

CTC Laboratories, Inc.

2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China

Tel: +86-755-27521059 Fax: +86-755-27521011 http://www.sz-ctc.org.cn

| Т | EST REPORT | | | |
|---------------------------------------|--|---------------------------------|--|--|
| Report No: | CTC20231517E06 | | | |
| FCC ID: | 2AKXB-W3011020 | | | |
| Applicant: | Woan Technology (Shenzhen) C | o., Ltd. | | |
| Address: | Room 1101, Qiancheng Commerci Road, Mabu Community, Xixiang S Shenzhen, Guangdong, P.R.China | Sub-district, Bao'an District, | | |
| Manufacturer | Woan Technology (Shenzhen) Co., | , Ltd. | | |
| Address | Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100 SwitchBot Mini Robot Vacuum K10+ | | | |
| | SwitchBot Mini Robot Vacuum K | 10 | | |
| Trade Mark: | SwitchBot | | | |
| Model/Type reference: | W3011020 | | | |
| Listed Model(s): | W3011021, W3011022, W3011023 | , W3011024, W3011025 | | |
| Standard: | FCC CFR Title 47 Part 15 Subpar | t C Section 15.247 | | |
| Date of receipt of test sample: | Jul. 10, 2023 | | | |
| Date of testing | Jul. 10, 2023 to Aug. 1, 2023 | | | |
| Date of issue | Aug. 13, 2023 | | | |
| Result | PASS | | | |
| Compiled by: | | Jim Jiang | | |
| (Printed name+signature) | Jim Jiang | | | |
| Supervised by: | | n: shang | | |
| (Printed name+signature) | Eric Zhang Totti Zhao | | | |
| Approved by: | | 1 Janes | | |
| (Printed name+signature) | Totti Zhao | | | |
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Table of Contents

Page

| 1. | TEST | SUMMARY | 3 |
|----|------|--|------|
| 1 | 1. | Test Standards | 3 |
| 1 | 2. | REPORT VERSION | 3 |
| 1 | 3. | TEST DESCRIPTION | 3 |
| 1 | 4. | TEST FACILITY | |
| 1 | 5. | MEASUREMENT UNCERTAINTY | 5 |
| 1 | 6. | ENVIRONMENTAL CONDITIONS | 5 |
| 2. | GEN | ERAL INFORMATION | 6 |
| 2 | 2.1. | CLIENT INFORMATION | |
| 2 | .2. | GENERAL DESCRIPTION OF EUT | 6 |
| 2 | .3. | ACCESSORY EQUIPMENT INFORMATION | |
| 2 | .4. | OPERATION STATE | |
| 2 | .5. | Measurement Instruments List | 9 |
| 3. | TEST | ITEM AND RESULTS | . 10 |
| 3 | .1. | CONDUCTED EMISSION | 10 |
| 3 | .2. | RADIATED EMISSION | .13 |
| 3 | .3. | BAND EDGE EMISSIONS (RADIATED) | 21 |
| 3 | .4. | BAND EDGE AND SPURIOUS EMISSIONS (CONDUCTED) | |
| 3 | .5. | DTS BANDWIDTH | .29 |
| 3 | .6. | PEAK OUTPUT POWER | |
| 3 | .7. | Power Spectral Density | |
| 3 | .8. | DUTY CYCLE | |
| 3 | .9. | ANTENNA REQUIREMENT | .39 |



1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Operation within the bands 902–928MHz, 2400–2483.5MHz, and 5725–5850MHz.

<u>RSS-247 Issue 2</u>: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.

RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus.

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

1.2. Report Version

| Revised No. | Date of issue | Description |
|-------------|---------------|-------------|
| 01 | Aug. 13, 2023 | Original |
| | | |
| | | |

1.3. Test Description

| FCC Part 15 Subpart C (15.247) / RSS-247 Issue 2 | | | | | |
|--|-----------------------------|-----------------------------|--------|-----------|--|
| Test Item | Standard | Section | Result | Test | |
| rest nem | FCC | IC | Result | Engineer | |
| Antenna Requirement | 15.203 | RSS-Gen 6.8 | Pass | Jim Jiang | |
| Conducted Emission | 15.207 | RSS-Gen 8.8 | Pass | Jim Jiang | |
| Conducted Band Edge and Spurious Emissions | 15.247(d) | RSS-247 5.5 | Pass | Jim Jiang | |
| Radiated Band Edge and Spurious Emissions | 15.205&15.209& 15.247(d) | RSS-247 5.5 | Pass | Jim Jiang | |
| 6dB Bandwidth | 15.247(a)(2) | RSS-247 5.2 (a) | Pass | Jim Jiang | |
| Conducted Max Output Power | 15.247(b)(3) | RSS-247 5.4 (d) | Pass | Jim Jiang | |
| Power Spectral Density | 15.247(e) | RSS-247 5.2 (b) | Pass | Jim Jiang | |
| Transmitter Radiated Spurious | 15.209&15.247(d) | RSS-247 5.5& RSS-Gen 8.9 | Pass | Jim Jiang | |

Note:

1. The measurement uncertainty is not included in the test result.

2. N/A: means this test item is not applicable for this device according to the technology characteristic of device.

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1.4. Test Facility

Address of the report laboratory

CTC Laboratories, Inc.

Add: 2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China

Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. 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 951311, Aug 26, 2017.



1.5. 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 TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties radio equipment characteristics; Part 2" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the CTC Laboratories, Inc. 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.

| Test Items | Measurement Uncertainty | Notes |
|---|---|-------|
| DTS Bandwidth | ±0.0196% | (1) |
| Maximum Conducted Output Power | ±0.686 dB | (1) |
| Maximum Power Spectral Density Level | ±0.743 dB | (1) |
| Band-edge Compliance | ±1.328 dB | (1) |
| Unwanted Emissions In Non-restricted Freq Bands | 9kHz-1GHz: ±0.746dB 1GHz-26GHz: ±1.328dB | (1) |
| Conducted Emissions 9kHz~30MHz | ±3.08 dB | (1) |
| Radiated Emissions 30~1000MHz | ±4.51 dB | (1) |
| Radiated Emissions 1~18GHz | ±5.84 dB | (1) |
| Radiated Emissions 18~40GHz | ±6.12 dB | (1) |

Below is the best measurement capability for CTC Laboratories, Inc.

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.6. Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

| Temperature: | 15 °C to 35 °C |
|--------------------|----------------|
| Relative Humidity: | 20 % to 75 % |
| Air Pressure: | 101 kPa |

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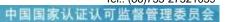
2. GENERAL INFORMATION

2.1. Client Information

| Applicant: | Woan Technology (Shenzhen) Co., Ltd. |
|---------------|--|
| Address: | Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100 |
| Manufacturer: | Woan Technology (Shenzhen) Co., Ltd. |
| Address: | Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100 |

2.2. General Description of EUT

| Product Name: | SwitchBot Mini Robot Vacuum K10+ | | | | |
|-----------------------|---|--|--|--|--|
| | SwitchBot Mini Robot Vacuum K10 | | | | |
| | All these products are identical in the same PCB, layout, electrical circuit and enclosure. The difference is in product accessories. | | | | |
| Product Differences: | K10+ is equipped with a mop holder, and there is a wet mop in the accessory bag. The product has a floor mop function. | | | | |
| | K10 is not equipped with a mop holder, and there is no wet mop in the accessory bag. The product does not have a floor mop function. | | | | |
| Trade Mark: | SwitchBot | | | | |
| Model/Type reference: | W3011020 | | | | |
| Listed Model(s): | W3011021, W3011022, W3011023, W3011024, W3011025 | | | | |
| Model Difference: | All these models are identical in the same PCB, layout, electrical circuit and enclosure. The difference is model name. | | | | |
| Power Supply: | Rated Voltage: DC14.4V, Rated Power: 30W, Rated Input: DC24V 1A | | | | |
| Hardware Version: | V1.2 | | | | |
| Software Version: | V1.9.0.3080-0.3 | | | | |
| Bluetooth 4.2 / BLE | | | | | |
| Modulation: | GFSK | | | | |
| Operation Frequency: | 2402MHz~2480MHz | | | | |
| Channel Number: | 40 | | | | |
| Channel Separation: | 2MHz | | | | |
| Data Rate: | 1Mbps | | | | |
| Antenna Type: | PCB Antenna | | | | |
| Antenna Gain: | 3.08dBi | | | | |
| | | | | | |



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2.3. Accessory Equipment Information

| Equipment Information | | | | | |
|---------------------------|----------------|--------------|--------------|--|--|
| Name | Model | S/N | Manufacturer | | |
| Notebook | ThinkPad T460s | / | Lenovo | | |
| Cable Information | | | | | |
| Name | Shielded Type | Ferrite Core | Length | | |
| USB Cable | Unshielded | NO | 150cm | | |
| Test Software Information | | | | | |
| Name | Version | / | 1 | | |
| RTL8762x_RFTestTool | v1.0.1.7 | / | / | | |

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2.4. Operation State

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. BT BLE, 40 channels are provided to the EUT. Channels 00/19/39 were selected for testing.

Operation Frequency List:

| Channel | Frequency (MHz) |
|---------|-----------------|
| 00 | 2402 |
| 01 | 2404 |
| : | : |
| 18 | 2438 |
| 19 | 2440 |
| 20 | 2442 |
| : | : |
| 38 | 2478 |
| 39 | 2480 |

Note: The display in grey were the channel selected for testing.

Test Mode:

For RF test items:

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The engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions:

The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.

For Radiated spurious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

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2.5. Measurement Instruments List

| Tonsce | Tonscend RF Test System | | | | | |
|--------|--|--------------|-----------|------------|------------------|--|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Calibrated Until | |
| 1 | MXA Signal Analyzer | Keysight | N9020A | MY46471737 | Dec. 16, 2023 | |
| 2 | Spectrum Analyzer | R&S | FSU26 | 100105 | Dec. 16, 2023 | |
| 3 | Spectrum Analyzer | R&S | FSV40-N | 101331 | Mar. 14, 2024 | |
| 4 | MXG Vector Signal Generator | Agilent | N5182A | MY47420864 | Dec. 16, 2023 | |
| 5 | PSG Analog Signal Generator | Agilent | E8257D | MY46521908 | Dec. 16, 2023 | |
| 6 | Power Sensor | Keysight | U2021XA | MY55130004 | Mar. 14, 2024 | |
| 7 | Power Sensor | Keysight | U2021XA | MY55130006 | Mar. 14, 2024 | |
| 8 | Wideband Radio Communication Tester | R&S | CMW500 | 102414 | Dec. 16, 2023 | |
| 9 | High and low temperature box | ESPEC | MT3035 | / | Mar. 24, 2024 | |
| 10 | JS1120 RF Test System | TONSCEND | v2.6 | / | / | |

| Radiate | Radiated Emission (3m chamber 2) | | | | | |
|---------|----------------------------------|--------------|------------|------------|------------------|--|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Calibrated Until | |
| 1 | Trilog-Broadband Antenna | Schwarzbeck | VULB 9168 | 9168-1013 | Dec. 07, 2024 | |
| 2 | Horn Antenna | Schwarzbeck | BBHA 9120D | 9120D-648 | Dec. 07, 2024 | |
| 3 | Spectrum Analyzer | R&S | FSU26 | 100105 | Dec. 16, 2023 | |
| 4 | Spectrum Analyzer | R&S | FSV40-N | 101331 | Mar. 14, 2024 | |
| 5 | Pre-Amplifier | SONOMA | 310 | 186194 | Dec. 16, 2023 | |
| 6 | Low Noise Pre-Amplifier | EMCI | EMC051835 | 980075 | Dec. 16, 2023 | |
| 7 | Test Receiver | R&S | ESCI7 | 100967 | Dec. 16, 2023 | |
| 8 | 3m chamber 2 | Frankonia | EE025 | / | Oct. 23, 2024 | |

| Conduc | ted Emission | | | | |
|--------|-------------------|--------------|-----------|----------------|------------------|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Calibrated Until |
| 1 | LISN | R&S | ENV216 | 101112 | Dec. 16, 2023 |
| 2 | LISN | R&S | ENV216 | 101113 | Dec. 16, 2023 |
| 3 | EMI Test Receiver | R&S | ESCS30 | 100353 | Dec. 16, 2023 |
| 4 | ISN CAT6 | Schwarzbeck | NTFM 8158 | CAT6-8158-0046 | Dec. 16, 2023 |
| 5 | ISN CAT5 | Schwarzbeck | NTFM 8158 | CAT5-8158-0046 | Dec. 16, 2023 |

Note: 1. The Cal. Interval was one year.

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2. The Cal. Interval was three years of the antenna.

3. The cable loss has been calculated in test result which connection between each test instruments.

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3. TEST ITEM AND RESULTS

3.1. Conducted Emission

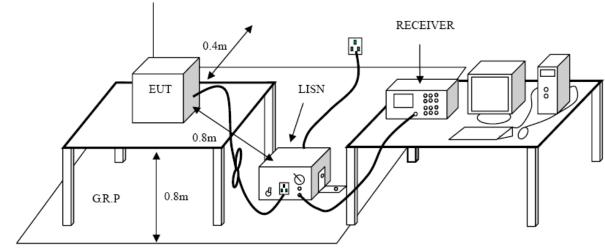
<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207 / RSS-Gen 8.8

| | Conducte | d Limit (dBμV) |
|-----------------|------------|----------------|
| Frequency (MHz) | Quasi-peak | Average |
| 0.15 - 0.5 | 66 to 56 * | 56 to 46 * |
| 0.5 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

Test Configuration



Test Procedure

1. The EUT was setup according to ANSI C63.10:2013 requirements.

2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.

3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm / 50 μ H coupling impedance for the measuring equipment. 4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

8. During the above scans, the emissions were maximized by cable manipulation.

Test Mode

Please refer to the clause 2.4.

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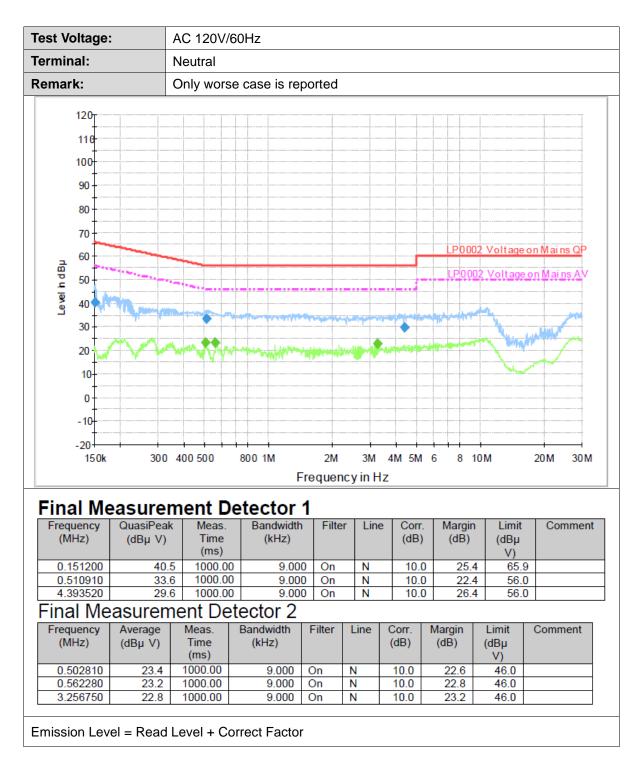
| est Voltage: | | AC 120V/6 | 60Hz | | | | | | |
|--|----------------------|---------------|--|----------|-----------------------|--|--------|---------------|---------------|
| erminal: | L | ine | | | | | | | |
| emark: | (| Only worse | e case is rep | orted | | | | | |
| 120 | | | | | | | | | |
| | | | | | | | | | |
| 110 | | | | | | | | | |
| 100 | | | | | | | | | |
| 90 | | | | | | | | | |
| 80 | | | | | | | | | |
| + | | | | | | | | | |
| 70 | | | | | | | FCC CI | ace D Voltag | e on Mains QP |
| ≥ ⁶⁰ | | | | | | | | | |
| E 50 | () | | | | | | FCC C | lass B Voltag | e on Mains AV |
| 50 to the second | | | | | | | | | |
| 30 | F FY | | | | and the second second | - | - | A Andrew | |
| | | | | | | | | | Manne |
| 20 | | V VV | a second and the seco | where we | | 1. Andrew of the second se | | | |
| 10 | | | | | | | | | |
| 0 | | | | | | | | | |
| -10- | | | | | | | | | |
| + | | | | | | | | | |
| -20 + 150k | 300 | 400 500 | 800 1M | 2M | 3M | 4M 5M | 6 8 1 | 0M | 20M 30M |
| | | | Fr | equency | in Hz | | | | |
| | | | | | | | | | |
| Final Me | | <u>nent D</u> | | | | | | | |
| Frequency (MHz) | QuasiPeak (dBµ V) | Meas. Time | Bandwidth (kHz) | Filte | r Line | e Corr (dB) | | Limit | Comment |
| (11112) | (ubµ v) | (ms) | (((12) | | | (00) | | (ubµ V) | |
| 0.151200 | 46.0 | | | _ | L1 | 9. | | 9 65.9 | _ |
| 0.169760 0.369750 | <u>41.0</u> 37.5 | | | | L1 | 9. | | | |
| Final Me | | | | | | | | | 1 |
| Frequency | Average | Meas. | Bandwidth | Filter | Line | Corr. | Margin | Limit | Comment |
| (MHz) | (dBµ V) | Time (ms) | (kHz) | | | (dB) | (dB) | (dBµ | |
| 0.344120 | 26.7 | 1000.00 | 9.000 | On | L1 | 9.7 | 22.4 | V) 49.1 | |
| 0.500810 | 24.7 | 1000.00 | 9.000 | On | L1 | 9.7 | 21.3 | 46.0 | |
| 0.569050 | 23.8 | 1000.00 | 9.000 | On | L1 | 9.7 | 22.2 | 46.0 | |

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3.2. Radiated Emission

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209 / RSS-Gen 8.9

| Frequency | Field Strength | Measurement Distance |
|-------------|--------------------|----------------------|
| (MHz) | (microvolts/meter) | (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 |
| 960~1000 | 500 | 3 |

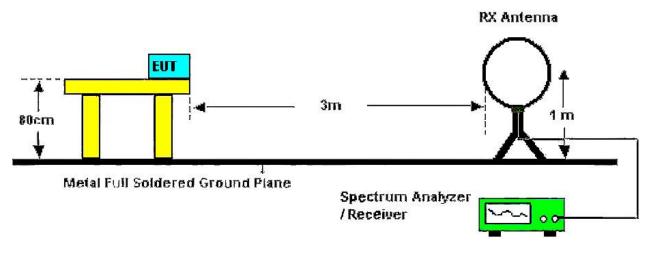
| | dBµV/m | (at 3 meters) |
|-----------------------|--------|---------------|
| Frequency Range (MHz) | Peak | Average |
| Above 1000 | 74 | 54 |

Note:

(1) The tighter limit applies at the band edges.

(2) Emission Level (dB μ V/m)=20log Emission Level (μ V/m).

Test Configuration



Below 30MHz Test Setup

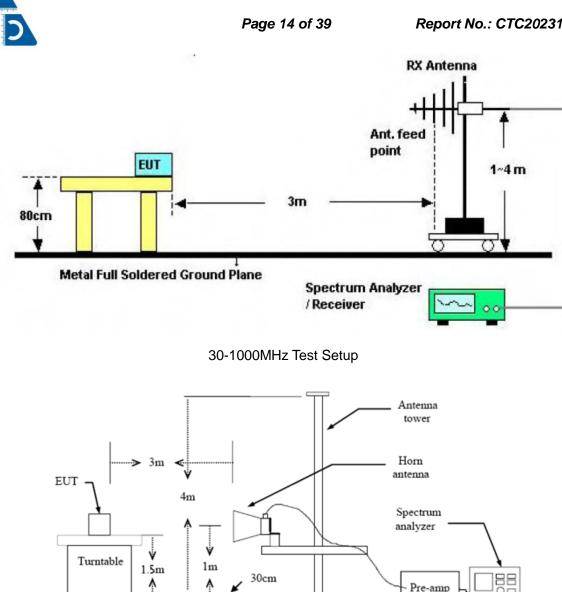
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Above 1GHz Test Setup

Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013.

The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for 2. above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable 3. height antenna tower.

4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

- Set to the maximum power setting and enable the EUT transmit continuously. 5.
- 6. Use the following spectrum analyzer settings
- Span shall wide enough to fully capture the emission being measured; (1)
- (2) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the guasi-peak detector and reported.

(3) From 1 GHz to 10th harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

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RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.8 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

Test Result

9 kHz~30 MHz

From 9 kHz to 30 MHz: The conclusion is PASS.

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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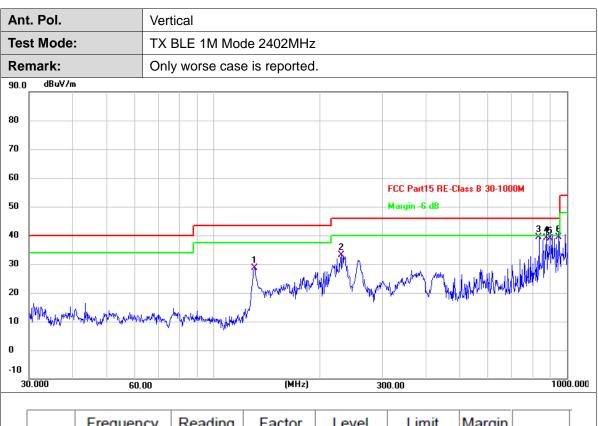
| 2 | 263.0799 | 55.61 | -18.23 | 37.38 | 46.00 | -8.62 | QP |
|-----|----------|-------|--------|-------|-------|---------------------------------------|----|
| 3 | 382.0516 | 52.74 | -15.25 | 37.49 | 46.00 | -8.51 | QP |
| 4 | 675.2078 | 46.39 | -9.40 | 36.99 | 46.00 | -9.01 | QP |
| 5 * | 854.6236 | 46.33 | -6.53 | 39.80 | 46.00 | -6.20 | QP |
| 6 | 942.7912 | 44.98 | -5.36 | 39.62 | 46.00 | -6.38 | QP |
| | | | | | | · · · · · · · · · · · · · · · · · · · | |

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|--------------------|-------------------|------------------|-------------------|-------------------|----------------|----------|
| 1 | 130.4704 | 47.20 | -18.46 | 28.74 | 43.50 | -14.76 | QP |
| 2 | 229.9370 | 52.47 | -19.33 | 33.14 | 46.00 | -12.86 | QP |
| 3 | 835.6579 | 46.14 | -6.80 | 39.34 | 46.00 | -6.66 | QP |
| 4 | 876.4754 | 45.34 | -6.22 | 39.12 | 46.00 | -6.88 | QP |
| 5 | 898.8857 | 44.83 | -5.89 | 38.94 | 46.00 | -7.06 | QP |
| 6 * | 950.7590 | 44.73 | -5.26 | 39.47 | 46.00 | -6.53 | QP |

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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| Ant. Pol. | Horizontal |
|------------|--|
| Test Mode: | TX BLE 1M Mode 2402MHz |
| Remark: | No report for the emission which more than 20 dB below the prescribed limit. |
| | |

| N | lo. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | | Margin (dB) | Detector |
|---|-----|--------------------|-------------------|------------------|-------------------|-------|----------------|----------|
| 1 | * | 4803.899 | 30.88 | 2.16 | 33.04 | 54.00 | -20.96 | AVG |
| | 2 | 4803.915 | 42.52 | 2.16 | 44.68 | 74.00 | -29.32 | peak |

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

| Ant. Pol. | Vertical |
|------------|--|
| Test Mode: | TX BLE 1M Mode 2402MHz |
| Remark: | No report for the emission which more than 20 dB below the prescribed limit. |
| | |
| | |

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | | Margin (dB) | Detector |
|-----|--------------------|-------------------|------------------|-------------------|-------|----------------|----------|
| 1 | 4804.000 | 41.73 | 2.16 | 43.89 | 74.00 | -30.11 | peak |
| 2 * | 4804.000 | 29.87 | 2.16 | 32.03 | 54.00 | -21.97 | AVG |

Remarks:

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1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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| TX BLE 1M Mode 2440MHz Remark: No report for the emission which more than 20 dB below the prescr limit. No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Detector | Ant | . Pol. | Horizontal | | | | | | |
|--|-----|---------|------------------------|-------------|------------|------------|-----------|-------------|--|
| No. Frequency Reading Factor Level Limit Margin | Tes | t Mode: | TX BLE 1M Mode 2440MHz | | | | | | |
| | Rer | nark: | • | he emission | which more | than 20 dB | below the | e prescribe | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | 1 | | | | |

2.31

2.31

32.86

44.14

54.00

74.00

-21.14

-29.86

AVG

peak

Remarks:

*

1 2

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

30.55

41.83

2.Margin value = Level -Limit value

4879.963

4880.077

| Ant. | . Pol. | | Vertical | | | | | | | | |
|------|---------|--------------------|--|------------------|-------------------|-------------------|----------------|------------------|--|--|--|
| Test | t Mode: | | TX BLE 1M Mode 2440MHz | | | | | | | | |
| Ren | nark: | | No report for the emission which more than 20 dB below the prescribed limit. | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | | | |
| | No. | | | | | | | Detector peak | | | |

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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| Ant | . Pol. | | Horizontal | | | | | | | |
|-----|---------|--------------------|---------------------------|------------------|-------------------|-------------------|----------------|-------------|----|--|
| Tes | t Mode: | | TX BLE 1M Mode 2480MHz | | | | | | | |
| Rer | nark: | | No report for t limit. | he emission | which more | than 20 dB | below the | e prescribe | ed | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | | |
| | | | | | 1 | | | | | |

2.48

43.77

74.00

-30.23

peak

Remarks:

2

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

41.29

2.Margin value = Level -Limit value

4960.024

| Ant. | . Pol. | | Vertical TX BLE 1M Mode 2480MHz | | | | | | | |
|------|---------|--------------------|------------------------------------|------------------|-------------------|-------------------|----------------|------------------|--|--|
| Test | t Mode: | | | | | | | | | |
| Rem | nark: | | No report for t limit. | the emissior | which more | than 20 dB | below the | e prescribe | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | | |
| | No. | | | | | | · · | Detector peak | | |

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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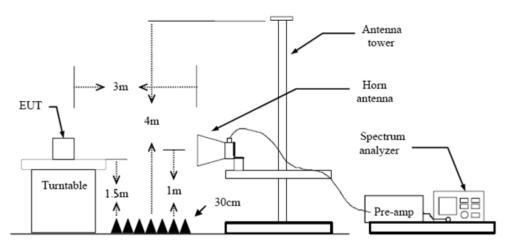
3.3. Band Edge Emissions (Radiated)

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d) / RSS-247 5.5

| Restricted Frequency Band | (dBµV/m | ı) (at 3m) |
|---------------------------|---------|------------|
| (MHz) | Peak | Average |
| 2310 ~ 2390 | 74 | 54 |
| 2483.5 ~ 2500 | 74 | 54 |

Test Configuration



Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 2. degrees to determine the position of the maximum emission level.

3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is 4. repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement. The receiver set as follow: 5.

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

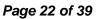
Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.8 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

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| | | Hor | rizontal | | | | | | | | | | | |
|--------------------|------------------|------|-------------------|--------|------------------|-----|--------------|-------|---------|---------------|-----------|-------|-----------------------|----------|
| Fest Mode: | | ТХ | BLE 1M | Mod | e 2402l | ИНz | | | | | | | | |
| 20.0 dBuV/m | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 00 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| 0 | | | | | | | | | | | | | ^ | |
| 30 | | | | | | | F | CC Pa | art15 C | lass B 3M | Above- | 1G Pe | ak | |
| 70 | | | | | | | | | | | | 1 | | |
| 50 | | | | | | | | | | | <u> </u> | | <u> </u> | |
| 50 | | | | | | | F | UU Pa | art15 L | lass B 3M | Above- | | | |
| 10 | | | | | | | | | | | ł | | | |
| 80 | | | | | | | | | | | 2 | | $ \langle \rangle$ | |
| | | | | | | | | | | | × | | <u> </u> | |
| 20 | | | | | | | | | | | | | | |
| 0 | | | | | | | | | | | | | | |
| 0.0 2285.400 22 | 298.40 2311. | 40 2 | 324.40 | 2337.4 | 0 (MH | zl | 2363.4 | 10 | 2376 | 40 23 | 89.40 | 24 | 02.40 | 241 |
| No. | Frequen (MHz) | | Reading (dBuV) | | Factor (dB/m) | | Leve BuV/ | | | imit uV/m) | Mar (d | | Dete | ctor |
| | 0000.00 | 0 | 50.24 | | -7.72 | 4 | 12.52 | 2 | 7 | 4.00 | -31 | .48 | pea | ak |
| 1 | 2390.00 | | | | -7.72 | | 29.99 | 0 | 5 | 4.00 | -24 | 04 | AV | <u> </u> |

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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EN

| . Pol. | ۱. | Vertical | | | | | |
|-----------|--------------------|-------------------|------------------|-------------------|--------------------|----------------|--------------|
| t Mode | : | TX BLE 1M M | ode 2402MI | Ηz | | | |
|) dBuV/m | 1 | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | FCC P | art15 Class B 3M | Above-1G Pe | ak |
| | | | | | | | Λ |
| | | | | FCC P | art15 Class B 3M . | Above-1G AV | \mathbb{N} |
| | | | | | | 1 | \square |
| | | | | | | X | <u> </u> |
| | | | | | | 3 | La. |
| | | | | | | | |
| | | | | | | | |
| 283.000 2 | 296.00 2309.00 | 2322.00 233 | 35.00 (MHz) | 2361.00 | 2374.00 23 | 87.00 24 | 00.00 241 |
| | - | D | | | | | |
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
| 1 | 2390.000 | 49.62 | -7.72 | 41.90 | 74.00 | -32.10 | peak |
| 2 * | 2390.000 | 37.65 | -7.72 | 29.93 | 54.00 | -24.07 | AVG |
| | | | | | | | |

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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| t. Pol. | | Hor | izontal | | | | | |
|-----------|--------------|-------|-----------|--------------|---------|--------------------|-------------|----------|
| st Mode | : | ΤХ | BLE 1M N | lode 2480M | Hz | | | |
| .0 dBuV/ | m | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | 0 | | | | | | | |
| | A | | | | FCC P | art15 Class B 3M . | Above-16 Pe | ak |
| | | | | | | | ADOVE-TO TE | |
| | | | | | | | | |
| \vdash | X | | | | FCC P | art15 Class B 3M . | Above-1G AV | |
| | X | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 467.800 2 | 2480.80 2493 | 00 21 | 506.80 25 | i19.80 (MHz) | 2545.80 | 2558.80 25 | 71.80 25 | 84.80 25 |
| Na | Frequer | icy f | Reading | Factor | Level | Limit | Margin | Detector |
| No. | (MHz) | · | (dBuV) | (dB/m) | - | (dBuV/m) | | |
| 1 | 2483.50 | 00 | 63.37 | -7.32 | 56.05 | 74.00 | -17.95 | peak |
| 2 * | 2483.50 | 00 | 53.88 | -7.32 | 46.56 | 54.00 | -7.44 | AVG |
| | | | | | | | | |

EN

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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| Ant. | Pol. | | | Ve | Vertical | | | | | | | | | | |
|-----------|------------------|--------------|----------------|-----|--------------|------|-------|--------------|-----|-------|----------|--------------|----------|---------|-------|
| Test | t Mode: | | | TX | BLE ' | 1M M | ode 2 | 480MI | Ηz | | | | | | |
| 120.0 | dBu∀/m | 1 | | | | | | | | | | | | 1 | _ |
| 110 | | | | | | | | | | | | | | | |
| 100 | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | FUU B | art15 Cl | aee R 3M | Above-1G | Peak | _ |
| 70 | | | | | | | | | | | | | ADOTE-TO | IGAN | |
| 60 | | \downarrow | | | | | | | | FCC P | art15 Cl | ass B 3M | Above-1G | AV | _ |
| 50 | | 1 × | | | | | | | | | | | | | |
| 40 | -+ | 2 | | | | | | | | | | | | | |
| 30 | | <u> </u> | | | | | | | | | | | + | | - |
| 20 | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | |
| 0.0 24 | 69.000 24 | 482.00 | 2495.0 | 0 2 | 2508.00 | 252 | 21.00 | (MHz) | 254 | 7.00 | 2560.0 | 0 25 | 73.00 | 2586.00 | 2599. |
| | No. | | quenc //Hz) | y | Read (dBu | V) | (dB | ctor 3/m) | - | V/m) | (dBı | mit ıV/m) | | Delecti | or |
| | 1 | 248 | 33.500 |) | 55.5 | 53 | -7 | .32 | 48. | 21 | 74 | .00 | -25.7 | 9 peak | ۲ |
| | 2 * | 248 | 3.500 |) | 46.1 | 1 | -7. | .32 | 38. | 79 | 54 | .00 | -15.2 | 1 AVG | |
| Rem | narks: | | | | | | | | | | | | | | |

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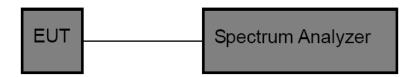
3.4. Band Edge and Spurious Emissions (Conducted)

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d) / RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Test Configuration



Test Procedure

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously.
- Use the following spectrum analyzer settings: RBW = 100 kHz, VBW ≥ RBW, scan up through 10th harmonic. Sweep = auto, Detector function = peak, Trace = max hold.
- 4. Measure and record the results in the test report.

Test Mode

Please refer to the clause 2.4.

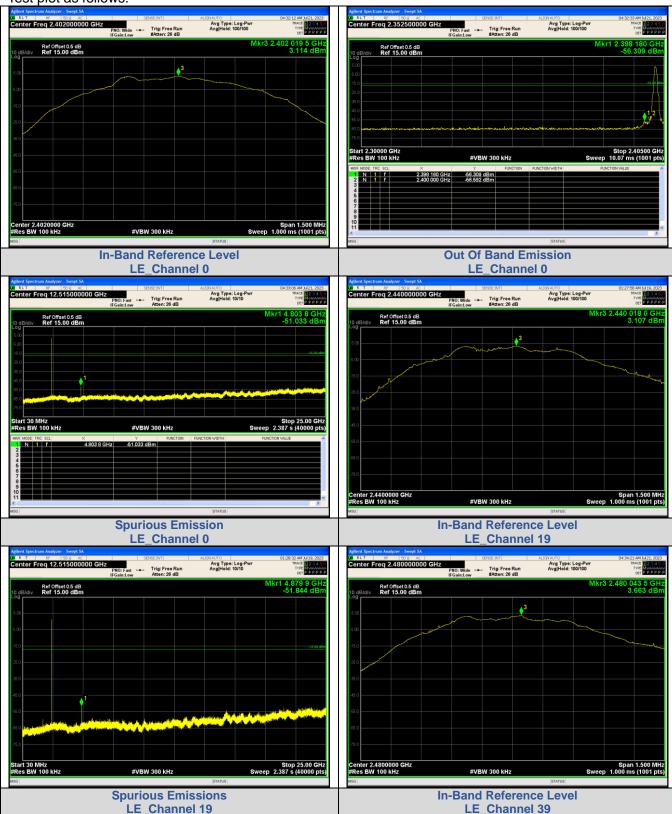
Test Result

| Mode | Channel | OOB Emission Frequency (MHz) | OOB Emission Level (dBm) | Limit (dBm) | Over Limit (dB) | Result |
|--------|---------|---------------------------------------|-----------------------------------|----------------|--------------------|--------|
| | | 2400.00 | -56.592 | -16.89 | -39.702 | PASS |
| | 0 | 2398.18 | -56.309 | -16.89 | -39.419 | PASS |
| BLE 1M | | 4803.80 | -51.033 | -16.89 | -34.143 | PASS |
| DLC_1W | 19 | 4879.92 | -51.844 | -16.89 | -34.954 | PASS |
| | 39 | 2483.50 | -58.228 | -16.34 | -42 | PASS |
| | | 4959.83 | -51.212 | -16.34 | -34.872 | PASS |

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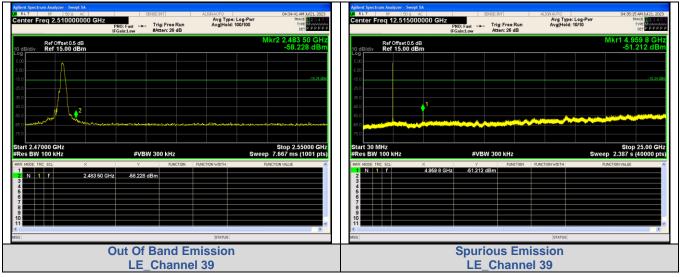
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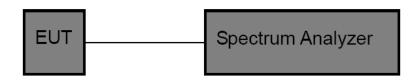
3.5. DTS Bandwidth

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2) / RSS-247 5.2 a

| Test Item | Limit | Frequency Range (MHz) |
|---------------|-----------------------------|--------------------------|
| DTS Bandwidth | ≥500 kHz (6dB bandwidth) | 2400~2483.5 |

Test Configuration



Test Procedure

- 1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 2. DTS Spectrum Setting:
 - (1) Set RBW = 100 kHz.
 - (2) Set the video bandwidth (VBW) \geq 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.
 - OCB Spectrum Setting:
 - (1) Set RBW = $1\% \sim 5\%$ occupied bandwidth.
 - (2) Set the video bandwidth (VBW) \geq 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

Please refer to the clause 2.4.

Test Result

| Test Mode | Frequency (MHz) | 99% Bandwidth (MHz) | DTS Bandwidth (MHz) | Limit (MHz) | Verdict |
|-----------|--------------------|------------------------|------------------------|----------------|---------|
| | 2402 | 1.0243 | 0.6529 | ≥0.5 | Pass |
| BLE_1M | 2440 | 1.0507 | 0.6477 | ≥0.5 | Pass |
| | 2480 | 1.0477 | 0.6911 | ≥0.5 | Pass |

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99% Bandwidth:

| Agilent Spectrum Analyzer - Occupied BW | | 01:21:37 AM Jul 19, 2023 | Agilent Spectrum Analyzer - Occupied BW | | nen aner-th en | | 01:27:08 AM Jul 19, 2023 |
|---|---|--|--|-------------|--|-----------------------------|------------------------------|
| Center Freq 2.402000000 GHz | Center Freq: 2.402000000 GHz Trig: Free Run Avg Hold: 100/100 | Radio Std: None | Center Freq 2.440000000 G | Hz | Center Freq: 2.4400000 Trig: Free Run | 00 GHz Avg Hold: 100/100 | Radio Std: None |
| #IFGain:Low | #Atten: 26 dB | Radio Device: BTS Mkr2 2.4025384 GHz | | #IFGain:Low | #Atten: 26 dB | | Radio Device: BTS |
| Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm | | -17.093 dBm | Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm | | | | -16.924 dBm |
| Log 10.5 | | | Log 10.5 | | | | |
| 9.500 | non and | | 9.500 | | | | |
| 19.50 Jun 447 | A to a company where | | -9.50 | 1 mm | | m | <u> </u> |
| -29.5 | | - m | -29.5 | | | | Month and a service |
| -39.5 | | have been a second and the second an | -39.5 | | | | 17-2-V |
| -59.5 | | | -59.5 | | | | |
| -69.5 | | | -69.6 | | | | |
| Center 2.402 GHz #Res BW 20 kHz | #VBW 62 kHz | Span 2 MHz Sweep 5.333 ms | Center 2.44 GHz #Res BW 20 kHz | | #VBW 62 kH: | z | Span 2 MHz Sweep 5.333 ms |
| Occupied Bandwidth | Total Power 8.79 dBm | | Occupied Bandwidth | | Total Power | 8.77 dBm | |
| 1.0243 MHz | | | 1.0 | 507 MHz | | | |
| Transmit Freq Error 26.489 kHz | OBW Power 99.00 % | | Transmit Freq Error | 23.002 kHz | OBW Power | 99.00 % | |
| x dB Bandwidth 1.249 MHz | x dB -26.00 dB | | x dB Bandwidth | 1.261 MHz | x dB | -26.00 dB | |
| | | | | | | | |
| | | | | | | | |
| MSG | STATUS | | MSG | | <u></u> | STATUS | |
| | E_Channel 0 | | | LE_ | Channel | 19 | |
| Agilent Spectrum Analyzer - Occupied BW | SENSE:INT ALIGN AUTO | 02:07:39 AM Jul 19, 2023 | | | | | |
| Center Freq 2.480000000 GHz #IFGain:Low | Center Freq: 2.480000000 GHz Trig: Free Run Avg Hold: 100/100 #Atten: 26 dB | Radio Std: None Radio Device: BTS | | | | | |
| | #Atten: 20 db | Mkr2 2.4805486 GHz | | | | | |
| Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm | | -16.846 dBm | | | | | |
| 10.5 | | | | | | | |
| 1.500 | | | | | | | |
| | man | 2 | | | | | |
| 9 50 | ······································ | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | | | | |
| | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | | | | |
| | | 22 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | | | | |
| | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | | | | |
| 0.55 016 016 016 016 016 016 016 016 | | | | | | | |
| | #VBW 62 kHz | Span 2 MHz Sweep 5.333 ms | | | | | |
| Center 2.48 CHz RRes BW 20 kHz | | Span 2 MHz | | | | | |
| 2.5 3.6 3.6 3.6 4.5 5 5 5 5 5 5 5 5 5 5 5 5 5 | #VBW 62 kHz | Span 2 MHz | | | | | |
| Center 2.48 CHz RRes BW 20 kHz | #VBW 62 kHz | Span 2 MHz | | | | | |
| Center 2.48 GHZ #Res BW 20 kHz Occupied Bandwidth 1.0477 MHz | #VBW 62 kHz Total Power 9.63 dBm | Span 2 MHz | | | | | |
| Center 2.48 GHz RRes BW 20 kHz Cocupied Bandwidth 1.0477 MHz Transmit Freq Error 24.884 kHz | #VBW 62 kHz Total Power 9.63 dBm OBW Power 99.00 % | Span 2 MHz | | | | | |
| Center 2.48 GHz RRes BW 20 kHz Cocupied Bandwidth 1.0477 MHz Transmit Freq Error 24.884 kHz | #VBW 62 kHz Total Power 9.63 dBm OBW Power 99.00 % x dB -26.00 dB | Span 2 MHz | | | | | |
| Center 2.48 GHz #Res BW 20 KHz Occupied Bandwidth 1.0477 MHz Transmit Freq Error 24.884 kHz x dB Bandwidth 1.285 MHz | #VBW 62 kHz Total Power 9.63 dBm OBW Power 99.00 % | Span 2 MHz | | | | | |

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DTS Bandwidth:

| Centre Freq 2.40200000 GHz Fred Status Fred Status Fre | Agilent Spectrum Analyzer - Occupied BW | | | Agilent Spectrum Analyzer - Occupied BW | | |
|--|---|----------------------------------|--------------------------------|---|----------------------------------|----------------------------|
| Exclusion and the set of the s | Center Freq 2.402000000 GHz | Trig: Free Run Avg Hold>100/100 | Radio Std: None | Center Freq 2.440000000 GHz | Trig: Free Run Avg Hold: 100/100 | |
| The second seco | | | | | | |
| <pre>ind of of</pre> | | | | | | |
| All of the second secon | 450 | | | 5.50 | | |
| All of the second secon | 14.5 | | | -14.5 | | |
| Bit Bandwidth Total Power 9.81 dBm Occupied Bandwidth Total Power 9.81 dBm 1.0500 MHZ Total Power 9.81 dBm Transmit Freq Error 13.400 kHz OBW Power 98.00 % x dB Bandwidth 652.9 kHz x dB -6.00 dB moi | -24.5 | | | 34.5 | | 1 Landana |
| Refe BW 100 kHz POWER 100 kHz BWeep 1.333 m Occupied Bandwidth Total Power 9.8.61 dBm 1.0.500 MHz Transmit Freq Error 13.400 kHz OBW Power 98.00 % x dB Bandwidth 652.9 kHz x dB - 6.00 dB Center Freq 248000000 GHz Bandwidth Court Freq 2000000 GHz Bandwidth Strees Files 2000 BARZ Strees Files 2000000 GHz Bandwidth 647.7 kHz x dB - 6.00 dB Center Freq 248000000 GHz Bandwidth Total Power 10.1 dBm 1.0.817 MHz Bandwidth Total Power 10.1 dBm 1.0.817 MHz Court 10.1 dBm 1.0.817 MHz Court 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Total Power 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Strees Error 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Strees Error 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Strees Error 10.1 dBm 1.0.817 MHz X dB - 6.00 dB | -44.5 | | | -44.5 | | |
| Refe BW 100 kHz POWER 100 kHz BWeep 1.333 m Occupied Bandwidth Total Power 9.8.61 dBm 1.0.500 MHz Transmit Freq Error 13.400 kHz OBW Power 98.00 % x dB Bandwidth 652.9 kHz x dB - 6.00 dB Center Freq 248000000 GHz Bandwidth Court Freq 2000000 GHz Bandwidth Strees Files 2000 BARZ Strees Files 2000000 GHz Bandwidth 647.7 kHz x dB - 6.00 dB Center Freq 248000000 GHz Bandwidth Total Power 10.1 dBm 1.0.817 MHz Bandwidth Total Power 10.1 dBm 1.0.817 MHz Court 10.1 dBm 1.0.817 MHz Court 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Total Power 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Strees Error 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Strees Error 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Strees Error 10.1 dBm 1.0.817 MHz X dB - 6.00 dB | -54.5 | | | -54.5 | | |
| Refe BW 100 kHz POWER 100 kHz BWeep 1.333 m Occupied Bandwidth Total Power 9.8.61 dBm 1.0.500 MHz Transmit Freq Error 13.400 kHz OBW Power 98.00 % x dB Bandwidth 652.9 kHz x dB - 6.00 dB Center Freq 248000000 GHz Bandwidth Court Freq 2000000 GHz Bandwidth Strees Files 2000 BARZ Strees Files 2000000 GHz Bandwidth 647.7 kHz x dB - 6.00 dB Center Freq 248000000 GHz Bandwidth Total Power 10.1 dBm 1.0.817 MHz Bandwidth Total Power 10.1 dBm 1.0.817 MHz Court 10.1 dBm 1.0.817 MHz Court 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Total Power 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Strees Error 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Strees Error 10.1 dBm 1.0.817 MHz X dB - 6.00 dB Center 5.23 6Hz Bandwidth Strees Error 10.1 dBm 1.0.817 MHz X dB - 6.00 dB | -74.5 | | | -74.5 | | |
| Instantik Freq Error 1.0500 MHz Transmit Freq Error 13.400 kHz OBW Power 99.00 % x dB Bandwidth 652.9 kHz x dB -6.00 dB moment LE_Channel 0 Image: Channel 10 Mathematic Reserved Colspan="2">Reserved State Name Colspan="2">Colspan="2">Reserved State Name Colspan="2">Reserved State Name Colspan="2">Reserved State Name Mathematic Reserved State Name Span 2 Mite Openet Freq 2.48 Other Freq Diverse 10.1 dBm Span 2 Mite Colspan="2">Colspan="2">Reserved State Name Mathematic Reserved State Name Span 2 Mite Span 2 Mite Openet Freq 2.48 Other Freq Brown 10.1 dBm Span 2 Mite Colspan="2">Colspan="2">State Name Span 2 Mite Mathematic Reserved State Name Span 2 Mite Span 2 Mite Mathematic Rese | Center 2.402 GHz #Res BW 100 kHz | #VBW 300 kHz | Span 2 MHz Sweep 1.333 ms | Center 2.44 GHz #Res BW 100 kHz | #VBW 300 kHz | Span 2 MH Sweep 1.333 m |
| Transmit Freq Error 13.400 kHz OBW Power 99.00 % x dB Bandwidth 65.2 9 kHz x dB -6.00 dB mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol mol m | | Total Power 9.61 dBm | | | | |
| tes source for a set of the format of the f | | OBW Power 99.00 % | | | | |
| LE_Channel 19 LE_Channel 19 LE_Channel 19 LE_Channel 19 LE_Channel 19 LE_Channel 19 LE_Channel 19 LE_Channel 19 | x dB Bandwidth 652.9 kHz | x dB -6.00 dB | | x dB Bandwidth 647.7 kHz | x dB -6.00 dB | |
| LE_Channel 19 LE_Channel 19 LE_Channel 19 LE_Channel 19 LE_Channel 19 LE_Channel 19 LE_Channel 19 LE_Channel 19 | | | | | | |
| Ref Channel 19 Conter Freq 2.480000000 GHz Conter Freq 2.48000000 GHz Conter Freq 2.48000000 GHz Order Freq 2.48000000 GHz Span 2 MHz Span 2 MHz Sweep 1.333 ms Occupied Bandwidth Total Power 1.0.817 MHz Transmit Freq Error Transmit Freq Error 33.707 KHz OBW Power 99.00 % x dB Bandwidth 691.1 KHz x dB Bandwidth 691.1 KHz | 100 | PTATI IP | | Nec | etatue | |
| Wed Synchron Registry & December 19 and 20 a | | | | MOU | | |
| Transmit Freq Error 33.707 KHz OBW Power 99.00 % x dB Bandwidth 691.1 KHz x dB = -6.00 dB | | | | L | | |
| Bit Control 0 Bit Read Device: BTS 0 Bit Sound Bit 0 | Center Freq 2.480000000 GHz | Trig: Free Run Avg Hold: 100/100 | Radio Std: None | | | |
| Log de la construction de la con | | #Atten: 26 dB | Radio Device: BTS | | | |
| All All All All All All All All All All All All All All All All Center 2.48 GHz #VBW 300 kHz Span 2 MHz SRes BW 100 kHz #VBW 300 kHz Sweep 1.333 ms Occupied Bandwidth Total Power 10.1 dBm 1.0817 MHz MHz Transmit Freq Error 33.707 kHz OBW Power 99.00 % x dB Bandwidth 691.1 kHz x dB M0 Intrul Intrul | | | | | | |
| All All All All All All All All All All All All All All All All Center 2.48 GHz #VBW 300 kHz Span 2 MHz SRes BW 100 kHz #VBW 300 kHz Sweep 1.333 ms Occupied Bandwidth Total Power 10.1 dBm 1.0817 MHz MHz Transmit Freq Error 33.707 kHz OBW Power 99.00 % x dB Bandwidth 691.1 kHz x dB M0 Intrul Intrul | 450 | | | | | |
| All All All All All All All All All All All All All All All All Center 2.48 GHz #VBW 300 kHz Span 2 MHz SRes BW 100 kHz #VBW 300 kHz Sweep 1.333 ms Occupied Bandwidth Total Power 10.1 dBm 1.0817 MHz MHz Transmit Freq Error 33.707 kHz OBW Power 99.00 % x dB Bandwidth 691.1 kHz x dB M0 Intrul Intrul | 14.5 | | Mar and a sector | | | |
| #Res BW 100 kHz #VBW 300 kHz Sweep 1.333 ms Occupied Bandwidth Total Power 10.1 dBm 1.0817 MHz Transmit Freq Error 33.707 kHz OBW Power 99.00 % x dB Bandwidth 691.1 kHz x dB 66.00 dB | 24.5 | | a Man Man | | | |
| #Res BW 100 kHz #VBW 300 kHz Sweep 1.333 ms Occupied Bandwidth Total Power 10.1 dBm 1.0817 MHz Transmit Freq Error 33.707 kHz OBW Power 99.00 % x dB Bandwidth 691.1 kHz x dB 66.00 dB | 44.5 | | | | | |
| #Res BW 100 kHz #VEW 300 kHz Sweep 1.333 ms Occupied Bandwidth Total Power 10.1 dBm 1.0817 MHz Transmit Freq Error 33.707 kHz OBW Power 99.00 % x dB Bandwidth 691.1 kHz x dB 66.00 dB | -54.5 -64.6 | | | | | |
| #Res BW 100 kHz #VEW 300 kHz Sweep 1.333 ms Occupied Bandwidth Total Power 10.1 dBm 1.0817 MHz Transmit Freq Error 33.707 kHz OBW Power 99.00 % x dB Bandwidth 691.1 kHz x dB 66.00 dB | -74.5 | | | | | |
| 1.0817 MHz Transmit Freq Error 33.707 kHz OBW Power 99.00 % x dB Bandwidth 691.1 kHz x dB -6.00 dB | Center 2.48 GHz #Res BW 100 kHz | #VBW 300 kHz | Span 2 MHz Sweep 1.333 ms | | | |
| Transmit Freq Error 33.707 kHz OBW Power 99.00 % x dB Bandwidth 691.1 kHz x dB -6.00 dB | | Total Power 10.1 dBm | | | | |
| x dB Bandwidth 691.1 kHz x dB -6.00 dB | | | | | | |
| | | | | | | |
| | x dB Bandwidth 691.1 kHz | x dB -5.00 dB | | | | |
| | | | | | | |
| LE Channel 20 | | | | | | |
| | 150 | STATUS | | | | |

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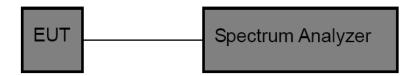
3.6. Peak Output Power

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3) / RSS-247 5.4 d

| Section | Test Item | Limit | Frequency Range (MHz) |
|---------------------------------|-----------------------------------|-----------------|--------------------------|
| FCC CFR 47 Part15.247 (b)(3) | Maximum Conducted Output Power | 1 Watt or 30dBm | 2400~2483.5 |
| ISED RSS-247 5.4 d | EIRP | 4 Watt or 36dBm | 2400~2483.5 |

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

- 2. Spectrum Setting:
 - (1) Set RBW ≥ DTS Bandwidth.
 - (2) Set VBW \geq 3*RBW.
 - (3) Set Span \geq 3*RBW.
 - (4) Sweep time = Auto couple.
 - (5) Detector = Peak.
 - (6) Trace mode = Max hold.

Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

Test Mode

Please refer to the clause 2.4.

Test Result

| Mode | Channel | Peak Output Power (dBm) | Limit (dBm) | Result |
|--------|---------|----------------------------|----------------|--------|
| | 0 | 3.354 | 30 | PASS |
| BLE_1M | 19 | 4.436 | 30 | PASS |
| | 39 | 4.671 | 30 | PASS |

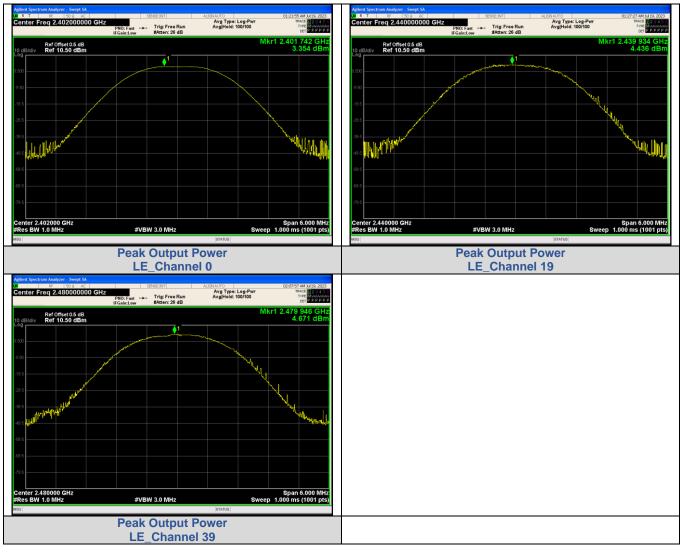
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Test plot as follows:





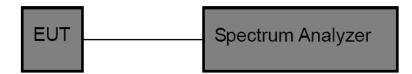
Power Spectral Density 3.7.

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e) / RSS-247 5.2 b

| Test Item | Limit | Frequency Range (MHz) |
|------------------------|----------------------|--------------------------|
| Power Spectral Density | 8 dBm (in any 3 kHz) | 2400~2483.5 |

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.

3. Spectrum Setting:

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: 3 kHz.

Set the VBW to: 10 kHz.

Detector: peak.

Sweep time: auto.

Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

Test Mode

Please refer to the clause 2.4.

Test Result

| Mode | Channel | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Result |
|--------|---------|----------------|------------------|--------|
| | 0 | -10.893 | 8 | PASS |
| BLE_1M | 19 | -11.362 | 8 | PASS |
| | 39 | -10.011 | 8 | PASS |

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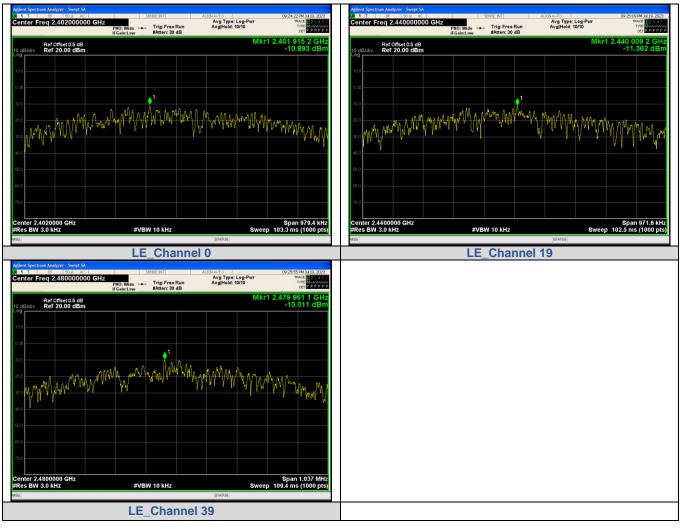
2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China





Test plot as follows:

EN



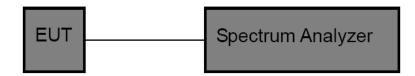


3.8. **Duty Cycle**

Limit

None, for report purposes only.

Test Configuration



Test Procedure

- 1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.

3. Spectrum Setting: Set analyzer center frequency to test channel center frequency. Set the span to 0Hz. Set the RBW to 10MHz. Set the VBW to 10MHz. Detector: Peak. Sweep time: Auto.

Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

Test Mode

Please refer to the clause 2.4.

Test Result

| Mode | Channel | On Time (ms) | Period (ms) | Duty Cycle (%) | 1/T Minimum VBW (kHz) | Final Setting for VBW (kHz) |
|--------|---------|-----------------|-------------|-------------------|--------------------------|--------------------------------|
| | 0 | 0.274 | 0.625 | 43.85 | 3.65 | 5 |
| BLE_1M | 19 | 0.274 | 0.625 | 43.78 | 3.65 | 5 |
| | 39 | 0.275 | 0.625 | 43.94 | 3.64 | 5 |

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| <mark>ΙΧΙ</mark> R T RF 50 Ω AC | SENSE:INT | | 01:21:29 AM Jul 19, 2023 |
|--|--|--|--|
| Center Freq 2.402000000 GHz | PNO: Fast ↔→ Trig: Free Run IFGain:Low #Atten: 26 dB | Avg Type: RMS | TRACE 1 2 3 4 5 6 TYPE WWWWW DET A A A A A A |
| Ref Offset 0.5 dB 10 dB/div Ref 16.50 dBm | | | ∆Mkr3 624.9 µs -0.29 dB |
| Log 6.50 | | Δ1 Δ2Δ1 | 3Δ1 |
| -3.50 | | Q ¹ 2∆1 | |
| -23.5 | | | |
| -43.5 | | | |
| -53.5 1 - 51 | | | |
| -73.5 | Alterebush the | understaat in the second s | and the first first of a state of |
| Center 2.402000000 GHz Res BW 8 MHz | #VBW 8.0 MHz* | Sweep | Span 0 Hz 3.333 ms (40000 pts) |
| | MIN -6.47 dBm | FUNCTION WIDTH FU | INCTION VALUE |
| 3 Δ1 1 t (Δ) 624.9 | μs (Δ) -0.15 dB μs (Δ) -0.29 dB | | |
| 5 6 7 | | | |
| 8 9 10 | | | |
| MSG | | STATUS | × |
| | LE 2402 | | |
| Agilent Spectrum Analyzer - Swept SA (XI) R T RF 50 Ω AC | SENSE:INT | ALIGNAUTO | 01:27:00 AM Jul 19, 2023 |
| Center Freq 2.440000000 GHz | PNO: Fast ↔ Trig: Free Run IFGain:Low #Atten: 26 dB | Avg Type: RMS | TRACE 123456 TYPE WWWWWW DET A A A A A A |
| | | | |
| Ref Offset 0.5 dB | | | ΔMkr3 624.9 μs |
| Ref Offset 0.5 dB 10 dB/div Ref 16.50 dBm Log | | .201 241 | ΔMkr3 624.9 μs -0.46 dB |
| 10 dB/div Ref 16.50 dBm 6.50 | ¢1 | | ΔMkr3 624.9 µs -0.46 dB |
| 10 dB/div Ref 16.50 dBm 6.50 -3.50 -13.5 -23.5 | | | ΔMkr3 624.9 μs -0.46 dB |
| 10 dB/div Ref 16.50 dBm 6.50 -3.50 -13.5 -23.5 -33.5 -43.5 | | | -0.46 dB |
| 10 dB/div Ref 16.50 dBm 6.50 -3.50 -13.5 -23.5 -33.5 -43.5 -43.5 -43.5 -44.5 -45.5 | 1 | | -0.46 dB |
| 10 dB/div Ref 16.50 dBm 6.50 -3.50 -3.50 -3.50 -3.50 -43.5 Hb, H, de team b -43.5 | ,,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, , ,, ,, | | |
| 10 aB/div Ref 16.50 dBm 6.50 -3.50 -3.50 -3.55 -3.55 -3.55 -3.55 -4.35 -4.35 -3.55 -4.35 -4.35 -4.35 -5.55 | 1 | | |
| 10 dB/div Ref 16.50 dBm Log | #VBW 8.0 MHz* | | -0.46 dB |
| 10 dB/div Ref 16.50 dBm 6.50 13.50 13.5 14.5 15.5 | Y Y | | -0.46 dB |
| 10 dB/div Ref 16.50 dBm L og 6.50 6.50 3.50 73.5 73.5 -43.5 73.5 73.5 -43.5 73.5 73.6 Center 2.440000000 GHz Center 2.440000000 GHz Res BW 8 MHz 1.575 2 Δ1 1 1 1 4 6 6 6 | #VBW 8.0 MHz* | | -0.46 dB |
| 10 dB/div Ref 16.50 dBm 6 50 - - - 3 50 - - - - -13 5 - - - - - -13 5 - - - - - - -13 5 - | #VBW 8.0 MHz* | | -0.46 dB |
| 10 dB/div Ref 16.50 dBm Log 6.50 13.50 13.5 13.5 13.5 13.5 13.5 13.5 13.5 13.5 13.5 14.5 15.5 10.0 | #VBW 8.0 MHz* | | -0.46 dB |

Page 37 of 39

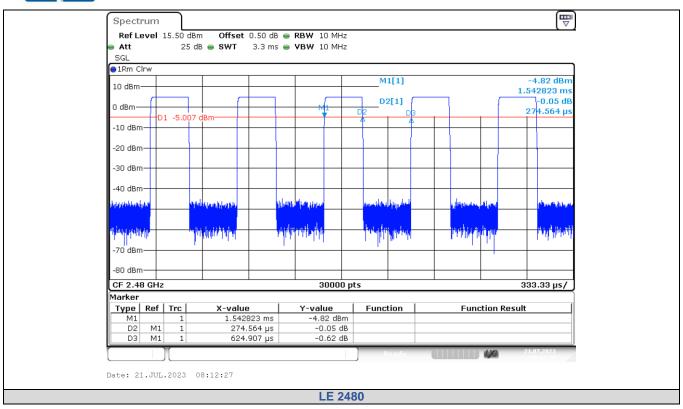
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EB 中国国家认证认可监督管理委员会

Accreditation Administration of the People's Republic of China : http://yz.cnca.cn





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3.9. Antenna Requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C 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 antenna that uses a unique coupling to the intentional radiator, 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.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i)

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Test Result

The directional gain of the antenna is less than 6dBi, please refer to the EUT internal photographs antenna photo.

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