



INDUSTRY CANADA RSS-210

TEST REPORT

for

912MHz+Bluetooth Wireless Outdoor Speaker

Model: AWS5B3S

Brand: Acoustic Research

Test Report Number:

C130315Z05-RC1

Issued for:

AUDIOVOX CANADA LIMITED

1900 Derry Road East .Mississauga ontario L5S 1Y6 Canada

Issued by:

COMPLIANCE CERTIFICATION SERVICES (SHENZHEN) INC.

**No.10-1, Mingkeda Logistics Park, NO.18, Huanguan South Rd.,
Guan Lan Town, Baoan District, Shenzhen China**

TEL: 86-755-28055000

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Issued Date: April 9, 2013



TESTING CERT #2861.01

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Revision History

| Rev. | Issue No. | Revisions | Effect Page | Revised By |
|------|----------------|---------------|-------------|------------|
| 00 | C130315Z05-RC1 | Initial Issue | ALL | Sunny Wang |
| | | | | |
| | | | | |
| | | | | |



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1 TEST CERTIFICATION

| | |
|----------------------|--|
| Product: | 912MHz+Bluetooth Wireless Outdoor Speaker |
| Model: | AWS5B3S |
| Brand: | Acoustic Research |
| Tested: | March 15~April 8, 2013 |
| Applicant: | AUDIOVOX CANADA LIMITED 1900 Derry Road East .Mississauga ontario L5S 1Y6 Canada |
| Manufacturer: | Uni-Art Precise Products Ltd 11-12/F, Yue Xiu Industrial Building, 87 Hung To Road, Kowloon, Hong Kong |

| APPLICABLE STANDARDS | |
|---|-------------------------|
| STANDARD | TEST RESULT |
| IC RSS-210 ISSUE 8 with amendment December 2010 | No non-compliance noted |

We hereby certify that:

Compliance Certification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Reviewed by:

Tom Gan
Supervisor of EMC Dept.
Compliance Certification Service Inc.

Ruby Zhang
Supervisor of Report Dept.
Compliance Certification Service Inc.



2 EUT DESCRIPTION

| | |
|------------------------------|---|
| Product | 912MHz+Bluetooth Wireless Outdoor Speaker |
| Model | AWS5B3S |
| Brand | Acoustic Research |
| Model Discrepancy | N/A |
| Identify Number | C130315Z05-RC1 |
| Received Date | March 15, 2013 |
| Power Supply | <p>TX: Adapter1# manufacturer/model name SIL switching adapter / SSA-5W-12 US 120020F Input: 100-240V, 50/60Hz, 0.2A Output: DC12V, 200mA DC output cable: Unshielded, 1.7m</p> <p>Adapter2# manufacturer/model name SUV-005-120-020-A2 AC input: 100-240V,50/60Hz 150mA DC output: DC12.0V 200mA DC output cable: Un-shielded, 1.80m</p> <p>RX: Adapter 3# manufacturer/model name Dongguan Yinli Electronics Co., Ltd. / YLS0151-T100150 Input: AC100-240V, 50/60Hz, 0.6A Output: DC10.0V, 1.5A DC output cable: Unshielded, 1.5m</p> |
| Audio In Cable(TX) | Unshielded, 2.0m |
| Audio In Cable(RX) | Unshielded, 1.13m |
| Frequency Range | 2402 ~ 2480 MHz |
| Transmit Power | GFSK : 4.49dBm 8DPSK : 2.61dBm |
| Modulation Technique | FHSS (GFSK for 1Mbps, $\pi/4$ -DQPSK for 2Mbps, 8DPSK for 3Mbps) |
| Number of Channels | 79 Channels |
| Antenna Specification | 2.4G ISM SMD Chip Antenna with 2dBi gain(Max) |
| Temperature Range | -10°C ~ +55°C |



3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with IC RSS-210, IC RSS-212, and ANSI C63.4:2003.

This submittal(s) (test report) is intended for IC Certification No: 342H-AWS5B3S filing to comply with Industry CANADA RSS210.

3.1. RSS-210 RESTRICTED BANDS OF OPERATIONS

This section includes the tables referenced within this Standard (i.e. Tables 1 to 5).

Table 1: Restricted Frequency Bands ^(Note)

| MHz | MHz | MHz | GHz |
|-------------------|---------------------|---------------|-------------|
| 0.090-0.110 | 12.57675-12.57725 | 960-1427 | 9.0-9.2 |
| 2.1735-2.1905 | 13.36-13.41 | 1435-1626.5 | 9.3-9.5 |
| 3.020-3.026 | 16.42-16.423 | 1645.5-1646.5 | 10.6-12.7 |
| 4.125-4.128 | 16.69475-16.69525 | 1660-1710 | 13.25-13.4 |
| 4.17725-4.17775 | 16.80425-16.80475 | 1718.8-1722.2 | 14.47-14.5 |
| 4.20725-4.20775 | 25.5-25.67 | 2200-2300 | 15.35-16.2 |
| 5.677-5.683 | 37.5-38.25 | 2310-2390 | 17.7-21.4 |
| 6.215-6.218 | 73-74.6 | 2655-2900 | 22.01-23.12 |
| 6.26775-6.26825 | 74.8-75.2 | 3260-3267 | 23.6-24.0 |
| 6.31175-6.31225 | 108-138 | 3332-3339 | 31.2-31.8 |
| 8.291-8.294 | 156.52475-156.52525 | 3345.8-3358 | 36.43-36.5 |
| 8.362-8.366 | 156.7-156.9 | 3500-4400 | Above 38.6 |
| 8.37625-8.38675 | 240-285 | 4500-5150 | |
| 8.41425-8.41475 | 322-335.4 | 5350-5460 | |
| 12.29-12.293 | 399.9-410 | 7250-7750 | |
| 12.51975-12.52025 | 608-614 | 8025-8500 | |

Note: Certain frequency bands listed in Table 1 and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard as well as in RSS-310.



3.2. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

The following test mode(s) were scanned during the preliminary test below 1G and above 1G:

| Test Item | Test mode | Worse mode |
|--------------------|---|------------|
| Conducted Emission | Mode 1: 900MHz Link with adapter Mode 2: Audio In with adapter Mode 3: Play Audio Bluetooth with adapter | Mode 3 |
| Radiated Emission | Mode 1: TX + RX | Mode 1 |

Above 1G, Channel Low (2402MHz) · Mid (2441MHz) and High (2480MHz) were chosen for full testing for GFSK and 8DPSK.



4 FACILITIES AND ACCREDITATIONS

4.1. FACILITIES

All measurement facilities used to collect the measurement data are located at **No.10-1, Mingkeda Logistics Park, No.18, Huanguan South Rd., Guan Lan Town, Baoan District, Shenzhen, China**

The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

4.2. ACCREDITATIONS

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

| | |
|--------------|------|
| USA | A2LA |
| China | CNAS |

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

| | |
|---------------|-------------------------------------|
| USA | FCC |
| Japan | VCCI (C-3478, R-3135, T-652, G-624) |
| Canada | INDUSTRY CANADA |
| Taiwan | BSMI |
| Norway | Nemko |

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

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement | Frequency | Uncertainty |
|---------------------|-----------------|-------------|
| Conducted emissions | 9kHz~30MHz | +/- 3.18dB |
| Radiated emissions | 30MHz ~ 200MHz | +/- 3.79dB |
| | 200MHz ~1000MHz | +/- 3.62dB |
| | Above 1000MHz | +/- 5.04dB |
| Band Edges | +/-0.182 dB | |

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

The measured result is above (below) the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance (non-compliance)



6. FCC PART 15.247 REQUIREMENTS

6.1 20DB BANDWIDTH

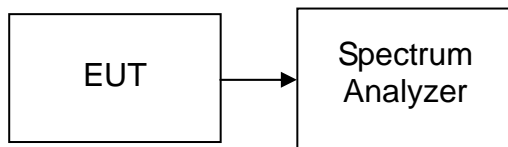
None; for reporting purpose only.

MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|-------------------|--------------|--------|---------------|------------------|-----------------|
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 03/09/2013 | 03/08/2014 |

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

TEST CONFIGURATION



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=30kHz, VBW=100kHz, Span=3MHz, Sweep = auto.
4. Mark the peak frequency and 20dB (upper and lower) frequency.
5. Repeat until all the test channels are investigated.

TEST RESULTS

No non-compliance noted

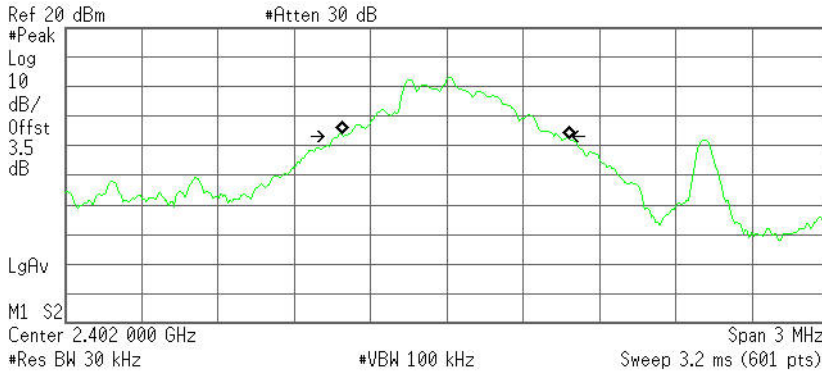


Test plot (GFSK)

20dB Bandwidth (CH Low)

Agilent

R T



Occupied Bandwidth

891.9564 kHz

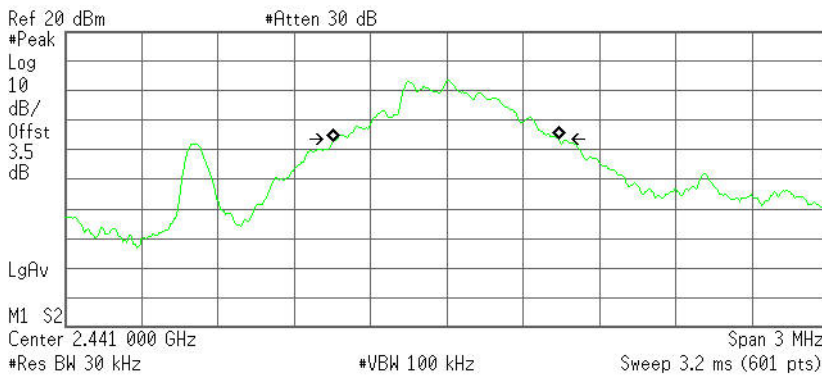
Occ BW % Pwr 99.00 %
x dB -20.00 dB

Transmit Freq Error 33.581 kHz
x dB Bandwidth 868.596 kHz

20dB Bandwidth (CH Mid)

Agilent

R T



Occupied Bandwidth

884.9649 kHz

Occ BW % Pwr 99.00 %
x dB -20.00 dB

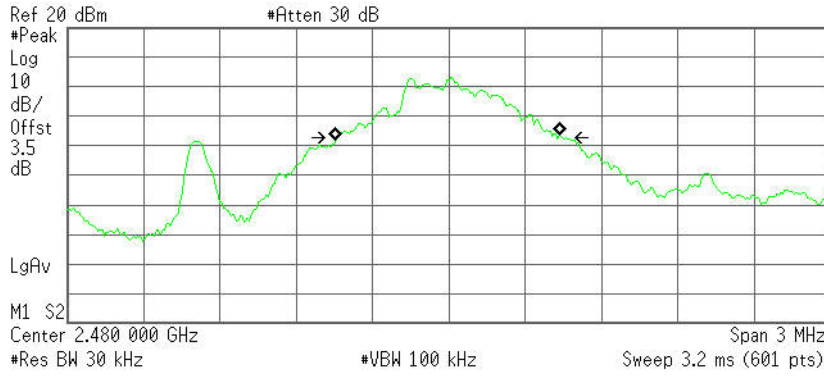
Transmit Freq Error -4.535 kHz
x dB Bandwidth 873.538 kHz



20dB Bandwidth (CH High)

Agilent

R T



Occupied Bandwidth

877.3011 kHz

Occ BW % Pwr 99.00 %
x dB -20.00 dB

Transmit Freq Error -4.295 kHz
x dB Bandwidth 879.169 kHz

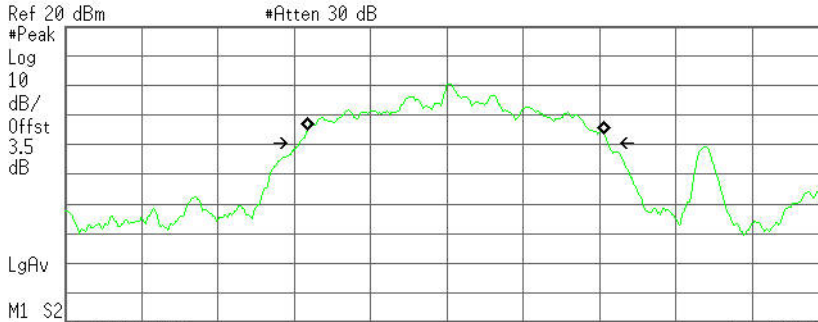


Test plot (8DPSK)

20dB Bandwidth (CH Low)

Agilent

R T



Occupied Bandwidth 1.1644 MHz

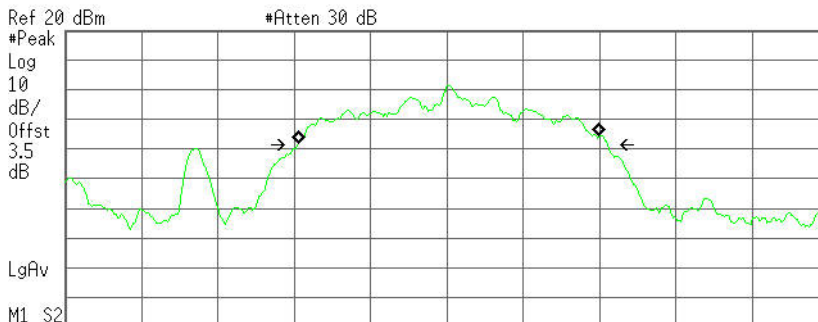
Occ BW % Pwr 99.00 % x dB -20.00 dB

Transmit Freq Error 38.196 kHz x dB Bandwidth 1.214 MHz

20dB Bandwidth (CH Mid)

Agilent

R T



Occupied Bandwidth 1.1771 MHz

Occ BW % Pwr 99.00 % x dB -20.00 dB

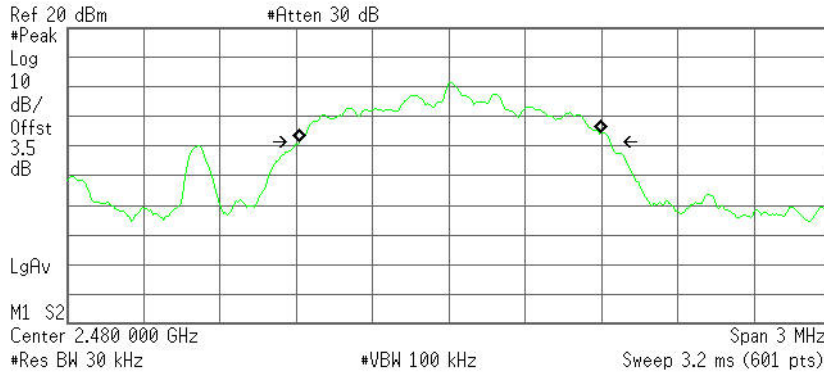
Transmit Freq Error 7.428 kHz x dB Bandwidth 1.221 MHz



20dB Bandwidth (CH High)

Agilent

R T



Occupied Bandwidth
1.1817 MHz

Occ BW % Pwr 99.00 %
x dB -20.00 dB

Transmit Freq Error 6.828 kHz
x dB Bandwidth 1.224 MHz



6.2 PEAK POWER

LIMIT

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

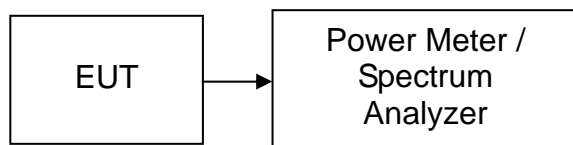
1. For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6dBi.
3. The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (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.

MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|-------------------|--------------|---------|---------------|------------------|-----------------|
| Power Meter | Anritsu | ML2495A | 1204003 | 03/09/2013 | 03/08/2014 |
| Power Sensor | Anritsu | MA2411B | 1126150 | 03/09/2013 | 03/08/2014 |
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 03/09/2013 | 03/08/2014 |

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

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.



TEST RESULTS

No non-compliance noted

Test Data

GFSK

| Channel | Frequency (MHz) | Reading Power (dBm) | Factor (dB) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---------|-----------------|---------------------|-------------|--------------------|------------------|-----------|--------|
| Low | 2402 | 0.36 | 3.50 | 3.86 | 0.00243 | 1 | PASS |
| Mid | 2441 | 0.99 | 3.50 | 4.49 | 0.00281 | | PASS |
| High | 2480 | 0.71 | 3.50 | 4.21 | 0.00264 | | PASS |

8DPSK

| Channel | Frequency (MHz) | Reading Power (dBm) | Factor (dB) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---------|-----------------|---------------------|-------------|--------------------|------------------|-----------|--------|
| Low | 2402 | -1.39 | 3.50 | 2.11 | 0.00163 | 1 | PASS |
| Mid | 2441 | -0.89 | 3.50 | 2.61 | 0.00182 | | PASS |
| High | 2480 | -0.90 | 3.50 | 2.60 | 0.00182 | | PASS |



6.3 PEAK POWER SPECTRAL DENSITY

LIMIT

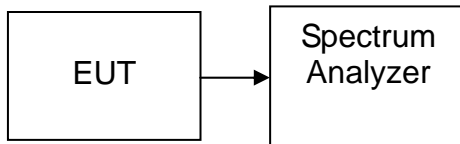
1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping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

MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|-------------------|--------------|--------|---------------|------------------|-----------------|
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 03/09/2013 | 03/08/2014 |

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

Test Configuration



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 = 1.5MHz, Sweep=500s
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

Not applicable. Since EUT is the Bluetooth device.



6.4 BAND EDGES MEASUREMENT

LIMIT

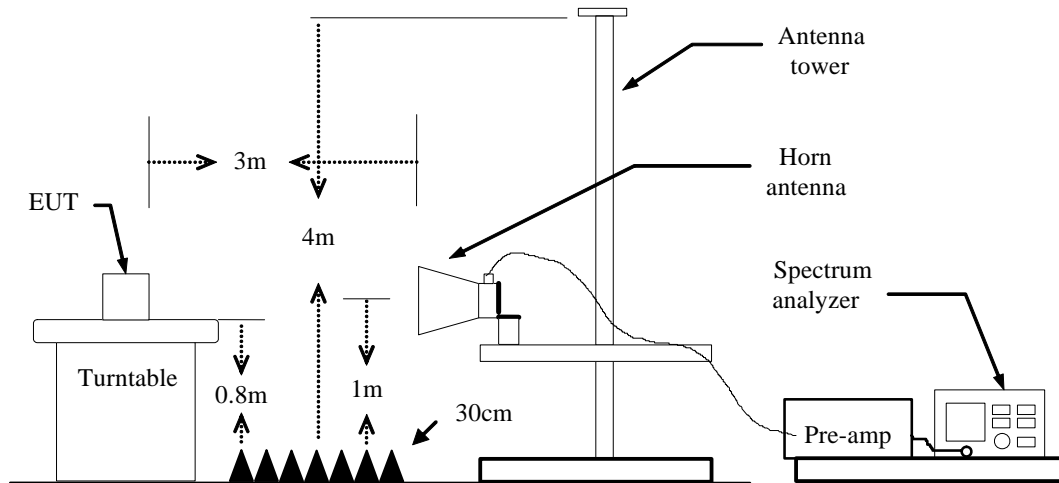
According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. 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).

MEASUREMENT EQUIPMENT USED

| Radiated Emission Test Site 966 (2) | | | | | |
|-------------------------------------|----------------|--------------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| PSA Series Spectrum Analyzer | Agilent | E4446A | US44300399 | 03/09/2013 | 03/08/2014 |
| ESCI EMI TEST RECEIVER.ESCI | ROHDE&SCHWARZ | ESCI | 100783 | 03/09/2013 | 03/08/2014 |
| Amplifier | MITEQ | AM-1604-3000 | 1123808 | 03/18/2013 | 03/18/2014 |
| High Noise Amplifier | Agilent | 8449B | 3008A01838 | 03/18/2013 | 03/18/2014 |
| Board-Band Horn Antenna | Schwarzbeck | BBHA 9170 | 9170-497 | 06/21/2012 | 06/21/2013 |
| Bilog Antenna | SCHAFFNER | CBL6143 | 5082 | 03/02/2013 | 03/01/2014 |
| Horn Antenna | SCHWARZBECK | BBHA9120 | D286 | 03/02/2013 | 03/01/2014 |
| Loop Antenna | A、R、A | PLA-1030/B | 1029 | 03/23/2013 | 03/23/2014 |
| Turn Table | N/A | N/A | N/A | N.C.R | N.C.R |
| Controller | Sunol Sciences | SC104V | 022310-1 | N.C.R | N.C.R |
| Controller | CT | N/A | N/A | N.C.R | N.C.R |
| Temp. / Humidity Meter | Anymetre | JR913 | N/A | 03/04/2013 | 03/03/2014 |
| Antenna Tower | SUNOL | TLT2 | N/A | N.C.R | N.C.R |
| 966(2) | 中宇电子 | N/A | N/A | 03/10/2013 | 03/09/2014 |
| Test S/W | FARAD | LZ-RF / CCS-SZ-3A2 | | | |



Test Configuration



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the 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 emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz / VBW=510Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

TEST RESULTS

Refer to attach spectrum analyzer data chart.



Test Data (GFSK)

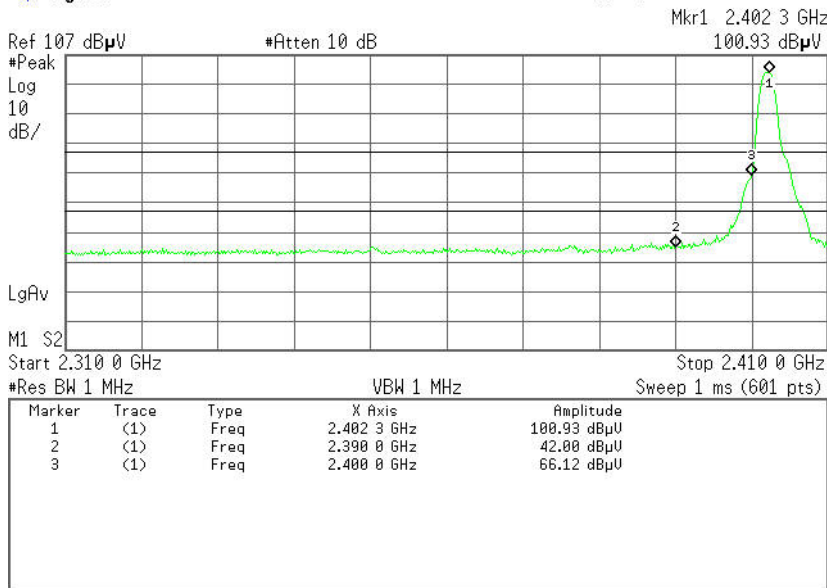
Band Edges (CH-Low)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

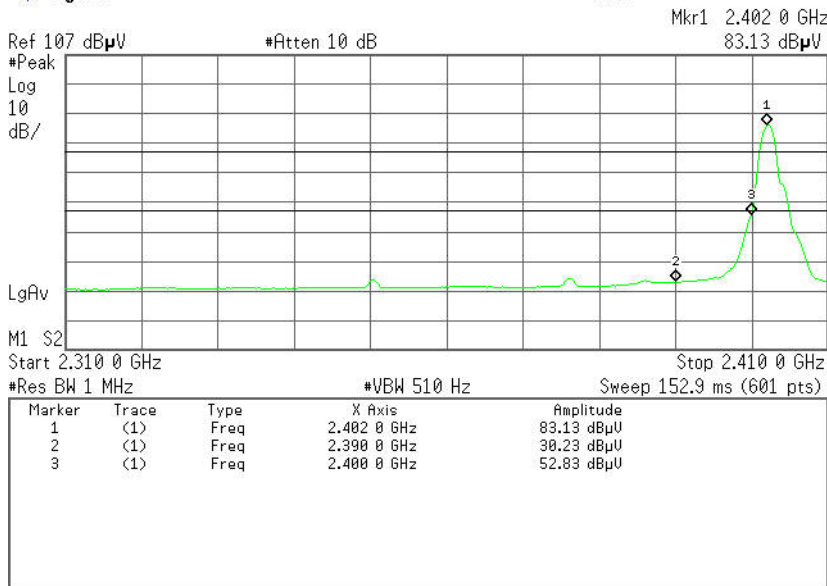


Detector mode: Average

Polarity: Vertical

Agilent

R L



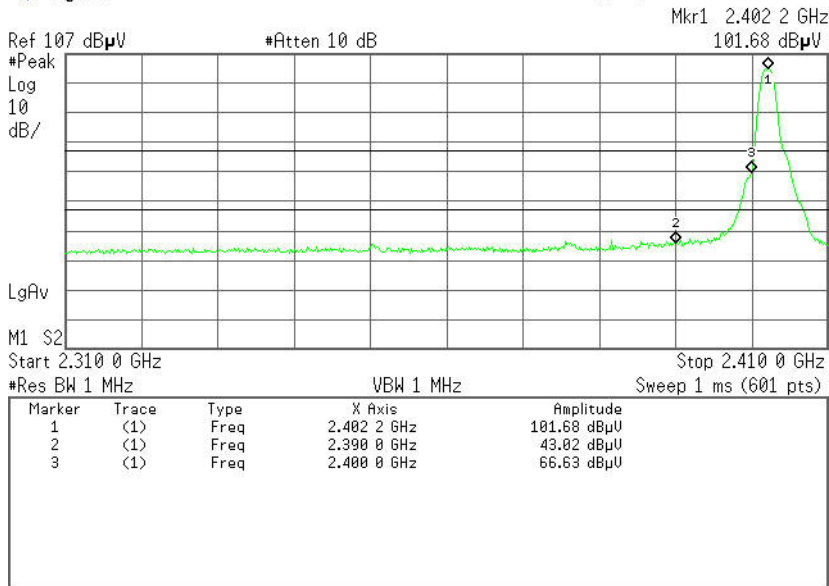


Detector mode: Peak

Polarity: Horizontal

Agilent

R T

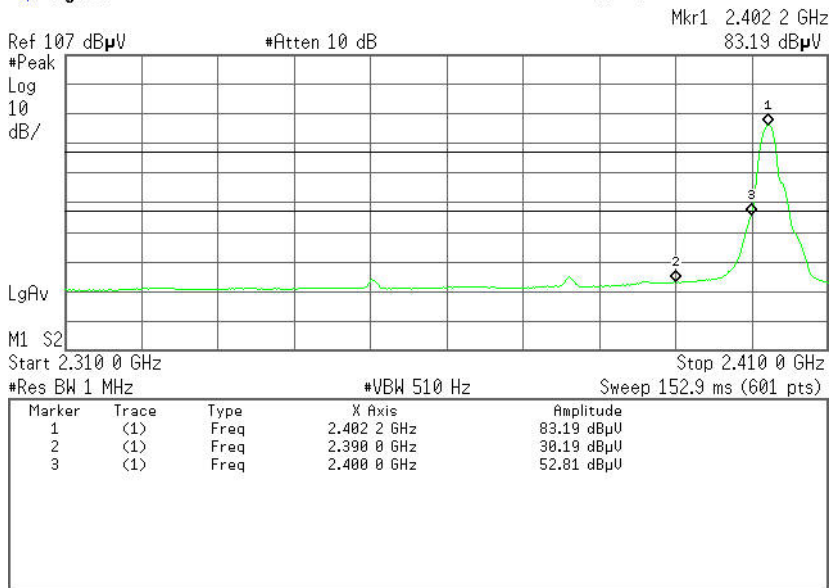


Detector mode: Average

Polarity: Horizontal

Agilent

R T





Band Edges (CH-High)

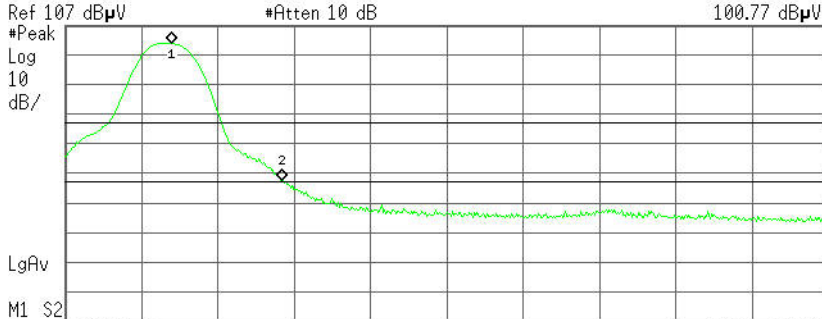
Detector mode: Peak

Polarity: Vertical

Agilent

R T

Mkr1 2.480 22 GHz
100.77 dBμV



Start 2.477 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz VBW 1 MHz Sweep 1 ms (601 pts)

| Marker | Trace | Type | X Axis | Amplitude |
|--------|-------|------|--------------|-------------|
| 1 | (1) | Freq | 2.480 22 GHz | 100.77 dBμV |
| 2 | (1) | Freq | 2.483 50 GHz | 54.68 dBμV |

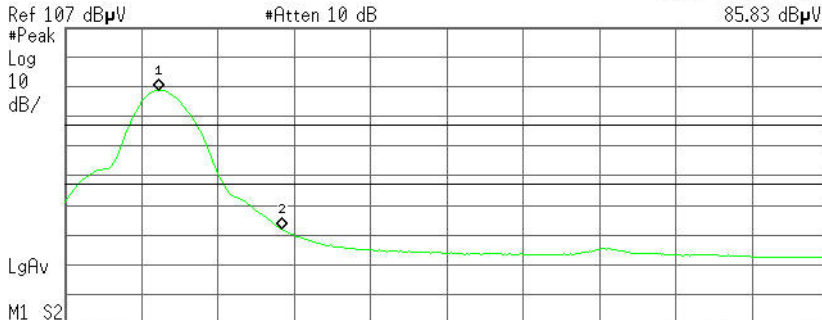
Detector mode: Average

Polarity: Vertical

Agilent

R T

Mkr1 2.479 84 GHz
85.83 dBμV



Start 2.477 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 510 Hz Sweep 35.2 ms (601 pts)

| Marker | Trace | Type | X Axis | Amplitude |
|--------|-------|------|--------------|------------|
| 1 | (1) | Freq | 2.479 84 GHz | 85.83 dBμV |
| 2 | (1) | Freq | 2.483 50 GHz | 38.89 dBμV |



Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.480 07 GHz
98.26 dBµV



Start 2.477 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 1 MHz Sweep 1 ms (601 pts)

| Marker | Trace | Type | X Axis | Amplitude |
|--------|-------|------|--------------|------------|
| 1 | (1) | Freq | 2.480 07 GHz | 98.26 dBµV |
| 2 | (1) | Freq | 2.483 50 GHz | 52.95 dBµV |

Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.479 91 GHz
83.505 dBµV



Start 2.477 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 510 Hz Sweep 35.2 ms (601 pts)

| Marker | Trace | Type | X Axis | Amplitude |
|--------|-------|------|--------------|------------|
| 1 | (1) | Freq | 2.479 91 GHz | 83.50 dBµV |
| 2 | (1) | Freq | 2.483 50 GHz | 37.22 dBµV |



Test Data (8DPSK)

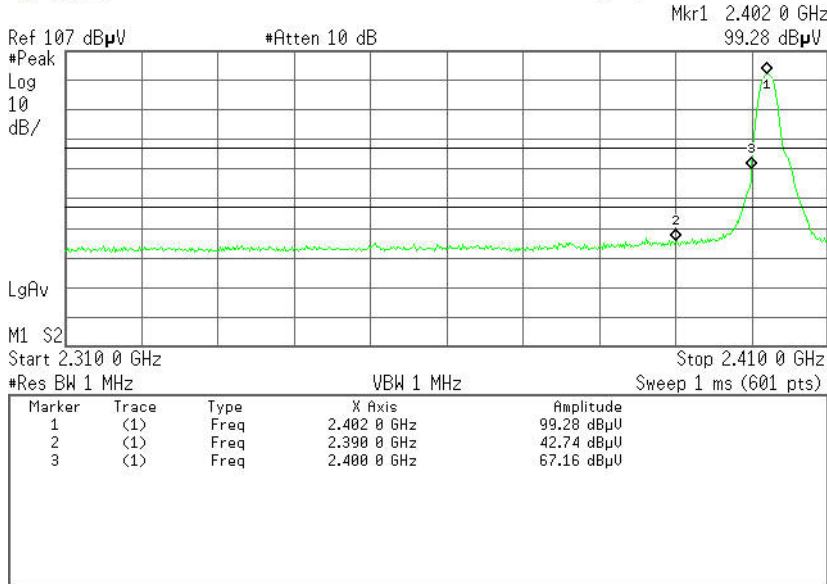
Band Edges (CH-Low)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

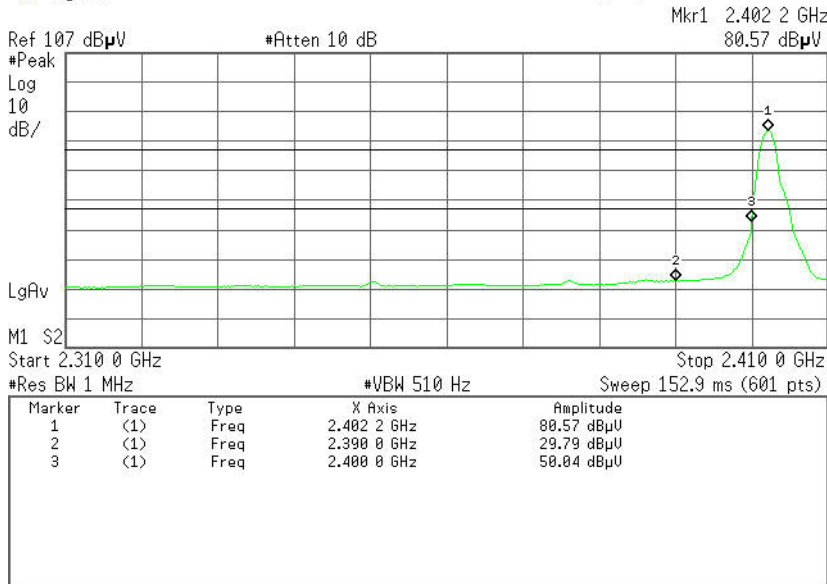


Detector mode: Average

Polarity: Vertical

Agilent

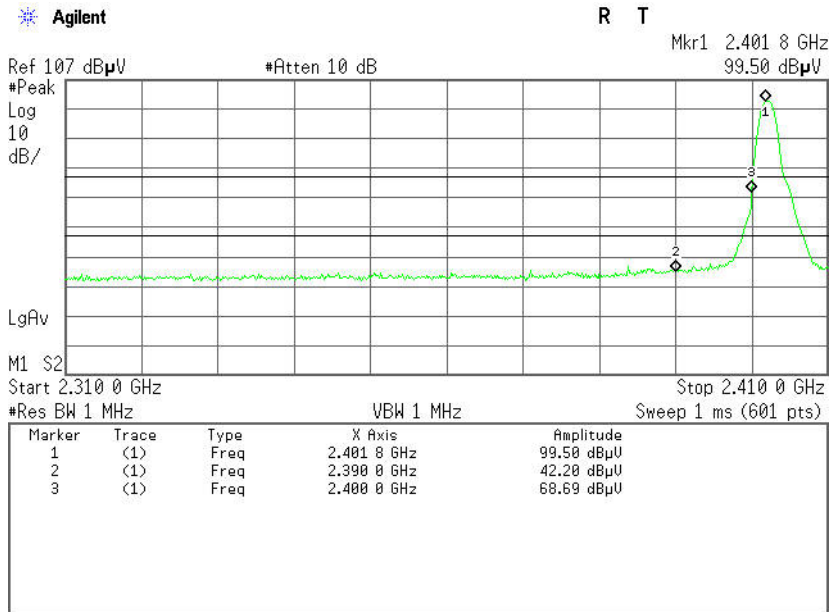
R T





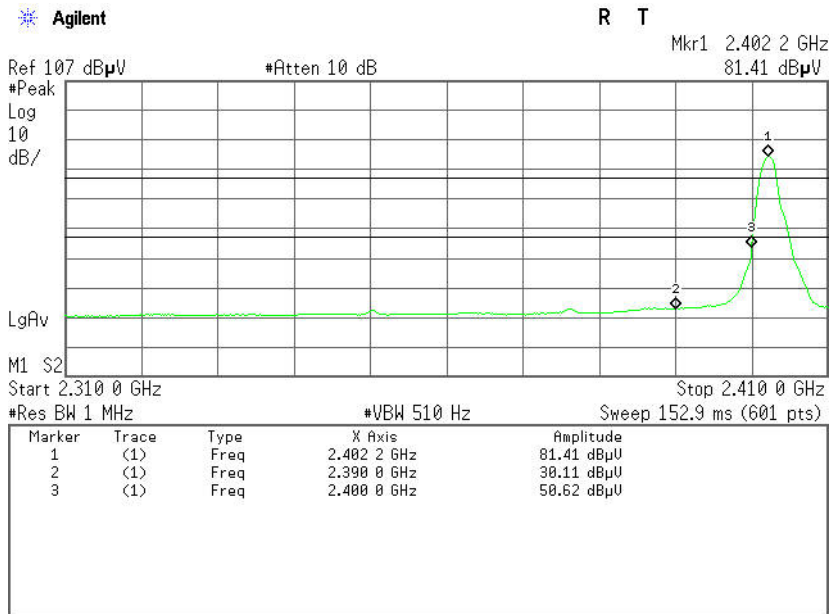
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal





Band Edges (CH-High)

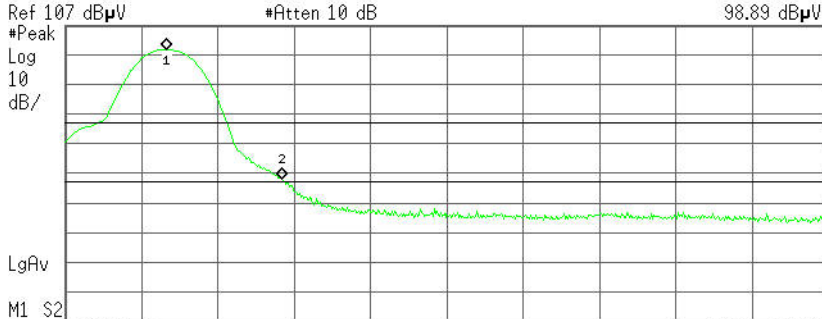
Detector mode: Peak

Polarity: Vertical

Agilent

R T

Mkr1 2.480 07 GHz
98.89 dBμV



| Marker | Trace | Type | X Axis | Amplitude |
|--------|-------|------|--------------|------------|
| 1 | (1) | Freq | 2.480 07 GHz | 98.89 dBμV |
| 2 | (1) | Freq | 2.483 50 GHz | 55.21 dBμV |

Detector mode: Average

Polarity: Vertical

Agilent

R T

Mkr1 2.479 84 GHz
83.37 dBμV



| Marker | Trace | Type | X Axis | Amplitude |
|--------|-------|------|--------------|------------|
| 1 | (1) | Freq | 2.479 84 GHz | 83.37 dBμV |
| 2 | (1) | Freq | 2.483 50 GHz | 38.06 dBμV |



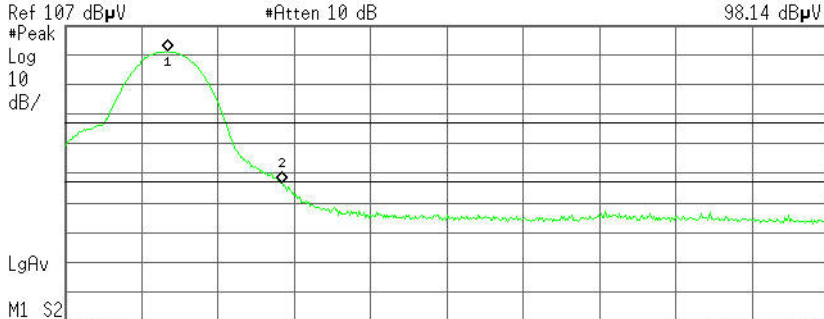
Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.480 10 GHz
98.14 dBµV



Start 2.477 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz VBW 1 MHz Sweep 1 ms (601 pts)

| Marker | Trace | Type | X Axis | Amplitude |
|--------|-------|------|--------------|------------|
| 1 | (1) | Freq | 2.480 10 GHz | 98.14 dBµV |
| 2 | (1) | Freq | 2.483 50 GHz | 53.85 dBµV |

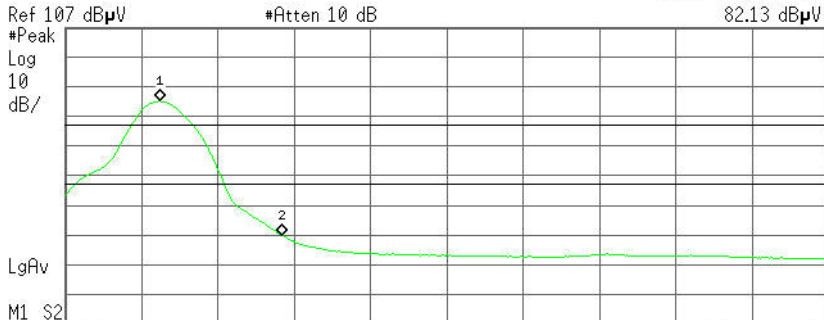
Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.479 88 GHz
82.13 dBµV



Start 2.477 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 510 Hz Sweep 35.2 ms (601 pts)

| Marker | Trace | Type | X Axis | Amplitude |
|--------|-------|------|--------------|------------|
| 1 | (1) | Freq | 2.479 88 GHz | 82.13 dBµV |
| 2 | (1) | Freq | 2.483 50 GHz | 36.90 dBµV |



6.5 FREQUENCY SEPARATION

LIMIT

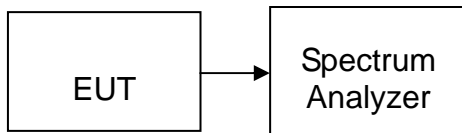
According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel 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.

MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|-------------------|--------------|--------|---------------|------------------|-----------------|
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 03/09/2013 | 03/08/2014 |

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

Test Configuration



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=30kHz, VBW=30kHz, Adjust Span to 4 MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

TEST RESULTS

No non-compliance noted

Test Data

GFSK

| Channel Separation (MHz) | Two-thirds of the 20 dB Bandwidth (kHz) | Channel Separation Limit | Result |
|--------------------------|---|-------------------------------------|--------|
| 1.000 | 586.113 | > Two-thirds of the 20 dB Bandwidth | Pass |

8DPSK

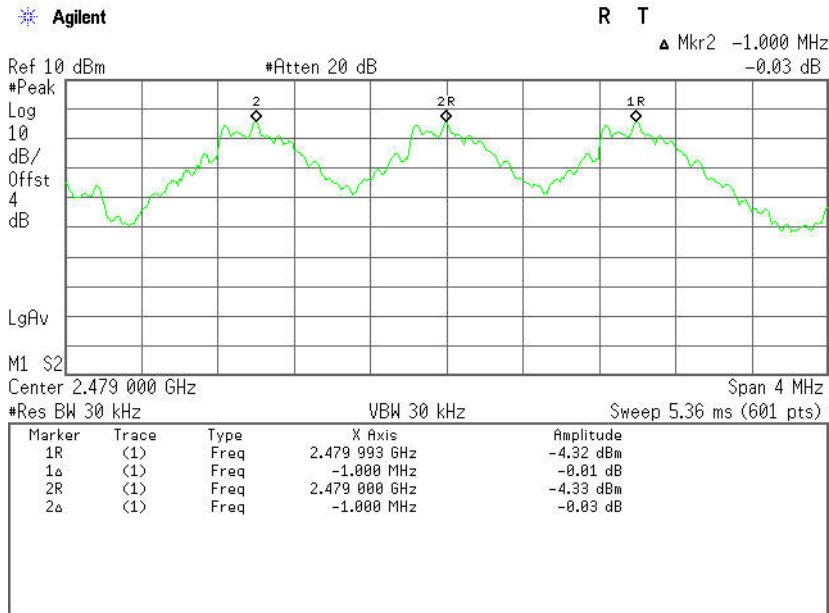
| Channel Separation (MHz) | Two-thirds of the 20 dB Bandwidth (kHz) | Channel Separation Limit | Result |
|--------------------------|---|-------------------------------------|--------|
| 1.000 | 816.000 | > Two-thirds of the 20 dB Bandwidth | Pass |



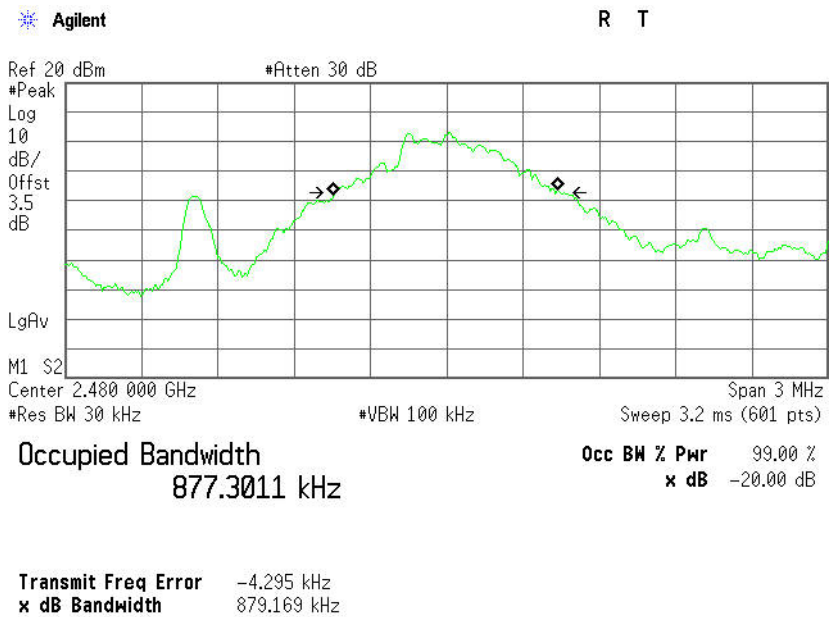
GFSK

Test Plot

Measurement of Channel Separation



20 dB bandwidth(CH High)

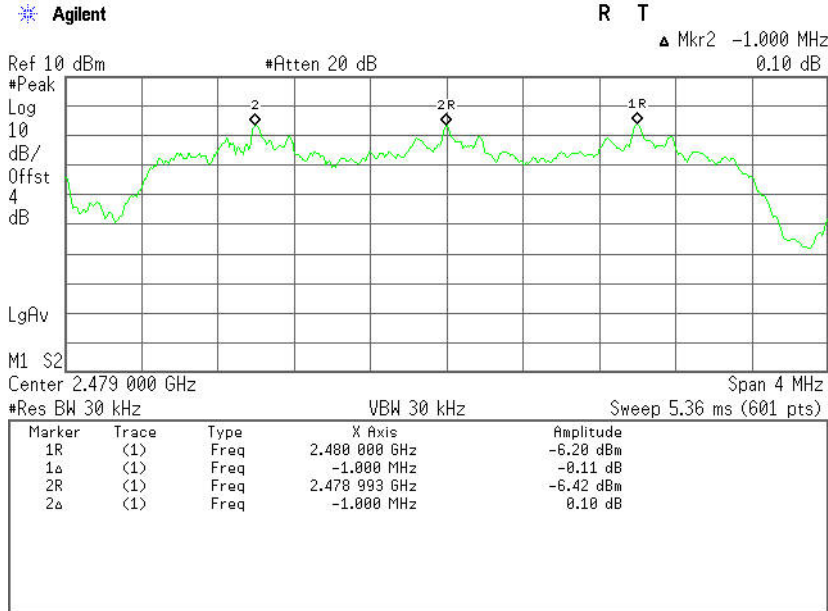




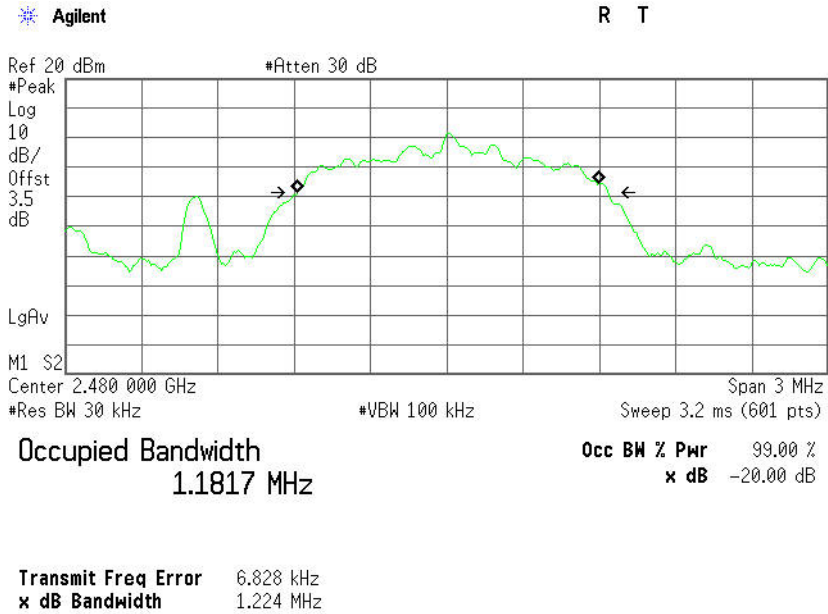
8DPSK

Test Plot

Measurement of Channel Separation



20 dB bandwidth(CH High)





6.6 NUMBER OF HOPPING FREQUENCY

LIMIT

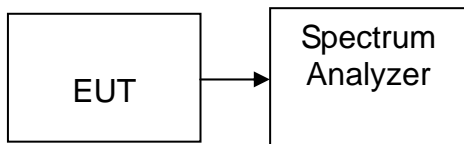
According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|-------------------|--------------|--------|---------------|------------------|-----------------|
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 03/09/2013 | 03/08/2014 |

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

Test Configuration



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 = 2441.5MHz, Sweep = 1ms and Start=2441.5MHz, Stop = 24835MHz, Sweep = 1ms.
4. Set the spectrum analyzer as RBW, VBW=300kHz,
5. Max hold, view and count how many channel in the band.

TEST RESULTS

No non-compliance noted

Test Data

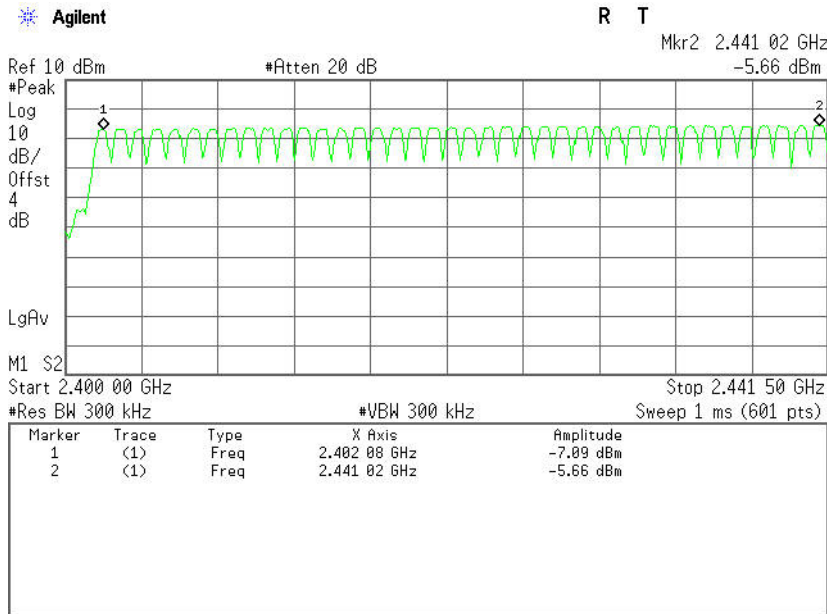
| Result (No. of CH) | Limit (No. of CH) | Result |
|--------------------|-------------------|--------|
| 79 | >15 | PASS |



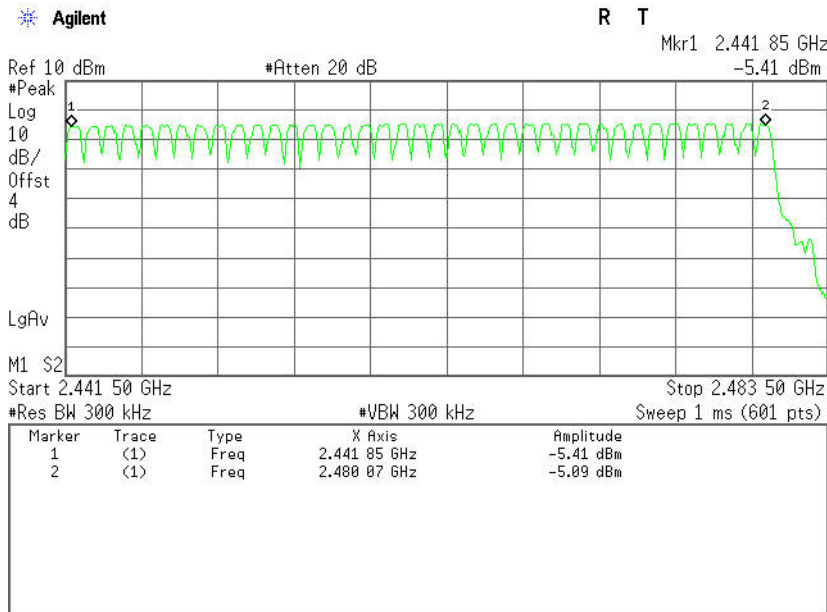
Test Plot (GFSK)

Channel Number

2.4000 GHz – 2.4415 GHz



2.4415 GHz –2.4835 GHz

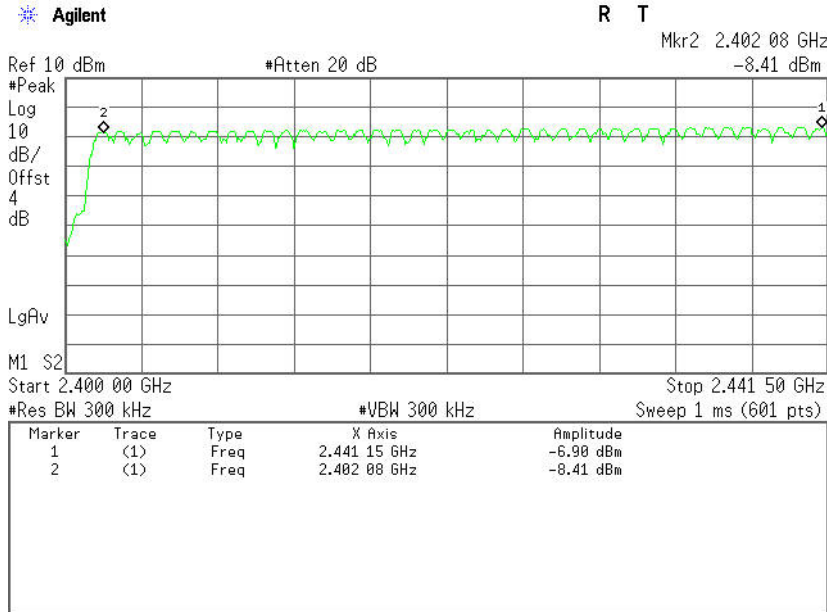




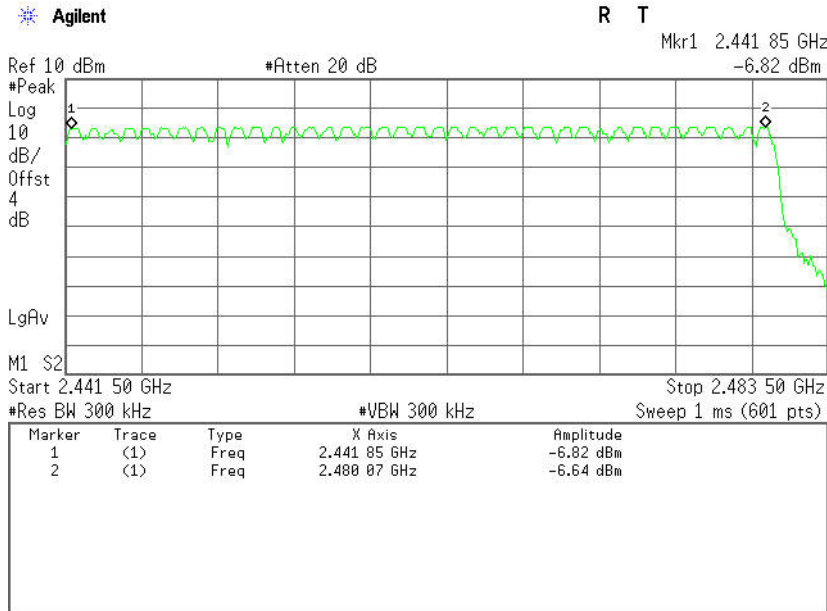
Test Plot (8DPSK)

Channel Number

2.4000 GHz – 2.4415 GHz



2.4415 GHz –2.4835 GHz





6.7 TIME OF OCCUPANCY (DWELL TIME)

LIMIT

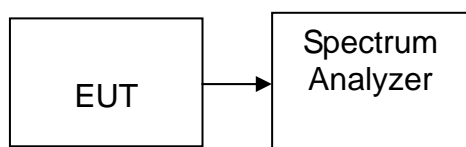
According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|-------------------|--------------|--------|---------------|------------------|-----------------|
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 03/09/2013 | 03/08/2014 |

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

Test Configuration



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.



TEST RESULTS

No non-compliance noted

Test Data

GFSK

DH 1

CH Mid: $0.508 * (1600/2)/79 * 31.6 = 162.560$ (ms)

| CH | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|-----|-----------------|---------------------|-----------------|------------|--------|
| Mid | 0.508 | 162.560 | 31.60 | 400.00 | PASS |

DH 3

CH Mid: $1.760 * (1600/4)/79 * 31.6 = 281.600$ (ms)

| CH | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|-----|-----------------|---------------------|-----------------|------------|--------|
| Mid | 1.760 | 281.600 | 31.60 | 400.00 | PASS |

DH 5

CH Mid: $3.008 * (1600/6)/79 * 31.6 = 320.853$ (ms)

| CH | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|-----|-----------------|---------------------|-----------------|------------|--------|
| Mid | 3.008 | 320.853 | 31.60 | 400.00 | PASS |



Test Data

8DPSK

DH 1

CH Mid: $0.520 * (1600/2)/79 * 31.6 = 166.400$ (ms)

| CH | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|-----|-----------------|---------------------|-----------------|------------|--------|
| Mid | 0.520 | 166.400 | 31.60 | 400.00 | PASS |

DH 3

CH Mid: $1.765 * (1600/4)/79 * 31.6 = 282.400$ (ms)

| CH | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|-----|-----------------|---------------------|-----------------|------------|--------|
| Mid | 1.765 | 282.400 | 31.60 | 400.00 | PASS |

DH 5

CH Mid: $3.008 * (1600/6)/79 * 31.6 = 320.853$ (ms)

| CH | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|-----|-----------------|---------------------|-----------------|------------|--------|
| Mid | 3.008 | 320.853 | 31.60 | 400.00 | PASS |

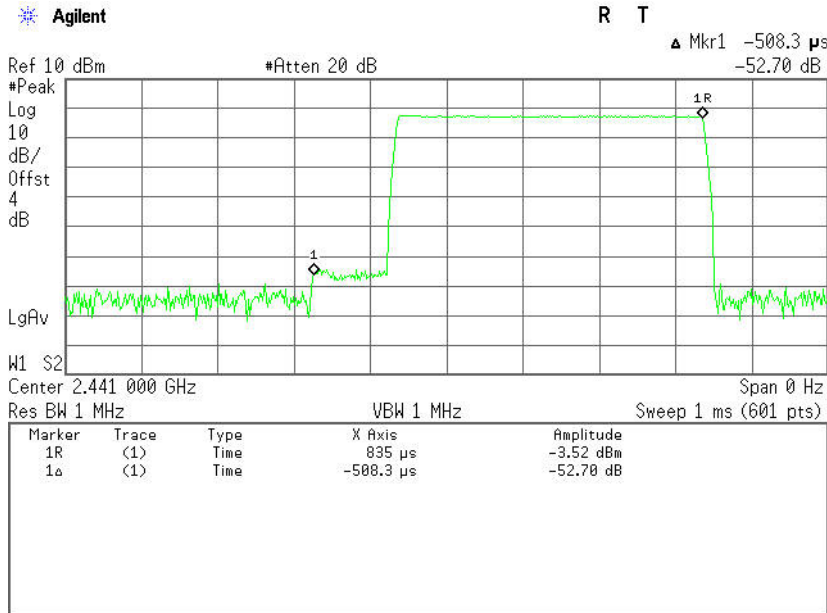


Test Plot

GFSK

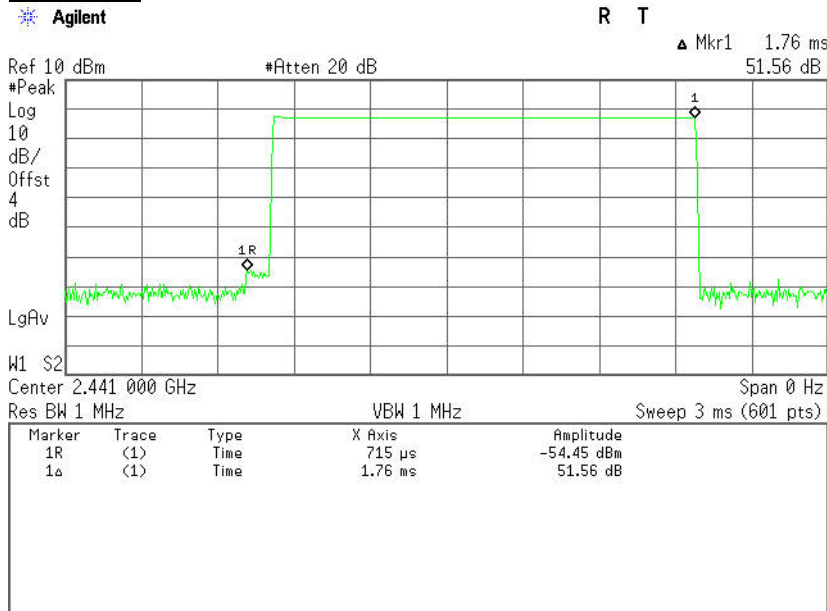
DH 1

(CH Mid)



DH 3

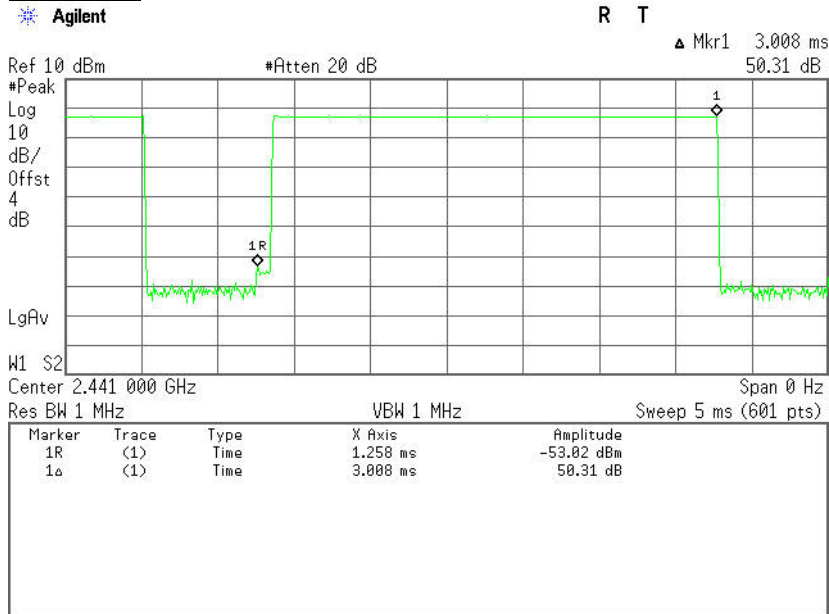
(CH Mid)





DH 5

(CH Mid)

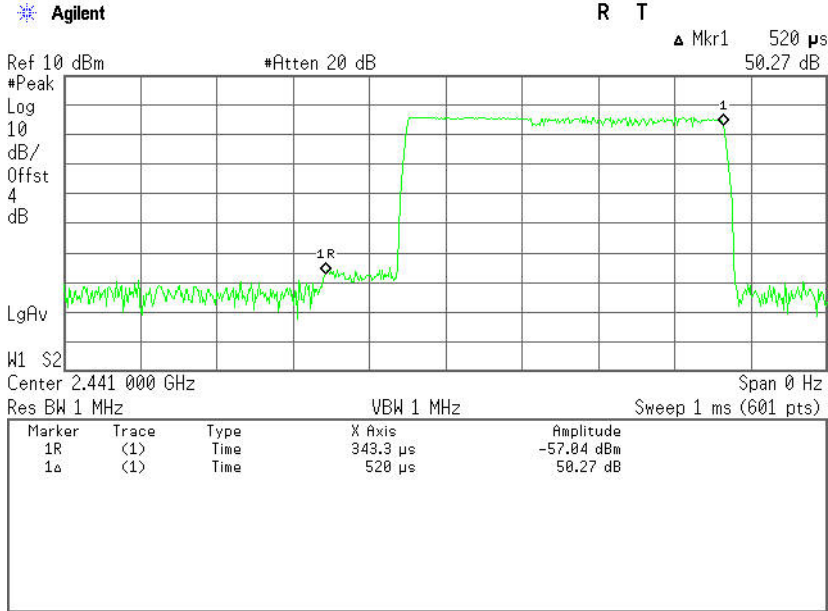




8DPSK
Test Plot

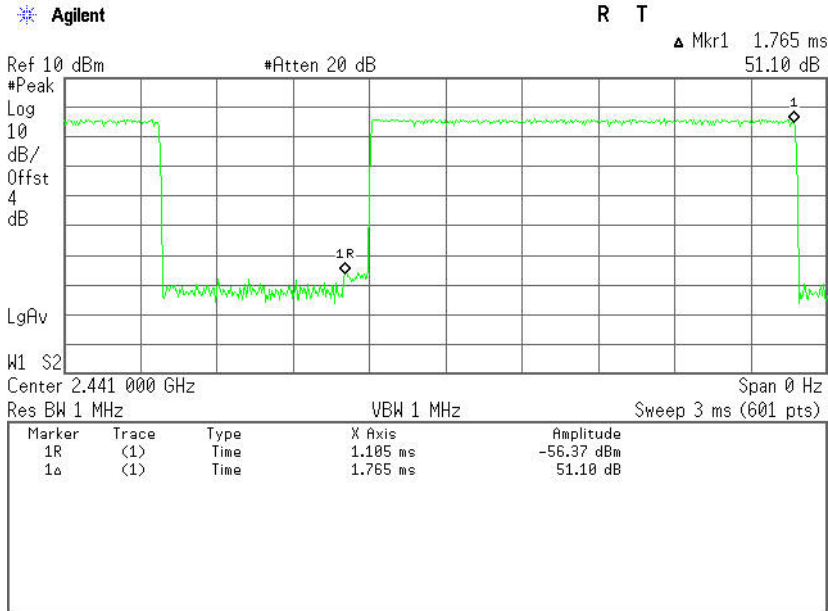
DH 1

(CH Mid)



DH 3

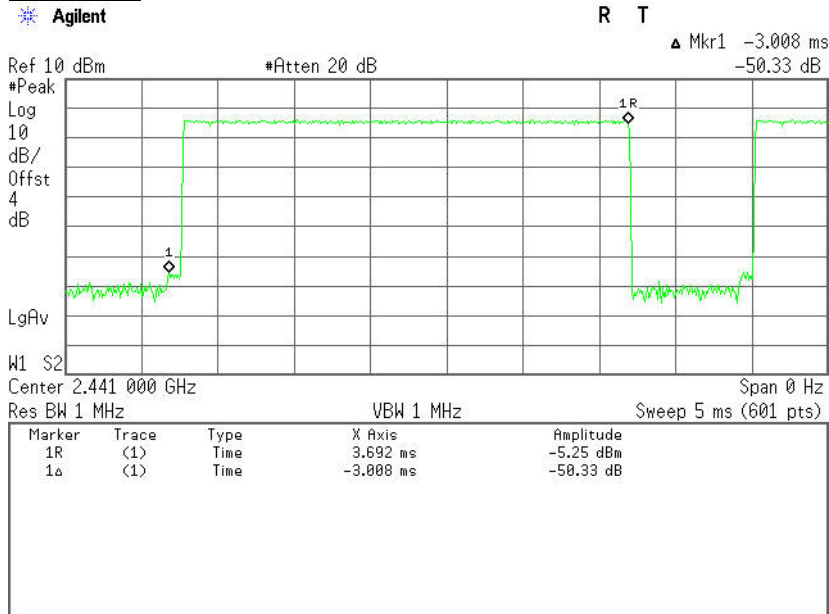
(CH Mid)





DH 5

(CH Mid)





6.8 SPURIOUS EMISSIONS

6.8.1. Conducted Measurement

LIMIT

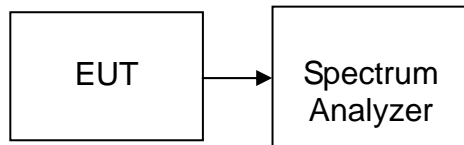
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|-------------------|--------------|--------|---------------|------------------|-----------------|
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 03/09/2013 | 03/08/2014 |

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

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

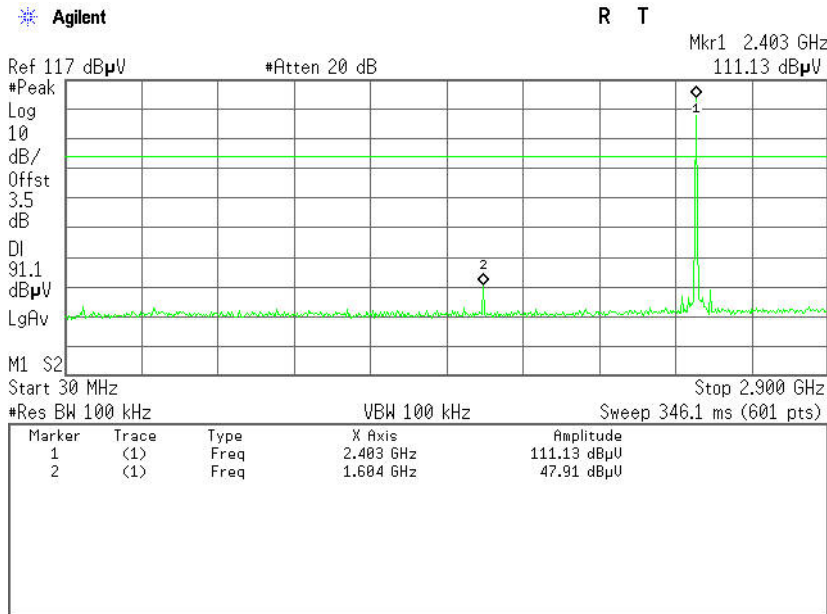
No non-compliance noted



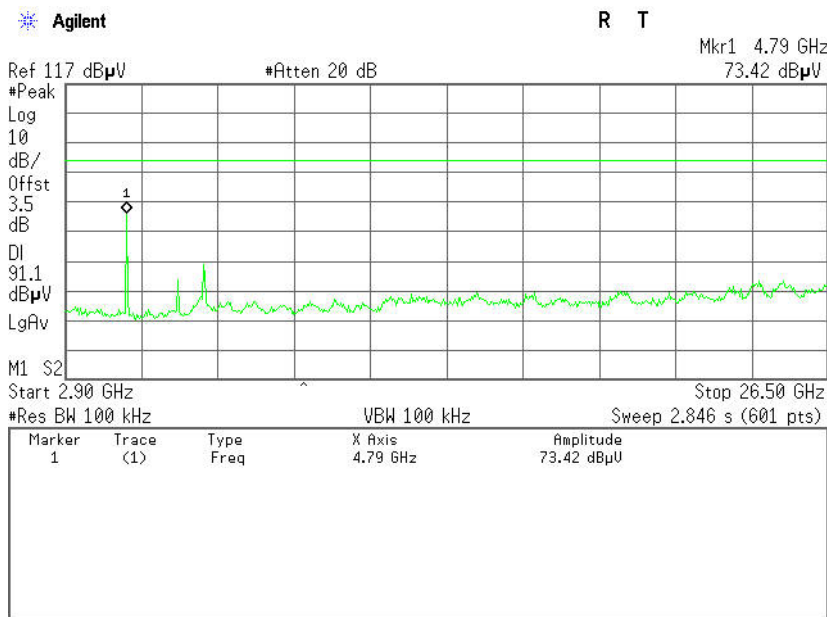
Test Plot (GFSK)

CH Low

30MHz ~2.9GHz



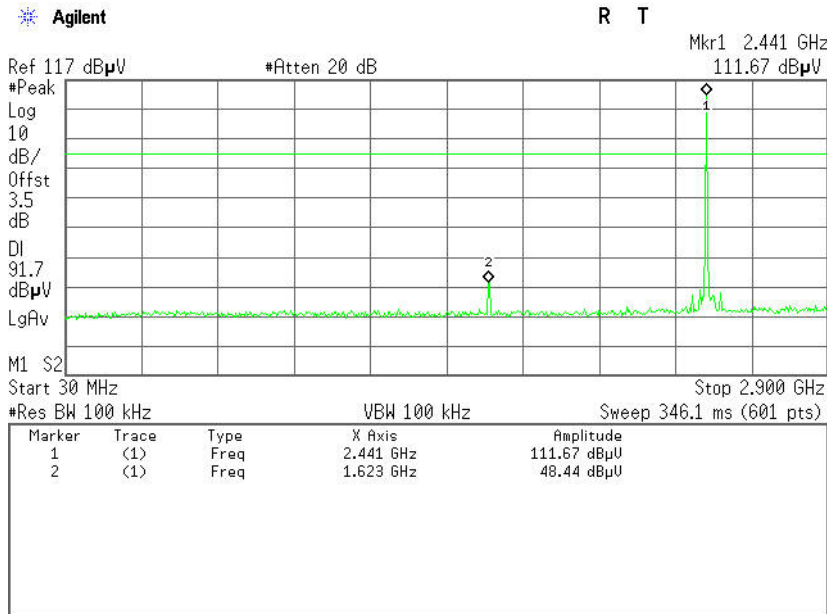
2.9MHz ~26.5GHz



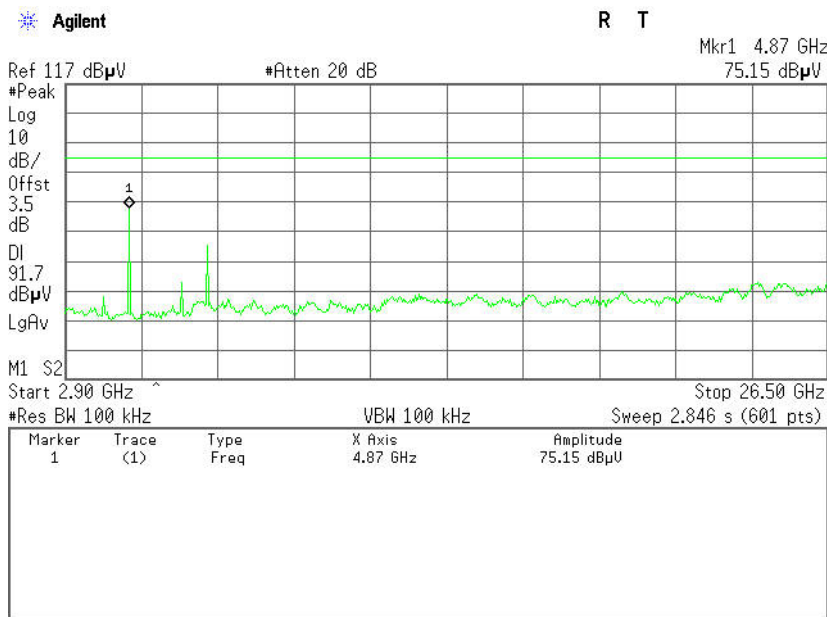


CH Mid

30MHz ~ 2.9GHz



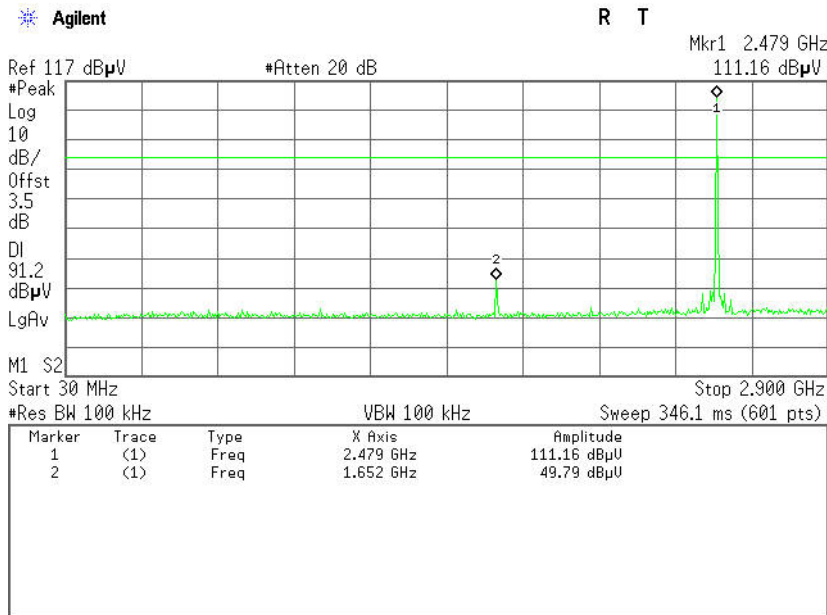
2.9GHz ~ 26.5GHz



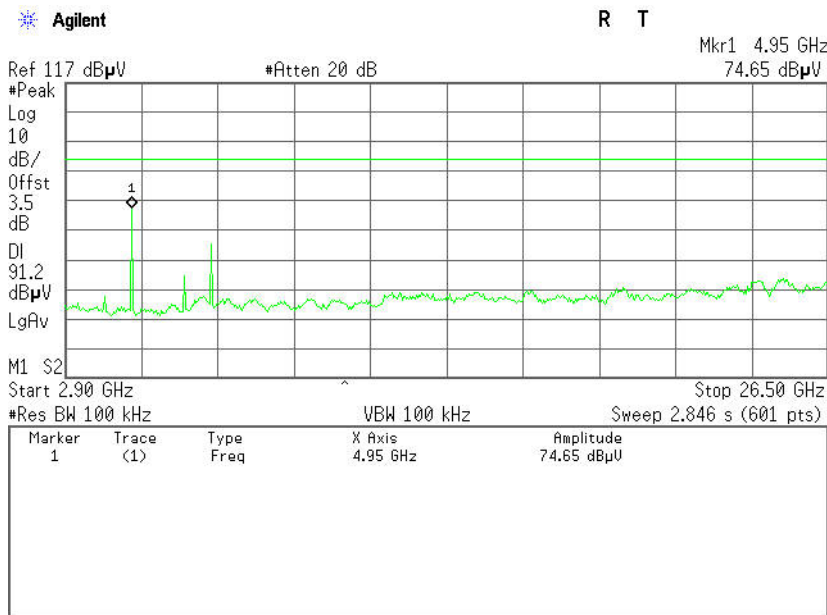


CH High

30MHz ~ 2.9GHz



2.9GHz ~ 26.5GHz

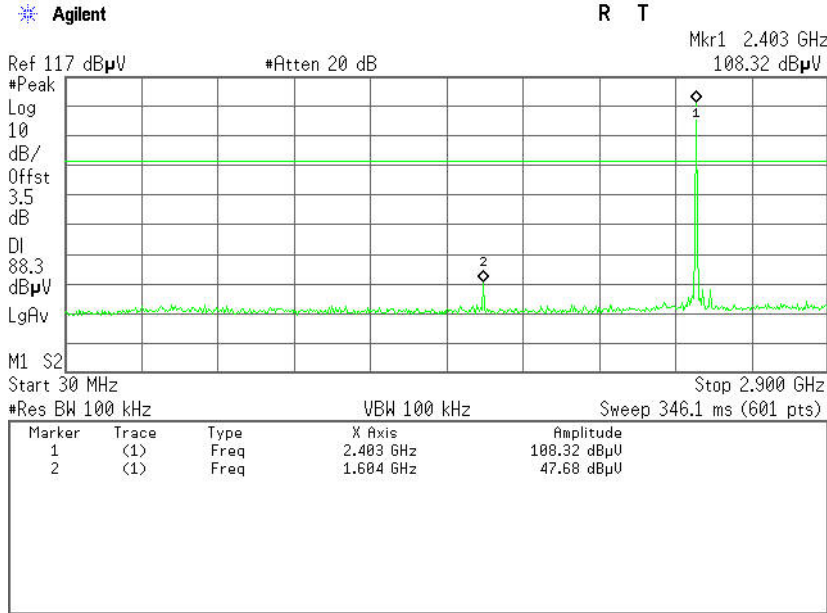




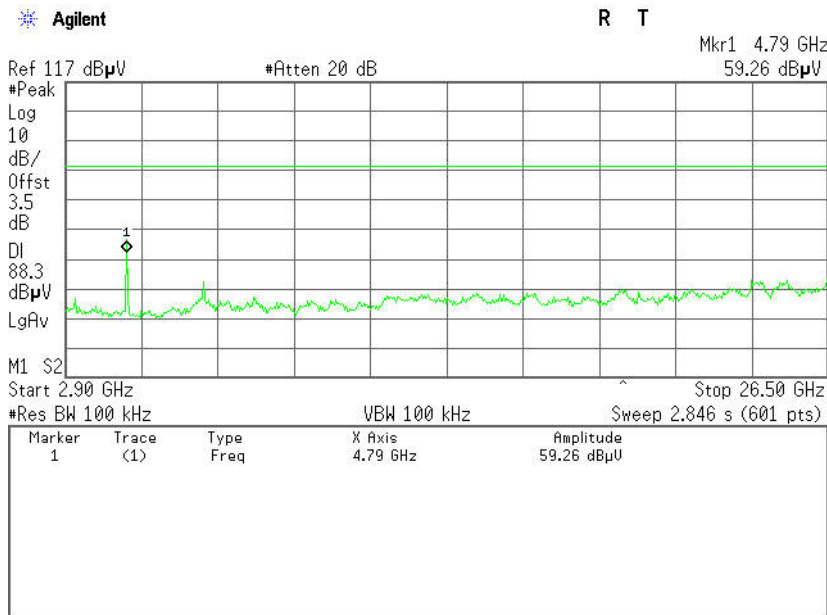
Test Plot (8DPSK)

CH Low

30MHz ~2.9GHz



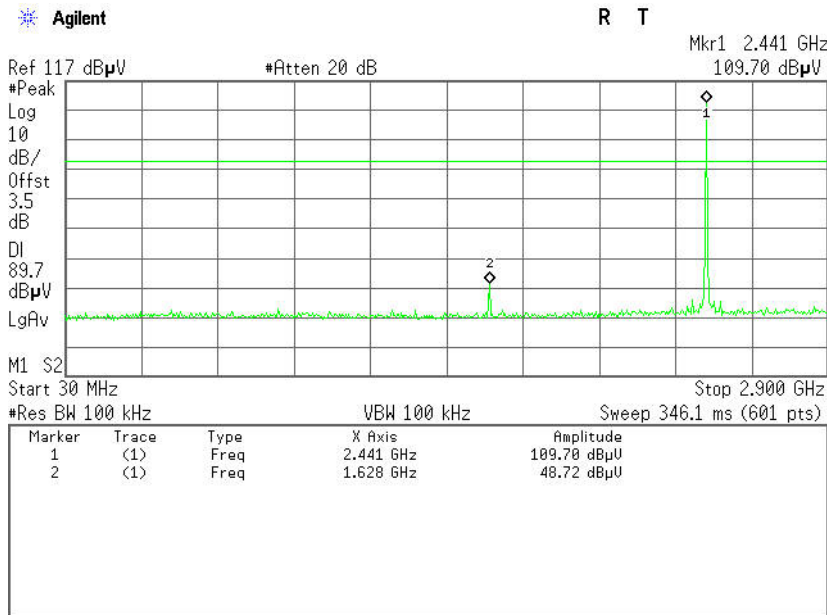
2.9MHz ~26.5GHz



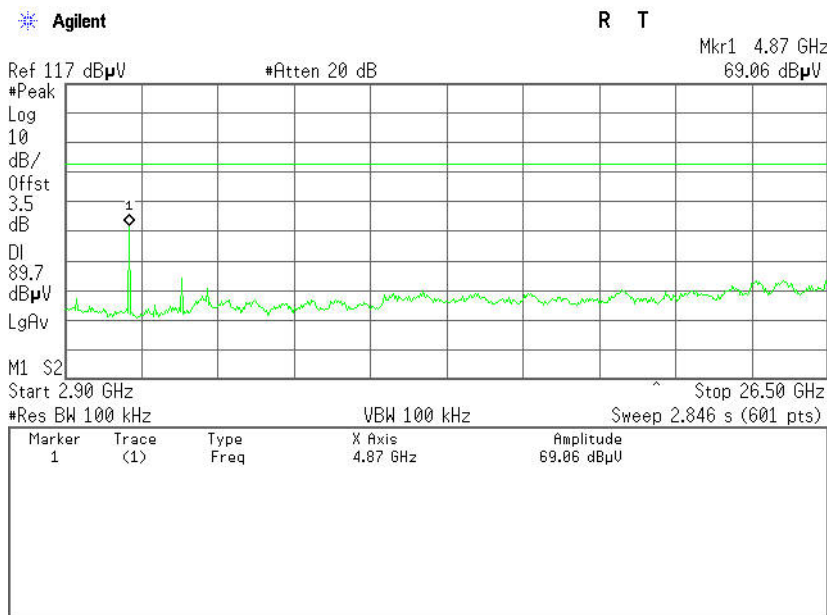


CH Mid

30MHz ~ 2.9GHz



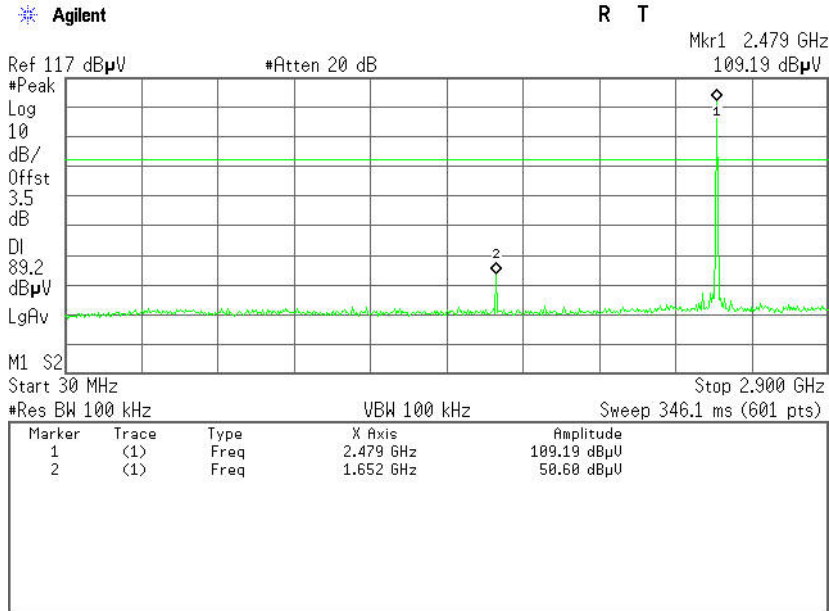
2.9GHz ~ 26.5GHz



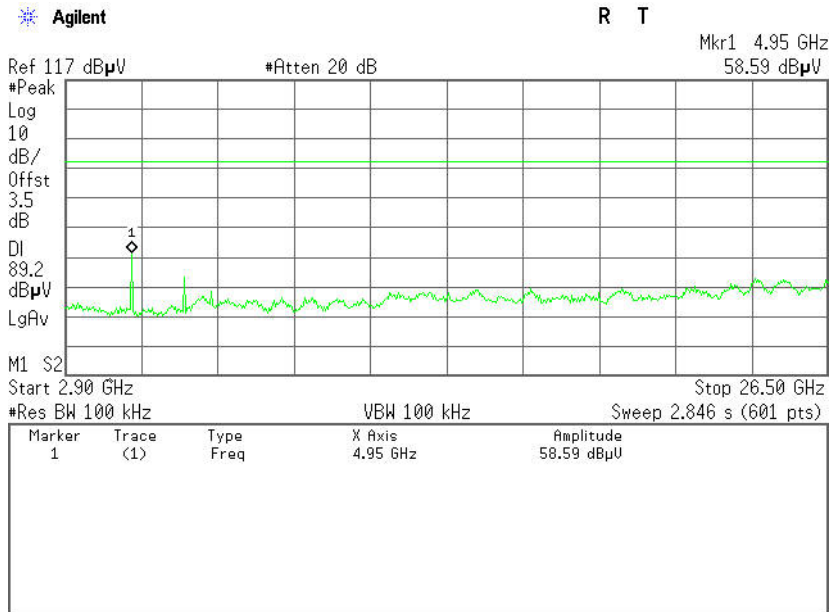


CH High

30MHz ~ 2.9GHz



2.9GHz ~ 26.5GHz





6.8.2. Radiated Emissions

LIMIT

1. 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 (mV/m) | Measurement Distance (m) |
|-----------------|-----------------------|--------------------------|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100* | 3 |
| 88-216 | 150* | 3 |
| 216-960 | 200* | 3 |
| Above 960 | 500 | 3 |

Note: 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.

2. In the above emission table, the tighter limit applies at the band edges.

| Frequency (Hz) | Field Strength (μ V/m at 3-meter) | Field Strength (dB μ V/m at 3-meter) |
|----------------|--|--|
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |



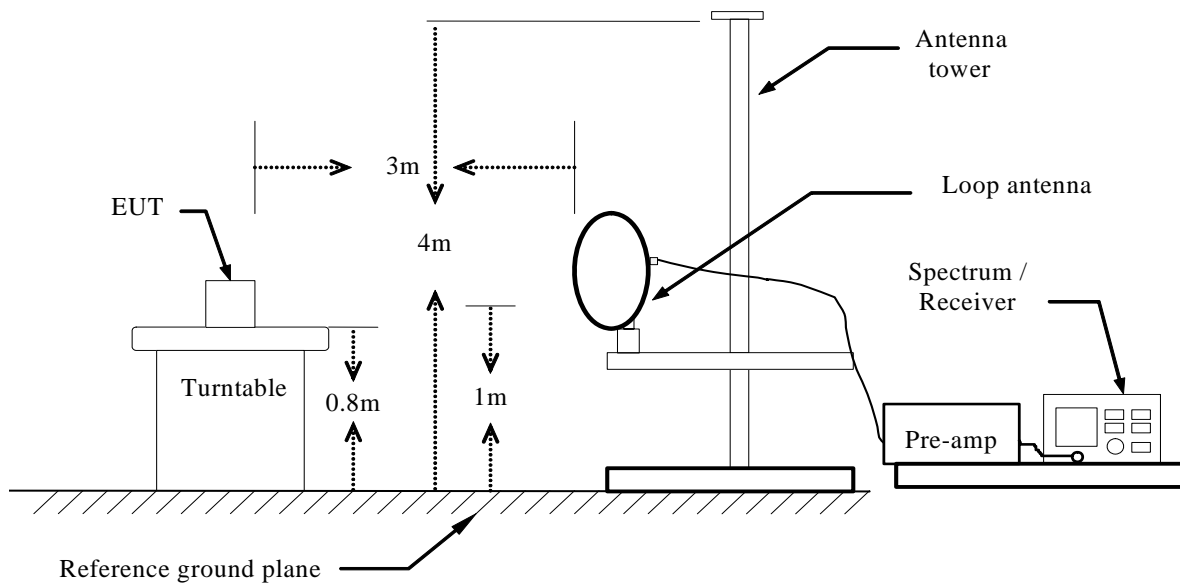
MEASUREMENT EQUIPMENT USED

| Radiated Emission Test Site 966 (2) | | | | | |
|-------------------------------------|----------------|--------------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| PSA Series Spectrum Analyzer | Agilent | E4446A | US44300399 | 03/09/2013 | 03/08/2014 |
| ESCI EMI TEST RECEIVER.ESCI | ROHDE&SCHWARZ | ESCI | 100783 | 03/09/2013 | 03/08/2014 |
| Amplifier | MITEQ | AM-1604-3000 | 1123808 | 03/18/2013 | 03/18/2014 |
| High Noise Amplifier | Agilent | 8449B | 3008A01838 | 03/18/2013 | 03/18/2014 |
| Board-Band Horn Antenna | Schwarzbeck | BBHA 9170 | 9170-497 | 06/21/2012 | 06/21/2013 |
| Bilog Antenna | SCHAFFNER | CBL6143 | 5082 | 03/02/2013 | 03/01/2014 |
| Horn Antenna | SCHWARZBECK | BBHA9120 | D286 | 03/02/2013 | 03/01/2014 |
| Loop Antenna | A、R、A | PLA-1030/B | 1029 | 03/23/2013 | 03/23/2014 |
| Turn Table | N/A | N/A | N/A | N.C.R | N.C.R |
| Controller | Sunol Sciences | SC104V | 022310-1 | N.C.R | N.C.R |
| Controller | CT | N/A | N/A | N.C.R | N.C.R |
| Temp. / Humidity Meter | Anymetre | JR913 | N/A | 03/04/2013 | 03/03/2014 |
| Antenna Tower | SUNOL | TLT2 | N/A | N.C.R | N.C.R |
| 966(2) | 中宇电子 | N/A | N/A | 03/10/2013 | 03/09/2014 |
| Test S/W | FARAD | LZ-RF / CCS-SZ-3A2 | | | |

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

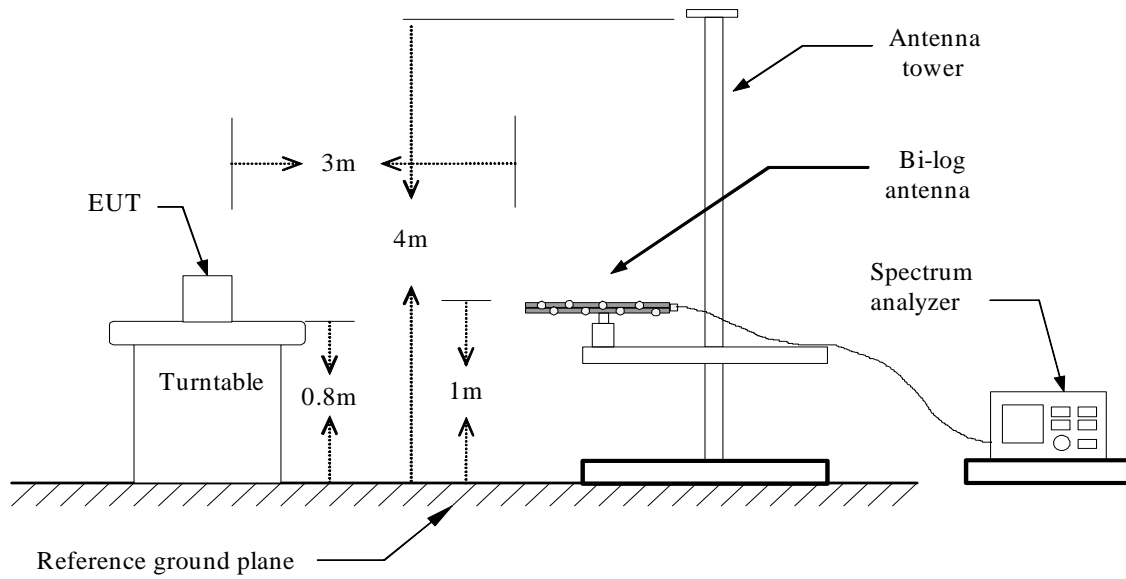
Test Configuration

Below 30MHz

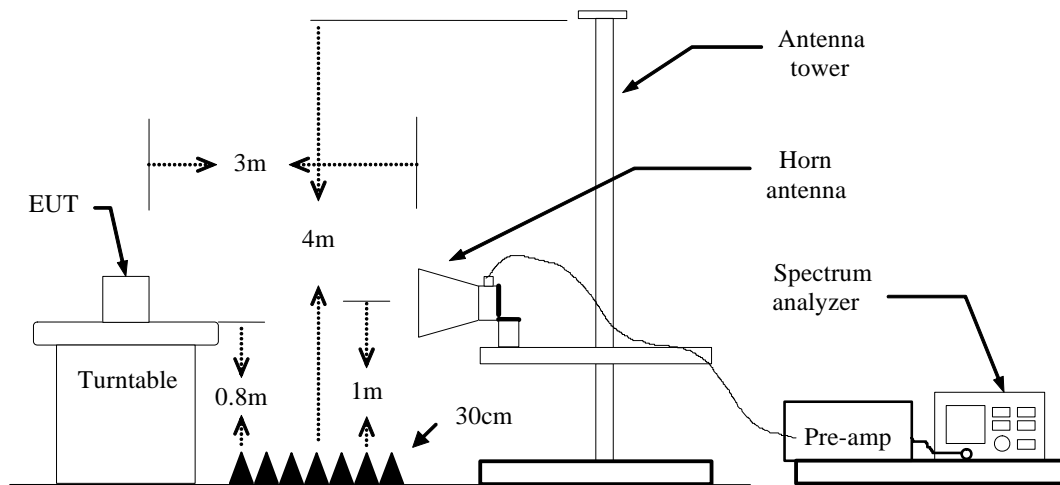




Below 1 GHz



Above 1 GHz





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.



Above 1 GHz

GFSK

Operation Mode:

TX(CH Low)

Test Date: April 1, 2013

Temperature: 24°C

Tested by: Viking Yuan

Humidity: 52% RH

Polarity: Ver. / Hor.

Table with 8 columns: Frequency (MHz), Reading (dBuV), Correction Factor (dB/m), Result (dBuV/m), Limit (dBuV/m), Margin (dB), Antenna Pole (V/H), Remark. It contains two sets of data rows for frequencies ranging from 1195.0000 to 5230.0000 MHz.

Notes:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded...
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode...
4. Spectrum setting:
a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. Frequency (MHz) = Emission frequency in MHz
Reading (dBuV/m) = Uncorrected Analyzer / Receiver Reading
Correction Factor (dB) = Antenna factor + Cable loss - Amplifier gain
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) - Limit (dBuV/m)
Pk = Peak Reading
AV = Average Reading
Remark = Mark Peak Reading or Average Reading



Operation Mode: TX(CH Mid)

Test Date: April 1, 2013

Temperature: 24°C

Tested by: Viking Yuan

Humidity: 52% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------------------|--------|
| 1195.0000 | 52.52 | -8.77 | 43.75 | 74.00 | -30.25 | V | Peak |
| 1630.0000 | 53.37 | -8.79 | 44.58 | 74.00 | -29.42 | V | Peak |
| 3805.0000 | 45.27 | -2.49 | 42.78 | 74.00 | -31.22 | V | Peak |
| 4885.0000 | 66.50 | 0.80 | 67.30 | 74.00 | -6.70 | V | Peak |
| 4885.0000 | 46.19 | 0.80 | 46.99 | 54.00 | -7.01 | V | AVG |
| 5845.0000 | 44.46 | 2.85 | 47.31 | 74.00 | -26.69 | V | Peak |
| 6580.0000 | 44.22 | 4.76 | 48.98 | 74.00 | -25.02 | V | Peak |
| 1195.0000 | 50.04 | -8.77 | 41.27 | 74.00 | -32.73 | H | Peak |
| 1630.0000 | 50.63 | -8.79 | 41.84 | 74.00 | -32.16 | H | Peak |
| 3760.0000 | 45.41 | -2.59 | 42.82 | 74.00 | -31.18 | H | Peak |
| 4300.0000 | 45.82 | -1.20 | 44.62 | 74.00 | -29.38 | H | Peak |
| 4885.0000 | 67.96 | 0.80 | 68.76 | 74.00 | -5.24 | H | Peak |
| 4885.0000 | 44.84 | 0.80 | 45.64 | 54.00 | -8.36 | H | AVG |
| 7330.0000 | 44.98 | 7.50 | 52.48 | 74.00 | -21.52 | H | Peak |

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. Frequency (MHz) = Emission frequency in MHz
 Reading (dBuV/m) =Uncorrected Analyzer / Receiver Reading
 Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
 Limit (dBuV/m) = Limit stated in standard
 Margin (dB) = Result (dBuV/m)- Limit (dBuV/m)
 Pk = Peak Reading
 AV. = Average Reading
 Remark = Mark Peak Reading or Average Reading



Operation Mode: TX(CH High)

Test Date: April 1, 2013

Temperature: 24 °C

Tested by: Viking Yuan

Humidity: 52% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------------------|--------|
| 1060.0000 | 56.29 | -9.85 | 46.44 | 74.00 | -27.56 | V | Peak |
| 1660.0000 | 53.73 | -8.91 | 44.82 | 74.00 | -29.18 | V | Peak |
| 4375.0000 | 45.24 | -0.91 | 44.33 | 74.00 | -29.67 | V | Peak |
| 4555.0000 | 46.87 | -0.54 | 46.33 | 74.00 | -27.67 | V | Peak |
| 4960.0000 | 63.79 | 1.14 | 64.93 | 74.00 | -9.07 | V | Peak |
| 4960.0000 | 40.13 | 1.14 | 41.27 | 54.00 | -12.73 | V | AVG |
| 5755.0000 | 44.50 | 2.59 | 47.09 | 74.00 | -26.91 | V | Peak |
| 1195.0000 | 51.60 | -8.77 | 42.83 | 74.00 | -31.17 | H | Peak |
| 4120.0000 | 45.10 | -1.96 | 43.14 | 74.00 | -30.86 | H | Peak |
| 4960.0000 | 67.45 | 1.14 | 68.59 | 74.00 | -5.41 | H | Peak |
| 4960.0000 | 42.99 | 1.14 | 44.13 | 54.00 | -9.87 | H | AVG |
| 5890.0000 | 43.77 | 2.92 | 46.69 | 74.00 | -27.31 | H | Peak |
| 6265.0000 | 44.30 | 3.88 | 48.18 | 74.00 | -25.82 | H | Peak |
| 7435.0000 | 45.21 | 7.61 | 52.82 | 74.00 | -21.18 | H | Peak |

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. Frequency (MHz) = Emission frequency in MHz
 Reading (dBuV/m) =Uncorrected Analyzer / Receiver Reading
 Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
 Limit (dBuV/m) = Limit stated in standard
 Margin (dB) = Result (dBuV/m)- Limit (dBuV/m)
 Pk = Peak Reading
 AV = Average Reading
 Remark = Mark Peak Reading or Average Reading



8DPSK

Operation Mode:

TX(CH Low)

Test Date: April 1, 2013

Temperature: 24°C

Tested by: Viking Yuan

Humidity: 52% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------------------|--------|
| 1195.0000 | 52.92 | -8.77 | 44.15 | 74.00 | -29.85 | V | Peak |
| 1600.0000 | 52.28 | -8.68 | 43.60 | 74.00 | -30.40 | V | Peak |
| 3385.0000 | 46.72 | -4.01 | 42.71 | 74.00 | -31.29 | V | Peak |
| 3775.0000 | 46.21 | -2.55 | 43.66 | 74.00 | -30.34 | V | Peak |
| 4810.0000 | 55.74 | 0.46 | 56.20 | 74.00 | -17.80 | V | Peak |
| 4810.0000 | 34.12 | 0.46 | 34.58 | 54.00 | -19.42 | V | AVG |
| 5590.0000 | 45.11 | 1.91 | 47.02 | 74.00 | -26.98 | V | Peak |
| 1195.0000 | 53.93 | -8.77 | 45.16 | 74.00 | -28.84 | H | Peak |
| 2860.0000 | 48.03 | -4.80 | 43.23 | 74.00 | -30.77 | H | Peak |
| 4420.0000 | 45.00 | -0.78 | 44.22 | 74.00 | -29.78 | H | Peak |
| 4810.0000 | 55.31 | 0.46 | 55.77 | 74.00 | -18.23 | H | Peak |
| 4810.0000 | 32.82 | 0.46 | 33.28 | 54.00 | -20.72 | H | AVG |
| 5875.0000 | 44.35 | 2.90 | 47.25 | 74.00 | -26.75 | H | Peak |
| 6250.0000 | 45.54 | 3.83 | 49.37 | 74.00 | -24.63 | H | Peak |

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. Frequency (MHz) = Emission frequency in MHz
 Reading (dBuV/m) =Uncorrected Analyzer / Receiver Reading
 Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
 Limit (dBuV/m) = Limit stated in standard
 Margin (dB) = Result (dBuV/m)- Limit (dBuV/m)
 Pk = Peak Reading
 AV. = Average Reading
 Remark = Mark Peak Reading or Average Reading



Operation Mode: TX(CH Mid)

Test Date: April 1, 2013

Temperature: 24°C

Tested by: Viking Yuan

Humidity: 52% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------------------|--------|
| 1600.0000 | 52.74 | -8.68 | 44.06 | 74.00 | -29.94 | V | Peak |
| 3790.0000 | 46.30 | -2.52 | 43.78 | 74.00 | -30.22 | V | Peak |
| 4300.0000 | 46.20 | -1.20 | 45.00 | 74.00 | -29.00 | V | Peak |
| 4885.0000 | 61.66 | 0.80 | 62.46 | 74.00 | -11.54 | V | Peak |
| 4885.0000 | 38.61 | 0.80 | 39.41 | 54.00 | -14.59 | V | AVG |
| 6220.0000 | 44.98 | 3.74 | 48.72 | 74.00 | -25.28 | V | Peak |
| 6430.0000 | 44.42 | 4.34 | 48.76 | 74.00 | -25.24 | V | Peak |
| 1195.0000 | 52.01 | -8.77 | 43.24 | 74.00 | -30.76 | H | Peak |
| 1630.0000 | 49.99 | -8.79 | 41.20 | 74.00 | -32.80 | H | Peak |
| 3580.0000 | 45.83 | -3.11 | 42.72 | 74.00 | -31.28 | H | Peak |
| 4090.0000 | 44.91 | -2.10 | 42.81 | 74.00 | -31.19 | H | Peak |
| 4885.0000 | 60.49 | 0.80 | 61.29 | 74.00 | -12.71 | H | Peak |
| 4885.0000 | 37.47 | 0.80 | 38.27 | 54.00 | -15.73 | H | AVG |
| 6265.0000 | 45.01 | 3.88 | 48.89 | 74.00 | -25.11 | H | Peak |

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. Frequency (MHz) = Emission frequency in MHz
 Reading (dBuV/m) =Uncorrected Analyzer / Receiver Reading
 Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
 Limit (dBuV/m) = Limit stated in standard
 Margin (dB) = Result (dBuV/m)- Limit (dBuV/m)
 Pk = Peak Reading
 AV. = Average Reading
 Remark = Mark Peak Reading or Average Reading



Operation Mode: TX(CH High)

Test Date: April 1, 2013

Temperature: 24 °C

Tested by: Viking Yuan

Humidity: 52% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------------------|--------|
| 1195.0000 | 52.46 | -8.77 | 43.69 | 74.00 | -30.31 | V | Peak |
| 1660.0000 | 51.33 | -8.91 | 42.42 | 74.00 | -31.58 | V | Peak |
| 3655.0000 | 46.13 | -2.87 | 43.26 | 74.00 | -30.74 | V | Peak |
| 4270.0000 | 45.69 | -1.31 | 44.38 | 74.00 | -29.62 | V | Peak |
| 4960.0000 | 53.64 | 1.14 | 54.78 | 74.00 | -19.22 | V | Peak |
| 4960.0000 | 31.04 | 1.14 | 32.18 | 54.00 | -21.82 | V | AVG |
| 6070.0000 | 44.89 | 3.30 | 48.19 | 74.00 | -25.81 | V | Peak |
| 1195.0000 | 52.94 | -8.77 | 44.17 | 74.00 | -29.83 | H | Peak |
| 3205.0000 | 46.68 | -4.09 | 42.59 | 74.00 | -31.41 | H | Peak |
| 3895.0000 | 46.39 | -2.51 | 43.88 | 74.00 | -30.12 | H | Peak |
| 4090.0000 | 45.93 | -2.10 | 43.83 | 74.00 | -30.17 | H | Peak |
| 4960.0000 | 47.75 | 1.14 | 48.89 | 74.00 | -25.11 | H | Peak |
| 5815.0000 | 44.02 | 2.80 | 46.82 | 74.00 | -27.18 | H | Peak |

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. Frequency (MHz) = Emission frequency in MHz
 Reading (dBuV/m) =Uncorrected Analyzer / Receiver Reading
 Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
 Limit (dBuV/m) = Limit stated in standard
 Margin (dB) = Result (dBuV/m)- Limit (dBuV/m)
 Pk = Peak Reading
 AV. = Average Reading
 Remark = Mark Peak Reading or Average Reading



6.9 POWERLINE CONDUCTED EMISSIONS

LIMIT

For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

| Frequency Range (MHz) | Limits (dBµV) | |
|-----------------------|---------------|----------|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

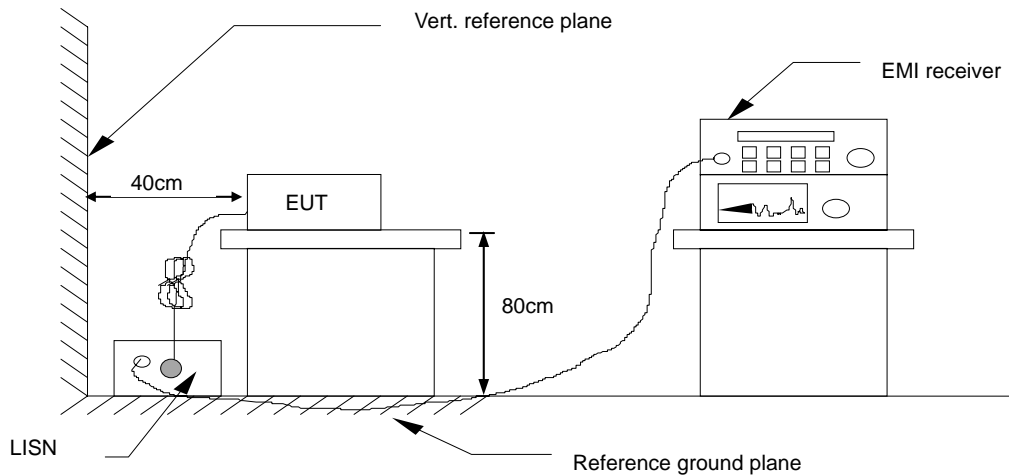
MEASUREMENT EQUIPMENT USED

| Conducted Emission Test Site | | | | | |
|------------------------------|---------------|--------------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| ESCI EMI TEST RECEIVER.ESCI | ROHDE&SCHWARZ | ESCI | 100783 | 03/09/2013 | 03/08/2014 |
| LISN(EUT) | ROHDE&SCHWARZ | ENV216 | 101543-WX | 09/20/2012 | 09/20/2013 |
| LISN | EMCO | 3825/2 | 8901-1459 | 03/09/2013 | 03/08/2014 |
| Temp. / Humidity Meter | VICTOR | HTC-1 | N/A | 03/04/2013 | 03/03/2014 |
| Test S/W | FARAD | EZ-EMC/ CCS-3A1-CE | | | |

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



Test Configuration



See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.



Test Data

| | | | |
|---------------------------------|--------------|------------------|---|
| Model No. | AWS5B3S | RBW,VBW | 9 kHz |
| Environmental Conditions | 26°C, 60% RH | Test Mode | Mode 3: Play Audio Bluetooth with adapter |
| Tested by | Eve Wang | | |

(The chart below shows the highest readings taken from the final data.)

| Frequency (MHz) | QuasiPeak Reading (dBuV) | Average Reading (dBuV) | Correction Factor (dB) | QuasiPeak Result (dBuV) | Average Result (dBuV) | QuasiPeak Limit (dBuV) | Average Limit (dBuV) | QuasiPeak Margin (dB) | Average Margin (dB) | Line (L1/L2) |
|-----------------|--------------------------|------------------------|------------------------|-------------------------|-----------------------|------------------------|----------------------|-----------------------|---------------------|--------------|
| 0.1620 | 39.88 | 27.29 | 9.74 | 49.62 | 37.03 | 65.36 | 55.36 | -15.74 | -18.33 | L1 |
| 0.1860 | 36.92 | 24.31 | 9.65 | 46.57 | 33.96 | 64.21 | 54.21 | -17.64 | -20.25 | L1 |
| 0.3700 | 25.34 | 20.65 | 9.65 | 34.99 | 30.30 | 58.50 | 48.50 | -23.51 | -18.20 | L1 |
| 0.5299 | 22.56 | 13.01 | 9.70 | 32.26 | 22.71 | 56.00 | 46.00 | -23.74 | -23.29 | L1 |
| 2.6460 | 17.95 | 9.22 | 9.69 | 27.64 | 18.91 | 56.00 | 46.00 | -28.36 | -27.09 | L1 |
| 15.7300 | 21.84 | 14.53 | 9.92 | 31.76 | 24.45 | 60.00 | 50.00 | -28.24 | -25.55 | L1 |
| | | | | | | | | | | |
| 0.1620 | 41.21 | 27.38 | 9.74 | 50.95 | 37.12 | 65.36 | 55.36 | -14.41 | -18.24 | L2 |
| 0.1860 | 38.30 | 24.25 | 9.65 | 47.95 | 33.90 | 64.21 | 54.21 | -16.26 | -20.31 | L2 |
| 0.3460 | 26.60 | 23.22 | 9.64 | 36.24 | 32.86 | 59.06 | 49.06 | -22.82 | -16.20 | L2 |
| 0.5340 | 22.26 | 16.83 | 9.70 | 31.96 | 26.53 | 56.00 | 46.00 | -24.04 | -19.47 | L2 |
| 7.1340 | 19.67 | 12.64 | 9.78 | 29.45 | 22.42 | 60.00 | 50.00 | -30.55 | -27.58 | L2 |
| 15.7180 | 23.05 | 16.41 | 9.92 | 32.97 | 26.33 | 60.00 | 50.00 | -27.03 | -23.67 | L2 |

- NOTE:** 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).
2. Those frequencies only show peak emission level because that was below the Average limit, so no need to check average anymore.