

EMC

TEST REPORT

Report No. : TW14050017

Model No. : WAP5705

Issued Date : Jun. 04, 2014

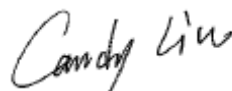
Applicant: ZyXEL Communications Corporation
No. 2, Gongye E. 9th Road Hsinchu Science Park,
Hsinchu, Taiwan

**Test Method/
Standard:** 47 CFR FCC Part 15.407
KDB 789033 D01 v01r03
KDB 662911 D01 v02r01
ANSI C63.4 2003.

Test By: Intertek Testing Services Taiwan Ltd.
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Shiang-Shan District, Hsinchu City, Taiwan

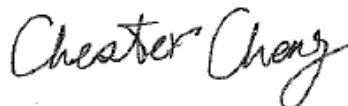
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1. Summary of Test Data

Test Requirement	Applicable Rule (Section 15.247)	Result
Maximum Conducted Output Power	15.407 (a)(1)/(2)/(3) KDB 789033 D01 v01r03 KDB 662911 D01 v02r01	Pass
Power Spectrum Density	15.407 (a)(1)/(2)/(3) KDB 789033 D01 v01r03 KDB 662911 D01 v02r01	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:	5-GHz Wireless HD Media Streaming Box
Model No.:	WAP5705
FCC ID:	I88WAP5705
Operating Frequency:	1. 5180 MHz ~ 5240 MHz for 802.11a, 802.11n(HT20) 2. 5190 MHz ~ 5230 MHz for 802.11n (HT40) 3. 5745 MHz ~ 5805 MHz for 802.11a, 802.11n (HT20) 4. 5755 MHz ~ 5795 MHz for 802.11n (HT40)
Channel Number:	1. 4 channels for 5180 MHz ~ 5240 MHz for 802.11a,802.11n (HT20) 2. 2 channels for 5190 MHz ~ 5230 MHz for 802.11n (HT40) 3. 4 channels for 5745 MHz ~ 5805 MHz for 802.11a, 802.11n (HT20) 4. 2 channels for 5755 MHz ~ 5795 MHz for 802.11n (HT40)
Access scheme:	OFDM
Modulation	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Rated Power:	DC 12 V from adapter
Power Cord:	2C × 18AWG × 1.0 meter unshielded cable
Sample Received:	May 2, 2014
Sample condition:	Workable
Test Date(s):	May 23, 2014 ~ May 30, 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	Chain 2 /Aux
802.11a ^{*1}	V	V	V
802.11 n (HT20) ^{*2}	V	V	V
802.11 n (HT40) ^{*2}	V	V	V

Note 1: The EUT supports the antenna with TX/RX diversity function. Both of chain0 、 chain 1 and chain 2 can be used as transmitting/receiving antenna, but only 1 antenna active at any moment in time

Note 2: Both of chain 0 、 1 and 2 can be used as transmitting/receiving antennas. Chain 0 、 chain 1 and chain 2 could transmit/receive simultaneously.

2.3 Antenna description

2.3.1 Antenna 0 (Chain0)

The EUT uses a permanently connected antenna.

Antenna Gain : 2.65 dBi max
 Antenna Type : Print antenna
 Connector Type : Fixed

2.3.2 Antenna 1 (Chain1)

The EUT uses a permanently connected antenna.

Antenna Gain : 4.08 dBi max
 Antenna Type : Print antenna
 Connector Type : Fixed

2.3.3 Antenna 2 (Chain2)

The EUT uses a permanently connected antenna.

Antenna Gain : 2.21 dBi max
Antenna Type : PIFA antenna
Connector Type : I-PEX

2.4 Adapter information

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

No.	Brand	Model no.	Specification
Adapter	DVE	DSA-12G-12 FUS 120120	I/P: 100-240V~, 0.3A, 50/60Hz O/P: 12V, 1.0A

The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

2.5 Peripherals equipment

Peripherals	Brand	Model No.	Serial No.	Data cable
Notebook PC	DELL	Latitude D610	GXWZK1S	RJ-45 UTP CAT.5 10 meter × 1
Notebook PC	DELL	Latitude D610	5YWZK1S	N/A
Dummy Load	N/A	N/A	N/A	RJ-45 UTP CAT.5 10 meter × 1

2.6 Operation mode

TX Mode: Based on tool “RT3883QA” to type command to select different frequency and modulation.

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 (HT20) mode, and 13.5 Mbps data rate for 802.11n (HT40) mode. The final tests were executed under these conditions and recorded in this report individually.

802.11a ch40 chain0		802.11n (HT20) ch40 chain0		802.11n (HT40) ch38 chain0	
Data rate (Mbps)	AV (dBm)	Data rate (Mbps)	AV (dBm)	Data rate (Mbps)	AV (dBm)
6	15.63	6.5	11.13	13.5	11.46
9	15.61	13	11.13	27	11.46
12	15.61	19.5	11.13	40.5	11.46
18	15.61	26	11.13	72	11.46
24	15.60	39	11.12	81	11.45
36	15.59	52	11.12	108	11.45
48	15.59	58.5	11.12	121.5	11.45
54	15.59	65	11.11	135	11.45
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	16.13	6.5	11.54	13.5	11.52
9	16.13	13	11.54	27	11.52
12	16.13	19.5	11.54	40.5	11.52
18	16.12	26	11.54	72	11.52
24	16.12	39	11.53	81	11.51
36	16.12	52	11.53	108	11.51
48	16.12	58.5	11.53	121.5	11.51
54	16.12	65	11.53	135	11.51
802.11a ch40 chain2		802.11n (HT20) ch40 chain2		802.11n (HT40) ch38 chain2	
Data rate (Mbps)	AV (dBm)	Data rate (Mbps)	AV (dBm)	Data rate (Mbps)	AV (dBm)
6	16.65	6.5	12.82	13.5	11.57
9	16.65	13	12.82	27	11.57
12	16.64	19.5	12.82	40.5	11.57
18	16.64	26	12.81	72	11.57
24	16.64	39	12.81	81	11.56
36	16.64	52	12.81	108	11.56
48	16.64	58.5	12.81	121.5	11.56
54	16.64	65	12.81	135	11.55

2.7 Applied test modes and channels

Test items	Mode	Data Rate (Mbps)	Channel	Antenna
Maximum Conducted Output Power	802.11a	6	36,40,48,149,157,161	Chain0/Chain1/Chain2
	802.11 n (HT20)	6.5	36,40,48,149,157,161	Chain0+Chain1+Chain2
	802.11 n (HT40)	13.5	38,46,151,159	Chain0+Chain1+Chain2
Power Spectrum Density	802.11a	6	36,40,48,149,157,161	Chain0/Chain1/Chain2
	802.11 n (HT20)	6.5	36,40,48,149,157,161	Chain0+Chain1+Chain2
	802.11 n (HT40)	13.5	38,46,151,159	Chain0+Chain1+Chain2
Peak Excursion To Average Ratio	802.11a	6	36,40,48,149,157,161	Chain0/Chain1/Chain2
	802.11 n (HT20)	6.5	36,40,48,149,157,161	Chain0+Chain1+Chain2
	802.11 n (HT40)	13.5	38,46,151,159	Chain0+Chain1+Chain2
Radiated spurious Emission 9kHz~1GHz	Normal Link			
Emissions In Restricted Frequency Bands (Radiated emission measurements)	802.11a	6	36,40,48,149,157,161	Chain0/Chain1/Chain2
	802.11 n (HT20)	6.5	36,40,48,149,157,161	Chain0+Chain1+Chain2
	802.11 n (HT40)	13.5	38,46,151,159	Chain0+Chain1+Chain2
Emission on The Band Edge	802.11a	6	36	Chain0/Chain1/Chain2
	802.11 n (HT20)	6.5	36	Chain0+Chain1+Chain2
	802.11 n (HT40)	13.5	38	Chain0+Chain1+Chain2
Frequency stability	802.11a	6	36,40,48,149,157,161	Chain0/Chain1/Chain2
	802.11 n (HT20)	6.5	36,40,48,149,157,161	Chain0+Chain1+Chain2
	802.11 n (HT40)	13.5	38,46,151,159	Chain0+Chain1+Chain2
AC Line Conducted Emission	Normal Link			

2.8 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	Software Version:		
	Channel	Frequency	Power setting
802.11a (chain0)	36	5180	0D00
	40	5200	0F00
	48	5240	1100
	149	5745	1F04
	157	5785	1F04
	161	5805	1F04
802.11a (chain1)	36	5180	0D00
	40	5200	0F00
	48	5240	0F00
	149	5745	1F04
	157	5785	1F04
	161	5805	1F04
802.11a (chain2)	36	5180	0C02
	40	5200	0C04
	48	5240	0F03
	149	5745	1F04
	157	5785	1F04
	161	5805	1F04
802.11n (HT20)	36	5180	0900
	40	5200	0A00
	48	5240	0A00
	149	5745	1F04
	157	5785	1F04
	161	5805	1F04
802.11n (HT40)	38	5190	0500
	46	5230	0A00
	151	5755	1F04
	159	5795	1F04

3. Maximum Conducted Output Power

3.1 Operating environment

Temperature:	25	°C
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,149,157,161 for 20MHz 38,46,151,159 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.

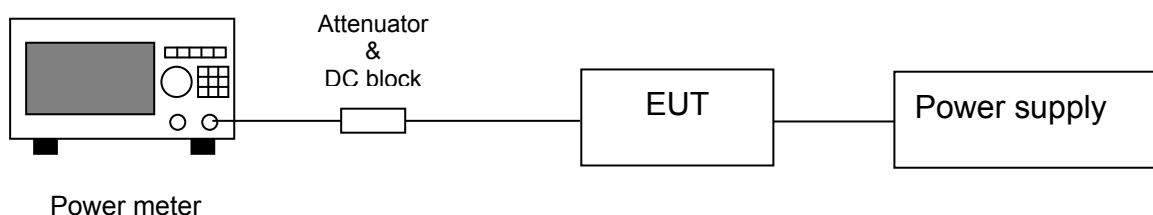
3.3 Measuring instrument setting

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 (chain0)	36	5180	6	15.94	39.26	16.82	-0.88
	40	5200		15.63	36.56	16.82	-1.19
	48	5240		15.42	34.83	16.82	-1.40
	149	5745		20.84	121.34	29.86	-9.02
	157	5785		20.44	110.66	29.86	-9.42
	161	5805		20.91	123.31	29.86	-8.95
802.11a (chain1)	36	5180	6	16.31	42.76	16.82	-0.51
	40	5200		16.13	41.02	16.82	-0.69
	48	5240		16.50	44.67	16.82	-0.32
	149	5745		21.32	135.52	29.86	-8.54
	157	5785		22.06	160.69	29.86	-7.80
	161	5805		22.21	166.34	29.86	-7.65
802.11a (chain2)	36	5180	6	16.68	46.56	16.82	-0.14
	40	5200		16.65	46.24	16.82	-0.17
	48	5240		16.67	46.45	16.82	-0.15
	149	5745		21.38	137.40	29.86	-8.48
	157	5785		21.83	152.41	29.86	-8.03
	161	5805		20.87	122.18	29.86	-8.99

Note 1: Limit(dBm) conducted power: 4 dBm +10 log (19.16)=16.82

Note 2: Limit(dBm) conducted power: 17 dBm +10 log (19.31)=29.86

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Output Power (AV)			Total Power (AV)		Limit (dBm)	Margin (dB)
				Chain 0	Chain 1	Chain 2	mW	dBm		
				dBm	dBm	dBm				
802.11n (HT20)	36	5180	6.5	11.45	10.77	11.95	41.57	16.19	16.87	-0.68
	40	5200		11.13	11.54	12.82	46.37	16.66	16.87	-0.21
	48	5240		10.4	11.73	11.41	39.69	15.99	16.87	-0.88
	149	5745		20.65	20.96	19.39	327.78	25.16	29.90	-4.74
	157	5785		20.12	21.37	20.24	345.57	25.39	29.90	-4.51
	161	5805		20.71	21.88	21.02	398.40	26.00	29.90	-3.89
802.11n (HT40)	38	5190	13.5	11.46	11.52	11.57	42.54	16.29	16.82	-0.54
	46	5230		10.02	12.51	11.75	42.83	16.32	16.82	-0.51
	151	5755		21.39	20.47	19.57	339.72	25.31	30.00	-4.69
	159	5795		20.31	21.06	21.16	365.66	25.63	30.00	-4.37

802.11n(HT20)

Note 1.: Limit(dBm) conducted power: 4 dBm +10 log (19.36)=16.87

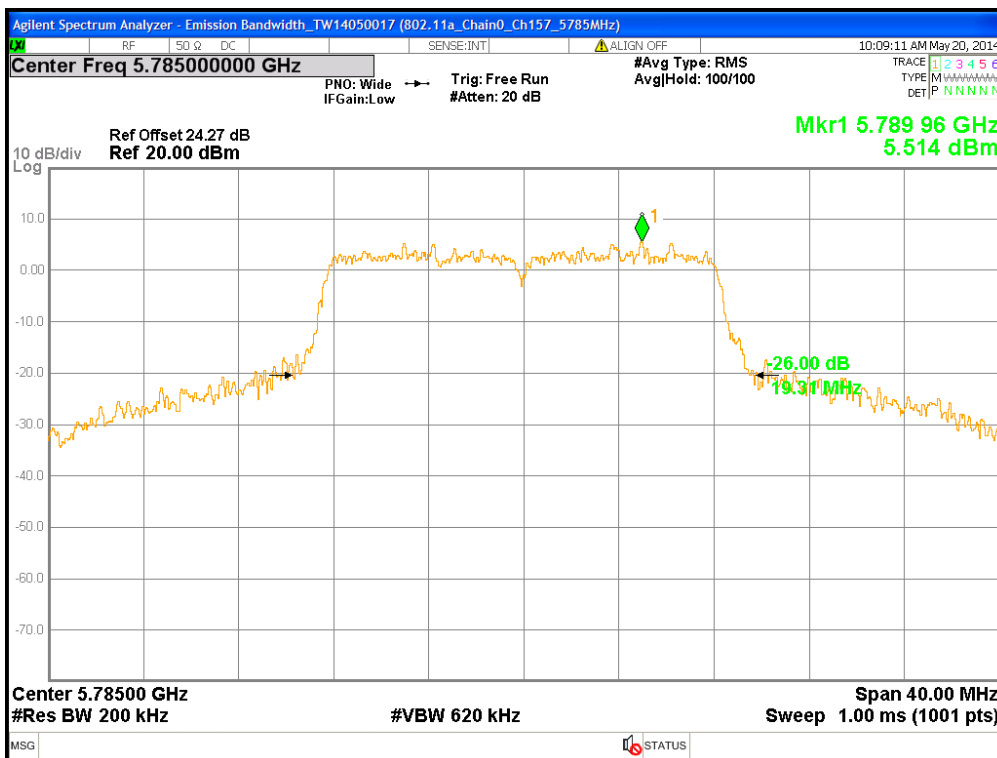
Note 2.: Limit(dBm) conducted power: 17 dBm +10 log (19.49)=29.9

802.11n(HT40)

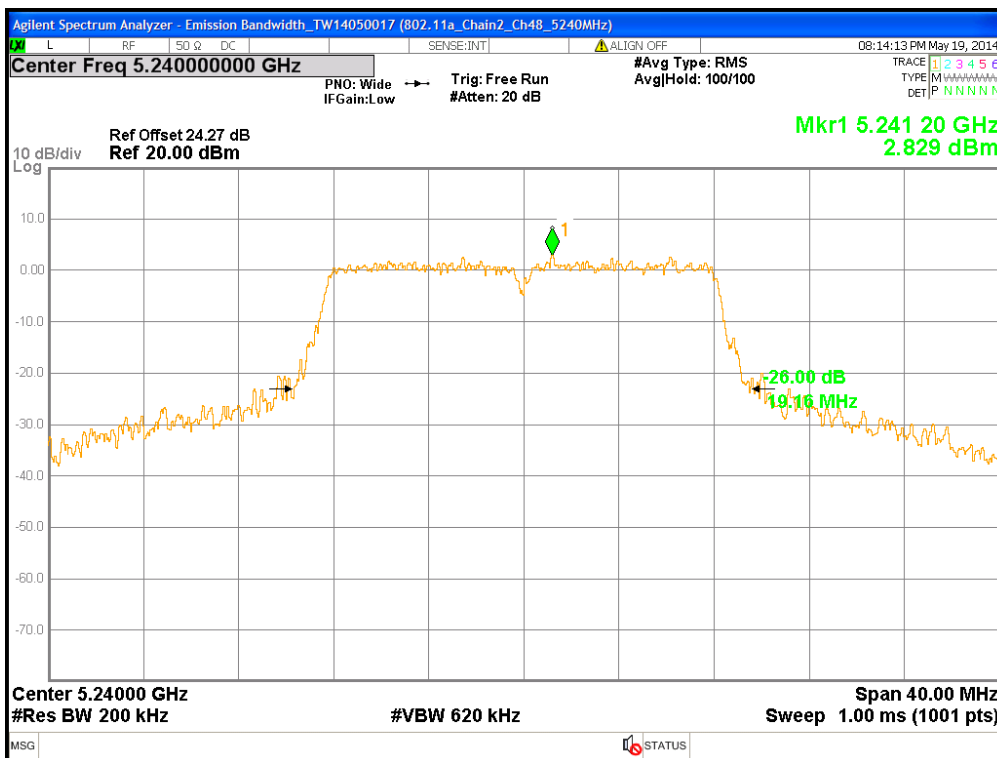
Note 3.: Limit(dBm) conducted power: 4 dBm +10 log (38.88)=16.82

Note 4.: Limit(dBm) conducted power: 17 dBm +10 log (39)=30

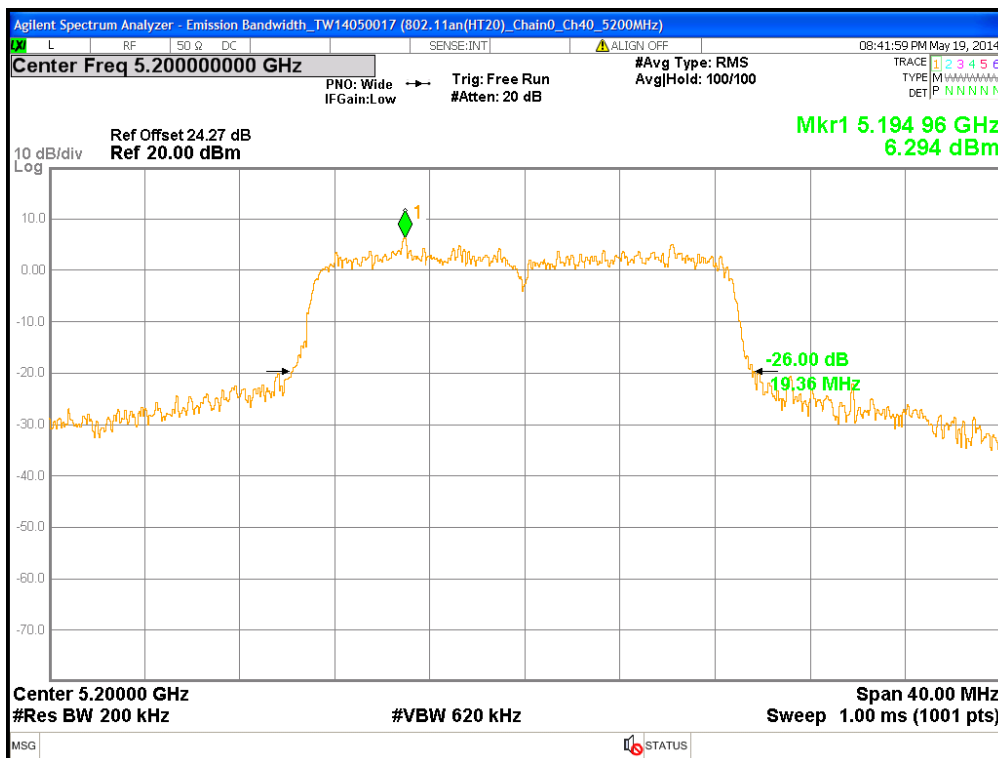
Chain0 : Emission Bandwidth @ 802.11a Mode Ch157



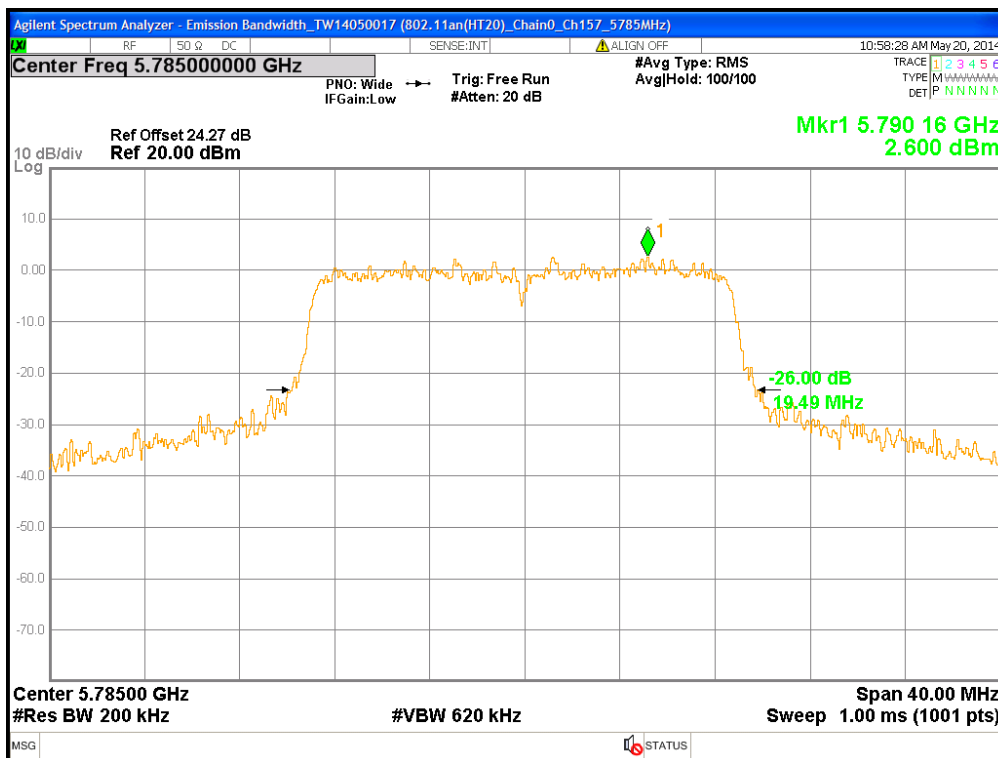
Chain2 : Emission Bandwidth @ 802.11a Mode Ch48



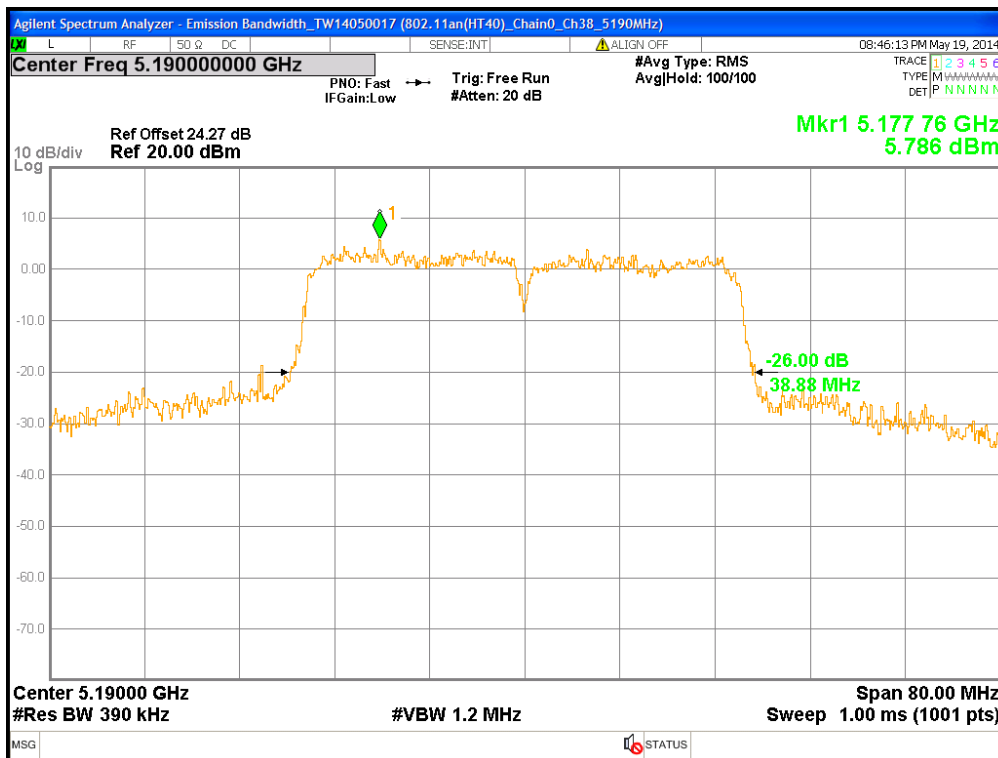
Chain0 : Emission Bandwidth @ 802.11n(HT20) Mode Ch40



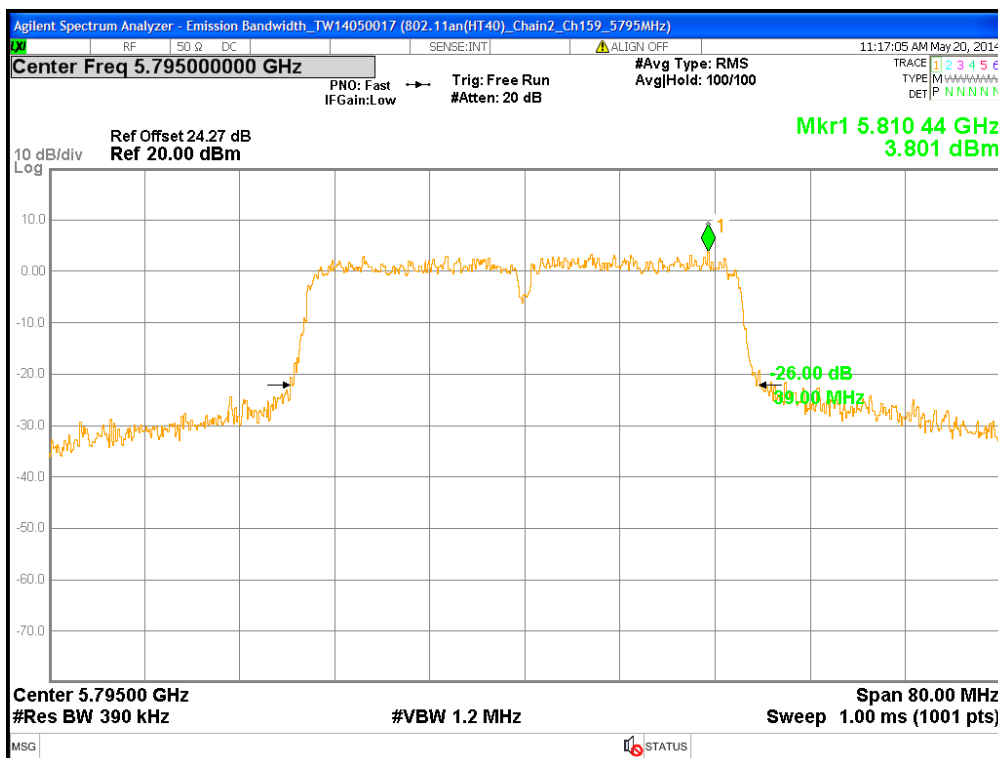
Chain0 : Emission Bandwidth @ 802.11n(HT20) Mode Ch157



Chain0 : Emission Bandwidth @ 802.11n(HT40) Mode Ch38



Chain2 : Emission Bandwidth @ 802.11n(HT40) Mode Ch159



4. Power Spectrum Density

4.1 Operating environment

Temperature:	25	°C
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,149,157,161 for 20MHz 38,46,151,159 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

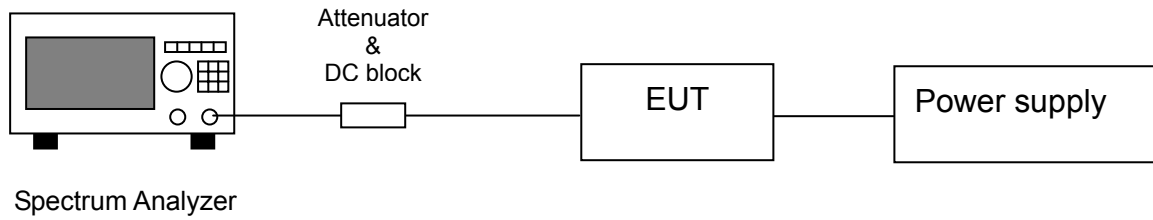
4.3 Measuring instrument setting

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

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

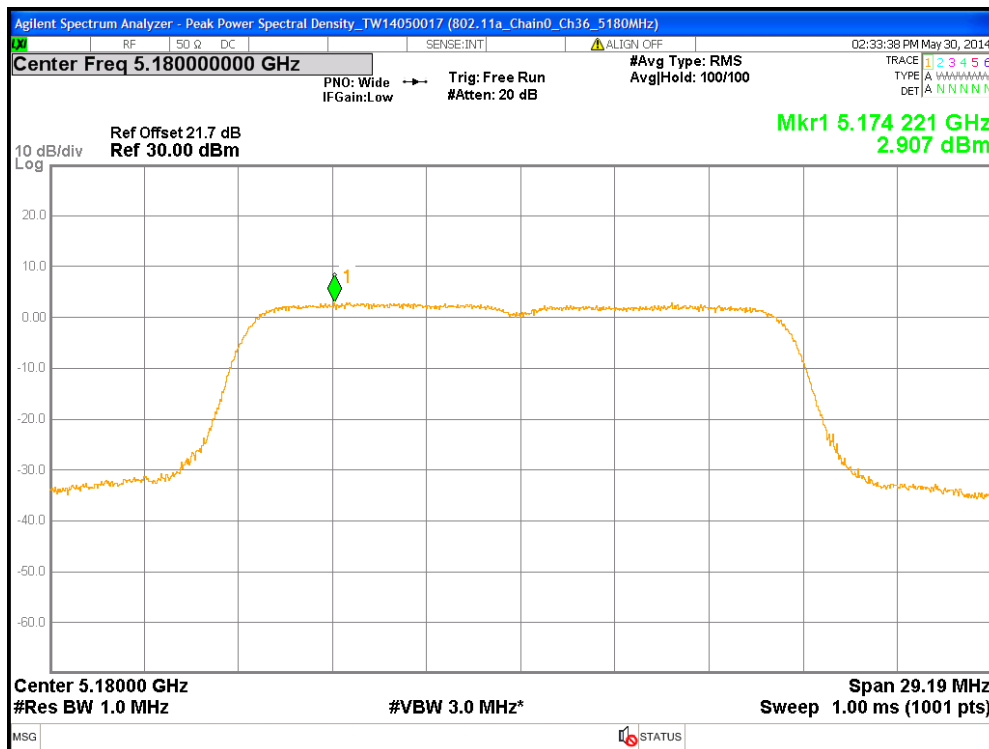


4.6 Test results

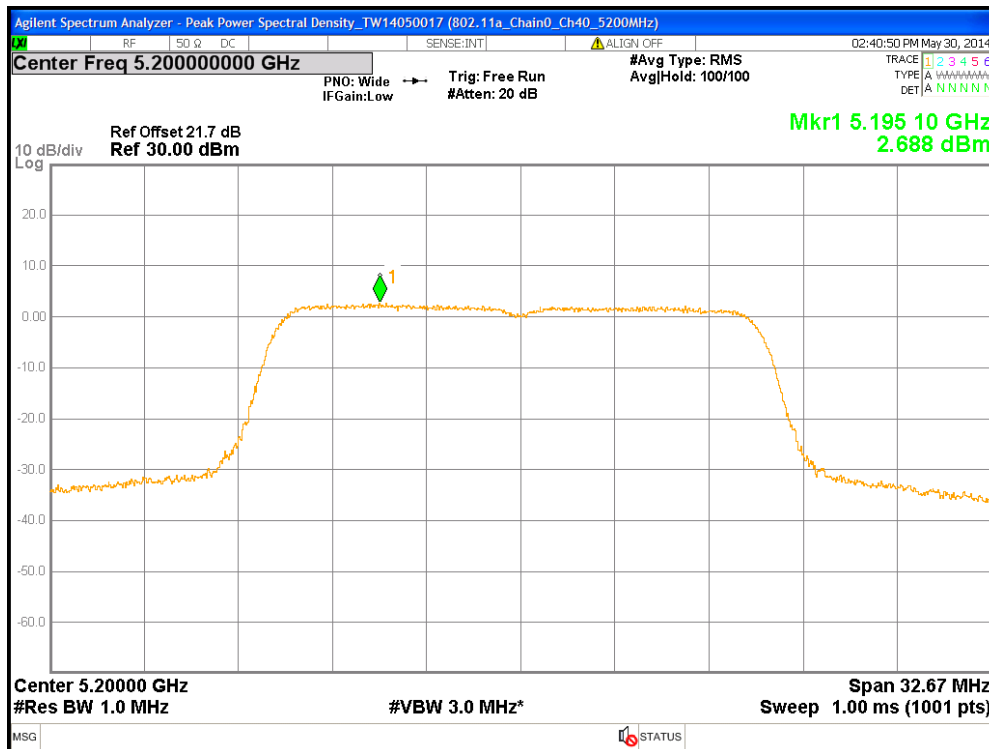
Mode	Channel	Freq. (MHz)	PSD	Duty Cycle factor (dB)	Total PSD with Duty factor		Limit (dBm)	Margin (dB)
			(dBm)		mW	dBm		
802.11a (Chain0)	36	5180	2.91	0.56	2.22	3.47	4	-0.53
	40	5200	2.69	0.56	2.11	3.25	4	-0.75
	48	5240	2.57	0.56	2.06	3.14	4	-0.86
	149	5745	6.77	0.56	5.41	7.33	17	-9.67
	157	5785	6.43	0.56	5.00	6.99	17	-10.01
	161	5805	7.01	0.56	5.72	7.57	17	-9.43
802.11a (Chain1)	36	5180	2.58	0.56	2.06	3.14	4	-0.86
	40	5200	2.96	0.56	2.25	3.52	4	-0.48
	48	5240	1.39	0.56	1.57	1.95	4	-2.05
	149	5745	6.09	0.56	4.63	6.65	17	-10.35
	157	5785	7.74	0.56	6.76	8.30	17	-8.70
	161	5805	7.55	0.56	6.48	8.11	17	-8.89
802.11a (Chain2)	36	5180	2.17	0.56	1.88	2.73	4	-1.27
	40	5200	2.13	0.56	1.86	2.69	4	-1.31
	48	5240	1.59	0.56	1.64	2.15	4	-1.85
	149	5745	6.07	0.56	4.60	6.63	17	-10.37
	157	5785	6.69	0.56	5.32	7.26	17	-9.74
	161	5808	6.91	0.56	5.59	7.48	17	-9.52

Mode	Channel	Frequency (MHz)	PSD (dBm)			Duty Cycle factor dB	PSD with Duty factor			Total PSD with Duty factor		Limit (dBm)	Margin (dB)
			Chain 0	Chain 1	Chain 2		Chain 0	Chain 1	Chain 2	mW	dBm		
802.11n (HT 20)	36	5180	-1.39	-2.00	-2.02	0.61	0.83	0.73	0.76	2.28	3.58	4	-3.27
	40	5200	-0.69	-1.60	-1.49	0.61	0.98	0.79	0.89	2.59	4.13	4	-3.21
	48	5240	-1.51	-1.65	-2.68	0.61	0.81	0.79	0.65	2.22	3.46	4	-3.21
	149	5745	6.29	5.68	5.11	0.61	4.90	4.25	10.01	12.88	11.10	17	-12.75
	157	5785	5.82	6.58	5.61	0.61	4.39	5.24	9.99	13.81	11.40	17	-11.76
	161	5805	6.00	6.68	5.40	0.61	4.58	5.35	9.94	13.91	11.43	17	-11.65
802.11n (HT 40)	38	5190	-8.46	-8.87	-8.63	1.16	0.19	0.17	0.14	0.53	-2.72	4	-3.83
	46	5230	-7.49	-6.21	-6.51	1.16	0.23	0.31	0.24	0.84	-0.78	4	-3.69
	151	5230	1.31	1.21	-0.38	1.15	1.76	1.72	1.38	4.68	6.70	17	-15.28
	159	5230	1.10	2.47	0.62	1.15	1.68	2.30	1.70	5.49	7.39	17	-14.70

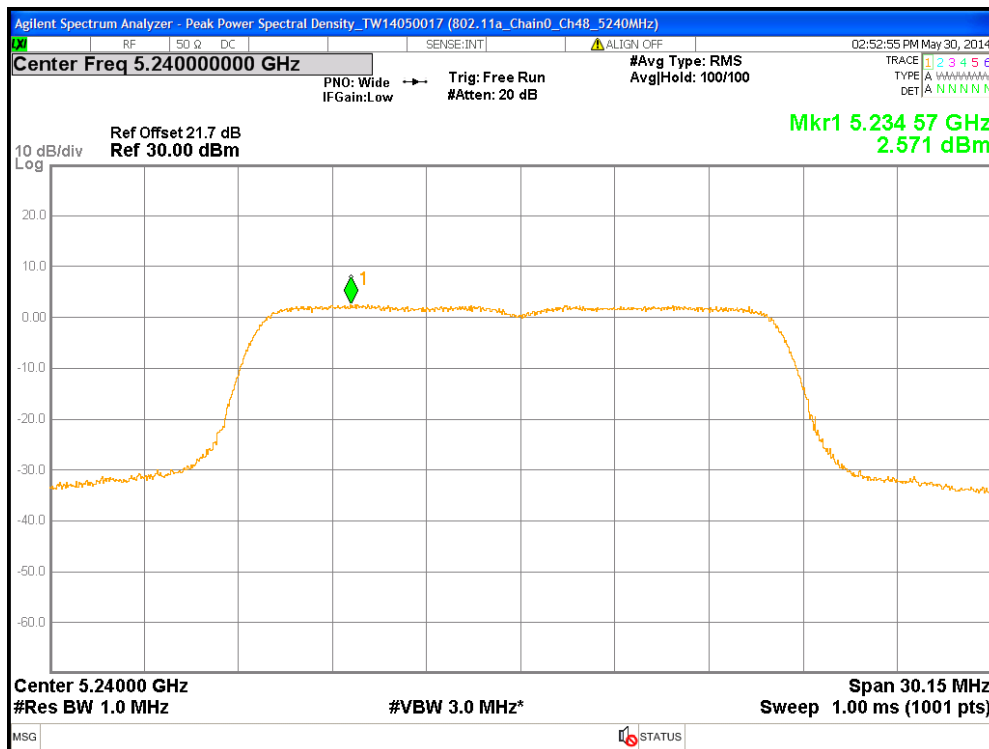
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch36



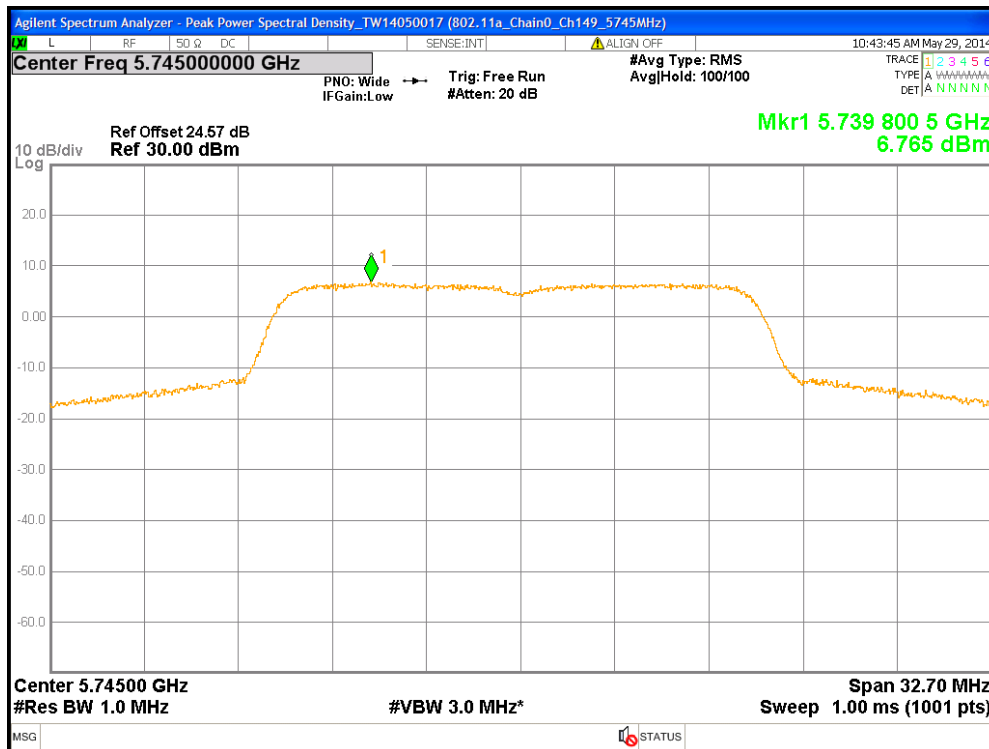
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch40



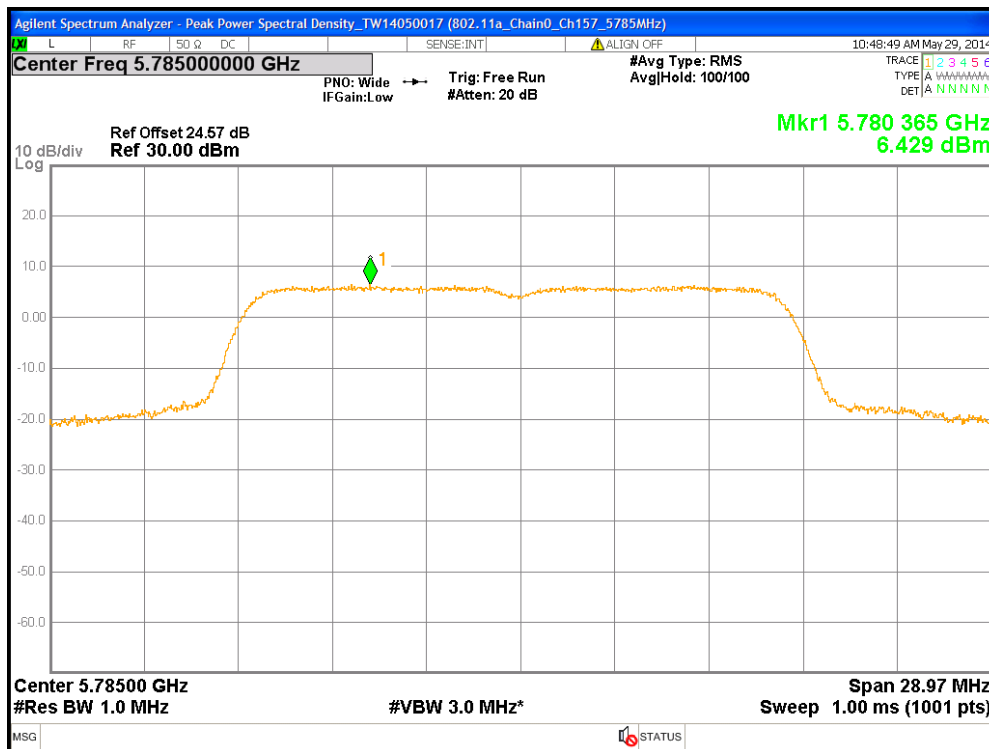
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch48



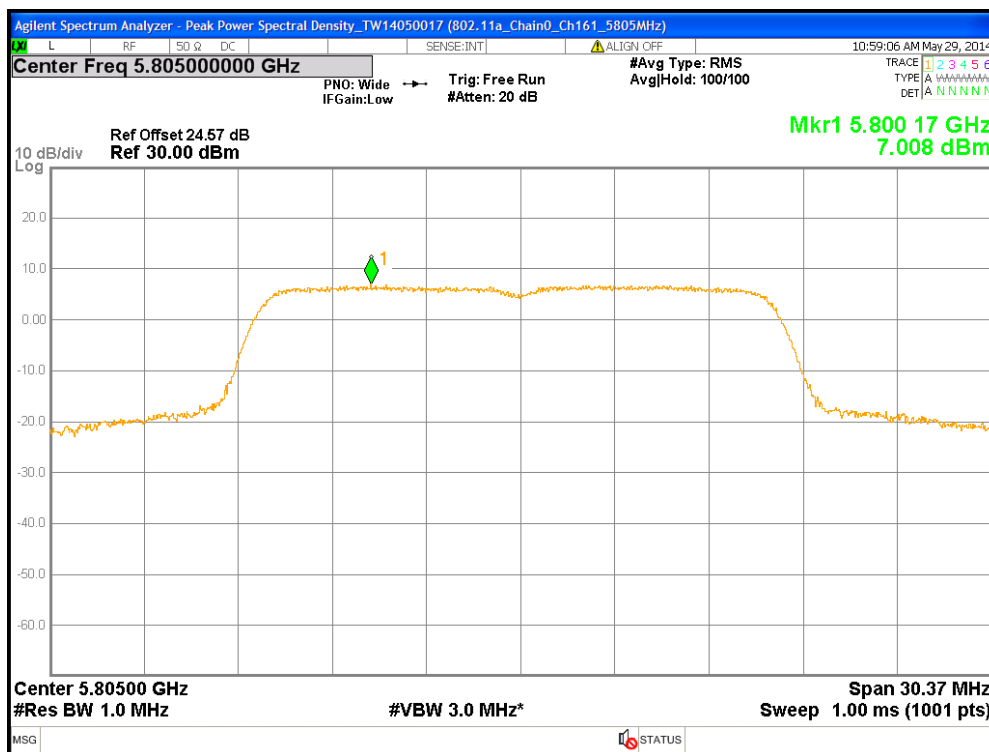
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch149



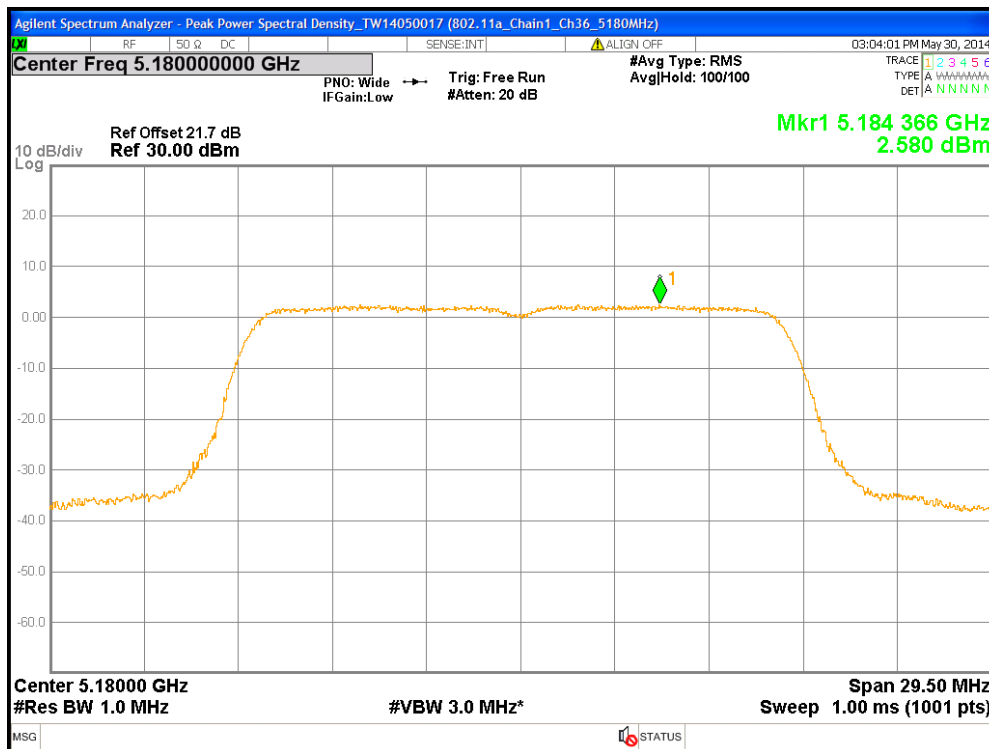
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch157



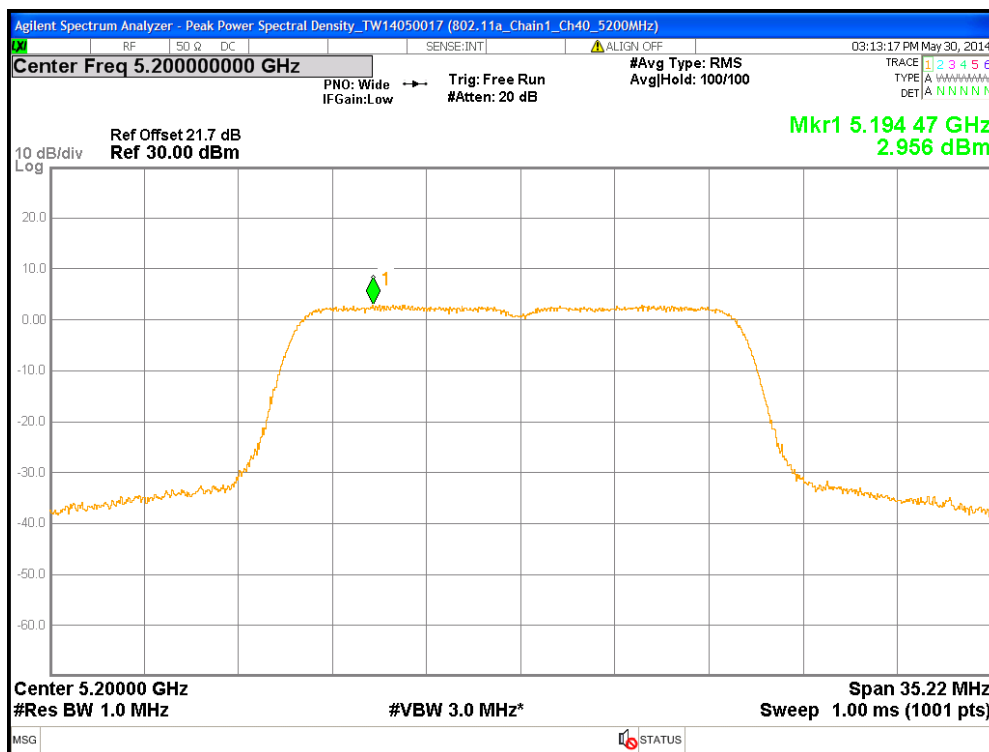
Chain0 : Peak Power Spectral Density @ 802.11a Mode Ch161



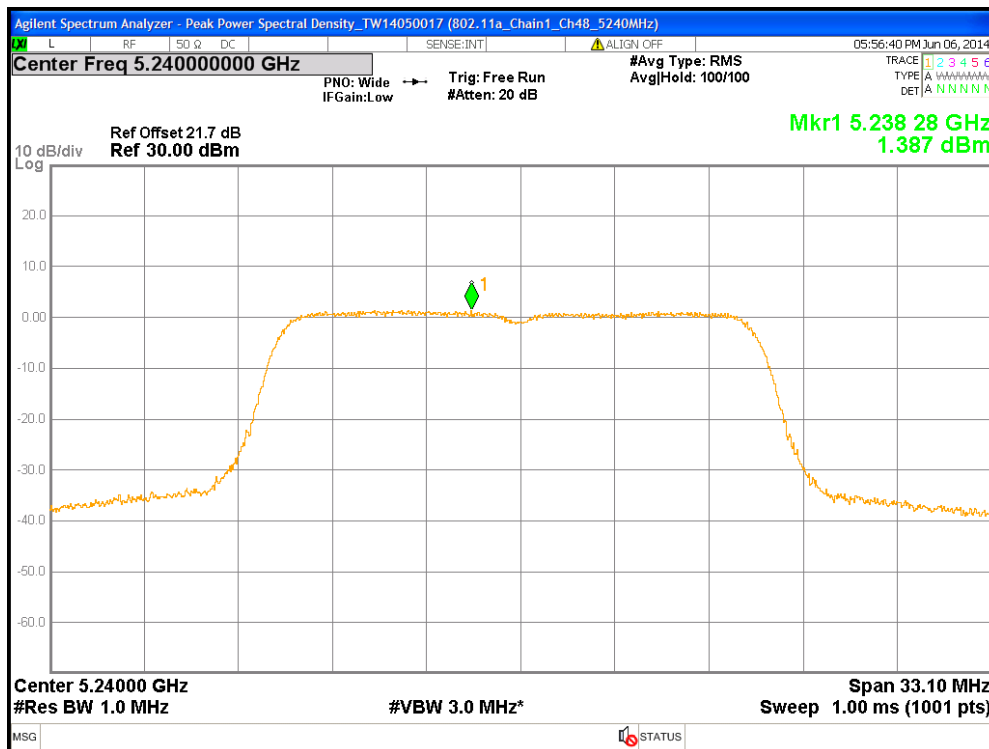
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch36



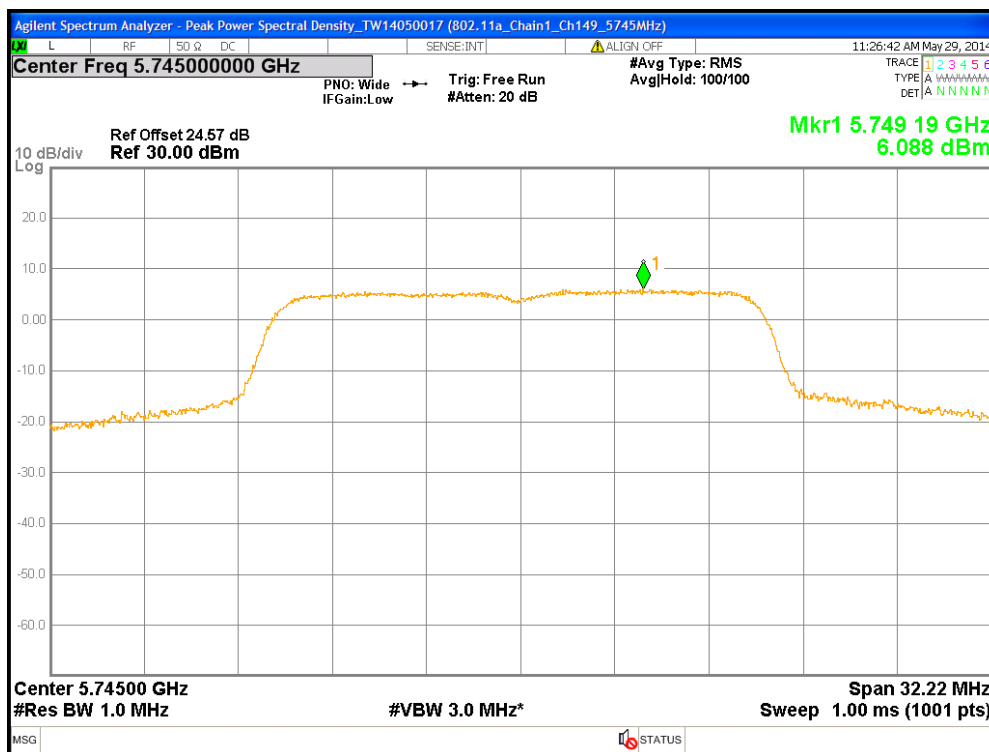
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch40



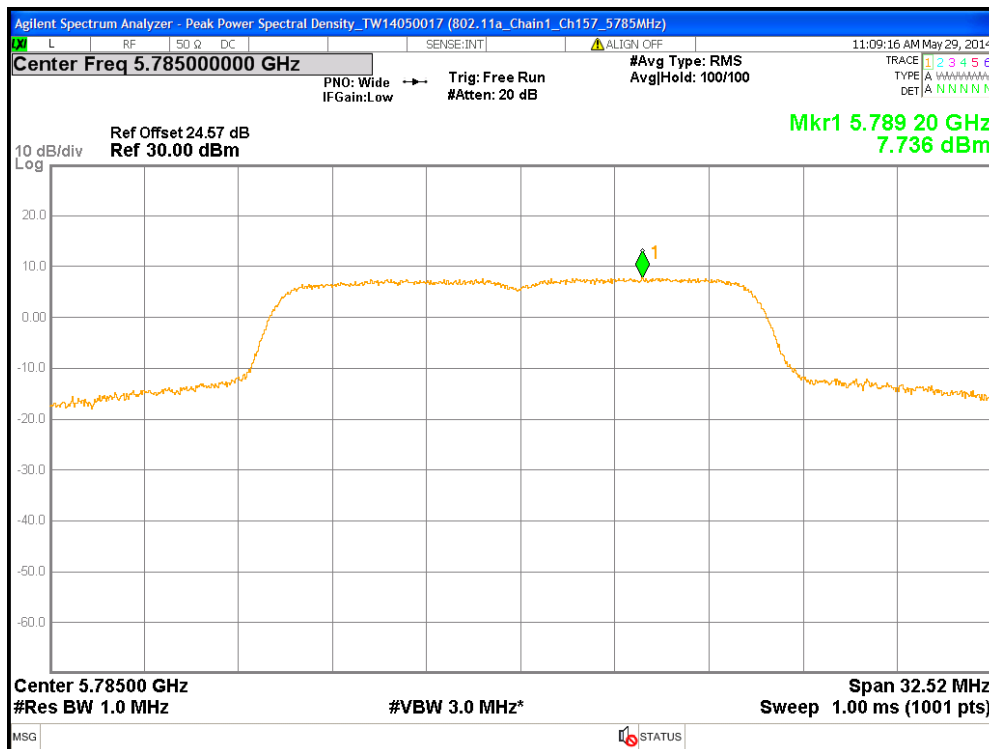
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch48



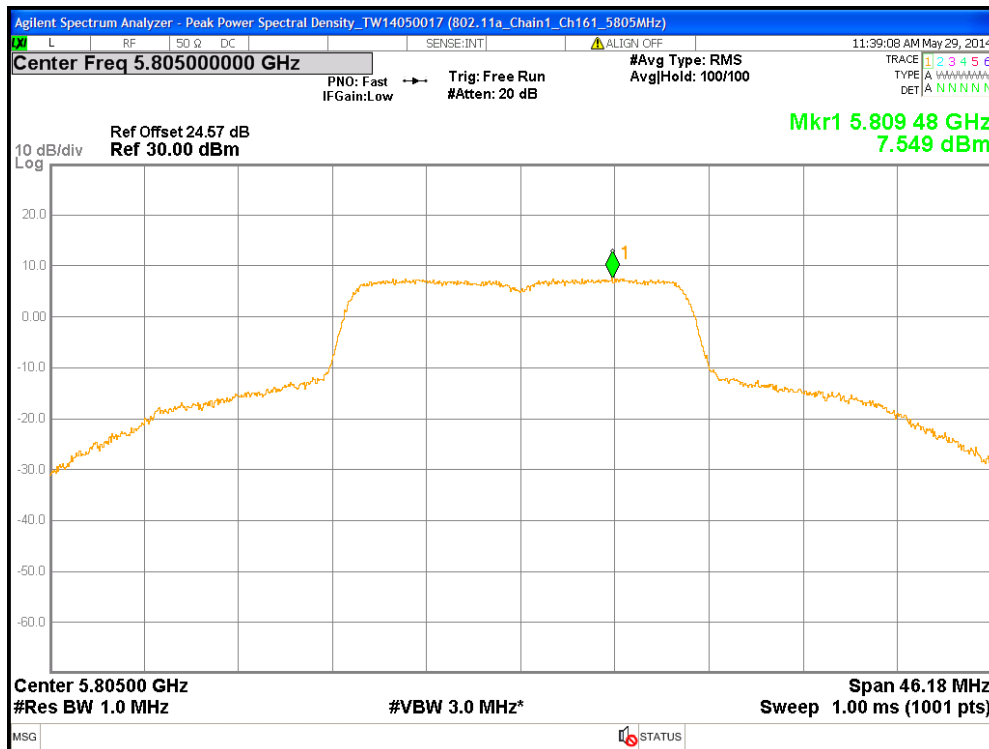
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch149



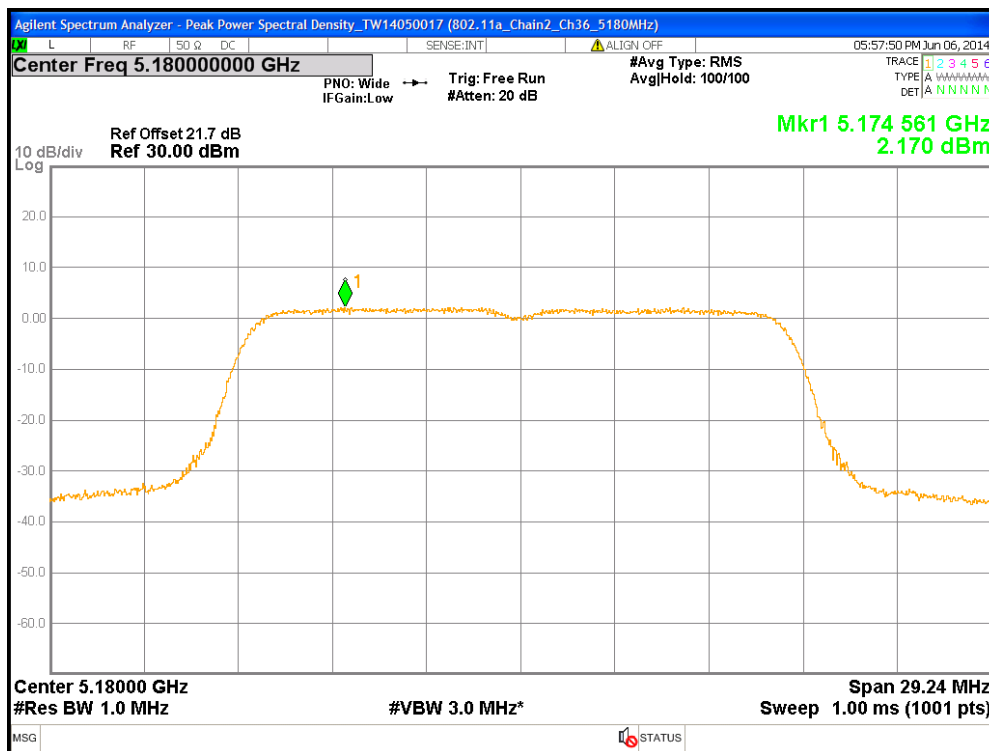
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch157



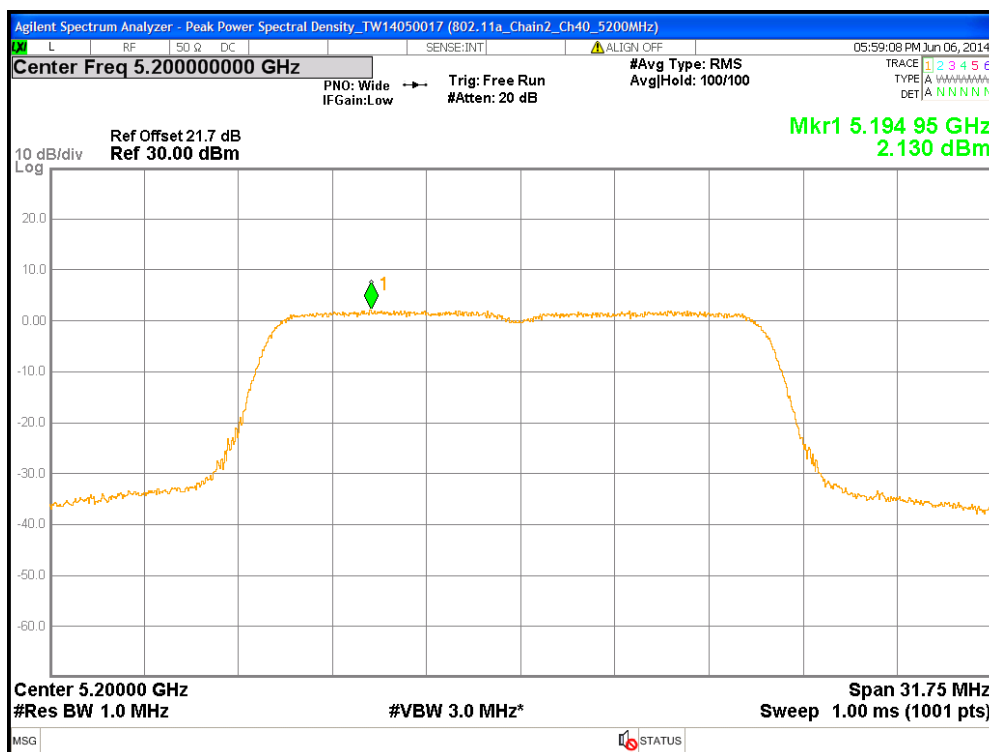
Chain1 : Peak Power Spectral Density @ 802.11a Mode Ch161



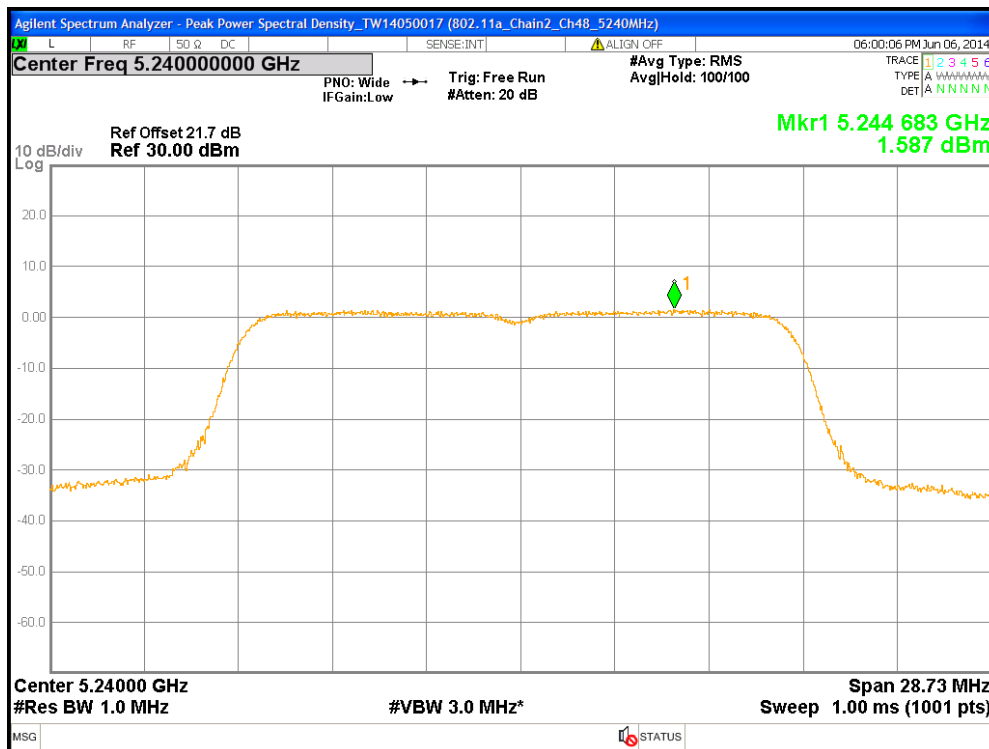
Chain2 : Peak Power Spectral Density @ 802.11a Mode Ch36



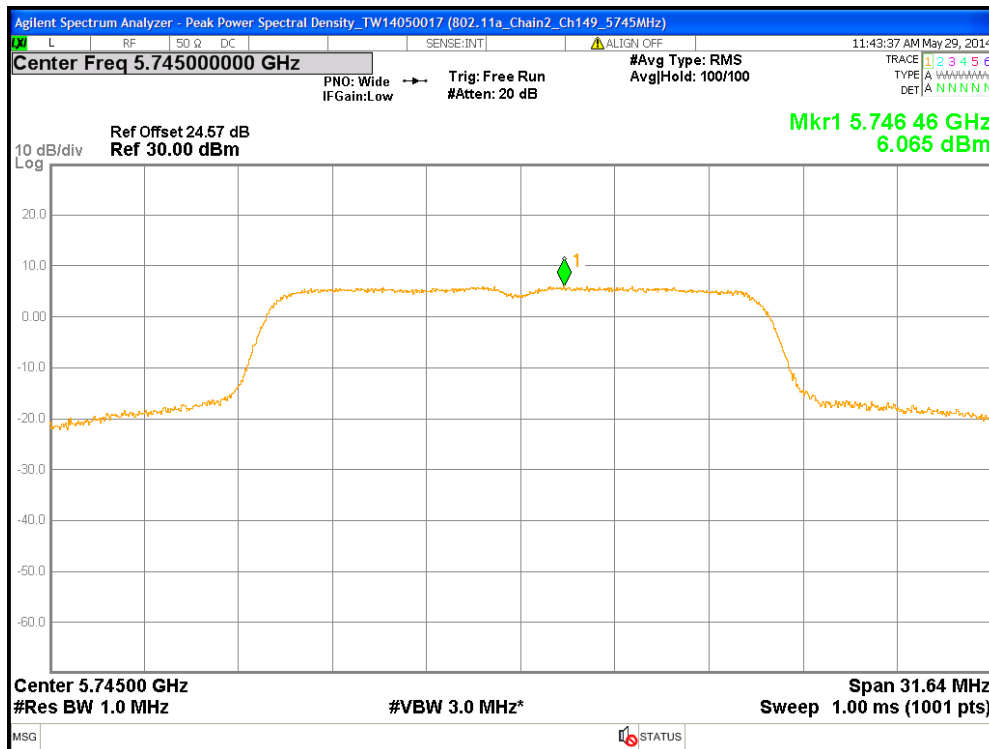
Chain2 : Peak Power Spectral Density @ 802.11a Mode Ch40



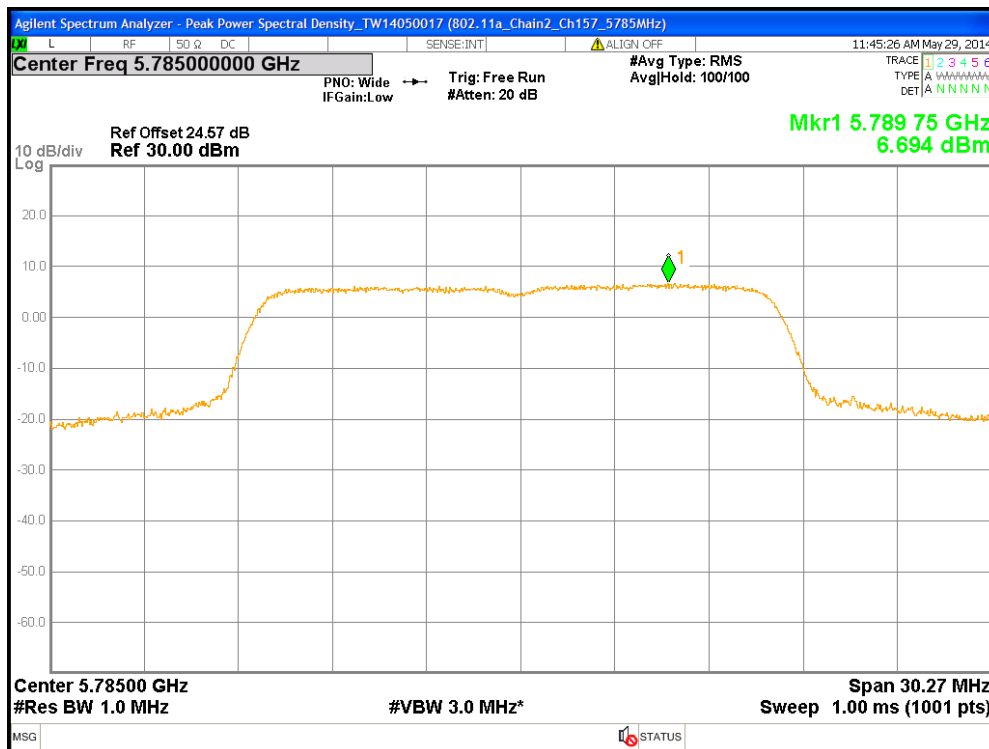
Chain2 : Peak Power Spectral Density @ 802.11a Mode Ch48



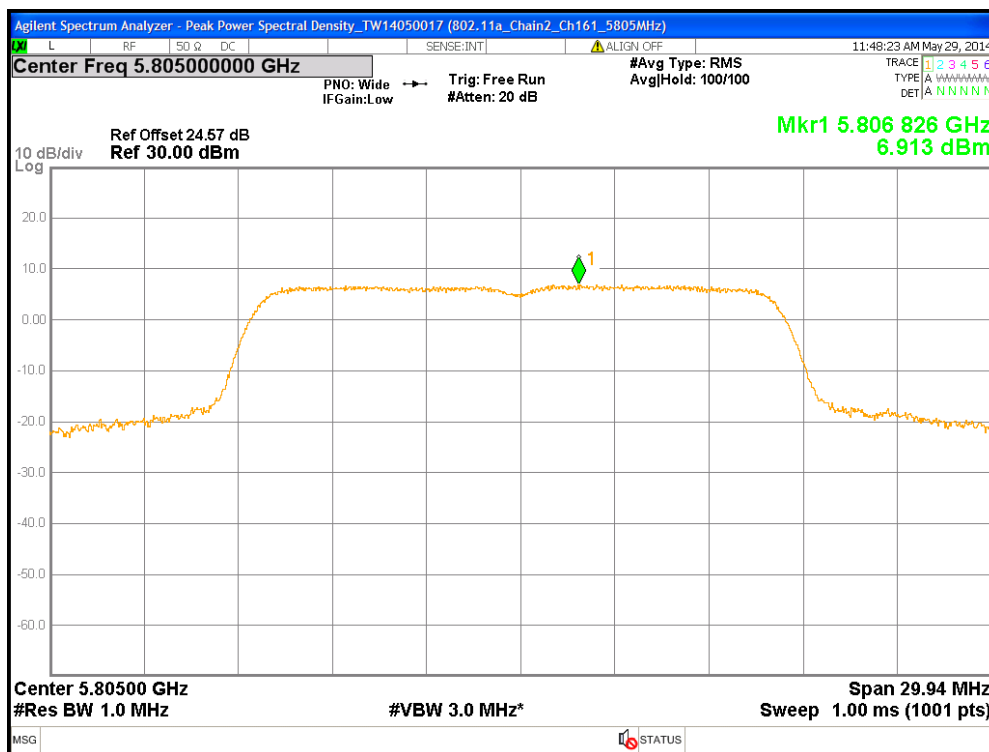
Chain2 : Peak Power Spectral Density @ 802.11a Mode Ch149



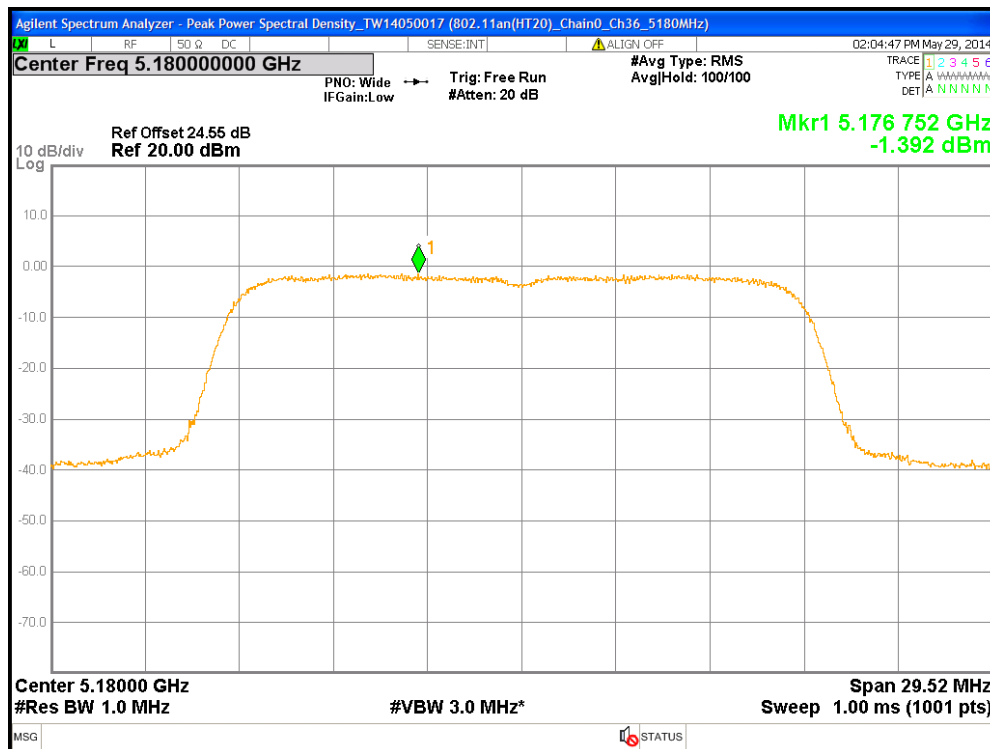
Chain2 : Peak Power Spectral Density @ 802.11a Mode Ch157



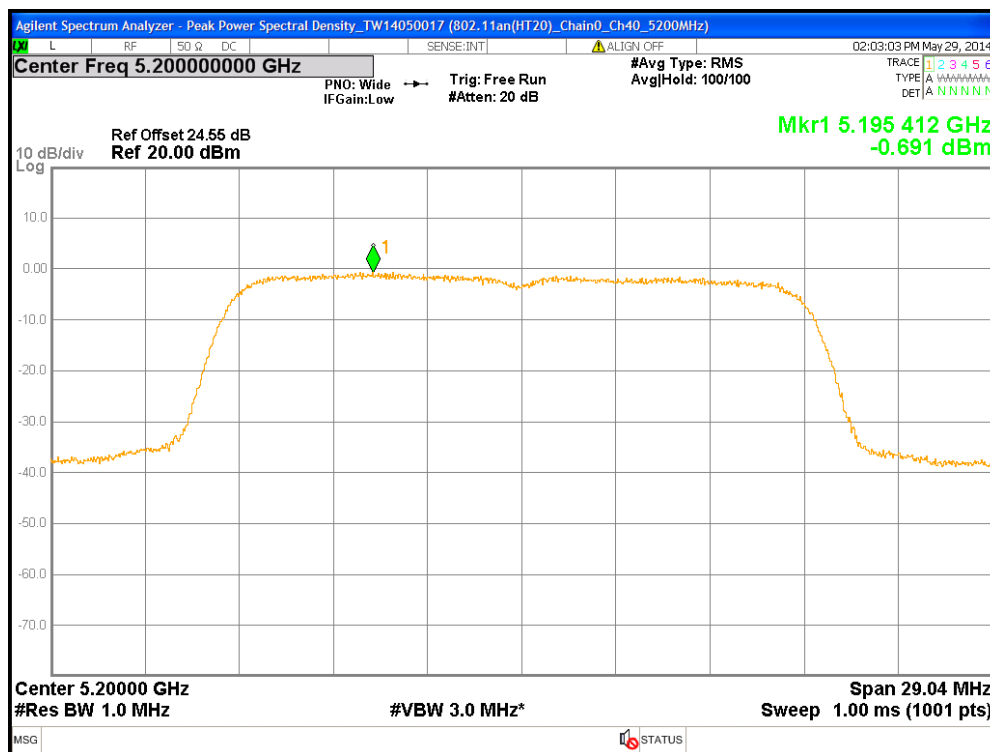
Chain2 : Peak Power Spectral Density @ 802.11a Mode Ch161



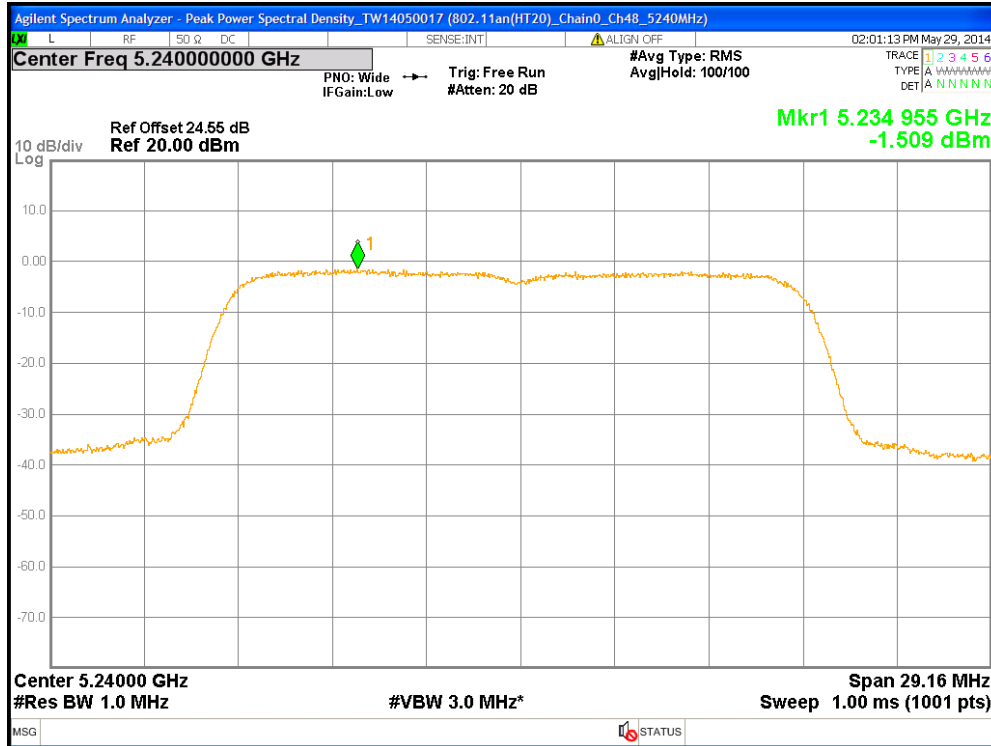
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch36



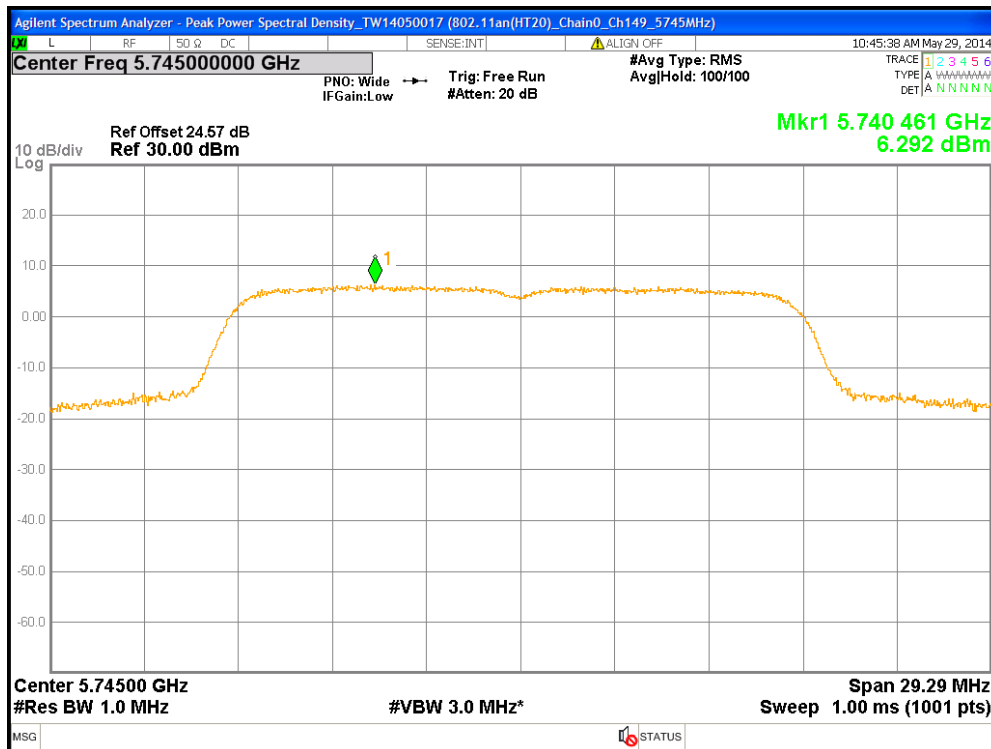
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch40



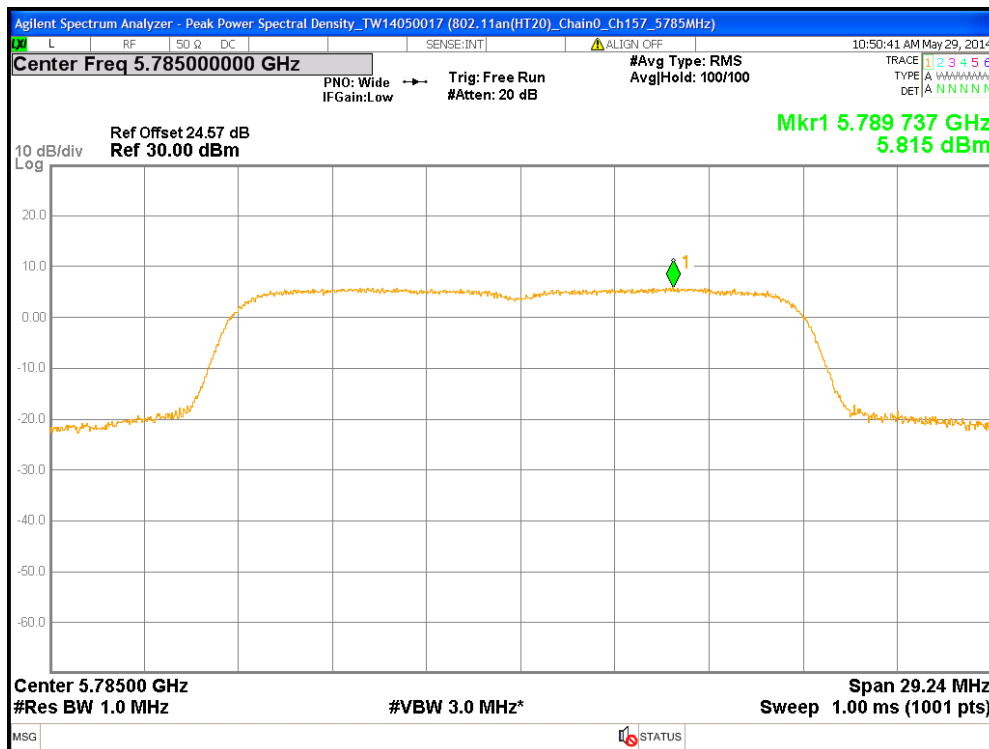
Chain0 : Peak Power Spectral Density @ 802.11a(HT20) Mode Ch48



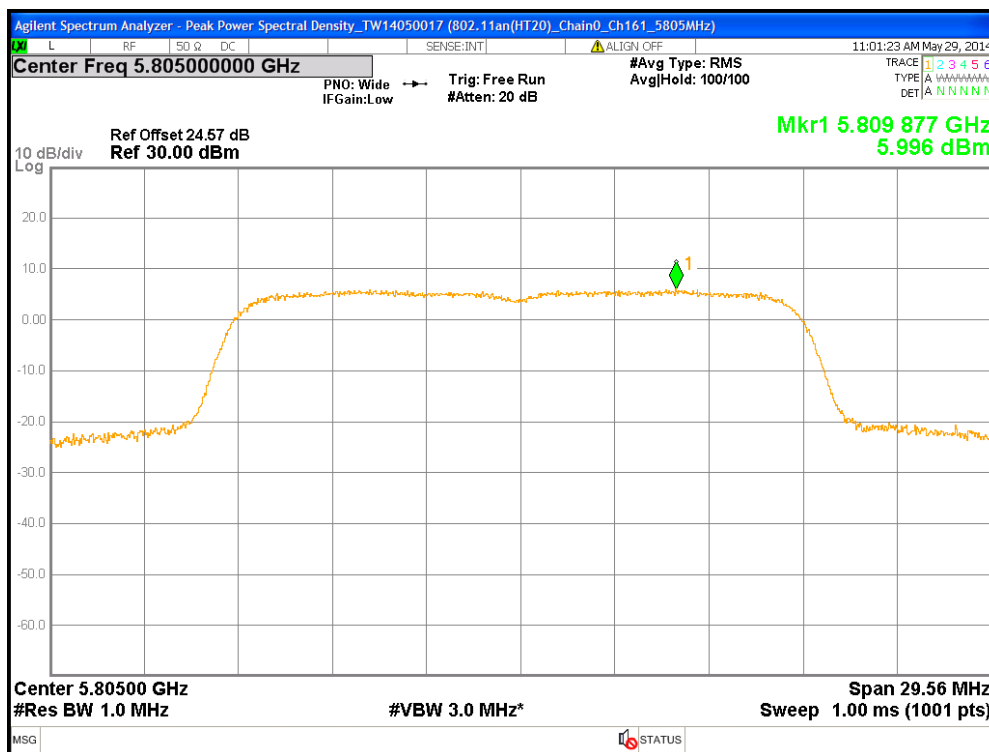
Chain0 : Peak Power Spectral Density @ 802.11a(HT20) Mode Ch149



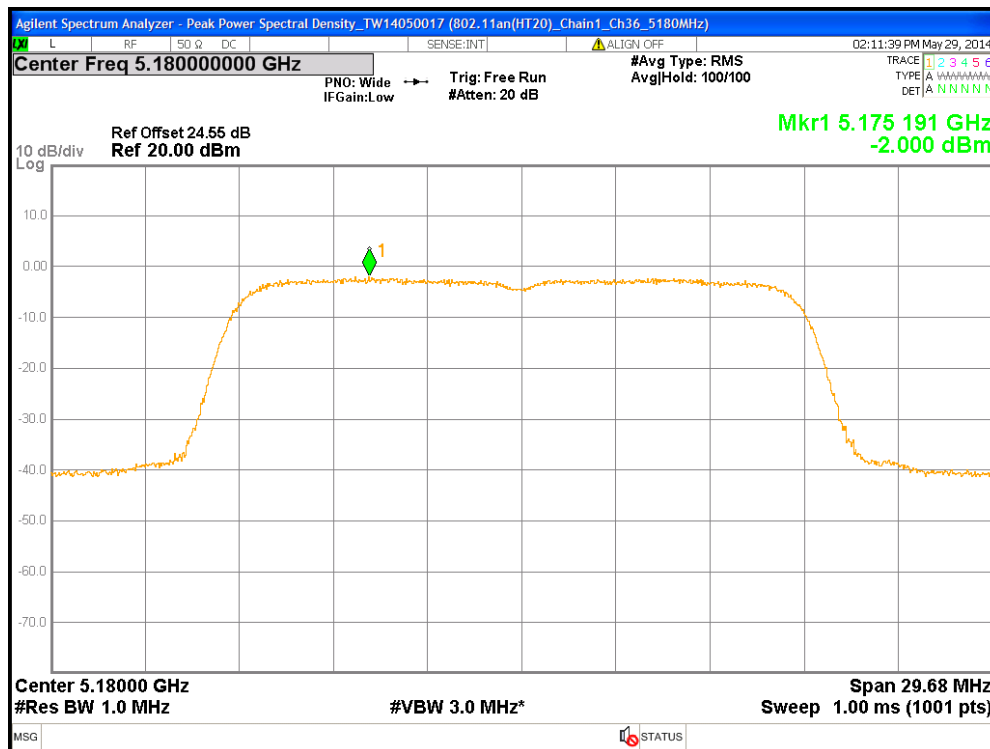
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch157



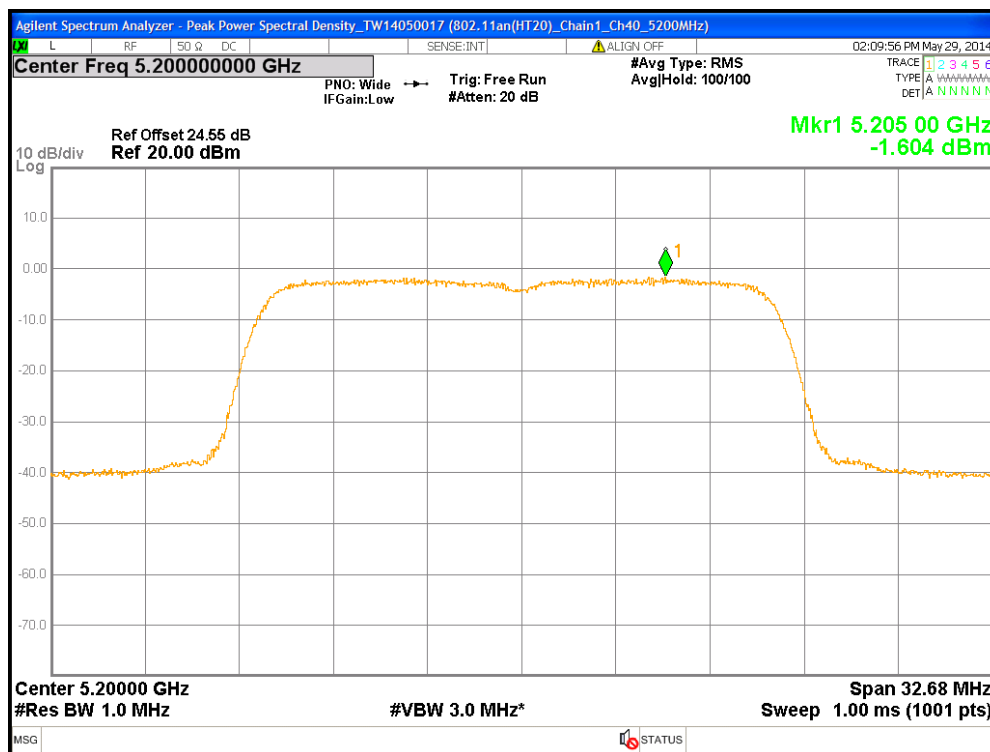
Chain0 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch161



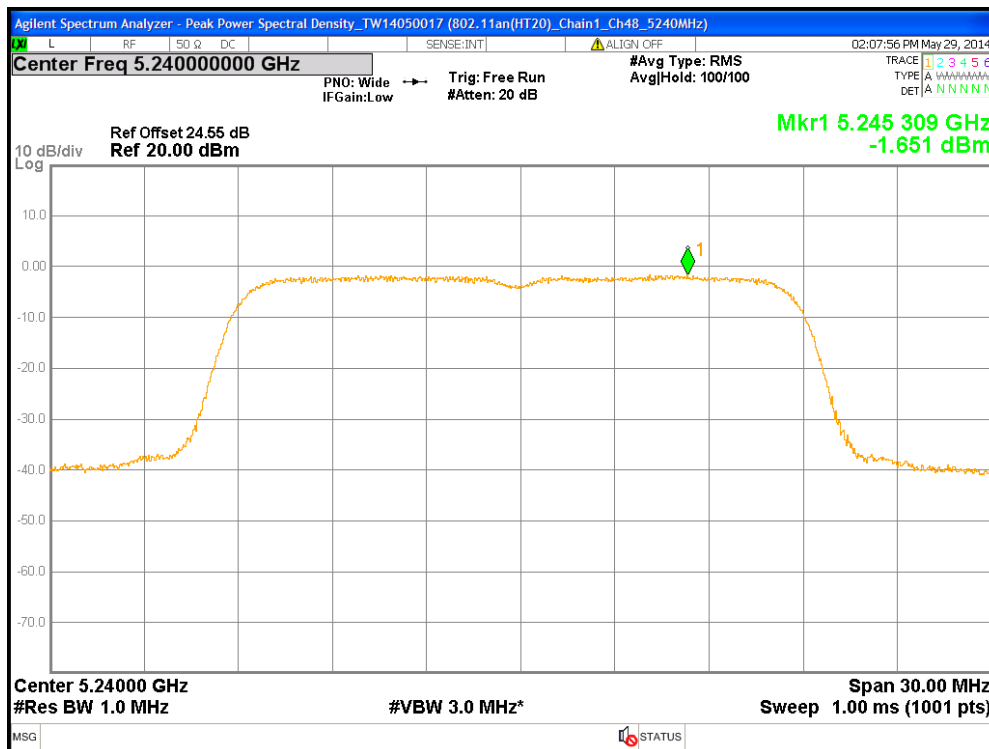
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch36



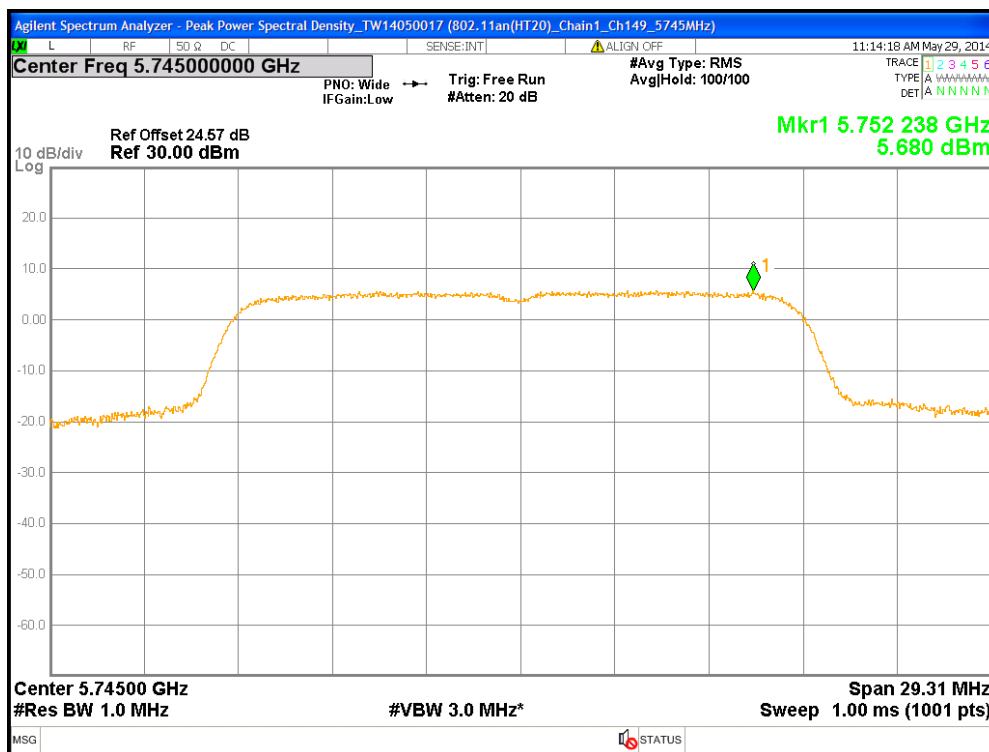
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch40



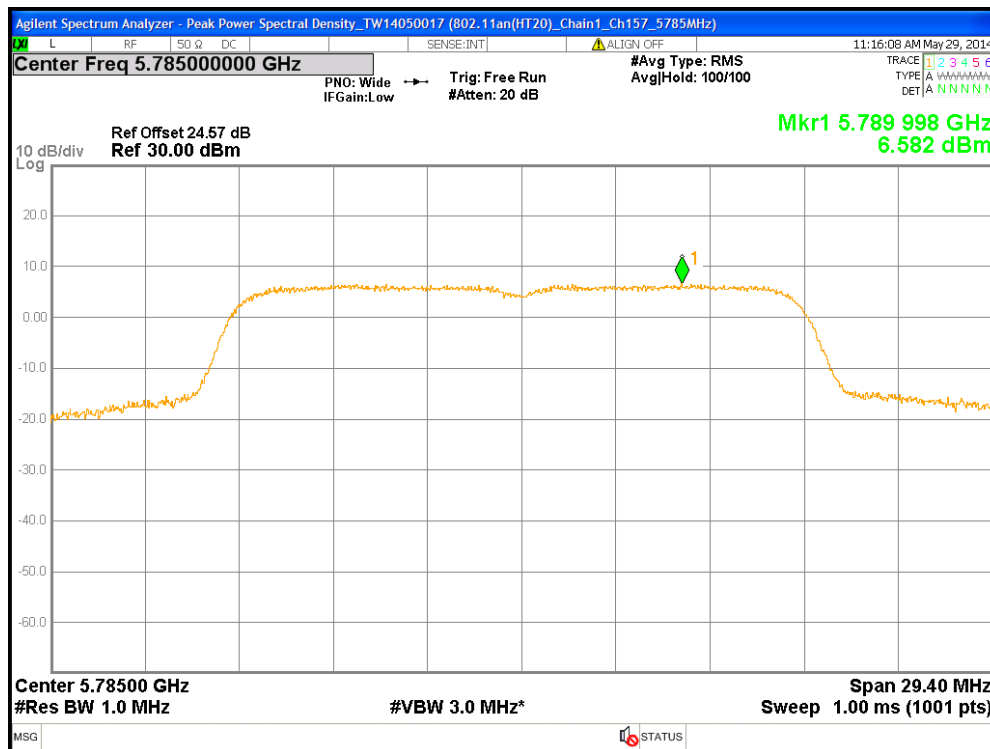
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch48



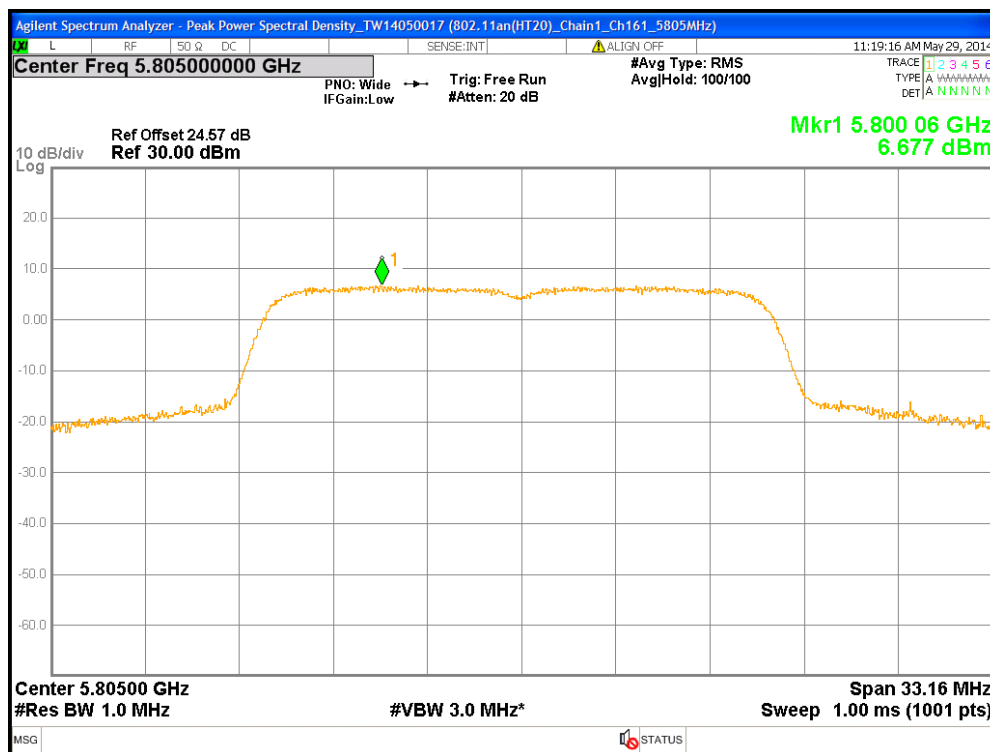
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch149



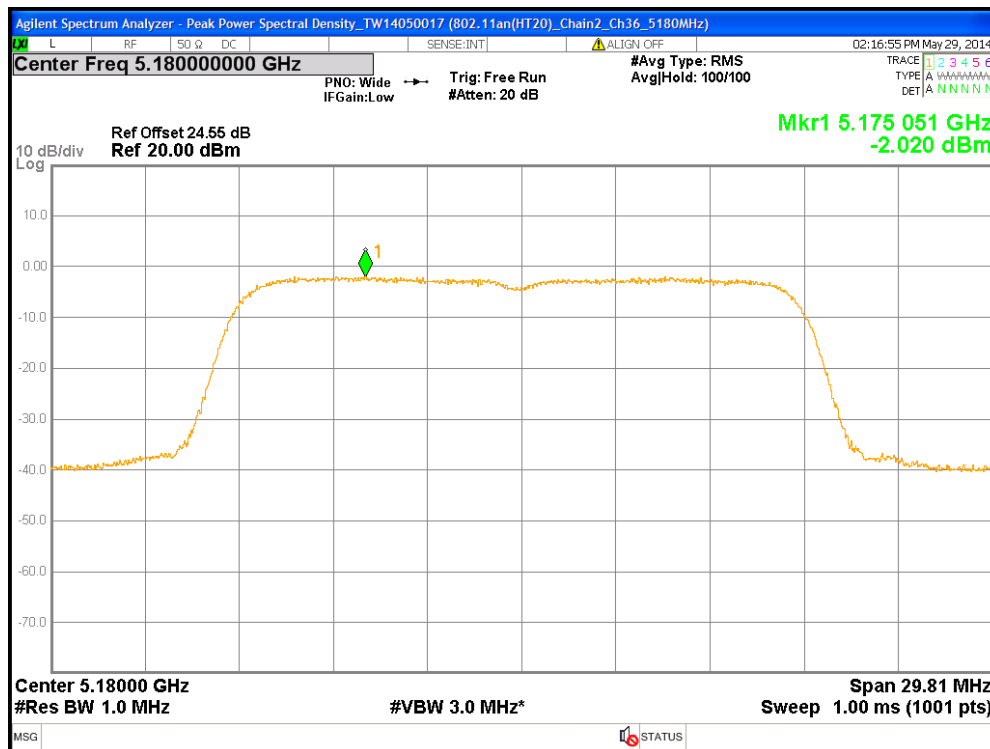
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch157



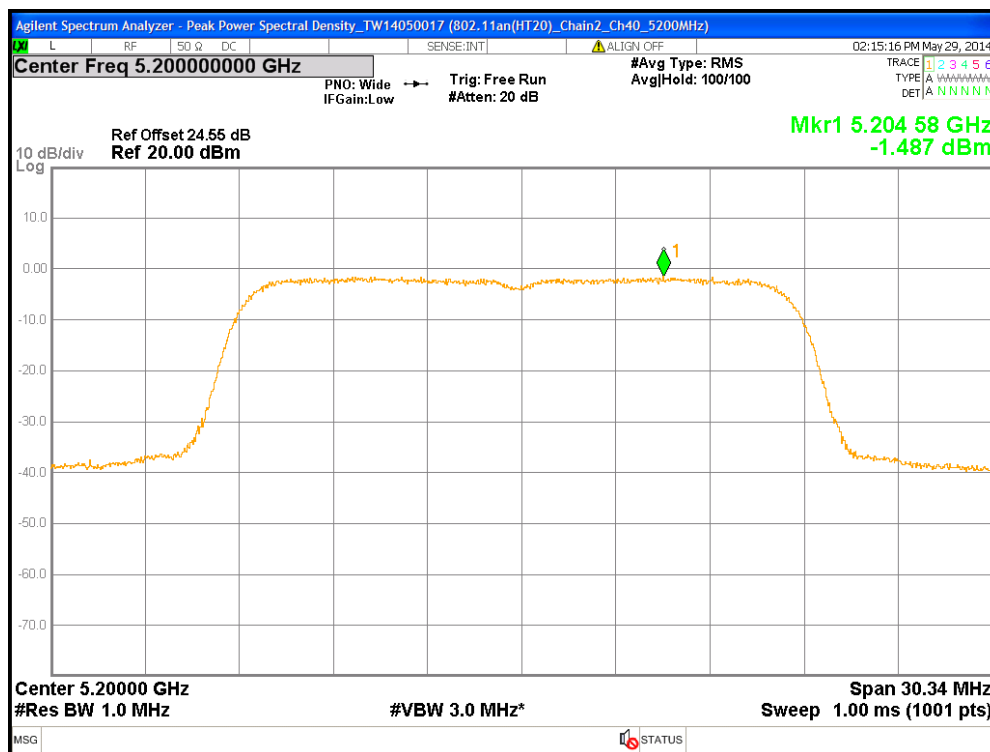
Chain1 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch161



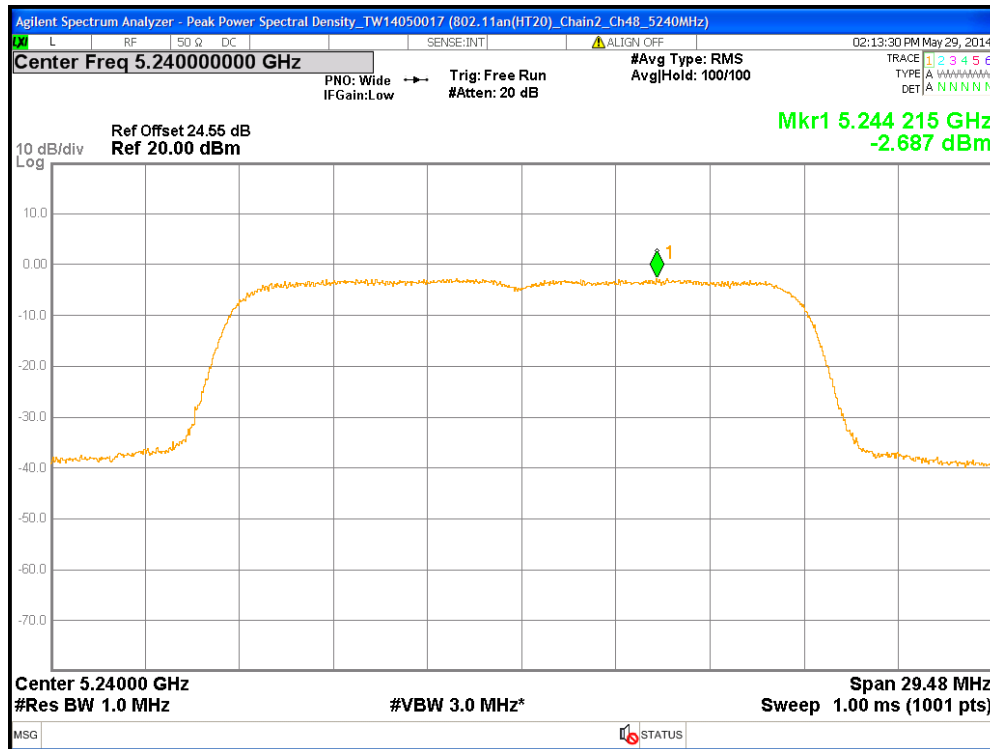
Chain2 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch36



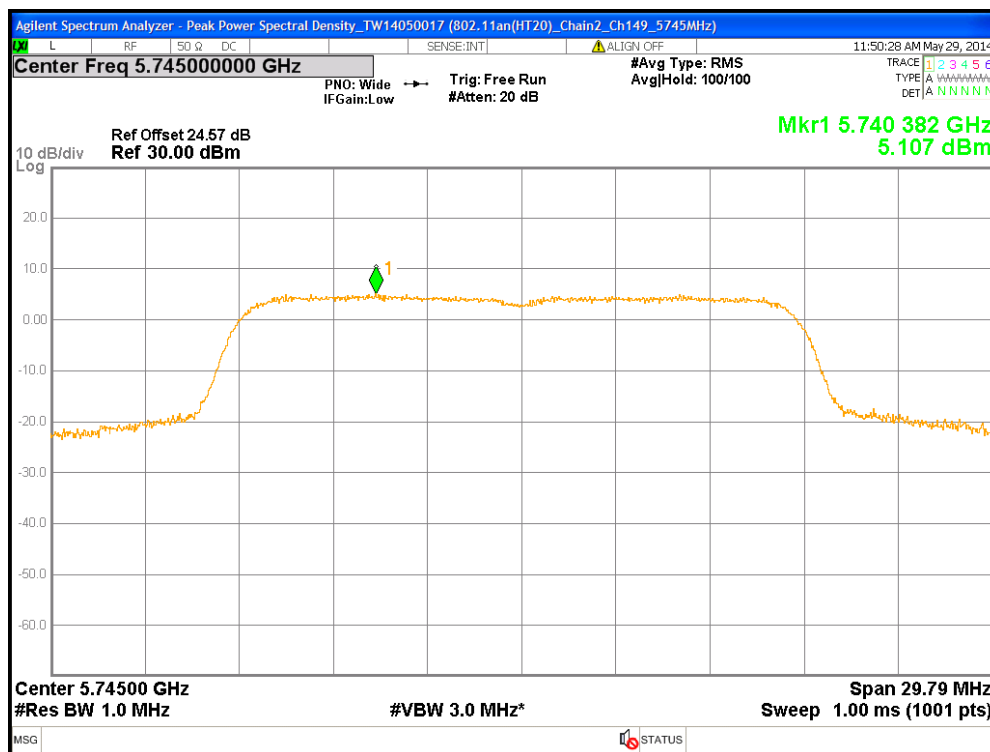
Chain2 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch40



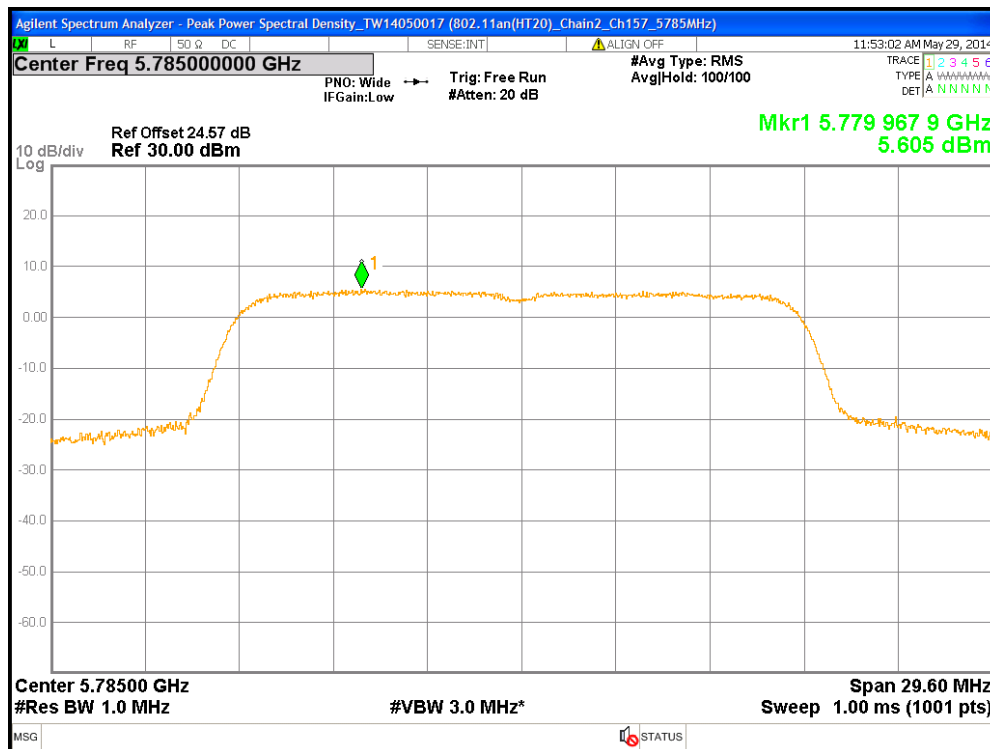
Chain2 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch48



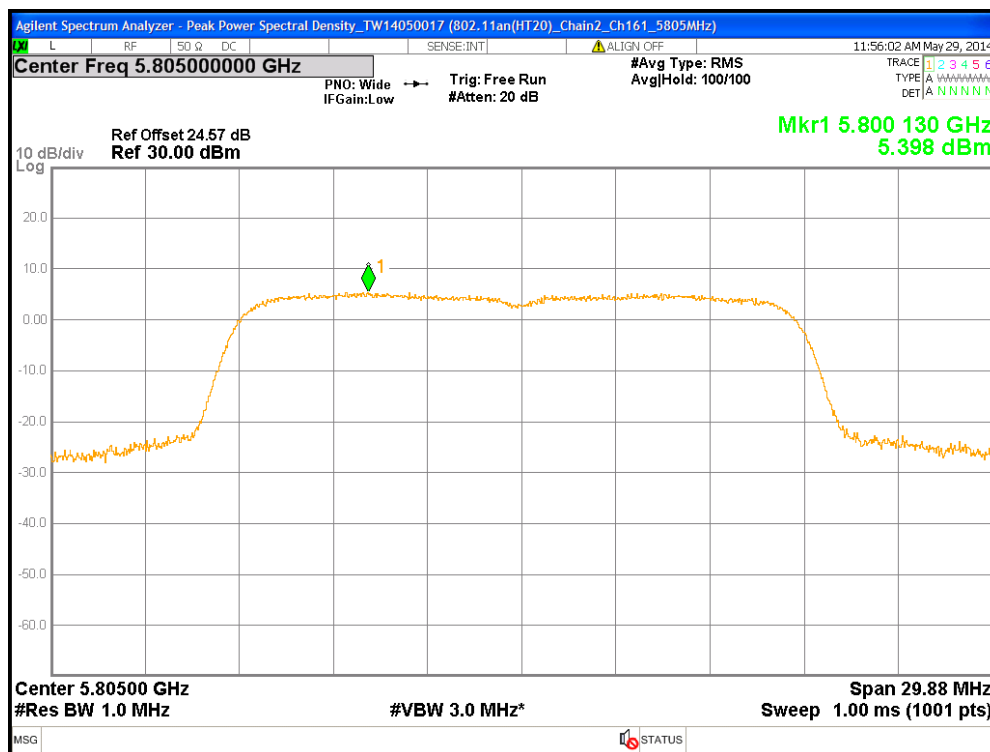
Chain2 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch149



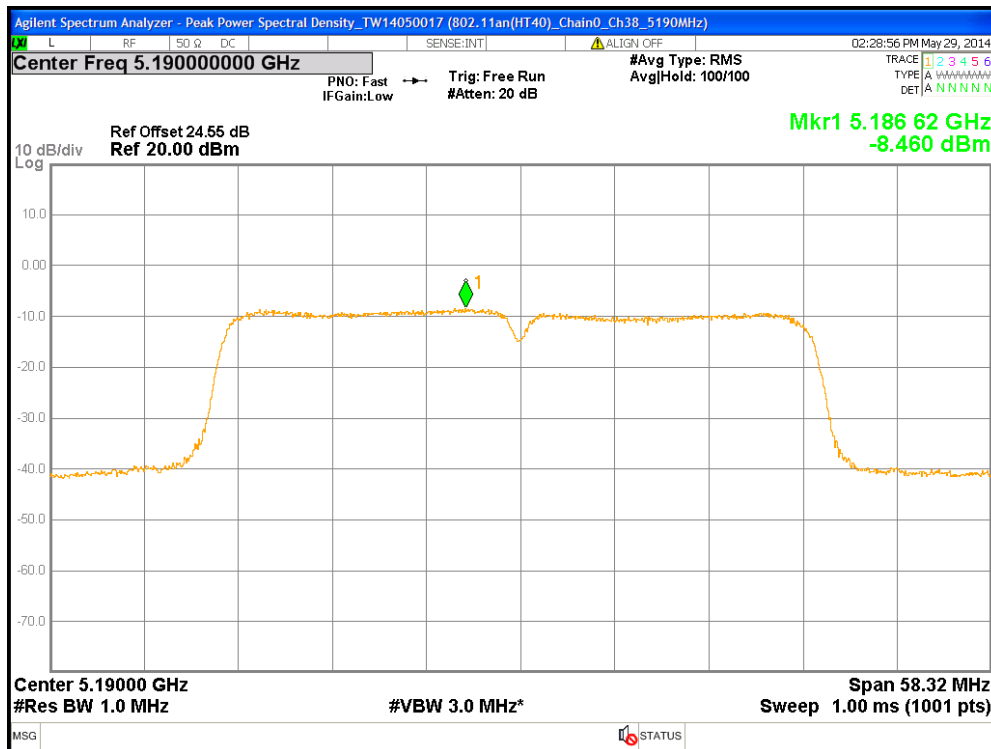
Chain2 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch157



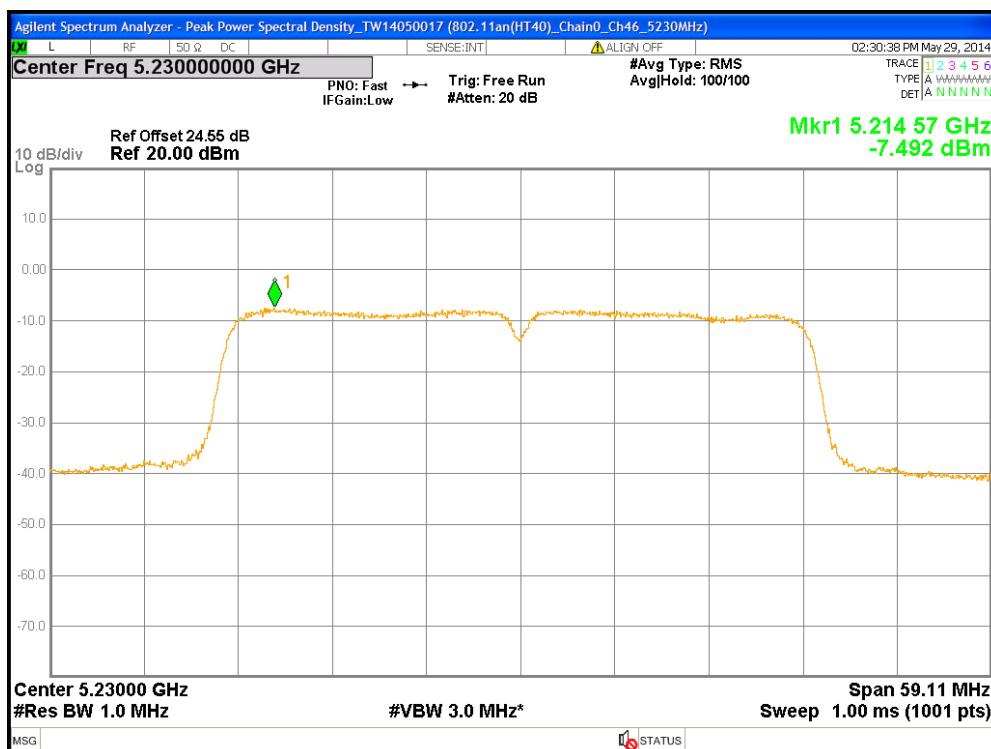
Chain2 : Peak Power Spectral Density @ 802.11an(HT20) Mode Ch161



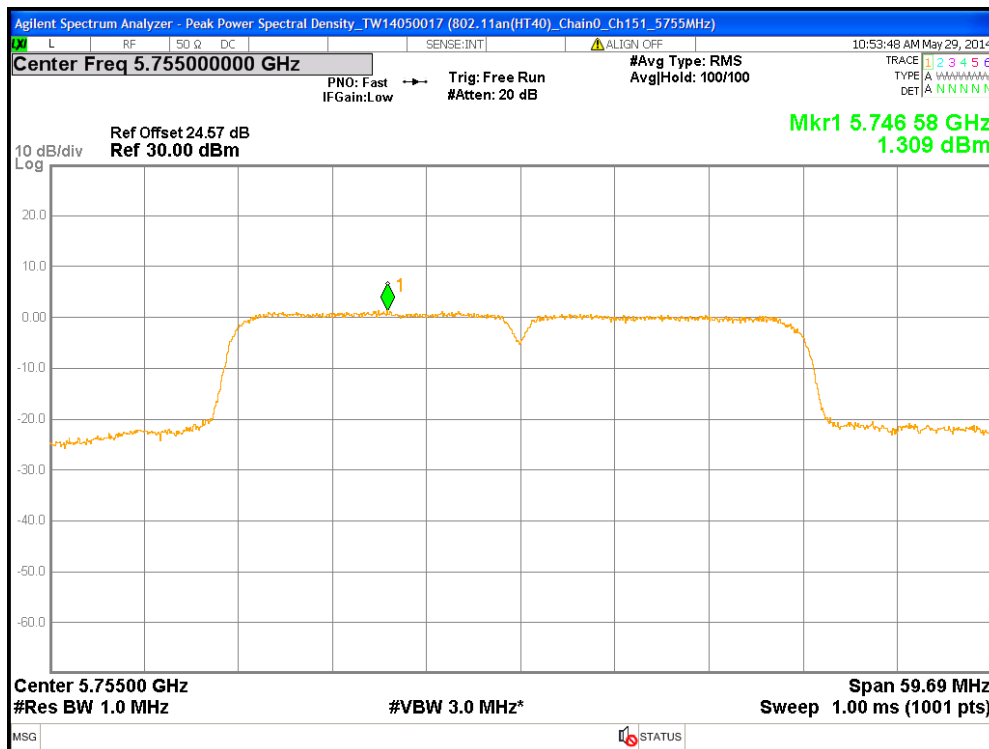
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch38



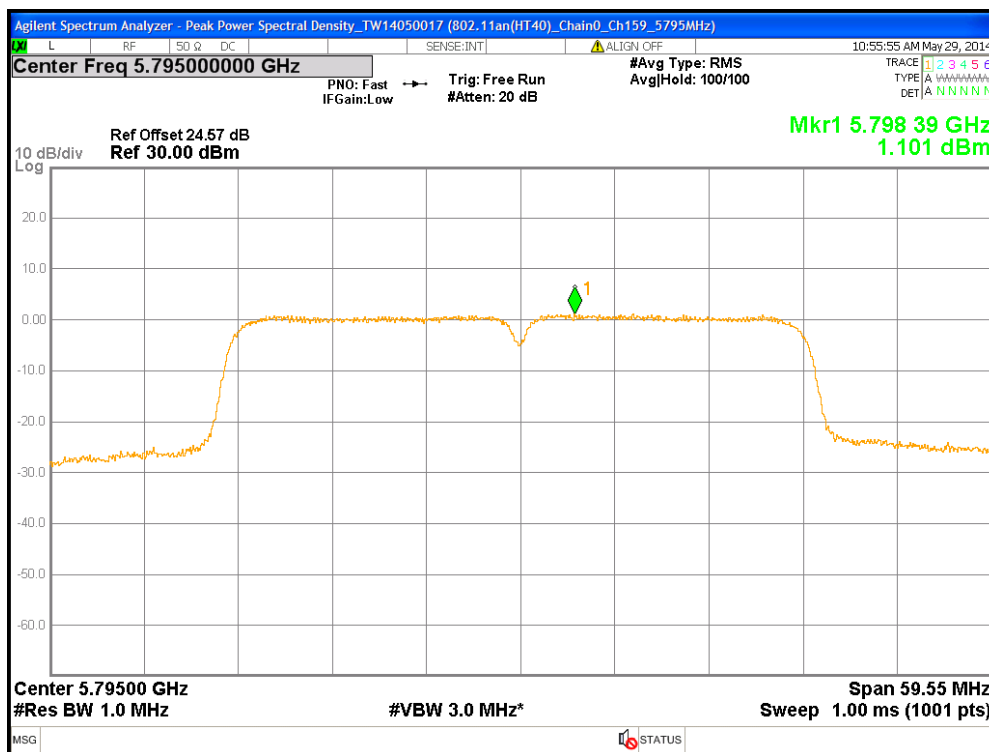
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch46



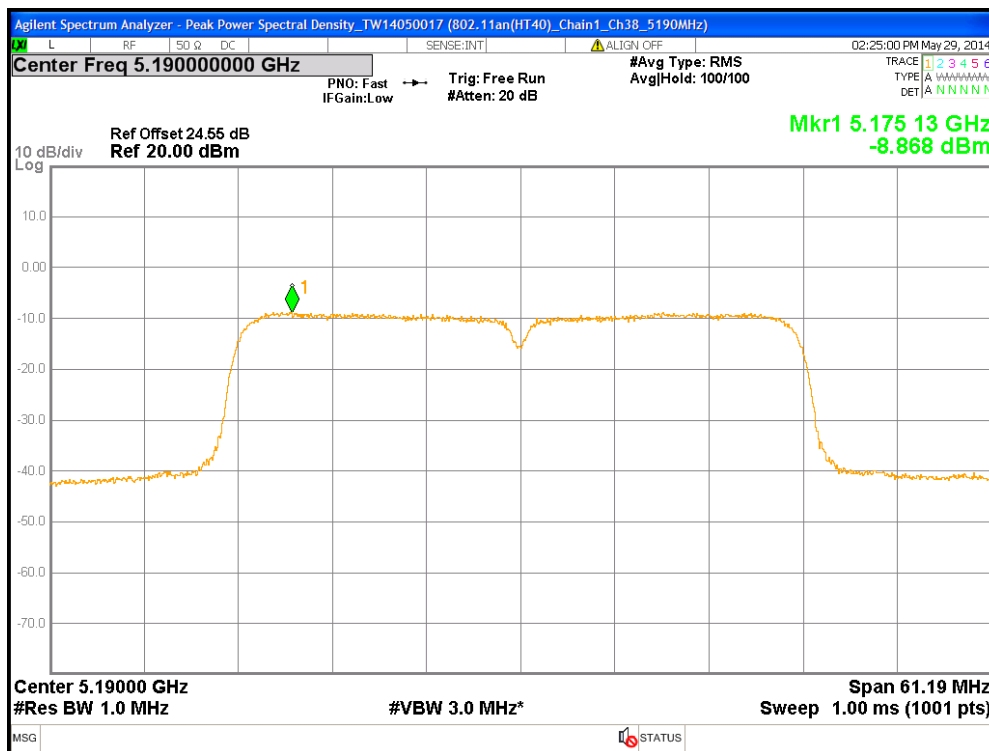
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch151



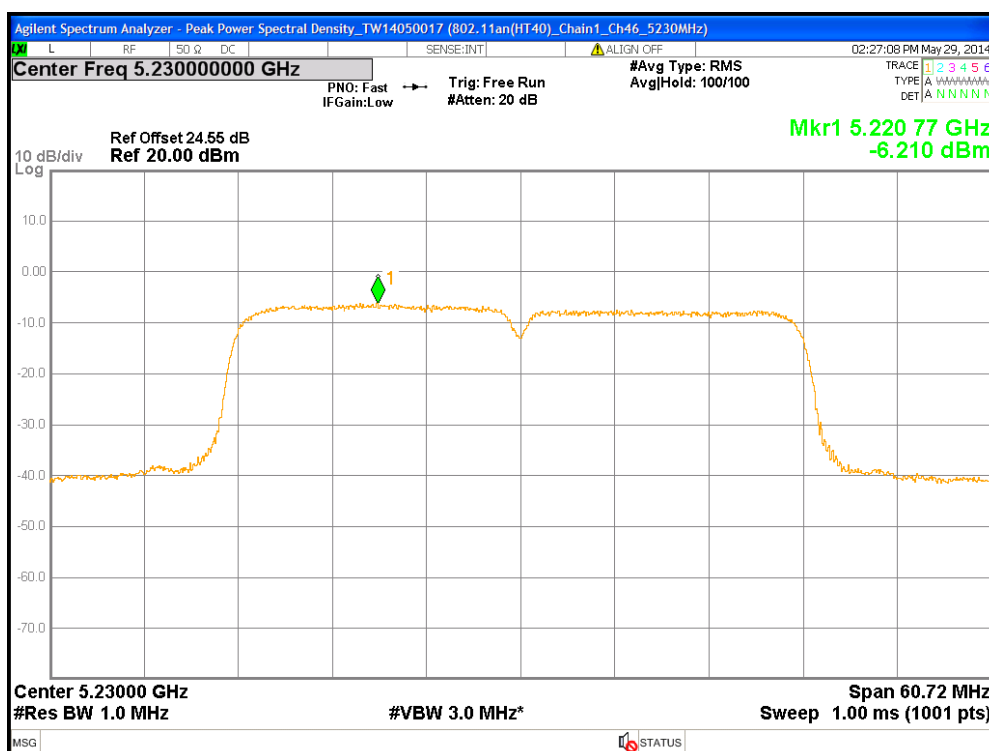
Chain0 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch159



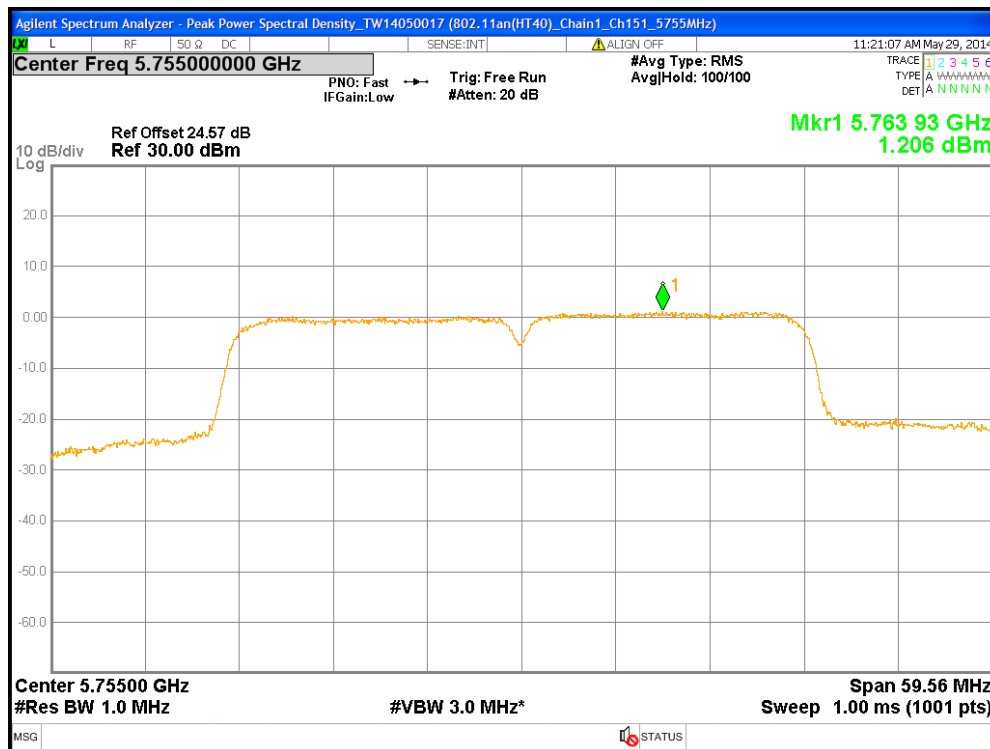
Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch38



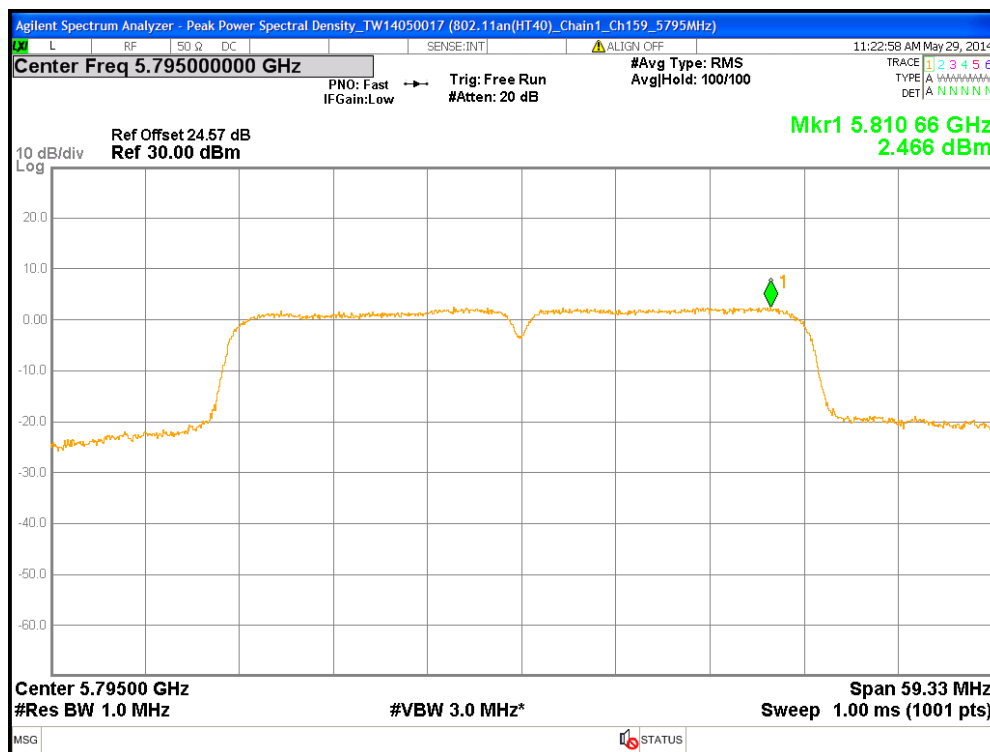
Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch46



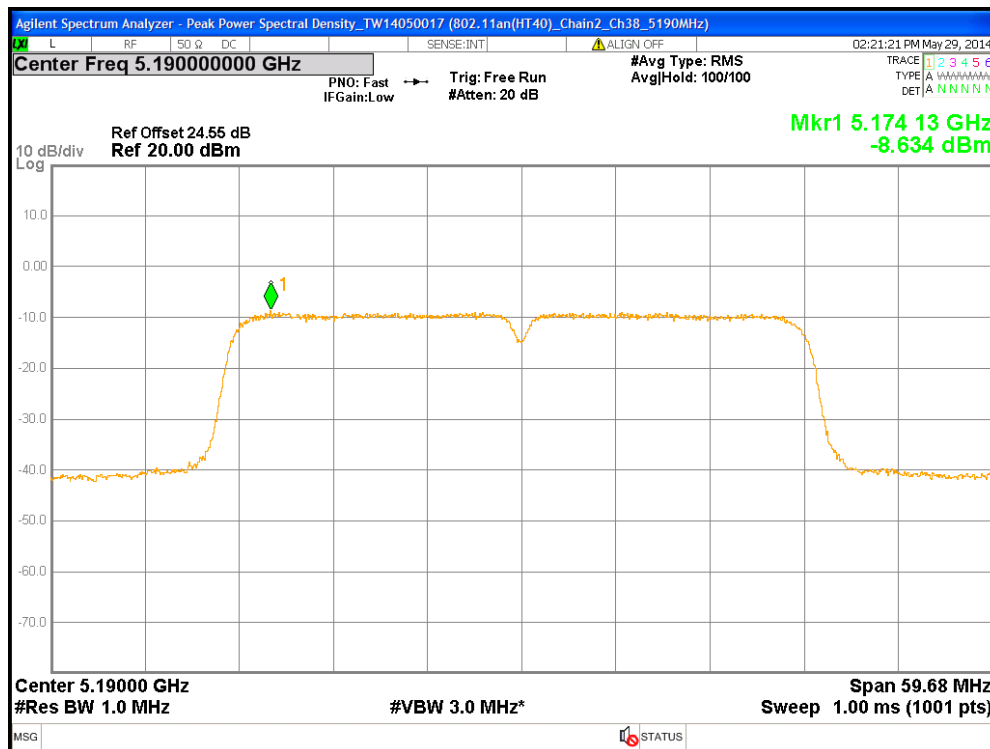
Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch151



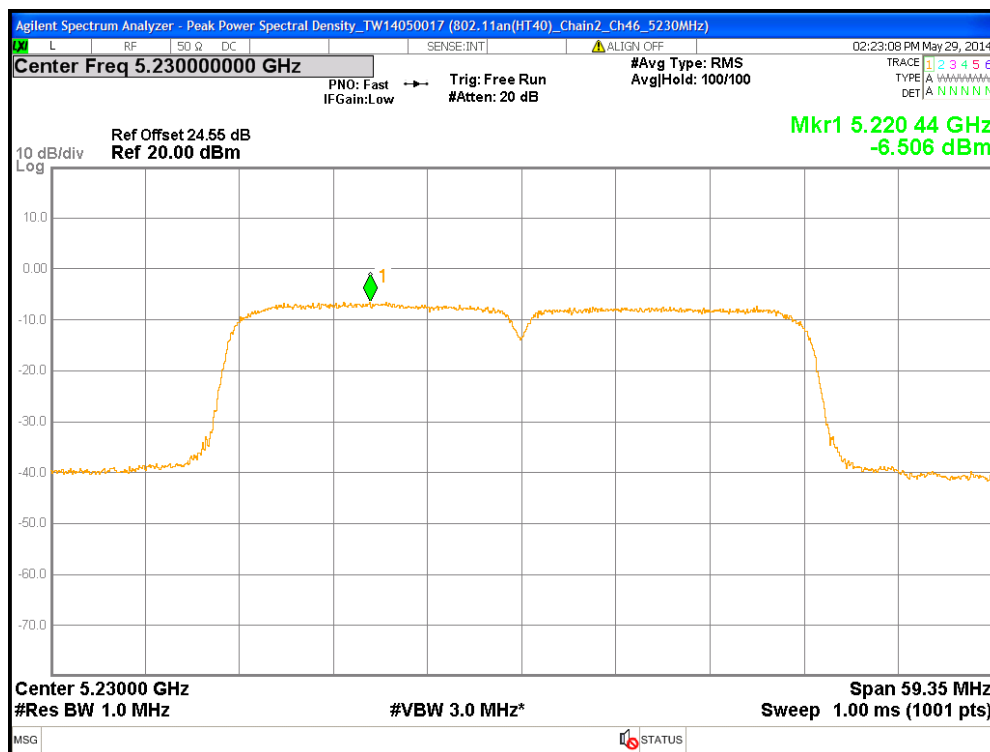
Chain1 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch159



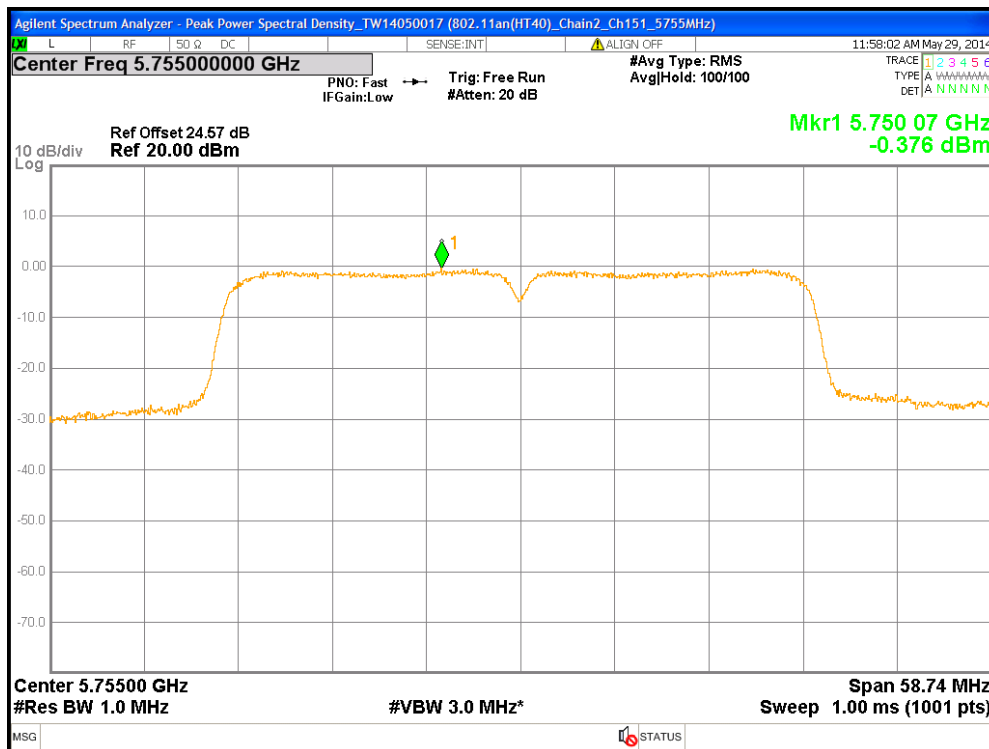
Chain2 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch38



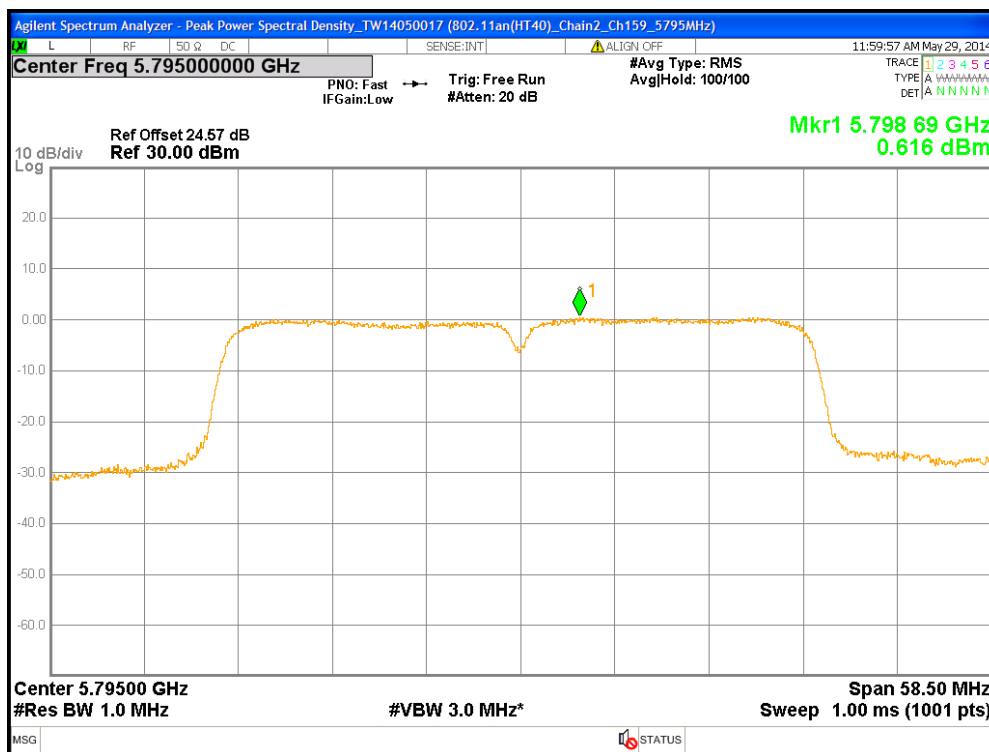
Chain2 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch46



Chain2 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch151



Chain2 : Peak Power Spectral Density @ 802.11an(HT40) Mode Ch159



5. Peak Excursion to Average Ratio

5.1 Operating environment

Temperature:	25	°C
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,149,157,161 for 20MHz 38,46,151,159 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

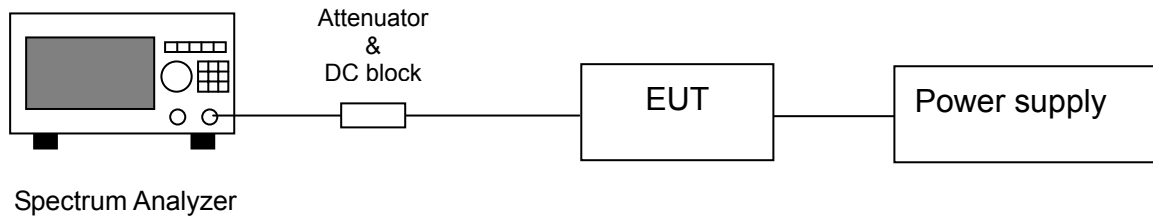
5.3 Measuring instrument setting

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



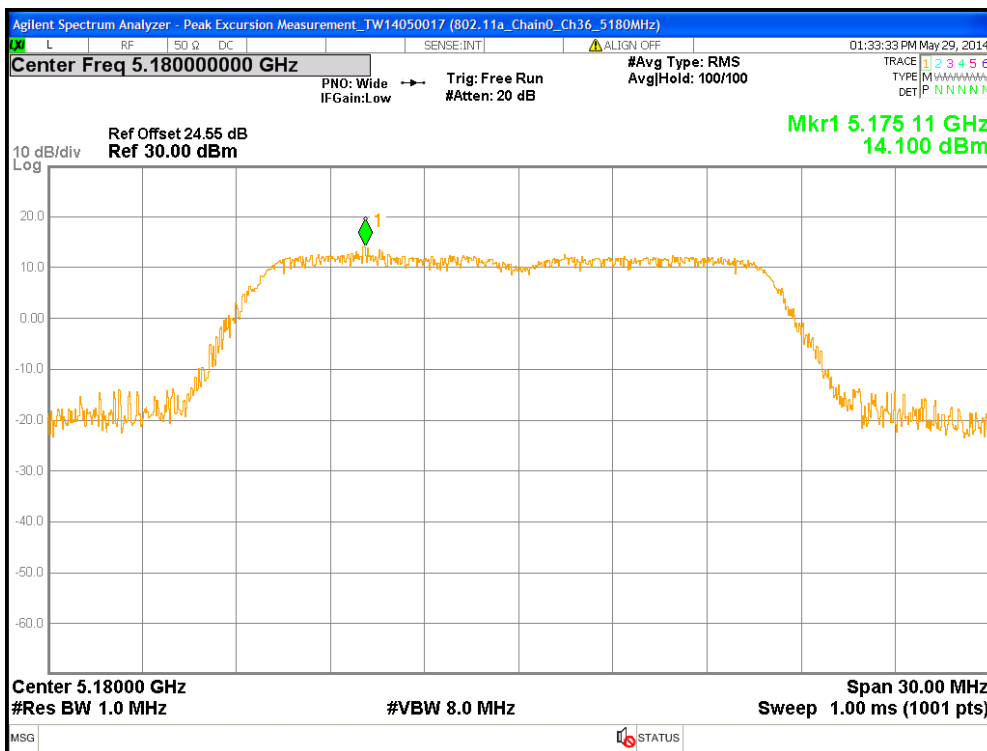
5.6 Test results

Mode	Channel	Frequency (MHz)	PK Value (dBm)	PSD with Duty factor		PK Excursion (dBm)	Limit (dBm)	Margin (dB)
				mW	dBm			
802.11a (Chain0)	36	5180	14.10	2.22	3.47	10.63	13	-2.37
	40	5200	15.44	2.11	3.25	12.18	13	-0.82
	48	5240	15.98	2.06	3.14	12.85	13	-0.15
	149	5745	15.83	5.41	7.33	8.50	13	-4.50
	157	5785	15.80	5.00	6.99	8.81	13	-4.19
	161	5805	15.91	5.72	7.57	8.34	13	-4.66
802.11a (Chain1)	36	5180	13.31	2.06	3.14	10.16	13	-2.84
	40	5200	11.41	2.25	3.52	7.89	13	-5.11
	48	5240	12.19	1.57	1.95	10.23	13	-2.77
	149	5745	15.12	4.63	6.65	8.47	13	-4.53
	157	5785	16.81	6.76	8.30	8.51	13	-4.49
	161	5805	17.64	6.48	8.11	9.52	13	-3.48
802.11a (Chain2)	36	5180	11.31	1.88	2.73	8.57	13	-4.43
	40	5200	10.97	1.86	2.69	8.28	13	-4.72
	48	5240	11.42	1.64	2.15	9.27	13	-3.73
	149	5745	14.76	4.60	6.63	8.13	13	-4.87
	157	5785	15.42	5.32	7.26	8.16	13	-4.84
	161	5805	16.11	5.59	7.48	8.63	13	-4.37

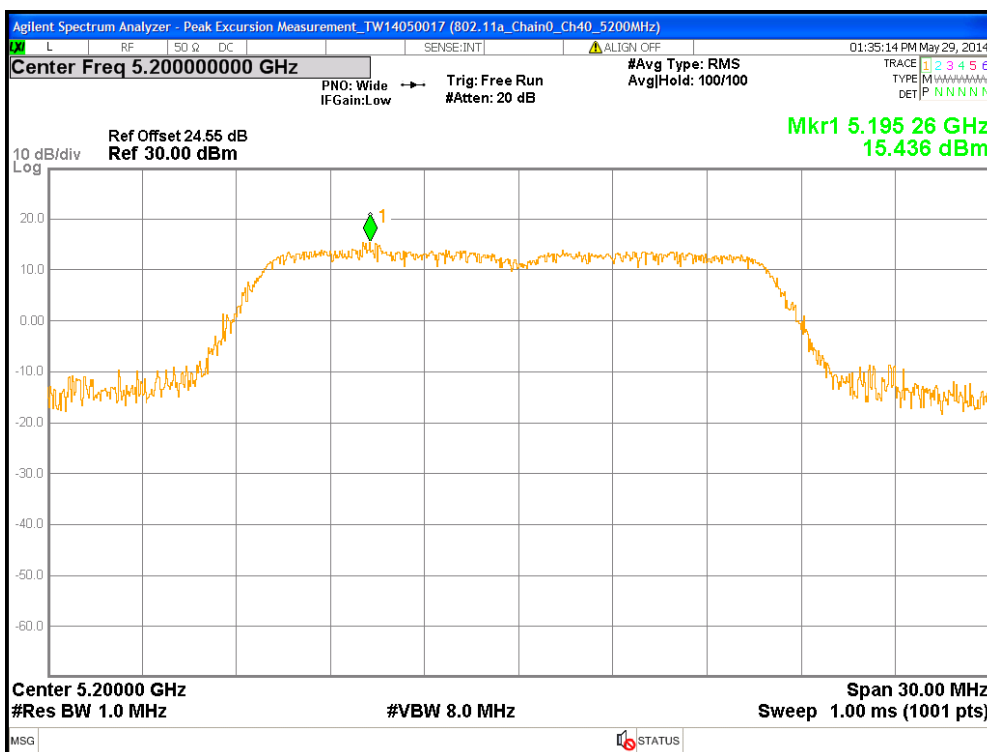
Mode	Channel	Frequency (MHz)	PK Value (dBm)	PSD with Duty factor		PK Excursion (dBm)	Limit (dBm)	Margin (dB)
				mW	dBm			
802.11n (HT20) (Chain0)	36	5180	7.84	2.28	3.58	4.26	13	-8.74
	40	5200	8.19	2.59	4.13	4.06	13	-8.94
	48	5240	7.56	2.22	3.46	4.10	13	-8.90
	149	5745	14.48	12.88	11.10	3.38	13	-9.62
	157	5785	13.94	13.81	11.40	2.54	13	-10.46
	161	5805	14.44	13.91	11.43	3.00	13	-10.00
802.11n (HT20) (Chain1)	36	5180	6.81	2.28	3.58	3.23	13	-9.77
	40	5200	7.57	2.59	4.13	3.44	13	-9.56
	48	5240	7.05	2.22	3.46	3.59	13	-9.41
	149	5745	14.44	12.88	11.10	3.34	13	-9.66
	157	5785	15.10	13.81	11.40	3.70	13	-9.30
	161	5805	15.62	13.91	11.43	4.19	13	-8.81
802.11n (HT20) (Chain2)	36	5180	6.61	2.28	3.58	3.02	13	-9.98
	40	5200	6.90	2.59	4.13	2.76	13	-10.24
	48	5240	6.27	2.22	3.46	2.81	13	-10.19
	149	5745	14.08	12.88	11.10	2.98	13	-10.02
	157	5785	14.39	13.81	11.40	2.99	13	-10.01
	161	5805	14.28	13.91	11.43	2.85	13	-10.15

Mode	Channel	Frequency (MHz)	PK Value (dBm)	PSD with Duty factor		PK Excursion (dBm)	Limit (dBm)	Margin (dB)
				mW	dBm			
802.11n (HT40) (Chain0)	38	5190	1.20	0.19	-7.30	8.51	13	-4.49
	46	5230	2.64	0.23	-6.34	8.98	13	-4.02
	151	5230	9.80	1.76	2.46	7.34	13	-5.66
	159	5230	10.38	1.68	2.26	8.13	13	-4.87
802.11n (HT40) (Chain1)	38	5190	0.41	0.19	-7.30	7.71	13	-5.29
	46	5230	2.69	0.23	-6.34	9.03	13	-3.97
	151	5230	10.02	1.76	2.46	7.55	13	-5.45
	159	5230	11.49	1.68	2.26	9.24	13	-3.76
802.11n (HT40) (Chain2)	38	5190	1.01	0.19	-7.30	8.31	13	-4.69
	46	5230	1.97	0.23	-6.34	8.31	13	-4.69
	151	5230	9.43	1.76	2.46	6.97	13	-6.03
	159	5230	9.96	1.68	2.26	7.70	13	-5.30

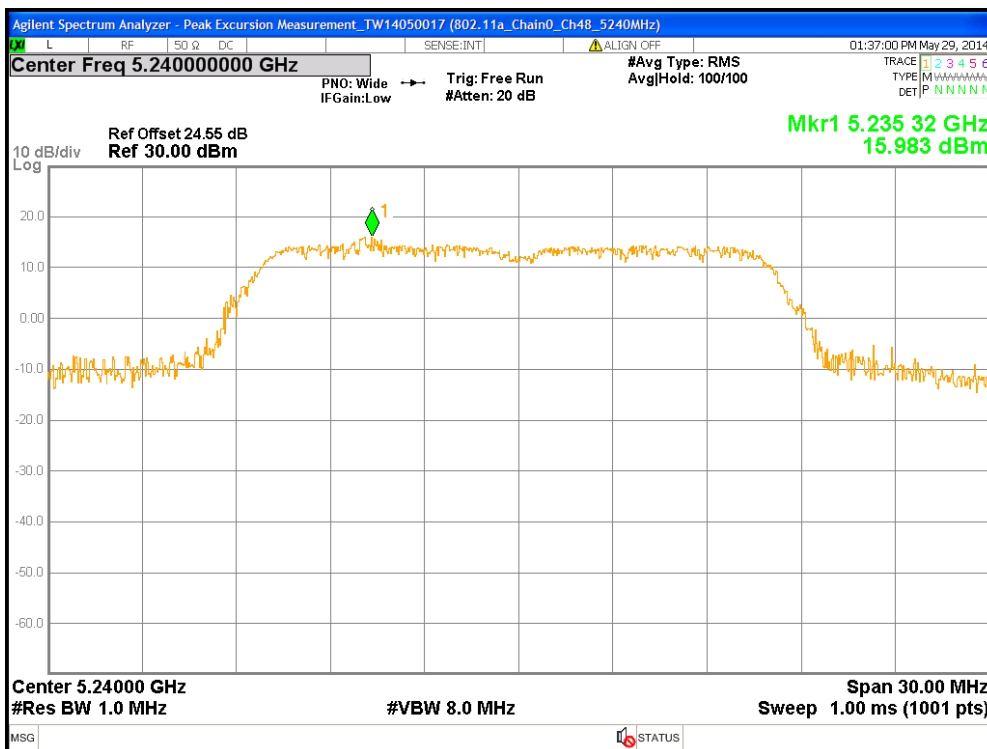
Chain0 : Peak Excursion Measurement @ 802.11a Mode Ch36



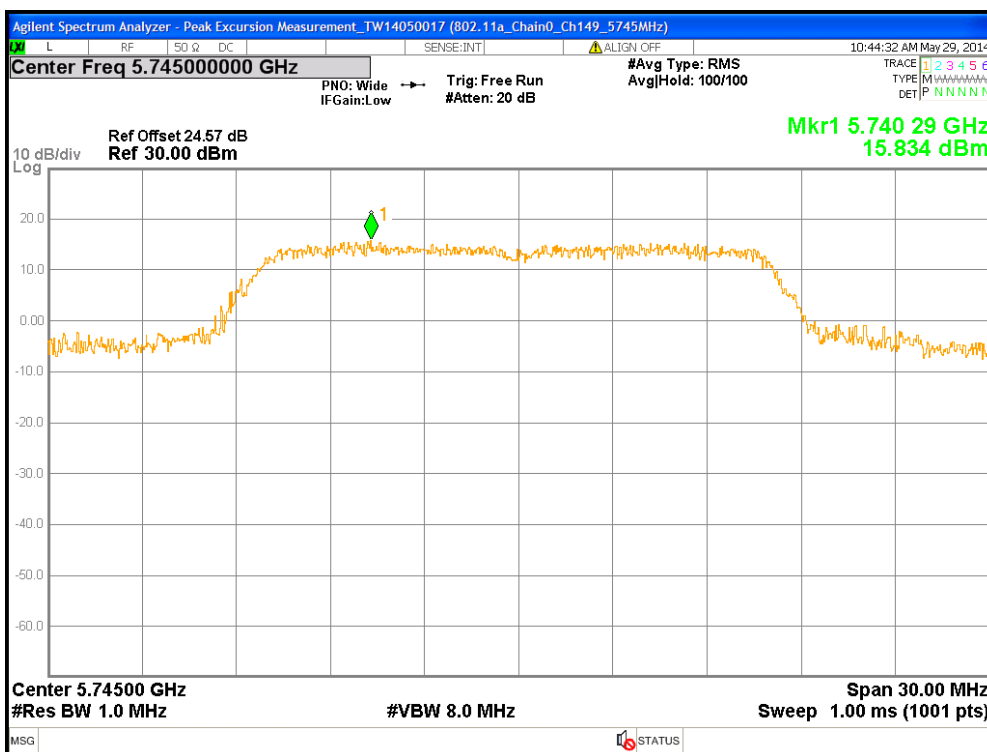
Chain0 : Peak Excursion Measurement @ 802.11a Mode Ch40



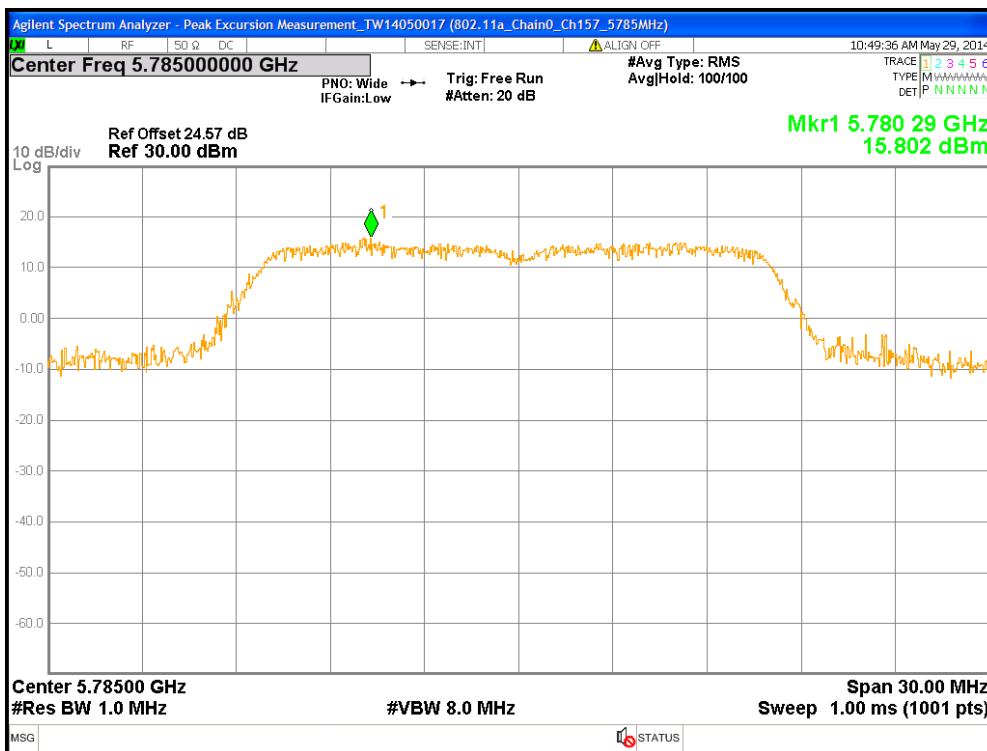
Chain0 : Peak Excursion Measurement @ 802.11a Mode Ch48



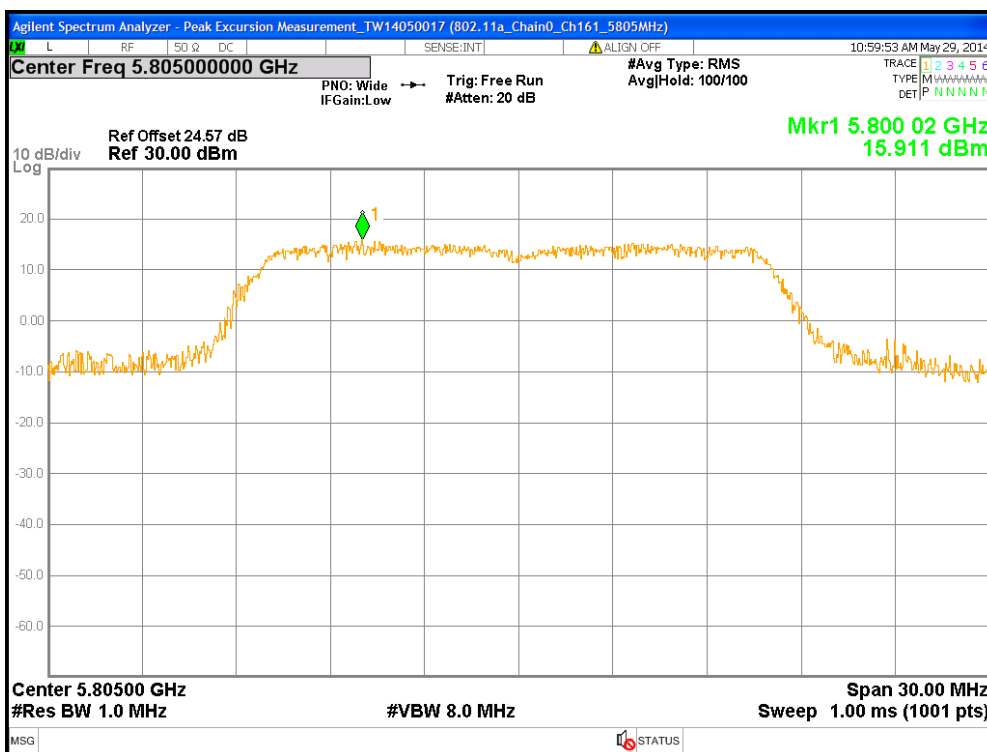
Chain0 : Peak Excursion Measurement @ 802.11a Mode Ch149



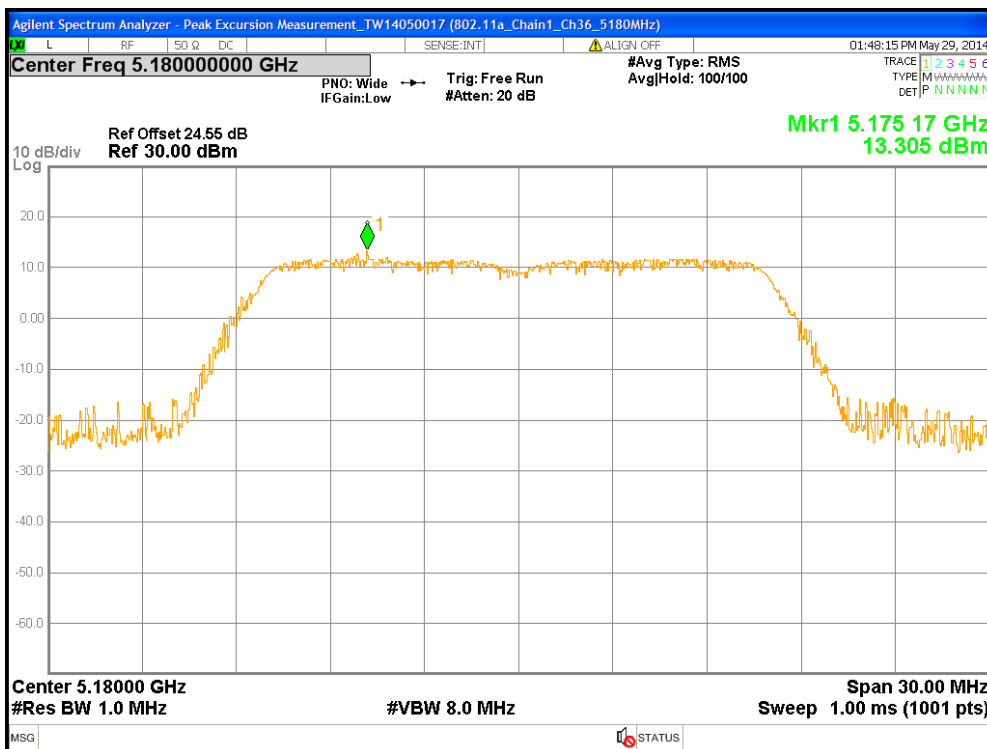
Chain0 : Peak Excursion Measurement @ 802.11a Mode Ch157



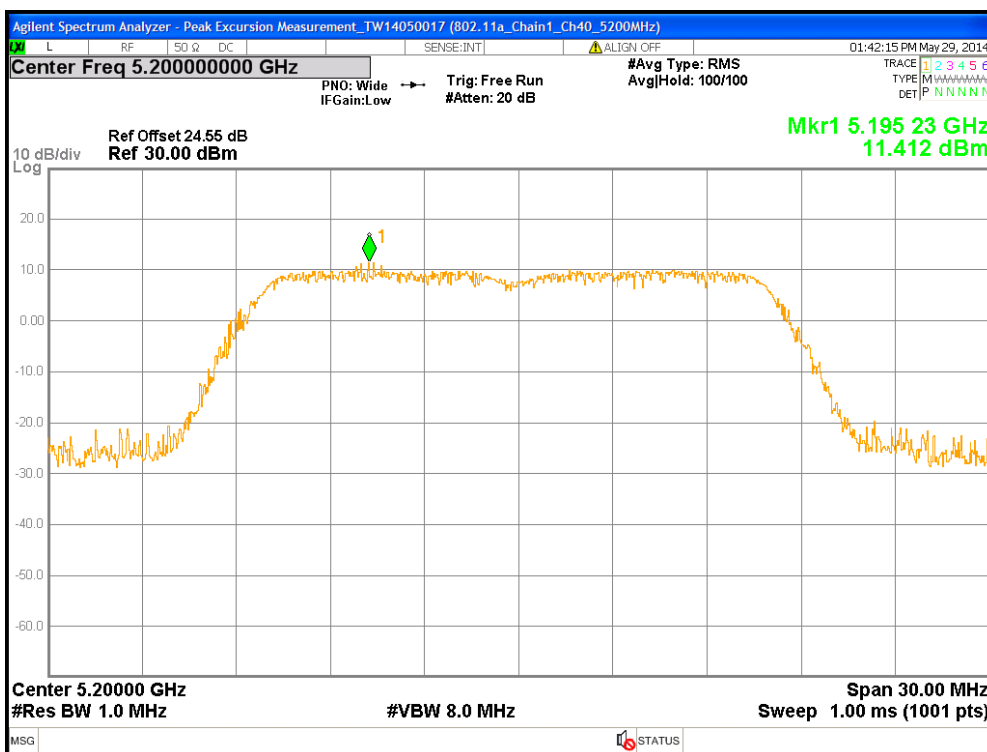
Chain0 : Peak Excursion Measurement @ 802.11a Mode Ch161



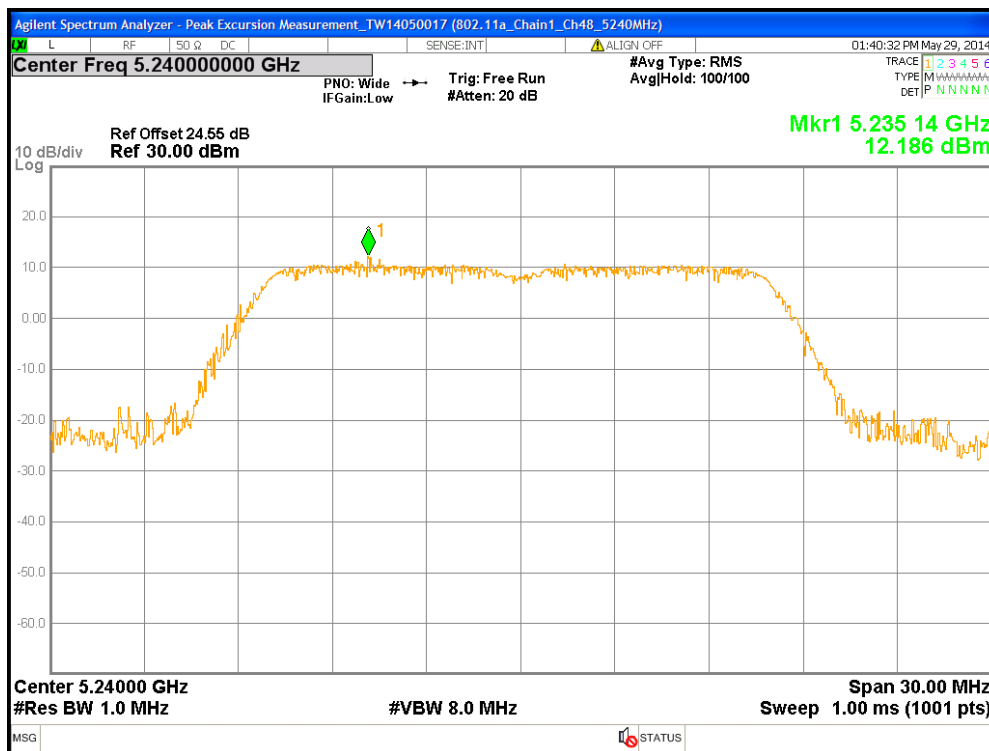
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch36



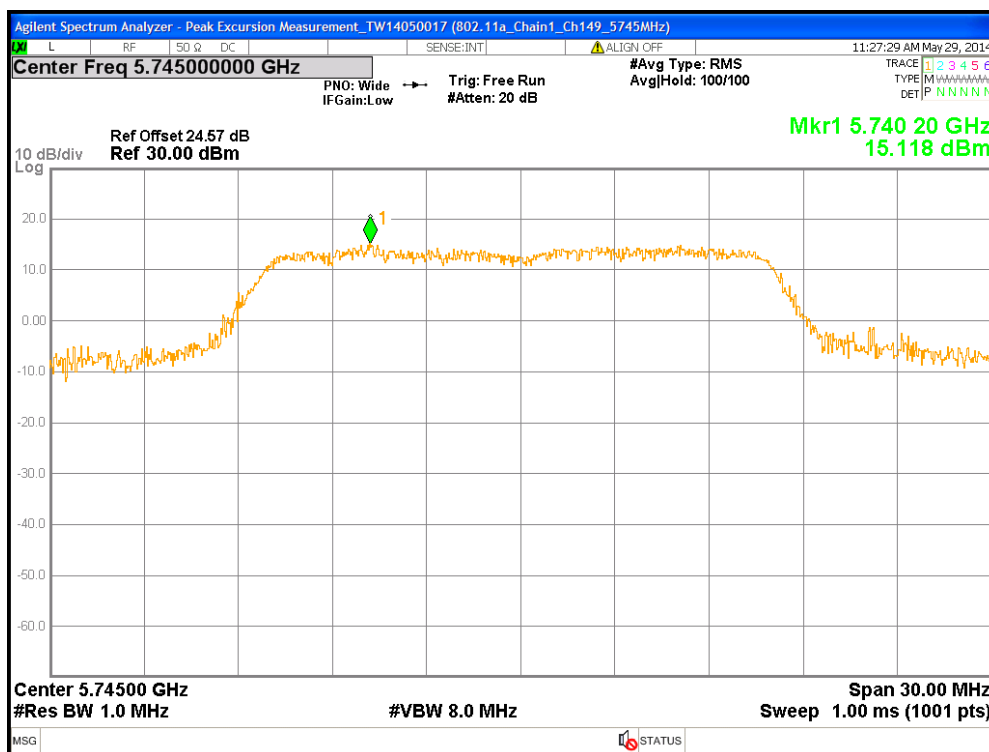
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch40



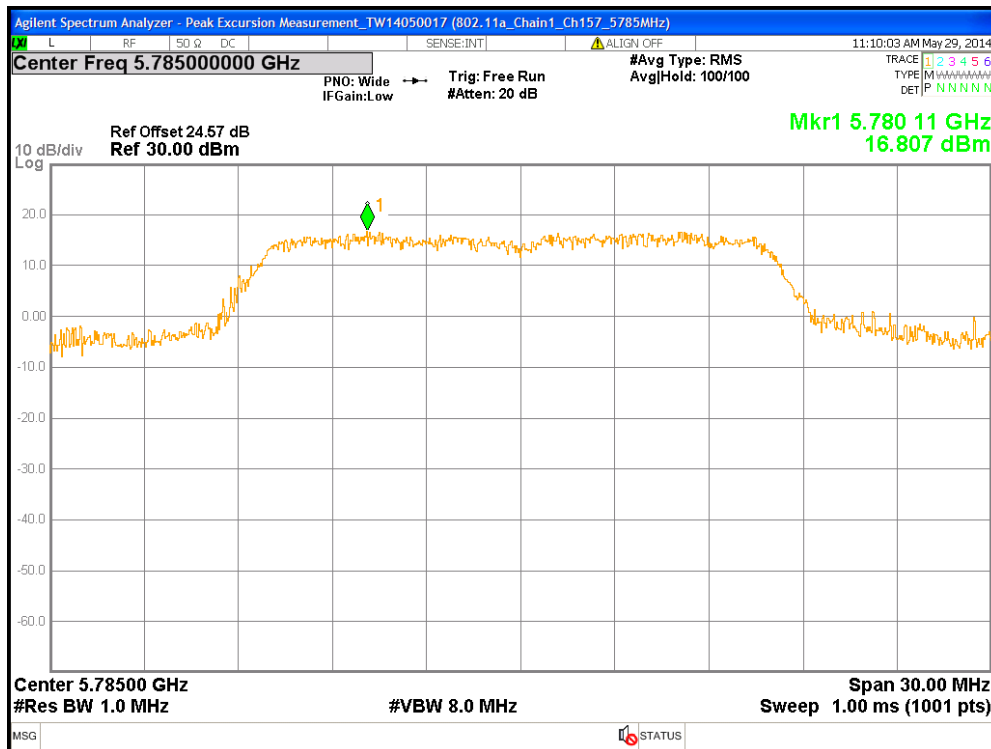
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch48



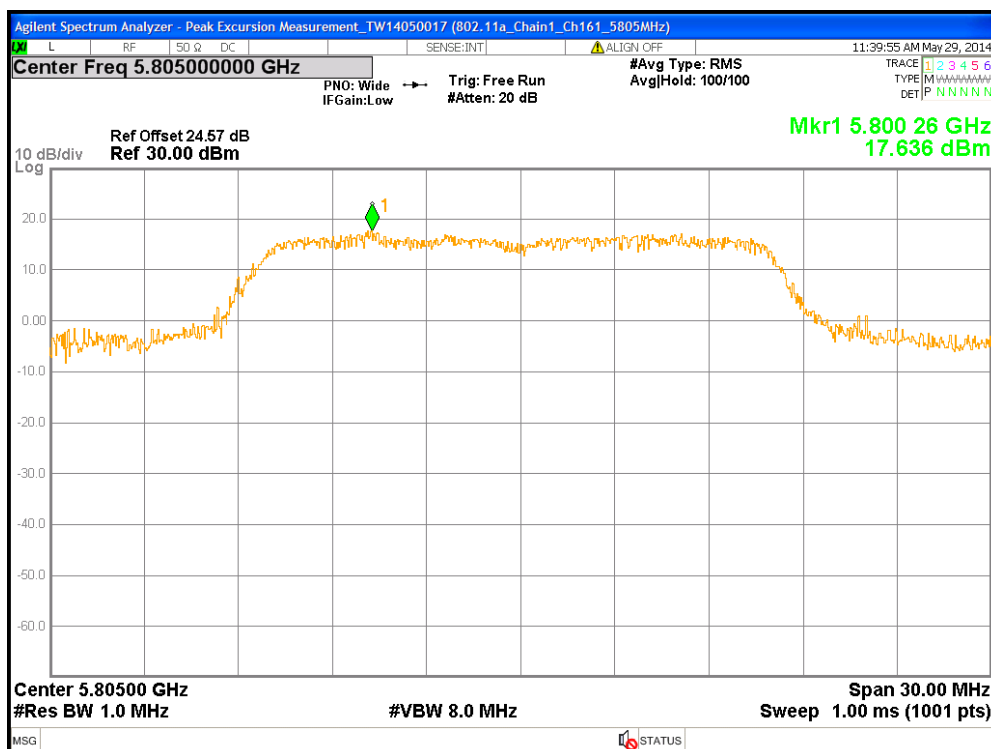
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch149



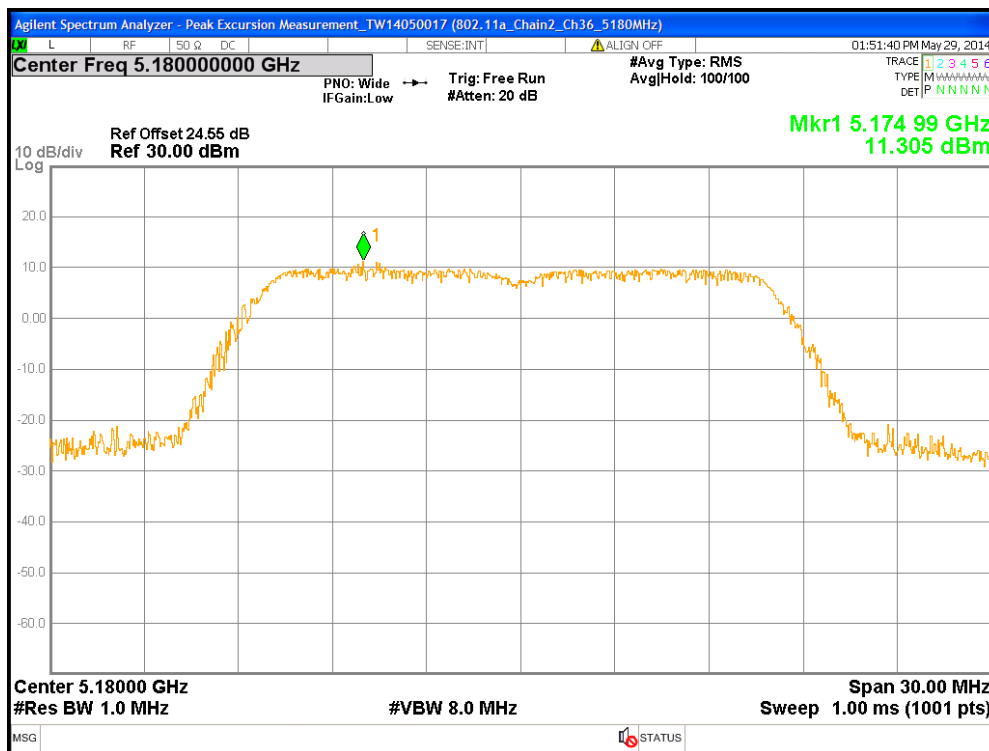
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch157



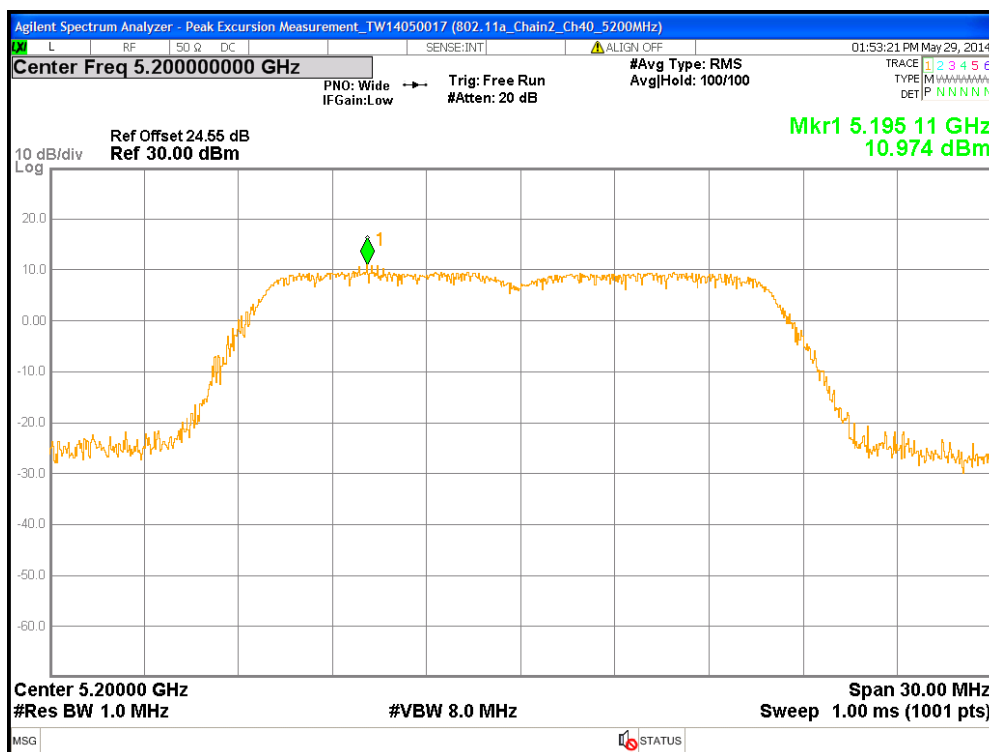
Chain1 : Peak Excursion Measurement @ 802.11a Mode Ch161



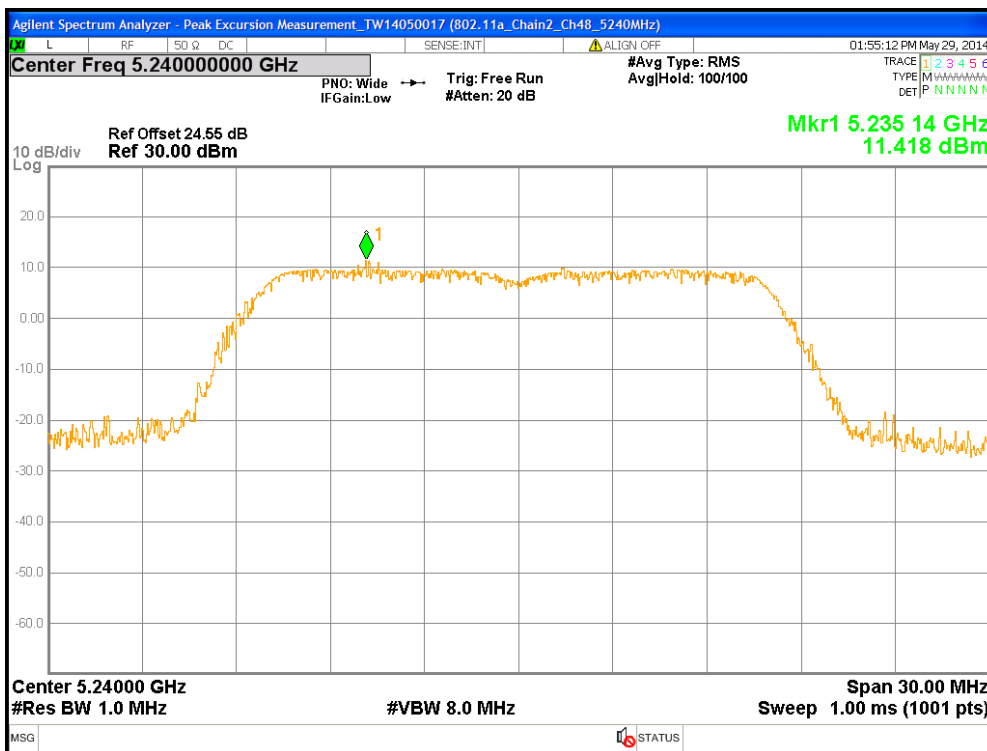
Chain2 : Peak Excursion Measurement @ 802.11a Mode Ch36



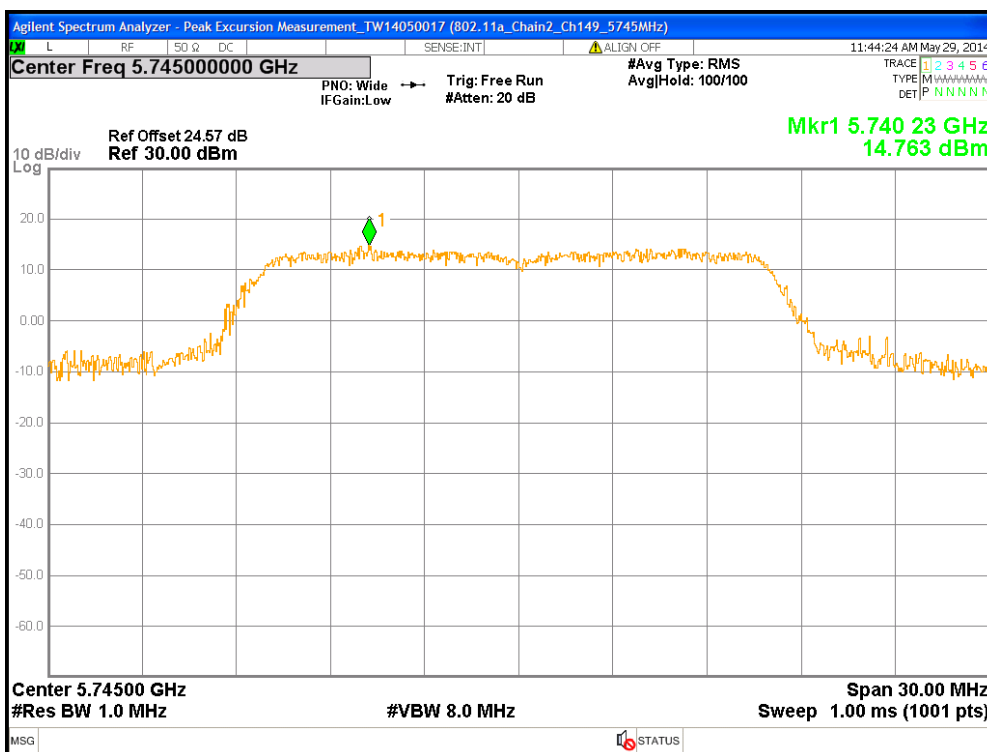
Chain2 : Peak Excursion Measurement @ 802.11a Mode Ch40



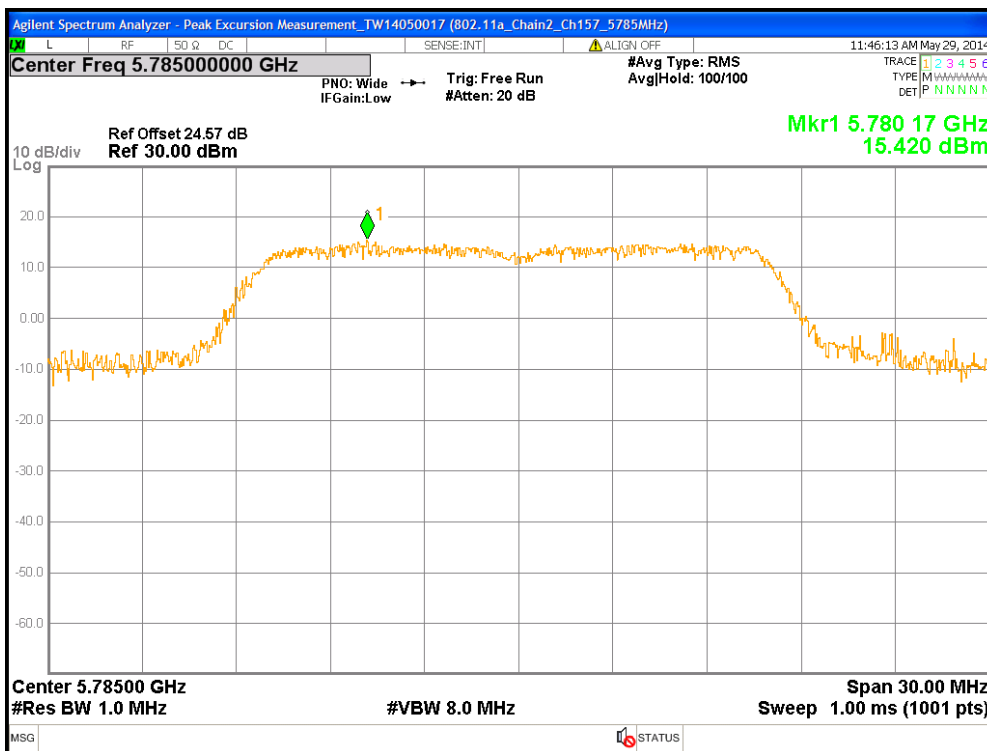
Chain2 : Peak Excursion Measurement @ 802.11a Mode Ch48



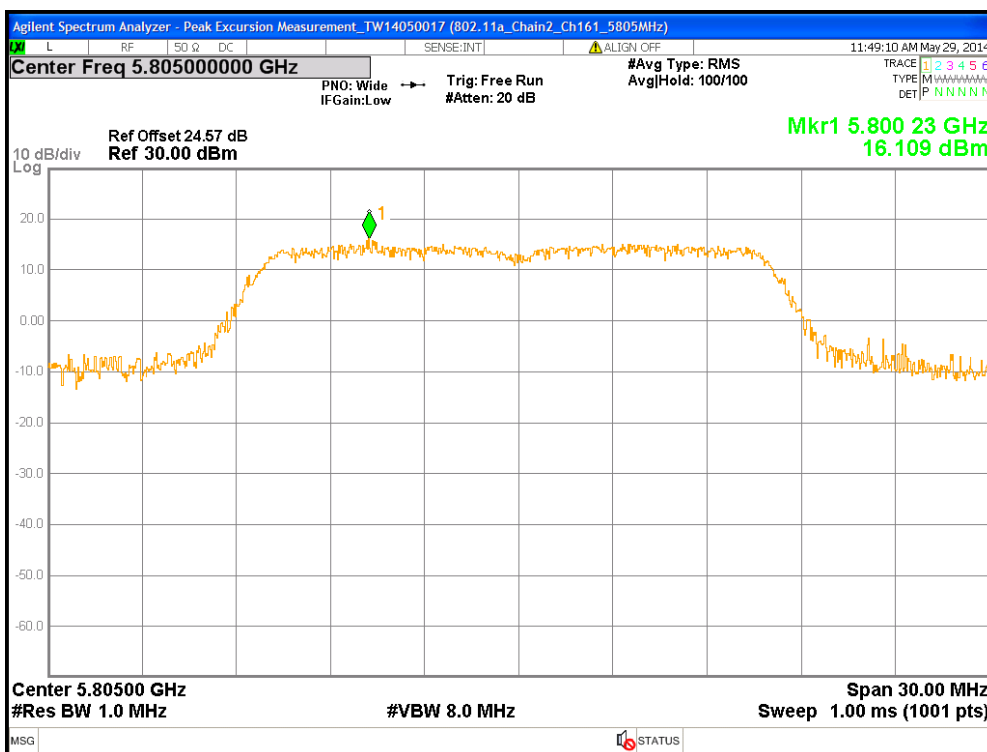
Chain2 : Peak Excursion Measurement @ 802.11a Mode Ch149



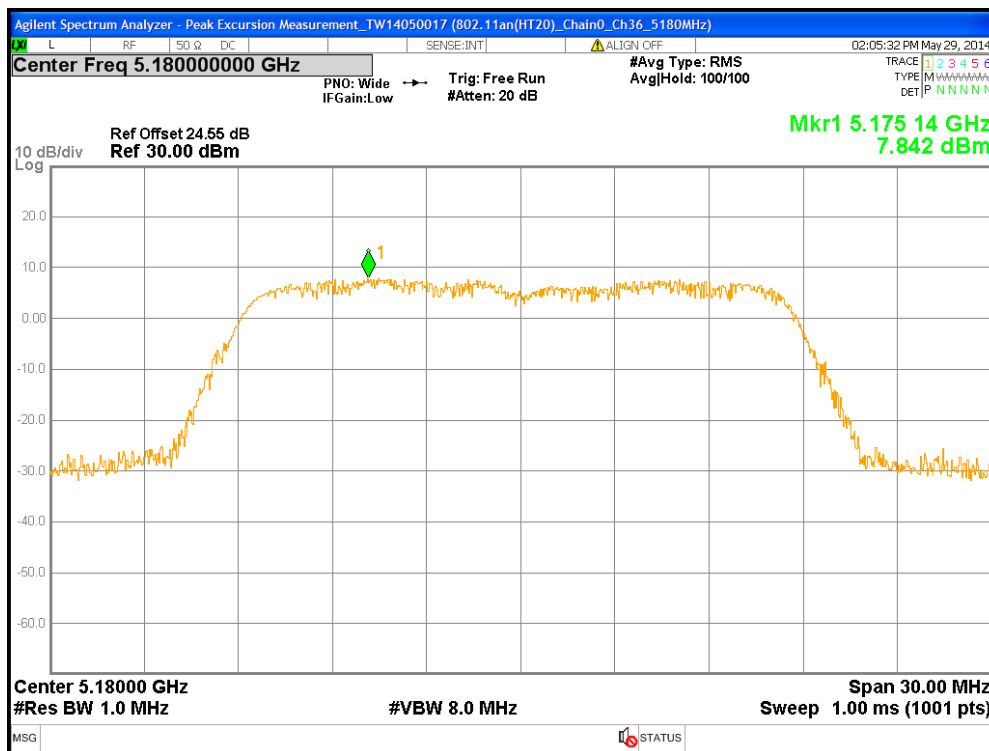
Chain2 : Peak Excursion Measurement @ 802.11a Mode Ch157



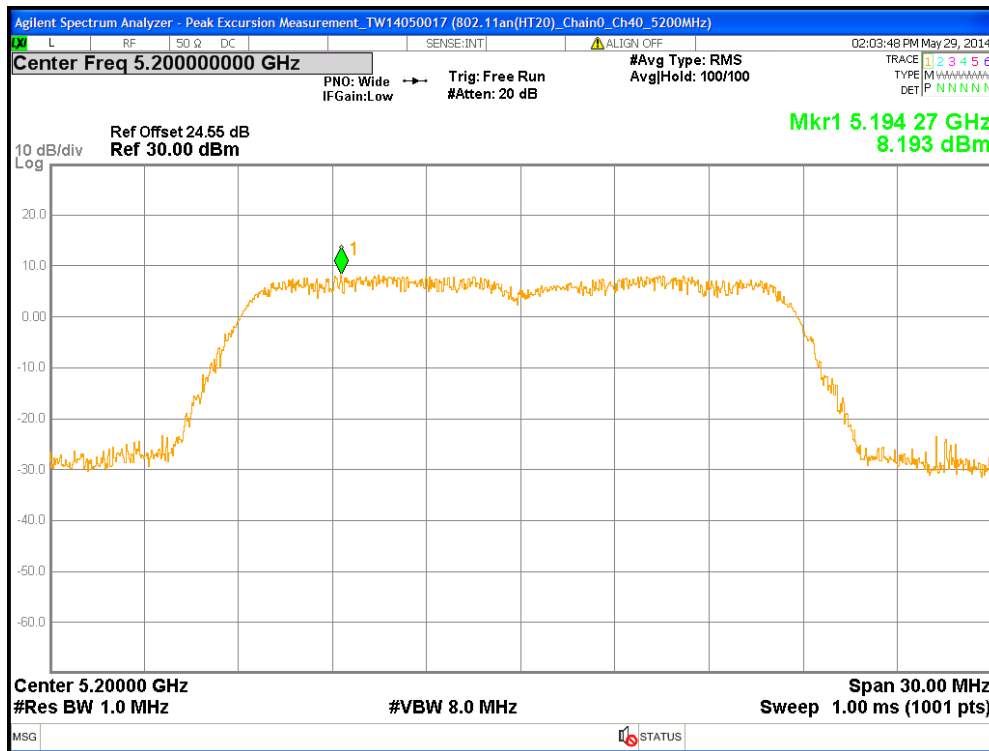
Chain2 : Peak Excursion Measurement @ 802.11a Mode Ch161



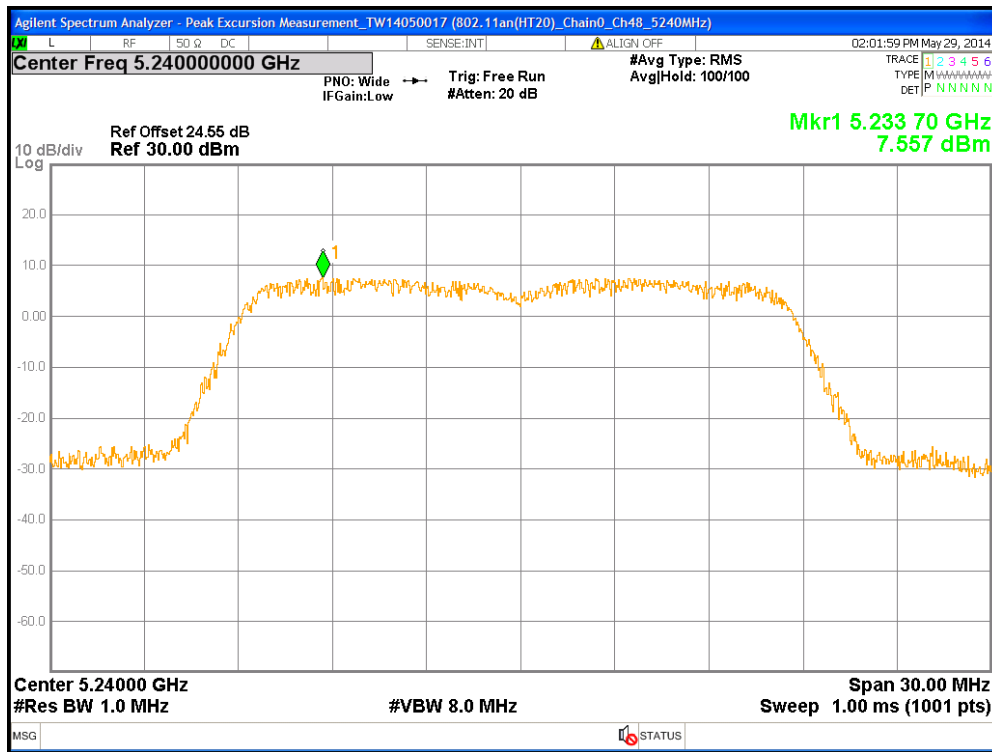
Chain0 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch36



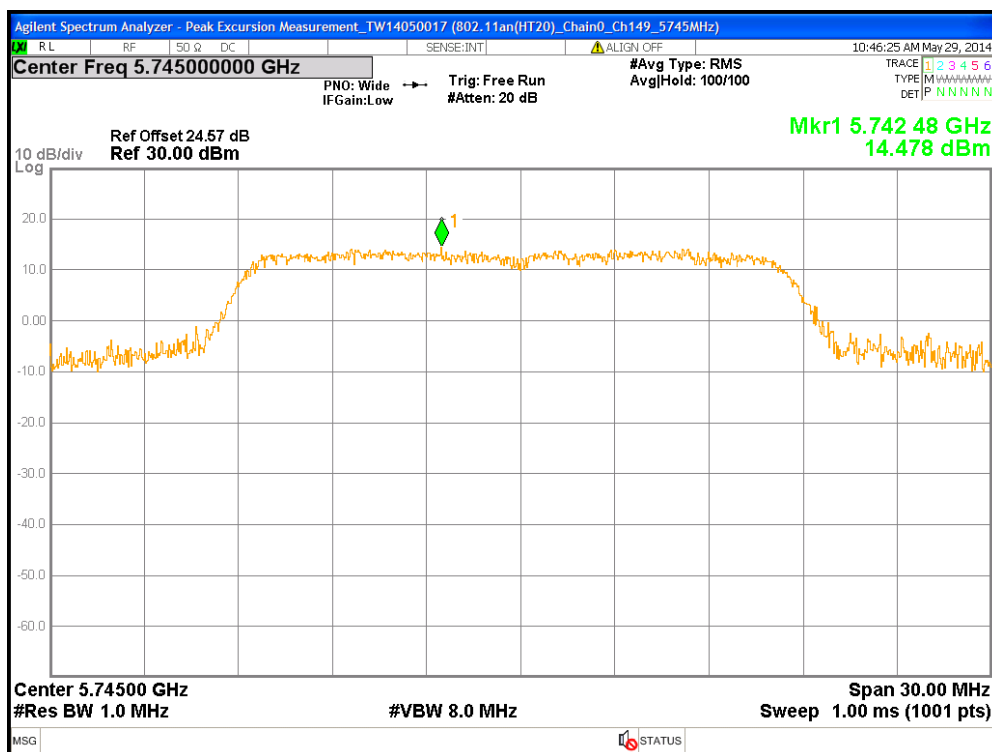
Chain0 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch40



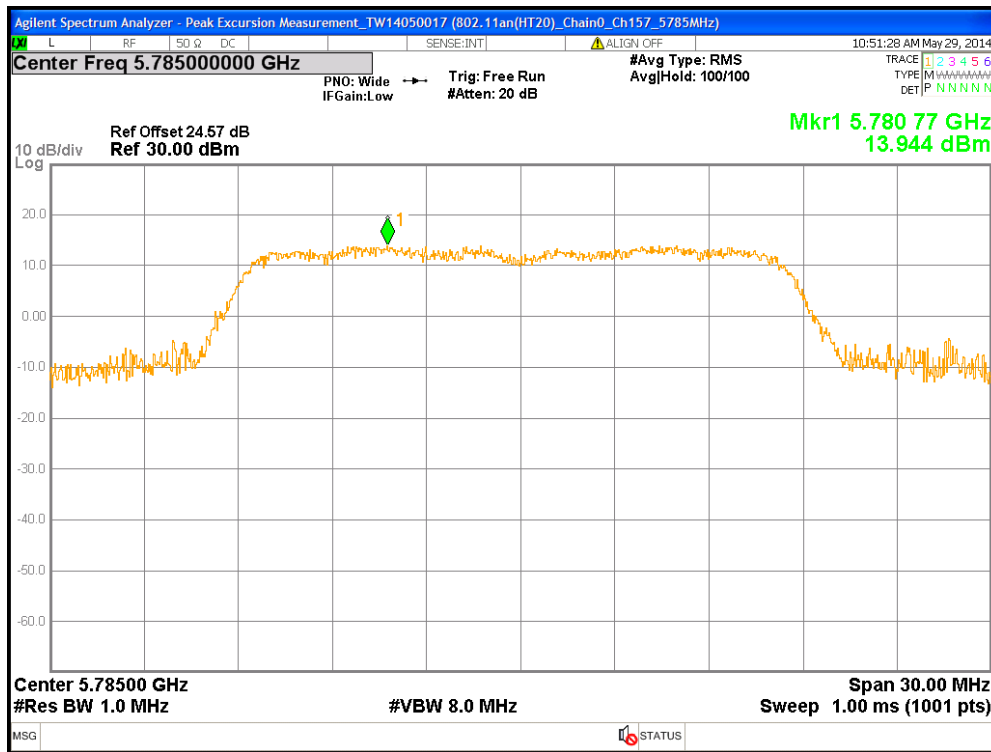
Chain0 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch48



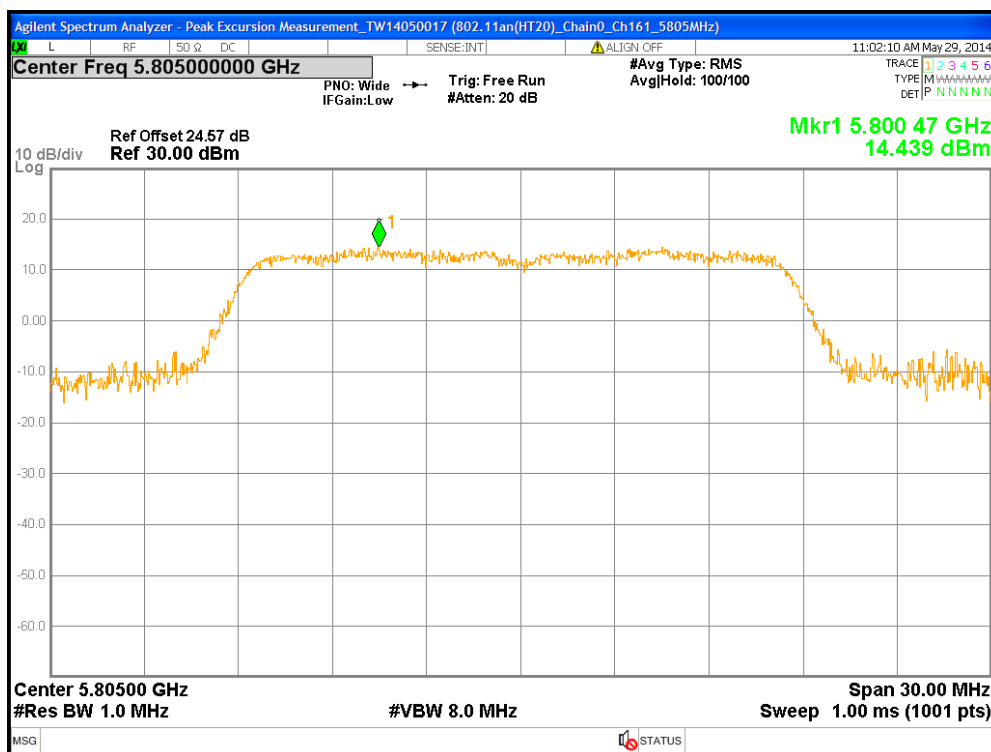
Chain0 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch149



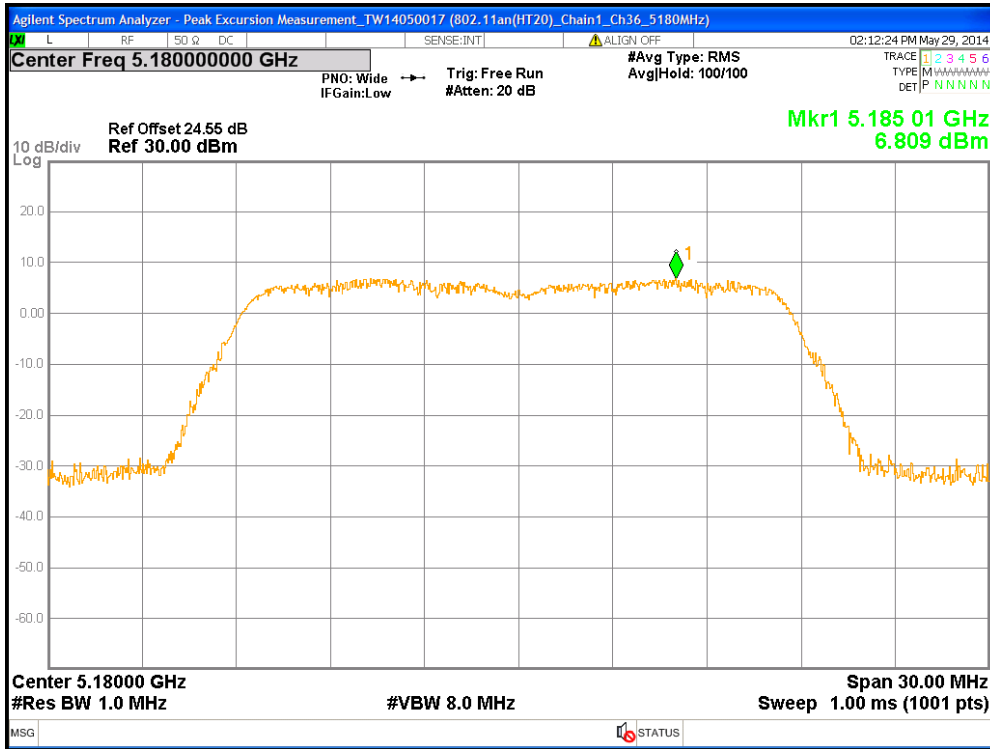
Chain0 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch157



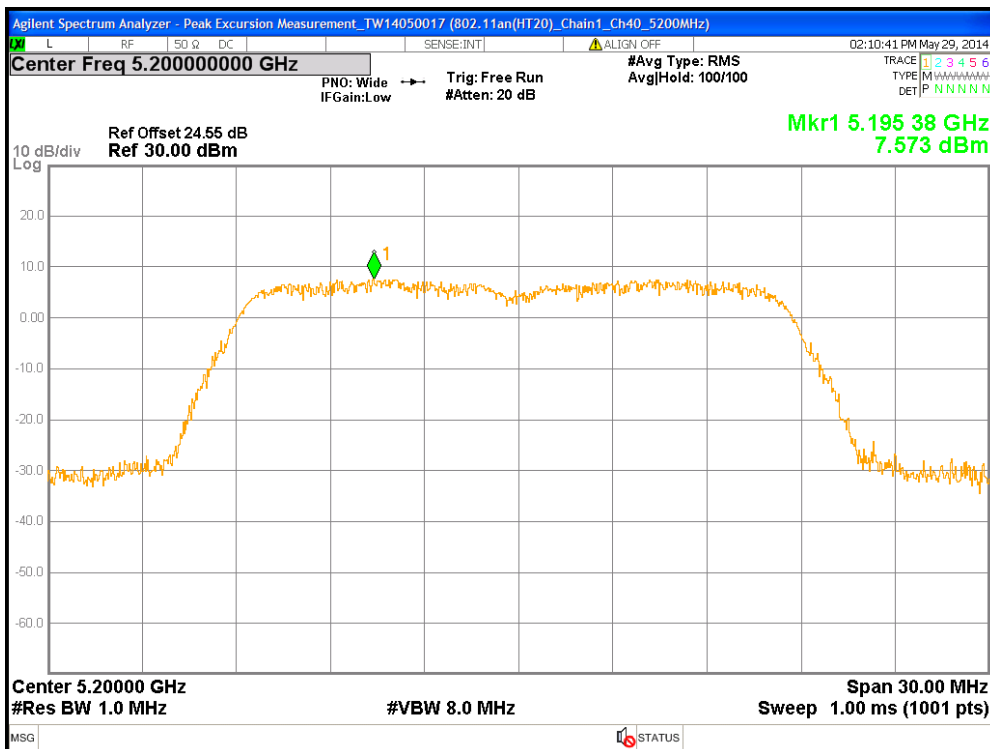
Chain0 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch161



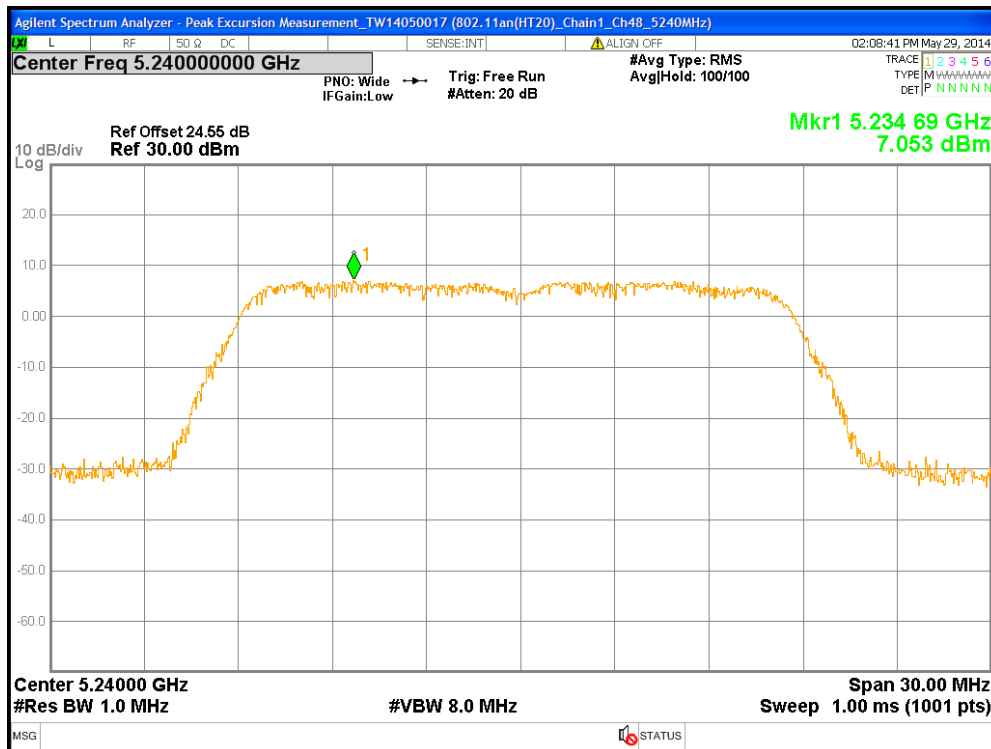
Chain1 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch36



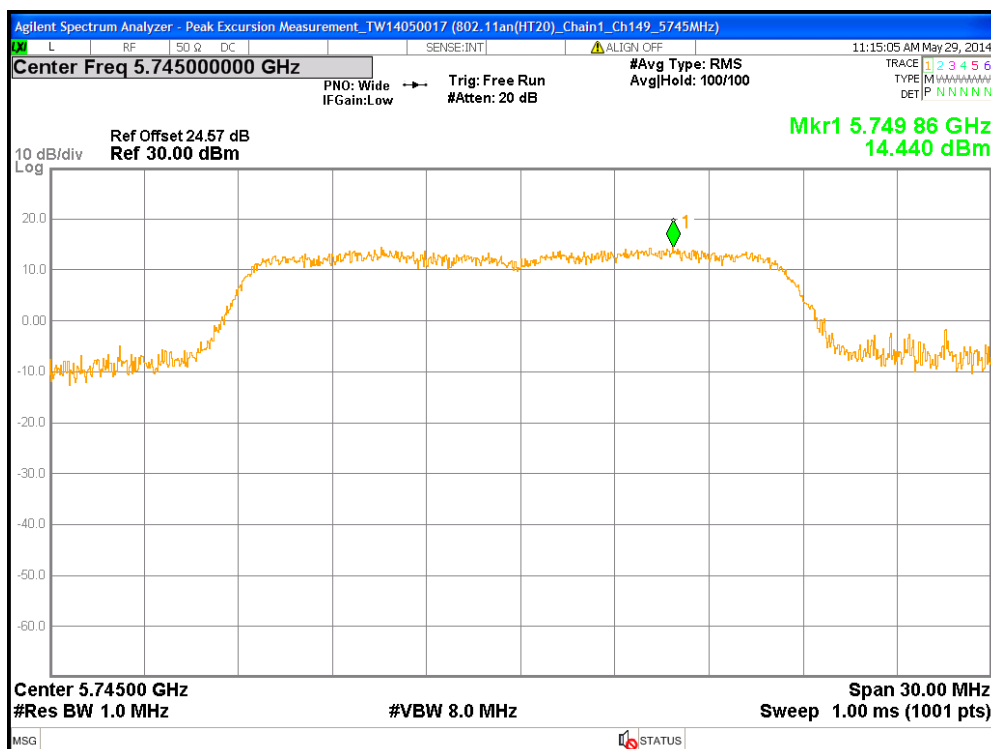
Chain1 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch40



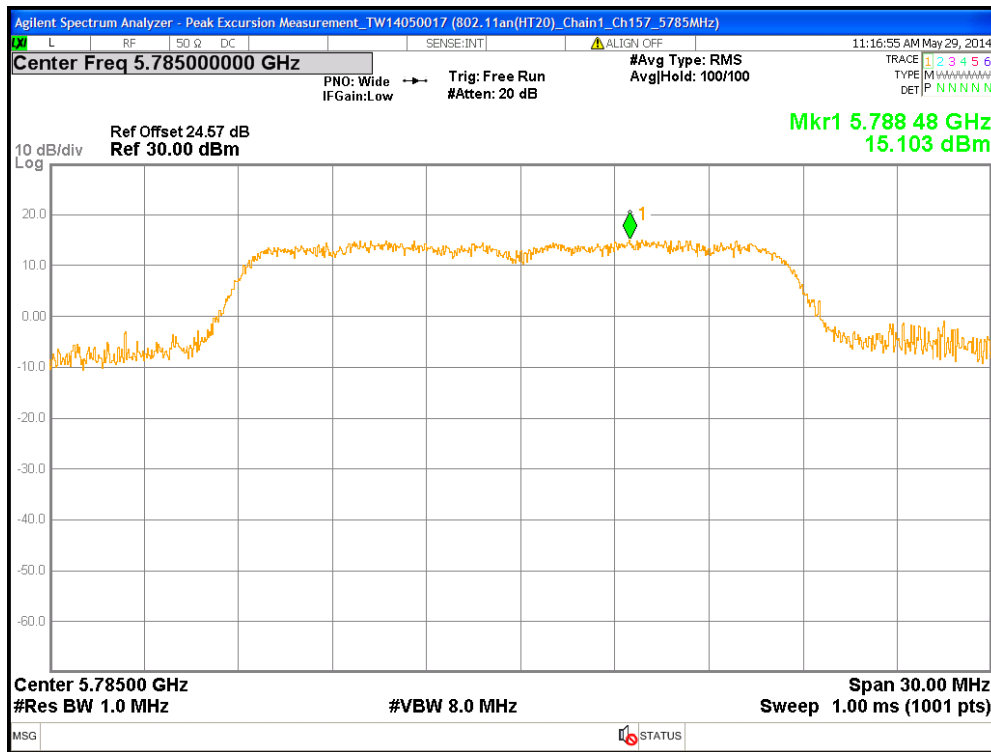
Chain1 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch48



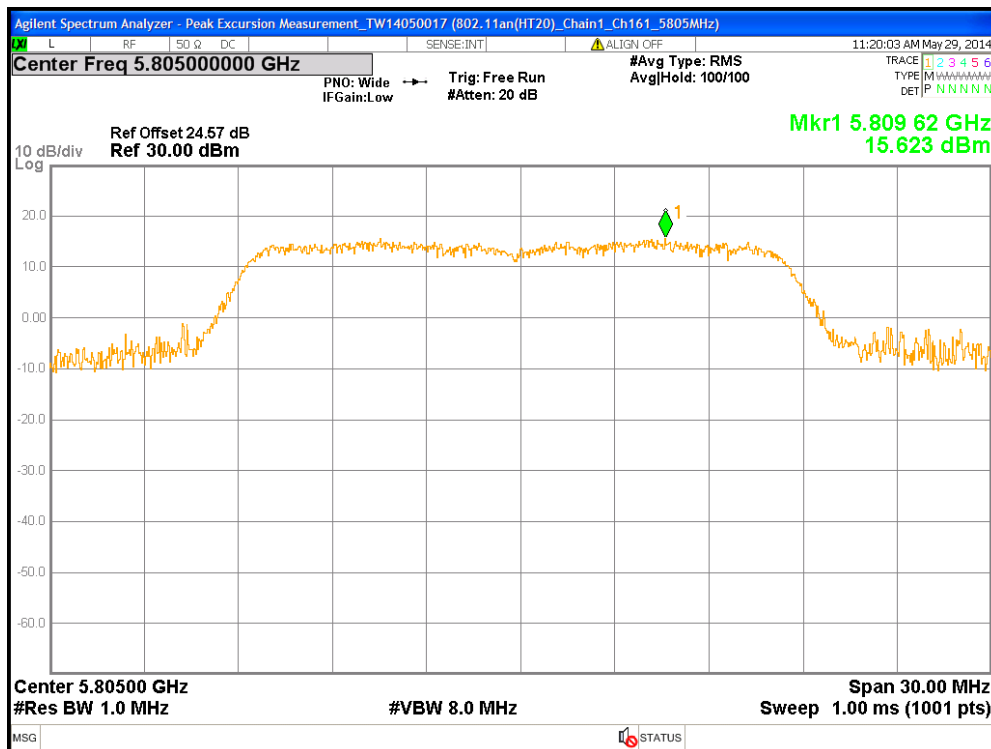
Chain1 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch149



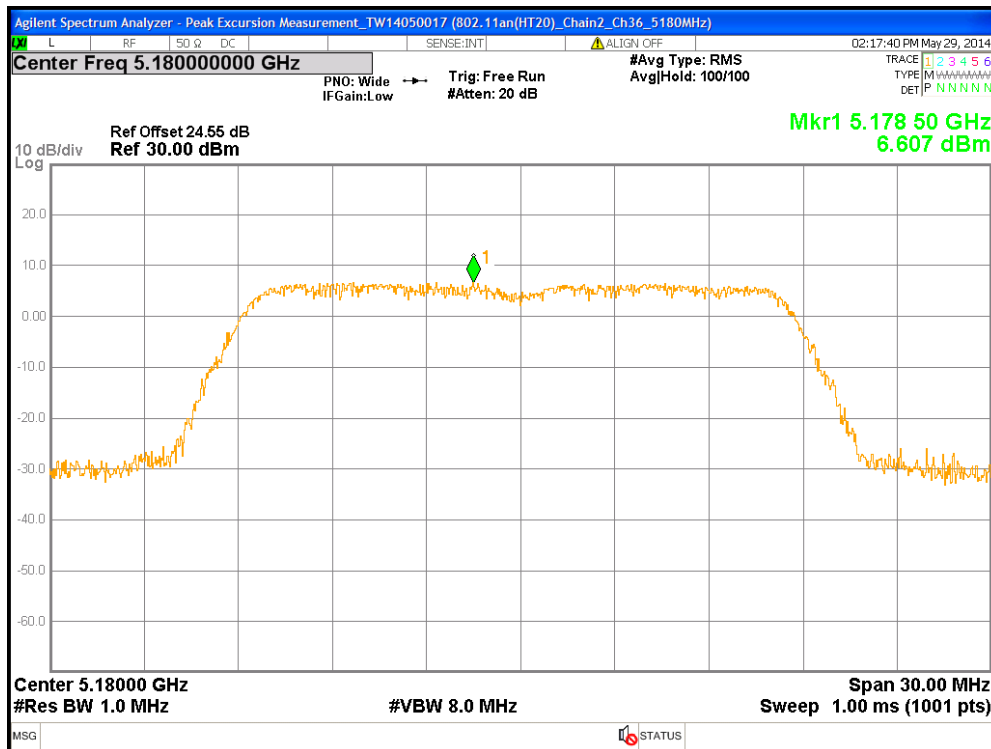
Chain1 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch157



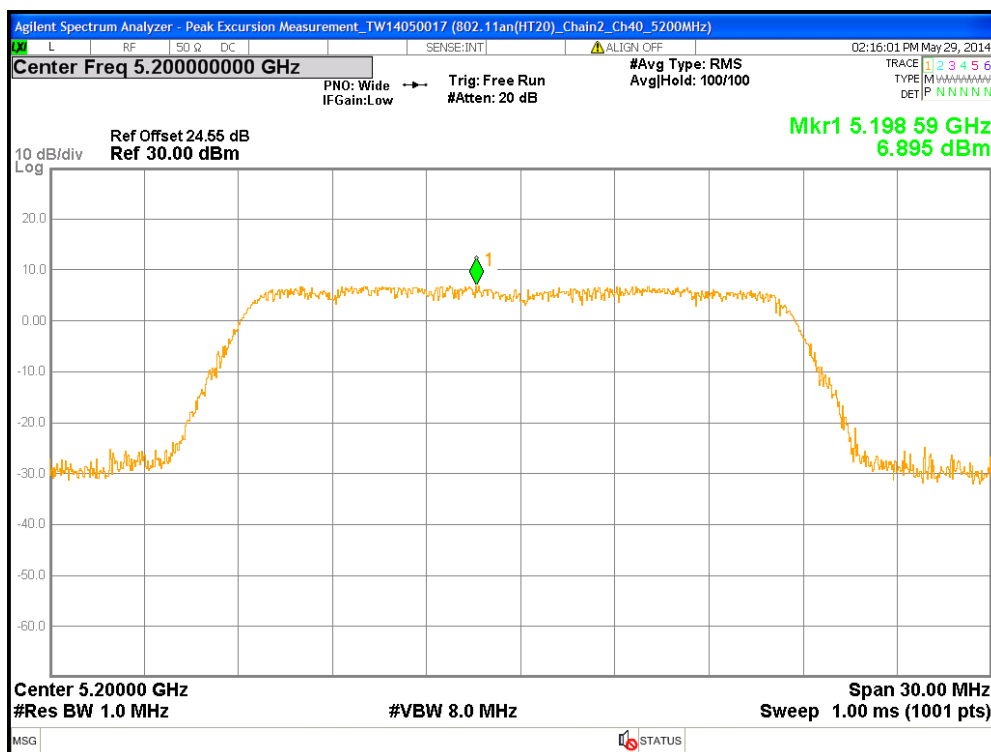
Chain1 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch161



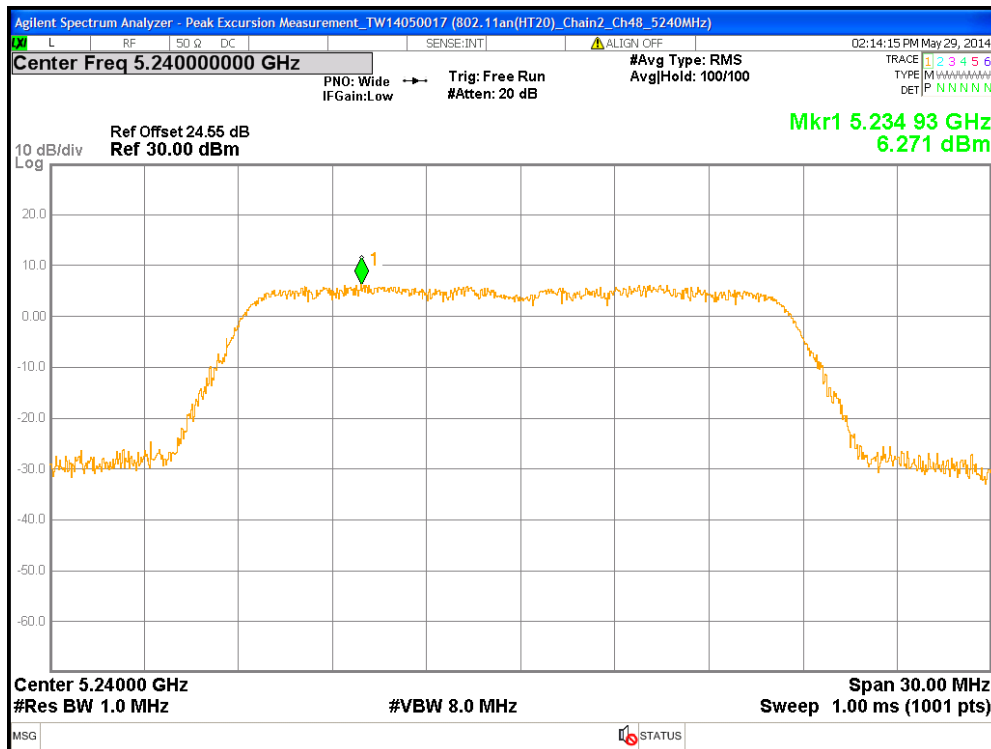
Chain2 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch36



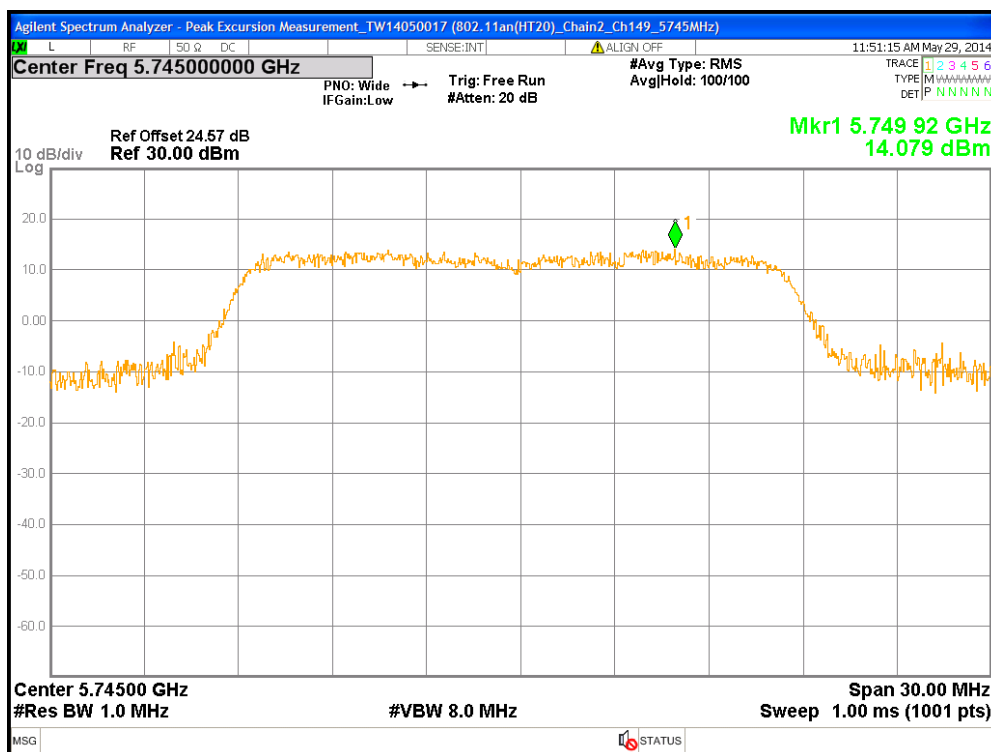
Chain2 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch40



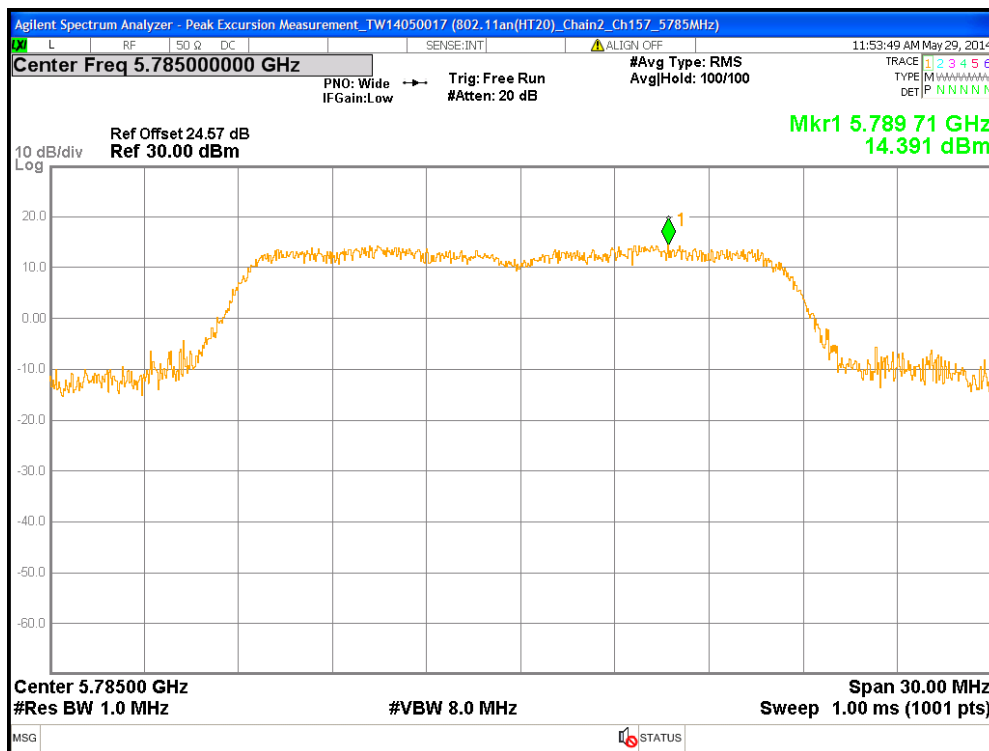
Chain2 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch48



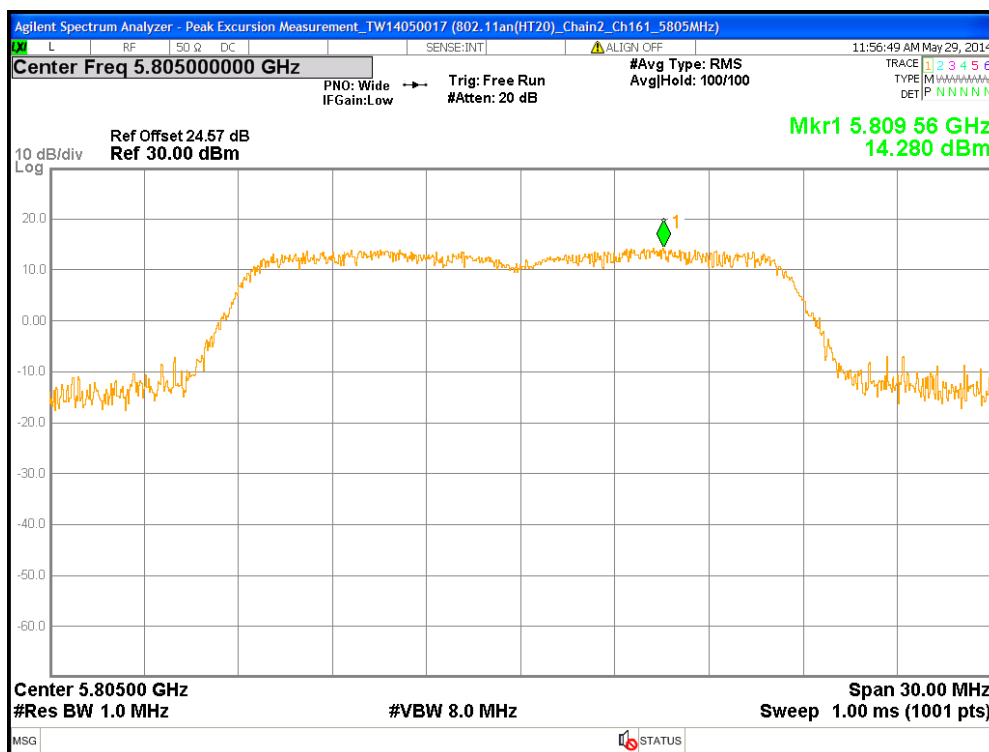
Chain2 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch149



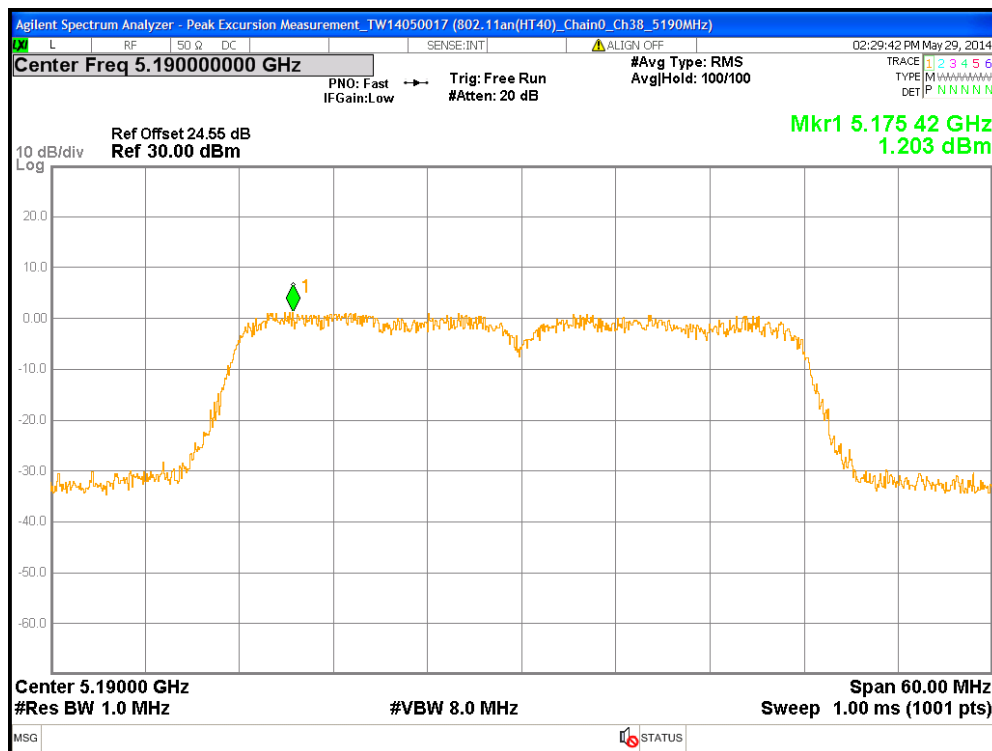
Chain2 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch157



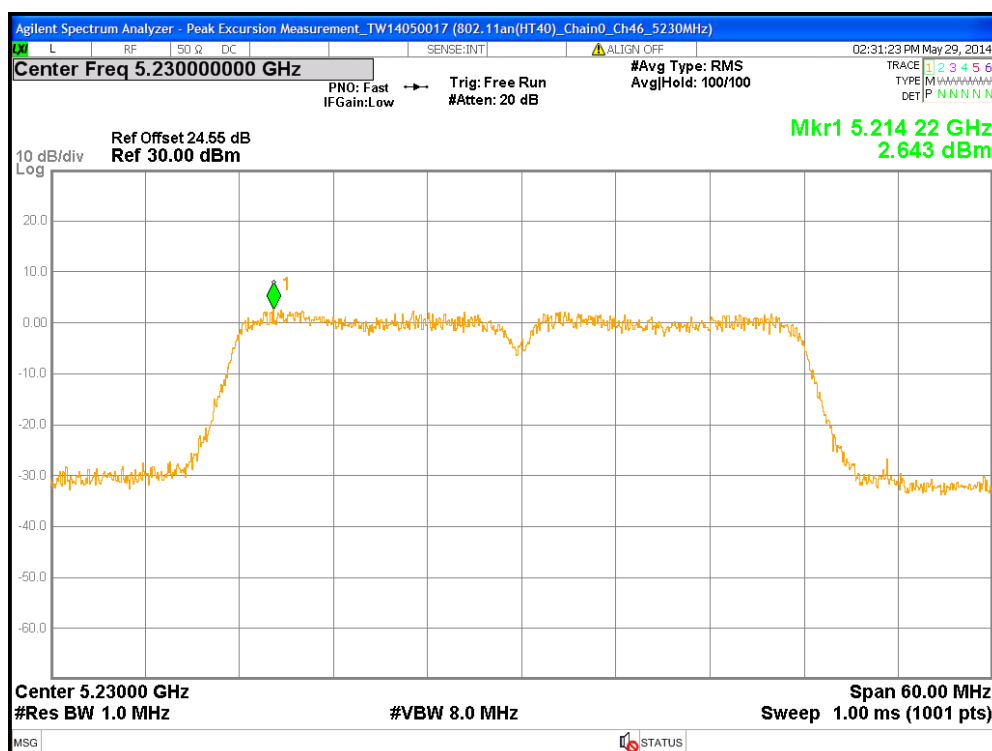
Chain2 : Peak Excursion Measurement @ 802.11n(HT20) Mode Ch161



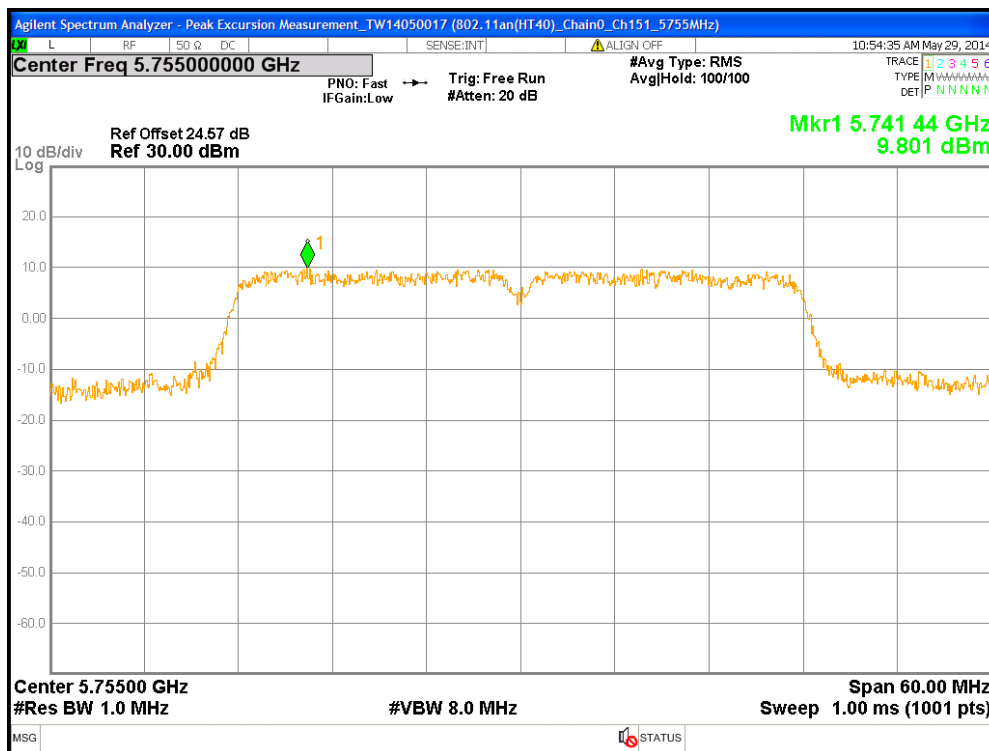
Chain0 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch38



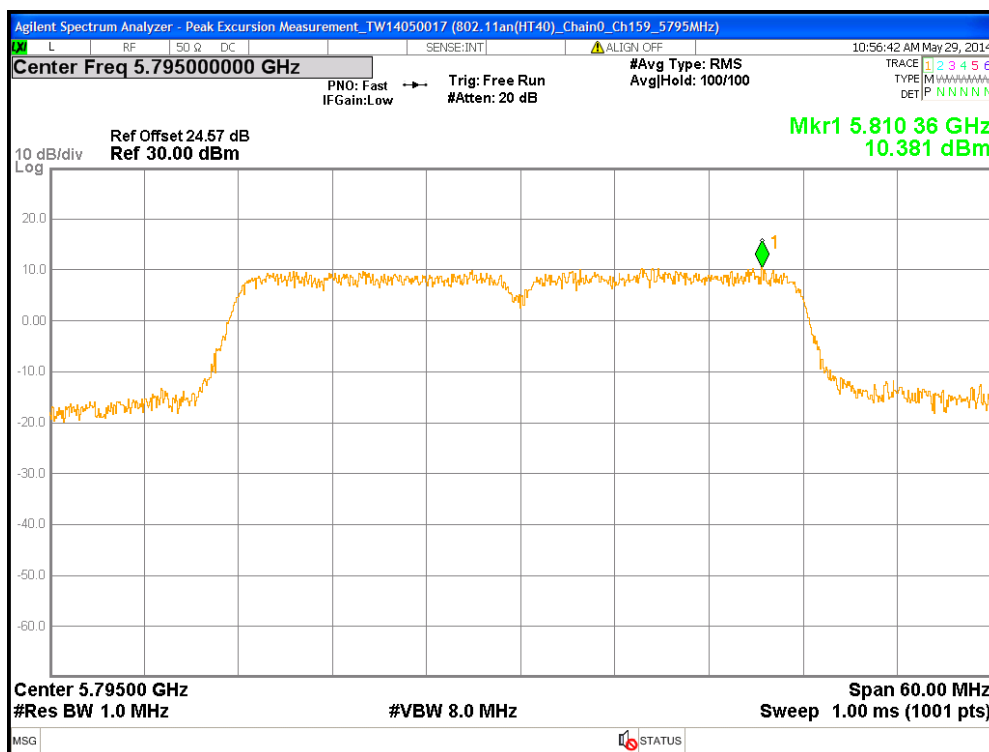
Chain0 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch46



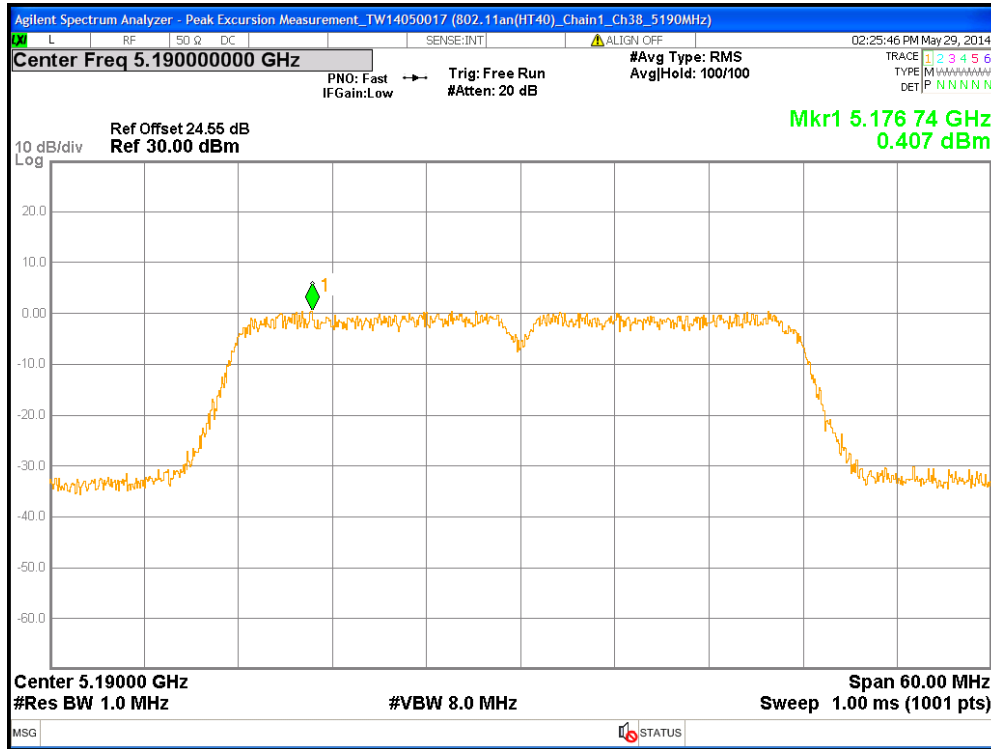
Chain0 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch151



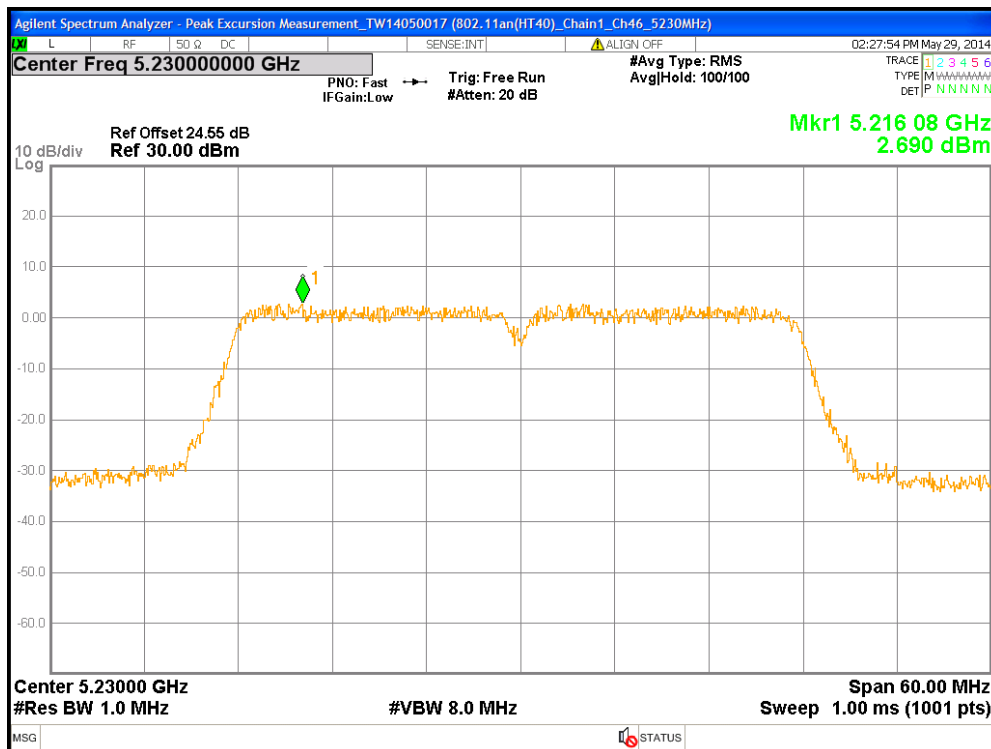
Chain0 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch159



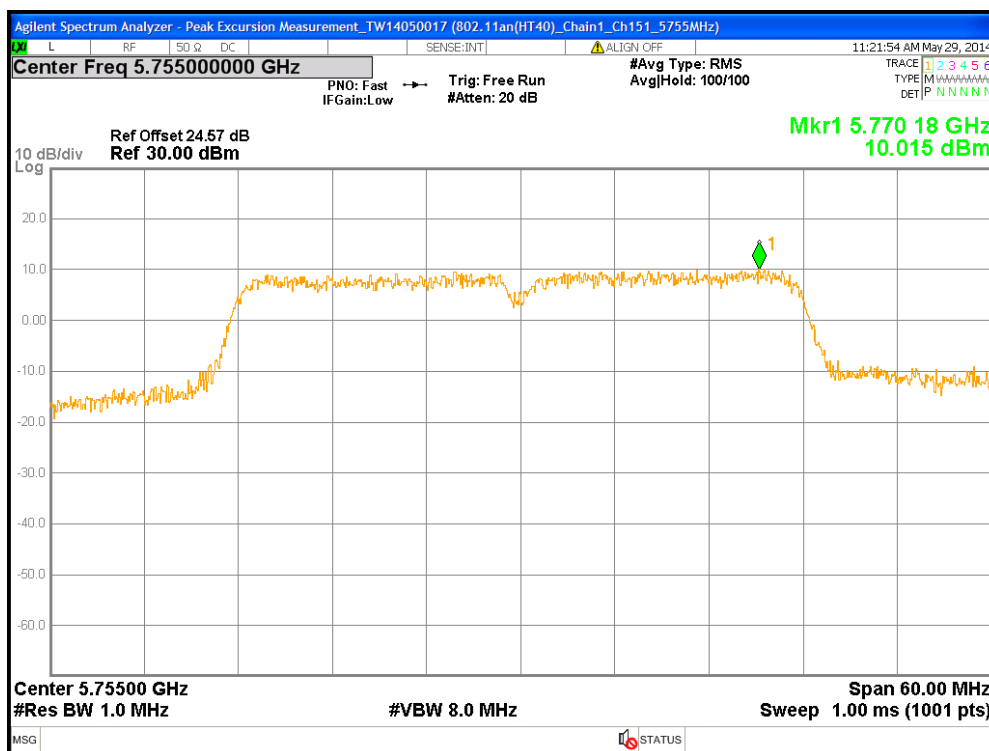
Chain1 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch38



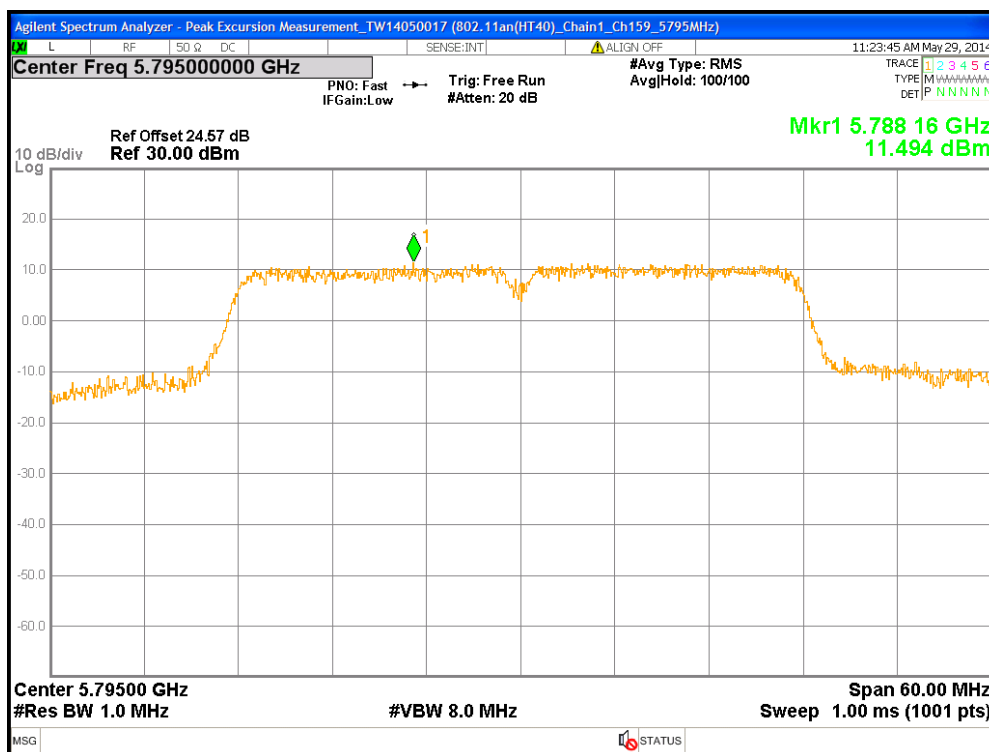
Chain1 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch46



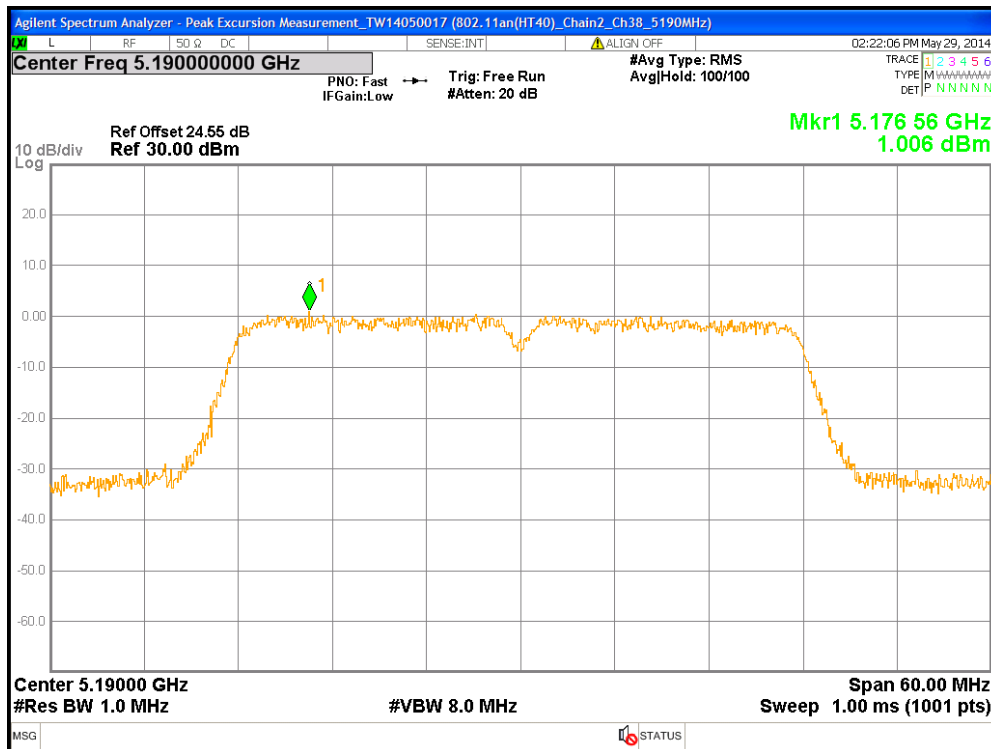
Chain1 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch151



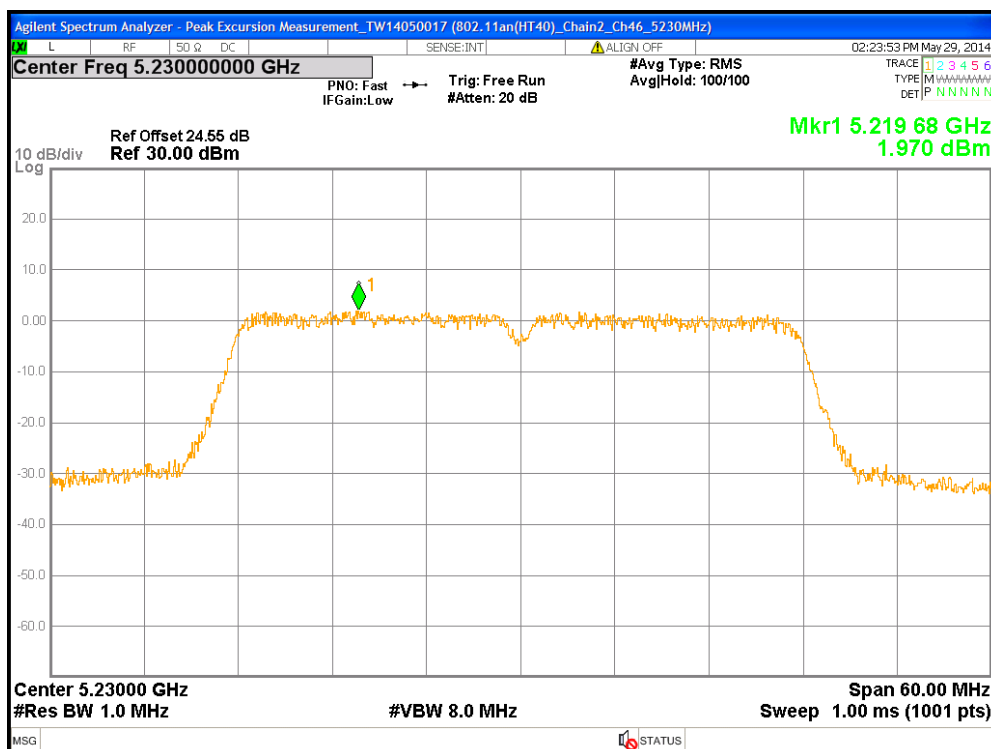
Chain1 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch159



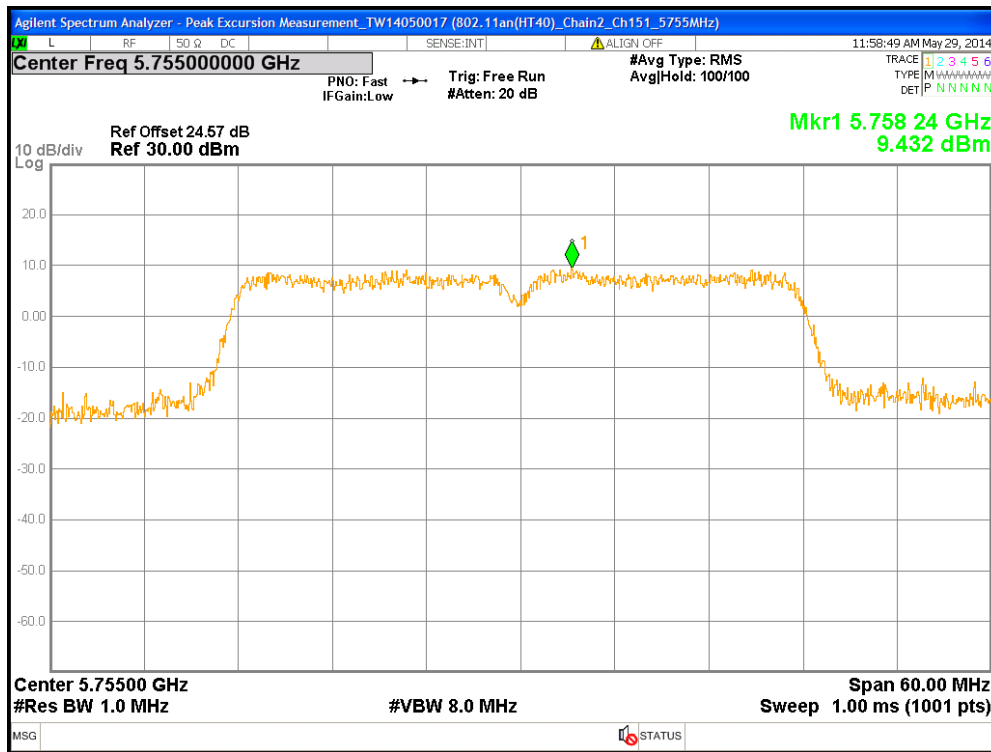
Chain2 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch38



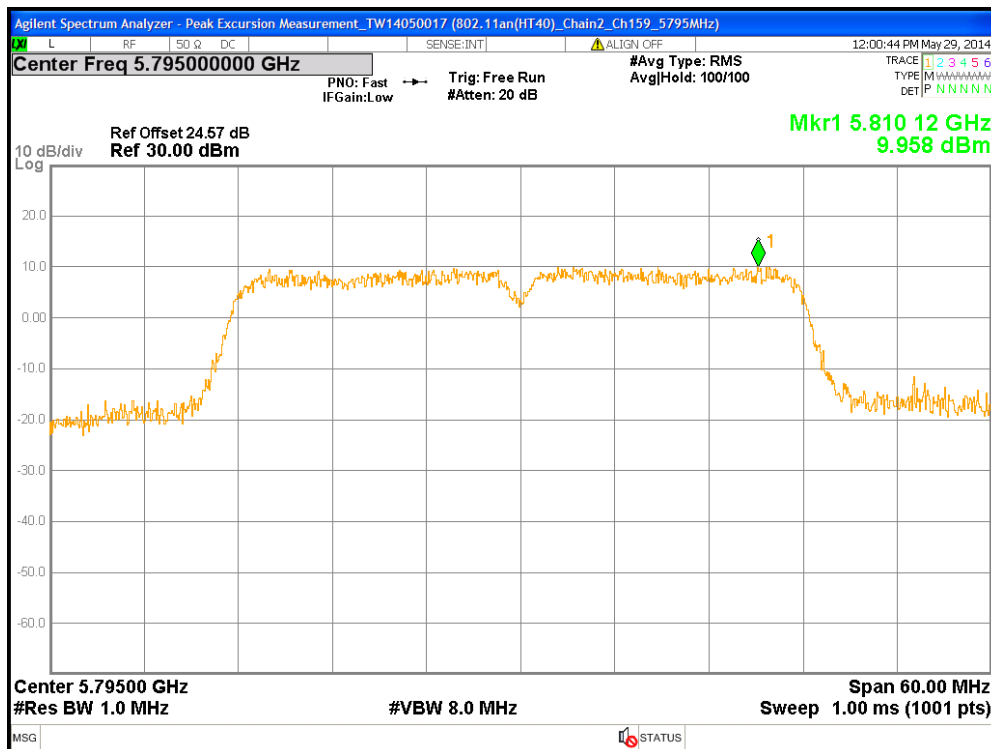
Chain2 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch46



Chain2 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch151



Chain2 : Peak Excursion Measurement @ 802.11n(HT40) Mode Ch159



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

7.1 Operating environment

Temperature:	25	°C
Relative Humidity:	55	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,149,157,161 for 20MHz 38,46,151,159 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	$\geq 3 \times$ 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 diagram

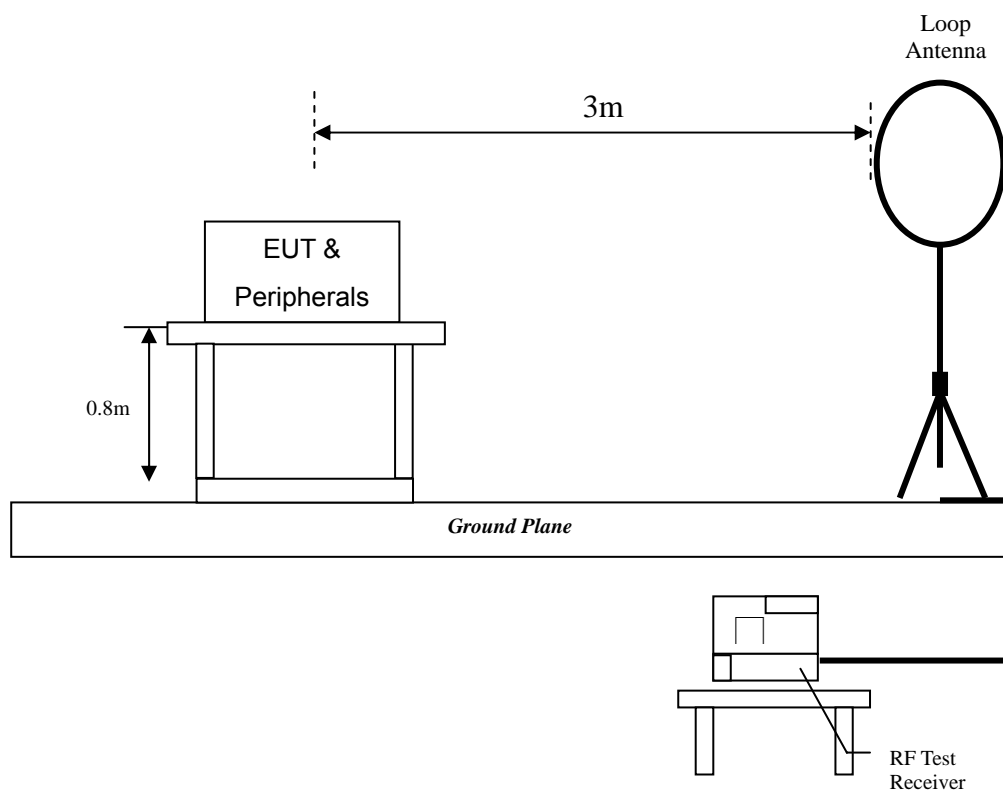
The signal is maximized through rotation and placement in the three orthogonal axes.



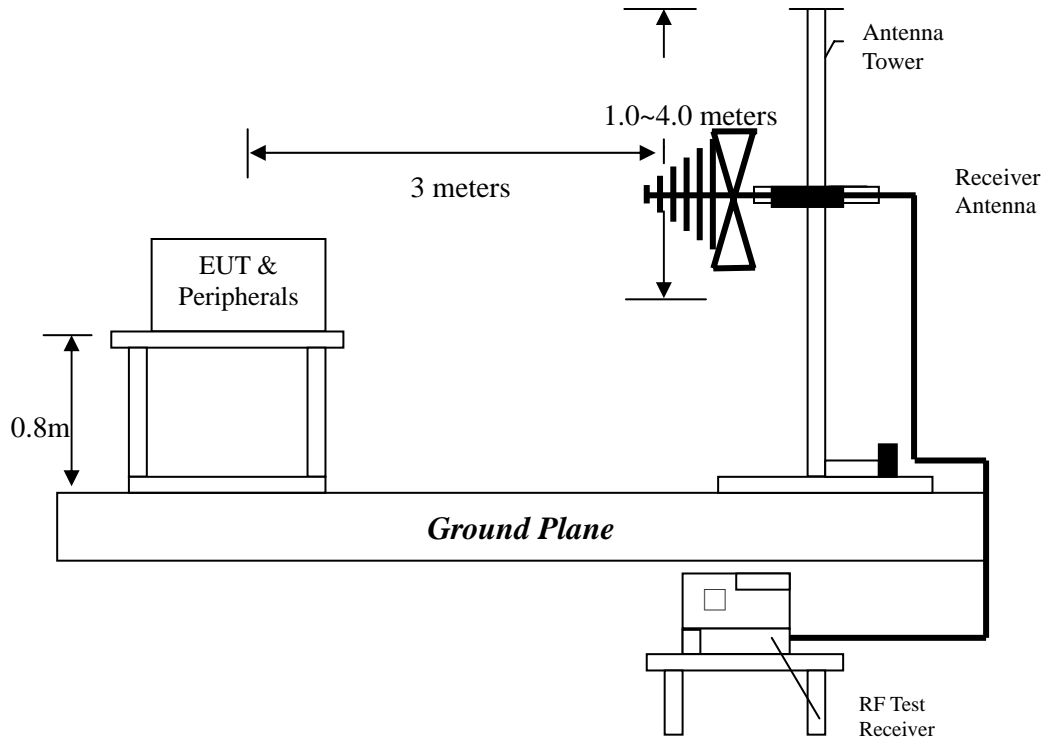
After verifying three axes, we found the maximum electromagnetic field was occurred at Y-plane configuration. The final test data was executed under this configuration.

7.6 Test configuration

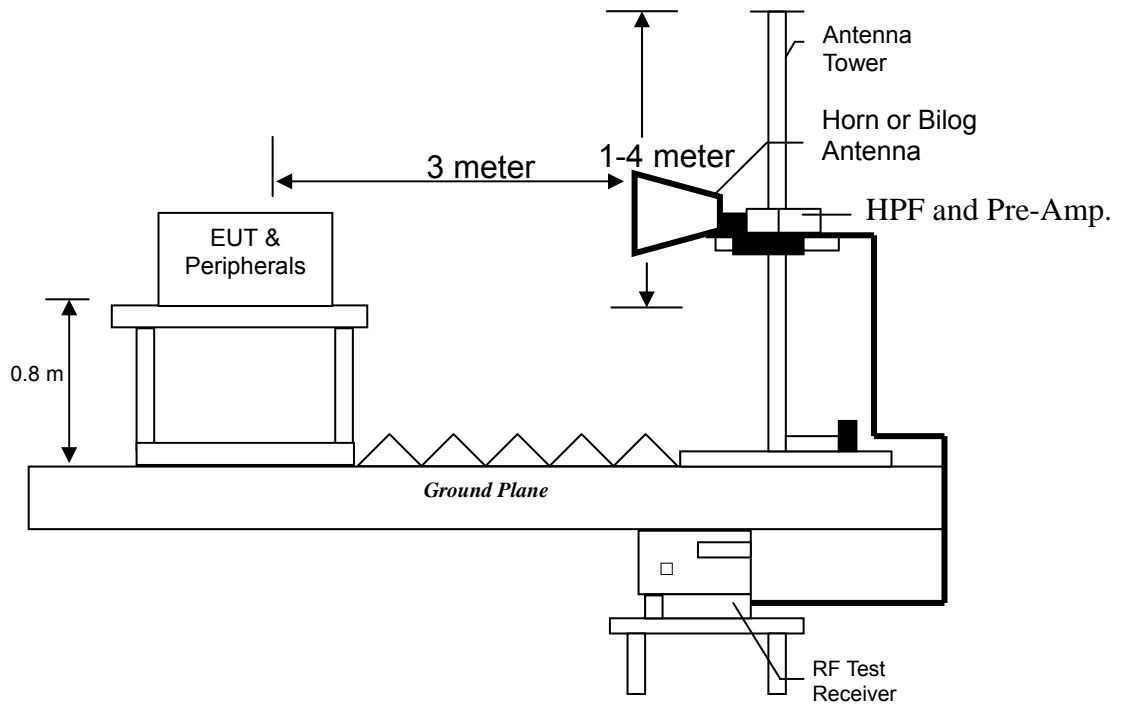
7.6.1 Radiated emission from 9 kHz to 30MHz using Loop Antenna



7.6.2 Radiated emission below 1GHz using Bilog Antenna



7.6.3 Radiated emission above 1GHz using Horn Antenna



7.7 Test results

7.7.1 Measurement results: frequencies from 9 kHz to 30MHz

Frequency (MHz)	Detector	Corrected Factor (dB/m)	Reading (dB μ V)	Calculated (dB μ V/m)	Limit @ 3m (dB μ V/m)	Margin (dB)
0.35	QP	62.50	25.62	88.12	117.00	-28.88
0.71	QP	56.38	-11.84	44.54	70.90	-26.36
25.0	QP	36.40	21.26	57.66	69.54	-11.88

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

7.7.2 Measurement results: frequencies from 30M to 1GHz

The test was performed on EUT under 802.11a/an continuously transmitting mode. The worst case occurred at chain 0: 802.11a Tx channel 48.

EUT : WAP5705
 Worst Case : chain 0: 802.11a Tx channel 48

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	125.06	QP	12.75	24.43	37.18	43.50	-6.32
V	249.22	QP	14.45	23.00	39.04	46.00	-6.96
V	375.32	QP	17.96	23.00	37.15	46.00	-8.85
V	499.48	QP	20.76	23.00	38.88	46.00	-7.12
V	625.58	QP	23.17	23.00	36.17	46.00	-9.83
V	875.84	QP	26.83	23.00	36.35	46.00	-9.65
H	37.76	QP	11.73	23.00	36.69	40.00	-3.31
H	375.32	QP	17.64	23.00	37.87	46.00	-8.13
H	499.48	QP	19.82	23.00	38.04	46.00	-7.96
H	625.58	QP	22.03	23.00	42.92	46.00	-3.08
H	835.10	QP	25.70	23.00	37.90	46.00	-8.10
H	875.84	QP	26.41	21.00	39.14	46.00	-6.86

Remark:

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

7.7.3 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 chain 0 ch36	10360	PK	V	38.94	13.36	44.29	57.65	74.00	-16.35
	10360	AV	V	38.94	13.36	29.71	43.07	54.00	-10.93
	10360	PK	H	38.94	13.36	36.93	50.29	54.00	-3.71
802.11a chain 1 ch36	10360	PK	V	38.94	13.36	40.58	53.94	54.00	-0.06
	10360	PK	H	38.94	13.36	36.94	50.30	54.00	-3.70
802.11a chain 2 ch36	10360	PK	V	38.94	13.36	39.85	53.21	54.00	-0.79
	10360	PK	H	38.94	13.36	36.67	50.03	74.00	-23.97
802.11a chain 0 ch40	10400	PK	V	38.97	13.47	46.22	59.69	74.00	-14.31
	10400	AV	V	38.97	13.47	31.56	45.03	54.00	-8.97
	10400	PK	H	38.97	13.47	38.07	51.54	54.00	-2.46
802.11a chain 1 ch40	10400	PK	V	38.97	13.47	37.47	50.94	54.00	-3.06
	10400	PK	H	38.97	13.47	36.61	50.08	54.00	-3.92
802.11a chain 2 ch40	10400	PK	V	38.97	13.47	38.43	51.90	54.00	-2.10
	10400	PK	H	38.97	13.47	36.61	50.08	54.00	-3.92
802.11a chain 0 ch48	10480	PK	V	39.03	13.71	46.11	59.82	74.00	-14.18
	10480	AV	V	39.03	13.71	31.83	45.54	54.00	-8.46
	10480	PK	H	39.03	13.71	47.62	61.33	74.00	-12.67
	10480	AV	H	39.03	13.71	31.93	45.64	54.00	-8.36
802.11a chain 1 ch48	10480	PK	V	39.03	13.71	39.65	53.36	54.00	-0.64
	10480	PK	H	39.03	13.71	42.60	56.31	74.00	-17.69
	10480	AV	H	39.03	13.71	27.27	40.98	54.00	-13.02
802.11a chain 2 ch48	10480	PK	V	39.03	13.71	40.26	53.97	54.00	-0.03
	10480	PK	H	39.03	13.71	44.20	57.91	74.00	-16.09
	10480	AV	H	39.03	13.71	28.20	41.91	54.00	-12.09
802.11a chain 0 ch149	11490	PK	V	39.04	15.54	38.23	53.77	54.00	-0.23
	11490	PK	H	39.04	15.54	46.90	62.44	74.00	-11.56
	11490	AV	H	39.04	15.54	32.00	47.54	54.00	-6.46
802.11a chain 1 ch149	11490	PK	V	39.04	15.54	38.39	53.93	54.00	-0.07
	11490	PK	H	39.04	15.54	47.98	63.52	74.00	-10.48
	11490	AV	H	39.04	15.54	33.20	48.74	54.00	-5.26
802.11a chain 2 ch149	11490	PK	V	39.04	15.54	38.38	53.92	54.00	-0.08
	11490	PK	H	39.04	15.54	47.32	62.86	74.00	-11.14
	11490	AV	H	39.04	15.54	32.36	47.90	54.00	-6.10
802.11a chain 0 ch157	11570	PK	V	39.01	15.39	38.36	53.75	54.00	-0.25
	11570	PK	H	39.01	15.39	47.10	62.49	74.00	-11.51
	11570	AV	H	39.01	15.39	32.40	47.79	54.00	-6.21
802.11a chain 1 ch157	11570	PK	V	39.01	15.39	37.64	53.03	54.00	-0.97
	11570	PK	H	39.01	15.39	48.93	64.32	74.00	-9.68
	11570	AV	H	39.01	15.39	33.81	49.20	54.00	-4.80
802.11a chain 2 ch157	11570	PK	V	39.01	15.39	37.88	53.27	54.00	-0.73
	11570	PK	H	39.01	15.39	47.39	62.78	74.00	-11.22
	11570	AV	H	39.01	15.39	33.07	48.46	54.00	-5.54
802.11a chain 0 ch161	11620	PK	V	38.99	15.28	43.10	58.38	74.00	-15.62
	11620	AV	V	38.99	15.28	27.96	43.24	54.00	-10.76
	11620	PK	H	38.99	15.28	46.83	62.11	74.00	-11.89
	11620	AV	H	38.99	15.28	30.96	46.24	54.00	-7.76
802.11a chain 1 ch161	11620	PK	V	38.99	15.28	38.68	53.96	54.00	-0.04
	11620	PK	H	38.99	15.28	48.31	63.59	74.00	-10.41
	11620	AV	H	38.99	15.28	32.33	47.61	54.00	-6.39
802.11a chain 2 ch161	11620	PK	V	38.99	15.28	37.89	53.17	54.00	-0.83
	11620	PK	H	38.99	15.28	48.49	63.77	74.00	-10.23
	11620	AV	H	38.99	15.28	33.08	48.36	54.00	-5.64

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) ch36	10360	PK	V	38.94	13.36	37.88	51.24	54.00	-2.76
	10360	AV	V	38.94	13.36	37.69	51.05	54.00	-2.95
802.11n (HT20) ch40	10400	PK	V	38.97	13.47	43.84	57.31	74.00	-16.69
	10400	AV	V	38.97	13.47	27.06	40.53	54.00	-13.47
	10400	PK	H	38.97	13.47	41.15	54.62	74.00	-19.38
	10400	AV	H	38.97	13.47	26.90	40.37	54.00	-13.63
802.11n (HT20) ch48	10480	PK	V	39.03	13.71	44.14	57.85	74.00	-16.15
	10480	AV	V	39.03	13.71	28.36	42.07	54.00	-11.93
	10480	PK	H	39.03	13.71	39.98	53.69	74.00	-20.31
802.11n (HT20) ch149	11490	PK	V	39.04	15.54	41.48	57.02	74.00	-16.98
	11490	AV	V	39.04	15.54	26.18	41.72	54.00	-12.28
	11490	PK	H	39.04	15.54	46.57	62.11	74.00	-11.89
	11490	AV	H	39.04	15.54	30.96	46.50	54.00	-7.50
802.11n (HT20) ch157	11570	PK	V	39.01	15.39	38.22	53.61	54.00	-0.39
	11570	PK	H	39.01	15.39	46.81	62.20	74.00	-11.80
	11570	AV	H	39.01	15.39	31.26	46.65	54.00	-7.35
802.11n (HT20) ch161	11620	PK	V	38.99	15.28	38.58	53.86	54.00	-0.14
	11620	PK	H	38.99	15.28	47.02	62.30	74.00	-11.70
	11620	AV	H	38.99	15.28	31.52	46.80	54.00	-7.20
802.11n (HT40) ch38	10380	PK	V	38.95	13.41	37.37	50.78	54.00	-3.22
	10380	PK	H	38.95	13.41	36.68	50.09	54.00	-3.91
802.11n (HT40) ch46	10460	PK	V	39.01	13.65	38.79	52.44	54.00	-1.56
	10460	PK	H	39.01	13.65	39.43	53.08	54.00	-0.92
802.11n (HT40) ch151	11510	PK	V	39.04	15.53	36.98	52.51	54.00	-1.49
	11510	PK	H	39.04	15.53	45.17	60.70	74.00	-13.30
	11510	AV	H	39.04	15.53	27.90	43.43	54.00	-10.57
802.11n (HT40) ch159	11590	PK	V	39.00	15.35	37.48	52.83	54.00	-1.17
	11590	PK	H	39.00	15.35	45.33	60.68	74.00	-13.32
	11590	AV	H	39.00	15.35	28.07	43.42	54.00	-10.58

Remark:

Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

8. Emission on The Band Edge

8.1 Operating environment

Temperature:	25	°C
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Requirement	15.407(b)(1)/(2)/(3)/(6), 15.209	
Channel	36	

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	2310~2390MHz
	2483.5 ~2500MHz
Attenuation	Auto

8.3 Test procedure

The test procedure is the same as clause 7.4

8.4 Test Result

Mode	Freq. (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dB μ V)	Corrected Reading (dB μ V/m)	Limit @ 3 m (dB μ V/m)	Margin (dB)	Restricted band (MHz)
802.11a ch36 chain0	5150	PK	H	39.30	1.49	50.73	52.22	74	-21.78	4500~5150
	5150	AV	H	39.30	1.49	38.32	39.81	54	-14.19	
	5180	PK	H	39.20	1.65	100.69	102.34	-	102.34	-
	5180	AV	H	39.20	1.65	83.06	84.71	-	84.71	
802.11a ch36 chain1	5150	PK	H	39.30	1.49	57.27	58.76	74	-15.24	4500~5150
	5150	AV	H	39.30	1.49	40.46	41.95	54	-12.05	
	5180	PK	H	39.20	1.65	103.79	105.44	-	105.44	-
	5180	AV	H	39.20	1.65	85.30	86.95	-	86.95	
802.11a ch36 chain2	5150	PK	H	39.30	1.49	55.38	56.87	74	-17.13	4500~5150
	5150	AV	H	39.30	1.49	37.47	38.96	54	-15.04	
	5180	PK	H	39.20	1.65	101.46	103.11	-	103.11	-
	5180	AV	H	39.20	1.65	76.83	78.48	-	78.48	
802.11n (HT20) ch36	5150	PK	H	39.30	1.49	60.68	62.17	74	-11.83	4500~5150
	5150	AV	H	39.30	1.49	41.64	43.13	54	-10.87	
	5180	PK	H	39.20	1.65	105.60	107.25	-	107.25	-
	5180	AV	H	39.20	1.65	83.89	85.54	-	85.54	
802.11n (HT40) ch38	5150	PK	H	39.30	1.49	72.32	73.81	74	-0.19	4500~5150
	5150	AV	H	39.30	1.49	48.32	49.81	54	-4.19	
	5190	PK	H	39.17	1.71	103.37	105.08	-	105.08	-
	5190	AV	H	39.17	1.71	70.03	71.74	-	71.74	

9. Power Line Conducted Emission

9.1 Operating environment

Temperature:	20	°C
Relative Humidity:	55	%
Atmospheric Pressure	1008	hPa
Requirement	15.207	
Channel number	1	

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

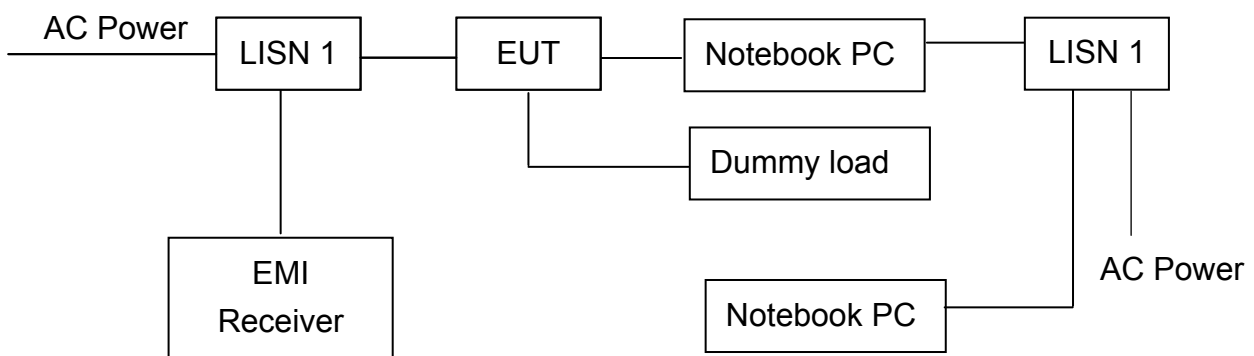
9.3 Measuring instrument setting

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 50U_h/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.

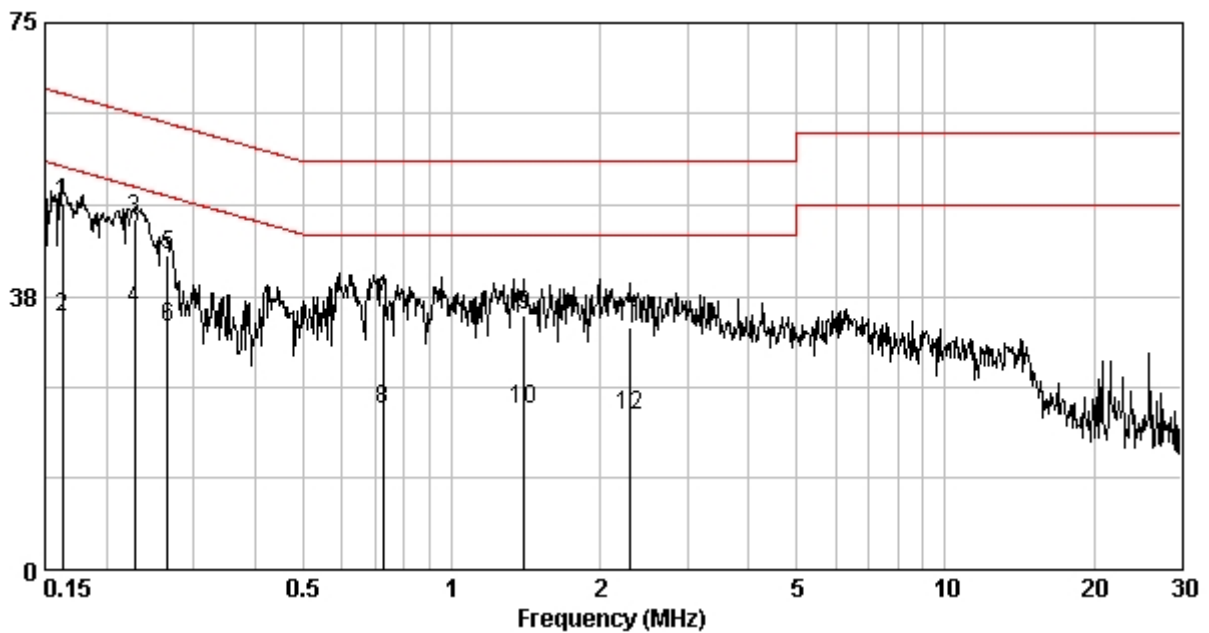
9.6 Test results

Phase : Line
 EUT : WAP5705
 Test Condition : Normal mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Over Limit (dB)	
						Qp	Av
0.162	9.55	50.26	65.34	34.52	55.34	-15.08	-20.82
0.228	9.57	48.20	62.52	35.83	52.52	-14.33	-16.70
0.266	9.58	43.12	61.25	33.15	51.25	-18.13	-18.10
0.727	9.61	36.44	56.00	22.07	46.00	-19.56	-23.93
1.403	9.65	34.85	56.00	21.93	46.00	-21.15	-24.07
2.297	9.69	33.24	56.00	21.26	46.00	-22.76	-24.74

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dB) = Level (dBuV) – Limit (dBuV)

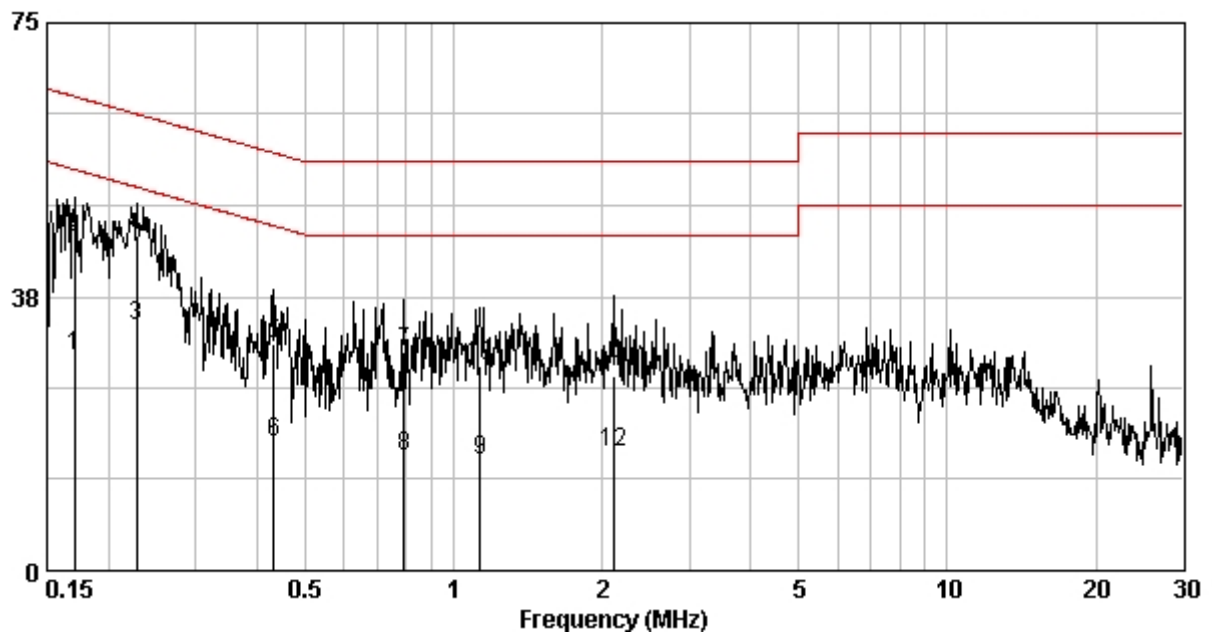


Phase : Neutral
 EUT : WAP5705
 Test Condition : Normal mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Over Qp (dB)	Limit Av (dB)
0.170	9.55	45.66	64.94	29.51	54.94	-19.28	-25.44
0.228	9.56	45.86	62.52	33.44	52.52	-16.67	-19.09
0.433	9.59	31.08	57.20	17.50	47.20	-26.12	-29.70
0.792	9.62	29.97	56.00	15.56	46.00	-26.03	-30.44
1.129	9.63	27.91	56.00	15.23	46.00	-28.09	-30.77
2.110	9.67	26.66	56.00	16.12	46.00	-29.34	-29.88

Remark:

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



10. Frequency Stability

10.1 Operating environment

Temperature:	0~45	°C
Relative Humidity:	55	%
Atmospheric Pressure	1008	hPa
Requirement	15.407(g)	
Channel number	1	

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.

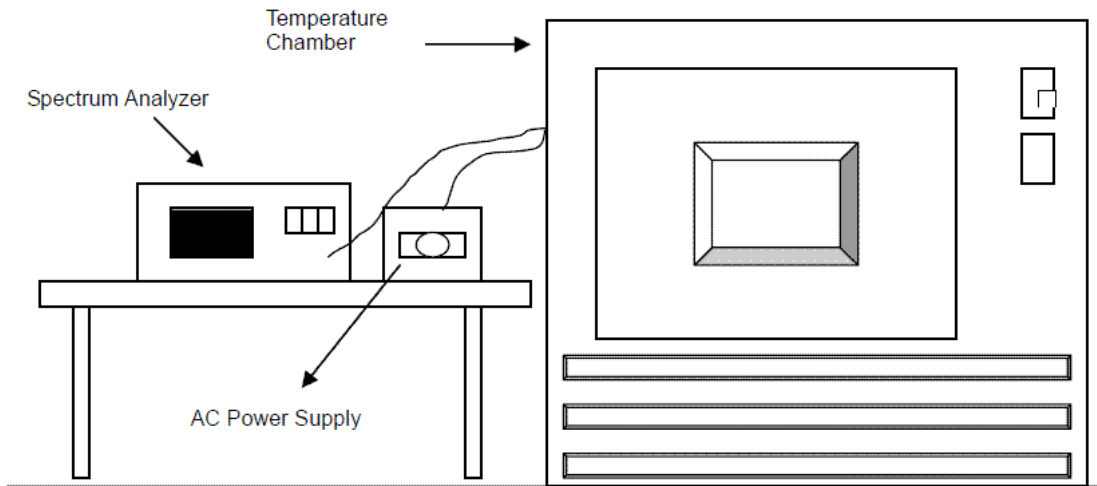
10.3 Measuring instrument setting

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)
126.50	5189.9976
110.00	5189.9975
93.50	5190.0030
Max. Deviation (MHz)	0.003000
Max. Deviation (ppm)	0.58

Temperature V.S. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
0	5190.0003
10	5189.9887
20	5190.9963
30	5190.9956
40	5189.9977
45	5190.9887
Max. Deviation (MHz)	0.011300
Max. Deviation (ppm)	2.18

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 Sensor	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



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 $k=2$.