

FCC/IC - TEST REPORTReport Number : 68.950.14.119.03 Date of Issue: December 4, 2014Model : Divine 15Product Type : HeadPhone DivineApplicant : XTZ SOUND BALANCE ABAddress : Gamla Nissastigen 19 314 41, Torup, SwedenProduction Facility : Fujikon Industrial Co., Ltd.Address : 16/F., Tower 1, Grand Central Plaza, 138 Shatin RuralCommittee Road, Shatin, N.T, HONG KONGTest Result : ☒ **Positive** ☐ **Negative**Total pages including
Appendices : 24

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

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Guangdong,
China

Telephone: 86 755 2663 9496
Fax: 86 755 2663 2877

3 Description of the Equipment Under Test

| | |
|-------------------------------|--|
| Product: | HeadPhone Divine |
| Model no.: | Divine 15 |
| FCC ID: | 2ADHR-DIVINE15 |
| Brand Name: | XTZ |
| Options and accessories: | NIL |
| Rating Voltage: | DC3.7V (Supplied by Li-ion rechargeable battery) DC5.0V (Charged by USB Port) |
| RF Transmission Frequency: | 2402-2480MHz |
| No. of Operated Channel: | 40 |
| Modulation: | GFSK(BLE) |
| Antenna Type: | PIFA |
| Antenna Gain: | 0dBi |
| Description of the EUT: | The Equipment Under Test (EUT) is a Bluetooth headset operated at 2.4GHz |

4 Summary of Test Standards

| Test Standards | |
|--|---|
| FCC Part 15 Subpart C 10-1-2013 Edition | PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators |
| RSS-Gen Issue 3 December 2010 | General Requirements and Information for the Certification of Radio Apparatus |
| RSS-210 Issue 8 December 2010 | RSS-210 — Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment |

All the test methods were according to Public Notice DA 00-705 -Frequency Hopper Spread Spectrum Test Procedure released by FCC on March 30, 2000 and C63.10 (2013).

5 Summary of Test Results

| Technical Requirements | | | | | |
|---|---|--|------------|-----------|-------------|
| FCC Part 15 Subpart C, RSS-Gen, RSS-210 | | | | | |
| Test Condition | | | Pages | Test Site | Test Result |
| §15.207 | RSS-GEN A7.2.4 | Conducted emission AC power port | --- | --- | N/A |
| §15.247(b)(1) | RSS-210 A8.4 | Conducted peak output power | 10 | Site 2 | Pass |
| §15.247(a)(2) | RSS-210 A8.2(a) | 6dB bandwidth | 11 | Site 2 | Pass |
| §15.247(a)(1) | RSS-210 A8.1(a) & RSSGEN 4.6.2 | 20dB bandwidth and 99% Occupied Bandwidth | --- | --- | N/A |
| §15.247(a)(1) | RSS-210 A8.1(b) | Carrier frequency separation | --- | --- | N/A |
| §15.247(a)(1)(iii) | RSS-210 A8.1(d) | Number of hopping frequencies | --- | --- | N/A |
| §15.247(a)(1)(iii) | RSS-210 A8.1(c) | Dwell Time | --- | --- | N/A |
| §15.247(e) | RSS-210 A8.2(b) | Power spectral density* | 13 | Site 2 | Pass |
| §15.247(d) | RSS-210 A8.5 | Spurious RF conducted emissions | 14 | Site 2 | Pass |
| §15.247(d) | RSS-210 A8.5 | Band edge | 18 | Site 2 | Pass |
| §15.247(d) & §15.209 & | RSS-210 2.5 & RSSGEN 7.2.5 & RSSGEN 6.1 | Spurious radiated emissions for transmitter and receiver | 20 | Site 2 | Pass |
| §15.203 | RSSGEN 7.1.2 | Antenna requirement | See note 2 | | Pass |

Note 1: N/A=Not Applicable.

Note 2: The EUT uses a permanently ceramic antenna, which gain is 0dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2ADHR-DIVINE15 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules and RSS-210.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: November 18, 2014

Testing Start Date: November 24, 2014

Testing End Date: December 3, 2014

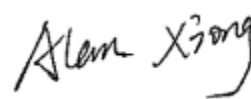
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Reviewed by:

Prepared by:



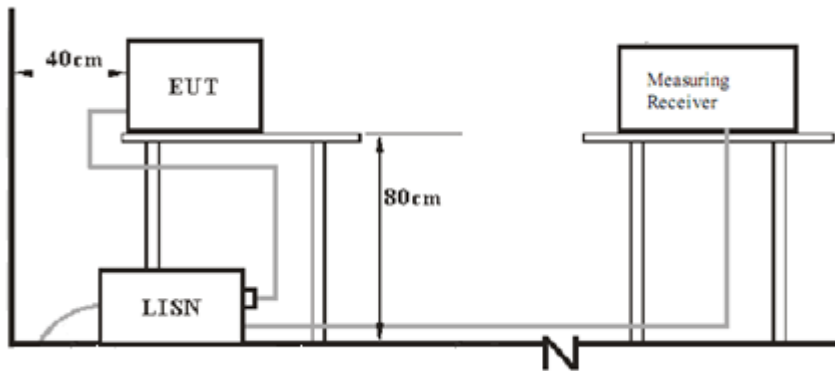
John Zhi
EMC Project Manager



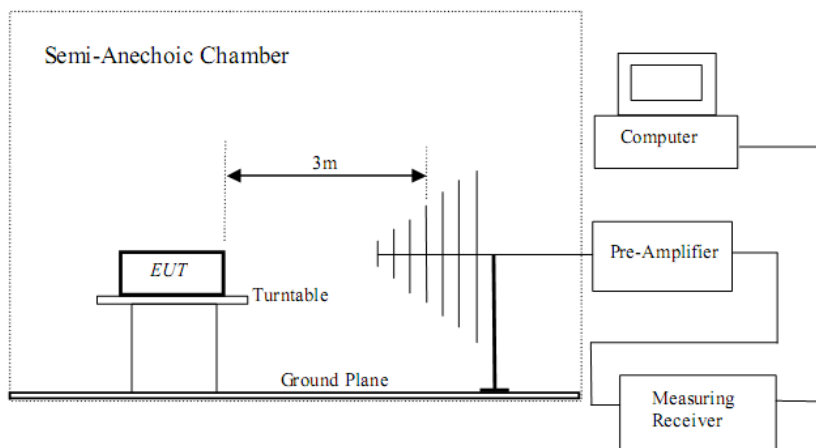
Alan Xiong
EMC Project Engineer

7 Test Setups

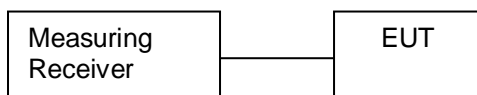
7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups



7.3 Conducted RF test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO.(SHIELD) | S/N(LENGTH) |
|-------------|--------------|-------------------|-------------|
| NoteBook | Lenovo | X220 | --- |

Test software: CSR_Bluetooth 3, which used to control the EUT in continues transmitting mode

The system was configured to non-hopping mode.

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power

9 Technical Requirement

9.1 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
RBW > the 20 dB bandwidth of the emission being measured, VBW ≥ RBW,
Sweep = auto, Detector function = peak, Trace = max hold
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power

Limits

According to §15.247 (b) (1) and RSS-210 A8.4, conducted peak output power limit as below:

| Frequency Range MHz | Limit W | Limit dBm |
|------------------------|------------|--------------|
| 2400-2483.5 | ≤1 | ≤30 |

Bluetooth Mode BLE modulation Test Result

| Frequency MHz | Conducted Peak Output Power dBm | Result |
|------------------------|---------------------------------------|--------|
| Low channel 2402MHz | 6.96 | Pass |
| Middle channel 2440MHz | 8.12 | Pass |
| High channel 2480MHz | 7.61 | Pass |

9.2 6dB bandwidth

Test Method

1. Use the following spectrum analyzer settings:
RBW=100K, VBW \geq 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be \geq 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

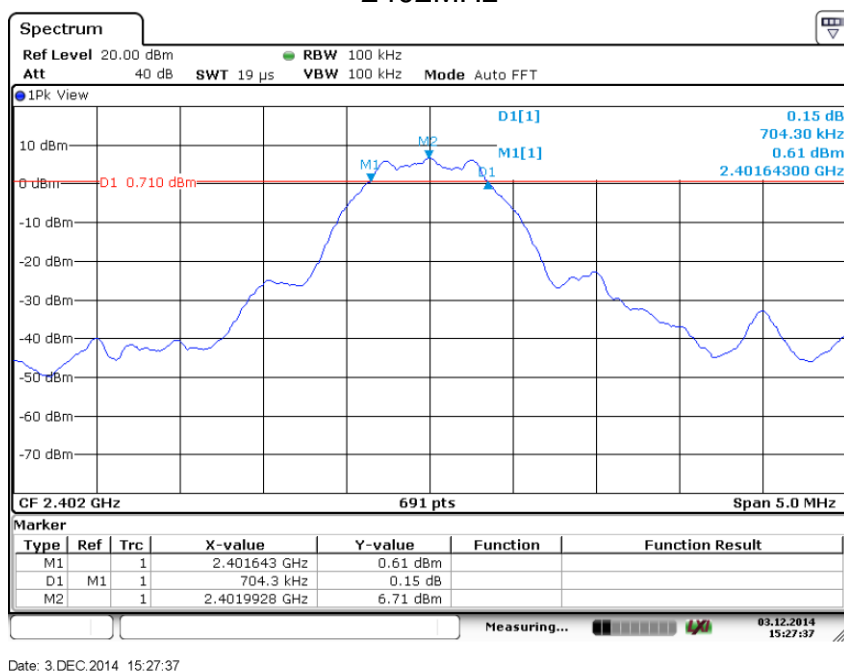
Limit [kHz]

≥ 500

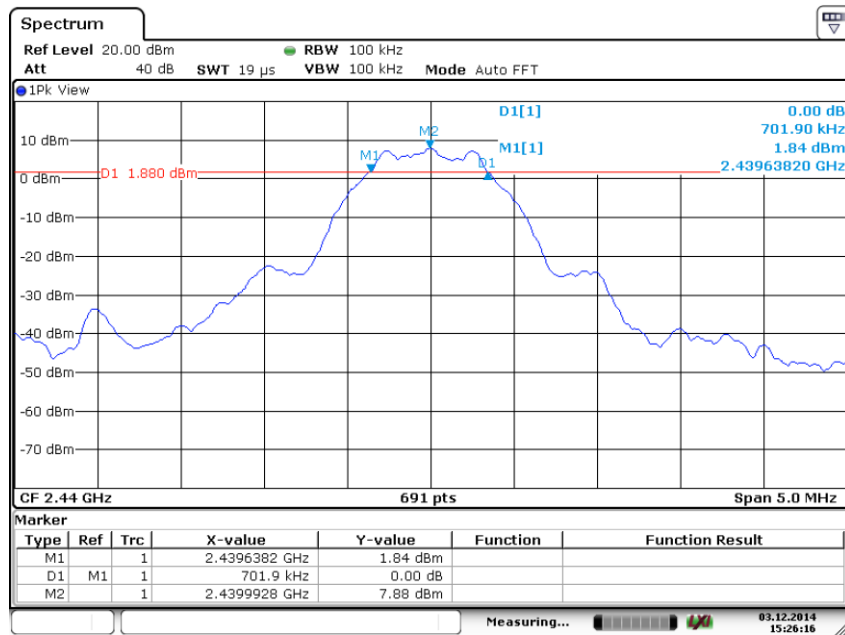
Test result

| Frequency MHz | 6dB bandwidth kHz | Result |
|------------------------|----------------------|--------|
| Low channel 2402MHz | 704.3 | Pass |
| Middle channel 2440MHz | 701.9 | Pass |
| High channel 2480MHz | 701.9 | Pass |

2402MHz

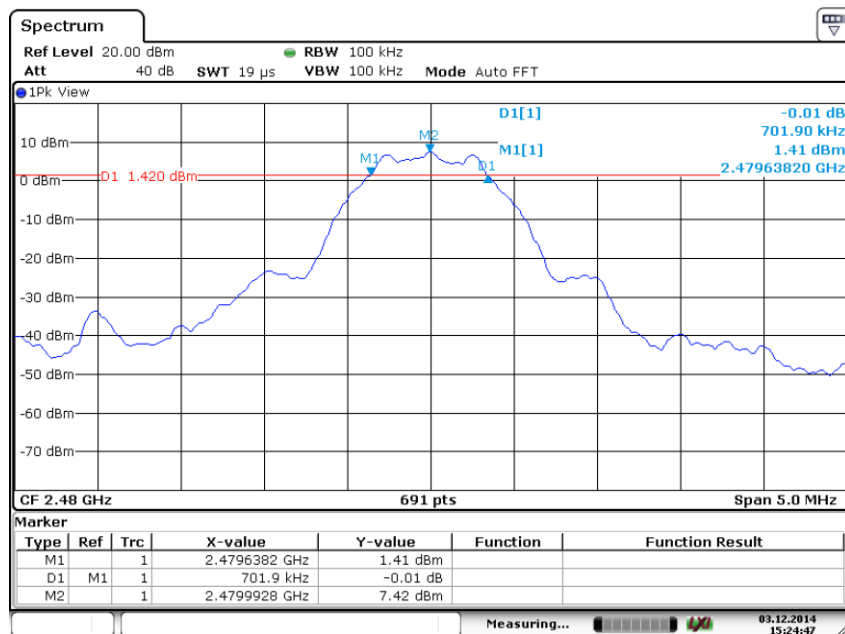


2440MHz



Date: 3.DEC.2014 15:26:16

2480MHz



Date: 3.DEC.2014 15:24:47

9.3 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency.
RBW=3kHz, VBW \geq 3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

Limit

Limit [dBm]

≤ 8

Test result

| Frequency MHz | Power spectral density dBm | Result |
|------------------------|----------------------------------|--------|
| Low channel 2402MHz | -8.71 | Pass |
| Middle channel 2440MHz | -7.66 | Pass |
| High channel 2480MHz | -7.93 | Pass |

9.4 Spurious RF conducted emissions

Test Method

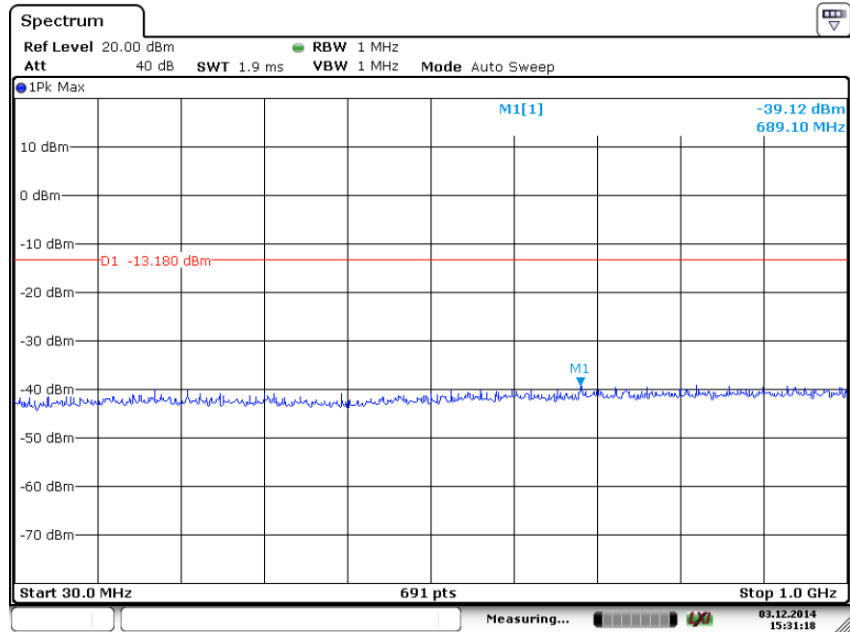
1. Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
RBW = 100 kHz, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
3. The level displayed must comply with the limit specified in this Section. Submit these plots.
4. Repeat above procedures until all frequencies measured were complete.

Limit

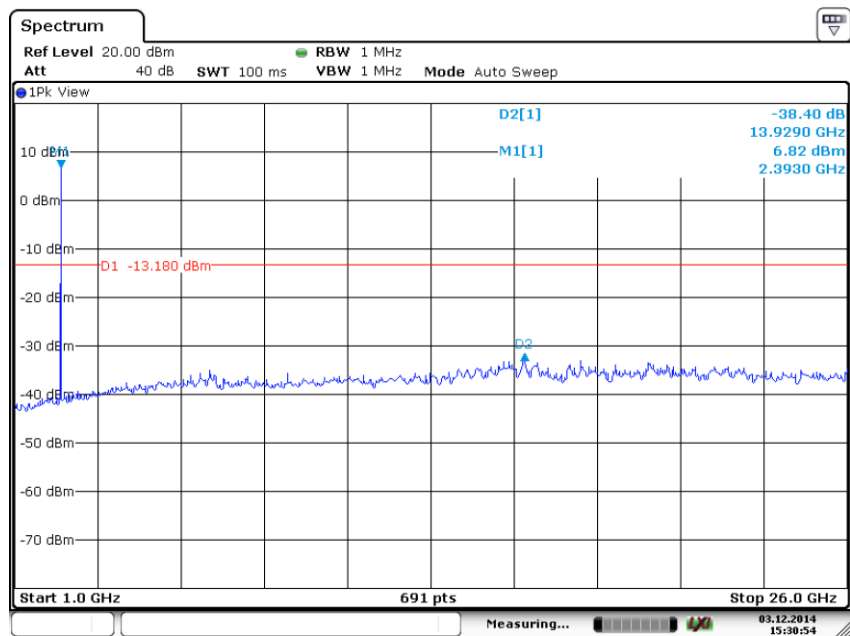
| Frequency Range MHz | Limit (dBc) |
|------------------------|-------------|
| 30-25000 | -20 |

Spurious RF conducted emissions

2402MHz



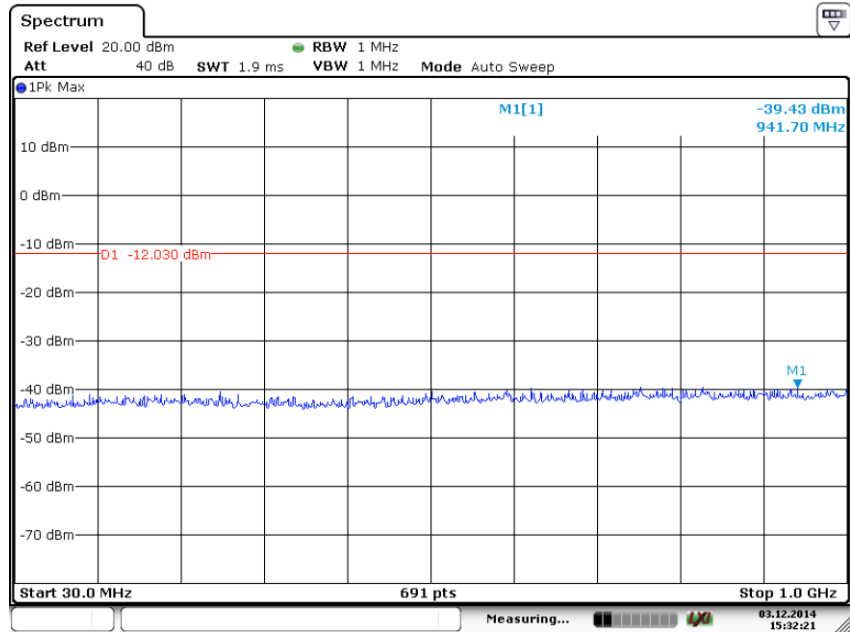
Date: 3.DEC.2014 15:31:18



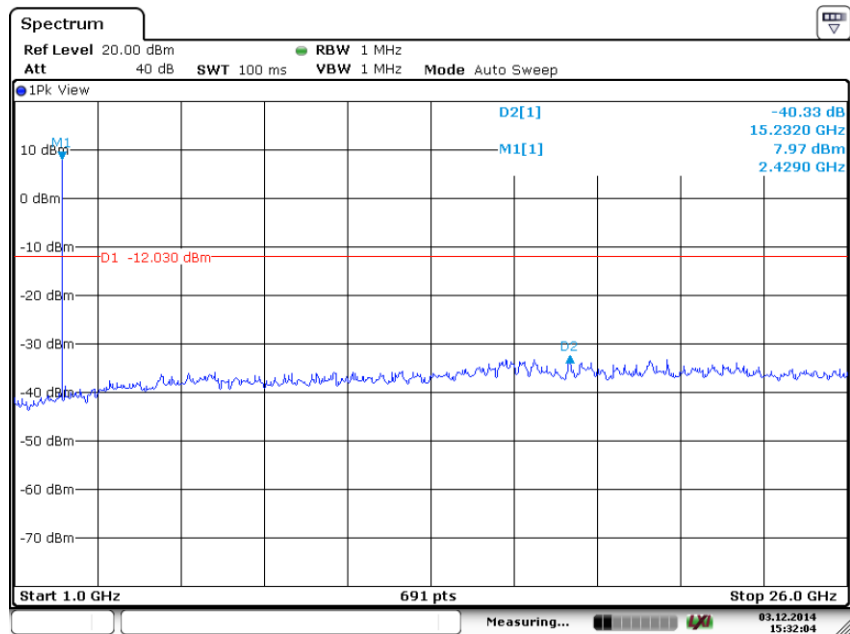
Date: 3.DEC.2014 15:30:54

Spurious RF conducted emissions

2440MHz



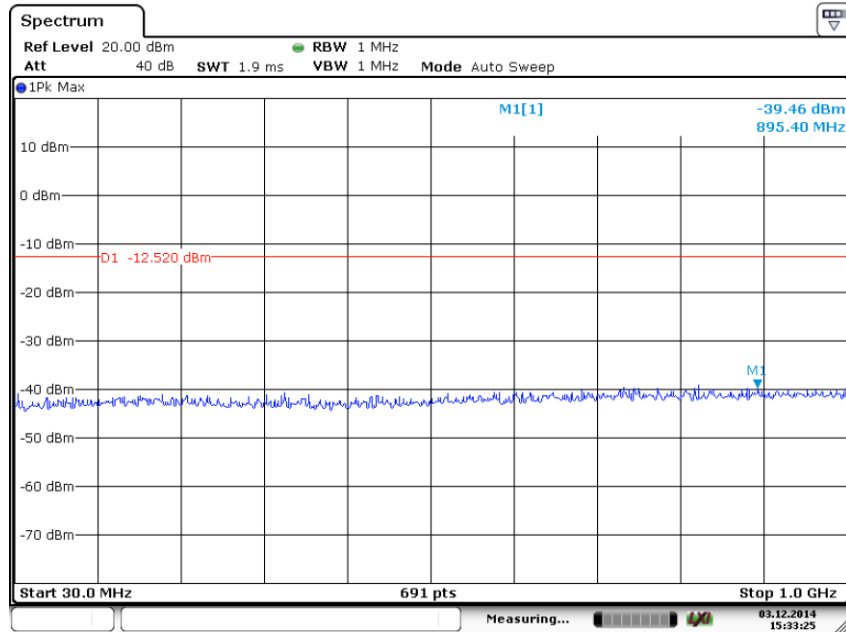
Date: 3.DEC.2014 15:32:21



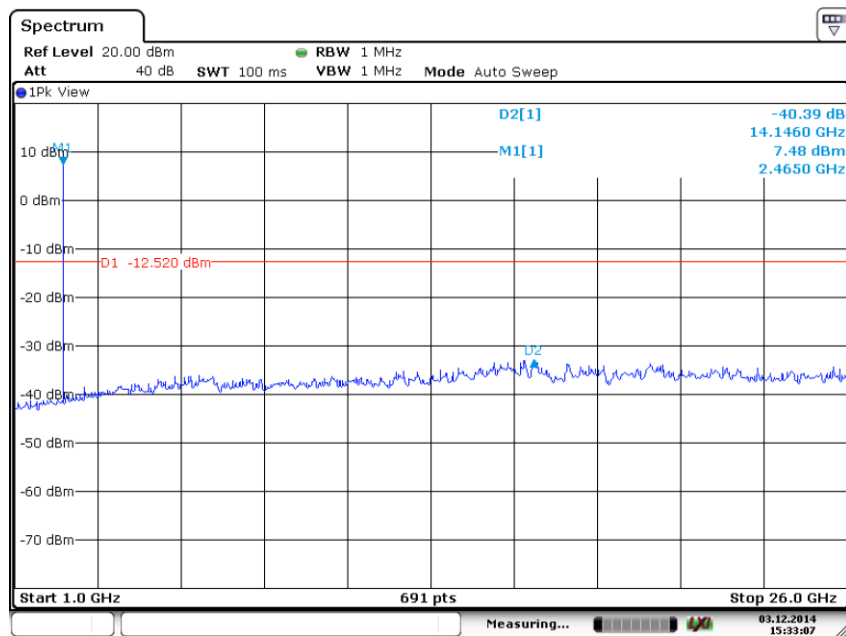
Date: 3.DEC.2014 15:32:04

Spurious RF conducted emissions

2480MHz



Date: 3.DEC.2014 15:33:26



Date: 3.DEC.2014 15:33:07

9.5 Band edge testing

Test Method

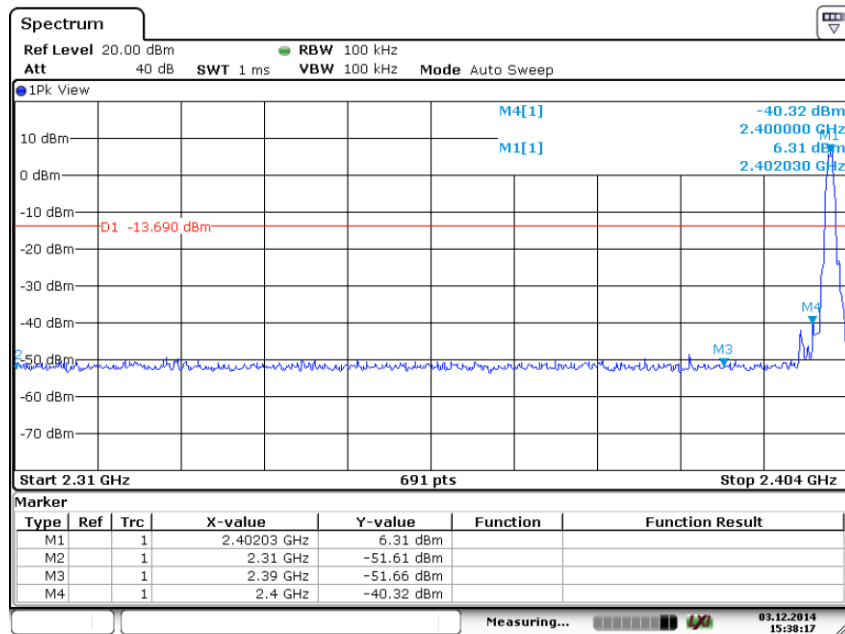
- 1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section. .
- 4 Repeat the test at the hopping off and hopping on mode, submit all the plots.

Limit:

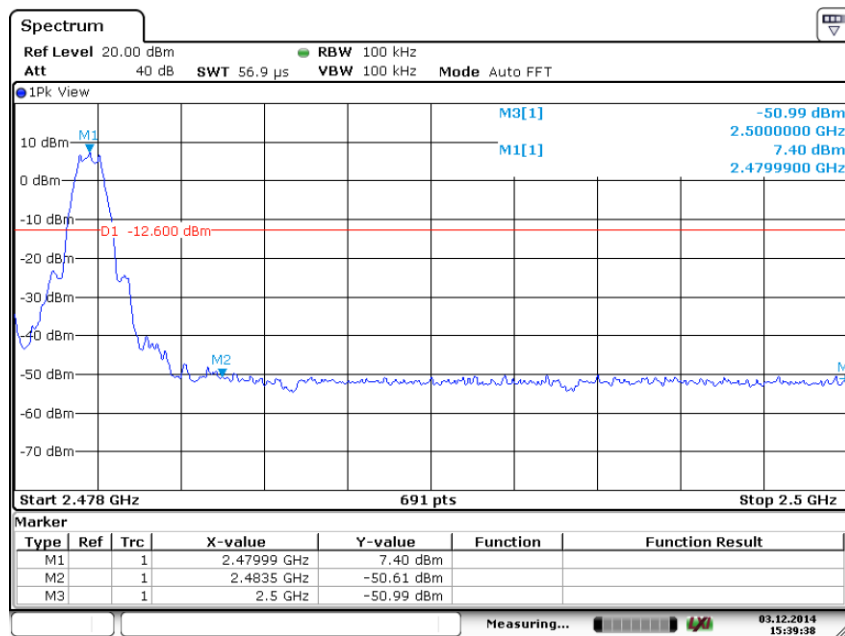
According to §15.247(d) and RSS-210 A8.5, in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) and RSS-Gen7.2.2, must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)) and RSS-Gen.

Band edge testing

BLE Modulation Test Result:



Date: 3.DEC.2014 15:38:17



Date: 3.DEC.2014 15:39:38

9.6 Spurious radiated emissions for transmitter and receiver

Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-1992 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.
The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{duty cycle}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limit

According to part 15.247(d), the radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

| Frequency MHz | Field Strength uV/m | Field Strength dBuV/m | Detector |
|------------------|------------------------|--------------------------|----------|
| 30-88 | 100 | 40 | QP |
| 88-216 | 150 | 43.5 | QP |
| 216-960 | 200 | 46 | QP |
| 960-1000 | 500 | 54 | QP |
| Above 1000 | 500 | 54 | AV |
| Above 1000 | 5000 | 74 | PK |

Spurious radiated emissions for transmitter and receiver

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Transmitting spurious emission test result as below:

Bluetooth Mode GFSK (BLE) Modulation 2402MHz Test Result

| Frequency | Emission Level | Limit | Polarization | Margin | Detector | Result |
|-----------|----------------|--------|--------------|--------|----------|--------|
| MHz | dBuV/m | dBuV/m | | dBuV/m | | |
| *4804 | 54.41 | 74 | Horizontal | 19.59 | PK | Pass |
| *4804 | 52.01 | 74 | Vertical | 21.99 | PK | Pass |
| *4804 | 48.38 | 54 | Horizontal | 5.62 | Ave | Pass |
| *4804 | 45.64 | 54 | Vertical | 8.36 | Ave | Pass |
| *7206 | 51.05 | 74 | Horizontal | 22.95 | PK | Pass |
| *7206 | 52.61 | 74 | Vertical | 21.38 | PK | Pass |
| *7206 | 45.29 | 54 | Horizontal | 8.71 | Ave | Pass |
| *7206 | 46.15 | 54 | Vertical | 7.85 | Ave | Pass |

Bluetooth Mode GFSK (BLE) Modulation 2440MHz Test Result

| Frequency | Emission Level | Limit | Polarization | Margin | Detector | Result |
|-----------|----------------|--------|--------------|--------|----------|--------|
| MHz | dBuV/m | dBuV/m | | dBuV/m | | |
| *4880 | 50.12 | 74 | Horizontal | 23.88 | PK | Pass |
| *4880 | 47.25 | 74 | Vertical | 26.75 | PK | Pass |
| *4880 | 48.32 | 54 | Horizontal | 5.68 | Ave | Pass |
| *4880 | 44.29 | 54 | Vertical | 9.71 | Ave | Pass |
| *7320 | 51.27 | 74 | Horizontal | 22.73 | PK | Pass |
| *7320 | 50.33 | 74 | Vertical | 23.67 | PK | Pass |
| *7320 | 47.39 | 54 | Horizontal | 6.61 | Ave | Pass |
| *7320 | 45.96 | 54 | Vertical | 8.04 | Ave | Pass |

Bluetooth Mode GFSK (BLE) Modulation 2480MHz Test Result

| Frequency | Emission Level | Limit | Polarization | Margin | Detector | Result |
|-----------|----------------|--------|--------------|--------|----------|--------|
| MHz | dBuV/m | dBuV/m | | dBuV/m | | |
| *4960 | 53.00 | 74 | Horizontal | 21 | PK | Pass |
| *4960 | 49.04 | 74 | Vertical | 24.96 | PK | Pass |
| *4960 | 46.31 | 54 | Horizontal | 7.69 | Ave | Pass |
| *4960 | 45.08 | 54 | Vertical | 8.92 | Ave | Pass |
| *7440 | 52.06 | 74 | Horizontal | 21.94 | PK | Pass |
| *7440 | 53.53 | 74 | Vertical | 20.47 | PK | Pass |
| *7440 | 45.39 | 54 | Horizontal | 8.61 | Ave | Pass |
| *7440 | 46.11 | 54 | Vertical | 7.89 | Ave | Pass |

Remark:

(1) QP Emission Level= Antenna Factor +Cable Loss + Reading

PK Emission Level= Antenna Factor +Cable Loss - Amp. factor + Reading

AV Emission Level= PK Emission Level+20log(dutycycle)

- (2) Data of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- (3) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

Receiving emission test result as below:

| Frequency | Emission Level | Limit | Polarization | Margin | Detector | Result |
|------------|----------------|--------|--------------|--------|----------|--------|
| MHz | dBuV/m | dBuV/m | | dBuV/m | | |
| 320.10 | 34.50 | 46 | Horizontal | 11.50 | QP | Pass |
| 446.85 | 35.25 | 46 | Horizontal | 10.75 | QP | Pass |
| 421.08 | 31.46 | 46 | Vertical | 14.54 | QP | Pass |
| 478.56 | 33.57 | 46 | Vertical | 12.43 | QP | Pass |
| 1000-25000 | -- | -- | Horizontal | 74 | PK | Pass |
| 1000-25000 | -- | -- | Vertical | 74 | PK | Pass |

Remark:

- (1) QP Emission Level= Antenna Factor +Cable Loss + Reading
PK Emission Level= Antenna Factor +Cable Loss - Amp. factor + Reading
AV Emission Level= PK Emission Level+20log (dutycycle)
- (2) Data of measurement within this frequency range shown “--” in the table above means the reading of emissions are the noise floor or attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- (3) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section RSS-Gen.

10 Test Equipment List

List of Test Instruments

| | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | CAL. DUE DATE | |
|------------------|------------------------|-----------------|-------------|------------|---------------|---|
| C | Spectrum | Agilent | E4446A | US44300459 | May.08, 15 | ☒ |
| RE < 1 GHz | Test Receiver <1GHz | Rohde & Schwarz | ESVS10 | 834468/011 | May.07, 15 | ☒ |
| | Amplifier < 1 GHz | HP | 8447D | 2648A04738 | May.07, 15 | ☒ |
| | HF Cable | Hubersuhne | Sucoflex104 | Room 2 | May.08, 15 | ☒ |
| | Bilog Antenna | Schaffner | CBL6111C | 2598 | Oct.25, 15 | ☒ |
| RE > 1 GHz | Spectrum > 1GHz | Agilent | E4446A | US44300459 | May.08, 15 | ☒ |
| | Horn Antenna | EMCO | 3115 | 9607-4877 | Jun. 24, 15 | ☒ |
| | Amp > 1 Ghz | HP | 8449B | 3008A08495 | May.08, 15 | ☒ |
| | HF Cable | Hubersuhne | Sucoflex104 | Room1 | May.08, 15 | ☒ |

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

| System Measurement Uncertainty | |
|--|--|
| Test Items | Extended Uncertainty |
| Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz | 4.54dB |
| Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz | Horizontal: 4.83dB; Vertical: 4.91dB; |
| Uncertainty for Radiated Emission in 3m chamber 1000MHz-18000MHz | Horizontal: 4.89dB; Vertical: 4.88dB; |
| Uncertainty for Conducted Emission 9kHz-150KHz | 3.88dB |
| Uncertainty for Conducted Emission 150kHz-30MHz | 3.50dB |