

FCC Test Report

Product Name	VOIP Phone
Model No	UVP-Executive
FCC ID	SWX-UVPEXT

Applicant	Ubiquiti Networks, Inc
Address	12F, No. 105, Song Ren Rd., Sin Yi District, Taipei 110, Taiwan

Date of Receipt	Sep. 05, 2014
Issued Date	Nov. 03, 2014
Report No.	1490231R-RFUSP47V00
Report Version	V1.0



The test results relate only to the samples tested.

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

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of QuieTek Corporation.

Test Report

Issued Date: Nov. 03, 2014

Report No.: 1490231R-RFUSP47V00



Product Name	VOIP Phone
Applicant	Ubiquiti Networks,Inc
Address	12F, No. 105, Song Ren Rd., Sin Yi District, Taipei 110, Taiwan
Manufacturer	Ubiquiti Networks,Inc
Model No.	UVP-Executive
FCC ID.	SWX-UVPEXT
EUT Rated Voltage	DC 48V (Power by POE)
EUT Test Voltage	AC 120V/60Hz
Trade Name	UBIQUITI
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E: 2014 ANSI C63.10: 2009 789033 D02 General UNII Test Procedures New Rules v01
Test Result	Complied

Documented By :

Genie Chang

(Senior Adm. Specialist / Genie Chang)

Tested By :

Nova chu

(Engineer / Nova Chu)

Approved By :

Vincent Lin

(Director / Vincent Lin)

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	9
1.6. Test Facility	10
2. Conducted Emission.....	11
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
3. Maximun conducted output power	21
3.1. Test Equipment.....	21
3.2. Test Setup	21
3.3. Limits	22
3.4. Test Procedur	23
3.5. Uncertainty	23
3.6. Test Result of Maximum conducted output power.....	24
4. Peak Power Spectral Density.....	39
4.1. Test Equipment.....	39
4.2. Test Setup	39
4.3. Limits	39
4.4. Test Procedure	40
4.5. Uncertainty	40
4.6. Test Result of Peak Power Spectral Density	41
5. Radiated Emission.....	61
5.1. Test Equipment.....	61
5.2. Test Setup	61
5.3. Limits	62
5.4. Test Procedure	63
5.5. Uncertainty	63
5.6. Test Result of Radiated Emission.....	64
6. Band Edge	109
6.1. Test Equipment.....	109
6.2. Test Setup	110
6.3. Limits	111
6.4. Test Procedure	111
6.5. Uncertainty	112
6.6. Test Result of Band Edge	113
7. Occupied Bandwidth	143

7.1.	Test Equipment.....	143
7.2.	Test Setup	143
7.3.	Limits	143
7.4.	.Test Procedure	143
7.5.	Uncertainty	143
7.6.	Test Result of Occupied Bandwidth	144
8.	Frequency Stability.....	152
8.1.	Test Equipment.....	152
8.2.	Test Setup	152
8.3.	Limits	152
8.4.	Test Procedure	152
8.5.	Uncertainty	152
8.6.	Test Result of Frequency Stability.....	153
9.	EMI Reduction Method During Compliance Testing	158
Attachment 1:	EUT Test Photographs	
Attachment 2:	EUT Detailed Photographs	

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	VOIP Phone
Trade Name	UBIQUITI
FCC ID.	SWX-UVPEXT
Model No.	UVP-Executive
Frequency Range	802.11a/n-20MHz: 5180-5320MHz, 5500-5700MHz, 5745-5825MHz 802.11n-40MHz: 5190-5310, 5510-5670MHz, 5755-5795MHz
Number of Channels	802.11a/n-20MHz: 24; 802.11n-40MHz: 11
Data Rate	802.11a: 6 - 54Mbps 802.11n: up to 150Mbps
Channel Control	Auto
Type of Modulation	802.11a/n:OFDM, BPSK, QPSK, 16QAM, 64QAM
Antenna type	Chip Antenna
Antenna Gain	Refer to the table “Antenna List”
Power Cable	Non-Shielded, 0.8m
Power Adapter	MFR: Ubiquiti, M/N: GP-B480-050G Input: 100-240V, 50/60Hz 0.75A Output: 48V $\overline{=}$ 0.5A

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	TDK	N/A	Chip Antenna	5.18dBi For 5.15~5.35GHz 5.04dBi For 5.47~5.725GHz 4.09dBi For 5.725~5.825GHz

Note: The antenna of EUT is conform to FCC 15.203

802.11a/n-20MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 36:	5180 MHz	Channel 40:	5200 MHz	Channel 44:	5220 MHz	Channel 48:	5240 MHz
Channel 52:	5260 MHz	Channel 56:	5280 MHz	Channel 60:	5300 MHz	Channel 64:	5320 MHz
Channel 100:	5500 MHz	Channel 104:	5520 MHz	Channel 108:	5540 MHz	Channel 112:	5560 MHz
Channel 116:	5580 MHz	Channel 120:	5600 MHz	Channel 124:	5620 MHz	Channel 128:	5640 MHz
Channel 132:	5660 MHz	Channel 136:	5680 MHz	Channel 140:	5700 MHz	Channel 149:	5745 MHz
Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz	Channel 165:	5825 MHz

802.11n-40MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 38:	5190 MHz	Channel 46:	5230 MHz	Channel 54:	5270 MHz	Channel 62:	5310 MHz
Channel 102:	5510 MHz	Channel 110:	5550 MHz	Channel 118:	5590 MHz	Channel 126:	5630 MHz
Channel 134:	5670 MHz	Channel 151:	5755 MHz	Channel 159:	5795 MHz		

Note:

1. This device is a VOIP Phone with a built-in 802.11a/n WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11a is 6Mbps 、802.11n-20BW is 7.2Mbps and 802.11n-40BW is 15Mbps)
4. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.

Test Mode	Mode 1: Transmit (802.11a-6Mbps) Mode 2: Transmit (802.11n-20BW 7.2Mbps) Mode 3: Transmit (802.11n-40BW 15Mbps)
-----------	---

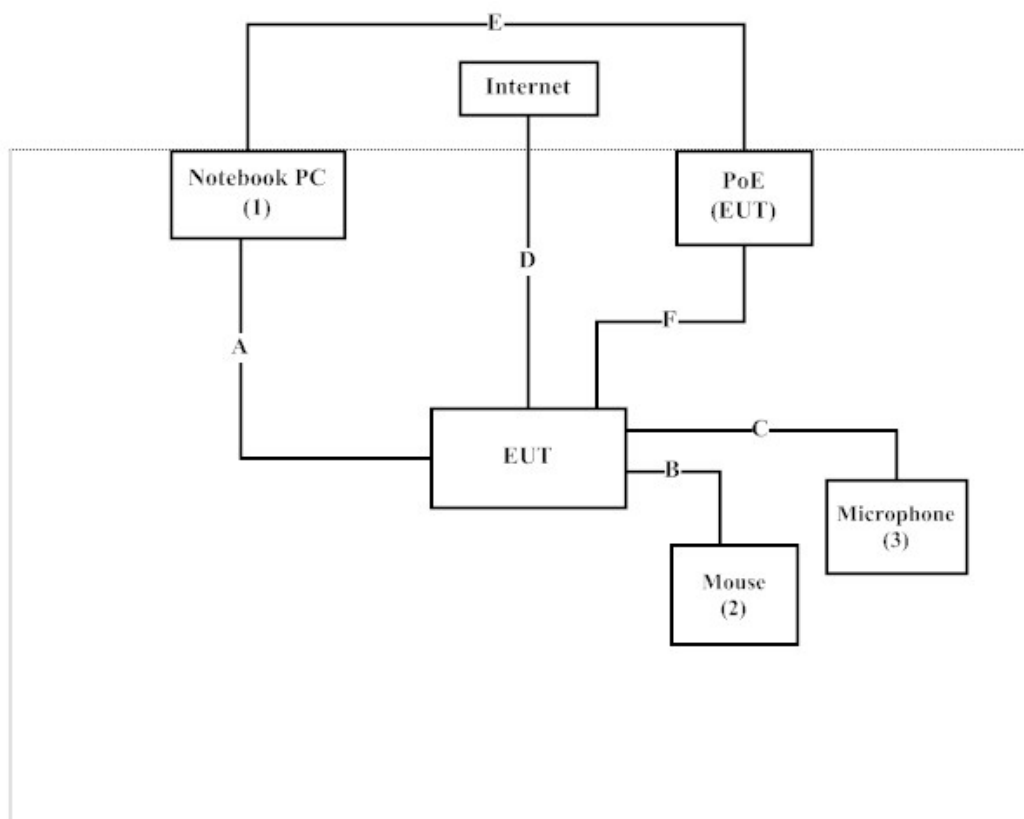
1.3. Tested System Details

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
2	USB Mouse	Logitech	M-U0003	LZ024HR	N/A
3	Microphone	Yi Sheng	S-124	N/A	N/A

Signal Cable Type	Signal cable Description
A Micro USB Cable	Shielded, 0.8m
B Mouse Cable	Shielded, 1.8m
C Microphone Cable	Non-Shielded, 1.8m
D LAN Cable	Shielded, 3.6m
E LAN Cable	Shielded, 1.8m
F LAN Cable	Shielded, 1.8m

1.4. Configuration of tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown on 1.4
- (2) Execute “WLAN RF Test” program on the EUT.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Start the continuous transmission.
- (5) 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://tw.quietek.com/modules/myalbum/>

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

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Site Name: Quietek Corporation
Site Address: No.5-22, Ruishukeng,
Linkou Dist. New Taipei City 24451,
Taiwan, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

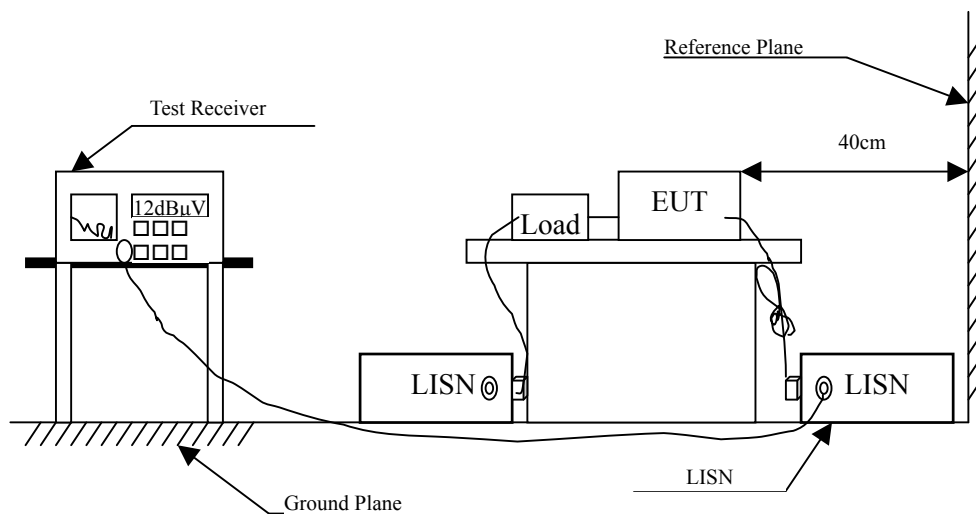
2.1. Test Equipment

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

Note:

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

2.2. Test Setup



2.3. Limits

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

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

2.4. Test Procedure

The EUT and 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 C63.10:2009 on conducted measurement.

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

The EUT was setup to ANSI C63.10, 2009; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : VOIP Phone
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5190MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV	dB	dBμV
LINE 1					
Quasi-Peak					
0.158	9.747	34.680	44.427	-21.344	65.771
0.170	9.743	32.900	42.644	-22.785	65.429
0.212	9.739	28.440	38.179	-26.050	64.229
0.341	9.745	26.150	35.895	-24.648	60.543
0.505	9.753	33.100	42.853	-13.147	56.000
0.654	9.759	26.900	36.659	-19.341	56.000
Average					
0.158	9.747	26.160	35.907	-19.864	55.771
0.170	9.743	13.810	23.554	-31.875	55.429
0.212	9.739	20.420	30.159	-24.070	54.229
0.341	9.745	10.480	20.225	-30.318	50.543
0.505	9.753	21.420	31.173	-14.827	46.000
0.654	9.759	19.760	29.519	-16.481	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 : VOIP Phone
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5190MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV	dB	dBμV
LINE 2					
Quasi-Peak					
0.166	9.747	33.830	43.577	-21.966	65.543
0.212	9.749	28.580	38.329	-25.900	64.229
0.373	9.747	28.450	38.197	-21.432	59.629
0.498	9.752	32.750	42.502	-13.555	56.057
7.912	9.920	27.580	37.500	-22.500	60.000
21.162	10.105	25.840	35.945	-24.055	60.000
Average					
0.166	9.747	28.500	38.247	-17.296	55.543
0.212	9.749	24.300	34.049	-20.180	54.229
0.373	9.747	15.410	25.157	-24.472	49.629
0.498	9.752	28.740	38.492	-7.565	46.057
7.912	9.920	22.630	32.550	-17.450	50.000
21.162	10.105	20.160	30.265	-19.735	50.000

Note:

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

Product : VOIP Phone
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5270MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV	dB	dBμV
LINE 1					
Quasi-Peak					
0.170	9.743	31.770	41.514	-23.915	65.429
0.216	9.739	29.070	38.809	-25.305	64.114
0.377	9.747	28.700	38.447	-21.067	59.514
0.525	9.753	32.540	42.293	-13.707	56.000
1.263	9.795	25.850	35.645	-20.355	56.000
21.170	10.065	26.590	36.655	-23.345	60.000
Average					
0.170	9.743	19.210	28.954	-26.475	55.429
0.216	9.739	21.590	31.329	-22.785	54.114
0.377	9.747	24.340	34.087	-15.427	49.514
0.525	9.753	24.320	34.073	-11.927	46.000
1.263	9.795	17.130	26.925	-19.075	46.000
21.170	10.065	19.700	29.765	-20.235	50.000

Note:

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

Product : VOIP Phone
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5270MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV	dB	dBμV
LINE 2					
Quasi-Peak					
0.162	9.747	34.780	44.527	-21.130	65.657
0.314	9.744	26.650	36.394	-24.920	61.314
0.377	9.747	28.840	38.587	-20.927	59.514
0.529	9.754	32.420	42.174	-13.826	56.000
7.931	9.920	27.330	37.250	-22.750	60.000
21.205	10.105	25.610	35.715	-24.285	60.000
Average					
0.162	9.747	20.840	30.587	-25.070	55.657
0.314	9.744	20.460	30.204	-21.110	51.314
0.377	9.747	18.490	28.237	-21.277	49.514
0.529	9.754	24.910	34.664	-11.336	46.000
7.931	9.920	21.940	31.860	-18.140	50.000
21.205	10.105	20.650	30.755	-19.245	50.000

Note:

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

Product : VOIP Phone
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5510MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV	dB	dBμV
LINE 1					
Quasi-Peak					
0.154	9.749	33.630	43.378	-22.508	65.886
0.205	9.739	27.460	37.199	-27.230	64.429
0.267	9.742	25.920	35.662	-26.995	62.657
0.490	9.752	32.790	42.542	-13.744	56.286
8.056	9.910	27.490	37.400	-22.600	60.000
21.369	10.068	27.010	37.078	-22.922	60.000
Average					
0.154	9.749	19.990	29.738	-26.148	55.886
0.205	9.739	15.970	25.709	-28.720	54.429
0.267	9.742	20.280	30.022	-22.635	52.657
0.490	9.752	27.340	37.092	-9.194	46.286
8.056	9.910	22.110	32.020	-17.980	50.000
21.369	10.068	20.660	30.728	-19.272	50.000

Note:

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

Product : VOIP Phone
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5510MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV	dB	dBμV
LINE 2					
Quasi-Peak					
0.220	9.750	28.520	38.270	-25.730	64.000
0.267	9.752	25.860	35.612	-27.045	62.657
0.509	9.753	33.100	42.853	-13.147	56.000
1.283	9.798	26.680	36.478	-19.522	56.000
8.021	9.920	27.580	37.500	-22.500	60.000
20.986	10.101	26.380	36.481	-23.519	60.000
Average					
0.220	9.750	20.710	30.460	-23.540	54.000
0.267	9.752	18.890	28.642	-24.015	52.657
0.509	9.753	21.730	31.483	-14.517	46.000
1.283	9.798	17.030	26.828	-19.172	46.000
8.021	9.920	22.510	32.430	-17.570	50.000
20.986	10.101	23.120	33.221	-16.779	50.000

Note:

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

Product : VOIP Phone
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5755MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV	dB	dBμV
LINE 1					
Quasi-Peak					
0.193	9.650	38.130	47.780	-16.991	64.771
0.279	9.655	24.690	34.345	-27.969	62.314
0.388	9.661	19.690	29.351	-29.849	59.200
0.654	9.675	33.740	43.415	-12.585	56.000
0.931	9.690	27.090	36.780	-19.220	56.000
1.755	9.747	24.960	34.708	-21.292	56.000
Average					
0.193	9.650	28.210	37.860	-16.911	54.771
0.279	9.655	9.910	19.565	-32.749	52.314
0.388	9.661	10.480	20.141	-29.059	49.200
0.654	9.675	25.630	35.305	-10.695	46.000
0.931	9.690	16.560	26.250	-19.750	46.000
1.755	9.747	14.430	24.178	-21.822	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 : VOIP Phone
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5755MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBμV	dBμV	dB	dBμV
LINE 2					
Quasi-Peak					
0.189	9.660	36.310	45.970	-18.916	64.886
0.306	9.657	25.240	34.897	-26.646	61.543
0.400	9.661	23.630	33.291	-25.566	58.857
0.611	9.673	33.820	43.493	-12.507	56.000
0.806	9.693	29.950	39.643	-16.357	56.000
1.349	9.723	27.860	37.583	-18.417	56.000
Average					
0.189	9.660	27.470	37.130	-17.756	54.886
0.306	9.657	17.960	27.617	-23.926	51.543
0.400	9.661	15.770	25.431	-23.426	48.857
0.611	9.673	24.770	34.443	-11.557	46.000
0.806	9.693	19.780	29.473	-16.527	46.000
1.349	9.723	16.550	26.273	-19.727	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

3. Maximun conducted output power

3.1. Test Equipment

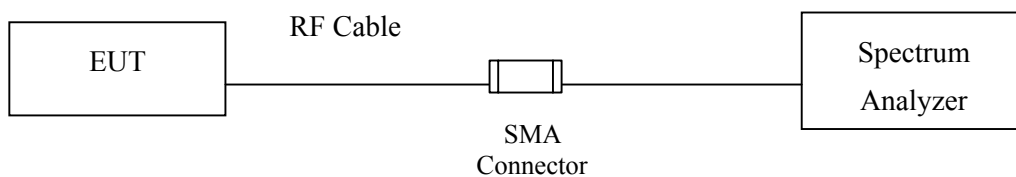
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2014
X	Power Sensor	Anritsu	MA2411B/0738448	Jun., 2014
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

Note:

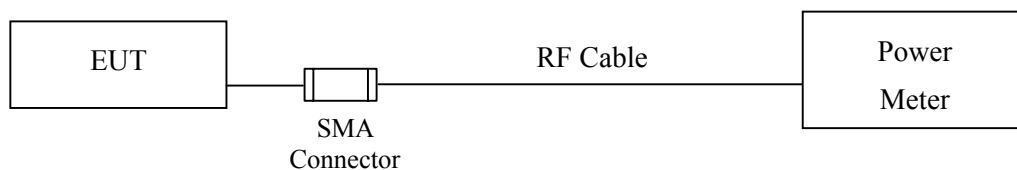
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup

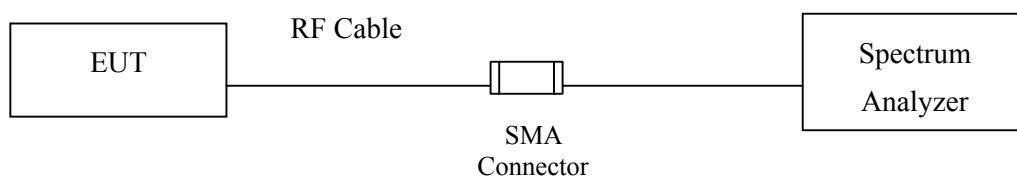
26dBc Occupied Bandwidth



Conduction Power Measurement (for 802.11an)



Conduction Power Measurement (for 802.11ac)



3.3. Limits

3.3.1. For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.3. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any

corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

3.4. Test Procedur

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater than 6dB BW of the emission under test. Maximum conducted 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 FCC KDB-789033, and provides more accurate measurements.

802.11an (BW $\leq$ 40MHz) Maximum conducted output power using KDB 789033 section E)3)b) Method PM-G (Measurement using a gated RF average power meter)

Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth, (Anritsu/ MA2411B video bandwidth: 65MHz)

802.11ac (BW=80MHz) Maximum conducted output power using KDB 789033 section E)2)b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep).

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D01 section F) procedure is used for measurements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Maximum conducted output power

Product : VOIP Phone
 Test Item : Maximum conducted output power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11a-6Mbps)

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	14.28	--	--	--	--	--	--	--	<24dBm
44	5220	14.05	13.95	13.84	13.77	13.72	13.67	13.61	13.54	<24dBm
48	5240	14.06	--	--	--	--	--	--	--	<24dBm
52	5260	14.18	--	--	--	--	--	--	--	<24dBm
60	5300	13.87	13.82	13.76	13.71	13.66	13.61	13.55	13.49	<24dBm
64	5320	13.95	--	--	--	--	--	--	--	<24dBm
100	5500	13.89	--	--	--	--	--	--	--	<24dBm
116	5580	13.86	13.8	13.76	13.71	13.63	13.54	13.47	13.41	<24dBm
140	5700	14.19	--	--	--	--	--	--	--	<24dBm
149	5745	13.95	--	--	--	--	--	--	--	<30dBm
157	5785	14.17	14.09	13.99	13.92	13.84	13.76	13.67	13.59	<30dBm
165	5825	14.02	--	--	--	--	--	--	--	<30dBm

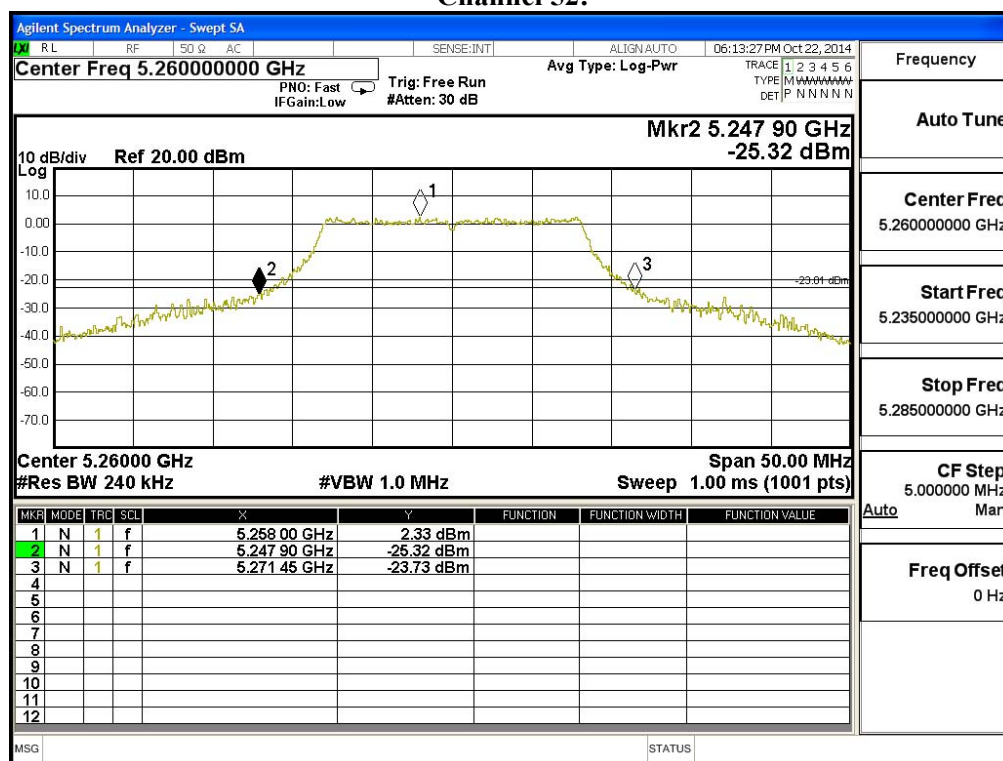
Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

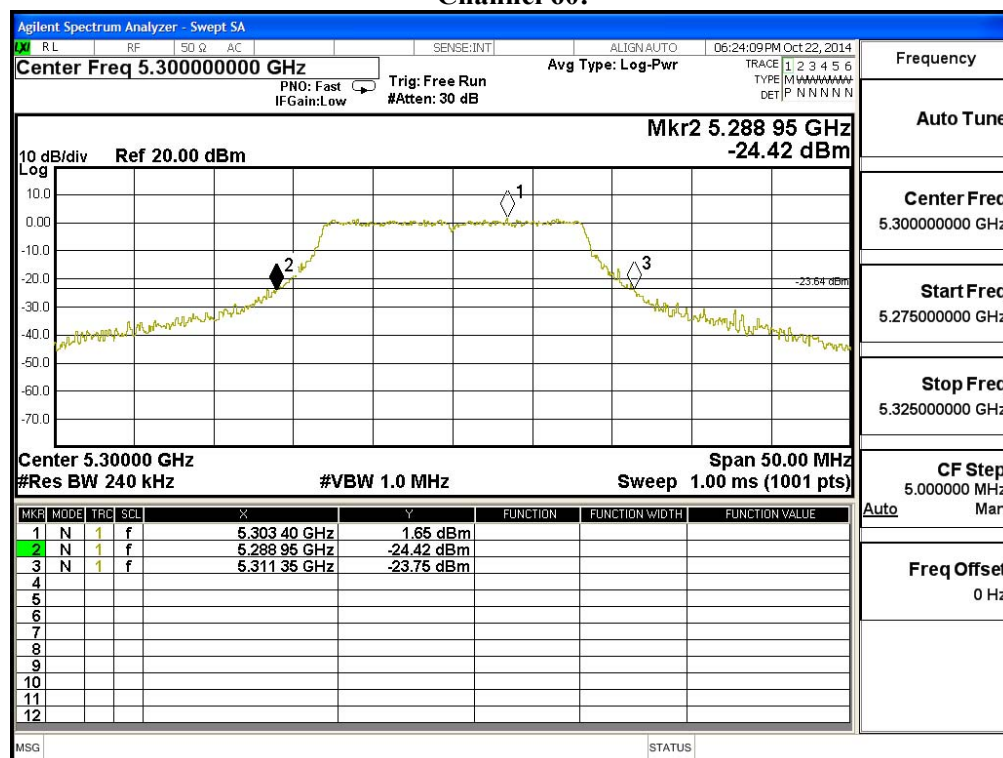
Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
36	5180	--	14.28	24	--
44	5220	--	14.05	24	--
48	5240	--	14.06	24	--
52	5260	22.600	14.18	24	24.54
60	5300	22.400	13.87	24	24.50
64	5320	22.350	13.95	24	24.49
100	5500	22.650	13.89	24	24.55
116	5580	22.300	13.86	24	24.48
140	5700	23.800	14.19	24	24.77
149	5745	--	13.95	30	--
157	5785	--	14.17	30	--
165	5825	--	14.02	30	--

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

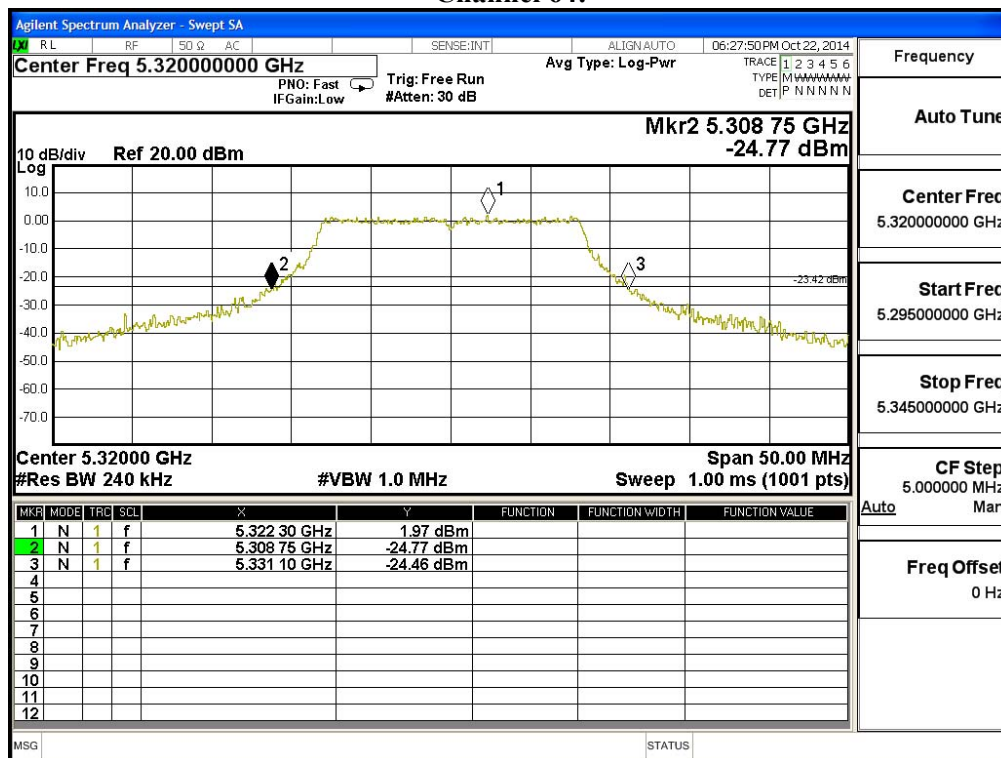
26dBc Occupied Bandwidth: Channel 52:



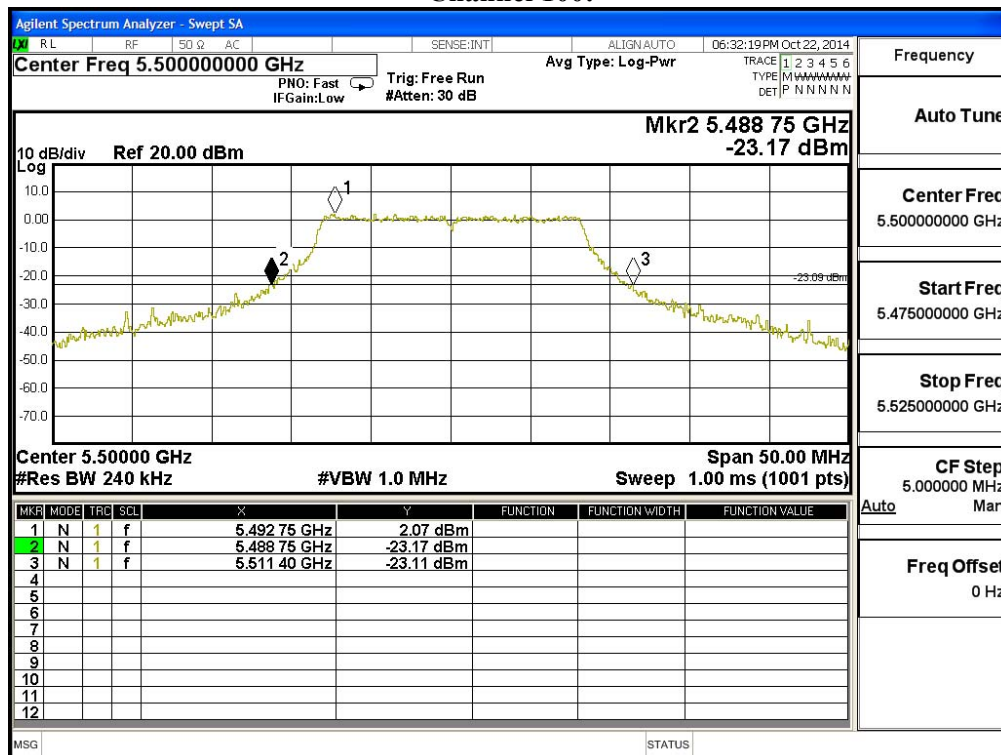
Channel 60:



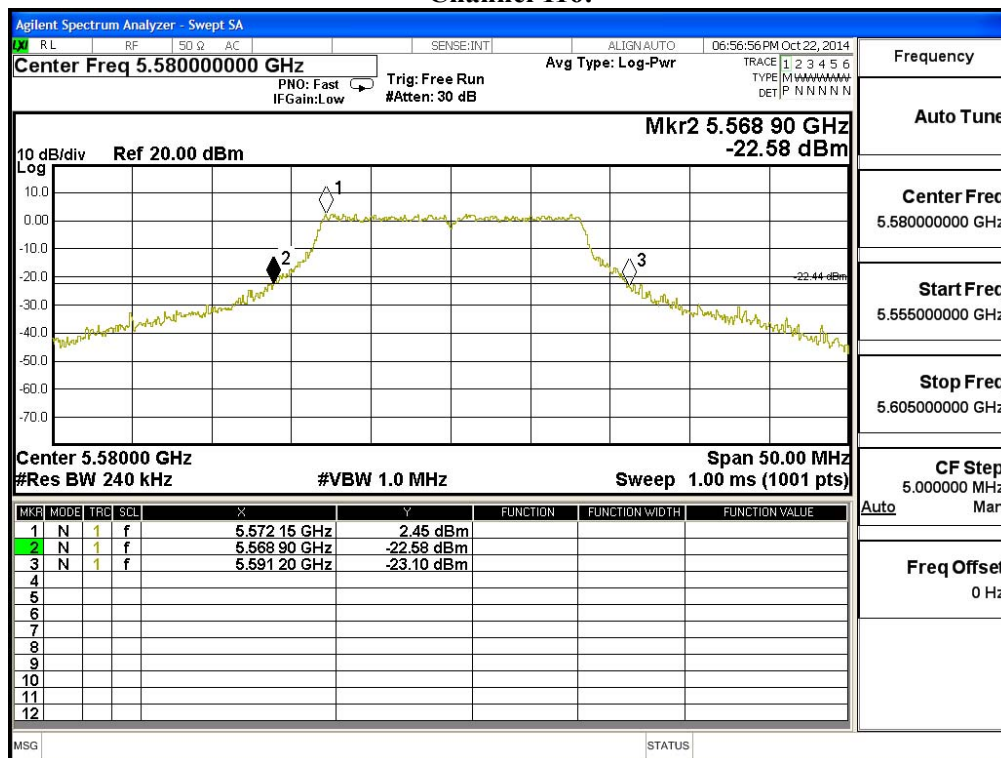
Channel 64:



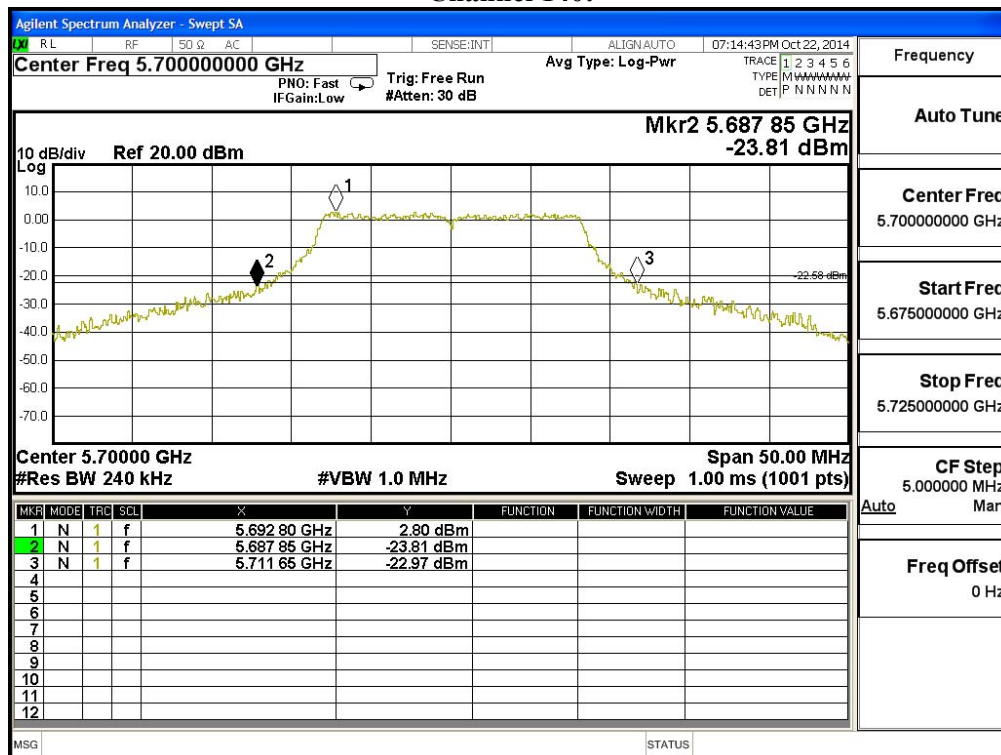
Channel 100:



Channel 116:



Channel 140:



Product : VOIP Phone
 Test Item : Maximum conducted output power
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps)

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	
		Measurement Level (dBm)								
36	5180	12.95	--	--	--	--	--	--	--	<24dBm
44	5220	13.11	13.02	12.94	12.86	12.77	12.68	12.6	12.51	<24dBm
48	5240	13.12	--	--	--	--	--	--	--	<24dBm
52	5260	13.15	--	--	--	--	--	--	--	<24dBm
60	5300	12.92	12.83	12.76	12.67	12.55	12.47	12.38	12.32	<24dBm
64	5320	12.98	--	--	--	--	--	--	--	<24dBm
100	5500	13.09	--	--	--	--	--	--	--	<24dBm
116	5580	13.01	12.92	12.84	12.77	12.7	12.62	12.54	12.48	<24dBm
140	5700	12.92	--	--	--	--	--	--	--	<24dBm
149	5745	12.98	--	--	--	--	--	--	--	<30dBm
157	5785	13.29	13.22	13.14	13.06	12.97	12.86	12.78	12.70	<30dBm
165	5825	13.07	--	--	--	--	--	--	--	<30dBm

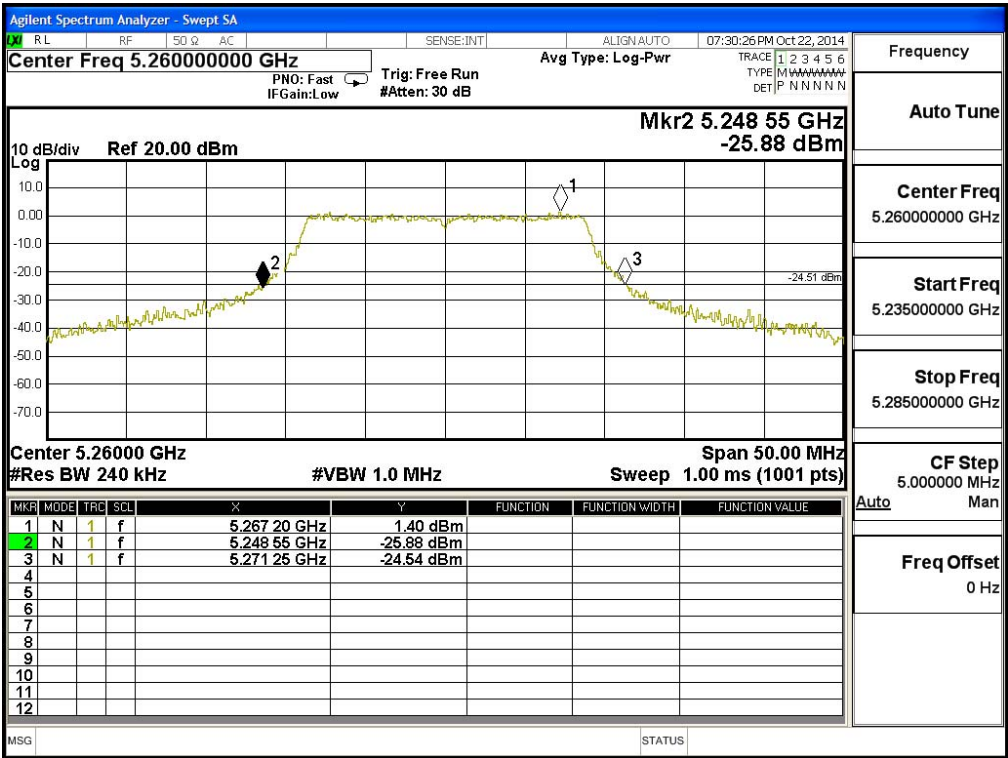
Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

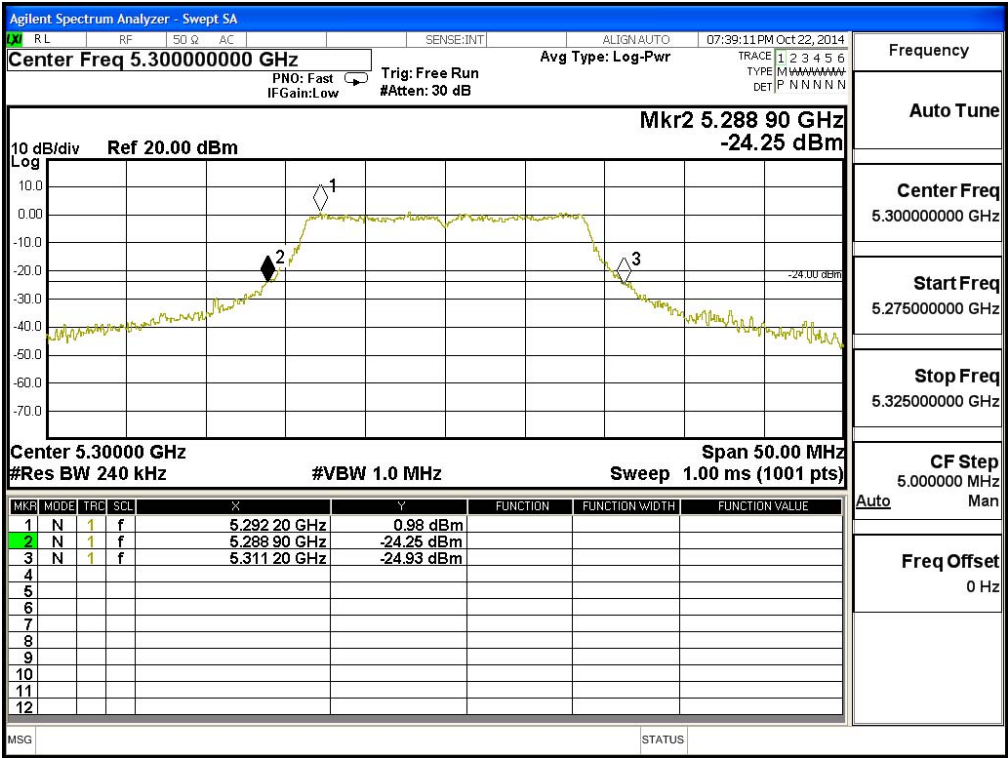
Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
36	5180	--	12.95	24	--
44	5220	--	13.11	24	--
48	5240	--	13.12	24	--
52	5260	22.700	13.15	24	24.56
60	5300	22.300	12.92	24	24.48
64	5320	22.500	12.98	24	24.52
100	5500	23.350	13.09	24	24.68
116	5580	22.100	13.01	24	24.44
140	5700	23.300	12.92	24	24.67
149	5745	--	12.98	30	--
157	5785	--	13.29	30	--
165	5825	--	13.07	30	--

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

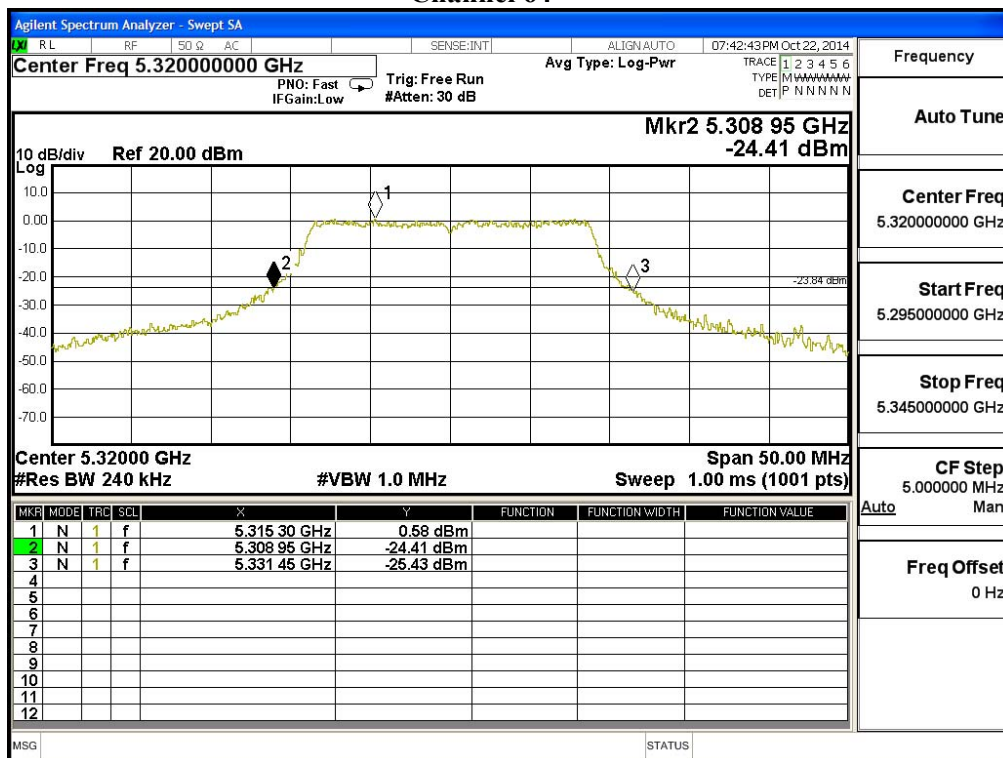
26dBc Occupied Bandwidth:
 Channel 52



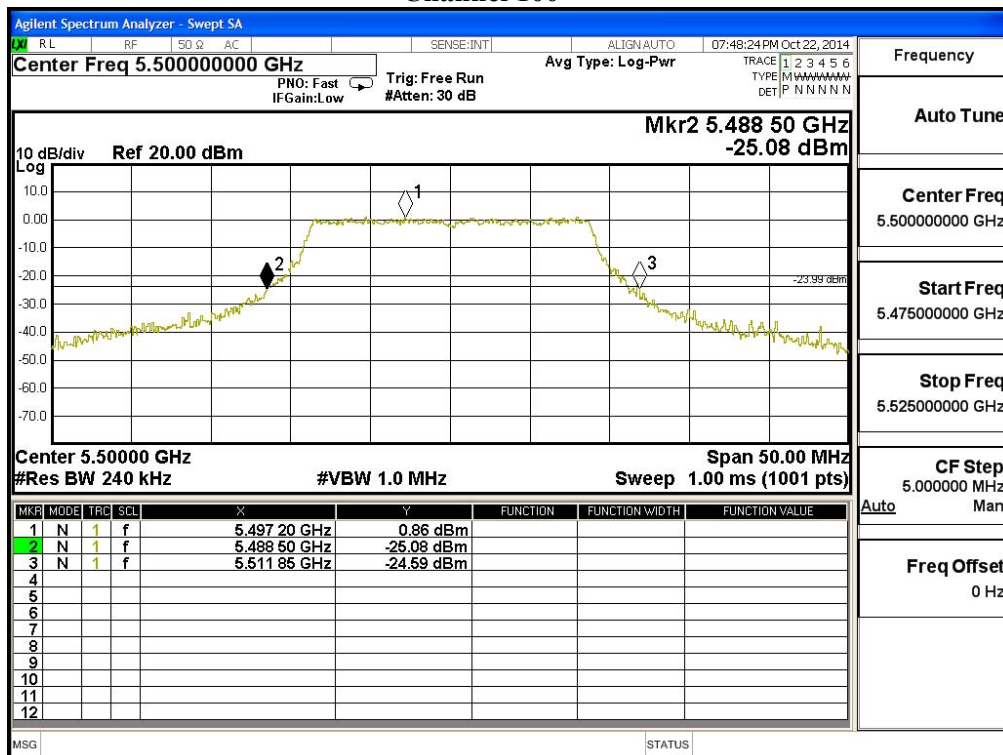
Channel 60



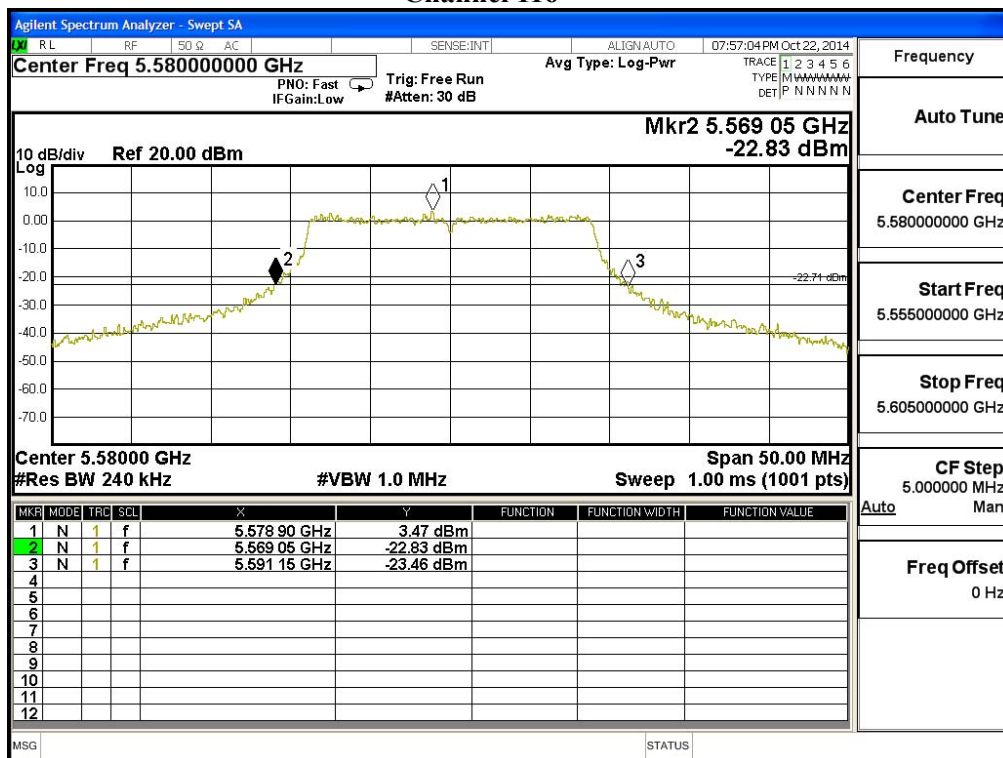
Channel 64



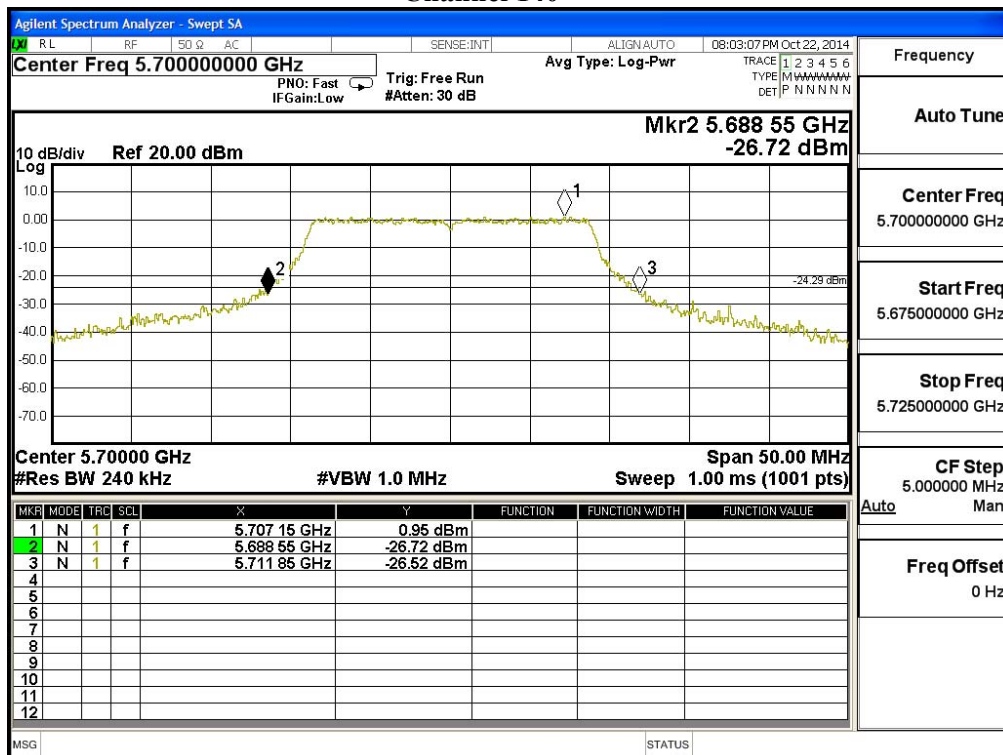
Channel 100



Channel 116



Channel 140



Product : VOIP Phone
Test Item : Maximum conducted output power
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps)

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		15	30	45	60	90	120	135	150	
		Measurement Level (dBm)								
38	5190	13.18	--	--	--	--	--	--	--	<24dBm
46	5230	13.25	13.17	13.1	13.02	12.93	12.84	12.76	12.67	<24dBm
54	5270	13.13	--	--	--	--	--	--	--	<24dBm
62	5310	13.15	13.08	13.01	12.93	12.86	12.74	12.67	12.59	<24dBm
102	5510	13.25	--	--	--	--	--	--	--	<24dBm
110	5550	13.12	13.04	12.97	12.9	12.81	12.73	12.66	12.59	<24dBm
134	5670	13.32	--	--	--	--	--	--	--	<24dBm
151	5755	12.87	--	--	--	--	--	--	--	<30dBm
159	5795	13.29	13.20	13.12	13.04	12.96	12.88	12.8	12.73	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

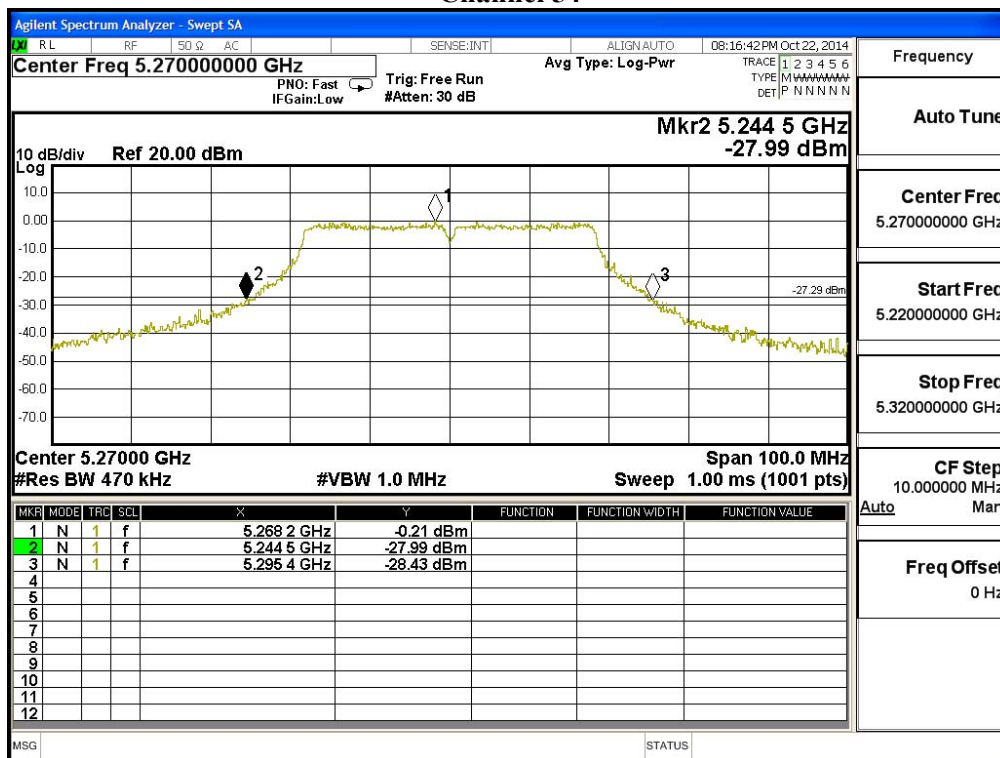
Maximum conducted output power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
38	5190	--	13.18	24	--
46	5230	--	13.25	24	--
54	5270	50.900	13.13	24	28.07
62	5310	51.800	13.15	24	28.14
102	5510	50.500	13.25	24	28.03
110	5550	51.800	13.12	24	28.14
134	5670	50.800	13.32	24	28.06
151	5755	--	12.87	30	--
159	5795	--	13.29	30	--

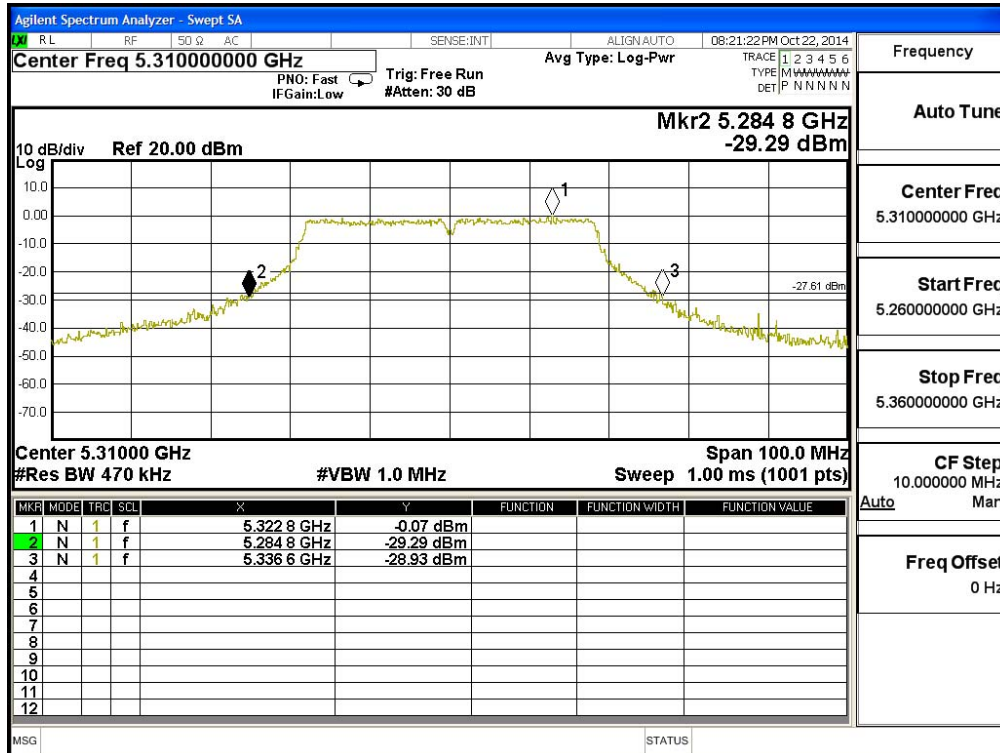
Note: Power Output Value =Reading value on average power meter + cable loss

26dBc Occupied Bandwidth:

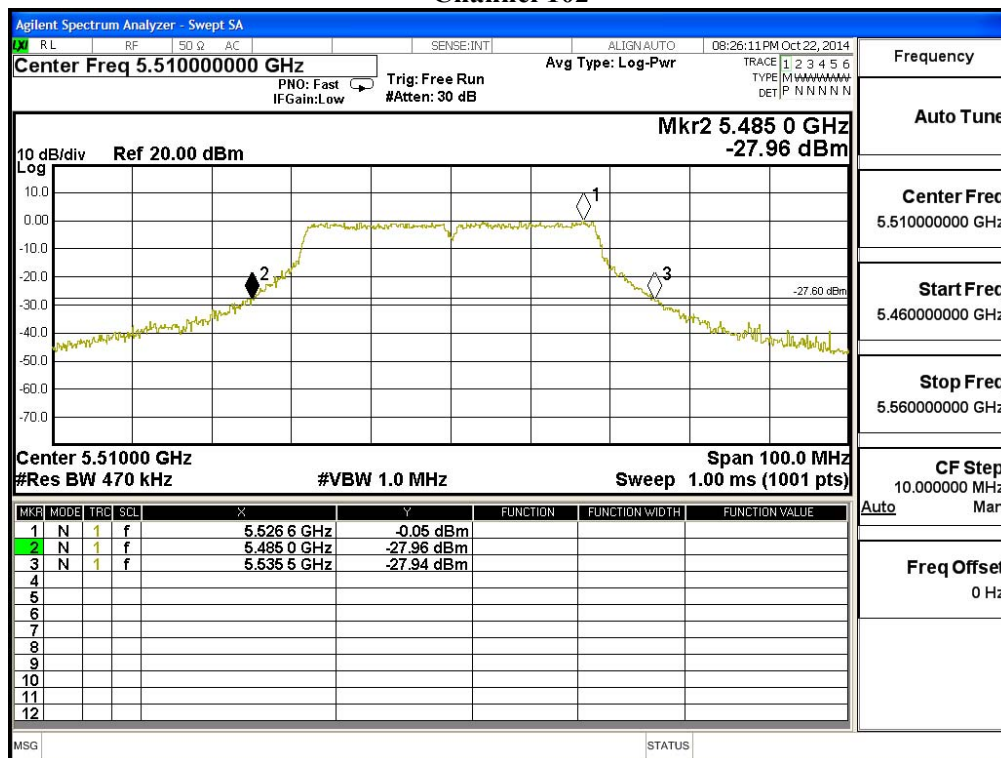
Channel 54



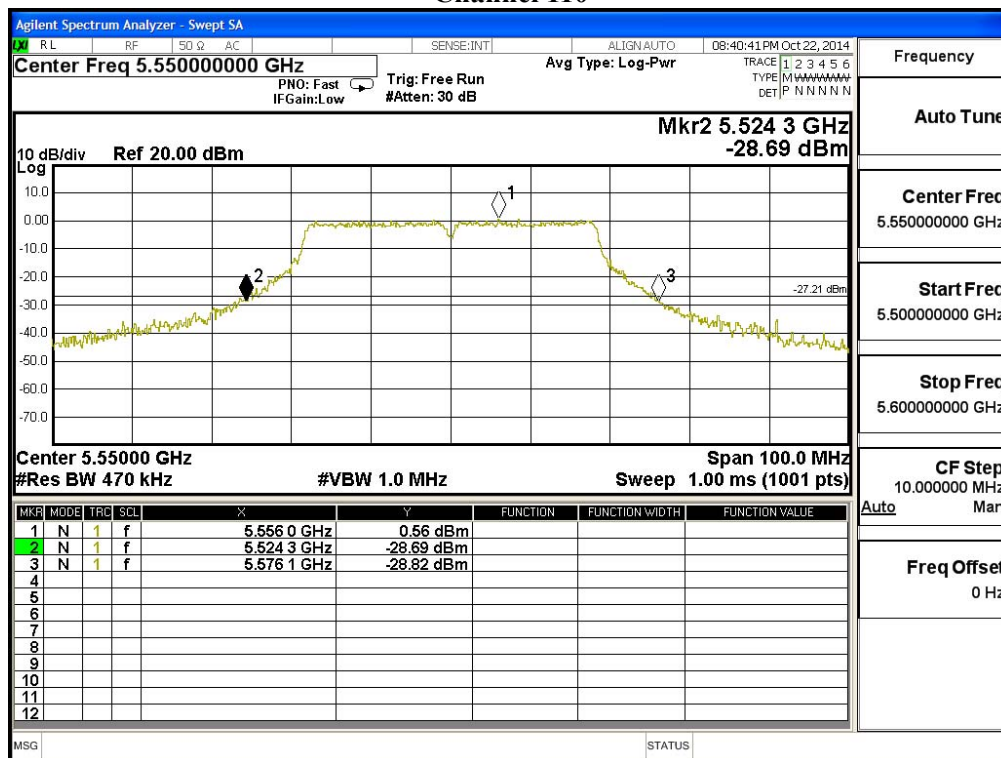
Channel 62



Channel 102



Channel 110



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC SENSE:INT ALIGN:AUTO 08:46:00 PM Oct 22, 2014

Center Freq 5.67000000 GHz Avg Type: Log-Pwr PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB

Mkr2 5.643 8 GHz
-27.89 dBm

10 dB/div Ref 20.00 dBm

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	5.653 5 GHz	0.23 dBm			
2	N	1	f	5.643 8 GHz	-27.89 dBm			
3	N	1	f	5.694 6 GHz	-27.06 dBm			

Center 5.67000 GHz Span 100.0 MHz
#Res BW 470 kHz #VBW 1.0 MHz Sweep 1.00 ms (1001 pts)

4. Peak Power Spectral Density

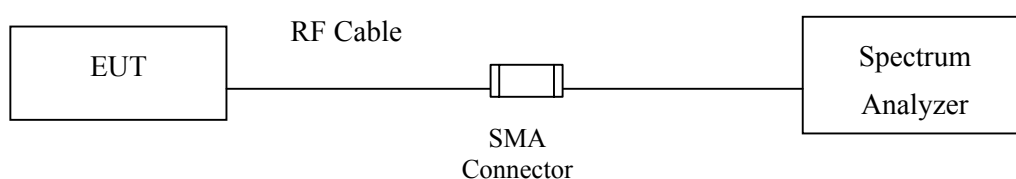
4.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun., 2014
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun., 2014
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr, 2014

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



4.3. Limits

- (1) For the band 5.15-5.25 GHz,
 - (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
 - (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
 - (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the

equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations. (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.+

- (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

4.4. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to DTS test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

The Peak Power Spectral Density using KDB 789033 section F) procedure, Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer.

SA-1 method is selected to run the test.

For the band 5.725-5.85 GHz, Scale the observed power level to an equivalent value in 500 kHz by adjusting (increase) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500\text{ kHz}/100\text{ kHz}) = 6.98\text{ dB}$.

4.5. Uncertainty

$\pm 1.27\text{ dB}$

4.6. Test Result of Peak Power Spectral Density

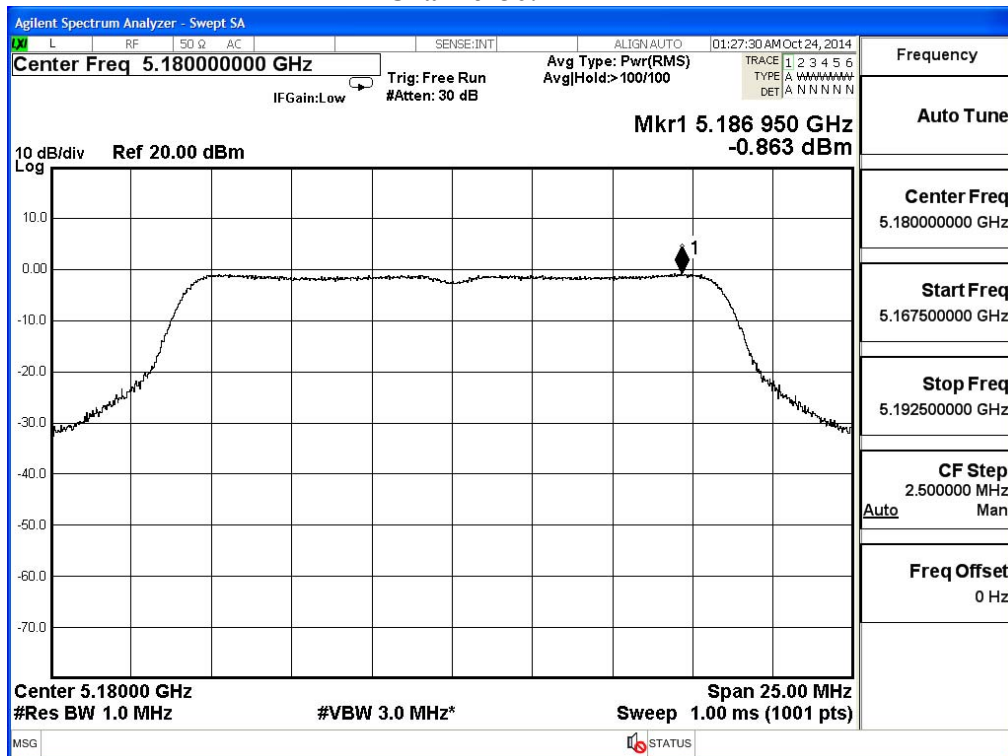
Product : VOIP Phone
Test Item : Peak Power Spectral Density
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11a-6Mbps)

Channel Number	Frequency (MHz)	Data Rate (Mbps)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	6	-0.863	17	Pass
44	5220	6	-1.211	17	Pass
48	5240	6	-1.257	17	Pass
52	5260	6	-1.571	11	Pass
60	5300	6	-1.209	11	Pass
64	5320	6	-1.489	11	Pass
100	5500	6	-1.136	11	Pass
116	5580	6	-0.570	11	Pass
140	5700	6	-0.484	11	Pass

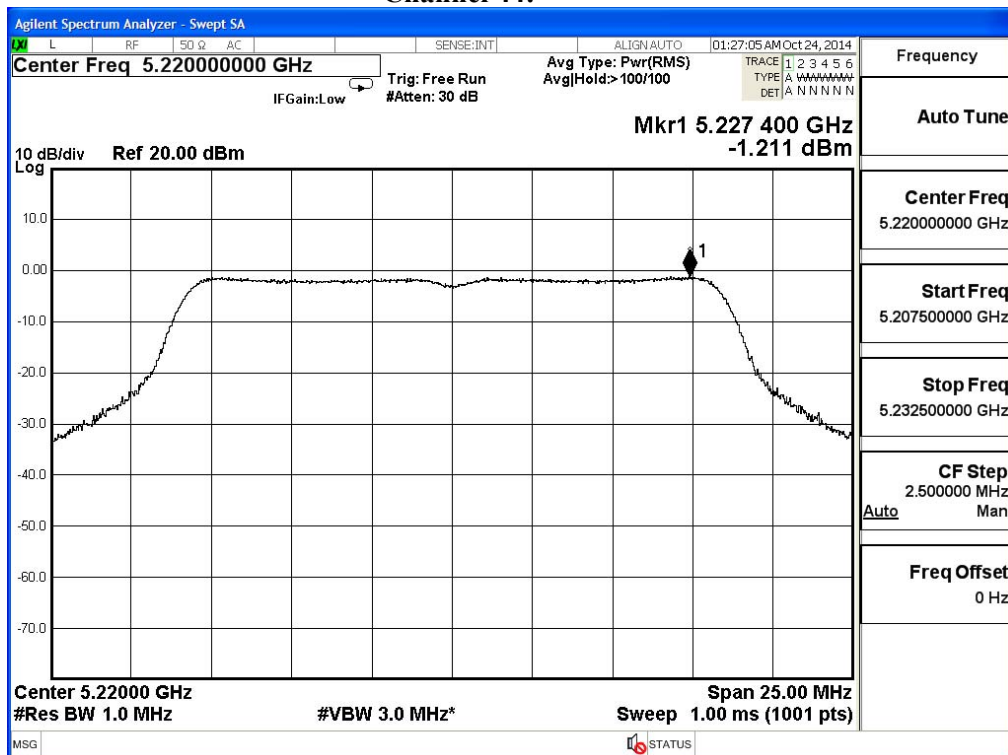
Channel Number	Frequency (MHz)	Data Rate (Mbps)	PPSD (dBm)	BWCF (dB)	Total PSD (dBm)	Required Limit (dBm)	Result
149	5745	6	0.990	6.980	7.970	<30	Pass
157	5785	6	1.210	6.980	8.190	<30	Pass
165	5825	6	1.400	6.980	8.380	<30	Pass

Note: Total PSD Value = PSD value + BWCF

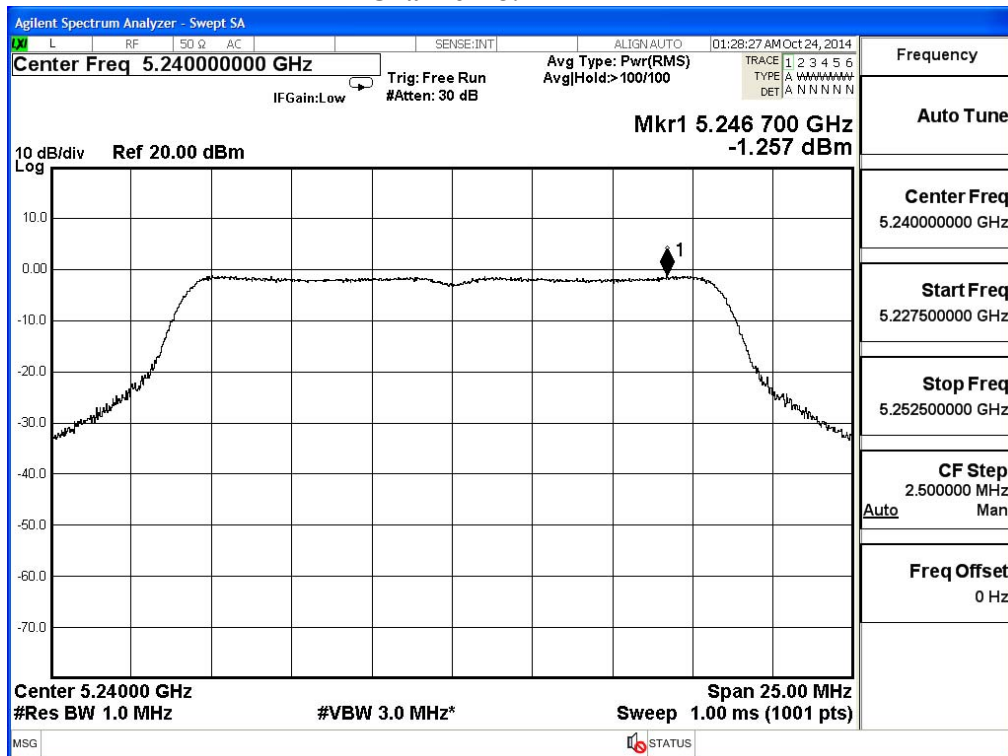
Channel 36:



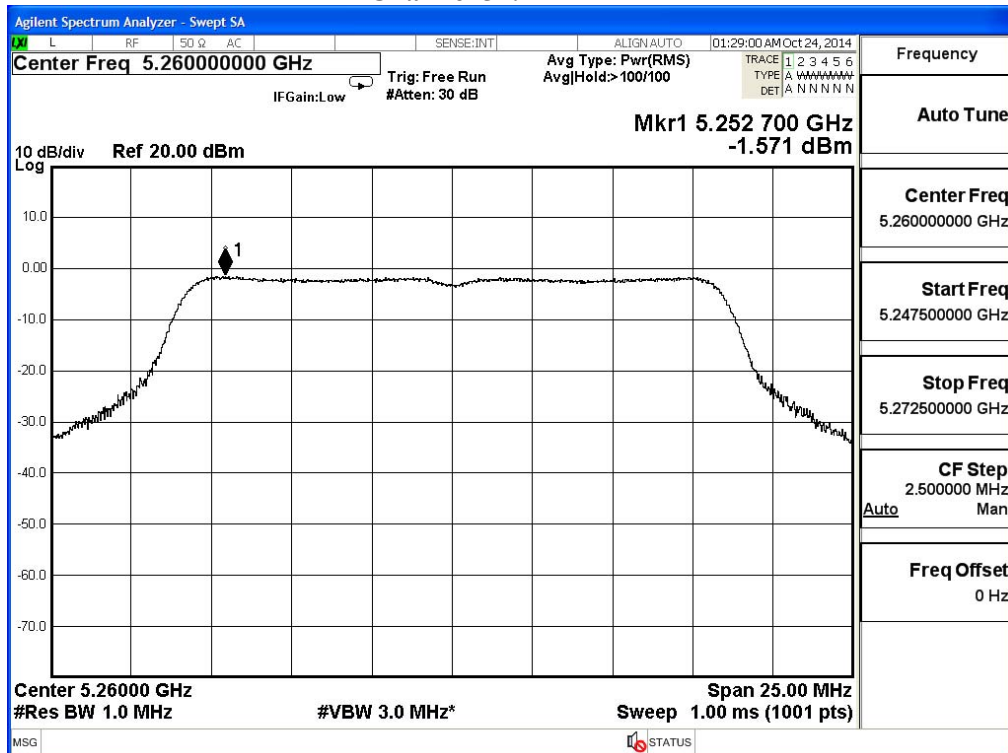
Channel 44:



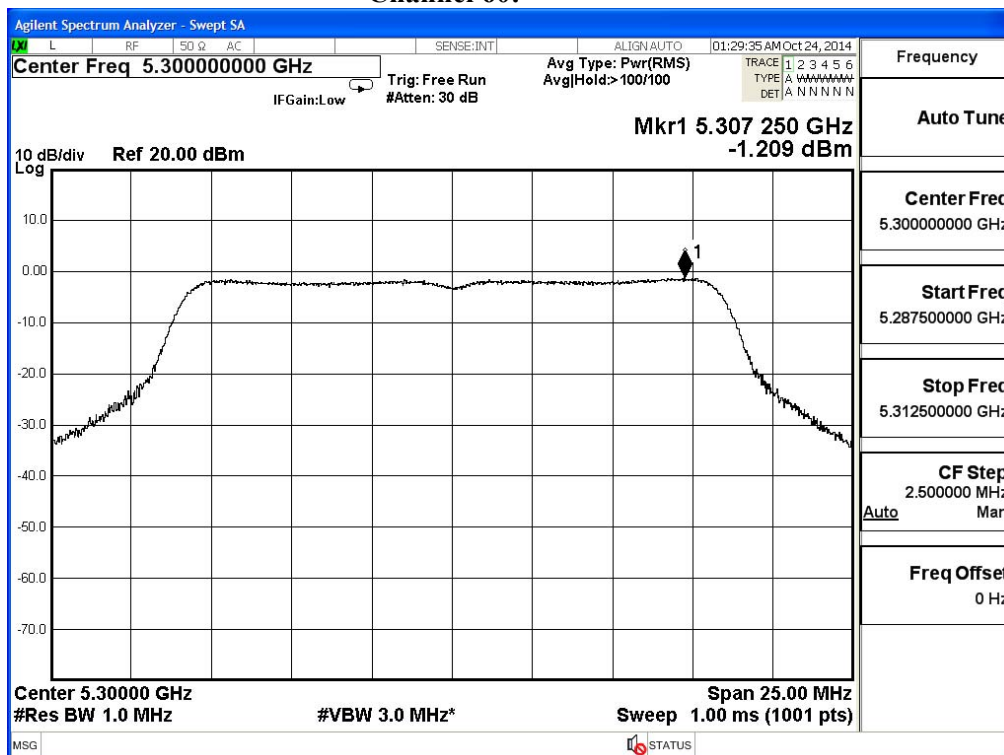
Channel 48:



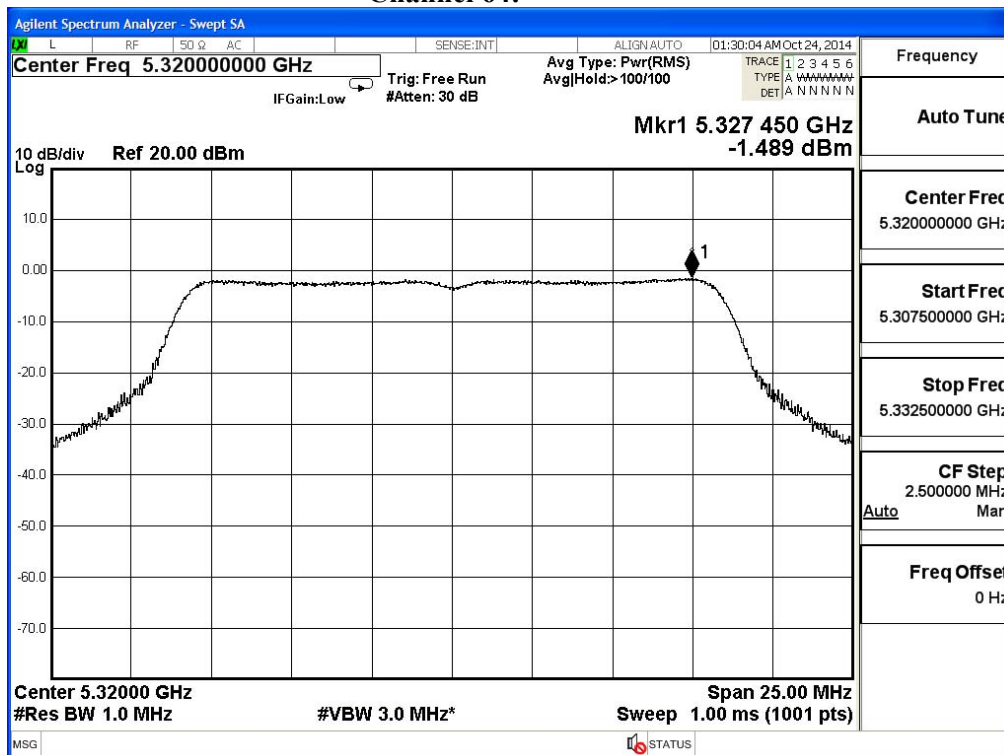
Channel 52:



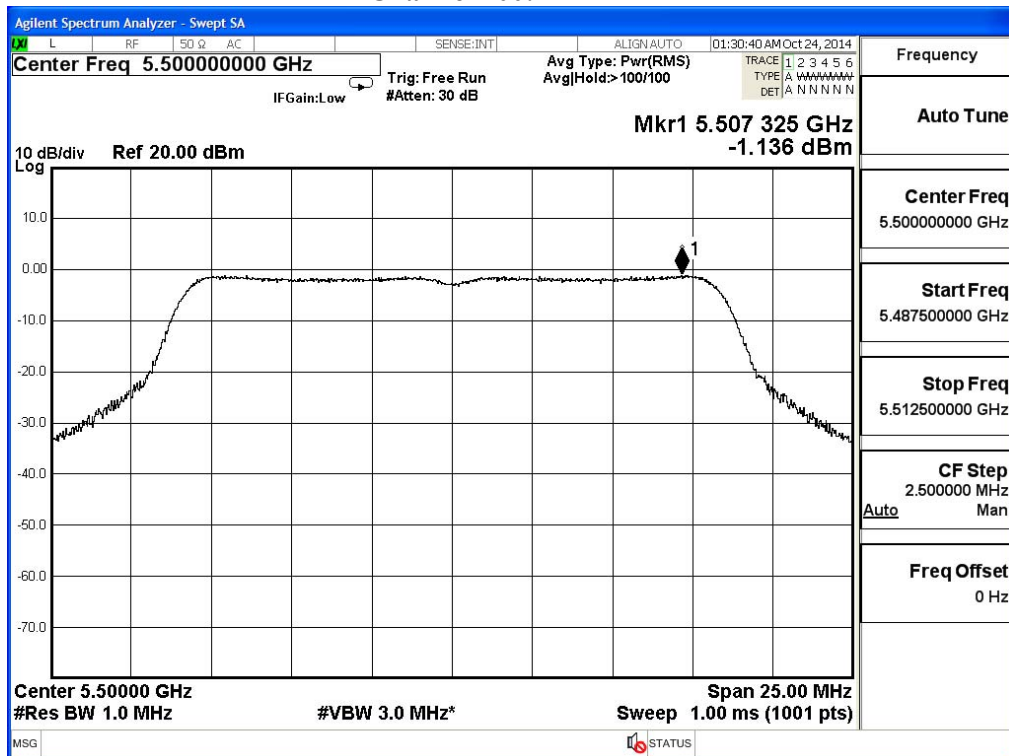
Channel 60:



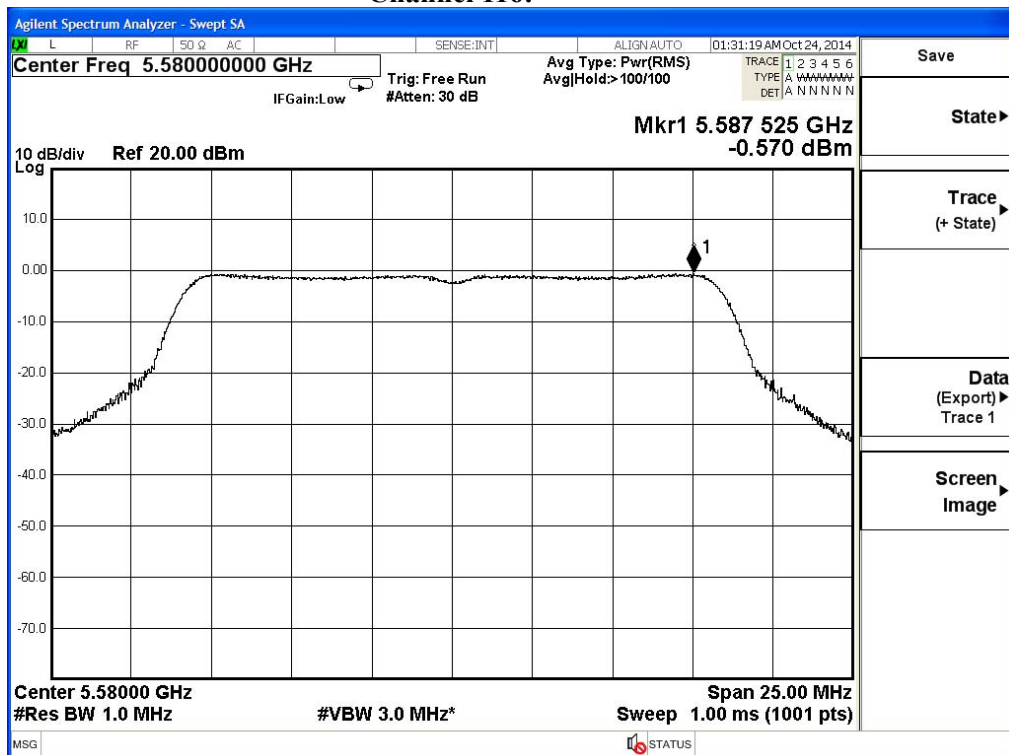
Channel 64:



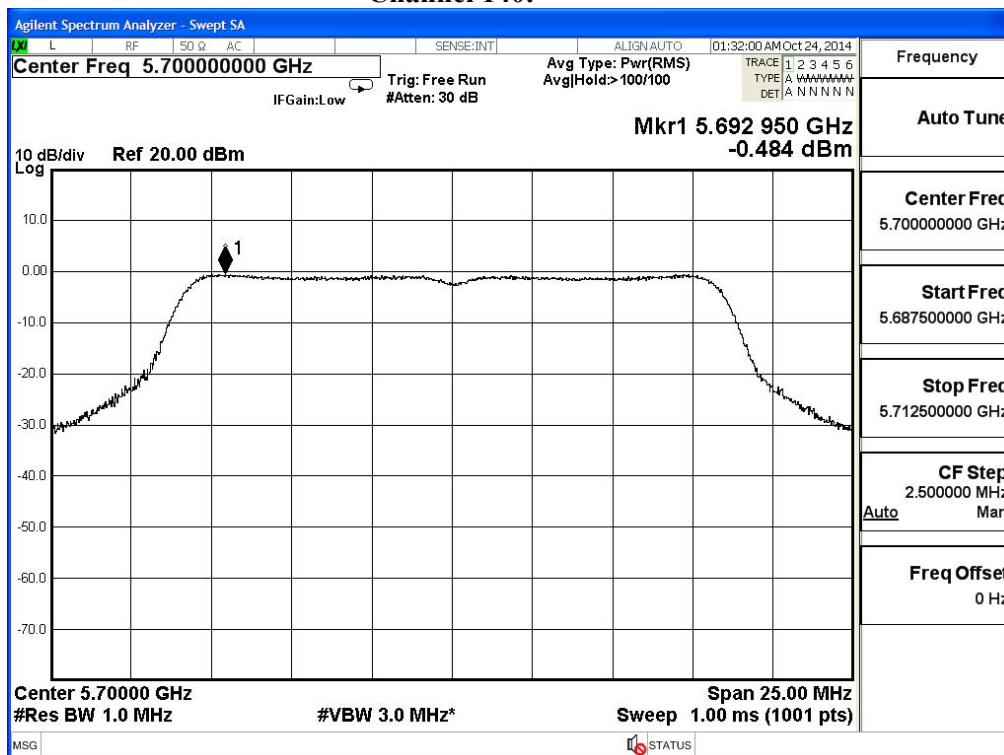
Channel 100:



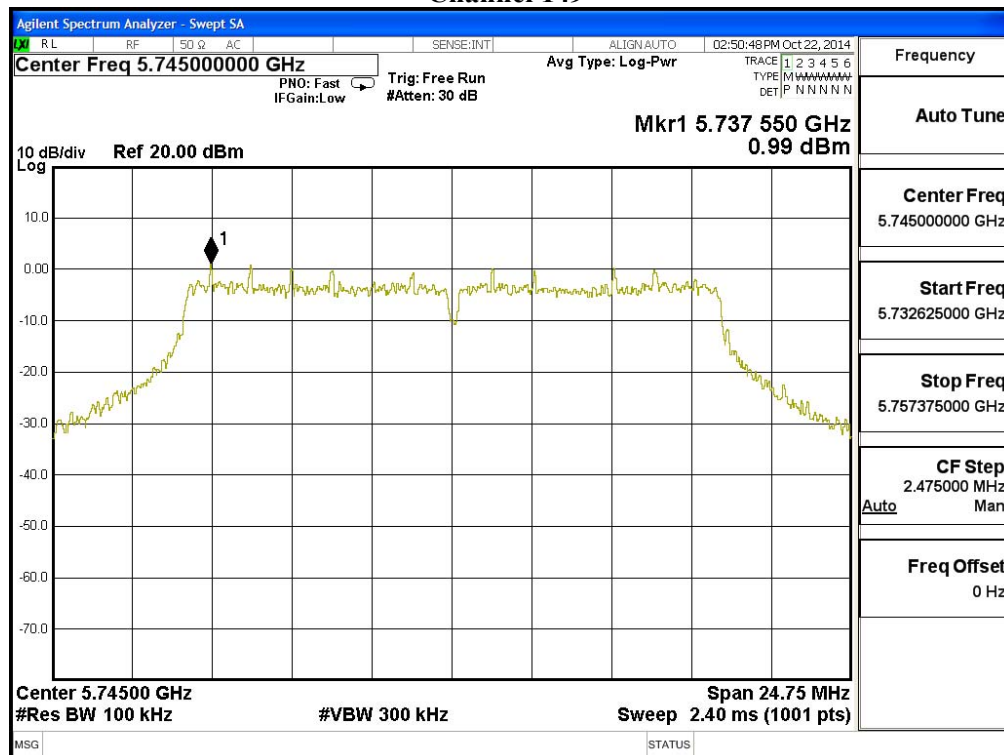
Channel 116:



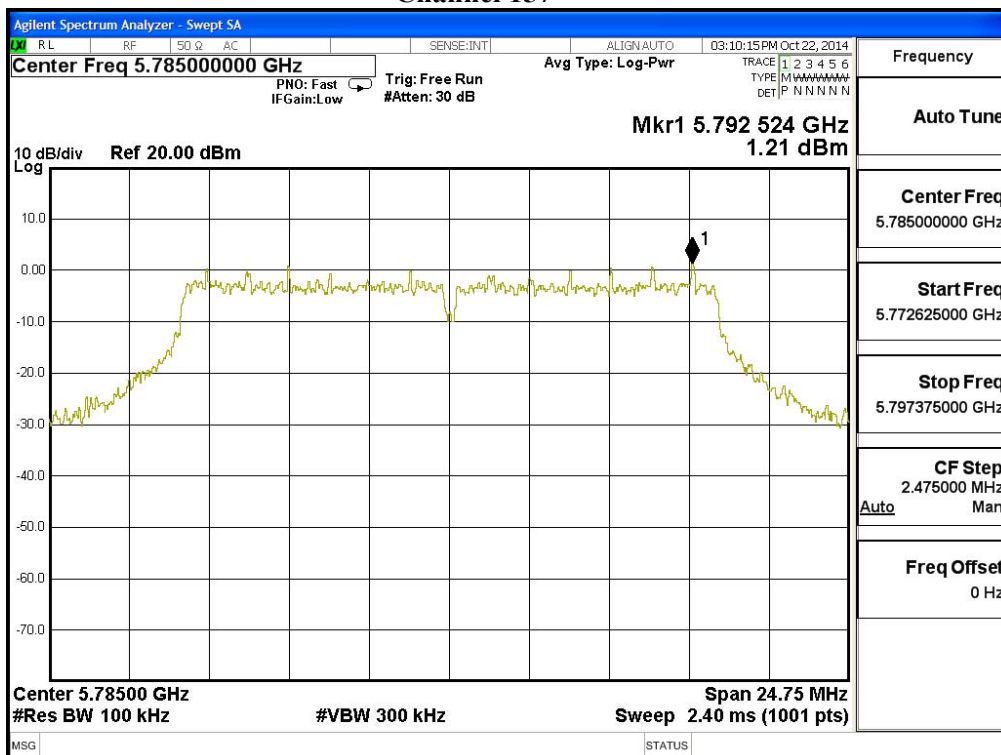
Channel 140:



Channel 149



Channel 157



Channel 165



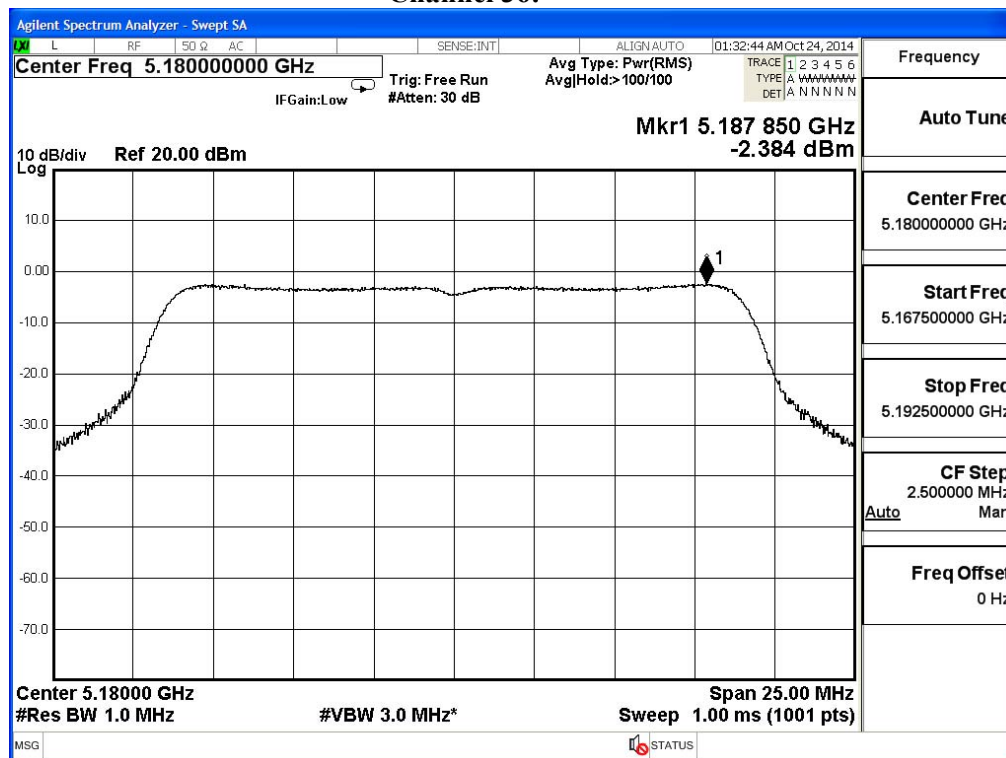
Product : VOIP Phone
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps)

Channel Number	Frequency (MHz)	Data Rate (Mbps)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	6	-2.384	17	Pass
44	5220	6	-2.279	17	Pass
48	5240	6	-2.460	17	Pass
52	5260	6	-2.483	11	Pass
60	5300	6	-2.246	11	Pass
64	5320	6	-2.281	11	Pass
100	5500	6	-2.274	11	Pass
116	5580	6	-1.826	11	Pass
140	5700	6	-2.125	11	Pass

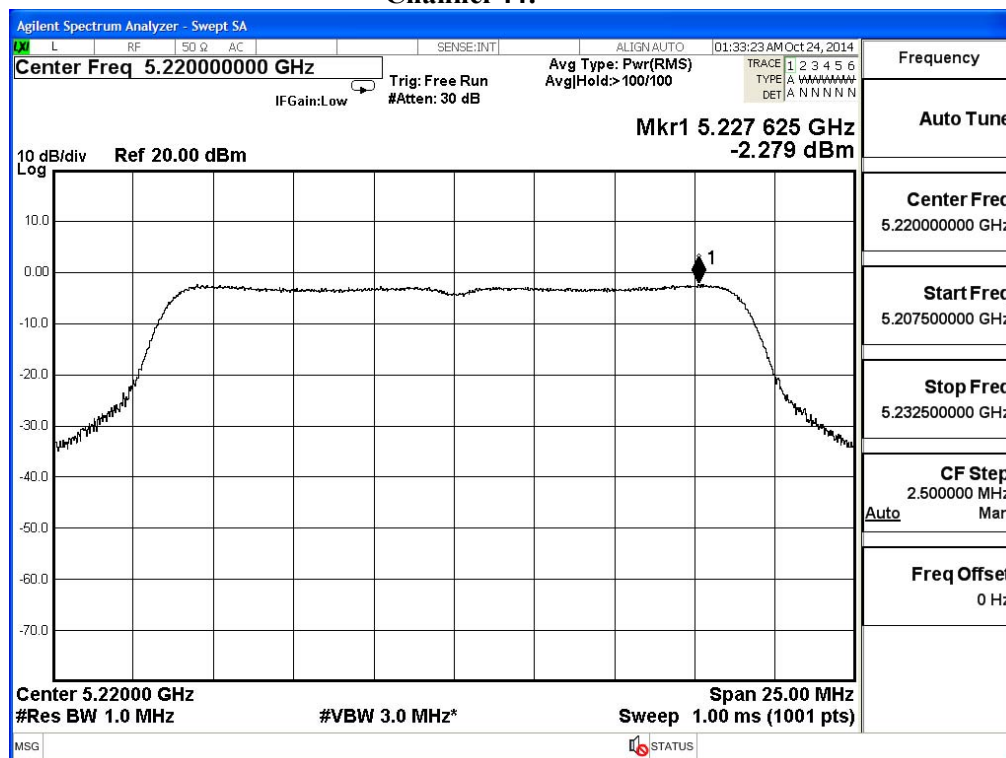
Channel Number	Frequency (MHz)	Data Rate (Mbps)	PPSD (dBm)	BWCF (dB)	Total PSD (dBm)	Required Limit (dBm)	Result
149	5745	6	-0.050	6.980	6.930	<30	Pass
157	5785	6	0.150	6.980	7.130	<30	Pass
165	5825	6	0.330	6.980	7.310	<30	Pass

Note: Total PSD Value = PSD value + BWCF

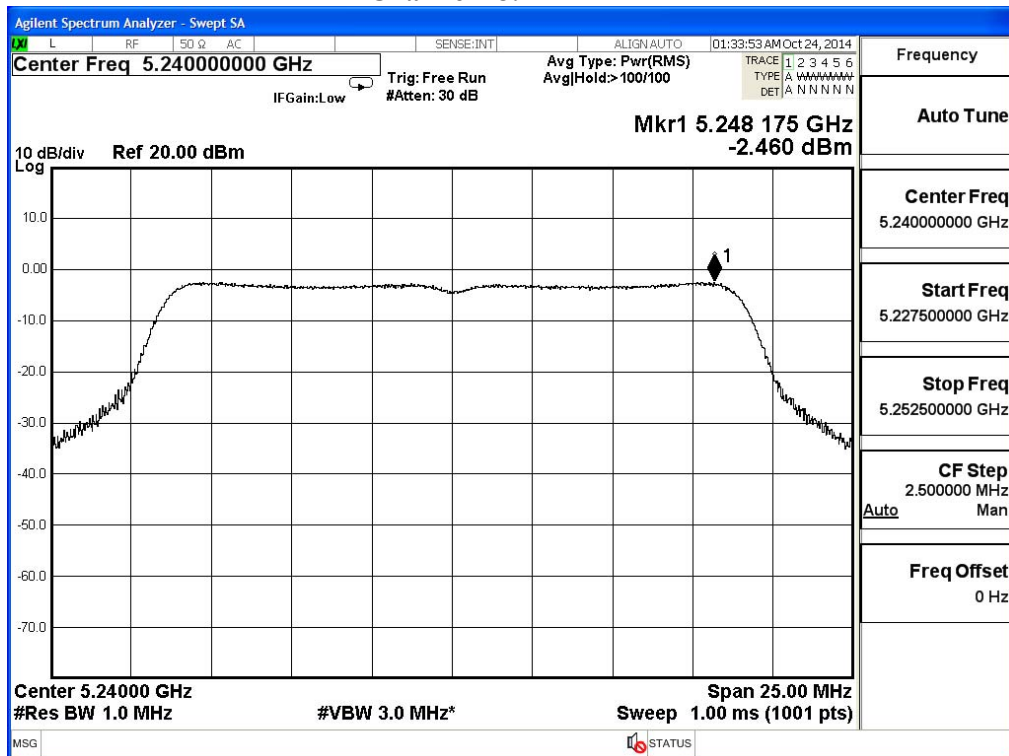
Channel 36:



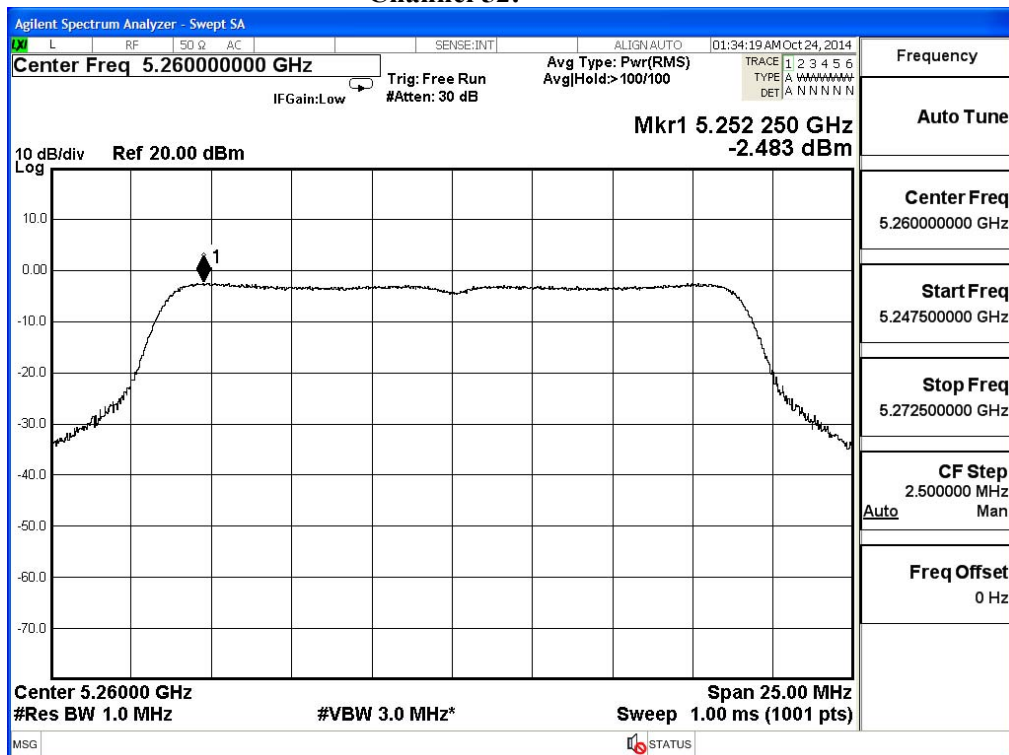
Channel 44:



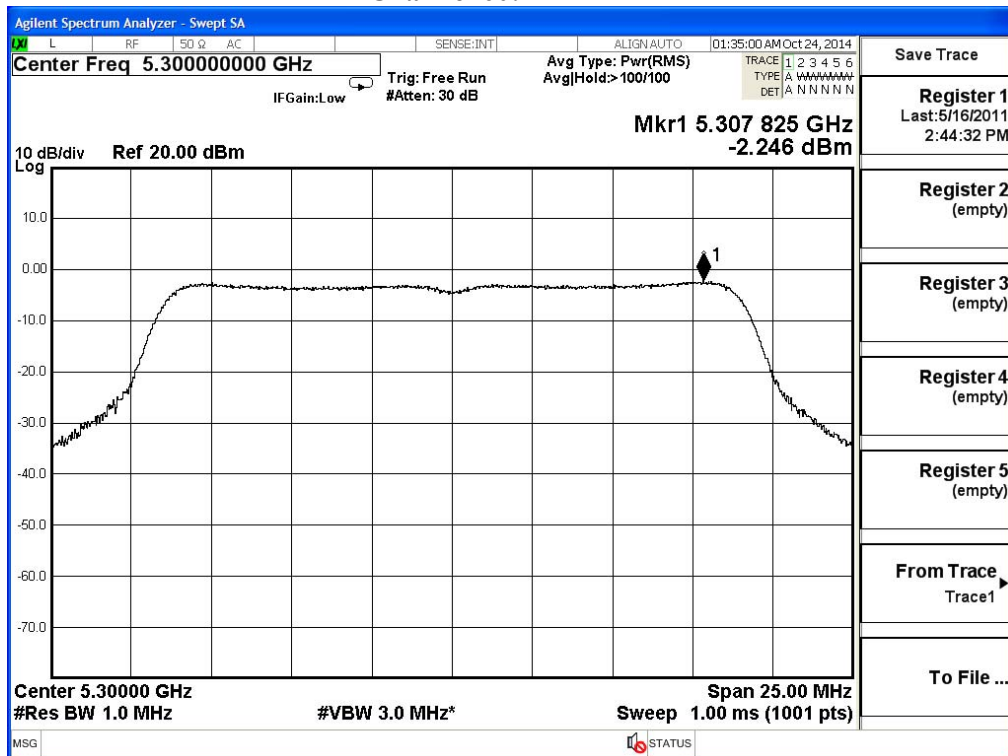
Channel 48:



Channel 52:



Channel 60:



Channel 64:

