11 26 dB Bandwidth and 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.407 (a)
Test Method:	KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v01 Section D
Test Limit:	No restriction limits
Test Result:	PASS

11.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

11.2 Test Result:

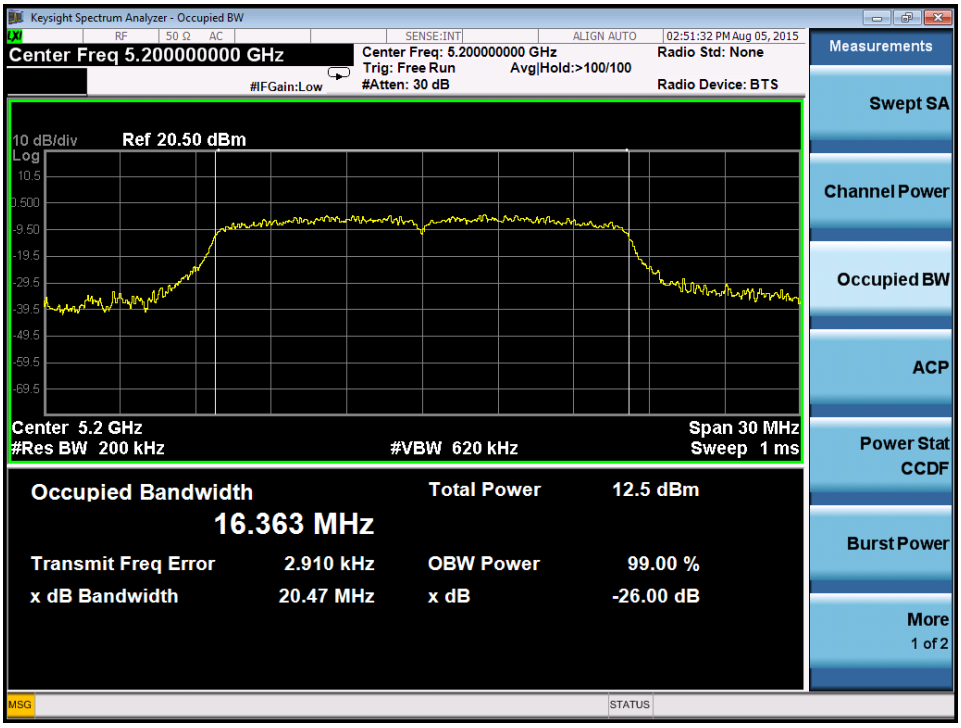
Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
ANT0 Band I	802.11a	22.71	20.47	24.80	16.378	16.363	16.422
	802.11n(HT20)	26.13	26.39	28.70	17.541	17.502	17.586
	802.11n(HT40)	45.06	/	45.10	36.299	/	36.275
ANT0 Band IV	802.11a	29.68	28.74	24.81	16.655	16.516	16.448
	802.11n(HT20)	22.80	20.25	19.92	17.446	17.395	17.383
	802.11n(HT40)	45.98	/	45.68	36.367	/	36.375
ANT1 Band I	802.11a	25.98	24.50	27.32	16.574	16.528	16.459
	802.11n(HT20)	27.24	27.96	29.81	17.713	17.790	17.715
	802.11n(HT40)	45.41	/	45.23	36.339	/	36.310
ANT1 Band IV	802.11a	28.04	20.95	20.68	16.523	16.387	16.399
	802.11n(HT20)	19.93	19.87	20.20	17.410	17.404	17.410
	802.11n(HT40)	46.28	/	45.81	36.384	/	36.400

Test result plots shown as follows:

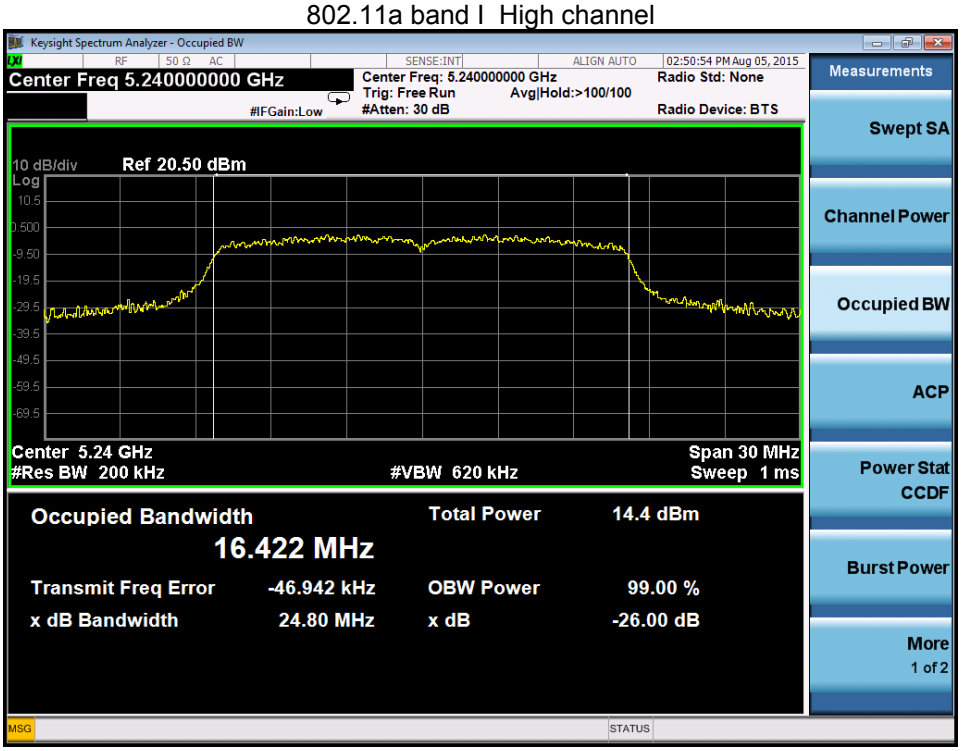
ANT0:

802.11a band I Low channel

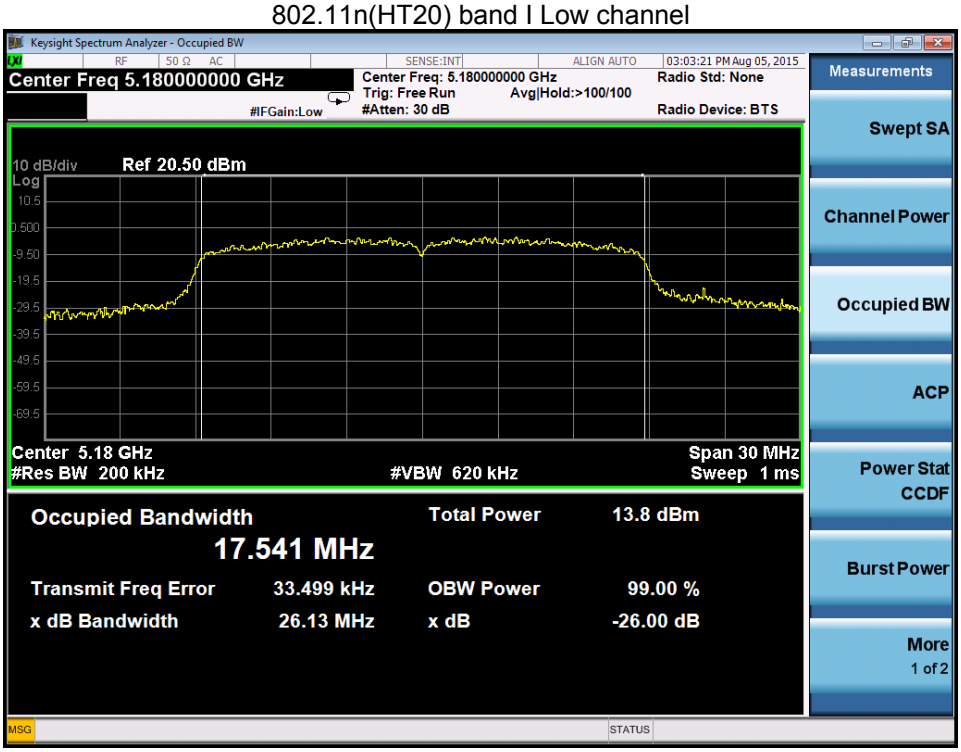
802.11a band I Middle channel



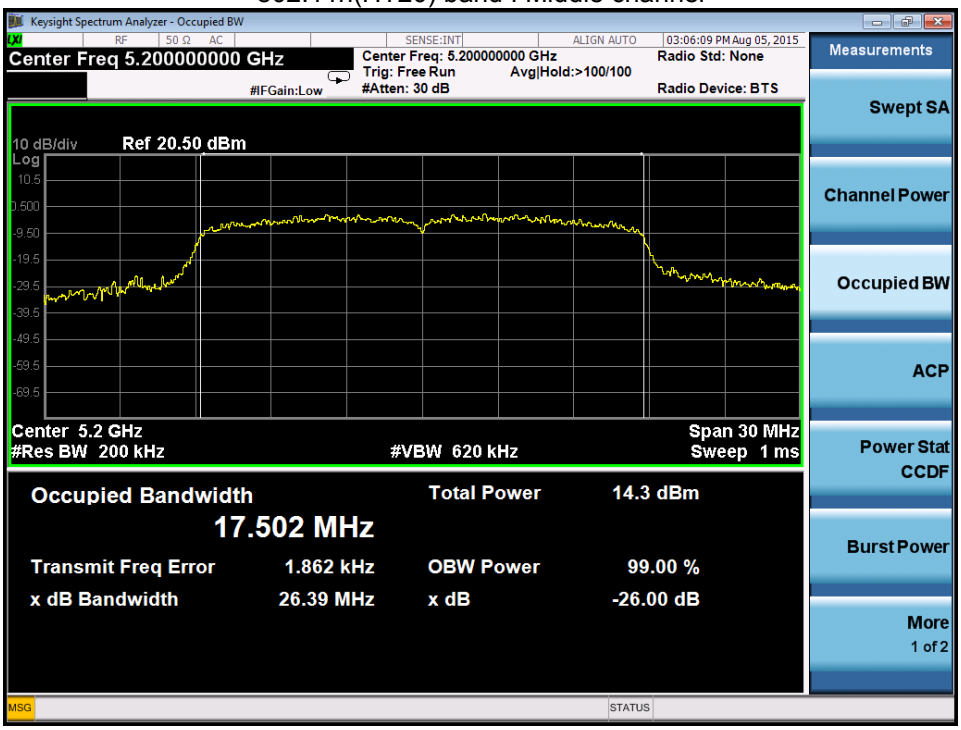
802.11a band I High channel



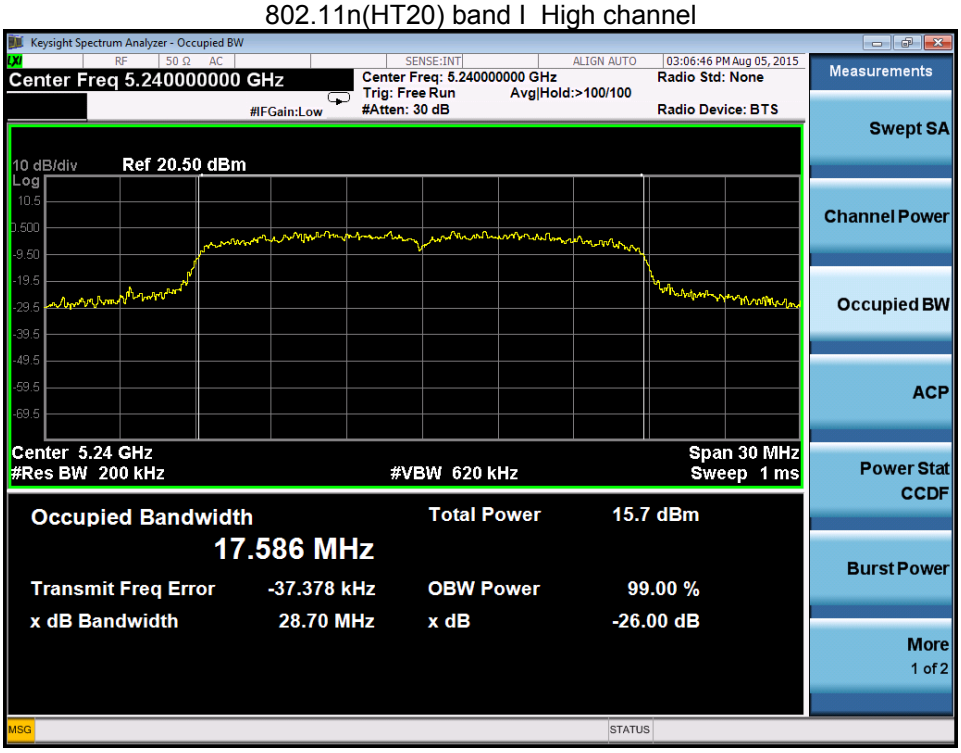
802.11n(HT20) band I Low channel



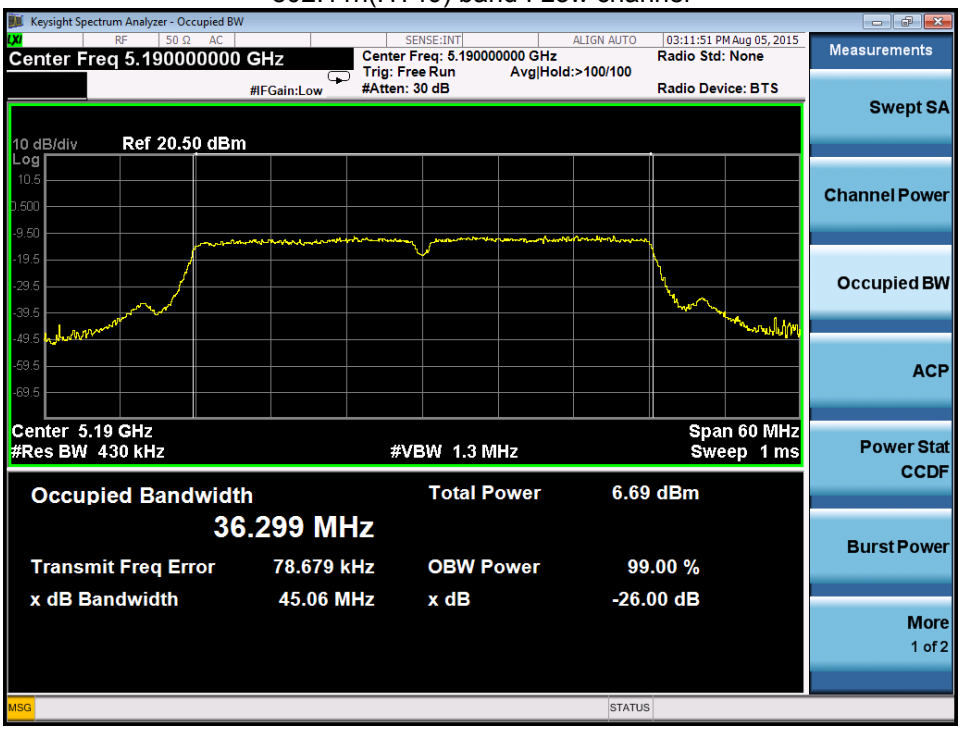
802.11n(HT20) band I Middle channel



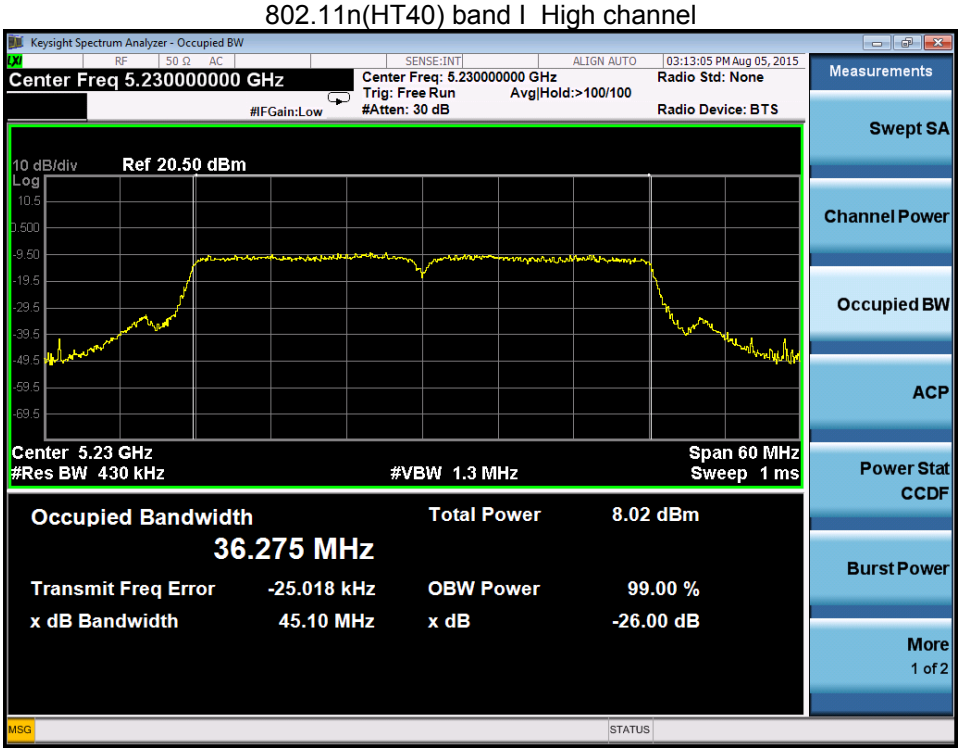
802.11n(HT20) band I High channel



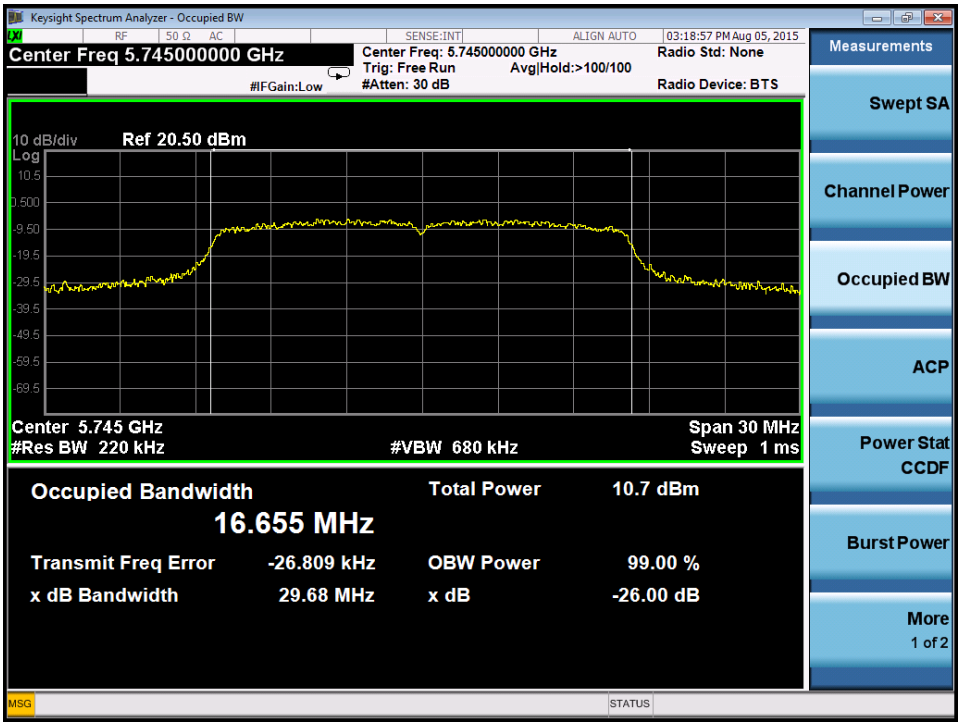
802.11n(HT40) band I Low channel



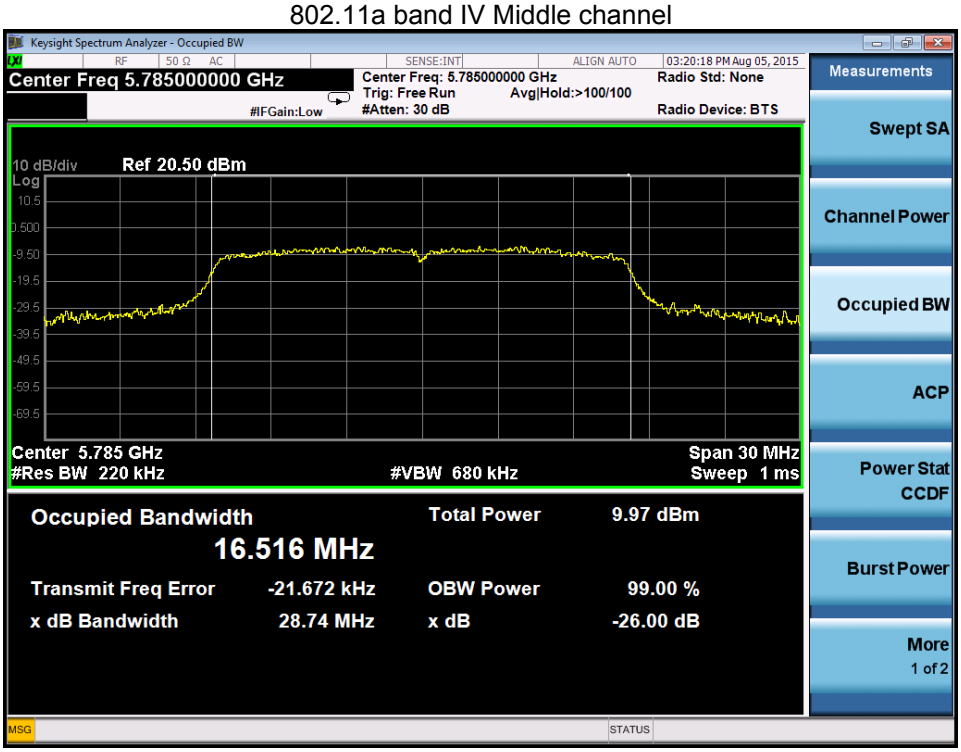
802.11n(HT40) band I High channel



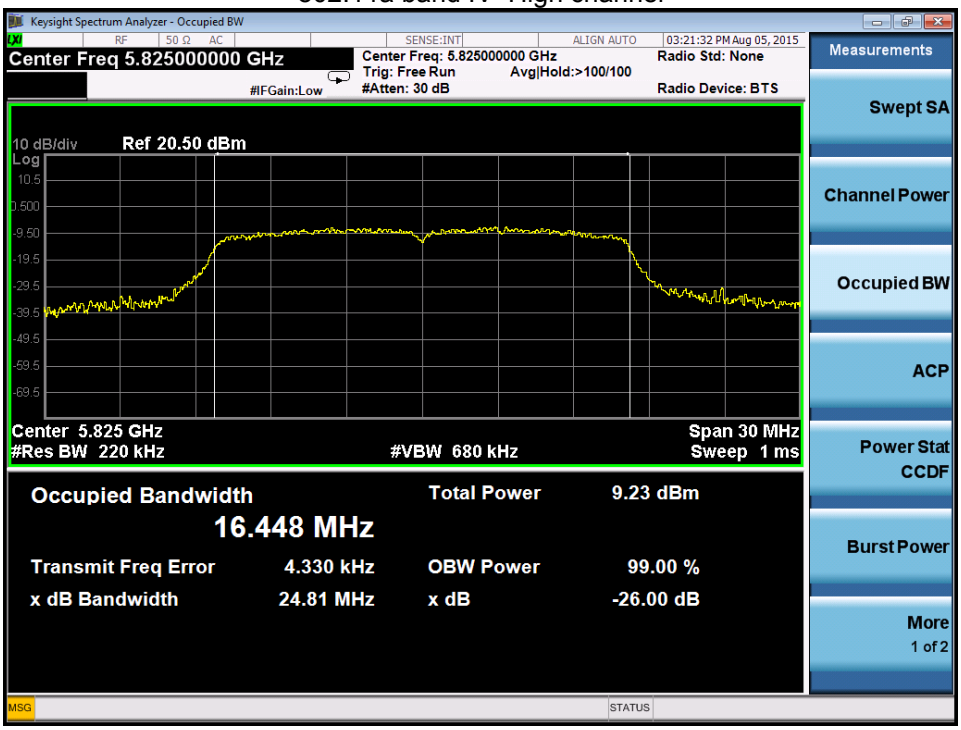
802.11a band IV Low channel



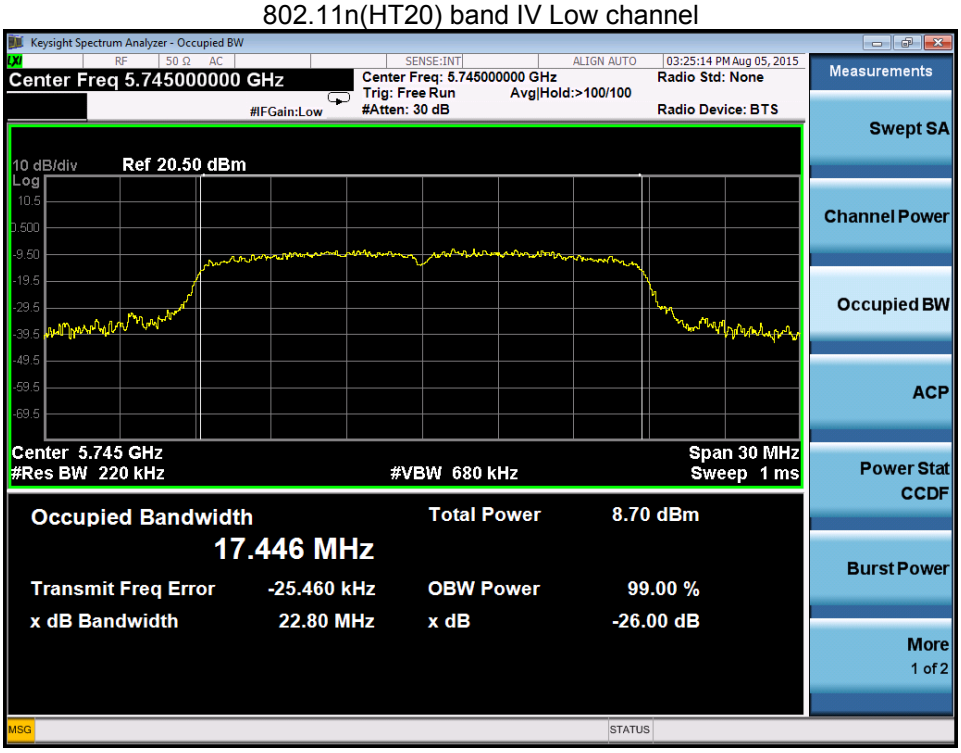
802.11a band IV Middle channel



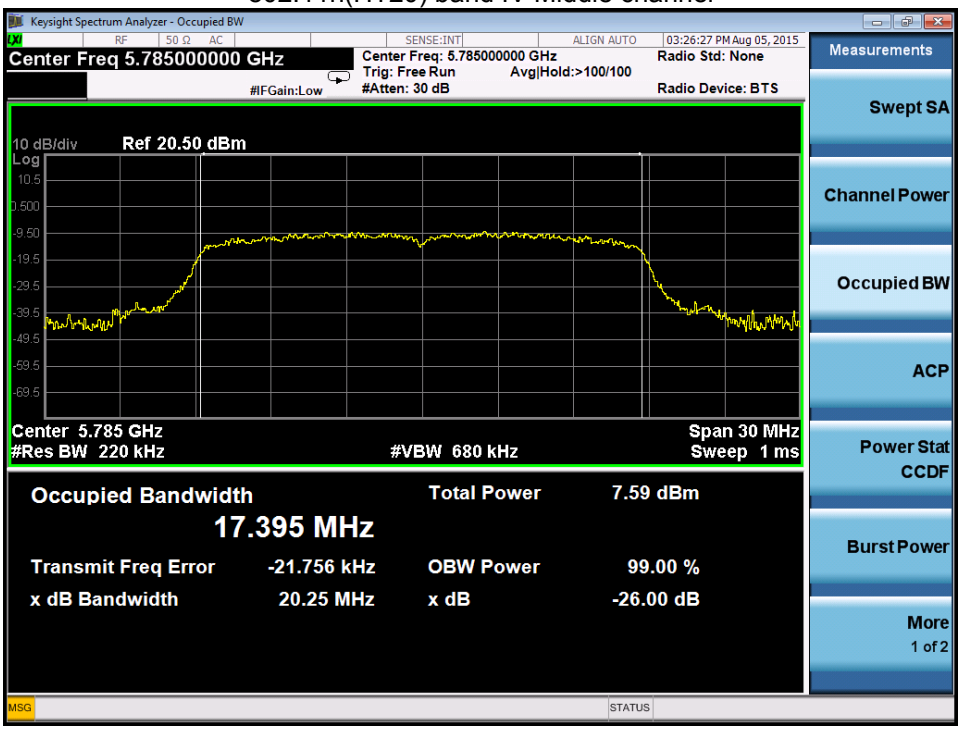
802.11a band IV High channel



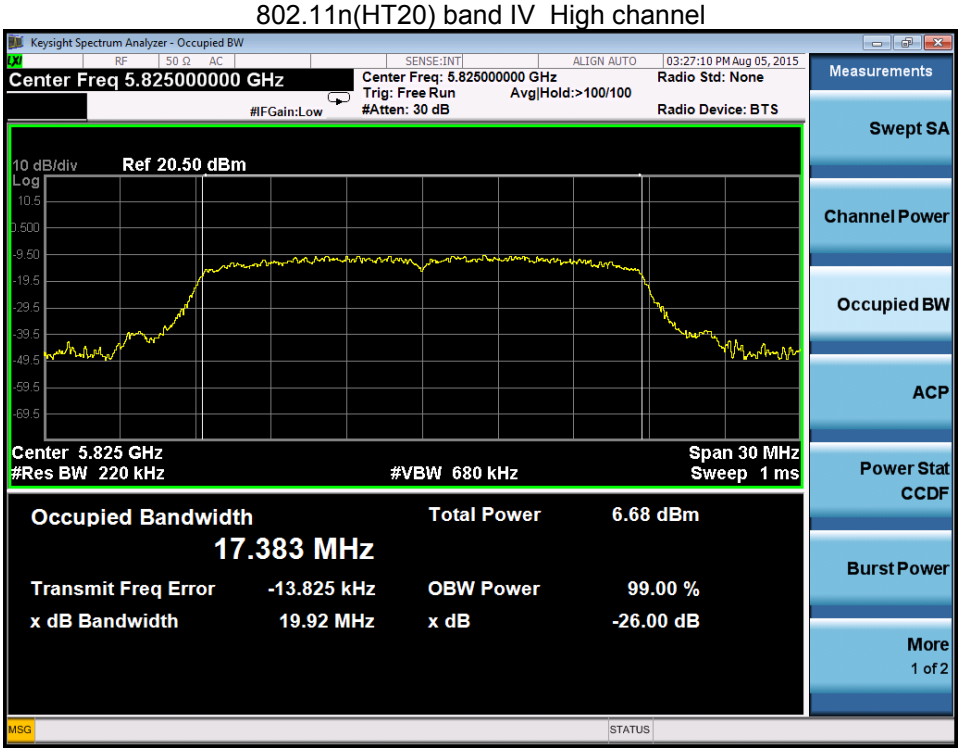
802.11n(HT20) band IV Low channel



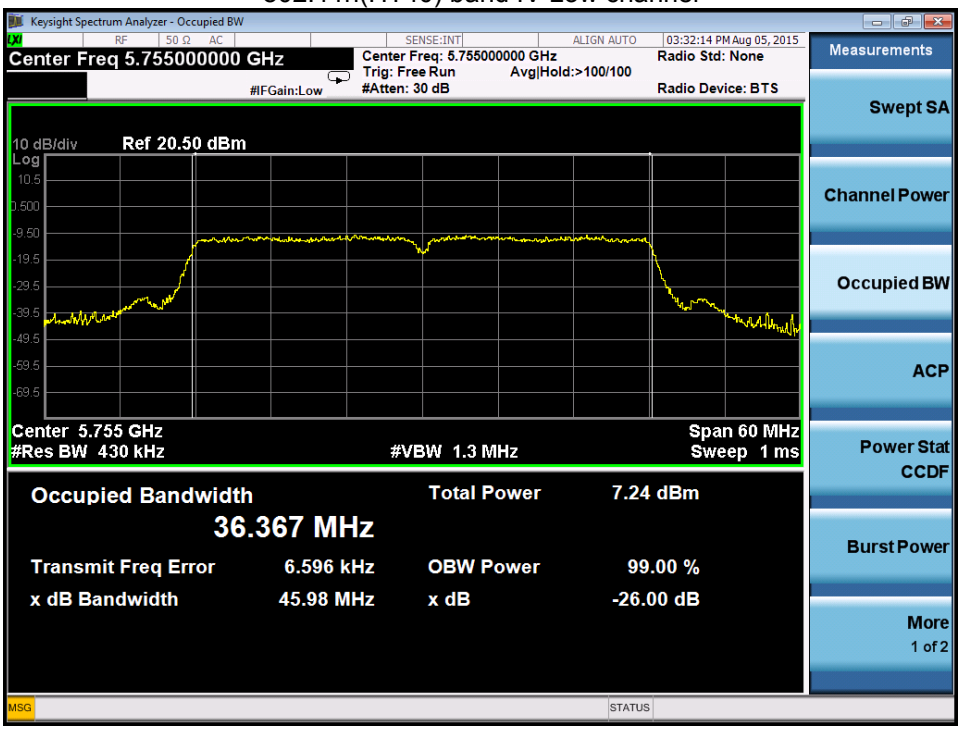
802.11n(HT20) band IV Middle channel



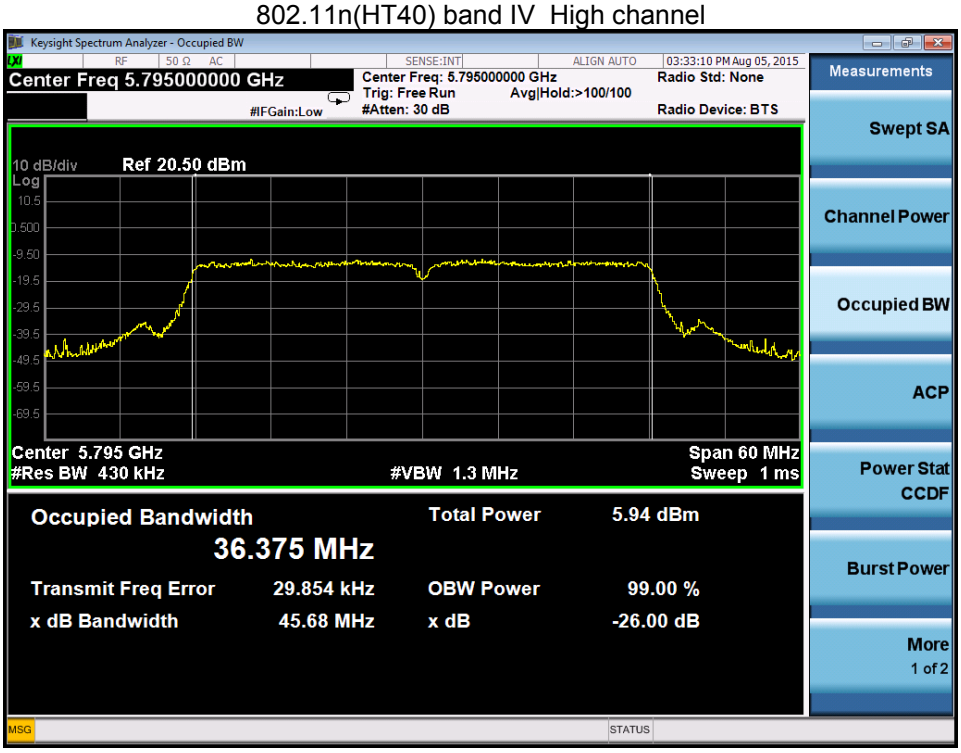
802.11n(HT20) band IV High channel



802.11n(HT40) band IV Low channel

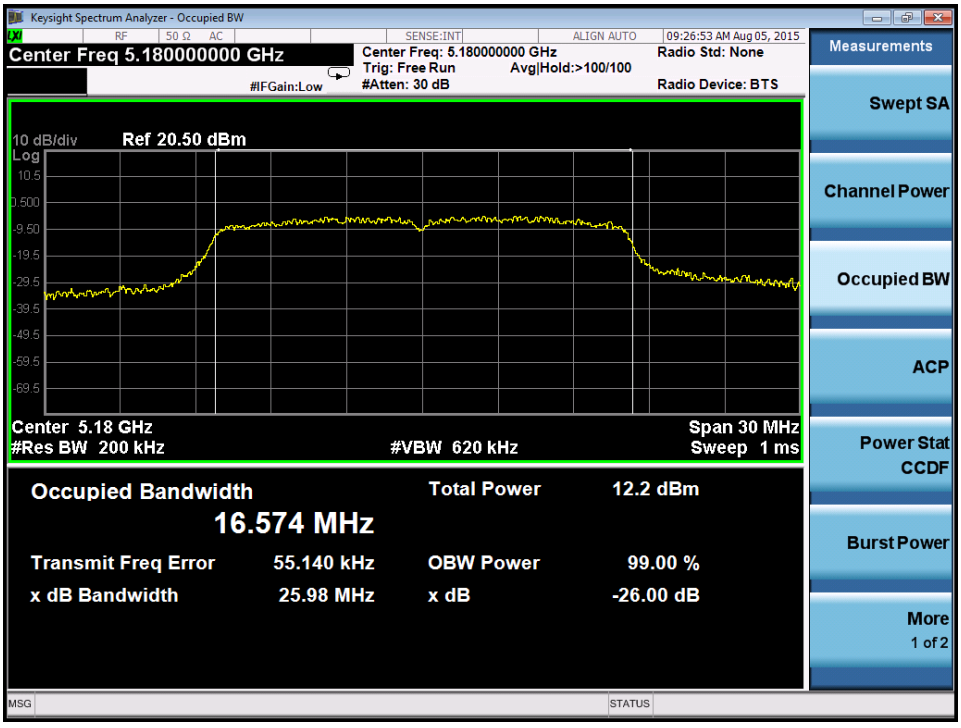


802.11n(HT40) band IV High channel

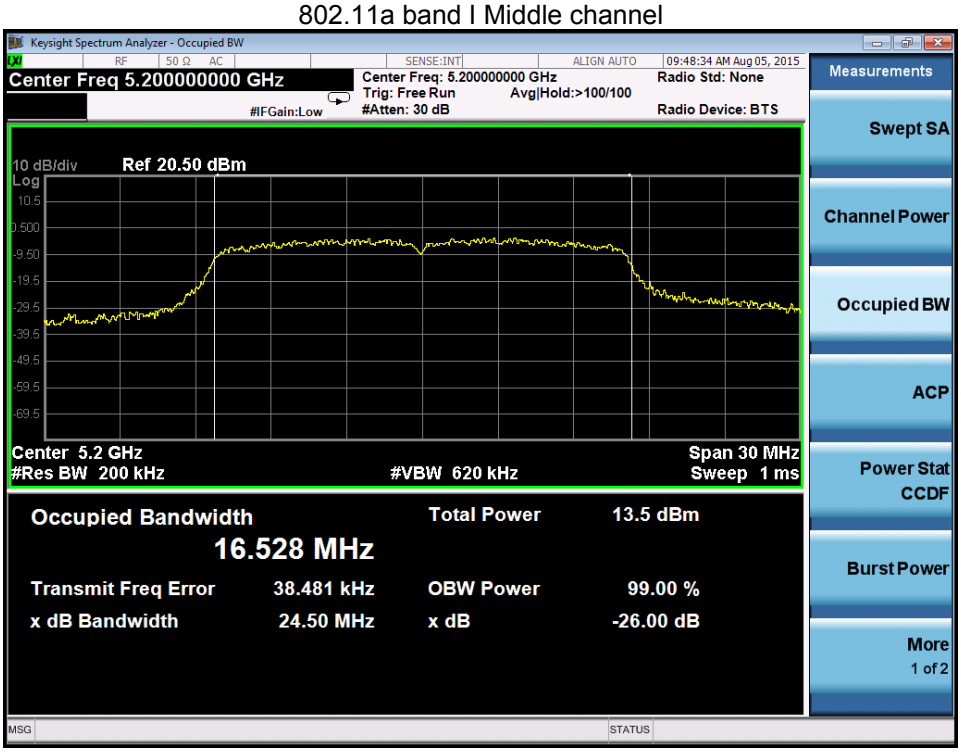


ANT1:

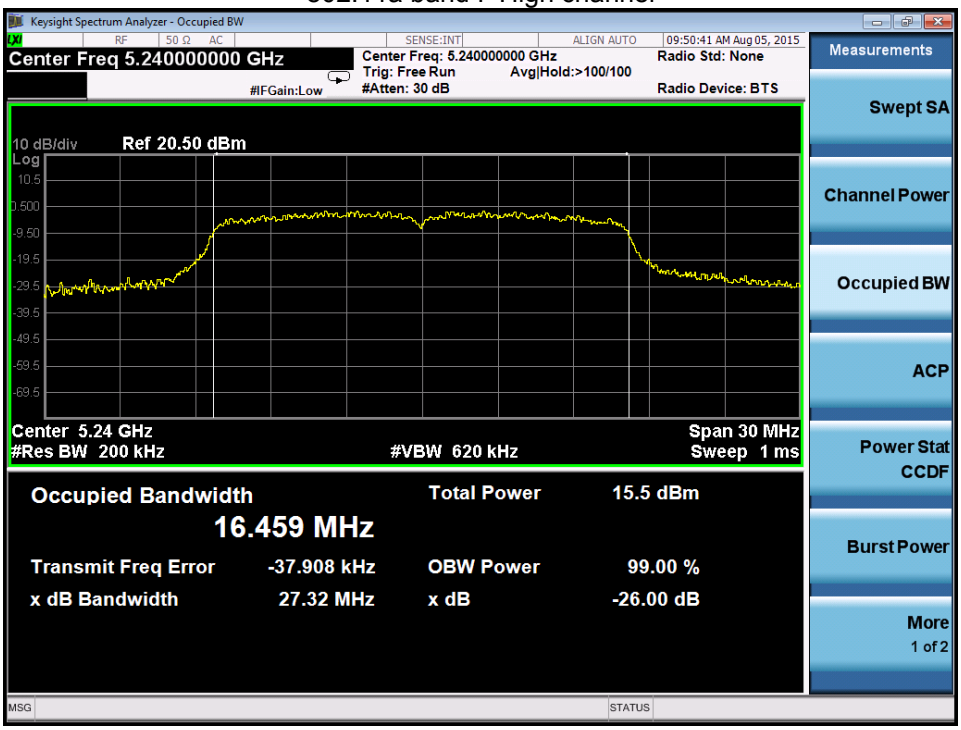
802.11a band I Low channel



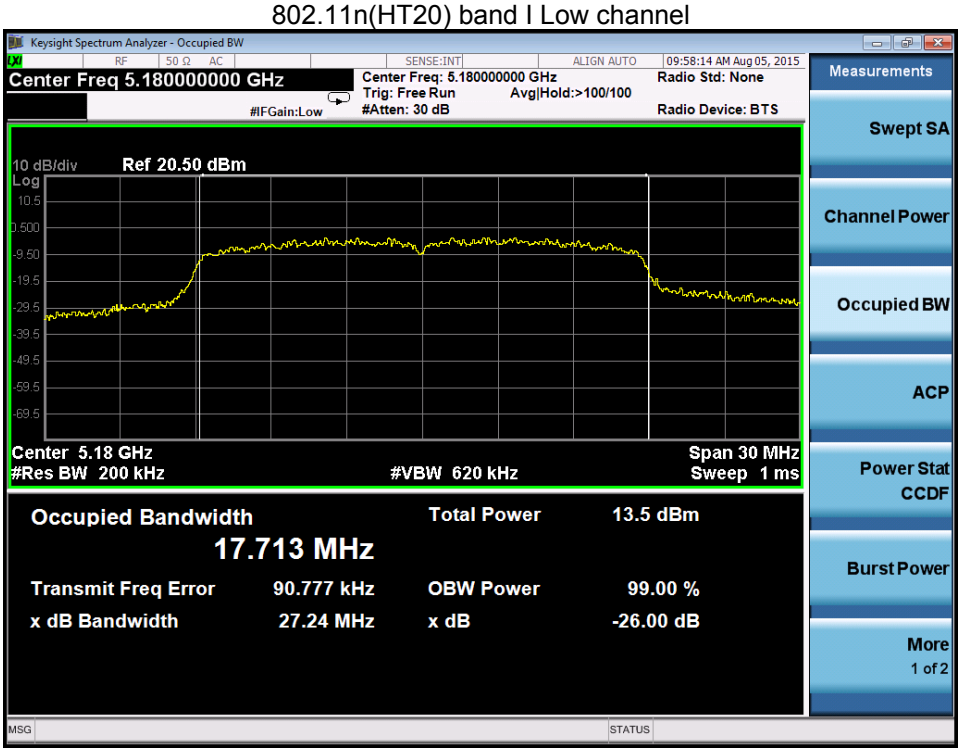
802.11a band I Middle channel



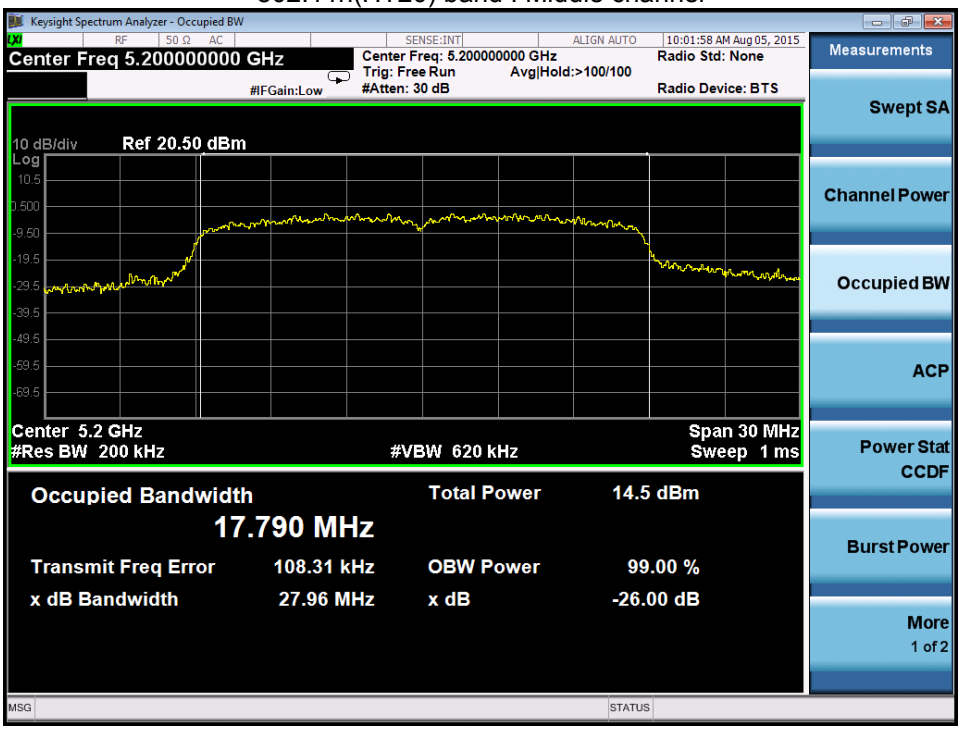
802.11a band I High channel



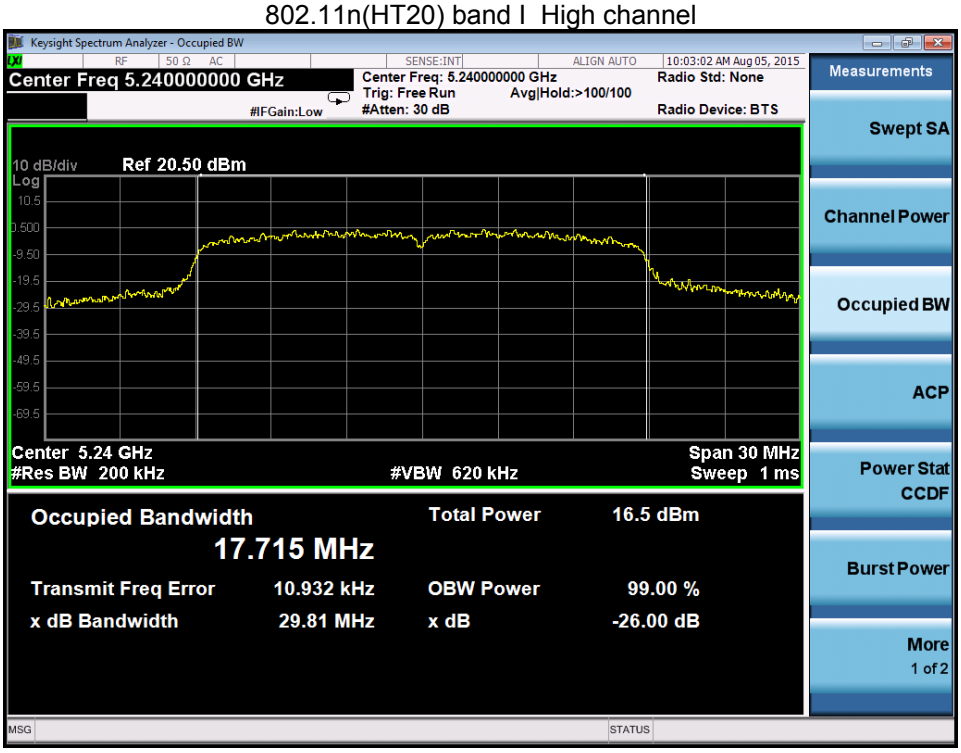
802.11n(HT20) band I Low channel



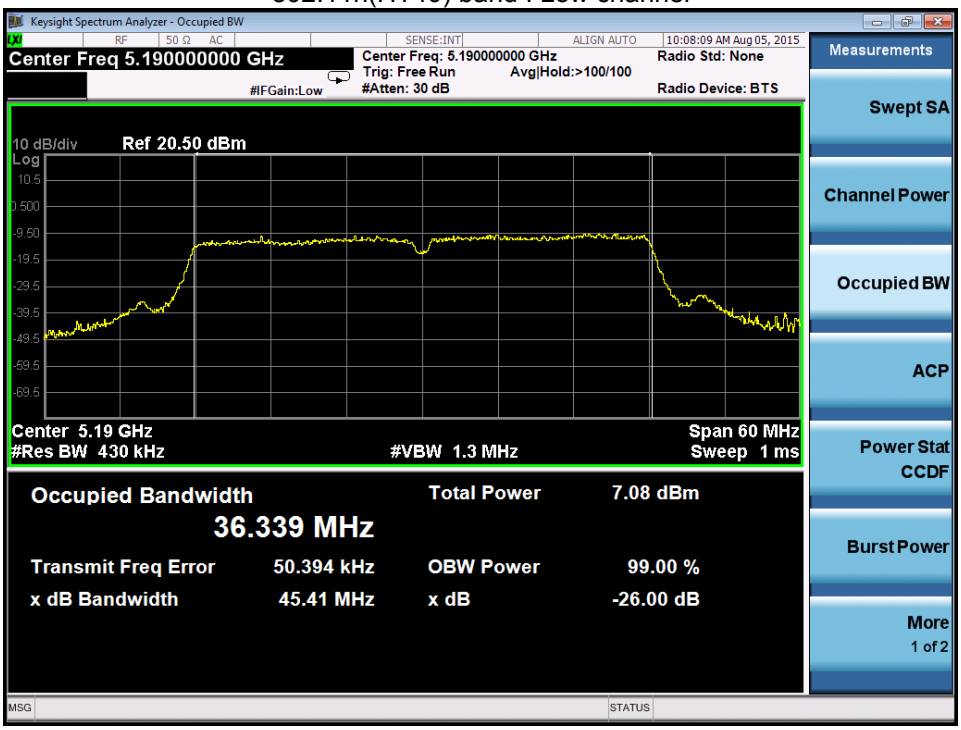
802.11n(HT20) band I Middle channel



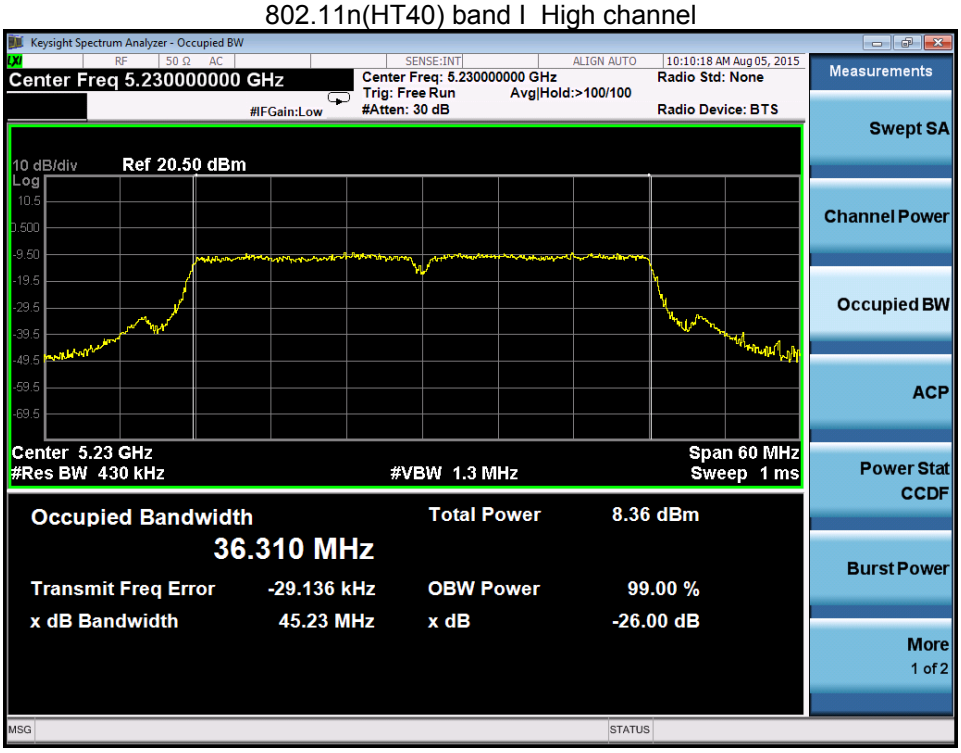
802.11n(HT20) band I High channel



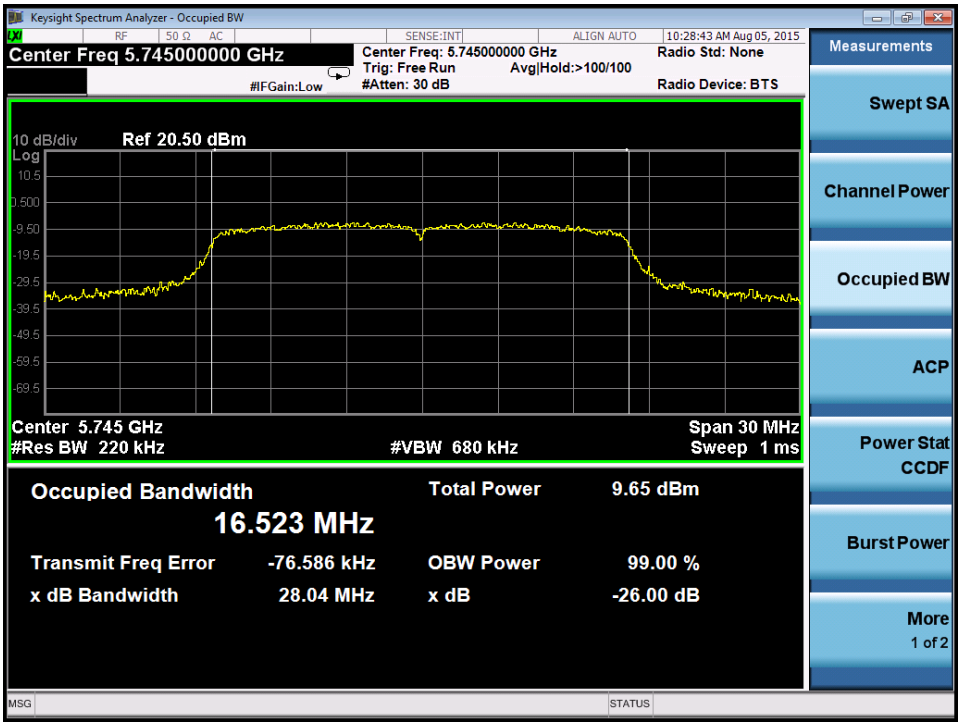
802.11n(HT40) band I Low channel



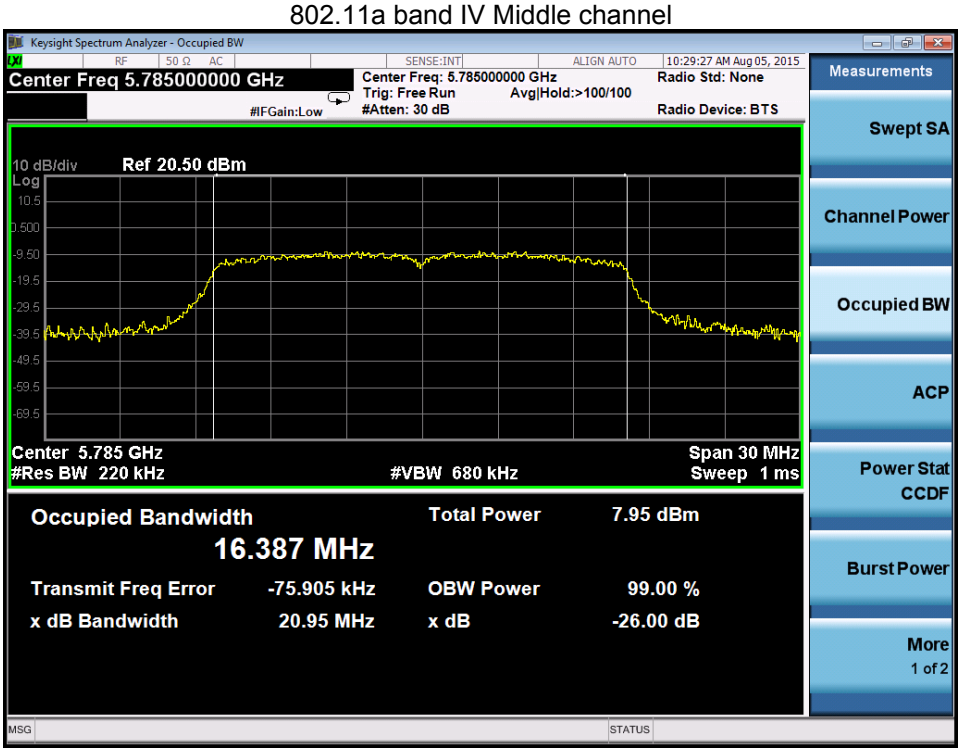
802.11n(HT40) band I High channel



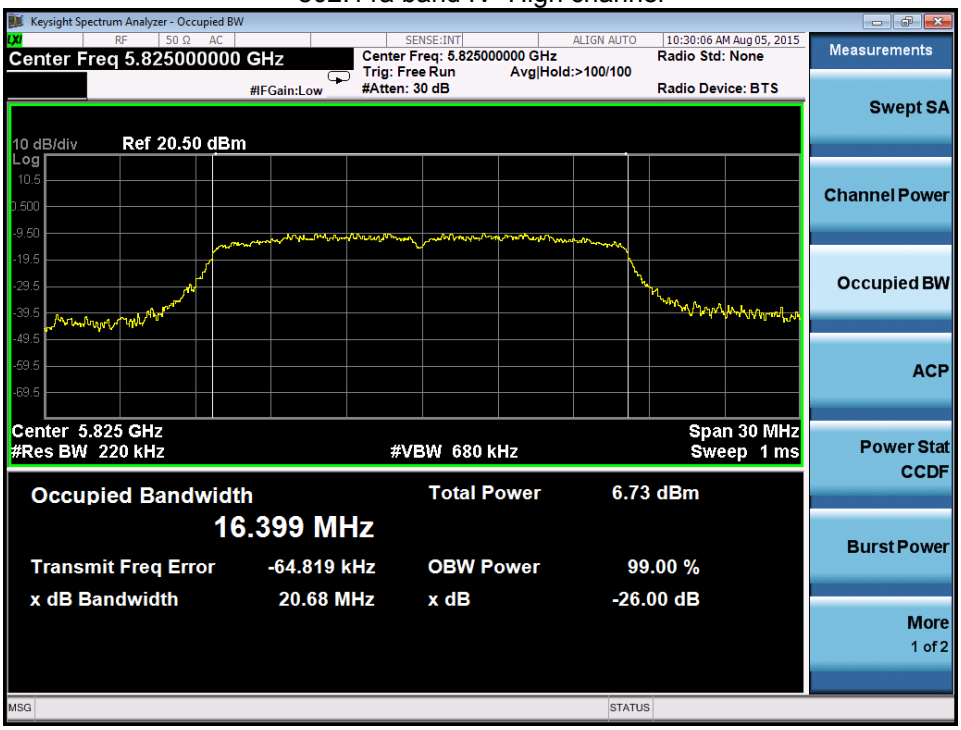
802.11a band IV Low channel



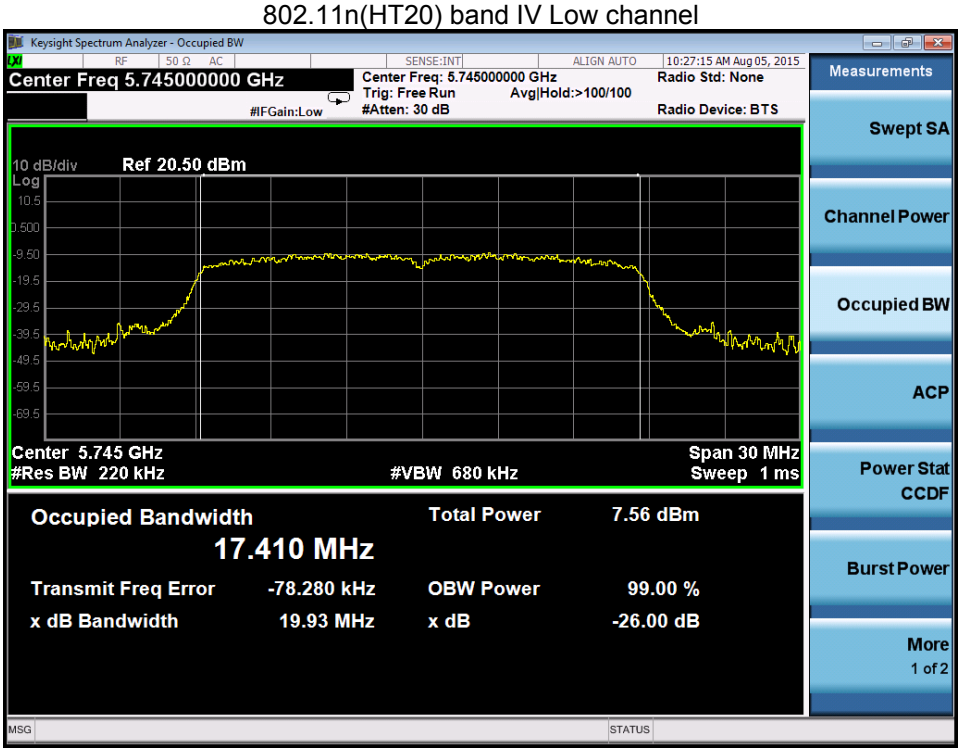
802.11a band IV Middle channel



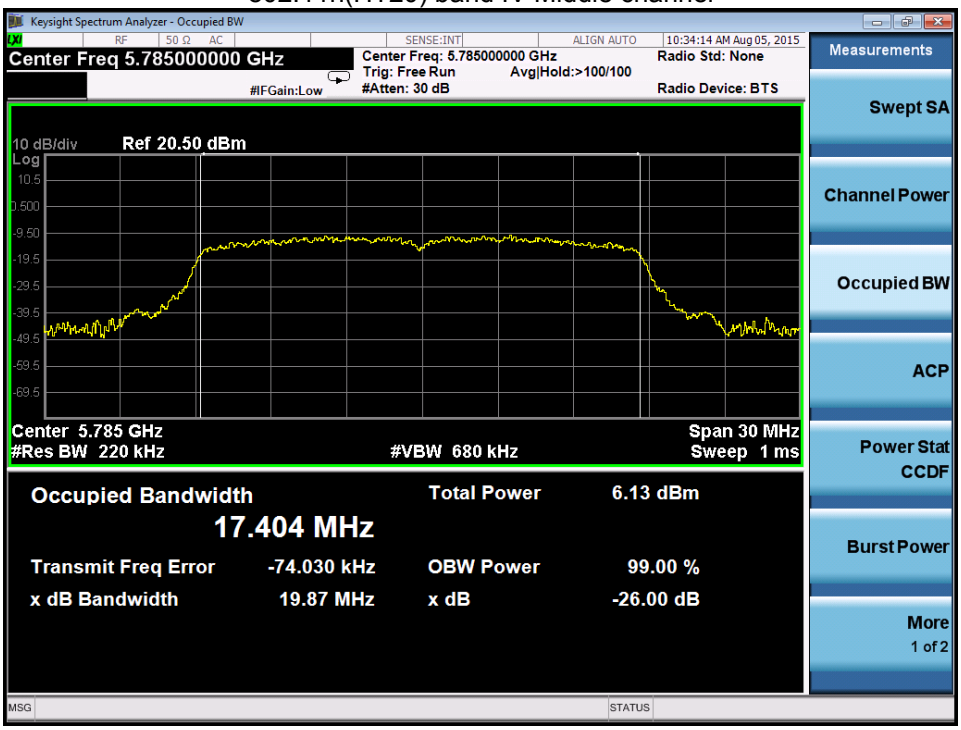
802.11a band IV High channel



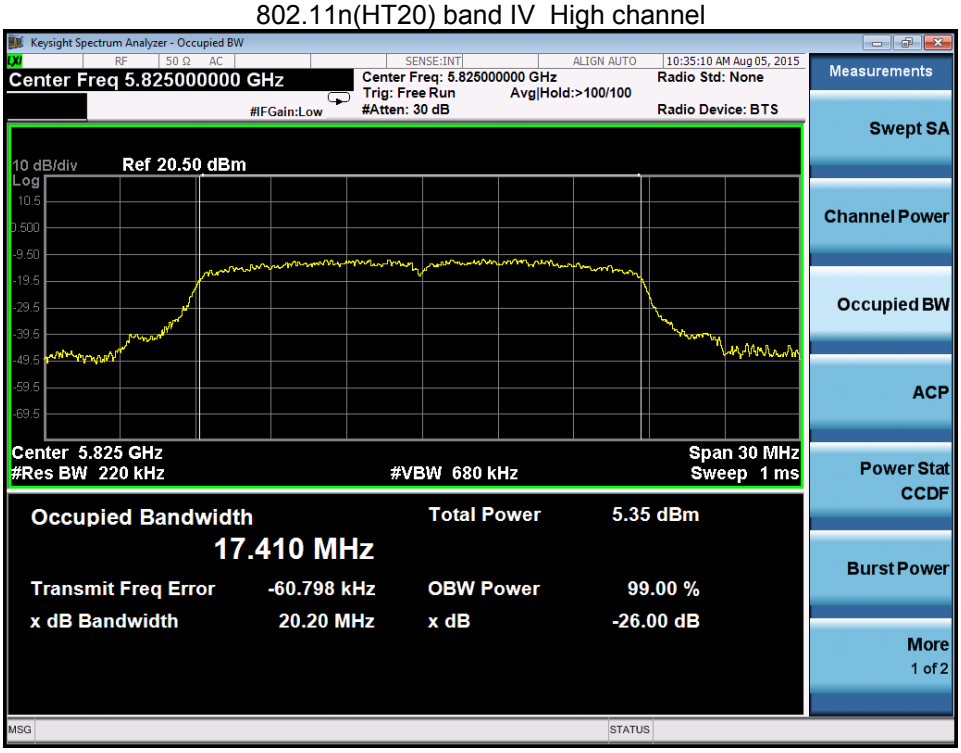
802.11n(HT20) band IV Low channel



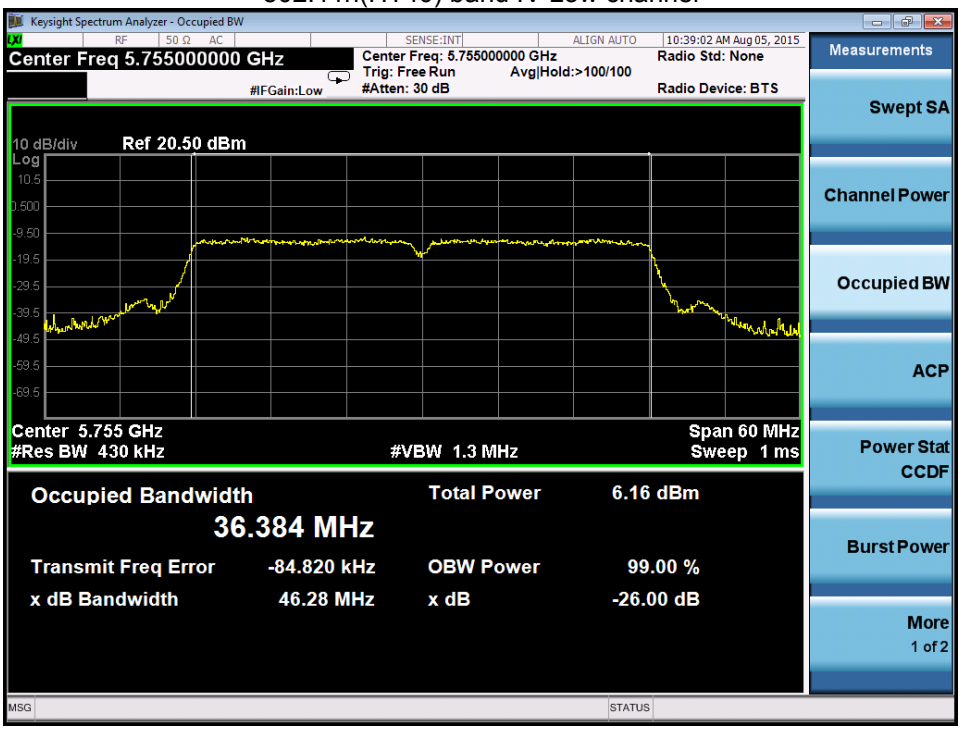
802.11n(HT20) band IV Middle channel



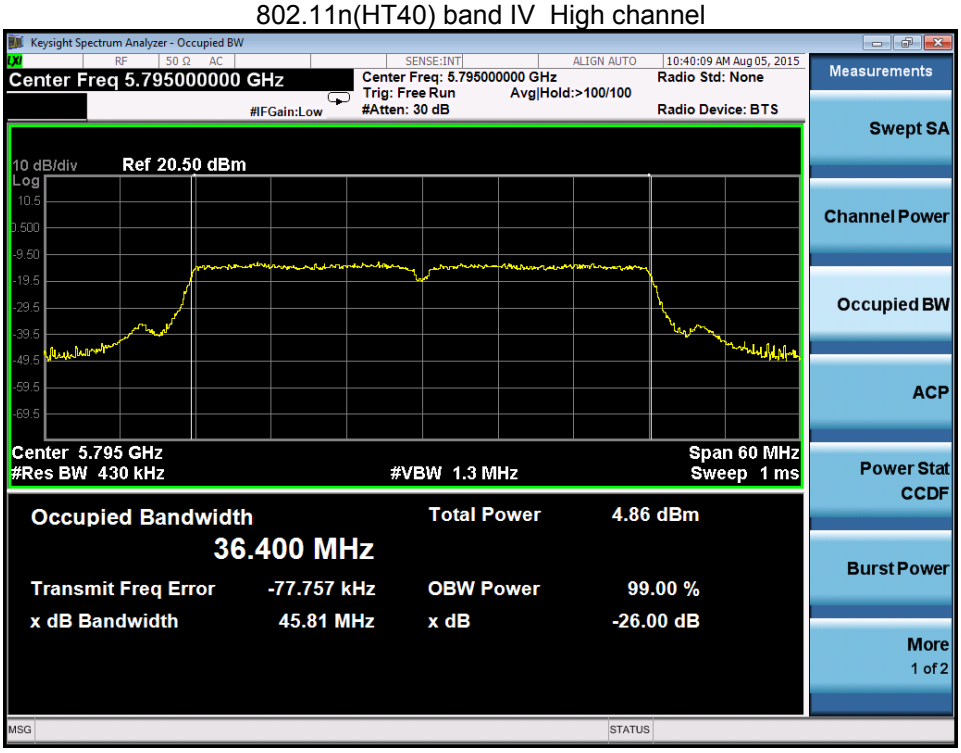
802.11n(HT20) band IV High channel



802.11n(HT40) band IV Low channel



802.11n(HT40) band IV High channel



12 Conducted Output Power

Test Requirement:	FCC CFR47 Part 15 Section 15.407(a)
Test Method:	KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v01 Section E
Test Limit:	30dBm
Test Result:	PASS
Remark:	Conducted output power= measurement power+10log(1/x) X is duty cycle=1, so 10log(1/1)=0 Conducted output power= measurement power

12.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

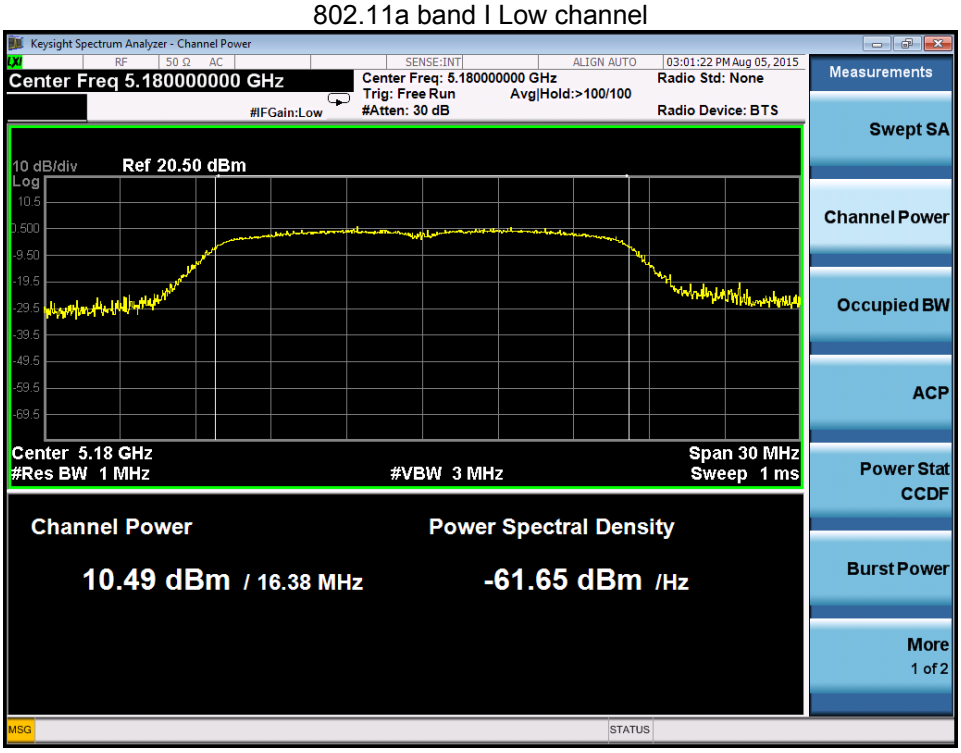
12.2 Test Result:

Band	Operation mode	CH	Conducted Output Power (dBm)		
			ANT0	ANT1	Total
Band I	802.11a	Low	10.49	13.41	/
		Middle	11.08	14.56	/
		High	12.54	16.24	/
	802.11n(HT20)	Low	14.31	14.28	17.31
		Middle	15.10	15.22	18.17
		High	16.69	17.26	19.99
	802.11n(HT40)	Low	7.20	6.76	10.00
		Middle	/	/	/
		High	8.94	9.05	12.01
Band IV	802.11a	Low	11.80	10.38	/
		Middle	10.90	9.07	/
		High	10.06	8.49	/
	802.11n(HT20)	Low	9.40	8.27	11.88
		Middle	8.57	7.08	10.90
		High	7.72	6.39	10.12
	802.11n(HT40)	Low	7.69	6.73	10.25
		Middle	/	/	/
		High	6.67	5.47	9.12

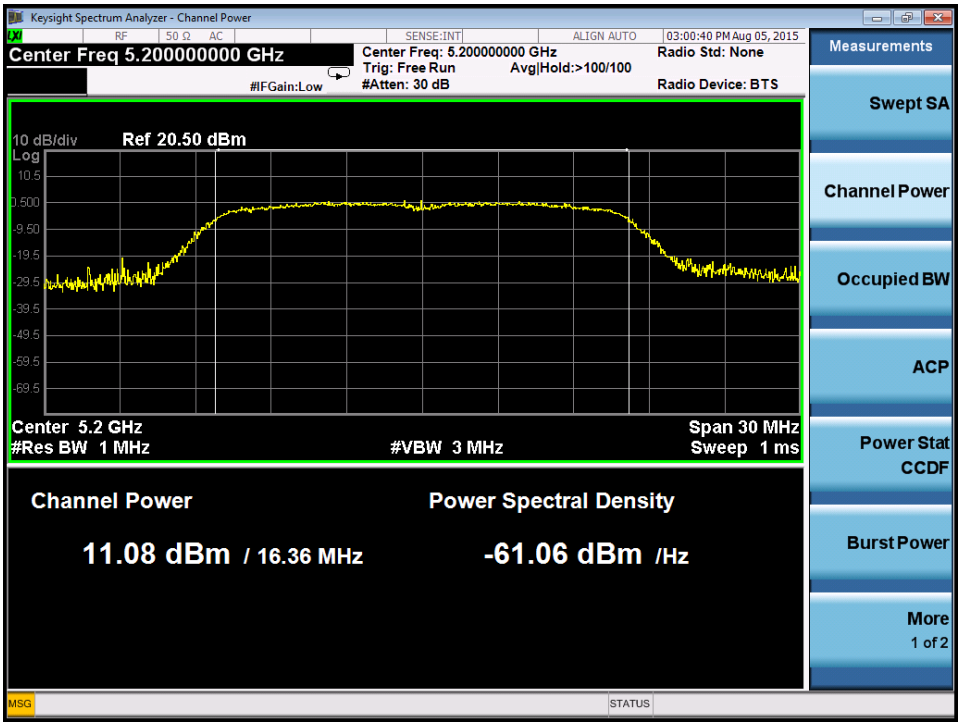
Test result plots shown as follows:

ANT0:

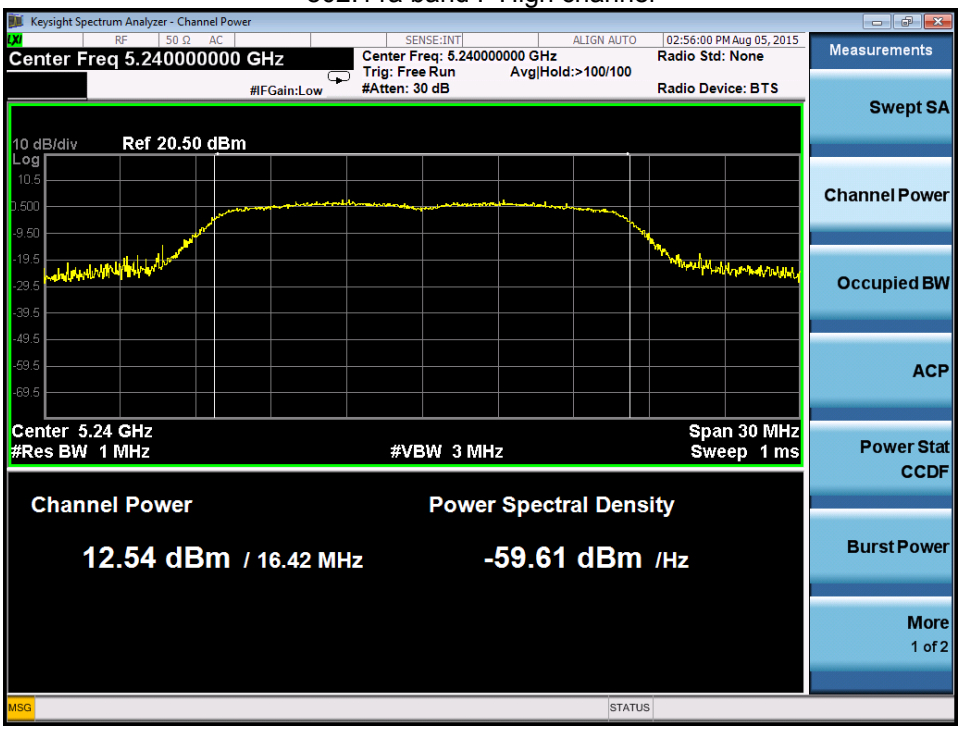
802.11a band I Low channel



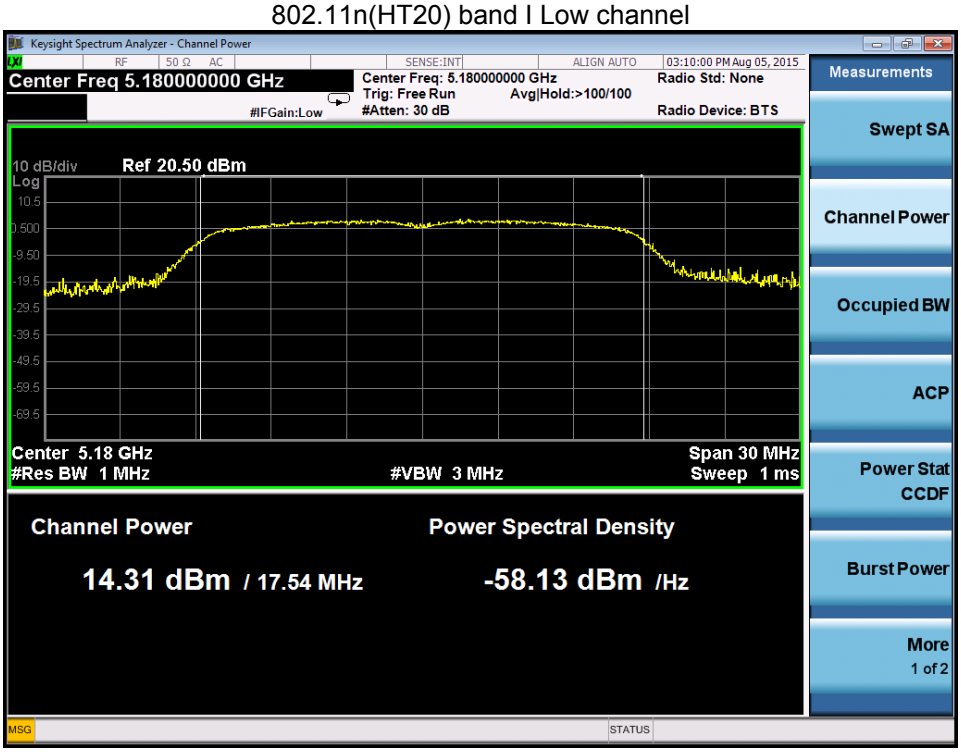
802.11a band I Middle channel



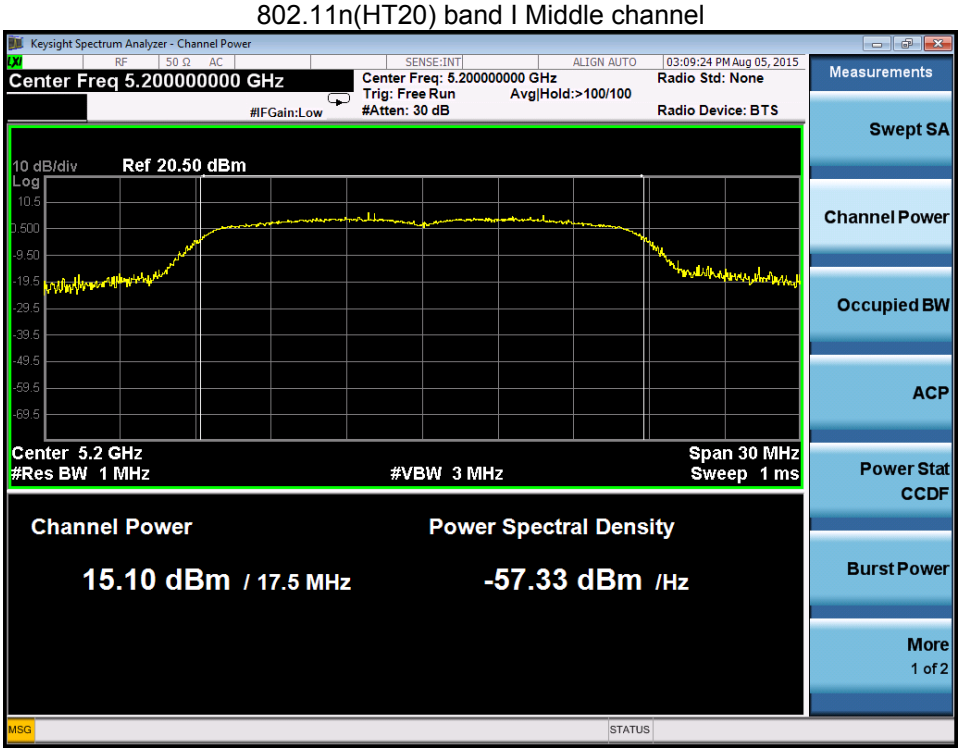
802.11a band I High channel



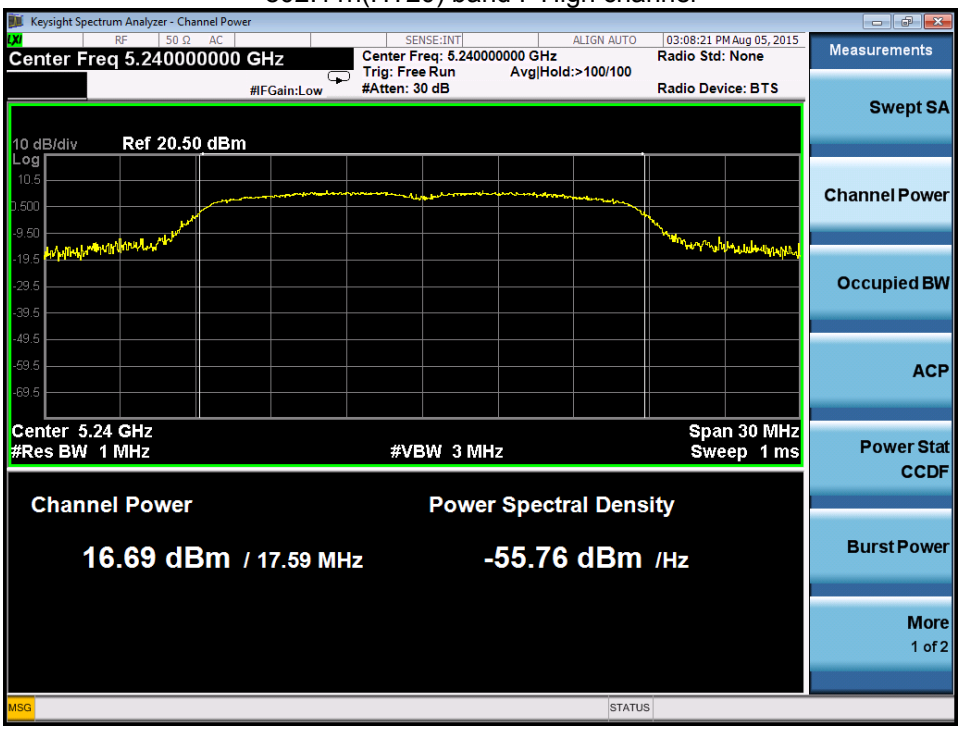
802.11n(HT20) band I Low channel



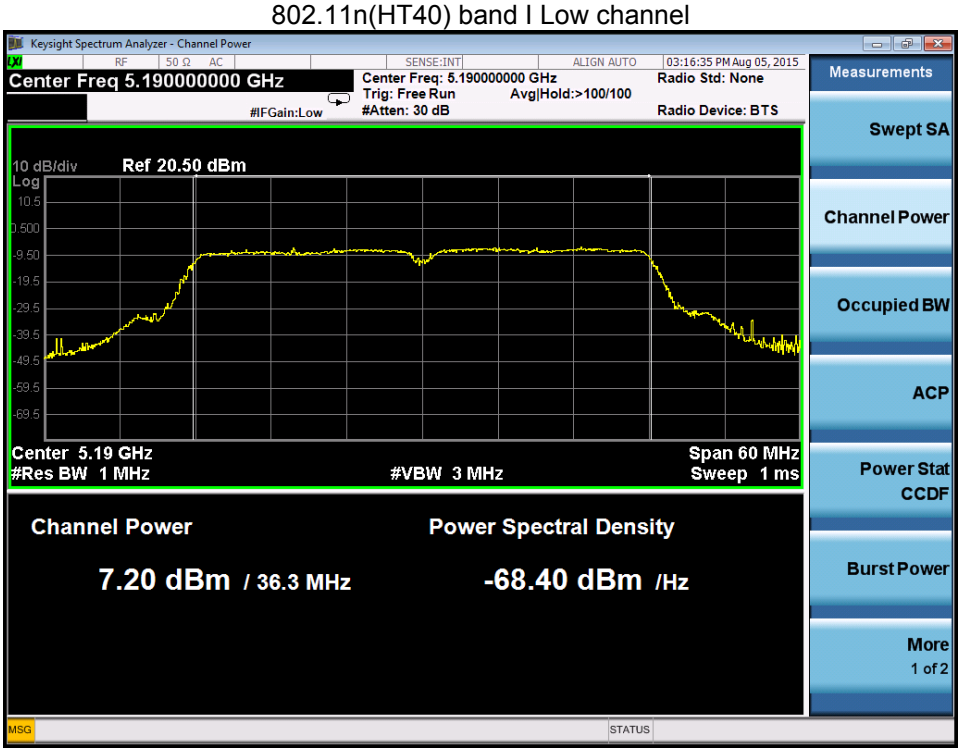
802.11n(HT20) band I Middle channel



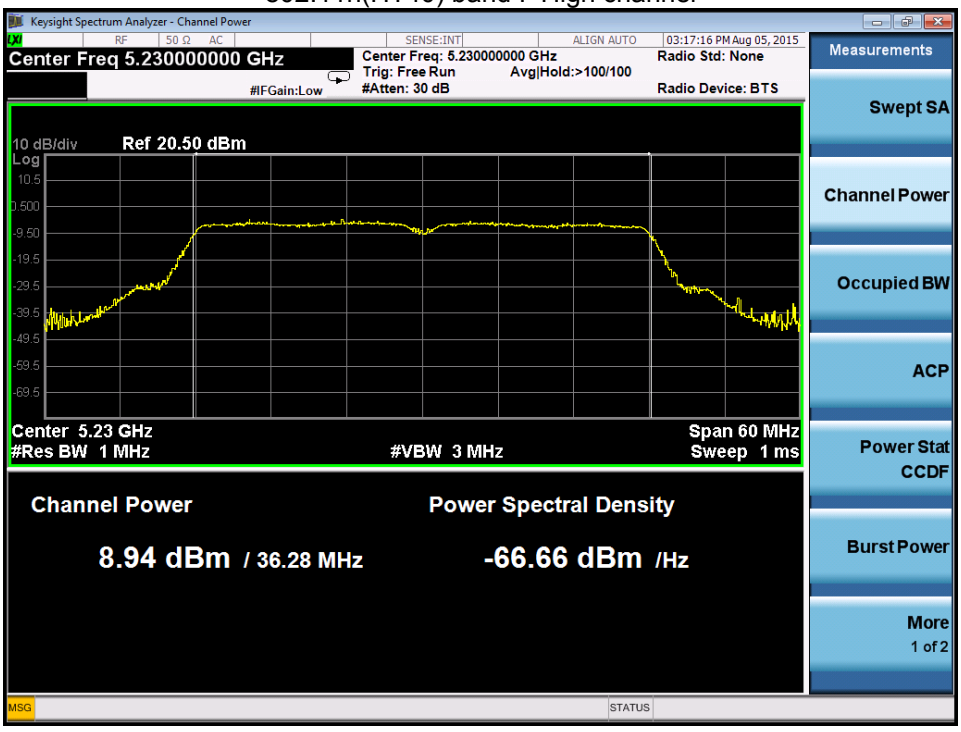
802.11n(HT20) band I High channel



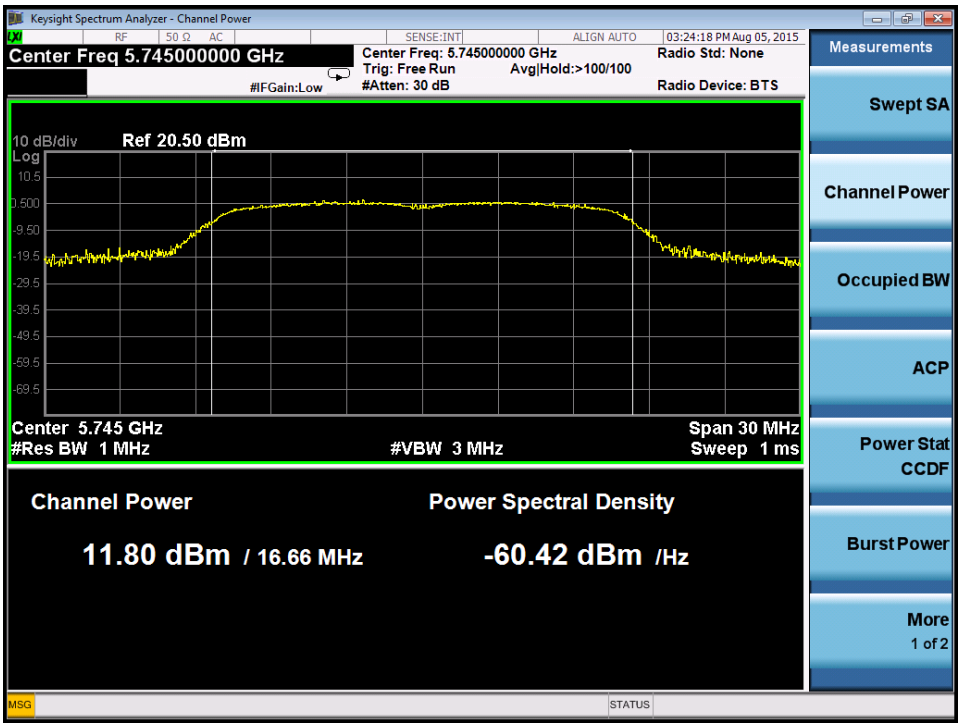
802.11n(HT40) band I Low channel



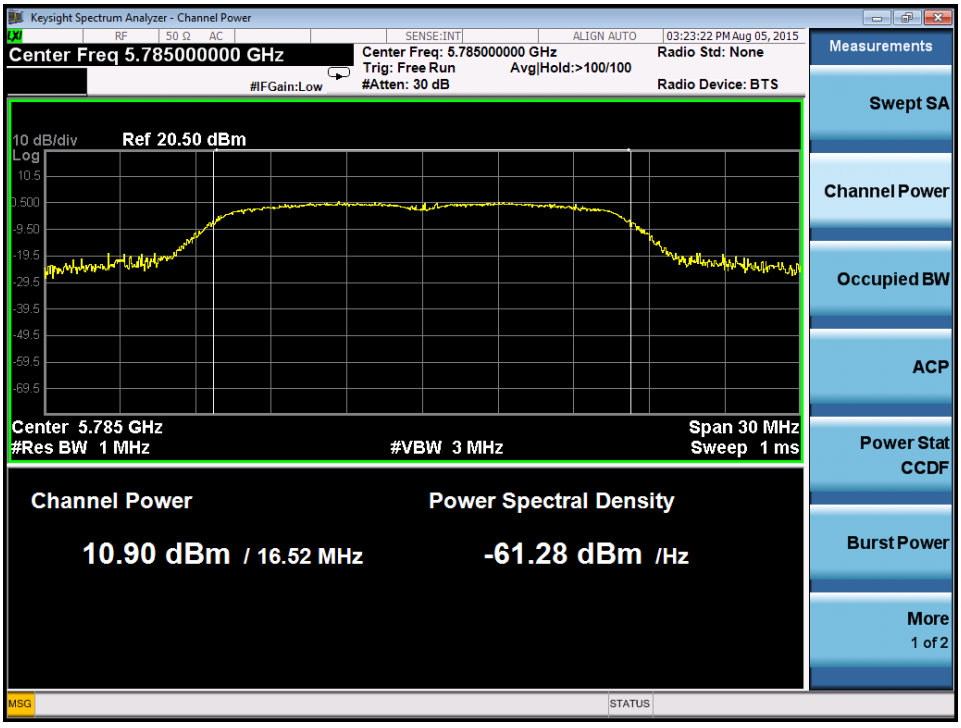
802.11n(HT40) band I High channel



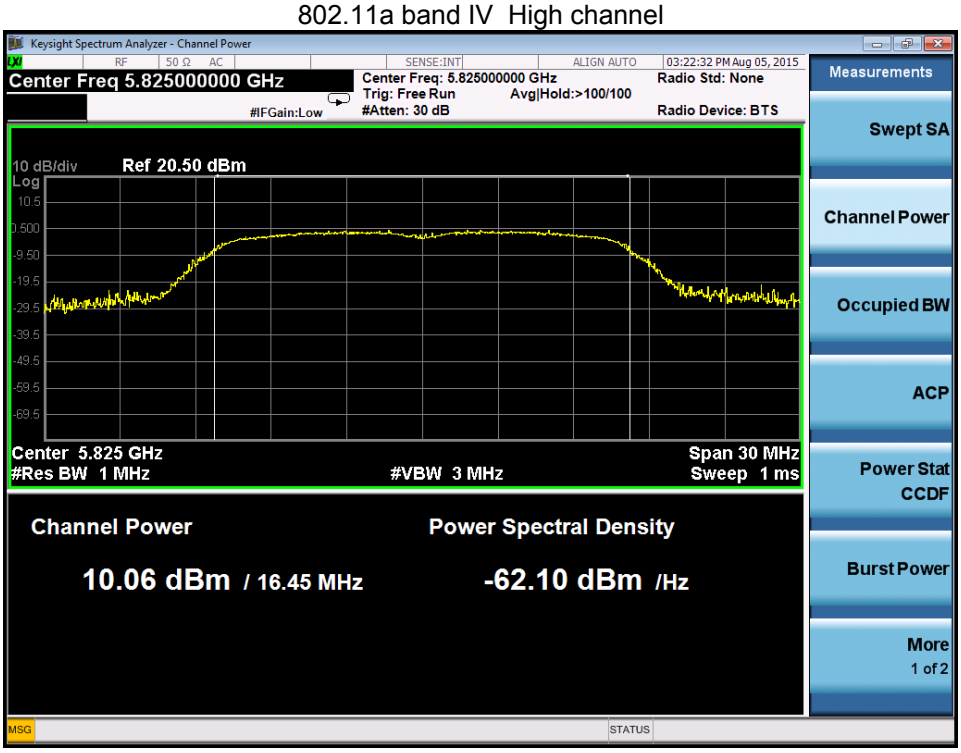
802.11a band IV Low channel



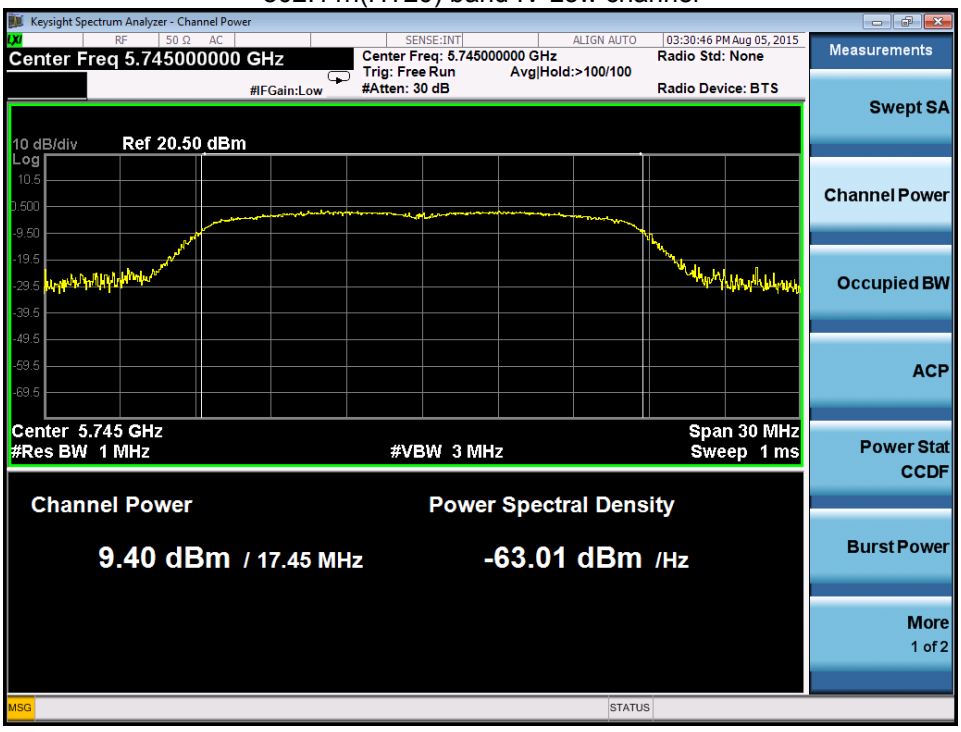
802.11a band IV Middle channel



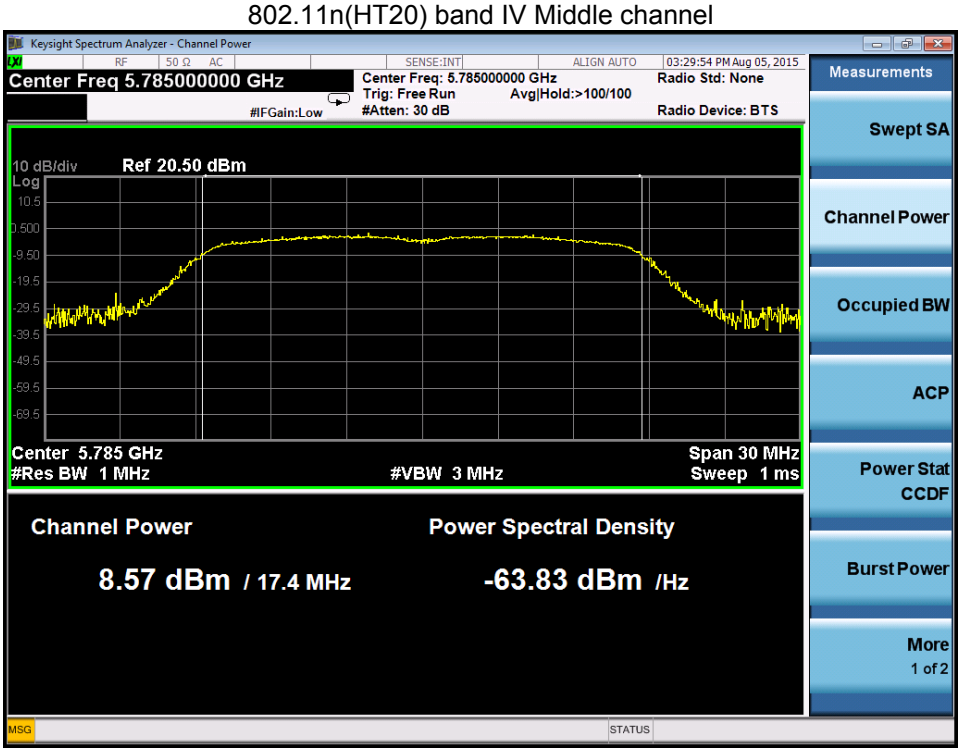
802.11a band IV High channel



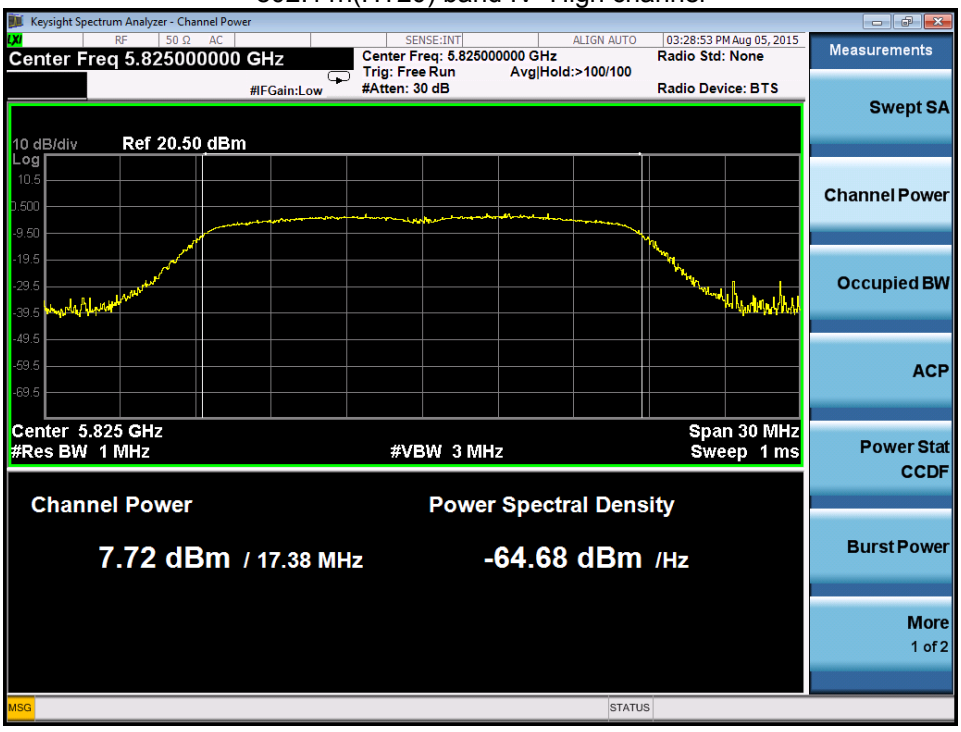
802.11n(HT20) band IV Low channel



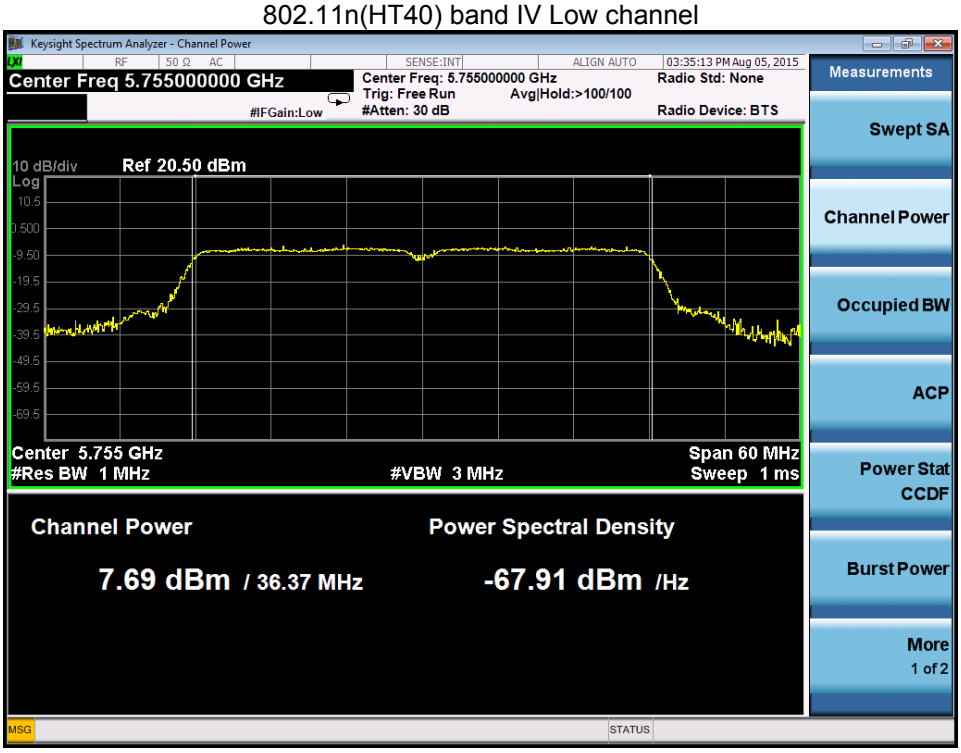
802.11n(HT20) band IV Middle channel



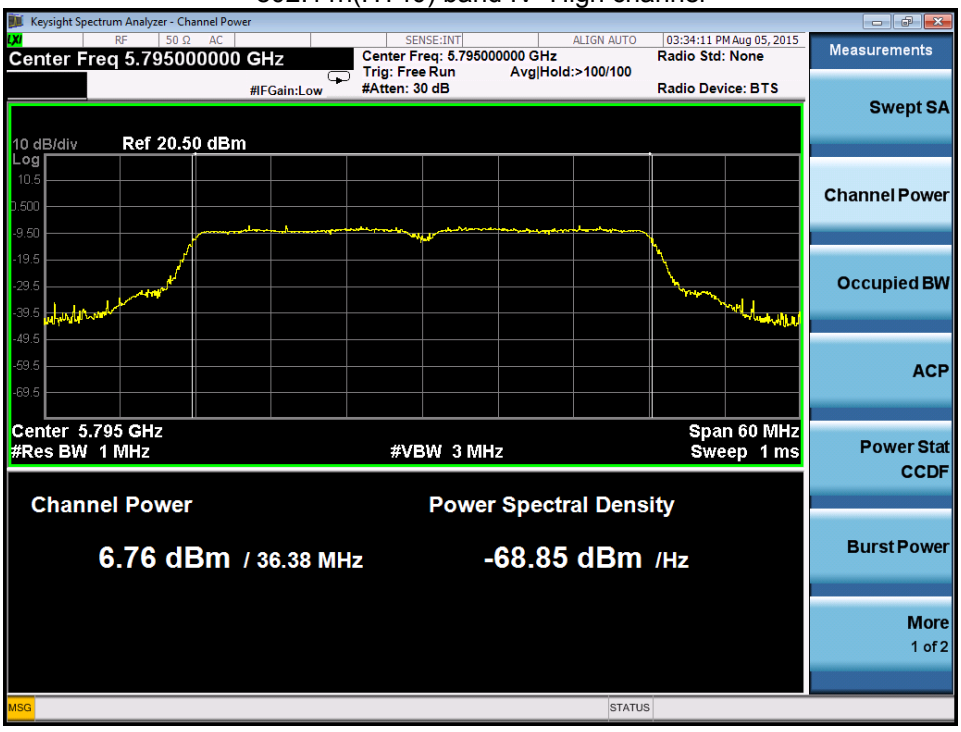
802.11n(HT20) band IV High channel



802.11n(HT40) band IV Low channel

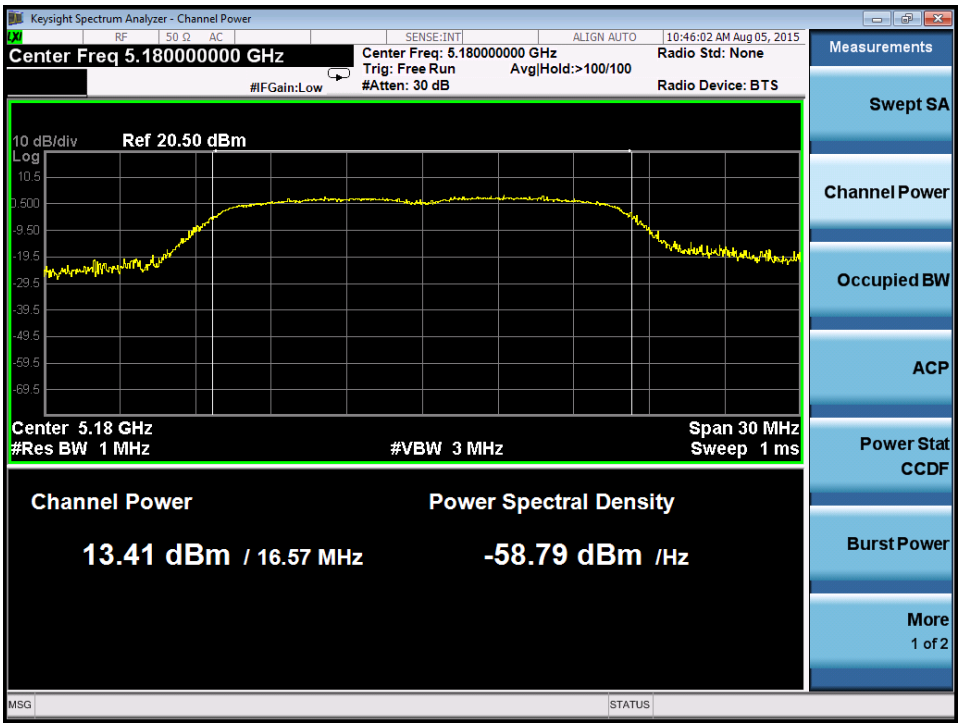


802.11n(HT40) band IV High channel

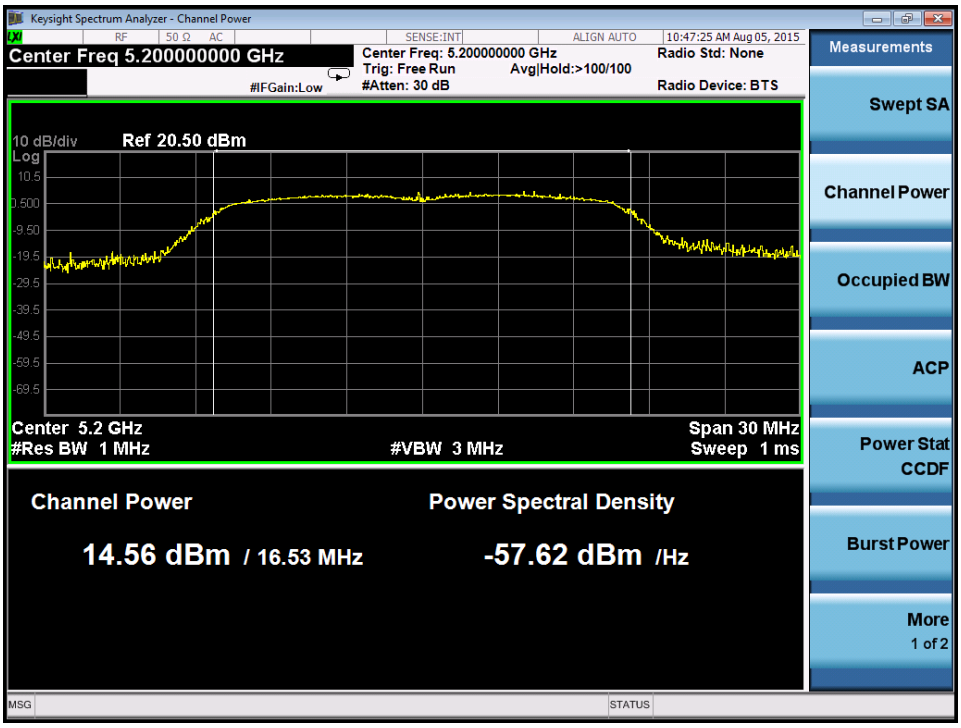


ANT1:

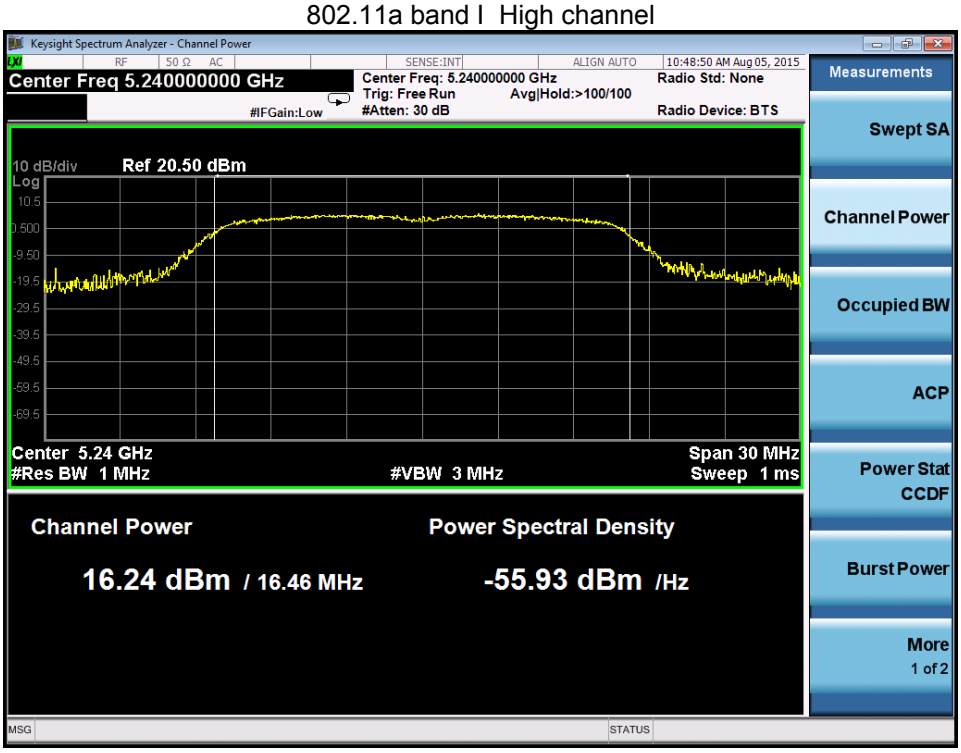
802.11a band I Low channel



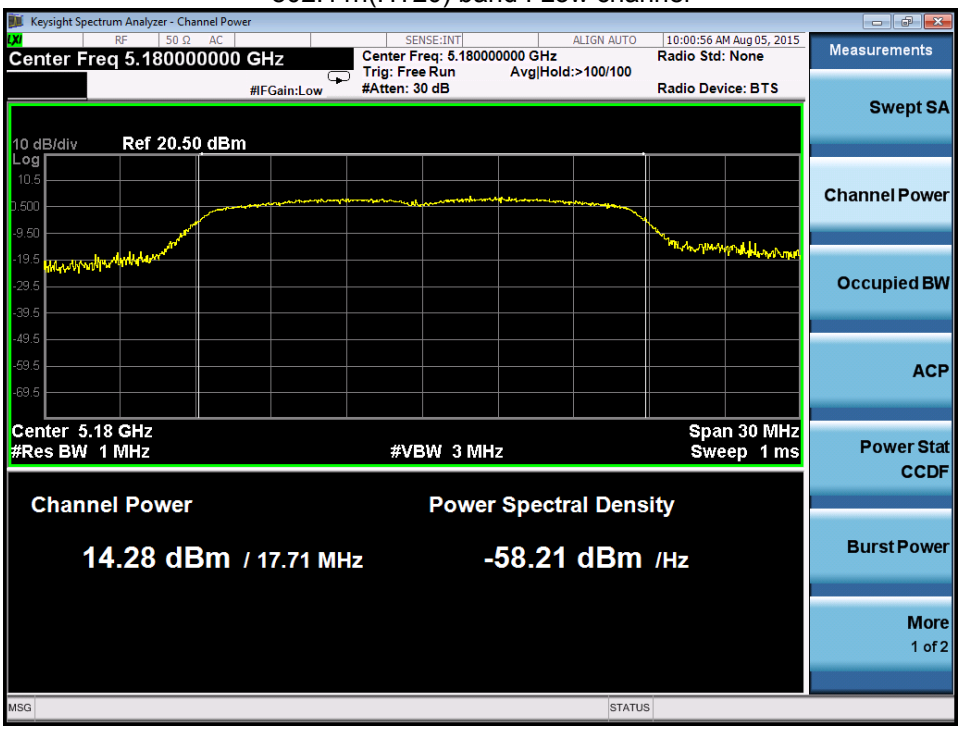
802.11a band I Middle channel



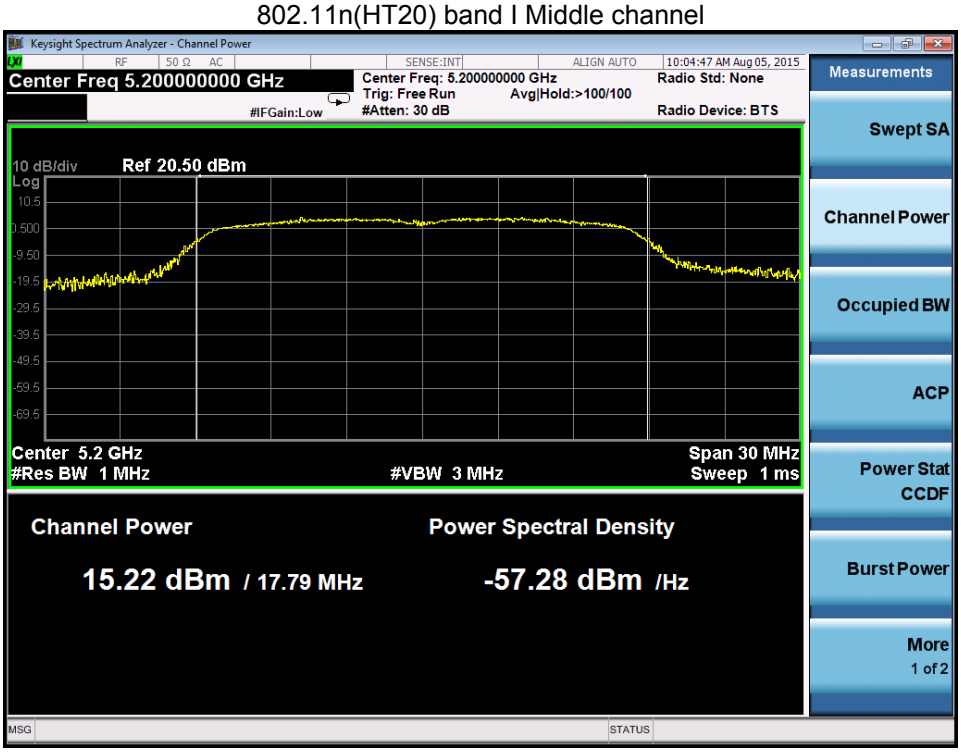
802.11a band I High channel



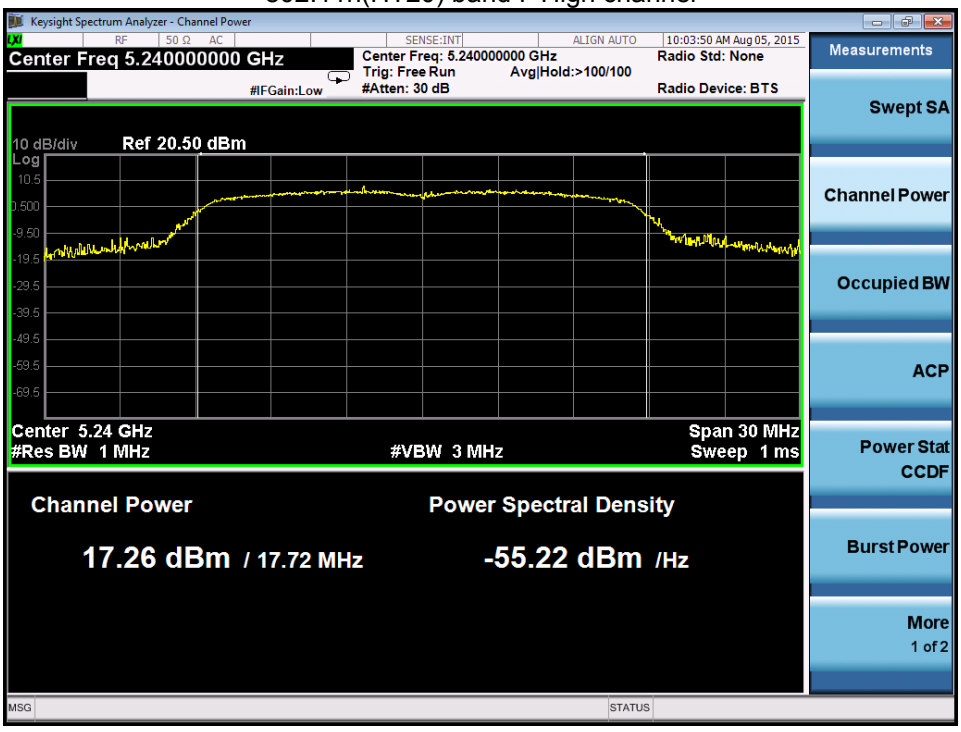
802.11n(HT20) band I Low channel



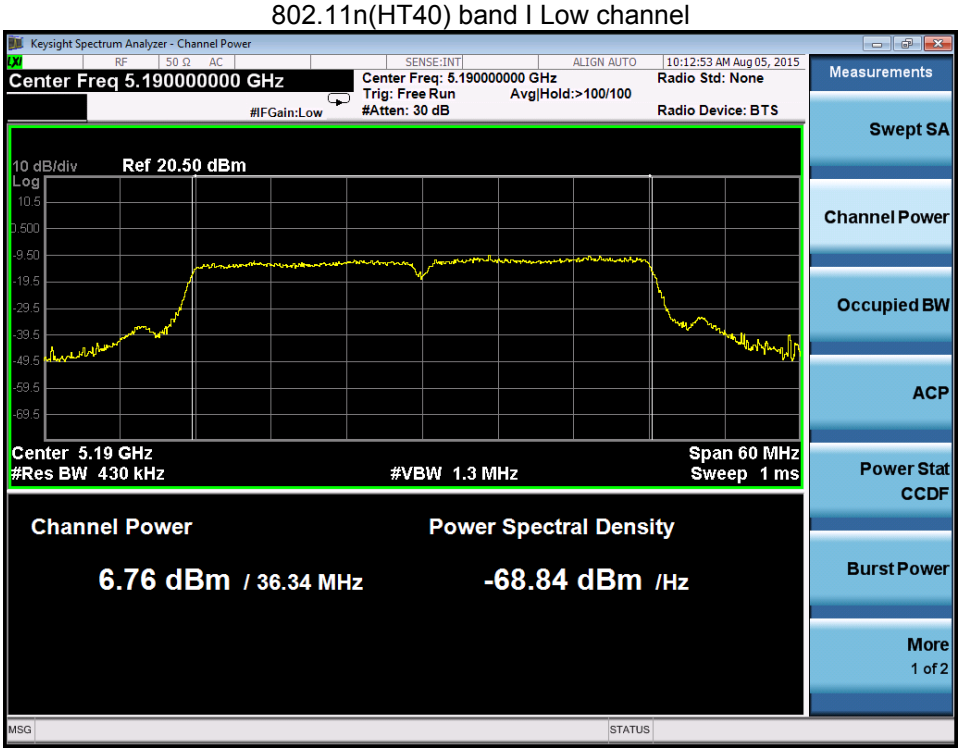
802.11n(HT20) band I Middle channel



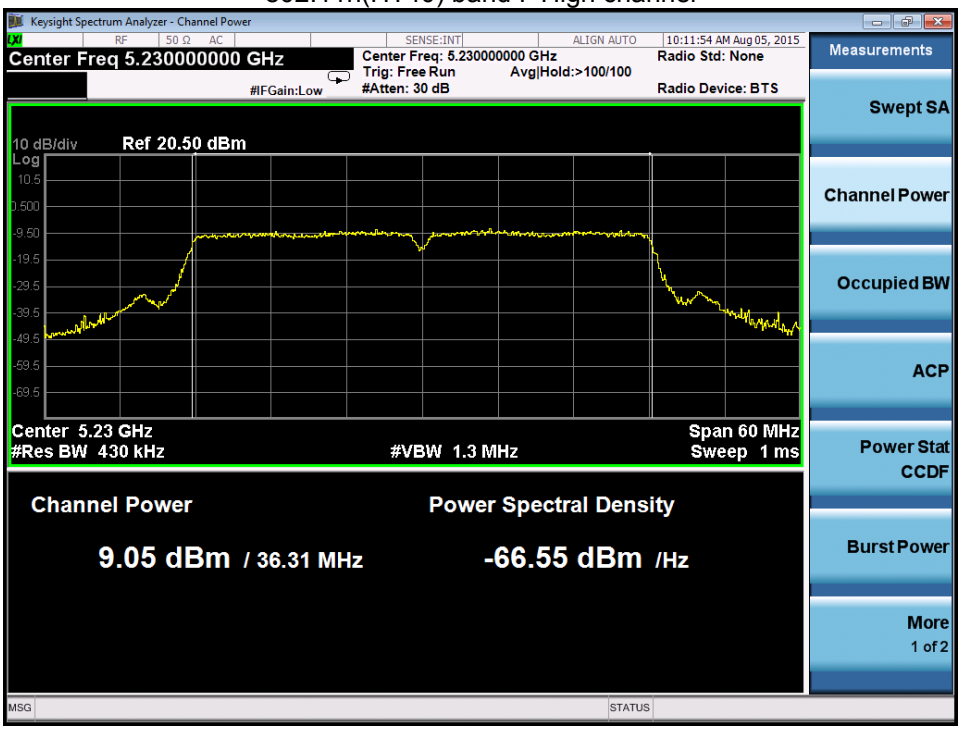
802.11n(HT20) band I High channel



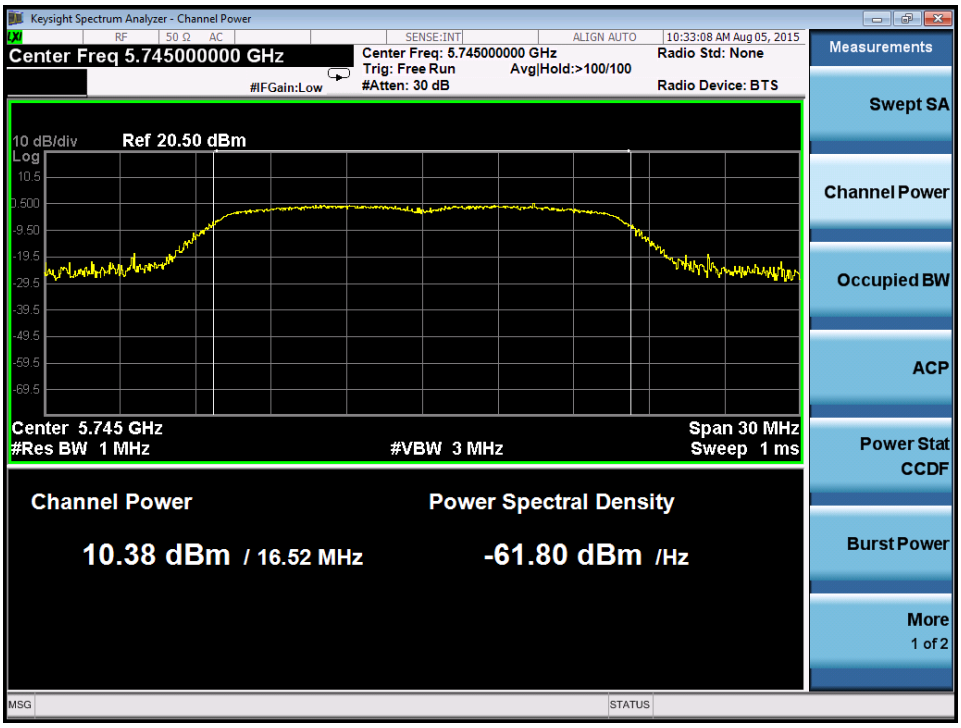
802.11n(HT40) band I Low channel



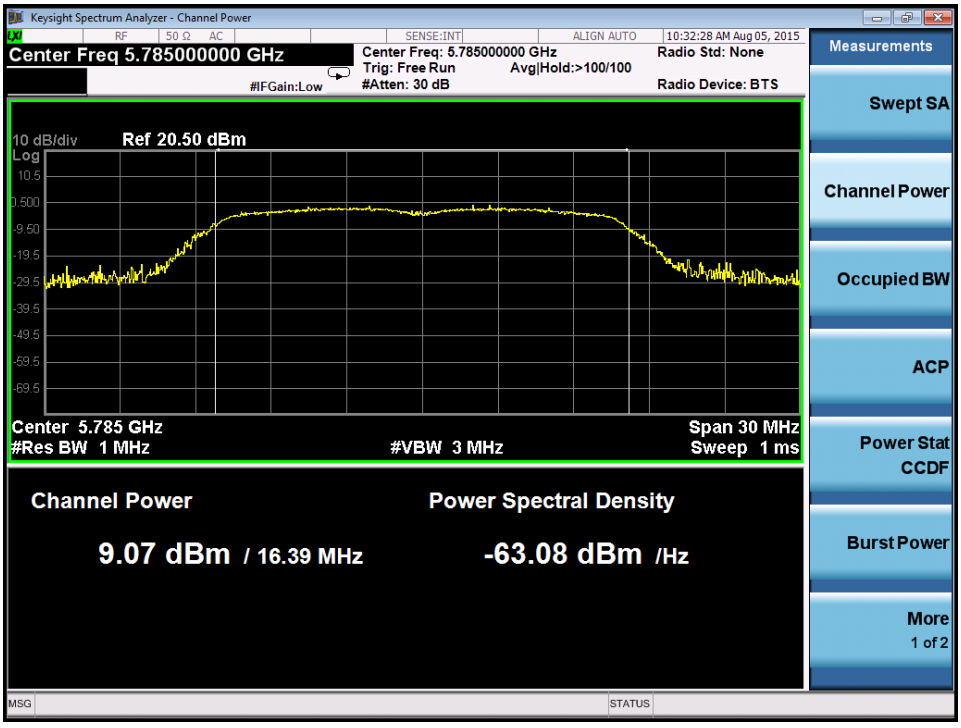
802.11n(HT40) band I High channel



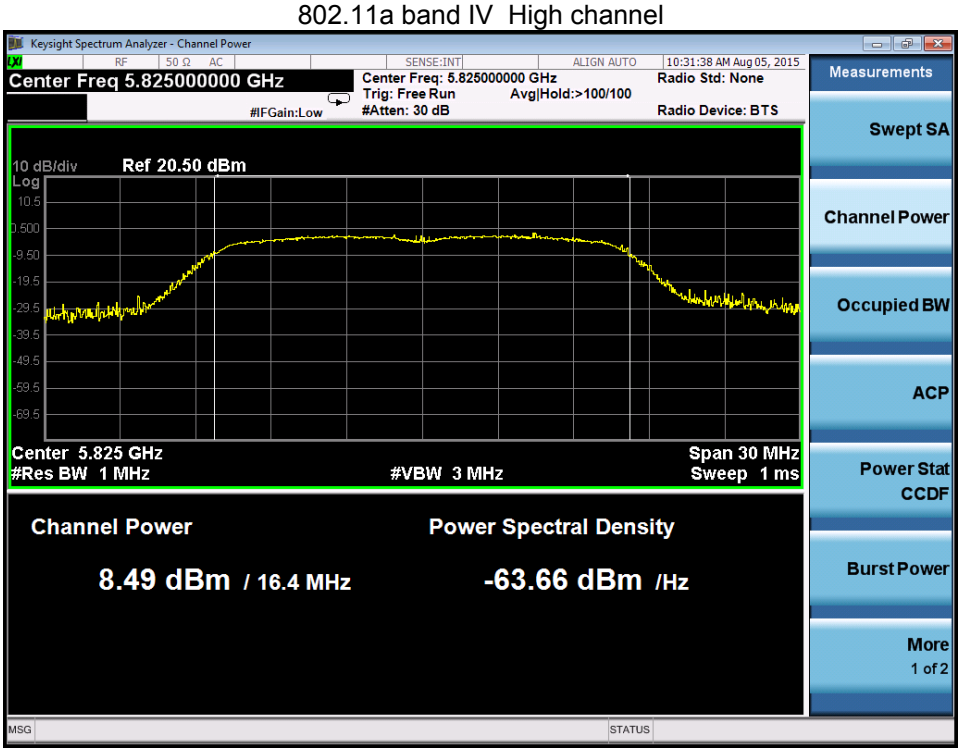
802.11a band IV Low channel



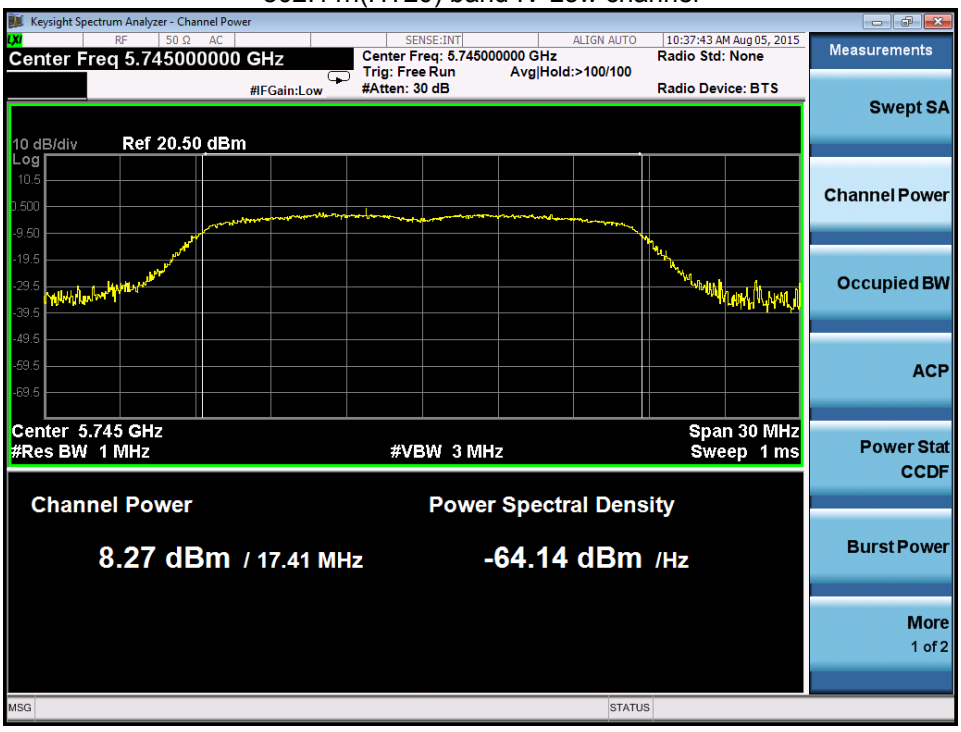
802.11a band IV Middle channel



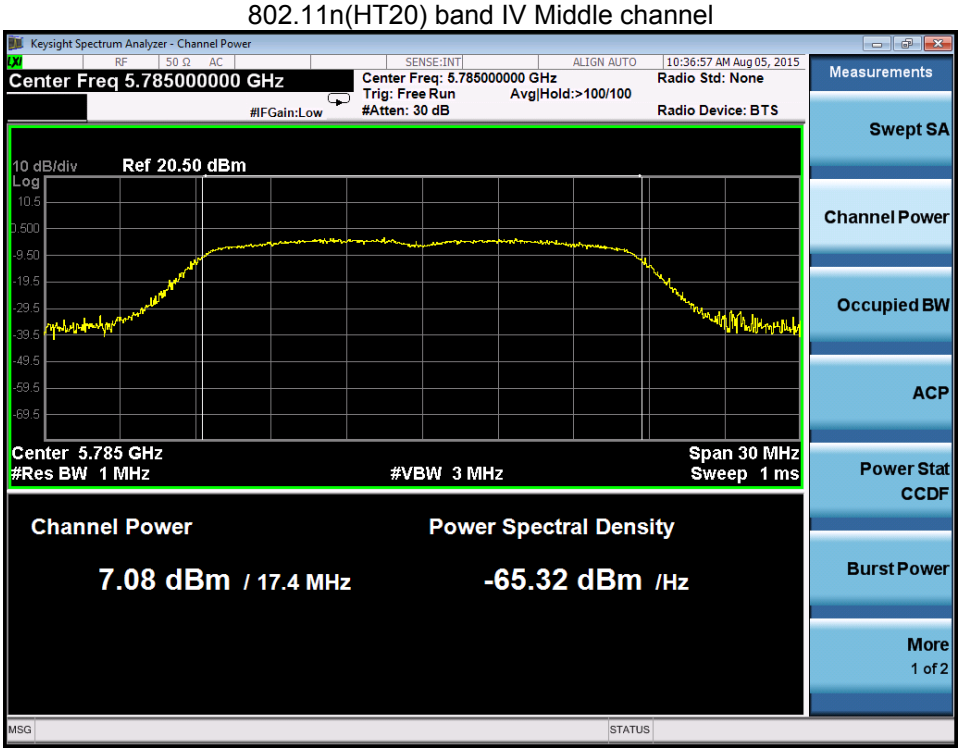
802.11a band IV High channel



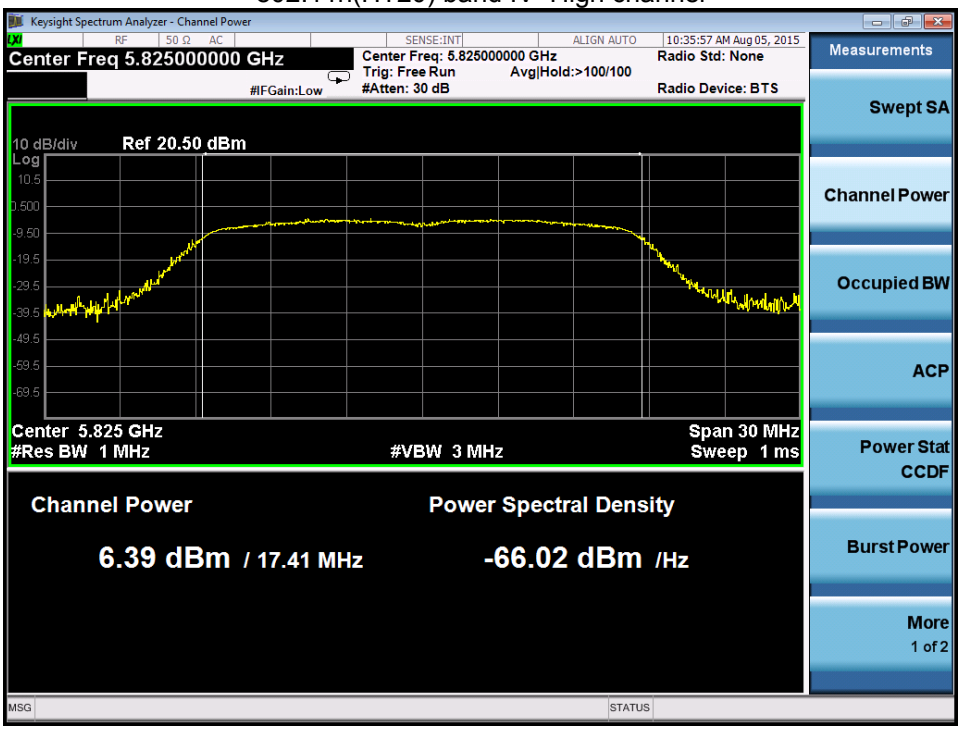
802.11n(HT20) band IV Low channel



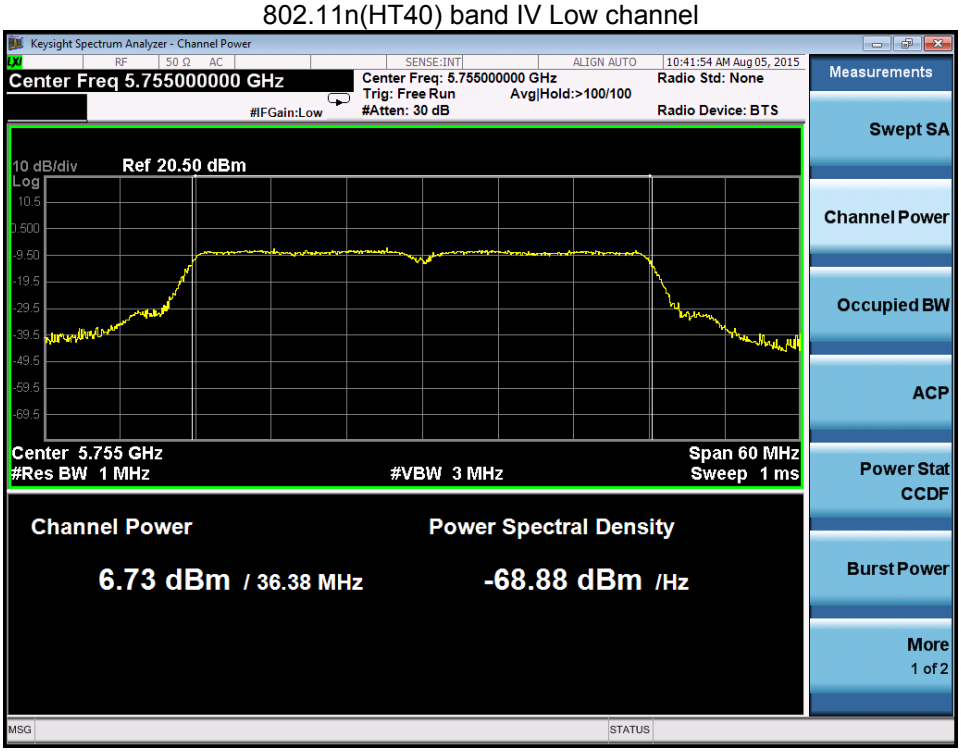
802.11n(HT20) band IV Middle channel



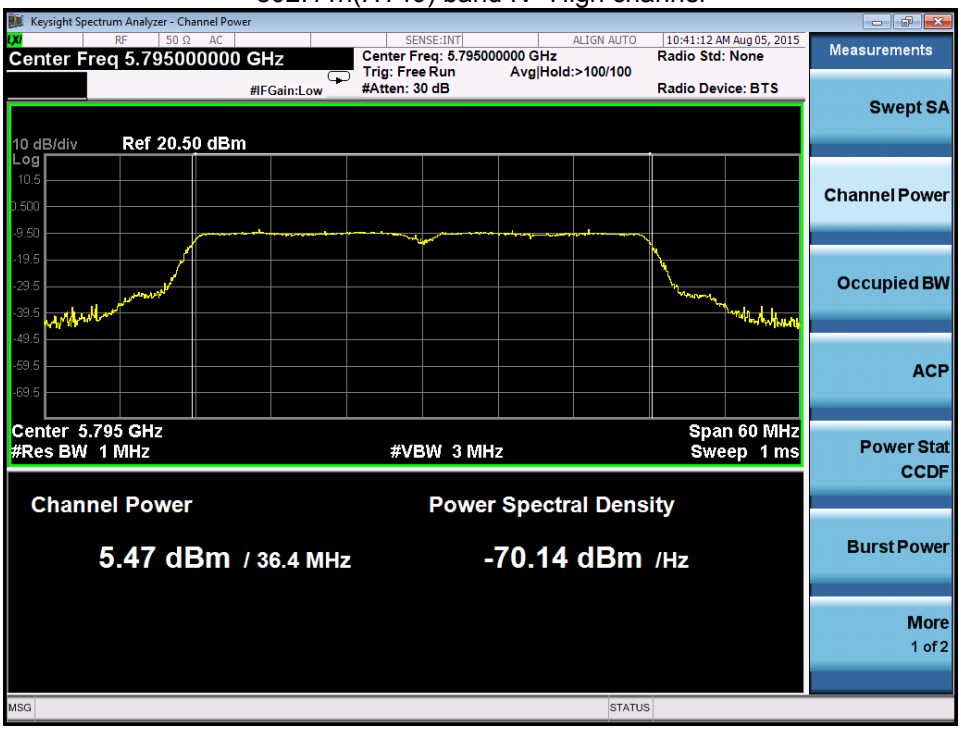
802.11n(HT20) band IV High channel



802.11n(HT40) band IV Low channel



802.11n(HT40) band IV High channel



13 Power Spectral density

Test Requirement:	FCC CFR47 Part 15 Section 15.407(a)
Test Method:	KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v01, Section F
Test Limit:	≤17.00dBm/MHz for Operation in the band I(5150MHz-5250MHz)of device ≤30.00dBm/500KHz for Operation in the band IV(5725MHz-5850MHz)of device
Test Result:	PASS

13.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 510kHz/1MHz. VBW ⩾3 RBW Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

13.2 Test Result:

Band	Operation mode	CH	Power Spectral Density (dBm/MHz)		
			ANT0	ANT1	Total
Band I	802.11a	Low	3.220	4.129	/
		Middle	4.050	4.818	/
		High	5.217	6.125	/
	802.11n(HT20)	Low	4.734	4.253	7.510
		Middle	6.334	5.257	8.839
		High	6.643	7.437	10.068
	802.11n(HT40)	Low	-5.943	-5.348	-2.625
		Middle	/	/	/
		High	-4.391	-3.423	-0.870
	Limit		≤17.00dBm/MHz		
Band	Operation mode	CH	Power Spectral Density (dBm/500kHz)		
			ANT0	ANT1	Total
Band IV	802.11a	Low	1.946	0.505	/
		Middle	1.716	-0.170	/
		High	0.856	-1.708	/
	802.11n(HT20)	Low	0.150	-1.145	2.561
		Middle	-1.215	-3.089	0.959
		High	-2.049	-3.766	0.187
	802.11n(HT40)	Low	-5.478	-7.035	-3.177
		Middle	/	/	/
		High	-6.548	-8.336	-4.340
	Limit		≤30.00dBm/500KHz		

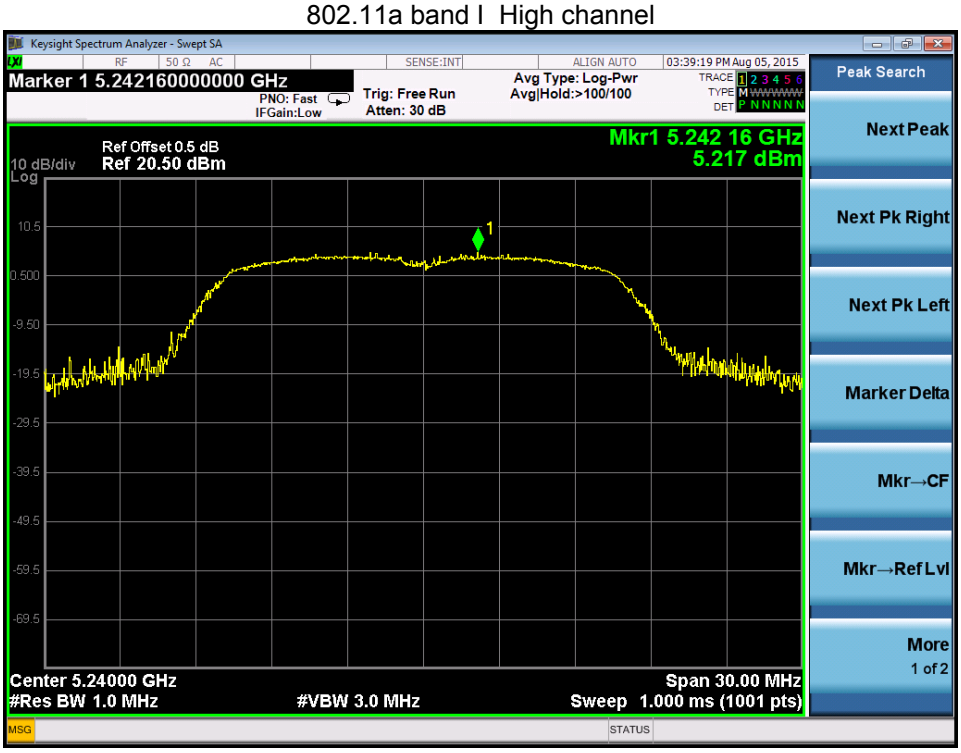
Test result plots shown as follows:

ANT0:

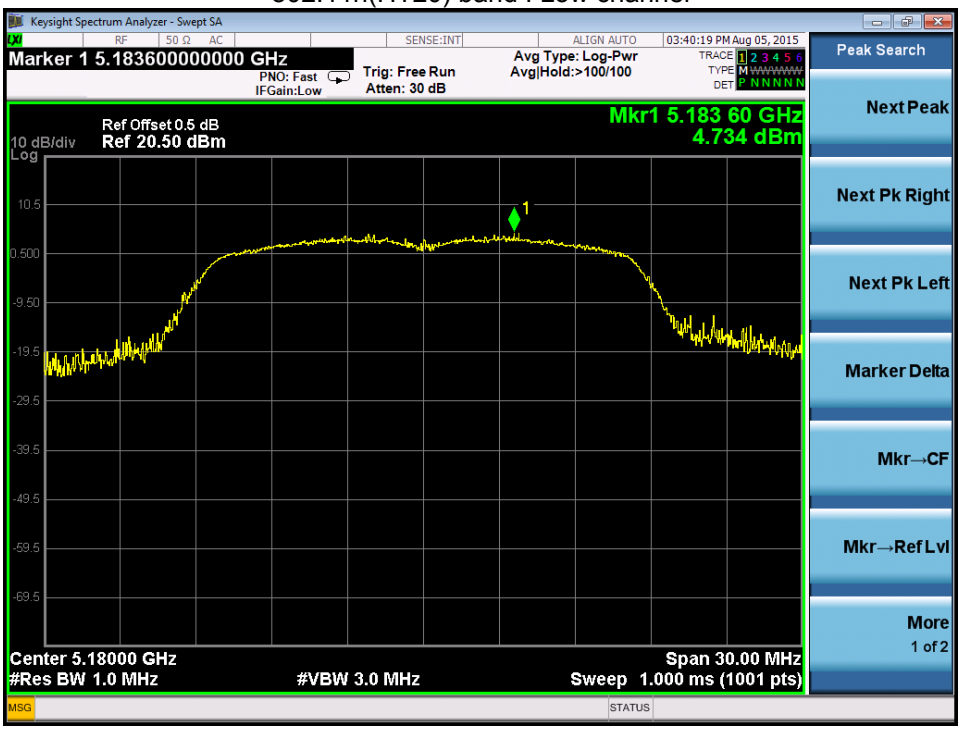
802.11a band I Low channel

802.11a band I Middle channel

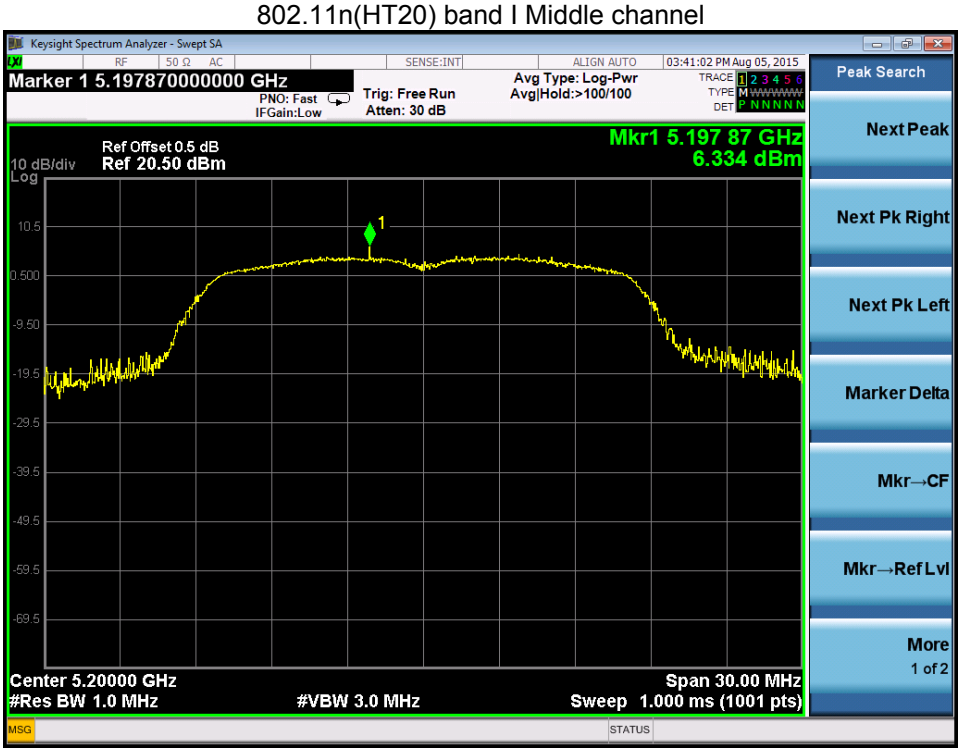
802.11a band I High channel



802.11n(HT20) band I Low channel

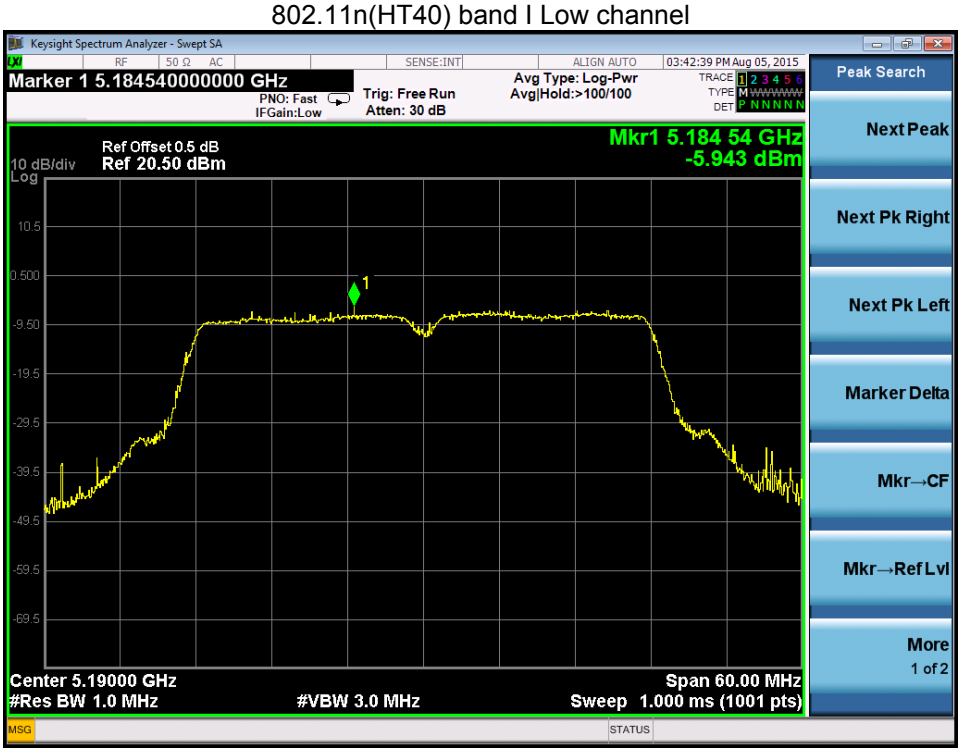


802.11n(HT20) band I Middle channel



802.11n(HT20) band I High channel

802.11n(HT40) band I Low channel

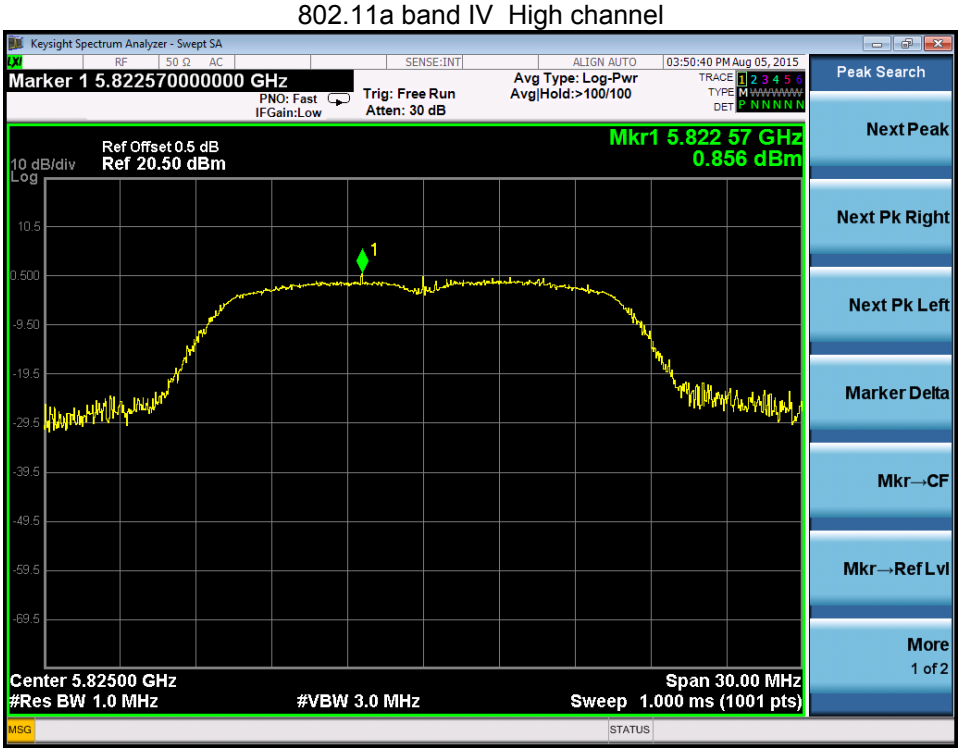


802.11n(HT40) band I High channel

802.11a band IV Low channel

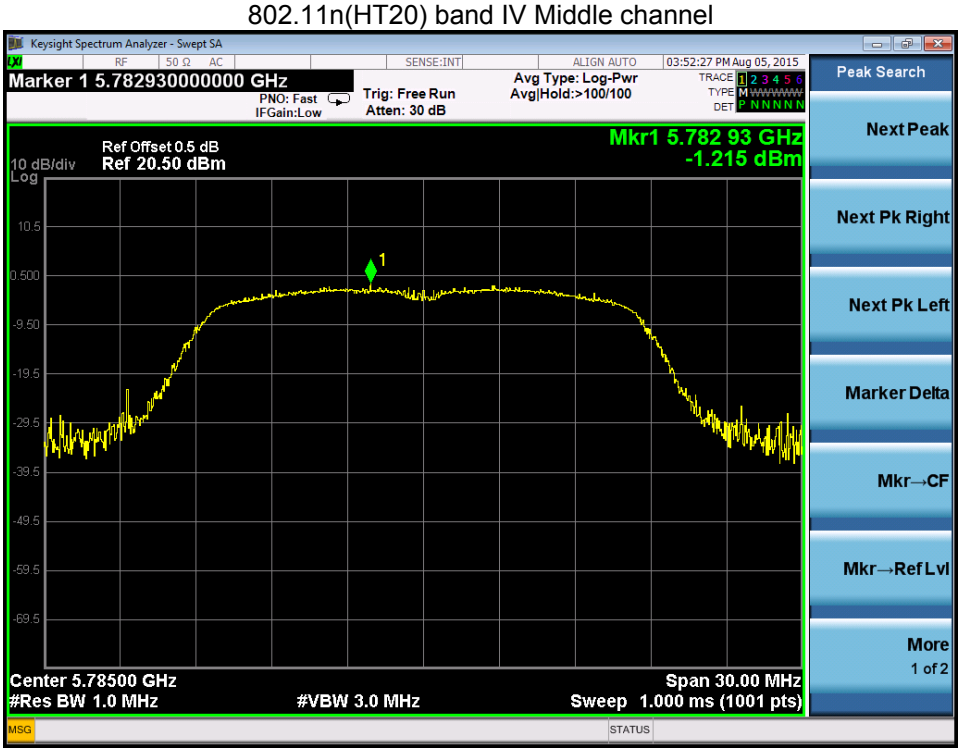
802.11a band IV Middle channel

802.11a band IV High channel

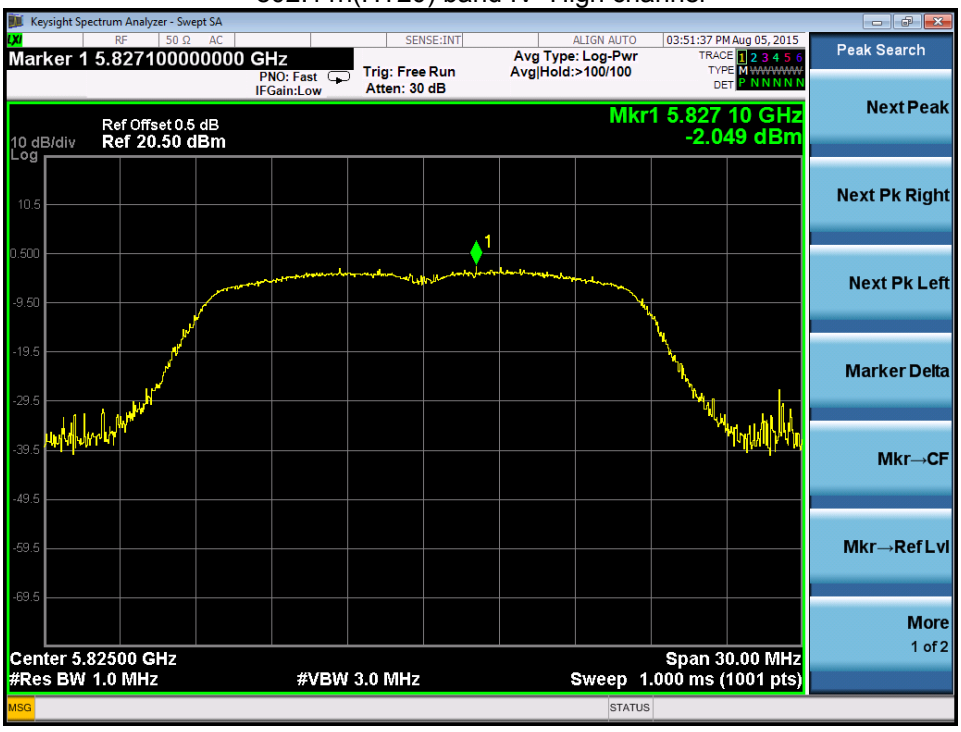


802.11n(HT20) band IV Low channel

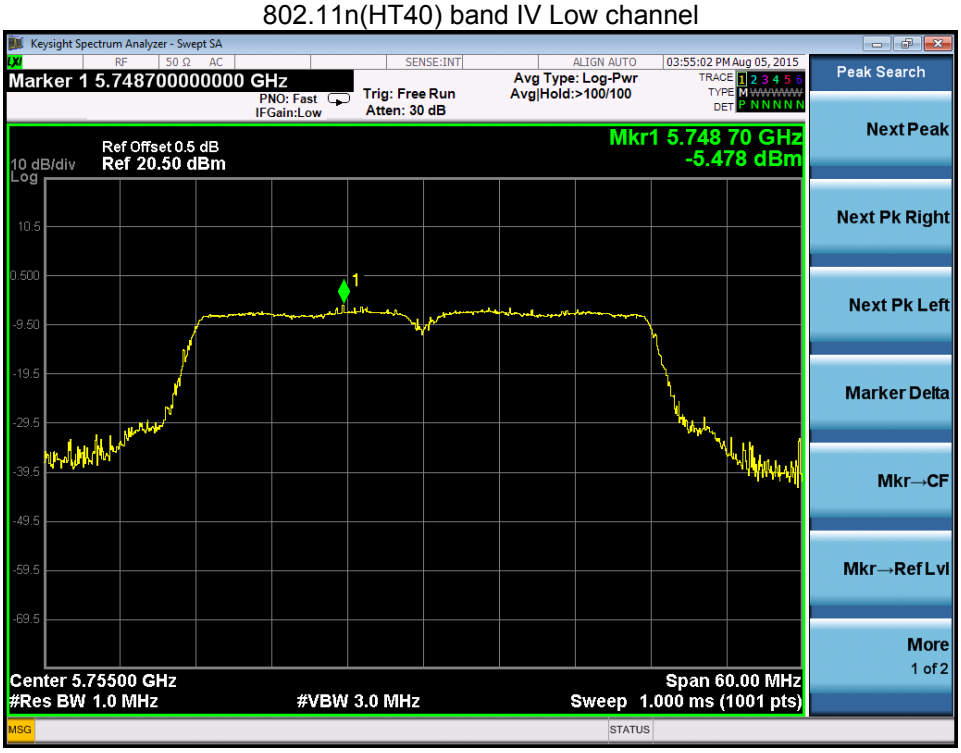
802.11n(HT20) band IV Middle channel



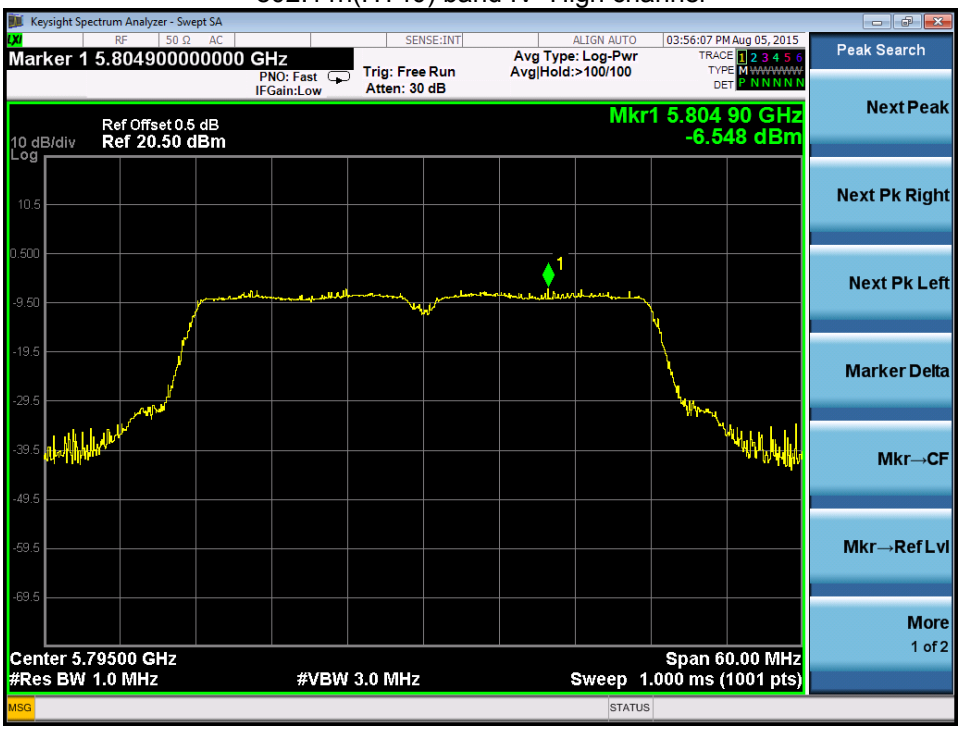
802.11n(HT20) band IV High channel



802.11n(HT40) band IV Low channel



802.11n(HT40) band IV High channel

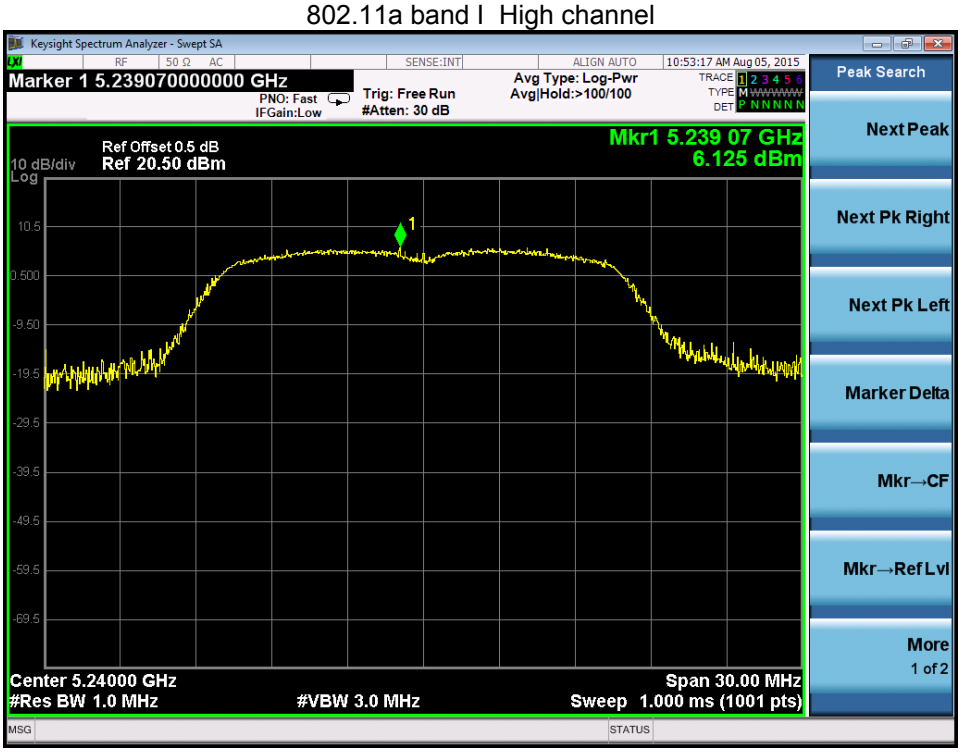


ANT1:

802.11a band I Low channel

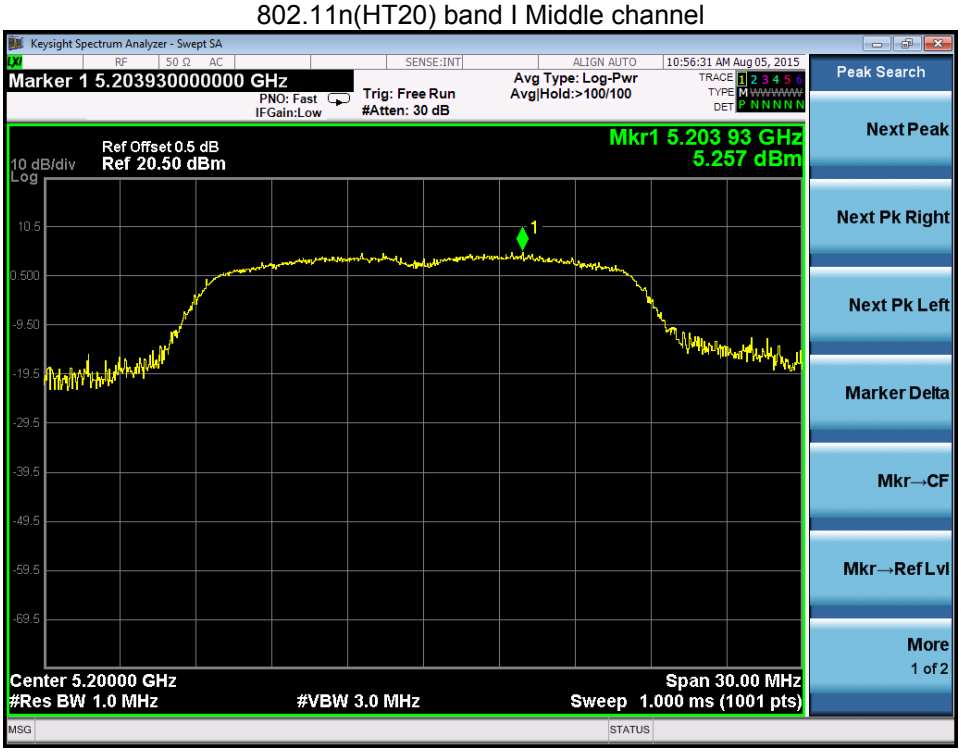
802.11a band I Middle channel

802.11a band I High channel



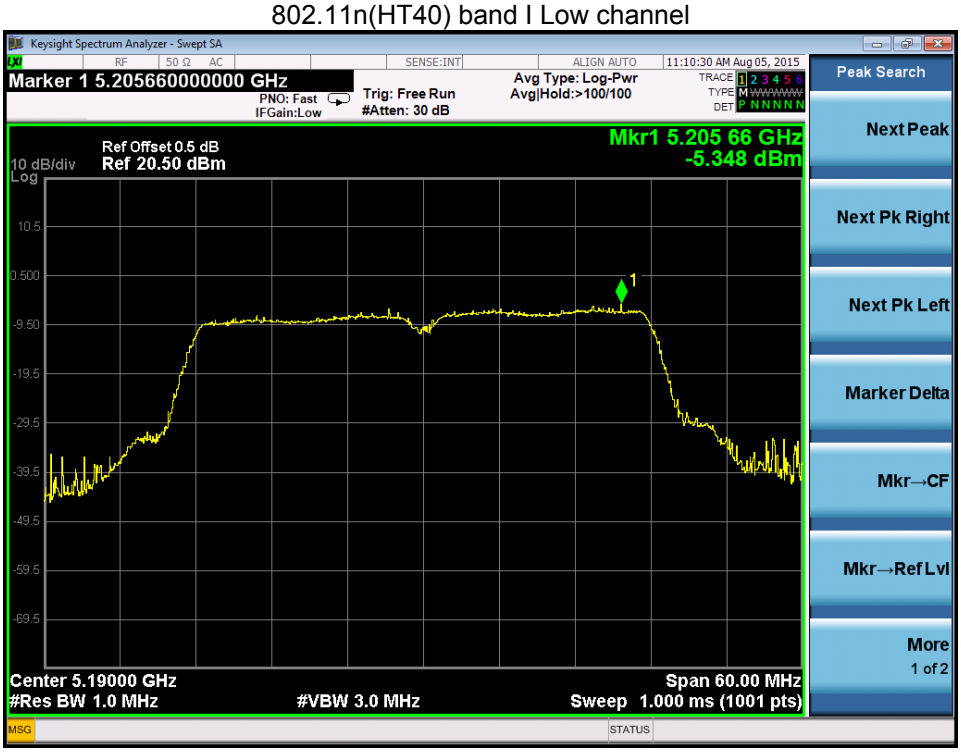
802.11n(HT20) band I Low channel

802.11n(HT20) band I Middle channel



802.11n(HT20) band I High channel

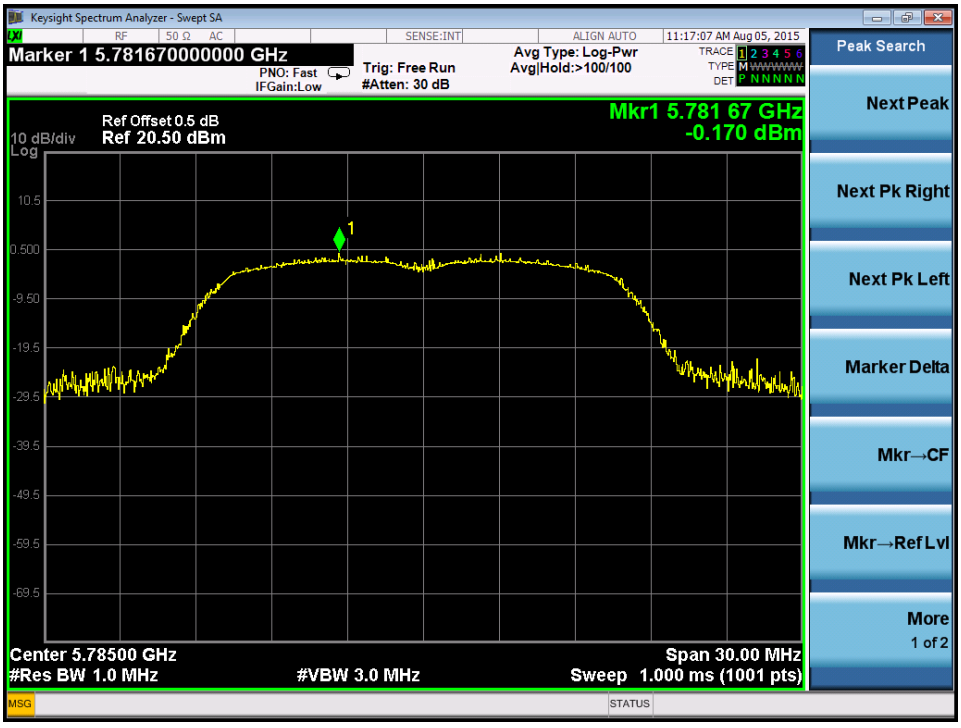
802.11n(HT40) band I Low channel



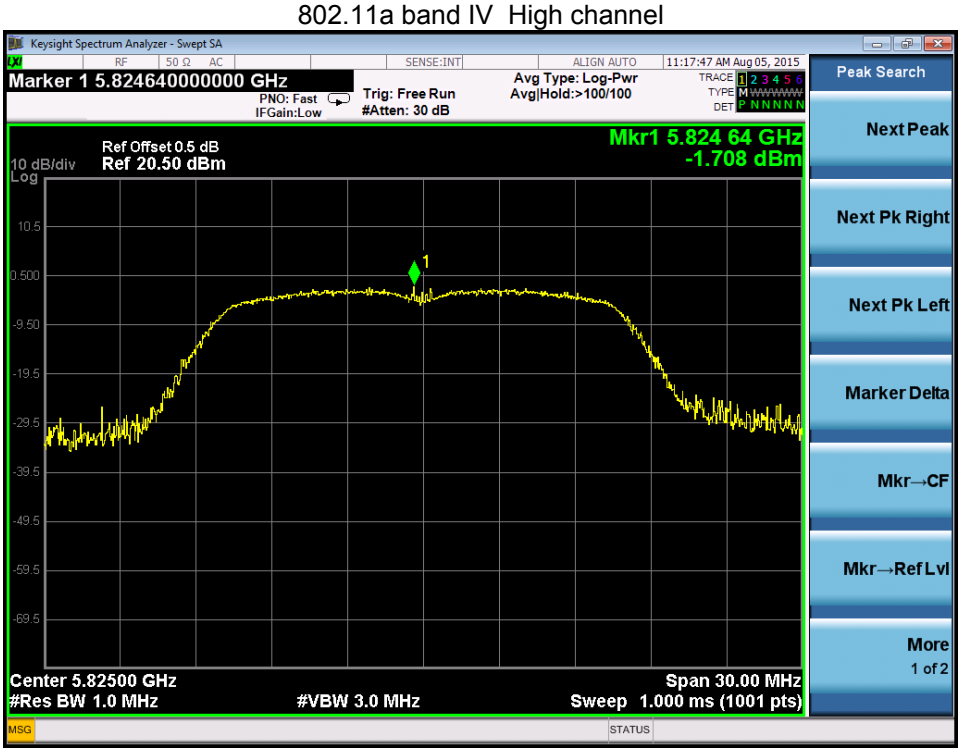
802.11n(HT40) band I High channel

802.11a band IV Low channel

802.11a band IV Middle channel

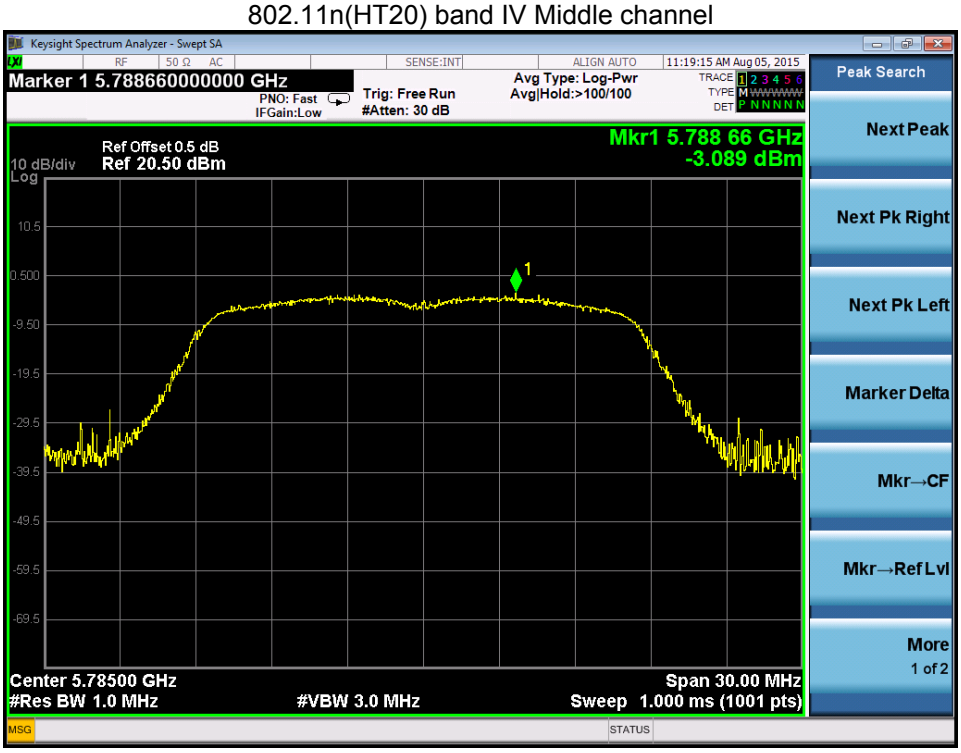


802.11a band IV High channel



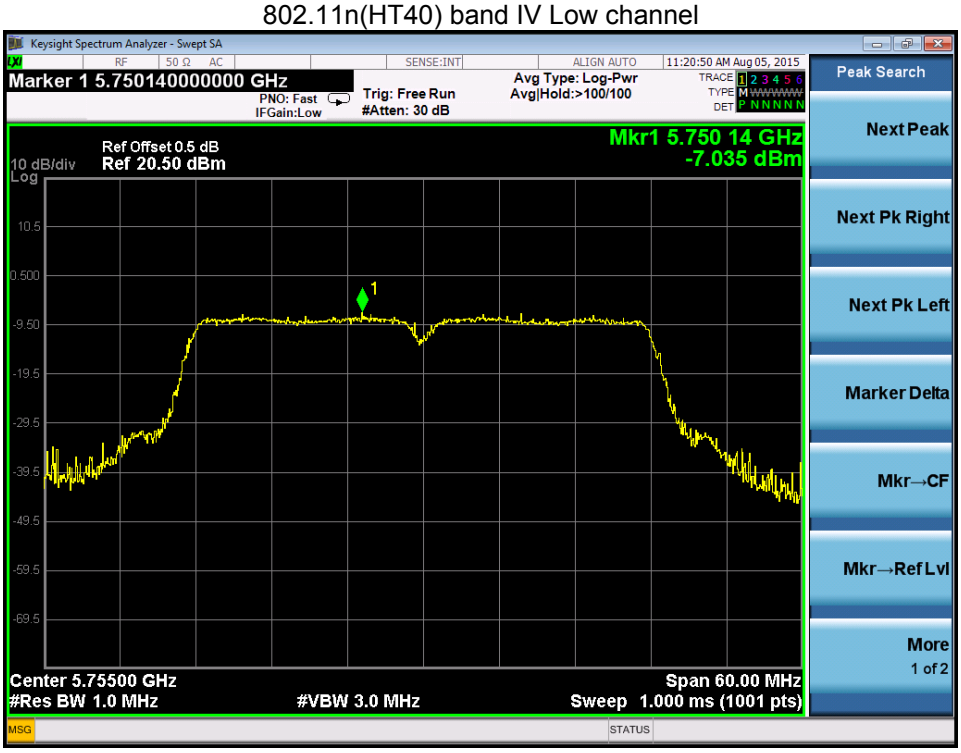
802.11n(HT20) band IV Low channel

802.11n(HT20) band IV Middle channel



802.11n(HT20) band IV High channel

802.11n(HT40) band IV Low channel



802.11n(HT40) band IV High channel

14 Antenna Requirement

According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. This product has an internal integrated antenna fulfill the requirement of this section.

15 RF Exposure

Test Requirement: FCC Part 1.1307

Evaluation Method: FCC Part 2.1091

15.1 Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

15.2 The procedures / limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

15.3 MPE Calculation Method

$$\text{E (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m²)} = \frac{E^2}{377}$$

E = Electric field (V/m)
P = Peak RF output power (W)
G = EUT Antenna numeric gain (numeric)
d = Separation distance between radiator and human body (m)
The formula can be changed to

$$\boldsymbol{Pd} = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

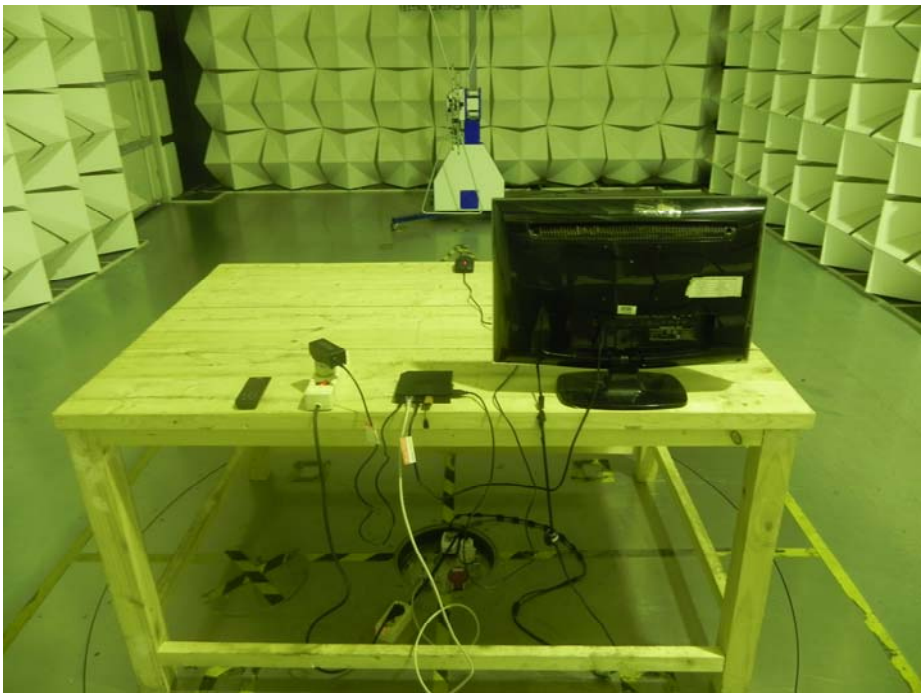
Antenna Gain (numeric)	Max. Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm2)	Limit of Power Density (mW/cm2)
1.585	19.99	99.77	0.0315	1

16 Photographs – Model LBA-048-CH Test Setup

16.1 Conducted Emission at Test Site 1

16.2 Radiated Emission

Test frequency from 30MHz to 1GHz at Test Site 2



Test frequency above 1GHz at Test Site 1

======End of Report======