FCC Test Report

Product Name	Play-Fi Wireless Speaker
Model No	W7
FCC ID	IPUW7SPEAKER

Applicant	DEI Sales Inc. dba Definitive Technology
Address	One Viper Way Vista California United States 92081

Date of Receipt	May 27, 2014
Issued Date	Aug. 08, 2014
Report No.	1460042R-RFUSP05V00
Report Version	V1.0

Testing Laboratory
0914

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: Aug. 08, 2014
Report No.: 1460042R-RFUSP05V00

QuieTek Corporation

Product Name	Play-Fi Wireless Speaker
Applicant	DEI Sales Inc. dba Definitive Technology
Address	One Viper Way Vista California United States 92081
Manufacturer	DEI Sales Inc. dba Definitive Technology
Model No.	W7
FCC ID.	IPUW7SPEAKER
EUT Rated Voltage	AC 100-240V, 50-60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	D. (Definitive Technology)
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E: 2013 ANSI C63.10: 2009, FCC KDB-789033
Test Result	Complied

Documented By : Joanne Lin

(Senior Adm. Specialist / Joanne Lin)

Tested By : Alan Chen

(Engineer / Alan Chen)

Approved By :

(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs
Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Play-Fi Wireless Speaker
Trade Name	D. (Definitive Technology)
FCC ID.	IPUW7SPEAKER
Model No.	W7
Frequency Range	802.11a/n-20MHz: 5180-5320MHz, 5500-5700MHz 802.11n-40MHz: 5190-5310, 5510-5670MHz
Number of Channels	802.11a/n-20MHz: 19; 802.11n-40MHz: 9
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	PIFA Antenna
Antenna Gain	Refer to the table “Antenna List”
Power Cable	Shielded, 1.8m
Contain Module	LITEON / WN3500M

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	MAG.LAYERS	MSA-3310-25GC4-A2 MSA-3310-25GC4-A5	PIFA Antenna	3.92 dBi for 5.15~5.25GHz 3.13 dBi for 5.25~5.35GHz 3.13 dBi for 5.47~5.725GHz

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 132:	5660 MHz	Channel 136:	5680 MHz	Channel 140:	5700 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 134:	5670 MHz		

Note:

1. This device is a Play-Fi Wireless Speaker, with a built-in 5GHz 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(20M-BW) is 7.2Mbps and 802.11n(40M-BW) 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)

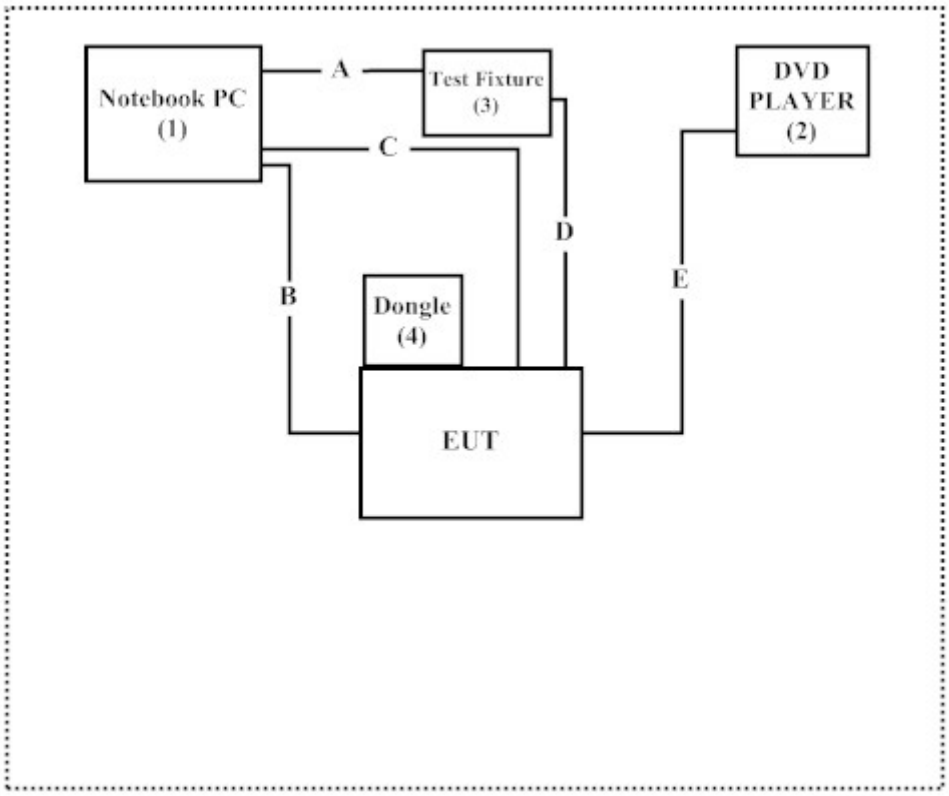
1.3. Tested System Datails

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	DVD PLAYER	Pioneer	DV-600AV	GJKD006378LS	Non-Shielded, 1.8m
3	Test Fixture	Meiloon	N/A	N/A	N/A
4	Dongle	Transcend	N/A	N/A	N/A

Signal Cable Type		Signal cable Description
A	RS-232 to RS-232 Cable	Shielded, 1.8m
B	Audio Cable	Shielded, 1.8m
C	LAN Cable	Shielded, 1.2m
D	Signal Cable	Non-Shielded, 0.3m
E	Fiber Cable	Shielded, 1.0m

1.4. Configuration of tested System



1.5. EUT Exercise Software

(1) Setup the EUT as shown in Section 1.4.
(2) Execute software “Tera Term V.4.67” on the Notebook PC.
(3) Configure the test mode, the test channel, and the data rate.
(4) Press “OK” to start the continuous Transmit.
(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://www.quietek.com/tw/ctg/cts/accreditations.htm

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

Site Description: File on
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FCC Engineering Laboratory
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Registration Number: 92195

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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

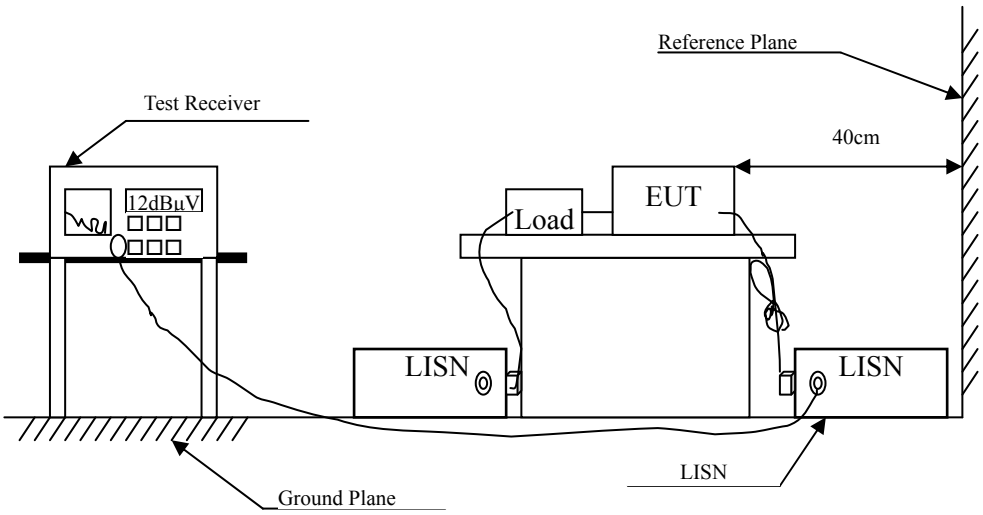
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2013	
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 invested 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 : Play-Fi Wireless Speaker
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5190MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV	Margin dB	Limit 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 : Play-Fi Wireless Speaker
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5190MHz)

Frequency MHz	Correct Factor dB	Reading Level dBµV	Measurement Level dBµV	Margin dB	Limit 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 : Play-Fi Wireless Speaker
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5270MHz)

Frequency MHz	Correct Factor dB	Reading Level dBµV	Measurement Level dBµV	Margin dB	Limit 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 : Play-Fi Wireless Speaker
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5270MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV	Margin dB	Limit 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 : Play-Fi Wireless Speaker
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5550MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV	Margin dB	Limit 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 : Play-Fi Wireless Speaker
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5550MHz)

Frequency MHz	Correct Factor dB	Reading Level dBµV	Measurement Level dBµV	Margin dB	Limit 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

3. Maximun conducted output power

3.1. Test Equipment

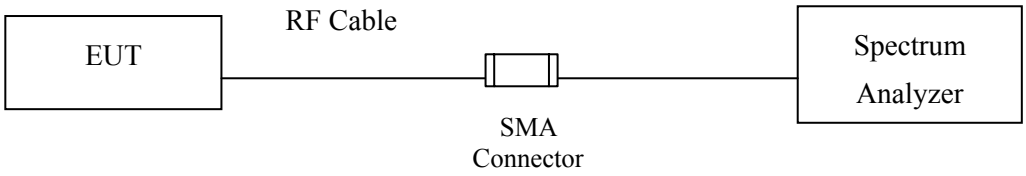
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2014
X	Power Sensor	Anritsu	MA2411B/0738448	Jun., 2014
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

Note:

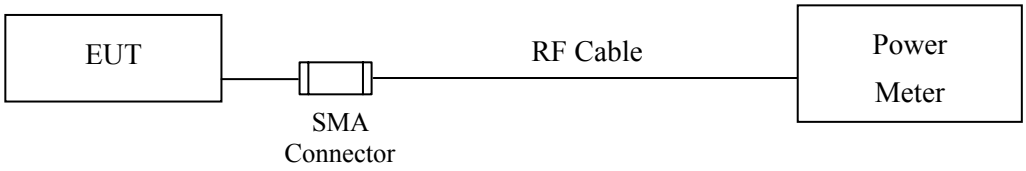
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with "X" are used to measure the final test results.

3.2. Test Setup

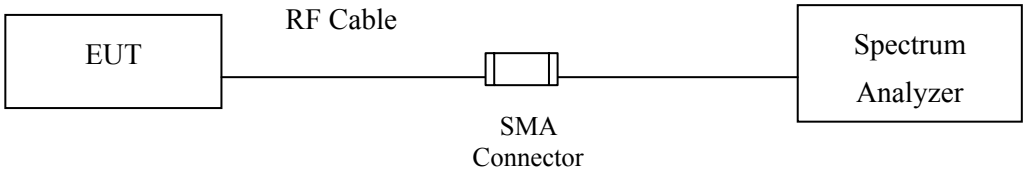
26dBc Occupied Bandwidth



Conduction Power Measurement (for 802.11an)



Conduction Power Measurement (for 802.11ac)



3.3. Limits

(1) For the band 5.15-5.25 GHz, the maximum conducted output 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 Maximum conducted output 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 maximum conducted output 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 Maximum conducted output 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 maximum conducted output 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 Maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

3.4. Test Procedure

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≦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 : Play-Fi Wireless Speaker
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	13.16	--	--	--	--	--	--	--	<17dBm
44	5220	13.26	13.22	13.18	13.14	13.10	13.06	13.02	12.98	<17dBm
48	5240	13.32	--	--	--	--	--	--	--	<17dBm
52	5260	13.42	--	--	--	--	--	--	--	<24dBm
60	5300	13.45	13.41	13.37	13.33	13.29	13.25	13.21	13.17	<24dBm
64	5320	13.50	--	--	--	--	--	--	--	<24dBm
100	5500	13.48	--	--	--	--	--	--	--	<24dBm
116	5580	13.48	13.44	13.40	13.36	13.32	13.28	13.24	13.20	<24dBm
140	5700	12.92	--	--	--	--	--	--	--	<24dBm

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

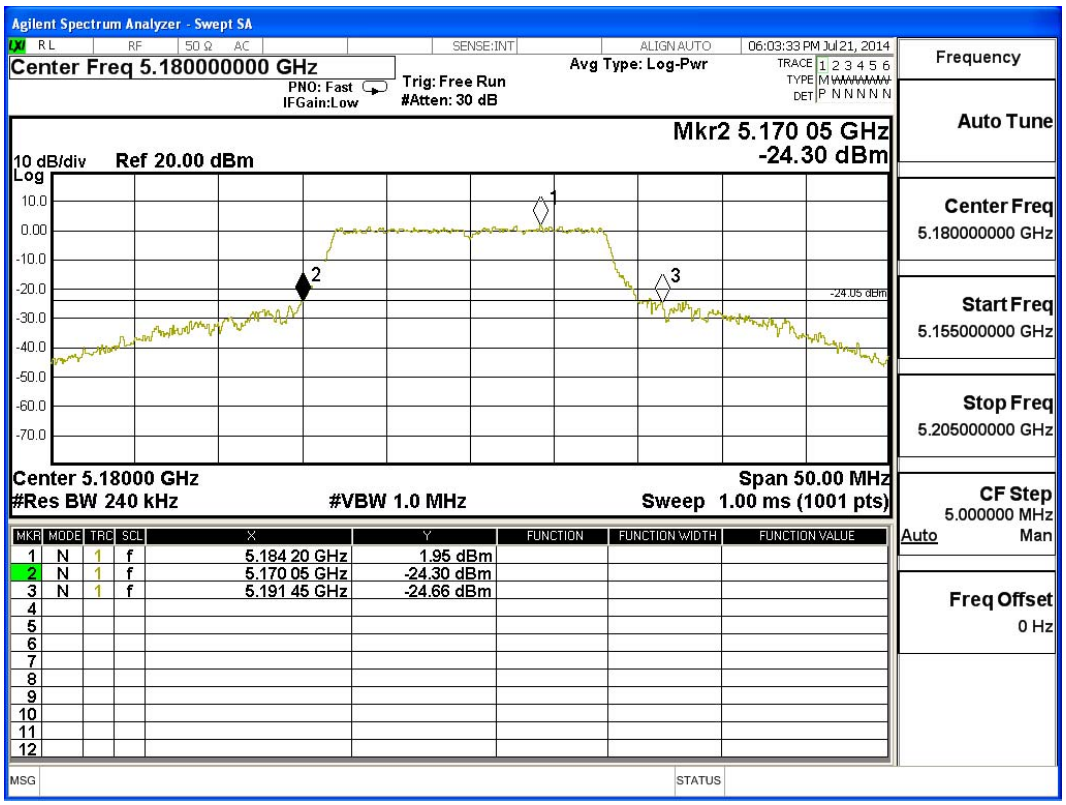
Maximum conducted output power Measurement:

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
36	5180	21.40	13.16	17	17.30
44	5220	23.05	13.26	17	17.63
48	5240	23.40	13.32	17	17.69
52	5260	23.40	13.42	24	24.69
60	5300	20.40	13.45	24	24.10
64	5320	20.10	13.50	24	24.03
100	5500	20.15	13.48	24	24.04
116	5580	21.00	13.48	24	24.22
140	5700	20.40	12.92	24	24.10

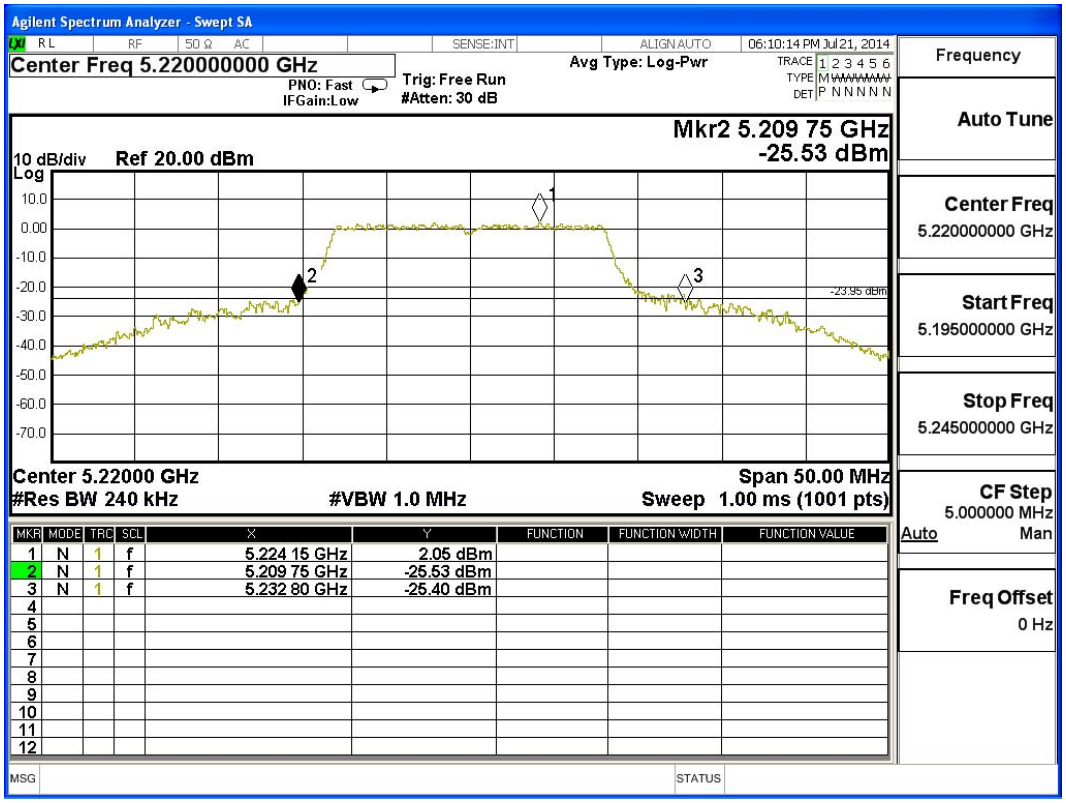
Note: Power Output Value =Reading value on average power meter + cable loss

26dBc Occupied Bandwidth:

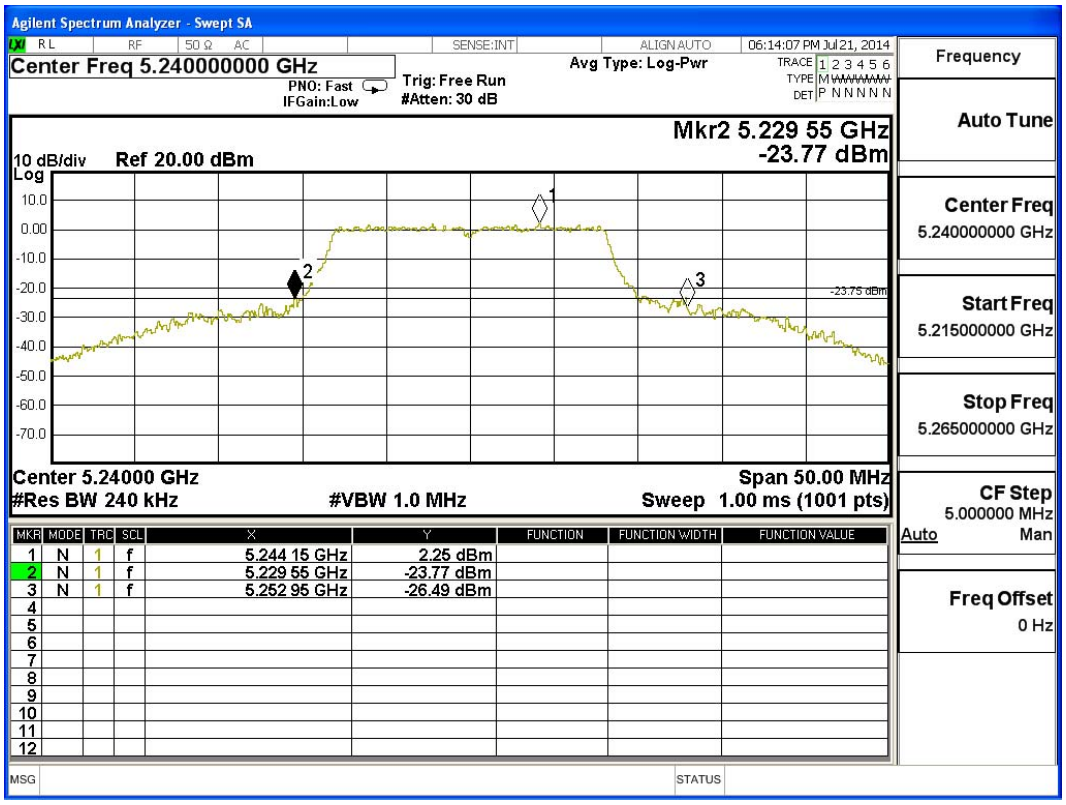
Channel 36



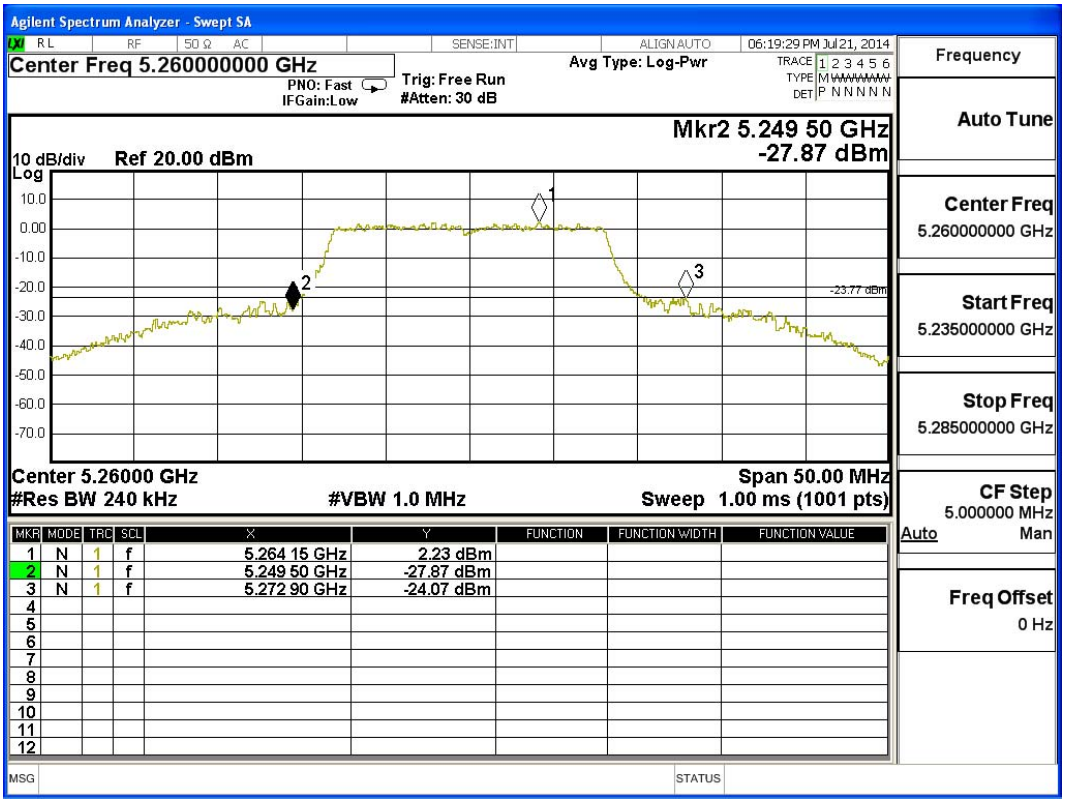
Channel 40



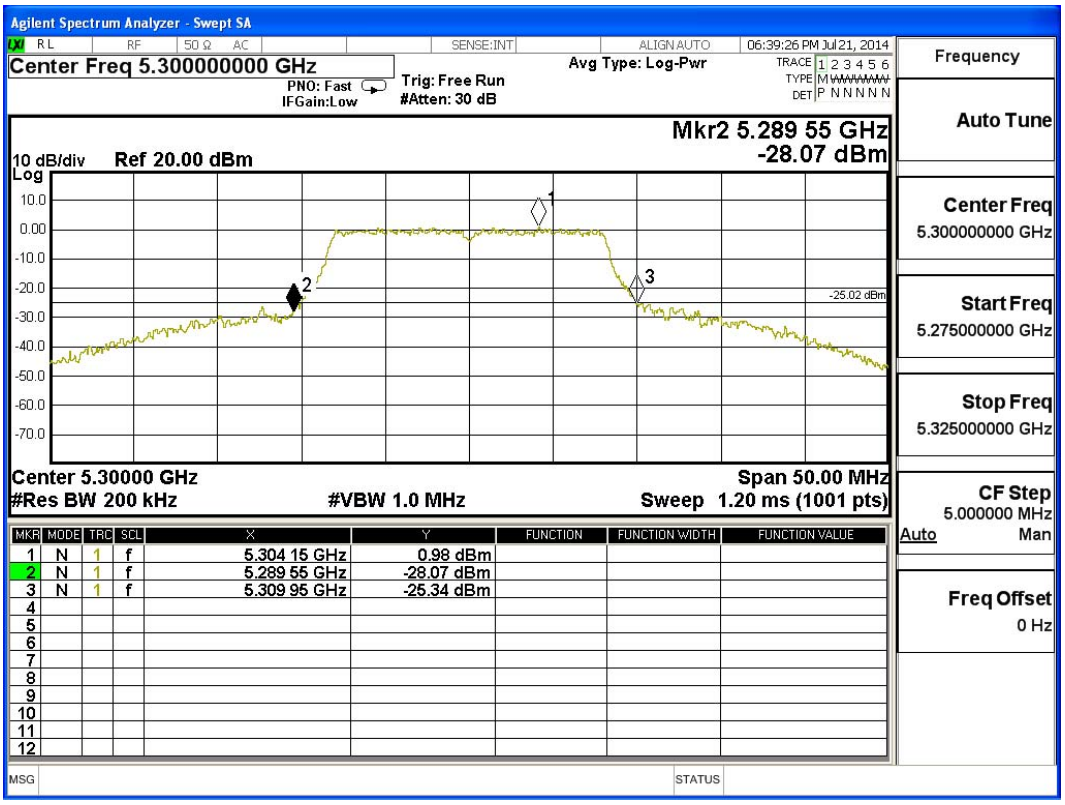
Channel 48



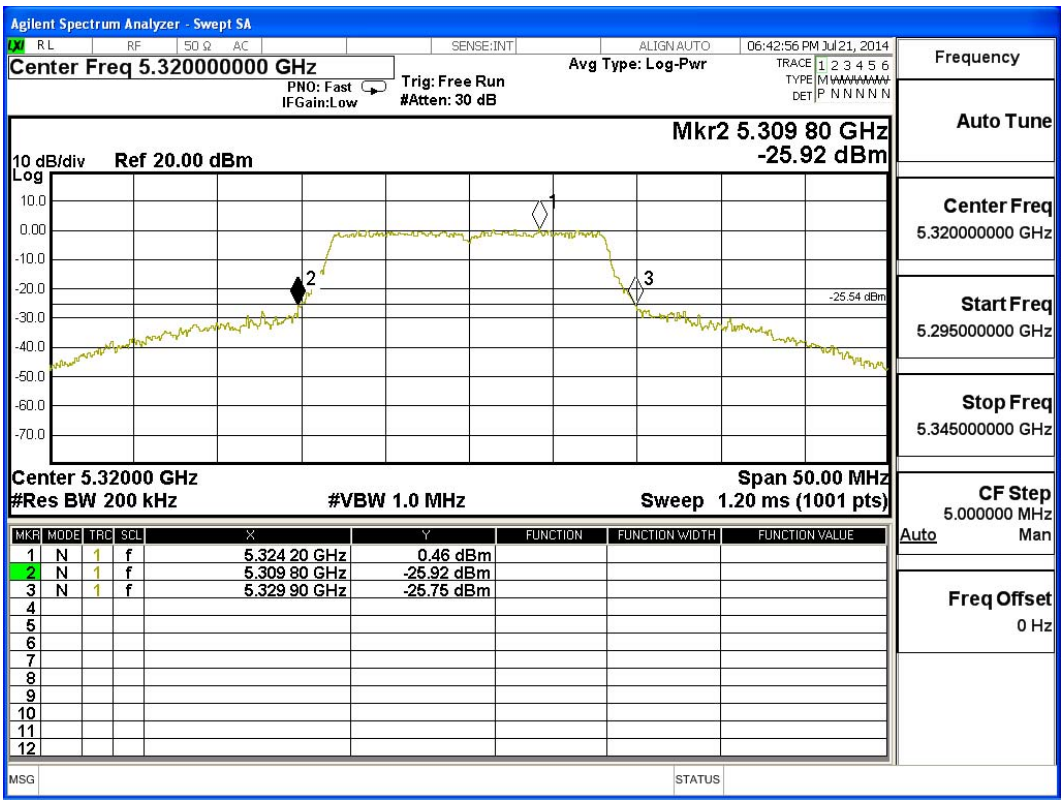
Channel 52



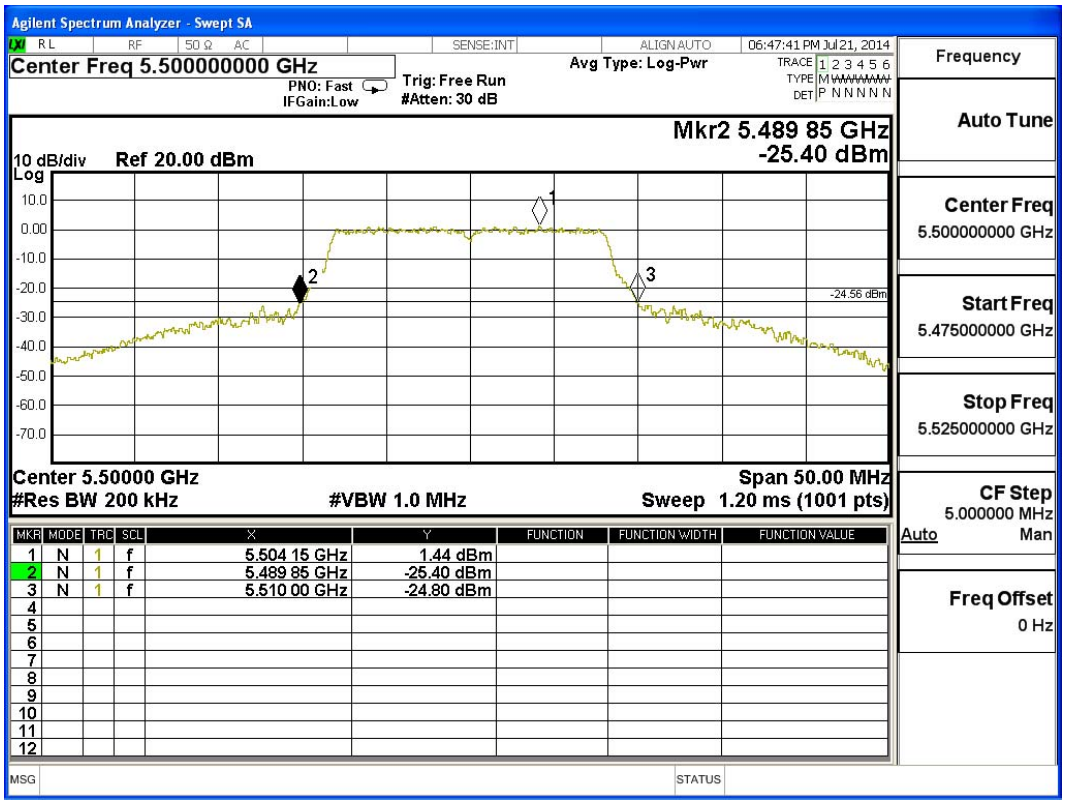
Channel 60



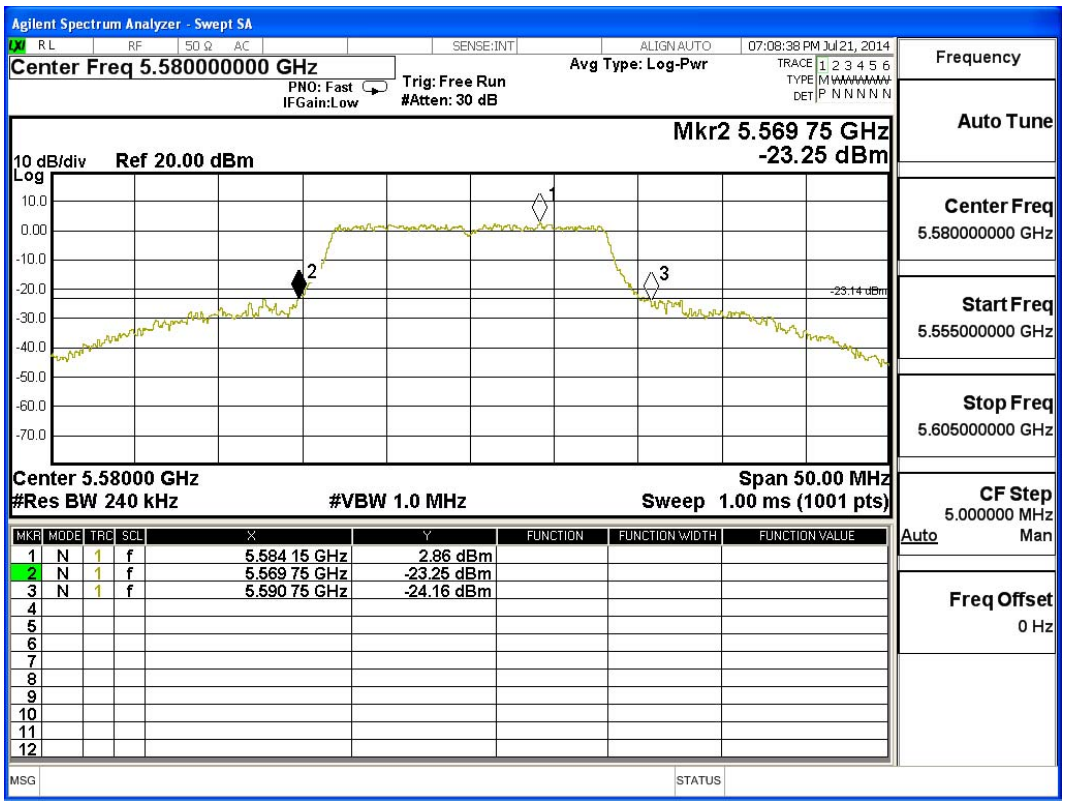
Channel 64



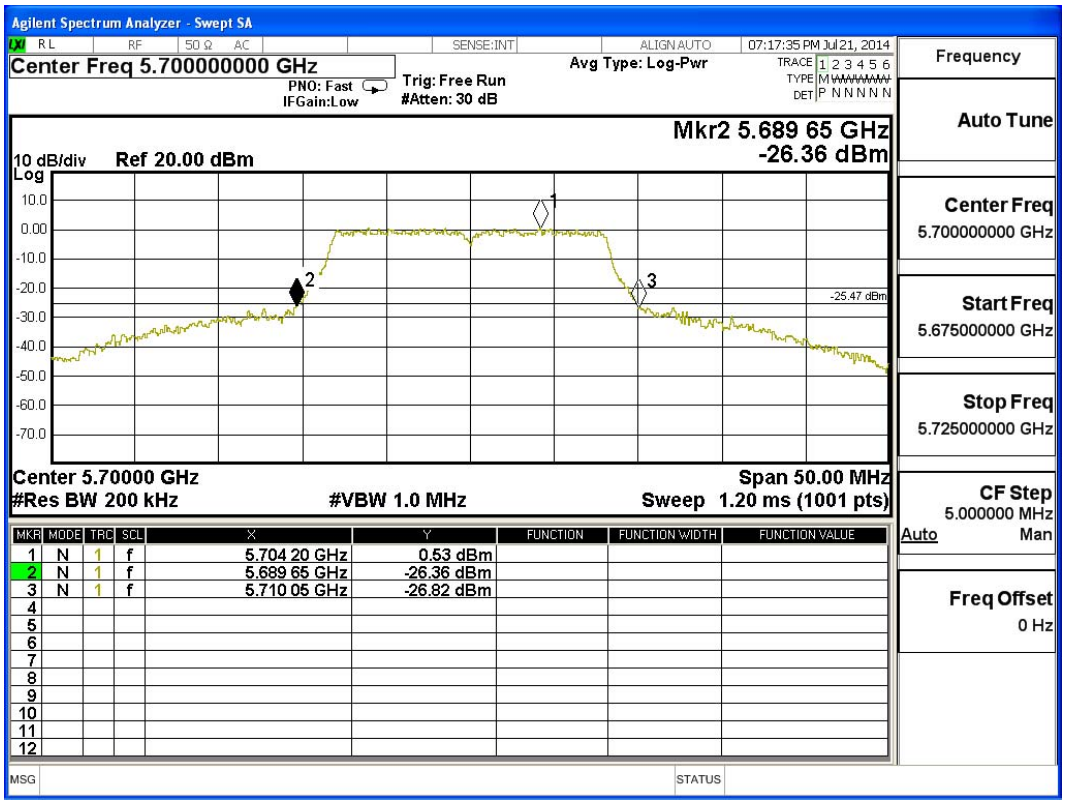
Channel 100



Channel 116



Channel 140


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.700000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
07:17:35 PM Jul 21, 2014
Mkr2 5.689 65 GHz
-26.36 dBm
10 dB/div
Ref 20.00 dBm
Log
-25.47 dBm
Center 5.70000 GHz
#Res BW 200 kHz
#VBW 1.0 MHz
Span 50.00 MHz
Sweep 1.20 ms (1001 pts)
1 N 1 f 5.704 20 GHz 0.53 dBm
2 N 1 f 5.689 65 GHz -26.36 dBm
3 N 1 f 5.710 05 GHz -26.82 dBm
Frequency
Auto Tune
Center Freq
5.700000000 GHz
Start Freq
5.675000000 GHz
Stop Freq
5.725000000 GHz
CF Step
5.000000 MHz
Auto
Man
Freq Offset
0 Hz

Product : Play-Fi Wireless Speaker
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	11.11	--	--	--	--	--	--	--	<17dBm
44	5220	11.13	11.06	10.99	10.92	10.85	10.78	10.71	10.64	<17dBm
48	5240	11.16	--	--	--	--	--	--	--	<17dBm
52	5260	11.26	--	--	--	--	--	--	--	<24dBm
60	5300	11.45	11.39	11.33	11.27	11.21	11.15	11.09	11.03	<24dBm
64	5320	11.47	--	--	--	--	--	--	--	<24dBm
100	5500	11.35	--	--	--	--	--	--	--	<24dBm
116	5580	11.96	11.90	11.84	11.78	11.72	11.66	11.60	11.54	<24dBm
140	5700	11.60	--	--	--	--	--	--	--	<24dBm

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

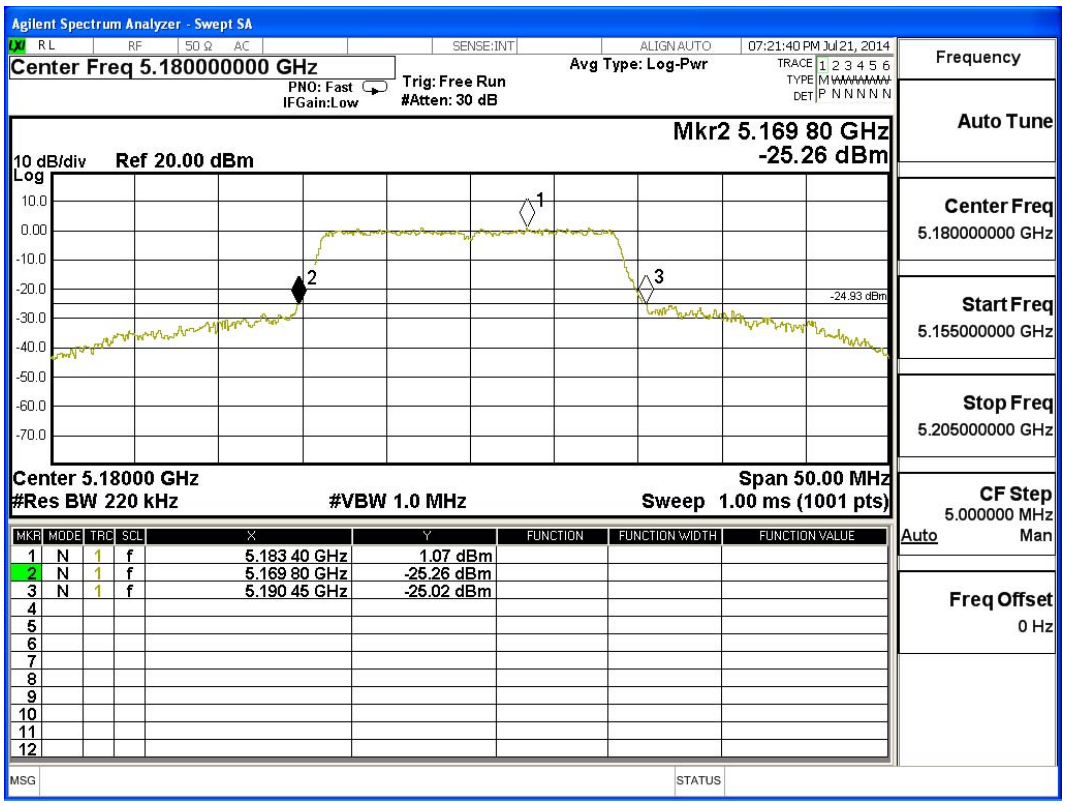
Maximum conducted output power Measurement:

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
36	5180	20.65	11.11	17	17.15
44	5220	20.80	11.13	17	17.18
48	5240	20.55	11.16	17	17.13
52	5260	20.60	11.26	24	24.14
60	5300	20.55	11.45	24	24.13
64	5320	20.45	11.47	24	24.11
100	5500	20.40	11.35	24	24.10
116	5580	20.55	11.96	24	24.13
140	5700	20.35	11.60	24	24.09

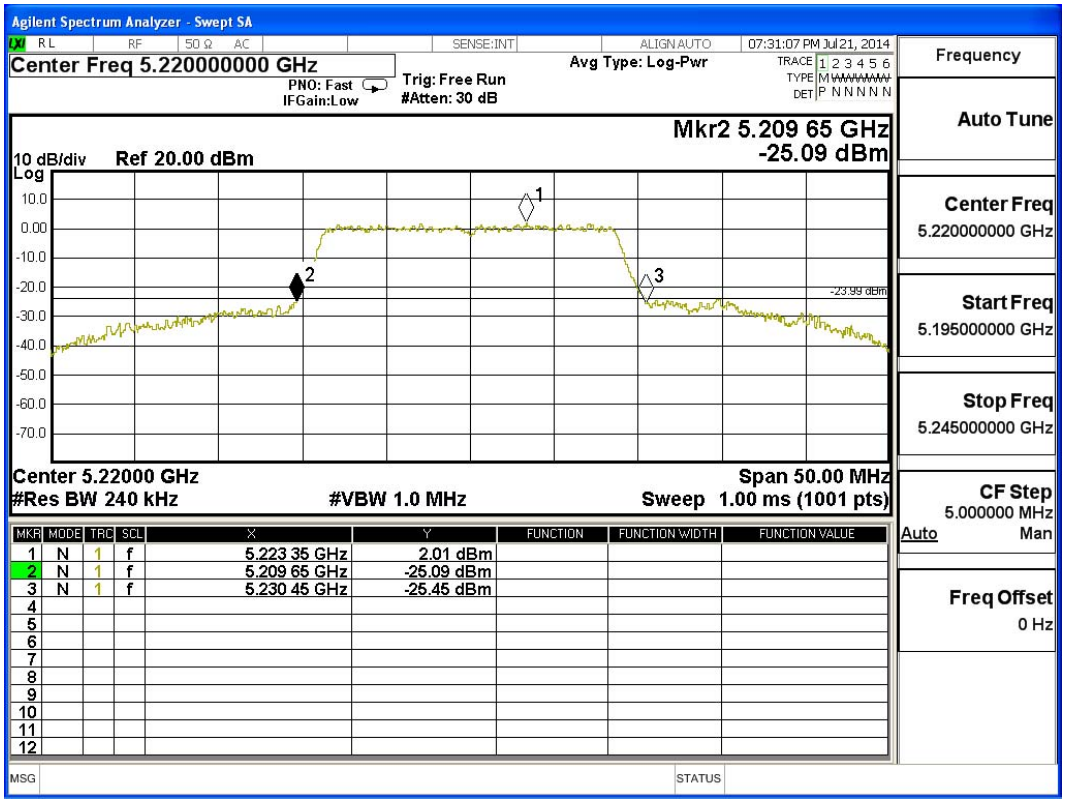
Note: Power Output Value =Reading value on average power meter + cable loss

26dBc Occupied Bandwidth:

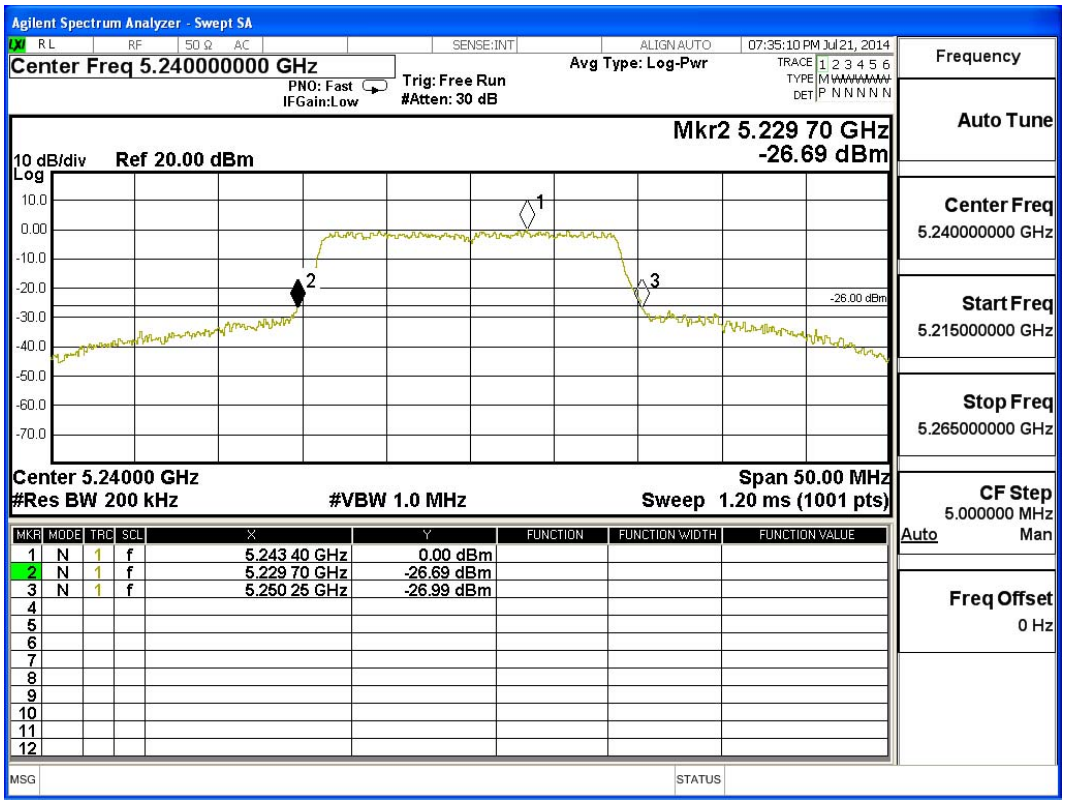
Channel 36



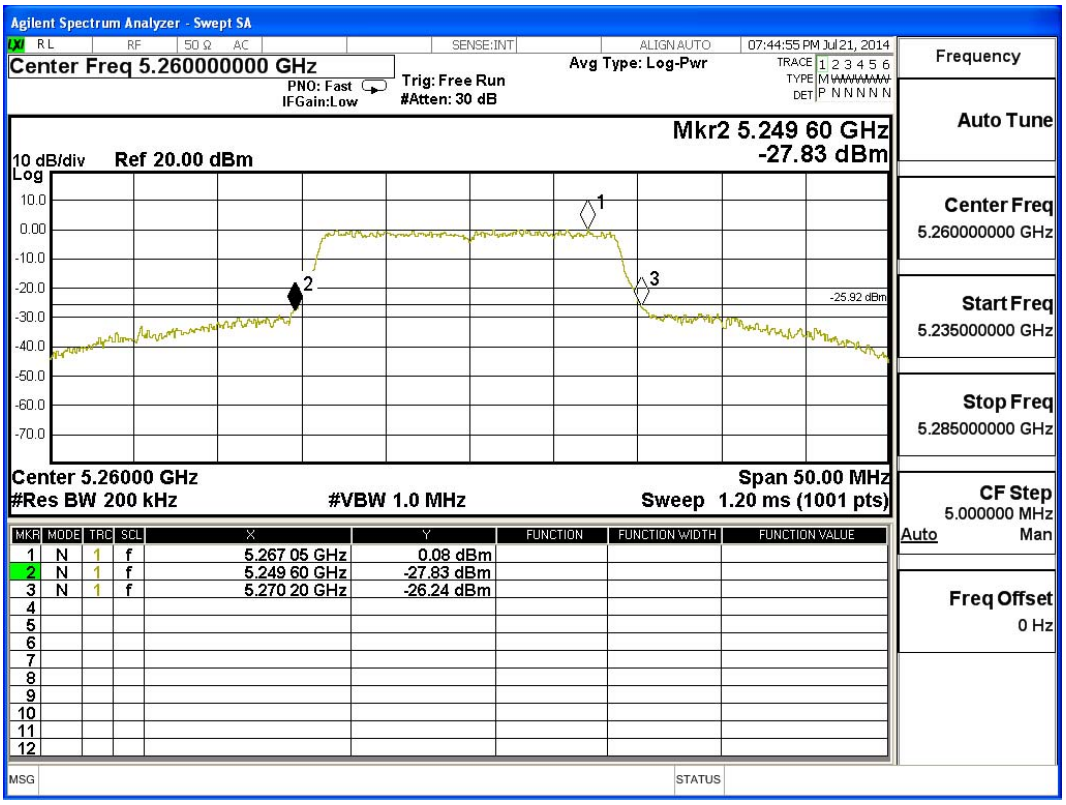
Channel 44



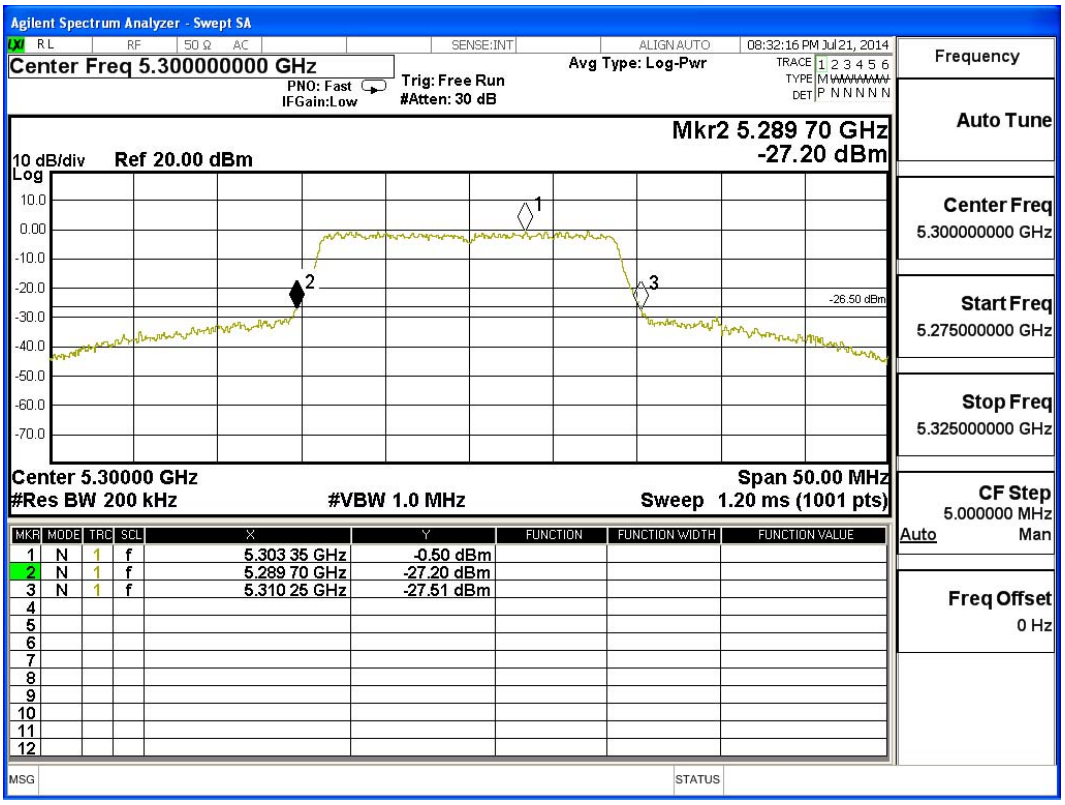
Channel 48



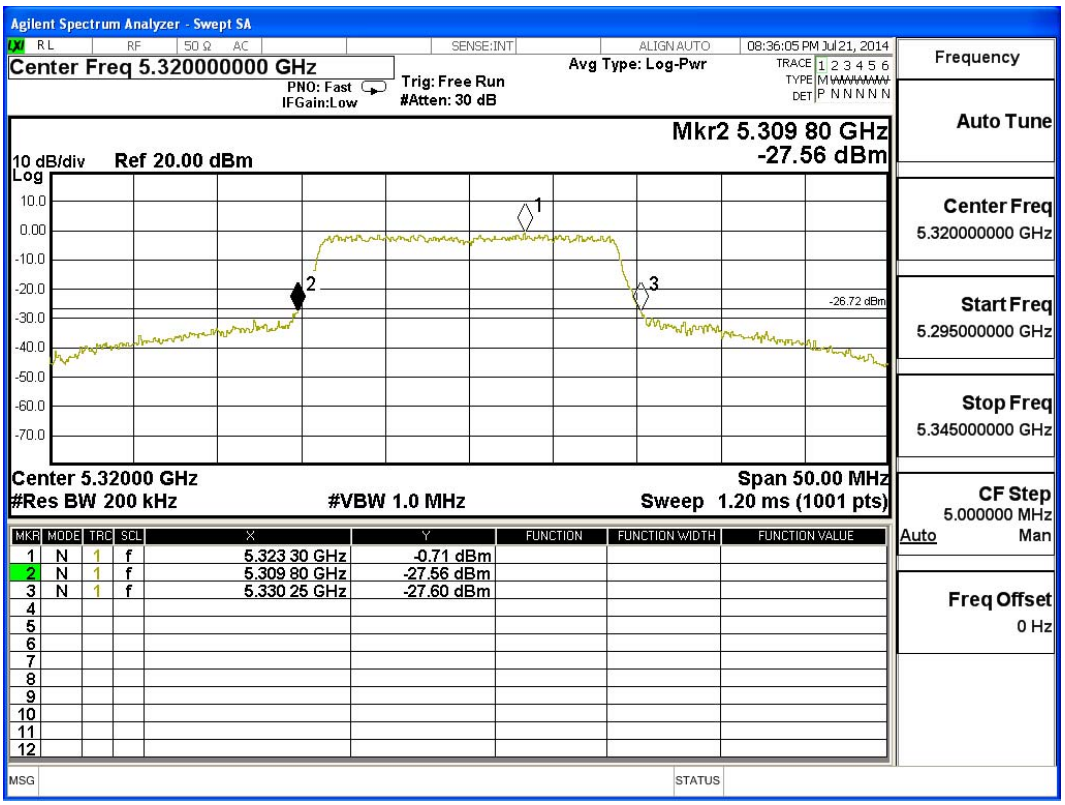
Channel 52



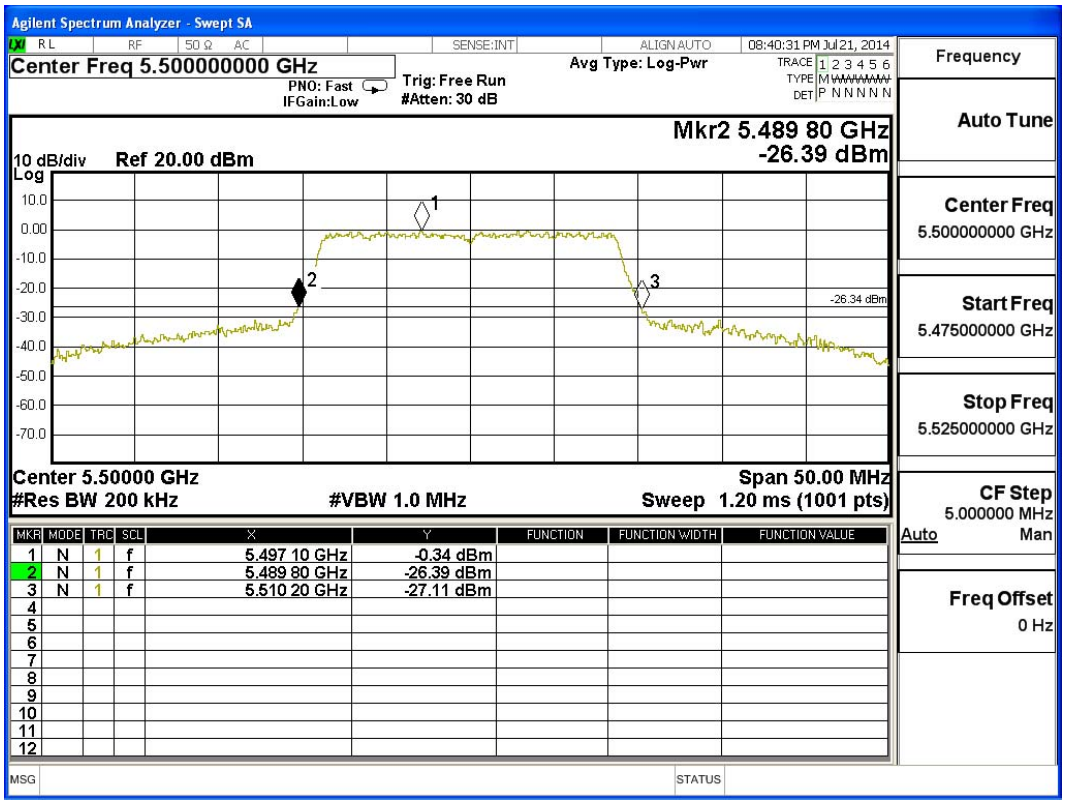
Channel 60



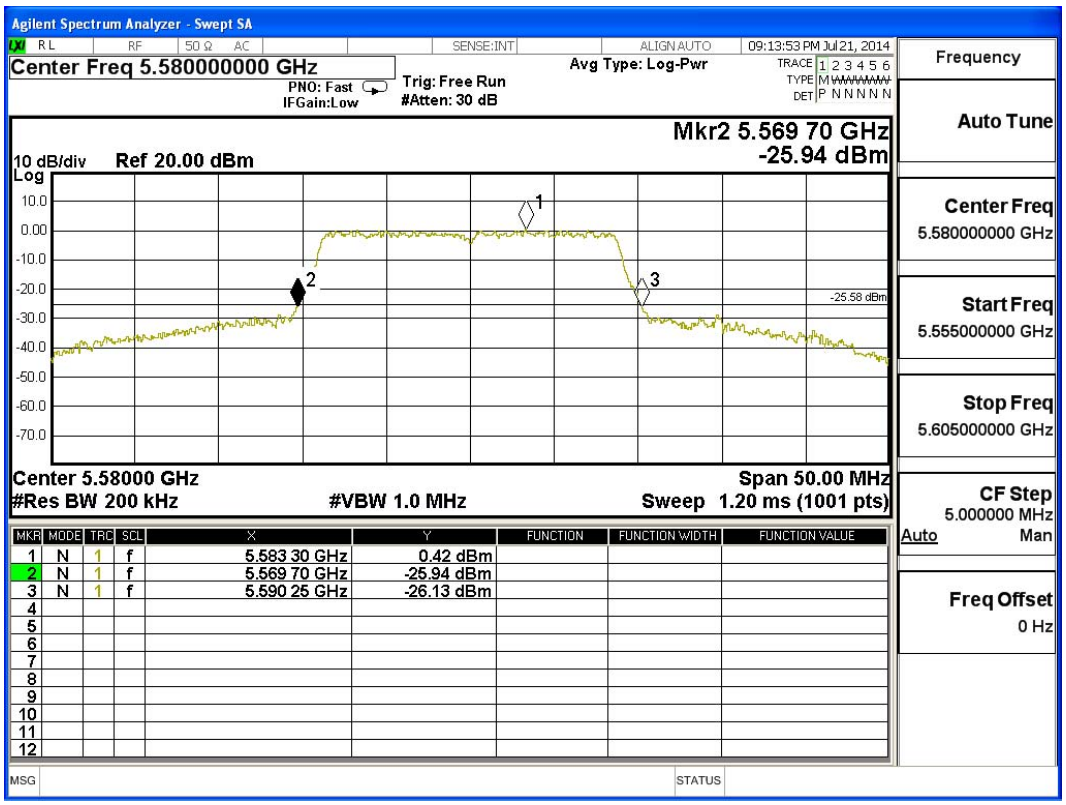
Channel 64



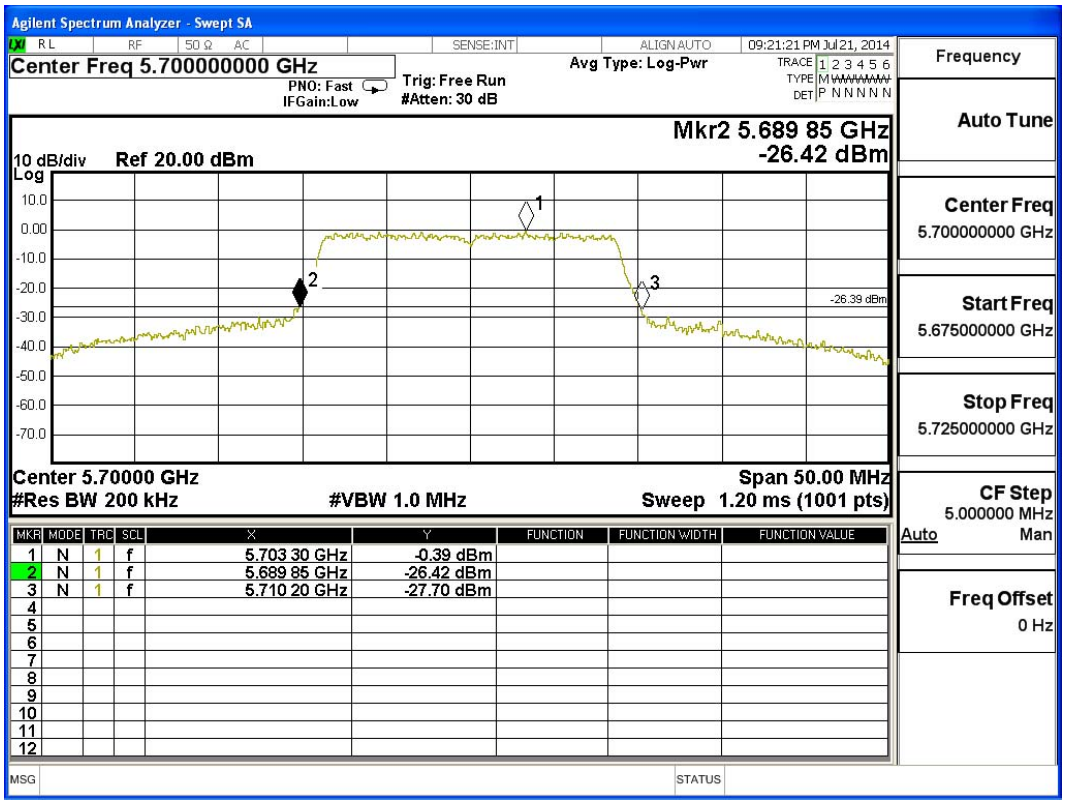
Channel 100



Channel 116



Channel 140


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.700000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
09:21:21 PM Jul 21, 2014
Mkr2 5.689 85 GHz
-26.42 dBm
10 dB/div Ref 20.00 dBm
Log
-26.39 dBm
Center 5.70000 GHz
#Res BW 200 kHz
#VBW 1.0 MHz
Span 50.00 MHz
Sweep 1.20 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 5.703 30 GHz -0.39 dBm
2 N 1 f 5.689 85 GHz -26.42 dBm
3 N 1 f 5.710 20 GHz -27.70 dBm
Frequency
Auto Tune
Center Freq
5.700000000 GHz
Start Freq
5.675000000 GHz
Stop Freq
5.725000000 GHz
CF Step
5.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

Product : Play-Fi Wireless Speaker
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	11.55	--	--	--	--	--	--	--	<17dBm
46	5230	11.21	11.14	11.07	11.00	10.93	10.86	10.79	10.72	<17dBm
54	5270	10.96	--	--	--	--	--	--	--	<17dBm
62	5310	10.77	10.69	10.61	10.53	10.45	10.37	10.29	10.21	<24dBm
102	5510	10.49	--	--	--	--	--	--	--	<24dBm
110	5550	10.69	10.61	10.53	10.45	10.37	10.29	10.21	10.13	<24dBm
134	5670	11.17	--	--	--	--	--	--	--	<24dBm

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

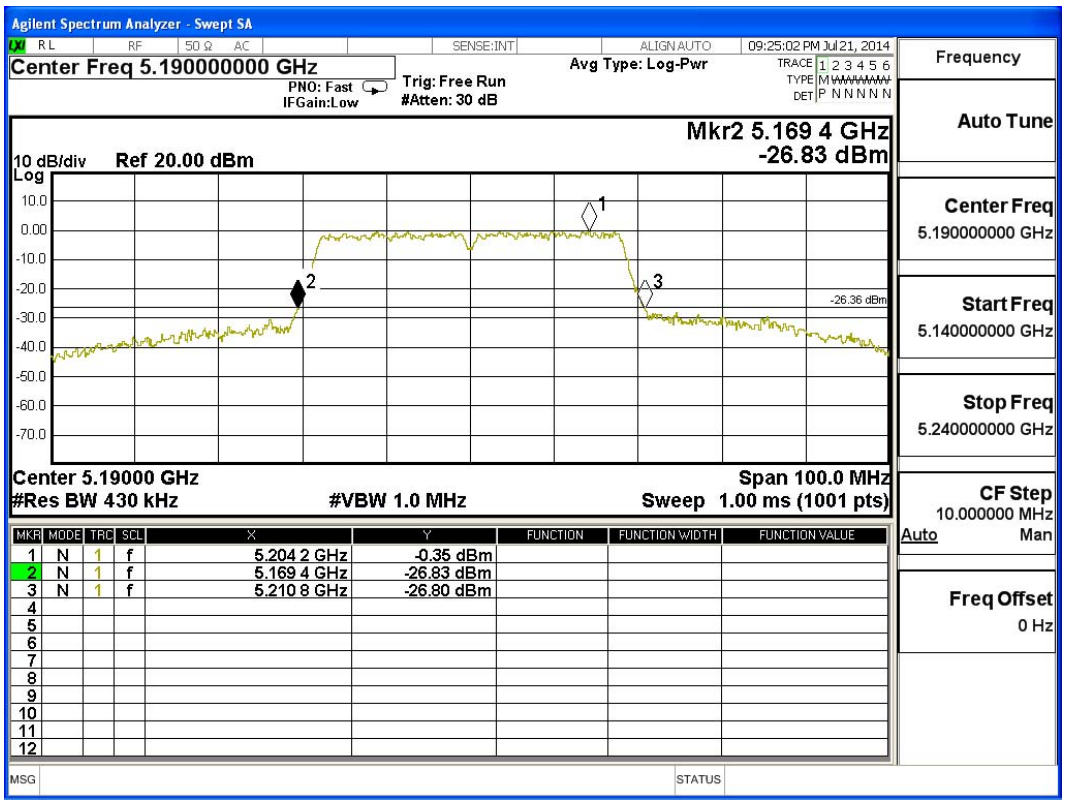
Maximum conducted output power Measurement:

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
38	5190	41.40	11.55	17	20.17
46	5230	42.20	11.21	17	20.25
54	5270	41.20	10.96	24	27.15
62	5310	41.00	10.77	24	27.13
102	5510	41.30	10.49	24	27.16
110	5550	41.60	10.69	24	27.19
134	5670	40.90	11.17	24	27.12

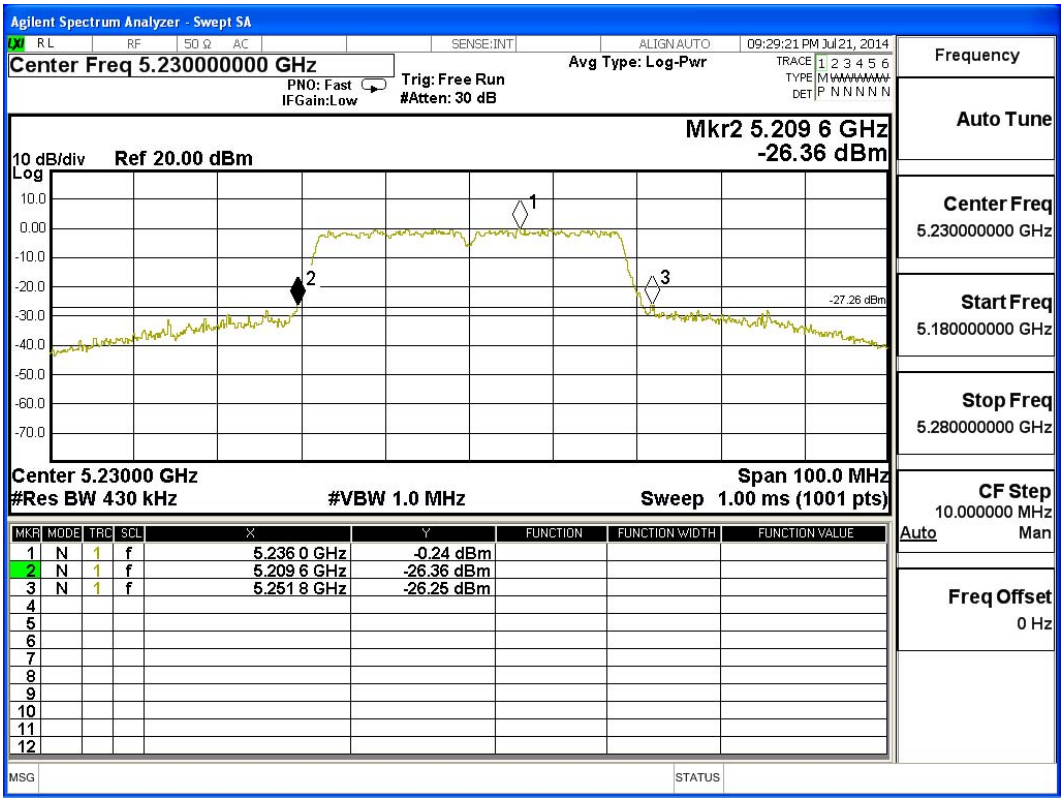
Note: Power Output Value =Reading value on average power meter + cable loss

26dBc Occupied Bandwidth:

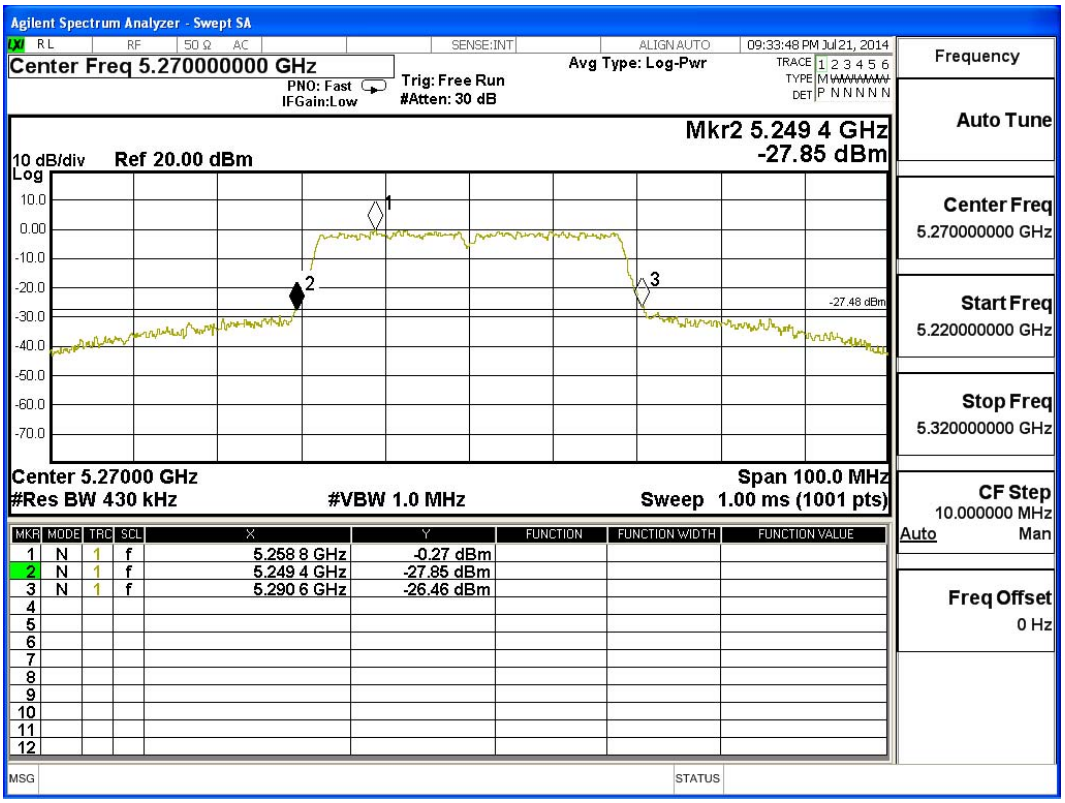
Channel 38



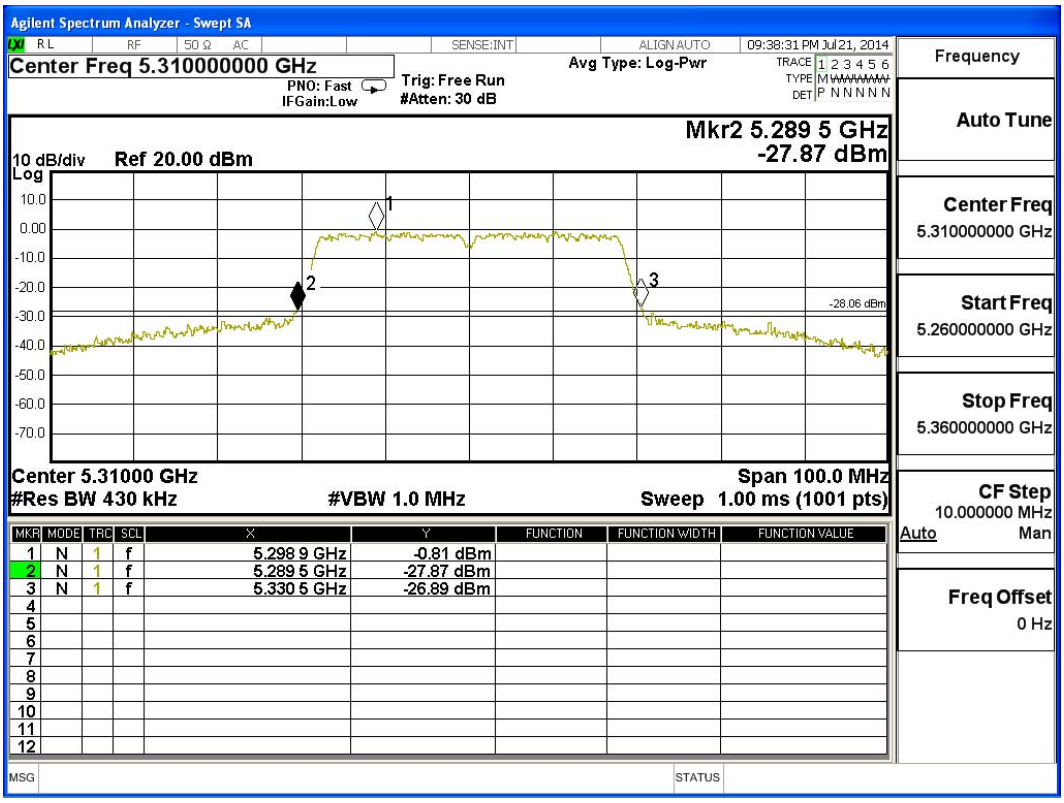
Channel 46



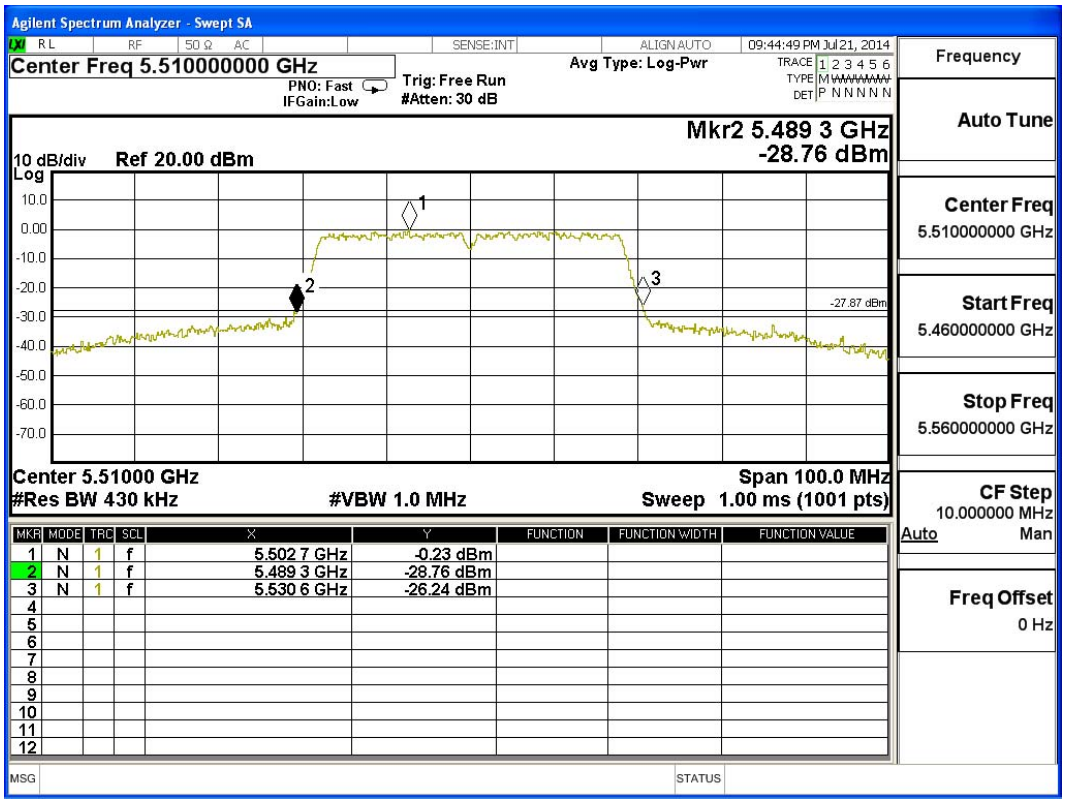
Channel 54



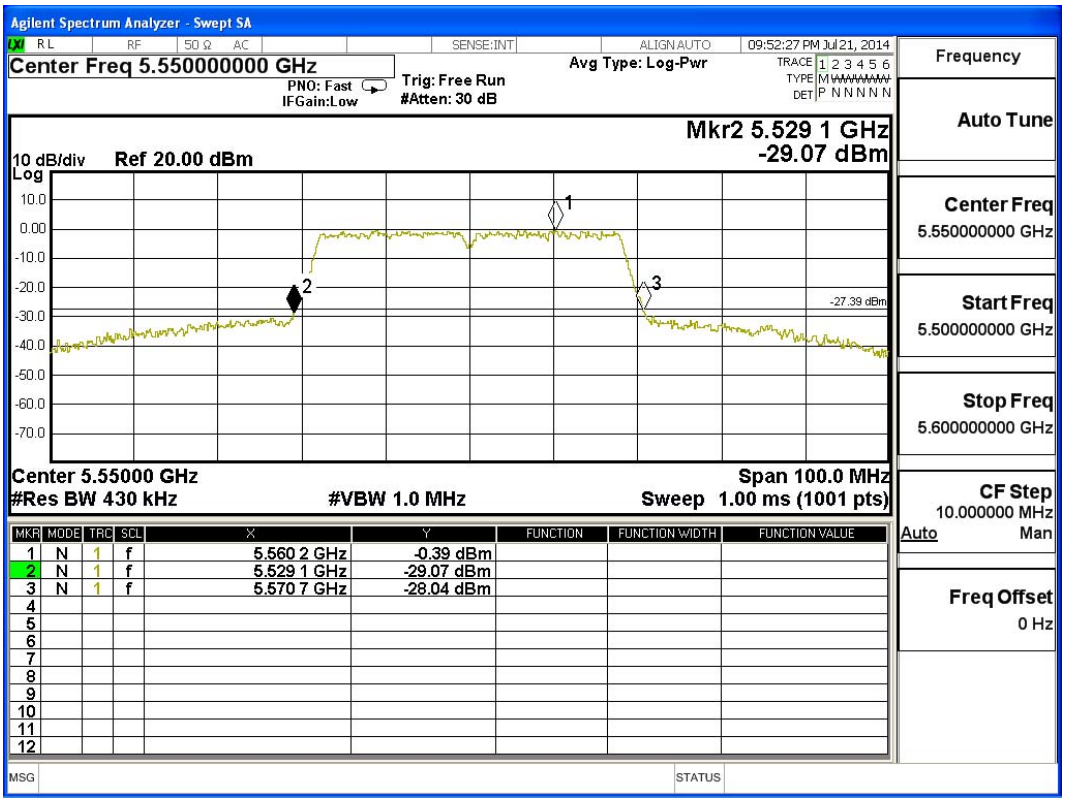
Channel 62



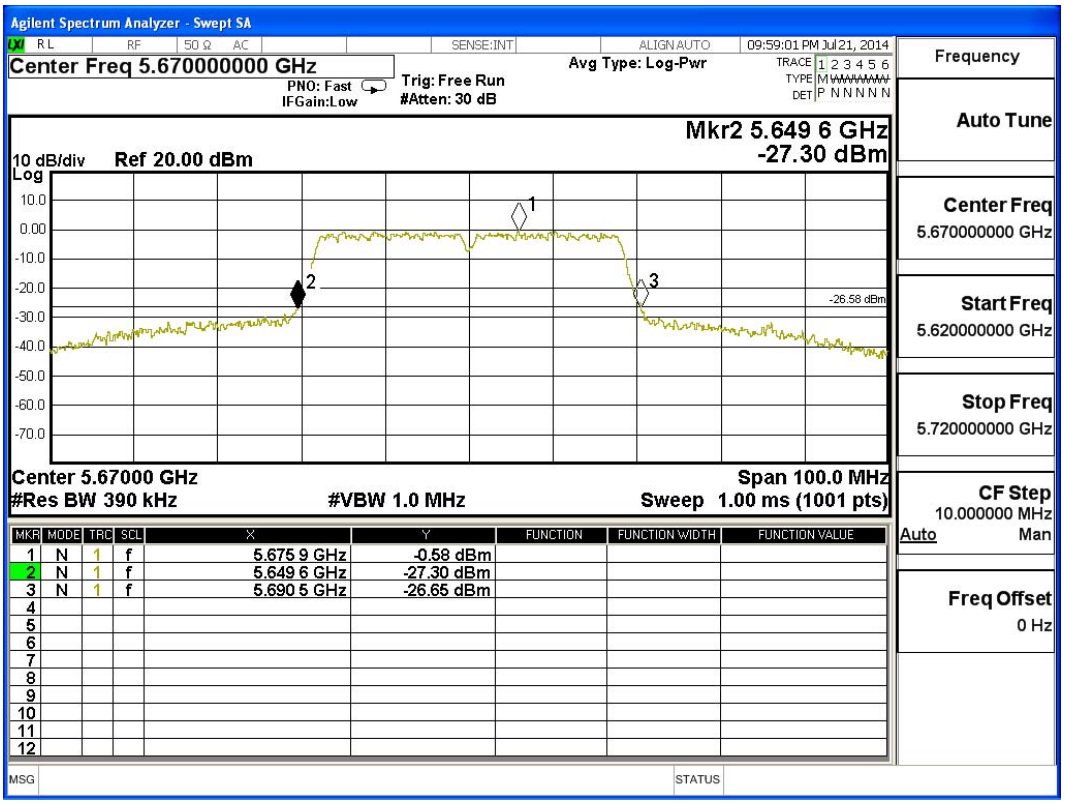
Channel 102



Channel 110



Channel 134


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.670000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
09:59:01 PM Jul 21, 2014
Mkr2 5.649 6 GHz
-27.30 dBm
10 dB/div
Ref 20.00 dBm
Log
-26.58 dBm
Center 5.67000 GHz
#Res BW 390 kHz
#VBW 1.0 MHz
Span 100.0 MHz
Sweep 1.00 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 5.675 9 GHz -0.58 dBm
2 N 1 f 5.649 6 GHz -27.30 dBm
3 N 1 f 5.690 5 GHz -26.65 dBm
Frequency
Auto Tune
Center Freq
5.670000000 GHz
Start Freq
5.620000000 GHz
Stop Freq
5.720000000 GHz
CF Step
10.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

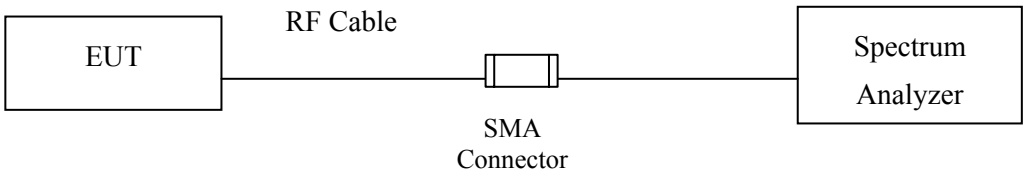
4. Peak Power Spectral Density

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

(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 C63.10, 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.

4.5. Uncertainty

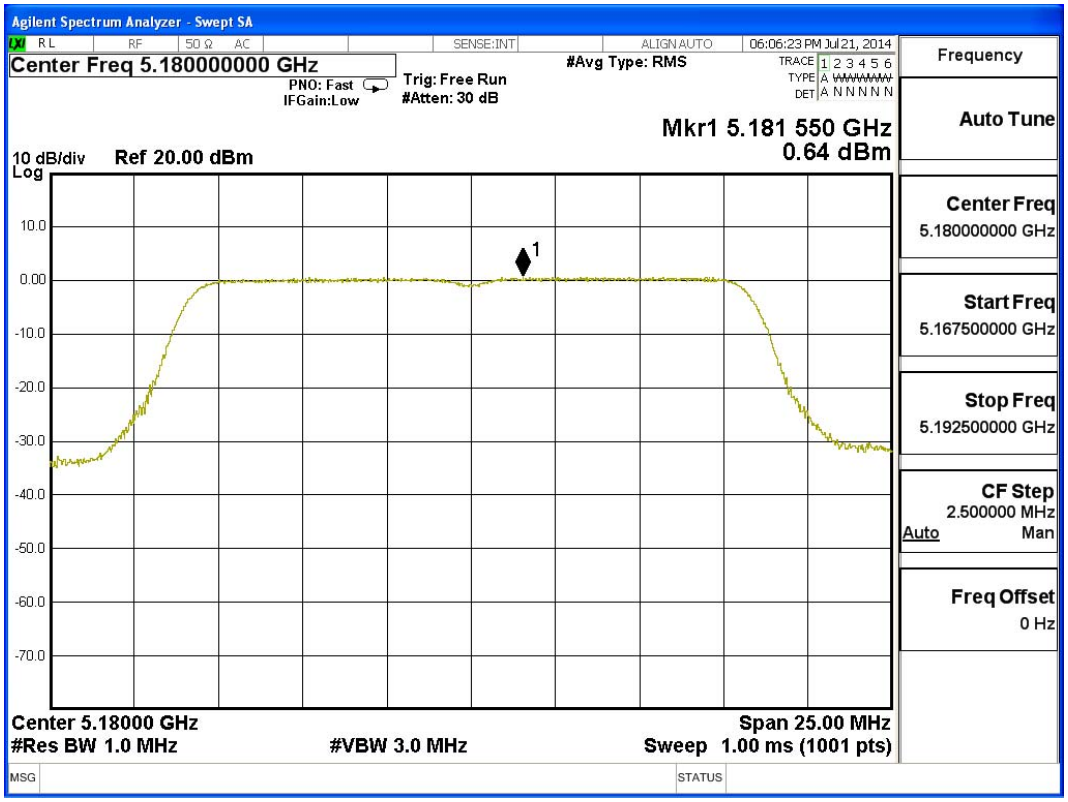
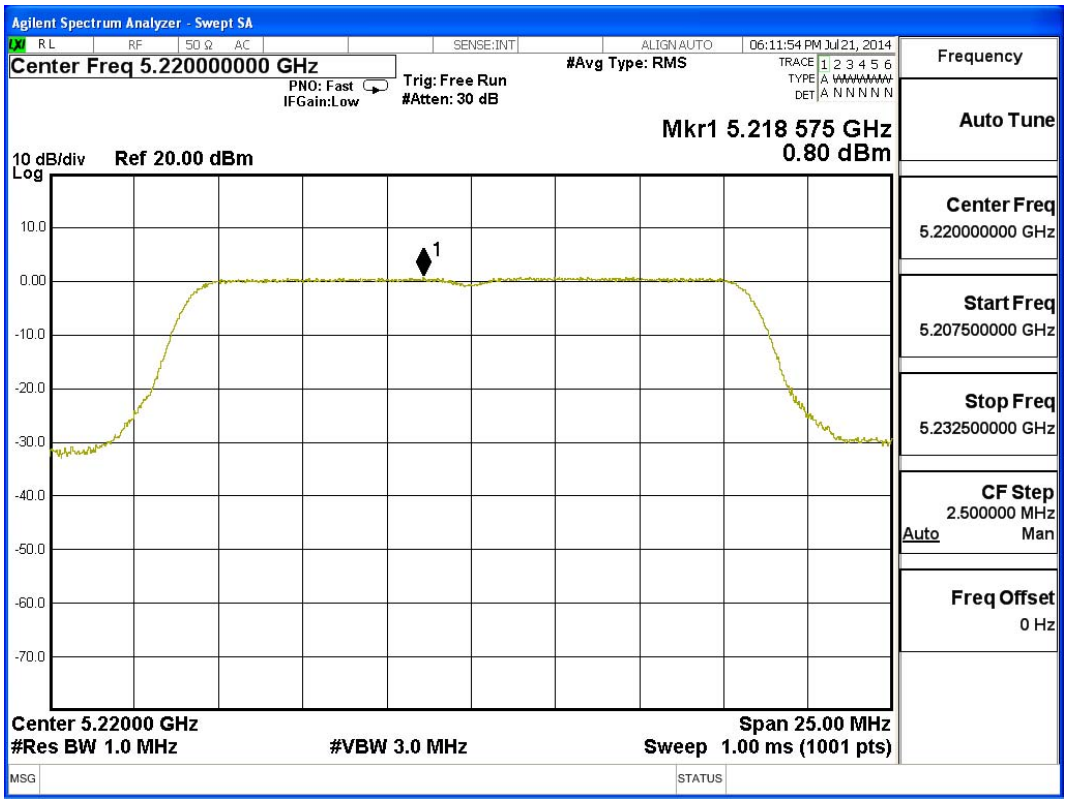
± 1.27 dB

4.6. Test Result of Peak Power Spectral Density

Product : Play-Fi Wireless Speaker
Test Item : Peak Power Spectral Density
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11a-6Mbps)

Channel Number	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	0.640	<4	Pass
44	5220	0.800	<4	Pass
48	5240	0.530	<4	Pass
52	5260	0.600	<11	Pass
60	5300	0.170	<11	Pass
64	5320	-0.350	<11	Pass
100	5500	0.750	<11	Pass
116	5580	1.240	<11	Pass
140	5700	0.090	<11	Pass

Channel 36:



Channel 44: