**CENTRE OF TESTING SERVICE INTERNATIONAL**

**OPERATE ACCORDING TO ISO/IEC 17025**

# FCC ID/IC TEST REPORT

**TEST REPORT NUMBER : CGZ3150605-00633-EFI**

**CENTRE OF TESTING SERVICE CO., LTD.**

A101，No.65，Zhuji Highway,Tianhe District，Guangzhou, China

# TEST REPORT For FCC ID/IC
# 47 CFR PART 15 OCT, 2016
# RSS-247 Issue 2

| | |
|---|---|
| **Report Reference No. .....** | CGZ3150605-00633-EFI |
| Date of issue ..... | 10 April 2017 |
| **Testing Laboratory Name .....** | **CENTRE OF TESTING SERVICE CO., LTD.** |
| Address ..... | A101, No.65, Zhuji Highway,Tianhe District, Guangzhou, China |
| Testing location/ procedure ..... | Full application of Harmonised standards ■<br>Partial application of Harmonised standards □<br>Other standard testing method □ |
| **Applicant's name .....** | Horizon Hobby, LLC |
| Address ..... | 4105 Fieldstone Road, Champaign, IL 61822, USA |
| **Test specification .....** | |
| Standard ..... | **47 CFR PART 15 OCT, 2016, RSS-247 Issue 2, RSS-Gen Issue 4**<br>**ANSI C63.10-2013** |
| **Test Report Form No. .....** | CTSEMC-1.0 |
| TRF Originator ..... | CENTRE OF TESTING SERVICE CO., LTD. |
| Master TRF ..... | Dated 2009-01 |



| | |
|---|---|
| **Test item description.....** | DXe Transmitter 2.4GHZ |
| Trade Mark..... | / |
| Manufacturer..... | Horizon Hobby, LLC |
| Model/Type reference..... | DXe Transmitter 2.4GHZ |
| Ratings..... | Battery 1.5V*4 |
| Operating Frequency ..... | 2404.0 MHz ~2476 MHz |
| Result ..... | **Positive** |

| **Compiled by:** | **Supervised by:** | **Approved by:** |
|---|---|---|
| Kate zhang / Fileadministrators | Duke yang / Technique principal | Vincent yao / Manager |



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# FCC ID/IC -- T E S T  R E P O R T

| Test Report No. : CGZ3150605-00633-EFI | 10 April 2017<br>Date of issue |
|---|---|

| | |
|---|---|
| Type / Model..... | DXe Transmitter 2.4GHZ |
| EUT..... | DXe Transmitter 2.4GHZ |
| **Applicant……** | Horizon Hobby, LLC |
| Address..... | 4105 Fieldstone Road, Champaign, IL 61822, USA |
| Telephone..... | +1-217 403 3542 |
| Fax..... | / |
| Contact..... | Erin Hassan |
| **Manufacturer……** | Horizon Hobby, LLC |
| Address..... | 4105 Fieldstone Road, Champaign, IL 61822, USA |
| Telephone..... | +1-217 403 3542 |
| Fax..... | / |
| Contact..... | Erin Hassan |
| **Factory……** | / |
| Address..... | / |
| Telephone..... | / |
| Fax..... | / |
| Contact..... | / |

**Test Result** according to the standards on page 1: **PASSED**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



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# 1.0 TEST STANDARDS

The tests were performed according to following standards:

- **RSS-247 Issue 2**
- **RSS-Gen Issue 4**
- **47 CFR PART 15 OCT, 2016**
- **ANSI C63.10-2013**

# 2.0 SUMMARY

## 2.1 GENERAL REMARKS

| | |
|---|---|
| Date of receipt of test sample | 05 June 2015 |
| | |
| Testing commenced on | 05 June 2015~10 April 2017 |
| | |
| Testing concluded on | 10 April 2017 |

## 2.2 FINAL ASSESSMENT

The IC requirements pertaining to the technical standards and tested operation modes are

■ - fulfilled.
□ - **not** fulfilled.

The equipment under test
■ - fulfils the FCC/IC requirements cited on page 1.
□ - **does not** fulfil the FCC/IC requirements cited on page 1.

# 3.0 EQUIPMENT UNDER TEST

## 3.1 POWER SUPPLY SYSTEM UNILISED

Power supply voltage : ■ Battery 1.5V*4

## 3.2 SHORT DESCRIPTION OF THE EQUIPMENT UNDER TEST (EUT)

Number of tested samples: **1**
Serial number: Prototype

## 3.3 EUT OPERATION MODE

The equipment under test was operated during the measurement under the following conditions:
□ - Standby
□ TX- Y position
□ TX- Zposition
■ TX- X position

Operation mode 1:TX-X Position Low (2404 MHz) , TX-X Position Middle (2440 MHz ),
TX-X Position High (2476 MHz)
Note:Operation mode 1 TX -X position of EUT is the radiated test worst case. so only these test results be recorded in the test report.



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## 3.4 EUT CONFIGURATION

### 3.4.1. Description of configuration (EUT)

| | | |
|---|---|---|
| Description | : | DXe Transmitter 2.4GHZ |
| Model Number | : | DXe Transmitter 2.4GHZ |
| Operation frequency | : | 2404.0 MHz~ 2476 MHz ISM Band |
| Modulation Technology | : | FHSS |
| Antenna | : | External antenna, met requirement of FCC 15.203 |

### 3.4.2. Tested Supporting System Details

N/A



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# 4.0 TEST ENVIRONMENT

## 4.1 ADDRESS OF THE TEST LABORATORY

A101，No.65，Zhuji Highway,Tianhe District，Guangzhou, China

Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406

## 4.2 TEST FACILITY

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

### CNAS-Lab Code: L3394

CENTRE OF TESTING SERVICE CO., LTD has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

### IC-Registration No.: 8374A

The 3m Alternate Test Site of CENTRE OF TESTING SERVICE CO., LTD has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374A on May 22, 2014.

### FCC-Registration No.: 971995

CENTRE OF TESTING SERVICE CO., LTD, EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No.791995, July 13,2012.

## 4.3 ENVIRONMENTAL CONDITIONS

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

| | |
|---|---|
| Temperature: | 15~35 ° C |
| | |
| Humidity: | 25~75 % |
| | |
| Atmospheric pressure: | 86~106 kPa |

## 4.4 DEFINITIONS OF SYMBOLS USED IN THIS TEST REPORT

■ - The black square indicates that the listed condition, standard or equipment is applicable for this report.
□ - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

## 4.5 STATEMENT OF THE MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the CTS 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.

## 4.6 MEASUREMENT UNCERTAINTY

| Test Item | Frequency Range | Uncertainty | Note |
|---|---|---|---|
| Conduction disturbance | 150kHz~30MHz | ±1.22dB | (1) |
| Power disturbance | 30MHz~300MHz | ±1.38dB | (1) |
| Radiation emission (3m) | 30MHz~300MHz | ±3.14dB | (1) |
| | 300MHz~1000MHz | ±3.18dB | (1) |
| | 1GHz~26.5GHz | ±3.54dB | (1) |

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



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# 5.0 SUMMARY OF STANDARDS AND RESULTS

## 5.1.DESCRIPTION OF STANDARDS AND RESULTS

The EUT have been tested according to the applicable standards as referenced below.

| EMISSION | | |
|---|---|---|
| **Description of Test Item** | **Standard** | **Results** |
| Conducted Emission Test | FCC Part 15:15.207<br>RSS-Gen Issue 4:7.2.4<br>ANSI C63.10-2013 | N/A |
| 20dB Bandwidth | FCC Part 15.247(a)(1)<br>RSS-247 Issue 2:5.1(a)<br>RSS-Gen Issue 4:4.6.3<br>ANSI C63.10-2013 | PASSED |
| Peak Power | FCC Part 15.247(b)(1)<br>RSS-247 Issue 2:5.4(b)<br>ANSI C63.10-2013 | PASSED |
| Peak Power Spectral Density | 15.247(e)<br>RSS-247 Issue 2:5.2(b)<br>ANSI C63.10-2013 | N/A |
| 100KHz Bandwidth Band edges measurement | FCC Part 15.247(d)<br>RSS-247 Issue 2:5.5<br>ANSI C63.10-2013 | PASSED |
| Conducted Spurious Emissions | FCC Part 15.247(d)<br>RSS-247 Issue 2:5.5<br>ANSI C63.10-2013 | PASSED |
| Frequency Separation | FCC Part 15.247(a)(1)<br>RSS-247 Issue 2:5.1(b)<br>ANSI C63.10-2013 | PASSED |
| Number of Hopping Frequency | FCC Part 15.247(a)(1)(iii)<br>RSS-247 Issue 2:5.4(c)<br>ANSI C63.10-2013 | PASSED |
| Dwell Time | FCC Part 15.247(a)(1)(iii)<br>RSS-247 Issue 2:5.4(c)<br>ANSI C63.10-2013 | PASSED |
| Transmitter Unwanted Emissions | FCC Part 15: 15.209<br>RSS-Gen Issue 4:4.9<br>ANSI C63.10-2013 | PASSED |
| Receiver Spurious Emissions | FCC Part 15: 15.209<br>RSS-Gen Issue 4:4.10<br>ANSI C63.10-2013 | PASSED |
| 99% Occupied Bandwidth | RSS-Gen Issue 4:4.6.1<br>ANSI C63.10-2013 | PASSED |
| Pseudo random hopping | RSS-247 Issue 2:5.1(a)<br>ANSI C63.10-2013 | PASSED |
| N/A is an abbreviation for Not Applicable. | | |

# 6.0 POWER LINE CONDUCTED EMISSION TEST

## 6.1.TEST EQUIPMENTS

| Conducted Disturbance | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | EMI Test Receiver | ROHDE & SCHWARZ | ESHS10 | 842884/012 | 2016/10 |
| 2 | Artificial Mains | ROHDE & SCHWARZ | ESH3-Z5 | 832479/025 | 2016/10 |
| 3 | Artificial Mains | ROHDE & SCHWARZ | ESH3-Z5 | 832479/026 | 2016/10 |
| 4 | Pulse Limiter | ROHDE & SCHWARZ | ESHSZ2 | 100301 | 2016/10 |
| 5 | EMI Test Software | EZ-EMC | Farad | N/A | N/A |

## 6.2. BLOCK DIAGRAM OF TEST SETUP


***(EUT:*** DXe Transmitter 2.4GHZ ***)***

## 6.3. POWER LINE CONDUCTED EMISSION TEST LIMITS

**Standard: FCC Part 15 : 15.207, RSS-Gen Issue 4:7.2.4 ,ANSI C63.10-2013**

| Frequency | Maximum RF Line Voltage | |
|---|---|---|
| | Quasi-Peak Level dB(μV) | Average Level dB(μV) |
| 150kHz ~ 500kHz | 66 ~ 56* | 56 ~ 46* |
| 500kHz ~ 5MHz | 56 | 46 |
| 5MHz ~ 30MHz | 60 | 50 |

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

## 6.4.TEST PROCEDURE

The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). This provides a 50 ohm coupling impedance for the EUT. Please refer the block diagram of the test setup and photographs. The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#1). Power on the PC and let it work normally, we use a keyboard test soft ware, let EUT working in test mode, then test it. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC Part 15C on Conducted Emission Test.

## 6.5. POWER LINE CONDUCTED EMISSION TEST RESULTS

The EUT power supply by Battery, Not applicable.



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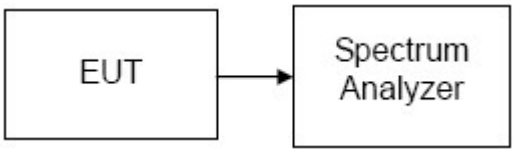
# 7.0 20dB BANDWIDTH

## 7.1 MEASUREMENT EQUIPMENT USED

| 20dB Bandwidth | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2017/03 |

## 7.2 TEST CONFIGURATION




## 7.3 TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT, then connect a low loss RF cable from antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=100kHz, VBW=300kHz, Span=3MHz, Sweep = auto.
4. Mark the peak frequency and 20dB (upper and lower) frequency.
5. Repeat until all the test channels are investigated.

## 7.4 TEST RESULTS

| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2404 | 1.272 | ----- | PASS |
| Middle | 2440 | 1.320 | ----- | PASS |
| High | 2476 | 1.330 | ----- | PASS |



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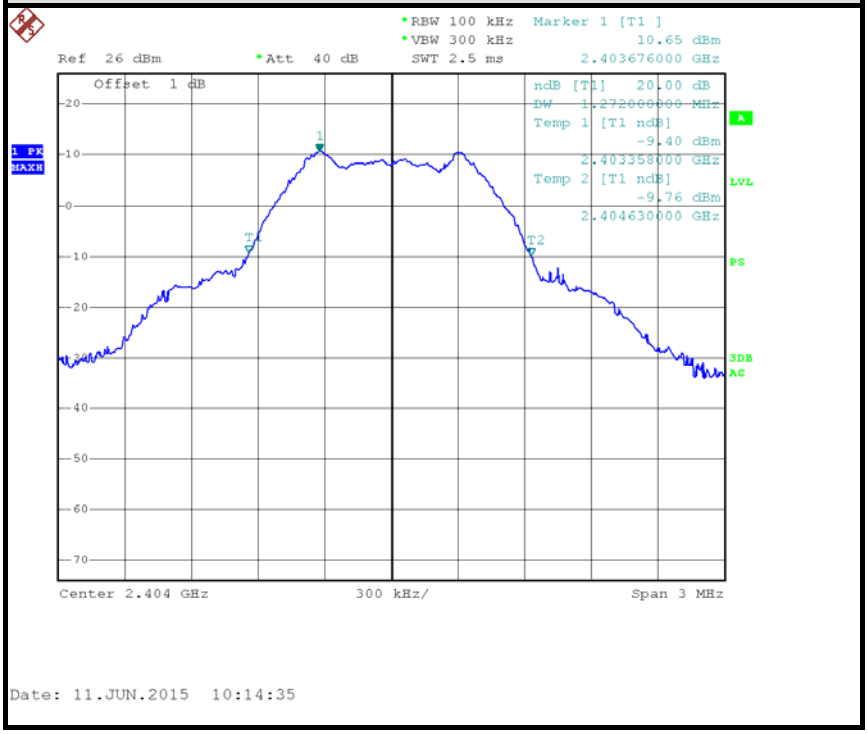
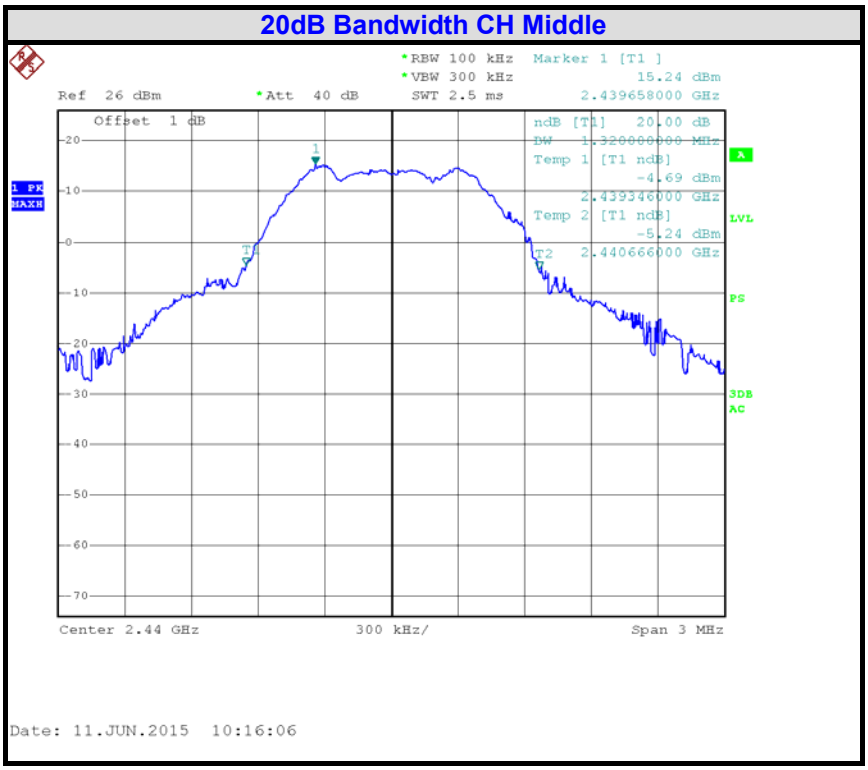
## Test Plot

**20dB Bandwidth CH Low**




**20dB Bandwidth CH Middle**



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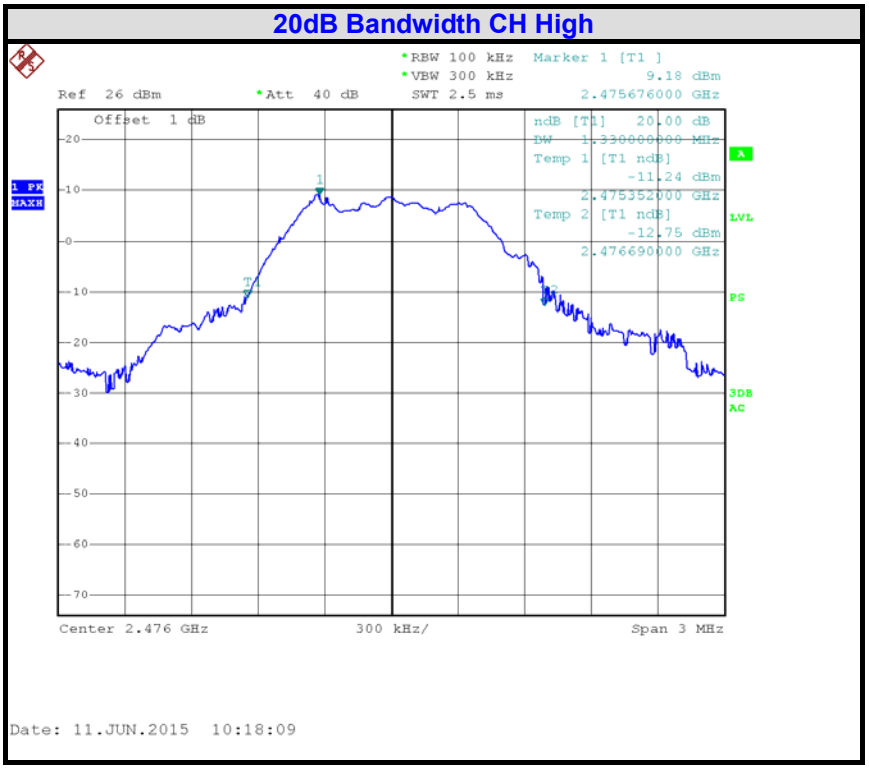
## 20dB Bandwidth CH High



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# 8.0 PEAK POWER

## 8.1 LIMIT

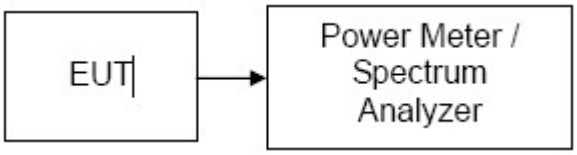
The maximum peak output power of the intentional radiator shall not exceed the following:

1. For frequency hopping systems operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W, and the e.i.r.p. shall not exceed 1 W if the hopset uses less than 50 hopping channels.
2. For frequency hopping systems operating in the band 2400-2483.5 MHz and employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W. Except as provided in Section A8.4 (5), the e.i.r.p. shall not exceed 4 W.
3. For frequency hopping systems operating in the band 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4 (5), the e.i.r.p. shall not exceed 4 W.
4. For systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4 (5), the e.i.r.p. shall not exceed 4 W.
5. Point-to-point systems in the bands 2400-2483.5 MHz and 5725-5850 MHz are permitted to have an e.i.r.p. higher than 4 W provided that the higher e.i.r.p. is achieved by employing higher gain directional antennas and not higher transmitter output powers. Point-to-multipoint systems, omnidirectional applications and multiple co-located transmitters transmitting the same information are prohibited from exceeding 4 W e.i.r.p. However, remote stations of point-to-multipoint systems shall be allowed to operate at greater than 4 W e.i.r.p. under the same conditions as for point-topoint systems.

## 8.2 MEASUREMENT EQUIPMENT USED

| Peak Power | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2017/03 |
| 2 | Power meter | ROHDE & SCHWARZ | NRVS | 842856/049 | 2017/03 |

## 8.3 TEST CONDIGURATION



## 8.4 TEST PROCEDURE

1. Set span to encompass the entire emission bandwidth of the signal.
2. Set RBW = 1 MHz.
3. Set VBW = 3 MHz.
4. Use sample detector mode if bin width (i.e., span/number of points in spectrum display) < 0.5 RBW. Otherwise use peak detector mode.
5. Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power Intervals, the trigger may be set to “free run”.
6. Mark the peak frequency and channel power function on spectrum.
7. Repeat until all the test channels are investigated.



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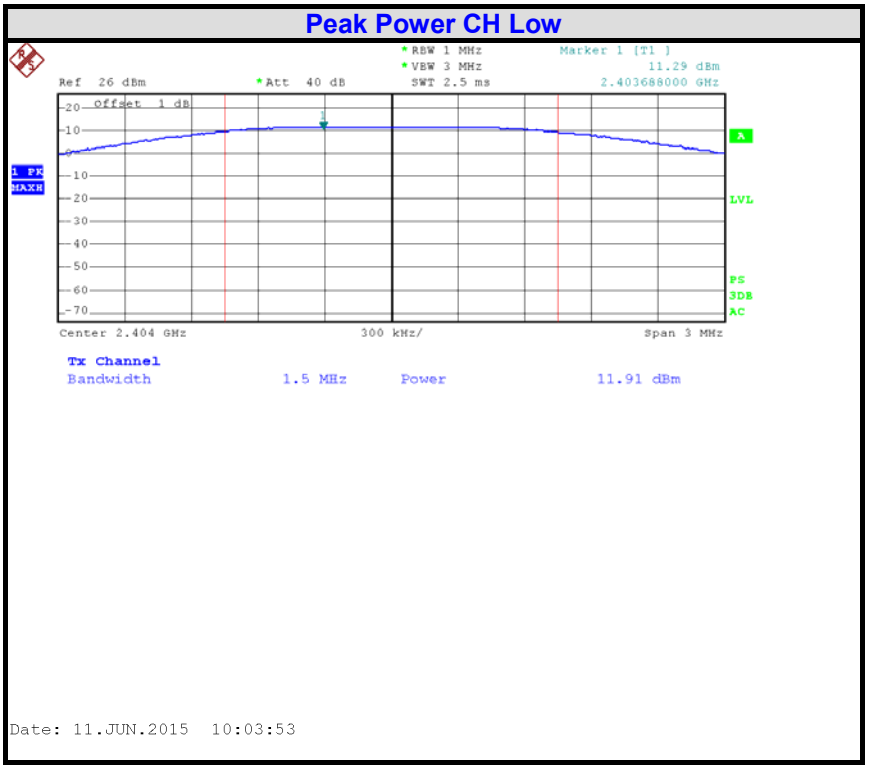
## 8.5 TEST RESULTS

**Passed**
**Test Data**

| Channel | Frequency (MHz) | Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2404 | 11.91 | 21 | PASS |
| Middle | 2440 | 17.35 | 21 | PASS |
| High | 2476 | 10.34 | 21 | PASS |



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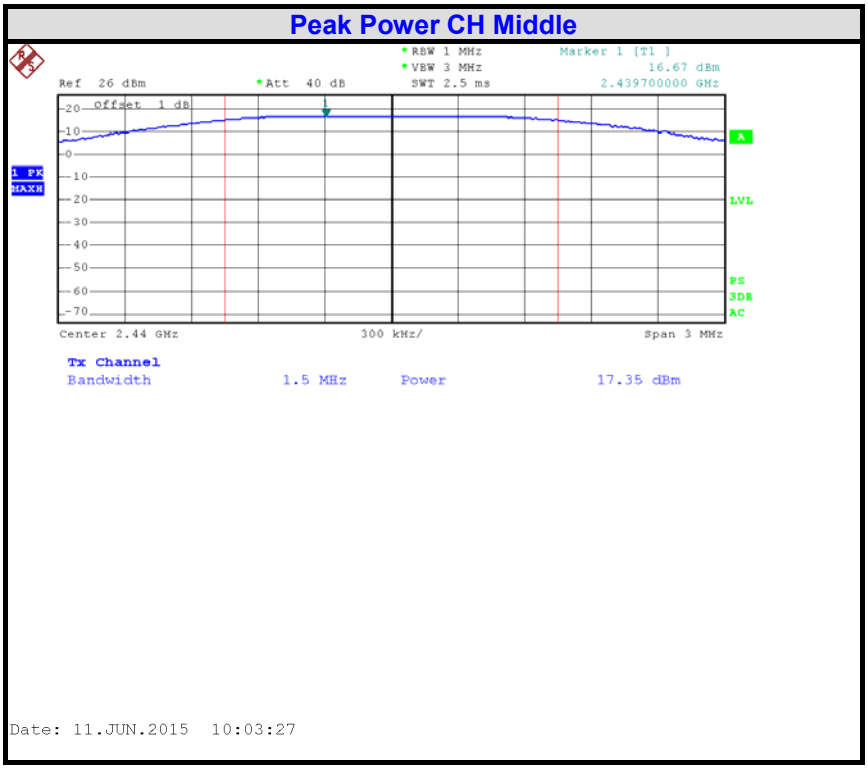
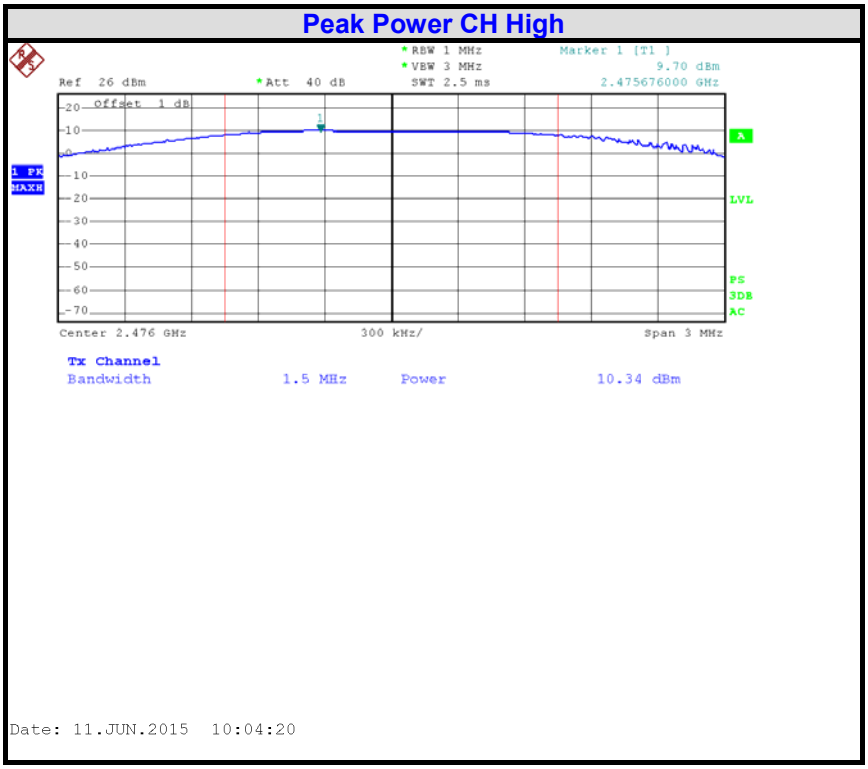
## Peak Power CH Middle




## Peak Power CH High



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# 9.0 PEAK POWER SPECTRAL DENSITY

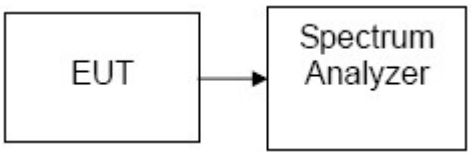
## 9.1 LIMIT

1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section

## 9.2 MEASUREMENT EQUIPMENT USED

| Peak Power Spectral Density | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2017/03 |

## 9.2 TEST CONFIGURATION




## 9.3 TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 300kHz, Sweep=100s
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed.

## 9.4 TEST RESULTS

Not applicable for frequency hopping systems device.



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# 10.0 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

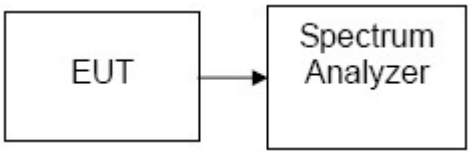
## 10.1 LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the100 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

## 10.2 MEASUREMENT EQUIPMENT USED

| Radiated disturbance (electric field) | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2017/03 |

## 10.3 TEST CONFIGURATION




## 10.4 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation
   RBW = 100KHz(1% of the span)
   VBW =3RBW
   Sweep = auto

Detector function = peak
Trace = max hold

4. Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Plot the result on the screen of spectrum analyzer.
5. Repeat above procedures until all measured frequencies were complete.

## 10.5 TEST RESULTS

Refer to attach spectrum analyzer data chart.



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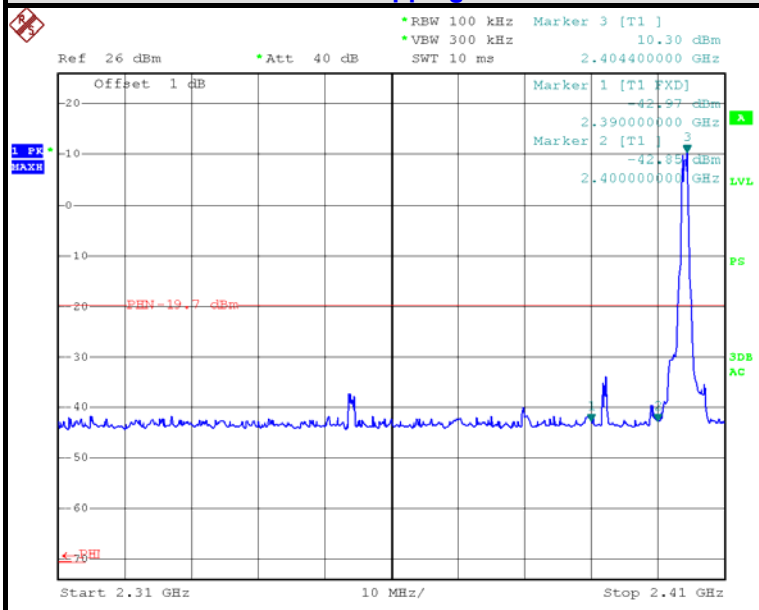
## Conducted Band Edges (CH-Low)-Peak

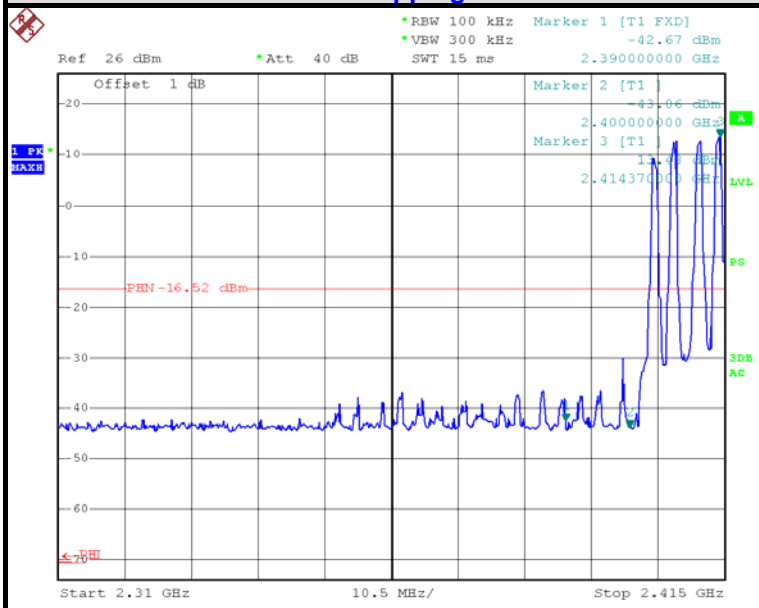
### Hopping Off




Date: 11.JUN.2015 10:44:44

## Conducted Band Edges (CH-Low)-Peak

### Hopping On




Date: 11.JUN.2015 10:46:45



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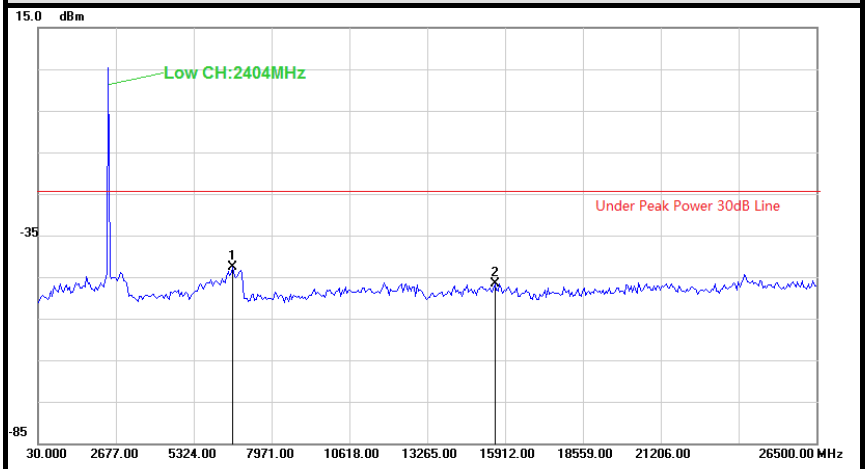
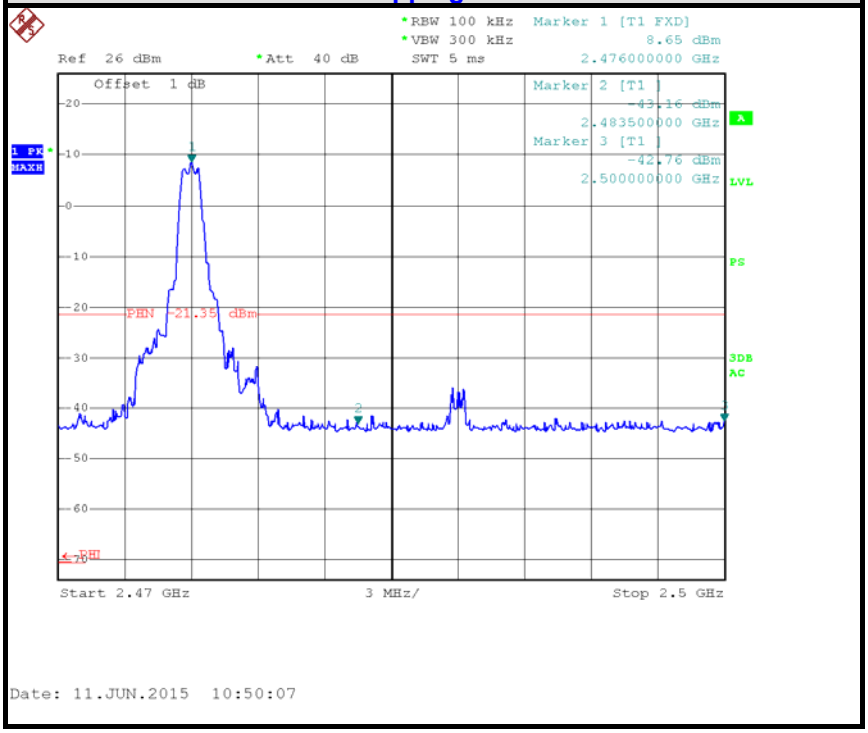
**Spurious Emission Conducted Measurment**

**Low CH:2404.0MHz**




**Conducted Band Edges (High CH)-Peak**

**Hopping Off**



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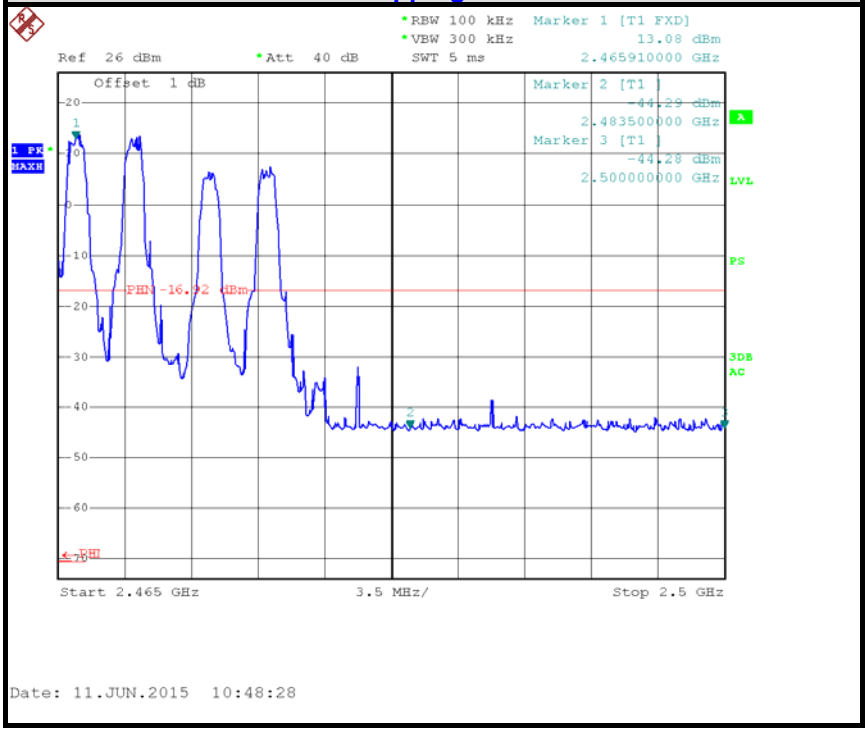
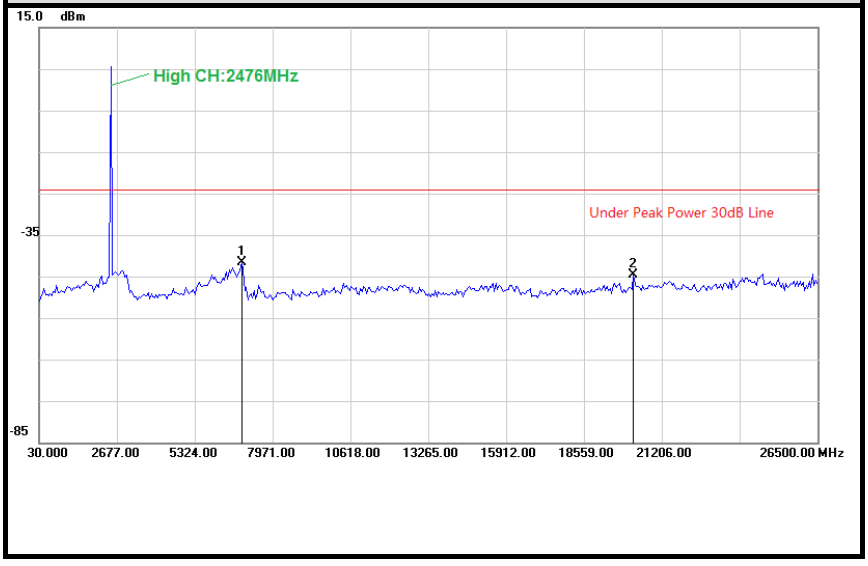
## Conducted Band Edges (High-CH)-Peak

### Hopping On




## Spurious Emission Conducted Measurment

### High CH:2476.0MHz



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# 11.0 FREQUENCY SEPARATION

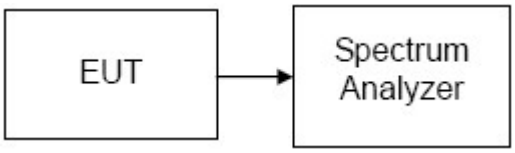
## 11.1 LIMIT

According to FCC Part 15.247(a)(1), RSS-247 Issue 2:5.1(2), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

## 11.2 MEASUREMENT EQUIPMENT USED

| Frequency Separation | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2017/03 |

## 11.3 TEST CONFIGURATION




## 11.4 TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel.
4. Set the spectrum analyzer as RBW=100KHz, VBW=300KHz, Adjust Span to 3 MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

## 11.5 TEST RESULTS

PASSED



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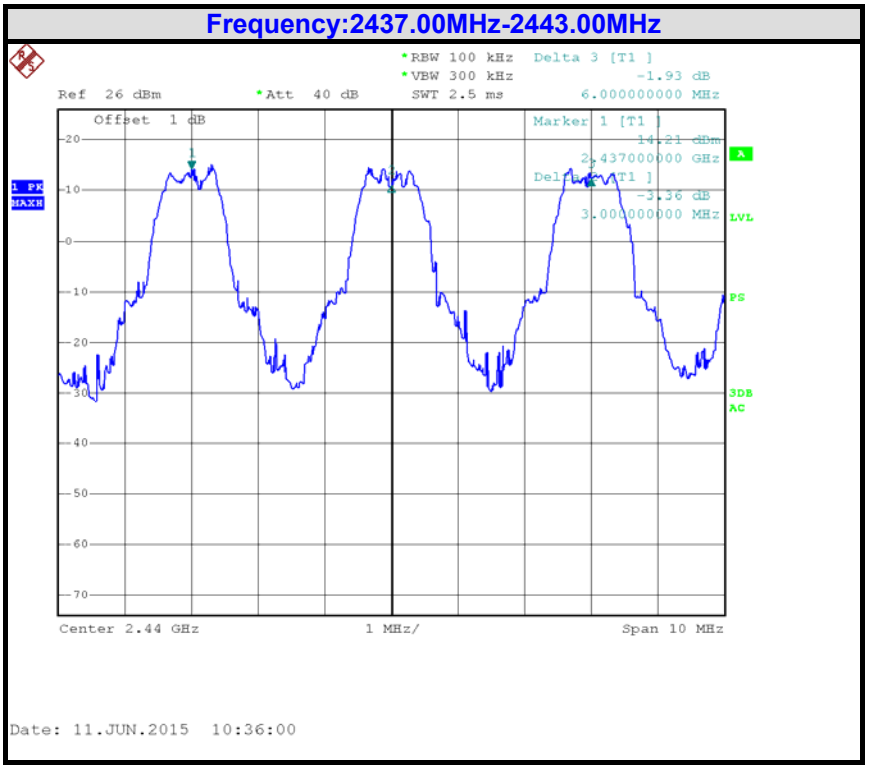
## Test Data

| Channel Separation (MHz) | Two-thirds of the 20dB Bandwidth (MHz) | Channel Separation Limit | Result |
|---|---|---|---|
| 3MHz | 0.87MHz | > Two-thirds of the 20 dB Bandwidth | PASSED |



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# 12.0 NUMBER OF HOPPING FREQUENCY

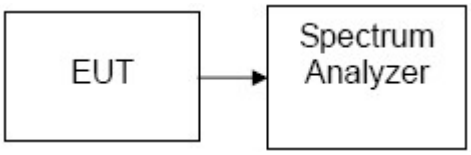
## 12.1 LIMIT

According to FCC Part 15.247(a)(1)(iii), RSS-247 Issue 2:5.4(c), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

## 12.2 MEASUREMENT EQUIPMENT USED

| Peak Power Spectral Density | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2017/03 |

## 12.3 TEST CONFIGURATION




## 12.4 TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set spectrum analyzer Start=2400MHz, Stop = 2440 MHz, Sweep = 1ms and Start=2443MHz, Stop = 2483.5MHz, Sweep = 1ms.
4. Set the spectrum analyzer as RBW, VBW=100KHz,
5. Max hold, view and count how many channel in the band.

## 12.5 TEST RESULTS

PASSED

## 12.6 TEST DATA

| Result(No. of CH) | Limit | Result |
|---|---|---|
| **23** | **>15** | **Pass** |



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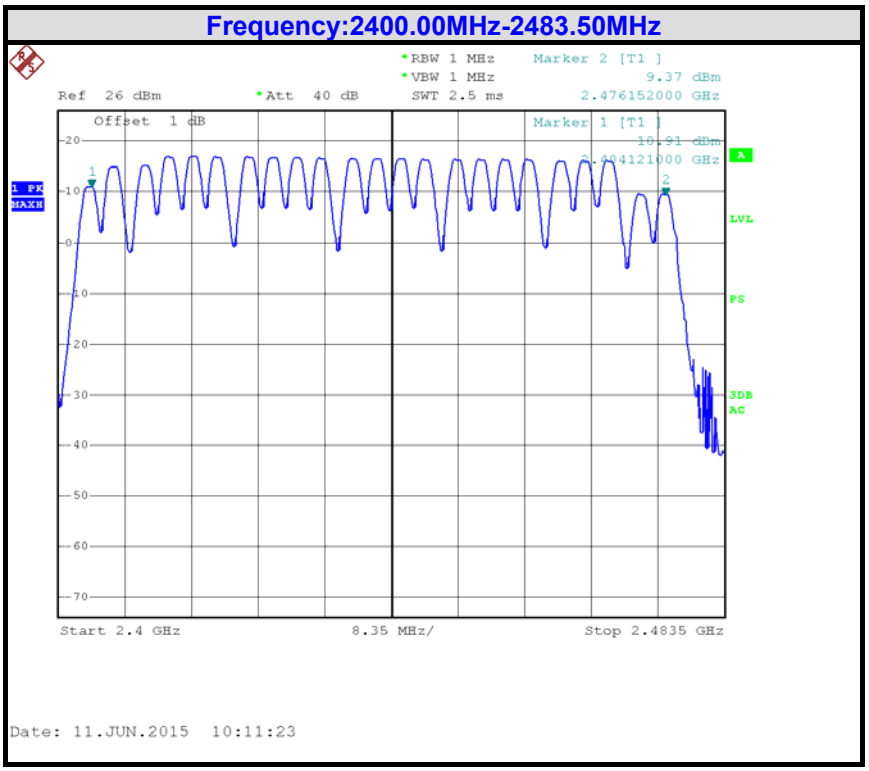
## Test Plot



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# 13.0 TIME OF OCCUPANCY (DWELL TIME)

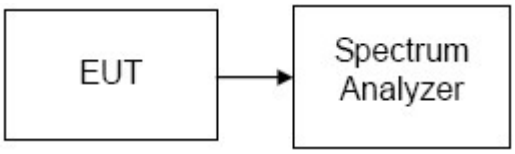
## 13.1 LIMIT

According to FCC Part 15.247(a)(1)(iii), RSS-247 Issue 2:5.4(3), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

## 13.2 MEASUREMENT EQUIPMENT USED

| Frequency Separation | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2017/03 |

## 13.3 TEST CONFIGURATION




## 13.4 TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.
5. Repeat above procedures until all frequency measured were complete.

## 13.5 TEST RESULTS

PASSED

## 13.6 TEST DATA

**Dwell time:** 1.72*4*10= 68.80(ms)

| Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|---|---|---|---|---|
| 1.72 | 68.80 | 9.2(23*0.4) | 400.00 | PASS |



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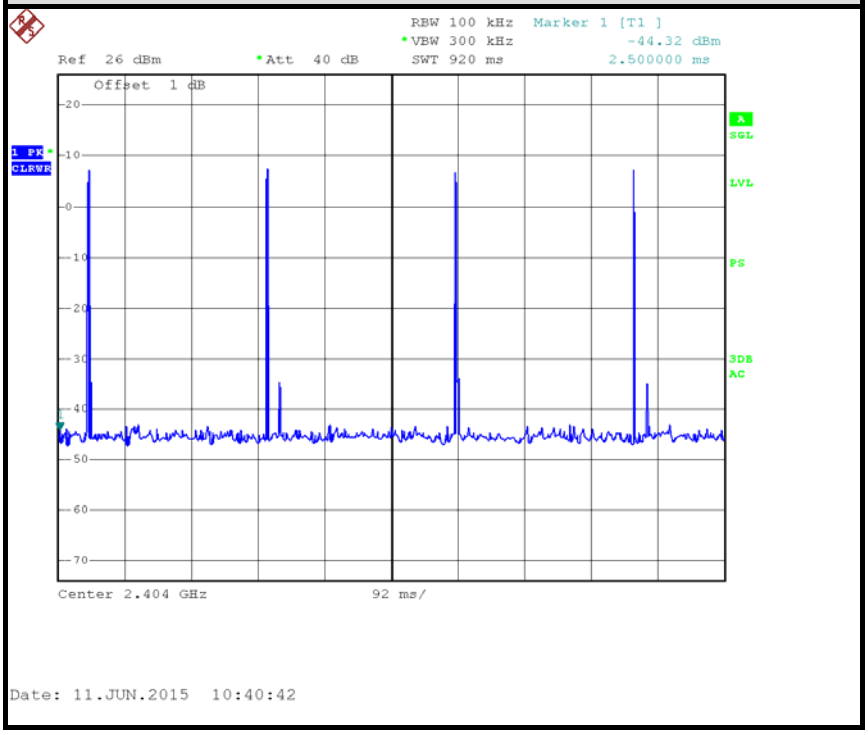
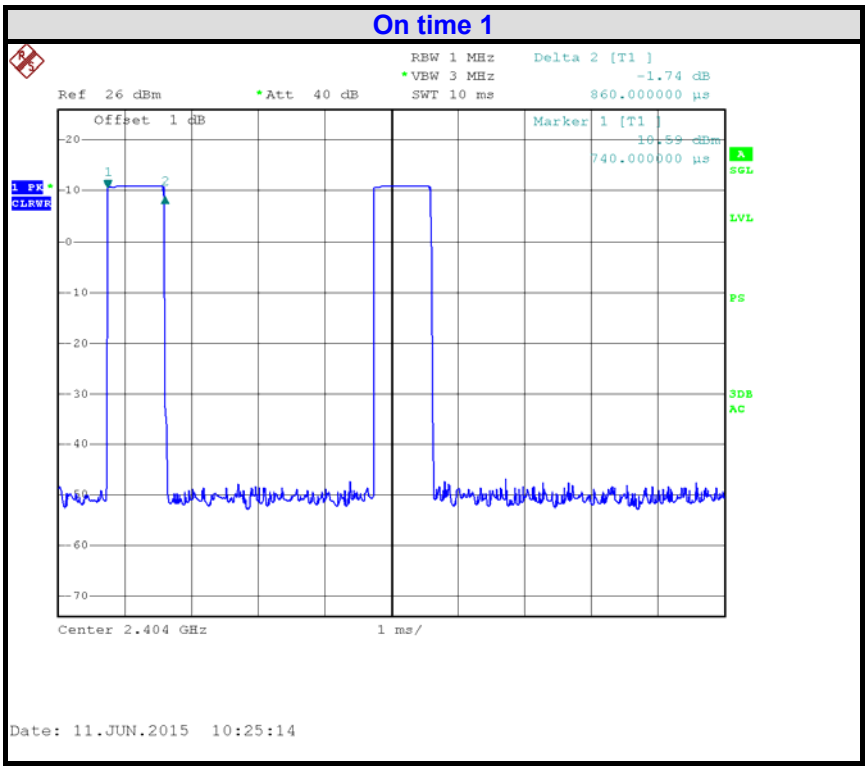
## Test Plot

**Total Pulse in 0.104s**




**On time 1**



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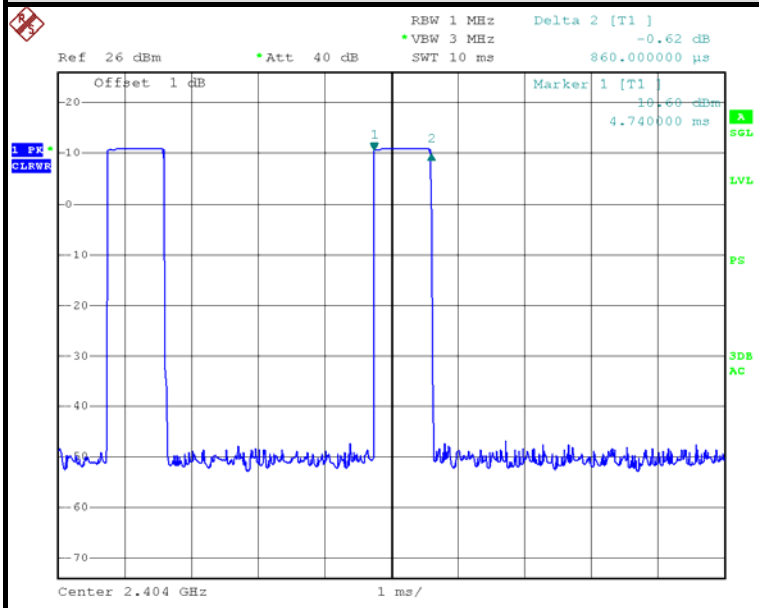
**On time 2**



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# 14.0 TRANSMITTER UNWANTED EMISSIONS

## 14.1 LIMIT

According to RSS-Gen Issue 4:4.9.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 | DISTANCE Meters | FIELD STRENGTHS LIMIT | |
|---|---|---|---|
| | | μV/m | dB(μV)/m |
| 0.009 ~ 0.490 | 300 | 2400/F(kHz) | --- |
| 0.490 ~ 1.705 | 30 | 24000/F(kHz) | --- |
| 1.705 ~ 30 | 30 | 30 | --- |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | Other:74.0 dB(μV)/m (Peak)<br>54.0 dB(μV)/m (Average) | |

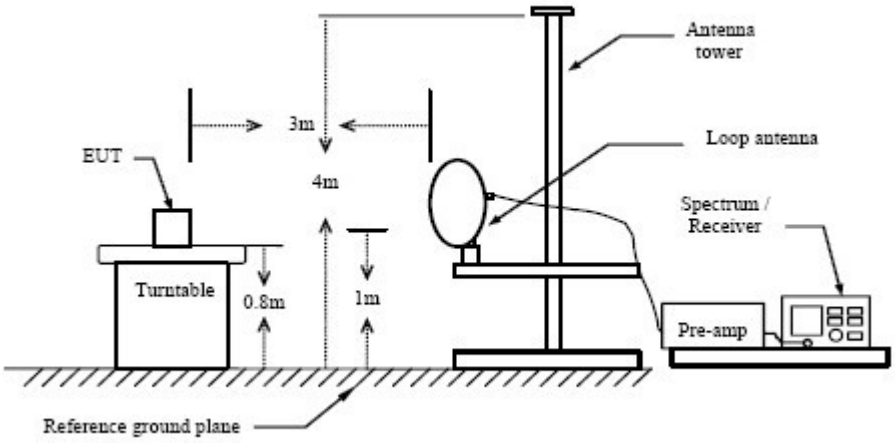
Note: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

## 14.2 TEST EQUIPMENT

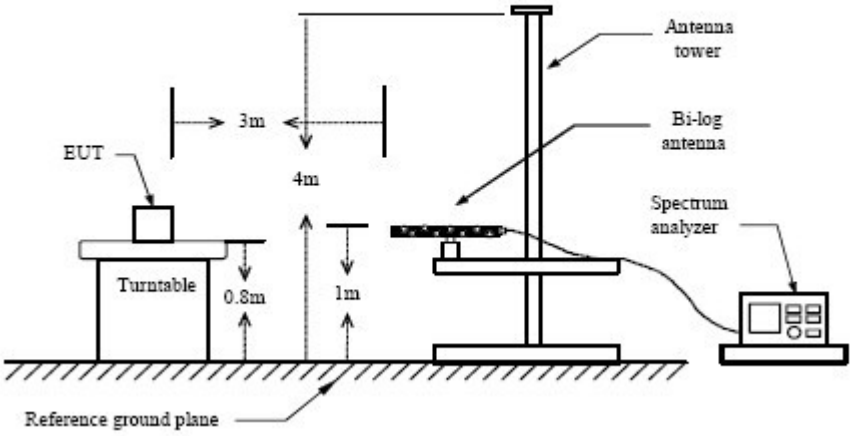
| Radiated disturbance (electric field) | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | EMI Test Receiver | ROHDE & SCHWARZ | ESCI | 100868 | 2016/10 |
| 2 | Biconical Antenna | ROHDE & SCHWARZ | HK116 | 100221 | 2017/03 |
| 3 | Log per Antenna | ROHDE & SCHWARZ | HL223 | 100226 | 2017/03 |
| 4 | Log per Antenna | ROHDE & SCHWARZ | HL050 | 100186 | 2017/03 |
| 5 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2017/03 |
| 6 | Loop Antenna | A.R.A | PLA-1030/B | 1030 | 2016/10 |
| 7 | EMI Test Software | EZ-EMC | Farad | N/A | N/A |

## 14.3 TEST CONFIGURATION

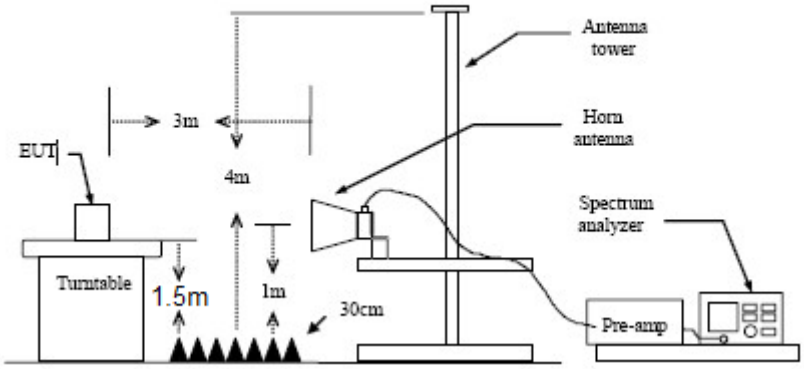
Below 30MHz




Below 1 GHz




Above 1 GHz



## 14.4 TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m (1.5m for Above 1GHz ) above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

## 14.5 TEST RESULTS

The frequency range from 9KHz~30MHz,30MHz to 230MHz, 230MHz to 1000MHz and above 1GHz. is investigated. Please see the following pages.



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| | | | |
|---|---|---|---|
| Test Mode:<br>Frequency range: | TX –X Position Mode<br>9KHz~30MHz | Result: | ■ - passed<br>□ - not passed |

| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| Remark: The test result reading value is to low, margin all > 20dB of the limit. | | | | | | | |



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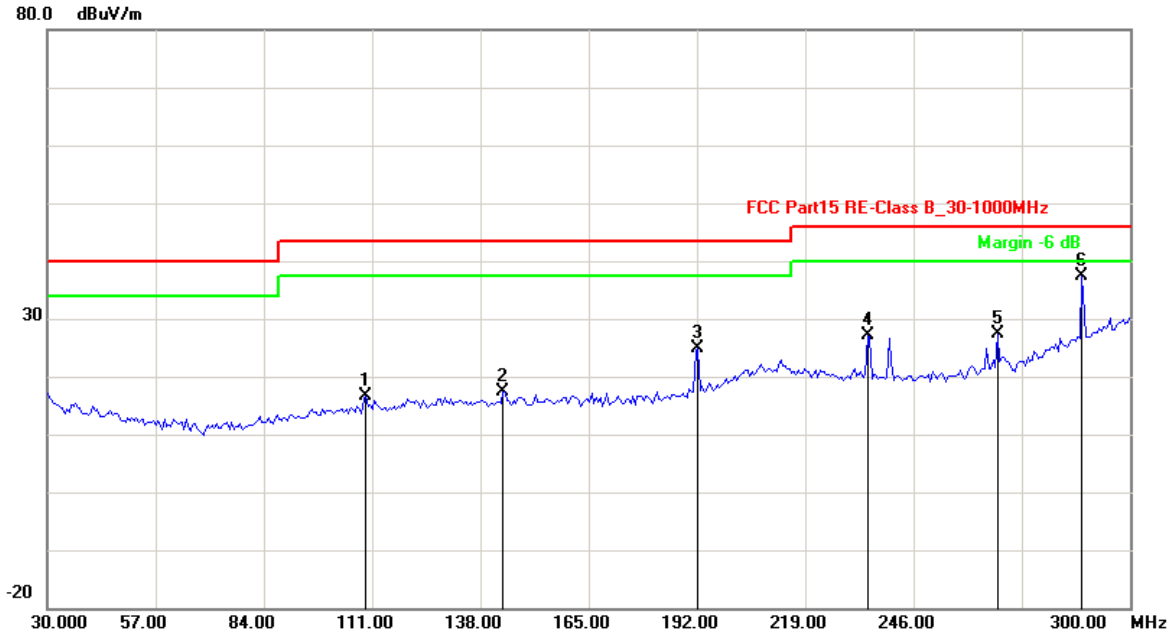
| | |
|---|---|
| EUT | DXe Transmitter 2.4GHZ |
| Operating Condition | Battery 1.5V*4 |
| Test Condition | Ambient Temperature: 25°C Humidity: 56% |
| Test distance | 3 Meter |
| Operator | **Duke** |
| MODEL NO | DXe Transmitter 2.4GHZ |

| | | | |
|---|---|---|---|
| Channel:<br>Test point:<br>Frequency range: | TX –X Position<br>Horizontal<br>30MHz-1GHz | Result: | ■ - passed<br>□ - not passed |




| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 109.5390 | -16.73 | 33.31 | 16.58 | 43.50 | -26.92 | QP |
| 2 | 143.6272 | -15.37 | 32.76 | 17.39 | 43.50 | -26.11 | QP |
| 3 | 192.3246 | -13.35 | 38.16 | 24.81 | 43.50 | -18.69 | QP |
| 4 | 234.5290 | -11.21 | 38.32 | 27.11 | 46.00 | -18.89 | QP |
| 5 | 266.9939 | -9.91 | 37.28 | 27.37 | 46.00 | -18.63 | QP |
| 6 | 288.0961 | -4.33 | 41.75 | 37.42 | 46.00 | -8.58 | QP |
| Remark: Other frequency mini margin all >6 dB of Limit | | | | | | | |



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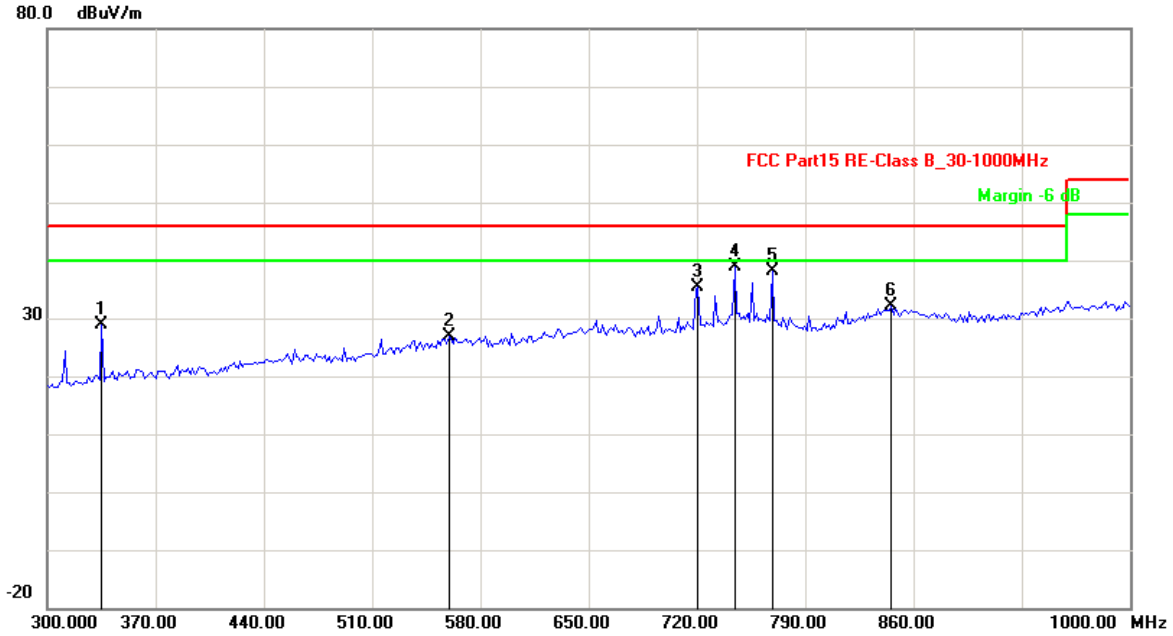


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 335.0701 | -11.66 | 40.47 | 28.81 | 46.00 | -17.19 | QP |
| 2 | 559.5190 | -5.49 | 32.46 | 26.97 | 46.00 | -19.03 | QP |
| 3 | 720.8417 | -2.45 | 37.77 | 35.32 | 46.00 | -10.68 | QP |
| 4 | 744.6894 | -1.53 | 40.29 | 38.76 | 46.00 | -7.24 | QP |
| 5 | 768.5371 | -1.93 | 40.07 | 38.14 | 46.00 | -7.86 | QP |
| 6 | 845.6914 | -0.37 | 32.52 | 32.15 | 46.00 | -13.85 | QP |
| Remark: Other frequency mini margin all >6 dB of Limit | | | | | | | |

| | | | |
|---|---|---|---|
| Channel: | Low Channel | Result: | ■ - passed |
| Test point: | Horizontal | | □ - not passed |
| Frequency range: | 1GHz-26.5GHz | | |

| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 4130.261 | 3.01 | 37.78 | 40.79 | 74.00 | -33.21 | peak |
| 2 | 4130.261 | 3.01 | 25.65 | 28.66 | 54.00 | -25.34 | AVG |
| 3 | 6268.537 | 9.56 | 40.55 | 50.11 | 74.00 | -23.89 | peak |
| 4 | 6268.537 | 9.56 | 29.18 | 38.74 | 54.00 | -15.26 | AVG |
| Remark: Other frequency mini margin all >20 dB of Limit | | | | | | | |



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| | | | |
|---|---|---|---|
| Channel: | Middle Channel | Result: | ■ - passed<br>□ - not passed |
| Test point: | Horizontal | | |
| Frequency range: | 1GHz-26.5GHz | | |

| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 4460.922 | 4.12 | 36.97 | 41.09 | 74.00 | -32.91 | peak |
| 2 | 4460.922 | 4.12 | 24.67 | 28.79 | 54.00 | -25.21 | AVG |
| 3 | 7260.521 | 12.05 | 37.05 | 49.10 | 74.00 | -24.90 | peak |
| 4 | 7260.521 | 12.05 | 24.69 | 36.74 | 54.00 | -17.26 | AVG |
| Remark: Other frequency mini margin all >20 dB of Limit | | | | | | | |

| | | | |
|---|---|---|---|
| Channel: | High Channel | Result: | ■ - passed<br>□ - not passed |
| Test point: | Horizontal | | |
| Frequency range: | 1GHz-26.5GHz | | |

| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 1529.058 | 1.99 | 38.45 | 40.44 | 74.00 | -33.56 | peak |
| 2 | 1529.058 | 1.99 | 26.48 | 28.47 | 54.00 | -25.53 | AVG |
| 3 | 5034.068 | 6.03 | 38.02 | 44.05 | 74.00 | -29.95 | peak |
| 4 | 5034.068 | 6.03 | 26.43 | 32.46 | 54.00 | -21.54 | AVG |
| Remark: Other frequency mini margin all >20 dB of Limit | | | | | | | |



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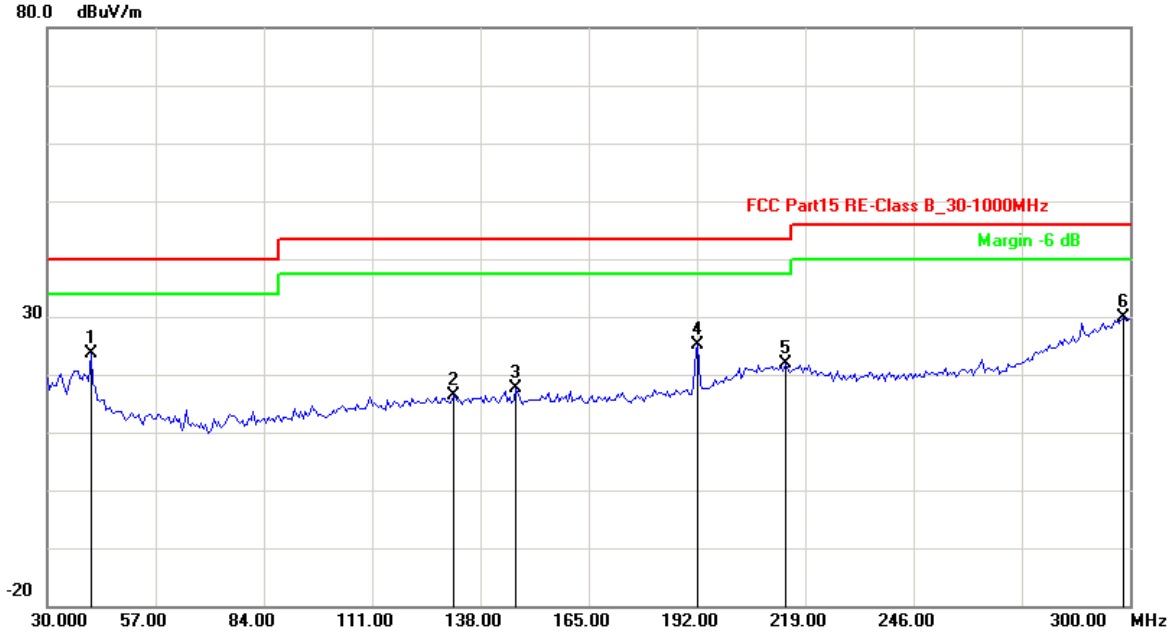
| | | | |
|---|---|---|---|
| Channel: | TX –X Position | Result: | ■ - passed<br>□ - not passed |
| Test point: | Vertical | | |
| Frequency range: | 30MHz-1GHz | | |




| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 40.8216 | -16.57 | 40.30 | 23.73 | 40.00 | -16.27 | QP |
| 2 | 131.1824 | -15.53 | 31.87 | 16.34 | 43.50 | -27.16 | QP |
| 3 | 146.8737 | -15.33 | 32.88 | 17.55 | 43.50 | -25.95 | QP |
| 4 | 192.3246 | -13.35 | 38.51 | 25.16 | 43.50 | -18.34 | QP |
| 5 | 213.9679 | -9.92 | 31.86 | 21.94 | 43.50 | -21.56 | QP |
| 6 | 298.3768 | -1.56 | 31.55 | 29.99 | 46.00 | -16.01 | QP |
| Remark: Other frequency mini margin all >6 dB of Limit | | | | | | | |



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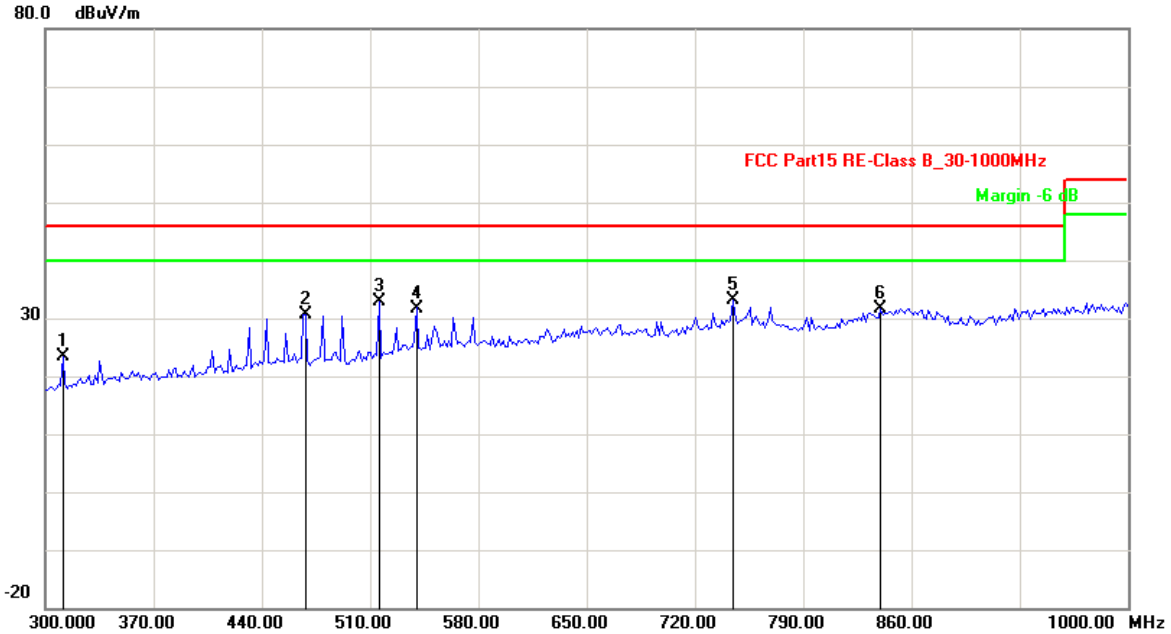


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 311.2223 | -12.66 | 36.04 | 23.38 | 46.00 | -22.62 | QP |
| 2 | 468.3366 | -8.01 | 38.67 | 30.66 | 46.00 | -15.34 | QP |
| 3 | 516.0319 | -6.97 | 39.85 | 32.88 | 46.00 | -13.12 | QP |
| 4 | 539.8797 | -5.94 | 37.69 | 31.75 | 46.00 | -14.25 | QP |
| 5 | 744.6893 | -1.53 | 34.78 | 33.25 | 46.00 | -12.75 | QP |
| 6 | 840.0801 | -0.69 | 32.35 | 31.66 | 46.00 | -14.34 | QP |
| Remark: Other frequency mini margin all >6 dB of Limit | | | | | | | |

| | | | |
|---|---|---|---|
| Channel: | Low Channel | Result: | ■ - passed |
| Test point: | Vertical | | □ - not passed |
| Frequency range: | 1GHz-26.5GHz | | |

| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 3777.555 | 3.02 | 37.95 | 40.97 | 74.00 | -33.03 | peak |
| 2 | 3777.555 | 3.02 | 25.77 | 28.79 | 54.00 | -25.21 | AVG |
| 3 | 6026.052 | 8.95 | 40.46 | 49.41 | 74.00 | -24.59 | peak |
| 4 | 6026.052 | 8.95 | 28.74 | 37.69 | 54.00 | -16.31 | AVG |
| Remark: Other frequency mini margin all >20 dB of Limit | | | | | | | |



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| | | | |
|---|---|---|---|
| Channel: | Middle Channel | Result: | ■ - passed<br>□ - not passed |
| Test point: | Vertical | | |
| Frequency range: | 1GHz-26.5GHz | | |

| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 4438.878 | 4.04 | 36.73 | 40.77 | 74.00 | -33.23 | peak |
| 2 | 4438.878 | 4.04 | 24.61 | 28.65 | 54.00 | -25.35 | AVG |
| 3 | 6290.581 | 9.62 | 39.18 | 48.80 | 74.00 | -25.20 | peak |
| 4 | 6290.581 | 9.62 | 26.79 | 36.41 | 54.00 | -17.59 | AVG |
| Remark: Other frequency mini margin all >20 dB of Limit | | | | | | | |

| | | | |
|---|---|---|---|
| Channel: | High Channel | Result: | ■ - passed<br>□ - not passed |
| Test point: | Vertical | | |
| Frequency range: | 1GHz-26.5GHz | | |

| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 1462.926 | 1.48 | 40.07 | 41.55 | 74.00 | -32.45 | peak |
| 2 | 1462.926 | 1.48 | 27.48 | 28.96 | 54.00 | -25.04 | AVG |
| 3 | 5078.156 | 6.16 | 37.94 | 44.10 | 74.00 | -29.90 | peak |
| 4 | 5078.156 | 6.16 | 26.25 | 32.41 | 54.00 | -21.59 | AVG |
| Remark: Other frequency mini margin all >20 dB of Limit | | | | | | | |



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# 15. 99% OCCUPIED BANDWIDTH

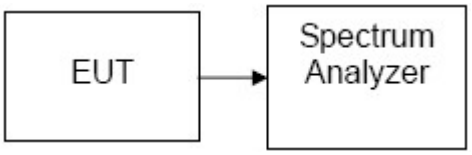
## 15.1 TEST PROCEDUR

According to RSS-Gen 4.6.1 The Bluetooth Dual HRM Strap output is connected to the spectrum analyzer. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual. The sweep time is coupled.

## 15.2. TEST EQUIPMENT

| Band Edge Compliance test | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | Log per Antenna | ROHDE & SCHWARZ | HL050 | 100186 | 2017/03/30 |
| 2 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2017/03/25 |

## 15.3 TEST CONFIGURATION




## 15.4 TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT, then connect a low loss RF cable from antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=100kHz, VBW=300kHz, Span=3MHz, Sweep = auto.
4. Mark the peak frequency and set 99% occupied bandwidth function on spectrum.
5. Repeat until all the test channels are investigated.

## 15.5 TEST RESULTS

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 2404 | 1.128 | ----- | PASS |
| Middle | 2440 | 1.176 | ----- | PASS |
| High | 2476 | 1.248 | ----- | PASS |



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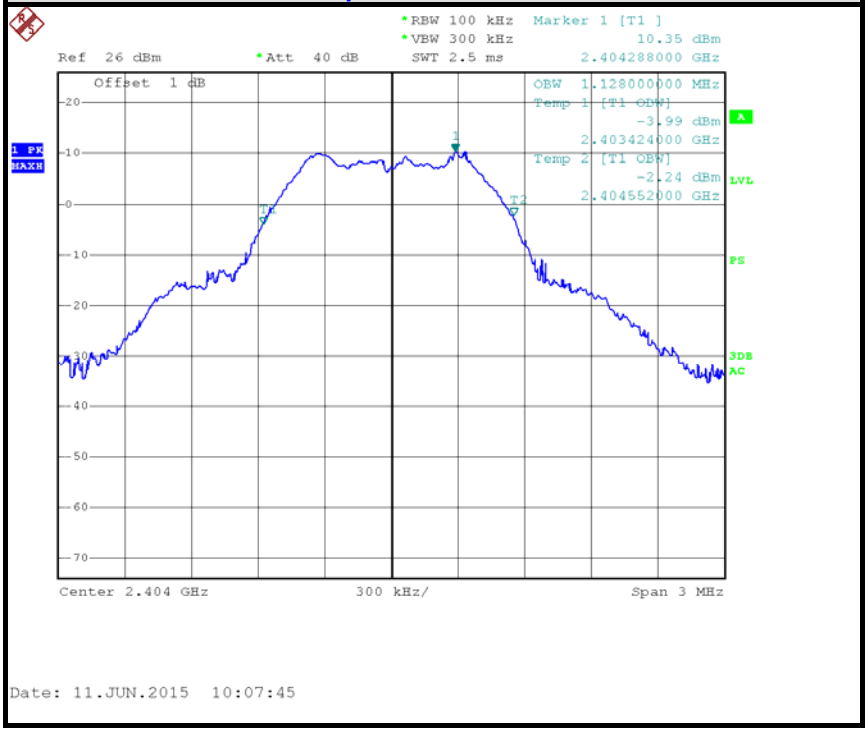
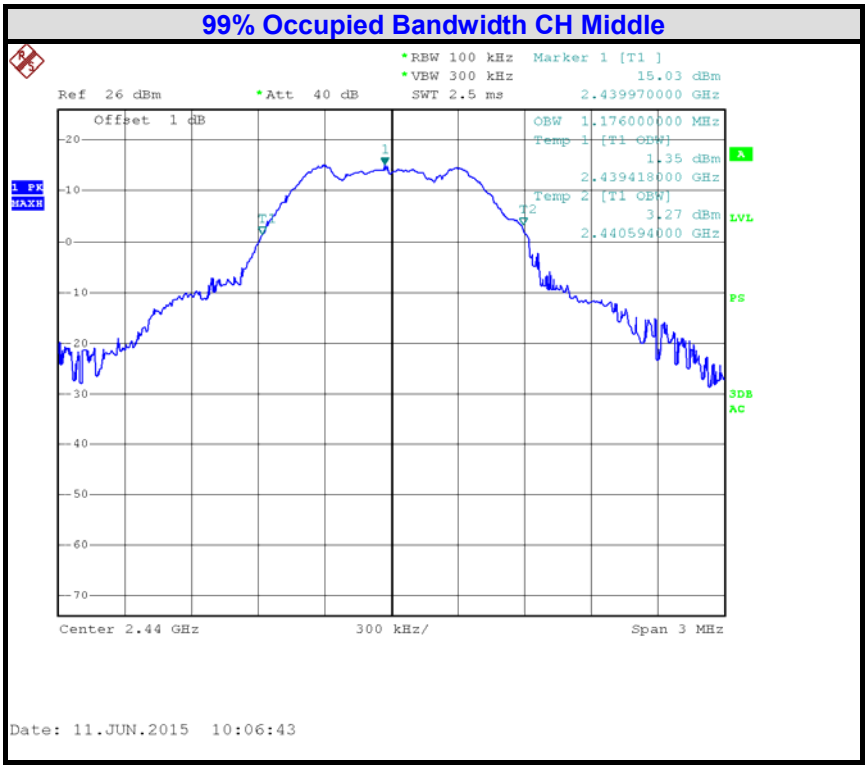
## Test Plot

**99% Occupied Bandwidth CH Low**




**99% Occupied Bandwidth CH Middle**



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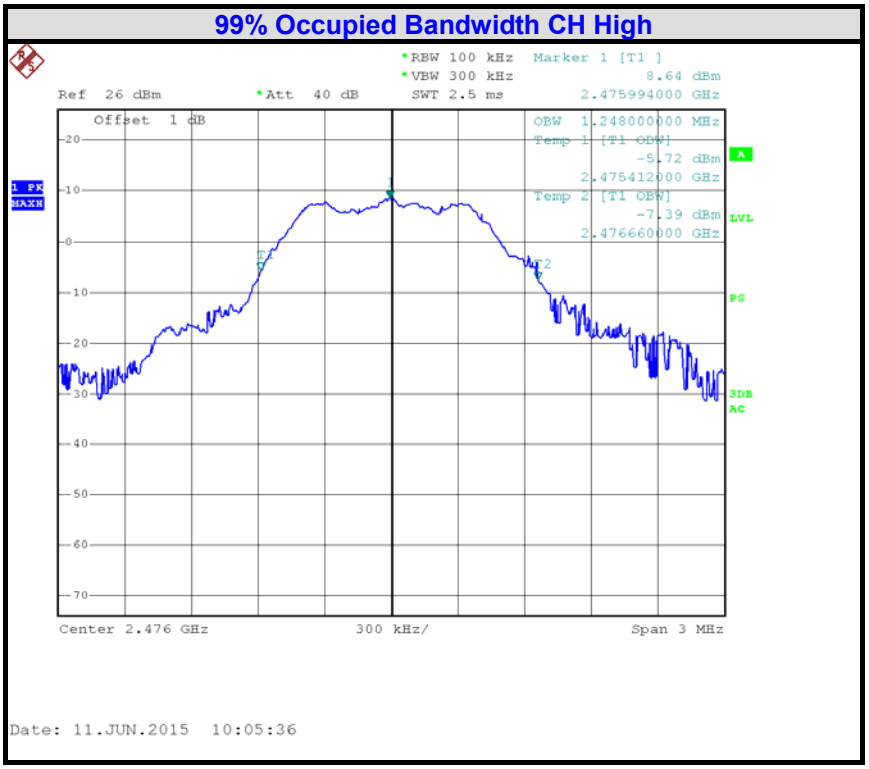
## 99% Occupied Bandwidth CH High



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# 16.0 RECEIVER SUPRIOUS EMISSION

## 16.1 LIMIT

According to RSS-Gen Issue 4:4.10.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 | DISTANCE Meters | FIELD STRENGTHS LIMIT | |
|---|---|---|---|
| | | μV/m | dB(μV)/m |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | Other:74.0 dB(μV)/m (Peak)<br>54.0 dB(μV)/m (Average) | |

## 16.2 TEST EQUIPMENT

| Radiated disturbance (electric field) | | | | | |
|---|---|---|---|---|---|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. |
| 1 | EMI Test Receiver | ROHDE & SCHWARZ | ESCI | 100868 | 2016/10 |
| 2 | Biconical Antenna | ROHDE & SCHWARZ | HK116 | 100221 | 2017/03 |
| 3 | Log per Antenna | ROHDE & SCHWARZ | HL223 | 100226 | 2017/03 |
| 4 | Log per Antenna | ROHDE & SCHWARZ | HL050 | 100186 | 2017/03 |
| 5 | Signal analyzer | ROHDE & SCHWARZ | FSIQ26 | 100311 | 2017/03 |
| 6 | Loop Antenna | A.R.A | PLA-1030/B | 1030 | 2016/10 |
| 7 | EMI Test Software | EZ-EMC | Farad | N/A | N/A |



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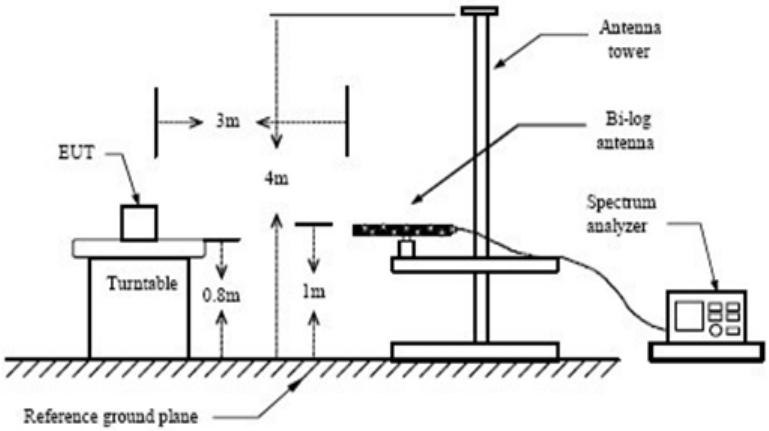
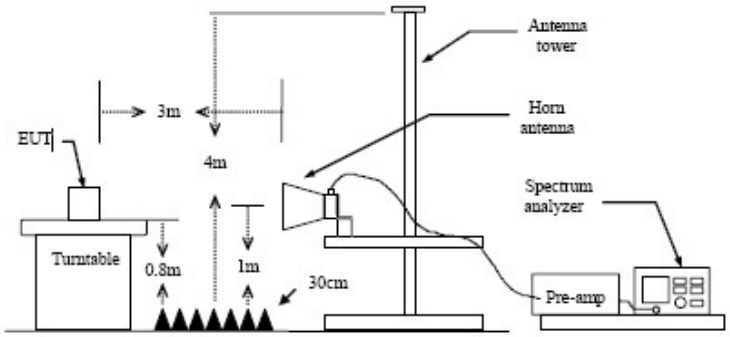
## 16.3 TEST CONFIGURATION

Below 1 GHz




Above 1 GHz




## 16.4 TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

## 16.5 TEST RESULTS



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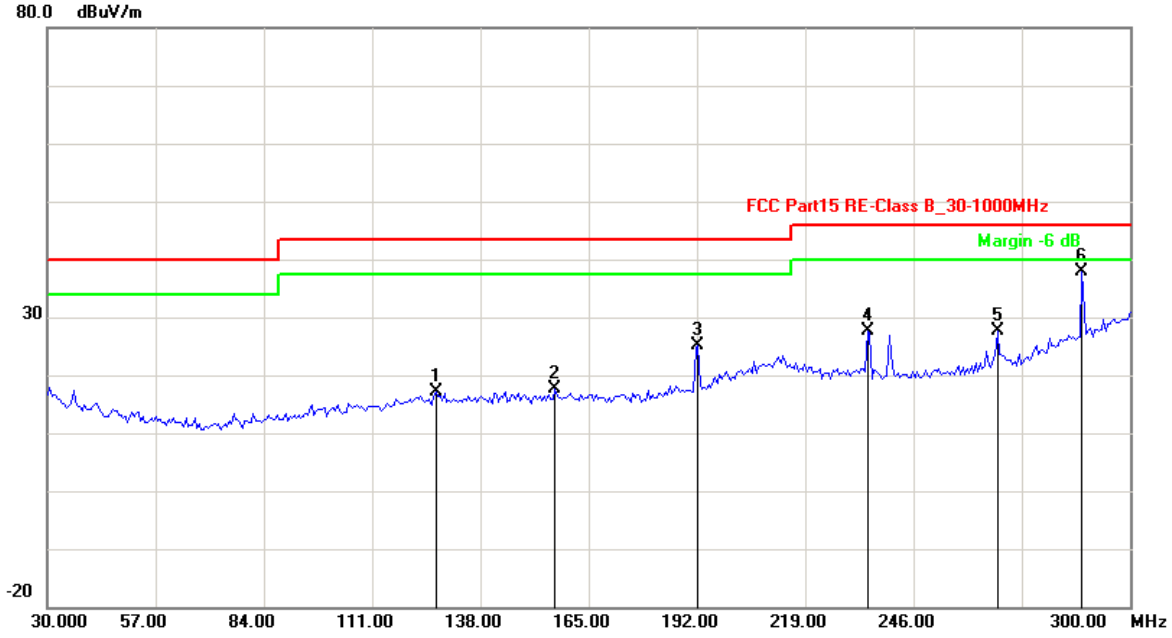
| | |
|---|---|
| EUT | DXe Transmitter 2.4GHZ |
| Operating Condition | Battery 1.5V*4 |
| Test Condition | Ambient Temperature: 25°C Humidity: 56% |
| Test distance | 3 Meter |
| Operator | **Duke** |
| MODEL NO | DXe Transmitter 2.4GHZ |

| | | | |
|---|---|---|---|
| Channel:<br>Test point:<br>Frequency range: | RX<br>Horizontal<br>30MHz-1GHz | Result: | ■ - passed<br>□ - not passed |




| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 126.8537 | -15.72 | 32.81 | 17.09 | 43.50 | -26.41 | QP |
| 2 | 156.6132 | -15.33 | 32.86 | 17.53 | 43.50 | -25.97 | QP |
| 3 | 192.3246 | -13.35 | 38.37 | 25.02 | 43.50 | -18.48 | QP |
| 4 | 234.5291 | -11.21 | 38.77 | 27.56 | 46.00 | -18.44 | QP |
| 5 | 266.9940 | -9.91 | 37.56 | 27.65 | 46.00 | -18.35 | QP |
| 6 | 288.0962 | -4.33 | 42.16 | 37.83 | 46.00 | -8.17 | QP |
| Remark: Other frequency mini margin all >6 dB of Limit | | | | | | | |



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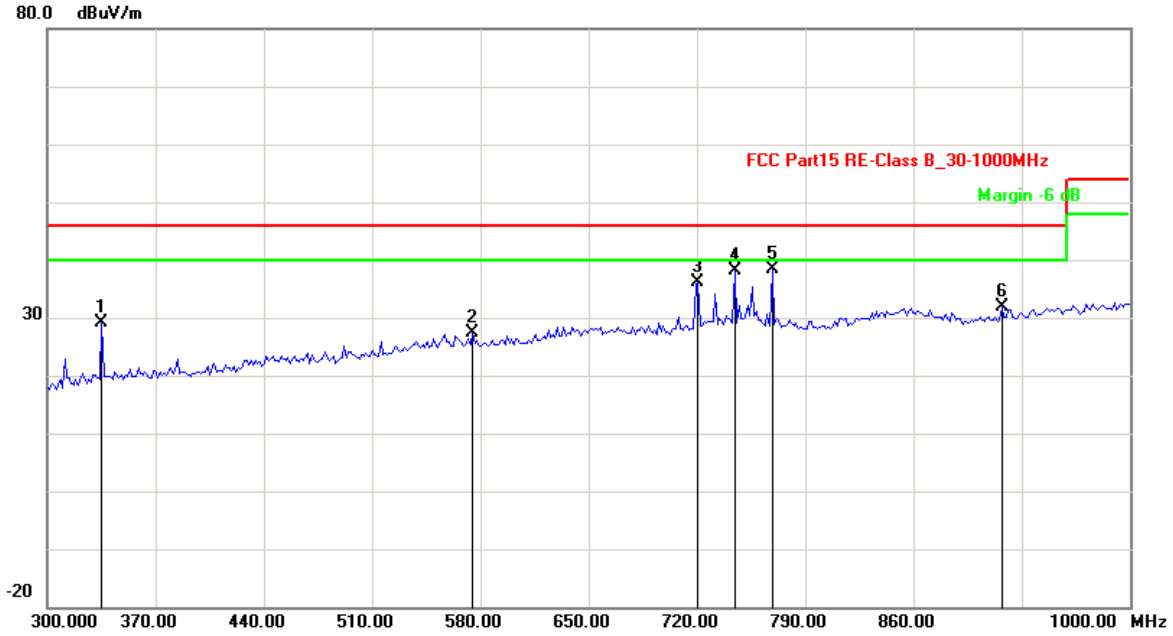


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 335.0701 | -11.66 | 40.74 | 29.08 | 46.00 | -16.92 | QP |
| 2 | 574.9498 | -5.47 | 32.86 | 27.39 | 46.00 | -18.61 | QP |
| 3 | 720.8416 | -2.45 | 38.65 | 36.20 | 46.00 | -9.80 | QP |
| 4 | 744.6893 | -1.53 | 39.57 | 38.04 | 46.00 | -7.96 | QP |
| 5 | 768.5370 | -1.93 | 40.20 | 38.27 | 46.00 | -7.73 | QP |
| 6 | 917.2344 | -1.02 | 32.84 | 31.82 | 46.00 | -14.18 | QP |
| Remark: Other frequency mini margin all >6 dB of Limit | | | | | | | |

| | | | |
|---|---|---|---|
| Channel: | RX | Result: | ■ - passed<br>□ - not passed |
| Test point: | Horizontal | | |
| Frequency range: | 1GHz-26.5GHz | | |

| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 1573.146 | 2.24 | 38.89 | 41.13 | 74.00 | -32.87 | peak |
| 2 | 1573.146 | 2.24 | 27.96 | 30.20 | 54.00 | -23.80 | AVG |
| 3 | 4681.363 | 4.86 | 37.04 | 41.90 | 74.00 | -32.10 | peak |
| 4 | 4681.363 | 4.86 | 25.48 | 30.34 | 54.00 | -23.66 | AVG |
| Remark: Other frequency mini margin all >20 dB of Limit | | | | | | | |



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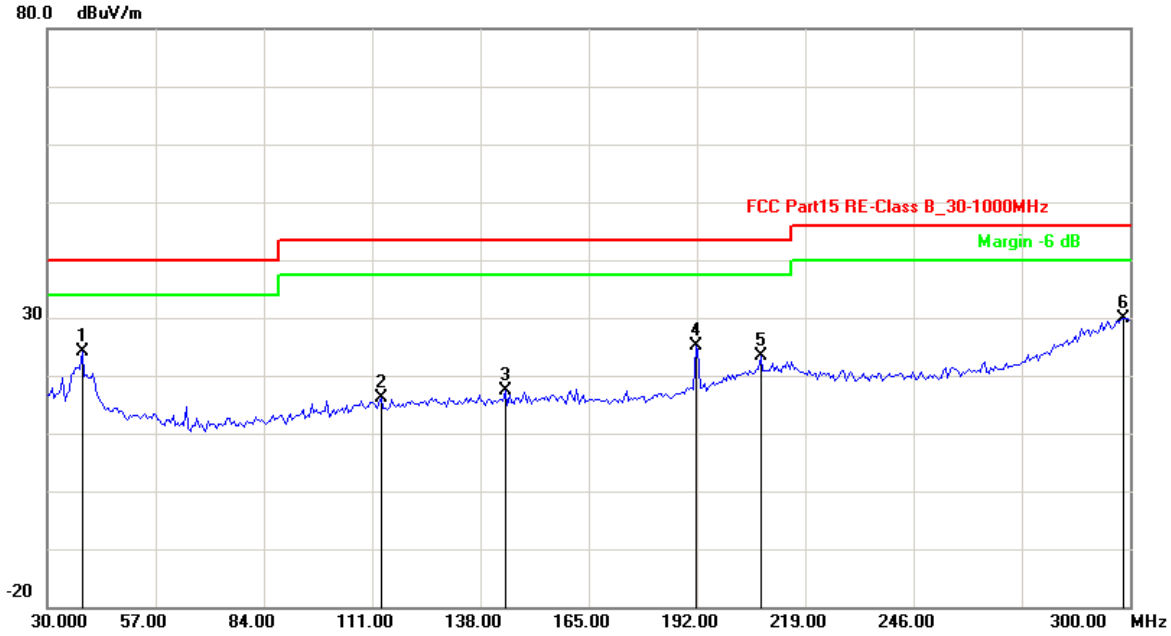
| | | | |
|---|---|---|---|
| Channel: | RX | Result: | ■ - passed<br>□ - not passed |
| Test point: | Vertical | | |
| Frequency range: | 30MHz-1GHz | | |




| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 38.6573 | -16.29 | 40.52 | 24.23 | 40.00 | -15.77 | QP |
| 2 | 113.3267 | -16.50 | 32.61 | 16.11 | 43.50 | -27.39 | QP |
| 3 | 144.1683 | -15.36 | 32.64 | 17.28 | 43.50 | -26.22 | QP |
| 4 | 191.7836 | -13.47 | 38.55 | 25.08 | 43.50 | -18.42 | QP |
| 5 | 208.0160 | -10.00 | 33.26 | 23.26 | 43.50 | -20.24 | QP |
| 6 | 298.3768 | -1.56 | 31.47 | 29.91 | 46.00 | -16.09 | QP |
| Remark: Other frequency mini margin all >6 dB of Limit | | | | | | | |



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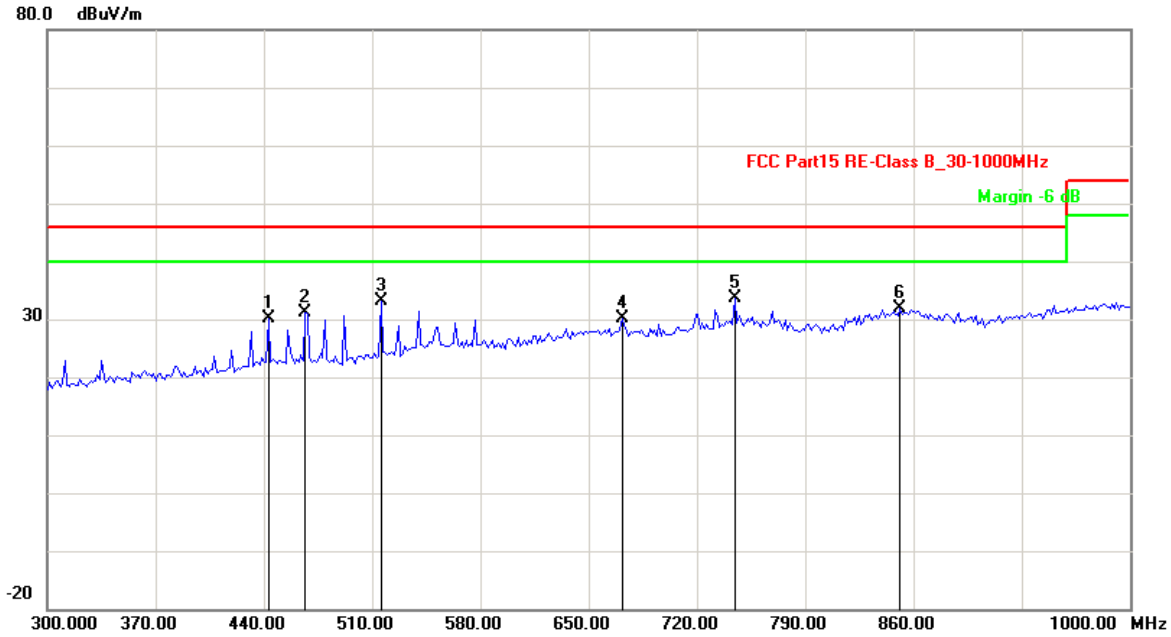


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 443.0862 | -8.50 | 38.63 | 30.13 | 46.00 | -15.87 | QP |
| 2 | 466.9339 | -8.03 | 39.19 | 31.16 | 46.00 | -14.84 | QP |
| 3 | 516.0321 | -6.97 | 40.00 | 33.03 | 46.00 | -12.97 | QP |
| 4 | 671.7435 | -3.19 | 33.23 | 30.04 | 46.00 | -15.96 | QP |
| 5 | 744.6894 | -1.53 | 35.09 | 33.56 | 46.00 | -12.44 | QP |
| 6 | 851.3026 | -0.17 | 32.04 | 31.87 | 46.00 | -14.13 | QP |
| Remark: Other frequency mini margin all >6 dB of Limit | | | | | | | |

| | | | |
|---|---|---|---|
| Channel: | RX | Result: | ■ - passed |
| Test point: | Vertical | | □ - not passed |
| Frequency range: | 1GHz-26.5GHz | | |

| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|---|---|---|---|---|---|---|---|
| 1 | 3689.379 | 3.20 | 37.14 | 40.34 | 74.00 | -33.66 | peak |
| 2 | 3689.379 | 3.20 | 25.77 | 28.97 | 54.00 | -25.03 | AVG |
| 3 | 5519.038 | 7.46 | 38.17 | 45.63 | 74.00 | -28.37 | peak |
| 4 | 5519.038 | 7.46 | 26.16 | 33.62 | 54.00 | -20.38 | AVG |
| Remark: Other frequency mini margin all >20 dB of Limit | | | | | | | |



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# 17.0 Pseudo Random Hopping

IC Frequencies：2403~2477MHz
IC Number of channels：73（CH0_04,CH1_05,..,CH71_76,CH72_77）
Channel Bandwidth：1MHz
Operating Frequencies：2404~2476MHz
Number of channels in Hop Sequence: 23
Modulation：GFSK, pseudo-random hopping

**Example of a 23 pseudo-random hopping frequency list:**

*2430,2412,2466,2470*
*2438,2426,2444,2424*
*2434,2472,2476,2422*
*2418,2416,2462,2442*
*2468,2432,2460,2428*
*2404,2464,2452*

# 18.0 Antenna Requirements

## 18.1 Standard Applicable

For intentional device, according to FCC 47 CFR 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.
And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

## 18.2 Antenna Construction and Directional Gain

Antenna type:External antenna
Antenna Gain: 2dBi

# 19.0 DEVIATION TO TEST SPECIFICATIONS

The following identical model(s):

**N/A**

Belong to the tested device:

Product description: **DXe Transmitter 2.4GHZ**
Model name: **DXe Transmitter 2.4GHZ**



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