RF TEST REPORT

Test item	:	Mobile Phone
Model No.	:	KYL22
Order No.	:	DEMC1309-02848
Date of receipt	:	2013-09-10
Test duration	:	2013-09-20 ~ 2013-10-14
Date of issue	:	2013-10-18
Use of report	:	FCC Original Grant

Applicant : KYOCERA Corporation
2-1-1 Kagahara, Tsuzuki-ku, Yokohama-Shi, Kanagawa 224-8502, Japan

Test laboratory : Digital EMC Co., Ltd.
683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-080, Korea

Test specification	:	FCC Part 15.407 Subpart E ANSI C63.10-2009, KDB 789033v01r03
Test environment	:	See appended test report
Test result	:	☒ Pass ☐ Fail

Tested by:	Witnessed by:	Reviewed by:
Engineer JaeJin Lee	N/A	Deputy General Manager WonJung Lee

Test Report Version

Test Report No.	Date	Description
DRTFCC1310-0995	Oct. 18, 2013	Initial issue

CONTENTS

1.EUT information

1.1 EUT description

FCC Equipment Class	Unlicensed National Information Infrastructure(UNII)	
Product	Mobile Phone	
Model Name	KYL22	
Add Model Name	-	
Equipment serial no.	Identical prototype	
Frequency Range	802.11a/n/ac(20MHz) :	Band I: 5180 MHz ~ 5240 MHz Band II: 5260 MHz ~ 5320 MHz Band III: 5500 MHz ~ 5700 MHz
	802.11n/ac(40MHz) :	Band I: 5190 MHz ~ 5230 MHz Band II: 5270 MHz ~ 5310 MHz Band III: 5510 MHz ~ 5670 MHz
	802.11ac(80MHz) :	Band I: 5210 MHz Band II: 5290 MHz Band III: 5530 MHz
Channels	802.11a/n/ac(20MHz): 802.11n/ac(40MHz): 802.11ac(80MHz):	4 (Band I) / 4 (Band II) / 8 (Band III) 2 (Band I) / 2 (Band II) / 3 (Band III) 1 (Band I) / 1 (Band II) /1 (Band III)
Modulation type	OFDM	
Data rate	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n(20MHz): 6.5/7.2, 13/14.4, 19.5/21.7, 26/28.9, 39/43.3, 52/57.8, 58.5/65, 65/72.2 Mbps 802.11n(40MHz): 13.5/15, 27/30, 40.5/45, 54/60, 81/90, 108/120, 121.5/135, 135/150 Mbps 802.11ac(20MHz):6.5/7.2, 13/14.4, 19.5/21.7, 26/28.9, 39/43.3, 52/57.8, 58.5/65, 65/72.2, 78/86.6 Mbps 802.11ac(40MHz): 13.5/15, 27/30, 40.5/45, 54/60, 81/90, 108/120, 121.5/135, 135/150, 162/180, 180/200 Mbps 802.11ac(80MHz): 29.3/32.5, 58.5/65, 87.8/97.5, 117/130, 175.5/195, 234/260, 263.3/292.5, 292.6/325, 351/390, 390/433.3 Mbps	
Antenna Specification	InternalAntenna(1TX / 1RX) Max. peak gain: 0dBi	
Power Supply	DC 3.8V	

1.2 Ancillary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

2. Information about test items

2.1 Test mode

5GHz Band	Test mode	
	IEEE 802.11 modes	Data Rate
Band I	802.11a	6Mbps
	802.11n(HT20)	6.5/7.2Mbps (MCS0)
	802.11n(HT40)	13.5/15Mbps (MCS0)
	802.11ac(VHT80)	29.3/32.5Mbps (MCS0)
Band II	802.11a	6Mbps
	802.11n(HT20)	6.5/7.2Mbps (MCS0)
	802.11n(HT40)	13.5/15Mbps (MCS0)
	802.11ac(VHT80)	29.3/32.5Mbps (MCS0)
Band III	802.11a	6Mbps
	802.11n(HT20)	6.5/7.2Mbps (MCS0)
	802.11n(HT40)	13.5/15Mbps (MCS0)
	802.11ac(VHT80)	29.3/32.5Mbps (MCS0)

For all test items, the low, middle and high channels of each mode were tested with above worst case data rate.
And the 802.11ac(VHT20/VHT40) are equivalent to the 802.11n(HT20/HT40).
Therefore, no additional measurements of 802.11ac(VHT20/VHT40) were required.

2.2Test Channel Information

5GHz Band	802.11a/n(20MHz)		802.11n(40MHz)		802.11ac(80MHz)	
	Channel	Frequency [MHz]	Channel	Frequency [MHz]	Channel	Frequency [MHz]
Band I	36	5180	38	5190	42	5210
	40	5200	-	-	-	-
	48	5240	46	5230	-	-
Band II	52	5260	54	5270	58	5290
	60	5300	-	-	-	-
	64	5320	62	5310	-	-
Band III	100	5500	102	5510	106	5530
	116	5580	110	5550	-	-
	140	5700	134	5670	-	-

2.3Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

2.4 Tested environment

Temperature	:	23 ~ 24°C
Relative humidity content	:	41 ~ 48 % R.H.
Details of power supply	:	DC 3.8V

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing
→ None

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	RSS Section(s)	Parameter	Limit	Test Condition	Status Note 1
I. Transmitter Mode (TX)					
15.407(a)	N/A	Emission Bandwidth (26 dB Bandwidth)	N/A	Conducted	C
15.407(a)	RSS-210 [A9.2]	Maximum Conducted Output Power	5150 ~ 5250MHz For FCC 50mW or<4 + 10log$_{10}$(B) dBm, whichever power is less. 5150 ~ 5250MHz For IC 200mWor <10 + 10log$_{10}$(B) dBm, whichever power is less. 5250 ~ 5350MHz For FCC & IC 250mWor<11 + 10log$_{10}$(B) dBm, whichever power is less. 5470 ~ 5725MHz For FCC & IC 250mW or<11 + 10log$_{10}$(B) dBm, whichever power is less.		C
15.407(a)	RSS-210 [A9.2]	Peak Power Spectral Density	5150 ~ 5250MHz For FCC: 4dBm/MHz 5150 ~ 5250MHz For IC: 10dBm/MHz 5250 ~ 5350MHz For FCC & IC: 11dBm/MHz 5470 ~ 5725MHz For FCC & IC: 11dBm/MHz		C
15.407(a)	N/A	Peak Excursion	< 13 dB/MHz maximum difference		C
15.407(g)	N/A	Frequency Stability	N/A		C
-	RSS Gen [4.6.1]	Occupied Bandwidth (99%)	N/A		C
15.407(b)	RSS-210 [A9.2]	Undesirable Emissions	< -27 dBm/MHz EIRP	Radiated	C
15.205 15.209 15.407(b)	RSS-Gen [7.2.5]	General Field Strength Limits(Restricted Bands and RadiatedEmission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		C Note.2
15.407(h)	RSS-210 [A9.3]	Dynamic Frequency Selection	See DFS test report	-	C Note.3
15.207	RSS-Gen [7.2.4]	AC Conducted Emissions	FCC 15.207	AC Line Conducted	C
15.203	RSS-Gen [7.1.2]	Antenna Requirements	FCC 15.203	-	C

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable

Note 2: These test items were performed in each axis and the worst case data was reported.

Note 3: For DFS testing, please refer to DFS test report.

3.2 Transmitter requirements

3.2.1 26 dBBandwidth

Test Requirements

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The 26dB bandwidth is used to determine the conducted output power limit.

▣TEST CONFIGURATION

Refer to the APPENDIX I.

▣TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer and used following test procedure of **KDB789033 v01r03**.

1. Set resolution bandwidth (RBW) = approximately **1 %** of the EBW.
2. Set the video bandwidth **(VBW) >RBW**.
3. Detector = **Peak**.
4. Trace mode = **max hold**.

Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

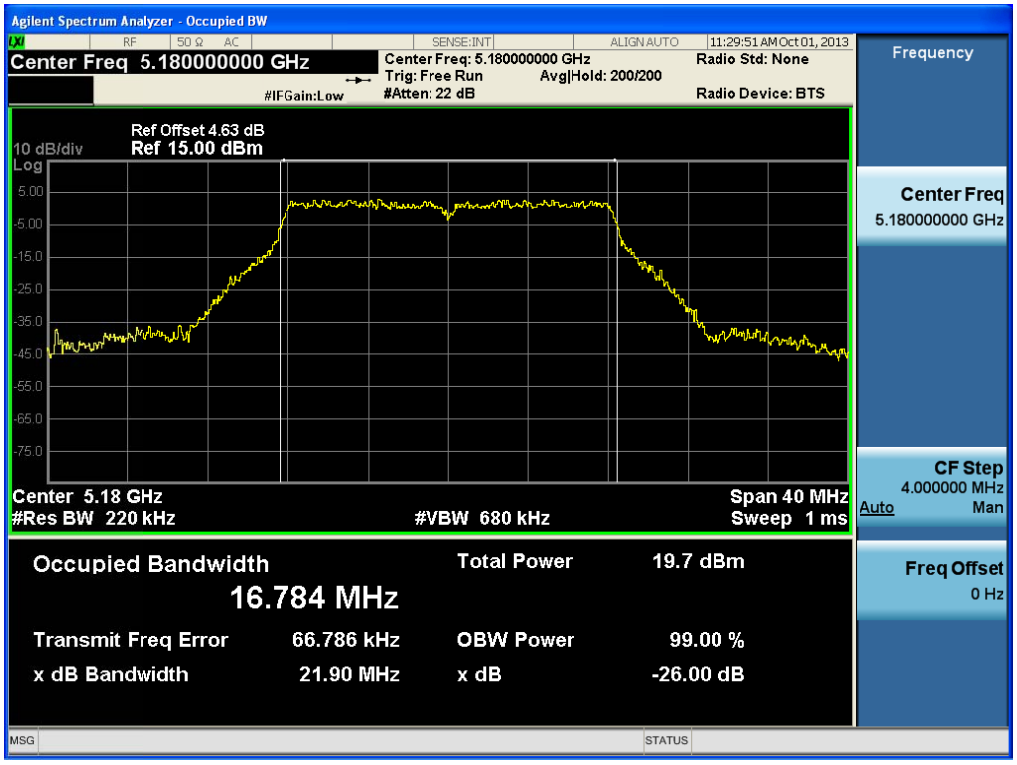
▣TEST RESULTS: Comply

Test Mode	Band	Channel	Frequency[MHz]	Test Result[MHz]
802.11a	Band I	36	5180	21.900
		40	5200	21.900
		48	5240	21.690
	Band II	52	5260	22.060
		60	5300	21.660
		64	5320	21.800
	Band III	100	5500	21.560
		116	5580	21.890
		140	5700	21.830
802.11n (HT20)	Band I	36	5180	22.280
		40	5200	22.050
		48	5240	22.240
	Band II	52	5260	22.320
		60	5300	22.350
		64	5320	22.140
	Band III	100	5500	22.130
		116	5580	22.260
		140	5700	22.490
802.11n (HT40)	Band I	38	5190	42.560
		46	5230	42.720
	Band II	54	5270	42.960
		62	5310	42.970
	Band III	102	5510	43.040
		110	5550	43.090
		134	5670	42.770
802.11ac (VHT80)	Band I	42	5210	83.900
	Band II	58	5290	84.060
	Band III	106	5530	83.290

▣RESULT PLOTS

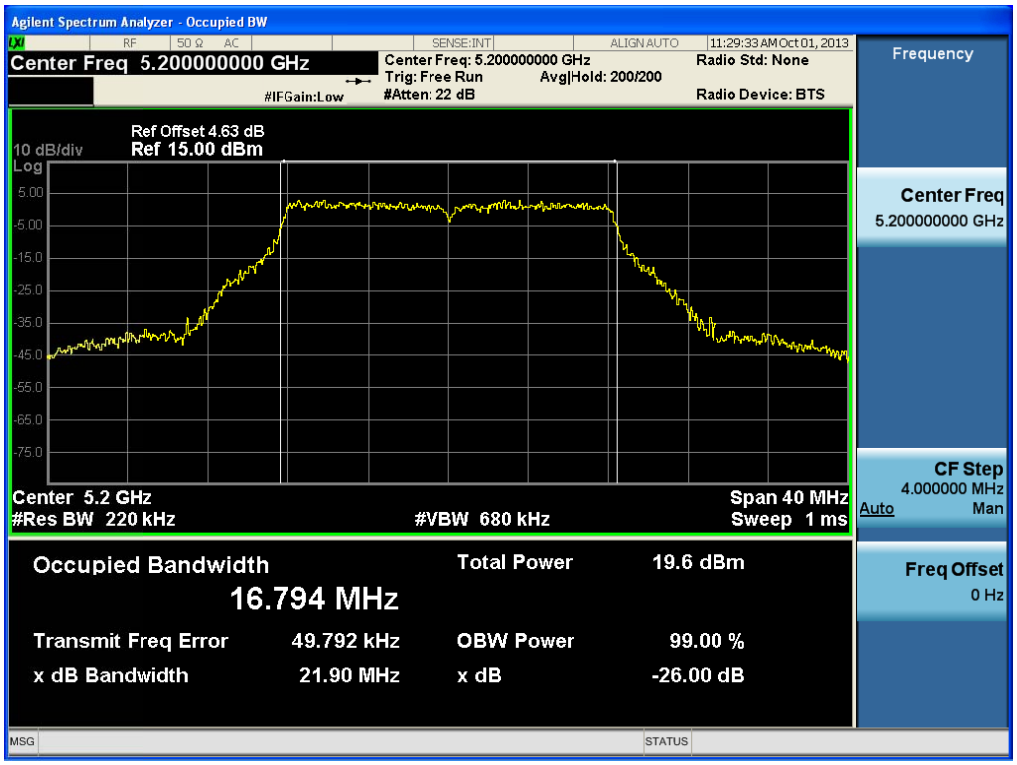
26 dBBandwidth

Test Mode: 802.11a & Ch.36



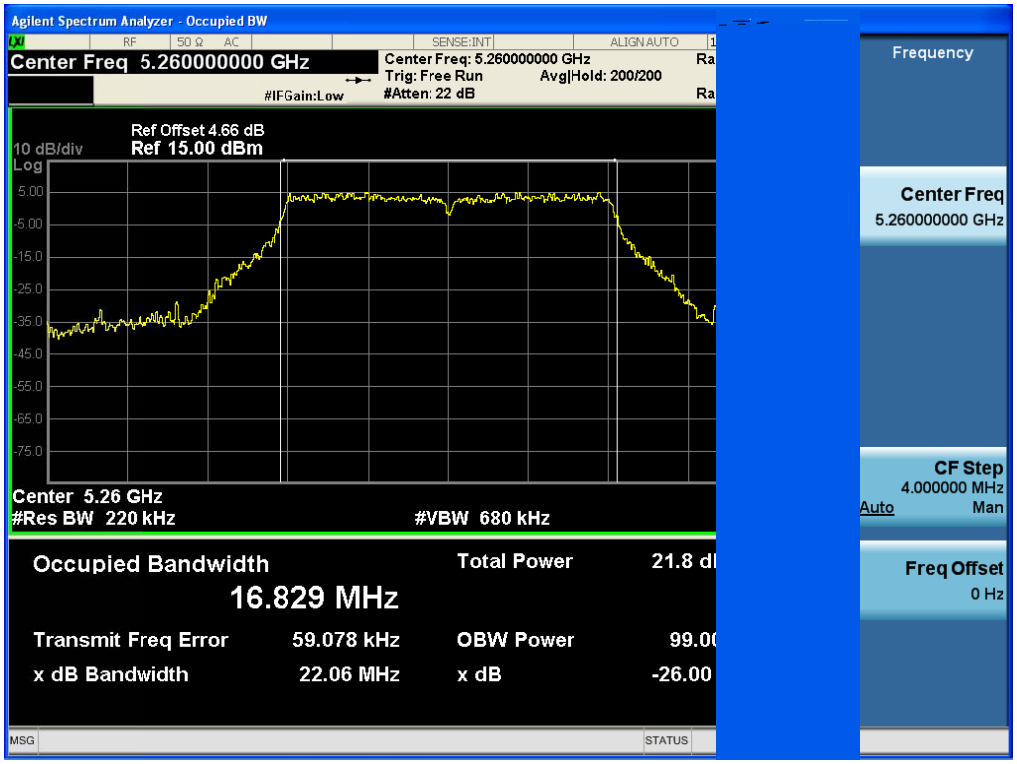
26 dBBandwidth

Test Mode: 802.11a& Ch.40



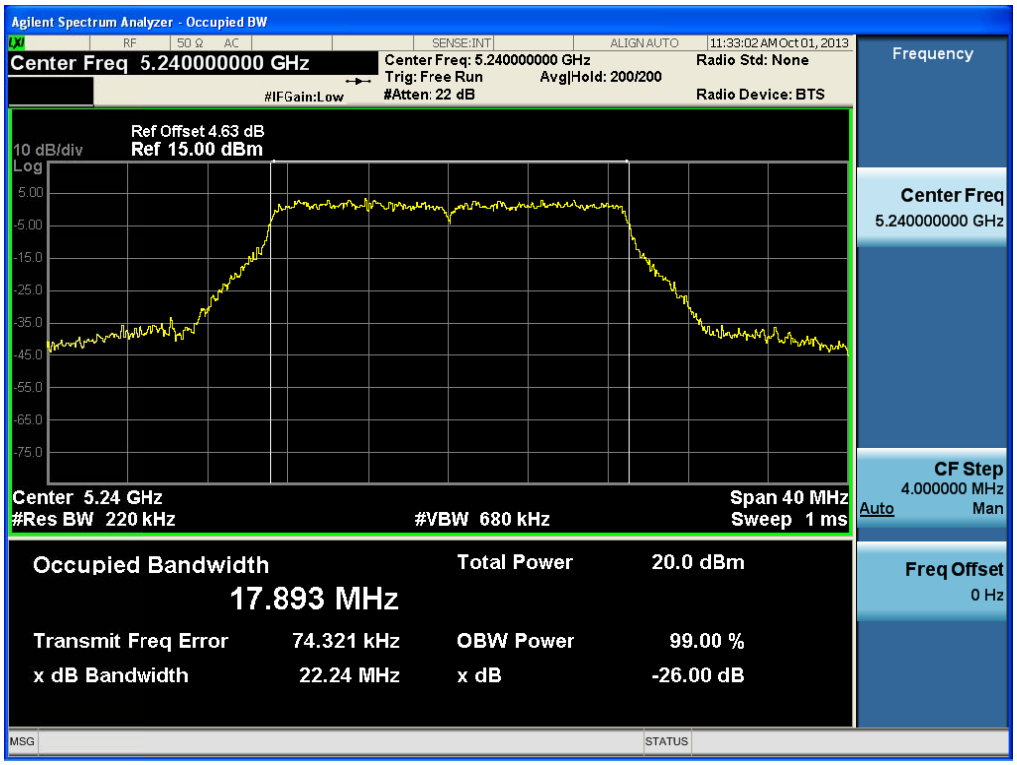
26 dBBandwidth Test Mode: 802.11a& Ch.48

26 dBBandwidth Test Mode: 802.11a& Ch.52

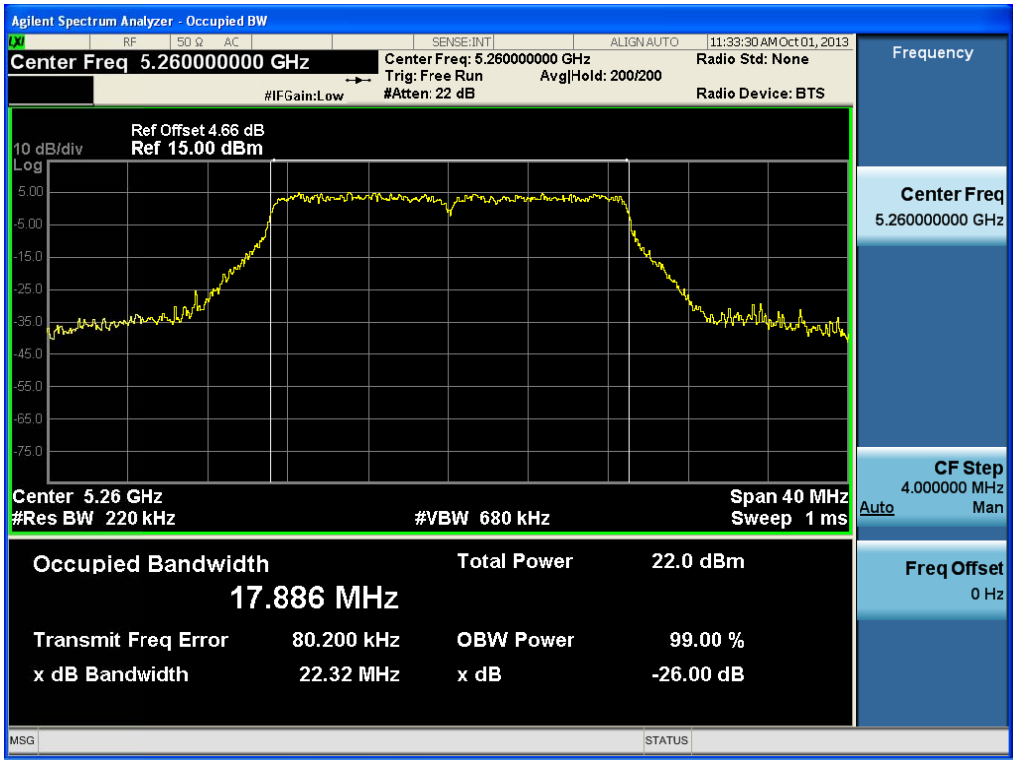


26 dBBandwidth Test Mode: 802.11a&Ch.60

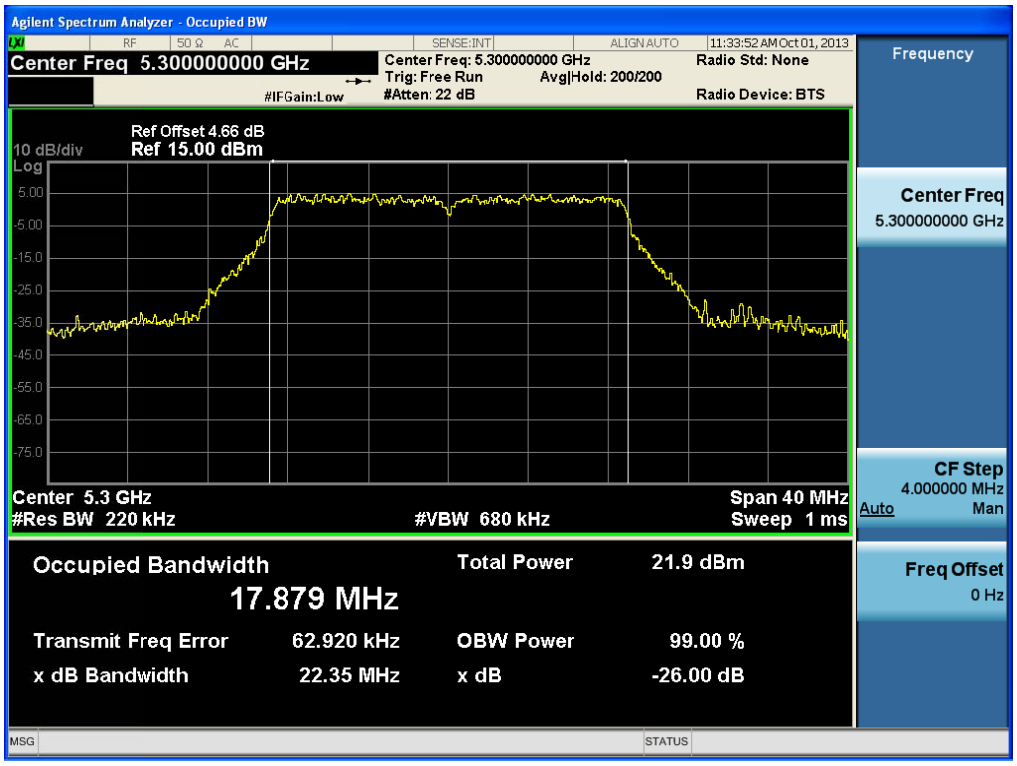
26 dBBandwidth Test Mode: 802.11n(HT20)& Ch.48



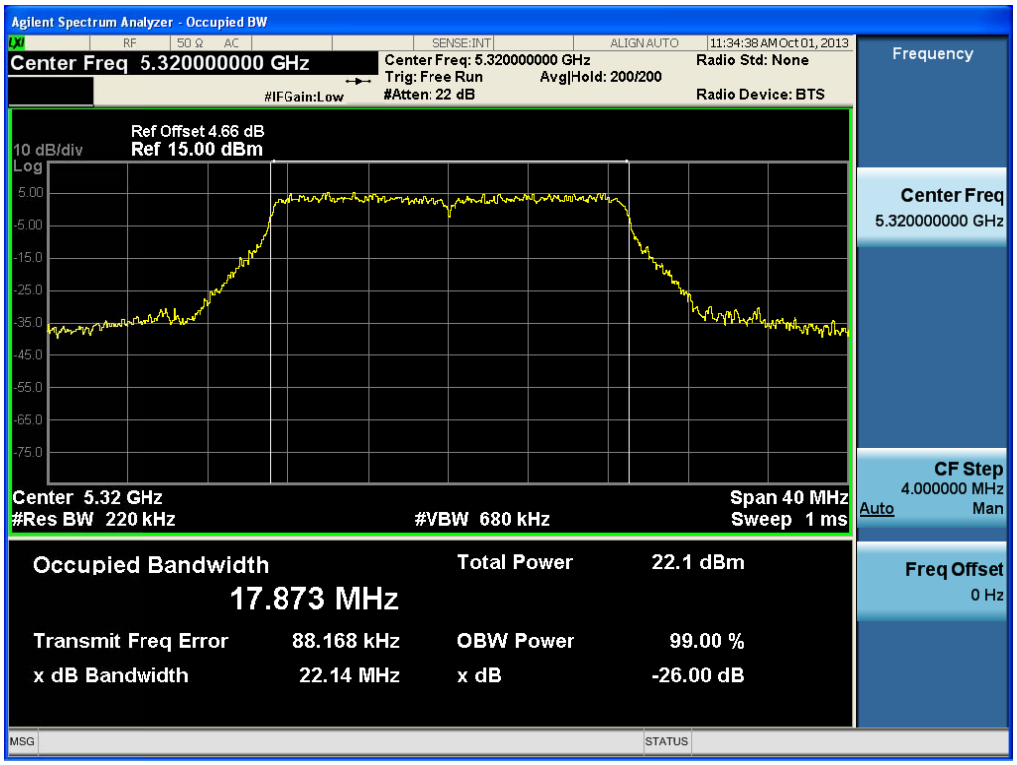
26 dBBandwidth Test Mode: 802.11n(HT20)& Ch.52



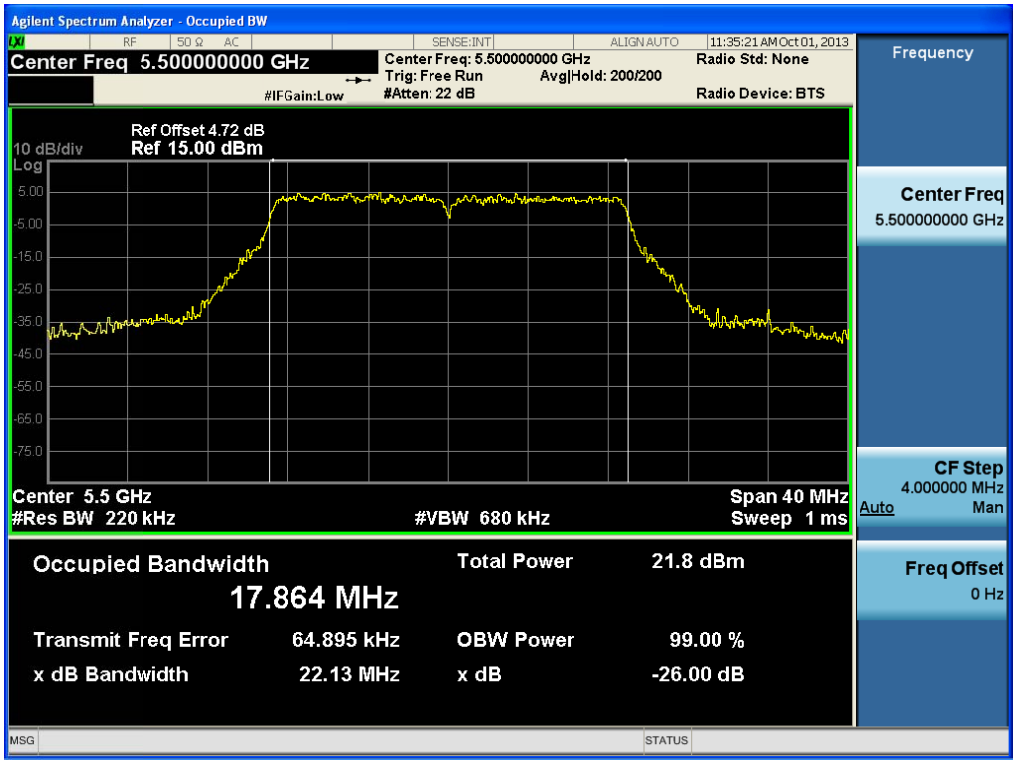
26 dBBandwidth Test Mode: 802.11n(HT20)&Ch.60



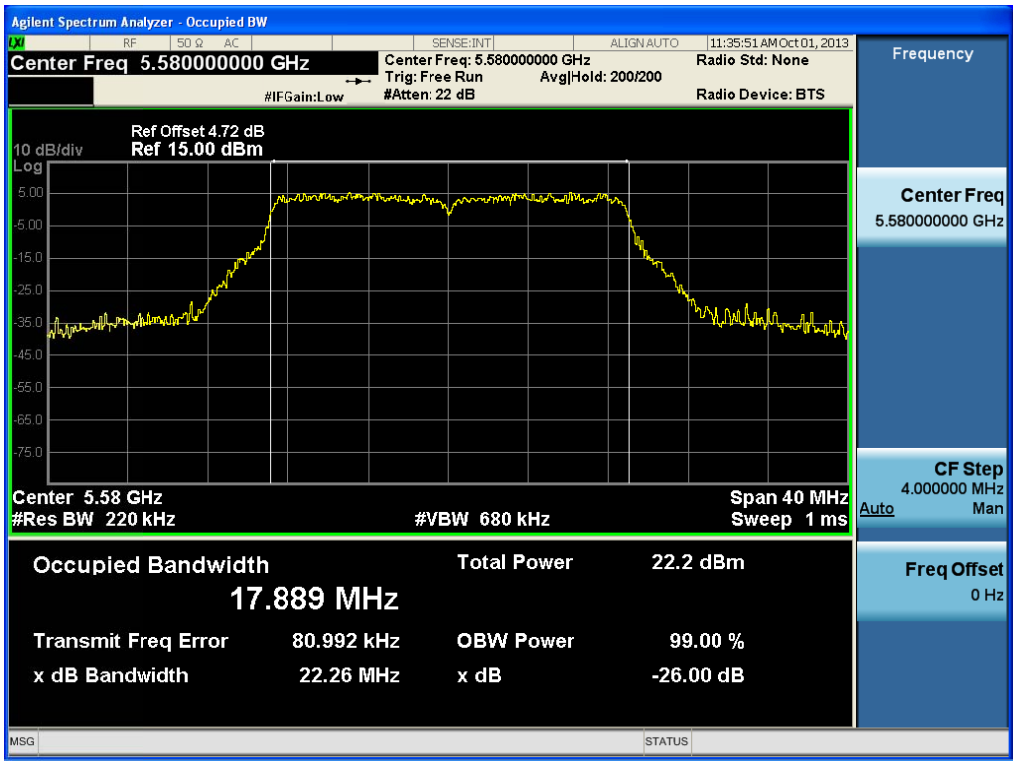
26 dBBandwidth Test Mode: 802.11n(HT20)& Ch.64



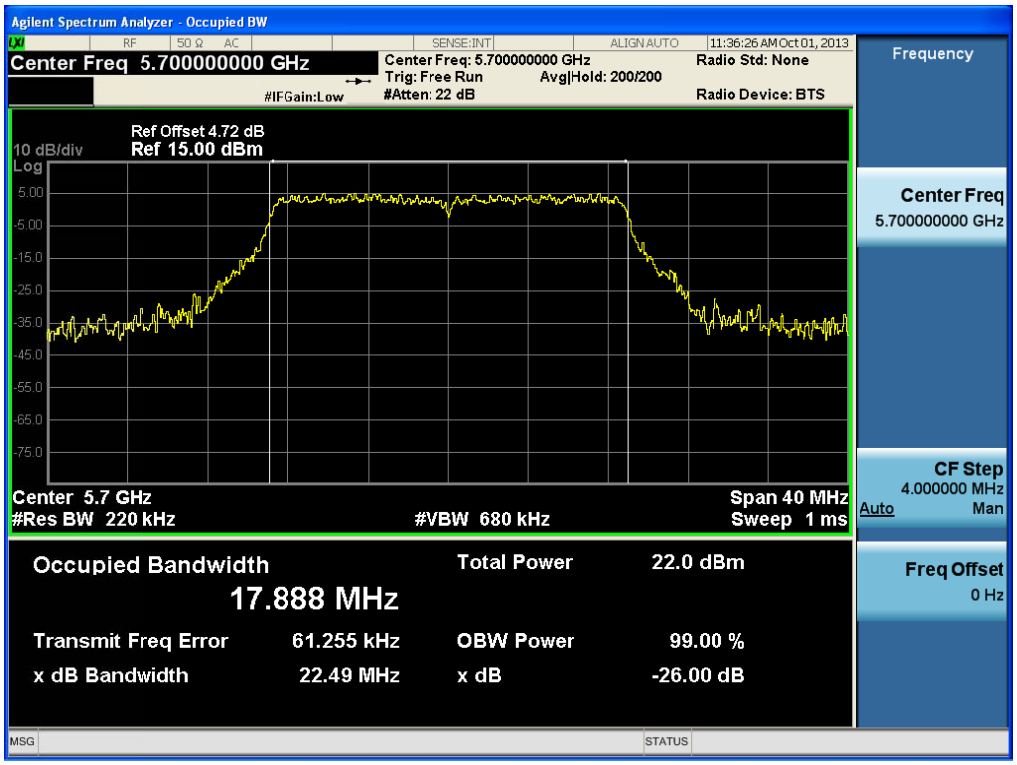
26 dBBandwidth Test Mode: 802.11n(HT20)& Ch.100



26 dBBandwidth Test Mode: 802.11n(HT20)&Ch.116

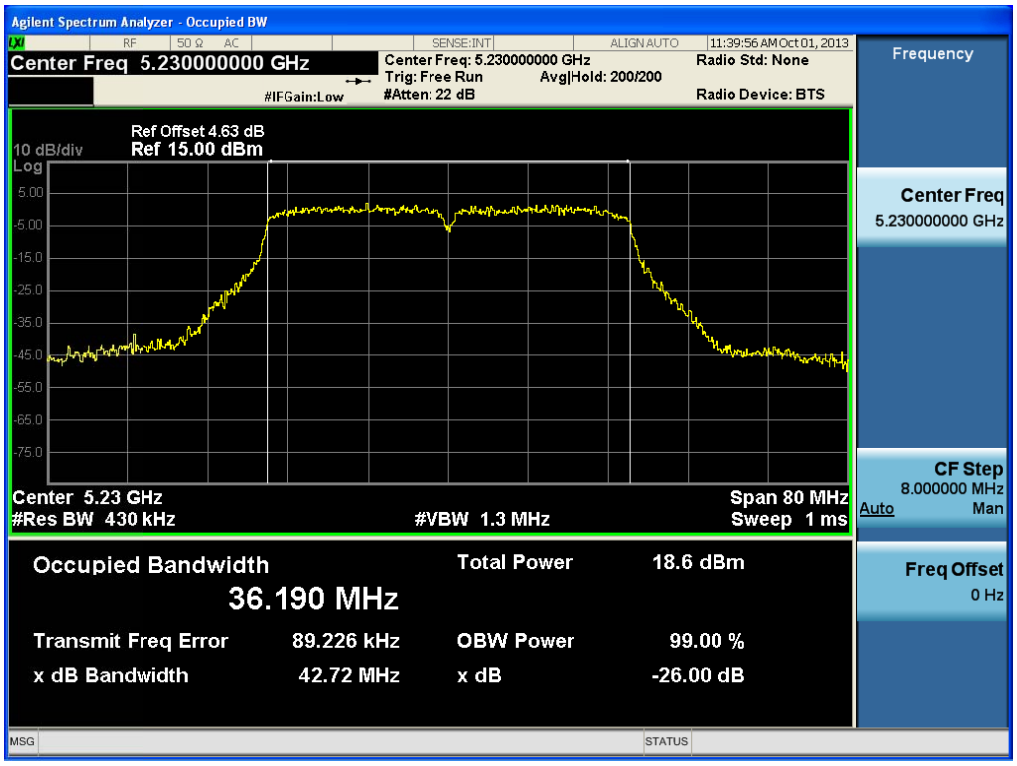


26 dBBandwidth Test Mode: 802.11n(HT20)& Ch.140

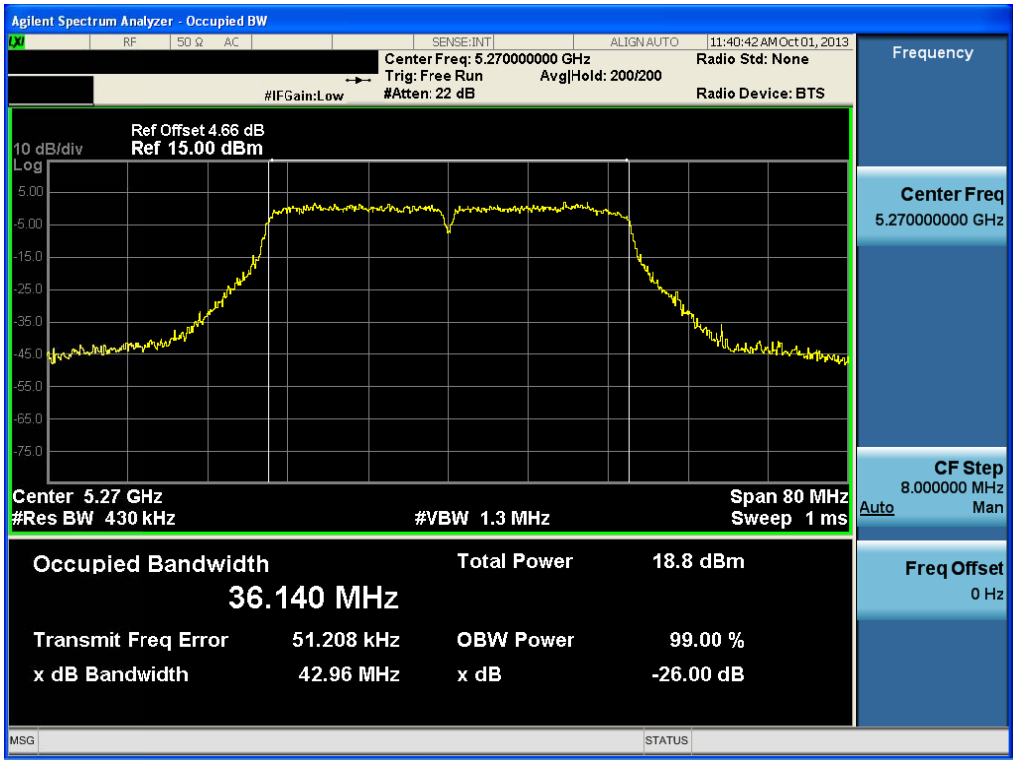


26 dBBandwidth Test Mode: 802.11n(HT40)& Ch.38

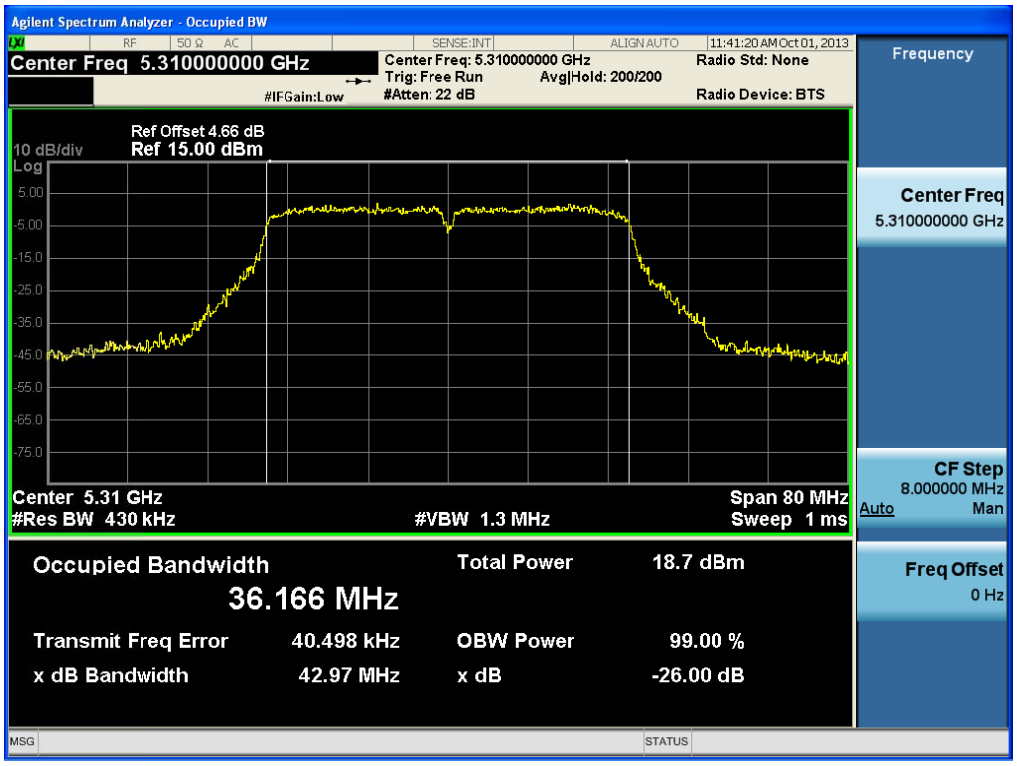
26 dBBandwidth Test Mode: 802.11n(HT40)& Ch.46



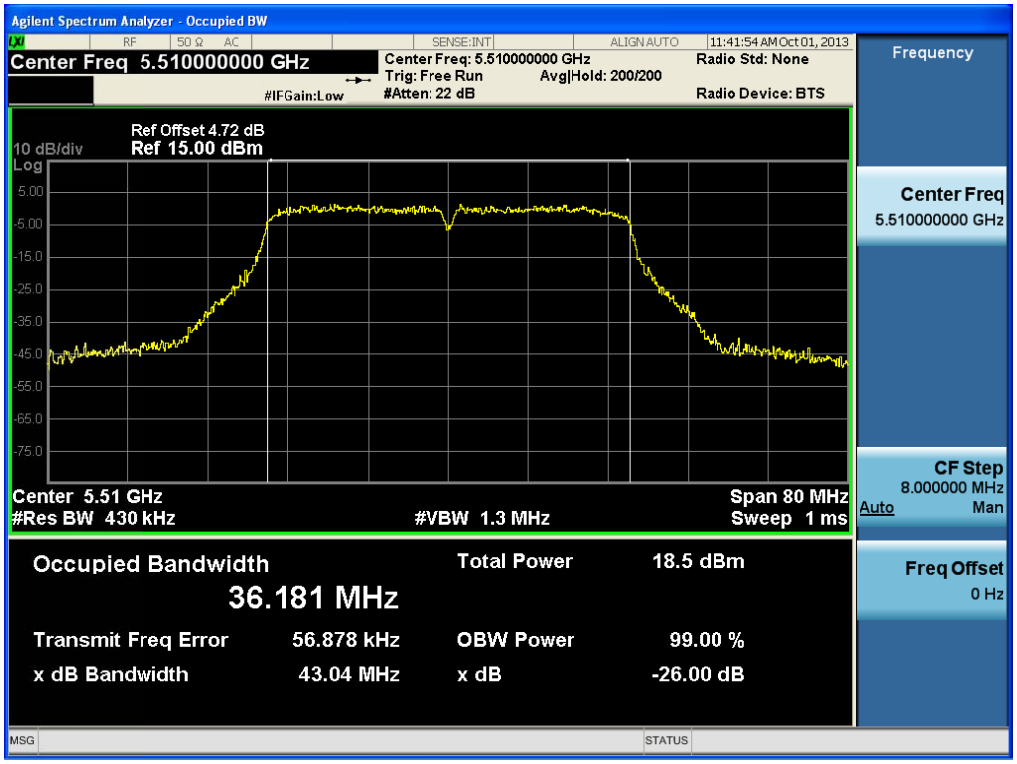
26 dBBandwidth Test Mode: 802.11n(HT40)& Ch.54



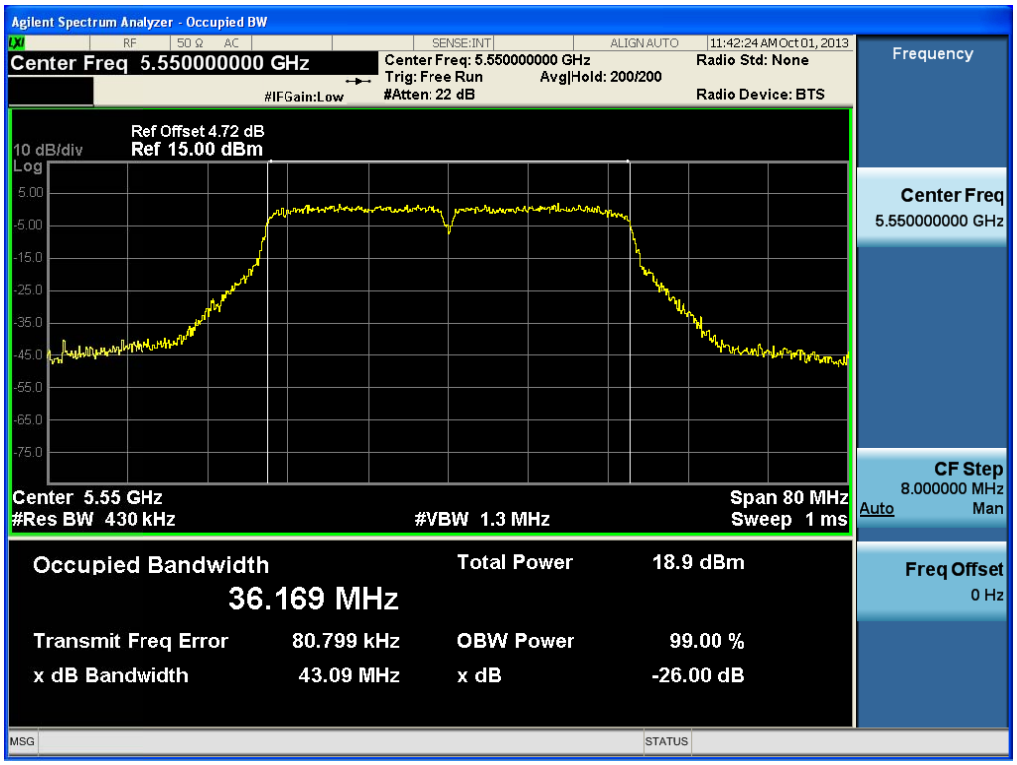
26 dBBandwidth Test Mode: 802.11n(HT40)& Ch.62



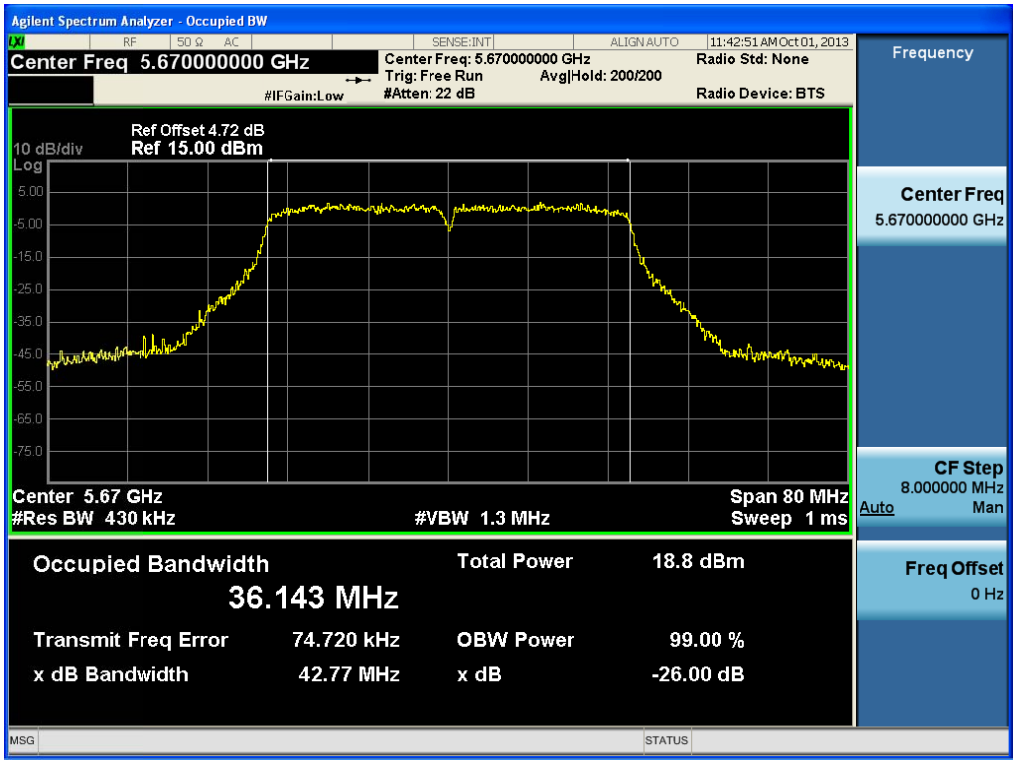
26 dBBandwidth Test Mode: 802.11n(HT40)& Ch.102



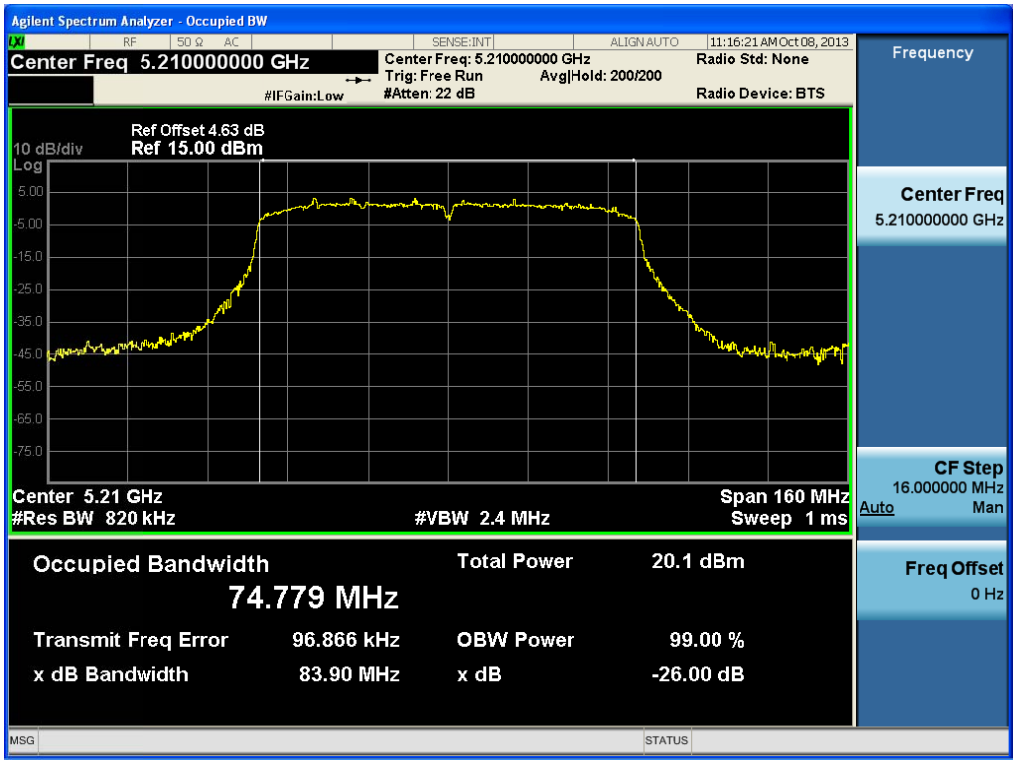
26 dBBandwidth Test Mode: 802.11n(HT40)& Ch.110



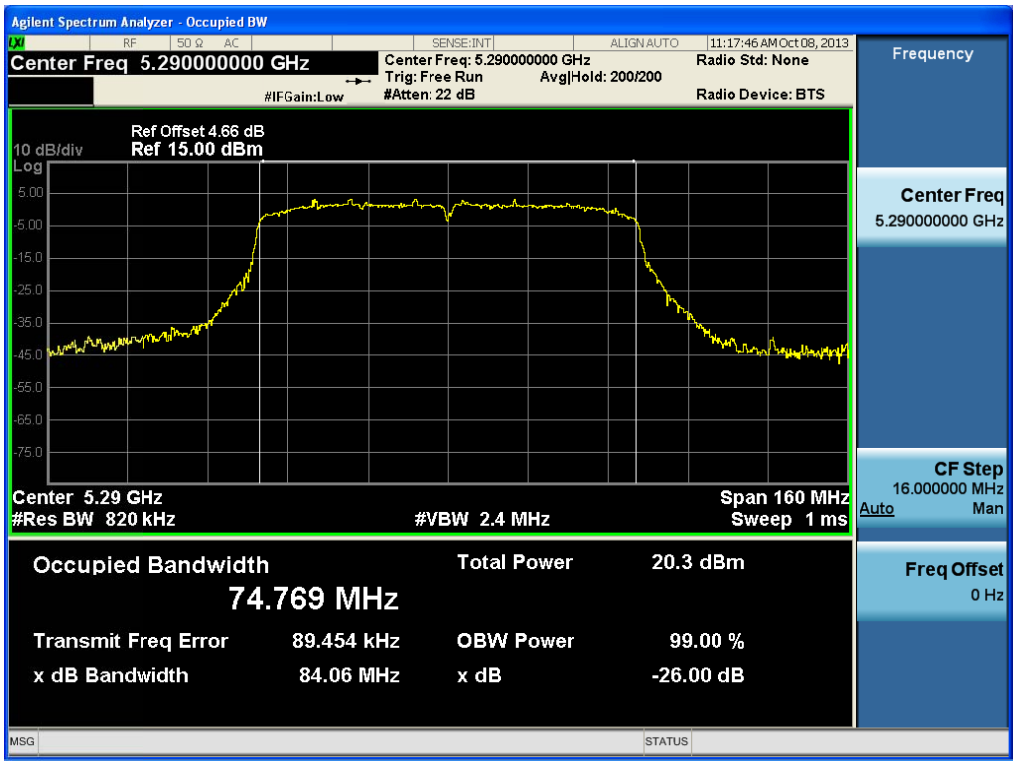
26 dBBandwidth Test Mode: 802.11n(HT40)& Ch.134



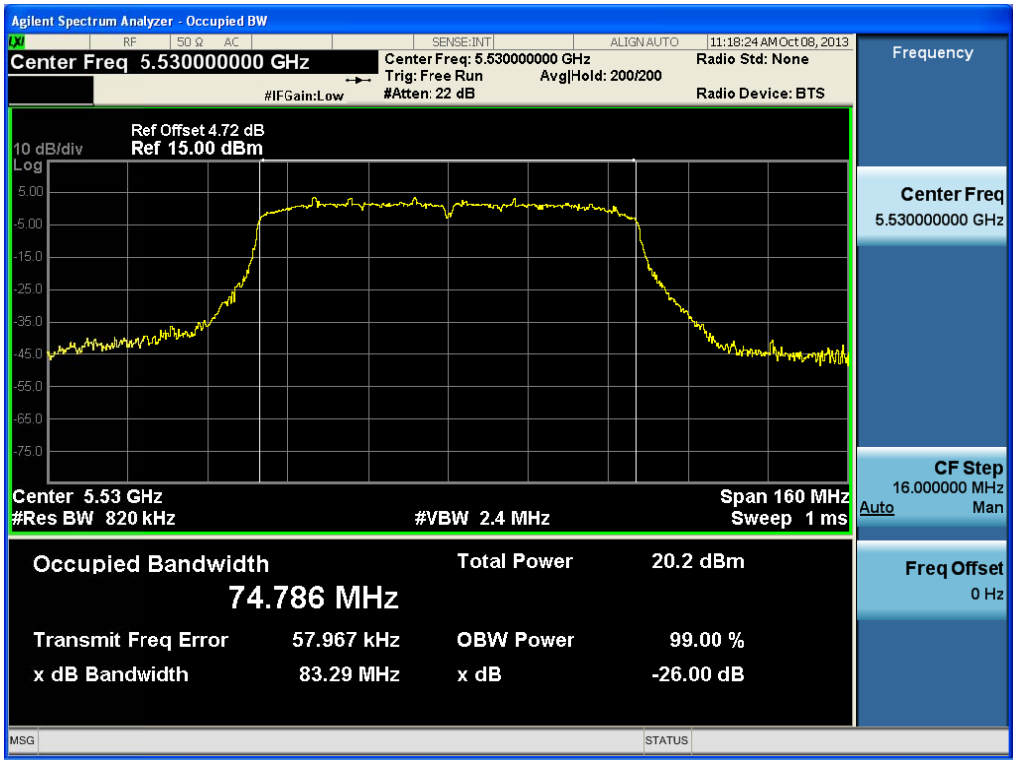
26 dBBandwidth Test Mode: 802.11ac(VHT80)& Ch.42



26 dBBandwidth Test Mode: 802.11ac(VHT80)& Ch.58



26 dBBandwidth Test Mode: 802.11ac(VHT80)& Ch.106



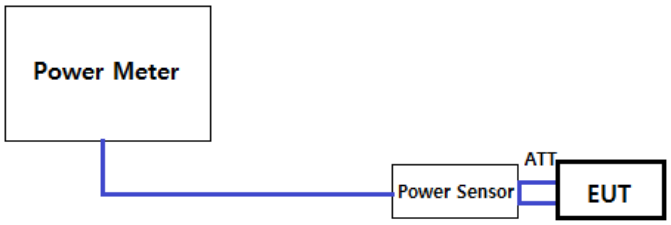
3.2.2 Output Power

Test Requirements

(1) For the band 5.15-5.25 GHz, the maximum conducted output power over thefrequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10log B, where B is the 26dB emission bandwidth in MHz.
If transmitting antennas of directional gain greater than 6 dBi are used, both themaximum conducted output power and the peak power spectral density shall be reduced by the amount indB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted outputpower over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B,where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the peak power spectral density shall bereduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

▣TEST CONFIGURATION



▣TEST PROCEDURE:

Method PM-G (Measurement using a gated RF average power meter) of **KDB789033 v01r03**

Measurements may be performed using a wideband gated RF power meter provided that the gateparameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

- Output power Limit Calculation

Bands	Mode	Power Limit [mW] / Least 26dBC BW [MHz]	Calculated Limit [dBm]	ANTGain [dBi]	Determined Limit [dBm]
Band I	802.11a	50	**16.98**	0	16.98
		21.690	17.36		
	802.11n HT20	50	**16.98**		16.98
		22.050	17.43		
	802.11n HT40	50	**16.98**		16.98
		42.560	20.29		
	802.11ac VHT80	50	**16.98**		16.98
		83.900	23.23		

Bands	Mode	Power Limit [mW] / Least 26dBC BW [MHz]	Calculated Limit [dBm]	ANT Gain [dBi]	DeterminedLimit [dBm]
Band II	802.11a	250	**23.97**	0	23.97
		21.660	24.35		
	802.11n HT20	250	**23.97**		23.97
		22.140	24.45		
	802.11n HT40	250	**23.97**		23.97
		42.960	27.33		
	802.11ac VHT80	250	**23.97**		23.97
		84.060	30.24		

Bands	Mode	Power Limit [mW] / Least 26dBC BW [MHz]	Calculated Limit [dBm]	ANT Gain [dBi]	DeterminedLimit [dBm]
Band III	802.11a	250	**23.97**	0	23.97
		21.560	24.33		
	802.11n HT20	250	**23.97**		23.97
		22.130	24.44		
	802.11n HT40	250	**23.97**		23.97
		42.770	27.31		
	802.11ac VHT80	250	**23.97**		23.97
		83.290	30.20		

▣**TEST RESULTS :Comply**

Test Mode	Band	CH	Freq. [MHz]	Test Result [dBm]									
				DataRate[Mbps]									
				6	9	12	18	24	36	48	54	-	-
802.11a	I	36	5180	**12.24**	12.21	12.20	12.18	12.05	12.03	12.03	12.00	-	-
		40	5200	**12.26**	12.21	12.19	12.14	12.11	12.10	12.10	12.05	-	-
		48	5240	**12.20**	12.17	12.13	12.06	12.00	11.98	11.95	11.91	-	-
	II	52	5260	**12.79**	12.77	12.72	12.68	12.68	12.63	12.56	12.54	-	-
		60	5300	**12.64**	12.62	12.60	12.56	12.54	12.47	12.41	12.37	-	-
		64	5320	**12.45**	12.42	12.40	12.32	12.29	12.20	12.12	12.07	-	-
	III	100	5500	**13.92**	13.86	13.83	13.77	13.70	13.64	13.60	13.57	-	-
		116	5580	**14.03**	13.96	13.89	13.84	13.82	13.71	13.65	13.64	-	-
		140	5700	**14.04**	13.96	13.92	13.85	13.83	13.72	13.68	13.64	-	-

Test Mode	Band	CH	Freq. [MHz]	Test Result [dBm]									
				DataRate[Mbps]									
				6.5/7.2	13/14.4	19.5/21.7	26/28.9	39/43.3	52/57.8	58.5/65	65/72.2	-	-
802.11n (HT20)	I	36	5180	**12.23**	12.18	12.10	12.09	12.05	12.01	11.98	11.88	-	-
		40	5200	**11.96**	11.94	11.86	11.81	11.82	11.80	11.72	11.69	-	-
		48	5240	**12.20**	12.11	12.09	12.11	12.10	12.06	12.08	12.01	-	-
	II	52	5260	**12.27**	12.25	12.23	12.22	12.21	12.15	12.05	11.99	-	-
		60	5300	**12.49**	12.45	12.40	12.36	12.30	12.22	12.16	12.11	-	-
		64	5320	**12.37**	12.33	12.27	12.28	12.27	12.19	12.10	12.01	-	-
	III	100	5500	**13.86**	13.83	13.76	13.66	13.62	13.54	13.46	13.46	-	-
		116	5580	**13.94**	13.92	13.88	13.81	13.81	13.75	13.67	13.64	-	-
		140	5700	**13.97**	13.94	13.87	13.78	13.74	13.70	13.61	13.63	-	-

Test Mode	Band	CH	Freq. [MHz]	Test Result [dBm]									
				DataRate[Mbps]									
				13.5/15	27/30	40.5/45	54/60	81/90	108/120	121.5/135	135/150	-	-
802.11n (HT40)	I	38	5190	**10.89**	10.82	10.79	10.76	10.67	10.57	10.49	10.40	-	-
		46	5230	**10.97**	10.89	10.83	10.77	10.74	10.68	10.60	10.53	-	-
	II	54	5270	**11.15**	11.05	11.03	10.96	10.94	10.87	10.78	10.72	-	-
		62	5310	**11.21**	11.20	11.10	11.08	11.01	10.96	10.86	10.81	-	-
	III	102	5510	**11.06**	11.00	10.92	10.86	10.82	10.83	10.76	10.70	-	-
		110	5550	**11.13**	11.06	11.02	11.04	10.96	10.87	10.81	10.73	-	-
		134	5670	**11.16**	11.06	11.04	10.95	10.89	10.87	10.82	10.78	-	-

Test Mode	Band	CH	Freq. [MHz]	Test Result [dBm]									
				DataRate[Mbps]									
				29.3/32.5	58.5/65	87.8/97.5	117/130	175.5/195	234/260	263.3/292.5	292.6/325	351/390	390/433.3
802.11ac (VHT80)	I	42	5210	**11.29**	11.28	11.23	11.21	11.14	11.12	11.03	11.01	10.91	10.82
	II	58	5290	**11.57**	11.47	11.40	11.34	11.27	11.21	11.23	11.21	11.14	11.10
	III	106	5530	**11.57**	11.55	11.52	11.47	11.40	11.32	11.32	11.28	11.29	11.20

3.2.3 Peak Power Spectral Density

Test requirements

(1) For the band 5.15-5.25 GHz, the peak power spectral densityshall not exceed 4 dBm in any 1MHzband.
(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the peak power spectral density shallnot exceed 11 dBm in any 1 MHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount indB that the directional gain of the antenna exceeds 6 dBi.

- Peak Power Spectral Density Limit Calculation

Band	Limit [dBm]	ANT Gain [dBi]	Determined Limit [dBm]
Band I	**4**	**0**	**4**
Band II	**11**	**0**	**11**
Band III	**11**	**0**	**11**

▣TEST CONFIGURATION

Refer to the APPENDIX I.

▣TEST PROCEDURE

Peak Power Spectral Density is measured using Measurement Procedure **ofKDB789033 v01r03**

1) Create an average power spectrum for the EUT operating mode being tested by following theinstructionsin section E)2) for measuring maximum conducted output power using a spectrum analyzer: select theappropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including,the step labeled, “Compute power…”. (This procedure is required even if the maximum conductedoutput power measurement was performed using a power meter, method PM.)
2) Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
3) Make the following adjustments to the peak value of the spectrum, if applicable:
   a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peakof the spectrum.
   b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
4) The result is the PPSD.

Measurement used Alternative SA-2
1. Set the **RBW = 1 MHz**&**VBW ≥ 3 MHz**.
2. Set span to encompass the **26 dB EBW** (or, alternatively, the entire 99% occupied bandwidth) of the signal.
3. Detector = **RMS (power averaging)**
4. Sweep time = **auto couple**.
5. **Trace average at least 100 traces in power averaging**.
6. **Add 10 log(1/x), where x is the duty cycle**, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission)

▣**TEST RESULT :Comply**

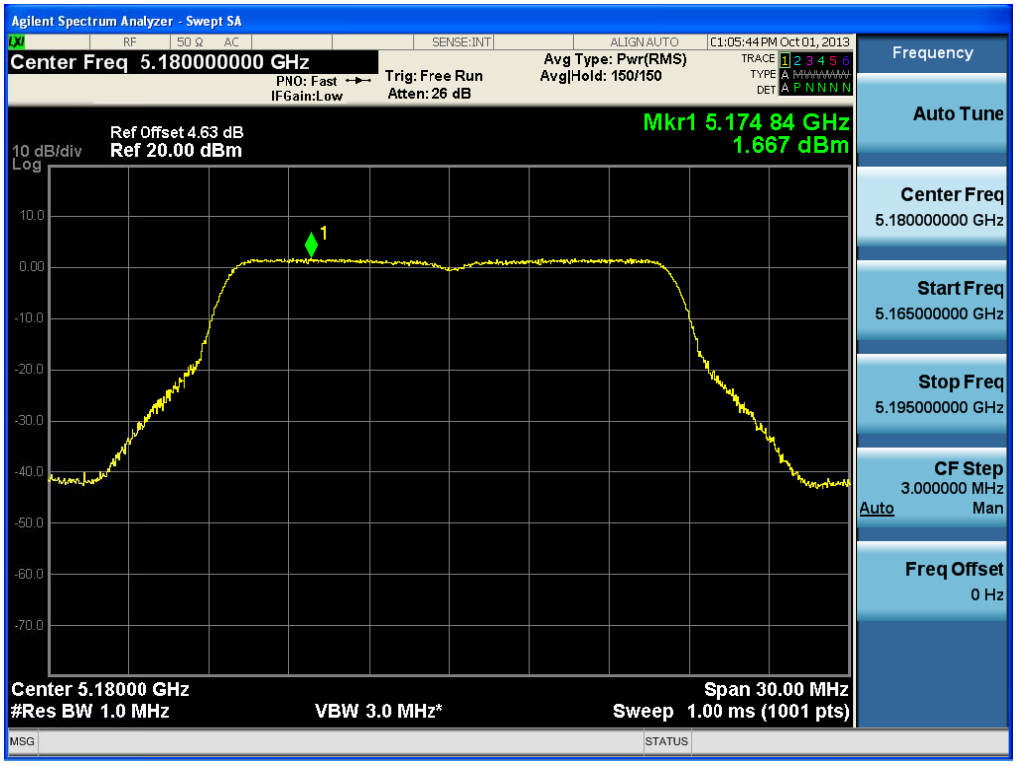
Mode	Band	CH	Frequency [MHz]	Reading [dBm]	Duty Cycle			DCF [dB]	Test Result [dBm]
					On Time[ms]	On+Off Time[ms]	X		
802.11a	I	36	5180	1.667	1.362	1.371	0.99	0.05	1.717
		40	5200	1.909					1.959
		48	5240	2.105					2.155
	II	52	5260	2.433	1.362	1.371	0.99	0.05	2.483
		60	5300	2.437					2.487
		64	5320	2.347					2.397
	III	100	5500	4.168	1.362	1.371	0.99	0.05	4.218
		116	5580	4.464					4.514
		140	5700	4.248					4.298
802.11n (HT20)	I	36	5180	1.818	1.275	1.284	0.99	0.05	1.868
		40	5200	1.908					1.958
		48	5240	1.910					1.960
	II	52	5260	2.185	1.275	1.284	0.99	0.05	2.235
		60	5300	1.504					1.554
		64	5320	1.374					1.424
	III	100	5500	3.840	1.275	1.284	0.99	0.05	3.890
		116	5580	4.116					4.166
		140	5700	3.939					3.989
802.11n (HT40)	I	38	5190	-2.411	0.634	0.644	0.98	0.09	-2.321
		46	5230	-2.221					-2.131
	II	54	5270	-2.069	0.634	0.644	0.98	0.09	-1.979
		62	5310	-2.233					-2.143
	III	102	5510	-2.262	0.634	0.644	0.98	0.09	-2.172
		110	5550	-2.293					-2.203
		134	5670	-2.135					-2.045
802.11ac (VHT80)	I	42	5210	- 4.604	0.246	0.258	0.95	0.23	- 4.374
	II	58	5290	- 4.478	0.246	0.258	0.95	0.23	- 4.248
	III	106	5530	- 4.346	0.246	0.258	0.95	0.23	- 4.116

Note 1 :DCF = 10log(1 / X), X = On Time /(On+Off time)
Note 2 :Test Result = Measurement Data + DCF

▣Measurement Data PLOTS

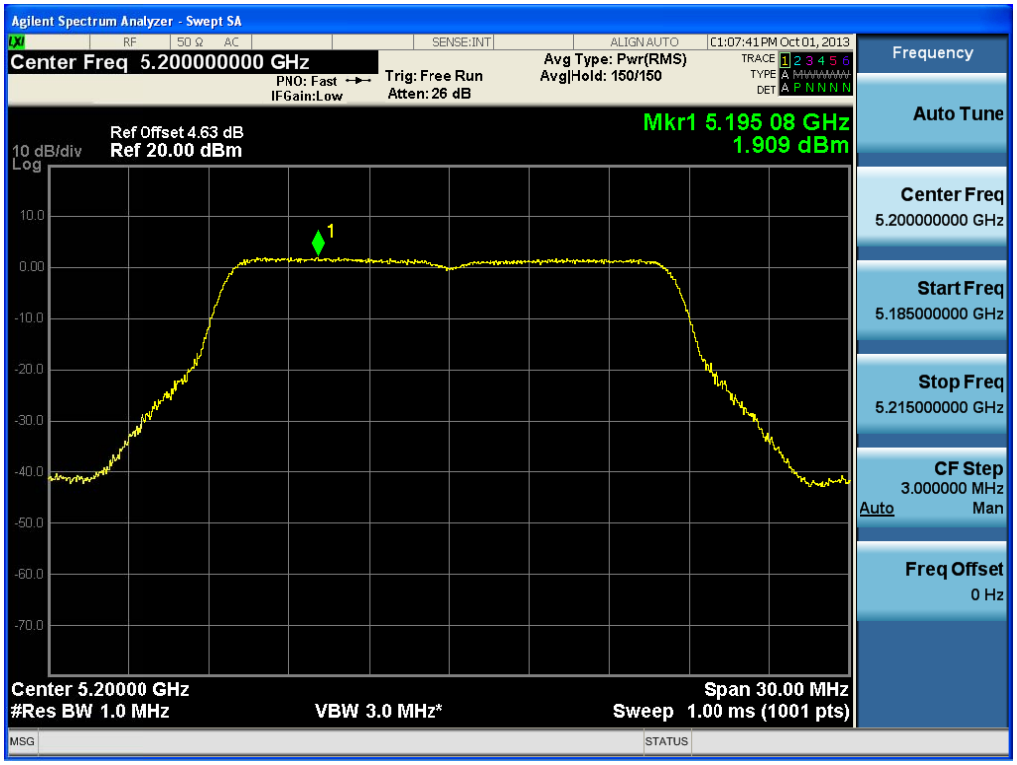
Peak Power Spectral Density

Test Mode: 802.11a & Ch.36

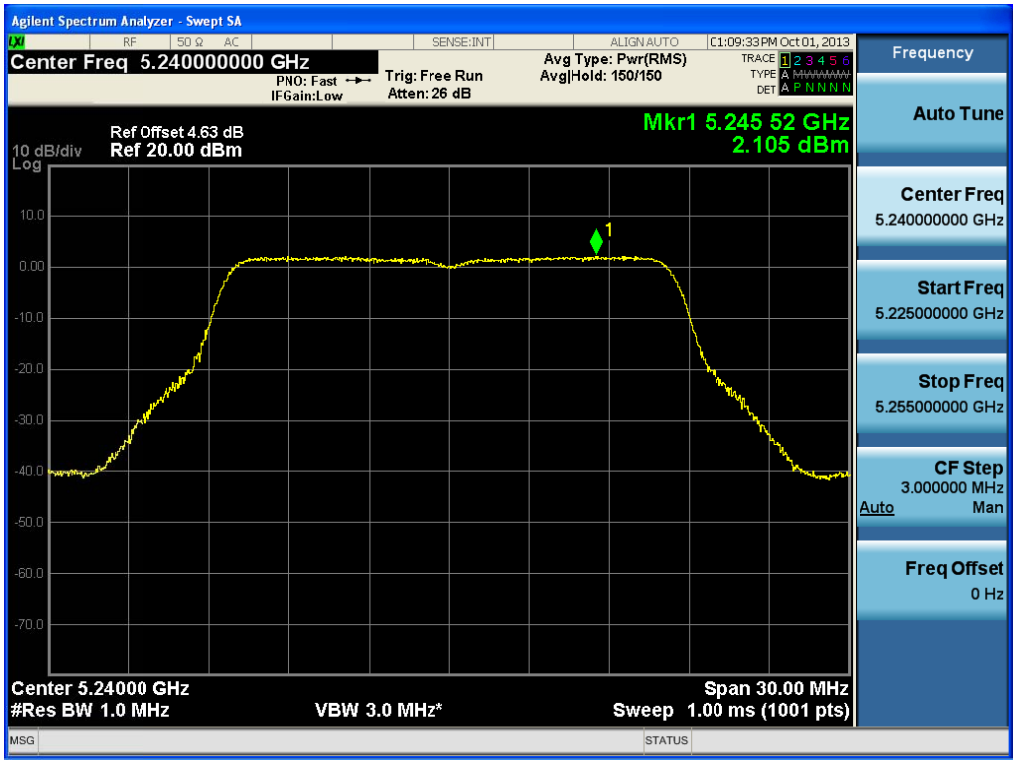


Peak Power Spectral Density

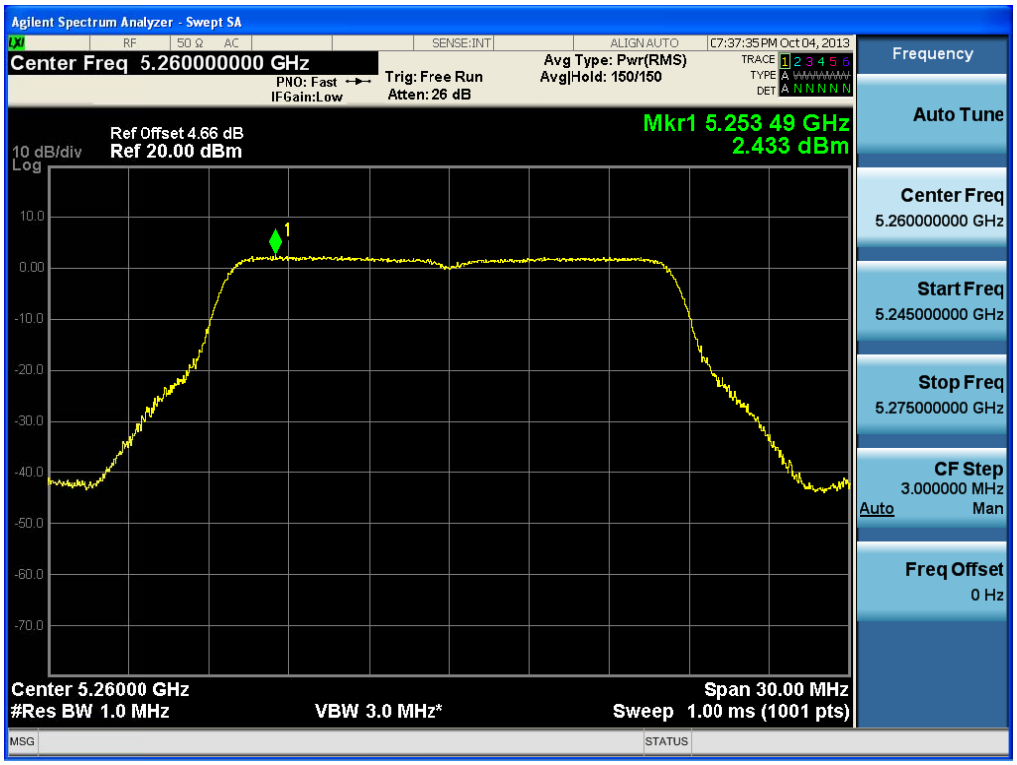
Test Mode: 802.11a & Ch.40



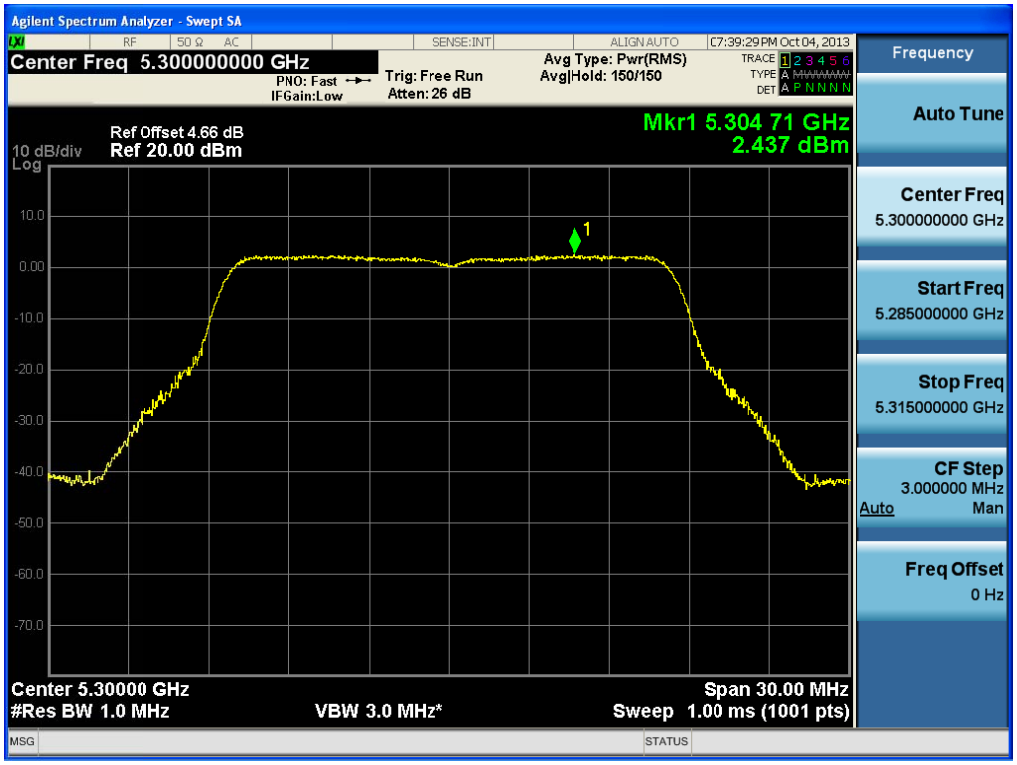
Peak Power Spectral Density Test Mode: 802.11a & Ch.48



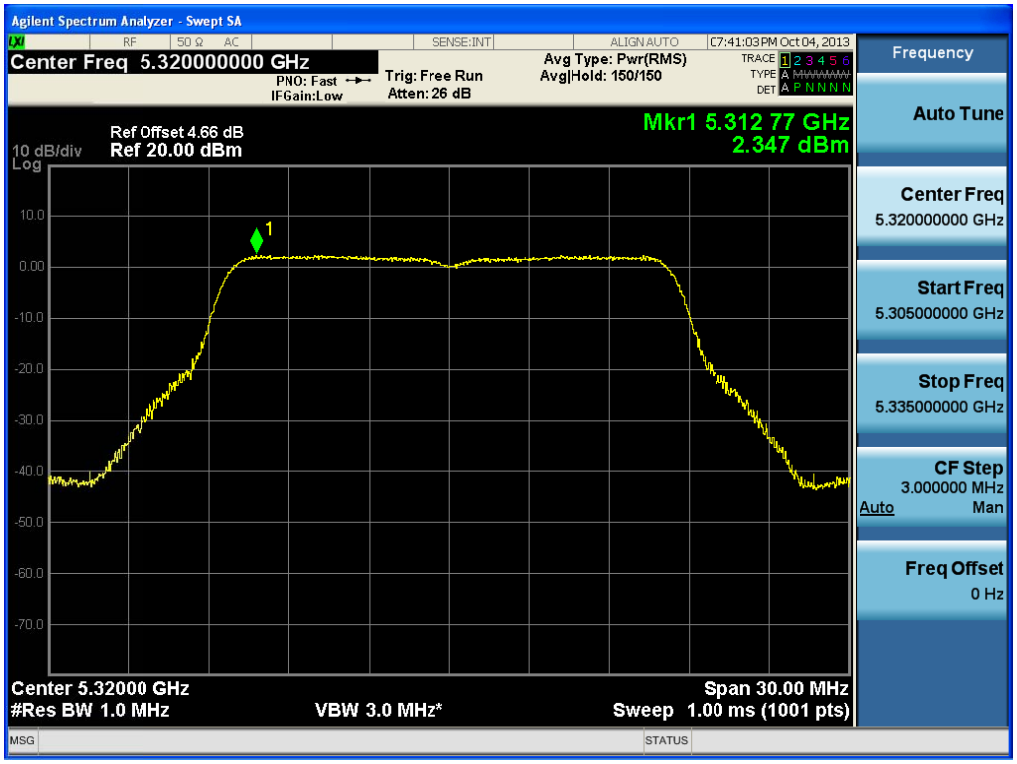
Peak Power Spectral Density Test Mode: 802.11a & Ch.52



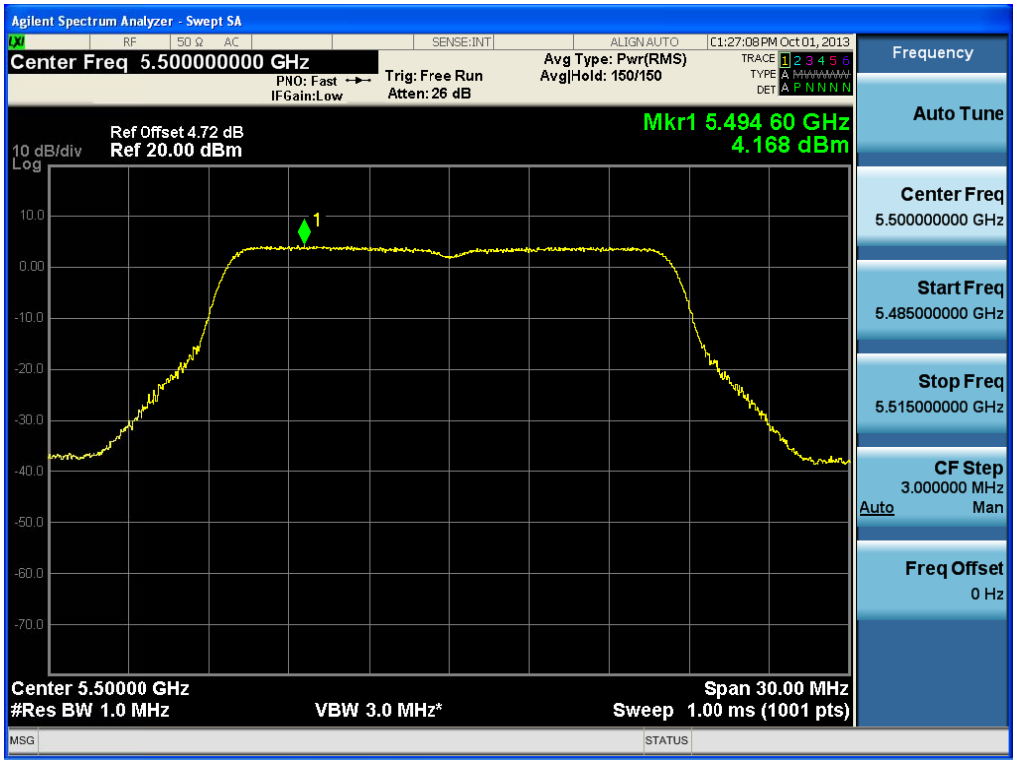
Peak Power Spectral Density Test Mode: 802.11a &Ch.60



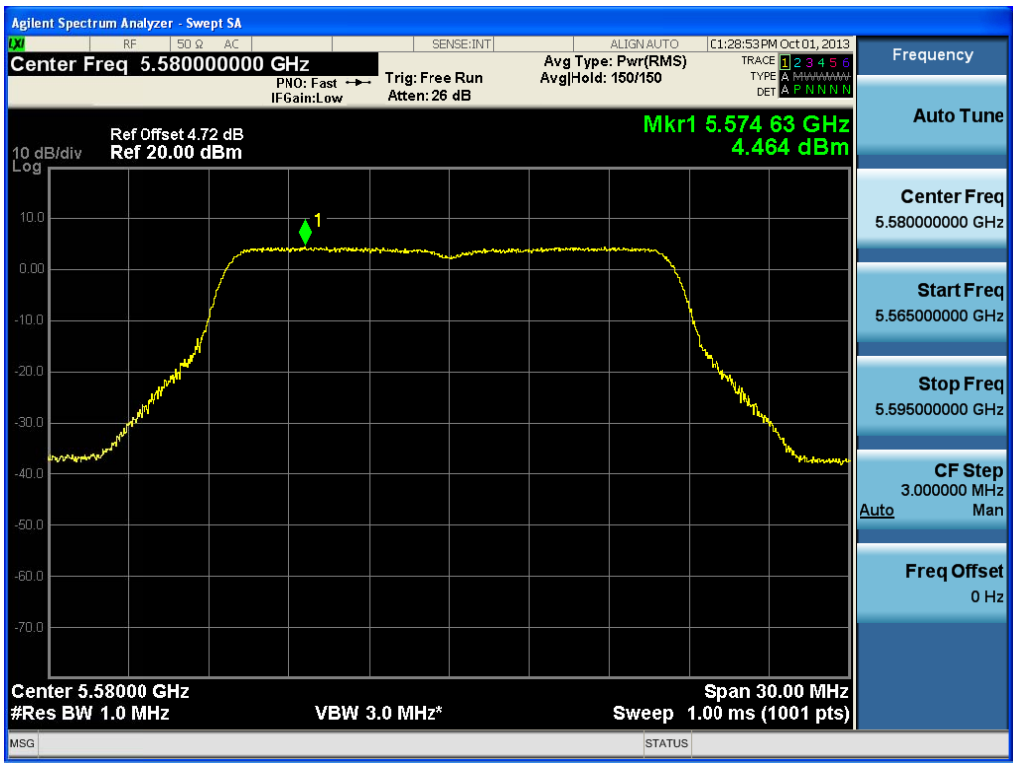
Peak Power Spectral Density Test Mode: 802.11a & Ch.64



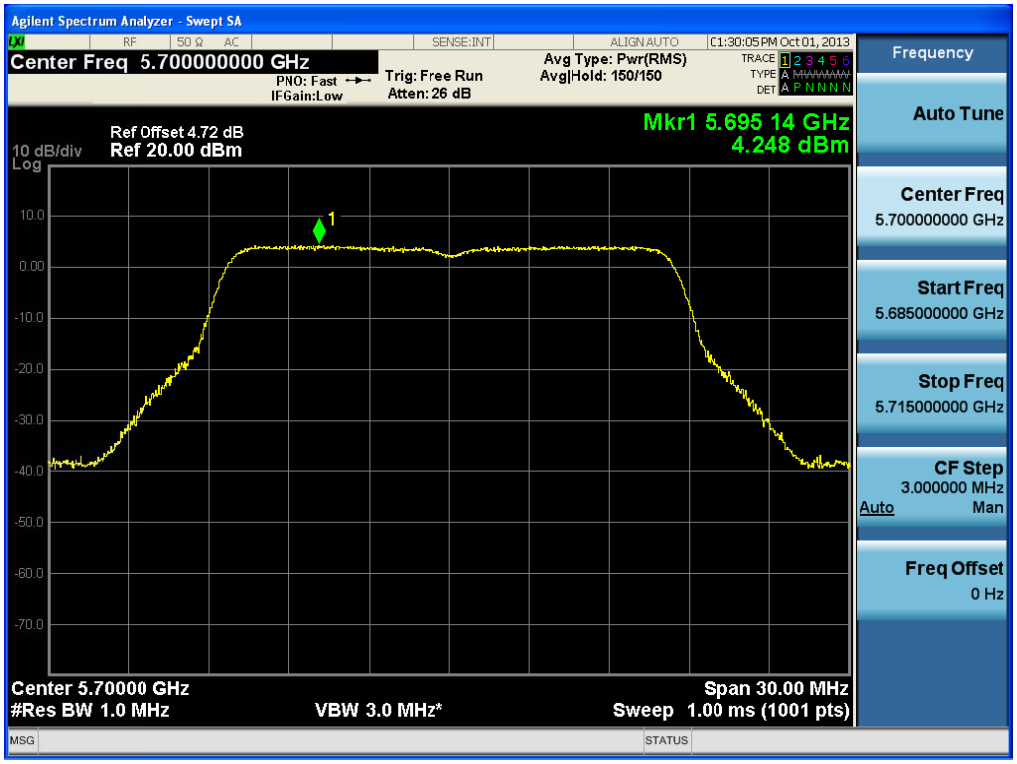
Peak Power Spectral Density Test Mode: 802.11a & Ch.100



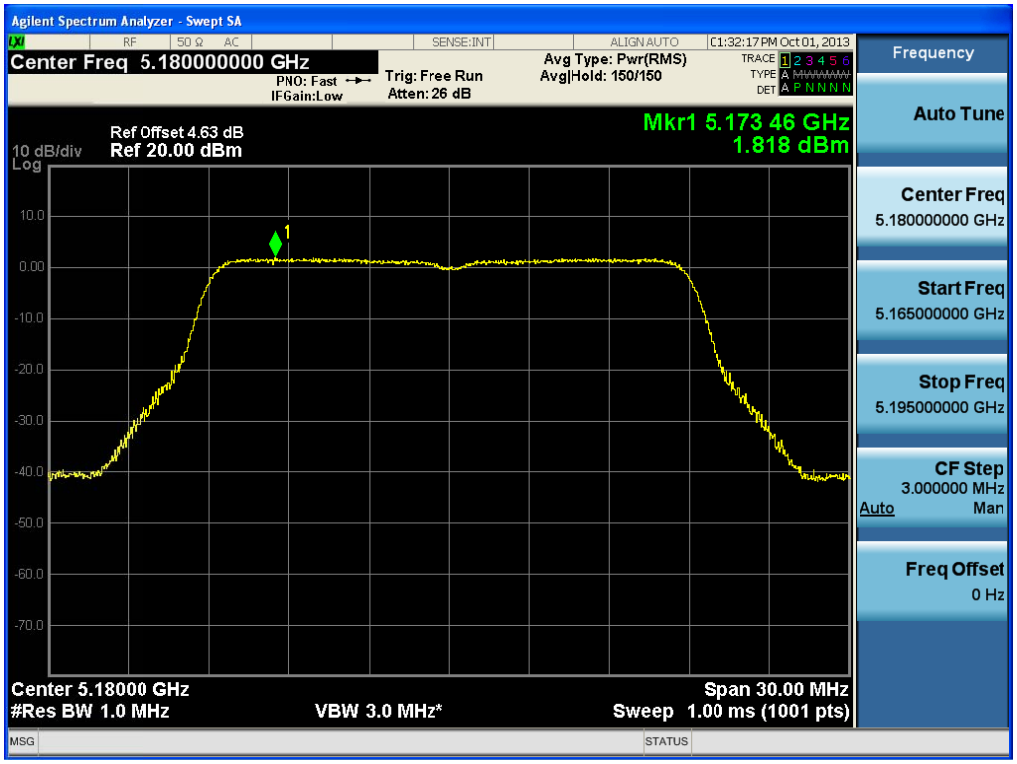
Peak Power Spectral Density Test Mode: 802.11a & Ch.116



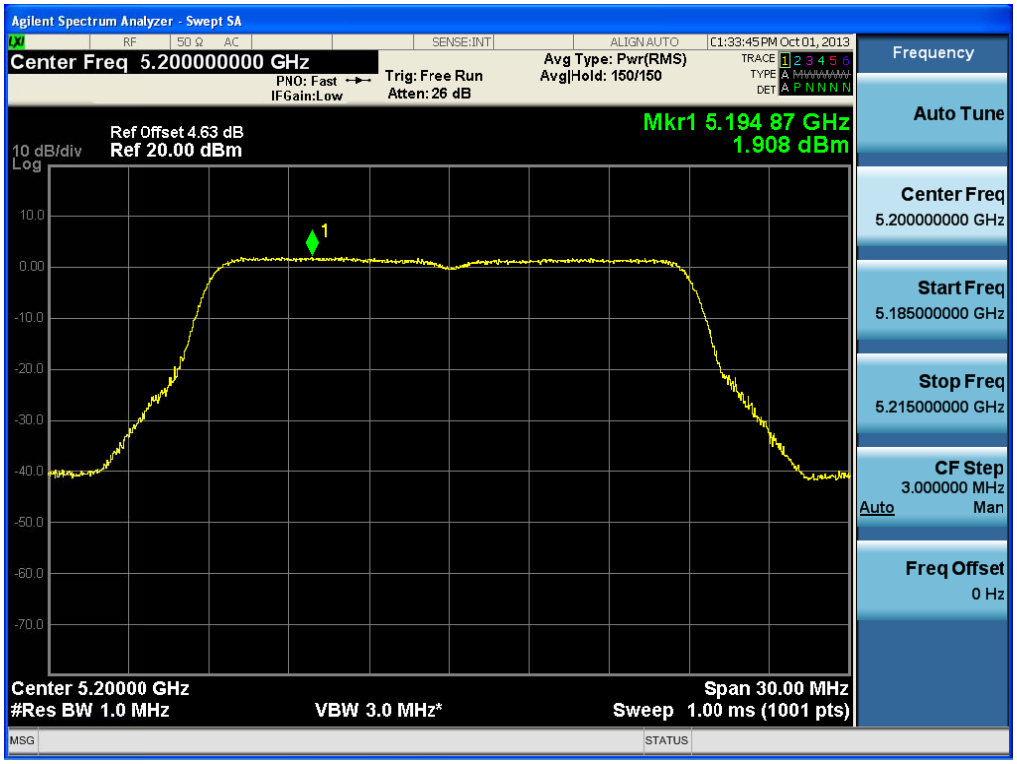
Peak Power Spectral Density Test Mode: 802.11a & Ch.140



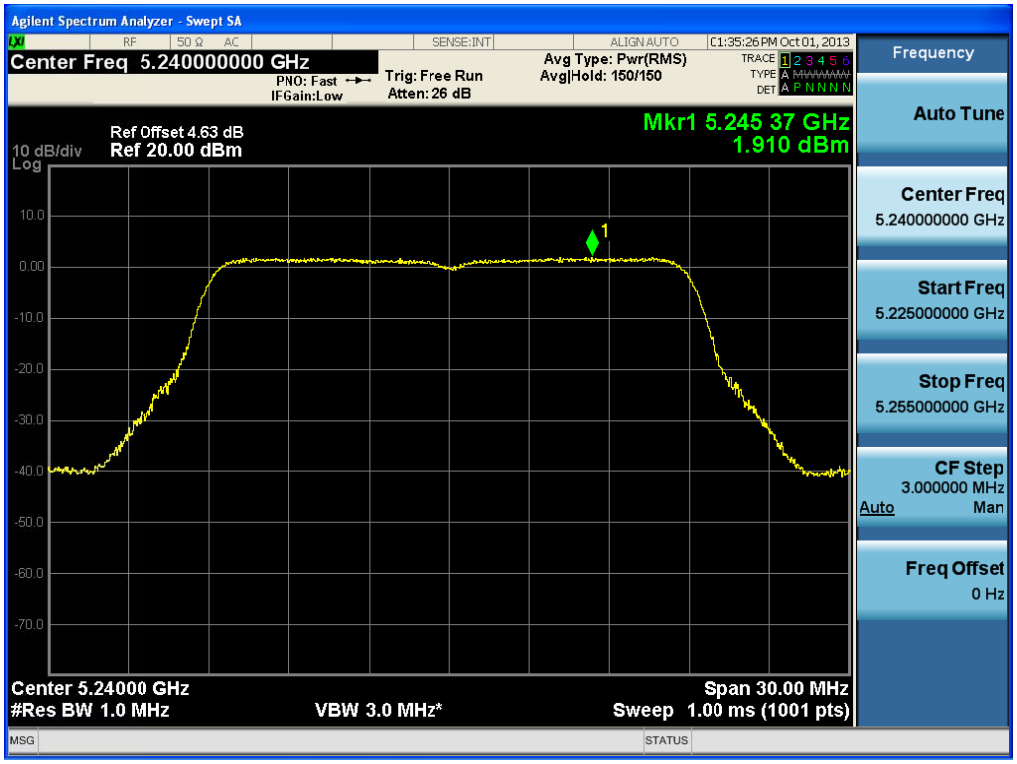
Peak Power Spectral Density Test Mode: 802.11n(HT20)& Ch.36



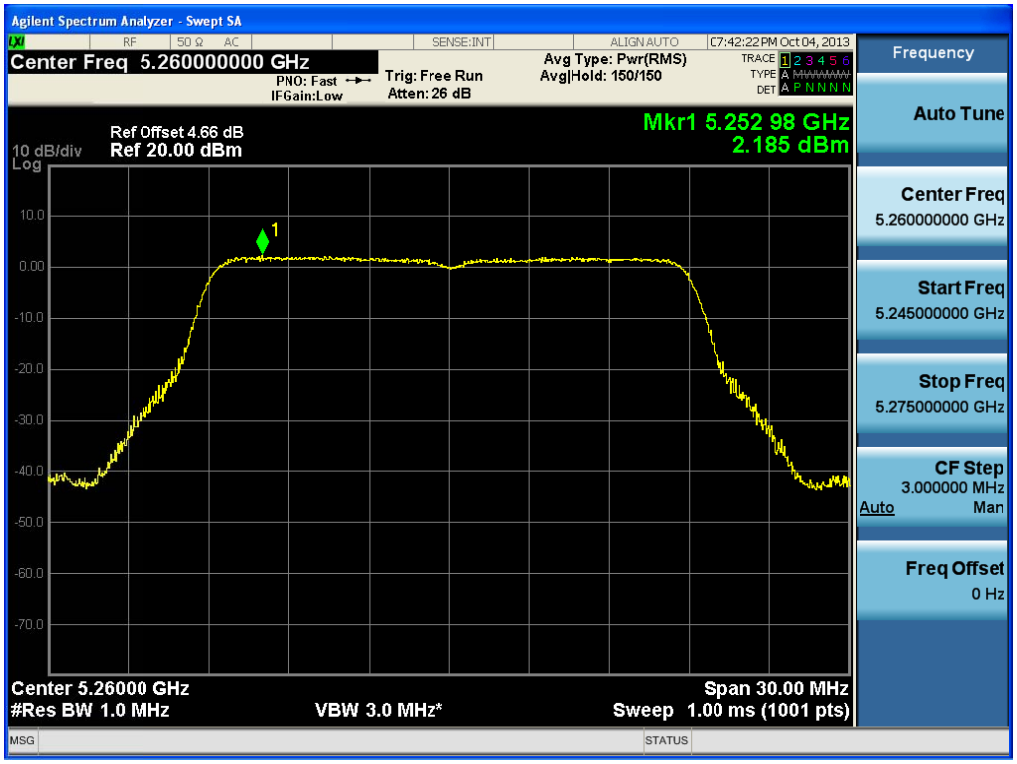
Peak Power Spectral Density Test Mode: 802.11n(HT20)& Ch.40



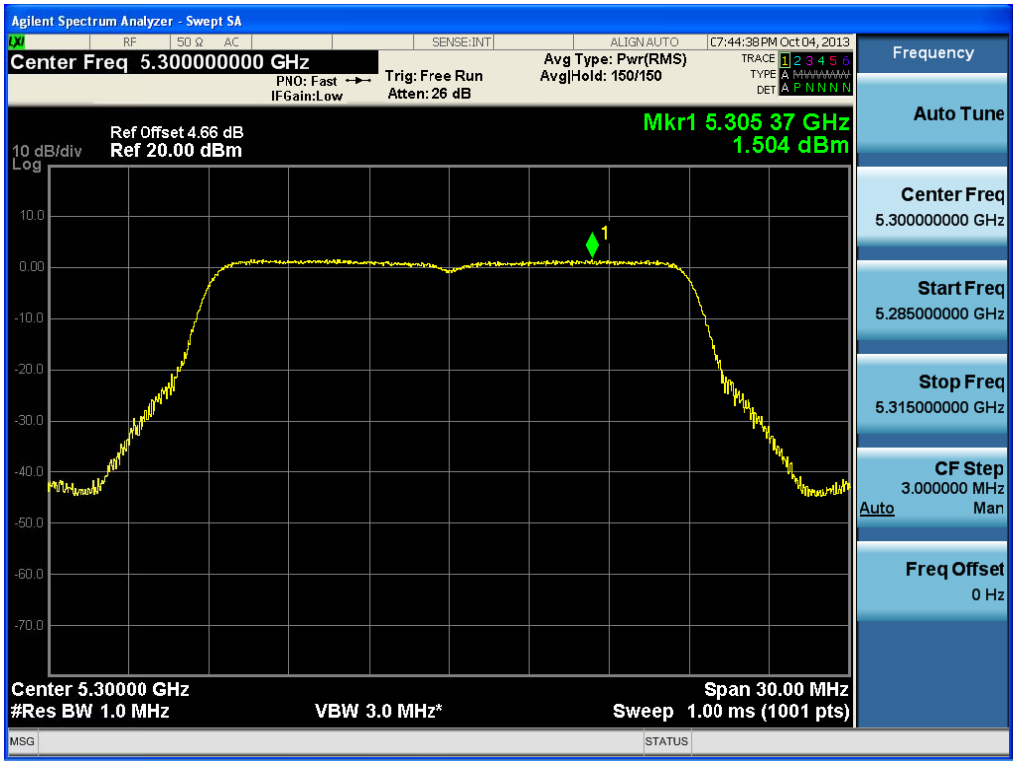
Peak Power Spectral Density Test Mode: 802.11n(HT20)& Ch.48



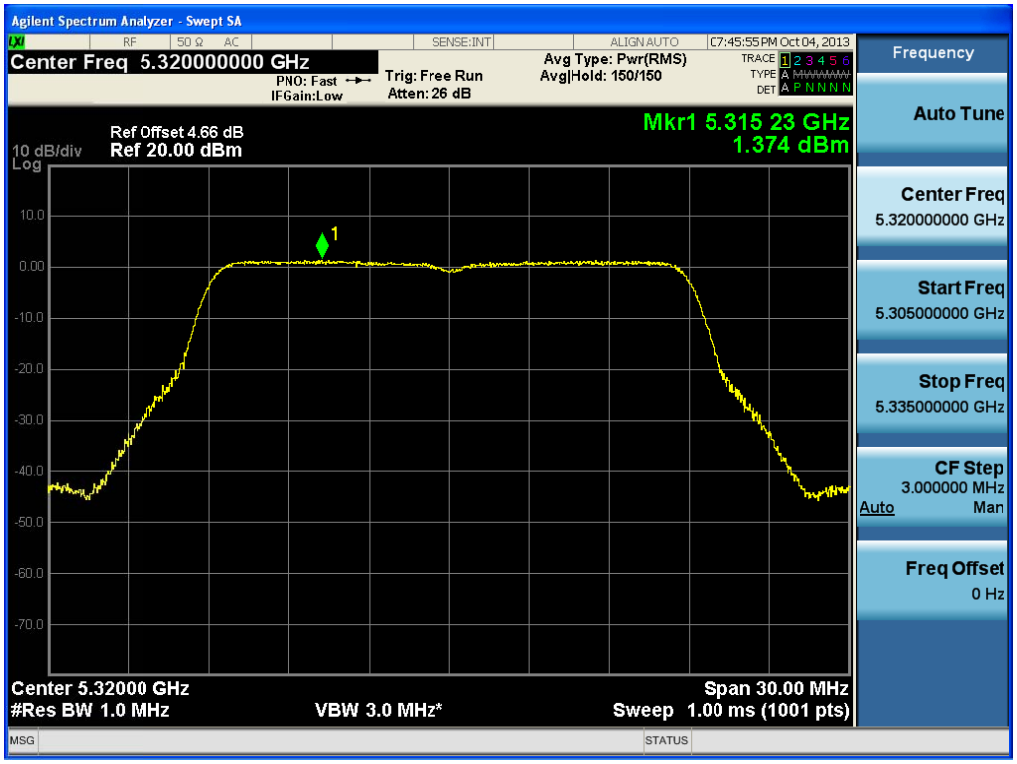
Peak Power Spectral Density Test Mode: 802.11n(HT20)& Ch.52



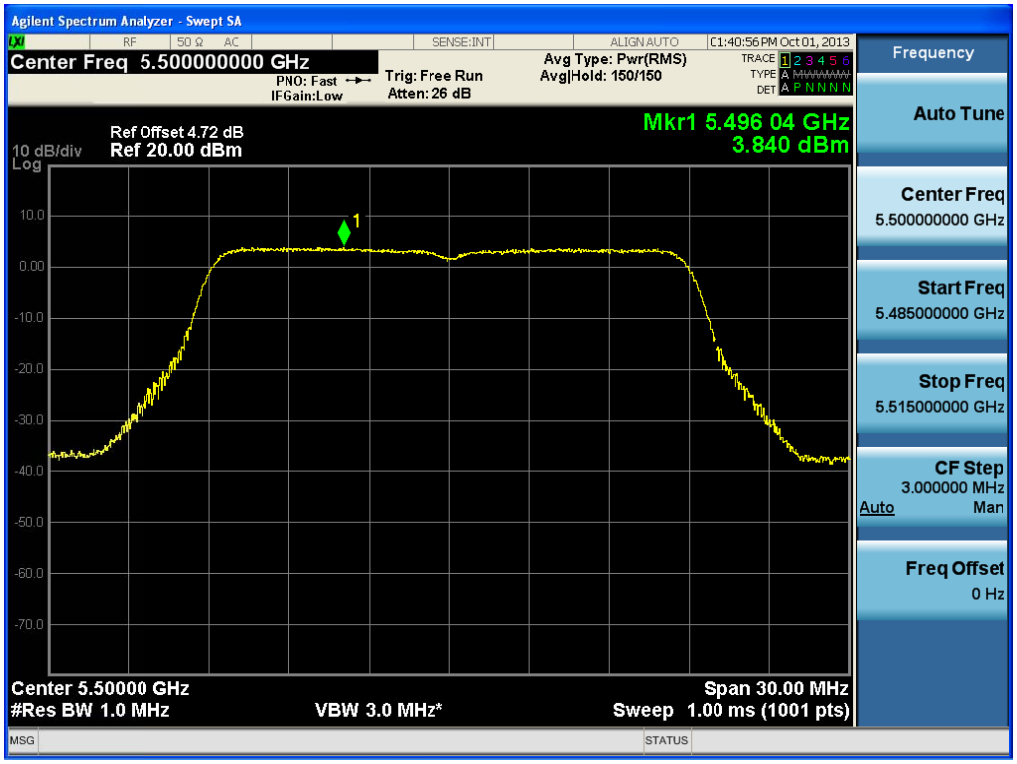
Peak Power Spectral Density Test Mode: 802.11n(HT20)&Ch.60



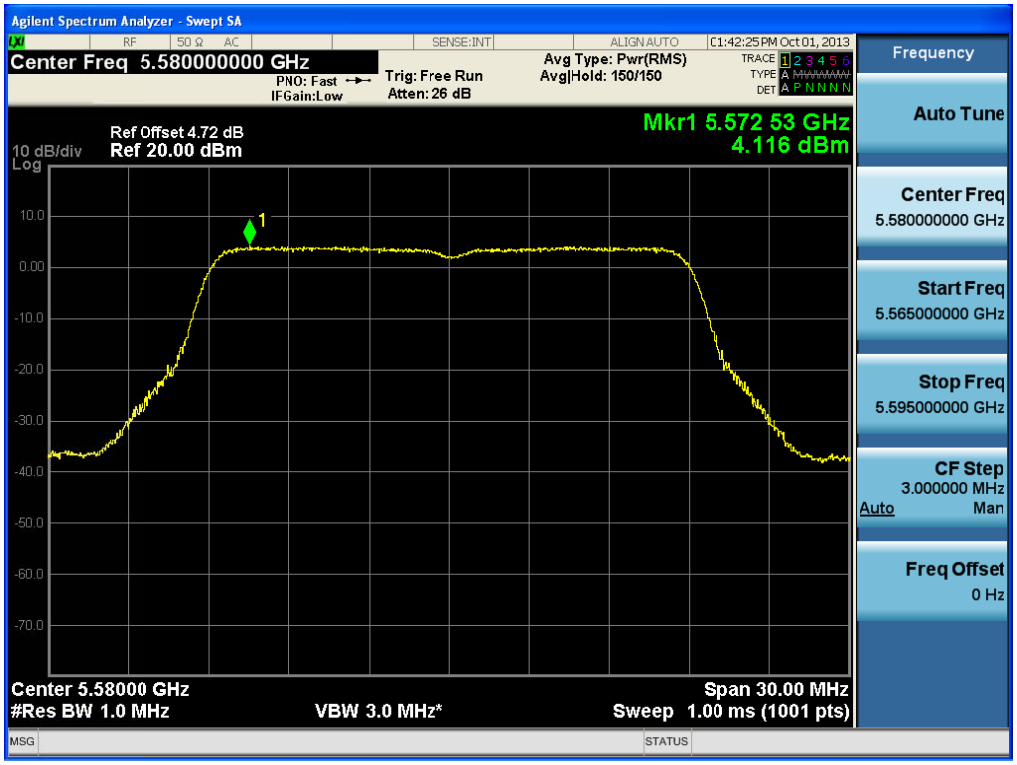
Peak Power Spectral Density Test Mode: 802.11n(HT20)& Ch.64



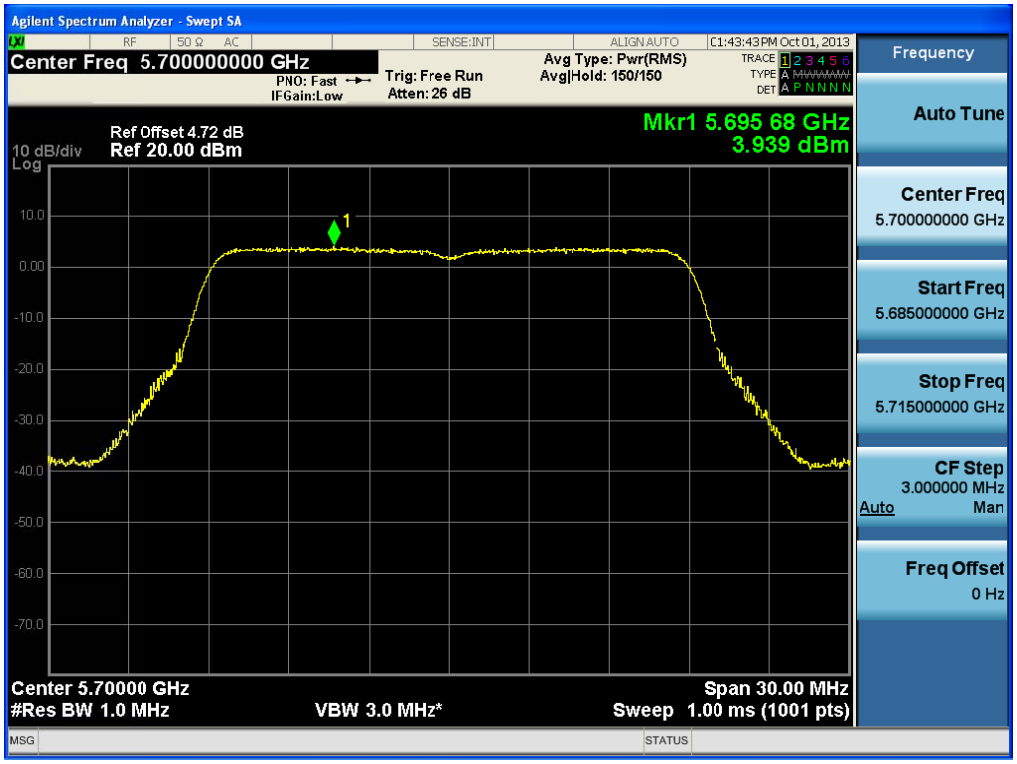
Peak Power Spectral Density Test Mode: 802.11n(HT20)& Ch.100



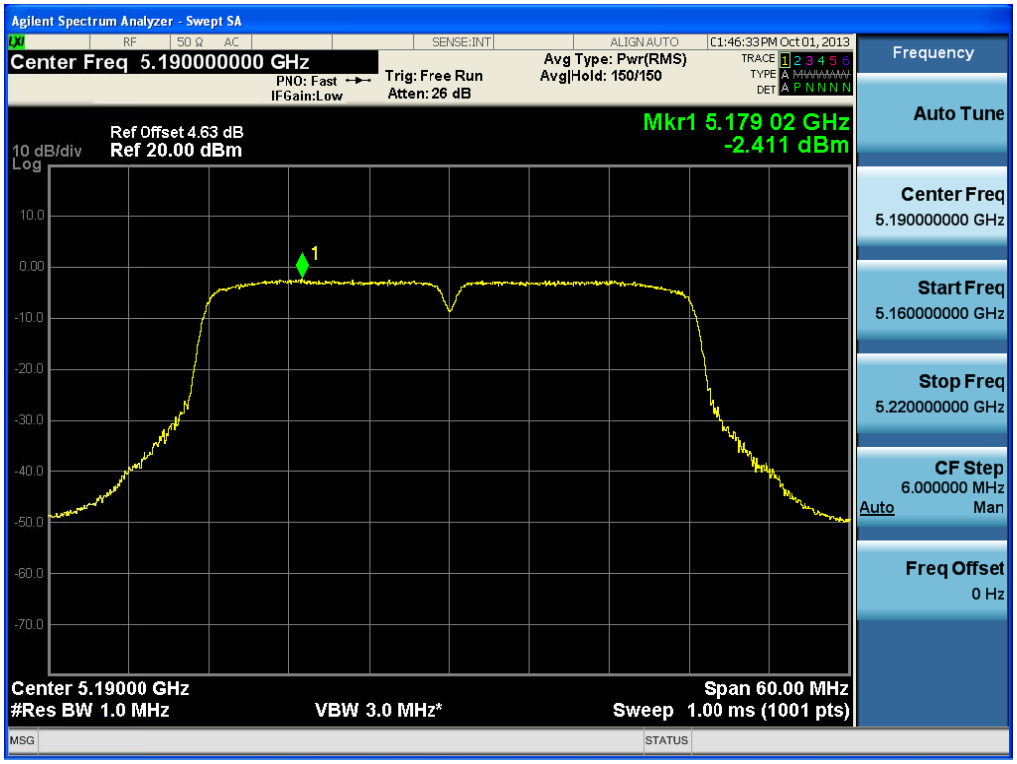
Peak Power Spectral Density Test Mode: 802.11n(HT20)& Ch.116



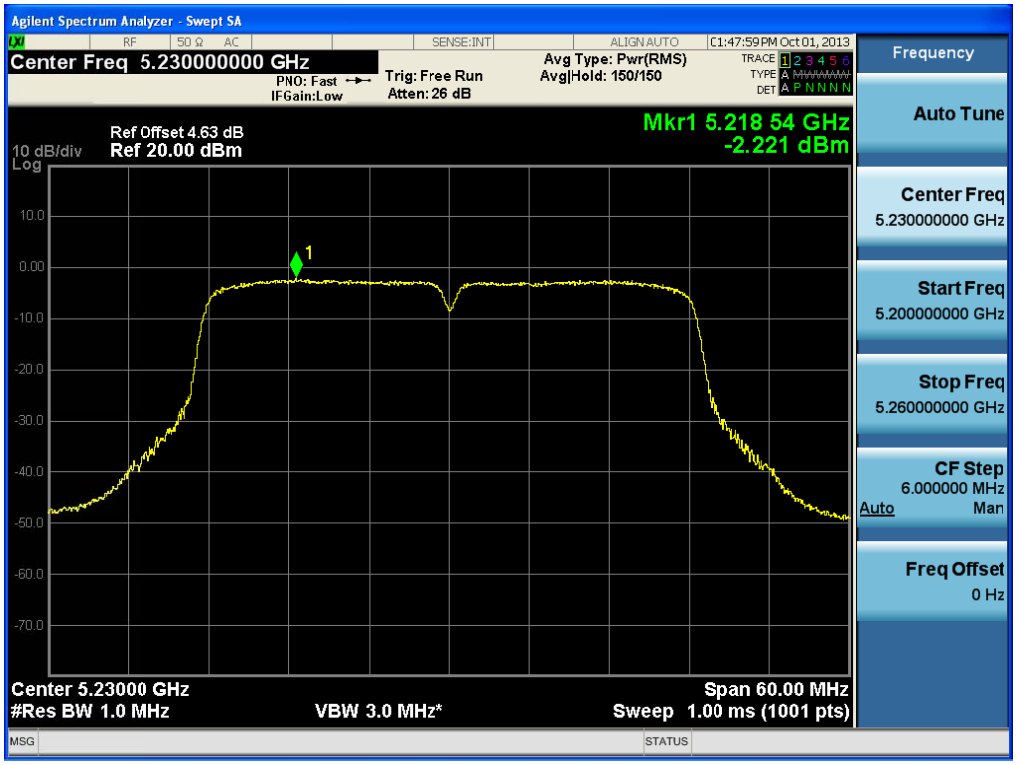
Peak Power Spectral Density Test Mode: 802.11n(HT20)& Ch.140



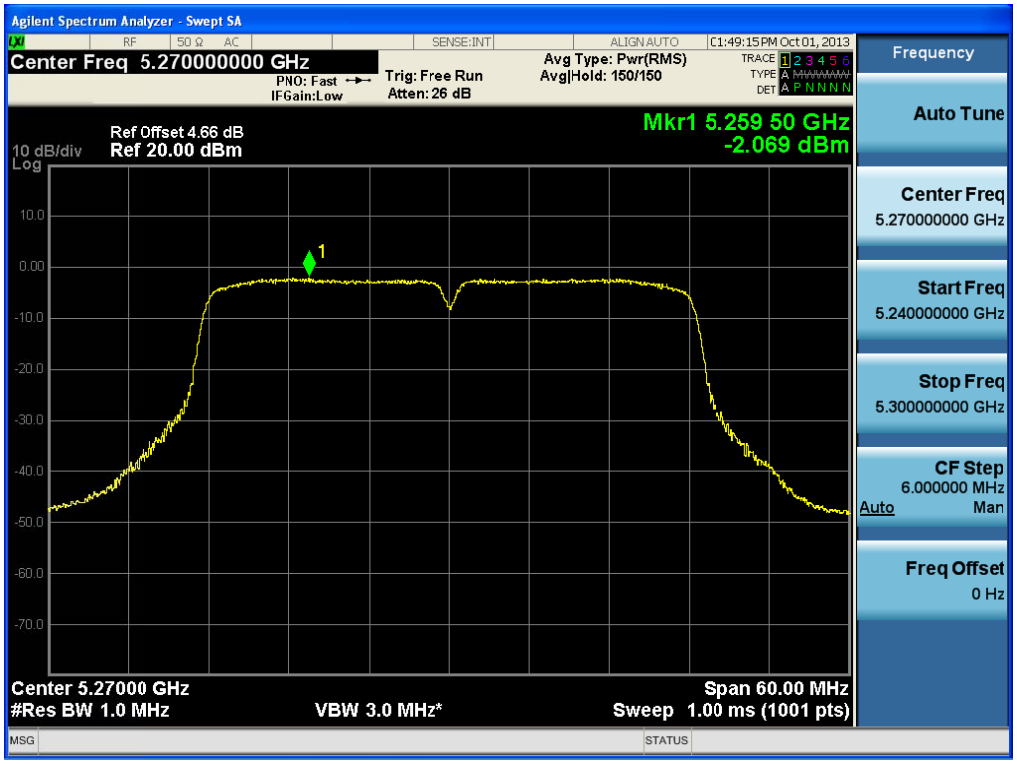
Peak Power Spectral Density Test Mode: 802.11n(HT40)&Ch.38



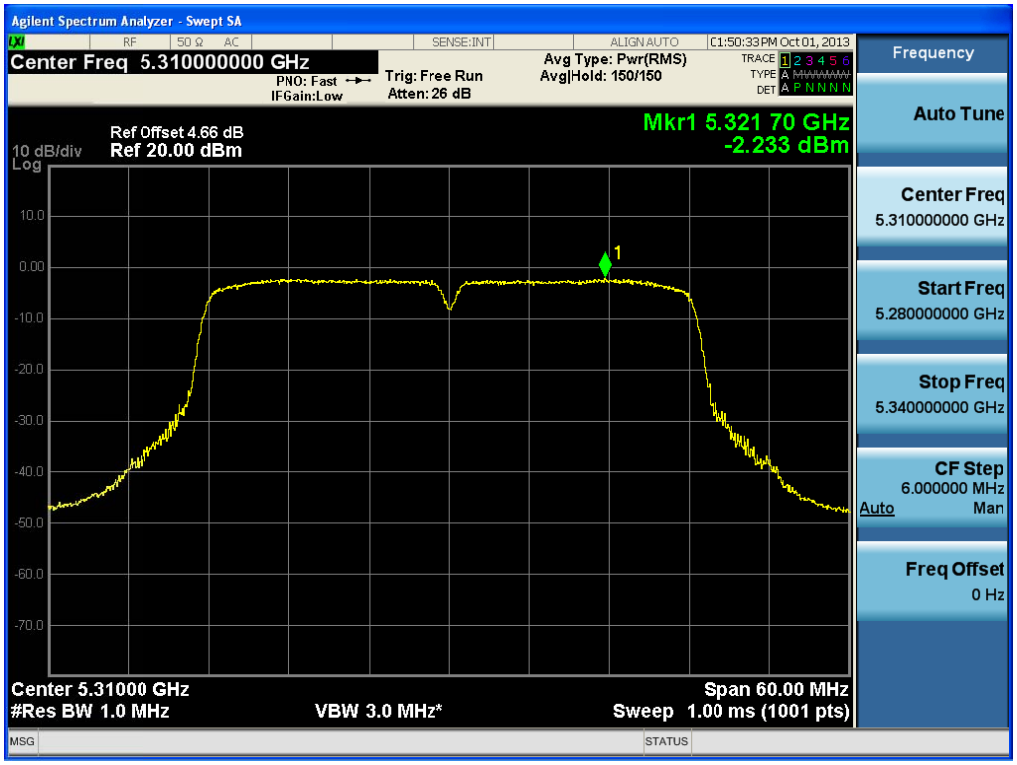
Peak Power Spectral Density Test Mode: 802.11n(HT40)& Ch.46



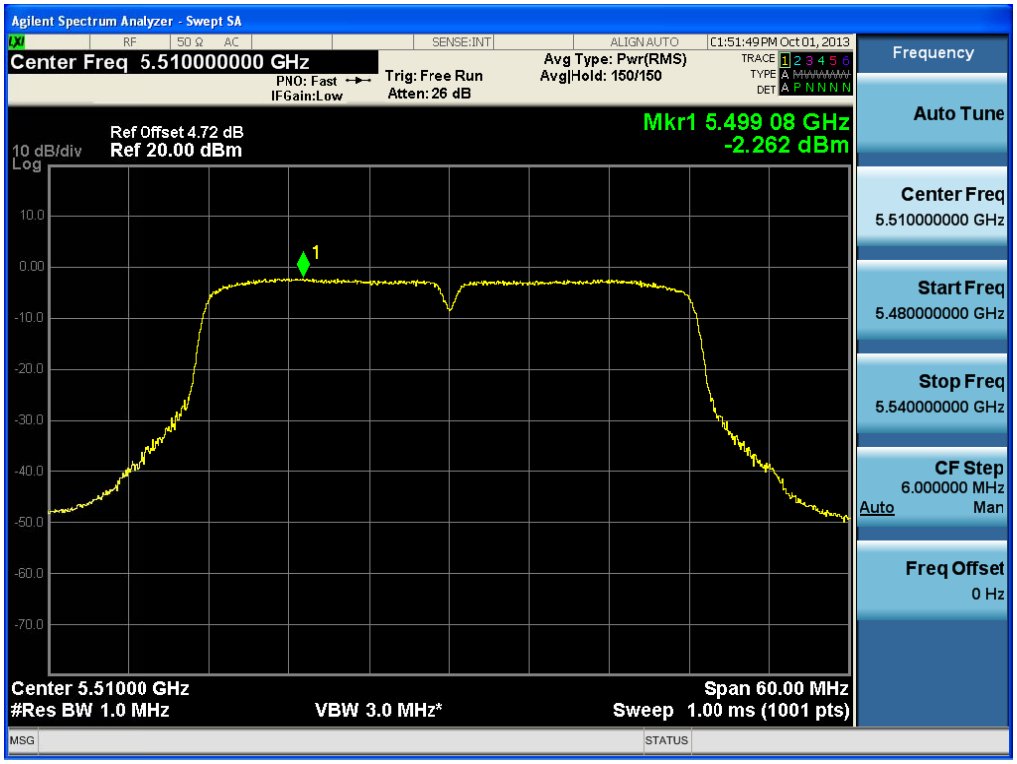
Peak Power Spectral Density Test Mode: 802.11n(HT40)& Ch.54



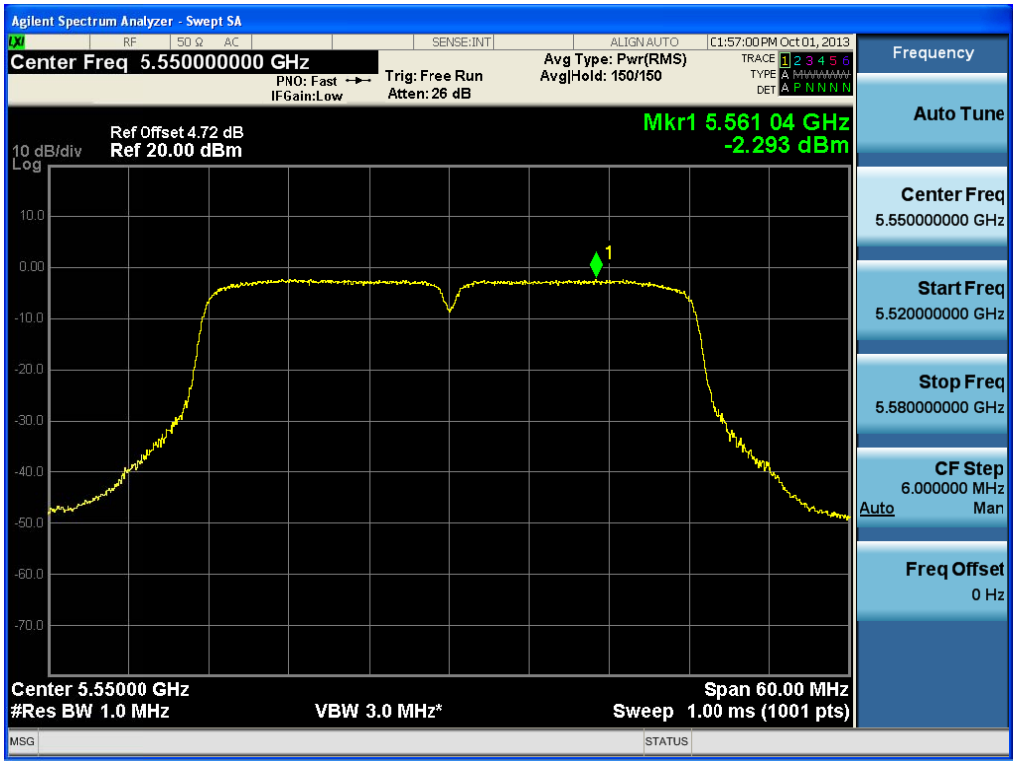
Peak Power Spectral Density Test Mode: 802.11n(HT40)& Ch.62



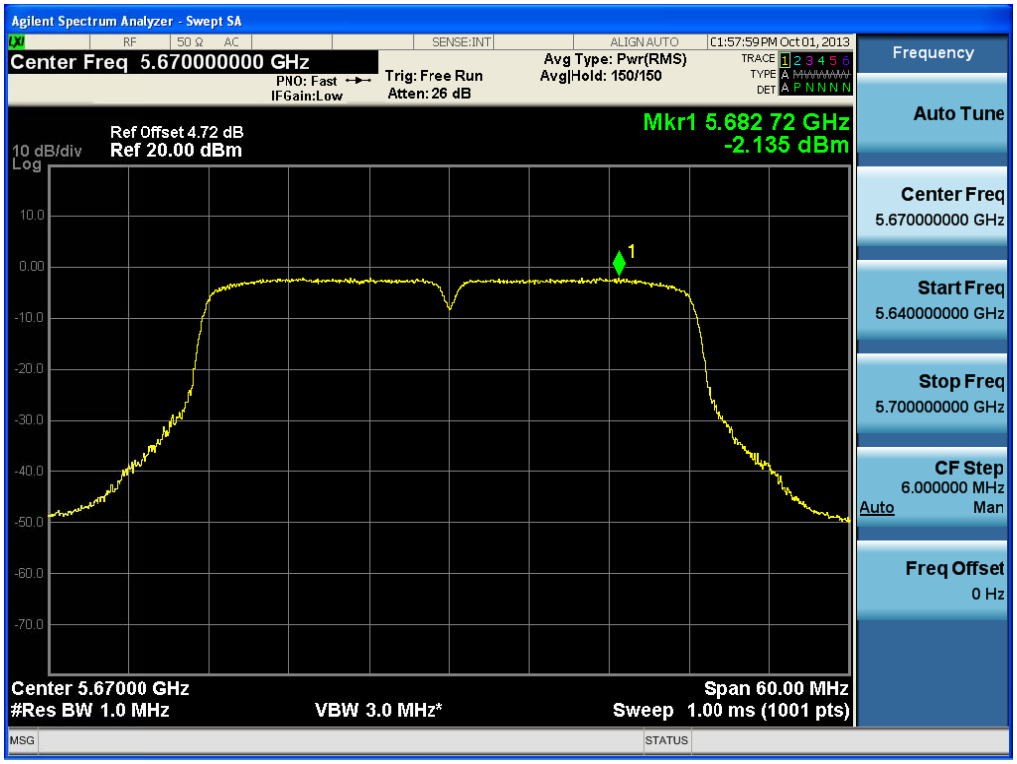
Peak Power Spectral Density Test Mode: 802.11n(HT40)& Ch.102



Peak Power Spectral Density Test Mode: 802.11n(HT40)& Ch.110

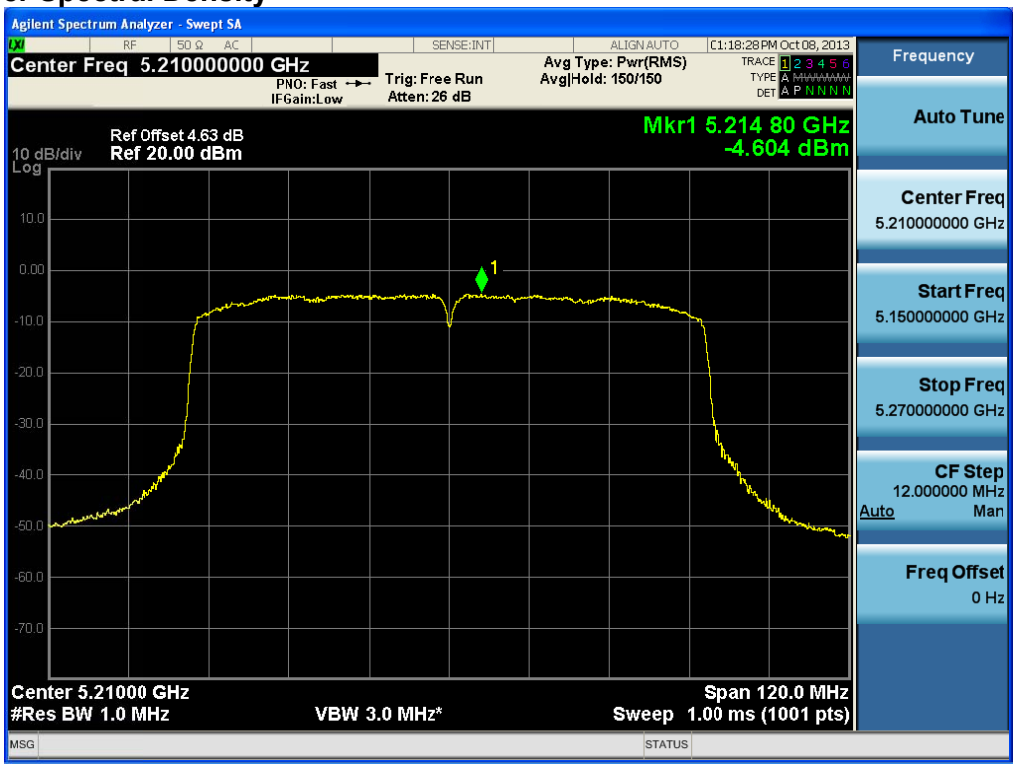


Peak Power Spectral Density Test Mode: 802.11n(HT40)& Ch.134



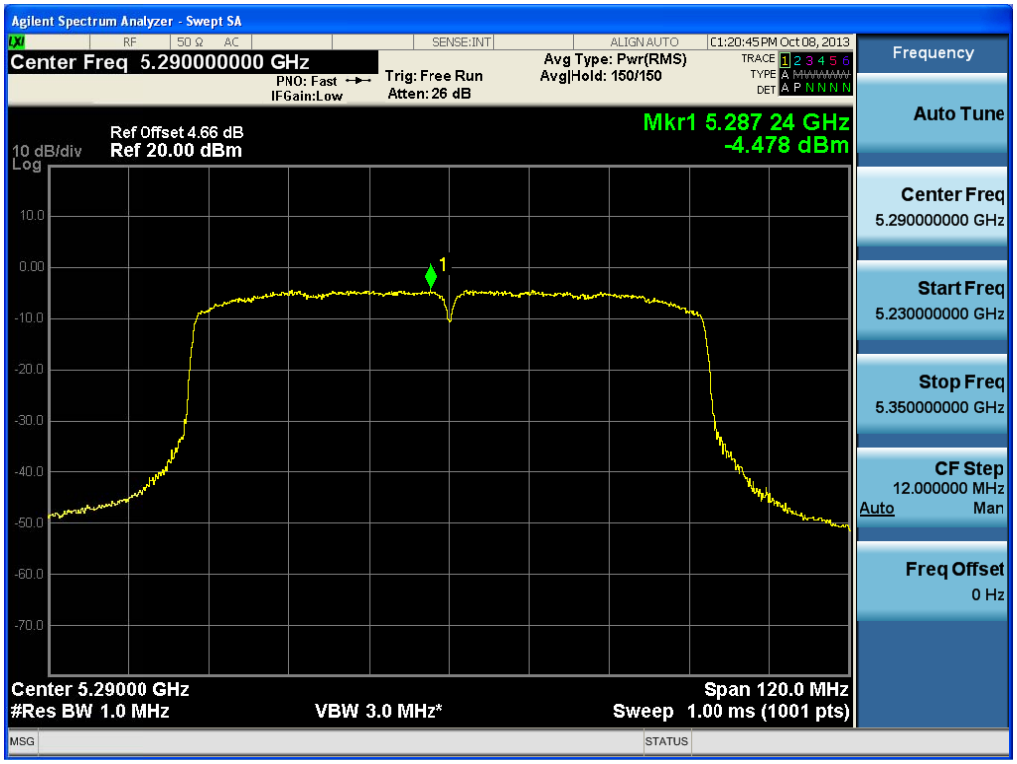
Peak Power Spectral Density

Test Mode: 802.11ac(VHT80)& Ch.42

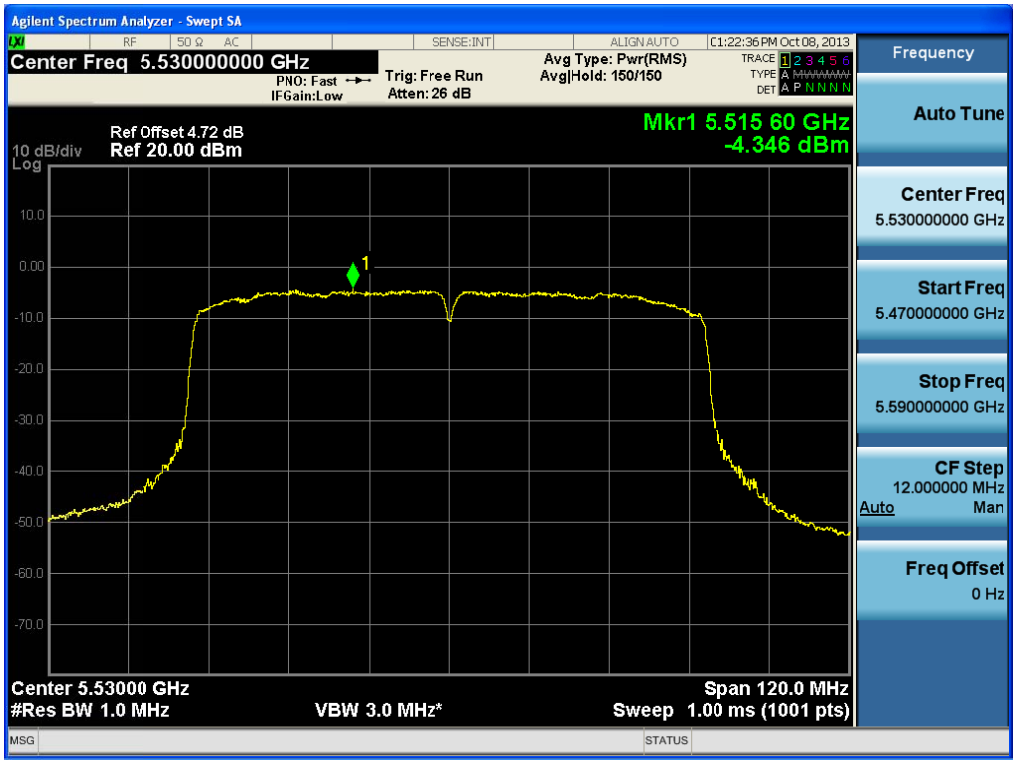


Peak Power Spectral Density

Test Mode: 802.11ac(VHT80)& Ch.58



Peak Power Spectral Density Test Mode: 802.11ac(VHT80)& Ch.106



3.2.4 Peak Excursion Ratio

Test requirements

The ratio of the peak excursion of the modulation envelope (measured using a peakhold function) to the maximum conducted output power (measured as specified above) shall not exceed**13 dB/MH**z.

▣TEST CONFIGURATION

Refer to the APPENDIX I.

▣TEST PROCEDURE

Peak Excursion Ratio is measured using Measurement Procedure **ofKDB789033 v01r03**

1) Compliance with the peak excursion requirement of Section 15.407(a)(6) shall be demonstrated byconfirming that the ratio of the maximum of the peak-max-hold spectrum to the maximum of the average
spectrum for continuous transmission does not exceed 13 dB. (Earlier procedures that required computing the ratio of the two spectra at each frequency across the emission bandwidth can lead to unintended failures at band edges and will no longer be required.)
2) Set the spectrum analyzer span to view the entire emission bandwidth.
3) Find the maximum of the peak-max-hold spectrum.
   a) Set **RBW = 1 MHz.**
   b) **VBW ≥ 3 MHz**.
   c) **Detector = peak.**
   d) **Trace mode = max-hold.**
   e) Allow the sweeps to continue until the trace stabilizes.
   f) Use the peak search function to find the peak of the spectrum.
4) **Use the procedure found under F) to measure the PPSD.**
5) Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

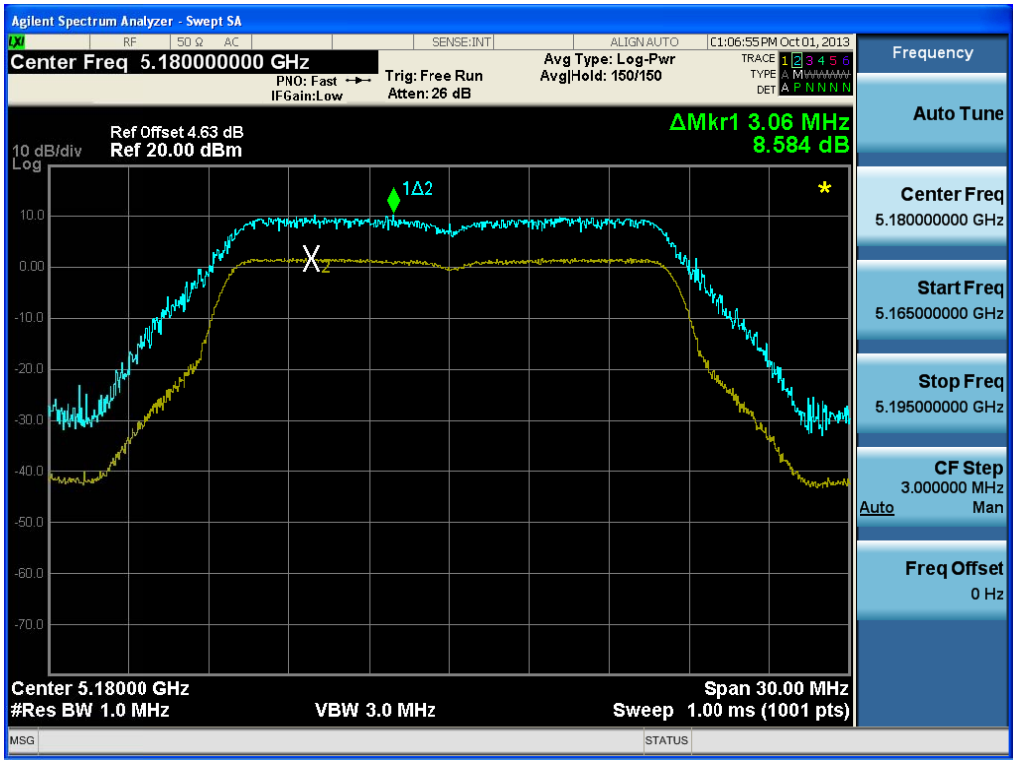
■**TEST RESULT :Comply**

Mode	Band	Channel	Frequency [MHz]	Test Result [dB/MHz]	Limit [dB/MHz]
802.11a	Band I	36	5180	8.584	13.000
		40	5200	8.079	
		48	5240	8.135	
	Band II	52	5260	7.578	
		60	5300	8.455	
		64	5320	8.228	
	Band III	100	5500	8.466	
		116	5580	8.131	
		140	5700	7.902	
802.11n (HT20)	Band I	36	5180	9.202	
		40	5200	8.220	
		48	5240	8.848	
	Band II	52	5260	8.705	
		60	5300	8.380	
		64	5320	8.057	
	Band III	100	5500	8.025	
		116	5580	8.537	
		140	5700	8.039	
802.11n (HT40)	Band I	38	5190	8.060	
		46	5230	8.655	
	Band II	54	5270	8.143	
		62	5310	8.933	
	Band III	102	5510	8.312	
		110	5550	8.471	
		134	5670	8.056	
802.11ac (VHT80)	Band I	42	5210	8.805	
	Band II	58	5290	8.646	
	Band III	106	5530	8.443	

▣Measurement Data PLOTS

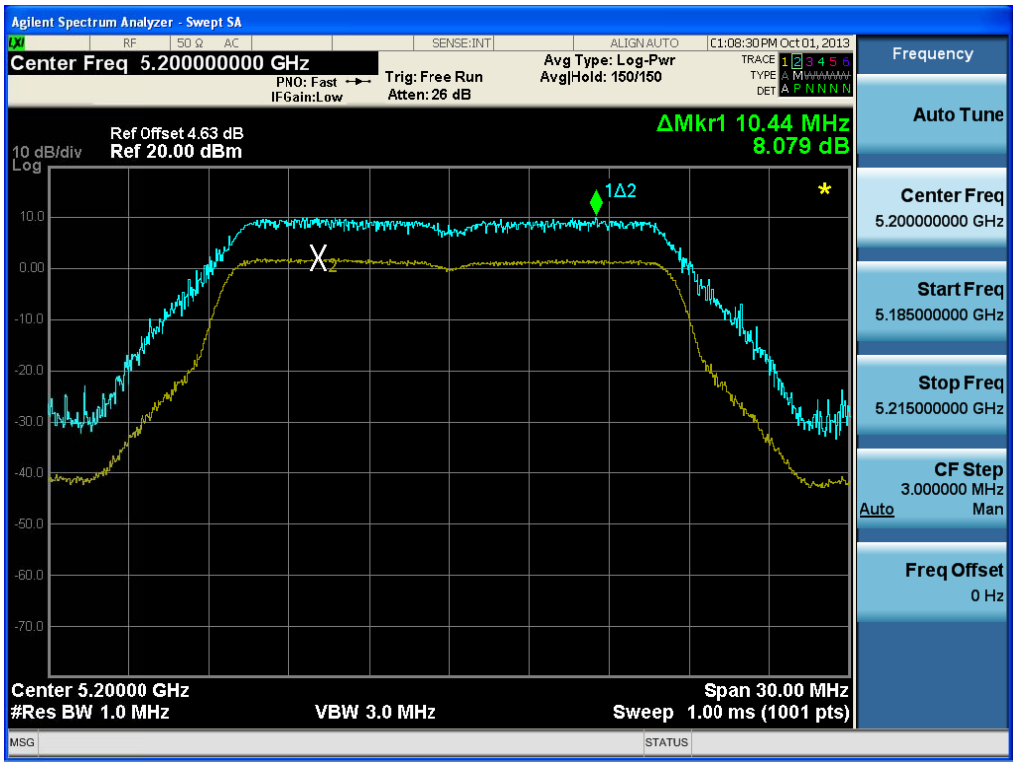
Peak Excursion Ratio

Test Mode: 802.11a & Ch.36

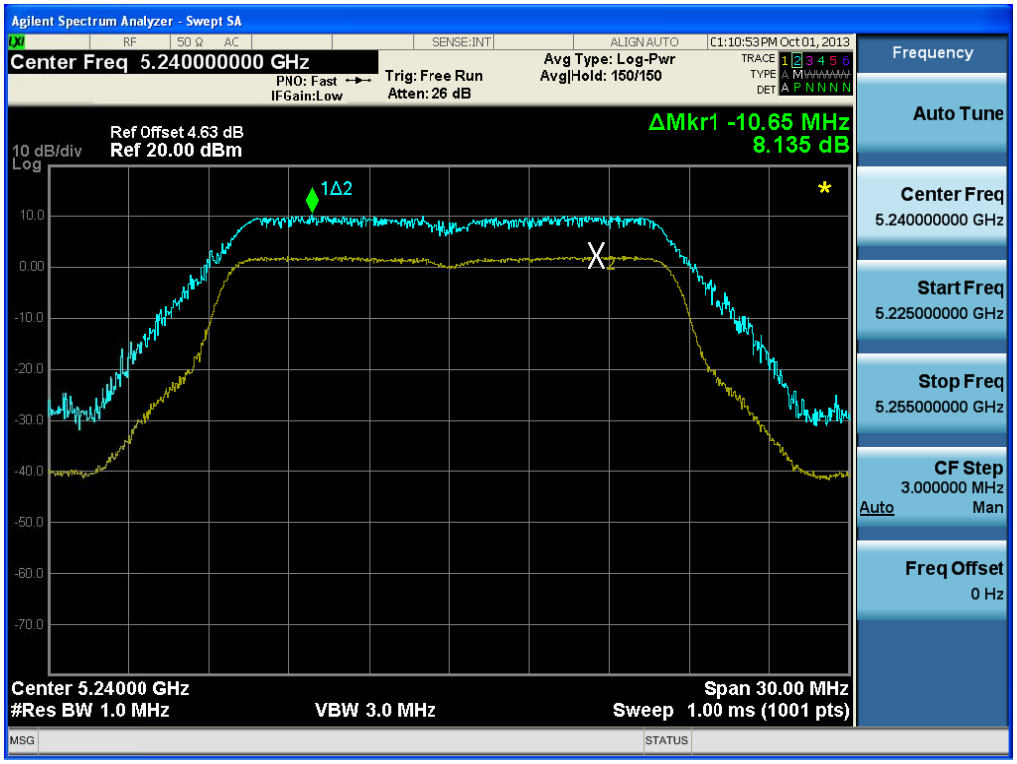


Peak Excursion Ratio

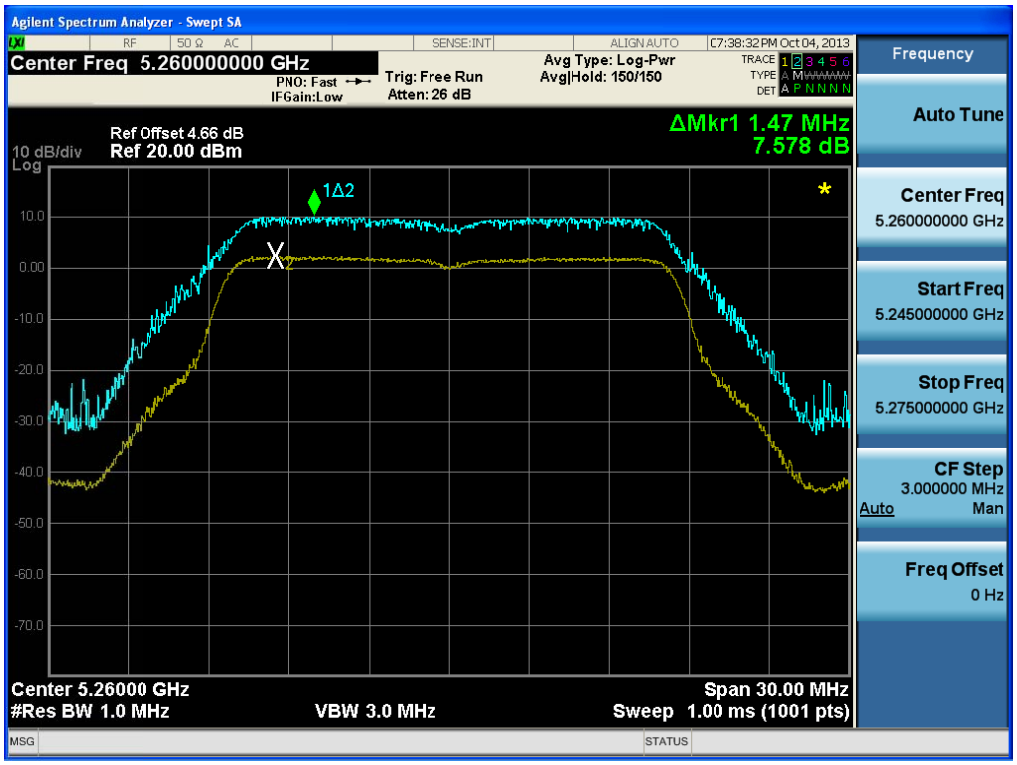
Test Mode: 802.11a & Ch.40



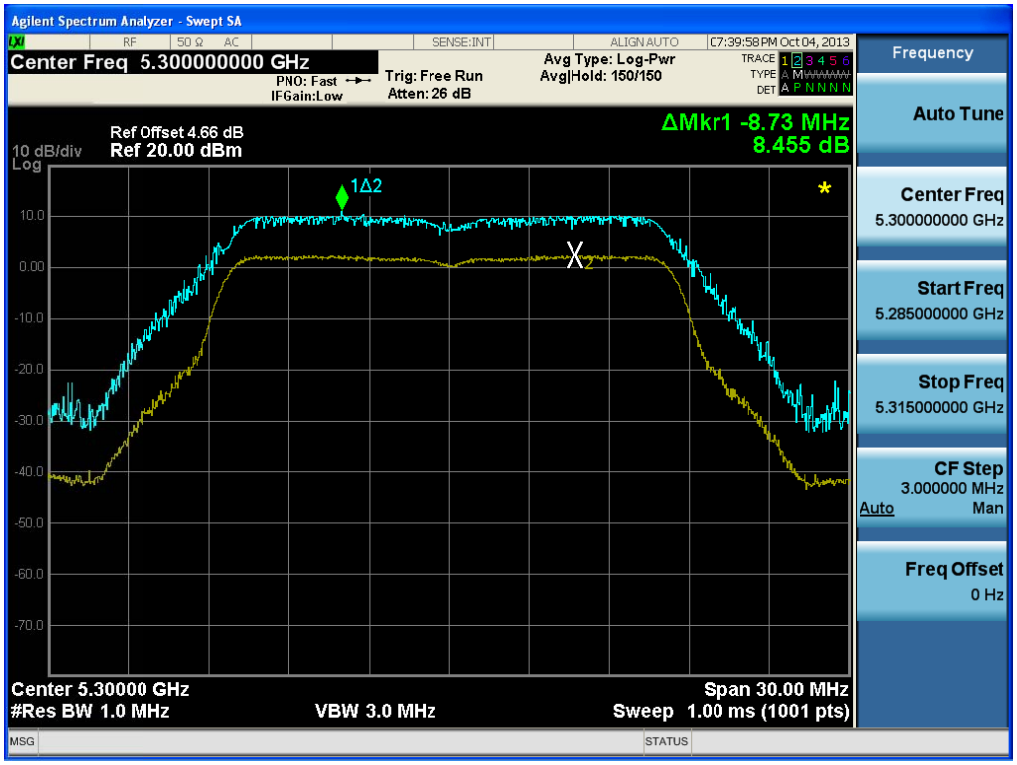
Peak Excursion Ratio Test Mode: 802.11a & Ch.48



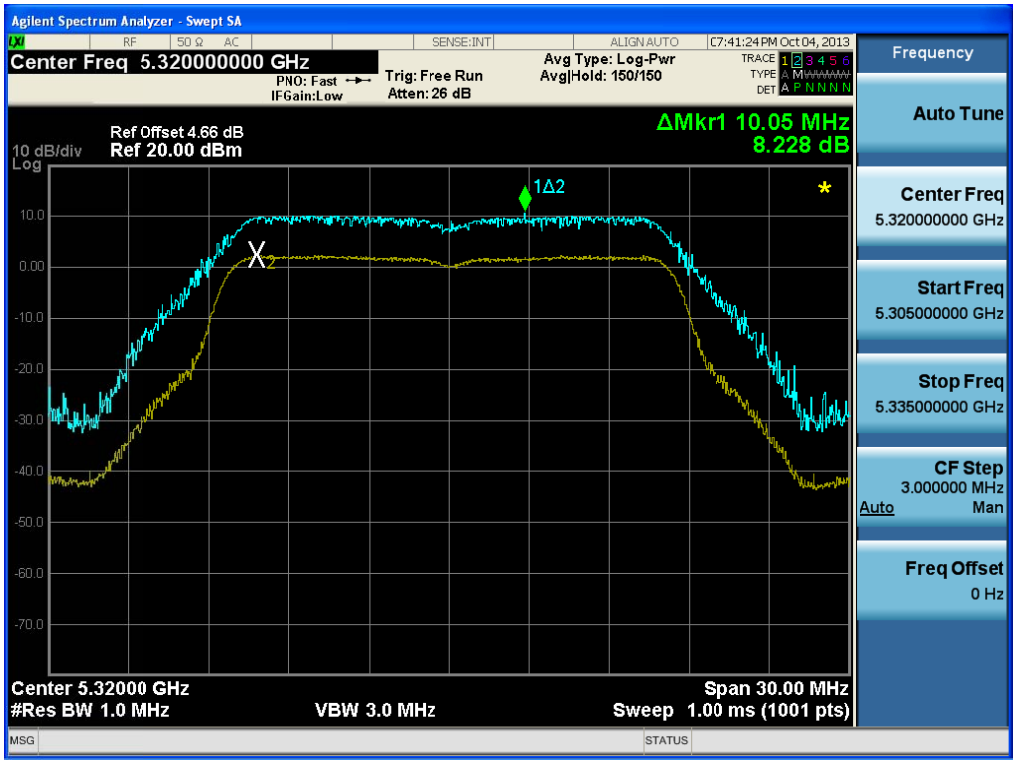
Peak Excursion Ratio Test Mode: 802.11a & Ch.52



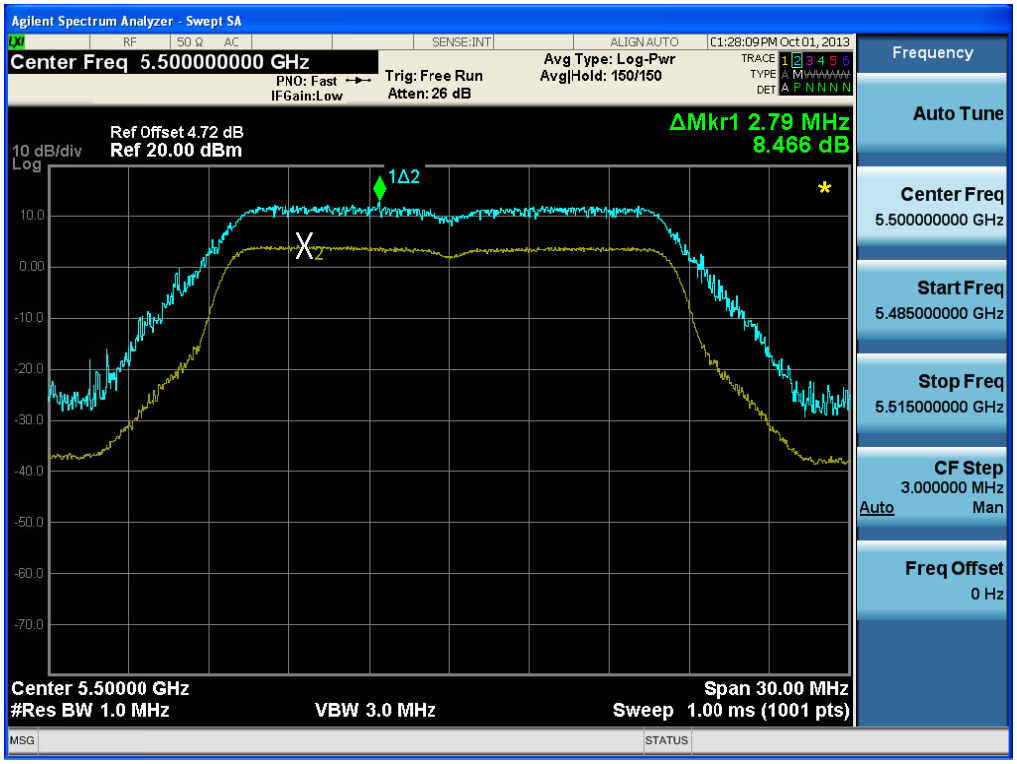
Peak Excursion Ratio Test Mode: 802.11a &Ch.60



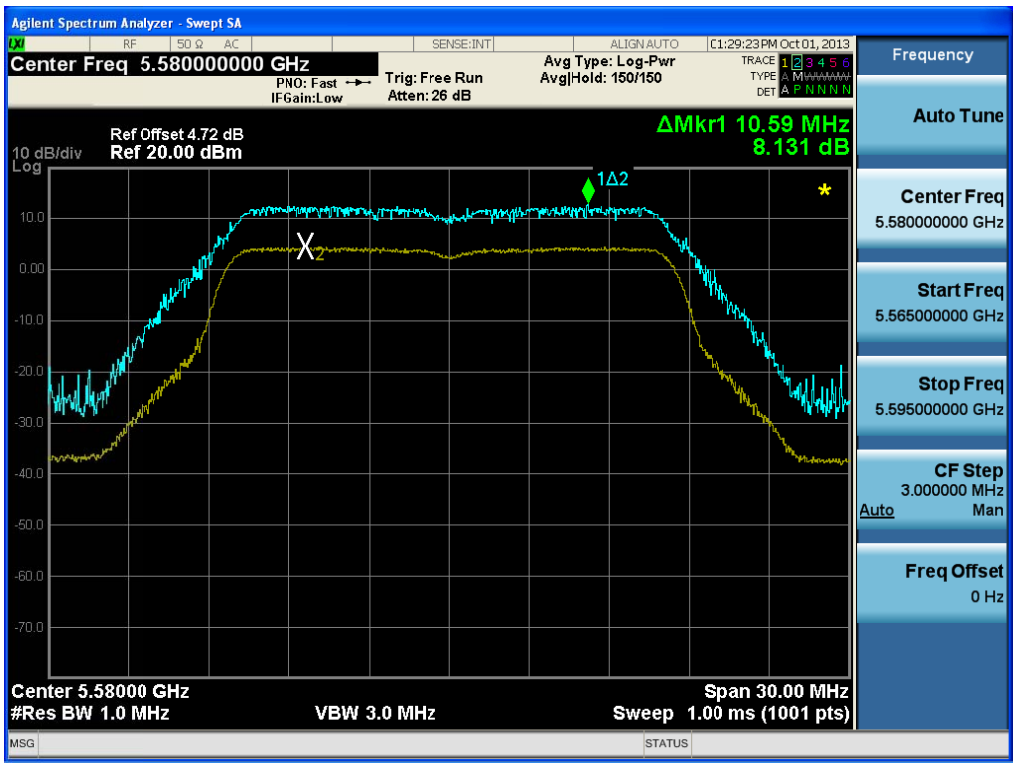
Peak Excursion Ratio Test Mode: 802.11a & Ch.64



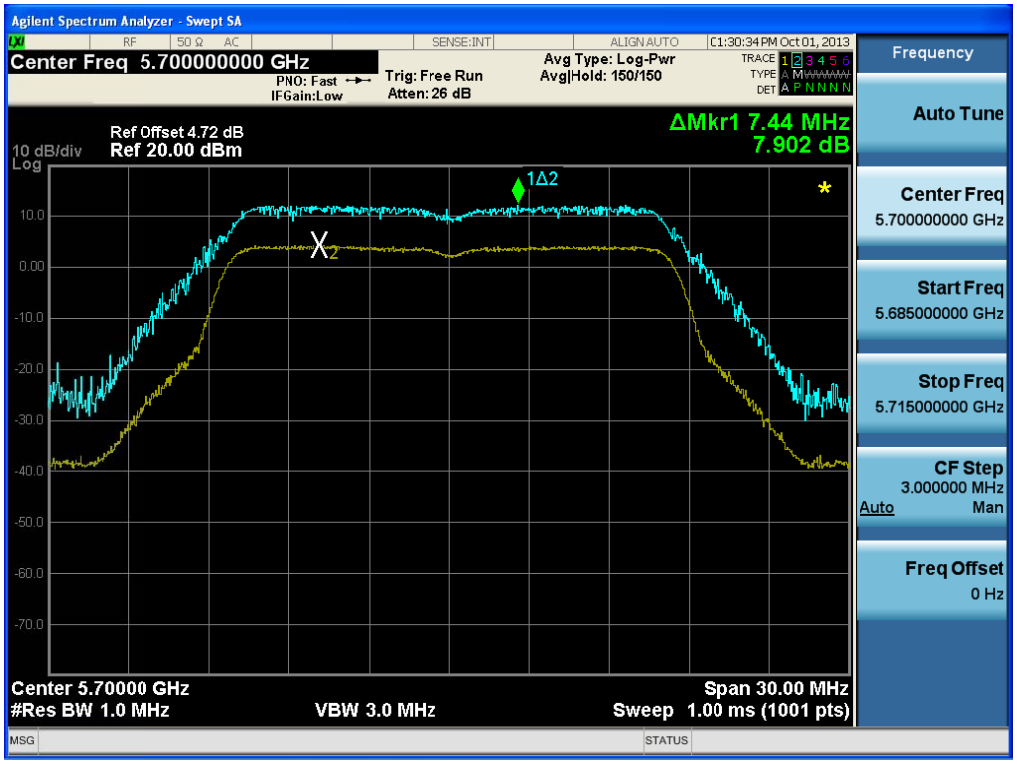
Peak Excursion Ratio Test Mode: 802.11a & Ch.100



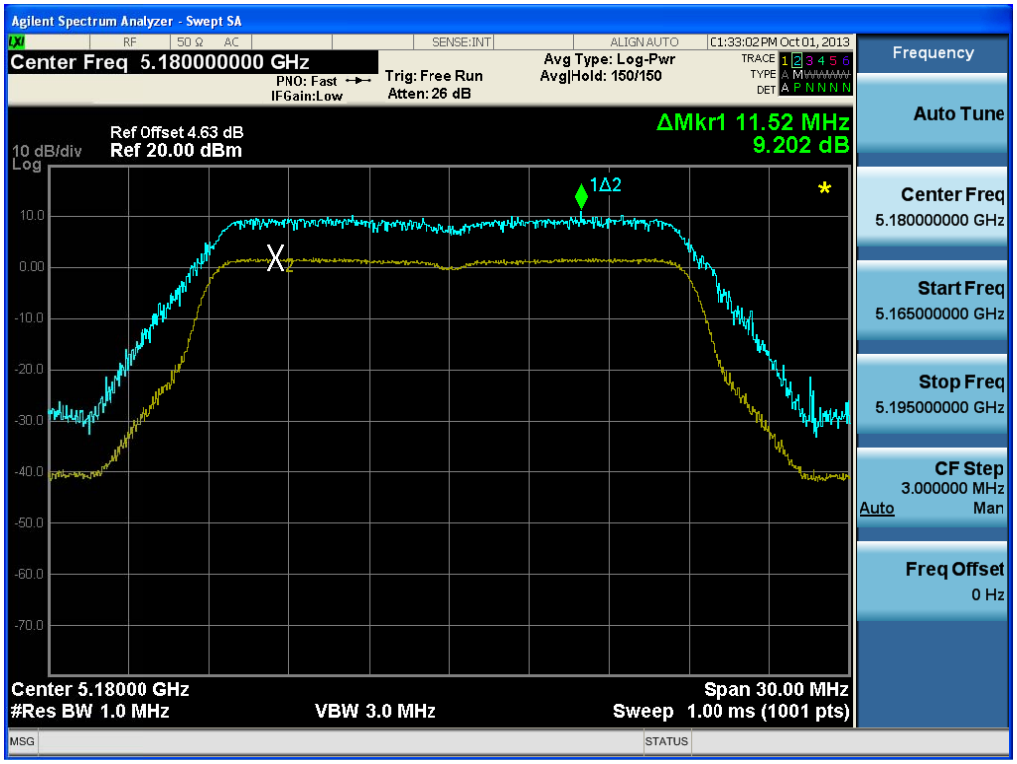
Peak Excursion Ratio Test Mode: 802.11a & Ch.116



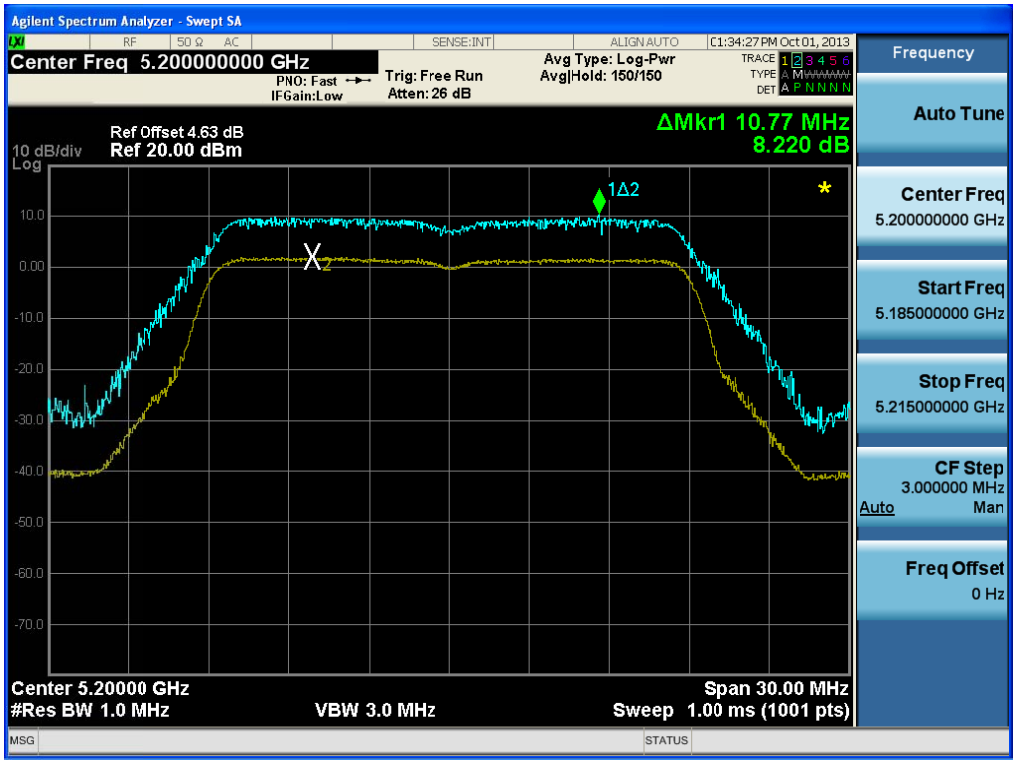
Peak Excursion Ratio Test Mode: 802.11a & Ch.140



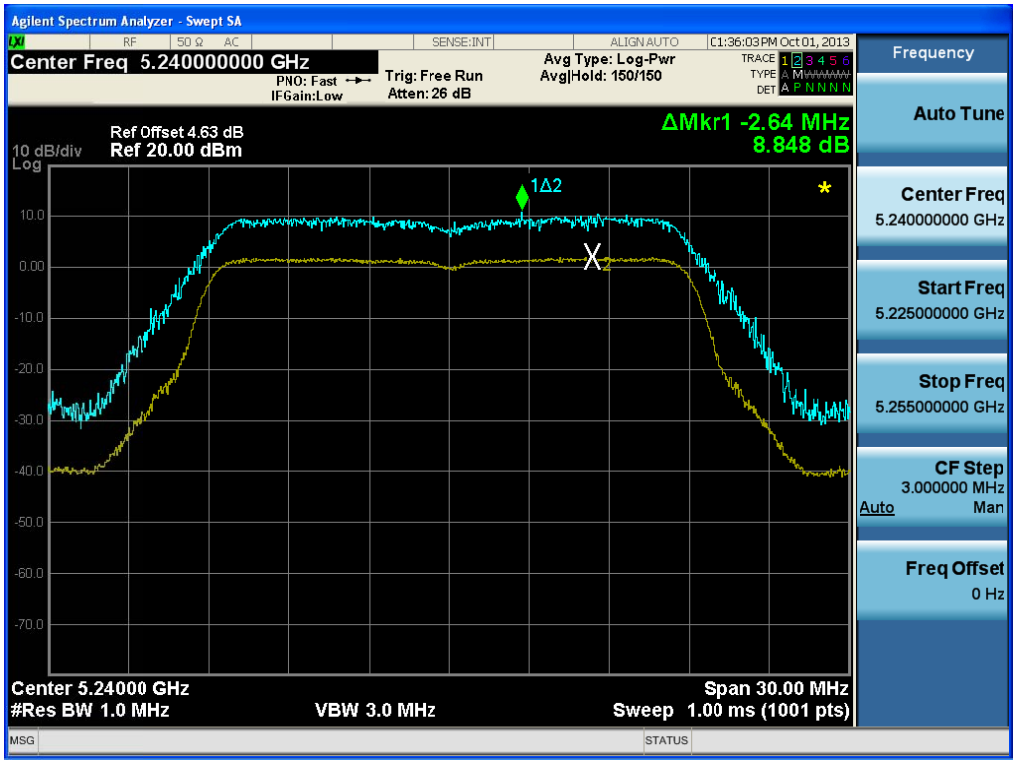
Peak Excursion Ratio Test Mode: 802.11n(HT20)& Ch.36



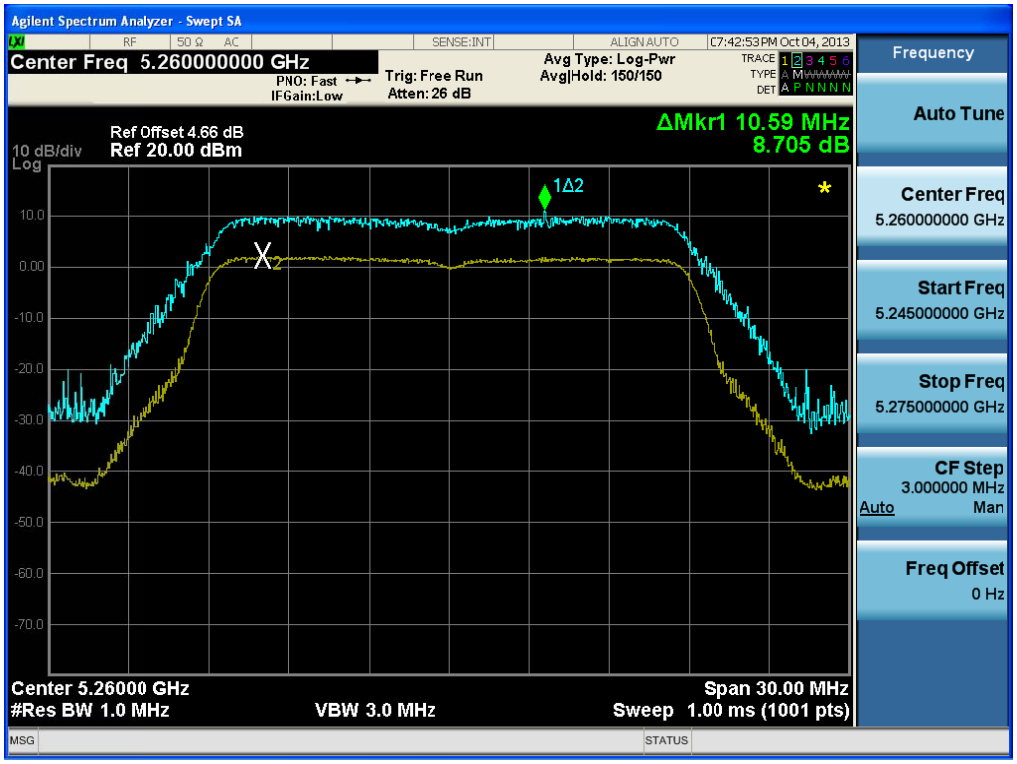
Peak Excursion Ratio Test Mode: 802.11n(HT20)& Ch.40



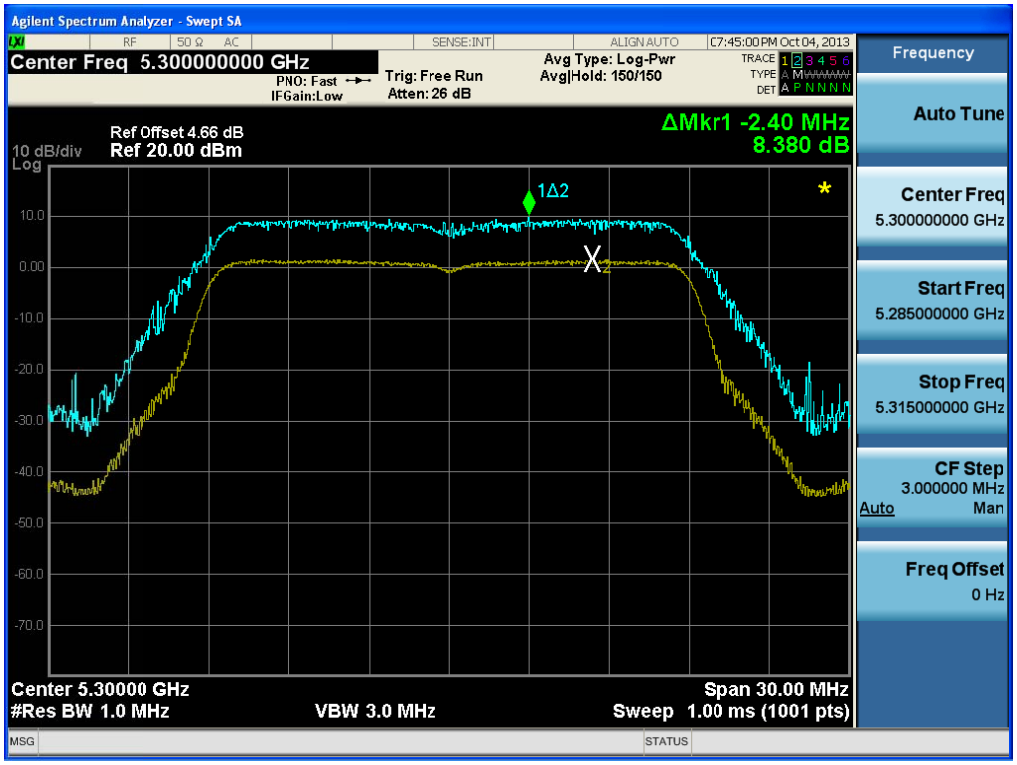
Peak Excursion Ratio Test Mode: 802.11n(HT20)& Ch.48



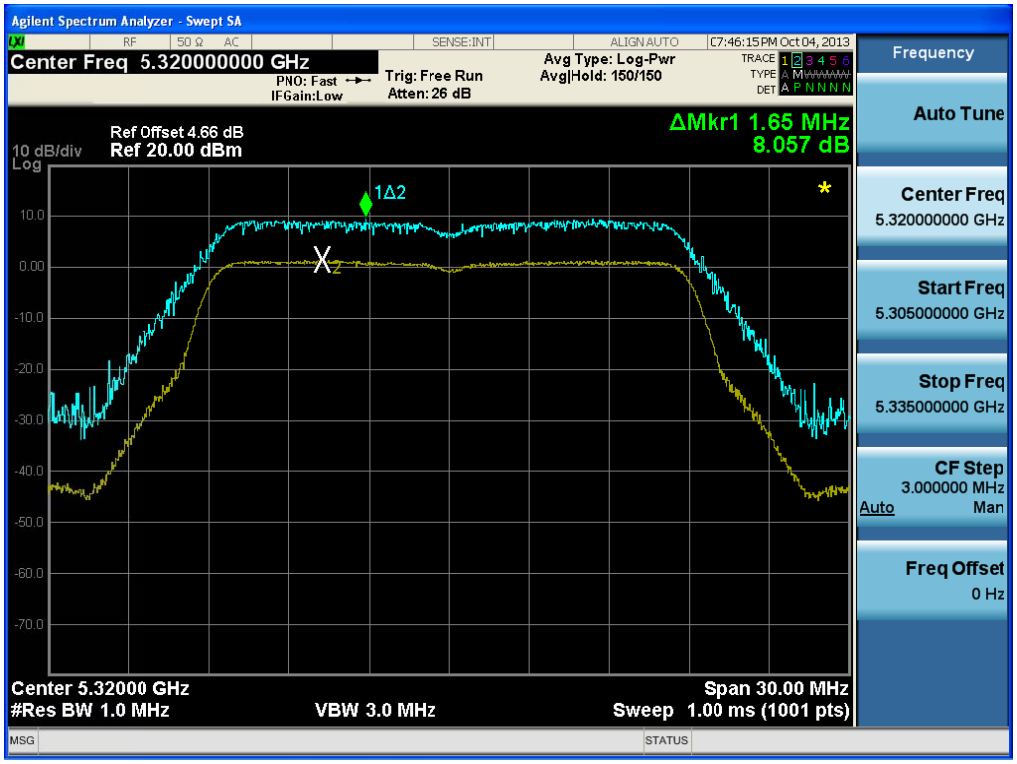
Peak Excursion Ratio Test Mode: 802.11n(HT20)& Ch.52



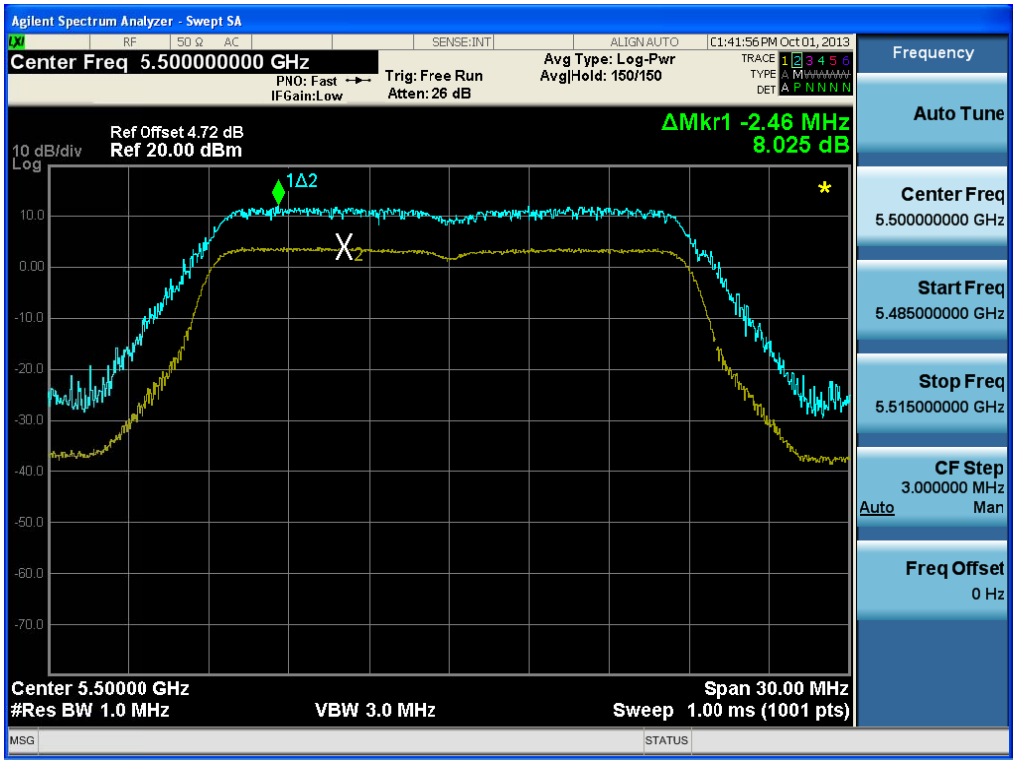
Peak Excursion Ratio Test Mode: 802.11n(HT20)&Ch.60



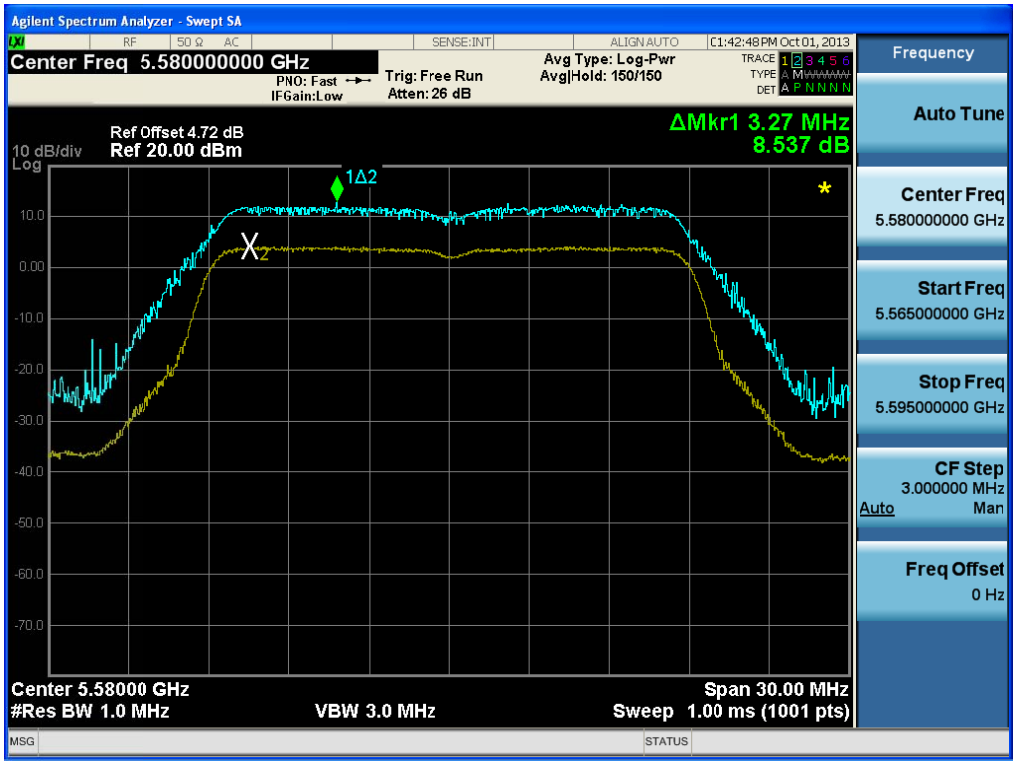
Peak Excursion Ratio Test Mode: 802.11n(HT20)& Ch.64



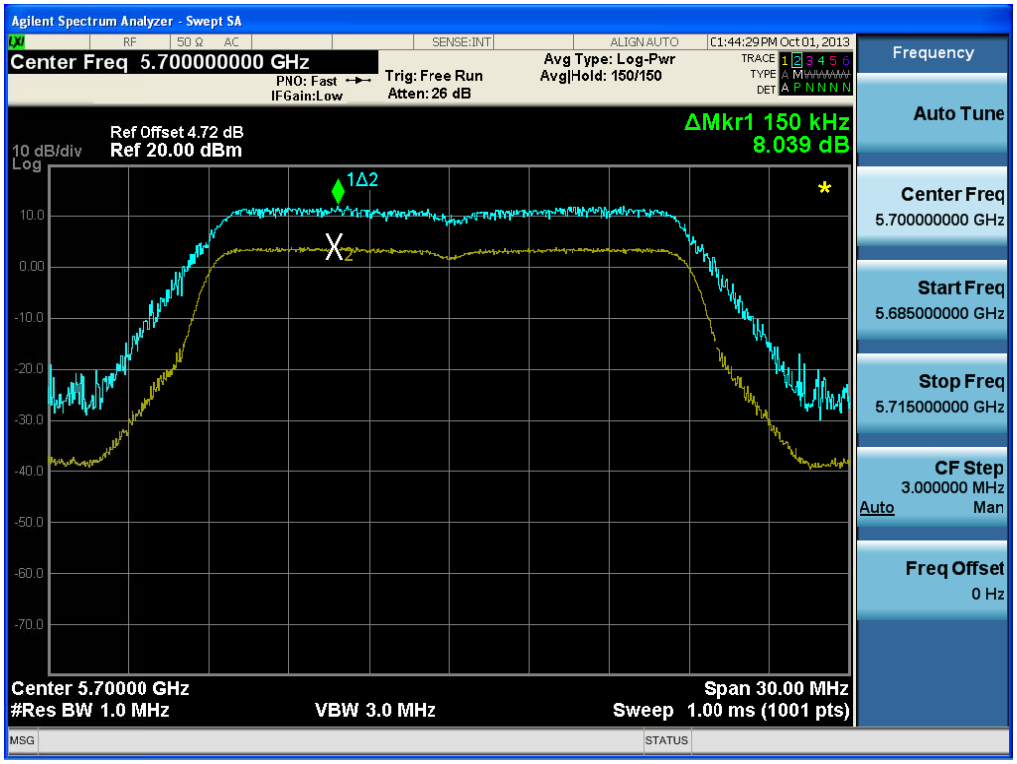
Peak Excursion Ratio Test Mode: 802.11n(HT20)& Ch.100



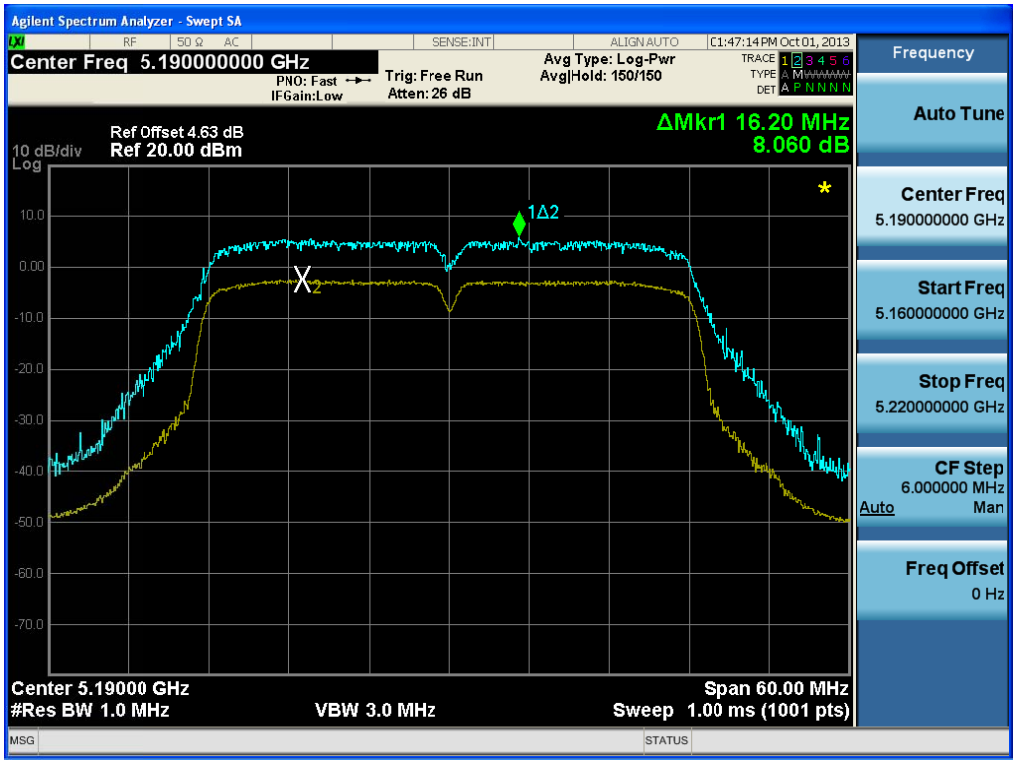
Peak Excursion Ratio Test Mode: 802.11n(HT20)& Ch.116



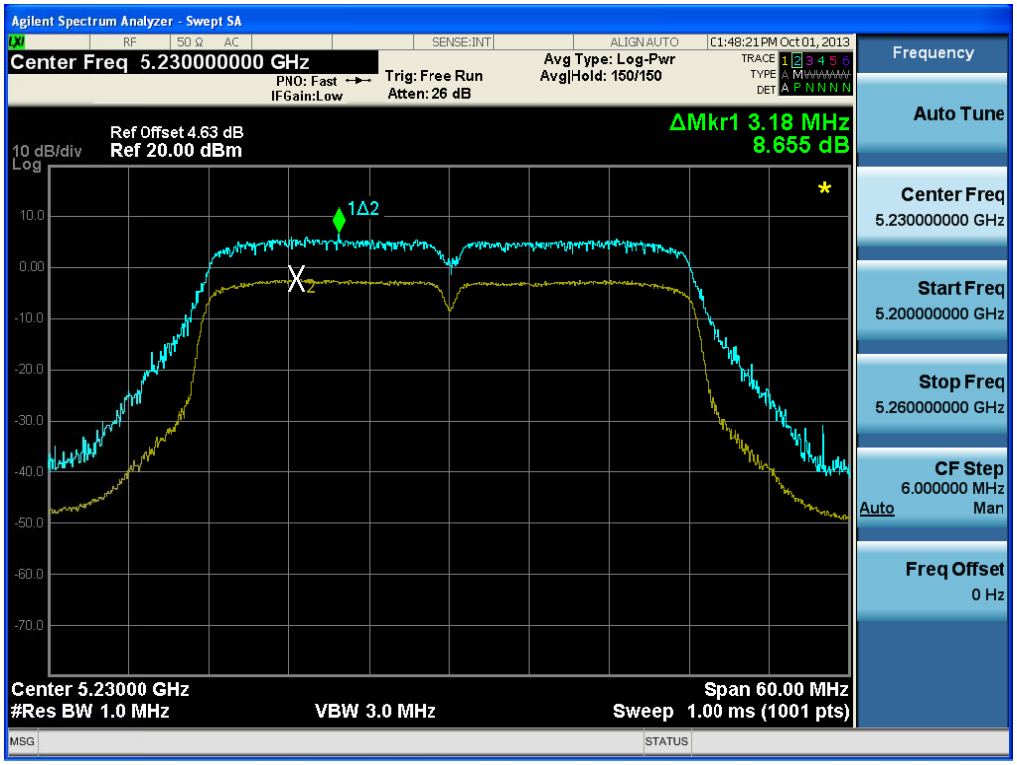
Peak Excursion Ratio Test Mode: 802.11n(HT20)& Ch.140



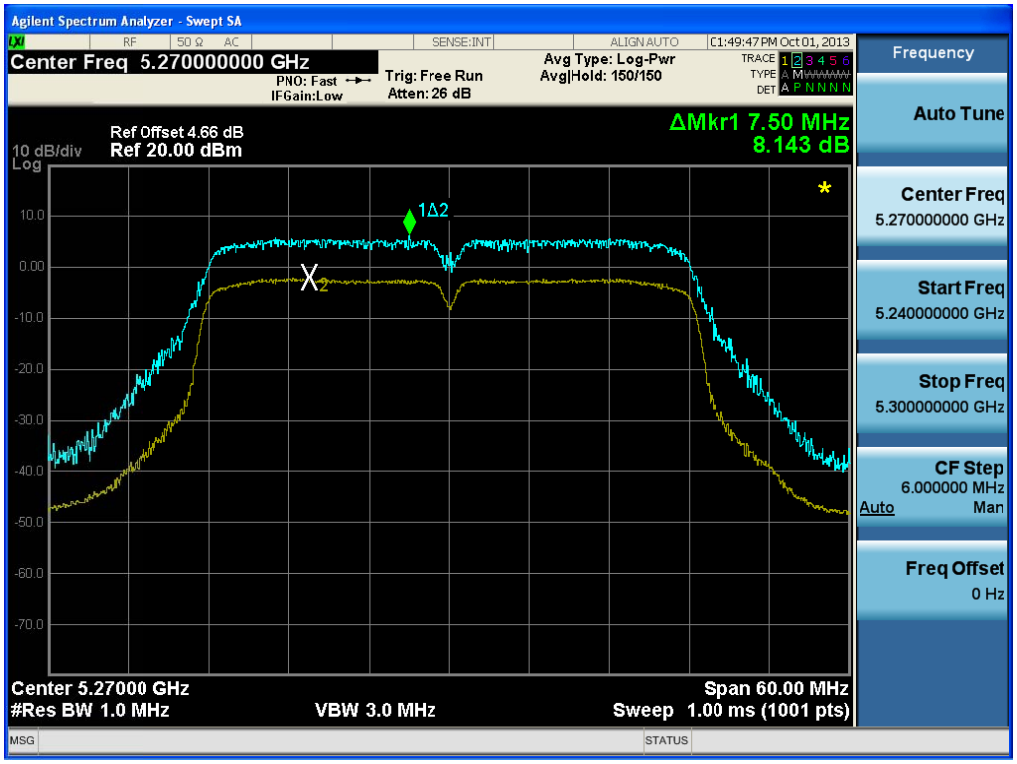
Peak Excursion Ratio Test Mode: 802.11n(HT40)&Ch.38



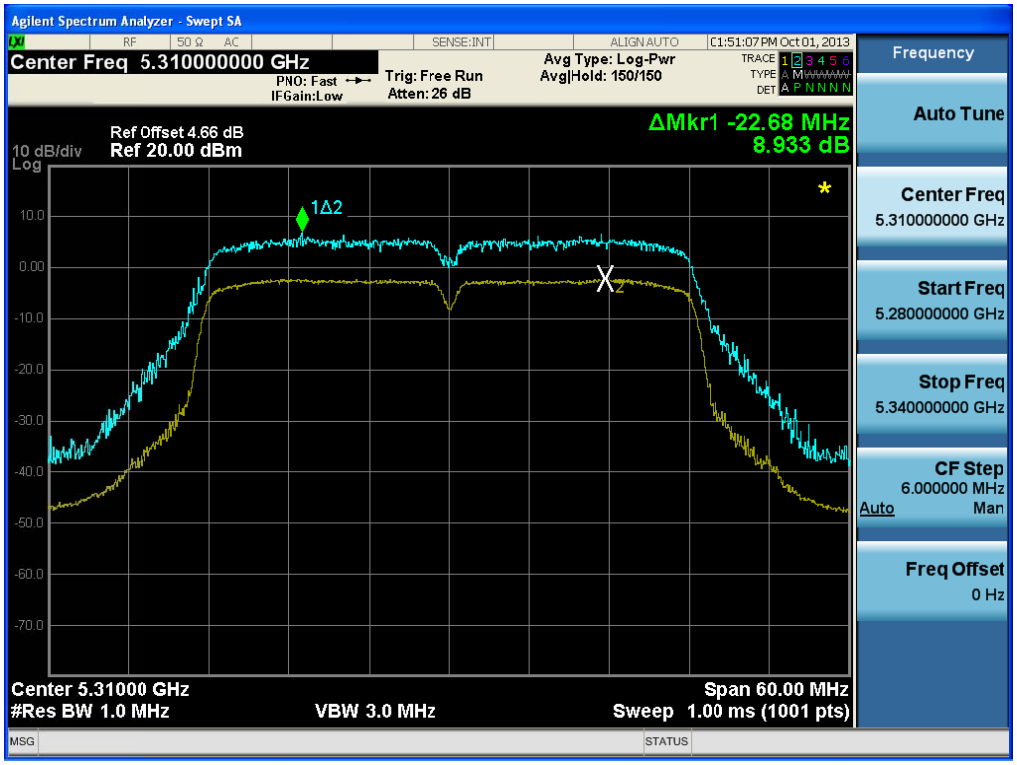
Peak Excursion Ratio Test Mode: 802.11n(HT40)& Ch.46



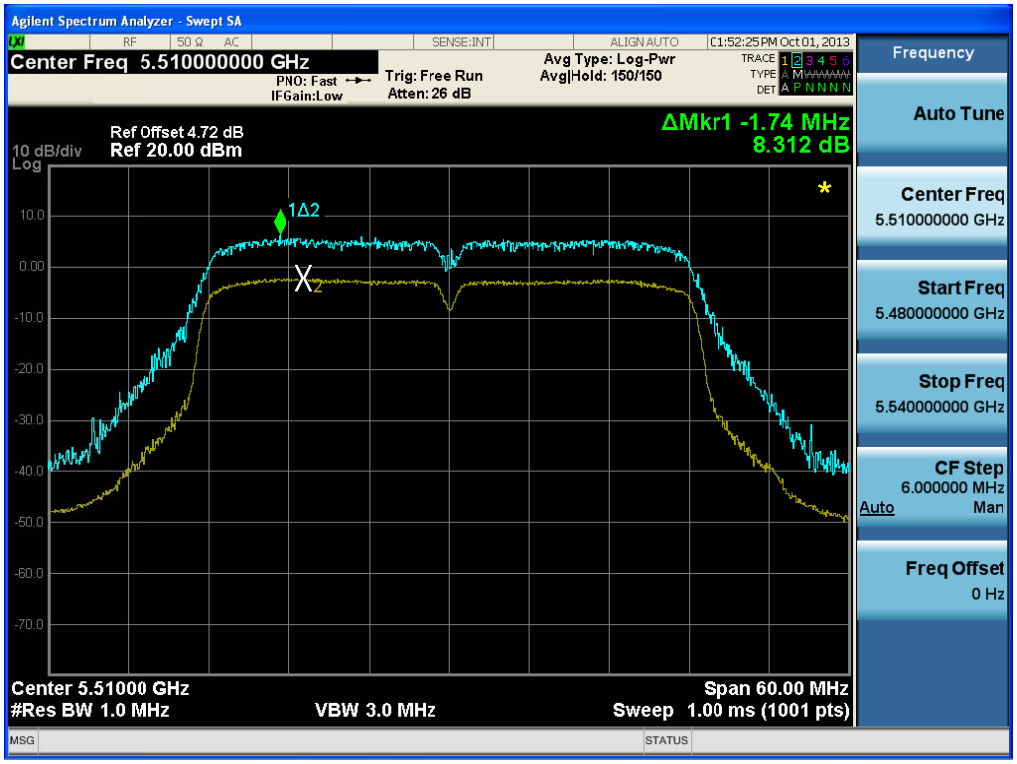
Peak Excursion Ratio Test Mode: 802.11n(HT40)& Ch.54



Peak Excursion Ratio Test Mode: 802.11n(HT40)& Ch.62

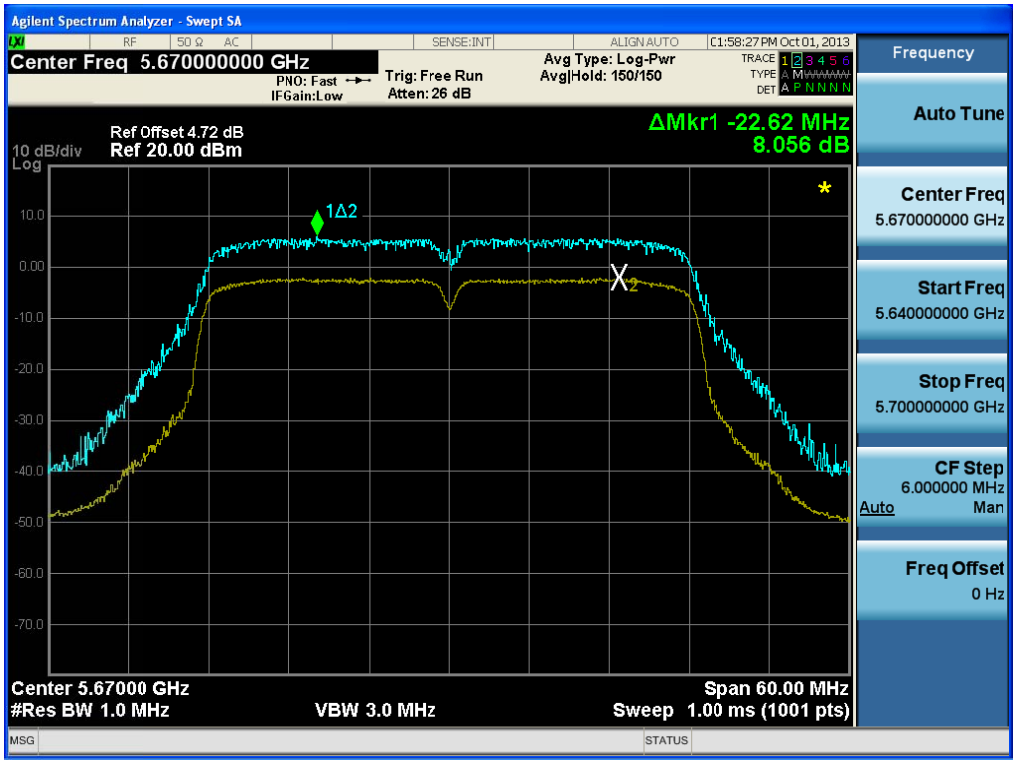


Peak Excursion Ratio Test Mode: 802.11n(HT40)& Ch.102



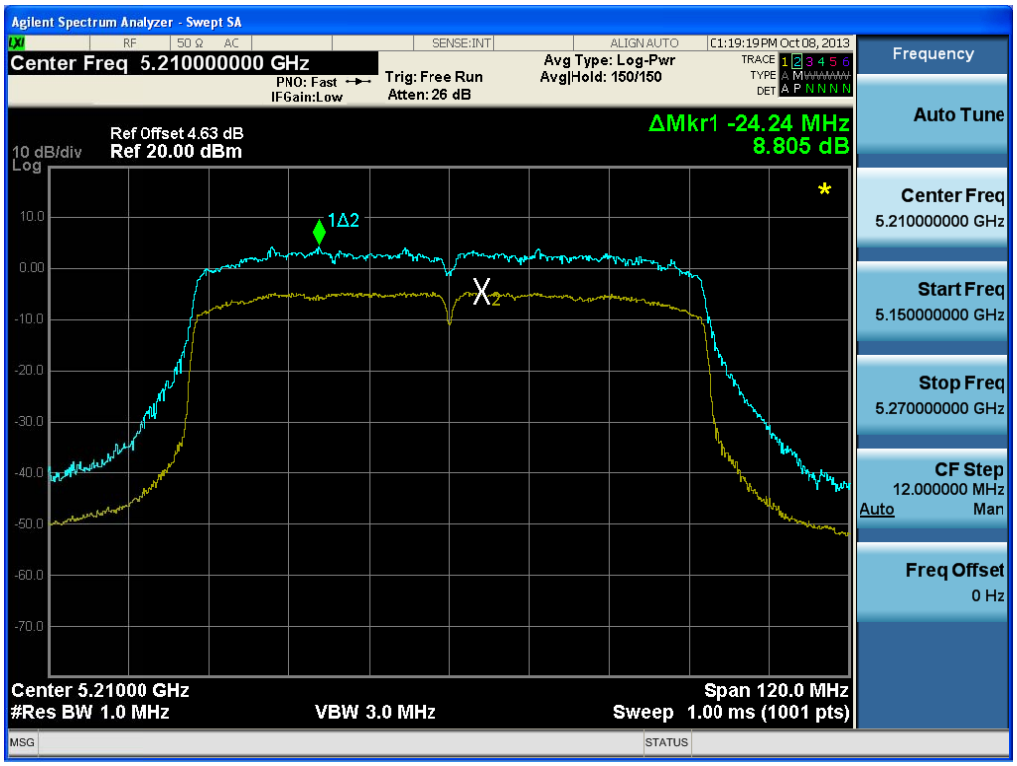
Peak Excursion Ratio Test Mode: 802.11n(HT40)& Ch.110

Peak Excursion Ratio Test Mode: 802.11n(HT40)& Ch.134



Peak Excursion Ratio

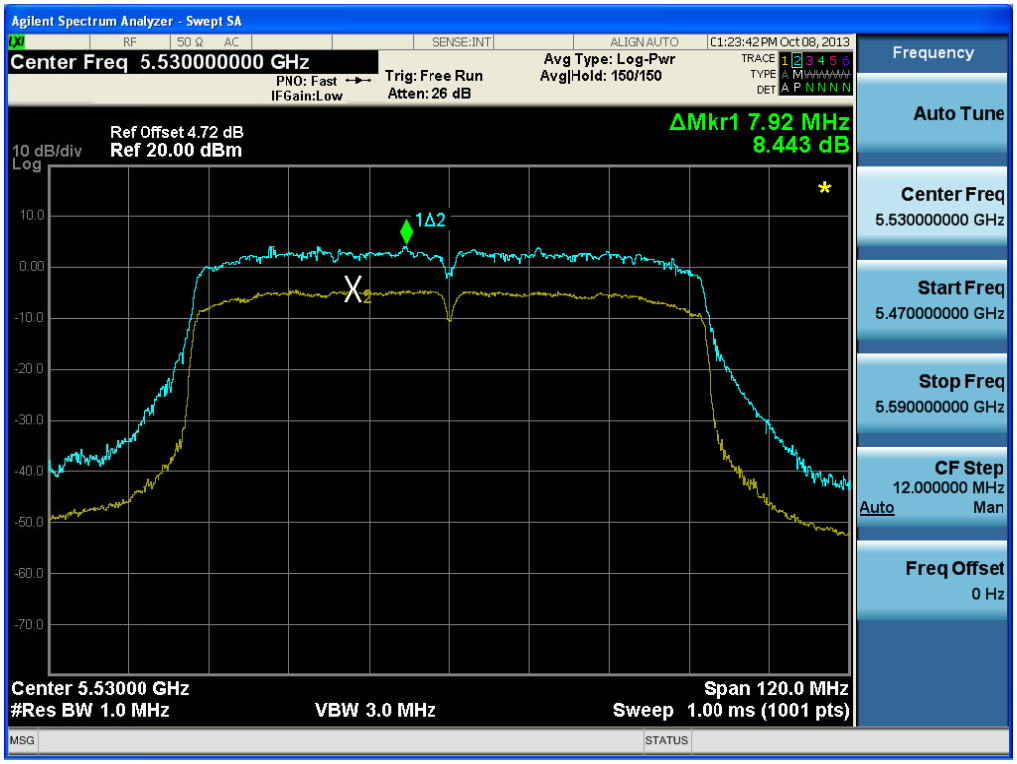
Test Mode: 802.11n(HT80)& Ch.42



Peak Excursion Ratio

Test Mode: 802.11ac(VHT80)& Ch.58

Peak Excursion Ratio Test Mode: 802.11ac(VHT80)& Ch.106



3.2.5Frequency Stability

Test requirements

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

▣TEST PROCEDURE

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between-30℃ and +50℃. The temperature was incremented by 10℃ intervals and the unit was allowed to stabilize at each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.
This test was performed at one channel out of the operating frequency range.

- Band I = 5180MHz(36 channel)
- Band II = 5320MHz(64 channel)
- Band III = 5700MHz(140 channel)

▣TEST RESULT :Comply

- Measurement Data:

OPERATING FREQUENCY : 5,180,000,000Hz
CHANNEL : 36
REFERENCE VOLTAGE : 3.800V DC

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQ (Hz)	Deviation (%)
100%	3.800	+25(Ref)	5,179,986,334	-0.000264
100%		- 30	5,180,018,994	0.000367
100%		- 20	5,179,987,736	-0.000237
100%		- 10	5,180,027,326	0.000528
100%		0	5,180,014,056	0.000271
100%		+10	5,180,011,839	0.000229
100%		+20	5,180,022,929	0.000443
100%		+30	5,179,995,609	-0.000085
100%		+40	5,180,003,744	0.000072
100%		+50	5,180,010,370	0.000200
100 %		+ 60	5,180,018,722	0.000361
85 %	3.230	+ 25	5,179,987,195	-0.000247
115%	4.370	+25	5,180,013,018	0.000251
BATT.ENDPOINT	2.800	+ 25	5,179,973,578	-0.000510

- Minimum Standard: The emission is maintained within the band of the operation.

- Measurement Data:

OPERATING FREQUENCY : 5,320,000,000Hz
CHANNEL : 64
REFERENCE VOLTAGE : 3.800V DC

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQ (Hz)	Deviation (%)
100%	3.800	+25(Ref)	5,319,981,170	-0.000354
100%		- 30	5,320,018,018	0.000339
100%		- 20	5,320,014,262	0.000268
100%		- 10	5,320,016,845	0.000317
100%		0	5,319,987,289	-0.000239
100%		+10	5,319,977,465	-0.000424
100%		+20	5,320,013,621	0.000256
100%		+30	5,319,981,861	-0.000341
100%		+40	5,319,990,420	-0.000180
100%		+50	5,320,015,104	0.000284
100 %		+ 60	5,319,991,318	-0.000163
85 %	3.230	+ 25	5,319,982,536	-0.000328
115%	4.370	+25	5,320,008,480	0.000159
BATT.ENDPOINT	2.800	+ 25	5,319,982,116	-0.000336

- Minimum Standard: The emission is maintained within the band of the operation.

- Measurement Data:

OPERATING FREQUENCY : 5,700,000,000Hz
CHANNEL : 140
REFERENCE VOLTAGE : 3.800V DC

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQ (Hz)	Deviation (%)
100%	3.800	+25(Ref)	5,699,990,001	-0.000175
100%		- 30	5,700,014,290	0.000251
100%		- 20	5,700,022,947	0.000403
100%		- 10	5,700,008,516	0.000149
100%		0	5,699,981,258	-0.000329
100%		+10	5,700,010,041	0.000176
100%		+20	5,700,028,237	0.000495
100%		+30	5,699,981,258	-0.000329
100%		+40	5,700,026,121	0.000458
100%		+50	5,700,016,041	0.000281
100 %		+ 60	5,699,988,583	-0.000200
85 %	3.230	+ 25	5,699,975,541	-0.000429
115%	4.370	+25	5,699,971,203	-0.000505
BATT.ENDPOINT	2.800	+ 25	5,699,987,236	-0.000224

- Minimum Standard: The emission is maintained within the band of the operation.

3.2.6Radiated Spurious Emission Measurements

▣TEST PROCEDURE

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in semi anechoic chamber. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine the worst-case orientation for maximum emissions.

Radiated spurious emission measured using followingMeasurement Procedure **of KDB789033**

- **Measurements Below 1000MHz**

a) Follow the requirements in section H)3), “General Requirements for Unwanted Emissions Measurements”

b) Compliance shall be demonstrated using **CISPR quasi-peak detection**; however, **peak detection** ispermitted as an alternative to quasi-peak detection.

H)3),General Requirements for Unwanted Emissions Measurements. The following requirements apply to all unwanted emissions measurements, both in and outside of the restricted bands:

a) EUT Duty Cycle

(1) The EUT shall be configured or modified to **transmit continuously** except as stated in (ii), below. The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle(**tono lower than 98 percent**) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

(2) If **continuous transmission (or at least 98 percent duty cycle) cannot be achieved** due to hardware limitations of the EUT (e.g., overheating), the following additions to the measurement and reporting procedures are required:

- The EUT shall be configured to operate at the maximum achievable duty cycle.
- Measure the duty cycle, x, of the transmitter output signal.
- Adjustments to measurement procedures (e.g., increasing test time and number of traces averaged) shall be performed as described in the procedures below.
- The test report shall include the following additional information:
  - The reason for the duty cycle limitation.
  - The duty cycle achieved for testing and the associated transmit duration and interval between transmissions.
  - The sweep time and the amount of time used for trace stabilization during max-hold measurements for peak emission measurements.

(3) **Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.**

- **Measurements Above 1000MHz(Peak)**

a) Follow the requirements in section H)3), “General Requirements for Unwanted Emissions Measurements”.
b) Peak emission levels are measured by setting the analyzer as follows:
(1) **RBW = 1 MHz**.
(2) **VBW ≥ 3 MHz**.
(3) **Detector = Peak.**
(4) Sweep time = auto.
(5) Trace mode = max hold.
(6) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

- **Measurements Above 1000MHz(Method AD)**

(1) **RBW = 1 MHz.**
(2) **VBW ≥ 3 MHz.**
(3) **Detector = RMS**, if span/(# of points in sweep) ≤ RBW/2. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.
(4) Averaging type = power (i.e., RMS)
• As an alternative, the detector and averaging type may be set for linear voltage averaging. Some analyzers require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
(5) Sweep time = auto.
(6) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle. For example, with 50 percent duty cycle, at least 200 traces should be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100 percent duty cycle—rather than turning on and off with the transmit cycle, at least 100 traces shall be averaged.)
(7) If tests are performed with the EUT transmitting at a duty cycle less than 98 percent, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
• **If power averaging (RMS) mode was used in step (4) above, the correction factor is 10 log(1/x), where x is the duty cycle**. For example, if the transmit duty cycle was 50 percent, then 3 dB must be added to the measured emission levels.
• If linear voltage averaging mode was used in step (4) above, the correction factor is 20 log(1/x), where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 6 dB must be added to the measured emission levels.
• If a specific emission is demonstrated to be continuous (100 percent duty cycle) rather than turning on and off with the transmit cycle, no duty cycle correction is required for that emission.

▣Minimum Standard:

▪ **FCC Part 15.209(a) and (b)**

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

▪ **FCC Part 15.205 (a):** Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	3600 ~ 4400	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	4.5 ~ 5.15	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	5.35 ~ 5.46	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~ 156.52525	1660 ~ 1710	7.25 ~ 7.75	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.7 ~ 156.9	1718.8 ~ 1722.2	8.025 ~ 8.5	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	162.0125 ~ 167.17	2200 ~ 2300	9.0 ~ 9.2	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	167.72 ~ 173.2	2310 ~ 2390	9.3 ~ 9.5	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	240 ~ 285	2483.5 ~ 2500	10.6 ~ 12.7	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	322 ~ 335.4	2655 ~ 2900	13.25 ~ 13.4	
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	960 ~ 1240	3345.8 ~ 3358		

▪ **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

▪ **FCC Part 15.407 (b):** Undesirable Emission Limits: Except as shown in Paragraph (b)(6) of this section, the peak emissions outside of the frequency bands of operation shall be attenuated in accordance with thefollowing limits:

(1) For transmitters operating in the **5.15-5.25 GHz band**: all emissions outside of the **5.15-5.35 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
(2) For transmitters operating in the **5.25-5.35 GHz band**: all emissions outside of the **5.15-5.35 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.
(3) For transmitters operating in the **5.47-5.725 GHz band**: all emissions outside of the **5.47-5.725 GHz band** shall not exceed an **EIRP of -27 dBm/MHz.**
(4) For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.
(5) The above emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
(6) Unwanted emissions **below 1 GHz** must comply with the general field strength limits set forth in **Section 15.209**. Further, any U-NII devices using an **AC power line** are required to comply also with the conducted limits set forth in **Section 15.207**.

▣Measurement Data:

9KHz~ 40GHz Radiated Spurious Emissions: *802.11a& 5180MHz(Ch. 36)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5127.15	V	Z	PK	43.21	6.51	-	-	49.72	74.00	24.28
5127.65	V	Z	AV	34.99	6.51	-	-	41.50	54.00	12.50
10359.69	H	X	PK	47.38	10.16	-	-9.54	48.00	68.20	20.20
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

9KHz~ 40GHz Radiated Spurious Emissions: *802.11a& 5200MHz(Ch. 40)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10400.02	H	X	PK	46.43	10.31	-	-9.54	47.20	68.20	21.00
-	-	-	-	-	-	-	-	-	-	-

9KHz ~ 40GHz Radiated Spurious Emissions:*802.11a& 5240MHz(Ch. 48)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10479.87	H	X	PK	48.23	10.61	-	-9.54	49.30	68.20	18.90
-	-	-	-	-	-	-	-	-	-	-

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
   Margin = Limit – Result
   Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
   T.F = AF + CL – AG
   DUTY Correction Factor :N/A (Duty cycle = 99%)
3. Measurement Distance above 10 GHz = 1m.
   So Distance Correction Factor :-9.54dB = 20*log(1m/3m)

▣**Measurement Data:**

9KHz~ 40GHz Radiated Spurious Emissions: *802.11a & 5260MHz(Ch. 52)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10519.70	V	X	PK	46.85	10.61	-	-9.54	47.92	68.20	20.28
-	-	-	-	-	-	-	-	-	-	-

9KHz~ 40GHz Radiated Spurious Emissions: *802.11a&5300MHz(Ch.60)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10600.36	V	X	PK	46.23	10.69	-	-9.54	47.38	74.00	26.62
10600.08	V	X	AV	39.84	10.69	-	-9.54	40.99	54.00	13.01

9KHz ~ 40GHz Radiated Spurious Emissions:*802.11a& 5320MHz(Ch. 64)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5350.35	H	Z	PK	48.18	6.73	-	-	54.91	74.00	19.09
5350.30	H	Z	AV	32.12	6.73	-	-	38.85	54.00	15.15
5372.25	H	Z	PK	43.68	6.73	-	-	50.41	74.00	23.59
5372.20	H	Z	AV	35.4	6.73	-	-	42.13	54.00	11.87
10639.90	V	X	PK	45.47	11.42	-	-9.54	47.35	74.00	26.65
10640.10	V	X	AV	40.4	11.42	-	-9.54	42.28	54.00	11.72

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
   Margin = Limit – Result
   Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
   T.F = AF + CL – AG
   DUTY Correction Factor :N/A (Duty cycle = 99%)
   Measurement Distance above 10 GHz = 1m. So Distance Correction Factor :-9.54dB = 20*log(1m/3m)

▣Measurement Data:

9KHz~ 40GHz Radiated Spurious Emissions: *802.11a & 5500MHz(Ch. 100)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5447.88	V	Z	PK	48.74	6.86	-	-	55.60	74.00	18.40
5447.60	V	Z	AV	38.86	6.86	-	-	45.72	54.00	8.28
5469.09	V	Z	PK	55.63	6.86	-	-	62.49	68.20	5.71
11000.54	V	X	PK	48.64	11.43	-	-9.54	50.53	74.00	23.47
11000.02	V	X	AV	39.73	11.43	-	-9.54	41.62	54.00	12.38

9KHz~ 40GHz Radiated Spurious Emissions: *802.11a& 5580MHz(Ch. 116)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11161.79	V	X	PK	48.52	11.71	-	-9.54	50.69	74.00	23.31
11160.09	V	X	AV	39.3	11.71	-	-9.54	41.47	54.00	12.53

9KHz ~ 40GHz Radiated Spurious Emissions:*802.11a& 5700MHz(Ch. 140)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5725.30	V	Z	PK	57.80	7.29	-	-	65.09	68.20	3.11
11398.10	V	X	PK	48.46	11.82	-	-9.54	50.74	74.00	23.26
11399.45	V	X	AV	39.09	11.82	-	-9.54	41.37	54.00	12.63

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
   Margin = Limit – Result
   Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
   T.F = AF + CL – AG
   DUTY Correction Factor :N/A (Duty cycle = 99%)
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor :-9.54dB = 20*log(1m/3m)

▣Measurement Data:

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT20)&5180MHz(Ch. 36)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5128.15	V	Z	PK	44.62	6.51	-	-	51.13	74.00	22.87
5128.35	V	Z	AV	36.08	6.51	-	-	42.59	54.00	11.41
10359.97	H	X	PK	46.42	10.16	-	-9.54	47.04	68.20	21.16
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT20)&5200MHz(Ch. 40)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10399.82	H	X	PK	46.52	10.31	-	- 9.54	47.29	68.20	20.91
-	-	-	-	-	-	-	-	-	-	-

9KHz ~ 40GHz Radiated Spurious Emissions:*802.11n(HT20)&5240MHz(Ch. 48)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10480.15	H	X	PK	46.49	10.61	-	-9.54	47.56	68.20	20.64
-	-	-	-	-	-	-	-	-	-	-

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
   Margin = Limit – Result
   Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
   T.F = AF + CL – AG
   DUTY Correction Factor :N/A (Duty cycle = 99%)
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor :-9.54dB = 20*log(1m/3m)

▣Measurement Data:

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT20)&5260MHz(Ch. 52)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10520.02	V	X	PK	46.75	10.61	-	-9.54	47.82	68.20	20.38
-	-	-	-	-	-	-	-	-	-	-

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT20)&5300MHz(Ch. 60)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10600.18	V	X	PK	45.73	10.69	-	-9.54	46.88	74.00	27.12
10600.08	V	X	AV	39.65	10.69	-	-9.54	40.80	54.00	13.20

9KHz ~ 40GHz Radiated Spurious Emissions:*802.11n(HT20)&5320MHz(Ch. 64)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5350.45	H	Z	PK	49.68	6.73	-	-	56.41	74.00	17.59
5350.35	H	Z	AV	33.94	6.73	-	-	40.67	54.00	13.33
5371.60	H	Z	PK	46.88	6.73	-	-	53.61	74.00	20.39
5371.75	H	Z	AV	37.09	6.73	-	-	43.82	54.00	10.18
10639.95	V	X	PK	45.57	11.42	-	-9.54	47.45	74.00	26.55
10640.15	V	X	AV	39.65	11.42	-	-9.54	41.53	54.00	12.47

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
   Margin = Limit – Result
   Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
   T.F = AF + CL – AG
   DUTY Correction Factor :N/A (Duty cycle = 99%)
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor :-9.54dB = 20*log(1m/3m)

▣Measurement Data:

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT20)&5500MHz(Ch. 100)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5447.60	H	Z	PK	48.55	6.86	-	-	55.41	74.00	18.59
5448.16	H	Z	AV	40.1	6.86	-	-	46.96	54.00	7.04
5468.46	H	Z	PK	55.57	6.86	-	-	62.43	68.20	5.77
11003.25	V	X	PK	48.18	11.43	-	-9.54	50.07	74.00	23.93
11000.25	V	X	AV	38.7	11.43	-	-9.54	40.59	54.00	13.41

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT20)&5580MHz(Ch. 116)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11160.15	V	X	PK	49.11	11.71	-	-9.54	51.28	74.00	22.72
11159.95	V	X	AV	39.35	11.71	-	-9.54	41.52	54.00	12.48

9KHz ~ 40GHz Radiated Spurious Emissions:*802.11n(HT20)&5700MHz(Ch. 140)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5726.80	H	Z	PK	58.29	7.29	-	-	65.58	68.20	2.62
11396.85	V	X	PK	49.24	11.82	-	-9.54	51.52	74.00	22.48
11398.95	V	X	AV	39.51	11.82	-	-9.54	41.79	54.00	12.21

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
   Margin = Limit – Result
   Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
   T.F = AF + CL – AG
   DUTY Correction Factor :N/A (Duty cycle = 99%).
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor :-9.54dB = 20*log(1m/3m)

▣**Measurement Data:**

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT40)&5190MHz(Ch. 38)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5149.90	V	Z	PK	42.98	6.51	-	-	49.49	74.00	24.51
5150.00	V	Z	AV	32.85	6.51	-	-	39.36	54.00	14.64
10379.69	H	X	PK	46.71	10.18	-	-9.54	47.35	68.20	20.85

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT40)&5230MHz(Ch. 46)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10459.87	X	H	PK	46.51	10.57	-	-9.54	47.54	68.20	20.66
-	-	-	-	-	-	-	-	-	-	-

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
   Margin = Limit – Result
   Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
   T.F = AF + CL – AG
   DUTY Correction Factor :N/A (Duty cycle = 98%).
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor :-9.54dB = 20*log(1m/3m)

▣**Measurement Data:**

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT40)&5270MHz(Ch. 54)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10540.22	V	X	PK	47.04	10.62	-	-9.54	48.12	68.20	20.08
-	-	-	-	-	-	-	-	-	-	-

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT40)&5310MHz(Ch. 62)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5351.50	H	Z	PK	44.77	6.73	-	-	51.50	74.00	22.50
5350.20	H	Z	AV	33.44	6.73	-	-	40.17	54.00	13.83
10620.10	V	X	PK	46.81	11.06	-	-9.54	48.33	74.00	25.67
10620.09	V	X	AV	39.85	11.06	-	-9.54	41.37	54.00	12.63

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
   Margin = Limit – Result
   Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
   T.F = AF + CL – AG
   DUTY Correction Factor :N/A (Duty cycle = 98%).
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor :-9.54dB = 20*log(1m/3m)

▣Measurement Data:

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT40)&5510MHz(Ch. 102)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5458.70	H	Z	PK	46.63	6.86	-	-	53.49	74.00	20.51
5459.99	H	Z	AV	32.52	6.86	-	-	39.38	54.00	14.62
5468.60	H	Z	PK	54.49	6.86	-	-	61.35	68.20	6.85
11020.45	V	X	PK	46.42	11.47	-	-9.54	48.35	74.00	25.65
11020.20	V	X	AV	37.33	11.47	-	-9.54	39.26	54.00	14.74

9KHz~ 40GHz Radiated Spurious Emissions: *802.11n(HT40)&5550MHz(Ch. 110)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11100.35	V	X	PK	45.91	11.58	-	-9.54	47.95	74.00	26.05
11099.85	V	X	AV	38.11	11.58	-	-9.54	40.15	54.00	13.85

9KHz ~ 40GHz Radiated Spurious Emissions:*802.11n(HT40)&5670MHz(Ch. 134)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5727.25	H	Z	PK	44.99	7.29	-	-	52.28	68.20	15.92
11337.60	V	X	PK	45.19	11.82	-	-9.54	47.47	74.00	26.53
11340.00	V	X	AV	36.82	11.82	-	-9.54	39.10	54.00	14.90

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
   Margin = Limit – Result
   Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
   T.F = AF + CL – AG
   DUTY Correction Factor :N/A (Duty cycle = 98%).
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor :-9.54dB = 20*log(1m/3m)

▣Measurement Data:

9KHz~ 40GHz Radiated Spurious Emissions: *802.11ac(VHT80)&5210MHz(Ch. 42)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5149.60	V	Z	PK	44.27	6.51	-	-	50.78	74.00	23.22
5149.60	V	Z	AV	33.67	6.51	0.23	-	40.41	54.00	13.59
10420.19	V	X	PK	46.9	10.46	-	-9.54	47.82	68.20	20.38

9KHz~ 40GHz Radiated Spurious Emissions: *802.11ac(VHT80)&5290MHz(Ch. 58)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5354.40	H	Z	PK	46.48	6.73	-	-	53.21	74.00	20.79
5354.35	H	Z	AV	34.7	6.73	0.23	-	41.66	54.00	12.34
10580.35	V	X	PK	45.97	10.66	-	-9.54	47.09	68.20	21.11

9KHz ~ 40GHz Radiated Spurious Emissions:*802.11ac(VHT80)& 5530MHz(Ch. 106)*

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector	Reading (dBuV)	T.F (dB/m)	DUTY Correction Factor (dB)	Distance Correction Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5459.50	H	Z	PK	49.72	6.86	-	-	56.58	74.00	17.42
5459.57	H	Z	AV	38.9	6.86	0.23	-	45.99	54.00	8.01
5466.85	H	Z	PK	51.54	6.86	-	-	58.40	68.20	9.80
11059.94	V	X	PK	45.83	11.51	-	-9.54	47.80	74.00	26.20
11060.08	V	X	AV	38.78	11.51	0.23	-9.54	40.98	54.00	13.02

Note.

1. This test item was performed in each axis and the worst case data were reported.
2. Sample Calculation.
   Margin = Limit – Result
   Result = Reading + T.F + DUTY Correction Factor + Distance Correction Factor
   T.F = AF + CL – AG
   DUTY Correction Factor : 0.23 dB = 10*log(1/0.95) for Method AD.
3. Measurement Distance above 10 GHz = 1m. So Distance Correction Factor :- 9.54 dB = 20*log(1m/3m)

3.2.7AC Conducted Emissions

▣ **TEST PROCEDURE :**

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. Emissions closest to the limit are measured in the quasi-peak mode (QP) and average mode (AV) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

▣ **Measurement Data: Comply**

Note 1: See next pages for actual measured spectrum plots and data.
The worst case data was reported.

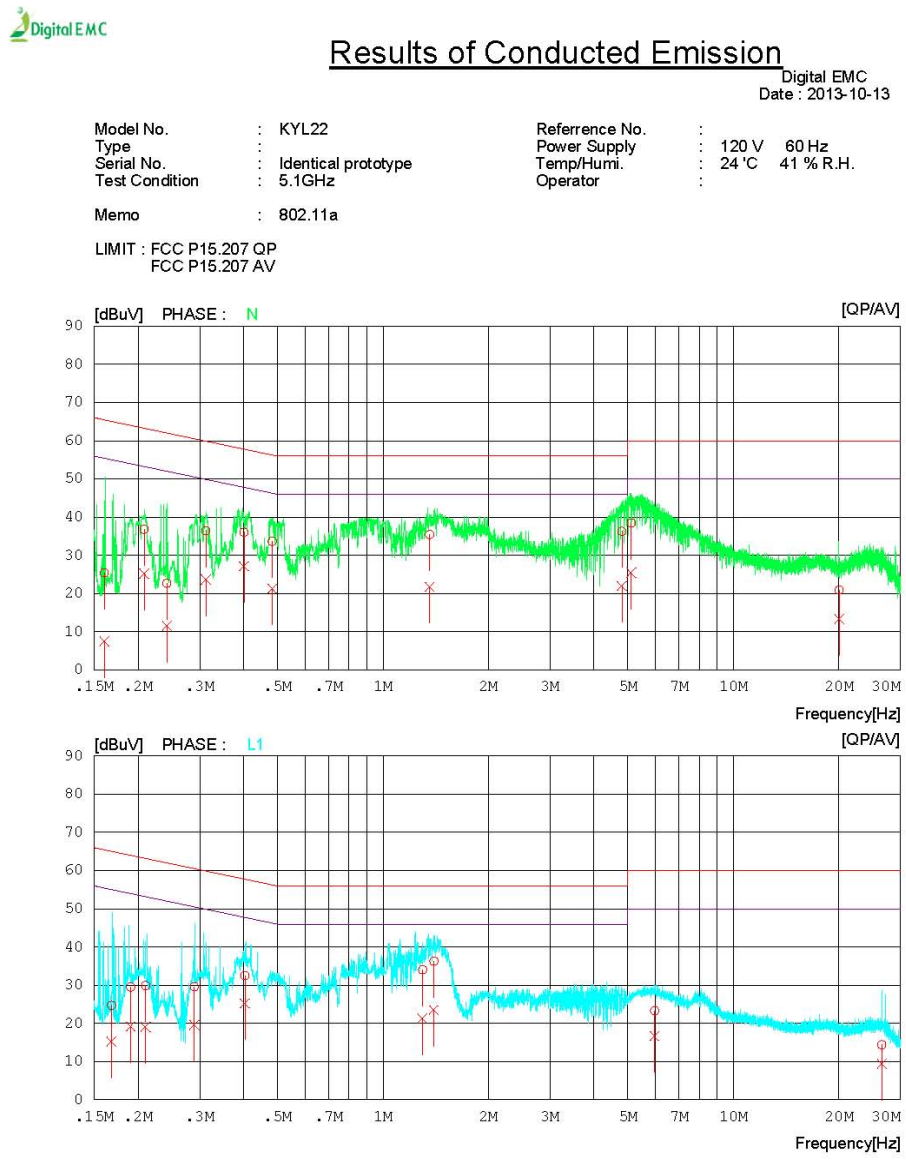
▣ **Minimum Standard: FCC Part 15.207(a)/EN 55022**

FrequencyRange (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

AC Line Conducted Emissions (Graph)

Test Mode: Band 1 &802.11a



AC Line Conducted Emissions (Data List)

Test Mode: Band 1 &802.11a

Results of Conducted Emission

Digital EMC
Date : 2013-10-13

Model No.	: KYL22		Referrence No.	:	
Type	:		Power Supply	: 120 V 60 Hz	
Serial No.	: Identical prototype		Temp/Humi.	: 24 'C 41 % R.H.	
Test Condition	: 5.1GHz		Operator	:	

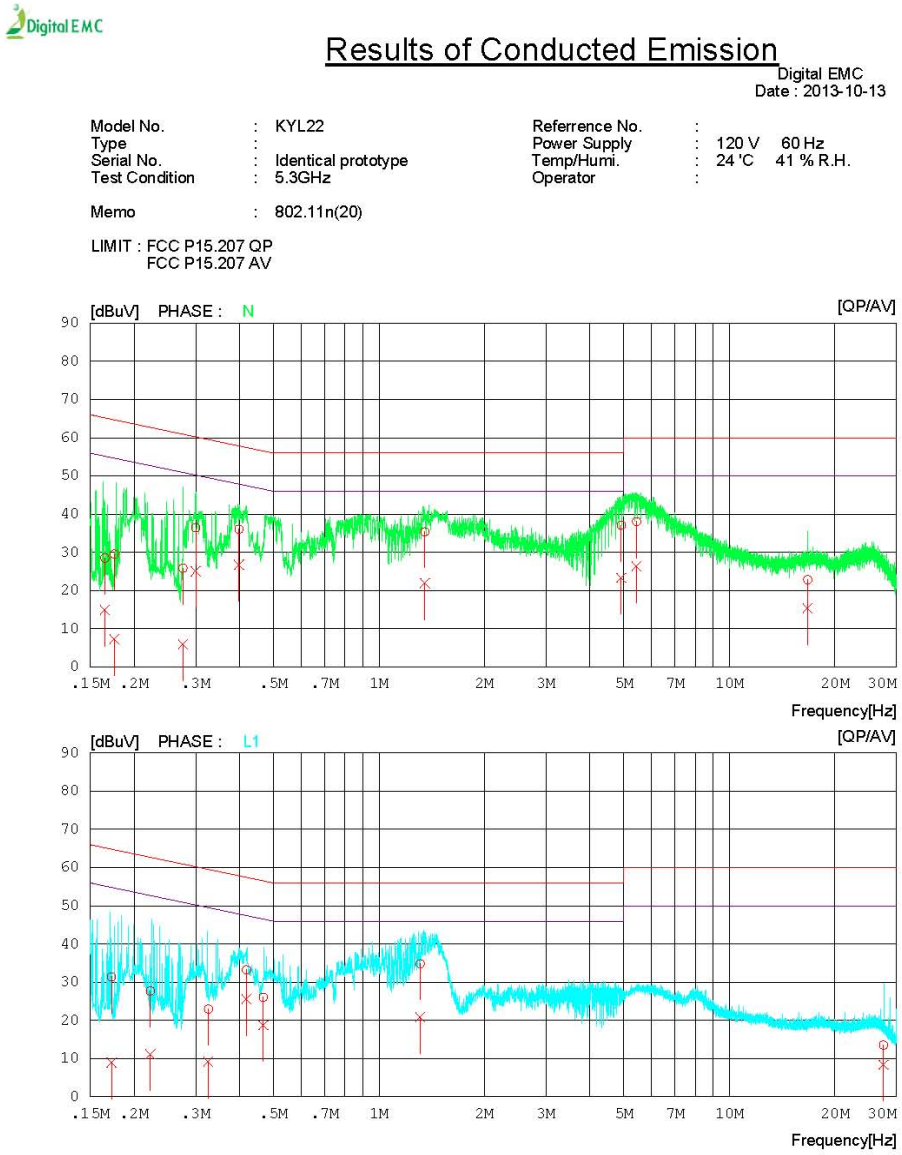
Memo : 802.11a

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.16024	25.3	7.4	0.1	25.4	7.5	65.5	55.5	40.1	48.0	N
2	0.20819	36.7	25.1	0.1	36.8	25.2	63.3	53.3	26.5	28.1	N
3	0.24170	22.6	11.5	0.1	22.7	11.6	62.0	52.0	39.3	40.4	N
4	0.31247	36.4	23.6	0.1	36.5	23.7	59.9	49.9	23.4	26.2	N
5	0.40109	36.0	27.0	0.1	36.1	27.1	57.8	47.8	21.7	20.7	N
6	0.48343	33.6	21.2	0.1	33.7	21.3	56.3	46.3	22.6	25.0	N
7	1.35860	35.2	21.5	0.2	35.4	21.7	56.0	46.0	20.6	24.3	N
8	4.80760	35.8	21.5	0.5	36.3	22.0	56.0	46.0	19.7	24.0	N
9	5.11560	38.0	25.0	0.5	38.5	25.5	60.0	50.0	21.5	24.5	N
10	20.05440	20.2	12.7	0.7	20.9	13.4	60.0	50.0	39.1	36.6	N
11	0.16819	24.6	15.1	0.1	24.7	15.2	65.0	55.0	40.3	39.8	L1
12	0.19052	29.4	19.1	0.1	29.5	19.2	64.0	54.0	34.5	34.8	L1
13	0.21037	29.8	19.0	0.1	29.9	19.1	63.2	53.2	33.3	34.1	L1
14	0.28948	29.5	19.5	0.1	29.6	19.6	60.5	50.5	30.9	30.9	L1
15	0.40350	32.4	25.1	0.1	32.5	25.2	57.8	47.8	25.3	22.6	L1
16	1.29740	33.8	21.1	0.2	34.0	21.3	56.0	46.0	22.0	24.7	L1
17	1.39800	36.1	23.3	0.2	36.3	23.5	56.0	46.0	19.7	22.5	L1
18	5.95920	22.8	16.2	0.5	23.3	16.7	60.0	50.0	36.7	33.3	L1
19	26.53520	13.7	8.7	0.7	14.4	9.4	60.0	50.0	45.6	40.6	L1

AC Line Conducted Emissions (Graph)

Test Mode: Band 2 &802.11n(HT20)



AC Line Conducted Emissions (Data List)

Test Mode: Band 2 &802.11n(HT20)

Results of Conducted Emission

Digital EMC
Date : 2013-10-13

Model No.	: KYL22		Referrence No.	:	
Type	:		Power Supply	: 120 V 60 Hz	
Serial No.	: Identical prototype		Temp/Humi.	: 24 'C 41 % R.H.	
Test Condition	: 5.3GHz		Operator	:	

Memo : 802.11n(20)

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.16515	28.4	14.8	0.1	28.5	14.9	65.2	55.2	36.7	40.3	N
2	0.17574	29.5	7.1	0.1	29.6	7.2	64.7	54.7	35.1	47.5	N
3	0.27605	25.7	5.8	0.1	25.8	5.9	60.9	50.9	35.1	45.0	N
4	0.30023	36.3	25.0	0.1	36.4	25.1	60.2	50.2	23.8	25.1	N
5	0.39850	35.9	26.6	0.1	36.0	26.7	57.9	47.9	21.9	21.2	N
6	1.35280	35.2	21.7	0.2	35.4	21.9	56.0	46.0	20.6	24.1	N
7	4.91380	36.6	22.8	0.5	37.1	23.3	56.0	46.0	18.9	22.7	N
8	5.43420	37.6	25.8	0.5	38.1	26.3	60.0	50.0	21.9	23.7	N
9	16.74820	22.2	14.8	0.6	22.8	15.4	60.0	50.0	37.2	34.6	N
10	0.17250	31.3	8.9	0.1	31.4	9.0	64.8	54.8	33.4	45.8	L1
11	0.22278	27.6	11.1	0.1	27.7	11.2	62.7	52.7	35.0	41.5	L1
12	0.32609	22.9	9.1	0.1	23.0	9.2	59.6	49.6	36.6	40.4	L1
13	0.41861	33.2	25.5	0.1	33.3	25.6	57.5	47.5	24.2	21.9	L1
14	0.46760	25.9	18.7	0.1	26.0	18.8	56.6	46.6	30.6	27.8	L1
15	1.31140	34.6	20.6	0.2	34.8	20.8	56.0	46.0	21.2	25.2	L1
16	27.56000	12.8	7.7	0.7	13.5	8.4	60.0	50.0	46.5	41.6	L1

AC Line Conducted Emissions (Graph)

Test Mode: Band 3 &802.11a

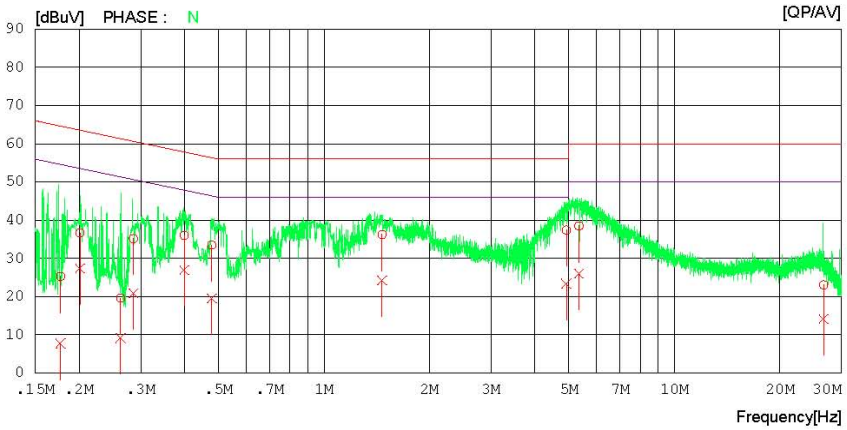
Digital EMC

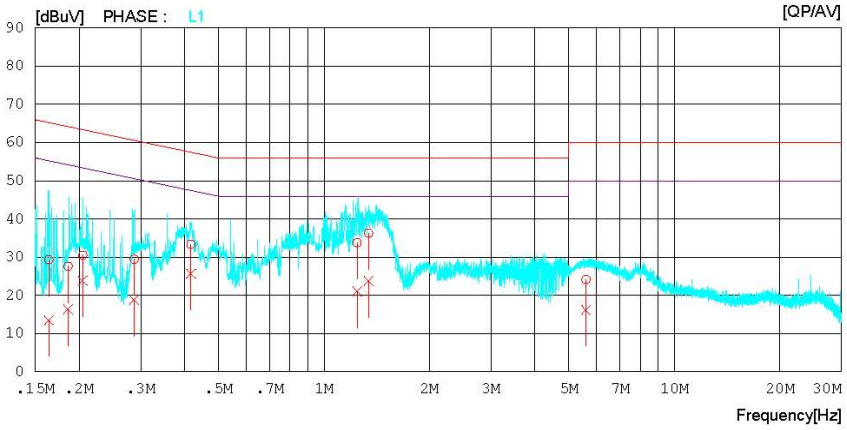
Results of Conducted Emission

Digital EMC
Date : 2013-10-13

Model No.	:	KYL22	Referrence No.	:	
Type	:		Power Supply	:	120 V 60 Hz
Serial No.	:	Identical prototype	Temp/Humi.	:	24 'C 41 % R.H.
Test Condition	:	5.5GHz	Operator	:	
Memo	:	802.11a			

LIMIT : FCC P15.207 QP
FCC P15.207 AV





AC Line Conducted Emissions (Data List)

Test Mode: Band 3 &802.11a

Results of Conducted Emission

Digital EMC
Date : 2013-10-13

Model No.	: KYL22	Referrence No.	:
Type	:	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 24 'C 41 % R.H.
Test Condition	: 5.5GHz	Operator	:

Memo : 802.11a

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ	READING QP	READING AV	C.FACTOR	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.17715	25.1	7.6	0.1	25.2	7.7	64.6	54.6	39.4	46.9	N
2	0.20146	36.5	27.3	0.1	36.6	27.4	63.6	53.6	27.0	26.2	N
3	0.26277	19.5	9.0	0.1	19.6	9.1	61.3	51.3	41.7	42.2	N
4	0.28592	35.1	20.8	0.1	35.2	20.9	60.6	50.6	25.4	29.7	N
5	0.39944	35.9	26.8	0.1	36.0	26.9	57.9	47.9	21.9	21.0	N
6	0.47851	33.4	19.4	0.1	33.5	19.5	56.4	46.4	22.9	26.9	N
7	1.46380	36.0	24.1	0.2	36.2	24.3	56.0	46.0	19.8	21.7	N
8	4.91660	36.9	22.9	0.5	37.4	23.4	56.0	46.0	18.6	22.6	N
9	5.34460	38.0	25.5	0.5	38.5	26.0	60.0	50.0	21.5	24.0	N
10	26.67500	22.3	13.4	0.7	23.0	14.1	60.0	50.0	37.0	35.9	N
11	0.16412	29.3	13.5	0.1	29.4	13.6	65.3	55.3	35.9	41.7	L1
12	0.18631	27.5	16.3	0.1	27.6	16.4	64.2	54.2	36.6	37.8	L1
13	0.28749	29.4	18.8	0.1	29.5	18.9	60.6	50.6	31.1	31.7	L1
14	0.41750	33.2	25.6	0.1	33.3	25.7	57.5	47.5	24.2	21.8	L1
15	1.24400	33.6	20.9	0.2	33.8	21.1	56.0	46.0	22.2	24.9	L1
16	1.34060	36.1	23.6	0.2	36.3	23.8	56.0	46.0	19.7	22.2	L1
17	5.59100	23.7	15.8	0.5	24.2	16.3	60.0	50.0	35.8	33.7	L1
18	0.20506	30.4	23.8	0.1	30.5	23.9	63.4	53.4	32.9	29.5	L1

3.2.8Antenna Requirements

▣ **Procedure:**

Describe how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.

▣ **Conclusion:** **Comply**

The internal antenna isattached on the main PCBusing the unique coupling method.

▣ **Minimum Standard:**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions.

3.2.9Occupied Bandwidth

▣ **TESTRequirements**

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured

▣ **TEST CONFIGURATION**

▣ **TEST PROCEDURE :**

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%.
The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted.
Where practical,a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual

▣ **TEST RESULT :N/A**

Minimum Standard:N/A

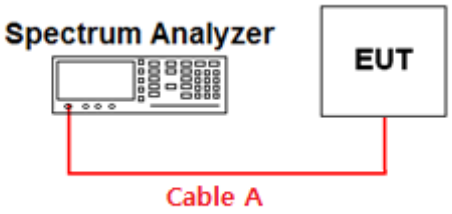
▣ **RESULT PLOT :N/A**

4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	E4440A	12/10/22	13/10/22	US45303051
Spectrum Analyzer	Agilent	N9020A	13/09/16	14/09/16	MY50410163
Spectrum Analyzer	Rohde Schwarz	FSQ26	13/02/14	14/02/14	200445
Harmonic Mixer	OML	M28HWD	13/02/14	14/02/14	Ka100224-1
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2495A / MA2490A	13/03/06	14/03/06	1306007 / 1249001
DC Power Supply	HP	6622A	13/02/27	14/02/27	3448A03760
Multimeter	HP	34401A	13/02/27	14/02/27	3146A13475
Vector Signal Generator	Rohde Schwarz	SMJ100A	13/01/08	14/01/08	100148
Signal Generator	Rohde Schwarz	SMF100A	13/07/22	14/07/22	102341
Thermohygrometer	BODYCOM	BJ5478	13/06/01	14/06/01	120612-2
Constant Temp & Humidity Chamber	JISICO	KR-100/J-RHC2	13/09/13	14/09/13	30604493/021031
High-pass filter	Wainwright Instruments	WHNX8.5	13/09/12	14/09/12	1
Loop Antenna	Schwarzbeck	FMZB1513	12/09/24	14/09/24	1513-128
BILOG ANTENNA	SCHAFFNER	CBL6112B	12/11/06	14/11/06	2737
Horn Antenna	ETS	3115	13/02/28	15/02/28	00021097
Horn Antenna	A.H.Systems Inc.	SAS-574	13/03/20	15/03/20	154
Attenuator (3dB)	Aeroflex/Weinschel	56-3	13/09/12	14/09/12	Y2342
Amplifier (22dB)	HP	8447E	13/01/08	14/01/08	2945A02865
Amplifier (30dB)	Agilent	8449B	13/02/27	14/02/27	3008A00370
EMI TEST RECEIVER	R&S	ESU	13/01/08	14/01/08	100014
EMI TEST RECEIVER	R&S	ESCI	13/02/27	14/02/27	100364
CVCF	NF	4420	13/09/12	14/09/12	3049354420023
LISN	R&S	ESH2-Z5	13/09/12	14/09/12	828739/006

APPENDIX I
Conducted Test set up Diagram &Path lossInformation

▪Conducted Measurement



Path loss value information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
5180	4.59	5260	4.60	5500	4.67
5190	4.59	5270	4.62	5510	4.66
5200	4.61	5290	4.64	5530	4.69
5210	4.63	5300	**4.66**	5550	4.65
5230	**4.63**	5310	4.65	5580	4.63
5240	4.61	5320	4.65	5670	4.70
				5700	**4.72**

Note. 1: The path loss from EUT to Spectrum analyzer was measured and used for test.
Path loss (=S/A's offset value) = Cable A
Note. 2: For all the test items the worst case path loss was used as below.
BAND1 : 4.63dB& BAND2 : 4.66dB& Band3 : 4.72dB

APPENDIX II
Duty cycle plots

▣ **TEST PROCEDURE**

Duty Cycle [X = On Time / (On + Off time)] is measured using Measurement Procedure **ofKDB789033**

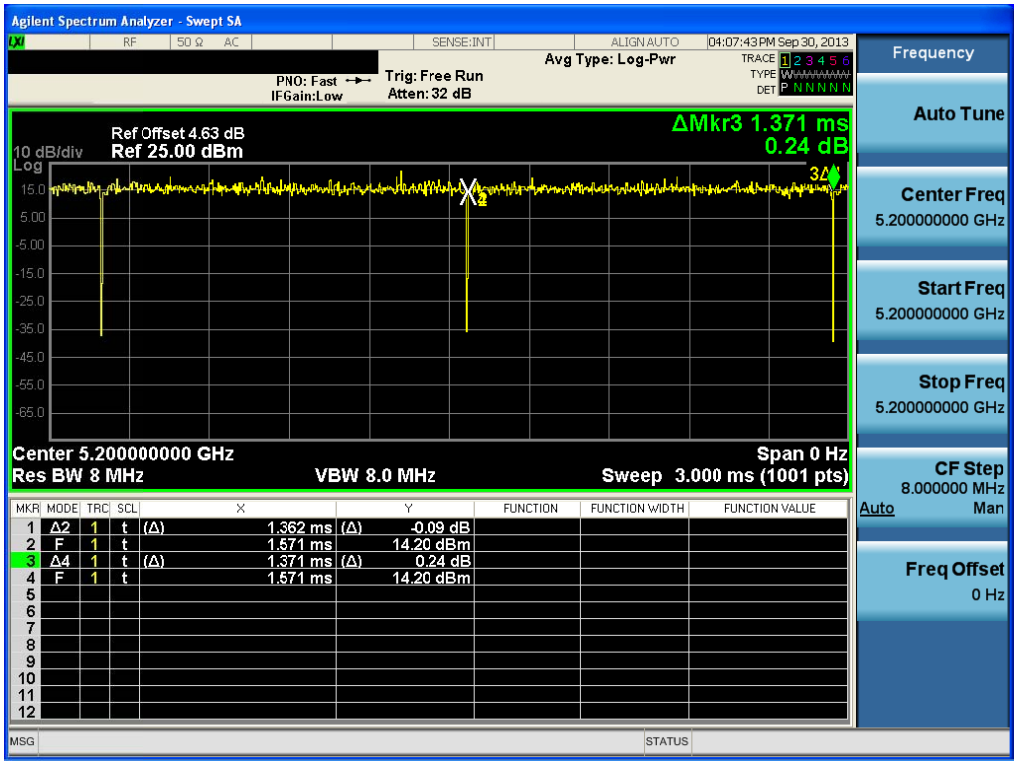
1. Set the center frequency of the spectrum analyzer to the center frequency of the transmission.
2. Set RBW ≥ EBW if possible; otherwise, set RBW to the largest available value.
3. Set VBW ≥ RBW.
4. Set detector = peak.
5. Note : The zero-span measurement method shall not be used unless both **RBW and VBW are> 50/*T***, where *T* is defined in section B)1)a), and **the number of sweep points across duration *T* exceeds 100**. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if *T* ≤ 16.7 microseconds.)

- **Summary of Duty Cycle Calculation Table**

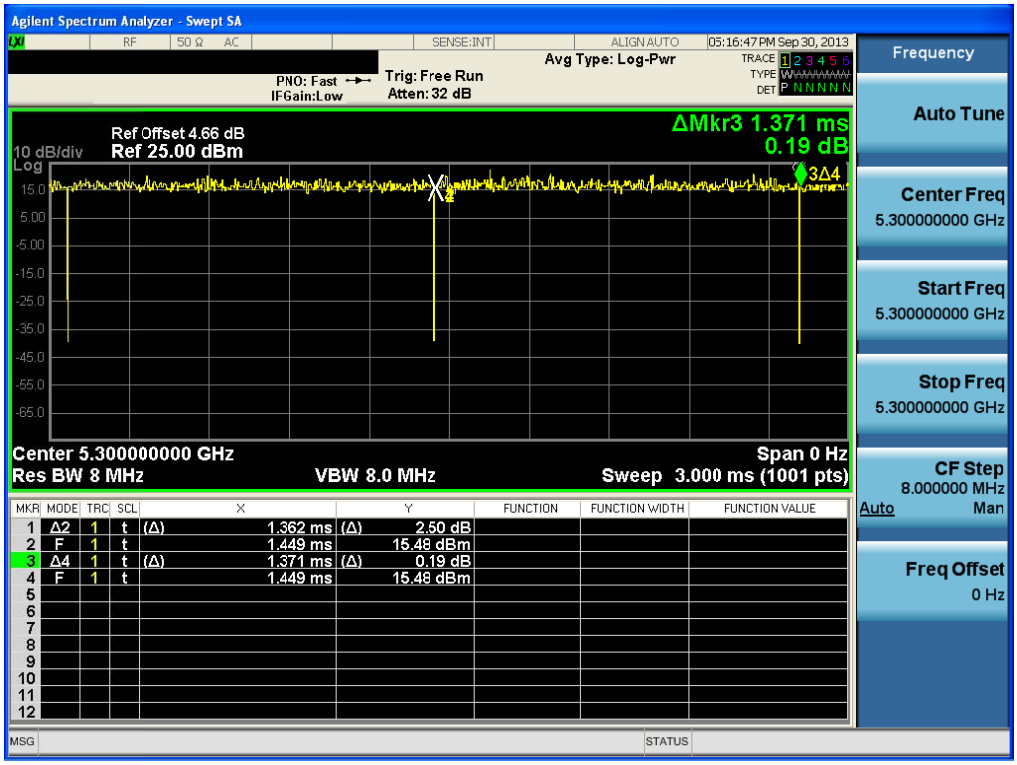
Mode	Channel	Frequency [MHz]	Maximum Achievable Duty Cycle (*x*) = On / (On+Off)		
			On Time [ms]	(On+Off) Time [ms]	*x*
802.11a	36	5180	1.362	1.371	0.99
	40	5200			
	48	5240			
	52	5260	1.362	1.371	0.99
	60	5300			
	64	5320			
	100	5500	1.362	1.371	0.99
	116	5580			
	140	5700			
802.11n (HT20)	36	5180	1.275	1.284	0.99
	40	5200			
	48	5240			
	52	5260	1.275	1.284	0.99
	60	5300			
	64	5320			
	100	5500	1.275	1.284	0.99
	116	5580			
	140	5700			
802.11n (HT40)	38	5190	0.634	0.644	0.98
	46	5230			
	54	5270	0.634	0.644	0.98
	62	5310			
	102	5510	0.634	0.644	0.98
	110	5550			
	134	5670			
802.11ac (VHT80)	42	5210	0.246	0.258	0.95
	58	5290	0.246	0.258	0.95
	106	5530	0.246	0.258	0.95

- Description for duty cycle plot data on next pages : **△2 = On Time , △4 = (On + Off) TimeSoOff Time = △4 -△2**
- *T* : The minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
  (***T* = On time** of the above table since the EUT operates with above fixed Duty Cycle and it is the minimum On time)
  For Duty Cycle with zero span method, both RBW/VBW > 50/*T*
  (For example, this case **RBW/VBW (8MHz)> 50/0.000246 = 203.25 KHz**)
- The reason for the Duty Cycle Limitation : The test S/W provided by the applicant supports transmission with above maximum fixed duty cycle.
- The number of sweeps were increased by factor of **1/*x***until the trace stabilizesfor Peak Measurement
  The number of average traces were increased by factor of **1/*x*** for Method AD

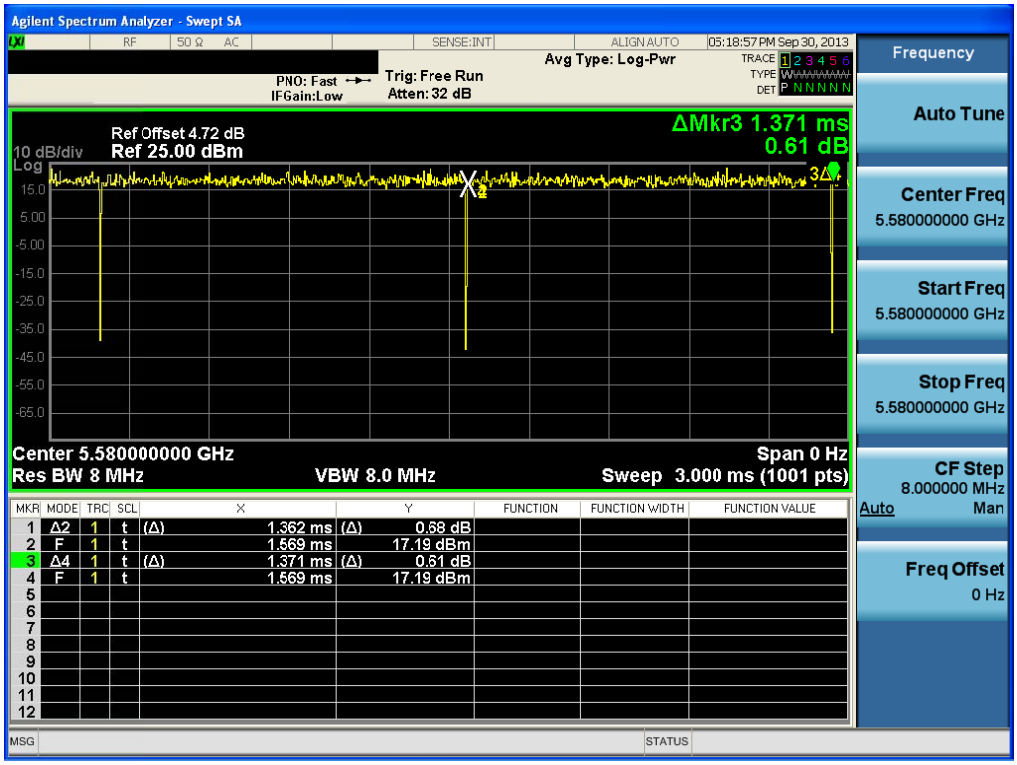
Duty Cycle Test Mode: 802.11a & Ch.40



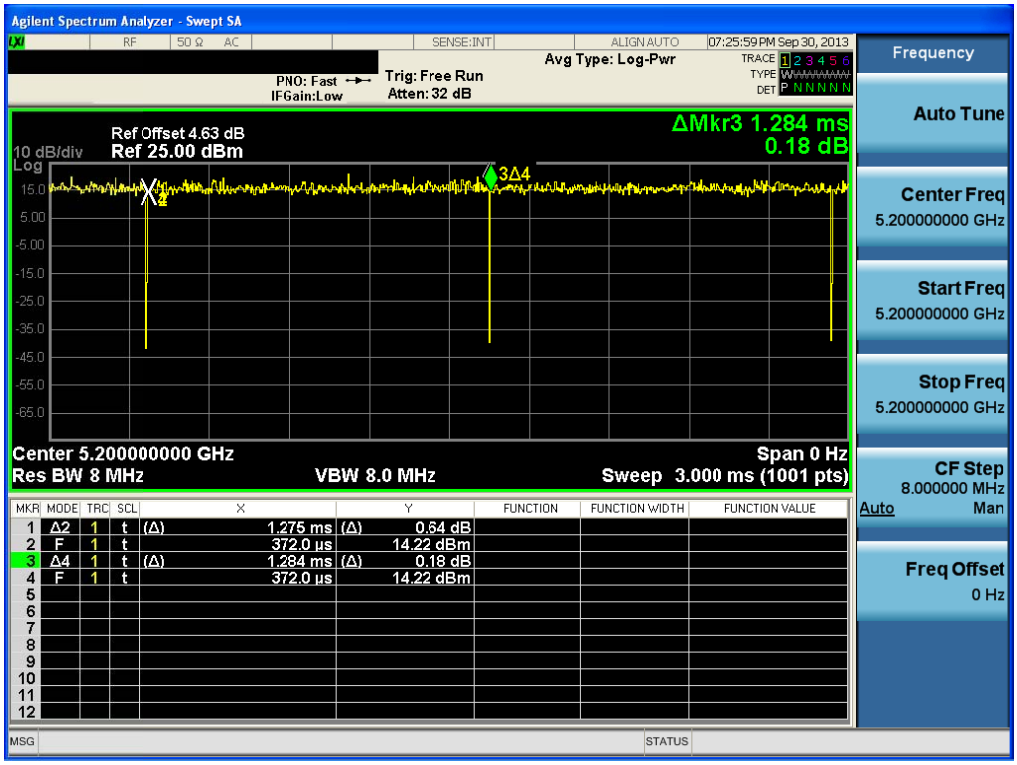
Duty Cycle Test Mode: 802.11a &Ch.60



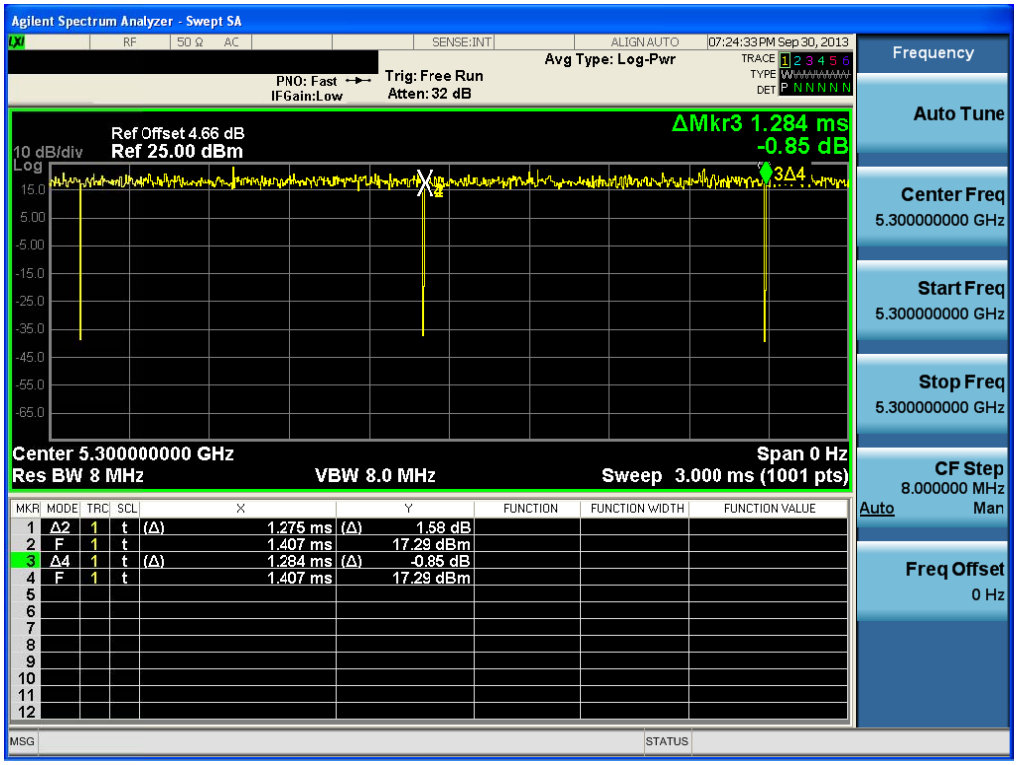
Duty Cycle Test Mode: 802.11a & Ch.116



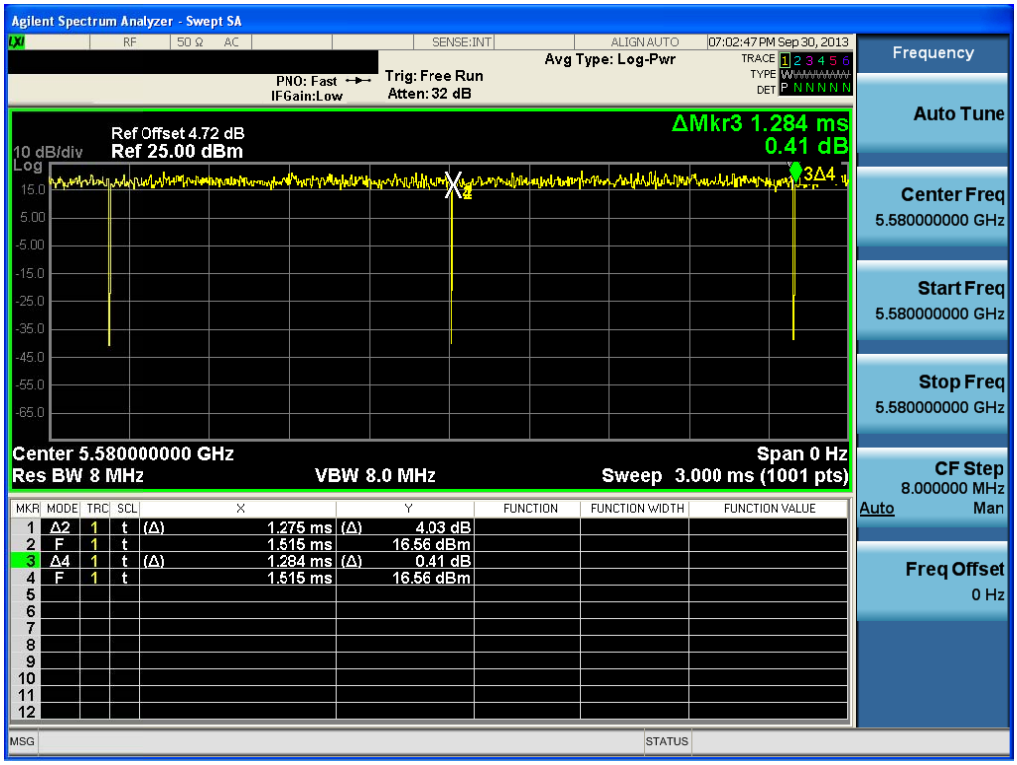
Duty Cycle Test Mode: 802.11n(HT20) & Ch.40



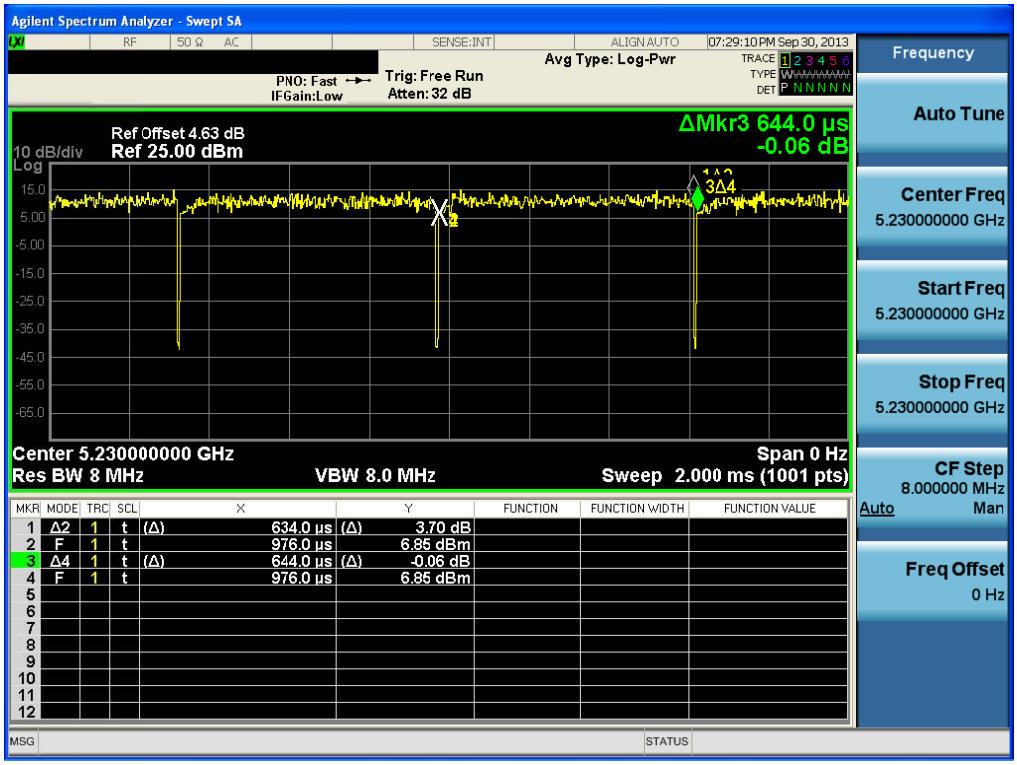
Duty Cycle Test Mode: 802.11n(HT20) &Ch.60



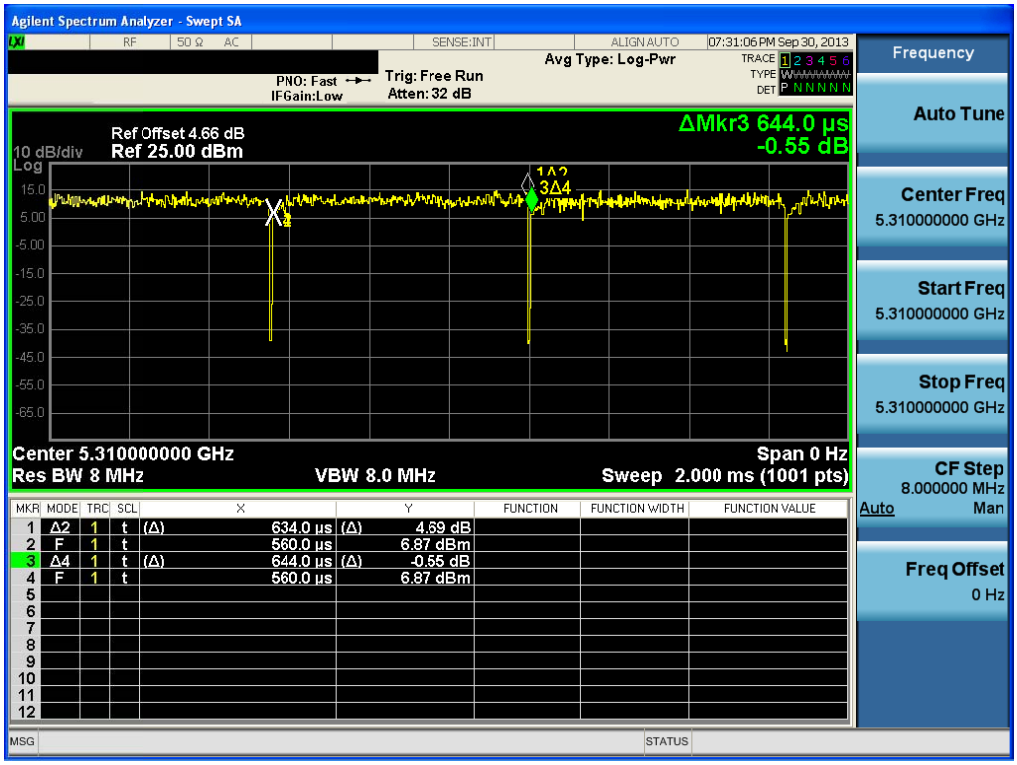
Duty Cycle Test Mode: 802.11n(HT20) & Ch.116



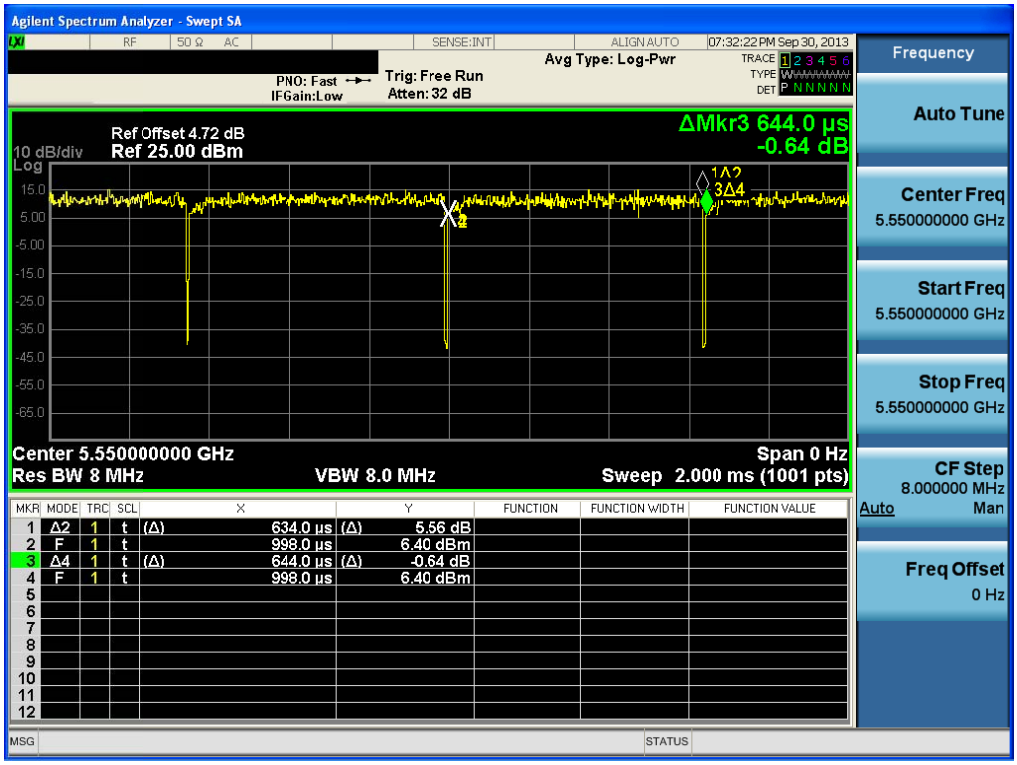
Duty Cycle Test Mode: 802.11n(HT40) & Ch.46



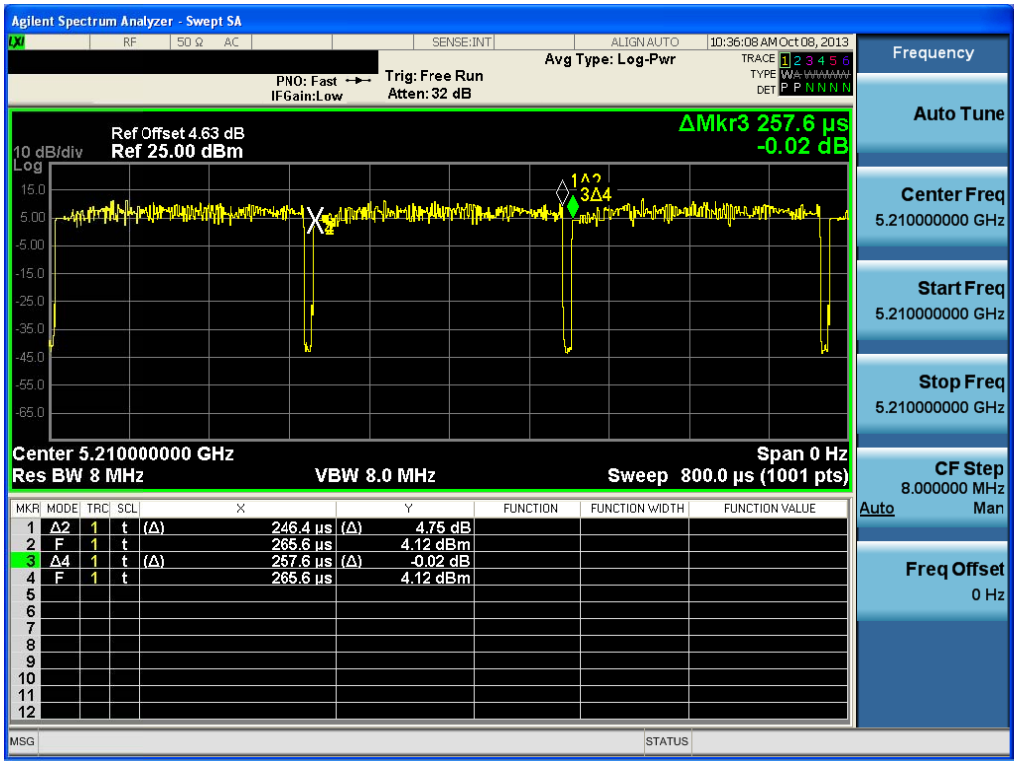
Duty Cycle Test Mode: 802.11n(HT40) & Ch.62



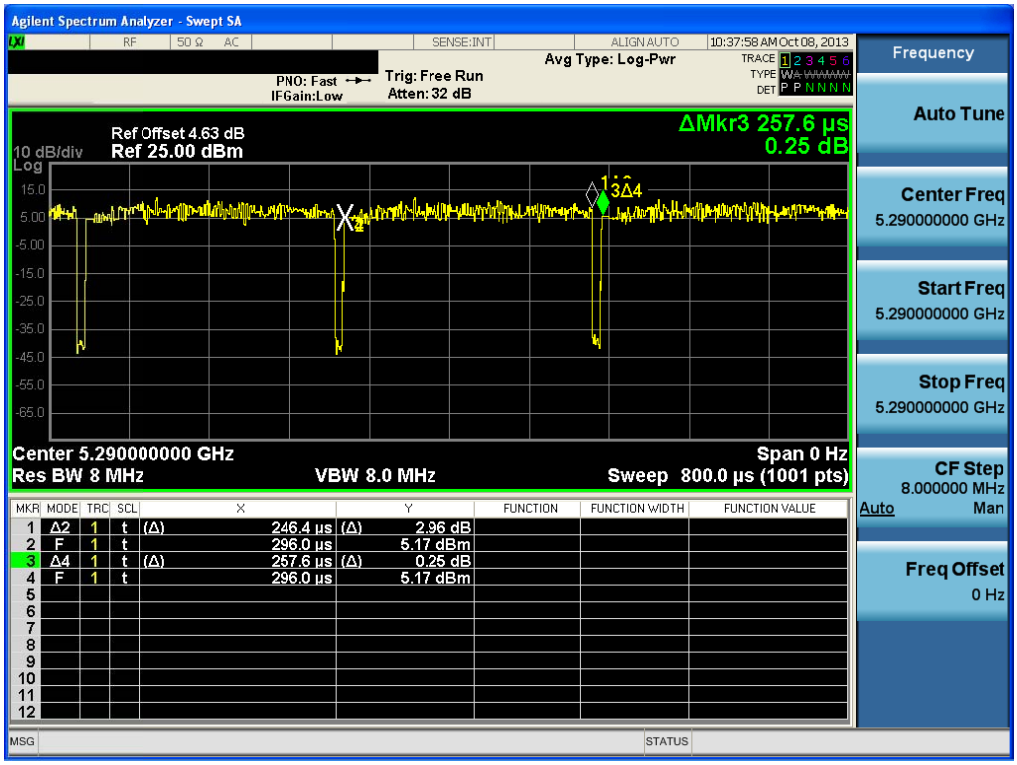
Duty Cycle Test Mode: 802.11n(HT40) & Ch.110



Duty Cycle Test Mode: 802.11ac(VHT80) & Ch.42



Duty Cycle Test Mode: 802.11ac(VHT80) & Ch.58



Duty Cycle Test Mode: 802.11ac(VHT80) & Ch.106