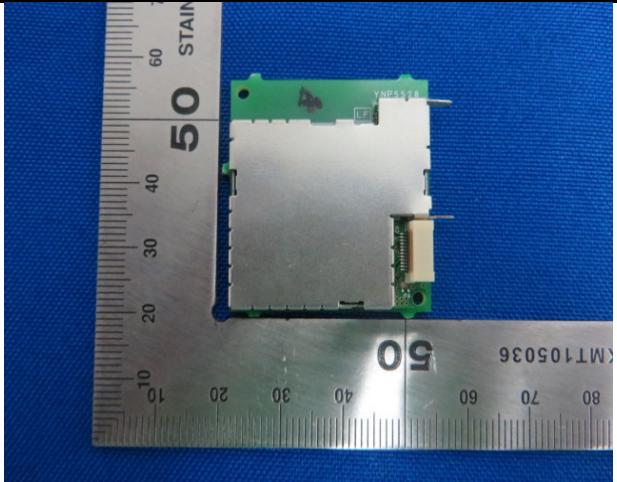


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Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	409548	Auftragsdatum: <i>Order date:</i>	06.06.2014	
Auftraggeber: <i>Client:</i>	Pioneer Corporation 1-1, Shin-ogura, Saiwai-ku, Kawasaki-shi			
Prüfgegenstand: <i>Test item:</i>	Bluetooth Car Module			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	YWX5057 FCC ID: AJDK083 IC: 775E-K083			
Auftrags-Inhalt: <i>Order content:</i>	Complete test			
Prüfgrundlage: <i>Test specification:</i>	FCC 47 CFR Part 15, Subpart C, § 15.247 ANSI C63.4-2003 Public Notice DA 00-705: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems (March 30, 2000) RSS-210 (Issue 8): 2010 RSS-Gen (Issue 3): 2010			
Wareneingangsdatum: <i>Date of receipt:</i>	06.06.2014			
Prüfmuster-Nr.: <i>Test sample No.:</i>	N.A			
Prüfzeitraum: <i>Testing period:</i>	09.06.2014 to 13.06.2014			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	MRT Technology(Suzhou) Co., Ltd.			
Prüfresultat*: <i>Test result*:</i>	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
Datum Date		Datum Date		
Name / Stellung Name / Position		Name / Stellung Name / Position		
Unterschrift Signature		Unterschrift Signature		
Sonstiges / Other				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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TEST SUMMARY

3.2.1 VOLTAGE REQUIREMENTS, FCC 15.31(E)

RESULT: PASS

3.2.2 ANTENNA REQUIREMENTS, FCC 15.203, FCC 15.204 AND RSS-GEN 7.1.4

RESULT: PASS

5.1.1 CONDUCTED OUTPUT POWER, FCC 15.247(B)(1)& AND RSS-210 A8.4(2)

RESULT: PASS

5.1.2 CARRIER FREQUENCY SEPARATION, FCC 15.247(A)(1) AND RSS-210 A8.1(B)

RESULT: PASS

5.1.3 20dB BANDWIDTH AND 99% BANDWIDTH, FCC 15.247(A)(1)& AND RSS-210 A8.2(A)

5.1.4 NUMBER OF HOPPING FREQUENCIES, FCC 15.247(A)(1)(III) AND RSS-210 A8.1(D)

RESULT: PASS

5.1.5 AVERAGE TIME OF OCCUPANCY, FCC 15.247(A)(1)(III) AND RSS-210 A8.1(D)

RESULT: PASS

5.1.6 CONDUCTED SPURIOUS EMISSION, FCC 15.247(D) AND RSS-210 A8.5

RESULT: PASS

5.1.7 BAND EDGE COMPLIANCE OF RF CONDUCTED EMISSION, FCC 15.247(D) AND RSS-210 A8.5

RESULT: PASS

6.1.1 BAND EDGE RADIATED EMISSION, FCC 15.205, FCC 15.209, FCC 15.247(D), RSS-210 2.2, RSS-210 2.6 AND RSS-210 A8.5

RESULT: PASS

6.1.2 RADIATED SPURIOUS EMISSION OF TRANSMITTER, FCC 15.205, FCC 15.209, FCC 15.247(D), RSS-210 2.2, RSS-210 2.6 AND RSS-210 A8.5

RESULT: PASS

6.2.1 RADIATED SPURIOUS EMISSION OF RECEIVER, FCC 15.109, RSS-210 2.2, RSS-210 2.6, RSS-210 A8.5, RSS-GEN 7.2.3.2

RESULT: PASS

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report.

2. Test Sites

2.1 Test Facilities

MRT Technology(Suzhou) Co., Ltd.

D8 Building, Youxin Industrial Park, No.2 Tian'e dang Rd., Wuzhong Economic Development Zone, Suzhou, China.

The used test equipment is in accordance with CISPR 16 for measurement of radio interference.

The Federal Communications Commission has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance with the requirements of section 2.948 of the FCC rules. The description of the test facility is listed under FCC registration number 809388.

The Industry Canada has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance. The description of the test facility is listed under chambers filing number 11384A.

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2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Conducted Emissions

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	101209	1 year	2014/11/08
Two-Line V-Network	R&S	ENV216	101683	1 year	2014/11/08
Two-Line V-Network	R&S	ENV216	101684	1 year	2014/11/08
Temperature/ Meter Humidity	Anymetre	TH101B	SR2-01	1 year	2014/11/15

Radiated Emission

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	1 year	2015/01/04
Bluetooth Test Set	Anritsu	MT8852B	0906001	1 year	2015.01.15
Preamplifier	MRT	AP01G18	1310002	1 year	2014/10/07
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	1 year	2014/11/24
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	1 year	2014/11/24
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	1 year	2014/11/24
Broadband Horn Antenna	Schwarzbeck	BBHA9170	9170-549	1 year	2014/12/11
Temperature/Humidity Meter	Anymetre	TH101B	AC1-01	1 year	2014/11/15

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	1 year	2015/01/04
Bluetooth Test Set	Anritsu	MT8852B	0906001	1 year	2015.01.15
Directional Coupler	Agilent	87301D OPT 292	N/A	1 year	2015/05/28
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	1 year	2014/11/15

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2.3 Measurement Uncertainty

Table 2: Emission Measurement Uncertainty

AC Conducted Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 150kHz~30MHz: $\pm 3.46\text{dB}$
Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 9kHz ~ 1GHz: $\pm 4.18\text{dB}$ 1GHz ~ 25GHz: $\pm 4.76\text{dB}$

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3. General Product Information

3.1 Product Function and Intended Use

The EUT (Equipment Under Test) is a Bluetooth module.

3.2 System Details

Radio standard	: Bluetooth 2.1+EDR
Max output power	: 2.58dBm
Antenna gain	: 4.4dBi
Antenna type	: PCB antenna
Antenna cable length	: N/A
Frequency range	: 2402 – 2480MHz
EDR Number of channels	: 79
EDR Channel spacing	: 1MHz
Modulation type	: EDR (GFSK; $\pi/4$ -DQPSK ;8DPSK)
Rated voltage	: 3V
Test voltage	: 3V

3.2.1 Voltage Requirements, FCC 15.31(e)

RESULT:

PASS

All the tests were performed using steady DC 3V. Hence it complies with the power supply requirements.

3.2.2 Antenna Requirements, FCC 15.203, FCC 15.204 and RSS-Gen 7.1.4

RESULT:

PASS

The EUT has an internal antenna which is not user accessible. Hence it complies with the requirements.

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3.3 Independent Operation Modes

The EUT was tested on a stand-alone basis (only attached to the test jig) and the test system was configured in a typical fashion (as a customer would normally use it).

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4:2003.

Bluetooth BDR and EDR mode:

Testing was performed at the lowest operating frequency (2402MHz), at the operating frequency in the middle of the specified frequency band (2441MHz) and at the highest operating frequency (2480MHz) with different modulation types.

Bluetooth BDR and EDR mode basic operation in (GFSK; $\pi/4$ -DQPSK ;8DPSK) :

- A. EUT transmits (TX mode), with full power, at lowest channel (2402MHz), a continuous modulated signal streaming with 100% duty cycle.
- B. EUT transmits (TX mode), with full power, at middle channel (2441MHz), a continuous modulated signal streaming with 100% duty cycle.
- C. EUT transmits (TX mode), with full power, at highest channel (2480MHz), a continuous modulated signal streaming with 100% duty cycle.
- D. EUT receives (RX mode), at lowest channel (2402MHz), continuously.
- E. EUT receives (RX mode), at middle channel (2441MHz), continuously.
- F. EUT receives (RX mode), at highest channel (2480MHz), continuously.
- G. EUT transmits on pseudo-random sequence on all channels (hopping mode).

3.4 Noise Suppressing Parts

Refer to schematics and internal photos.

4. Test Set-up and Operation Modes

4.1 Test Methodology

The test methodology used is based on the requirements of 47 CFR Part 15, Sections 15.31, 15.33, 15.35, 15.205, 15.207, 15.209.

The test methods, which have been used, are based on Public Notice DA 00-705 and ANSI C63.4-2003

For details, see under each test item.

Note: Bluetooth BDR and EDR is following Public Notice DA 00-705

4.2 Physical Configuration for Testing

The EUT was designed to get into related working mode with the control of a laptop computer through RS 232 interface.

Notes:

Two test samples was available:

For antennas conducted measurements with 50Ω connector and radiated measurements. More details, refer to section: Photographs of the Test Set-Up.

4.3 Test Operation and Test Software

Software used for testing: CSR Bluetest 3 by client.

This software was running on the laptop computer connected to the EUT. It was used to enable the test operation modes listed in section 3.3 as appropriate.

4.4 Special Accessories and Auxiliary Equipment

The product has been tested together with a PCB Development kit (Control the module).

4.5 Countermeasures to achieve EMC Compliance

No additional measures were employed to achieve compliance.

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5. Test Results of Conducted Measurements at Antenna Port

5.1 Transmitter Parameters

5.1.1 Conducted Output Power, FCC 15.247(b)(1)& and RSS-210 A8.4(2)

RESULT:

PASS

Date of testing: 2014-06-09

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

For frequency hopping systems operating in the 2400-2483.5MHz band employing at least 75 non-overlapping hopping channels, the maximum peak output power shall be 1W (30dBm). For other hopping systems operating in the 2400-2483.5MHz band, the maximum peak output power shall be 0.125W (21dBm).

Test procedure:

ANSI C63.10-2003, RSS-Gen 4.8 and Public Notice DA 00-705

The maximum peak output power (conducted) was measured at the antenna connector with a spectrum analyzer. The analyzer resolution bandwidth was set to 3MHz and the video bandwidth to 10MHz. The final measurement takes into account the loss generated by all the involved cables.

Table 3: Conducted Output Power, Mode A

Data Rate [Mbps]	RBW [MHz]	Output Power [dBm]	Limit [dBm]
1	1	1.758	30
2	3	2.080	21
3	3	2.249	21

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Table 4: Conducted Output Power, Mode B

Data Rate [Mbps]	RBW [MHz]	Output Power [dBm]	Limit [dBm]
1	1	2.149	30
2	3	2.372	21
3	3	2.580	21

Table 5: Conducted Output Power, Mode C

Data Rate [Mbps]	RBW [MHz]	Output Power [dBm]	Limit [dBm]
1	1	1.956	30
2	3	2.138	21
3	3	2.373	21

Remark:

The above results show that the BDR and EDR worst case output power is found at the data rate of 3Mbps.

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5.1.2 Carrier Frequency Separation, FCC 15.247(a)(1) and RSS-210 A8.1(b)

RESULT:

PASS

Date of testing: 2014-06-09

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

Frequency hopping systems operating in the 2400-2483.5MHz band shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. In case of an output power less than 125mW, the frequency hopping system may have channels separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

Test procedure:

ANSI C63.4-2003 and Public Notice DA 00-705.

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth was set to 30kHz and the video bandwidth to 100kHz. The Delta Marker function was used to determine the separation between the peaks of two adjacent channels.

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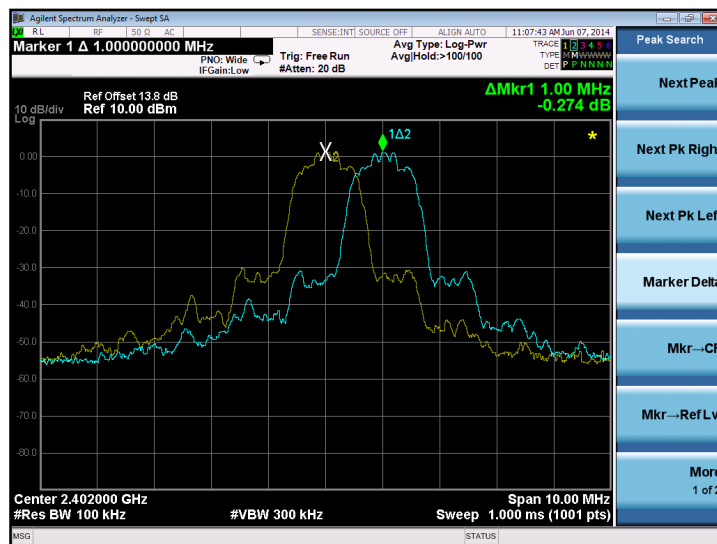
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Table 6: Carrier Frequency Separation

Channel	Channel Separation [kHz]	20dB Bandwidth [kHz](8DPSK)	Limit [kHz]
Low	1000	1250	833
Middle	1000	1253	835
High	1000	1253	835

Notes: Limit = 20dB bandwidth * 2/3 since it is greater than 25kHz and the output power is less than 125mW.

Figure 1: Carrier Frequency Separation-Low Channel



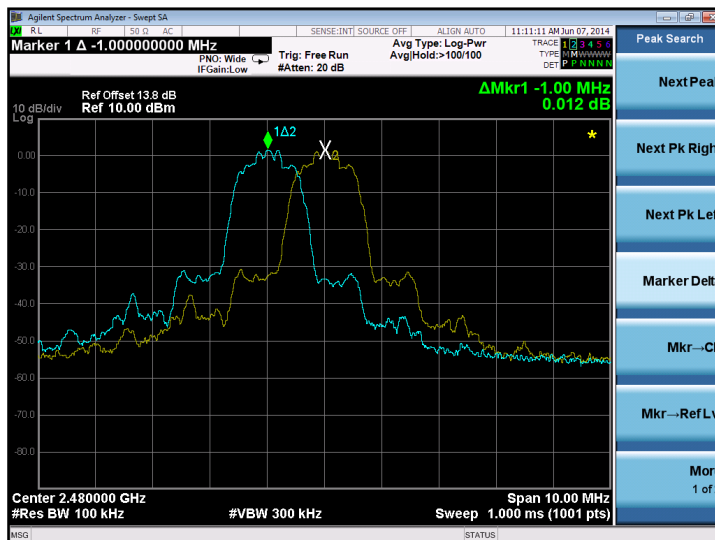
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Figure 2: Carrier Frequency Separation-Middle Channel



Figure 3: Carrier Frequency Separation-High Channel



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5.1.3 20dB Bandwidth and 99% Bandwidth, FCC 15.247(a)(1)& and RSS-210 A8.2(a)

Date of testing: 2014-06-09

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

For frequency hopping systems operating in the 2400-2483.5MHz band, no bandwidth limit is specified. Test data is provided for reference.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.6.2 and Public Notice DA 00-705.

A spectrum analyzer was connected to the antenna port of the EUT. The spectrum analyzer resolution bandwidth was set to 100kHz, the video bandwidth to 300kHz and the span to 2MHz.

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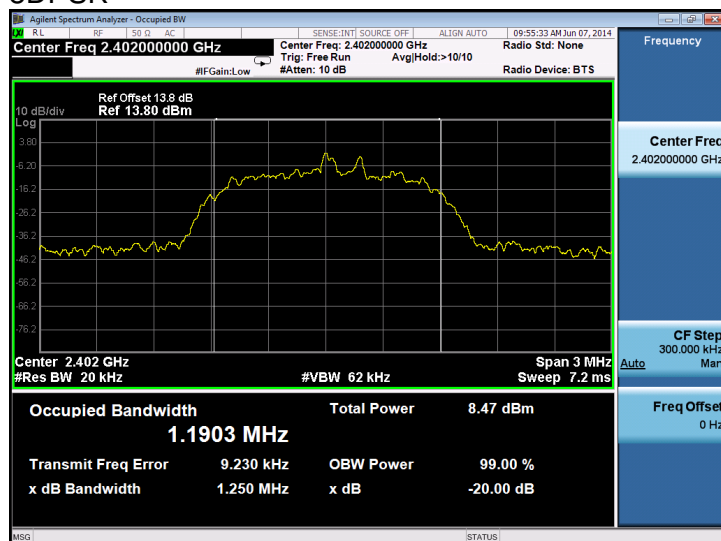
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Table 7: 20dB &99% Bandwidth (Bluetooth BDR and EDR)

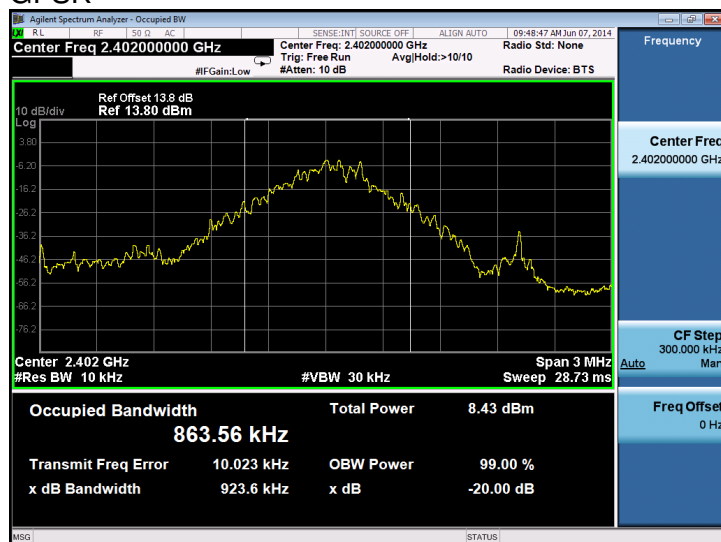
Operating Frequency [MHz]	20dB Bandwidth [kHz](8DPSK)	20dB Bandwidth [kHz](GFSK)	99% Bandwidth [kHz](8DPSK)	99% Bandwidth [kHz](GFSK)
2402	1250	923.6	1190.3	863.56
2441	1253	923.1	1191.8	858.59
2480	1253	918.9	1190.7	847.67

Figure 4: 20dB &99% Bandwidth, Mode A (8DPSK and GFSK)

8DPSK



GFSK

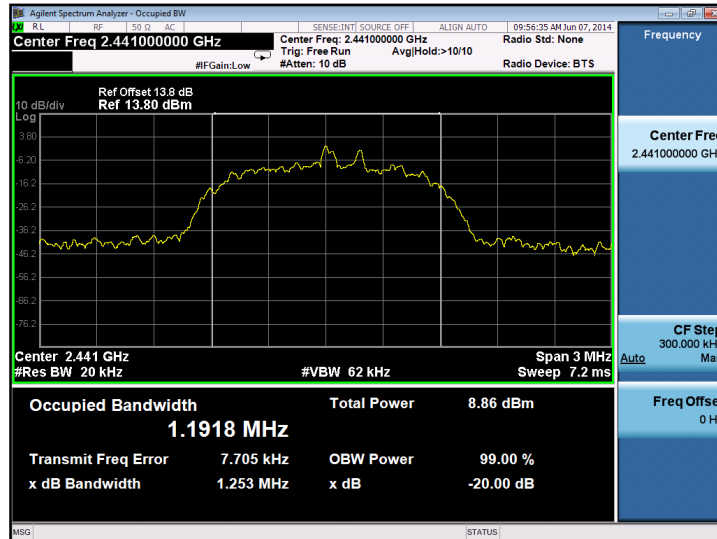


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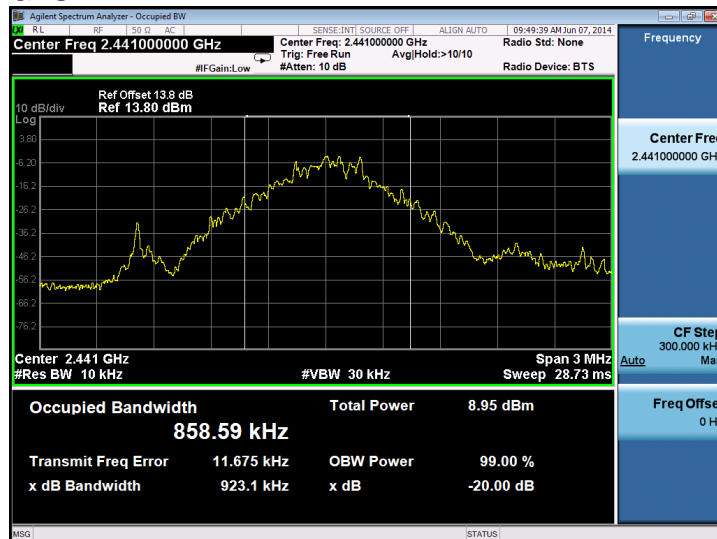
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Figure 5: 20dB Bandwidth, Mode B (8DPSK and GFSK)

8DPSK



GFSK

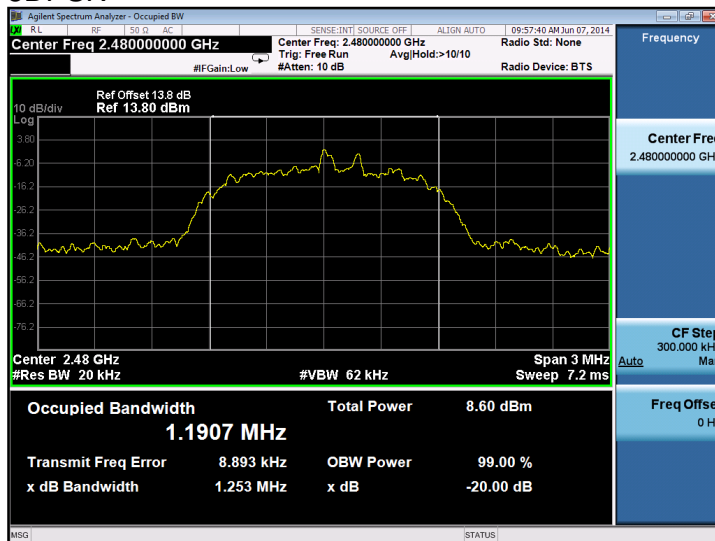


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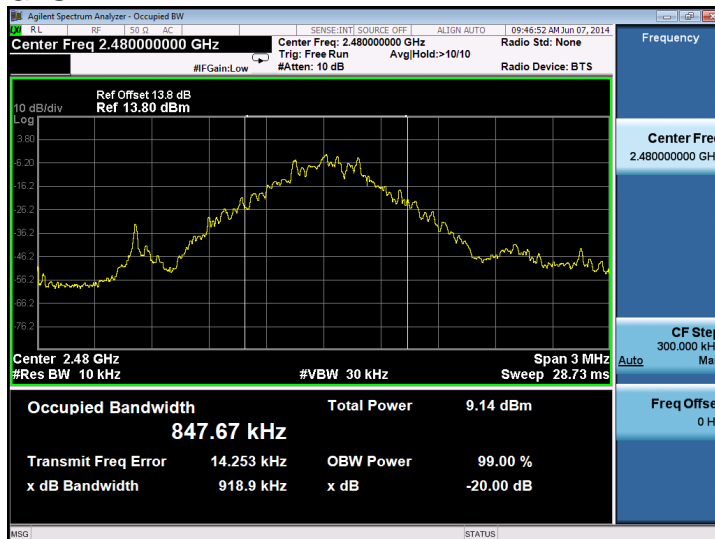
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Figure 6: 20dB Bandwidth, Mode C (8DPSK and GFSK)

8DPSK



GFSK



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5.1.4 Number of Hopping Frequencies, FCC 15.247(a)(1)(iii) and RSS-210 A8.1(d)

RESULT:

PASS

Date of testing: 2014-06-09

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

Frequency hopping systems operating in the 2400-2483.5MHz band shall use at least 15 channels.

Test procedure:

ANSI C63.4-2003 and Public Notice DA 00-705.

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth was set to 300kHz and video bandwidth was set to 1MHz. The spectrum was broken in three plots to show all the hopping frequencies.

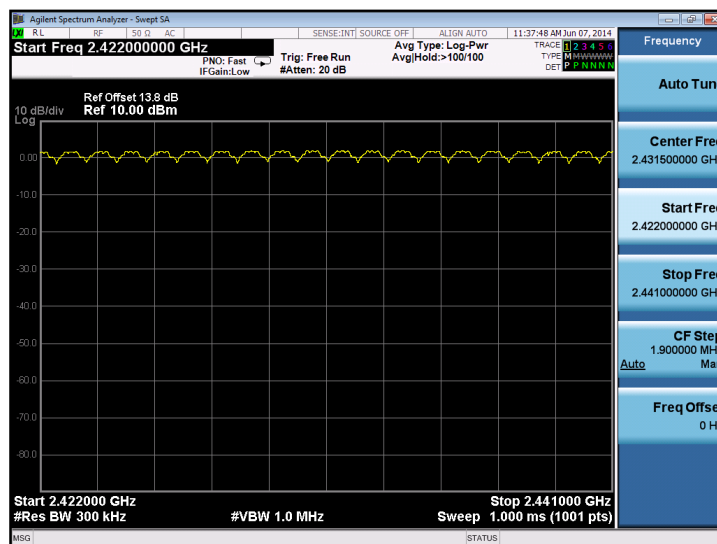
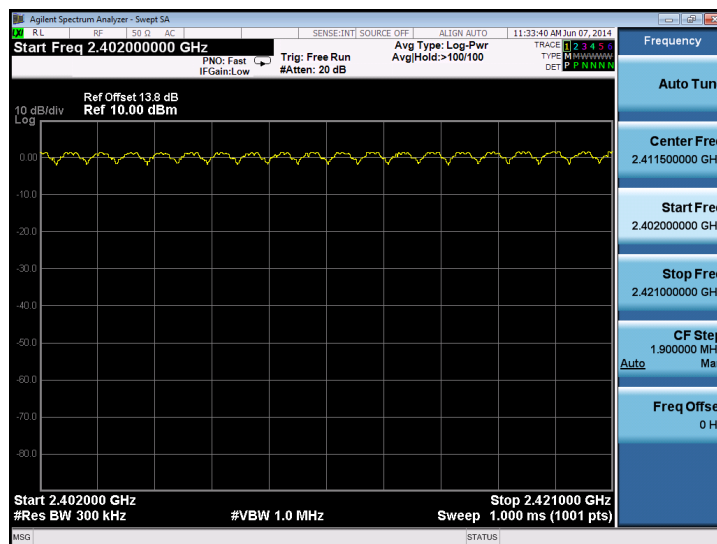
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Table 8: Number of Hopping Frequencies

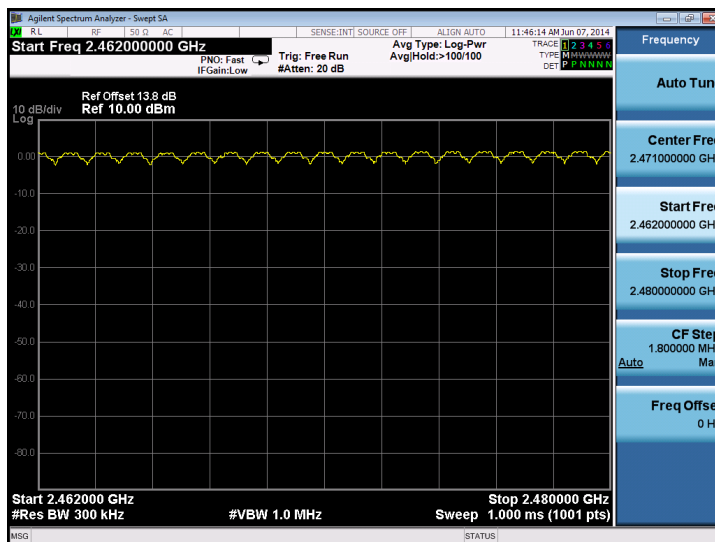
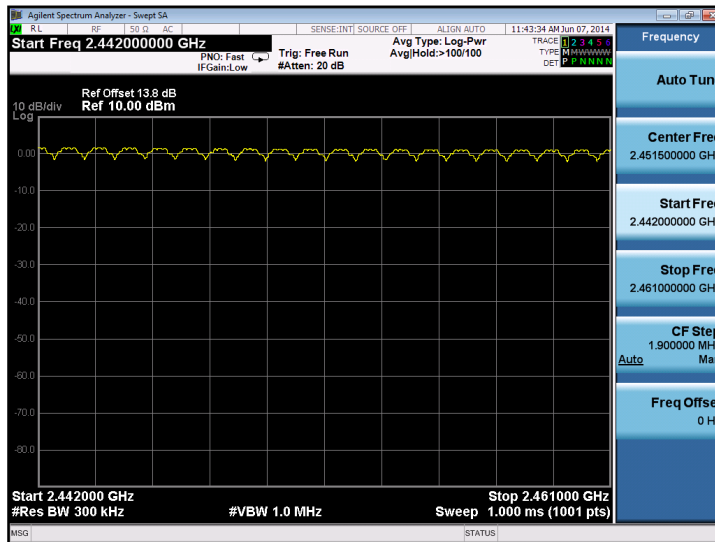
Number of Hopping Frequencies	Limit
79	15

Figure 7: Hopping Frequencies



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5.1.5 Average Time of Occupancy, FCC 15.247(a)(1)(iii) and RSS-210 A8.1(d)

RESULT:

PASS

Date of testing: 2014-06-09

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

For frequency hopping systems operating in the 2400-2483.5MHz band, the average time of occupancy on any channel shall not be greater than 0.4s within a period of 0.4s multiplied by the number of hopping channels employed.

Test procedure:

ANSI C63.4-2003 and Public Notice DA 00-705.

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth and video bandwidth were set to 1MHz. The average time of occupancy was obtained by measuring first the dwell time of a single packet with the Delta Marker function using a zero span centered on a hopping channel and by counting then the number of hops per channel in a 31.6s period (0.4s times the number of hopping channels).

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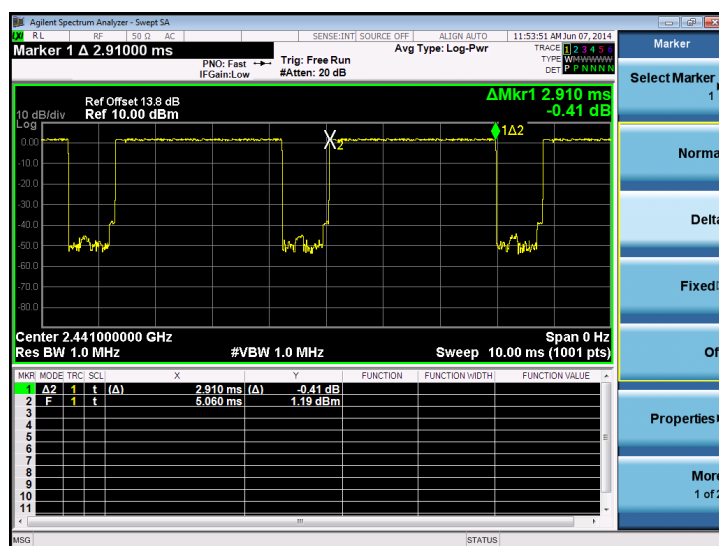
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Table 9: Average Time of Occupancy

Channel	Packet Type	Packet Duration [ms]	Number of Hops per Channel in a 31.6s Period	Average Time of Occupancy [ms]	Limit [ms]
Mid	3M-DH5	2.91	106.67	310.40	400

Notes: Average time of occupancy = Packet duration * Number of hops per channel in a 31.6s period

Figure 8: Dwell Time, Mode G, 3M-DH5, Mid channel



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5.1.6 Conducted Spurious Emission, FCC 15.247(d) and RSS-210 A8.5

RESULT:

PASS

Date of testing: 2014-06-09

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

In any 100kHz bandwidth outside the frequency band, the RF power shall be at least 20dB below that of the maximum in-band 100kHz emission.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9 and Public Notice DA 00-705.

.

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth was set to 100kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed. The out-of-band emissions were measured from 30MHz to 26GHz (10th harmonics).

The final measurement takes into account the loss generated by all the involved cables.

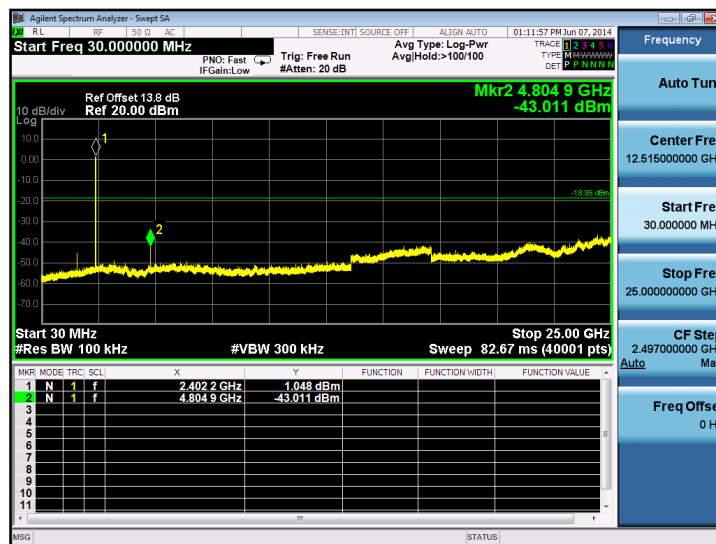
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Table 10: Conducted Spurious Emission, Mode A

Frequency [MHz]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
4804.9	-43.011	-18.952	24.059
2402.2	1.048	N/A	N/A

Figure 9: Conducted Spurious Emission, 30MHz – 25GHz, Mode A



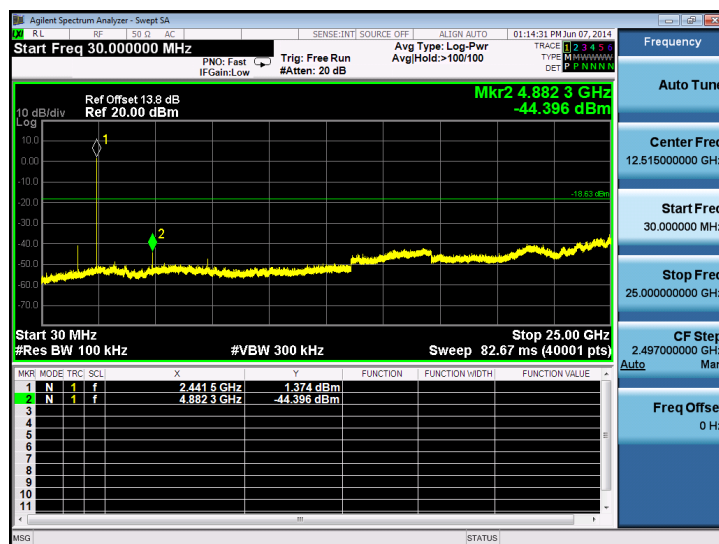
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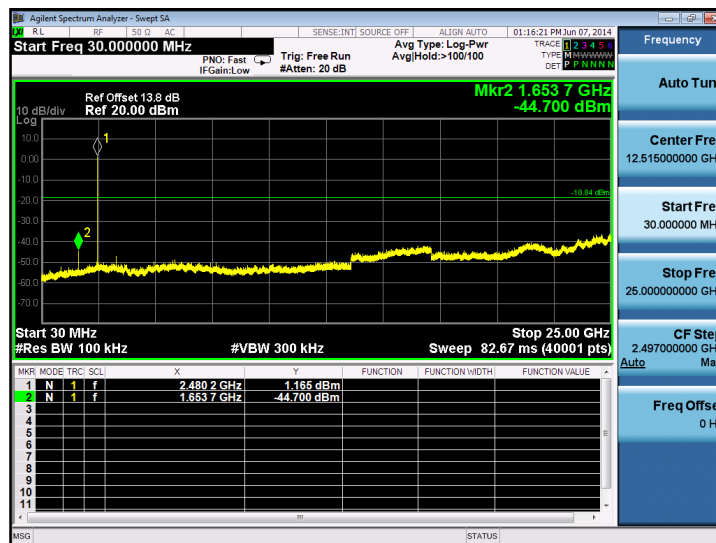
Table 11: Conducted Spurious Emission, Mode B

Frequency [MHz]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
4882.3	-44.396	-18.626	25.77
2441.5	1.374	NA	N/A

Figure 10: Conducted Spurious Emission, 30MHz – 25GHz, Mode B



Frequency [MHz]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
1653.7	-44.700	-18.835	25.865
2480.2	1.165	N/A	N/A



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5.1.7 Band Edge Compliance of RF Conducted Emission, FCC 15.247(d) and RSS-210 A8.5

RESULT:

PASS

Date of testing: 2014-06-09

Ambient temperature: 20°C

Relative humidity: 39.6%

Atmospheric pressure: 101.5hPa

Requirements:

In any 100kHz bandwidth outside the frequency band, the RF power shall be at least 20dB below that of the maximum in-band 100kHz emission.

Test procedure:

ANSI C63.4-2003 and and Public Notice DA 00-705.

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth was set to 100kHz and video bandwidth was set to 300kHz. Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of the in-band emission.

The final measurement takes into account the loss generated by all the involved cables.

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Figure 12: Lower Band Edge Conducted Mode A

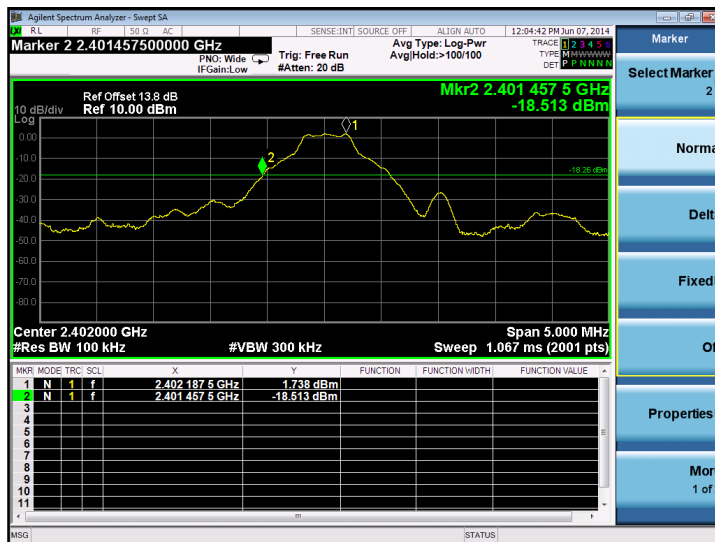
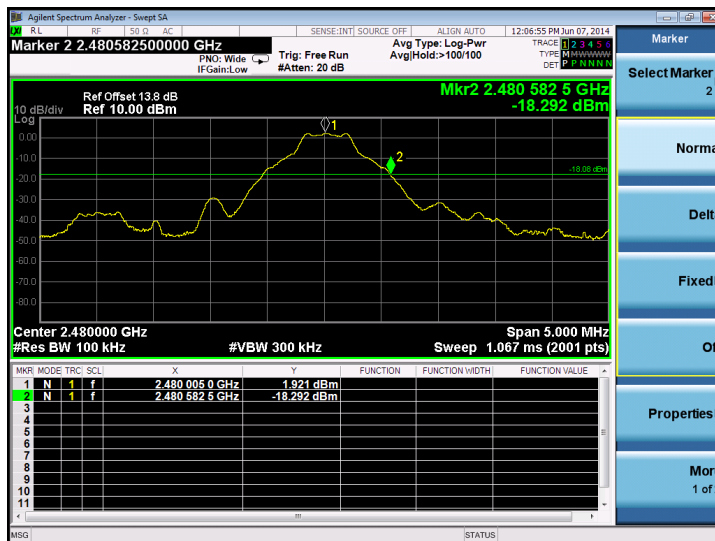


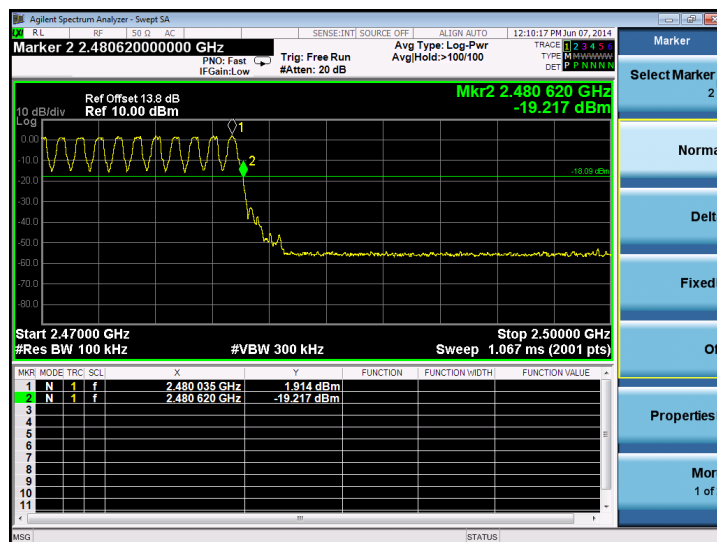
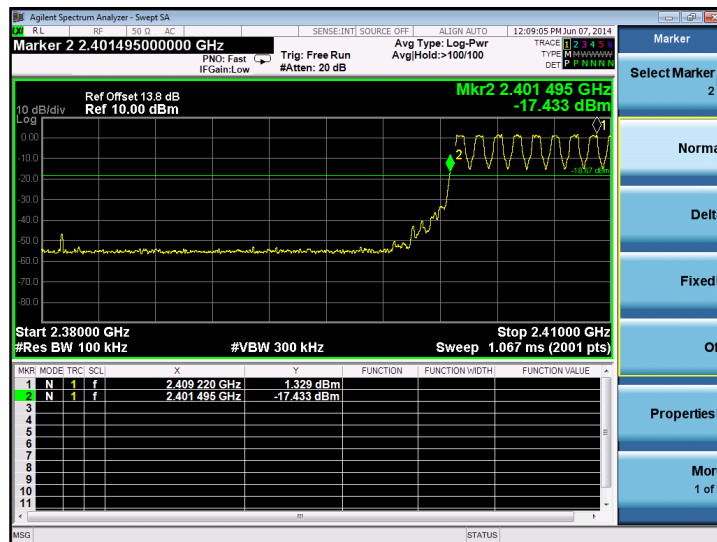
Figure 13: Upper Band Edge Conducted Mode C



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Figure 14: Lower Band Edge Conducted Mode G



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6. Test Results of Radiated Measurements

6.1 Transmitter Parameters

6.1.1 Band Edge Radiated Emission, FCC 15.205, FCC 15.209, FCC 15.247(d), RSS-210 2.2, RSS-210 2.6 and RSS-210 A8.5

RESULT:

Pass

Date of testing: 2014-06-12

Ambient temperature: 23.5°C

Relative humidity: 45%

Atmospheric pressure: 101.5hPa

Measurement distance: 3m

Kind of test site: Semi Anechoic Chamber

Requirements:

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-210 2.7 (Table 1), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-210 2.7 (Table 2 and 3).

Test procedure:

ANSI C63.10-2009, RSS-Gen 4.9 and KDB 558074 D01 DTS Meas Guidance v02
Public Notice DA 00-705.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Measurements were made at 3m distance. The EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level.

Measurements were taken using both horizontal and vertical antenna polarization. The rotation through the three orthogonal axes is normally not needed for equipment that is not hand-held or body-worn. The EUT was pretested in floor-standing condition and in the table position and the worst case condition was table position which was used for the final measurements.

Measurements were performed using a spectrum analyzer with a suitable span to encompass the peak of the fundamental and using the following settings: Peak: RBW & VBW = 1MHz, Average: RBW = 1MHz, VBW = 10Hz.

The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

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Table 13: Band Edge Radiated Emission Mode A

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Horizontal	2390.000	56.862	26.178	-17.138	74.000	30.684	PK
2	Horizontal	2401.979	96.876	66.215	N/A	N/A	30.662	PK

Figure 15: Band Edge Radiated Emission Mode A

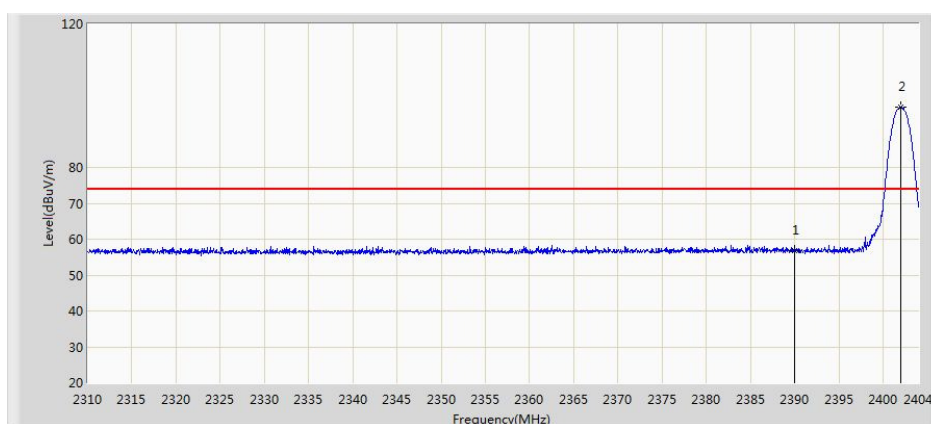
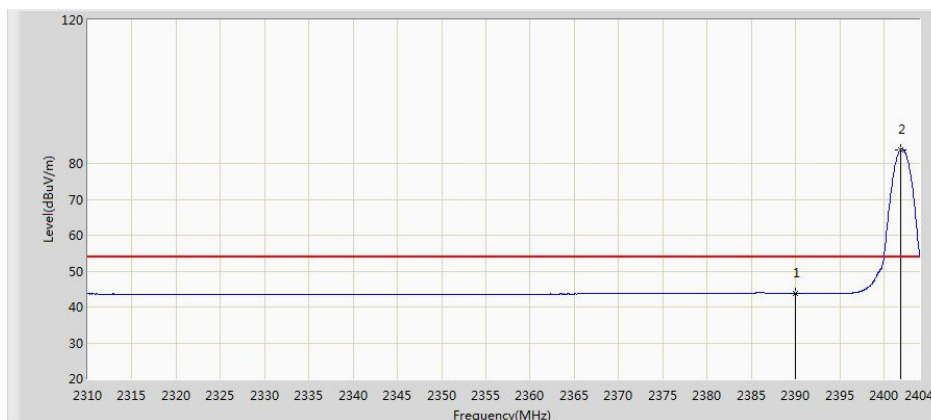


Table 14: Band Edge Radiated Emission Mode A

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Horizontal	2390.000	43.827	13.143	-10.173	54.000	30.684	AV
2	Horizontal	2401.885	83.856	53.195	N/A	N/A	30.661	AV

Figure 16: Band Edge Radiated Emission Mode A



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Table 15: Band Edge Radiated Emission Mode A

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Vertical	2390.000	55.407	24.723	-18.593	74.000	30.684	PK
2	Vertical	2401.932	87.246	56.585	N/A	N/A	30.662	PK

Figure 17: Band Edge Radiated Emission Mode A

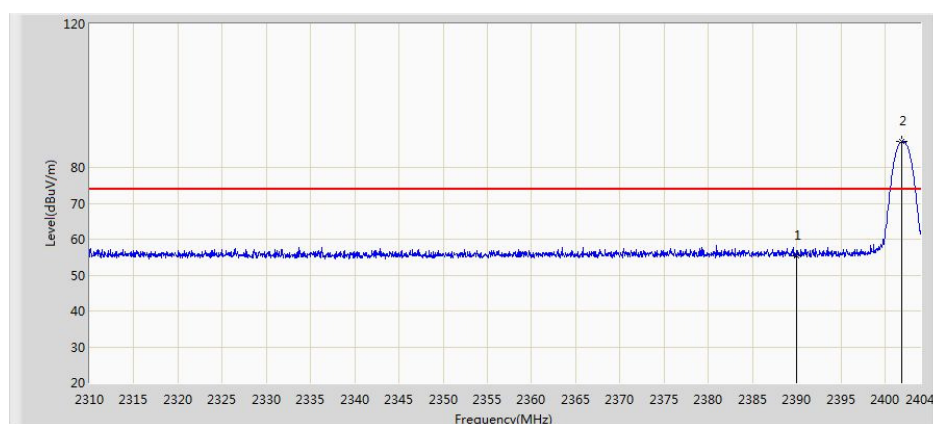
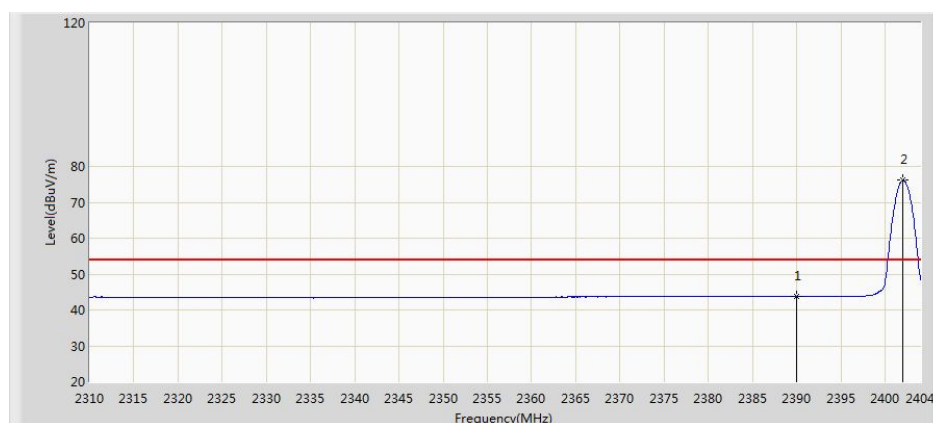


Table 16: Band Edge Radiated Emission Mode A

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Vertical	2390.000	43.770	13.086	-10.230	54.000	30.684	AV
2	Vertical	2401.979	76.099	45.438	N/A	N/A	30.662	AV

Figure 18: Band Edge Radiated Emission Mode A



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Table 17: Band Edge Radiated Emission Mode C

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Horizontal	2480.002	95.963	65.301	N/A	N/A	30.662	PK
2	Horizontal	2483.500	56.598	25.925	-17.402	74.000	30.673	PK

Figure 19: Band Edge Radiated Emission Mode C

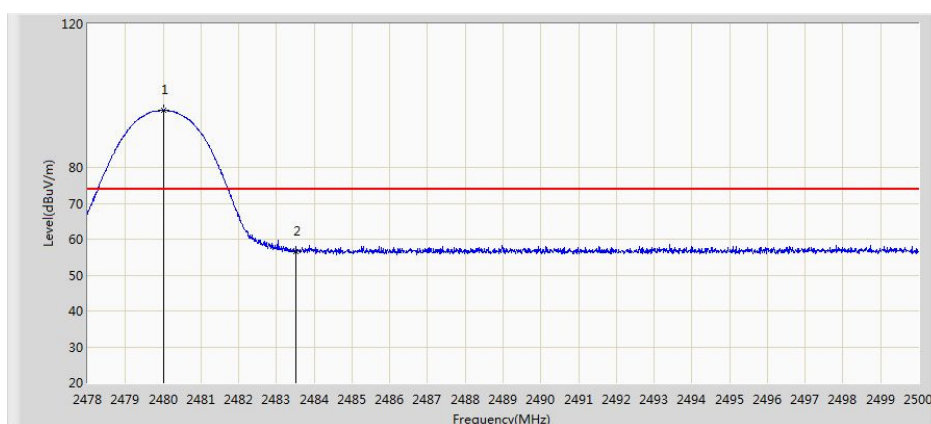
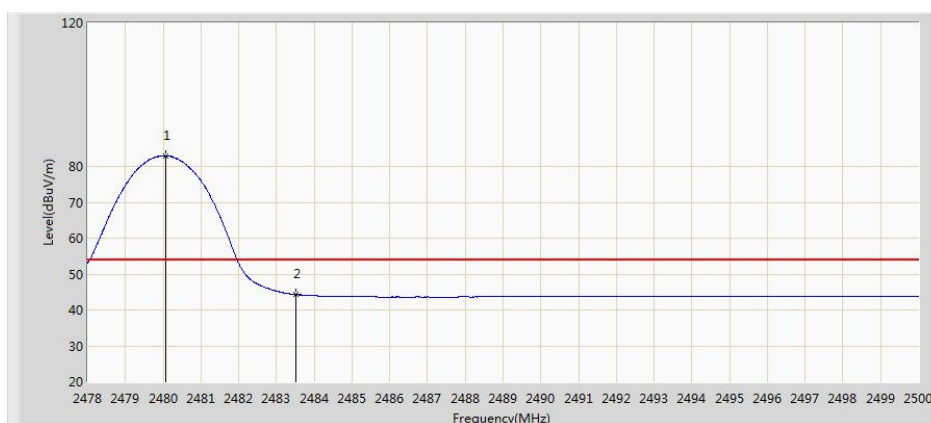


Table 18: Band Edge Radiated Emission Mode C

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Horizontal	2480.079	82.945	52.282	N/A	N/A	30.662	AV
2	Horizontal	2483.500	44.299	13.626	-9.701	54.000	30.673	AV

Figure 20: Band Edge Radiated Emission Mode C



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Table 19: Band Edge Radiated Emission Mode C

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Vertical	2479.980	86.360	55.698	N/A	N/A	30.662	PK
2	Vertical	2483.500	56.437	25.764	-17.563	74.000	30.673	PK

Figure 21: Band Edge Radiated Emission Mode C

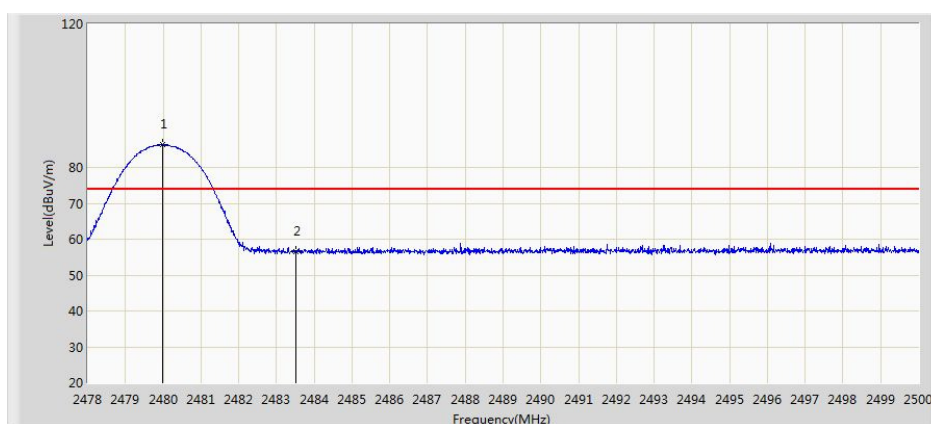
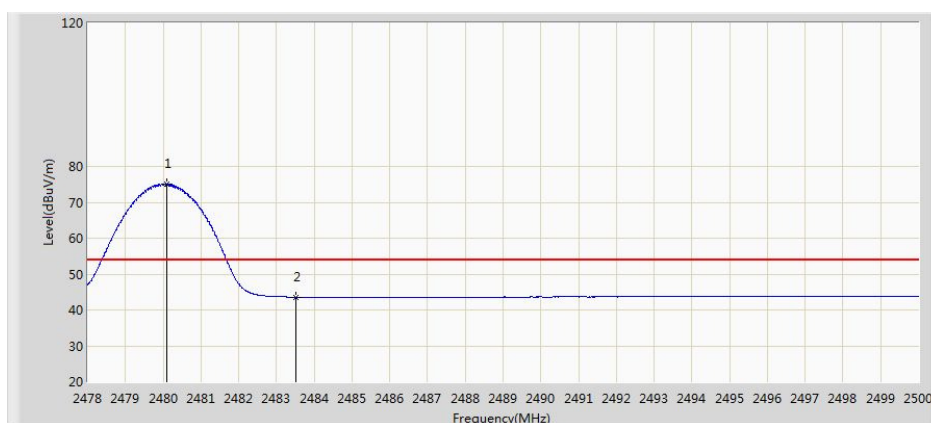


Table 20: Band Edge Radiated Emission Mode C

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Vertical	2480.090	75.144	44.481	N/A	N/A	30.662	AV
2	Vertical	2483.500	43.579	12.906	-10.421	54.000	30.673	AV

Figure 22: Band Edge Radiated Emission Mode C



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6.1.2 Radiated Spurious Emission of Transmitter, FCC 15.205, FCC 15.209, FCC 15.247(d), RSS-210 2.2, RSS-210 2.6 and RSS-210 A8.5

RESULT:

PASS

Date of testing:	2014-06-12
Ambient temperature:	23.5°C
Relative humidity:	45%
Atmospheric pressure:	101.5hPa
Frequency range:	30MHz – 25GHz
Measurement distance:	3m
Kind of test site:	Semi Anechoic Chamber

Requirements:

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-210 2.7 (Table 1), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-210 2.7 (Table 2 and 3).

Test procedure:

ANSI C63.04-2003, RSS-Gen 4.9 and Public Notice DA 00-705.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile. The EUT was pretested in floor-standing condition and in the table position and the worst case condition was table position which was used for the final measurements. The rotation through the three orthogonal axes is normally not needed for equipment that is not hand-held or body-worn.

The spectrum was examined from 30MHz to the 10th harmonic of the highest fundamental transmitter frequency (25GHz). Final radiated emission measurements were made at 3m distance.

At each frequency where a spurious emission was found, the EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations.

For frequencies between 30MHz and 1GHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1GHz, measurements were performed using the following settings: Peak: RBW & VBW = 1MHz, Average: RBW = 1MHz, VBW = 10Hz.

The highest emission amplitudes relative to the appropriate limit were recorded in this report. Emissions other than those mentioned are small or not detectable.

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Table 21: Radiated Emission, Average and Peak Data, 1 – 25GHz, Horizontal and Vertical Antenna Orientations, Mode A

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Horizontal	3201.500	41.655	38.120	-32.345	74.000	3.535	PK
2	Horizontal	4804.000	44.025	37.669	-29.975	74.000	6.356	PK
3	Horizontal	7206.000	50.265	36.625	-23.735	74.000	13.639	PK
4	Vertical	3660.500	41.644	37.664	-32.356	74.000	3.980	PK
5	Vertical	4804.000	42.819	36.463	-31.181	74.000	6.356	PK
6	Vertical	7206.000	49.578	35.938	-24.422	74.000	13.639	PK

Table 22: Radiated Emission, Average and Peak Data, 1 – 25GHz, Horizontal and Vertical Antenna Orientations, Mode B

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Horizontal	3252.500	43.508	40.147	-30.492	74.000	3.361	PK
2	Horizontal	4882.000	43.251	36.610	-30.749	74.000	6.641	PK
3	Horizontal	7323.000	50.220	36.206	-23.780	74.000	14.014	PK
4	Vertical	3252.500	42.043	38.682	-31.957	74.000	3.361	PK
5	Vertical	4882.000	42.516	35.875	-31.484	74.000	6.641	PK
6	Vertical	7323.000	49.323	35.309	-24.677	74.000	14.014	PK

Table 23: Radiated Emission, Average and Peak Data, 1 – 25GHz, Horizontal and Vertical Antenna Orientations, Mode C

No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1	Horizontal	3303.500	43.252	40.063	-30.748	74.000	3.190	PK
2	Horizontal	4960.000	42.535	35.748	-31.465	74.000	6.787	PK
3	Horizontal	7440.000	48.092	33.924	-25.908	74.000	14.168	PK
4	Vertical	3303.500	42.467	39.278	-31.533	74.000	3.190	PK
5	Vertical	4960.000	42.225	35.438	-31.775	74.000	6.787	PK
6	Vertical	7440.000	48.438	34.270	-25.562	74.000	14.168	PK

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6.2 Receiver Parameters

6.2.1 Radiated Spurious Emission of Receiver, FCC 15.109, RSS-210 2.2, RSS-210 2.6, RSS-210 A8.5, RSS-Gen 7.2.3.2

RESULT:

PASS

Date of testing: 2014-06-13

Ambient temperature: 23.5°C

Relative humidity: 45%

Atmospheric pressure: 101.5hPa

Frequency range: 30MHz – 12.5GHz

Measurement distance: 3m

Kind of test site: Semi Anechoic Chamber

Requirements:

The emissions from the unintentional radiator shall not exceed the field strength specified in 15.109(a) and RSS-210 Table 2 (and RSS-Gen Table 1).

Test procedure:

ANSI C63.4-2003 and RSS-Gen 4.10.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile. The EUT was pretested in floor-standing condition and in the table position and the worst case condition was table position which was used for the final measurements. The rotation through the three orthogonal axes is normally not needed for equipment that is not hand-held or body-worn. The spectrum was examined from 30MHz to the 5th harmonic of the highest fundamental operation frequency (12.5GHz). Final radiated emission measurements were made at 3m distance.

Measurements were taken using both horizontal and vertical antenna polarizations.

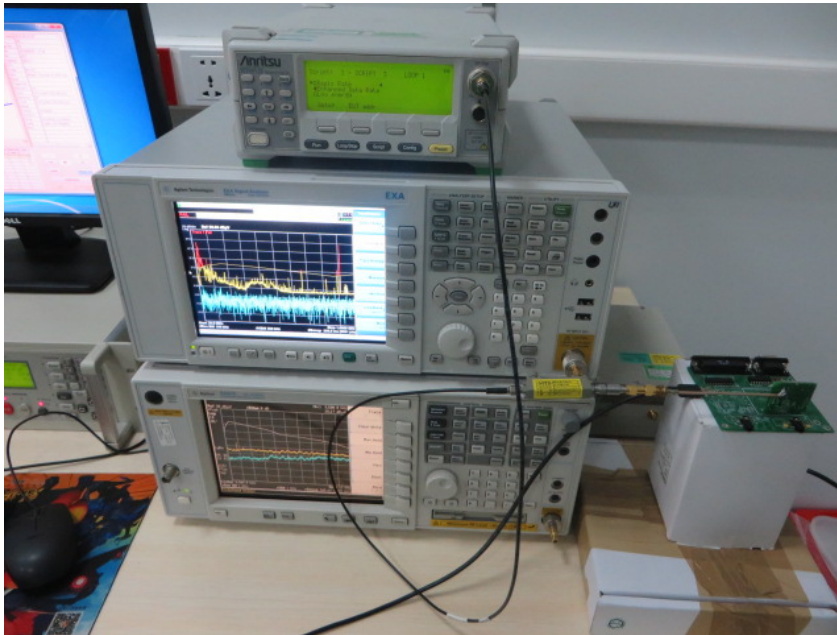
For frequencies between 30MHz and 1GHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1GHz, measurements were performed using the following settings: Peak: RBW & VBW = 1MHz, Average: RBW = 1MHz, VBW = 10Hz. The highest emission amplitudes relative to the appropriate limit were recorded in this report. No spurious emission was found in the range 30MHz – 12500MHz. emission in mode D, E, F . all signals found in the pre-testing were more than 20 dB below the limit .

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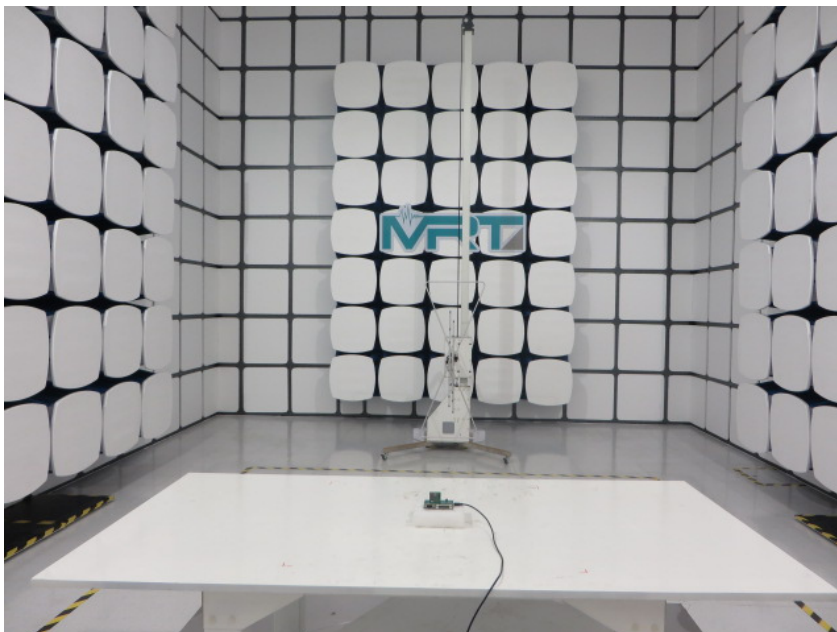
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7. Photographs of the Test Setup

Photograph 1: Set-up for Conducted RF test at Antenna Port



Photograph 2: Set-up for Radiated Emission, 30MHz-1000MHz



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Photograph 3: Set-up for Radiated Spurious Emission, 1G-18GHz



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