

# FC

## Test Report

Product Name	T2 ENDURE
Model No.	T2
FCC ID.	VHFBLUEANTT2

Applicant	BlueAnt Wireless
Address	Level 4, Building 1, 658 Church St, Richmond VIC 3121, Australia

Date of Receipt	March 13, 2012
Issued Date	March 16, 2012
Report No.	123211R-RFUSP29V01
Report Version	V1.0



The Test Results relate only to the samples tested.  
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 This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

# Test Report Certification

Issued Date: March 16, 2012

Report No.: 123211R-RFUSP29V01



Product Name	T2 ENDURE
Applicant	BlueAnt Wireless
Address	Level 4, Building 1, 658 Church St, Richmond VIC 3121, Australia
Manufacturer	DONG GUAN G-COM COMPUTER CO., LTD.
Model No.	T2
FCC ID.	VHFBLUEANTT2
EUT Rated Voltage	AC 100-240V, 50-60Hz
EUT Test Voltage	AC 120V/ 60Hz
Trade Name	BlueAnt T2 ENDURE
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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## TABLE OF CONTENTS

Description	Page
<b>1. GENERAL INFORMATION .....</b>	<b>5</b>
1.1. EUT Description.....	5
1.2. Operational Description.....	7
1.3. Tested System Details.....	8
1.4. Configuration of Tested System .....	8
1.5. EUT Exercise Software .....	9
1.6. Test Facility .....	10
<b>2. CONDUCTED EMISSION .....</b>	<b>11</b>
2.1. Test Equipment.....	11
2.2. Test Setup .....	11
2.3. Limits.....	12
2.4. Test Procedure .....	12
2.5. Uncertainty .....	12
2.6. Test Result of Conducted Emission.....	13
<b>3. PEAK POWER OUTPUT .....</b>	<b>15</b>
3.1. Test Equipment.....	15
3.2. Test Setup .....	15
3.3. Limit .....	15
3.4. Test Procedure .....	15
3.5. Uncertainty .....	15
3.6. Test Result of Peak Power Output.....	16
<b>4. RADIATED EMISSION .....</b>	<b>18</b>
4.1. Test Equipment.....	18
4.2. Test Setup .....	18
4.3. Limits.....	19
4.4. Test Procedure .....	20
4.5. Uncertainty .....	20
4.6. Test Result of Radiated Emission.....	21
<b>5. RF ANTENNA CONDUCTED TEST .....</b>	<b>29</b>
5.1. Test Equipment.....	29
5.2. Test Setup .....	29
5.3. Limits.....	29
5.4. Test Procedure .....	29
5.5. Uncertainty .....	29
5.6. Test Result of RF Antenna Conducted Test.....	30
<b>6. BAND EDGE .....</b>	<b>42</b>
6.1. Test Equipment.....	42
6.2. Test Setup .....	43
6.3. Limit .....	44
6.4. Test Procedure .....	44
6.5. Uncertainty .....	44

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6.6.	Test Result of Band Edge .....	45
<b>7.</b>	<b>CHANNEL NUMBER.....</b>	<b>53</b>
7.1.	Test Equipment .....	53
7.2.	Test Setup .....	53
7.3.	Limit .....	53
7.4.	Test Procedure .....	53
7.5.	Uncertainty .....	53
7.6.	Test Result of Channel Number.....	54
<b>8.</b>	<b>CHANNEL SEPARATION.....</b>	<b>56</b>
8.1.	Test Equipment .....	56
8.2.	Test Setup .....	56
8.3.	Limit .....	56
8.4.	Test Procedure .....	56
8.5.	Uncertainty .....	56
8.6.	Test Result of Channel Separation.....	57
<b>9.</b>	<b>DWELL TIME.....</b>	<b>61</b>
9.1.	Test Equipment .....	61
9.2.	Test Setup .....	61
9.3.	Limit .....	61
9.4.	Test Procedure .....	61
9.5.	Uncertainty .....	61
9.6.	Test Result of Dwell Time .....	62
<b>10.</b>	<b>OCCUPIED BANDWIDTH .....</b>	<b>66</b>
10.1.	Test Equipment .....	66
10.2.	Test Setup .....	66
10.3.	Limits.....	66
10.4.	Test Procedure .....	66
10.5.	Uncertainty .....	66
10.6.	Test Result of Occupied Bandwidth .....	67
<b>11.</b>	<b>EMI REDUCTION METHOD DURING COMPLIANCE TESTING .....</b>	<b>73</b>

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	T2 ENDURE
Trade Name	BlueAnt T2 ENDURE
Model No.	T2
FCC ID.	VHFBLUEANTT2
Frequency Range	2402 – 2480MHz
Channel Number	79
Type of Modulation	FHSS: GFSK(1Mbps) / $\pi$ /4DQPSK(2Mbps) / 8DPSK(3Mbps)
Antenna Type	PIFA Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
Power Adapter (1)	MFR: SIL, M/N: SSC-5W-05 050050 (0112) Input: 100-240V, 50-60Hz, 0.2A Output: DC 5V $\overline{=}$ 500mA
Power Adapter (2)	MFR: SIL, M/N: SSC-5W-05 050050 (3210) Input: 100-240V, 50-60Hz, 0.2A Output: DC 5V $\overline{=}$ 500mA
Car Charger	MFR: SIL, M/N: SIL-050050B-CLA Input: 12VDC/24VDC Output: DC 5V $\overline{=}$ 500mA
USB CABLE (1)	Non-Shielded, 0.5m
USB CABLE (2)	Non-Shielded, 0.5m (have brand Mark)

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Soarcomm	3010000242S7	PIFA Antenna	0 dBi for 2.4 GHz

Note:

- The antenna of EUT is conform to FCC 15.203.

## 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 T2 ENDURE 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.

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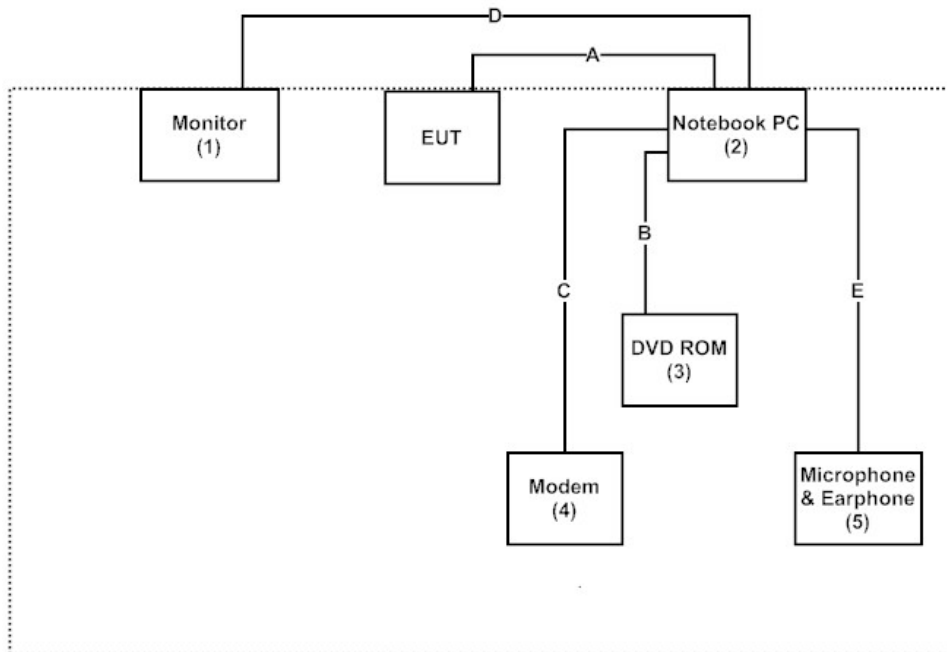
### 1.3. Tested System Details

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

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Monitor	LG	W2261VT	907YHZK07373	Non-Shielded, 1.8m
2	Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m
3	DVD ROM	DELL	PP01S	N/A	N/A
4	Modem	ACEEX	DM-1414	0102027536	Non-Shielded, 1.8m
5	Microphone & Earphone	PCHOME	N/A	N/A	N/A

Signal Cable Type	Signal cable Description
A	USB Cable Non-Shielded, 0.5m
B	USB Cable Non-Shielded, 0.5m
C	Modem Cable Shielded, 1.0m
D	D-SUB Cable Shielded, 1.8m, with two ferrite cores bonded.
E	Microphone & Earphone Cable Non-Shielded, 1.5m

### 1.4. Configuration of Tested System



## 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Into the engineering mode, to connect the notebook via usb cable.
- (3) Execute software on the Notebook.
- (4) Configure the test mode, the test channel, and the data rate.
- (5) Press “OK” to start the continuous Transmit.
- (6) 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/tw/ctg/cts/accreditations.htm>  
 The address and introduction of Quietek Corporation's laboratories can be founded in our Web site: <http://www.quietek.com/>

Site Description: File on  
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 Registration Number: 92195

Accreditation on NVLAP  
 NVLAP Lab Code: 200533-0

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FCC Accreditation Number: TW1014

## 2. Conducted Emission

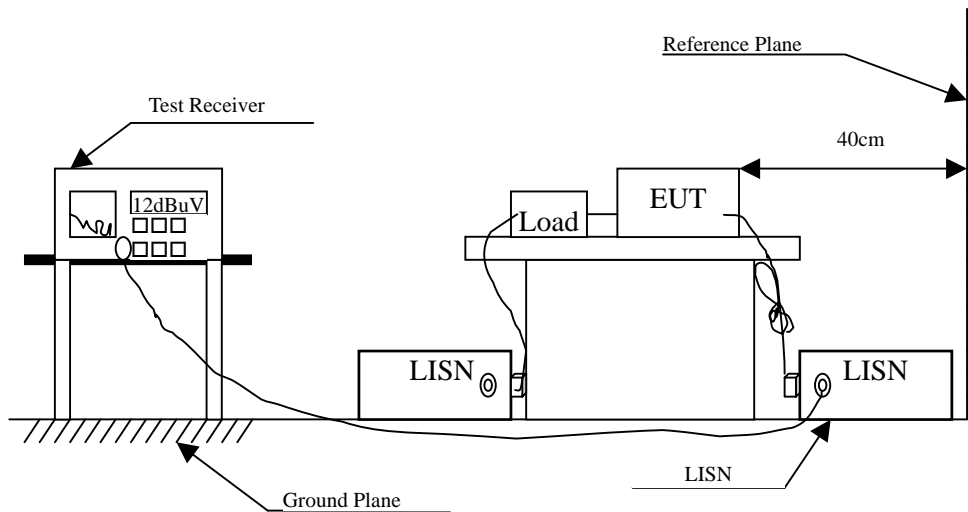
### 2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2011	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2012	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2012	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2012	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2012	
	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**

<b>FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit</b>		
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 : T2 ENDURE  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
<b>LINE 1</b>					
<b>Quasi-Peak</b>					
0.158	9.841	33.850	43.691	-22.080	65.771
0.201	9.840	36.210	46.050	-18.493	64.543
0.338	9.840	29.090	38.930	-21.699	60.629
0.463	9.840	29.610	39.450	-17.607	57.057
0.755	9.850	24.220	34.070	-21.930	56.000
1.240	9.850	23.080	32.930	-23.070	56.000
<b>Average</b>					
0.158	9.841	21.040	30.881	-24.890	55.771
0.201	9.840	19.370	29.210	-25.333	54.543
0.338	9.840	16.560	26.400	-24.229	50.629
0.463	9.840	20.080	29.920	-17.137	47.057
0.755	9.850	15.340	25.190	-20.810	46.000
1.240	9.850	13.580	23.430	-22.570	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 : T2 ENDURE  
 Test Item : Conducted Emission Test  
 Power Line : Line 2  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
<b>LINE 2</b>					
<b>Quasi-Peak</b>					
0.162	9.840	39.670	49.510	-16.147	65.657
0.205	9.840	36.740	46.580	-17.849	64.429
0.459	9.840	30.460	40.300	-16.871	57.171
0.611	9.840	23.050	32.890	-23.110	56.000
2.334	9.860	13.310	23.170	-32.830	56.000
7.912	9.986	10.350	20.336	-39.664	60.000
<b>Average</b>					
0.162	9.840	24.390	34.230	-21.427	55.657
0.205	9.840	19.600	29.440	-24.989	54.429
0.459	9.840	20.500	30.340	-16.831	47.171
0.611	9.840	13.620	23.460	-22.540	46.000
2.334	9.860	4.160	14.020	-31.980	46.000
7.912	9.986	4.400	14.386	-35.614	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

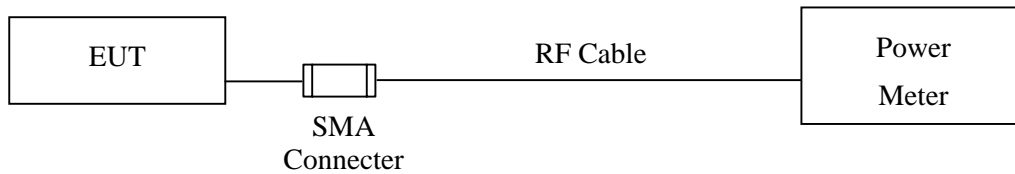
### 3. Peak Power Output

#### 3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2011
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2011

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 : T2 ENDURE  
Test Item : Peak Power Output  
Test Site : No.3 OATS  
Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	5.98	1 Watt= 30 dBm	Pass
Channel 39	2441.00	5.73	1 Watt= 30 dBm	Pass
Channel 78	2480.00	5.33	1 Watt= 30 dBm	Pass

Product : T2 ENDURE  
Test Item : Peak Power Output  
Test Site : No.3 OATS  
Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
Channel 00	2402.00	5.12	1 Watt= 30 dBm	Pass
Channel 39	2441.00	4.54	1 Watt= 30 dBm	Pass
Channel 78	2480.00	4.01	1 Watt= 30 dBm	Pass



#### 4. Radiated Emission

##### 4.1. Test Equipment

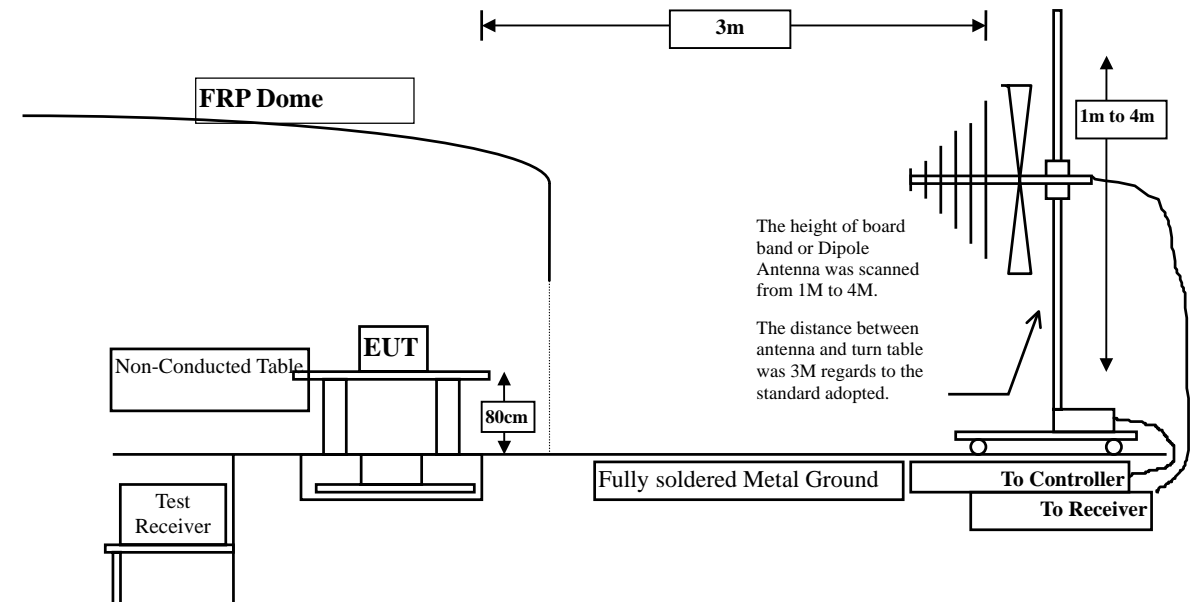
The following test equipments are used during the radiated emission test:

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, 2011
	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

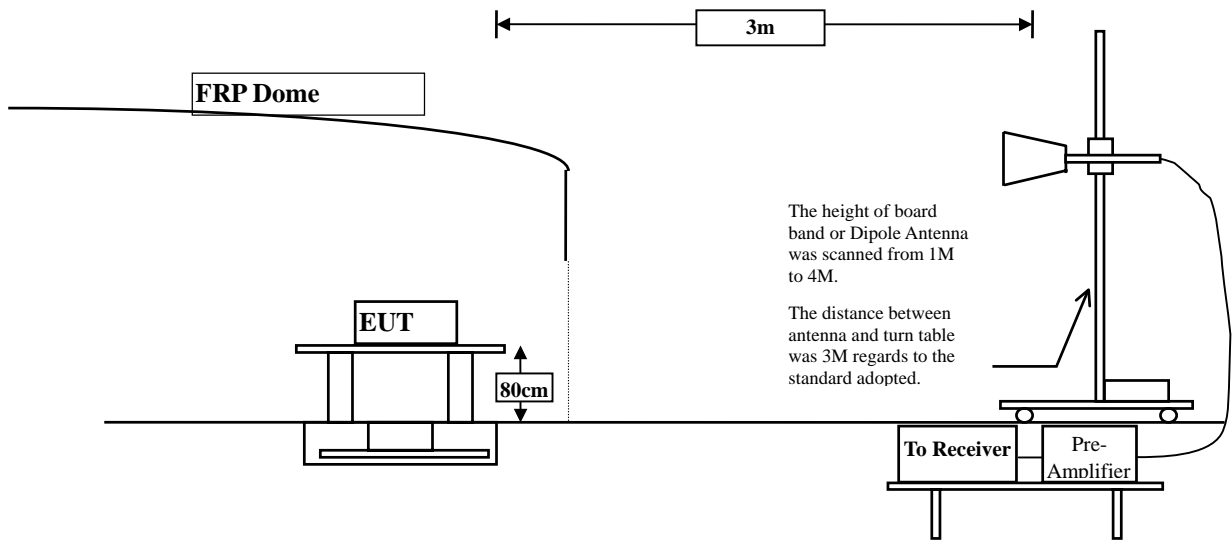
- Note: 1. All equipments are calibrated every one year.  
 2. The test instruments marked by "X" are used to measure the final test results.

##### 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 measurement frequency range form 30MHz - 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 : T2 ENDURE  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4804.000	0.511	57.670	58.180	-15.820	74.000
7206.000	7.511	44.710	52.221	-21.779	74.000
9608.000	8.394	39.480	47.874	-26.126	74.000
<b>Average Detector:</b>					
4804.000	0.511	46.460	46.970	-7.030	54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
4804.000	0.923	60.910	61.832	-12.168	74.000
7206.000	7.988	44.430	52.419	-21.581	74.000
9608.000	8.847	39.540	48.387	-25.613	74.000
<b>Average Detector:</b>					
4804.000	0.923	49.330	50.252	-3.748	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.

Product : T2 ENDURE  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4882.000	0.025	60.060	60.085	-13.915	74.000
7323.000	7.762	44.440	52.201	-21.799	74.000
9764.000	7.682	41.850	49.531	-24.469	74.000
<b>Average</b>					
<b>Detector:</b>					
4882.000	0.025	51.300	51.325	-2.675	54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
4882.000	0.488	60.950	61.438	-12.562	74.000
7323.000	8.375	44.710	53.084	-20.916	74.000
9764.000	8.315	39.640	47.955	-26.045	74.000
<b>Average</b>					
<b>Detector:</b>					
4882.000	0.488	52.060	52.548	-1.452	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.

Product : T2 ENDURE  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)(2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4960.000	0.582	60.200	60.782	-13.218	74.000
7440.000	8.555	46.340	54.895	-19.105	74.000
9920.000	8.206	41.440	49.646	-24.354	74.000
<b>Average</b>					
<b>Detector:</b>					
4960.000	0.582	51.230	51.812	-2.188	54.000
7440.000	8.555	37.560	46.115	-7.885	54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
4960.000	1.398	59.810	61.209	-12.791	74.000
7440.000	9.214	46.730	55.944	-18.056	74.000
9920.000	9.245	38.650	47.895	-26.105	74.000
<b>Average</b>					
<b>Detector:</b>					
4960.000	1.398	52.327	53.725	-0.275	54.000
7440.000	9.214	37.960	47.174	-6.826	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.

Product : T2 ENDURE  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)(2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4804.000	0.511	53.100	53.610	-20.390	74.000
7206.000	7.511	39.370	46.881	-27.119	74.000
9608.000	8.394	39.200	47.594	-26.406	74.000
<b>Average Detector:</b>					
--					
<b>Vertical</b>					
<b>Peak Detector:</b>					
4804.000	0.923	55.600	56.522	-17.478	74.000
7206.000	7.988	39.770	47.759	-26.241	74.000
9608.000	8.847	39.530	48.377	-25.623	74.000
<b>Average Detector:</b>					
4804.000	0.923	40.640	41.562	-12.438	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.

Product : T2 ENDURE  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4882.000	0.025	56.160	56.185	-17.815	74.000
7323.000	7.762	39.370	47.131	-26.869	74.000
9764.000	7.682	39.260	46.941	-27.059	74.000
<b>Average Detector:</b>					
4882.000	0.025	43.100	43.125	-10.875	54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
4882.000	0.488	57.310	57.798	-16.202	74.000
7323.000	8.375	41.130	49.504	-24.496	74.000
9764.000	8.315	39.290	47.605	-26.395	74.000
<b>Average Detector:</b>					
4882.000	0.488	44.350	44.838	-9.162	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.



Product : T2 ENDURE  
 Test Item : Harmonic Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
4960.000	0.582	55.360	55.942	-18.058	74.000
7440.000	8.555	41.870	50.425	-23.575	74.000
9920.000	8.206	38.580	46.786	-27.214	74.000
<b>Average Detector:</b>					
4960.000	0.582	41.900	42.482	-11.518	54.000
<b>Vertical</b>					
<b>Peak Detector:</b>					
4960.000	1.398	55.990	57.389	-16.611	74.000
7440.000	9.214	42.250	51.464	-22.536	74.000
9920.000	9.245	38.650	47.895	-26.105	74.000
<b>Average Detector:</b>					
4960.000	1.398	42.690	44.089	-9.911	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.

Product : T2 ENDURE  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
196.840	-10.321	41.994	31.673	-11.827	43.500
507.240	2.529	33.781	36.310	-9.690	46.000
602.300	3.794	35.359	39.153	-6.847	46.000
664.380	1.882	31.079	32.961	-13.039	46.000
796.300	6.389	27.625	34.014	-11.986	46.000
916.580	6.470	31.967	38.437	-7.563	46.000
<b>Vertical</b>					
179.380	-0.824	39.118	38.294	-5.206	43.500
507.240	0.429	30.650	31.079	-14.921	46.000
608.120	2.175	30.810	32.985	-13.015	46.000
747.800	1.665	29.201	30.866	-15.134	46.000
871.960	-0.147	31.132	30.985	-15.015	46.000
930.160	3.830	28.624	32.454	-13.546	46.000

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.

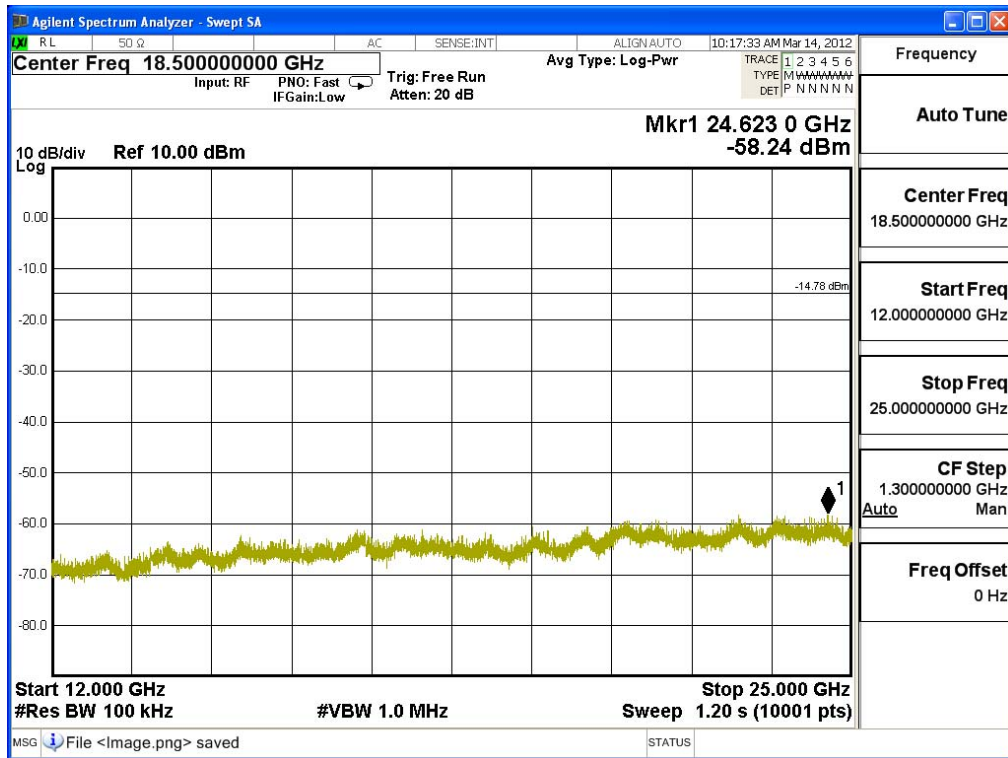
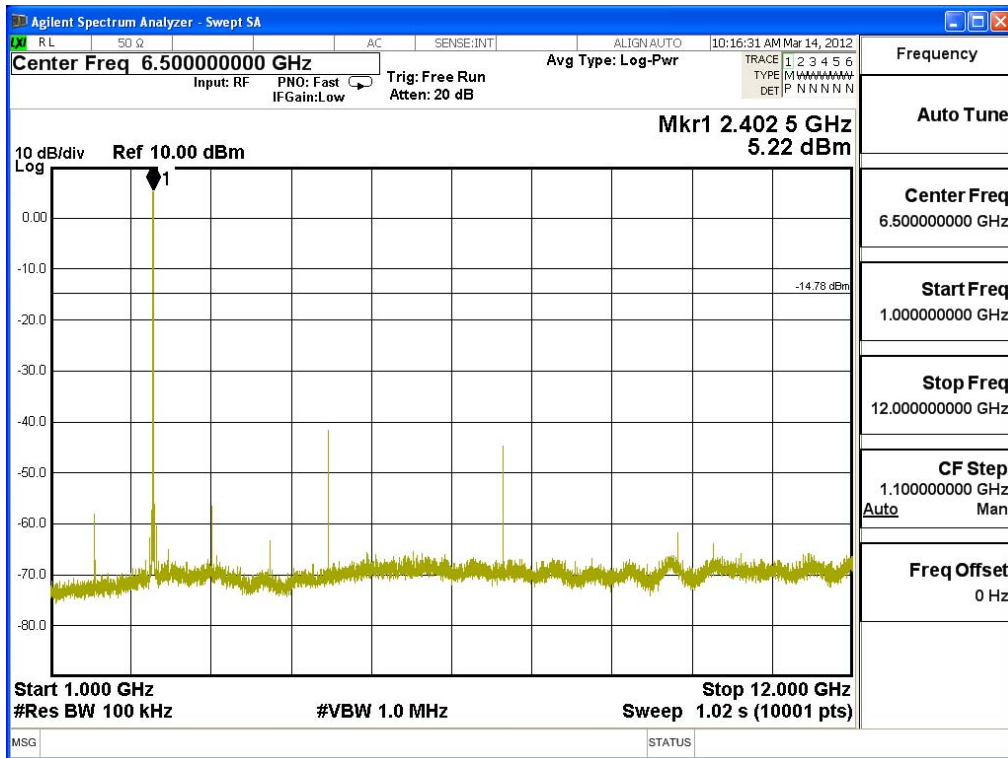
Product : T2 ENDURE  
 Test Item : General Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
373.380	0.873	37.864	38.737	-7.263	46.000
507.240	2.529	33.661	36.190	-9.810	46.000
602.300	3.794	34.421	38.215	-7.785	46.000
666.320	1.879	31.948	33.827	-12.173	46.000
852.560	7.106	29.099	36.205	-9.795	46.000
949.560	7.036	29.027	36.063	-9.937	46.000
<b>Vertical</b>					
507.240	2.529	30.721	33.250	-12.750	46.000
608.120	3.925	29.957	33.882	-12.118	46.000
666.320	1.879	31.941	33.820	-12.180	46.000
848.680	6.579	28.305	34.884	-11.116	46.000
912.700	6.450	31.395	37.845	-8.155	46.000
937.920	6.750	29.800	36.550	-9.450	46.000

Note:

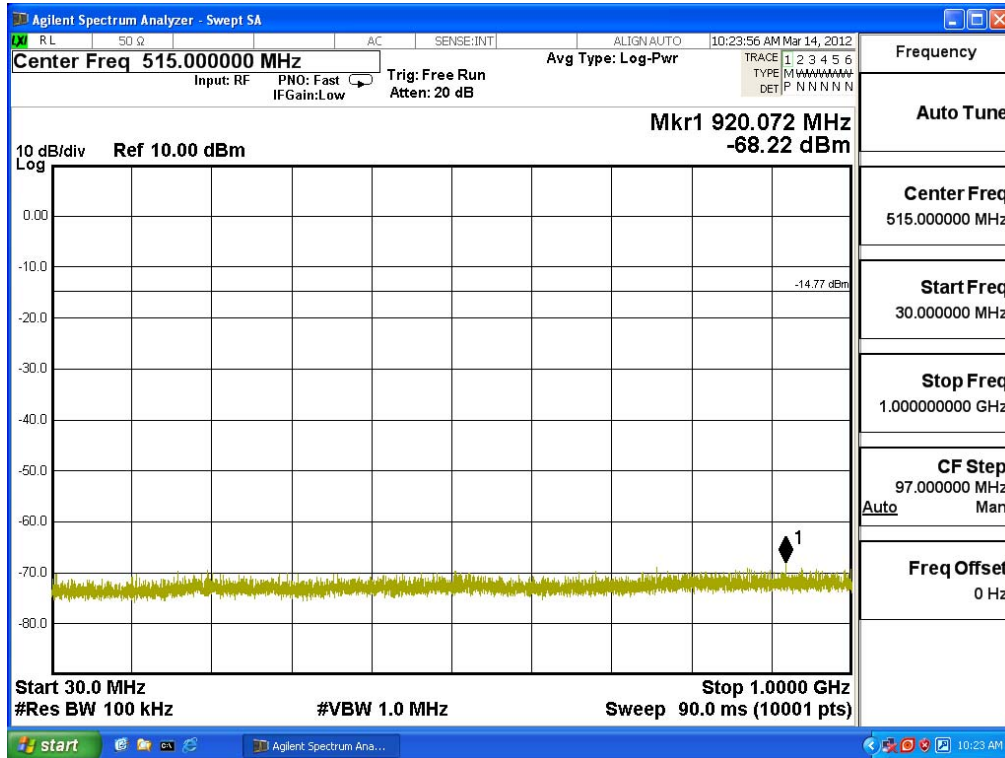
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. 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.

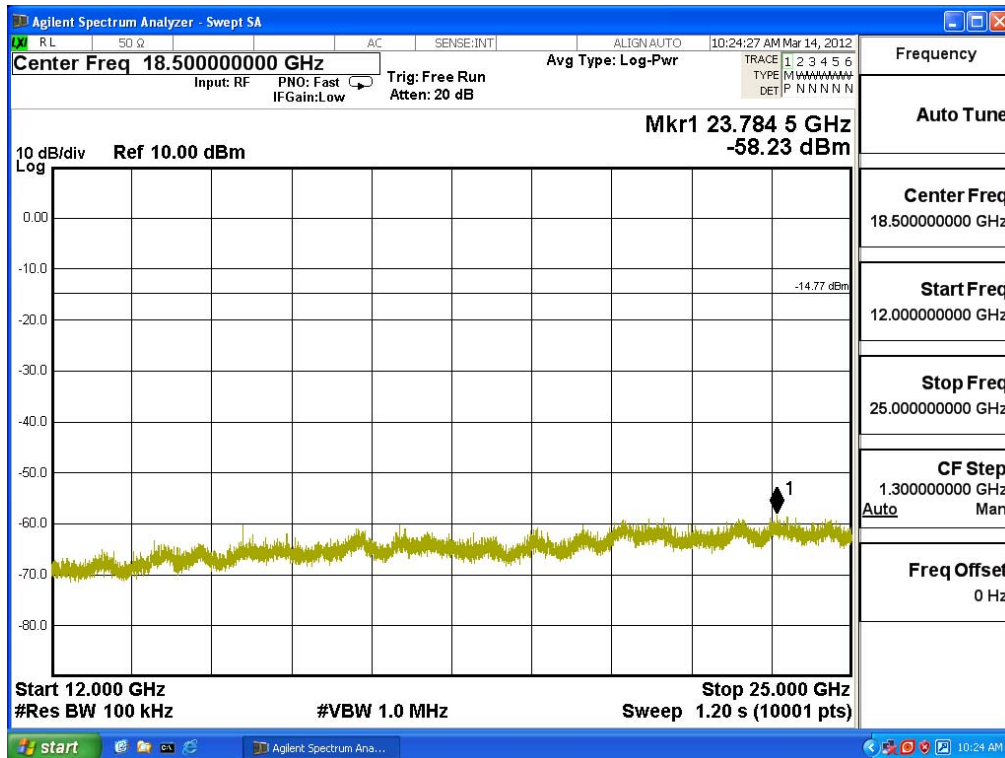
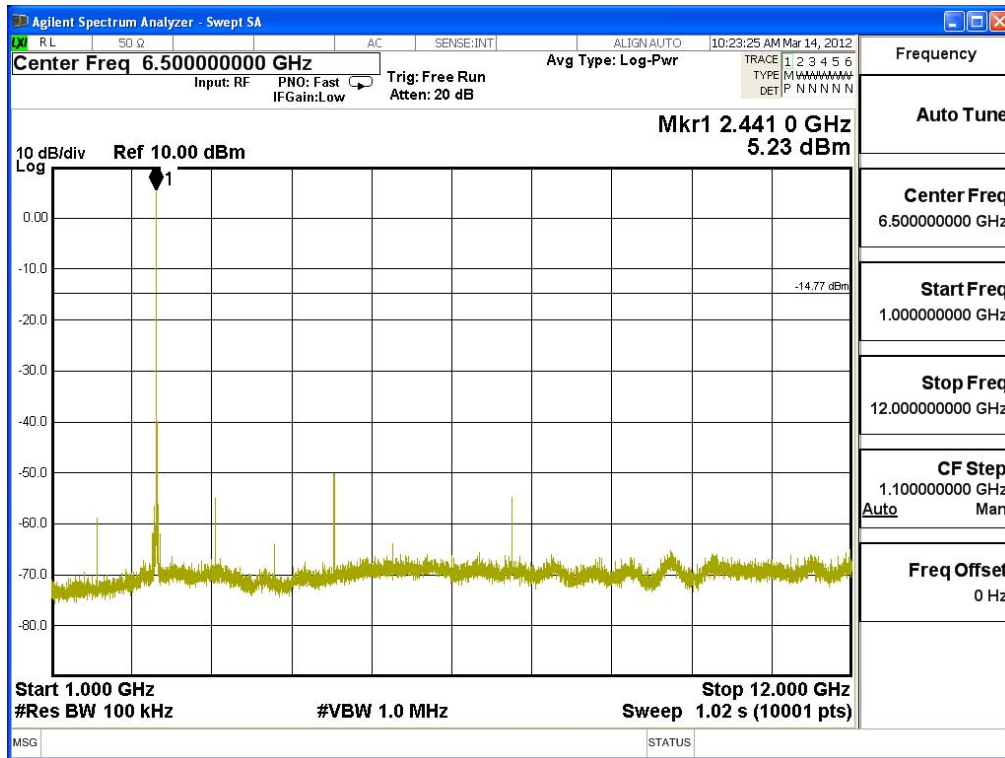




Product : T2 ENDURE  
 Test Item : RF Antenna Conducted Test  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

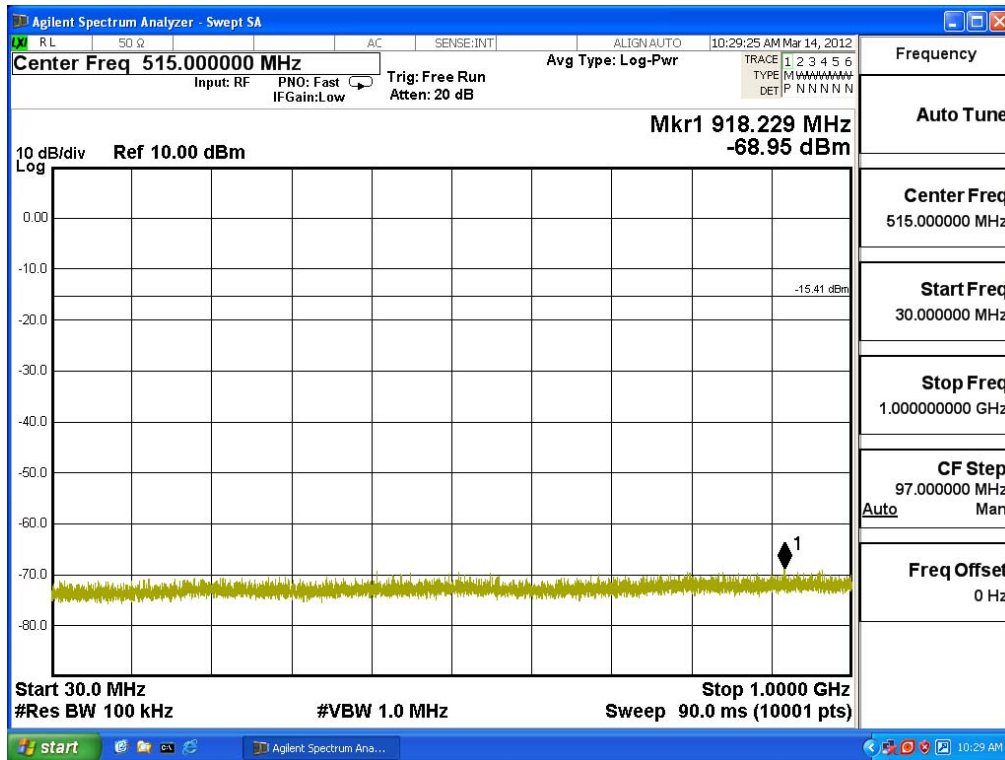
**Figure Channel 39:**



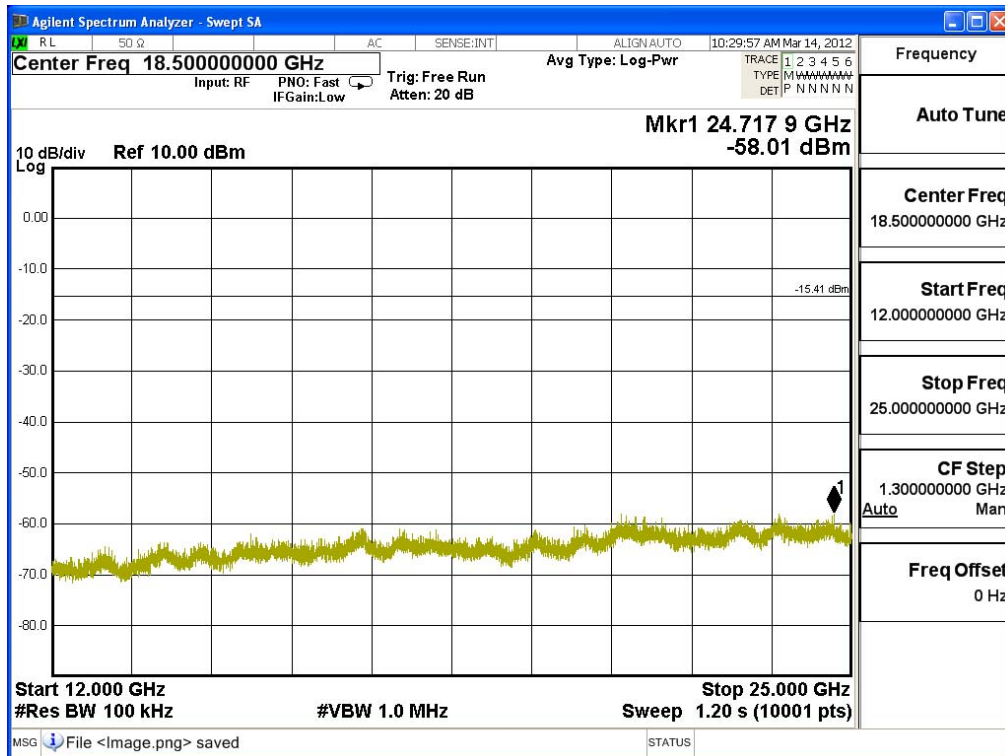
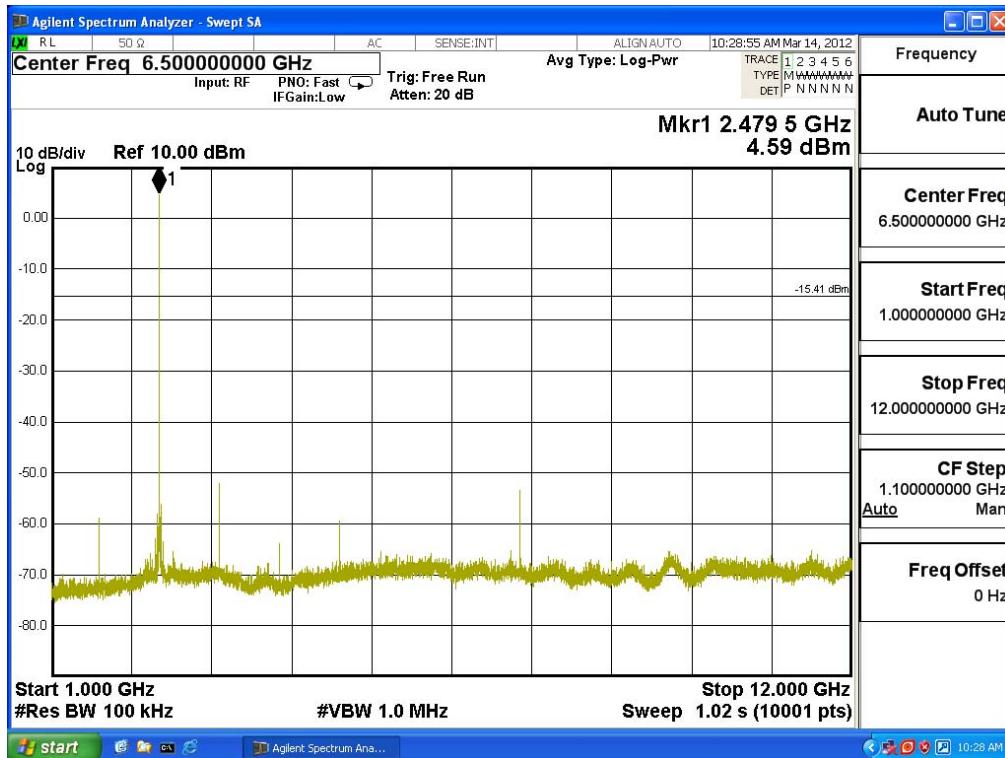


Product : T2 ENDURE  
 Test Item : RF Antenna Conducted Test  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

**Figure Channel 78:**

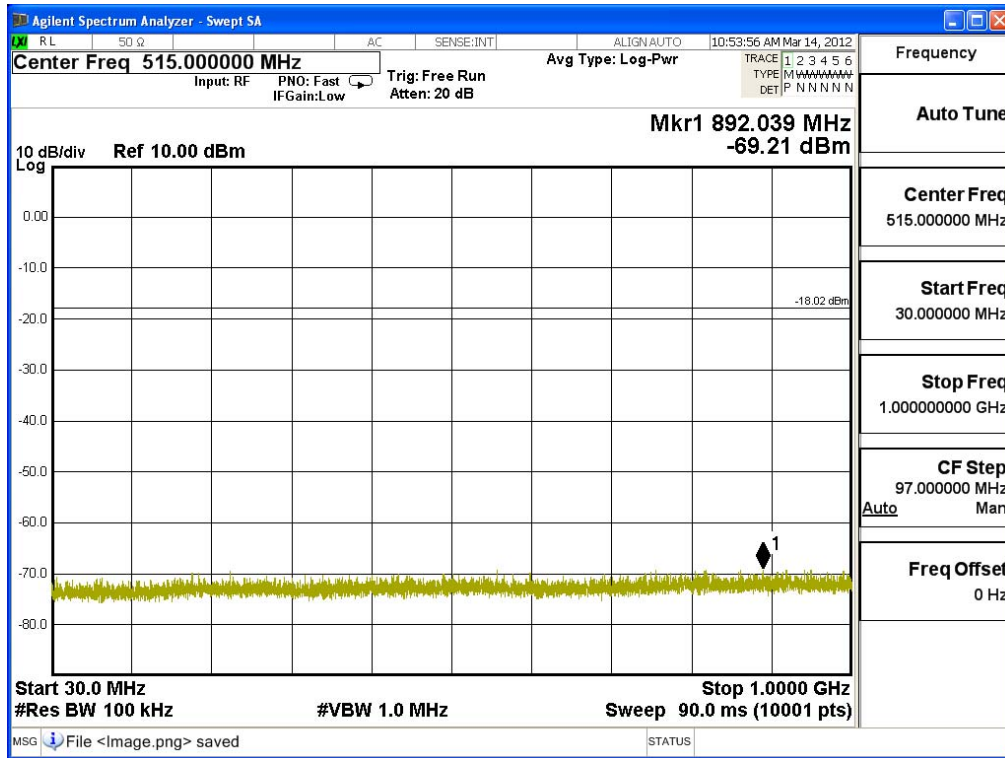


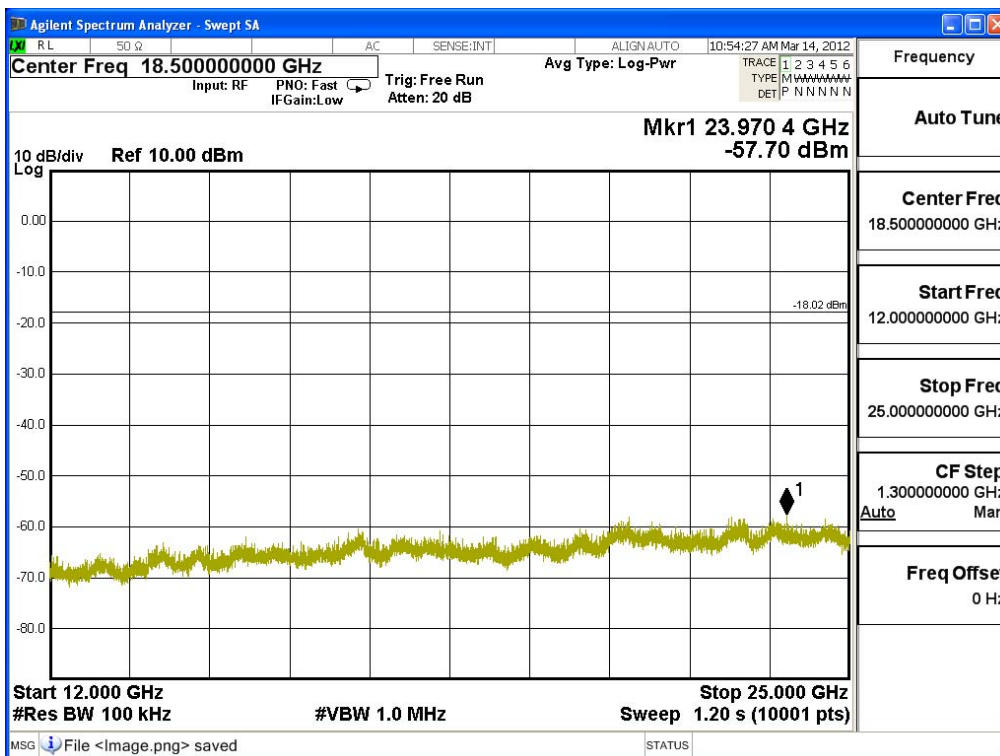
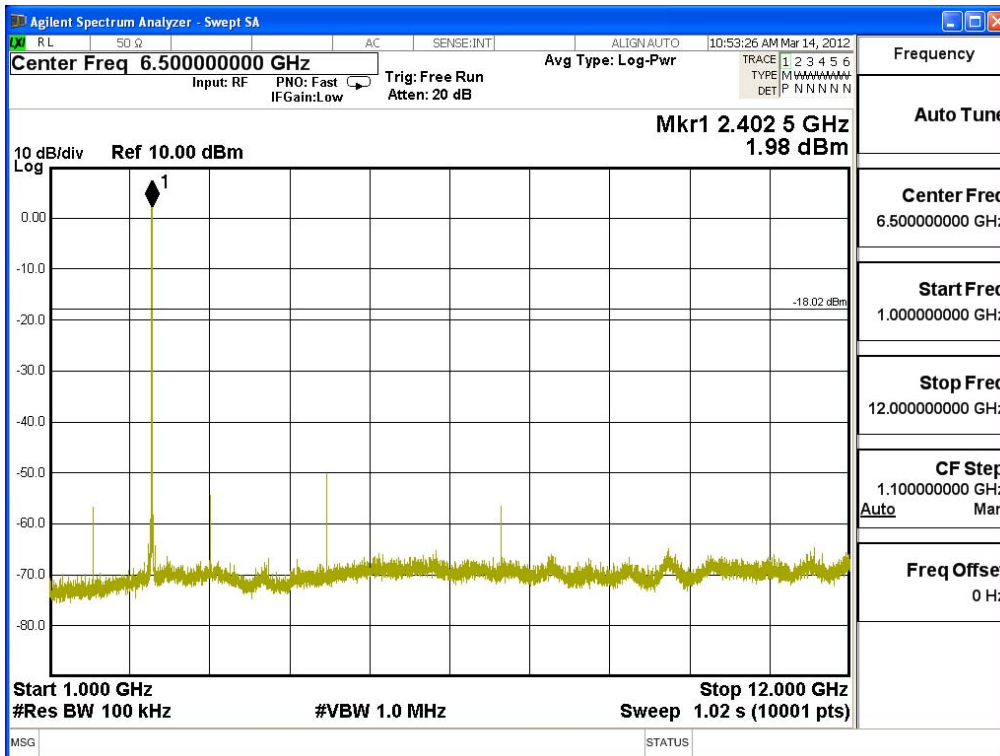




Product : T2 ENDURE  
 Test Item : RF Antenna Conducted Test  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

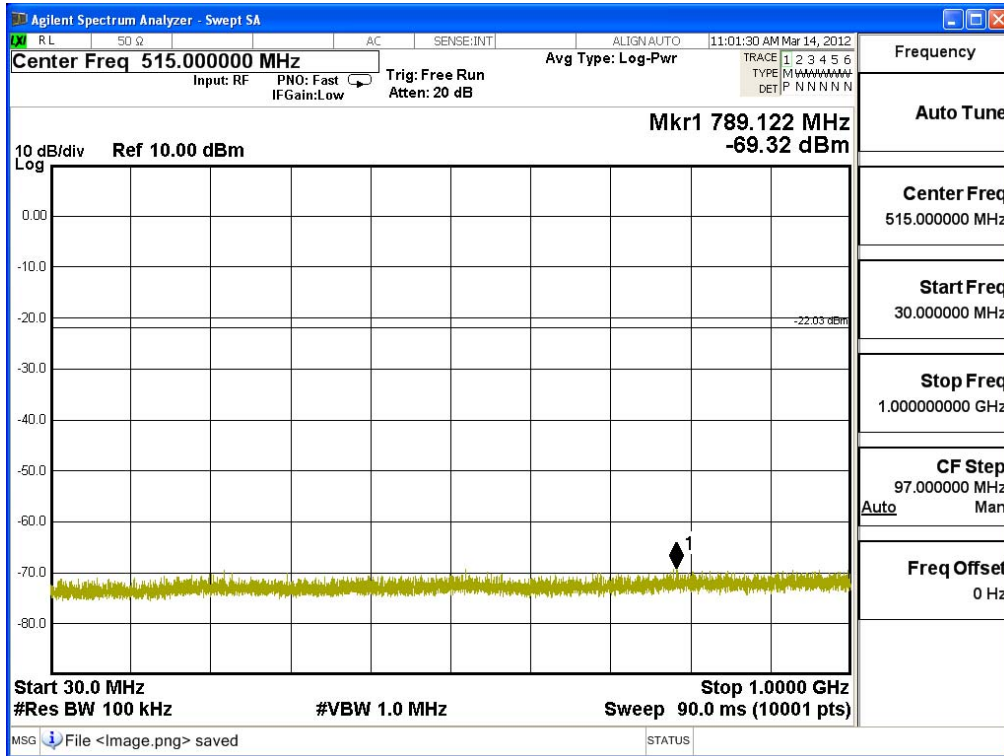
**Figure Channel 00:**

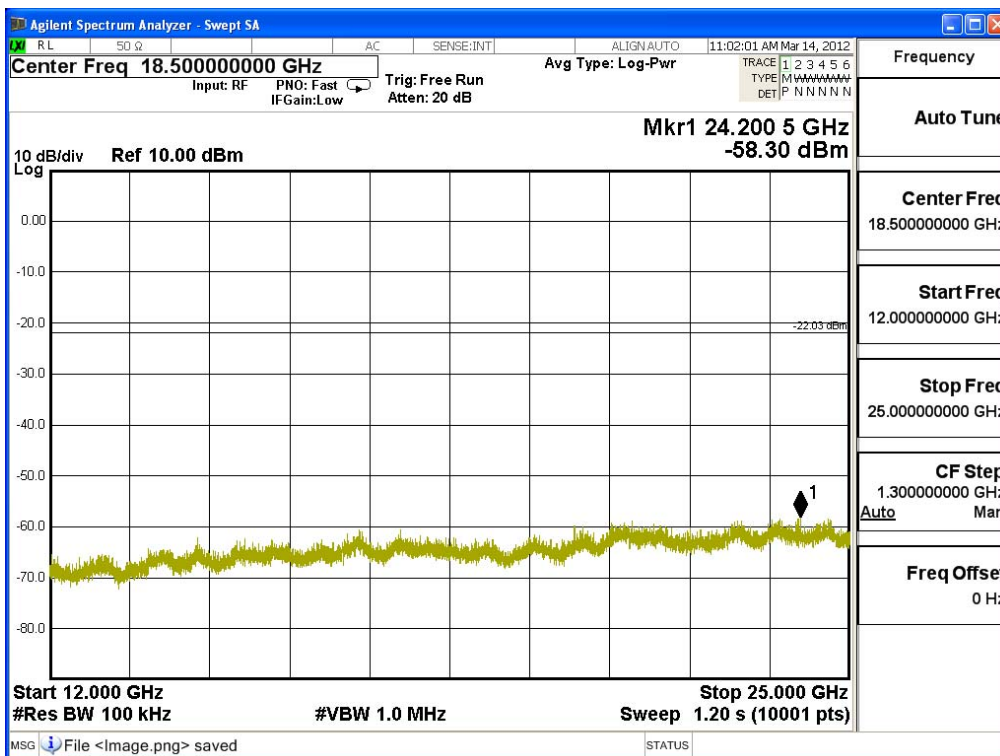
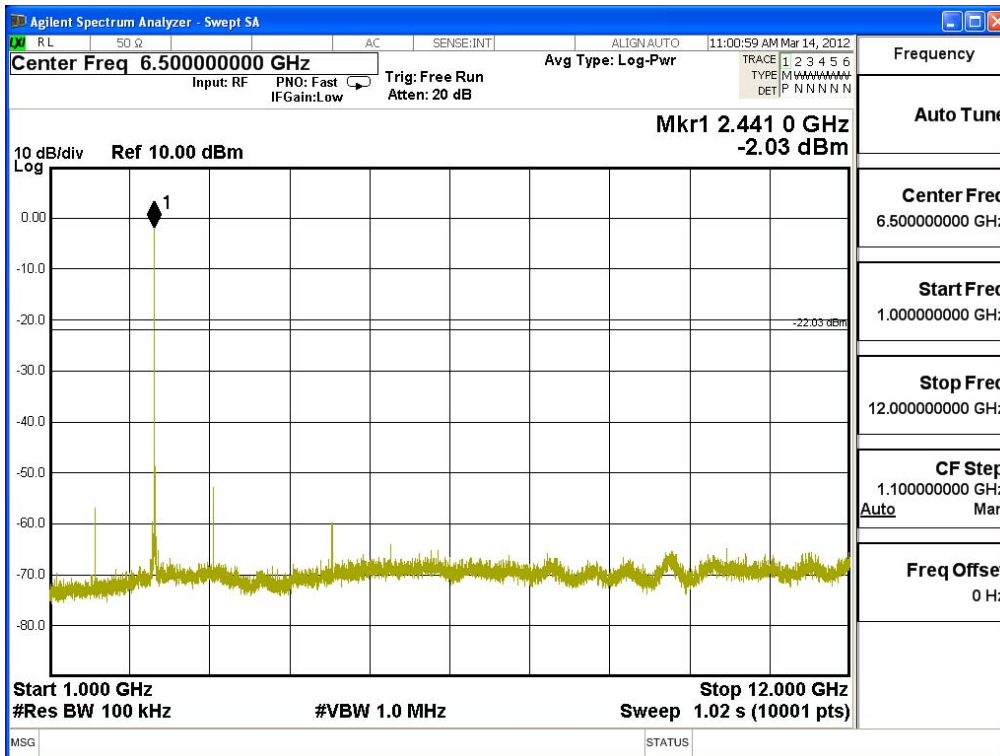




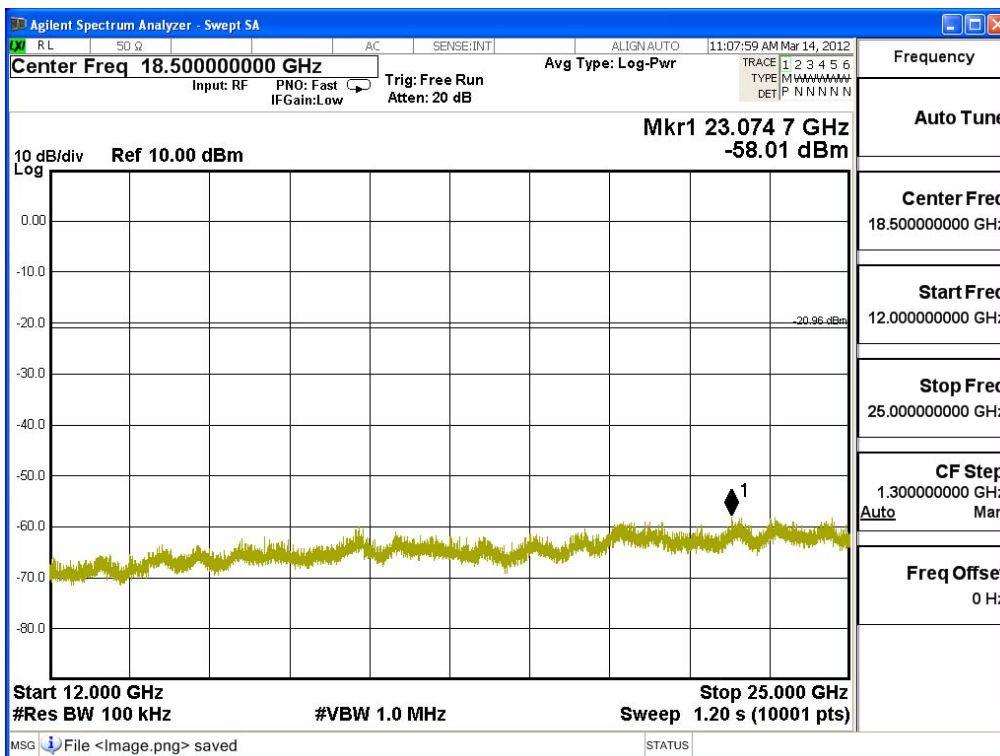
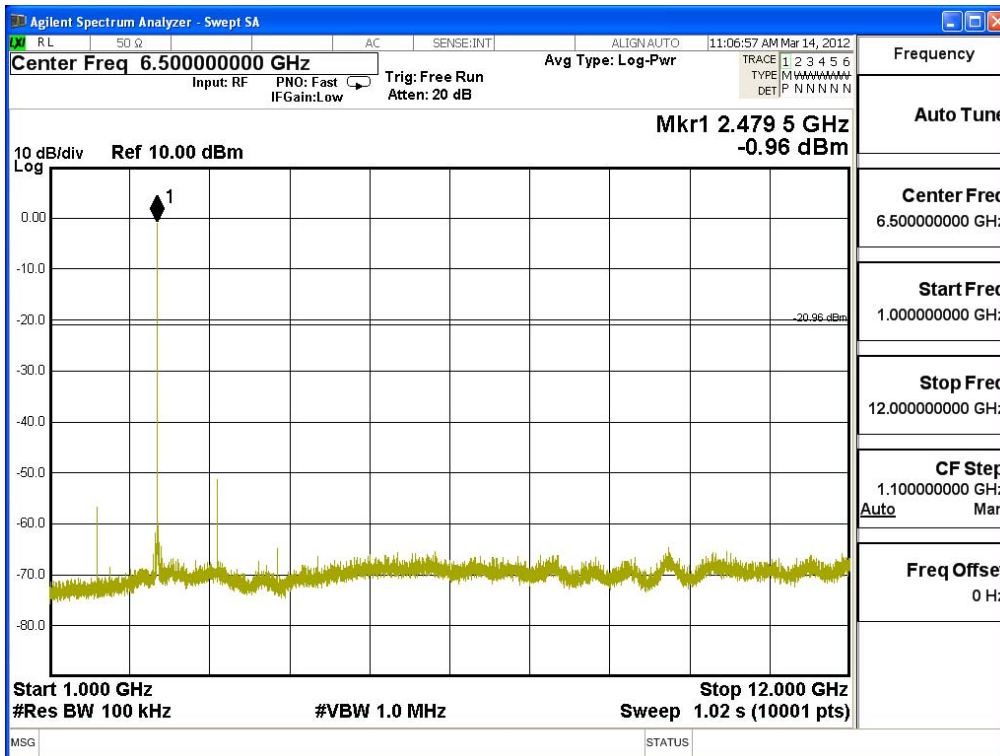
Product : T2 ENDURE  
 Test Item : RF Antenna Conducted Test  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

**Figure Channel 39:**









## 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., 2011

#### RF Radiated Measurement:

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

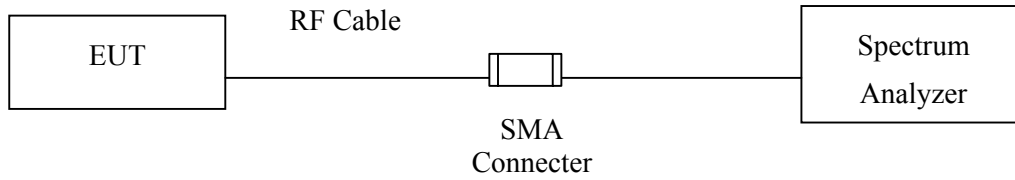
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2011
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2011
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2011
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2011
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2011
		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.



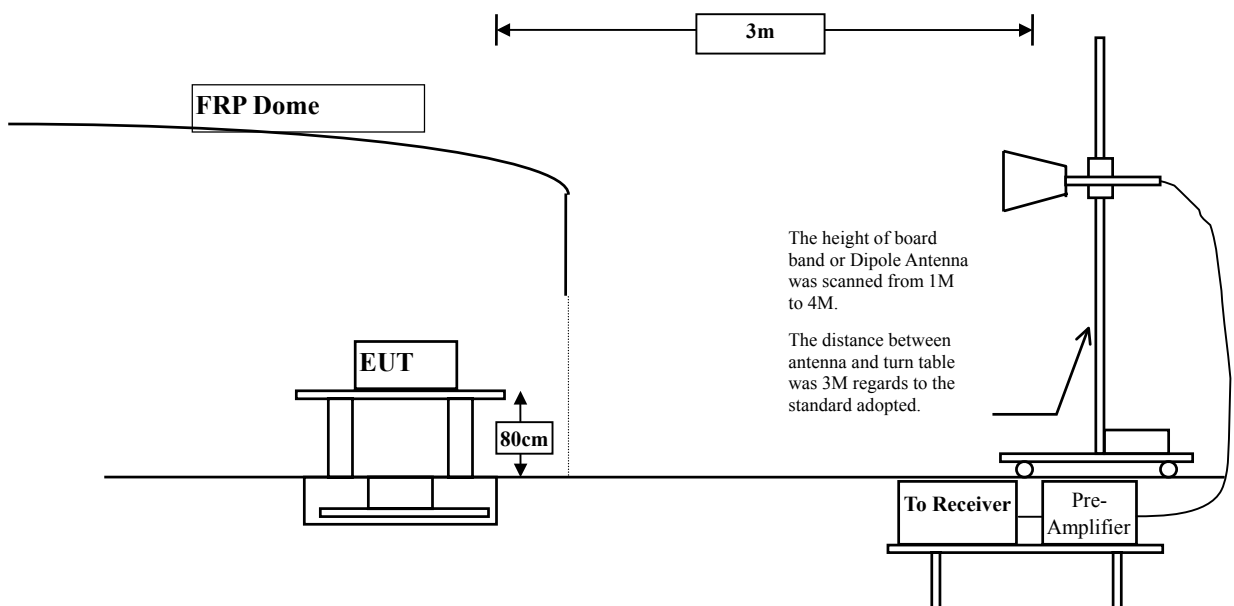
## 6.2. Test Setup

### 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 : T2 ENDURE  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

### Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2402	31.755	68.43	100.184	Peak
Horizontal	2402	31.755	55.916	87.67	Average
Vertical	2402	30.241	64.621	94.862	Peak
Vertical	2402	30.241	53.017	83.258	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	$\Delta$ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2376	100.184	57.62	42.564	74.000	Peak
Horizontal	2376	87.67	50.81	36.86	54.000	Average
Vertical	2376	94.862	57.62	37.242	74.000	Peak
Vertical	2376	83.258	50.81	32.448	54.000	Average

Note:

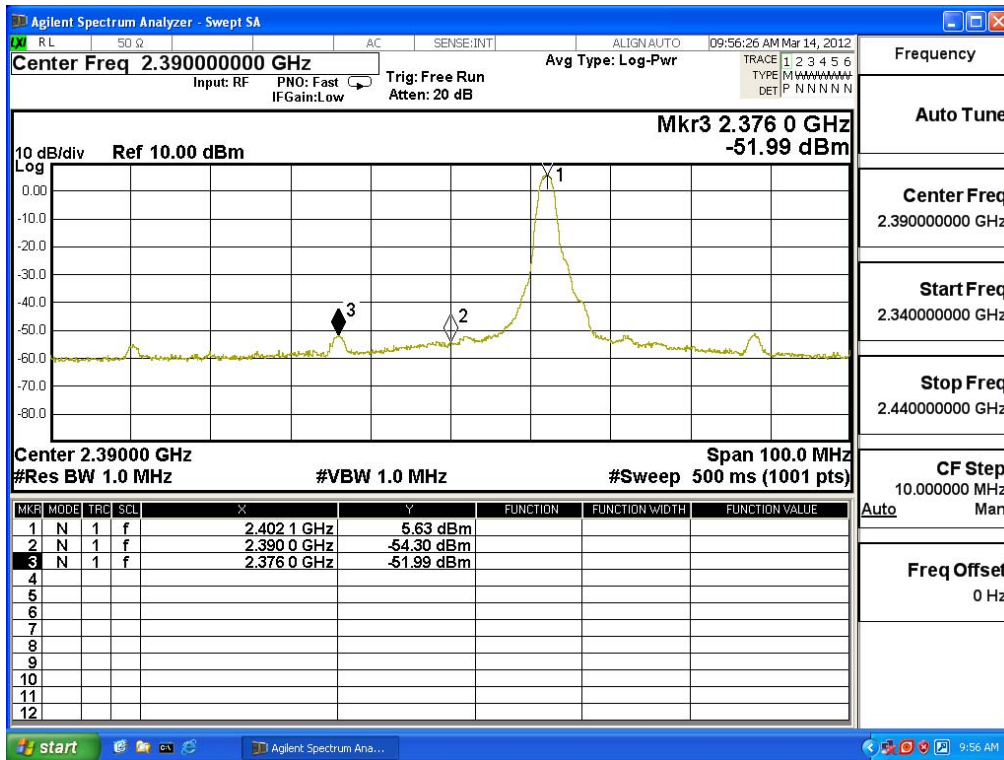
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

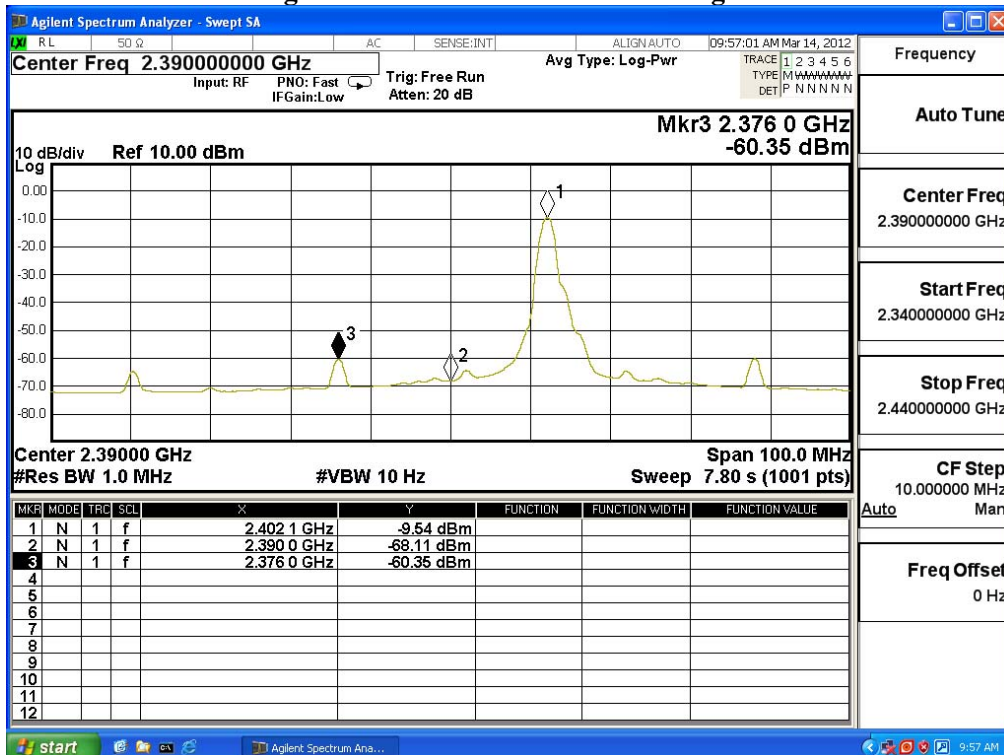
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta



Product : T2 ENDURE  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit - 1Mbps (GFSK)

### Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dB(uV/m)]	Detector
Horizontal	2480	31.941	68.371	100.312	Peak
Horizontal	2480	31.941	56.183	88.124	Average
Vertical	2480	30.568	65.14	95.708	Peak
Vertical	2480	30.568	53.09	83.658	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	$\Delta$ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2483.5	100.312	49.61	50.702	74.000	Peak
Horizontal	2483.5	88.124	48.9	39.224	54.000	Average
Vertical	2483.5	95.708	49.61	46.098	74.000	Peak
Vertical	2483.5	83.658	48.9	34.758	54.000	Average

Note:

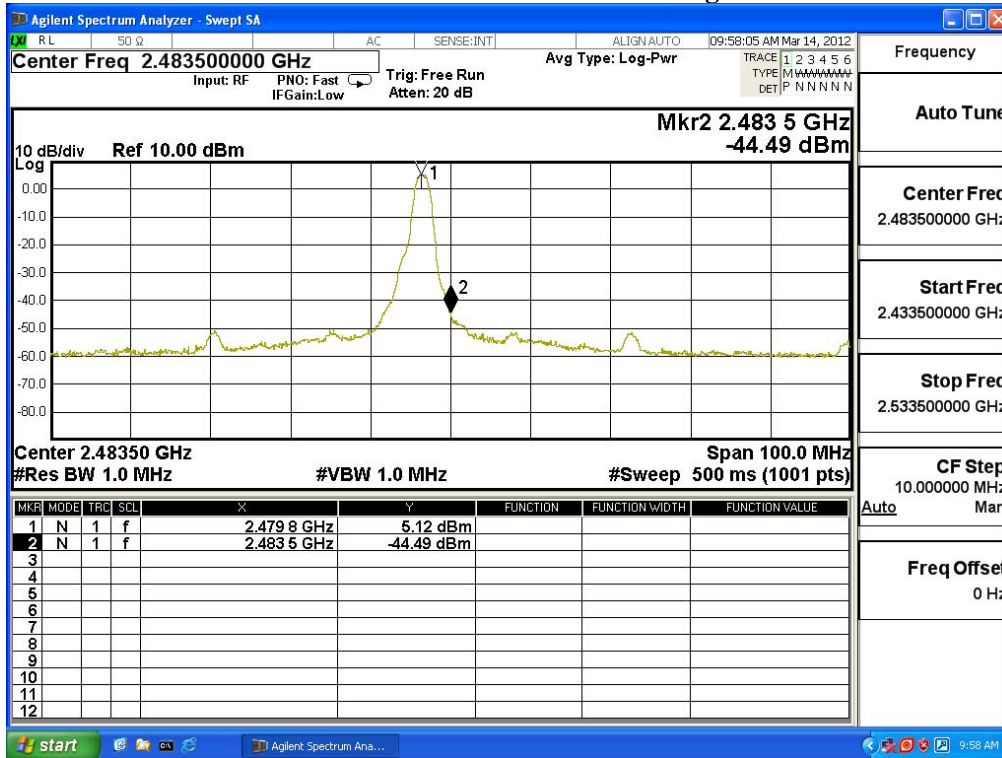
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

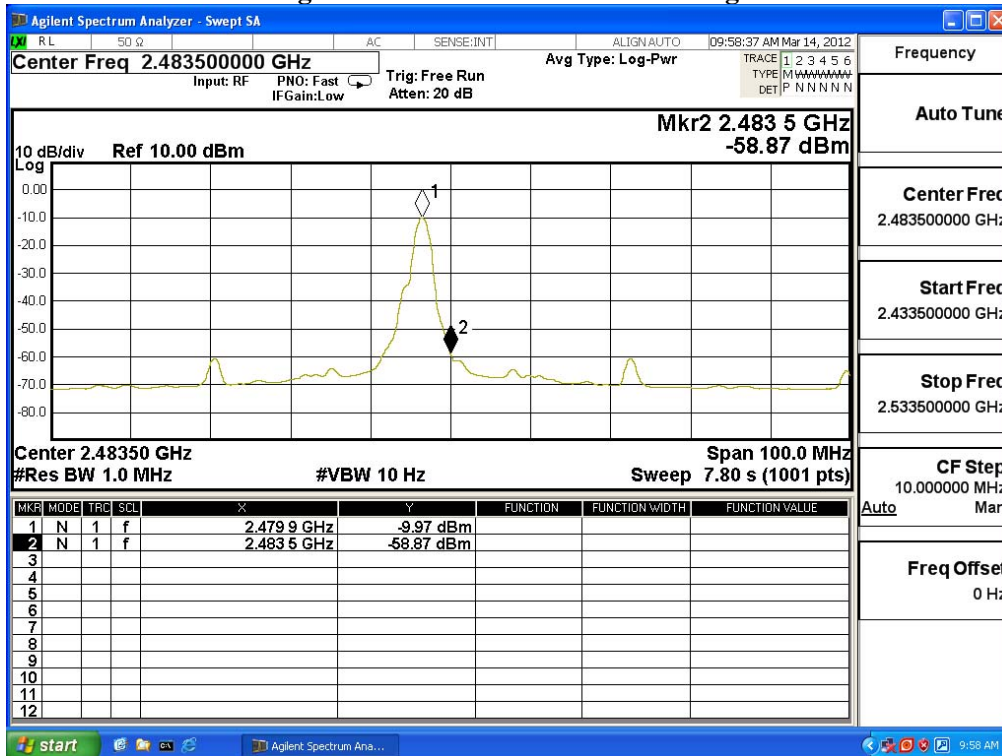
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta



Product : T2 ENDURE  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

### Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dBuV/m]	Detector
Horizontal	2402	31.755	66.96	98.714	Peak
Horizontal	2402	31.755	51.99	83.744	Average
Vertical	2402	30.241	64.21	94.451	Peak
Vertical	2402	30.241	50.1	80.341	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	$\Delta$ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2376.2	98.714	56.71	42.004	74.000	Peak
Horizontal	2376	83.744	50.4	33.344	54.000	Average
Vertical	2376.2	94.451	56.71	37.741	74.000	Peak
Vertical	2376	80.341	50.4	29.941	54.000	Average

Note:

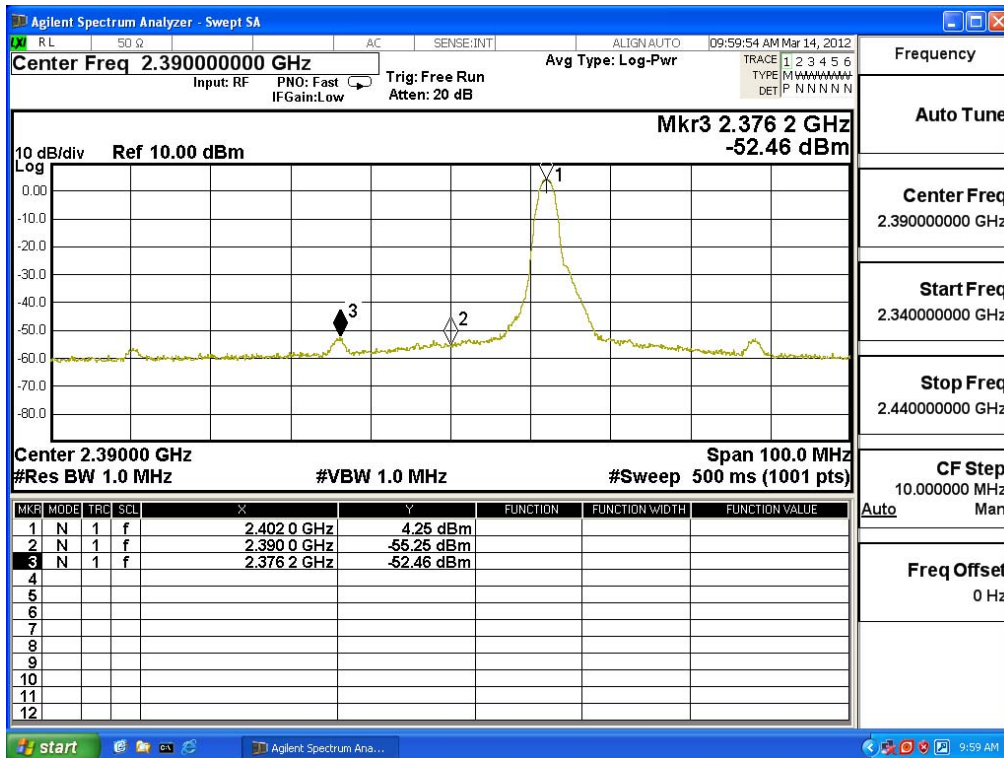
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

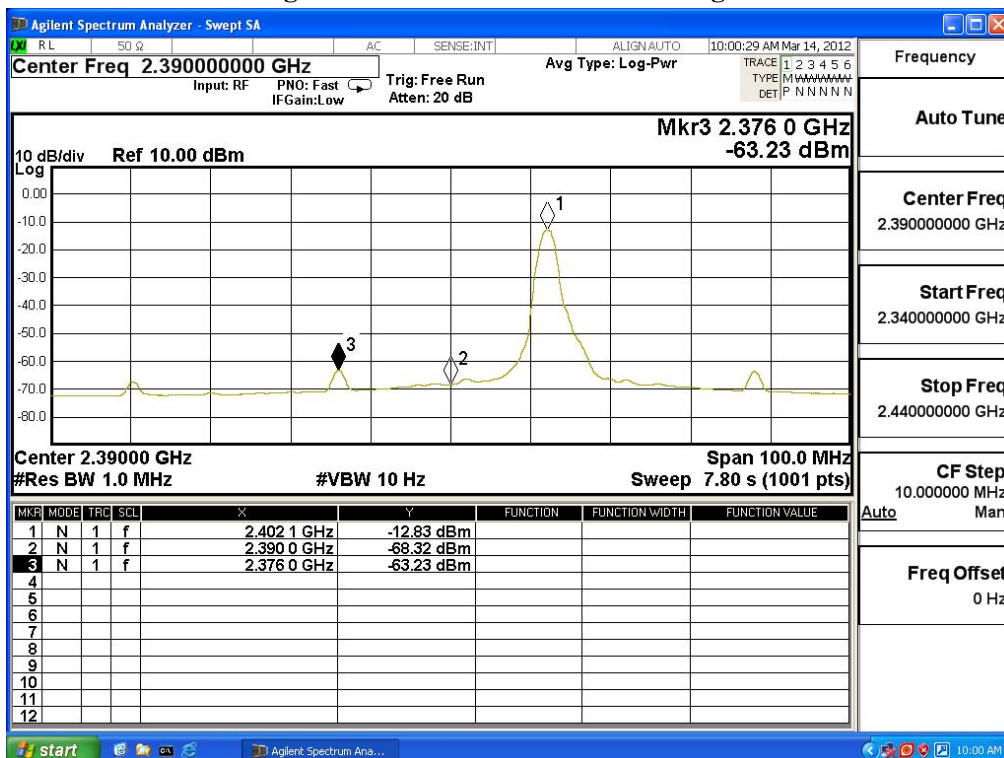
F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta





Product : T2 ENDURE  
 Test Item : Band Edge  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmit - 3Mbps (8DPSK)

### Fundamental Filed Strength

Antenna Pole	Frequency [MHz]	Correction Factor [dB/m]	Reading Level [dBuV]	Emission Level [dB(uV/m)]	Detector
Horizontal	2480	31.941	67.06	99.001	Peak
Horizontal	2480	31.941	52.52	84.461	Average
Vertical	2480	30.568	63.74	94.308	Peak
Vertical	2480	30.568	49.83	80.398	Average

Note: 1:Spectrum Analyzer setting:

Peak detector: RBW=1MHz, VBW=1MHz

Average detector: RBW=1MHz, VBW=10Hz

### Band Edge Test Data

Antenna Pole	Test Frequency (MHz)	Fundamental (dBuV/m)	$\Delta$ (dB)	Band Edge Field Strength (dBuV/m)	Limit (dBuV/m)	Detector
Horizontal	2483.5	99.001	49.94	49.061	74.000	Peak
Horizontal	2483.5	84.461	47.17	37.291	54.000	Average
Vertical	2483.5	94.308	49.94	44.368	74.000	Peak
Vertical	2483.5	80.398	47.17	33.228	54.000	Average

Note:

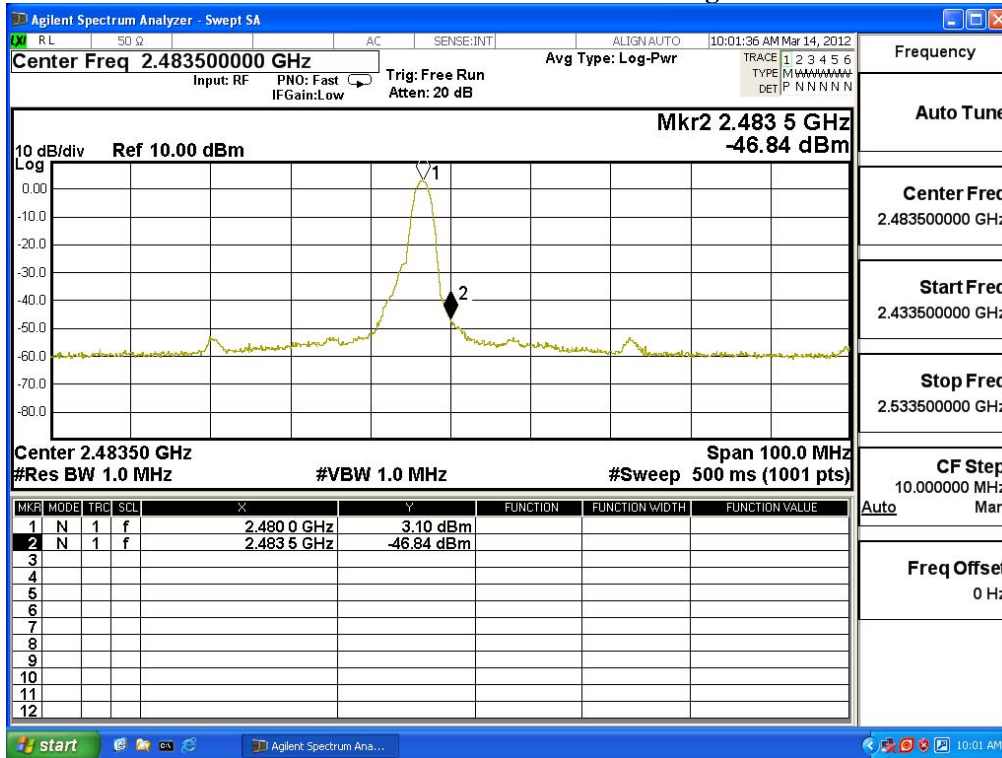
The Band Edge Field Strength was calculated using the Fundamental and Conducted Band Edge measurements per the Marker-Delta Method with the following formula:

Band Edge field Strength = F -  $\Delta$

F = Fundamental field Strength (Peak or Average)

$\Delta$  = Conducted Band Edge Delta (Peak or Average)

### Peak Detector of conducted Band Edge Delta



### Average Detector of conducted Band Edge Delta

