Test Report

Product Name	Portable Data Collection Terminal
Model No	MM3
FCC ID	U7X-MM3

Applicant	M3 Mobile Co., Ltd.
Address	DongWon B/D, 725-30, Yeoksam-dong, Gangnam-gu, Seoul, 135-080, Korea

Date of Receipt	July 30, 2009
Issued Date	Sep. 14, 2009
Report No.	098068S-CUSTOM-B
Report Version	V1.0

Test Report Certification

Issued Date: Sep. 14, 2009
Report No.: 098068S-CUSTOM-B

Accredited by NIST (NVLAP)
NVLAP Lab Code: 200533-0

Product Name	Portable Data Collection Terminal
Applicant	M3 Mobile Co., Ltd.
Address	DongWon B/D, 725-30, Yeoksam-dong, Gangnam-gu, Seoul, 135-080, Korea
Manufacturer	M3 Mobile Co., Ltd.
Model No.	MM3
EUT Rated Voltage	AC 120V/60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	Hand Held Terminal
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E: 2008 ANSI C63.4: 2003 NVLAP Lab Code: 200533-0
Test Result	Complied

The Test Results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

(Vincent Lin)
Approval

(Tom Hsieh)
Test Engineer

TABLE OF CONTENTS

Description Page

1. Undesirable Emission

1.1. Test Equipment

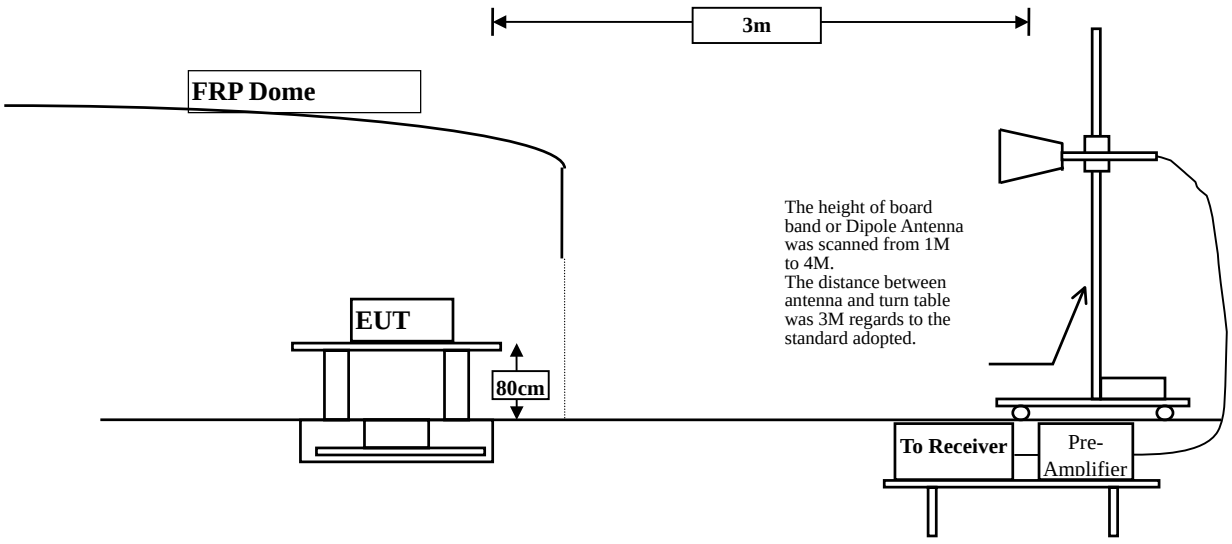
The following test equipment are used during the radiated emission test:

Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2009
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2009
	X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2009
	X	Horn Antenna	ETS	3115 / 0005-6160	July, 2009
	X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2009

Note: 1. All equipments are calibrated every one year.

2. The test instruments marked by "X" are used to measure the final test results.

1.2. Test Setup



1.3. Limits

Inside of the restricted band(section 15.205): Apply to 15.209 limit.

Outside of the restricted band (section 15.407):

5 .15GHz - 5.35 GHz < -27 dBm/MHz EIRP,

5.47GHz - 5.725 GHz < -27 dBm/MHz EIRP,

5.725GHz - 5.825 GHz < -27 dBm/MHz EIRP,

<-17 dBm/MHz EIRP (all emission within the frequency range from the band edge to 10 MHz above or below the band edge).

1.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to FCC Public Notice DA 02-2138 test procedure for compliance to FCC 47CFR 15. 407 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.

1.5. Uncertainty

± 3.8 dB below 1GHz

± 3.9 dB above 1GHz

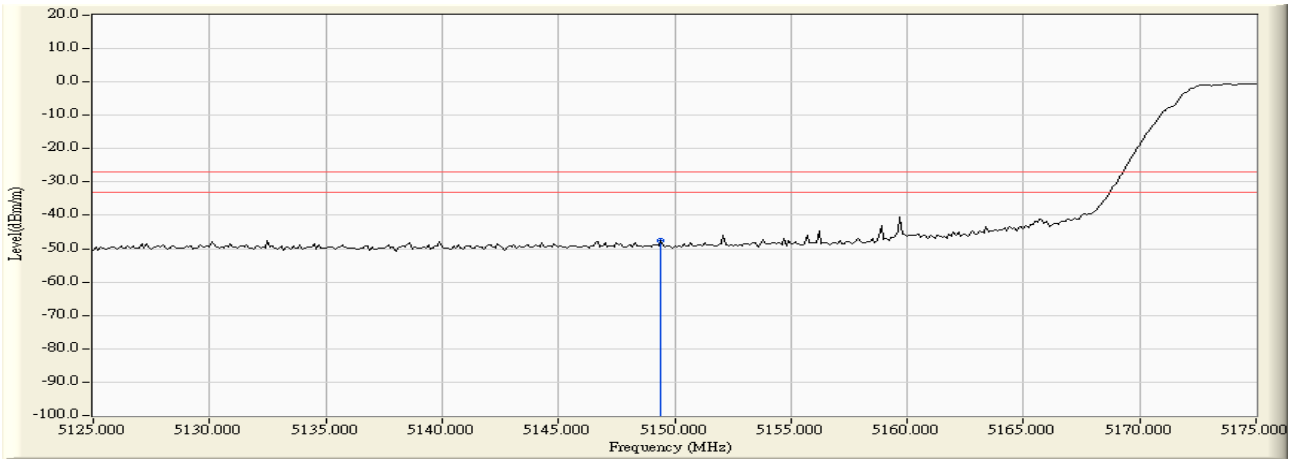
1.6. Test Result of Undesirable Emission

Product : Portable Data Collection Terminal
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5180MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
36 (Peak)	5149.400	14.534	-62.210	-47.676	-20.676	-27.000	Pass

Figure Channel 36: Horizontal (Peak)



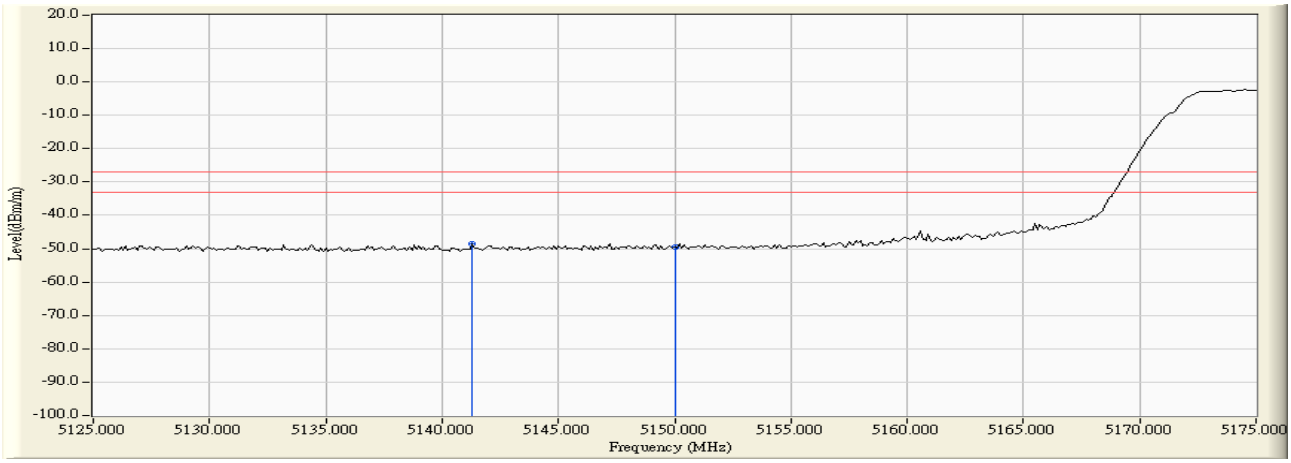
Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : Portable Data Collection Terminal
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5180MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
36 (Peak)	5141.300	14.233	-62.700	-48.467	-21.467	-27.000	Pass
36 (Peak)	5150.000	14.177	-63.788	-49.611	-22.611	-27.000	Pass

Figure Channel 36: Vertical (Peak)



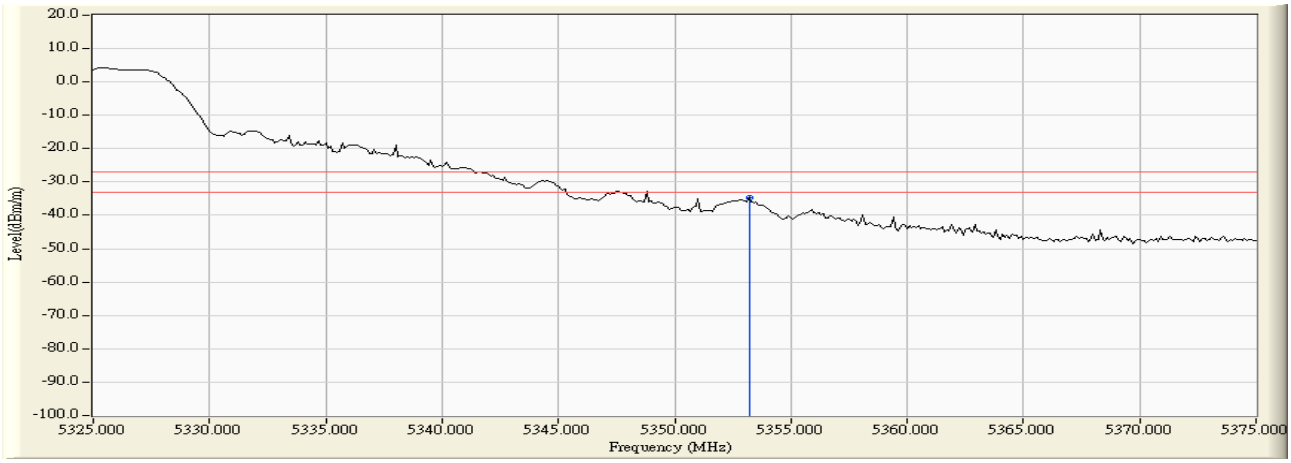
Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : Portable Data Collection Terminal
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5320MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
64 (Peak)	5353.200	13.710	-48.435	-34.725	-7.725	-27.000	Pass

Figure Channel 64: Horizontal (Peak)



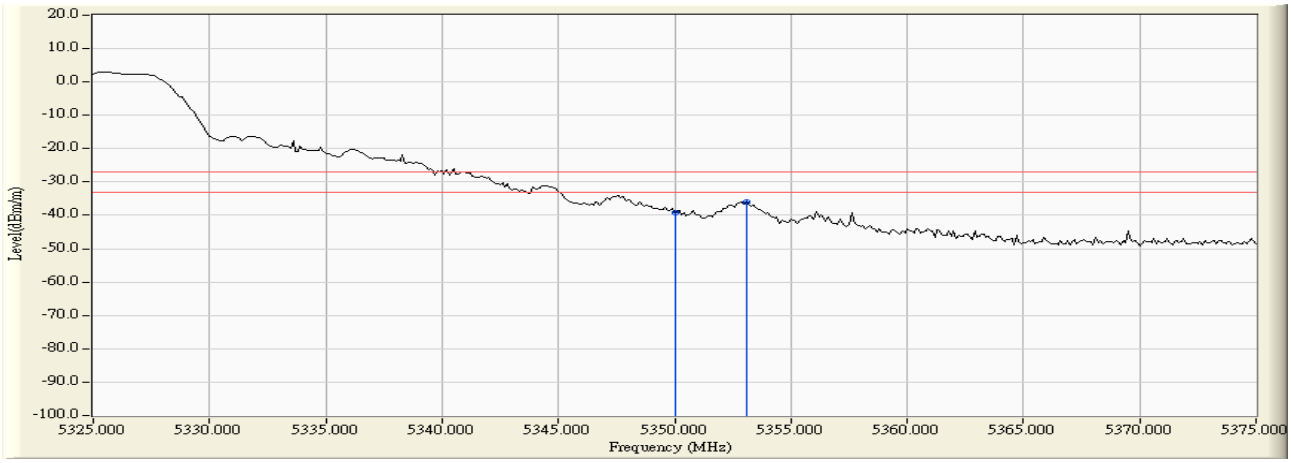
Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : Portable Data Collection Terminal
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5320MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
64 (Peak)	5350.000	13.244	-52.393	-39.149	-12.149	-27.000	Pass
64 (Peak)	5353.100	13.268	-49.362	-36.094	-9.094	-27.000	Pass

Figure Channel 64: Vertical (Peak)



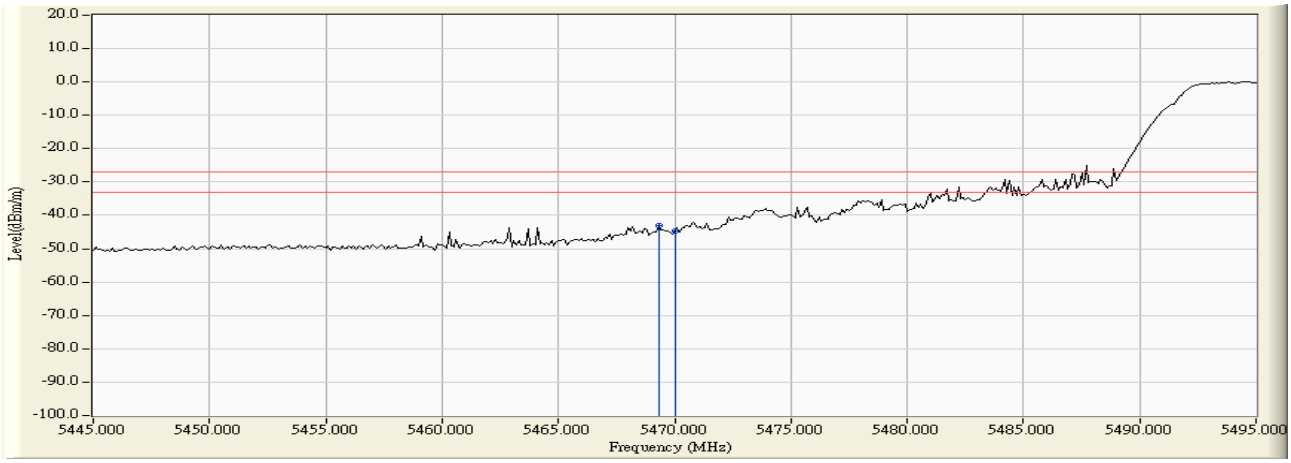
Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : Portable Data Collection Terminal
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5500MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
100 (Peak)	5469.300	14.188	-57.358	-43.170	-16.170	-27.000	Pass
100 (Peak)	5470.000	14.189	-58.936	-44.747	-17.747	-27.000	Pass

Figure Channel 100: Horizontal (Peak)



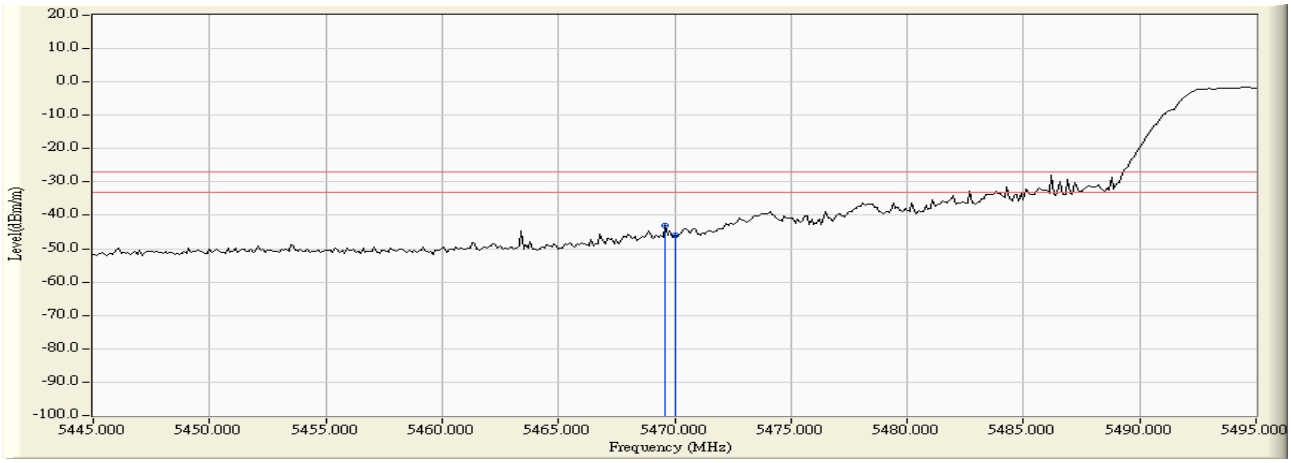
Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : Portable Data Collection Terminal
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5500MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
100 (Peak)	5469.600	13.630	-56.605	-42.975	-15.975	-27.000	Pass
100 (Peak)	5470.000	13.630	-59.686	-46.056	-19.056	-27.000	Pass

Figure Channel 100: Vertical (Peak)



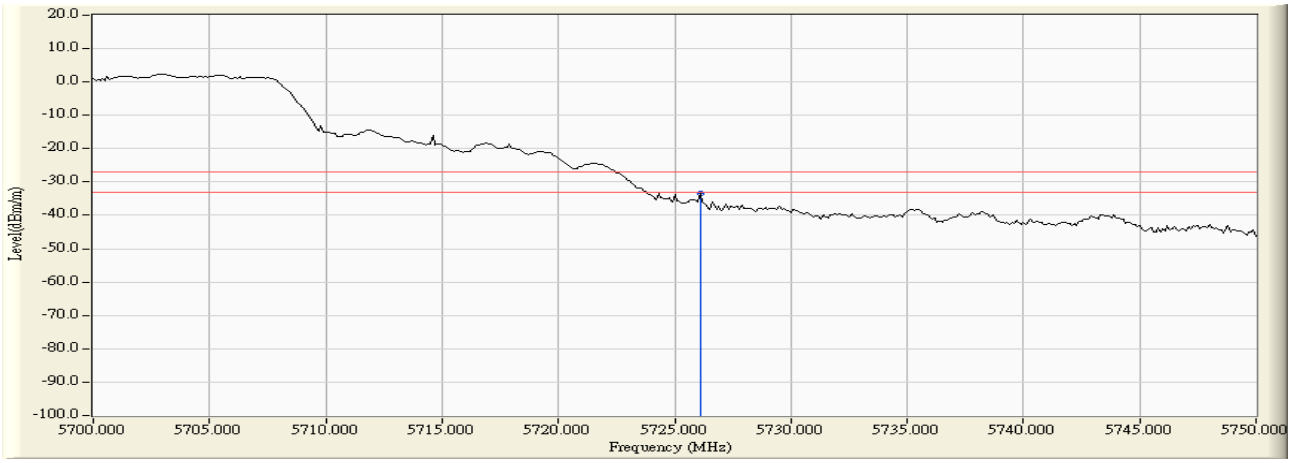
Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : Portable Data Collection Terminal
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5700MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
140 (Peak)	5726.100	14.560	-47.836	-33.276	-6.276	-27.000	Pass

Figure Channel 140: Horizontal (Peak)



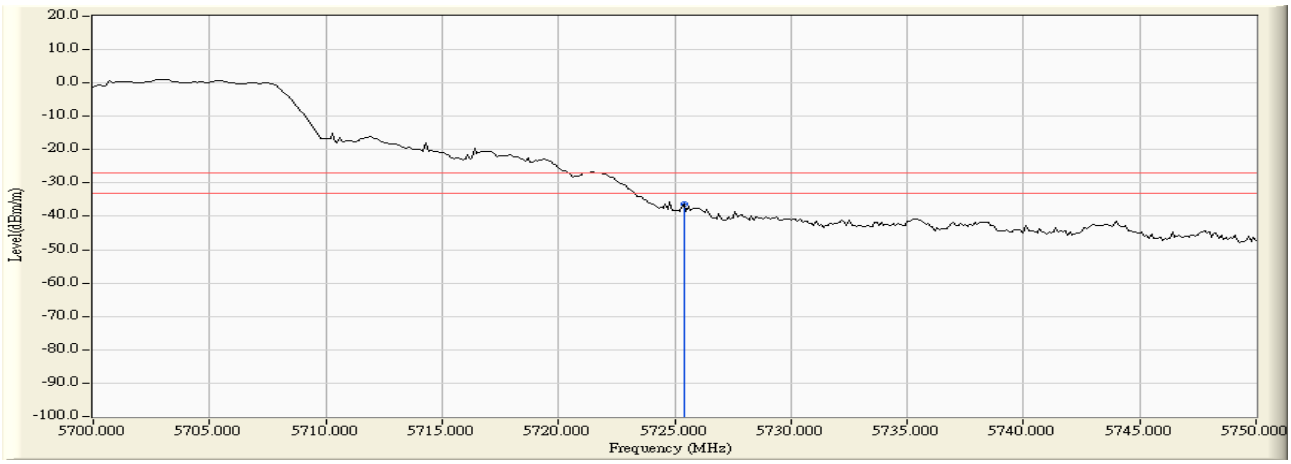
Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

Product : Portable Data Collection Terminal
Test Item : Undesirable Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5700MHz)

RF Radiated Measurement (VERTICAL):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
140 (Peak)	5725.400	14.291	-50.664	-36.373	-9.373	-27.000	Pass

Figure Channel 140: Vertical (Peak)



Note: Spectrum setting: Detector=Peak detector and maximum hold,
RBW= 1MHz, VBW=3 MHz.

2. Radiated Emission

2.1. Test Equipment

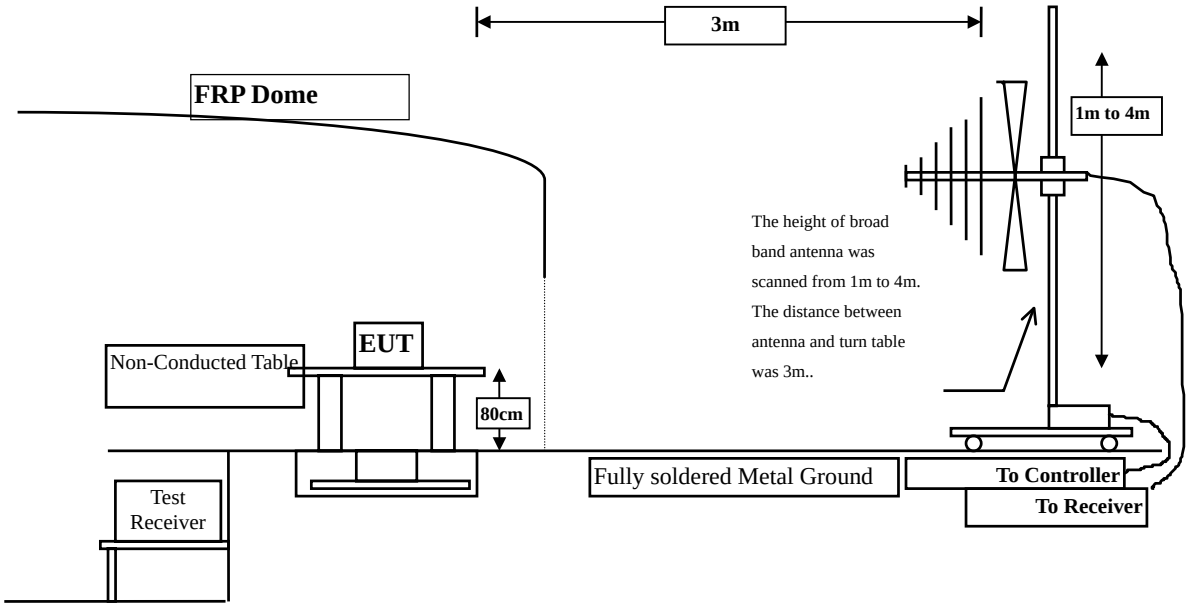
The following test equipments are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2008
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2008
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2009
	X	Pre-Amplifier	AGILENT	8447D/2944A09549	Sep., 2008
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2008
	X	Spectrum Analyzer	R & S	FSP40 / 100170	Nov, 2008
	X	Spectrum Analyzer	Advantest	R3162/91700283	Oct., 2008
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2009
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

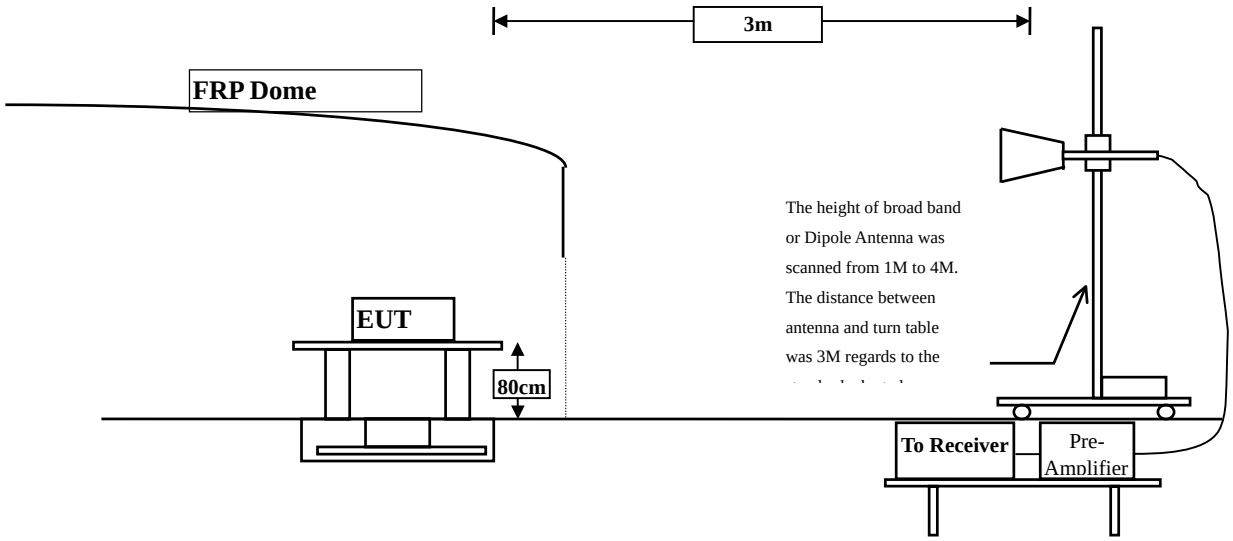
Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with "X" are used to measure the final test results.

2.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



2.3. 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)

2.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to FCC Public Notice DA 02-2138 test procedure for compliance to FCC 47CFR 15. 407 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.
The frequency range from 30MHz to 10th harminics is checked.

2.5. Uncertainty

± 3.8 dB below 1GHz
± 3.9 dB above 1GHz

2.6. Test Result of Radiated Emission

Product : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5180MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
10360.000	-1.418	64.950	63.532	-10.468	74.000
15540.000	2.487	46.290	48.777	-25.223	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000
31080.000	*	*	*	*	74.000
36260.000	*	*	*	*	74.000
Average Detector:					
10360.000	-1.418	41.620	40.202	-13.798	54.000
15540.000	*	*	*	*	54.000
20720.000	*	*	*	*	54.000
25900.000	*	*	*	*	54.000
31080.000	*	*	*	*	54.000
36260.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5180MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
10360.000	-0.468	53.280	52.812	-21.188	74.000
15540.000	2.857	45.540	48.397	-25.603	74.000
20720.000	*	*	*	*	74.000
25900.000	*	*	*	*	74.000
31080.000	*	*	*	*	74.000
36260.000	*	*	*	*	74.000
Average Detector:					
10360.000	*	*	*	*	54.000
15540.000	*	*	*	*	54.000
20720.000	*	*	*	*	54.000
25900.000	*	*	*	*	54.000
31080.000	*	*	*	*	54.000
36260.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5220MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
10440.000	-1.490	65.560	64.070	-9.930	74.000
15660.000	1.860	46.740	48.600	-25.400	74.000
20800.000	*	*	*	*	74.000
26000.000	*	*	*	*	74.000
31200.000	*	*	*	*	74.000
36400.000	*	*	*	*	74.000
Average Detector:					
10440.000	-1.490	42.160	40.670	-13.330	54.000
15600.000	*	*	*	*	54.000
20800.000	*	*	*	*	54.000
26000.000	*	*	*	*	54.000
31200.000	*	*	*	*	54.000
36400.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5220MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
10440.000	-0.580	63.930	63.350	-10.650	74.000
15660.000	2.340	46.390	48.730	-25.270	74.000
20800.000	*	*	*	*	74.000
26000.000	*	*	*	*	74.000
31200.000	*	*	*	*	74.000
36400.000	*	*	*	*	74.000
Average Detector:					
10440.000	-0.580	42.330	41.750	-12.250	54.000
15600.000	*	*	*	*	54.000
20800.000	*	*	*	*	54.000
26000.000	*	*	*	*	54.000
31200.000	*	*	*	*	54.000
36400.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5240MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
10480.000	-1.810	67.400	65.590	-8.410	74.000
15720.000	1.384	47.300	48.684	-25.316	74.000
20960.000	*	*	*	*	74.000
26200.000	*	*	*	*	74.000
31440000	*	*	*	*	74.000
36680.000	*	*	*	*	74.000
Average Detector:					
10480.000	-1.810	41.920	40.110	-13.890	54.000
15720.000	*	*	*	*	54.000
20960.000	*	*	*	*	54.000
26200.000	*	*	*	*	54.000
31440000	*	*	*	*	54.000
36680.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5240MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
10480.000	-0.870	63.730	62.860	-11.140	74.000
15720.000	1.784	45.640	47.424	-26.576	74.000
20960.000	*	*	*	*	74.000
26200.000	*	*	*	*	74.000
31440000	*	*	*	*	74.000
36680.000	*	*	*	*	74.000
Average Detector:					
10480.000	-0.870	44.050	43.180	-10.820	54.000
15720.000	*	*	*	*	54.000
20960.000	*	*	*	*	54.000
26200.000	*	*	*	*	54.000
31440000	*	*	*	*	54.000
36680.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5260MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
10520.000	-2.074	56.210	54.136	-19.864	74.000
15780.000	0.808	47.220	48.028	-25.972	74.000
21040.000	*	*	*	*	74.000
26300.000	*	*	*	*	74.000
31560.000	*	*	*	*	74.000
36820.000	*	*	*	*	74.000
Average Detector:					
10520.000	-2.074	36.460	34.386	-19.614	54.000
15780.000	*	*	*	*	54.000
21040.000	*	*	*	*	54.000
26300.000	*	*	*	*	54.000
31560.000	*	*	*	*	54.000
36820.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5260MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
10520.000	-1.064	66.840	65.776	-8.224	74.000
15780.000	1.148	46.570	47.718	-26.282	74.000
21040.000	*	*	*	*	74.000
26300.000	*	*	*	*	74.000
31560.000	*	*	*	*	74.000
36820.000	*	*	*	*	74.000
Average Detector:					
10520.000	-1.064	46.780	45.716	-8.284	54.000
15780.000	*	*	*	*	54.000
21040.000	*	*	*	*	54.000
26300.000	*	*	*	*	54.000
31560.000	*	*	*	*	54.000
36820.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5300MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
10600.000	-2.620	64.220	61.600	-12.400	74.000
15900.000	0.933	46.880	47.813	-26.187	74.000
21200.000	*	*	*	*	74.000
26500.000	*	*	*	*	74.000
31800.000	*	*	*	*	74.000
37100.000	*	*	*	*	74.000
Average Detector:					
10600.000	-2.620	44.420	41.800	-12.200	54.000
15900.000	*	*	*	*	54.000
21200.000	*	*	*	*	54.000
26500.000	*	*	*	*	54.000
31800.000	*	*	*	*	54.000
37100.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5300MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
10600.000	-1.530	62.720	61.190	-12.810	74.000
15900.000	1.583	45.710	47.293	-26.707	74.000
21200.000	*	*	*	*	74.000
26500.000	*	*	*	*	74.000
31800.000	*	*	*	*	74.000
37100.000	*	*	*	*	74.000
Average Detector:					
10600.000	-1.530	44.670	43.140	-10.860	54.000
15900.000	*	*	*	*	54.000
21200.000	*	*	*	*	54.000
26500.000	*	*	*	*	54.000
31800.000	*	*	*	*	54.000
37100.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5320MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
10640.000	-2.516	54.920	52.404	-21.596	74.000
15960.000	1.133	47.070	48.203	-25.797	74.000
21280.000	*	*	*	*	74.000
26600.000	*	*	*	*	74.000
31920.000	*	*	*	*	74.000
37240.000	*	*	*	*	74.000
Average Detector:					
10640.000	*	*	*	*	54.000
15960.000	*	*	*	*	54.000
21280.000	*	*	*	*	54.000
26600.000	*	*	*	*	54.000
31920.000	*	*	*	*	54.000
37240.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5320MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
10640.000	-1.466	59.150	57.684	-16.316	74.000
15960.000	1.993	46.280	48.273	-25.727	74.000
21280.000	*	*	*	*	74.000
26600.000	*	*	*	*	74.000
31920.000	*	*	*	*	74.000
37240.000	*	*	*	*	74.000
Average Detector:					
10640.000	-1.466	41.490	40.024	-13.976	54.000
15960.000	*	*	*	*	54.000
21280.000	*	*	*	*	54.000
26600.000	*	*	*	*	54.000
31920.000	*	*	*	*	54.000
37240.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5500MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
11000.000	-0.311	55.230	54.919	-19.081	74.000
16500.000	0.030	45.110	45.140	-28.860	74.000
20760.000	*	*	*	*	74.000
25950.000	*	*	*	*	74.000
31140.000	*	*	*	*	74.000
36330.000	*	*	*	*	74.000
Average Detector:					
11000.000	-0.311	37.030	36.719	-17.281	54.000
15570.000	*	*	*	*	54.000
20760.000	*	*	*	*	54.000
25950.000	*	*	*	*	54.000
31140.000	*	*	*	*	54.000
36330.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5500MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
11000.000	0.209	45.780	45.989	-28.011	74.000
16500.000	0.490	45.160	45.650	-28.350	74.000
20760.000	*	*	*	*	74.000
25950.000	*	*	*	*	74.000
31140.000	*	*	*	*	74.000
36330.000	*	*	*	*	74.000
Average Detector:					
10380.000	*	*	*	*	54.000
15570.000	*	*	*	*	54.000
20760.000	*	*	*	*	54.000
25950.000	*	*	*	*	54.000
31140.000	*	*	*	*	54.000
36330.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5600MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
11200.000	-1.650	50.300	48.650	-25.350	74.000
16800.000	0.110	46.870	46.980	-27.020	74.000
20920.000	*	*	*	*	74.000
26150.000	*	*	*	*	74.000
31380.000	*	*	*	*	74.000
36610.000	*	*	*	*	74.000
Average Detector:					
10460.000	*	*	*	*	54.000
15690.000	*	*	*	*	54.000
20920.000	*	*	*	*	54.000
26150.000	*	*	*	*	54.000
31380.000	*	*	*	*	54.000
36610.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5600MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
11200.000	-1.890	53.560	51.670	-22.330	74.000
16800.000	0.240	46.620	46.860	-27.140	74.000
20920.000	*	*	*	*	74.000
26150.000	*	*	*	*	74.000
31380.000	*	*	*	*	74.000
36610.000	*	*	*	*	74.000
Average Detector:					
10460.000	*	*	*	*	54.000
15690.000	*	*	*	*	54.000
20920.000	*	*	*	*	54.000
26150.000	*	*	*	*	54.000
31380.000	*	*	*	*	54.000
36610.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5700MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
11400.000	-2.737	63.540	60.803	-13.197	74.000
17100.000	1.375	46.890	48.265	-25.735	74.000
21080.000	*	*	*	*	74.000
26350.000	*	*	*	*	74.000
31620.000	*	*	*	*	74.000
36890.000	*	*	*	*	74.000
Average Detector:					
11400.000	-2.737	47.970	45.233	-8.767	54.000
15810.000	*	*	*	*	54.000
21080.000	*	*	*	*	54.000
26350.000	*	*	*	*	54.000
31620.000	*	*	*	*	54.000
36890.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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 : Portable Data Collection Terminal
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps) (5700MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Vertical					
Peak Detector:					
11400.000	-3.537	61.530	57.993	-16.007	74.000
17100.000	1.935	44.120	46.055	-27.945	74.000
21080.000	*	*	*	*	74.000
26350.000	*	*	*	*	74.000
31620.000	*	*	*	*	74.000
36890.000	*	*	*	*	74.000
Average Detector:					
11400.000	-3.537	46.110	42.573	-11.427	54.000
15810.000	*	*	*	*	54.000
21080.000	*	*	*	*	54.000
26350.000	*	*	*	*	54.000
31620.000	*	*	*	*	54.000
36890.000	*	*	*	*	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. " * ", means this data is the too weak instrument of signal is unable to test.
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.

3. Peak Transmit Power

3.1. Test Equipment

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

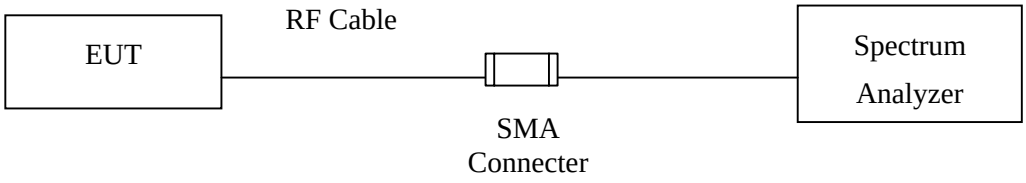
Equipment		Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2009
X	Power Sensor	Anritsu	MA2491A/034457	May, 2009
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr, 2009

Note: 1. All equipments are calibrated every one year.

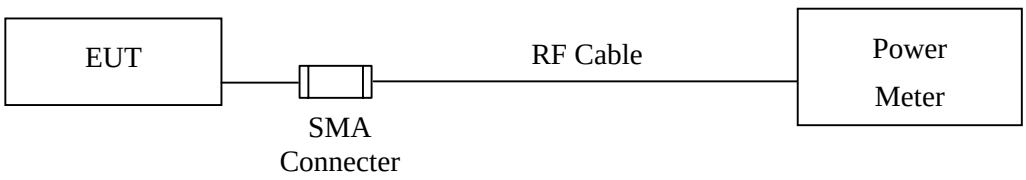
2. The test instruments marked by "X" are used to measure the final test results.

3.2. Test Setup

26dBc Occupied Bandwidth



Conduction Power Measurement



3.3. Limits

(1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

(2) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.825 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 1W or 17 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

3.4. Test Procedur

As an alternative to DA 02-2138, the EUT peak power was measured with a peak power meter employing a video bandwidth greater than 6dB BW of the emission under test. Peak output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of DA 02-2138, and provides more accurate measurements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Transmit Power

Product : Portable Data Collection Terminal
Test Item : Peak Transmit Power
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps)

Cable loss=1dB		Peak Power Output								
Channel No.	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
36	5180	10.07	--	--	--	--	--	--	--	<17dBm
44	5220	10.6	--	--	--	--	--	--	--	<17dBm
48	5240	10.91	10.76	10.75	10.6	10.45	10.7	10.8	10.4	<17dBm
52	5260	11.27	11	10.52	10.98	10.99	11.01	10.95	10.88	<24dBm
60	5300	10.8	--	--	--	--	--	--	--	<24dBm
64	5320	11.14	--	--	--	--	--	--	--	<24dBm

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

Cable loss=1dB		Peak Power Output								
Channel No.	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
100	5500	9.9	--	--	--	--	--	--	--	<24dBm
120	5600	11.28	11	10.69	10.85	10.52	11.02	11	10.76	<24dBm
140	5700	11.82	--	--	--	--	--	--	--	<24dBm

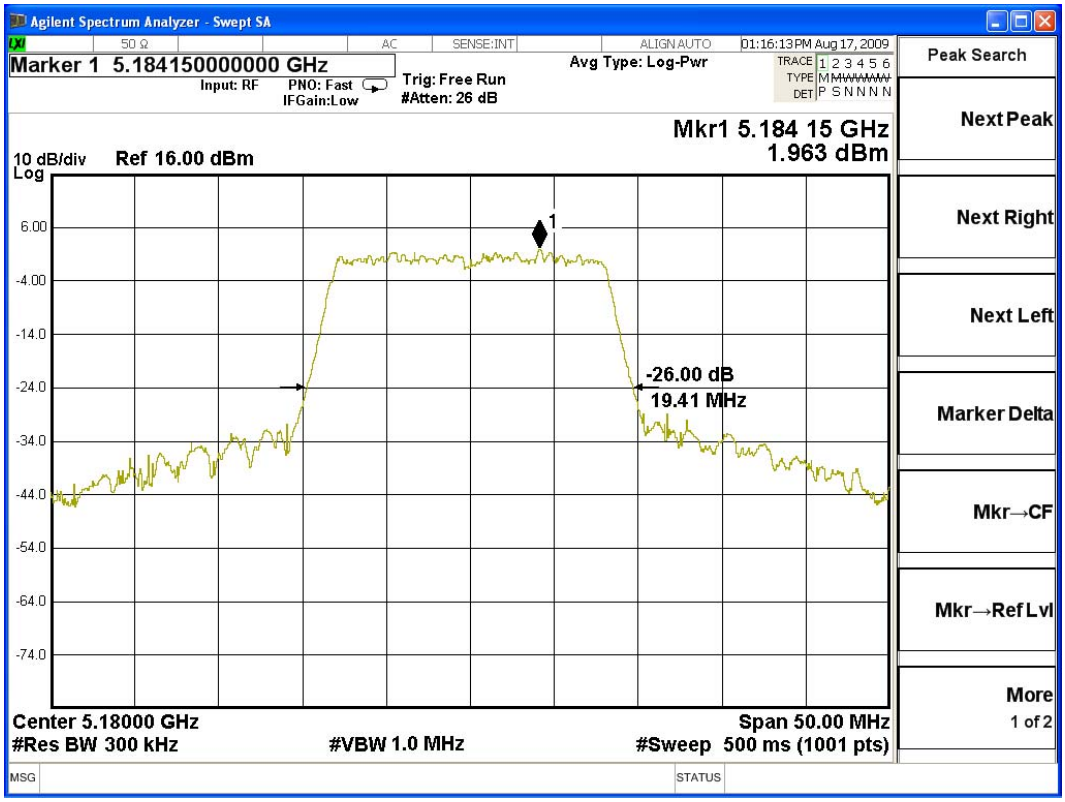
Note: Peak Power Output Value =Reading value on peak power meter + cable loss

Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
36	5180	19.41	10.07	17	16.88	Pass

26dBc Occupied Bandwidth:

Channel 36

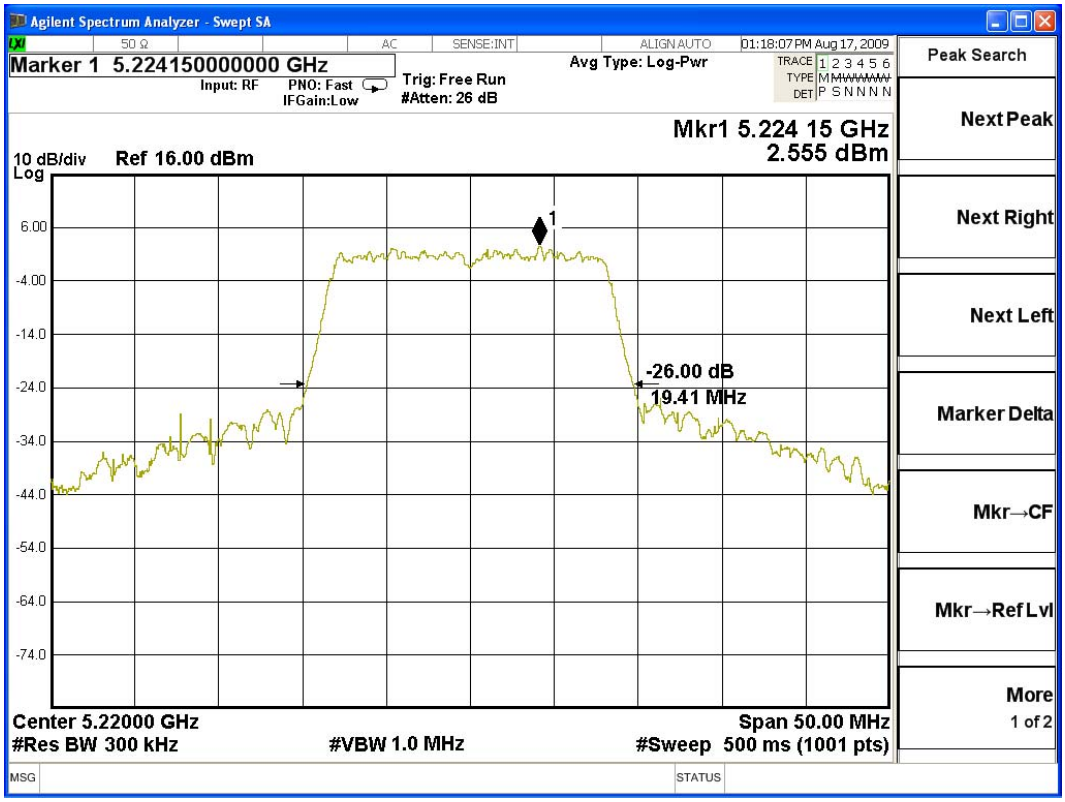


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
44	5220	19.41	10.6	17	16.88	Pass

26dBc Occupied Bandwidth:

Channel 40

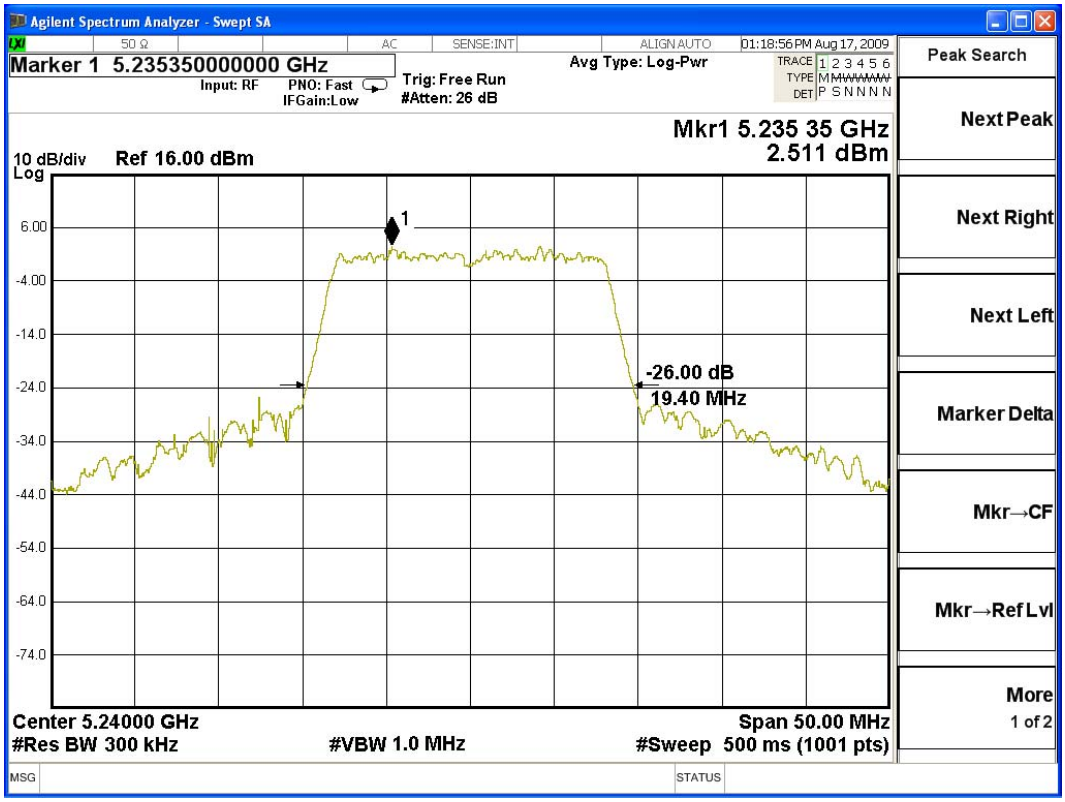


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
48	5240	19.4	10.91	17	16.88	Pass

26dBc Occupied Bandwidth:

Channel 48

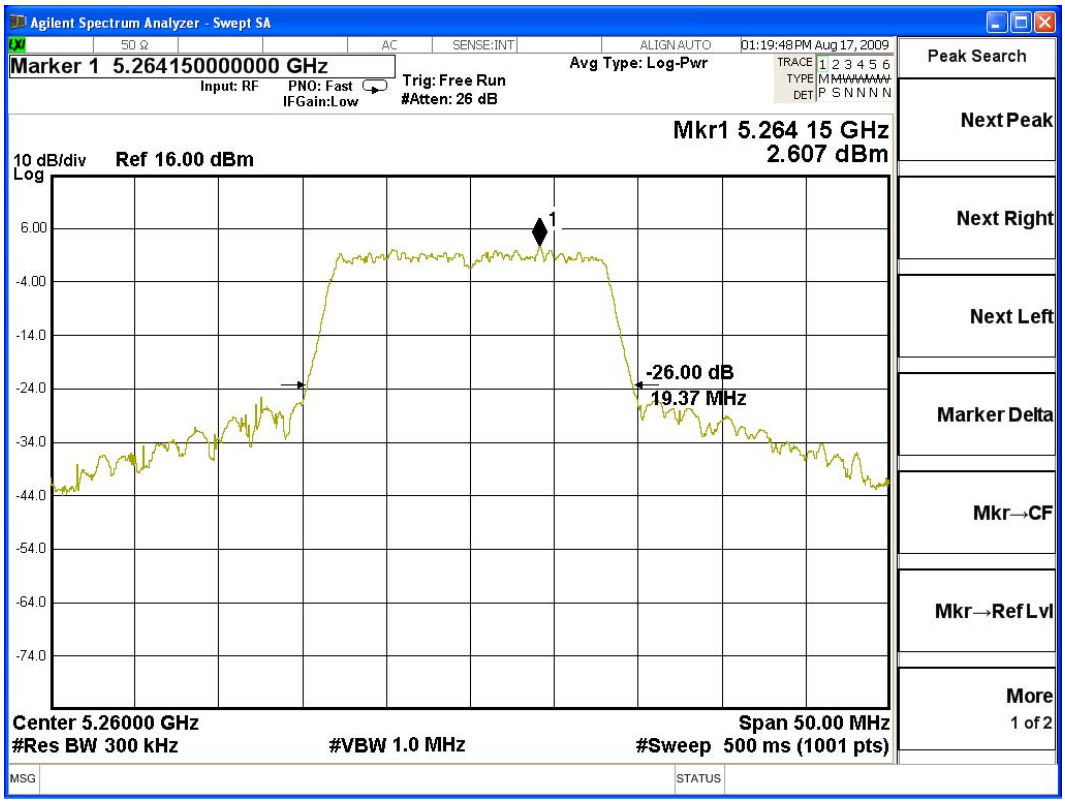


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
52	5260	19.37	11.27	24	23.87	Pass

26dBc Occupied Bandwidth:

Channel 52

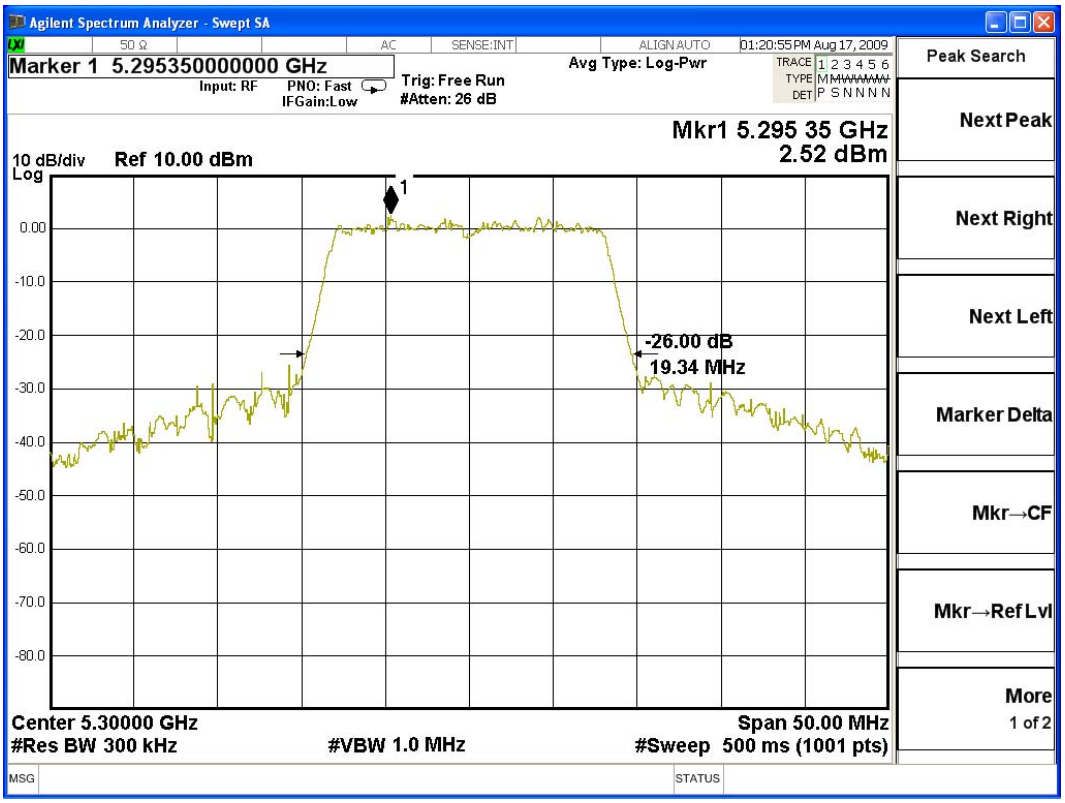


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
60	5300	19.34	10.8	24	23.86	Pass

26dBc Occupied Bandwidth:

Channel 60

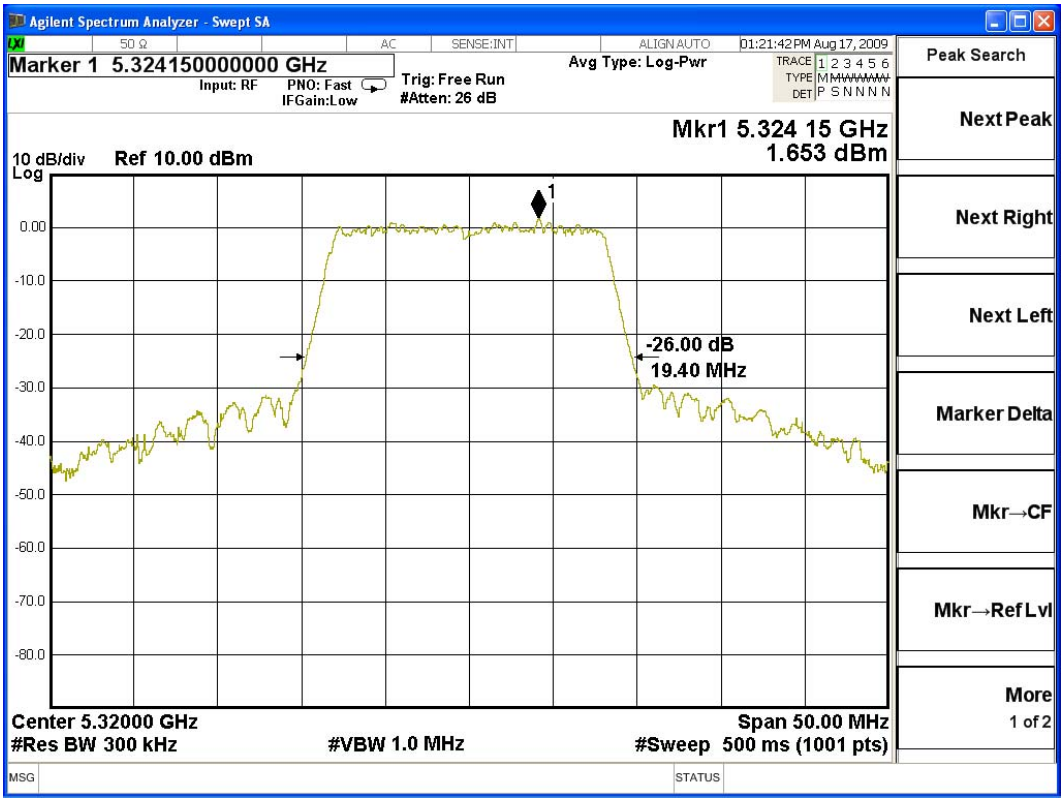


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
64	5320	19.4	11.14	24	23.88	Pass

26dBc Occupied Bandwidth:

Channel 64

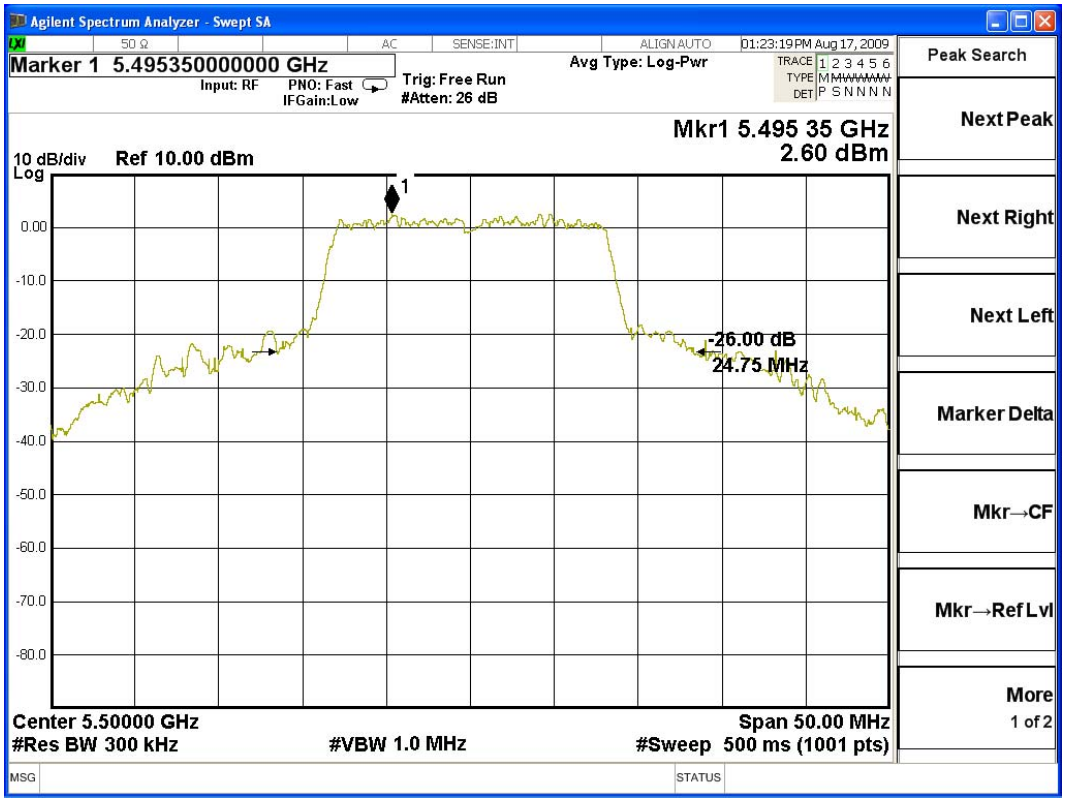


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
100	5500	24.75	9.9	24	24.94	Pass

26dBc Occupied Bandwidth:

Channel 100

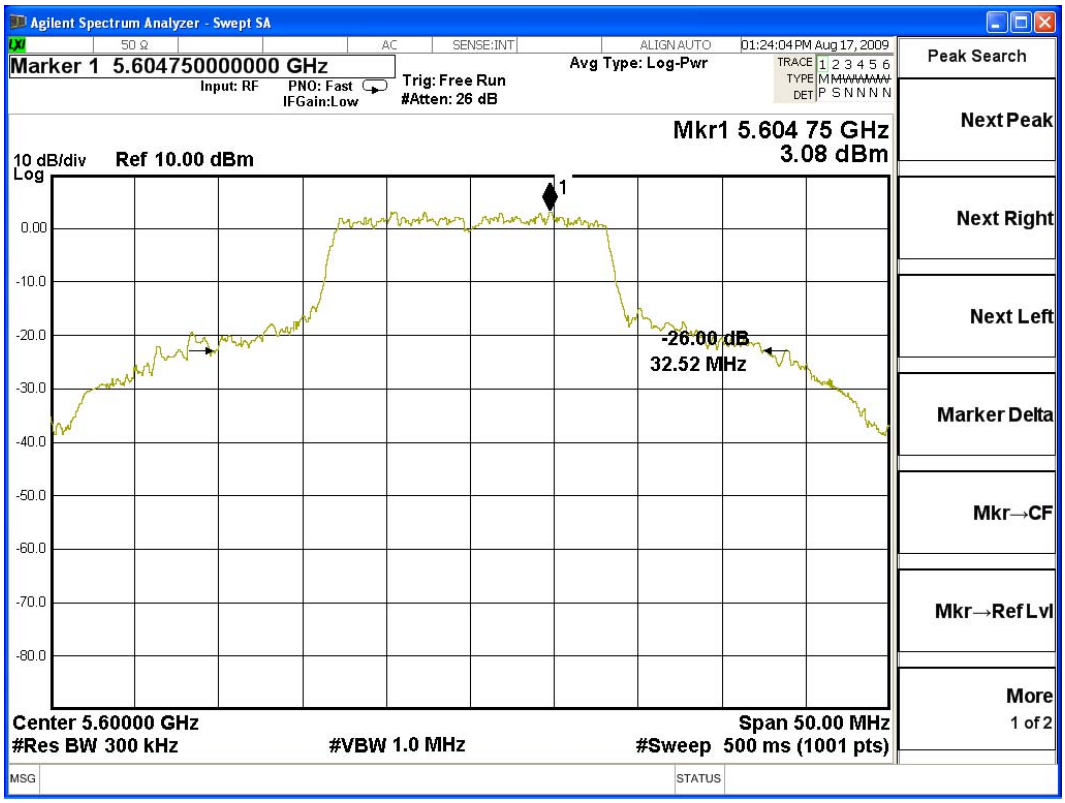


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
120	5600	32.52	11.28	24	26.12	Pass

26dBc Occupied Bandwidth:

Channel 120

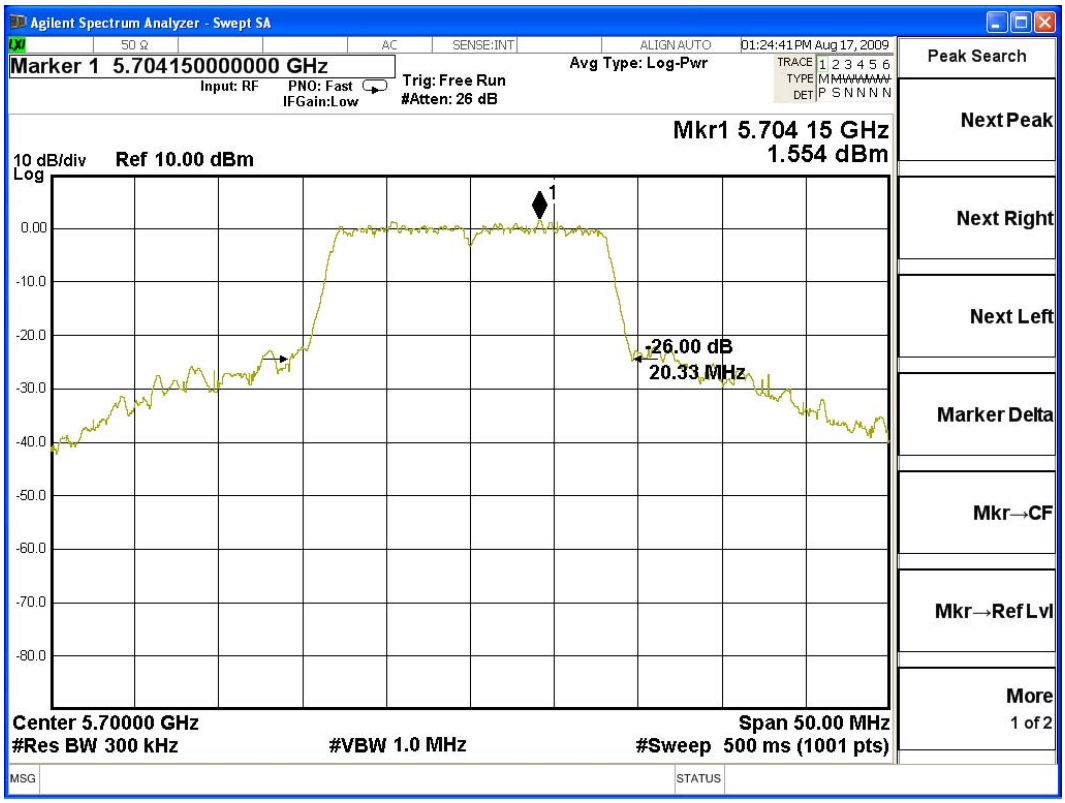


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
140	5700	20.33	11.82	24	24.08	Pass

26dBc Occupied Bandwidth:

Channel 140



4. Peak Power Spectral Density

4.1. Test Equipment

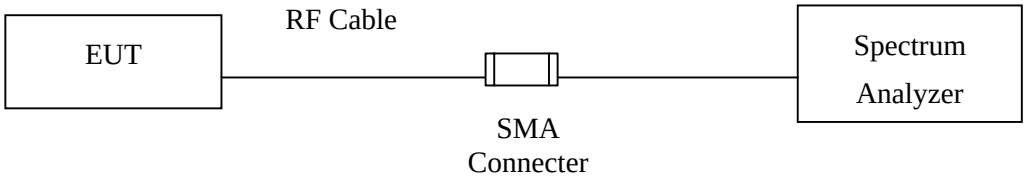
The following test equipments are used during the radiated emission tests:

Equipment		Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr, 2009

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



4.3. Limits

(4) For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

(5) For the band 5.25-5.35 GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

(6) For the band 5.725-5.825 GHz, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

4.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to DTS test procedure of Aug 2002 DA 02-2138 for compliance to FCC 47CFR Subpart E requirements.

4.5. Uncertainty

± 1.27 dB

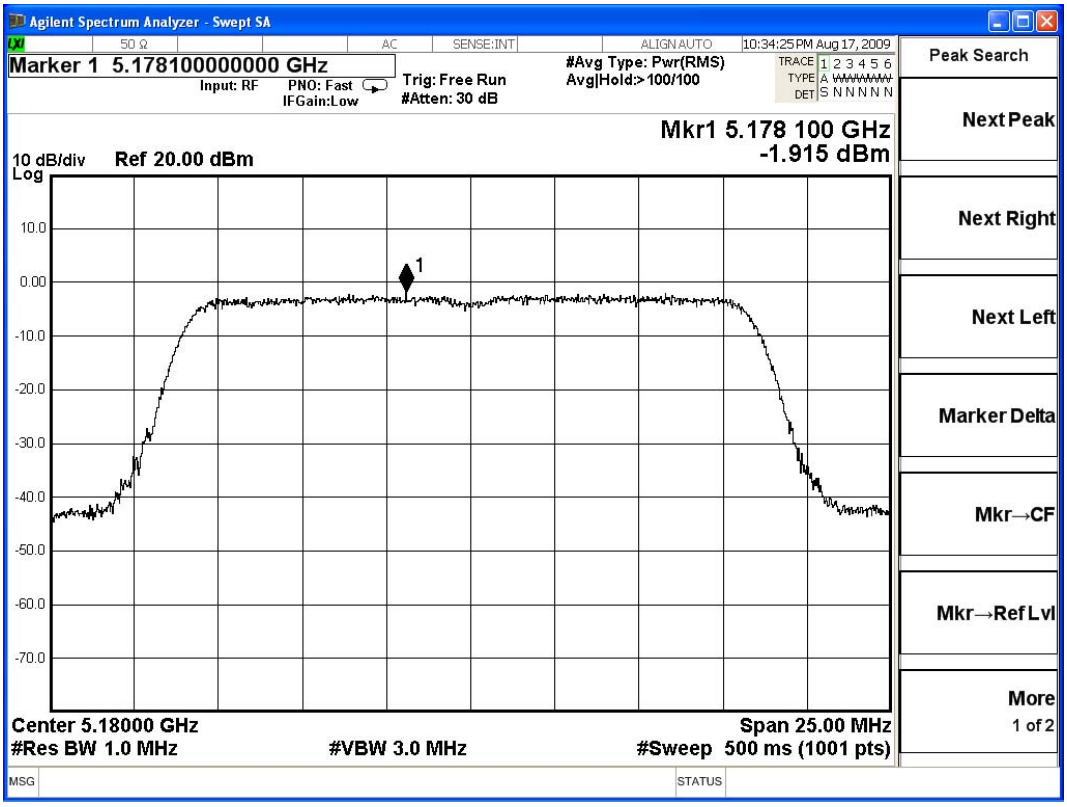
4.6. Test Result of Peak Power Spectral Density

Product : Portable Data Collection Terminal
Test Item : Peak Power Spectral Density
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter (802.11a-6Mbps)

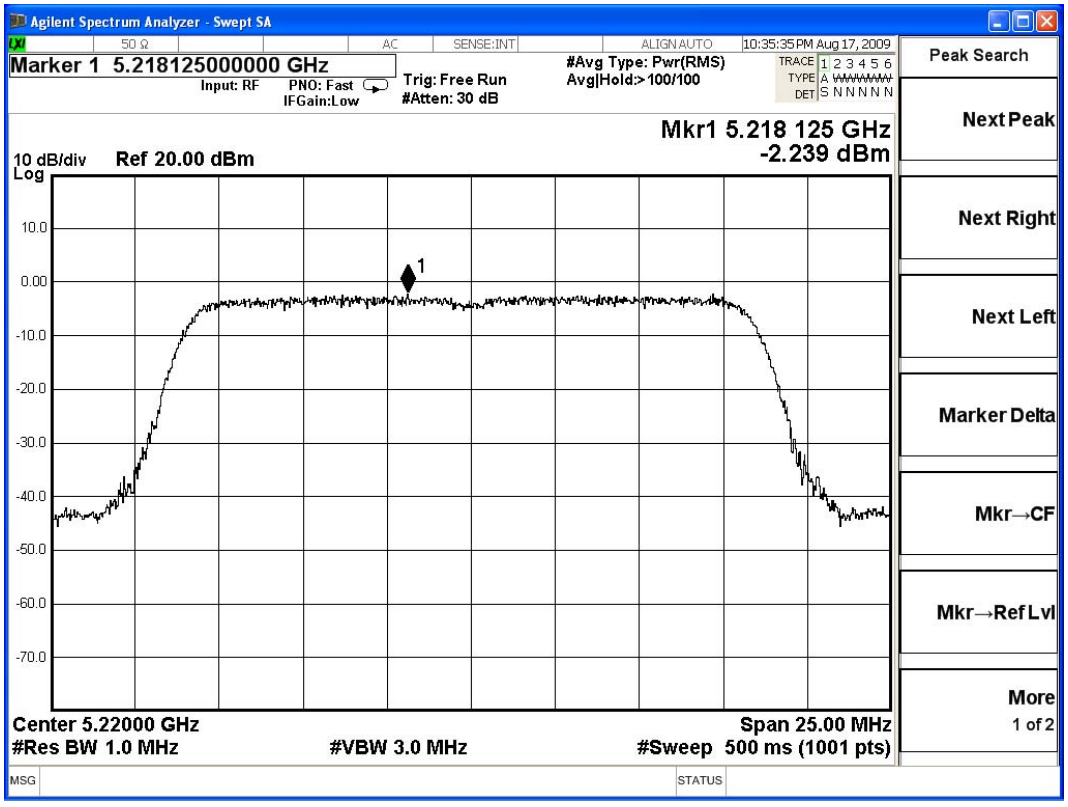
Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	-1.915	<4	Pass
44	5220	-2.239	<4	Pass
48	5240	-2.276	<4	Pass
52	5260	-1.258	<11	Pass
60	5300	-1.643	<11	Pass
64	5320	-1.808	<11	Pass

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
100	5500	-2.675	<11	Pass
120	5600	-1.578	<11	Pass
140	5700	-0.644	<11	Pass

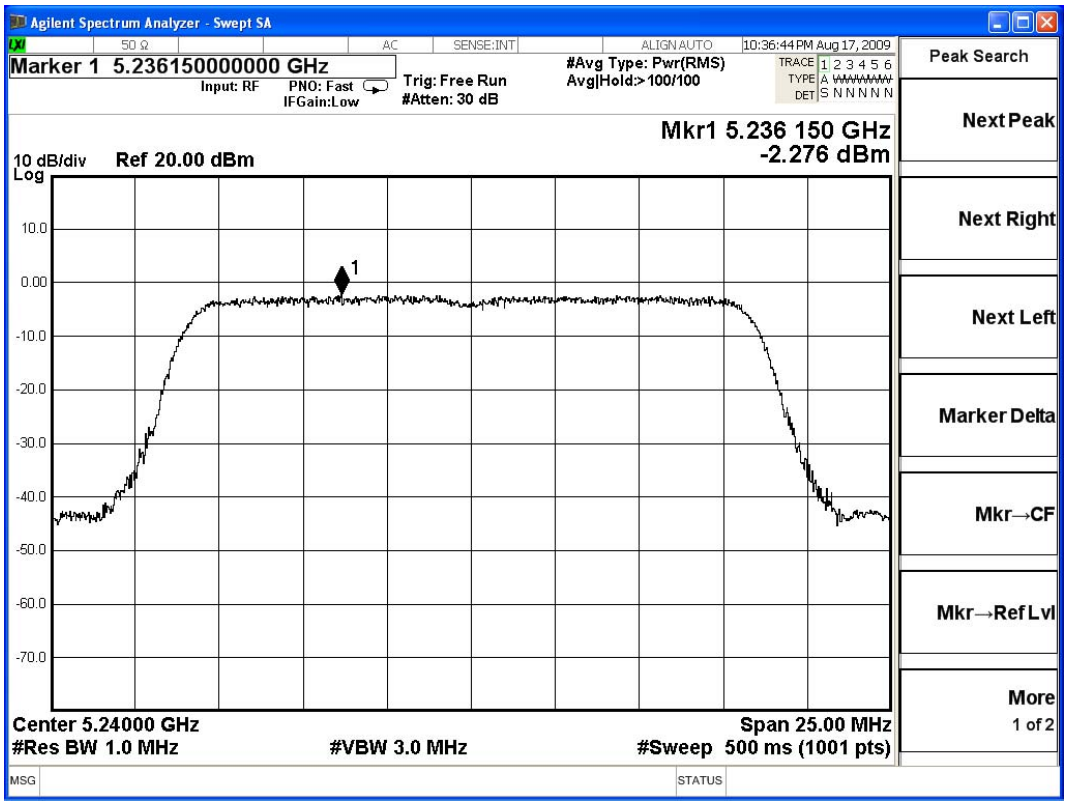
Channel 36:



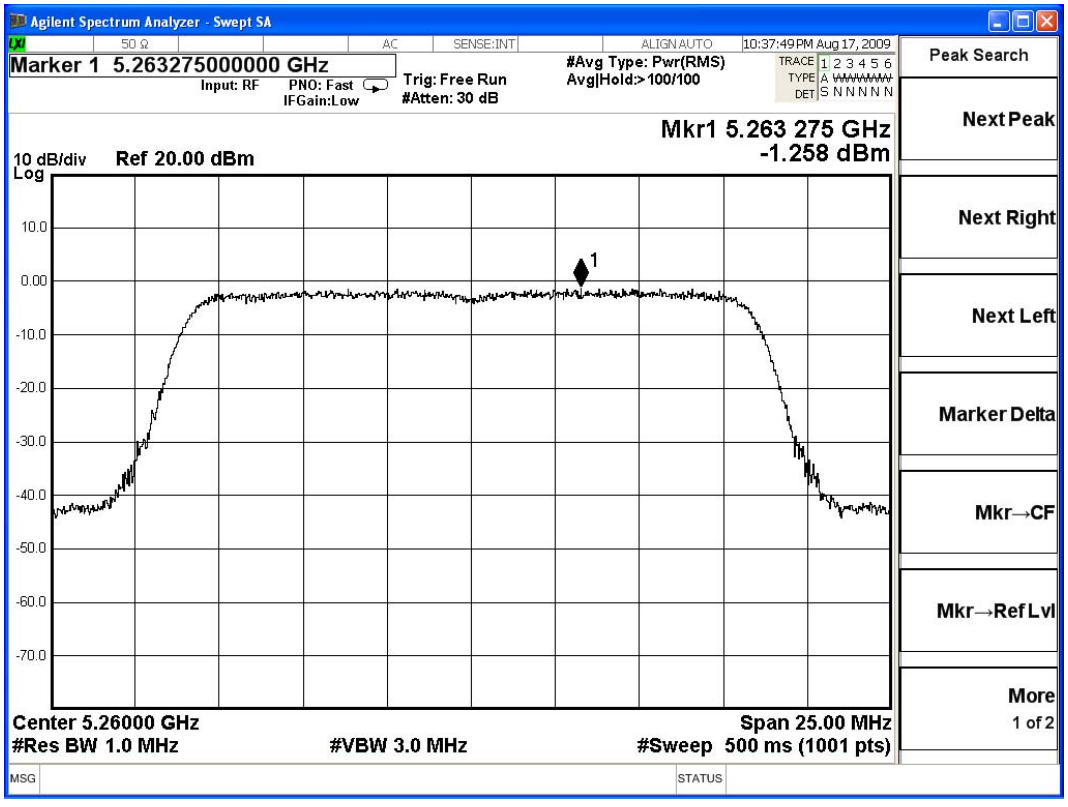
Channel 44:



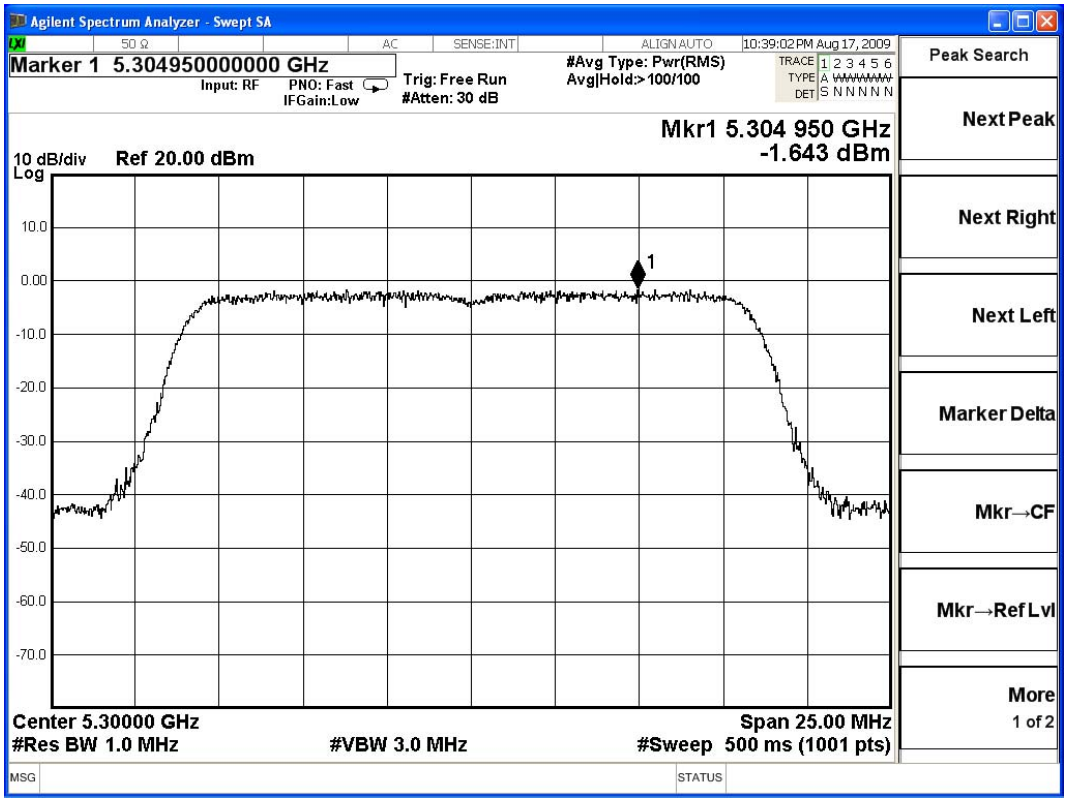
Channel 48:



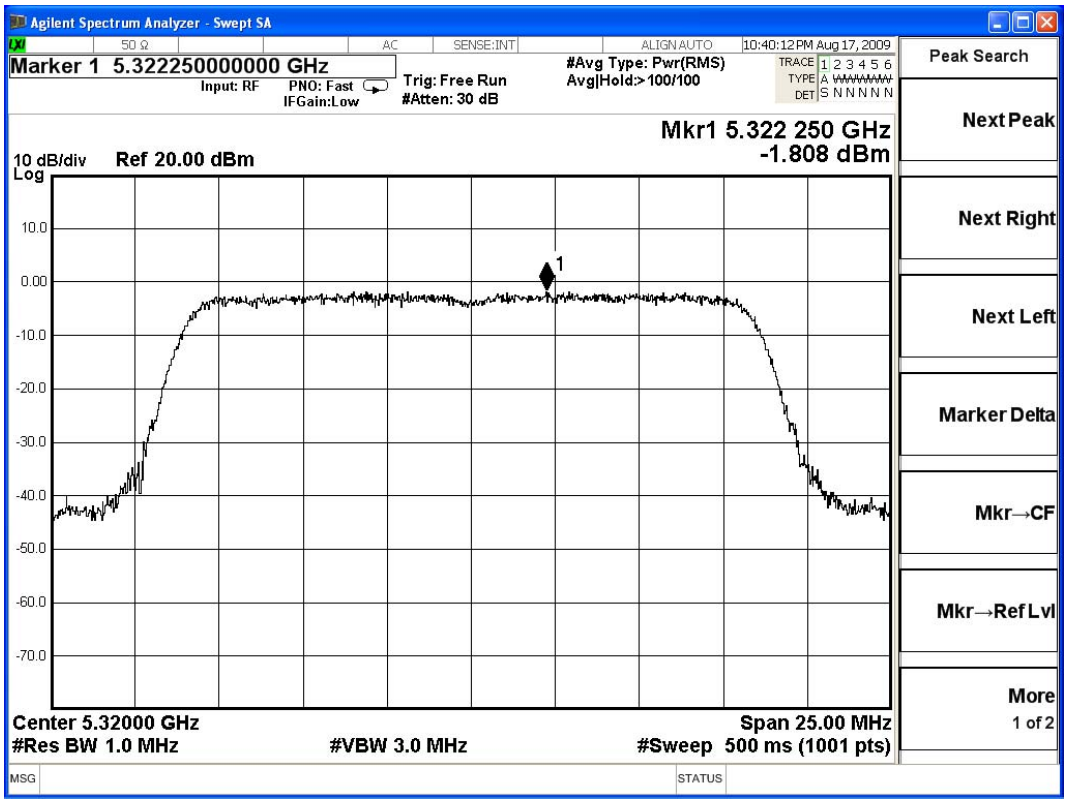
Channel 52:



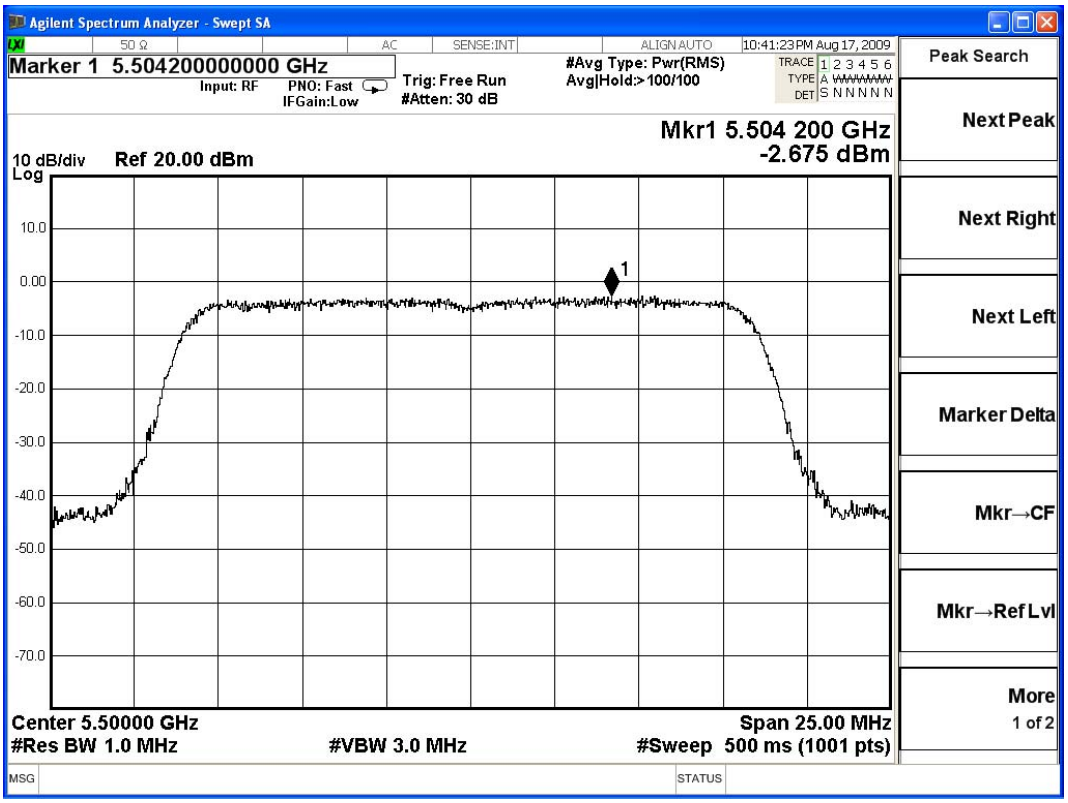
Channel 60:



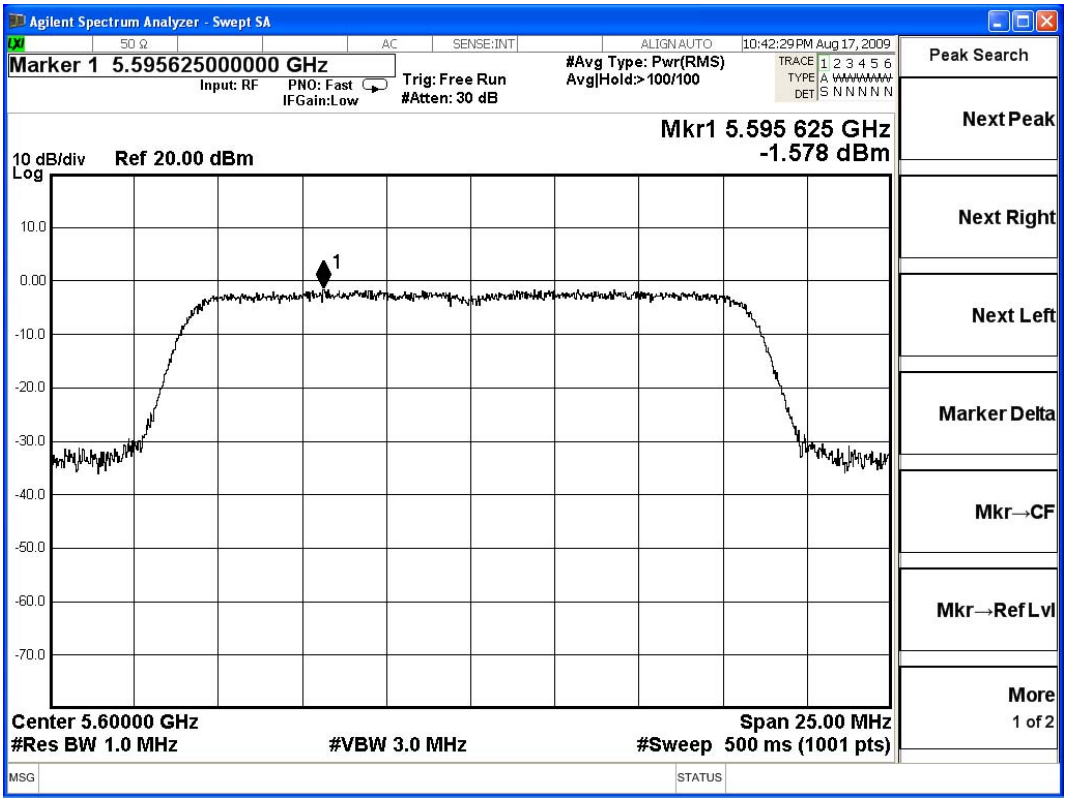
Channel 64:



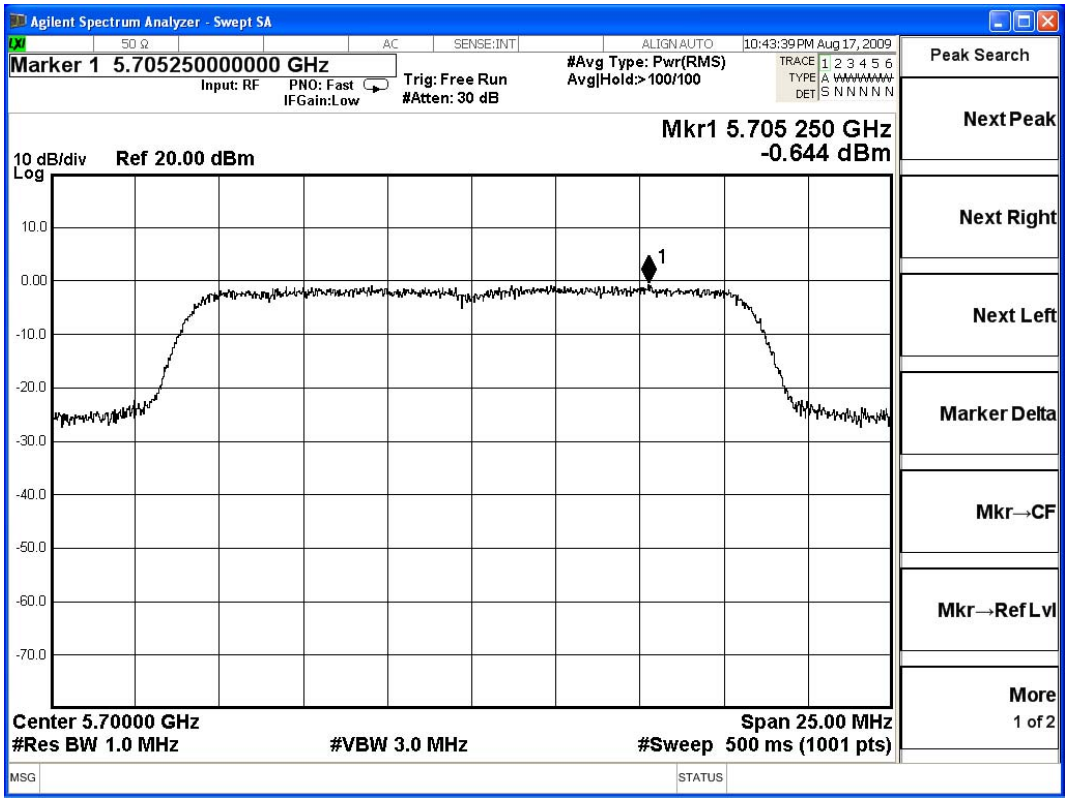
Channel 100:



Channel 120:



Channel 140:


Agilent Spectrum Analyzer - Swept SA
50 Ω
AC
SENSE:INT
ALIGN AUTO
10:43:39 PM Aug 17, 2009
Marker 1 5.705250000000 GHz
Input: RF
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: Pwr(RMS)
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE A WWWWW
DET S N N N N N
Mkr1 5.705 250 GHz
-0.644 dBm
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
Center 5.70000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Span 25.00 MHz
#Sweep 500 ms (1001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Right
Next Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2