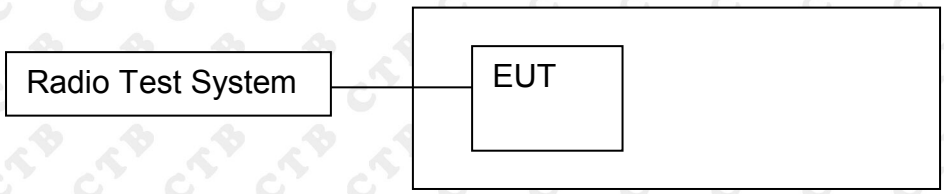
10. EMISSION BANDWIDTH& OCCUPIED BANDWIDTH

10.1 Block Diagram Of Test Setup



10.2 Limits

(1) For the band 5.15-5.25 GHz.

(iv) 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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(2) 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 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

10.3 Test Procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
2. Minimum Emission Bandwidth for the band 5.725−5.85 GHz
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.725−5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 * RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) 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.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described in this section. For devices that use channel aggregation refer to III.A and III.C for determining emission bandwidth.

D. 99% Occupied Bandwidth

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is *required* only as a condition for using the optional band-edge measurement techniques described in II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the 789033 D02 General UNII Test Procedures New Rules v02r01 Page 4 spectrum is integrated when measuring maximum conducted output power as described in II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with Section 15.407(a).
The following procedure shall be used for measuring (99%) power bandwidth:
1. Set center frequency to the nominal EUT channel center frequency.

2. Set span = 1.5 times to 5.0 times the OBW.

3. Set RBW = 1% to 5% of the OBW

4. Set VBW ≥ 3 * RBW

5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6. Use the 99% power bandwidth function of the instrument (if available).

7. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

10.4 Test Results

Test mode ANT 1	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	23.14
	5200	22.932
	5240	23.917
802.11ac20	5180	23.814
	5200	24.255
	5240	23.832
802.11ac40	5190	39.388
	5230	39.367
802.11ac80	5210	80.039
802.11n(HT20)	5180	24.078
	5200	24.851
	5240	39.427
802.11n(HT40)	5190	39.246
	5230	23.9

Test mode ANT 2	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	22.864
	5200	22.606
	5240	22.776
802.11ac20	5180	23.335
	5200	23.501
	5240	22.651
802.11ac40	5190	43.38
	5230	43.91
802.11ac80	5210	84.043
802.11n(HT20)	5180	23.808
	5200	22.974
	5240	42.453
802.11n(HT40)	5190	43.736
	5230	23.286

Test mode ANT 3	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	23.85
	5200	23.303
	5240	22.689
802.11ac20	5180	23.704
	5200	23.312
	5240	23.046
802.11ac40	5190	43.548
	5230	44.072
802.11ac80	5210	82.582
802.11n(HT20)	5180	23.26
	5200	23.234
	5240	23.627
802.11n(HT40)	5190	43.396
	5230	44.191

5250-5350 MHz

Test mode Ant 1	Test Channel (MHz)	26dB Bandwidth (MHz)	Result
802.11a	5260	19.614	Pass
	5280	19.784	Pass
	5320	19.62	Pass
802.11n(HT20)	5260	20.272	Pass
	5280	20.315	Pass
	5320	20.255	Pass
802.11n(HT40)	5270	39.401	Pass
	5310	20.166	Pass
802.11ac(VH20)	5260	20.221	Pass
	5280	20.314	Pass
	5320	39.317	Pass
802.11ac(VH40)	5270	39.398	Pass
	5310	20.166	Pass
802.11ac(VH80)	5290	79.826	Pass

Test mode Ant 2	Test Channel (MHz)	26dB Bandwidth (MHz)	Result
802.11a	5260	23.573	Pass
	5280	22.671	Pass
	5320	23.981	Pass
802.11n(HT20)	5260	23.596	Pass
	5280	22.783	Pass
	5320	23.984	Pass
802.11n(HT40)	5270	44.365	Pass
	5310	41.35	Pass
802.11ac(VH20)	5260	23.058	Pass
	5280	22.882	Pass
	5320	23.242	Pass
802.11ac(VH40)	5270	43.038	Pass
	5310	42.965	Pass
802.11ac(VH80)	5290	84.69	Pass

Test mode Ant 3	Test Channel (MHz)	26dB Bandwidth (MHz)	Result
802.11a	5260	23.407	Pass
	5280	23.148	Pass
	5320	23.295	Pass
802.11n(HT20)	5260	22.797	Pass
	5280	23.082	Pass
	5320	22.831	Pass
802.11n(HT40)	5270	43.309	Pass
	5310	42.754	Pass
802.11ac(VH20)	5260	23.151	Pass
	5280	22.977	Pass
	5320	23.219	Pass
802.11ac(VH40)	5270	43.166	Pass
	5310	43.259	Pass
802.11ac(VH80)	5290	83.526	Pass

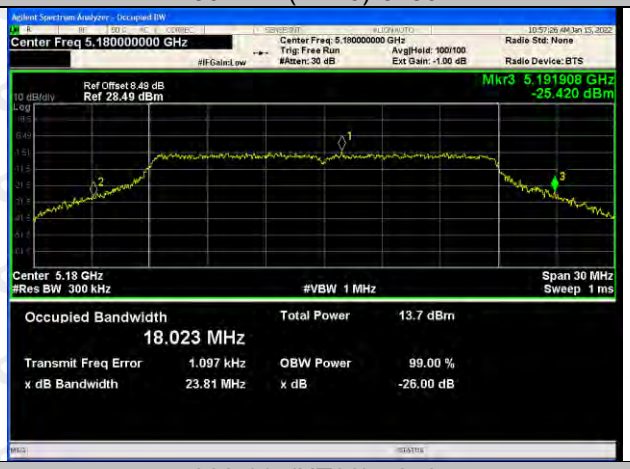
Test Graph ANT 1

802.11a-5180

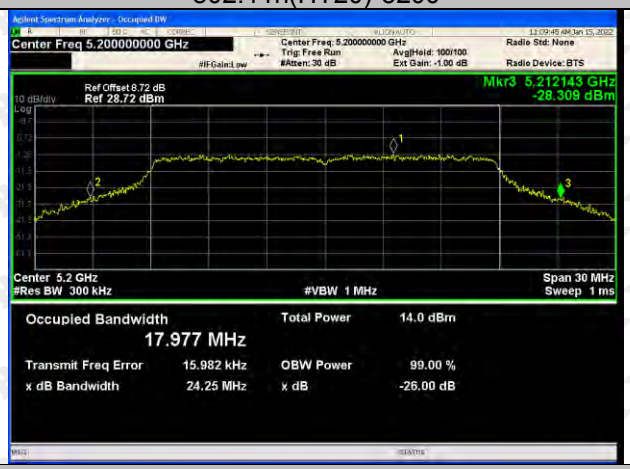
802.11a-5200

802.11a-5240

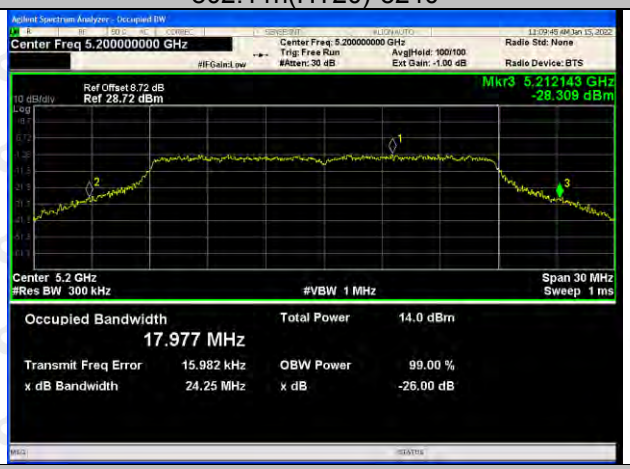
802.11n(HT20)-5180



802.11n(HT20)-5200

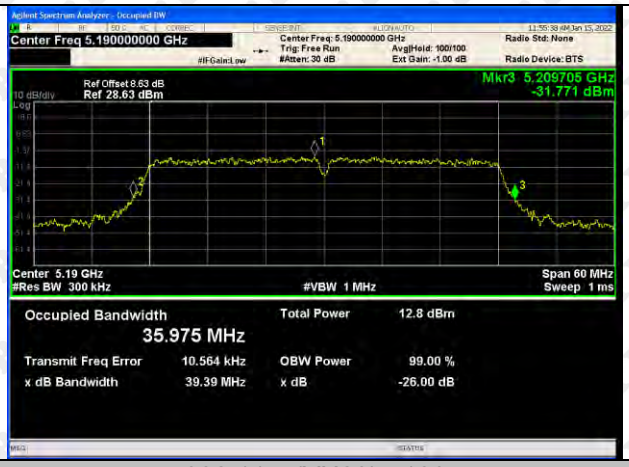


802.11n(HT20)-5240



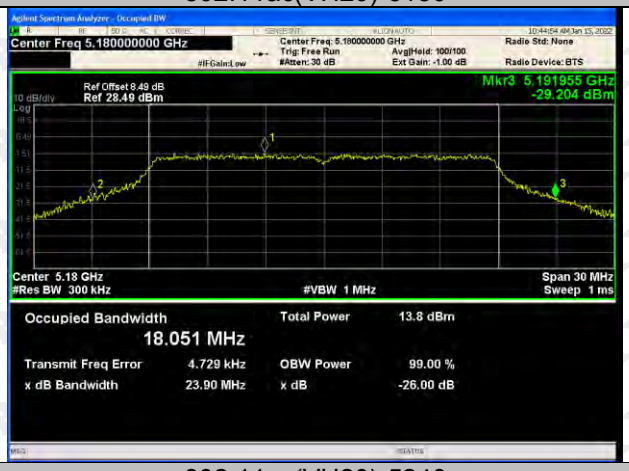
802.11n(HT40)-5190

802.11n(HT40)-5230

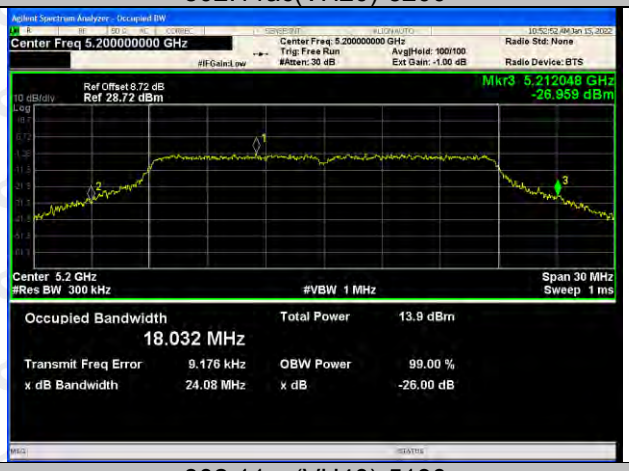


802.11ac(VH20)-5180

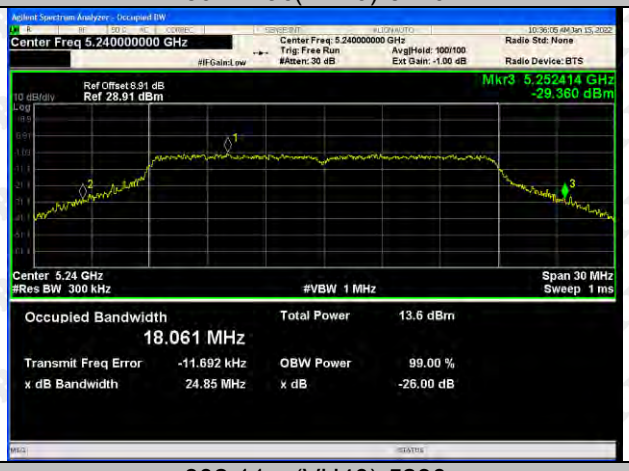
802.11ac(VH20)-5200



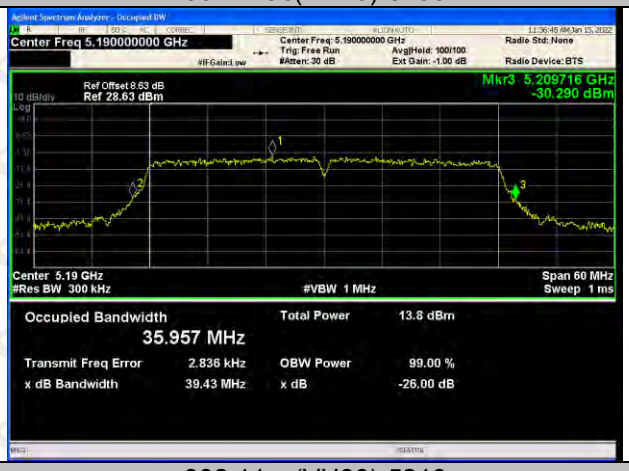
802.11ac(VH20)-5240



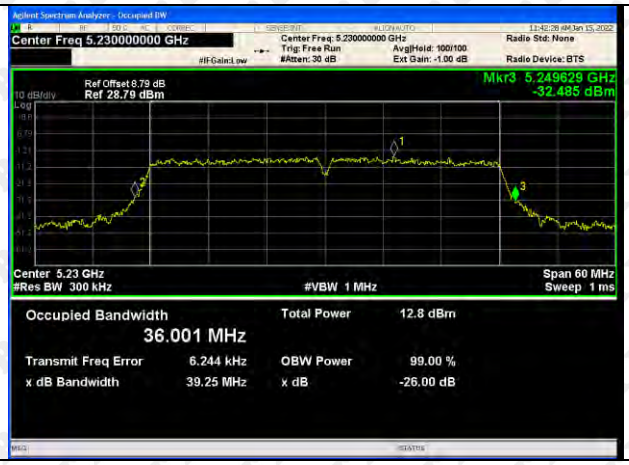
802.11ac(VH40)-5190

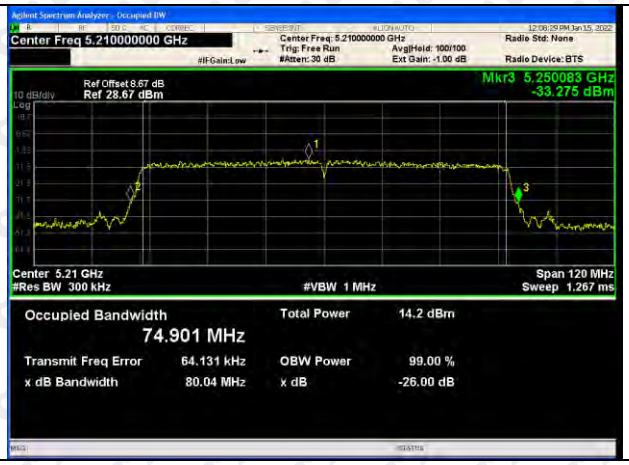


802.11ac(VH40)-5230



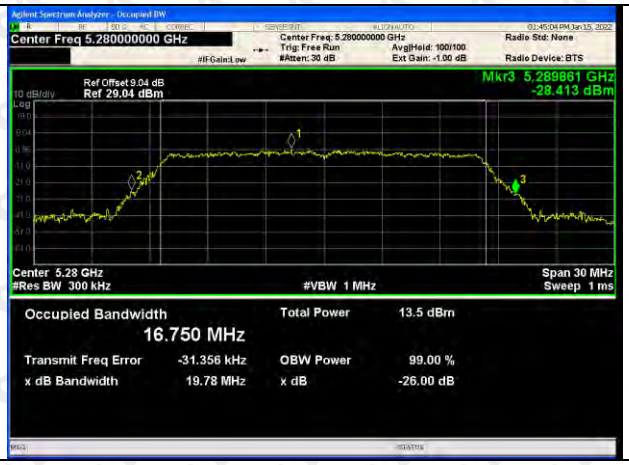
802.11ac(VH80)-5210





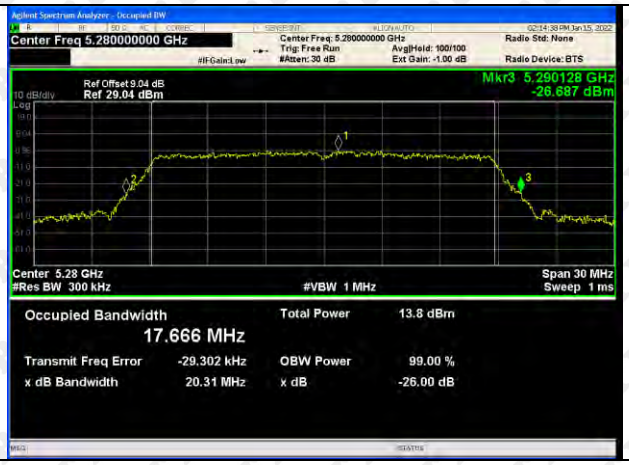
5250-5350MHz

802.11a-5260	802.11a-5280



802.11a-5320	802.11ac(VH20)-5260

802.11ac(VH20)-5280	802.11ac(VH20)-5320



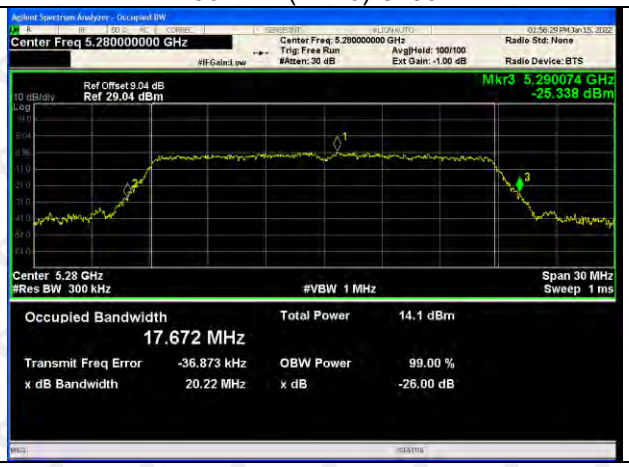
802.11ac(VH40)-5270

802.11ac(VH40)-5310

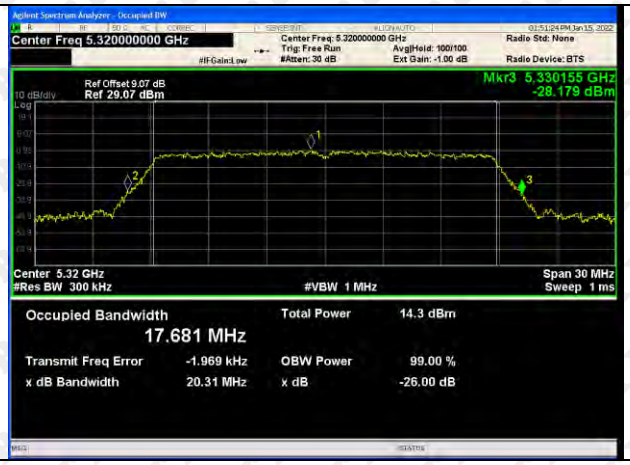
802.11n(HT20)-5260

802.11n(HT20)-5280

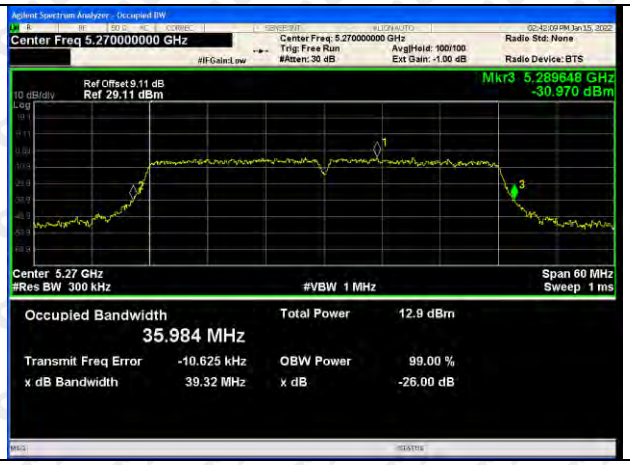
802.11n(HT20)-5320



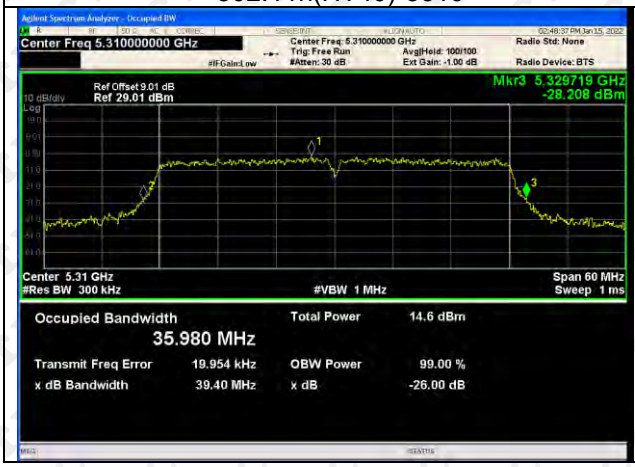
802.11n(HT40)-5270

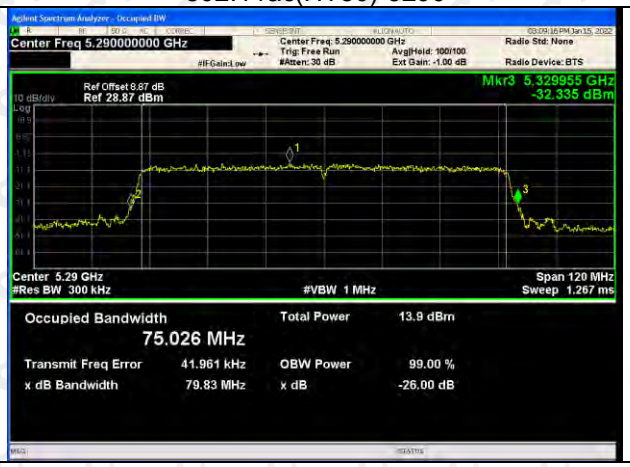


802.11n(HT40)-5310



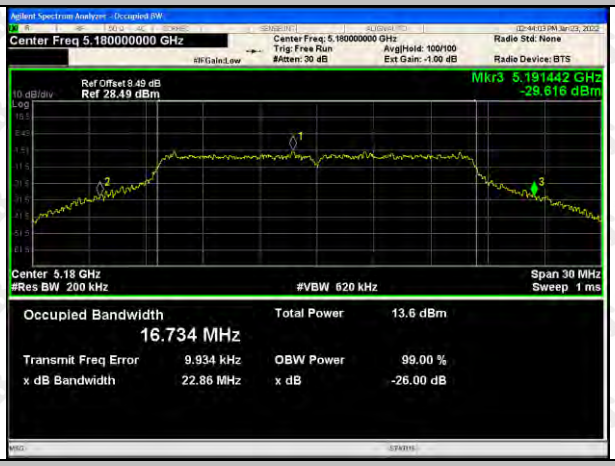
802.11ac(HT80)-5290



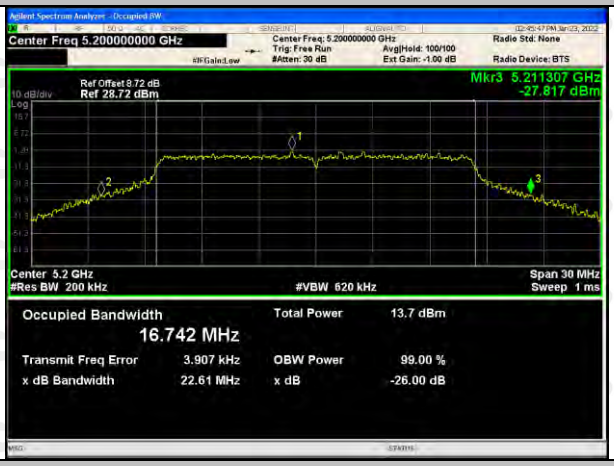


ANT 2

802.11a-5180



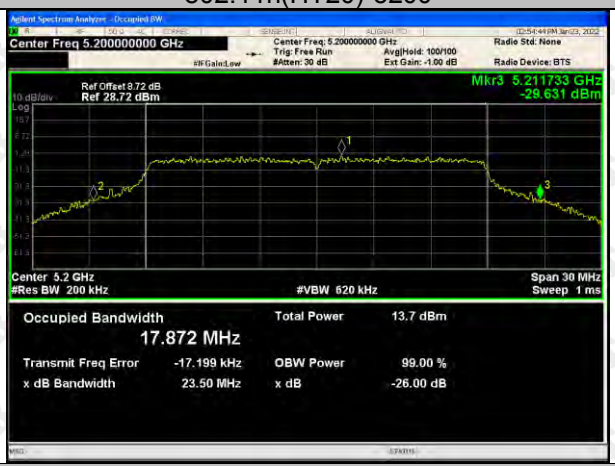
802.11a-5200



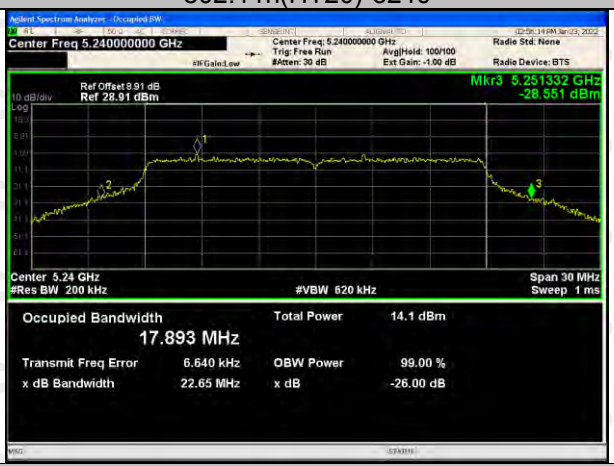
802.11a-5240

802.11n(HT20)-5180

802.11n(HT20)-5200



802.11n(HT20)-5240



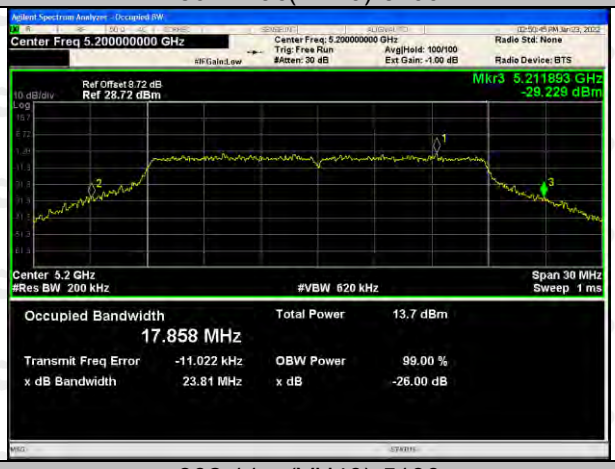
802.11n(HT40)-5190

802.11n(HT40)-5230

802.11ac(VH20)-5180

802.11ac(VH20)-5200

802.11ac(VH20)-5240



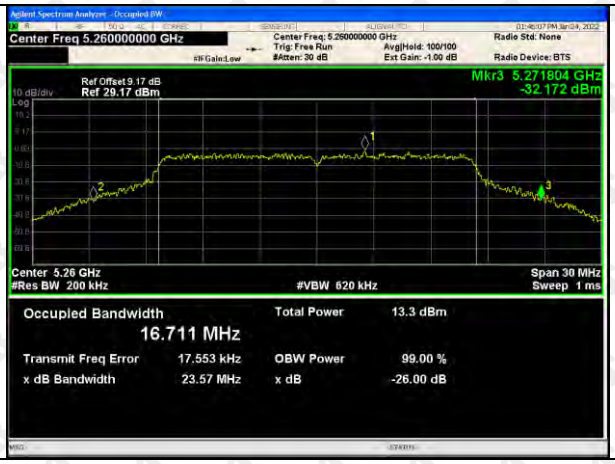
802.11ac(VH40)-5190

802.11ac(VH40)-5230

802.11ac(VH80)-5210

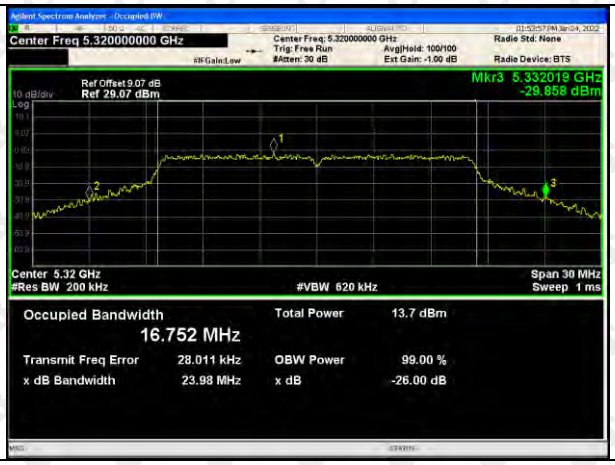
802.11a-5260

802.11a-5280



802.11a-5320

802.11ac(VH20)-5260



802.11ac(VH20)-5280

802.11ac(VH20)-5320

802.11ac(VH40)-5270

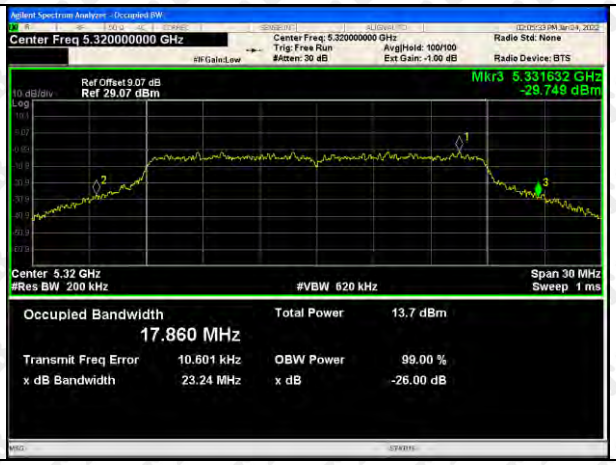
802.11ac(VH40)-5310

802.11n(HT20)-5260

802.11n(HT20)-5280

802.11n(HT20)-5320

802.11n(HT40)-5270



802.11n(HT40)-5310

802.11ac(HT80)-5290

ANT 3

802.11a-5180

802.11a-5200

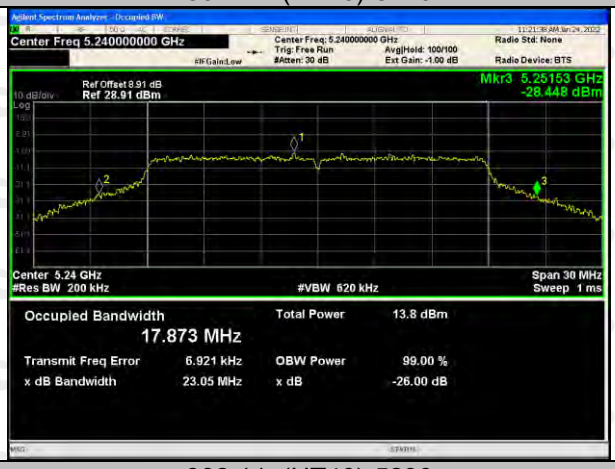
802.11a-5240

802.11n(HT20)-5180

802.11n(HT20)-5200

802.11n(HT20)-5240

802.11n(HT40)-5190



802.11n(HT40)-5230

802.11ac(VH20)-5180

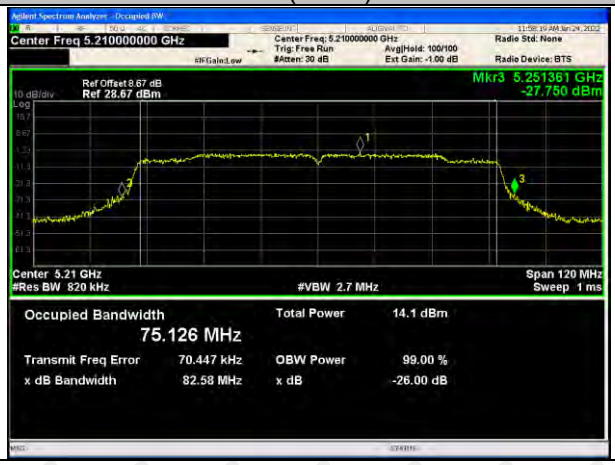
802.11ac(VH20)-5200

802.11ac(VH20)-5240

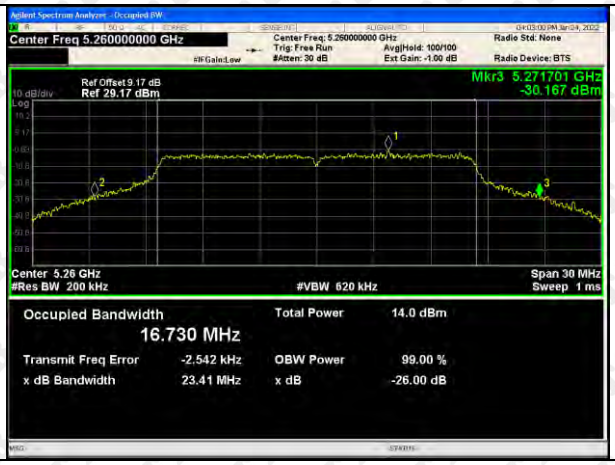
802.11ac(VH40)-5190

802.11ac(VH40)-5230

802.11ac(VH80)-5210

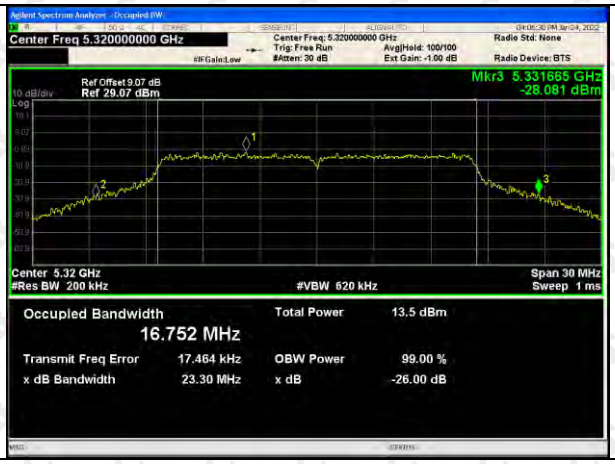


802.11a-5260	802.11a-5280

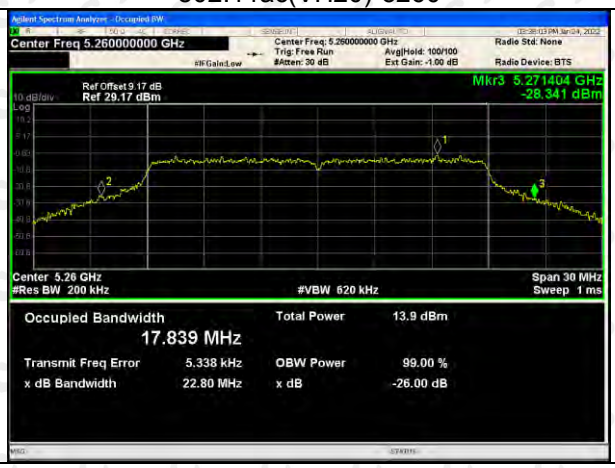


802.11a-5320

802.11ac(VH20)-5260



802.11ac(VH20)-5280



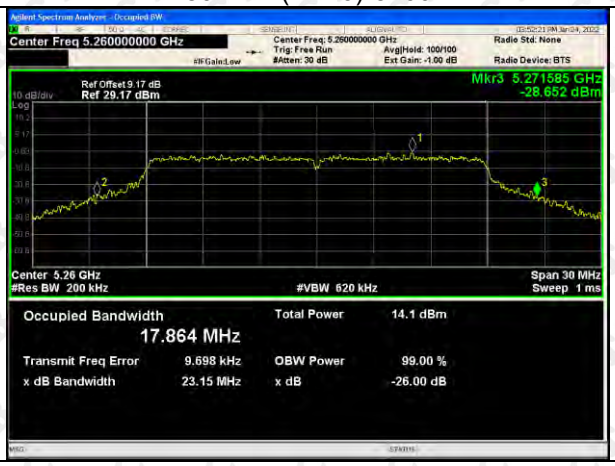
802.11ac(VH20)-5320

802.11ac(VH40)-5270

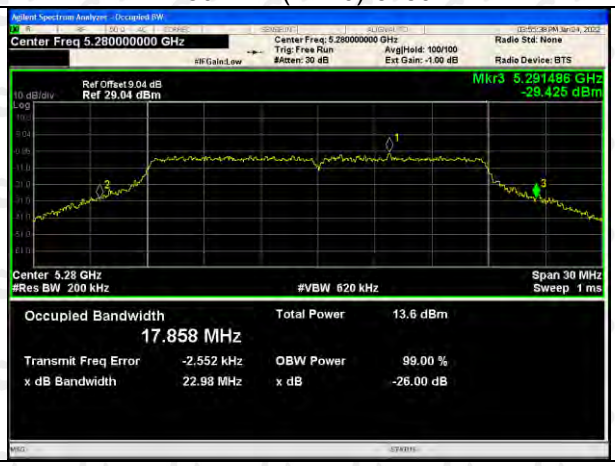
802.11ac(VH40)-5310

802.11n(HT20)-5260

802.11n(HT20)-5280



802.11n(HT20)-5320



802.11n(HT40)-5270

802.11n(HT40)-5310

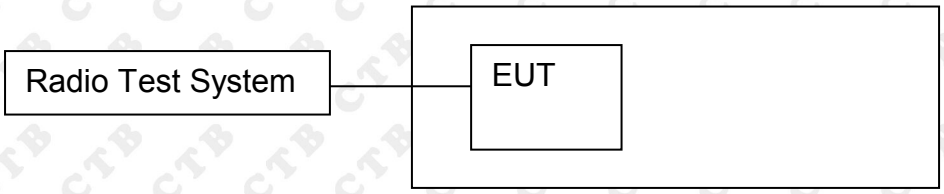
802.11ac(HT80)-5290


Agilent Spectrum Analyzer - Occupied BW
Center Freq 5.310000000 GHz
Center Freq: 5.310000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Ext Gain: -1.00 dB
Radio Std: None
Radio Device: BTS
Ref Offset 9.01 dB
10 dB/div
Ref 29.01 dBm
Mkr3 5.331638 GHz
-31.578 dBm
Center 5.31 GHz
#Res BW 390 kHz
#VBW 820 kHz
Span 60 MHz
Sweep 1 ms
Occupied Bandwidth
36.305 MHz
Total Power 12.9 dBm
Transmit Freq Error 7.905 kHz
OBW Power 99.00 %
x dB Bandwidth 43.26 MHz
x dB -26.00 dB


Agilent Spectrum Analyzer - Occupied BW
Center Freq 5.290000000 GHz
Center Freq: 5.290000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Ext Gain: -1.00 dB
Radio Std: None
Radio Device: BTS
Ref Offset 8.87 dB
10 dB/div
Ref 28.87 dBm
Mkr3 5.331769 GHz
-31.743 dBm
Center 5.29 GHz
#Res BW 820 kHz
#VBW 2.7 MHz
Span 120 MHz
Sweep 1 ms
Occupied Bandwidth
75.156 MHz
Total Power 13.1 dBm
Transmit Freq Error 6.016 kHz
OBW Power 99.00 %
x dB Bandwidth 83.53 MHz
x dB -26.00 dB

11. POWER SPECTRAL DENSITY

11.1 Block Diagram Of Test Setup



11.2 Limit

(1) For the band 5.15-5.25 GHz.

(iv) 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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(2) 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 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

11.3 Test procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

For devices operating in the bands 5.15−5.25 GHz, 5.25−5.35 GHz, and 5.47−5.725 GHz, the preceding procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in Section 15.407(a)(5). For devices operating in the band 5.725−5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
a) Set RBW ≥ 1/T, where T is defined in II.B.1.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (<500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.
Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the II.F.5.c) and II.F.5.d), since RBW=100 kHz is available on nearly all spectrum analyzers.

11.4 Test Result

Test mode	Test Channel (MHz)	PSD [dBm/MHz]	Limit [dBm/MHz]	Result
802.11a	5180	4.575	11	Pass
	5200	4.788	11	Pass
	5240	5.082	11	Pass
802.11ac(VH20)	5180	4.344	11	Pass
	5200	4.367	11	Pass
	5240	4.81	11	Pass
802.11ac(VH40)	5190	1.337	11	Pass
	5230	1.055	11	Pass
802.11ac(VH80)	5210	-0.411	11	Pass
802.11n(HT20)	5180	4.25	11	Pass
	5200	4.451	11	Pass
	5240	4.829	11	Pass
802.11n(HT40)	5190	1.887	11	Pass
	5230	1.074	11	Pass

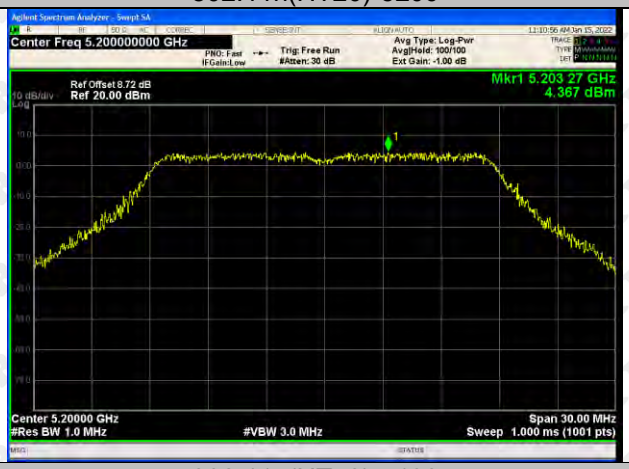
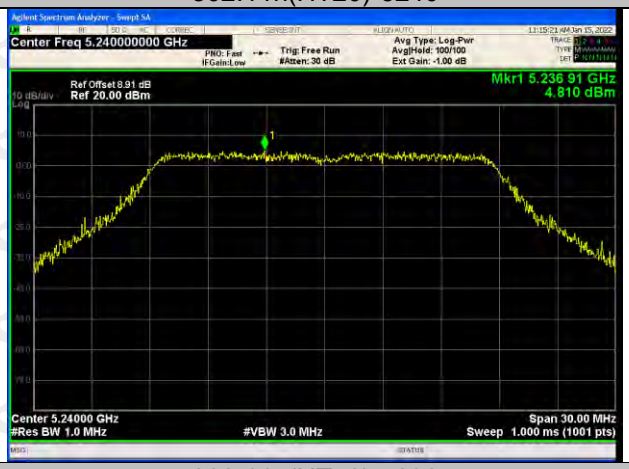
ANT 2+3

Test mode	Test Channel (MHz)	PSD [dBm/MHz] ANT 2	PSD [dBm/MHz] ANT 3	PSD [dBm/MHz] Total	Limit (dBm)	Result
802.11a	5180	2.254	1.769	/	11	Pass
	5200	2.709	1.828	/	11	Pass
	5240	2.401	2.706	/	11	Pass
802.11n(HT20)	5180	1.92	2.026	4.984	11	Pass
	5200	2.099	1.525	4.832	11	Pass
	5240	1.508	2.03	4.787	11	Pass
802.11n(HT40)	5190	-0.567	-1.471	2.015	11	Pass
	5230	-0.49	-0.389	2.571	11	Pass
802.11ac(VH20)	5210	2.408	-6.108	2.980	11	Pass
	5180	1.796	1.652	4.735	11	Pass
	5200	2.252	1.451	4.880	11	Pass
802.11ac(VH40)	5240	-1.281	2.883	4.292	11	Pass
	5190	-1.371	-1.043	1.806	11	Pass
802.11ac(VH80)	5230	--4.639	-1.274	5.630	11	Pass

Test mode Ant 1	Test Condition	Test Channel (MHz)	PSD [dBm/MHz]	Result
802.11a	NTNV	5260	4.715	Pass
	NTNV	5280	5.08	Pass
	NTNV	5320	7.129	Pass
802.11n(HT20)	NTNV	5260	4.599	Pass
	NTNV	5280	4.898	Pass
	NTNV	5320	4.88	Pass
802.11n(HT40)	NTNV	5270	1.43	Pass
	NTNV	5310	1.869	Pass
802.11ac(VH20)	NTNV	5260	4.913	Pass
	NTNV	5280	5.081	Pass
	NTNV	5320	6.446	Pass
802.11ac(VH40)	NTNV	5270	0.838	Pass
	NTNV	5310	2.861	Pass
802.11ac(VH80)	NTNV	5290	-1.63	Pass

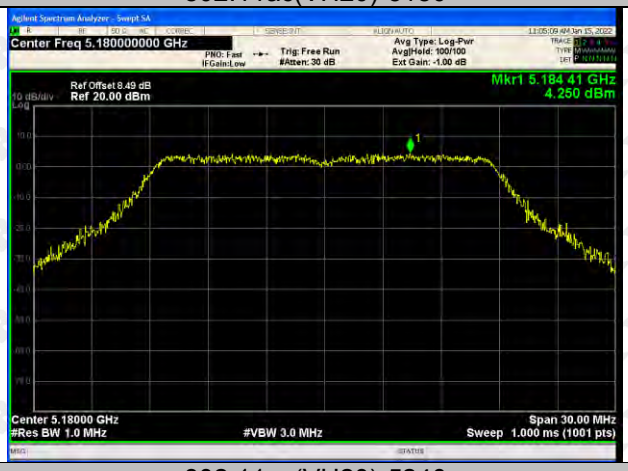
Test mode	Test Channel (MHz)	PSD [dBm/MHz] ANT 2	PSD [dBm/MHz] ANT 3	PSD [dBm/MHz] Total	Limit (dBm)	Result
802.11a	5260	1.661	2.551	/	11	Pass
	5280	2.322	1.835	/	11	Pass
	5320	2.381	1.952	/	11	Pass
802.11n(HT20)	5260	2.803	2.403	5.618	11	Pass
	5280	1.538	1.744	4.653	11	Pass
	5320	1.811	1.483	4.660	11	Pass
802.11n(HT40)	5270	-1.264	0.778	2.886	11	Pass
	5310	-2.137	-0.412	1.821	11	Pass
802.11ac(VH20)	5260	-6.842	2.24	2.746	11	Pass
	5280	2.018	2.077	5.058	11	Pass
	5320	1.552	2.141	4.867	11	Pass
802.11ac(VH40)	5270	1.302	-3.766	2.479	11	Pass
	5310	-1.471	-1.8	1.378	11	Pass
802.11ac(VH80)	5290	-2.084	-5.093	-0.323	11	Pass

ANT 1

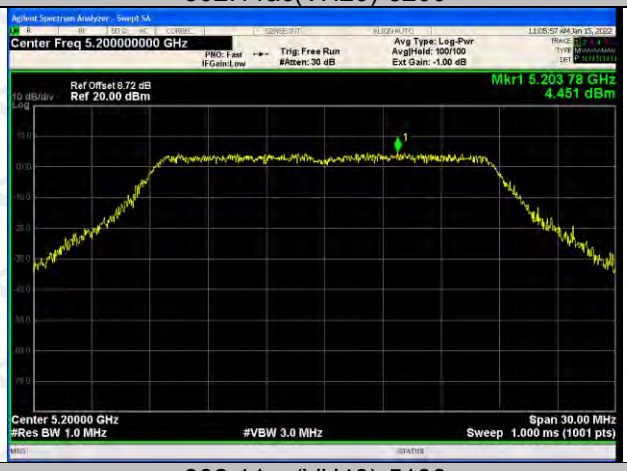
802.11a-5180	802.11a-5200
	
802.11a-5240	**802.11n(HT20)-5180**
	
802.11n(HT20)-5200	**802.11n(HT20)-5240**
	
802.11n(HT40)-5190	**802.11n(HT40)-5230**

802.11ac(VH20)-5180

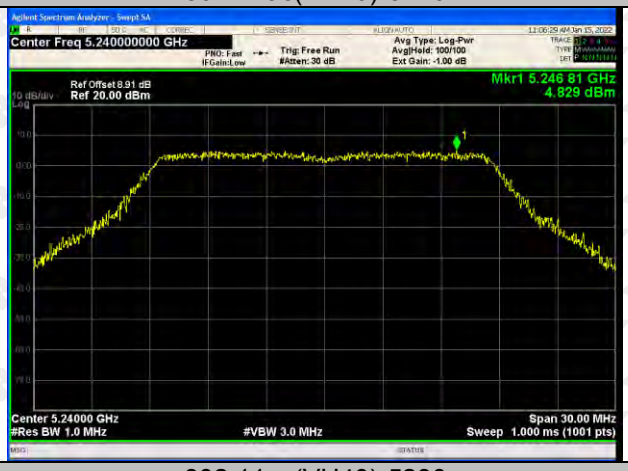
802.11ac(VH20)-5200



802.11ac(VH20)-5240



802.11ac(VH40)-5190

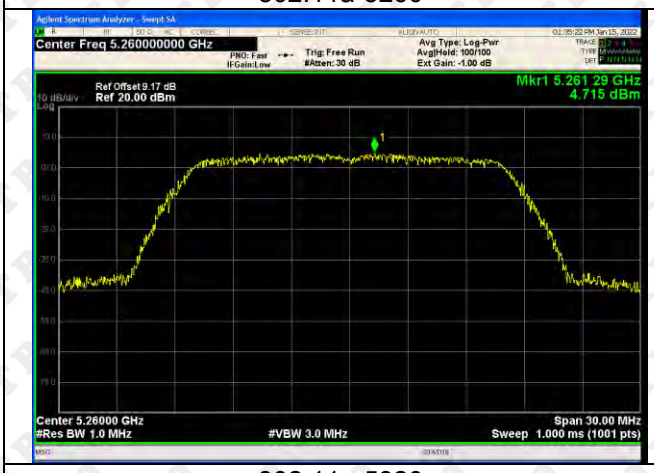


802.11ac(VH40)-5230

802.11ac(VH80)-5210

802.11a-5260

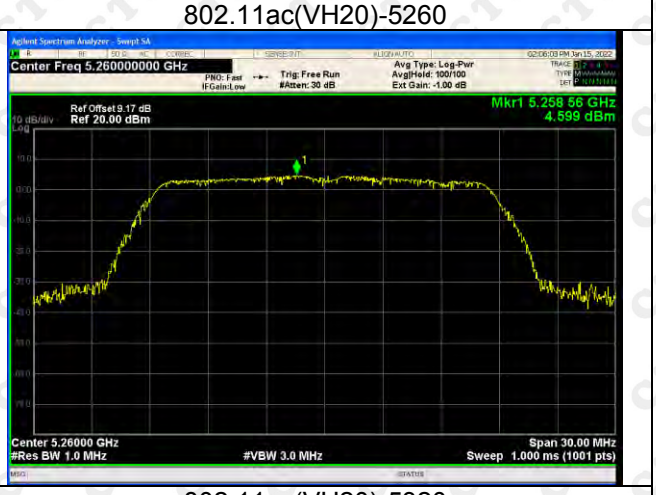
802.11a-5280



802.11a-5320

802.11ac(VH20)-5260

802.11ac(VH20)-5280



802.11ac(VH20)-5320

802.11ac(VH40)-5270

802.11ac(VH40)-5310

802.11n(HT20)-5260

802.11n(HT20)-5280

802.11n(HT20)-5320

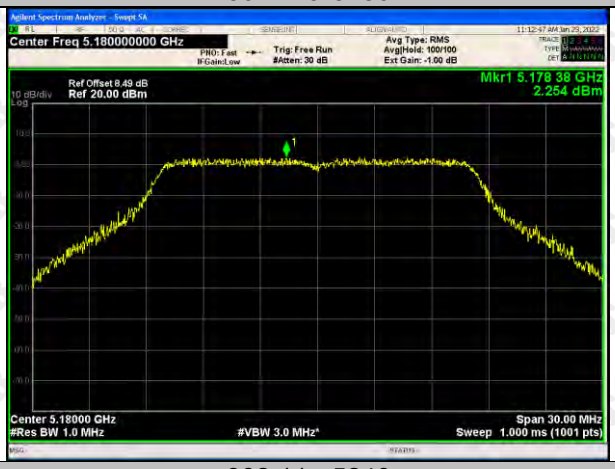
802.11n(HT40)-5270

802.11n(HT40)-5310

802.11ac(HT80)-5290

ANT 2

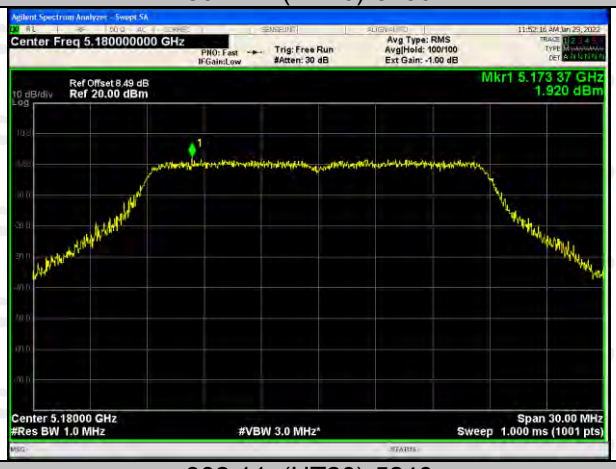
802.11a-5180



802.11a-5200

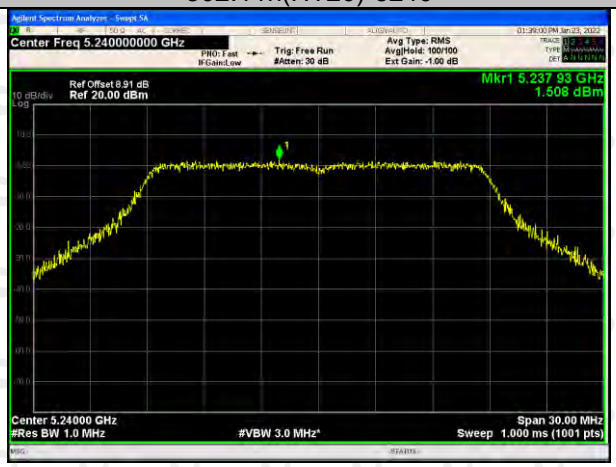
802.11a-5240

802.11n(HT20)-5180



802.11n(HT20)-5200

802.11n(HT20)-5240



802.11n(HT40)-5190

802.11n(HT40)-5230

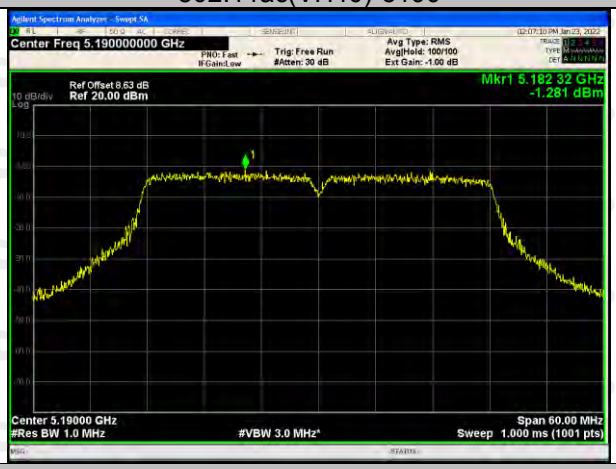
802.11ac(VH20)-5180

802.11ac(VH20)-5200

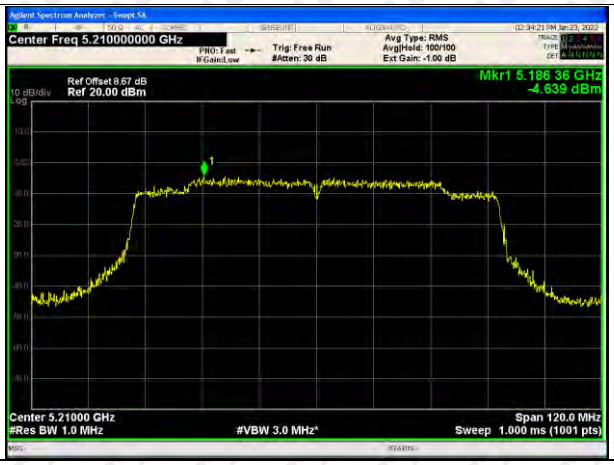
802.11ac(VH20)-5240

802.11ac(VH40)-5190

802.11ac(VH40)-5230



802.11ac(VH80)-5210

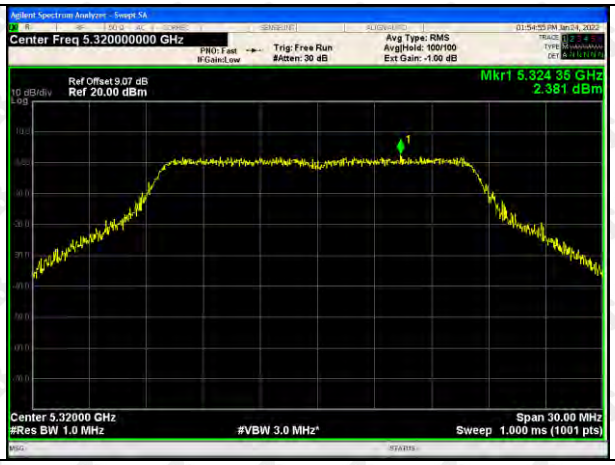


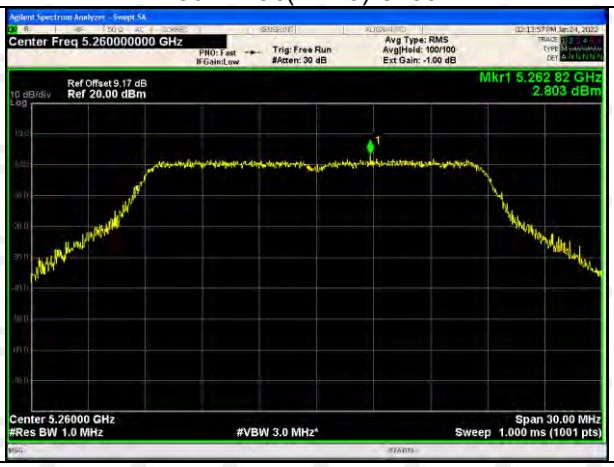
802.11a-5260

802.11a-5280

802.11a-5320

802.11ac(VH20)-5260





802.11ac(VH20)-5280

802.11ac(VH20)-5320

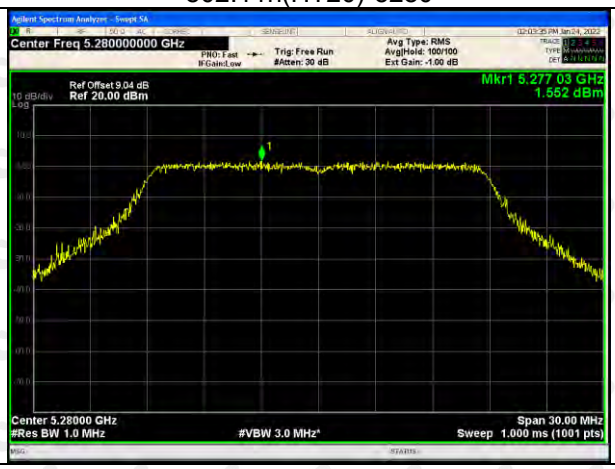
802.11ac(VH40)-5270

802.11ac(VH40)-5310

802.11n(HT20)-5260

802.11n(HT20)-5280

802.11n(HT20)-5320



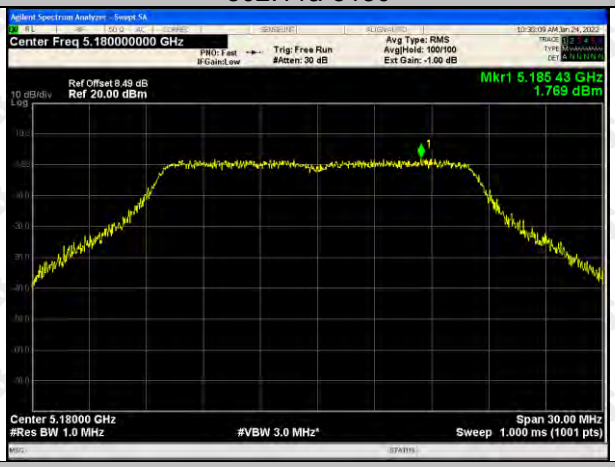
802.11n(HT40)-5270

802.11n(HT40)-5310

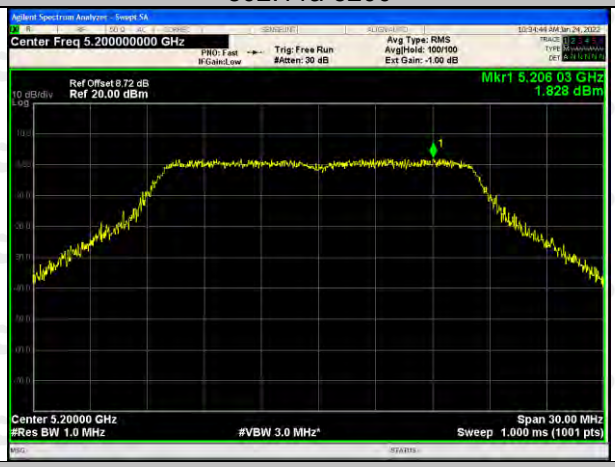
802.11ac(HT80)-5290

ANT 3

802.11a-5180



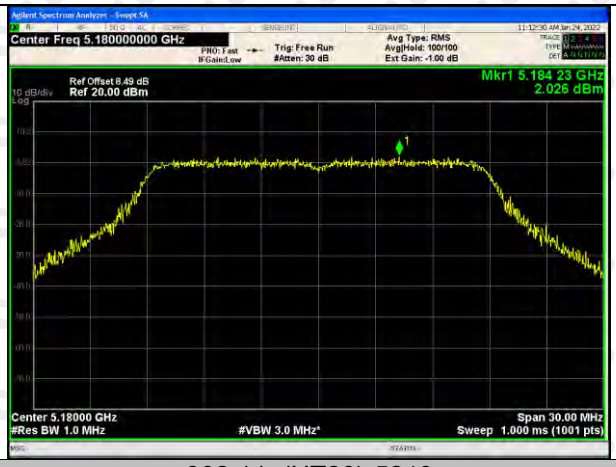
802.11a-5200



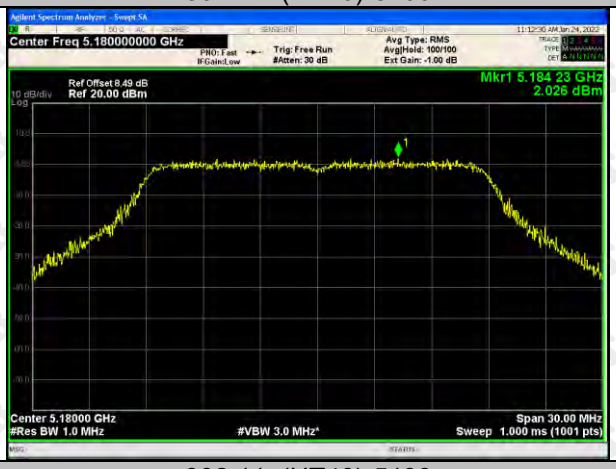
802.11a-5240

802.11n(HT20)-5180

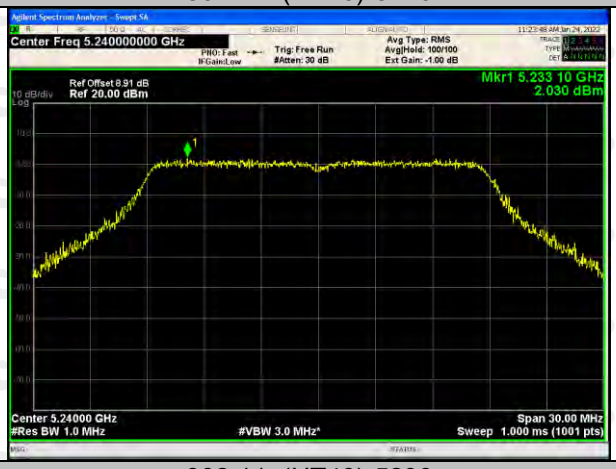
802.11n(HT20)-5200



802.11n(HT20)-5240



802.11n(HT40)-5190



802.11n(HT40)-5230

802.11ac(VH20)-5180

802.11ac(VH20)-5200

802.11ac(VH20)-5240

802.11ac(VH40)-5190

802.11ac(VH40)-5230

802.11ac(VH80)-5210

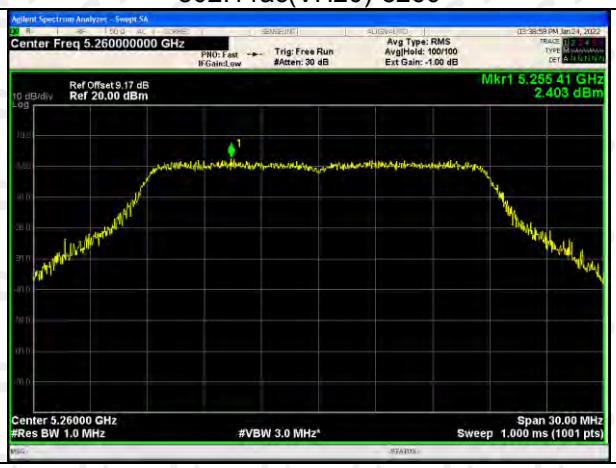
802.11a-5260

802.11a-5280

802.11a-5320

802.11ac(VH20)-5260

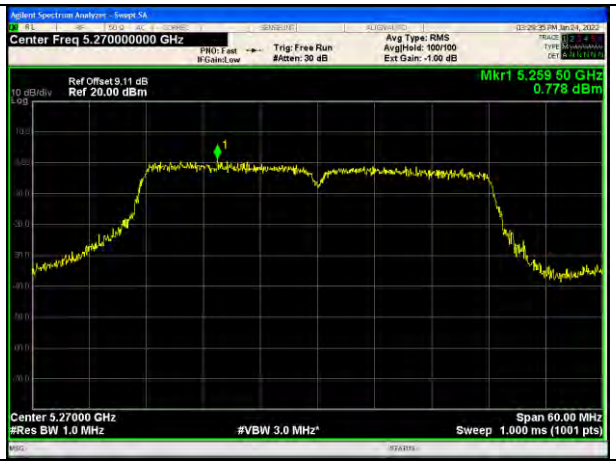
802.11ac(VH20)-5280



802.11ac(VH20)-5320

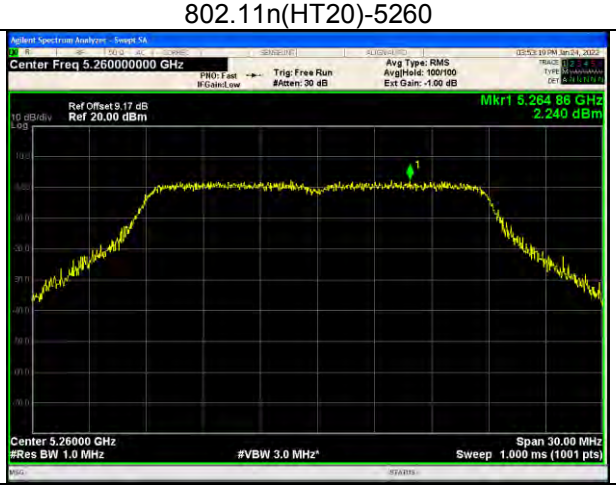
802.11ac(VH40)-5270

802.11ac(VH40)-5310



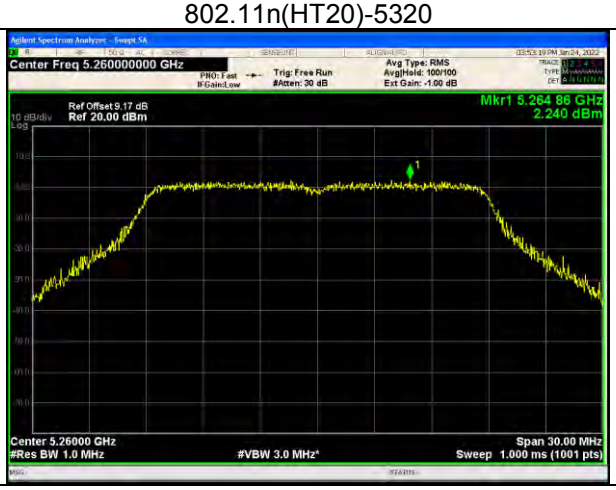
802.11n(HT20)-5260

802.11n(HT20)-5280

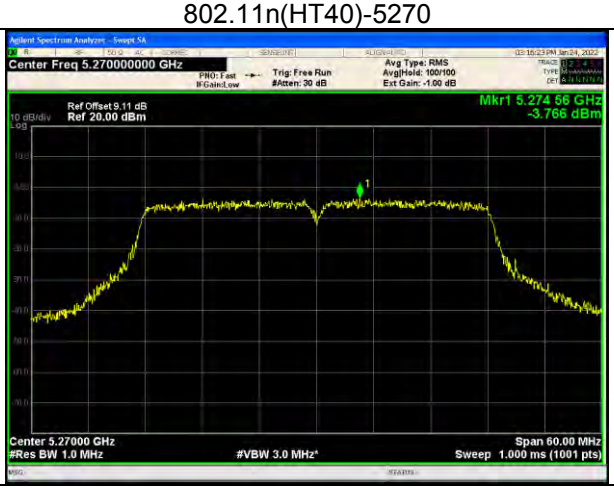


802.11n(HT20)-5320

802.11n(HT40)-5270



802.11n(HT40)-5310



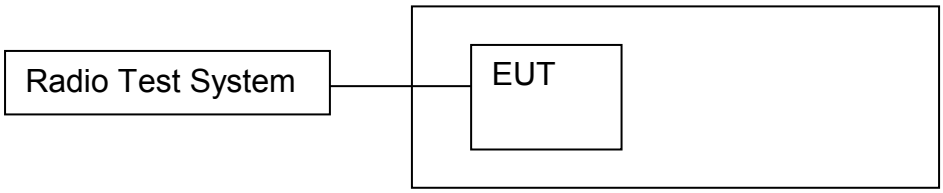
802.11ac(HT80)-5290


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.310000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
Ext Gain: -1.00 dB
Ref Offset 9.01 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.303 28 GHz
-1.800 dBm
Center 5.31000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Span 60.00 MHz
Sweep 1.000 ms (1001 pts)


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.290000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: RMS
Avg|Hold: 100/100
Ext Gain: -1.00 dB
Ref Offset 8.87 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.276 08 GHz
-5.093 dBm
Center 5.29000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Span 120.0 MHz
Sweep 1.000 ms (1001 pts)

12. FREQUENCY STABILITY

12.1 Block Diagram Of Test Setup



12.2 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.

12.3 Test procedure

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.

2. Set EUT as normal operation.

3. Turn the EUT on and couple its output to spectrum.

4. Turn the EUT off and set the chamber to the highest temperature specified.

5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.

6. Repeat step with the temperature chamber set to the lowest temperature.

12.4 Test Result

ANT1:

TX Frequency (5180-5240MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5180.0556	5180	0.0556	10.7336
		V max (V)	132	5180.0323	5180	0.0323	6.2355
		V min (V)	108	5180.0246	5180	0.0246	4.7490
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.7	T (°C)	-20	5180.0054	5180	0.0054	1.0425
		T (°C)	-10	5180.0105	5180	0.0105	2.0270
		T (°C)	0	5180.0323	5180	0.0323	6.2355
		T (°C)	10	5180.0386	5180	0.0386	7.4517
		T (°C)	20	5180.0293	5180	0.0293	5.6564
		T (°C)	30	5180.0218	5180	0.0218	4.2085
		T (°C)	40	5180.0125	5180	0.0125	2.4131
		T (°C)	50	5180.0097	5180	0.0097	1.8726
		T (°C)	60	5180.0414	5180	0.0414	7.9923
		T (°C)	70	5180.0697	5180	0.0697	13.4556
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5200.0254	5200	0.0254	4.8846
		V max (V)	132	5200.0428	5200	0.0428	8.2308
		V min (V)	108	5200.0694	5200	0.0694	13.3462
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5200.0633	5200	0.0633	12.1731
		T (°C)	-10	5200.0526	5200	0.0526	10.1154
		T (°C)	0	5200.0434	5200	0.0434	8.3462
		T (°C)	10	5200.0928	5200	0.0928	17.8462
		T (°C)	20	5200.0635	5200	0.0635	12.2115
		T (°C)	30	5200.0124	5200	0.0124	2.3846
		T (°C)	40	5200.0733	5200	0.0733	14.0962
		T (°C)	50	5200.0416	5200	0.0416	8.0000
		T (°C)	60	5200.0325	5200	0.0325	6.2500
		T (°C)	70	5200.0427	5200	0.0427	8.2115
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5240.0136	5240	0.0136	2.5954
		V max (V)	132	5240.0414	5240	0.0414	7.9008
		V min (V)	108	5240.0097	5240	0.0097	1.8511
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5240.0094	5240	0.0094	1.7939
		T (°C)	-10	5240.0035	5240	0.0035	0.6679
		T (°C)	0	5240.0144	5240	0.0144	2.7481
		T (°C)	10	5240.0856	5240	0.0856	16.3359
		T (°C)	20	5240.0114	5240	0.0114	2.1756
		T (°C)	30	5240.0125	5240	0.0125	2.3855
		T (°C)	40	5240.0063	5240	0.0063	1.2023
		T (°C)	50	5240.0076	5240	0.0076	1.4504
		T (°C)	60	5240.0053	5240	0.0053	1.0115
		T (°C)	70	5240.0105	5240	0.0105	2.0038
Limits				±20ppm			
Result				Complies			

ANT2:

TX Frequency (5180-5240MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5180.0557	5180	0.0557	10.7490
		V max (V)	132	5180.0320	5180	0.0320	6.1776
		V min (V)	108	5180.0247	5180	0.0247	4.7683
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5180.0051	5180	0.0051	0.9846
		T (°C)	-10	5180.0107	5180	0.0107	2.0656
		T (°C)	0	5180.0321	5180	0.0321	6.1969
		T (°C)	10	5180.0383	5180	0.0382	7.3842
		T (°C)	20	5180.0235	5180	0.0235	4.5367
		T (°C)	30	5180.0219	5180	0.0219	4.2278
		T (°C)	40	5180.0127	5180	0.0127	2.4517
		T (°C)	50	5180.0097	5180	0.0097	1.8726
		T (°C)	60	5180.0417	5180	0.0417	8.0502
		T (°C)	70	5180.0695	5180	0.0695	13.4170
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5200.0252	5200	0.0252	4.8462
		V max (V)	132	5200.0427	5200	0.0427	8.2115
		V min (V)	108	5200.0696	5200	0.0696	13.3846
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5200.0637	5200	0.0637	12.2500
		T (°C)	-10	5200.0523	5200	0.0523	10.0577
		T (°C)	0	5200.0437	5200	0.0437	8.4038
		T (°C)	10	5200.0925	5200	0.0925	17.7885
		T (°C)	20	5200.0639	5200	0.0639	12.2885
		T (°C)	30	5200.0121	5200	0.0121	2.3269
		T (°C)	40	5200.0738	5200	0.0738	14.1923
		T (°C)	50	5200.0416	5200	0.0416	8.0000
		T (°C)	60	5200.0329	5200	0.0329	6.3269
		T (°C)	70	5200.0421	5200	0.0421	8.0962
Limits				±20ppm			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5240.0138	5240	0.0138	2.6336
		V max (V)	132	5240.0411	5240	0.0411	7.8435
		V min (V)	108	5240.0102	5240	0.0102	1.9466
Limits				±20ppm			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5240.0097	5240	0.0097	1.8511
		T (°C)	-10	5240.0033	5240	0.0033	0.6298
		T (°C)	0	5240.0148	5240	0.0148	2.8244
		T (°C)	10	5240.0856	5240	0.0856	16.3359
		T (°C)	20	5240.0119	5240	0.0119	2.2710
		T (°C)	30	5240.0125	5240	0.0125	2.3855
		T (°C)	40	5240.0061	5240	0.0061	1.1641
		T (°C)	50	5240.0076	5240	0.0076	1.4504
		T (°C)	60	5240.0059	5240	0.0059	1.1260
		T (°C)	70	5240.0107	5240	0.0107	2.0420
Limits				±20ppm			
Result				Complies			

Ant 3

TX Frequency (5180-5240MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5180.0556	5180	0.0556	10.7336
		V max (V)	132	5180.0323	5180	0.0323	6.2355
		V min (V)	108	5180.0246	5180	0.0246	4.7490
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5180.0054	5180	0.0054	1.0425
		T (°C)	-10	5180.0105	5180	0.0105	2.0270
		T (°C)	0	5180.0323	5180	0.0323	6.2355
		T (°C)	10	5180.0386	5180	0.0386	7.4517
		T (°C)	20	5180.0293	5180	0.0293	5.6564
		T (°C)	30	5180.0218	5180	0.0218	4.2085
		T (°C)	40	5180.0125	5180	0.0125	2.4131
		T (°C)	50	5180.0097	5180	0.0097	1.8726
		T (°C)	60	5180.0414	5180	0.0414	7.9923
		T (°C)	70	5180.0697	5180	0.0697	13.4556
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5200.0254	5200	0.0254	4.8846
		V max (V)	132	5200.0428	5200	0.0428	8.2308
		V min (V)	108	5200.0694	5200	0.0694	13.3462
Limits				5150-5250MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5200.0633	5200	0.0633	12.1731
		T (°C)	-10	5200.0526	5200	0.0526	10.1154
		T (°C)	0	5200.0434	5200	0.0434	8.3462
		T (°C)	10	5200.0928	5200	0.0928	17.8462
		T (°C)	20	5200.0635	5200	0.0635	12.2115
		T (°C)	30	5200.0124	5200	0.0124	2.3846
		T (°C)	40	5200.0733	5200	0.0733	14.0962
		T (°C)	50	5200.0416	5200	0.0416	8.0000
		T (°C)	60	5200.0325	5200	0.0325	6.2500
		T (°C)	70	5200.0427	5200	0.0427	8.2115
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5240.0136	5240	0.0136	2.5954
		V max (V)	132	5240.0414	5240	0.0414	7.9008
		V min (V)	108	5240.0097	5240	0.0097	1.8511
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5240.0094	5240	0.0094	1.7939
		T (°C)	-10	5240.0035	5240	0.0035	0.6679
		T (°C)	0	5240.0144	5240	0.0144	2.7481
		T (°C)	10	5240.0856	5240	0.0856	16.3359
		T (°C)	20	5240.0114	5240	0.0114	2.1756
		T (°C)	30	5240.0125	5240	0.0125	2.3855
		T (°C)	40	5240.0063	5240	0.0063	1.2023
		T (°C)	50	5240.0076	5240	0.0076	1.4504
		T (°C)	60	5240.0053	5240	0.0053	1.0115
		T (°C)	70	5240.0105	5240	0.0105	2.0038
Limits				5150-5250 MHz			
Result				Complies			

ANT1:
TX Frequency(5260-5320MHz)
Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5260.00415	5260	0.00415	0.7888
		V max (V)	138.00	5260.00378	5260	0.00378	0.7186
		V min (V)	102.00	5260.00113	5260	0.00113	0.2141
Limits				5260-5320 MHz			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5260.01017	5260	0.01017	1.9333
		T (°C)	-10	5260.00658	5260	0.00658	1.2513
		T (°C)	0	5260.01267	5260	0.01267	2.4090
		T (°C)	10	5260.00763	5260	0.00763	1.4514
		T (°C)	20	5260.01252	5260	0.01252	2.3802
		T (°C)	30	5260.01099	5260	0.01099	2.0898
		T (°C)	40	5260.00006	5260	0.00006	0.0123
		T (°C)	50	5260.00970	5260	0.00970	1.8450
		T (°C)	60	5260.00909	5260	0.00909	1.7283
		T (°C)	70	5260.00904	5260	0.00904	1.7195
Limits				5260-5320MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5280.01086	5280	0.01086	2.0577
		V max (V)	132	5280.00838	5280	0.00838	1.5879
		V min (V)	108	5280.01147	5280	0.01147	2.1725
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5280.00413	5280	0.00413	0.7825
		T (°C)	-10	5280.01171	5280	0.01171	2.2183
		T (°C)	0	5280.00927	5280	0.00927	1.7558
		T (°C)	10	5280.00368	5280	0.00368	0.6976
		T (°C)	20	5280.00406	5280	0.00406	0.7692
		T (°C)	30	5280.00221	5280	0.00221	0.4184
		T (°C)	40	5280.00521	5280	0.00521	0.9874
		T (°C)	50	5280.00248	5280	0.00248	0.4688
		T (°C)	60	5280.00920	5280	0.00920	1.7432
		T (°C)	70	5280.00611	5280	0.00611	1.1579
Limits				5260-5320 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5320.01147	5320	0.01147	2.1565
		V max (V)	132	5320.01119	5320	0.01119	2.1037
		V min (V)	108	5320.00692	5320	0.00692	1.3007
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5320.01242	5320	0.01242	2.3346
		T (°C)	-10	5320.00354	5320	0.00354	0.6649
		T (°C)	0	5320.00444	5320	0.00444	0.8343
		T (°C)	10	5320.01193	5320	0.01193	2.2423
		T (°C)	20	5320.00693	5320	0.00693	1.3025
		T (°C)	30	5320.01234	5320	0.01234	2.3189
		T (°C)	40	5320.00975	5320	0.00975	1.8318
		T (°C)	50	5320.00932	5320	0.00932	1.7528
		T (°C)	60	5320.00621	5320	0.00621	1.1675
		T (°C)	70	5320.00124	5320	0.00124	0.2327
Limits				5260-5320 MHz			
Result				Complies			

ANT 2:

TX Frequency(5260-5320MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5260.00704	5260	0.00704	1.3380
		V max (V)	132.00	5260.01032	5260	0.01032	1.9621
		V min (V)	108.00	5260.00180	5260	0.00180	0.3418
Limits				5260-5320 MHz			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5260.00681	5260	0.00681	1.2940
		T (°C)	-10	5260.00472	5260	0.00472	0.8964
		T (°C)	0	5260.00829	5260	0.00829	1.5760
		T (°C)	10	5260.00685	5260	0.00685	1.3032
		T (°C)	20	5260.00126	5260	0.00126	0.2388
		T (°C)	30	5260.00480	5260	0.00480	0.9128
		T (°C)	40	5260.00474	5260	0.00474	0.9018
		T (°C)	50	5260.00070	5260	0.00070	0.1335
		T (°C)	60	5260.00556	5260	0.00556	1.0575
		T (°C)	70	5260.01026	5260	0.01026	1.9498
Limits				5260-5320MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5280.00220	5280	0.00220	0.4164
		V max (V)	132	5280.00665	5280	0.00665	1.2598
		V min (V)	108	5280.01302	5280	0.01302	2.4658
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5280.00011	5280	0.00011	0.0212
		T (°C)	-10	5280.00454	5280	0.00454	0.8592
		T (°C)	0	5280.00786	5280	0.00786	1.4880
		T (°C)	10	5280.00660	5280	0.00660	1.2506
		T (°C)	20	5280.00044	5280	0.00044	0.0841
		T (°C)	30	5280.01304	5280	0.01304	2.4699
		T (°C)	40	5280.00775	5280	0.00775	1.4675
		T (°C)	50	5280.00437	5280	0.00437	0.8280
		T (°C)	60	5280.00590	5280	0.00590	1.1165
		T (°C)	70	5280.00465	5280	0.00465	0.8806
Limits				5260-5320 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5320.01051	5320	0.01051	1.9746
		V max (V)	132	5320.00272	5320	0.00272	0.5121
		V min (V)	108	5320.00677	5320	0.00677	1.2728
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5320.01283	5320	0.01283	2.4108
		T (°C)	-10	5320.00194	5320	0.00194	0.3647
		T (°C)	0	5320.00593	5320	0.00593	1.1148
		T (°C)	10	5320.00512	5320	0.00512	0.9617
		T (°C)	20	5320.01354	5320	0.01354	2.5450
		T (°C)	30	5320.00862	5320	0.00862	1.6201
		T (°C)	40	5320.00870	5320	0.00870	1.6350
		T (°C)	50	5320.00458	5320	0.00458	0.8616
		T (°C)	60	5320.01035	5320	0.01035	1.9464
		T (°C)	70	5320.00372	5320	0.00372	0.6984
Limits				5260-5320 MHz			
Result				Complies			

Ant 3

TX Frequency(5260-5320MHz)

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5260.00652	5260	0.00652	1.2400
		V max (V)	132.00	5260.00487	5260	0.00487	0.9257
		V min (V)	108.00	5260.00771	5260	0.00771	1.4654
Limits				5260-5320 MHz			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5260.00436	5260	0.00436	0.8286
		T (°C)	-10	5260.00597	5260	0.00597	1.1355
		T (°C)	0	5260.00065	5260	0.00065	0.1231
		T (°C)	10	5260.01210	5260	0.01210	2.3009
		T (°C)	20	5260.00432	5260	0.00432	0.8215
		T (°C)	30	5260.01201	5260	0.01201	2.2838
		T (°C)	40	5260.01323	5260	0.01323	2.5158
		T (°C)	50	5260.00566	5260	0.00566	1.0764
		T (°C)	60	5260.01263	5260	0.01263	2.4020
		T (°C)	70	5260.00287	5260	0.00287	0.5451
Limits				5260-5320MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5280.01099	5280	0.01099	2.0814
		V max (V)	132.00	5280.01248	5280	0.01248	2.3645
		V min (V)	108.00	5280.00704	5280	0.00704	1.3332
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5280.01002	5280	0.01002	1.8980
		T (°C)	-10	5280.00406	5280	0.00406	0.7696
		T (°C)	0	5280.00432	5280	0.00432	0.8185
		T (°C)	10	5280.00497	5280	0.00497	0.9409
		T (°C)	20	5280.00819	5280	0.00819	1.5513
		T (°C)	30	5280.00599	5280	0.00599	1.1349
		T (°C)	40	5280.00563	5280	0.00563	1.0656
		T (°C)	50	5280.00576	5280	0.00576	1.0908
		T (°C)	60	5280.00368	5280	0.00368	0.6970
		T (°C)	70	5280.01199	5280	0.01199	2.2702
Limits				5260-5320 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5320.00960	5320	0.00960	1.8036
		V max (V)	132.00	5320.00451	5320	0.00451	0.8469
		V min (V)	108.00	5320.00149	5320	0.00149	0.2802
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5320.00330	5320	0.00330	0.6212
		T (°C)	-10	5320.00120	5320	0.00120	0.2250
		T (°C)	0	5320.00802	5320	0.00802	1.5079
		T (°C)	10	5320.01243	5320	0.01243	2.3371
		T (°C)	20	5320.00047	5320	0.00047	0.0878
		T (°C)	30	5320.01346	5320	0.01346	2.5304
		T (°C)	40	5320.00381	5320	0.00381	0.7163
		T (°C)	50	5320.00535	5320	0.00535	1.0055
		T (°C)	60	5320.01010	5320	0.01010	1.8980
		T (°C)	70	5320.01132	5320	0.01132	2.1273
Limits				5260-5320 MHz			
Result				Complies			

13. OPERATION IN THE ABSENCE OF INFORMATION TO THE TRANSMIT

13.1 Requirement

15.407(c) requirement:
The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signal ling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

13.2 Test Results

Operation in the absence of information to the transmit:

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling
signal of ASK message transmitting from remote device and verify whether it shall resend or
discontinue transmission. (manufacturer declare)

14. ANTENNA REQUIREMENT

15.203 requirement:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is Internal Antenna and no consideration of replacement. The best case gain of the antenna is 1.0dBi.

15. EUT PHOTOGRAPHS

EUT Photo 1

EUT Photo 2

16. EUT TEST SETUP PHOTOGRAPHS

Spurious emissions

Below 1GHz

Above 1GHz

Conducted Emission

※※※※※ **END OF REPORT** ※※※※※