

TEST REPORT

Part 15 Subpart E 15.407

Equipment under test HOME CAMERA

Model name SNH-V6430BN

FCC ID NLMSNHV6430BN

Applicant Hanwha Techwin Co., Ltd.

Manufacturer Tianjin Samsung Techwin Opto-Electronic Co., Ltd.

Date of test(s) 2016.07.14 ~ 2016.09.09

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Issued to

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The test results in the report only apply to the tested sample.



Revision history

Revision	Date of issue	Test report No.	Description
-	2016.09.07	KES-RF-16T0068	Initial
R1	2016.09.08	KES-RF-16T0068-R1	Retest a 99% Occupied bandwidth and Added data and plots of ac VHT20, VHT 40 mode
R2	2016.09.09	KES-RF-16T0068-R2	Retest a 99% Occupied bandwidth



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1. General information

Applicant: Hanwha Techwin Co., Ltd.
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473-29, Gayeo-ro, Yeosu-si, Gyeonggi-do, Korea
FCC rule part(s): 15.407
FCC ID: NLMSNHV6430BN
Test device serial No.: ☒ Production ☐ Pre-production ☐ Engineering

1.1. EUT description

Equipment under test HOME CAMERA
Frequency range
UNII-1 2 412 MHz ~ 2 462 MHz (11b/g/n_HT20)
2 422 MHz ~ 2 452 MHz (11n_HT40)
5 180 MHz ~ 5 240 MHz (11a/n_HT20, 11ac_VHT20)
5 190 MHz ~ 5 230 MHz (11n_HT40, 11ac_VHT40)
5 210 MHz (11ac_VHT80)
UNII-2A 5 260 MHz ~ 5 320 MHz (11a/n_HT20, 11ac_VHT20)
5 270 MHz ~ 5 310 MHz (11n_HT40, 11ac_VHT40)
5 290 MHz (11ac_VHT80)
UNII-2C 5 500 MHz ~ 5 720 MHz (11a/n_HT20, 11ac_VHT20)
5 510 MHz ~ 5 710 MHz (11n_HT40, 11ac_VHT40)
5 530 MHz ~ 5 690 MHz (11ac_VHT80)
UNII-3 5 745 MHz ~ 5 825 MHz (11a/n_HT20, 11ac_VHT20)
5 755 MHz ~ 5 795 MHz (11n_HT40, 11ac_VHT40)
5 775 MHz (11ac_VHT80)
Model: SNH-V6430BN
Modulation technique OFDM
Number of channels 2 412 MHz ~ 2 462 MHz : 11ch , 2 422 MHz ~ 2 452 MHz : 7 ch
5 180 MHz ~ 5 240 MHz : 4ch , 5 190 MHz ~ 5 230 MHz : 2ch , 5 210 MHz : 1ch
5 260 MHz ~ 5 320 MHz : 4ch , 5 270 MHz ~ 5 310 MHz : 2ch , 5 290 MHz : 1ch
5 500 MHz ~ 5 720 MHz : 12ch , 5 510 MHz ~ 5 710 MHz : 6ch , 5 530 MHz ~ 5 690 MHz : 3ch
5 745 MHz ~ 5 825 MHz : 5ch , 5 755 MHz ~ 5 795 MHz : 2ch , 5 775 MHz : 1ch
Antenna specification 11b/g/n_HT20/40 : Chip antenna & 2.74 dBi
UNII-1 : Chip antenna & 1.39 dBi
UNII2A : Chip antenna & 1.95 dBi
UNII2C : Chip antenna & 3.91 dBi
UNII-3 : Chip antenna & 3.39 dBi
Power source AC 120V Adapter (Output : DC 5V / 2 A)

1.2. Test configuration

The **Hanwha Techwin Co., Ltd. HOME CAMERA FCC ID: NLMSNHV6430BN** was tested per the guidance of KDB 789033 D02 v01r03 and KDB 644545 D03 v01. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing

This report contains the worst case data from the following mode of the test in 20/40/80 MHz signal bandwidth.

1.3. Device modifications

N/A

1.4. Derivation model information

N/A

1.5. Frequency/channel operations

UNII-1		UNII-2A		UNII-2C		UNII-3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
36	5 180	52	5 260	100	5 500	149	5 745
44	5 220	56	5 280	116	5 580	157	5 785
48	5 240	64	5 320	144	5 720	165	5 825

Table 1.7-1. 802.11a/n/ac_HT20/VHT20 mode

UNII-1		UNII-2A		UNII-2C		UNII-3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
38	5 190	54	5 270	102	5 510	151	5 755
46	5 230	62	5 310	118	5 590	159	5 795
				142	5 710		

Table 1.7-2. 802.11a/n/ac_HT40/VHT40 mode

UNII-1		UNII-2A		UNII-2C		UNII-3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
42	5 210	58	5 290	106	5 530	155	5 775
				122	5 610		
				138	5 690		

Table 1.7-3. 802.11ac_VHT80 mode

1.6. Maximum average output power

Refer to the average output power.

Note.

1. Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.
2. Worst-case data rates as provided by the client were:

UNII-1 a : 6 Mbps, n/ac_HT20/40/VHT20/40/80 : MCS0

UNII-2A a : 6 Mbps, n/ac_HT20/40/VHT20/40/80 : MCS0

UNII-2C a : 6 Mbps, n/ac_HT20/40/VHT20/40/80 : MCS0

UNII-3 a : 6 Mbps, n/ac_HT20/40/VHT20/40/80 : MCS0



2. Summary of tests

Reference	Parameter	Test results
15.407(a)	26 dB bandwidth & 99 % Occupied Bandwidth	Pass
15.407(e)	6 dB bandwidth	Pass
15.407(a)	Maximum conducted output power	Pass
15.407(a)	Power spectral density	Pass
15.407(g)	Frequency stability	Pass
15.205 15.209	Radiated restricted band and emission	Pass
15.407(d)	General field strength limit (Restricted bands and radiated emission limit)	Pass
15.207	AC power line conducted emissions	Pass

3. Test results

3.1. 26 dB bandwidth & 99% Occupied Bandwidth

Test procedure

26 dB bandwidth

KDB 789033 D02 v01r03– Section C.1, KDB 644545 D03 v01

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. 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%.
6. In case of band crossing channels 138, 142 and 144, the measurement is complied with section D of KDB 644545_D03 v01

Limit

N/A

99 % bandwidth

KDB 789033 D02 v01r03– Section D

1. Set span = 1.5 times to 5.0 times the OBW.
2. Set RBW = 1% to 5% of the OBW
3. Set the VBW > 3 x RBW.
4. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak bandwidth function of the instrument (if available).
5. Use the 99% power bandwidth function of the instrument (if available).
6. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

In the result,

-DFS requirements are not applicable in the 5 150 MHz ~ 5 250 MHz.

Test results

Band	Frequency(MHz)	Mode	26 dB bandwidth(MHz)	99 % bandwidth(MHz)
UNII-1	5 180	a	20.839	-
	5 220		20.912	-
	5 240		20.839	16.860
UNII-2A	5 260		20.767	16.779
	5 280		20.984	-
	5 320		20.912	-
UNII-2C	5 500		20.622	-
	5 580		20.839	-
	5 720		20.478	-
UNII-3	5 745		20.622	-
	5 785		20.405	-
	5 825		20.478	-
UNII-1	5 180	HT20	21.129	-
	5 220		21.129	-
	5 240		21.129	17.945
UNII-2A	5 260		21.056	17.773
	5 280		21.129	-
	5 320		21.056	-
UNII-2C	5 500		21.056	-
	5 580		21.201	-
	5 720		20.984	-
UNII-3	5 745		21.129	-
	5 785		20.984	-
	5 825		20.984	-
UNII-1	5 190	HT40	44.230	-
	5 230		44.110	36.932
UNII-2A	5 270		44.230	37.065
	5 310		43.990	-
UNII-2C	5 510		44.340	-
	5 590		44.230	-
	5 710		44.110	-
UNII-3	5 755		44.110	-
	5 795		43.880	-

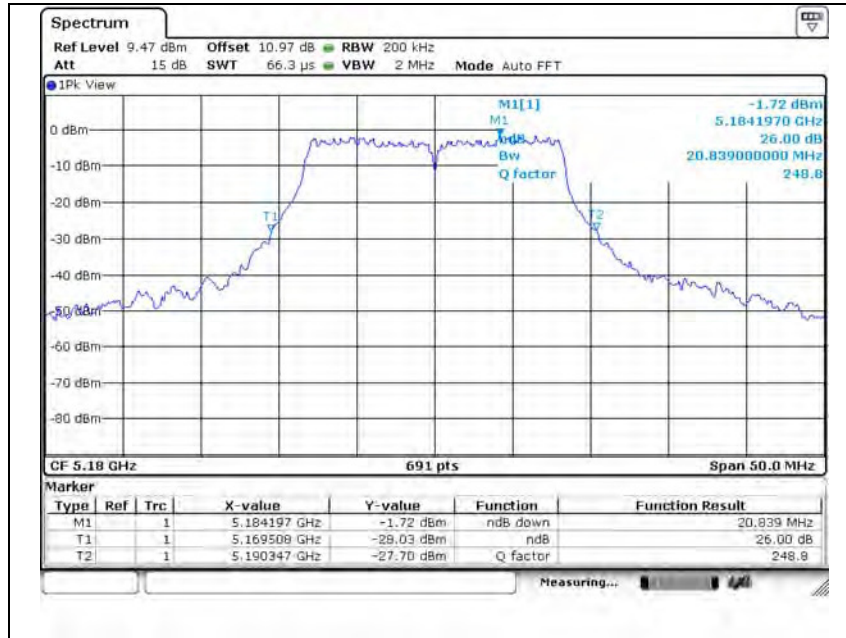
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Band	Frequency(MHz)	Mode	26 dB bandwidth(MHz)	99 % bandwidth(MHz)
UNII-1	5 180	VHT20	21.201	-
	5 220		21.056	-
	5 240		21.129	17.873
UNII-2A	5 260		21.129	17.798
	5 280		21.129	-
	5 320		20.984	-
UNII-2C	5 500		21.056	-
	5 580		20.984	-
	5 720		21.056	-
UNII-3	5 745		20.984	-
	5 785		21.056	-
	5 825		21.056	-
UNII-1	5 190	VHT40	44.230	-
	5 230		43.880	36.932
UNII-2A	5 270		44.110	37.095
	5 310		44.110	-
UNII-2C	5 510		44.110	-
	5 590		44.110	-
	5 710		44.230	-
UNII-3	5 755		44.110	-
	5 795		43.760	-
UNII-1	5 210	VHT80	82.660	75.253
UNII-2A	5 290		82.490	75.051
UNII-2C	5 530		82.660	-
	5 610		82.840	-
	5 690		82.840	-
UNII-3	5 775		82.660	-
UNII-2C (Band-crossing channel)	5 720	a	15.420	-
	5 720	HT20	15.854	-
	5 710	HT40	37.110	-
	5 720	VHT20	15.840	-
	5 710	VHT40	37.230	-
	5 690	VHT80	76.080	-

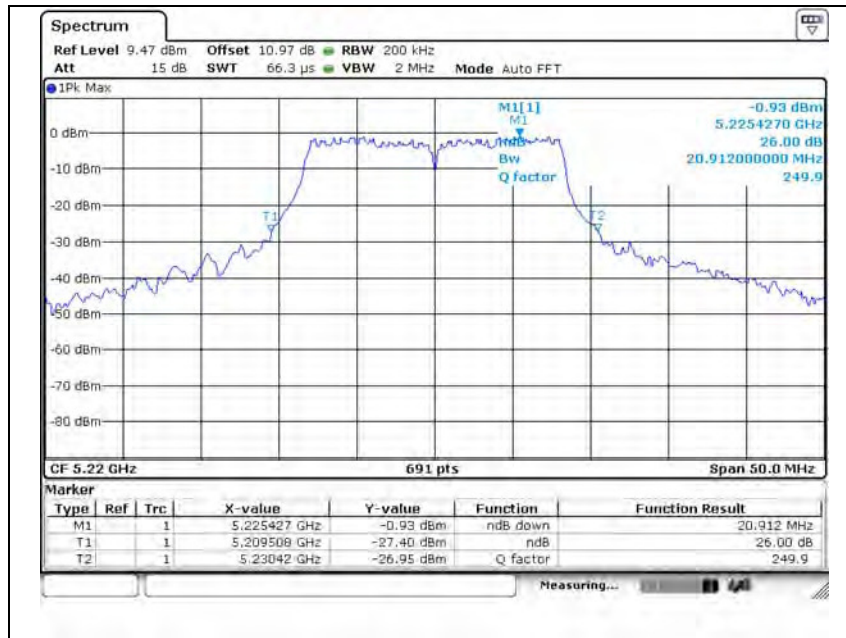
26 dB bandwidth

802.11a

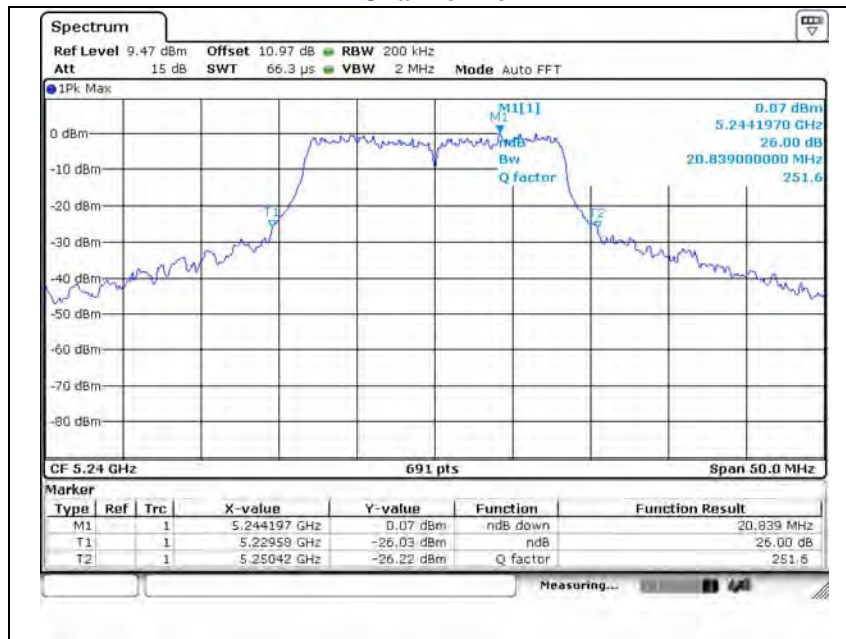
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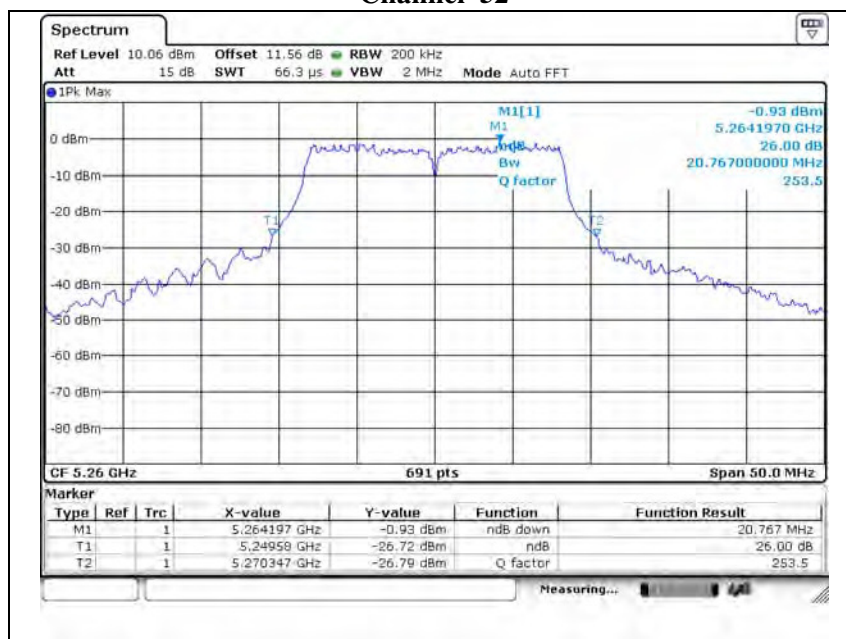
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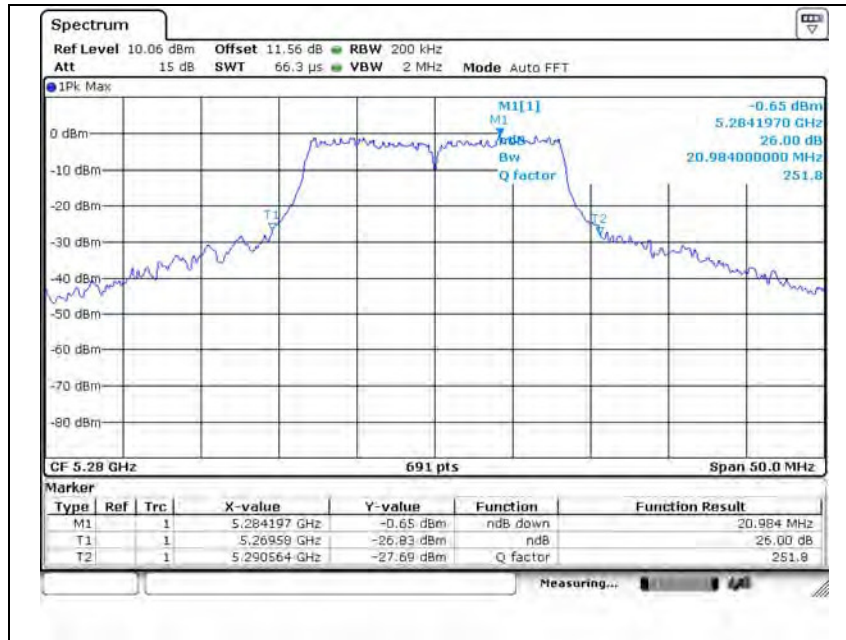
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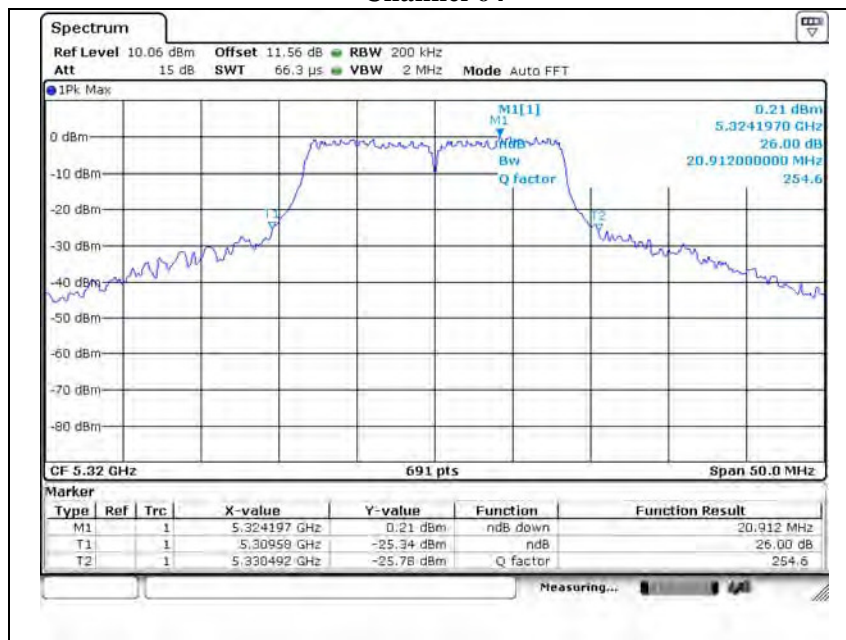
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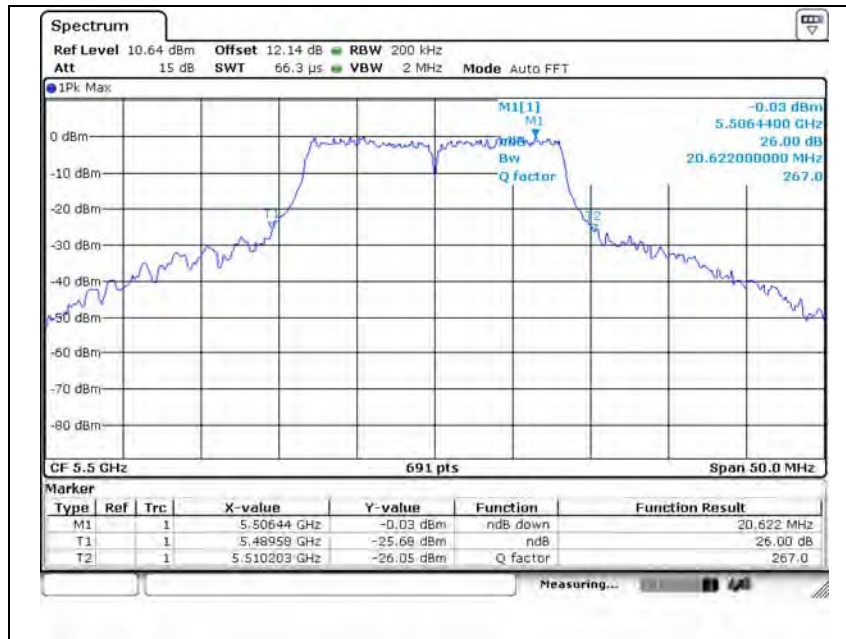
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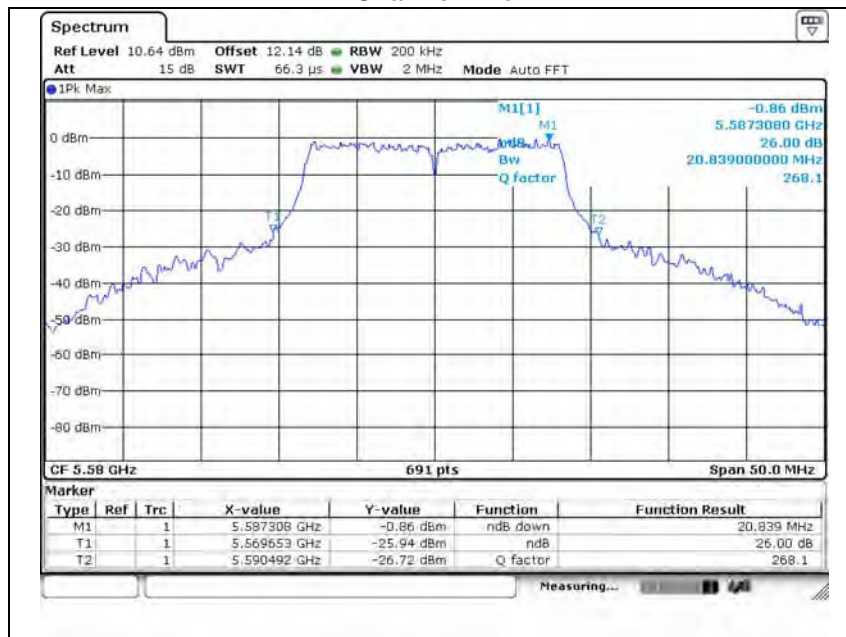
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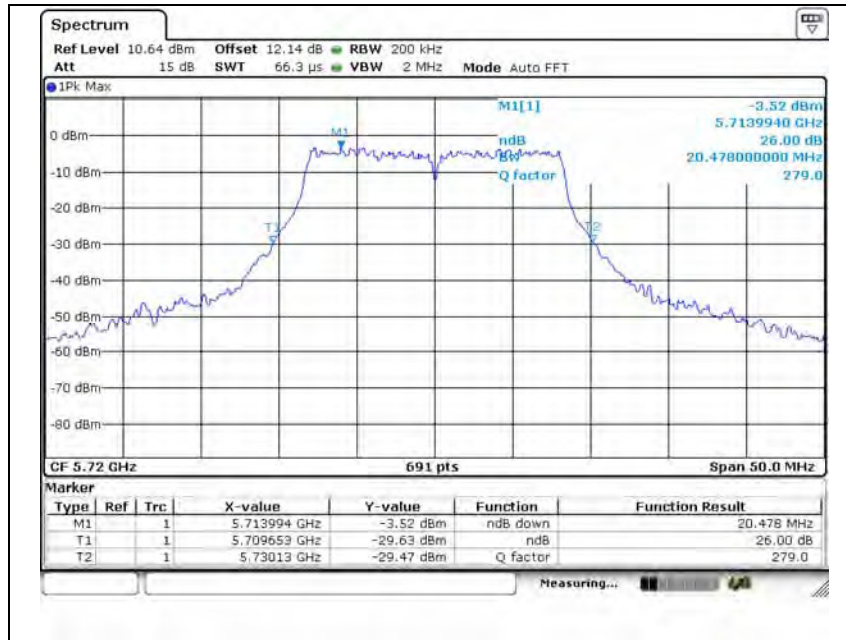
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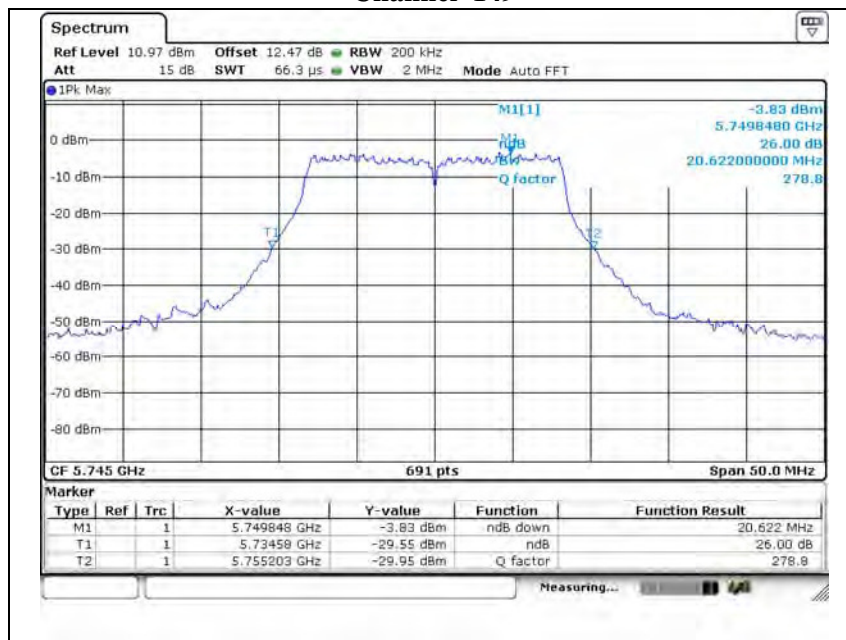
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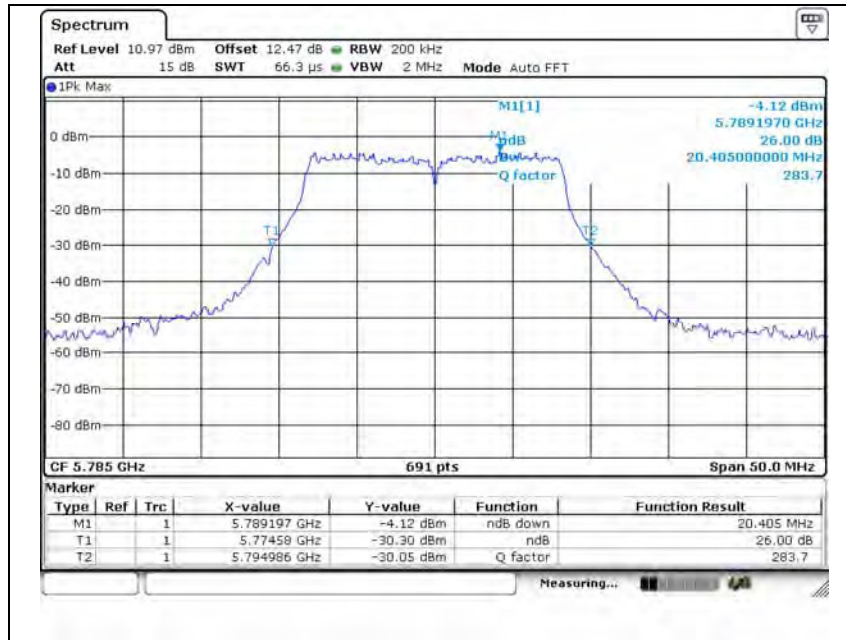
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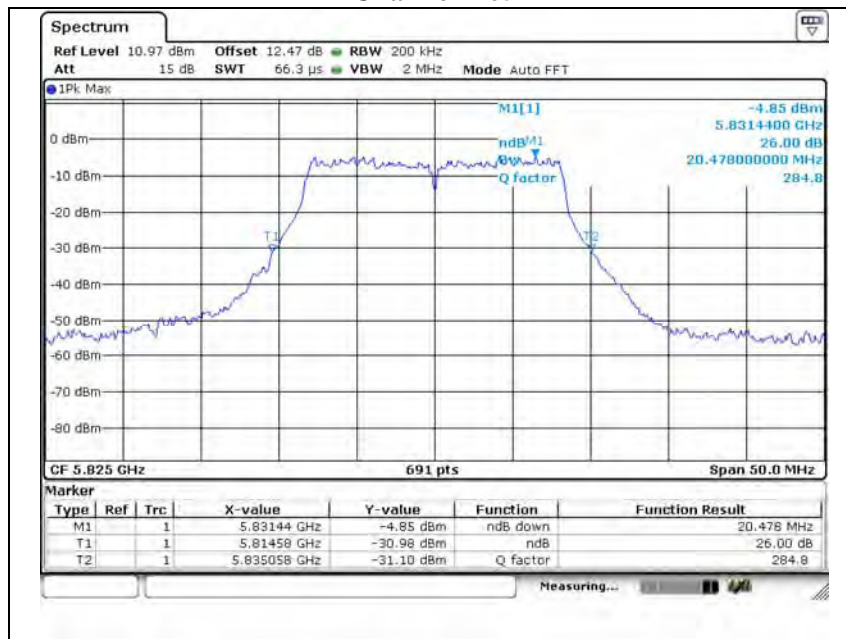
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Channel 157

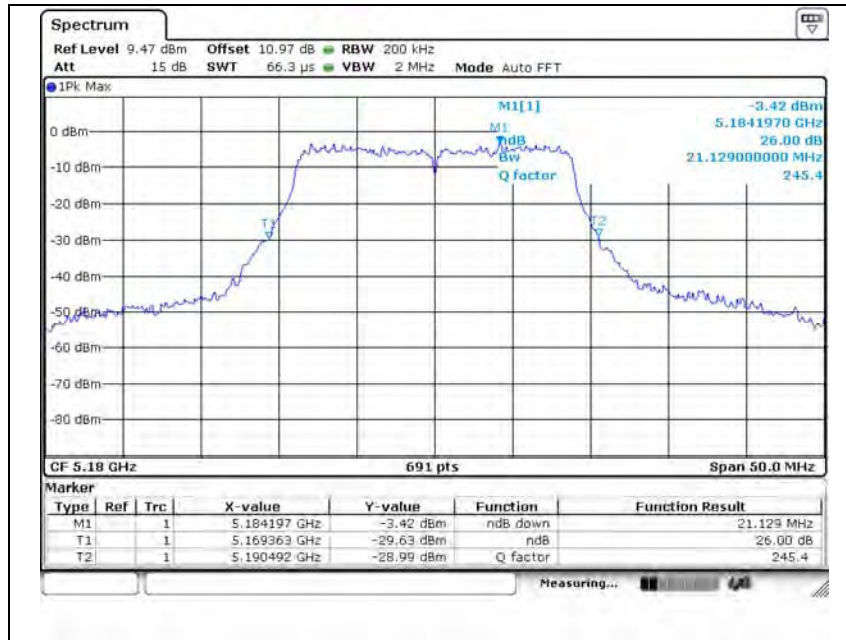


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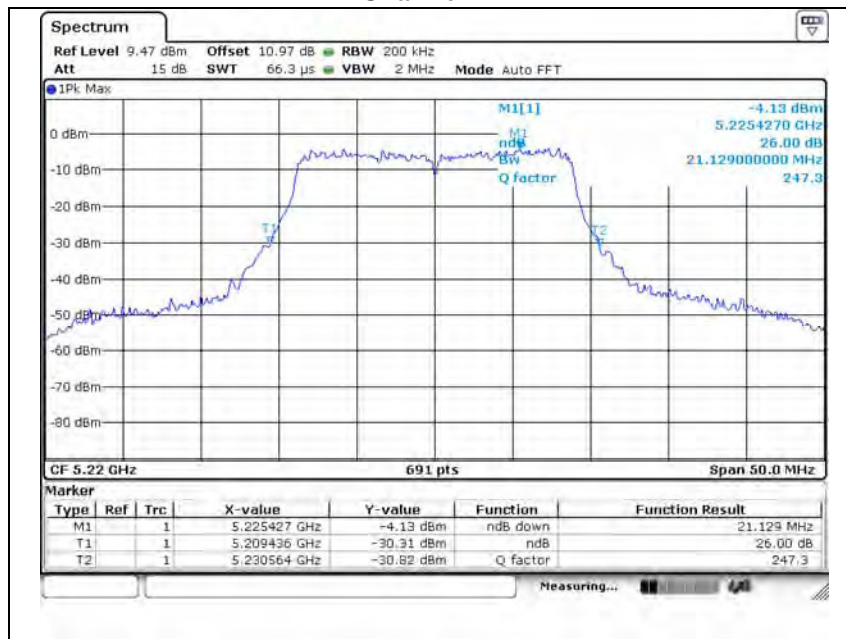


802.11n_HT20

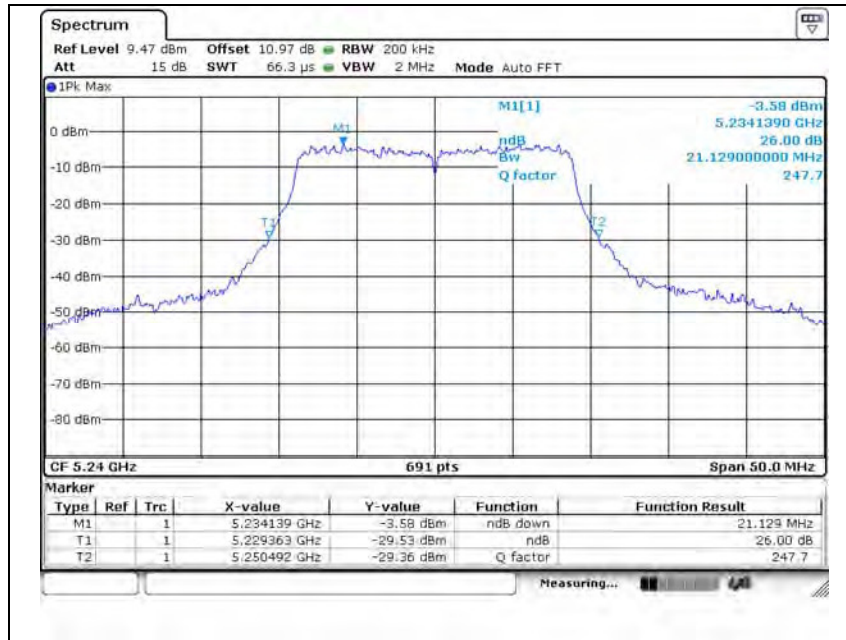
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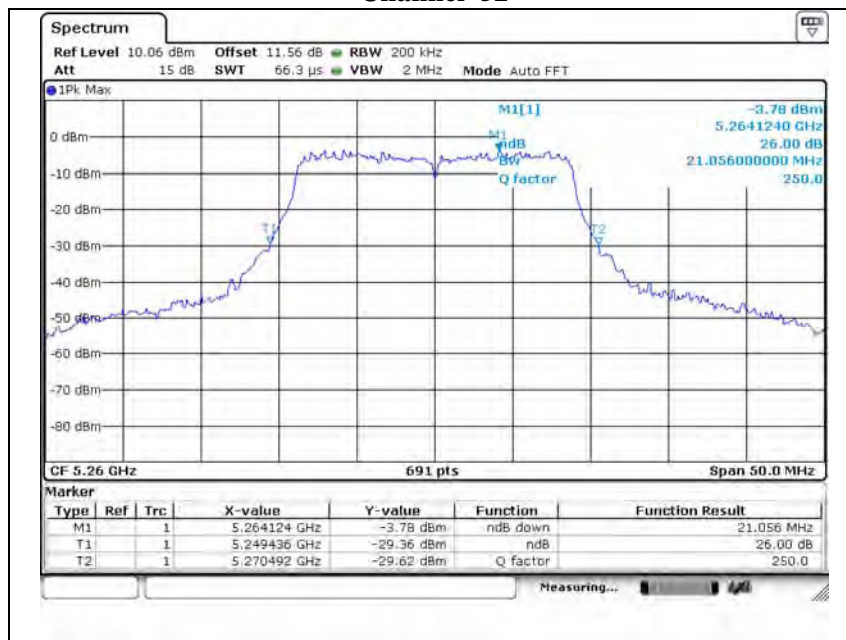
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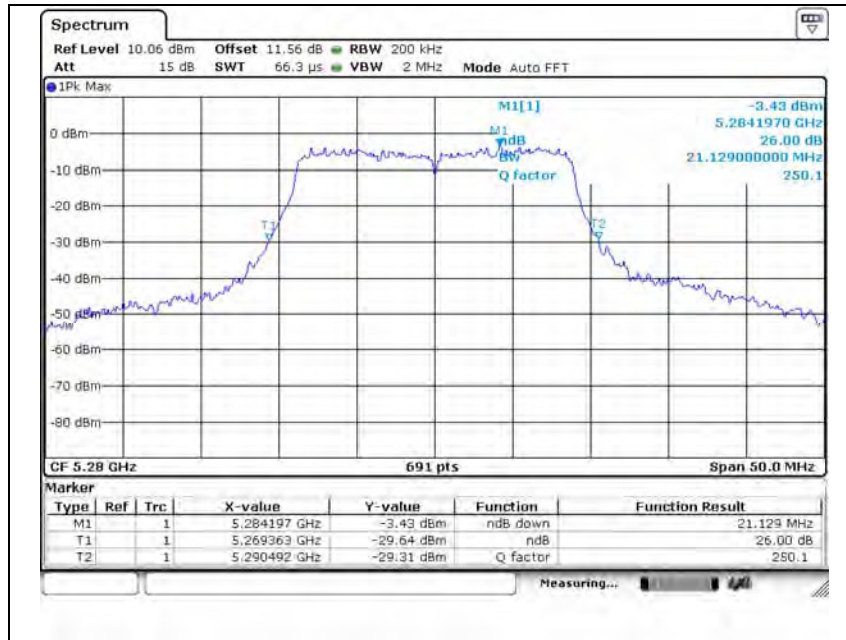
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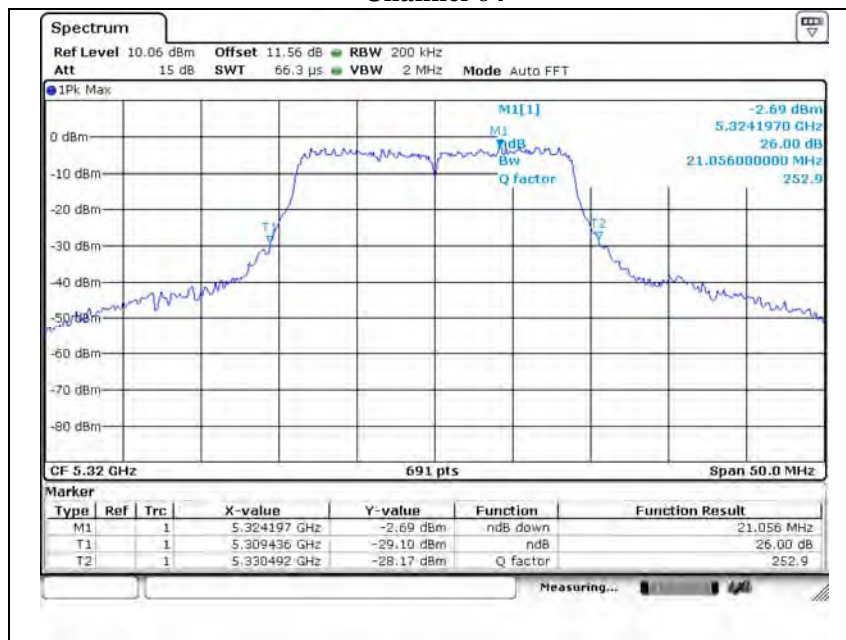
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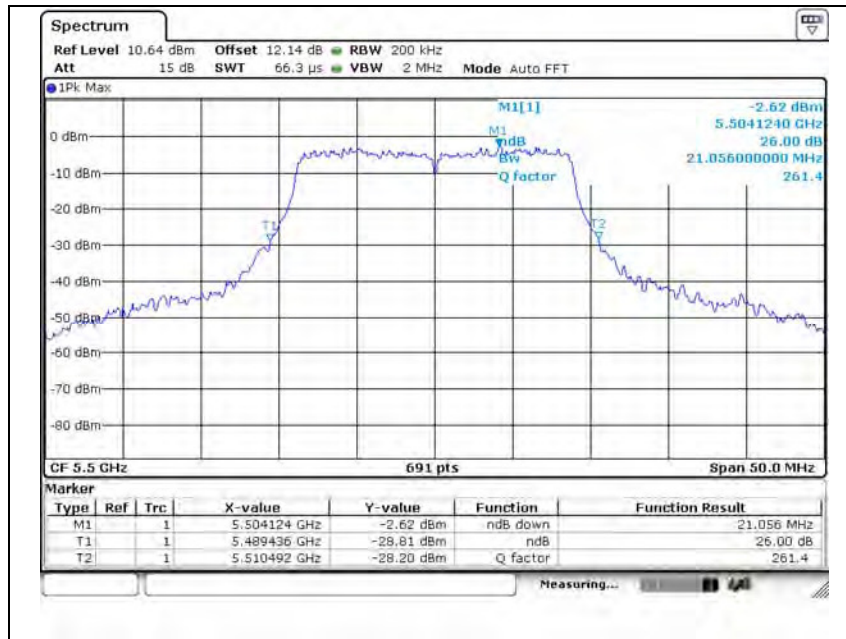
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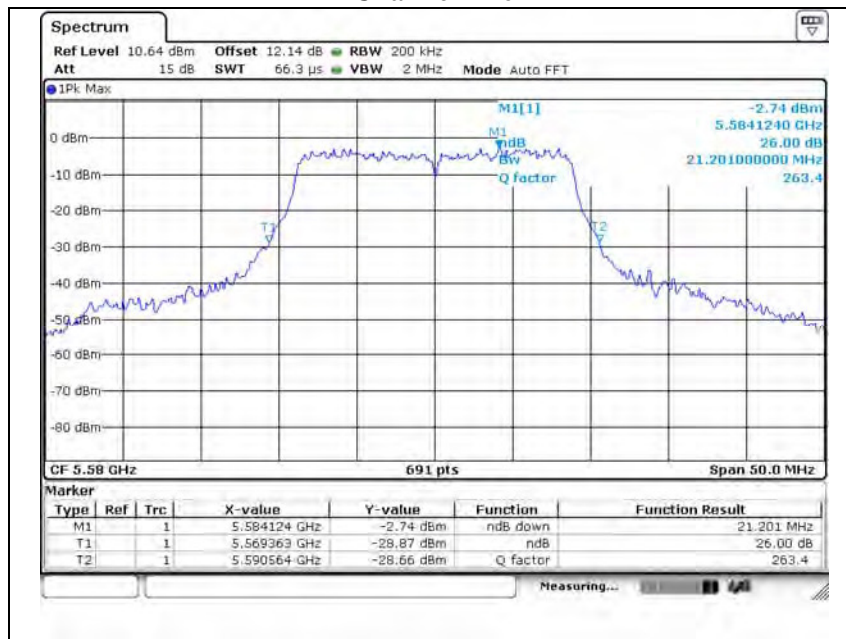
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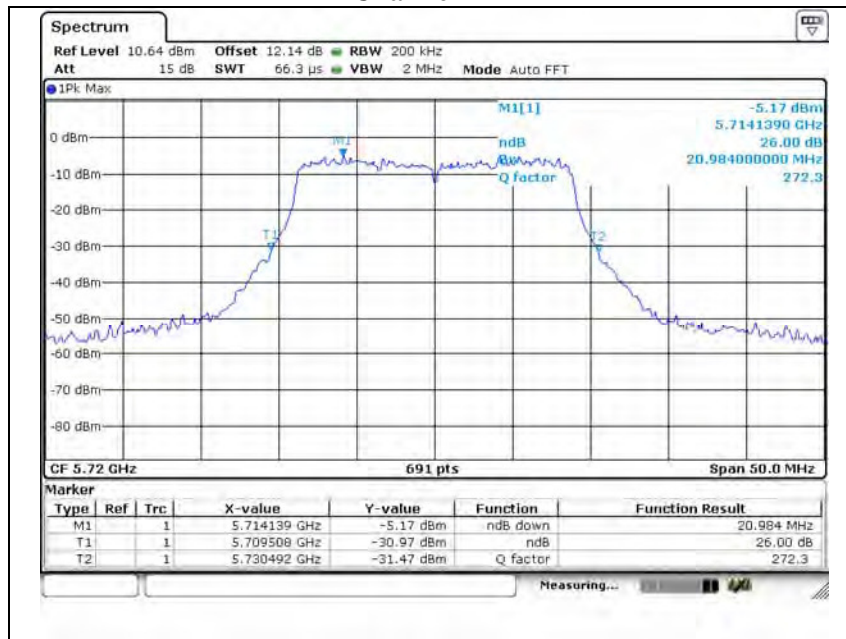
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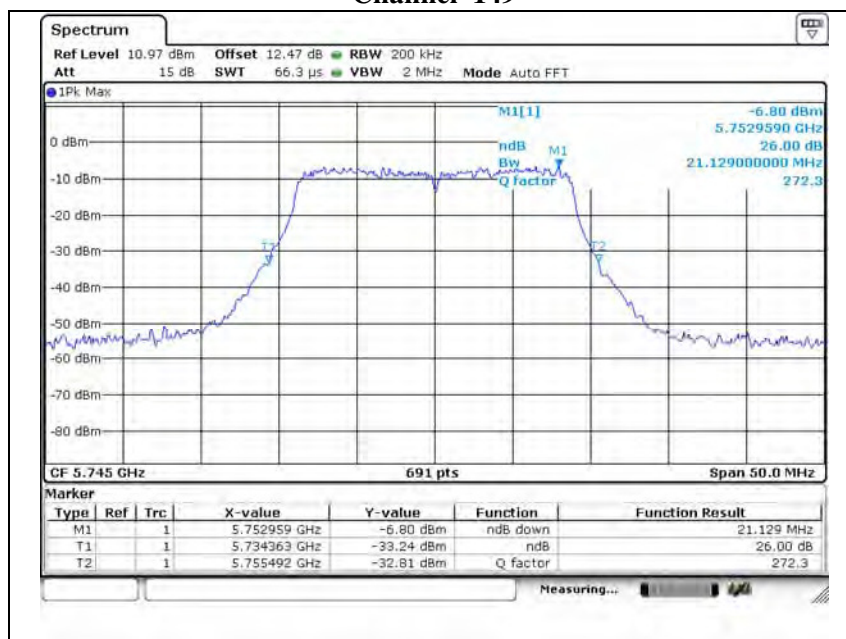
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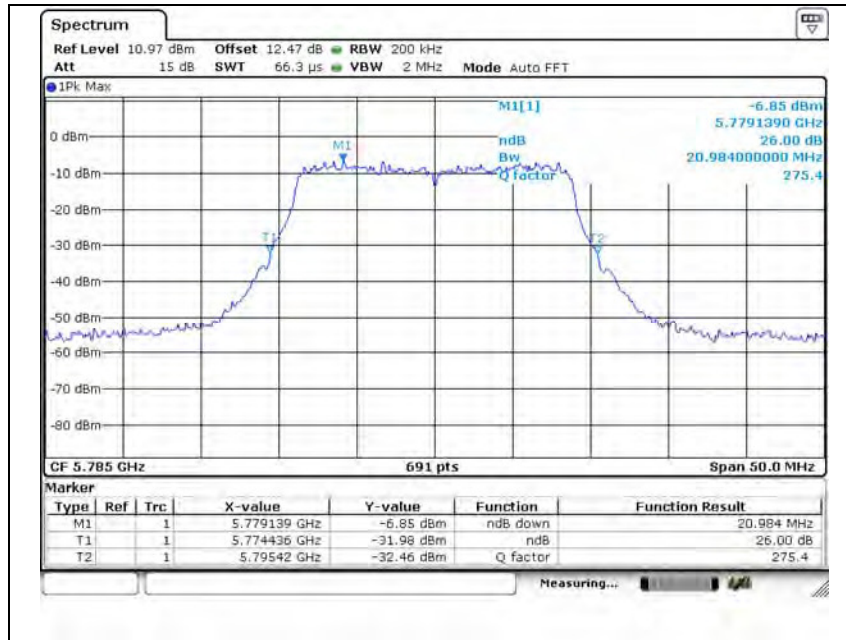
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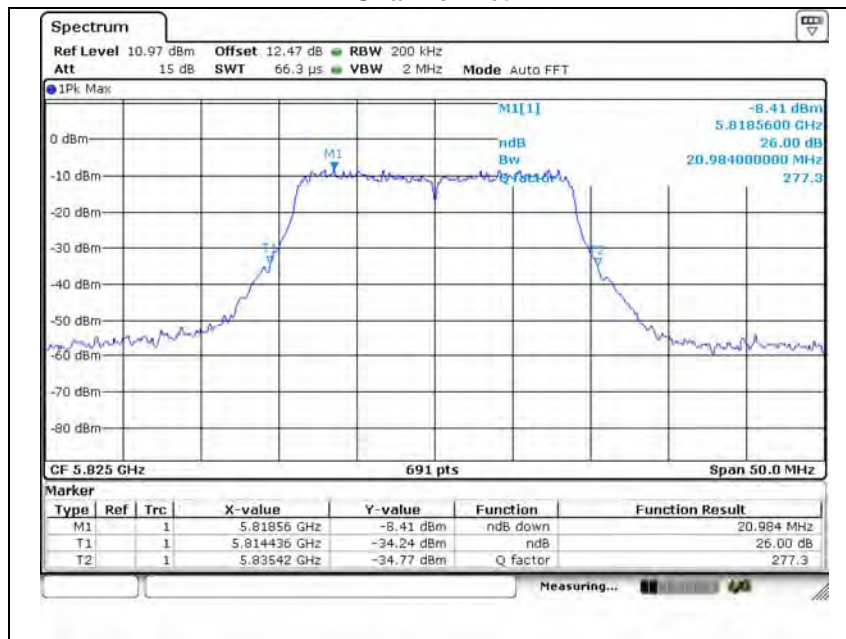
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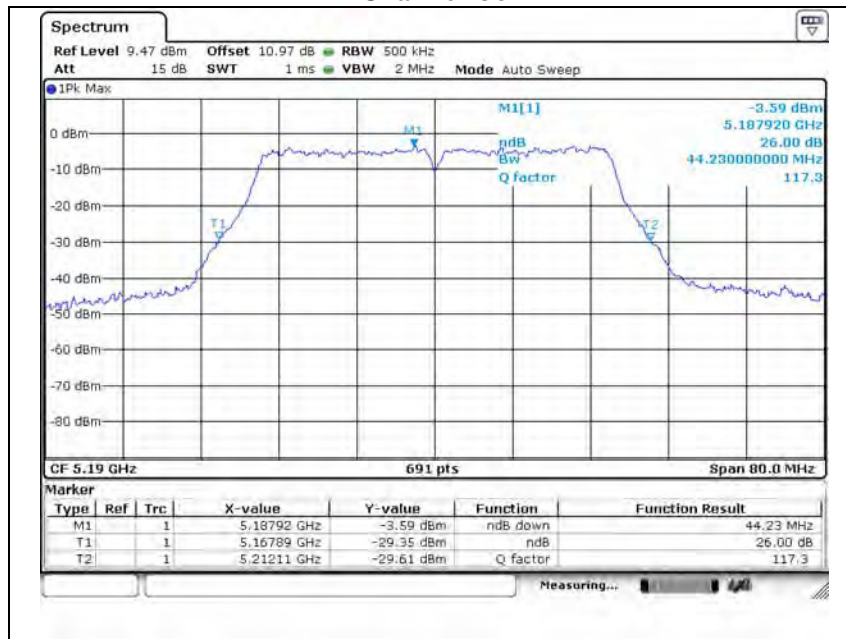


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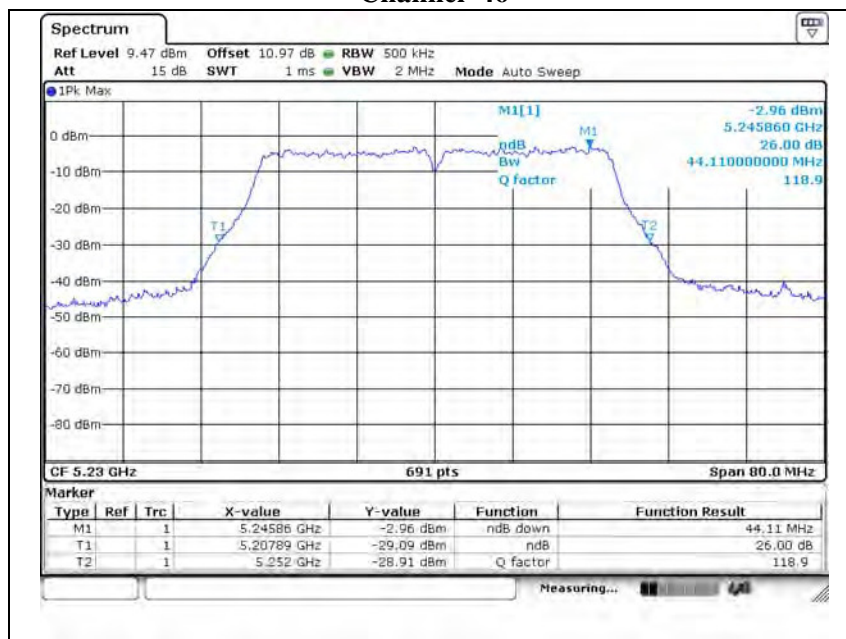


802.11n_HT40

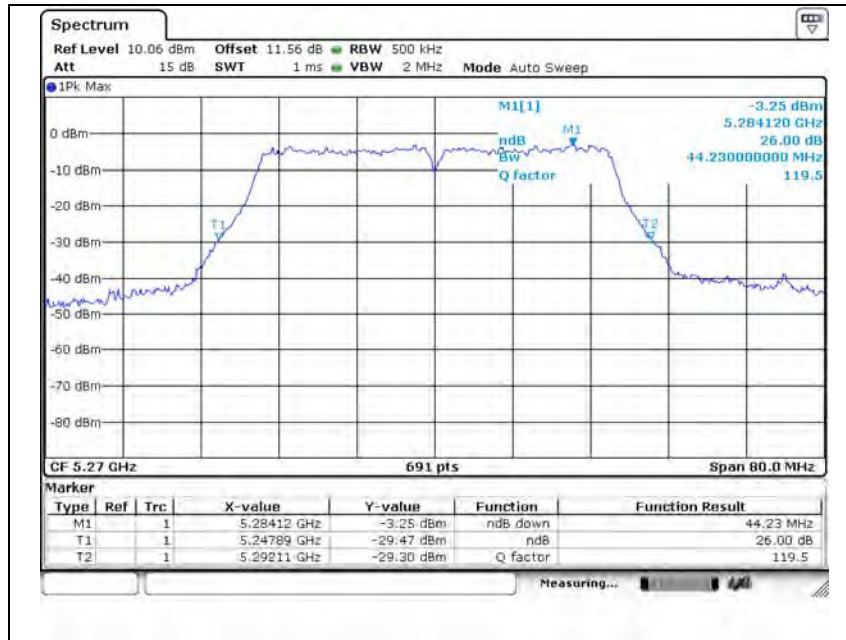
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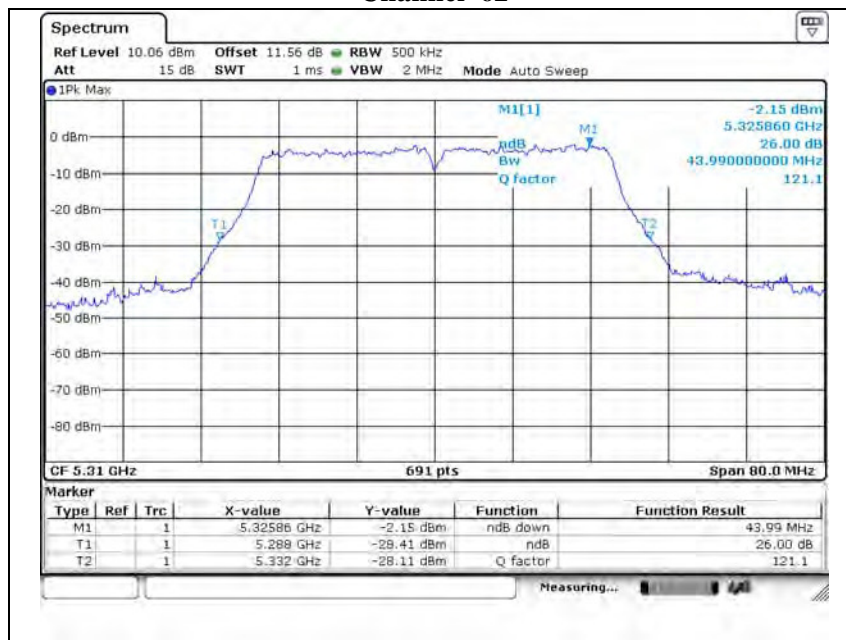
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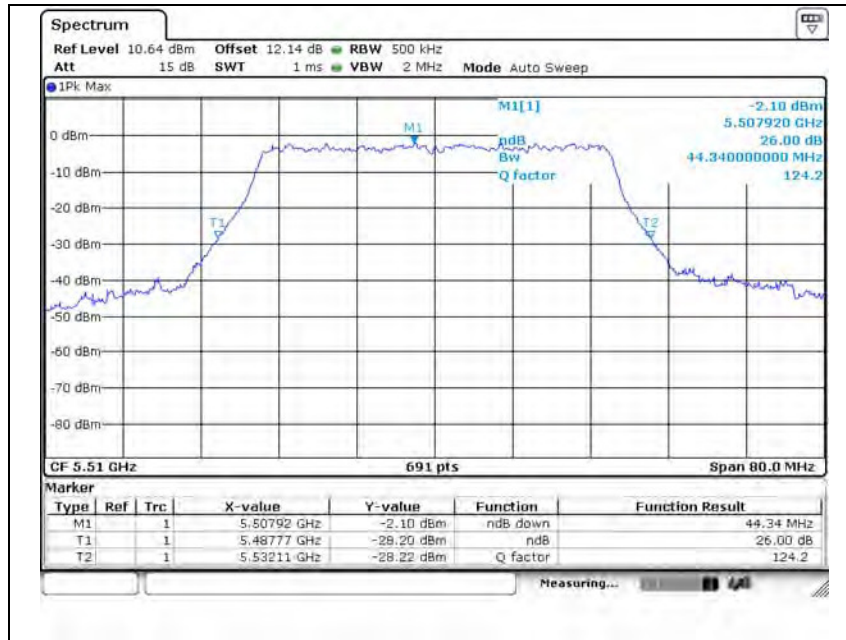
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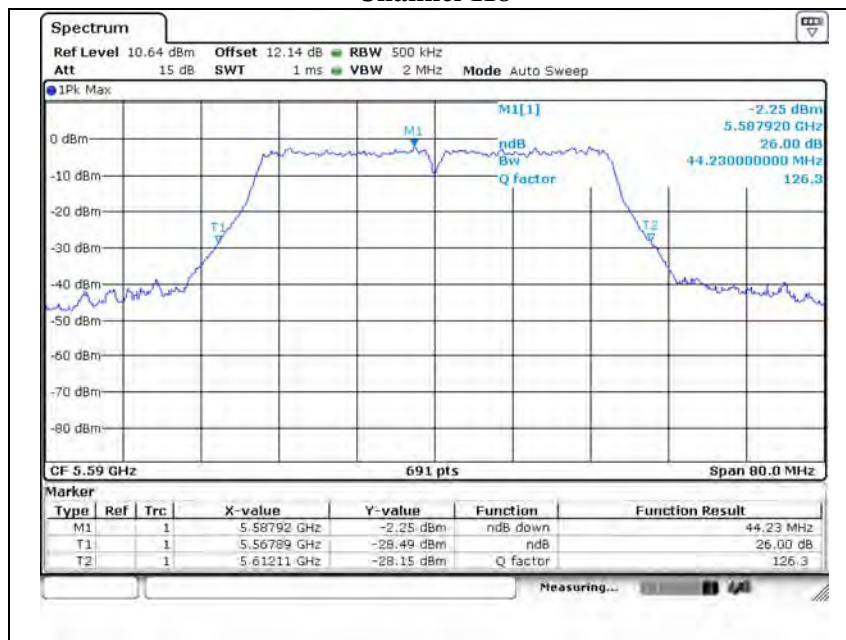
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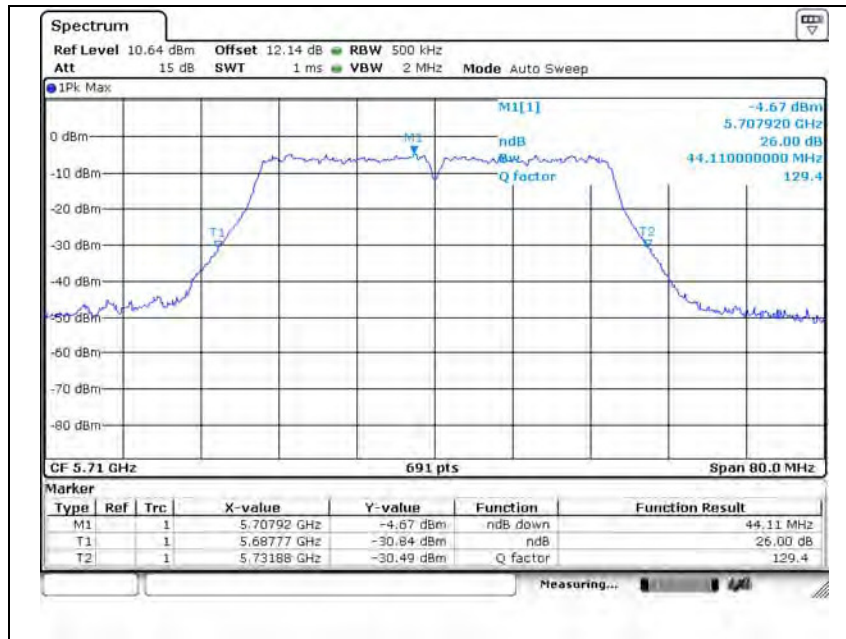
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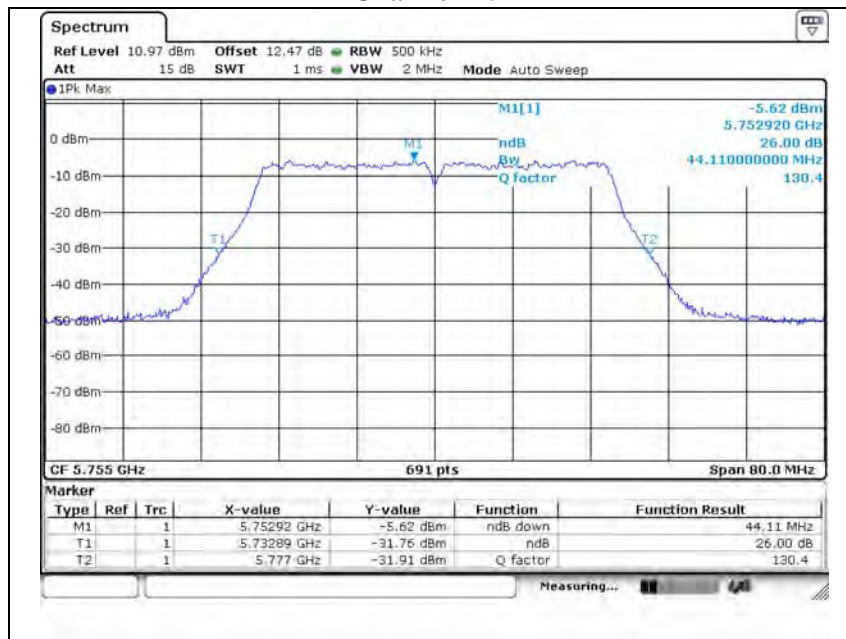
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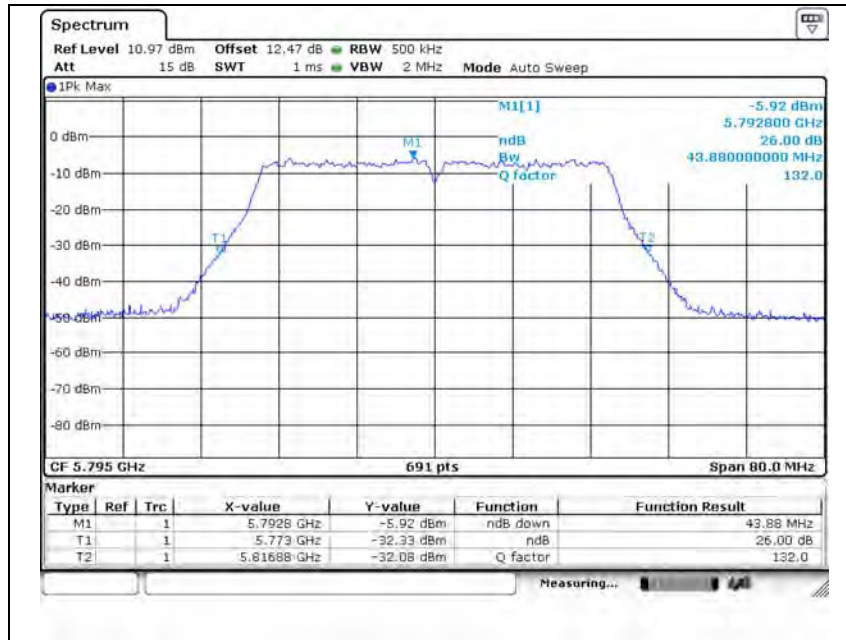
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Channel 151

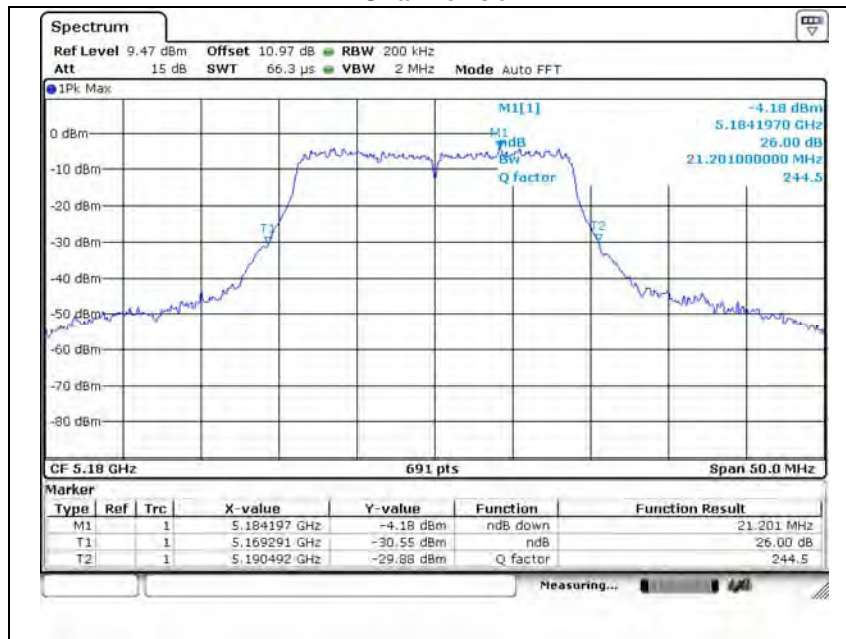


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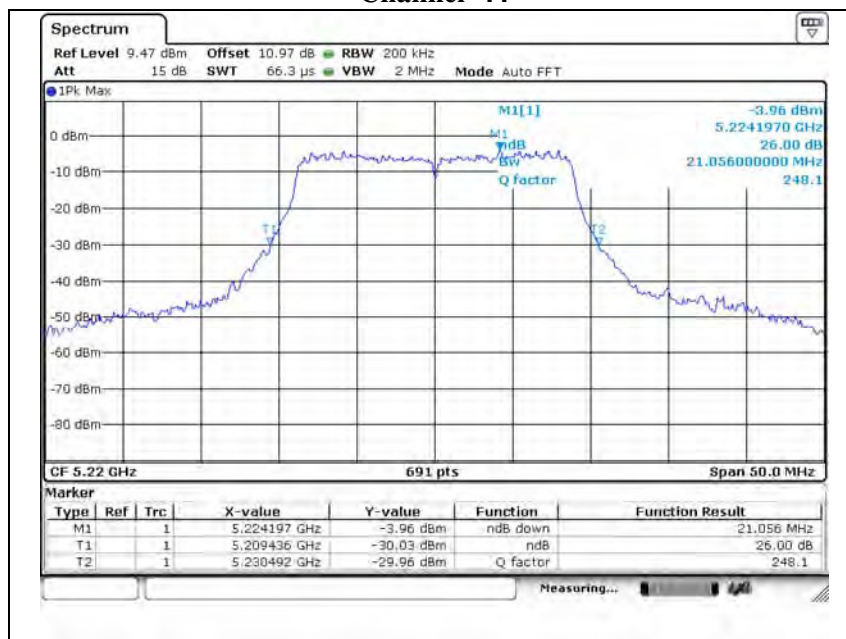


802.11ac_VHT20

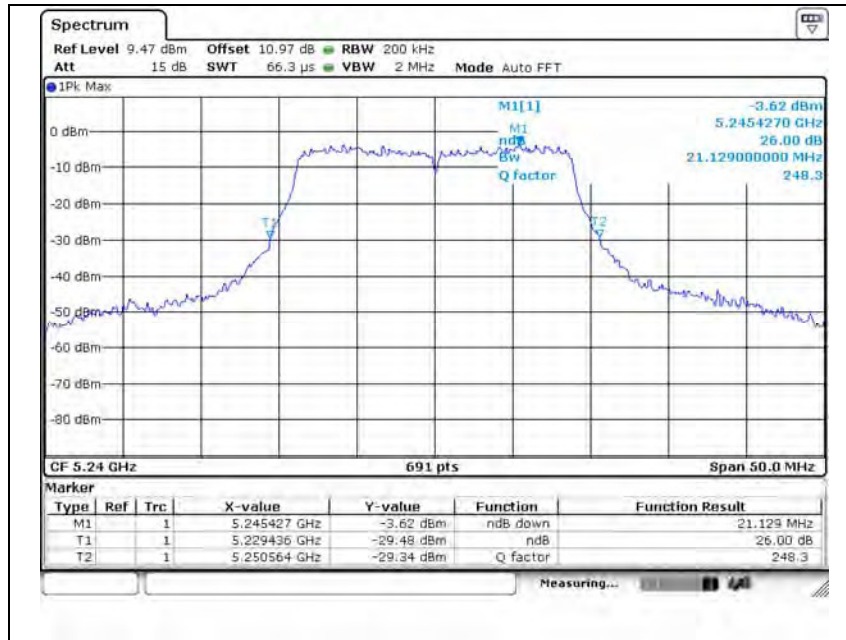
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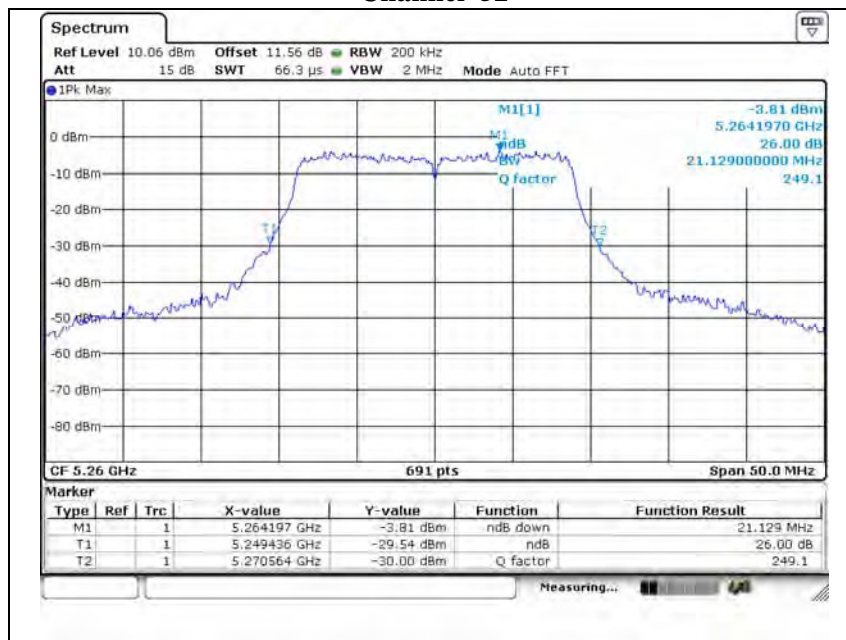
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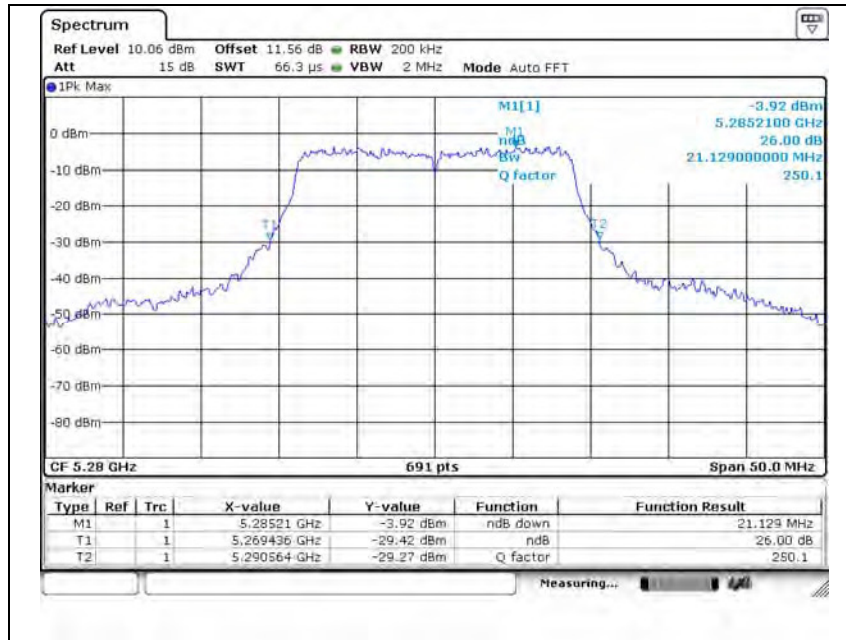
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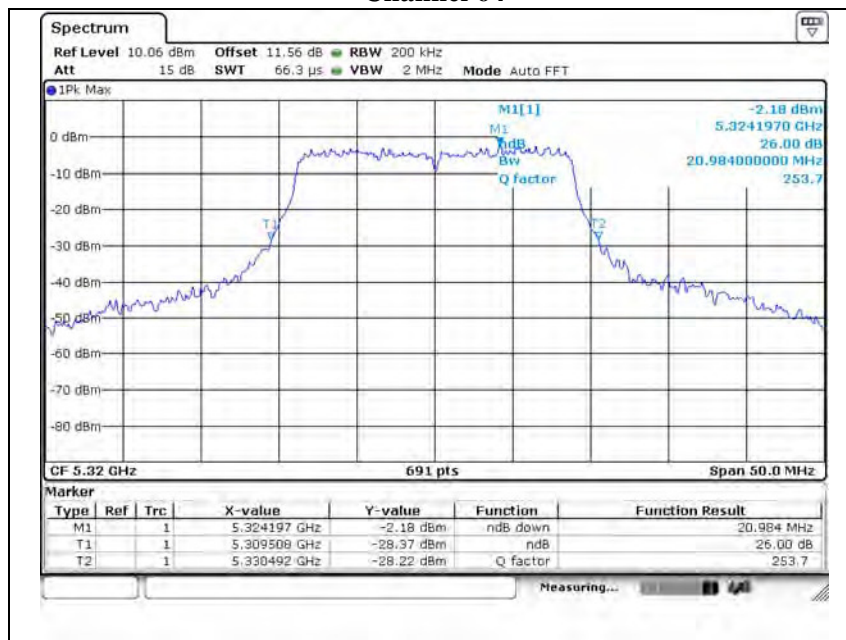
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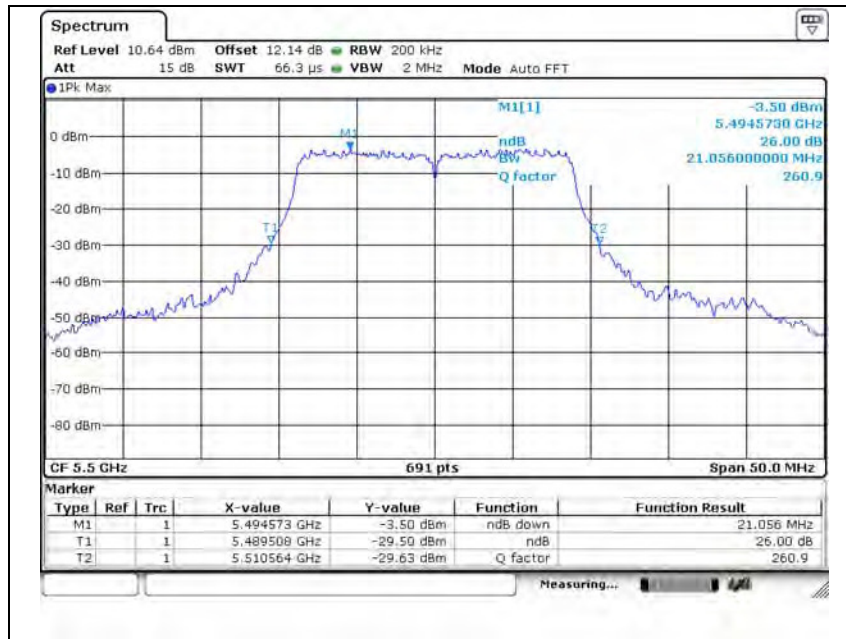
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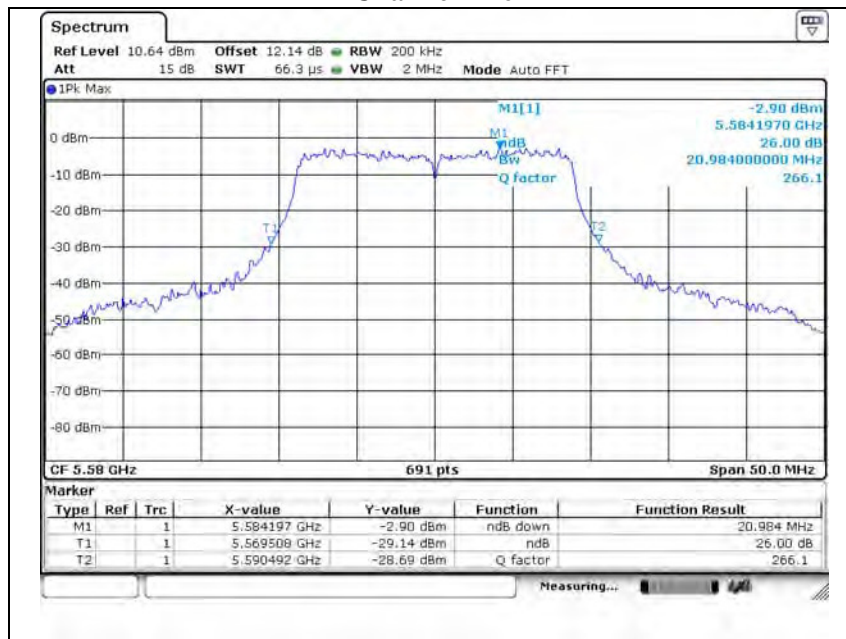
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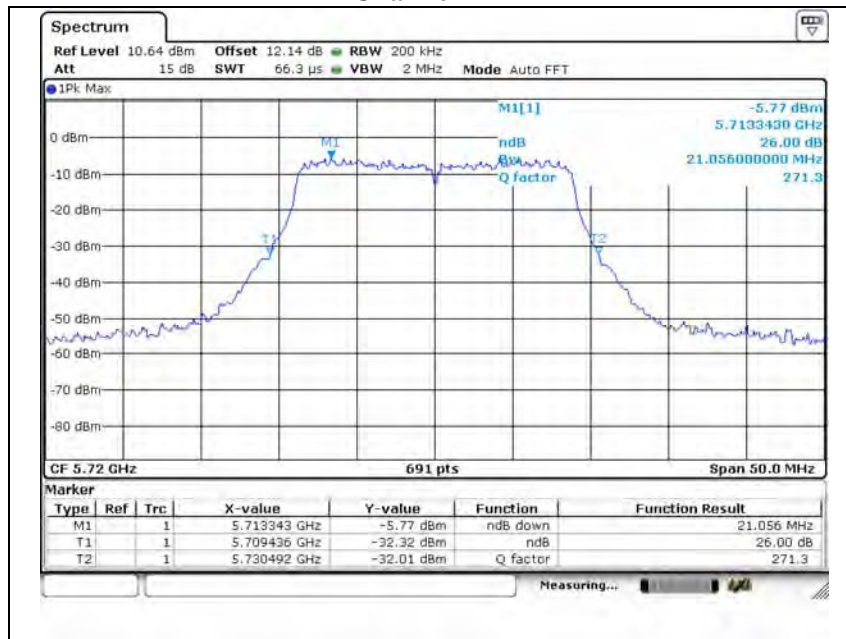
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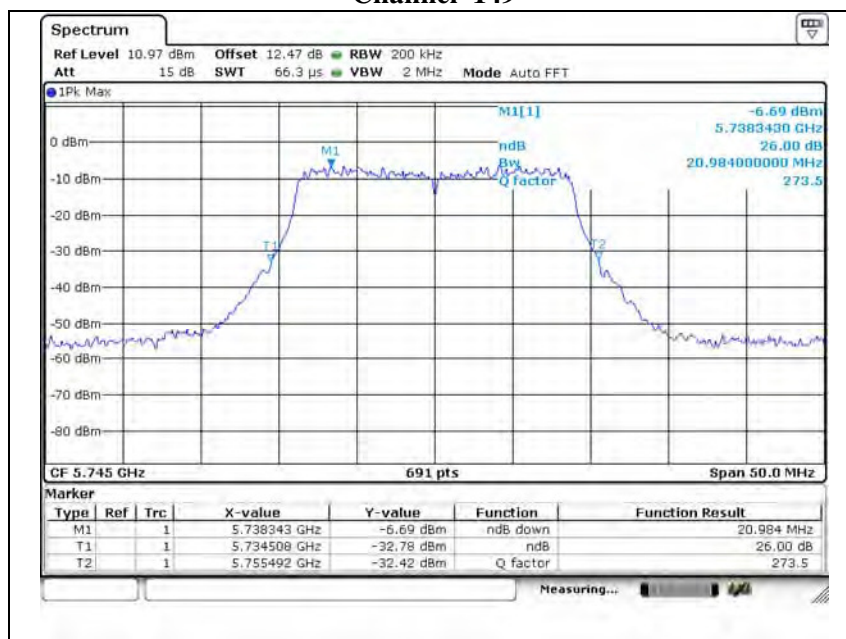
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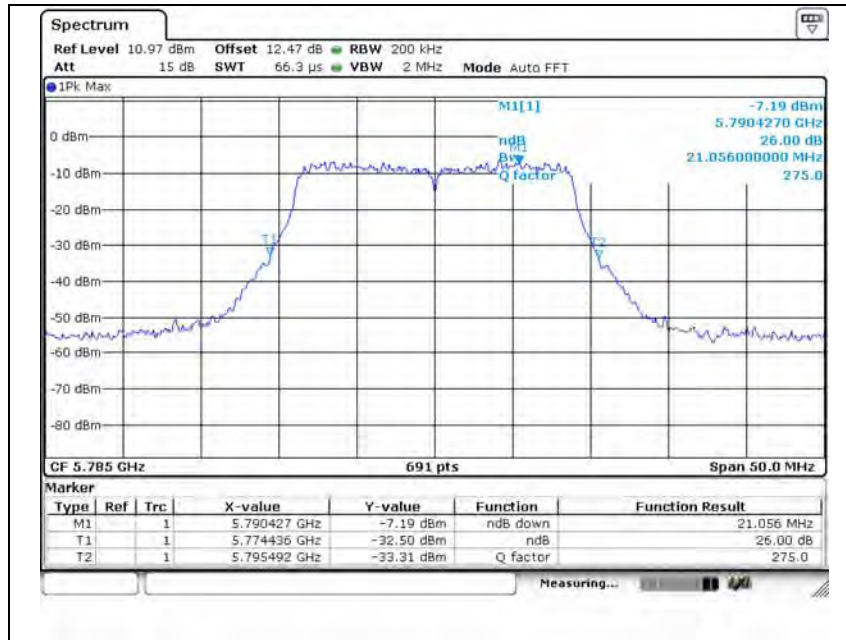
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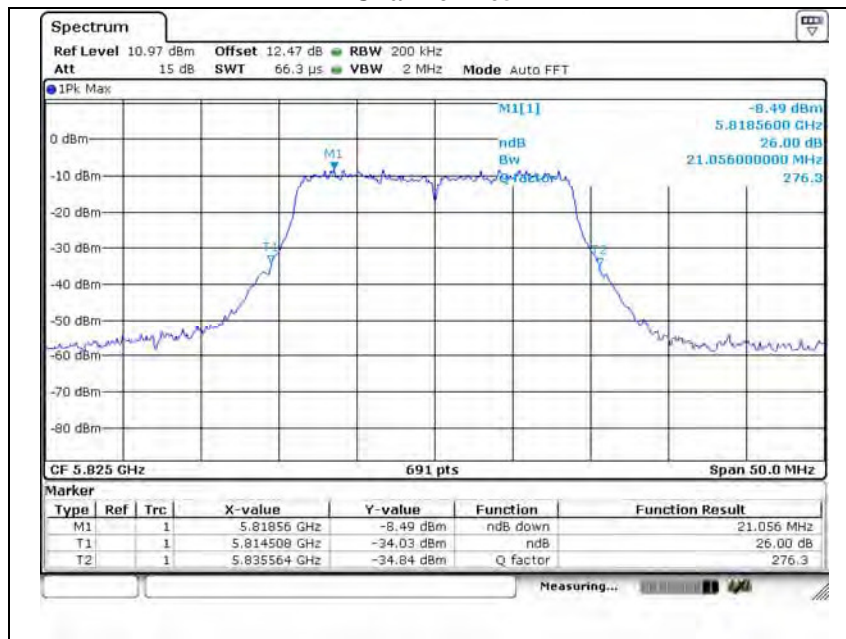
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Channel 157

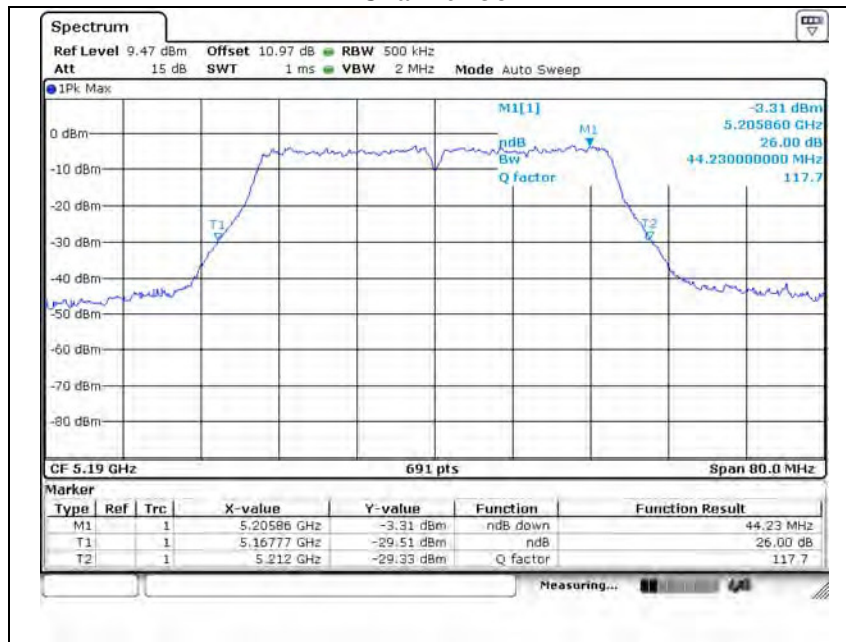


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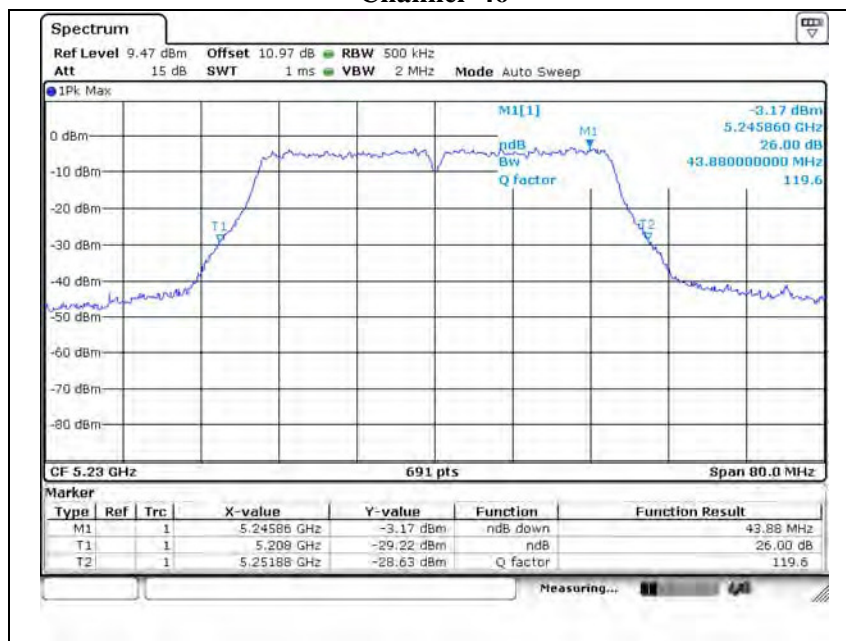


802.11ac_VHT40

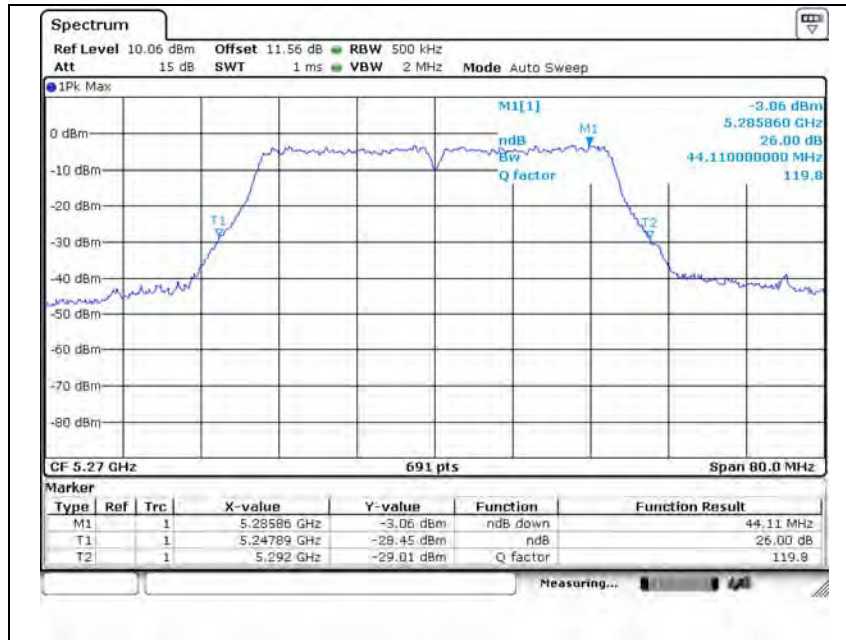
Channel 38



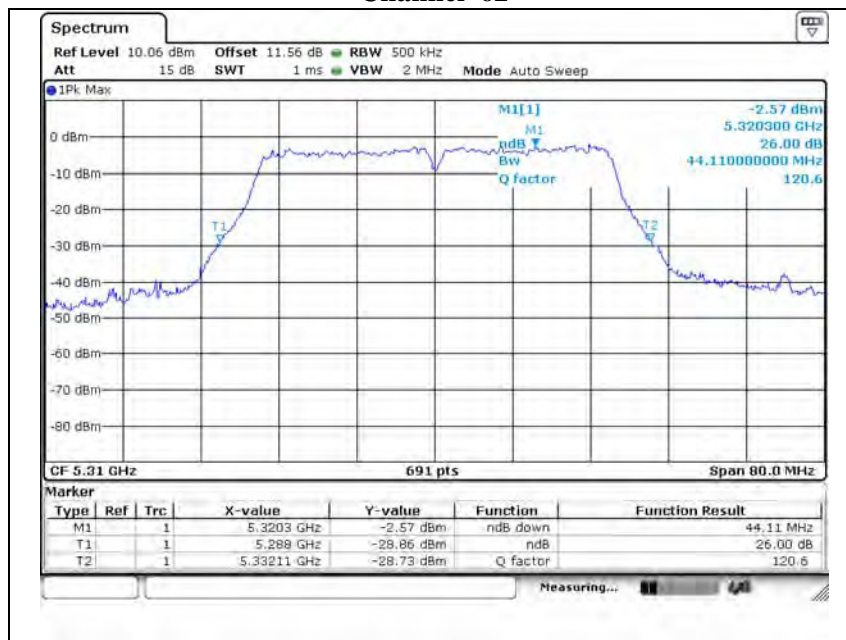
Channel 46



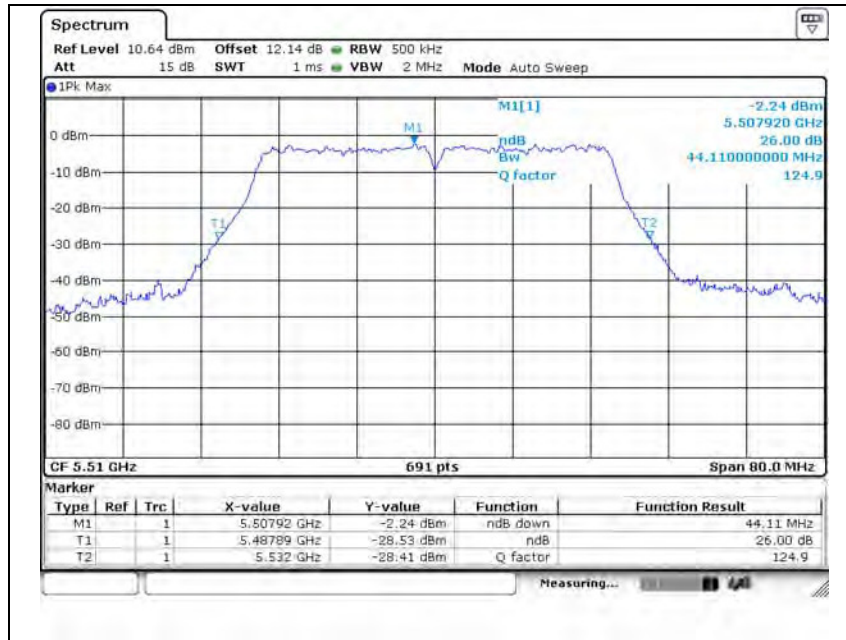
Channel 54



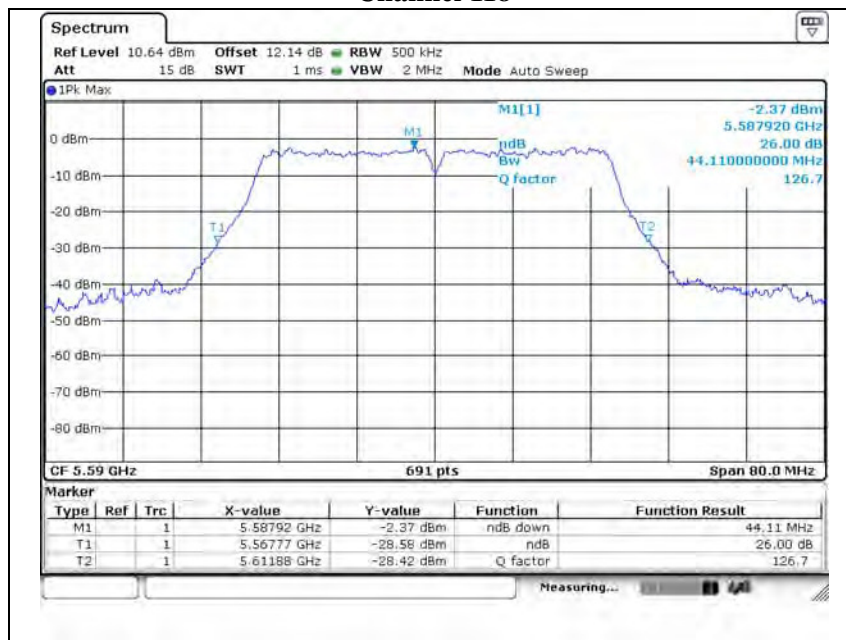
Channel 62



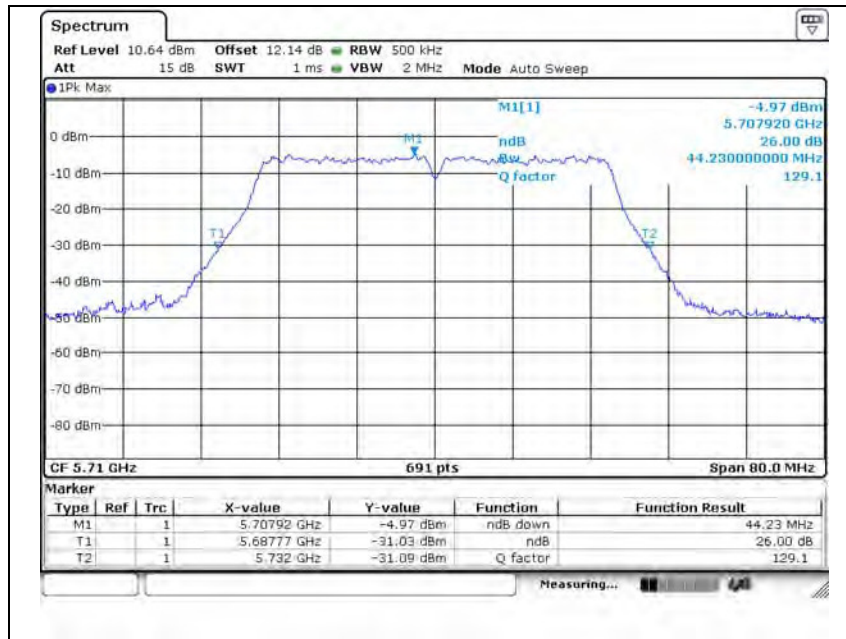
Channel 102



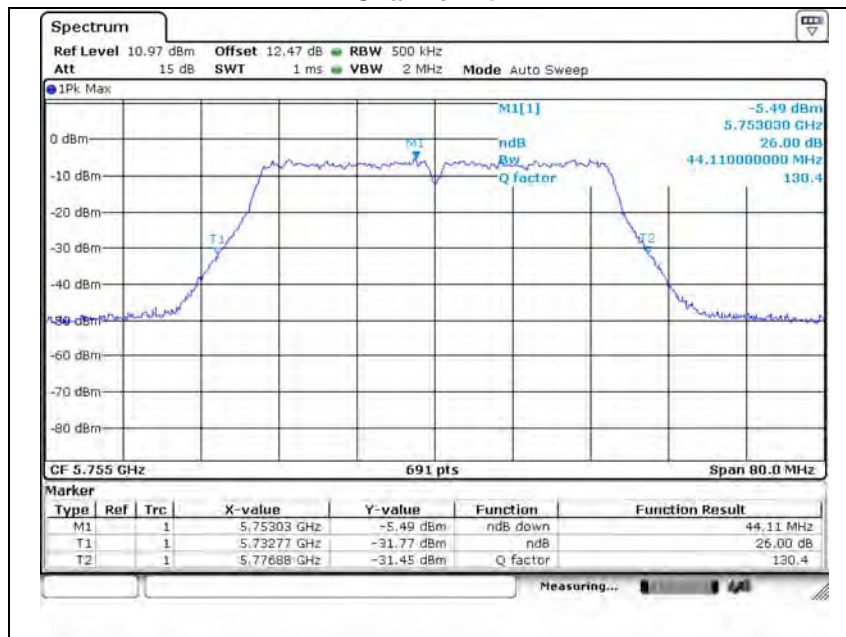
Channel 118



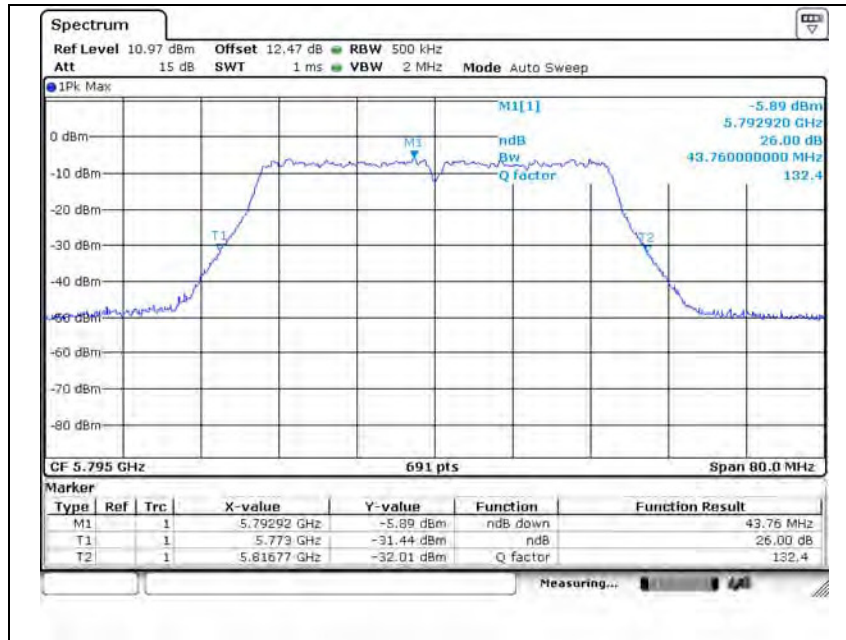
Channel 142



Channel 151

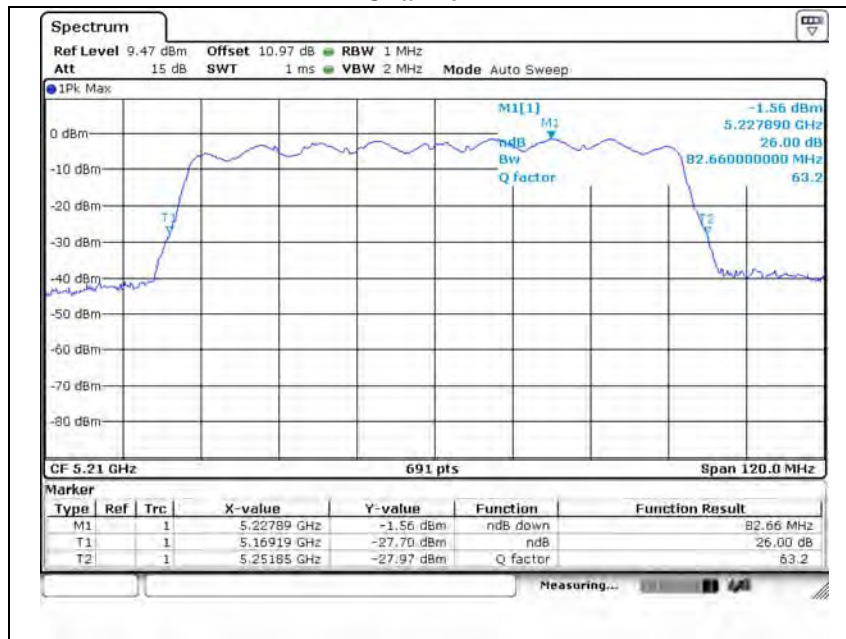


Channel 159

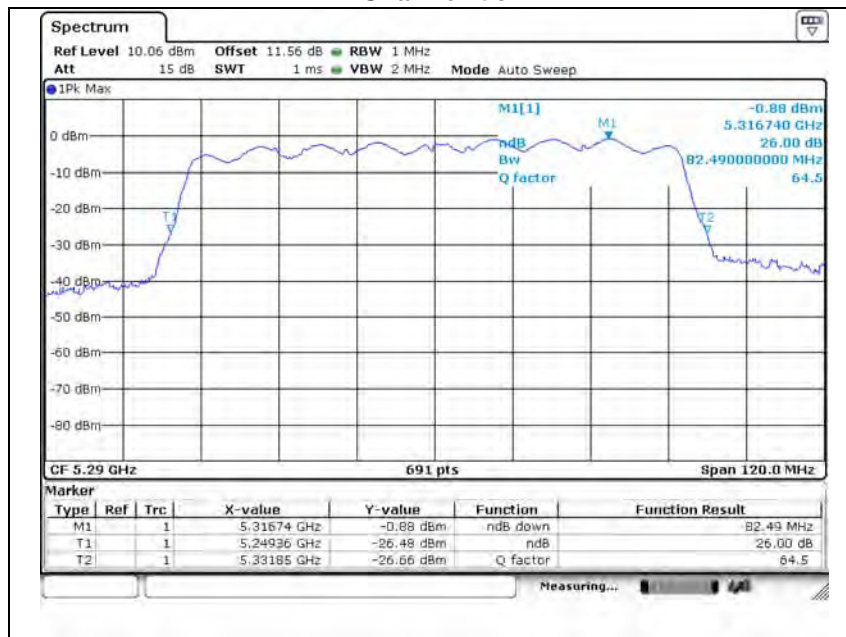


802.11ac_VHT80

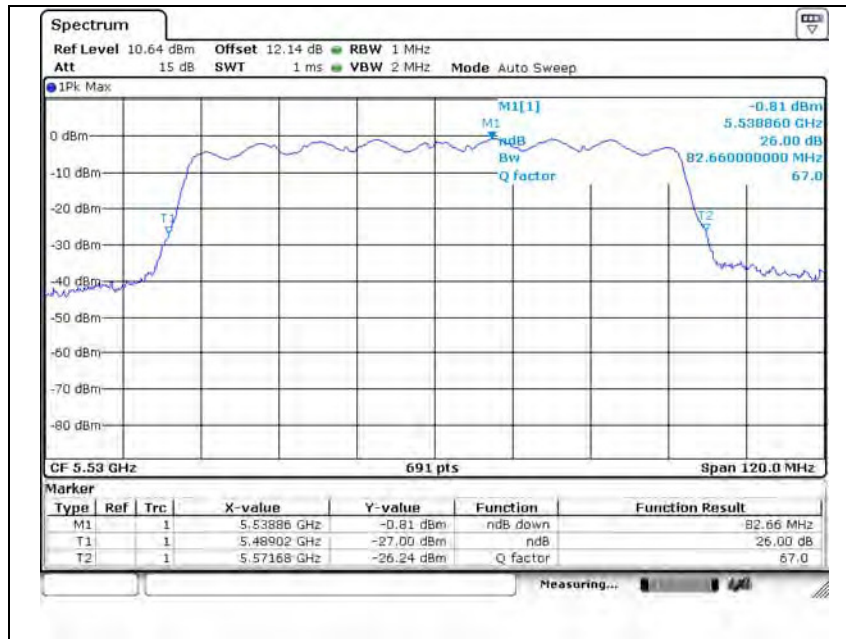
Channel 42



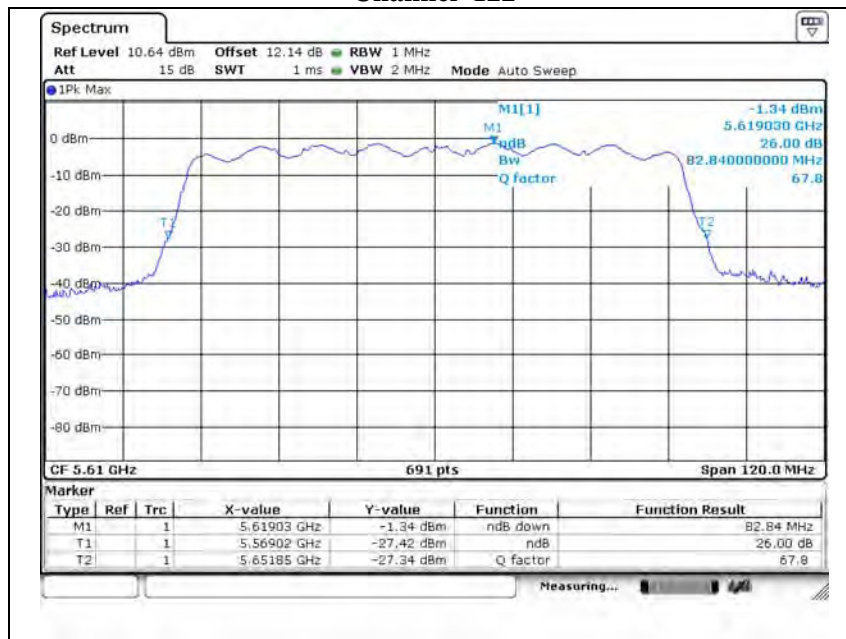
Channel 58



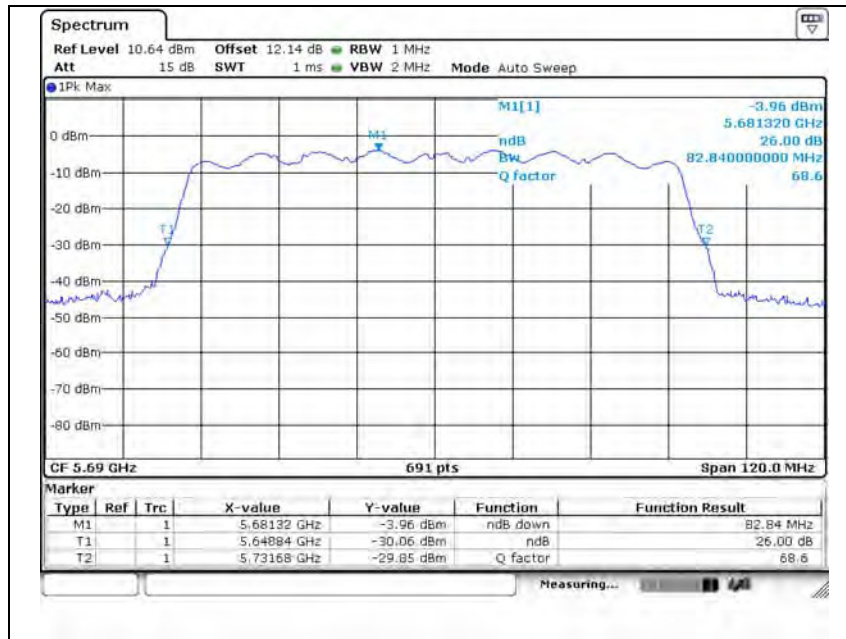
Channel 106



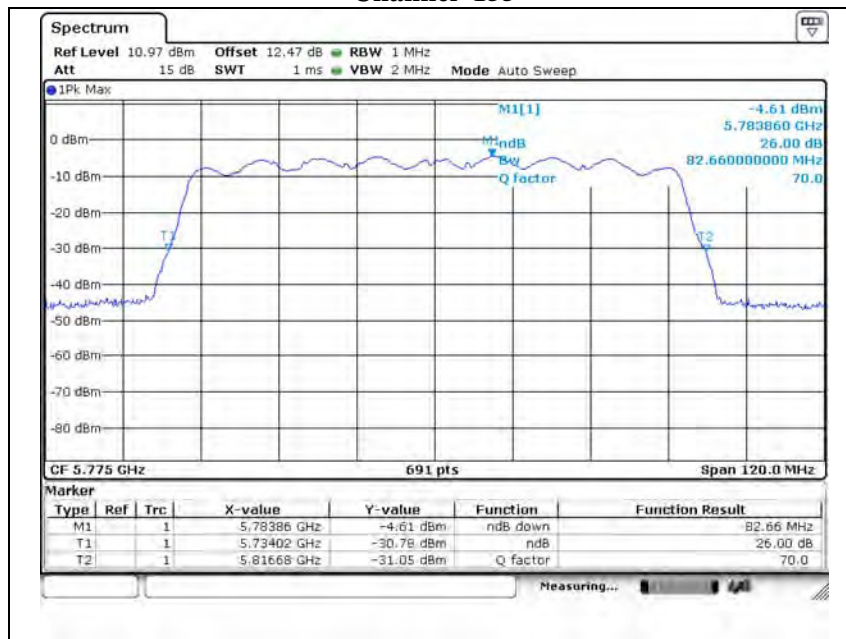
Channel 122



Channel 138

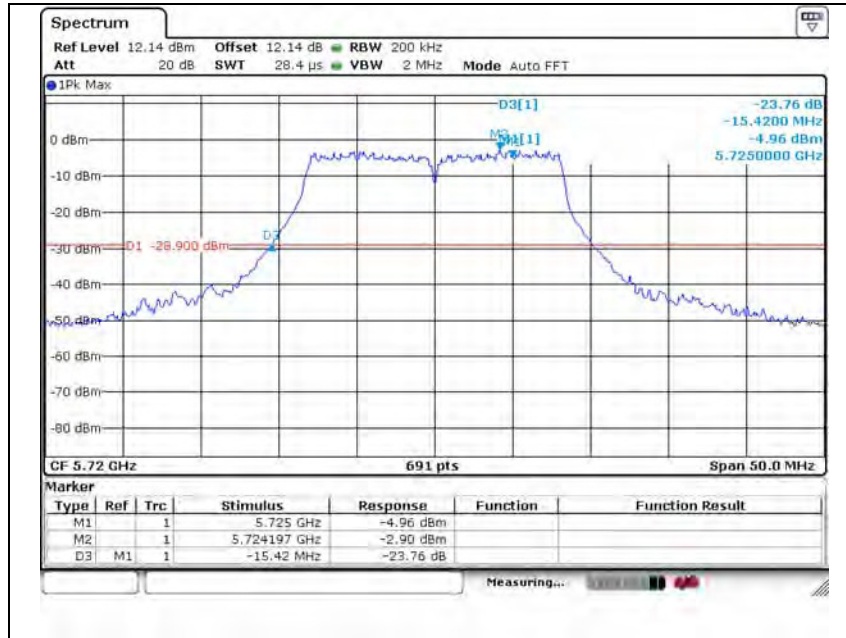


Channel 155



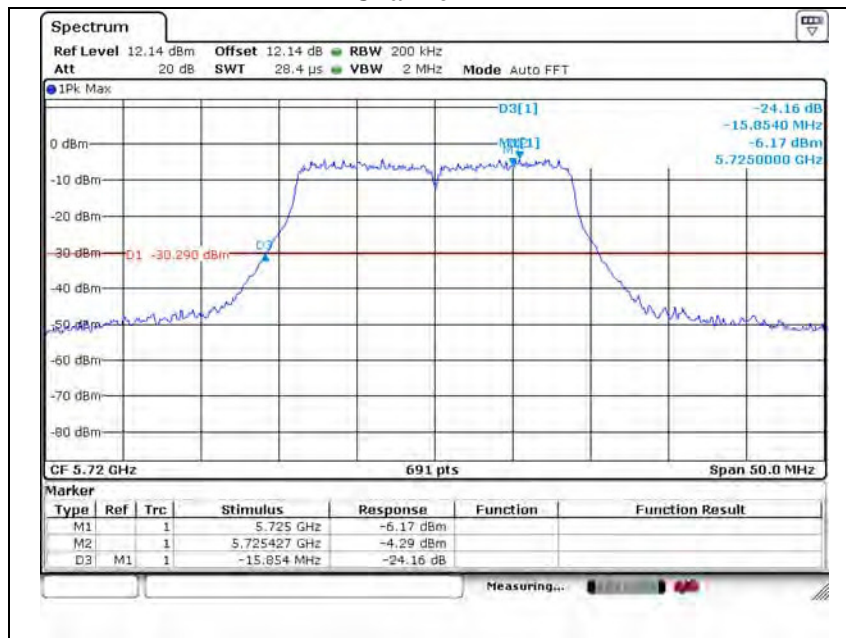
Band-crossing channels 802.11a

Channel 144



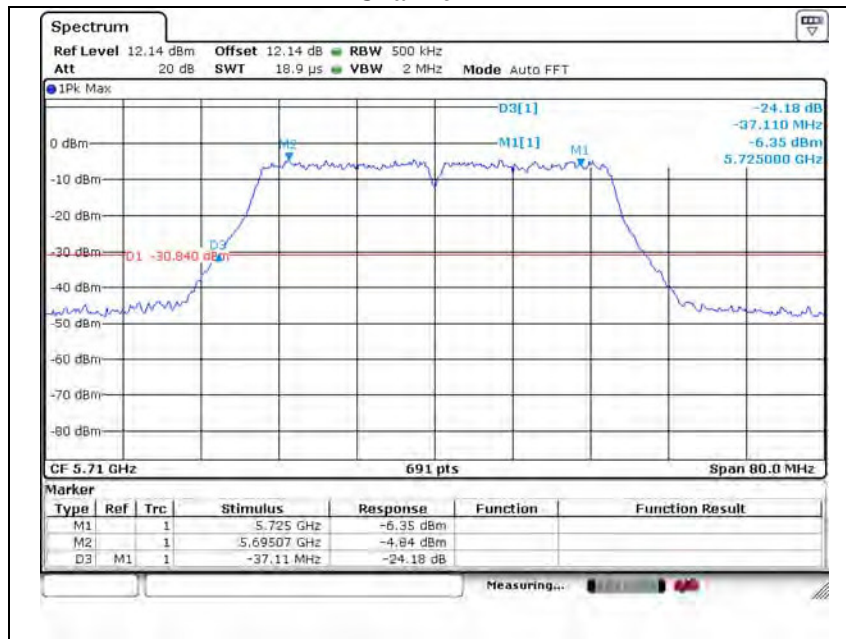
802.11n_HT20

Channel 144



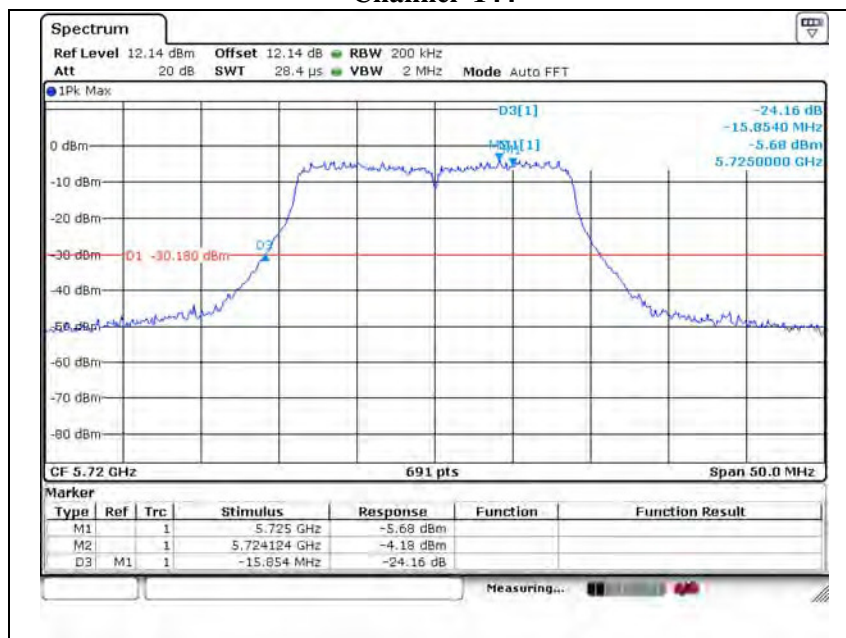
802.11n_HT40

Channel 142



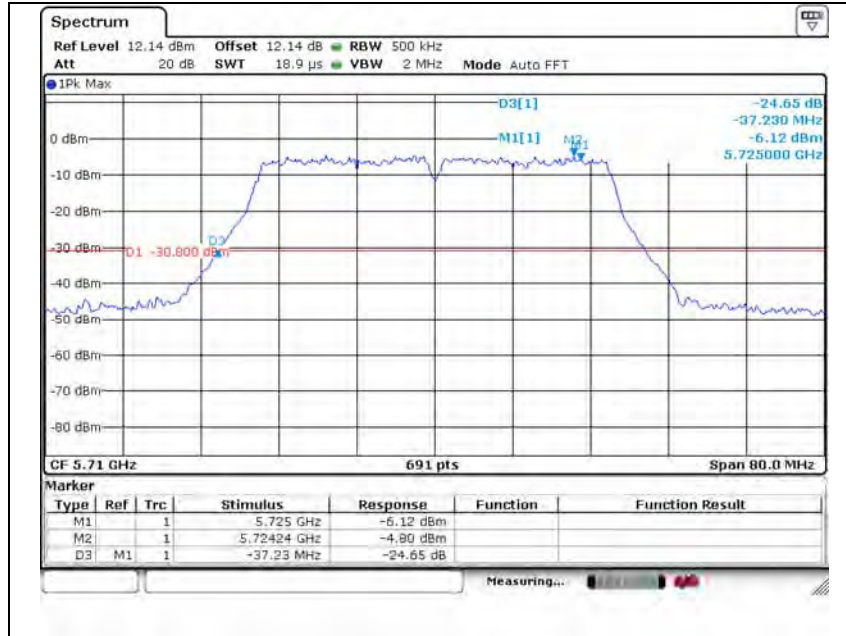
802.11ac_VHT20

Channel 144



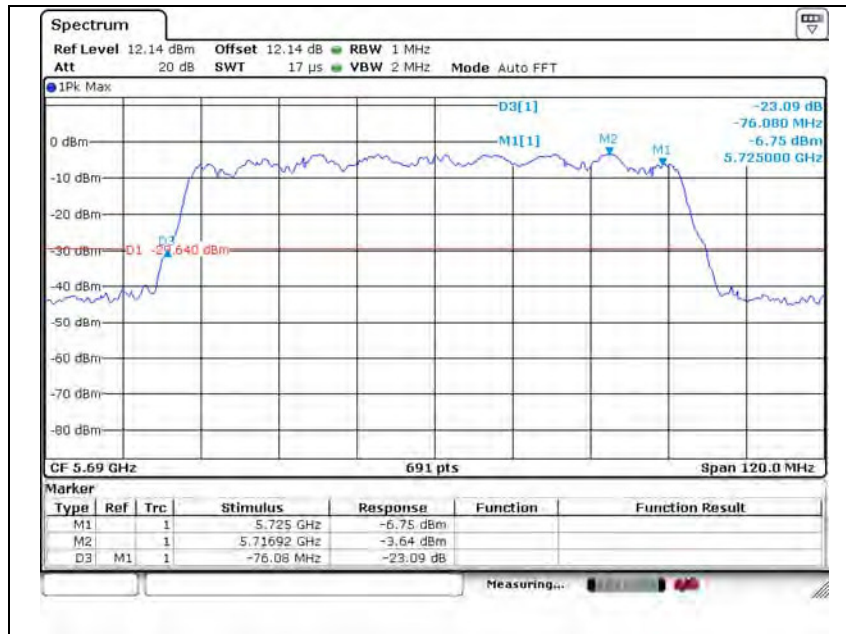
802.11ac_VHT40

Channel 142



802.11ac_VHT80

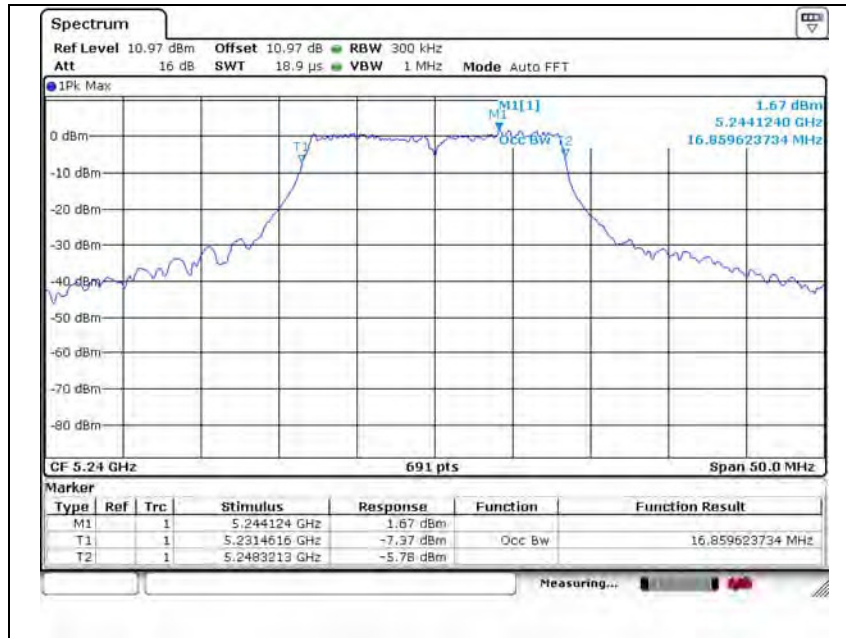
Channel 138



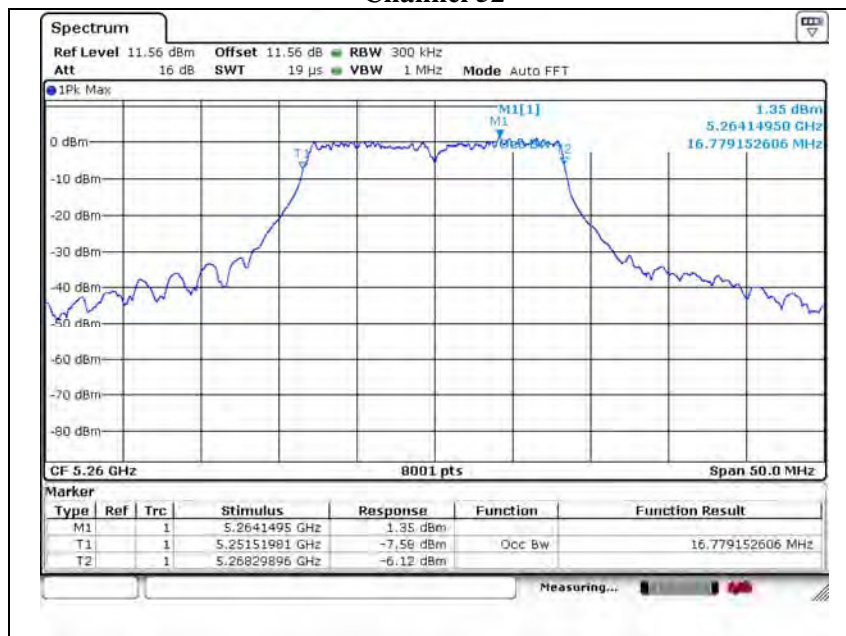
99 % bandwidth

802.11a

Channel 48

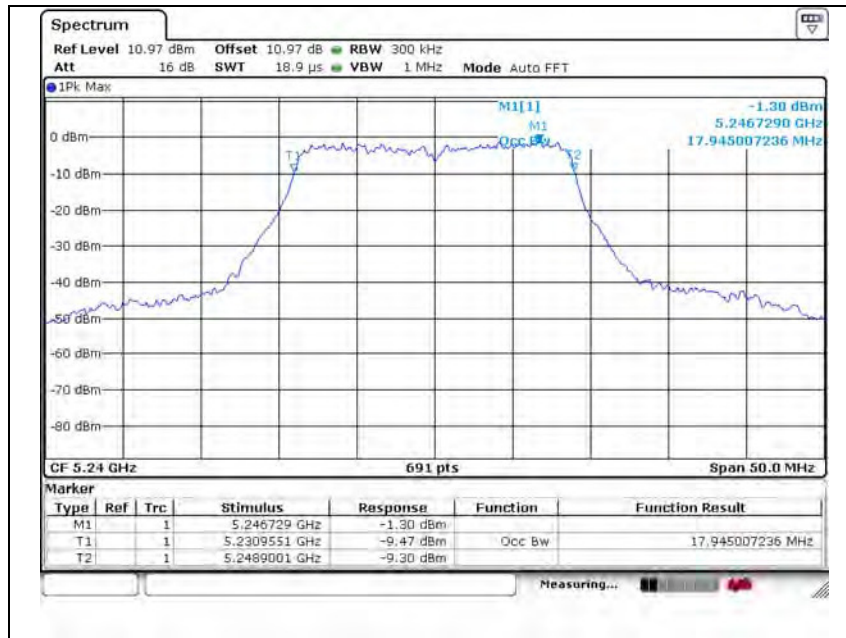


Channel 52

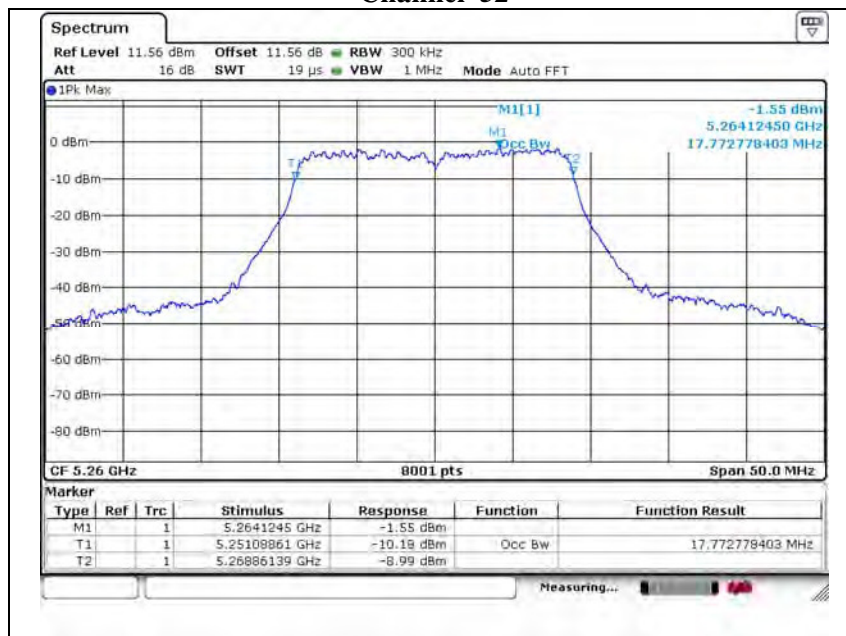


802.11n_HT20

Channel 48

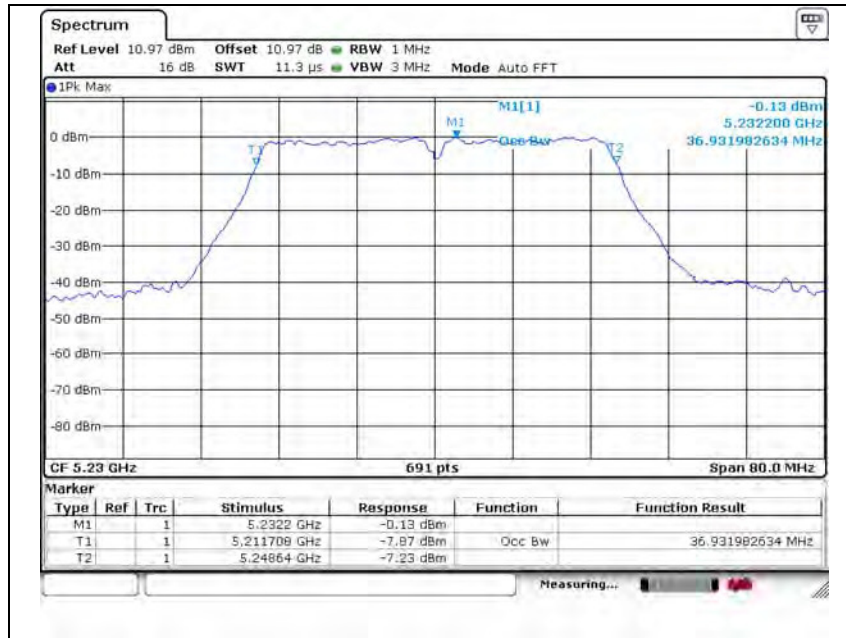


Channel 52



802.11n_HT40

Channel 46

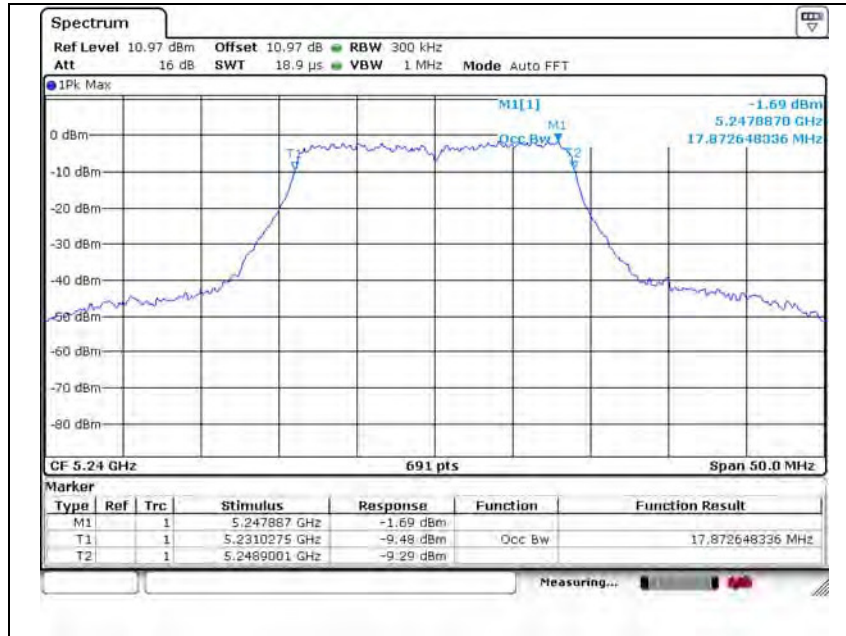


Channel 54

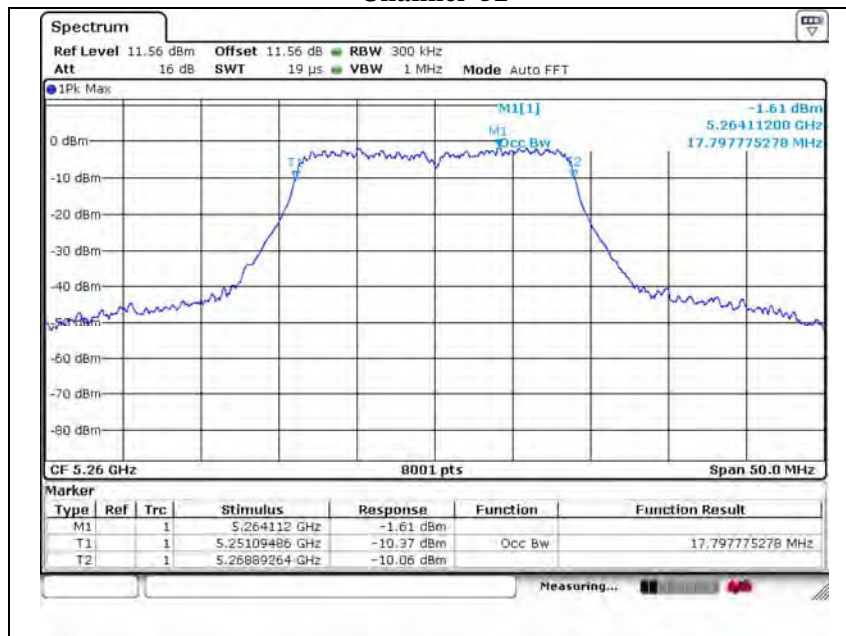


802.11ac_VHT20

Channel 48



Channel 52

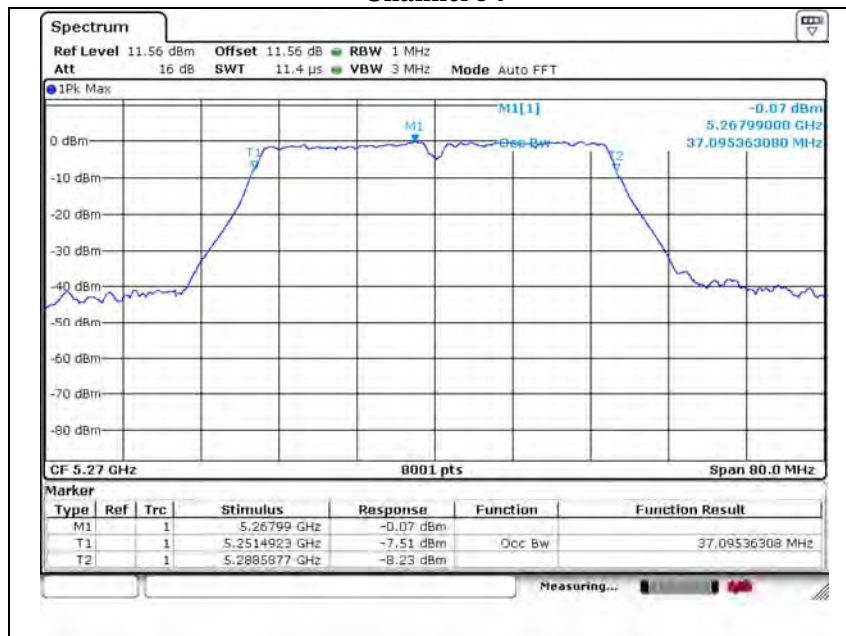


802.11ac_VHT40

Channel 46

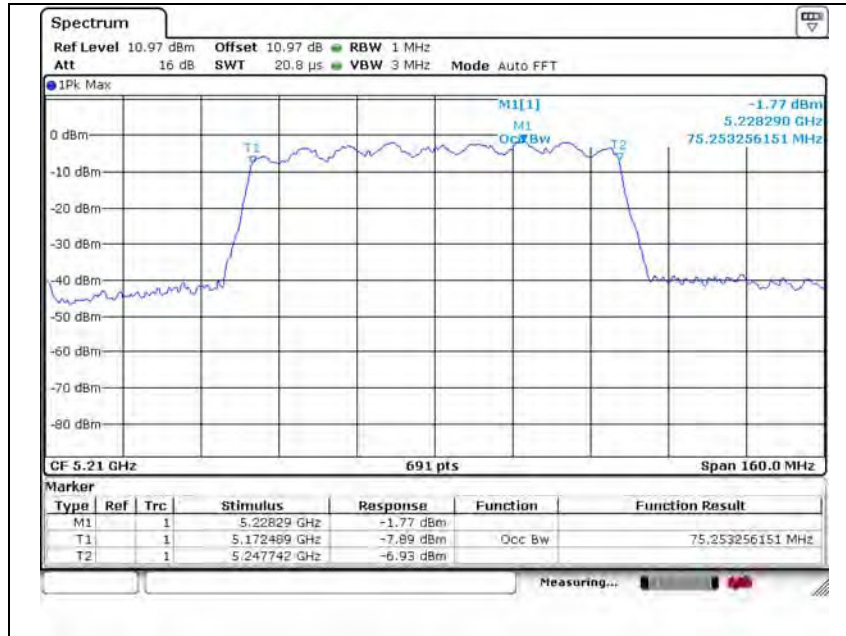


Channel 54

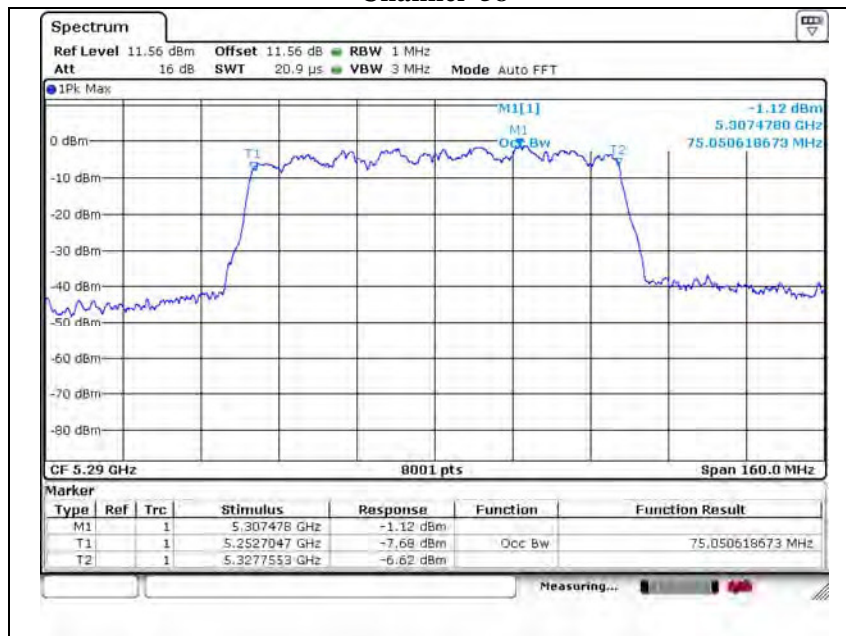


802.11ac_VHT80

Channel 42



Channel 58



3.2. 6 dB bandwidth

Test procedure

KDB 789033 D02 v01r03– Section C.2, KDB 644545 D03 v01

1. Set RBW = 100 kHz
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = peak.
4. Sweep = auto couple.
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
7. In case of band crossing channels 138, 142 and 144, the measurement is complied with section D of KDB 644545_D03 v01.

Limit

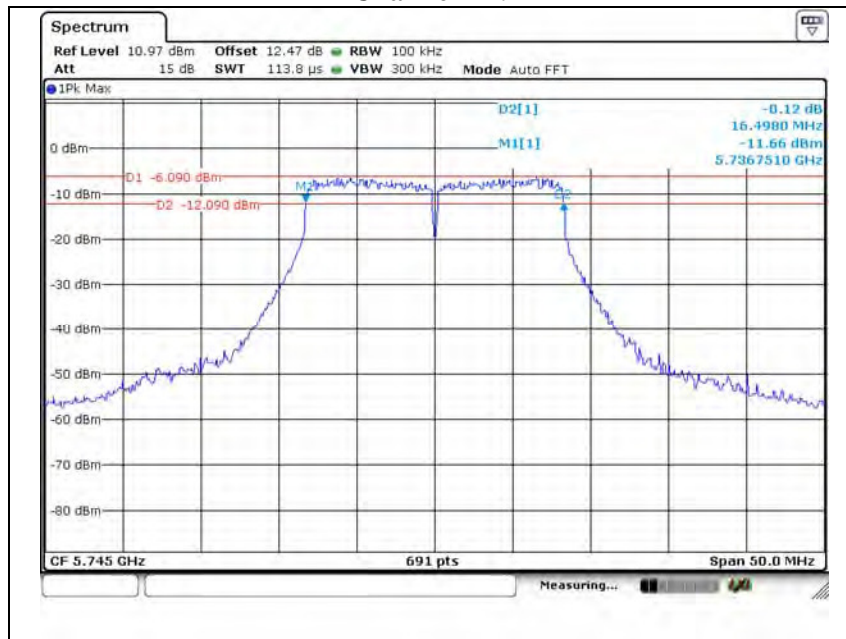
Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test results

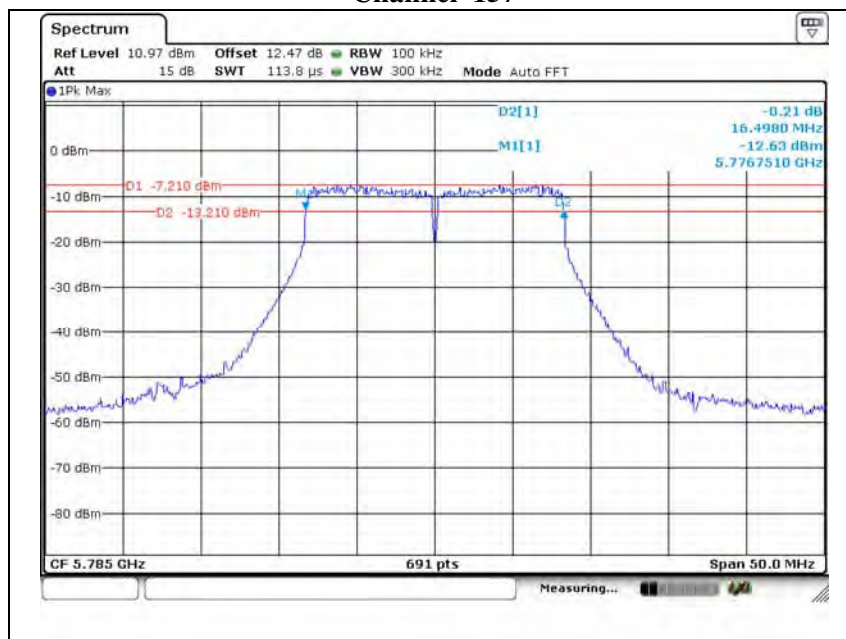
Band	Frequency(MHz)	Mode	6 dB bandwidth(MHz)
UNII-3	5 745	a	16.498
	5 785		16.498
	5 825		16.498
	5 745	HT20	17.656
	5 785		17.656
	5 825		17.656
	5 755	HT40	36.580
	5 795		36.470
	5 745	VHT20	17.656
	5 785		17.656
	5 825		17.656
	5 755	VHT40	36.580
	5 795		36.580
	5 775	VHT80	75.540
UNII-3 (Band-crossing channels)	5 720	a	3.249
	5 720	HT20	3.828
	5 710	HT40	3.290
	5 720	VHT20	3.799
	5 710	VHT40	3.340
	5 690	VHT80	2.810

802.11a

Channel 149



Channel 157



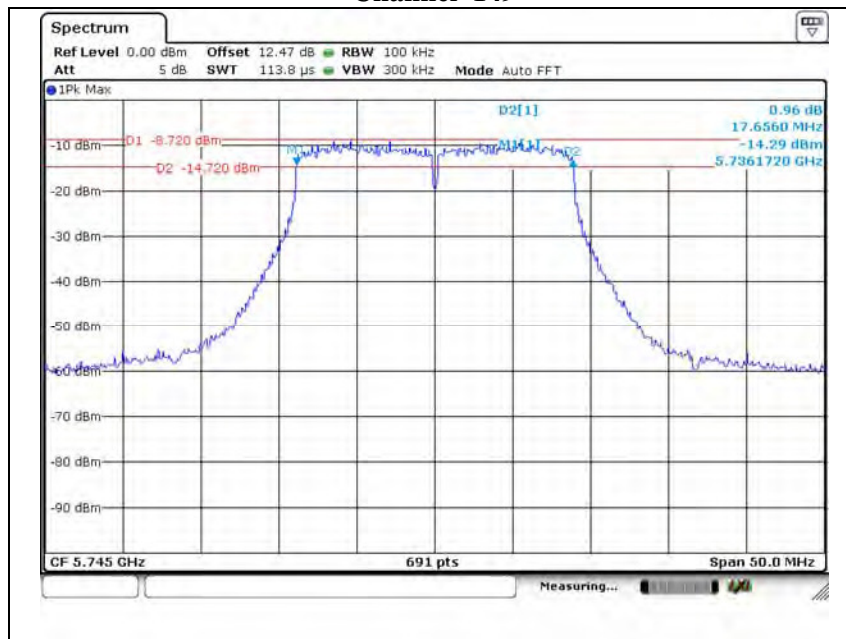
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The test results in the report only apply to the tested sample.

Channel 165

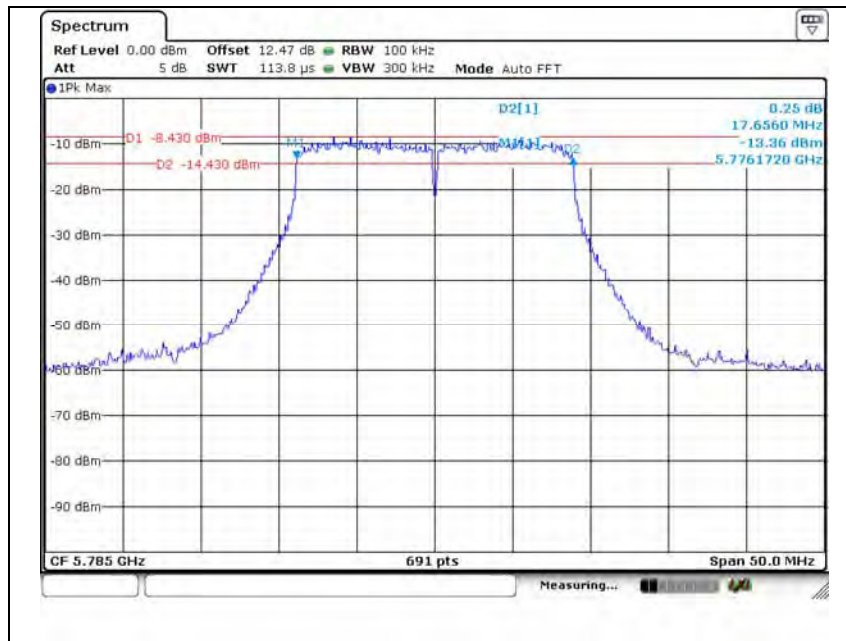


802.11n_HT20

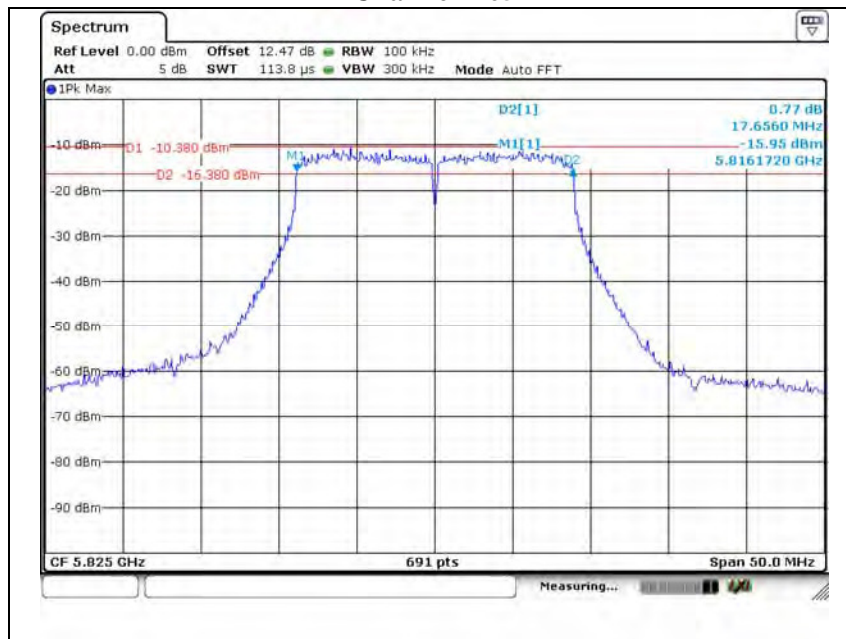
Channel 149



Channel 157



Channel 165

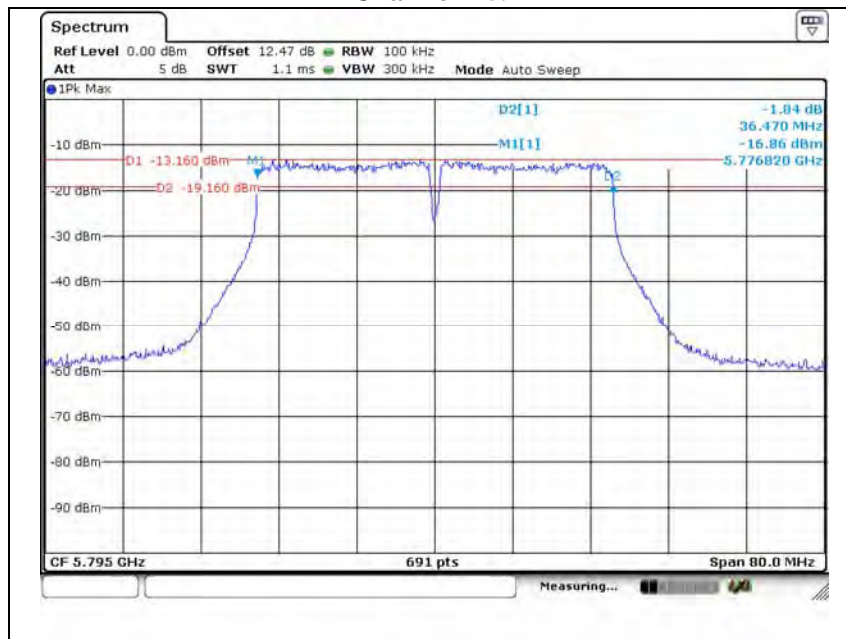


802.11n_HT40

Channel 151

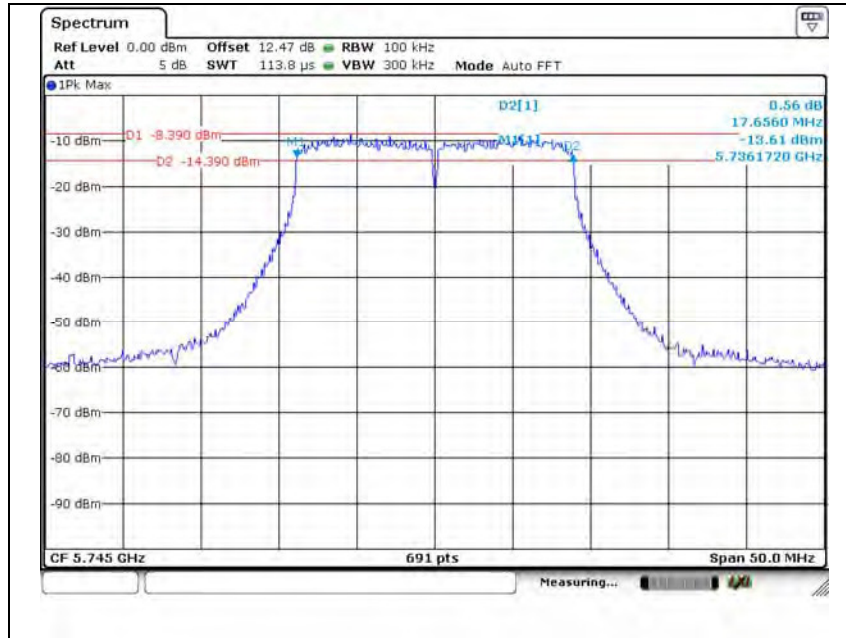


Channel 159

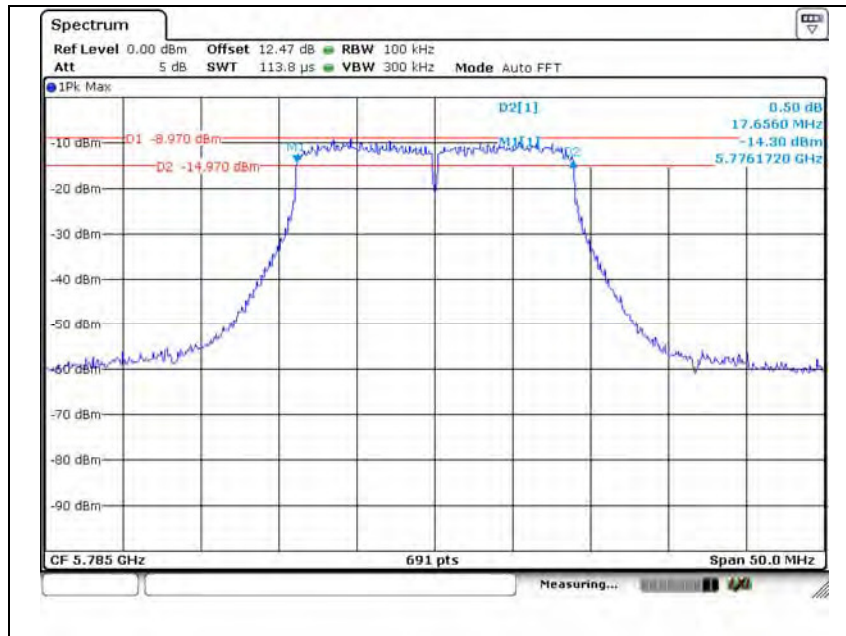


802.11ac_VHT20

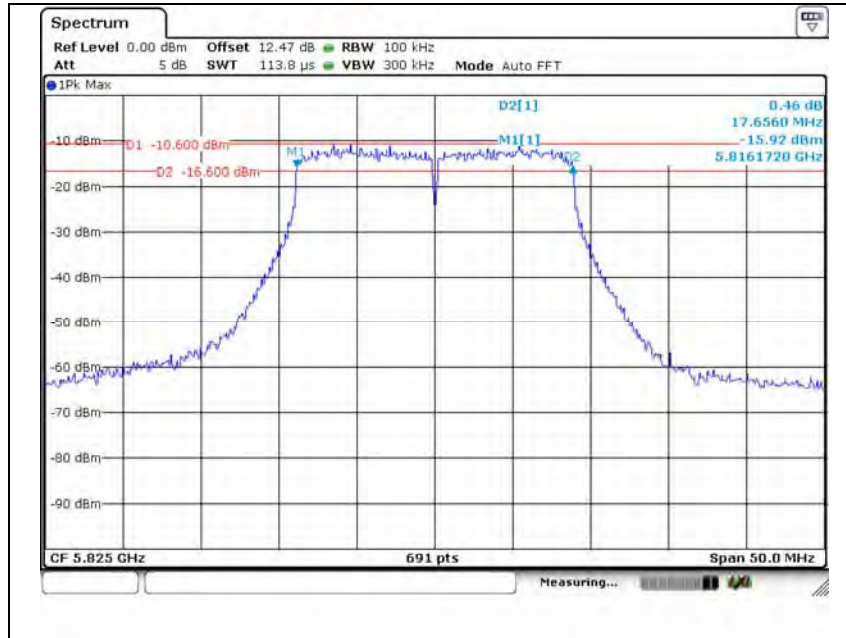
Channel 149



Channel 157

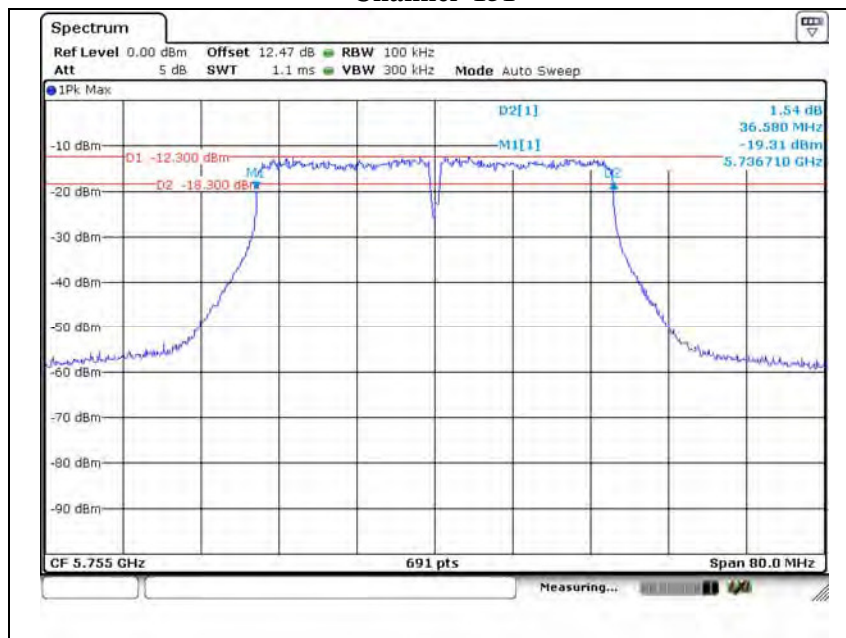


Channel 165

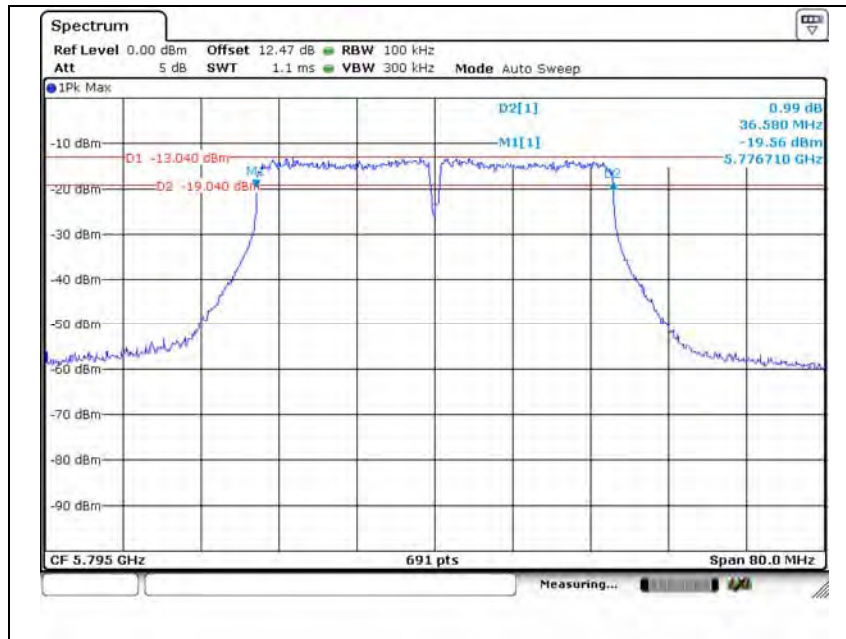


802.11ac_VHT40

Channel 151

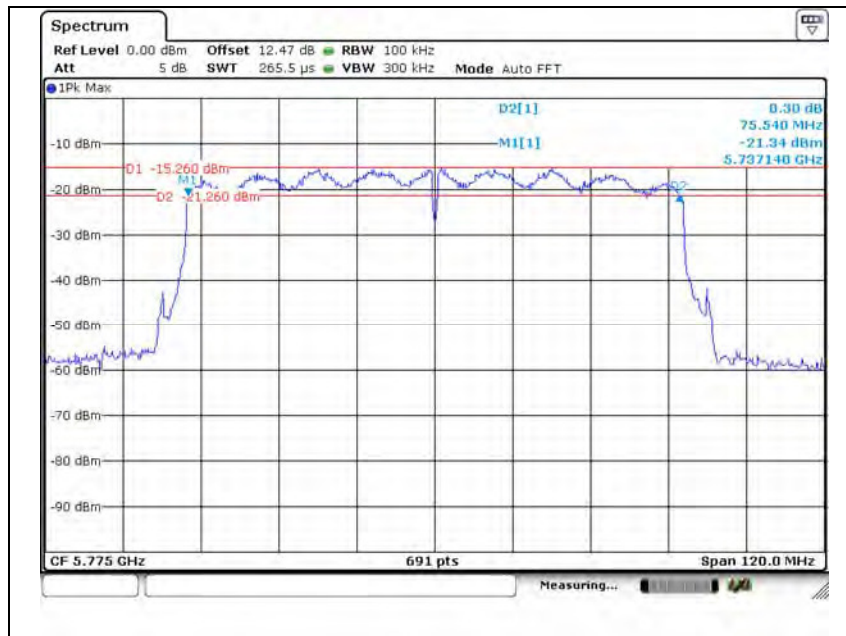


Channel 159



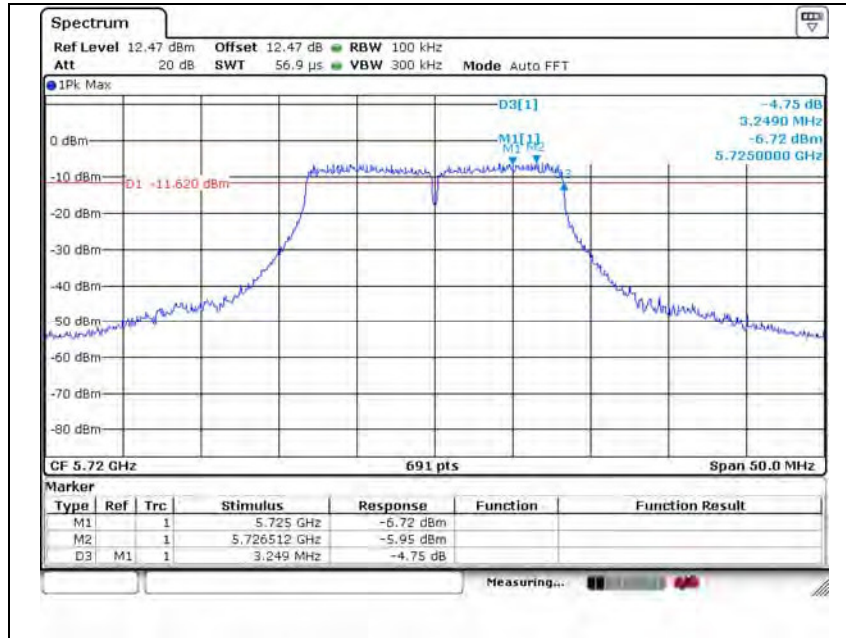
802.11ac_VHT80

Channel 155



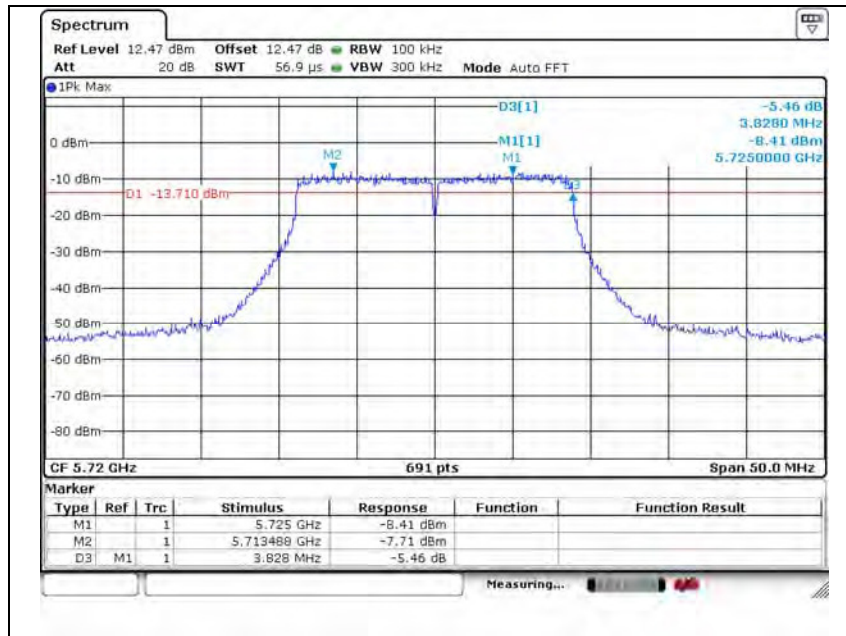
Band-crossing channels 802.11a

Channel 144



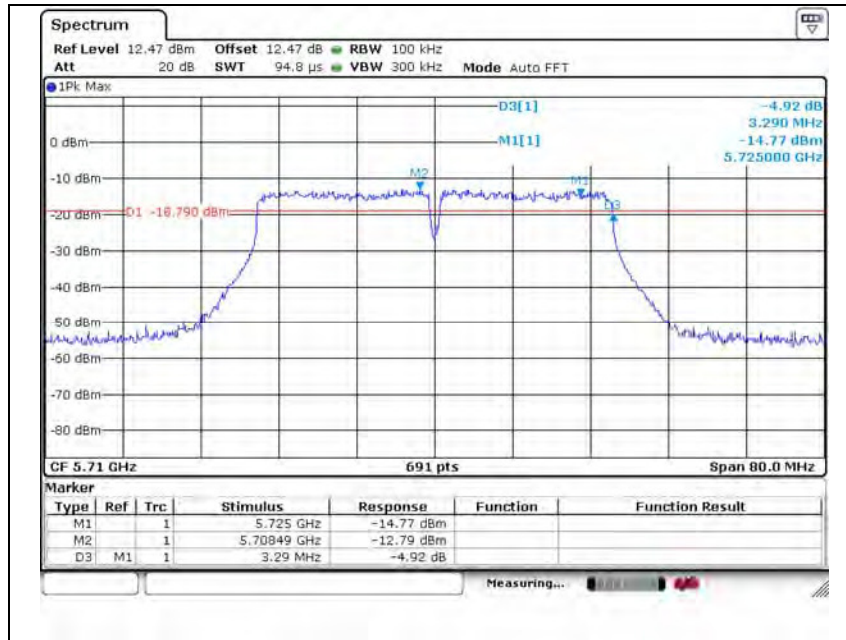
802.11n_HT20

Channel 144



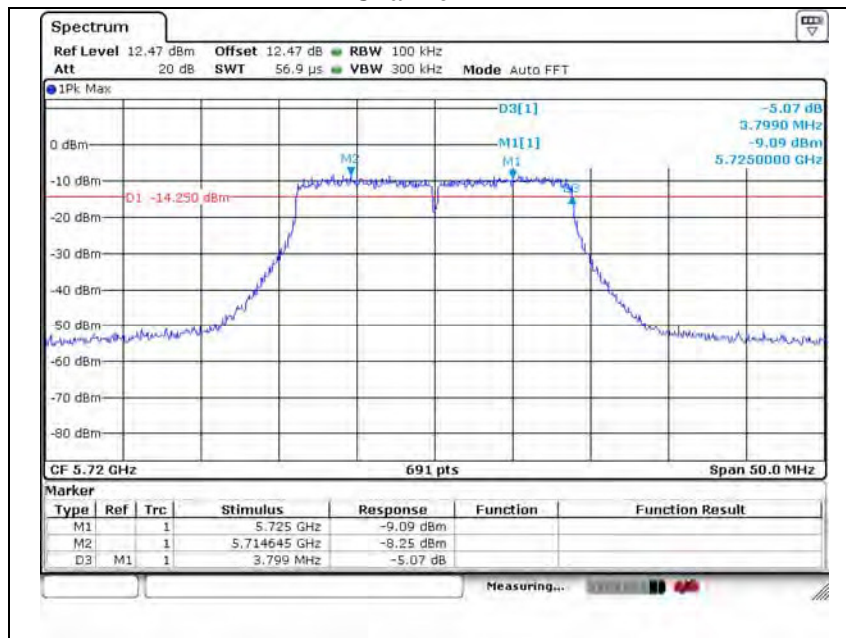
802.11n_HT40

Channel 142



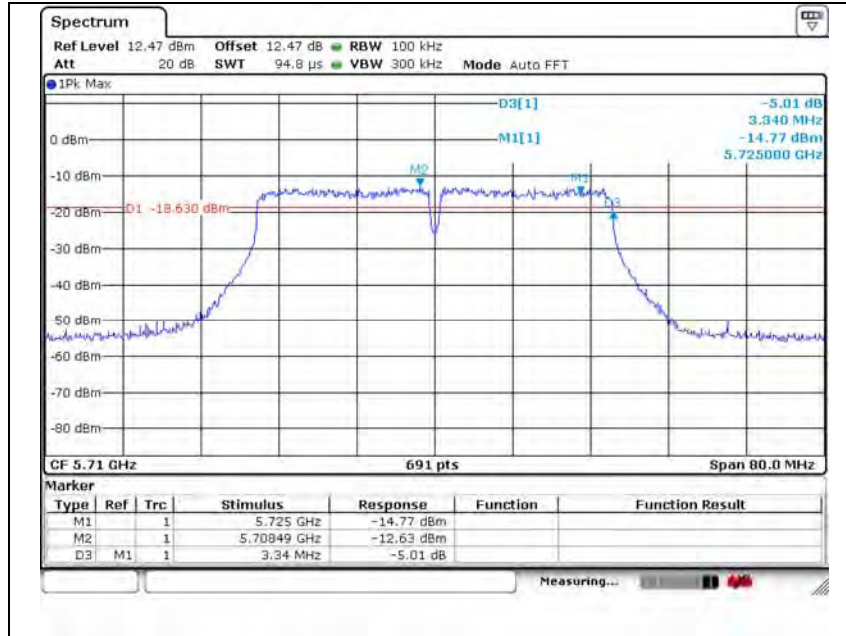
802.11ac_VHT20

Channel 144



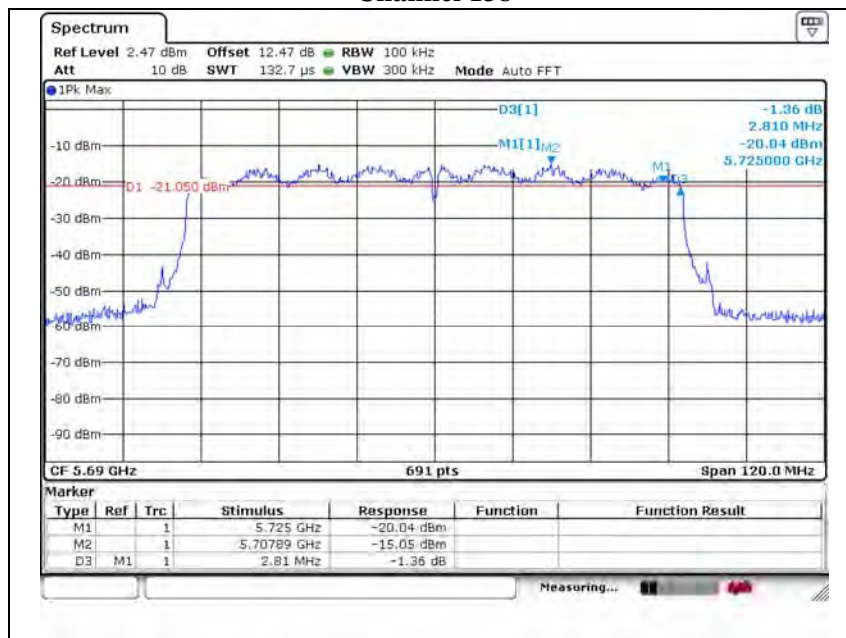
802.11ac_VHT40

Channel 142



802.11ac_VHT80

Channel 138



3.3. Maximum conducted output power

Test procedure

KDB 789033 D02 v01r03– Section E.3.a) or b), KDB 644545 D03 v01

Method PM (Measurement using an RF average power meter):

- i. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.
 - The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
 - At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
 - The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- ii. If the transmitter does not transmit continuously, measure the duty cycle, x , of the transmitter output signal as described in section II.B.
- iii. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
- iv. Adjust the measurement in dBm by adding $10 \log (1/x)$ where x is the duty cycle (e.g., $10 \log (1/0.25)$ if the duty cycle is 25 %).
- v. In case of band crossing channels 138, 142 and 144, the measurement is complied with section E.2.d of KDB 644545_D03 v01

Method PM-G (Measurement using a gated RF average power meter):

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters 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.

Limit

Band	EUT Category		Limit
UNII-1		Outdoor access point	1 W (30 dBm)
		Indoor access point	
		Fixed point-to-point access point	
	✓	Mobile and portable client device	250 mW (24 dBm)
UnII-2A	✓		250 mW or 11 dBm + $10 \log B^*$
UNII-2C	✓		250 mW or 11 dBm + $10 \log B^*$
UNII-3	✓		1 W (30 dBm)

Note.

1. B is the 26 dB emission bandwidth.

Test results

Band	Frequency (MHz)	Mode	Detector mode	DCF [†] Note1	Output power(dBm)	Limit (dBm)
UNII-1	5 180	a	AV	-	11.20	24.00
	5 220		AV		11.25	
	5 240		AV		11.75	
UNII-2A	5 260		AV	-	11.80	24.00
	5 280		AV		12.15	
	5 320		AV		12.30	
UNII-2C	5 500		AV	-	12.13	24.00
	5 580		AV		12.40	
	5 720		AV		11.52	
UNII-3	5 745		AV	-	9.99	30.00
	5 785		AV		9.66	
	5 825		AV		8.76	

Band	Frequency (MHz)	Mode	Detector mode	DCF [†] Note1	Output power(dBm)	Limit (dBm)
UNII-1	5 180	HT20	AV	-	8.81	24.00
	5 220		AV		8.97	
	5 240		AV		9.52	
UNII-2A	5 260		AV	-	9.23	24.00
	5 280		AV		9.58	
	5 320		AV		9.87	
UNII-2C	5 500		AV	-	10.15	24.00
	5 580		AV		10.60	
	5 720		AV		9.91	
UNII-3	5 745		AV	-	7.50	30.00
	5 785		AV		7.28	
	5 825		AV		6.52	

Note.

1. Refer to the page 87 on this report.

Band	Frequency (MHz)	Mode	Detector mode	DCF ^{Note1}	Output power(dBm)	Limit (dBm)
UNII-1	5 190	HT40	AV	-	8.17	24.00
	5 230		AV		8.49	
UNII-2A	5 270		AV	-	8.82	24.00
	5 310		AV		9.13	
UNII-2C	5 510		AV	-	9.36	24.00
	5 590		AV		10.20	
	5 710		AV		9.10	
UNII-3	5 755		AV	-	7.09	30.00
	5 795		AV		6.59	

Band	Frequency (MHz)	Mode	Detector mode	DCF ^{Note1}	Output power(dBm)	Limit (dBm)
UNII-1	5 180	VHT20	AV	-	9.16	24.00
	5 220		AV		9.30	
	5 240		AV		9.76	
UNII-2A	5 260		AV	-	9.03	24.00
	5 280		AV		9.55	
	5 320		AV		10.09	
UNII-2C	5 500		AV	-	10.21	24.00
	5 580		AV		10.75	
	5 720		AV		9.90	
UNII-3	5 745		AV	-	7.61	30.00
	5 785		AV		7.31	
	5 825		AV		6.41	

Note.

1. Refer to the page 87 on this report.

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Test report No.:
KES-RF-16T0068-R2
Page (66) of (205)

Band	Frequency (MHz)	Mode	Detector mode	DCF ^{Note1}	Output power(dBm)	Limit (dBm)
UNII-1	5 190	VHT40	AV	-	8.31	24.00
	5 230		AV		8.58	
UNII-2A	5 270		AV	-	8.81	24.00
	5 310		AV		9.03	
UNII-2C	5 510		AV	-	9.50	24.00
	5 590		AV		9.91	
	5 710		AV		8.78	
UNII-3	5 755		AV	-	6.90	30.00
	5 795		AV		6.71	

Band	Frequency (MHz)	Mode	Detector mode	DCF ^{Note1}	Output power(dBm)	Limit (dBm)
UNII-1	5 210	VHT80	AV	-	8.81	24.00
UNII-2A	5 290		AV	-	8.93	24.00
UNII-2C	5 530		AV	-	9.57	24.00
	5 610		AV		9.83	
	5 590		AV		8.11	
UNII-3	5 775		AV	-	6.51	30.00

Note.

1. Refer to the page 87 on this report.

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Band-crossing channels

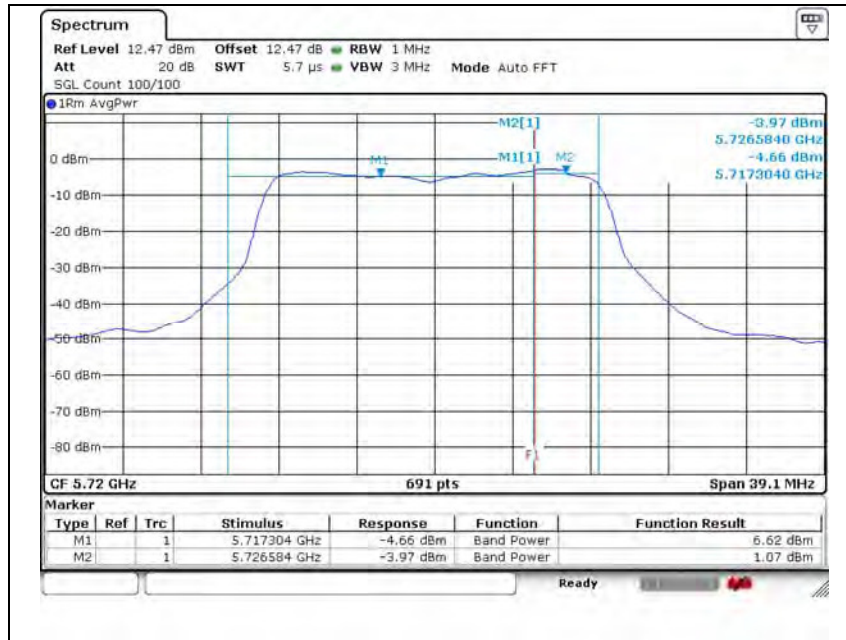
Band	Frequency (MHz)	Mode	Detector mode	DCF ^{Note1}	Output power(dBm)	Limit (dBm)
UNII-2C	5 720	a	AV	-	6.62	22.92
	5 720	HT20	AV		5.19	23.00
	5 710	HT40	AV		5.17	30.00
	5 720	VHT20	AV		5.23	23.02
	5 710	VHT40	AV		5.13	30.00
	5 690	VHT80	AV		5.78	30.00
UNII-3	5 720	a	AV	-	1.07	30.00
	5 720	HT20	AV		0.12	
	5 710	HT40	AV		-4.97	
	5 720	VHT20	AV		-0.07	
	5 710	VHT40	AV		-4.69	
	5 690	VHT80	AV		-10.06	

Note.

1. Refer to the page 87 on this report.

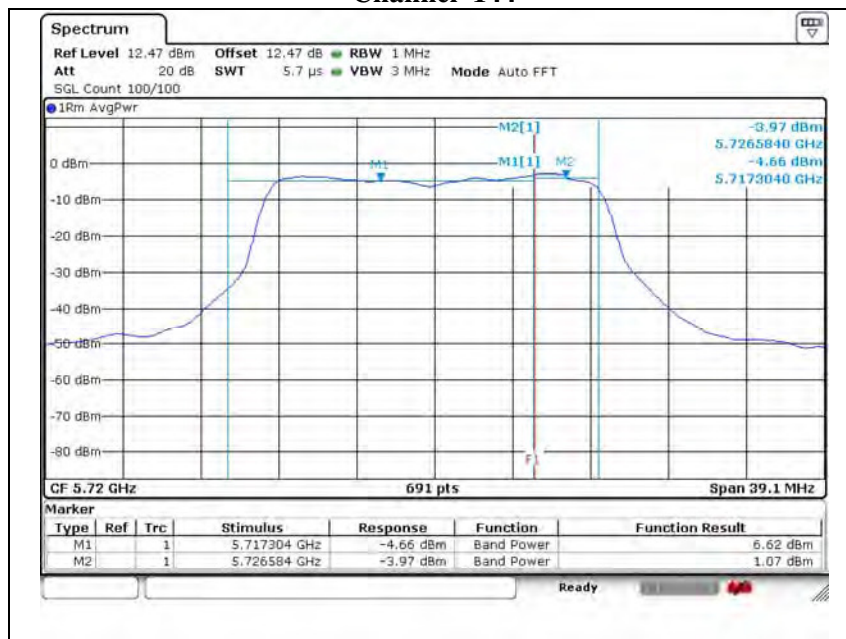
802.11a (UNII-2C)

Channel 144



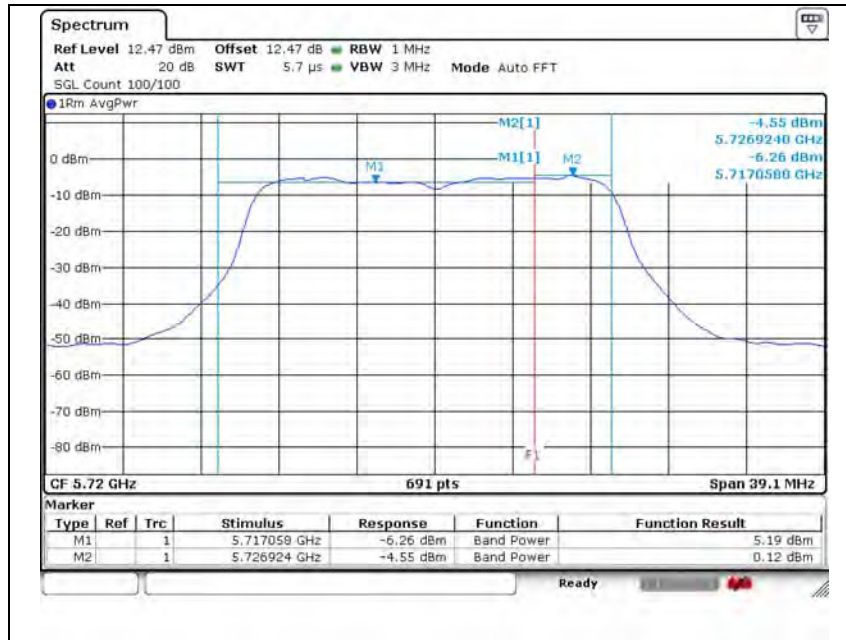
802.11a (UNII-3)

Channel 144



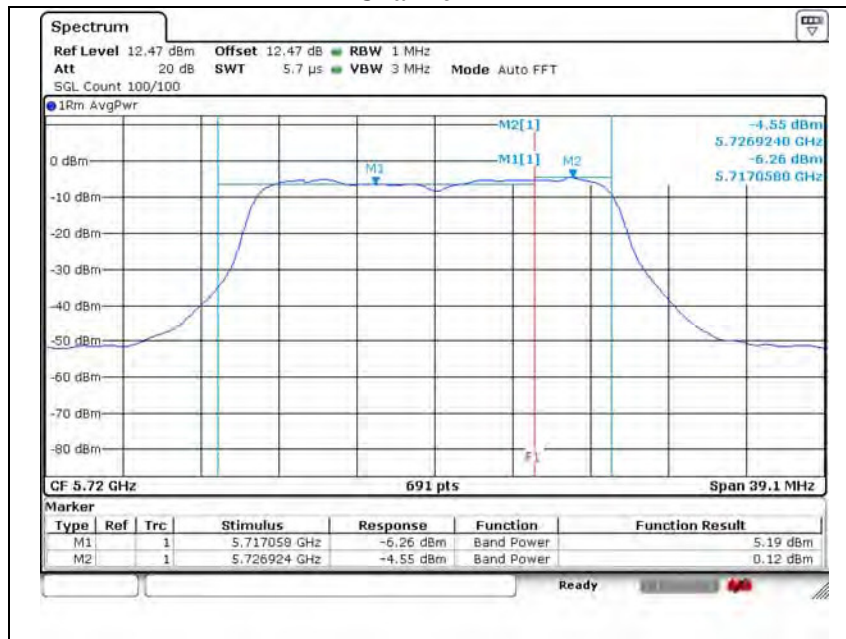
802.11n_HT20 (UNII-2C)

Channel 144



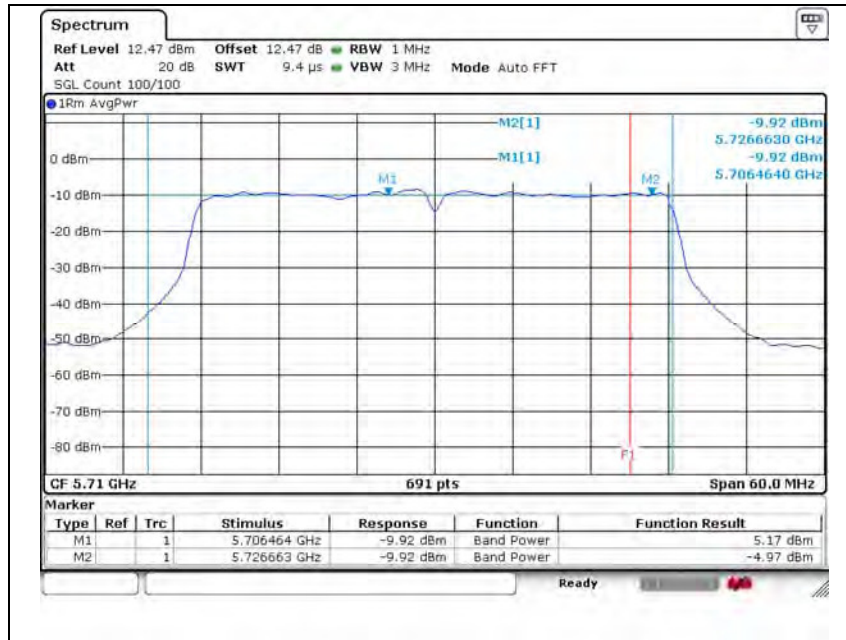
802.11n_HT20 (UNII-3)

Channel 144



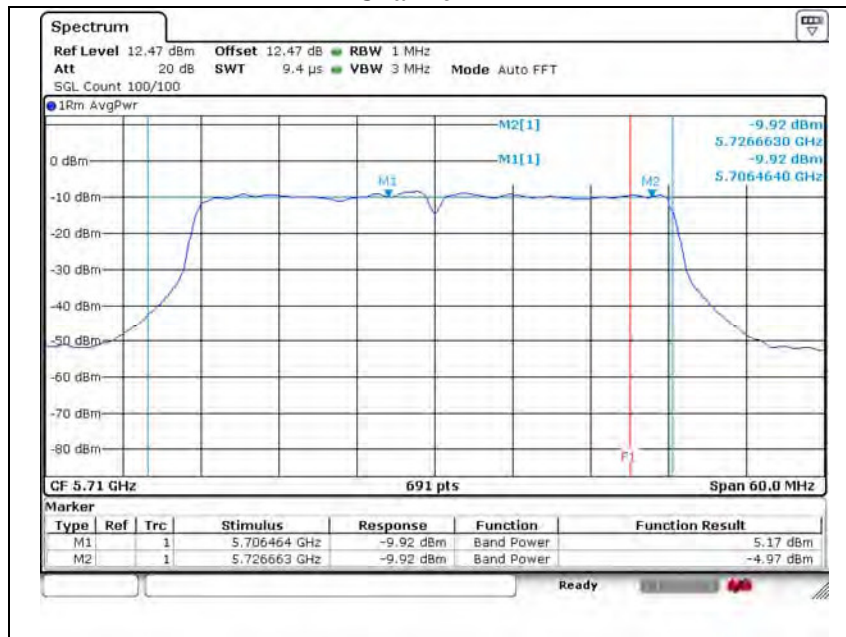
802.11n_HT40 (UNII-2C)

Channel 142



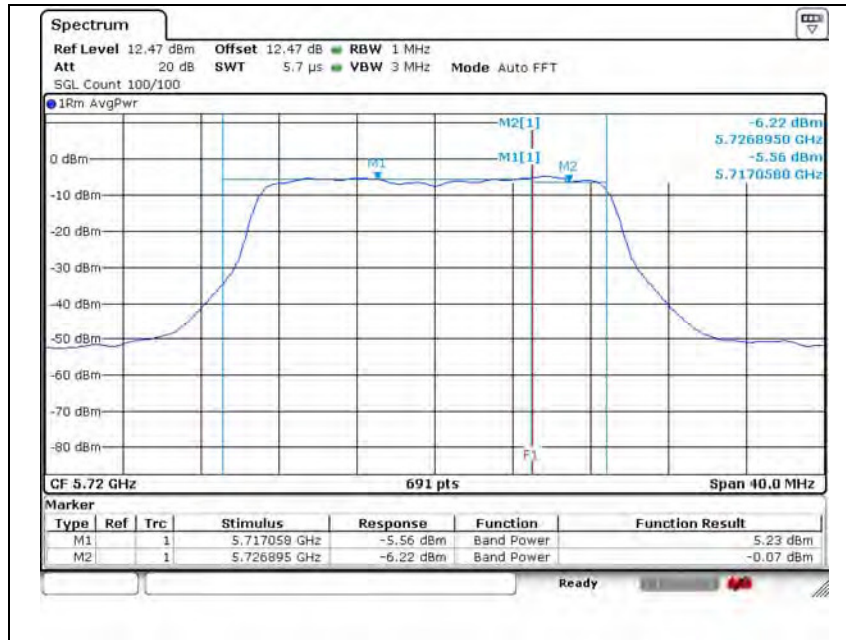
802.11n_HT40 (UNII-3)

Channel 142



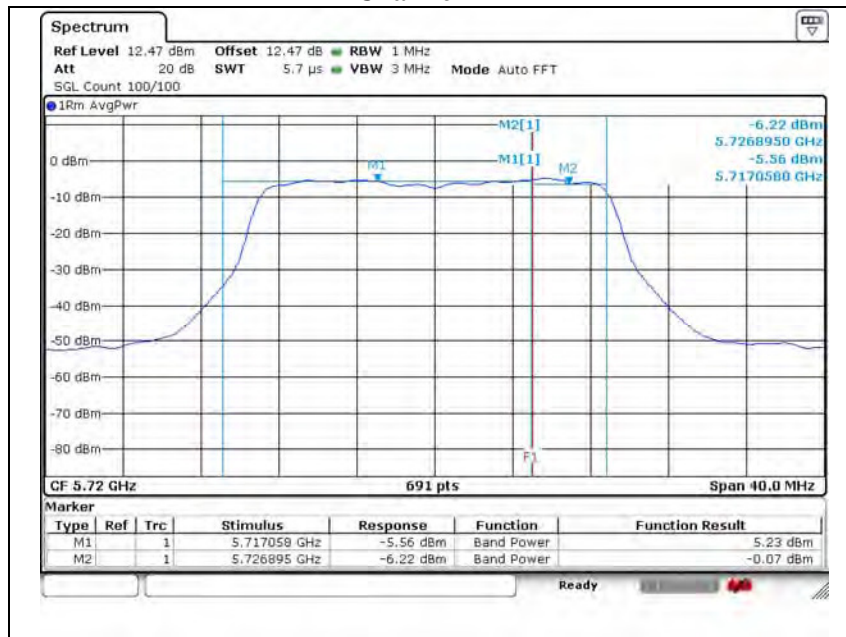
802.11n_VHT20 (UNII-2C)

Channel 144



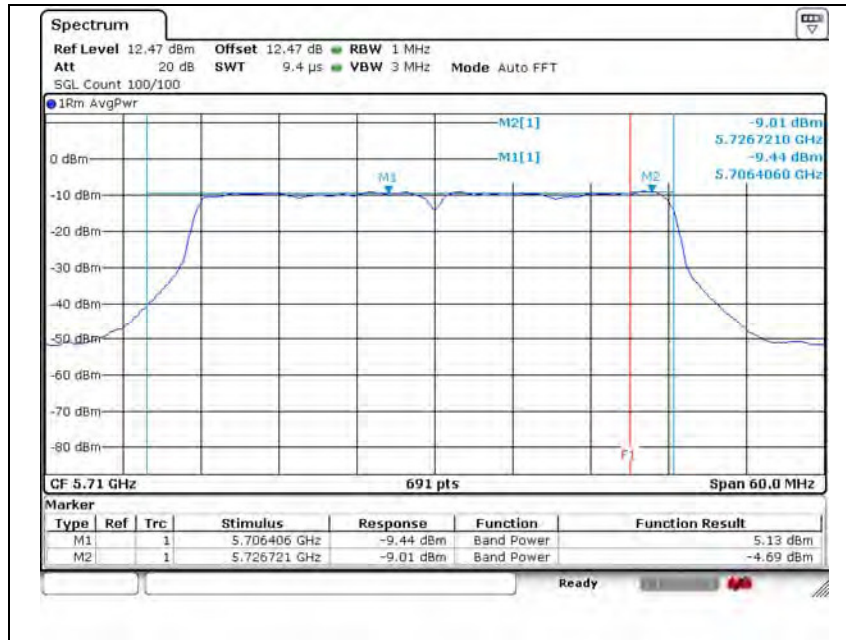
802.11n_VHT20 (UNII-3)

Channel 144



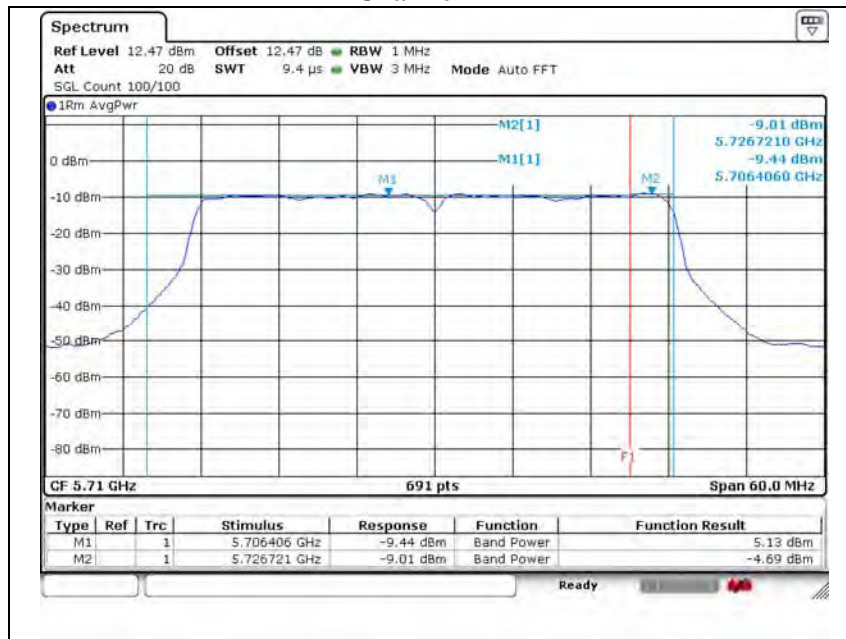
802.11n_VHT40 (UNII-2C)

Channel 142



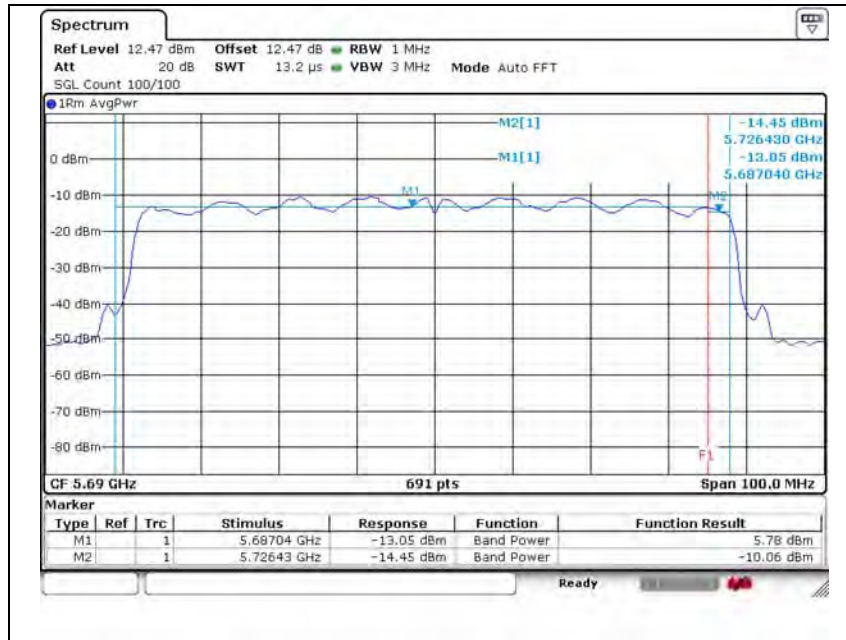
802.11n_VHT40 (UNII-3)

Channel 142



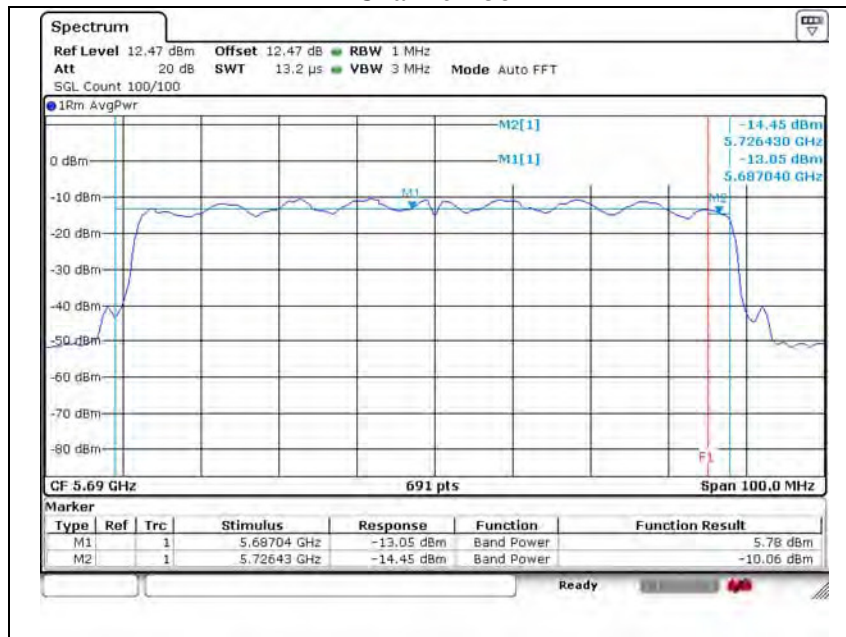
802.11n_VHT80 (UNII-2C)

Channel 138



802.11n_VHT80 (UNII-3)

Channel 138



3.4. Power spectral density

Test procedure

KDB 789033 D02 v01r03 – Section F, KDB 644545 D03 v01

1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate 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 conducted output power measurement was performed using a power meter, method PM.)
2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
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 peak of the spectrum.
 - b) If Method SA-3 Alternative was used and the linear mode was used in step II.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 Maximum PSD over 1 MHz reference bandwidth.
5. For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
 - a) Set $RBW \geq 1/T$, where T is defined in section II.B.1.a)
 - b) Set $VBW \geq 3$ RBW.
 - c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log(500 \text{ kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ kHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
 - d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10 \log(1 \text{ MHz}/RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ is the reduced resolution bandwidth of spectrum analyzer set during measurement.
 - e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.
6. In case of band crossing channels 138, 142 and 144, the measurement is complied with section D of KDB 644545_D03 v01.

Note.

As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections 5.c) and 5.d) above, since $RBW=100 \text{ kHz}$ is available on nearly all spectrum analyzers.



Limit

Band	EUT Category		Limit
UNII-1		Outdoor access point	17 dBm/MHz
		Indoor access point	
		Fixed point-to-point access point	
	✓	Mobile and portable client device	11 dBm/MHz
UNII-2A	✓		11 dBm/MHz
UNII-2C	✓		11 dBm/MHz
UNII-3	✓		30 dBm/500 kHz

Test results

Band	Frequency (MHz)	Mode	PSD(dBm)	RBWF ^{Note1}	DCF ^{Note2}	Sum ^{Note3}
UNII-1	5 180	a	-1.17	-	-	-1.17
	5 220		-1.12	-		-1.12
	5 240		-0.50	-		-0.50
UNII-2A	5 260		-0.24	-	-	-0.24
	5 280		-0.12	-		-0.12
	5 320		0.48	-		0.48
UNII-2C	5 500		0.25	-	-	0.25
	5 580		0.04	-		0.04
	5 720		-1.84	-		-1.84
UNII-3	5 745		-5.21	-	-	-5.21
	5 785		-5.53	-		-5.53
	5 825		-6.38	-		-6.38



Band	Frequency (MHz)	Mode	PSD(dBm)	RBWF ^{Note1}	DCF ^{Note2}	Sum ^{Note3}
UNII-1	5 180	HT20	-3.95	-	-	-3.95
	5 220		-3.94	-		-3.94
	5 240		-3.45	-		-3.45
UNII-2A	5 260		-3.34	-	-	-3.34
	5 280		-2.50	-		-2.50
	5 320		-0.81	-		-0.81
UNII-2C	5 500		-2.10	-	-	-2.10
	5 580		-1.71	-		-1.71
	5 720		-3.64	-		-3.64
UNII-3	5 745		-7.88	-	-	-7.88
	5 785		-8.22	-		-8.22
	5 825		-9.84	-		-9.84

Band	Frequency (MHz)	Mode	PSD(dBm)	RBWF ^{Note1}	DCF ^{Note2}	Sum ^{Note3}
UNII-1	5 190	HT40	-7.63	-	-	-7.63
	5 230		-7.37	-		-7.37
UNII-2A	5 270		-6.89	-	-	-6.89
	5 310		-6.19	-		-6.19
UNII-2C	5 510		-5.95	-	-	-5.95
	5 590		-5.50	-		-5.50
	5 710		-7.43	-		-7.43
UNII-3	5 755		-11.32	-	-	-11.32
	5 795		-11.81	-		-11.81



Band	Frequency (MHz)	Mode	PSD(dBm)	RBWF ^{Note1}	DCF ^{Note2}	Sum ^{Note3}
UNII-1	5 180	VHT20	-3.67	-	-	-3.67
	5 220		-2.33	-		-2.33
	5 240		-3.31	-		-3.31
UNII-2A	5 260		-3.30	-	-	-3.30
	5 280		-2.78	-		-2.78
	5 320		-2.14	-		-2.14
UNII-2C	5 500		-2.10	-	-	-2.10
	5 580		-1.80	-		-1.80
	5 720		-3.48	-		-3.48
UNII-3	5 745		-7.86	-	-	-7.86
	5 785		-8.41	-		-8.41
	5 825		-10.14	-		-10.14

Band	Frequency (MHz)	Mode	PSD(dBm)	RBWF ^{Note1}	DCF ^{Note2}	Sum ^{Note3}
UNII-1	5 190	VHT40	-7.24	-	-	-7.24
	5 230		-7.03	-		-7.03
UNII-2A	5 270		-6.85	-	-	-6.85
	5 310		-4.90	-		-4.90
UNII-2C	5 510		-5.97	-	-	-5.97
	5 590		-3.66	-		-3.66
	5 710		-2.98	-		-2.98
UNII-3	5 755		-11.54	-	-	-11.54
	5 795		-11.90	-		-11.90

Band	Frequency (MHz)	Mode	PSD(dBm)	RBWF ^{Note1}	DCF ^{Note2}	Sum ^{Note3}
UNII-1	5 210	VHT80	-8.45	-	-	-8.45
UNII-2A	5 290		-7.95	-	-	-7.95
UNII-2C	5 530		-7.75	-	-	-7.75
	5 610		-4.68	-		-4.68
	5 690		-9.92	-		-9.92
UNII-3	5 775		-13.99	-	-	-13.99

Band-crossing channels

Band	Frequency (MHz)	Mode	PSD(dBm)	RBWF ^{Note1}	DCF ^{Note2}	Sum ^{Note3}
UNII-2C	5 720	a	-1.91	-	-	-1.91
	5 720	HT20	-3.68	-		-3.68
	5 710	HT40	-7.94	-		-7.94
	5 720	VHT20	-4.30	-		-4.30
	5 710	VHT40	-8.03	-		-8.03
	5 690	VHT80	-9.77	-		-9.77
UNII-3	5 720	a	-4.87	-	-	-4.87
	5 720	HT20	-6.33	-		-6.33
	5 710	HT40	-11.11	-		-11.11
	5 720	VHT20	-6.59	-		-6.59
	5 710	VHT40	-10.74	-		-10.74
	5 690	VHT80	-15.04	-		-15.04

Note.

- UNII-1 = $10\log(1 \text{ MHz}/1 \text{ MHz})$
UNII-2A = $10\log(1 \text{ MHz}/1 \text{ MHz})$
UNII-2C = $10\log(1 \text{ MHz}/1 \text{ MHz})$
UNII-3 = $10\log(500 \text{ kHz}/500 \text{ kHz})$
- Refer to the page 87 on this report.
- $\text{Sum(dBm)} = \text{PSD(dBm)} + \text{RBWF} + \text{Duty correction factor (dB)}$

802.11a

Channel 36



Channel 44



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The test results in the report only apply to the tested sample.

Channel 48



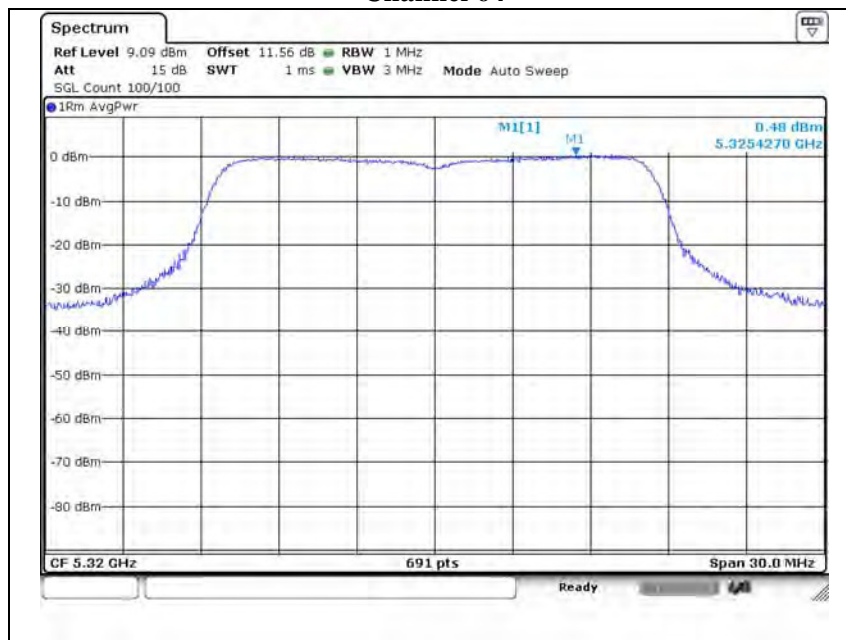
Channel 52



Channel 56



Channel 64



Channel 100



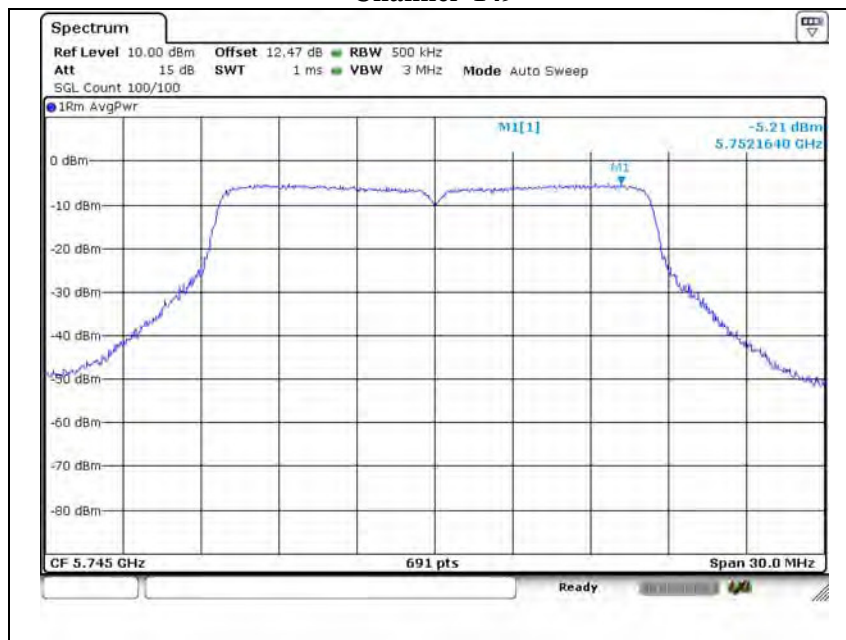
Channel 116



Channel 144



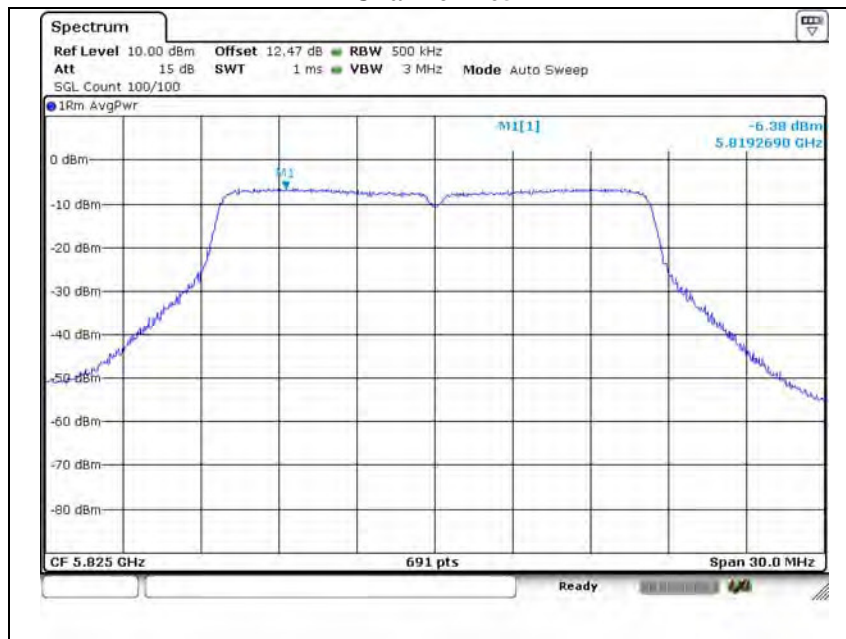
Channel 149



Channel 157



Channel 165



802.11n_HT20

Channel 36



Channel 44



Channel 48



Channel 52



Channel 56



Channel 64



Channel 100



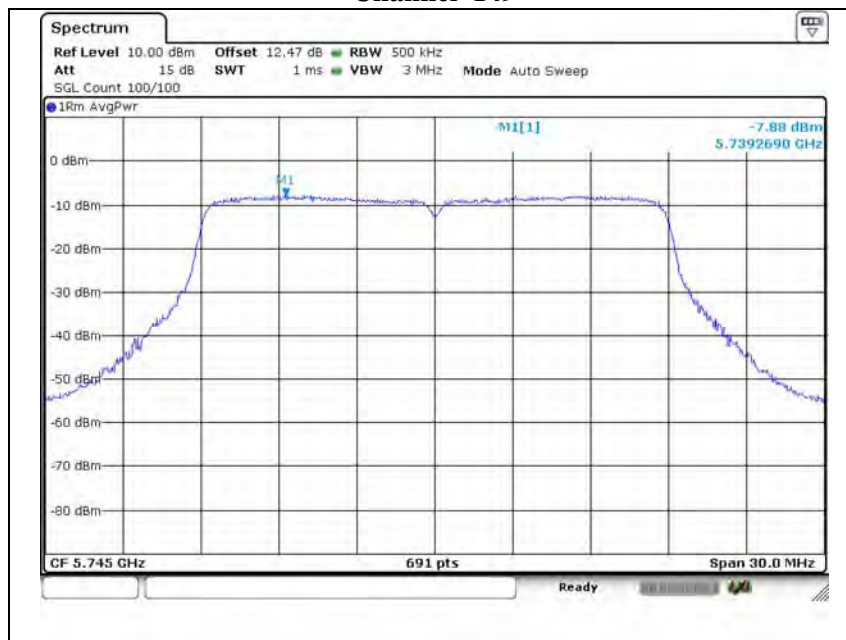
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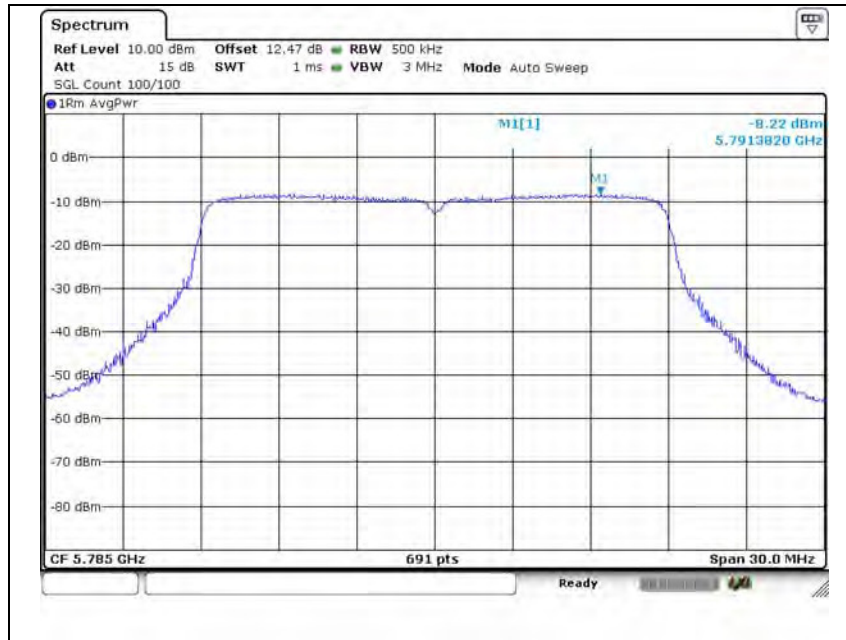
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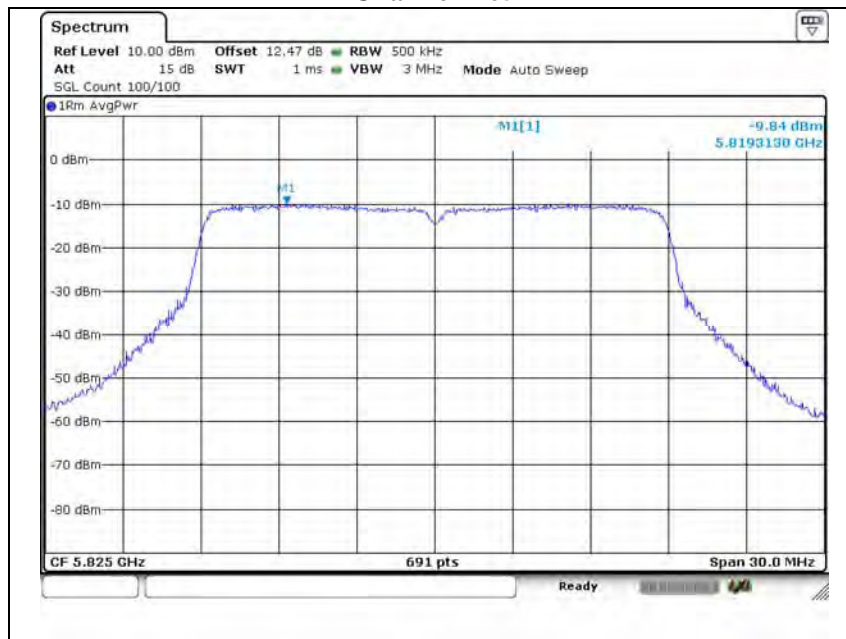
Channel 149



Channel 157



Channel 165



802.11n_HT40

Channel 38



Channel 46



Channel 54



Channel 62



Channel 102



Channel 118



Channel 142



Channel 151



Channel 159



802.11ac_VHT20

Channel 36



Channel 44



Channel 48



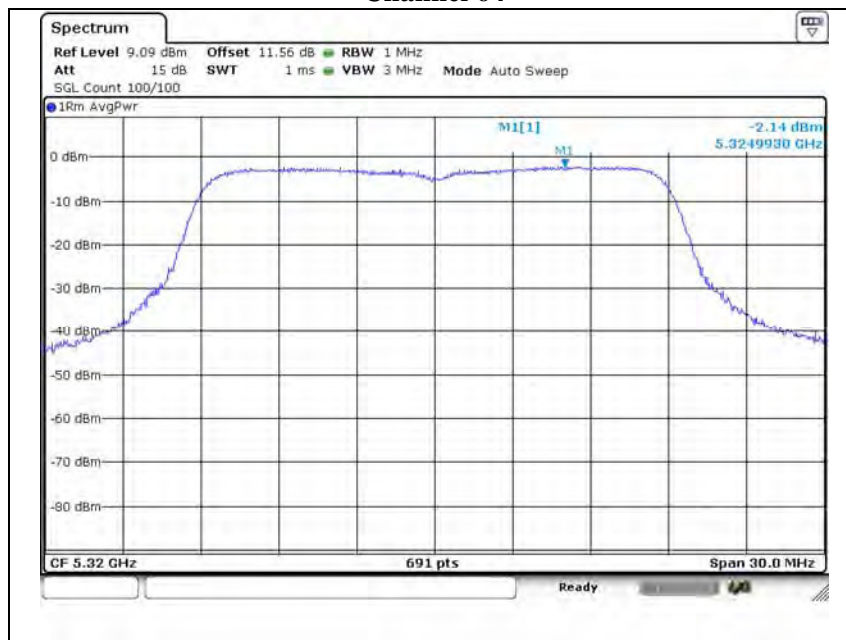
Channel 52



Channel 56



Channel 64



Channel 100



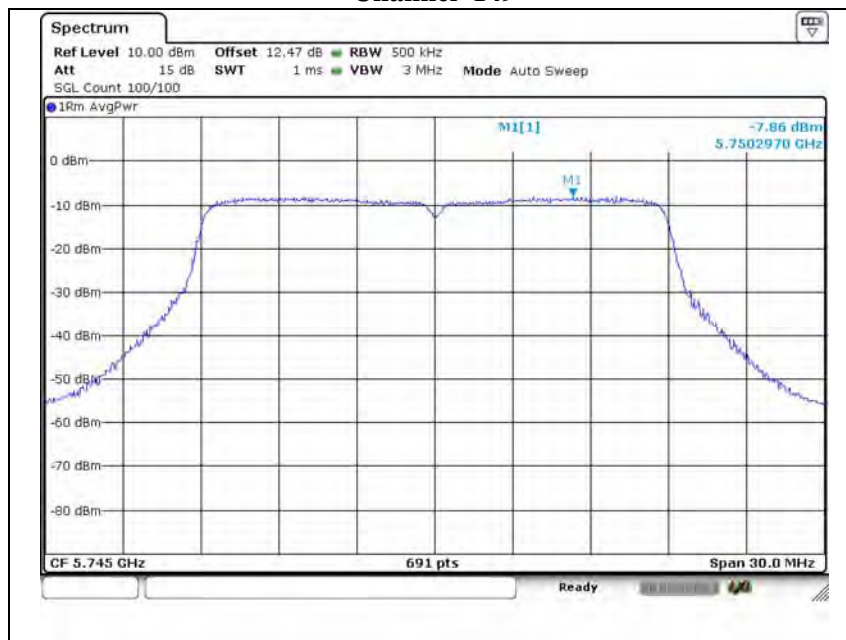
Channel 116



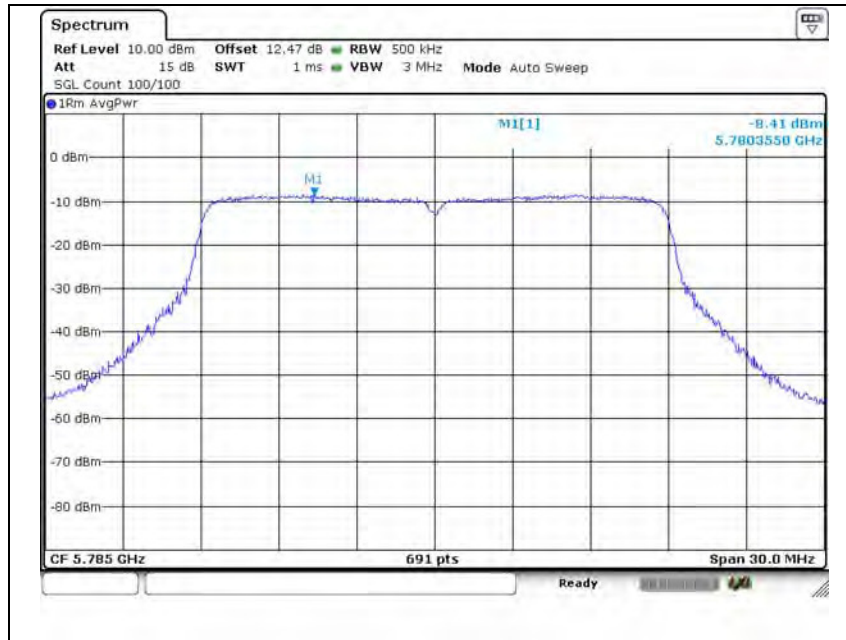
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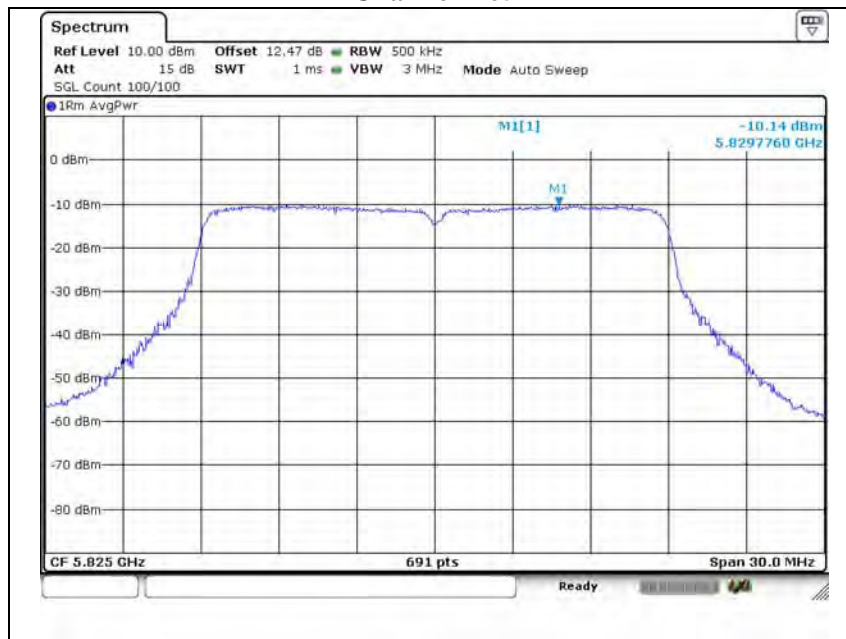
Channel 149



Channel 157



Channel 165



802.11ac_VHT40

Channel 38



Channel 46



Channel 54



Channel 62



Channel 102



Channel 118



Channel 142



Channel 151

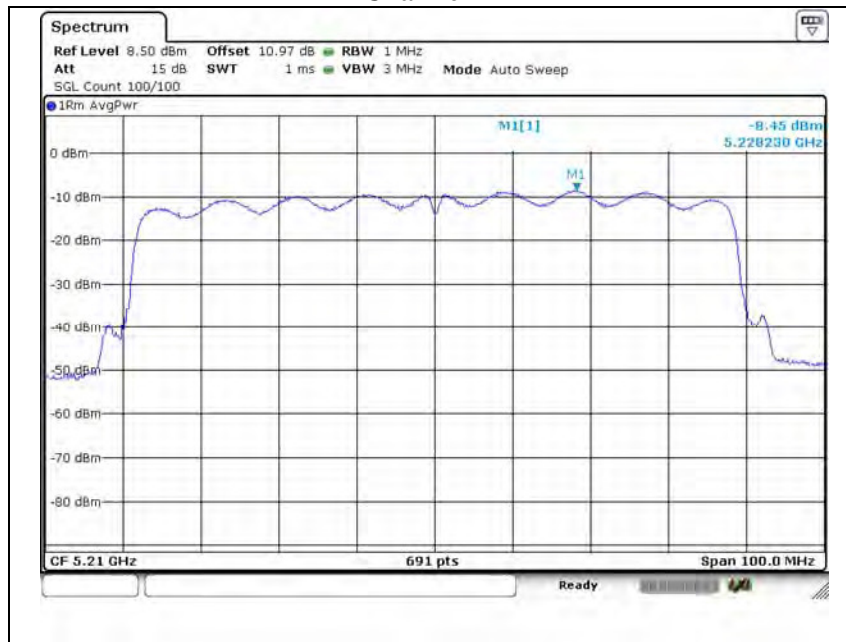


Channel 159

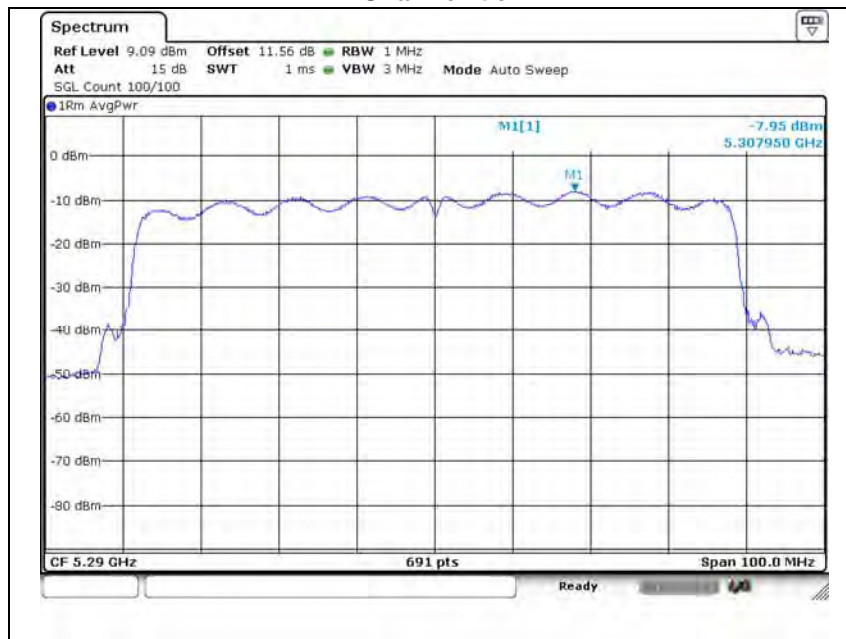


802.11ac_VHT80

Channel 42



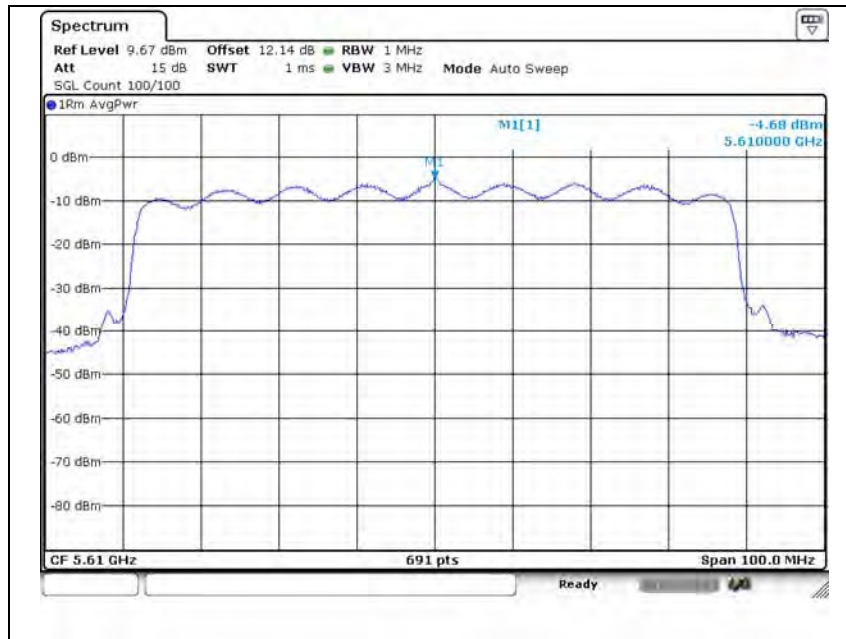
Channel 58



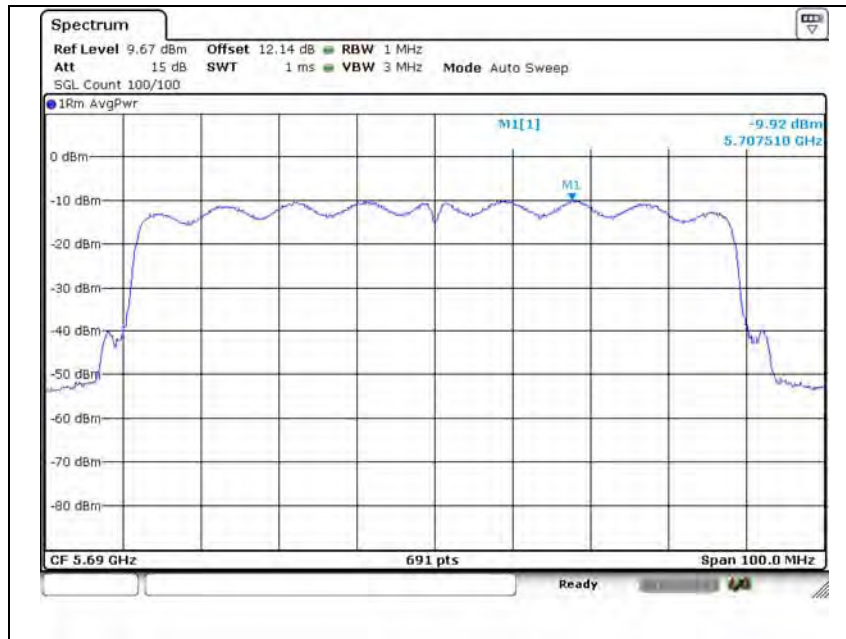
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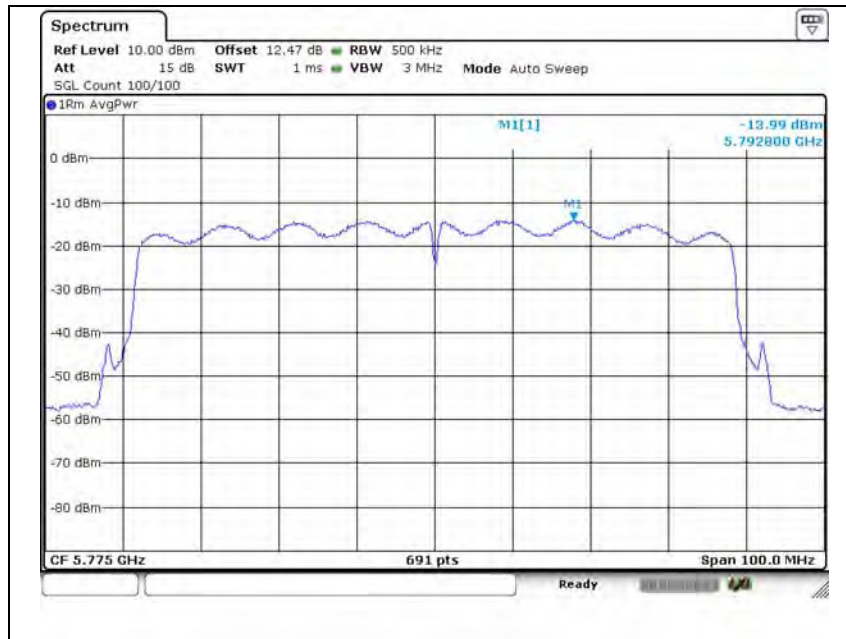
Channel 122



Channel 138

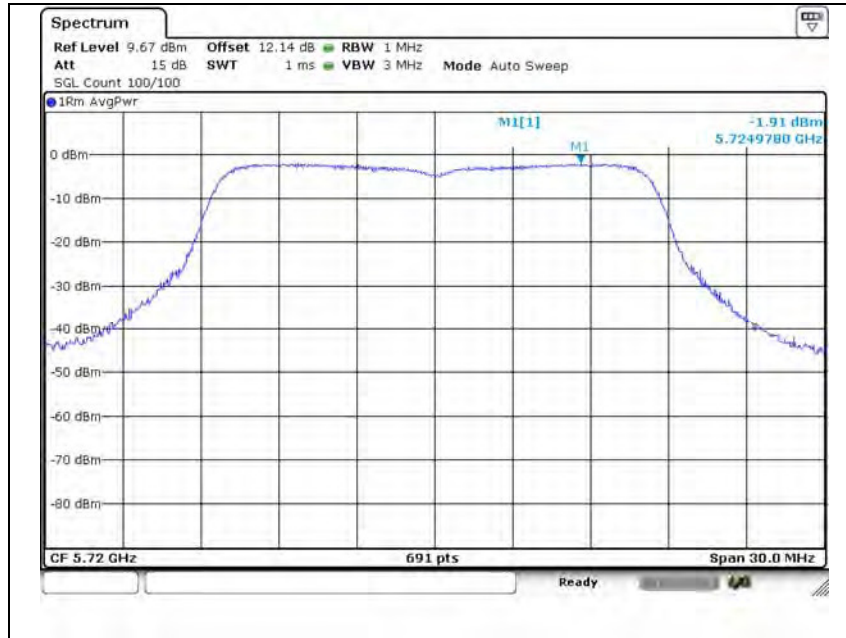


Channel 155



Band-crossing channels 802.11a (UNII-2C)

Channel 144



802.11a (UNII-3)

Channel 144



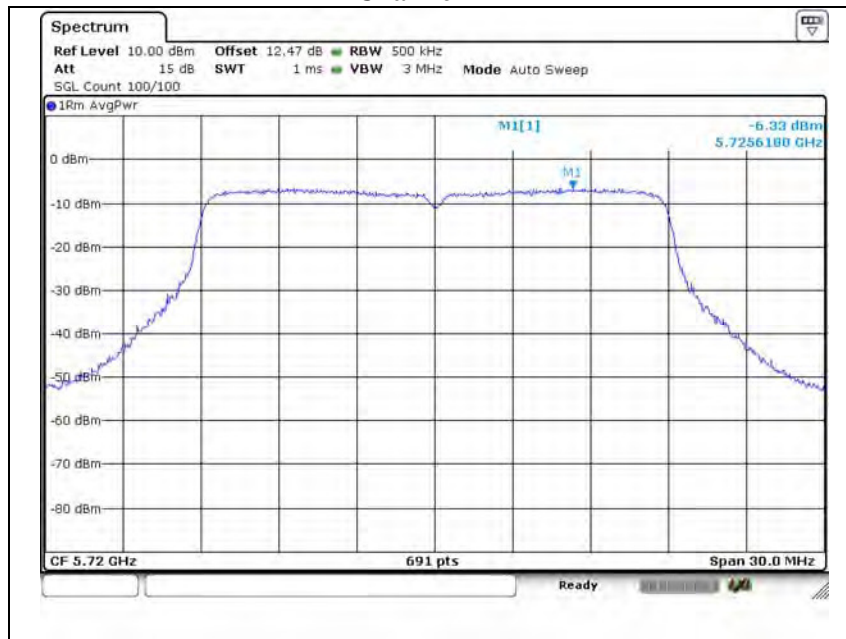
802.11n_HT20 (UNII-2C)

Channel 144



802.11n_HT20 (UNII-3)

Channel 144



802.11n_HT40 (UNII-2C)

Channel 142



802.11n_HT40 (UNII-3)

Channel 142



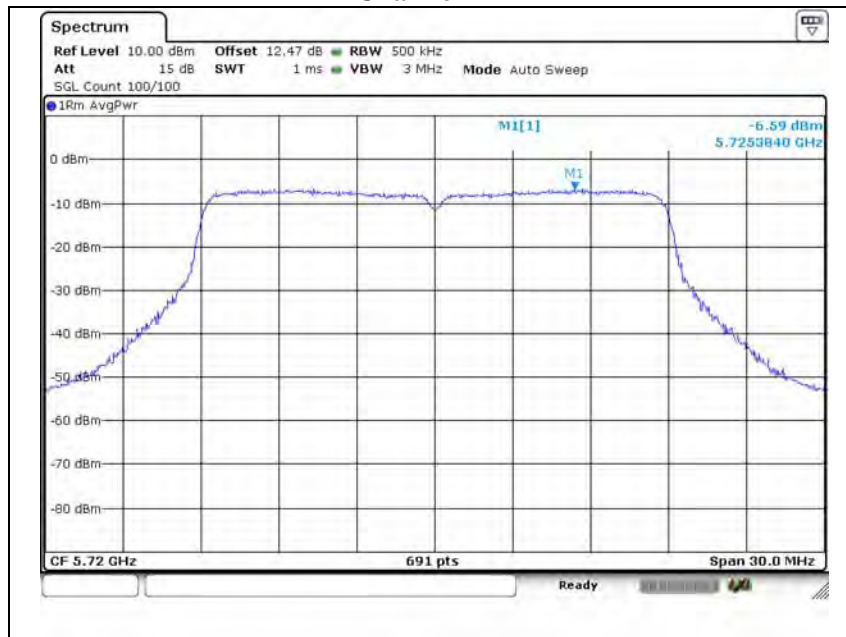
802.11ac_VHT20 (UNII-2C)

Channel 144



802.11ac_VHT20 (UNII-3)

Channel 144



802.11ac_VHT40 (UNII-2C)

Channel 142



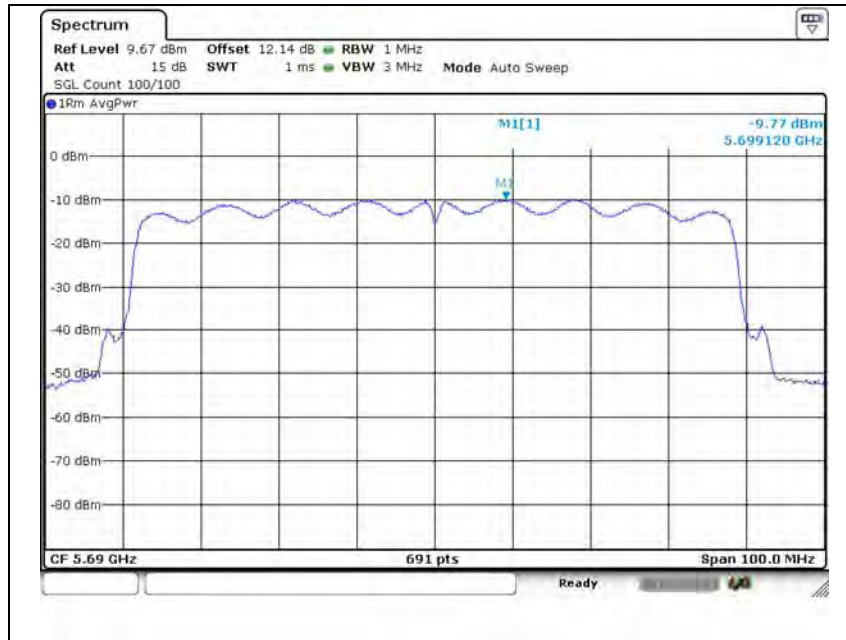
802.11ac_VHT40 (UNII-3)

Channel 142



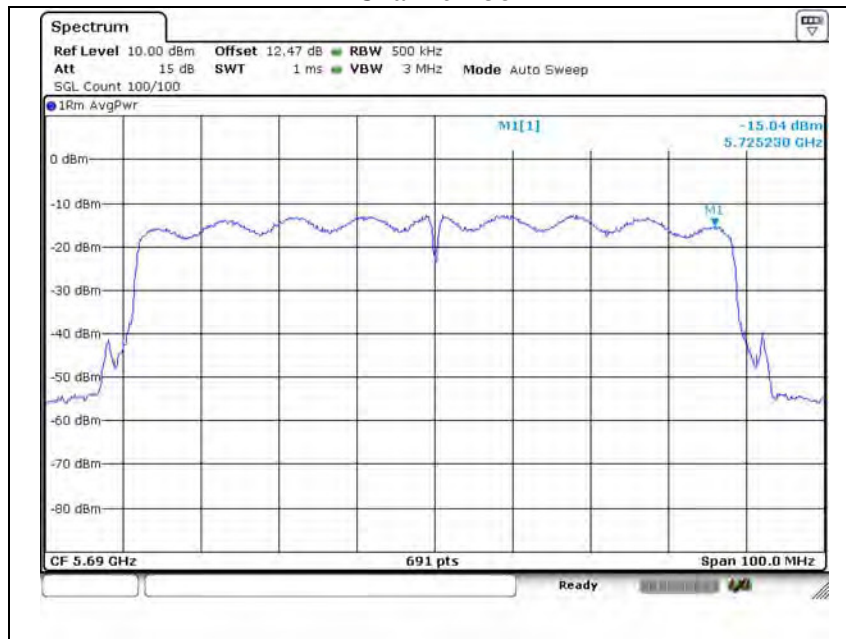
802.11n_VHT80 (UNII-2C)

Channel 138



802.11n_VHT80 (UNII-3)

Channel 138



3.5. Frequency Stability

Test procedure

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

Limit

N/A

Test results

Mode: UNII-1
Operating frequency: 5 180 MHz

Test voltage (%)	Test voltage (V)	Temperature (°C)	Measure frequency (MHz)	Frequency deviation (Hz)	Deviation (%)
100 %	AC 120	-20	5 180.035 725	35 725	0.000 690
100 %		-10	5 180.020 431	20 431	0.000 394
100 %		0	5 180.003 761	3 761	0.000 073
100 %		10	5 180.008 547	8 547	0.000 165
100 %		20	5 180.003 332	3 332	0.000 064
100 %		28	5 180.023 300	23 000	0.000 444
100 %		30	5 180.021 275	21 275	0.000 411
100 %		40	5 180.057 932	57 932	0.001 118
100 %		50	5 180.072 962	72 962	0.001 409
85 %	AC 102	28	5 180.037 121	37 121	0.000 717
115 %	AC 138	28	5 180.041 028	41 028	0.000 792



Mode: UNII-2A
Operating frequency: 5 260 MHz

Test voltage (%)	Test voltage (V)	Temperature (°C)	Measure frequency (MHz)	Frequency deviation (Hz)	Deviation (%)
100 %	AC 120	-20	5 260.028 043	28 043	0.000 533
100 %		-10	5 260.019 427	19 427	0.000 369
100 %		0	5 260.003 525	3 525	0.000 067
100 %		10	5 260.008 123	8 123	0.000 154
100 %		20	5 260.004 051	4 051	0.000 077
100 %		28	5 260.034 586	34 586	0.000 658
100 %		30	5 260.024 936	24 936	0.000 474
100 %		40	5 260.057 932	57 932	0.001 101
100 %		50	5 260.090 154	90 154	0.001 714
85 %	AC 102	28	5 260.046 882	46 882	0.000 891
115 %	AC 138	28	5 260.051 830	51 830	0.000 985

Mode: UNII-2C
Operating frequency: 5500 MHz

Test voltage (%)	Test voltage (V)	Temperature (°C)	Measure frequency (MHz)	Frequency deviation (Hz)	Deviation (%)
100 %	AC 120	-20	5 500.026 843	26 843	0.000 488
100 %		-10	5 500.016 024	16 024	0.000 291
100 %		0	5 500.008 683	86 830	0.001 579
100 %		10	5 500.013 176	13 176	0.000 240
100 %		20	5 500.019 102	19 102	0.000 347
100 %		28	5 500.029 523	29 523	0.000 537
100 %		30	5 500.026 457	26 457	0.000 481
100 %		40	5 500.066 615	66 615	0.001 211
100 %		50	5 500.085 382	85 382	0.001 552
85 %	AC 102	28	5 500.040 375	40 375	0.000 734
115 %	AC 138	28	5 500.046 332	46 332	0.000 842

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www.kes.co.kr

Test report No.:
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Mode: UNII-3
Operating frequency: 5 745 MHz

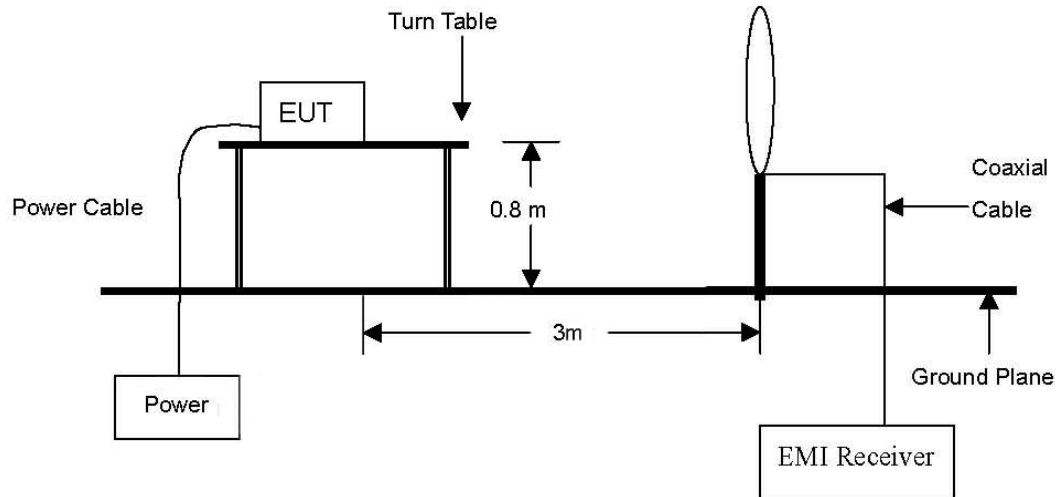
Test voltage (%)	Test voltage (V)	Temperature (°C)	Measure frequency (MHz)	Frequency deviation (Hz)	Deviation (%)
100 %	AC 120	-20	5 745.028 324	28 324	0.000 493
100 %		-10	5 745.016 248	16 248	0.000 283
100 %		0	5 745.006 817	6 817	0.000 119
100 %		10	5 745.018 232	18 232	0.000 317
100 %		20	5 745.004 052	4 052	0.000 071
100 %		28	5 745.017 625	17 625	0.000 307
100 %		30	5 745.011 632	11 632	0.000 202
100 %		40	5 745.065 156	65 156	0.001 134
100 %		50	5 745.058 026	58 026	0.001 010
85 %	AC 102	28	5 745.018 430	18 430	0.000 321
115 %	AC 138	28	5 745.022 430	22 430	0.000 390

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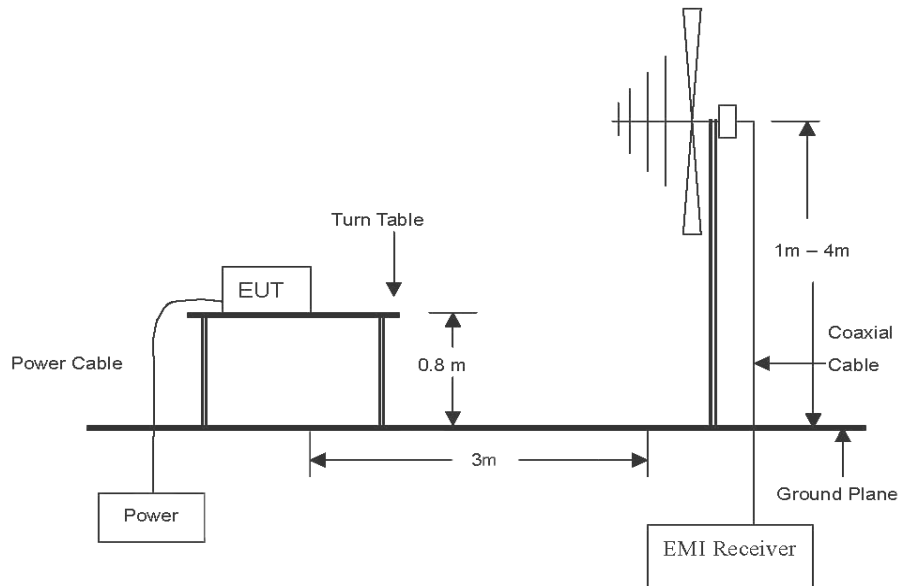
3.6. Radiated restricted band and emissions

Test setup

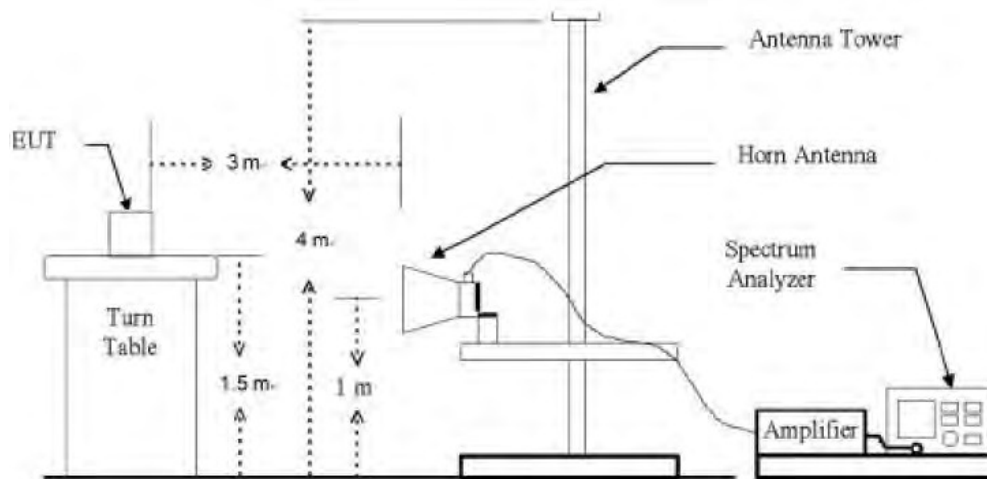
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz emissions, whichever is lower.



Test procedure below 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum hold mode.

Test procedure above 30 MHz

1. Spectrum analyzer settings for $f < 1$ GHz:
 - ① Span = wide enough to fully capture the emission being measured
 - ② RBW = 120 kHz
 - ③ VBW $\geq$ RBW
 - ④ Detector = quasi peak
 - ⑤ Sweep time = auto
 - ⑥ Trace = max hold
2. Spectrum analyzer settings for $f \geq 1$ GHz: Peak
 - ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
 - ② RBW = 1 MHz
 - ③ VBW = 3 MHz ($\geq 3 \times$ RBW)
 - ④ Detector = peak
 - ⑤ Sweep time = auto
 - ⑥ Trace = max hold
 - ⑦ Trace was allowed to stabilize

3. Spectrum analyzer settings for $f \geq 1$ GHz: Average

- ① Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- ② RBW = 1 MHz
- ③ VBW = 3 MHz ($\geq 3 \times$ RBW)
- ④ Averaging type = power averaging (rms)
- ⑤ Detector function = power averaging (rms)
- ⑥ Sweep = auto
- ⑦ Trace = max hold
- ⑧ Trace was averaged over 100 sweeps.

Note.

1. $f < 30$ MHz, extrapolation factor of 40 dB/decade of distance. $F_d = 40\log(D_m/D_s)$
 $f \geq 30$ MHz, extrapolation factor of 20 dB/decade of distance. $F_d = 20\log(D_m/D_s)$
 Where:
 F_d = Distance factor in dB
 D_m = Measurement distance in meters
 D_s = Specification distance in meters
2. CF(Correction factors(dB)) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or F_d (dB)
3. “*” means the restricted band.
4. Field strength(dB μ V/m) = Level(dB μ V) + Correction factors(dB)
5. Margin(dB) = Limit(dB μ V/m) - Field strength(dB μ V/m)
6. Emissions below 18 GHz were measured at a 3 meter test distance while emissions above 18 GHz were measured at a 1 meter test distance with the application of a distance correction factor.
7. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z, it was determined that **Y orientation** was worst-case orientation; therefore, all final radiated testing was performed with the EUT in **Y orientation**.
8. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.

Limit

According to 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

Frequency (MHz)	Distance (Meters)	Radiated (μ V/m)
0.009 ~ 0.490	300	2 400 / F(kHz)
0.490 ~ 1.705	30	24 000 / F(kHz)
1.705 ~ 30.0	30	30
30 ~ 88	3	100**
88 ~ 216	3	150**
216 ~ 960	3	200**
Above 960	3	500

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

According to 15.407(b), (b) Undesirable emission limits: Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following 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 e.i.r.p. 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 e.i.r.p. of -27 dBm/MHz.
- (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 e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725–5.85 GHz band:
 - i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
 - ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.
- (5) The 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 § 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in § 15.207.
- (7) The provisions of §15.205 apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

Duty cycle

Regarding to KDB 558074 D01_v03r05, 6.0, the maximum duty cycles of all modes were investigated and set the spectrum analyzer as below.

Set RBW $\geq$ OBW if possible; otherwise, set RBW to the largest available value. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100.

For the band 5.15-5.25 GHz

Test mode	T _{on} time (ms)	Period (ms)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (dB)
802.11a	10.00	10.00	1	100	0
802.11n_HT20	10.00	10.00	1	100	0
802.11n_HT40	10.00	10.00	1	100	0
802.11n_VHT20	10.00	10.00	1	100	0
802.11n_VHT40	10.00	10.00	1	100	0
802.11n_VHT80	10.00	10.00	1	100	0

For the band 5.250-5.350 GHz

Test mode	T _{on} time (ms)	Period (ms)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (dB)
802.11a	10.00	10.00	1	100	0
802.11n_HT20	10.00	10.00	1	100	0
802.11n_HT40	10.00	10.00	1	100	0
802.11n_VHT20	10.00	10.00	1	100	0
802.11n_VHT40	10.00	10.00	1	100	0
802.11n_VHT80	10.00	10.00	1	100	0

For the band 5.470-5.725 GHz

Test mode	T _{on} time (ms)	Period (ms)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (dB)
802.11a	10.00	10.00	1	100	0
802.11n_HT20	10.00	10.00	1	100	0
802.11n_HT40	10.00	10.00	1	100	0
802.11n_VHT20	10.00	10.00	1	100	0
802.11n_VHT40	10.00	10.00	1	100	0
802.11n_VHT80	10.00	10.00	1	100	0

For the band 5.725-5.85 GHz

Test mode	T _{on} time (ms)	Period (ms)	Duty cycle (Linear)	Duty cycle (%)	Duty cycle correction factor (dB)
802.11a	10.00	10.00	1	100	0
802.11n_HT20	10.00	10.00	1	100	0
802.11n_HT40	10.00	10.00	1	100	0
802.11n_VHT20	10.00	10.00	1	100	0
802.11n_VHT40	10.00	10.00	1	100	0
802.11n_VHT80	10.00	10.00	1	100	0

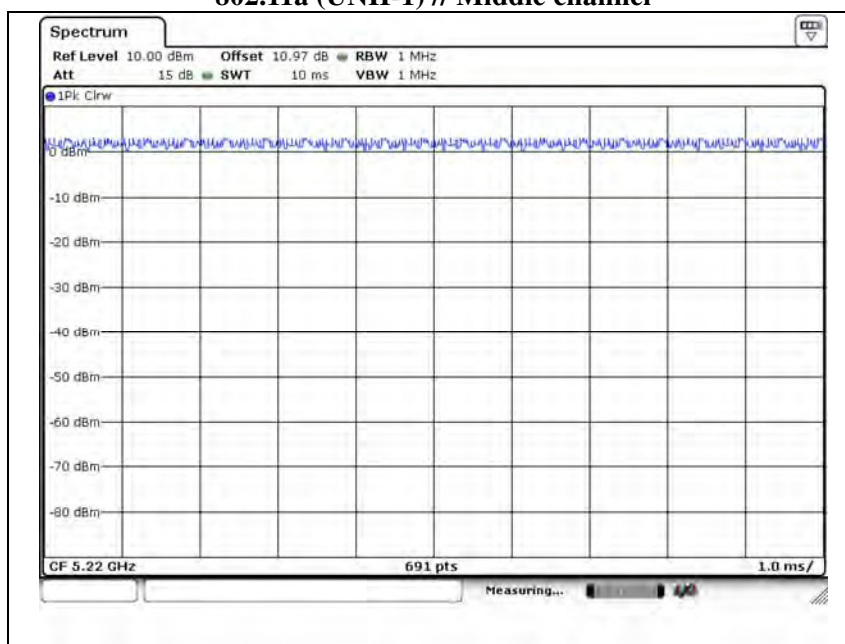
Note:

Duty cycle (Linear) = T_{on} time/Period

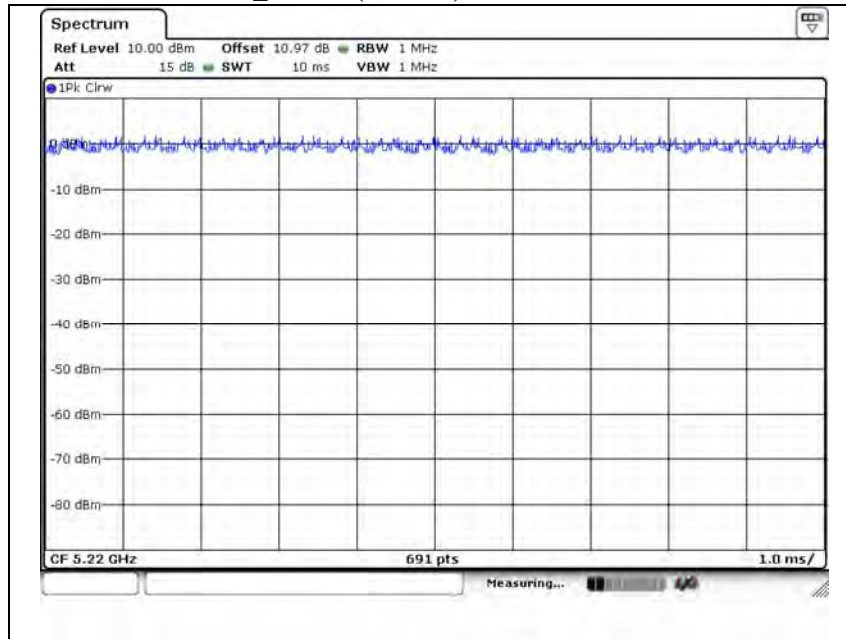
Minimum VBW(kHz) = 1/T_{on}, where T is on time in second

Duty cycle correction factor (dB) = 10log(1/duty cycle)

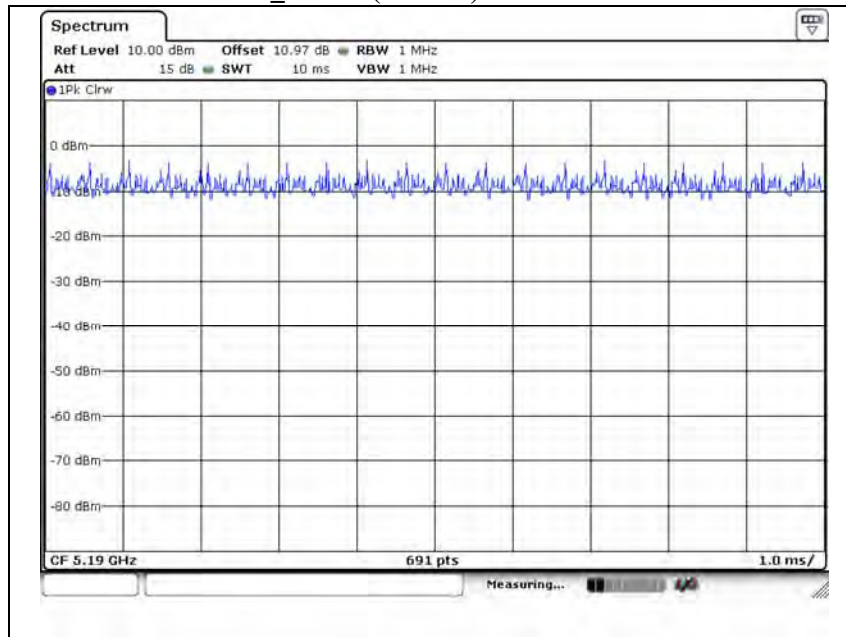
802.11a (UNII-1) // Middle channel



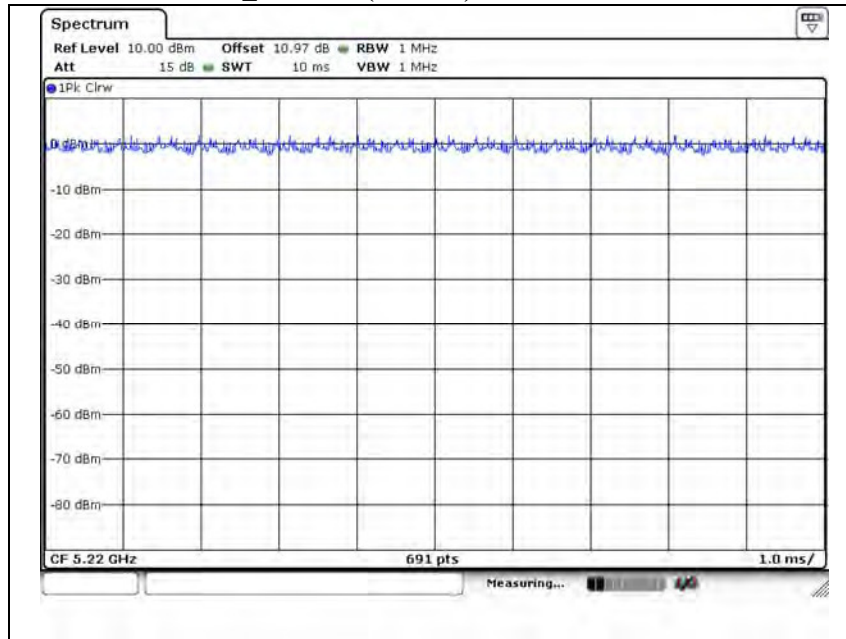
802.11n_HT20 (UNII-1) // Middle channel



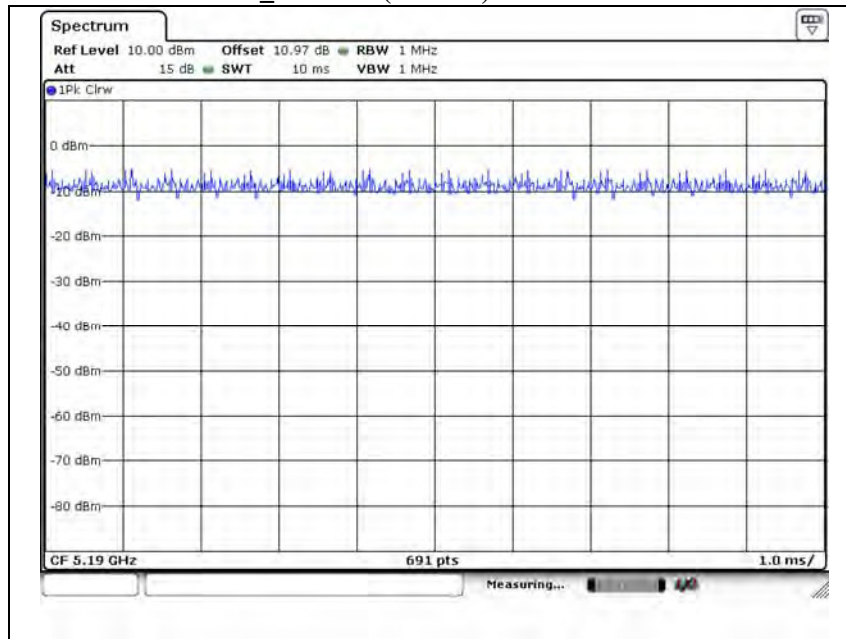
802.11n_HT40 (UNII-1) // Low channel



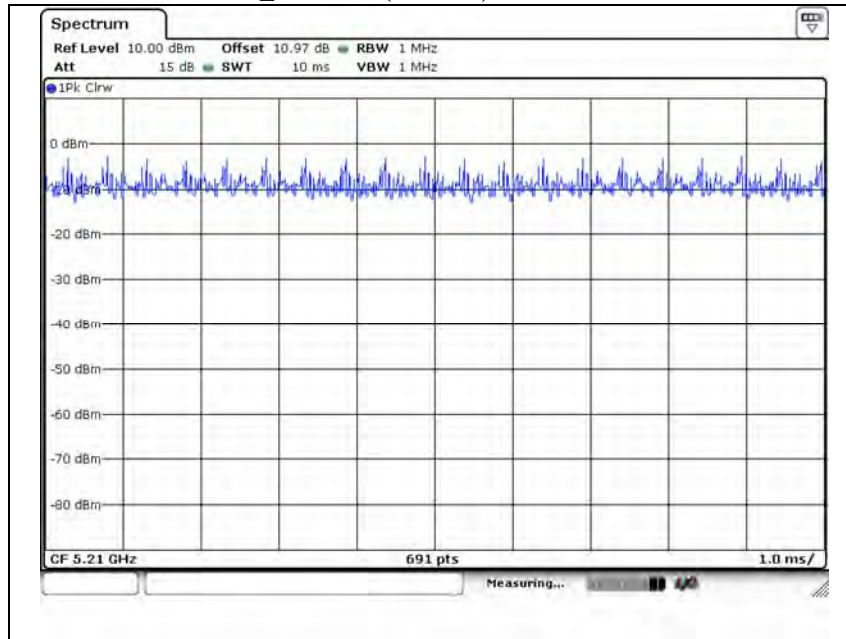
802.11n_VHT20 (UNII-1) // Middle channel



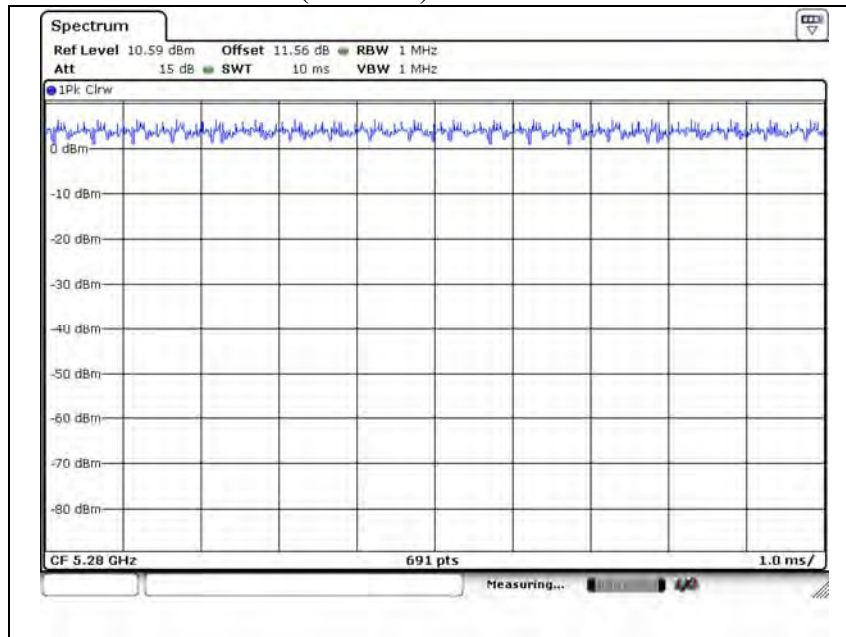
802.11n_VHT40 (UNII-1) // Low channel



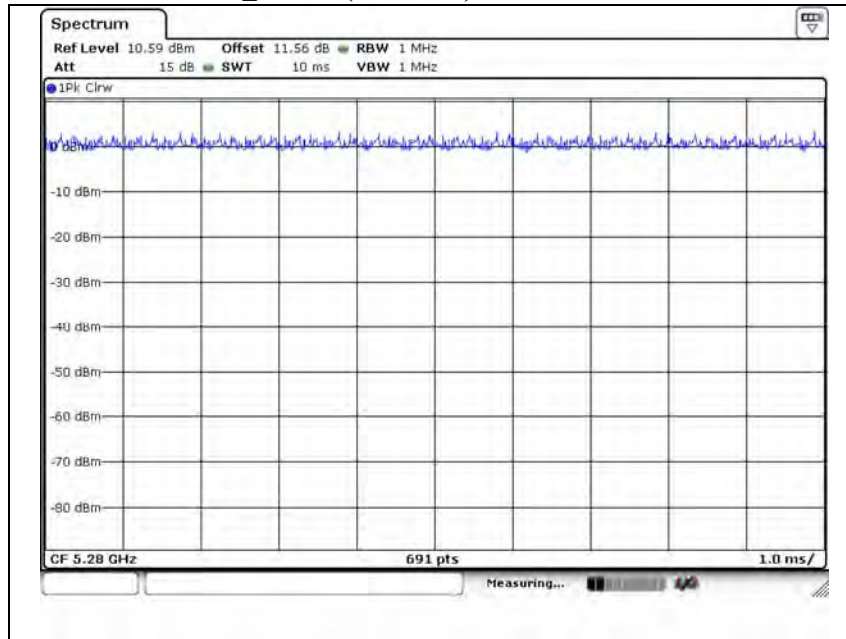
802.11n_VHT80 (UNII-1) // Low channel



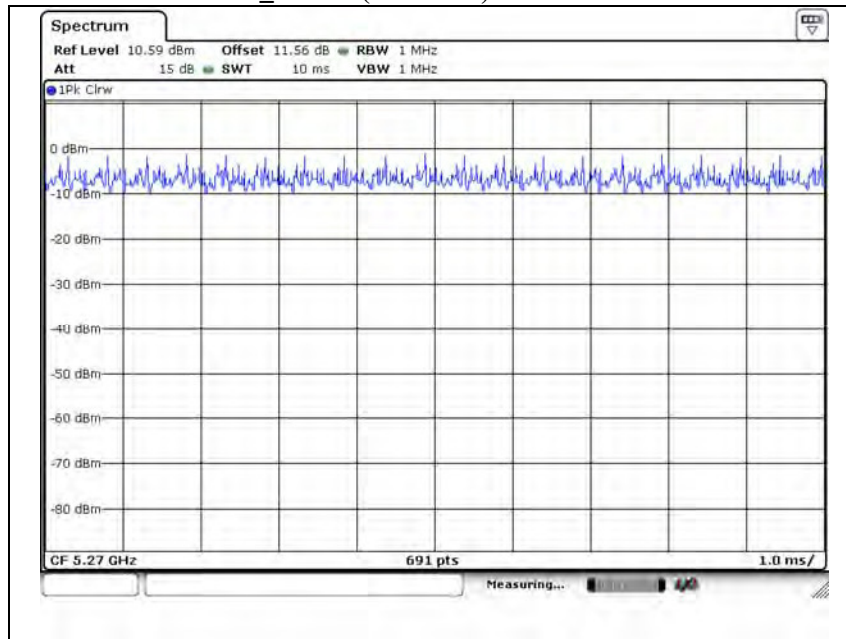
802.11a (UNII-2A) // Middle channel



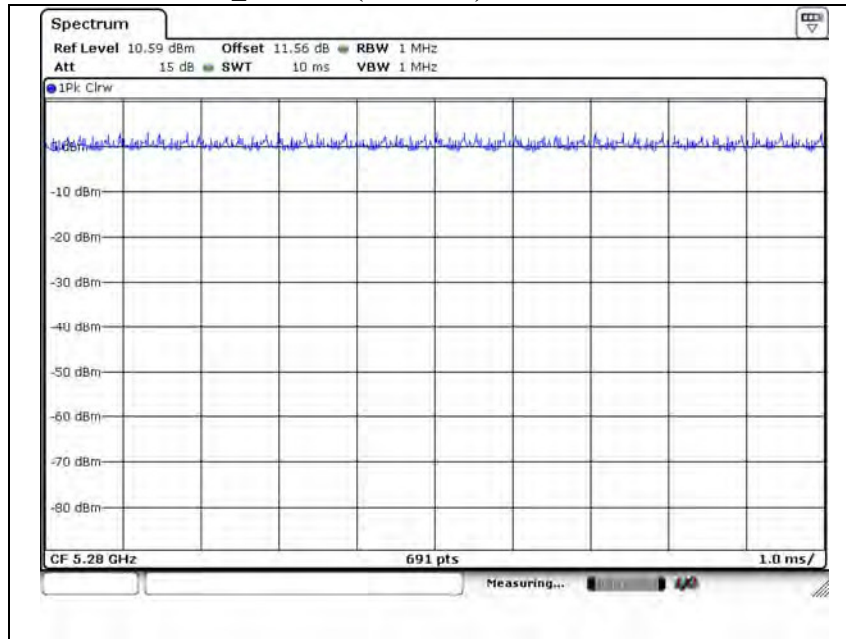
802.11n_HT20 (UNII-2A) // Middle channel



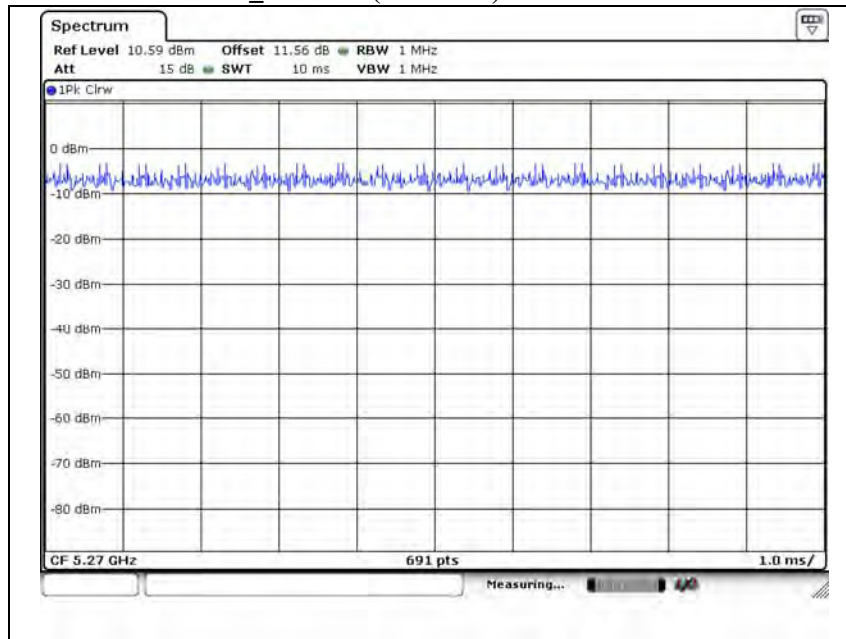
802.11n_HT40 (UNII-2A) // Low channel



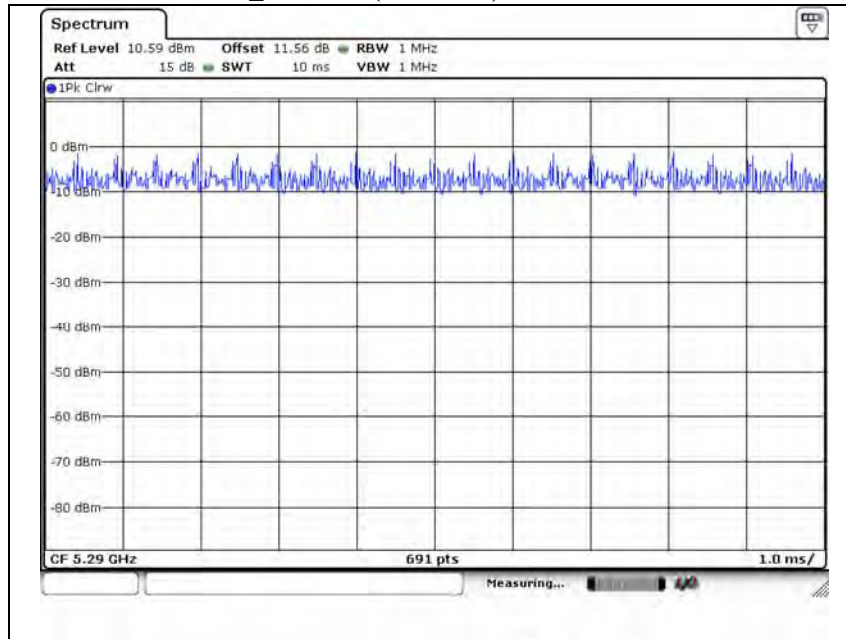
802.11n_VHT20 (UNII-2A) // Middle channel



802.11n_VHT40 (UNII-2A) // Low channel



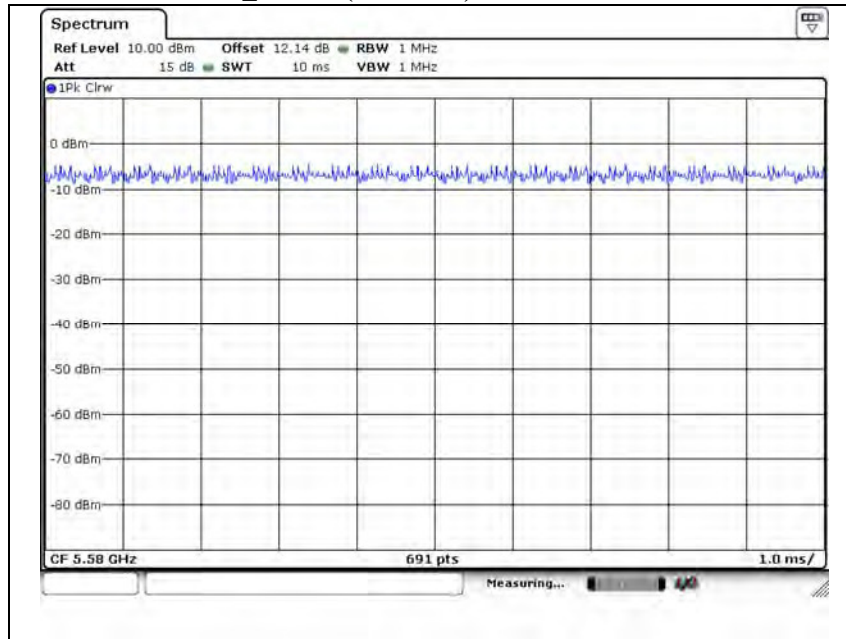
802.11n_VHT80 (UNII-2A) // Low channel



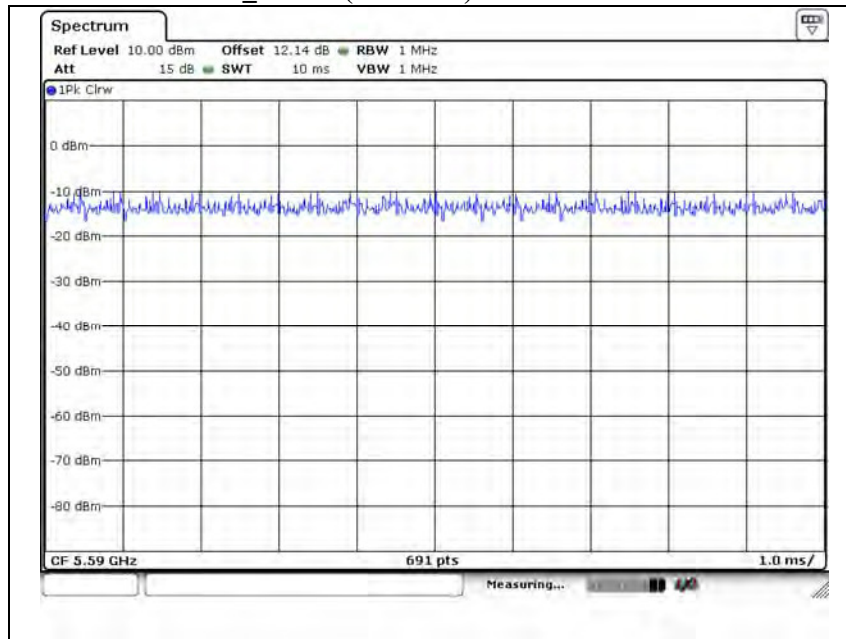
802.11a (UNII-2C) // Middle channel



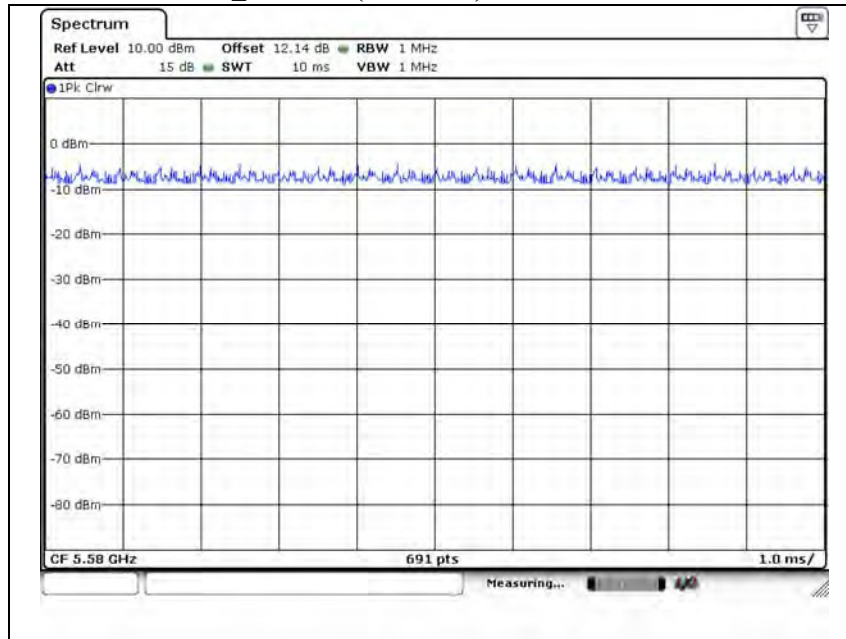
802.11n_HT20 (UNII-2C) // Middle channel



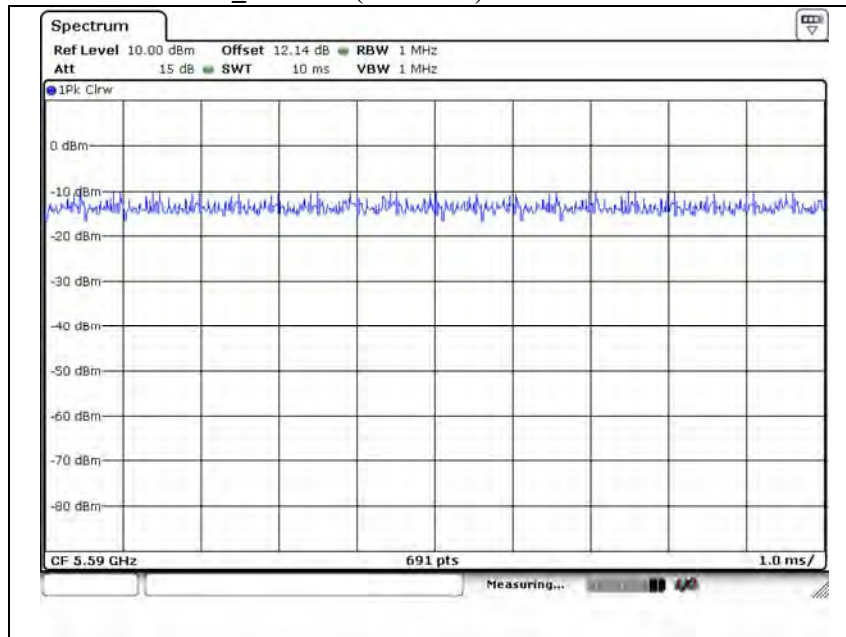
802.11n_HT40 (UNII-2C) // Middle channel



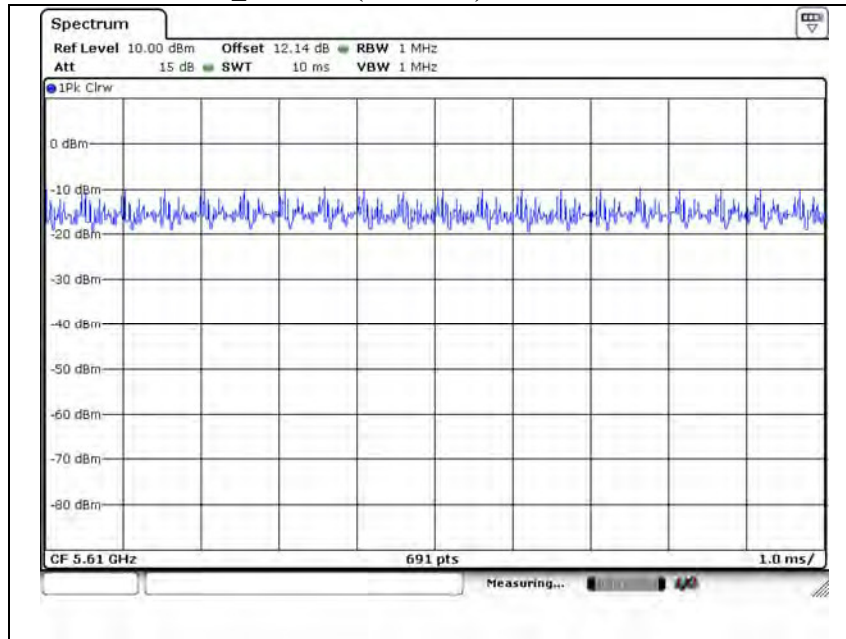
802.11n_VHT20 (UNII-2C) // Middle channel



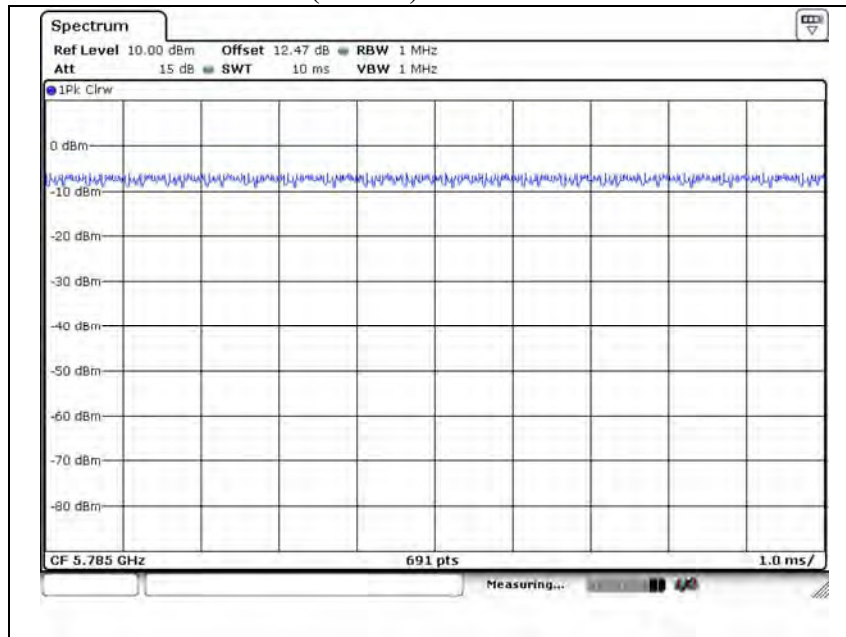
802.11n_VHT40 (UNII-2C) // Middle channel



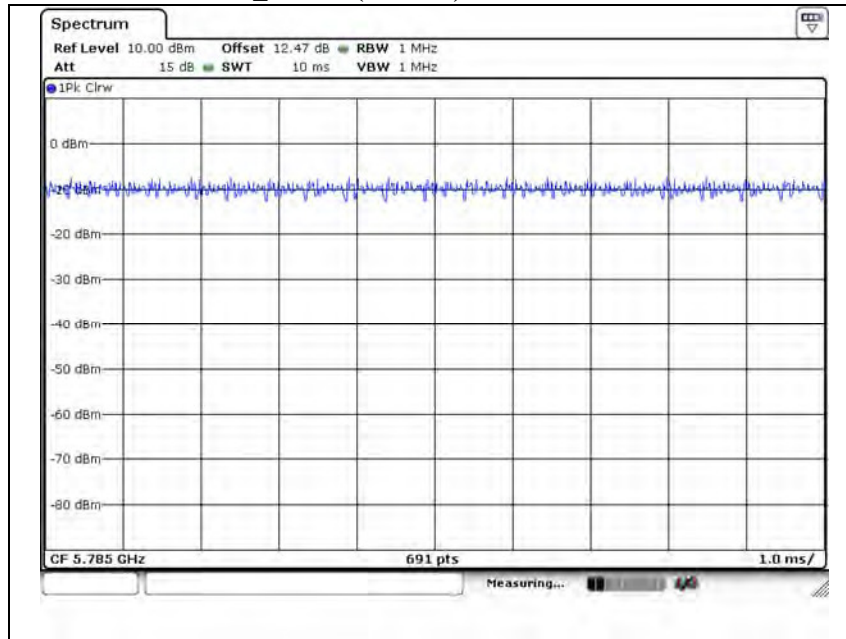
802.11n_VHT80 (UNII-2C) // Middle channel



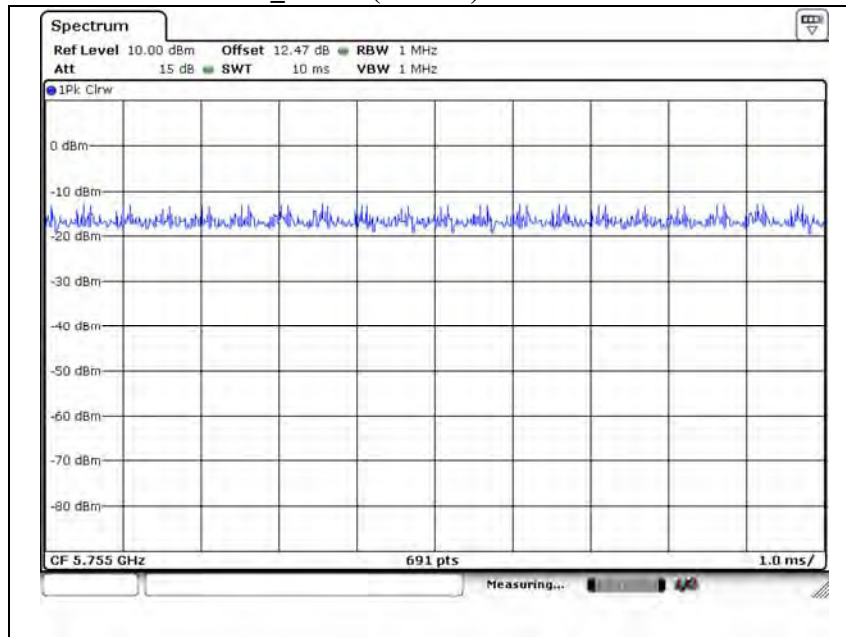
802.11a (UNII-3) // Middle channel



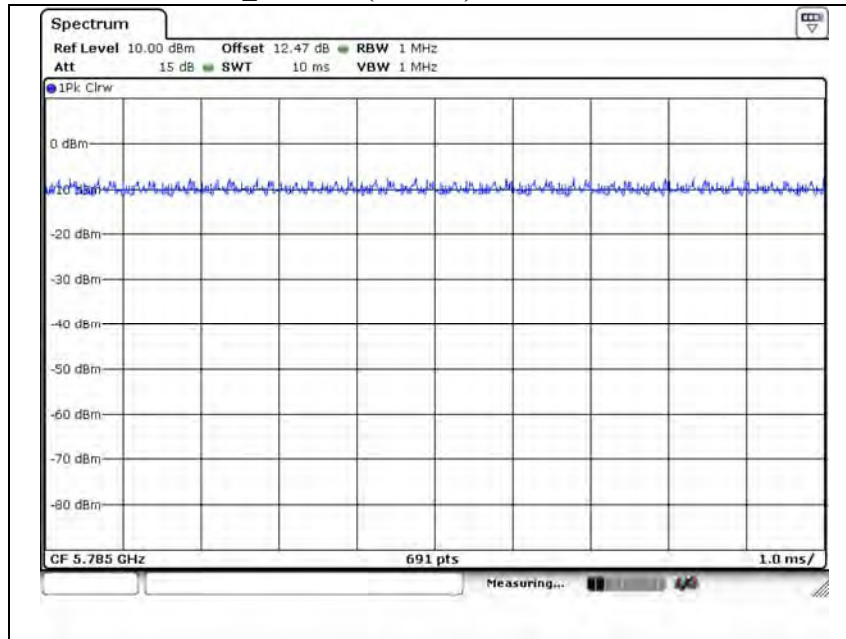
802.11n_HT20 (UNII-3) // Middle channel



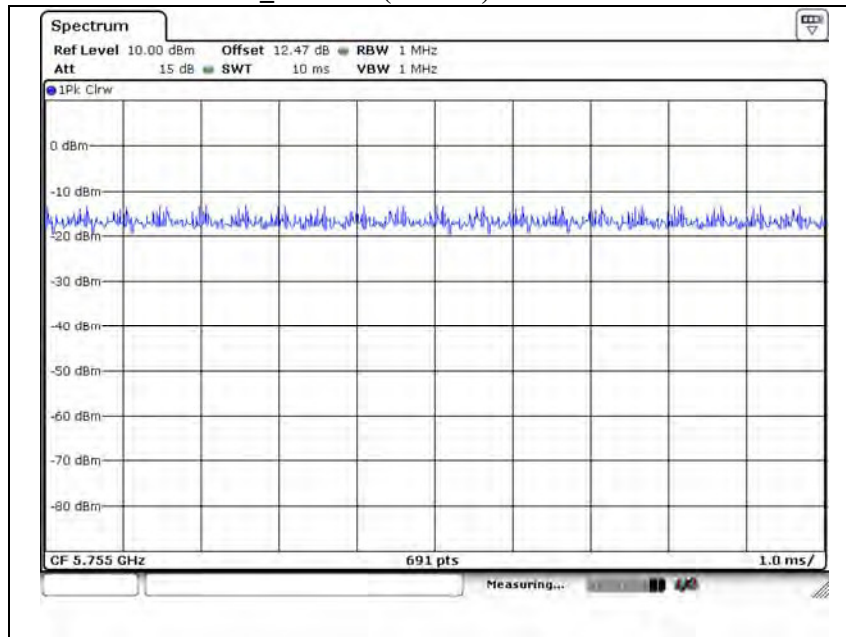
802.11n_HT40 (UNII-3) // Low channel



802.11n_VHT20 (UNII-3) // Middle channel

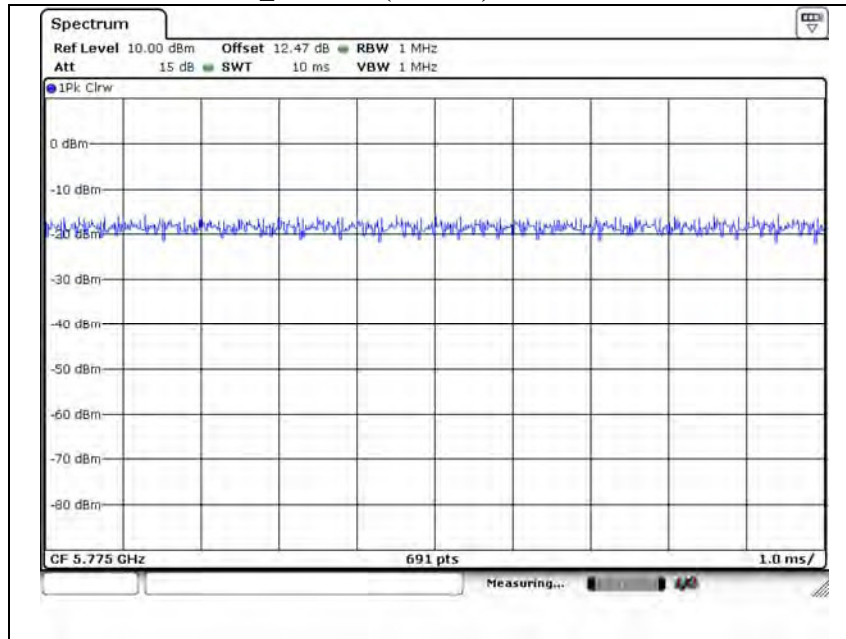


802.11n_VHT40 (UNII-3) // Low channel





802.11n_VHT80 (UNII-3) // Low channel



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Test results (Below 30 MHz)

Mode: UNII-2C
Transfer rate: 6 Mbps
Distance of measurement: 3 meter
Channel: 116 (Worst case)

Frequency (MHz)	Level (dB μ V)	Ant. Pol. (H/V)	CF (dB)	F _d (dB)	Field strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit							

Test results (Below 1 000 MHz)

Mode: UNII-2C
Transfer rate: 6 Mbps
Distance of measurement: 3 meter
Channel: 116 (Worst case)

Frequency (MHz)	Level (dB μ V)	Ant. Pol (H/V)	CF (dB)	Field strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
50.37	20.85	V	14.13	34.98	40.00	5.02
155.13	16.22	V	13.77	29.99	43.50	13.51
250.19	29.63	H	12.96	42.59	46.00	3.41
283.17	23.85	H	14.34	38.19	46.00	7.81
350.10	20.79	H	16.06	36.85	46.00	9.15
550.89	20.11	H	20.93	41.04	46.00	4.96

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Test results (Above 1 000 MHz)

Mode: UNII-1
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 36

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5110.10	51.71	Peak	H	-3.42	-	48.29	74.00	25.71
*5090.10	51.49	Peak	V	-3.43	-	48.06	74.00	25.94

Mode: UNII-1
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 44

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-1
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 48

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

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Mode: UNII-2A
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 52

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2A
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 56

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2A
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 64

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5371.70	51.90	Peak	H	-3.60	-	48.30	74.00	25.70
*5354.70	51.84	Peak	V	-3.58	-	48.26	74.00	25.74

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Mode: UNII-2C
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 100

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5458.30	53.00	Peak	H	-3.55	-	49.45	74.00	24.55
*5451.70	52.46	Peak	V	-3.56	-	48.90	74.00	25.10

Mode: UNII-2C
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 116

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2C
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 144

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

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Mode: UNII-3
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 149

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5695.07	52.55	Peak	H	-2.60	-	49.95	68.23	18.28
5694.49	51.16	Peak	V	-2.60	-	48.56	68.23	19.67
5725.00	50.84	Peak	H	-2.49	-	48.35	110.83	62.48
5725.00	51.55	Peak	V	-2.49	-	49.06	110.83	61.77

Mode: UNII-3
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 157

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-3
Transfer rate: 6Mbps
Distance of measurement: 3 meter
Channel: 165

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5850.00	51.80	Peak	H	-2.07	-	49.73	110.83	61.10
5850.00	50.26	Peak	V	-2.07	-	48.19	110.83	62.64
5862.29	52.61	Peak	H	-2.03	-	50.58	105.23	54.65
5869.64	51.91	Peak	V	-2.01	-	49.90	105.23	55.33

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Mode: UNII-1 (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 36

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5108.60	51.75	Peak	H	-3.42	-	48.33	74.00	25.67
*5072.10	52.03	Peak	V	-3.43	-	48.60	74.00	25.40

Mode: UNII-1 (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 44

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-1 (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 48

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

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Mode: UNII-2A (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 52

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2A (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 56

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2A (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 64

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5360.20	52.41	Peak	H	-3.59	-	48.82	74.00	25.18
*5388.90	51.97	Peak	V	-3.62	-	48.35	74.00	25.65

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Mode: UNII-2C (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 100

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5459.10	51.86	Peak	H	-3.55	-	48.31	74.00	25.69
*5455.83	52.10	Peak	V	-3.55	-	48.55	74.00	25.45

Mode: UNII-2C (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 116

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2C (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 144

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

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Mode: UNII-3 (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 149

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5664.64	52.19	Peak	H	-2.71	-	49.48	105.23	55.75
5600.38	53.42	Peak	V	-2.95	-	50.47	68.23	17.76
5725.00	52.77	Peak	H	-2.49	-	50.28	110.83	60.55
5725.00	50.55	Peak	V	-2.49	-	48.06	110.83	62.77

Mode: UNII-3 (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 157

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-3 (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 165

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5850.00	51.20	Peak	H	-2.07	-	49.13	110.83	61.70
5850.00	48.58	Peak	V	-2.07	-	46.51	110.83	64.32
5862.87	53.06	Peak	H	-2.03	-	51.03	105.23	54.20
5863.13	52.35	Peak	V	-2.03	-	50.32	105.23	54.91

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Mode: UNII-1 (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 38

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*4906.90	52.60	Peak	H	-3.75	-	48.85	74.00	25.15
*4986.90	52.39	Peak	V	-3.48	-	48.91	74.00	25.09

Mode: UNII-1 (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 46

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2A (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 54

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

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Mode: UNII-2A (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 62

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5354.40	52.36	Peak	H	-3.58	-	48.78	74.00	25.22
*5364.60	52.47	Peak	V	-3.59	-	48.88	74.00	25.12

Mode: UNII-2C (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 102

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5449.42	52.45	Peak	H	-3.56	-	48.89	74.00	25.11
*5445.73	51.56	Peak	V	-3.57	-	47.99	74.00	26.01

Mode: UNII-2C (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 118

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

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Mode: UNII-2C (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 142

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-3 (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 151

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5700.85	53.10	Peak	H	-2.58	-	50.52	105.23	54.71
5671.33	51.83	Peak	V	-2.69	-	49.14	68.23	19.09
5725.00	50.96	Peak	H	-2.49	-	48.47	110.83	62.36
5725.00	50.76	Peak	V	-2.49	-	48.27	110.83	62.56

Mode: UNII-3 (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 159

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5850.00	49.81	Peak	H	-2.07	-	47.74	110.83	63.09
5850.00	50.69	Peak	V	-2.07	-	48.62	110.83	62.21
5869.02	52.68	Peak	H	-2.01	-	50.67	105.23	54.56
5902.32	52.34	Peak	V	-1.92	-	50.42	68.23	17.81

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Mode: UNII-1 (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 36

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5036.20	52.76	Peak	H	-3.43	-	49.33	74.00	24.67
*5080.10	52.39	Peak	V	-3.43	-	48.96	74.00	25.04

Mode: UNII-1 (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 44

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-1 (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 48

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

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Mode: UNII-2A (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 52

Frequency (MHz)	Level (dB μ V)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2A (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 56

Frequency (MHz)	Level (dB μ V)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2A (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 64

Frequency (MHz)	Level (dB μ V)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*5352.39	51.91	Peak	H	-3.58	-	48.33	74.00	25.67
*5357.16	51.49	Peak	V	-3.59	-	47.90	74.00	26.10

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Mode: UNII-2C (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 100

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5456.76	52.65	Peak	H	-3.55	-	49.10	74.00	24.90
*5451.90	52.04	Peak	V	-3.56	-	48.48	74.00	25.52

Mode: UNII-2C (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 116

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2C (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 144

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								



Mode: UNII-3 (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 149

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5598.95	53.07	Peak	H	-2.95	-	50.12	68.23	18.11
5708.55	52.17	Peak	V	-2.55	-	49.62	105.23	55.61
5725.00	50.58	Peak	H	-2.49	-	48.09	110.83	62.74
5725.00	50.24	Peak	V	-2.49	-	47.75	110.83	63.08

Mode: UNII-3 (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 157

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-3 (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 165

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5850.00	50.16	Peak	H	-2.07	-	48.09	110.83	62.74
5850.00	50.01	Peak	V	-2.07	-	47.94	110.83	62.89
5893.20	52.00	Peak	H	-1.94	-	50.06	68.23	18.17
5873.39	50.83	Peak	V	-2.00	-	48.83	105.23	56.40

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Mode: UNII-1 (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 38

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5077.10	52.03	Peak	H	-3.43	-	48.60	74.00	25.40
*4957.50	52.73	Peak	V	-3.58	-	49.15	74.00	24.85

Mode: UNII-1 (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 46

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2A (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 54

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

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Mode: UNII-2A (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 62

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5385.20	52.25	Peak	H	-3.61	-	48.64	74.00	25.36
*5373.39	51.97	Peak	V	-3.60	-	48.37	74.00	25.63

Mode: UNII-2C (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 102

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5452.87	52.33	Peak	H	-3.56	-	48.77	74.00	25.23
*5455.08	52.55	Peak	V	-3.55	-	49.00	74.00	25.00

Mode: UNII-2C (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 118

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

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Mode: UNII-2C (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 142

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-3 (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 151

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5675.36	51.61	Peak	H	-2.67	-	48.94	68.23	19.29
5707.19	51.70	Peak	V	-2.55	-	49.15	105.23	56.08
5725.00	50.05	Peak	H	-2.49	-	47.56	110.83	63.27
5725.00	50.02	Peak	V	-2.49	-	47.53	110.83	63.30

Mode: UNII-3 (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 159

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5850.00	50.04	Peak	H	-2.07	-	47.97	110.83	62.86
5850.00	50.05	Peak	V	-2.07	-	47.98	110.83	62.85
5871.65	52.81	Peak	H	-2.00	-	50.81	105.23	54.42
5864.04	51.25	Peak	V	-2.03	-	49.22	105.23	56.01

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Mode: UNII-1 (VHT80)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 42

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5003.30	52.82	Peak	H	-3.43	-	49.39	74.00	24.61
*5118.90	51.32	Peak	V	-3.42	-	47.90	74.00	26.10

Mode: UNII-2A (VHT80)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 58

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5376.00	52.49	Peak	H	-3.60	-	48.89	74.00	25.11
*5401.80	52.61	Peak	V	-3.63	-	48.98	74.00	25.02

Mode: UNII-2C (VHT80)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 106

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
*5454.00	52.59	Peak	H	-3.55	-	49.04	74.00	24.96
*5452.60	53.79	Peak	V	-3.56	-	50.23	74.00	23.77

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Mode: UNII-2C (VHT80)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 122

Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-2C (VHT80)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 138

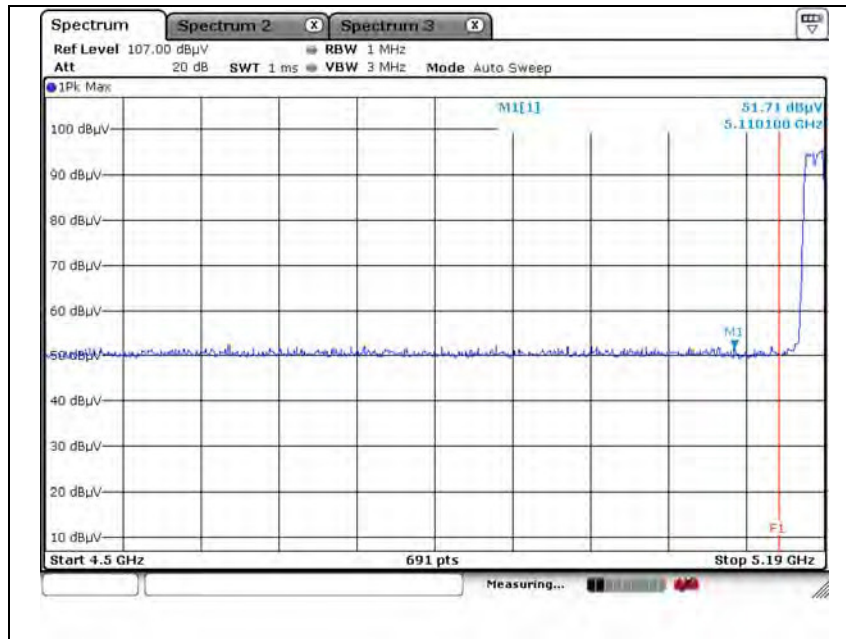
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
No spurious emissions were detected within 20 dB of the limit								

Mode: UNII-3 (VHT80)
Transfer rate: MCS9
Distance of measurement: 3 meter
Channel: 155

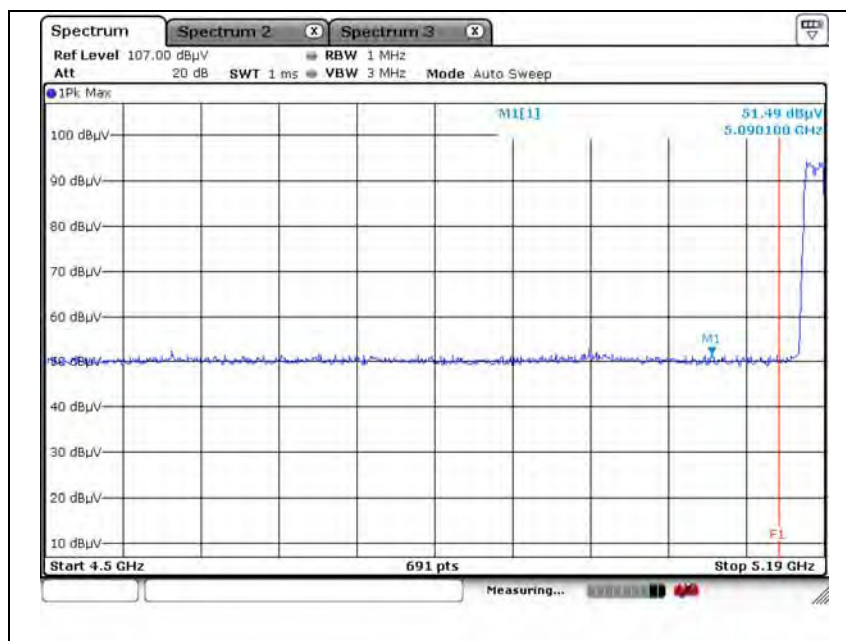
Frequency (MHz)	Level (dBμV)	Detect mode	Ant. Pol. (H/V)	CF (dB)	DCF (dB)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5606.90	52.38	Peak	H	-2.92	-	49.46	68.23	18.77
5638.73	52.15	Peak	V	-2.81	-	49.34	68.23	18.89
5725.00	50.24	Peak	H	-2.49	-	47.75	110.83	63.08
5725.00	50.20	Peak	V	-2.49	-	47.71	110.83	63.12
5850.00	50.08	Peak	H	-2.07	-	48.01	110.83	62.82
5850.00	50.03	Peak	V	-2.07	-	47.96	110.83	62.87
5871.03	51.74	Peak	H	-2.01	-	49.73	105.23	55.50
5868.09	51.78	Peak	V	-2.02	-	49.76	105.23	55.47

Test plots (Worst case)

Mode: UNII-1
Transfer rate: 6 Mbps
Distance of measurement: 3 meter
Channel: 36
Detected mode: Peak, Hor

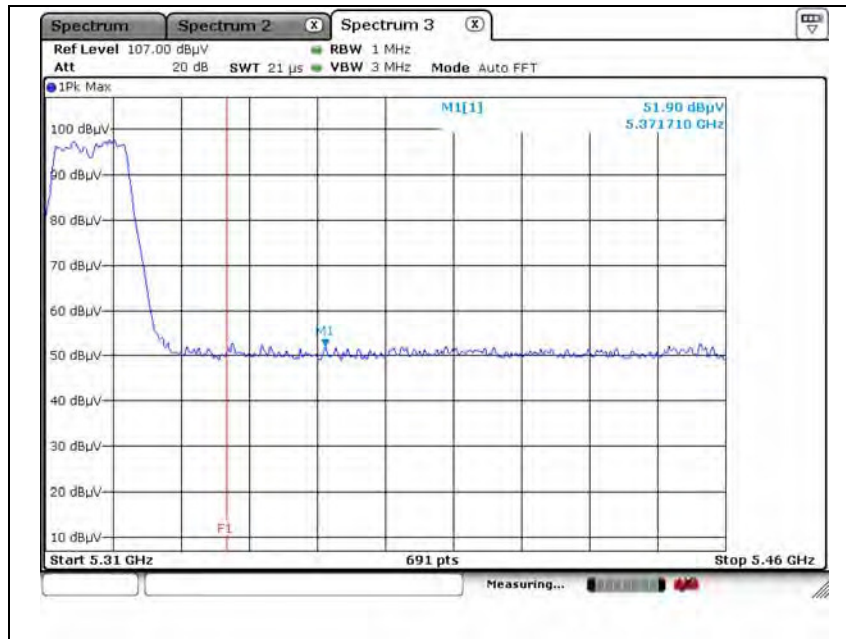


Detected mode: Peak, Ver

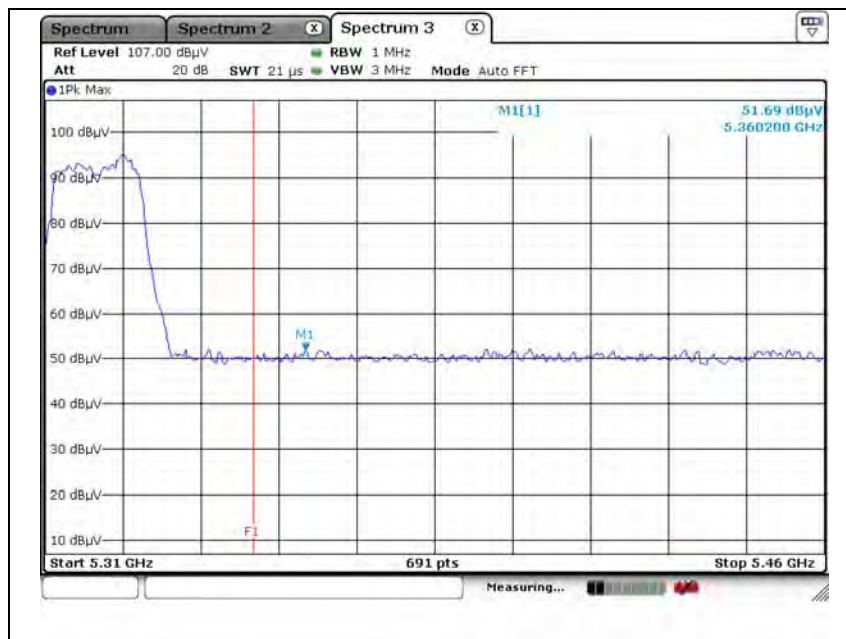


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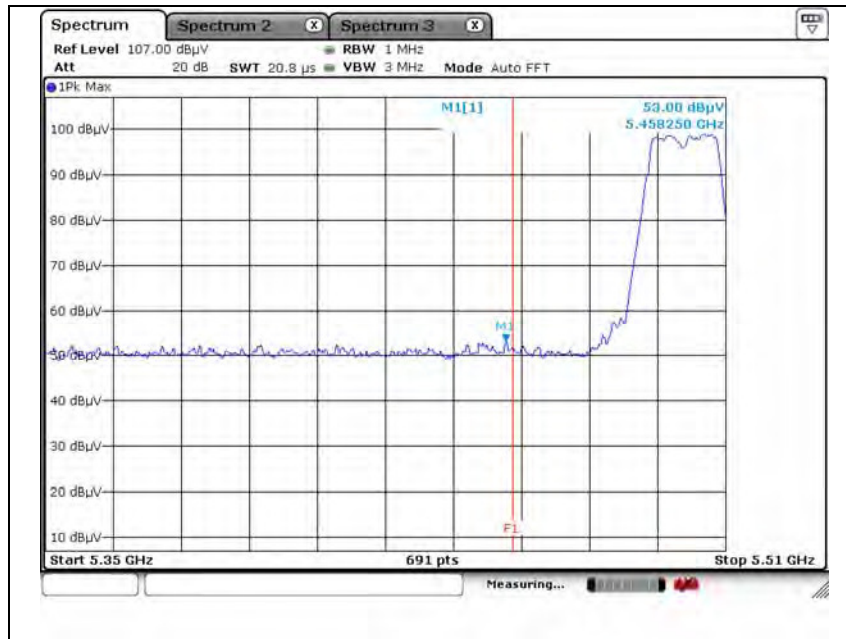
Mode: UNII-2A
Transfer rate: 6 Mbps
Distance of measurement: 3 meter
Channel: 64
Detected mode: Peak, Hor



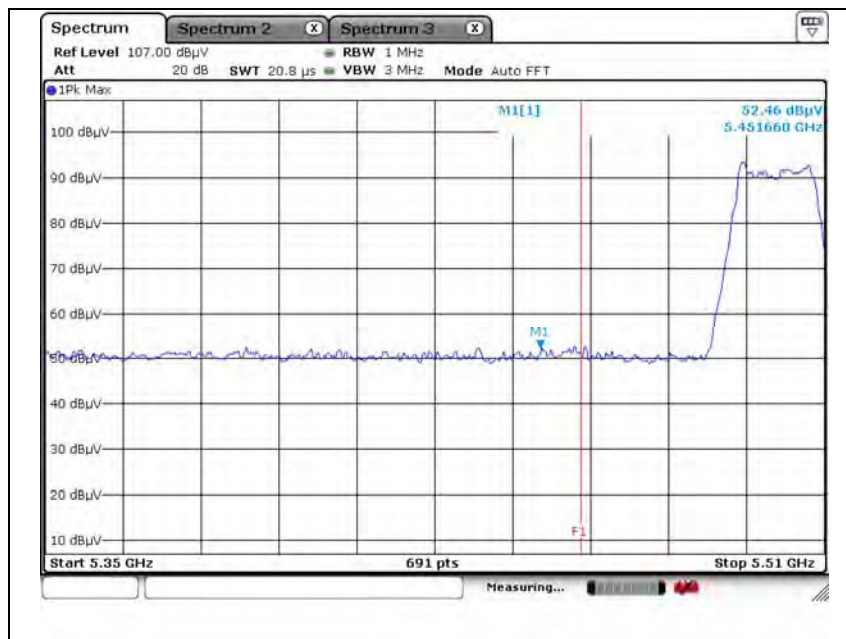
Detected mode: Peak, Ver



Mode: UNII-2C
Transfer rate: 6 Mbps
Distance of measurement: 3 meter
Channel: 100
Detected mode: Peak, Hor



Detected mode: Peak, Ver



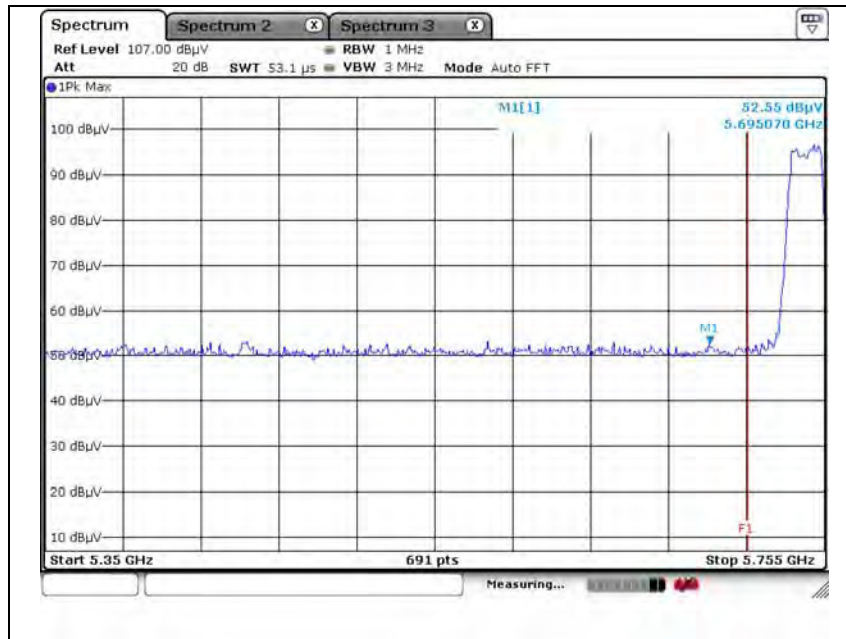


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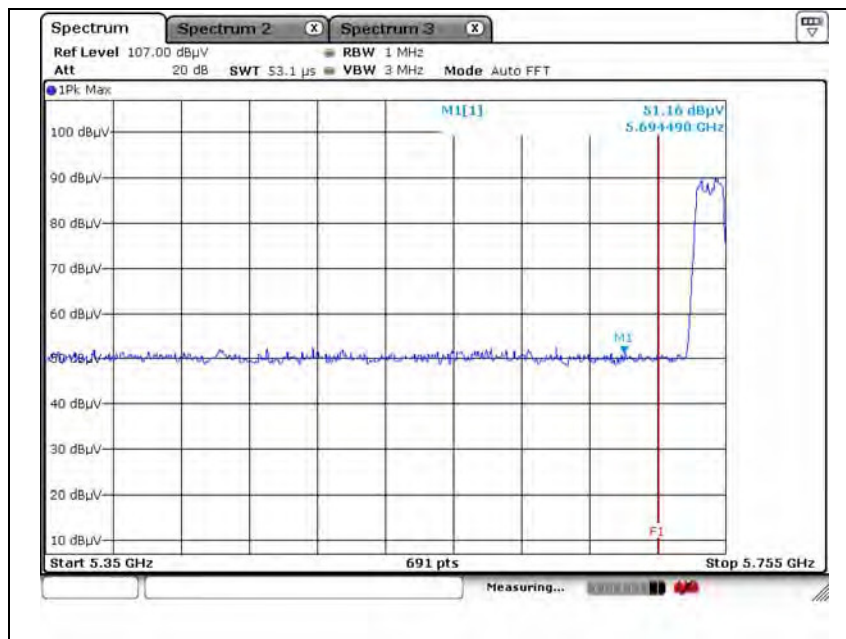
C-3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

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Mode: UNII-3 (1)
Transfer rate: 6 Mbps
Distance of measurement: 3 meter
Channel: 149
Detected mode: Peak, Hor

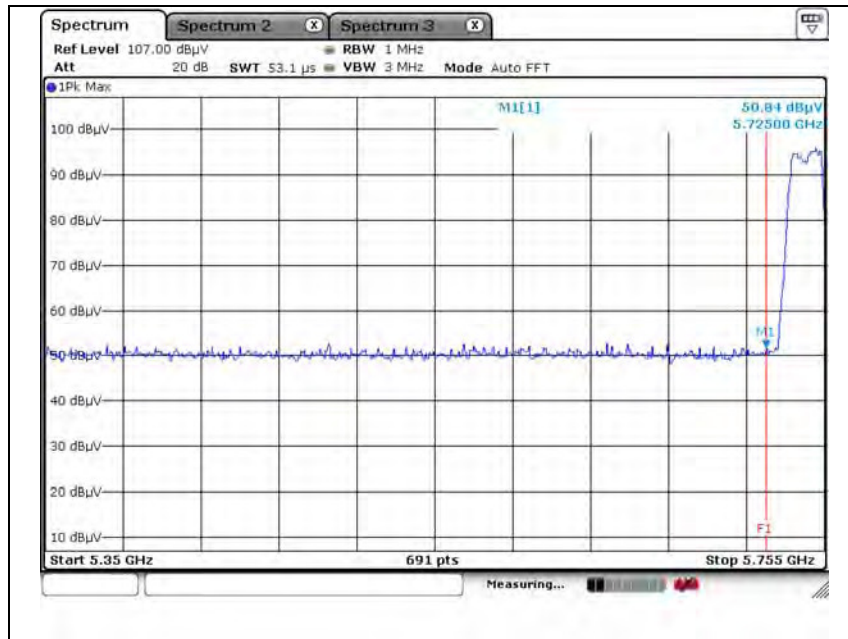


Detected mode: Peak, Ver

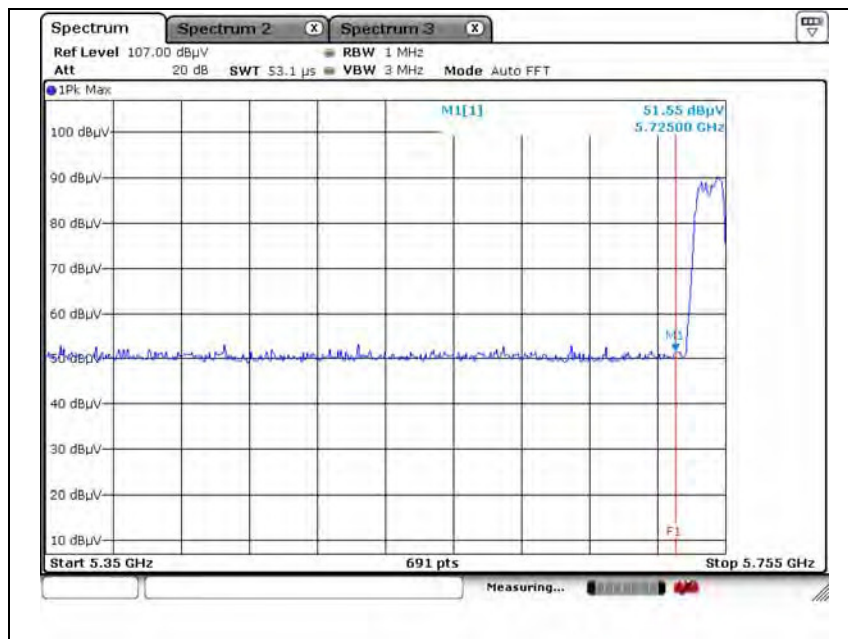


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Mode: UNII-3 (2)
Transfer rate: 6 Mbps
Distance of measurement: 3 meter
Channel: 149
Detected mode: Peak, Hor

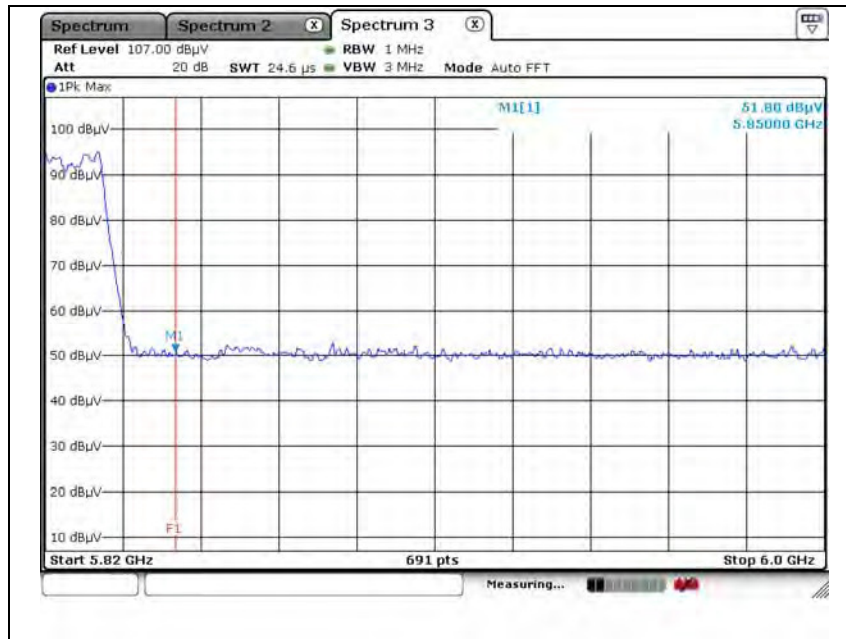


Detected mode: Peak, Ver

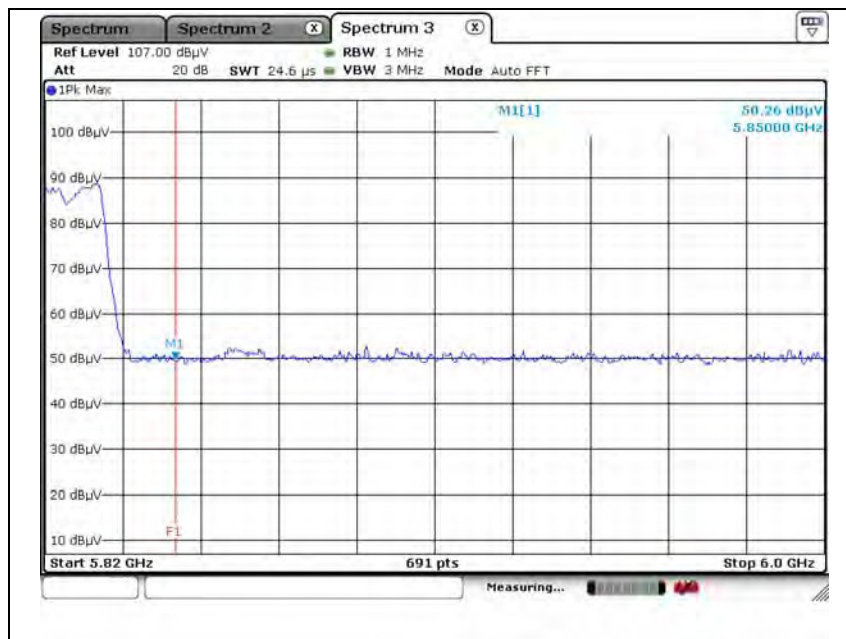


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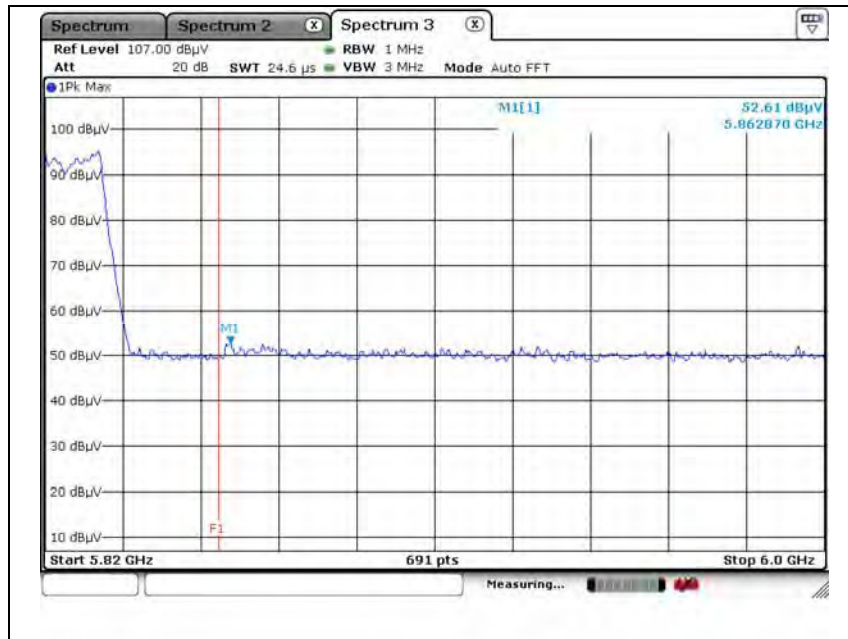
Mode: UNII-3 (1)
Transfer rate: 6 Mbps
Distance of measurement: 3 meter
Channel: 165
Detected mode: Peak, Hor



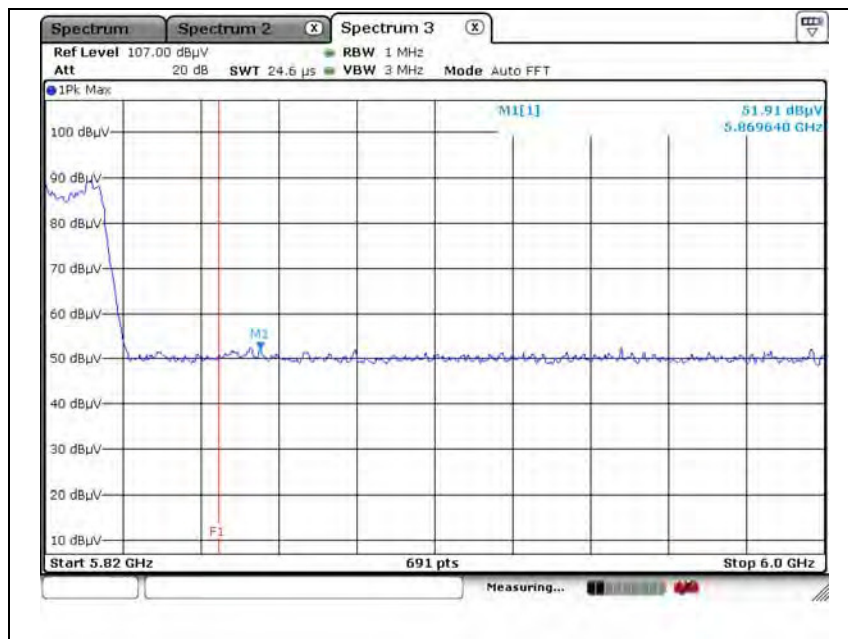
Detected mode: Peak, Ver



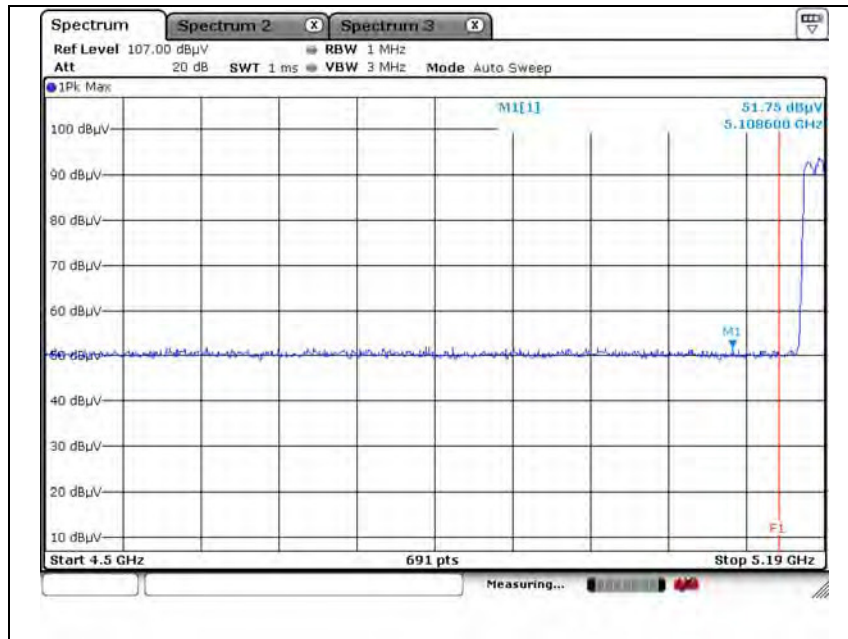
Mode: UNII-3 (2)
Transfer rate: 6 Mbps
Distance of measurement: 3 meter
Channel: 165
Detected mode: Peak, Hor



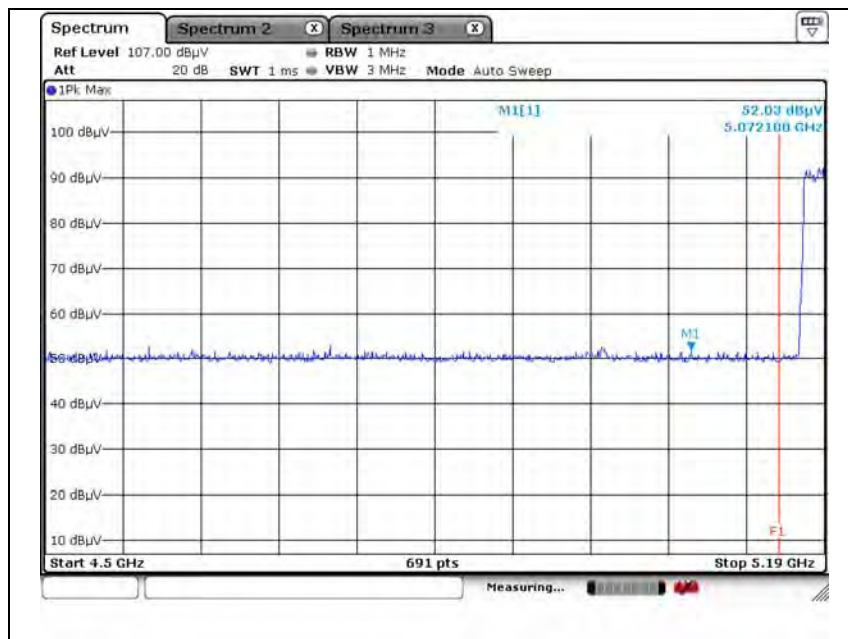
Detected mode: Peak, Ver



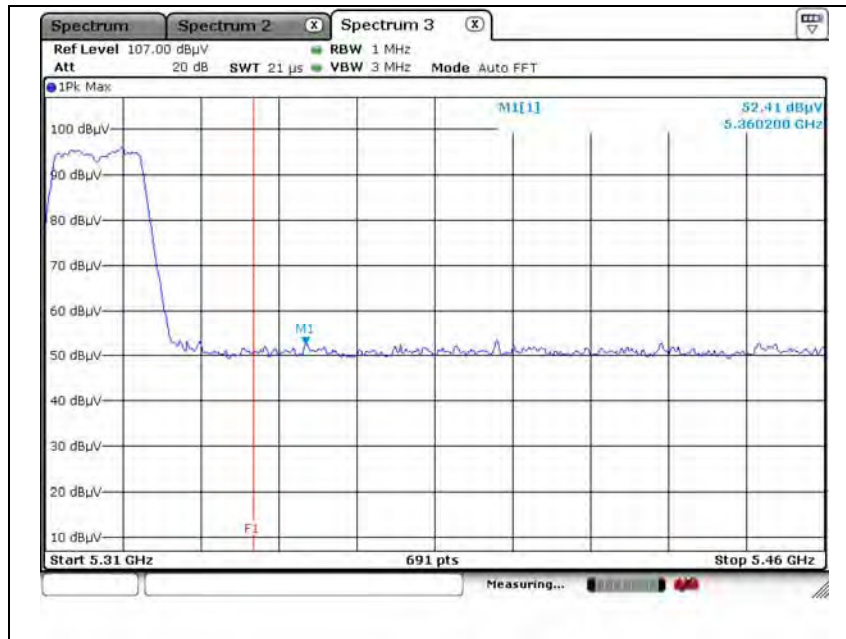
Mode: UNII-1 (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 36
Detected mode: Peak, Hor



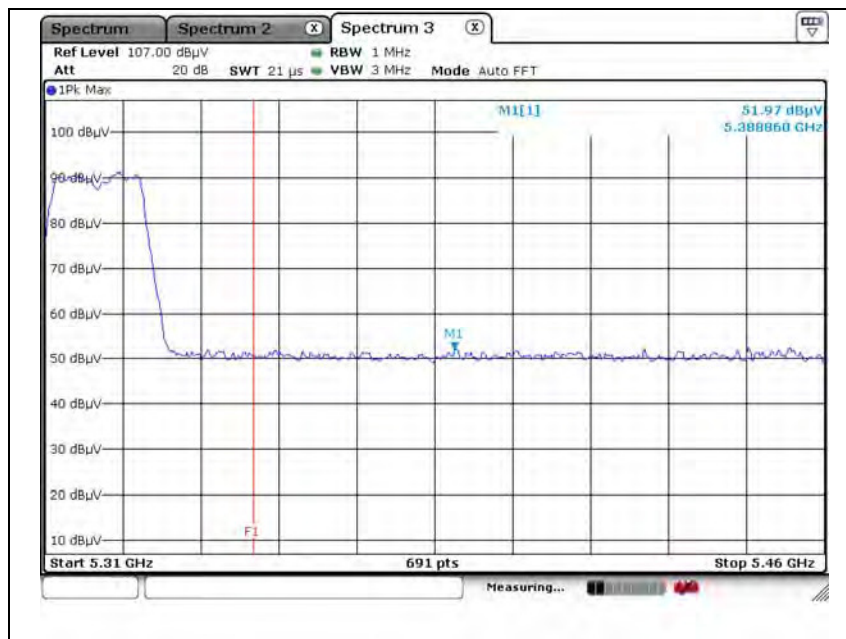
Detected mode: Peak, Ver



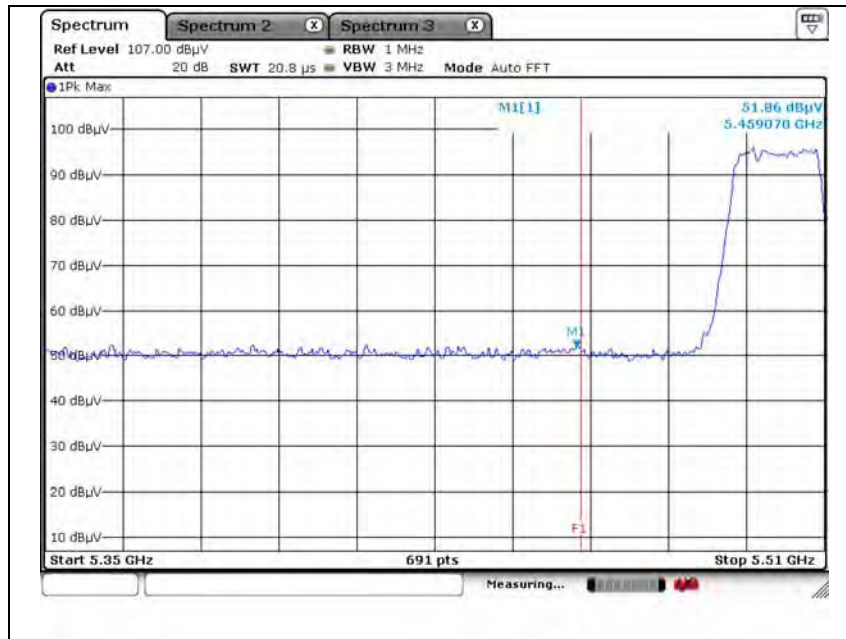
Mode: UNII-2A (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 64
Detected mode: Peak, Hor



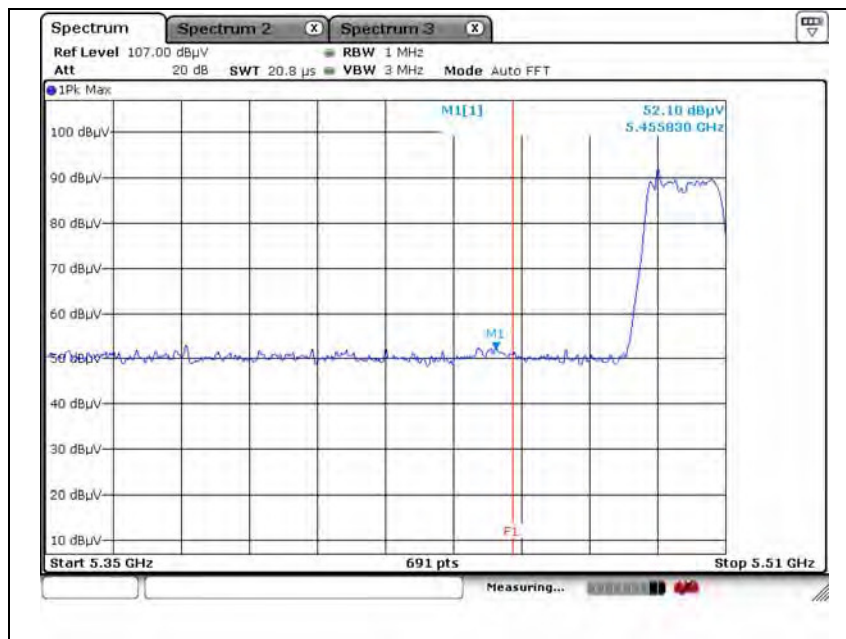
Detected mode: Peak, Ver



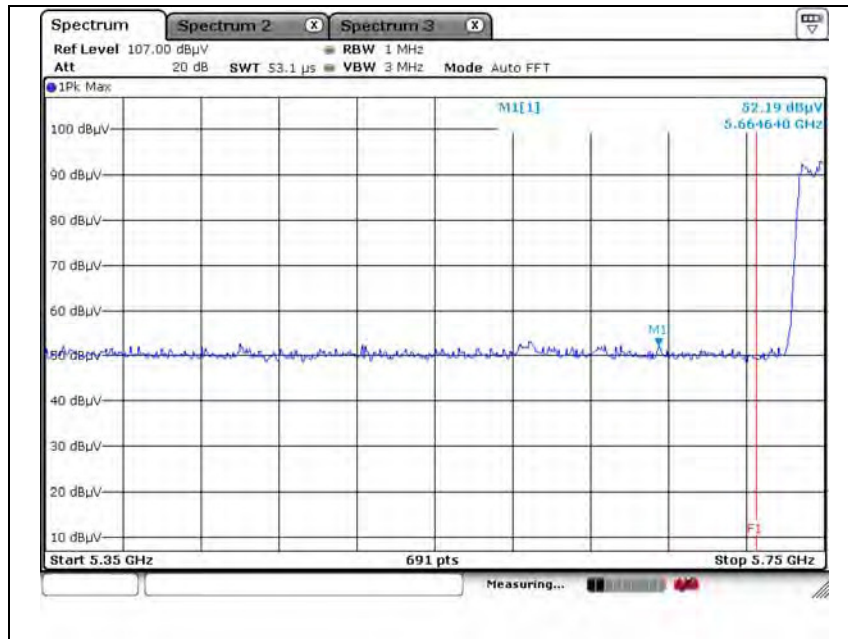
Mode: UNII-2C (HT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 100
Detected mode: Peak, Hor



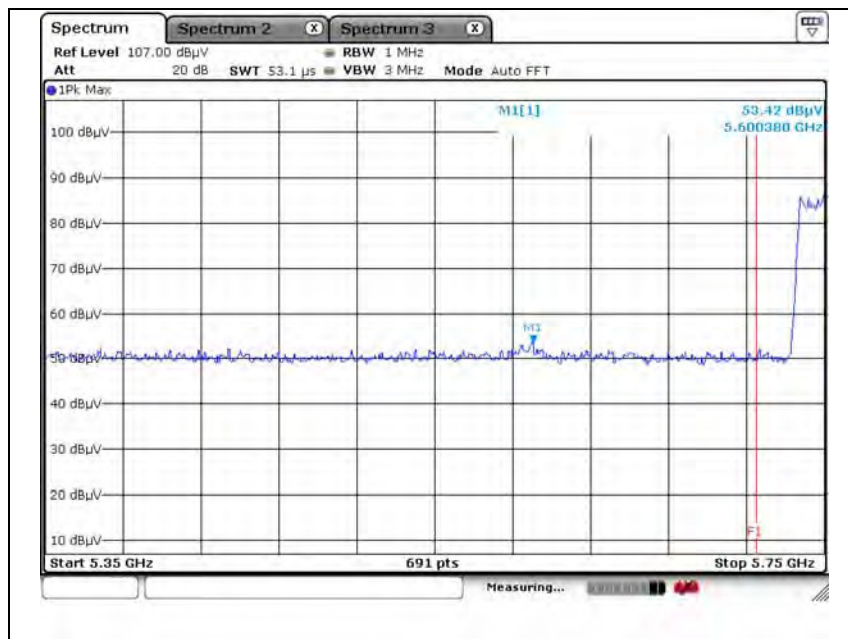
Detected mode: Peak, Ver



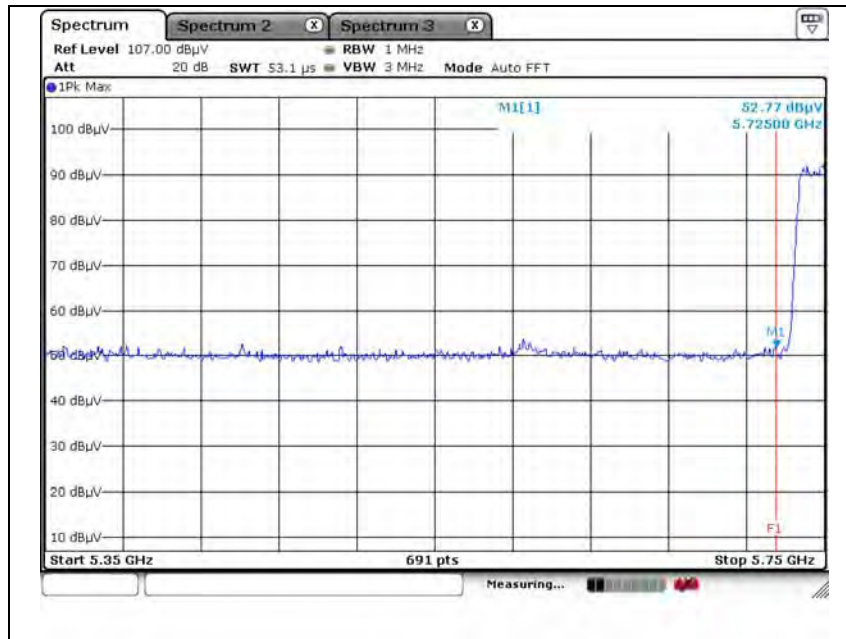
Mode: UNII-3 (HT20) (1)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 149
Detected mode: Peak, Hor



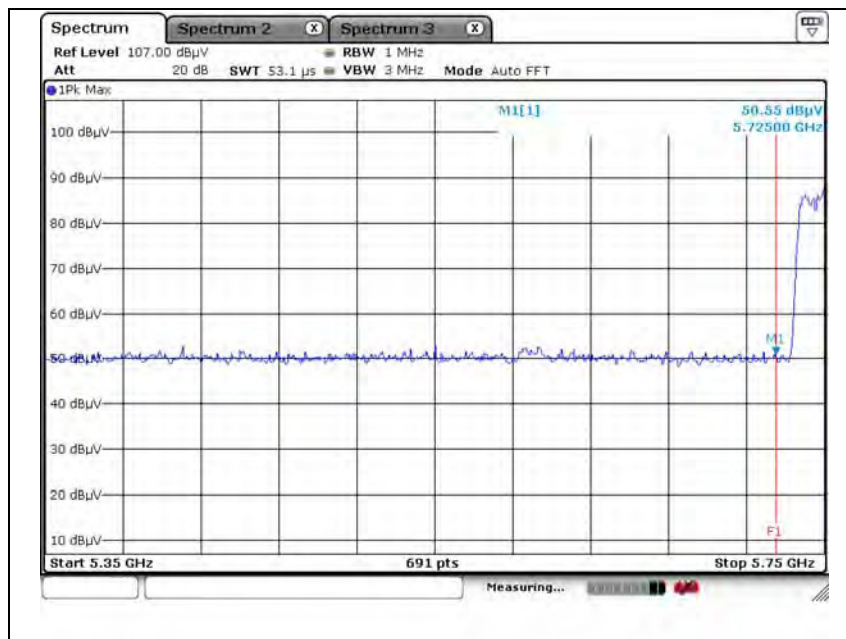
Detected mode: Peak, Ver



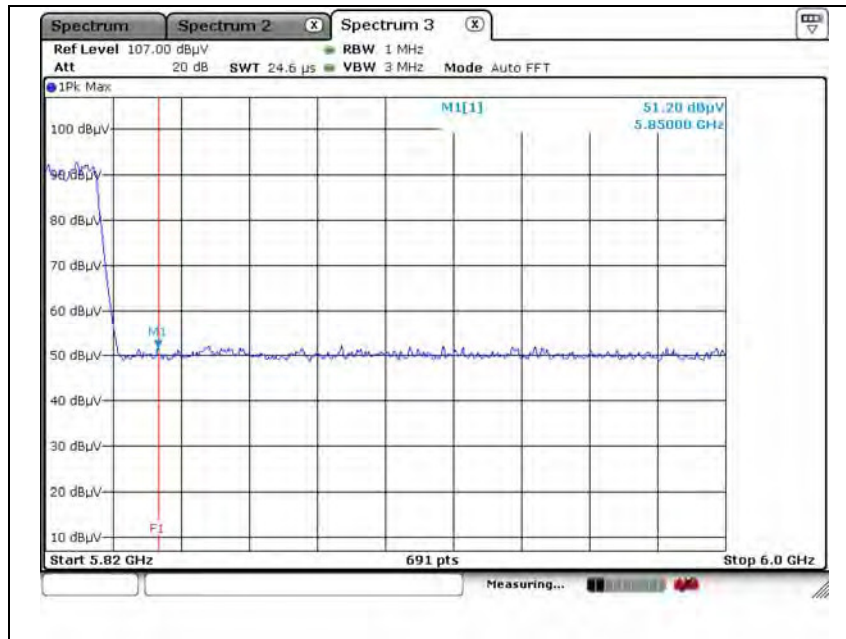
Mode: UNII-3 (HT20) (2)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 149
Detected mode: Peak, Hor



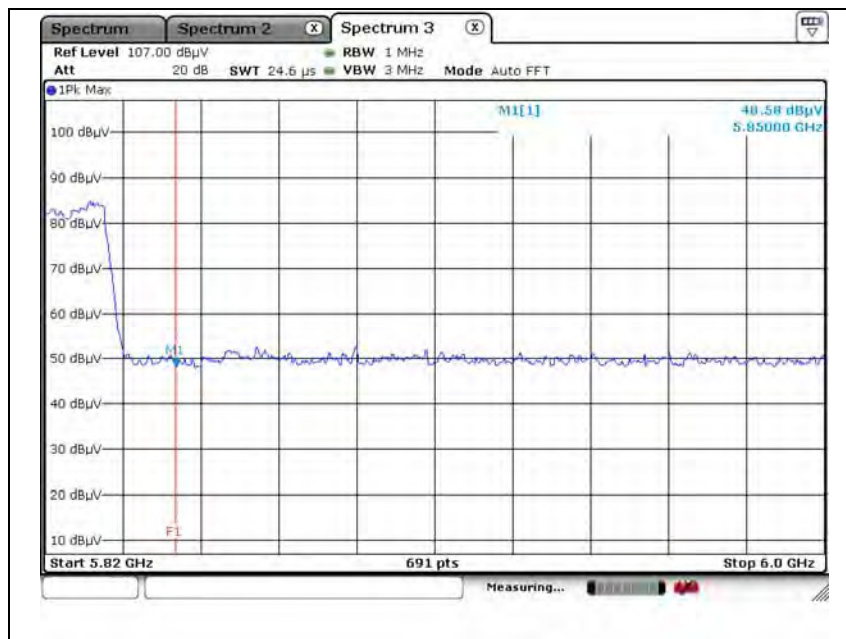
Detected mode: Peak, Ver



Mode: UNII-3 (HT20) (1)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 165
Detected mode: Peak, Hor

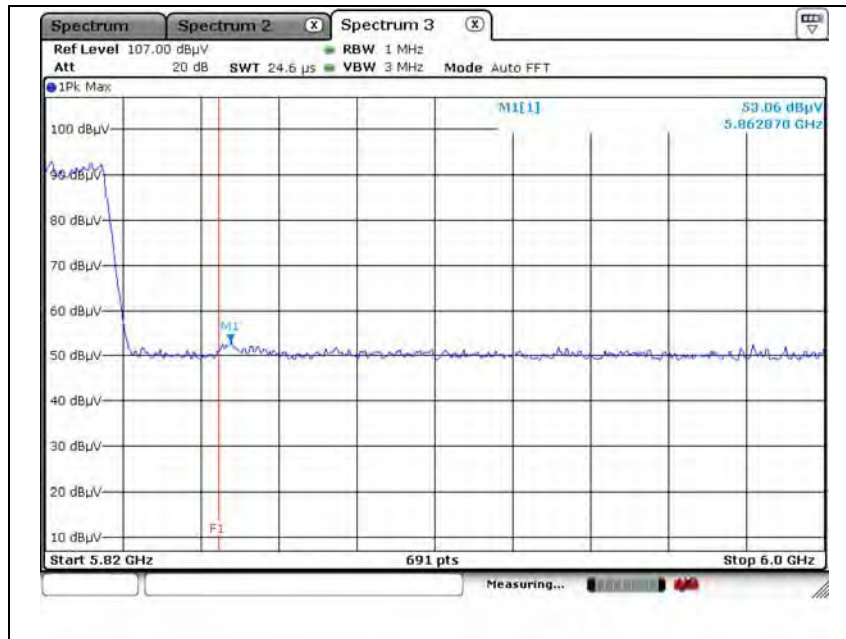


Detected mode: Peak, Ver

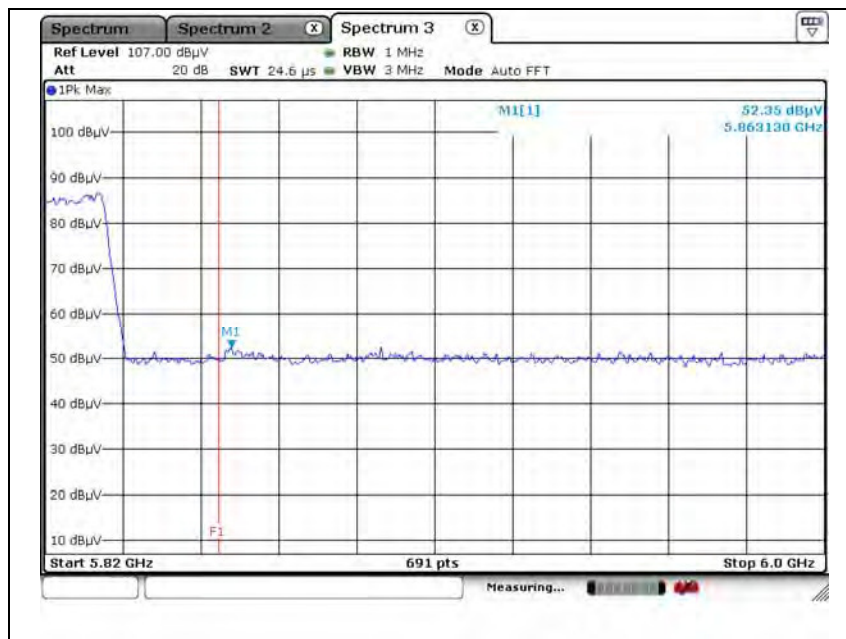


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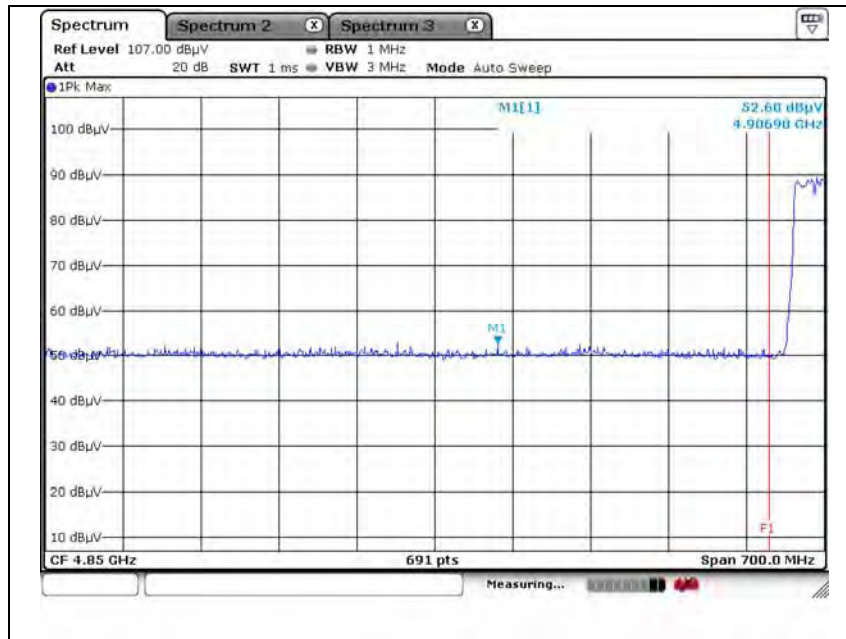
Mode: UNII-3 (HT20) (2)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 165
Detected mode: Peak, Hor



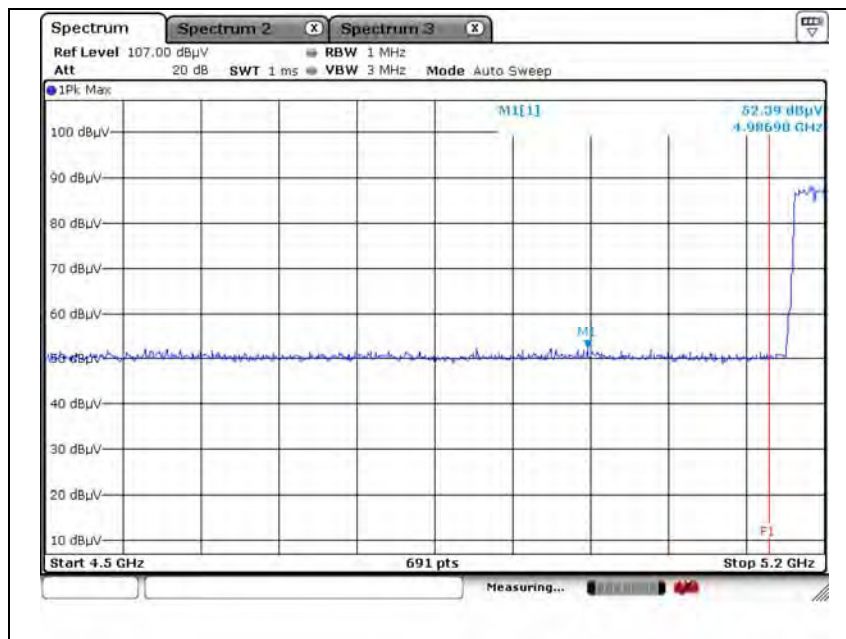
Detected mode: Peak, Ver



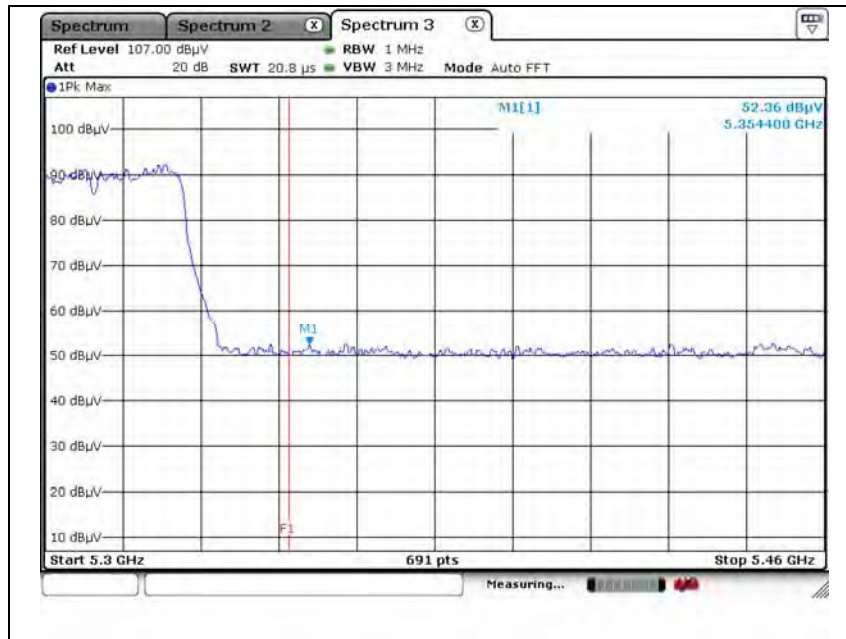
Mode: UNII-1 (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 38
Detected mode: Peak, Hor



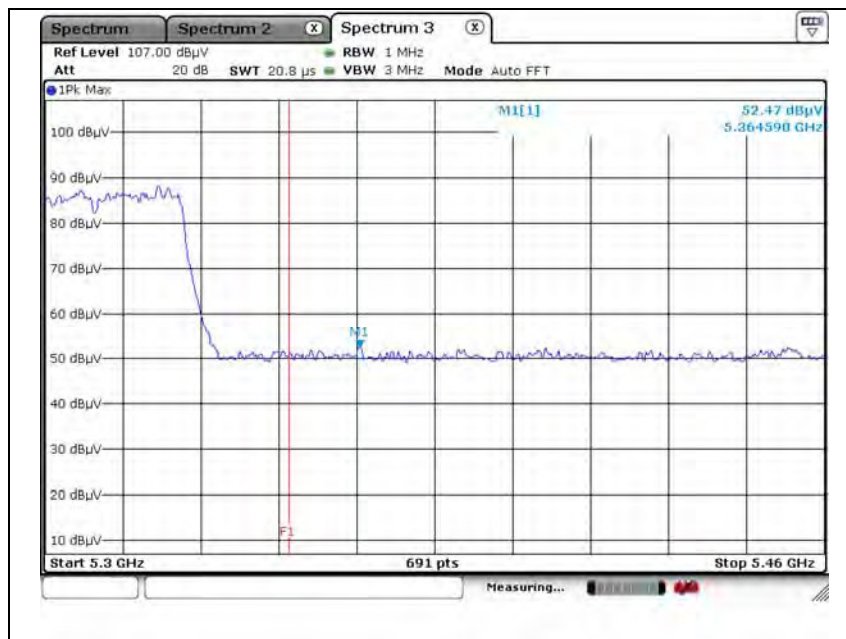
Detected mode: Peak, Ver



Mode: UNII-2A (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 62
Detected mode: Peak, Hor

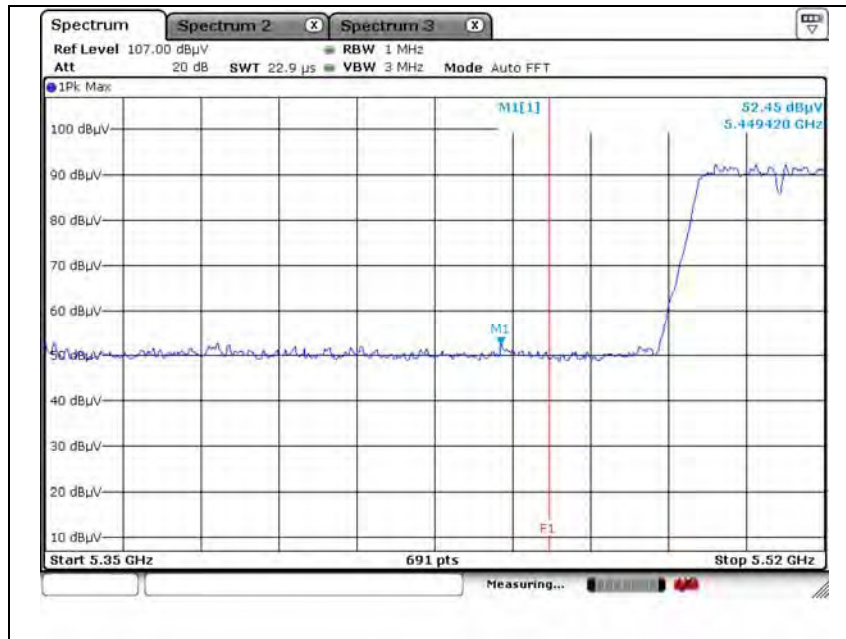


Detected mode: Peak, Ver

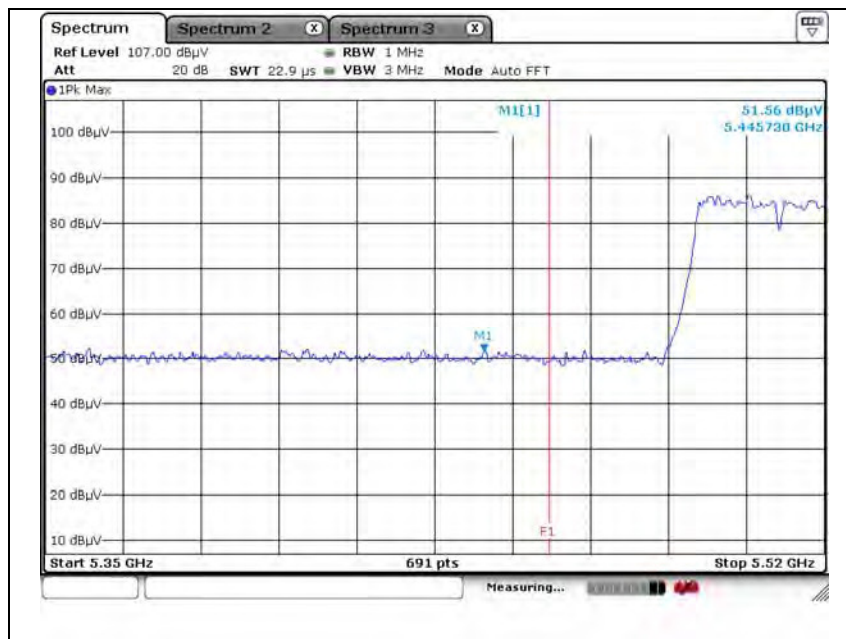


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Mode: UNII-2C (HT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 102
Detected mode: Peak, Hor

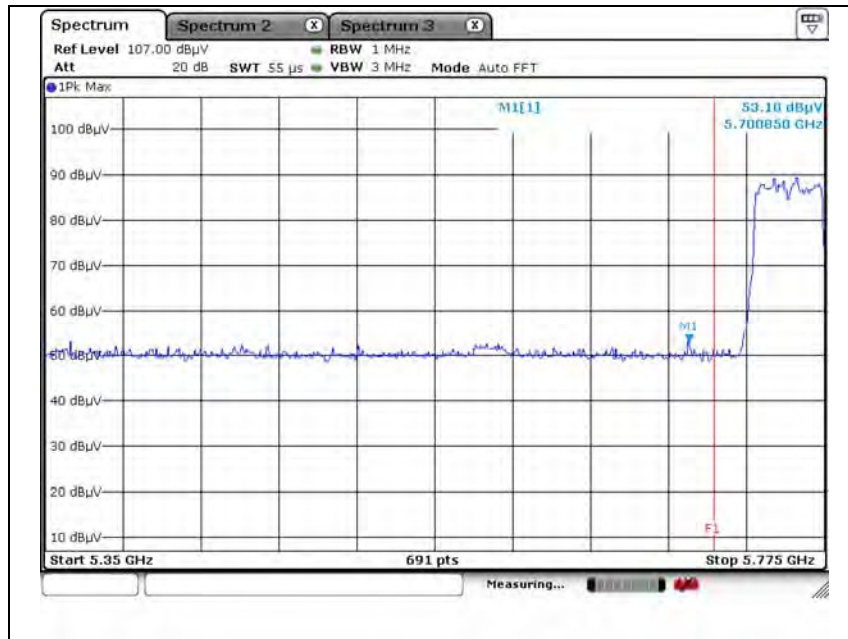


Detected mode: Peak, Ver

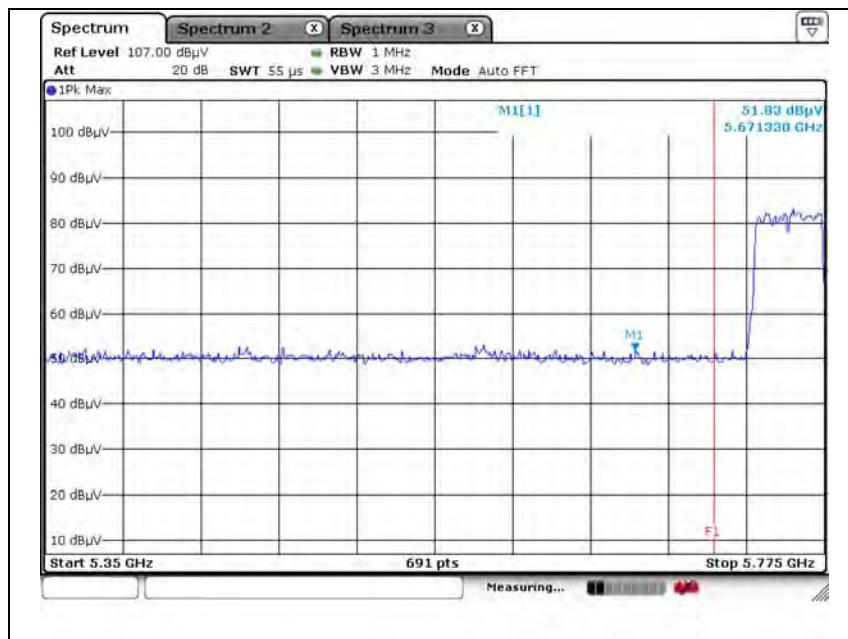


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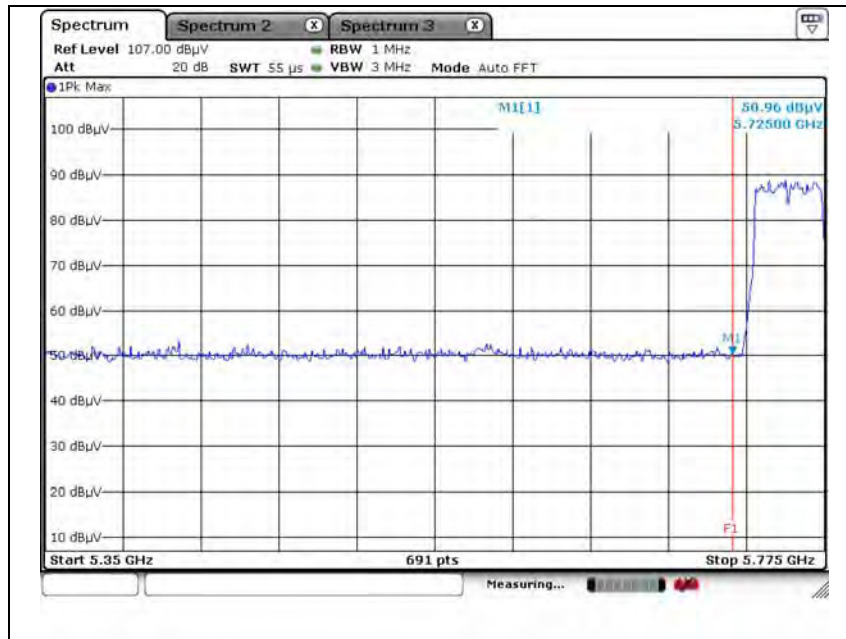
Mode: UNII-3 (HT40) (1)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 151
Detected mode: Peak, Hor



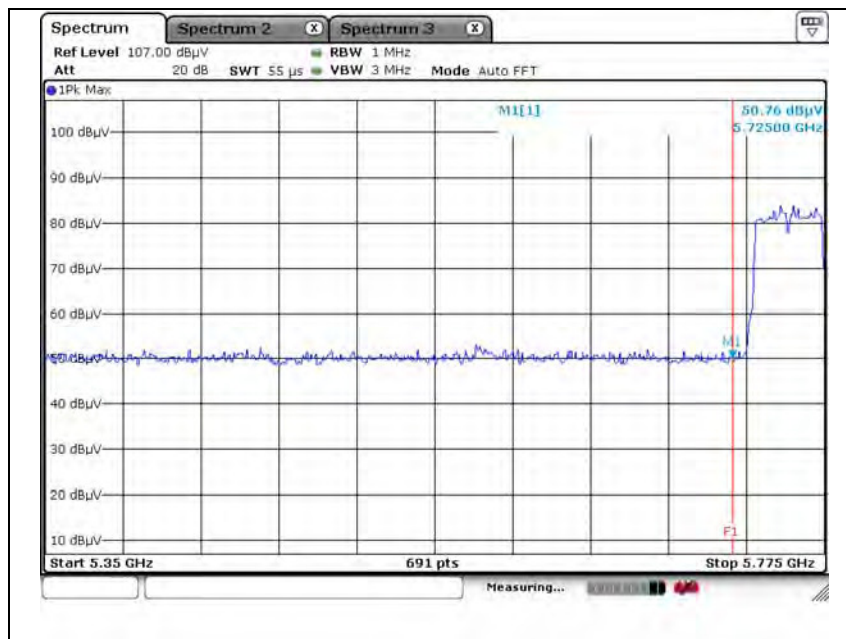
Detected mode: Peak, Ver



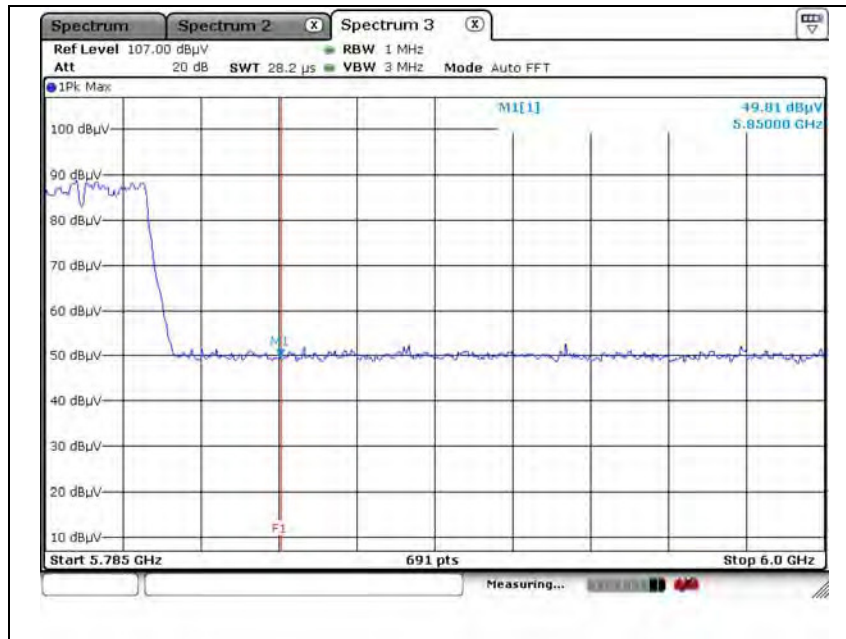
Mode: UNII-3 (HT40) (2)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 151
Detected mode: Peak, Hor



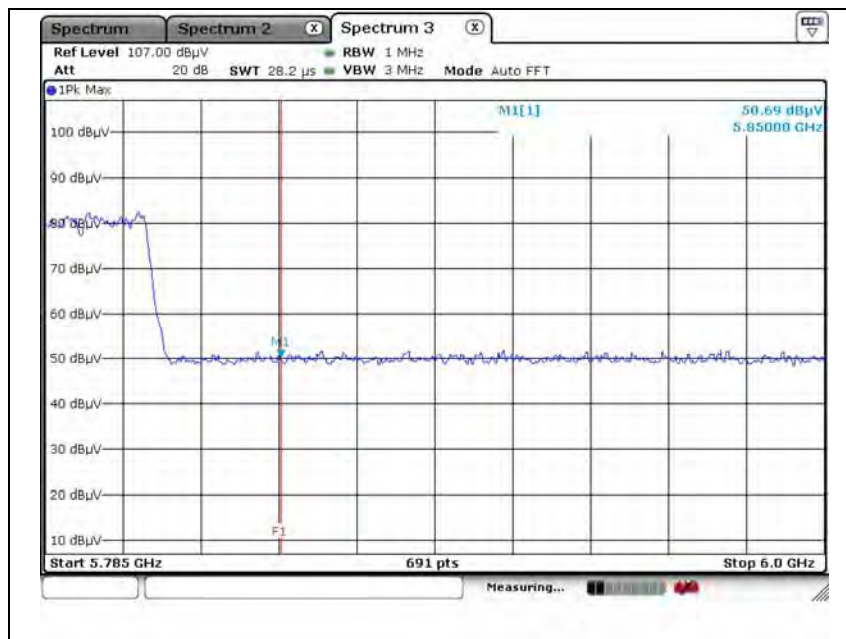
Detected mode: Peak, Ver



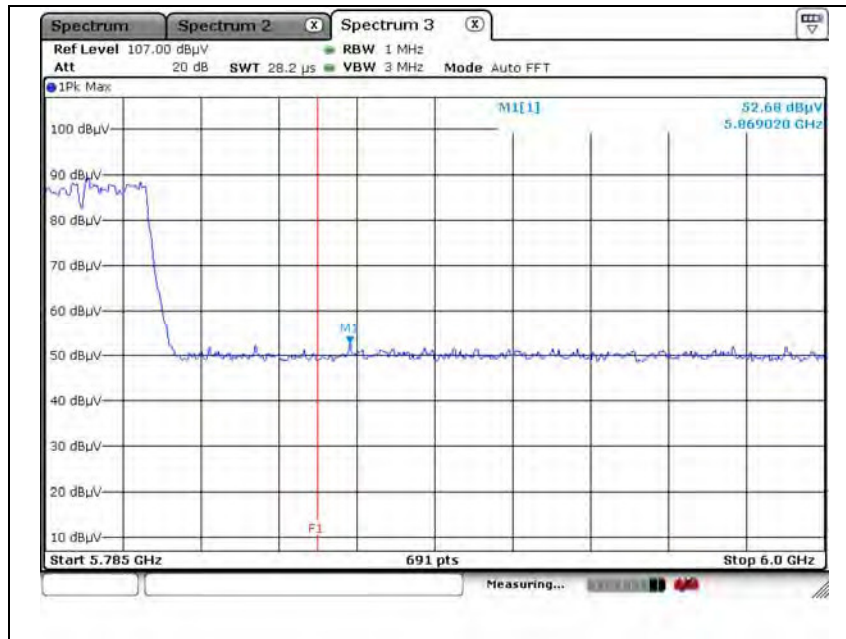
Mode: UNII-3 (HT40) (1)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 159
Detected mode: Peak, Hor



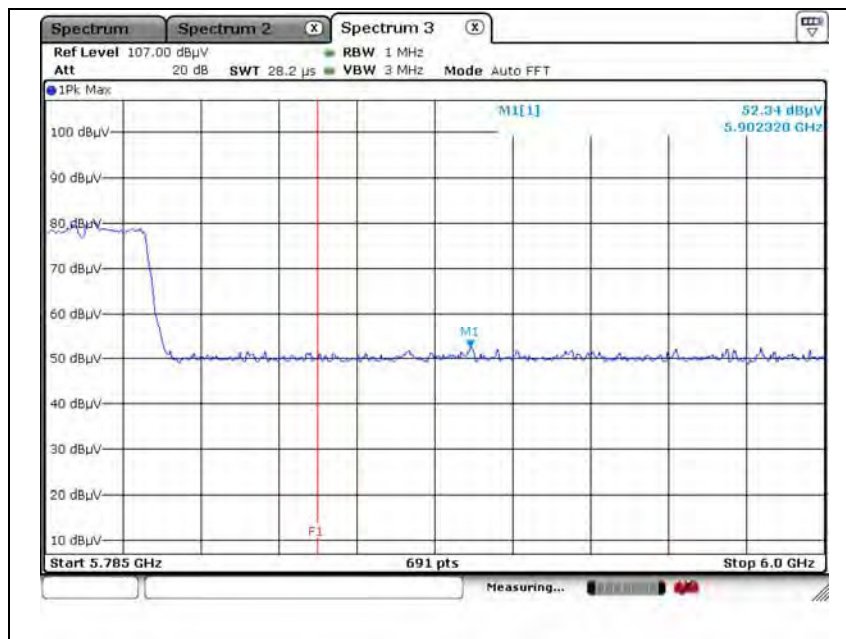
Detected mode: Peak, Ver



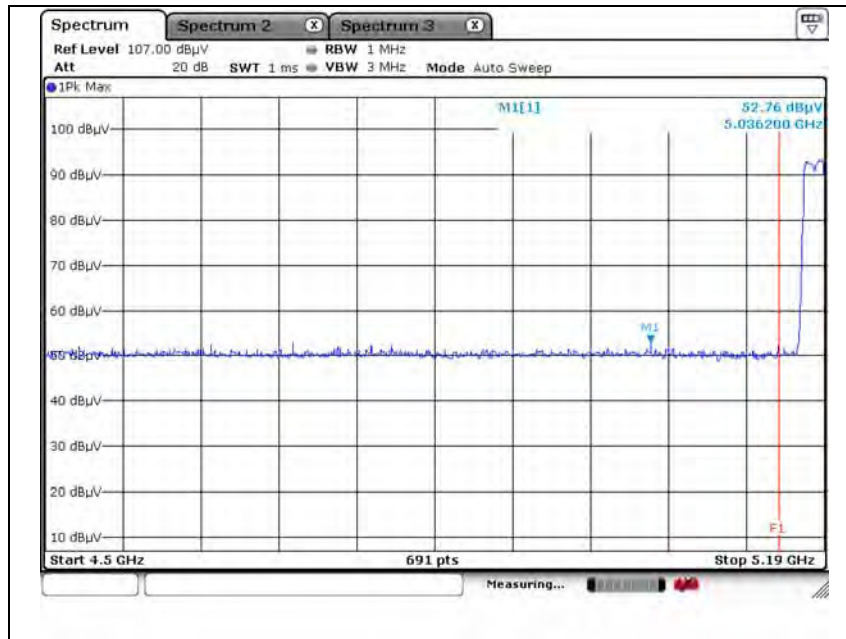
Mode: UNII-3 (HT40) (2)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 159
Detected mode: Peak, Hor



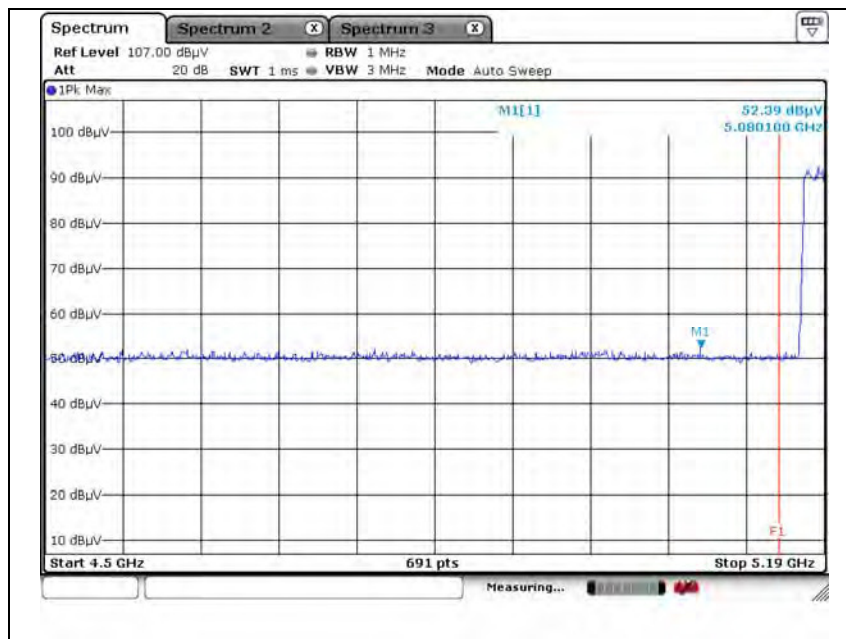
Detected mode: Peak, Ver



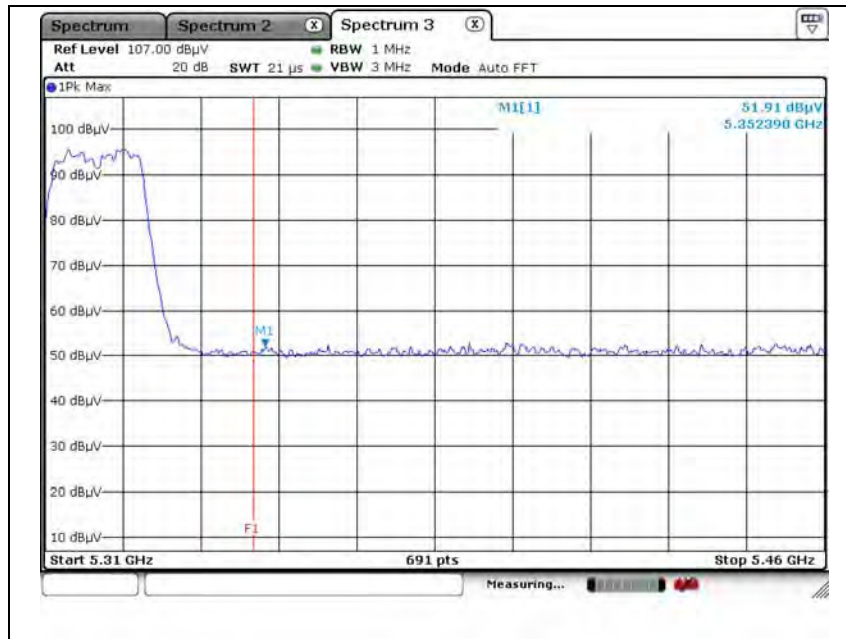
Mode: UNII-1 (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 36
Detected mode: Peak, Hor



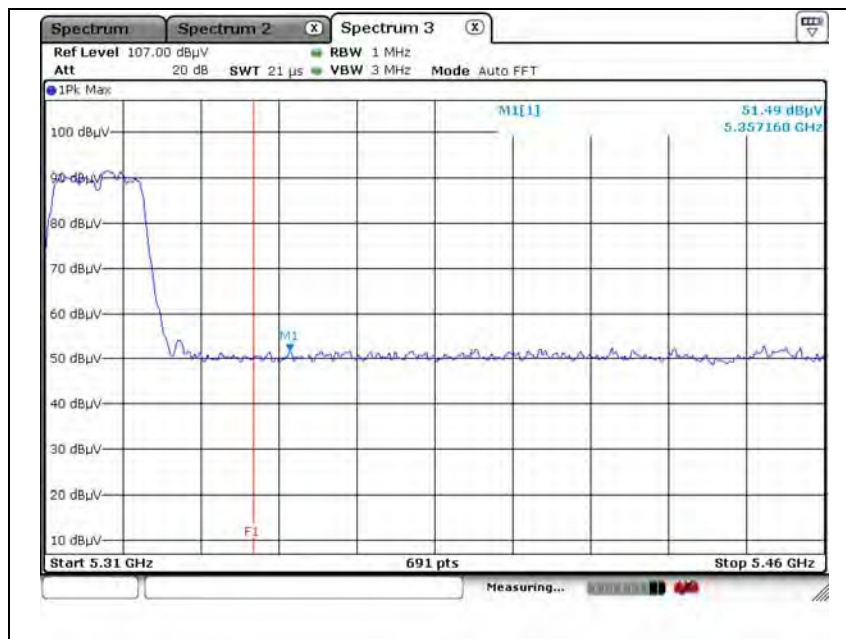
Detected mode: Peak, Ver



Mode: UNII-2A (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 64
Detected mode: Peak, Hor

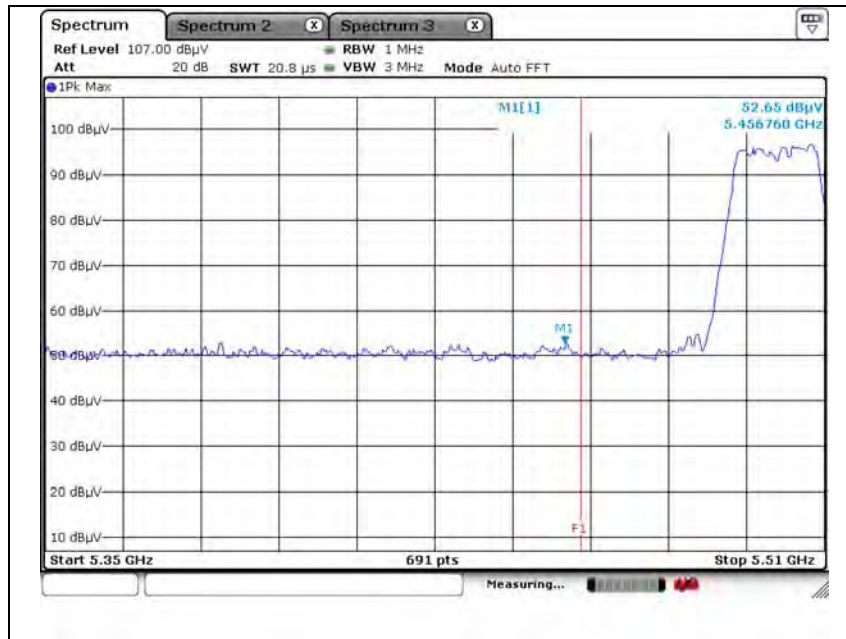


Detected mode: Peak, Ver

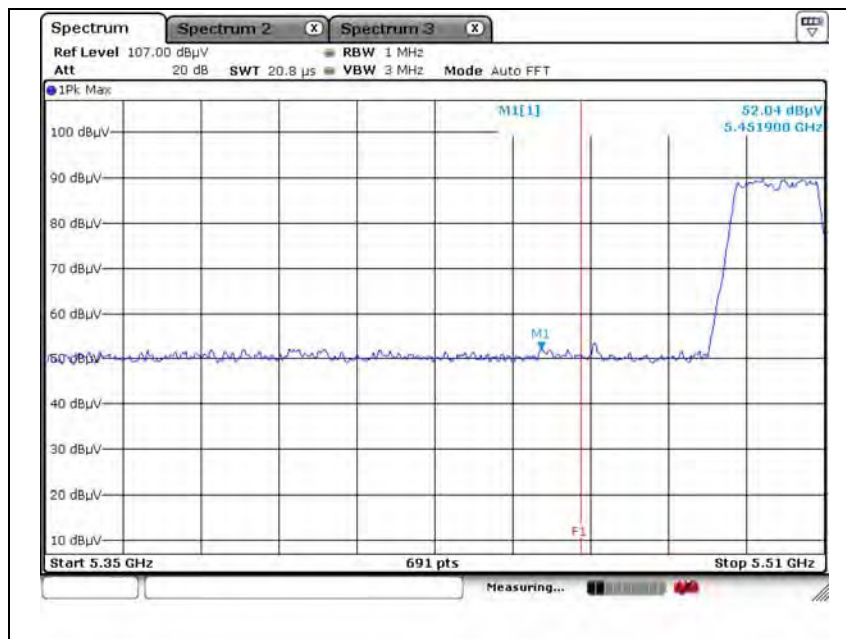


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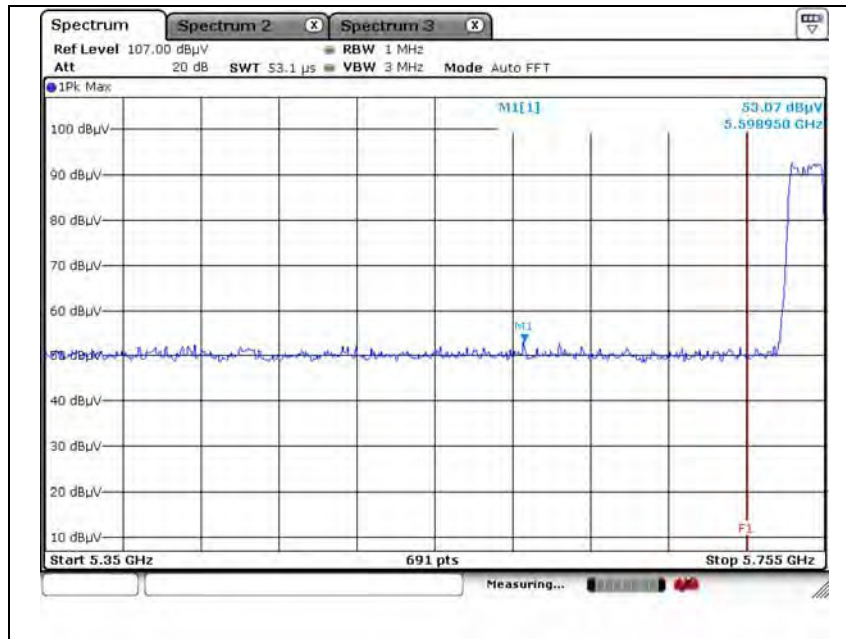
Mode: UNII-2C (VHT20)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 100
Detected mode: Peak, Hor



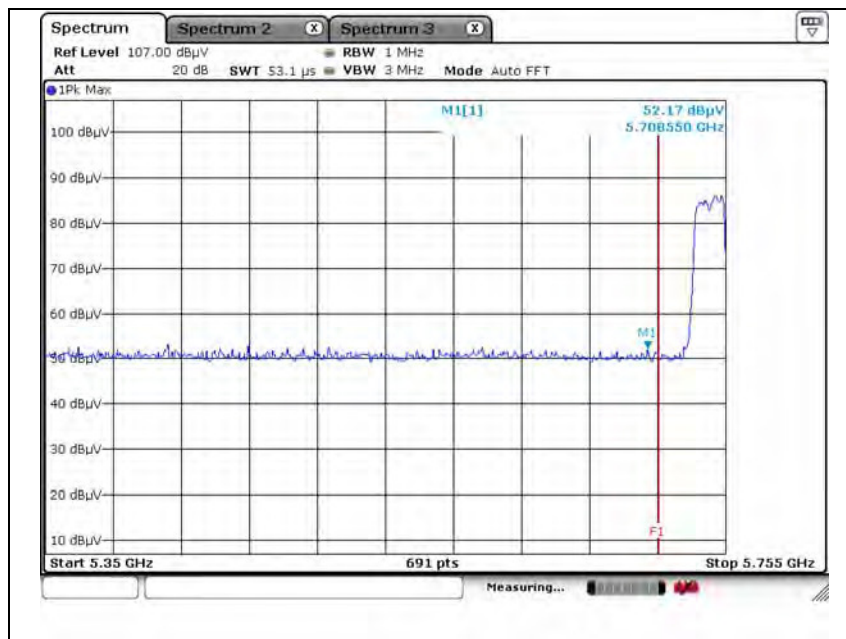
Detected mode: Peak, Ver



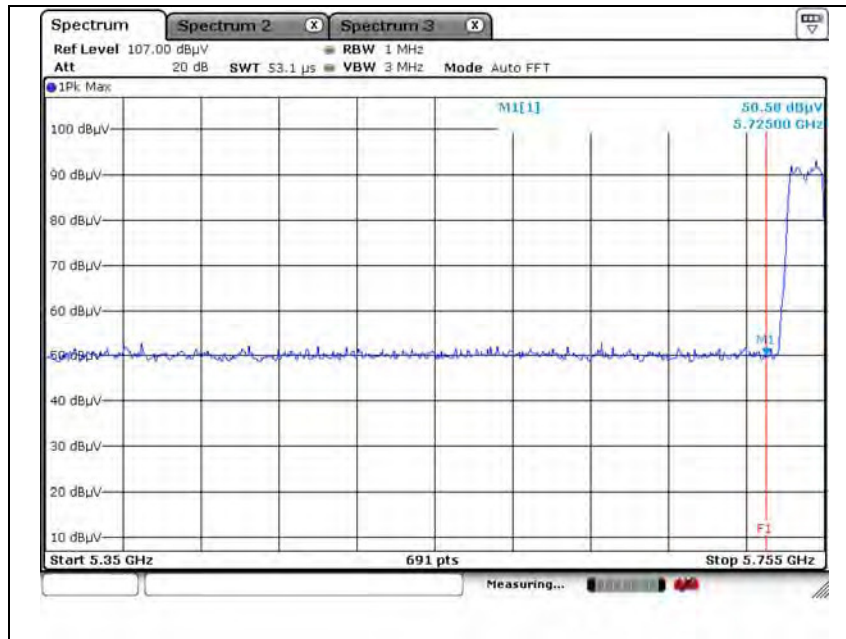
Mode: UNII-3 (VHT20) (1)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 149
Detected mode: Peak, Hor



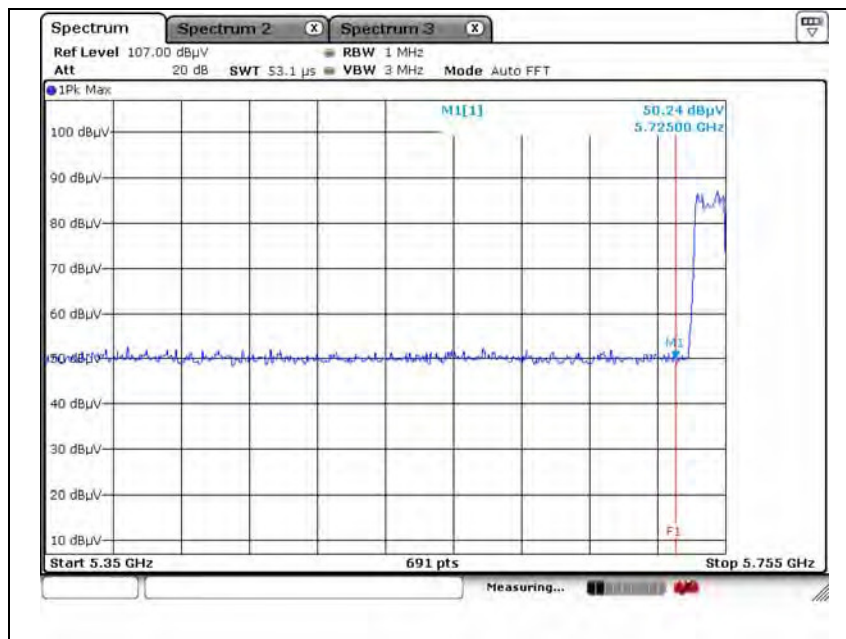
Detected mode: Peak, Ver



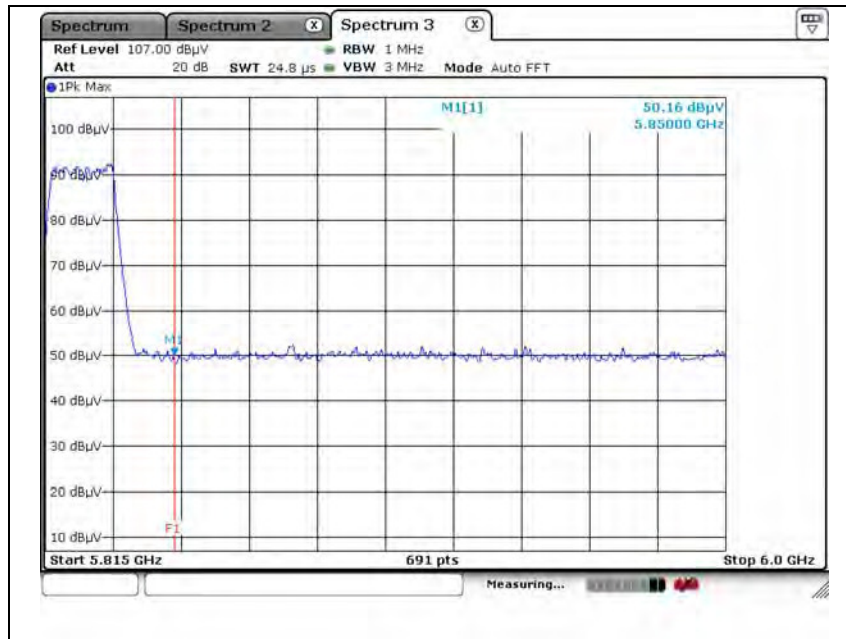
Mode: UNII-3 (VHT20) (2)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 149
Detected mode: Peak, Hor



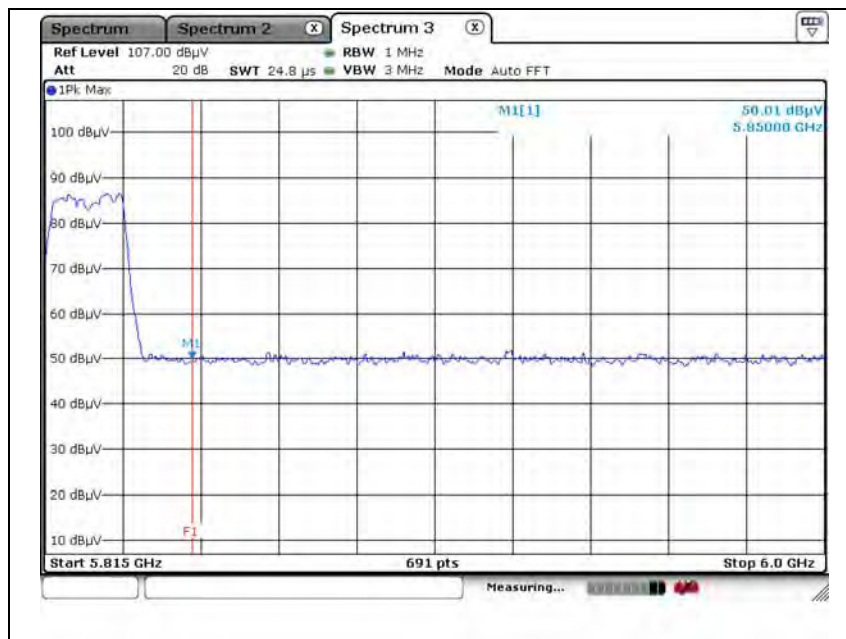
Detected mode: Peak, Ver



Mode: UNII-3 (VHT20) (1)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 165
Detected mode: Peak, Hor

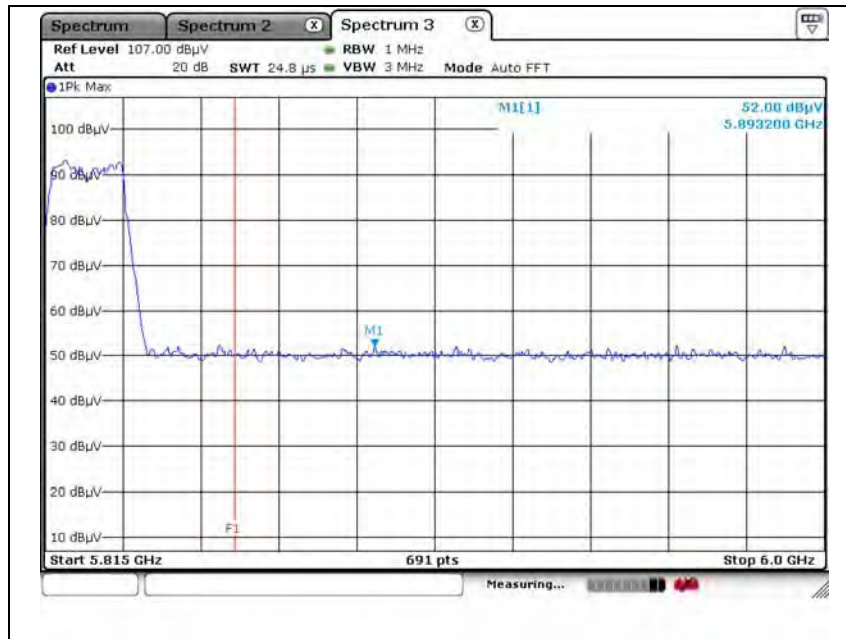


Detected mode: Peak, Ver

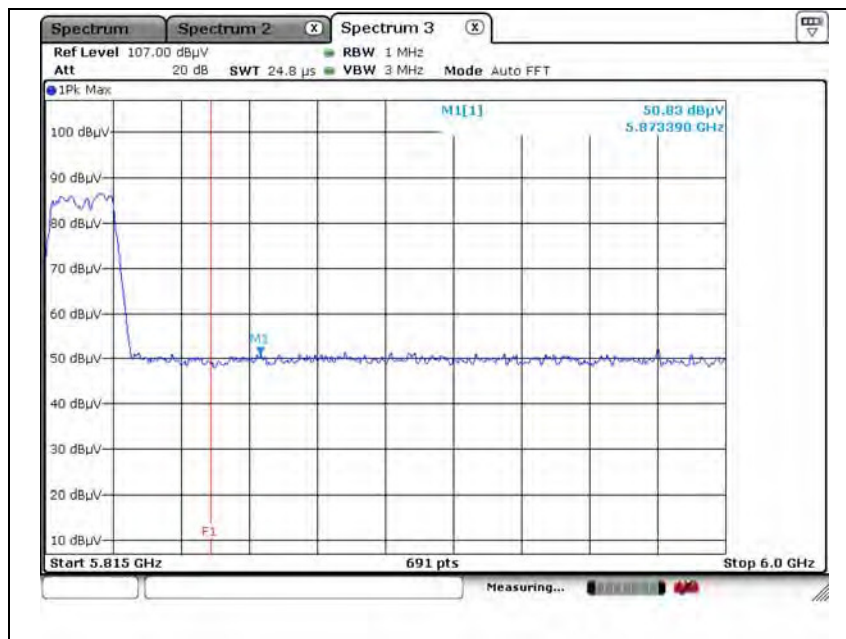


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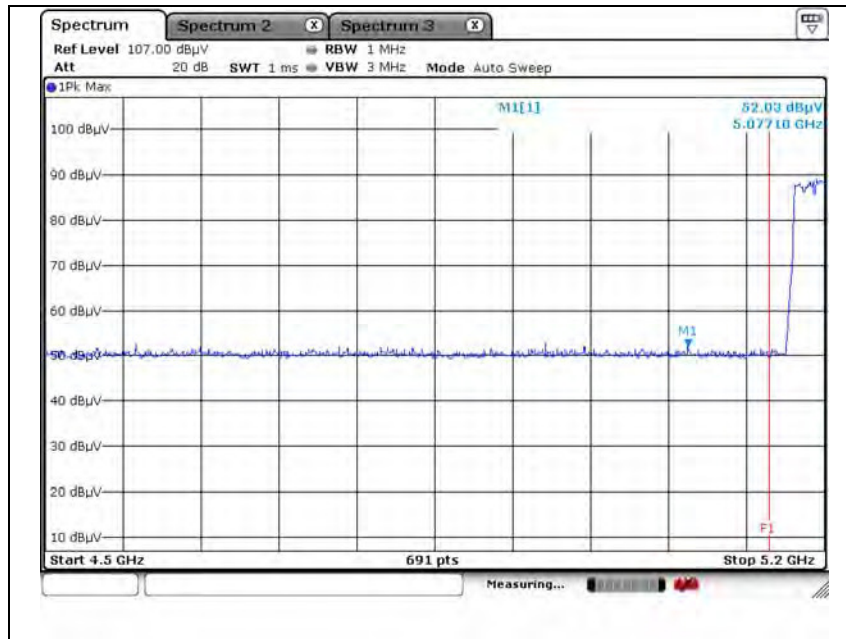
Mode: UNII-3 (VHT20) (2)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 165
Detected mode: Peak, Hor



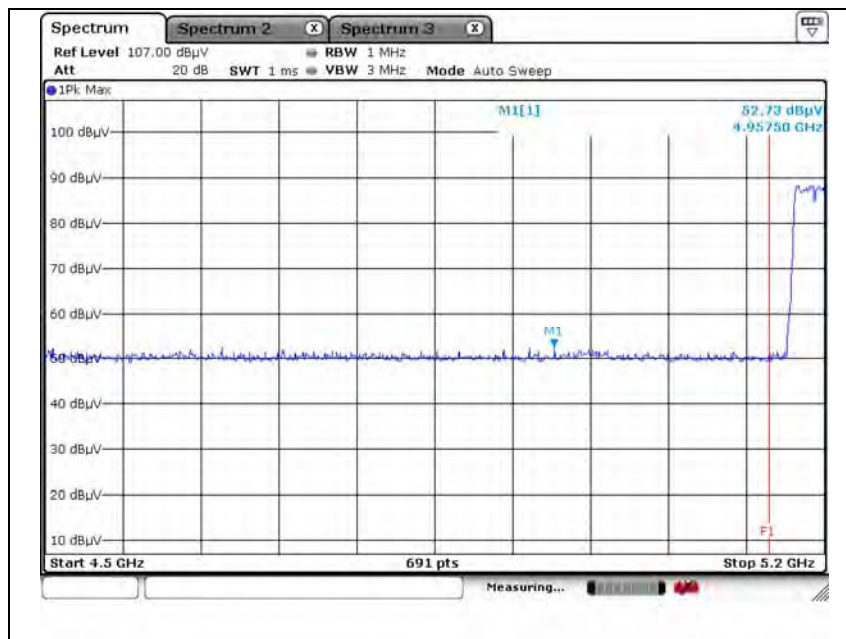
Detected mode: Peak, Ver



Mode: UNII-1 (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 38
Detected mode: Peak, Hor

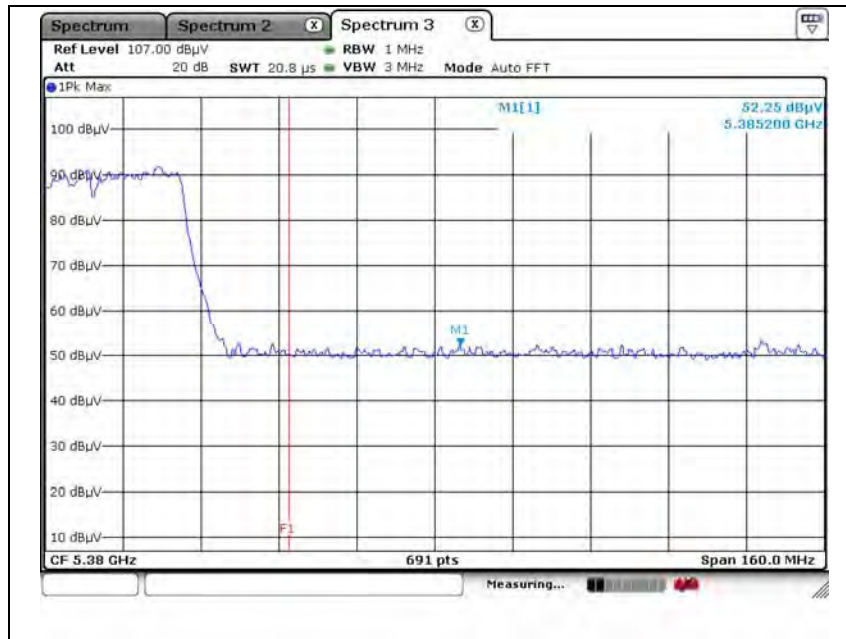


Detected mode: Peak, Ver

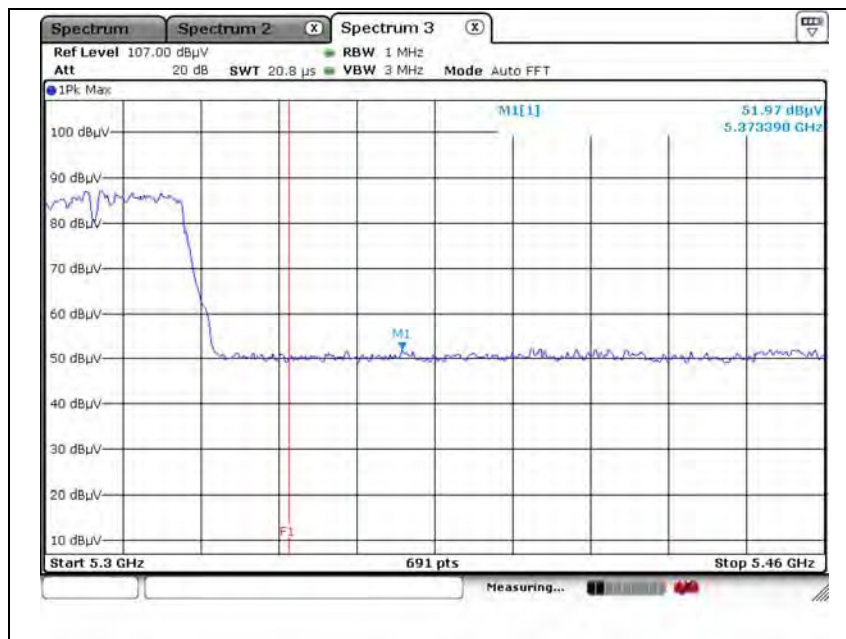


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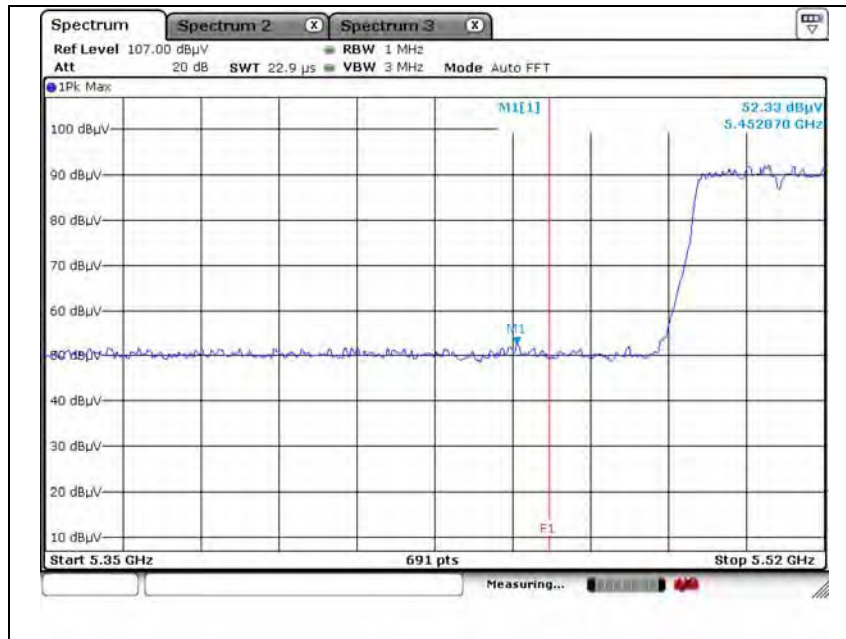
Mode: UNII-2A (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 62
Detected mode: Peak, Hor



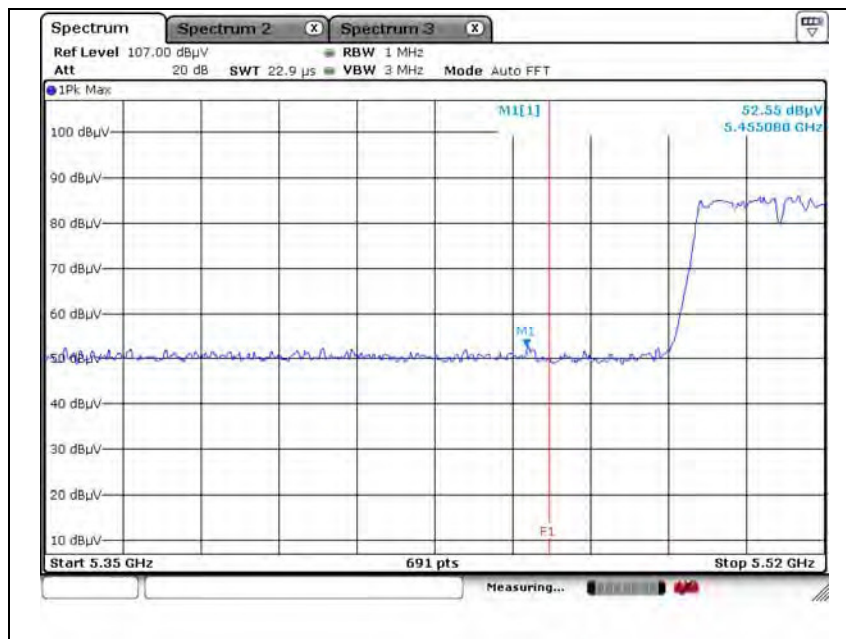
Detected mode: Peak, Ver



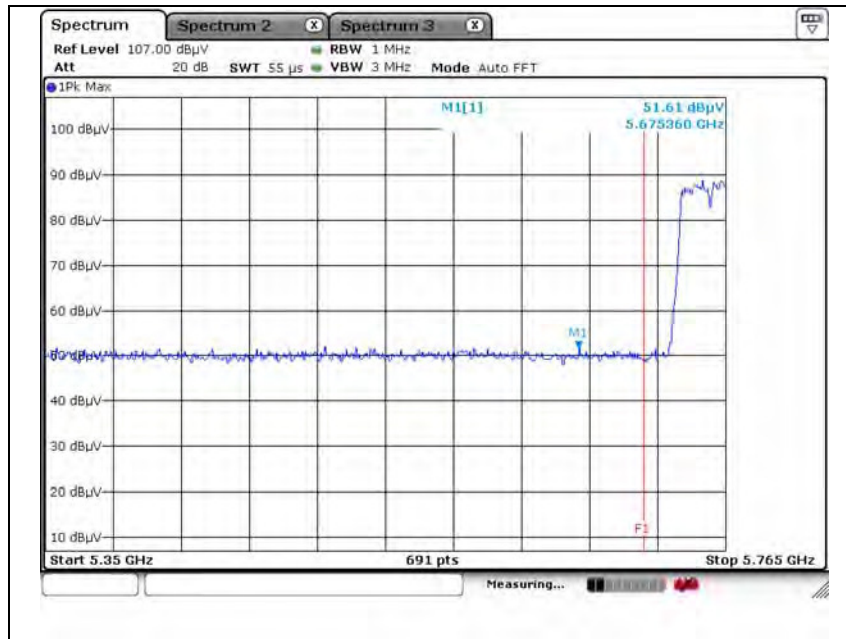
Mode: UNII-2C (VHT40)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 102
Detected mode: Peak, Hor



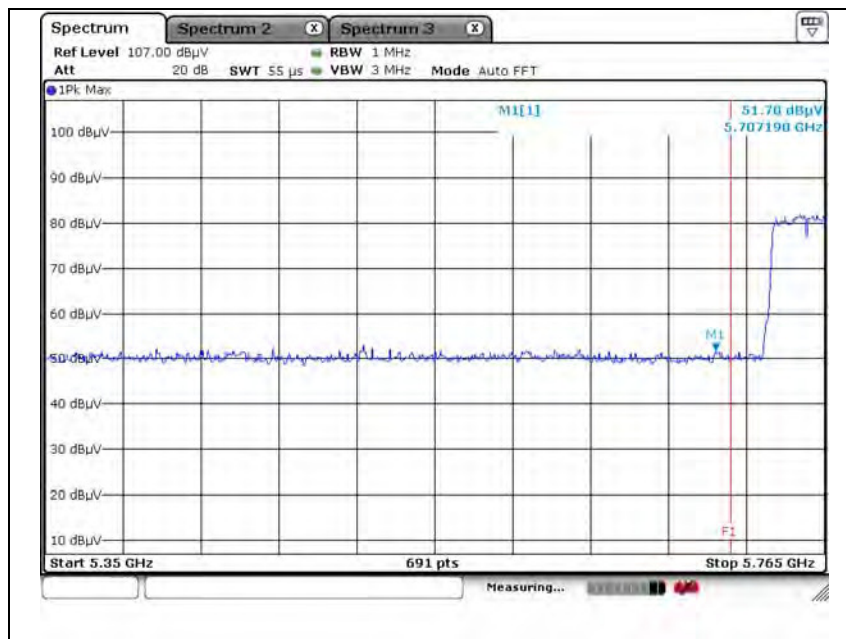
Detected mode: Peak, Ver



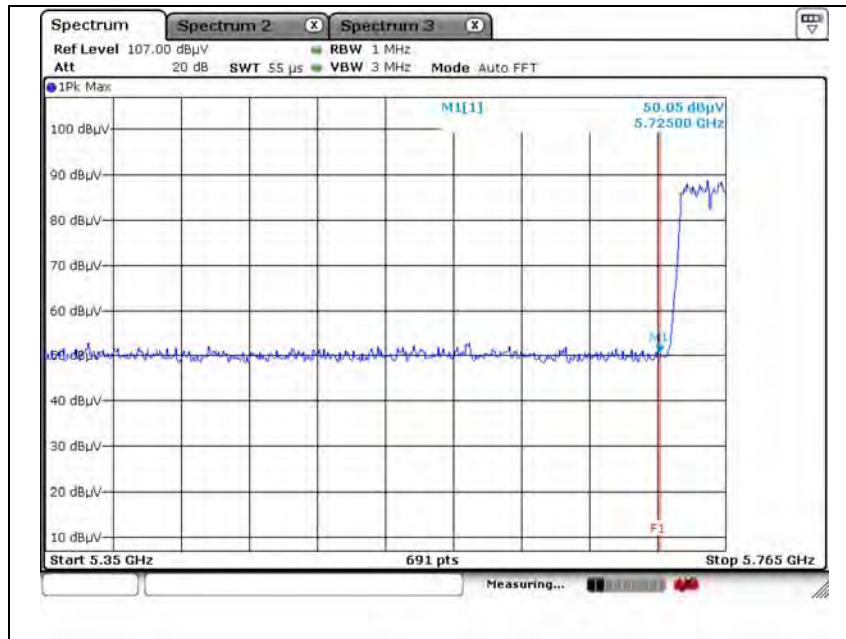
Mode: UNII-3 (VHT40) (1)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 151
Detected mode: Peak, Hor



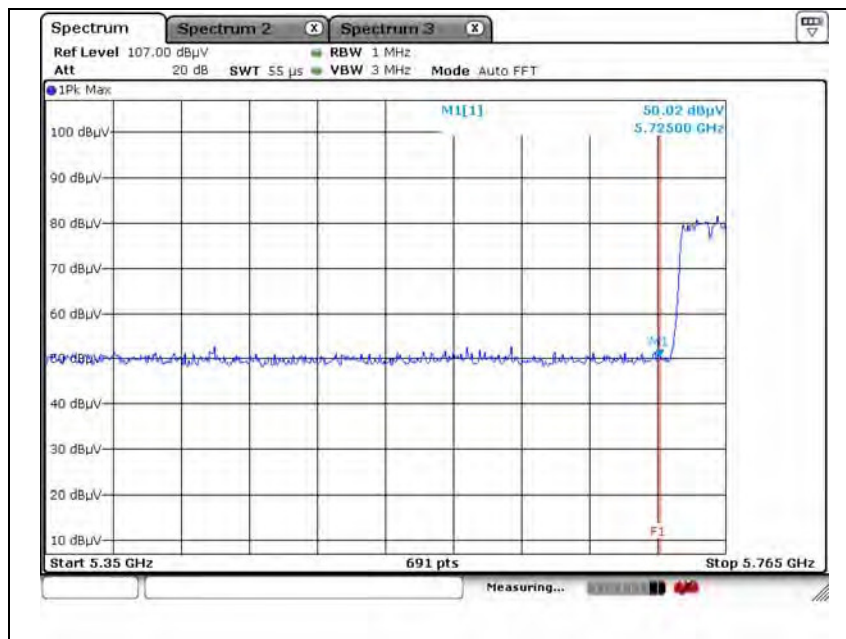
Detected mode: Peak, Ver



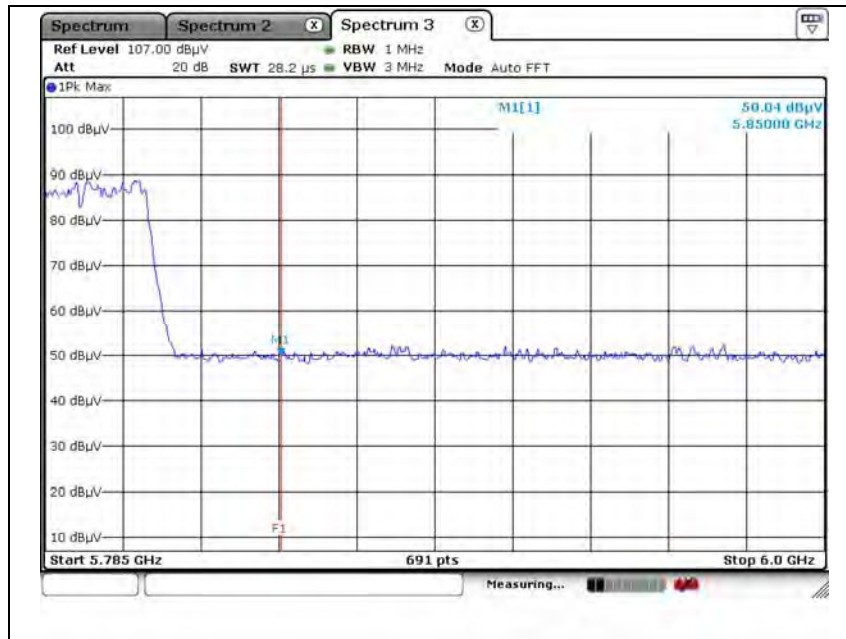
Mode: UNII-3 (VHT40) (2)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 151
Detected mode: Peak, Hor



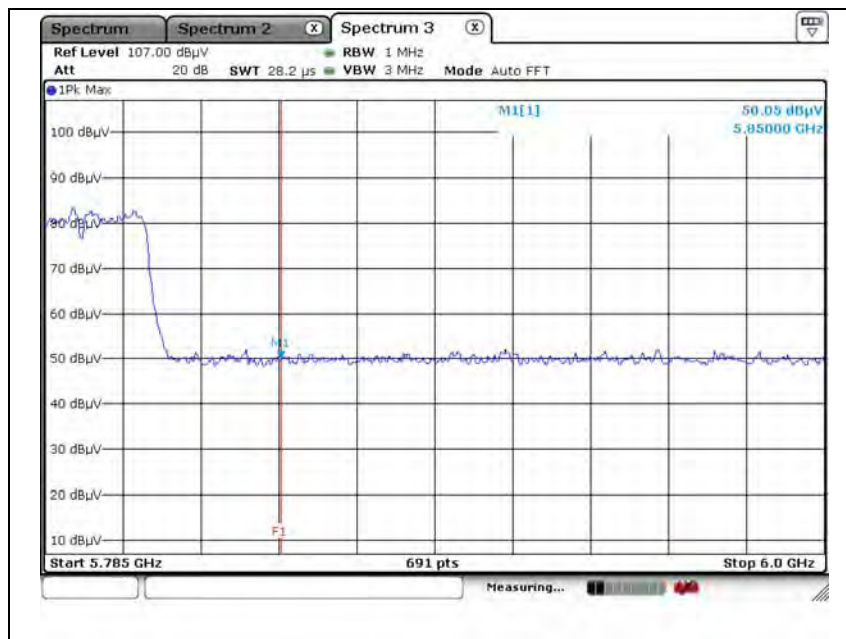
Detected mode: Peak, Ver



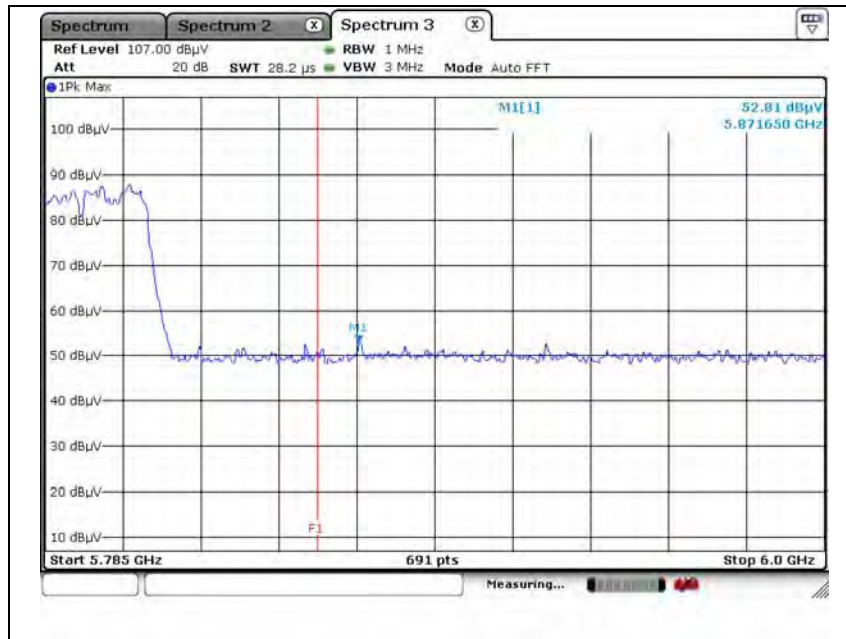
Mode: UNII-3 (VHT40) (1)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 159
Detected mode: Peak, Hor



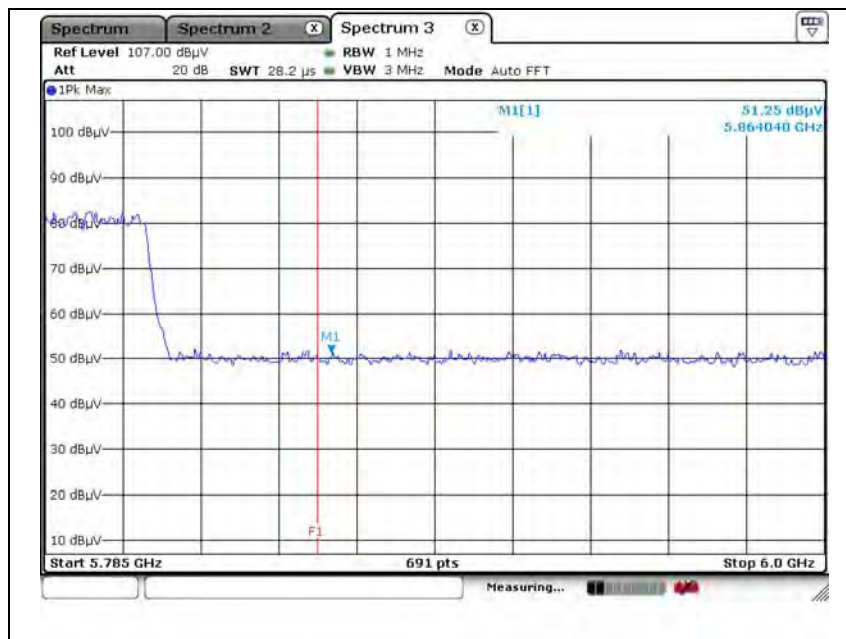
Detected mode: Peak, Ver



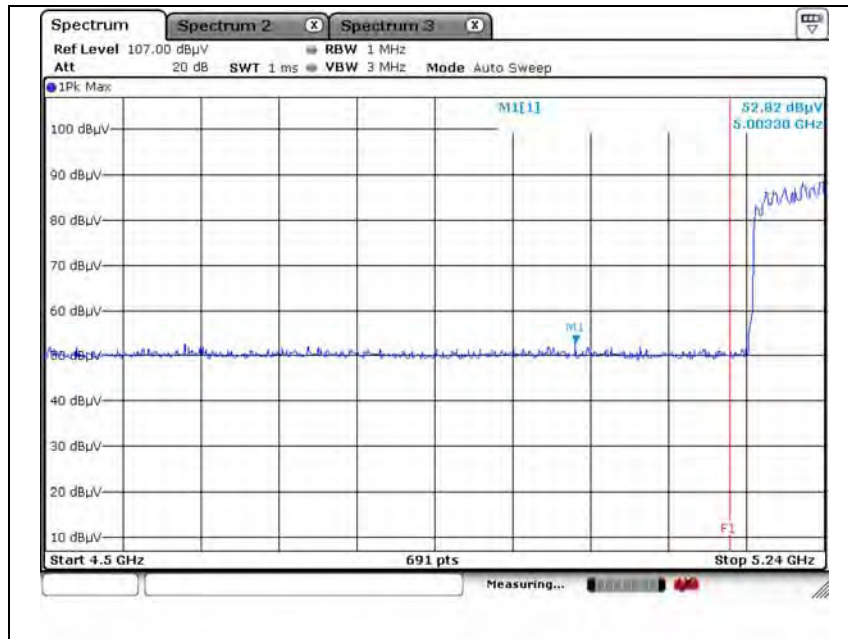
Mode: UNII-3 (VHT40) (2)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 159
Detected mode: Peak, Hor



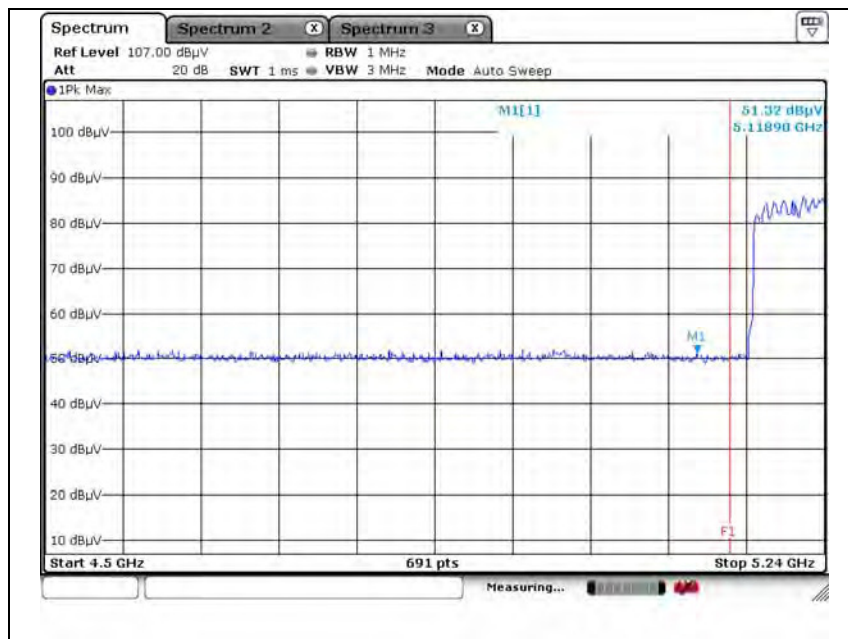
Detected mode: Peak, Ver



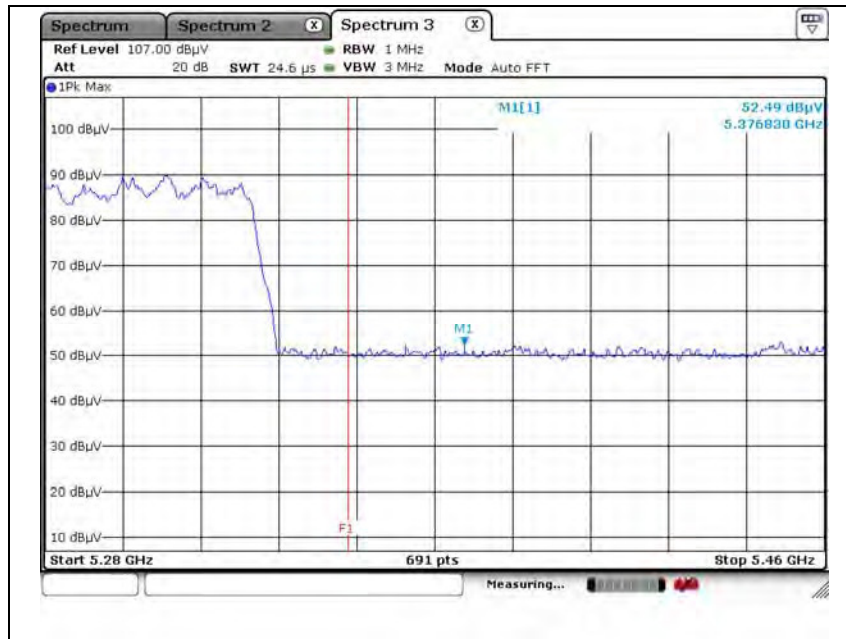
Mode: UNII-1 (VHT80)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 42
Detected mode: Peak, Hor



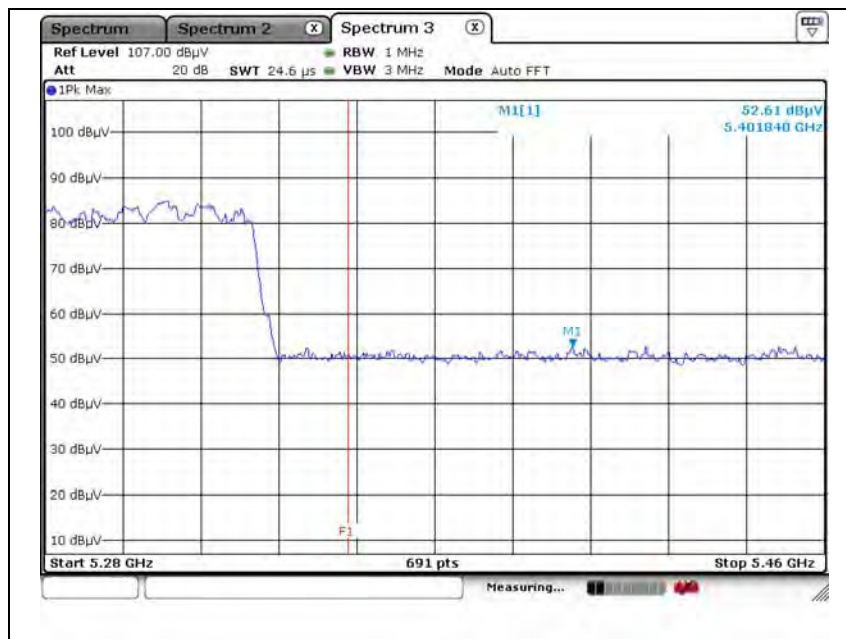
Detected mode: Peak, Ver



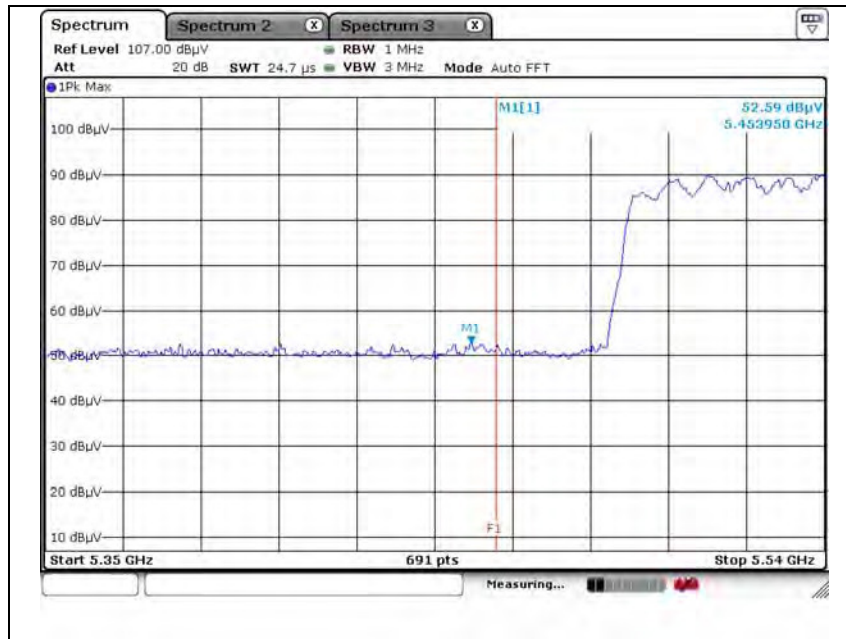
Mode: UNII-2A (VHT80)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 58
Detected mode: Peak, Hor



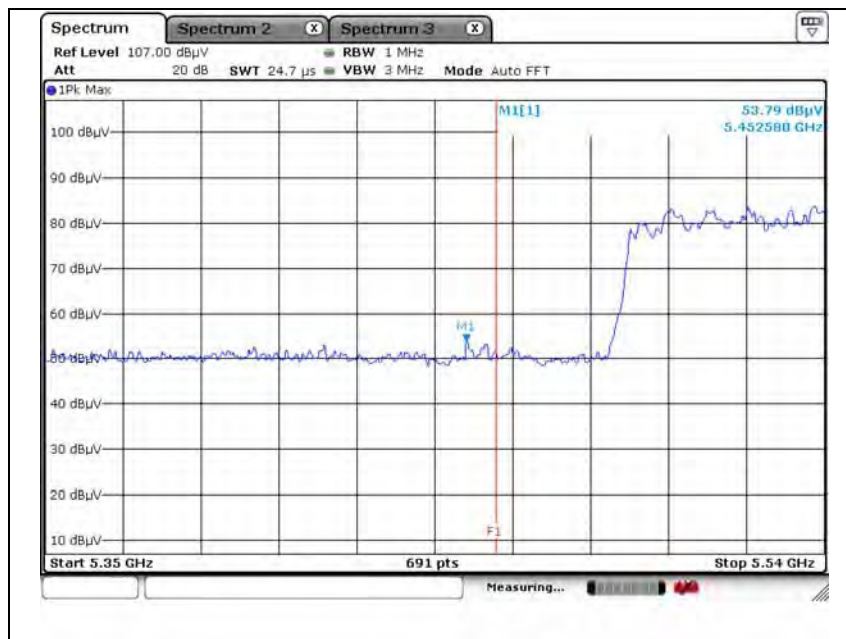
Detected mode: Peak, Ver



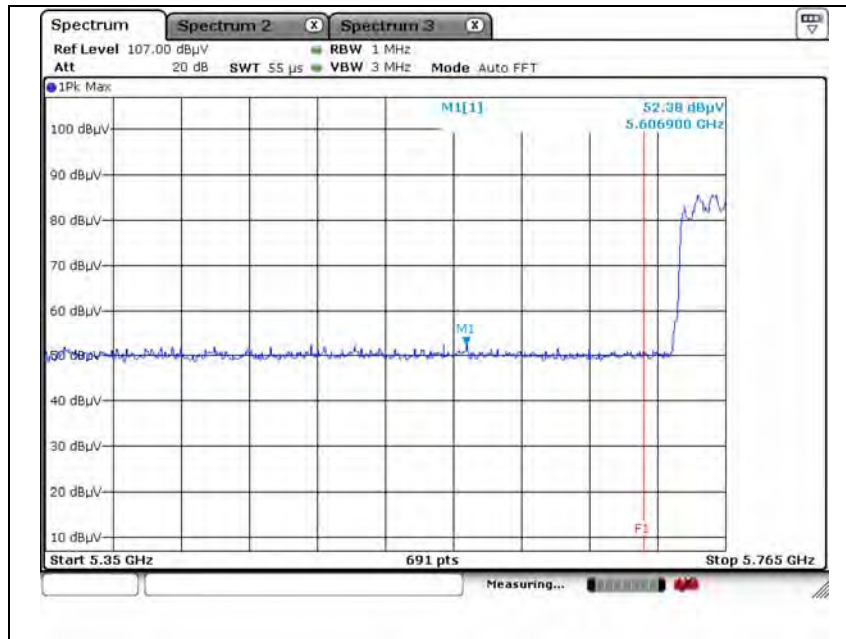
Mode: UNII-2C (VHT80)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 106
Detected mode: Peak, Hor



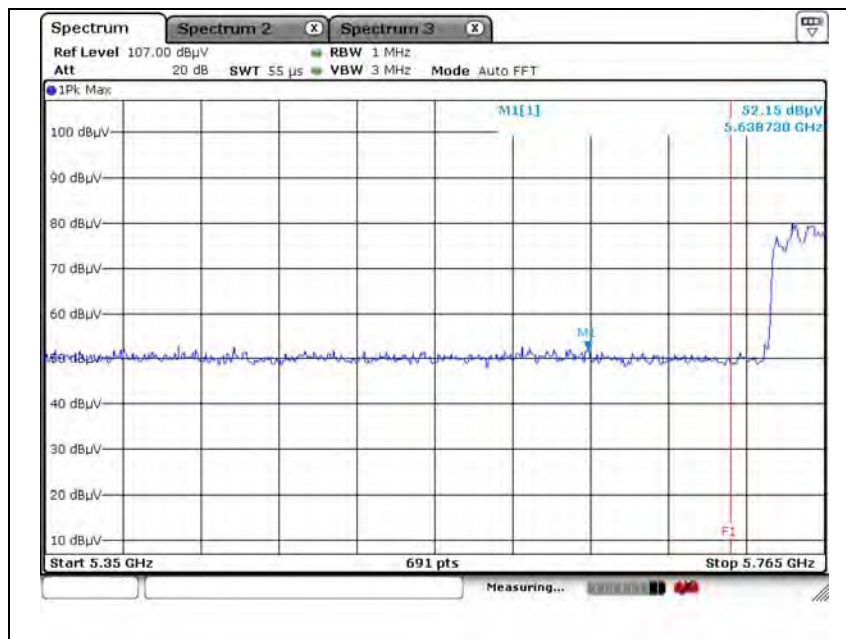
Detected mode: Peak, Ver



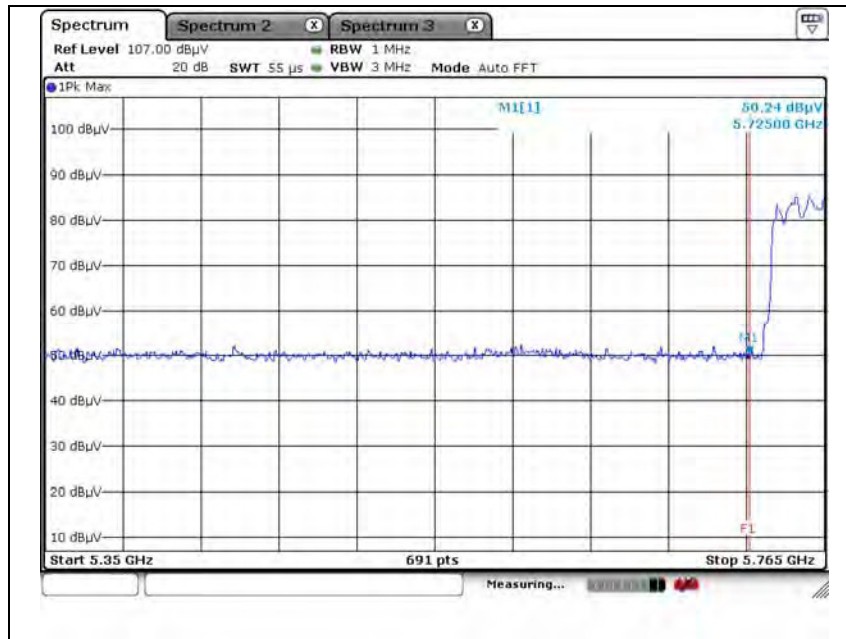
Mode: UNII-3 (VHT80) (1)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 151
Detected mode: Peak, Hor



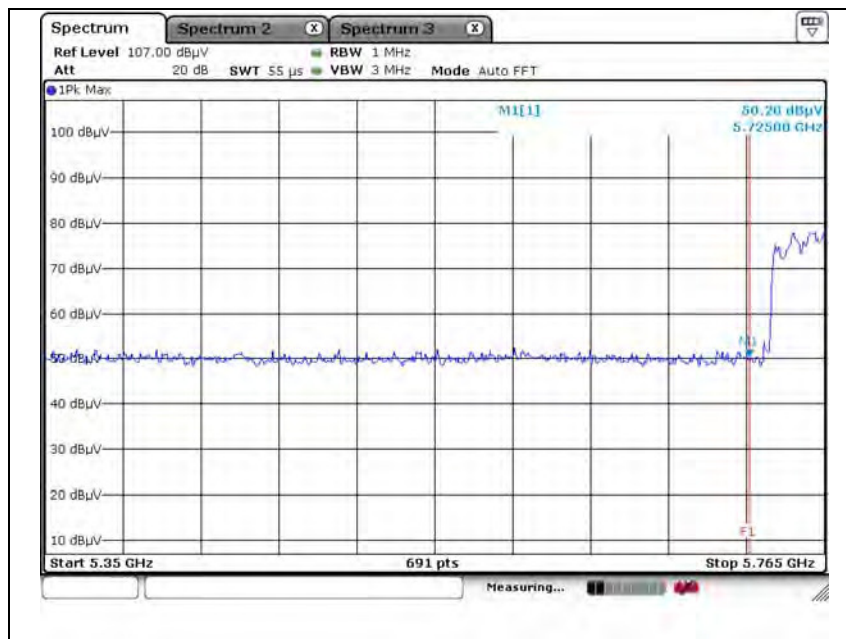
Detected mode: Peak, Ver



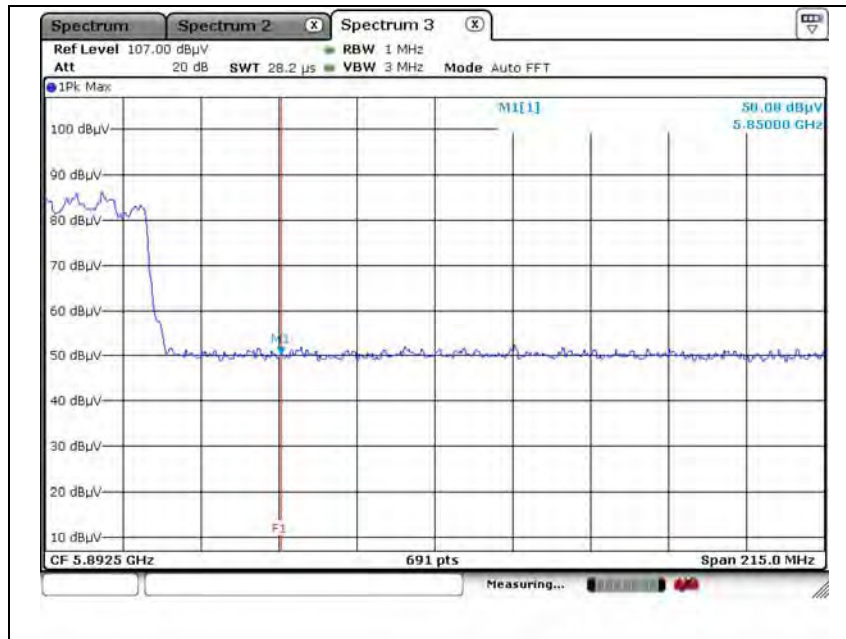
Mode: UNII-3 (VHT80) (2)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 151
Detected mode: Peak, Hor



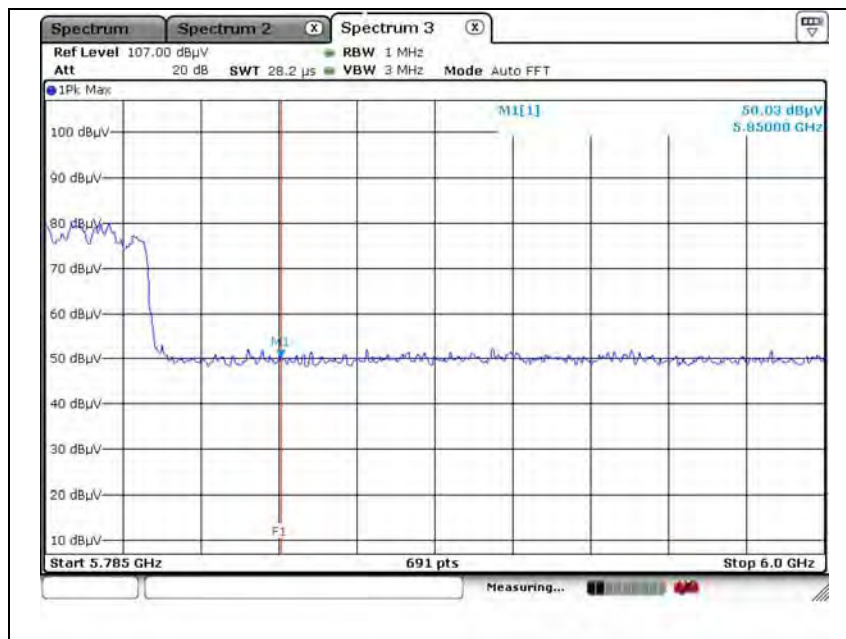
Detected mode: Peak, Ver



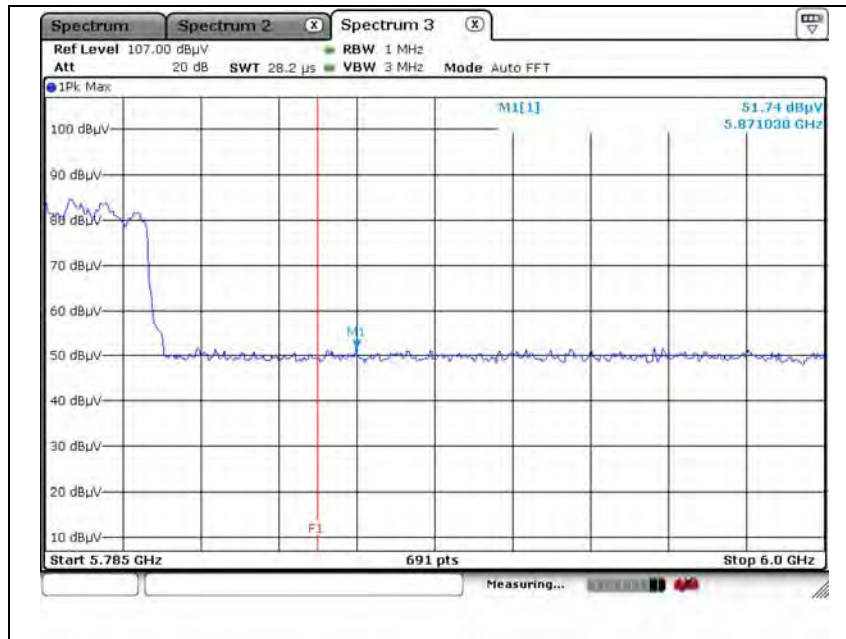
Mode: UNII-3 (VHT80) (3)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 151
Detected mode: Peak, Hor



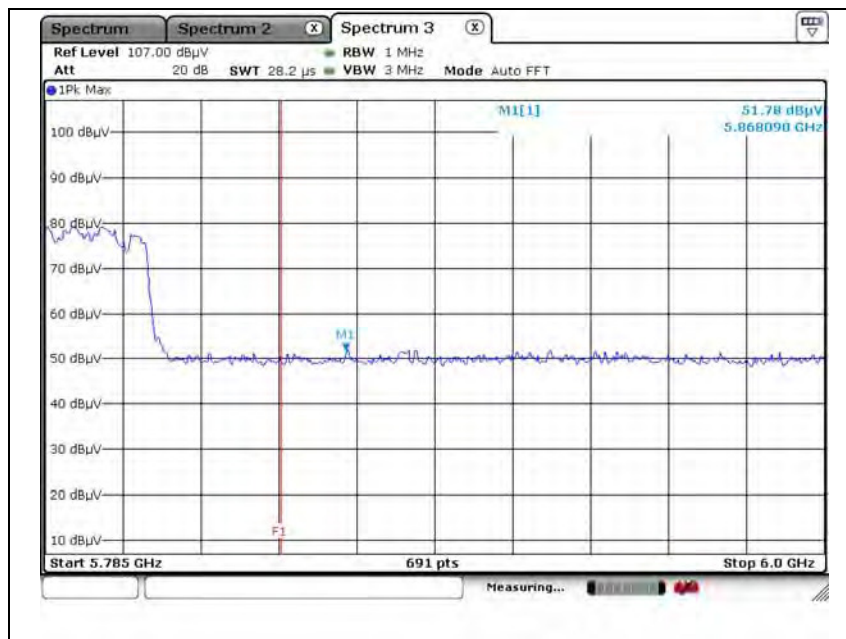
Detected mode: Peak, Ver



Mode: UNII-3 (VHT80) (4)
Transfer rate: MCS0
Distance of measurement: 3 meter
Channel: 151
Detected mode: Peak, Hor



Detected mode: Peak, Ver



3.7. AC conducted emissions

Limit

According to 15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohm line impedance stabilization network (LISN). Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted limit (dB μ V/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Note:

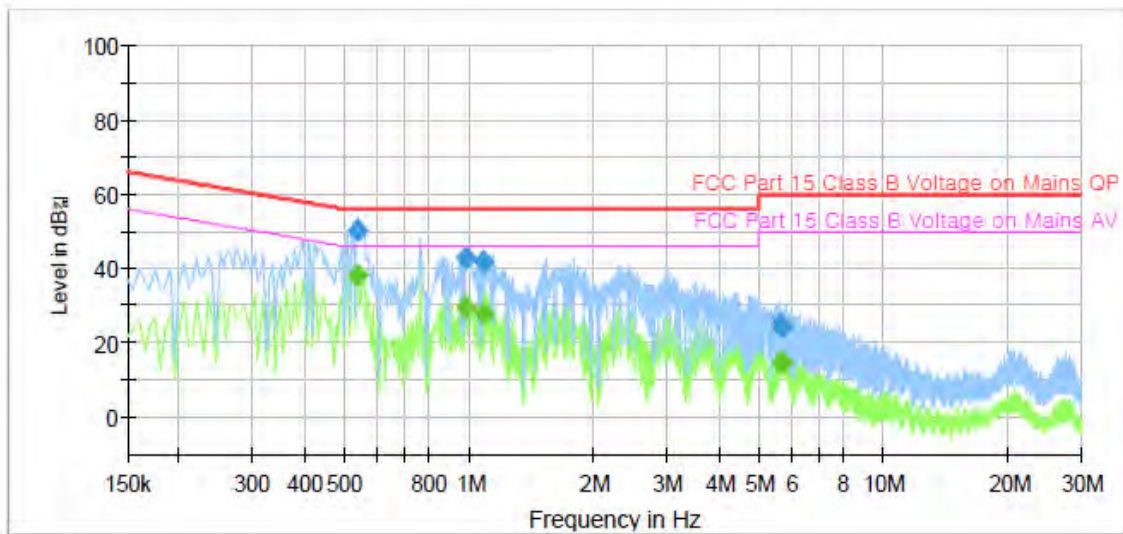
1. All AC line conducted spurious emission are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and the appropriate frequencies. All data rates and modes were investigated for conducted spurious emission. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.
3. Both Cable loss and LISN factor are included in measurement level(QP Level or AV Level).

Test results

Test Report

Common Information

Test Description:	Conducted Emission
Model No.:	TEST
Mode	5 GHz
Operator Name:	KES



Final Result

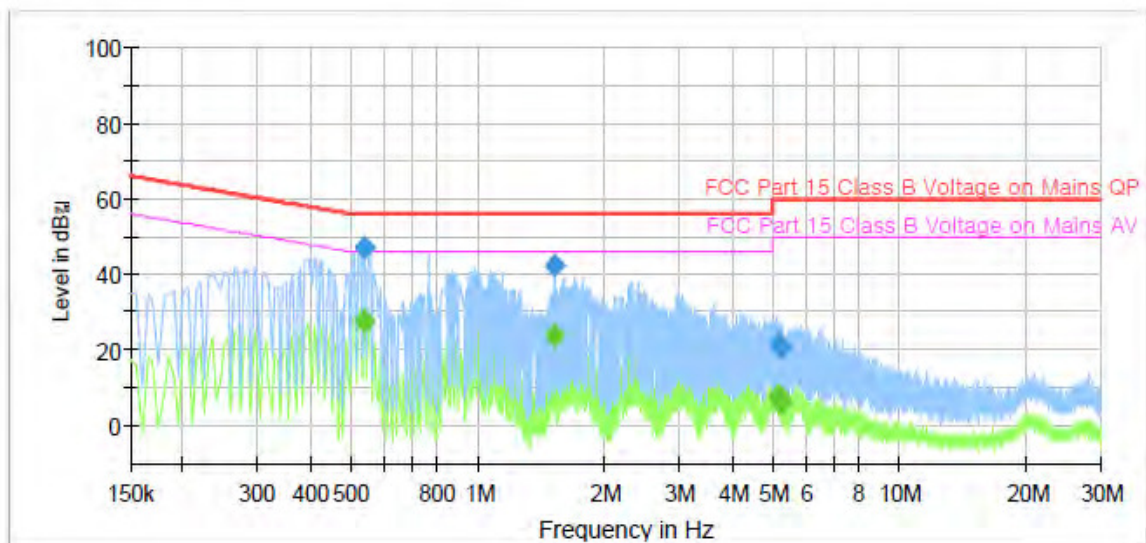
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.540000	---	38.17	46.00	7.83	1000.0	9.000	L1	9.8
0.540000	50.49	---	56.00	5.51	1000.0	9.000	L1	9.8
0.980000	---	29.69	46.00	16.31	1000.0	9.000	L1	9.9
0.980000	43.12	---	56.00	12.88	1000.0	9.000	L1	9.9
1.080000	---	28.21	46.00	17.79	1000.0	9.000	L1	9.9
1.080000	42.07	---	56.00	13.93	1000.0	9.000	L1	9.9
5.665000	---	15.06	50.00	34.94	1000.0	9.000	L1	10.0
5.665000	25.14	---	60.00	34.86	1000.0	9.000	L1	10.0
5.725000	---	14.98	50.00	35.02	1000.0	9.000	L1	10.0
5.725000	24.60	---	60.00	35.40	1000.0	9.000	L1	10.0

Note; Hot Line

Test Report

Common Information

Test Description:	Conducted Emission
Model No.:	TEST
Mode	5 GHz
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.540000	---	27.49	46.00	18.51	1000.0	9.000	N	9.8
0.540000	46.95	---	56.00	9.05	1000.0	9.000	N	9.8
1.525000	---	23.64	46.00	22.36	1000.0	9.000	N	10.0
1.525000	42.21	---	56.00	13.79	1000.0	9.000	N	10.0
5.140000	---	7.81	50.00	42.19	1000.0	9.000	N	10.0
5.140000	21.74	---	60.00	38.26	1000.0	9.000	N	10.0
5.240000	---	5.91	50.00	44.09	1000.0	9.000	N	10.0
5.240000	20.48	---	60.00	39.52	1000.0	9.000	N	10.0

Note; Neutral Line

Appendix A. Measurement equipment

Equipment	Manufacturer	Model	Serial No.	Calibration interval	Calibration due.
Spectrum Analyzer	R&S	FSV40	101002	1 year	2017.07.06
8360B Series Swept Signal Generator	HP	83630B	3844A00786	1 year	2017.01.25
PSG Analog Signal Generator	AGILENT	E8257C	US42340237	1 year	2017.07.05
Power Meter	Anritsu	ML2495A	1438001	1 year	2017.01.25
Pluse Power Sensor	Anritsu	MA2411B	1339205	1 year	2017.01.25
Loop antenna	R&S	HFH2-Z2.335.4711.52	826532	2 years	2017.03.03
Trilog-broadband antenna	SCHWARZBECK	VULB 9168	9168-461	2 years	2017.04.03
Horn Antenna	A.H.	SAS-571	414	2 years	2017.02.09
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170550	2 years	2017.04.30
Preamplifier	SCHWARZBECK	BBV-9718	9718-246	1 year	2016.10.23
Broadband Amplifier	SCHWARZBECK	BBV-9721	PS9721-003	1 year	2017.01.25
Low Pass Filter	Wainwright Instrument	WHNK6.0/26.5G-6SS	1	1 year	2017.07.05
High Pass Filter	WAINWRIGHT INSTRUMENT	WHJS3000-10TT	1	1 year	2017.07.04
Attenuator	KEYSIGHT	8493C	82509	1 year	2017.01.25
EMI Test Receiver	R&S	ESR3	101781	1 year	2017.05.03
EMI Test Receiver	R&S	ESU26	100552	1 year	2017.04.24
EMI Test Receiver	R&S	ESR3	101783	1 year	2017.05.03
DC Power supply	Aglient	6674A	US36370369	1 year	2017.07.04
Temperature & Humidity Chamber	Daehan Engineering	DH-1000	DH1000060628	1 year	2017.01.28
LISN	R&S	ENV216	101137	1 year	2017.02.04

Peripheral devices

Device	Manufacturer	Model No.	Serial No.
Notebook Computer	Samsung Electronics Co., Ltd.	NT-R530	ZWC493BZC00014H
Test Board	N/A	N/A	N/A
USB to Serial Converter	Kangwon Electronics	KW-825	N/A
AC Adapter	Channel Well Technology	2ABE010B	N/A