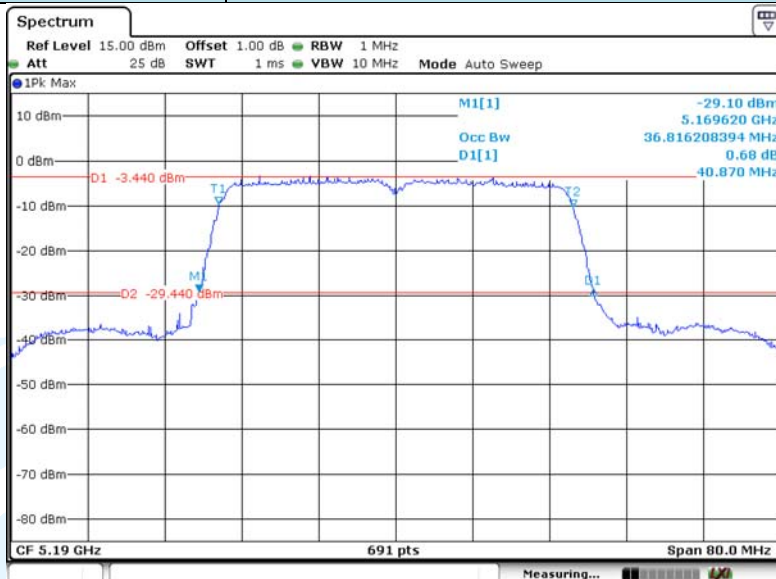
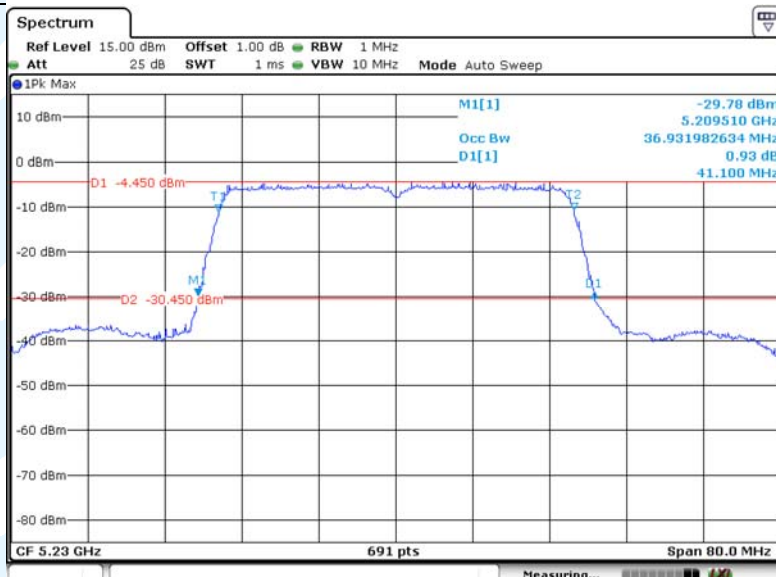
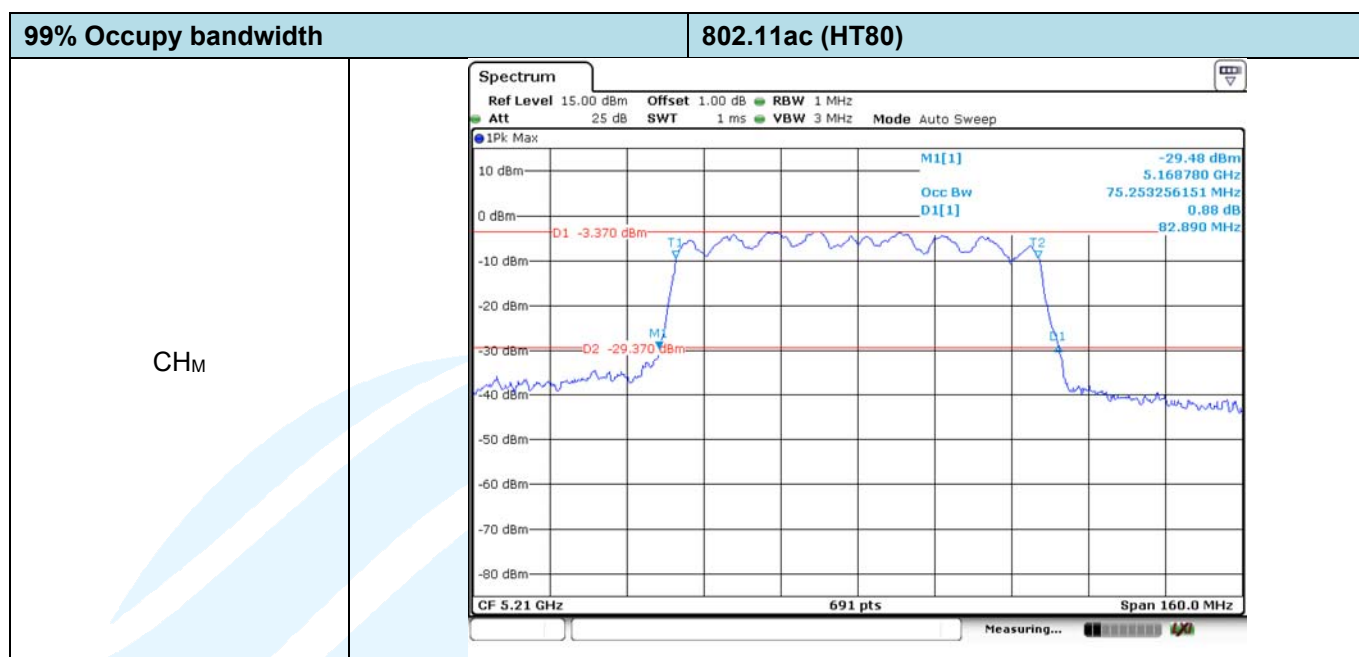


99% Occupy bandwidth

802.11n (HT40)

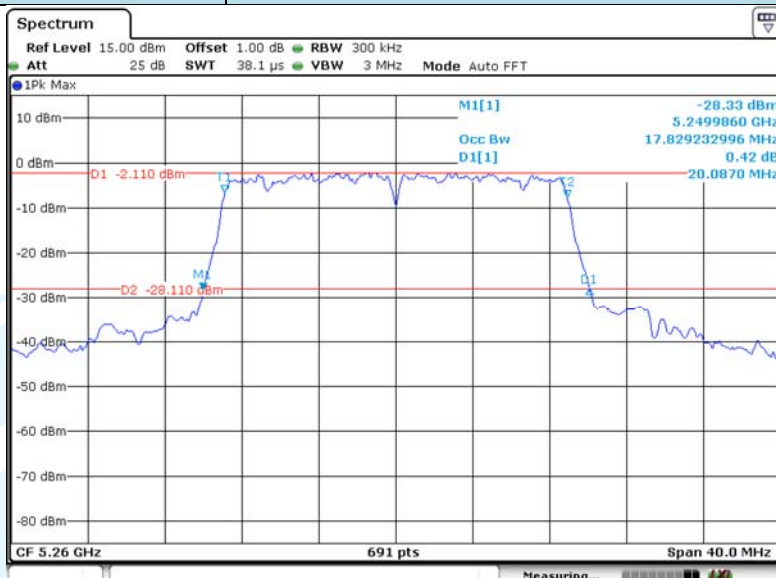
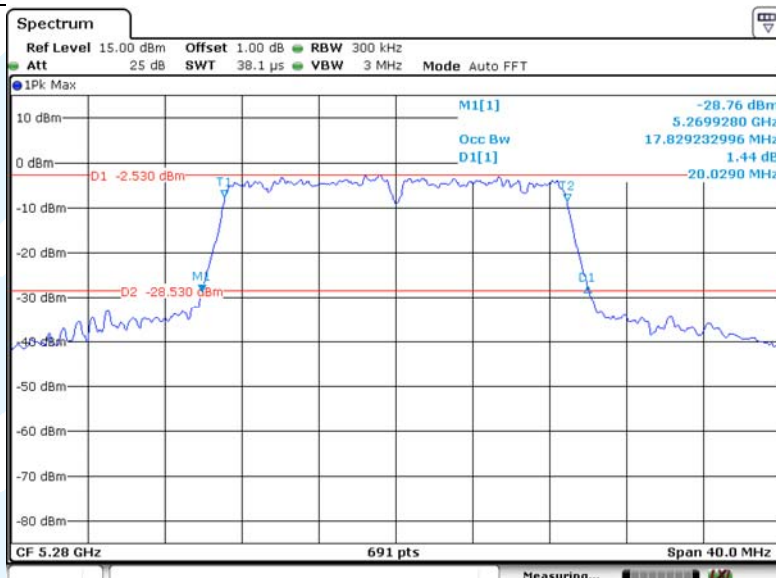
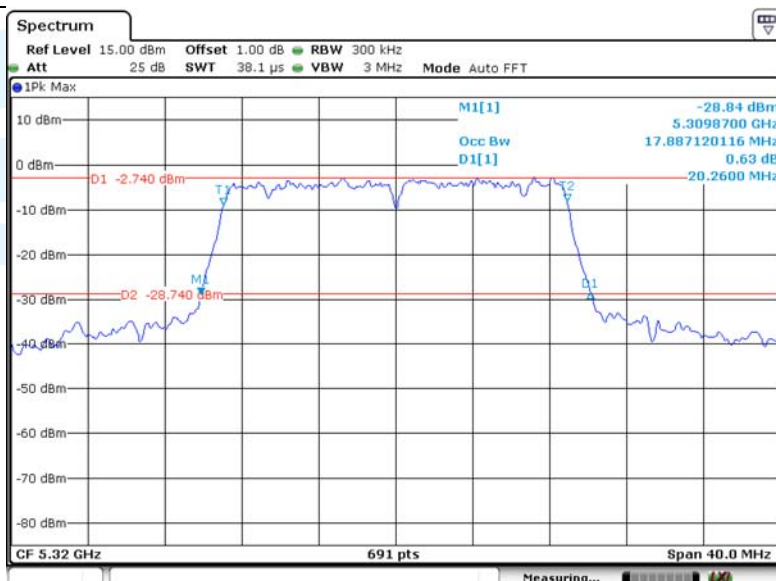
CH<sub>L</sub>

CH<sub>H</sub>


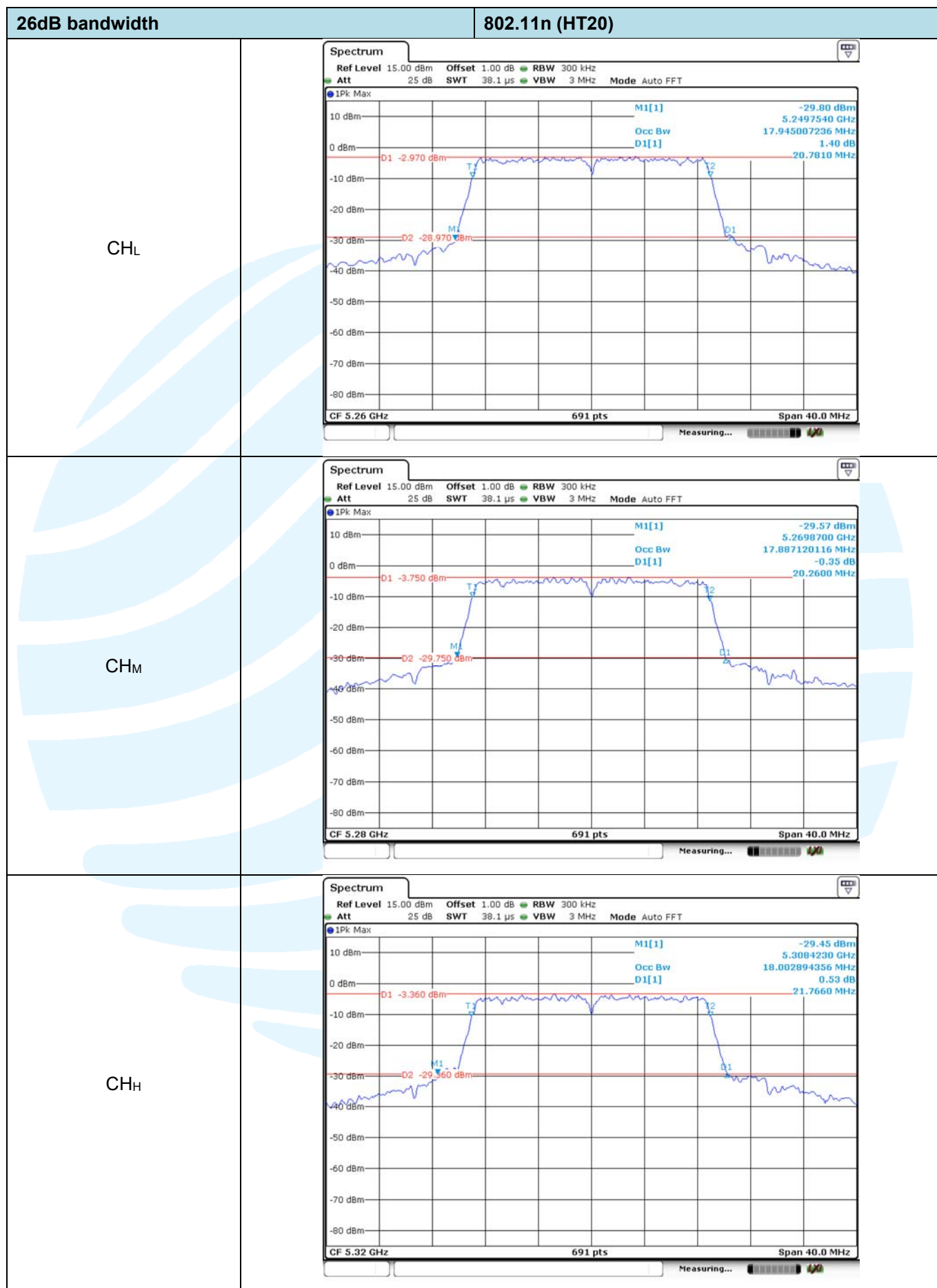


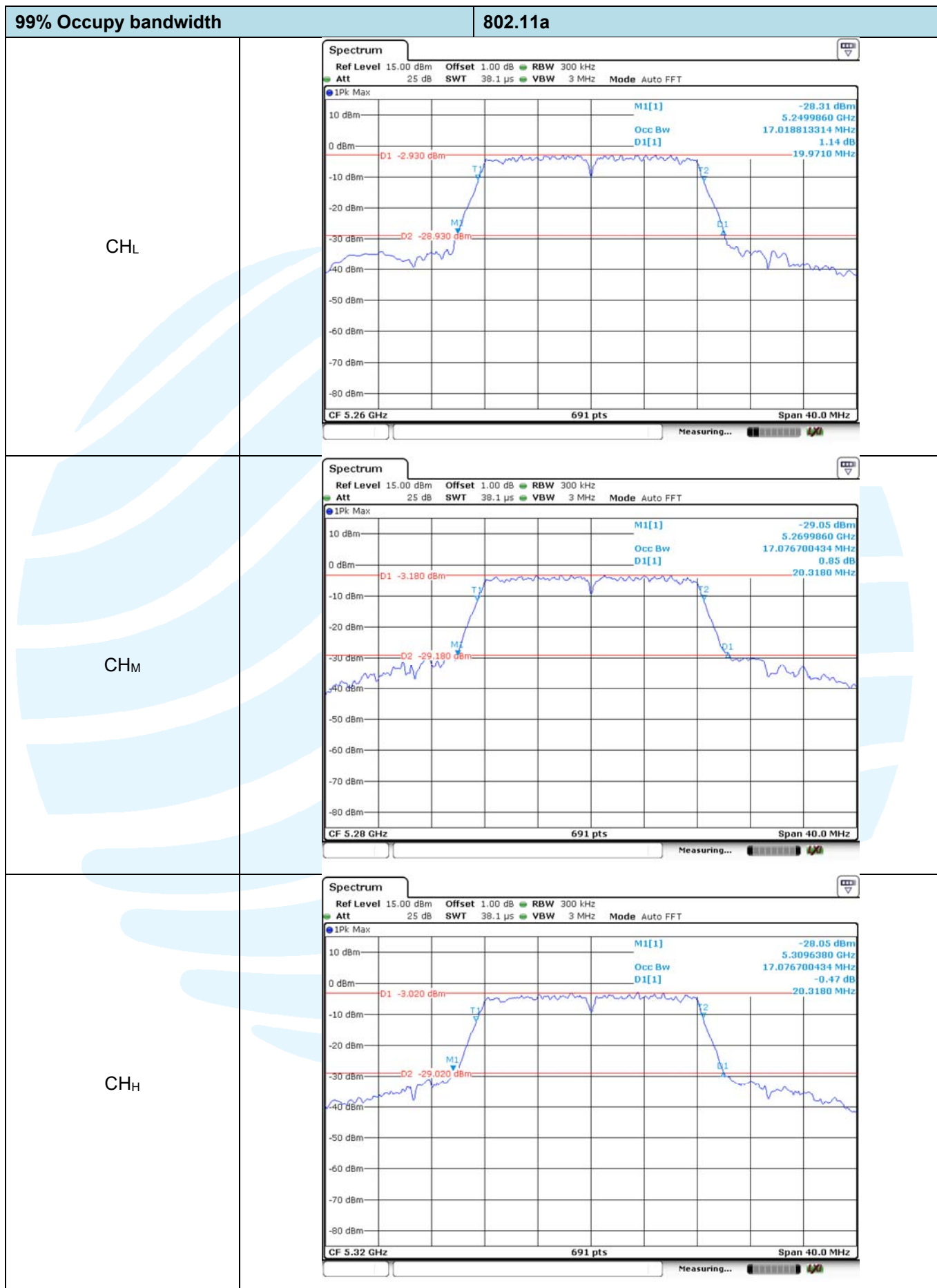
## Band II

99% Occupancy bandwidth

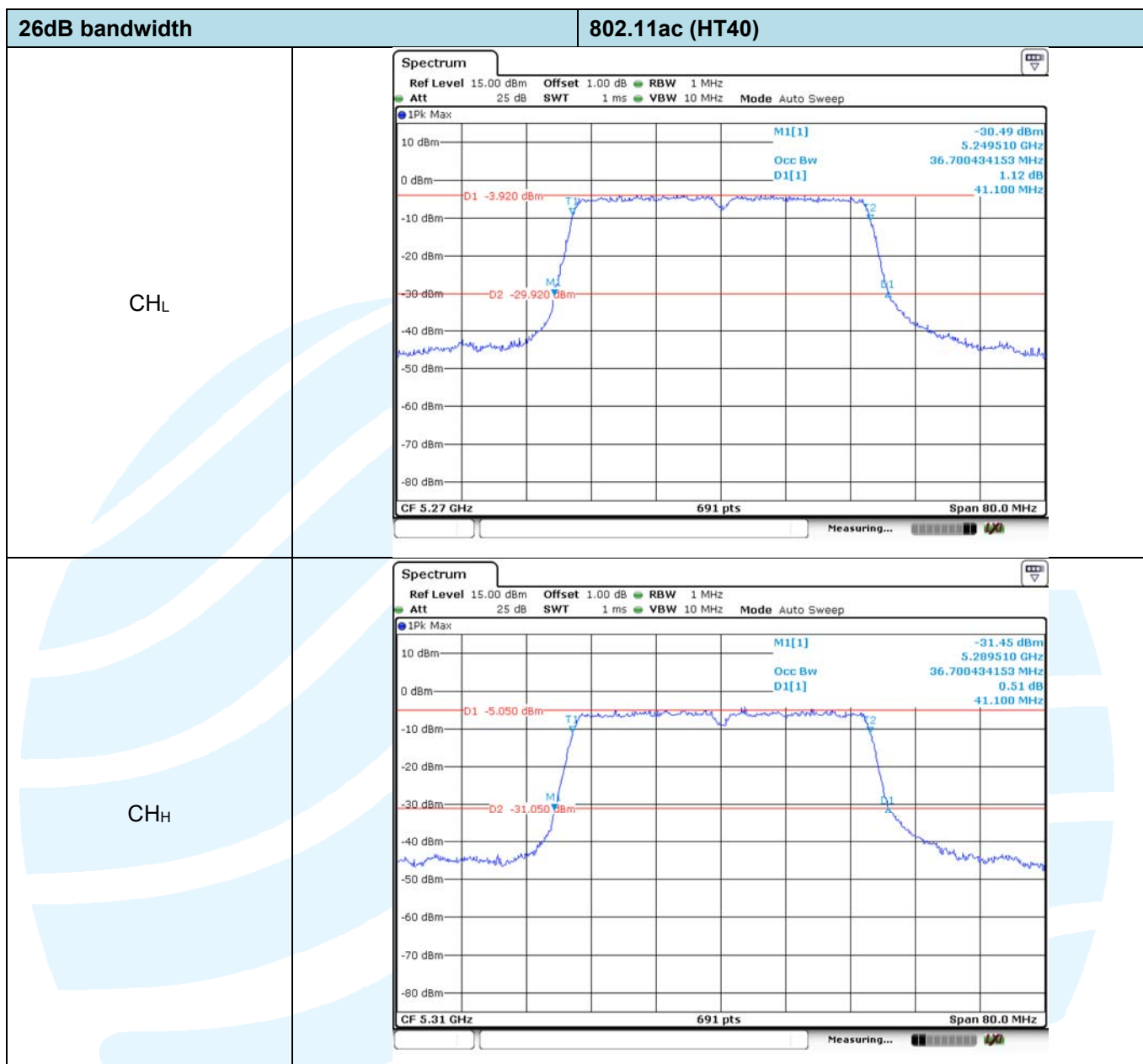
802.11ac (HT20)

CH<sub>L</sub>

CH<sub>M</sub>

CH<sub>H</sub>




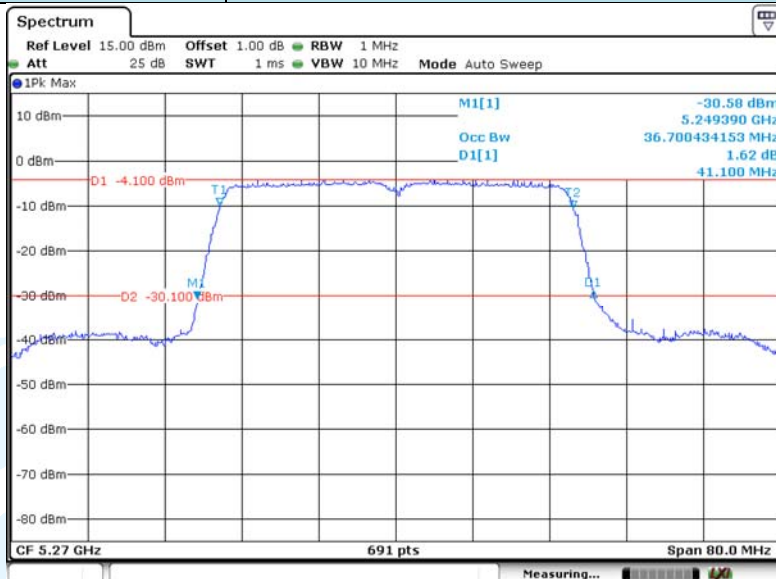
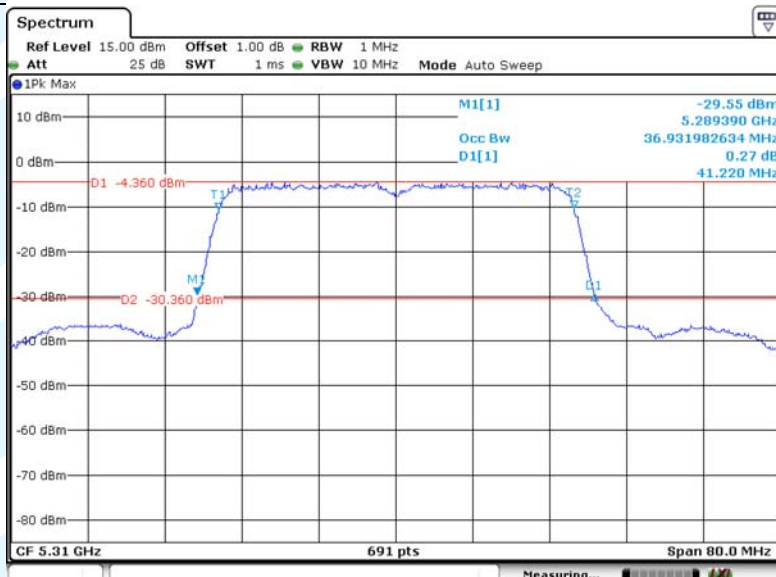




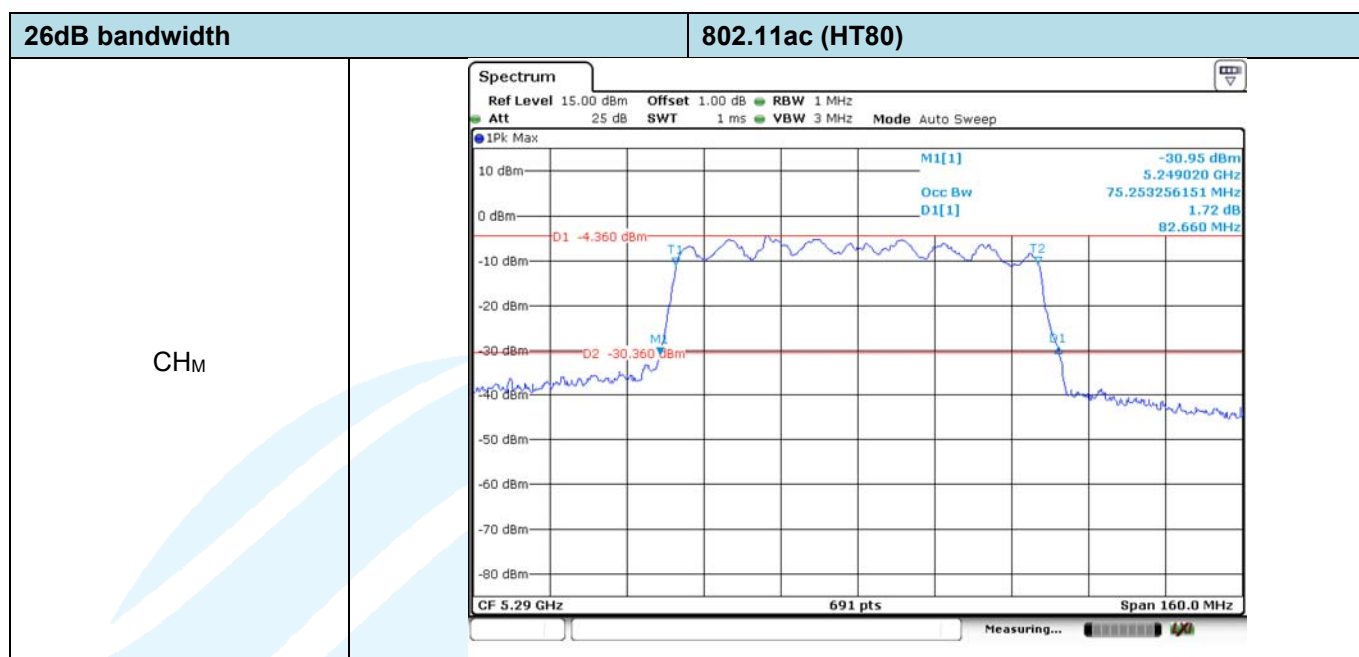


26dB bandwidth

802.11n (HT40)

CH<sub>L</sub>

CH<sub>H</sub>


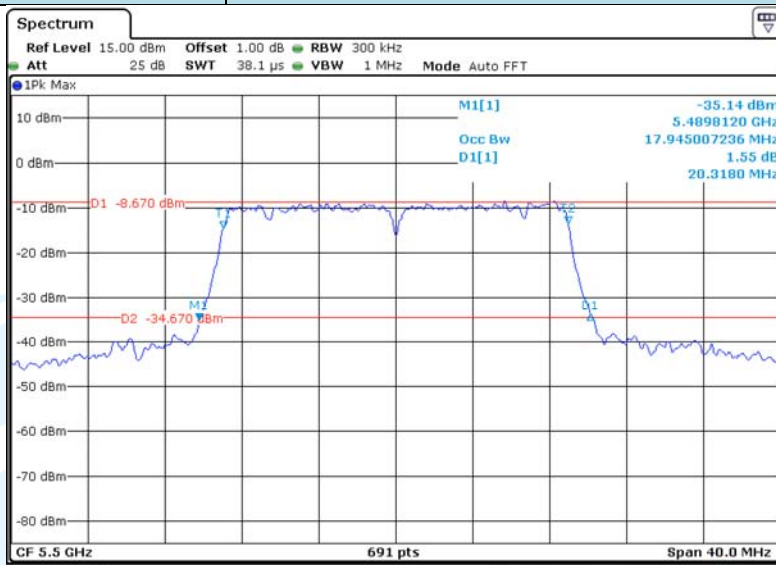
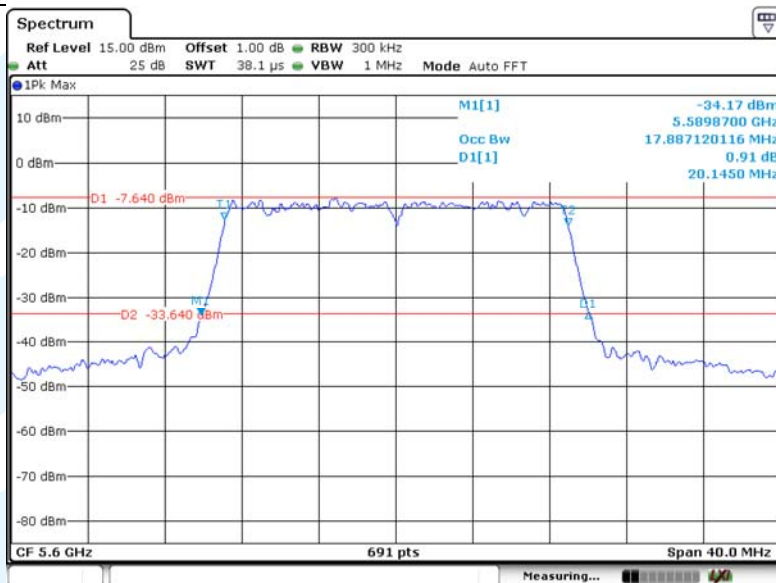
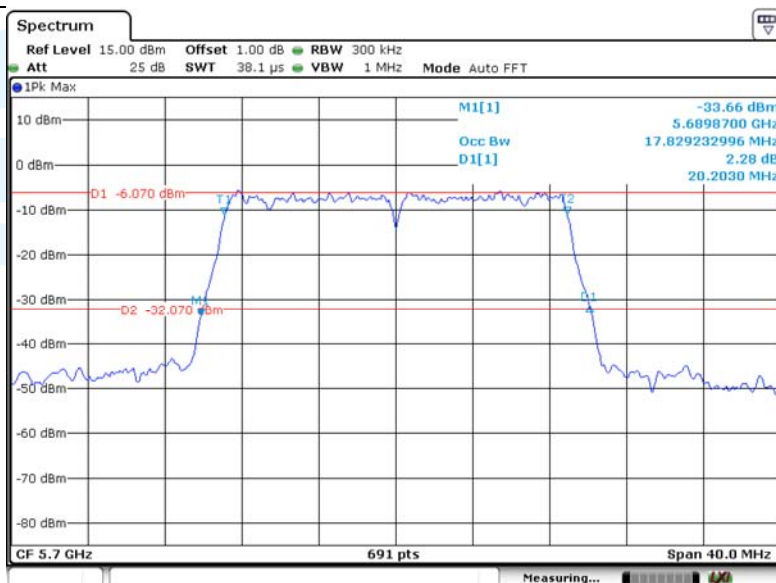


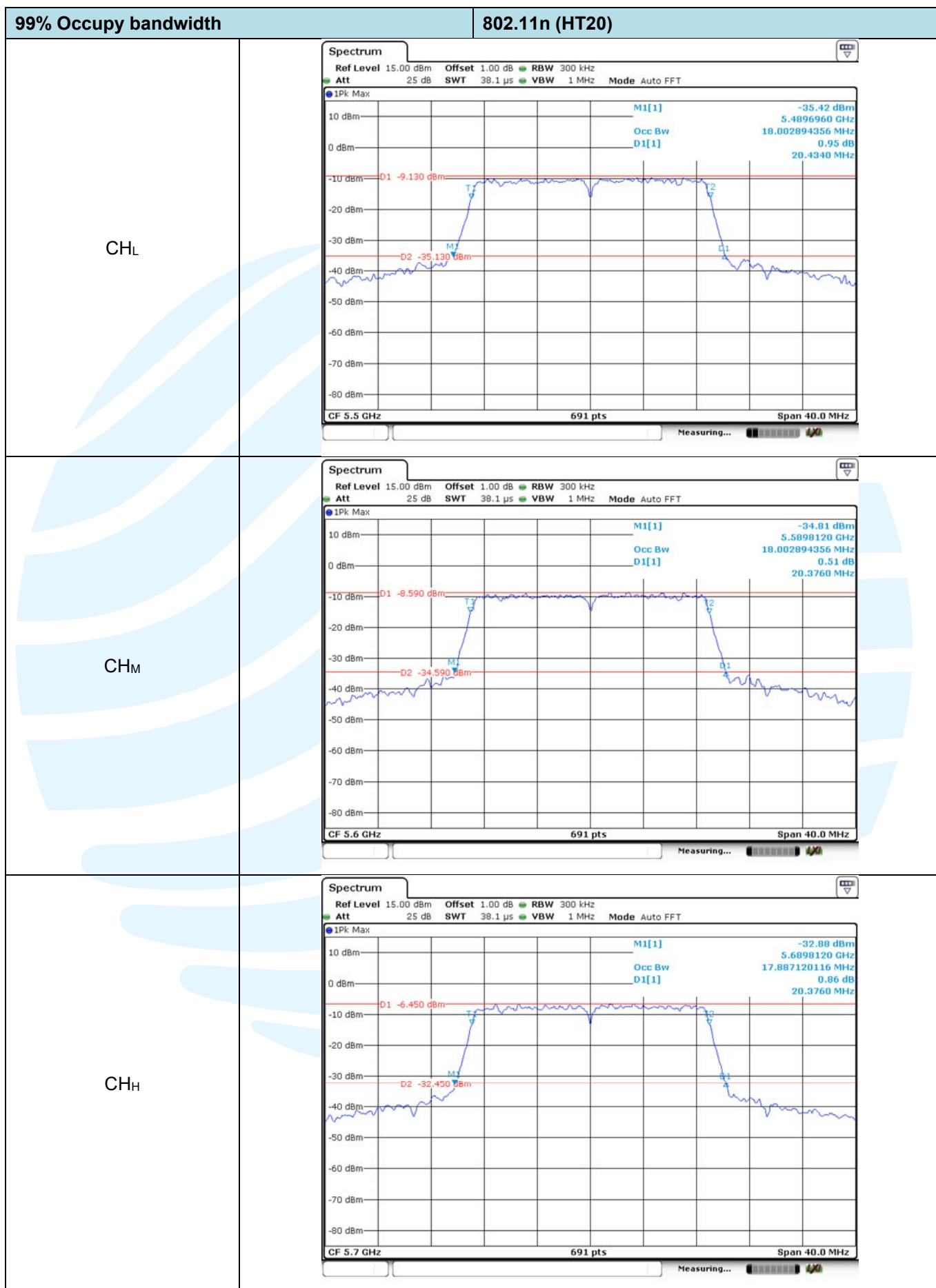


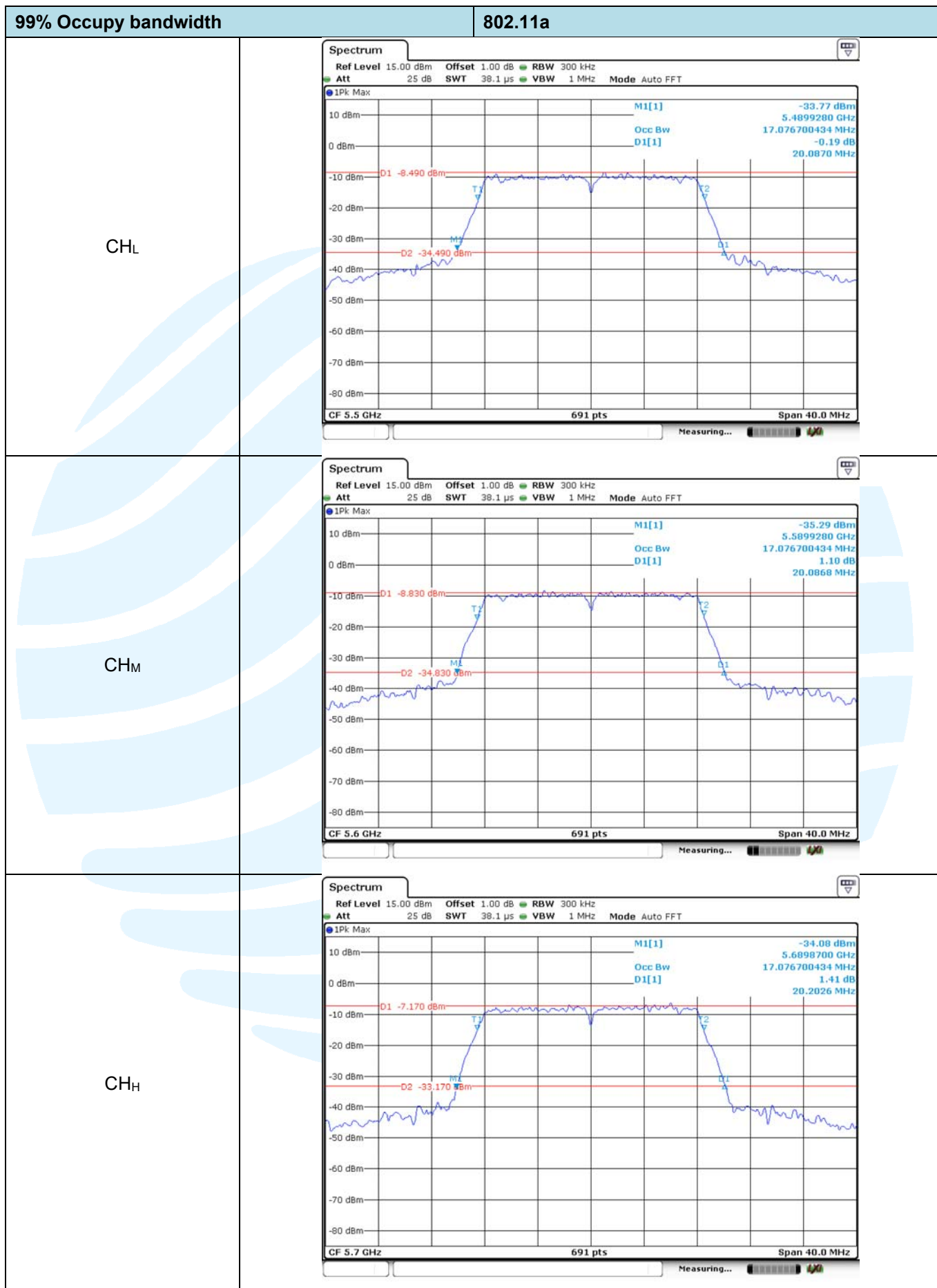
## Band III

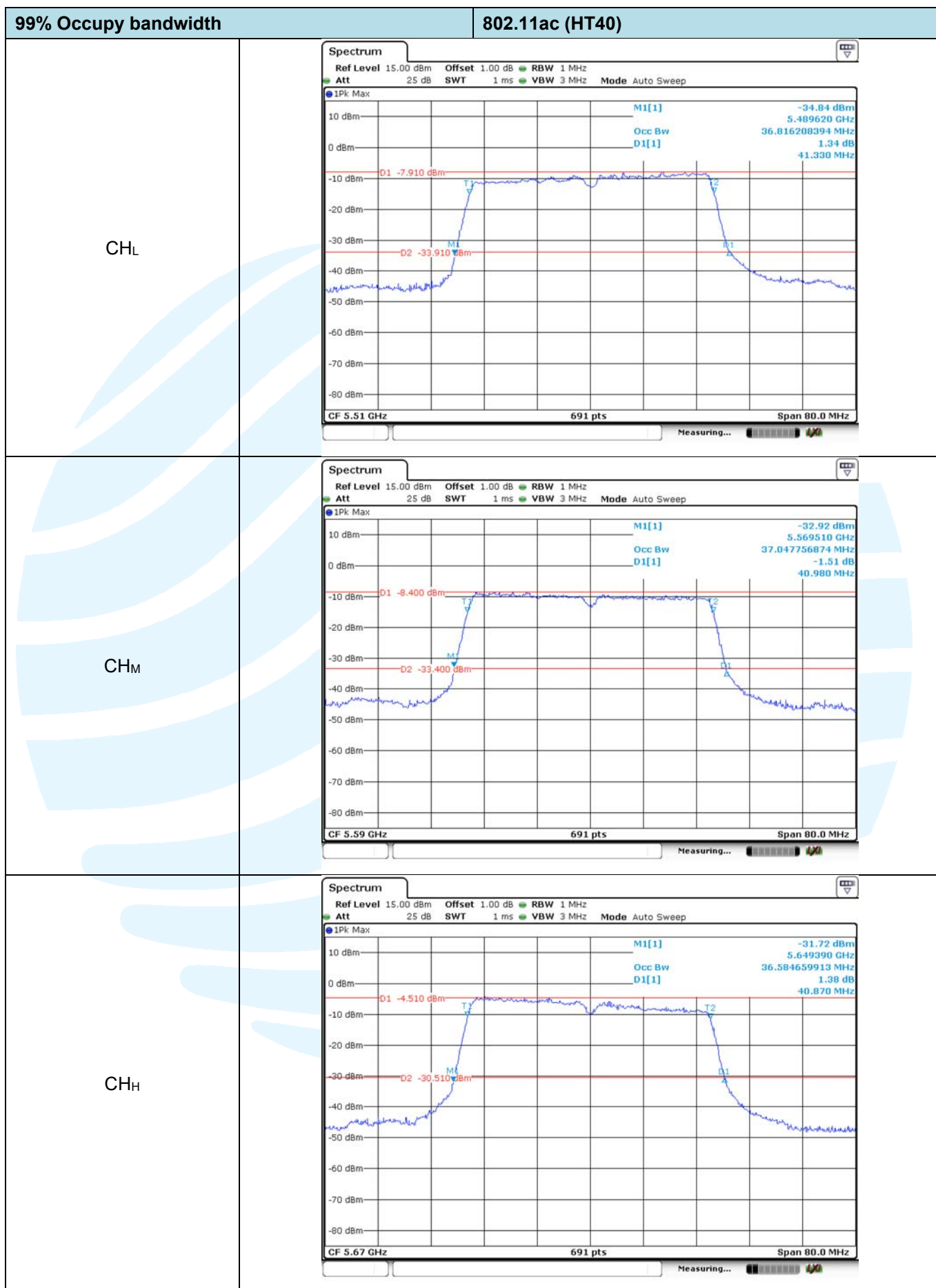
99% Occupancy bandwidth

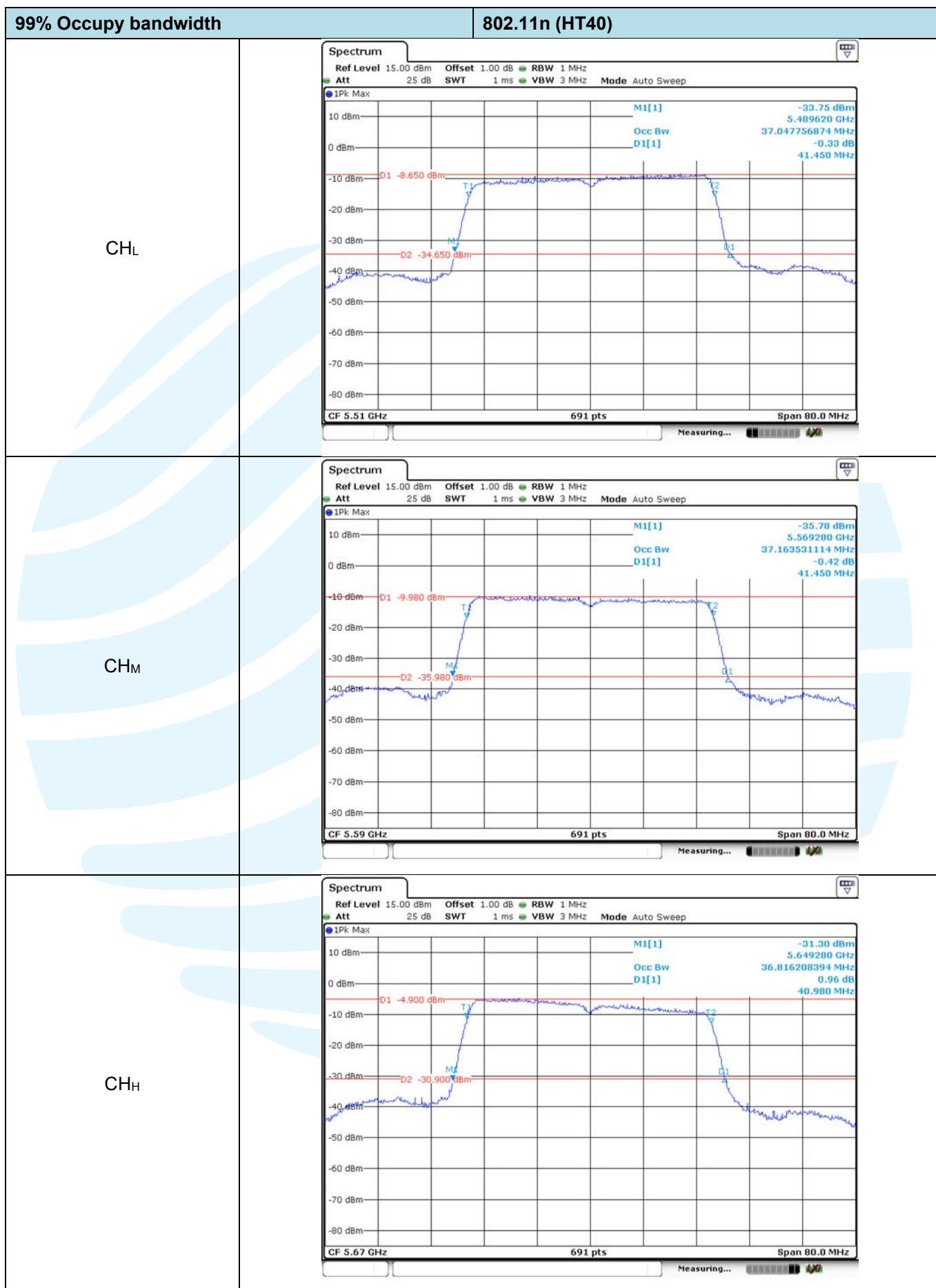
802.11ac (HT20)

CH<sub>L</sub>

CH<sub>M</sub>

CH<sub>H</sub>


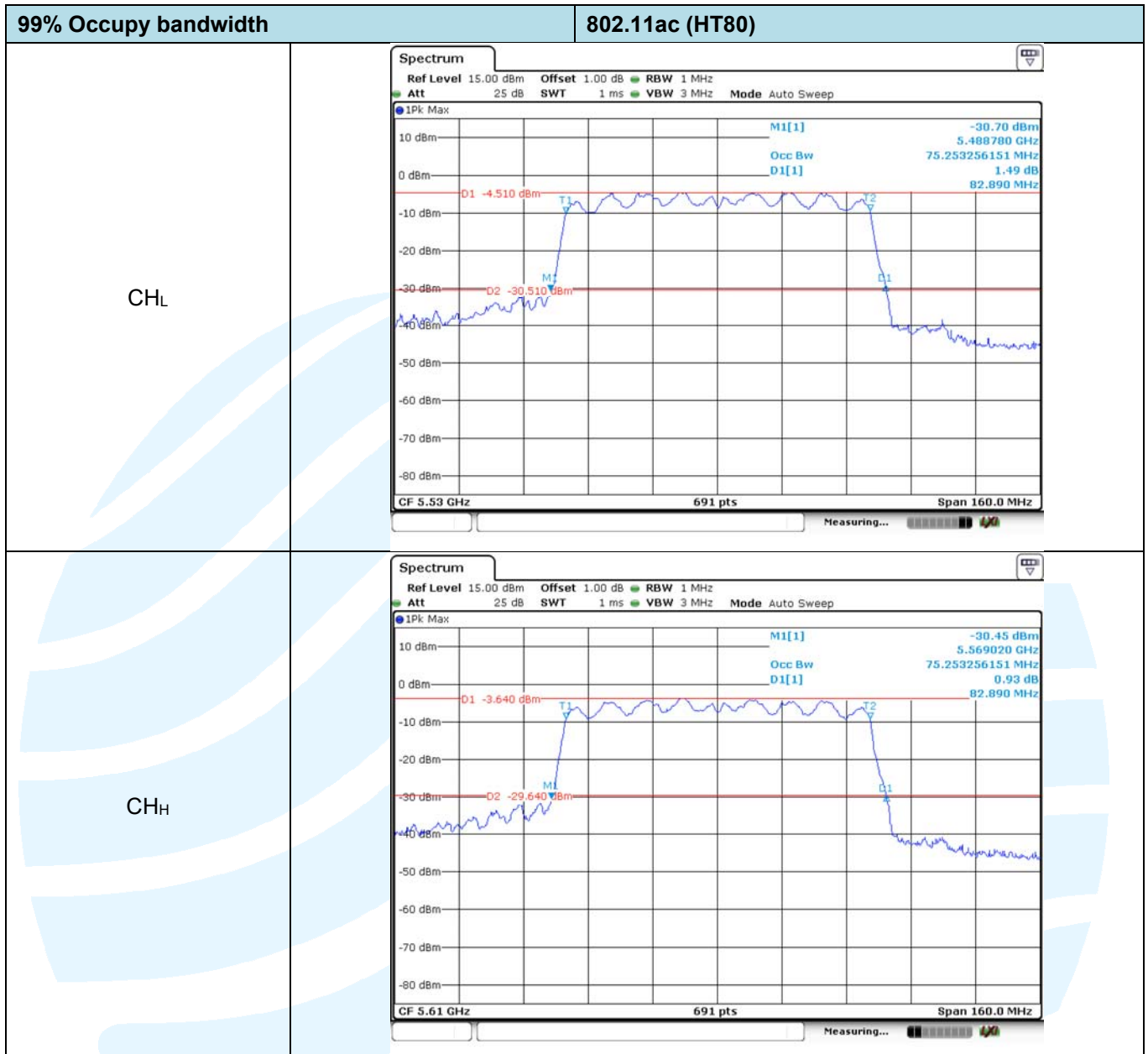










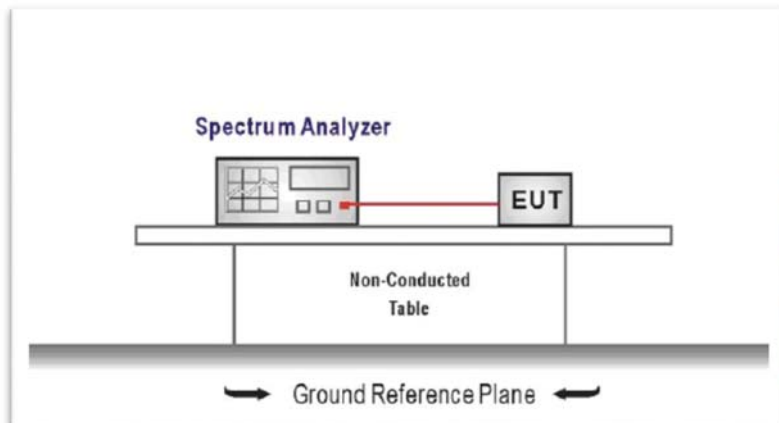


## 5.6. 6dB Bandwidth

### LIMIT

**FCC CFR Title 47 Part 15 Subpart E Section 15.407(e)** Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz

### TEST CONFIGURATION



### TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).  
Center Frequency = DTS channel center frequency  
Span = 2 x DTS bandwidth  
RBW = 100 kHz, VBW ≥ 3 x RBW  
Sweep time = auto couple  
Detector = Peak  
Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
4. 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, and record the pertinent measurements.

### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

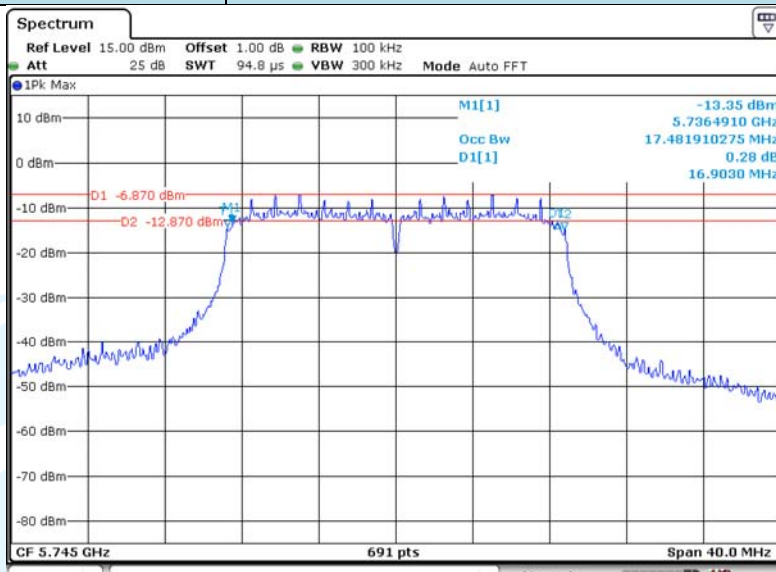
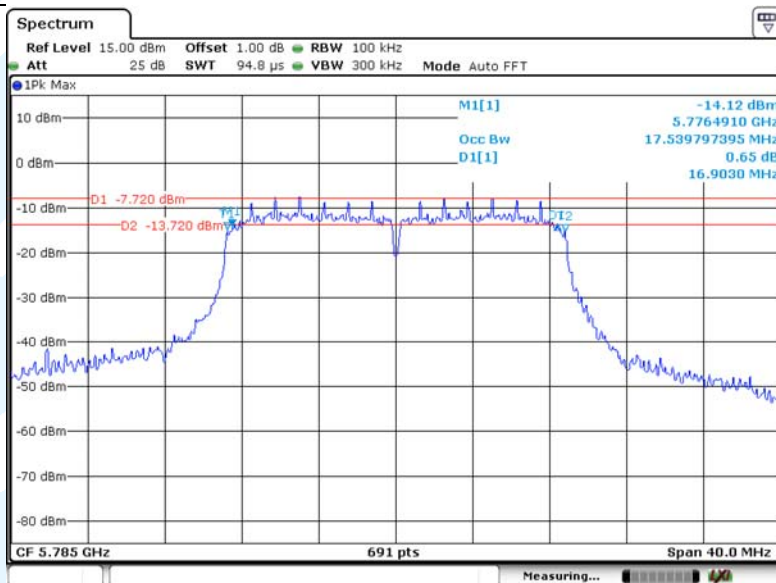
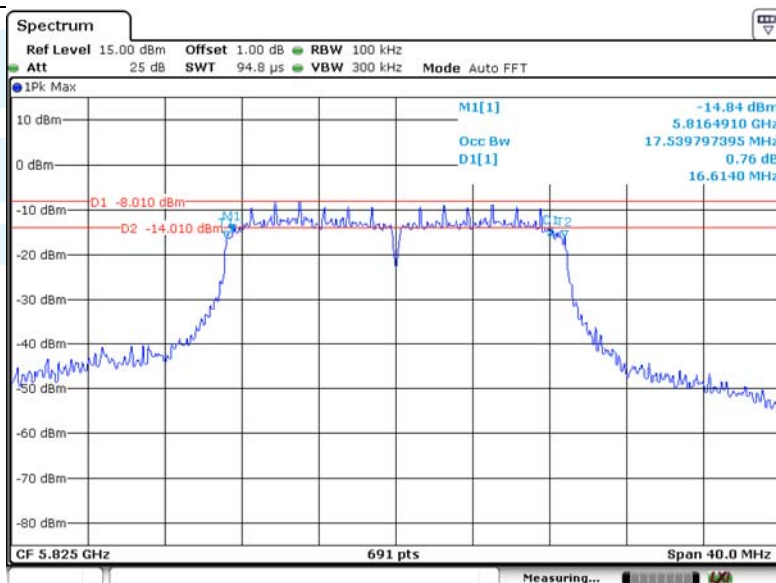
☒ Passed ☐ Not Applicable

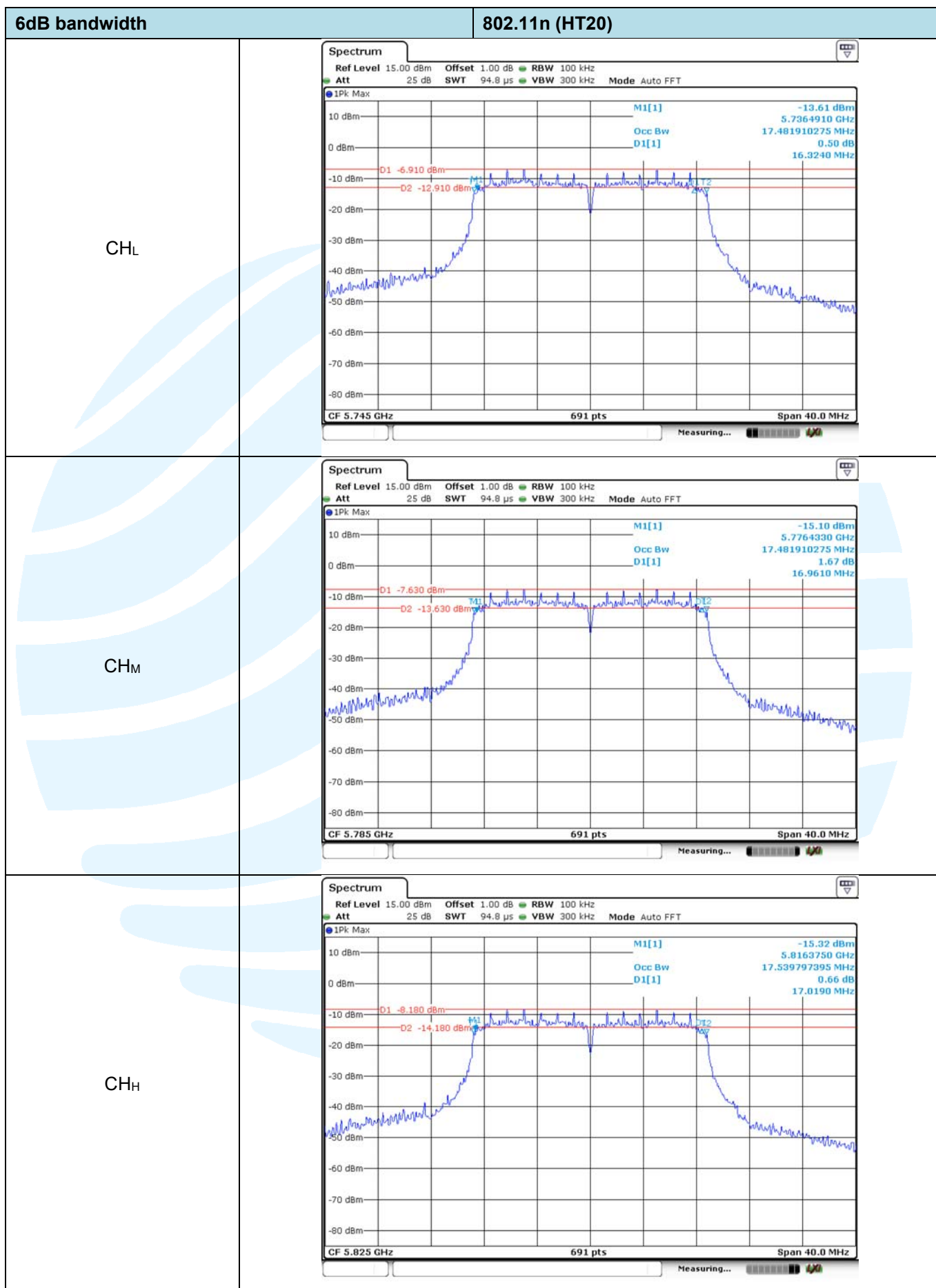
Band	Bandwidth (MHz)	Type	Channel	6dB bandwidth (MHz)	Limit (MHz)	Result
IV	20	802.11ac	CH <sub>L</sub>	16.9030	≥0.50	Pass
			CH <sub>M</sub>	16.9030		
			CH <sub>H</sub>	16.6140		
		802.11n	CH <sub>L</sub>	16.3240	≥0.50	Pass
			CH <sub>M</sub>	16.9610		
			CH <sub>H</sub>	17.0190		
		802.11a	CH <sub>L</sub>	15.6870	≥0.50	Pass
			CH <sub>M</sub>	16.3240		
			CH <sub>H</sub>	16.0930		
	40	802.11ac	CH <sub>L</sub>	35.5100	≥0.50	Pass
			CH <sub>H</sub>	35.4300		
		802.11n	CH <sub>L</sub>	35.2800	≥0.50	Pass
			CH <sub>H</sub>	35.5400		
	80	802.11ac	CH <sub>M</sub>	74.0700	≥0.50	Pass

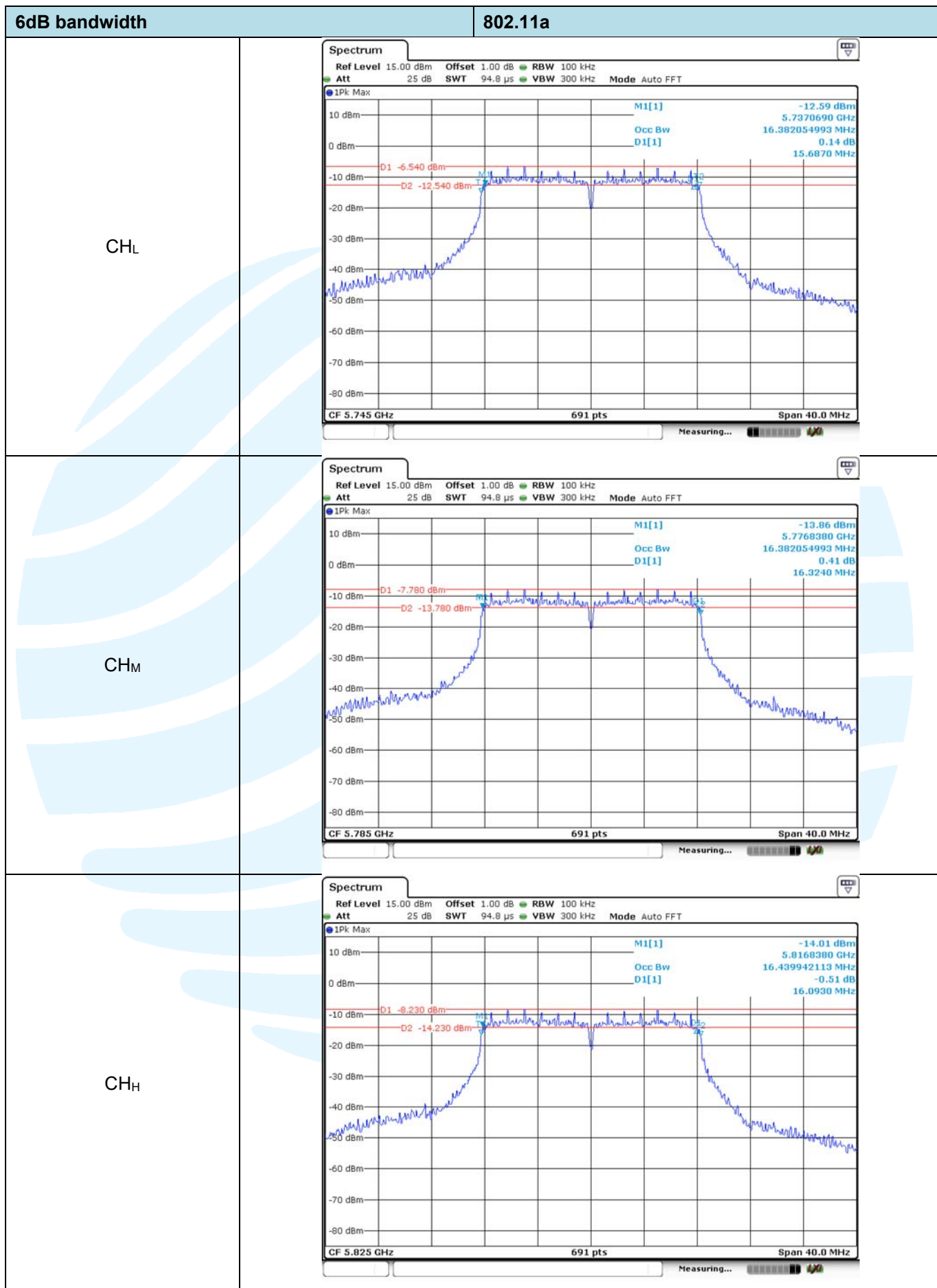
## Band IV

6dB bandwidth

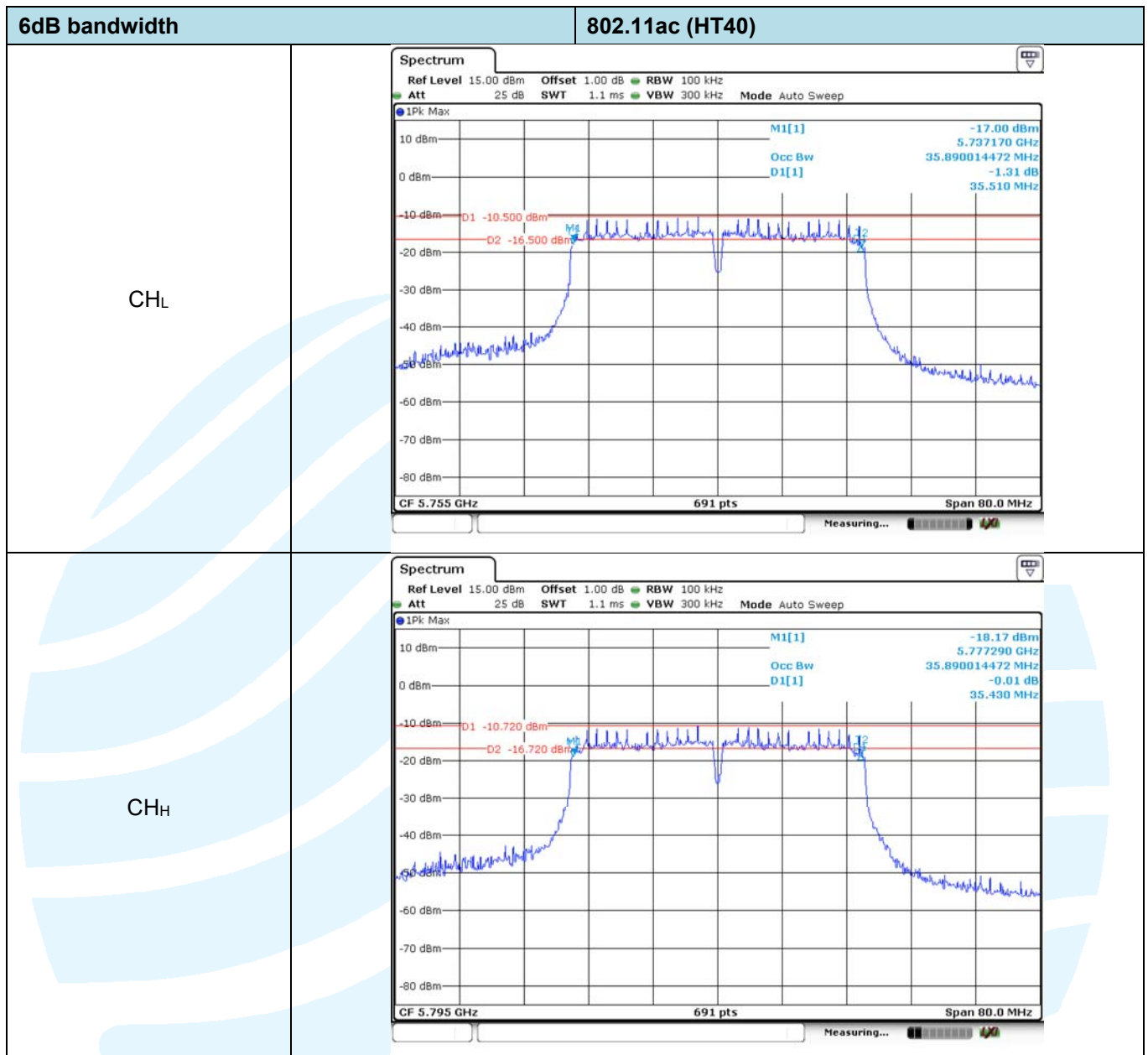
802.11ac (HT20)

CH<sub>L</sub>

CH<sub>M</sub>

CH<sub>H</sub>




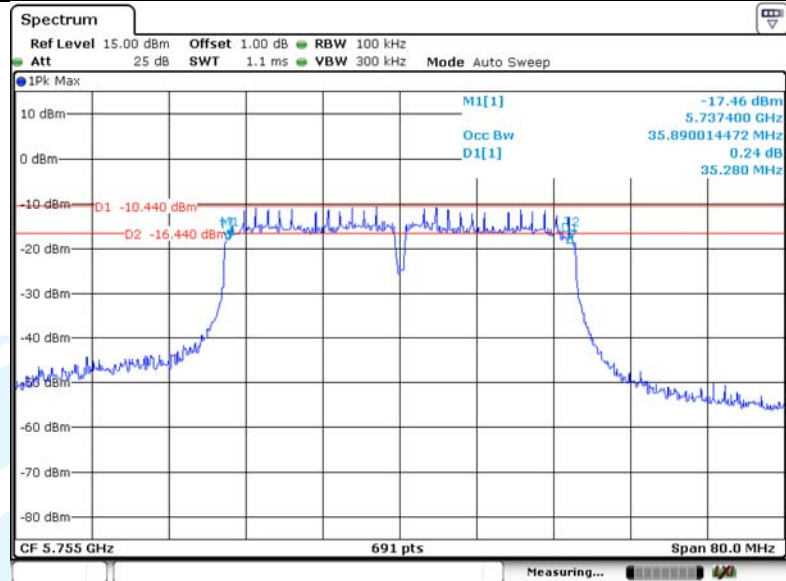
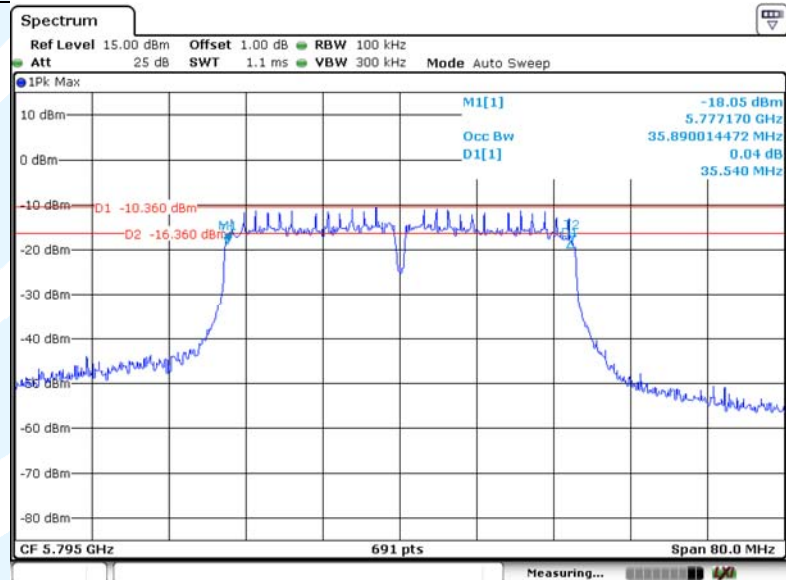


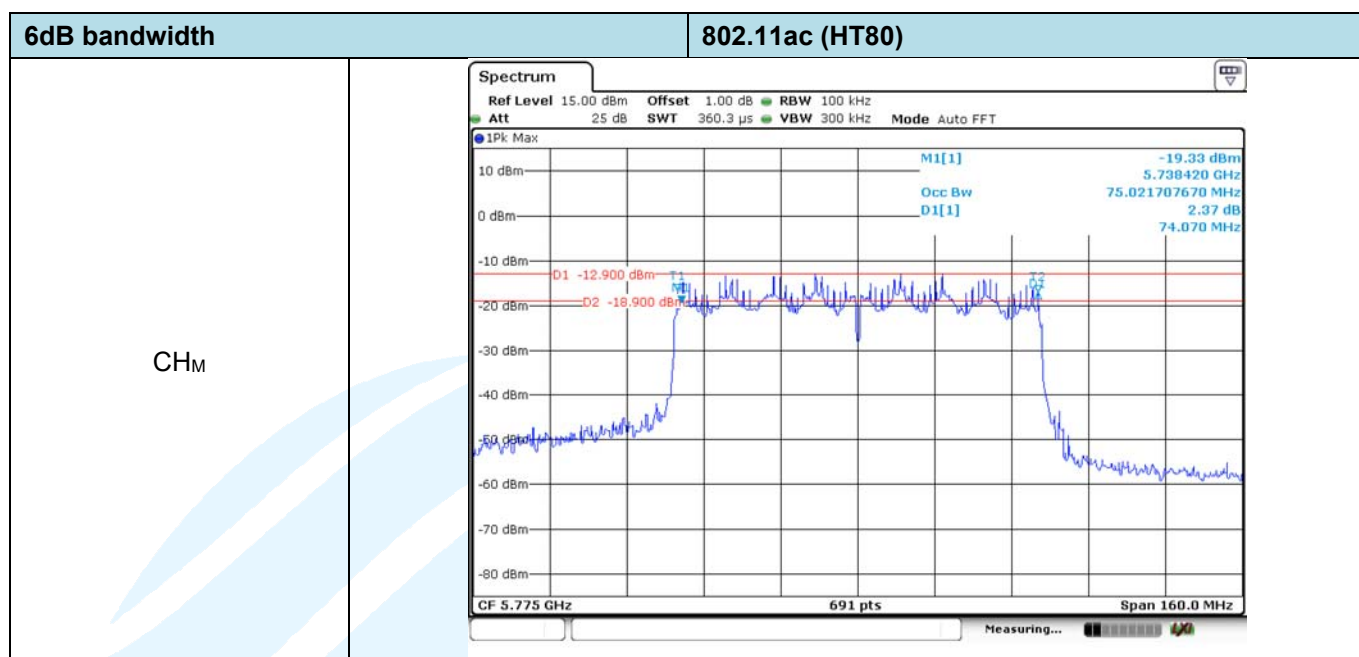




6dB bandwidth

802.11n (HT40)

CH<sub>L</sub>

CH<sub>H</sub>




## 5.7. Radiated Emissions & Band edge

### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

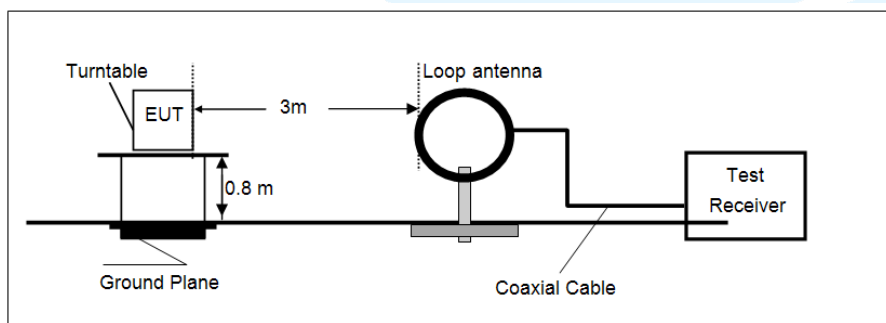
Operating Band	Frequency	EIRP Limit	Value
5150-5250MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
5250-5350MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
5470-5725MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
5725-5850 MHz	1GHz-5.65GHz	-27 dBm/MHz(68.2dBuV/m)@3m	Peak
	5.65GHz-5.7GHz	-27*dBm/MHz to 10dBm/MHz (68.2* dBuV/m to 105.6dBuV/m)	Peak
	5.7GHz-5.72GHz	10*dBm/MHz to 15.6dBm/MHz (105.6*dBuV/m to 110.8dBuV/m)	Peak
	5.72GHz-5.725GHz	15.6*dBm/MHz to 27dBm/MHz (110.8dBuV/m to* 122.2dBuV/m)	Peak
	5.85GHz-5.855GHz	27dBm/MHz to 15.6*dBm/MHz (122.2dBuV/m to110.8* dBuV/m)	Peak
	5.855GHz-5.875GHz	15.6dBm/MHz to 10*dBm/MHz (110.8dBuV/m to 105.6* dBuV/m)	Peak
	5.875GHz-5.925GHz	10dBm/MHz to -27*dBm/MHz (105.6dBuV/m to 68.2* dBuV/m)	Peak
	Above 5.925GHz	-27 dBm/MHz(68.2dBuV/m)@3m	Peak

\* Increase/Decreases with the linearity of the frequency.

For emission above 1GHz and in restricted band, according to FCC KDB 789033 D02 General UNII Test Procedure, all emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.  $E[dB\mu V/m] = EIRP[dBm] + 95.2$ , for  $d = 3$  meters.

### TEST CONFIGURATION

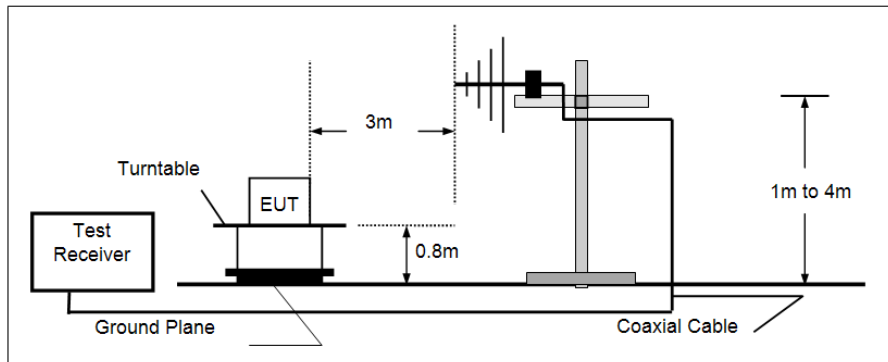
- 9KHz ~30MHz



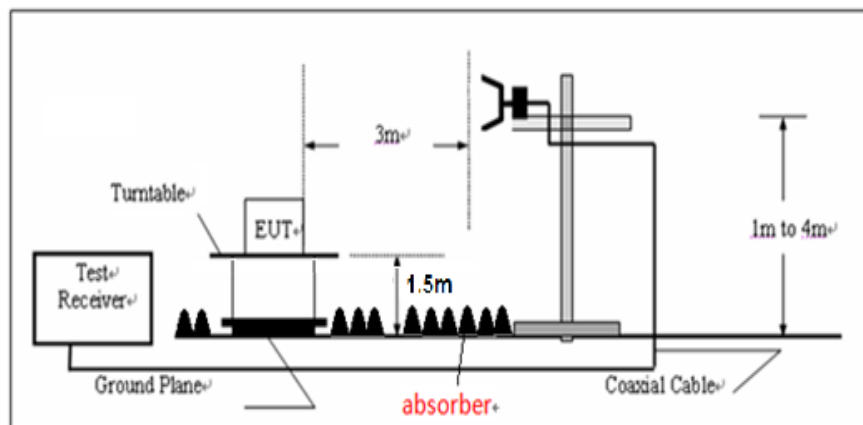
### Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China  
Tel: +86-755-28230888 Fax: +86-755-28230886 E-mail: info@uttlab.com [Http://www.uttlab.com](http://www.uttlab.com)

● 30MHz ~ 1GHz



● Above 1GHz



## TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT is placed on a turn table which is 0.8/1.5 meter above ground plane. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna.
5. Use the following spectrum analyzer settings
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Below 1GHz, RBW=120KHz, VBW=300KHz, Sweep=auto, Detector function=peak, Trace=max hold;  
*If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.*
  - (3) Above 1GHz, RBW=1MHz, VBW=3MHz Peak detector for Peak value  
RBW=1MHz, VBW=3MHz RMS detector for Average value.

Remark: "floor-standing equipment" Where possible, the antenna(s) of the EUT shall be located at a height of 1.5 m above the floor, and the intentional radiator circuitry shall be located within the system at a height of at least 0.8 m above the floor.

## TEST RESULTS

### Measurement data:

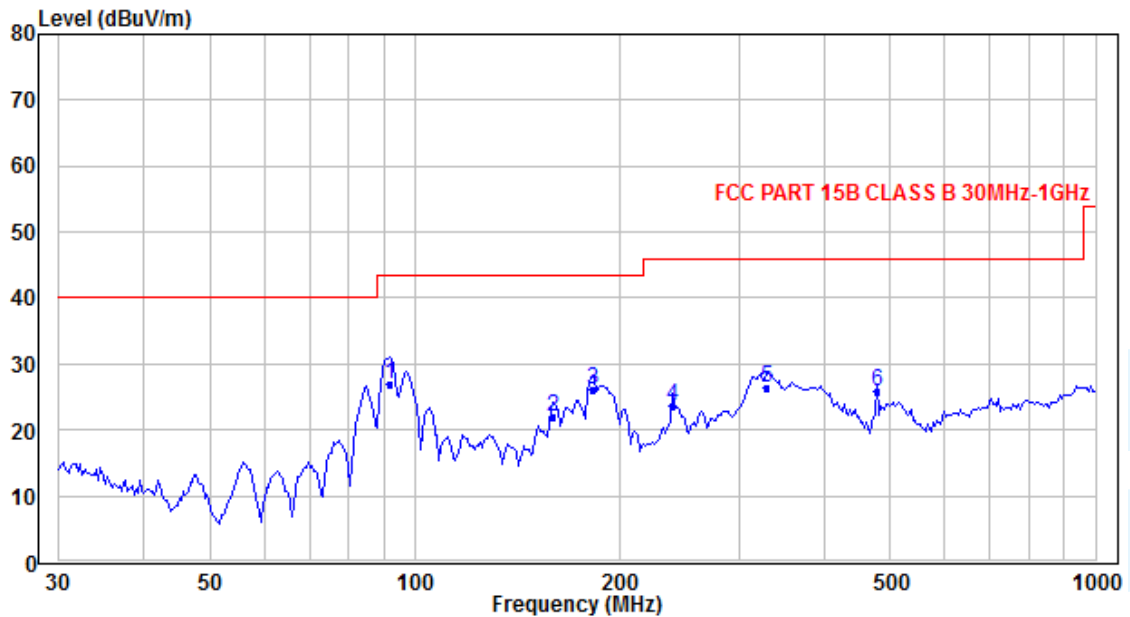
#### ■ 9kHz ~ 30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

Pre-scan all of the 802.11a/n(HT20) /n(HT40)/ac(HT20)/ac(HT40) /ac(HT80) mode at U-NII band I/II/III and IV. And found 802.11a mode was the worst case at this four bands. So only the worst data was shown on the report.

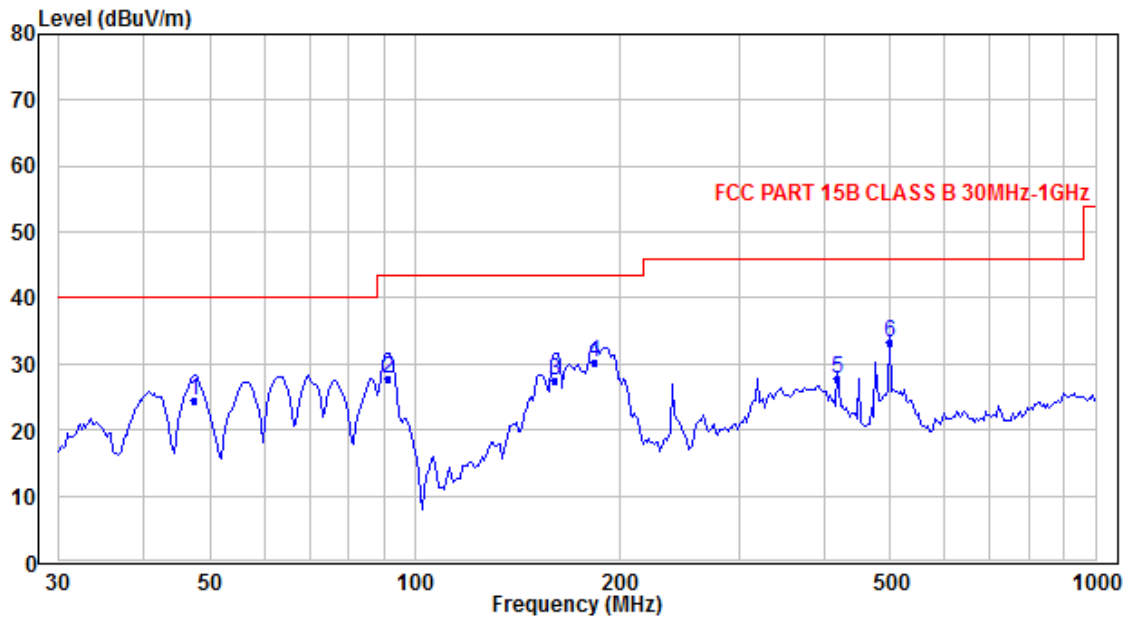
#### ■ 30MHz ~ 1GHz

### Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m )	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	91.700	45.60	-18.54	27.06	43.50	16.44	QP
2	159.759	38.00	-15.88	22.12	43.50	21.38	QP
3	182.578	41.94	-15.85	26.09	43.50	17.41	QP
4	238.463	36.87	-13.33	23.54	46.00	22.46	QP
5	329.462	36.97	-10.47	26.50	46.00	19.50	QP
6	478.139	33.30	-7.39	25.91	46.00	20.09	QP



**Vertical**


No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m )	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	47.369	44.03	-19.67	24.36	40.00	15.64	QP
2	91.057	47.04	-19.41	27.63	43.50	15.87	QP
3	160.885	44.01	-16.40	27.61	43.50	15.89	QP
4	183.866	46.68	-16.42	30.26	43.50	13.24	QP
5	418.378	36.91	-9.03	27.88	46.00	18.12	QP
6	498.730	39.85	-6.64	33.21	46.00	12.79	QP

Remark:Result=Reading+ Correction factor;Margin=Limit -Level

■ Above 1GHz

Low channel for 802.11a Band I									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
4101.07	34.82	29.78	8.86	37.88	35.58	74.00	-38.42	Vertical	Peak
7320.79	32.21	36.07	11.99	34.92	45.35	74.00	-28.65	Vertical	Peak
10324.50	32.88	38.59	13.58	35.36	49.69	68.20	-18.51	Vertical	Peak
4979.50	35.70	31.18	9.66	36.46	40.08	74.00	-33.92	Horizontal	Peak
7568.46	32.87	36.27	12.62	34.95	46.81	74.00	-27.19	Horizontal	Peak
10585.37	32.29	38.76	13.59	33.39	51.25	68.20	-16.95	Horizontal	Peak
10585.37	23.57	38.76	13.59	33.39	42.53	54.00	-11.47	Horizontal	Average

Middle channel for 802.11a Band I									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
3680.75	36.49	29.01	8.36	38.25	35.61	74.00	-38.39	Vertical	Peak
6830.54	33.29	35.58	11.64	34.96	45.55	68.20	-22.65	Vertical	Peak
10324.50	32.88	38.59	13.58	35.36	49.69	68.20	-18.51	Vertical	Peak
4383.25	34.85	30.58	9.11	37.57	36.97	74.00	-37.03	Horizontal	Peak
7422.99	31.78	36.15	12.14	34.84	45.23	74.00	-28.77	Horizontal	Peak
10353.17	32.25	38.61	13.58	35.46	48.98	68.20	-19.22	Horizontal	Peak

High channel for 802.11a Band I									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
3231.04	36.74	28.60	7.76	38.25	34.85	68.20	-33.35	Vertical	Peak
6480.03	31.97	35.03	11.14	35.33	42.81	68.20	-25.39	Vertical	Peak
9958.99	32.08	38.37	13.56	33.67	50.34	68.20	-17.86	Vertical	Peak
3133.99	36.31	28.56	7.64	38.21	34.30	68.20	-33.90	Horizontal	Peak
6755.21	32.00	35.46	11.55	35.07	43.94	68.20	-24.26	Horizontal	Peak
9794.69	32.04	38.27	13.64	35.68	48.27	68.20	-19.93	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz of highest fundamental frequency.

Low channel for 802.11a Band II									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
3680.75	36.49	29.01	8.36	38.25	35.61	68.20	-32.59	Vertical	Peak
6337.88	32.05	34.49	11.00	35.30	42.24	68.20	-25.96	Vertical	Peak
10556.06	31.72	38.73	13.59	33.75	50.29	68.20	-17.91	Vertical	Peak
3560.30	36.41	28.80	8.21	38.33	35.09	68.20	-33.11	Horizontal	Peak
6717.85	32.05	35.41	11.50	35.14	43.82	68.20	-24.38	Horizontal	Peak
9686.67	32.84	38.22	13.70	35.39	49.37	68.20	-18.83	Horizontal	Peak

Middle channel for 802.11a Band II									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
3912.25	35.57	29.36	8.66	38.16	35.43	74.00	-38.57	Vertical	Peak
7505.77	31.53	36.20	12.41	34.90	45.24	74.00	-28.76	Vertical	Peak
8864.26	31.58	37.73	13.17	34.32	48.16	68.20	-20.04	Vertical	Peak
3073.75	36.65	28.53	7.57	38.22	34.53	68.20	-33.67	Horizontal	Peak
6925.89	31.74	35.72	11.76	34.86	44.36	68.20	-23.84	Horizontal	Peak
10070.06	31.95	38.44	13.55	33.78	50.16	68.20	-18.04	Horizontal	Peak

High channel for 802.11a Band II									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
3711.49	36.55	29.06	8.40	38.25	35.76	74.00	-38.24	Vertical	Peak
6755.21	32.00	35.46	11.55	35.07	43.94	68.20	-24.26	Vertical	Peak
10703.42	31.91	38.89	13.58	33.95	50.43	74.00	-23.57	Vertical	Peak
3805.27	36.04	29.19	8.51	38.23	35.51	74.00	-38.49	Horizontal	Peak
7160.20	31.81	35.93	11.86	35.02	44.58	68.20	-23.62	Horizontal	Peak
11599.57	31.01	39.10	13.63	33.15	50.59	74.00	-23.41	Horizontal	Peak

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz of highest fundamental frequency.

Low channel for 802.11a Band III									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
3610.00	39.30	28.89	8.28	38.27	38.20	68.20	-30.00	Vertical	Peak
6588.73	32.18	35.21	11.34	35.36	43.37	68.20	-24.83	Vertical	Peak
8621.87	32.03	37.38	12.91	34.49	47.83	68.20	-20.37	Vertical	Peak
3501.57	36.80	28.72	8.12	38.41	35.23	68.20	-32.97	Horizontal	Peak
7505.77	31.53	36.20	12.41	34.90	45.24	74.00	-28.76	Horizontal	Peak
11826.90	30.16	39.10	14.22	33.58	49.90	74.00	-24.10	Horizontal	Peak

Middle channel for 802.11a Band III									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
3142.69	36.91	28.56	7.65	38.21	34.91	68.20	-33.29	Vertical	Peak
7422.99	31.78	36.15	12.14	34.84	45.23	74.00	-28.77	Vertical	Peak
10644.23	31.02	38.83	13.59	33.53	49.91	74.00	-24.09	Vertical	Peak
4123.87	35.46	29.85	8.88	37.83	36.36	74.00	-37.64	Horizontal	Peak
7042.07	32.20	35.83	11.85	34.85	45.03	68.20	-23.17	Horizontal	Peak
9447.94	32.62	38.08	13.70	35.27	49.13	74.00	-24.87	Horizontal	Peak

High channel for 802.11a Band III									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
4044.61	35.67	29.60	8.82	38.01	36.08	74.00	-37.92	Vertical	Peak
7422.99	31.78	36.15	12.14	34.84	45.23	74.00	-28.77	Vertical	Peak
9659.85	33.74	38.20	13.71	35.32	50.33	68.20	-17.87	Vertical	Peak
4123.87	35.46	29.85	8.88	37.83	36.36	74.00	-37.64	Horizontal	Peak
6906.72	31.67	35.69	11.73	34.88	44.21	68.20	-23.99	Horizontal	Peak
10042.18	31.37	38.42	13.54	33.53	49.80	68.20	-18.40	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz of highest fundamental frequency.

Low channel for 802.11a Band IV									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
3640.16	36.08	28.94	8.32	38.26	35.08	74.00	-38.92	Vertical	Peak
7042.07	32.20	35.83	11.85	34.85	45.03	68.20	-23.17	Vertical	Peak
10673.79	31.69	38.86	13.59	33.74	50.40	74.00	-23.60	Vertical	Peak
3570.19	36.26	28.82	8.22	38.31	34.99	68.20	-33.21	Horizontal	Peak
7505.77	31.53	36.20	12.41	34.90	45.24	74.00	-28.76	Horizontal	Peak
10852.83	32.07	39.04	13.58	34.44	50.25	74.00	-23.75	Horizontal	Peak

Middle channel for 802.11a Band IV									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
4044.61	35.67	29.60	8.82	38.01	36.08	74.00	-37.92	Vertical	Peak
8742.22	31.93	37.55	13.04	34.35	48.17	68.20	-20.03	Vertical	Peak
10042.18	31.37	38.42	13.54	33.53	49.80	68.20	-18.40	Vertical	Peak
3462.95	37.15	28.69	8.06	38.46	35.44	74.00	-38.56	Horizontal	Peak
6426.35	32.06	34.83	11.04	35.32	42.61	68.20	-25.59	Horizontal	Peak
9931.42	32.02	38.35	13.57	34.02	49.92	68.20	-18.28	Horizontal	Peak

High channel for 802.11a Band IV									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
3453.36	37.12	28.68	8.04	38.48	35.36	68.20	-32.84	Vertical	Peak
7240.05	33.79	36.00	11.90	35.03	46.66	68.20	-21.54	Vertical	Peak
9421.78	31.93	38.07	13.70	35.28	48.42	74.00	-25.58	Vertical	Peak
3006.32	37.86	28.50	7.49	38.23	35.62	68.20	-32.58	Horizontal	Peak
7568.46	32.87	36.27	12.62	34.95	46.81	74.00	-27.19	Horizontal	Peak
9659.85	33.74	38.20	13.71	35.32	50.33	68.20	-17.87	Horizontal	Peak

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz of highest fundamental frequency.

Band I&II									
Bandwidth:		20MHz		Worst mode:		802.11a		Test channel:	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector
5150.00	17.56	31.70	9.79	0.00	59.05	68.20	-9.15	Horizontal	Peak
5350.00	13.85	31.40	10.06	0.00	55.31	68.20	-12.89	Horizontal	Peak
5150.00	18.25	31.70	9.79	0.00	59.74	68.20	-8.46	Vertical	Peak
5350.00	15.33	31.40	10.06	0.00	56.79	68.20	-11.41	Vertical	Peak
5150.00	8.17	31.70	9.79	0.00	49.66	54.00	-4.34	Horizontal	Average
5350.00	7.13	31.40	10.06	0.00	48.59	54.00	-5.41	Horizontal	Average
5150.00	8.16	31.70	9.79	0.00	49.65	54.00	-4.35	Vertical	Average
5350.00	7.24	31.40	10.06	0.00	48.70	54.00	-5.30	Vertical	Average

Band I&II									
Bandwidth:		20MHz		Worst mode:		802.11a		Test channel:	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector
5150.00	18.86	31.70	9.79	0.00	60.35	68.20	-7.85	Horizontal	Peak
5350.00	14.69	31.40	10.06	0.00	56.15	68.20	-12.05	Horizontal	Peak
5150.00	18.77	31.70	9.79	0.00	60.26	68.20	-7.94	Vertical	Peak
5350.00	15.68	31.40	10.06	0.00	57.14	68.20	-11.06	Vertical	Peak
5150.00	8.94	31.70	9.79	0.00	50.43	54.00	-3.57	Horizontal	Average
5350.00	6.68	31.40	10.06	0.00	48.14	54.00	-5.86	Horizontal	Average
5150.00	8.86	31.70	9.79	0.00	50.35	54.00	-3.65	Vertical	Average
5350.00	8.03	31.40	10.06	0.00	49.49	54.00	-4.51	Vertical	Average

Band I&II									
Bandwidth:		40MHz		Worst mode:		802.11ac		Test channel:	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector
5150.00	19.84	31.70	9.79	0.00	61.33	68.20	-6.87	Horizontal	Peak
5350.00	17.44	31.40	10.06	0.00	58.90	68.20	-9.30	Horizontal	Peak
5150.00	19.75	31.70	9.79	0.00	61.24	68.20	-6.96	Vertical	Peak
5350.00	16.88	31.40	10.06	0.00	58.34	68.20	-9.86	Vertical	Peak
5150.00	9.87	31.70	9.79	0.00	51.36	54.00	-2.64	Horizontal	Average
5350.00	7.68	31.40	10.06	0.00	49.14	54.00	-4.86	Horizontal	Average
5150.00	9.25	31.70	9.79	0.00	50.74	54.00	-3.26	Vertical	Average
5350.00	7.23	31.40	10.06	0.00	48.69	54.00	-5.31	Vertical	Average



Bandwidth:		40MHz		Worst mode:		802.11ac		Test channel:		CH <sub>H</sub>
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector	
5150.00	20.75	31.70	9.79	0.00	62.24	68.20	-5.96	Horizontal	Peak	
5350.00	18.89	31.40	10.06	0.00	60.35	68.20	-7.85	Horizontal	Peak	
5150.00	20.67	31.70	9.79	0.00	62.16	68.20	-6.04	Vertical	Peak	
5350.00	18.63	31.40	10.06	0.00	60.09	68.20	-8.11	Vertical	Peak	
5150.00	7.37	31.70	9.79	0.00	48.86	54.00	-5.14	Horizontal	Average	
5350.00	8.93	31.40	10.06	0.00	50.39	54.00	-3.61	Horizontal	Average	
5150.00	9.76	31.70	9.79	0.00	51.25	54.00	-2.75	Vertical	Average	
5350.00	8.64	31.40	10.06	0.00	50.10	54.00	-3.90	Vertical	Average	

Bandwidth:		80MHz		Worst mode:		802.11ac		Test channel:		CH <sub>M</sub>
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector	
5150.00	22.42	31.70	9.79	0.00	63.91	68.20	-4.29	Horizontal	Peak	
5350.00	19.50	31.40	10.06	0.00	60.96	68.20	-7.24	Horizontal	Peak	
5150.00	23.30	31.70	9.79	0.00	64.79	68.20	-3.41	Vertical	Peak	
5350.00	19.86	31.40	10.06	0.00	61.32	68.20	-6.88	Vertical	Peak	
5150.00	10.69	31.70	9.79	0.00	52.18	54.00	-1.82	Horizontal	Average	
5350.00	8.99	31.40	10.06	0.00	50.45	54.00	-3.55	Horizontal	Average	
5150.00	9.82	31.70	9.79	0.00	51.31	54.00	-2.69	Vertical	Average	
5350.00	7.88	31.40	10.06	0.00	49.34	54.00	-4.66	Vertical	Average	

Band III									
Bandwidth:		20MHz		Worst mode:		802.11a		Test channel:	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector
5460.00	17.56	31.74	10.17	0.00	59.47	68.20	-8.73	Horizontal	Peak
5725.00	13.85	31.73	10.47	0.00	56.05	68.20	-12.15	Horizontal	Peak
5460.00	18.25	31.74	10.17	0.00	60.16	68.20	-8.04	Vertical	Peak
5725.00	15.33	31.73	10.47	0.00	57.53	68.20	-10.67	Vertical	Peak
5460.00	8.17	31.74	10.17	0.00	50.08	54.00	-3.92	Horizontal	Average
5725.00	7.13	31.73	10.47	0.00	49.33	54.00	-4.67	Horizontal	Average
5460.00	8.16	31.74	10.17	0.00	50.07	54.00	-3.93	Vertical	Average
5725.00	7.24	31.73	10.47	0.00	49.44	54.00	-4.56	Vertical	Average

Band III									
Bandwidth:		20MHz		Worst mode:		802.11a		Test channel:	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector
5460.00	18.65	31.74	10.17	0.00	60.56	68.20	-7.64	Horizontal	Peak
5725.00	14.53	31.73	10.47	0.00	56.73	68.20	-11.47	Horizontal	Peak
5460.00	18.76	31.74	10.17	0.00	60.67	68.20	-7.53	Vertical	Peak
5725.00	15.44	31.73	10.47	0.00	57.64	68.20	-10.56	Vertical	Peak
5460.00	9.86	31.74	10.17	0.00	51.77	54.00	-2.23	Horizontal	Average
5725.00	7.53	31.73	10.47	0.00	49.73	54.00	-4.27	Horizontal	Average
5460.00	9.68	31.74	10.17	0.00	51.59	54.00	-2.41	Vertical	Average
5725.00	7.55	31.73	10.47	0.00	49.75	54.00	-4.25	Vertical	Average

Band III									
Bandwidth:		40MHz		Worst mode:		802.11ac		Test channel:	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector
5460.00	19.94	31.74	10.17	0.00	61.85	68.20	-6.35	Horizontal	Peak
5725.00	16.77	31.73	10.47	0.00	58.97	68.20	-9.23	Horizontal	Peak
5460.00	19.88	31.74	10.17	0.00	61.79	68.20	-6.41	Vertical	Peak
5725.00	16.88	31.73	10.47	0.00	59.08	68.20	-9.12	Vertical	Peak
5460.00	8.68	31.74	10.17	0.00	50.59	54.00	-3.41	Horizontal	Average
5725.00	7.89	31.73	10.47	0.00	50.09	54.00	-3.91	Horizontal	Average
5460.00	9.14	31.74	10.17	0.00	51.05	54.00	-2.95	Vertical	Average
5725.00	7.55	31.73	10.47	0.00	49.75	54.00	-4.25	Vertical	Average

Bandwidth:		40MHz		Worst mode:		802.11ac		Test channel:		CH <sub>H</sub>
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector	
5460.00	20.14	31.74	10.17	0.00	62.05	68.20	-6.15	Horizontal	Peak	
5725.00	18.35	31.73	10.47	0.00	60.55	68.20	-7.65	Horizontal	Peak	
5460.00	20.01	31.74	10.17	0.00	61.92	68.20	-6.28	Vertical	Peak	
5725.00	18.12	31.73	10.47	0.00	60.32	68.20	-7.88	Vertical	Peak	
5460.00	8.55	31.74	10.17	0.00	50.46	54.00	-3.54	Horizontal	Average	
5725.00	6.93	31.73	10.47	0.00	49.13	54.00	-4.87	Horizontal	Average	
5460.00	8.76	31.74	10.17	0.00	50.67	54.00	-3.33	Vertical	Average	
5725.00	6.64	31.73	10.47	0.00	48.84	54.00	-5.16	Vertical	Average	

Bandwidth:		80MHz		Worst mode:		802.11ac		Test channel:		CH <sub>M</sub>
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector	
5460.00	21.34	31.74	10.17	0.00	63.25	68.20	-4.95	Horizontal	Peak	
5725.00	19.56	31.73	10.47	0.00	61.76	68.20	-6.44	Horizontal	Peak	
5460.00	21.16	31.74	10.17	0.00	63.07	68.20	-5.13	Vertical	Peak	
5725.00	19.27	31.73	10.47	0.00	61.47	68.20	-6.73	Vertical	Peak	
5460.00	9.15	31.74	10.17	0.00	51.06	54.00	-2.94	Horizontal	Average	
5725.00	7.89	31.73	10.47	0.00	50.09	54.00	-3.91	Horizontal	Average	
5460.00	9.21	31.74	10.17	0.00	51.12	54.00	-2.88	Vertical	Average	
5725.00	7.98	31.73	10.47	0.00	50.18	54.00	-3.82	Vertical	Average	

Band IV									
Bandwidth:		20MHz		Worst mode:		802.11a		Test channel:	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector
5725.49	20.33	31.73	10.47	0.00	62.53	68.20	-5.67	Horizontal	Peak
5850.00	16.45	32.20	10.61	0.00	59.26	68.20	-8.94	Horizontal	Peak
5725.49	20.47	31.73	10.47	0.00	62.67	68.20	-5.53	Vertical	Peak
5850.00	16.28	32.20	10.61	0.00	59.09	68.20	-9.11	Vertical	Peak
5725.49	8.86	31.73	10.47	0.00	51.06	54.00	-2.94	Horizontal	Average
5850.00	6.35	32.20	10.61	0.00	49.16	54.00	-4.84	Horizontal	Average
5725.49	8.56	31.73	10.47	0.00	50.76	54.00	-3.24	Vertical	Average
5850.00	6.94	32.20	10.61	0.00	49.75	54.00	-4.25	Vertical	Average

Band IV									
Bandwidth:		20MHz		Worst mode:		802.11a		Test channel:	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector
5725.49	19.46	31.73	10.47	0.00	61.66	68.20	-6.54	Horizontal	Peak
5850.00	15.65	32.20	10.61	0.00	58.46	68.20	-9.74	Horizontal	Peak
5725.49	19.33	31.73	10.47	0.00	61.53	68.20	-6.67	Vertical	Peak
5850.00	15.38	32.20	10.61	0.00	58.19	68.20	-10.01	Vertical	Peak
5725.49	8.33	31.73	10.47	0.00	50.53	54.00	-3.47	Horizontal	Average
5850.00	6.25	32.20	10.61	0.00	49.06	54.00	-4.94	Horizontal	Average
5725.49	8.75	31.73	10.47	0.00	50.95	54.00	-3.05	Vertical	Average
5850.00	6.24	32.20	10.61	0.00	49.05	54.00	-4.95	Vertical	Average

Band IV									
Bandwidth:		40MHz		Worst mode:		802.11ac		Test channel:	
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector
5725.49	20.71	31.73	10.47	0.00	62.91	68.20	-5.29	Horizontal	Peak
5850.00	17.66	32.20	10.61	0.00	60.47	68.20	-7.73	Horizontal	Peak
5725.49	20.46	31.73	10.47	0.00	62.66	68.20	-5.54	Vertical	Peak
5850.00	17.54	32.20	10.61	0.00	60.35	68.20	-7.85	Vertical	Peak
5725.49	9.15	31.73	10.47	0.00	51.35	54.00	-2.65	Horizontal	Average
5850.00	7.23	32.20	10.61	0.00	50.04	54.00	-3.96	Horizontal	Average
5725.49	8.94	31.73	10.47	0.00	51.14	54.00	-2.86	Vertical	Average
5850.00	7.15	32.20	10.61	0.00	49.96	54.00	-4.04	Vertical	Average

Bandwidth:		40MHz		Worst mode:		802.11ac		Test channel:		CH <sub>H</sub>
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector	
5725.49	19.88	31.73	10.47	0.00	62.08	68.20	-6.12	Horizontal	Peak	
5850.00	17.21	32.20	10.61	0.00	60.02	68.20	-8.18	Horizontal	Peak	
5725.49	19.68	31.73	10.47	0.00	61.88	68.20	-6.32	Vertical	Peak	
5850.00	16.94	32.20	10.61	0.00	59.75	68.20	-8.45	Vertical	Peak	
5725.49	8.79	31.73	10.47	0.00	50.99	54.00	-3.01	Horizontal	Average	
5850.00	6.57	32.20	10.61	0.00	49.38	54.00	-4.62	Horizontal	Average	
5725.49	8.66	31.73	10.47	0.00	50.86	54.00	-3.14	Vertical	Average	
5850.00	6.48	32.20	10.61	0.00	49.29	54.00	-4.71	Vertical	Average	

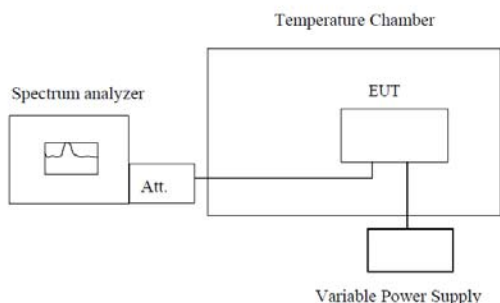
Bandwidth:		80MHz		Worst mode:		802.11ac		Test channel:		CH <sub>M</sub>
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Detector	
5725.49	20.41	31.73	10.47	0.00	62.61	68.20	-5.59	Horizontal	Peak	
5850.00	18.35	32.20	10.61	0.00	61.16	68.20	-7.04	Horizontal	Peak	
5725.49	20.33	31.73	10.47	0.00	62.53	68.20	-5.67	Vertical	Peak	
5850.00	17.94	32.20	10.61	0.00	60.75	68.20	-7.45	Vertical	Peak	
5725.49	9.79	31.73	10.47	0.00	51.99	54.00	-2.01	Horizontal	Average	
5850.00	7.33	32.20	10.61	0.00	50.14	54.00	-3.86	Horizontal	Average	
5725.49	9.67	31.73	10.47	0.00	51.87	54.00	-2.13	Vertical	Average	
5850.00	7.02	32.20	10.61	0.00	49.83	54.00	-4.17	Vertical	Average	

## 5.8. Frequency stability

### LIMIT

Within Operation Band

### TEST CONFIGURATION



Note : Measurement setup for testing on Antenna connector

### TEST PROCEDURE

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

### TEST RESULTS

ANT 0:Band I for 802.11a Low				
Voltage(%)	Power(Va.c.)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	120	-30	3640	0.703
100%		-20	2650	0.512
100%		-10	3350	0.647
100%		0	3250	0.627
100%		+10	3540	0.683
100%		+20	3590	0.693
100%		+30	3260	0.629
100%		+40	3260	0.629
100%		+50	4210	0.813
Low power	108	+20	4350	0.840
High power	132	+20	3560	0.687



ANT 0:Band IV for 802.11a Low				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	120	-30	3670	0.639
100%		-20	3640	0.634
100%		-10	3550	0.618
100%		0	3750	0.653
100%		+10	3450	0.601
100%		+20	3580	0.623
100%		+30	3640	0.634
100%		+40	3900	0.679
100%		+50	3970	0.691
Low power	108	+20	3570	0.621
High power	132	+20	3980	0.693

ANT 1:Band I for 802.11a Low				
Voltage(%)	Power(Va.c.)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	120	-30	3640	0.703
100%		-20	2650	0.512
100%		-10	3350	0.647
100%		0	3250	0.627
100%		+10	3540	0.683
100%		+20	3590	0.693
100%		+30	3260	0.629
100%		+40	3260	0.629
100%		+50	4210	0.813
Low power	108	+20	4350	0.840
High power	132	+20	3560	0.687

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100%		0	3750	0.653
100%		+10	3450	0.601
100%		+20	3580	0.623
100%		+30	3640	0.634
100%		+40	3900	0.679
100%		+50	3970	0.691
Low power	108	+20	3570	0.621
High power	132	+20	3980	0.693

## 5.9. Dynamic Frequency Selection (DFS)

### Requirement

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

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

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

### LIMIT

#### 1. DFS Detection Thresholds

Table 3: DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP $\geq$ 200 milliwatt	-64 dBm
EIRP $<$ 200 milliwatt and power spectral density $<$ 10 dBm/MHz	-62 dBm
EIRP $<$ 200 milliwatt that do not meet the power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.

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

Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

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Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China  
Tel: +86-755-28230888 Fax: +86-755-28230886 E-mail: info@uttlab.com [Http://www.uttlab.com](http://www.uttlab.com)

## 2. DFS Response Requirements

Table 4: DFS Response Requirement Values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required facilitating a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

## RADAR TEST WAVEFORMS

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

Table 5 Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$\text{Roundup} \left\{ \left( \frac{1}{360} \right), \left( \frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30

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Aggregate (Radar Types 1-4)	80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.		

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

For example if in Short Pulse Radar Type 1 Test B a PRI of 3066  $\mu$ sec is selected, the number of pulses

would be Round up  $\left\lceil \left( \frac{1}{360} \right) \cdot \left( \frac{19 \cdot 10^6}{3066} \right) \right\rceil = \text{Round up } \{17.2\} = 18$ .

Table 5a - Pulse Repetition Intervals Values for Test A

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

Table 6 – Long Pulse Radar Test Waveform

Radar Type	Pulse Width ( $\mu$ sec)	Chirp Width (MHz)	PRI ( $\mu$ sec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
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5	50-100	5-20	1000-2000	1-3	8-20	80%	30
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The parameters for this waveforms are randomly chosen. Thirty unique waveforms are required for the Long Pulse Radar Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type waveforms, then each additional waveform must also be unique and not repeated from the previous waveforms.

Table 7 – Frequency Hopping Radar Test Waveform

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

For the Frequency Hopping Radar Type, the same Burst parameters are used for each wave form. The hopping sequence is different for each wave form and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

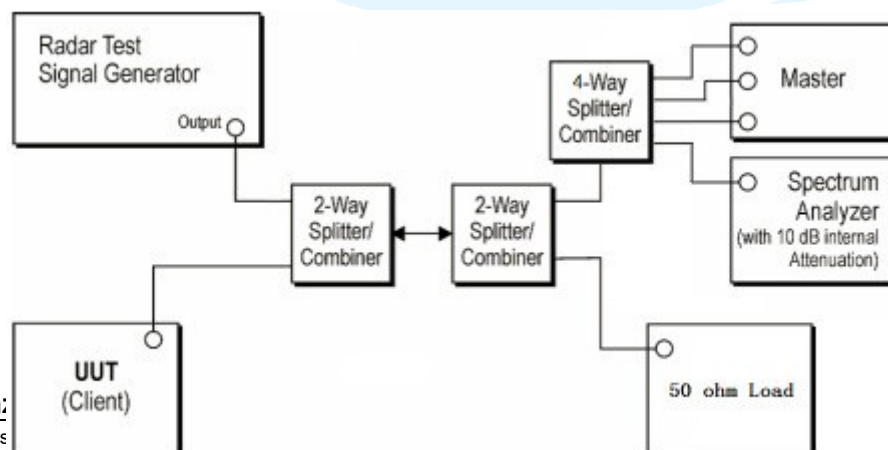
The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250–5724MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until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

## Calibration of Radar Waveform

### Radar Waveform Calibration Procedure

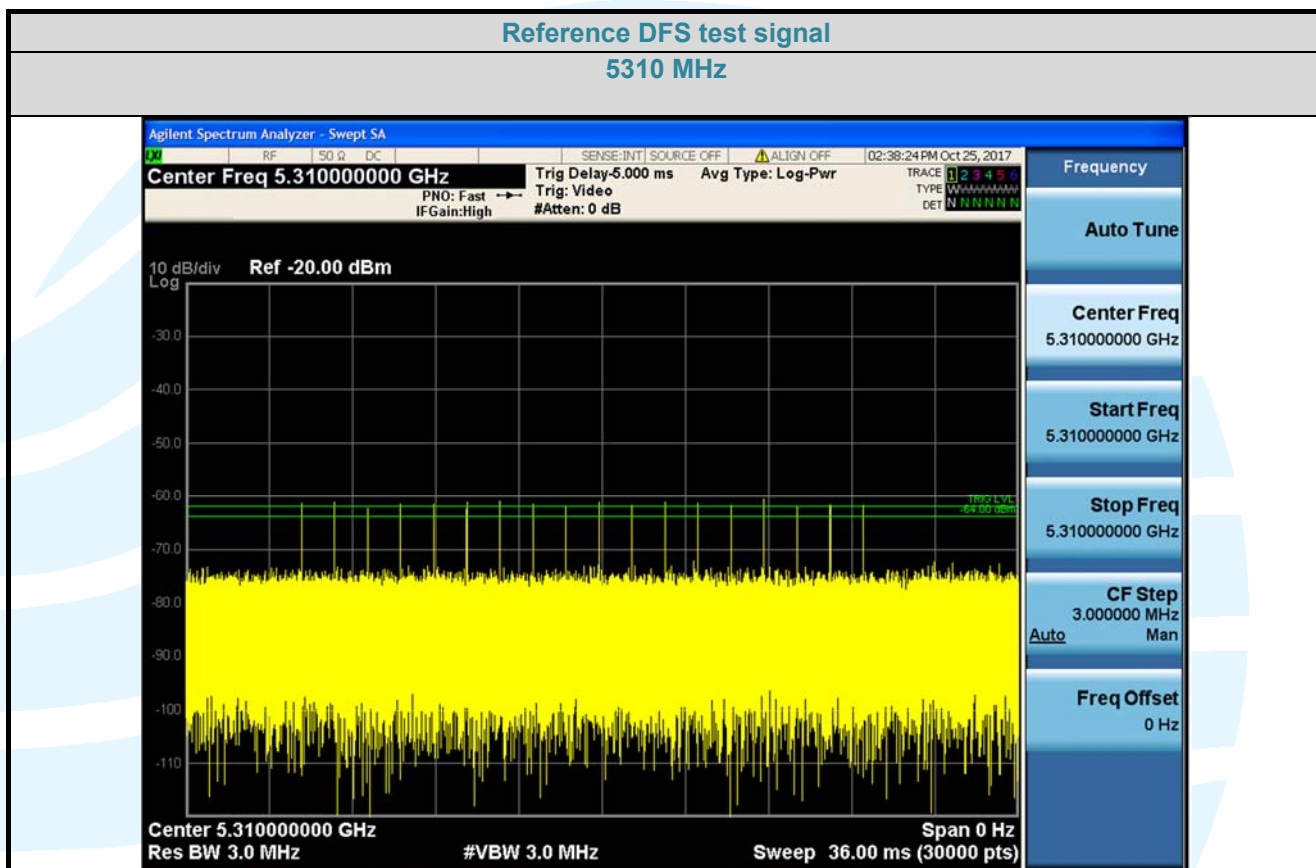
- 1) A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to place of the master
- 2) The interference Radar Detection Threshold Level is  $-62\text{dBm} + 0\text{dBi} + 1\text{dB} = -61\text{dBm}$  that had been taken into account the output power range and antenna gain.
- 3) The following equipment setup was used to calibrate the conducted radar waveform. A vector signal generator was utilized to establish the test signal level for radar type 0. During this process there were no transmissions by either the master or client device. The spectrum analyzer was switched to the zero spans (time domain) at the frequency of the radar waveform generator. Peak detection was used. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3 MHz. The spectrum analyzer had offset -1.0dB to compensate RF cable loss 1.0dB.
- 4) The vector signal generator amplitude was set so that the power level measured at the spectrum analyzer was  $-62\text{dBm} + 0\text{dBi} + 1\text{dB} = -61\text{dBm}$ . Capture the spectrum analyzer plots on short pulse radar waveform.

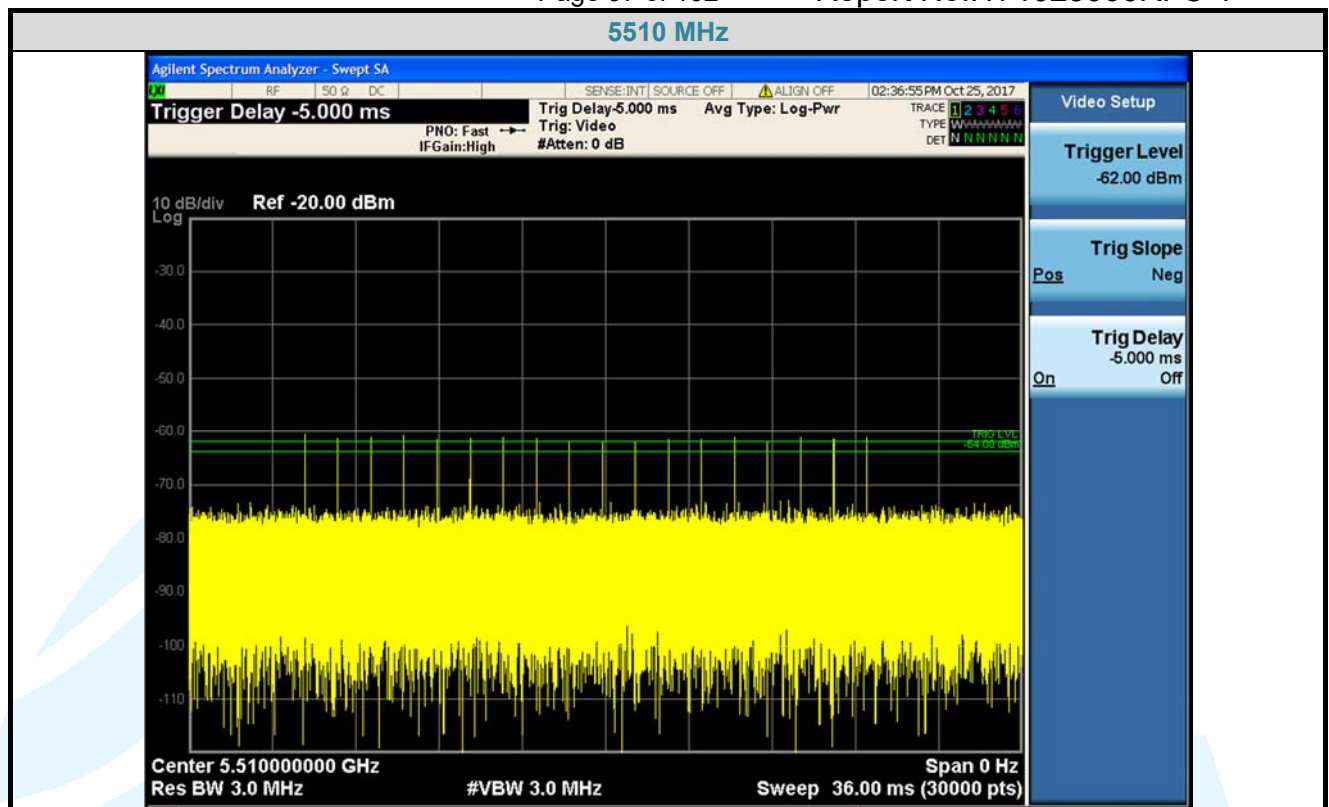
## Conducted Calibration Setup





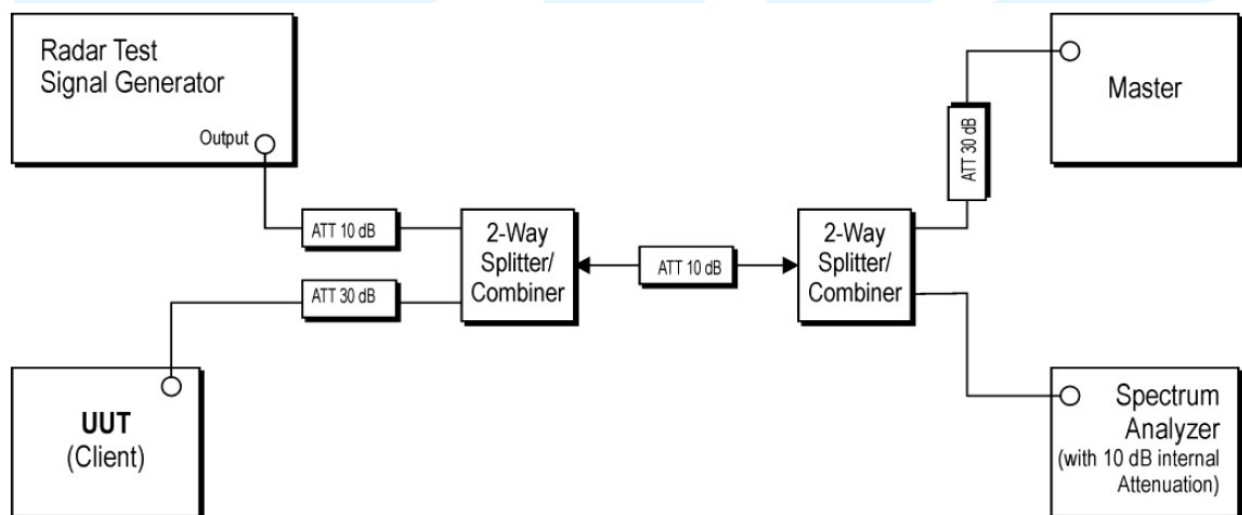
### Radar Waveform Calibration Result





## TEST CONFIGURATION

Setup for Client with injection at the Master



## TEST PROCEDURE

1. The radar pulse generator is setup to provide a pulse at frequency that the master and client are operating. A type 0 radar pulse with a 1us pulse width and a 1428us PRI is used for the testing.
2. The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -61dBm at the antenna port of the master device

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3. A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.
4. EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using Media Player Classic Ver. 6.4.8.6 in order to properly load the network for the entire period of the test.
5. When radar burst with a level equal to the DFS Detection Threshold +1dB is generated on the operating channel of the U-NII device. At time T0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection Threshold +1dB.
6. Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel Measure and record the transmissions from the UUT during the observation time (Channel Move Time). One 15 seconds plot is reported for the Short Pulse Radar Type 0. The plot for the Short Pulse Radar Types start at the end of the radar burst. The Channel Move Time will be calculated based on the zoom in 600ms plot of the Short Pulse Radar Type
7. Measurement of the aggregate duration of the Channel Closed Transmission Time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by:  $Dwell (0.3ms) = S (12000ms) / B (4000)$ ; where Dwell is the dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by:  $C (ms) = N \times Dwell (0.3ms)$ ; where C is the Closing Time, N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.
8. Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.

#### **TEST MODE:**

Please refer to the clause 3.3

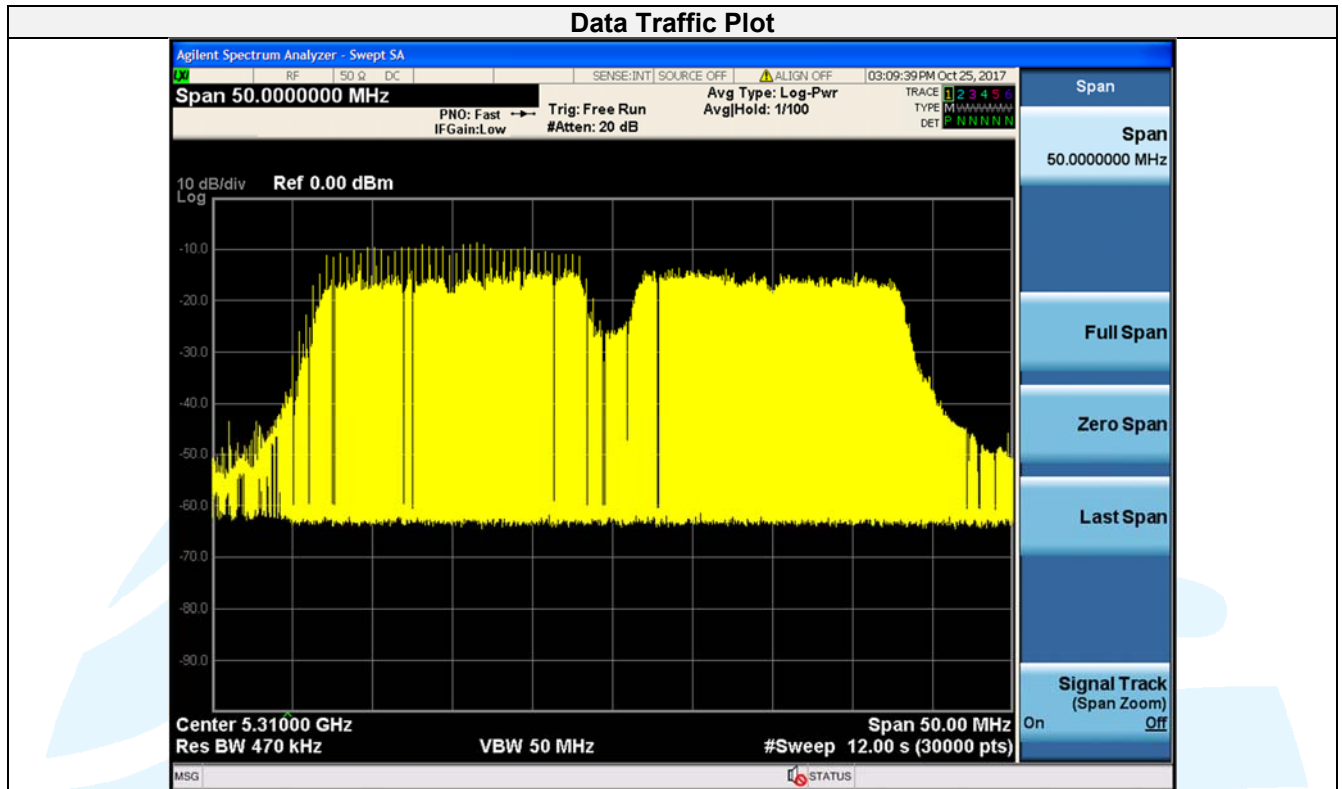
#### **TEST RESULTS**

☒ **Passed**      ☐ **Not Applicable**

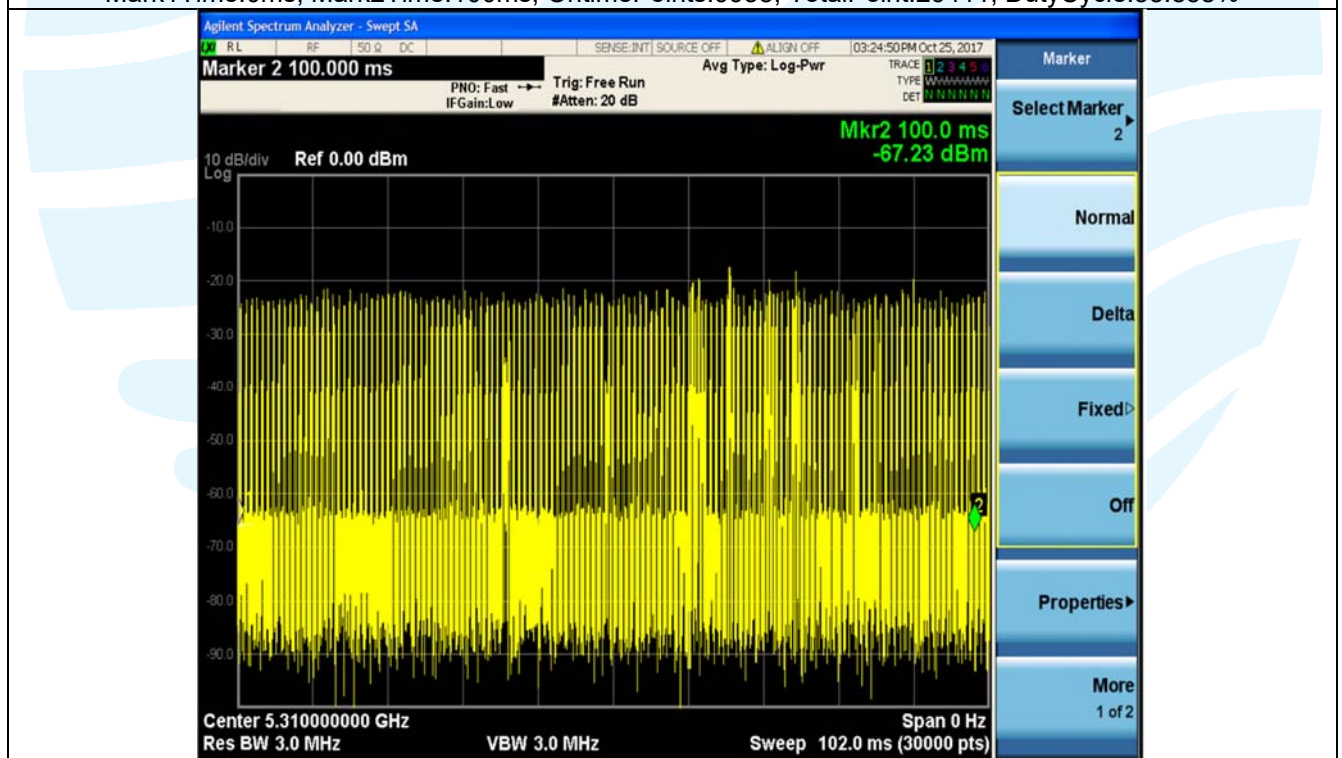
BW/Channel	Test Item	Test Result	Limit	Result
40MHz/5310MHz	Channel Move Time	0.5866s	<10s	Pass
	Channel Closing Transmission Time	200+3.6ms	<200+60ms	Pass
40MHz/5510MHz	Channel Move Time	0.575S	<10s	Pass
	Channel Closing Transmission Time	200+5.2ms	<200+60ms	Pass

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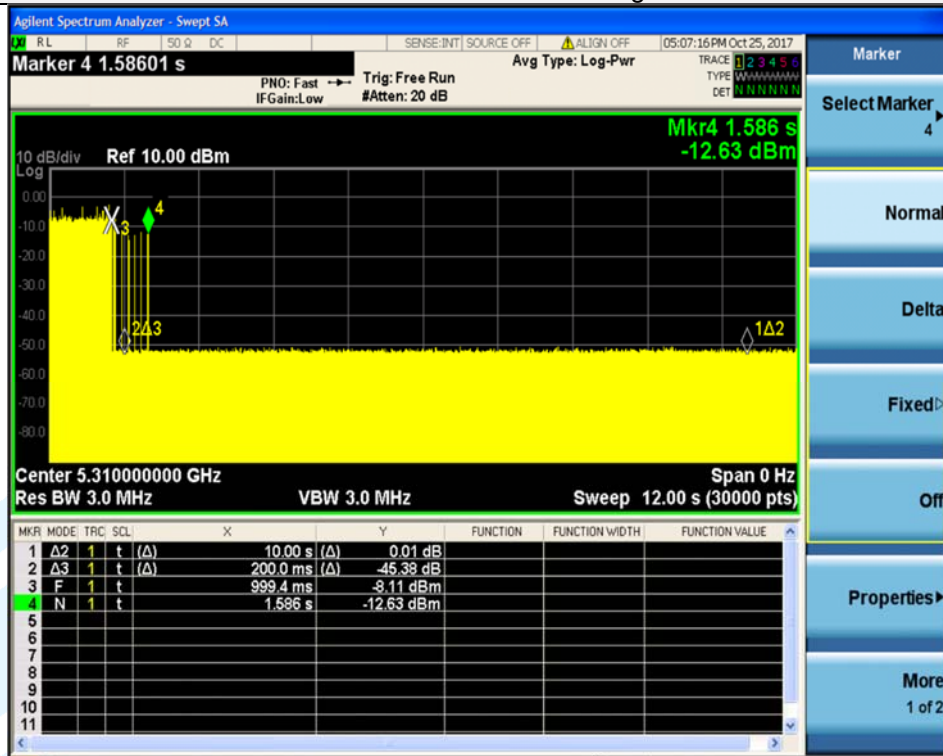
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Mark1Time:0ms, Mark2Time:100ms, OntimePoints:9958, TotalPoint:29411, DutyCycle:33.858%



## Band II Channel Move Time& Channel Closing Transmission Time

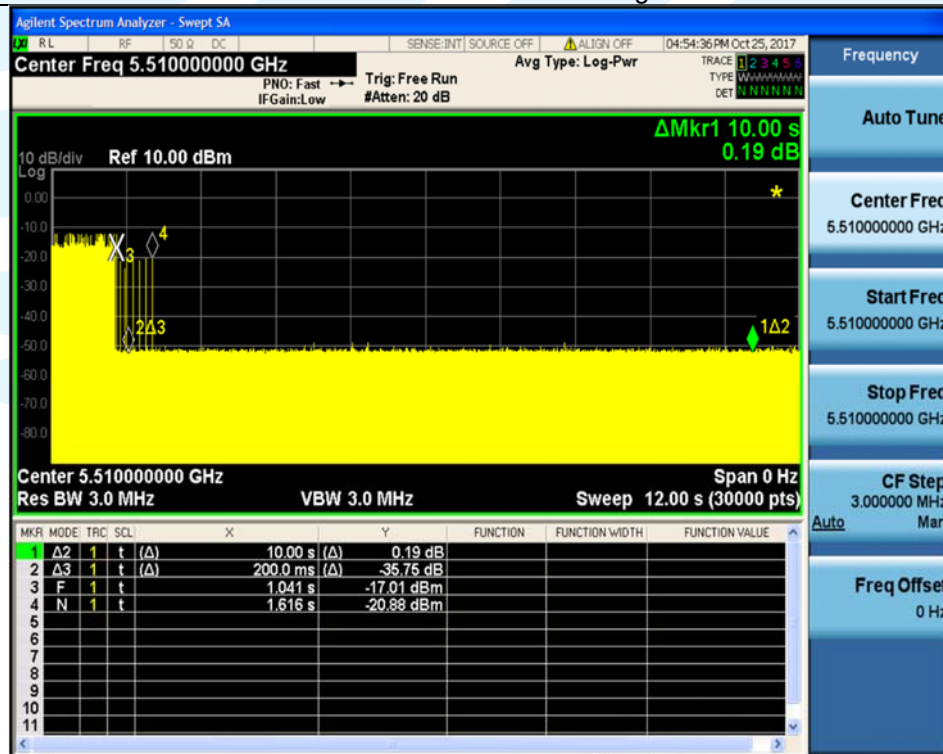


40MHz/5310MHz

Mark1Time:1001.4ms, Mark2Time:1099.9ms, OntimePoints:9, TotalPoint:246, DutyCycle:3.659%,Sum of OnTime:3.601ms

1. Dwell = S/B = 12000ms/30000 = 0.4 ms, C = N x Dwell = 9 x 0.4 = 3.6ms
2. CMT = 1.586 s – 0.9994 s = 0.5866s

## Band III Channel Move Time& Channel Closing Transmission Time



40MHz/5510MHz

Mark1Time:1241ms, Mark2Time:11041ms, OntimePoints:13, TotalPoint:24495, DutyCycle:0.053%,Sum of OnTime:5.201ms

1. Dwell = S/B = 12000ms/30000 = 0.4 ms, C = N x Dwell = 13 x 0.4 = 5.2ms
2. CMT = 1.616 s – 1.041 s = 0.575s

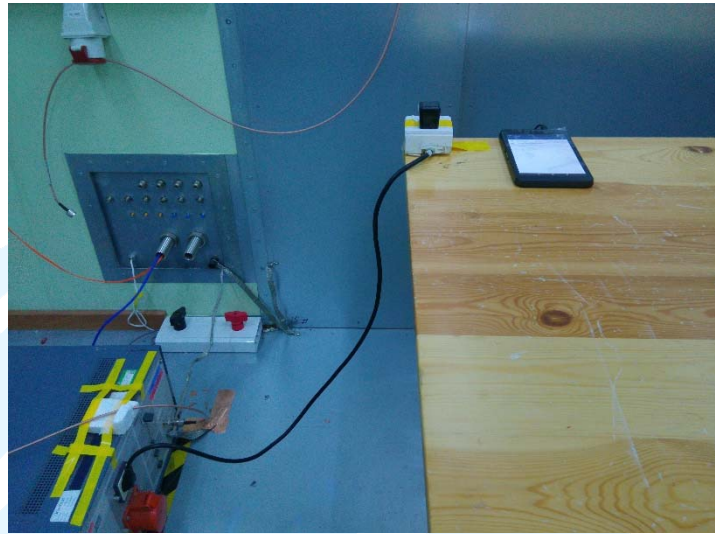
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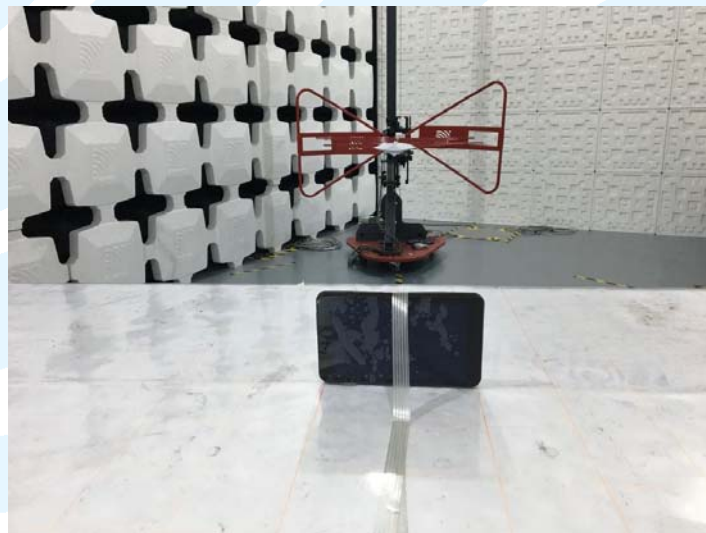


## 6. Test Setup Photos of the EUT

### Conducted Emissions (AC Mains)



### Radiated Emissions





## Dynamic Frequency Selection (DFS)

**7. External and Internal Photos of the EUT**

Reference to Test Report No.: TRE1709024401.

-----End of Report-----