EMC
TEST REPORT

Report No. : **TS13060011-EME**
Model No. : **K110**
Issued Date : **Jul. 30, 2013**

Applicant: **Kobo Inc**
135 Liberty Street, Suite 101, Toronto, Ontario, M6K1A7
Canada

Test Method/ Standard: **FCC Part 15 Subpart E Section §15.207、§15.209 、§15.407 and ANSI C63.4/2003.**

Test By: **Intertek Testing Services Taiwan Ltd.**
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The test report was reviewed by:

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Title Engineer

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Summary of Tests

Test	Reference	Results
Peak output power test	15.407 (a)(1)/(2)/(3) KDB 789033	Pass
Power Spectrum Density test	15.407 (a)(1)/(2)/(3) KDB 789033	Pass
Peak excursion to average ratio test	15.407(a)(6) KDB 789033	Pass
Radiated spurious emission test	15.407(b)(1)/(2)/(3)/(6), 15.209	Pass
Dynamic Frequency Selection (DFS) test	15.407(h), FCC 06-96	Pass
AC line conducted emission test	15.407(b)(6) 15.207	Pass

1. General information

1.1 Identification of the EUT

Product:	Tablet
Model No.:	K110
Operating Frequency:	1. 5180 MHz ~ 5240 MHz 2. 5260 MHz ~ 5320 MHz 3. 5500 MHz ~ 5700 MHz 4. 5745 MHz ~ 5805 MHz
Channel Number:	1. 4 channels for 5180 MHz ~ 5240 MHz for 11a,11n HT20 2. 2 channels for 5190 MHz ~ 5230 MHz for 11n HT40 3. 4 channels for 5260 MHz ~ 5320 MHz for 11a,11n HT20 4. 2 channels for 5270 MHz ~ 5310 MHz for 11n HT40 5. 8 channels for 5500 MHz ~ 5700 MHz for 11a,11n HT20 6. 3 channels for 5510 MHz ~ 5670 MHz for 11n HT40 7. 4 channels for 5745 MHz ~ 5805 MHz for 11a,11n HT20 8. 2 channels for 5755 MHz ~ 5795 MHz for 11n HT40
Access scheme:	DSSS, OFDM
Rated Power:	1. DC 5.35 V from adapter 2. DC 3.7 V from battery
Power Cord:	N/A
Data Cable:	USB shielded cable 1 meter × 1
Sample Received:	Jun. 03, 2013
Test Date(s):	Jun. 15, 2013 ~ Jul. 25, 2013
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

1.2 Additional information about the EUT

The EUT is Tablet, and was defined as information technology equipment.

For more detail features, please refer to User's manual as file name “Installation guide.pdf”

1.3 Adapter information

The EUT will be supplied with a power supply from below list:

No.	Brand	Model no.	Specification
Adapter	kobo	PSAI10R-050Q	I/P: 100-240V~, 0.3A, 50-60Hz O/P: 5.35V, 2.0A

1.4 Antenna description

(1) Chain 0: AUX Antenna

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain : 4.69dBi
Antenna Type : PIFA Antenna
Connector Type : I-PEX

(2) Chain 1: Main Antenna

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain : 4.31dBi
Antenna Type : PIFA Antenna
Connector Type : I-PEX

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart E Section § 15.207、§15.209、§15.407、KDB 789033 and ANSI C63.4/2003.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

The AC power conducted emissions was invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz (15.207 paragraph).

Radiated emissions were invested cover the frequency range from 30 MHz to 1000 MHz using a receiver RBW of 120 kHz record QP reading, and the frequency over 1 GHz using a spectrum analyzer RBW of 1 MHz and 10 Hz VBW record Average reading (15.209 paragraph), the Peak reading recorded also on the report.

The EUT setup configurations please refer to the photo of test configuration in item.

2.2 Operation mode

The EUT is supplied with DC 3.7 V from battery for all test items except for conducted emission test.

The EUT is supplied with DC 5.35 V from adapter (Test voltage: 120VAC, 60Hz) for conducted emission test.

The EUT executes test by “MS-DOS” and key-in commands provided by Wistron.

With individual verifying, the maximum output power was found at 6 Mbps data rate for 802.11a mode, 6.5 Mbps data rate for 802.11n (HT 20) mode, and 13.5 Mbps data rate for 802.11n (HT 40) mod. The final tests were executed under these conditions and recorded in this report individually.

802.11a chain 0 ch40		**802.11n (HT 20) ch40**		**802.11n (HT 40) ch38**	
Mbps	AV(dBm)	Mbps	AV(dBm)	Mbps	AV(dBm)
6	11.18	6.5	12.16	13	12.03
9	11.16	13	12.11	26	12.01
12	11.08	19.5	12.10	39	11.99
18	11.06	26	12.12	52	11.89
24	11.09	39	12.05	78	11.84
36	11.01	52	12.01	104	11.89
48	11.03	58.5	12.04	117	11.81
54	10.90	65	12.00	130	11.75

802.11a chain 0 ch60		802.11n (HT 20) ch60		802.11n (HT 40) ch54	
Mbps	AV(dBm)	Mbps	AV(dBm)	Mbps	AV(dBm)
6	11.82	6.5	11.87	13	11.94
9	11.77	13	11.70	26	11.89
12	11.7	19.5	11.74	39	11.75
18	11.73	26	11.69	52	11.74
24	11.6	39	11.71	78	11.79
36	11.72	52	11.63	104	11.72
48	11.61	58.5	11.59	117	11.74
54	11.59	65	11.50	130	11.70

802.11a chain 0 ch116		802.11n (HT 20) ch116		802.11n (HT 40) ch102	
Mbps	AV(dBm)	Mbps	AV(dBm)	Mbps	AV(dBm)
6	11.51	6.5	11.91	13	11.87
9	11.49	13	11.89	26	11.8
12	11.40	19.5	11.85	39	11.78
18	11.42	26	11.87	52	11.74
24	11.36	39	11.80	78	11.79
36	11.30	52	11.79	104	11.7
48	11.29	58.5	11.82	117	11.61
54	11.34	65	11.80	130	11.59

802.11a chain 0 ch157		802.11n (HT 20) ch157		802.11n (HT 40) ch159	
Mbps	AV(dBm)	Mbps	AV(dBm)	Mbps	AV(dBm)
6	11.57	6.5	11.86	13	11.27
9	11.50	13	11.80	26	11.24
12	11.52	19.5	11.74	39	11.20
18	11.46	26	11.79	52	11.10
24	11.40	39	11.70	78	11.19
36	11.42	52	11.71	104	11.03
48	11.31	58.5	11.69	117	11.09
54	11.29	65	11.60	130	11.01

2.3 Test equipment

Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100018	2012/11/30	2013/11/29
Spectrum Analyzer	Rohde&schwarz	FSP30	100137	2013/06/21	2014/06/21
Spectrum Analyzer	Rohde&schwarz	FSEK30	100186	2013/01/23	2014/01/23
Horn Antenna (1-18G)	Schwarzbeck	BBHA 9120 D	9120D-456	2012/9/3	2014/9/3
Horn Antenna (14-42G)	SHWARZBECK	BBHA 9170	BBHA9170159	2012/9/5	2014/9/5
Broadband Antenna	SCHWARZBECK	VULB 9168	9168-172	2011/7/26	2013/7/25
Pre-Amplifier	MITEQ	AFS44-00102650--42-10P-44	1495287	2011/10/27	2013/10/26
Pre-Amplifier	MITEQ	JS4-26004000--27-8A	828825	2012/9/18	2014/9/18
Power Meter	Anritsu	ML2495A	0844001	2012/10/9	2013/10/9
Power Senor	Anritsu	MA2411B	0738452	2012/10/9	2013/10/9
Temperature& Humidity Test Chamber	TERCHY	MHU-225LRU (SA)	950838	2013/06/14	2014/06/14
Two-Line V-Network	Rohde&schwarz	ESH3-Z5	838979/014	2012/10/29	2013/10/29
WiMAX PSA Spectrum Analyzer	Agilent	E4440A	MY46186191	2013/6/5	2014/6/5
Radar waveform simulator software (Pulse Building)	Agilent	N7620A-101	N/A	N/A	N/A
WiMAX ESG Vector Signal Generator	Agilent	E4438C	MY45094140	2013/5/3	2014/5/3

Note: The above equipments are within the valid calibration period.

3. Peak Output Power test (FCC 15.407)

3.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1008	hPa

3.2 Test setup & procedure

The power output per FCC §15.407(a) was measured on the EUT using a 50 ohm SMA cable connected to wideband peak power meter via power sensor which the video bandwidth can be up to 65MHz. Power was read directly and cable loss correction (1.5dB) was added to the reading to obtain power at the EUT antenna terminals.

3.3 Limit

Operating Frequency (MHz)	Output power limit
5150~5250	< 50 mW (17 dBm) or 4 dBm+10 log B
5250~5350, 5470~5725	< 250 mW (24 dBm) or 11 dBm+10 log B
5725~5825	< 1 W (30 dBm) or 17 dBm+10 log B

Remark: where B is the –26 dB emission bandwidth in MHz.

3.4 Measured data of Maximum Output Power test results

Mode	Channel	Frequency (MHz)	Data rate Mbps	Output Power (AV)		Reault	Mragin (dB)
				(dBm)	mW		
802.11a Chain0	36	5180	6	12.03	15.96	17	Pass
	40	5200		11.18	13.12	17	Pass
	48	5240		12.36	17.22	17	Pass
	52	5260		11.91	15.52	24	Pass
	60	5300		11.82	15.21	24	Pass
	64	5320		11.78	15.07	24	Pass
	100	5500		12.17	16.48	24	Pass
	116	5580		11.51	14.16	24	Pass
	140	5700		11.93	15.60	24	Pass
	149	5745		12.44	17.54	30	Pass
	157	5785		11.57	14.35	30	Pass
	161	5805		11.45	13.96	30	Pass
802.11a Chain1	36	5180	6	12.30	16.98	17	Pass
	40	5200		12.47	17.66	17	Pass
	48	5240		11.55	14.29	17	Pass
	52	5260		12.72	18.71	24	Pass
	60	5300		11.96	15.70	24	Pass
	64	5320		11.77	15.03	24	Pass
	100	5500		11.68	14.72	24	Pass
	116	5580		11.60	14.45	24	Pass
	140	5700		12.31	17.02	24	Pass
	149	5745		11.99	15.81	30	Pass
	157	5785		12.16	16.44	30	Pass
	161	5805		11.44	13.93	30	Pass

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Output Power(dBm)		Total Power (AV)		Limit (dBm)	Result	Margin (dB)
				Chain 0	Chain 1					
				AV	AV	mW	dBm			
802.11an (HT 20)	36	5180	6.5	9.47	8.82	16.47	12.17	17	Pass	-4.83
	40	5200		9.65	8.58	16.44	12.16	17	Pass	-4.84
	48	5240		9.44	9.14	16.99	12.30	17	Pass	-4.70
	52	5260		10.2	8.59	17.70	12.48	24	Pass	-11.52
	60	5300		9.27	8.41	15.39	11.87	24	Pass	-12.13
	64	5320		9.52	8.84	16.61	12.20	24	Pass	-11.80
	100	5500		10.34	7.83	16.88	12.27	24	Pass	-11.73
	116	5580		9.79	7.79	15.54	11.91	24	Pass	-12.09
	140	5700		9.37	8.06	15.05	11.77	24	Pass	-12.23
	149	5745		10.1	8.79	17.80	12.50	30	Pass	-17.50
	157	5785		9.23	8.44	15.36	11.86	30	Pass	-18.14
	161	5805		9.01	8.07	14.37	11.58	30	Pass	-18.42
802.11an (HT 40)	38	5190	13.5	9.48	8.5	15.95	12.03	17	Pass	-4.97
	46	5230		9.17	8.25	14.94	11.74	17	Pass	-5.26
	54	5270		9.28	8.54	15.62	11.94	24	Pass	-12.06
	62	5310		9.15	8.47	15.25	11.83	24	Pass	-12.17
	102	5510		9.57	8.02	15.40	11.87	24	Pass	-12.13
	134	5670		9.98	8.79	17.52	12.44	24	Pass	-11.56
	151	5755		9.63	8.33	15.99	12.04	30	Pass	-17.96
	159	5795		8.82	7.62	13.40	11.27	30	Pass	-18.73

4. Power Spectrum Density test (FCC 15.407)

4.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1023	hPa

4.2 Test setup & procedure

The power spectrum density per FCC §15.407(a) was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set at 1MHz, the video bandwidth set at 3 MHz. Power spectrum density was read directly and cable loss (1.5 dB)/external attenuator (20 dB) correction was added to the reading to obtain power at the EUT antenna terminals.

4.3 Limitation

Operating Frequency (MHz)	Power density limit
5150~5250	< 4 dBm/MHz
5250~5350, 5470~5725	< 11 dBm/MHz
5725~5825	< 17 dBm/MHz

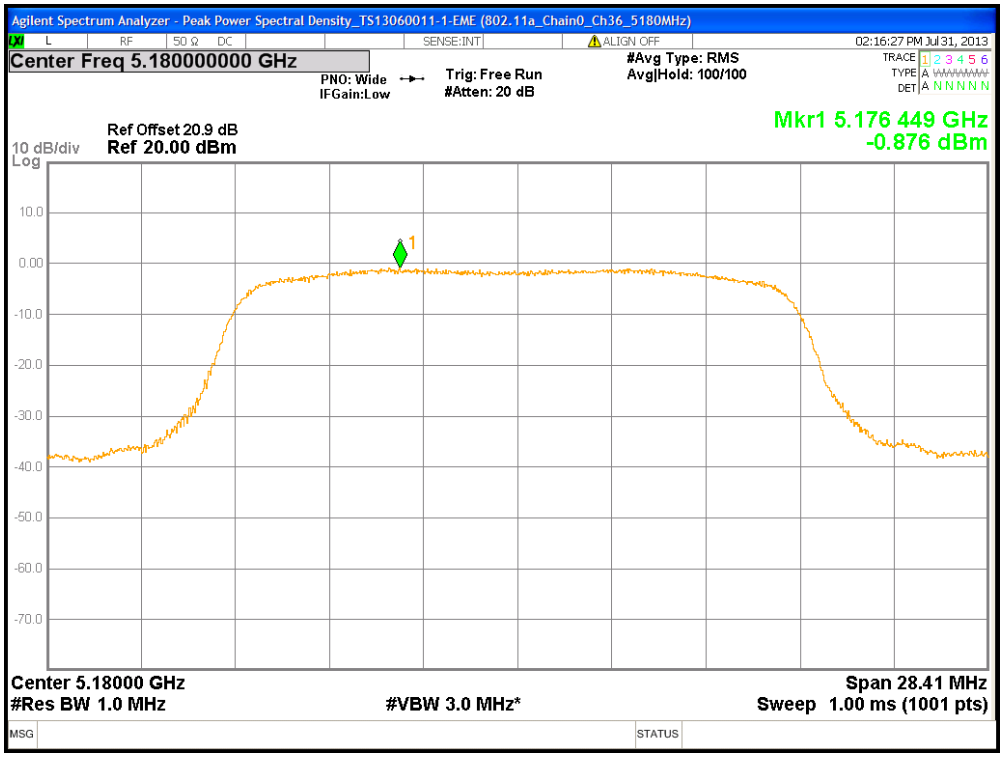
4.4 Measured data of Power Spectrum Density test results

Mode	Channel	Frequency (MHz)	Data rate Mbps	PPSD (dBm)	Limit (dBm)	Reault	Mragin (dB)
802.11a Chain0	36	5180	6	-0.876	4	PASS	-4.876
	40	5200		-0.712	4	PASS	-4.712
	48	5240		-0.574	4	PASS	-4.574
	52	5260		-0.36	11	PASS	-11.36
	60	5300		-0.577	11	PASS	-11.577
	64	5320		-0.582	11	PASS	-11.582
	100	5500		-0.763	11	PASS	-11.763
	116	5580		-1.819	11	PASS	-12.819
	140	5700		-2.125	11	PASS	-13.125
	149	5745		-0.72	17	PASS	-17.716
	157	5785		-0.84	17	PASS	-17.844
	161	5805		-1.36	17	PASS	-18.361
802.11a Chain1	36	5180	6	-2.24	4	PASS	-6.24
	40	5200		-0.249	4	PASS	-4.249
	48	5240		0.484	4	PASS	-3.516
	52	5260		1.755	11	PASS	-9.245
	60	5300		2.002	11	PASS	-8.998
	64	5320		1.805	11	PASS	-9.195
	100	5500		2.194	11	PASS	-8.806
	116	5580		1.423	11	PASS	-9.577
	140	5700		0.192	11	PASS	-10.808
	149	5745		1.12	17	PASS	-15.885
	157	5785		1.89	17	PASS	-15.109
	161	5805		1.59	17	PASS	-15.408

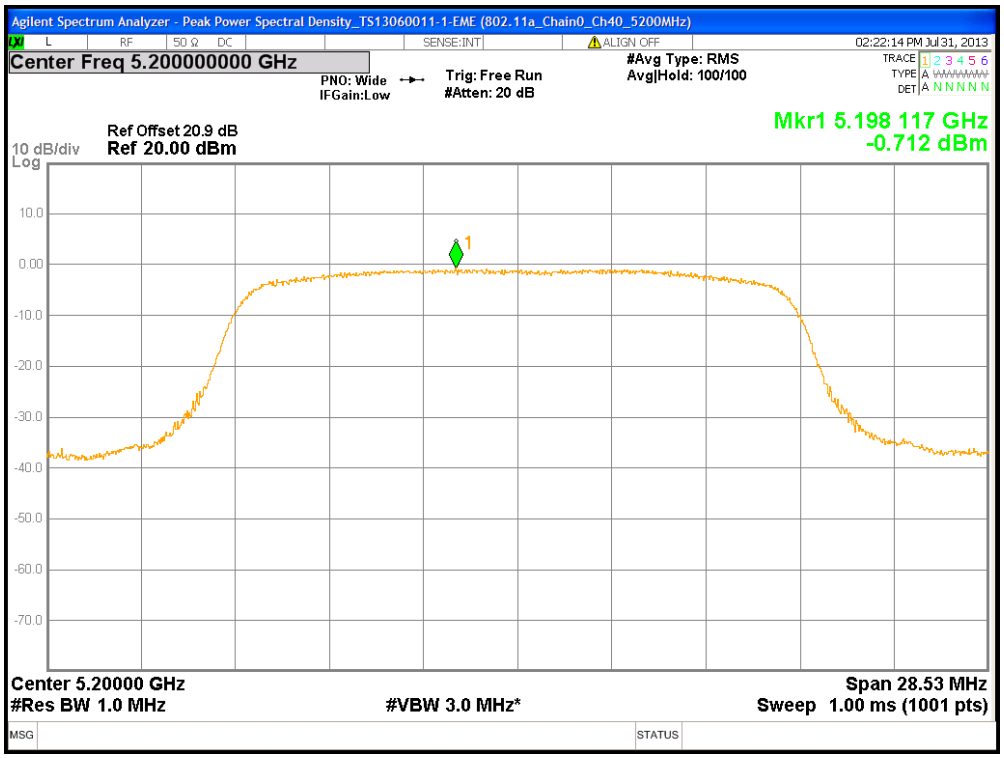
Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	PPSD(dBm)		Total Power (AV)		Limit (dBm)	Result	Margin (dB)
				Chain0	chain1					
				AV	AV	mW	dBm			
802.11n (HT 20)	36	5180	6.5	-5.077	-6.721	0.52	-2.81	4	Pass	-6.81
	40	5200		-4.424	-6.768	0.57	-2.43	4	Pass	-6.43
	48	5240		-4.176	-5.606	0.66	-1.82	4	Pass	-5.82
	52	5260		-3.815	-5.796	0.68	-1.68	11	Pass	-12.68
	60	5300		-4.934	-5.424	0.61	-2.16	11	Pass	-13.16
	64	5320		-4.592	-5.42	0.63	-1.98	11	Pass	-12.98
	100	5500		-4.69	-4.337	0.71	-1.50	11	Pass	-12.50
	116	5580		-6.062	-5.224	0.55	-2.61	11	Pass	-13.61
	140	5700		-7.186	-6.219	0.43	-3.67	11	Pass	-14.67
	149	5745		-6.197	-5.721	0.51	-2.94	17	Pass	-19.94
	157	5785		-5.252	-4.909	0.62	-2.07	17	Pass	-19.07
	161	5805		-5.275	-5.003	0.61	-2.13	17	Pass	-19.13
802.11n (HT 40)	38	5190	13.5	-11.142	-11.961	0.14	-8.52	4	Pass	-12.52
	46	5230		-9.849	-11.45	0.18	-7.57	4	Pass	-11.57
	54	5270		-9.678	-10.611	0.19	-7.11	11	Pass	-18.11
	62	5310		-9.847	-9.707	0.21	-6.77	11	Pass	-17.77
	102	5510		-8.483	-7.434	0.32	-4.92	11	Pass	-15.92
	134	5670		-10.919	-10.043	0.18	-7.45	11	Pass	-18.45
	151	5755		-11.582	-11.06	0.15	-8.30	17	Pass	-25.30
	159	5795		-10.27	-9.997	0.19	-7.12	17	Pass	-24.12

Please see the plot below.

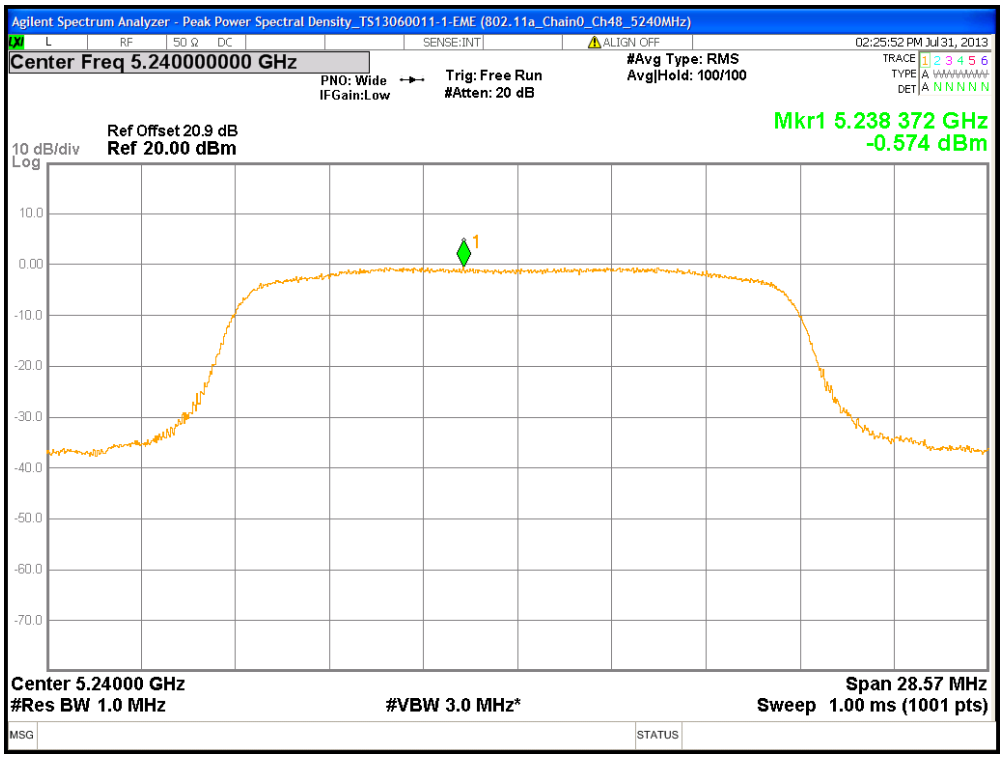
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch36



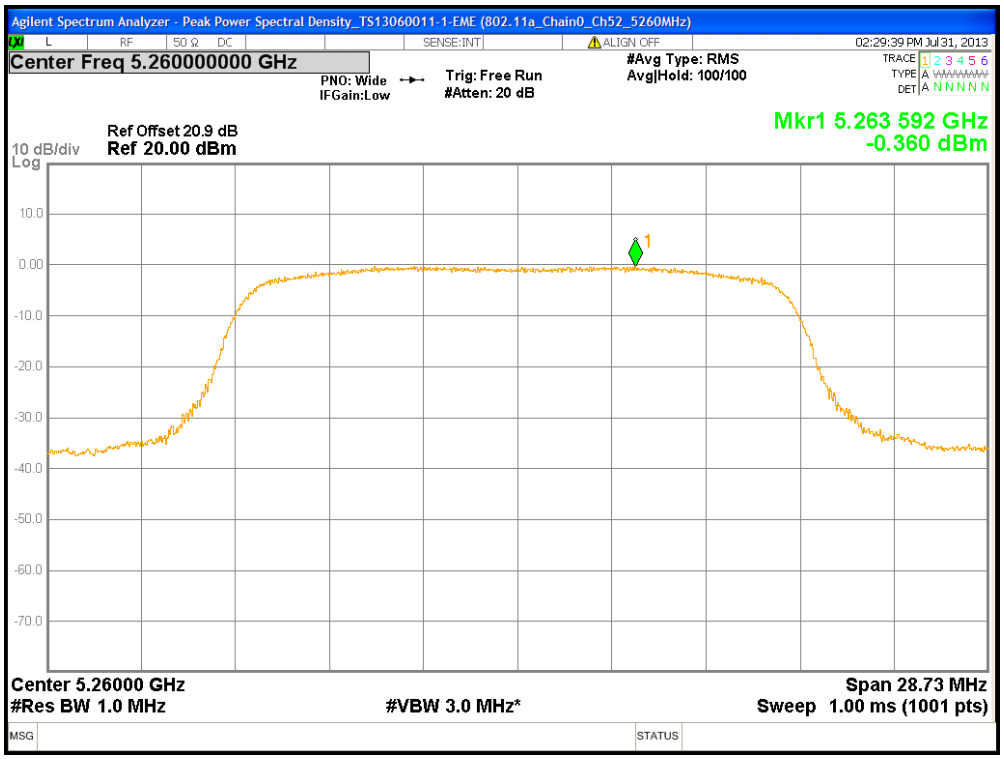
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch40



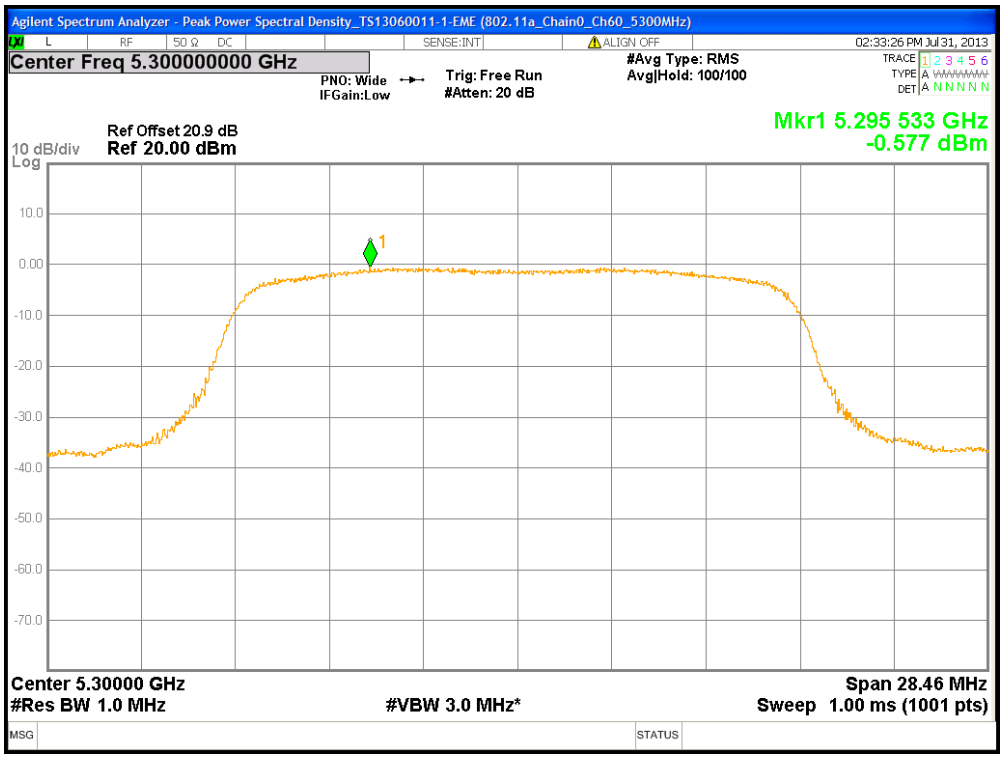
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch48



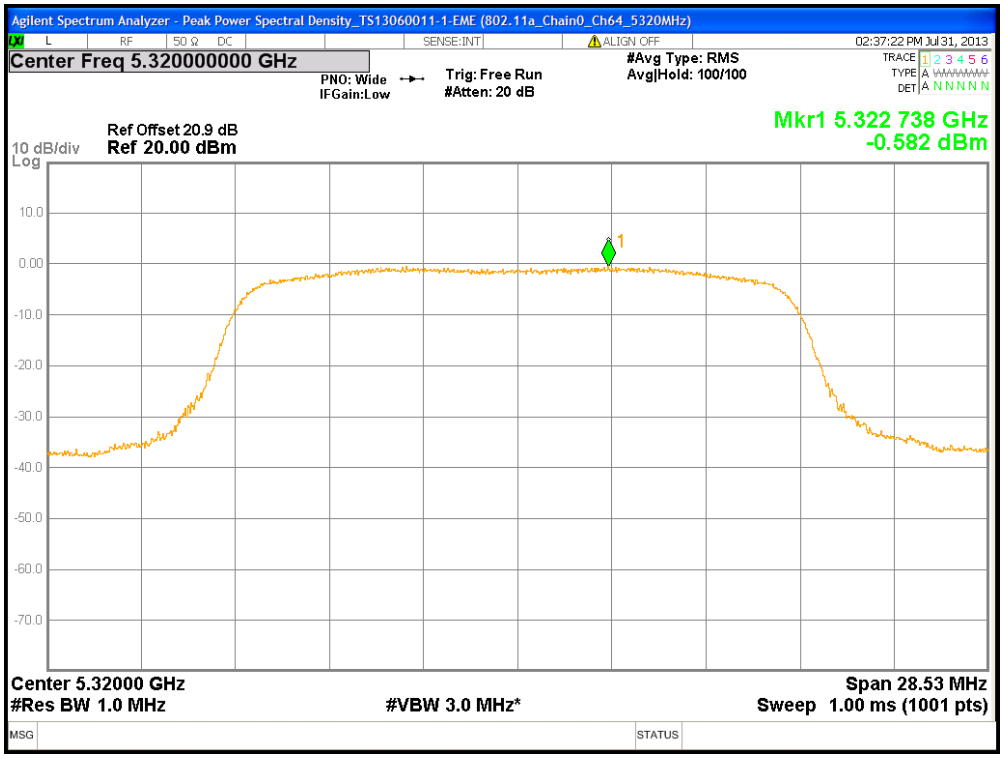
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch52



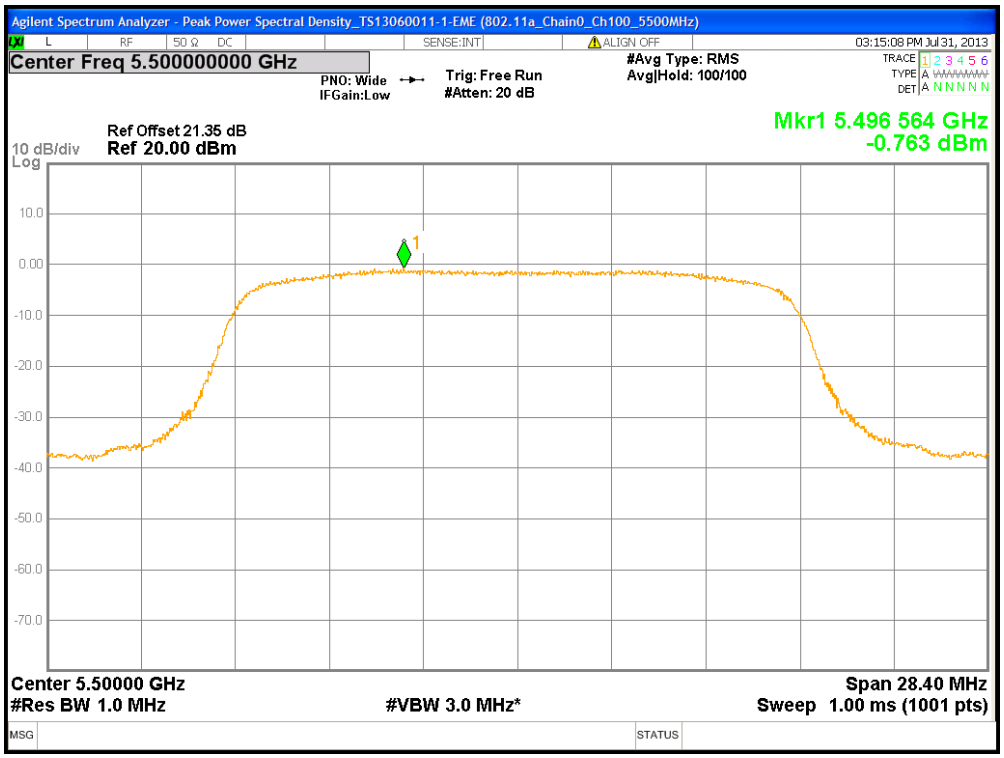
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch60



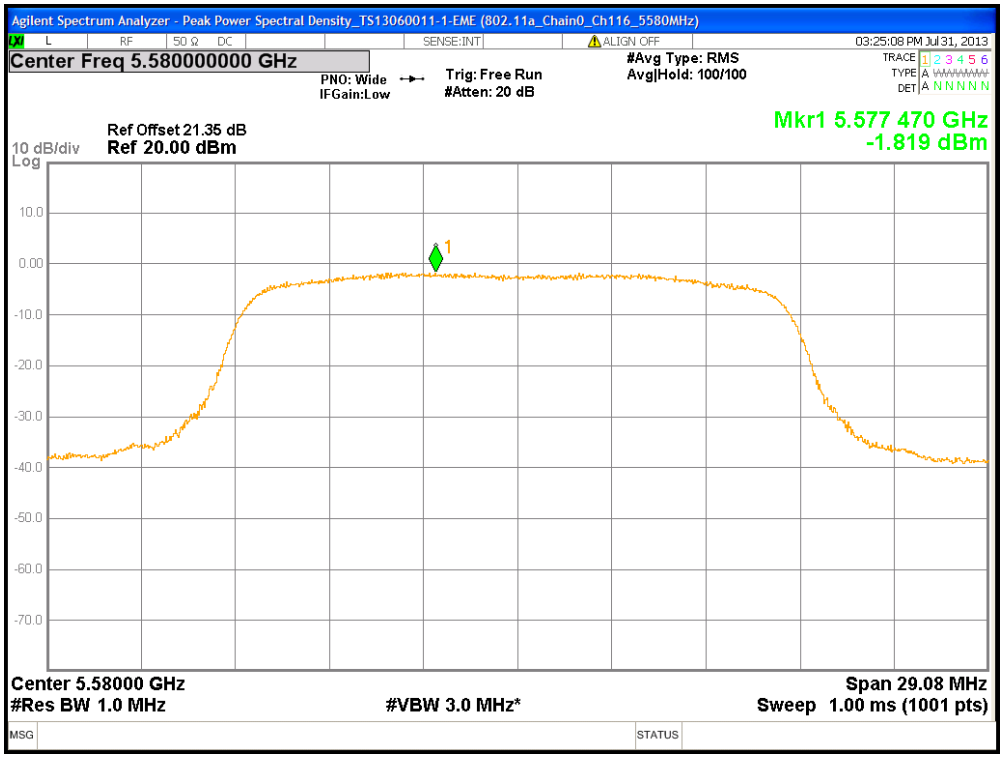
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch64



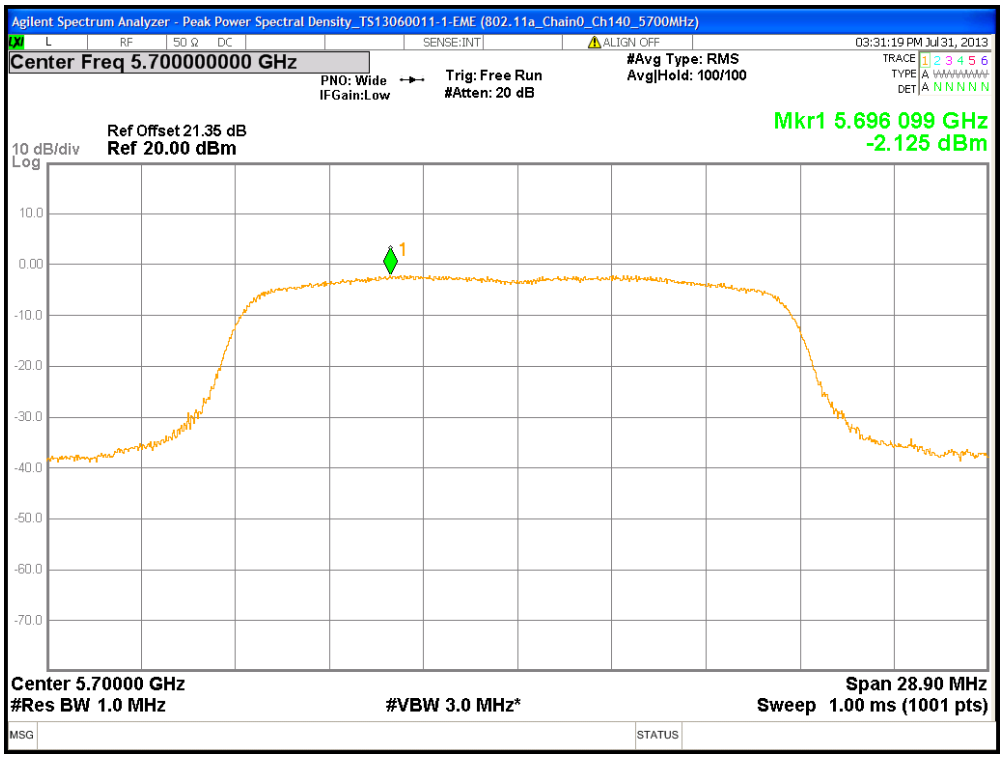
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch100



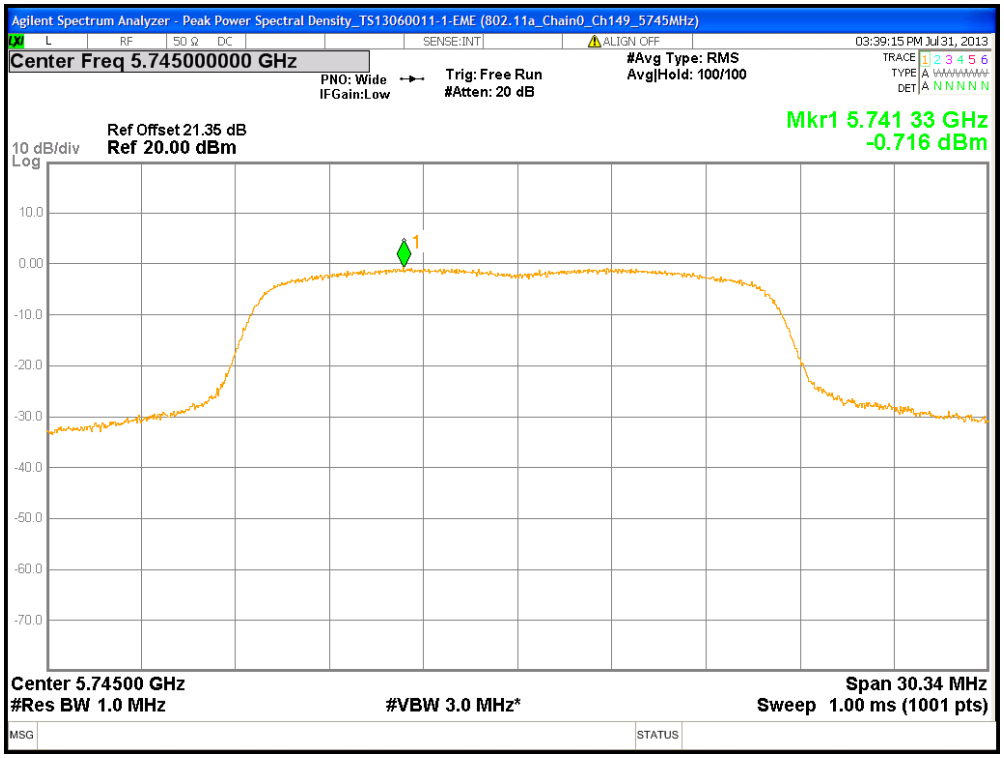
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch116



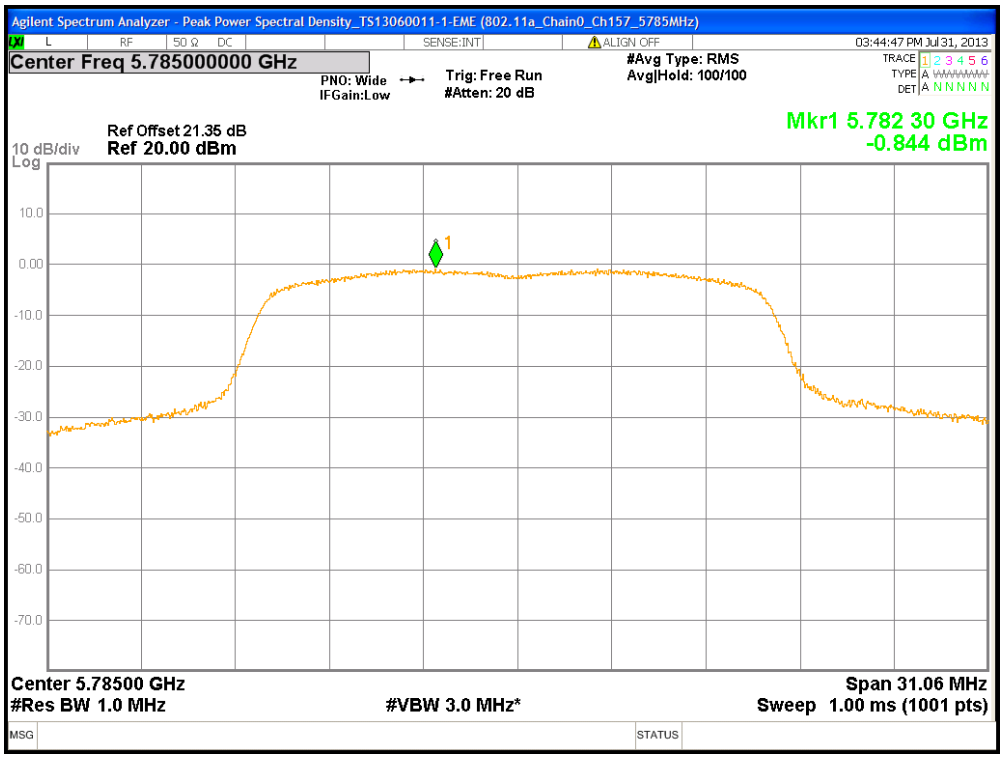
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch140



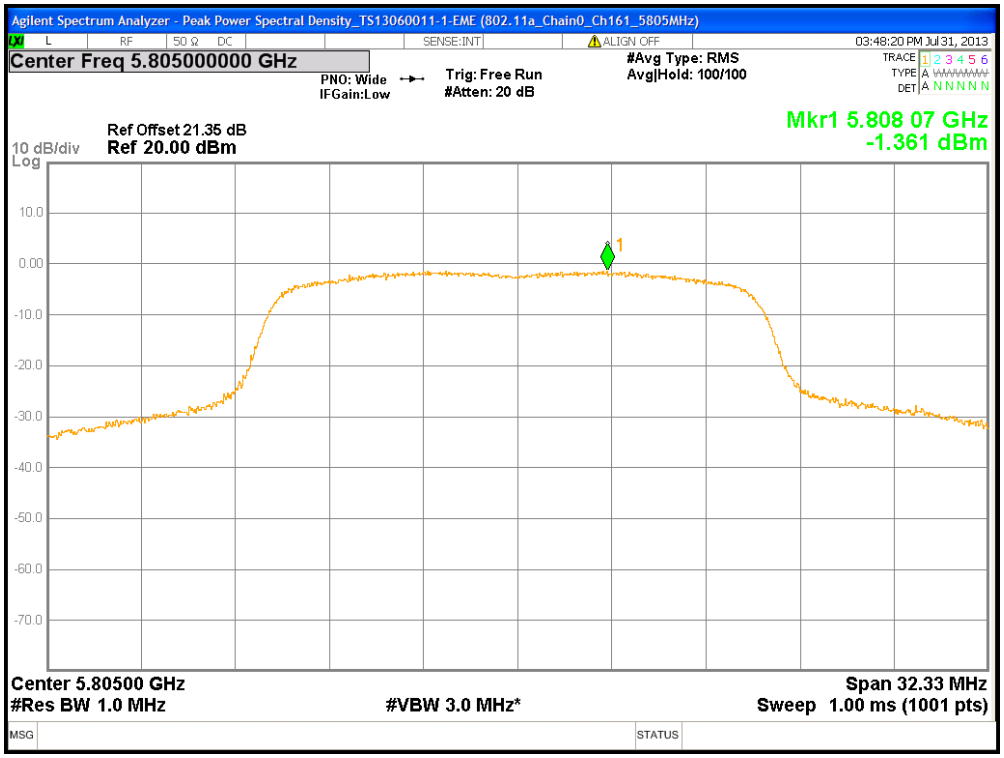
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch149



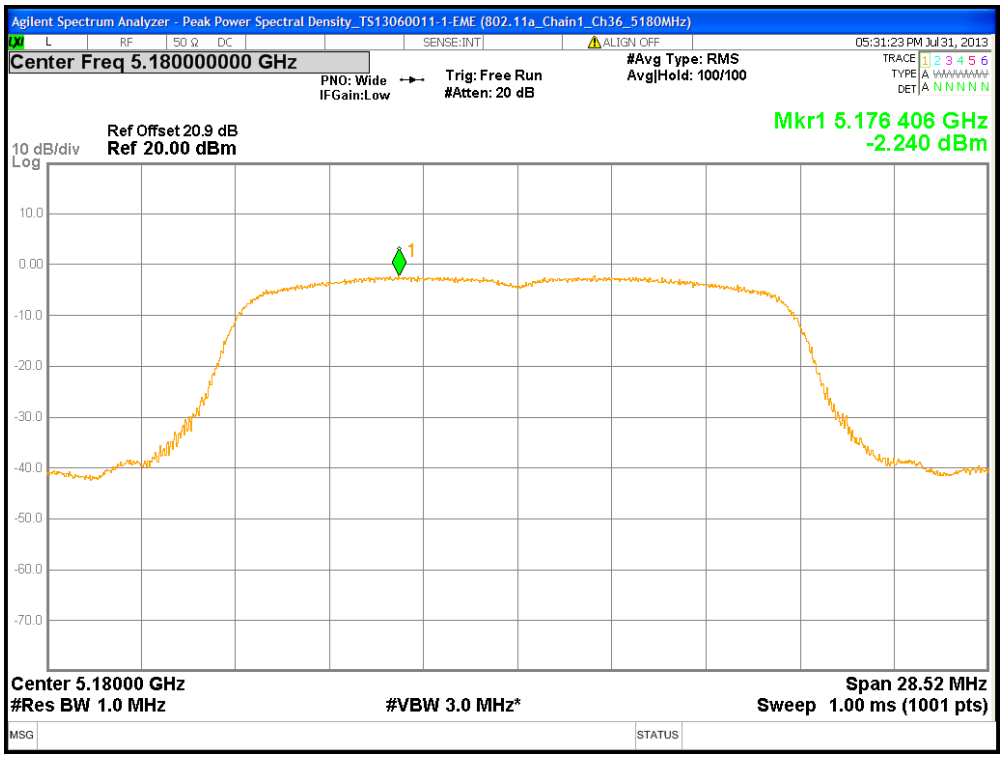
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch157



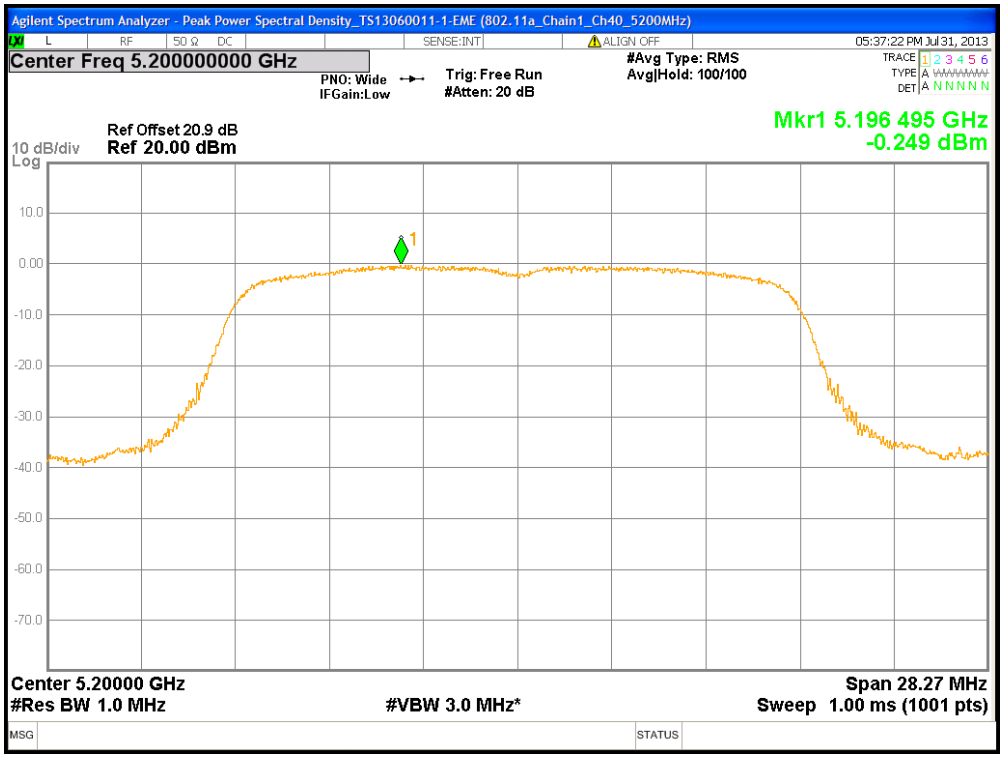
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch161



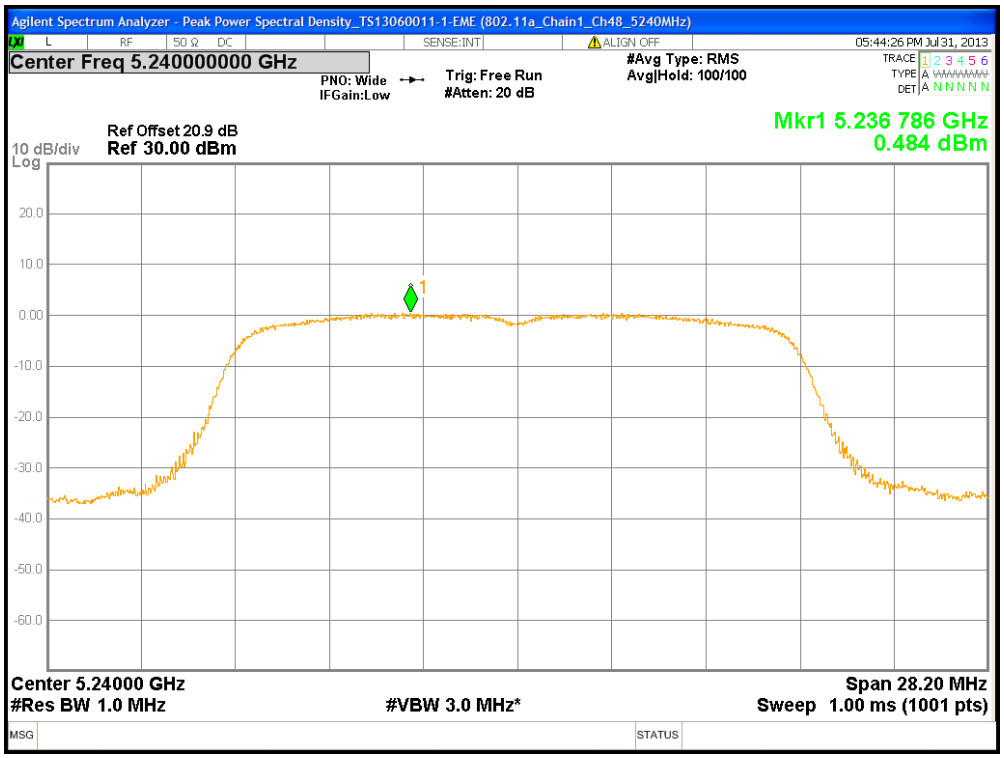
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch36



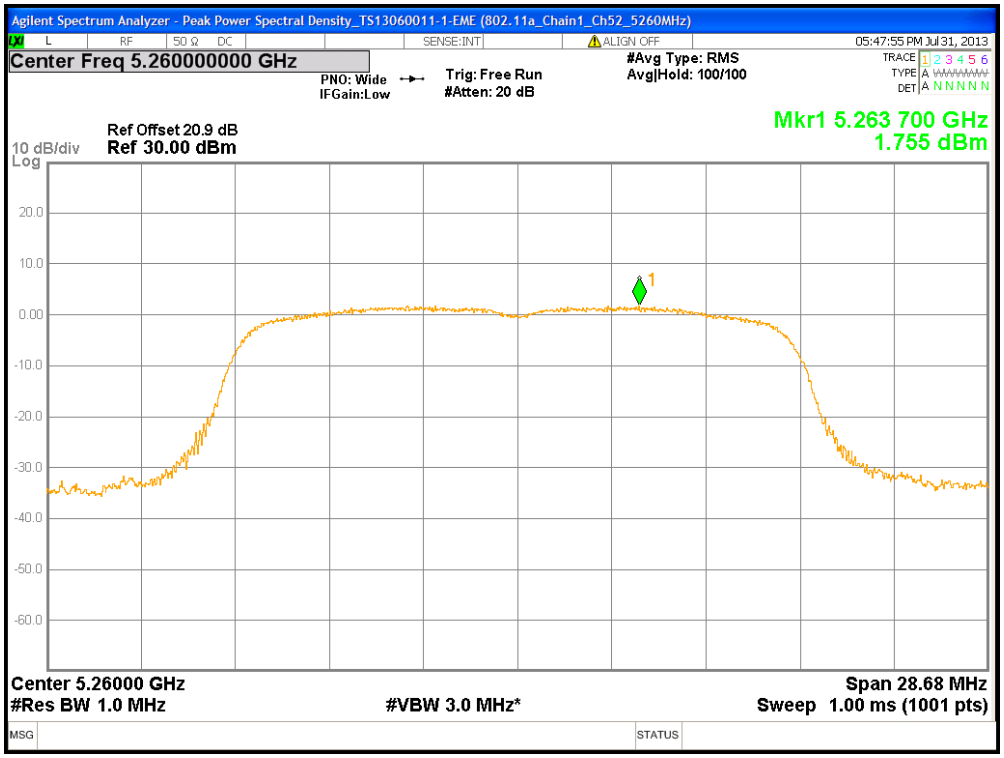
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch40



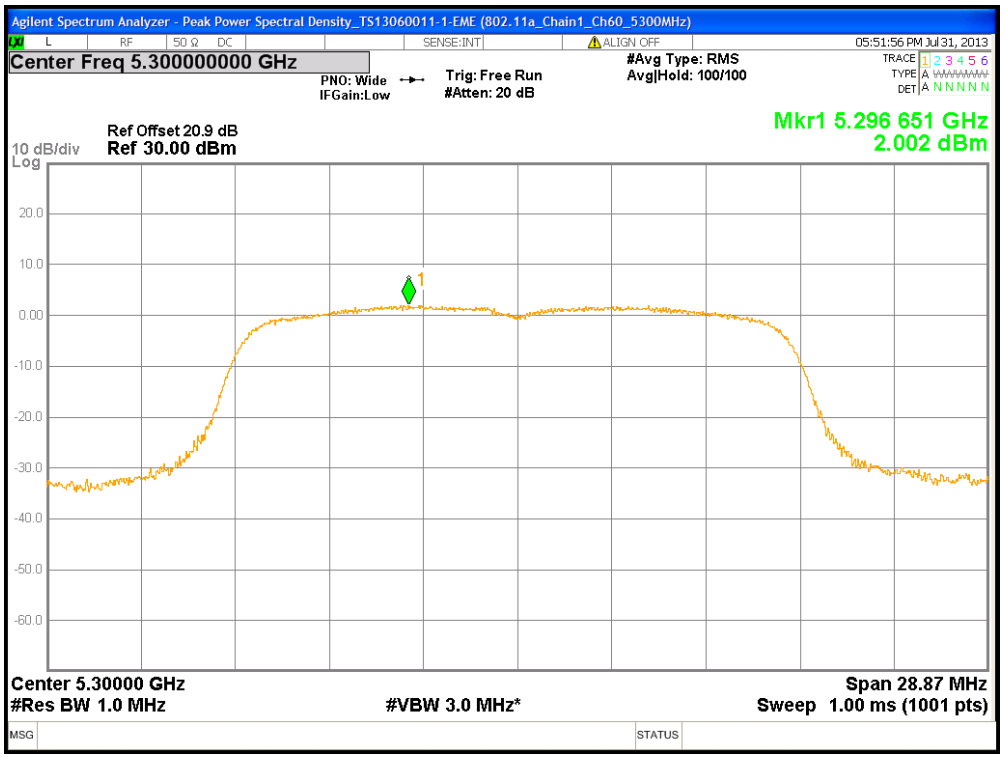
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch48



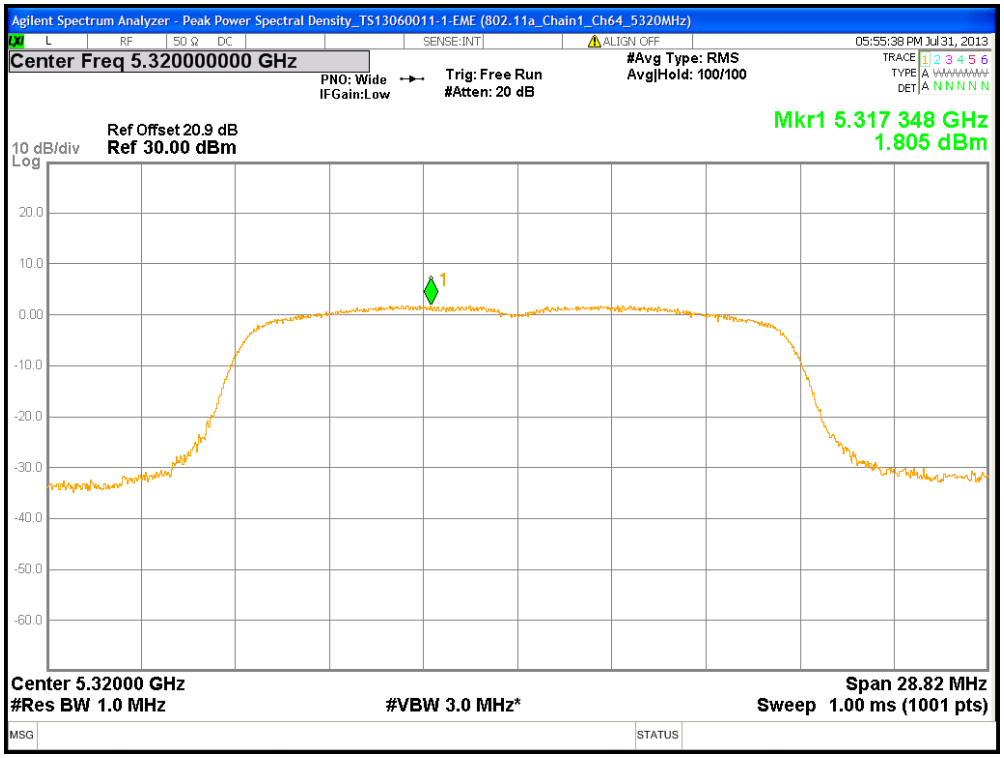
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch52



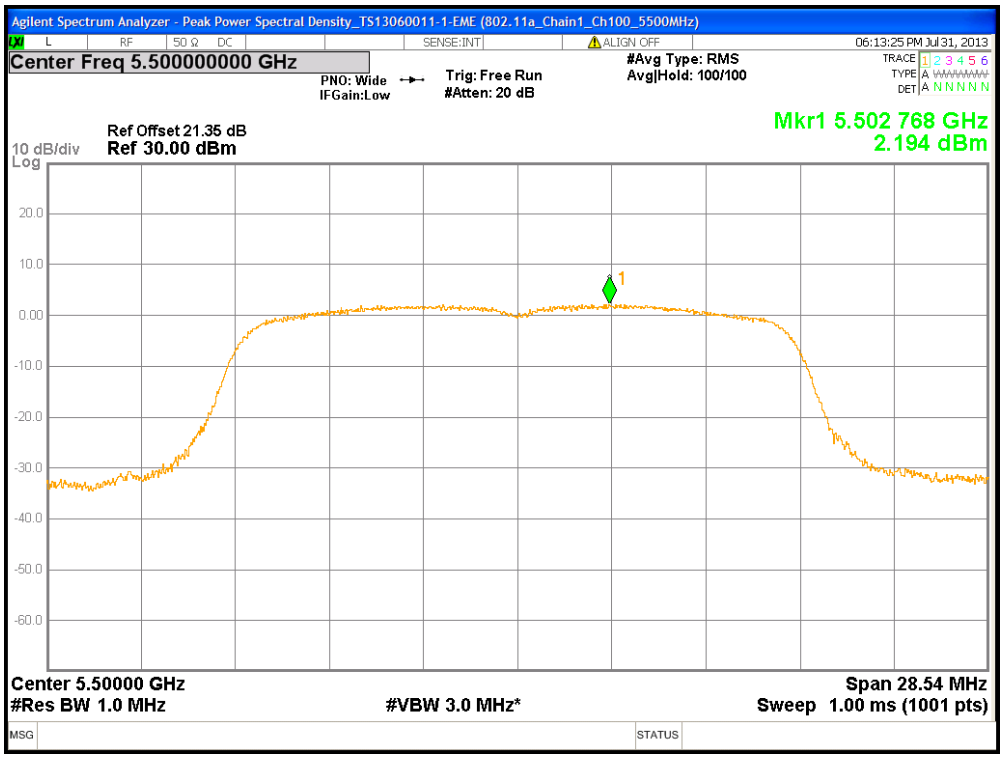
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch60



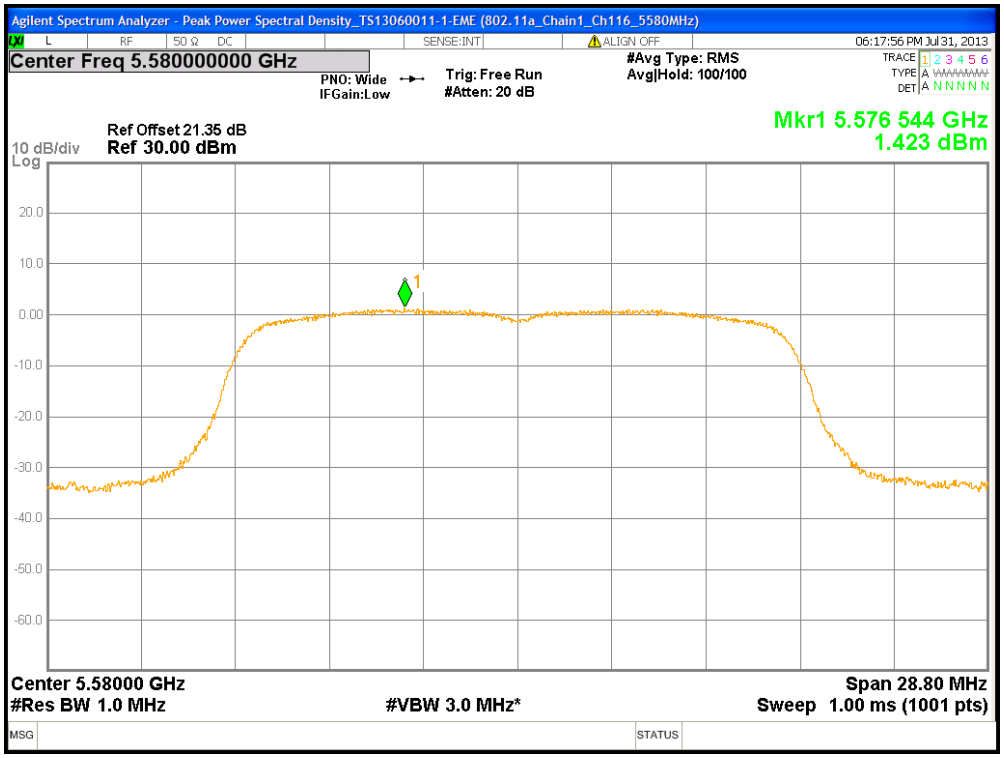
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch64



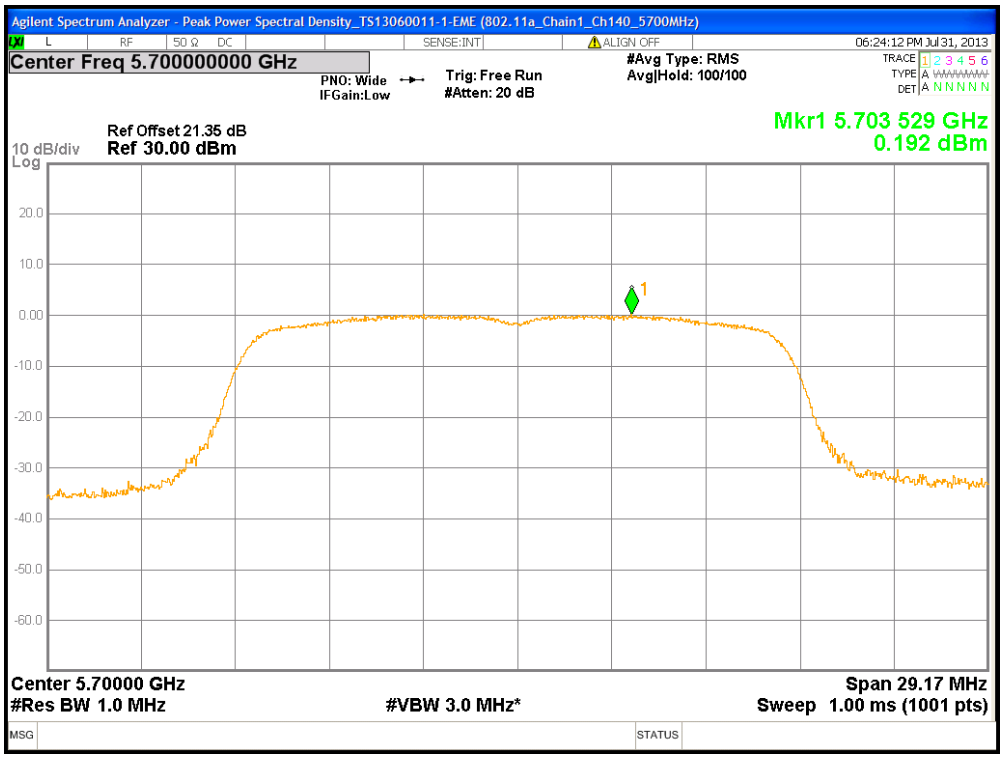
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch100



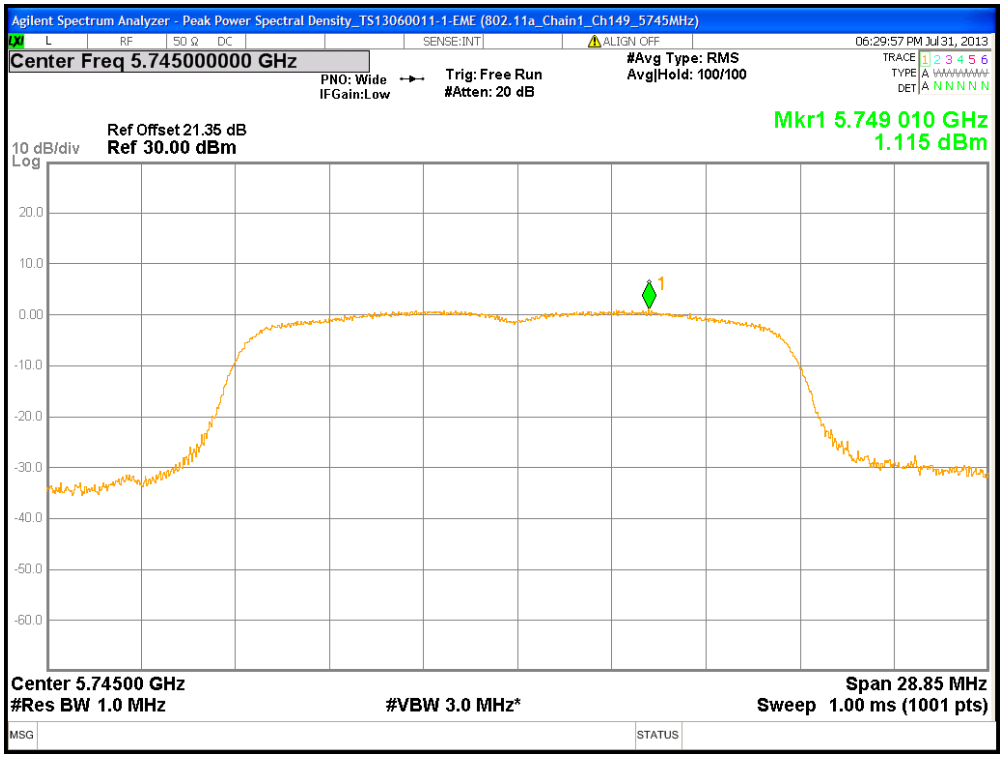
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch116



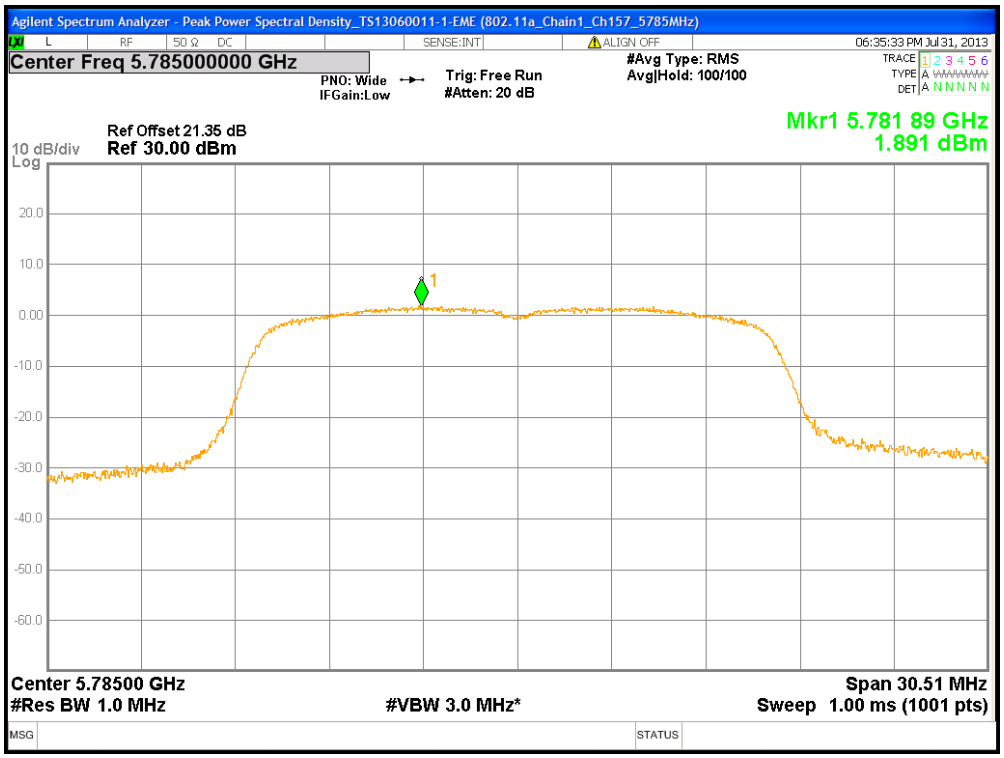
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch140



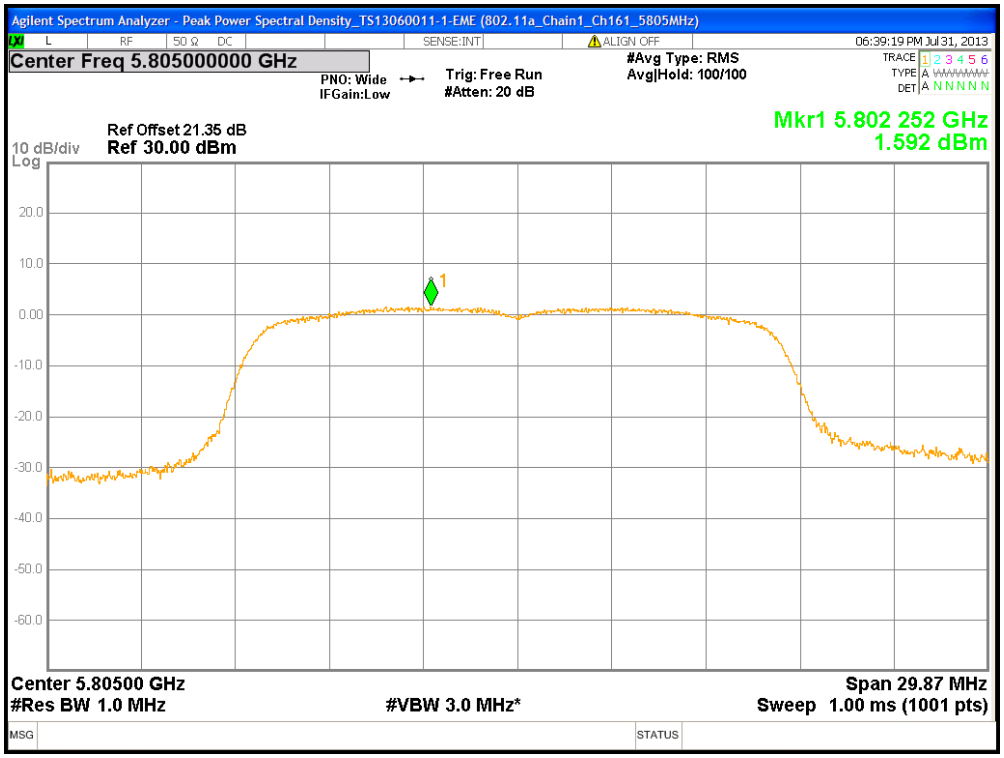
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch149



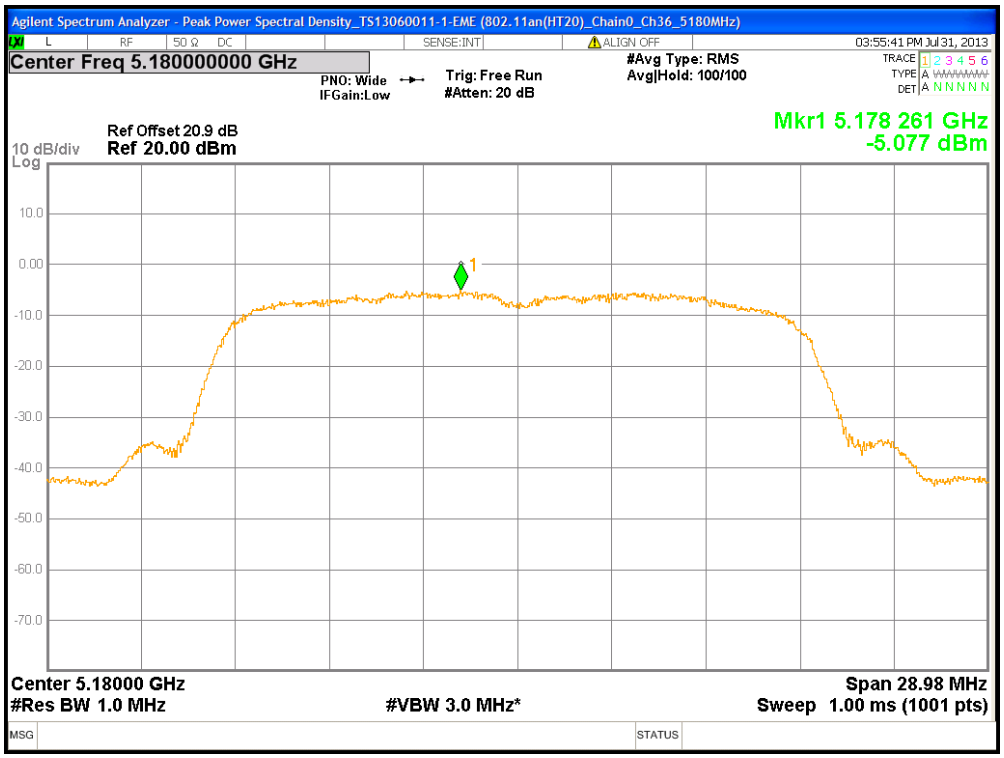
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch157



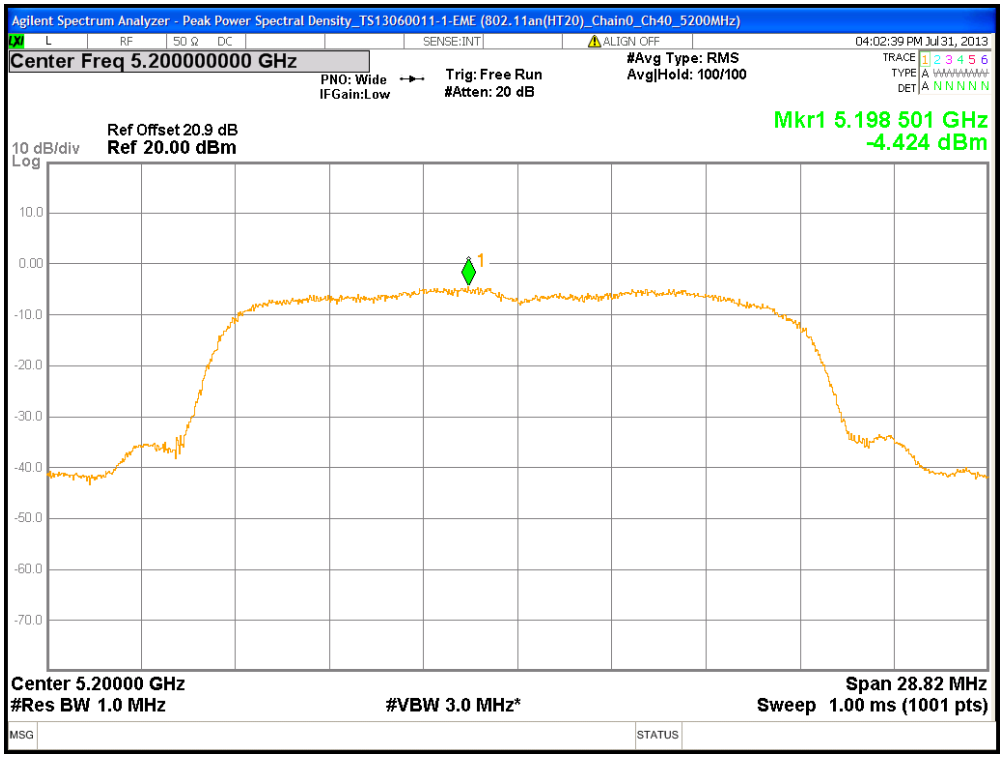
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch161



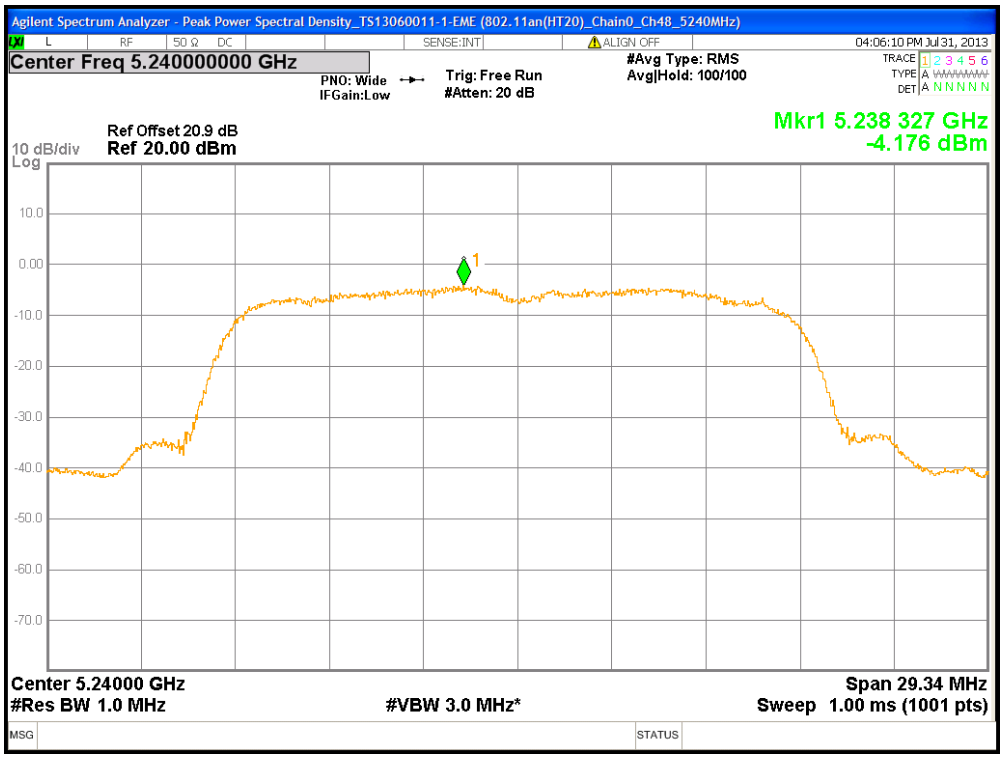
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch36



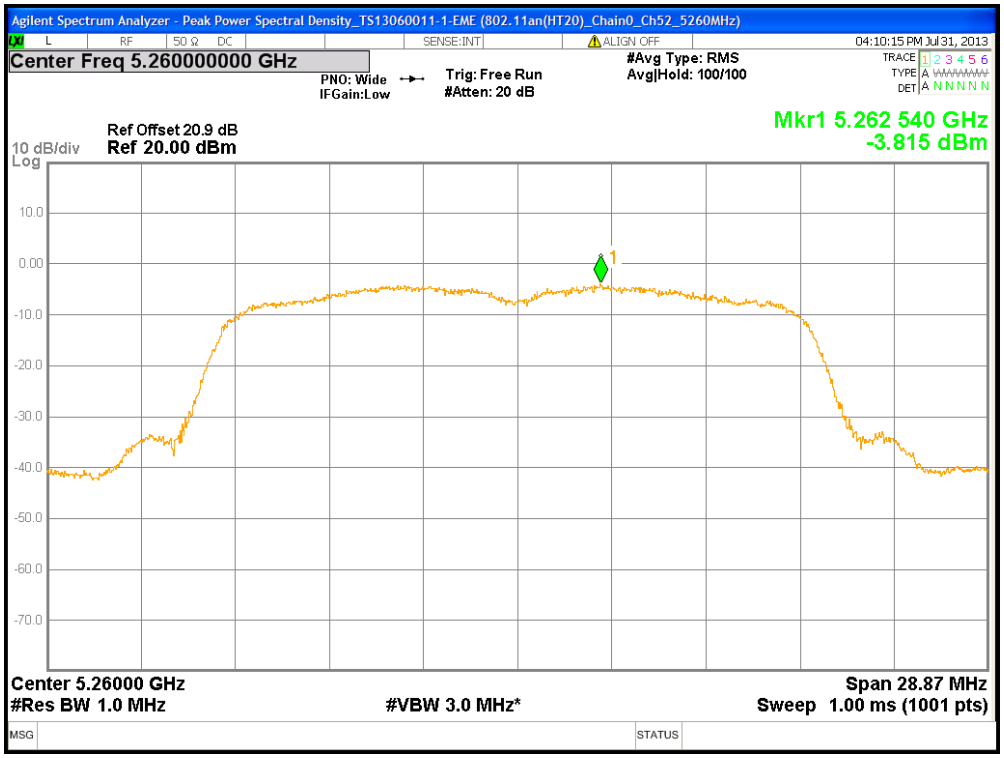
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch40



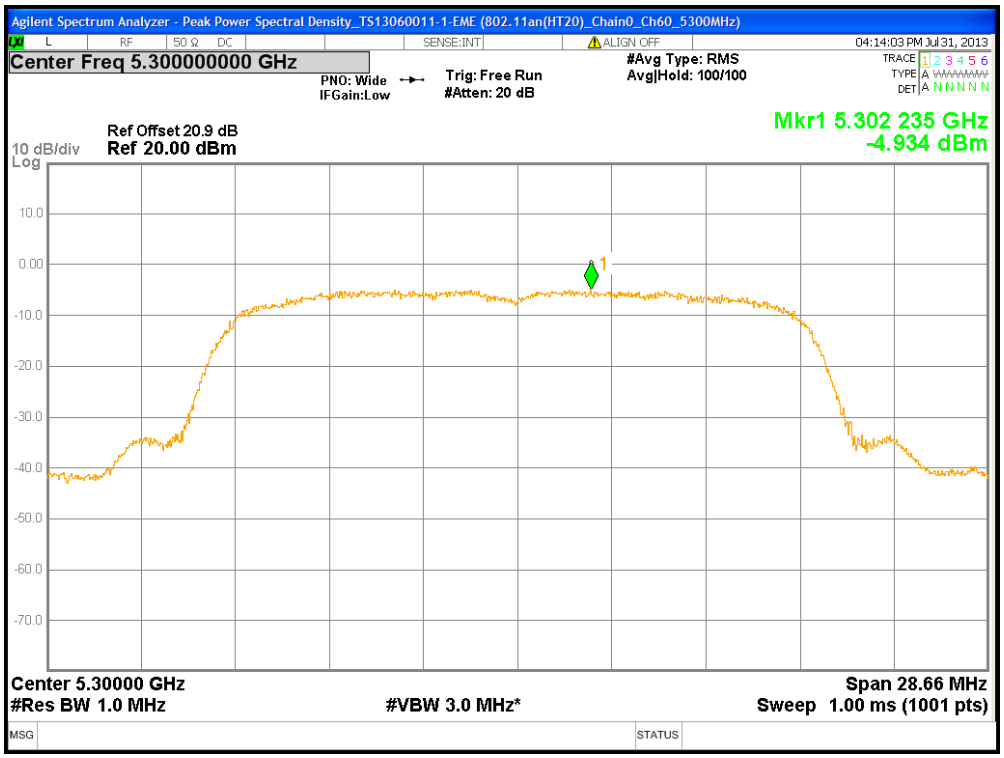
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch48



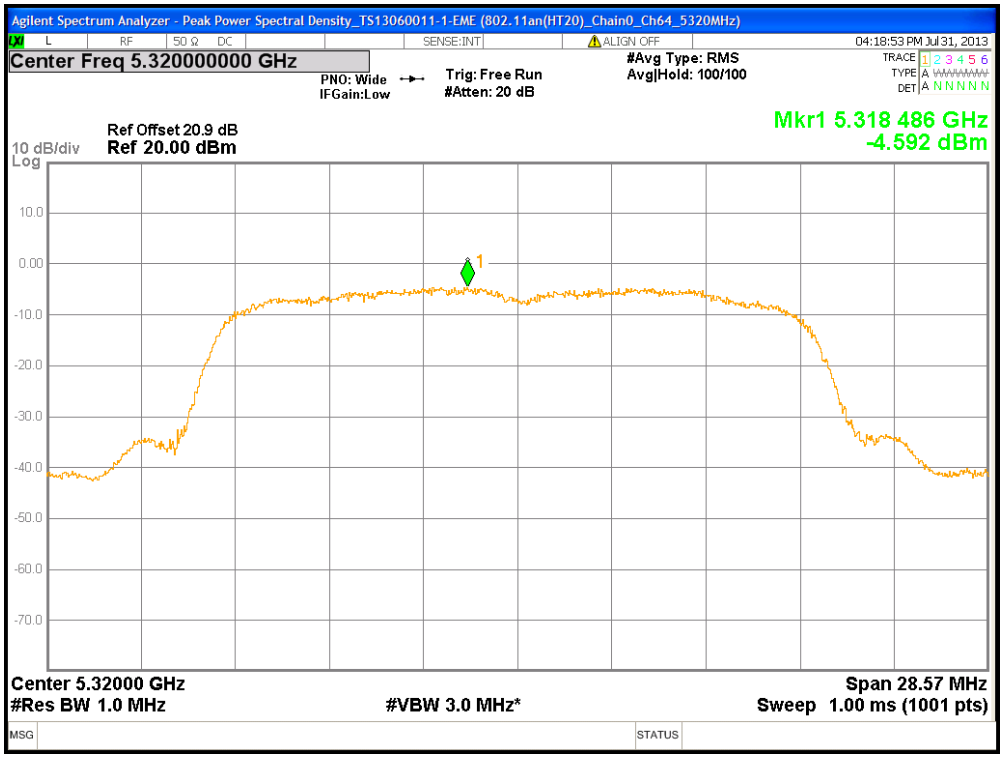
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch52



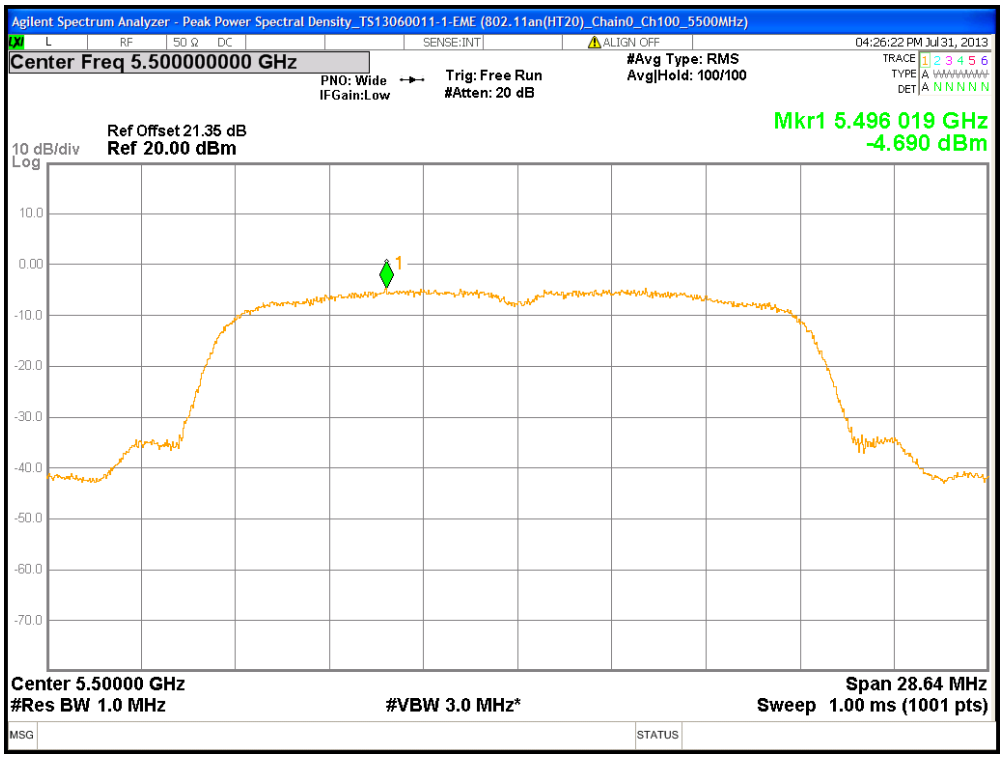
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch60



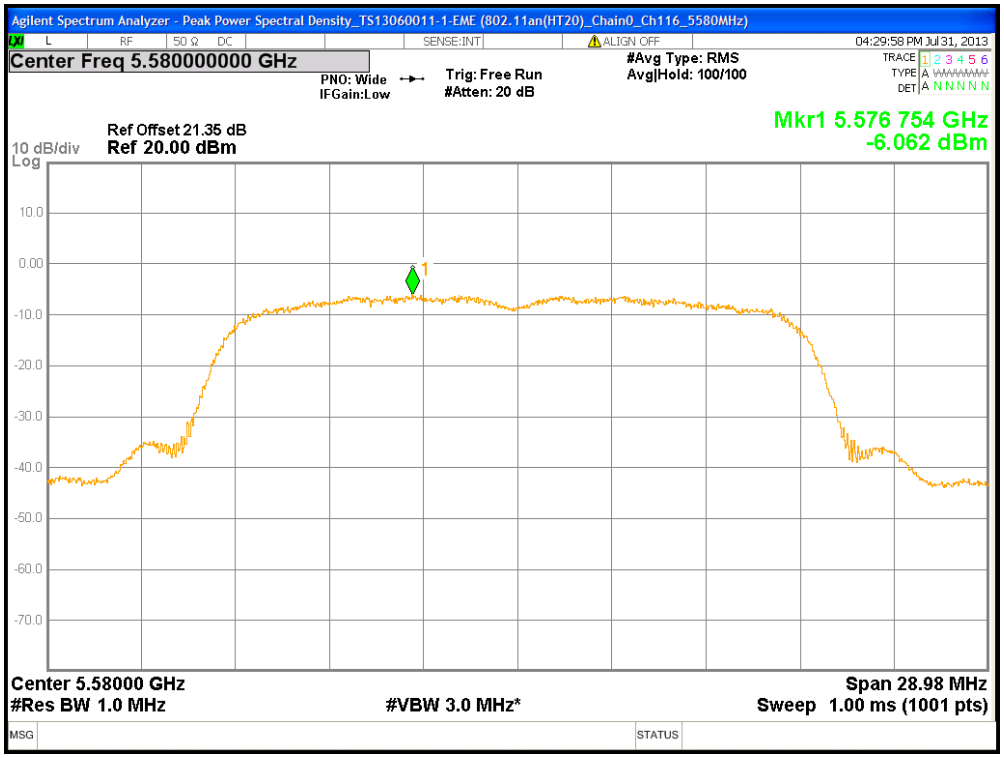
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch64



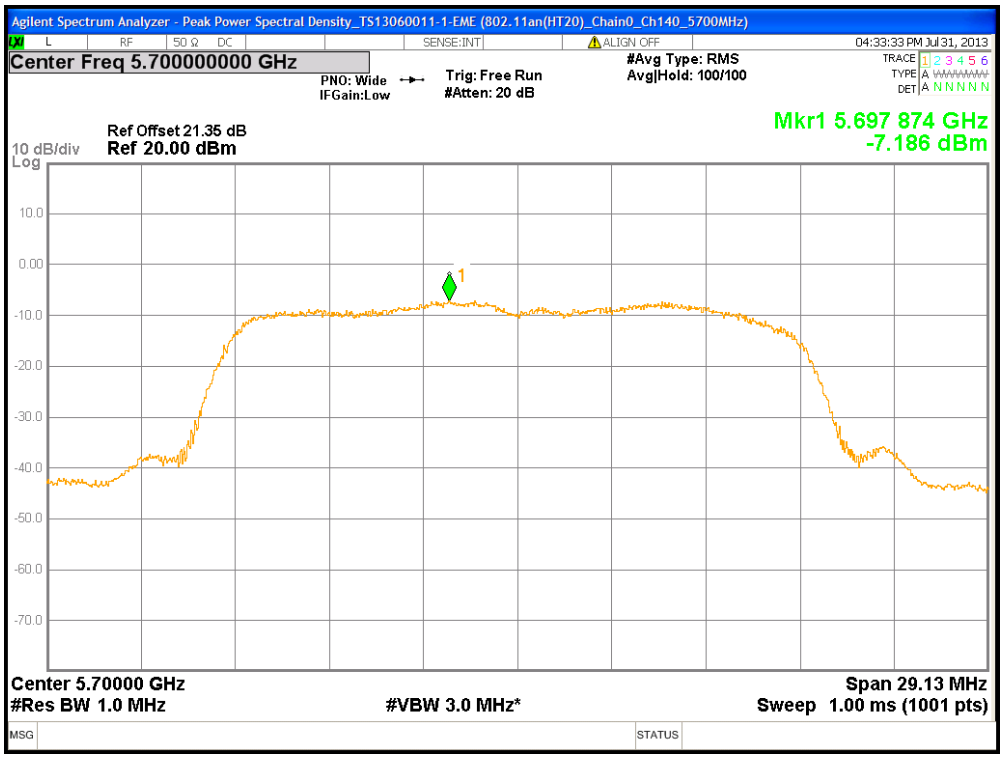
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch100



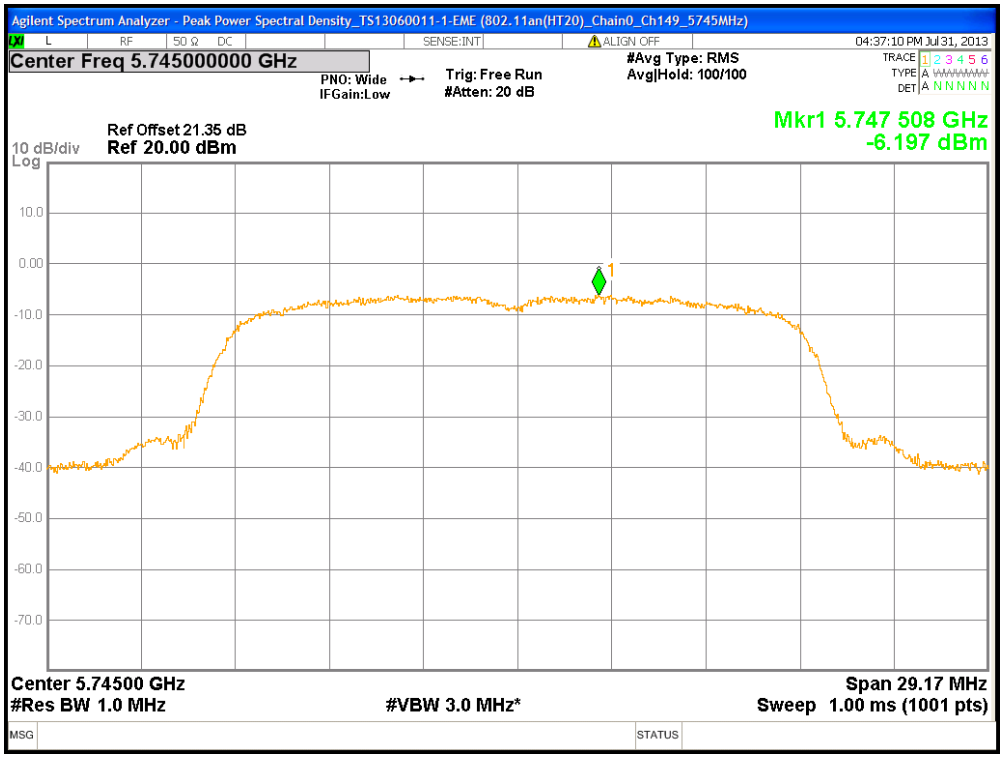
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch116



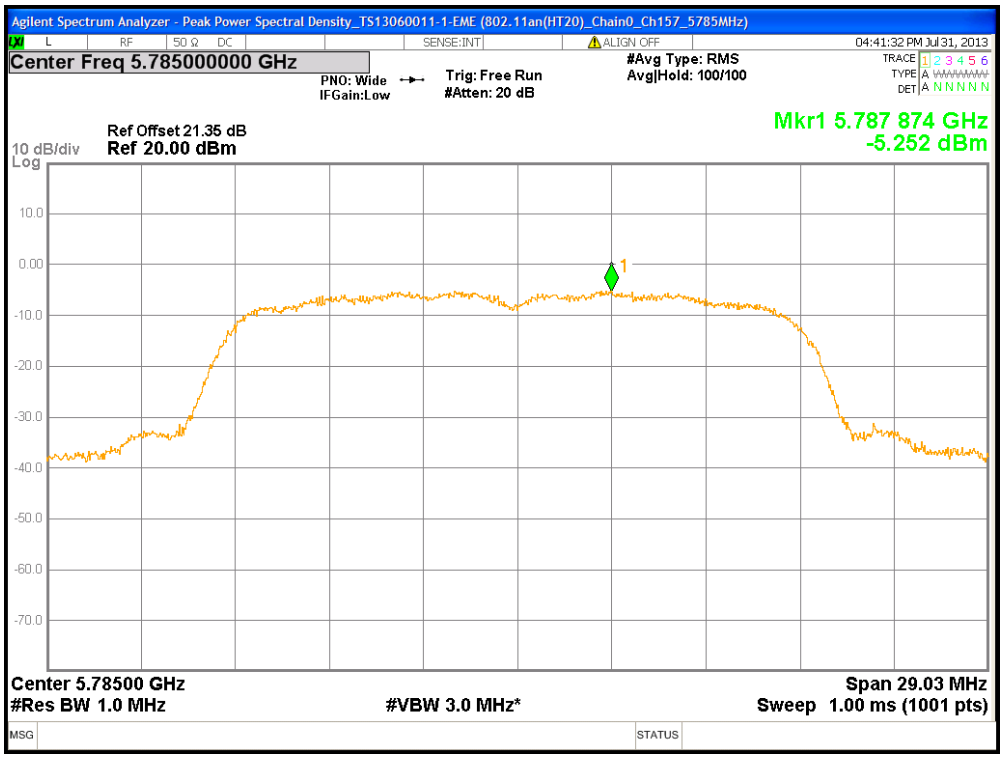
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch140



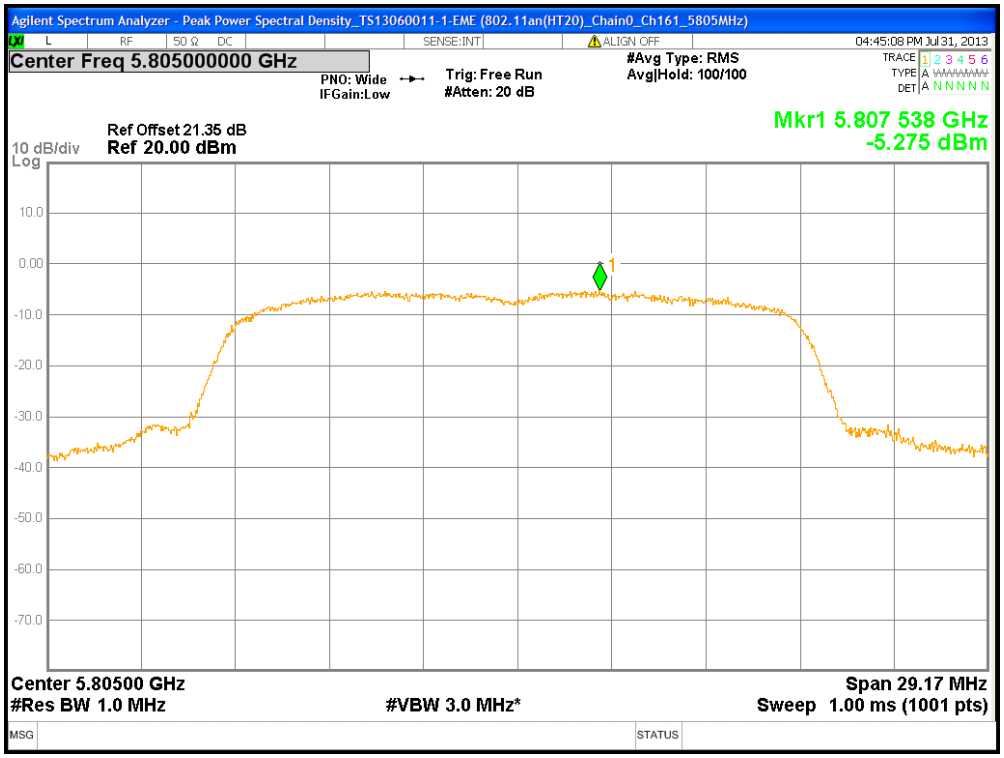
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch149



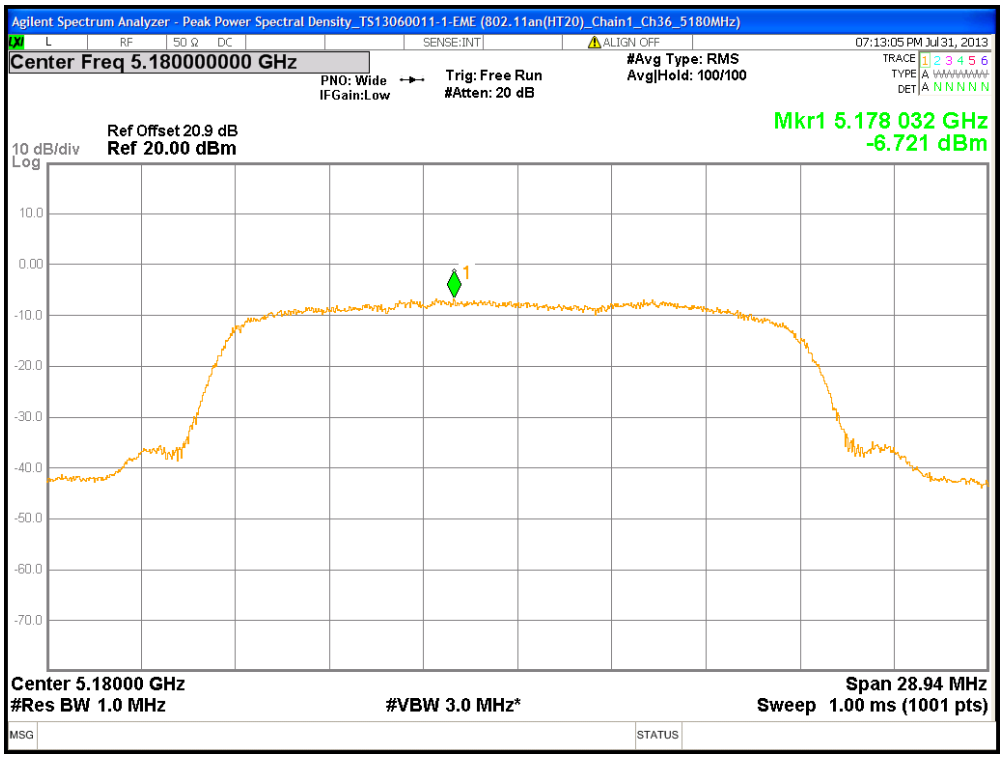
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch157



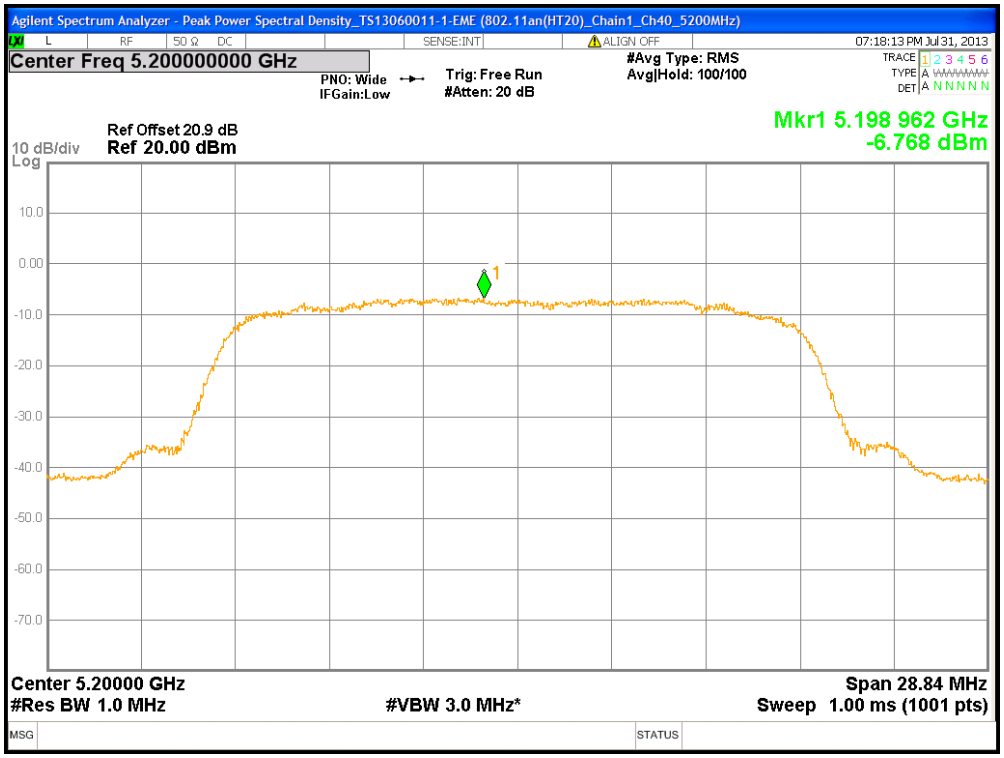
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch161



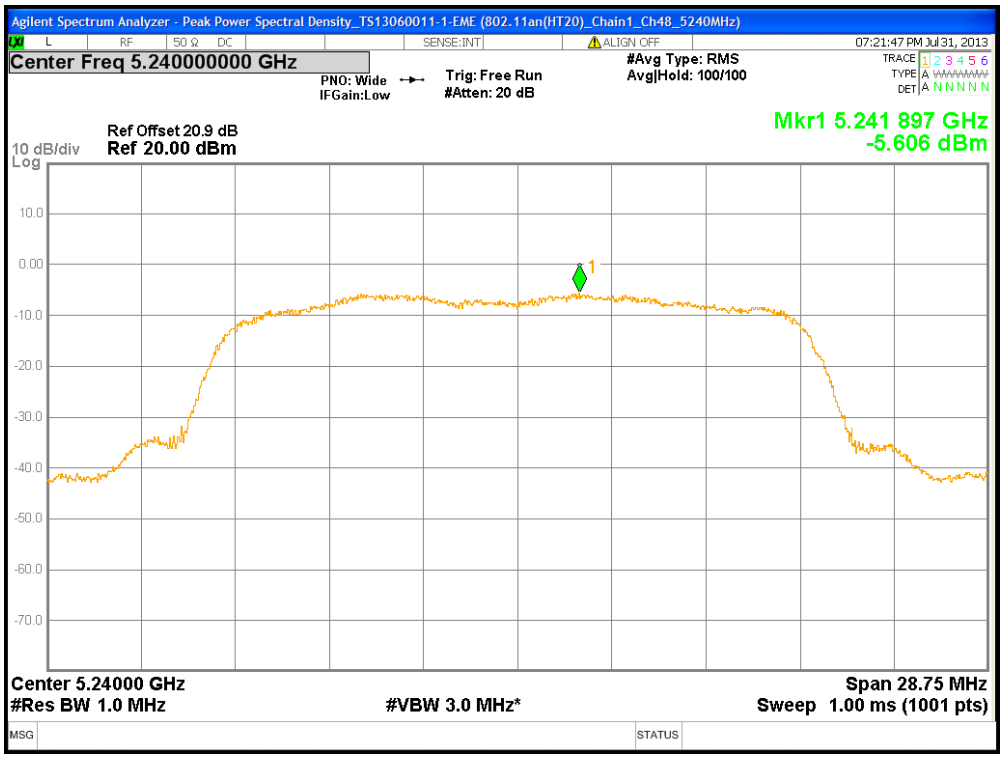
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch36



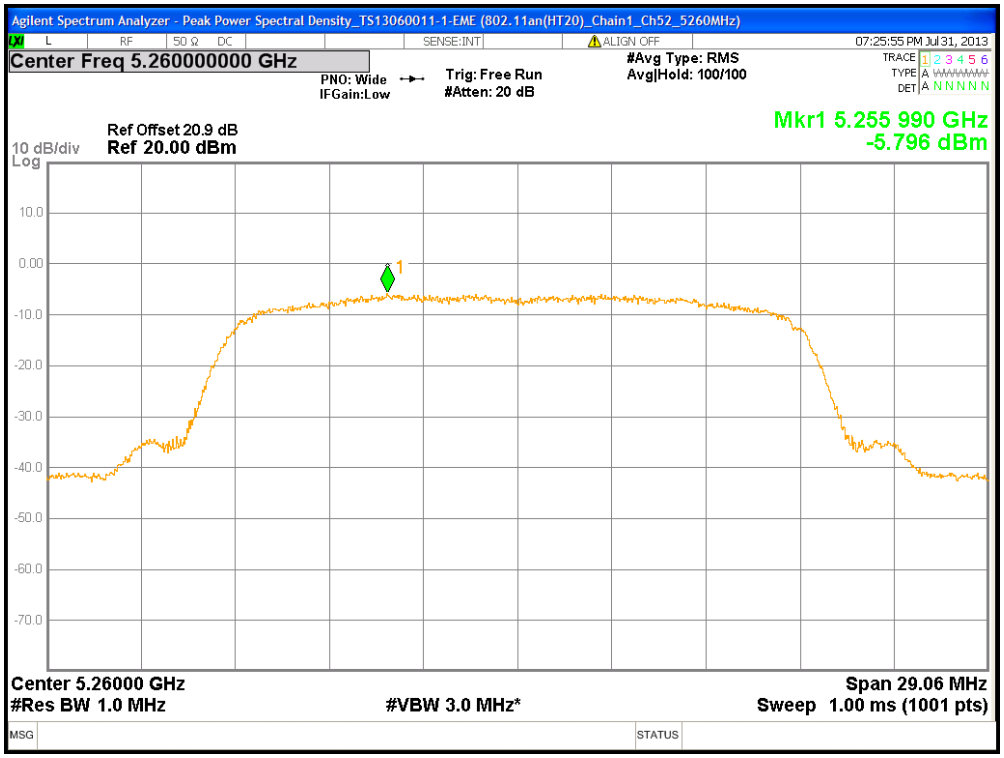
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch40



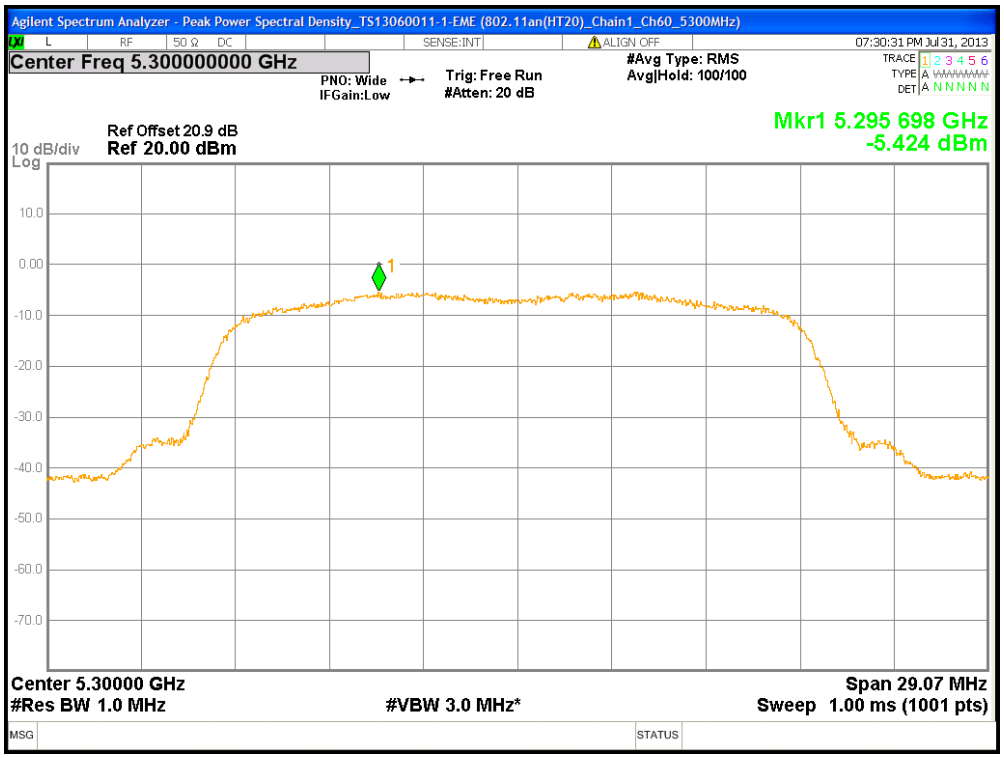
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch48



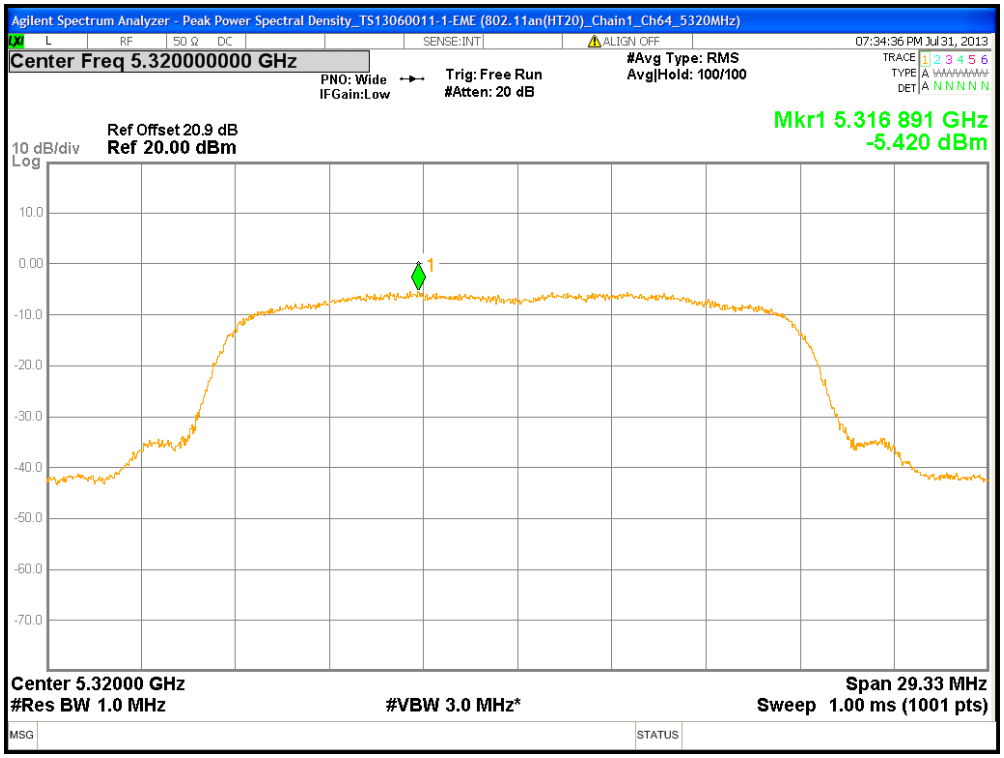
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch52



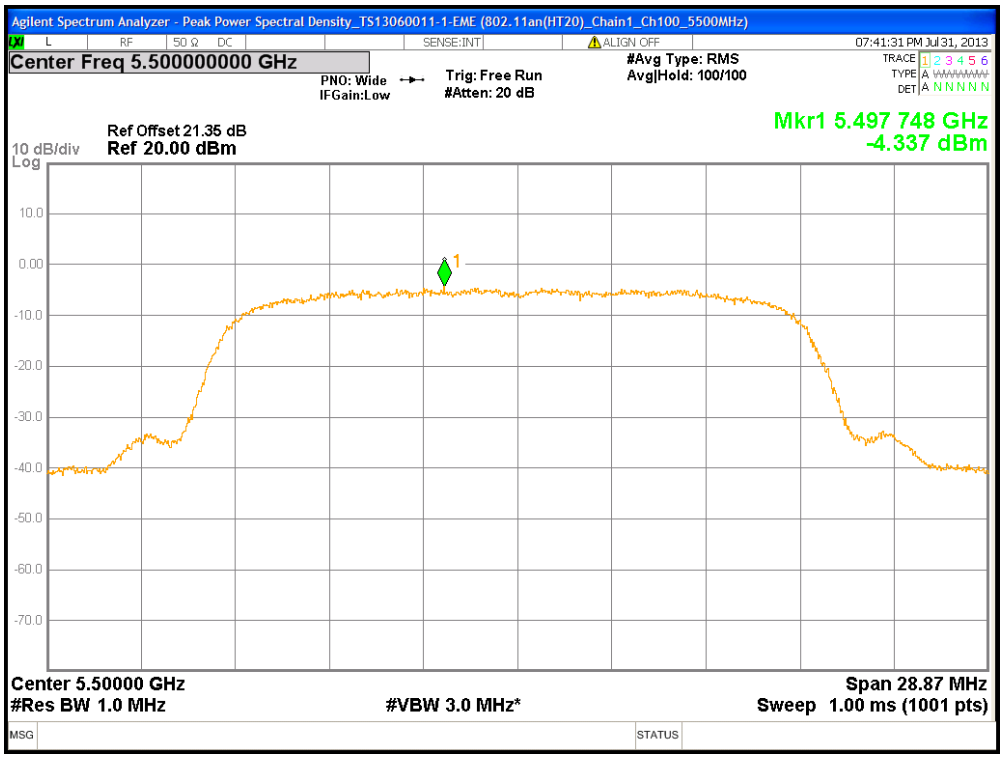
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch60



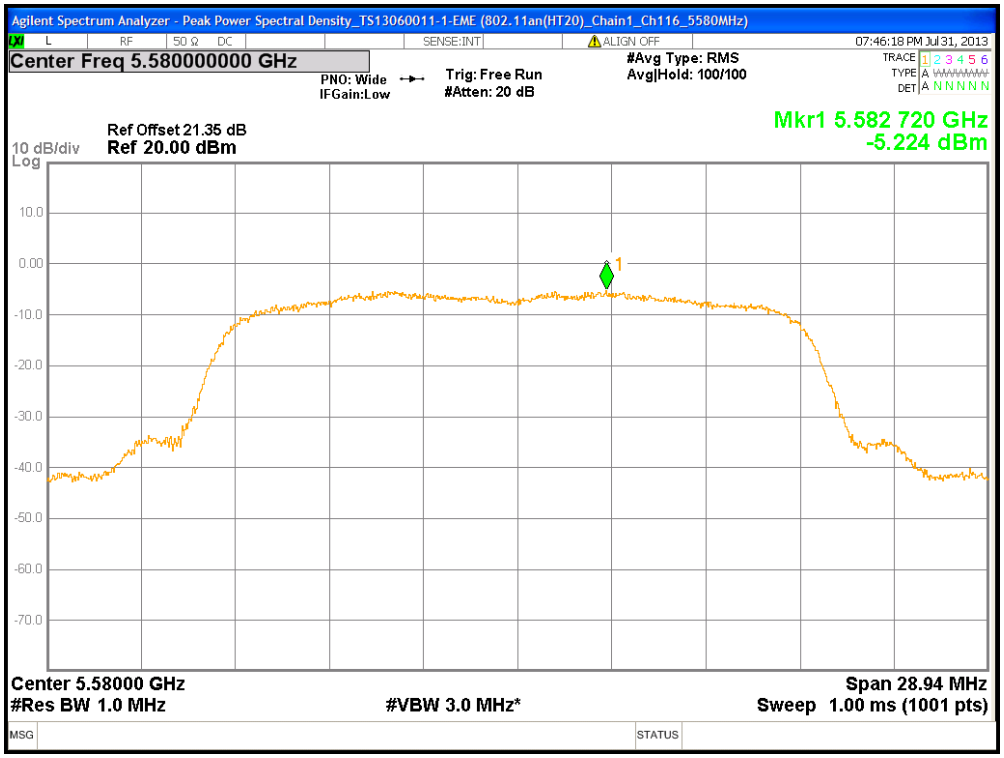
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch64



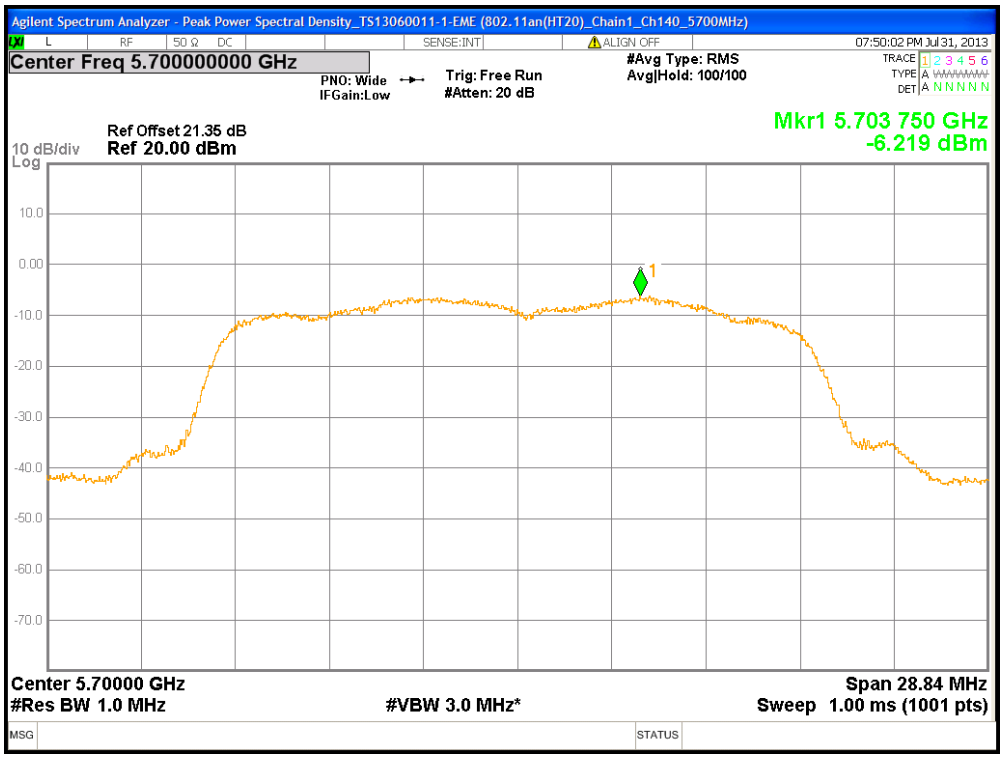
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch100



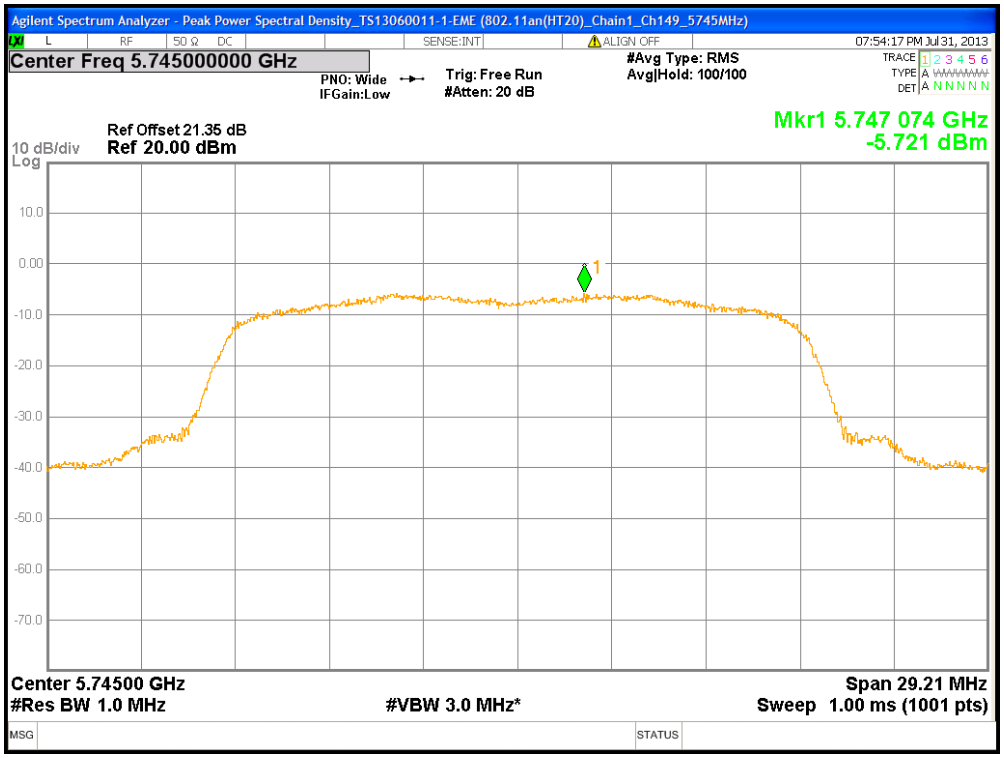
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch116



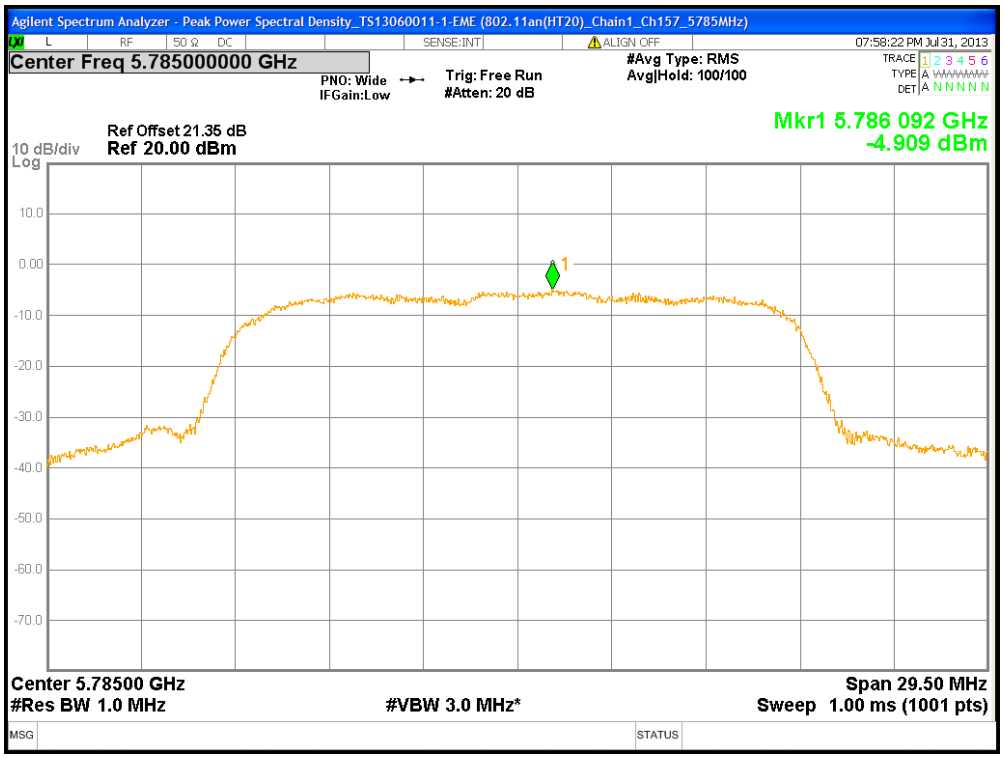
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch140



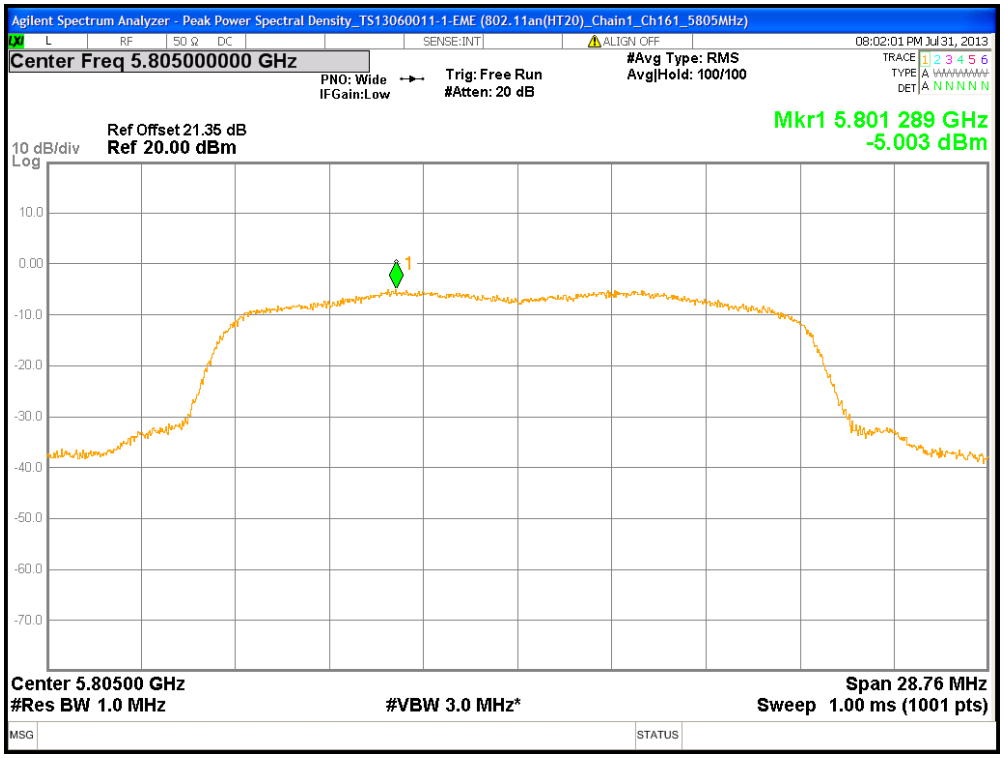
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch149



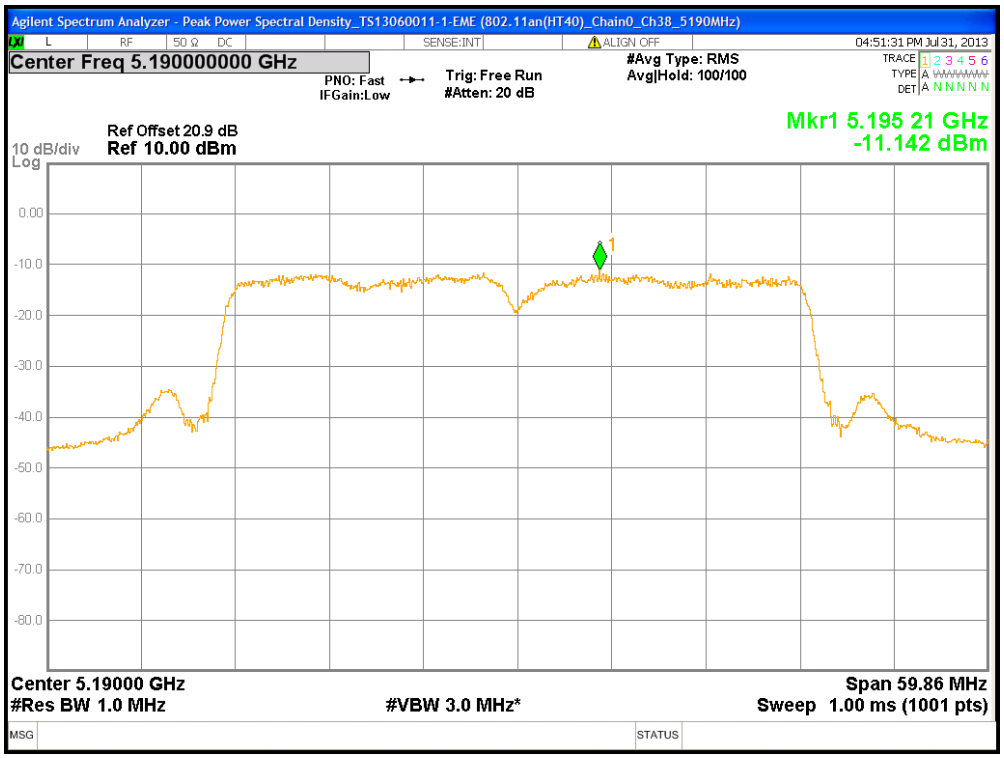
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch157



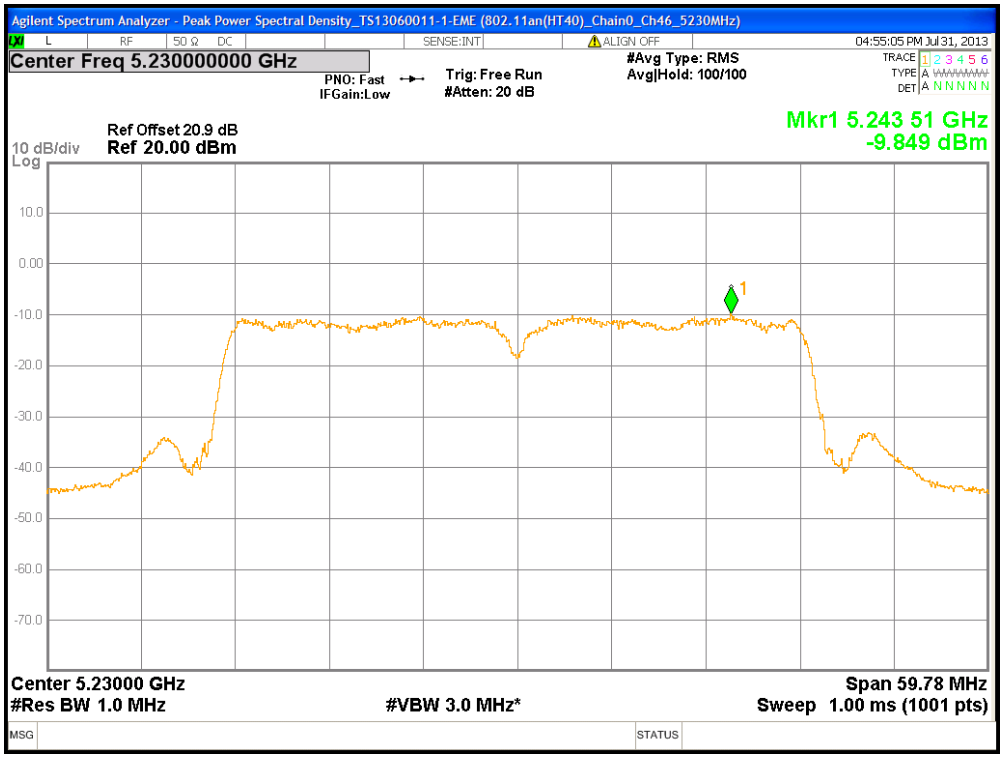
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch161



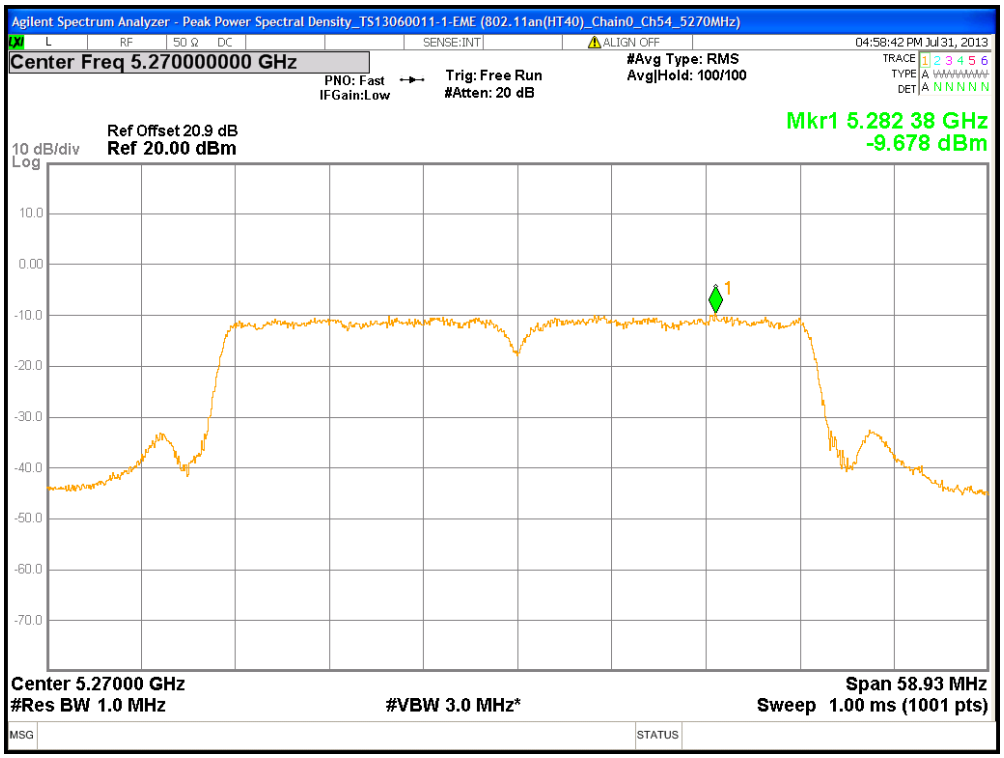
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch38



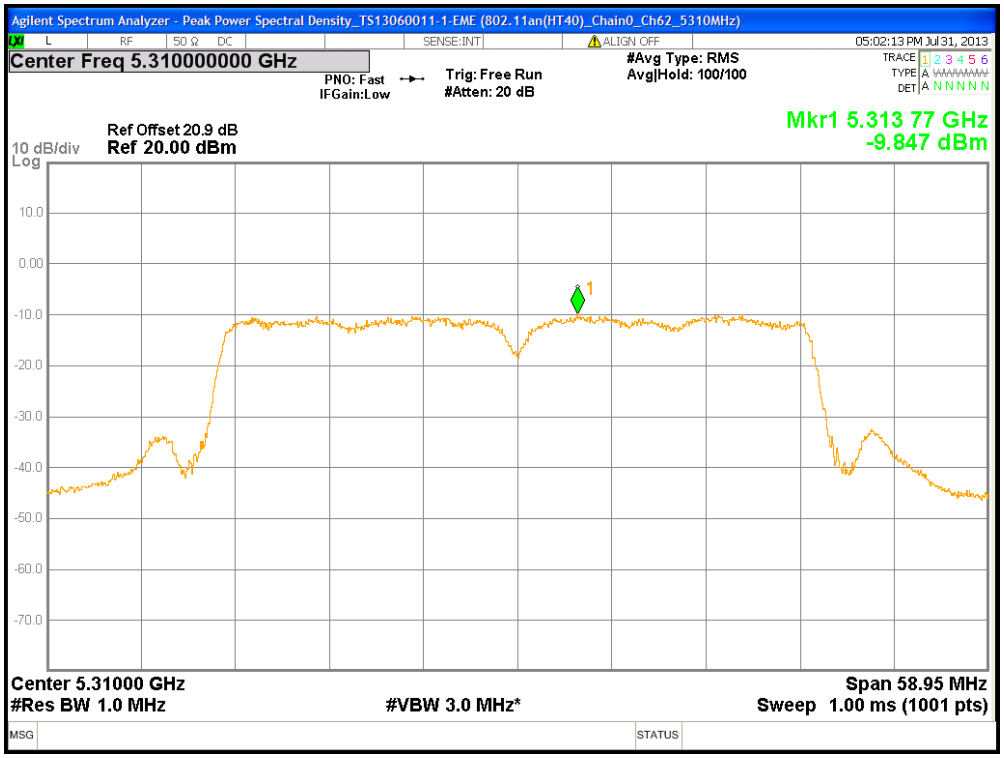
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch46



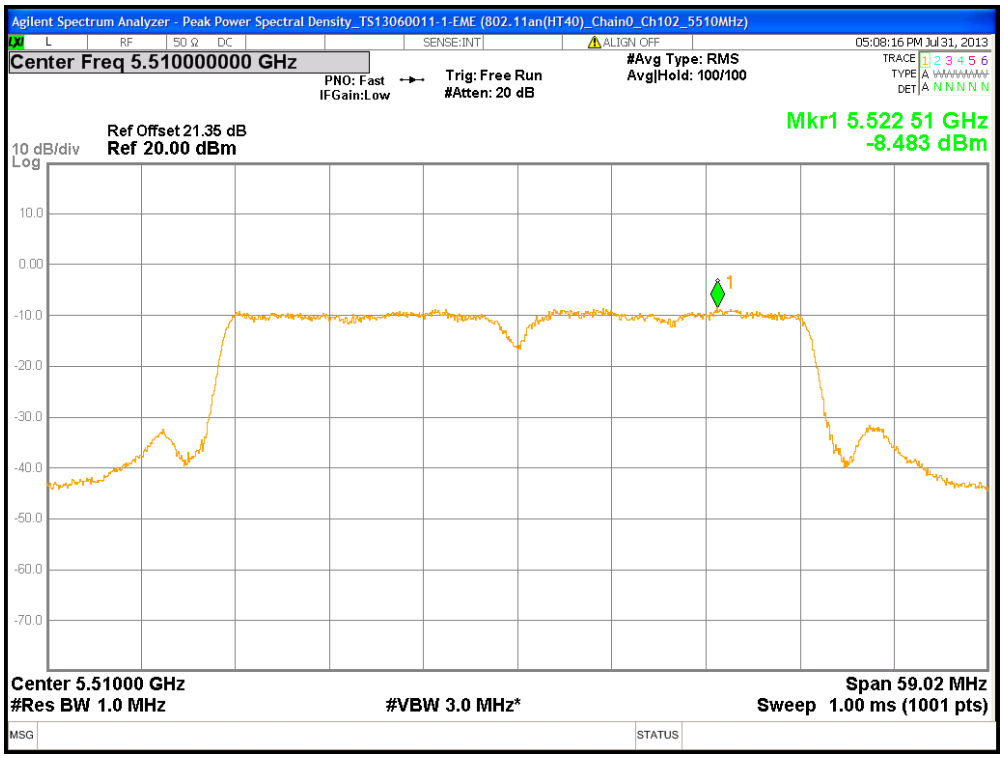
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch54



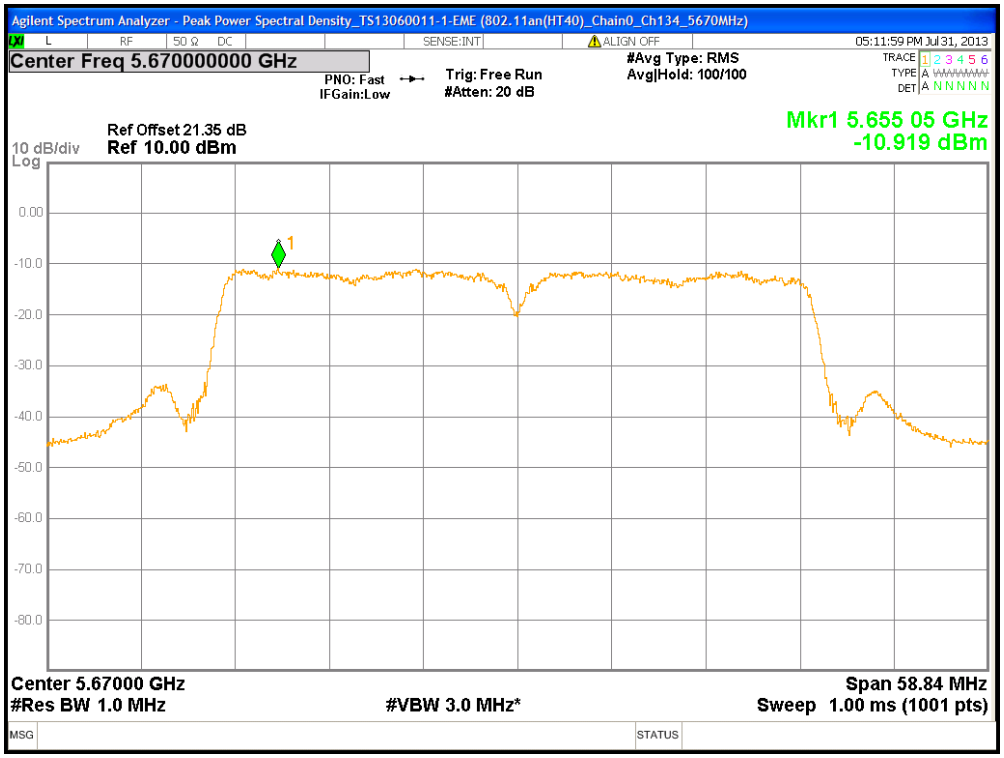
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch62



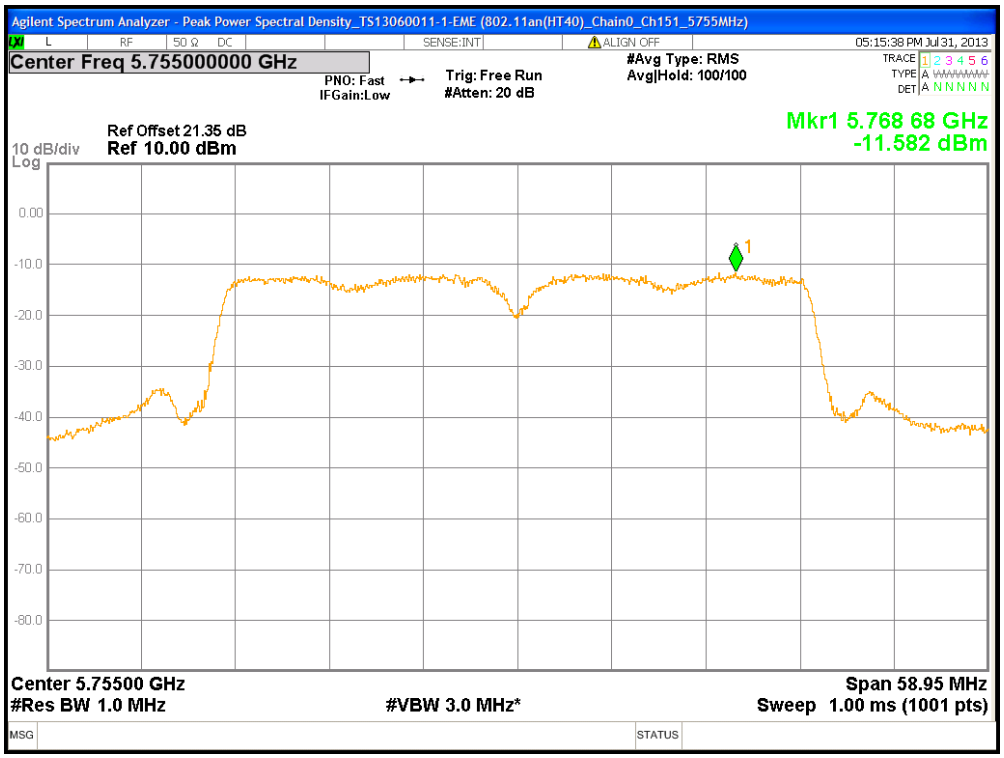
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch102



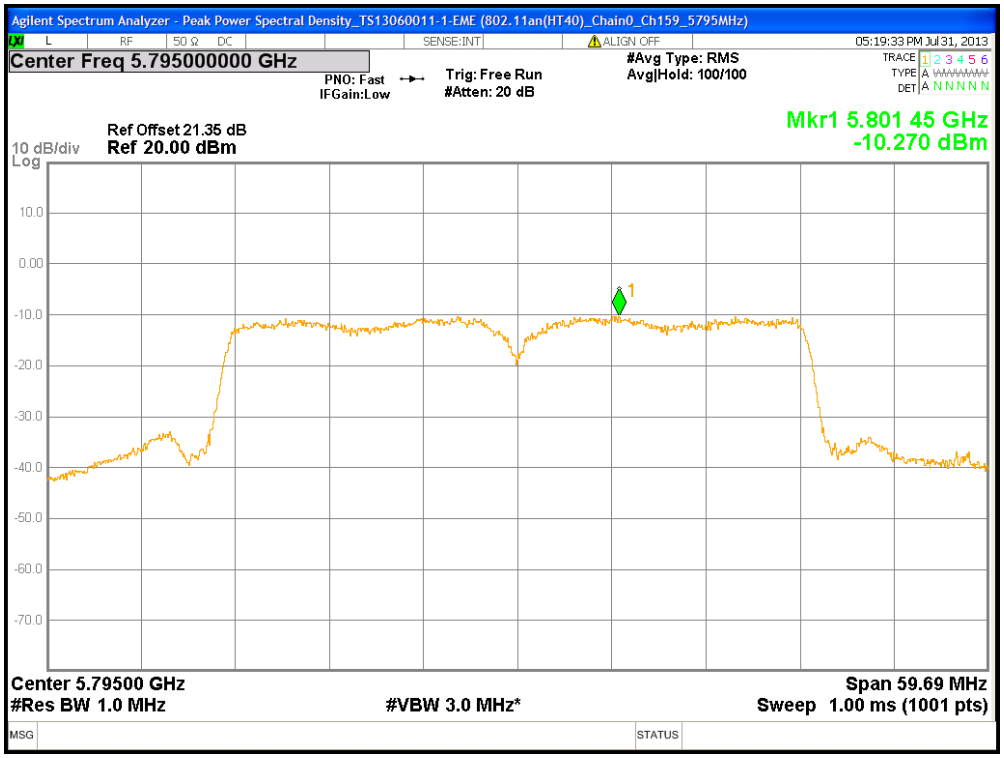
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch134



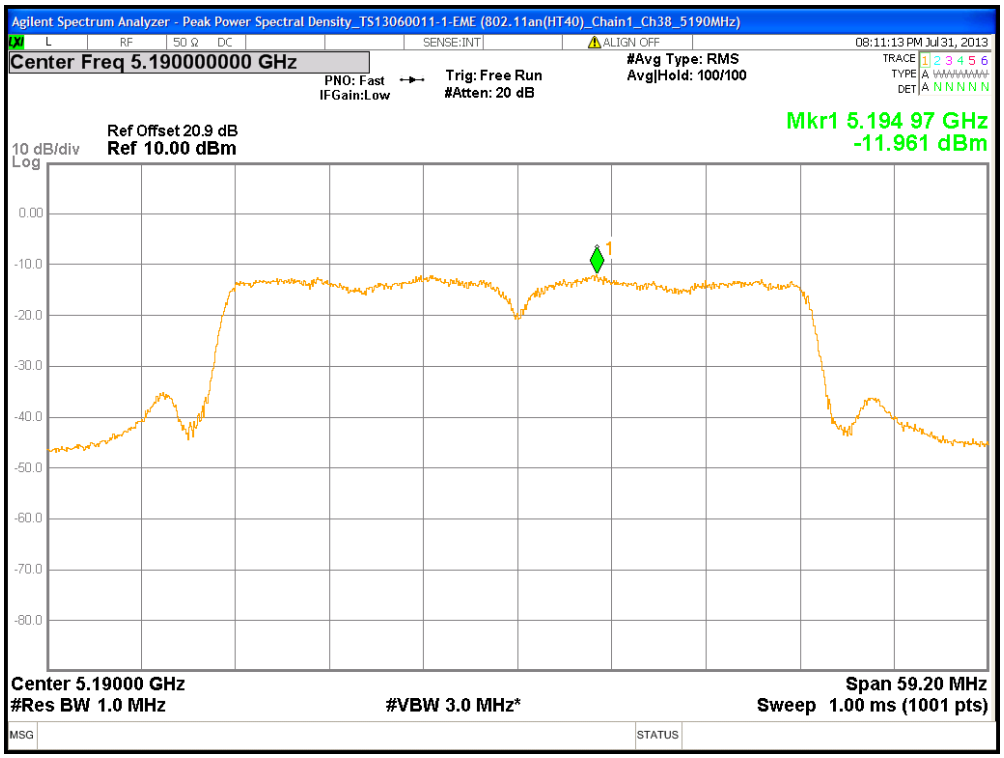
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch151



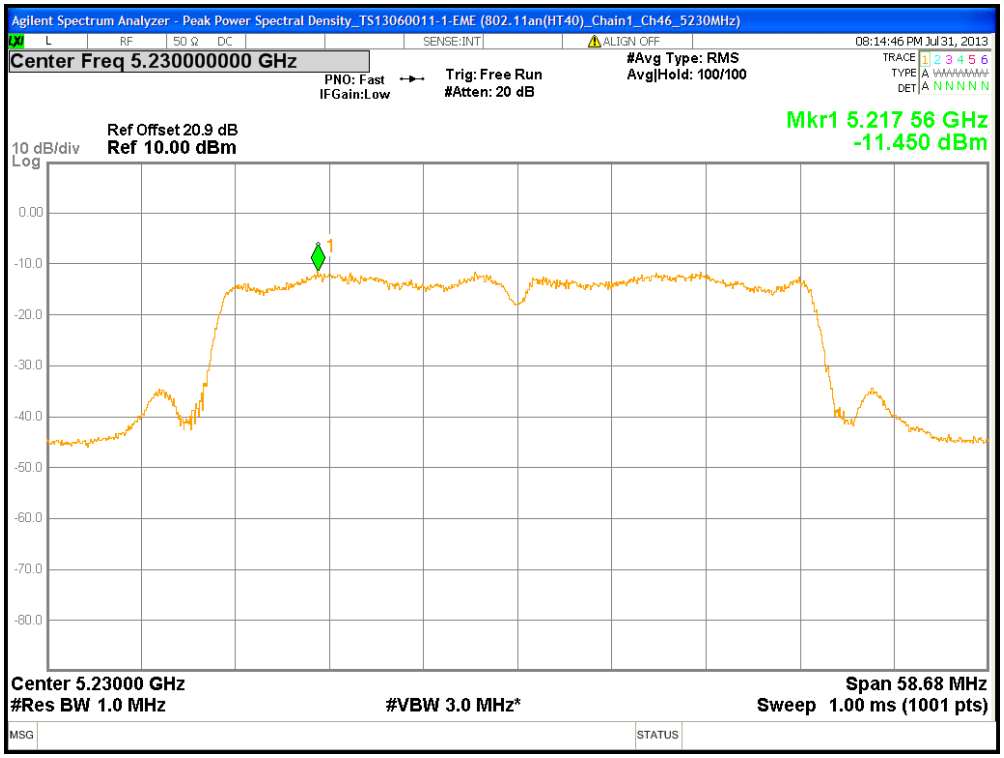
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch159



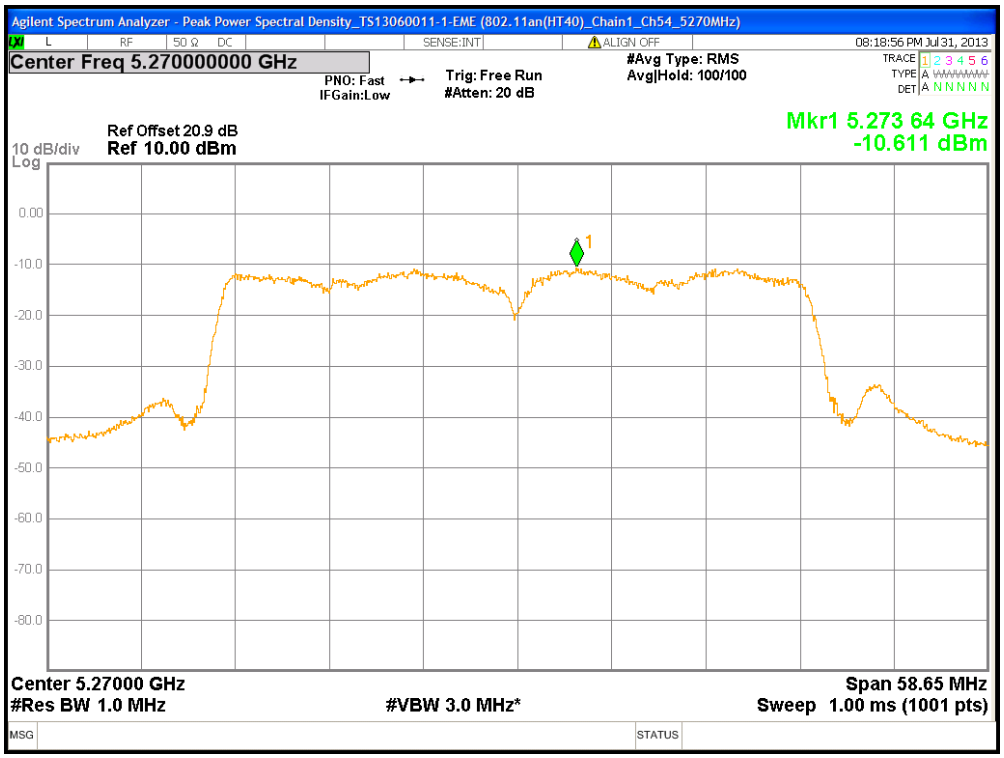
Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch38



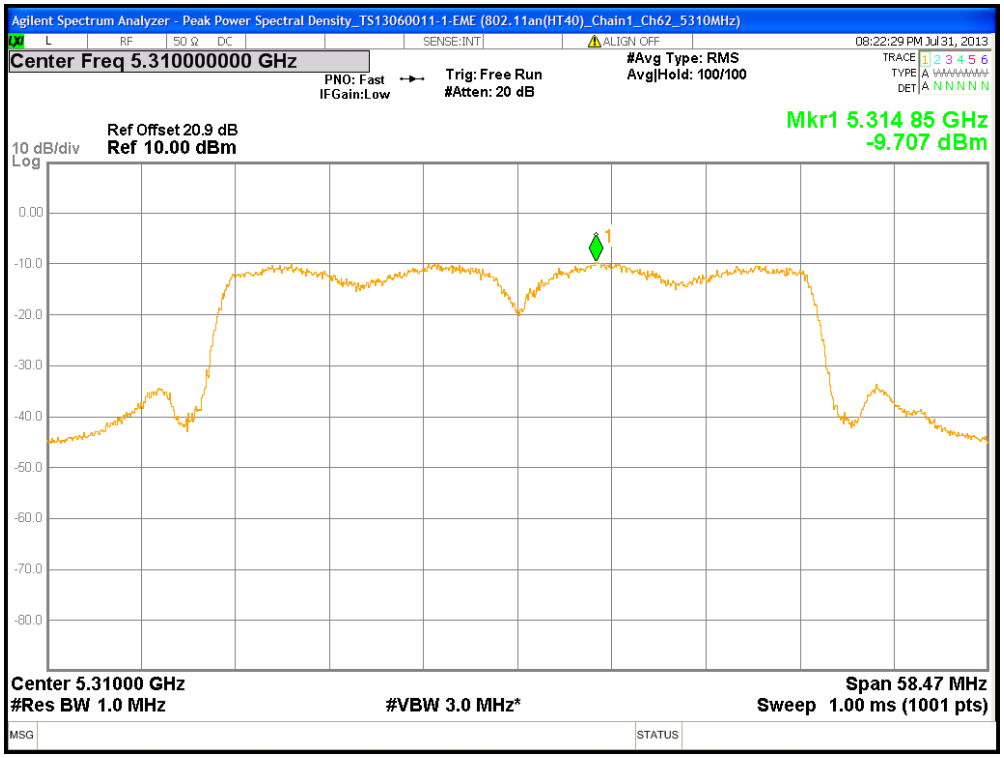
Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch46



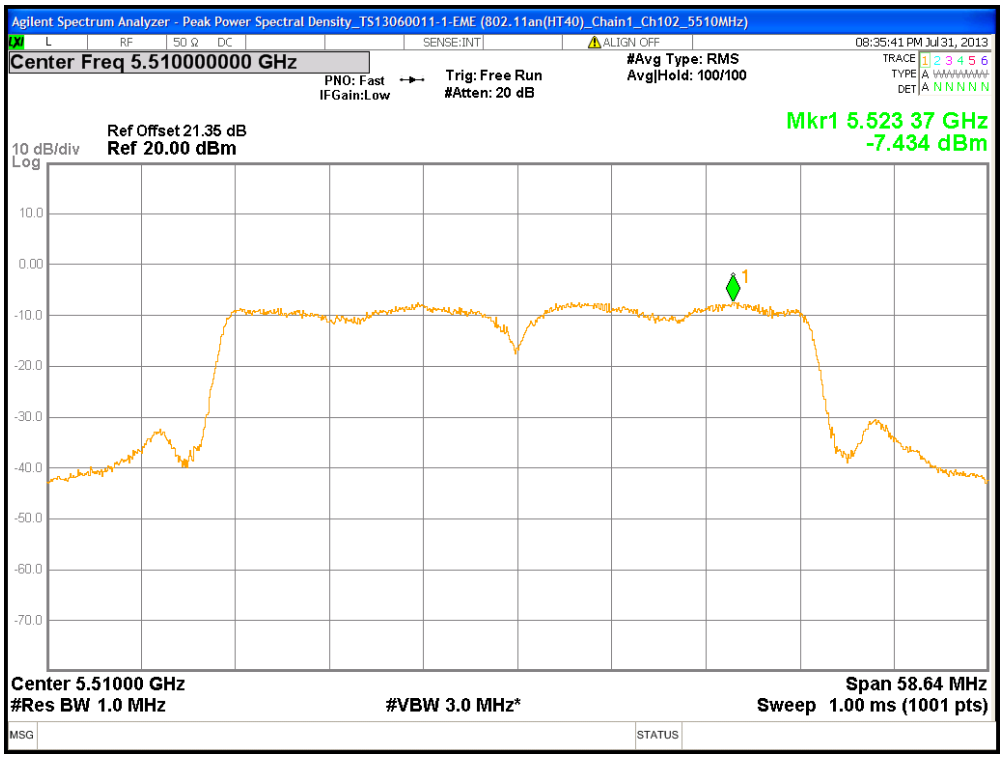
Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch54



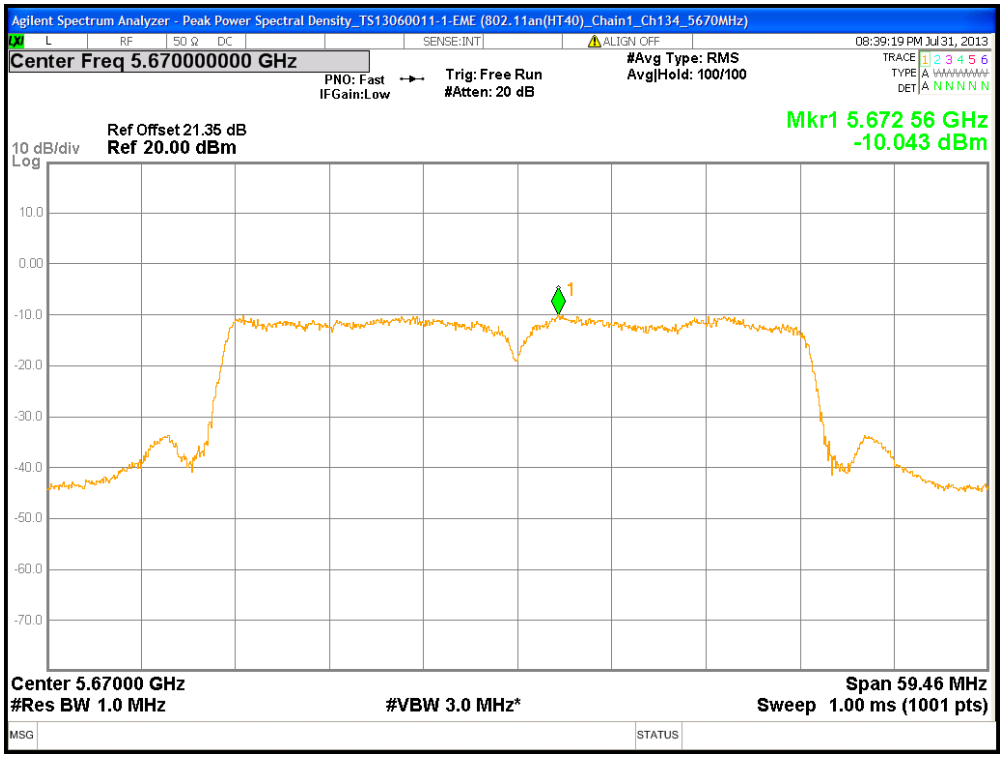
Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch62



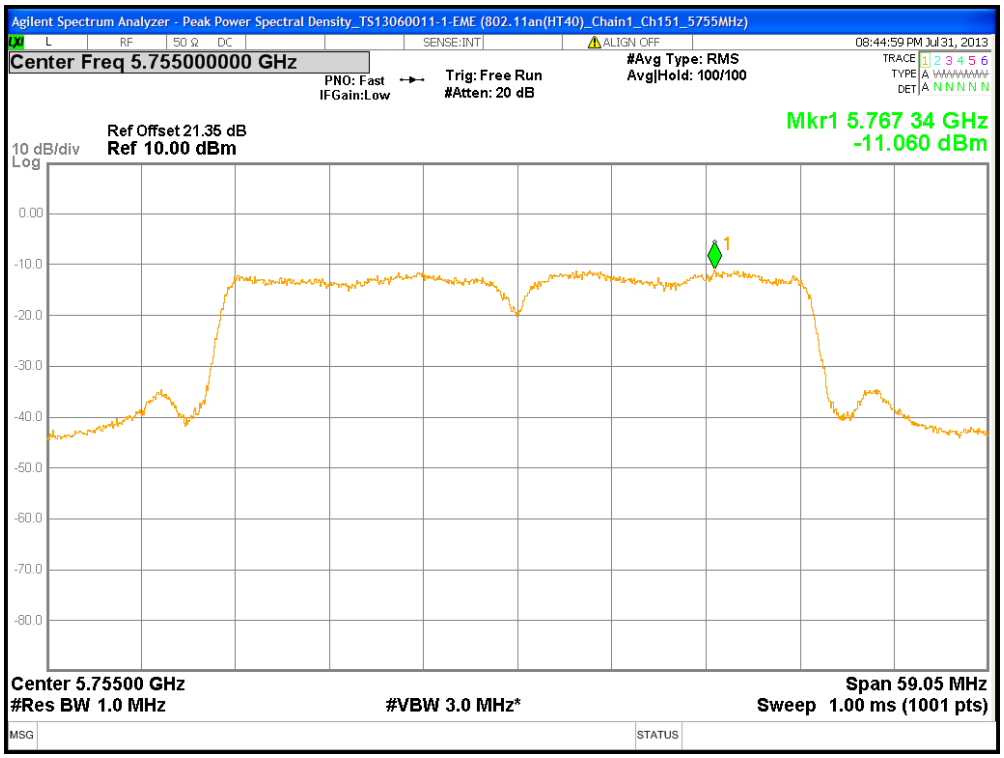
Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch102



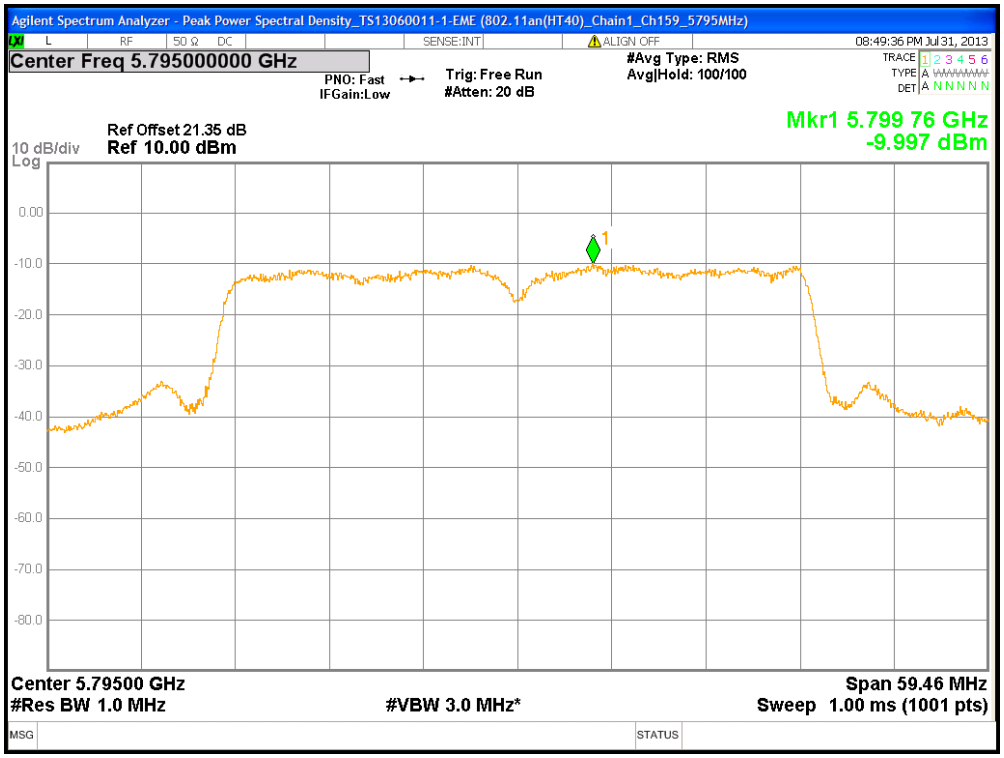
Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch134



Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch151



Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch159



5. Dynamic Frequency Selection (DFS) test

5.1 Operating environment

Temperature:	23	℃
Relative Humidity:	52	%
Atmospheric Pressure	1008	hPa

5.2 UNII Device Description

1. The K110 operates in the following UNII bands:
   a. 5250-5350 MHz
   b. 5470-5725 MHz

2. Operating mode:
   - Client (Slave) EUT: (without radar detection)
     The EUT was defined as the client without radar detection function.
     There are no an “ad-hoc” for this device.

     Associating peripheral:
     The device was set up to associate with the master device (Product name: AP; Brand: 3Com; FCC ID: O9C-WA2620EAGN; Model: H3CWA2610E-AGN).The rated output power of the Client unit is < 23 dBm (EIRP). Therefore the required interference threshold level is -62 dBm.

3. Peripheral equipment:

Peripherals	Brand	Model No.	Serial No.	Description of Data Cable
Notebook PC	DELL	Latitude D610	5YWZK1S	N/A
AP	3Com	H3CWA2610E-AGN	N/A	N/A

4. The maximum EIRP of this device in 5250~5350MHz and 5470~5725MHz is 17.03 dBm at 802.11a chain 1 channel 52; the Minimum EIRP of this device in 5250~5350MHz and 5470~5725MHz is 15.82 dBm at 802.11a chain 0 channel 116. This device doesn’t exceed 27dBm EIRP, so no transmit power control is implemented.

5. Stream the test file from the master device to the client device for IP Based(Load Based) and performed NTIA approved MPEG file (TestFile.mpg), NTIA test file refer as: http://ntiacsd.ntia.doc.gov/dfs/

6. The type of system architecture is IP based , the data rates are 6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps, 54Mbps for 802.11a mode; 6.5 Mbps, 13 Mbps, 19.5 Mbps, 26 Mbps, 39 Mbps, 52 Mbps, 58.5 Mbps, 65Mbps for 802.11n HT20 mode and 13.5 Mbps, 27 Mbps, 40.5 Mbps, 54 Mbps, 81 Mbps, 108 Mbps, 121.5 Mbps, 135 Mbps for 802.11n HT40 mode; the U-NII Channel bandwidths are 20MHz for 802.11a mode, 20MHz for 802.11n HT20 mode and 40MHz for 802.11n HT40 mode.

7. Information regarding the parameters of the detected Radar Waveforms is not available to the end user.

5.2.1 Operating mode

Performance was measured at an active frequency of 5320 MHz and 5510 MHz, and the radar signal was centered at 5320 MHz and 5510 MHz.
Tablet is connected to the AP via a conducted RF connection. A separated laptop PC is used as a host computer to change AP's channel. The AP transmit output levels are set to normal operating condition.
System architectures were used under IP based mode.

5.3 Test Protocol and Requirements

For a Master Device, the DFS conformance requirements will be verified utilizing one short pulse radar type. Additionally, the Channel Move Time and Channel Closing Transmission Time requirements will be verified utilizing the long pulse radar type. The statistical performance check will be verified utilizing all radar type.

For a Client Device without DFS, the channel move time and channel closing transmission time requirements will be verified with one short pulse radar type.

For testing a Client Device with In-Service Monitoring, two configurations must be tested.

a. The Client Device detects the radar waveform:
   The channel move time and channel closing transmission time requirements will be verified utilizing short pulse radar type and the long pulse radar type. The statistical performance check will be verified utilizing all radar types.
b. The Master Device detects the radar waveform:
   The channel move time and channel closing transmission time requirements will be verified utilizing short pulse radar type.

A UNII network will employ a DFS function to:
- detect signals from radar systems and to avoid co-channel operation with these systems
- provide on aggregate a Uniform Spreading of the Operating Channels across the entire band. This applies to the 5250-5350 MHz and/ or 5470-5725 MHz bands.

Within the context of the operation of the DFS function, a UNII device will operate in either Master Mode or Client Mode. UNII devices operating in Client Mode can only operate in a network controlled by a UNII device operating in Master Mode.
The tables as below summarize the information contained.

Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required
UNII Detection Bandwidth	Yes	Not required	Yes

Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
UNII Detection Bandwidth	Yes	Not required	Yes

5.4 DFS Detection Thresholds and Limitations of each Parameter

Maximum Transmit Power	Value (See Notes 1 and 2)
≧ 200 mW	-64 dBm
≦ 200 mW	-62 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.
Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Parameter	Value
Non-occupancy Period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds (See Note 1)
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period (See Note 1 and 2)
UNII Detection Bandwidth	Minimum 80% of the UNII 99% transmission power bandwidth. (See Note 3)

Note 1: The instant that the Channel Move Time and the Channel Closing Transmission Time begins is as follows:
- For the Short Pulse Radar Test Signals this instant is the end of the Burst.
- For the Frequency Hopping radar Test Signal, this instant is the end of the last radar Burst generated.
- For the Long Pulse Radar Test Signal this instant is the end of the 12 second period defining the Radar Waveform.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
Note 3: During the U-NII Detection Bandwidth detection test, radar type 1 is used and for each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

5.5 Radar Test Waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Type 2 through 4. For Short Pulse Radar Type 1, the same waveform is used a minimum of 30 times. If more than 30 waveforms are used for Short Pulse Radar Type 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms.

The aggregate is the average of the percentage of successful detections of Short Pulse Radar Type 1-4.

Long Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms.

Each waveform is defined as follows:

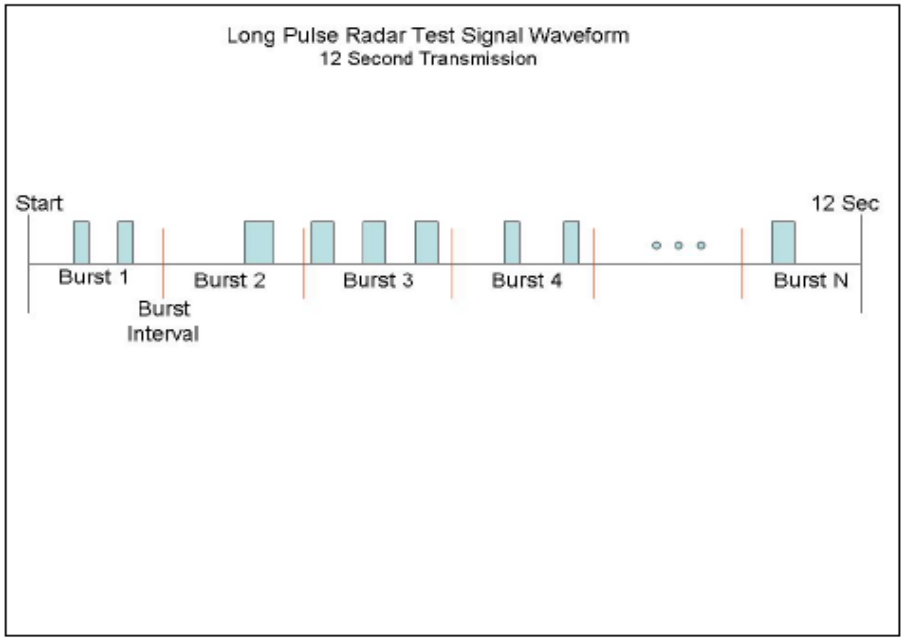
1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst_Count.
3) Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.
4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.
5) Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a Burst will have the same chirp width. Pulses in different Bursts may have different chirp widths. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
6) If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the time between the first and second pulses is chosen independently of the time between the second and third pulses.
7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst_Count. Each interval is of length (12,000,000 / Burst_Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12,000,000 / Burst_Count) – (Total Burst Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

A representative example of a Long Pulse radar test waveform:

1) The total test signal length is 12 seconds.
2) 8 Bursts are randomly generated for the Burst_Count.
3) Burst 1 has 2 randomly generated pulses.
4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.

5) The PRI is randomly selected to be at 1213 microseconds.
6) Bursts 2 through 8 are generated using steps 3 – 5.
7) Each Burst is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, Burst 1 is randomly generated (1 to 1,500,000 minus the total Burst 1 length + 1 random PRI interval) at the 325,001 microsecond step. Bursts 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. Burst 2 falls in the 1,500,001 – 3,000,000 microsecond range).

Graphical Representation of a Long Pulse radar Test Waveform



Frequency Hopping Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform.

The hopping sequence is different for each waveform and a 100-length segment is selected1 from the hopping sequence defined by the following algorithm:

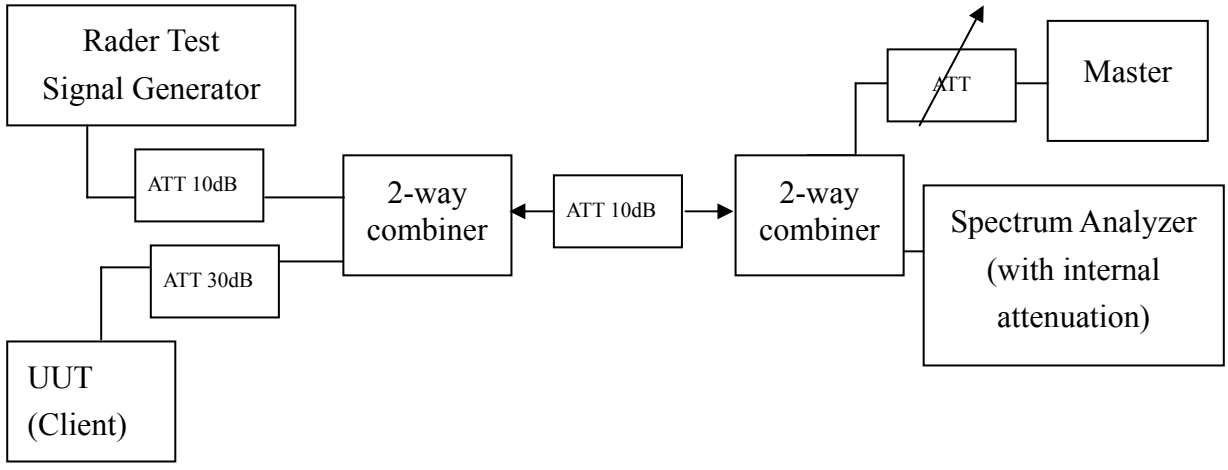
The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

5.6 Radar Waveform Calibration

The following equipment setup was used to calibrate the conducted radar waveform. A spectrum analyzer is used to establish the test signal level for each radar type. During this process, there were no transmissions by either Master or Client device. The spectrum analyzer was switched to the zero span (time domain) mode ate the frequency of the radar waveform generator. The peak detection was utilized. The spectrum analyzer RBW and VBW were set to at least 3MHz.
The signal generator amplitude and/ or step attenuators were set so that the power level measured at the spectrum analyzer was equal to the DFS detection threshold that is required for the tests.

The signal generator amplitude was set so that the power level measured at the spectrum analyzer was -63 dBm.

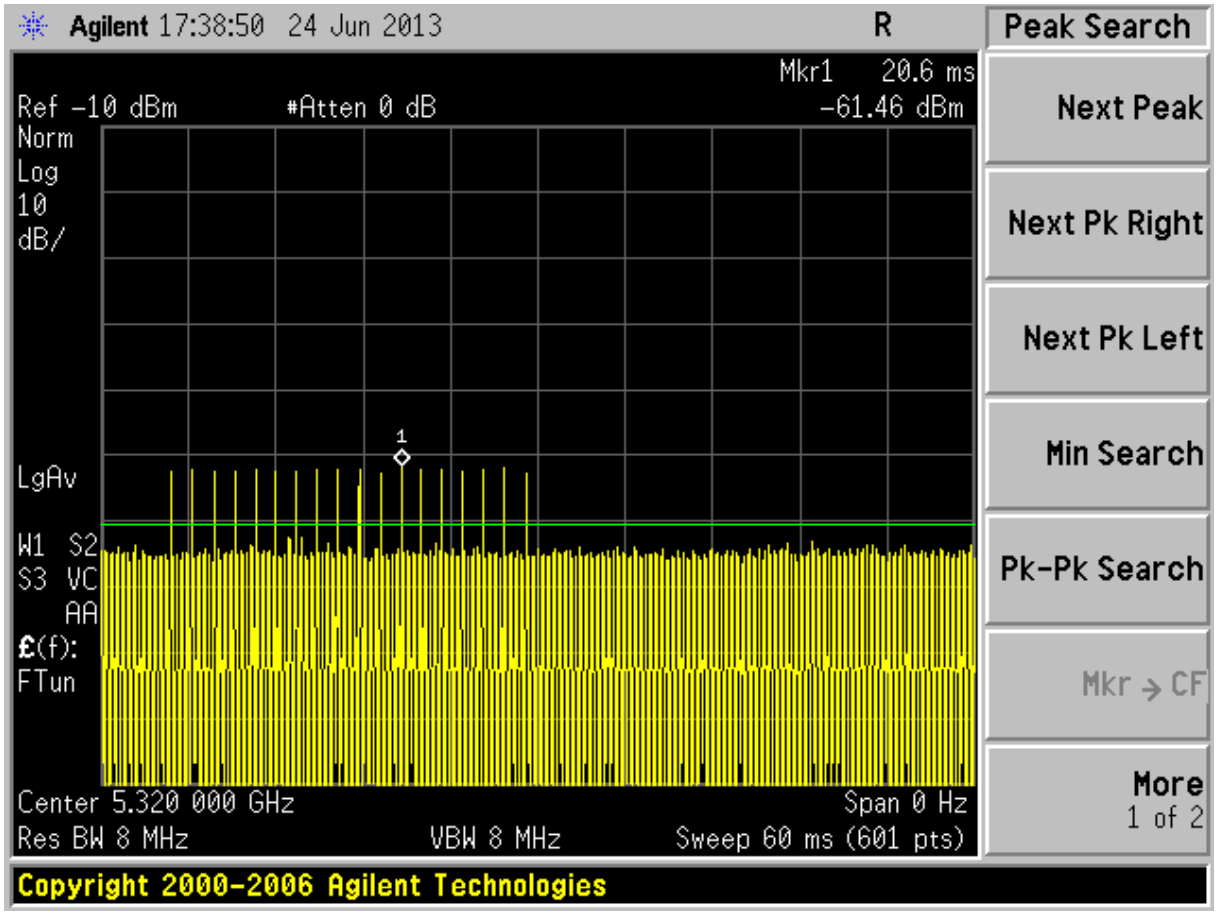
Conducted calibrated setup diagram:



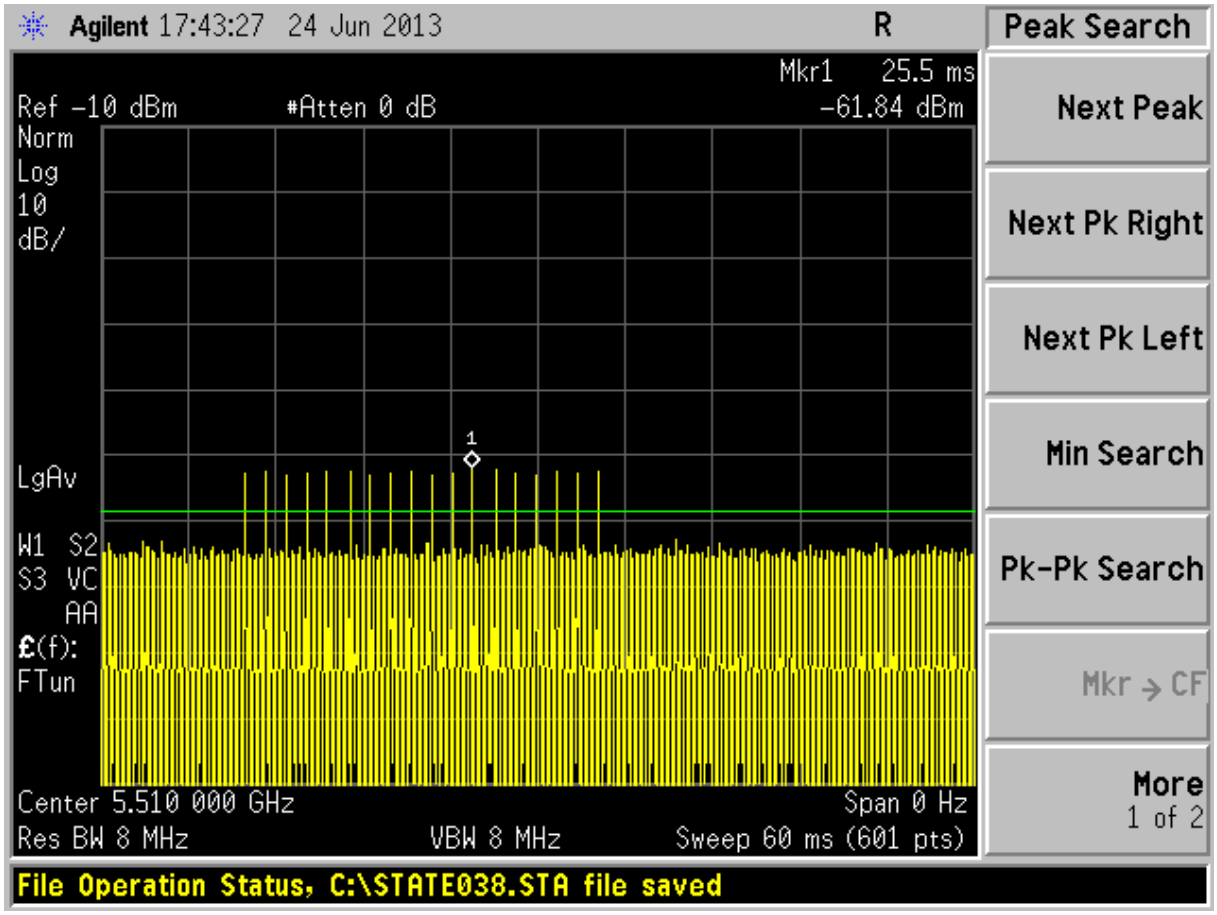
5.6.1 Radar Waveform Calibration Plots

The following are the calibration plots for radar waveform of testing required.

Rader Type 1 (5320 MHz)



Rader Type 1 (5510 MHz)



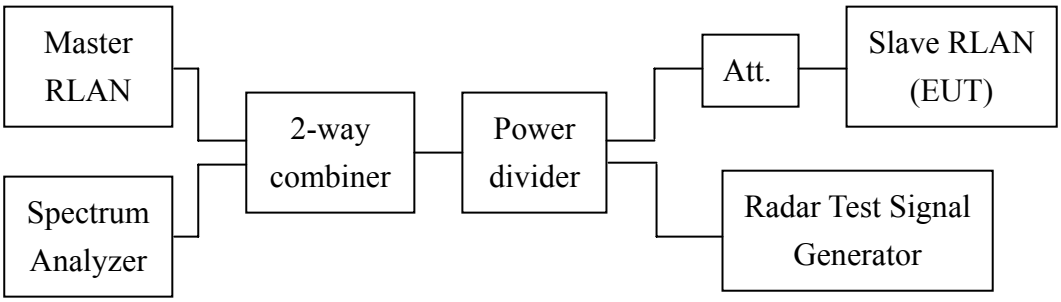
5.7 Test instruments and setup

5.7.1 Deviation about the radar waveform

No deviation.

5.7.2 Test setup

Setup for Client with injection at the Master (Client Mode without DFS detection)



5.8 DFS test results

5.8.1 Test summary

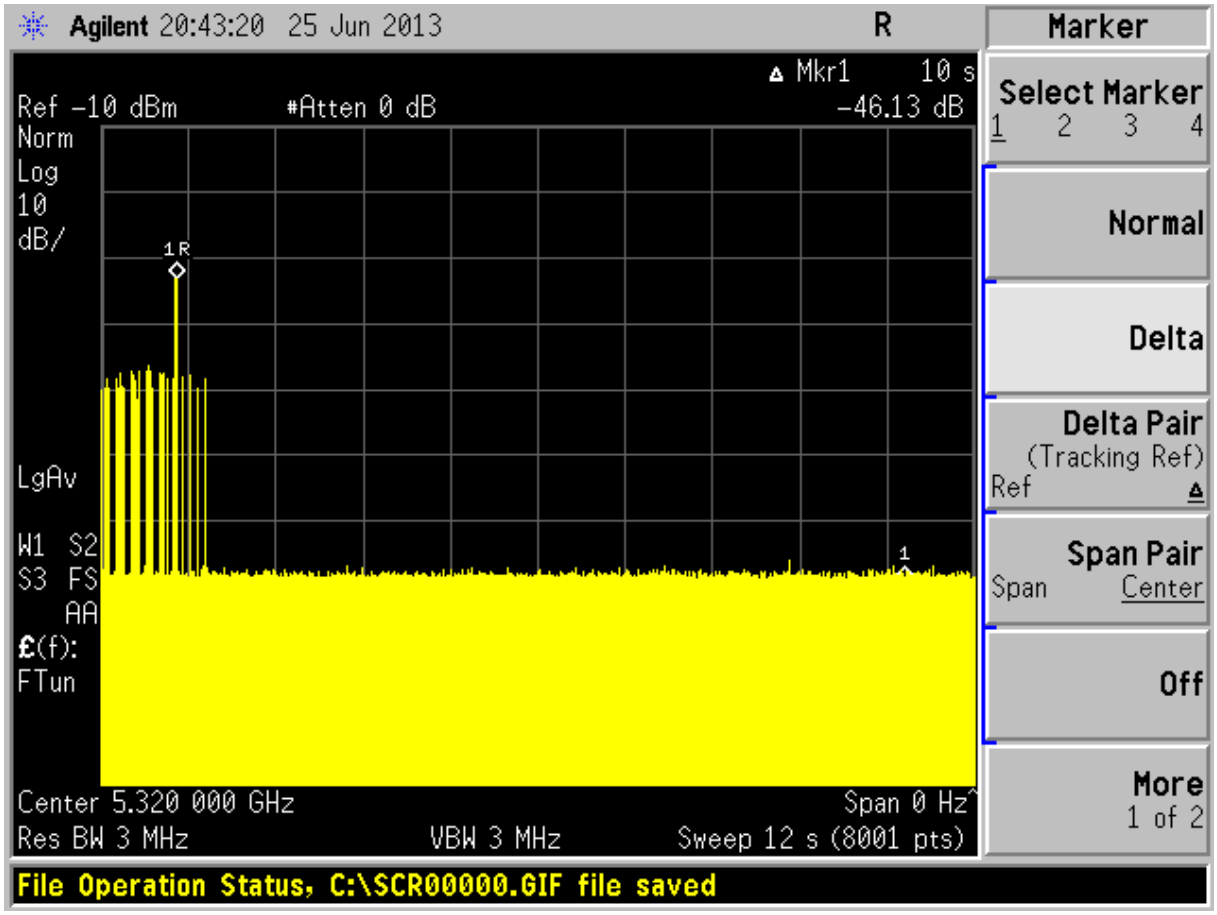
This EUT was defined as the Client without DFS detection.

Clause	Parameter	Required	Pass/ Fail
A9.3	DFS Detection Threshold	Not Required	N/A
A9.3	Channel Availability Check Time	Not Required	N/A
A9.3	Channel Move Time	Applicable	Pass
A9.3	Channel Closing Transmission Time	Applicable	Pass
A9.3	Non-Occupancy Period	Applicable	Pass
A9.3	Uniform Spreading	Not Required	N/A
A9.3	UNII Detection Bandwidth	Not Required	N/A

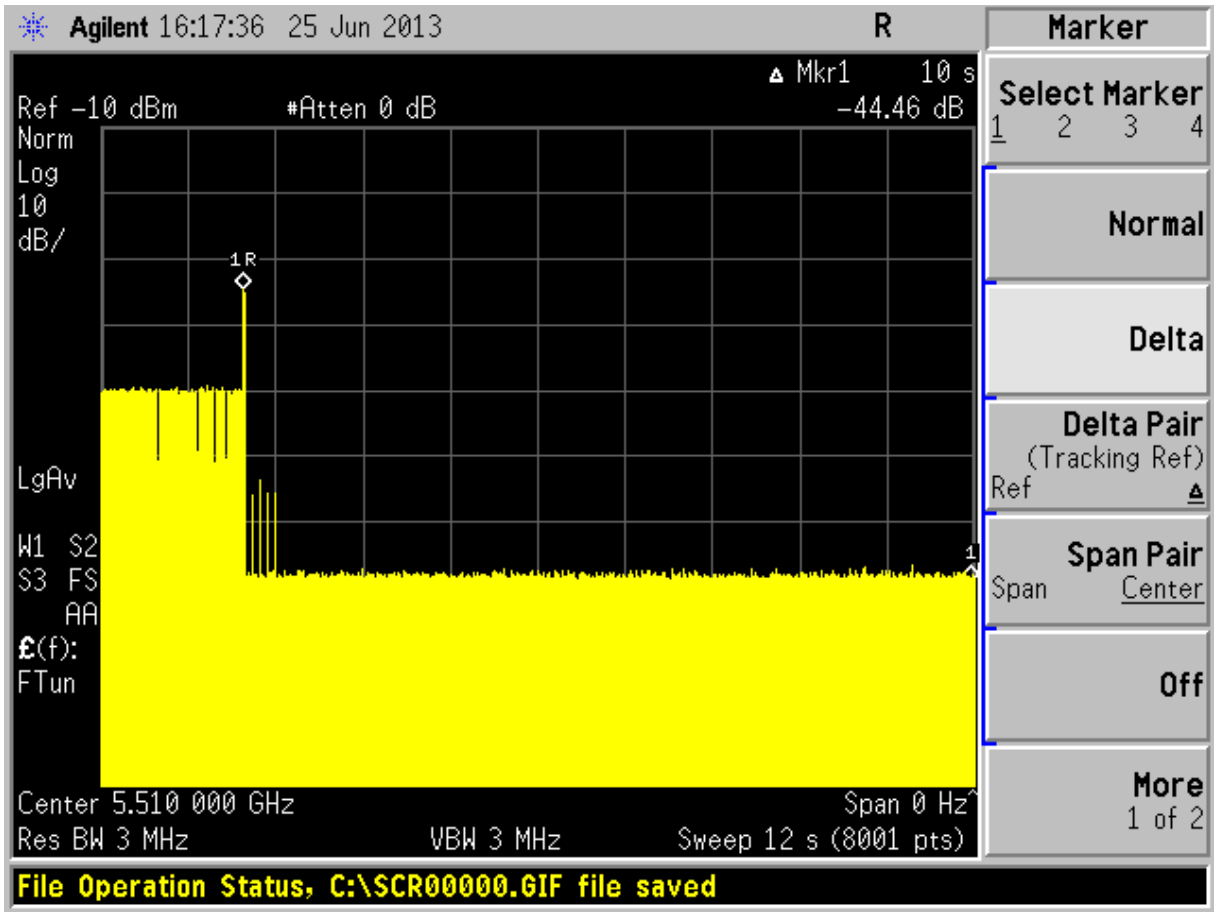
5.8.2 DFS test result

5.8.2.1 Channel Move time

Rader Type 1 (5320 MHz)

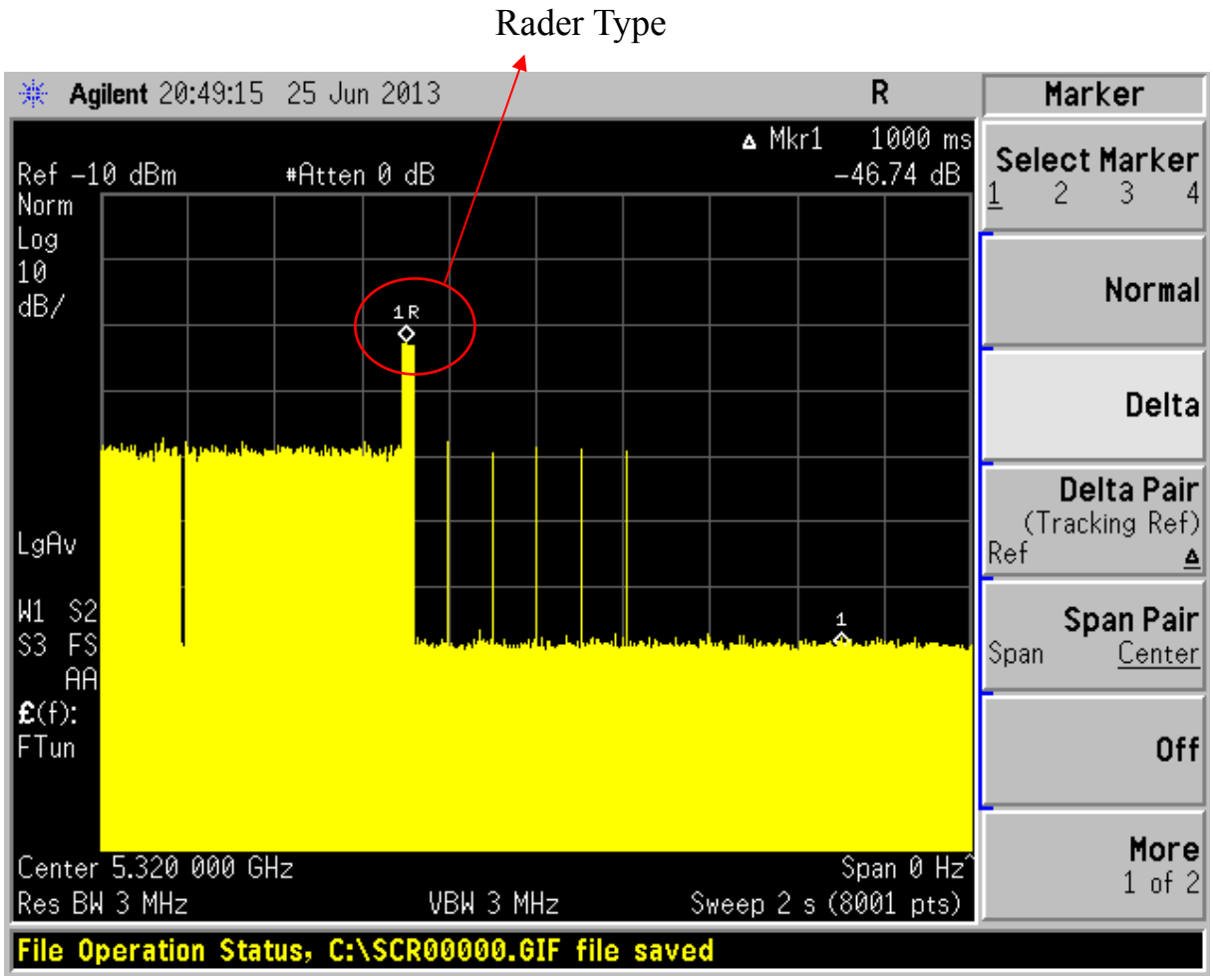


Rader Type 1 (5510 MHz)

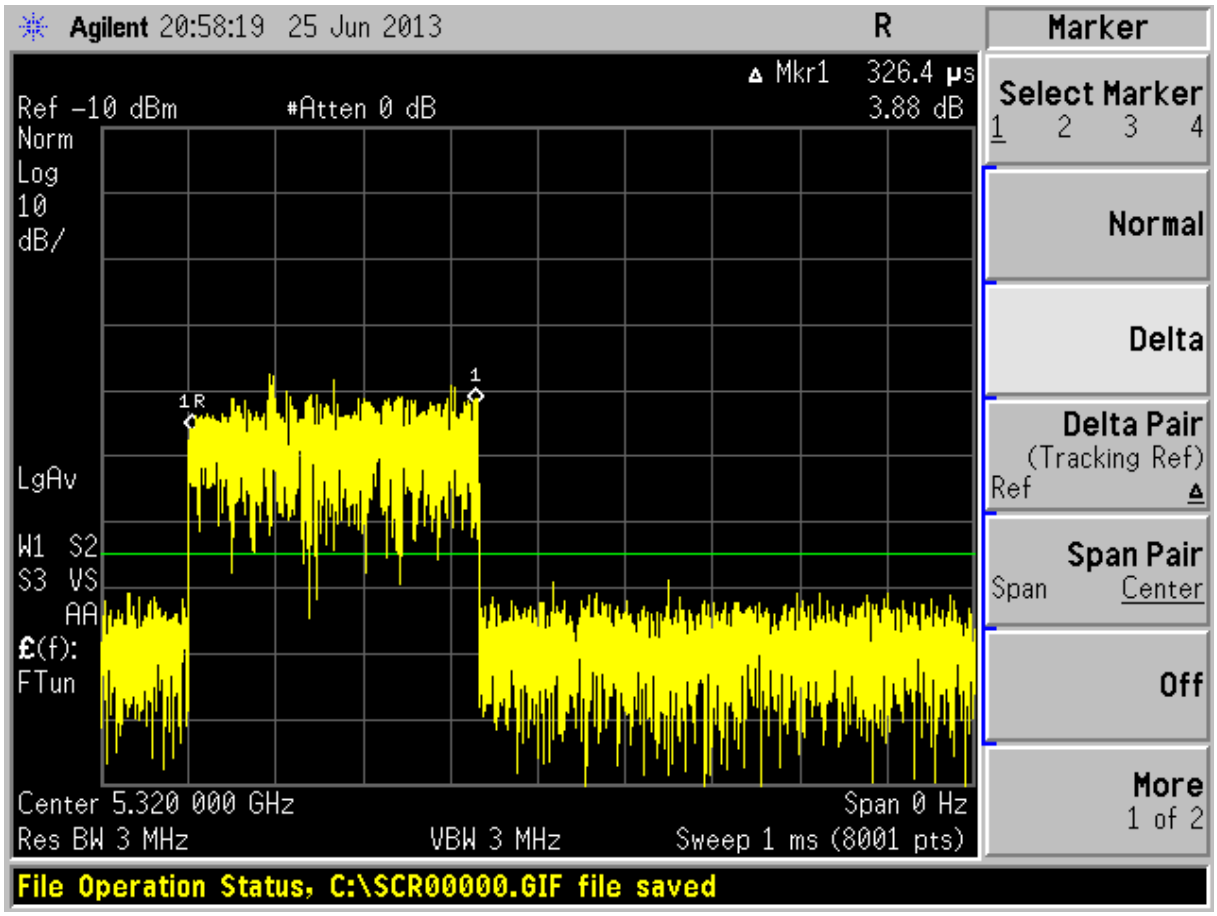


5.8.2.2 Channel Closing Transmission Time

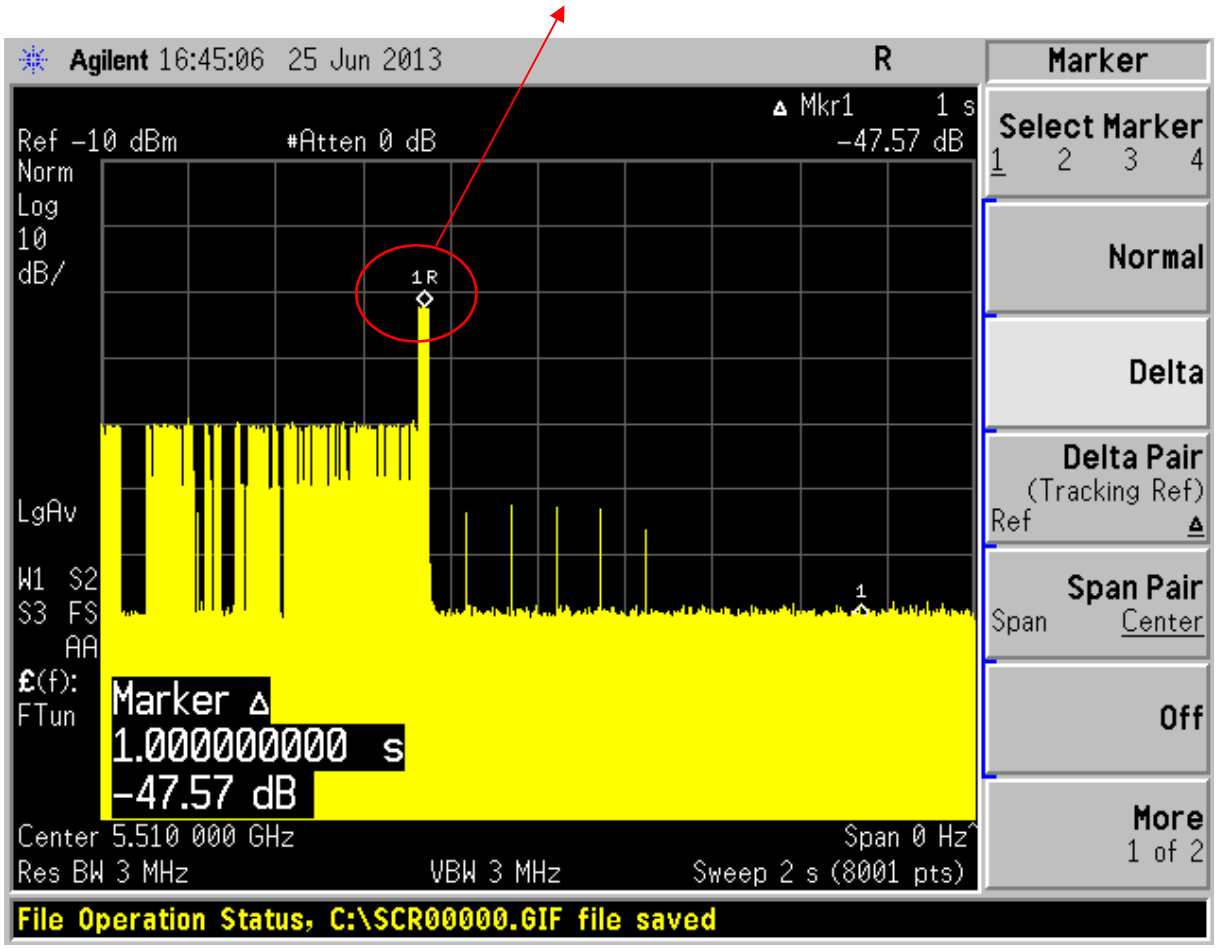
Rader Type 1 (5320 MHz) Part 1



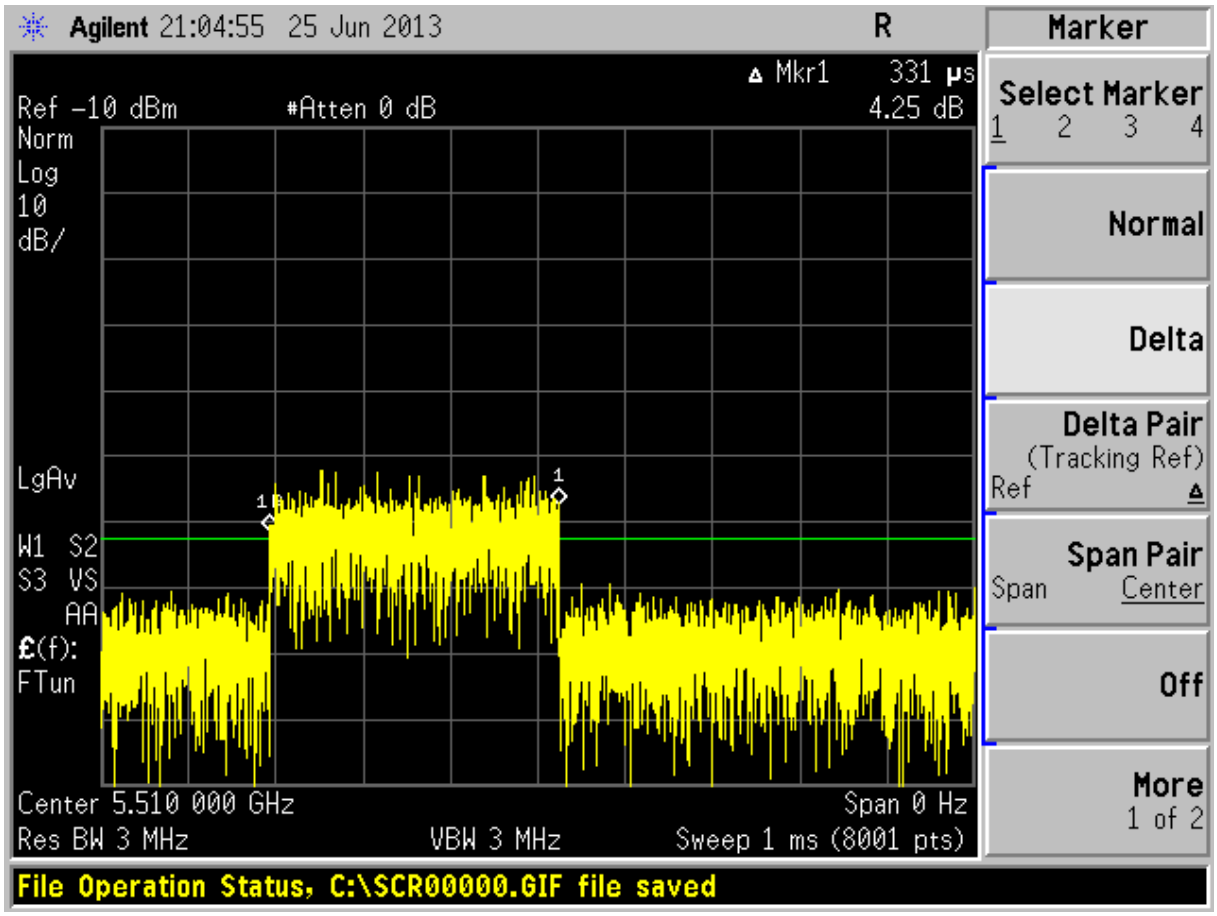
Rader Type 1 (5320 MHz) Part 2



Rader Type 1 (5510 MHz) Part 1



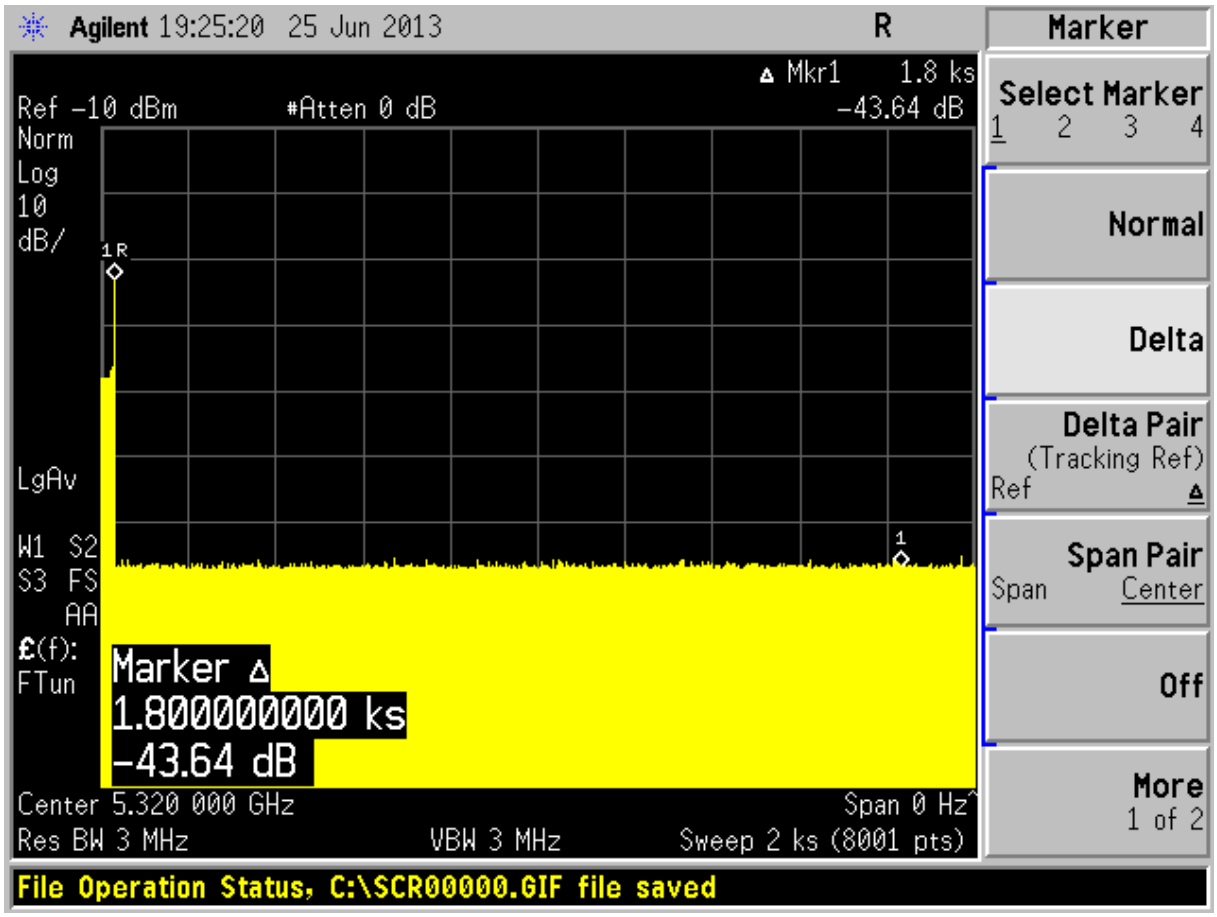
Rader Type 1 (5510 MHz) Part 2



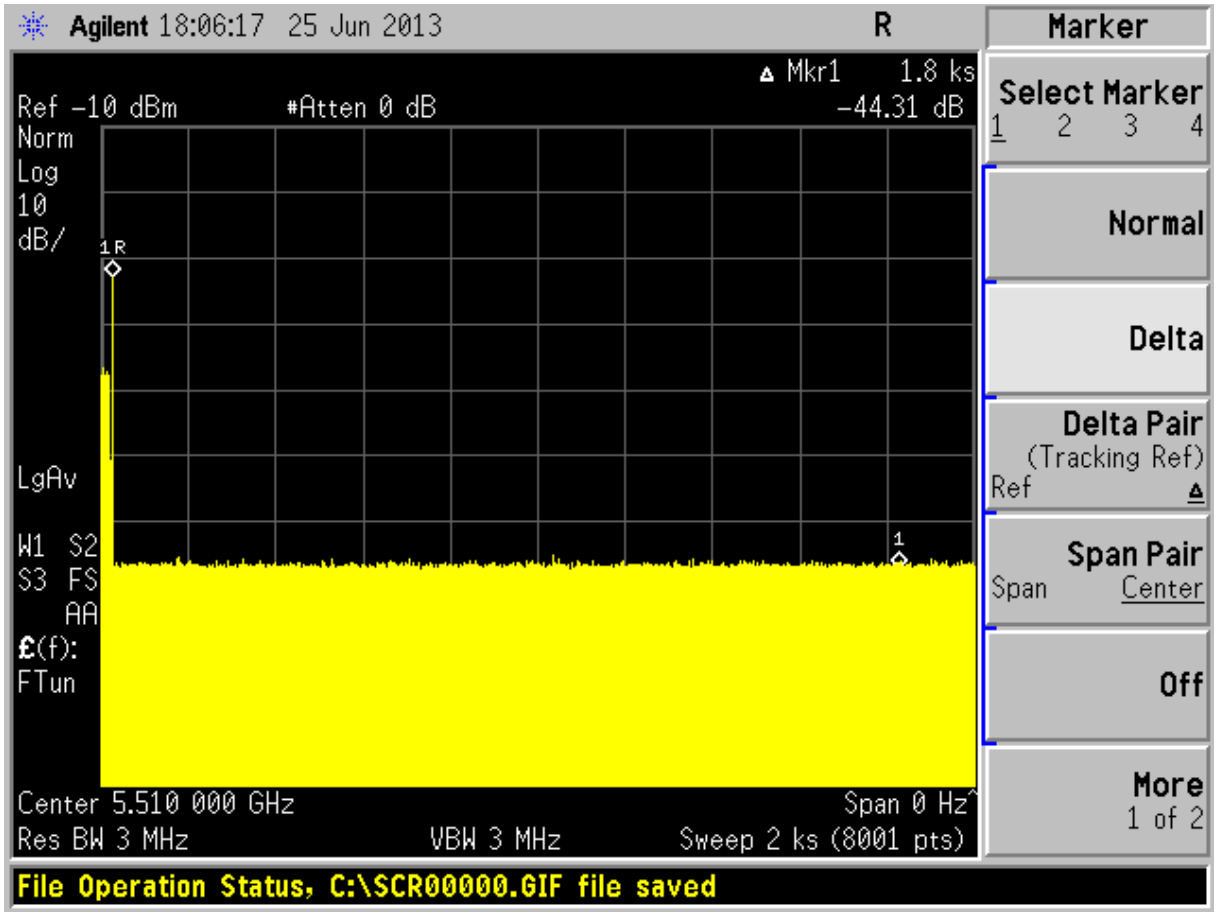
5.8.2.3 Non-Occupancy Period

No transmissions were observed on the previously active channel during 30 minutes observation time for the EUT.

5320 MHz



5510 MHz


Agilent 18:06:17 25 Jun 2013
R
Marker
Mkr1 1.8 ks
Ref -10 dBm
#Atten 0 dB
-44.31 dB
Norm
Log
10
dB/
1R
LgAv
W1 S2
S3 FS
AA
£(f):
FTun
1
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
Center 5.510 000 GHz
Span 0 Hz
Res BW 3 MHz
VBW 3 MHz
Sweep 2 ks (8001 pts)
File Operation Status, C:\SCR00000.GIF file saved

6. Peak excursion to average ratio test (FCC 15.407)

6.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1023	hPa

6.2 Test setup & procedure

The power spectrum density per FCC §15.407(a)(6) was measured from the antenna port of the EUT. Using a 50ohm spectrum analyzer with the RBW=1MHz, VBW=3MHz for peak measurement and RBW=1MHz, VBW=10kHz for average measurement. Peak excursion to average ratio was read directly.

6.3 Limitation

Operating Frequency (MHz)	Peak excursion to average ratio limit
5150~5250	<13dB
5250~5350, 5470~5725	<13dB
5725~5825	<13dB

6.4 Measured data of Peak excursion to average ratio test results

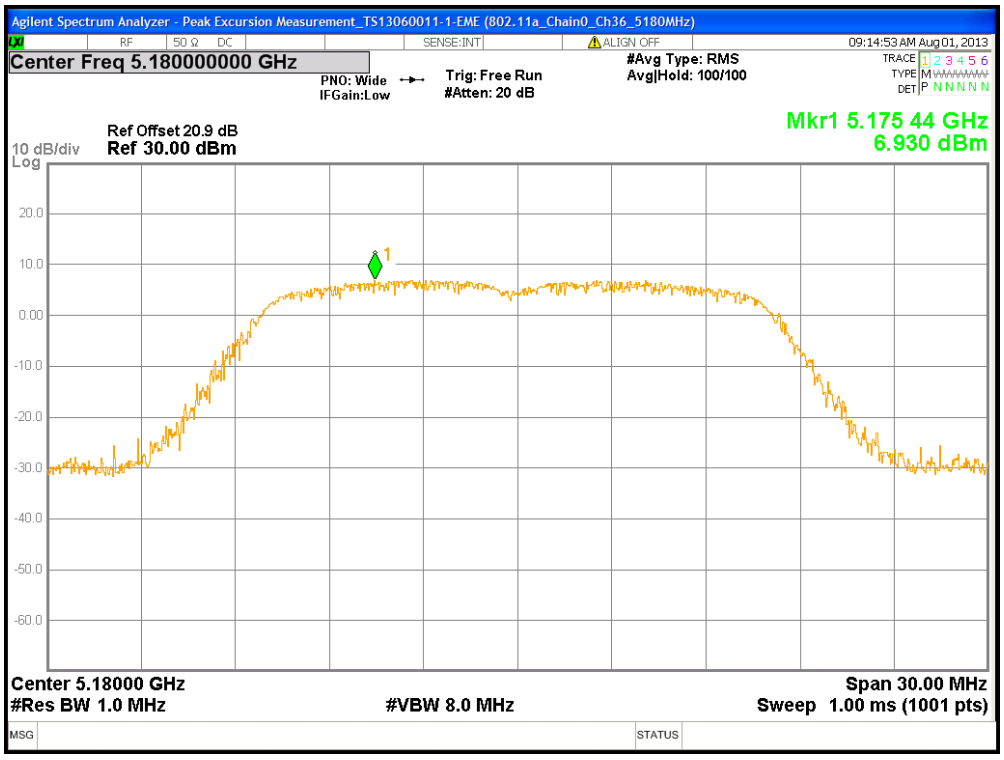
Single Tx

Mode	Channel	Frequency (MHz)	Data rate Mbps	PK Excursion (dBm)	Limit (dBm)	Reault	Margin(dB)
802.11a Chain0	36	5180	6	7.8060	13	PASS	-5.194
	40	5200		9.2720	13	PASS	-3.728
	48	5240		8.3190	13	PASS	-4.681
	52	5260		8.8970	13	PASS	-4.103
	60	5300		8.2720	13	PASS	-4.728
	64	5320		7.9080	13	PASS	-5.092
	100	5500		7.8530	13	PASS	-5.147
	116	5580		8.5780	13	PASS	-4.422
	140	5700		9.0810	13	PASS	-3.919
	149	5745		9.0040	13	PASS	-3.996
	157	5785		8.1670	13	PASS	-4.833
	161	5805		9.4430	13	PASS	-3.557
802.11a Chain1	36	5180	6	7.8700	13	PASS	-5.13
	40	5200		8.4710	13	PASS	-4.529
	48	5240		8.4880	13	PASS	-4.512
	52	5260		7.4740	13	PASS	-5.526
	60	5300		7.8600	13	PASS	-5.14
	64	5320		7.7750	13	PASS	-5.225
	100	5500		7.9570	13	PASS	-5.043
	116	5580		7.4630	13	PASS	-5.537
	140	5700		8.4220	13	PASS	-4.578
	149	5745		7.6350	13	PASS	-5.365
	157	5785		7.7100	13	PASS	-5.29
	161	5805		8.8630	13	PASS	-4.137

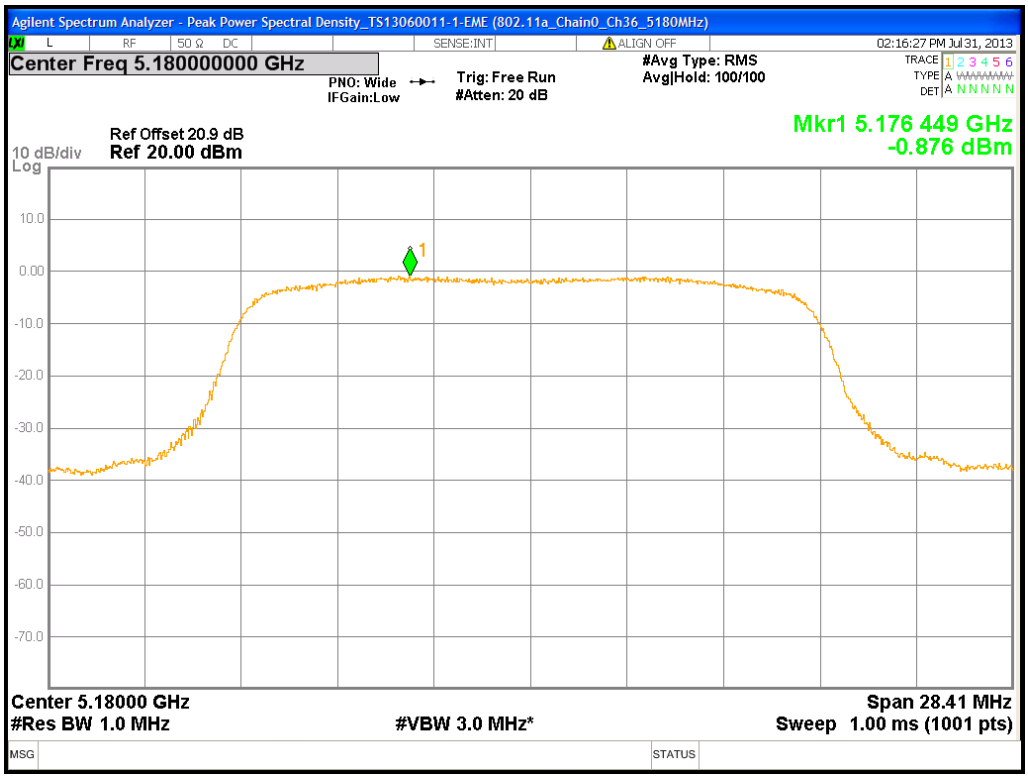
Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	PK Excursion(dB)		Limit (dB)	Margin (dB)	
				Chain0	Chain1			
802.11n (HT 20)	36	5180	6.5	10.6310	10.4310	13	-2.37	-2.57
	40	5200		10.0880	10.8660	13	-2.91	-2.13
	48	5240		10.4330	10.8350	13	-2.57	-2.17
	52	5260		10.3040	10.1980	13	-2.70	-2.80
	60	5300		11.2580	10.5810	13	-1.74	-2.42
	64	5320		10.9140	11.8720	13	-2.09	-1.13
	100	5500		10.4040	10.5160	13	-2.60	-2.48
	116	5580		10.7430	10.1330	13	-2.26	-2.87
	140	5700		10.2240	9.9430	13	-2.78	-3.06
	149	5745		10.9420	9.9970	13	-2.06	-3.00
	157	5785		11.0570	9.9850	13	-1.94	-3.02
	161	5805		10.6520	10.1360	13	-2.35	-2.86
802.11n (HT 40)	38	5190	13	12.7990	10.7810	13	-0.20	-2.22
	46	5230		11.6940	11.2940	13	-1.31	-1.71
	54	5270		11.8800	10.7400	13	-1.12	-2.26
	62	5310		11.5870	10.8210	13	-1.41	-2.18
	102	5510		11.5990	10.6900	13	-1.40	-2.31
	134	5670		11.7300	11.3770	13	-1.27	-1.62
	151	5755		10.7600	11.3280	13	-2.24	-1.67
	159	5795		11.1810	12.3990	13	-1.82	-0.60

Please see the plot below (Unless otherwise specified, only present 802.11a ch36,802.11an HT20 ch36 and 802.11an HT40 ch38 plots as typical representative).

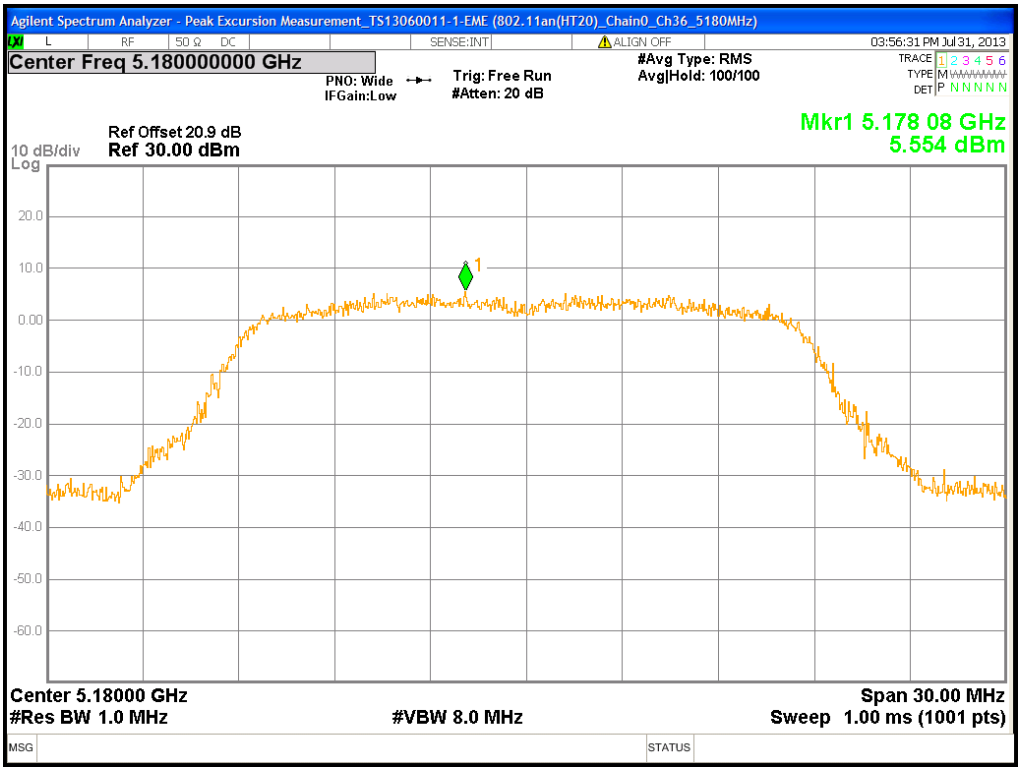
Chain0 : Peak Excursion Measurement @ 802.11a Mode Ch36



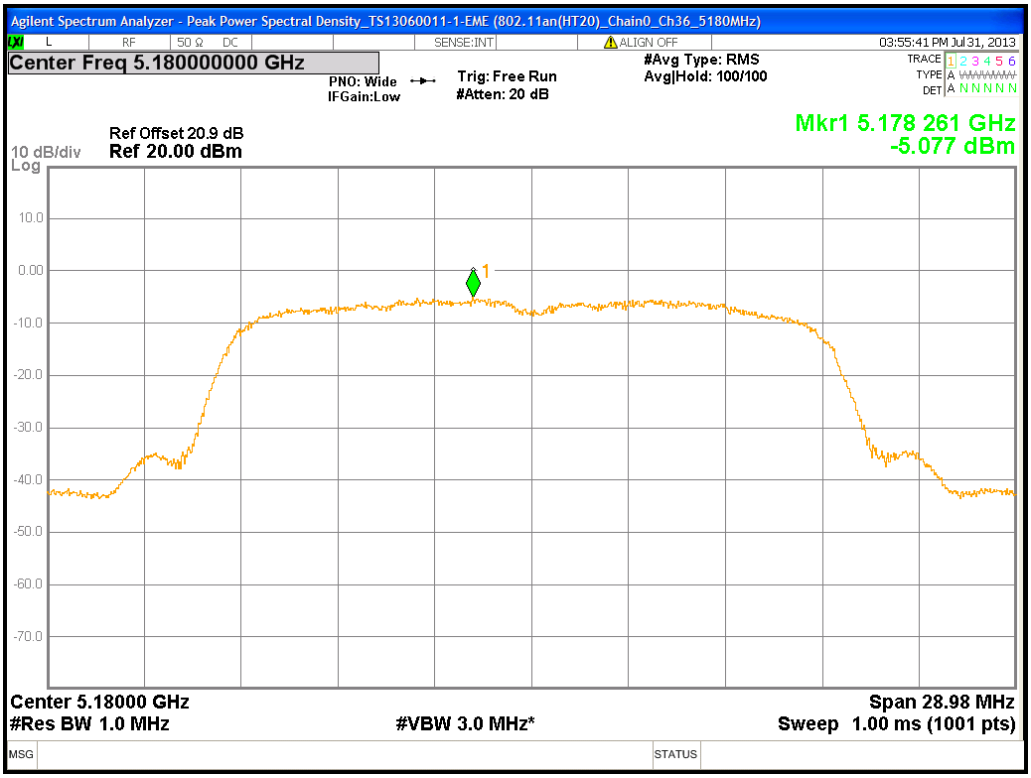
Chain0 : AV Excursion Measurement @ 802.11a Mode Ch36



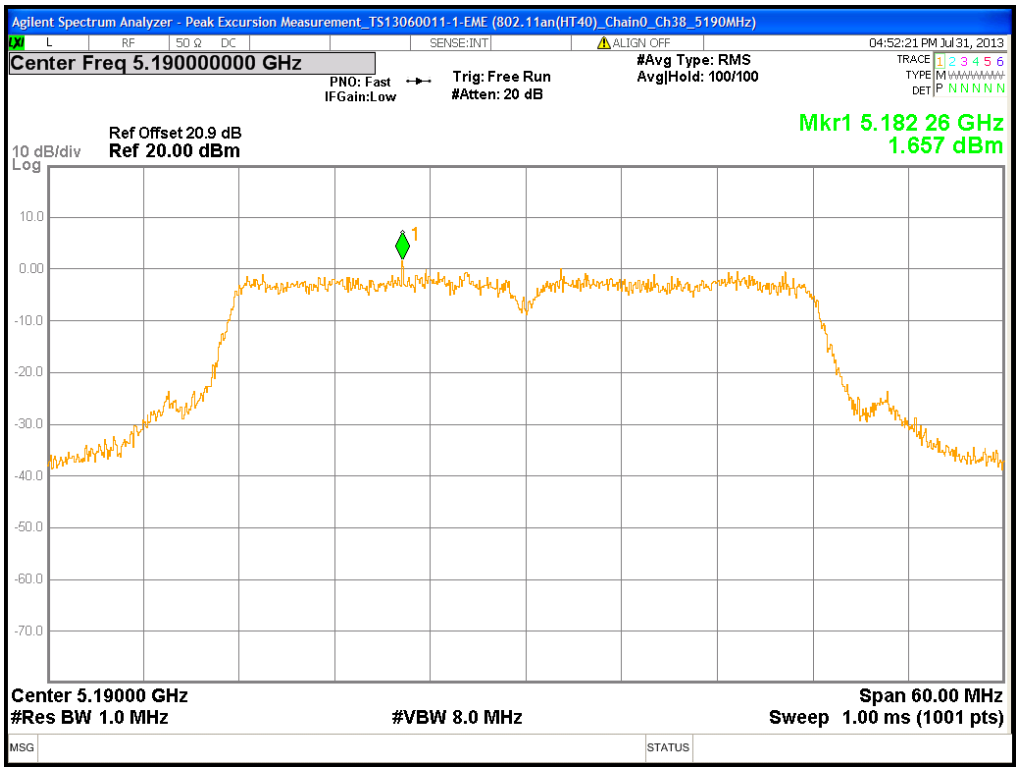
Chain0 : Peak Excursion Measurement @ 802.11an (HT 20) Mode Ch36



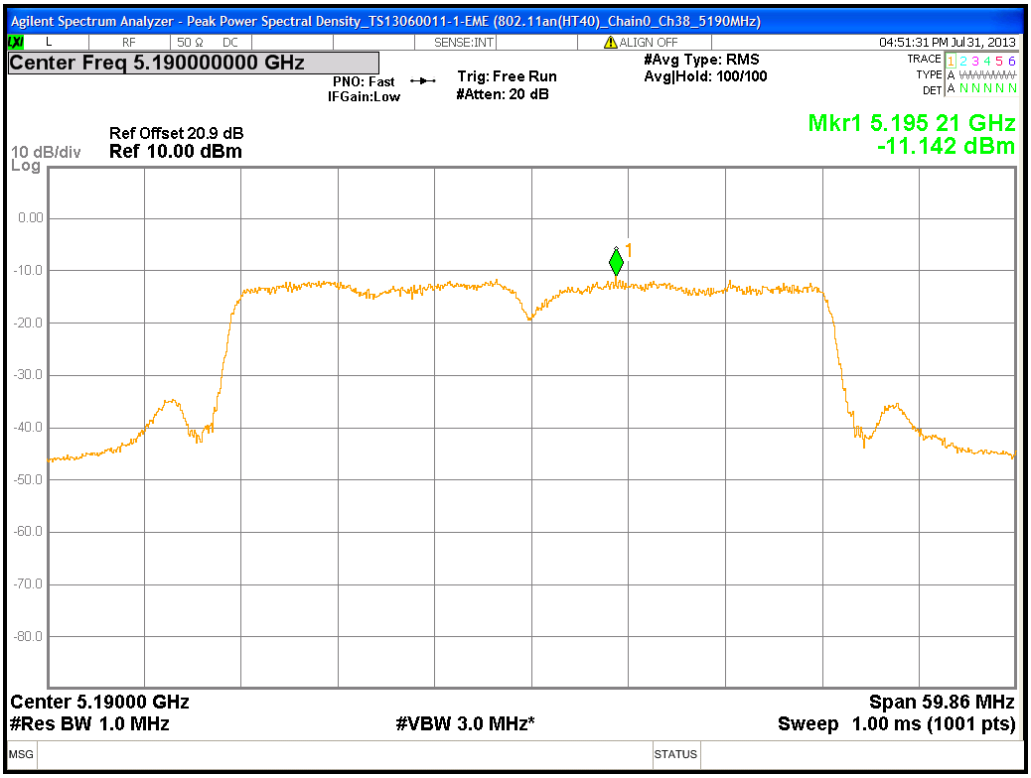
Chain0 : AV Excursion Measurement @ 802.11an (HT 20) Mode Ch36



Chain0 : Peak Excursion Measurement @ 802.11an (HT 40) Mode Ch38



Chain0 : AV Excursion Measurement @ 802.11an (HT 40) Mode Ch38



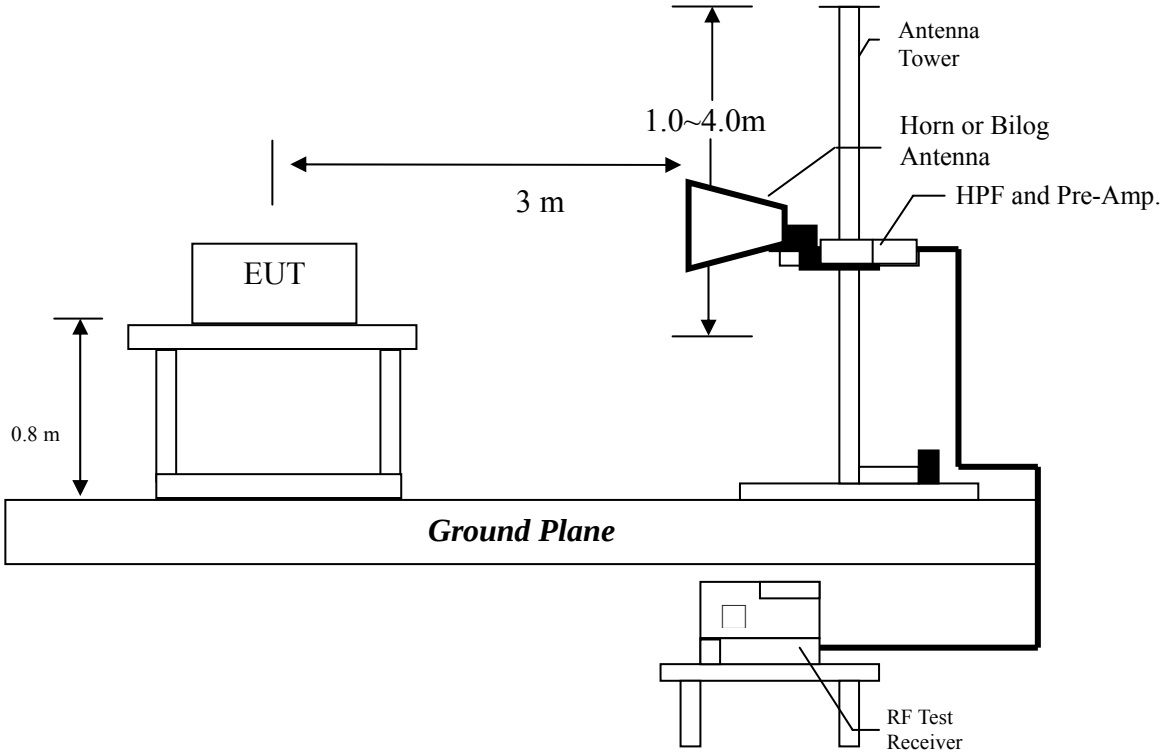
7. Radiated Emission test (FCC 15.205 & 15.209)

7.1 Operating environment

Temperature:	23	℃
Relative Humidity:	58	%
Atmospheric Pressure	1008	hPa

7.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emission measurements were performed from 30MHz to tenth harmonic or 40GHz. The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

7.3 Emission limits

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Frequency (MHz)	Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:
1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Measurement Uncertainty:
Measurement uncertainty was calculated in accordance with TR 100 028-1.

Parameter	Uncertainty		
Radiated Emission	Below 1 GHz	Vertical	3.90 dB
		Horizontal	3.86 dB
	Above 1 GHz	Vertical	5.74 dB
		Horizontal	5.55 dB
Conducted Emission	2.08 dB		

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of *k*=2.

7.4 Radiated spurious emission test data

7.4.1 Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under 802.11a continuously transmitting mode. The worst case occurred at chain 1: 802.11a Tx channel 40.

EUT : K110
Worst Case : chain 1: 802.11a Tx channel 40

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	383.08	QP	16.40	7.02	23.42	46.00	-22.58
V	520.82	QP	18.56	9.87	28.42	46.00	-17.58
V	668.26	QP	21.50	7.49	28.99	46.00	-17.01
V	811.82	QP	23.29	8.22	31.51	46.00	-14.49
V	889.42	QP	24.35	7.76	32.10	46.00	-13.90
V	951.50	QP	25.34	8.23	33.56	46.00	-12.44
H	592.60	QP	20.84	7.19	28.02	46.00	-17.98
H	641.10	QP	21.55	7.53	29.07	46.00	-16.93
H	716.76	QP	22.44	8.46	30.90	46.00	-15.10
H	807.94	QP	23.62	7.93	31.55	46.00	-14.45
H	825.40	QP	24.04	7.08	31.11	46.00	-14.89
H	941.80	QP	25.33	7.70	33.03	46.00	-12.97

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

7.4.2 Measurement results: frequency above 1GHz

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 36

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10360.00	PK	V	33.72	48.15	37.41	51.84	74	-22.16
10360.00	PK	H	33.72	48.15	37.53	51.96	74	-22.04

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 40

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10400.00	PK	V	33.72	48.15	37.18	51.61	74	-22.39
10400.00	PK	H	33.72	48.15	37.61	52.04	74	-21.96

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 48

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10480.00	PK	V	33.72	48.15	37.92	52.35	74	-21.65
10480.00	PK	H	33.72	48.15	37.82	52.25	74	-21.75

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 52

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10520.00	PK	V	33.23	49.24	36.68	52.69	74	-21.31
10520.00	PK	H	33.23	49.24	36.9	52.91	74	-21.09

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 60

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10600.00	PK	V	33.23	49.24	36.79	52.80	74	-21.20
10600.00	PK	H	33.23	49.24	36.92	52.93	74	-21.07

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 64

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
7121.00	PK	V	36.18	43.97	42.80	50.59	74	-23.41
10640.00	PK	V	33.23	49.24	37.19	53.20	74	-20.80
7903.00	PK	H	36.59	45.41	40.45	49.27	74	-24.73
10640.00	PK	H	33.23	49.24	36.32	52.33	74	-21.67

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 100

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11000.00	PK	V	33.53	49.96	35.59	52.02	74	-21.98
11000.00	PK	H	33.53	49.96	36.22	52.65	74	-21.35

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 116

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11160.00	PK	V	33.53	49.96	36.80	53.23	74	-20.77
11160.00	PK	H	33.53	49.96	36.39	52.82	74	-21.18

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 140

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11400.00	PK	V	33.53	49.96	36.11	52.54	74	-21.46
11400.00	PK	H	33.53	49.96	36.61	53.04	74	-20.96

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 149

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11490.00	PK	V	33.53	49.96	36.14	52.57	74	-21.43
11490.00	PK	H	33.53	49.96	36.00	52.43	74	-21.57

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 157

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11570.00	PK	V	34.55	50.03	36.88	52.36	74	-21.64
11570.00	PK	H	34.55	50.03	38.25	53.73	74	-20.27

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0: 802.11a Tx at channel 161

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11610.00	PK	V	34.55	50.03	36.10	51.58	74	-22.42
11610.00	PK	H	34.55	50.03	36.53	52.01	74	-21.99

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 36

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10360.00	PK	V	33.72	48.15	37.17	51.60	74	-22.40
10360.00	PK	H	33.72	48.15	36.82	51.25	74	-22.75

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 40

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10400.00	PK	V	33.72	48.15	37.80	52.23	74	-21.77
10400.00	PK	H	33.72	48.15	37.75	52.18	74	-21.82

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 48

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10480.00	PK	V	33.72	48.15	43.48	57.91	74	-16.09
10480.00	AV	V	33.72	48.15	28.87	43.30	54	-10.70
10480.00	PK	H	33.72	48.15	37.52	51.95	74	-22.05

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 52

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10520.00	PK	V	33.23	49.24	37.78	53.79	74	-20.21
10520.00	AV	V	33.23	49.24	23.84	39.85	54	-14.15
10520.00	PK	H	33.23	49.24	38.16	54.17	74	-19.83
10520.00	AV	H	33.23	49.24	24.17	40.18	54	-13.82

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 60

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10600.00	PK	V	33.23	49.24	42.11	58.12	74	-15.88
10600.00	AV	V	33.23	49.24	27.96	43.97	54	-10.03
10600.00	PK	V	33.23	49.24	37.47	53.48	74	-20.52
10600.00	AV	H	33.23	49.24	24.02	40.03	54	-13.97

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 64

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10640.00	PK	V	33.23	49.24	44.53	60.54	74	-13.46
10640.00	AV	V	33.23	49.24	28.61	44.62	54	-9.38
10640.00	PK	H	33.23	49.24	37.4	53.41	74	-20.59

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 100

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11000.00	PK	V	33.53	49.96	36.35	52.78	74	-21.22
11000.00	PK	H	33.53	49.96	37.43	53.86	74	-20.14

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 116

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11160.00	PK	V	33.53	49.96	35.9	52.33	74	-21.67
11160.00	PK	H	33.53	49.96	36.17	52.60	74	-21.40

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 140

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11400.00	PK	V	33.53	49.96	36.05	52.48	74	-21.52
11400.00	PK	H	33.53	49.96	36.77	53.20	74	-20.80

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 149

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11490.00	PK	V	33.53	49.96	36.25	52.68	74	-21.32
11490.00	PK	H	33.53	49.96	35.30	51.73	74	-22.27

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 157

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11570.00	PK	V	34.55	50.03	35.85	51.33	74	-22.67
11570.00	PK	H	34.55	50.03	36.46	51.94	74	-22.06

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 1: 802.11a Tx at channel 161

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11610.00	PK	V	34.55	50.03	36.33	51.81	74	-22.19
11610.00	PK	H	34.55	50.03	35.79	51.27	74	-22.73

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 36

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10360.00	PK	V	33.72	48.15	36.86	51.29	74	-22.71
10360.00	PK	H	33.72	48.15	36.89	51.32	74	-22.68

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 40

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10400.00	PK	V	33.72	48.15	36.35	50.78	74	-23.22
10400.00	PK	H	33.72	48.15	37.09	51.52	74	-22.48

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 48

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10480.00	PK	V	33.72	48.15	37.39	51.82	74	-22.18
10480.00	PK	H	33.72	48.15	37.55	51.98	74	-22.02

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 52

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10520.00	PK	V	33.23	49.24	35.77	51.78	74	-22.22
10520.00	PK	H	33.23	49.24	35.4	51.41	74	-22.59

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 60

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10600.00	PK	V	33.23	49.24	35.25	51.26	74	-22.74
10600.00	PK	H	33.23	49.24	36.82	52.83	74	-21.17

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 64

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10640.00	PK	V	33.23	49.24	36.07	52.08	74	-21.92
10640.00	PK	H	33.23	49.24	35.67	51.68	74	-22.32

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 100

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11000.00	PK	V	33.53	49.96	35.37	51.80	74	-22.20
11000.00	PK	H	33.53	49.96	35.72	52.15	74	-21.85

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 116

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11160.00	PK	V	33.53	49.96	35.59	52.02	74	-21.98
11160.00	PK	H	33.53	49.96	35.96	52.39	74	-21.61

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 140

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11400.00	PK	V	33.53	49.96	34.72	51.15	74	-22.85
11400.00	PK	H	33.53	49.96	36.32	52.75	74	-21.25

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 149

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11490.00	PK	V	33.53	49.96	34.48	50.91	74	-23.09
11490.00	PK	H	33.53	49.96	34.76	51.19	74	-22.81

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 157

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11570.00	PK	V	34.55	50.03	34.98	50.46	74	-23.54
11570.00	PK	H	34.55	50.03	36.26	51.74	74	-22.26

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 20) Tx at channel 161

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11610.00	PK	V	34.55	50.03	35.46	50.94	74	-23.06
11610.00	PK	H	34.55	50.03	36.11	51.59	74	-22.41

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 40) Tx at channel 38

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10380.00	PK	V	33.72	48.15	37.32	51.75	74	-22.25
10380.00	PK	H	33.72	48.15	37.65	52.08	74	-21.92

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 40) Tx at channel 46

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10460.00	PK	V	33.72	48.15	36.63	51.06	74	-22.94
10460.00	PK	H	33.72	48.15	37.06	51.49	74	-22.51

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 40) Tx at channel 54

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10540.00	PK	V	33.23	49.24	35.81	51.82	74	-22.18
10540.00	PK	H	33.23	49.24	36.12	52.13	74	-21.87

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 40) Tx at channel 62

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10620.00	PK	V	33.23	49.24	36.35	52.36	74	-21.64
10620.00	PK	H	33.23	49.24	36.41	52.42	74	-21.58

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 40) Tx at channel 102

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11020.00	PK	V	33.53	49.96	35.85	52.28	74	-21.72
11020.00	PK	H	33.53	49.96	35.22	51.65	74	-22.35

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 40) Tx at channel 134

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11340.00	PK	V	33.53	49.96	35.91	52.34	74	-21.66
11340.00	PK	H	33.53	49.96	36.30	52.73	74	-21.27

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 40) Tx at channel 151

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11510.00	PK	V	34.55	50.03	35.37	50.85	74	-23.15
11510.00	PK	H	34.55	50.03	36.08	51.56	74	-22.44

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : K110
Test Condition : Chain 0+1: 802.11a (HT 40) Tx at channel 159

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
11590.00	PK	V	34.55	50.03	34.55	50.03	74	-23.97
11590.00	PK	H	34.55	50.03	35.69	51.17	74	-22.83

Remark:
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

8. Emission on the band edge §FCC 15.205

The measurement was made to the average and peak field strength of the fundamental frequency. And the spurious emission in the restrict band must also comply with the FCC subpart C 15.209.

8.1 Operating environment

Temperature:	22	℃
Relative Humidity:	56	%
Atmospheric Pressure	1008	hPa

8.2 Test setup & procedure

The output of EUT was connected to spectrum analyzer via a 50ohm cable.

The setting of spectrum analyzer is:

Peak: RBW = 100kHz ; VBW = 100kHz
Average: RBW = 1MHz ; VBW = 10Hz

8.3 Test Result

Mode	Restricted Band (MHz)	Freq. (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
Chain 0: 802.11a	4500~5150	5148.50	PK	V	40.074	39.106	62.508	61.54	74	-12.46
		5148.50	AV	V	40.074	39.106	46.108	45.14	54	-8.86
	-	5180.00	PK	V	40.090	39.173	107.377	106.46	-	106.46
		5180.00	AV	V	40.090	39.173	93.927	93.01	-	93.01
	-	5320.00	PK	V	40.160	39.470	108.130	107.44	-	107.44
		5320.00	AV	V	40.160	39.470	94.380	93.69	-	93.69
	5350~5460	5350.24	PK	V	40.175	39.534	60.781	60.14	74	-13.86
		5350.24	AV	V	40.175	39.534	45.271	44.63	54	-9.37
	5350~5460	5460.16	PK	V	40.230	39.767	57.683	57.22	74	-16.78
		5460.16	AV	V	40.230	39.767	43.733	43.27	54	-10.73
	-	5500.00	PK	V	40.250	39.851	105.049	104.65	-	104.65
		5500.00	AV	V	40.250	39.851	91.899	91.50	-	91.50

Mode	Restricted Band (MHz)	Freq. (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
Chain 1: 802.11a	4500~5150	5149.44	PK	V	40.075	39.108	62.597	61.63	74	-12.37
		5149.44	AV	V	40.075	39.108	46.347	45.38	54	-8.62
	-	5180.00	PK	V	40.090	39.173	104.347	103.43	-	103.43
		5180.00	AV	V	40.090	39.173	93.467	92.55	-	92.55
	-	5320.00	PK	V	40.160	39.470	101.230	100.54	-	100.54
		5320.00	AV	V	40.160	39.470	96.020	95.33	-	95.33
	5350~5460	5350.32	PK	V	40.175	39.534	72.401	71.76	74	-2.24
		5350.32	AV	V	40.175	39.534	50.071	49.43	54	-4.57
	5350~5460	5460.16	PK	V	40.230	39.767	65.173	64.71	74	-9.29
		5460.16	AV	V	40.230	39.767	44.273	43.81	54	-10.19
	-	5500.00	PK	V	40.250	39.851	100.669	100.27	-	100.27
		5500.00	AV	V	40.250	39.851	94.789	94.39	-	94.39
Chain 0+ Chain 1: 802.11an HT20	4500~5150	5149.99	PK	V	40.075	39.109	58.746	57.78	74	-16.22
		5149.99	AV	V	40.075	39.109	45.186	44.22	54	-9.78
	-	5180.00	PK	V	40.090	39.173	107.347	106.43	-	106.43
		5180.00	AV	V	40.090	39.173	92.127	91.21	-	91.21
	-	5320.00	PK	V	40.160	39.470	109.720	109.03	-	109.03
		5320.00	AV	V	40.160	39.470	73.000	72.31	-	72.31
	5350~5460	5350.24	PK	V	40.175	39.534	70.981	70.34	74	-3.66
		5350.24	AV	V	40.175	39.534	46.541	45.90	54	-8.10
	5350~5460	5460.16	PK	V	40.230	39.767	65.183	64.72	74	-9.28
		5460.16	AV	V	40.230	39.767	45.123	44.66	54	-9.34
	-	5500.00	PK	V	40.250	39.851	108.339	107.94	-	107.94
		5500.00	AV	V	40.250	39.851	95.179	94.78	-	94.78

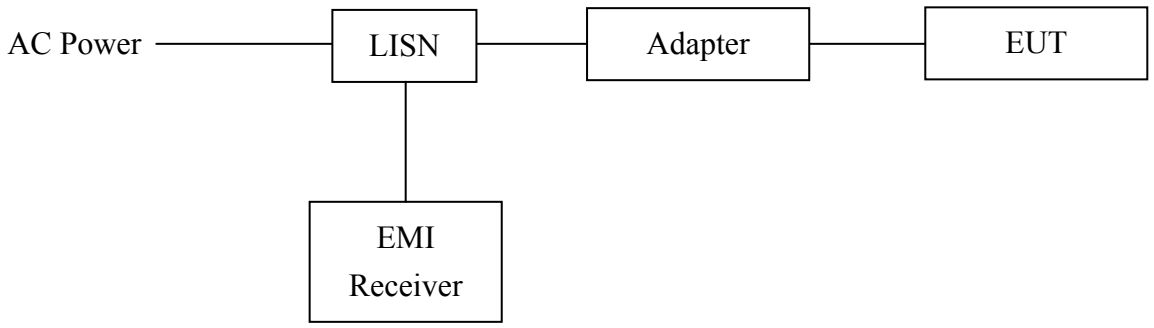
Mode	Restricted Band (MHz)	Freq. (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
Chain 0+ Chain 1: 802.11an HT40	4500~ 5150	5149.50	PK	V	40.075	39.108	70.817	69.85	74	-4.15
		5149.50	AV	V	40.075	39.108	45.667	44.70	54	-9.30
	-	5190.00	PK	V	40.095	39.194	103.021	102.12	-	102.12
		5190.00	AV	V	40.095	39.194	62.341	61.44	-	61.44
	-	5310.00	PK	V	40.155	39.449	104.446	103.74	-	103.74
		5310.00	AV	V	40.155	39.449	46.336	62.20	-	62.20
	5350~ 5460	5314.56	PK	V	40.157	39.458	73.169	72.47	74	-1.53
		5314.56	AV	V	40.157	39.458	62.899	45.63	54	-8.37
	5350~ 5460	5459.64	PK	V	40.230	39.766	64.174	63.71	74	-10.29
		5459.64	AV	V	40.230	39.766	43.234	42.77	54	-11.23
	-	5510.00	PK	V	40.251	39.860	101.301	100.91	-	100.91
		5510.00	AV	V	40.251	39.860	92.071	91.68	-	91.68

9. Power Line Conducted Emission test §FCC 15.207

9.1 Operating environment

Temperature:	23	℃
Relative Humidity:	52	%
Atmospheric Pressure	1008	hPa
Test Date:	Jun. 11, 2013	

9.2 Test setup & procedure



The test procedure was according to ANSI C63.4/2003.

The EUT are connected to the main power through a line impedance stabilization network (LISN). 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 50 ohm/50uH coupling impedance with 50 ohm termination.
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/2003 on conducted measurement. The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9 kHz.

The EUT configuration refers to the "Conducted set-up photo.pdf".

9.3 Emission limit

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

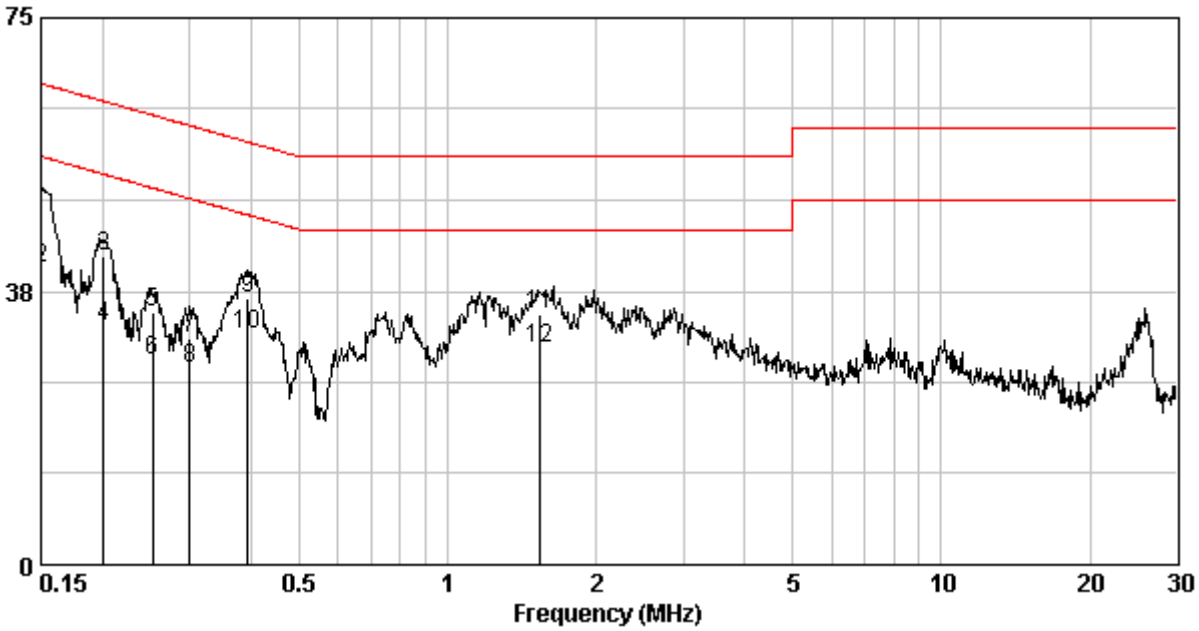
*Decreases with the logarithm of the frequency.

9.4 Power Line Conducted Emission test data

Phase: Line
Model No.: K110
Operating mode: TX mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.150	0.13	49.48	66.00	40.70	56.00	-16.52	-15.30
0.201	0.14	42.20	63.58	32.59	53.58	-21.38	-20.99
0.252	0.14	34.66	61.69	27.94	51.69	-27.02	-23.74
0.300	0.15	31.17	60.24	27.03	50.24	-29.06	-23.20
0.393	0.16	36.53	57.99	31.53	47.99	-21.46	-16.46
1.544	0.24	34.32	56.00	29.64	46.00	-21.68	-16.36

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase: Neutral
Model No.: K110
Operating mode: TX mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.151	0.10	50.41	65.96	43.47	55.96	-15.55	-12.49
0.202	0.11	43.73	63.54	37.09	53.54	-19.81	-16.45
0.253	0.11	39.81	61.64	33.36	51.64	-21.83	-18.28
0.299	0.11	38.11	60.28	33.62	50.28	-22.16	-16.65
0.354	0.12	35.29	58.87	31.33	48.87	-23.58	-17.54
0.417	0.12	37.88	57.51	32.71	47.51	-19.62	-14.79

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)