

FCC Test Report

Product Name	Gaming Android Gem Box
Model No.	Gem Box F500 US
FCC ID.	W3Q-GEMBOXF500

Applicant	DEXXON GROUPE
Address	79 avenue Louis Roche Gennevilliers Cedex 92238 France

Date of Receipt	April 17, 2015
Issued Date	June 04, 2015
Report No.	1540385R-RFUSP23V00-A
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Test Report

Issued Date: June 04, 2015

Report No.: 1540385R-RFUSP23V00-A



Product Name	Gaming Android Gem Box
Applicant	DEXXON GROUPE
Address	79 avenue Louis Roche Gennevilliers Cedex 92238 France
Manufacturer	GIGA-BYTE TECHNOLOGY CO., LTD
Model No.	Gem Box F500 US
FCC ID.	W3Q-GEMBOXF500
EUT Rated Voltage	AC 100-240V, 50-60Hz
EUT Test Voltage	AC 120V/ 60Hz
Trade Name	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2014 ANSI C63.4: 2009, ANSI C63.10: 2009 KDB 558074 D01 DTS Meas Guidance v03r03
Test Result	Complied

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Approved By :

Vincent Lin


(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Gaming Android Gem Box
Trade Name	
Model No.	Gem Box F500 US
FCC ID.	W3Q-GEMBOXF500
Frequency Range	2402 – 2480MHz
Channel Number	V4.0: 40CH
Type of Modulation	V4.0: GFSK(1Mbps)
Antenna Type	Chip Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
HDMI Cable	Shielded, 1.2m
LAN Cable	Non-Shielded, 3.0m
Power Adapter	MFR: APD, M/N: WA-12M12R Input: AC 100-240V, 50-60Hz, 0.5A Output: DC 12V, 1A Cable Out: Non-Shielded, 1.5m

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Walsin	RFANT5220110A2T	Chip Antenna	3.12 dBi for 2.4 GHz

Note: The antenna of EUT is conforming to FCC 15.203.

Center Frequency of Each Channel: (For V4.0)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 01:	2404 MHz	Channel 02:	2406 MHz	Channel 03:	2408 MHz
Channel 04:	2410 MHz	Channel 05:	2412 MHz	Channel 06:	2414 MHz	Channel 07:	2416 MHz
Channel 08:	2418 MHz	Channel 09:	2420 MHz	Channel 10:	2422 MHz	Channel 11:	2424 MHz
Channel 12:	2426 MHz	Channel 13:	2428 MHz	Channel 14:	2430 MHz	Channel 15:	2432 MHz
Channel 16:	2434 MHz	Channel 17:	2436 MHz	Channel 18:	2438 MHz	Channel 19:	2440 MHz
Channel 20:	2442 MHz	Channel 21:	2444 MHz	Channel 22:	2446 MHz	Channel 23:	2448 MHz
Channel 24:	2450 MHz	Channel 25:	2452 MHz	Channel 26:	2454 MHz	Channel 27:	2456 MHz
Channel 28:	2458 MHz	Channel 29:	2460 MHz	Channel 30:	2462 MHz	Channel 31:	2464 MHz
Channel 32:	2466 MHz	Channel 33:	2468 MHz	Channel 34:	2470 MHz	Channel 35:	2472 MHz
Channel 36:	2474 MHz	Channel 37:	2476 MHz	Channel 38:	2478 MHz	Channel 39:	2480 MHz

Note:

1. The EUT is a Gaming Android Gem Box with a built-in Bluetooth V4.0 transceiver.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.

Test Mode	Mode 1: Transmit - BLE (GFSK)
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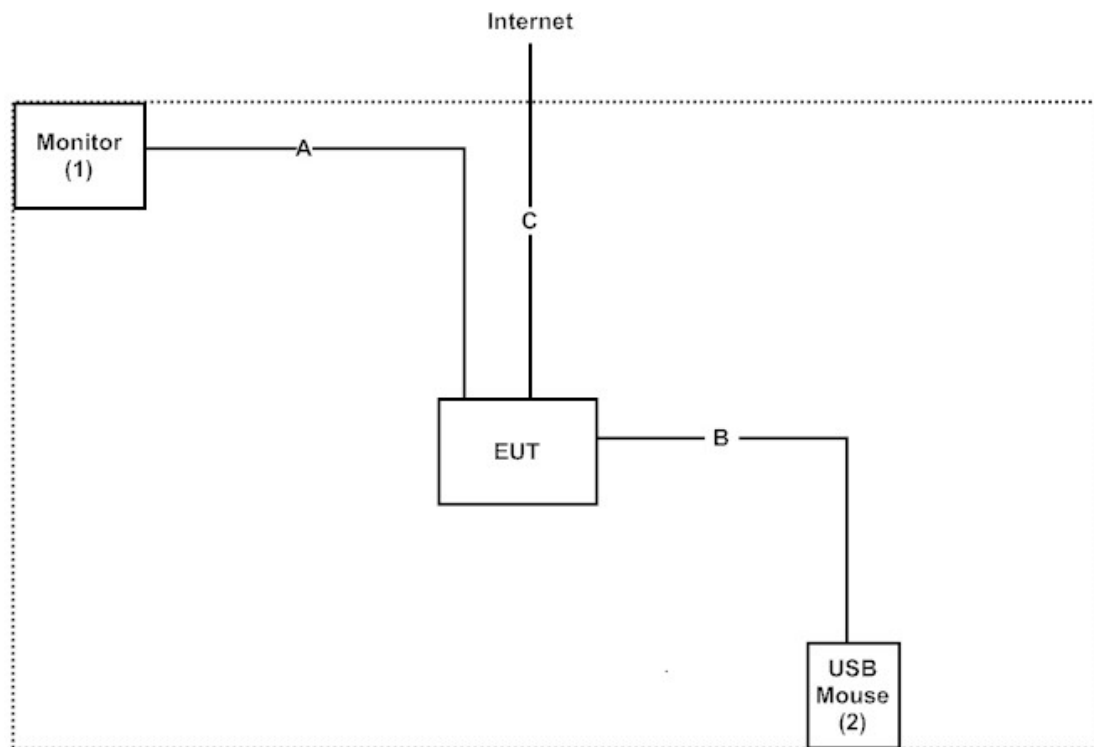
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Monitor	Dell	ST2320L3	CN-0M2NN672872-22I-C9WWS	Non-Shielded, 1.8m
2	USB Mouse	Logitech	M-UV83	HCB54904413	N/A

	Signal Cable Type	Signal cable Description
A	HDMI Cable	Shielded, 1.2m
B	Mouse Cable	Non-Shielded, 1.8m
C	LAN Cable	Non-Shielded, 2.0m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT and Peripherals as shown on 1.4
- (2) Enable the Bluetooth function of the EUT.
- (3) The AmpakRFTestTool v5.2 uses in controlling EUT to transmit continuously.
- (4) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from

Quietek Corporation's Web Site: <http://www.quietek.com/chinese/about/certificates.aspx?bval=5>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site:

<http://www.quietek.com/>

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FCC Accreditation Number: TW1014

2. Conducted Emission

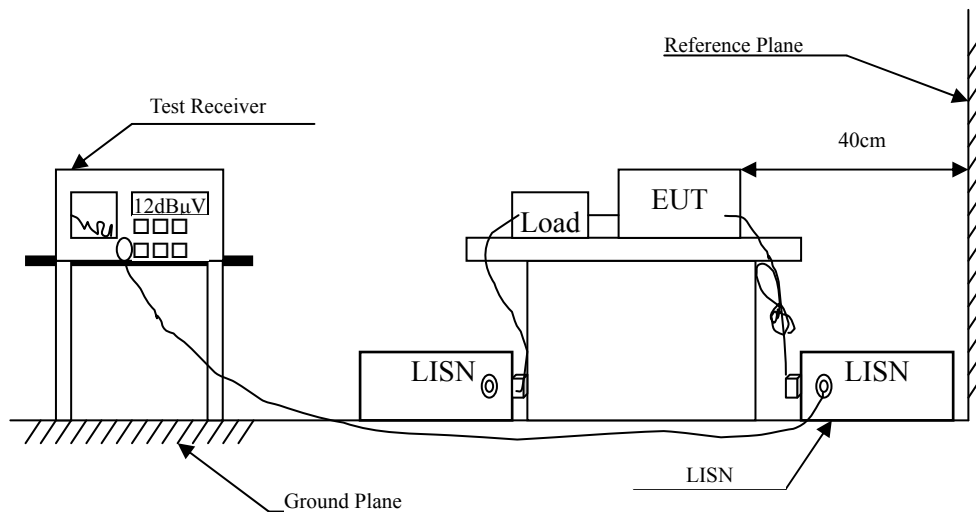
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2014	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2015	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2015	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar., 2015	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2015	
	No.1 Shielded Room				

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBμV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.4: 2009; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Gaming Android Gem Box
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.166	9.667	32.400	42.066	-23.477	65.543
0.212	9.661	26.340	36.001	-28.228	64.229
0.369	9.670	36.530	46.200	-13.543	59.743
0.841	9.695	17.730	27.425	-28.575	56.000
9.838	9.959	23.630	33.589	-26.411	60.000
11.963	9.979	31.700	41.679	-18.321	60.000
Average					
0.166	9.667	22.440	32.106	-23.437	55.543
0.212	9.661	19.690	29.351	-24.878	54.229
0.369	9.670	33.350	43.020	-6.723	49.743
0.841	9.695	9.330	19.025	-26.975	46.000
9.838	9.959	17.920	27.879	-22.121	50.000
11.963	9.979	26.800	36.779	-13.221	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Gaming Android Gem Box
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
LINE 2					
Quasi-Peak					
0.166	9.667	29.650	39.316	-26.227	65.543
0.212	9.661	24.350	34.011	-30.218	64.229
0.365	9.669	31.000	40.669	-19.188	59.857
0.795	9.693	15.140	24.833	-31.167	56.000
6.361	9.897	16.880	26.777	-33.223	60.000
11.963	10.029	27.880	37.909	-22.091	60.000
Average					
0.166	9.667	6.260	15.926	-39.617	55.543
0.212	9.661	19.130	28.791	-25.438	54.229
0.365	9.669	28.600	38.269	-11.588	49.857
0.795	9.693	6.760	16.453	-29.547	46.000
6.361	9.897	11.210	21.107	-28.893	50.000
11.963	10.029	23.830	33.859	-16.141	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

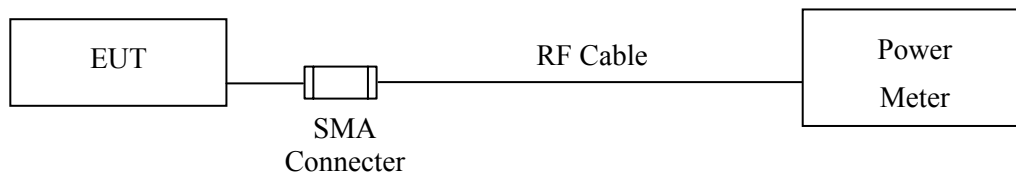
3. Peak Power Output

3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2015
X	Power Sensor	Anritsu	MA2411B/0738448	Jun., 2015

Note: 1. All equipments are calibrated every one year.
2. The test instruments marked by “X” are used to measure the final test results.

3.2. Test Setup



3.3. Limit

The maximum peak power shall be less 1Watt.

3.4. Test Procedure

Tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 9.1.2 PKPM1 Peak power meter method.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : Gaming Android Gem Box
Test Item : Peak Power Output
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - BLE (GFSK)

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	7.11	1 Watt= 30 dBm	Pass
Channel 19	2440.00	7.19	1 Watt= 30 dBm	Pass
Channel 39	2480.00	7.11	1 Watt= 30 dBm	Pass

4. Radiated Emission

4.1. Test Equipment

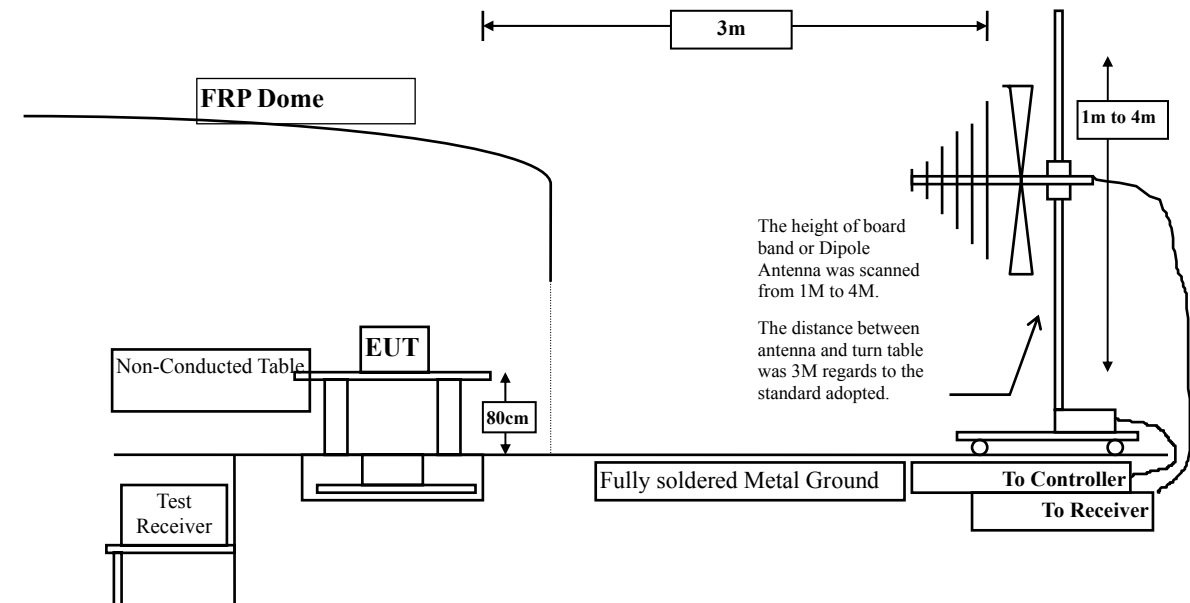
The following test equipments are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2014
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2014
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2014
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2014
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2014
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2015
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2014
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2015
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

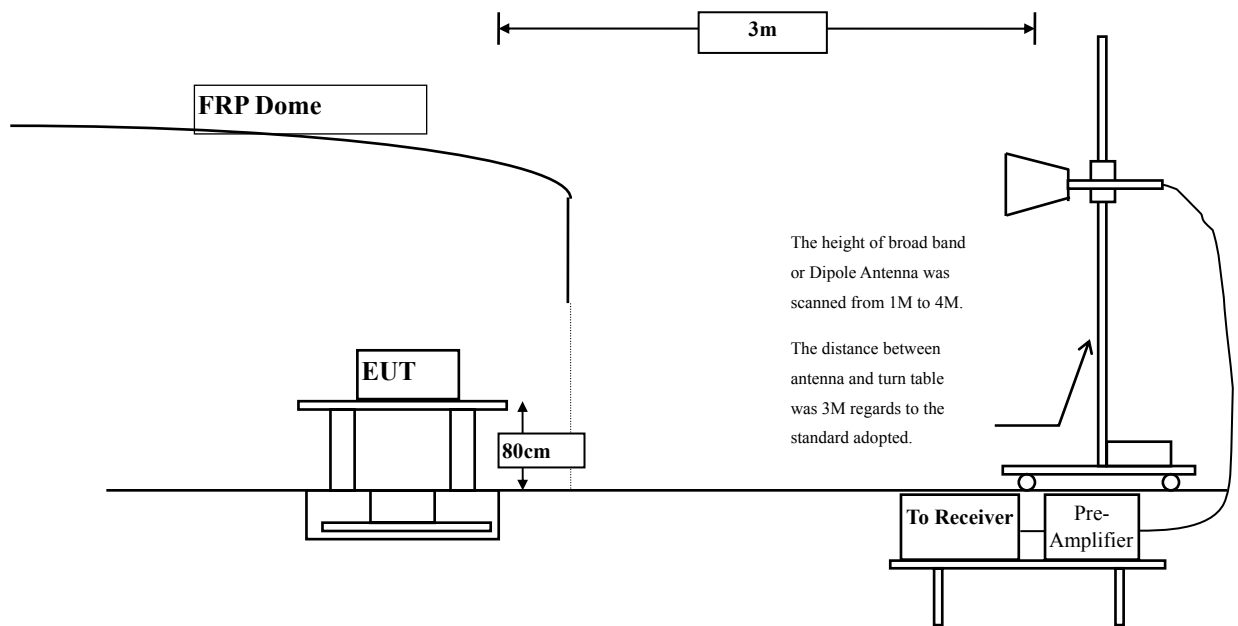
- Note:
1. All equipments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

4.2. Test Setup

Below 1GHz



Above 1GHz



4.3. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

- Remarks:
1. RF Voltage (dBμV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2009 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : Gaming Android Gem Box
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - BLE (GFSK)(2402MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dB μ V/m
Horizontal					
Peak Detector:					
4804.000	3.327	34.319	37.646	-36.354	74.000
7206.000	10.136	33.293	43.429	-30.571	74.000
9608.000	13.706	31.599	45.305	-28.695	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4804.000	6.638	33.931	40.568	-33.432	74.000
7206.000	11.005	32.426	43.431	-30.569	74.000
9608.000	14.103	32.516	46.619	-27.381	74.000
Average					
Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Gaming Android Gem Box
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV/m	dB	dBμV/m
Horizontal					
Peak Detector:					
4880.000	3.010	34.348	37.358	-36.642	74.000
7320.000	11.833	33.159	44.993	-29.007	74.000
9760.000	12.580	32.168	44.749	-29.251	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4880.000	5.738	33.849	39.587	-34.413	74.000
7320.000	12.703	32.762	45.465	-28.535	74.000
9760.000	13.052	31.849	44.901	-29.099	74.000
Average					
Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Gaming Android Gem Box
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
Peak Detector:					
4960.000	2.760	34.284	37.044	-36.956	74.000
7440.000	12.567	33.149	45.715	-28.285	74.000
9920.000	13.456	31.843	45.299	-28.701	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4960.000	5.557	33.894	39.451	-34.549	74.000
7440.000	13.426	33.142	46.567	-27.433	74.000
9920.000	13.958	32.492	46.450	-27.550	74.000
Average					
Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Gaming Android Gem Box
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
60.070	-14.228	37.275	23.047	-16.953	40.000
150.280	-10.194	36.537	26.343	-17.157	43.500
498.510	-0.093	28.154	28.061	-17.939	46.000
681.840	2.844	28.005	30.849	-15.151	46.000
845.770	5.691	27.569	33.260	-12.740	46.000
946.650	6.587	24.943	31.530	-14.470	46.000
Vertical					
98.870	-0.716	26.380	25.664	-17.836	43.500
302.570	-6.783	33.311	26.527	-19.473	46.000
419.940	-8.684	38.036	29.352	-16.648	46.000
694.450	2.053	24.177	26.230	-19.770	46.000
845.770	3.121	24.556	27.677	-18.323	46.000
969.930	8.192	23.776	31.968	-22.032	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

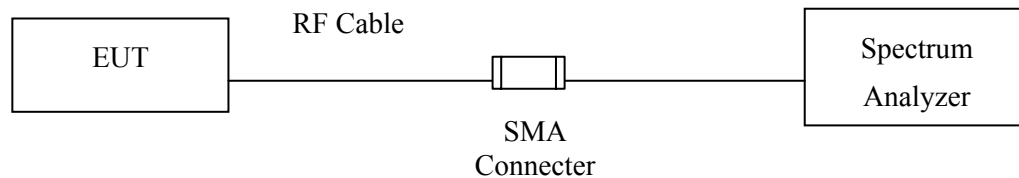
5. RF Antenna Conducted Test

5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

Note: 1. All equipments are calibrated every one year.
2. The test instruments Marked "X" are used to measure the final test results.

5.2. Test Setup



5.3. Limits

According to FCC Section 15.247(d). 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.4. Test Procedure

The EUT was tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

5.5. Uncertainty

$\pm 150\text{Hz}$

5.6. Test Result of RF Antenna Conducted Test

Product : Gaming Android Gem Box
Test Item : RF Antenna Conducted Test
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - BLE (GFSK)

Figure Channel 00:

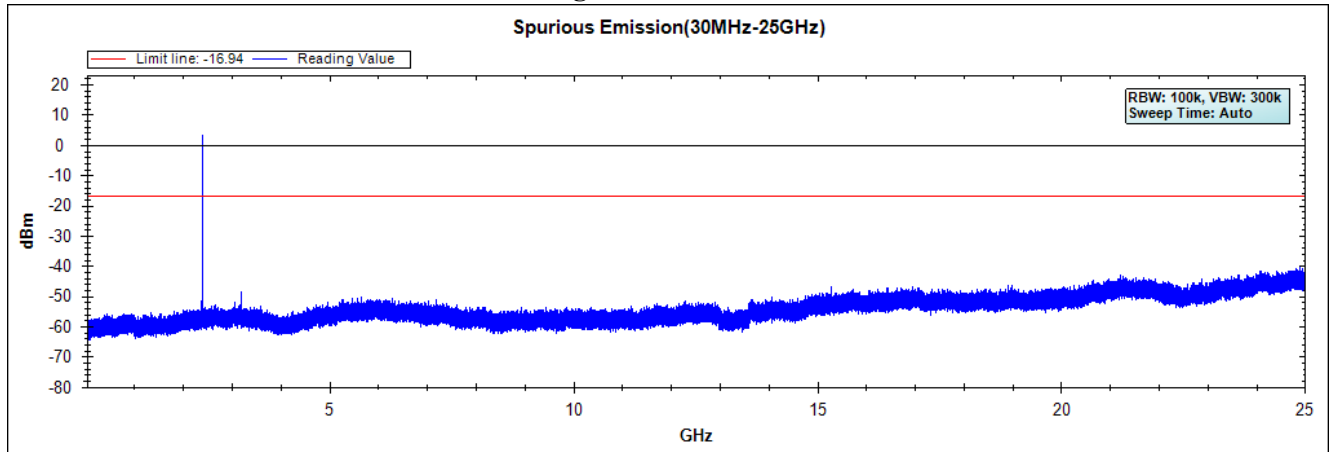


Figure Channel 19:

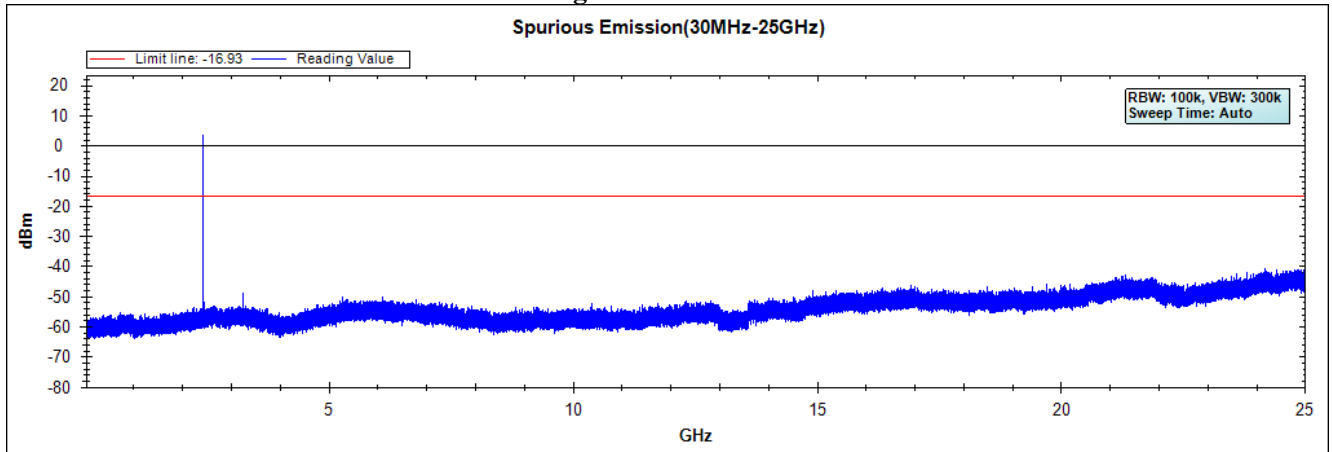
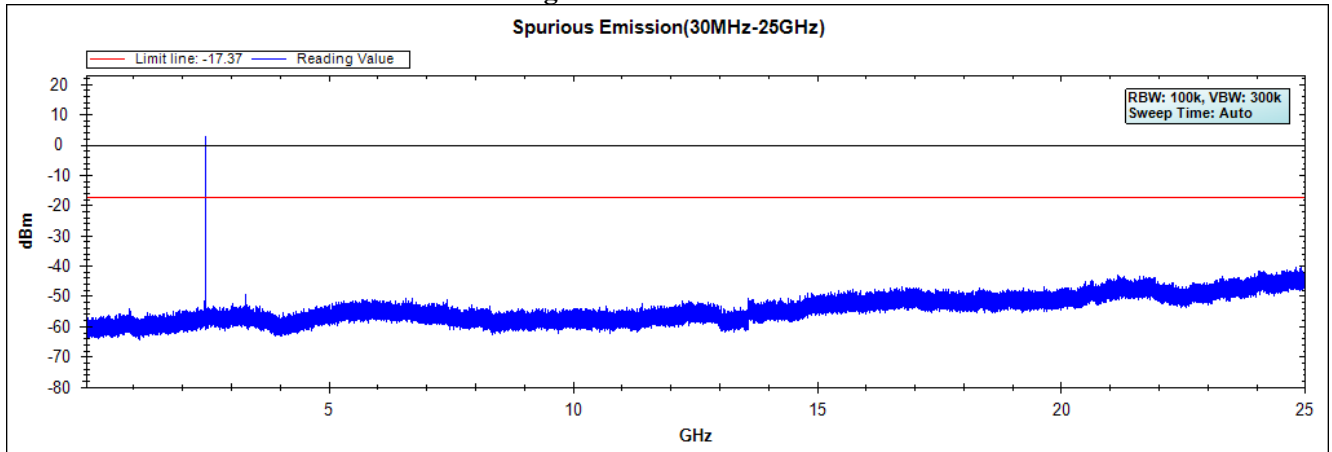


Figure Channel 39:



Note: The above test pattern is synthesized by multiple of the frequency range.

6. Band Edge

6.1. Test Equipment

RF Conducted Measurement

The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

RF Radiated Measurement:

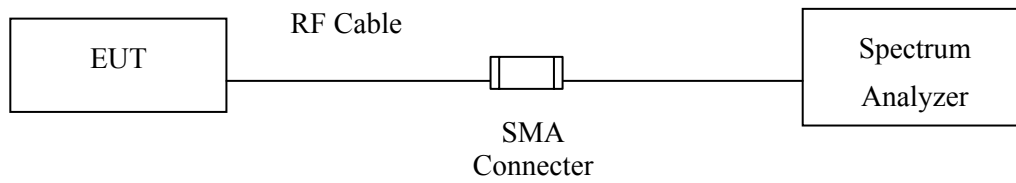
The following test equipments are used during the band edge tests:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2014
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2014
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2014
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2014
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2015
		Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2014
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2015
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

- Note:
1. All equipments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

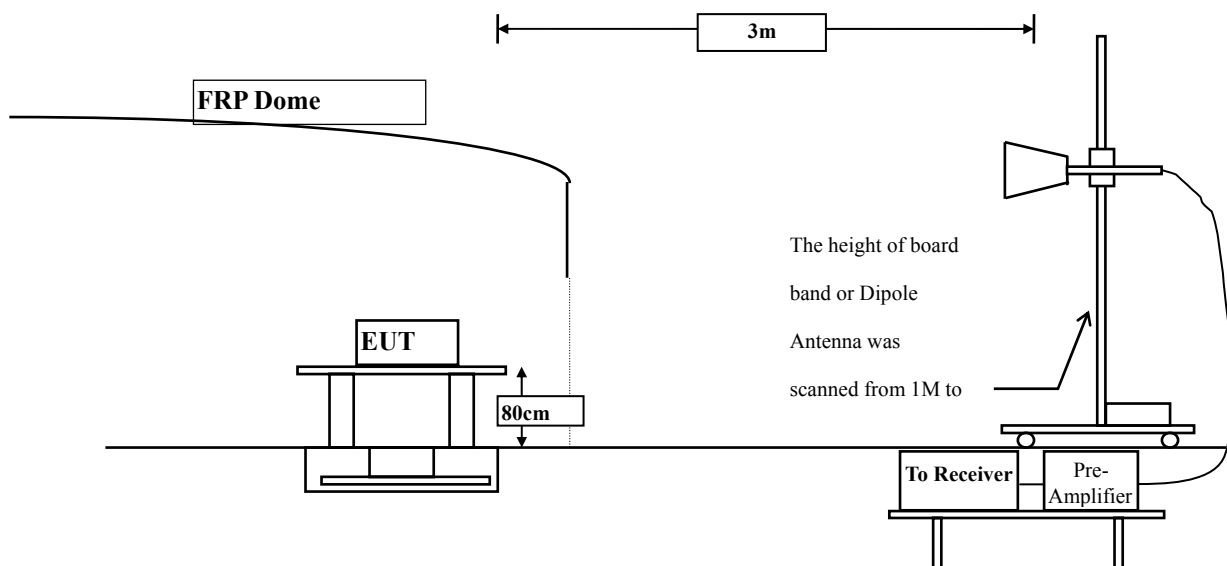
6.2. Test Setup

RF Conducted Measurement



RF Radiated Measurement:

Above 1GHz



6.3. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the 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)).

6.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2009 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2009 on radiated measurement.

6.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

6.6. Test Result of Band Edge

Product : Gaming Android Gem Box
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - BLE (GFSK) (2402MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
00 (Peak)	2389.000	-1.135	51.838	50.703	74.00	54.00	Pass
00 (Peak)	2390.000	-1.131	48.485	47.354	74.00	54.00	Pass
00 (Peak)	2400.000	-1.084	71.078	69.995	--	--	--
00 (Peak)	2401.800	-1.074	102.344	101.270	--	--	--
00 (Average)	2388.900	-1.135	40.621	39.486	74.00	54.00	Pass
00 (Average)	2390.000	-1.131	36.277	35.146	74.00	54.00	Pass
00 (Average)	2400.000	-1.084	48.429	47.346	--	--	--
00 (Average)	2402.000	-1.073	79.464	78.392	--	--	--

Figure Channel 00:

Horizontal (Peak)

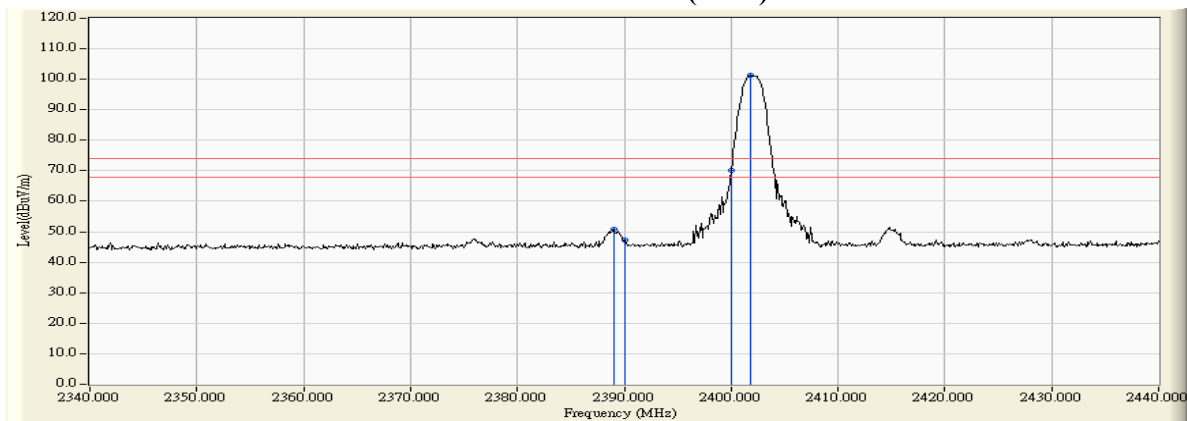
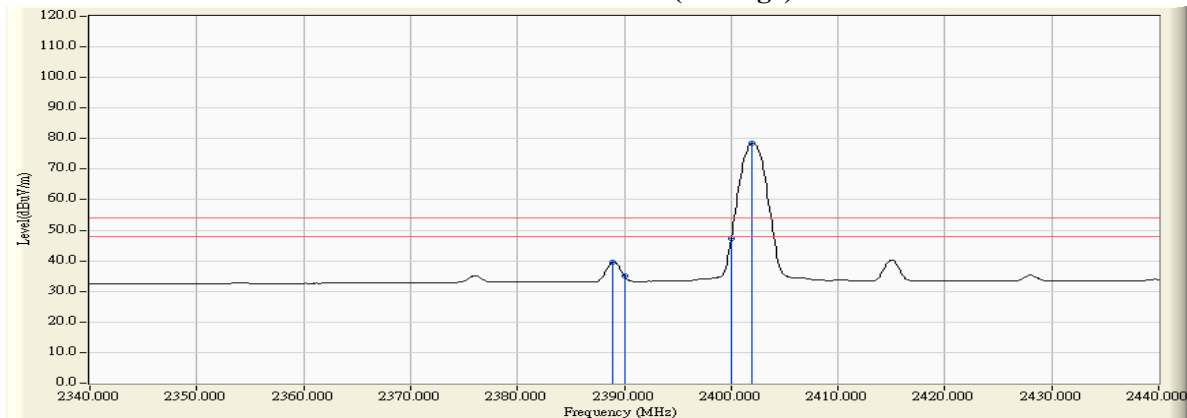


Figure Channel 00:

Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Gaming Android Gem Box
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - BLE (GFSK) (2402MHz)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
00 (Peak)	2388.800	-1.719	48.544	46.825	74.00	54.00	Pass
00 (Peak)	2390.000	-1.725	46.791	45.066	74.00	54.00	Pass
00 (Peak)	2400.000	-1.733	65.900	64.168	--	--	--
00 (Peak)	2402.200	-1.729	96.253	94.525	--	--	--
00 (Average)	2389.000	-1.720	37.371	35.651	74.00	54.00	Pass
00 (Average)	2390.000	-1.725	34.911	33.186	74.00	54.00	Pass
00 (Average)	2400.000	-1.733	44.883	43.151	--	--	--
00 (Average)	2402.000	-1.729	75.228	73.499	--	--	--

Figure Channel 00: Vertical (Peak)

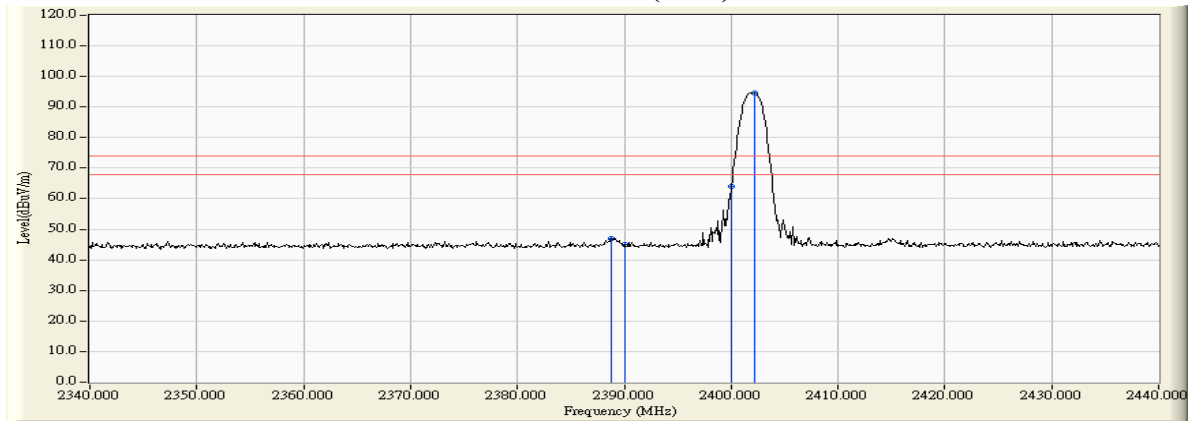
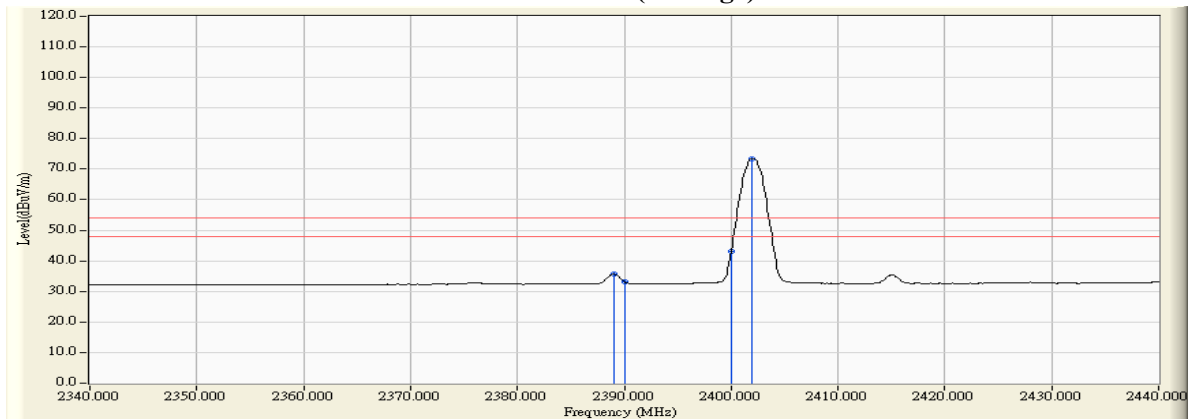


Figure Channel 00: Vertical (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Gaming Android Gem Box
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
39 (Peak)	2480.200	-0.579	101.544	100.965	--	--	--
39 (Peak)	2483.500	-0.558	54.481	53.923	74.00	54.00	Pass
39 (Peak)	2493.000	-0.497	50.969	50.471	74.00	54.00	Pass
39 (Average)	2480.000	-0.581	79.216	78.635	--	--	--
39 (Average)	2483.500	-0.558	35.690	35.132	74.00	54.00	Pass
39 (Average)	2493.000	-0.497	40.586	40.088	74.00	54.00	Pass

Figure Channel 39: Horizontal (Peak)

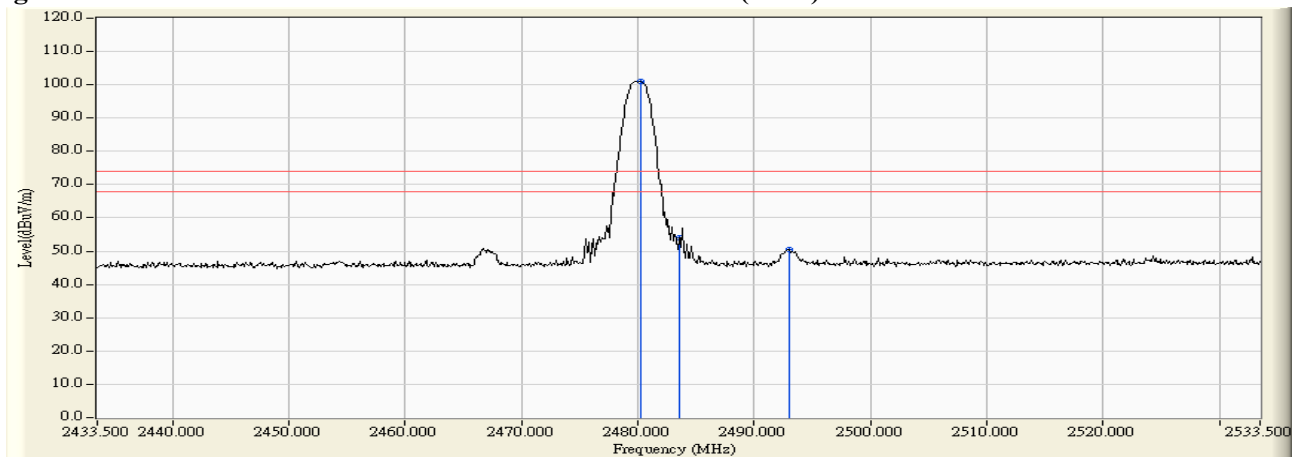
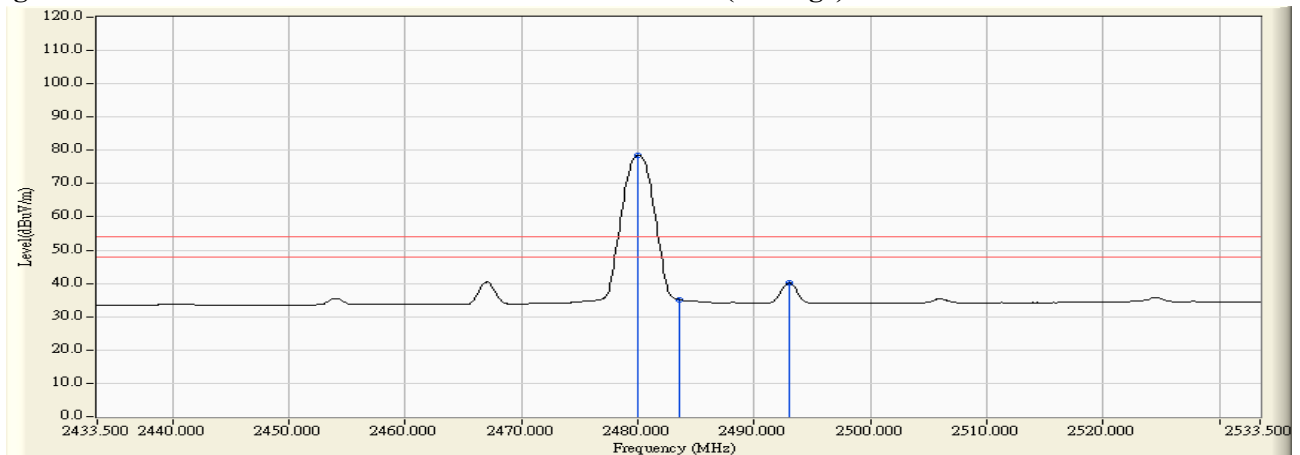


Figure Channel 39: Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Gaming Android Gem Box
Test Item : Band Edge
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
39 (Peak)	2480.300	-1.323	94.474	93.151	--	--	--
39 (Peak)	2483.500	-1.305	51.491	50.186	74.00	54.00	Pass
39 (Average)	2480.000	-1.324	74.041	72.717	--	--	--
39 (Average)	2483.500	-1.305	34.788	33.483	74.00	54.00	Pass
39 (Average)	2493.100	-1.251	36.647	35.395	74.00	54.00	Pass

Figure Channel 39: Vertical (Peak)

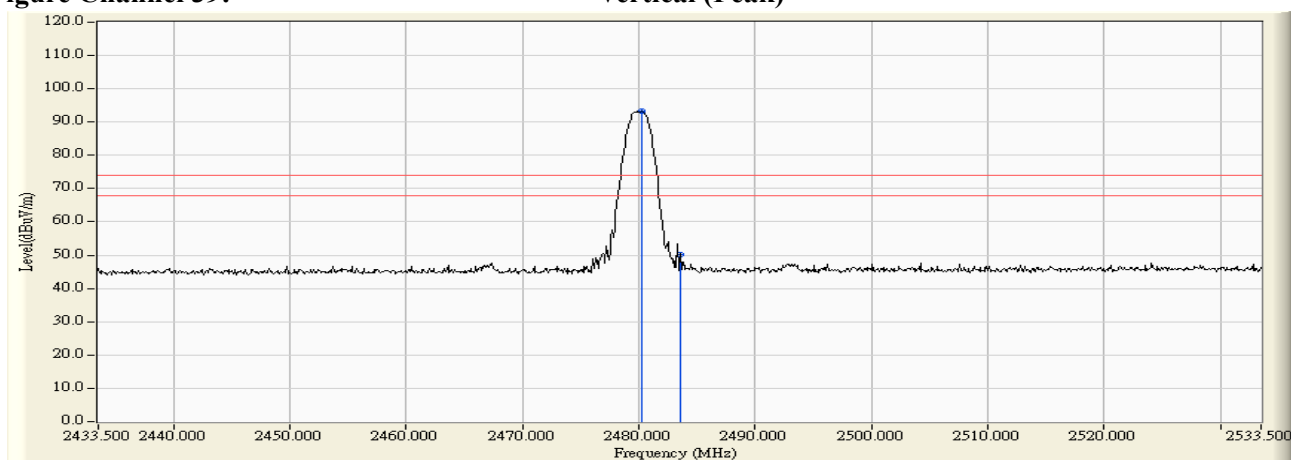
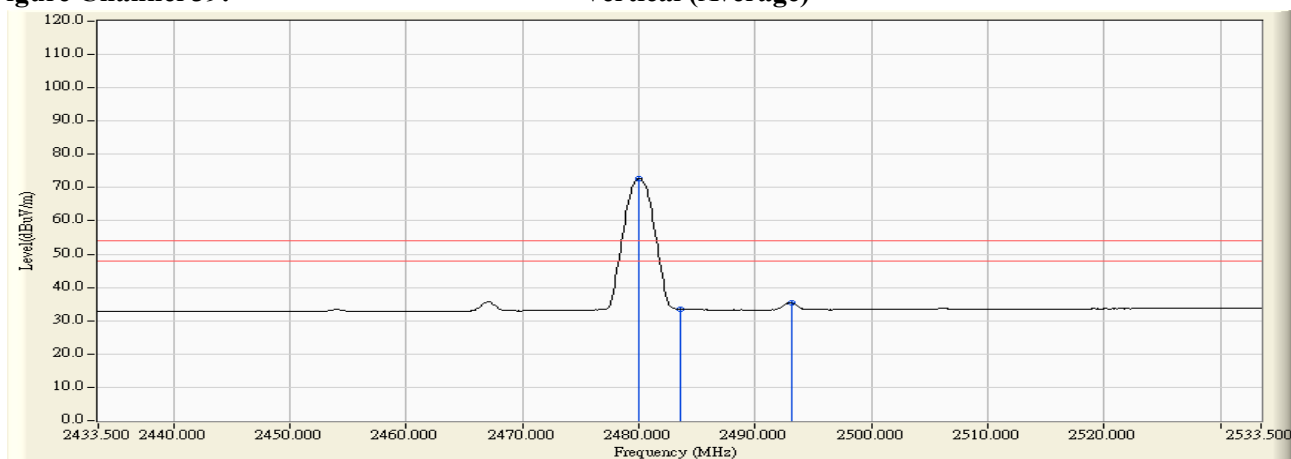


Figure Channel 39: Vertical (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

7. Occupied Bandwidth (6dB BW)

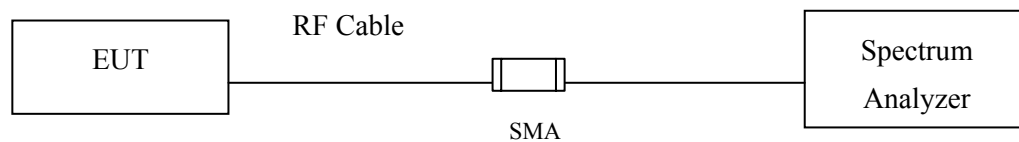
7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

7.2. Test Setup



7.3. Limits

The minimum bandwidth shall be at least 500 kHz.

7.4. Test Procedure

The EUT was setup according to ANSI C63.10 2009; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 1-5% of the emission bandwidth, $VBW \geq 3 \cdot RBW$

7.5. Uncertainty

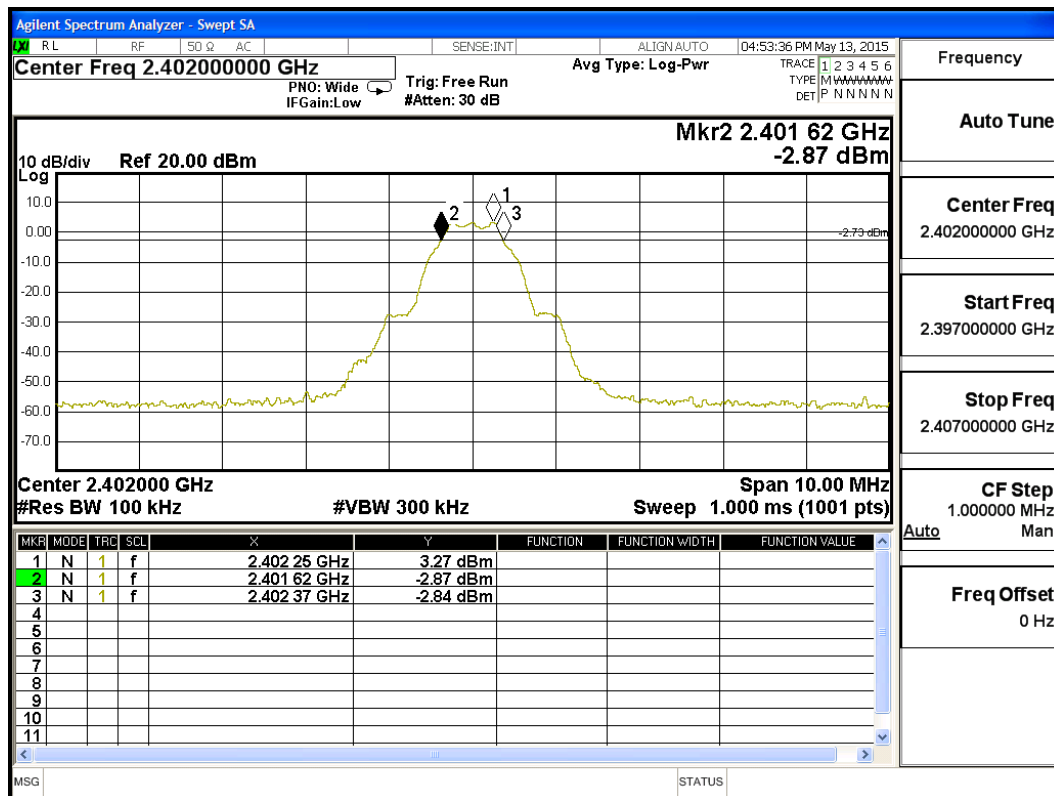
$\pm 150\text{Hz}$

7.6. Test Result of Occupied Bandwidth

Product : Gaming Android Gem Box
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	750	>500	Pass

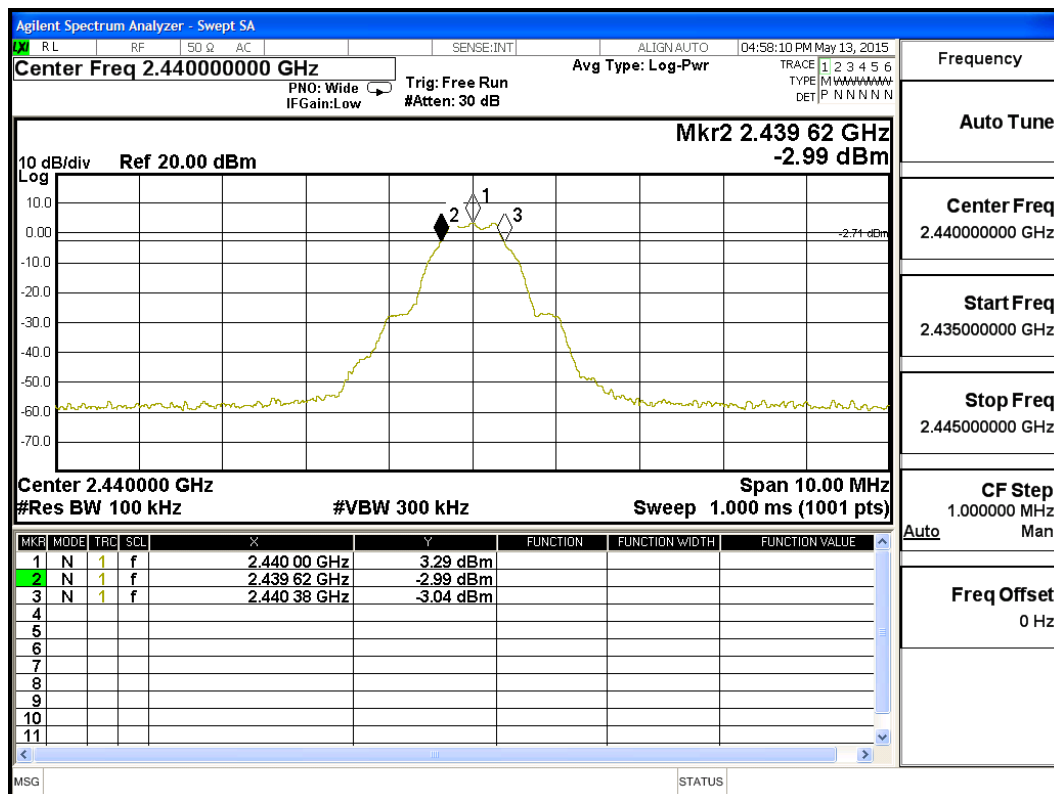
Figure Channel 00:



Product : Gaming Android Gem Box
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
19	2440	760	>500	Pass

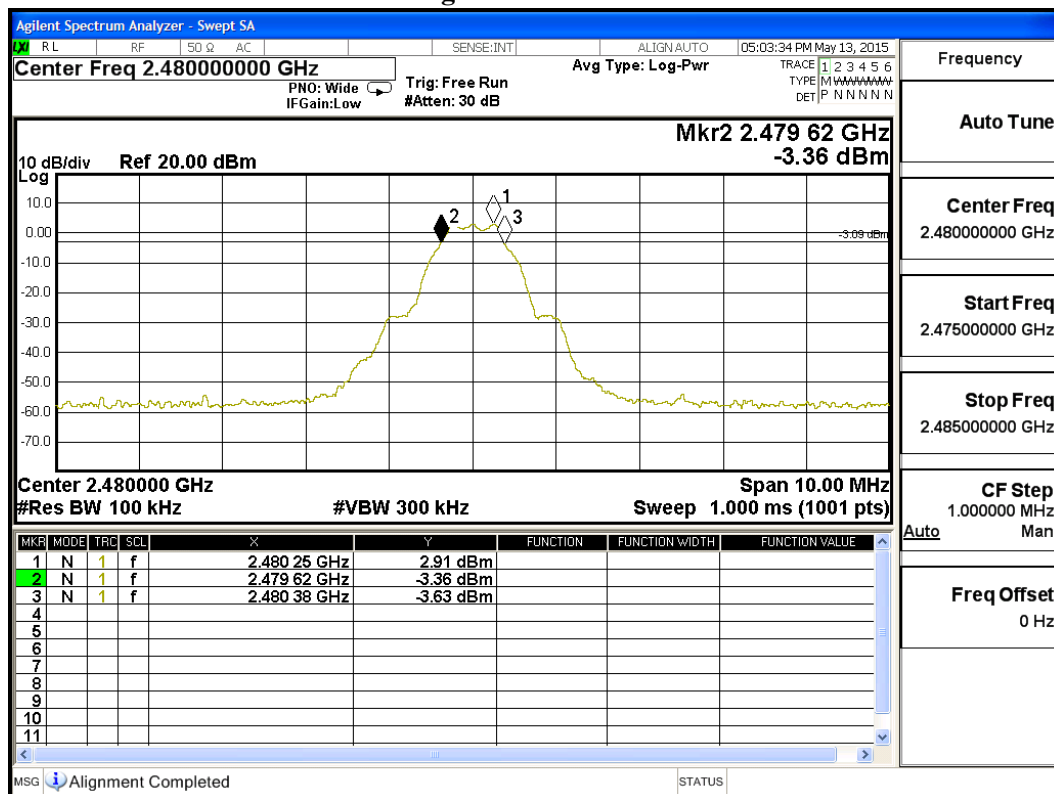
Figure Channel 19:



Product : Gaming Android Gem Box
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit - BLE (GFSK) (2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2480	760	>500	Pass

Figure Channel 39:



8. Power Density

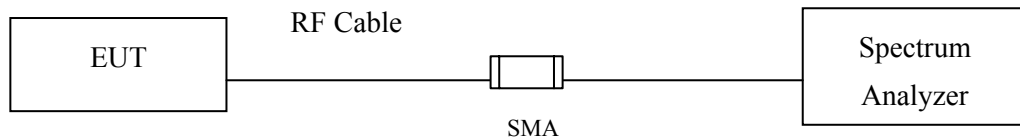
8.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2015
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2015
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2015

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

8.2. Test Setup



8.3. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2009, the maximum power spectral density using KDB 558074 section 10.2 PKPSD (peak PSD) method.

8.5. Uncertainty

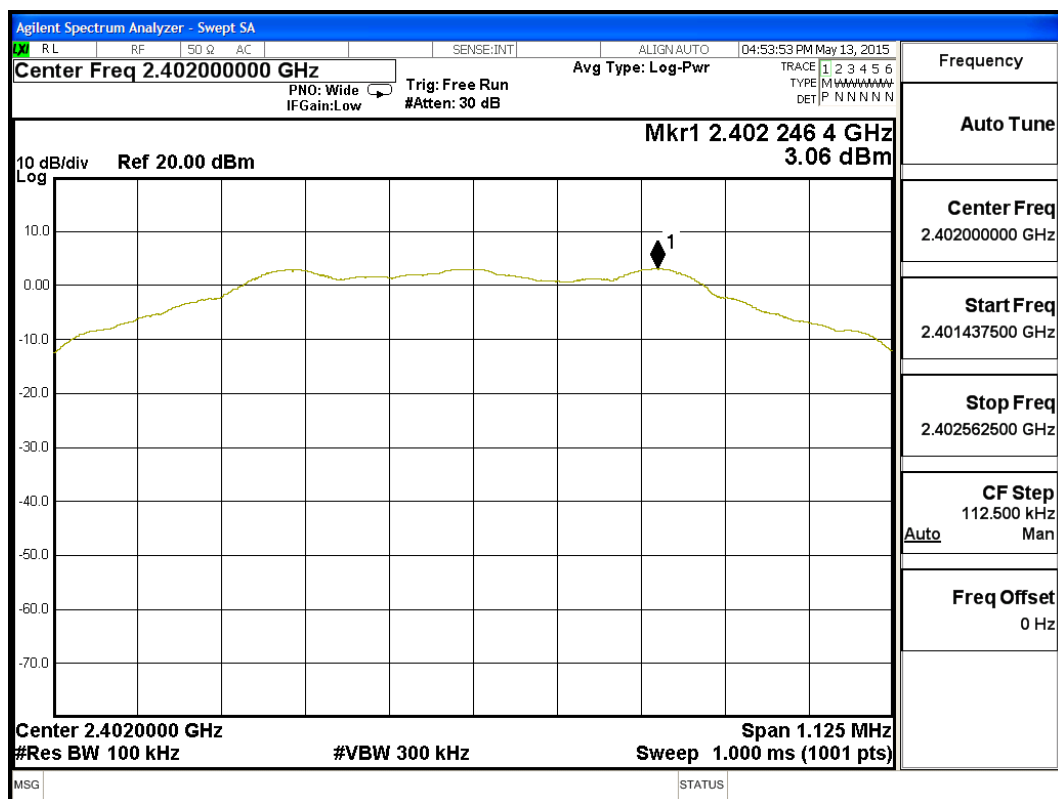
± 1.27 dB

8.6. Test Result of Power Density

Product : Gaming Android Gem Box
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2402MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	3.06	< 8dBm	Pass

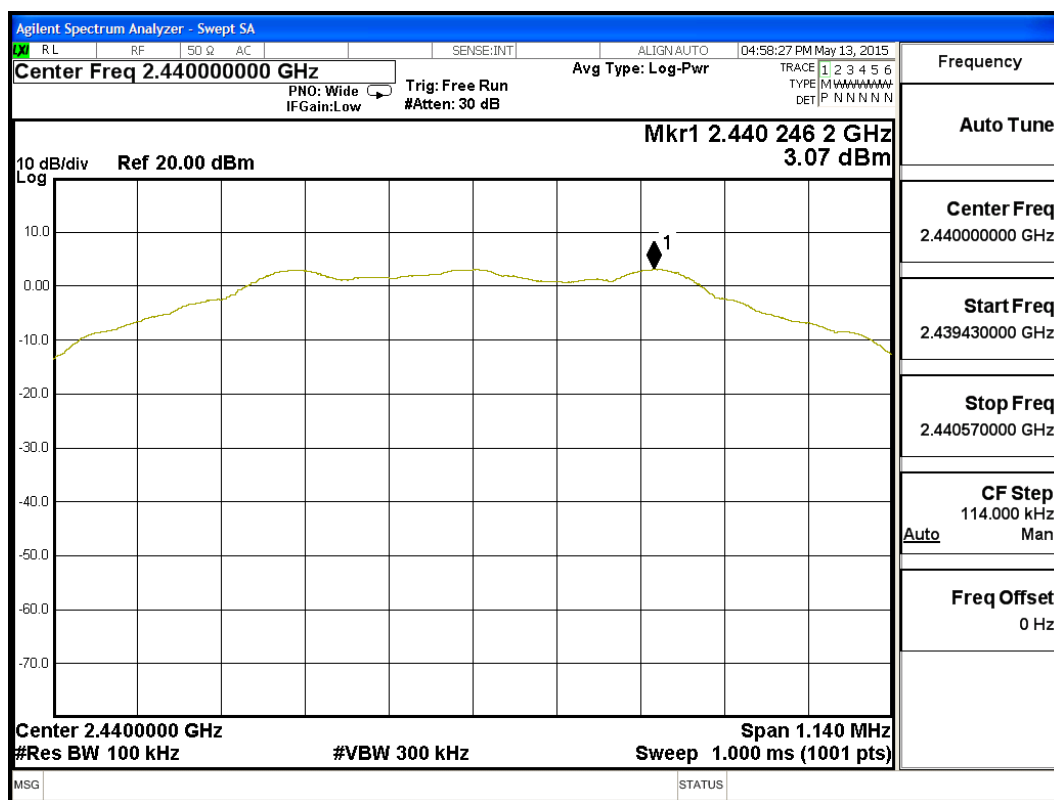
Figure Channel 00:



Product : Gaming Android Gem Box
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit - BLE (GFSK) (2440MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
19	2440	3.07	< 8dBm	Pass

Figure Channel 19:



Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
39	2480	2.63	< 8dBm	Pass

Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC SENSE:INT ALIGN:AUTO 05:03:52 PM May 13, 2015

Center Freq 2.48000000 GHz Avg Type: Log-Pwr

Trig: Free Run #Atten: 30 dB

PN0: Wide IF Gain: Low

TRACE 1 2 3 4 5 6
TYPE M W W W W W W W
DET P N N N N N

Frequency

Auto Tune

Center Freq
2.480000000 GHz

Start Freq
2.479430000 GHz

Stop Freq
2.480570000 GHz

CF Step
114.000 kHz
Auto Man

Freq Offset
0 Hz

10 dB/div Ref 20.00 dBm

Mkr1 2.480 005 7 GHz
2.63 dBm

Center 2.4800000 GHz Span 1.140 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)

MSG STATUS

9. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs