

7. OUTPUT POWER TEST

7.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	N9030A	MY51380221	Oct.15,16	1 Year
2.	Power meter	Anritsu	ML2487A	6K00002472	Apr.22,17	1 Year
3.	Power sensor	Anritsu	MA2491A	0033005	Apr.22,17	1 Year
4.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr.22,17	1 Year
5.	RF Cable	Marvelous Microwave Inc	SFL402105FLEX	No.1	Oct.15,16	1 Year

7.2. Limit

For the band 5.15–5.25 GHz.

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

7.3. Test Procedure

1. Connected the EUT's antenna port to measure device by 26dB attenuator.
2. For IEEE 802.11a and IEEE802.11n HT20 and 802.11ac VHT20 mode, use a PK power meter which's bandwidth is 20MHz and above 26dB bandwidth of signal to measure out each test modes' PK output power.
3. For IEEE802.11n HT40 mode, because the signal's bandwidth is about 40MHz and above 20MHz bandwidth of power sensor ML2491A. So use the test method described in KBD789033 clause E Method SA-1
 - 1) Connect the antenna port to the spectrum analyzer and Set span of the spectrum to encompass the entire emission bandwidth (EBW) of the signal.
 - 2) Set the RBW=1MHz and VBW =3MHz
 - 3) Number of points in sweep $\geq 2 \text{ Span} / \text{RBW}$
 - 4) Detector = RMS
 - 5) Sweep time = auto couple
 - 6) Allow the sweep to "free run" and set the Trace average at least 100 traces in power averaging (i.e., RMS) mode.
 - 7) Compute power by integrating the spectrum across the 26 dB EBW of the signal using the instrument's band power measurement function with band limits set equal to the EBW band edges.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

7.4. Test Results

5180-5240MHz Band:

EUT: Wireless Speaker			
M/N: LF-S50G			
Test date: 2017-06-01		Pressure: 102.4±1.0 kpa	Humidity:53.1±3.0%
Tested by: zack_zhu		Test site: RF site	Temperature:23.2±0.6 °C
Test Mode	Frequency (MHz)	Maximum Conducted output power (dBm)	Limit (dBm)
11a	5180	12.86	23.98
	5200	12.79	23.98
	5240	12.78	23.98
11n HT20	5180	12.55	23.98
	5200	12.57	23.98
	5240	12.47	23.98
11n HT40	5190	12.49	23.98
	5230	12.56	23.98
Conclusion: PASS			

5260-5320MHz Band:

EUT: Wireless Speaker			
M/N: LF-S50G			
Test date: 2017-06-01		Pressure: 102.4±1.0 kpa	Humidity:53.1±3.0%
Tested by: zack_zhu		Test site: RF site	Temperature:23.2±0.6 °C
Test Mode	Frequency (MHz)	Maximum Conducted output power (dBm)	Limit (dBm)
11a	5260	12.48	23.69
	5300	12.22	23.69
	5320	12.36	23.69
11n HT20	5260	12.14	23.82
	5300	12.05	23.82
	5320	12.17	23.82
11n HT40	5270	12.01	23.89
	5310	12.10	23.89
Conclusion: PASS			

5500-5700MHz Band:

EUT: Wireless Speaker			
M/N: LF-S50G			
Test date: 2017-06-01		Pressure: 102.4±1.0 kpa	Humidity:53.1±3.0%
Tested by: zack_zhu		Test site: RF site	Temperature:23.2±0.6 °C
Test Mode	Frequency (MHz)	Maximum Conducted output power (dBm)	Limit (dBm)
11a	5500	13.01	23.81
	5600	13.17	23.81
	5700	12.60	23.81
11n HT20	5500	12.69	23.89
	5600	12.80	23.89
	5700	12.54	23.89
11n HT40	5510	12.75	23.98
	5590	12.82	23.98
	5670	12.50	23.98
Conclusion: PASS			

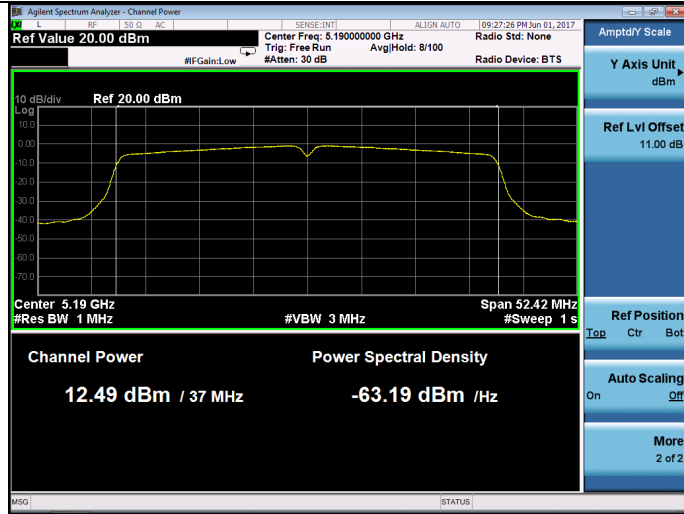
5745-5825MHz Band:

EUT: Wireless Speaker			
M/N: LF-S50G			
Test date: 2017-06-02		Pressure: 102.4±1.0 kpa	Humidity:53.1±3.0%
Tested by: zack_zhu		Test site: RF site	Temperature:23.2±0.6 °C
Test Mode	Frequency (MHz)	Maximum Conducted output power (dBm)	Limit (dBm)
11a	5745	12.19	29.61
	5785	11.91	29.61
	5825	11.79	29.61
11n HT20	5745	12.08	29.61
	5785	11.75	29.61
	5825	11.48	29.61
11n HT40	5755	11.60	29.61
	5795	11.88	29.61
Conclusion: PASS			

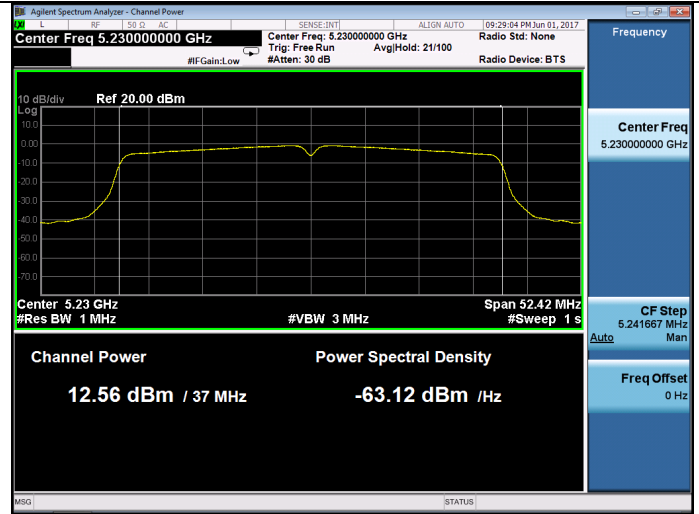
5180-5240MHz Band:

11n HT40

5190MHz



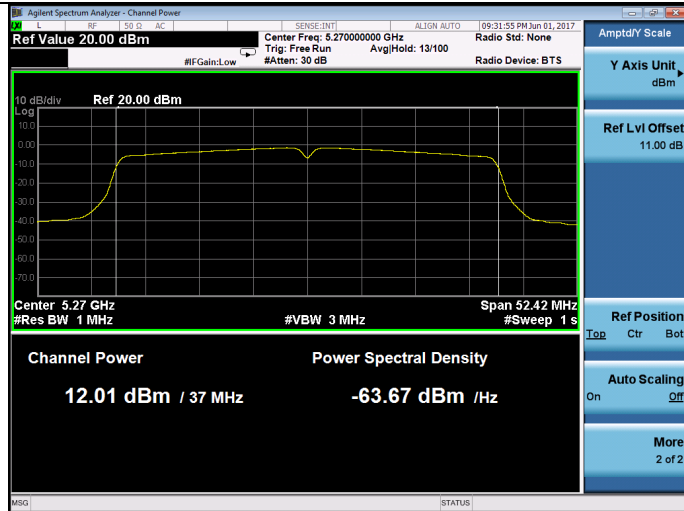
5230MHz



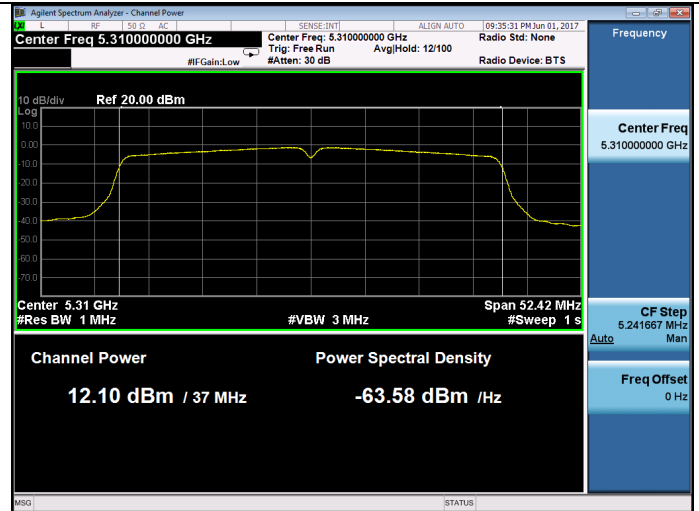
5260-5320MHz Band:

11n HT40

5270MHz



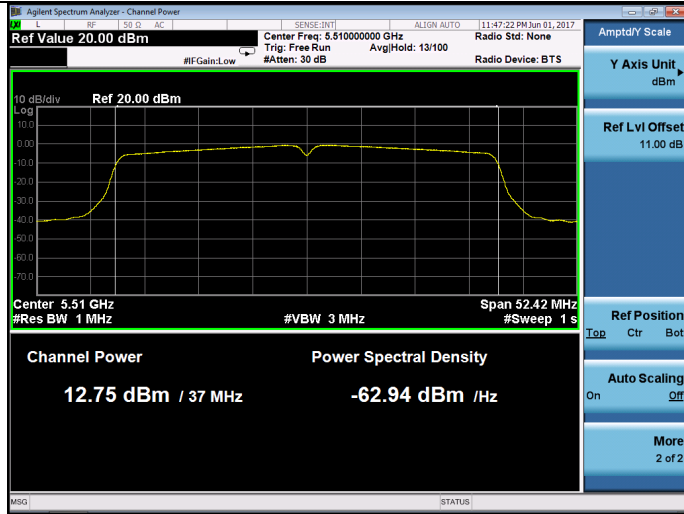
5310MHz



5500-5700MHz Band:

11n HT40

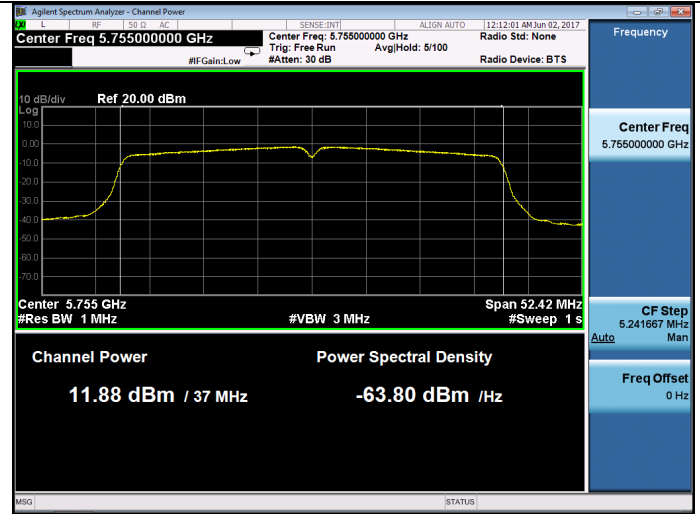
5510MHz



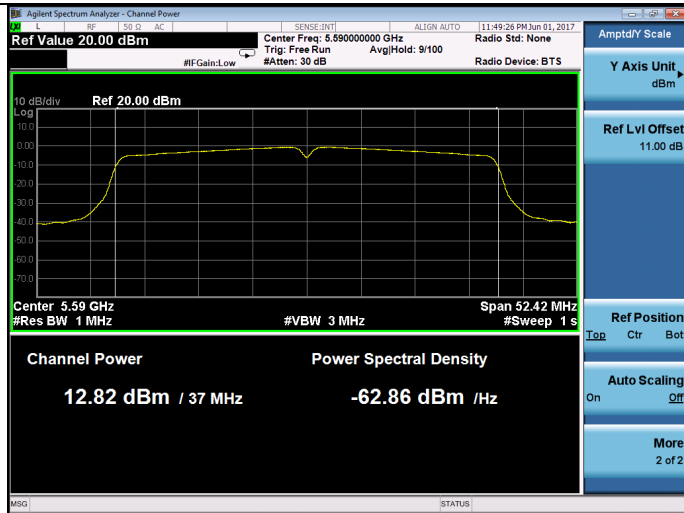
5745-5825MHz Band:

11n HT40

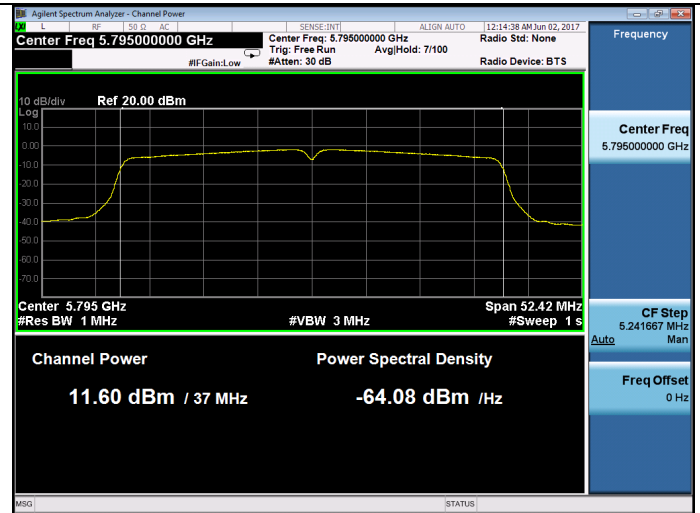
5755MHz



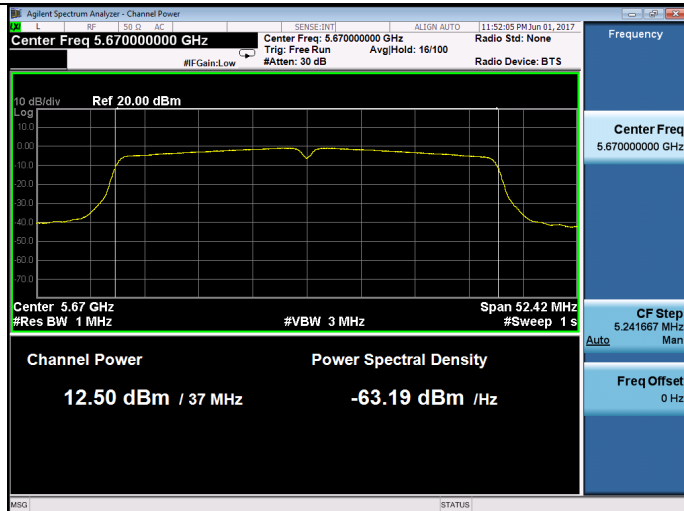
5590MHz



5795MHz



5670MHz



8. POWER SPECTRAL DENSITY TEST

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	N9030A	MY51380221	Oct.15,16	1 Year
2.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr.27,17	1 Year
3.	RF Cable	Marvelous Microwave Inc	SFL402105FLEX	No.1	Oct.15,16	1 Year

8.2. Limit

Band 5150-5250 MHz:

The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Band 5250-5350 MHz:

The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Band 5470-5725 MHz:

The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Band 5725-5850 MHz:

The power spectral density shall not exceed 30 dBm in any 500 KHz band.

8.3. Test Procedure

For the Band 5.15-5.35GHz; 5.47-5.725 GHz:

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW; Detector: RMS mode.

For the band 5.725-5.85 GHz:

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW, RMS Detector.

So use the test method described in KDB789033 clause E

- 1) Set the RBW=100kHz and VBW =3MHz
- 2) Number of points in sweep $\geq 2 \text{ Span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)
- 3) Sweep time = auto
- 4) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- 5) Use the "peak search" function of spectrum analyzer find the max value, then add $10\log(500\text{kHz}/\text{RBW})$ to the measured result.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

8.4. Test Results

5180-5240MHz Band:

EUT: Wireless Speaker		
M/N: LF-S50G		
Test date: 2017-06-21	Pressure: 102.6±1.0 kpa	Humidity:53.6±3.0%
Tested by: zack_zhu	Test site: RF site	Temperature:23.5±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/MHz)	Limit (dBm/MHz)
11a	5180	2.634	10.98
	5200	2.627	10.98
	5240	2.367	10.98
11n HT20	5180	2.308	10.98
	5200	2.554	10.98
	5240	2.171	10.98
11n HT40	5190	-0.476	10.98
	5230	-0.898	10.98
Conclusion: PASS			

5260-5320MHz Band:

EUT: Wireless Speaker		
M/N: LF-S50G		
Test date: 2017-06-21	Pressure: 102.6±1.0 kpa	Humidity:53.6±3.0%
Tested by: zack_zhu	Test site: RF site	Temperature:23.5±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/MHz)	Limit (dBm/MHz)
11a	5260	2.356	10.91
	5300	2.189	10.91
	5320	2.314	10.91
11n HT20	5260	1.984	10.91
	5300	2.042	10.91
	5320	1.966	10.91
11n HT40	5270	-1.122	10.91
	5310	-0.926	10.91
Conclusion: PASS			

5500-5700MHz Band:

EUT: Wireless Speaker		
M/N: LF-S50G		
Test date: 2017-06-21	Pressure: 102.6±1.0 kpa	Humidity:53.6±3.0%
Tested by: zack_zhu	Test site: RF site	Temperature:23.5±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/MHz)	Limit (dBm/MHz)
11a	5500	2.526	11
	5600	2.300	11
	5700	2.699	11
11n HT20	5500	2.098	11
	5600	2.120	11
	5700	2.241	11
11n HT40	5510	-0.588	11
	5590	-0.773	11
	5670	-0.820	11
Conclusion: PASS			

5745-5825MHz Band:

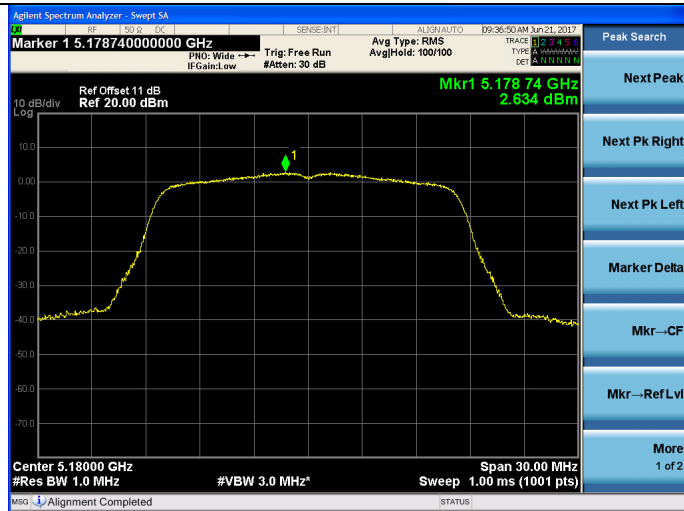
EUT: Wireless Speaker		
M/N: LF-S50G		
Test date: 2017-06-21	Pressure: 102.6±1.0 kpa	Humidity:53.6±3.0%
Tested by: zack_zhu	Test site: RF site	Temperature:23.5±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/MHz)	Limit (dBm/500kHz)
11a	5745	0.3927	29.61
	5785	0.3747	29.61
	5825	0.0167	29.61
11n HT20	5745	0.2637	29.61
	5785	0.5117	29.61
	5825	0.2627	29.61
11n HT40	5755	-2.2153	29.61
	5795	-2.8693	29.61
Conclusion: PASS			

5180-5240MHz Band:

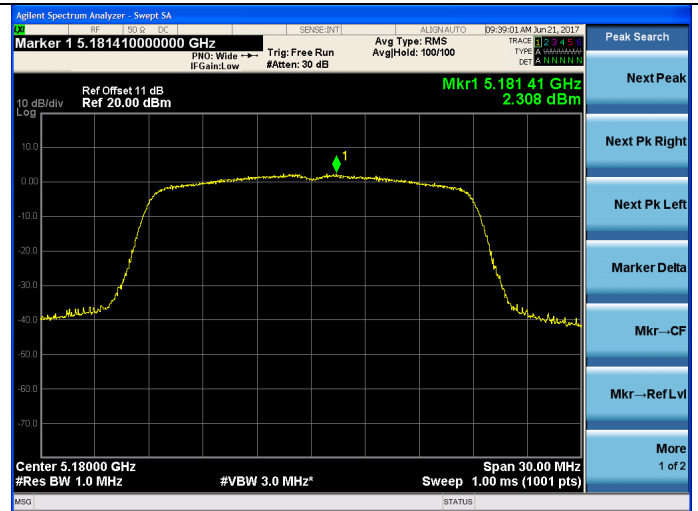
11a

5180MHz

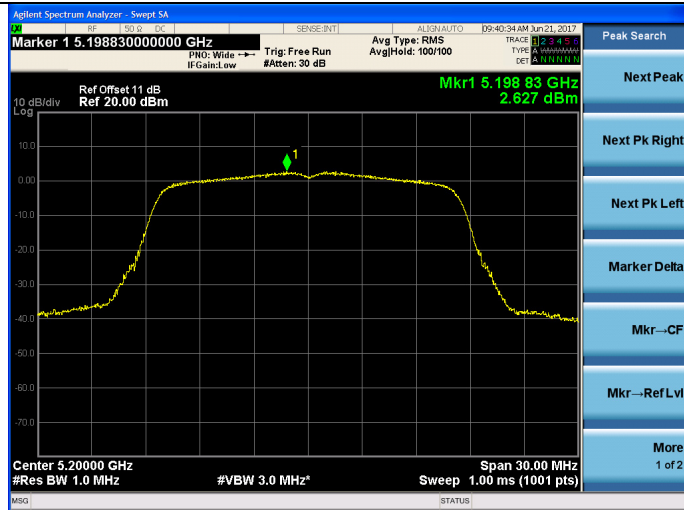


11n HT20

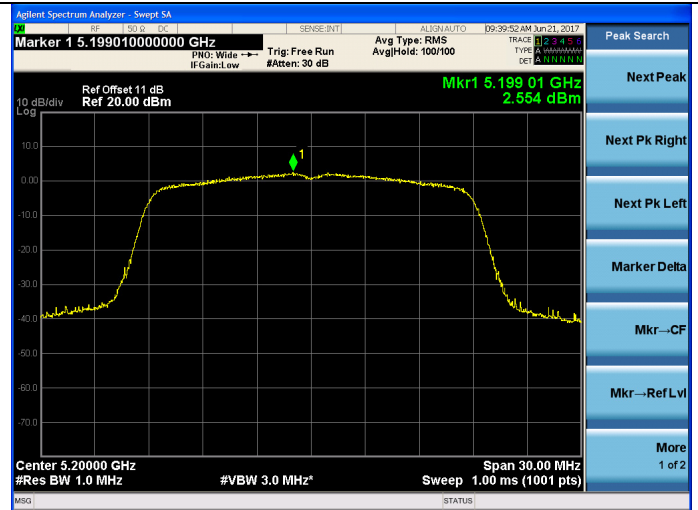
5180MHz



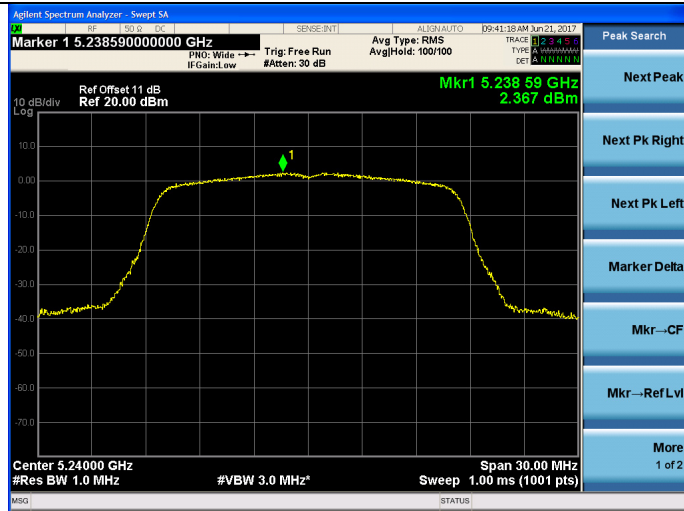
5200MHz



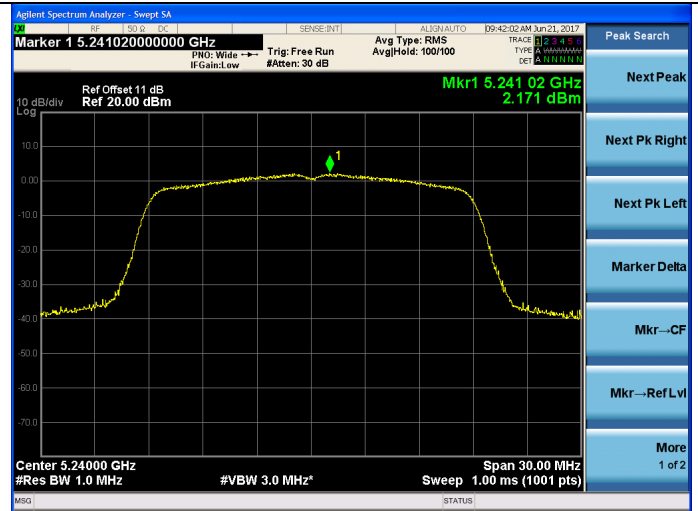
5200MHz

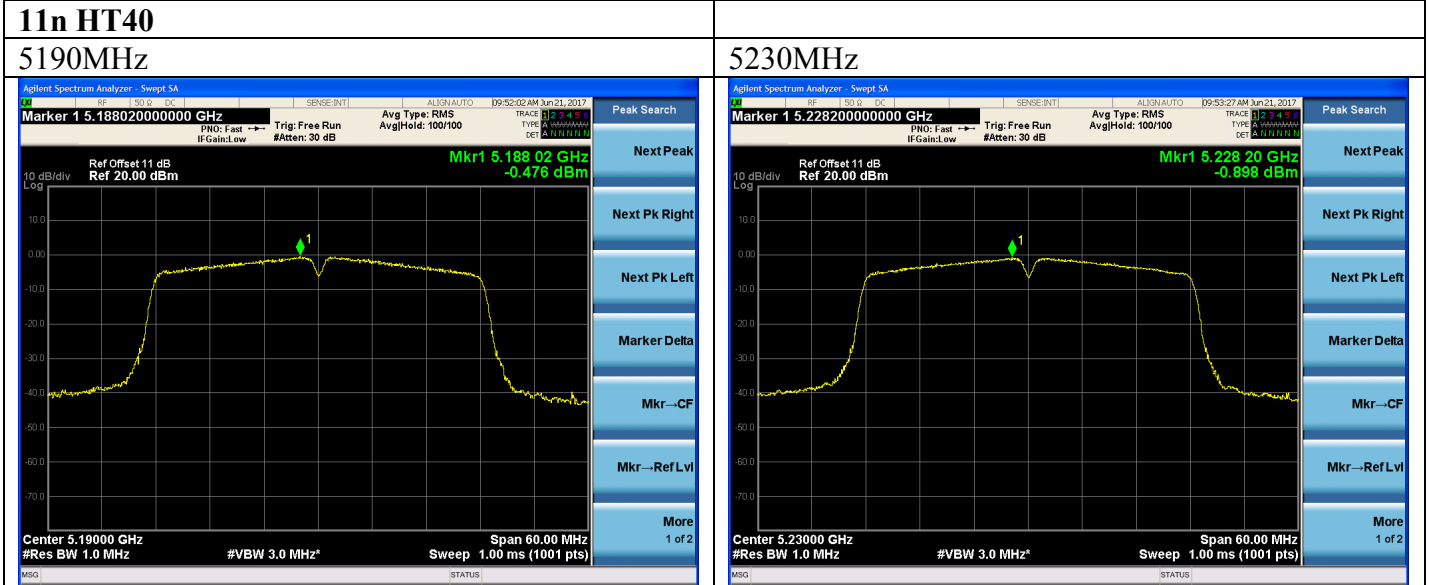


5240MHz



5240MHz

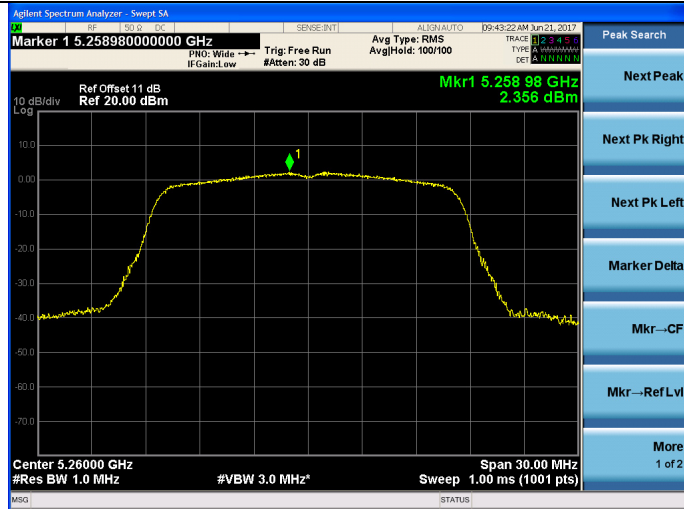




5260-5320MHz Band:

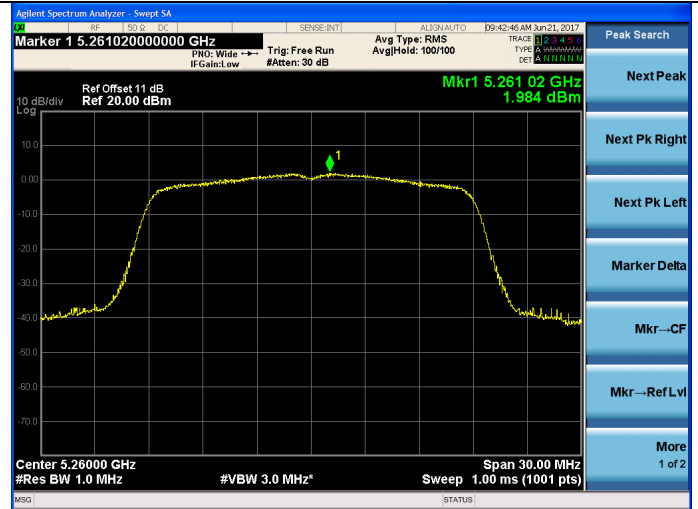
11a

5260MHz

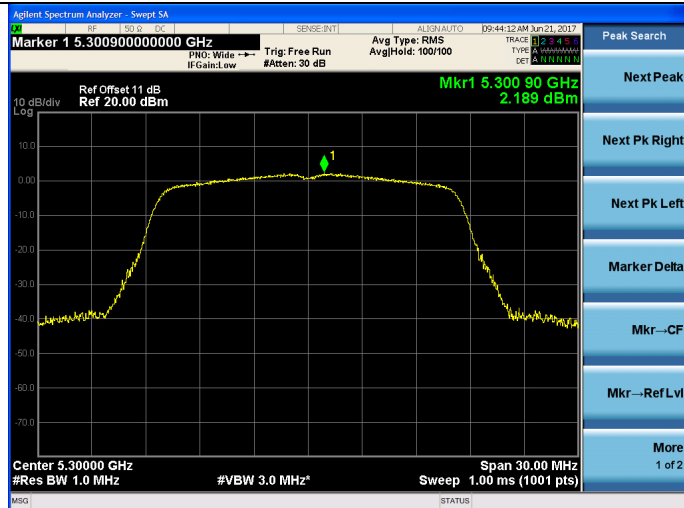


11n HT20

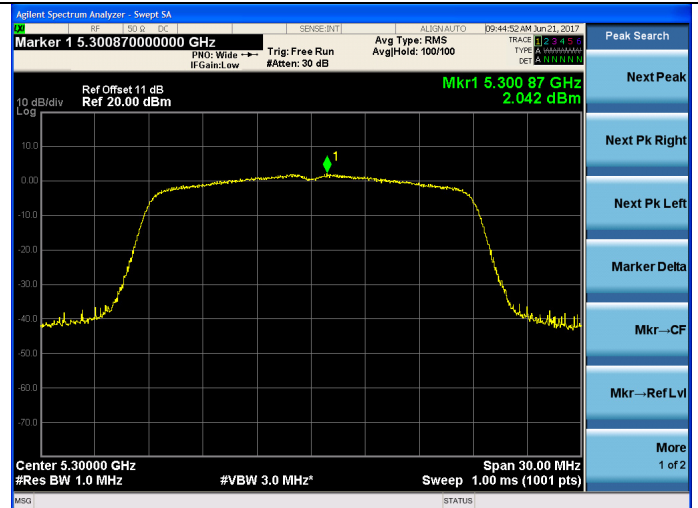
5260MHz



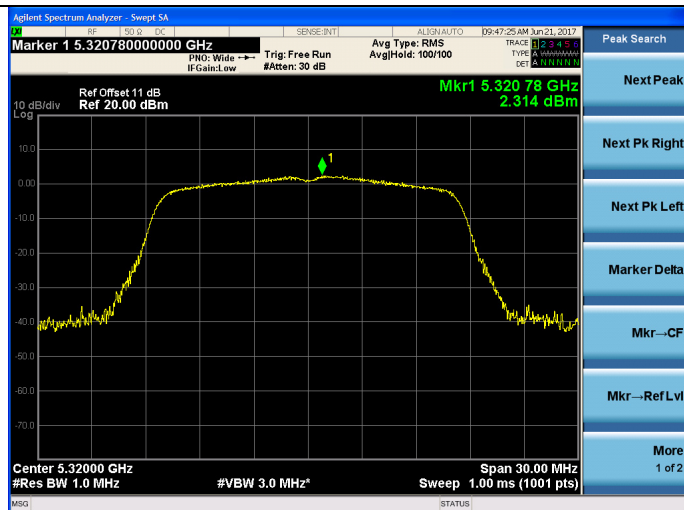
5300MHz



5300MHz



5320MHz



5320MHz

