EMC
TEST REPORT

Report No. :**TW14040225**
Model No. : **OD-11**
Issued Date : **Jun. 16, 2014**

Applicant: **Teenage Engineering AB**
Katarina bangata 71 garage

Test Method/ Standard: **47 CFR FCC Part 15.407**
KDB 789033 D01 v01r03
ANSI C63.4 2003.

Test By: **Intertek Testing Services Taiwan Ltd.**
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan

The test report was prepared by: Sign on File

Sunny Liu/ Senior Officer

These measurements were taken by: Sign on File

Chester/ Engineer

The test report was reviewed by:

Name Jimmy Yang
Title Engineer

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1. Summary of Test Data

Test Requirement	Applicable Rule (Section 15.247)	Result
Maximum Conducted Output Power	15.407 (a)(1)/(2)/(3) KDB 789033 D01 v01r03	Pass
Power Spectrum Density	15.407 (a)(1)/(2)/(3) KDB 789033 D01 v01r03	Pass
Peak Excursion To Average Ratio	15.407(a)(6) KDB 789033 D01 v01r03	Pass
Emissions In Restricted Frequency Bands (Radiated emission measurements)	15.407(b)(1)/(2)/(3)/(6), 15.209	Pass
Emission on The Band Edge	15.407(b)(1)/(2)/(3)/(6), 15.209	Pass
AC Line Conducted Emission	15.407(b)(6) 15.207	Pass
Frequency Stability	15.407(g)	Pass
Antenna requirement	15.203	Pass

2. General information

2.1 Identification of the EUT

Product:	OD-11 Wireless Speaker
Model No.:	OD-11
FCC ID:	Z23007A
Operating Frequency:	1. 5180 MHz ~ 5320 MHz for 802.11a, 802.11n (HT20) 2. 5190 MHz ~ 5310 MHz for 802.11n (HT40) 3. 5500 MHz ~ 5700 MHz for 802.11a, 802.11n (HT20) 4. 5510 MHz ~ 5670 MHz for 802.11n (HT 40) 5. 5745 MHz ~ 5805 MHz for 802.11a, 802.11n (HT20) 6. 5755 MHz ~ 5795 MHz for 802.11n (HT 40)
Channel Number:	1. 8 channels for 5180 MHz ~ 5320 MHz for 802.11a, 802.11n (HT20) 2. 4 channels for 5190 MHz ~ 5230 MHz for 802.11a (HT40) 3. 8 channels for 5500 MHz ~ 5700 MHz for 802.11a, 802.11n (HT20) 4. 3 channels for 5510 MHz ~ 5670 MHz for 802.11n (HT 40) 5. 4 channels for 5745 MHz ~ 5805 MHz for 802.11a, 802.11n (HT20) 6. 2 channels for 5755 MHz ~ 5795 MHz for 802.11n (HT 40)
Access scheme:	OFDM
Modulation	64QAM, 16QAM, QPSK, BPSK for OFDM
Rated Power:	100-240 Vac, 50-60 Hz, ~1.95-1.10A
Power Cord:	2 C × 0.75mm^2 × 1.0 meter unshielded cable
Sample Received:	Apr. 10, 2014
Sample condition:	Workable
Test Date(s):	Apr. 14, 2014 ~ May 28, 2014
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.

2.2 Description of EUT

Modulation mode	Transmit path	
	Chain 0/Main	Chain 1/Aux
802.11a	X	V
802.11 n (HT20)	X	V
802.11 n (HT40)	X	V

Note:"V" means that equip with this function, "X" stands for no providing with

2.3 Antenna description

(1) Antenna 1 (chain 0 for WiFi and BT)

The EUT uses a permanently connected antenna.

Antenna Gain : 0 dBi
Antenna Type : Internal, Integral

(2) Antenna 2 (chain 1 for WiFi only)

The EUT uses a permanently connected antenna.

Antenna Gain : 2 dBi
Antenna Type : Dipole antenna

2.4 Peripherals equipment

Peripherals	Brand	Model No.	Serial No.	Data cable
iPad	Apple	Pad01	N/A	N/A
Notebook PC	ASUS	CEL051	N/A	N/A
Access Point	Cisco	EP396	N/A	N/A
iPhone	Apple	A1429	N/A	N/A

2.5 Operation mode

TX-MODE based on “Terminal” to type command to select different frequency and modulation.

With individual verifying, the maximum output power was found out 6 Mbps data rate for 802.11a mode,6.5 Mbps data rate for 802.11n HT20 mode, 13.5 Mbps data rate for 802.11n HT40 mode .The final tests were executed under these conditions recorded in this report individually.

802.11a ch40 chain1		802.11n HT20 ch40 chain1		802.11n HT40 ch38 chain1	
Data rate (Mbps)	AV (dBm)	Data rate (Mbps)	AV (dBm)	Data rate (Mbps)	AV (dBm)
6	14.86	6.5	14.51	13.5	6.94
9	14.86	13	14.51	27	6.94
12	14.86	19.5	14.50	40.5	6.93
18	14.85	26	14.50	72	6.93
24	14.85	39	14.50	81	6.93
36	14.85	52	14.50	108	6.93
48	14.85	58.5	14.49	121.5	6.92
54	14.85	65	14.48	135	6.92

2.6 Applied test modes and channels

Test items	Mode	Data Rate (Mbps)	Channel	Antenna
Maximum Conducted Output Power	802.11a	6	36,40,48,52,56,64,100,116,140,149,153,161	Chain1
	802.11 n (HT20)	6.5	36,40,48,52,56,64,100,116,140,149,153,161	Chain1
	802.11 n (HT40)	13.5	38,46,54,62,102,110,134,151,159	Chain1
Power Spectrum Density	802.11a	6	36,40,48,52,56,64,100,116,140,149,153,161	Chain1
	802.11 n (HT20)	6.5	36,40,48,52,56,64,100,116,140,149,153,161	Chain1
	802.11 n (HT40)	13.5	38,46,54,62,102,110,134,151,159	Chain1
Peak Excursion To Average Ratio	802.11a	6	36,40,48,52,56,64,100,116,140,149,153,161	Chain1
	802.11 n (HT20)	6.5	36,40,48,52,56,64,100,116,140,149,153,161	Chain1
	802.11 n (HT40)	13.5	38,46,54,62,102,110,134,151,159	Chain1
Emissions In Restricted Frequency Bands (Radiated emission measurements)	802.11a	6	36,40,48,52,56,64,100,116,140,149,153,161	Chain1
	802.11 n (HT20)	6.5	36,40,48,52,56,64,100,116,140,149,153,161	Chain1
	802.11 n (HT40)	13.5	38,46,54,62,102,110,134,151,159	Chain1
Radiated spurious Emission 9kHz~1GHz	Normal Link			
Emissions In Restricted Frequency Bands (Radiated emission measurements)	802.11a	6	36,64,100,116,140,149,153,161	Chain1
	802.11 n (HT20)	6.5	36,40,48,52,56,64,100,116,140,149,153,161	Chain1
	802.11 n (HT40)	13.5	38,46,54,62,102,110,134,151,159	Chain1
Emission on The Band Edge	802.11a	6	36,64,100	Chain1
	802.11 n (HT20)	6.5	36,64,100	Chain1
	802.11 n (HT40)	13.5	38,62,102	Chain1
Frequency Stability	802.11 n (HT40)	13.5	38	Chain 1
AC Line Conducted Emission	Normal Link			

2.7 Power setting of test software

Channels & power setting software provided by the client was used to change the operating channels as well as the output power level and is going to be installed in the final end product.

Mode	Channel	Frequency (MHz)	Setting
802.11a (Chain1)	36	5180	19
	40	5200	19
	48	5240	19
	52	5260	18
	56	5280	18
	64	5320	18
	100	5500	20
	116	5580	20
	140	5700	20
	149	5745	20
	153	5765	20
	161	5805	20
802.11n (HT 20) (Chain1)	36	5180	18
	40	5200	18
	48	5240	18
	52	5260	17.5
	56	5280	17.5
	64	5320	17.5
	100	5500	20
	116	5580	20
	140	5700	20
	149	5745	20
	153	5765	20
	161	5805	20
802.11n (HT 40) (Chain1)	38	5190	17.5
	46	5230	17.5
	54	5270	16.5
	62	5310	16.5
	102	5510	20
	110	5550	20
	134	5670	20
	151	5755	20
	159	5795	20

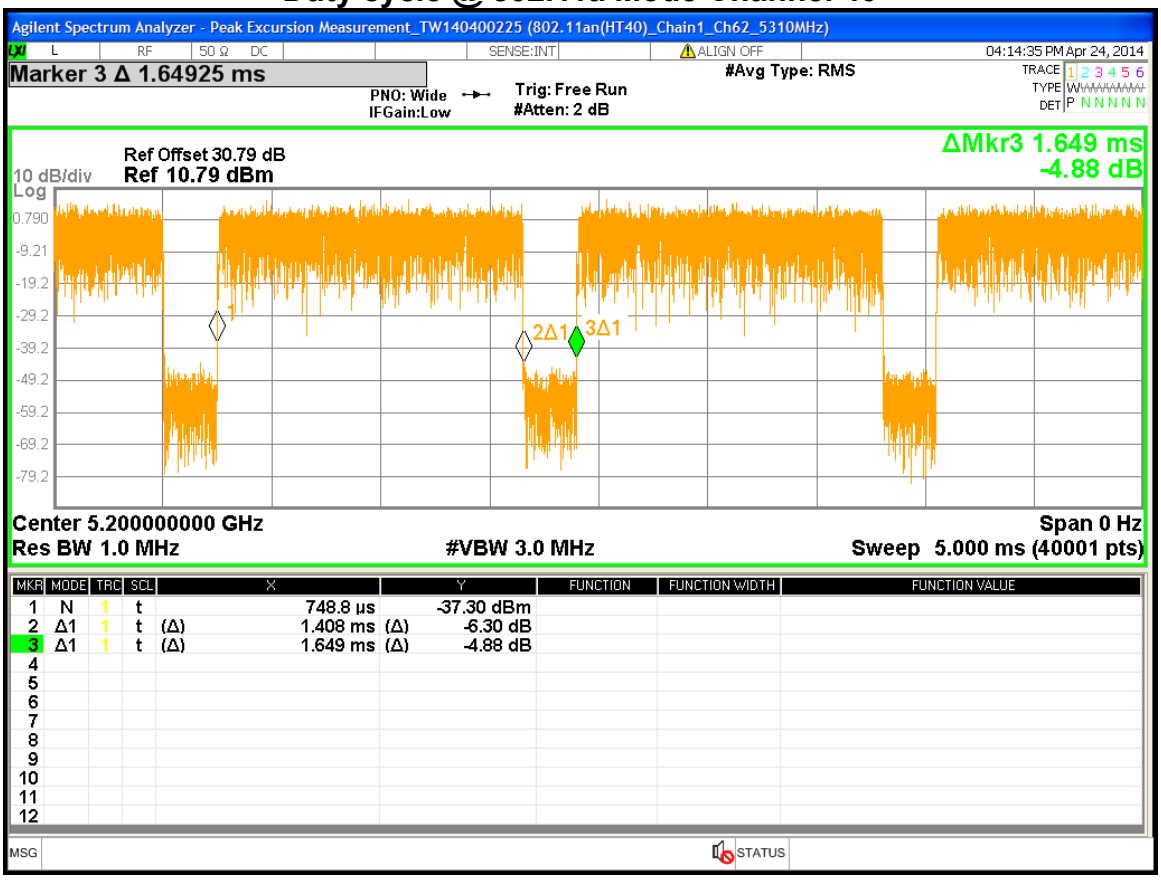
2.8 Duty cycle of test signal

If duty cycle of test signal is>98%, duty cycle factor is not required adding to the measurement result.

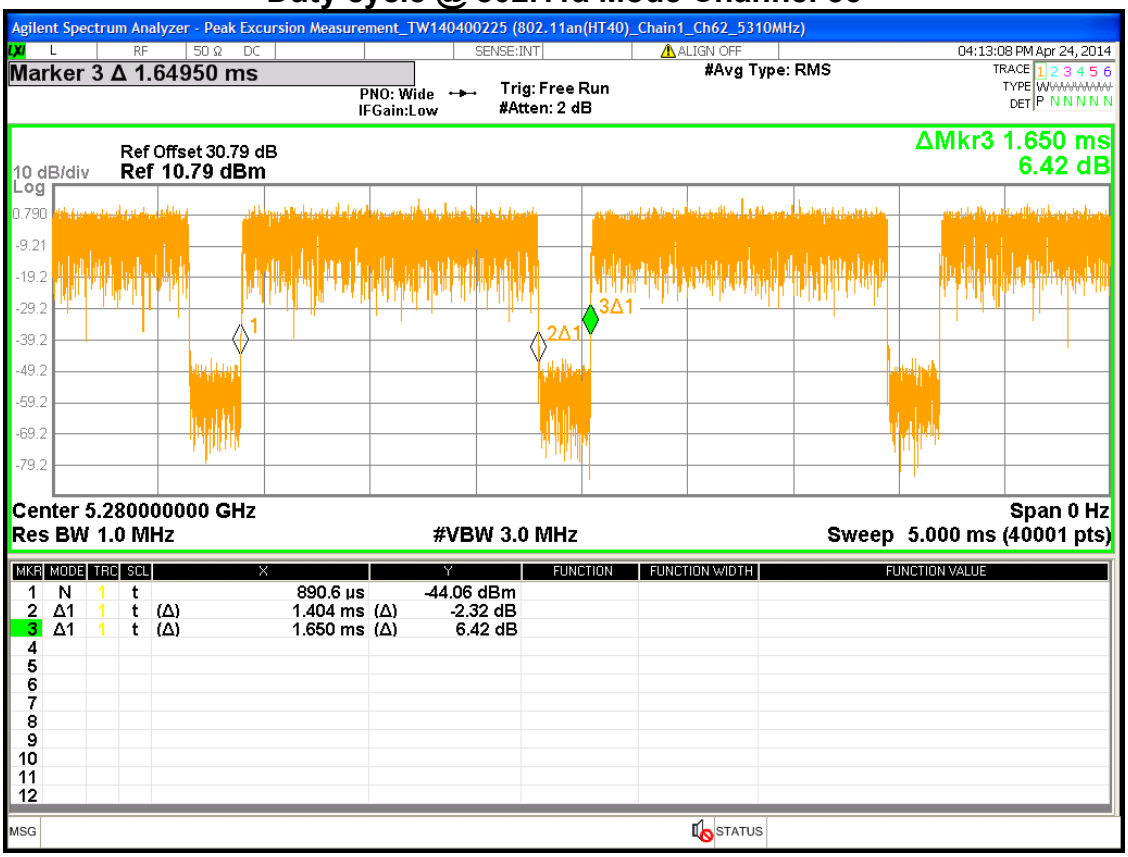
Mode	Channel	Frequency (MHz)	Data rate	Signal on time(ms)	Total signal transmit time(ms)	Duty cycle	Duty Cycle factor
802.11a (Chain1)	40	5200	6	1.408	1.649	0.854	0.686
	56	5280	6	1.404	1.65	0.851	0.701
	116	5580	6	1.41	1.649	0.855	0.680
	153	5765	6	1.409	1.649	0.854	0.683
802.11n (HT 20) (Chain1)	40	5200	6.5	1.317	1.557	0.846	0.727
	56	5280	6.5	1.318	1.557	0.846	0.724
	116	5580	6.5	1.312	1.557	0.843	0.744
	153	5765	6.5	1.312	1.557	0.843	0.744
802.11n (HT 40) (Chain1)	38	5190	13.5	651.8	897.5	0.726	1.389
	54	5270	13.5	658.5	897.2	0.734	1.343
	110	5550	13.5	658.4	897.2	0.734	1.344
	151	5755	13.5	658.66	897.3	0.734	1.343

Note: Duty cycle factor =10log(1/ duty cycle)

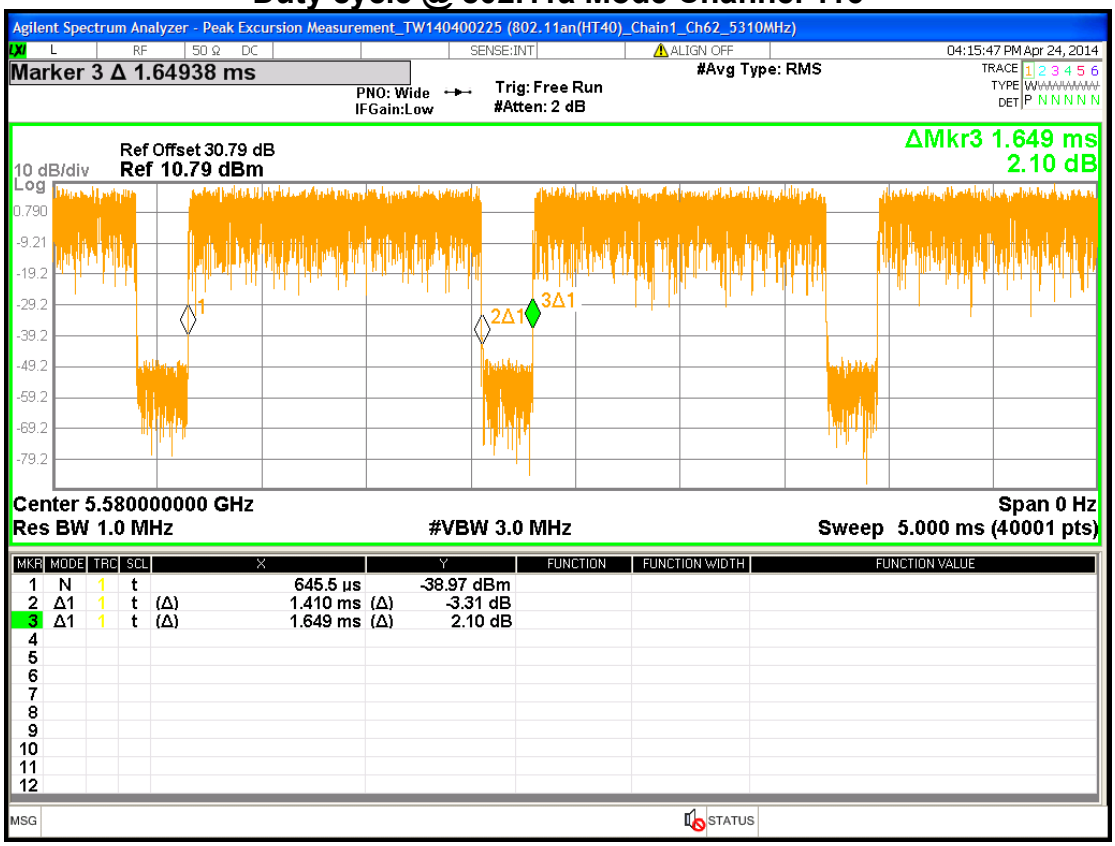
Duty cycle @ 802.11a Mode Channel 40



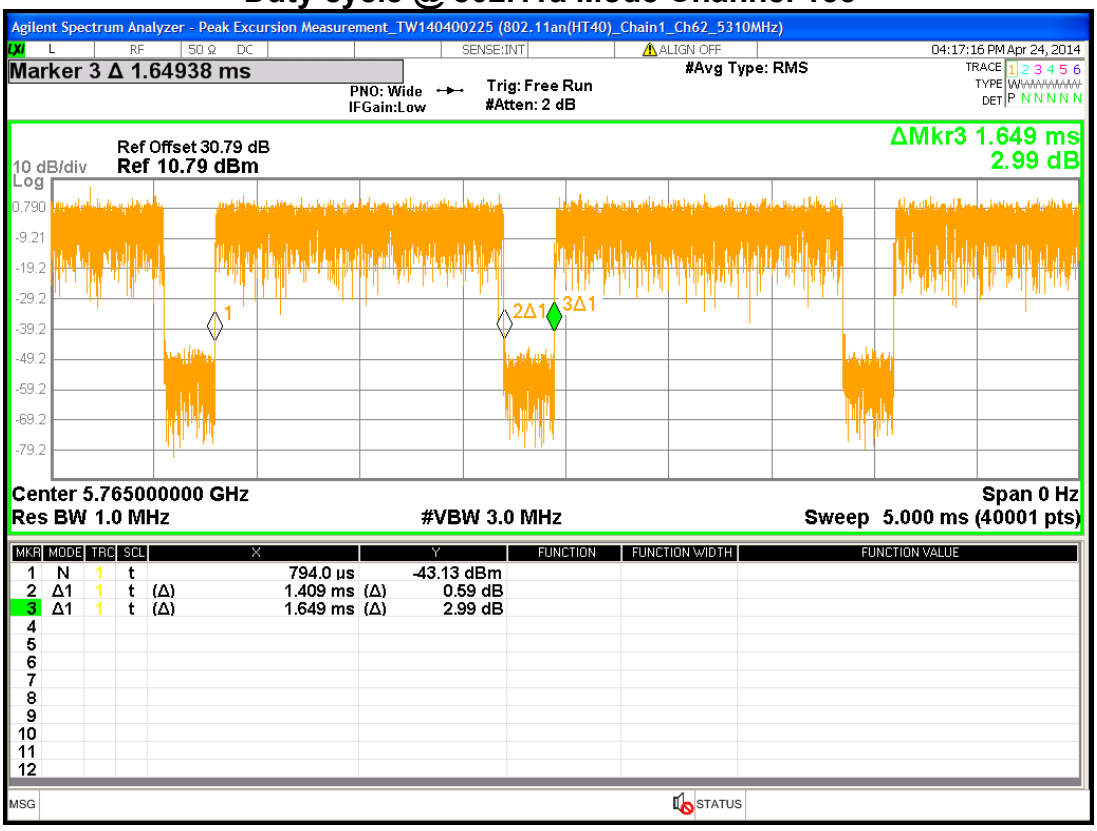
Duty cycle @ 802.11a Mode Channel 56



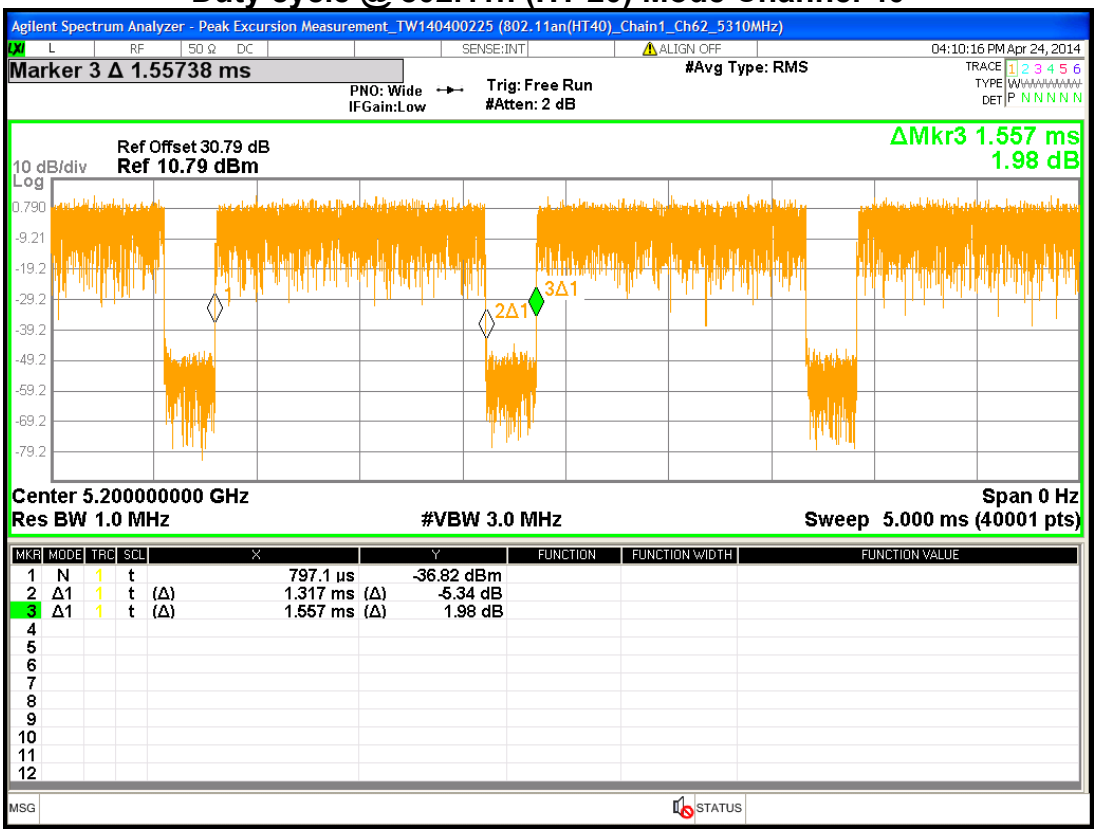
Duty cycle @ 802.11a Mode Channel 116



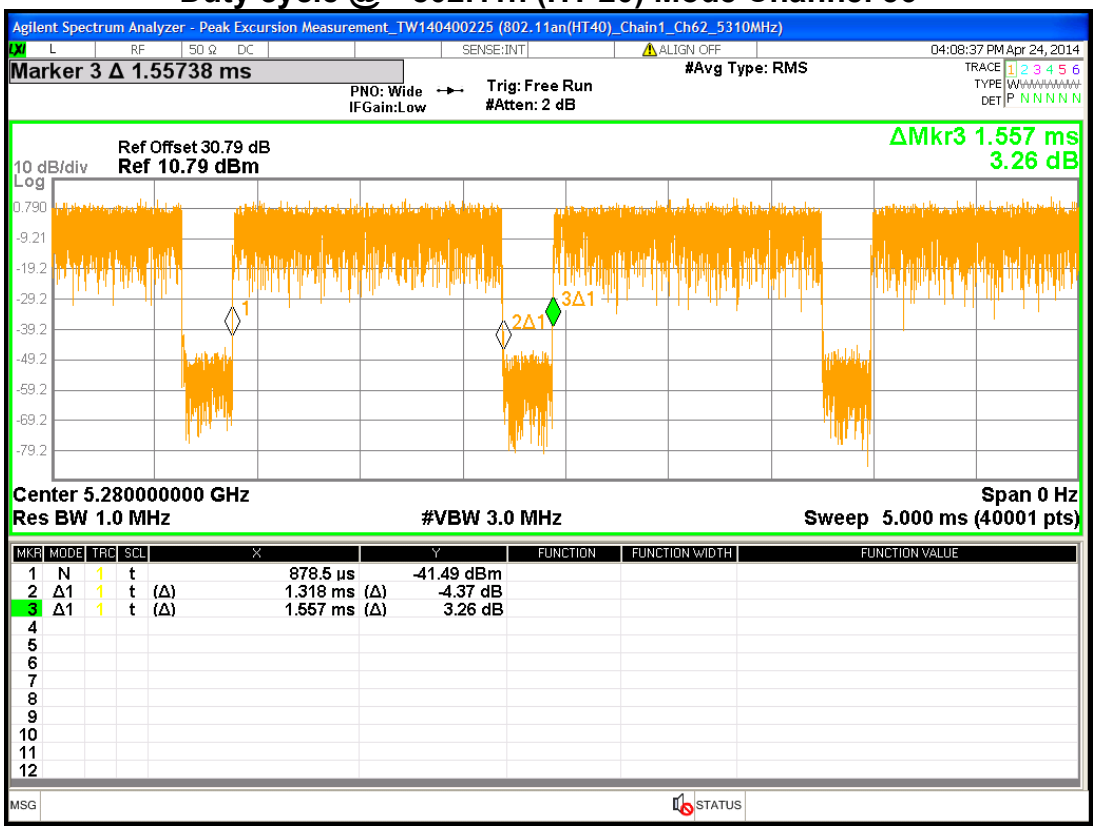
Duty cycle @ 802.11a Mode Channel 153



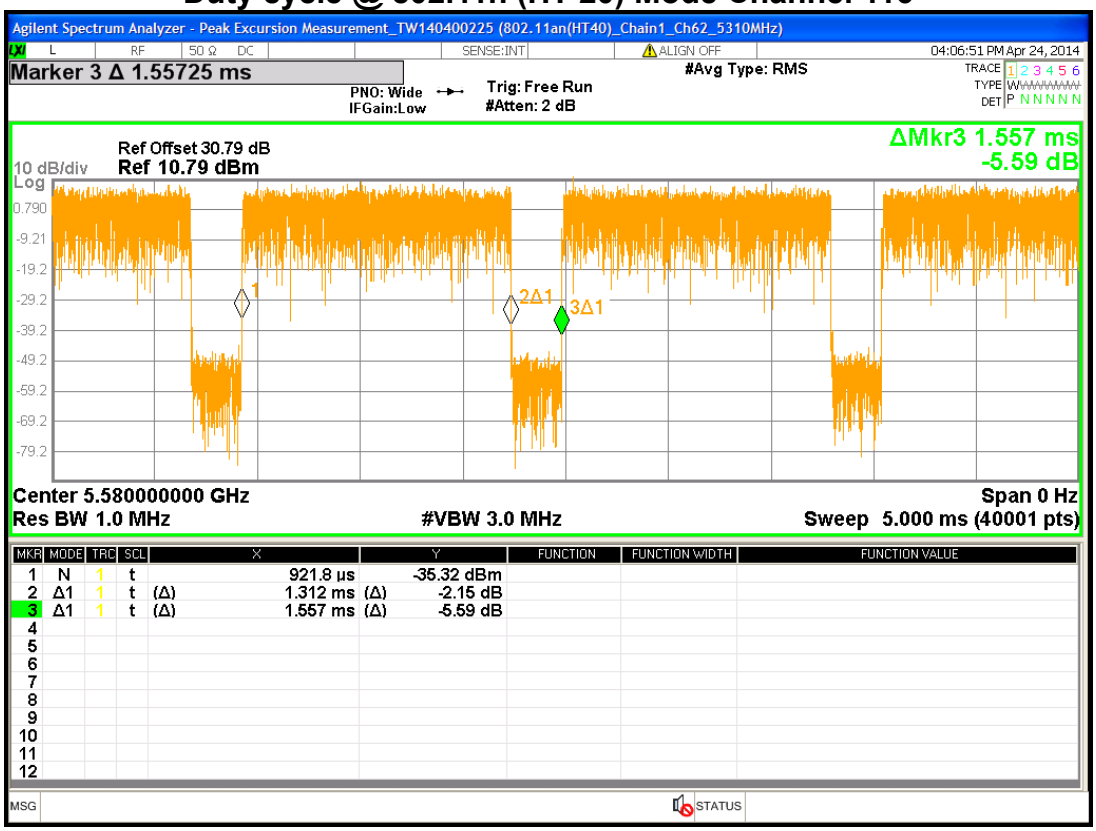
Duty cycle @ 802.11n (HT 20) Mode Channel 40



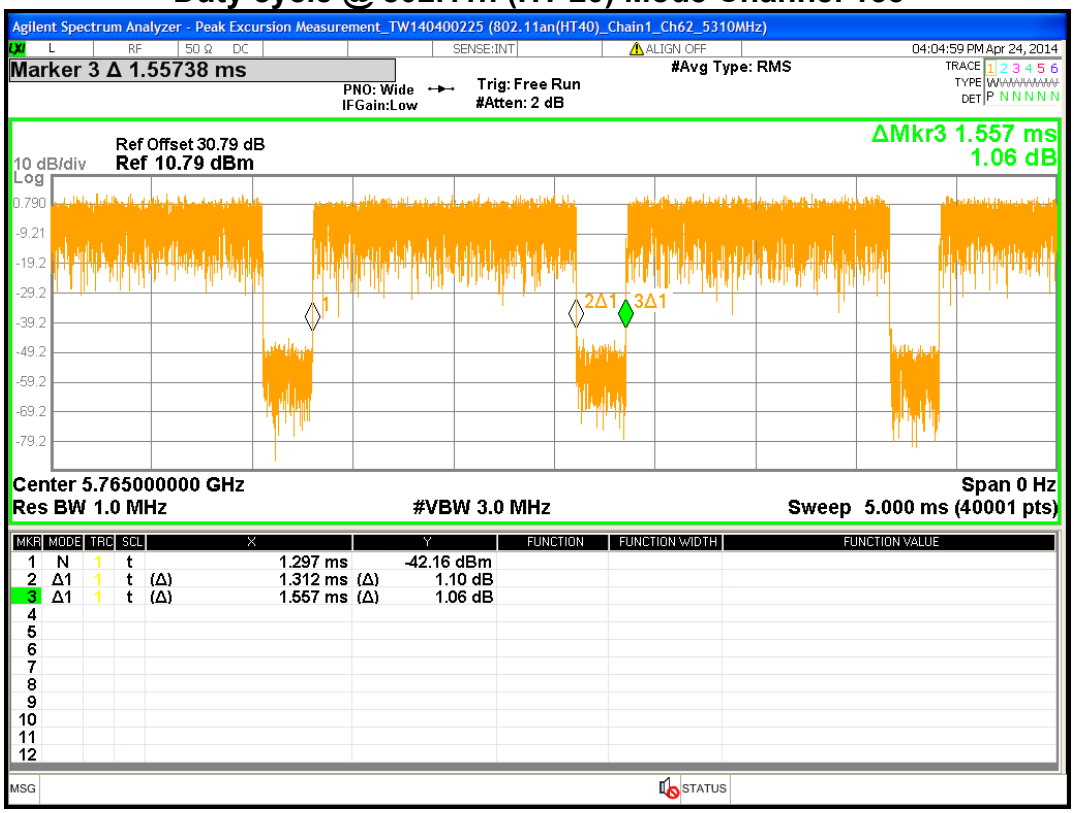
Duty cycle @ 802.11n (HT 20) Mode Channel 56



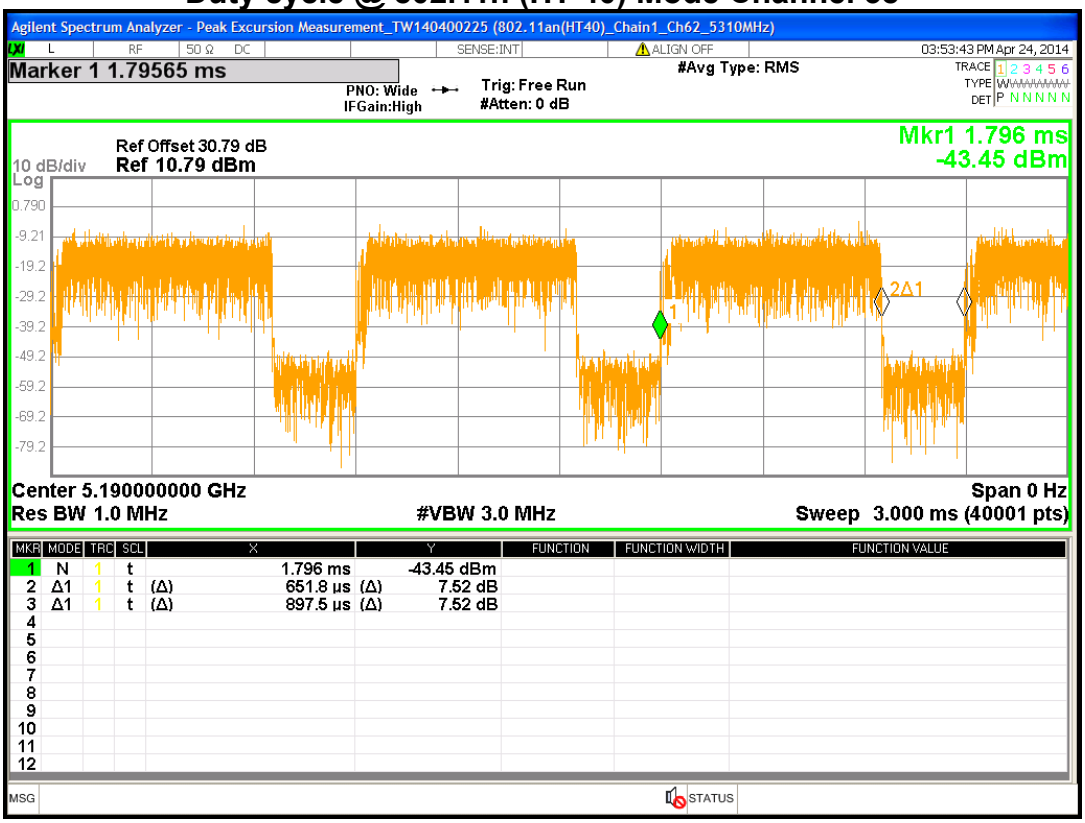
Duty cycle @ 802.11n (HT 20) Mode Channel 116



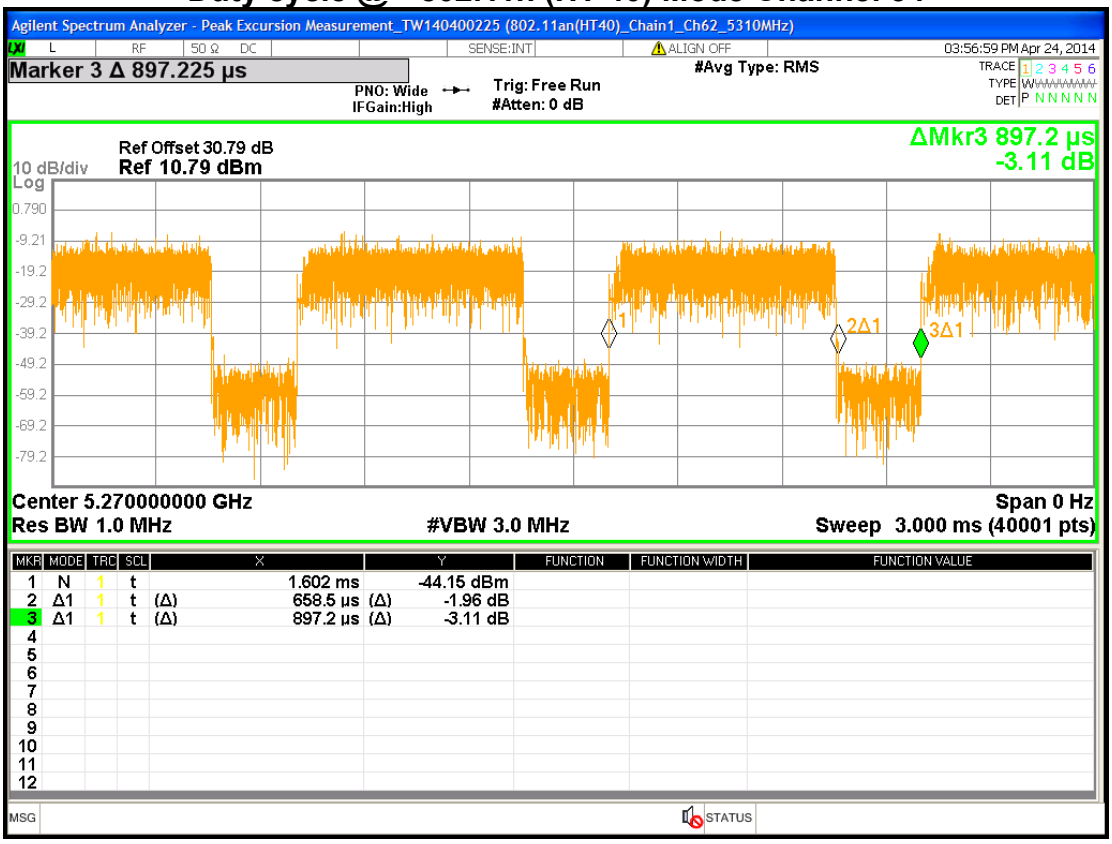
Duty cycle @ 802.11n (HT 20) Mode Channel 153



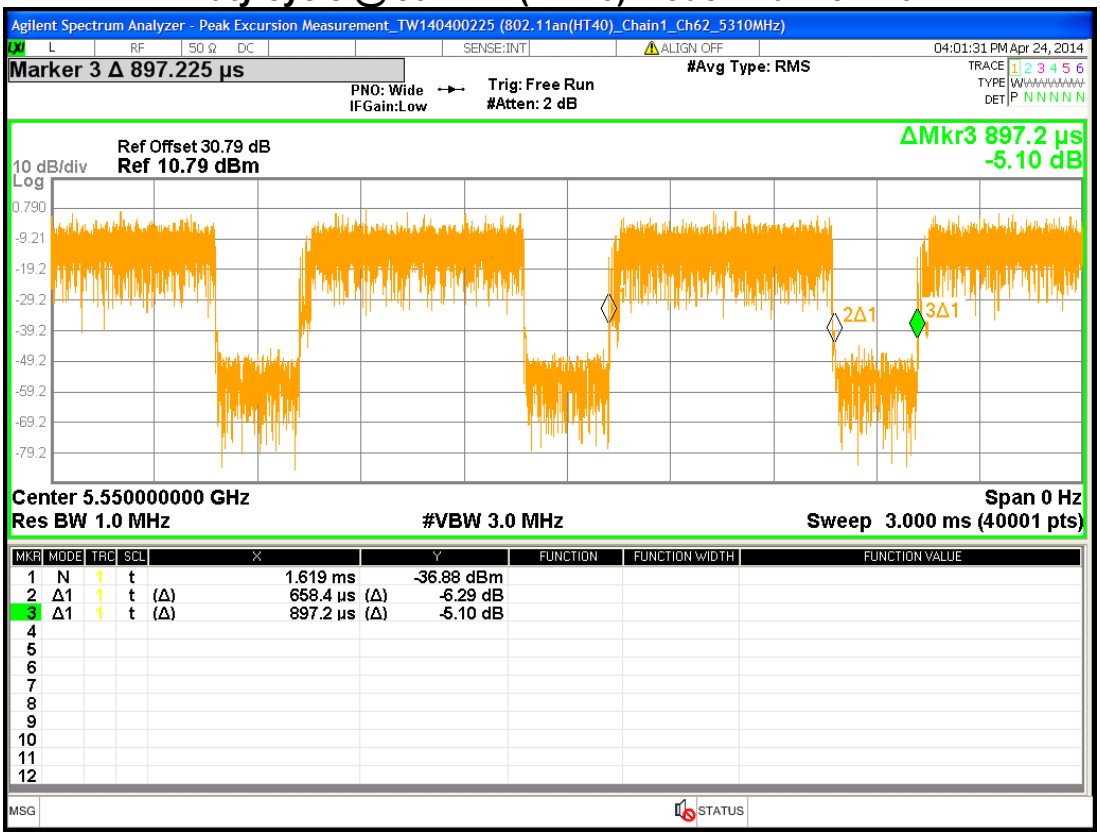
Duty cycle @ 802.11n (HT 40) Mode Channel 38



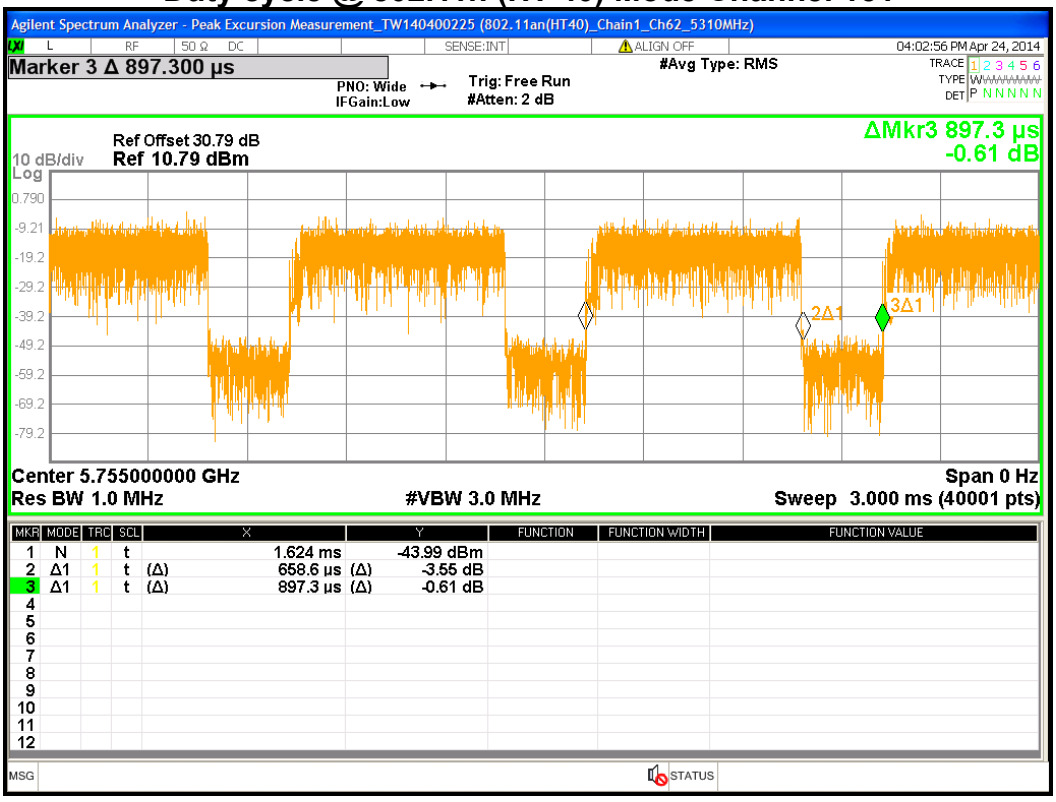
Duty cycle @ 802.11n (HT 40) Mode Channel 54



Duty cycle @ 802.11n (HT 40) Mode Channel 110



Duty cycle @ 802.11n (HT 40) Mode Channel 151



3. Maximum Conducted Output Power

3.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,52,56,64,100,116,140,149,153,161 for 20MHz 38,46,54,62,102,110,134,151,159 for 40MHz	

3.2 Limit for maximum conducted output power

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: 1. whichever power is less.

Remark: 2 where B is the –26 dB emission bandwidth in MHz.

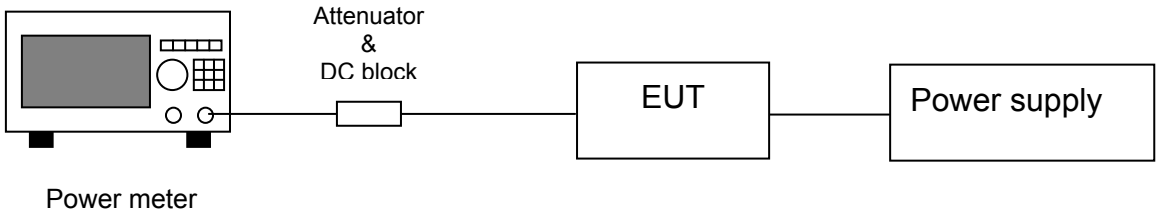
3.3 Measuring instrument setting

Power meter	
Power meter	**Setting**
Bandwidth	65MHz bandwidth is greater than the EUT emission bandwidth
Detector	Average

3.4 Test procedure

Test procedures refer to clause E) 3) b) measurement using a gated RF average power meter of KDB 789033 D01 v01r03

3.5 Test diagram



3.6 Test results

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Output Power (AV)		Limit (dBm)	Margin (dB)
				dBm	mW		
802.11a (Chain1)	36	5180	6	14.54	28.44	17.00	-2.46
	40	5200		14.86	30.62	17.00	-2.14
	48	5240		15.47	35.24	17.00	-1.53
	52	5260		14.30	26.92	24.00	-9.70
	56	5280		13.46	22.18	24.00	-10.54
	64	5320		13.59	22.86	24.00	-10.41
	100	5500		17.29	53.58	24.00	-6.71
	116	5600		17.49	56.10	24.00	-6.51
	140	5700		14.36	27.29	24.00	-9.64
	149	5745		14.15	26.00	30.00	-15.85
	153	5765		12.53	17.91	30.00	-17.47
	161	5805		12.68	18.54	30.00	-17.32
802.11n (HT 20) (Chain1)	36	5180	13	14.76	29.92	17.00	-2.24
	40	5200		14.51	28.25	17.00	-2.49
	48	5240		15.40	34.67	17.00	-1.60
	52	5260		13.67	23.28	24.00	-10.33
	56	5280		13.71	23.50	24.00	-10.29
	64	5320		13.81	24.04	24.00	-10.19
	100	5500		16.97	49.77	24.00	-7.03
	116	5600		17.22	52.72	24.00	-6.78
	140	5700		13.78	23.88	24.00	-10.22
	149	5745		13.61	22.96	30.00	-16.39
	153	5765		12.68	18.54	30.00	-17.32
	161	5805		12.42	17.46	30.00	-17.58
802.11n (HT 40) (Chain1)	38	5190	13.5	6.94	4.94	17.00	-10.06
	46	5230		6.77	4.75	17.00	-10.23
	54	5270		5.35	3.43	24.00	-18.65
	62	5310		5.89	3.88	24.00	-18.11
	102	5510		12.04	16.01	24.00	-11.96
	110	5550		12.16	16.46	24.00	-11.84
	134	5670		10.24	10.58	24.00	-13.76
	151	5755		8.01	6.32	30.00	-21.99
	159	5795		7.49	5.61	30.00	-22.51

4. Power Spectrum Density

4.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,52,56,64,100,116,140,149,153,161 for 20MHz 38,46,54,62,102,110,134,151,159 for 40MHz	

4.2 Limit for power spectrum density

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

4.3 Measuring instrument setting

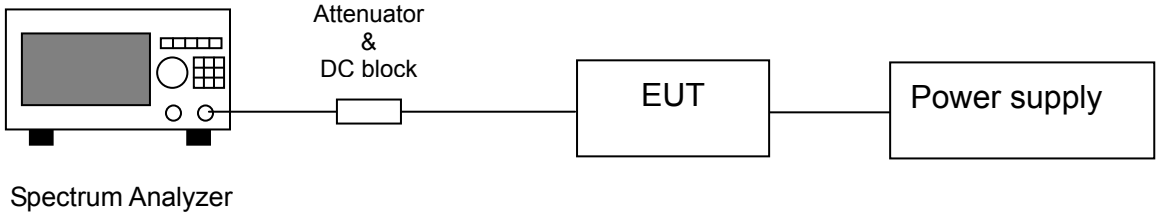
Spectrum analyzer settings	
Spectrum Analyzer function	**Setting**
Detector	RMS
RBW	=1MHz
VBW	≧3 MHz
Sweep	Auto couple
Trace	Average
Span	Encompass the 26 dB EBW
Attenuation	Auto
Sweep point	≥ 2 Span / RBW

Note: The parameter above use method SA-2 of KDB 789033

4.4 Test procedure

1. Set relevant parameter according to clause 4.3.
2. Trace average at least 100 traces in power averaging mode.
3. Compute power by integrating the spectrum across the 26 dB EBW of the signal using the instrument's band power measurement function with band limits set equal to the EBW band edges
4. Record the max value and add 10 log (1/duty cycle)

4.5 Test diagram



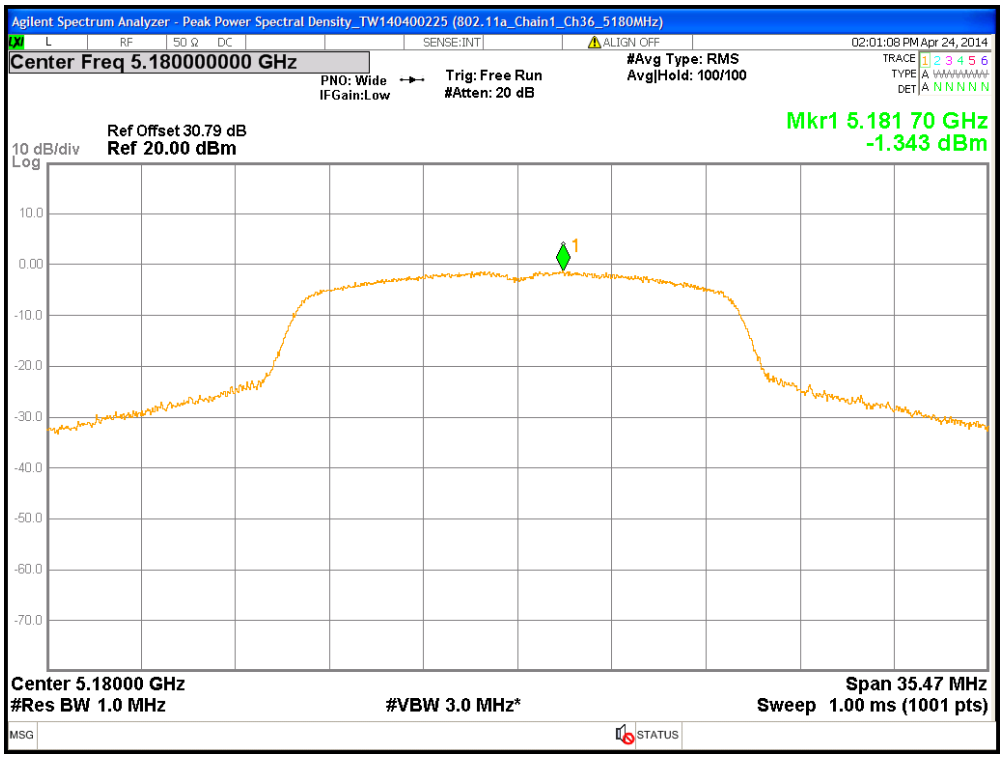
4.6 Test results

Mode	Channel	Frequency (MHz)	PSD (dBm)	Duty Cycle	Total PSD with Duty factor		Limit (dBm)	Margin (dB)
					mW	dBm		
802.11a (Chain1)	36	5180	-1.34	0.85	0.86	-0.66	4	-4.66
	40	5200	-0.84	0.85	0.96	-0.16	4	-4.16
	48	5240	-1.51	0.85	0.83	-0.83	4	-4.83
	52	5260	-2.48	0.85	0.66	-1.78	11	-12.78
	56	5280	-2.80	0.85	0.62	-2.10	11	-13.10
	64	5320	-2.06	0.85	0.73	-1.36	11	-12.36
	100	5500	2.24	0.86	1.96	2.92	11	-8.08
	116	5580	3.12	0.86	2.40	3.80	11	-7.20
	140	5700	-1.20	0.86	0.89	-0.52	11	-11.52
	149	5745	-5.14	0.85	0.36	-4.45	17	-21.45
	153	5765	-5.22	0.85	0.35	-4.54	17	-21.54
	161	5805	-5.44	0.85	0.33	-4.76	17	-21.76
802.11n (HT 20) (Chain1)	36	5180	-2.12	0.85	0.73	-1.39	4	-5.39
	40	5200	-1.69	0.85	0.80	-0.96	4	-4.96
	48	5240	-2.27	0.85	0.70	-1.55	4	-5.55
	52	5260	-3.10	0.85	0.58	-2.38	11	-13.38
	56	5280	-3.54	0.85	0.52	-2.81	11	-13.81
	64	5320	-2.96	0.85	0.60	-2.24	11	-13.24
	100	5500	2.33	0.84	2.03	3.07	11	-7.93
	116	5580	2.81	0.84	2.27	3.56	11	-7.44
	140	5700	-1.27	0.84	0.89	-0.52	11	-11.52
	149	5745	-4.64	0.84	0.41	-3.89	17	-20.89
	153	5765	-3.73	0.84	0.50	-2.99	17	-19.99
	161	5805	-3.34	0.84	0.55	-2.59	17	-19.59

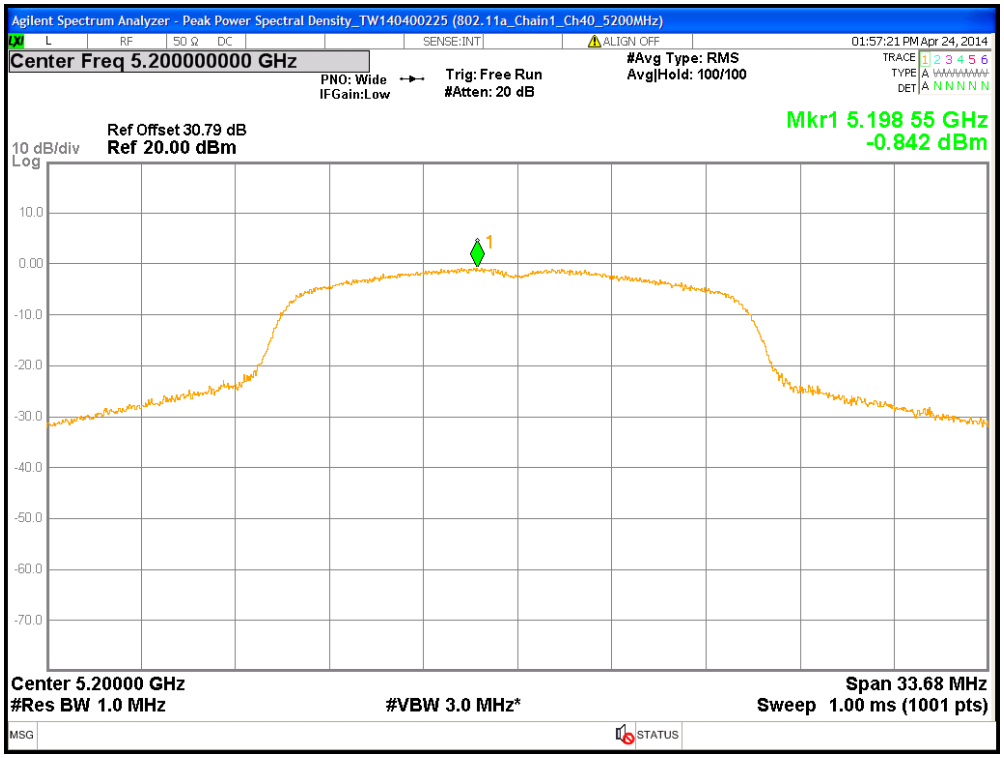
Note: Total PSD with Duty factor=PSD+10log(1/(Duty cycle))

Mode	Channel	Frequency (MHz)	PSD (dBm)	Duty Cycle	Total PSD with Duty factor		Limit (dBm)	Margin (dB)
					mW	dBm		
802.11n (HT 40) (Chain1)	38	5190	-11.88	0.73	0.09	-10.49	4	-14.49
	46	5230	-12.66	0.73	0.07	-11.27	4	-15.27
	54	5270	-13.33	0.73	0.06	-11.99	11	-22.99
	62	5310	-12.98	0.73	0.07	-11.64	11	-22.64
	102	5510	-10.26	0.73	0.13	-8.92	11	-19.92
	110	5550	-7.87	0.73	0.22	-6.52	11	-17.52
	134	5670	-8.70	0.73	0.18	-7.36	11	-18.36
	151	5755	-11.13	0.73	0.11	-9.78	17	-26.78
	159	5795	-10.88	0.73	0.11	-9.54	17	-26.54

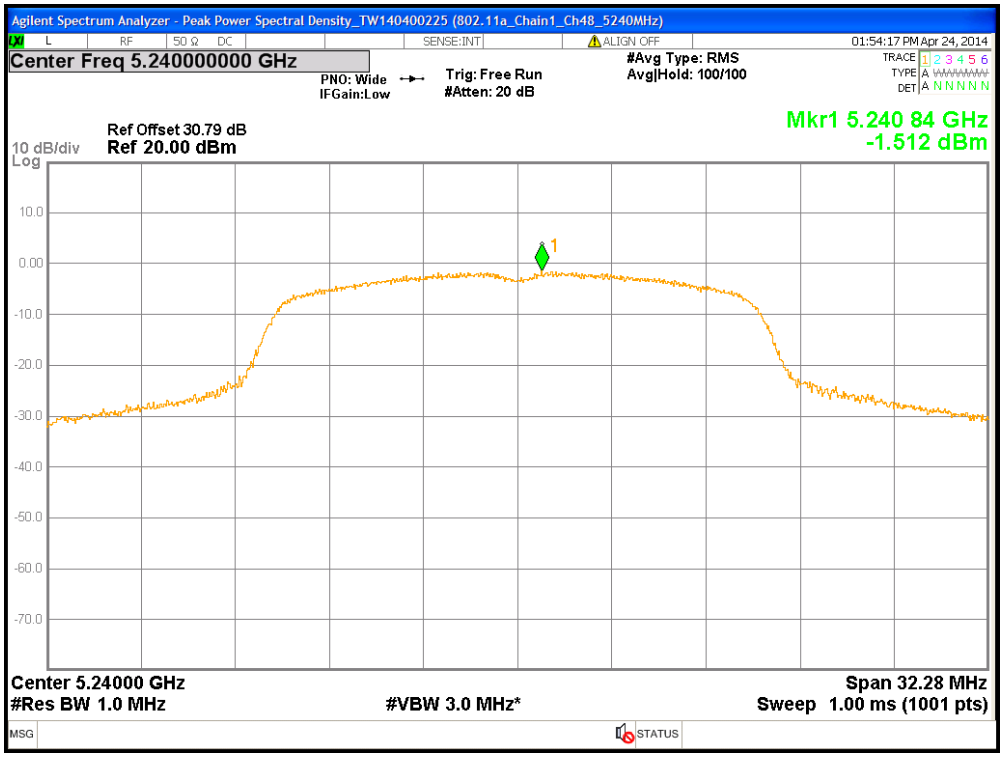
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch36



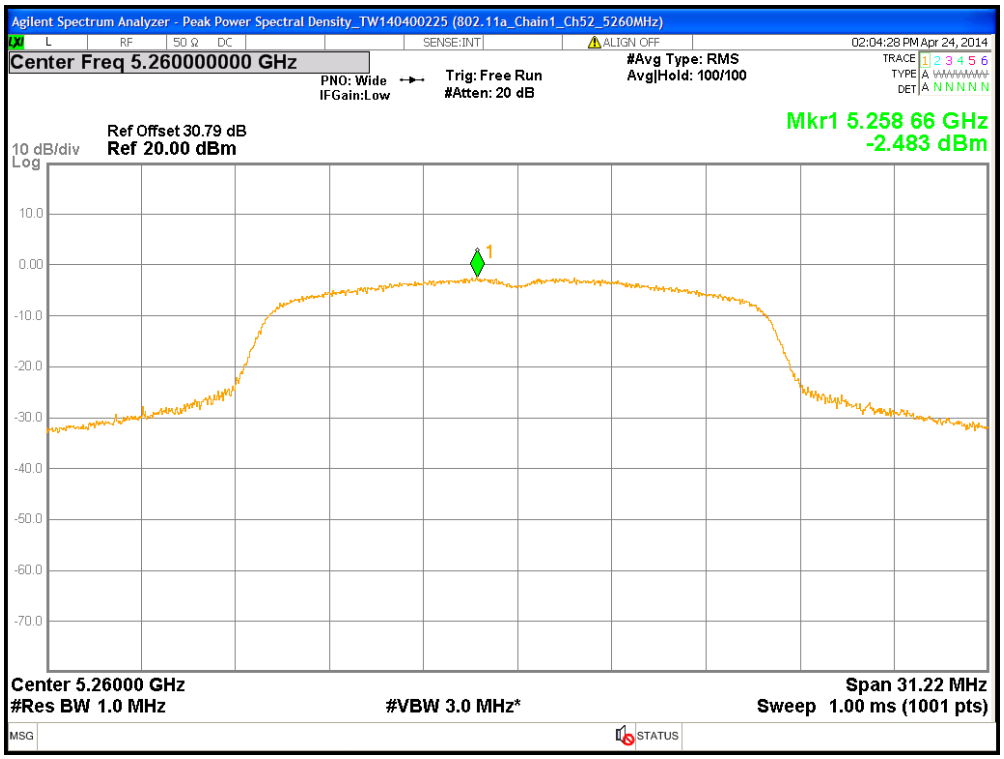
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch40



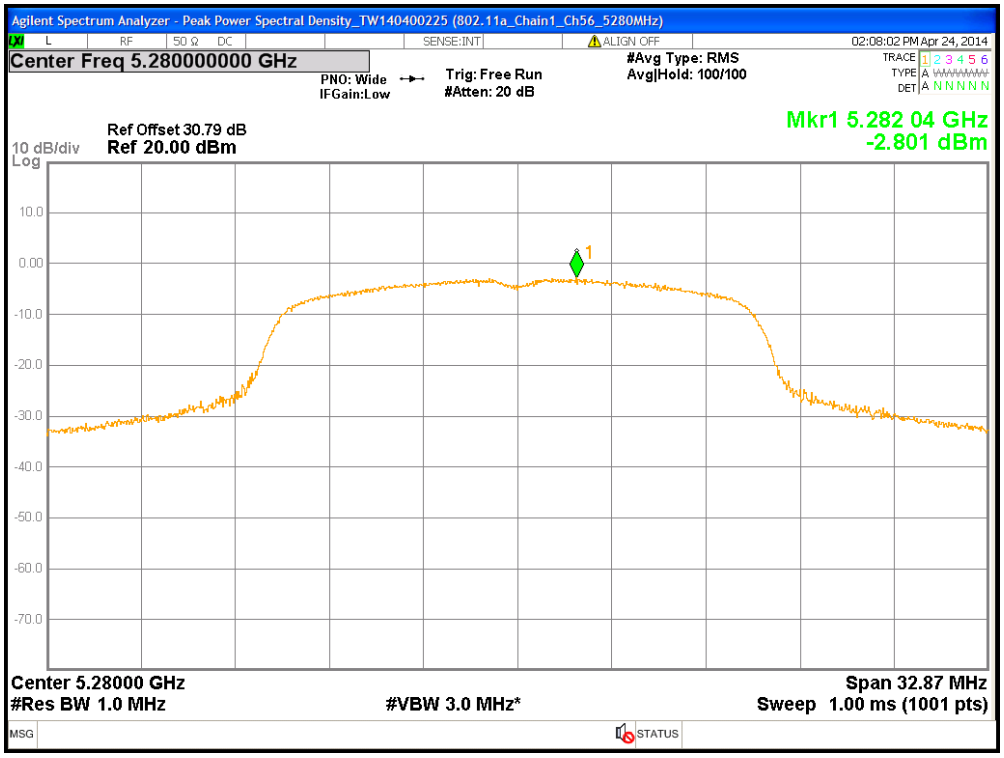
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch48



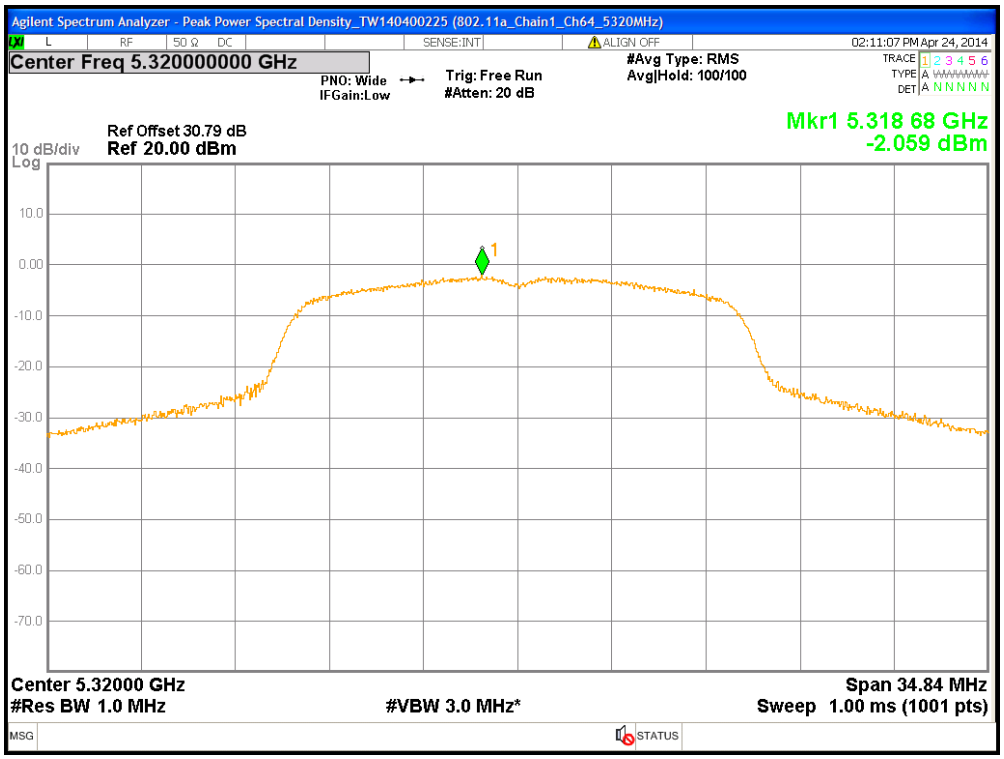
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch52



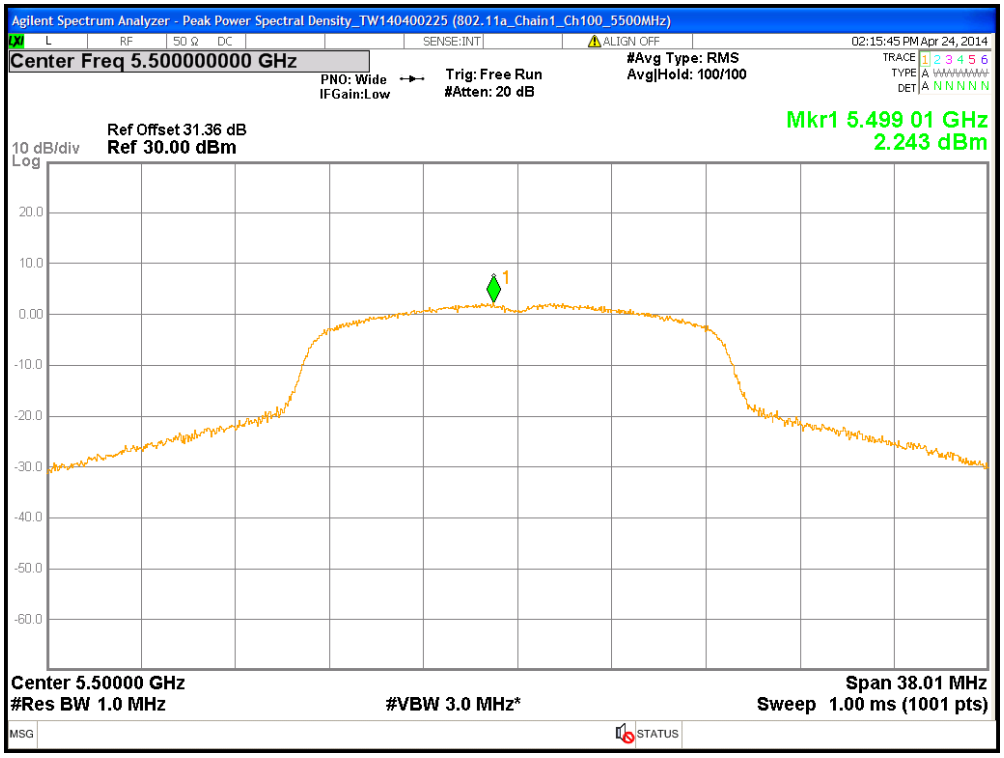
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch56



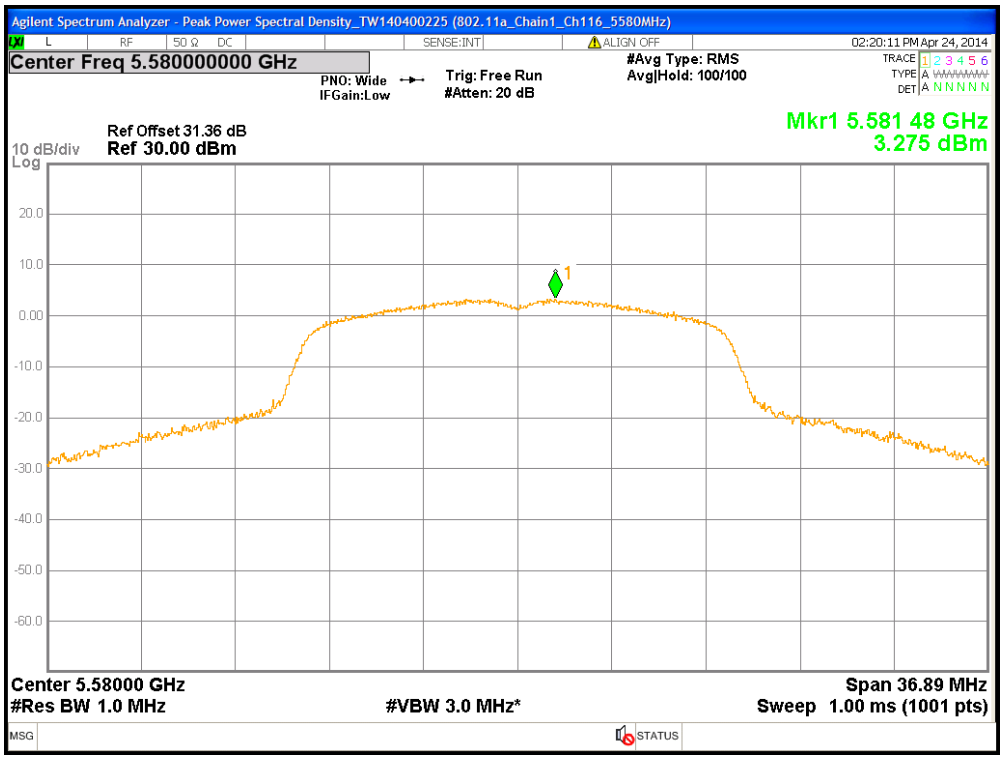
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch64



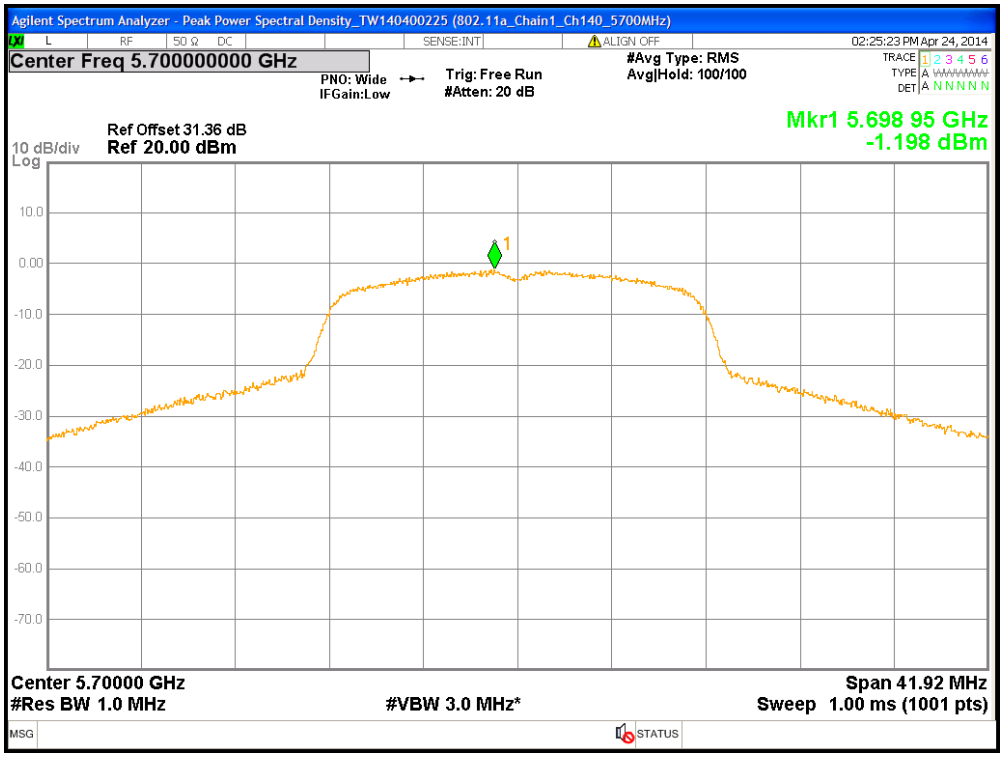
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch100



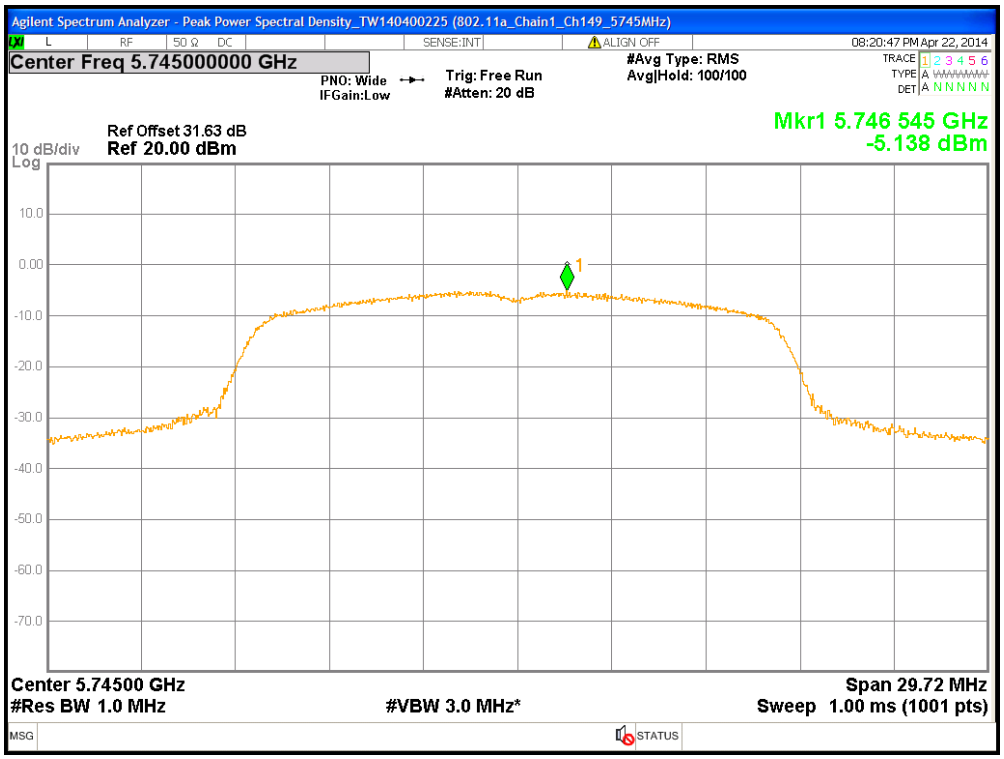
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch116



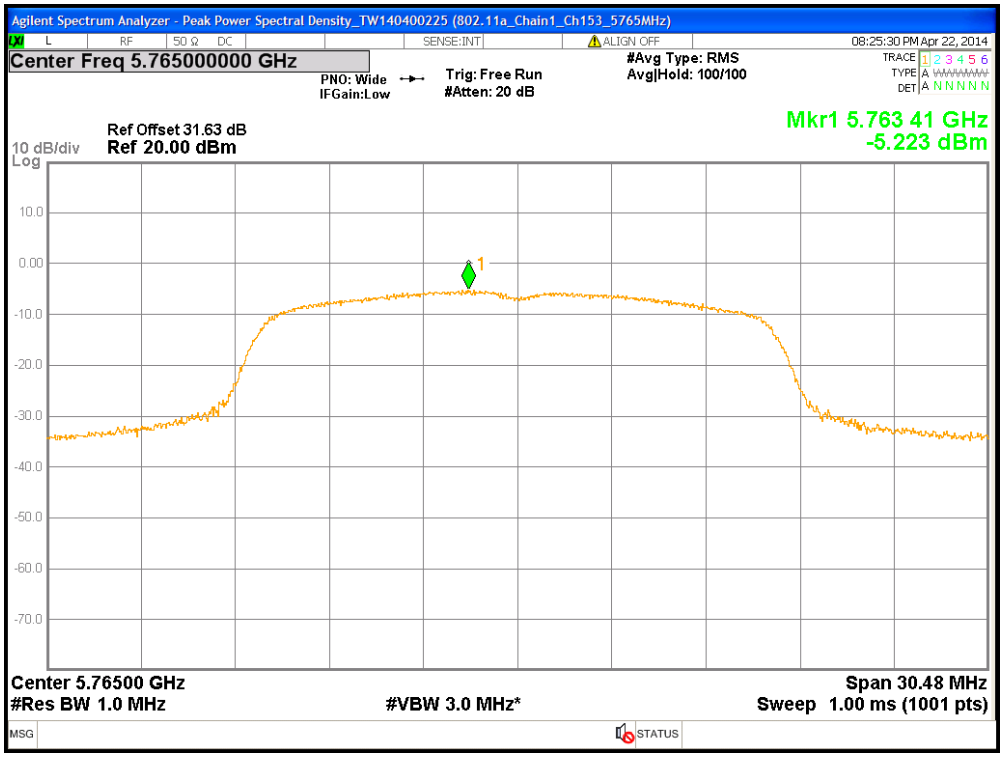
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch140



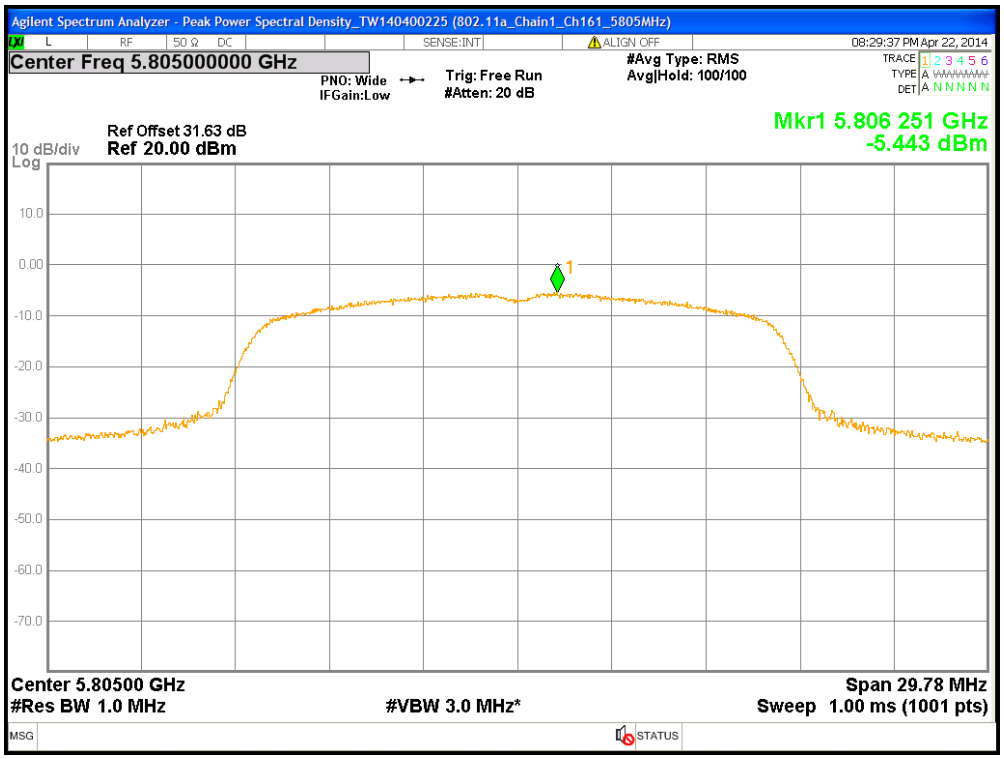
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch149



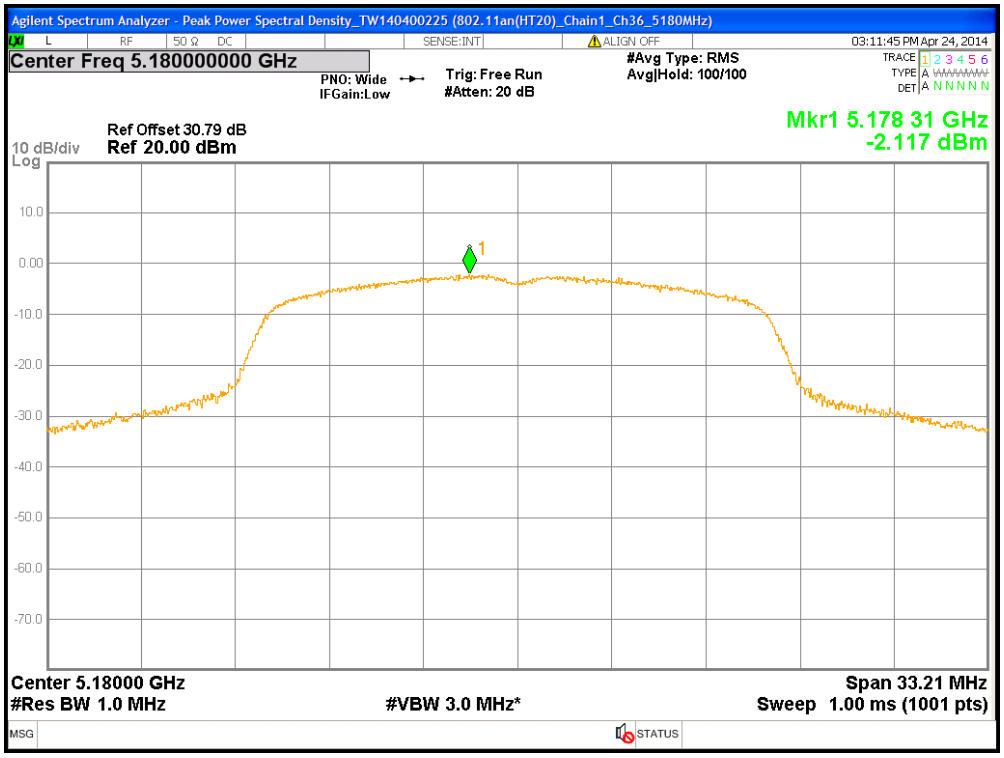
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch153



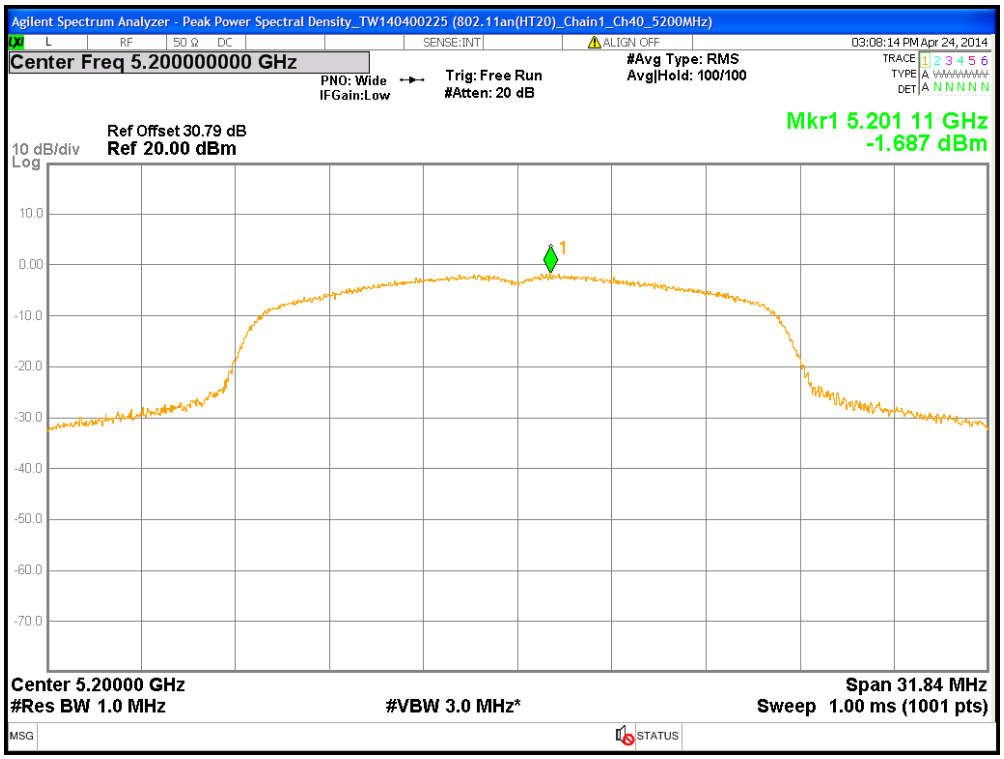
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch161



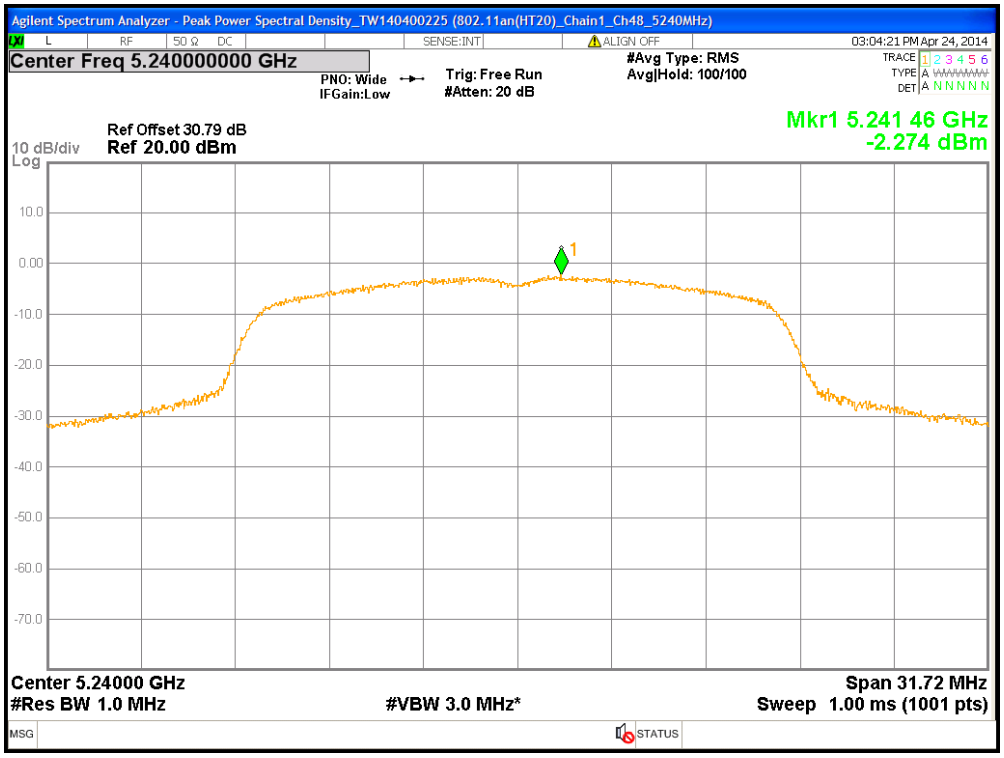
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch36



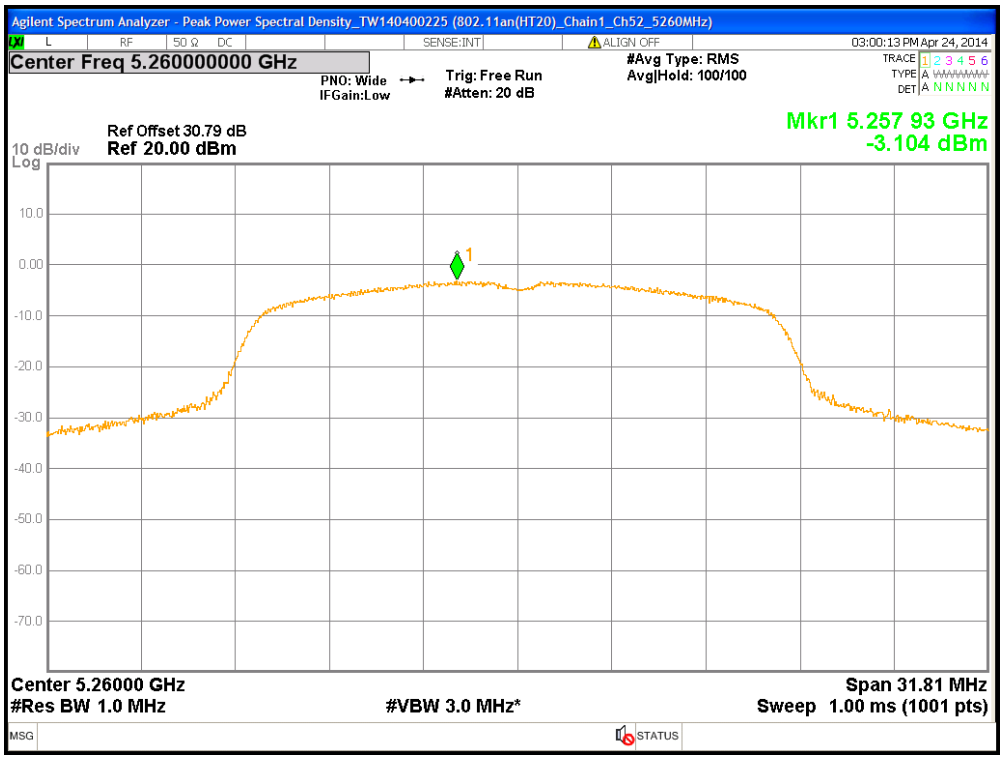
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch40



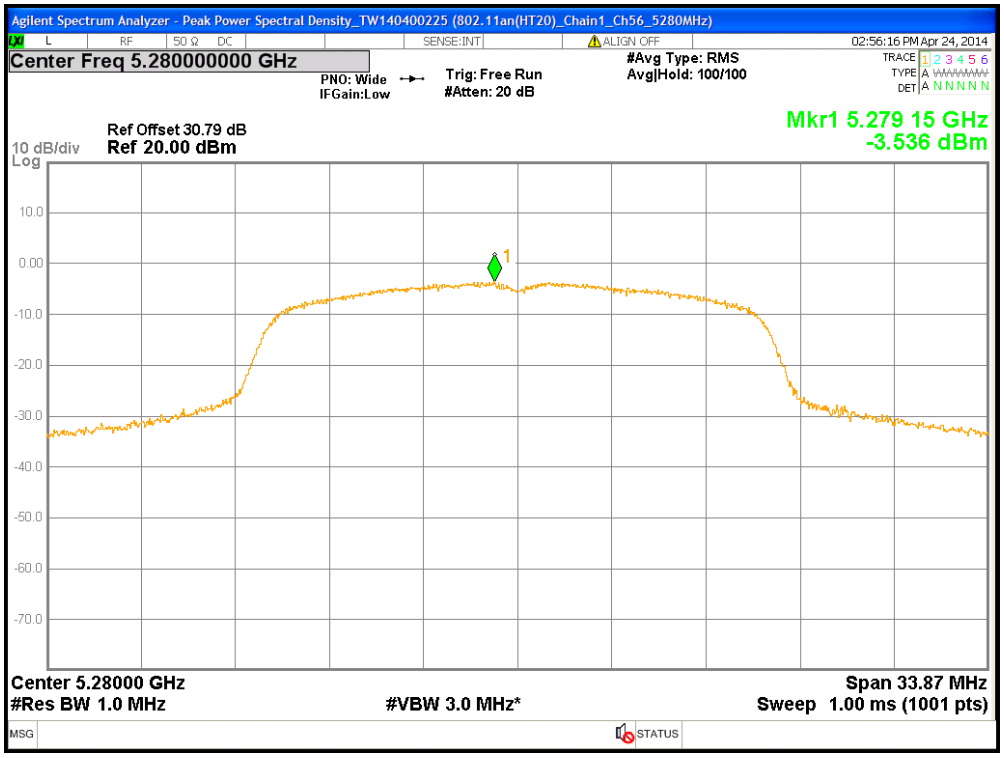
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch48



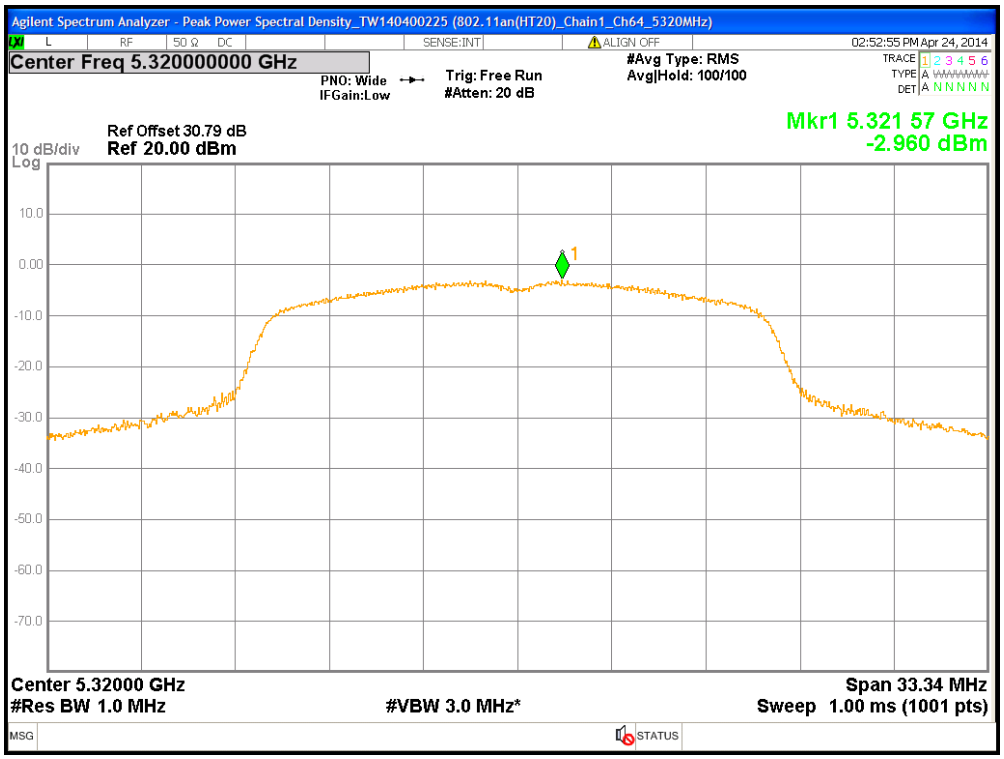
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch52



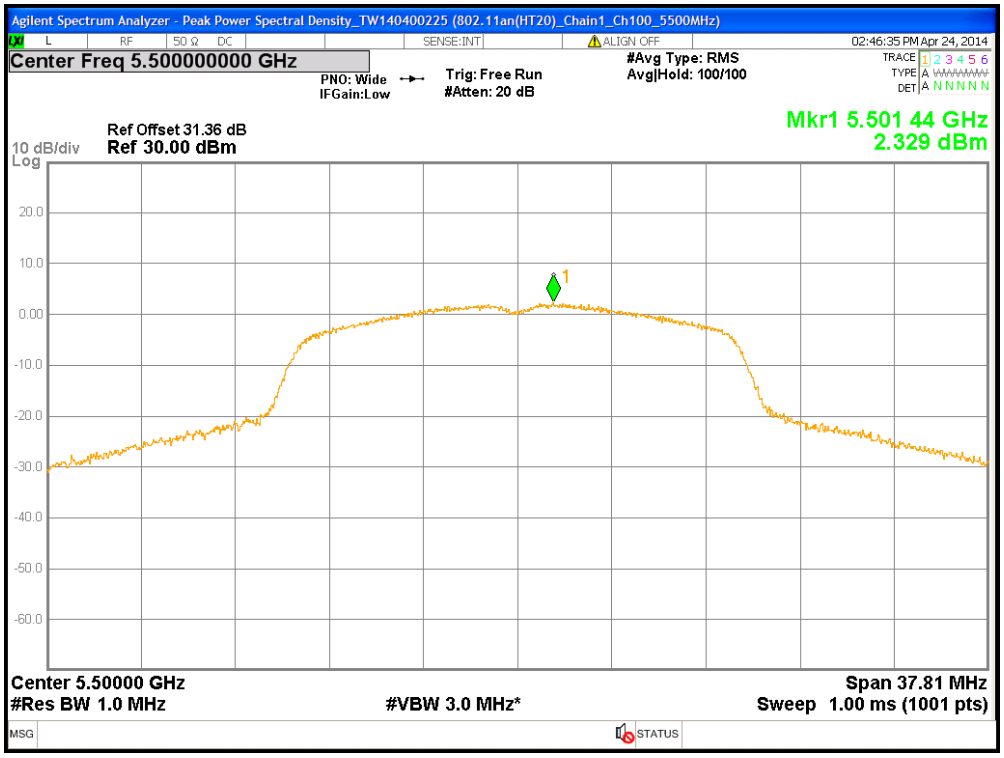
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch56



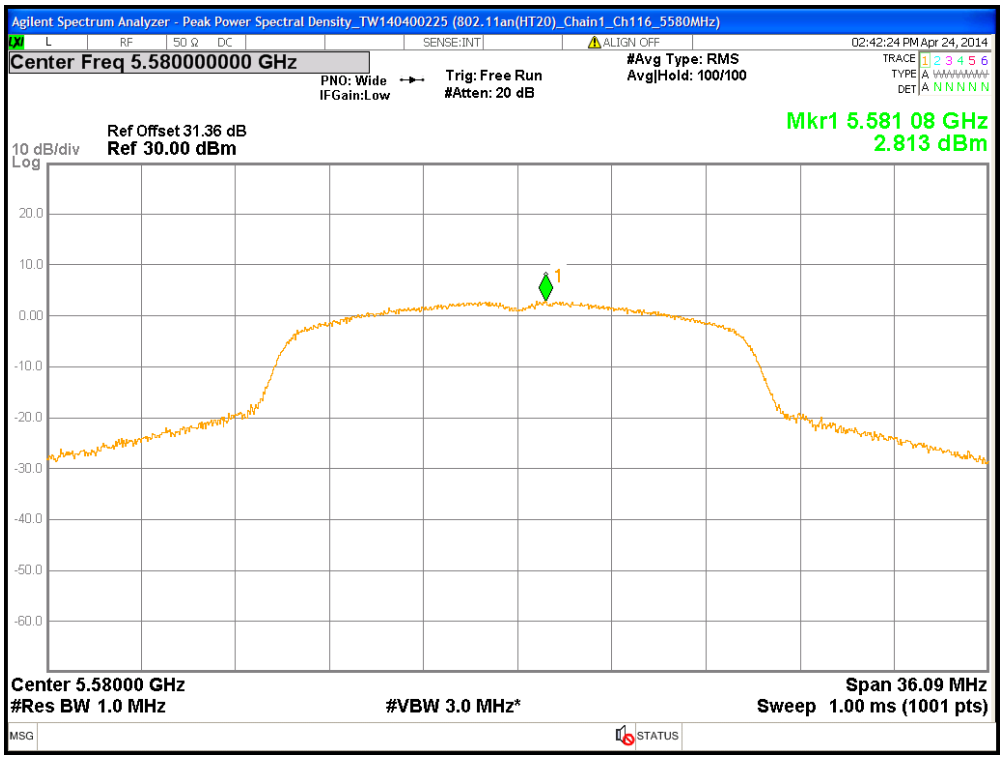
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch64



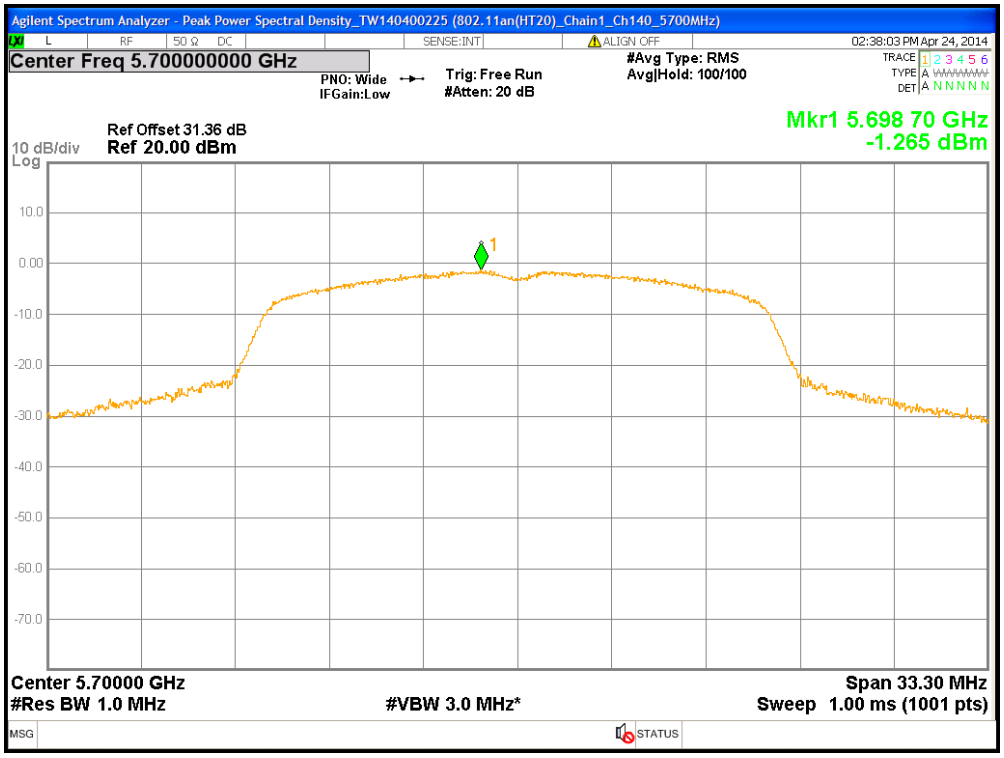
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch100



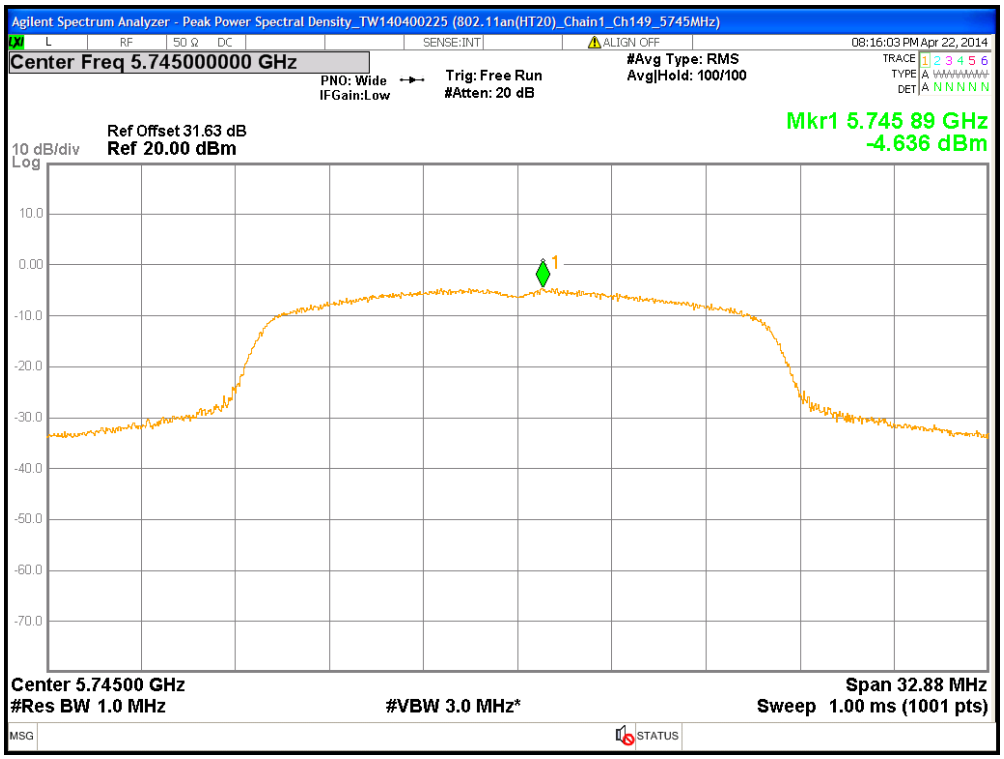
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch116



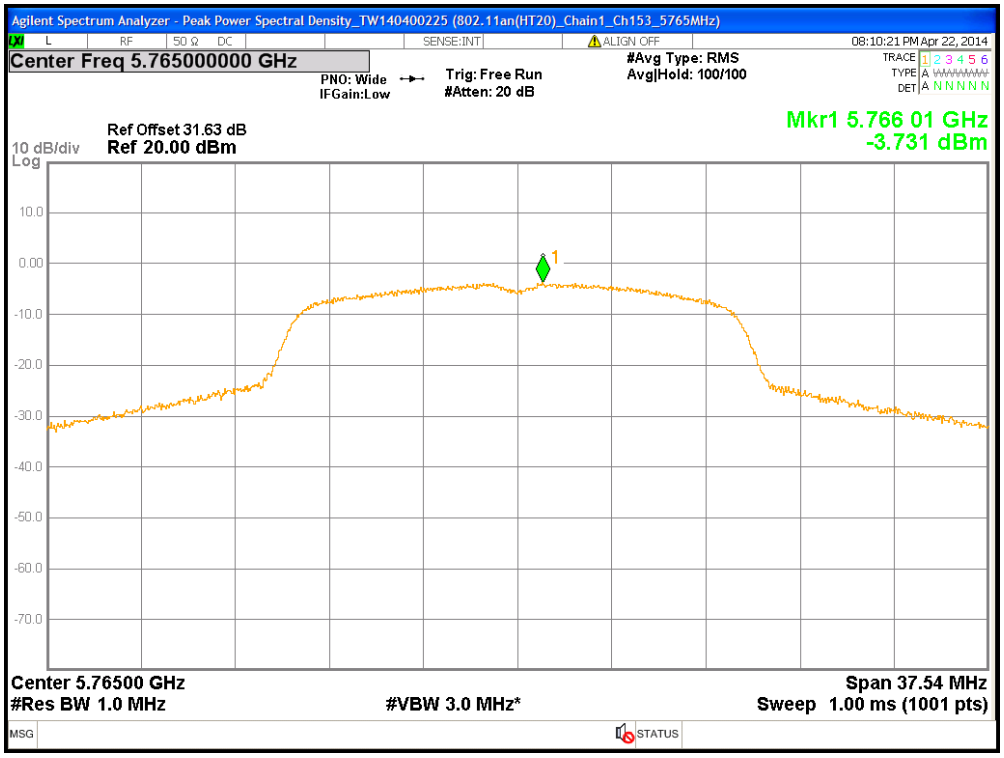
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch140



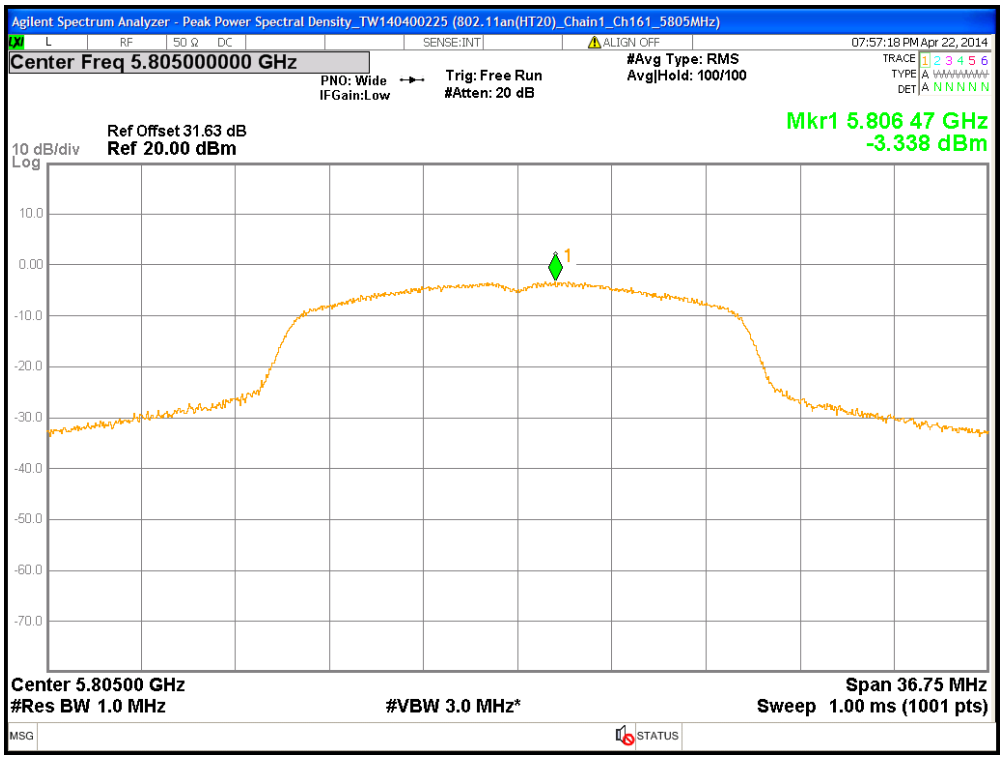
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch149



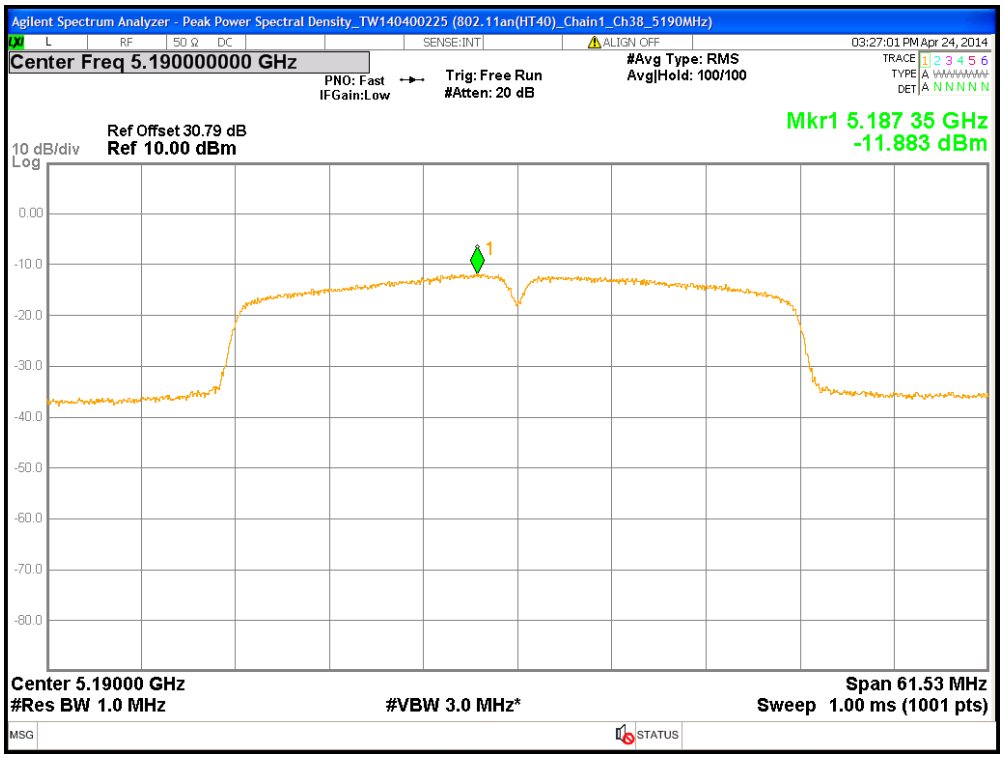
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch153



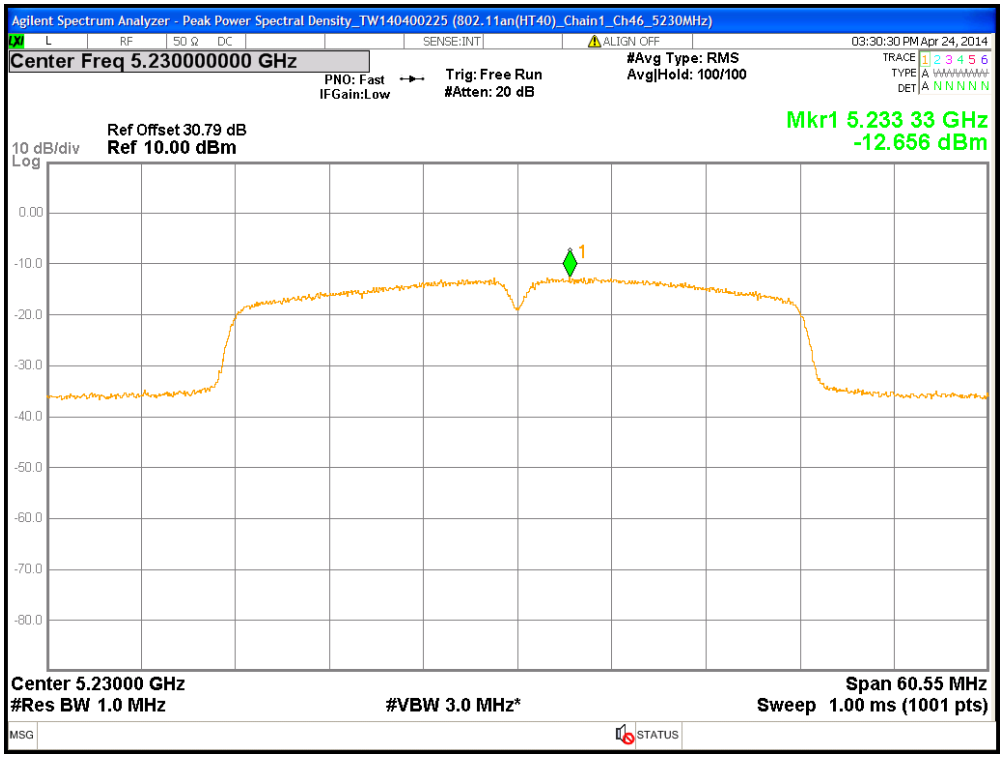
Chain1 : Peak Power Spectral Density @ 802.11n (HT 20) Mode Ch161



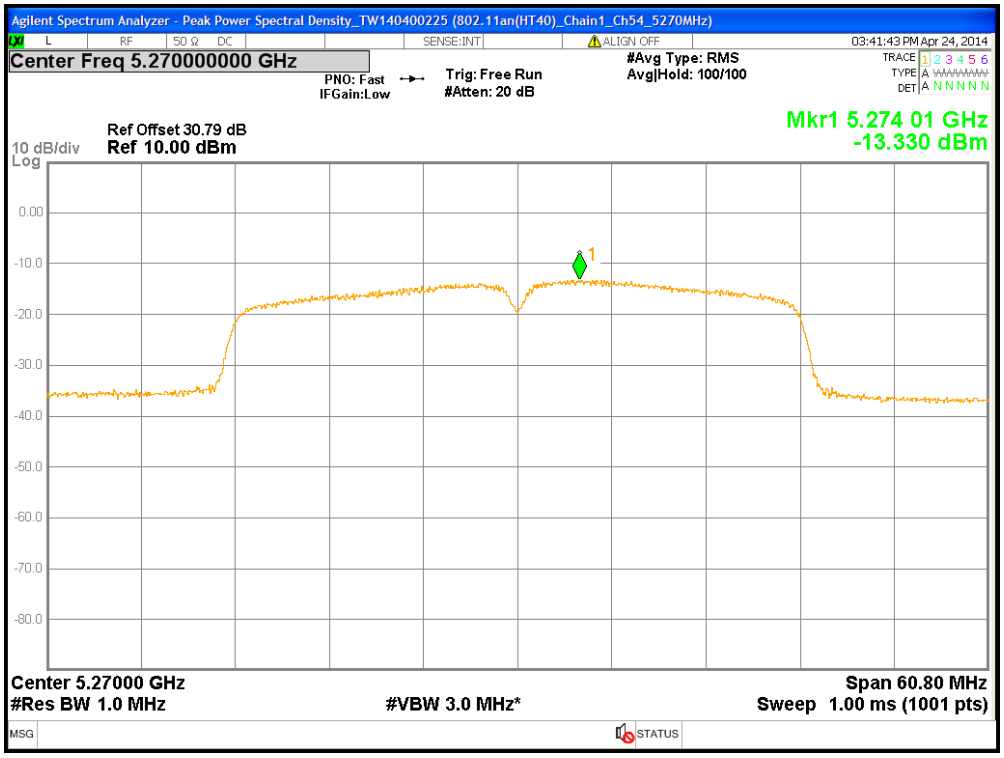
Chain1 : Peak Power Spectral Density @ 802.11n (HT 40) Mode Ch38



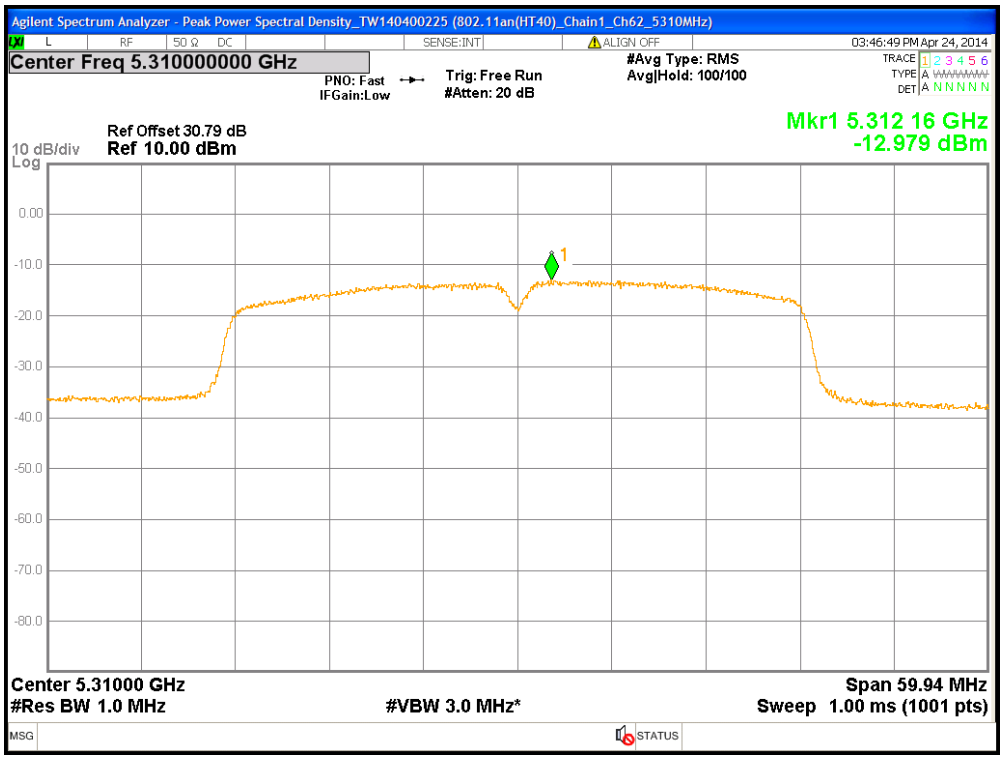
Chain1 : Peak Power Spectral Density @ 802.11n (HT 40) Mode Ch46



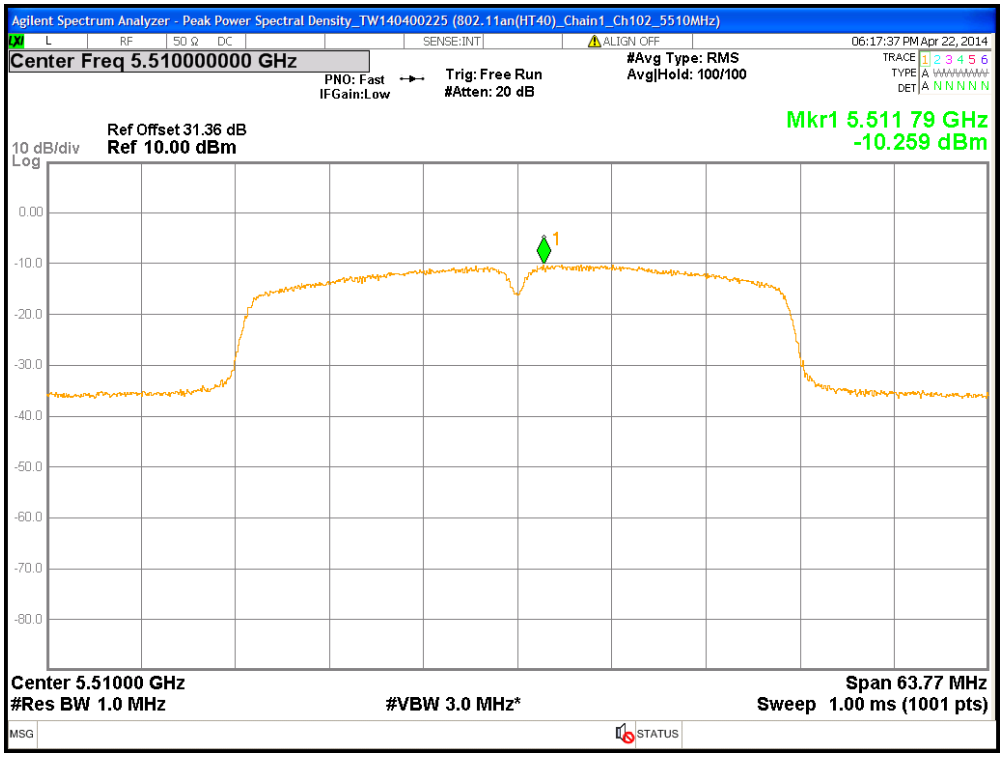
Chain1 : Peak Power Spectral Density @ 802.11n (HT 40) Mode Ch54



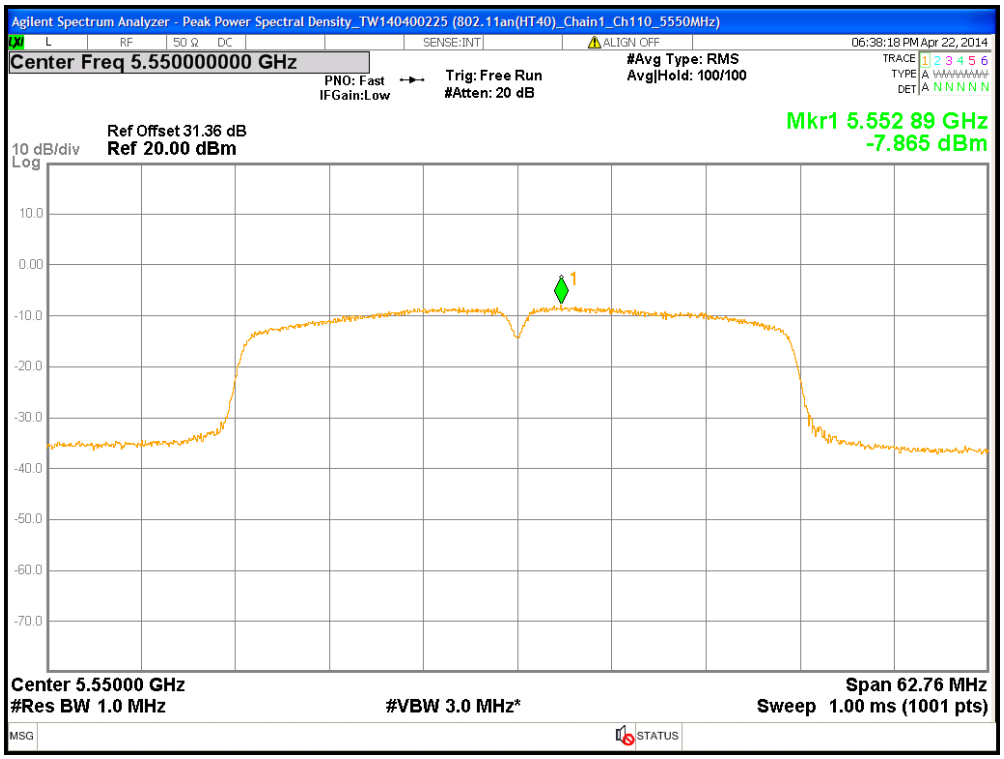
Chain1 : Peak Power Spectral Density @ 802.11n (HT 40) Mode Ch62



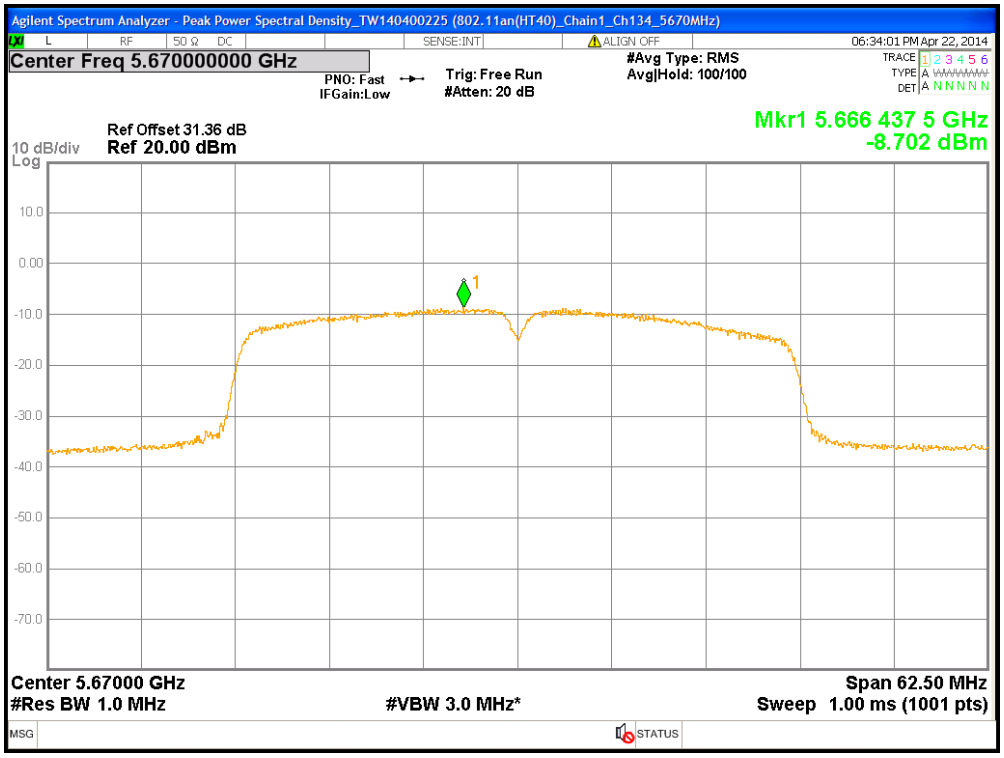
Chain1 : Peak Power Spectral Density @ 802.11n (HT 40) Mode Ch102



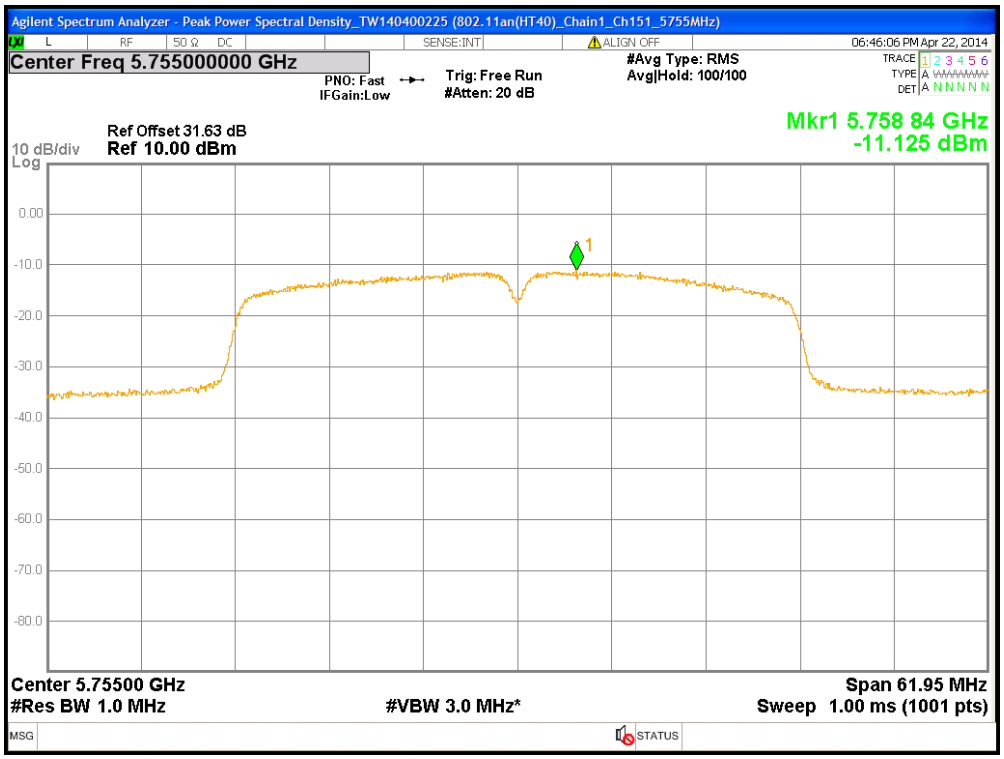
Chain1 : Peak Power Spectral Density @ 802.11n (HT 40) Mode Ch110



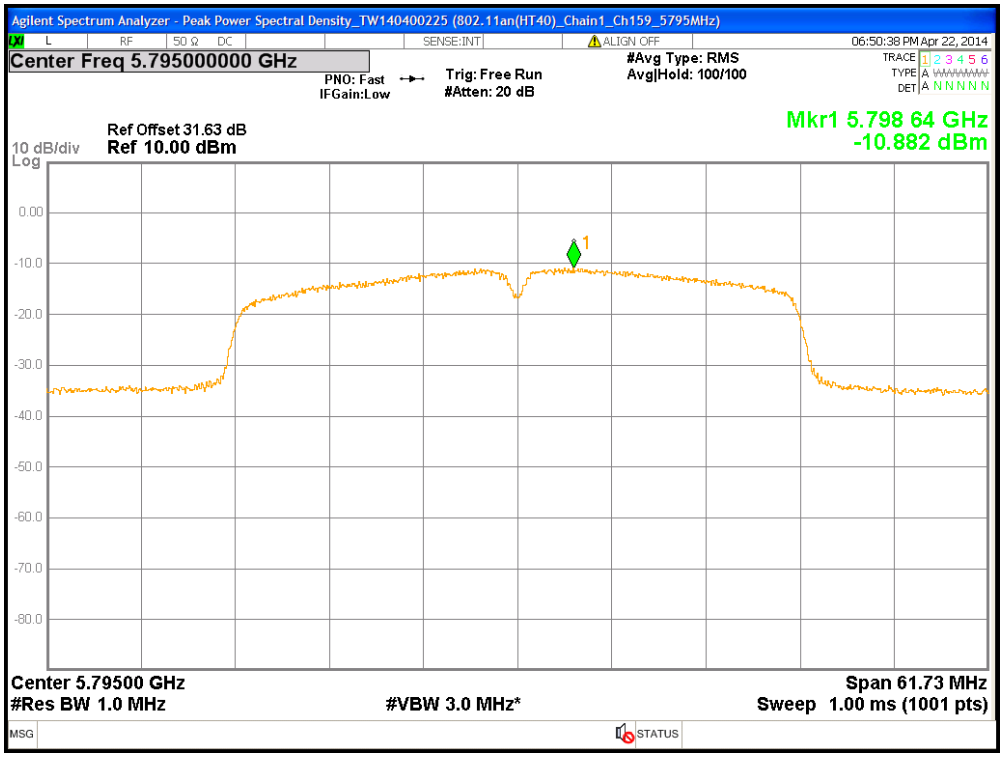
Chain1 : Peak Power Spectral Density @ 802.11n (HT 40) Mode Ch134



Chain1 : Peak Power Spectral Density @ 802.11n (HT 40) Mode Ch151



Chain1 : Peak Power Spectral Density @ 802.11n (HT 40) Mode Ch159



5. Peak Excursion to Average Ratio

5.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,52,56,64,100,116,140,149,153,161 for 20MHz 38,46,54,62,102,110,134,151,159 for 40MHz	

5.2 Limit for peak excursion to average ratio

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

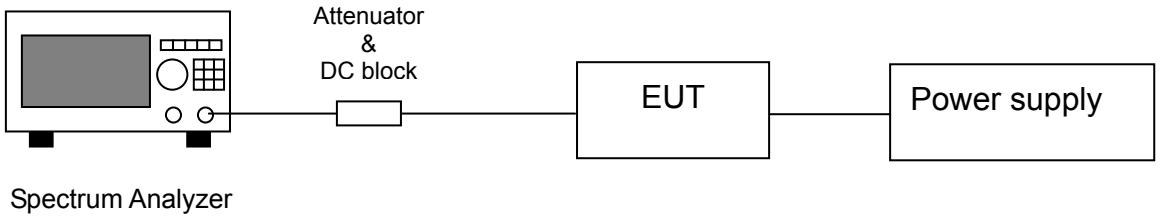
5.3 Measuring instrument setting

Spectrum analyzer settings	
Spectrum Analyzer function	**Setting**
Detector	Peak(Peak trace)/RMS(Average trace)
RBW	1MHz(Peak trace)/1MHz(Average trace)
VBW	＞3MHz(Peak trace)/ ＞3MHz(Average trace)
Sweep	Until the trace stabilizes
Trace	Max hold
Span	Encompass the 26 dB EBW
Attenuation	Auto

5.4 Test procedure

1. Set relevant parameter according to clause 5.3.
2. Use the peak search function to find the peak of the spectrum.
3. Measure the PPSD (peak power spectrum density).
4. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

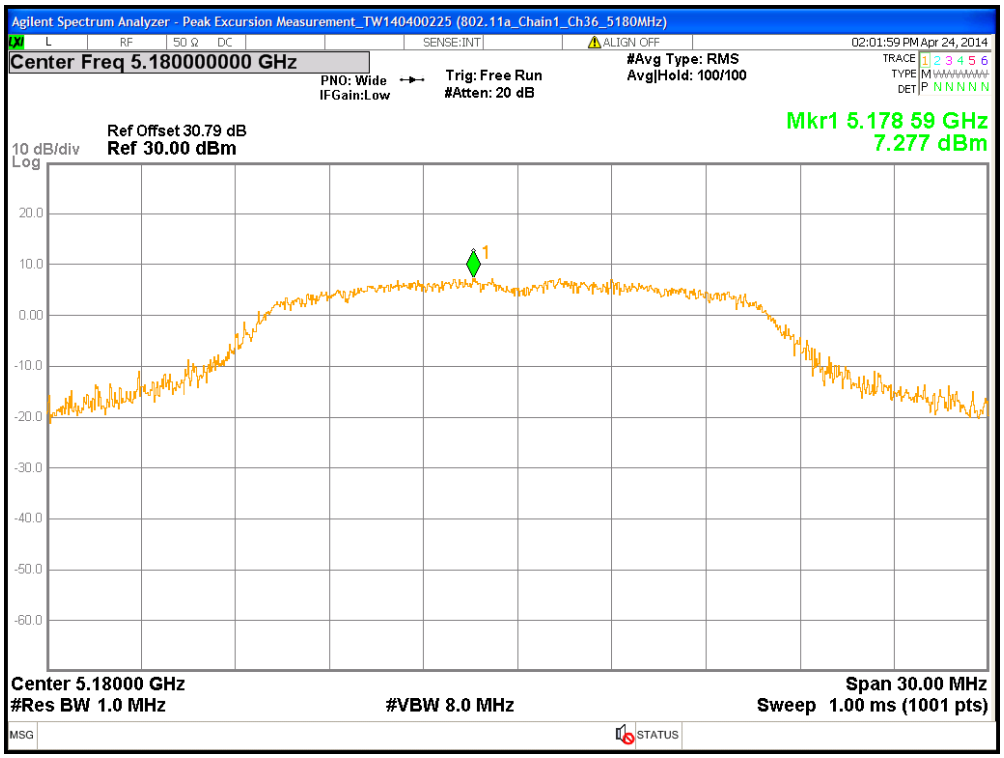
5.5 Test diagram



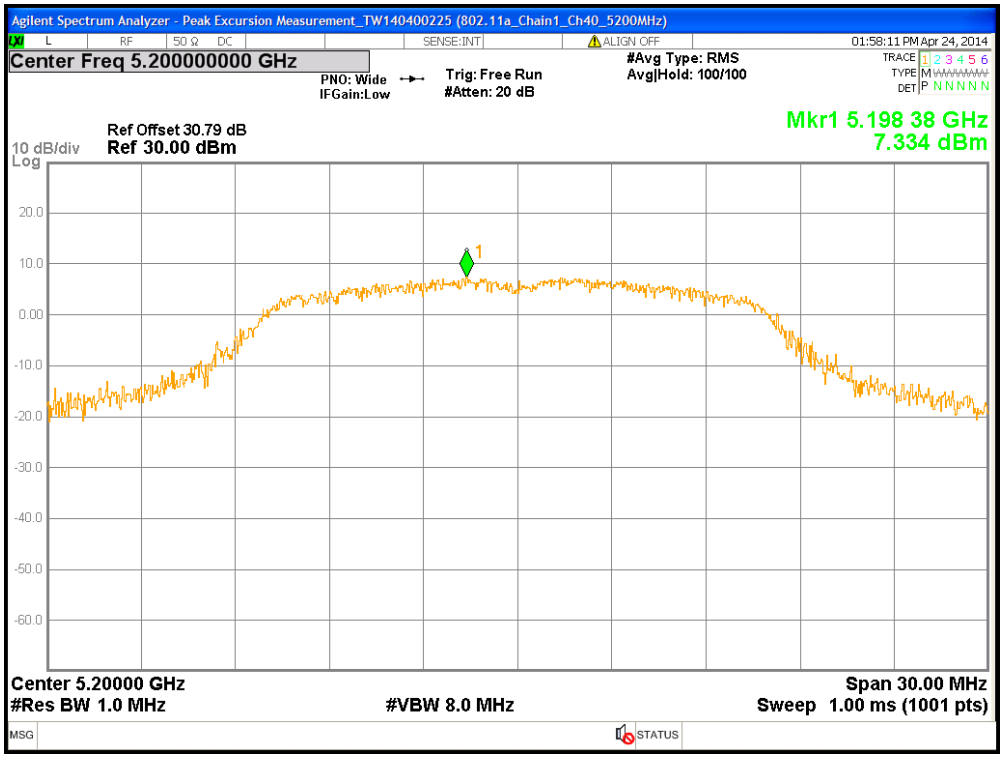
5.6 Test results

Mode	Channel	Frequency (MHz)	PK Value (dBm)	PSD with Duty factor		PK Excursion (dB)	Limit (dB)	Margin (dB)
				mW	dBm			
802.11a (Chain1)	36	5180	7.28	0.86	-0.66	7.93	13	-5.07
	40	5200	7.33	0.86	-0.66	7.99	13	-5.01
	48	5240	7.00	0.96	-0.16	7.15	13	-5.85
	52	5260	6.12	0.83	-0.83	6.94	13	-6.06
	56	5280	5.65	0.66	-1.78	7.43	13	-5.57
	64	5320	7.12	0.62	-2.10	9.22	13	-3.78
	100	5500	10.99	0.73	-1.36	12.35	13	-0.65
	116	5580	11.58	1.96	2.92	8.66	13	-4.34
	140	5700	8.57	2.40	3.80	4.77	13	-8.23
	149	5745	3.06	0.89	-0.52	3.57	13	-9.43
	153	5765	2.74	0.36	-4.45	7.19	13	-5.81
	161	5805	2.83	0.33	-4.76	7.59	13	-5.41
802.11n (HT 20) (Chain1)	36	5180	6.41	0.73	-1.39	7.80	13	-5.20
	40	5200	6.32	0.80	-0.96	7.28	13	-5.72
	48	5240	5.83	0.70	-1.55	7.37	13	-5.63
	52	5260	6.09	0.58	-2.38	8.47	13	-4.53
	56	5280	4.99	0.52	-2.81	7.80	13	-5.20
	64	5320	5.26	0.60	-2.24	7.50	13	-5.50
	100	5500	10.89	2.03	3.07	7.82	13	-5.18
	116	5580	11.13	2.27	3.56	7.58	13	-5.42
	140	5700	7.58	0.89	-0.52	8.10	13	-4.90
	149	5745	4.34	0.41	-3.89	8.23	13	-4.77
	153	5765	6.21	0.50	-2.99	9.20	13	-3.80
	161	5805	5.32	0.55	-2.59	7.91	13	-5.09
802.11n (HT 40) (Chain1)	38	5190	-2.91	0.09	-10.49	7.58	13	-5.42
	46	5230	-2.84	0.07	-11.27	8.42	13	-4.58
	54	5270	-4.04	0.06	-11.99	7.95	13	-5.05
	62	5310	-3.86	0.07	-11.64	7.78	13	-5.22
	102	5510	-1.23	0.13	-8.92	7.69	13	-5.31
	110	5550	2.64	0.22	-6.52	9.16	13	-3.84
	134	5670	0.07	0.18	-7.36	7.43	13	-5.57
	151	5755	-1.41	0.11	-9.78	8.37	13	-4.63
	159	5795	-2.24	0.11	-9.54	7.30	13	-5.70

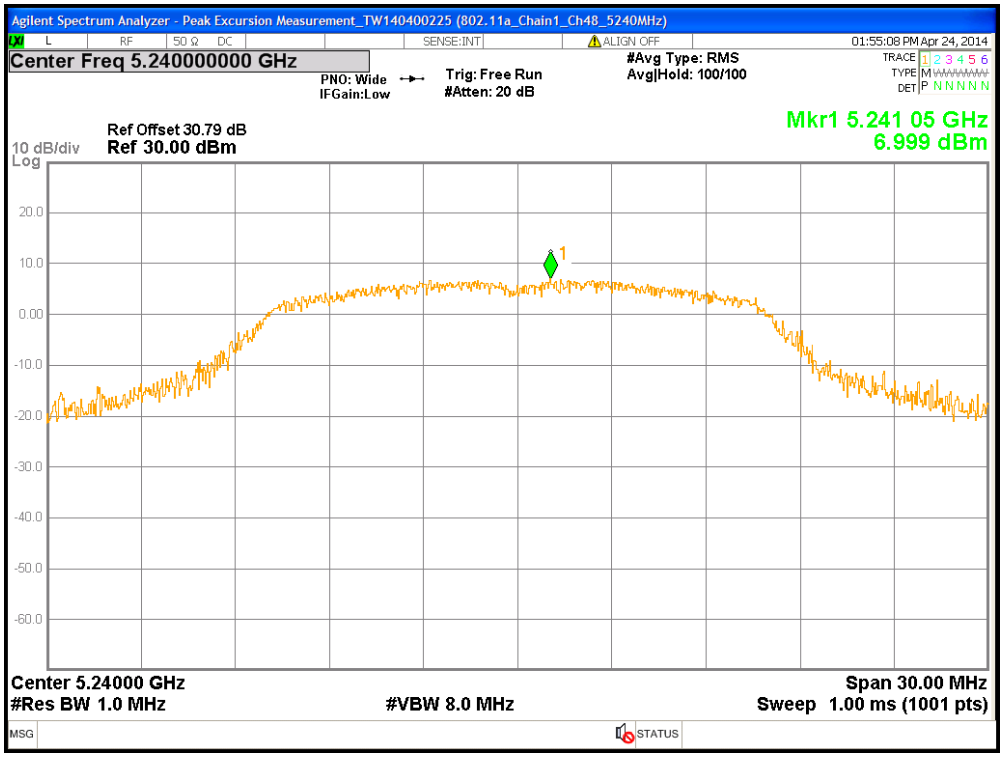
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch36



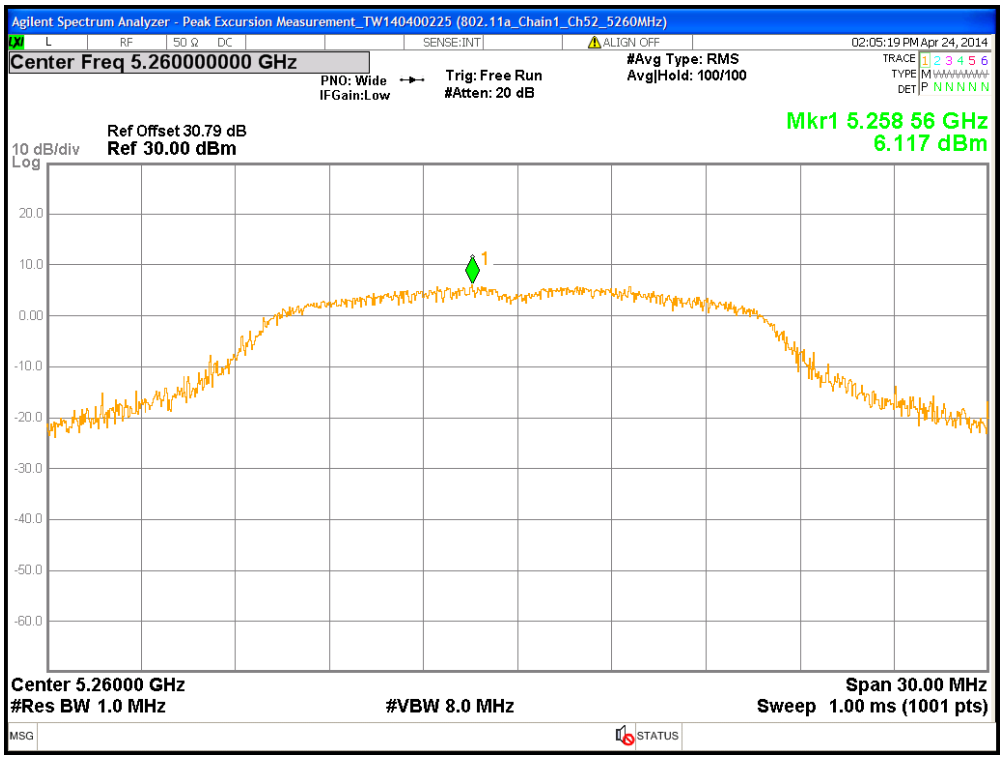
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch40



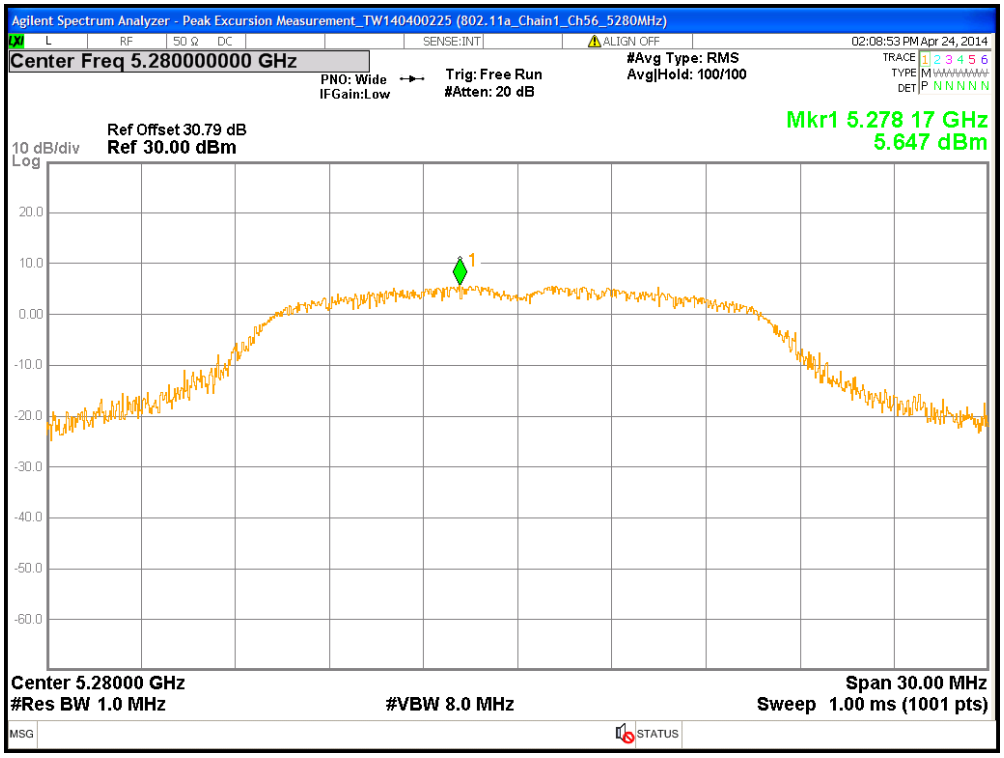
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch48



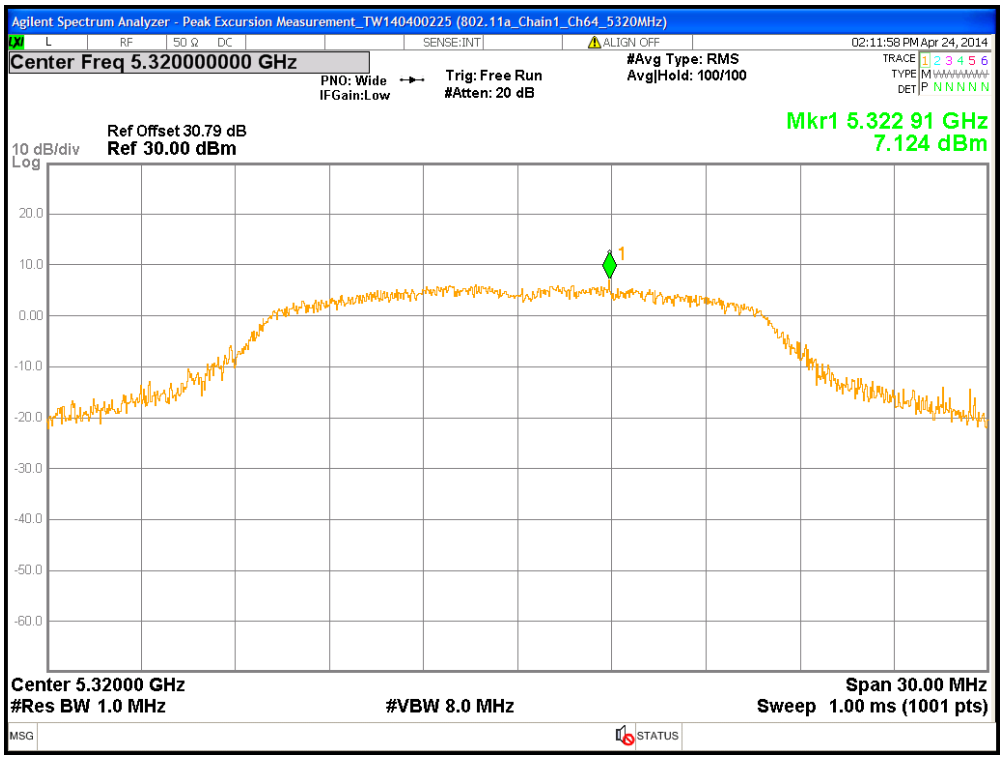
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch52



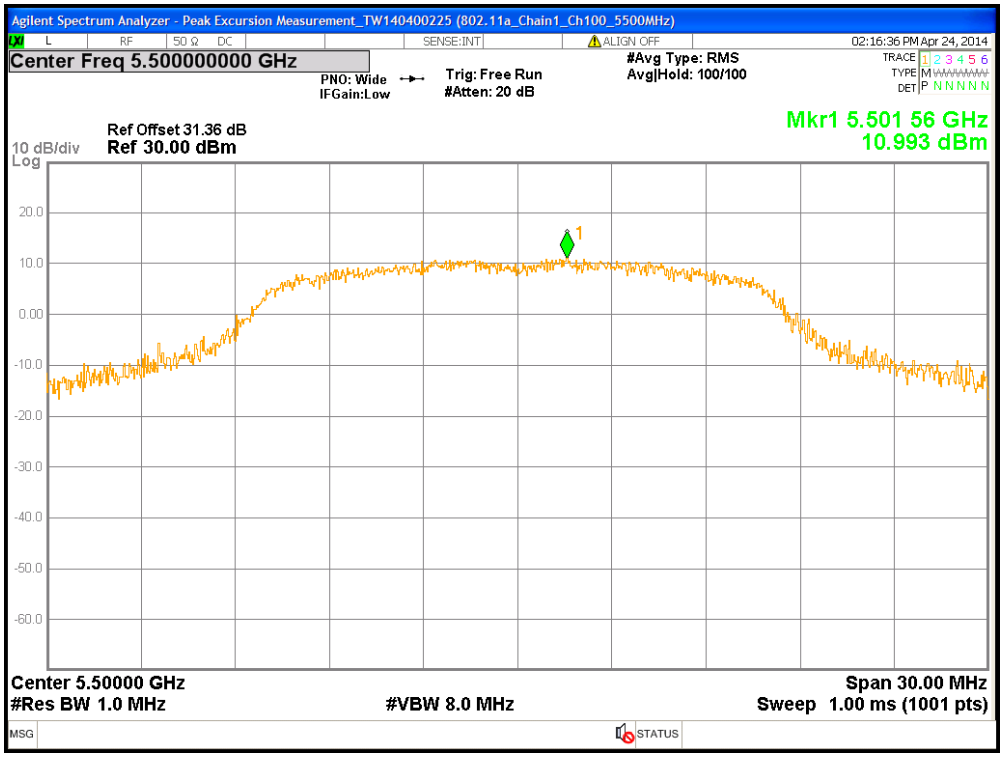
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch56



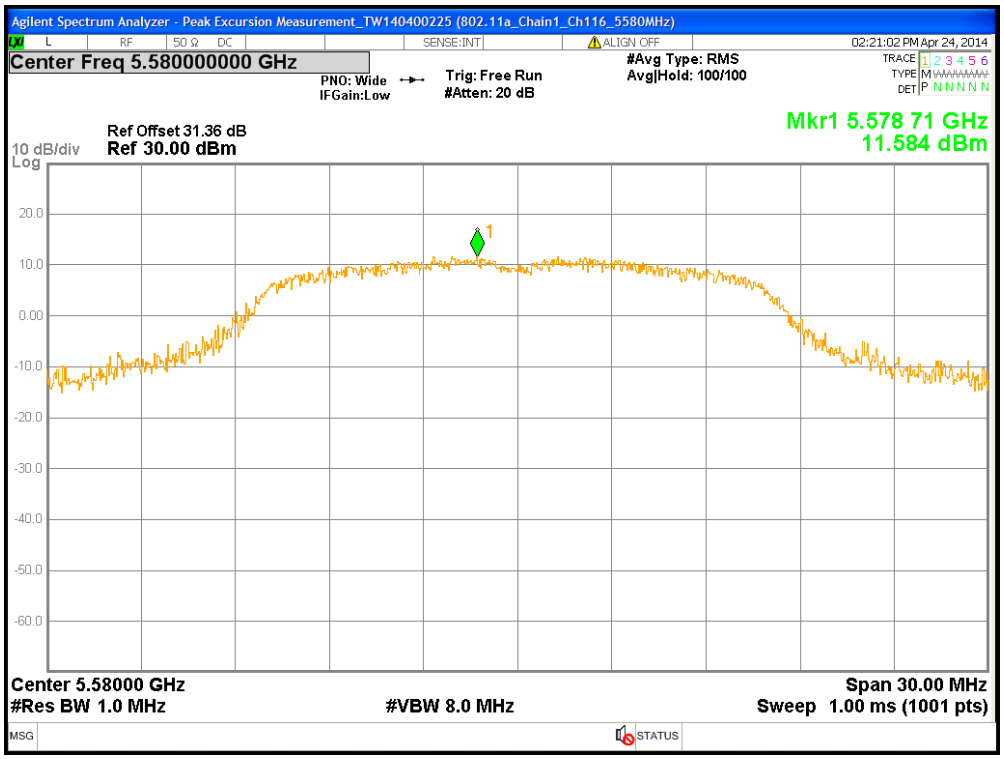
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch64



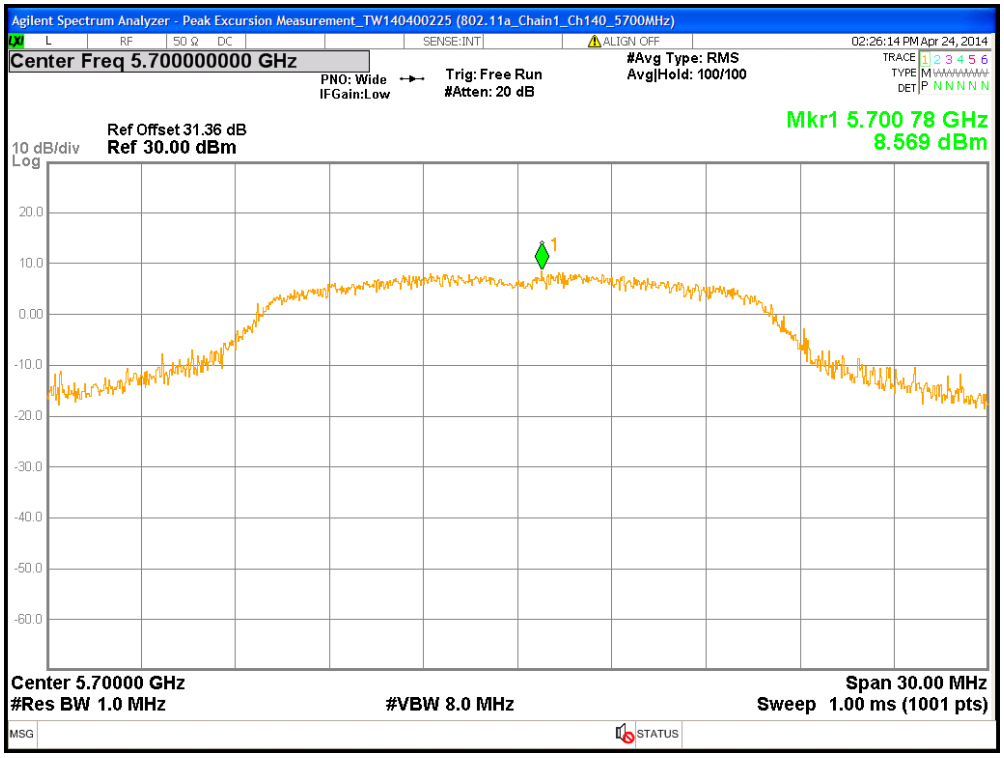
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch100



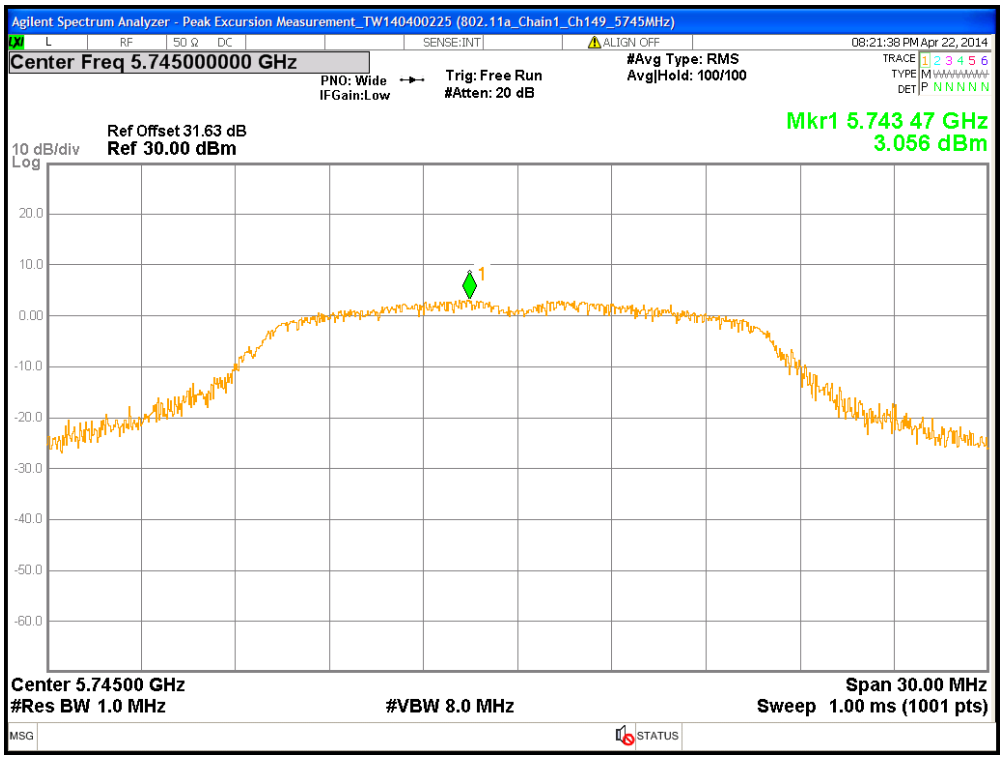
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch116



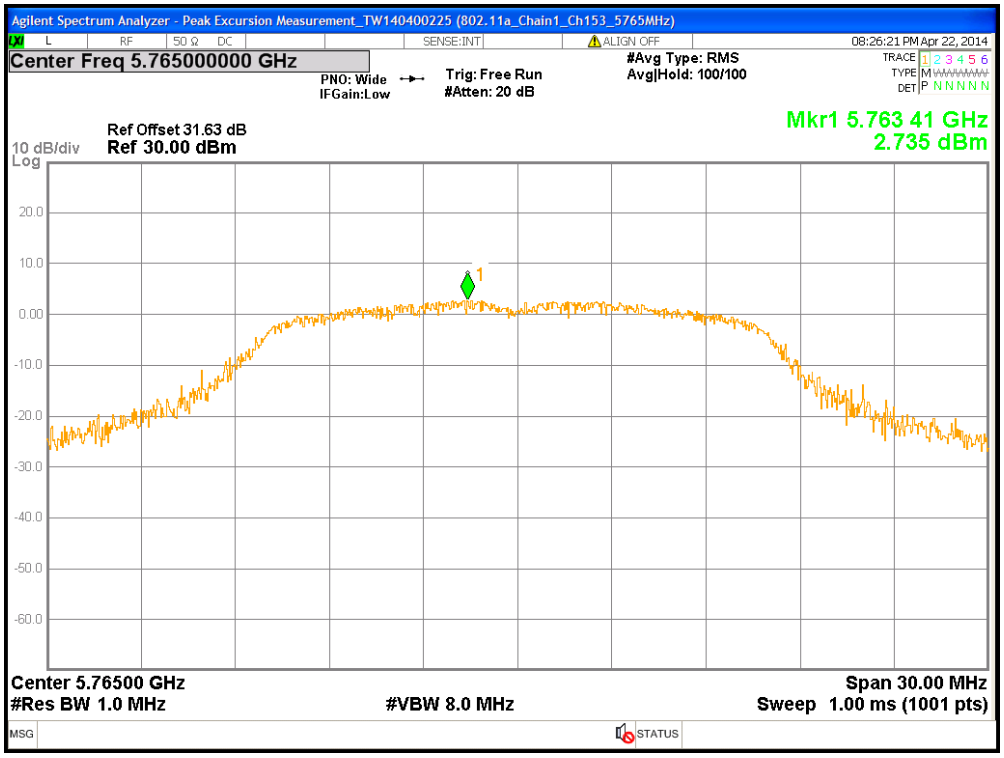
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch140



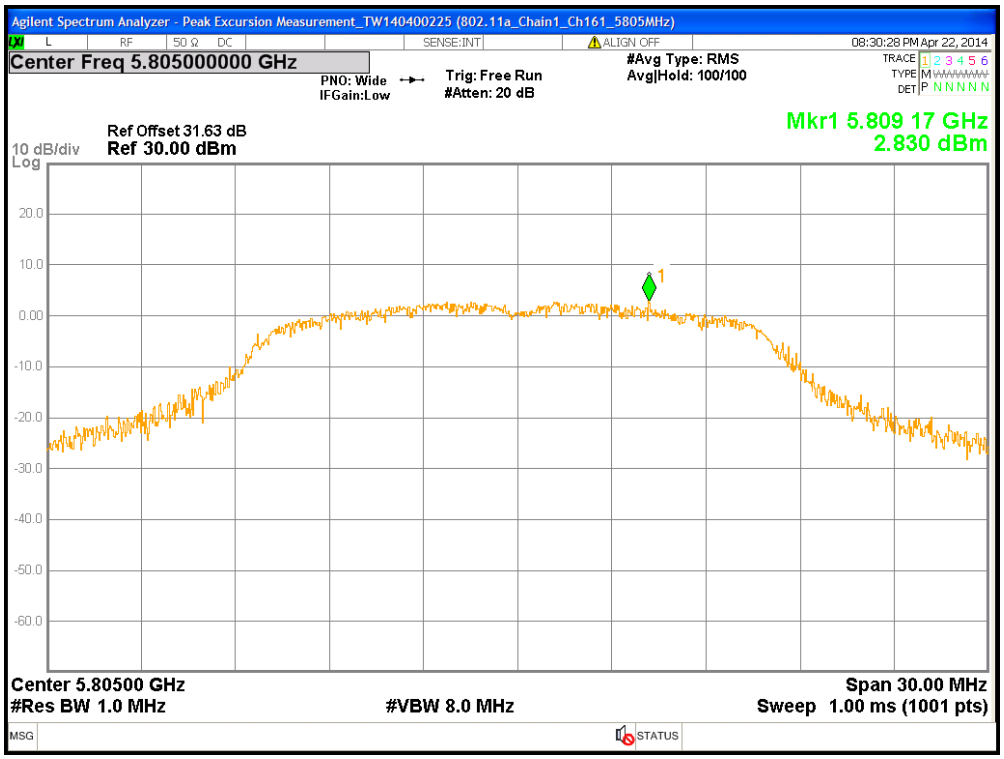
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch149



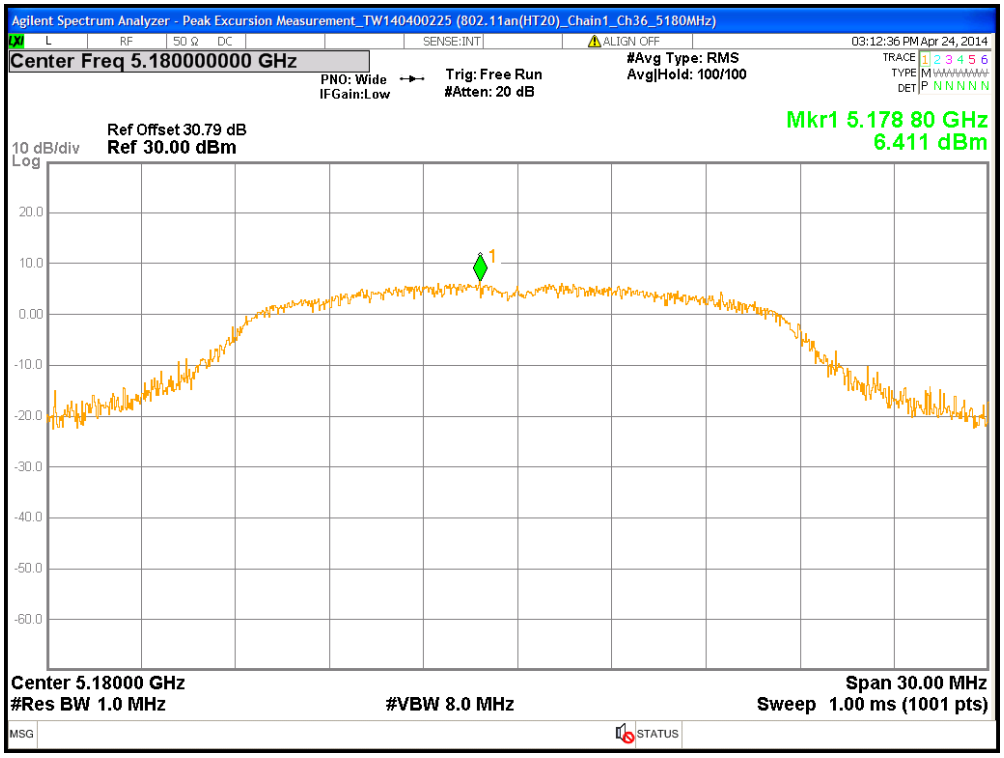
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch153



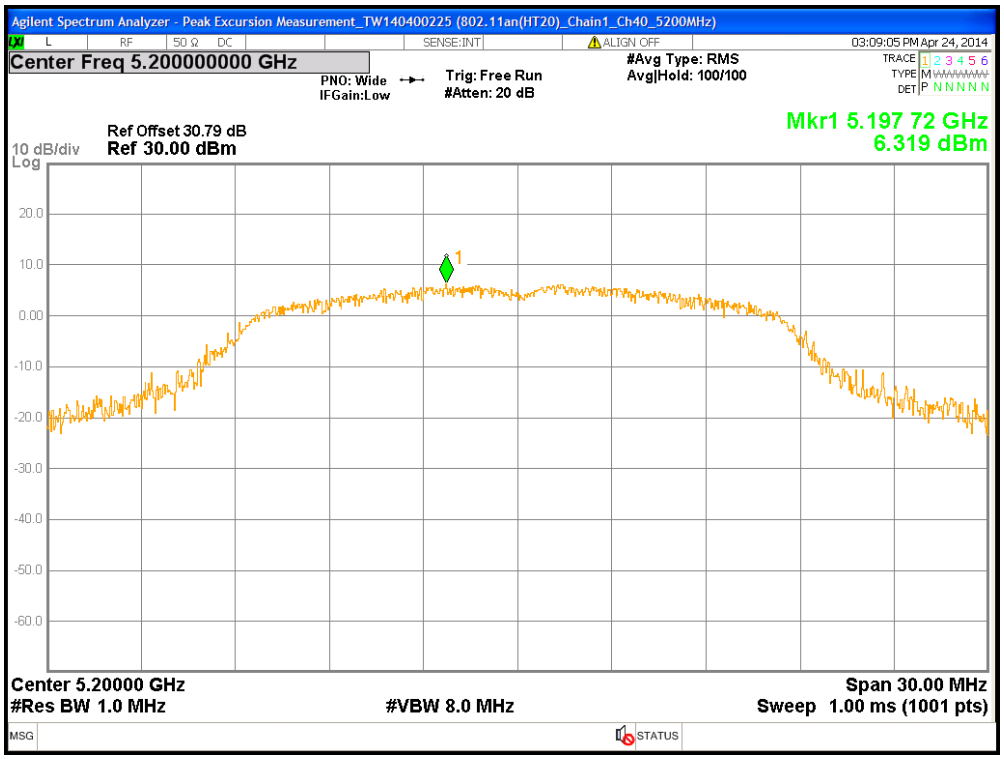
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch161



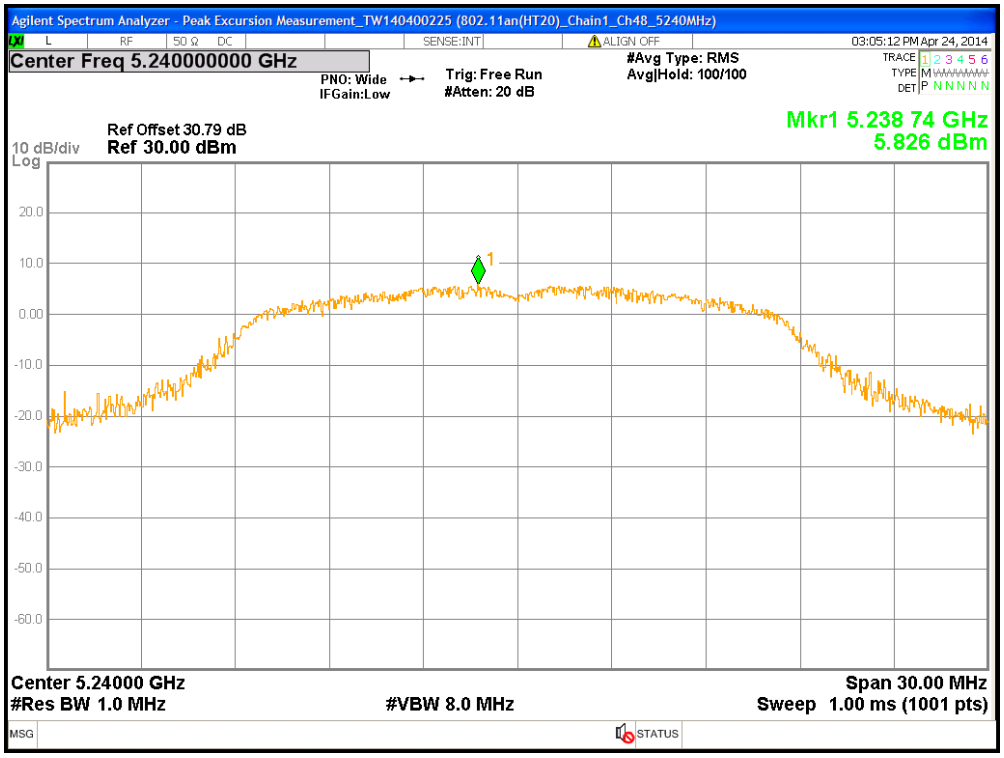
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch36



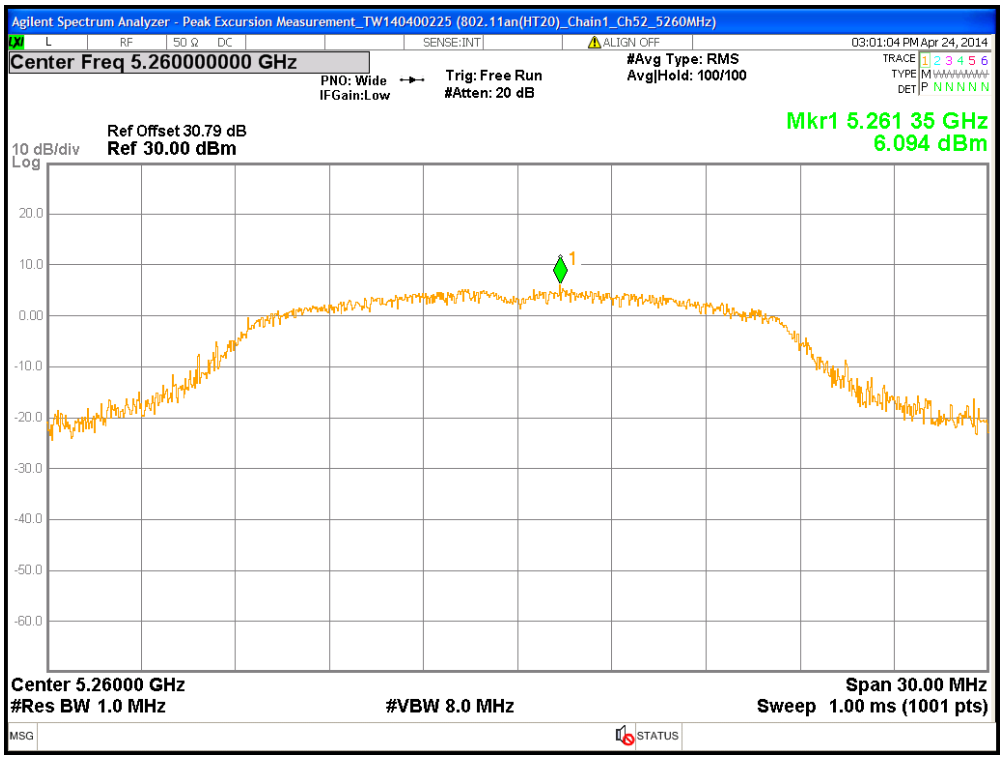
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch40



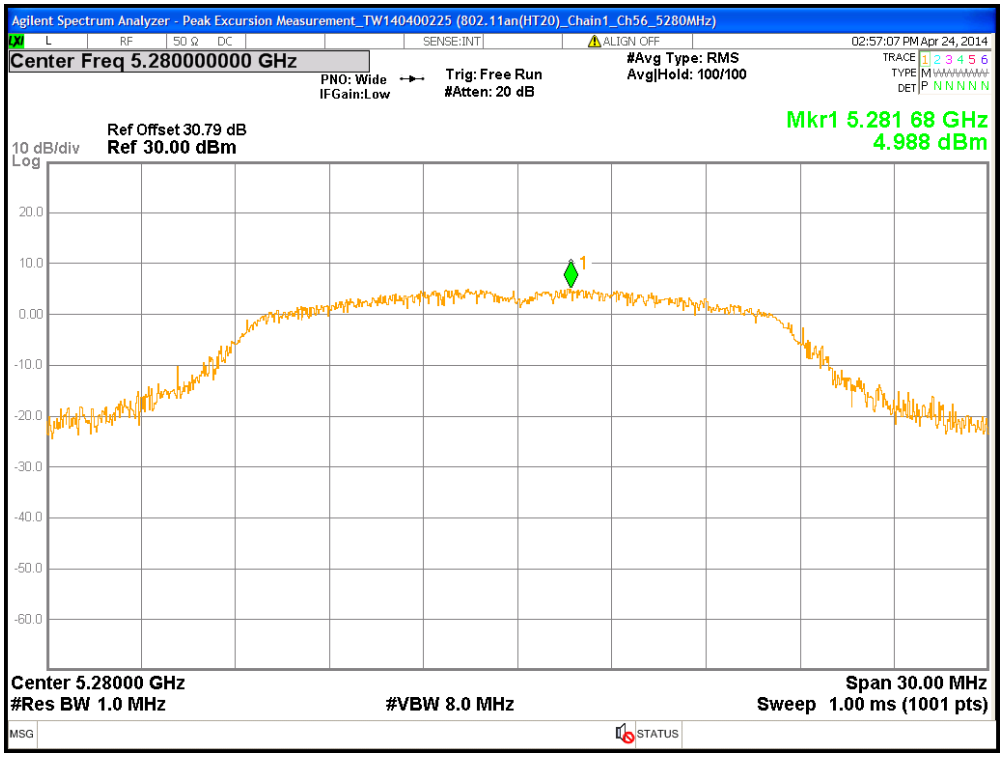
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch48



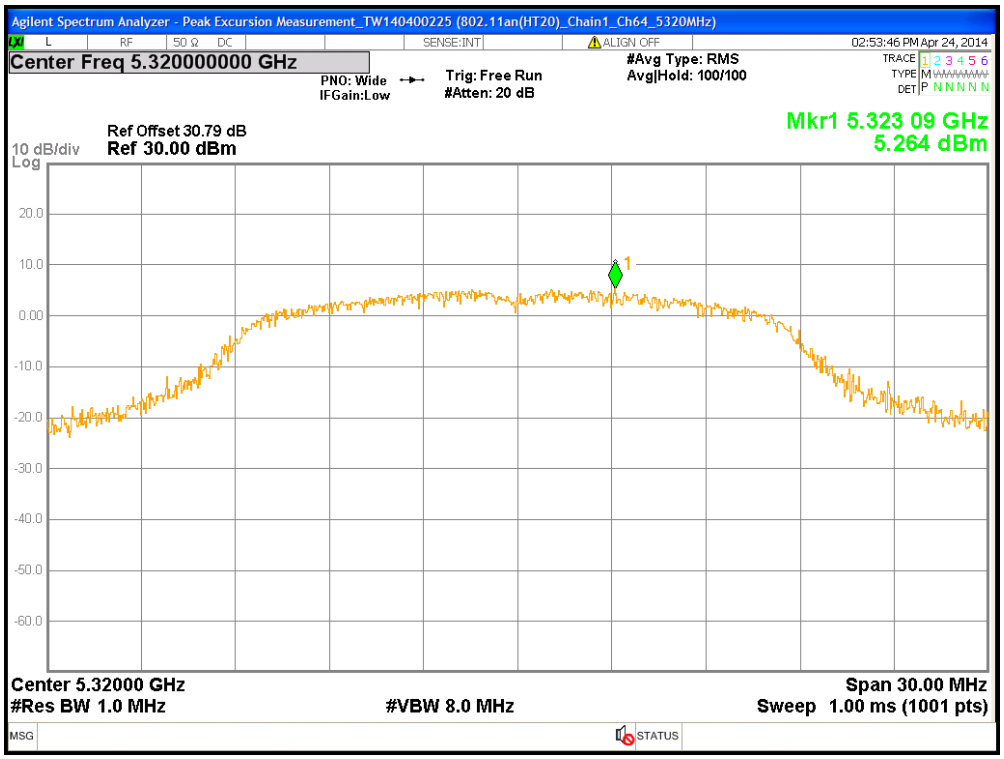
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch52



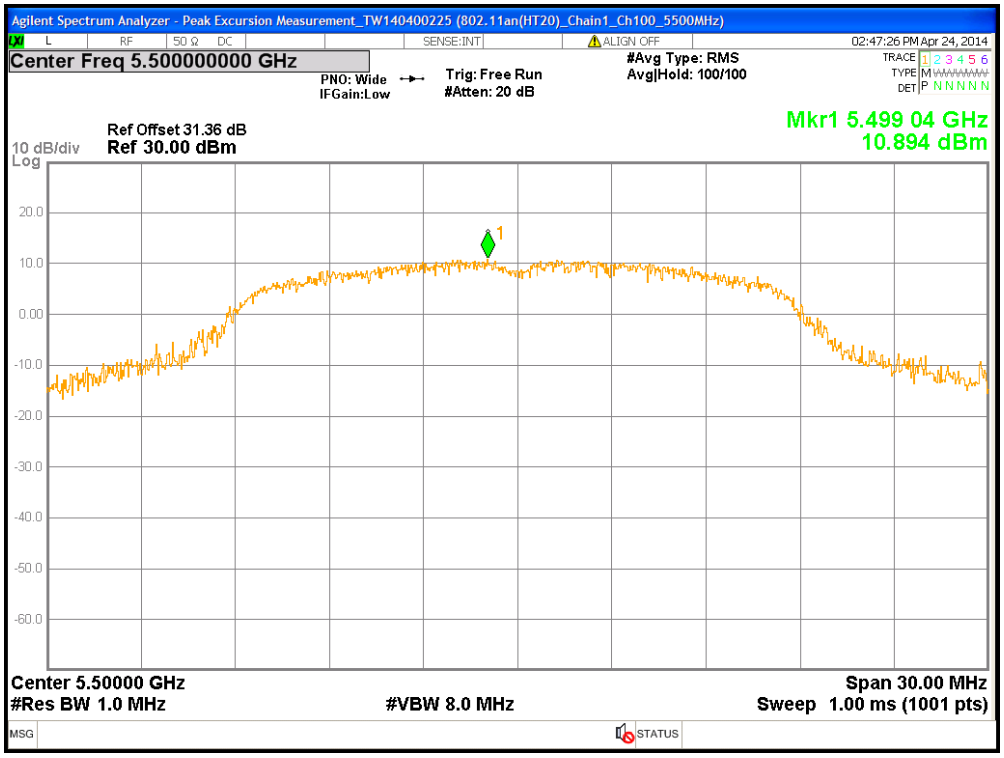
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch56



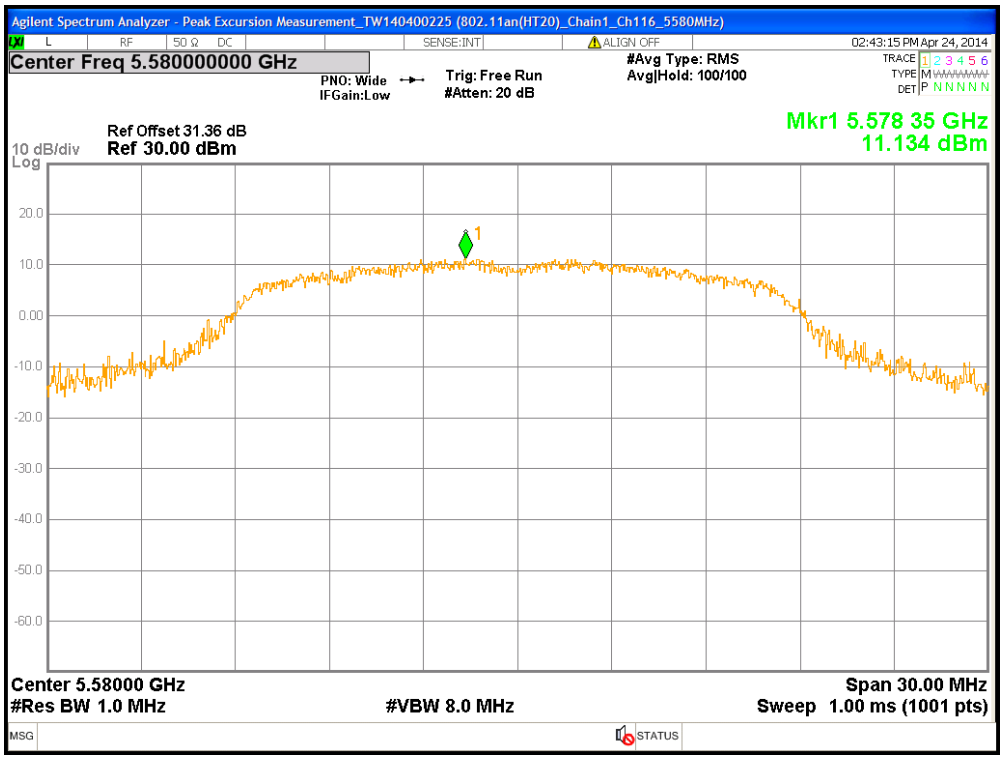
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch64



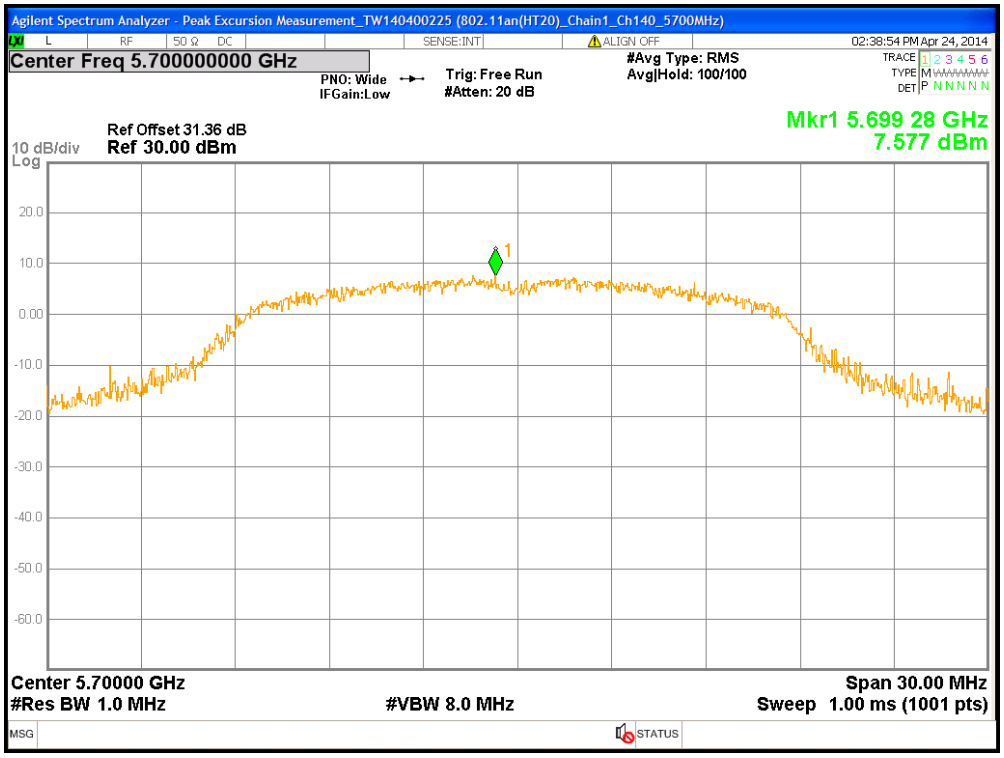
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch100



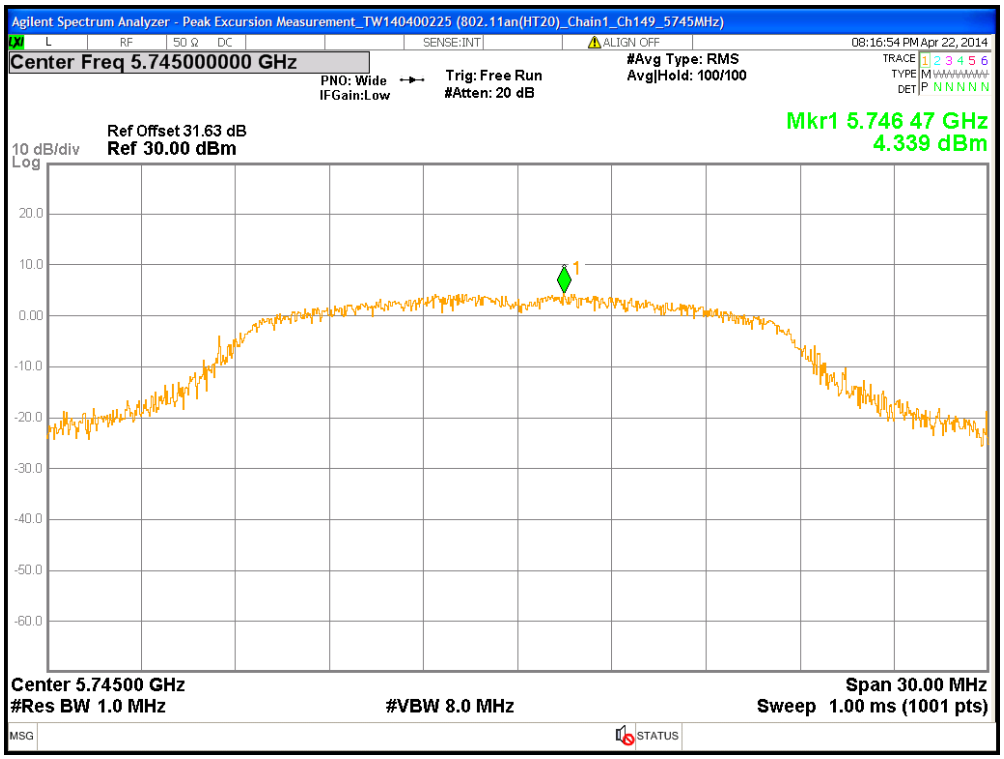
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch116



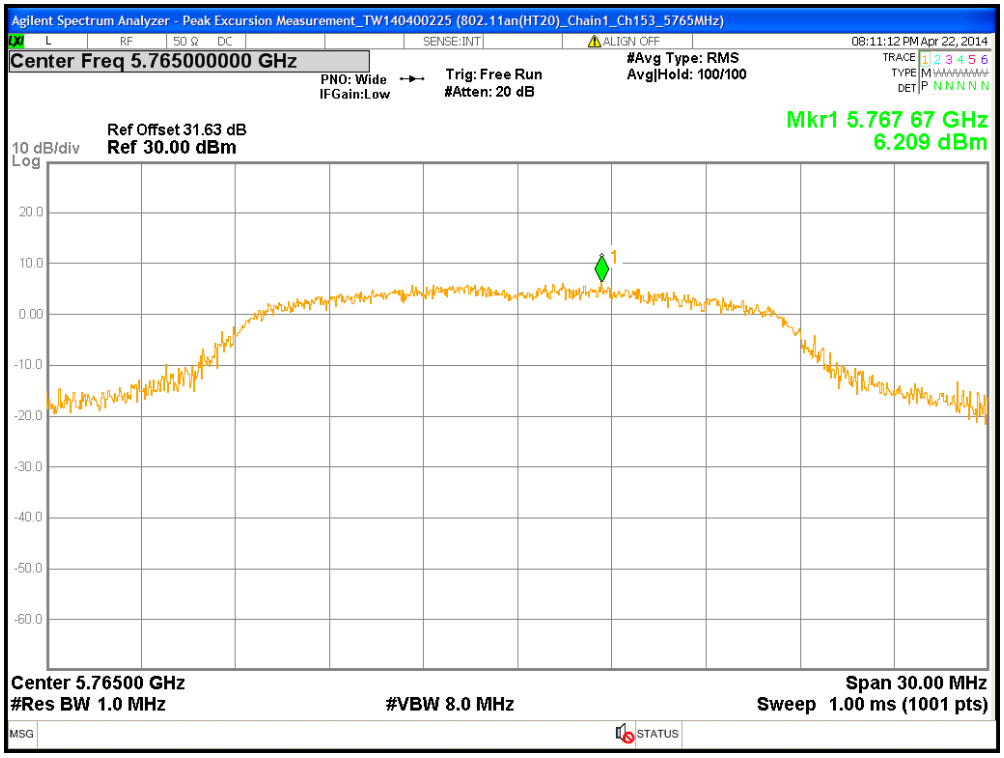
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch140



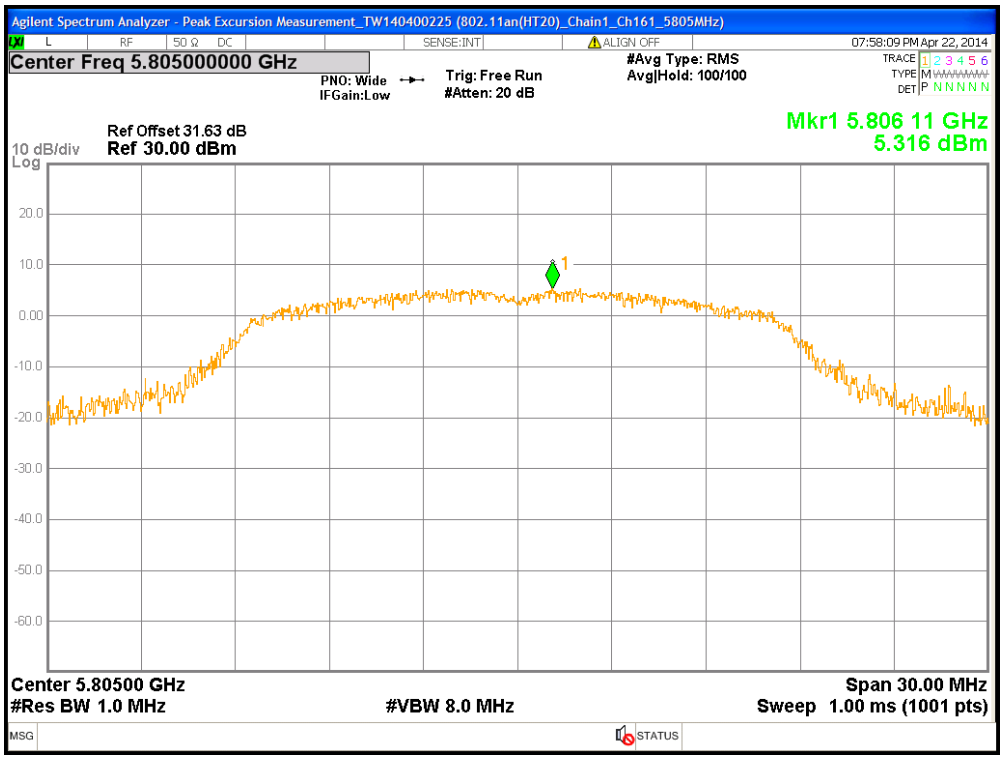
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch149



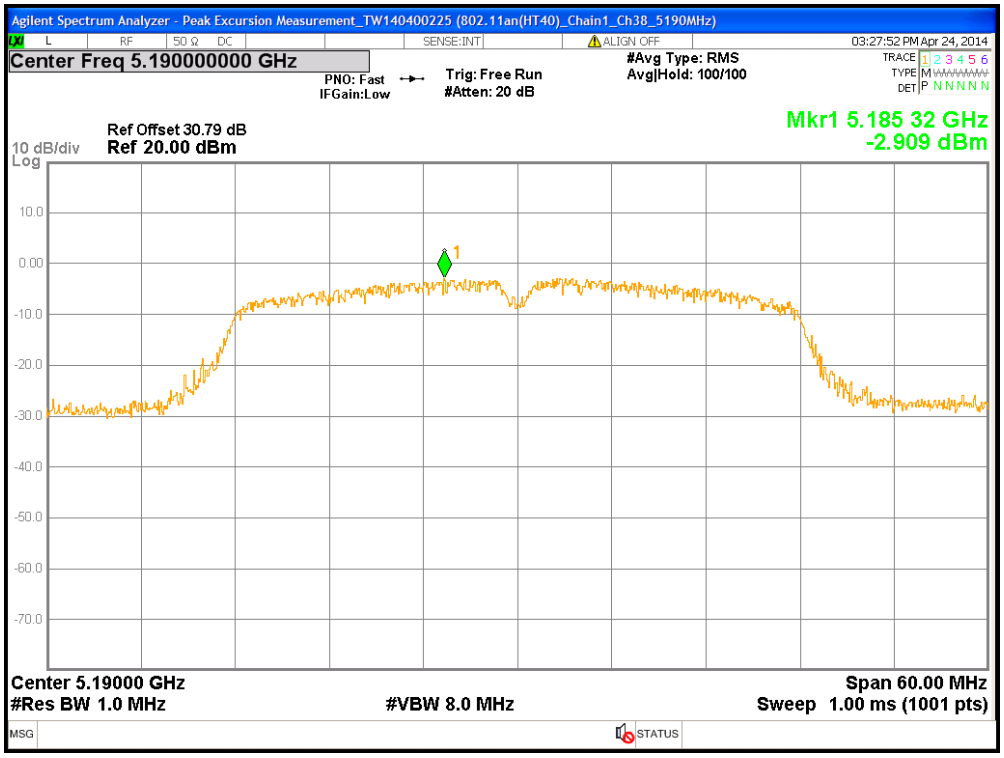
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch153



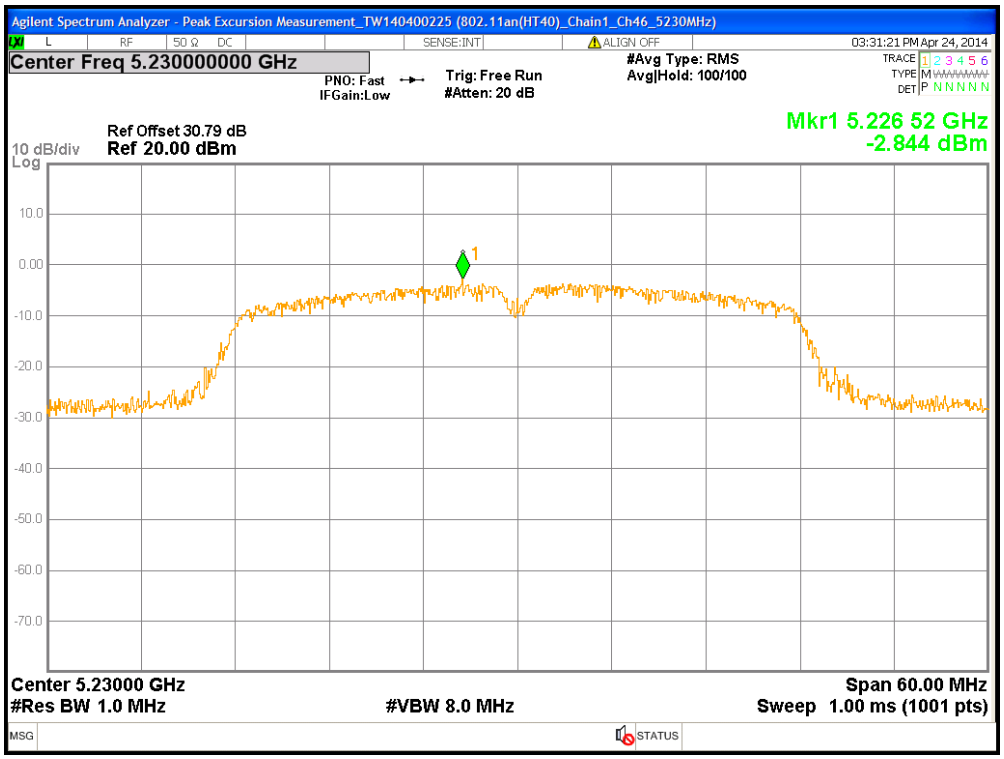
Chain1 : Peak Excursion Measurement @ 802.11n(HT 20) Mode Ch161



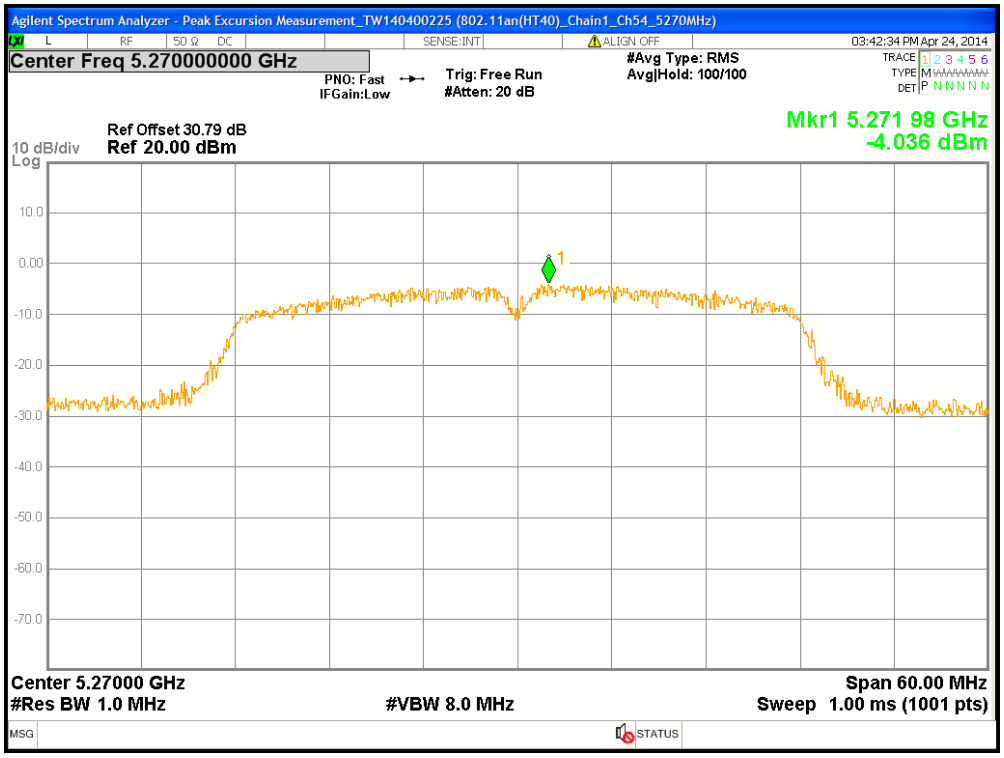
Chain1 : Peak Excursion Measurement @ 802.11n(HT 40) Mode Ch38



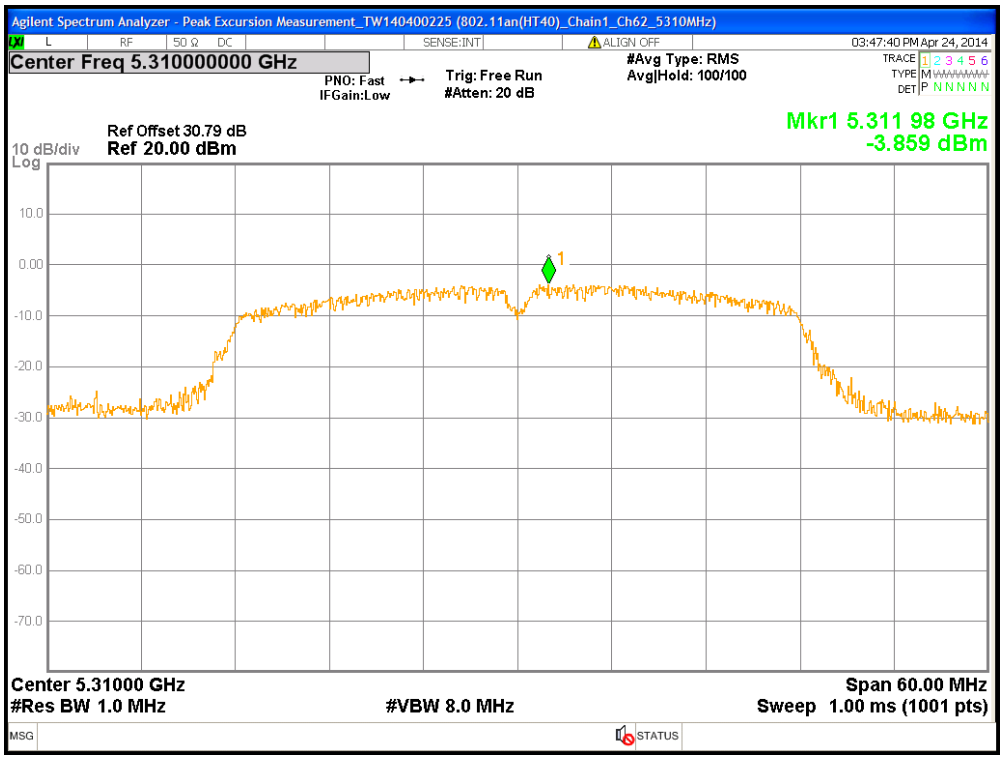
Chain1 : Peak Excursion Measurement @ 802.11n(HT 40) Mode Ch46



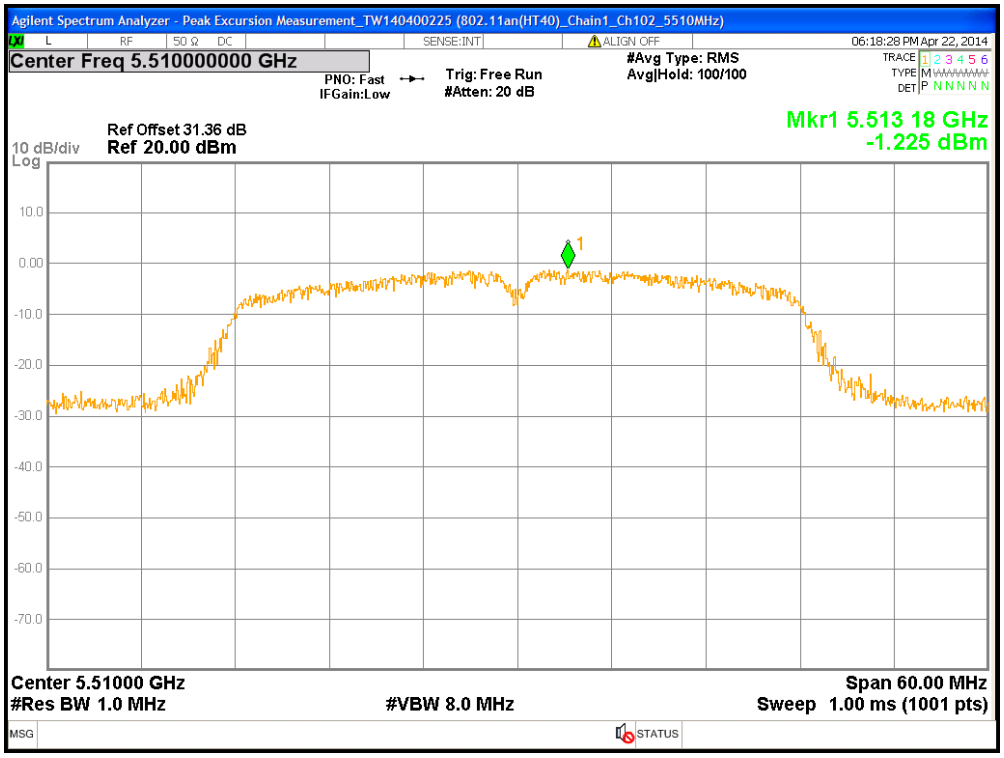
Chain1 : Peak Excursion Measurement @ 802.11n(HT 40) Mode Ch54



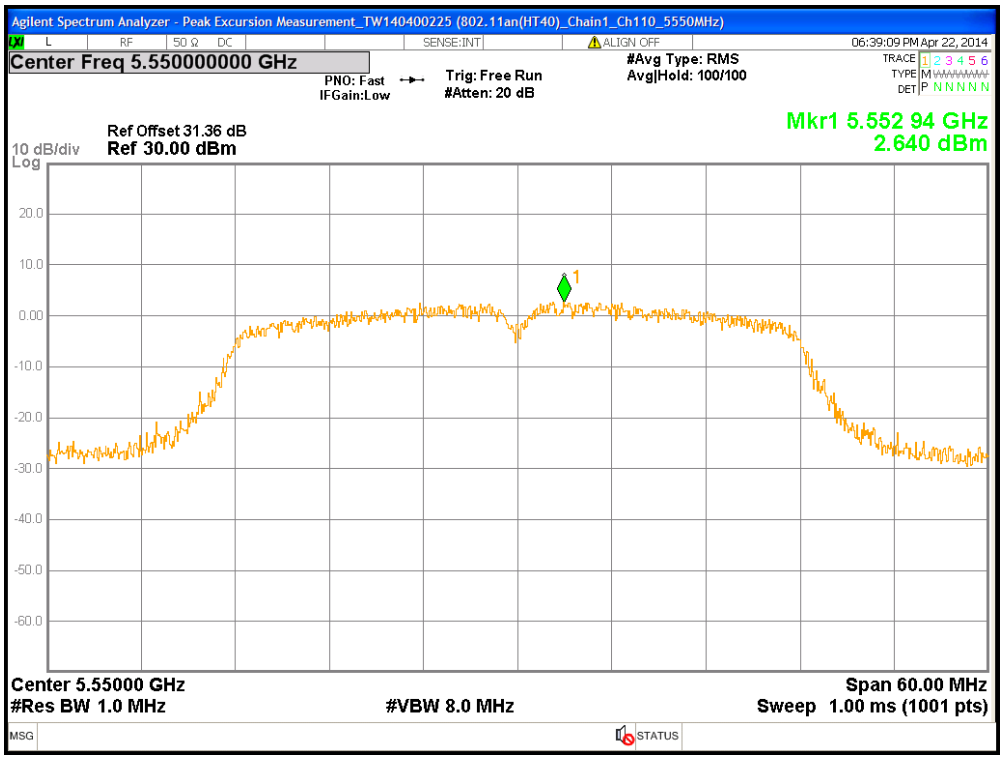
Chain1 : Peak Excursion Measurement @ 802.11n(HT 40) Mode Ch62



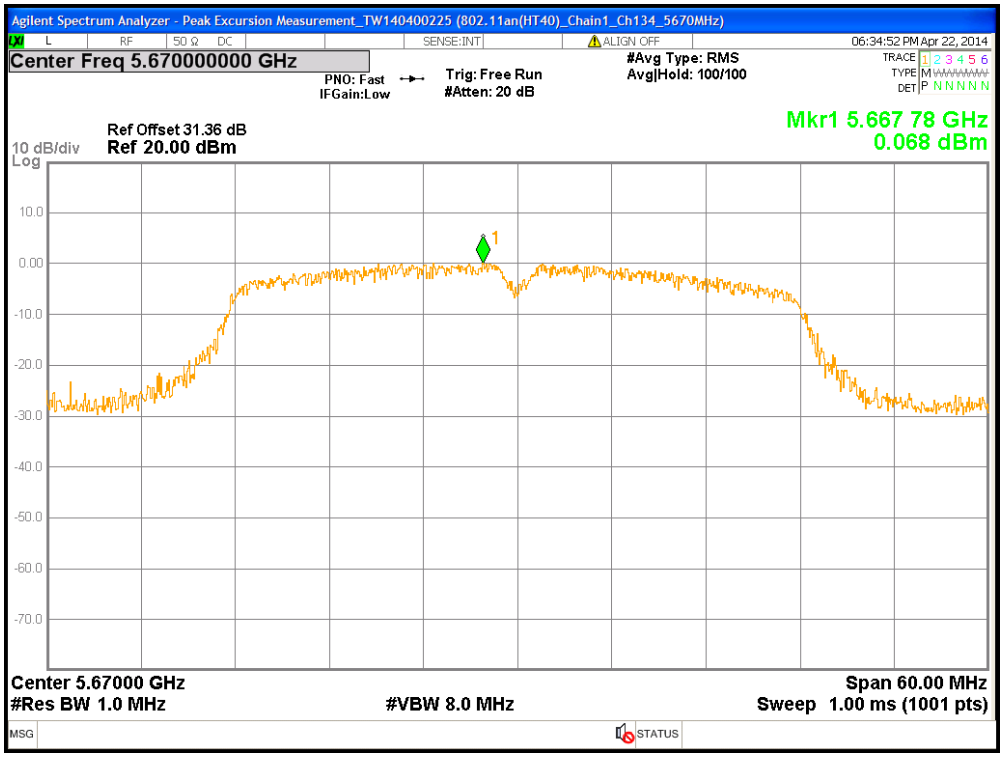
Chain1 : Peak Excursion Measurement @ 802.11n(HT 40) Mode Ch102



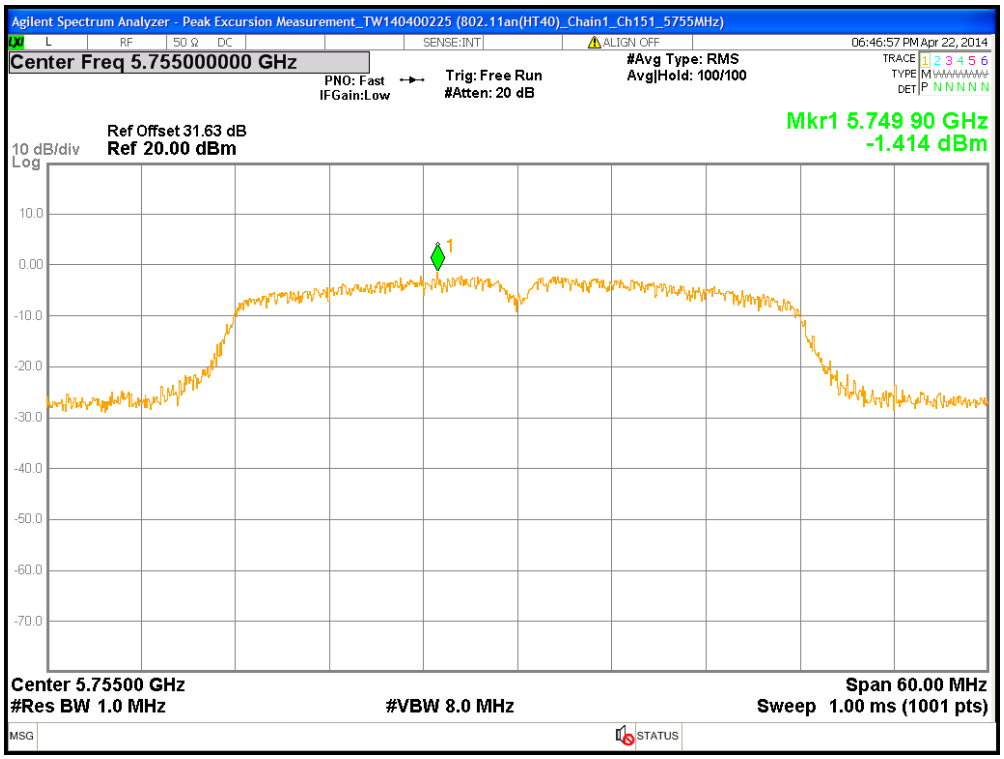
Chain1 : Peak Excursion Measurement @ 802.11n(HT 40) Mode Ch110



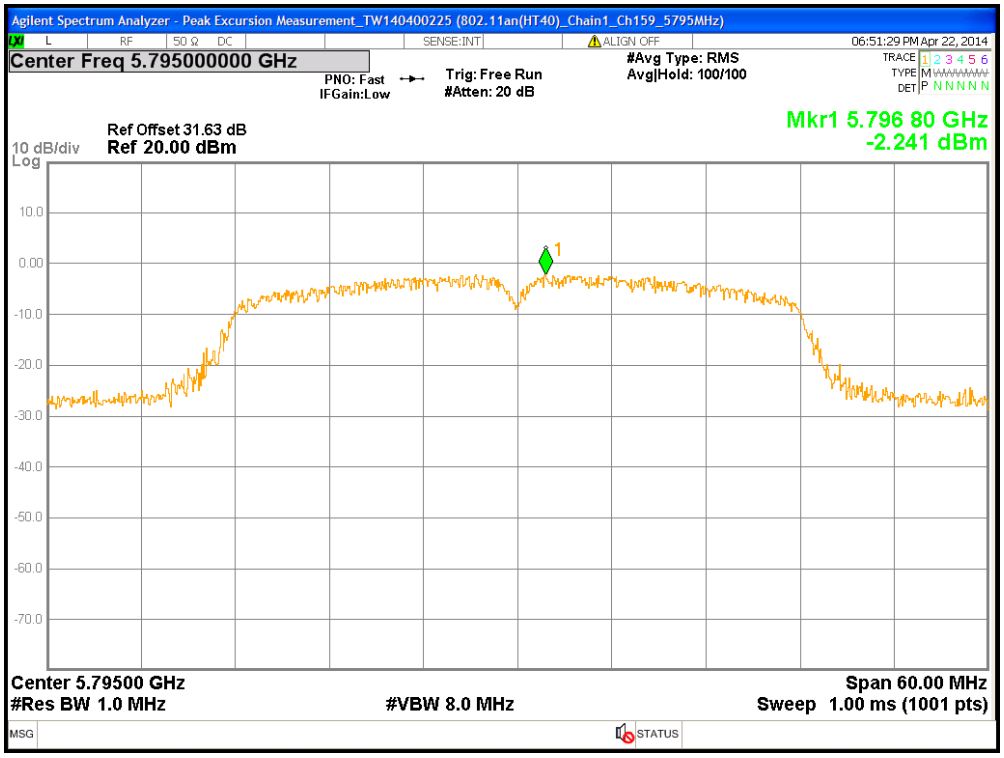
Chain1 : Peak Excursion Measurement @ 802.11n(HT 40) Mode Ch134



Chain1 : Peak Excursion Measurement @ 802.11n(HT 40) Mode Ch151



Chain1 : Peak Excursion Measurement @ 802.11n(HT 40) Mode Ch159



7. Emissions In Restricted Frequency Bands (Radiated emission measurements)

7.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,52,56,64,100,116,140,149,153,161 for 20MHz 38,46,54,62,102,110,134,151,159 for 40MHz	

7.2 Limit for emission in restricted frequency bands (Radiated emission measurement)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	2400/F(kHz)	30
1.705~30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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

As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit

Applicable to	Limit	
	Field strength at 3m (dBμV/m)	
V	PK	AV
	74	54
	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBμV/m)
	PK	PK
	-27	68.3

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength: $E = 1000000(\sqrt{30P})/3$ (μV/m), where P is the eirp (Watt)

7.3 Measuring instrument setting

Below 1GHz measurement

Receiver settings	
Receiver function	**Setting**
Detector	QP
RBW	9-150 kHz ; 200-300 Hz 0.15-30 MHz; 9-10 kHz 30-1000 MHz; 100-120 kHz
VBW	≧3 x RBW
Sweep	Auto couple
Attenuation	Auto

Above 1GHz measurement

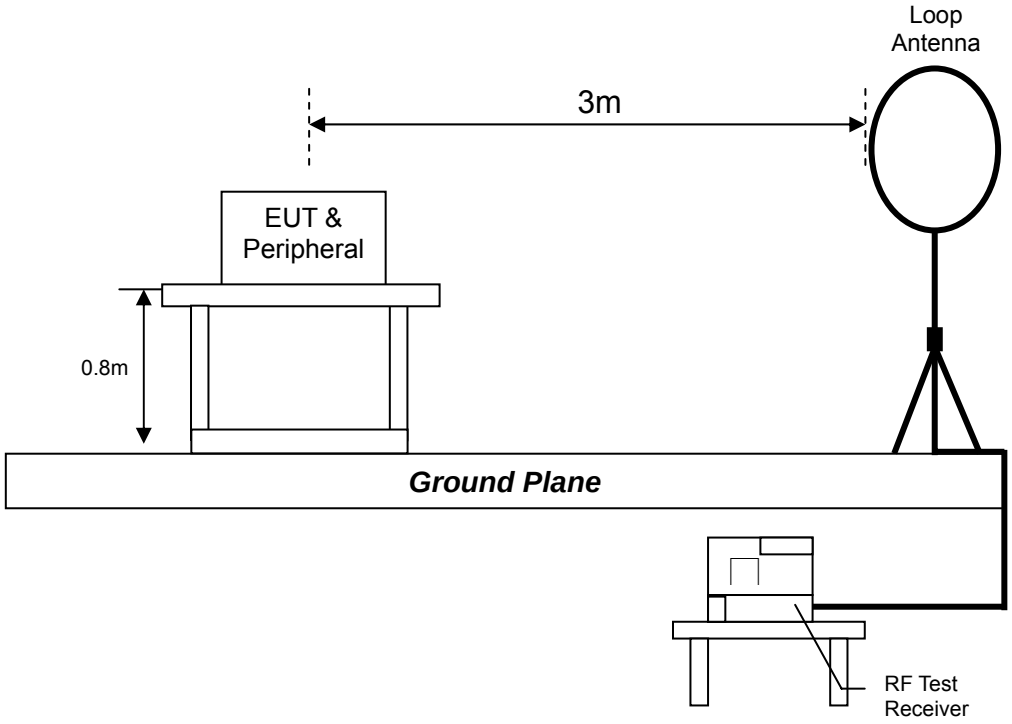
Spectrum analyzer settings	
Spectrum Analyzer function	**Setting**
Detector	Peak
RBW	1MHz
VBW	3MHz for Peak; 10Hz for Average
Sweep	Auto couple
Start Frequency	1GHz
Stop Frequency	Tenth harmonic
Attenuation	Auto

7.4 Test procedure

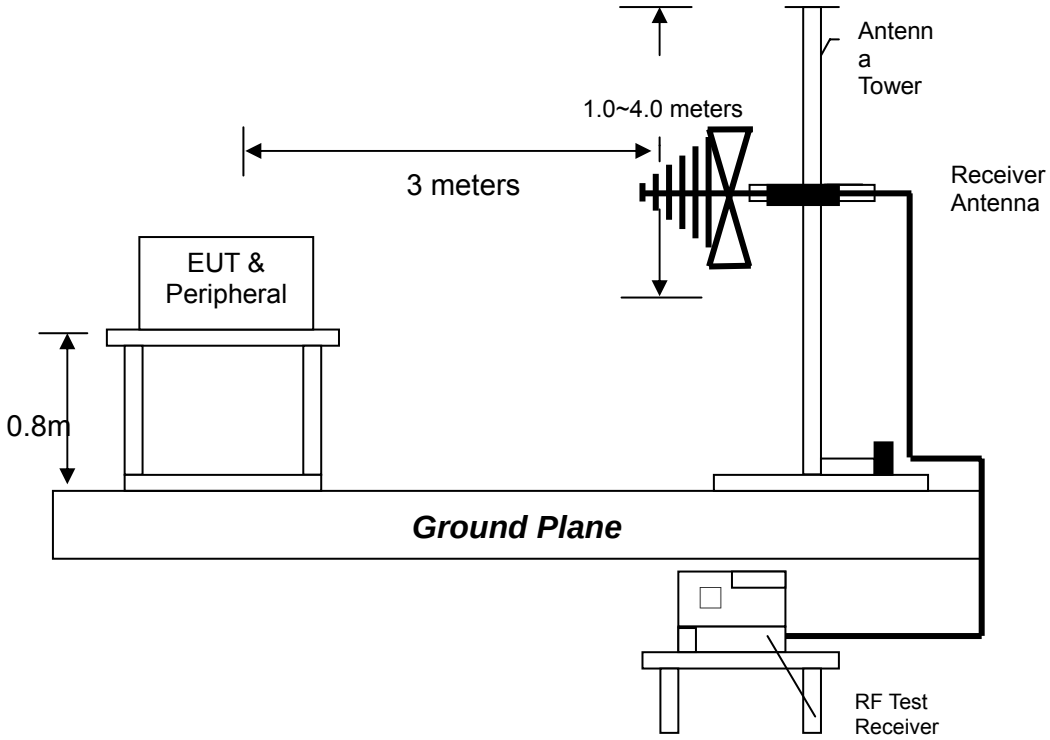
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the companion devices. The turntable was rotated by 360 degree to find the position of the maximum emission level.
3. The height of the receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of the both horizontal and vertical polarization
4. If find the frequencies above the limit or below within 3dB, the antenna tower was scan (from 1m to 4m) and then the turntable was rotated to find the maximum reading.
5. Set the test-receiver system to peak or CISPR quasi-peak detector with specified bandwidth under maximum hold mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3dB lower than the average limit specified then testing will be stopped and peak values of the EUT will be reported. Otherwise, the emissions which do not have 3dB margin will be measured using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, The emissions level of the EUT in peak mode was lower than average limit, then testing will be stopped and peak values of the EUT will be reported, otherwise, the emission will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be quasi-peak measured by receiver.

7.5 Test configuration

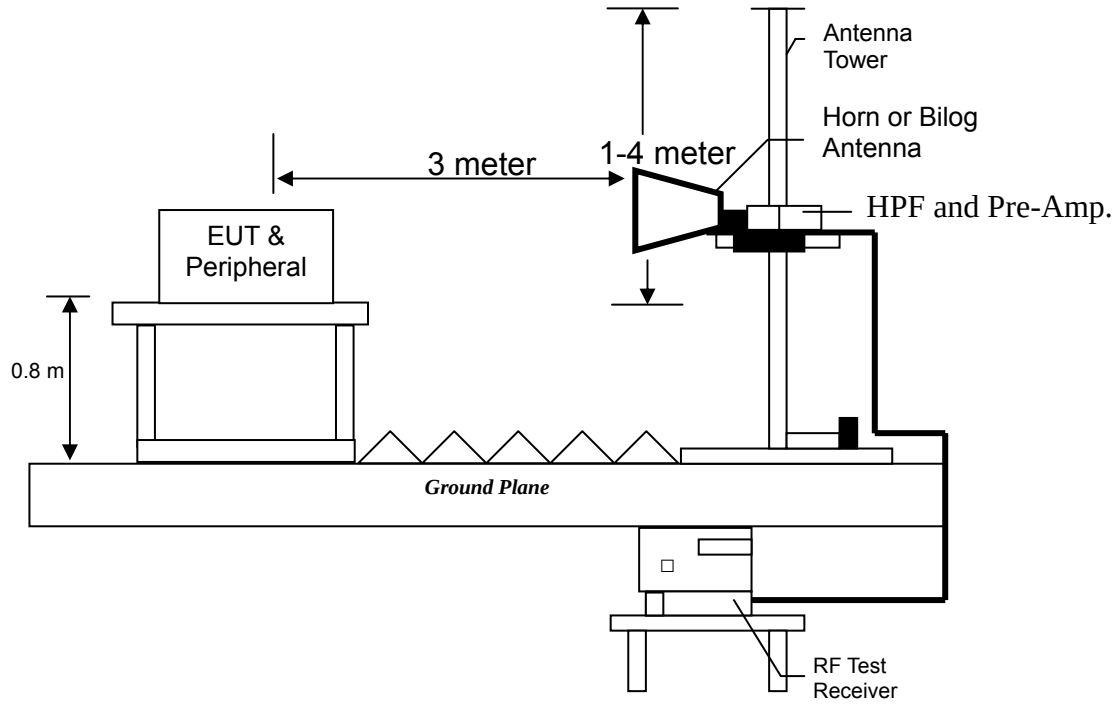
Radiated emission from 9 kHz to 30 MHz uses Loop Antenna:



Radiated emission from 30 MHz to 1 GHz using Bilog Antenna



Radiated emission above 1GHz using Horn Antenna



7.6 Test results

7.6.1 Measurement results: frequencies from 9kHz to 30MHz

Frequency (MHz)	Detector	Corrected Factor (dB/m)	Reading (dBμV)	Calculated (dBμV/m)	Limit @ 3m (dBμV/m)	Margin (dB)
0.03	PK	85.90	24.25	110.15	138.00	-27.85
0.03	AV	85.90	18.53	104.43	138.00	-33.57
0.35	PK	63.45	26.68	90.13	107.00	-16.87
0.35	AV	63.45	16.89	80.34	107.00	-26.66
24	QP	36.68	16.26	52.94	69.54	-16.60
25	QP	36.65	14.92	51.57	69.54	-17.97

Note: The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible values has no need to be reported.

7.6.2 Measurement results: frequencies from 30MHz to 1GHz

The test was performed on EUT under 802.11a/n continuously transmitting mode. The worst case occurred at chain 1: 802.11a Tx channel 48.

EUT : OD-11
Worst Case : Chain 1: 802.11a Tx channel 48

Polarization (circle)	Frequency (MHz)	Detector	Corr. Factor (dB/m)	Reading (dBμV)	Calculated level (dBμV/m)	Limit @ 3m (dBμV/m)	Margin (dB)
Vertical	191.20	QP	12.14	21.40	33.54	43.50	-9.96
Vertical	202.66	QP	12.50	20.44	32.94	43.50	-10.56
Vertical	454.86	QP	19.98	16.09	36.07	46.00	-9.93
Vertical	503.36	QP	20.84	15.22	36.06	46.00	-9.94
Vertical	526.64	QP	21.31	17.43	38.74	46.00	-7.26
Vertical	551.86	QP	21.83	16.01	37.84	46.00	-8.16
Horizontal	202.66	QP	14.62	20.58	35.20	43.50	-8.30
Horizontal	288.02	QP	16.11	19.23	35.34	46.00	-10.66
Horizontal	431.58	QP	18.63	16.32	34.95	46.00	-11.05
Horizontal	503.36	QP	19.88	16.17	36.05	46.00	-9.95
Horizontal	701.24	QP	23.35	12.78	36.13	46.00	-9.87
Horizontal	745.86	QP	24.13	12.45	36.58	46.00	-9.42

Remark:

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

7.6.3 Measurement results: frequency above 1GHz

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
802.11a ; Chain1 ; Channel36	7972	PK	V	37.37	11.01	43.43	54.44	74.00	-19.56
	7972	AV	V	37.37	11.01	26.41	37.42	54.00	-16.58
	10360	PK	V	38.94	13.36	42.14	55.50	74.00	-18.50
	10360	AV	V	38.94	13.36	27.05	40.41	54.00	-13.59
	10360	PK	H	38.94	13.36	38.17	51.53	74.00	-22.47
802.11a ; Chain1 ; Channel40	7949	PK	V	37.39	10.93	44.45	55.38	74.00	-18.62
	7949	AV	V	37.39	10.93	26.79	37.72	54.00	-16.28
	10400	PK	V	38.97	13.47	41.15	54.62	74.00	-19.38
	10400	AV	V	38.97	13.47	26.40	39.87	54.00	-14.13
	10400	PK	H	38.97	13.47	39.44	52.91	74.00	-21.09
802.11a ; Chain1 ; Channel48	7949	PK	V	37.39	10.93	44.40	55.33	74.00	-18.67
	7949	AV	V	37.39	10.93	22.86	33.79	54.00	-20.21
	10480	PK	V	39.03	13.71	46.60	60.31	74.00	-13.69
	10480	AV	V	39.03	13.71	29.89	43.60	54.00	-10.40
	10480	PK	H	39.03	13.71	39.69	53.40	74.00	-20.60
802.11a ; Chain1 ; Channel52	7949	PK	V	37.39	10.93	42.88	53.81	74.00	-20.19
	10520	PK	V	39.04	13.82	38.85	52.67	74.00	-21.33
	10520	PK	H	39.04	13.82	35.82	49.64	74.00	-24.36
802.11a ; Chain1 ; Channel56	7995	PK	V	37.35	11.08	43.48	54.56	74.00	-19.44
	7995	AV	V	37.35	11.08	21.48	32.56	54.00	-21.44
	10560	PK	V	39.04	13.93	37.94	51.87	74.00	-22.13
	10560	PK	H	39.04	13.93	36.60	50.53	74.00	-23.47
802.11a ; Chain1 ; Channel64	7949	PK	V	37.39	10.93	41.55	52.48	74.00	-21.52
	10640	PK	V	39.05	14.13	37.08	51.21	74.00	-22.79
	10640	PK	H	39.05	14.13	35.57	49.70	74.00	-24.30
802.11a ; Chain1 ; Channel100	7972	PK	V	37.37	11.01	43.99	55.00	74.00	-19.00
	7972	AV	V	37.37	11.01	21.99	33.00	54.00	-21.00
	11000	PK	V	39.08	15.07	35.45	50.52	74.00	-23.48
	11000	PK	H	39.08	15.07	36.61	51.68	74.00	-22.32
802.11a ; Chain1 ; Channel116	7995	PK	V	37.35	11.08	41.93	53.01	74.00	-20.99
	11160	PK	V	39.07	15.22	36.85	52.07	74.00	-21.93
	11160	PK	H	39.07	15.22	36.52	51.74	74.00	-22.26

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBµV)	Corrected Reading (dBµV/m)	Limit @ 3 m (dBµV/m)	Margin (dB)
802.11a ; Chain1 ; Channel140	7972	PK	V	37.37	11.01	44.78	55.79	74.00	-18.21
	7972	AV	V	37.37	11.01	26.70	37.71	54.00	-16.29
	11400	PK	V	39.05	15.45	36.61	52.06	74.00	-21.94
	11400	PK	H	39.05	15.45	38.03	53.48	74.00	-20.52
802.11a ; Chain1 ; Channel149	7972	PK	V	37.37	11.01	43.59	54.60	74.00	-19.40
	7972	AV	V	37.37	11.01	25.72	36.73	54.00	-17.27
	11490	PK	V	39.04	15.54	35.97	51.51	74.00	-22.49
	11490	PK	H	39.04	15.54	35.55	51.09	74.00	-22.91
802.11a ; Chain1 ; Channel157	7972	PK	V	37.37	11.01	43.82	54.83	74.00	-19.17
	7972	AV	V	37.37	11.01	26.46	37.47	54.00	-16.53
	11570	PK	V	39.01	15.39	36.99	52.38	74.00	-21.62
	11570	PK	H	39.01	15.39	37.24	52.63	74.00	-21.37
802.11a ; Chain1 ; Channel161	7995	PK	V	37.35	11.08	43.79	54.87	74.00	-19.13
	7995	AV	V	37.35	11.08	26.56	37.64	54.00	-16.36
	11630	PK	V	38.99	15.26	37.28	52.54	74.00	-21.46
	11630	PK	H	38.99	15.26	36.86	52.12	74.00	-21.88
802.11n HT20 ; Chain1 ; Channel36	7949	PK	V	37.39	10.93	43.24	54.17	74.00	-19.83
	7949	AV	V	37.39	10.93	21.14	32.07	54.00	-21.93
	10360	PK	V	38.94	13.36	41.73	55.09	74.00	-18.91
	10360	AV	V	38.94	13.36	26.42	39.78	54.00	-14.22
	10360	PK	H	38.94	13.36	37.61	50.97	74.00	-23.03
802.11n HT20 ; Chain1 ; Channel40	7972	PK	V	37.37	11.01	44.04	55.05	74.00	-18.95
	7972	AV	V	37.37	11.01	22.36	33.37	54.00	-20.63
	10400	PK	V	38.97	13.47	42.11	55.58	74.00	-18.42
	10400	AV	V	38.97	13.47	26.28	39.75	54.00	-14.25
	10400	PK	H	38.97	13.47	36.39	49.86	74.00	-24.14
802.11n HT20 ; Chain1 ; Channel48	7949	PK	V	37.39	10.93	44.57	55.50	74.00	-18.50
	7949	AV	V	37.39	10.93	22.41	33.34	54.00	-20.66
	10480	PK	V	39.03	13.71	40.34	54.05	74.00	-19.95
	10480	AV	V	39.03	13.71	25.26	38.97	54.00	-15.03
	10480	PK	H	39.03	13.71	36.96	50.67	74.00	-23.33
802.11n HT20 ; Chain1 ; Channel52	7995	PK	V	37.35	11.08	43.73	54.81	74.00	-19.19
	7995	AV	V	37.35	11.08	21.66	32.74	54.00	-21.26
	10520	PK	V	39.04	13.82	38.22	52.04	74.00	-21.96
	10520	PK	H	39.04	13.82	36.00	49.82	74.00	-24.18

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBµV)	Corrected Reading (dBµV/m)	Limit @ 3 m (dBµV/m)	Margin (dB)
802.11n HT20 ; Chain1 ; Channel56	7949	PK	V	37.39	10.93	45.39	56.32	74.00	-17.68
	7949	AV	V	37.39	10.93	23.38	34.31	54.00	-19.69
	10570	PK	V	39.05	13.95	39.83	53.78	74.00	-20.22
	10570	PK	H	39.05	13.95	36.71	50.66	74.00	-23.34
802.11n HT20 ; Chain1 ; Ch64	7949	PK	V	37.39	10.93	45.43	56.36	74.00	-17.64
	7949	AV	V	37.39	10.93	23.41	34.34	54.00	-19.66
	10640	PK	V	39.05	14.13	38.18	52.31	74.00	-21.69
	10640	PK	H	39.05	14.13	36.40	50.53	74.00	-23.47
802.11n HT20 ; Chain1 ; Channel100	7972	PK	V	37.37	11.01	42.70	53.71	74.00	-20.29
	11000	PK	V	39.08	15.07	37.30	52.37	74.00	-21.63
	11000	PK	H	39.08	15.07	36.31	51.38	74.00	-22.62
802.11n HT20 ; Chain1 ; Channel116	7995	PK	V	37.35	11.08	42.65	53.73	74.00	-20.27
	11160	PK	V	39.07	15.22	37.16	52.38	74.00	-21.62
	11160	PK	H	39.07	15.22	37.28	52.50	74.00	-21.50
802.11n HT20 ; Chain1 ; Channel140	7972	PK	V	37.37	11.01	43.91	54.92	74.00	-19.08
	7972	AV	V	37.37	11.01	21.90	32.91	54.00	-21.09
	11400	PK	V	39.05	15.45	36.60	52.05	74.00	-21.95
	11400	PK	H	39.05	15.45	35.83	51.28	74.00	-22.72
802.11n HT20 ; Chain1 ; Channel149	7972	PK	V	37.37	11.01	44.01	55.02	74.00	-18.98
	7972	AV	V	37.37	11.01	22.41	33.42	54.00	-20.58
	11490	PK	V	39.04	15.54	35.74	51.28	74.00	-22.72
	11490	PK	H	39.04	15.54	37.27	52.81	74.00	-21.19
802.11n HT20 ; Chain1 ; Channel157	7949	PK	V	37.39	10.93	45.69	56.62	74.00	-17.38
	7949	AV	V	37.39	10.93	23.59	34.52	54.00	-19.48
	11570	PK	V	39.01	15.39	37.12	52.51	74.00	-21.49
	11570	PK	H	39.01	15.39	36.50	51.89	74.00	-22.11
802.11n HT20 ; Chain1 ; Channel161	7972	PK	V	37.37	11.01	40.28	51.29	74.00	-22.71
	11630	PK	V	38.99	15.26	37.22	52.48	74.00	-21.52
	11630	PK	H	38.99	15.26	37.71	52.97	74.00	-21.03
802.11n HT40 ; Chain1 ; Channel38	7972	PK	V	37.37	11.01	41.56	52.57	74.00	-21.43
	10380	PK	V	38.95	13.41	36.78	50.19	74.00	-23.81
	10380	PK	H	38.95	13.41	36.05	49.46	74.00	-24.54
802.11n HT40 ; Chain1 ; Channel46	7995	PK	V	37.35	11.08	45.05	56.13	74.00	-17.87
	7995	AV	V	37.35	11.08	23.23	34.31	54.00	-19.69
	10460	PK	V	39.01	13.65	36.46	50.11	74.00	-23.89
	10460	PK	H	39.01	13.65	37.85	51.50	74.00	-22.50

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
802.11n HT40 ; Chain1 ; Channel54	7972	PK	V	37.37	11.01	42.54	53.55	74.00	-20.45
	10550	PK	V	39.04	13.90	36.96	50.86	74.00	-23.14
	10550	PK	H	39.04	13.90	36.06	49.96	74.00	-24.04
802.11n HT40 ; Chain1 ; Channel62	7949	PK	V	37.39	10.93	44.15	55.08	74.00	-18.92
	7949	AV	V	37.39	10.93	22.16	33.09	54.00	-20.91
	10620	PK	V	39.05	14.08	35.69	49.77	74.00	-24.23
	10620	PK	H	39.05	14.08	36.50	50.58	74.00	-23.42
802.11n HT40 ; Chain1 ; Channel102	11020	PK	V	39.08	15.09	36.37	51.46	74.00	-22.54
	11020	PK	H	39.08	15.09	35.51	50.60	74.00	-23.40
802.11n HT40 ; Chain1 ; Channel110	7972	PK	V	37.37	11.01	43.07	54.08	74.00	-19.92
	7972	AV	V	37.37	11.01	21.11	32.12	54.00	-21.88
	11120	PK	V	39.07	15.18	36.47	51.65	74.00	-22.35
	11120	PK	H	39.07	15.18	36.44	51.62	74.00	-22.38
802.11n HT40 ; Chain1 ; Channel134	7972	PK	V	37.37	11.01	45.10	56.11	74.00	-17.89
	7972	PK	V	37.37	11.01	23.17	34.18	54.00	-19.82
	11340	PK	V	39.05	15.39	38.19	53.58	74.00	-20.42
	11340	PK	H	39.05	15.39	37.14	52.53	74.00	-21.47
802.11n HT40 ; Chain1 ; Channel151	7995	PK	V	37.35	11.08	42.06	53.14	74.00	-20.86
	11510	PK	V	39.04	15.53	37.49	53.02	74.00	-20.98
	11510	PK	H	39.04	15.53	36.57	52.10	74.00	-21.90
802.11n HT40 ; Chain1 ; Channel159	7995	PK	V	37.35	11.08	42.98	54.06	74.00	-19.94
	7995	AV	V	37.35	11.08	21.05	32.13	54.00	-21.87
	11590	PK	V	39.00	15.35	36.40	51.75	74.00	-22.25
	11590	PK	H	39.00	15.35	37.61	52.96	74.00	-21.04

Remark:

1. Correction Factor = Antenna Factor + Cable Loss-Preamp. Gain
2. Corrected Level = Reading + Correction Factor
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

8.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	36,64,100 for 20MHz 38,62,102 for 40MHz	

8.2 Measuring instrument setting

Spectrum analyzer settings	
Spectrum Analyzer function	**Setting**
Detector	Peak
RBW	1MHz
VBW	3MHz for Peak; 10Hz for Average
Sweep	Auto couple
Restrict bands	4500~5150MHz
	5350 ~5460MHz
Attenuation	Auto

8.3 Test procedure

The test procedure is the same as clause 7.4

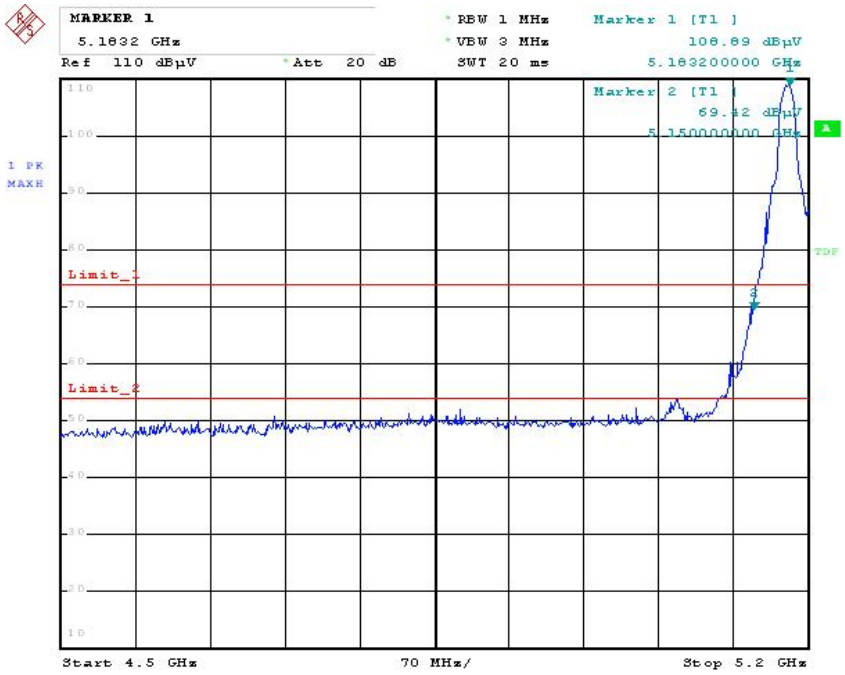
8.4 Test Result

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
802.11a Channel 36	5150	PK	H	39.30	1.49	67.93	69.42	74	-4.58	4500~5150
	5150	AV	H	39.30	1.49	48.10	49.59	54	-4.41	
	5180	PK	H	39.20	1.65	107.24	108.89	-	108.89	-
	5180	AV	H	39.20	1.65	87.79	89.44	-	89.44	
802.11a Channel 64	5320	PK	H	38.77	2.41	106.89	109.30	-	109.30	-
	5320	AV	H	38.77	2.41	87.03	89.44	-	89.44	
	5350	PK	H	38.67	2.58	71.18	73.76	74	-0.24	5350~5460
	5350	AV	H	38.67	2.58	44.66	47.24	54	-6.76	
802.11a Channel 100	5460	PK	H	38.33	3.17	59.12	62.29	74	-11.71	5350~5460
	5460	AV	H	38.33	3.17	39.95	43.12	54	-10.88	
	5500	PK	H	38.20	3.39	106.63	110.02	-	110.02	
	5500	AV	H	38.20	3.39	86.94	90.33	-	90.33	
802.11n (HT 20) Channel 36	5150	PK	H	39.30	1.49	71.58	73.07	74	-0.93	4500~5150
	5150	AV	H	39.30	1.49	47.72	49.21	54	-4.79	
	5180	PK	H	39.20	1.65	107.34	108.99	-	108.99	-
	5180	AV	H	39.20	1.65	87.22	88.87	-	88.87	
802.11n (HT 20) Channel 64	5320	PK	H	38.77	2.41	105.99	108.40	-	108.40	-
	5320	AV	H	38.77	2.41	86.05	88.46	-	88.46	
	5350	PK	H	38.67	2.58	68.95	71.53	74	-2.47	5350~5460
	5350	AV	H	38.67	2.58	43.57	46.15	54	-7.85	
802.11n (HT 20) Channel 100	5460	PK	H	38.33	3.17	65.43	68.60	74	-5.40	5350~5460
	5460	AV	H	38.33	3.17	39.77	42.94	54	-11.06	
	5500	PK	H	38.20	3.39	106.54	109.93	-	109.93	-
	5500	AV	H	38.20	3.39	86.33	89.72	-	89.72	
802.11n (HT 40) Channel 38	5150	PK	H	39.30	1.49	68.57	70.06	74	-3.94	4500~5150
	5150	AV	H	39.30	1.49	47.42	48.91	54	-5.09	
	5190	PK	H	39.17	1.71	100.48	102.19	-	102.19	-
	5190	AV	H	39.17	1.71	75.40	77.11	-	77.11	
802.11n (HT 40) Channel62	5310	PK	H	38.80	2.36	99.49	101.85	-	101.85	-
	5310	AV	H	38.80	2.36	74.19	76.55	-	76.55	
	5350	PK	H	38.67	2.58	68.82	71.40	74	-2.60	5350~5460
	5350	AV	H	38.67	2.58	44.93	47.51	54	-6.49	
802.11n (HT 40) Channel 102	5460	PK	H	38.33	3.17	60.97	64.14	74	-9.86	5350~5460
	5460	AV	H	38.33	3.17	40.12	43.29	54	-10.71	
	5510	PK	H	38.20	3.41	100.36	103.77	-	103.77	-
	5510	AV	H	38.20	3.41	74.79	78.20	-	78.20	

Remark:

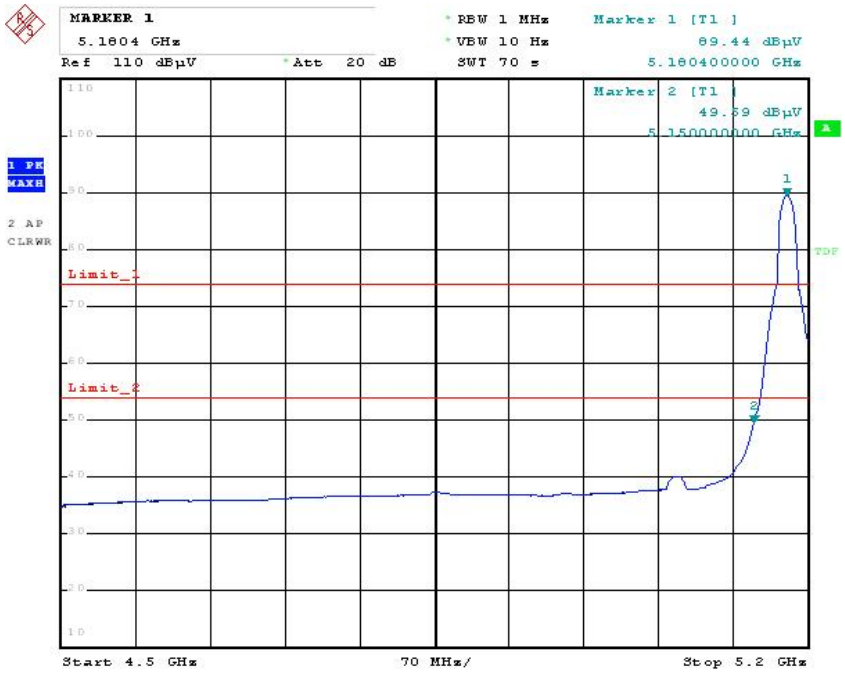
1. Correction Factor = Antenna Factor + Cable Loss-Preamp. Gain
2. Corrected Level = Reading + Correction Factor

Chain1: Band Edge PK @ 802.11a Channel 36



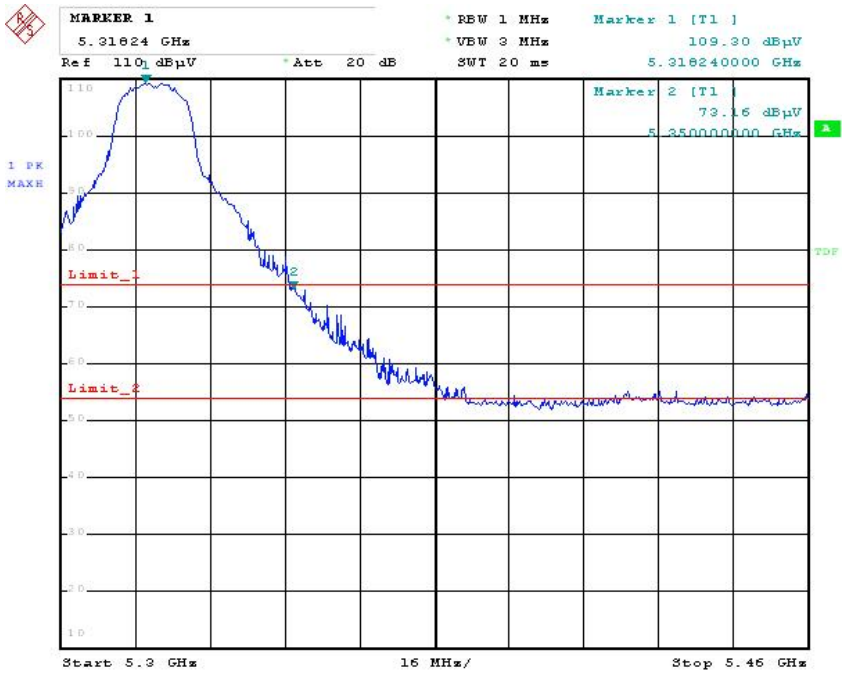
Comment: 2nd comment ...
Date: 23.APR.2014 17:34:21

Chain1: Band Edge AV @ 802.11a Channel 36



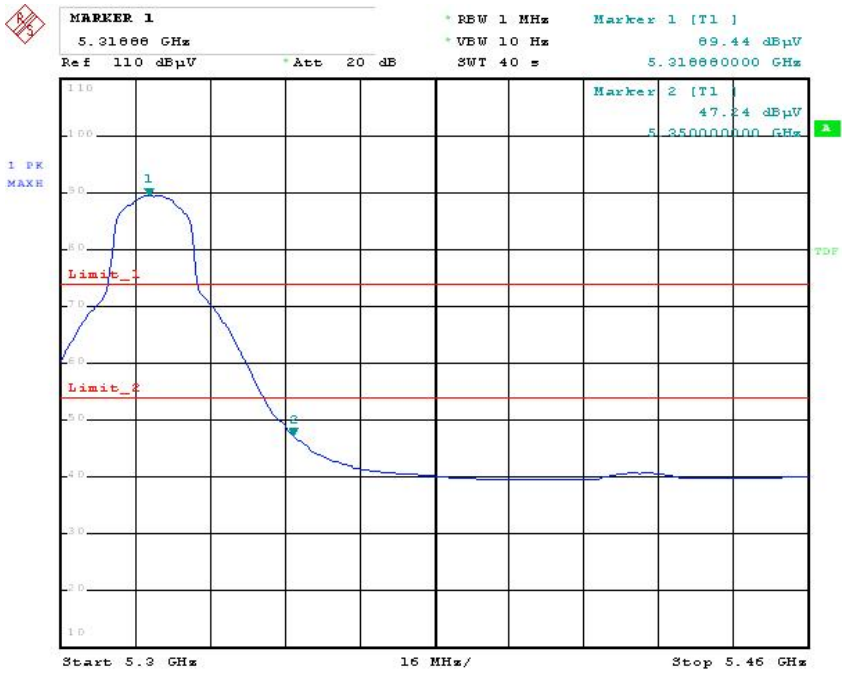
Comment: 2nd comment ...
Date: 23.APR.2014 17:32:21

Chain1: Band Edge PK @ 802.11a Channel 64



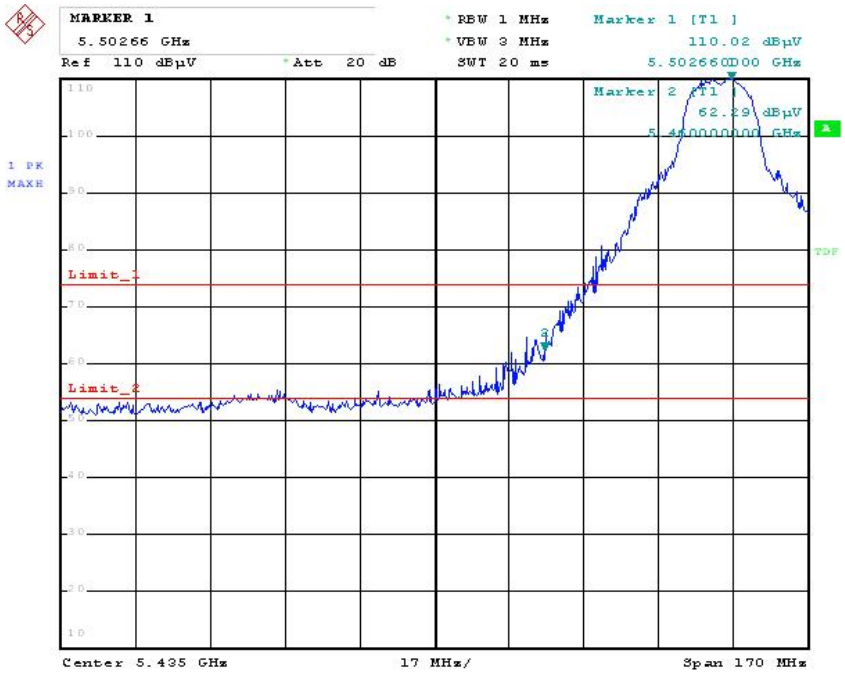
Comment: 2nd comment ...
Date: 23.APR.2014 10:13:42

Chain1: Band Edge AV @ 802.11a Channel 64



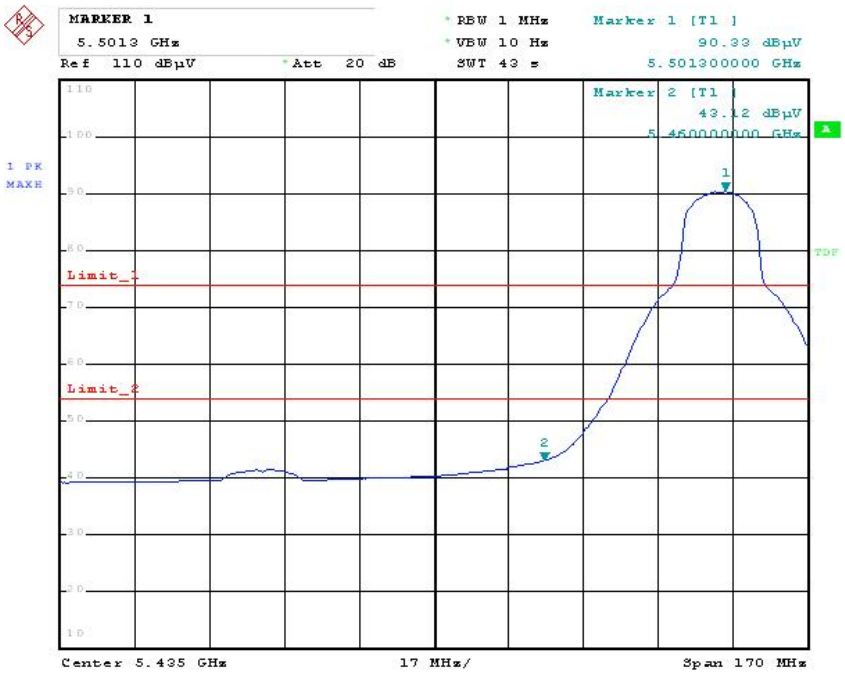
Comment: 2nd comment ...
Date: 23.APR.2014 10:15:16

Chain1: Band Edge PK @ 802.11a Channel 100



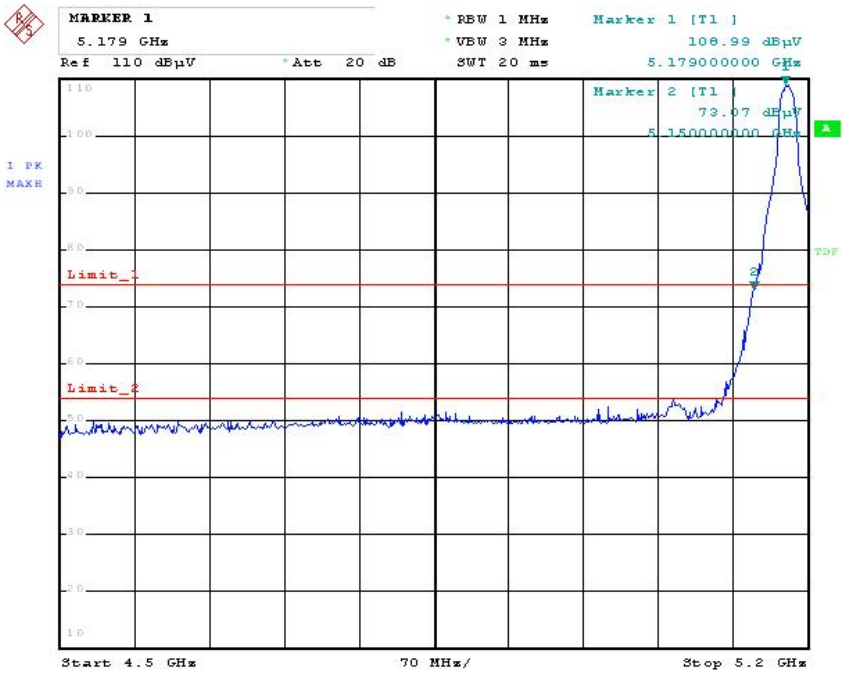
Comment: 2nd comment ...
Date: 23.APR.2014 18:20:07

Chain1: Band Edge AV @ 802.11a Channel 100



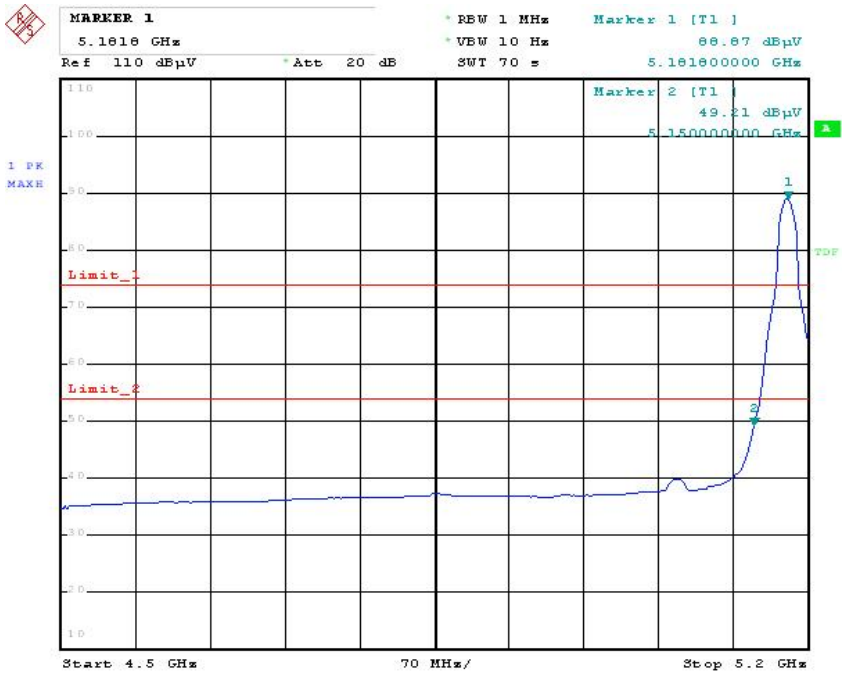
Comment: 2nd comment ...
Date: 23.APR.2014 18:23:01

Chain1: Band Edge PK @ 802.11an (HT 20) Channel 36



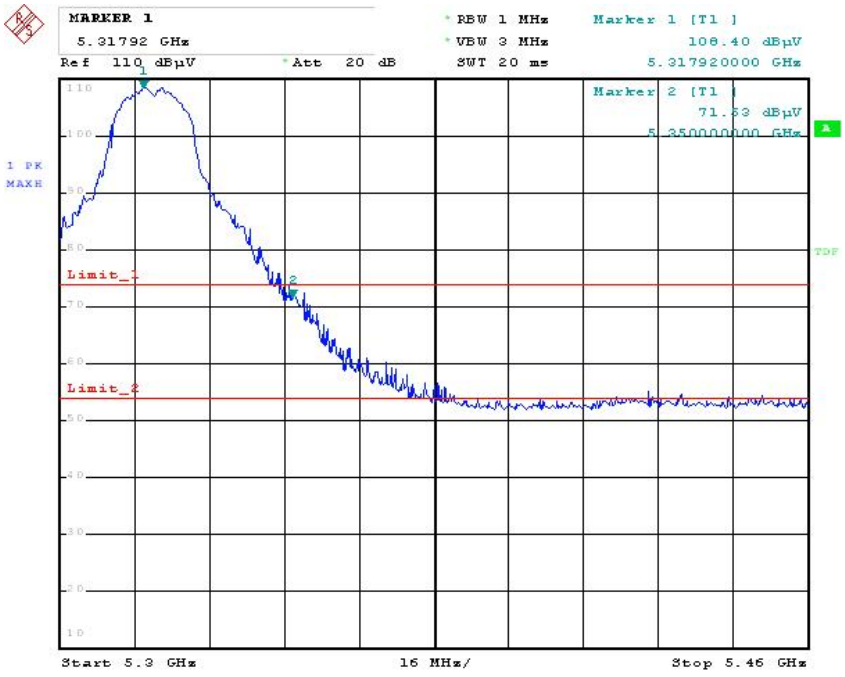
Comment: 2nd comment ...
Date: 23.APR.2014 17:40:35

Chain1: Band Edge AV @ 802.11an (HT 20) Channel 36



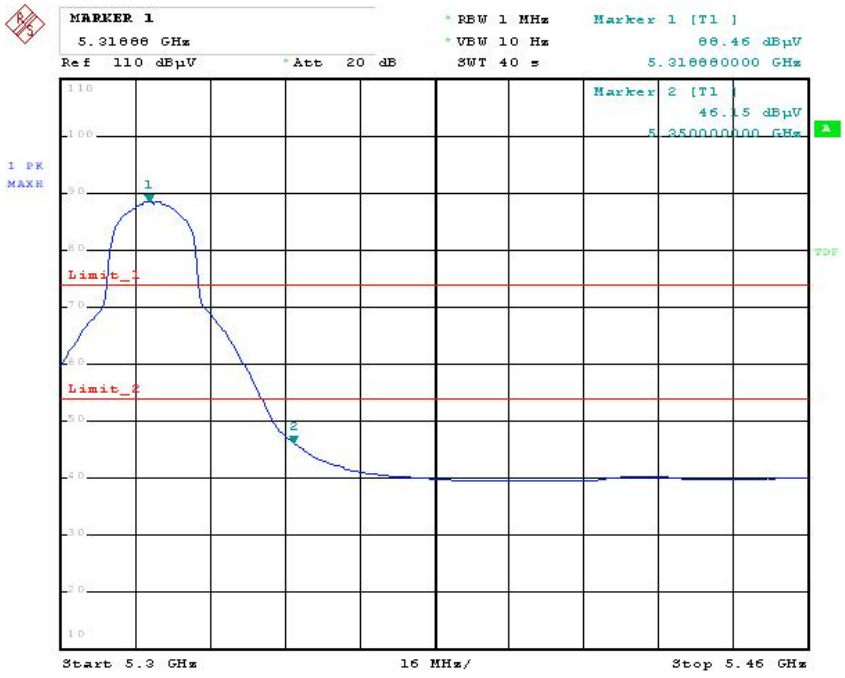
Comment: 2nd comment ...
Date: 23.APR.2014 17:43:38

Chain1: Band Edge PK @ 802.11an (HT 20) Channel 64



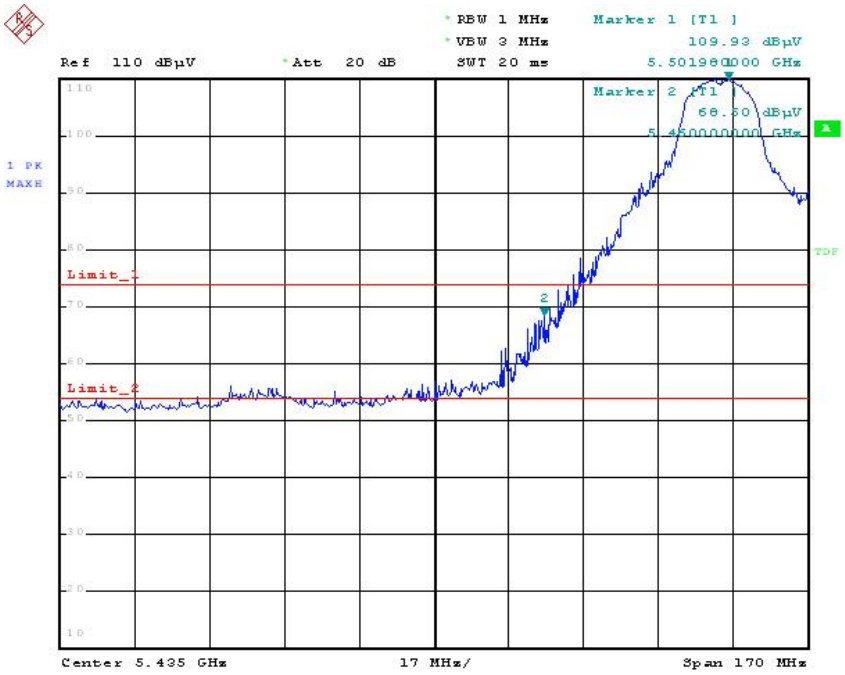
Comment: 2nd comment ...
Date: 23.APR.2014 10:07:51

Chain1: Band Edge AV @ 802.11an (HT 20) Channel 64



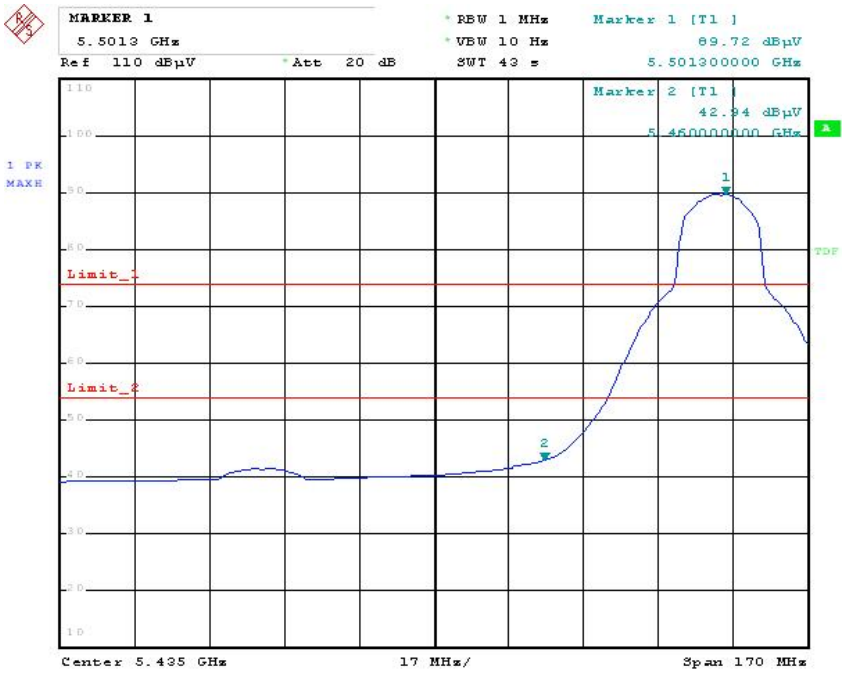
Comment: 2nd comment ...
Date: 23.APR.2014 10:10:00

Chain1: Band Edge PK @ 802.11an (HT 20) Channel 100



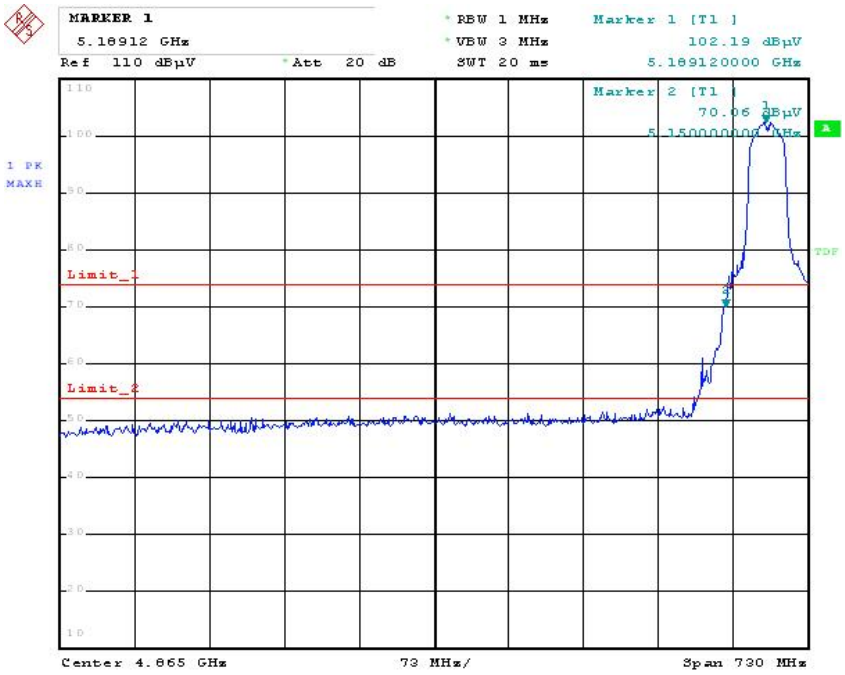
Comment: 2nd comment ...
Date: 23.APR.2014 16:25:03

Chain1: Band Edge AV @ 802.11an (HT 20) Channel 100



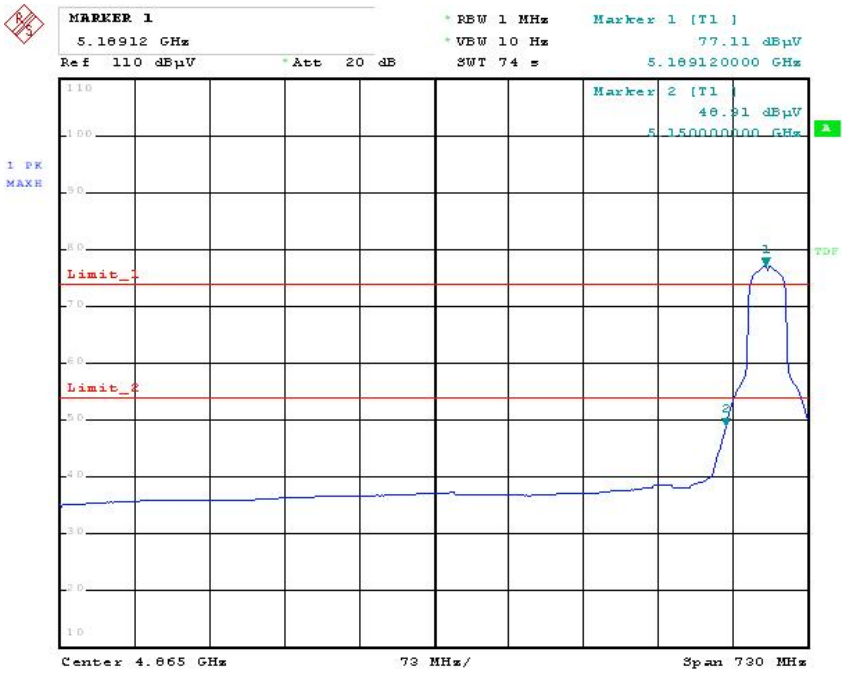
Comment: 2nd comment ...
Date: 23.APR.2014 16:27:12

Chain1: Band Edge PK @ 802.11an (HT 40) Channel 38



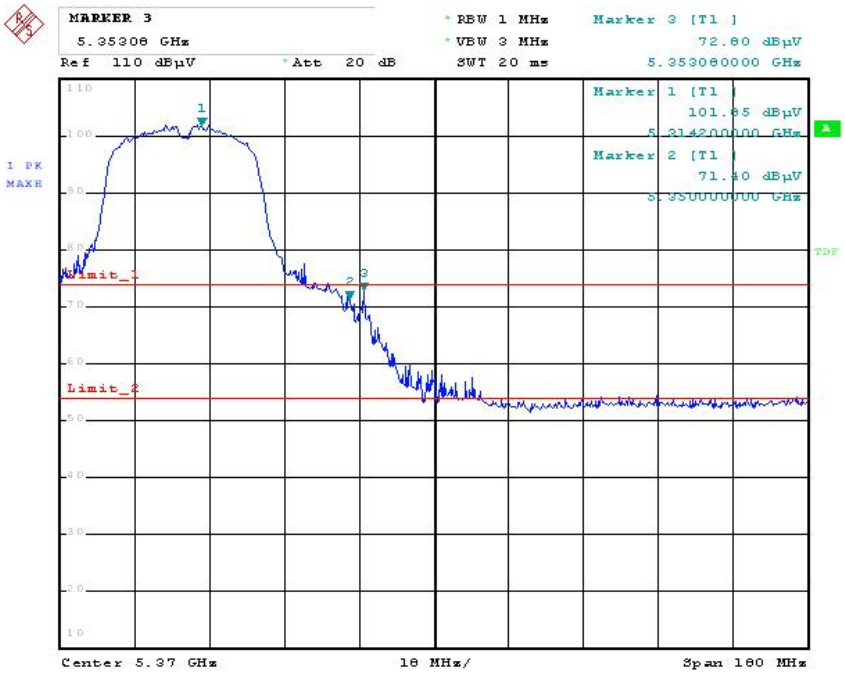
Comment: 2nd comment ...
Date: 23.APR.2014 10:40:02

Chain1: Band Edge AV @ 802.11an (HT 40) Channel 38



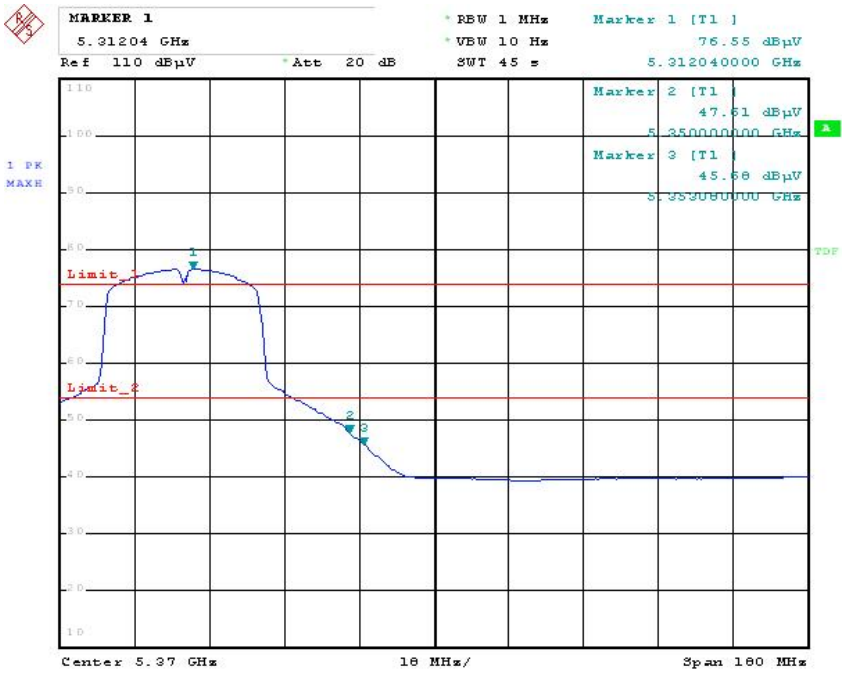
Comment: 2nd comment ...
Date: 23.APR.2014 10:41:46

Chain1: Band Edge PK @ 802.11an (HT 40) Channel 62



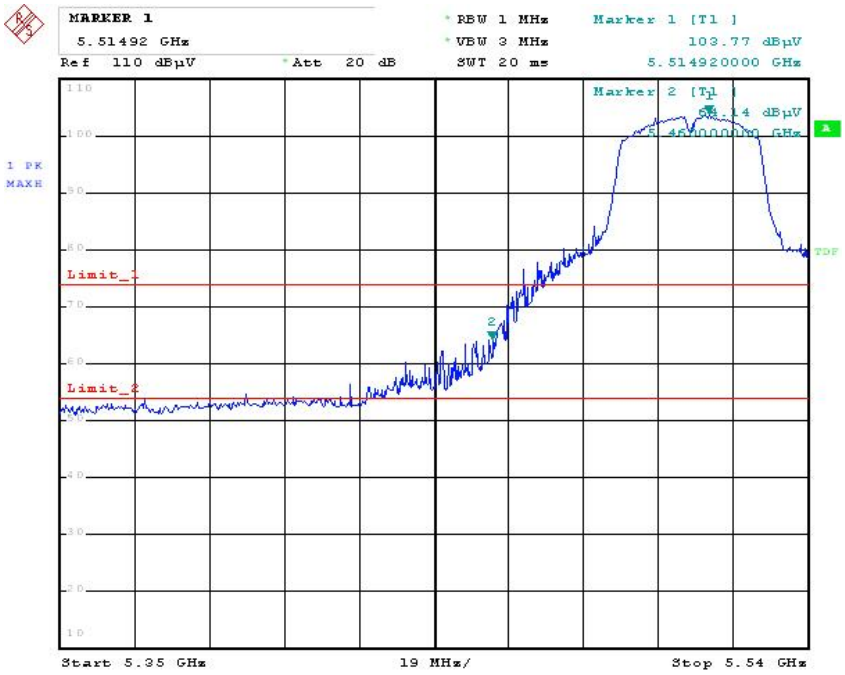
Comment: 2nd comment ...
Date: 23.APR.2014 10:00:13

Chain1: Band Edge AV @ 802.11an (HT 40) Channel 62



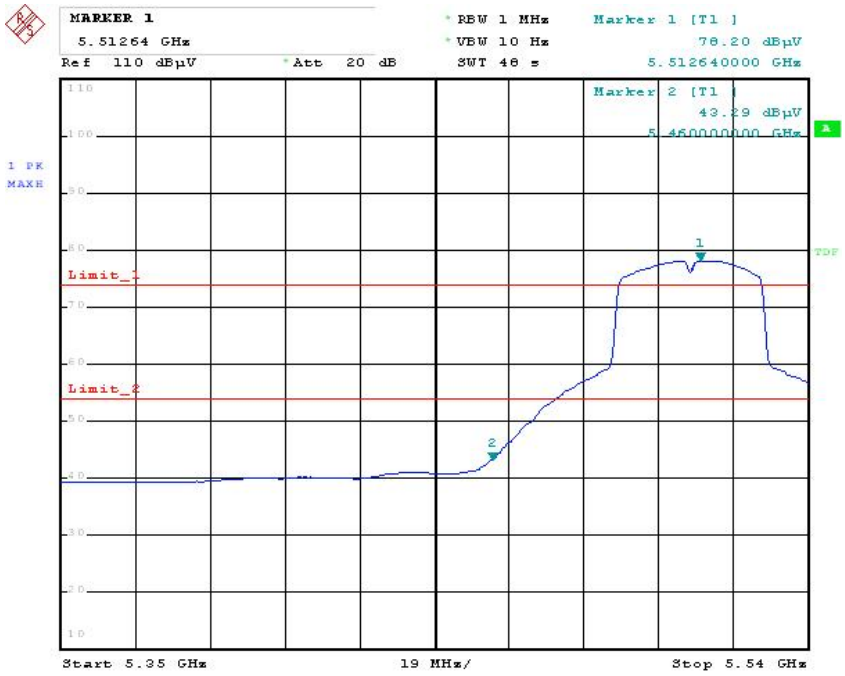
Comment: 2nd comment ...
Date: 23.APR.2014 10:02:35

Chain1: Band Edge PK @ 802.11an (HT 40) Channel 102



Comment: 2nd comment ...
Date: 23.APR.2014 18:30:51

Chain1: Band Edge AV @ 802.11an (HT 40) Channel 102



Comment: 2nd comment ...
Date: 23.APR.2014 18:33:10

9. Power Line Conducted Emission

9.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	Normal Link	

9.2 Limit for AC power line conducted emission

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

9.3 Measuring instrument setting

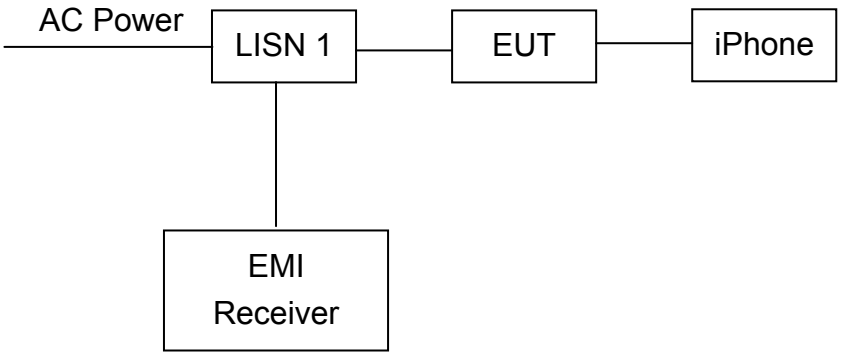
Receiver settings	
Receiver function	**Setting**
Detector	QP
Start frequency	0.15MHz
Stop frequency	30MHz
IF bandwidth	9 kHz
Attenuation	10dB

9.4 Test procedure

1. Configure the EUT according to ANSI C63.10. The EUT or host of EHT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network.
3. All the companion devices are connected to the other LISN. The LISN should provide 50Uh/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30MHz was searched
5. Set the test-receiver system to peak detector and specified bandwidth with maximum hold mode.
6. The measurement has to be done between each power line and ground at the power

terminal.

9.5 Test diagram

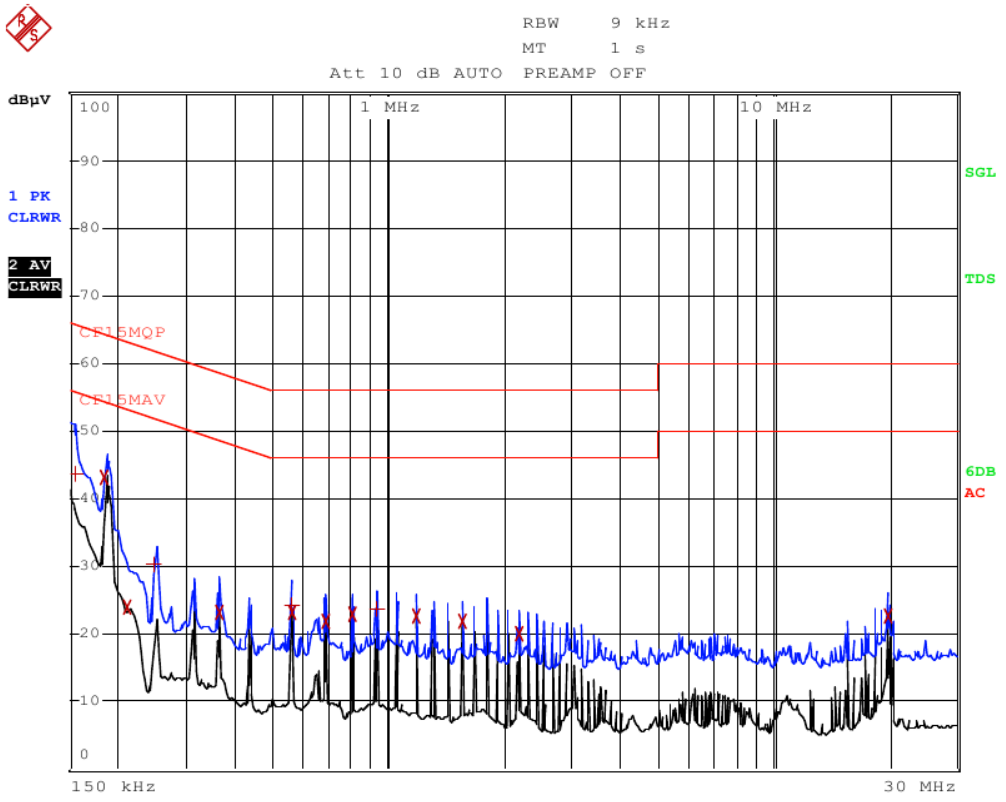


Note: The EUT was tested while in normal communication mode.

9.6 Test results

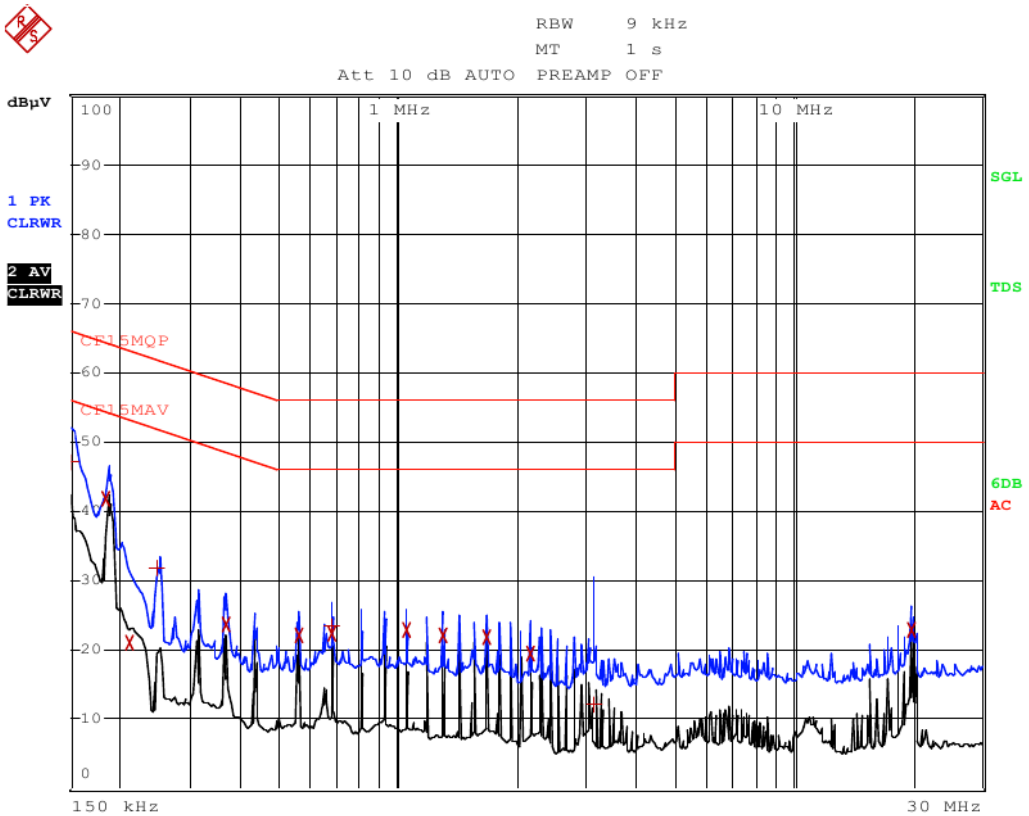
Phase : Line
EUT : OD-11
Test Condition : Normal Link

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	154.5 kHz	43.57	L1	-22.17
2	CISPR Average	186 kHz	43.17	L1	-11.03
2	CISPR Average	213 kHz	24.10	L1	-28.98
1	Quasi Peak	249 kHz	30.43	L1	-31.35
2	CISPR Average	361.5 kHz	23.25	L1	-25.43
1	Quasi Peak	559.5 kHz	24.27	L1	-31.72
2	CISPR Average	559.5 kHz	23.19	L1	-22.80
2	CISPR Average	685.5 kHz	21.93	L1	-24.06
2	CISPR Average	807 kHz	22.91	L1	-23.08
1	Quasi Peak	933 kHz	23.85	L1	-32.14
2	CISPR Average	1.1805 MHz	22.75	L1	-23.24
2	CISPR Average	1.554 MHz	21.92	L1	-24.08
2	CISPR Average	2.175 MHz	20.13	L1	-25.86
2	CISPR Average	19.77 MHz	22.65	L1	-27.34



Phase : Neutral
EUT : OD-11
Test Condition : Normal Link

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	150 kHz	47.11	N	-18.88
2	CISPR Average	186 kHz	41.86	N	-12.34
2	CISPR Average	213 kHz	21.07	N	-32.01
1	Quasi Peak	249 kHz	31.82	N	-29.96
2	CISPR Average	366 kHz	23.64	N	-24.94
2	CISPR Average	559.5 kHz	22.30	N	-23.69
1	Quasi Peak	681 kHz	23.45	N	-32.54
2	CISPR Average	681 kHz	22.40	N	-23.60
2	CISPR Average	1.0545 MHz	22.92	N	-23.07
2	CISPR Average	1.302 MHz	22.18	N	-23.81
2	CISPR Average	1.6755 MHz	21.83	N	-24.17
2	CISPR Average	2.1705 MHz	19.44	N	-26.56
1	Quasi Peak	3.1425 MHz	12.09	N	-43.90
2	CISPR Average	19.7745 MHz	22.86	N	-27.13



10. Frequency Stability

10.1 Operating environment

Temperature:	-40~80	℃
Relative Humidity:	55	%
Atmospheric Pressure	1008	hPa
Requirement	15.407(g)	

10.2 Limit for frequency stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

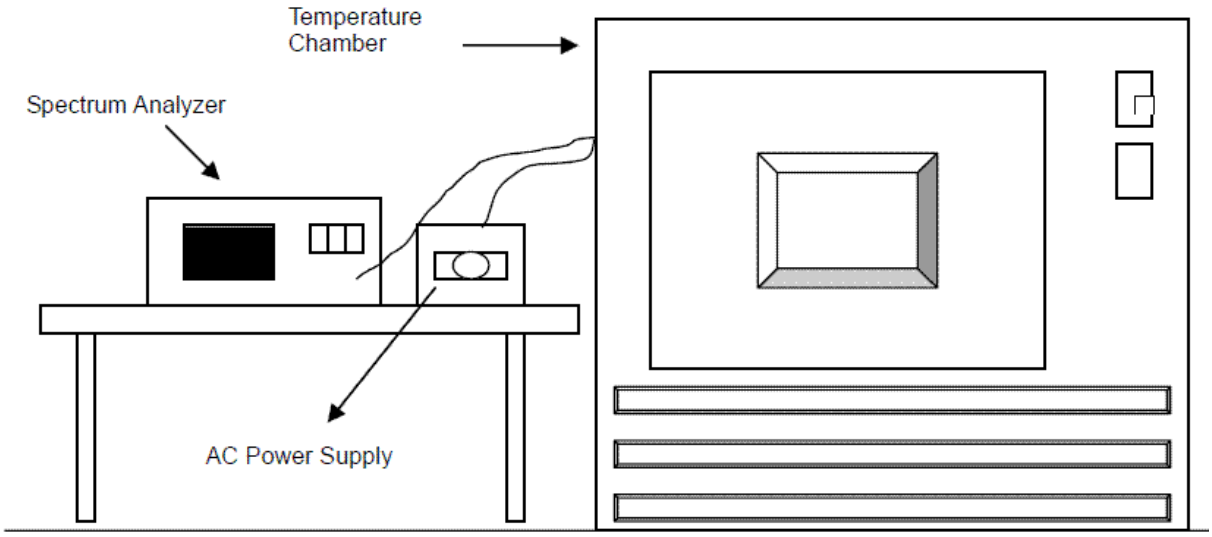
10.3 Measuring instrument setting

Receiver settings	
Receiver function	**Setting**
Span frequency	Entire absence of modulation emission bandwidth
RBW	10 kHz
VBW	10 kHz
Sweep time	Auto
Attenuation	Auto

10.4 Test procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency.
e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
f. The test chamber was allowed to stabilize at +20degree C for minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record

10.5 Test Diagram



10.6 Test results

Voltage V.S. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)
	5190
126.5	5189.9886
110	5189.9985
93.5	5190.0133
Max. Deviation (MHz)	0.0148
Max. Deviation (ppm)	2.85

Temperature V.S. Frequency Stability

Temperature (℃)	Measurement Frequency (MHz)
	5190
-40	5190.1009
-30	5189.8998
-20	5189.8999
-10	5189.9882
0	5189.9685
10	5189.9787
20	5190.0683
30	5190.0556
40	5189.9977
50	5190.0887
60	5190.0887
70	5190.0987
80	5190.0992
Max. Deviation (MHz)	0.1685
Max. Deviation (ppm)	32.47

11. Dynamic Frequency Selection (DFS) test

11.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1008	hPa
Test date:	May 28, 2014	

11.2 UNII Device Description

1. The AIR-AP1242AG-A-K9 operates in the following UNII bands:
   a. 5250-5350 MHz
   b. 5470-5725 MHz

2. Operating mode:

   The EUT was defined as the client without radar detection function.

   Associating peripheral:
   The device was set up to associate with the master device (AIR-AP1242AG-A-K9).

3. The maximum EIRP of this device is 17.49 dBm from UNII band. This device doesn't exceed 27dBm EIRP, so no transmit power control is implemented.

4. Below are the available 50 ohm antenna assemblies and their corresponding gains. 0dBi gain was used to set the -63dBm threshold level (-62dBm+1dB) during calibration of the conducted test setup.
   AIR-ANT5135D-R (5 GHz, 2.0 dBi dipole antenna)

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

11.2.1 Operating mode

Performance was measured at an active frequency of 5260 and 5510MHz, and the radar signal was centered at 5260 and 5510 MHz.
One laptop PC is connected to the AP via a wire Ethernet connection. A separate laptop PC is used as a host computer for the Station. The AP and the Station transmit output levels are set to normal operating condition.
System architectures were used under IP based mode.

11.3 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

11.4 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.

11.5 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:

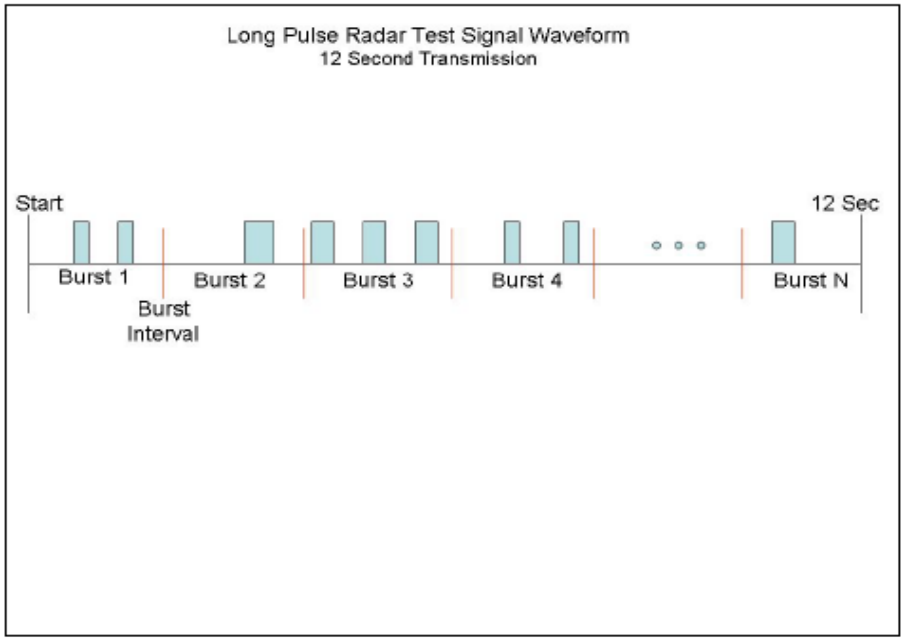
1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst_Count.
3) Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly 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.

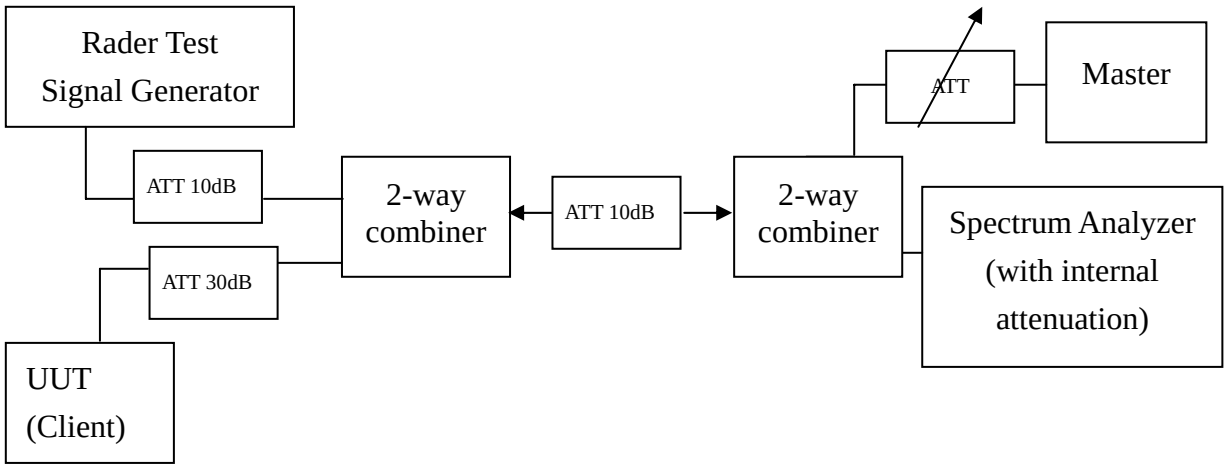
The hopping sequence is different for each waveform and a 100-length segment is selected1 from the hopping sequence defined by the following algorithm:

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.

11.6 Radar Waveform Calibration

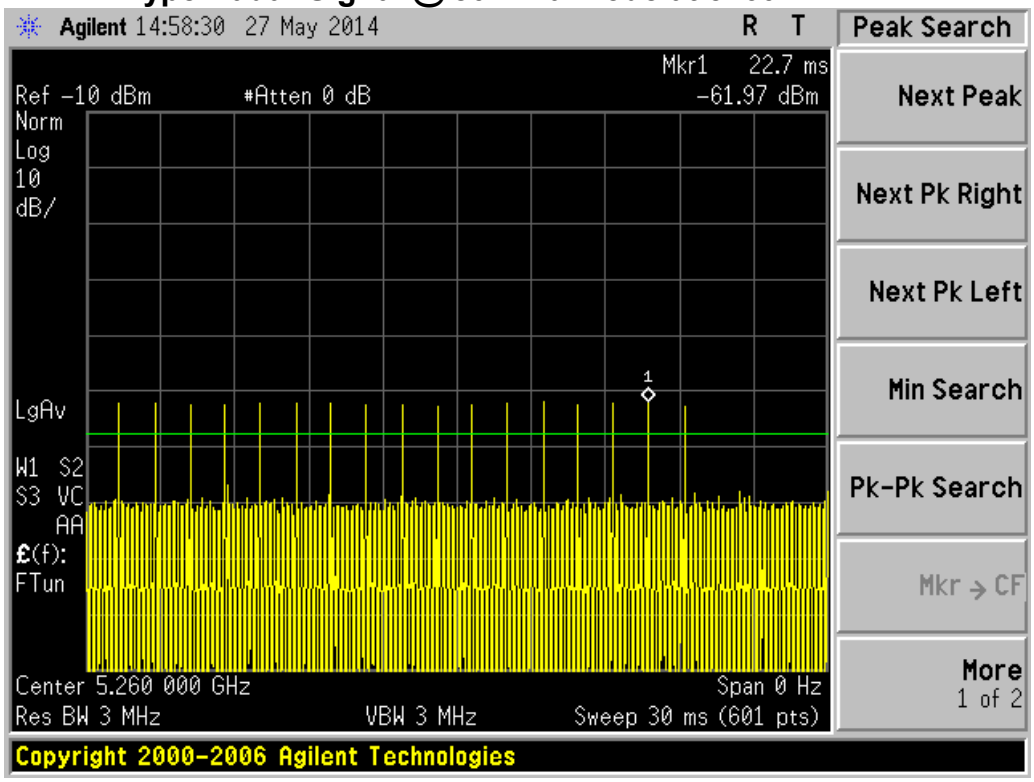
The following equipment setup was used to calibrate the conducted radar waveform. A spectrum analyzer is used to establish the test signal level for each radar type. During this process, there were no transmissions by either Master or Client device. The spectrum analyzer was switched to the zero span (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 –61 dBm.

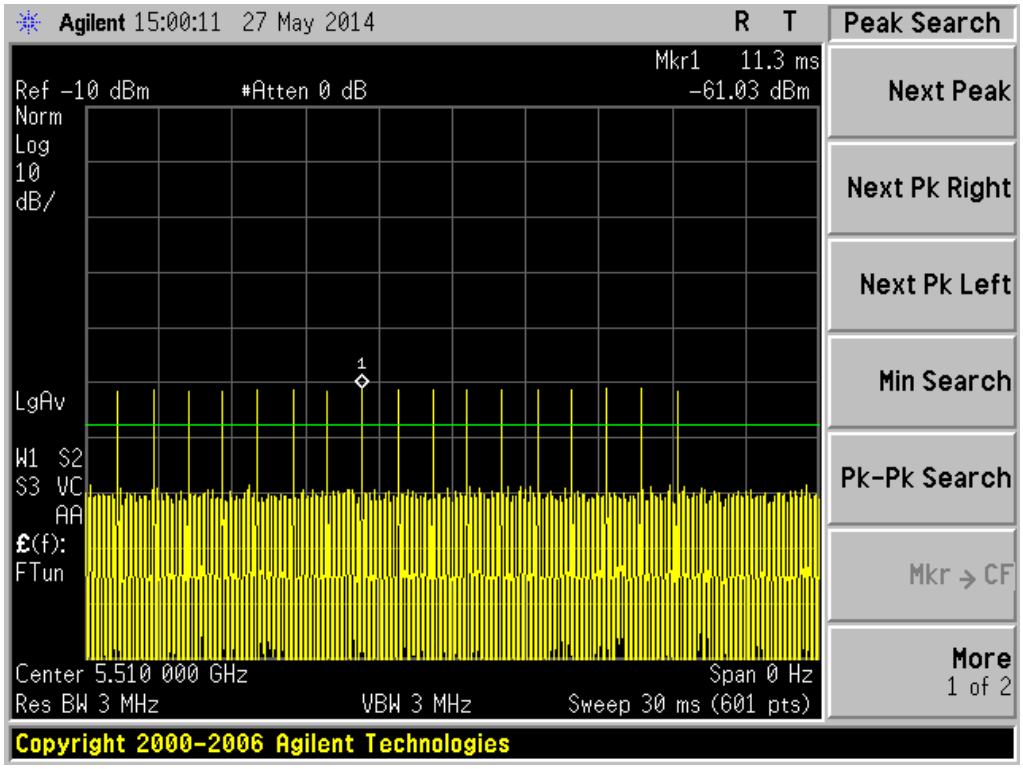


11.6.1 Radar Waveform Calibration Plots

Type Radar Signal @ 802.11a mode at 5260 MHz



Type Radar Signal @ 802.11a mode at 5510 MHz



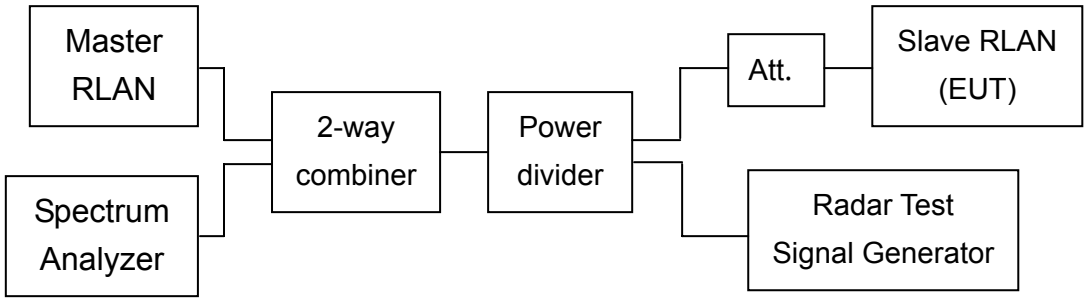
11.7 Test instruments and setup

11.7.1 Deviation about the radar waveform

No deviation.

11.7.2 Test setup

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



11.8 DFS test results

11.8.1 Test summary

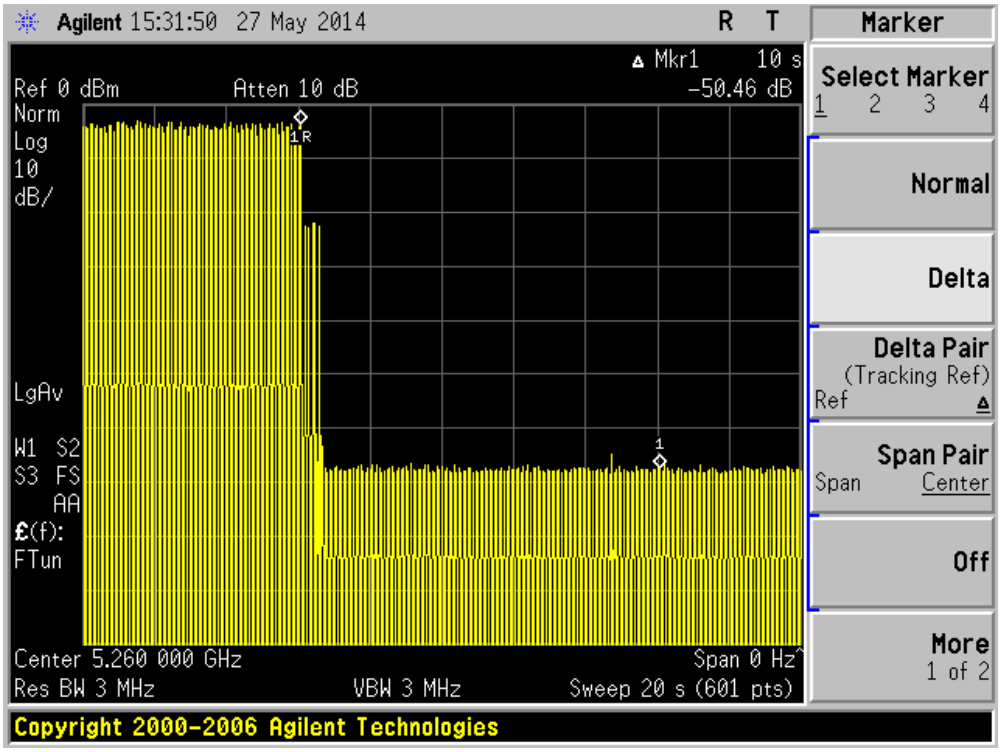
This EUT was defined as the Client without DFS detection.

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

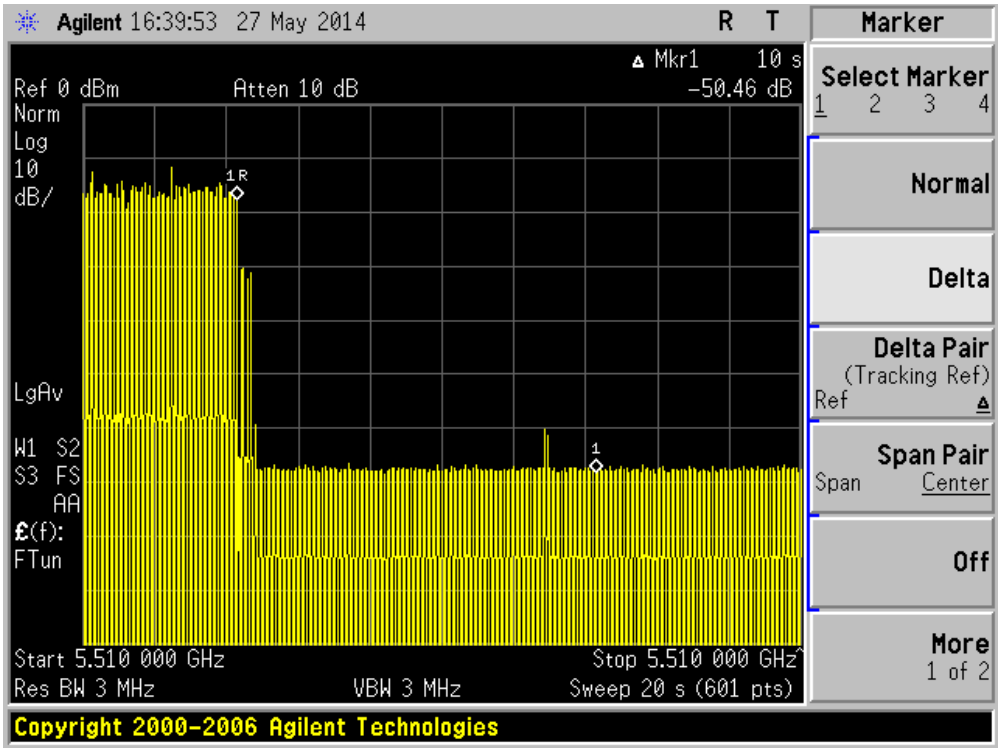
11.8.2 DFS test result

11.8.2.1 Channel Move time

Rader Type (5260MHz)

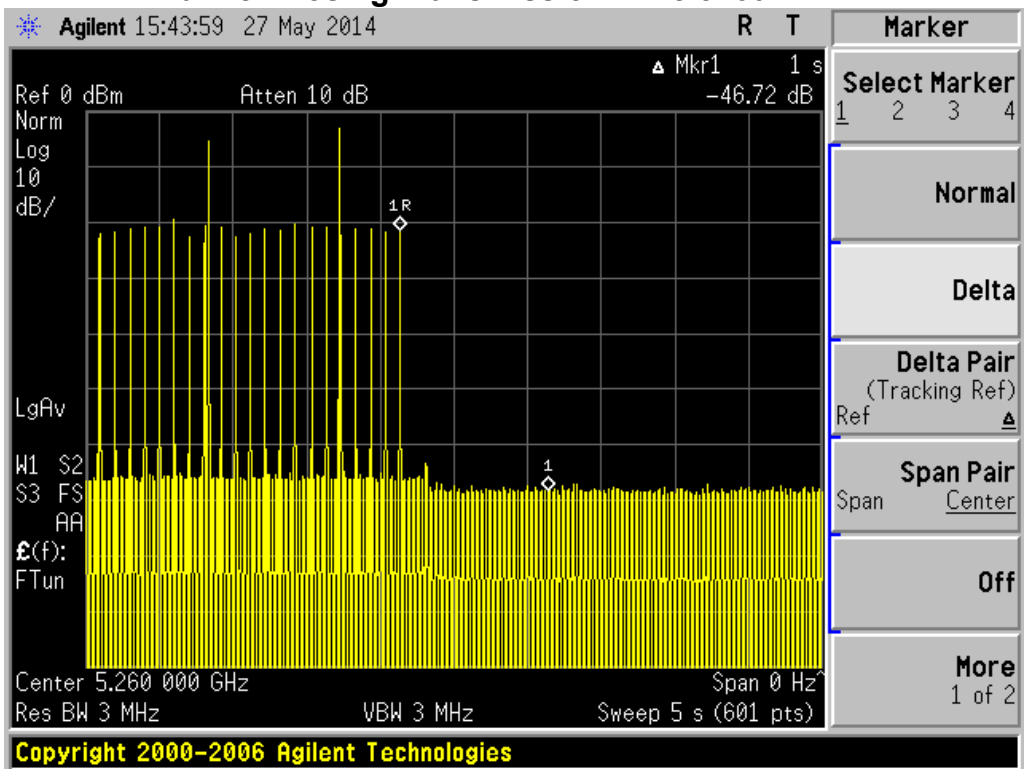


Rader Type (5510MHz)

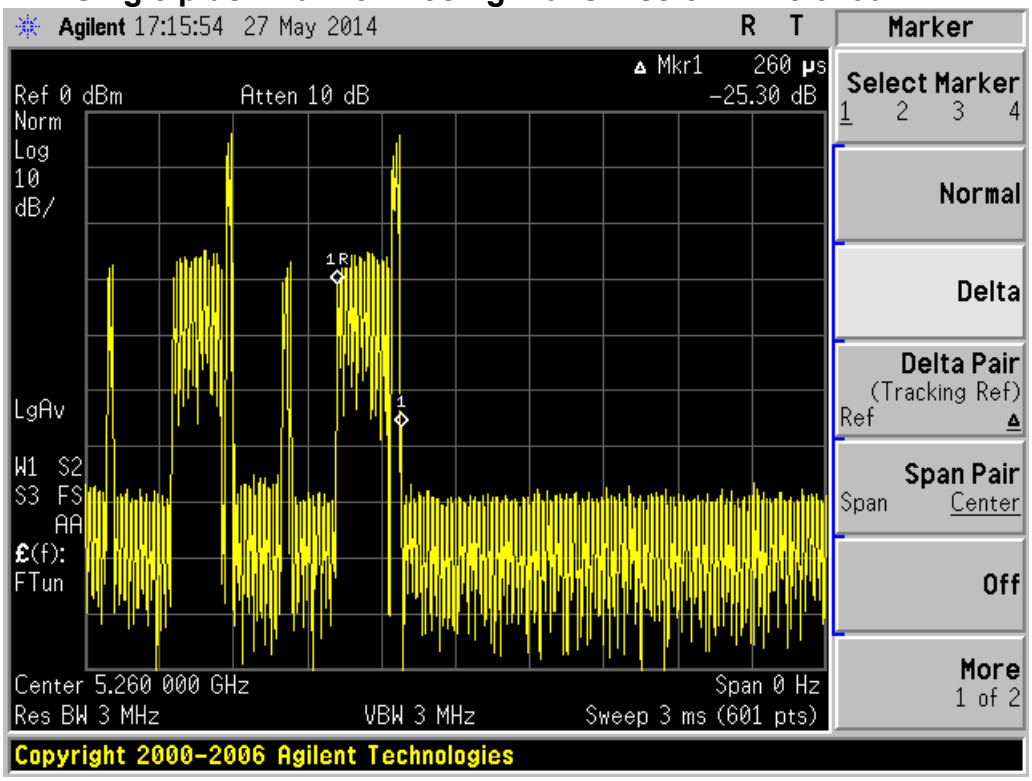


11.8.2.2 Channel Closing Transmission Time

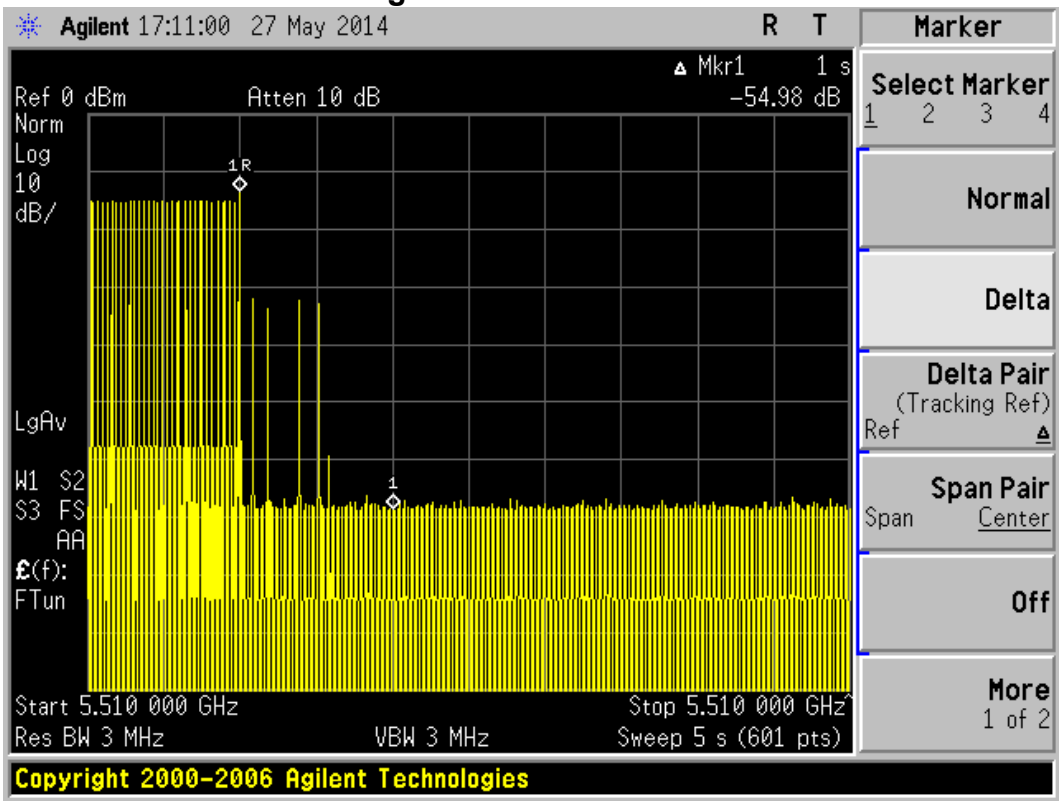
Channel Closing Transmission Time 5260 MHz



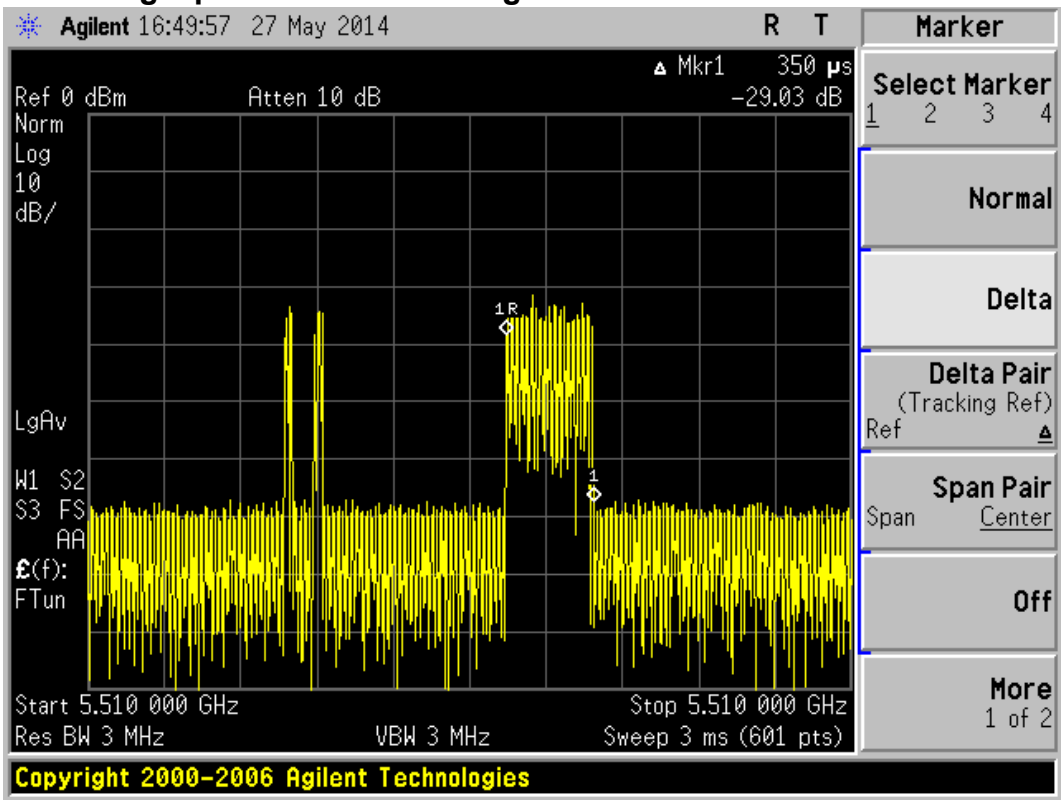
Single plus Channel Closing Transmission Time 5260 MHz



Channel Closing Transmission Time 5510 MHz



Single plus Channel Closing Transmission Time 5510 MHz

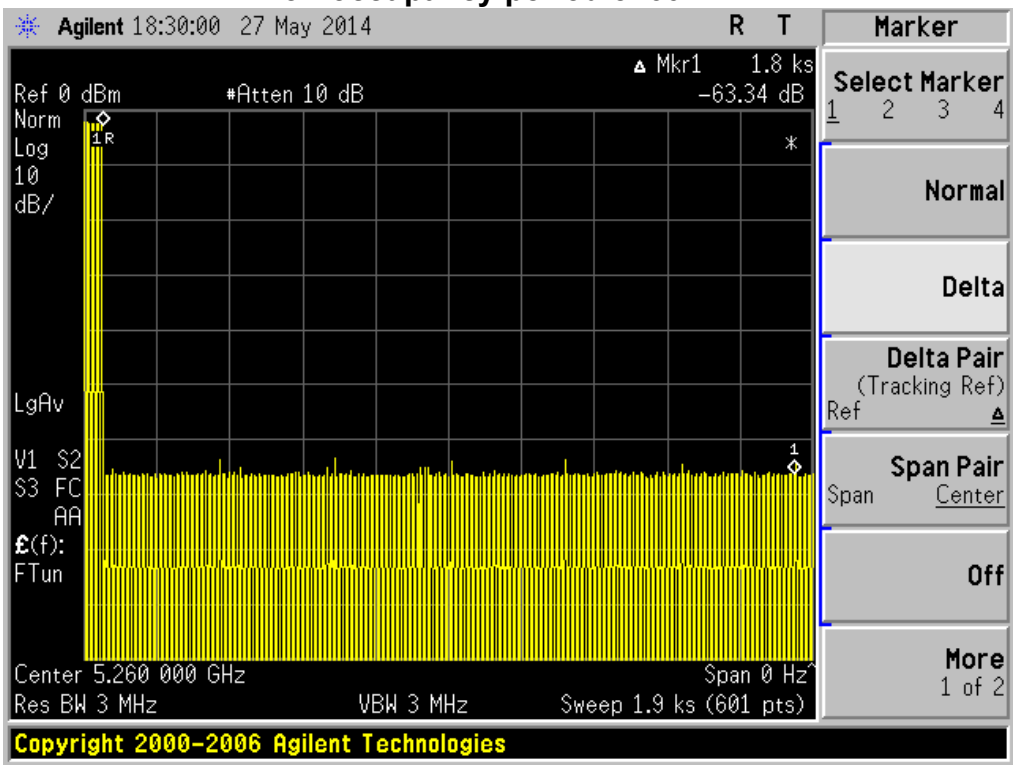


Mode	Channel	Frequency (Mhz)	Radar type	Single pulse (ms)	Pulse number	Total time (ms)
802.11n (HT20)	52	5260	1	0.26	5	1.3
802.11n (HT40)	102	5510	1	0.35	5	1.75

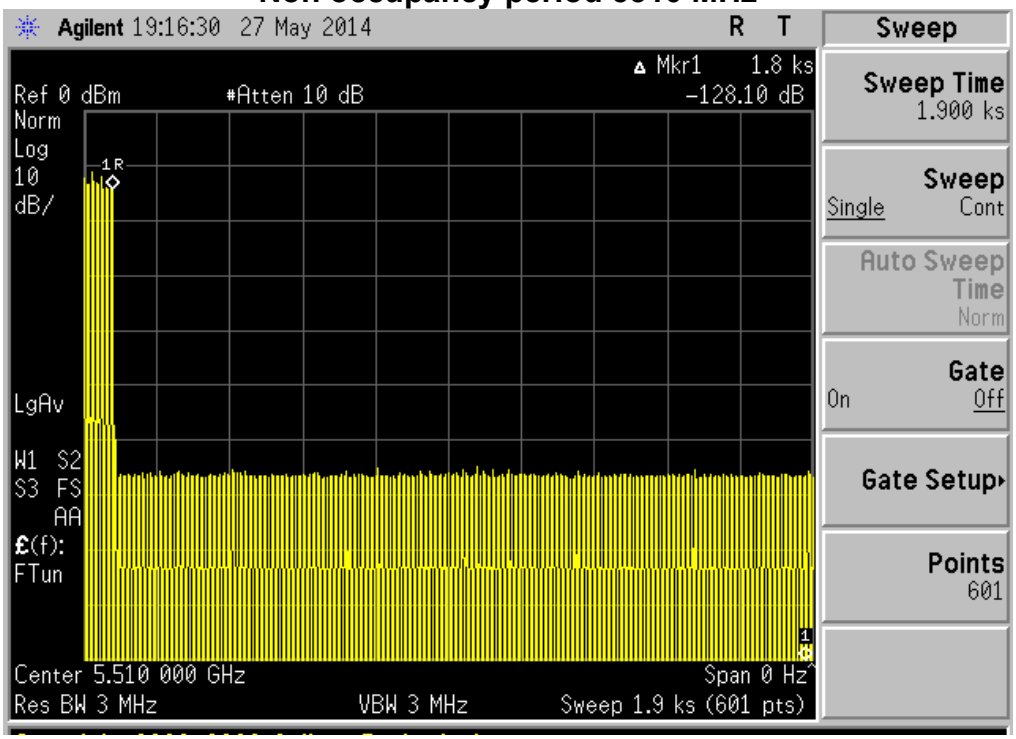
11.8.2.3 Non-Occupancy Period

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

Non occupancy period 5260 MHz



Non occupancy period 5510 MHz



Appendix A: Test equipment list

Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
ESCI EMI Test Receiver	Rohde & Schwarz	ESCI	100018	2013/12/03	2014/12/02
Spectrum Analyzer	Rohde&schwarz	FSP30	100137	2013/06/21	2014/06/20
Spectrum Analyzer	Rohde&schwarz	FSEK30	100186	2014/01/20	2015/01/19
Horn Antenna (1-18G)	Schwarzbeck	BBHA 9120 D	9120D-456	2012/09/03	2014/09/02
Horn Antenna (14-42G)	SHWARZBECK	BBHA 9170	BBHA9170159	2012/09/05	2014/09/04
Broadband Antenna	SCHWARZBECK	VULB 9168	9168-172	2013/08/08	2015/08/07
Loop Antenna	RolfHeine	LA-285	02/10033	2014/03/18	2016/03/16
Pre-Amplifier	MITEQ	AFS44-00102650--42-10P-44	1495287	2013/10/27	2015/10/26
Pre-Amplifier	MITEQ	JS4-26004000--27-8A	828825	2012/09/18	2014/09/17
Power Meter	Anritsu	ML2495A	0844001	2013/10/10	2014/10/09
Power Senor	Anritsu	MA2411B	0738452	2013/10/10	2014/10/09
Temperature&Humidity Test Chamber	TERCHY	MHU-225LRU (SA)	950838	2013/06/14	2014/06/13
Two-Line -V-Network	Rohde&schwarz	ESH3-Z5	825562/003	2013/10/12	2014/10/11
Two-Line V-Network	Rohde&schwarz	ESH3-Z5	838979/014	2013/10/12	2014/10/11
Singal Analyzer	Agilent	N9030A	MY51380492	2013/09/19	2014/09/18
WiMAX PSA Spectrum Analyzer	Agilent	E4440A	MY46186191	2014/05/22	2015/05/21
WiMAX ESG Vector Signal Generator	Agilent	E4438C	MY45094140	2014/05/10	2015/05/09

Appendix B: 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.

Appendix C. 26 dB down Bandwidth

C 1.1 Test conditions

Temperature:	20	℃
Relative Humidity:	55	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,52,56,64,100,116,140,149,153,161for 20MHz 38,46,54,62,102,110,134,151,159 for 40MHz	

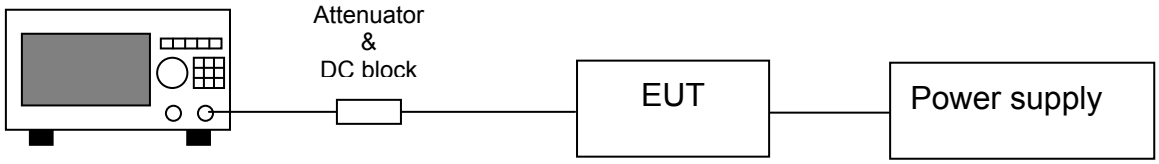
C1.2 Measuring instrument setting

Spectrum analyzer settings	
Spectrum Analyzer function	**Setting**
Detector	Peak
RBW	Approximately 1% of the emission bandwidth
VBW	> RBW
Sweep	Auto couple
Trace	Max hold.
Attenuation	Auto

C1.3 Test procedure

1. The transmitter output was connected to the spectrum analyzer.
2. Test was performed in accordance with clause c) emission bandwidth of KDB 789033 D01
3. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission

C1.4 Test diagram



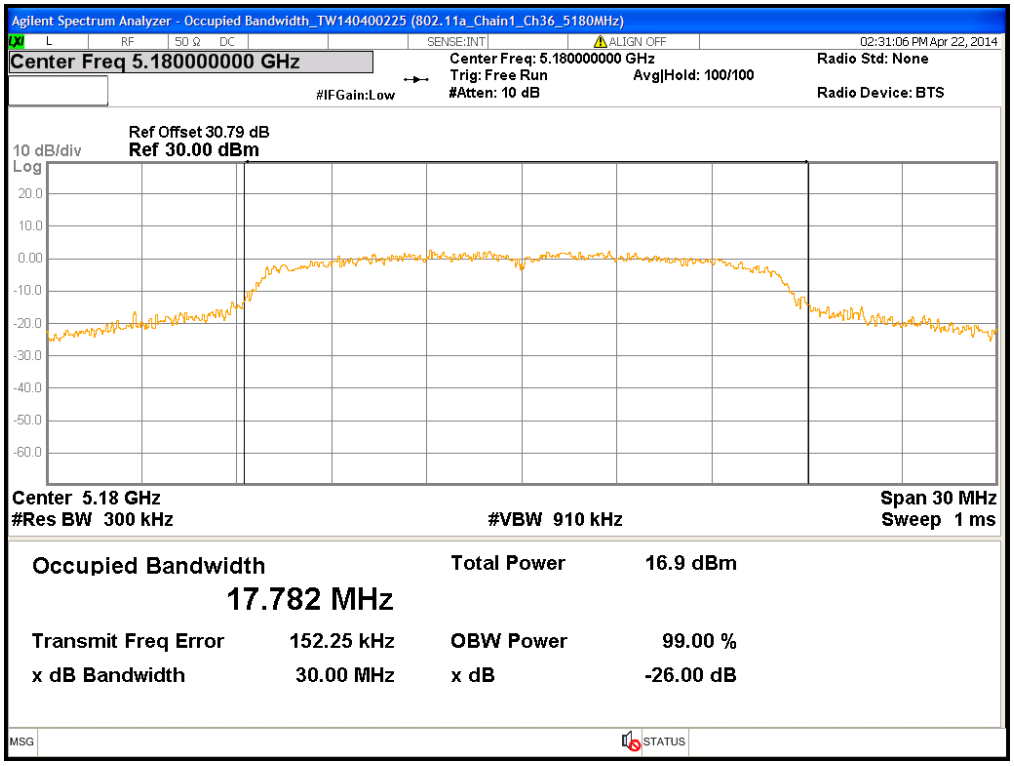
C1.5 Test results

Mode	Channel	Frequency (MHz)	Data rate (Mbps)	26 dB Bandwidth (MHz)
802.11a (Chain1)	36	5180	6	30.00
	40	5200		29.82
	48	5240		29.87
	52	5260		30.00
	56	5280		29.90
	64	5320		29.64
	100	5500		29.79
	116	5600		30.00
	140	5700		30.00
	149	5745		23.25
	153	5765		24.14
	161	5805		24.73
802.11n (HT 20) (Chain1)	36	5180	6.5	29.85
	40	5200		29.96
	48	5240		29.80
	52	5260		29.81
	56	5280		29.39
	64	5320		29.91
	100	5500		30.00
	116	5600		29.57
	140	5700		29.96
	149	5745		27.03
	153	5765		29.94
	161	5805		29.96

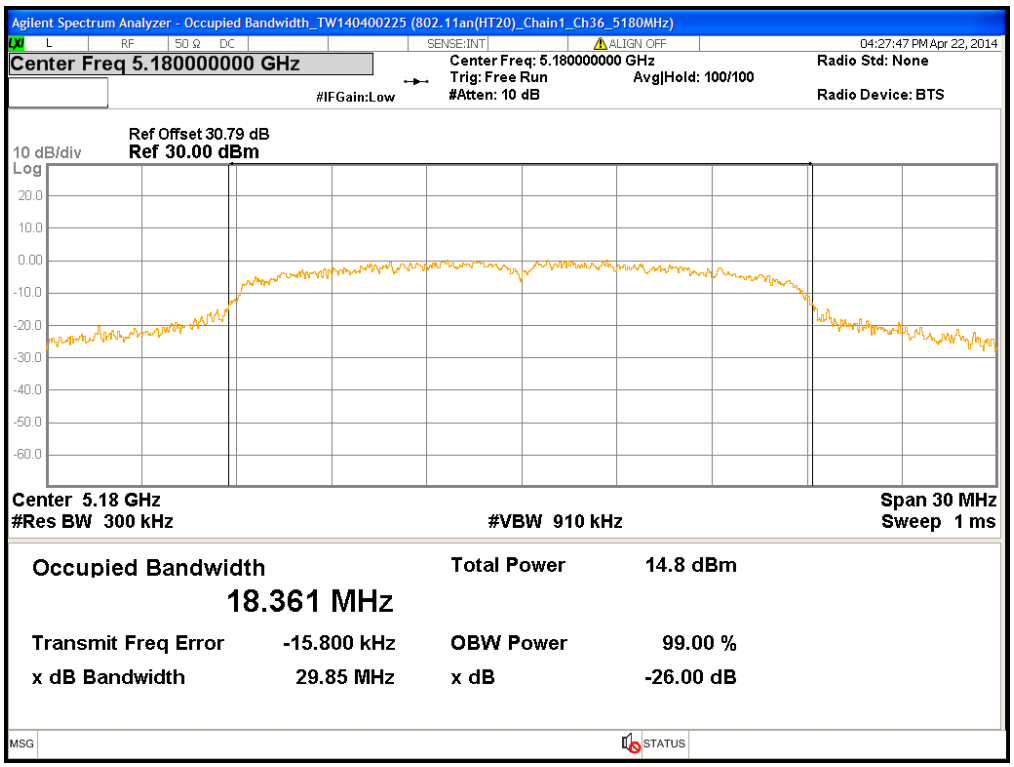
Mode	Channel	Frequency (MHz)	Data rate (Mbps)	26 dB Bandwidth (MHz)
802.11n (HT 40) (Chain1)	38	5190	13.5	60.00
	46	5230		59.39
	54	5270		59.70
	62	5310		44.75
	102	5510		44.58
	110	5550		45.91
	134	5670		43.34
	151	5755		44.56
	159	5795		45.61

For convenience reason, the following plots are typical test results:

Chain1: Bandwidth @ 802.11a Channel 36



Chain1: Bandwidth @ 802.11an (HT20) Channel 36



Chain1: Bandwidth @ 802.11an (HT40) Channel 38