# FCC 47 CFR PART 15 SUBPART C AND ANSI C63.10:2013 TEST REPORT

**For**

**BT 4.0 Module**

**Model: BDP-1010**

**Trade Name: Digisine**

**Issued for**

**DIGISINE ENERGYTECH CO.,**

**2F., No.196, Sec. 2, Zhong-Xing Road, Hsin-Tien Dist., New Taipei City, Taiwan**

**Issued by**

**Compliance Certification Services Inc.**
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**Issued Date: February 22, 2017**

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# Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|---|---|---|---|---|
| 00 | 02/22/2017 | Initial Issue | All Page 49 | Michelle Chiu |
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# 1. TEST REPORT CERTIFICATION

| | | |
|---|---|---|
| **Applicant** | ： | DIGISINE ENERGYTECH CO., |
| **Address** | ： | 2F., No.196, Sec. 2, Zhong-Xing Road, Hsin-Tien Dist., New Taipei City, Taiwan |
| **Equipment Under Test** | ： | BT 4.0 Module |
| **Model** | ： | BDP-1010 |
| **Trade Name** | ： | Digisine |
| **Tested Date** | ： | December 21, 2015 ~ February 03, 2017 |

| APPLICABLE STANDARD | |
|---|---|
| **Standard** | **Test Result** |
| FCC Part 15 Subpart C AND ANSI C63.10:2013 | PASS |

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

***Approved by:***

Sb. Lu
Sr. Engineer

***Reviewed by:***

Gundam Lin
Sr. Engineer



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# 2. EUT DESCRIPTION

| | |
|---|---|
| **Product Name** | BT 4.0 Module |
| **Model Number** | BDP-1010 |
| **Identify Number** | T151221D07 |
| **Received Date** | December 21, 2015 |
| **Frequency Range** | 2402MHz ~ 2480MHz |
| **Transmit Power** | -2.89 dBm (0.0005 W) |
| **Channel Spacing** | 2MHz |
| **Channel Number** | 40 Channels |
| **Transmit Data Rate** | 1Mbps |
| **Type of Modulation** | GFSK |
| **Antenna Type** | PCB Antenna, Antenna Gain: 0.41 dBi |
| **Power Rating** | 3.3Vdc |
| **Test Voltage** | 120Vac, 60Hz |

***Remark:***

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *For more details, please refer to the User's manual of the EUT.*
3. *This submittal(s) (test report) is intended for FCC ID: VLV101029185569 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*



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# 3. DESCRIPTION OF TEST MODES

**Conducted Emission / Radiated Emission Test (Below 1 GHz)**

1. The following test modes were scanned during the preliminary test:

| No. | Pre-Test mode |
|---|---|
| 1 | TX Mode |

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

| Final Test mode | | |
|---|---|---|
| Emission | Radiated Emission | Mode 1 |
| | Conducted Emission | Mode 1 |

***Remark:*** *Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.*

**Conducted / Radiated Emission Test (Above 1 GHz)**

The EUT had been tested under operating condition.

There are three channels have been tested as following:

| Channel | Frequency (MHz) |
|---|---|
| Low | 2402 |
| Middle | 2440 |
| High | 2480 |

***Remark：****The field strength of spurious emission was measured in the following position: EUT stand-up position(Y axis), lie-down position(X, Z axis). The worst emission was found in stand-up position(Y axis) and the worst case was recorded.*



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# 4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10:2013 and FCC CFR 47, 15.207, 15.209 and 15.247.

# 5. FACILITIES AND ACCREDITATION

## 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.989-1, Wenshan Rd., Shangshan Village,
Qionglin Township, Hsinchu County 30741, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.10:2013 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4 and CISPR 16-1-5.

## 5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

| | |
|---|---|
| **Taiwan** | TAF |

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

| | |
|---|---|
| **Canada** | INDUSTRY CANADA |
| **Japan** | VCCI |
| **Taiwan** | BSMI |
| **USA** | FCC MRA |

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

***Remark:*** *FCC Designation Number TW1027.*



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## 5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

| PARAMETER | UNCERTAINTY |
|---|---|
| Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 30 to 1000 MHz | +/- 3.97 |
| Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 1 to 18GHz | +/- 3.58 |
| Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 18 to 26 GHz | +/- 3.59 |
| Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 26 to 40 GHz | +/- 3.81 |
| Conducted Emission (Mains Terminals), 9kHz to 30MHz | +/- 2.48 |

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

Consistent with industry standard (e.g. CISPR 22, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than $U_{CISPR}$ which is 3.6dB and 5.2dB respectively. CCS values (called $U_{Lab}$ in CISPR 16-4-2) is less than $U_{CISPR}$ as shown in the table above. Therefore, MU need not be considered for compliance.



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# 6. SETUP OF EQUIPMENT UNDER TEST

## SUPPORT EQUIPMENT

| No. | Product | Manufacturer | Model No. | Serial No. |
|---|---|---|---|---|
| 1 | Notebook PC | TOSHIBA | PORTEGE R30-A | 1E101235H |

| No. | Signal Cable Description |
|---|---|
| 1 | Shielded USB cable, 1.5 m × 1 |

## SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

## EUT OPERATING CONDITION

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. TX Mode:
   - ⇨ **Power control:**
     Channel Low (2402MHz) Power set 7.
     Channel Mid (2440MHz) Power set 7.
     Channel High (2480MHz) Power set 7.
3. All of the functions are under run.
4. Start test



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# 7. FCC PART 15.247 REQUIREMENTS

## 7.1 DUTY CYCLE CORRECTION FACTOR

| Product Name | BT 4.0 Module | Test By | Allen Liu |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/09 |
| Test Mode | TX Mode | Temp. & Humidity | 25°C, 55% |

| TX on (ms) | TX on + off (ms) | Duty Cycle (%) | Duty Factor (dB) | 1/T Minimum VBW (kHz) |
|---|---|---|---|---|
| 1.000 | 1.000 | 100.00% | 0.00 | 0.010 |



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## 7.2 6dB BANDWIDTH

**LIMITS**

§ 15.247(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

**TEST EQUIPMENT**

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| EXA Signal Analyzer | Agilent | N9010A | MY52220817 | 03/15/2017 |
| Test S/W | N/A | | | |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

**TEST SETUP**


**TEST PROCEDURE**

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


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**TEST RESULTS**

| Product Name | BT 4.0 Module | Test By | Waternil Guan |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/17 |
| Test Mode | TX Mode | Temp. & Humidity | 23°C, 57% |

| Channel | Channel Frequency (MHz) | 6dB Bandwidth (MHz) | Minimum Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 2402 | 0.66 | 500 | PASS |
| Middle | 2440 | 0.66 | 500 | PASS |
| High | 2480 | 0.67 | 500 | PASS |


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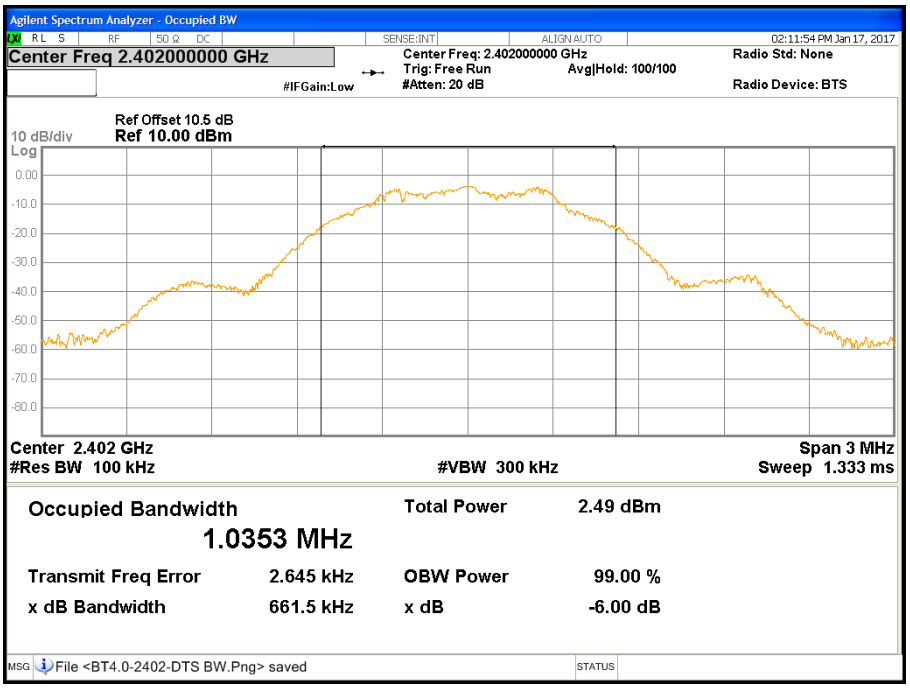
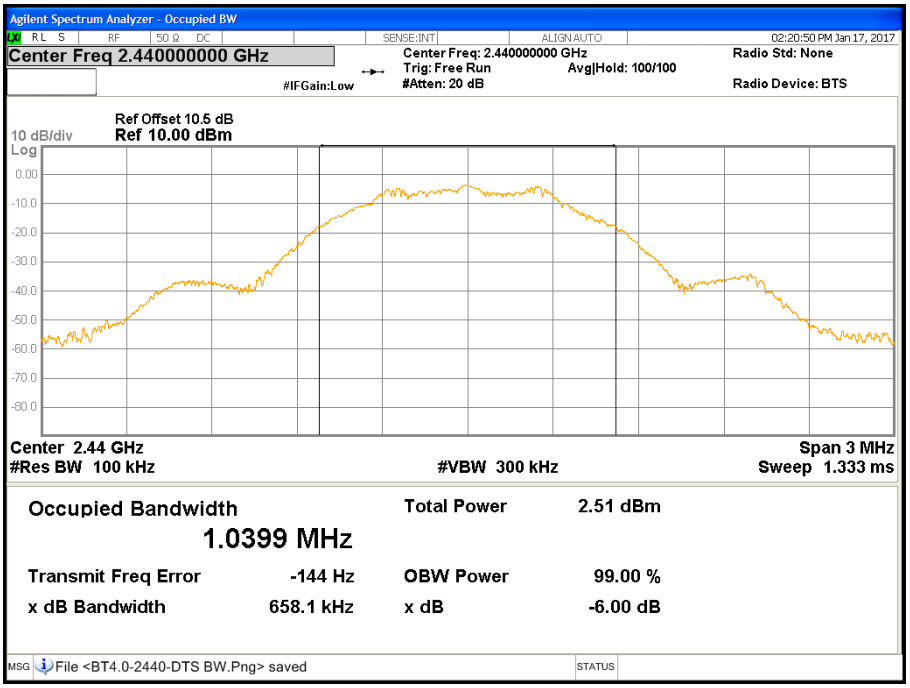
## 6dB BANDWIDTH

CH Low




CH Middle





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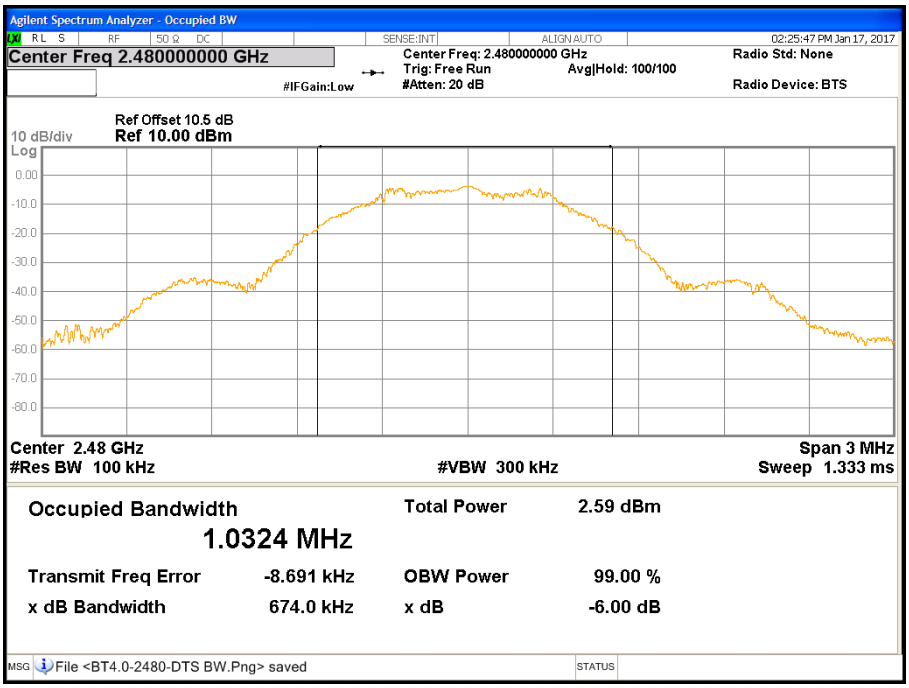
CH High





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## 7.3 MAXIMUM PEAK OUTPUT POWER

**LIMITS**

§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following:
§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 watt.
§ 15.247(b) (4) Except as shown in paragraphs (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**TEST EQUIPMENT**

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| Power Meter | Anritsu | ML2495A | 1149001 | 12/05/2017 |
| Power Sensor | Anritsu | MA2411B | 1126148 | 12/05/2017 |
| Test S/W | N/A | | | |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

**TEST SETUP**


**TEST PROCEDURE**

The transmitter output is connected to the power meter. The power meter is set to the peak power detection.


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## TEST RESULTS

| Product Name | BT 4.0 Module | Test By | Waternil Guan |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/17 |
| Test Mode | TX Mode | Temp. & Humidity | 23°C, 57% |

| Channel | Channel Frequency (MHz) | Maximum Peak Output Power | | | | Result |
|---|---|---|---|---|---|---|
| | | Measured Value | | Limit | | |
| | | (dBm) | (W) | (dBm) | (W) | |
| Low | 2402 | -2.97 | 0.0005 | 30.00 | 1.0000 | PASS |
| Middle | 2440 | -2.89 | 0.0005 | 30.00 | 1.0000 | PASS |
| High | 2480 | -3.06 | 0.0005 | 30.00 | 1.0000 | PASS |

***Remark:*** *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.*


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## 7.4 AVERAGE POWER

**LIMITS**

None: For reporting purposes only.

**TEST EQUIPMENT**

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| Power Meter | Anritsu | ML2495A | 1149001 | 12/05/2017 |
| Power Sensor | Anritsu | MA2411B | 1126148 | 12/05/2017 |
| Test S/W | N/A | | | |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

**TEST SETUP**


**TEST PROCEDURE**

The transmitter output is connected to the power meter. The power meter is set to the average power detection.


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## TEST RESULTS

| Product Name | BT 4.0 Module | Test By | Waternil Guan |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/17 |
| Test Mode | TX Mode | Temp. & Humidity | 23°C, 57% |

| Channel | Channel Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 2402 | -3.49 |
| Middle | 2440 | -3.35 |
| High | 2480 | -3.55 |

***Remark:*** *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.*



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## 7.5 POWER SPECTRAL DENSITY

**LIMITS**

§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

§ KDB 662911:

If all antennas have the same gain, $G_{ANT}$, Directional gain = $G_{ANT}$ + Array Gain, where Array Gain is as follows.

Array Gain = 10 log($N_{ANT}/N_{SS}$) dB.

If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream:

Directional gain may be calculated by using the formulas applicable to equal gain antennas with $G_{ANT}$ set equal to the gain of the antenna having the highest gain; or,

$$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$

**TEST EQUIPMENT**

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| EXA Signal Analyzer | Agilent | N9010A | MY52220817 | 03/15/2017 |
| Test S/W | N/A | | | |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

**TEST SETUP**




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**TEST PROCEDURE**

1. The transmitter output was connected to the spectrum analyzer.
2. Set analyzer center frequency to DTS channel center frequency.
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
5. Set the VBW ≥ 3 x RBW.
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum amplitude level within the RBW.
11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.


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## TEST RESULTS

| Product Name | BT 4.0 Module | Test By | Waternil Guan |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/17 |
| Test Mode | TX Mode | Temp. & Humidity | 23°C, 57% |

| Channel | Channel Frequency (MHz) | Final RF Power Level in 3KHz BW (dBm) | | Result |
|---|---|---|---|---|
| | | Measured Value | Limit | |
| Low | 2402 | -12.68 | 8 | PASS |
| Middle | 2440 | -12.54 | 8 | PASS |
| High | 2480 | -12.50 | 8 | PASS |

***Remark:*** *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.*



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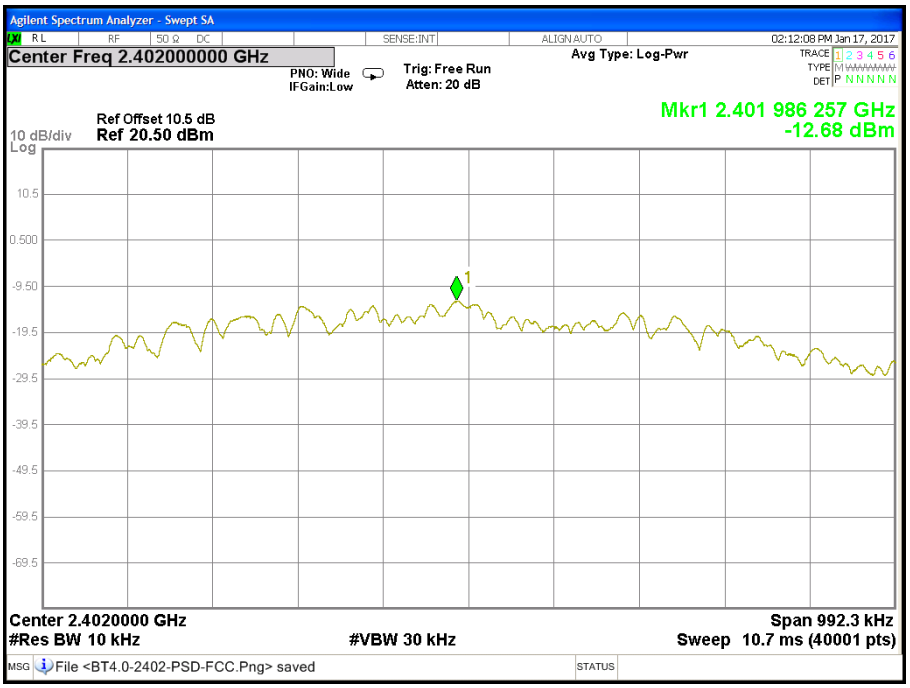
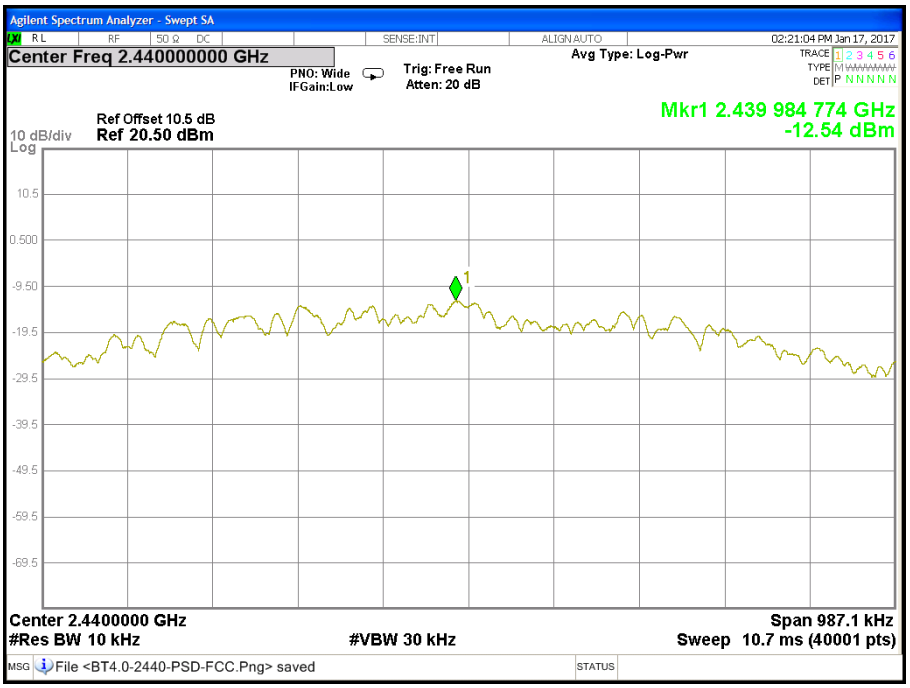
## POWER SPECTRAL DENSITY

CH Low




CH Middle



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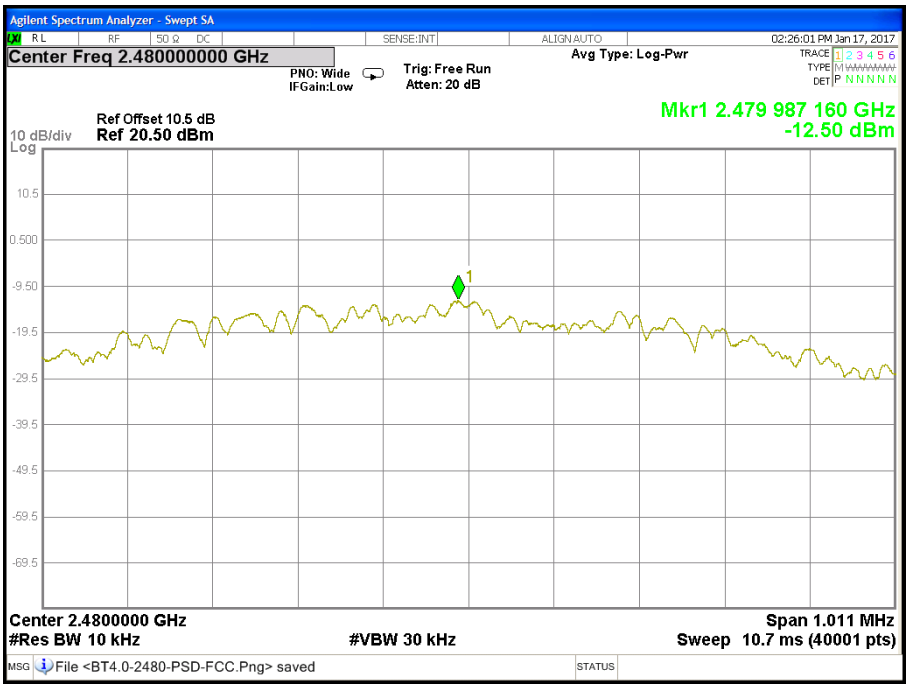
CH High





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## 7.6 CONDUCTED SPURIOUS EMISSION

**LIMITS**

§ 15.247(d) 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 and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

**TEST EQUIPMENT**

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| EXA Signal Analyzer | Agilent | N9010A | MY52220817 | 03/15/2017 |
| Test S/W | N/A | | | |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

**TEST SETUP**


**TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.
The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

**TEST RESULTS**

| Product Name | BT 4.0 Module | Test By | Waternil Guan |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/17 |
| Test Mode | TX Mode | Temp. & Humidity | 23°C, 57% |


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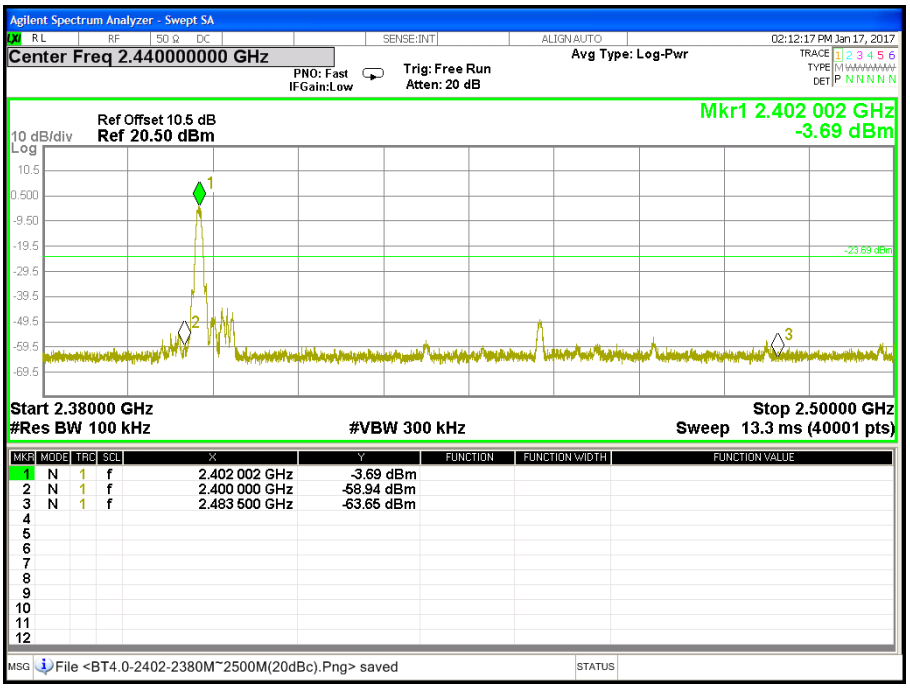
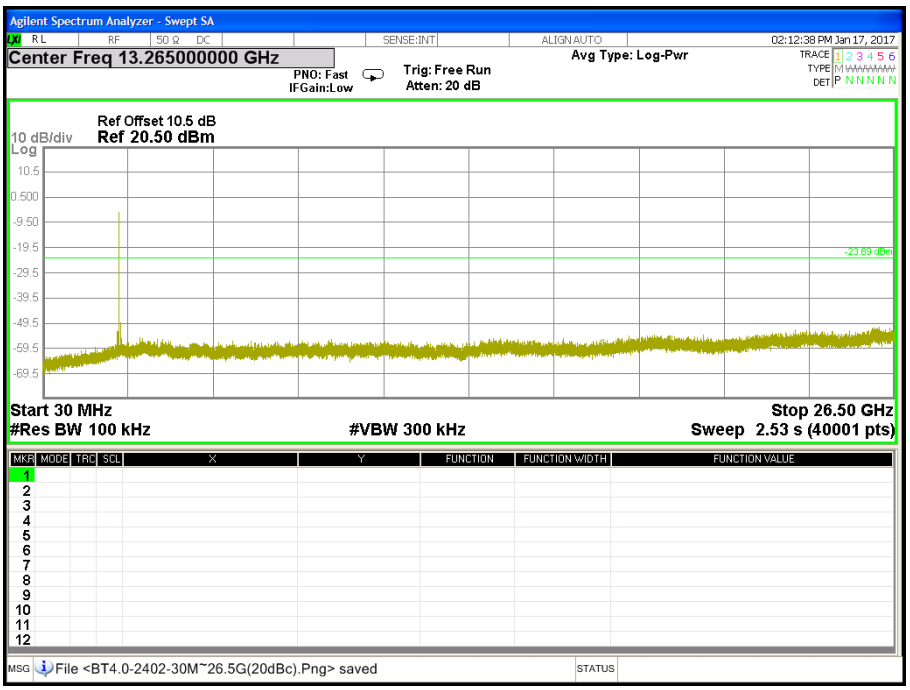
## OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

CH Low (2.38GHz ~ 2.5GHz)




CH Low (30MHz ~ 26.5GHz)





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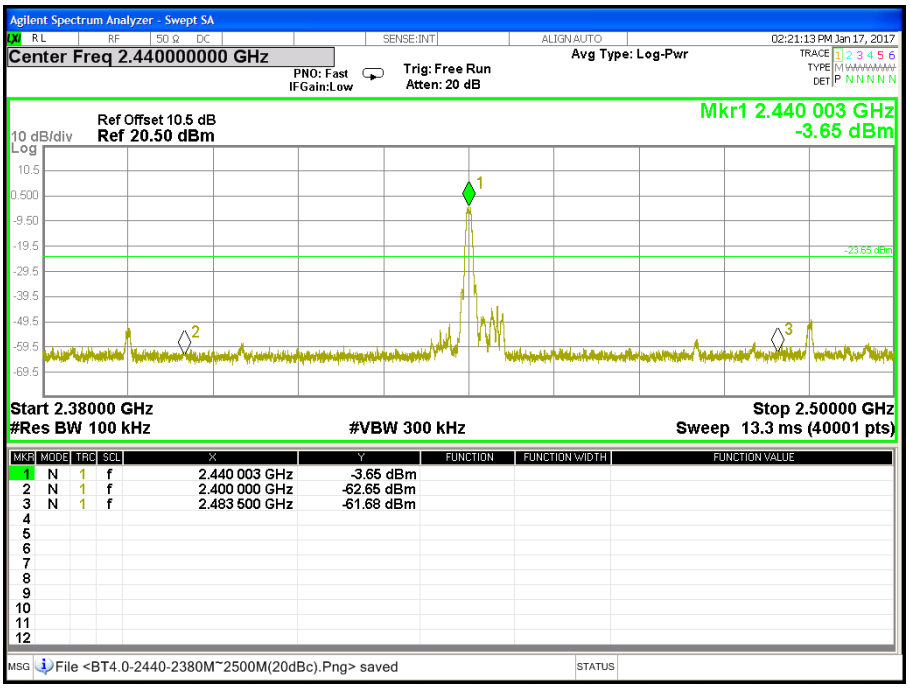
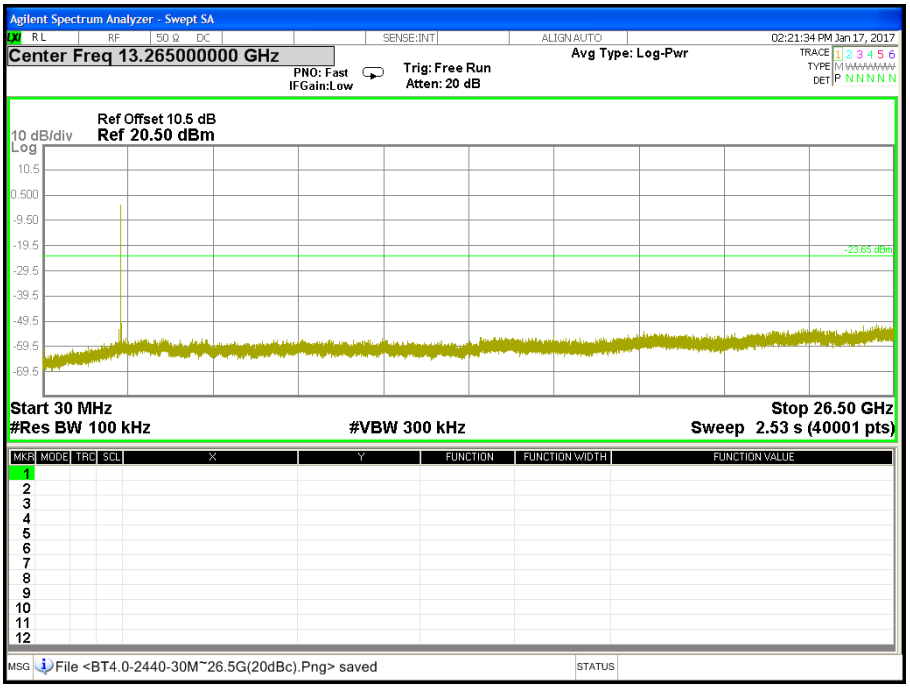
CH Middle (2.38GHz ~ 2.5GHz)




CH Middle (30MHz ~ 26.5GHz)





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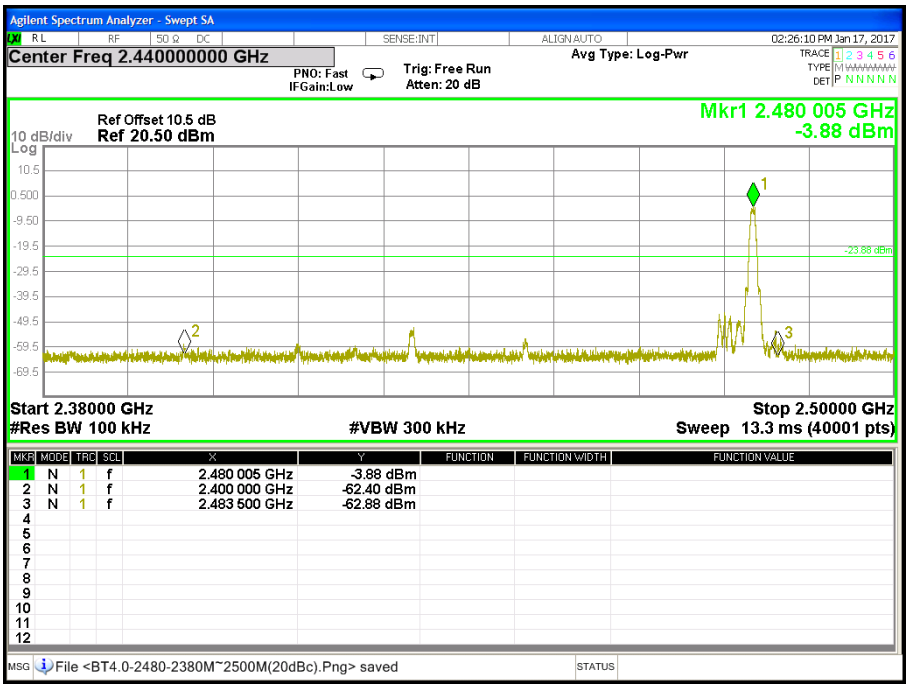
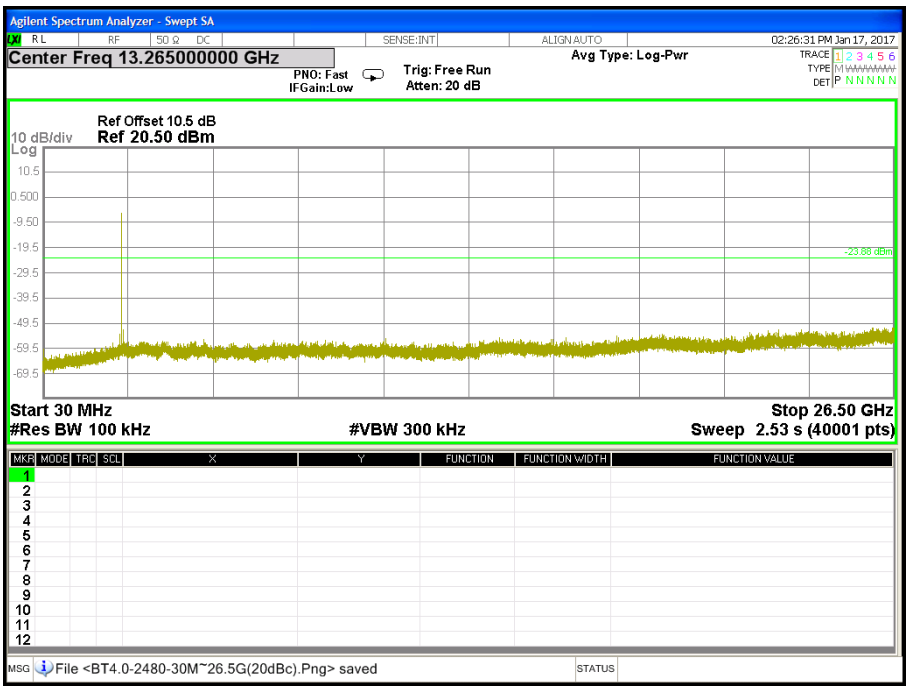
CH High (2.38GHz ~ 2.5GHz)




CH High (30MHz ~ 26.5GHz)





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## 7.7 RADIATED EMISSION

**LIMITS**

(1) According to § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| [1]0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 -1710 | 10.6 -12.7 |
| 6.26775 - 6.26825 | 108 -121.94 | 1718.8 - 1722.2 | 13.25 -13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 – 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 -16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2655 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3338 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 -335.4 | 3600 - 4400 | ([2]) |
| 13.36 - 13.41 | | | |

***Remark:***
*1. [1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.*
*2. [2] Above 38.6*

(2) According to § 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.


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(3) According to § 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 (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009 – 0.490 | 2400/F(KHz) | 300 |
| 0.490 – 1.705 | 24000/F(KHz) | 30 |
| 1.705 – 30.0 | 30 | 30 |
| 30 - 88 | 100 ** | 3 |
| 88 - 216 | 150 ** | 3 |
| 216 - 960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

***Remark:*** ***Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

(4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

## TEST EQUIPMENT

**Radiated Emission / 966Chamber_C**

| Name of Equipment | Manufacture | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4446A | MY48250064 | 04/21/2017 |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101387 | 10/04/2017 |
| Bi-log Antenna | TESEQ | CBL 6112D | 35404 | 07/22/2017 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA 9120 D | 9120D-285 | 04/17/2017 |
| Double-Ridged Waveguide Horn | ETS-LINDGREN | 3117 | 00078732 | 07/10/2017 |
| Horn Antenna | COM-POWER | AH-840 | 03077 | 12/01/2017 |
| Pre-Amplifier | EMCI | EMC001625 | 980243 | 04/11/2017 |
| Pre-Amplifier | COM-POWER | PAM-118A | 551043 | 04/11/2017 |
| LOOP Antenna | COM-POWER | AL-130 | 121060 | 05/23/2017 |
| Test S/W | E3.815206a | | | |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*


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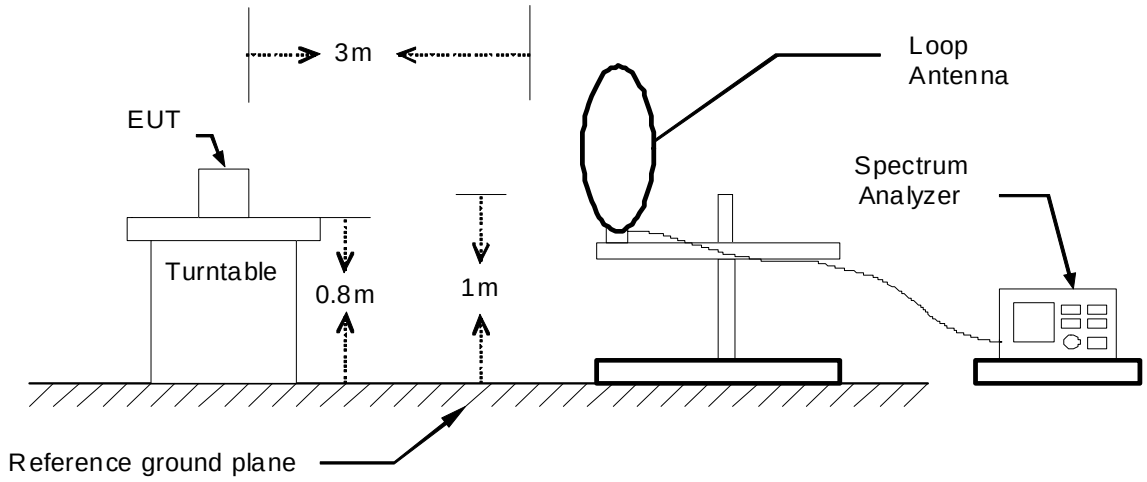
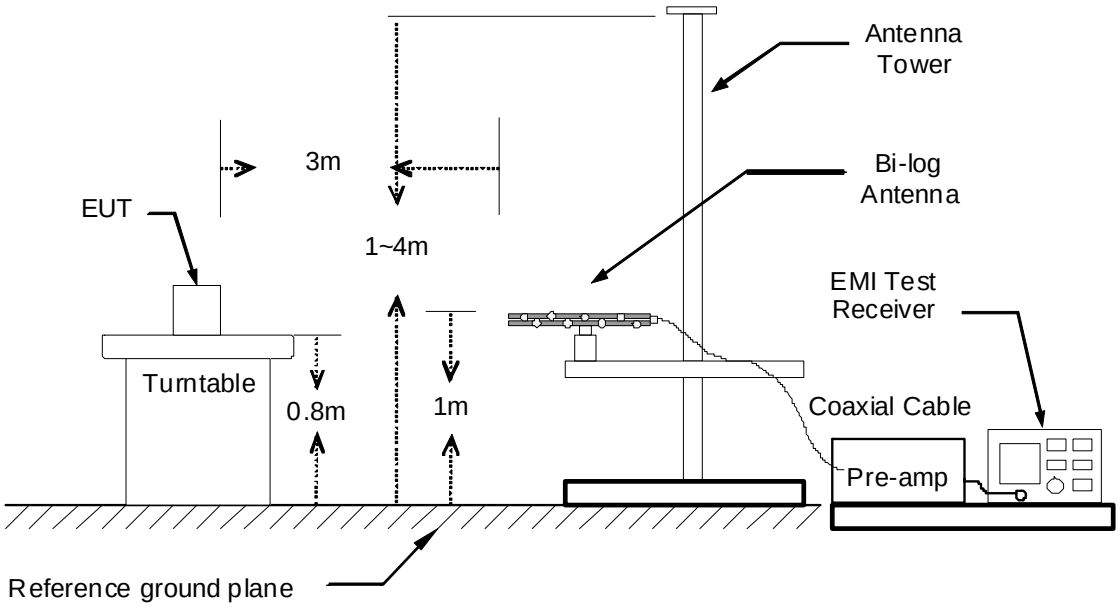
## TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission below 1GHz.

**9kHz ~ 30MHz**




**30MHz ~ 1GHz**



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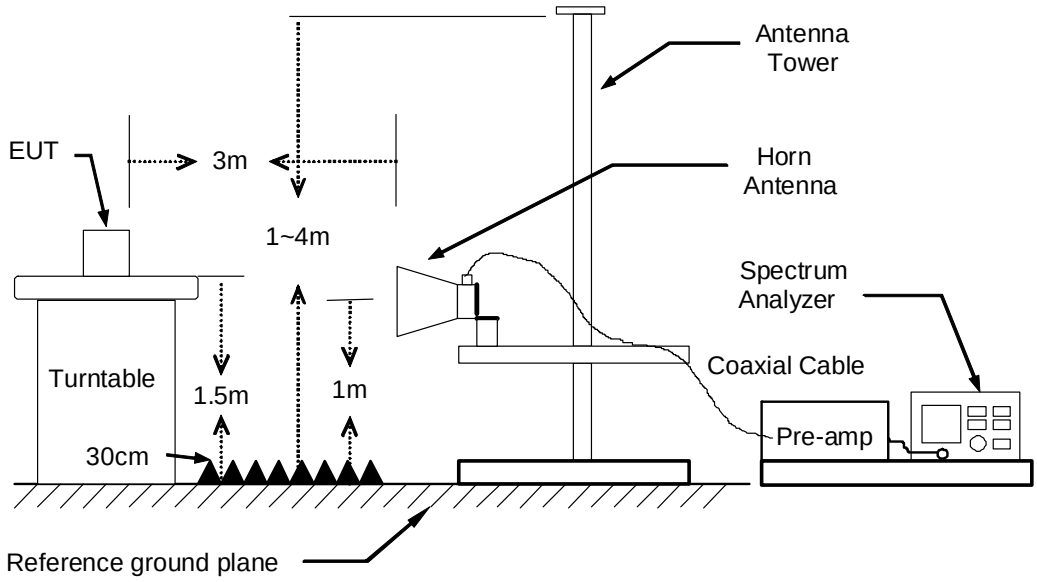
The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.





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## TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 and 1.5 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

***Remark:***

1. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.*
2. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.*
3. *The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.*



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## TEST RESULTS

### Below 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

### Below 1 GHz (30MHz ~ 1GHz)

| Product Name | BT 4.0 Module | Test By | Allen Liu |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/18 |
| Test Mode | Mode 1 | Temp. & Humidity | 25°C, 55% |

**966Chamber_C at 3Meter / Horizontal**

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 71.71 | 46.61 | -19.58 | 27.03 | 40.00 | -12.97 | 333 | 400 | Peak |
| 163.86 | 52.75 | -16.11 | 36.64 | 43.50 | -6.86 | 108 | 125 | Peak |
| 204.60 | 53.70 | -16.27 | 37.43 | 43.50 | -6.07 | 31 | 125 | Peak |
| 400.54 | 36.82 | -9.21 | 27.61 | 46.00 | -18.39 | 261 | 100 | Peak |
| 696.39 | 38.80 | -5.22 | 33.58 | 46.00 | -12.42 | 196 | 125 | Peak |
| 768.17 | 36.53 | -4.58 | 31.95 | 46.00 | -14.05 | 210 | 100 | Peak |

**966Chamber_C at 3Meter / Vertical**

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 71.71 | 51.21 | -19.58 | 31.63 | 40.00 | -8.37 | 139 | 100 | Peak |
| 153.19 | 47.61 | -15.46 | 32.15 | 43.50 | -11.35 | 222 | 125 | Peak |
| 312.27 | 36.76 | -11.72 | 25.04 | 46.00 | -20.96 | 110 | 150 | Peak |
| 400.54 | 40.81 | -9.21 | 31.60 | 46.00 | -14.40 | 115 | 100 | Peak |
| 499.48 | 35.08 | -7.39 | 27.69 | 46.00 | -18.31 | 143 | 100 | Peak |
| 778.84 | 32.58 | -4.47 | 28.11 | 46.00 | -17.89 | 131 | 200 | Peak |

***Remark:***

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
3. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
4. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*



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**Above 1 GHz**

| Product Name | BT 4.0 Module | Test By | Allen Liu |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/09 |
| Test Mode | TX / CH Low | Temp. & Humidity | 25°C, 55% |

**966Chamber_C at 3Meter / Horizontal**

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 1766.00 | 49.25 | -2.64 | 46.61 | 74.00 | -27.39 | 345 | 200 | Peak |
| 2494.00 | 48.61 | -0.06 | 48.55 | 74.00 | -25.45 | 34 | 100 | Peak |
| 2658.00 | 50.34 | 0.46 | 50.80 | 74.00 | -23.20 | 266 | 100 | Peak |
| 3534.00 | 38.55 | 2.16 | 40.71 | 74.00 | -33.29 | 172 | 100 | Peak |
| 3867.00 | 39.03 | 2.97 | 42.00 | 74.00 | -32.00 | 212 | 200 | Peak |
| 4401.00 | 39.13 | 4.51 | 43.64 | 74.00 | -30.36 | 290 | 200 | Peak |
| 6564.00 | 44.13 | 3.06 | 47.19 | 74.00 | -26.81 | 22 | 100 | Peak |
| 6948.00 | 43.95 | 2.82 | 46.77 | 74.00 | -27.23 | 79 | 100 | Peak |
| 7392.00 | 45.39 | 3.08 | 48.47 | 74.00 | -25.53 | 262 | 100 | Peak |

**966Chamber_C at 3Meter / Vertical**

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 1978.00 | 49.94 | -2.13 | 47.81 | 74.00 | -26.19 | 214 | 200 | Peak |
| 2494.00 | 48.09 | -0.06 | 48.03 | 74.00 | -25.97 | 176 | 100 | Peak |
| 2788.00 | 48.77 | 0.87 | 49.64 | 74.00 | -24.36 | 330 | 100 | Peak |
| 3717.00 | 38.99 | 2.61 | 41.60 | 74.00 | -32.40 | 151 | 200 | Peak |
| 3906.00 | 39.03 | 3.06 | 42.09 | 74.00 | -31.91 | 94 | 200 | Peak |
| 4098.00 | 39.84 | 3.59 | 43.43 | 74.00 | -30.57 | 332 | 100 | Peak |
| 6012.00 | 43.61 | 2.18 | 45.79 | 74.00 | -28.21 | 85 | 200 | Peak |
| 6540.00 | 44.10 | 3.08 | 47.18 | 74.00 | -26.82 | 37 | 200 | Peak |
| 7212.00 | 48.03 | 2.95 | 50.98 | 74.00 | -23.02 | 220 | 200 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
4. *Result = Reading + Correction Factor*
   *Margin = Result – Limit*
   *Remark Peak = Result(PK) – Limit(PK)*
   *Remark AVG = Result(AV) – Limit(AV)*



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| Product Name | BT 4.0 Module | Test By | Allen Liu |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/09 |
| Test Mode | TX / CH Middle | Temp. & Humidity | 25°C, 55% |

**966Chamber_C at 3Meter / Horizontal**

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 2318.00 | 48.44 | -0.78 | 47.66 | 74.00 | -26.34 | 102 | 100 | Peak |
| 2488.00 | 50.31 | -0.09 | 50.22 | 74.00 | -23.78 | 114 | 200 | Peak |
| 2858.00 | 49.04 | 1.09 | 50.13 | 74.00 | -23.87 | 3 | 100 | Peak |
| 3930.00 | 39.03 | 3.12 | 42.15 | 74.00 | -31.85 | 186 | 200 | Peak |
| 4110.00 | 39.42 | 3.62 | 43.04 | 74.00 | -30.96 | 229 | 200 | Peak |
| 4449.00 | 39.46 | 4.65 | 44.11 | 74.00 | -29.89 | 319 | 200 | Peak |
| 6468.00 | 43.63 | 3.04 | 46.67 | 74.00 | -27.33 | 275 | 100 | Peak |
| 6612.00 | 44.00 | 3.03 | 47.03 | 74.00 | -26.97 | 305 | 200 | Peak |
| 7320.00 | 46.81 | 3.03 | 49.84 | 74.00 | -24.16 | 142 | 100 | Peak |

**966Chamber_C at 3Meter / Vertical**

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 2008.00 | 52.38 | -2.05 | 50.33 | 74.00 | -23.67 | 264 | 200 | Peak |
| 2358.00 | 49.35 | -0.62 | 48.73 | 74.00 | -25.27 | 311 | 100 | Peak |
| 2488.00 | 50.02 | -0.09 | 49.93 | 74.00 | -24.07 | 91 | 100 | Peak |
| 2728.00 | 48.48 | 0.68 | 49.16 | 74.00 | -24.84 | 347 | 200 | Peak |
| 3759.00 | 39.69 | 2.71 | 42.40 | 74.00 | -31.60 | 165 | 100 | Peak |
| 3789.00 | 39.87 | 2.78 | 42.65 | 74.00 | -31.35 | 285 | 200 | Peak |
| 4602.00 | 39.28 | 5.10 | 44.38 | 74.00 | -29.62 | 224 | 100 | Peak |
| 6480.00 | 44.19 | 3.06 | 47.25 | 74.00 | -26.75 | 313 | 200 | Peak |
| 6948.00 | 44.60 | 2.82 | 47.42 | 74.00 | -26.58 | 1 | 100 | Peak |
| 7320.00 | 47.04 | 3.03 | 50.07 | 74.00 | -23.93 | 294 | 200 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
4. *Result = Reading + Correction Factor*
   *Margin = Result – Limit*
   *Remark Peak = Result(PK) – Limit(PK)*
   *Remark AVG = Result(AV) – Limit(AV)*



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| Product Name | BT 4.0 Module | Test By | Allen Liu |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/09 |
| Test Mode | TX / CH High | Temp. & Humidity | 25°C, 55% |

**966Chamber_C at 3Meter / Horizontal**

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 1520.00 | 49.74 | -3.23 | 46.51 | 74.00 | -27.49 | 184 | 200 | Peak |
| 1758.00 | 49.58 | -2.66 | 46.92 | 74.00 | -27.08 | 107 | 200 | Peak |
| 2340.00 | 49.07 | -0.69 | 48.38 | 74.00 | -25.62 | 174 | 100 | Peak |
| 4263.00 | 38.97 | 4.09 | 43.06 | 74.00 | -30.94 | 279 | 200 | Peak |
| 4593.00 | 38.91 | 5.08 | 43.99 | 74.00 | -30.01 | 235 | 100 | Peak |
| 4959.00 | 39.87 | 6.13 | 46.00 | 74.00 | -28.00 | 346 | 200 | Peak |
| 6804.00 | 43.90 | 2.91 | 46.81 | 74.00 | -27.19 | 24 | 200 | Peak |
| 7440.00 | 46.49 | 3.12 | 49.61 | 54.00 | -4.39 | 167 | 100 | Average |
| 7440.00 | 49.40 | 3.12 | 52.52 | 74.00 | -21.48 | 167 | 100 | Peak |
| 7584.00 | 46.56 | 3.22 | 49.78 | 74.00 | -24.22 | 284 | 200 | Peak |

**966Chamber_C at 3Meter / Vertical**

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 1930.00 | 50.64 | -2.25 | 48.39 | 74.00 | -25.61 | 269 | 100 | Peak |
| 1984.00 | 52.40 | -2.12 | 50.28 | 74.00 | -23.72 | 271 | 100 | Peak |
| 2366.00 | 48.87 | -0.59 | 48.28 | 74.00 | -25.72 | 330 | 100 | Peak |
| 3336.00 | 39.89 | 1.90 | 41.79 | 74.00 | -32.21 | 41 | 100 | Peak |
| 4311.00 | 39.39 | 4.24 | 43.63 | 74.00 | -30.37 | 253 | 200 | Peak |
| 4959.00 | 40.13 | 6.13 | 46.26 | 74.00 | -27.74 | 117 | 200 | Peak |
| 6384.00 | 43.69 | 2.88 | 46.57 | 74.00 | -27.43 | 89 | 100 | Peak |
| 6936.00 | 44.11 | 2.83 | 46.94 | 74.00 | -27.06 | 170 | 100 | Peak |
| 7440.00 | 49.33 | 3.12 | 52.45 | 54.00 | -1.55 | 292 | 200 | Average |
| 7440.00 | 50.84 | 3.12 | 53.96 | 74.00 | -20.04 | 292 | 200 | Peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
4. *Result = Reading + Correction Factor*
   *Margin = Result – Limit*
   *Remark Peak = Result(PK) – Limit(PK)*
   *Remark AVG = Result(AV) – Limit(AV)*



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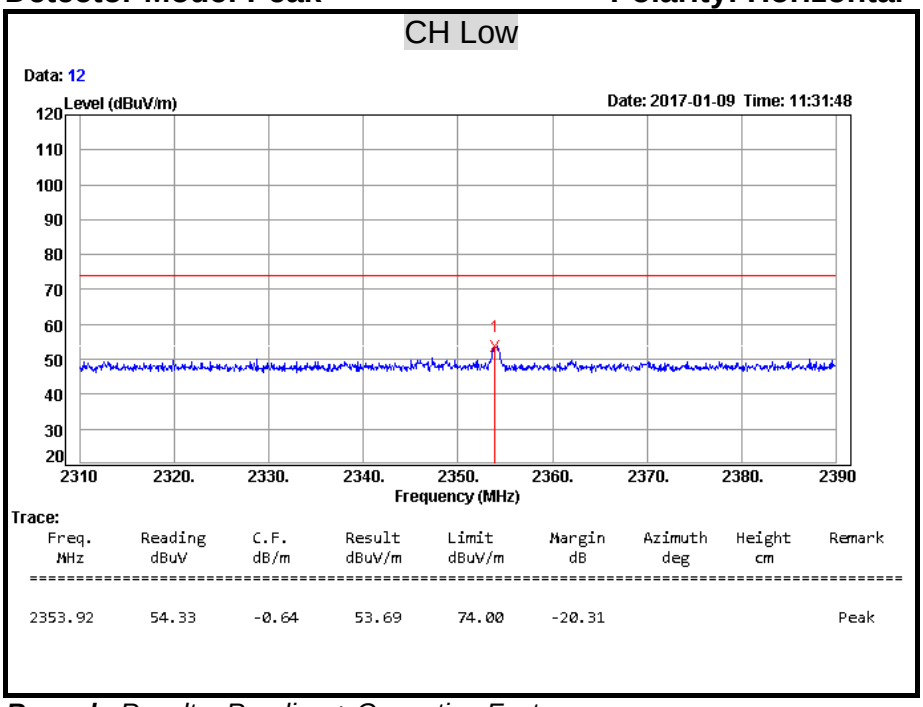
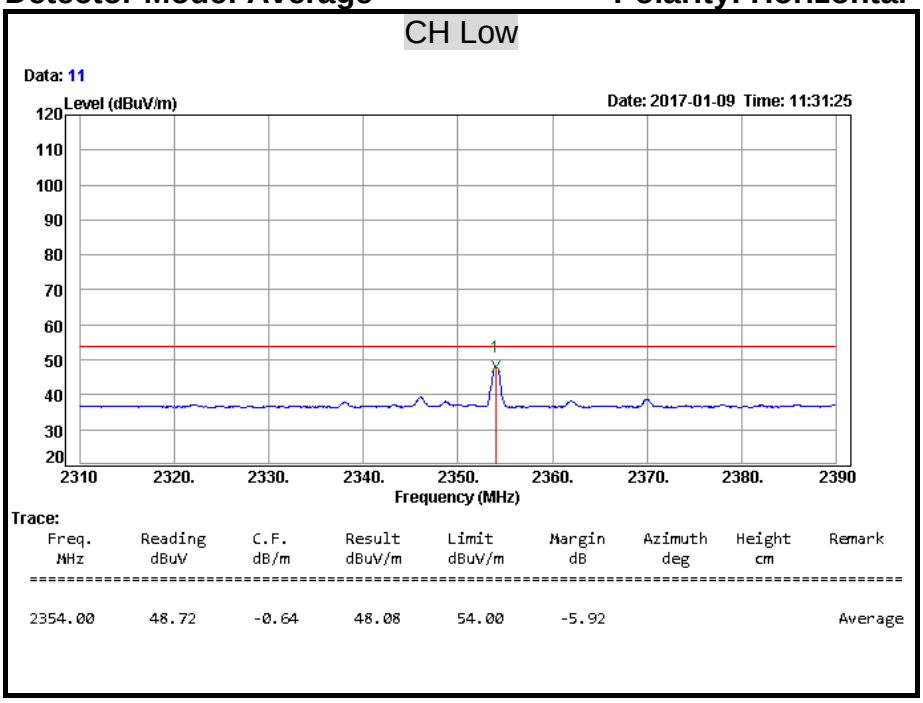
## Restricted Band Edges

**Detector Mode: Peak** **Polarity: Horizontal**




***Remark:*** *Result = Reading + Correction Factor*
*Margin = Result – Limit*
*Remark Peak = Result(PK) – Limit(PK)*

**Detector Mode: Average** **Polarity: Horizontal**




***Remark:*** *Result = Reading + Correction Factor*
*Margin = Result – Limit*
*Remark AVG = Result(AV) – Limit(AV)*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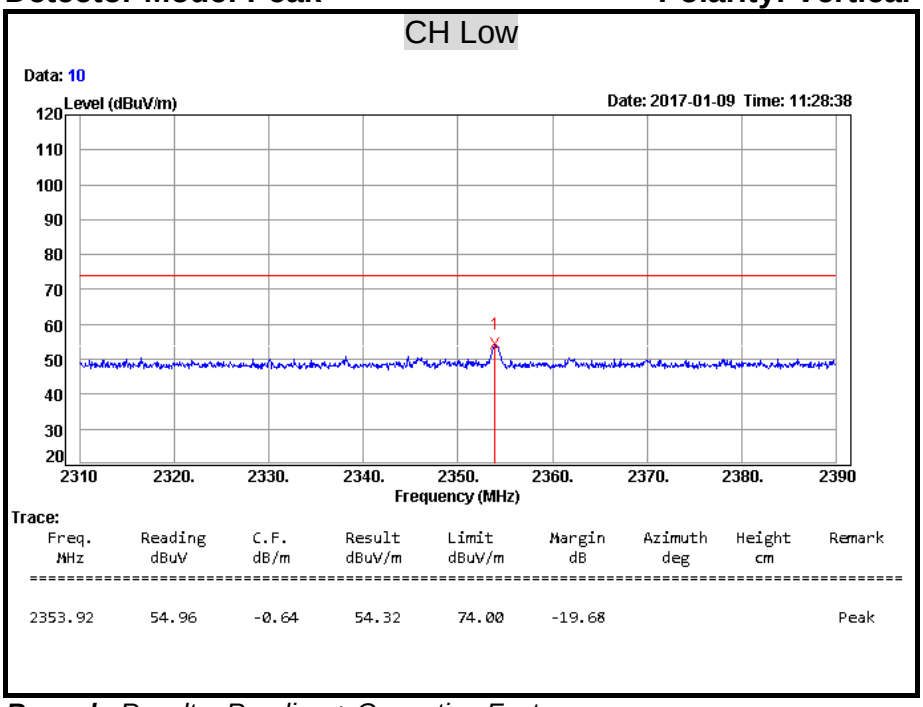
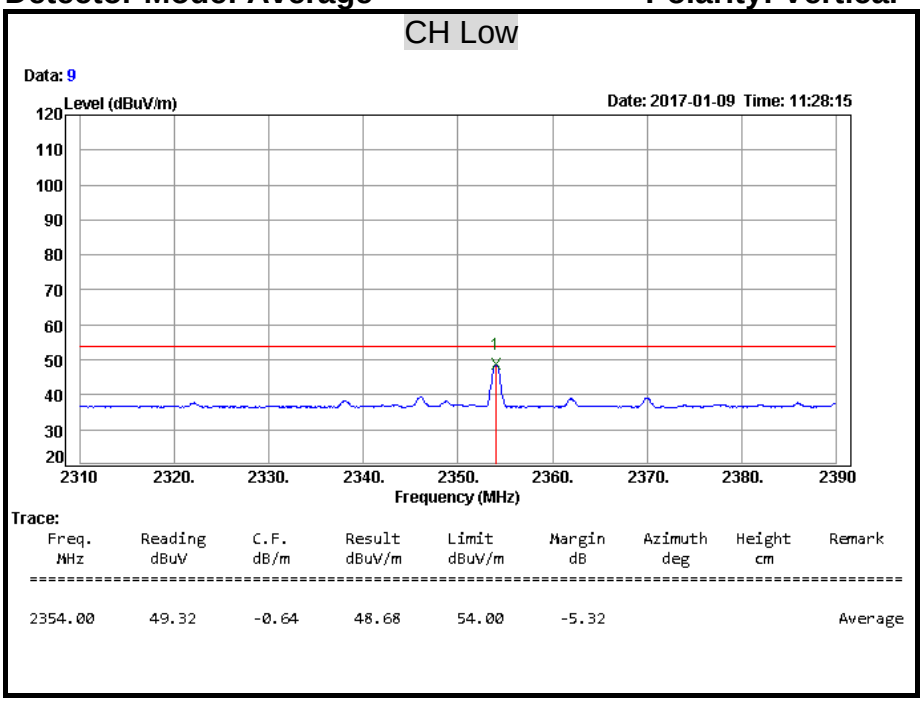
**Detector Mode: Peak** **Polarity: Vertical**




***Remark:*** *Result = Reading + Correction Factor*
*Margin = Result – Limit*
*Remark Peak = Result(PK) – Limit(PK)*

**Detector Mode: Average** **Polarity: Vertical**




***Remark:*** *Result = Reading + Correction Factor*
*Margin = Result – Limit*
*Remark AVG = Result(AV) – Limit(AV)*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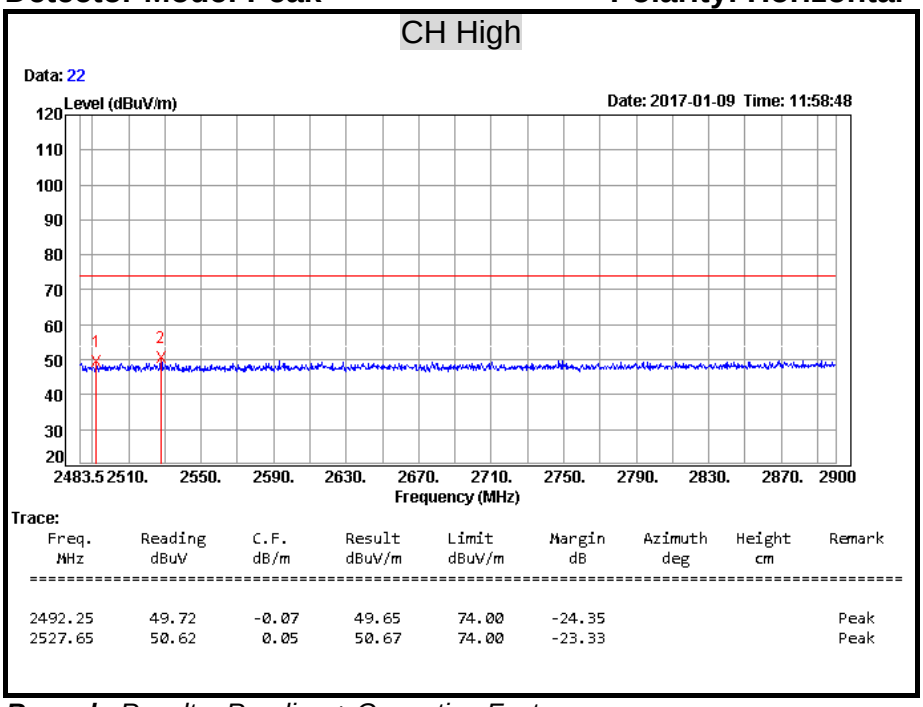
**Detector Mode: Peak** **Polarity: Horizontal**

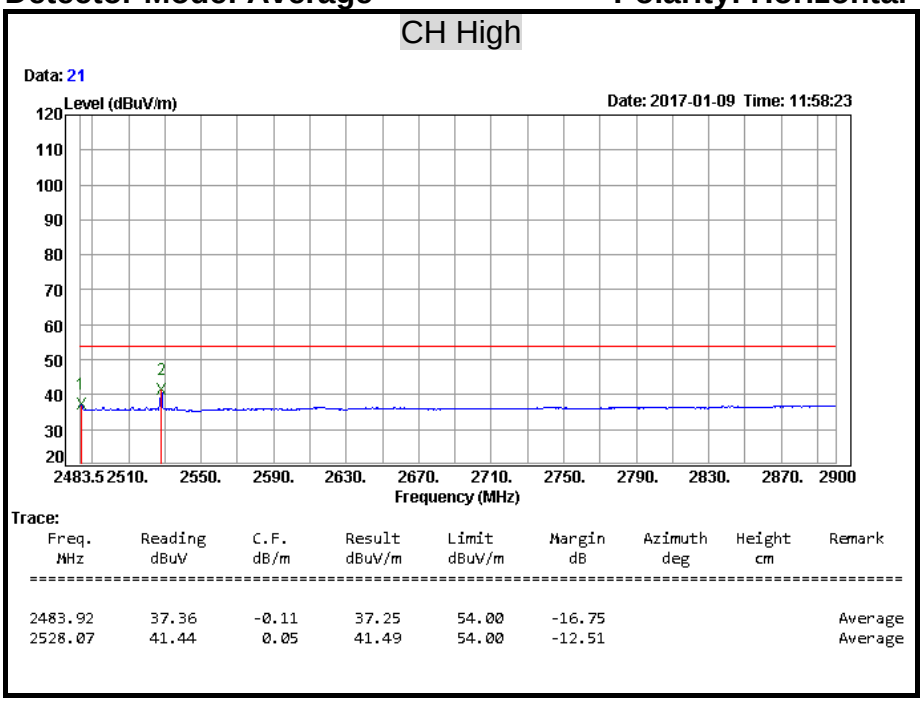



Trace:

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 2492.25 | 49.72 | -0.07 | 49.65 | 74.00 | -24.35 | | | Peak |
| 2527.65 | 50.62 | 0.05 | 50.67 | 74.00 | -23.33 | | | Peak |

***Remark:*** *Result = Reading + Correction Factor*
*Margin = Result – Limit*
*Remark Peak = Result(PK) – Limit(PK)*

**Detector Mode: Average** **Polarity: Horizontal**




Trace:

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 2483.92 | 37.36 | -0.11 | 37.25 | 54.00 | -16.75 | | | Average |
| 2528.07 | 41.44 | 0.05 | 41.49 | 54.00 | -12.51 | | | Average |

***Remark:*** *Result = Reading + Correction Factor*
*Margin = Result – Limit*
*Remark AVG = Result(AV) – Limit(AV)*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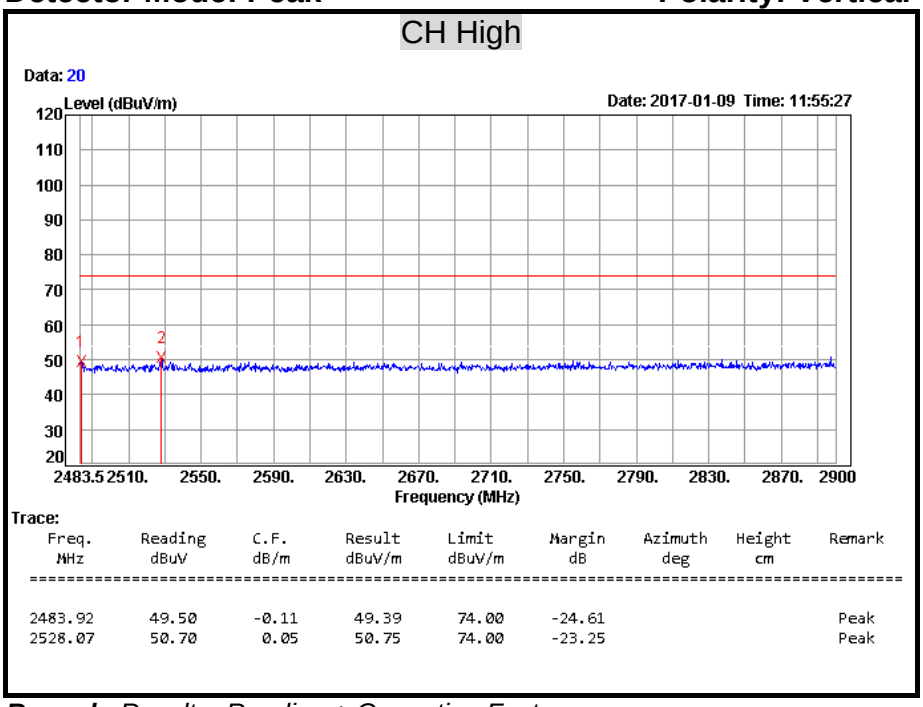
**Detector Mode: Peak** **Polarity: Vertical**

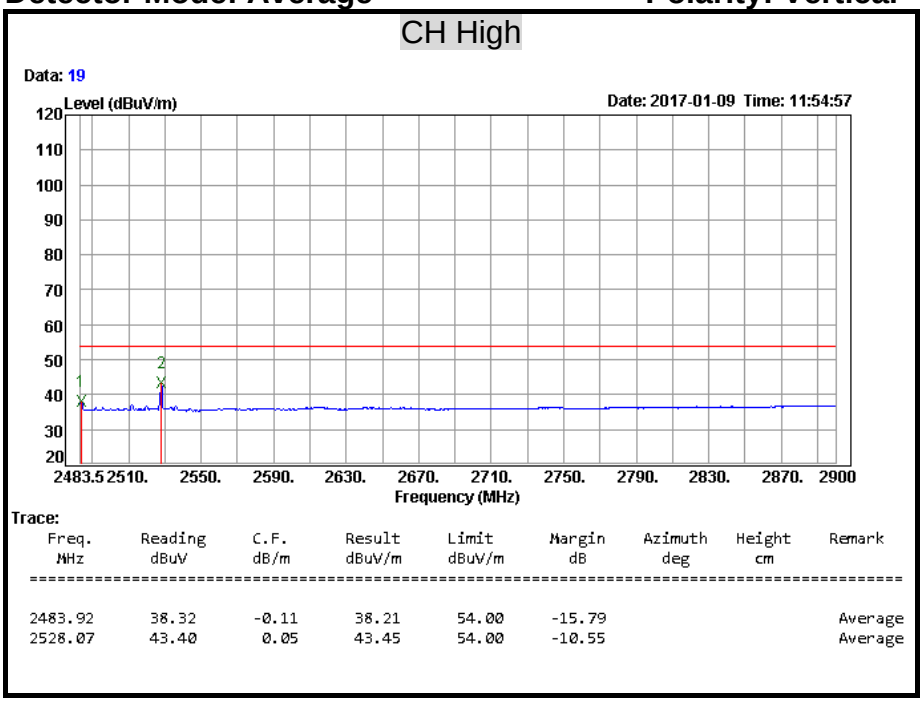



Trace:

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 2483.92 | 49.50 | -0.11 | 49.39 | 74.00 | -24.61 | | | Peak |
| 2528.07 | 50.70 | 0.05 | 50.75 | 74.00 | -23.25 | | | Peak |

***Remark:*** *Result = Reading + Correction Factor*
*Margin = Result – Limit*
*Remark Peak = Result(PK) – Limit(PK)*

**Detector Mode: Average** **Polarity: Vertical**




Trace:

| Freq. MHz | Reading dBuV | C.F. dB/m | Result dBuV/m | Limit dBuV/m | Margin dB | Azimuth deg | Height cm | Remark |
|---|---|---|---|---|---|---|---|---|
| 2483.92 | 38.32 | -0.11 | 38.21 | 54.00 | -15.79 | | | Average |
| 2528.07 | 43.40 | 0.05 | 43.45 | 54.00 | -10.55 | | | Average |

***Remark:*** *Result = Reading + Correction Factor*
*Margin = Result – Limit*
*Remark AVG = Result(AV) – Limit(AV)*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## 7.8 CONDUCTED EMISSION

**LIMITS**

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, 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 or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

| Frequency Range (MHz) | Conducted Limit (dBμv) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 - 0.50 | 66 to 56 | 56 to 46 |
| 0.50 - 5.00 | 56 | 46 |
| 5.00 - 30.0 | 60 | 50 |

**TEST EQUIPMENT**

| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
|---|---|---|---|---|
| L.I.S.N | Schwarzbeck | NSLK 8127 | 8127465 | 07/28/2017 |
| L.I.S.N | Schwarzbeck | NSLK 8127 | 8127473 | 03/10/2017 |
| EMI Test Receiver | Rohde & Schwarz | ESHS 30 | 838550/003 | 10/25/2017 |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | 100111 | 06/27/2017 |
| Test S/W | E3.815206a | | | |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*


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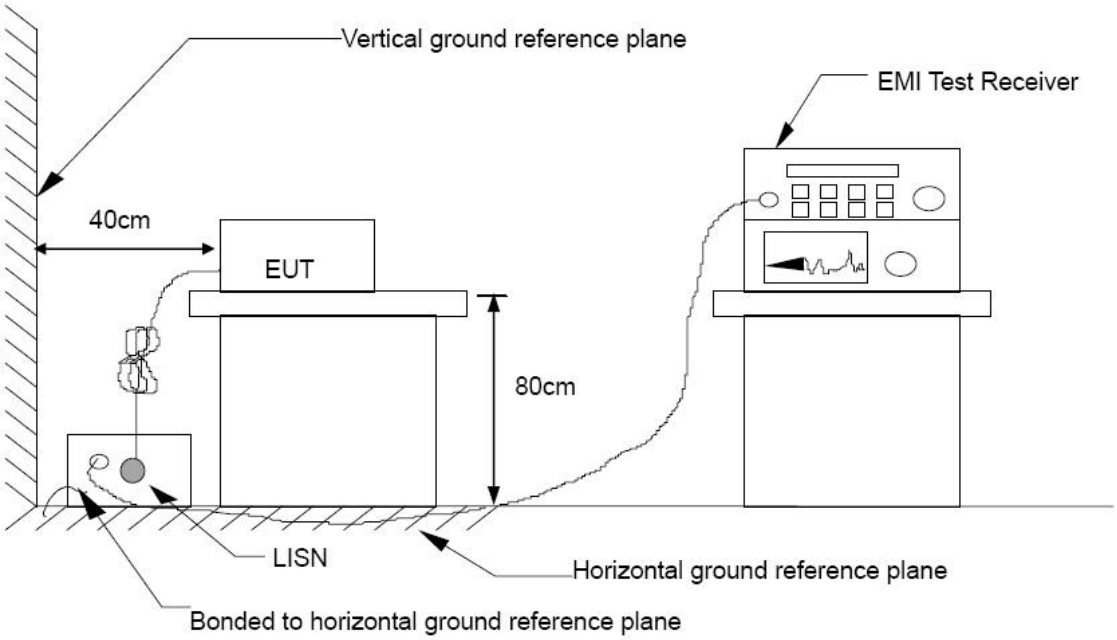
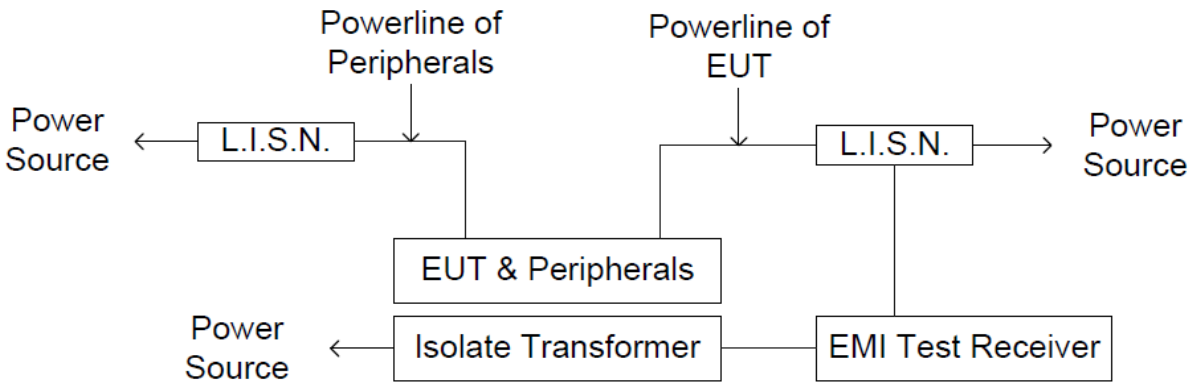
## TEST SETUP





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## TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.10:2013.
The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.
The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.


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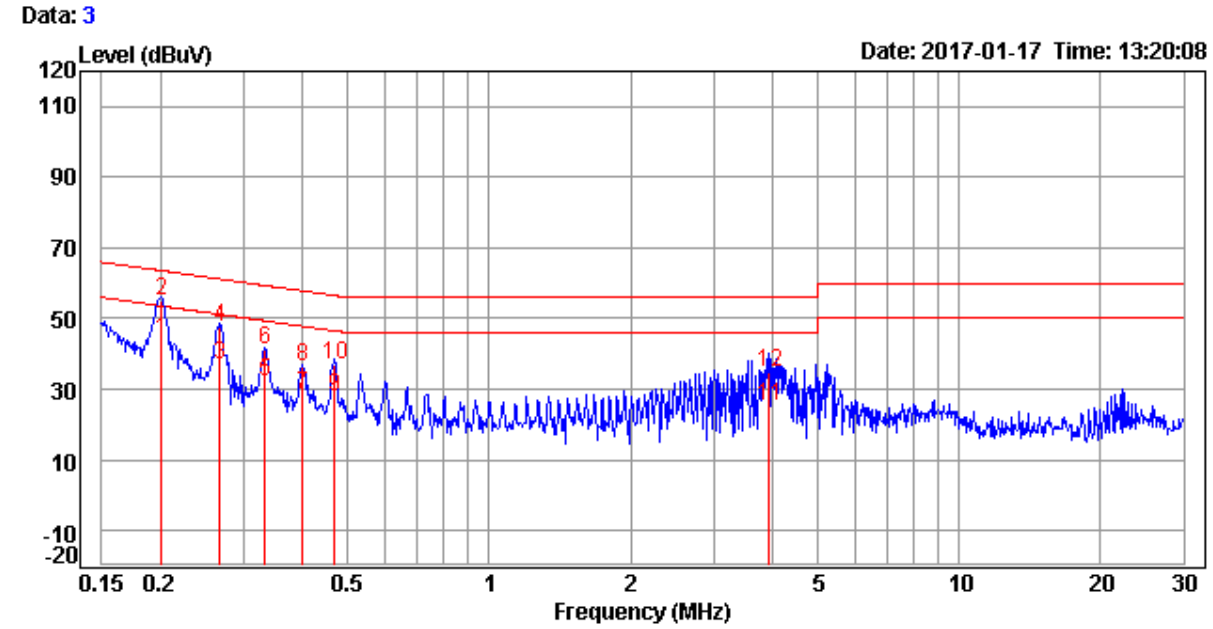
## TEST RESULTS

| Product Name | BT 4.0 Module | Test By | Waternil Guan |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/17 |
| Test Mode | Mode 1 | Temp. & Humidity | 24°C, 54% |

### LINE




Trace:

| Freq. MHz | Reading dBuV Q.P. | Reading dBuV AV. | C.F. dB | Result dBuV Q.P. | Result dBuV AV. | Limit dBuV Q.P. | Limit dBuV AV. | Margin dB Q.P. | Margin dB AV. |
|---|---|---|---|---|---|---|---|---|---|
| 0.201 | 45.23 | 33.75 | 9.97 | 55.20 | 43.72 | 63.58 | 53.58 | -8.38 | -9.86 |
| 0.267 | 37.78 | 27.03 | 9.92 | 47.70 | 36.95 | 61.20 | 51.20 | -13.50 | -14.25 |
| 0.334 | 31.42 | 22.14 | 9.87 | 41.29 | 32.01 | 59.35 | 49.35 | -18.06 | -17.34 |
| 0.402 | 26.58 | 18.83 | 9.82 | 36.40 | 28.65 | 57.81 | 47.81 | -21.41 | -19.16 |
| 0.469 | 26.97 | 18.26 | 9.84 | 36.81 | 28.10 | 56.54 | 46.54 | -19.73 | -18.44 |
| 3.943 | 24.45 | 14.87 | 10.17 | 34.62 | 25.04 | 56.00 | 46.00 | -21.38 | -20.96 |

***Remark:***

1. *Correction Factor = Insertion loss + Cable loss*
2. *Result level = Reading Value + Correction factor*
3. *Margin value = Result level – Limit value*



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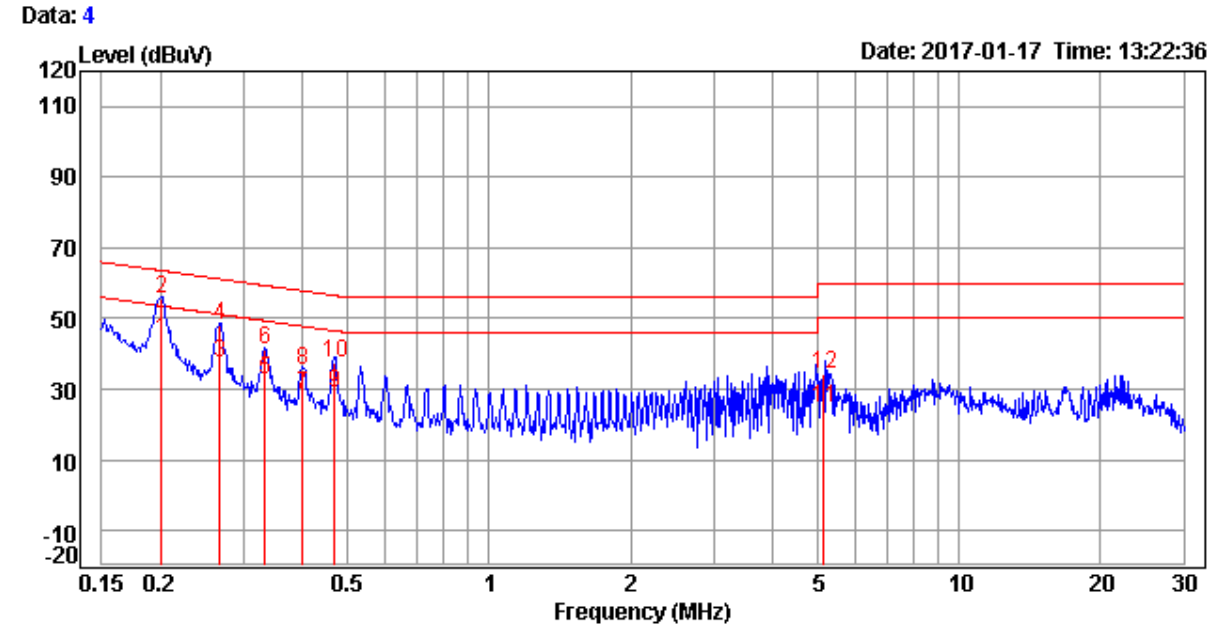
| Product Name | BT 4.0 Module | Test By | Waternil Guan |
|---|---|---|---|
| Test Model | BDP-1010 | Test Date | 2017/01/17 |
| Test Mode | Mode 1 | Temp. & Humidity | 24°C, 54% |

**NEUTRAL**




Trace:

| Freq. MHz | Reading dBuV Q.P. | Reading dBuV AV. | C.F. dB | Result dBuV Q.P. | Result dBuV AV. | Limit dBuV Q.P. | Limit dBuV AV. | Margin dB Q.P. | Margin dB AV. |
|---|---|---|---|---|---|---|---|---|---|
| 0.201 | 45.37 | 33.84 | 10.00 | 55.37 | 43.84 | 63.58 | 53.58 | -8.21 | -9.74 |
| 0.267 | 37.98 | 27.73 | 9.93 | 47.91 | 37.66 | 61.20 | 51.20 | -13.29 | -13.54 |
| 0.334 | 31.38 | 22.67 | 9.87 | 41.25 | 32.54 | 59.35 | 49.35 | -18.10 | -16.81 |
| 0.400 | 25.48 | 18.48 | 9.80 | 35.28 | 28.28 | 57.86 | 47.86 | -22.58 | -19.58 |
| 0.469 | 27.55 | 19.41 | 9.82 | 37.37 | 29.23 | 56.54 | 46.54 | -19.17 | -17.31 |
| 5.152 | 24.12 | 14.66 | 10.20 | 34.32 | 24.86 | 60.00 | 50.00 | -25.68 | -25.14 |

***Remark:***

1. *Correction Factor = Insertion loss + Cable loss*
2. *Result level = Reading Value + Correction factor*
3. *Margin value = Result level – Limit value*



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