

FC

Test Report

Product Name	7"PORTABLE
Model No	C4-TSMC7-EN-BL, C4-TSTTC7-EN-BL, SCH-Tablet
FCC ID.	R33C4TSMC7

Applicant	Control4 corporation
Address	11734 S. Election Road Suite 200 Draper, UT 84020 United States

Date of Receipt	Sep. 23, 2011
Issue Date	Dec. 13, 2011
Report No.	119408R-RFUSP42V01
Report Version	V1.0

The test results relate only to the samples tested.

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Test Report Certification

Issue Date: Dec. 13, 2011

Report No.: 119408R-RFUSP42V01



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200533-0

Product Name	7"PORTABLE
Applicant	Control4 corporation
Address	11734 S. Election Road Suite 200 Draper, UT 84020 United States
Manufacturer	Lite-On Technology Corp.
Model No.	C4-TSMC7-EN-BL, C4-TSTTC7-EN-BL, SCH-Tablet
FCC ID.	R33C4TSMC7
EUT Rated Voltage	AC 100-240V, 50-60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	Control4 & Cisco
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2010 ANSI C63.4: 2003+2009
Test Result	Complied



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TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	5
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	8
1.6. Test Facility	9
2. Conducted Emission.....	10
2.1. Test Equipment.....	10
2.2. Test Setup	10
2.3. Limits	11
2.4. Test Procedure	11
2.5. Uncertainty	11
2.6. Test Result of Conducted Emission.....	12
3. Peak Power Output	14
3.1. Test Equipment.....	14
3.2. Test Setup	14
3.3. Limits	14
3.4. Test Procedure	14
3.5. Uncertainty	14
3.6. Test Result of Peak Power Output.....	15
4. Radiated Emission.....	18
4.1. Test Equipment.....	18
4.2. Test Setup	19
4.3. Limits	20
4.4. Test Procedure	21
4.5. Uncertainty	21
4.6. Test Result of Radiated Emission.....	22
5. RF antenna conducted test.....	34
5.1. Test Equipment.....	34
5.2. Test Setup	34
5.3. Limits	34
5.4. Test Procedure	34
5.5. Uncertainty	35
5.6. Test Result of RF antenna conducted test.....	36
6. Band Edge	54
6.1. Test Equipment.....	54
6.2. Test Setup	55
6.3. Limits	55
6.4. Test Procedure	56
6.5. Uncertainty	56
6.6. Test Result of Band Edge	57

7.	Occupied Bandwidth.....	69
7.1.	Test Equipment.....	69
7.2.	Test Setup	69
7.3.	Limits	69
7.4.	Test Procedure	69
7.5.	Uncertainty	69
7.6.	Test Result of Occupied Bandwidth	70
8.	Power Density	79
8.1.	Test Equipment.....	79
8.2.	Test Setup	79
8.3.	Limits	79
8.4.	Test Procedure	79
8.5.	Uncertainty	79
8.6.	Test Result of Power Density	80
9.	EMI Reduction Method During Compliance Testing	89
Attachment 1: EUT Test Photographs		
Attachment 2: EUT Detailed Photographs		

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	7"PORTABLE
Trade Name	Control4 & Cisco
Model No.	C4-TSMC7-EN-BL, C4-TSTTC7-EN-BL, SCH-Tablet
FCC ID.	R33C4TSMC7
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW
Number of Channels	802.11b/g/n-20MHz: 11
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 72.2Mbps
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	PIFA
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto
Power Adapter (1)	MFR: Asian, M/N: WA-12L12FU Input: AC 100-240V ~ 50-60Hz, 0.5A Max. Output: DC 12V $\overline{=}$ 1A Cable Out: Non-Shielded, 1.5m
Power Adapter (2)	MFR: Asian, M/N: WA-12L12R Input: AC 100-240V ~ 50-60Hz, 0.5A Max. Output: DC 12V $\overline{=}$ 1A Cable Out: Non-Shielded, 1.5m

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	ARISTOTLE	RFA-02-G91-70-50	3.7dBi for 2.4GHz

Note:

- The antenna of EUT is Conform to FCC 15.203.

802.11b/g/n-20MHz Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		

Note:

1. The EUT is a 7"PORTABLE with a built-in 2.4GHz WLAN transceiver.
2. The different of the each model is shown as below:

Model Number	Description
C4-TSMC7-EN-BL	Control4 version 7" Portable Touch Screen POE & WiFi
C4-TSTTC7-EN-BL	Control4 version 7" Tabletop Touch Screen POE & WiFi
SCH-Tablet	Cisco version 7" Tabletop Touch Screen POE & WiFi

3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report.
(802.11b is 1Mbps 、802.11g is 6Mbps 、802.11n(20M-BW) is 7.2Mbps)
5. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.

1.2. Operational Description

The EUT is a 7"PORTABLE, This device provided four kinds of transmitting speed 1, 2, 5.5 and 11Mbps and the device of RF carrier is DBPSK, DQPSK and CCK (IEEE 802.11b). The device provided of eight kinds of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mbps the device of RF carrier is BPSK, QPSK, 16QAM and 64QAM (IEEE 802.11g).

The device provided of eight kinds of transmitting speed 7.2,14.4,21.7,28.9,43.3,57.8,65 and 72.2Mbps in 802.11n(20M-BW) mode, the device of RF carrier is BPSK, QPSK, 16QAM and 64QAM (IEEE 802.11n), The IEEE 802.11n is Single In, Single Out" (SISO) technology and one antennas to support 1(Transmit) * 1(Receive) SISO technology.

This 7"PORTABLE, compliant with IEEE 802.11b and IEEE 802.11g/n, is a high-efficiency Wireless LAN adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires. Operation in 2.4GHz Direct Sequence Spread Spectrum (DSSS) and Orthogonal Frequency Division Multiplexing (OFDM) radio transmission, the 7"PORTABLE Wired Equivalent Protection (WEP) algorithm is used. In addition, its standard compliance ensures that it can communicate with any IEEE 802.11b and IEEE 802.11g/n network.

Test Mode:	Mode 1: Transmit (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

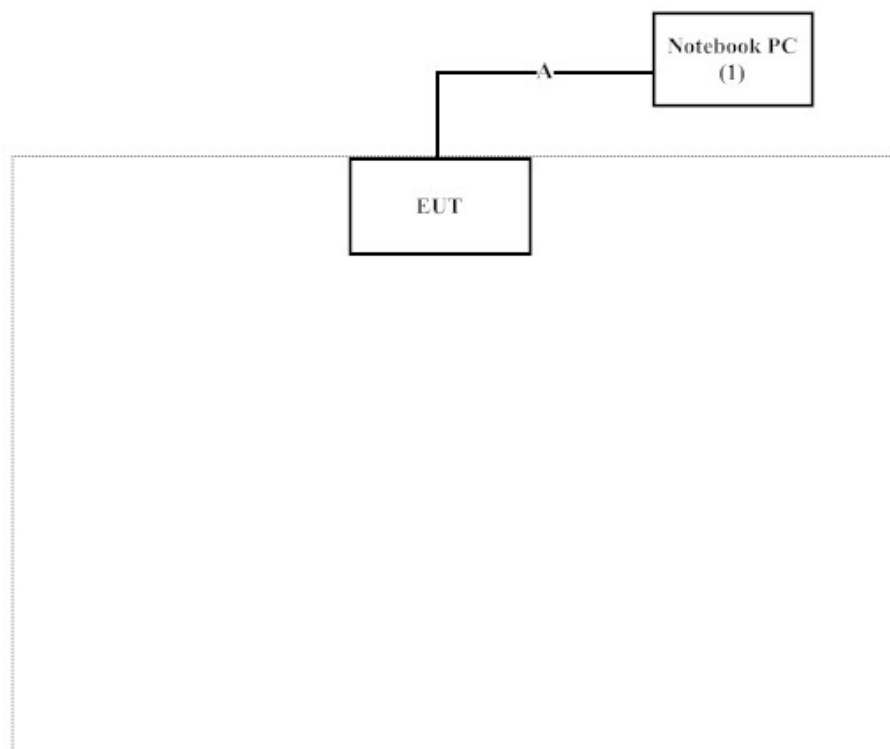
1.3. Tested System Details

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	Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m

Signal Cable Type	Signal cable Description
A LAN Cable	Non-Shielded, 1.8m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT and peripherals as shown in Section 1.4.
- (2) Execute “Tera Term.exe (Ver4.64)” on the EUT.
- (3) Configure the test mode, the test channel, and the data rate to start the continuous transmit
- (4) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
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
Federal Communications Commission
FCC Engineering Laboratory
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Columbia, MD 21046
Registration Number: 92195



Accreditation on NVLAP
NVLAP Lab Code: 200533-0



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FCC Accreditation Number: TW1014



2. Conducted Emission

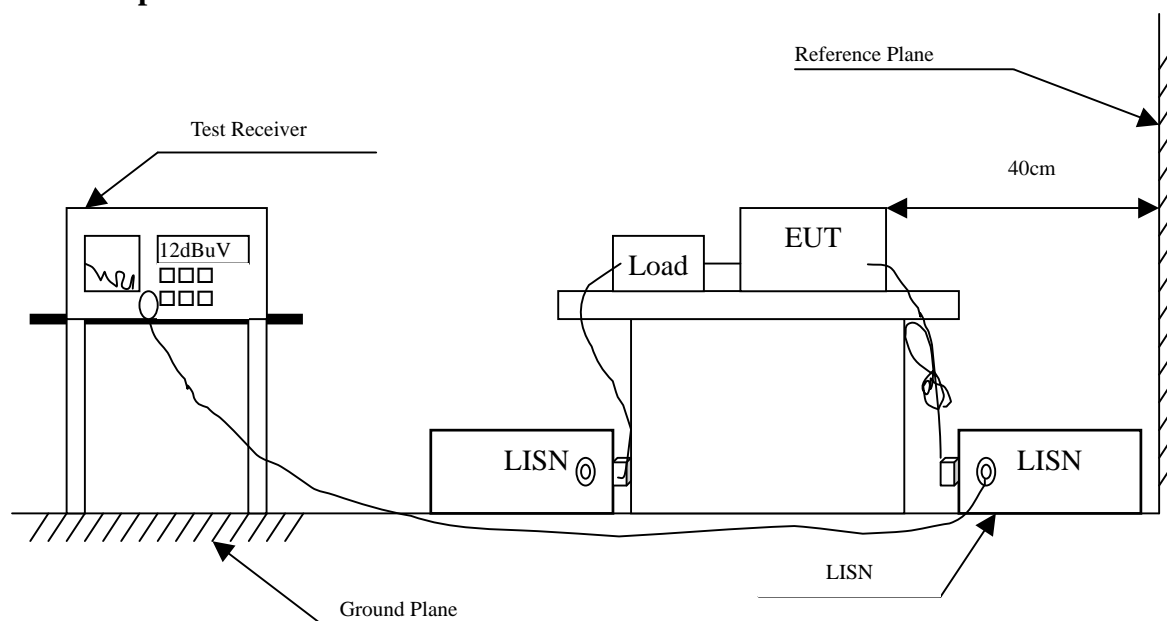
2.1. Test Equipment

	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., 2011	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2011	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2011	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2011	
	No.1 Shielded Room				

Note:

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

2.2. Test Setup



2.3. Limits

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

2.4. Test Procedure

The EUT and simulators 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 refers 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 of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.

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

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : 7"PORTABLE
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 1					
Quasi-Peak					
0.166	9.790	40.704	50.494	-15.049	65.543
0.198	9.790	22.876	32.666	-31.963	64.629
0.222	9.790	33.573	43.363	-20.580	63.943
0.278	9.790	26.575	36.365	-25.978	62.343
0.338	9.790	24.409	34.199	-26.430	60.629
3.494	9.820	18.324	28.144	-27.856	56.000
Average					
0.166	9.790	28.178	37.968	-17.575	55.543
0.198	9.790	11.040	20.830	-33.799	54.629
0.222	9.790	21.533	31.323	-22.620	53.943
0.278	9.790	16.988	26.778	-25.565	52.343
0.338	9.790	16.806	26.596	-24.033	50.629
3.494	9.820	12.646	22.466	-23.534	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 : 7"PORTABLE
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.166	9.790	35.790	45.580	-19.963	65.543
0.194	9.790	35.748	45.538	-19.205	64.743
0.222	9.790	30.416	40.206	-23.737	63.943
0.390	9.790	27.249	37.039	-22.104	59.143
3.642	9.820	14.739	24.559	-31.441	56.000
26.610	10.350	23.422	33.772	-26.228	60.000
Average					
0.166	9.790	19.285	29.075	-26.468	55.543
0.194	9.790	22.320	32.110	-22.633	54.743
0.222	9.790	18.222	28.012	-25.931	53.943
0.390	9.790	16.161	25.951	-23.192	49.143
3.642	9.820	8.944	18.764	-27.236	46.000
26.610	10.350	19.128	29.478	-20.522	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

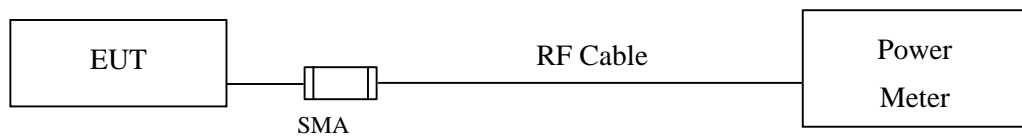
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2011
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2011

Note:

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

3.2. Test Setup

Conducted Measurement



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : 7"PORTABLE
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)				Peak Power	Required Limit	Result
		1	2	5.5	11	1		
		Measurement Level (dBm)						
01	2412	15.01				18.04	<30dBm	Pass
06	2437	14.54	14.52	14.51	14.47	17.56	<30dBm	Pass
11	2462	15.01				17.9	<30dBm	Pass

Note: Peak Power Output Value = Reading value on peak power meter + cable loss

Product : 7"PORTABLE
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
01	2412	11.83								21.17	<30dBm	Pass
06	2437	11.81	11.8	11.78	11.76	11.75	11.73	11.71	11.7	21.92	<30dBm	Pass
11	2462	11.99								20.76	<30dBm	Pass

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

Product : 7"PORTABLE
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	7.2		
		Measurement Level (dBm)										
01	2412	11.79								21.48	<30dBm	Pass
06	2437	11.81	11.79	11.78	11.75	11.74	11.73	11.71	11.69	21.92	<30dBm	Pass
11	2462	11.92								20.82	<30dBm	Pass

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

4. Radiated Emission

4.1. Test Equipment

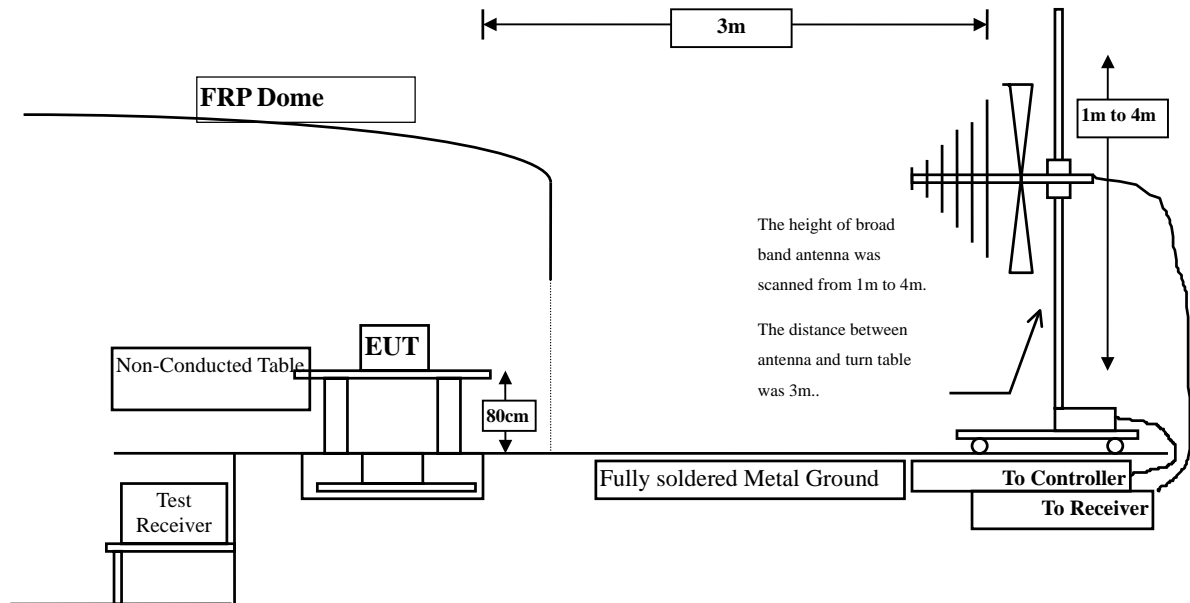
The following test equipment are used during the radiated emission test:

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., 2011
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

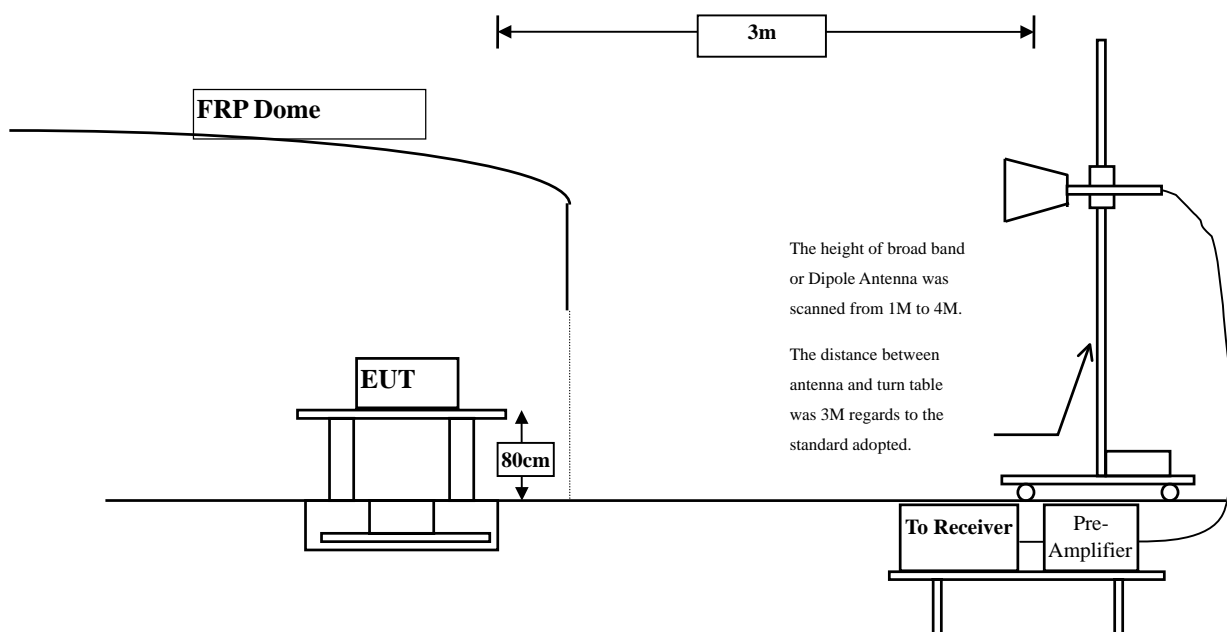
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.3. 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(a) 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: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

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

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2009 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 in the Open Area Test Site 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 : 7"PORTABLE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4824.000	3.261	58.280	61.541	-12.459	74.000
7236.000	10.650	44.710	55.360	-18.640	74.000
9648.000	13.337	36.280	49.616	-24.384	74.000
Average Detector:					
4824.000	3.261	45.200	48.461	-5.539	54.000
7236.000	10.650	31.800	42.450	-11.550	54.000
Vertical					
Peak Detector:					
4824.000	6.421	51.860	58.281	-15.719	74.000
7236.000	11.495	40.240	51.735	-22.265	74.000
9648.000	13.807	36.580	50.386	-23.614	74.000
Average Detector:					
4824.000	6.421	39.170	45.591	-8.409	54.000
7236.000	11.495	28.010	39.505	-14.495	54.000
9648.000	13.807	20.360	34.166	-19.834	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 : 7"PORTABLE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	3.038	57.560	60.597	-13.403	74.000
7311.000	11.795	43.650	55.444	-18.556	74.000
9748.000	12.635	36.660	49.295	-24.705	74.000
Average Detector:					
4874.000	3.038	44.480	47.517	-6.483	54.000
7311.000	11.795	30.060	41.854	-12.146	54.000
Vertical					
Peak Detector:					
4874.000	5.812	52.290	58.101	-15.899	74.000
7311.000	12.630	38.450	51.079	-22.921	74.000
9748.000	13.126	36.150	49.276	-24.724	74.000
Average Detector:					
4874.000	5.812	39.260	45.071	-8.929	54.000
7311.000	12.630	25.390	38.019	-15.981	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 : 7"PORTABLE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	2.858	56.950	59.807	-14.193	74.000
7386.000	12.127	40.080	52.208	-21.792	74.000
9848.000	12.852	36.130	48.983	-25.017	74.000
Average Detector:					
4924.000	2.858	44.020	46.877	-7.123	54.000
7386.000	12.127	26.950	39.078	-14.922	54.000
Vertical					
Peak Detector:					
4924.000	5.521	52.540	58.060	-15.940	74.000
7386.000	13.254	36.930	50.184	-23.816	74.000
9848.000	13.367	36.440	49.807	-24.193	74.000
Average Detector:					
4924.000	5.521	39.810	45.330	-8.670	54.000
7386.000	13.254	23.700	36.954	-17.046	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 : 7"PORTABLE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	3.261	52.920	56.181	-17.819	74.000
7236.000	10.650	42.520	53.170	-20.830	74.000
9648.000	13.337	36.100	49.436	-24.564	74.000
Average Detector:					
4824.000	3.261	37.290	40.551	-13.449	54.000
7236.000	10.650	26.390	37.040	-16.960	54.000
Vertical					
Peak Detector:					
4824.000	6.421	46.500	52.921	-21.079	74.000
7236.000	11.495	39.220	50.715	-23.285	74.000
9648.000	13.807	36.190	49.996	-24.004	74.000
Average Detector:					
4824.000	6.421	31.360	37.781	-16.219	54.000
7236.000	11.495	24.200	35.695	-18.305	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 : 7"PORTABLE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	3.038	52.760	55.797	-18.203	74.000
7311.000	11.795	40.940	52.734	-21.266	74.000
9748.000	12.635	36.220	48.855	-25.145	74.000
Average Detector:					
4874.000	3.038	36.980	40.017	-13.983	54.000
7311.000	11.795	25.060	36.854	-17.146	54.000
Peak Detector:					
4874.000	5.812	46.340	52.151	-21.849	74.000
7311.000	12.630	36.490	49.119	-24.881	74.000
9748.000	13.126	36.010	49.136	-24.864	74.000
Average Detector:					
4874.000	5.812	31.210	37.021	-16.979	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 : 7"PORTABLE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	2.858	52.360	55.217	-18.783	74.000
7386.000	12.127	39.010	51.138	-22.862	74.000
9848.000	12.852	36.290	49.143	-24.857	74.000
Average Detector:					
4924.000	2.858	36.490	39.347	-14.653	54.000
7386.000	12.127	23.990	36.118	-17.882	54.000
Vertical					
Peak Detector:					
4924.000	5.521	47.970	53.490	-20.510	74.000
7386.000	13.254	35.180	48.434	-25.566	74.000
9848.000	13.367	36.410	49.777	-24.223	74.000
Average Detector:					
4924.000	5.521	32.830	38.350	-15.650	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 : 7"PORTABLE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	3.261	52.900	56.161	-17.839	74.000
7236.000	10.650	41.920	52.570	-21.430	74.000
9648.000	13.337	36.020	49.356	-24.644	74.000
Average Detector:					
4824.000	3.261	37.700	40.961	-13.039	54.000
7236.000	10.650	26.820	37.470	-16.530	54.000
Vertical					
Peak Detector:					
4824.000	6.421	46.550	52.971	-21.029	74.000
7236.000	11.495	38.250	49.745	-24.255	74.000
9648.000	13.807	35.740	49.546	-24.454	74.000
Average Detector:					
4824.000	6.421	31.420	37.841	-16.159	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 : 7"PORTABLE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal

Peak Detector:

4874.000	3.038	52.400	55.437	-18.563	74.000
7311.000	11.795	40.600	52.394	-21.606	74.000
9748.000	12.635	36.350	48.985	-25.015	74.000

Average Detector:

4874.000	3.038	36.460	39.497	-14.503	54.000
7311.000	11.795	24.890	36.684	-17.316	54.000

Vertical

Peak Detector:

4874.000	5.812	46.630	52.441	-21.559	74.000
7311.000	12.630	36.630	49.259	-24.741	74.000
9748.000	13.126	36.180	49.306	-24.694	74.000

Average Detector:

4874.000	5.812	31.650	37.461	-16.539	54.000
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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 : 7"PORTABLE
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	2.858	52.010	54.867	-19.133	74.000
7386.000	12.127	39.030	51.158	-22.842	74.000
9848.000	12.852	36.490	49.343	-24.657	74.000
Average Detector:					
4924.000	2.858	35.570	38.427	-15.573	54.000
7386.000	12.127	23.920	36.048	-17.952	54.000
Vertical					
Peak Detector:					
4924.000	5.521	47.050	52.570	-21.430	74.000
7386.000	13.254	35.390	48.644	-25.356	74.000
9848.000	13.367	35.970	49.337	-24.663	74.000
Average Detector:					
4924.000	5.521	31.970	37.490	-16.510	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 : 7"PORTABLE
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
41.640	-3.949	33.706	29.757	-10.243	40.000
159.980	-11.775	37.386	25.611	-17.889	43.500
379.200	-1.005	31.266	30.260	-15.740	46.000
480.080	-0.329	32.717	32.388	-13.612	46.000
608.120	4.384	30.897	35.281	-10.719	46.000
877.780	5.679	30.473	36.152	-9.848	46.000
Vertical					
62.980	-5.003	39.661	34.658	-5.342	40.000
125.060	-4.046	37.350	33.304	-10.196	43.500
159.980	-6.185	38.542	32.357	-11.143	43.500
524.700	-0.379	34.170	33.791	-12.209	46.000
875.840	1.621	33.257	34.878	-11.122	46.000
967.020	8.071	29.032	37.103	-16.897	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 : 7"PORTABLE
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
103.720	-6.751	30.052	23.300	-20.200	43.500
385.020	-1.350	32.583	31.233	-14.767	46.000
511.120	1.499	32.204	33.703	-12.297	46.000
604.240	4.770	29.256	34.026	-11.974	46.000
825.400	6.250	29.376	35.626	-10.374	46.000
926.280	6.491	30.713	37.204	-8.796	46.000
Vertical					
62.980	-5.003	38.790	33.787	-6.213	40.000
159.980	-6.185	37.985	31.800	-11.700	43.500
385.020	-2.820	30.803	27.983	-18.017	46.000
524.700	-0.379	34.226	33.847	-12.153	46.000
699.300	0.695	31.376	32.071	-13.929	46.000
875.840	1.621	34.101	35.722	-10.278	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 : 7"PORTABLE
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
97.900	-7.650	33.291	25.640	-17.860	43.500
319.060	-4.317	32.459	28.142	-17.858	46.000
513.060	1.550	32.723	34.273	-11.727	46.000
602.300	4.287	30.299	34.586	-11.414	46.000
761.380	4.345	30.904	35.249	-10.751	46.000
922.400	6.334	29.729	36.063	-9.937	46.000
Vertical					
51.340	-7.145	39.031	31.886	-8.114	40.000
159.980	-6.185	37.421	31.236	-12.264	43.500
375.320	-2.029	30.693	28.664	-17.336	46.000
524.700	-0.379	34.929	34.550	-11.450	46.000
699.300	0.695	33.673	34.368	-11.632	46.000
875.840	1.621	34.140	35.761	-10.239	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.

5. RF antenna conducted test

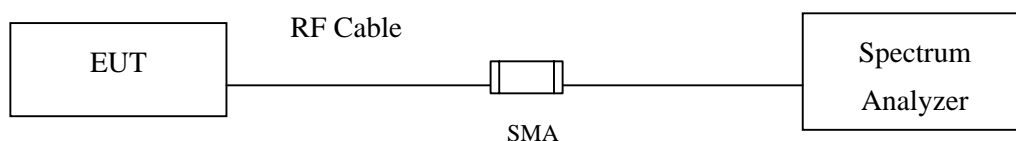
5.1. Test Equipment

	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

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

5.2. Test Setup

RF antenna Conducted Measurement:



5.3. Limits

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)).

5.4. Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

5.5. Uncertainty

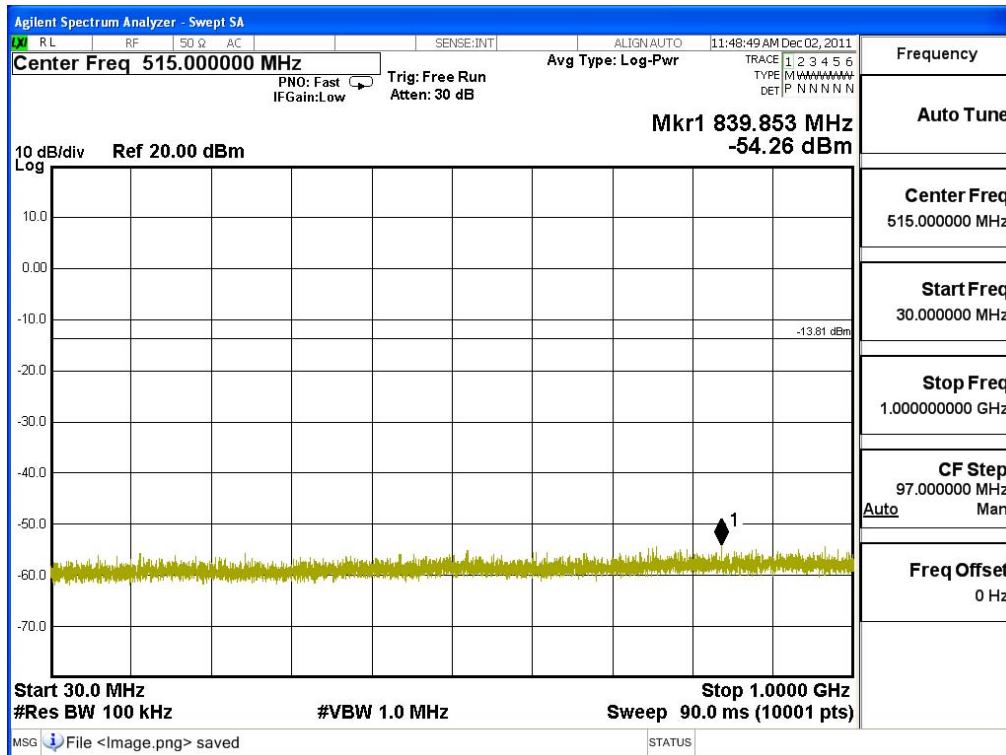
The measurement uncertainty

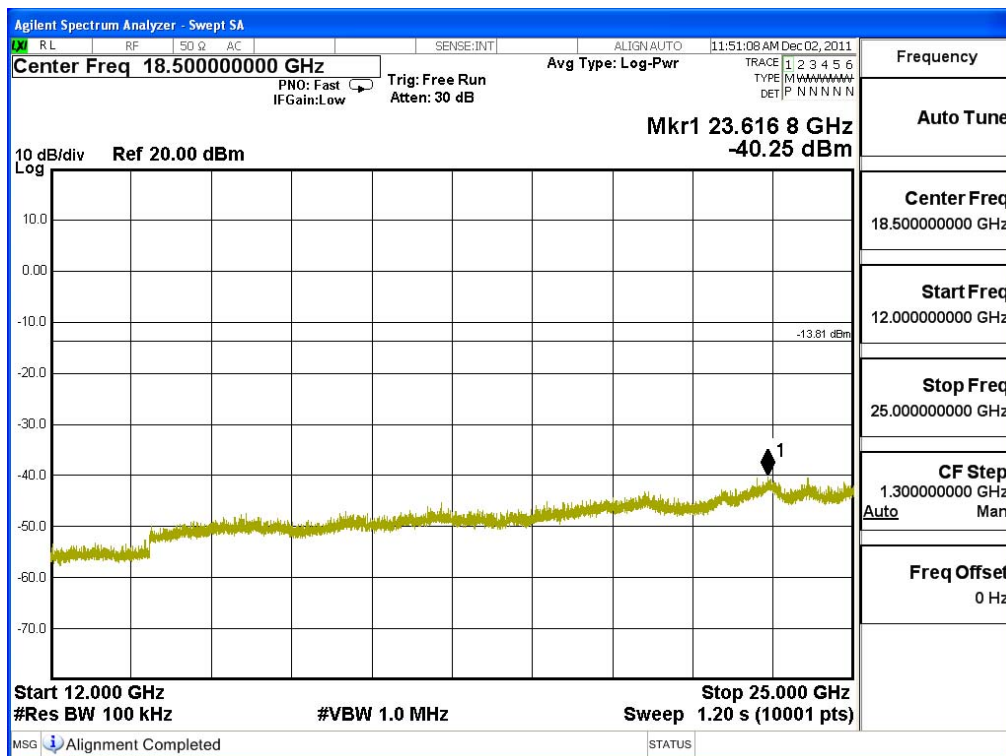
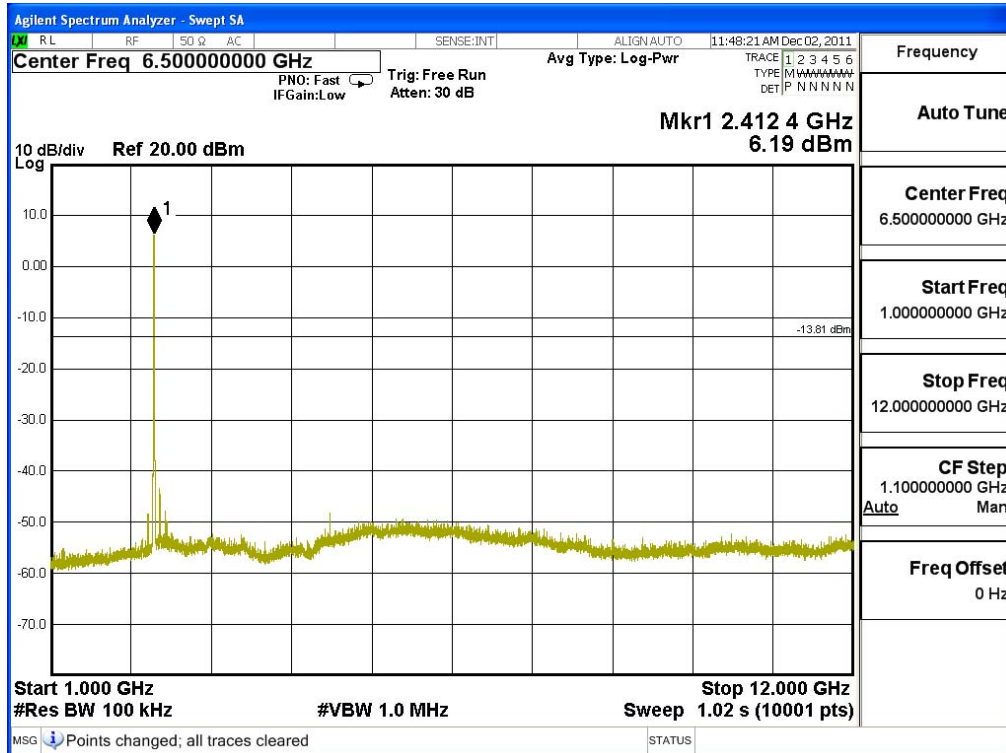
Conducted is defined as $\pm 1.27\text{dB}$

5.6. Test Result of RF antenna conducted test

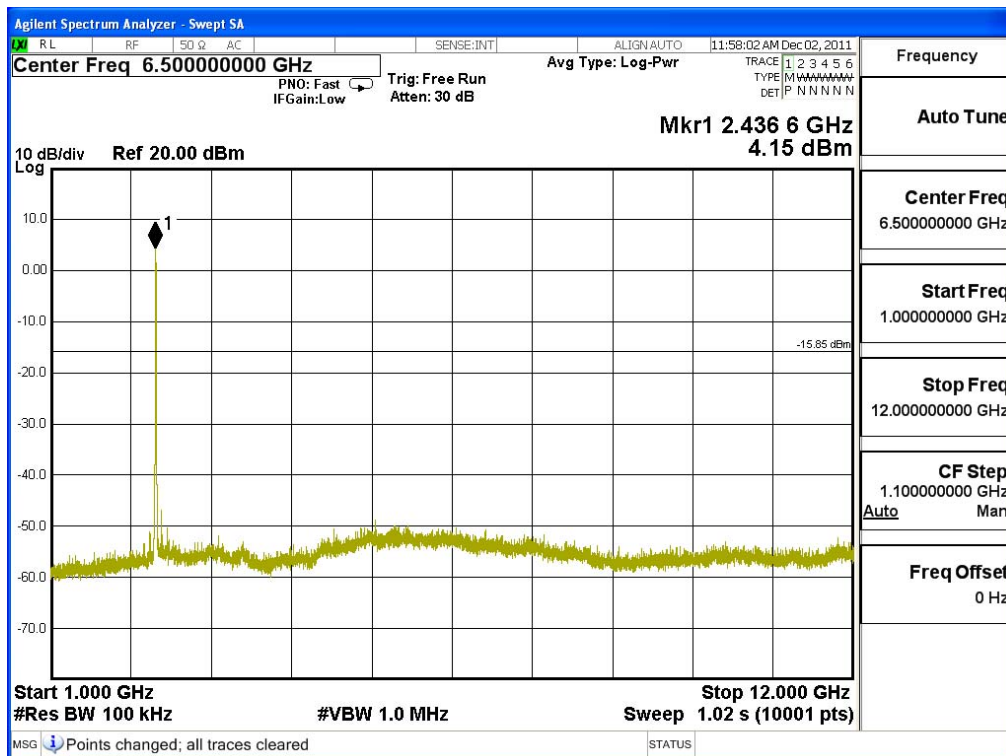
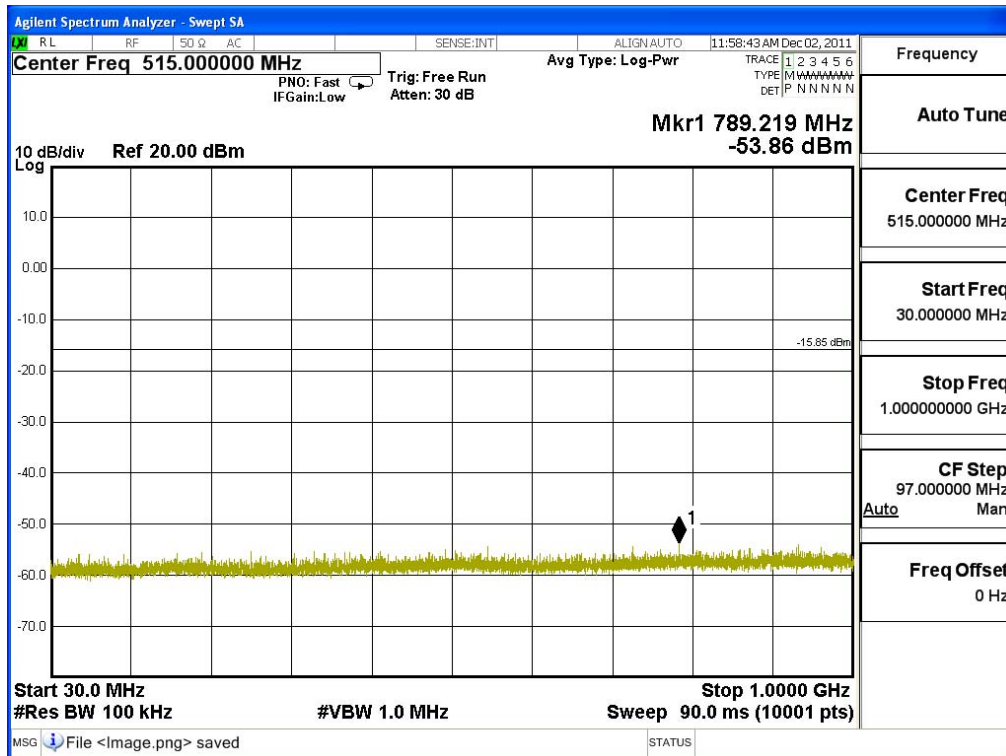
Product : 7"PORTABLE
 Test Item : RF antenna conducted test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

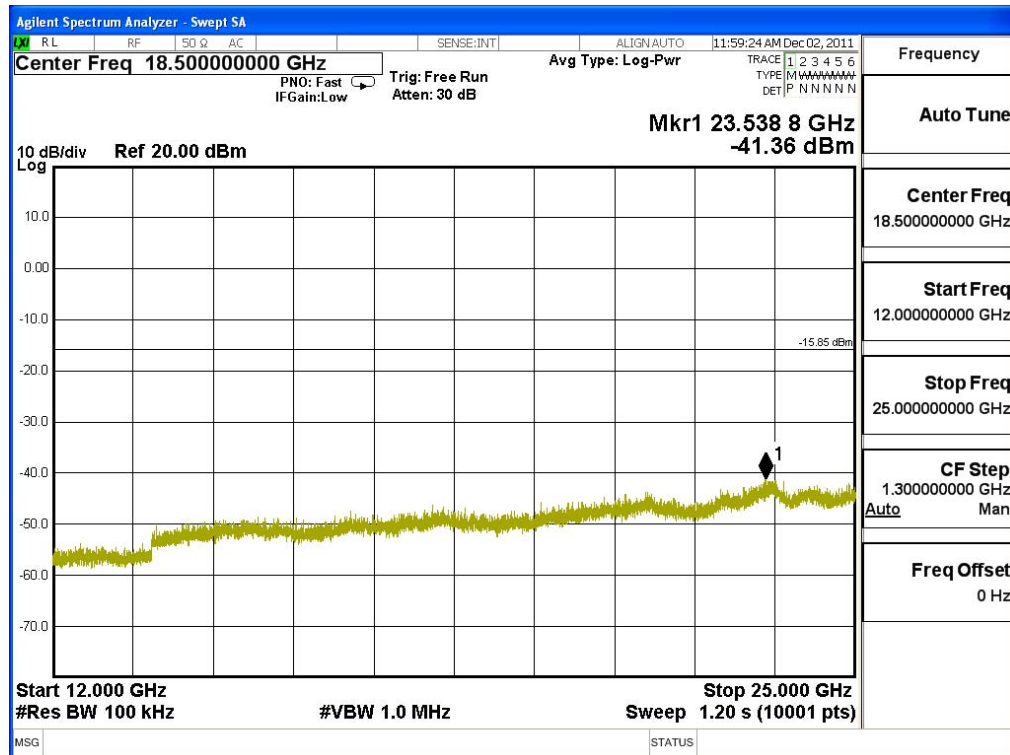
Channel 01 (2412MHz)



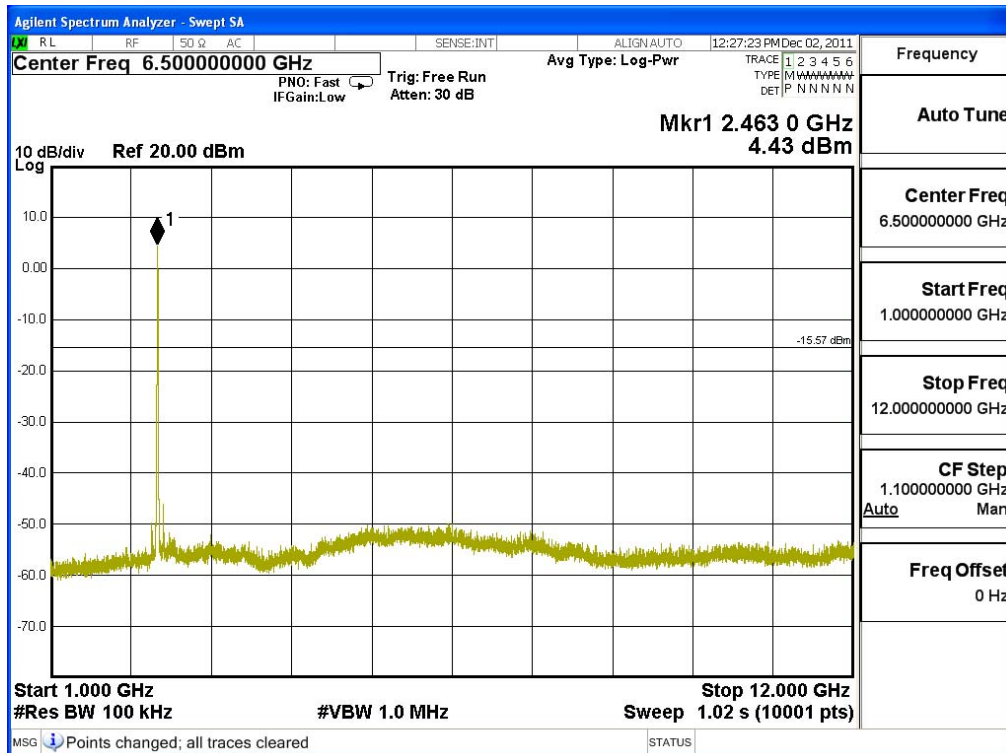
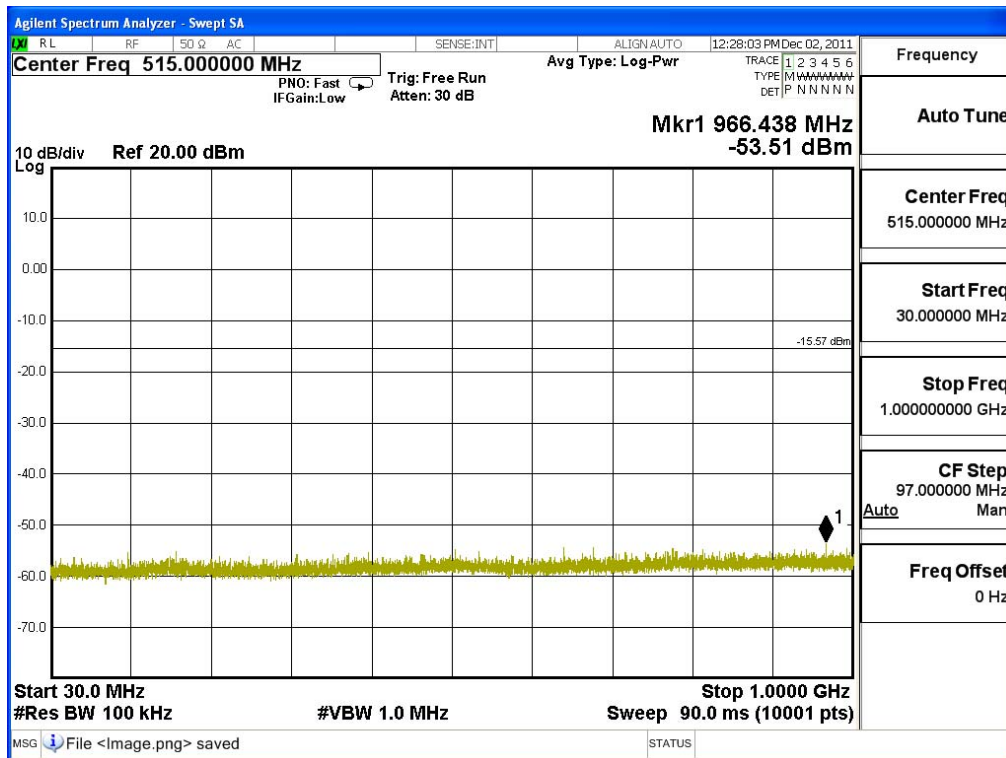


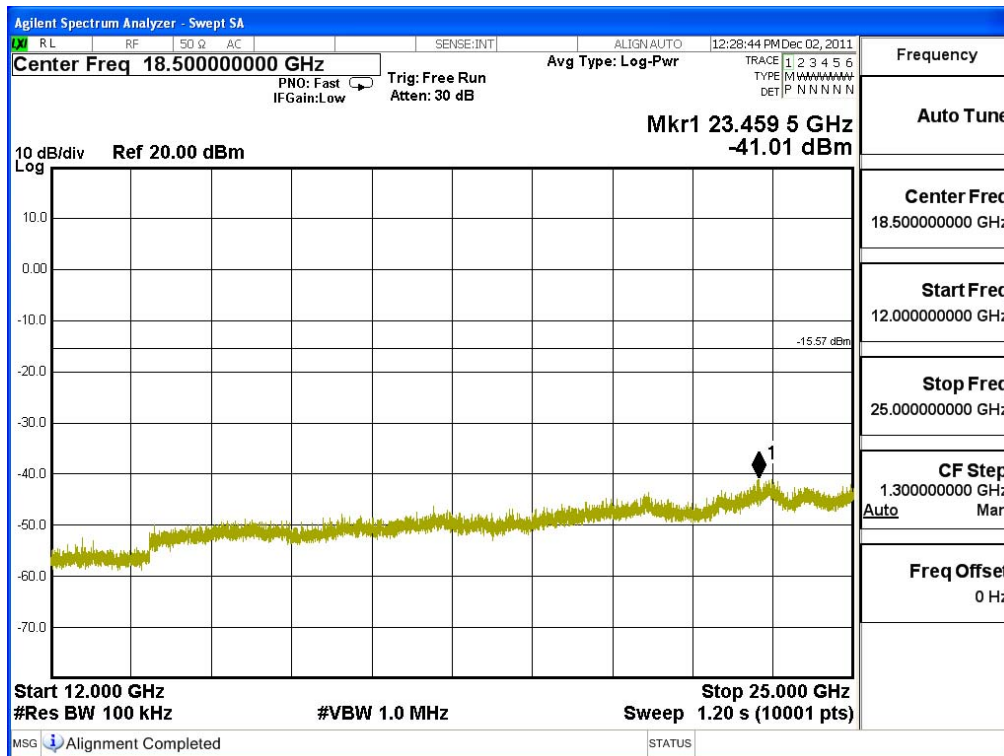
Channel 06 (2437MHz)





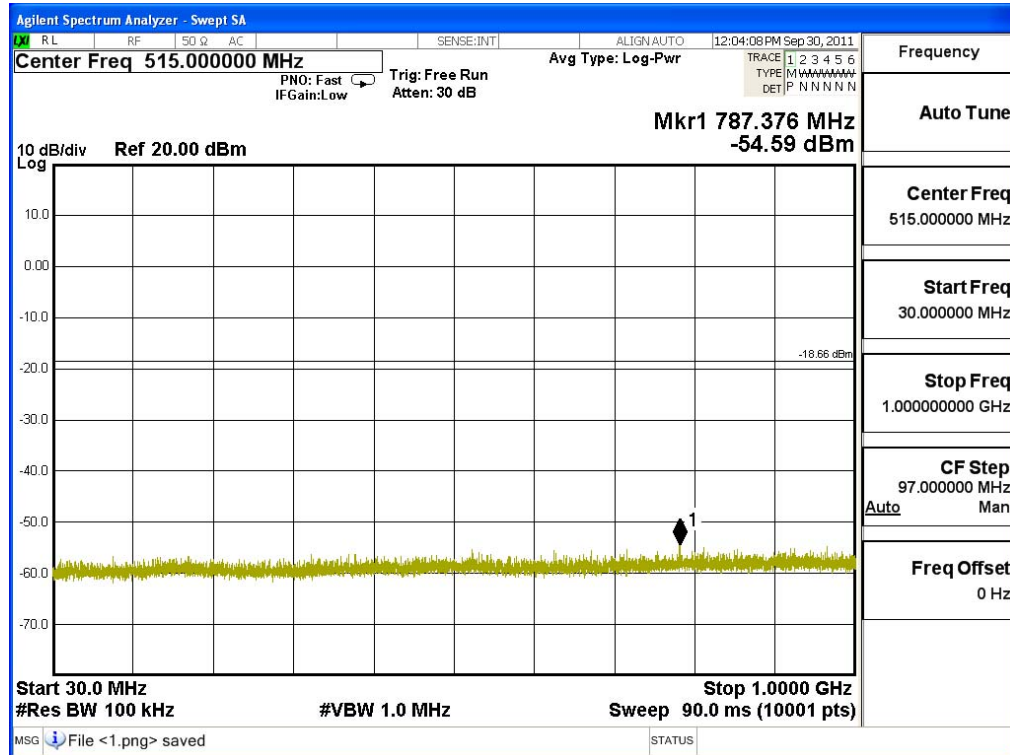
Channel 11 (2462MHz)

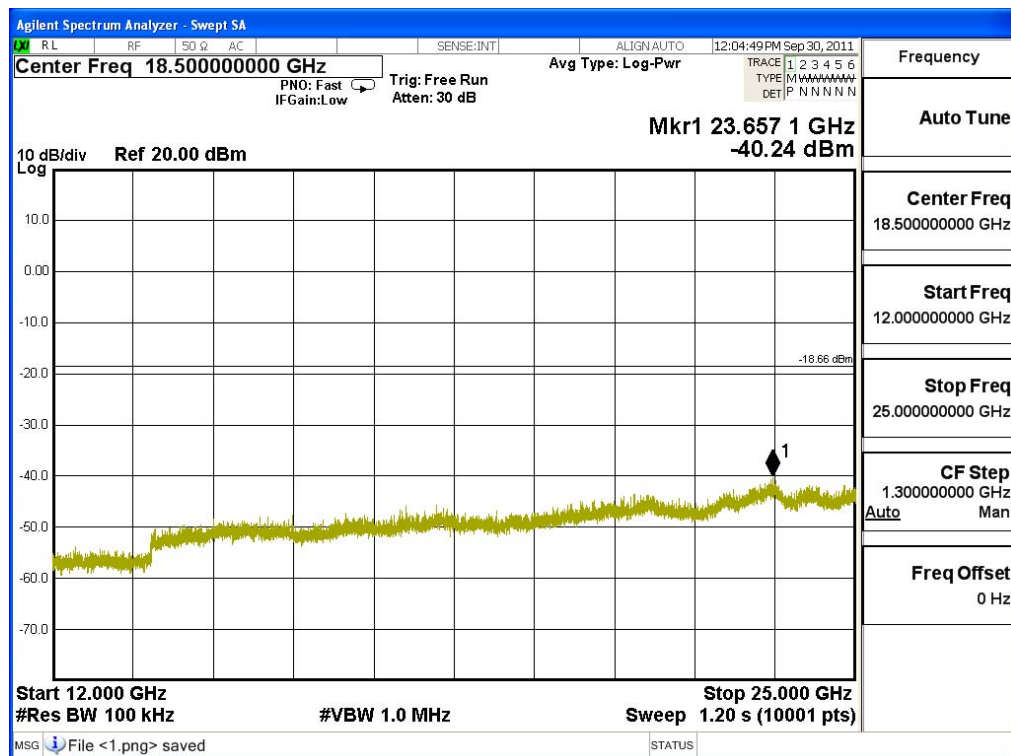
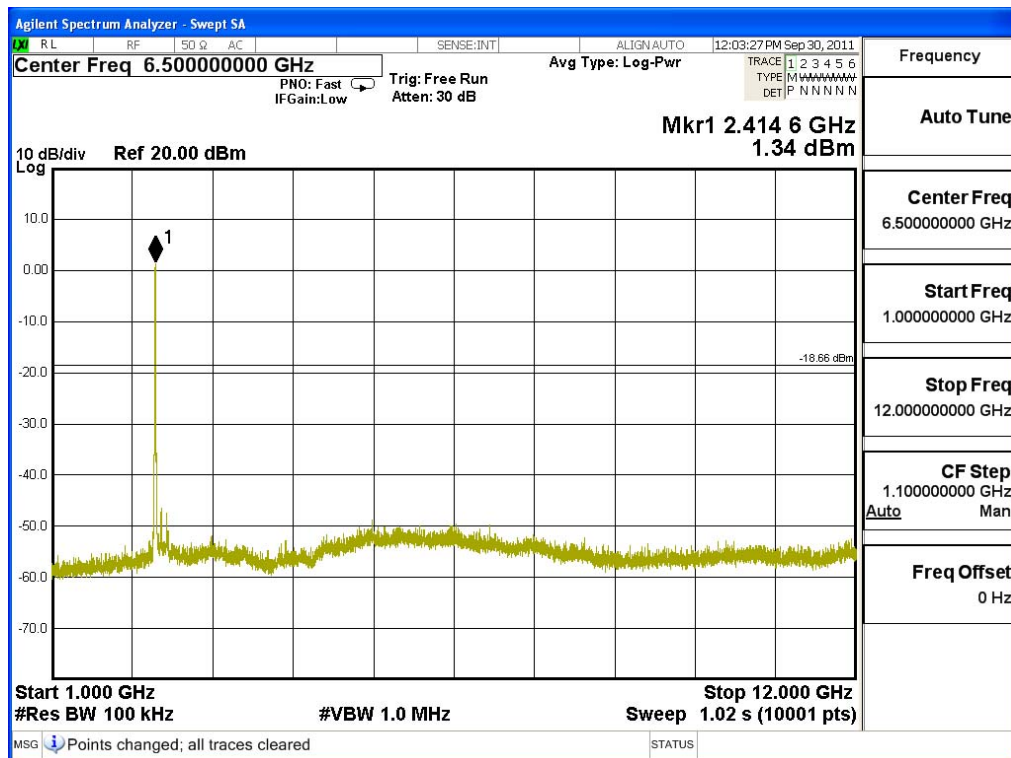




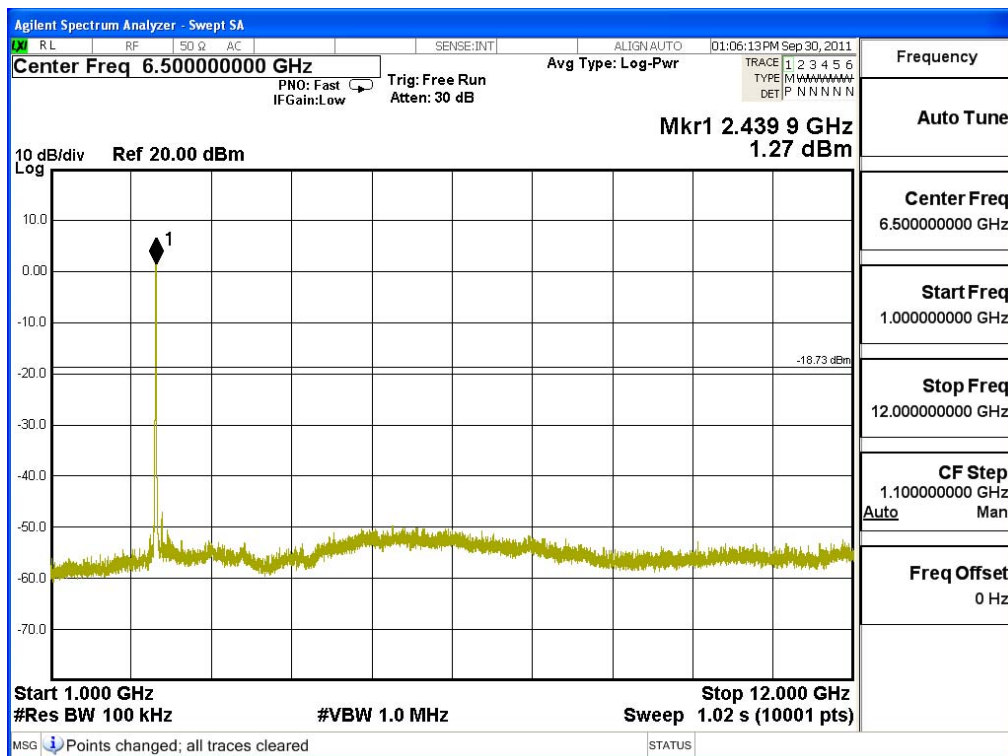
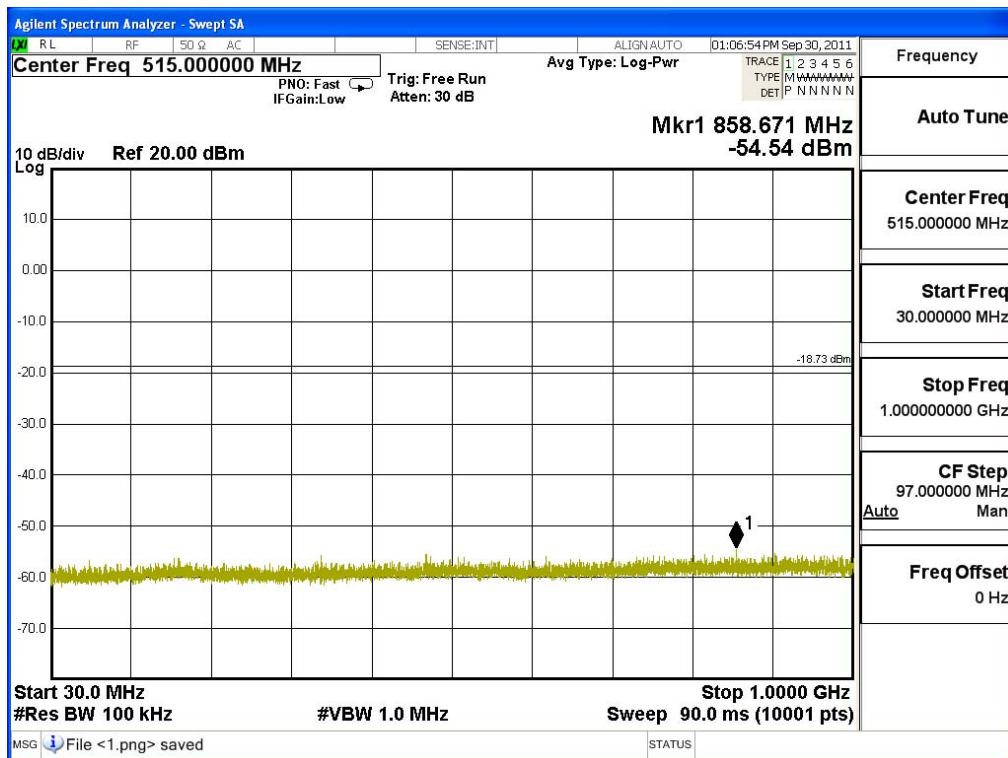
Product : 7"PORTABLE
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

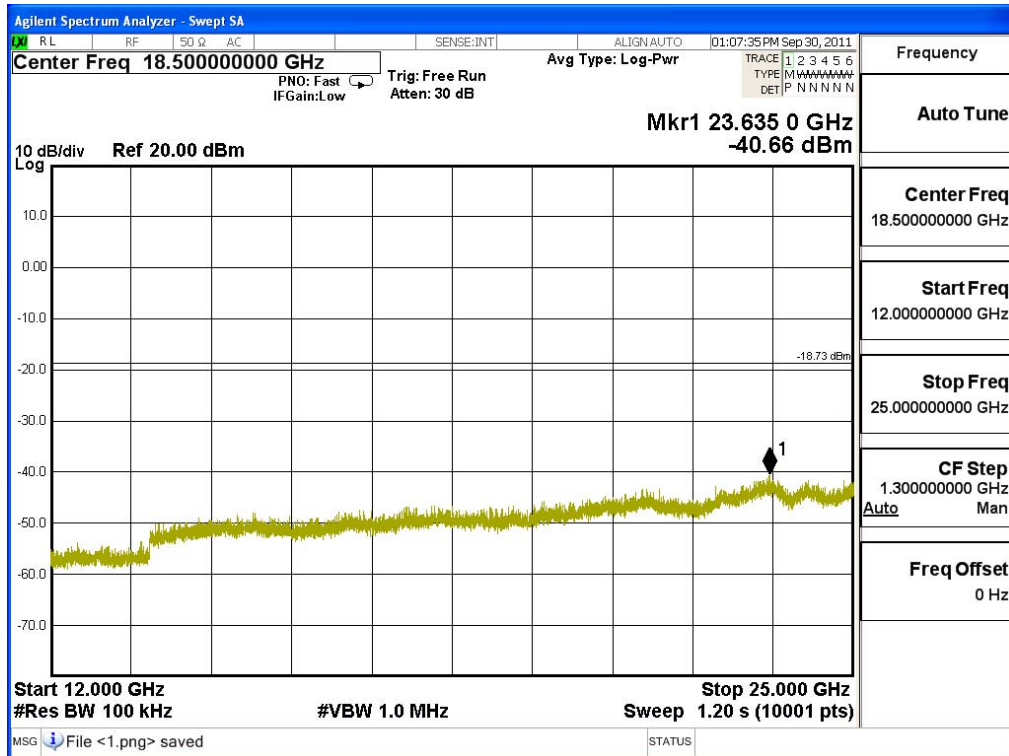
Channel 01 (2412MHz)



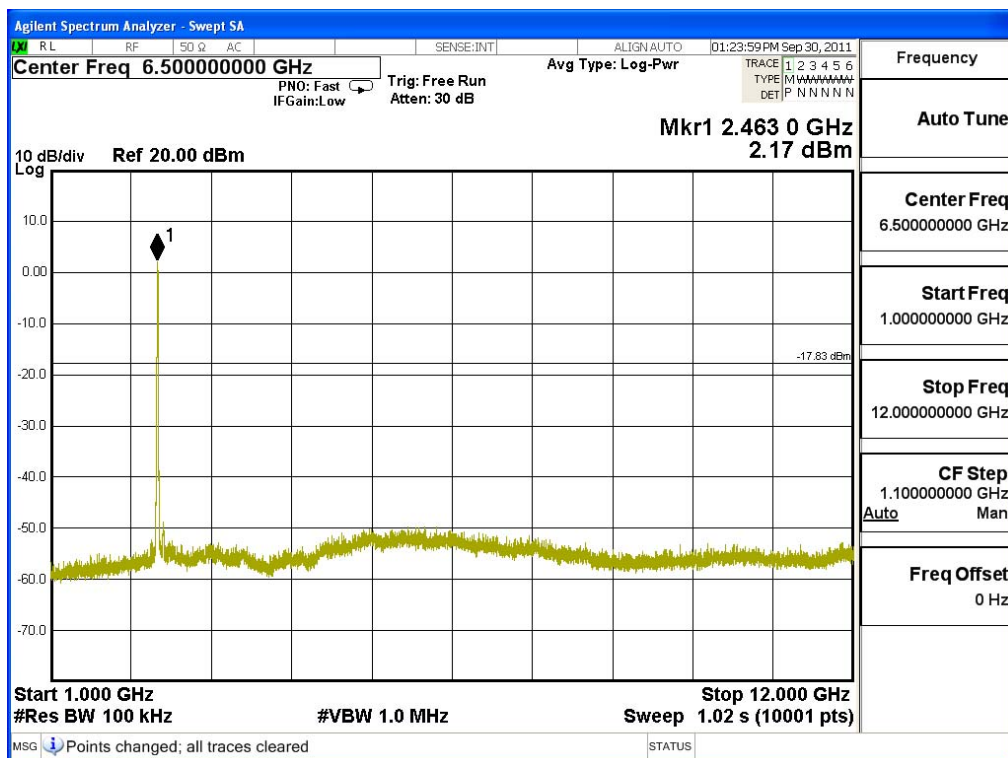
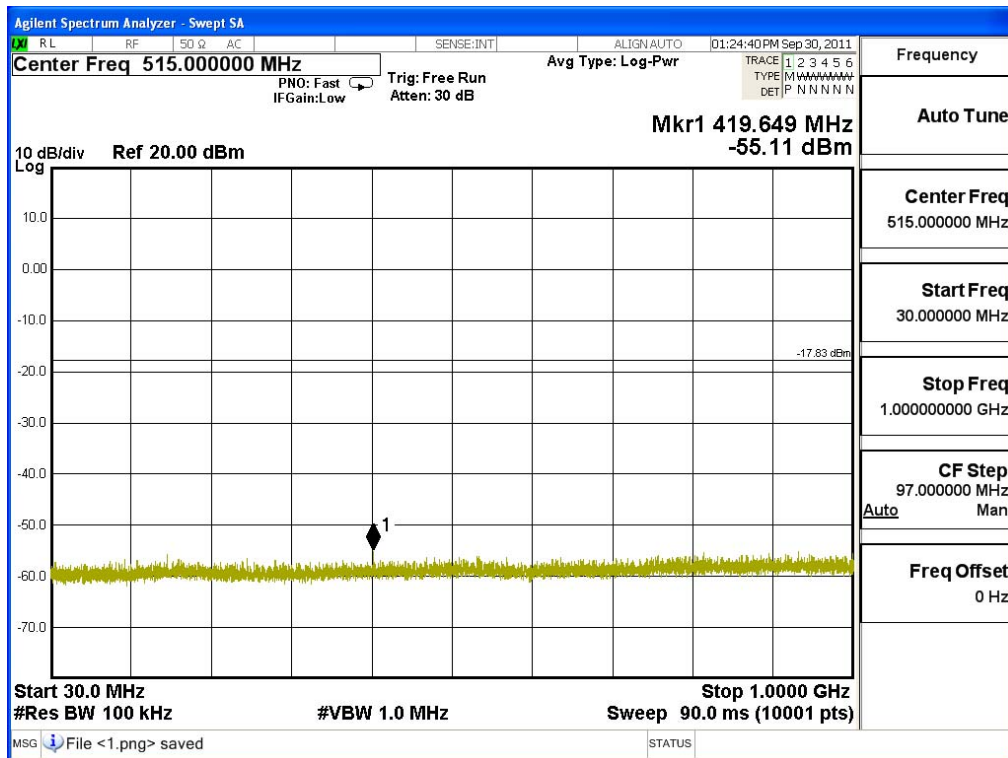


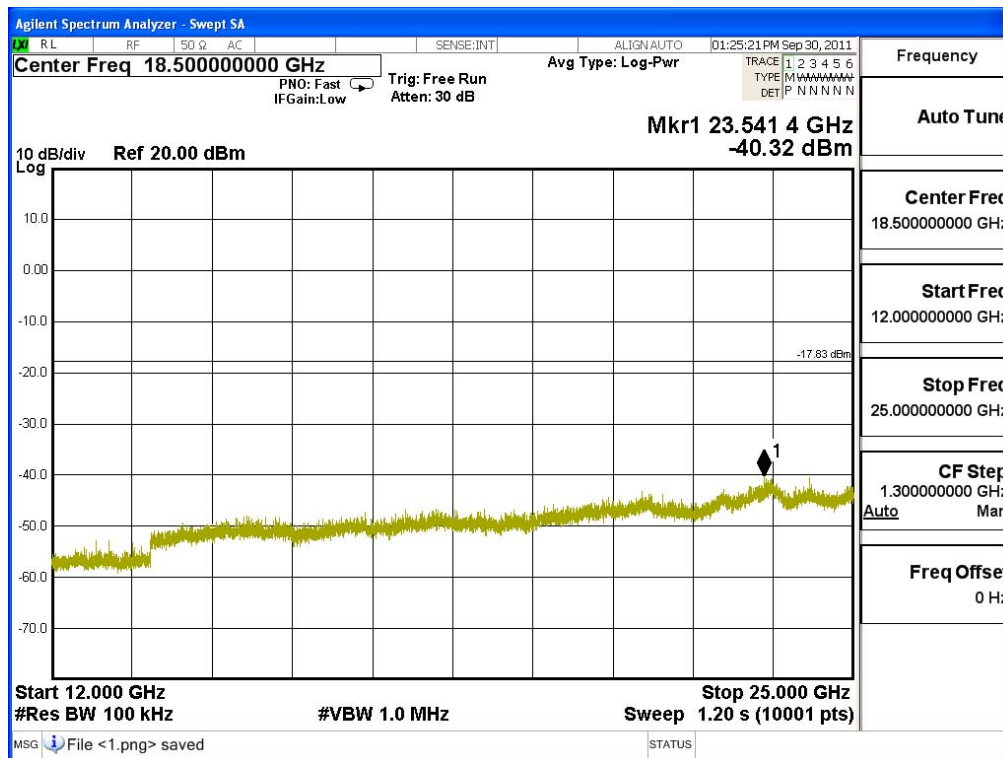
Channel 06 (2437MHz)





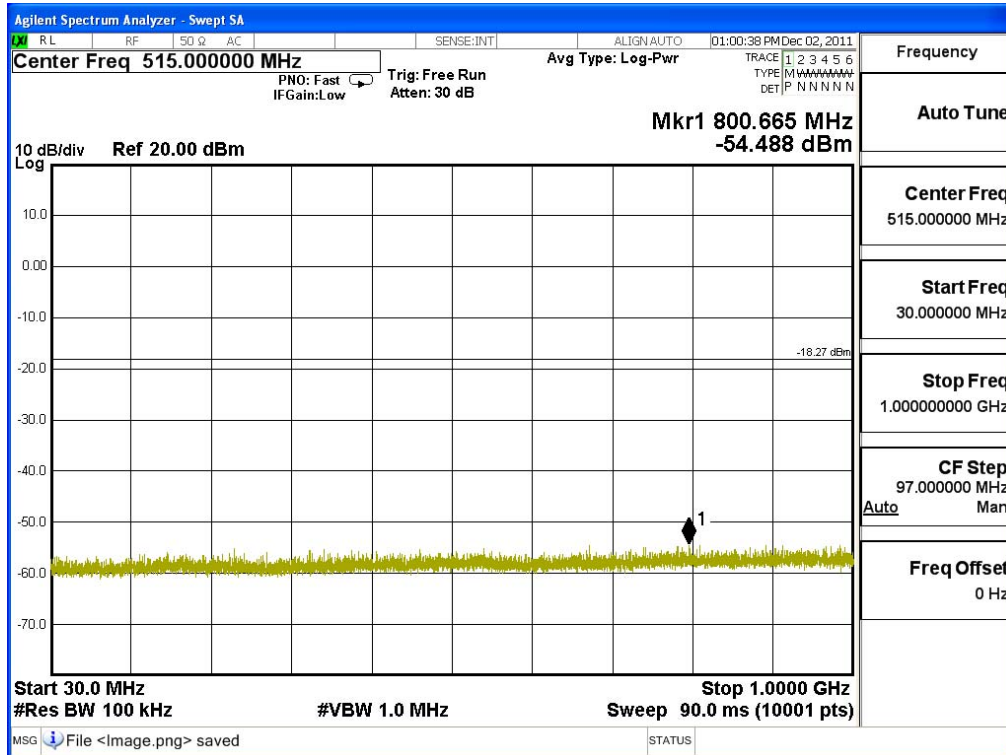
Channel 11 (2462MHz)

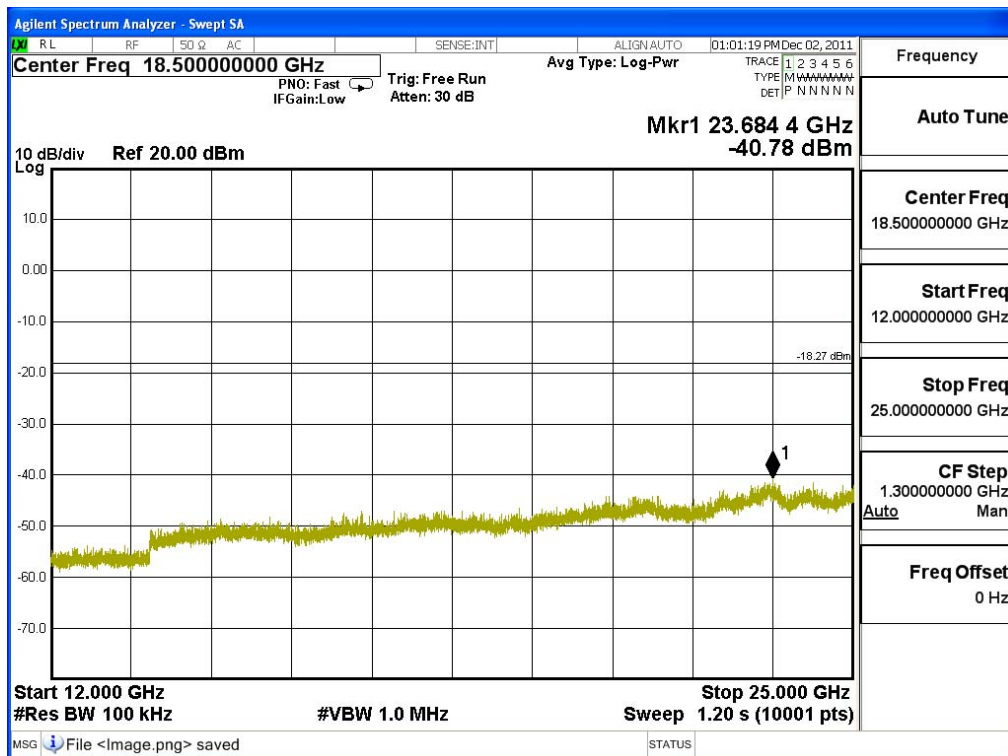
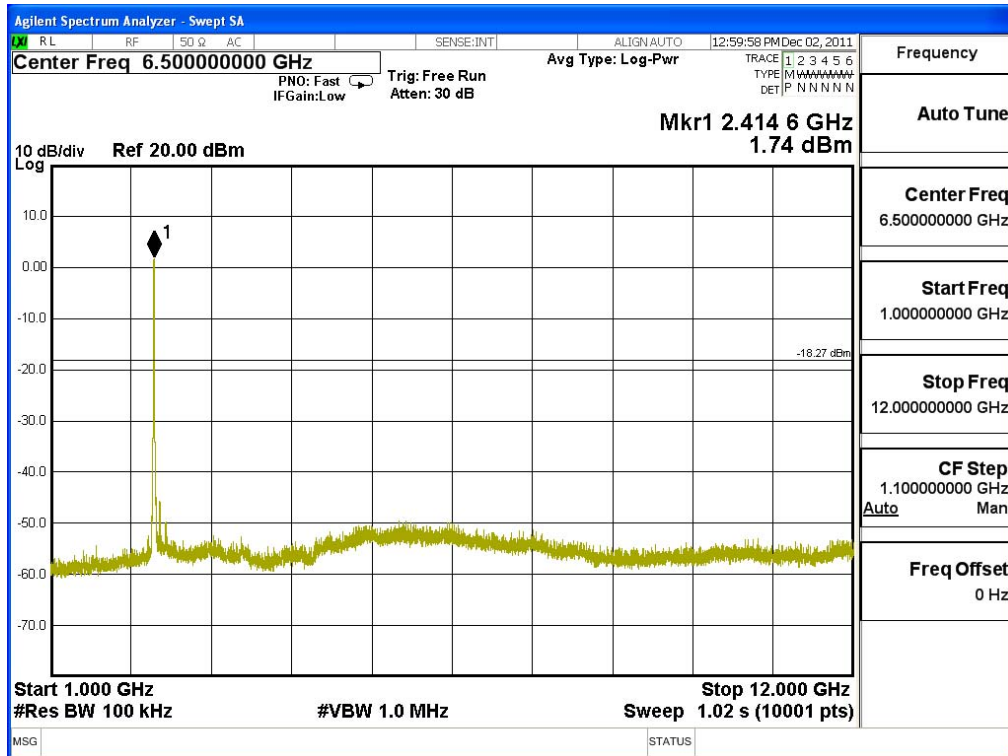




Product : 7"PORTABLE
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel 01 (2412MHz)





Channel 06 (2437MHz)

