

8. SPECTRAL DENSITY TEST

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Sep.08,18	1 Year
2.	Attenuator	Agilent	8491B	MY39269170	Oct.14,18	1 Year
3.	RF Cable	Hubersuhner	SUCOFLEX106	505238/6	Apr.23,18	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

Use the test method described in ANSI C63.10 clause 12.5:

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 ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is \leq 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: SRS-XB402M		
Test date: 2019-02-18	Pressure: 102.5±1.0 kpa	Humidity: 53.1±3.0%
Tested by: Cote	Test site: RF site	Temperature: 22.6±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/MHz)	Limit (dBm/MHz)
11a	5180	2.402	11
	5200	2.993	
	5240	3.310	
11n HT20	5180	2.330	11
	5200	2.433	
	5240	3.068	
11n HT40	5190	-1.561	11
	5230	-0.811	
11ac VHT20	5180	2.275	11
	5200	2.629	
	5240	3.300	
11ac VHT40	5190	-1.576	11
	5230	-0.803	
11ac VHT80	5210	-5.515	11

Conclusion: PASS

Note: Antenna Gain= 4.04dBi<6dBi.

5260-5320MHz Band:

EUT: Wireless Speaker		
M/N: SRS-XB402M		
Test date: 2019-02-18	Pressure: 102.3±1.0 kpa	Humidity: 51.6±3.0%
Tested by: Cote	Test site: RF site	Temperature: 22.5±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/MHz)	Limit (dBm/MHz)
11a	5260	3.554	11
	5300	3.368	
	5320	3.526	
11n HT20	5260	3.543	11
	5300	3.109	
	5320	3.117	
11n HT40	5270	-0.581	11
	5310	-0.961	
11ac VHT20	5260	3.544	11
	5300	3.003	
	5320	3.339	
11ac VHT40	5270	-0.742	11
	5310	-0.857	
11ac VHT80	5290	-5.326	11

Conclusion: PASS

Note: Antenna Gain= 4.66dBi<6dBi.

5500-5700MHz Band:

EUT: Wireless Speaker		
M/N: SRS-XB402M		
Test date: 2019-02-18	Pressure: 102.8±1.0 kpa	Humidity: 51.8±3.0%
Tested by: Cote	Test site: RF site	Temperature: 23.2±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/MHz)	Limit (dBm/MHz)
11a	5500	2.287	11
	5600	2.639	
	5700	1.887	
11n HT20	5500	2.136	11
	5600	2.408	
	5700	2.054	
11n HT40	5510	-2.000	11
	5590	-1.773	
	5670	-1.371	
11ac VHT20	5500	1.837	11
	5600	2.514	
	5700	1.923	
11ac VHT40	5510	-1.721	11
	5590	-1.683	
	5670	-1.367	
11ac VHT80	5530	-6.393	11
	5610	-5.687	

Conclusion: PASS

Note: Antenna Gain= 4.82dBi<6dBi.

5745-5825MHz Band:

EUT: Wireless Speaker		
M/N: SRS-XB402M		
Test date: 2019-01-23	Pressure: 102.1±1.0 kpa	Humidity: 51.1±3.0%
Tested by: Cote	Test site: RF site	Temperature: 22.8±0.6 °C

Test Mode	Frequency (MHz)	Power density (dBm/500KHz)	Limit (dBm/500KHz)
11a	5745	0.197	30
	5785	0.159	
	5825	-0.435	
11n HT20	5745	0.065	30
	5785	-0.431	
	5825	-0.766	
11n HT40	5755	-4.339	30
	5795	-4.075	
11ac VHT20	5745	-0.048	30
	5785	-0.168	
	5825	-0.778	
11ac VHT40	5755	-4.489	30
	5795	-4.058	
11ac VHT80	5775	-8.749	30
Conclusion: PASS			

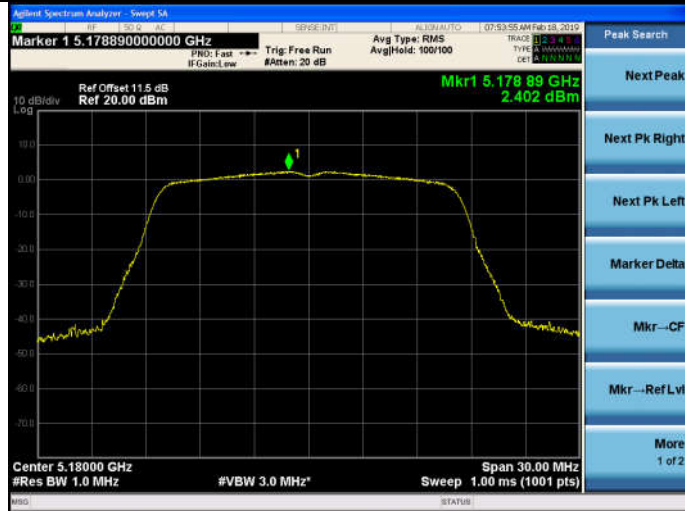
Notes: 1. Antenna Gain= 4.91dBi<6dBi.

2. The total result = Reading + 10log(500kHz/100kHz)

5180-5240MHz Band:

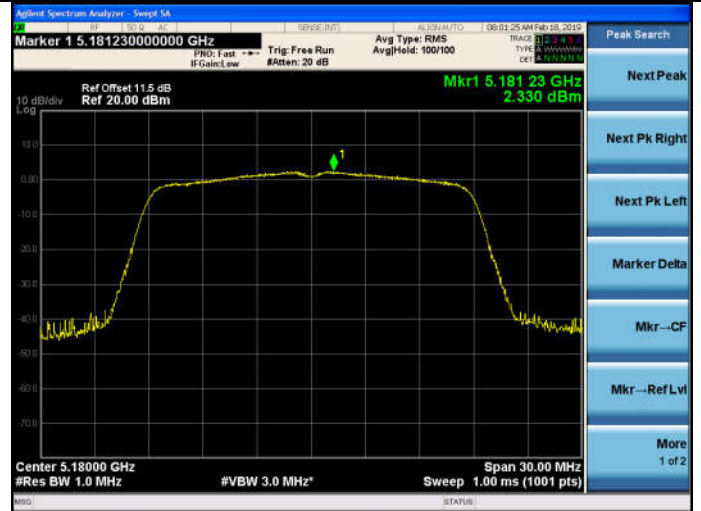
11a

5180MHz

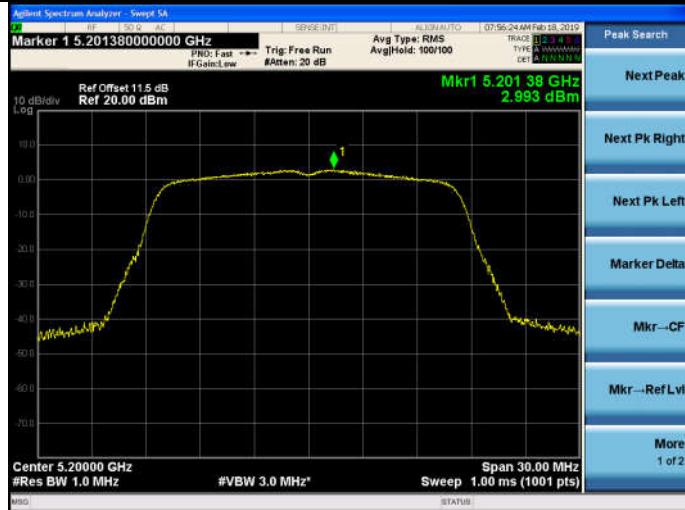


11n HT20

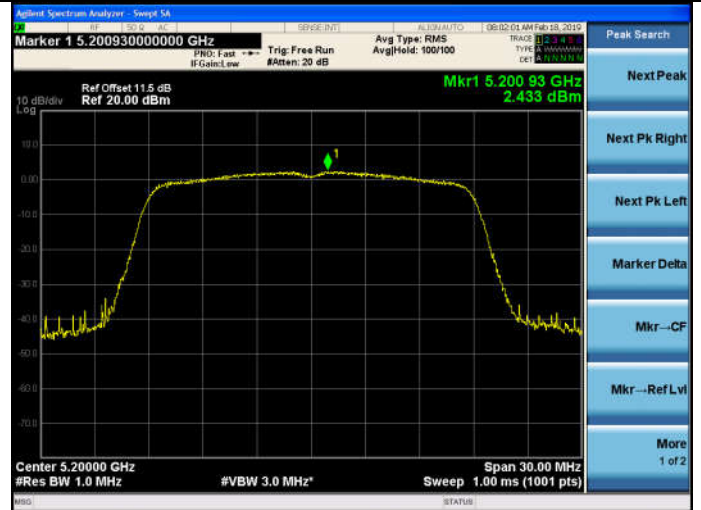
5180MHz



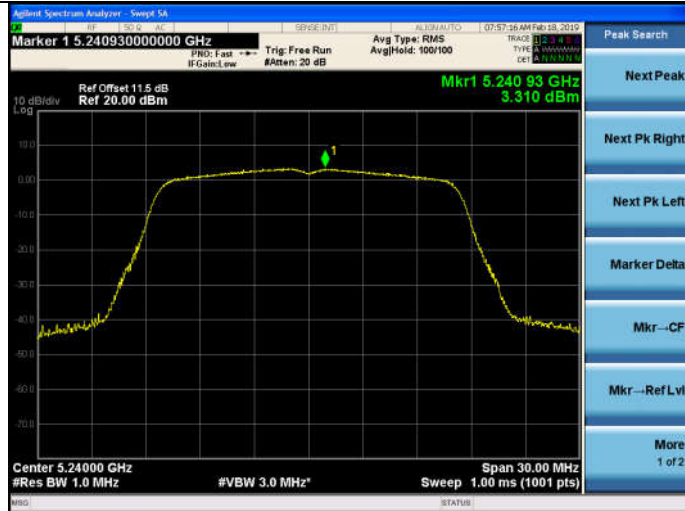
5200MHz



5200MHz



5240MHz

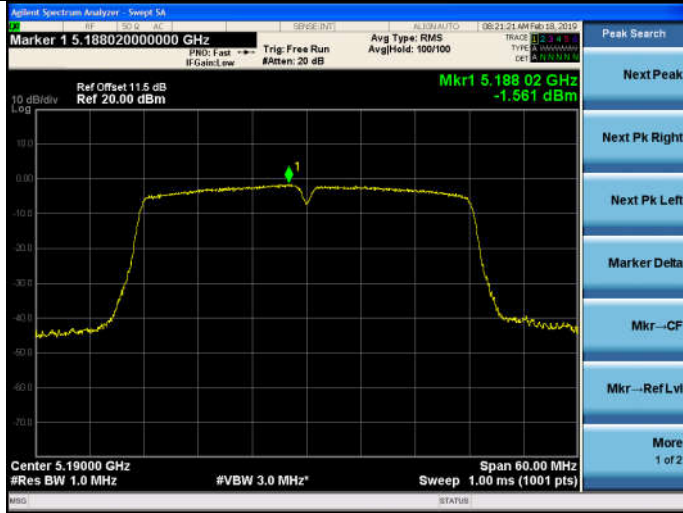


5240MHz



11n HT40

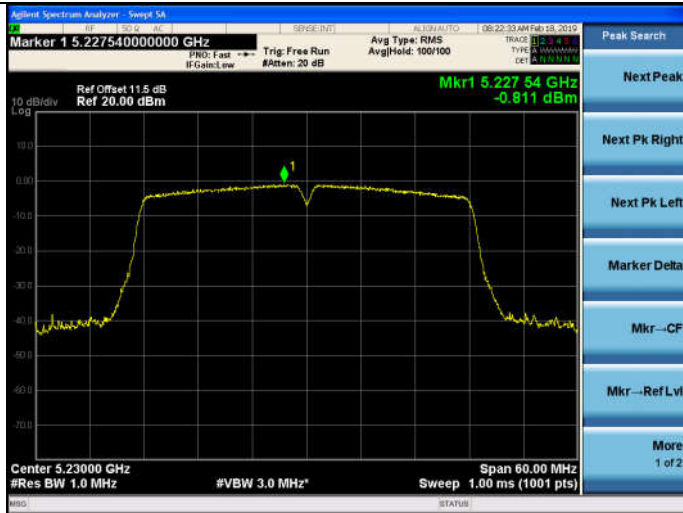
5190MHz



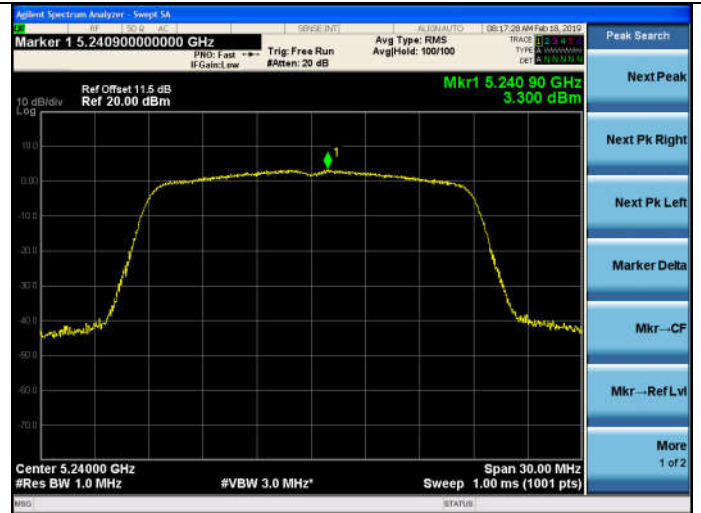
5200MHz



5230MHz

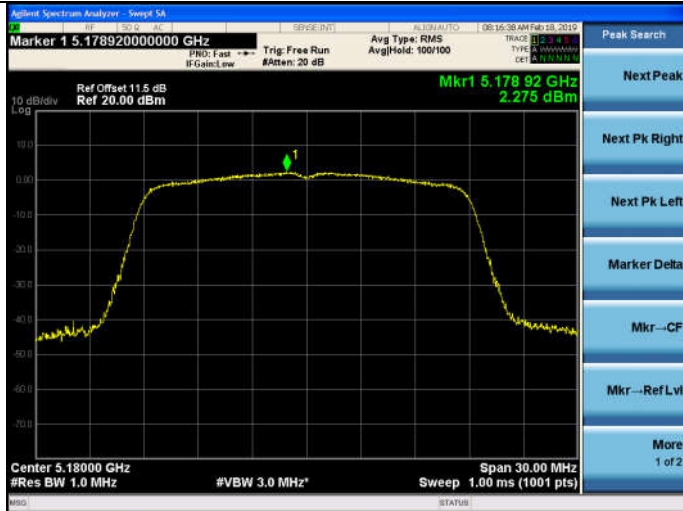


5240MHz



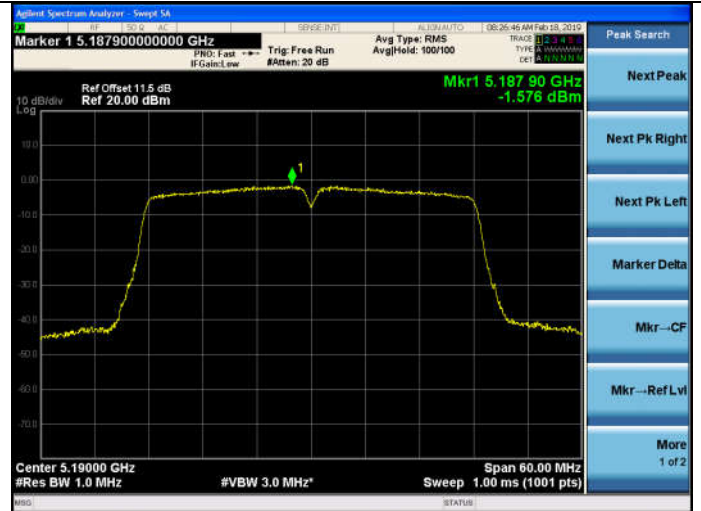
11ac VHT20

5180MHz



11ac VHT40

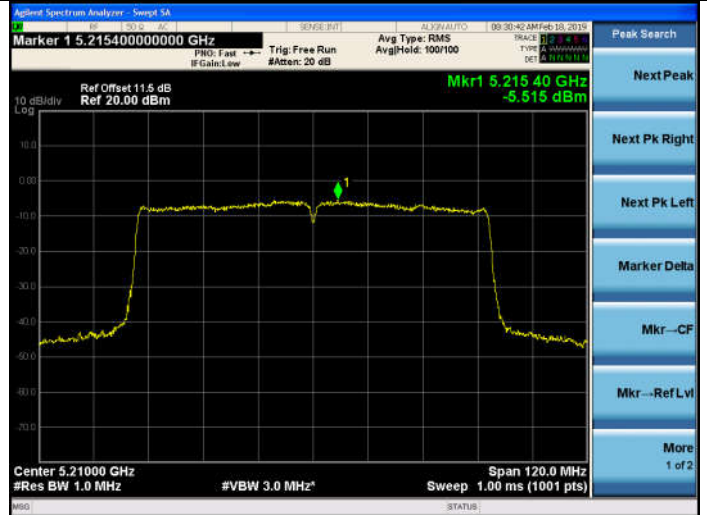
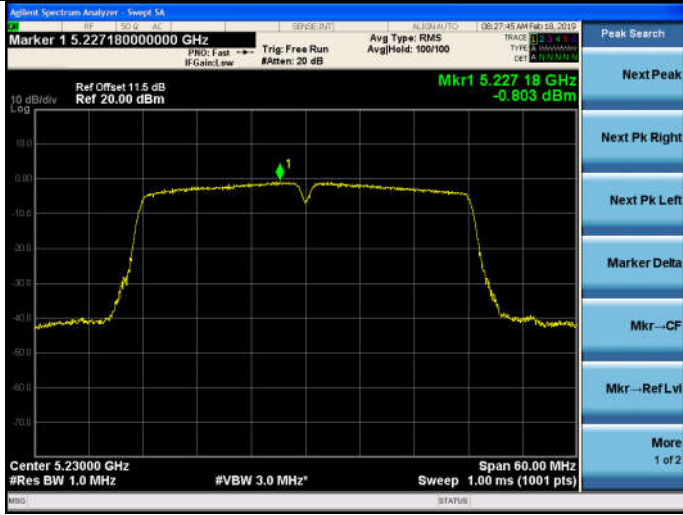
5190MHz



11ac VHT80

5210MHz

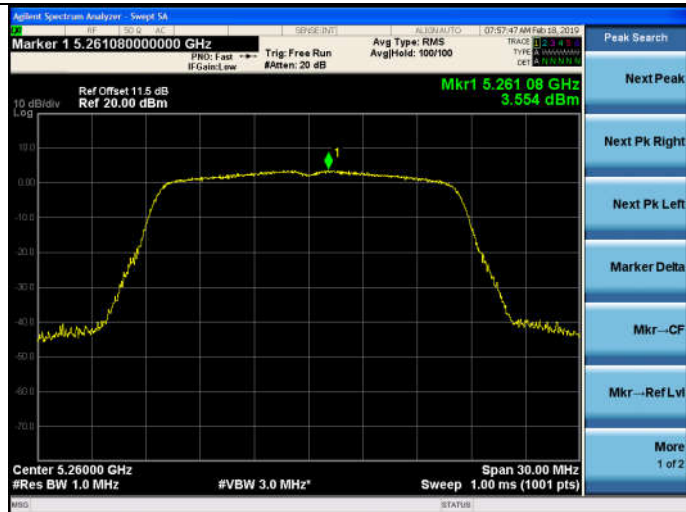
5230MHz



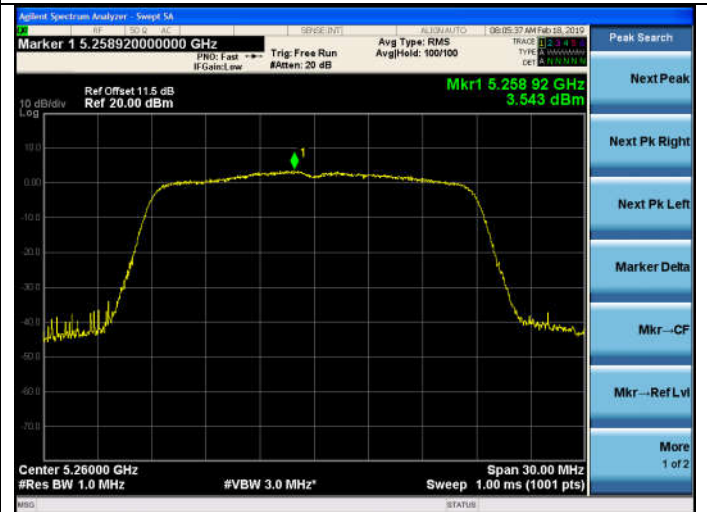
5260-5320MHz Band:

11a **11n HT20**

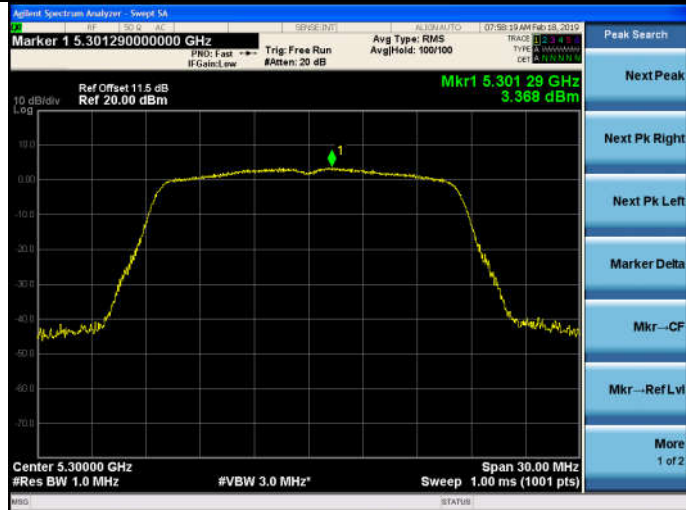
5260MHz



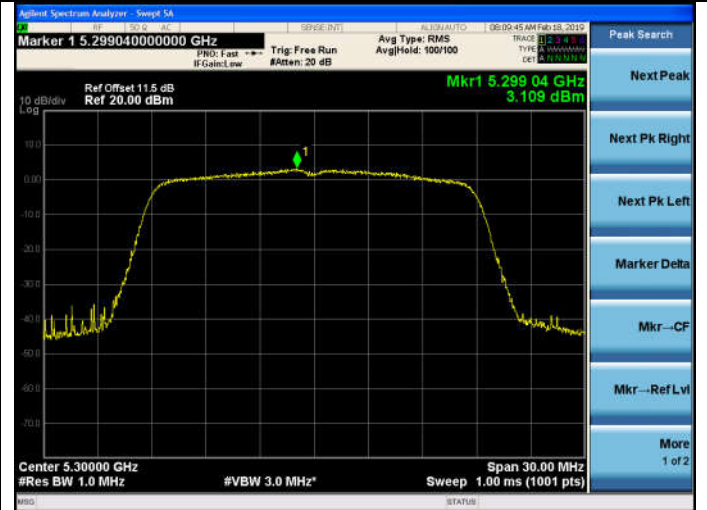
5260MHz



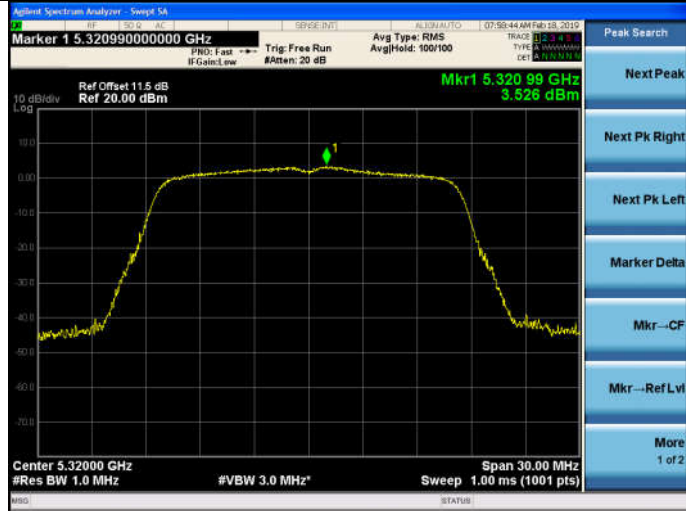
5300MHz



5300MHz



5320MHz

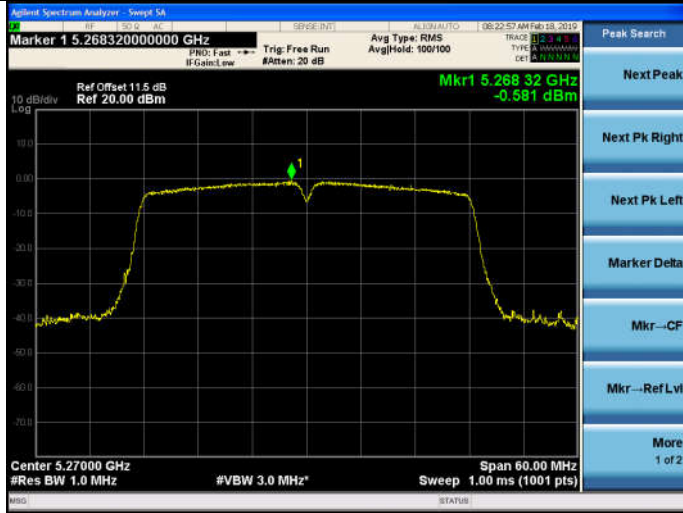


5320MHz



11n HT40

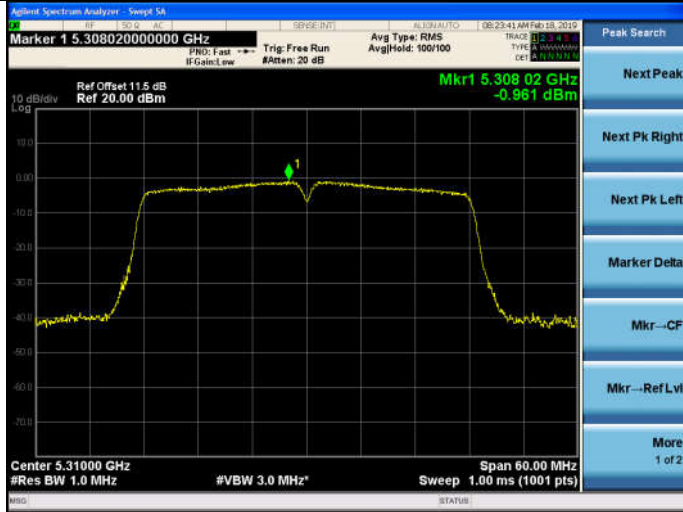
5270MHz



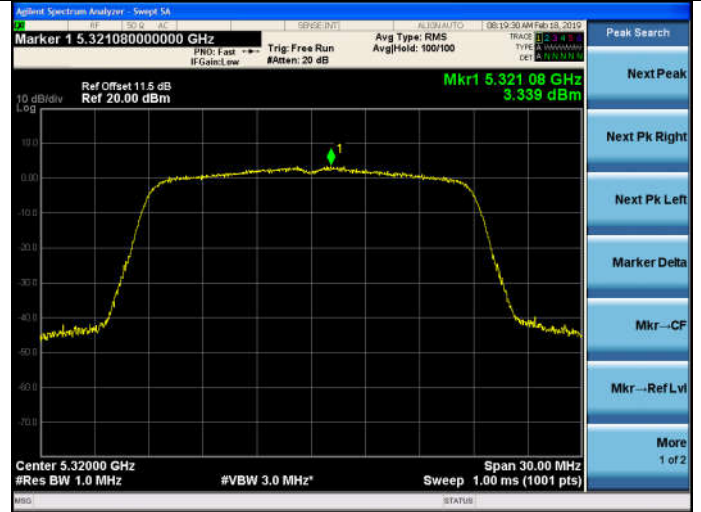
5300MHz



5310MHz

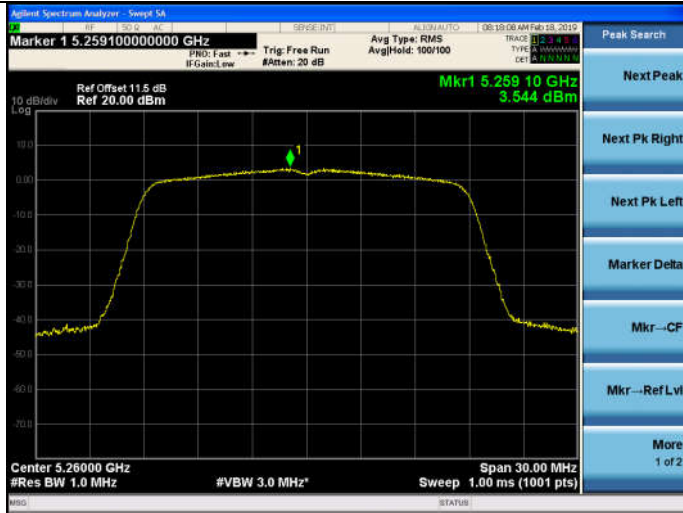


5320MHz



11ac VHT20

5260MHz

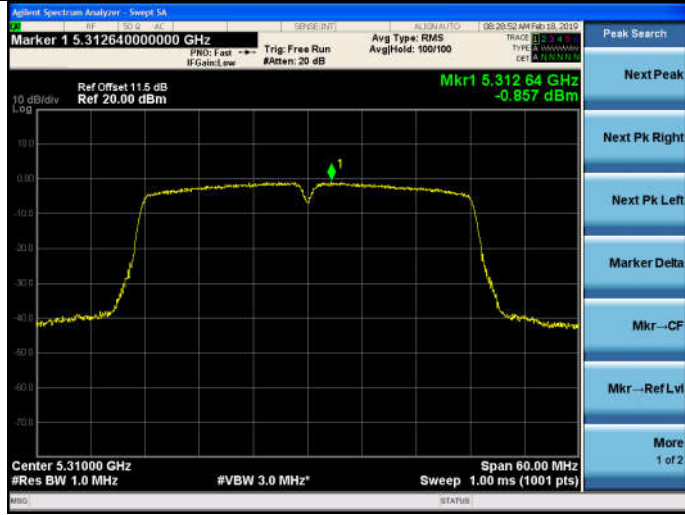


11ac VHT40

5270MHz



5310MHz

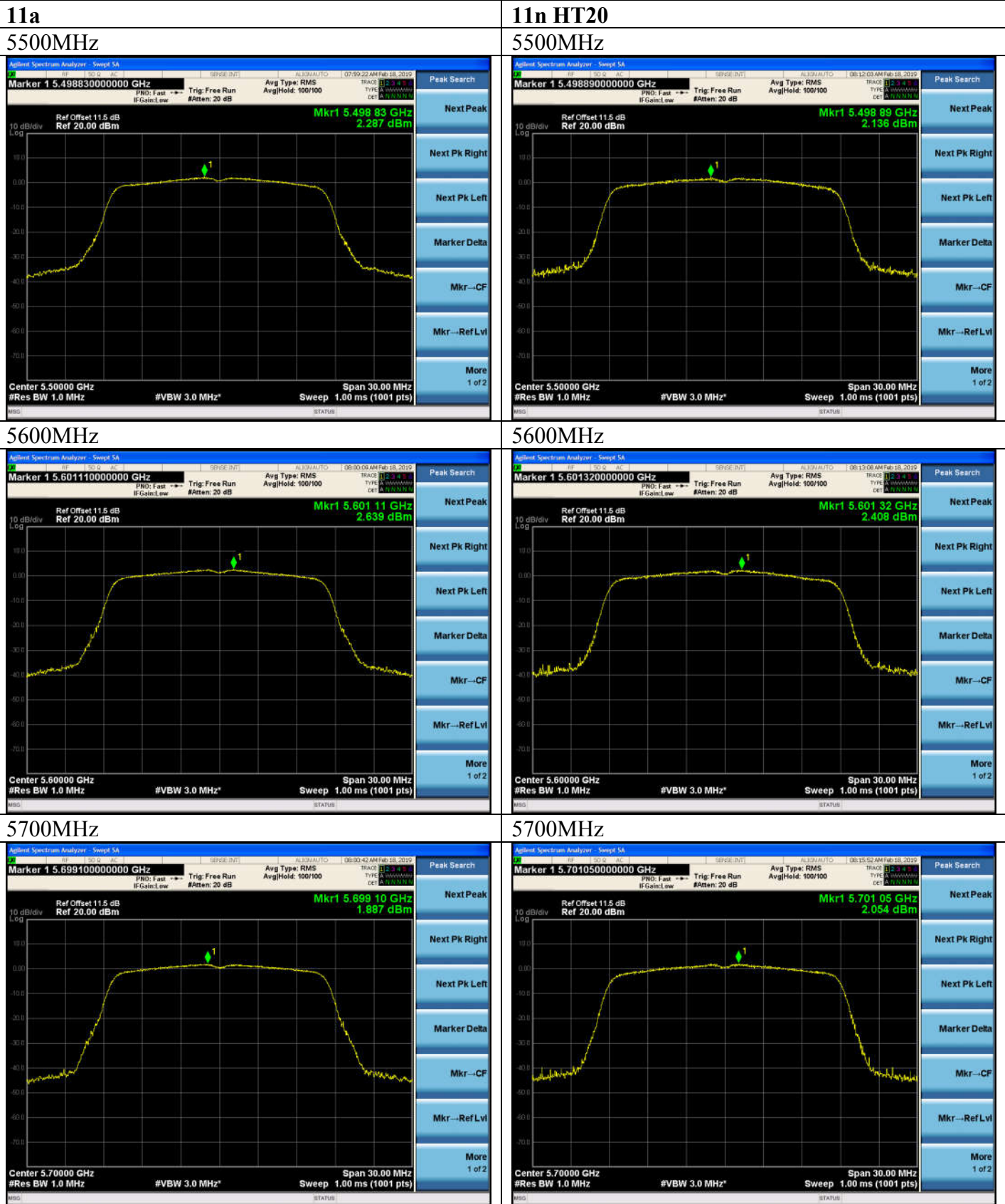


11ac VHT80

5290MHz

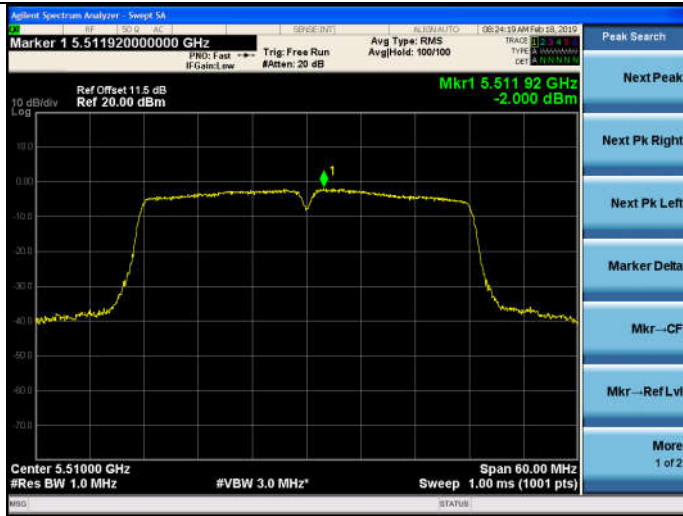


5500-5700MHz Band:



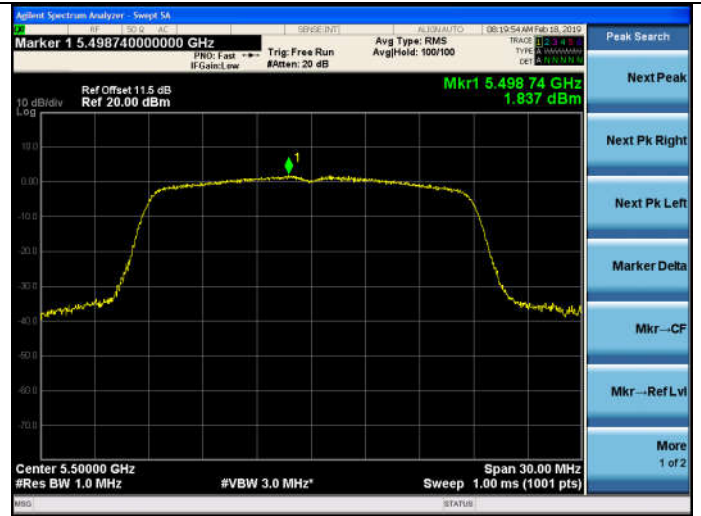
11n HT40

5510MHz

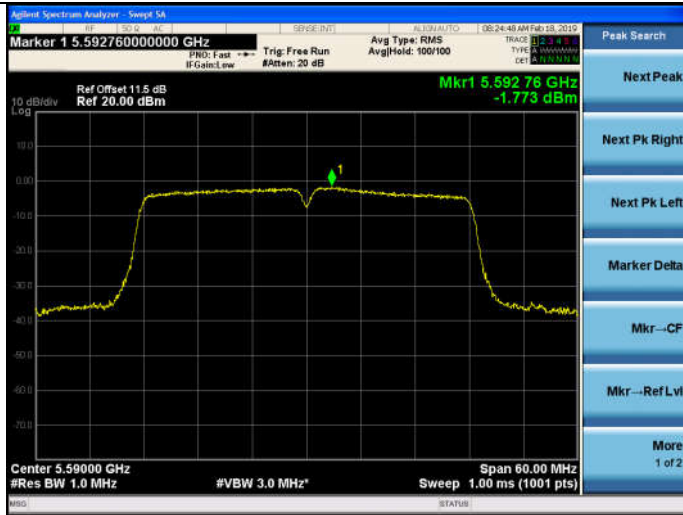


11ac VHT20

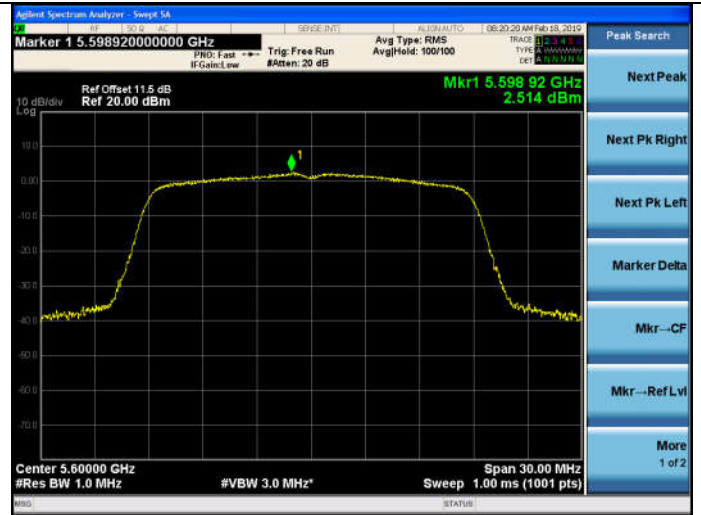
5500MHz



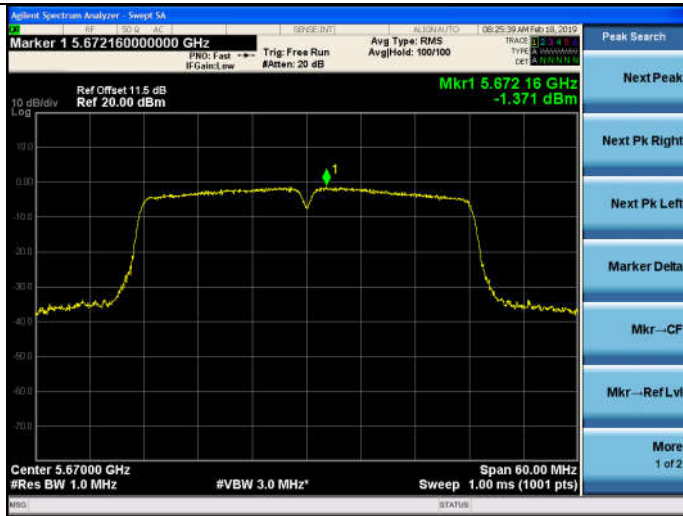
5590MHz



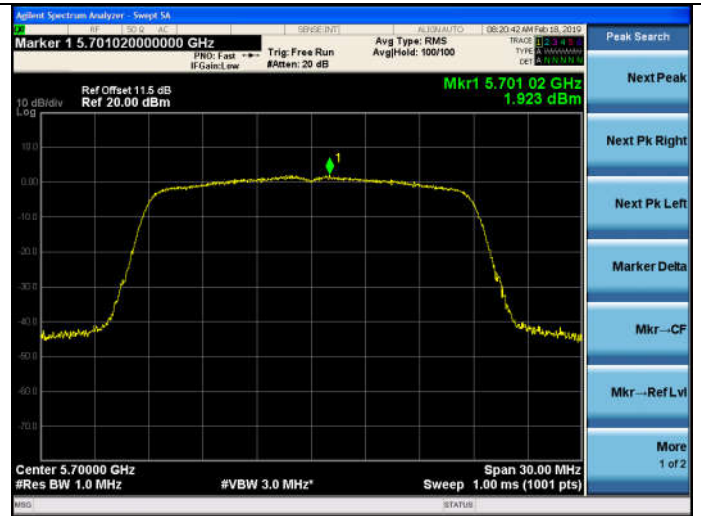
5600MHz



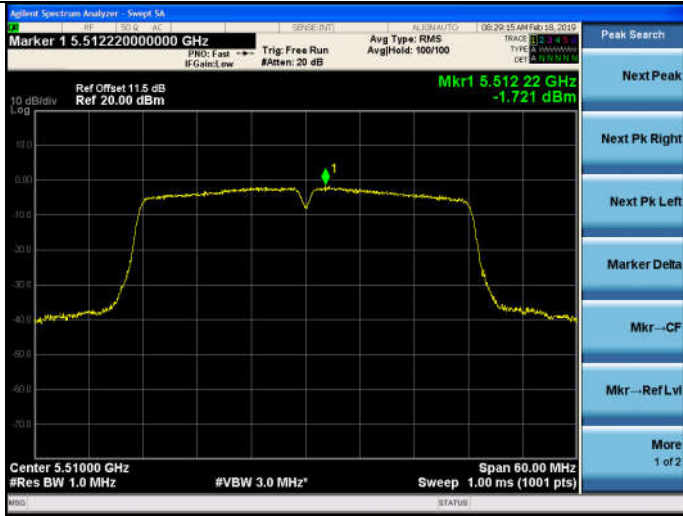
5670MHz



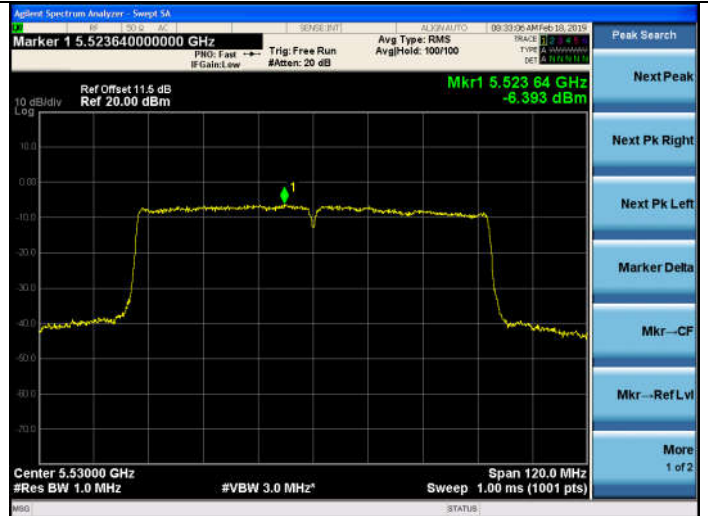
5700MHz



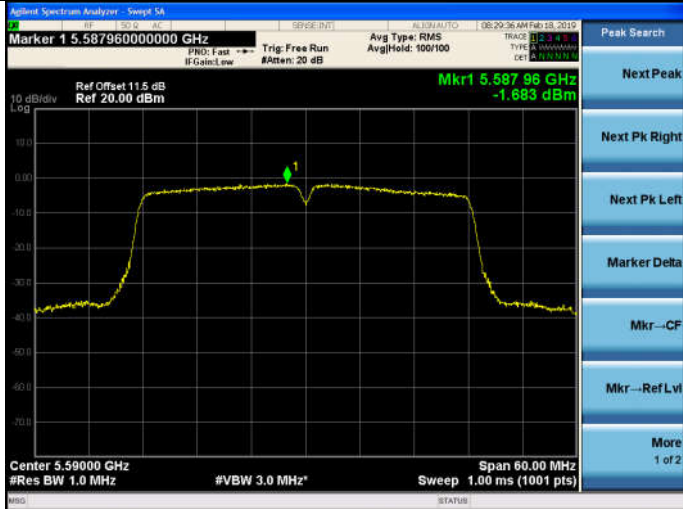
11ac VHT40 5510MHz



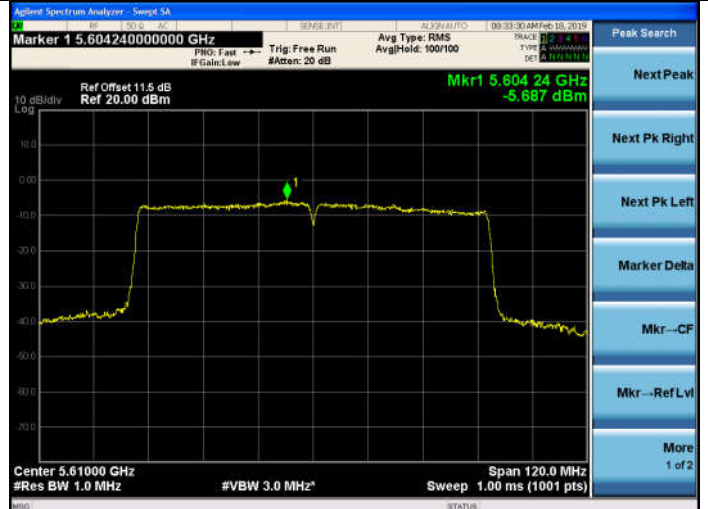
11ac VHT80 5530MHz



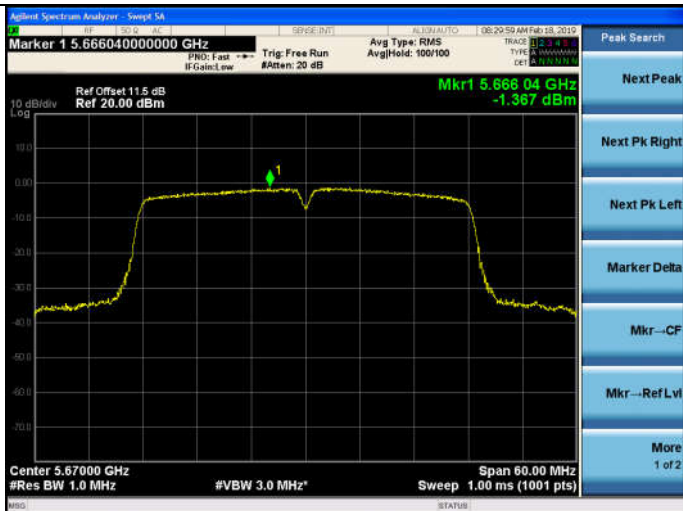
5590MHz



5610MHz



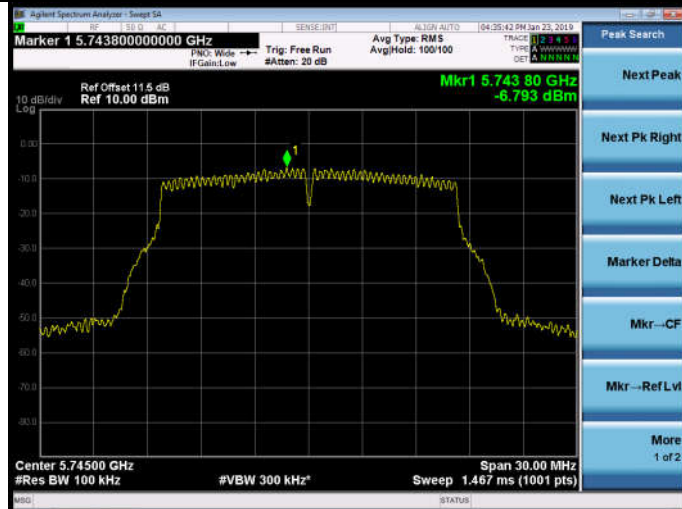
5670MHz



5745-5825MHz Band:

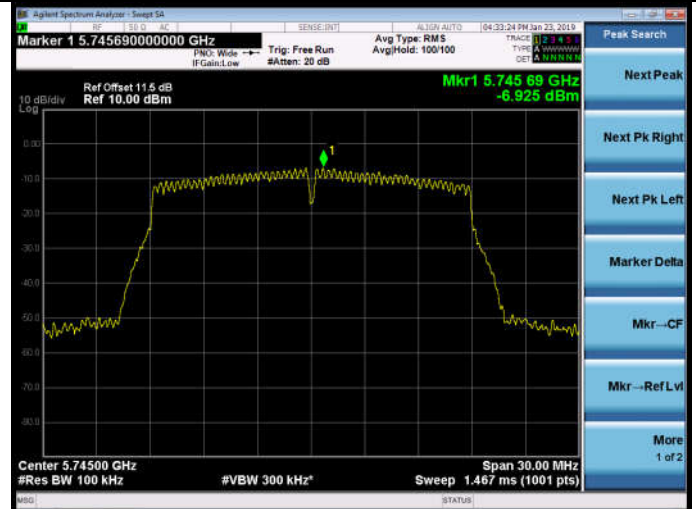
11a

5745MHz



11n HT20

5745MHz



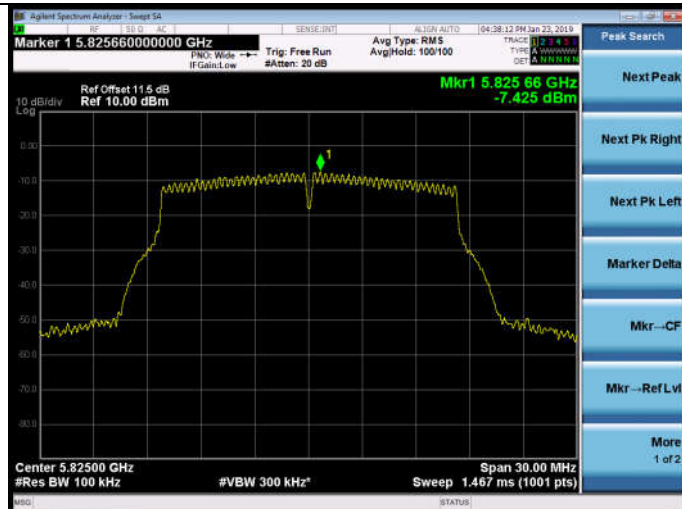
5785MHz



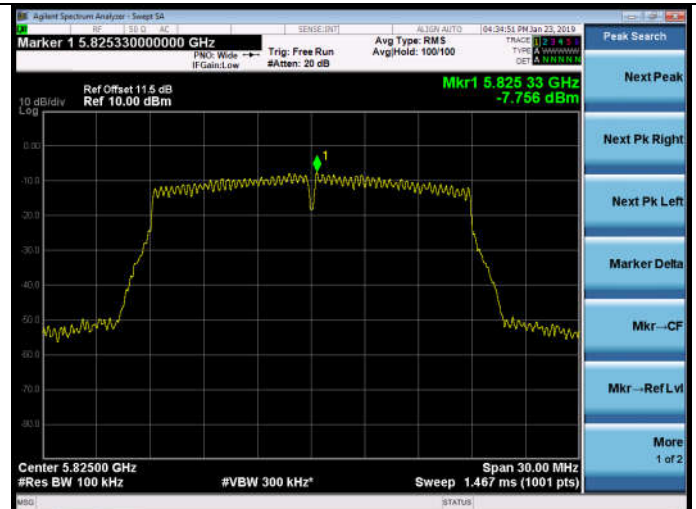
5785MHz



5825MHz

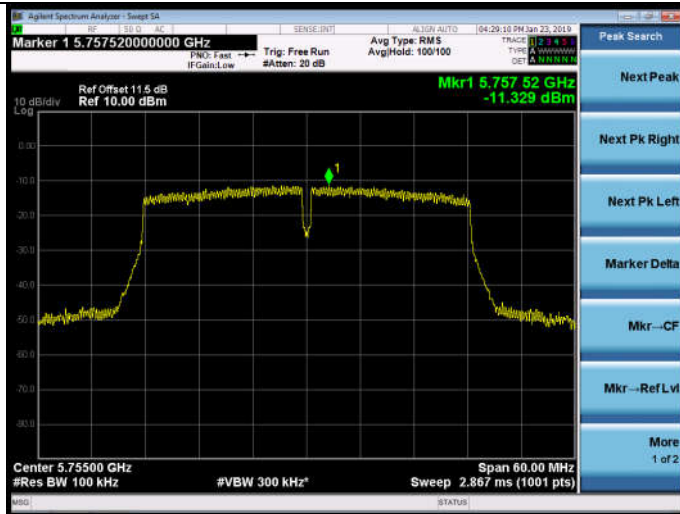


5825MHz

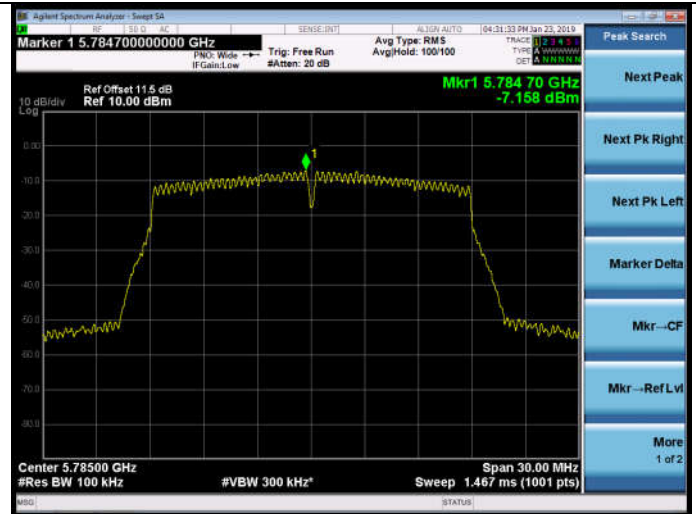


11n HT40

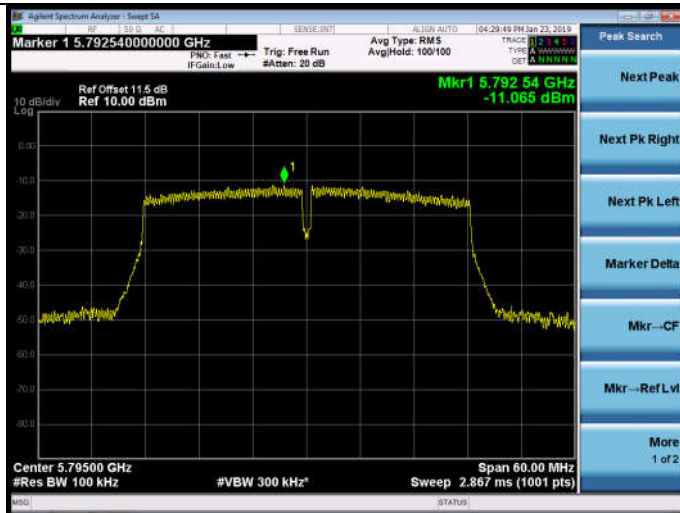
5755MHz



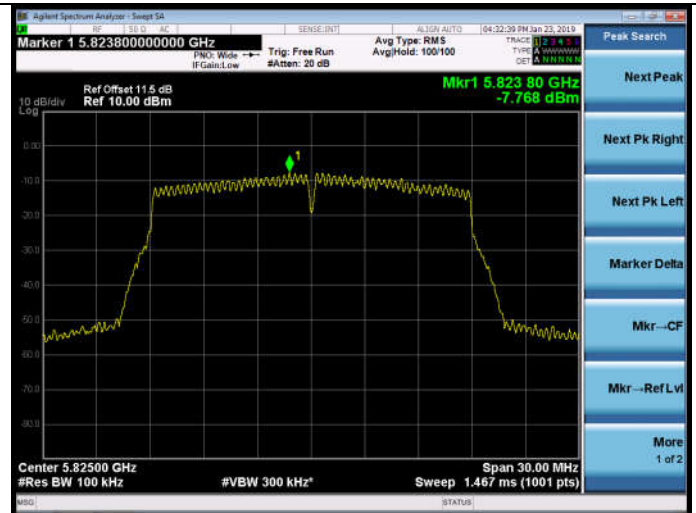
5785MHz



5795MHz

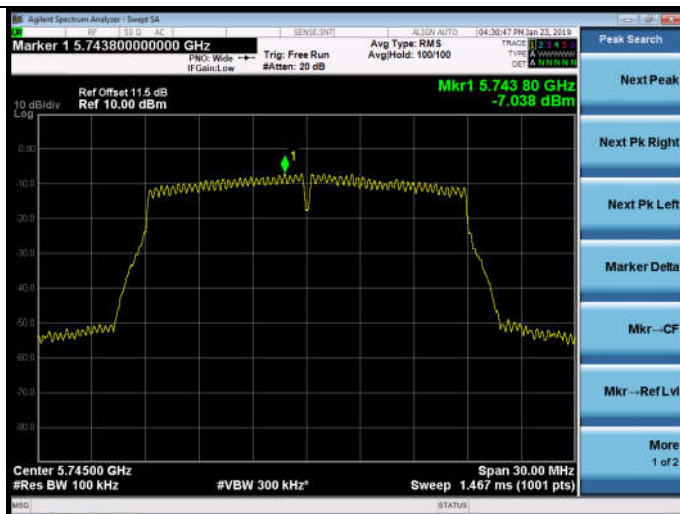


5825MHz



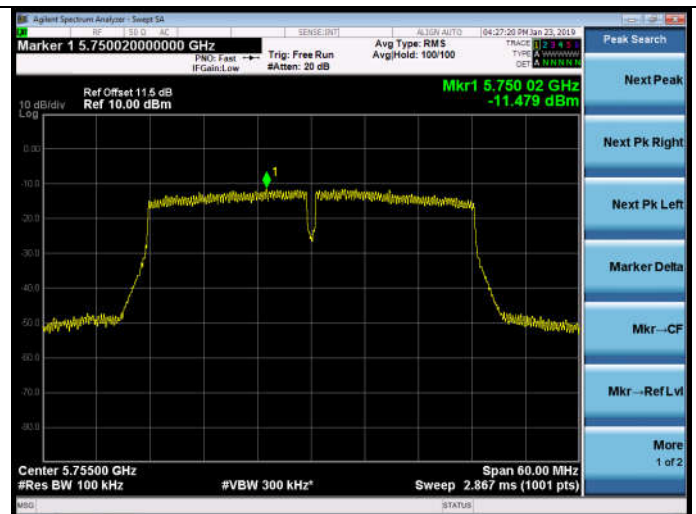
11ac VHT20

5745MHz

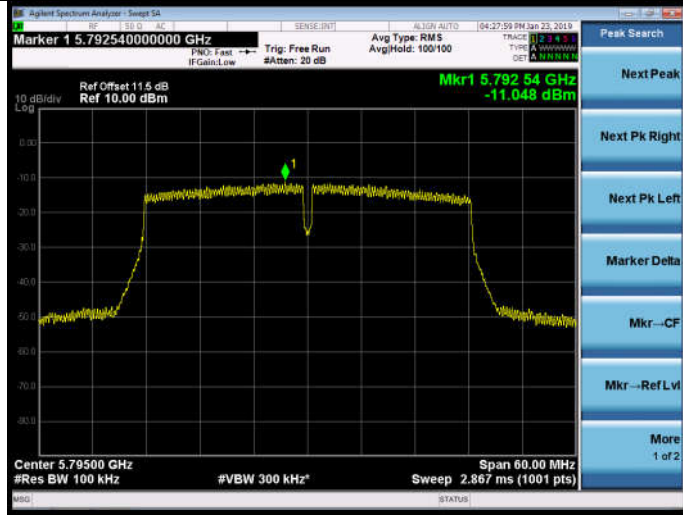


11ac VHT40

5755MHz

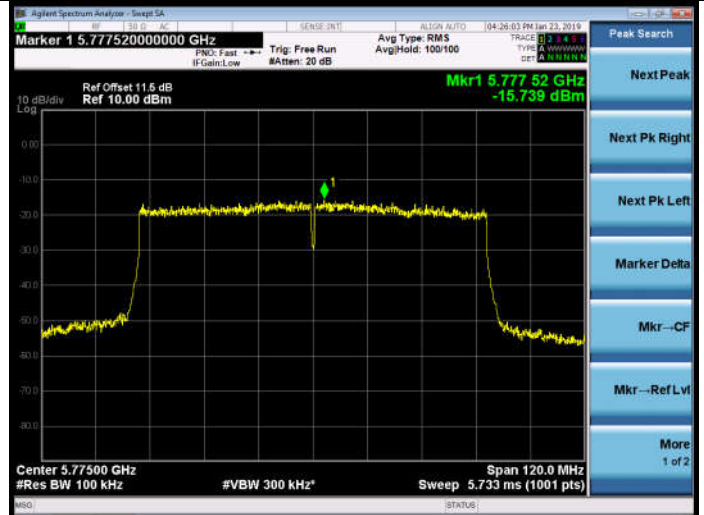


5795MHz



11ac VHT80

5775MHz



9. FREQUENCY STABILITY MEASUREMENT

9.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Sep.08,18	1 Year
2.	Amplifier	HP	8449B	3008A02495	Apr.23.18	1 Year
3.	RF Cable	Hubersuhner	SUCOFLEX106	505238/6	Apr.23,18	1 Year

9.2. Limit

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

9.3. Test Procedure

Use the test method described in ANSI C63.10 clause 6.8:

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
EUT have transmitted absence of modulation signal and fixed channelise. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f) / f \times 10^{-6}$ ppm. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.
2. Extreme temperature rule is -30°C~50°C.

9.4. Test Result

EUT: Wireless Speaker		
M/N: SRS-XB402M		
Test date: 2019-01-28	Pressure: 102.7±1.0 kpa	Humidity: 52.5±3.0%
Tested by: Cote	Test site: RF site	Temperature: 22.7±0.6 °C

Frequency Stability vs. Voltage:

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
AC 102V	20°C	CH36	5180.015	5180	2.90
		CH38	5190.003	5190	0.58
		CH40	5200.034	5200	6.54
		CH42	5209.985	5210	-2.88
		CH46	5230.015	5230	2.87
		CH48	5240.011	5240	2.10
		CH52	5259.9935	5260	-1.24
		CH54	5270.015	5270	2.85
		CH58	5289.9855	5290	-2.74
		CH60	5300.0055	5300	1.04
		CH62	5309.9899	5310	-1.90
		CH64	5319.99	5320	-1.88
		CH100	5500.0025	5500	0.45
		CH102	5510.01	5510	1.81
		CH106	5530.014	5530	2.53
		CH118	5589.9975	5590	-0.45
		CH120	5599.9942	5600	-1.04
		CH122	5610.0022	5610	0.39
		CH134	5670.0035	5670	0.62
		CH140	5700.0089	5700	1.56
CH149	5745.0018	5745	0.31		
CH151	5754.9855	5755	-2.52		
CH155	5774.9985	5775	-0.26		
CH157	5785.0053	5785	0.92		
CH159	5795.0021	5795	0.36		
CH165	5825.0095	5825	1.63		

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
AC 120V	20°C	CH36	5180.025	5180	4.83
		CH38	5190.015	5190	2.89
		CH40	5200	5200	0
		CH42	5210.025	5210	4.80
		CH46	5230.025	5230	4.78
		CH48	5240.001	5240	0.19
		CH52	5260.0025	5260	0.48
		CH54	5270.031	5270	5.88
		CH58	5289.9964	5290	-0.68
		CH60	5300.0072	5300	1.36
		CH62	5309.9975	5310	-0.47
		CH64	5319.9932	5320	-1.28
		CH100	5500.001	5500	0.18
		CH102	5510.028	5510	5.08
		CH106	5530.026	5530	4.70
		CH118	5589.9925	5590	-1.34
		CH120	5599.9912	5600	-1.57
		CH122	5610.0012	5610	0.21
		CH134	5670.0005	5670	0.09
		CH140	5700.0085	5700	1.49
		CH149	5745.001	5745	0.17
		CH151	5754.998	5755	-0.35
		CH155	5774.9998	5775	-0.03
CH157	5785.0003	5785	0.05		
CH159	5795	5795	0		
CH165	5825	5825	0		

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
AC 138V	20°C	CH36	5180.0001	5180	0.02
		CH38	5190.0166	5190	3.20
		CH40	5200.0135	5200	2.60
		CH42	5210.0066	5210	1.27
		CH46	5229.9785	5230	-4.11
		CH48	5240.0089	5240	1.70
		CH52	5259.9933	5260	-1.27
		CH54	5270.0088	5270	1.67
		CH58	5289.9755	5290	-4.63
		CH60	5300.0198	5300	3.74
		CH62	5310.0084	5310	1.58
		CH64	5319.9824	5320	-3.31
		CH100	5500.0037	5500	0.67
		CH102	5509.9925	5510	-1.36
		CH106	5530.0094	5530	1.70
		CH118	5589.9963	5590	-0.66
		CH120	5599.9918	5600	-1.46
		CH122	5610.0122	5610	2.17
		CH134	5670.0048	5670	0.85
		CH140	5699.982	5700	-3.16
		CH149	5745.0255	5745	4.44
		CH151	5754.9965	5755	-0.61
CH155	5774.9915	5775	-1.47		
CH157	5785.0145	5785	2.51		
CH159	5795.0032	5795	0.55		
CH165	5825.001	5825	0.17		

Frequency Stability vs. Temperature:

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
AC 120V	0°C	CH36	5180.0079	5180	1.53
		CH38	5189.9832	5190	-3.24
		CH40	5200.0125	5200	2.40
		CH42	5209.9965	5210	-0.67
		CH46	5229.9864	5230	-2.60
		CH48	5240.01	5240	1.91
		CH52	5260.0025	5260	0.48
		CH54	5270.0025	5270	0.47
		CH58	5289.9975	5290	-0.47
		CH60	5299.998	5300	-0.38
		CH62	5310.0095	5310	1.79
		CH64	5319.9815	5320	-3.48
		CH100	5500.0136	5500	2.47
		CH102	5509.9912	5510	-1.60
		CH106	5530.0018	5530	0.33
		CH118	5589.9861	5590	-2.49
		CH120	5600.0024	5600	0.43
		CH122	5609.9963	5610	-0.66
		CH134	5670.0125	5670	2.20
		CH140	5699.9846	5700	-2.70
CH149	5745.0095	5745	1.65		
CH151	5755.0092	5755	1.60		
CH155	5774.991	5775	-1.56		
CH157	5785.0125	5785	2.16		
CH159	5795.0098	5795	1.69		
CH165	5825.0045	5825	0.77		

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
AC 120V	10°C	CH36	5180.02	5180	3.86
		CH38	5190.001	5190	0.19
		CH40	5200.0015	5200	0.29
		CH42	5210.0015	5210	0.29
		CH46	5229.99	5230	-1.91
		CH48	5240.0096	5240	1.83
		CH52	5260.0055	5260	1.05
		CH54	5269.98	5270	-3.80
		CH58	5290.0038	5290	0.72
		CH60	5299.98	5300	-3.77
		CH62	5310.0058	5310	1.09
		CH64	5319.9925	5320	-1.41
		CH100	5500.0039	5500	0.71
		CH102	5510.0042	5510	0.76
		CH106	5529.9961	5530	-0.71
		CH118	5589.9875	5590	-2.24
		CH120	5600.0095	5600	1.70
		CH122	5610.0082	5610	1.46
		CH134	5670.0068	5670	1.20
		CH140	5700.0042	5700	0.74
		CH149	5745.0096	5745	1.67
		CH151	5754.9935	5755	-1.13
CH155	5775.0068	5775	1.18		
CH157	5785.0036	5785	0.62		
CH159	5795.0018	5795	0.31		
CH165	5825.003	5825	0.52		

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
AC 120V	20°C	CH36	5180.0125	5180	2.41
		CH38	5189.998	5190	-0.39
		CH40	5200.007	5200	1.35
		CH42	5210.0045	5210	0.86
		CH46	5229.9946	5230	-1.03
		CH48	5239.9965	5240	-0.67
		CH52	5260.0092	5260	1.75
		CH54	5270.0015	5270	0.28
		CH58	5289.9964	5290	-0.68
		CH60	5299.9825	5300	-3.30
		CH62	5310.002	5310	0.38
		CH64	5320.0024	5320	0.45
		CH100	5500.0038	5500	0.69
		CH102	5509.9865	5510	-2.45
		CH106	5529.9963	5530	-0.67
		CH118	5590.0035	5590	0.63
		CH120	5600.0035	5600	0.62
		CH122	5610.0015	5610	0.27
		CH134	5670.0036	5670	0.63
		CH140	5700.0035	5700	0.61
		CH149	5745.004	5745	0.70
		CH151	5755.004	5755	0.70
		CH155	5775.02	5775	3.46
CH157	5785.006	5785	1.04		
CH159	5795.0034	5795	0.59		
CH165	5825.0068	5825	1.17		

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
AC 120V	30°C	CH36	5180.0025	5180	0.48
		CH38	5189.9935	5190	-1.25
		CH40	5199.9975	5200	-0.48
		CH42	5210.0035	5210	0.67
		CH46	5229.9965	5230	-0.67
		CH48	5239.99	5240	-1.91
		CH52	5260.004	5260	0.76
		CH54	5270.006	5270	1.14
		CH58	5289.98	5290	-3.78
		CH60	5299.9982	5300	-0.34
		CH62	5310.0065	5310	1.22
		CH64	5320.0052	5320	0.98
		CH100	5499.991	5500	-1.64
		CH102	5509.992	5510	-1.45
		CH106	5529.9925	5530	-1.36
		CH118	5590.0063	5590	1.13
		CH120	5600.0035	5600	0.62
		CH122	5610.0065	5610	1.16
		CH134	5670.01	5670	1.76
		CH140	5700.0045	5700	0.79
CH149	5745.0095	5745	1.65		
CH151	5754.9985	5755	-0.26		
CH155	5775.0036	5775	0.62		
CH157	5785.0065	5785	1.12		
CH159	5795.0152	5795	2.62		
CH165	5825.009	5825	1.55		

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
AC 120V	40°C	CH36	5180.0036	5180	0.69
		CH38	5190.003	5190	0.58
		CH40	5200.0058	5200	1.12
		CH42	5210.0025	5210	0.48
		CH46	5230.0035	5230	0.67
		CH48	5239.9965	5240	-0.67
		CH52	5260.0075	5260	1.43
		CH54	5270.0068	5270	1.29
		CH58	5289.99	5290	-1.89
		CH60	5299.9825	5300	-3.30
		CH62	5310.0085	5310	1.60
		CH64	5320.007	5320	1.32
		CH100	5500.0085	5500	1.55
		CH102	5509.9825	5510	-3.18
		CH106	5529.9964	5530	-0.65
		CH118	5590.0038	5590	0.68
		CH120	5600.0095	5600	1.70
		CH122	5610.005	5610	0.89
		CH134	5670.005	5670	0.88
		CH140	5700.0095	5700	1.67
		CH149	5745.01	5745	1.74
		CH151	5755.008	5755	1.39
CH155	5775.0035	5775	0.61		
CH157	5785.0096	5785	1.66		
CH159	5795.002	5795	0.35		
CH165	5825.0068	5825	1.17		

10. ANTENNA REQUIREMENT

10.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2. Antenna Connected Construction

The antennas used for this product are FPC antenna that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 4.91dBi.

11. DEVIATION TO TEST SPECIFICATIONS

[NONE]

..... **End of Report**