# Test Report of FCC CFR 47 Part 15 Subpart C

## On Behalf of

GL Technologies (Hong Kong) Limited
Unit 210D, 2/F, Enterprise Place Hong Kong Science Park, Shatin, N.T.
Hong Kong, China

| | |
|---|---|
| Product Name: | **Bluetooth Connected Body Fat Scale** |
| Model/Type No.: | **W191** |
| FCC ID: | **2AFIW-MIFIV1** |
| Prepared By: | **Shenzhen Hongcai Testing Technology Co., Ltd.**<br>1st-3rd Floor, Building C, Shuanghuan Xin Yi Dai Hi-Tech Industrial Park, No.8 Baoqing Road, Baolong Industrial Zone, Longgang District, Shenzhen, Guangdong, China<br>Tel: +86-755-86337020<br>Fax:+86-755-86337028 |
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| Tested By: | Jerry Zhao/ Jerry Zhao |

Reviewed By: Owen.Yang

Owen.Yang
EMC Technical Supervisor

Approved By: Tony Wu

Tony Wu
EMC Technical Manager

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# 1. GENERAL INFORMATION

## 1.1 Product Description for Equipment Under Test (EUT)

Client Information

| | |
|---|---|
| Applicant: | **Lifespan Brands LLC** |
| Address of applicant: | 1200 Thorndale Ave, Elk Grove Village, ELK GROVE, Illinois, United States |
| Manufacturer : | **Cha's Electronic Industries(Shenzhen)Co., Ltd** |
| Address of applicant: | Danzhutou Ind. District, Buji, Shenzhen, China |

General Description of E.U.T

| **Items** | **Description** |
|---|---|
| EUT Description: | Bluetooth Connected Body Fat Scale |
| Model No.: | W191 |
| Supplementary Model No.: | N/A |
| Trade Name: | WeighRite |
| RF Specification: | Bluetooth Low Energy |
| Frequency Band: | 2402~2480MHz |
| Channel Spacing: | 2 MHz |
| Number of Channels: | 40 |
| Type of Modulation: | GFSK |
| Antenna Gain | 2.5dB |
| Antenna Type: | PCB Antenna |
| Rated Voltage: | DC4.5V from battery |

Note: In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test.

## 1.2 Test standards

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

KDB558074 D01 V04: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under Section 15.247.

## 1.3 Test Facility

All measurement required was performed at laboratory of Shenzhen CTL Testing Technology Co., Ltd. Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

**FCC – Registration No.: 970318**

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December, 2013.

**IC Registration No.: 9618B**

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

# 2. SYSTEM TEST CONFIGURATION

## 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

## 2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

## 2.3 General Test Procedures

Conducted Emissions: The EUT is placed on the table, which is 0.8 m above ground plane According to the requirements in ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions: The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10-2013.

## 2.4 Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Parameter | Uncertainty |
|---|---|
| Transmitter power conducted | +/- 0.57 dB |
| Transmitter power Radiated | +/- 2.20 dB |
| Conducted spurious emission 9KHz-40 GHz | +/- 2.20 dB |
| Occupied Bandwidth | +/- 0.01 dB |
| Power Line Conducted Emission | +/- 3.20 dB |
| Radiated Emission | +/- 4.32 dB |

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

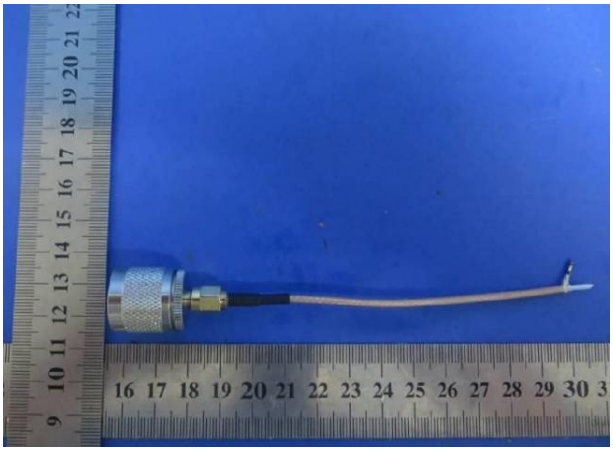
## 2.5 Measure Results Explanation Example

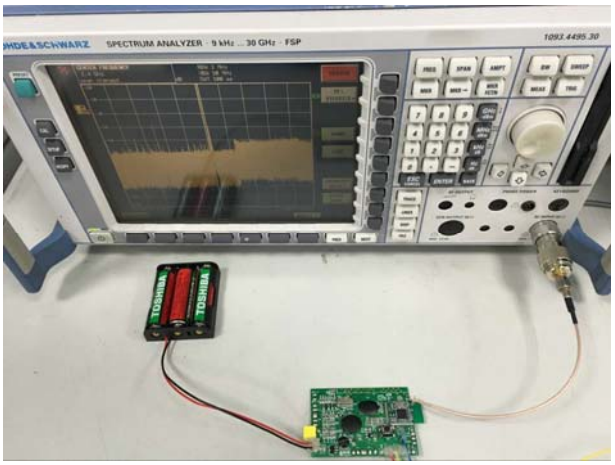
For all conducted test items:
The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable less and attenuator factor.
Offset= RF cable less+ attenuator factor.

Note: Using a temporary antenna connector for the EUT when the conducted measurements are performed.

| Equipment | Manufacturer | Model No. | Frequency range(GHz) | Attenuation values(dBm) |
|---|---|---|---|---|
| Line | Zhenjiang south electronic | RG316 | 1-12 | 0.08 |
| Connector | Zhenjiang south electronic | SMA-K/N-J | 1-12 | 0.01 |





## 2.6. Information of EUT Configuration for Test

The test software was used to control EUT work in Continuous Tx mode, and select test channel, wireless mode as below table.

Channel List:

| Frequency band (MHz) | | | | 2400~2483.5 | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 37 | 2402 | 9 | 2422 | 18 | 2442 | 28 | 2462 |
| 0 | 2404 | 10 | 2424 | 19 | 2444 | 29 | 2464 |
| 1 | 2406 | 38 | 2426 | 20 | 2446 | 30 | 2466 |
| 2 | 2408 | 11 | 2428 | 21 | 2448 | 31 | 2468 |
| 3 | 2410 | 12 | 2430 | 22 | 2450 | 32 | 2470 |
| 4 | 2412 | 13 | 2432 | 23 | 2452 | 33 | 2472 |
| 5 | 2414 | 14 | 2434 | 24 | 2454 | 34 | 2474 |
| 6 | 2416 | 15 | 2436 | 25 | 2456 | 35 | 2476 |
| 7 | 2418 | 16 | 2438 | 26 | 2458 | 36 | 2478 |
| 8 | 2420 | 17 | 2440 | 27 | 2460 | 39 | 2480 |

## 2.7 List of Measuring Equipments Used

Test equipments list of Shenzhen CTL Testing Technology Co., Ltd.

| No. | Equipment | Manufacturer | Model No. | S/N | Last Calculator | Due Calculator |
|---|---|---|---|---|---|---|
| 1 | EMI Test Receiver | R&S | ESCI | 100687 | 2016-7-25 | 2017-7-24 |
| 2 | EMI Test Receiver | R&S | ESPI | 100097 | 2016-10-1 | 2017-10-31 |
| 3 | Amplifier | HP | 8447D | 1937A02492 | 2016-7-25 | 2017-7-24 |
| 4 | TRILOG Broadband Test-Antenna | SCHWARZBECK | VULB9163 | 9163-324 | 2016-7-25 | 2017-7-24 |
| 5 | RF POWER AMPLIFIER | FRANKONIA | FLL-75 | 1020A1109 | 2016-7-25 | 2017-7-24 |
| 6 | 6DB Attenuator | FRANKONIA | N/A | 1001698 | 2016-7-25 | 2017-7-24 |
| 7 | 10dB attenuator | ELECTRO-METRICS | EM-7600 | 836 | 2016-7-25 | 2017-7-24 |
| 8 | Spectrum Analyzer | R&S | FSP | 100397 | 2016-10-1 | 2017-10-31 |
| 9 | Broadband preamplifier | SCH WARZBECK | BBV9718 | 9718-182 | 2016-7-25 | 2017-7-24 |
| 10 | Power Sensor | Anritsu | ML2438A | 1241002 | 2016-7-25 | 2017-7-24 |
| 11 | Power Sensor | Anritsu | MA2411B | 1207366 | 2016-7-25 | 2017-7-24 |
| 12 | Horn Antenna | SCHWARZBECK | BBHA 9120D | 0437 | 2016-7-25 | 2017-7-24 |
| 13 | Horn Antenna | SCHWARZBECK | BBHA9170 | 0483 | 2016-7-25 | 2017-7-24 |

## 3. SUMMARY OF Test RESULTS

| FCC/IC Rules | Description of Test | Result |
|---|---|---|
| FCC §15.207 | AC Power Line Conducted Emission | Pass |
| FCC §15.247(a) | 6dB Bandwidth | Pass |
| FCC §15.247(b) | Maximum Output Power | Pass |
| FCC §15.247(e) | Power Spectral Density | Pass |
| FCC §15.247 (d) | Conducted Spurious Emission | Pass |
| FCC §15.205 and §15.209 | Radiated Spurious Emission | Pass |
| FCC§15.247 (d) and §15.205 and §15.209 | Unwanted Emissions | Pass |
| FCC §15.203/15.247(b)/(c) | Antenna Requirement | Pass |

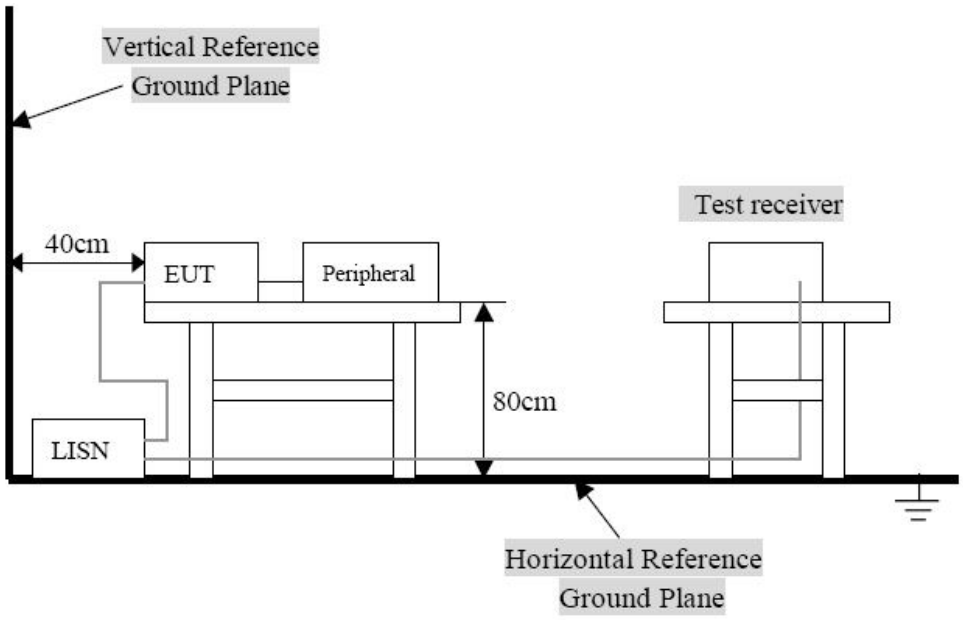
# 4. Test OF AC POWER LINE CONDUCTED EMISSION

## 4.1 Applicable standard

Refer to FCC §15.207.
For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

| Frequency Range (MHz) | Limits ( dBuV) | |
|---|---|---|
| | Quasi-Peak | Average |
| 0.150～0.500 | 66～56 | 56～46 |
| 0.500～5.000 | 56 | 46 |
| 5.000～30.00 | 60 | 50 |

## 4.2 Test Setup Diagram




Remark: Not applicable.The EUT is powered by battery.

# 5. Test of 6dB Bandwidth

## 5.1 Applicable standard

Refer to FCC §15.247 (a) (2) and KDB558074 D01 V04 Section 8.2.
The minimum 6dB bandwidth shall be at least 500 kHz.

## 5.2 EUT Setup


**Spectrum Analyzer**

## 5.3 Test Equipment List and Details

See section 2.7.

## 5.4 Test Procedure

The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB. The transmitter output was connected to a spectrum analyzer and the parameter was set as below:

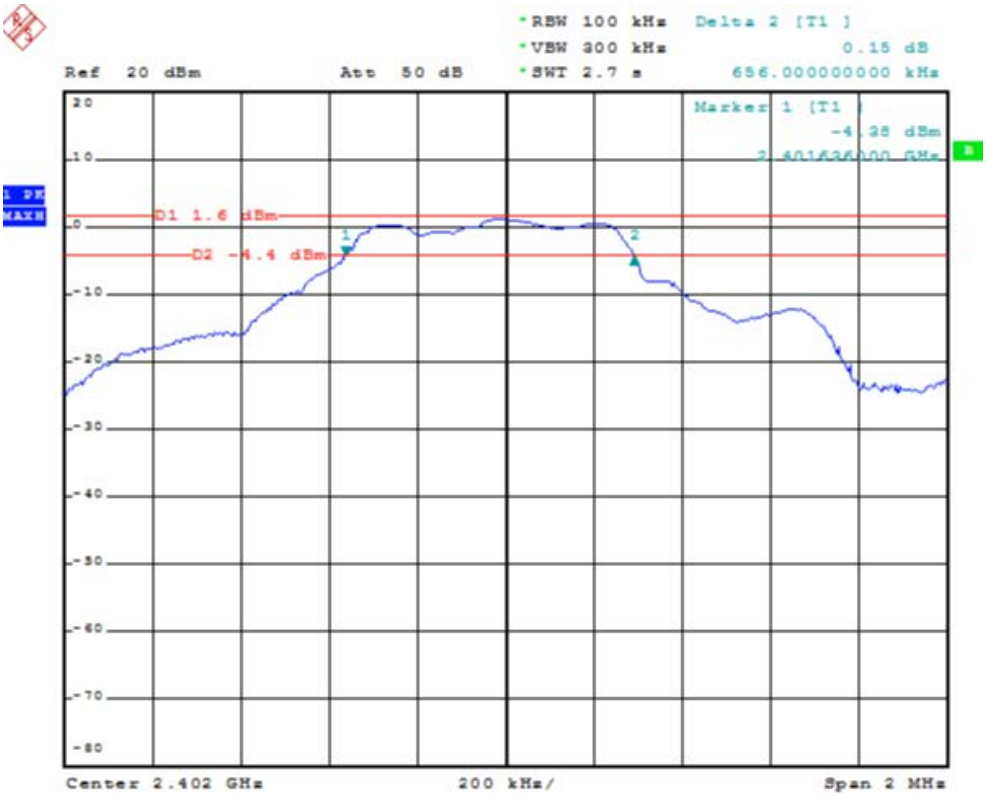
1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) ⩾ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

## 5.5 Test Result

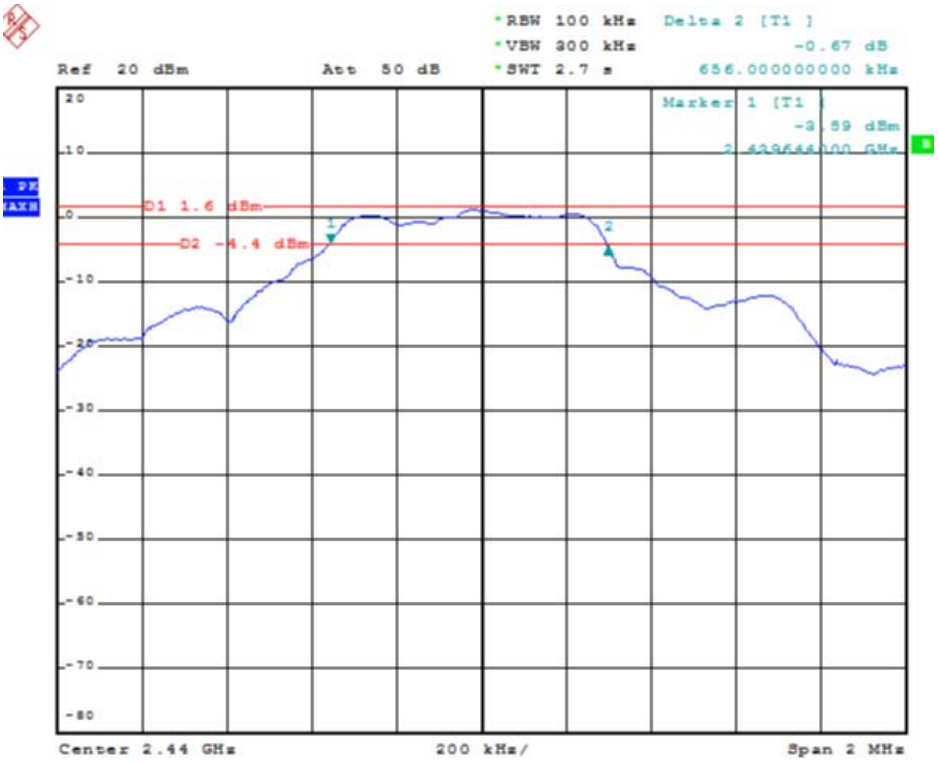
| | |
|---|---|
| Temperature ( ℃ ) : 22~23 | EUT: Bluetooth Connected Body Fat Scale |
| Humidity (%RH ): 50~54 | M/N: W191 |
| Barometric Pressure ( mbar ): 950~1000 | Operation Condition: Continuously Tx Mode |

| Channel | Channel Frequency (MHz) | 6dB Bandwidth (kHz) | Minimum Limit (kHz) | Pass / Fail |
|---|---|---|---|---|
| Low | 2402 | 656 | 500 | PASS |
| Middle | 2440 | 656 | 500 | PASS |
| High | 2480 | 676 | 500 | PASS |

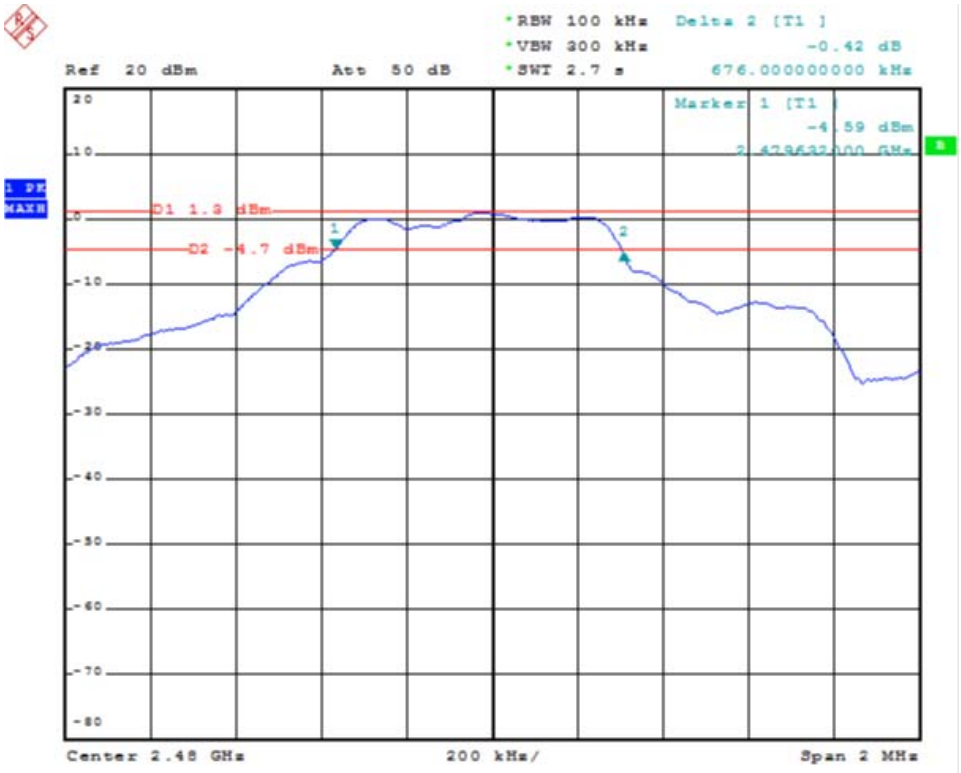
**6dB BANDWIDTH ( GFSK CH Low)**



## 6dB BANDWIDTH (GFSK CH Mid)




## 6dB BANDWIDTH (GFSK CH High)



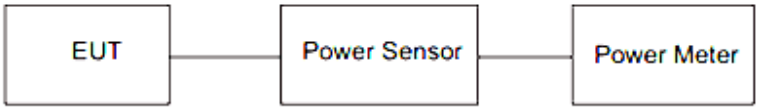
# 6. Maximum Output Power Measurement

## 6.1 Applicable standard

Refer to FCC §15.247 (b) and KDB558074 D01 V04 Section 9.0.
The maximum permissible conducted output power is 1Watt.

## 6.2 EUT Setup

Maximum Peak Conducted Output Power：




## 6.3 Test Equipment List and Details

See section 2.7.

## 6.4 Test Procedure

☒ Maximum Peak Conducted Output Power

☐ Spectrum analyzer

1) Set RBW = 1MHz, VBW = 3MHz, Detector = Peak.
2) Sweep time = auto, Trace mode = max hold, Allow trace to fully stabilize.
3) Use the spectrum analyzer channel power measurement function with the band limits set equal to the DTS bandwidth edges.

☒ Power meter

A broadband Peak RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

## 6.5 Test Result

| | |
|---|---|
| Temperature ( ℃ ) : 22~23 | EUT: Bluetooth Connected Body Fat Scale |
| Humidity (%RH ): 50~54 | M/N: W191 |
| Barometric Pressure ( mbar ): 950~1000 | Operation Condition: Continuously Tx Mode |

| Modulation Type | Channel No. | Frequency (MHz) | Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| BT LE | Low | 2402 | 1.09 | 30 | Pass |
| BT LE | Middle | 2440 | 0.95 | 30 | Pass |
| BT LE | High | 2480 | 1.12 | 30 | Pass |

# 7. Test of Peak Power Spectral Density

## 7.1 Applicable standard

Refer to FCC §15.247 (e) and KDB558074 D01 V04 Section 10.2.
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## 7.2 EUT Setup


**Spectrum Analyzer**

## 7.3 Test Equipment List and Details

See section 2.7.

## 7.4 Test Procedure

☒ Maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit.

1) Set the RBW = 3kHz, VBW = 10kHz.
2) Detector = Peak, Sweep time = auto couple.
3) Trace mode = max hold, allow trace to fully stabilize.
4) Use the peak marker function to determine the maximum amplitude level.

☐ Maximum (average) conducted output power was used to demonstrate compliance to the fundamental output power limit.

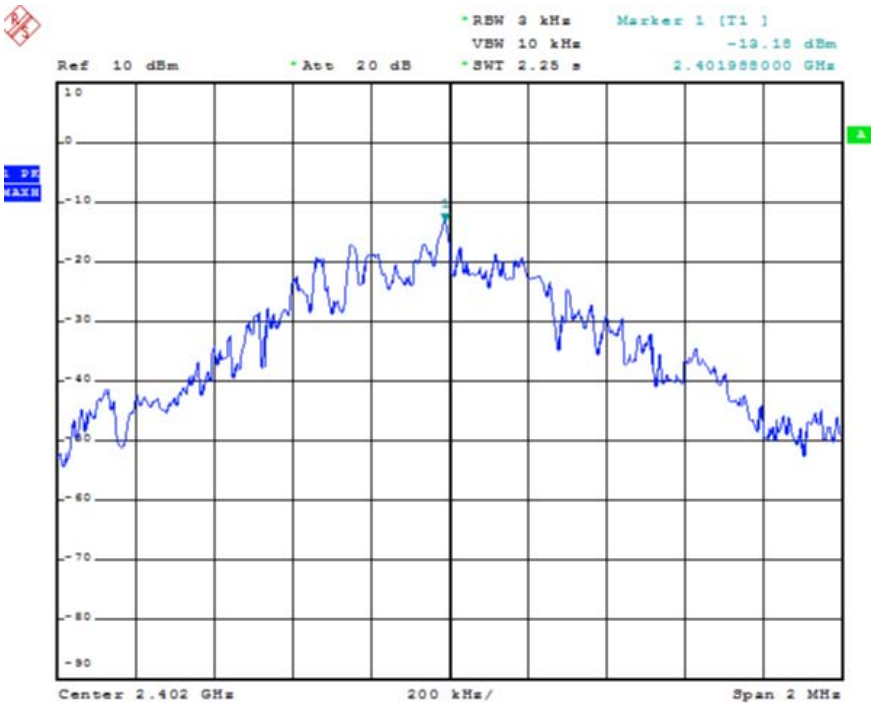
1) Set the RBW = 100kHz, VBW = 300 kHz.
2) Detector = RMS, Sweep time = auto couple.
3) Perform the measurement over a single sweep.
4) Use the peak marker function to determine the maximum amplitude level.

## 7.5 Test Result

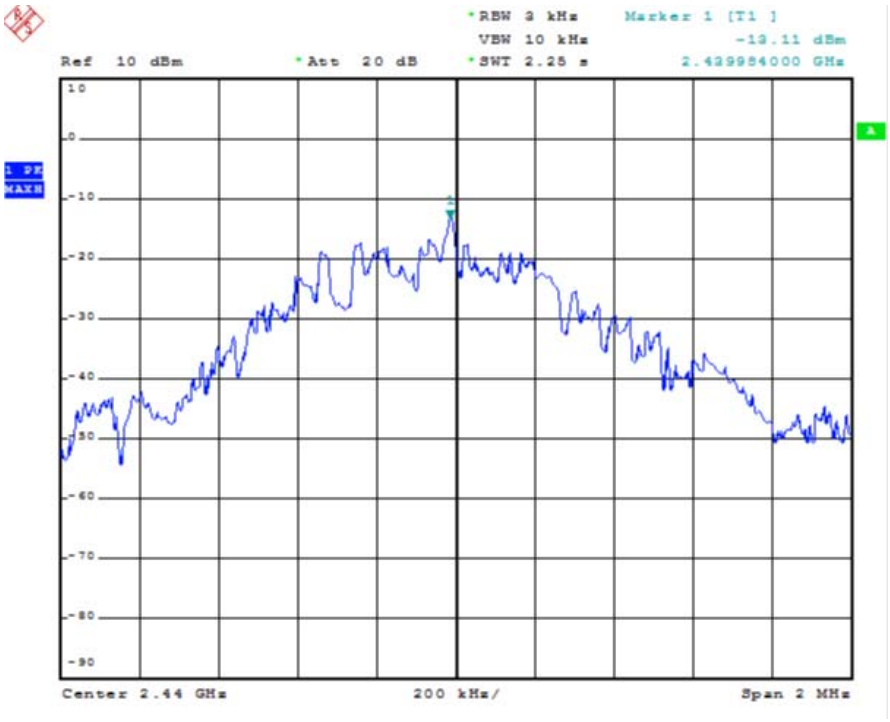
| | |
|---|---|
| Temperature ( ℃ ) : 22~23 | EUT: Bluetooth Connected Body Fat Scale |
| Humidity (%RH ): 50~54 | M/N: W191 |
| Barometric Pressure ( mbar ): 950~1000 | Operation Condition: Continuously Tx Mode |

| Channel | Channel Frequency (MHz) | Power Level in 3KHz RBW (dBm/3kHz) | Maximum Limit (dBm/3kHz) | Pass / Fail |
|---|---|---|---|---|
| Low | 2412 | -13.18 | 8 | PASS |
| Middle | 2437 | -13.11 | 8 | PASS |
| High | 2462 | -13.03 | 8 | PASS |

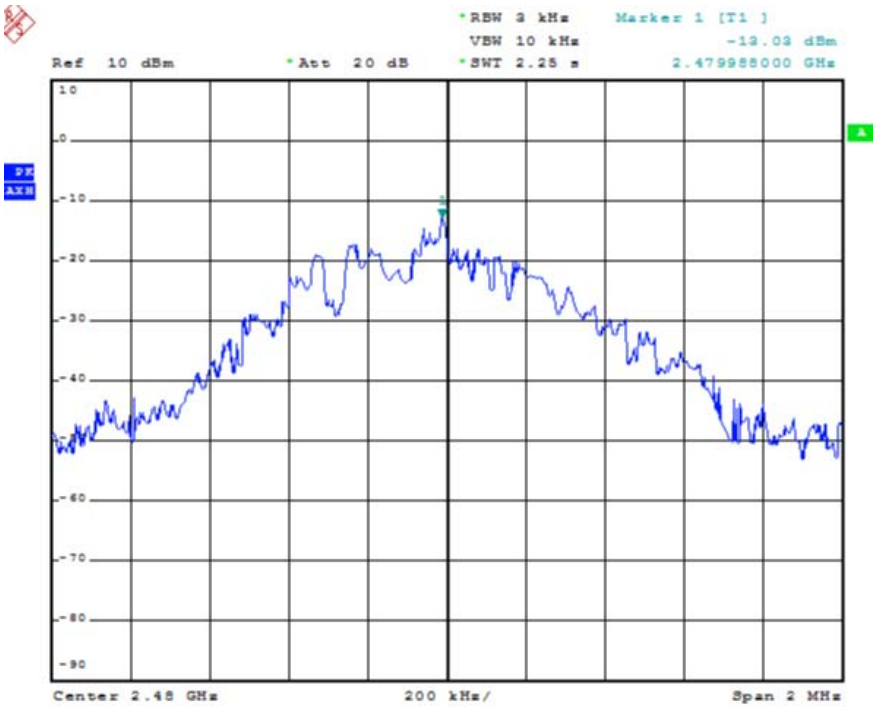
**POWER SPECTRAL DENSITY (GFSK CH Low)**



## POWER SPECTRAL DENSITY (GFSK CH Mid)




## POWER SPECTRAL DENSITY (GFSK CH CH High)



# 8. Test of Conducted Spurious Emission

## 8.1 Applicable standard

Refer to FCC §15.247 (d) and KDB558074 D01 V04 Section 11.3.
Section 15.247(d): 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. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

## 8.2 EUT Setup


**Spectrum Analyzer**

## 8.3 Test Equipment List and Details

See section 2.7.

## 8.4 Test Procedure

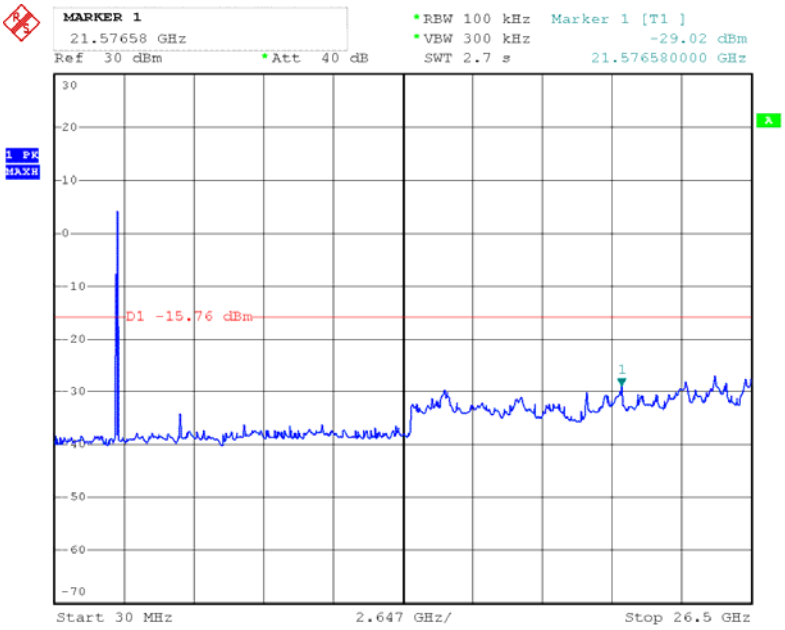
1. Set start frequency to DTS channel edge frequency.
2. Set stop frequency so as to encompass the spectrum to be examined.
3. Set RBW = 100 kHz.
4. Set VBW ≥ 300 kHz.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
9. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

## 8.5 Test Result

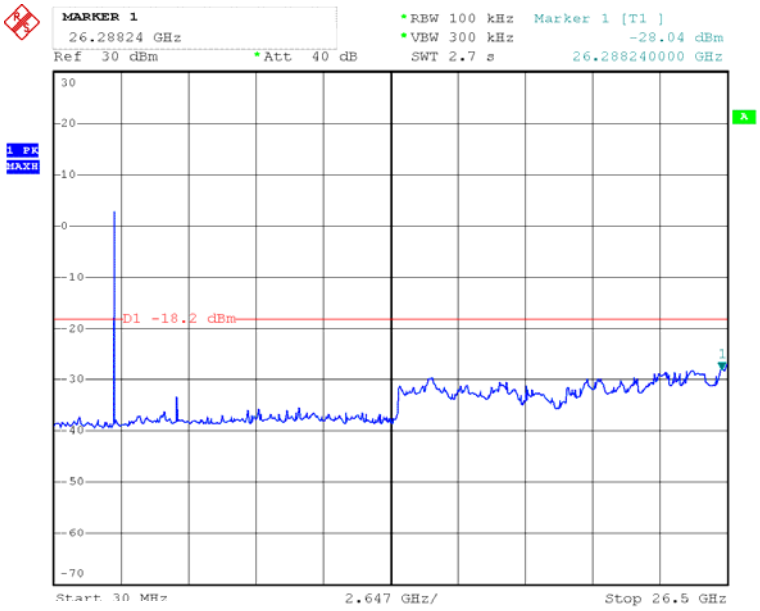
| | |
|---|---|
| Temperature ( ℃ ) : 22~23 | EUT: Bluetooth Connected Body Fat Scale |
| Humidity (%RH ): 50~54 | M/N: W191 |
| Barometric Pressure ( mbar ): 950~1000 | Operation Condition: Continuously Tx Mode |

Test Result: PASS

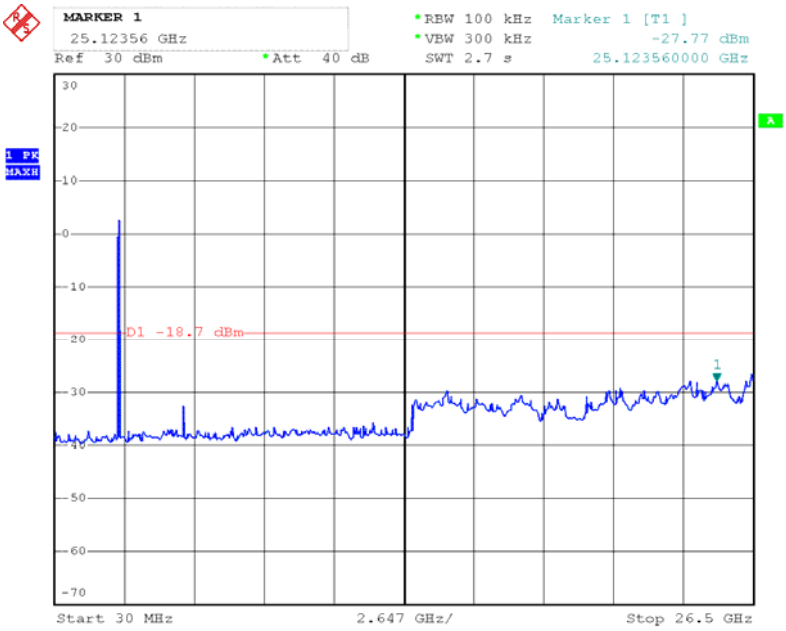
GFSK mode
Channel Low




Channel Middle



Channel High



# 9. Test of Radiated Spurious Emission

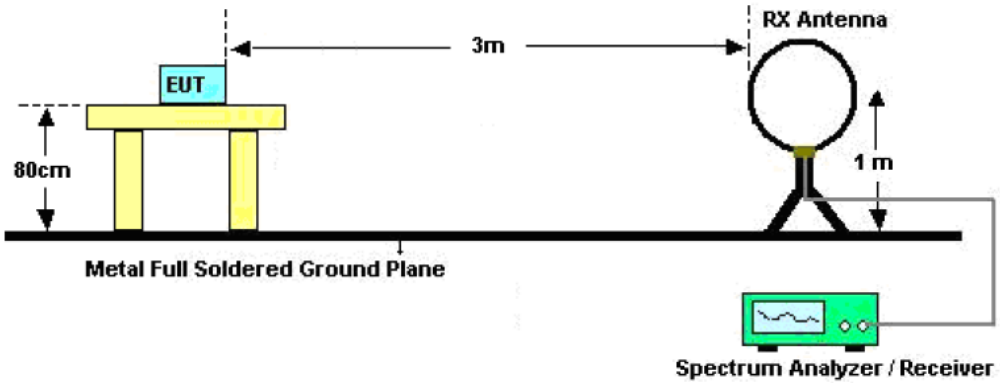
## 9.1 Applicable standard

Refer to FCC §15.205, §15.209 and KDB558074 D01 V04 Section 12.1, 12.2.7
All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

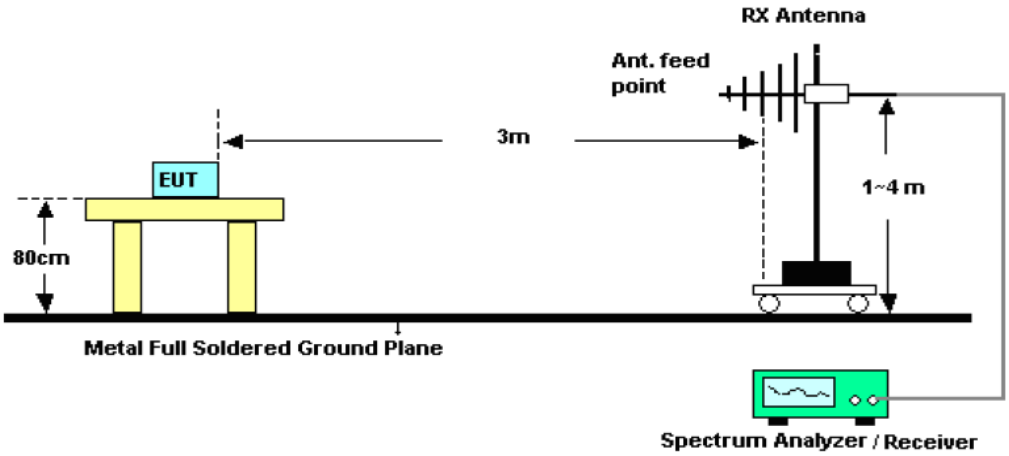
| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009 – 0.490 | 2400/F(kHz) | 300 |
| 0.490 – 1.705 | 24000/F(kHz) | 30 |
| 1.705 – 30.0 | 30 | 30 |
| 30 – 88 | 100 | 3 |
| 88 – 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

## 9.2 EUT Setup

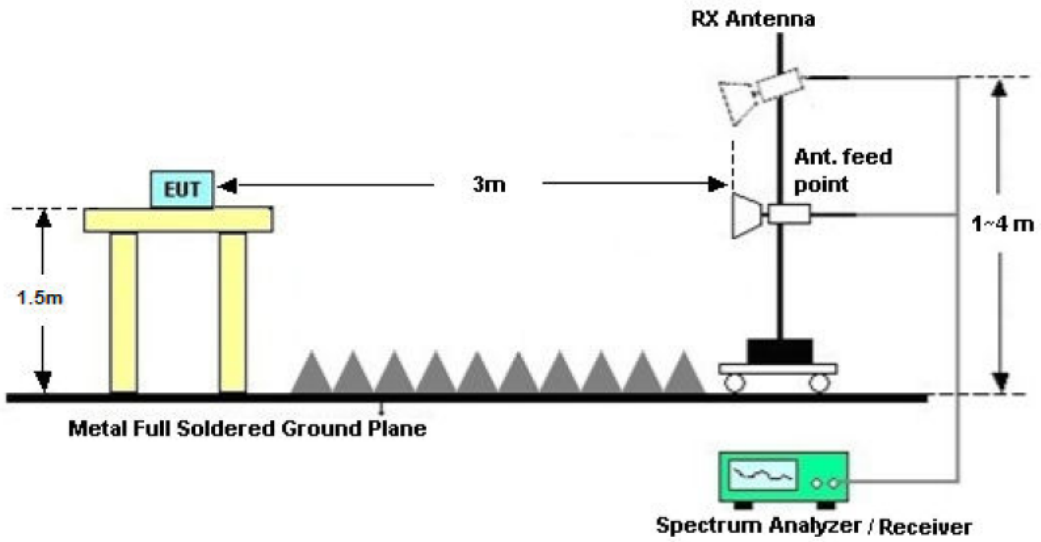
For radiated emission below 30MHz




For radiated emission from 30MHz to1GHz



For radiated emission from above1GHz




## 9.3 Test Procedure

1. Configure the EUT according to ANSI C63.10-2013
2. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
4. For band edge emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.

According to KDB558074 D01 V04 Section 12.1, 12.2.7,the analyzer setting is as below:

**Quasi-Peak Field Strength Measurements**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Set RBW = 120kHz(for emissions from 30MHz-1GHz)
3. Detector = Quasi-Peak
4. Trace Mode = max hold.
5. Sweep = auto couple.
6. Trace was allowed to stabilize

**Peak Field Strength Measurements**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Set RBW = 1MHz
3. Set VBW = 3MHz
4. Detector = Peak
5. Trace Mode = max hold.
6. Sweep = auto couple.
7. Trace was allowed to stabilize

**Average Field Strength Measurements**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Set RBW = 1MHz

3. Set VBW = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points=1001 ( >= 2 x span/RBW)
6. Sweep = auto couple.
7. Trace (RMS) averaging was performed over at least 100 traces

## 9.4 Test Result

| | |
|---|---|
| Temperature ( ℃ ) : 22~23 | EUT: Bluetooth Connected Body Fat Scale |
| Humidity (%RH ): 50~54 | M/N: GL-MIFI |
| Barometric Pressure ( mbar ): 950~1000 | Operation Condition: Charging, Normal operation, Continuously Tx Mode |

**RADIATED EMISSION BELOW 30 MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Emission Levels (dBuV/m) | Limit (dBμV/m) | Margin (dB) | Detector Mode |
|---|---|---|---|---|---|---|---|
| 0.59 | 25.56 | 8.22 | -1.01 | 32.77 | 67.00 | -34.23 | QP |
| 19.55 | 24.45 | 8.17 | -1.20 | 31.42 | 49.50 | -18.08 | QP |
| 22.58 | 24.00 | 8.03 | -1.05 | 30.98 | 49.50 | -18.52 | QP |

Note:

1. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos. The worst case data is recorded in the report.

2. Emission level (dBuV/m) =Raw Value (dBuV) + Correction Factor (dB/m)

3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)

4. The other emission levels were very low against the limit.

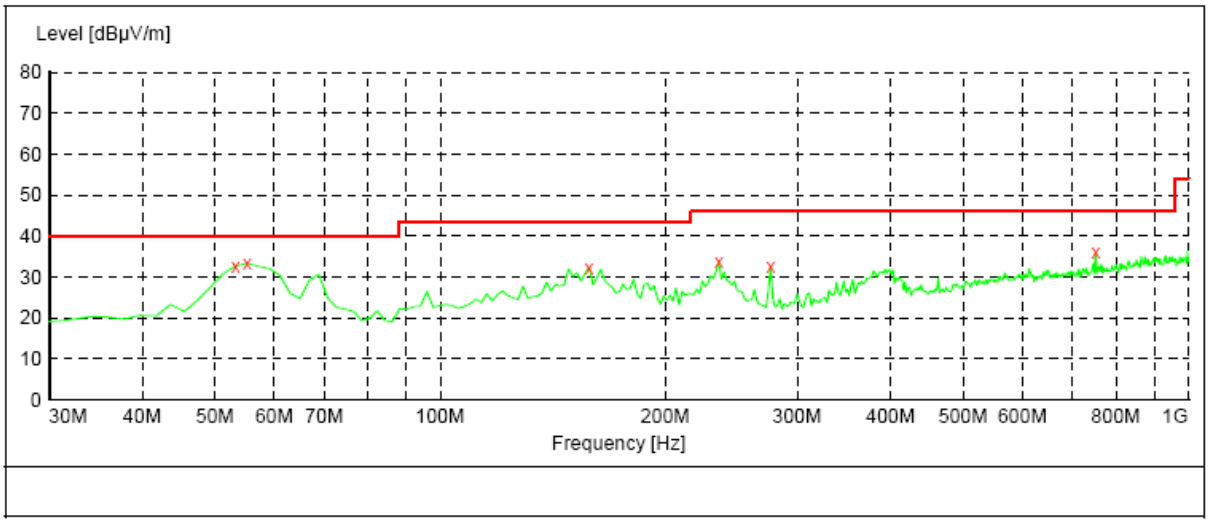
5. Margin value = Emission level.- Limit value

Radiated Spurious Emission Data Below 1GHz
Channel Low:2402MHz

| | |
|---|---|
| Operating Condition: | TX Mode |
| Test Specification: | DC4.5V from battery |
| Comment: | Polarization: Horizontal |

***SWEEP TABLE: "test (30M-1G)"***

| Short Description: | | | Field Strength | | |
|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | VULB9163 NEW |




***MEASUREMENT RESULT: "14CR067E02_red"***

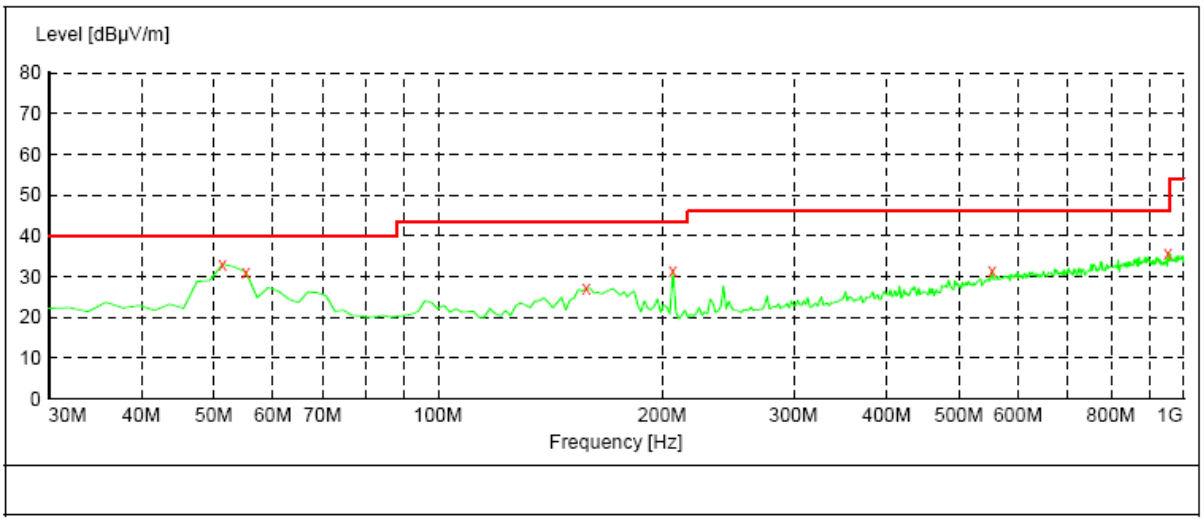
| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 53.280000 | 32.70 | 15.7 | 40.0 | 7.3 | QP | 100.0 | 0.00 | HORIZONTAL |
| 55.220000 | 33.30 | 15.6 | 40.0 | 6.7 | QP | 100.0 | 0.00 | HORIZONTAL |
| 158.040000 | 32.40 | 12.7 | 43.5 | 11.1 | QP | 100.0 | 0.00 | HORIZONTAL |
| 235.640000 | 33.60 | 16.6 | 46.0 | 12.4 | QP | 100.0 | 0.00 | HORIZONTAL |
| 276.380000 | 32.50 | 18.0 | 46.0 | 13.5 | QP | 100.0 | 0.00 | HORIZONTAL |
| 751.680000 | 36.00 | 27.3 | 46.0 | 10.0 | QP | 100.0 | 0.00 | HORIZONTAL |

Radiated Spurious Emission Data Below 1GHz
Channel Low:2402MHz

| | |
|---|---|
| Operating Condition: | TX Mode |
| Test Specification: | DC4.5V from battery |
| Comment: | Polarization: Vertical |

***SWEEP TABLE: "test (30M-1G)"***

| Short Description: | | | Field Strength | | |
|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | VULB9163 NEW |




***MEASUREMENT RESULT: "14CR067E01_red"***

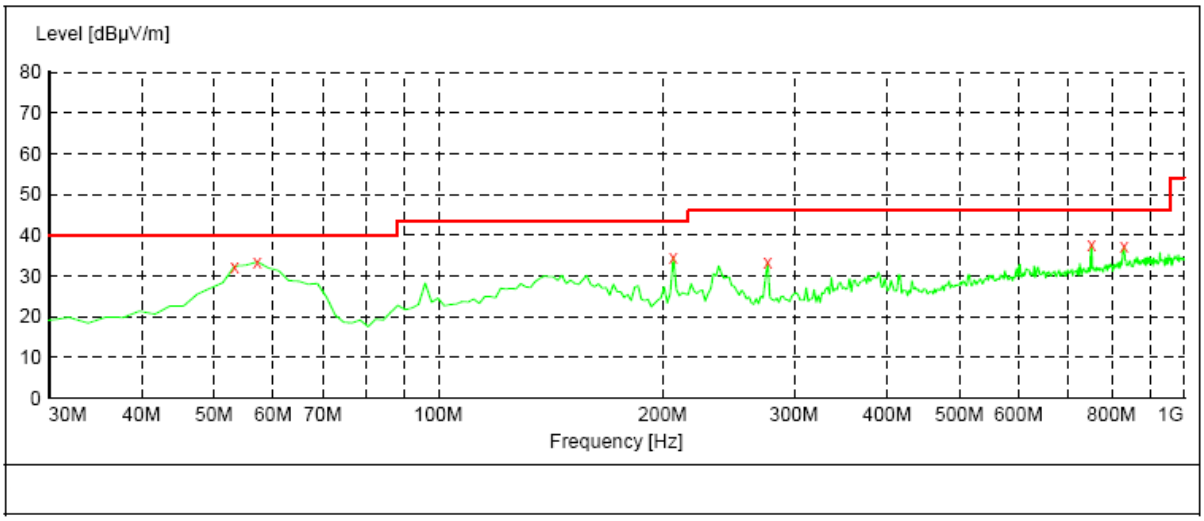
| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 51.340000 | 33.10 | 15.7 | 40.0 | 6.9 | QP | 100.0 | 0.00 | VERTICAL |
| 55.220000 | 31.00 | 15.6 | 40.0 | 9.0 | QP | 100.0 | 0.00 | VERTICAL |
| 158.040000 | 27.10 | 12.7 | 43.5 | 16.4 | QP | 100.0 | 0.00 | VERTICAL |
| 206.540000 | 31.60 | 15.0 | 43.5 | 11.9 | QP | 100.0 | 0.00 | VERTICAL |
| 553.800000 | 31.60 | 25.1 | 46.0 | 14.4 | QP | 100.0 | 0.00 | VERTICAL |
| 953.440000 | 35.90 | 29.6 | 46.0 | 10.1 | QP | 100.0 | 0.00 | VERTICAL |

Radiated Spurious Emission Data Below 1GHz
Channel Middle: 2440MHz

| | |
|---|---|
| Operating Condition: | TX Mode |
| Test Specification: | DC4.5V from battery |
| Comment: | Polarization: Horizontal |

***SWEEP TABLE: "test (30M-1G)"***

| Short Description: | | | Field Strength | | |
|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | VULB9163 NEW |




***MEASUREMENT RESULT: "14CR067E03_red"***

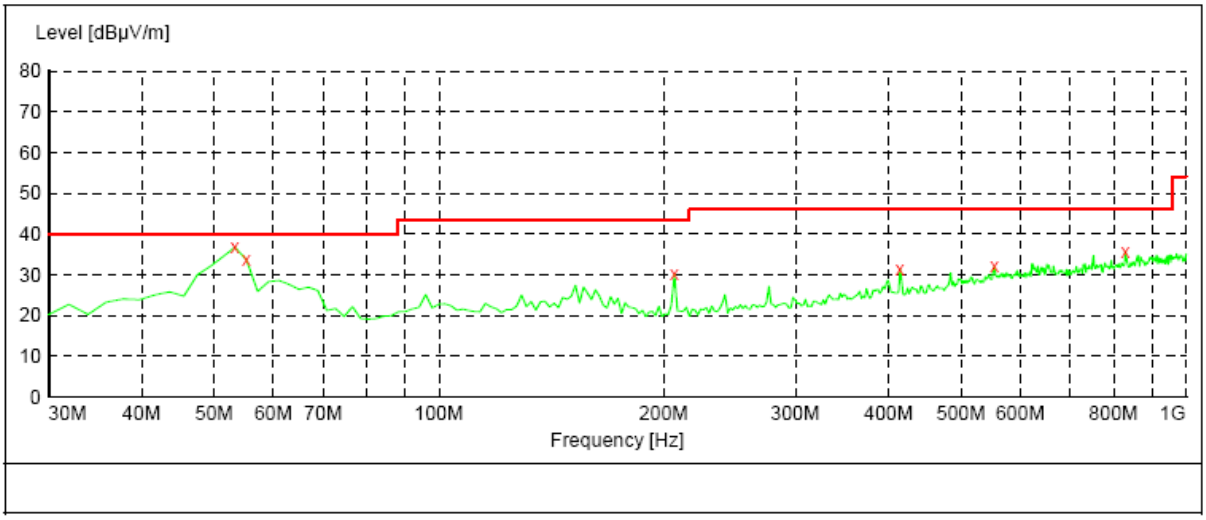
| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 53.280000 | 32.40 | 15.7 | 40.0 | 7.6 | QP | 100.0 | 0.00 | HORIZONTAL |
| 57.160000 | 33.50 | 15.1 | 40.0 | 6.5 | QP | 100.0 | 0.00 | HORIZONTAL |
| 206.540000 | 34.70 | 15.0 | 43.5 | 8.8 | QP | 100.0 | 0.00 | HORIZONTAL |
| 276.380000 | 33.30 | 18.0 | 46.0 | 12.7 | QP | 100.0 | 0.00 | HORIZONTAL |
| 751.680000 | 37.70 | 27.3 | 46.0 | 8.3 | QP | 100.0 | 0.00 | HORIZONTAL |
| 831.220000 | 37.10 | 28.4 | 46.0 | 8.9 | QP | 100.0 | 0.00 | HORIZONTAL |

Radiated Spurious Emission Data Below 1GHz
Channel Middle: 2440MHz

| | |
|---|---|
| Operating Condition: | TX Mode |
| Test Specification: | DC4.5V from battery |
| Comment: | Polarization: Vertical |

***SWEEP TABLE: "test (30M-1G)"***

| Short Description: | | | Field Strength | | |
|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | VULB9163 NEW |




***MEASUREMENT RESULT: "14CR067E04_red"***

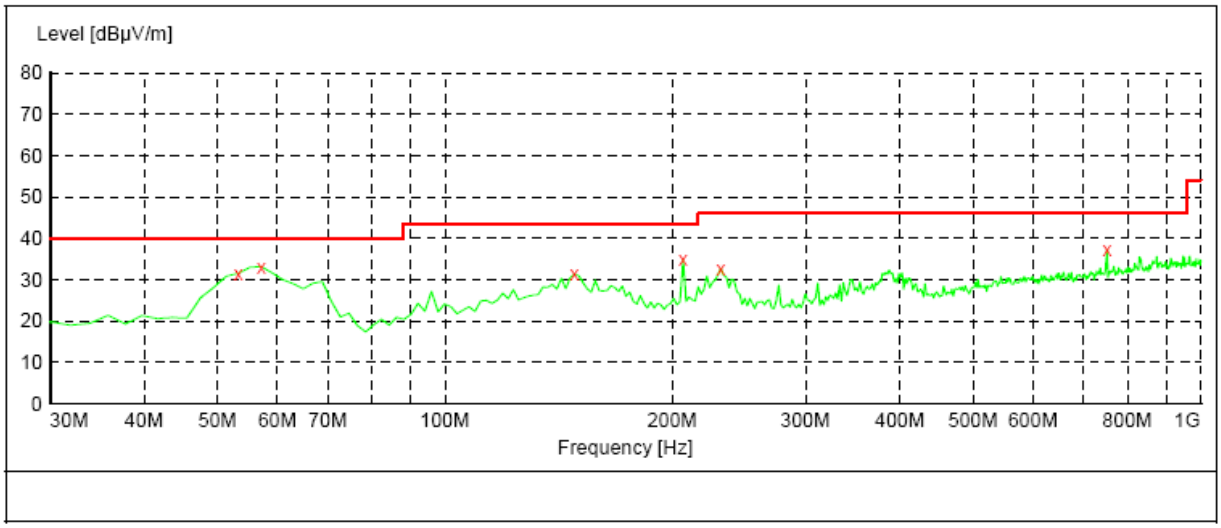
| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 53.280000 | 36.70 | 15.7 | 40.0 | 3.3 | QP | 100.0 | 0.00 | VERTICAL |
| 55.220000 | 33.70 | 15.6 | 40.0 | 6.3 | QP | 100.0 | 0.00 | VERTICAL |
| 206.540000 | 30.10 | 15.0 | 43.5 | 13.4 | QP | 100.0 | 0.00 | VERTICAL |
| 414.120000 | 31.50 | 21.8 | 46.0 | 14.5 | QP | 100.0 | 0.00 | VERTICAL |
| 553.800000 | 32.00 | 25.1 | 46.0 | 14.0 | QP | 100.0 | 0.00 | VERTICAL |
| 829.280000 | 35.70 | 28.4 | 46.0 | 10.3 | QP | 100.0 | 0.00 | VERTICAL |

Radiated Spurious Emission Data Below 1GHz
Channel High: 2480MHz

| | |
|---|---|
| Operating Condition: | TX Mode |
| Test Specification: | DC4.5V from battery |
| Comment: | Polarization: Horizontal |

***SWEEP TABLE: "test (30M-1G)"***

| Short Description: | | | Field Strength | | |
|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | VULB9163 NEW |




***MEASUREMENT RESULT: "14CR067E06_red"***

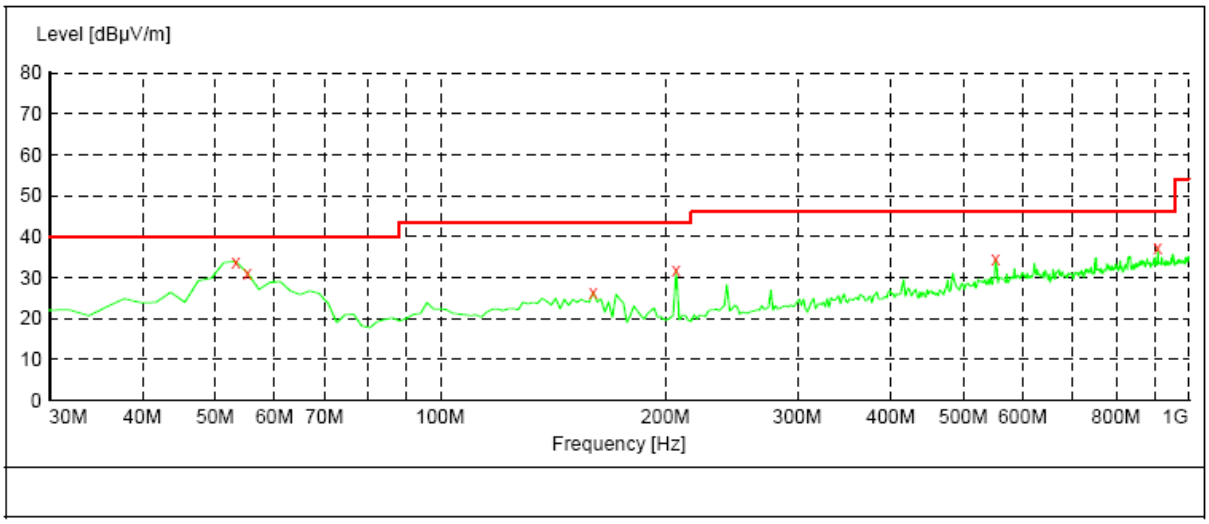
| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 53.280000 | 31.50 | 15.7 | 40.0 | 8.5 | QP | 100.0 | 0.00 | HORIZONTAL |
| 57.160000 | 33.10 | 15.1 | 40.0 | 6.9 | QP | 100.0 | 0.00 | HORIZONTAL |
| 148.340000 | 31.30 | 12.3 | 43.5 | 12.2 | QP | 100.0 | 0.00 | HORIZONTAL |
| 206.540000 | 34.80 | 15.0 | 43.5 | 8.7 | QP | 100.0 | 0.00 | HORIZONTAL |
| 231.760000 | 32.70 | 16.3 | 46.0 | 13.3 | QP | 100.0 | 0.00 | HORIZONTAL |
| 751.680000 | 37.30 | 27.3 | 46.0 | 8.7 | QP | 100.0 | 0.00 | HORIZONTAL |

Radiated Spurious Emission Data Below 1GHz Channel High:
Channel High: 2480MHz

| | |
|---|---|
| Operating Condition: | TX Mode |
| Test Specification: | DC4.5V from battery |
| Comment: | Polarization: Vertical |

***SWEEP TABLE: "test (30M-1G)"***

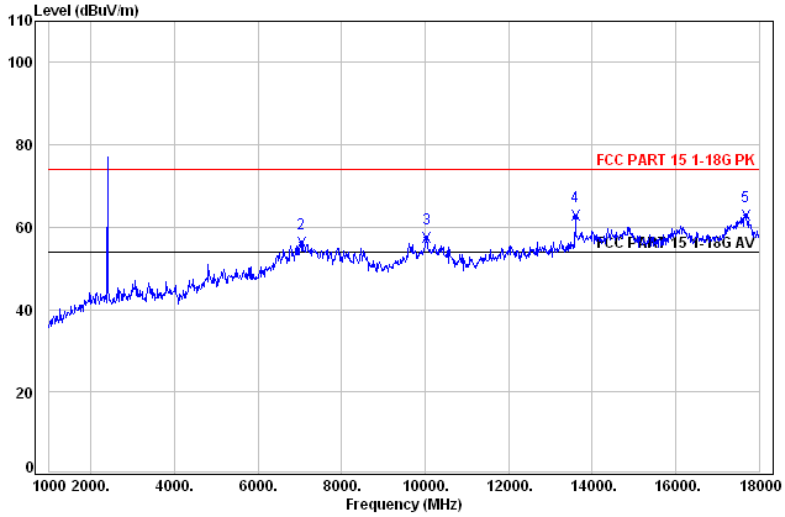
| Short Description: | | Field Strength | | | |
|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | VULB9163 NEW |




***MEASUREMENT RESULT: "14CR067E05_red"***

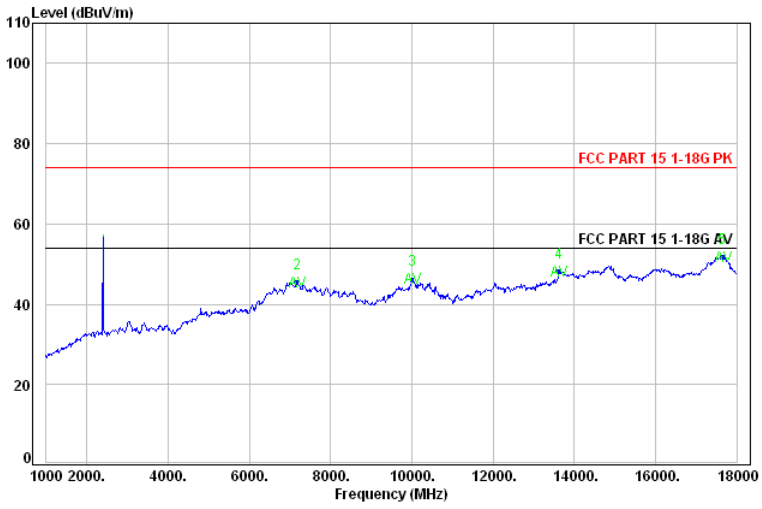
| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 53.280000 | 33.90 | 15.7 | 40.0 | 6.1 | QP | 100.0 | 0.00 | VERTICAL |
| 55.220000 | 31.10 | 15.6 | 40.0 | 8.9 | QP | 100.0 | 0.00 | VERTICAL |
| 159.980000 | 26.40 | 12.8 | 43.5 | 17.1 | QP | 100.0 | 0.00 | VERTICAL |
| 206.540000 | 31.70 | 15.0 | 43.5 | 11.8 | QP | 100.0 | 0.00 | VERTICAL |
| 551.860000 | 34.50 | 25.0 | 46.0 | 11.5 | QP | 100.0 | 0.00 | VERTICAL |
| 908.820000 | 37.10 | 29.3 | 46.0 | 8.9 | QP | 100.0 | 0.00 | VERTICAL |

Radiated Spurious Emission Test Data Above 1GHz
Channel Low:2402MHz
Polarization: Vertical
PK:



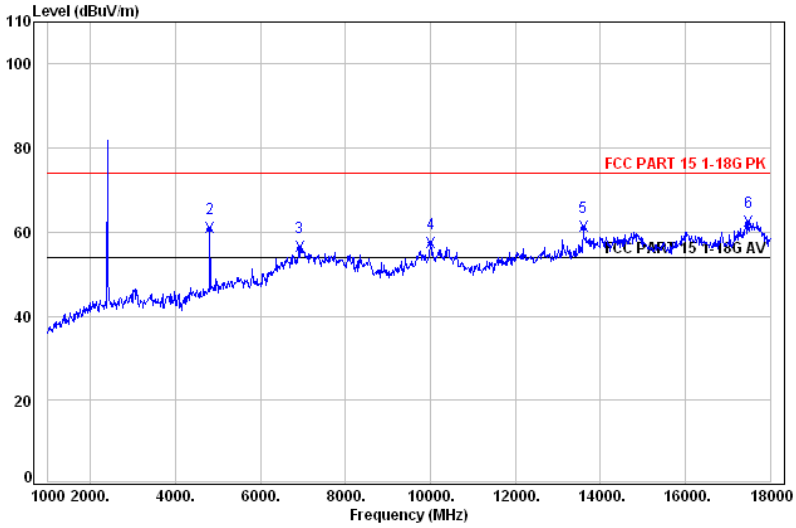

| | Freq | Ant Factor | Read Level | Limit Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 2 | 7171.00 | 39.47 | 26.96 | 45.50 | 74.00 | -28.50 | Peak |
| 3 | 10010.00 | 39.40 | 28.85 | 46.24 | 74.00 | -27.76 | Peak |
| 4 | 13614.00 | 42.39 | 33.78 | 48.13 | 74.00 | -25.87 | Peak |
| 5 | 17660.00 | 43.46 | 34.87 | 51.79 | 74.00 | -22.21 | Peak |

AV:



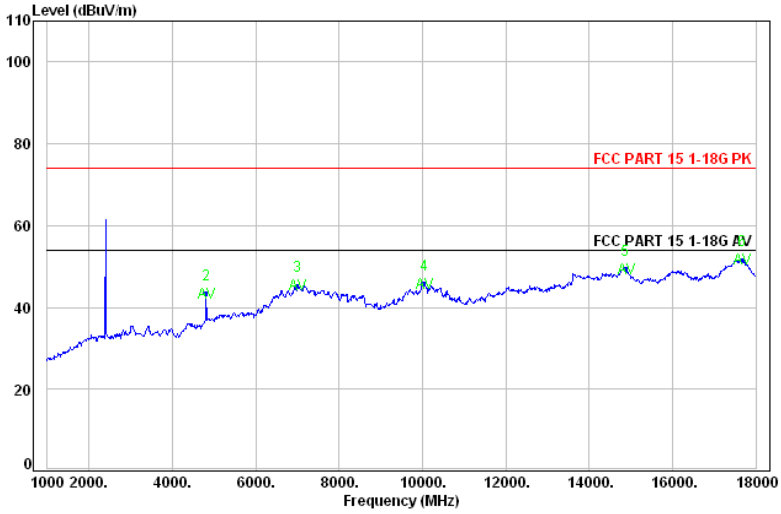

| | Freq | Ant Factor | Read Level | Limit Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 2 | 7035.00 | 39.49 | 37.37 | 56.30 | 74.00 | -17.70 | Average |
| 3 | 10044.00 | 39.42 | 40.22 | 57.51 | 74.00 | -16.49 | Average |
| 4 | 13597.00 | 42.38 | 43.34 | 62.67 | 74.00 | -11.33 | Average |
| 5 | 17677.00 | 43.31 | 46.09 | 62.92 | 74.00 | -11.08 | Average |

Radiated Spurious Emission Test Data Above 1GHz
Channel Low:2402MHz
Polarization: Horizontal
PK:



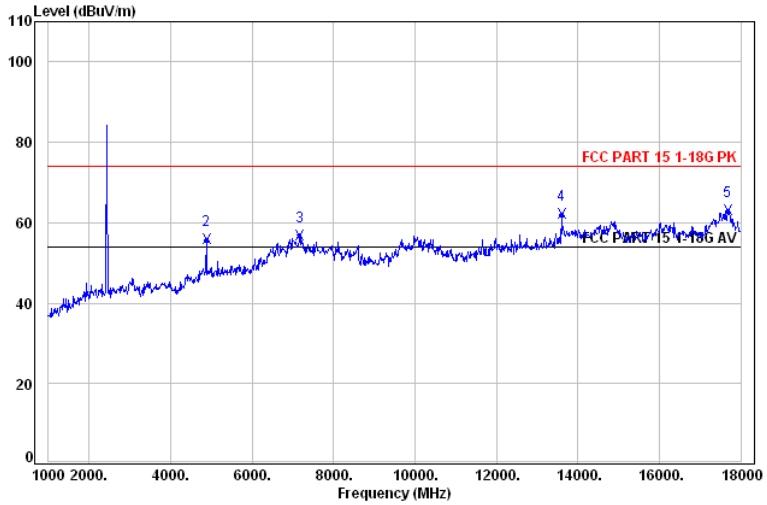

| | Freq | Ant Factor | Read Level | Limit Level | Over Line Limit | Remark |
|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB |
| 2 | 4808.00 | 35.16 | 34.34 | 43.32 | 74.00 | -30.68 Peak |
| 3 | 7001.00 | 39.50 | 26.26 | 45.28 | 74.00 | -28.72 Peak |
| 4 | 10044.00 | 39.42 | 28.55 | 45.84 | 74.00 | -28.16 Peak |
| 5 | 14872.00 | 42.30 | 36.01 | 49.45 | 74.00 | -24.55 Peak |
| 6 | 17677.00 | 43.31 | 34.82 | 51.65 | 74.00 | -22.35 Peak |

AV:



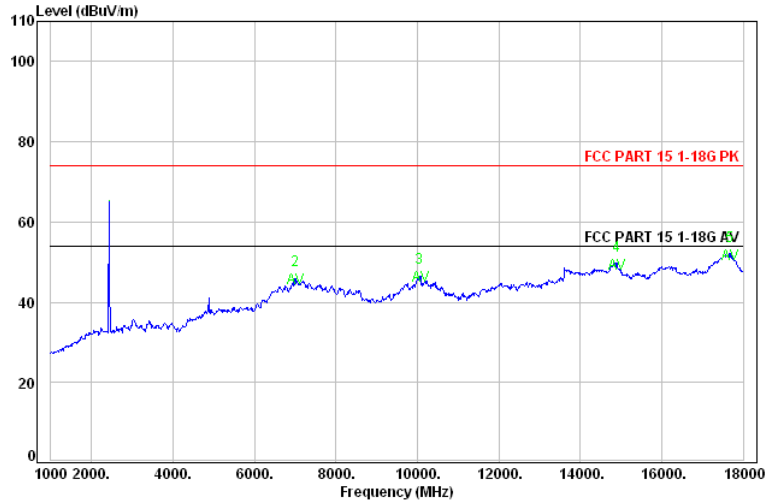

| | Freq | Ant Factor | Read Level | Limit Level | Over Line Limit | Remark |
|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB |
| 2 | 4808.00 | 35.16 | 51.95 | 60.93 | 74.00 | -13.07 Average |
| 3 | 6916.00 | 39.30 | 37.91 | 56.39 | 74.00 | -17.61 Average |
| 4 | 10010.00 | 39.40 | 40.10 | 57.49 | 74.00 | -16.51 Average |
| 5 | 13597.00 | 42.38 | 41.85 | 61.18 | 74.00 | -12.82 Average |
| 6 | 17490.00 | 44.79 | 44.73 | 62.40 | 74.00 | -11.60 Average |

Radiated Spurious Emission Test Data Above 1GHz
Channel Middle:2440MHz
Polarization: Vertical
PK:



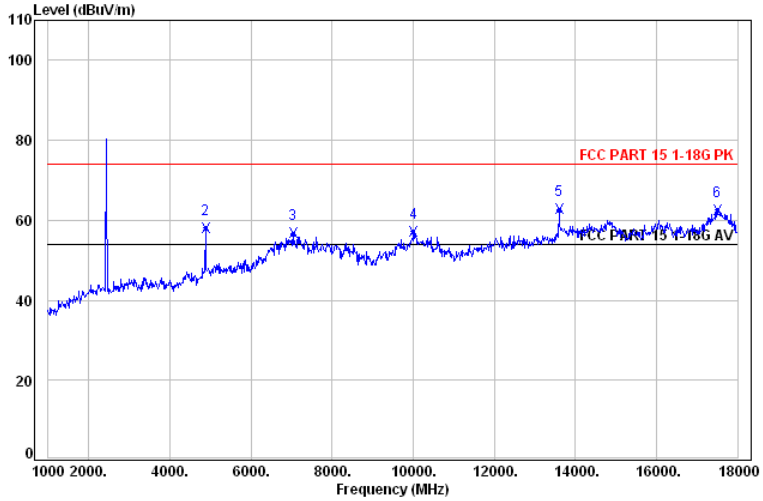

| Freq | Ant Factor | Read Level | Limit Level | Over Line Limit | Remark |
|---|---|---|---|---|---|
| MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 2 | 7001.00 | 39.50 | 26.54 | 45.56 | 74.00 | -28.44 | Peak |
| 3 | 10061.00 | 39.42 | 28.97 | 46.19 | 74.00 | -27.81 | Peak |
| 4 | 14889.00 | 42.28 | 36.00 | 49.40 | 74.00 | -24.60 | Peak |
| 5 | 17677.00 | 43.31 | 34.96 | 51.79 | 74.00 | -22.21 | Peak |

AV:



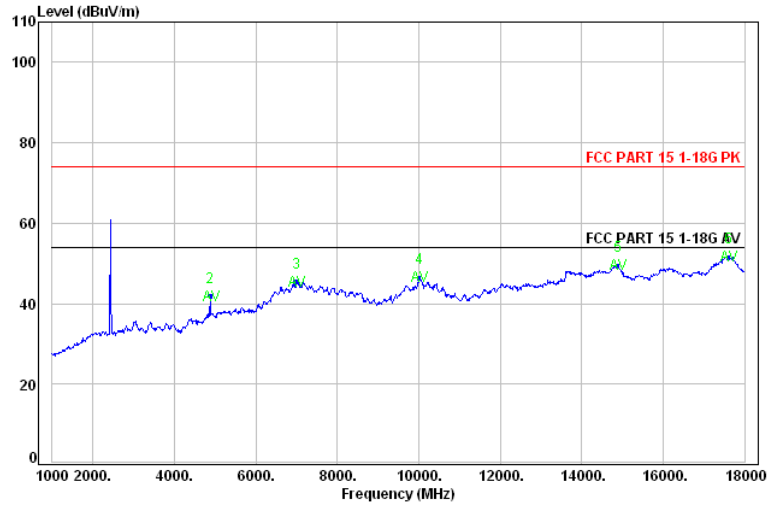

| Freq | Ant Factor | Read Level | Limit Level | Over Line Limit | Remark |
|---|---|---|---|---|---|
| MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 2 | 4876.00 | 35.35 | 46.46 | 55.75 | 74.00 | -18.25 | Average |
| 3 | 7171.00 | 39.47 | 38.32 | 56.86 | 74.00 | -17.14 | Average |
| 4 | 13597.00 | 42.38 | 42.74 | 62.07 | 74.00 | -11.93 | Average |
| 5 | 17677.00 | 43.31 | 46.26 | 63.09 | 74.00 | -10.91 | Average |

Radiated Spurious Emission Test Data Above 1GHz
Channel Middle:2440MHz
Polarization: Horizontal
PK:



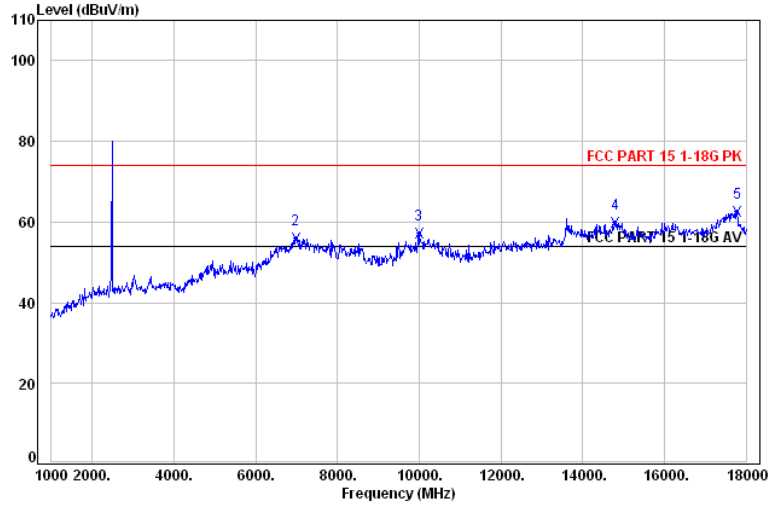

| | Freq | Ant Factor | Read Level | Limit Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 2 | 4876.00 | 35.35 | 32.55 | 41.84 | 74.00 | -32.16 | Peak |
| 3 | 7001.00 | 39.50 | 26.51 | 45.53 | 74.00 | -28.47 | Peak |
| 4 | 10010.00 | 39.40 | 29.09 | 46.48 | 74.00 | -27.52 | Peak |
| 5 | 14889.00 | 42.28 | 36.15 | 49.55 | 74.00 | -24.45 | Peak |
| 6 | 17609.00 | 43.88 | 34.48 | 51.65 | 74.00 | -22.35 | Peak |

AV:



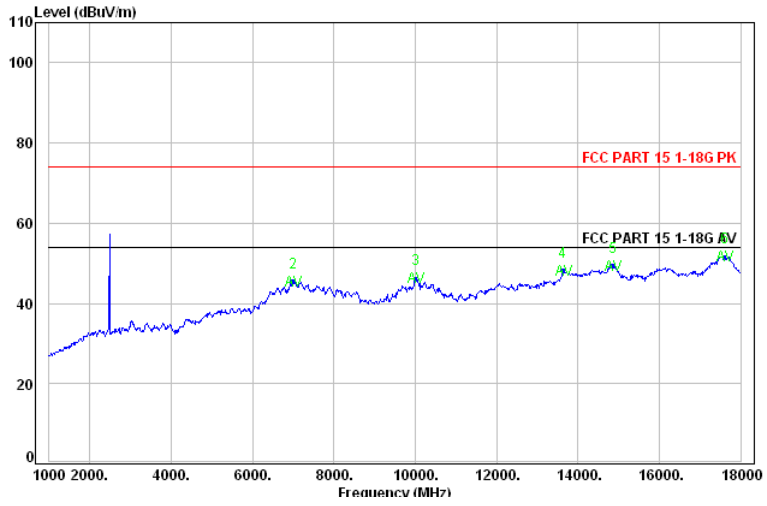

| | Freq | Ant Factor | Read Level | Limit Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 2 | 4876.00 | 35.35 | 48.73 | 58.02 | 74.00 | -15.98 | Average |
| 3 | 7035.00 | 39.49 | 37.81 | 56.74 | 74.00 | -17.26 | Average |
| 4 | 10010.00 | 39.40 | 39.81 | 57.20 | 74.00 | -16.80 | Average |
| 5 | 13597.00 | 42.38 | 43.34 | 62.67 | 74.00 | -11.33 | Average |
| 6 | 17507.00 | 44.74 | 44.88 | 62.56 | 74.00 | -11.44 | Average |

Radiated Spurious Emission Test Data Above 1GHz
Channel High:2480MHz
Polarization: Vertical
PK:



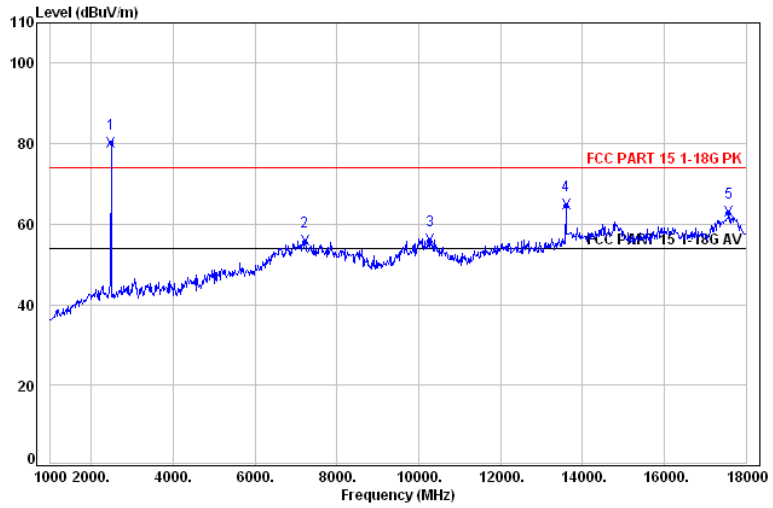

| | Freq | Ant Factor | Read Level | Limit Level | Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 2 | 7001.00 | 39.50 | 26.44 | 45.46 | 74.00 | -28.54 | Peak |
| 3 | 10010.00 | 39.40 | 28.78 | 46.17 | 74.00 | -27.83 | Peak |
| 4 | 13631.00 | 42.40 | 33.89 | 48.26 | 74.00 | -25.74 | Peak |
| 5 | 14855.00 | 42.33 | 35.90 | 49.38 | 74.00 | -24.62 | Peak |
| 6 | 17609.00 | 43.88 | 34.53 | 51.70 | 74.00 | -22.30 | Peak |

AV:



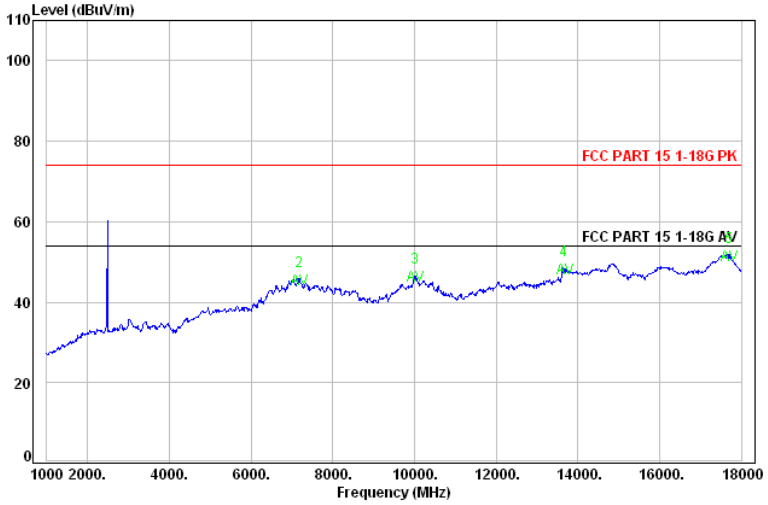

| | Freq | Ant Factor | Read Level | Limit Level | Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB | |
| 2 | 6984.00 | 39.46 | 37.07 | 55.99 | 74.00 | -18.01 | Average |
| 3 | 9993.00 | 39.39 | 39.74 | 57.13 | 74.00 | -16.87 | Average |
| 4 | 14804.00 | 42.41 | 46.27 | 59.89 | 74.00 | -14.11 | Average |
| 5 | 17779.00 | 42.46 | 46.27 | 62.60 | 74.00 | -11.40 | Average |

Radiated Spurious Emission Test Data Above 1GHz
Channel High:2480MHz
Polarization: Horizontal
PK:




| | Freq | Ant Factor | Read Level | Limit Level | Over Line Limit | Remark |
|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB |
| 2 | 7171.00 | 39.47 | 27.00 | 45.54 | 74.00 | -28.46 Peak |
| 3 | 10010.00 | 39.40 | 28.88 | 46.27 | 74.00 | -27.73 Peak |
| 4 | 13665.00 | 42.43 | 33.66 | 48.06 | 74.00 | -25.94 Peak |
| 5 | 17694.00 | 43.17 | 34.77 | 51.52 | 74.00 | -22.48 Peak |

AV：




| | Freq | Ant Factor | Read Level | Limit Level | Over Line Limit | Remark |
|---|---|---|---|---|---|---|
| | MHz | dB/m | dBuV | dBuV/m | dBuV/m | dB |
| 2 | 7222.00 | 39.46 | 37.44 | 55.84 | 74.00 | -18.16 Average |
| 3 | 10282.00 | 39.51 | 39.60 | 56.15 | 74.00 | -17.85 Average |
| 4 | 13597.00 | 42.38 | 45.44 | 64.77 | 74.00 | -9.23 Average |
| 5 | 17575.00 | 44.17 | 45.71 | 63.05 | 74.00 | -10.95 Average |

# 10. Test of Band Edges Emission

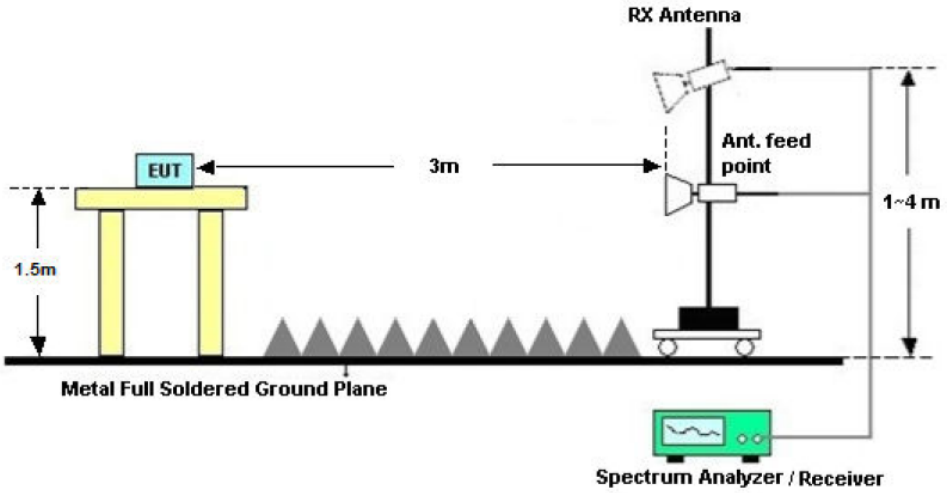
## 10.1 Applicable standard

Refer to FCC §15.247 (d) and KDB558074 D01 V04 Section 13.0

Section 15.247(d): 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. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

## 10.2 EUT Setup

### Radiated Measurement Setup




### Conducted Measurement Setup


**Spectrum Analyzer**

## 10.3 Test Equipment List and Details

See section 2.7.

## 10.4 Test Procedure

### Conducted Measurement

KDB558074 D01 V04 Section 11.3

1.Set the center frequency and span to encompass frequency range to be measured.
2.Set the RBW = 100 kHz.

3.Set the VBW ≥ 3 x RBW.

4.Detector = peak.

5.Sweep time = auto couple.

6.Trace mode = max hold.

7.Allow trace to fully stabilize.

8.Use the peak marker function to determine the maximum amplitude level.

**Radiated Measurement**

KDB558074 D01 V04 Section 12.1, 12.2.7

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Set RBW = 1MHz
3. Set VBW = 3MHz
4. Detector = Peak
5. Trace Mode = max hold.
6. Sweep = auto couple.
7. Trace was allowed to stabilize

Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Set RBW = 1MHz
3. Set VBW = 3MHz
4. Detector = power average (RMS)
5. Sweep = auto couple.
6. Trace (RMS) averaging was performed over at least 100 traces

Note :

1. Configure the EUT according to ANSI C63.10-2013
2. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
4. For band edge emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.

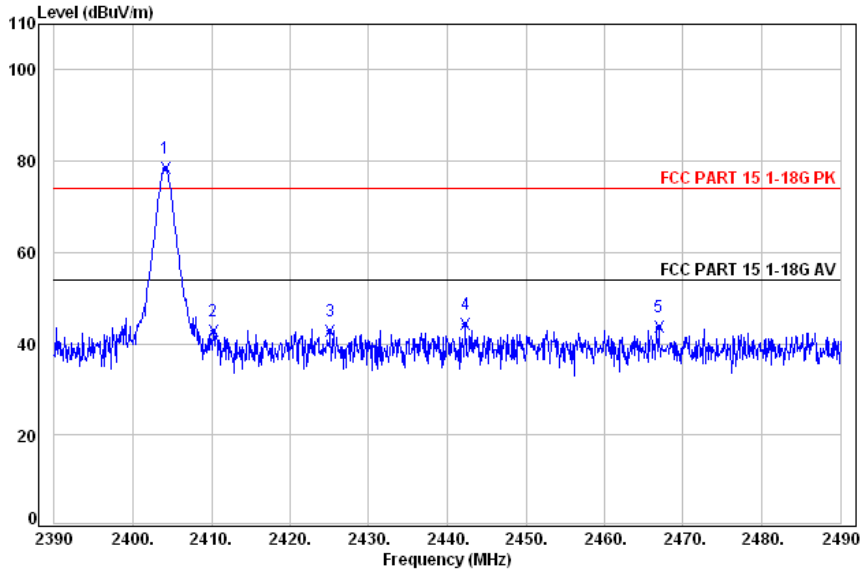
## 10.5 Test Result

| | |
|---|---|
| Temperature ( ℃ ) : 22~23 | EUT: Bluetooth Connected Body Fat Scale |
| Humidity (%RH ): 50~54 | M/N: W191 |
| Barometric Pressure ( mbar ): 950~1000 | Operation Condition: Continuously Tx Mode |

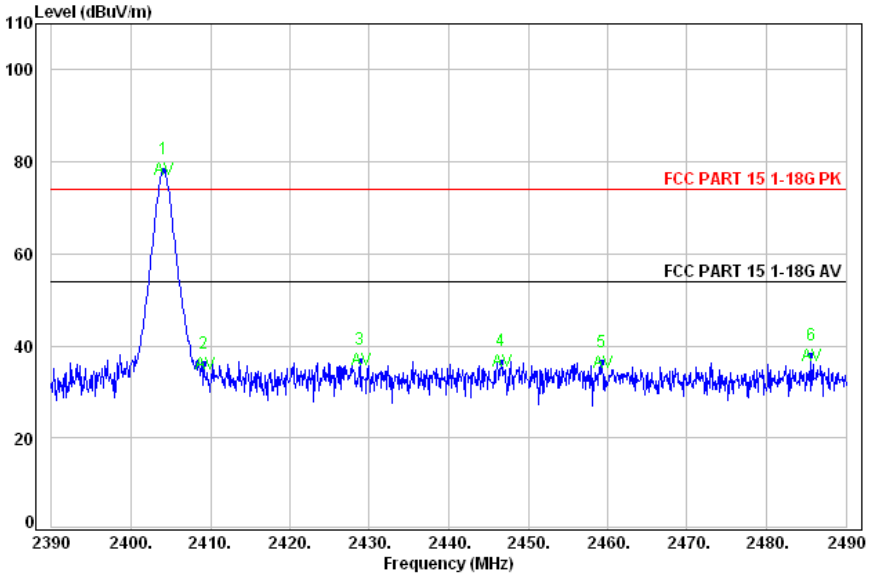
**For Radiated Band edge Measurement**

Channel Low: 2402MHz
Polarization: Horizontal

**PK**

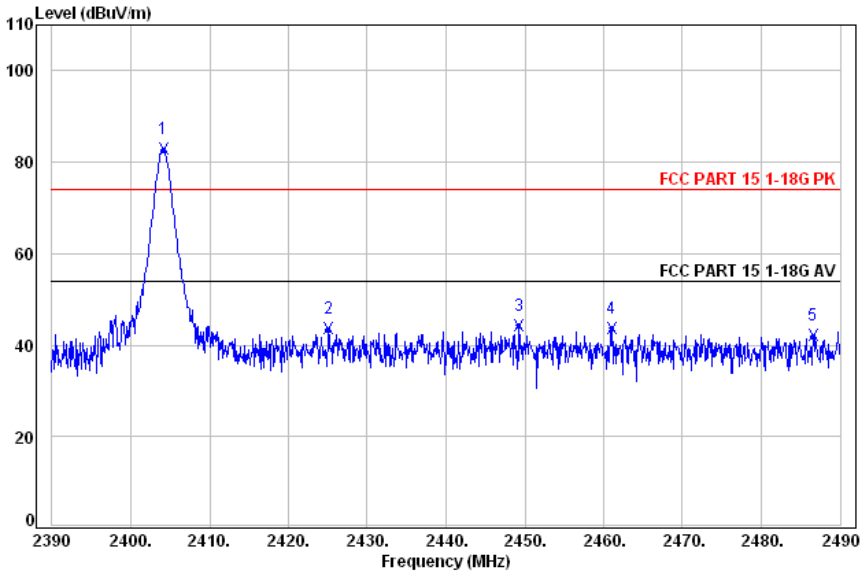



**AV:**

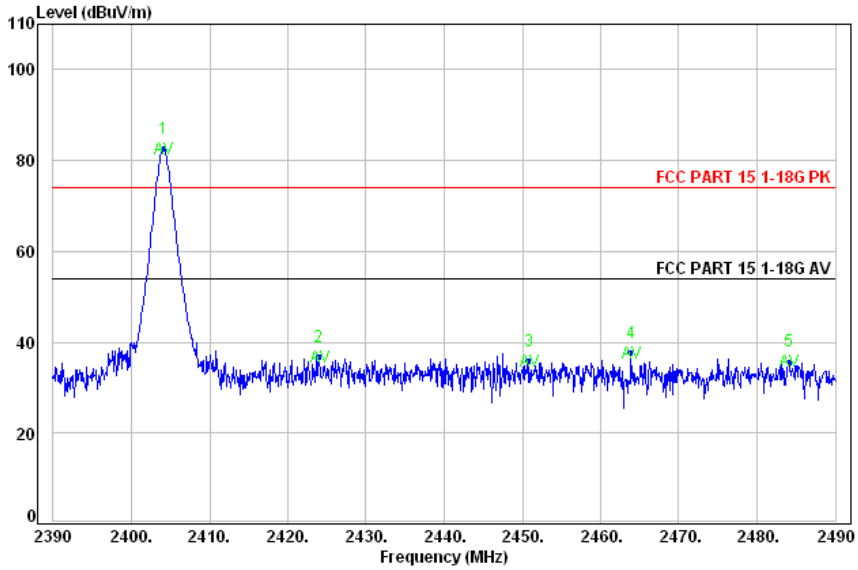


Channel Low: 2402MHz
Polarization: Vertical

**PK**

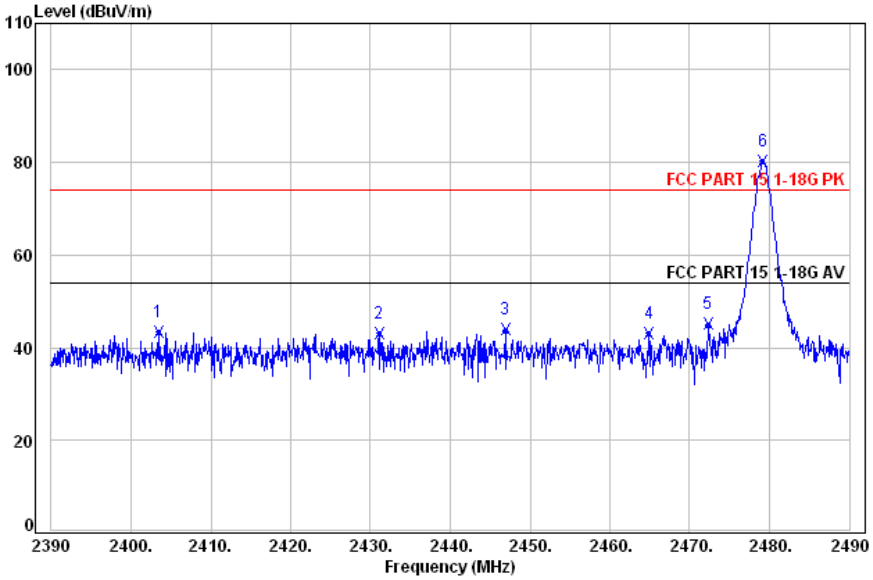



**AV**

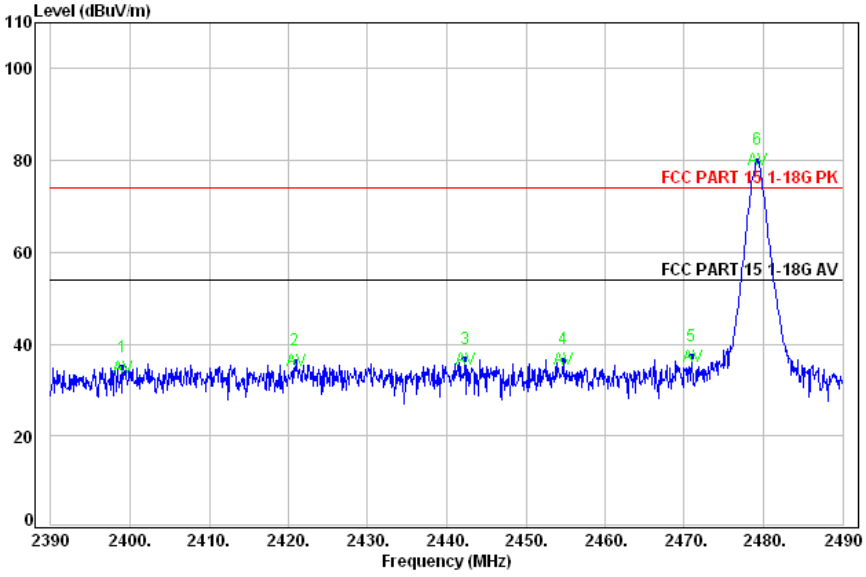


Channel High:2480MHz
Polarization: Horizontal

**PK**

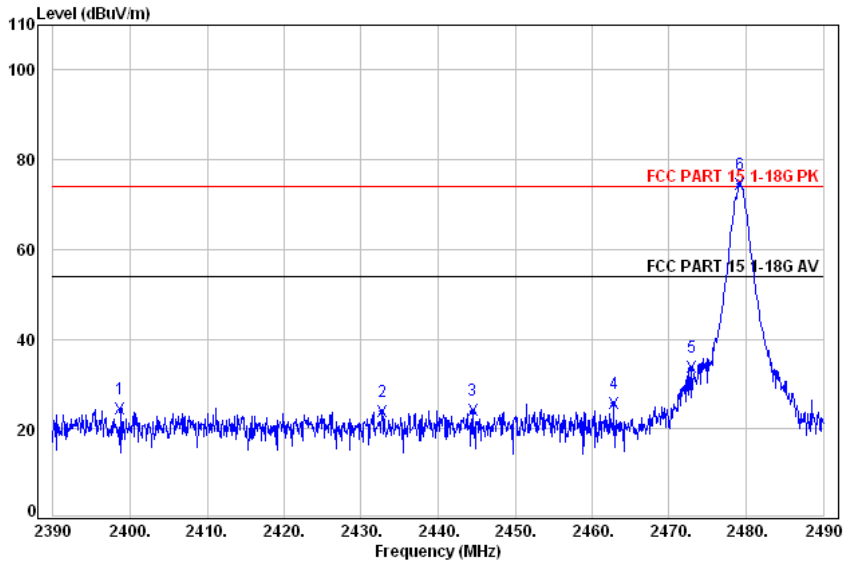



**AV**

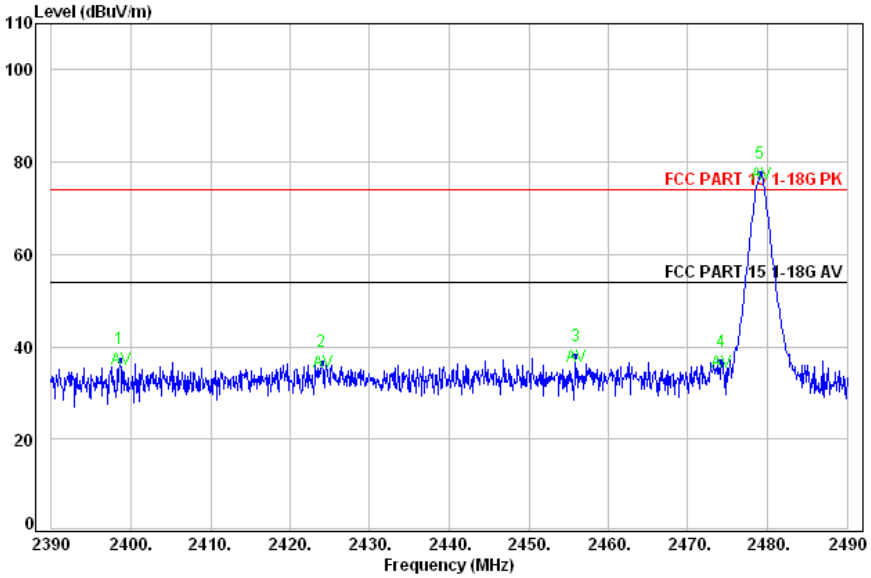


Channel High:2480MHz
Polarization: Vertical

**PK**




**AV**



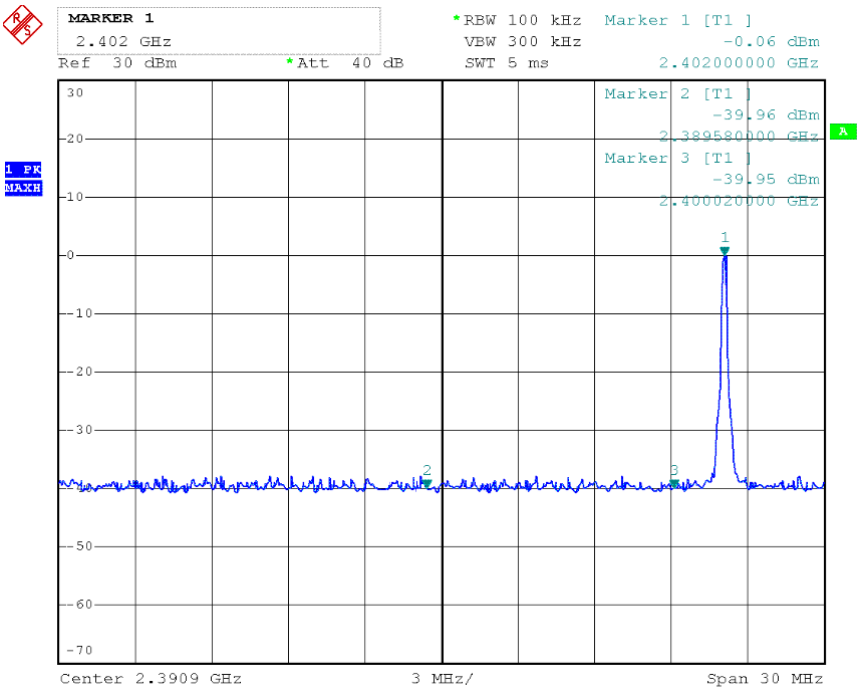

Note:

1. Margin value = Emission level.- Limit

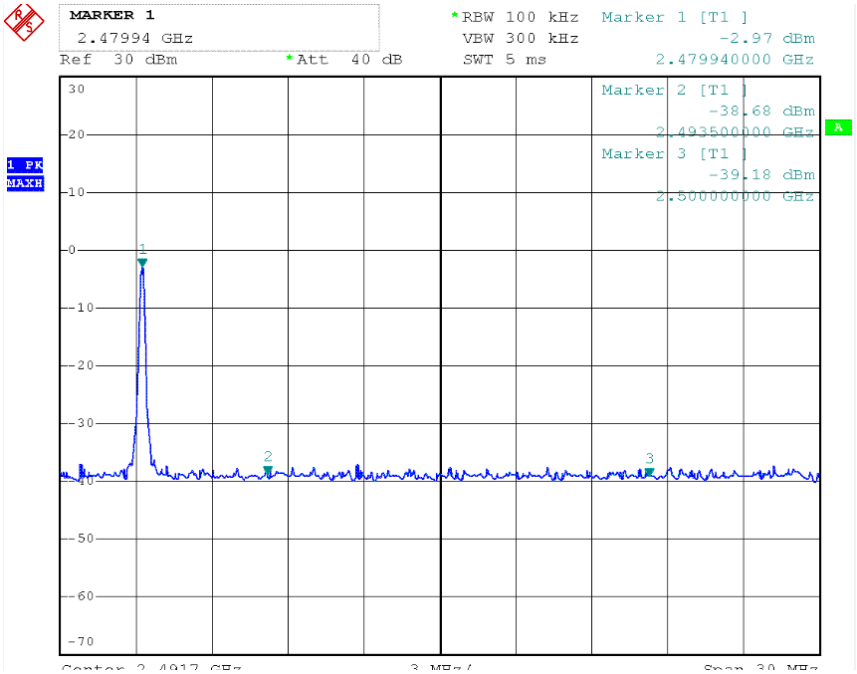
2. The other emission levels were very low against the limit.

**For Conducted Band edge Measurement**

Channel Low: 2402MHz




Channel High:2480MHz



# 11. ANTENNA REQUIREMENT

## 11.1 standard Applicable

Refer to FCC Section 15.203.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Section 15.247(b)/(c)

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

## 11.2 Antenna Connected Construction

There are no provisions for connections to an external antenna.
The antenna is designed with PCB antenna and no consideration of replacement.
The antenna used in this product is complied with standard. The maximum Gain of the antenna lower than 6.0dBi and have the definite antenna Specification.

…End of Report…