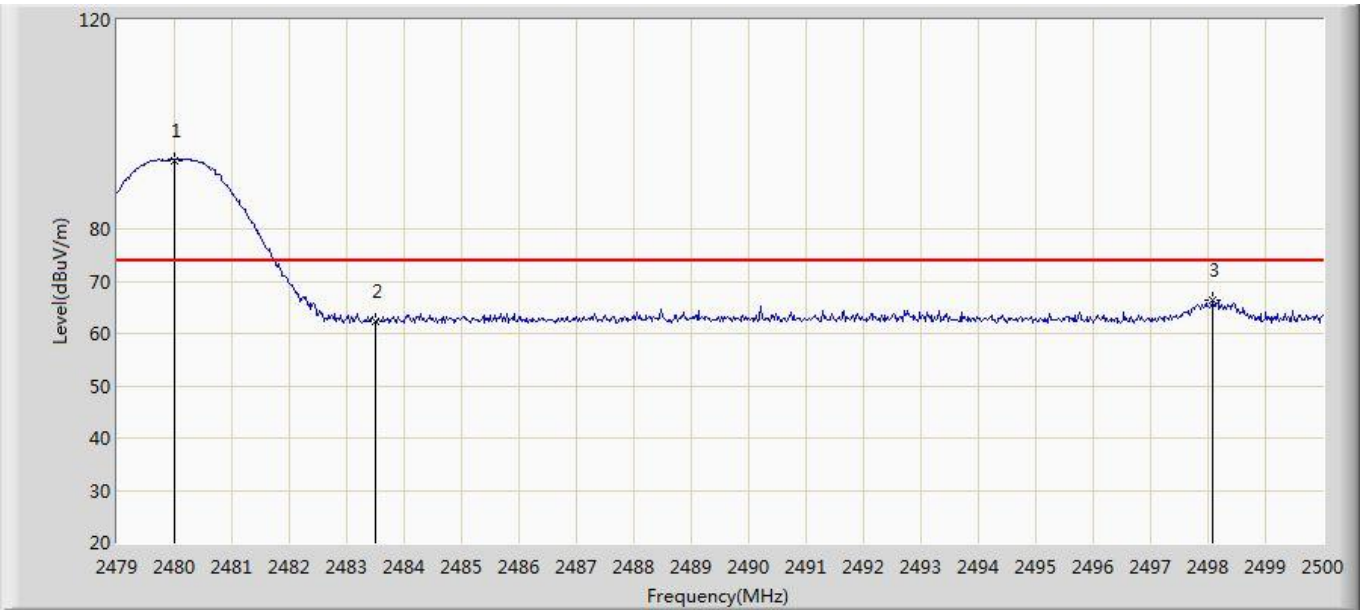



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|
| 1 | * | 2480.050 | 89.516 | 56.037 | N/A | N/A | 33.479 | AV |
| 2 | | 2483.500 | 50.005 | 16.513 | -3.995 | 54.000 | 33.493 | AV |

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

| | |
|---|---|
| Site: AC102 | Time: 2016/10/19 - 13:29 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: N/A | Polarity: Vertical |
| EUT: LEECO SOUNDBAR | Power:AC 120V/60Hz |
| Note: Mode 1: Transmit BLE at 2480MHz | |

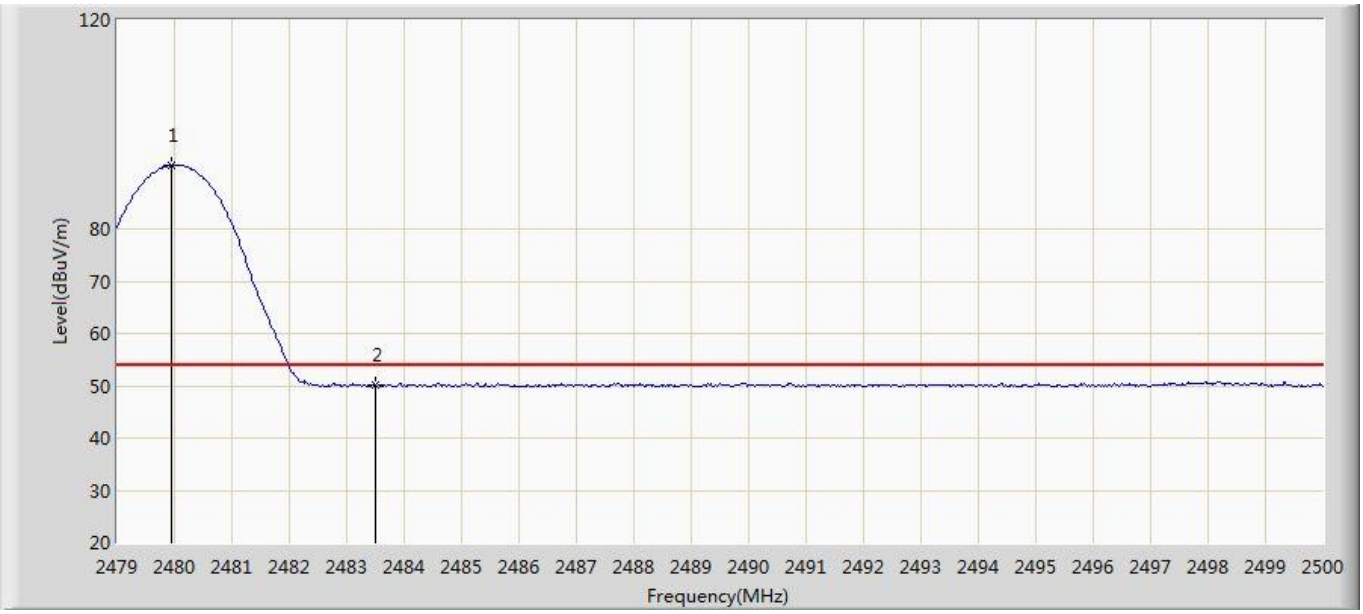



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|
| 1 | * | 2480.008 | 93.152 | 59.674 | N/A | N/A | 33.478 | PK |
| 2 | | 2483.500 | 62.448 | 28.956 | -11.552 | 74.000 | 33.493 | PK |
| 3 | | 2498.089 | 66.449 | 32.899 | -7.551 | 74.000 | 33.550 | PK |

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

| | |
|---|---|
| Site: AC102 | Time: 2016/10/19 - 13:32 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: N/A | Polarity: Vertical |
| EUT: LEECO SOUNDBAR | Power:AC 120V/60Hz |
| Note: Mode 1: Transmit BLE at 2480MHz | |




| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|
| 1 | * | 2479.945 | 92.151 | 58.673 | N/A | N/A | 33.478 | AV |
| 2 | | 2483.500 | 50.147 | 16.655 | -3.853 | 54.000 | 33.493 | AV |

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

## 12. Appendix - Information On The Testing Laboratory

We, BUREAU VERITAS ADT (Shanghai) Corporation, were founded in 2004 to provide our best service in EMC, Radio and Vehicle consultation. Our laboratories are accredited by the following accreditation bodies according to ISO/IEC 17025 (2005) .

| | |
|---|---|
| **USA** | A2LA |
| | Certificate No.: 2343.01 |
| **China** | CNAS |
| | Certificate No.: L2810 |

Copies of accreditation certificates could be inquired from our office. If you have any comments, please feel free to contact us at the following:

**EMC / RF / Vehicle Lab**:
Tel: +86 21 6465 9091
Fax:+86 21 6465 9092
Email: bvadtshmail@cn.bureauveritas.com

--- END ---

The End