

FC

Test Report

Product Name	BlueAnt Commute
Model No.	Commute
FCC ID.	VHFBLUEANTCMT

Applicant	BlueAnt Wireless
Address	Level 4, Building 1, 658 Church Street, Richmond, Victoria, 3121, Australia

Date of Receipt	Mar. 09, 2010
Issued Date	May. 17, 2012
Report No.	125270R-RFUSP29V01
Report Version	V1.0



The Test Results relate only to the samples tested.

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Test Report Certification

Issued Date: May. 17, 2012

Report No.: 125270R-RFUSP29V01



Product Name	BlueAnt Commute
Applicant	BlueAnt Wireless
Address	Level 4, Building 1, 658 Church Street, Richmond, Victoria, 3121, Australia
Manufacturer	DONG GUAN G-COM COMPUTER CO., LTD.
Model No.	Commute
FCC ID.	VHFBLUEANTCMT
EUT Rated Voltage	DC 5V(Power by USB)
EUT Test Voltage	AC 120V/60Hz
Trade Name	BlueAnt Commute
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2010 ANSI C63.4: 2003
Test Result	Complied

The Test Results relate only to the samples tested.

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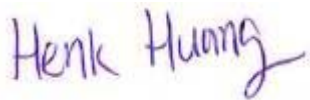
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Documented By :



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Tested By :



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Approved By :



(Manager / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	BlueAnt Commute
Trade Name	BlueAnt Commute
Model No.	Commute
FCC ID.	VHFBLUEANTCMT
Frequency Range	2402 – 2480MHz
Channel Number	79
Type of Modulation	FHSS: GFSK(1Mbps) / π / 4DQPSK(2Mbps) / 8DPSK(3Mbps)
Antenna Type	Printed on PCB
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
USB Cable	Shielded, 0.5m
Car Charger	MFR: N/A, M/N: SIL-050050B-CLA Input: 12VDC/24VDC Output: 5VDC, 500mA
Switching Adapter	MFR: BlueAnt, M/N: SSC-5W-05 050050 Input: 100-240VAC, 50/60Hz Output: 5VDC, 500mA

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	DONG GUAN G-COM COMPUTER CO., LTD.	N/A	3dBi for 2.4 GHz

Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 20:	2422 MHz	Channel 40:	2442 MHz	Channel 60:	2462 MHz
Channel 01:	2403 MHz	Channel 21:	2423 MHz	Channel 41:	2443 MHz	Channel 61:	2463 MHz
Channel 02:	2404 MHz	Channel 22:	2424 MHz	Channel 42:	2444 MHz	Channel 62:	2464 MHz
Channel 03:	2405 MHz	Channel 23:	2425 MHz	Channel 43:	2445 MHz	Channel 63:	2465 MHz
Channel 04:	2406 MHz	Channel 24:	2426 MHz	Channel 44:	2446 MHz	Channel 64:	2466 MHz
Channel 05:	2407 MHz	Channel 25:	2427 MHz	Channel 45:	2447 MHz	Channel 65:	2467 MHz
Channel 06:	2408 MHz	Channel 26:	2428 MHz	Channel 46:	2448 MHz	Channel 66:	2468 MHz
Channel 07:	2409 MHz	Channel 27:	2429 MHz	Channel 47:	2449 MHz	Channel 67:	2469 MHz
Channel 08:	2410 MHz	Channel 28:	2430 MHz	Channel 48:	2450 MHz	Channel 68:	2470 MHz
Channel 09:	2411 MHz	Channel 29:	2431 MHz	Channel 49:	2451 MHz	Channel 69:	2471 MHz
Channel 10:	2412 MHz	Channel 30:	2432 MHz	Channel 50:	2452 MHz	Channel 70:	2472 MHz
Channel 11:	2413 MHz	Channel 31:	2433 MHz	Channel 51:	2453 MHz	Channel 71:	2473 MHz
Channel 12:	2414 MHz	Channel 32:	2434 MHz	Channel 52:	2454 MHz	Channel 72:	2474 MHz
Channel 13:	2415 MHz	Channel 33:	2435 MHz	Channel 53:	2455 MHz	Channel 73:	2475 MHz
Channel 14:	2416 MHz	Channel 34:	2436 MHz	Channel 54:	2456 MHz	Channel 74:	2476 MHz
Channel 15:	2417 MHz	Channel 35:	2437 MHz	Channel 55:	2457 MHz	Channel 75:	2477 MHz
Channel 16:	2418 MHz	Channel 36:	2438 MHz	Channel 56:	2458 MHz	Channel 76:	2478 MHz
Channel 17:	2419 MHz	Channel 37:	2439 MHz	Channel 57:	2459 MHz	Channel 77:	2479 MHz
Channel 18:	2420 MHz	Channel 38:	2440 MHz	Channel 58:	2460 MHz	Channel 78:	2480 MHz
Channel 19:	2421 MHz	Channel 39:	2441 MHz	Channel 59:	2461 MHz		

Note:

1. This device is a BlueAnt Commute with a built-in 2.4GHz Bluetooth V2.1+EDR 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.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmitter - 1Mbps (GFSK) Mode 2: Transmitter - 3Mbps (8DPSK)
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1.3. Tested System Details

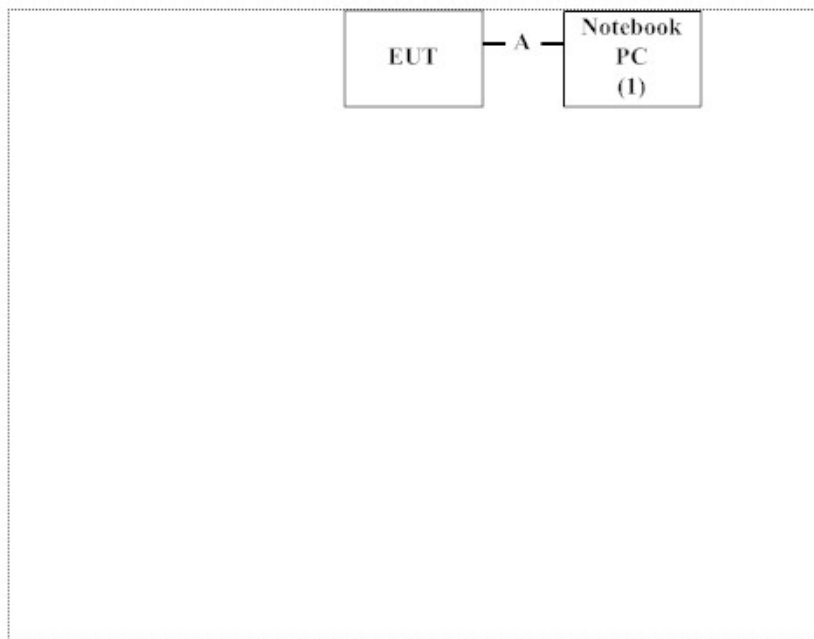
The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Test Mode	Mode 1 & Mode 2					
Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord	
1.	Notebook PC	DELL	PPT	N/A	DoC	Non-shielded, 0.8m

Test Mode	Mode 1 & Mode 2	
Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 0.5m

1.4. Configuration of Test System

Mode 1 & Mode 2



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in section 1.4
- (2) Execute the CSR program (Bluetest3.exe) on the EUT
- (3) Setup the test mode, the test channel, and the data rate.
- (4) Press OK to start the transmission.
- (5) Verify that the EUT works correctly.

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://tw.quietek.com/modules/myalbum/>
The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on
Federal Communications Commission
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Registration Number: 92195

Accreditation on NVLAP
NVLAP Lab Code: 200533-0

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E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

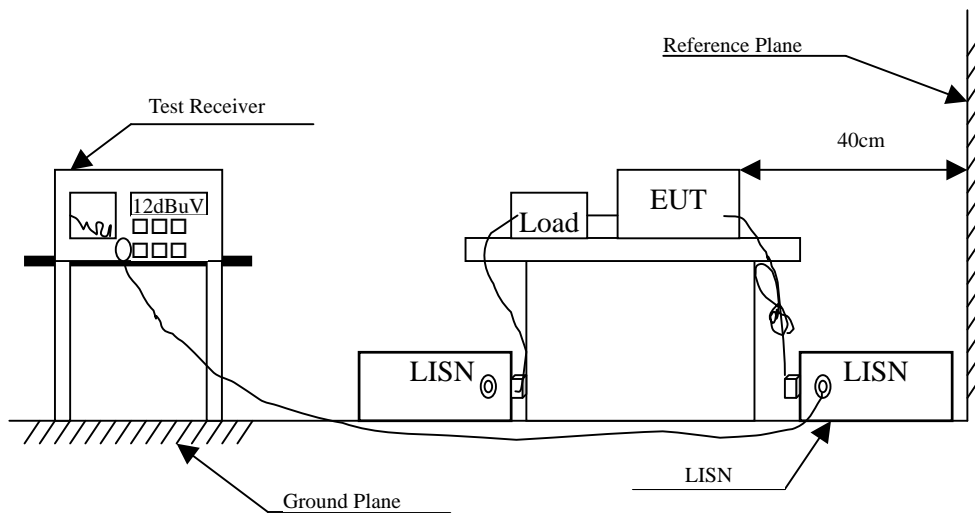
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/014	Feb., 2012	
2	L.I.S.N.	R & S	ESH3-Z5/825562/002	Feb., 2012	EUT
3	L.I.S.N.	R & S	ENV4200/848411/010	Feb., 2012	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2/100410	July, 2011	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) 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: 2003 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, 2003; 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 : BlueAnt Commute
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.181	9.724	41.720	51.444	-13.670	65.114
0.244	9.679	36.160	45.839	-17.475	63.314
0.302	9.650	32.590	42.240	-19.417	61.657
0.361	9.650	25.380	35.030	-24.941	59.971
1.884	9.680	20.530	30.210	-25.790	56.000
3.826	9.700	26.070	35.770	-20.230	56.000
Average					
0.181	9.724	32.160	41.884	-13.230	55.114
0.244	9.679	28.480	38.159	-15.155	53.314
0.302	9.650	24.200	33.850	-17.807	51.657
0.361	9.650	18.140	27.790	-22.181	49.971
1.884	9.680	17.810	27.490	-18.510	46.000
3.826	9.700	16.170	25.870	-20.130	46.000

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 : BlueAnt Commute
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.185	9.727	39.380	49.108	-15.892	65.000
0.244	9.689	35.410	45.099	-18.215	63.314
0.306	9.660	31.520	41.180	-20.363	61.543
0.365	9.651	26.710	36.361	-23.496	59.857
2.064	9.680	21.880	31.560	-24.440	56.000
4.130	9.700	26.740	36.440	-19.560	56.000
Average					
0.185	9.727	29.720	39.448	-15.552	55.000
0.244	9.689	28.050	37.739	-15.575	53.314
0.306	9.660	22.640	32.300	-19.243	51.543
0.365	9.651	19.380	29.031	-20.826	49.857
2.064	9.680	17.840	27.520	-18.480	46.000
4.130	9.700	15.930	25.630	-20.370	46.000

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 : BlueAnt Commute
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (Adapter) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.295	9.652	32.870	42.522	-19.335	61.857
0.892	9.670	33.810	43.480	-12.520	56.000
1.486	9.672	33.590	43.262	-12.738	56.000
2.677	9.690	34.040	43.730	-12.270	56.000
3.869	9.700	34.250	43.950	-12.050	56.000
6.248	9.740	34.970	44.710	-15.290	60.000
Average					
0.295	9.652	26.680	36.332	-15.525	51.857
0.892	9.670	28.120	37.790	-8.210	46.000
1.486	9.672	27.780	37.452	-8.548	46.000
2.677	9.690	32.070	41.760	-4.240	46.000
3.869	9.700	31.090	40.790	-5.210	46.000
6.248	9.740	32.310	42.050	-7.950	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 : BlueAnt Commute
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (Adapter) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.279	9.667	27.310	36.977	-25.337	62.314
0.892	9.670	29.920	39.590	-16.410	56.000
1.486	9.672	29.840	39.512	-16.488	56.000
3.271	9.690	30.210	39.900	-16.100	56.000
5.654	9.720	31.450	41.170	-18.830	60.000
6.841	9.750	31.930	41.680	-18.320	60.000
Average					
0.279	9.667	13.180	22.847	-29.467	52.314
0.892	9.670	26.990	36.660	-9.340	46.000
1.486	9.672	26.890	36.562	-9.438	46.000
3.271	9.690	27.740	37.430	-8.570	46.000
5.654	9.720	29.030	38.750	-11.250	50.000
6.841	9.750	29.670	39.420	-10.580	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 : BlueAnt Commute
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (Car Charger) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
2.662	0.273	27.490	27.763	-28.237	56.000
3.841	0.279	31.710	31.989	-24.011	56.000
10.330	0.335	29.950	30.285	-29.715	60.000
11.509	0.387	31.170	31.557	-28.443	60.000
13.279	0.576	32.070	32.646	-27.354	60.000
20.689	0.702	36.920	37.622	-22.378	60.000
Average					
2.662	0.273	25.420	25.693	-20.307	46.000
3.841	0.279	26.410	26.689	-19.311	46.000
10.330	0.335	24.390	24.725	-25.275	50.000
11.509	0.387	24.910	25.297	-24.703	50.000
13.279	0.576	25.180	25.756	-24.244	50.000
20.689	0.702	25.690	26.392	-23.608	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 : BlueAnt Commute
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (Car Charger) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.295	0.255	44.720	44.975	-16.882	61.857
0.888	0.242	43.320	43.562	-12.438	56.000
1.478	0.245	43.090	43.335	-12.665	56.000
2.068	0.250	44.900	45.150	-10.850	56.000
9.162	0.294	45.380	45.674	-14.326	60.000
10.341	0.305	38.600	38.905	-21.095	60.000
Average					
0.295	0.255	44.710	44.965	-6.892	51.857
0.888	0.242	39.170	39.412	-6.588	46.000
1.478	0.245	40.490	40.735	-5.265	46.000
2.068	0.250	42.560	42.810	-3.190	46.000
9.162	0.294	35.980	36.274	-13.726	50.000
10.341	0.305	31.610	31.915	-18.085	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

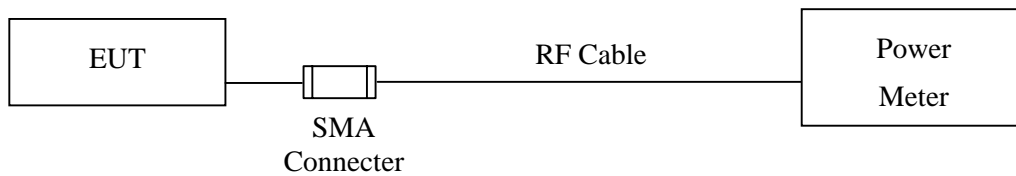
3.1. Test Equipment

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Power Meter	Anritsu	ML2495A/6K00003357	May, 2012
X Power Sensor	Anritsu	MA2491A/034457	May, 2012

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

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : BlueAnt Commute
Test Item : Peak Power Output
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)

Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
Channel 00	2402.00	4.32dBm	1 Watt= 30 dBm	Pass
Channel 39	2441.00	4.17dBm	1 Watt= 30 dBm	Pass
Channel 78	2480.00	4.52dBm	1 Watt= 30 dBm	Pass

Product : BlueAnt Commute
Test Item : Peak Power Output
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)

Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
Channel 00	2402.00	1.69dBm	1 Watt= 30 dBm	Pass
Channel 39	2441.00	1.45dBm	1 Watt= 30 dBm	Pass
Channel 78	2480.00	1.24dBm	1 Watt= 30 dBm	Pass

4. Radiated Emission

4.1. Test Equipment

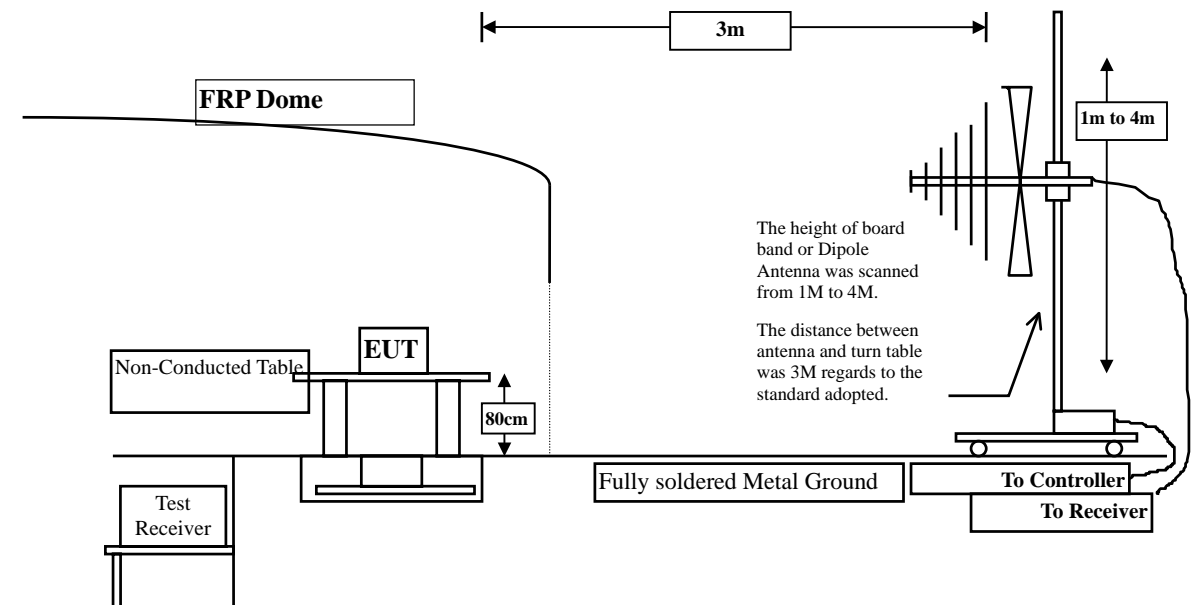
The following test equipments are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2011
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2011
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2011
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2011
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2011
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2012
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

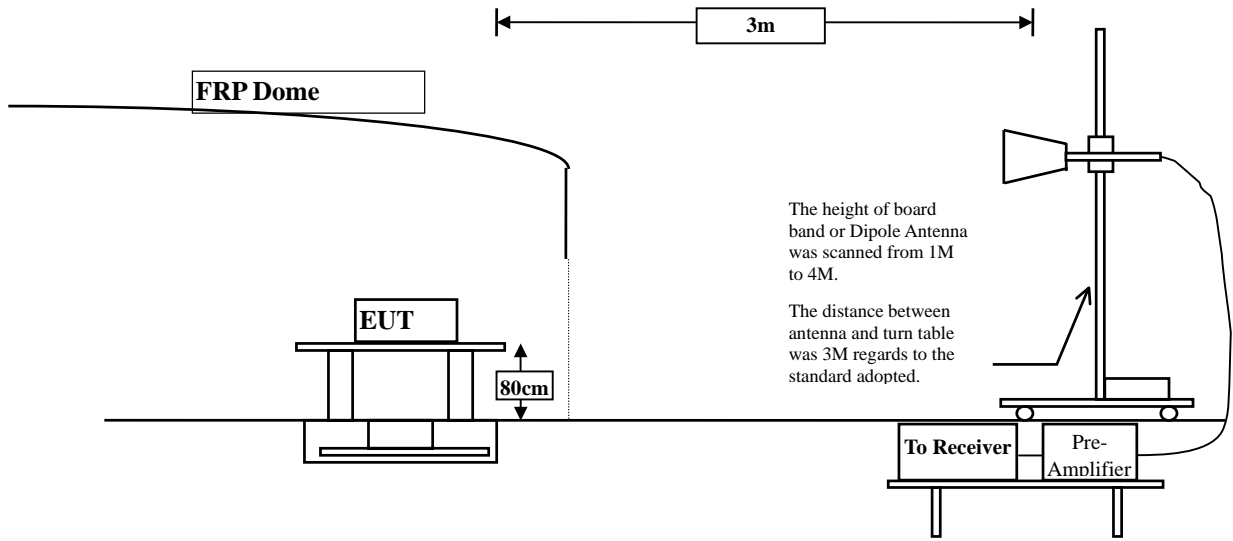
- Note: 1. All equipments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

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	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks:
1. RF Voltage (dBuV) = 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 C63.4, 2003 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 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 C63.4:2003 on radiated measurement.

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

Radiated emission measurements below 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 on the Final Measurement.

The frequency range from 30MHz to 10th harmonics is checked.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : BlueAnt Commute
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)(2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4804.000	0.511	44.690	45.200	-28.800	74.000
7206.000	7.511	38.260	45.771	-28.229	74.000
9608.000	8.394	37.770	46.164	-27.836	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4804.000	0.923	47.820	48.742	-25.258	74.000
7206.000	7.988	38.740	46.729	-27.271	74.000
9608.000	8.847	37.800	46.647	-27.353	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz °
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz °
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : BlueAnt Commute
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)(2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4882.000	0.025	45.510	45.535	-28.465	74.000
7323.000	7.762	37.460	45.221	-28.779	74.000
9764.000	7.682	38.350	46.031	-27.969	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4882.000	0.488	49.460	49.948	-24.052	74.000
7323.000	8.375	37.230	45.604	-28.396	74.000
9764.000	8.315	38.670	46.985	-27.015	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : BlueAnt Commute
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)(2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4960.000	0.582	44.860	45.442	-28.558	74.000
7440.000	8.555	38.430	46.985	-27.015	74.000
9920.000	8.206	39.040	47.246	-26.754	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4960.000	1.398	46.970	48.369	-25.631	74.000
7440.000	9.214	37.710	46.924	-27.076	74.000
9920.000	9.245	38.370	47.615	-26.385	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : BlueAnt Commute
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)(2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4804.000	0.511	40.320	40.830	-33.170	74.000
7206.000	7.511	38.820	46.331	-27.669	74.000
9608.000	8.394	37.900	46.294	-27.706	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4804.000	0.923	43.980	44.902	-29.098	74.000
7206.000	7.988	38.040	46.029	-27.971	74.000
9608.000	8.847	38.050	46.897	-27.103	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : BlueAnt Commute
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4882.000	0.025	42.290	42.315	-31.685	74.000
7323.000	7.762	37.130	44.891	-29.109	74.000
9764.000	7.682	38.240	45.921	-28.079	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4882.000	0.488	45.160	45.648	-28.352	74.000
7323.000	8.375	37.020	45.394	-28.606	74.000
9764.000	8.315	38.570	46.885	-27.115	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : BlueAnt Commute
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4960.000	0.582	41.950	42.532	-31.468	74.000
7440.000	8.555	36.890	45.445	-28.555	74.000
9920.000	8.206	38.340	46.546	-27.454	74.000
Average Detector:					
--					
Peak Detector:					
4960.000	1.398	43.600	44.999	-29.001	74.000
7440.000	9.214	37.810	47.024	-26.976	74.000
9920.000	9.245	38.320	47.565	-26.435	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : BlueAnt Commute
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)(2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
57.160	-11.836	45.594	33.758	-6.242	40.000
101.780	-9.100	42.095	32.994	-10.506	43.500
216.240	-10.271	44.342	34.071	-11.929	46.000
268.620	-5.522	39.767	34.245	-11.755	46.000
369.500	0.787	39.060	39.847	-6.153	46.000
759.440	5.140	27.788	32.928	-13.072	46.000
Vertical					
66.860	-12.435	42.940	30.505	-9.495	40.000
128.940	-3.710	34.611	30.901	-12.599	43.500
194.900	-5.673	41.442	35.769	-7.731	43.500
249.220	-5.096	43.821	38.725	-7.275	46.000
580.960	-2.274	29.747	27.473	-18.527	46.000
804.060	3.371	35.910	39.281	-6.719	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. "█" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pre-tested. Only the worst case is shown on the report.

Product : BlueAnt Commute
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
62.980	-12.319	46.431	34.112	-5.888	40.000
113.420	-7.449	45.071	37.622	-5.878	43.500
239.520	-6.878	41.553	34.675	-11.325	46.000
324.880	-4.510	35.207	30.697	-15.303	46.000
468.440	3.544	24.732	28.276	-17.724	46.000
544.100	4.373	24.991	29.364	-16.636	46.000
Vertical					
125.060	-3.725	35.472	31.747	-11.753	43.500
225.940	-6.267	43.139	36.872	-9.128	46.000
390.840	-0.768	31.012	30.244	-15.756	46.000
462.620	-2.571	36.227	33.656	-12.344	46.000
606.180	2.246	38.618	40.864	-5.136	46.000
879.720	1.188	29.191	30.379	-15.621	46.000

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “█” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pre-tested. Only the worst case is shown on the report.

Product : BlueAnt Commute
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (Adapter)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
181.623	-13.976	46.952	32.976	-10.524	43.500
222.445	-10.216	51.513	41.297	-4.703	46.000
234.108	-9.361	44.337	34.976	-11.024	46.000
368.236	-3.298	35.044	31.746	-14.254	46.000
665.651	3.861	30.425	34.286	-11.714	46.000
811.443	4.850	30.773	35.623	-10.377	46.000
Vertical					
41.663	-9.016	43.255	34.239	-5.761	40.000
179.679	-5.284	41.827	36.543	-6.957	43.500
191.343	-3.596	42.445	38.848	-4.652	43.500
222.445	-2.742	42.248	39.506	-6.494	46.000
245.772	-3.154	41.419	38.265	-7.735	46.000
354.629	-5.176	36.158	30.982	-15.018	46.000

Note:

- All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
- “█” means the worst emission level.
- Measurement Level = Reading Level + Correct Factor.
- The radiated emissions below 1GHz of the lowest, middle, highest frequency are pre-tested. Only the worst case is shown on the report.

Product : BlueAnt Commute
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (Car Charger)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
38.093	1.339	34.249	35.587	-4.413	40.000
148.577	-13.910	45.567	31.657	-11.843	43.500
212.725	-10.964	51.087	40.124	-3.376	43.500
222.445	-10.238	45.635	35.397	-10.603	46.000
374.068	-3.089	37.406	34.317	-11.683	46.000
405.170	-1.390	37.306	35.916	-10.084	46.000
Vertical					
37.824	-7.756	43.988	36.232	-3.768	40.000
84.429	-10.533	44.238	33.705	-6.295	40.000
148.577	-7.687	46.508	38.821	-4.679	43.500
191.343	-3.640	39.315	35.675	-7.825	43.500
212.725	-2.608	42.720	40.113	-3.387	43.500
222.445	-2.764	38.347	35.583	-10.417	46.000

Note:

5. The reading levels below 1GHz are quasi-peak values.
6. “” means the worst emission level.
7. Measurement Level = Reading Level + Correct Factor.
8. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pre-tested. Only the worst case is shown on the report.

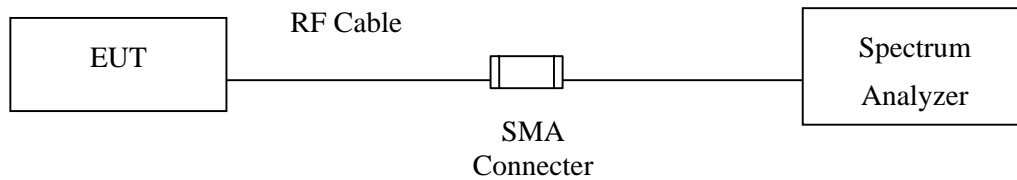
5. RF Antenna Conducted Test

5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40/ 100339	Jun, 2011
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Jun, 2011
	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012

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 setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

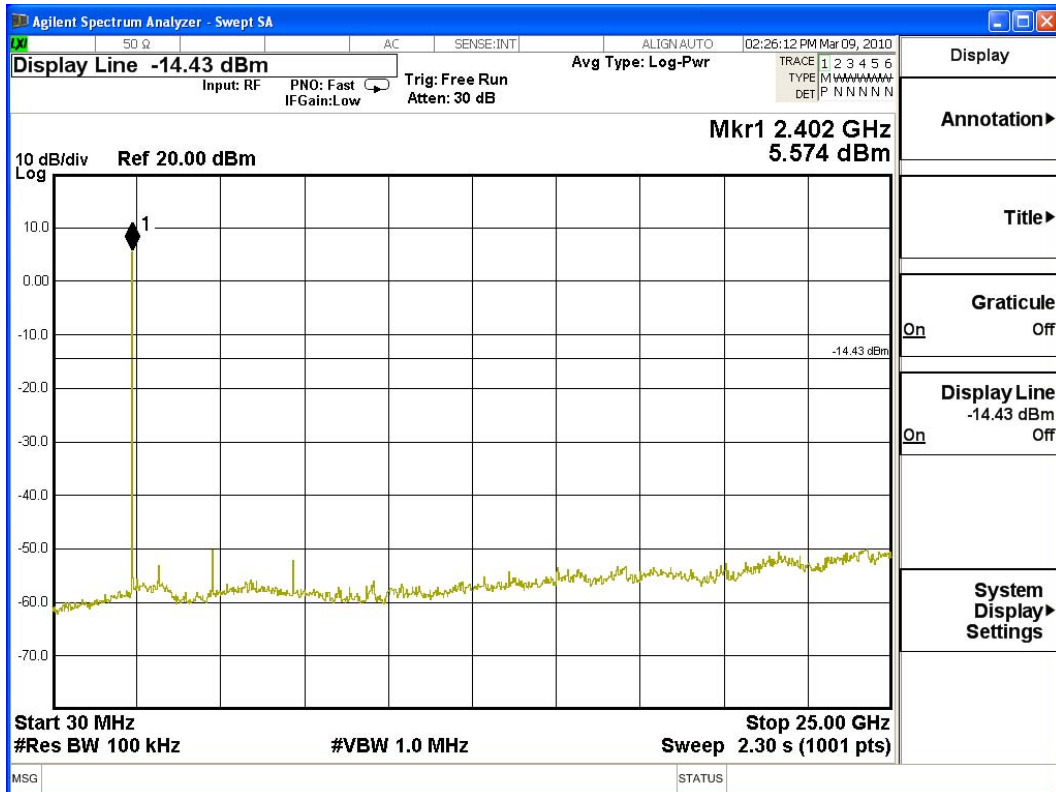
5.5. Uncertainty

± 150Hz

5.6. Test Result of RF Antenna Conducted Test

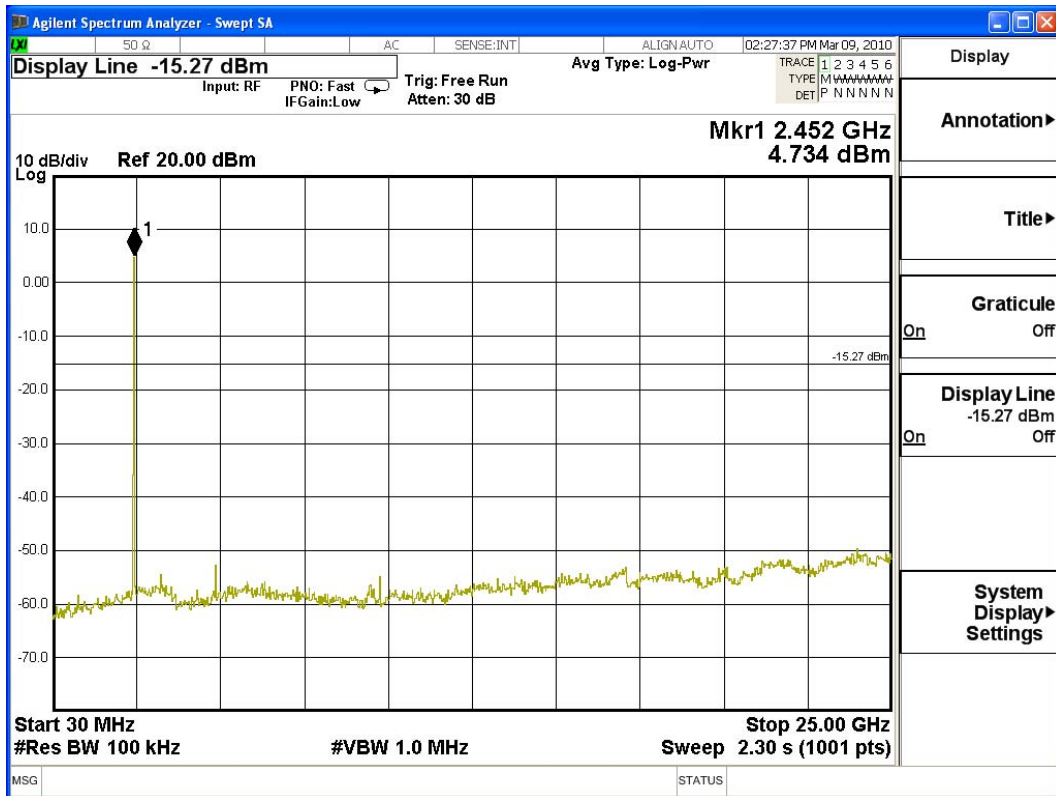
Product : BlueAnt Commute
 Test Item : RF Antenna Conducted Test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)

Figure Channel 00: 30MHz-25GHz



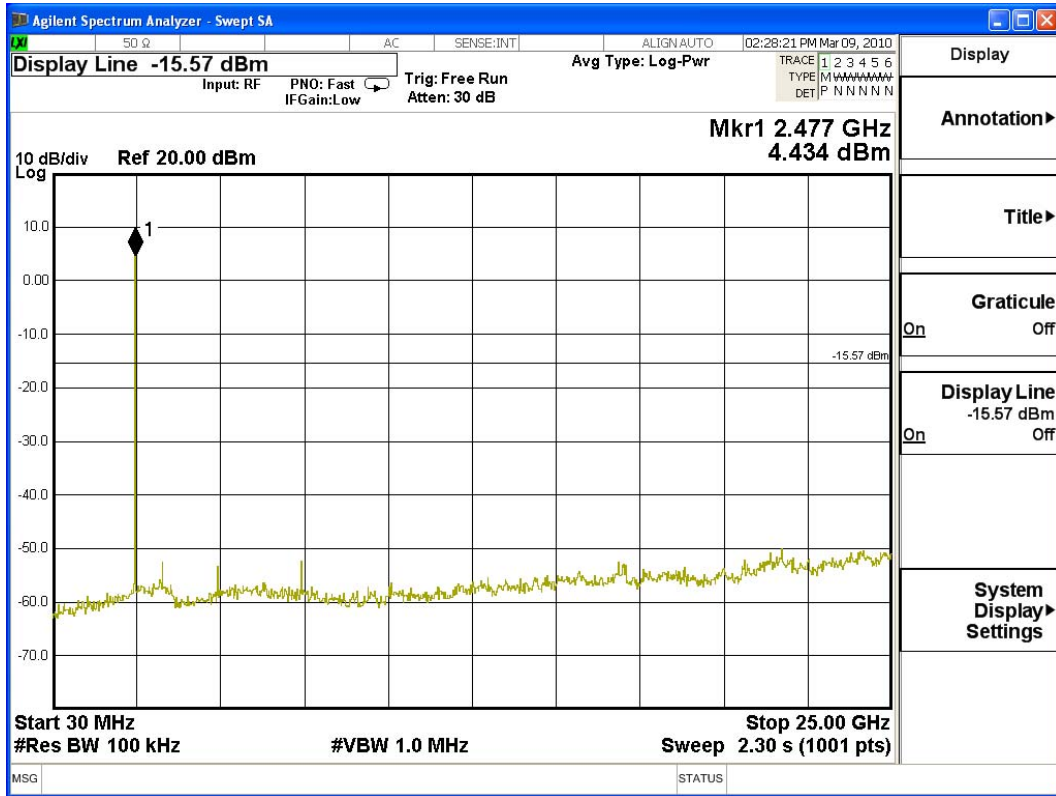
Product : BlueAnt Commute
 Test Item : RF Antenna Conducted Test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)

Figure Channel 39: 30MHz-25GHz



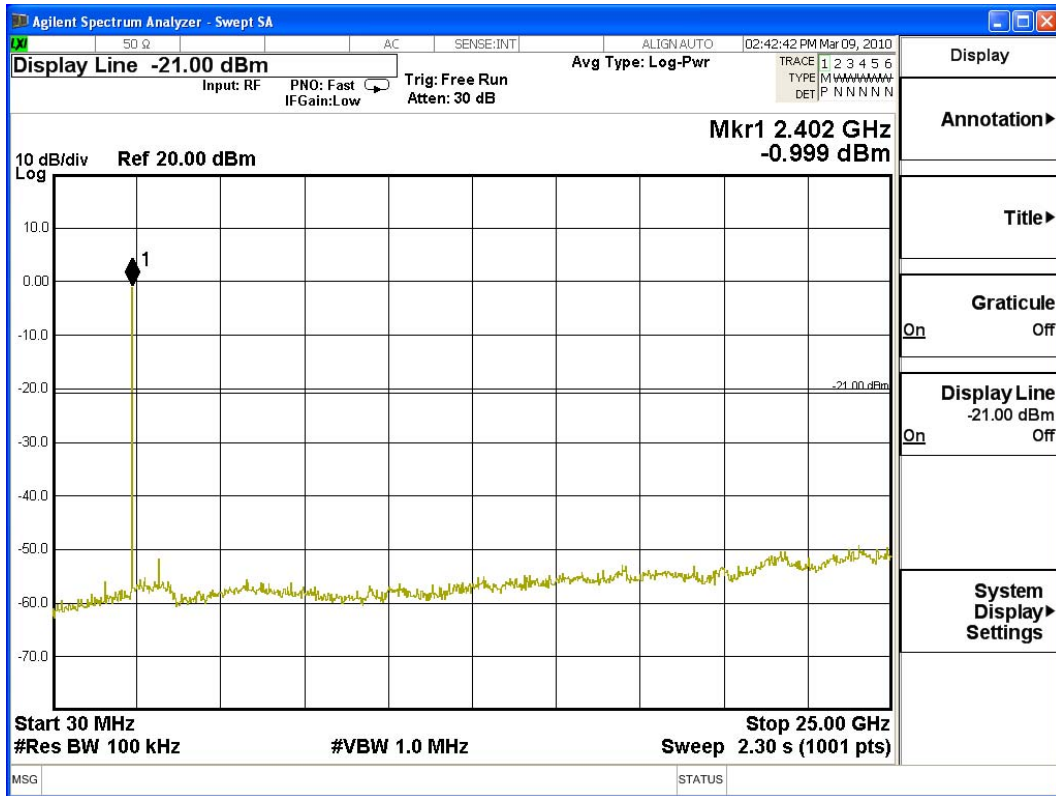
Product : BlueAnt Commute
 Test Item : RF Antenna Conducted Test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)

Figure Channel 78: 30MHz-25GHz



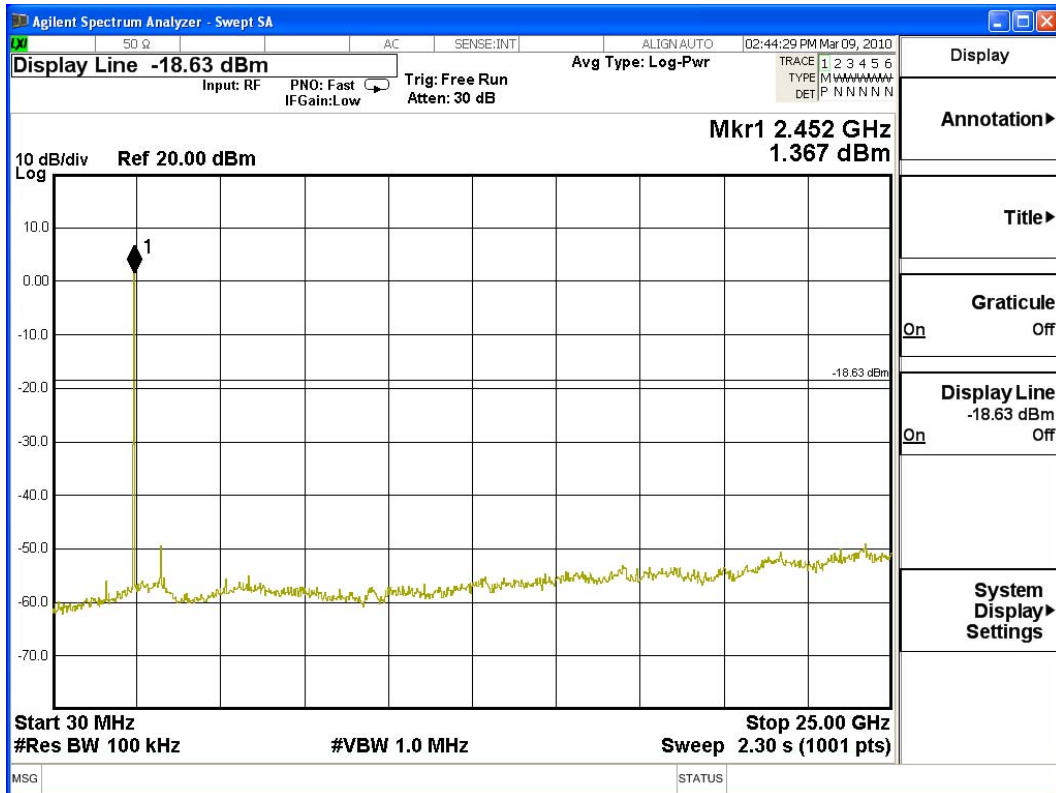
Product : BlueAnt Commute
 Test Item : RF Antenna Conducted Test
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)

Figure Channel 00: 30MHz-25GHz



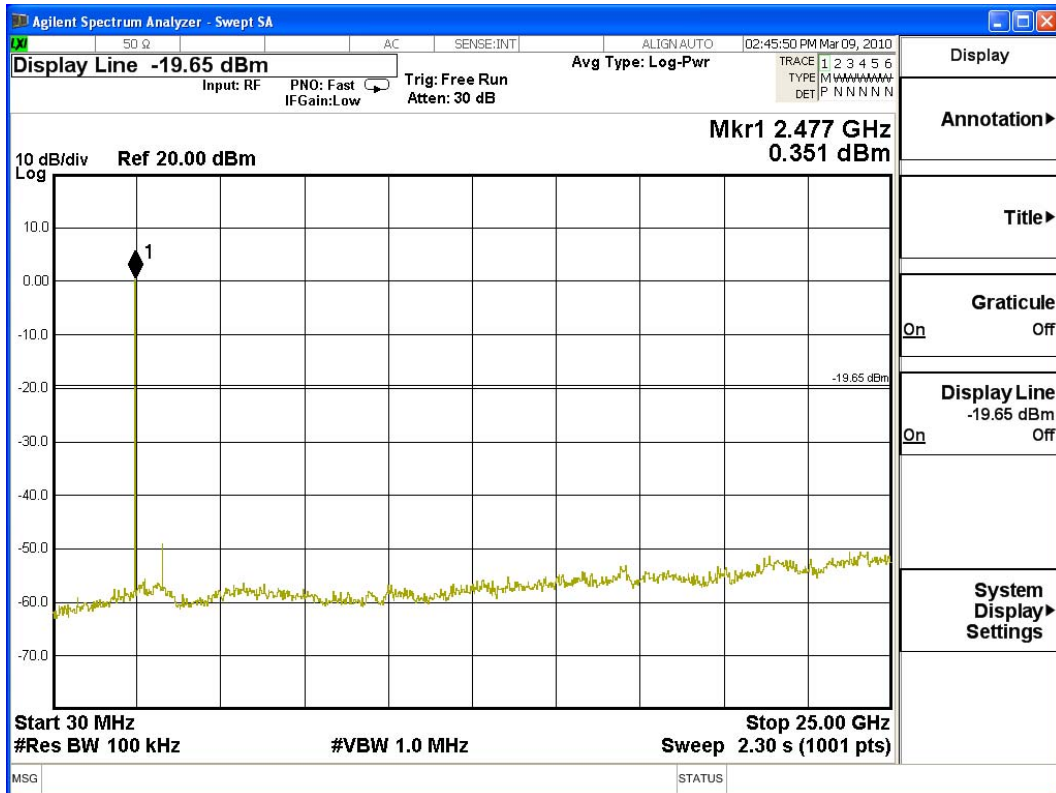
Product : BlueAnt Commute
 Test Item : RF Antenna Conducted Test
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)

Figure Channel 39: 30MHz-25GHz



Product : BlueAnt Commute
 Test Item : RF Antenna Conducted Test
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)

Figure Channel 78: 30MHz-25GHz



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, 2011
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2011
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2012

RF Radiated Measurement:

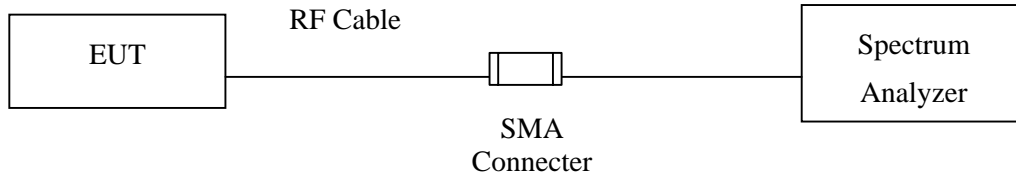
The following test equipments are used during the band edge tests:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2011
	X Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2011
	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2011
	X Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2011
	X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012
	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2011
	X Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2012
	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.

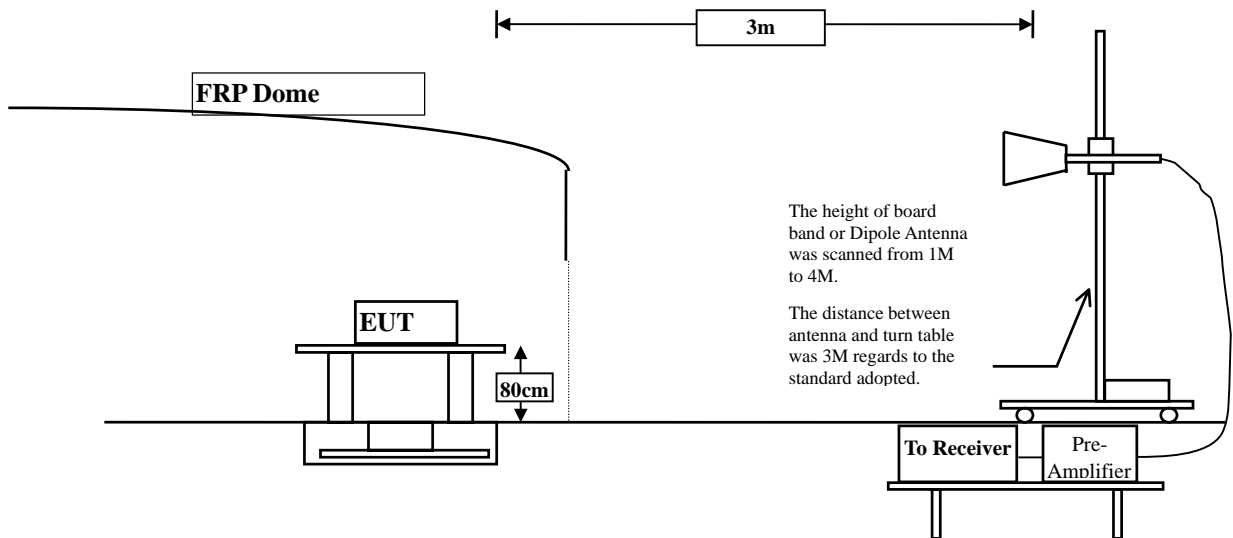
6.2. Test Setup

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 and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 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 can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz. The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

6.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

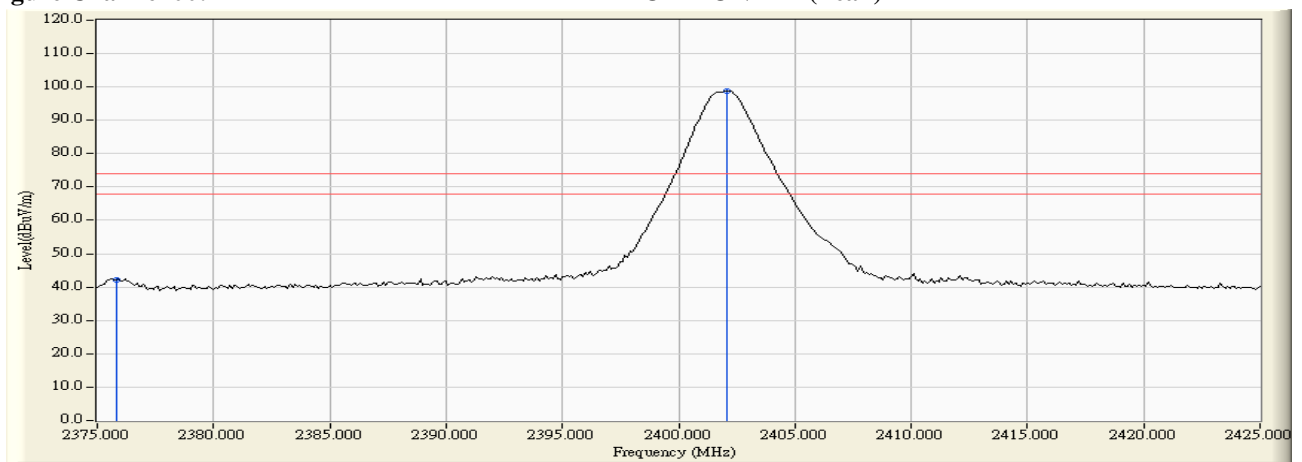
6.6. Test Result of Band Edge

Product : BlueAnt Commute
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2375.800	-6.116	48.394	42.278	74.00	54.00	Pass
00 (Peak)	2402.100	-6.057	104.814	98.757	--	--	--

Figure Channel 00: HORIZONTAL (Peak)



Note:

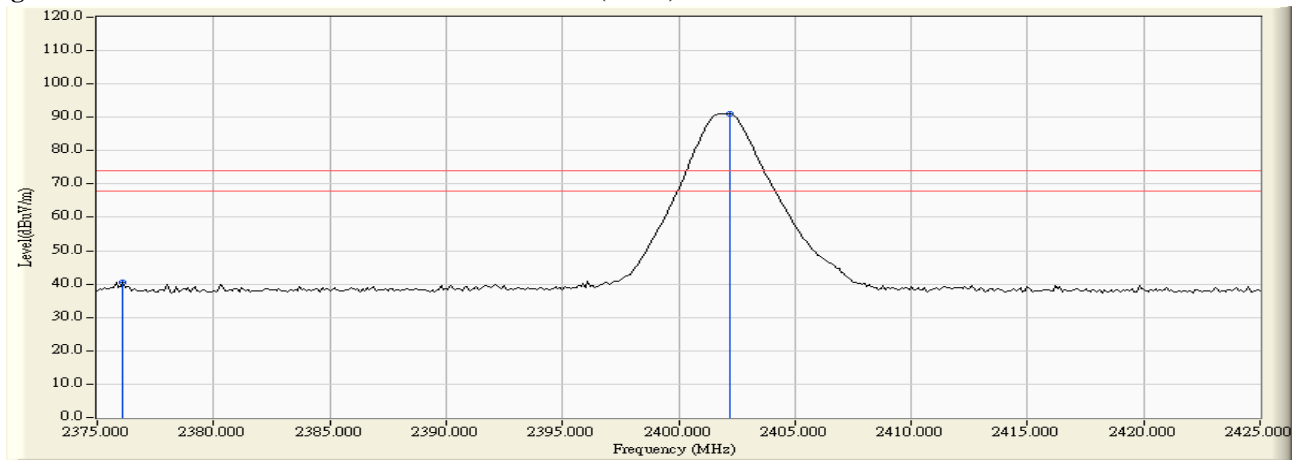
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading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

Product : BlueAnt Commute
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2376.100	-7.479	48.010	40.531	74.00	54.00	Pass
00 (Peak)	2402.200	-7.571	98.678	91.107	--	--	--

Figure Channel 00: Vertical (Peak)



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.
9. Measurement Level = Reading Level + Correct Factor.
10. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : BlueAnt Commute
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78 (Peak)	2483.500	-6.025	63.999	57.974	74.00	54.00	Pass
78 (Average)	2483.500	-6.025	46.671	40.646	74.00	54.00	Pass

Figure Channel 78: HORIZONTAL (Peak)

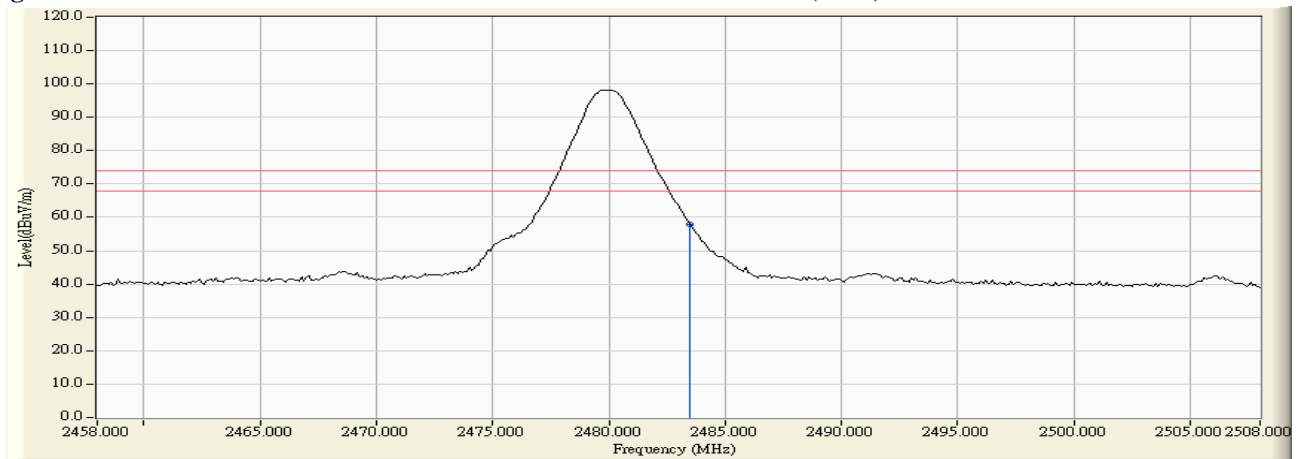
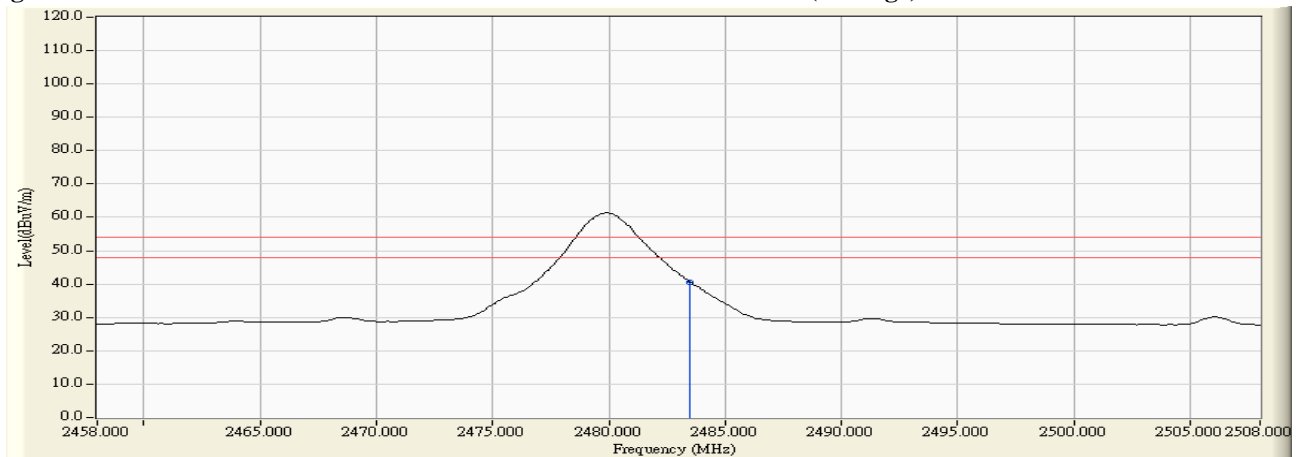


Figure Channel 78: HORIZONTAL (Average)



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 : BlueAnt Commute
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78 (Peak)	2483.500	-7.390	61.815	54.425	74.00	54.00	Pass
78 (Average)	2483.500	-7.390	45.738	38.348	74.00	54.00	Pass

Figure Channel 78: Vertical (Peak)

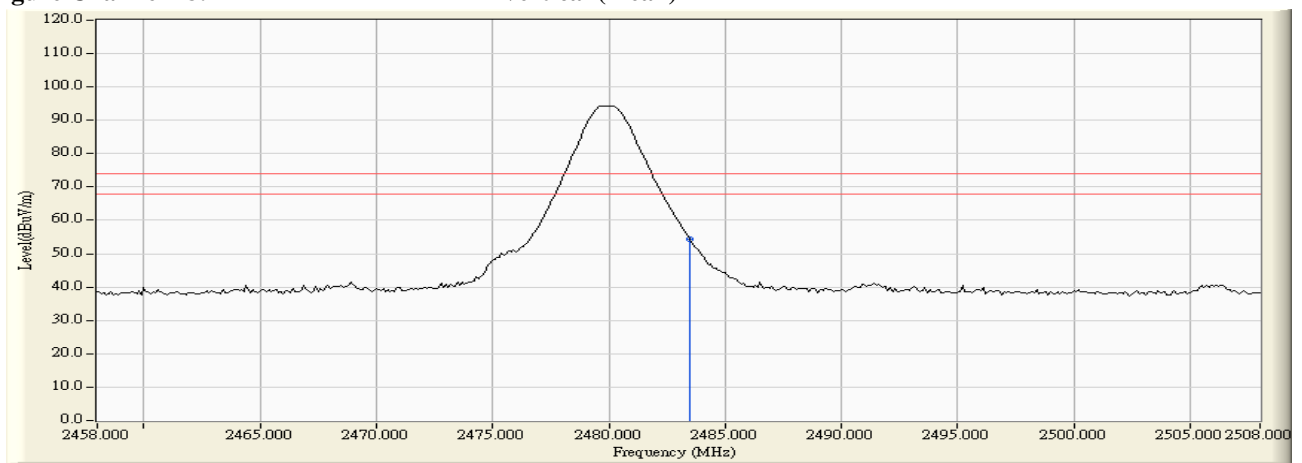
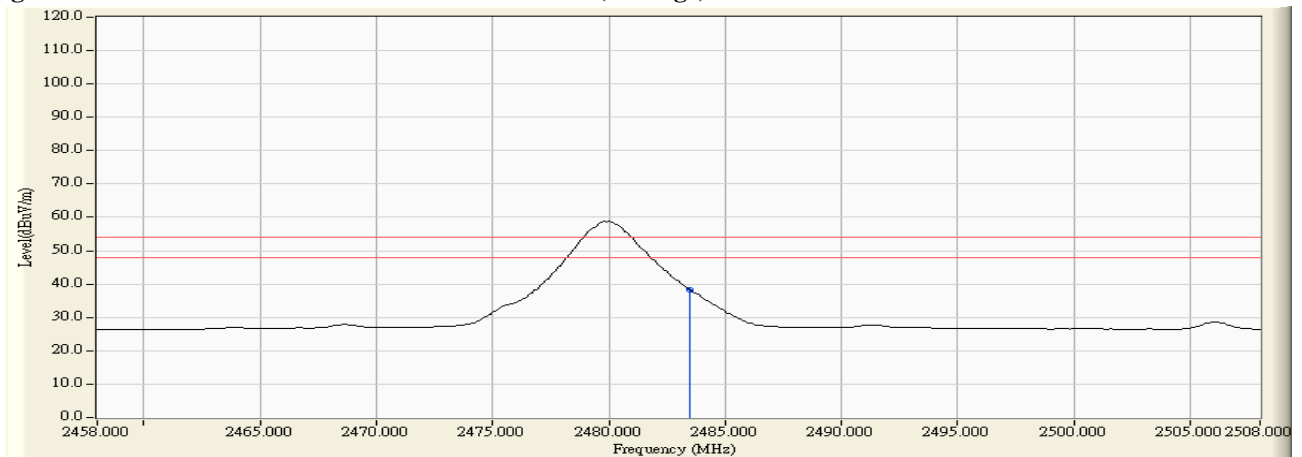


Figure Channel 78: Vertical (Average)



Note:

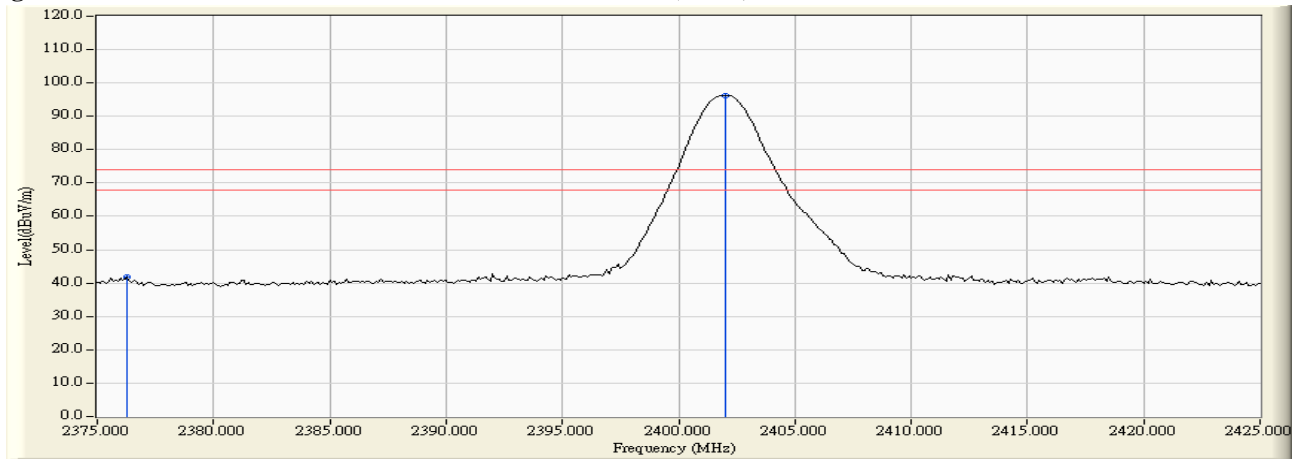
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading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

Product : BlueAnt Commute
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2376.300	-6.115	48.034	41.919	74.00	54.00	Pass
00 (Peak)	2402.000	-6.057	102.398	96.341	--	--	--

Figure Channel 00: Horizontal (Peak)



Note:

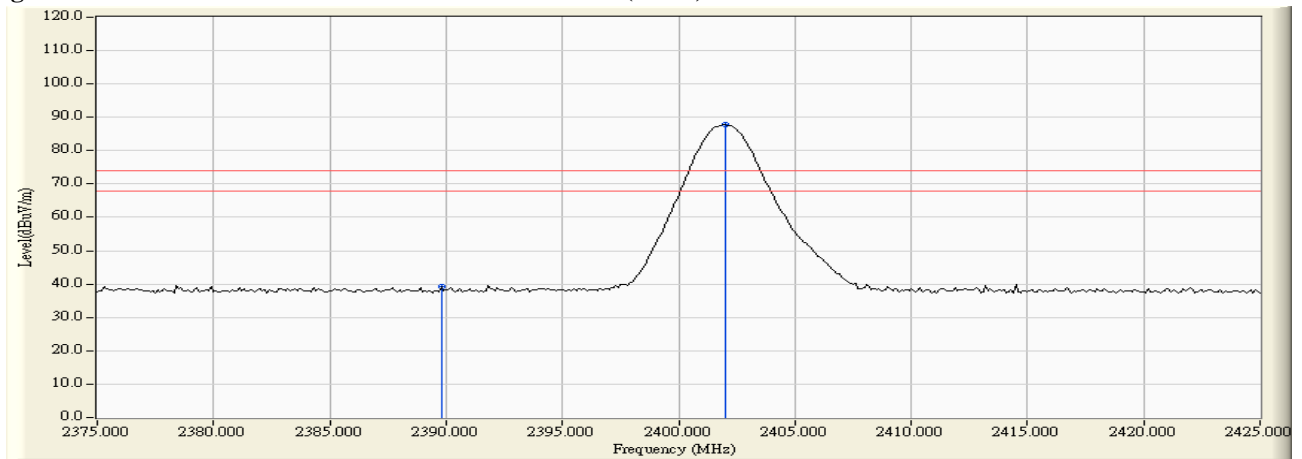
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
9. Measurement Level = Reading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

Product : BlueAnt Commute
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2389.800	-7.545	46.894	39.348	74.00	54.00	Pass
00 (Peak)	2402.000	-7.571	95.311	87.740	--	--	--

Figure Channel 00: Vertical (Peak)



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 : BlueAnt Commute
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78 (Peak)	2483.500	-6.025	64.461	58.436	74.00	54.00	Pass
78 (Average)	2483.500	-6.025	46.403	40.378	74.00	54.00	Pass

Figure Channel 78: Horizontal (Peak)

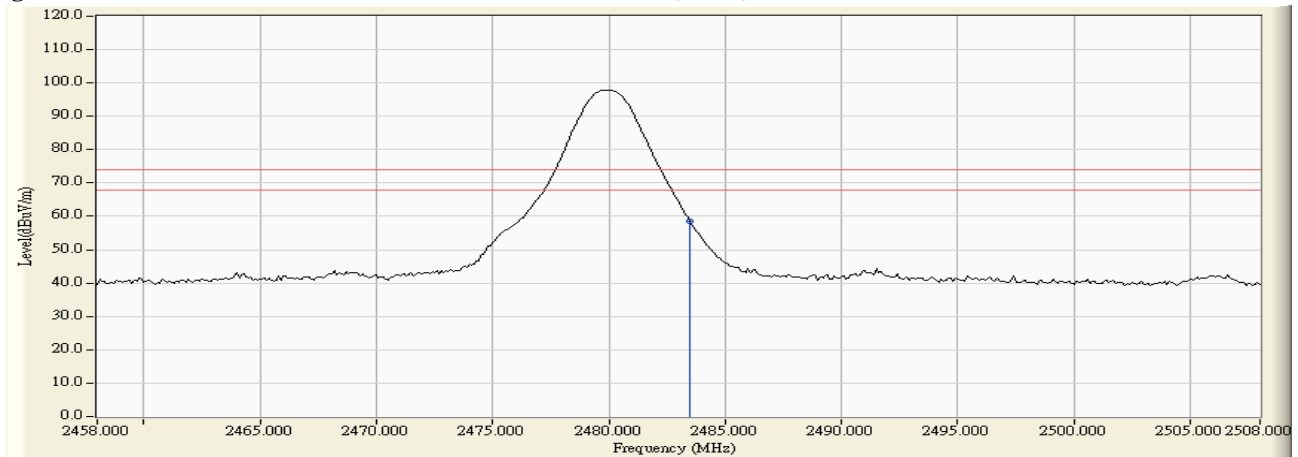
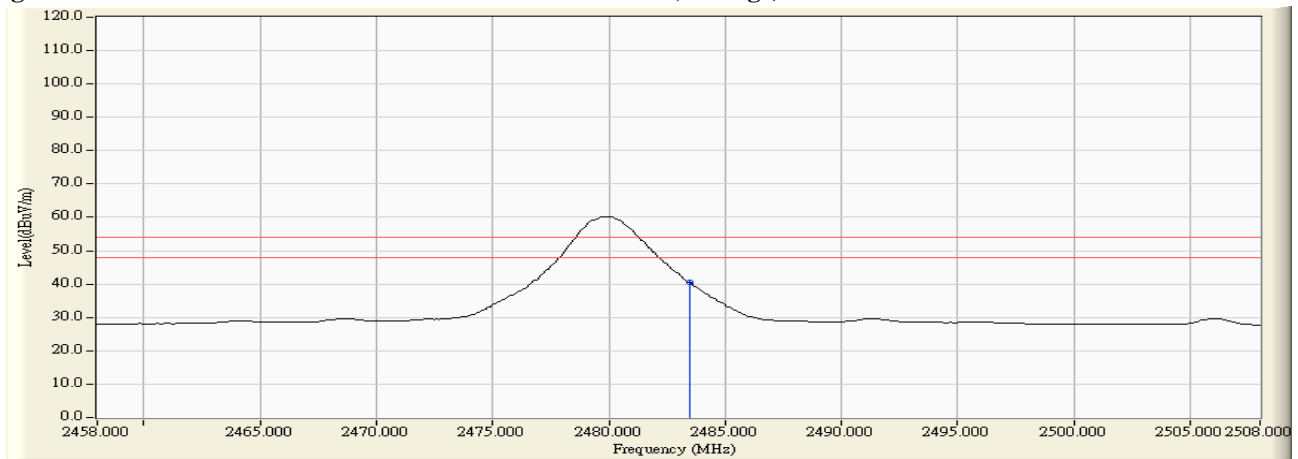


Figure Channel 78: Horizontal (Average)



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 : BlueAnt Commute
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78 (Peak)	2483.500	-7.390	62.097	54.707	74.00	54.00	Pass
78 (Average)	2483.500	-7.390	45.081	37.691	74.00	54.00	Pass

Figure Channel 78: Vertical (Peak)

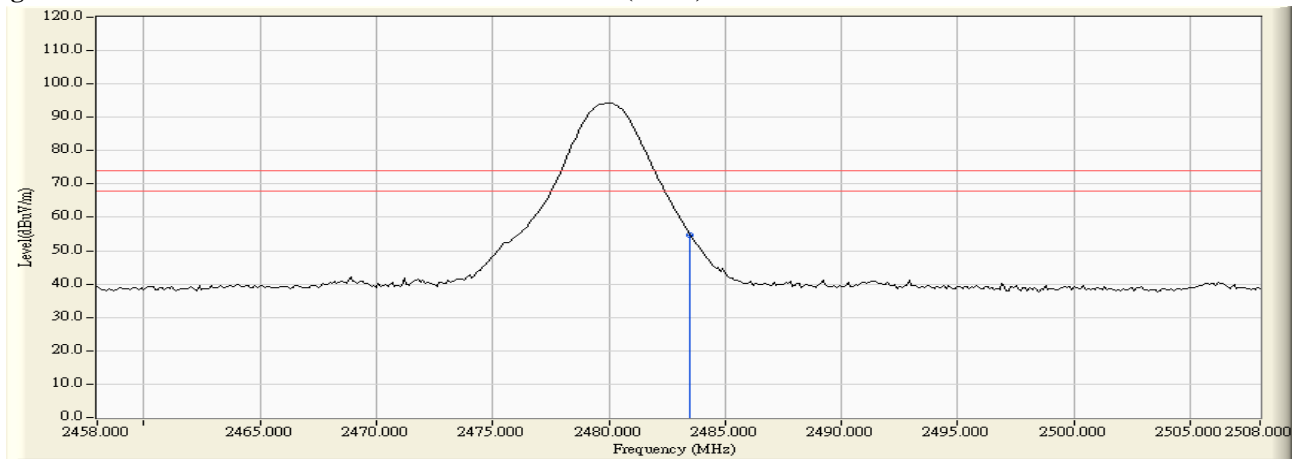
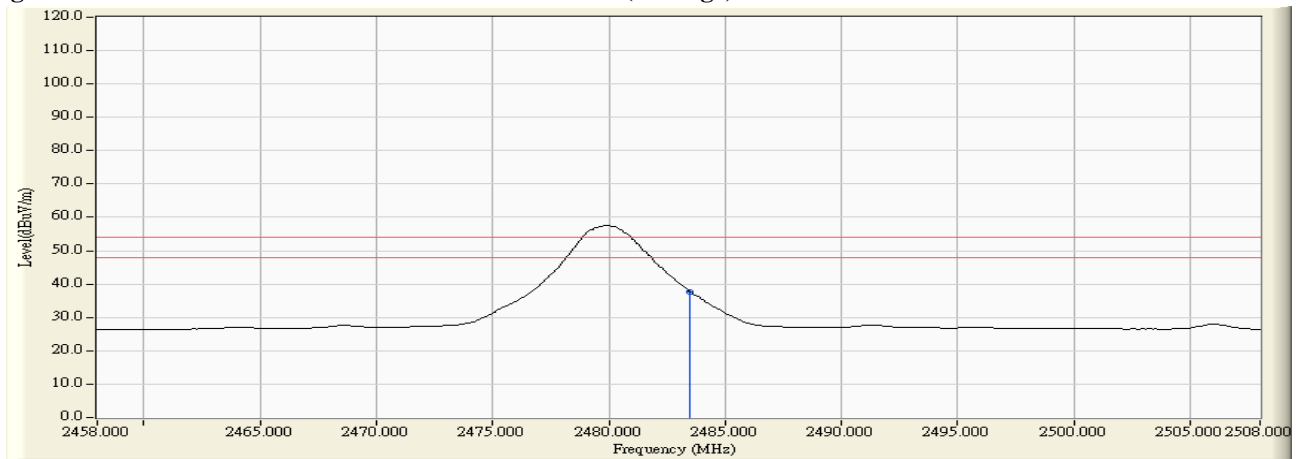


Figure Channel 78: Vertical (Average)



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. Channel Number

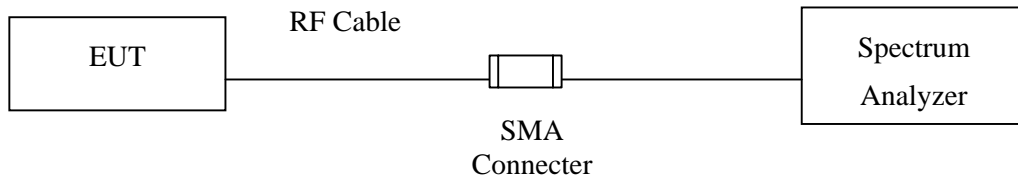
7.1. Test Equipment

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40/ 100339	Jun, 2011
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Jun, 2011
Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012

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

7.2. Test Setup



7.3. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

7.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

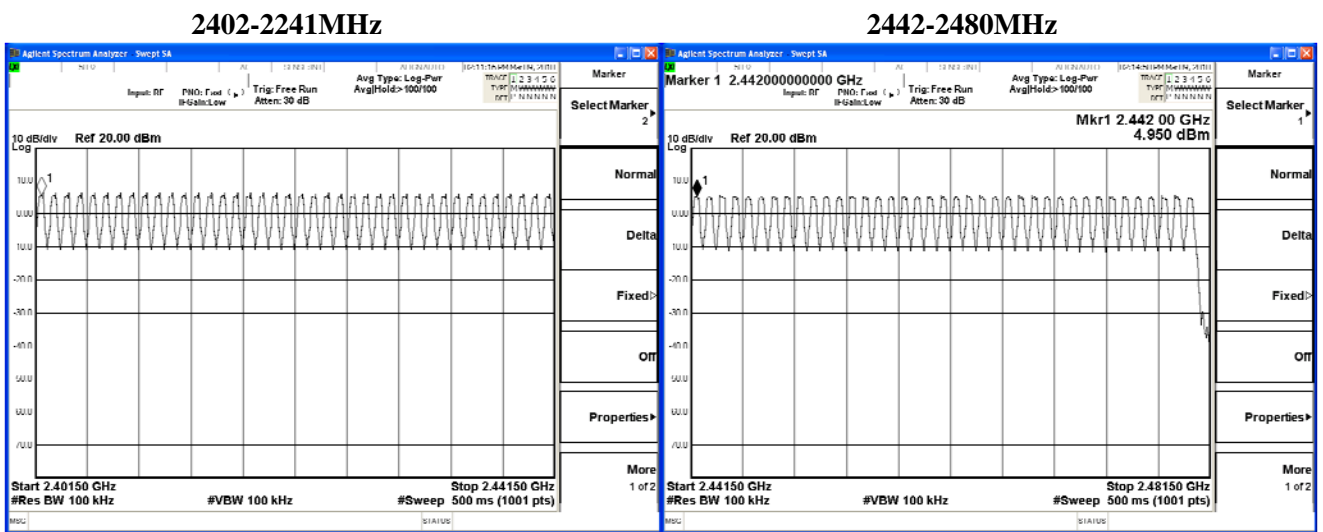
7.5. Uncertainty

N/A

7.6. Test Result of Channel Number

Product : BlueAnt Commute
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)

Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

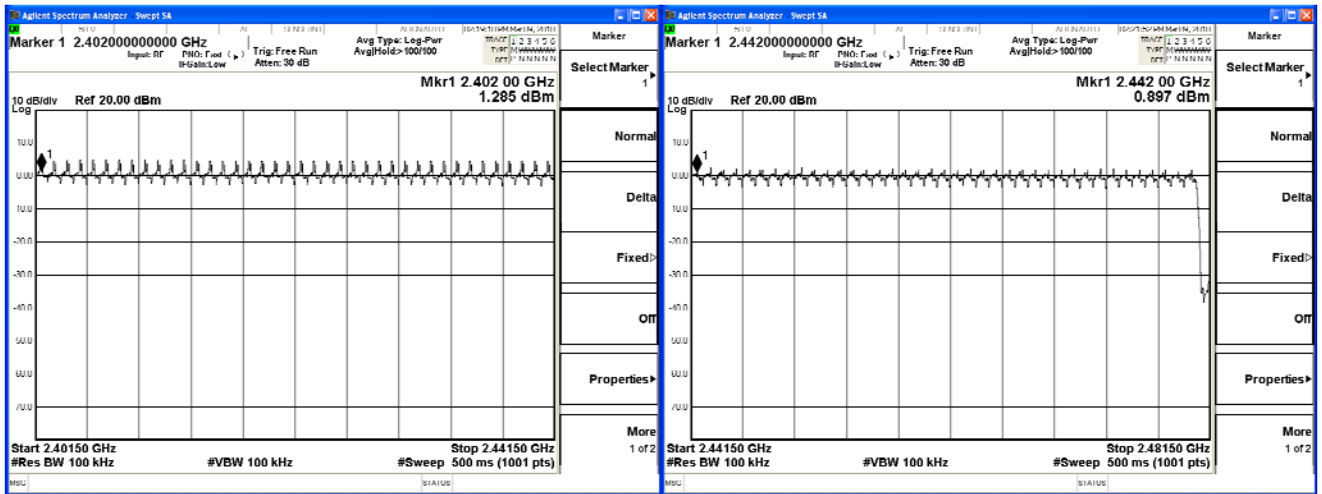


Product : BlueAnt Commute
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)

Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

2402-2241MHz

2442-2480MHz



8. Channel Separation

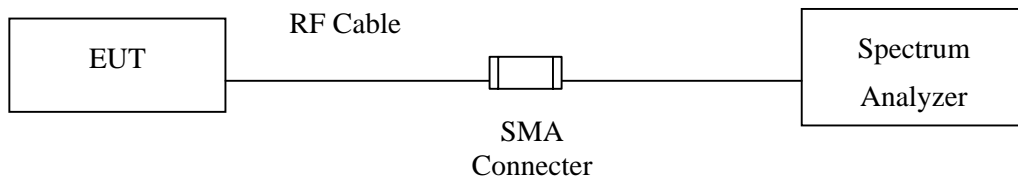
8.1. Test Equipment

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40/ 100339	Jun, 2011
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Jun, 2011
Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012

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

8.2. Test Setup



8.3. Limit

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.

8.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

8.5. Uncertainty

± 150Hz

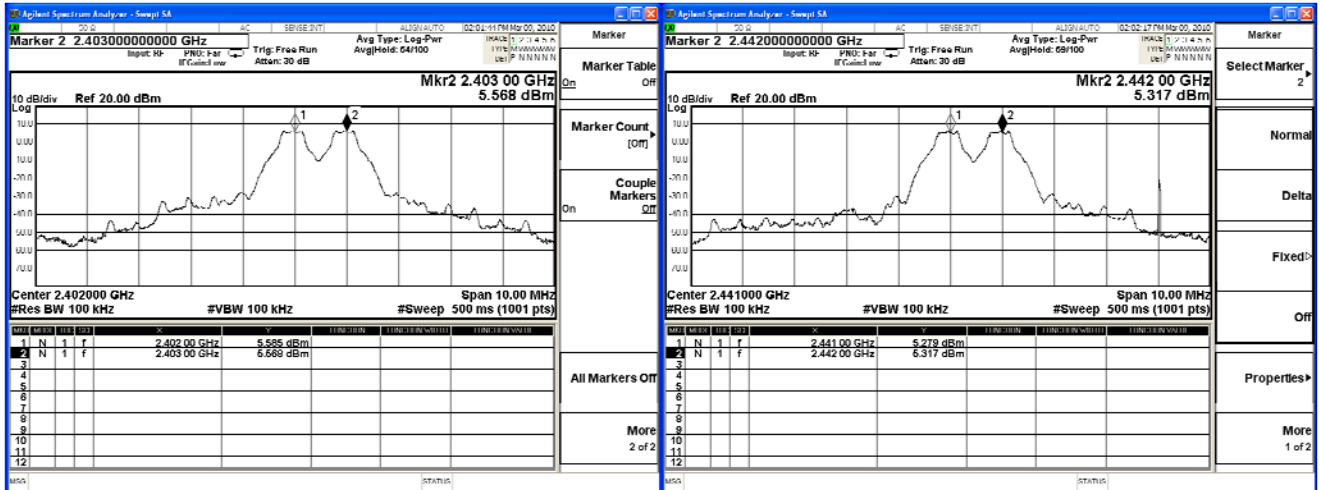
8.6. Test Result of Channel Separation

Product : BlueAnt Commute
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)

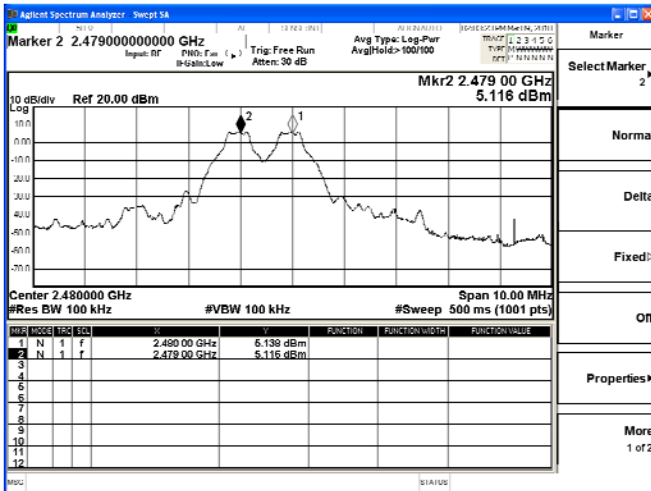
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1000	>25 kHz	740.0	Pass
39	2441	1000	>25 kHz	740.0	Pass
78	2480	1000	>25 kHz	733.3	Pass

Channel 00 2402MHz

Channel 39 2441MHz



Channel 78 2480 MHz

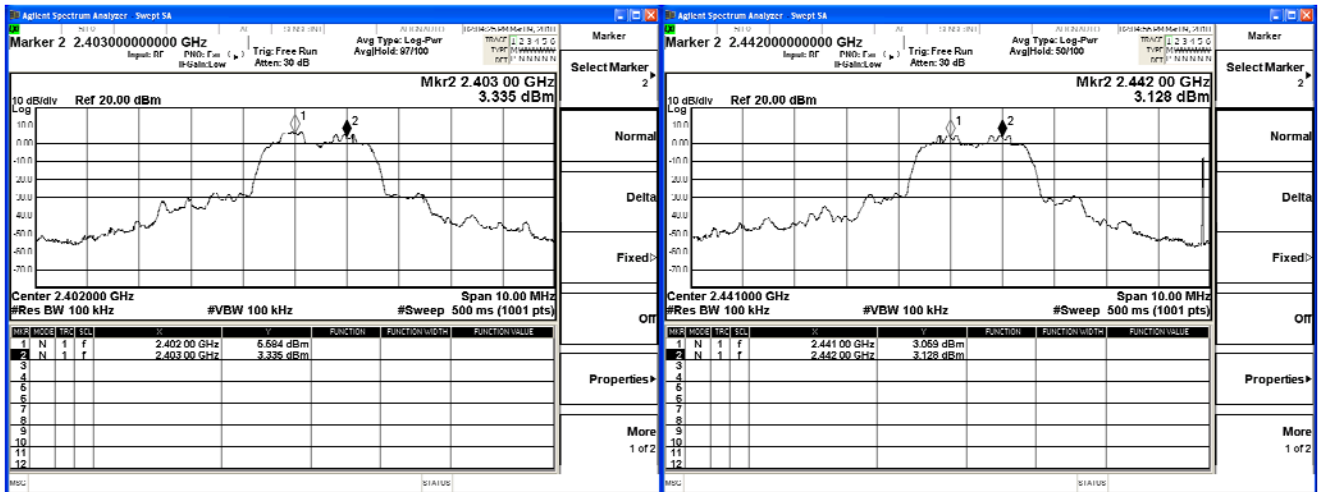


Product : BlueAnt Commute
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)

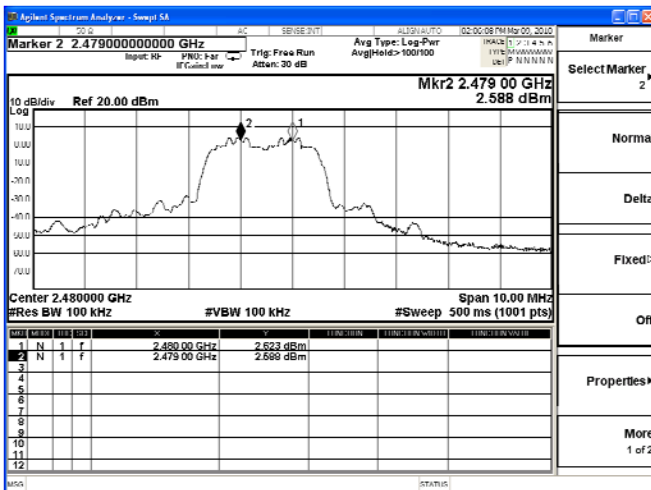
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Limit (kHz)	Limit of (2/3)*20dB Bandwidth (kHz)	Result
00	2402	1000	>25 kHz	900.0	Pass
39	2441	1000	>25 kHz	920.0	Pass
78	2480	1000	>25 kHz	920.0	Pass

Channel 00 2402MHz

Channel 39 2441MHz



Channel 78 2480 MHz



9. Dwell Time

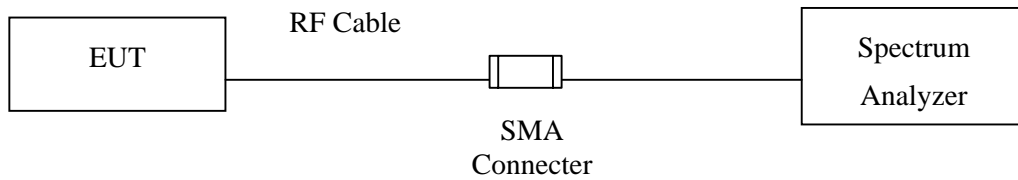
9.1. Test Equipment

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40/ 100339	Jun, 2011
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Jun, 2011
	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012

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

9.2. Test Setup



9.3. Limit

The dwell time shall be the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

9.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

9.5. Uncertainty

± 25msec

9.6. Test Result of Dwell Time

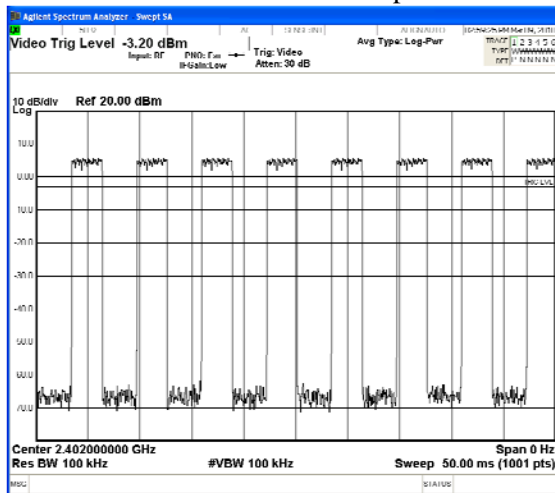
Product : BlueAnt Commute
 Test Item : Dwell Time
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.980	8	50	0.48	0.191	0.4	Pass
2441	2.980	8	50	0.48	0.191	0.4	Pass
2480	2.980	8	50	0.48	0.191	0.4	Pass

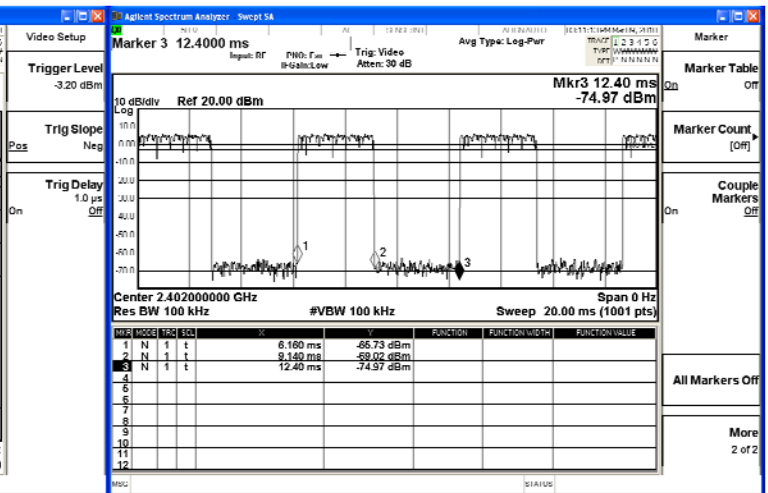
Duty cycle = ((Time slot length(ms)*Hopping of Number) / Sweep time (ms))

Dwell time = (Duty cycle /79) * (79*0.4)

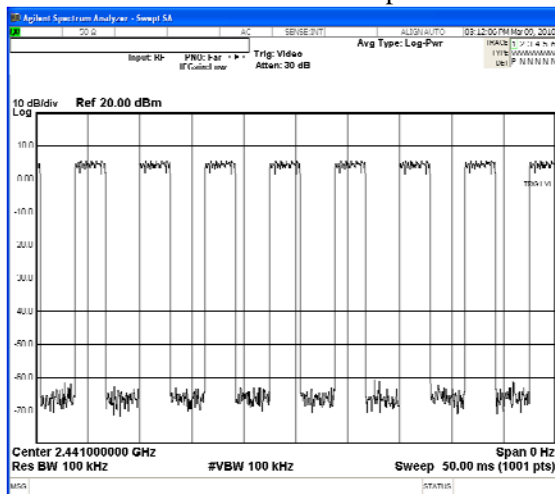
CH 00 Time Interval between hops



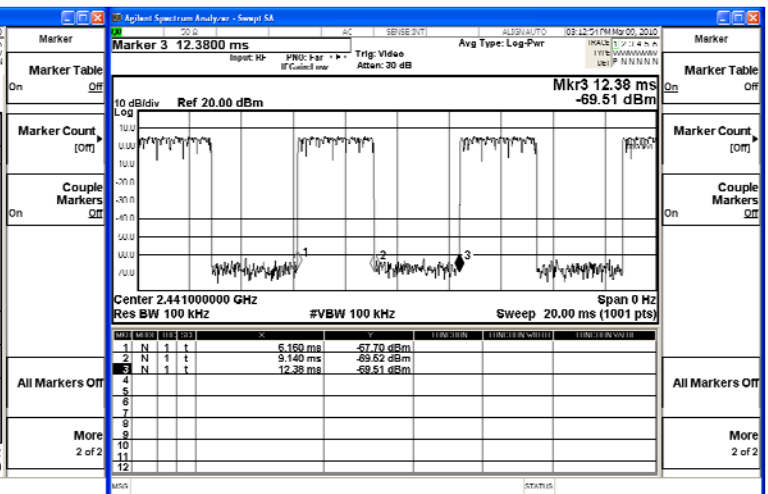
CH 00 Transmission Time



CH39 Time Interval between hops

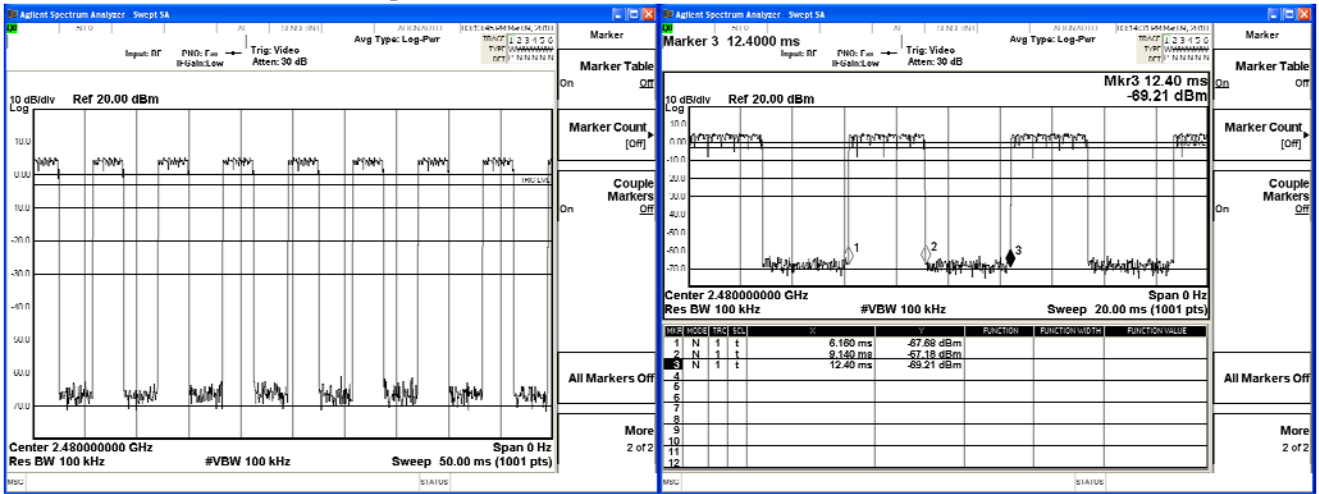


CH 39 Transmission Time



CH 78 Time Interval between hops

CH 78 Transmission Time



Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

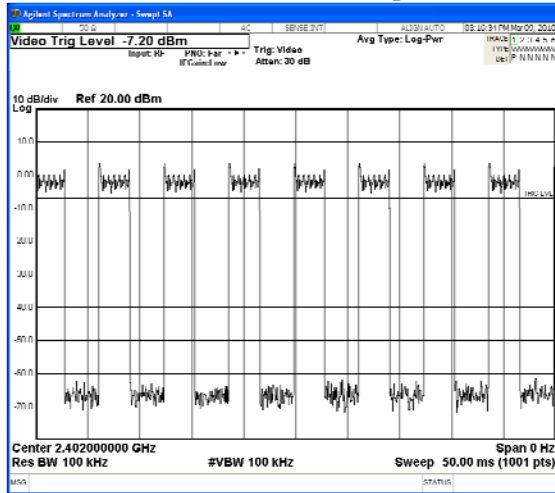
Product : BlueAnt Commute
 Test Item : Dwell Time
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
2402	2.980	8	50	0.48	0.191	0.4	Pass
2441	2.980	8	50	0.48	0.191	0.4	Pass
2480	2.980	8	50	0.48	0.191	0.4	Pass

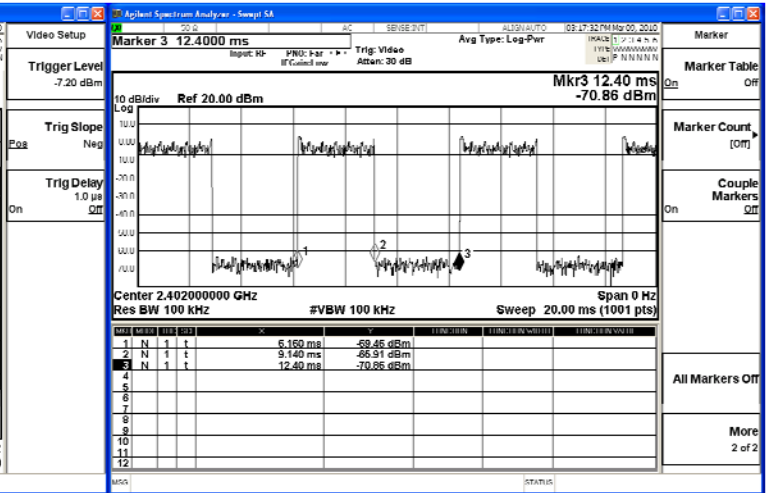
Duty cycle = ((Time slot length(ms)*Hopping of Number) / Sweep time (ms))

Dwell time = (Duty cycle /79) * (79*0.4)

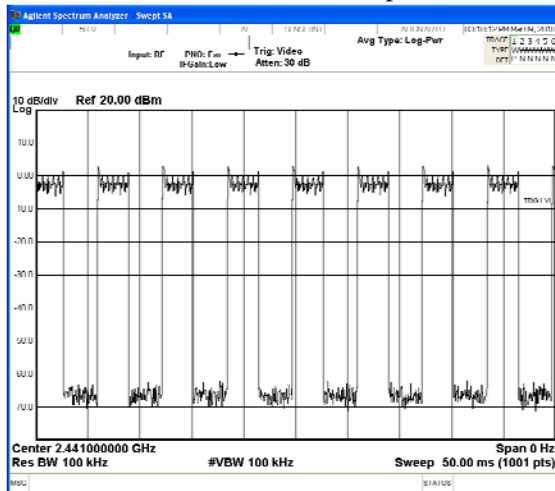
CH 00 Time Interval between hops



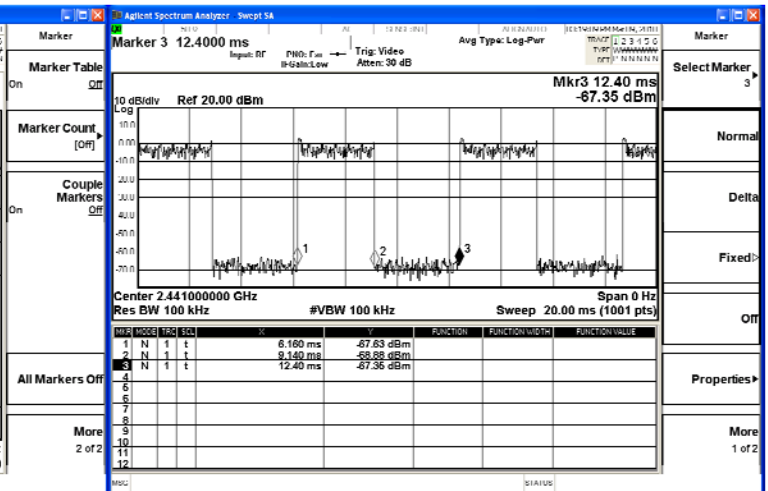
CH 00 Transmission Time



CH39 Time Interval between hops

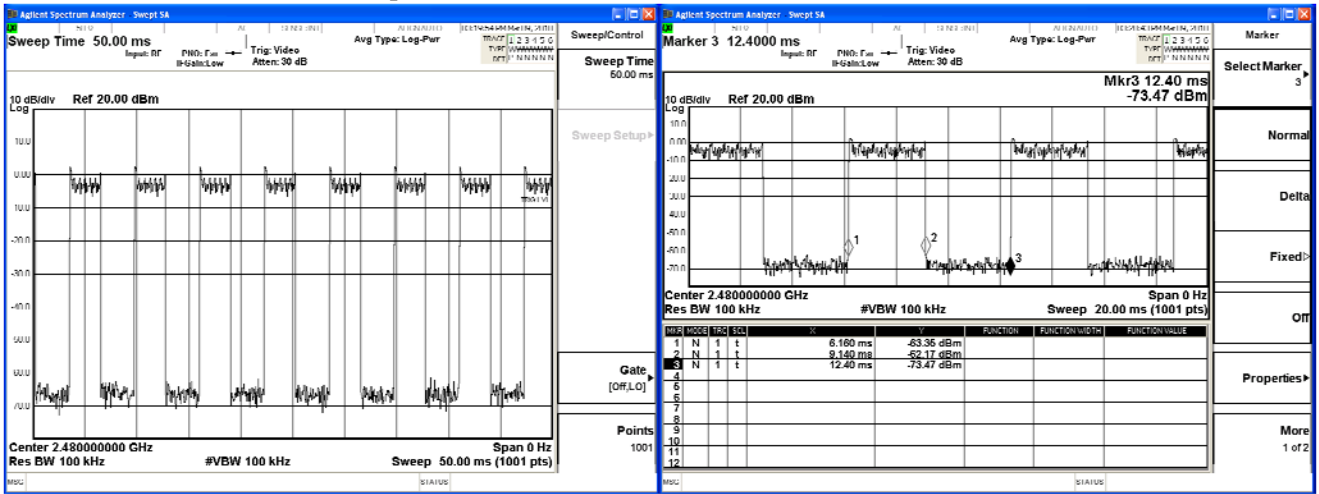


CH 39 Transmission Time



CH 78 Time Interval between hops

CH 78 Transmission Time



Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

10. Occupied Bandwidth

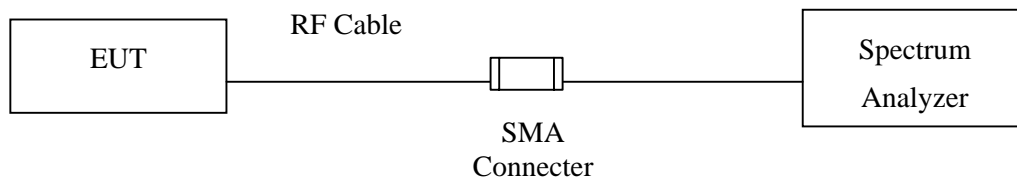
10.1. Test Equipment

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

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40/ 100339	Jun, 2011
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Jun, 2011
Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2012

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

10.2. Test Setup



10.3. Limits

N/A

10.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

10.5. Uncertainty

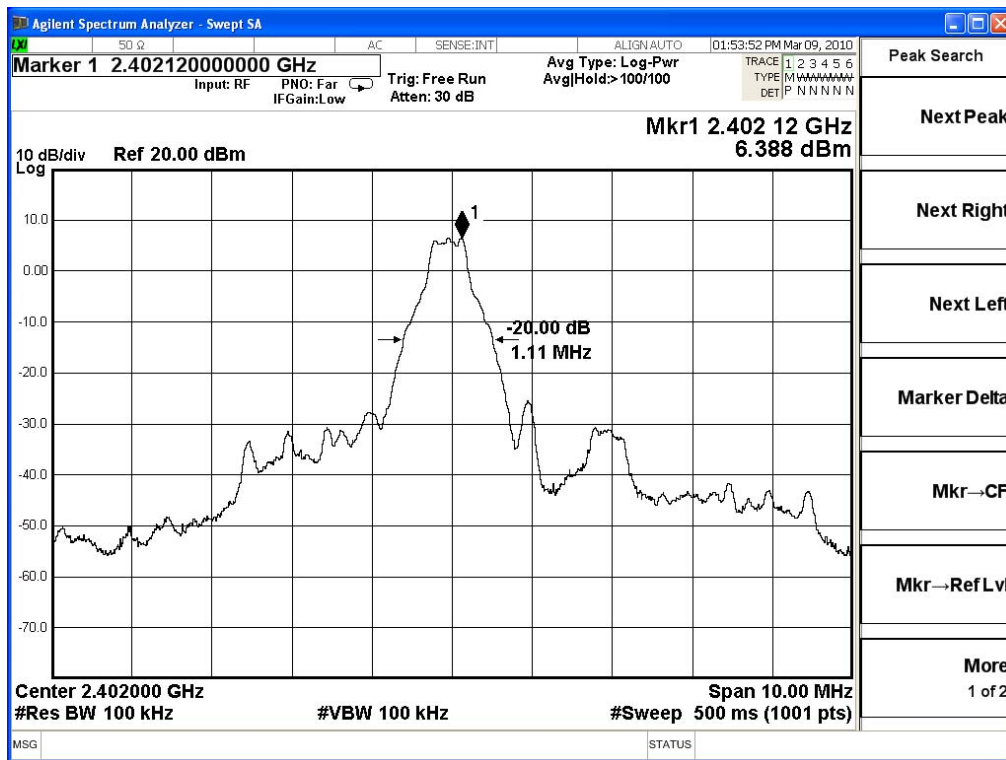
± 150Hz

10.6. Test Result of Occupied Bandwidth

Product : BlueAnt Commute
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)(2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1110	--	NA

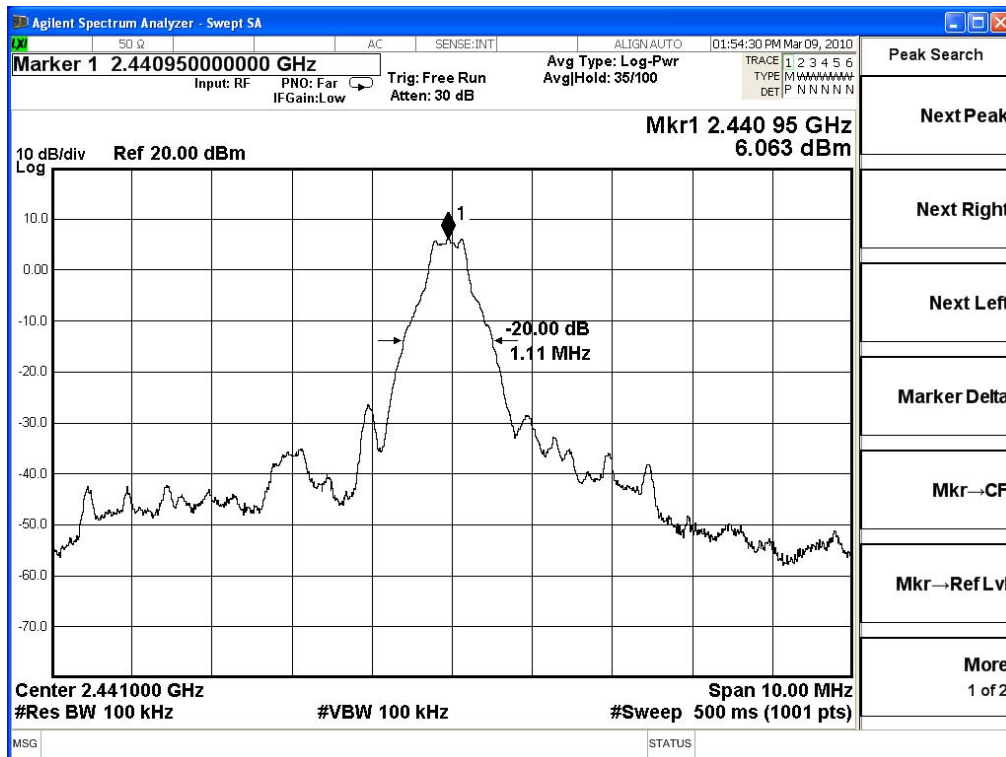
Figure Channel 00:



Product : BlueAnt Commute
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)(2441MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2441	1110	--	NA

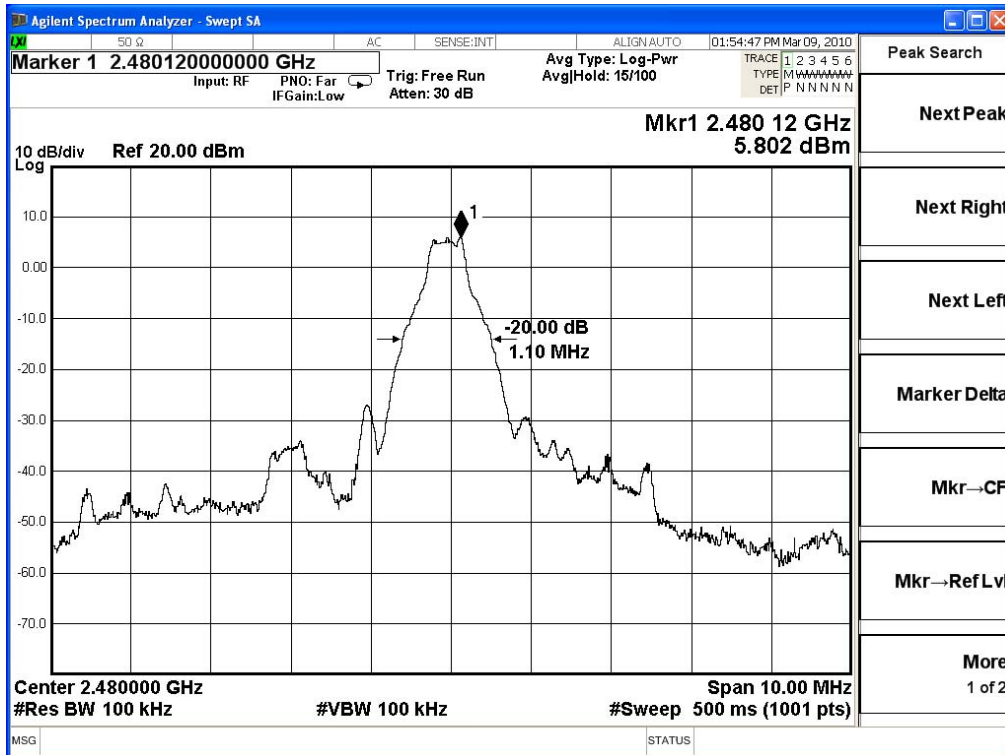
Figure Channel 39:



Product : BlueAnt Commute
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter - 1Mbps (GFSK)(2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
78	2480	1100	--	NA

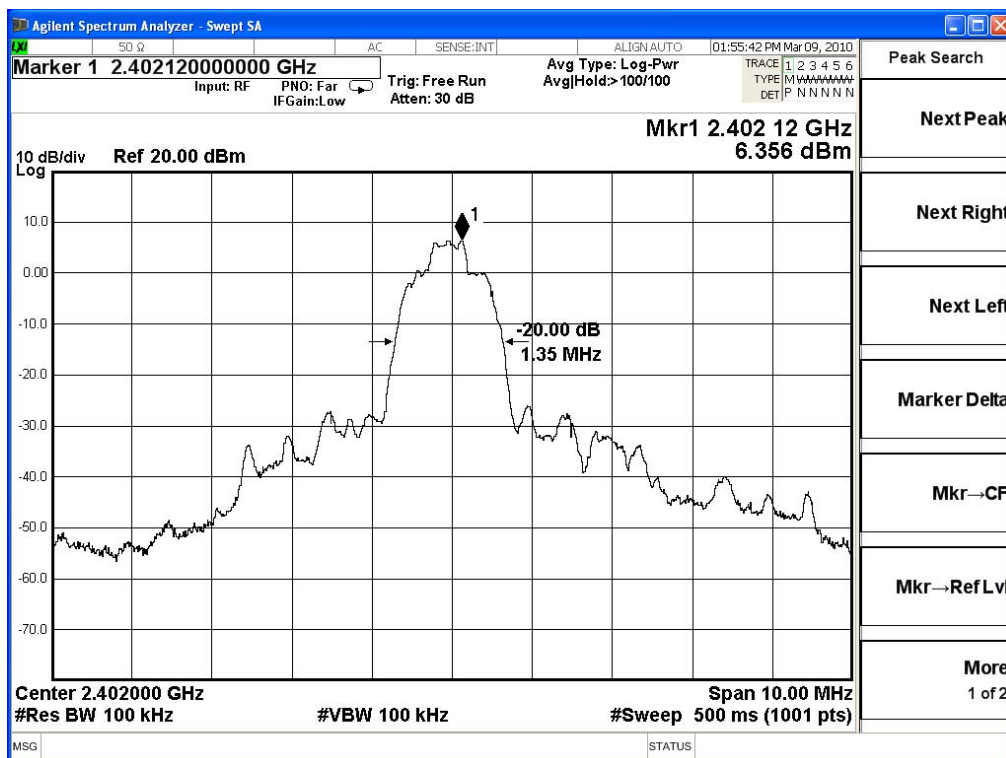
Figure Channel 78:



Product : BlueAnt Commute
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1350	--	NA

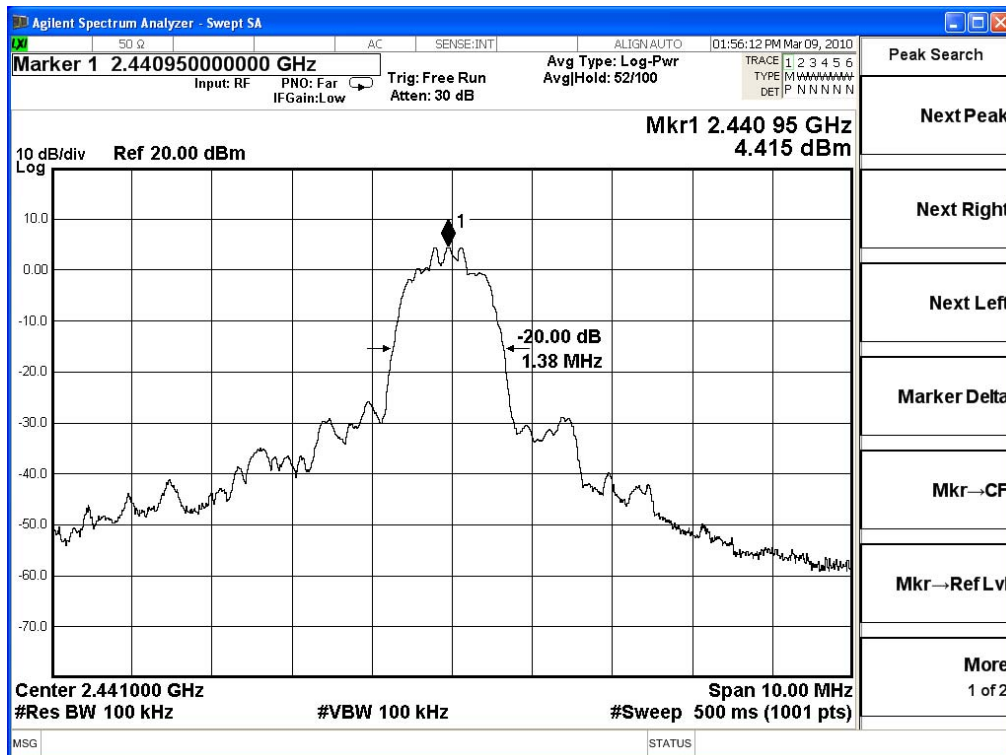
Figure Channel 00:



Product : BlueAnt Commute
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK) (2441MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2441	1380	--	NA

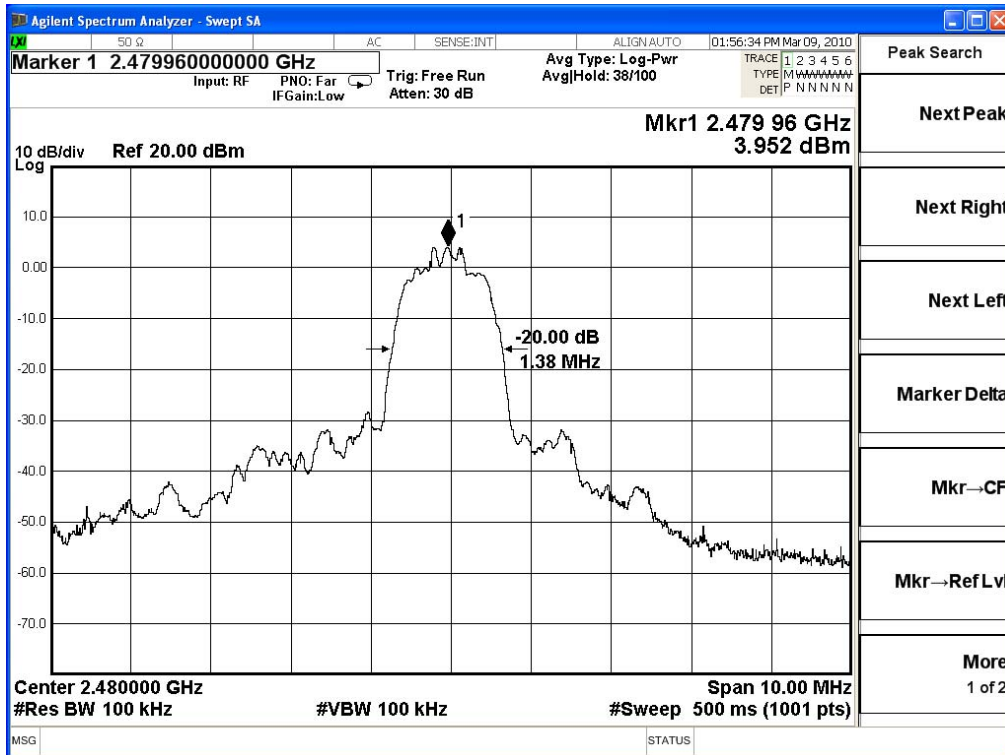
Figure Channel 39:



Product : BlueAnt Commute
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter - 3Mbps (8DPSK)(2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
78	2480	1380	--	NA

Figure Channel 78:



11. EMI Reduction Method During Compliance Testing

No modification was made during testing.