# Test Report

FCC ID: 2ATXX-M2XTCBLE321

Date of issue: Sept. 19, 2019

| | |
|---|---|
| Report Number: | MTi190731E039 |
| Sample Description: | Inventory Tag |
| Model(s): | 2.0 |
| Applicant: | Christie Lites Enterprises USA |
| Address: | 6990 Lake Ellenor Drive, Orlando, Florida 32809, United States |
| Date of Test: | Apr. 04, 2019 to Sept. 19, 2019 |

Shenzhen Microtest Co., Ltd.
http://www.mtitest.com

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# Test Result Certification

| | |
|---|---|
| Applicant's name: | Christie Lites Enterprises USA |
| Address: | 6990 Lake Ellenor Drive, Orlando, Florida 32809, United States |
| Manufacture's Name: | Christie Lites Enterprises USA |
| Address: | 6990 Lake Ellenor Drive, Orlando, Florida 32809, United States |
| Product name: | Inventory Tag |
| Trademark: | Christie Lites Enterprises |
| Model name: | 2.0 |
| Standards: | FCC Part 15.249 |
| Test Procedure: | ANSI C63.10-2013 |

*This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.*

| | | |
|---|---|---|
| Tested by: | Demi Mu | Sept. 19, 2019 |
| Reviewed by: | Blue Zheng | Sept. 19, 2019 |
| Approved by: | Smith Chen | Sept. 19, 2019 |

# 1 General description

## 1.1 Feature of equipment under test (EUT)

| | |
|---|---|
| Equipment: | Inventory Tag |
| Trade Name: | Christie Lites Enterprises |
| Model Name: | 2.0 |
| Serial Model: | N/A |
| Model Difference: | N/A |
| Operation Frequency: | 2405-2480MHz |
| Modulation Type: | GFSK |
| Antenna Type: | PCB antenna |
| Antenna Gain: | TX:1dBi |
| Max. Field Strength: | 97.0dBuV/m@3m |
| Power Source: | DC 3V by battery |
| Battery: | DC 3V |
| Hardware Version: | 1.02 |
| Software Version: | 1.01t |

## 1.2 Operation channel list

| Channel | Frequency(MHz) | Channel | Frequency(MHz) | Channel | Frequency(MHz) |
|---|---|---|---|---|---|
| 0 | 2405 | 6 | 2435 | 12 | 2465 |
| 1 | 2410 | 7 | 2440 | 13 | 2470 |
| 2 | 2415 | 8 | 2445 | 14 | 2475 |
| 3 | 2420 | 9 | 2450 | 15 | 2480 |
| 4 | 2425 | 10 | 2455 | | |
| 5 | 2430 | 11 | 2460 | | |

## 1.3 Test Frequency Channel

| Channel | Frequency(MHz) |
|---|---|
| Low | 2405 |
| Middle | 2440 |
| High | 2480 |

## 1.4 EUT operation mode

During testing, RF test program provided by the manufacture to control the Tx operation followed the test requirement.

## 1.5 Ancillary equipment list

| Equipment | Model | S/N | Manufacturer |
|---|---|---|---|
| / | / | / | / |

# 2 Summary of Test Result

Test procedures according to the technical standards:

| Item | FCC Part No. | Description of Test | Result |
|---|---|---|---|
| 1 | FCC Part15.203 | Antenna Requirement | Pass |
| 2 | FCC Part15.207 | AC power line conducted emission | N/A |
| 3 | FCC Part15.249(a) | Field strength of fundamental and harmonic emissions | Pass |
| 4 | FCC Part 15.215 | 20dB Bandwidth | Pass |
| 5 | FCC Part15.249(d) | Radiated spurious emission | Pass |

# 3 Test Facilities and Accreditations

## 3.1 Test laboratory

| | |
|---|---|
| Test Laboratory | Shenzhen Microtest Co., Ltd |
| Location | No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China |
| FCC Registration No. | 448573 |

## 3.2 Environmental conditions

| | |
|---|---|
| Temperature: | 15ºC~35ºC |
| Humidity | 20%~75% |
| Atmospheric pressure | 98kPa~101kPa |

## 3.3 Measurement uncertainty

The reported uncertainty of measurement y ± U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %

| | |
|---|---|
| RF frequency | 1 x 10-7 |
| RF power, conducted | ± 1 dB |
| Conducted emission(150kHz~30MHz) | ± 2.5 dB |
| Radiated emission(30MHz~1GHz) | ± 4.2 dB |
| Radiated emission (above 1GHz) | ± 4.3 dB |
| Temperature | ±1 degree |
| Humidity | ± 5 % |

## 3.4 Test software

| Software Name | Manufacturer | Model | Version |
|---|---|---|---|
| RF Test System | Farad | LZ-RF | Lz_Rf 3A3 |

# 4 List of test equipment

| Equipment No. | Equipment Name | Manufacturer | Model | Serial No. | Calibration date | Due date |
|---|---|---|---|---|---|---|
| MTI-E001 | Spectrum Analyzer | Agilent | E4407B | MY41441082 | 2019/03/06 | 2020/03/07 |
| MTI-E004 | EMI Test Receiver | Rohde&schwarz | ESPI | 1000314 | 2018/10/ 9 | 2019/10/08 |
| MTI-E006 | Broadband antenna | schwarabeck | VULB9163 | 872 | 2018/10/15 | 2019/10/14 |
| MTI-E007 | Horn antenna | schwarabeck | BBHA9120D | 1201 | 2018/10/15 | 2019/10/14 |
| MTI-E014 | amplifier | America | 8447D | 3113A06150 | 2018/10/09 | 2019/10/ 8 |
| MTI-E015 | Conduction Immunity Signal Generator | Schloder | CDG6000 | 126A1343/2015 | 2018/10/09 | 2019/10/08 |
| MTI-E016 | Coupled decoupling network | Schloder | CND M2/M3 | A2210332/2015 | 2018/10/09 | 2019/10/08 |
| MTI-E034 | amplifier | Agilent | 8449B | 3008A02400 | 2018/10/09 | 2019/10/08 |
| MTI-E040 | Spectrum analyzer | Agilent | N9020A | MY49100060 | 2019/03/06 | 2020/03/07 |
| MTI-E041 | Signal generator | Agilent | N5182A | MY49060455 | 2019/03/06 | 2020/03/07 |
| MTI-E042 | Analog signal generator | Agilent | E4421B | GB40051240 | 2018/10/09 | 2019/10/08 |
| MTI-E043 | Power probe | Dare Instruments | RPR3006W | 16I00054SNO16 | 2018/10/09 | 2019/10/08 |
| MTI-E047 | 10dB attenuator | Mini-Circuits | UNAT-10+ | 15542 | 2018/10/09 | 2019/10/08 |
| MTI-E049 | spectrum analyzer | Rohde&schwarz | FSP-38 | 100019 | 2018/10/09 | 2019/10/08 |
| MTI-E050 | PSG Signal generator | Agilent | E8257D | MY46520873 | 2018/10/09 | 2019/10/08 |
| MTI-E061 | Active Loop Antenna 9kHz - 30MHz | Schwarzbeek | FMZB 1519 B | 00044 | 2018/10/09 | 2019/10/08 |
| MTI-E052 | 18-40GHz amplifier | Chengdu step Micro Technology | ZLNA-18-40G-21 | 1608001 | 2018/10/09 | 2019/10/08 |
| MTI-E053 | 15-40G Antenna | Schwarzbeek | BBHA9170 | BBHA9170582 | 2018/10/09 | 2019/10/08 |
| Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI). | | | | | | |

# 5 Test Result

## 5.1 Antenna requirement

### 5.1.1 Standard requirement

FCC PART 15.203 and 15.247(b);

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.

This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

### 5.1.2 EUT Antenna

The antenna is a PCB antenna, which was permanently affixed to the device and un-replaced, complies with 15.203. In addition, the maximum antenna gain is 1dBi.

## 5.2 AC power line conducted emission

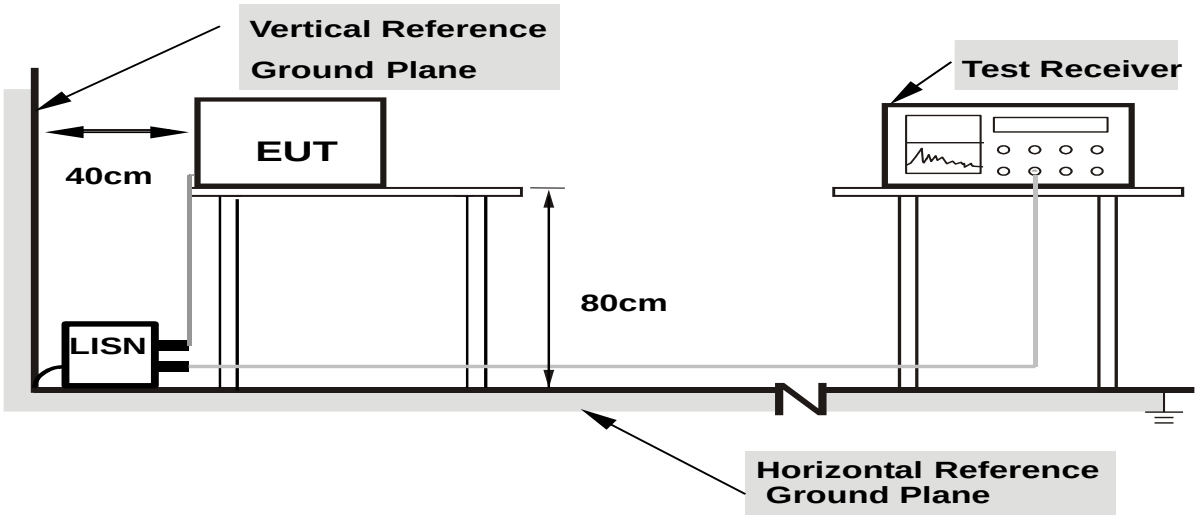
### 5.2.1 Limits

FCC §15.207;

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

| Frequency (MHz) | Quasi-peak | Average |
|---|---|---|
| 0.15 -0.5 | 66 - 56 note2 | 56 - 46 note2 |
| 0.50 -5.0 | 56.00 | 46.00 |
| 5.0 -30.0 | 60.00 | 50.00 |
| *Note1: The tighter limit applies at the band edges.*<br>*Note2: The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.* | | |

### 5.2.2 Test setup




**Note: 1.Support units were connected to second LISN.**
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

### 5.2.3 Test procedure

a. EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

b. The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---|---|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

c. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

d. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

e. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

f. LISN at least 80 cm from nearest part of EUT chassis.

For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 5.2.4 Test results

| | | | |
|---|---|---|---|
| EUT： | Inventory Tag | Model Name. ： | 2.0 |
| Pressure： | 1010hPa | Phase : | L |
| Test Voltage ： | DC 3V by battery | Test Mode： | TX |

Note: The device is a DC power supply and does not apply to conducted emissions.

## 5.3 Field strength of fundamental and harmonic emissions

### 5.3.1 Limits

FCC §15.249(a);

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not

exceed 50 mV/m and 0.5 mV/m respectively.

The field strength limits shall be measured using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using an International Special Committee on Radio Interference (CISPR) quasi-peak detector

| Frequency | Field Strength(dBuv/m) | Detector |
|---|---|---|
| Fundamental | 114 | PK |
| Fundamental | 94 | AV |
| Harmonic emissions | 74 | PK |
| Harmonic emissions | 54 | AV |

### 5.3.2 Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range blew 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

3. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold

4. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

5. The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

### 5.3.3 Test Result

Transmitter channel: 2405MHz

| Frequency | Ant. Polarization | Emission level | Limits | Detector | |
|---|---|---|---|---|---|
| (MHz) | H / V | dBμV/m | dBμV/m | | |
| 2405 | V | 89.52 | 114 | PK | Result |
| 2405 | H | 97.00 | 114 | PK | |
| 2405 | V | 76.14 | 94 | AV | |
| 2405 | H | 84.56 | 94 | AV | |
| 4810 | V | 51.67 | 74 | PK | |
| 4810 | H | 52.45 | 74 | PK | |
| 4810 | V | 43.69 | 54 | AV | |
| 4810 | H | 41.67 | 54 | AV | |

Transmitter channel: 2440MHz

| Frequency | Ant. Polarization | Emission level | Limits | Detector | |
|---|---|---|---|---|---|
| (MHz) | H / V | dBμV/m | dBμV/m | | |
| 2440 | V | 90.50 | 114 | PK | Result |
| 2440 | H | 89.24 | 114 | PK | |
| 2440 | V | 79.58 | 94 | AV | |
| 2440 | H | 75.12 | 94 | AV | |
| 4880 | V | 51.89 | 74 | PK | |
| 4880 | H | 52.76 | 74 | PK | |
| 4880 | V | 46.19 | 54 | AV | |
| 4880 | H | 43.85 | 54 | AV | |

Transmitter channel: 2480MHz

| Frequency | Ant. Polarization | Emission level | Limits | Detector | |
|---|---|---|---|---|---|
| (MHz) | H / V | dBμV/m | dBμV/m | | |
| 2480 | V | 85.79 | 114 | PK | Result |
| 2480 | H | 90.09 | 114 | PK | |
| 2480 | V | 76.45 | 94 | AV | |
| 2480 | H | 79.38 | 94 | AV | |
| 4960 | V | 51.53 | 74 | PK | |
| 4960 | H | 53.15 | 74 | PK | |
| 4960 | V | 44.37 | 54 | AV | |
| 4960 | H | 45.19 | 54 | AV | |

## 5.4 20dB bandwidth

### 5.4.1 Limits

FCC §15.215(c)

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 5.4.2 Test method

Use the following spectrum analyzer settings:

For 20 dB bandwidth

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW ≥1% of the 20 dB bandwidth
VBW ≥RBW
Sweep = auto
Detector function = peak
Trace = max hold

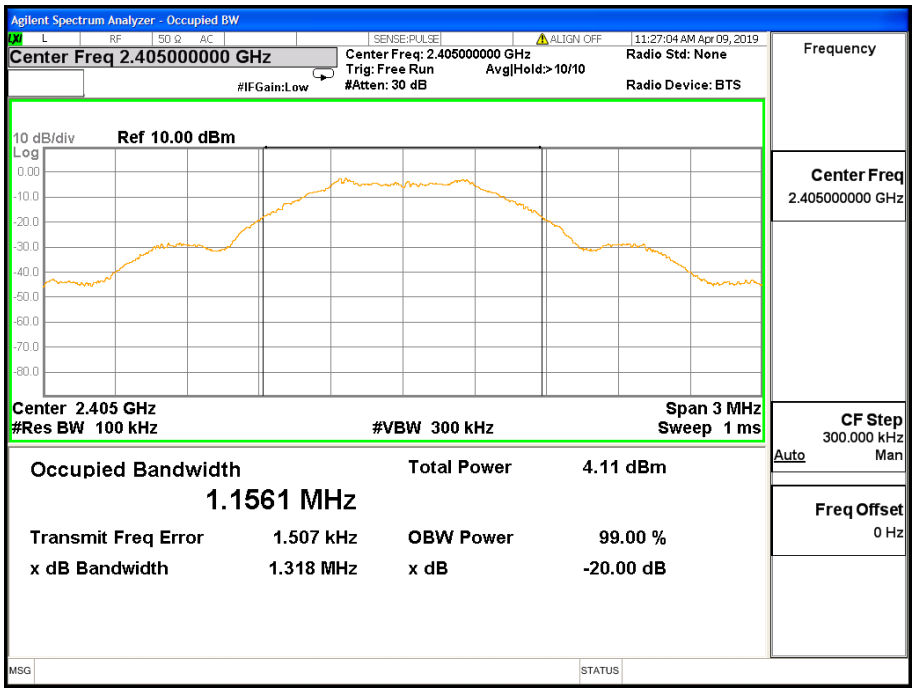
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth and 99% occupied bandwidth of the emission

### 5.4.3 Test result

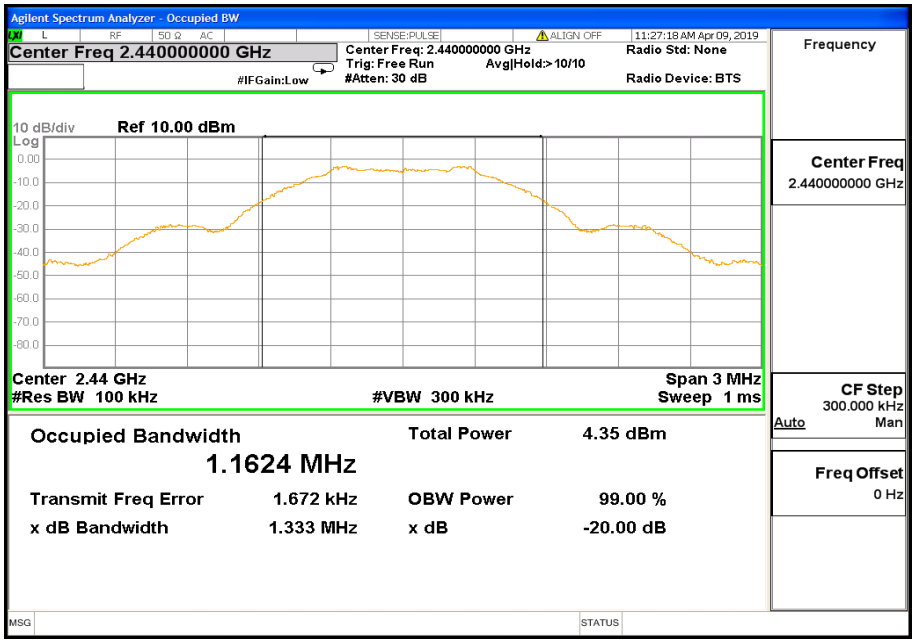
| Frequency (MHz) | 20dB bandwidth (MHz) |
|---|---|
| 2405 | 1.318 |
| 2440 | 1.333 |
| 2480 | 1.320 |

Test plots

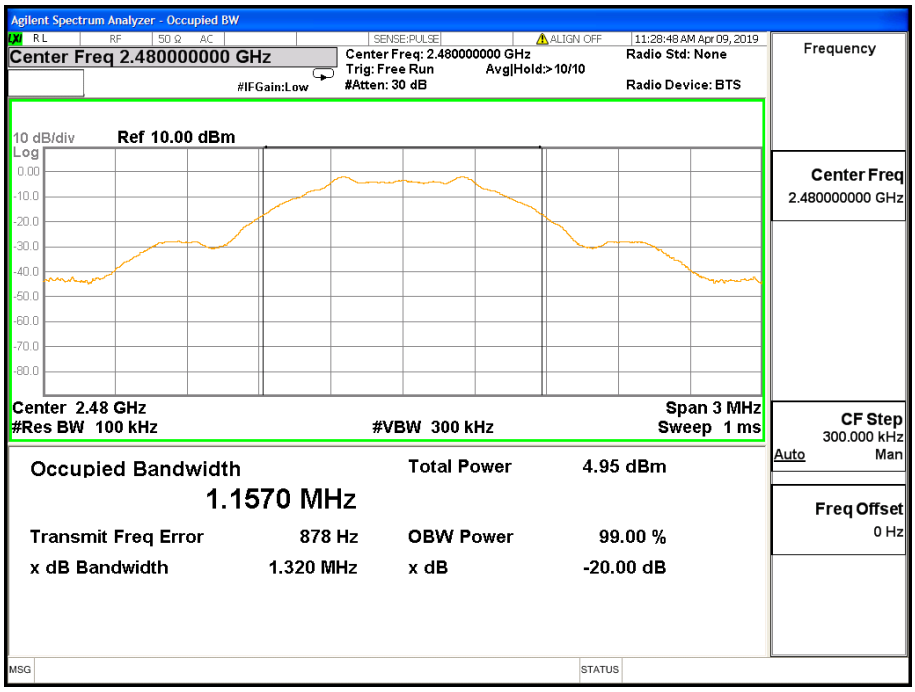
2405MHz




2440MHz



2480MHz


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
11:28:48 AM Apr 09, 2019
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center 2.48 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3 MHz
Sweep 1 ms
Occupied Bandwidth
1.1570 MHz
Total Power 4.95 dBm
Transmit Freq Error 878 Hz
OBW Power 99.00 %
x dB Bandwidth 1.320 MHz
x dB -20.00 dB
Frequency
Center Freq
2.480000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

## 5.5 Radiated spurious emission

### 5.5.1 Limit

FCC PART 15.249(a);

Except as provided in paragraph (a) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Frequency (MHz) | Field Strength of Fundamental (mV/m) | Field Strength of Harmonics (μV/m) |
|---|---|---|
| 902-928 | 50 | 500 |
| 2400-2483.5 | 50 | 500 |
| 5725-5875 | 50 | 500 |

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (μV/m) | Measurement Distance (m) |
|---|---|---|
| 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 |

Test standard reference:
Based on the data recorded in the table below, the EUT complies with FCC Title 47. Part 15. Part C sections 15205. 15209 and 15.249.

### 5.5.2 Test method

a) The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range blew 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

b) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

c) Use the following spectrum analyzer settings:

   1) Span = wide enough to fully capture the emission being measured

   2) RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz

   3) VBW ≥ RBW, Sweep = auto

   4) Detector function = peak

   5) Trace = max hold

d) Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

e) The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

### 5.5.3 Test Result

Note: If the PK measured values lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.

Below 30MHz

| | | | |
|---|---|---|---|
| EUT： | Inventory Tag | Model Name. ： | 2.0 |
| Pressure： | 1010 hPa | Test Voltage： | DC 3V by battery |
| Test Mode： | TX | Polarization : | -- |

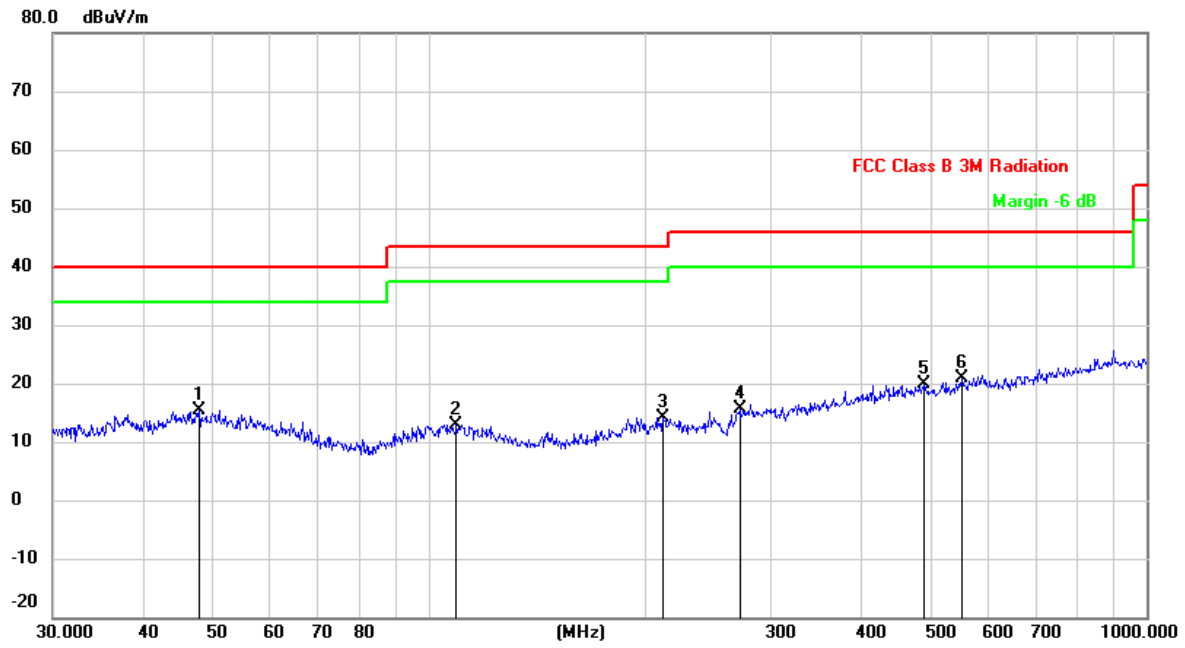
| Freq. | Reading | Limit | Margin | State |
|---|---|---|---|---|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB) | P/F |
| -- | -- | -- | -- | Pass |
| -- | -- | -- | -- | Pass |

Note:
For 9k-30MHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuV) + distance extrapolation factor.

## Radiation (30MHz – 1GHz)

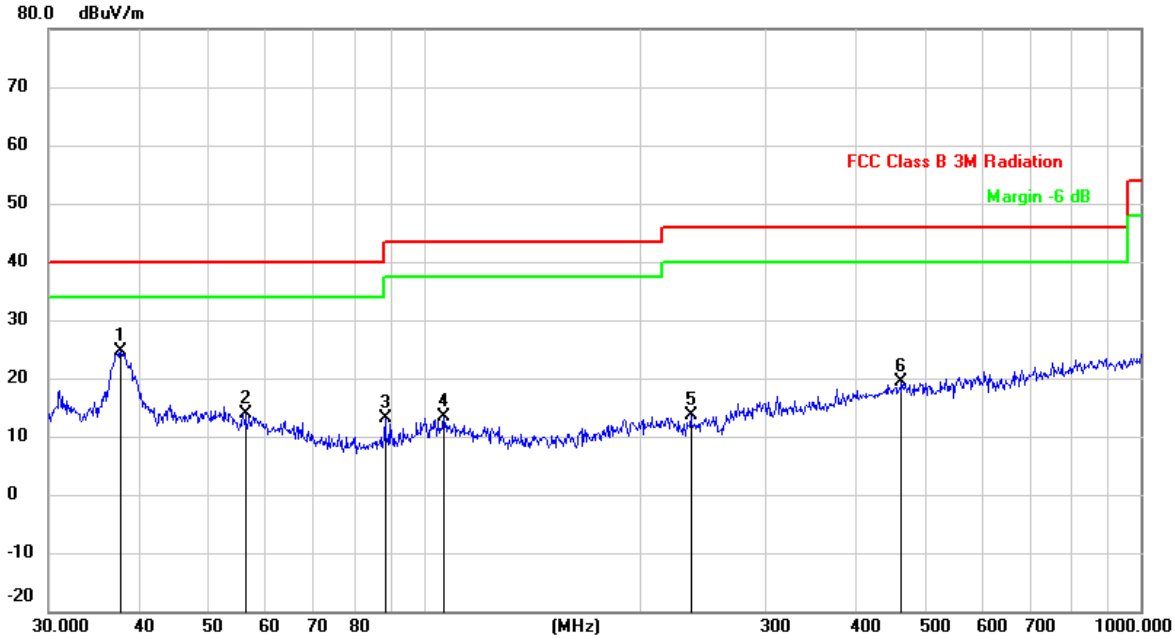
Note: The high, medium and low channels have been tested. The report only shows the worst mode. The worst mode is Low Channel 2405MHz.
EUT has two different voltage supports, reporting only the worst voltage mode

| | | | |
|---|---|---|---|
| EUT： | Inventory Tag | Model Name. ： | 2.0 |
| Pressure： | 1010hPa | Polarziation: | H |
| Test Voltage ： | DC 3V by battery | Test Mode： | TX |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | * | 47.9940 | 24.96 | -9.67 | 15.29 | 40.00 | -24.71 | QP |
| 2 | | 109.4116 | 24.43 | -11.44 | 12.99 | 43.50 | -30.51 | QP |
| 3 | | 212.2692 | 25.51 | -11.31 | 14.20 | 43.50 | -29.30 | QP |
| 4 | | 271.3245 | 24.96 | -9.42 | 15.54 | 46.00 | -30.46 | QP |
| 5 | | 490.7447 | 25.02 | -5.22 | 19.80 | 46.00 | -26.20 | QP |
| 6 | | 552.8832 | 26.18 | -5.22 | 20.96 | 46.00 | -25.04 | QP |

| | | | |
|---|---|---|---|
| EUT： | Inventory Tag | Model Name. ： | 2.0 |
| Pressure： | 1010hPa | Polarziation: | V |
| Test Voltage ： | DC 3V by battery | Test Mode： | TX |

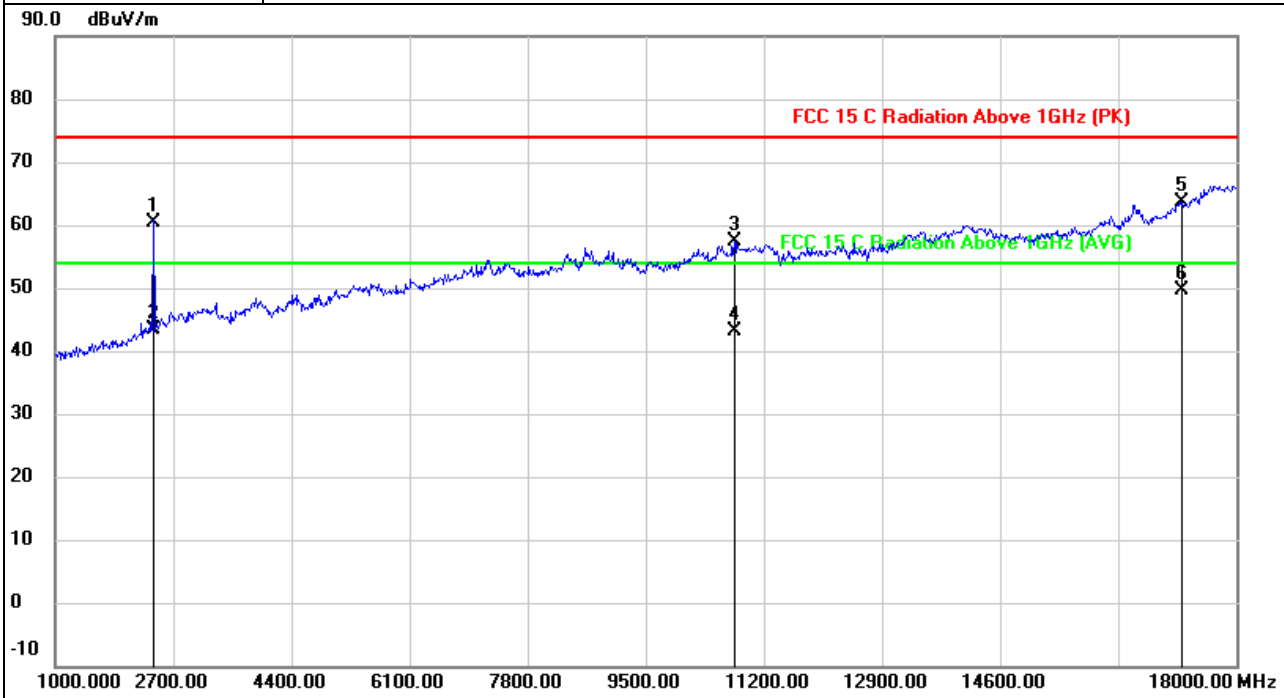



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | * | 37.8121 | 35.65 | -10.92 | 24.73 | 40.00 | -15.27 | QP |
| 2 | | 56.3947 | 24.50 | -10.63 | 13.87 | 40.00 | -26.13 | QP |
| 3 | | 88.3421 | 26.74 | -13.51 | 13.23 | 43.50 | -30.27 | QP |
| 4 | | 106.7587 | 24.78 | -11.44 | 13.34 | 43.50 | -30.16 | QP |
| 5 | | 235.8163 | 24.25 | -10.51 | 13.74 | 46.00 | -32.26 | QP |
| 6 | | 463.9696 | 25.08 | -5.61 | 19.47 | 46.00 | -26.53 | QP |

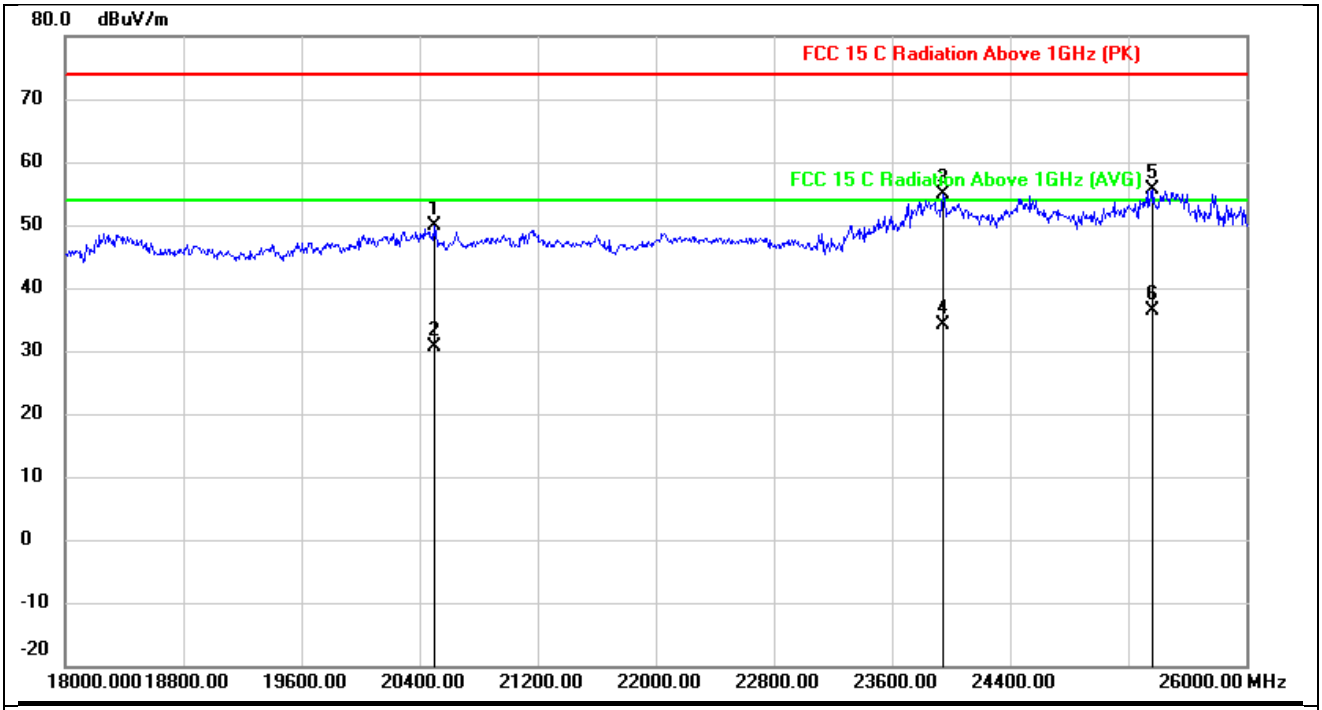
**Above 1GHz:**

Note: Test with 2.4GHz-2.4835GHz notch Filter

| | | | |
|---|---|---|---|
| EUT: | Inventory Tag | Model name: | 2.0 |
| Pressure: | 1010hPa | Polarization: | H |
| Test voltage : | DC 3V from battery | Test mode: | TX |
| Test channel: | 2405MHz | | |

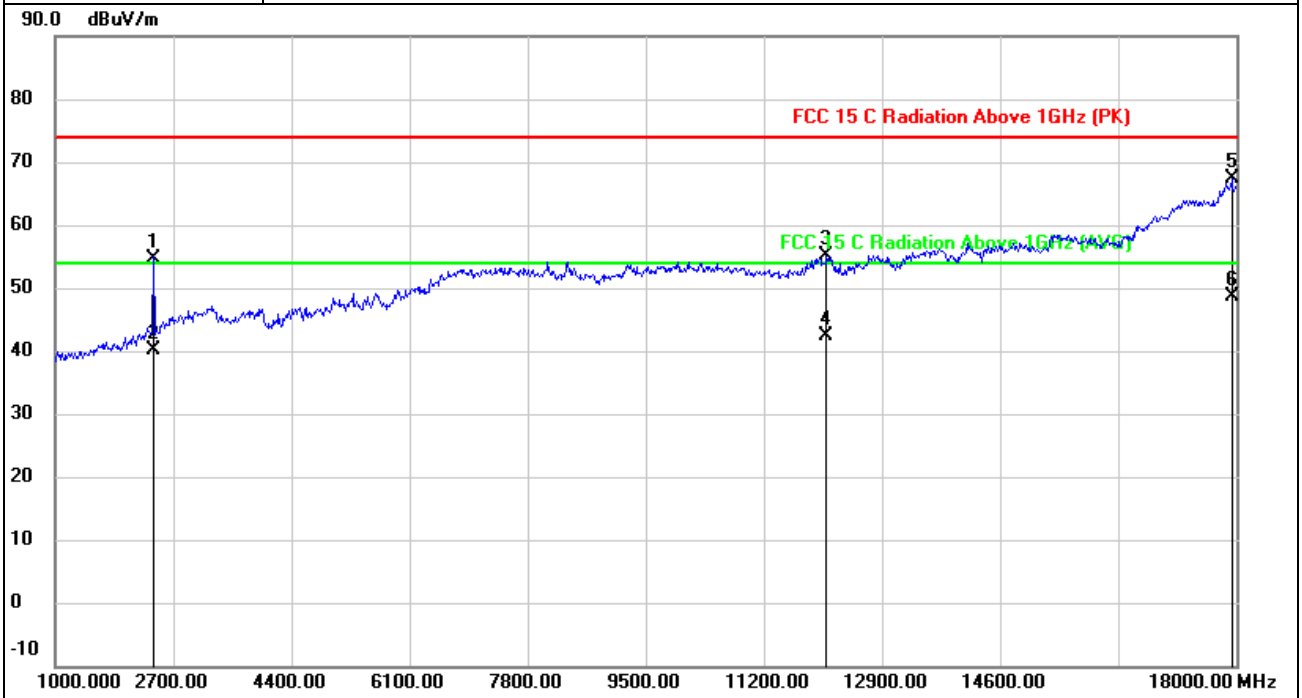



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 2411.000 | 74.61 | -14.30 | 60.31 | 74.00 | -13.69 | peak |
| 2 | | 2411.000 | 57.80 | -14.30 | 43.50 | 54.00 | -10.50 | AVG |
| 3 | | 10775.000 | 52.73 | 4.57 | 57.30 | 74.00 | -16.70 | peak |
| 4 | | 10775.000 | 38.63 | 4.57 | 43.20 | 54.00 | -10.80 | AVG |
| 5 | | 17218.000 | 55.61 | 7.94 | 63.55 | 74.00 | -10.45 | peak |
| 6 | * | 17218.000 | 41.66 | 7.94 | 49.60 | 54.00 | -4.40 | AVG |

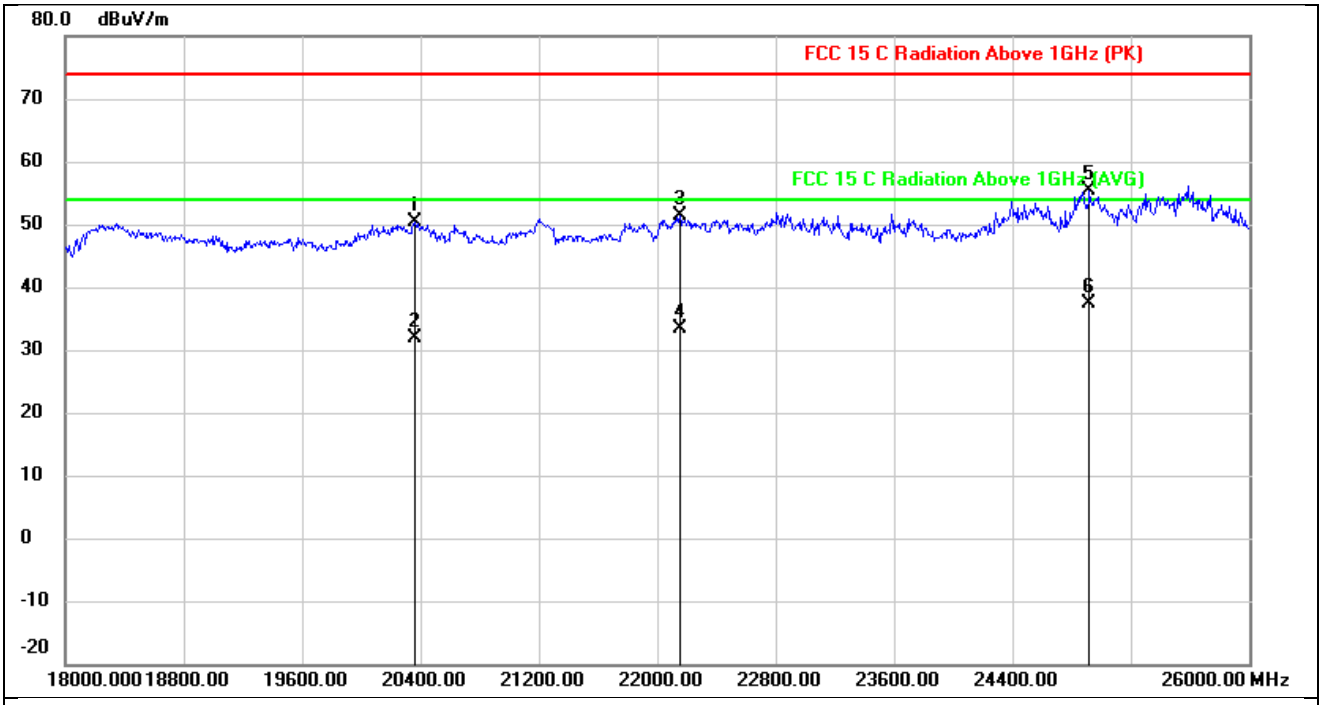



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 20496.000 | 30.87 | 18.91 | 49.78 | 74.00 | -24.22 | peak |
| 2 | | 20496.000 | 11.79 | 18.91 | 30.70 | 54.00 | -23.30 | AVG |
| 3 | | 23944.000 | 35.24 | 19.62 | 54.86 | 74.00 | -19.14 | peak |
| 4 | | 23944.000 | 14.58 | 19.62 | 34.20 | 54.00 | -19.80 | AVG |
| 5 | | 25368.000 | 36.02 | 19.59 | 55.61 | 74.00 | -18.39 | peak |
| 6 | * | 25368.000 | 16.91 | 19.59 | 36.50 | 54.00 | -17.50 | AVG |

| | | | |
|---|---|---|---|
| EUT: | Inventory Tag | Model name: | 2.0 |
| Pressure: | 1010hPa | Polarization: | V |
| Test voltage : | DC 3V from battery | Test mode: | TX |
| Test channel: | 2405MHz | | |

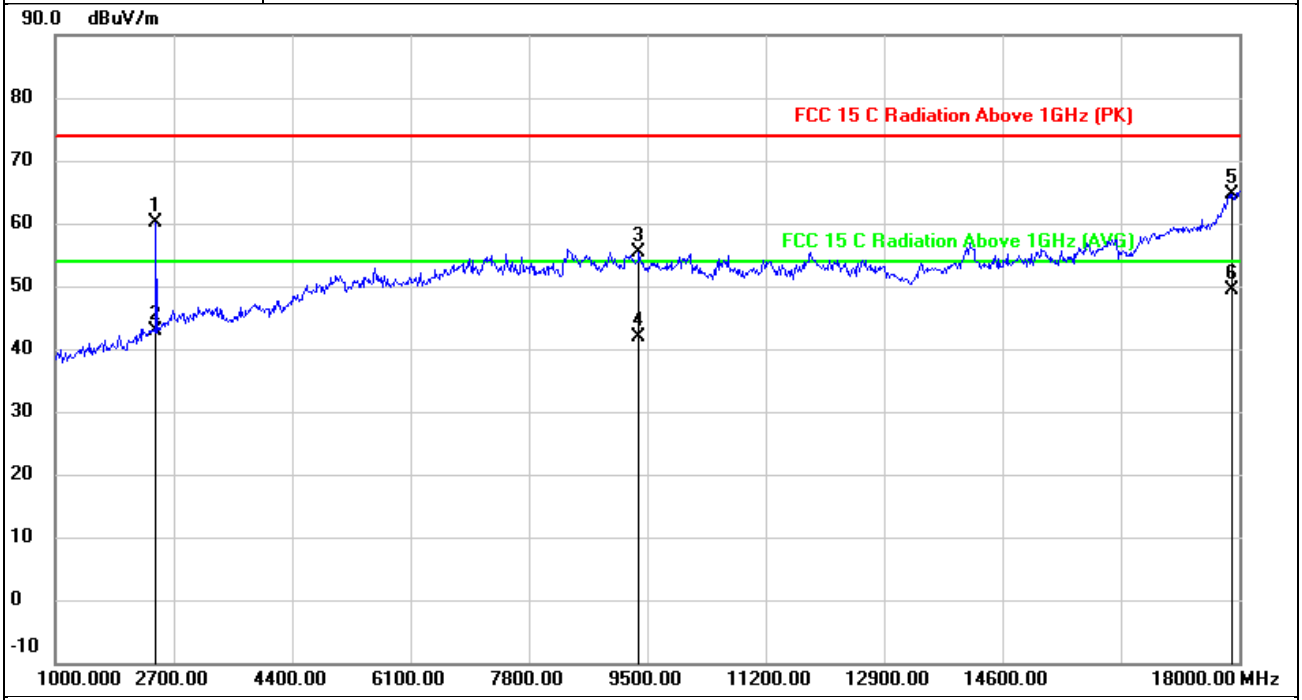



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 2411.000 | 68.90 | -14.30 | 54.60 | 74.00 | -19.40 | peak |
| 2 | | 2411.000 | 54.50 | -14.30 | 40.20 | 54.00 | -13.80 | AVG |
| 3 | | 12101.000 | 50.92 | 4.26 | 55.18 | 74.00 | -18.82 | peak |
| 4 | | 12101.000 | 38.04 | 4.26 | 42.30 | 54.00 | -11.70 | AVG |
| 5 | | 17932.000 | 53.70 | 13.61 | 67.31 | 74.00 | -6.69 | peak |
| 6 | * | 17932.000 | 35.09 | 13.61 | 48.70 | 54.00 | -5.30 | AVG |

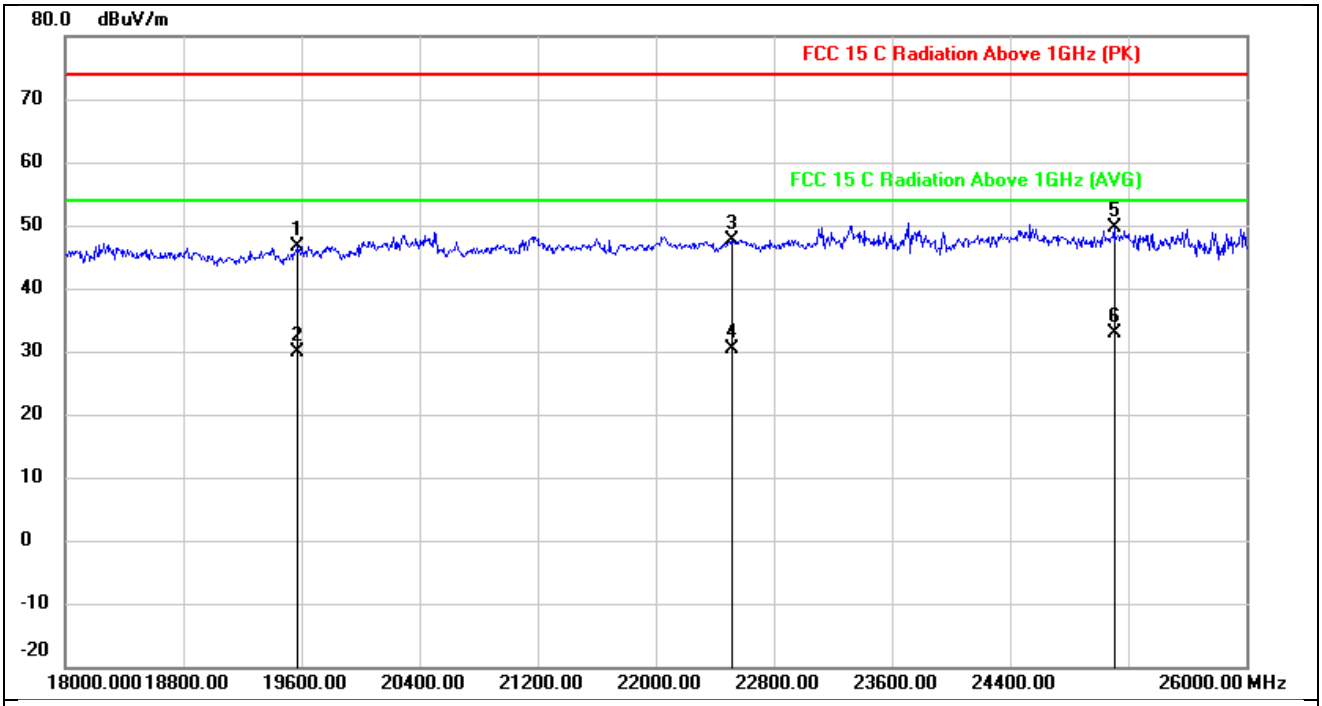



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 20360.000 | 31.58 | 18.88 | 50.46 | 74.00 | -23.54 | peak |
| 2 | | 20360.000 | 13.02 | 18.88 | 31.90 | 54.00 | -22.10 | AVG |
| 3 | | 22152.000 | 32.01 | 19.25 | 51.26 | 74.00 | -22.74 | peak |
| 4 | | 22152.000 | 14.05 | 19.25 | 33.30 | 54.00 | -20.70 | AVG |
| 5 | | 24920.000 | 35.63 | 19.82 | 55.45 | 74.00 | -18.55 | peak |
| 6 | * | 24920.000 | 17.58 | 19.82 | 37.40 | 54.00 | -16.60 | AVG |

| | | | |
|---|---|---|---|
| EUT: | Inventory Tag | Model name: | 2.0 |
| Pressure: | 1010hPa | Polarization: | H |
| Test voltage : | DC 3V from battery | Test mode: | TX |
| Test channel: | 2440MHz | | |

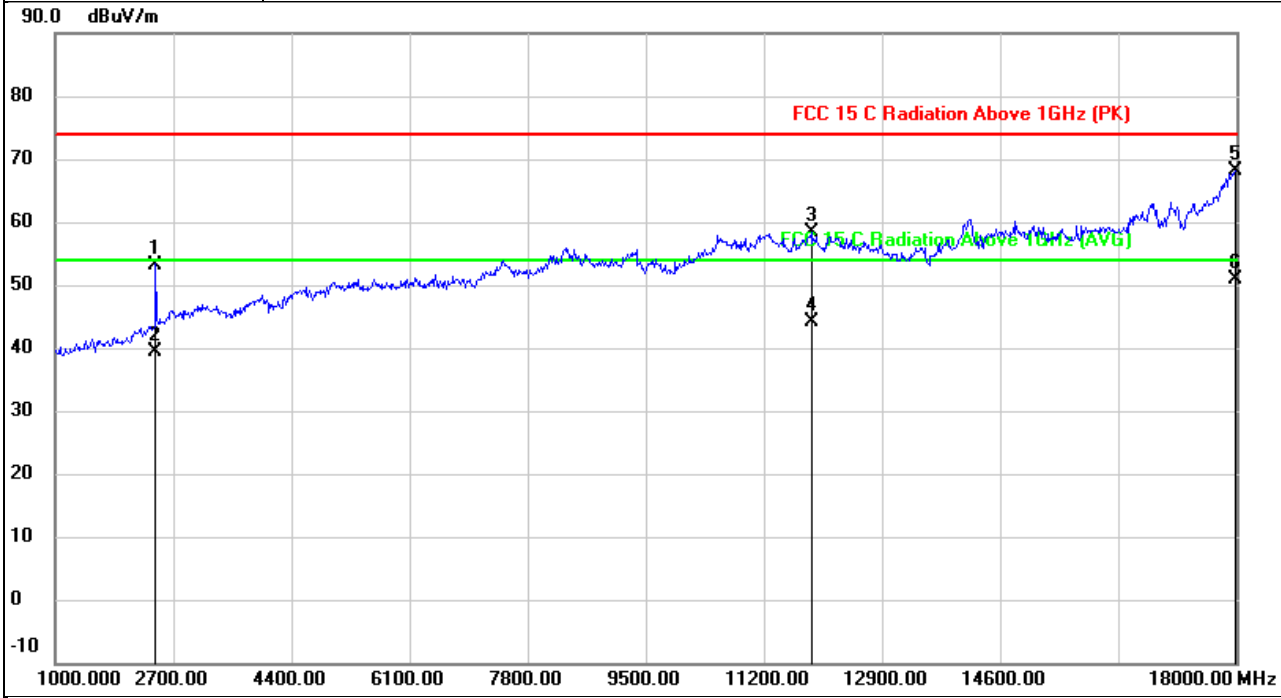



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 2445.000 | 74.22 | -14.11 | 60.11 | 74.00 | -13.89 | peak |
| 2 | | 2445.000 | 57.01 | -14.11 | 42.90 | 54.00 | -11.10 | AVG |
| 3 | | 9381.000 | 53.46 | 1.97 | 55.43 | 74.00 | -18.57 | peak |
| 4 | | 9381.000 | 39.93 | 1.97 | 41.90 | 54.00 | -12.10 | AVG |
| 5 | | 17898.000 | 51.31 | 13.34 | 64.65 | 74.00 | -9.35 | peak |
| 6 | * | 17898.000 | 36.06 | 13.34 | 49.40 | 54.00 | -4.60 | AVG |

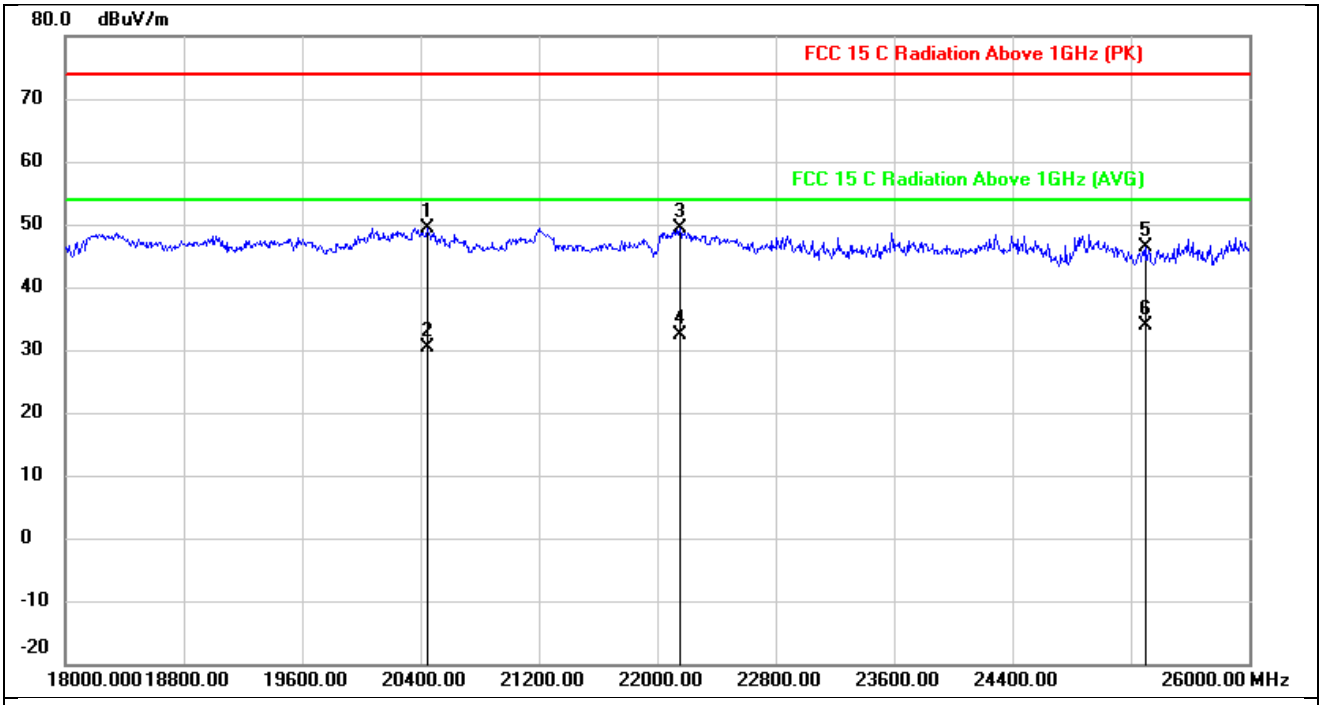



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 19568.000 | 27.79 | 18.95 | 46.74 | 74.00 | -27.26 | peak |
| 2 | | 19568.000 | 10.85 | 18.95 | 29.80 | 54.00 | -24.20 | AVG |
| 3 | | 22512.000 | 28.35 | 19.33 | 47.68 | 74.00 | -26.32 | peak |
| 4 | | 22512.000 | 11.17 | 19.33 | 30.50 | 54.00 | -23.50 | AVG |
| 5 | | 25104.000 | 29.75 | 19.77 | 49.52 | 74.00 | -24.48 | peak |
| 6 | * | 25104.000 | 13.13 | 19.77 | 32.90 | 54.00 | -21.10 | AVG |

| | | | |
|---|---|---|---|
| EUT: | Inventory Tag | Model name: | 2.0 |
| Pressure: | 1010hPa | Polarization: | V |
| Test voltage : | DC 3V from battery | Test mode: | TX |
| Test channel: | 2440MHz | | |

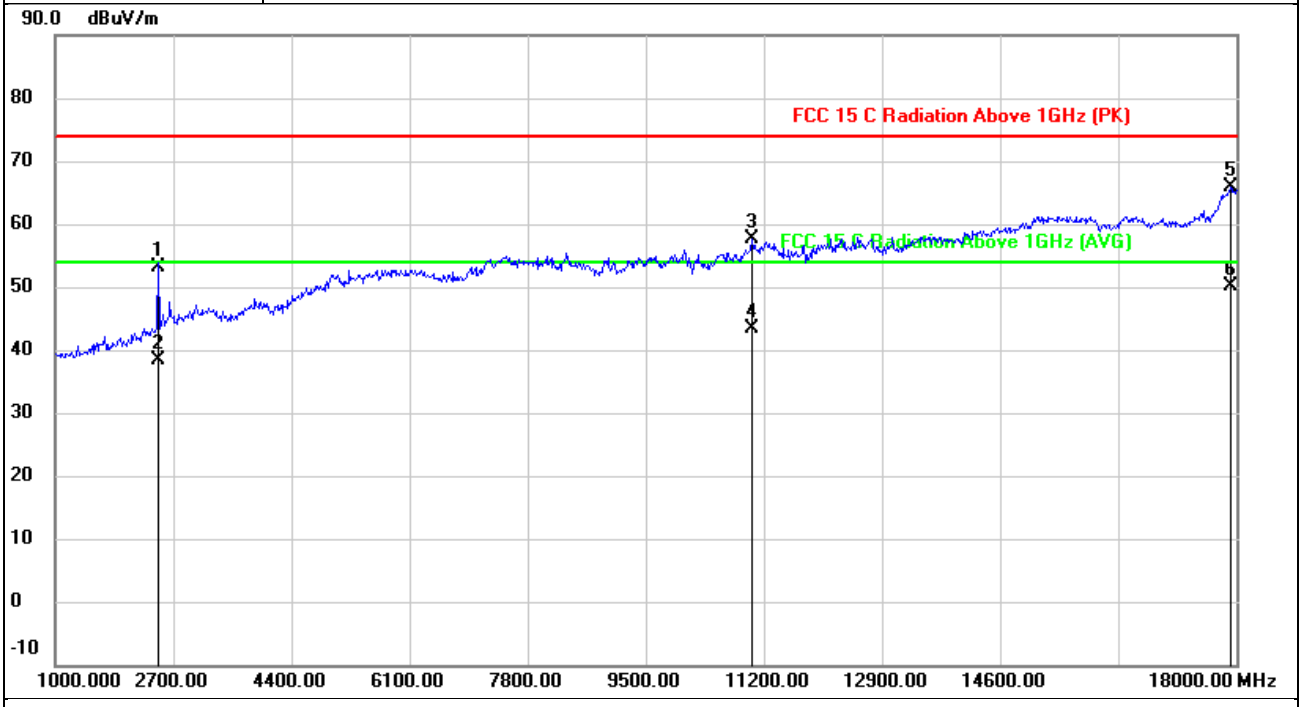



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 2445.000 | 67.21 | -14.11 | 53.10 | 74.00 | -20.90 | peak |
| 2 | | 2445.000 | 53.61 | -14.11 | 39.50 | 54.00 | -14.50 | AVG |
| 3 | | 11880.000 | 53.88 | 4.48 | 58.36 | 74.00 | -15.64 | peak |
| 4 | | 11880.000 | 39.62 | 4.48 | 44.10 | 54.00 | -9.90 | AVG |
| 5 | | 17983.000 | 54.11 | 13.99 | 68.10 | 74.00 | -5.90 | peak |
| 6 | * | 17983.000 | 36.81 | 13.99 | 50.80 | 54.00 | -3.20 | AVG |

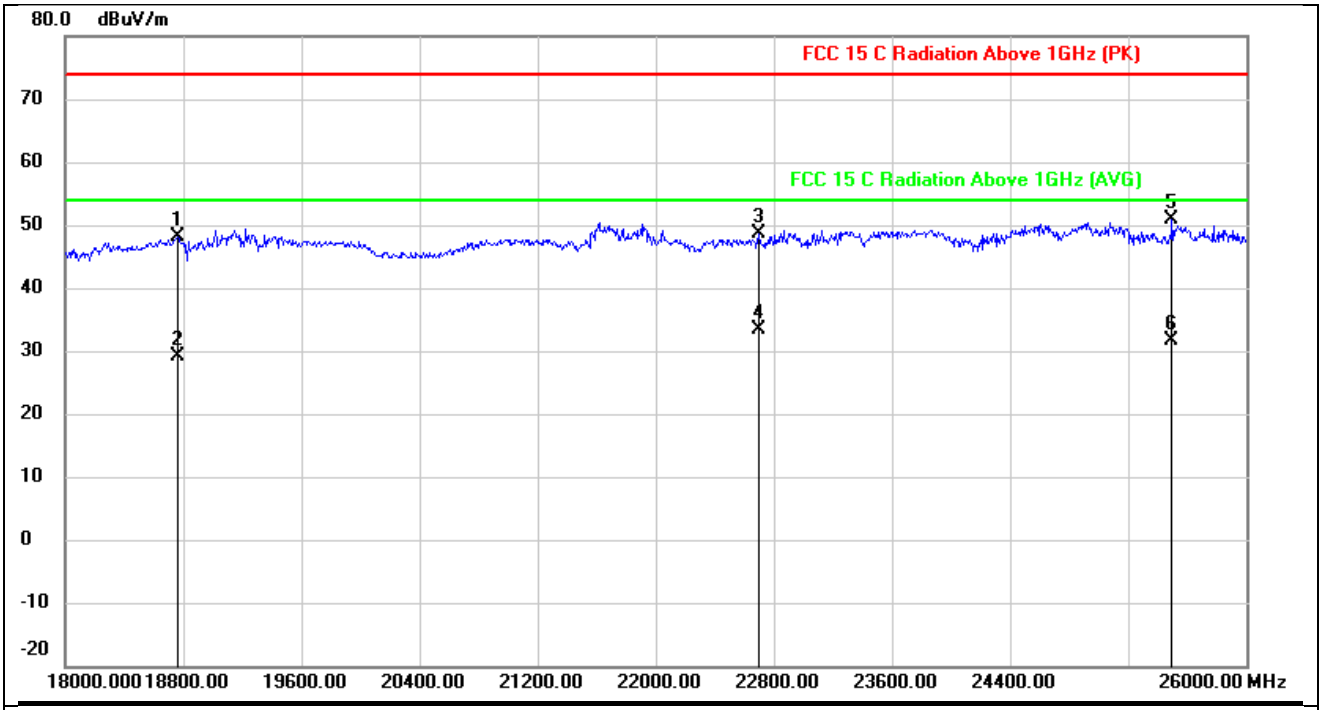



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 20448.000 | 30.59 | 18.90 | 49.49 | 74.00 | -24.51 | peak |
| 2 | | 20448.000 | 11.40 | 18.90 | 30.30 | 54.00 | -23.70 | AVG |
| 3 | | 22152.000 | 30.01 | 19.25 | 49.26 | 74.00 | -24.74 | peak |
| 4 | | 22152.000 | 13.15 | 19.25 | 32.40 | 54.00 | -21.60 | AVG |
| 5 | | 25304.000 | 26.86 | 19.64 | 46.50 | 74.00 | -27.50 | peak |
| 6 | * | 25304.000 | 14.36 | 19.64 | 34.00 | 54.00 | -20.00 | AVG |

| | | | |
|---|---|---|---|
| EUT: | Inventory Tag | Model name: | 2.0 |
| Pressure: | 1010hPa | Polarization: | H |
| Test voltage : | DC 3V from battery | Test mode: | TX |
| Test channel: | 2480MHz | | |

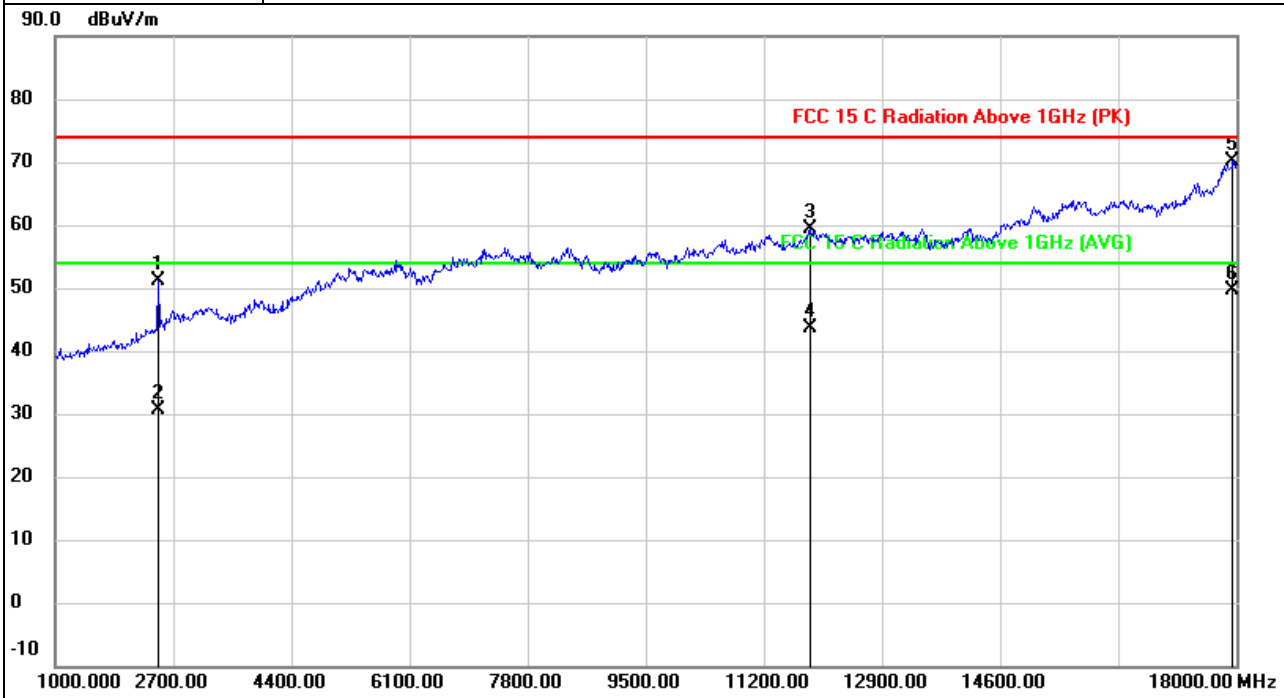



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 2479.000 | 67.03 | -13.93 | 53.10 | 74.00 | -20.90 | peak |
| 2 | | 2479.000 | 52.33 | -13.93 | 38.40 | 54.00 | -15.60 | AVG |
| 3 | | 11030.000 | 52.64 | 5.06 | 57.70 | 74.00 | -16.30 | peak |
| 4 | | 11030.000 | 38.44 | 5.06 | 43.50 | 54.00 | -10.50 | AVG |
| 5 | | 17915.000 | 52.30 | 13.48 | 65.78 | 74.00 | -8.22 | peak |
| 6 | * | 17915.000 | 36.72 | 13.48 | 50.20 | 54.00 | -3.80 | AVG |

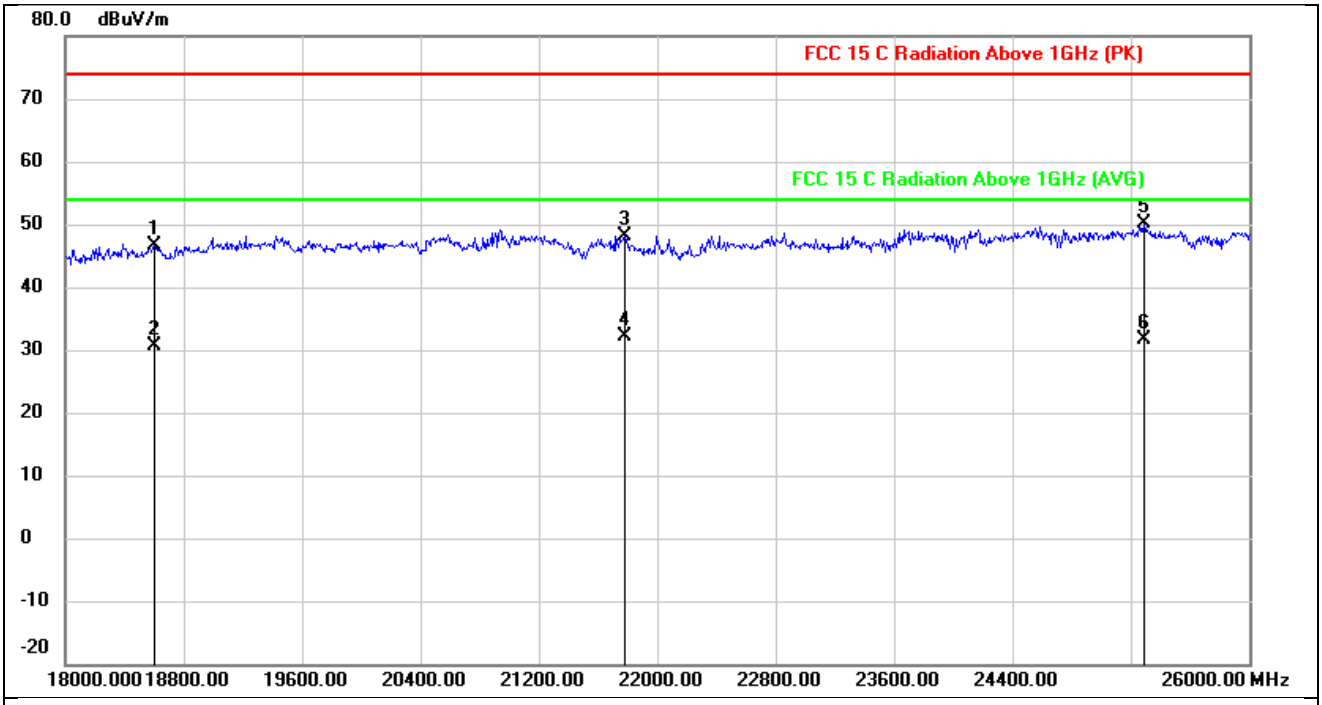



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 18760.000 | 29.67 | 18.41 | 48.08 | 74.00 | -25.92 | peak |
| 2 | | 18760.000 | 10.79 | 18.41 | 29.20 | 54.00 | -24.80 | AVG |
| 3 | | 22696.000 | 29.19 | 19.37 | 48.56 | 74.00 | -25.44 | peak |
| 4 | * | 22696.000 | 14.13 | 19.37 | 33.50 | 54.00 | -20.50 | AVG |
| 5 | | 25496.000 | 31.48 | 19.51 | 50.99 | 74.00 | -23.01 | peak |
| 6 | | 25496.000 | 12.19 | 19.51 | 31.70 | 54.00 | -22.30 | AVG |

| | | | |
|---|---|---|---|
| EUT: | Inventory Tag | Model name: | 2.0 |
| Pressure: | 1010hPa | Polarization: | V |
| Test voltage : | DC 3V from battery | Test mode: | TX |
| Test channel: | 2480MHz | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 2479.000 | 64.94 | -13.93 | 51.01 | 74.00 | -22.99 | peak |
| 2 | | 2479.000 | 44.53 | -13.93 | 30.60 | 54.00 | -23.40 | AVG |
| 3 | | 11863.000 | 54.93 | 4.50 | 59.43 | 74.00 | -14.57 | peak |
| 4 | | 11863.000 | 39.10 | 4.50 | 43.60 | 54.00 | -10.40 | AVG |
| 5 | * | 17949.000 | 56.38 | 13.74 | 70.12 | 74.00 | -3.88 | peak |
| 6 | | 17949.000 | 35.96 | 13.74 | 49.70 | 54.00 | -4.30 | AVG |



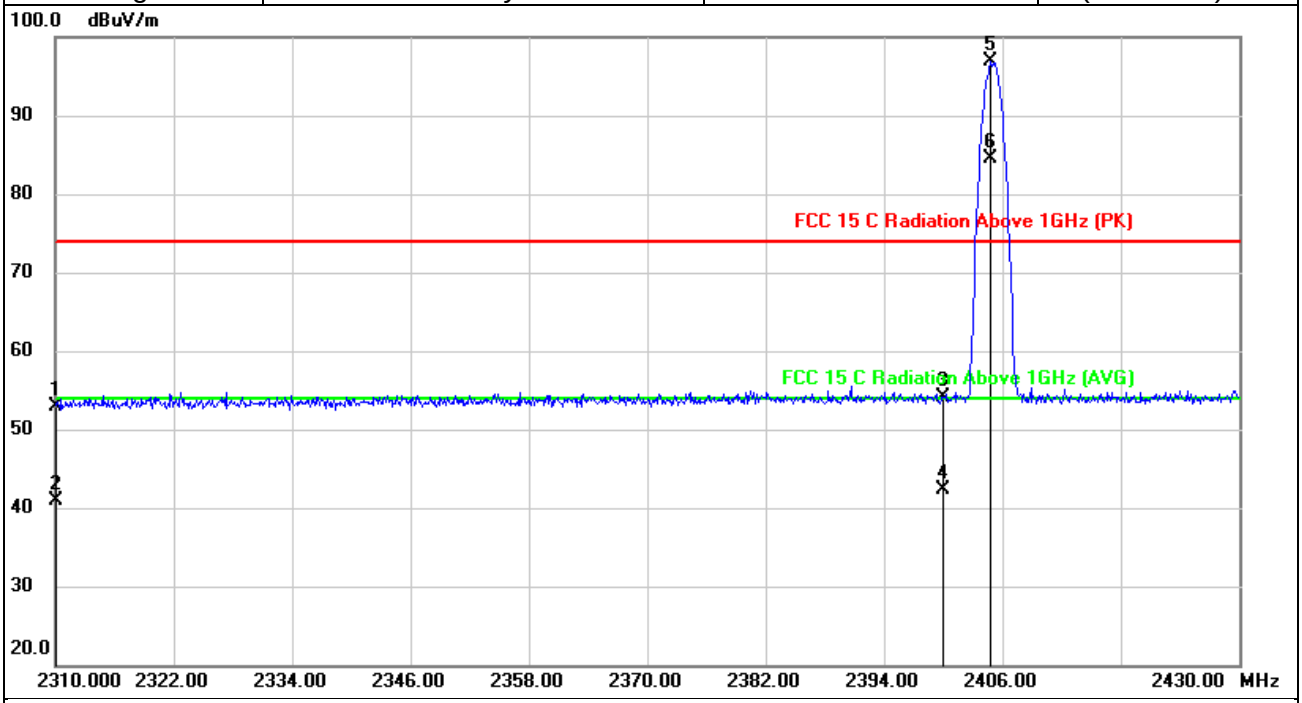

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 18600.000 | 28.70 | 17.93 | 46.63 | 74.00 | -27.37 | peak |
| 2 | | 18600.000 | 12.77 | 17.93 | 30.70 | 54.00 | -23.30 | AVG |
| 3 | | 21776.000 | 28.95 | 19.18 | 48.13 | 74.00 | -25.87 | peak |
| 4 | * | 21776.000 | 13.02 | 19.18 | 32.20 | 54.00 | -21.80 | AVG |
| 5 | | 25288.000 | 30.37 | 19.65 | 50.02 | 74.00 | -23.98 | peak |
| 6 | | 25288.000 | 11.95 | 19.65 | 31.60 | 54.00 | -22.40 | AVG |

### 5.5.4 Band edge-radiated

Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
(2)Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor
(3) All other emissions more than 20dB below the limit.

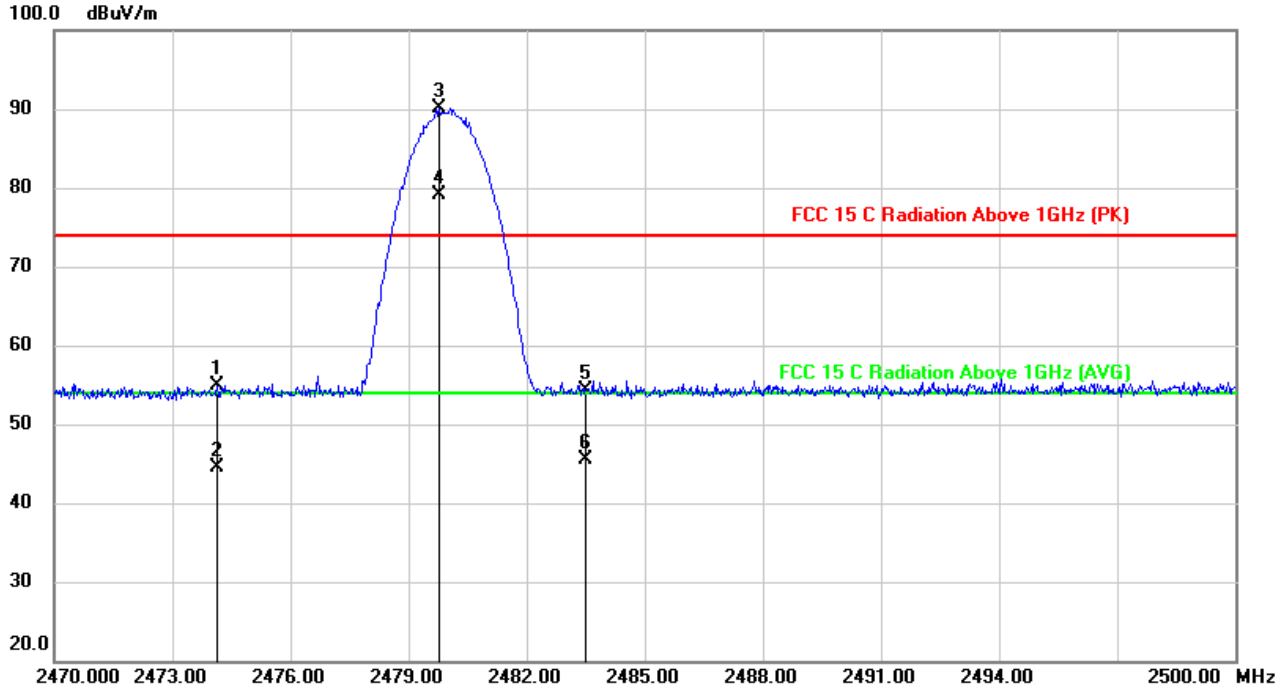
All the modulation modes have been tested, and the worst result was report as below:

| | | | |
|---|---|---|---|
| EUT: | Inventory Tag | Model name: | 2.0 |
| Pressure: | 1010hPa | Polarization: | H |
| Test voltage : | DC 3V from battery | Test mode: | TX(2405MHz) |



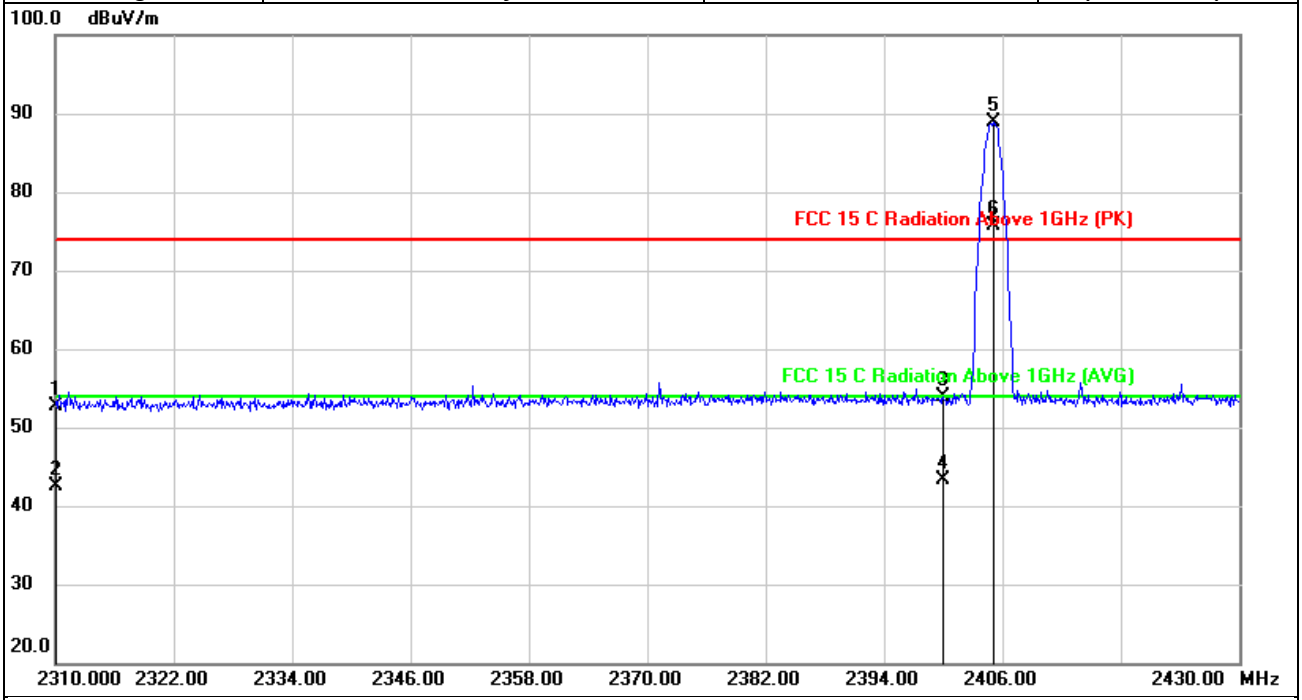

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 2310.000 | 57.79 | -4.83 | 52.96 | 74.00 | -21.04 | peak |
| 2 | | 2310.000 | 45.73 | -4.83 | 40.90 | 54.00 | -13.10 | AVG |
| 3 | | 2400.000 | 58.40 | -4.35 | 54.05 | 74.00 | -19.95 | peak |
| 4 | | 2400.000 | 46.75 | -4.35 | 42.40 | 54.00 | -11.60 | AVG |
| 5 | X | 2404.800 | 101.29 | -4.33 | 96.96 | 74.00 | 22.96 | peak |
| 6 | * | 2404.800 | 88.83 | -4.33 | 84.50 | 54.00 | 30.50 | AVG |

| | | | |
|---|---|---|---|
| EUT: | Inventory Tag | Model name: | 2.0 |
| Pressure: | 1010hPa | Polarization: | H |
| Test voltage : | DC 3V from battery | Test mode: | TX(2480MHz) |



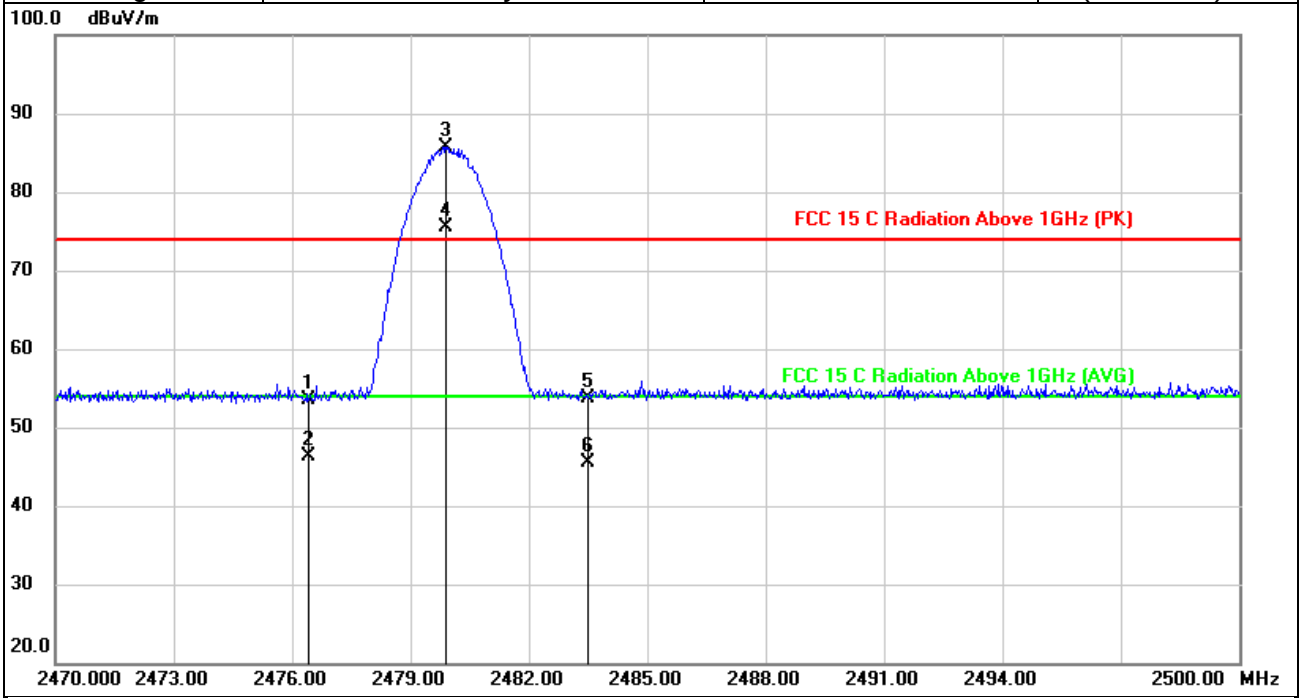

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 2474.140 | 58.92 | -3.95 | 54.97 | 74.00 | -19.03 | peak |
| 2 | | 2474.140 | 48.45 | -3.95 | 44.50 | 54.00 | -9.50 | AVG |
| 3 | X | 2479.780 | 93.97 | -3.93 | 90.04 | 74.00 | 16.04 | peak |
| 4 | * | 2479.780 | 83.13 | -3.93 | 79.20 | 54.00 | 25.20 | AVG |
| 5 | | 2483.500 | 58.24 | -3.91 | 54.33 | 74.00 | -19.67 | peak |
| 6 | | 2483.500 | 49.51 | -3.91 | 45.60 | 54.00 | -8.40 | AVG |

| | | | |
|---|---|---|---|
| EUT: | Inventory Tag | Model name: | 2.0 |
| Pressure: | 1010hPa | Polarization: | V |
| Test voltage : | DC 3V from battery | Test mode: | TX(2405MHz) |



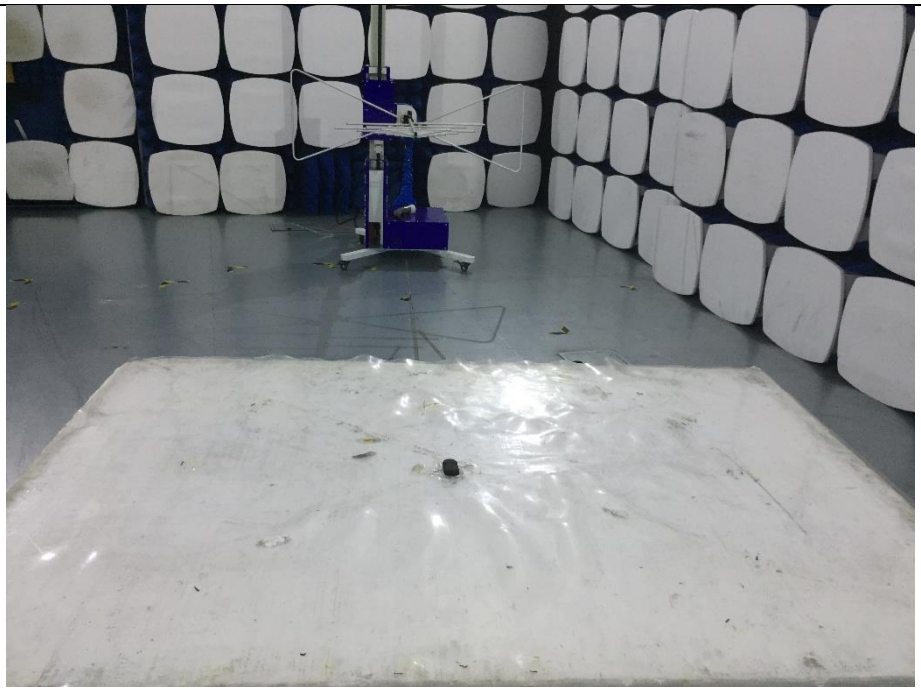
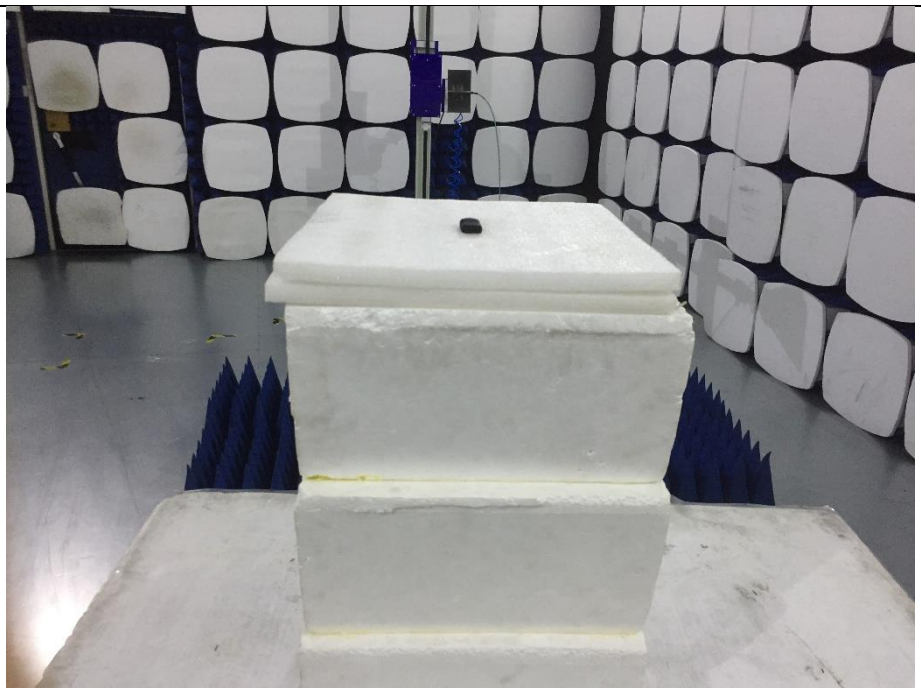

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 2310.000 | 57.63 | -4.83 | 52.80 | 74.00 | -21.20 | peak |
| 2 | | 2310.000 | 47.43 | -4.83 | 42.60 | 54.00 | -11.40 | AVG |
| 3 | | 2400.000 | 58.21 | -4.35 | 53.86 | 74.00 | -20.14 | peak |
| 4 | | 2400.000 | 47.55 | -4.35 | 43.20 | 54.00 | -10.80 | AVG |
| 5 | X | 2405.040 | 93.17 | -4.33 | 88.84 | 74.00 | 14.84 | peak |
| 6 | * | 2405.040 | 80.03 | -4.33 | 75.70 | 54.00 | 21.70 | AVG |

| | | | |
|---|---|---|---|
| EUT: | Inventory Tag | Model name: | 2.0 |
| Pressure: | 1010hPa | Polarization: | V |
| Test voltage : | DC 3V from battery | Test mode: | TX(2480MHz) |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 2476.400 | 57.41 | -3.94 | 53.47 | 74.00 | -20.53 | peak |
| 2 | | 2476.400 | 50.24 | -3.94 | 46.30 | 54.00 | -7.70 | AVG |
| 3 | X | 2479.900 | 89.63 | -3.93 | 85.70 | 74.00 | 11.70 | peak |
| 4 | * | 2479.900 | 79.53 | -3.93 | 75.60 | 54.00 | 21.60 | AVG |
| 5 | | 2483.500 | 57.71 | -3.91 | 53.80 | 74.00 | -20.20 | peak |
| 6 | | 2483.500 | 49.41 | -3.91 | 45.50 | 54.00 | -8.50 | AVG |

# Photographs of the Test Setup

| Radiated emission – below 1GHz |
| --- |
|  |
| Radiated emission – above 1GHz |
|  |

## Photographs of the EUT

See the APPENDIX 1: EUT PHOTO in the report No.: MTi190731E039-1.

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