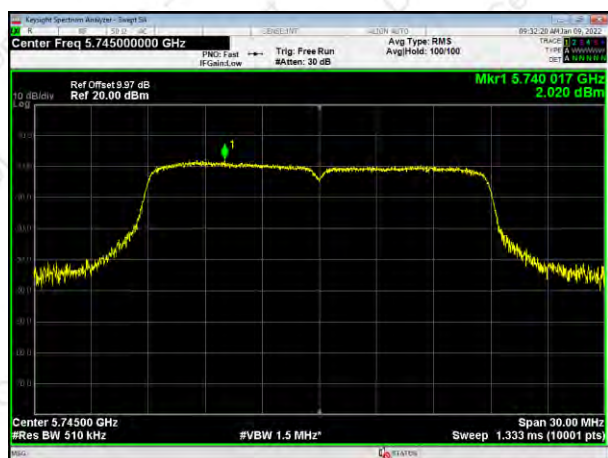




ANT1

802.11a



802.11n HT20



5745MHz



5745MHz



5785MHz



5785MHz



5825MHz

5825MHz



ANT1

802.11n HT40



802.11ac HT20



5755MHz

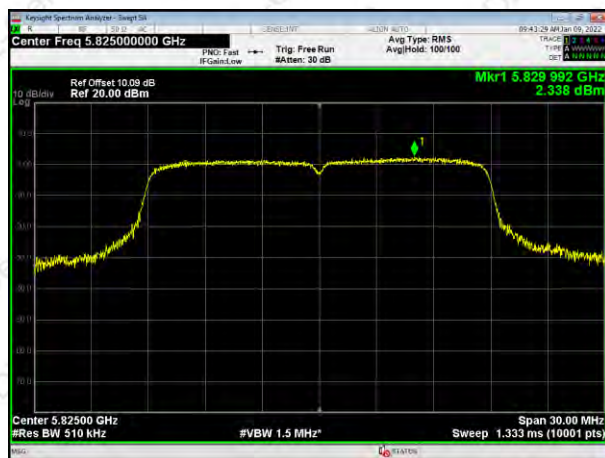


5745MHz



5795MHz

5785MHz



5825MHz



ANT1

802.11ac HT40



802.11ac HT80



5755MHz

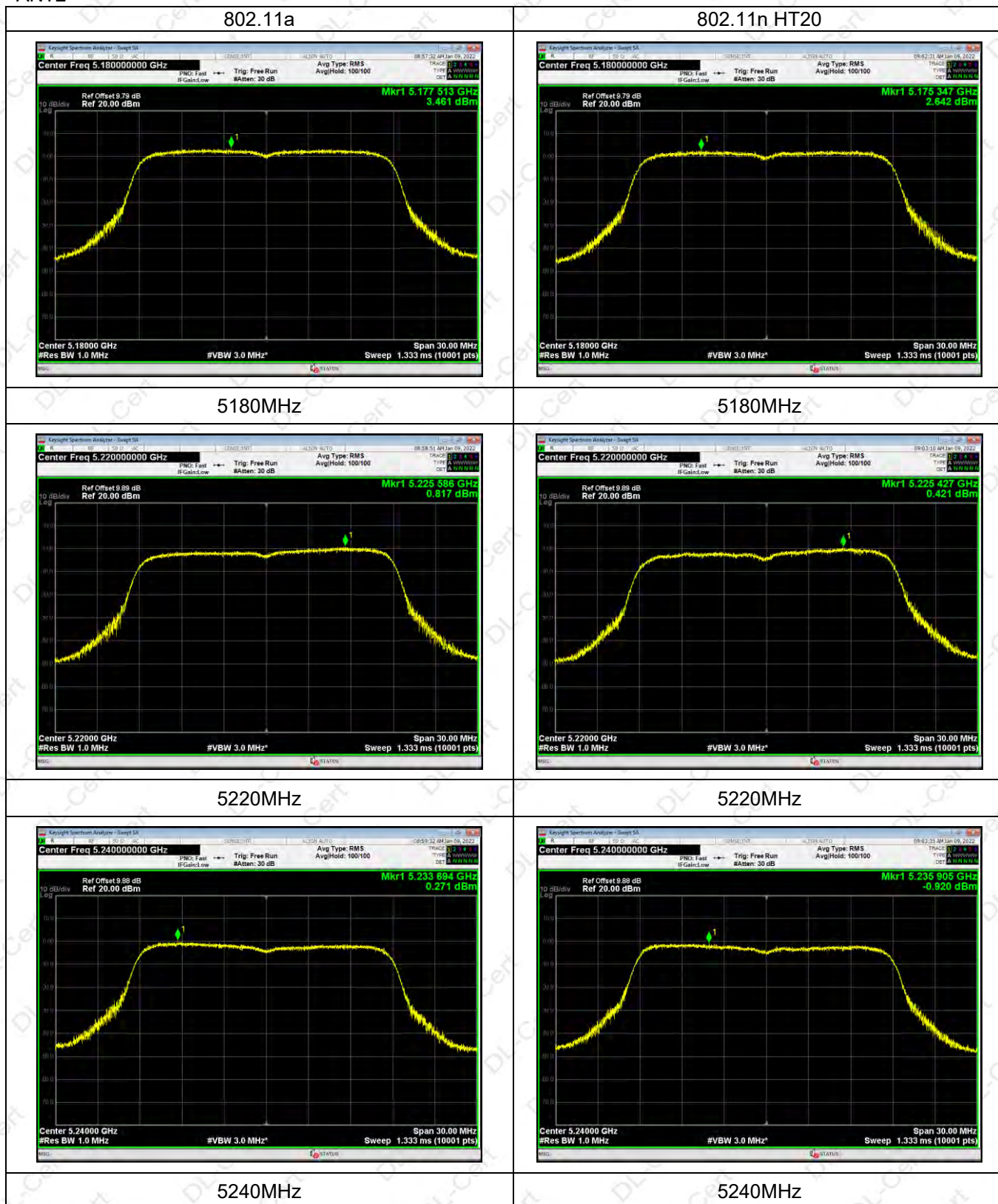


5775MHz

5795MHz



ANT2





ANT2

802.11n HT40



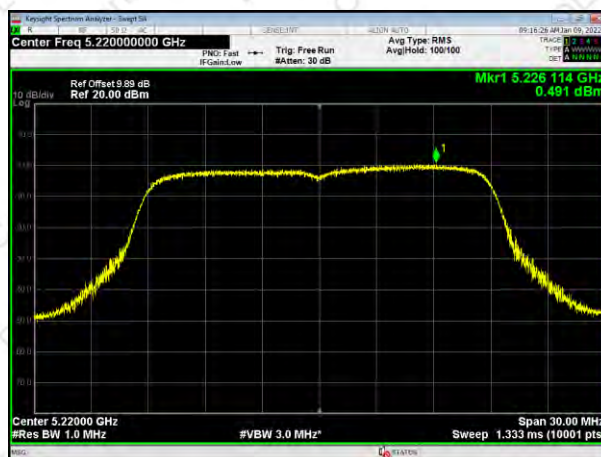
802.11ac HT20



5190MHz



5180



5230MHz

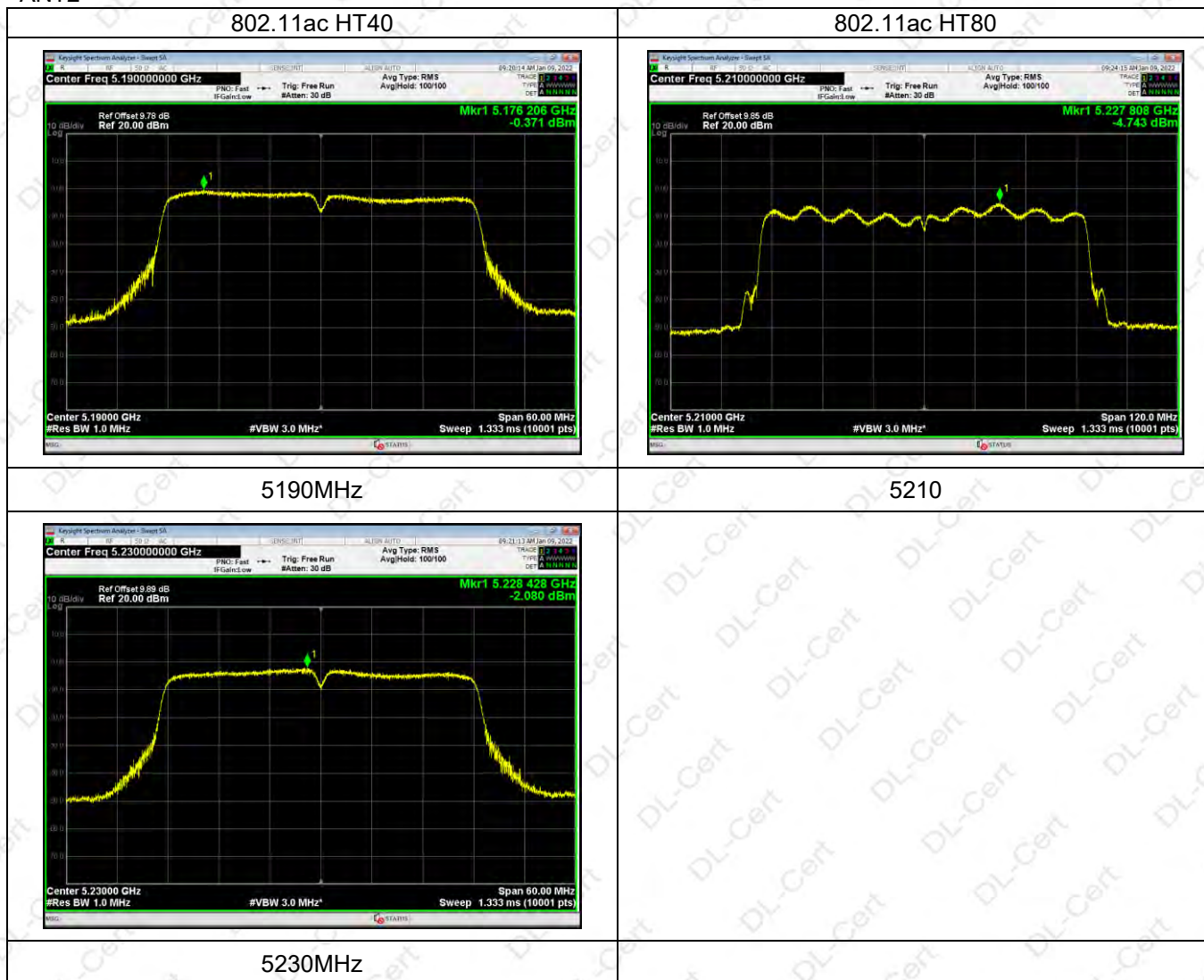


5220

5240



ANT2





ANT2

802.11a



802.11n HT20



5745MHz



5745MHz



5785MHz



5785MHz



5825MHz

5825MHz



ANT2

802.11n HT40



802.11ac HT20



5755MHz



5745MHz



5795MHz

5785MHz



5825MHz



ANT2

802.11ac HT40



802.11ac HT80



5755MHz



5775MHz

5795MHz



6. 6DB&26DB&99% BANDWIDTH TEST

6.1 APPLIED PROCEDURES / LIMIT

The 26 dB bandwidth is used to determine the conducted power limits.

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

6.1.1 TEST PROCEDURE

6dB Bandwidth	
Spectrum Parameters	Setting
RBW	100KHz
VBW	300KHz
Span	30MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

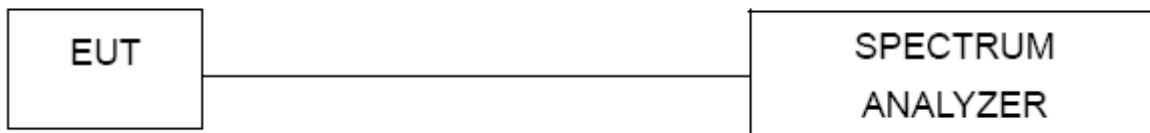
26dB Bandwidth	
Spectrum Parameters	Setting
RBW	approximately 1% of the emission bandwidth
VBW	>RBW
Span	30MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

99% Occupied Bandwidth	
Spectrum Parameters	Setting
RBW	1% to 5% of the OBW
VBW	Approximately three times the RBW
Span	between 1.5 times and 5.0 times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP





6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

Ant 1:

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT 20)	802.11ac(H T20)	802.11a	802.11n(HT 20)	802.11ac(H T20)
36	5180	16.400	17.632	17.631	22.65	23.51	23.09
40	5200	16.446	17.632	17.615	22.70	22.80	22.25
48	5240	16.432	17.626	17.598	21.65	21.99	21.56

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)		26dB Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(HT40)	802.11n(HT40)	802.11ac(HT40)
38	5190	36.069	36.030	41.59	41.40
46	5230	36.016	36.073	40.76	41.68

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210	75.542	102.7

Ant 2:

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT 20)	802.11ac(H T20)	802.11a	802.11n(HT 20)	802.11ac(H T20)
36	5180	16.407	17.653	17.625	21.77	21.41	21.87
40	5200	16.438	17.613	17.608	21.54	22.12	22.07
48	5240	16.391	17.626	17.619	21.67	22.36	22.00

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)		26dB Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(HT40)	802.11n(HT40)	802.11ac(HT40)
38	5190	36.083	36.049	42.02	41.77
46	5230	35.986	36.039	40.27	41.45

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210	75.465	101.4



Ant 1:

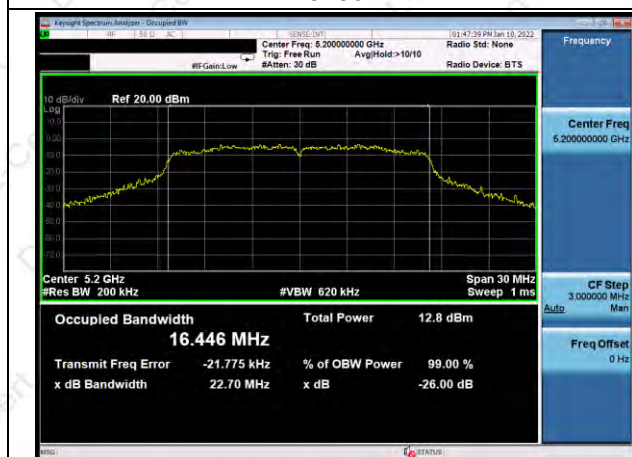
802.11a mode



802.11n(HT20) mode



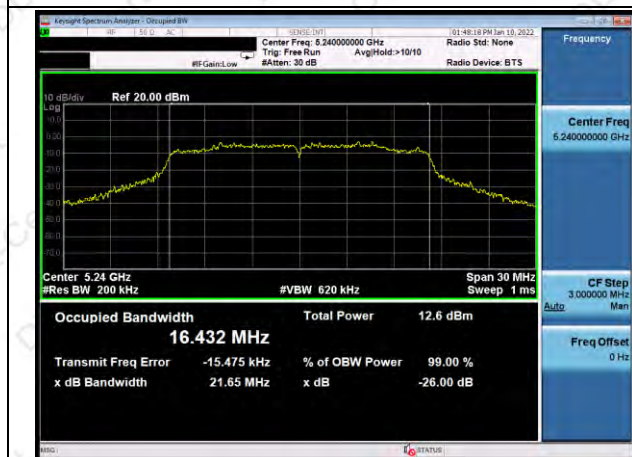
5180



5180



5200



5200



5240

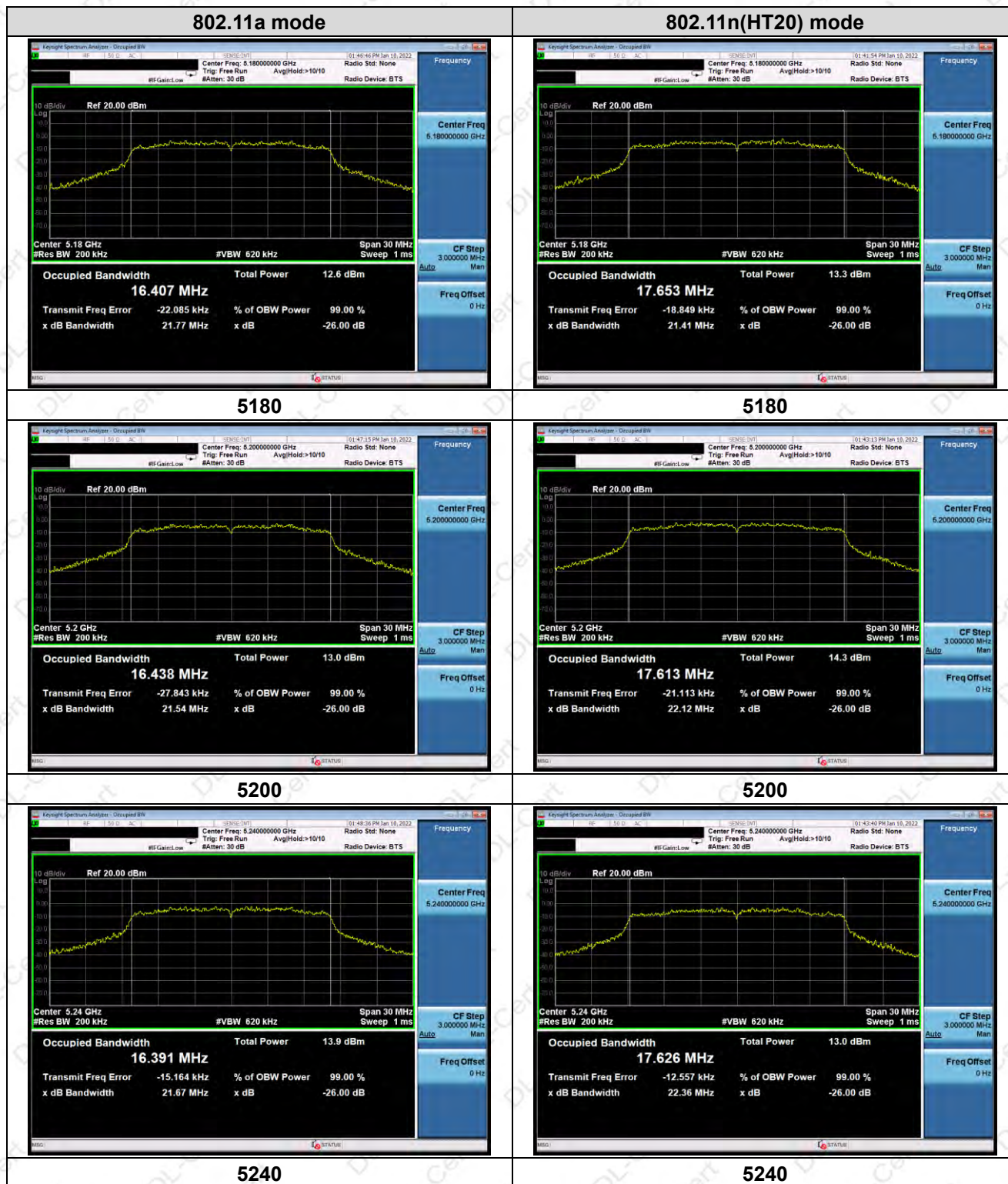
5240

**802.11ac(HT20) mode****5180****5200****5240**

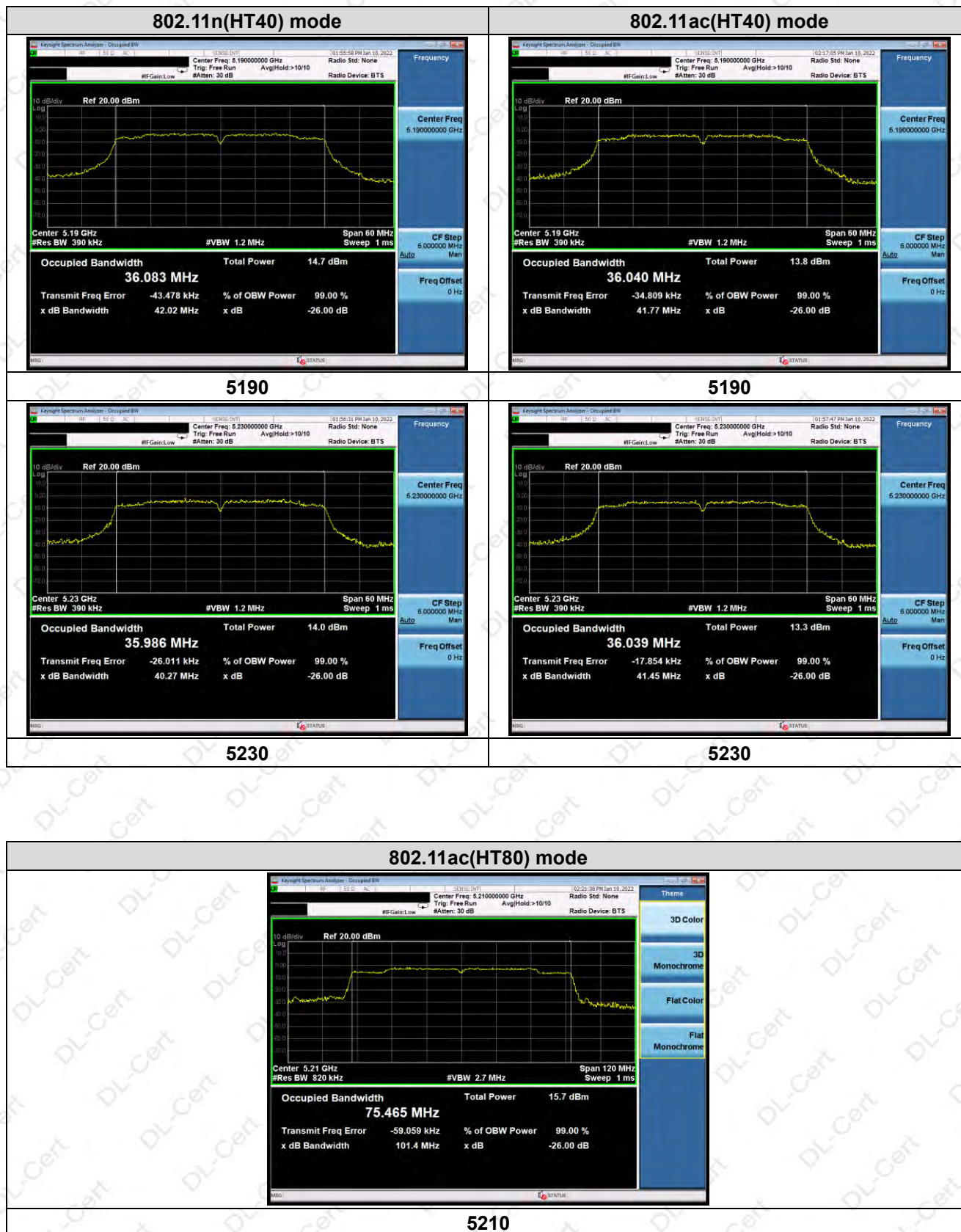




Ant 2:



**802.11ac(HT20) mode****5180****5200****5240**



**B4****Ant 1:**

Test CH	Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	14.73	15.14	15.02	35.16	35.17	-	>500	Pass
Middle	15.14	15.15	15.11	-	-	75.26		
Highest	15.12	15.07	15.08	35.16	35.15	-		

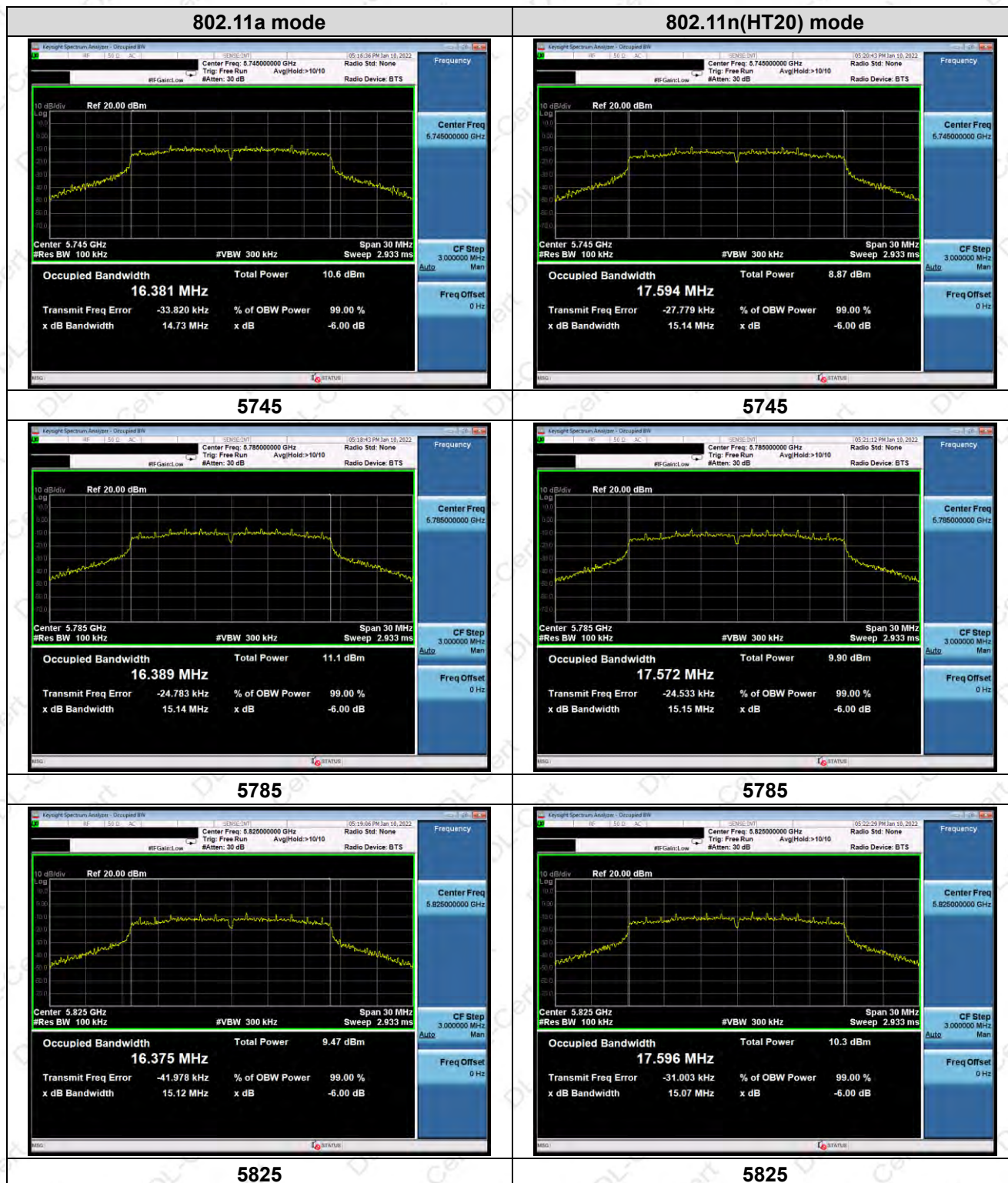
Ant 2:

Test CH	Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	14.29	15.12	15.14	35.12	35.17	-	>500	Pass
Middle	15.06	15.08	15.15	-	-	75.26		
Highest	15.14	15.04	15.14	33.86	35.16	-		

Remark: "---" is not applicable



Ant 1:

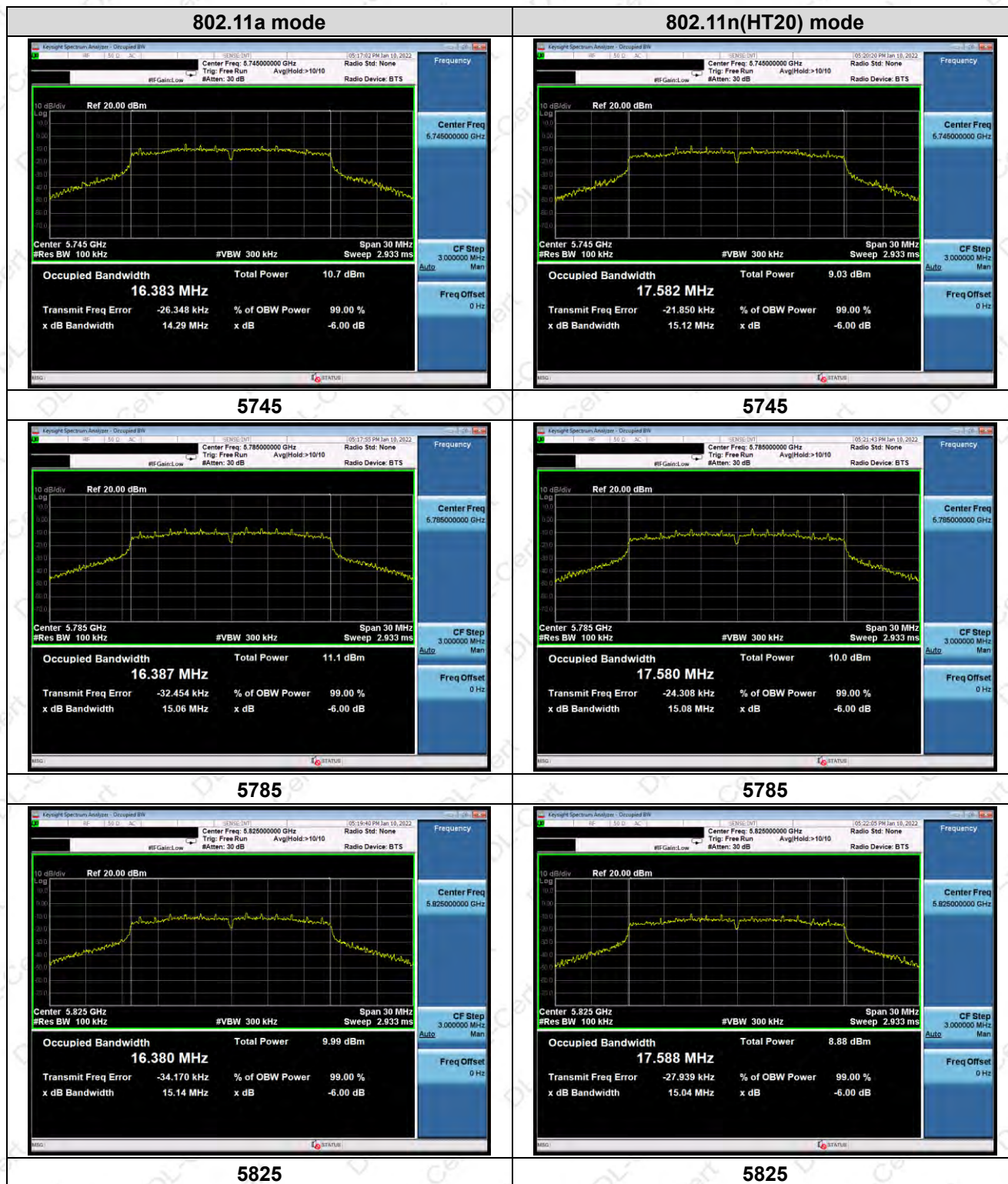


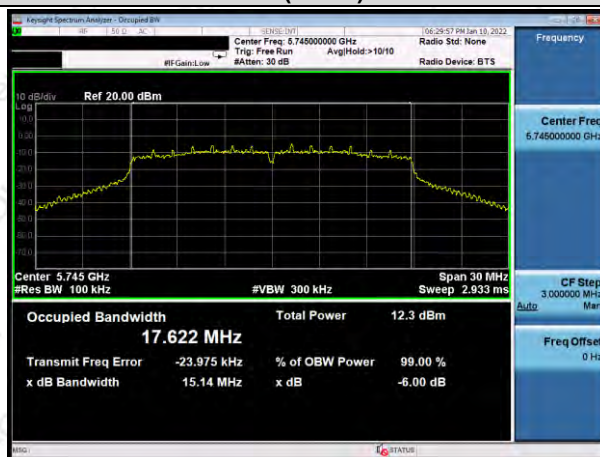
**802.11ac(HT20) mode****5745****5785****5825**





Ant 2:



**802.11ac(HT20) mode****5745****5785****5825**





7. DUTY CYCLE TEST SIGNAL

7.1 APPLIED PROCEDURES / LIMIT

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

7.1.1 TEST PROCEDURE

1. Set RBW = 1 MHz.
2. Set the video bandwidth (VBW) $\geq$ RBW.
3. Detector = Peak.
4. Sweep = auto couple.
5. Allow the trace to stabilize.
6. Span=0

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

**7.1.5 TEST RESULTS**

Ant1

Operation Mode		Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 1	802.11a	96.7	0.15
	802.11n(HT20)	89.61	0.48
	802.11n(HT40)	94.16	0.26
	802.11ac(HT20)	96.91	0.14
	802.11ac(HT40)	94.03	0.27
	802.11ac(HT80)	88.83	0.51
Band 4	802.11a	96.81	0.14
	802.11n(HT20)	89.68	0.47
	802.11n(HT40)	94.16	0.26
	802.11ac(HT20)	96.93	0.14
	802.11ac(HT40)	94.05	0.27
	802.11ac(HT80)	88.87	0.51

Ant2

Operation Mode		Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 1	802.11a	97	0.13
	802.11n(HT20)	89.75	0.47
	802.11n(HT40)	94.14	0.26
	802.11ac(HT20)	96.9	0.14
	802.11ac(HT40)	94.01	0.27
	802.11ac(HT80)	88.72	0.52
Band 4	802.11a	97	0.13
	802.11n(HT20)	89.79	0.47
	802.11n(HT40)	94.16	0.26
	802.11ac(HT20)	96.88	0.14
	802.11ac(HT40)	93.64	0.29
	802.11ac(HT80)	88.88	0.51

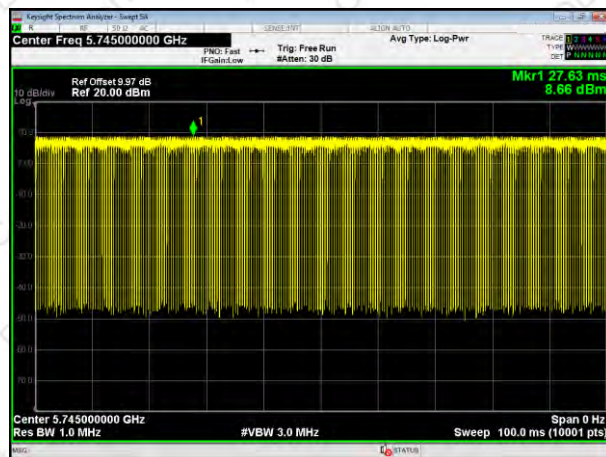


Ant1

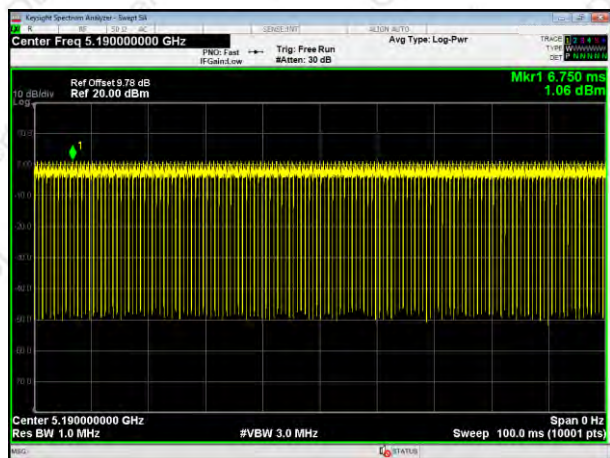
802.11a



802.11n HT20

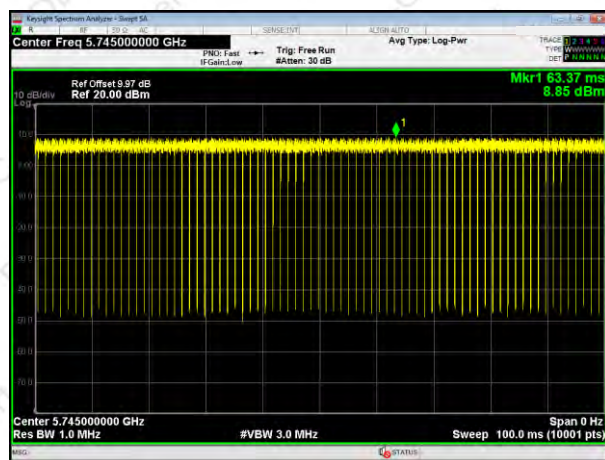


802.11n HT40

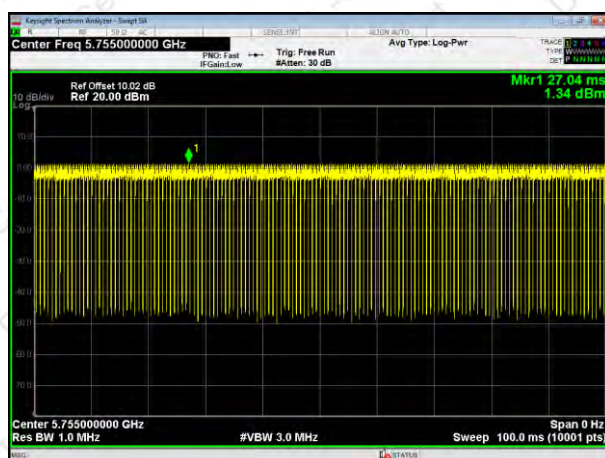
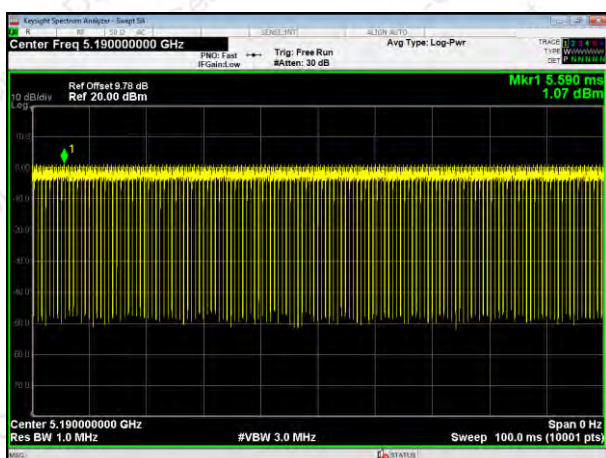




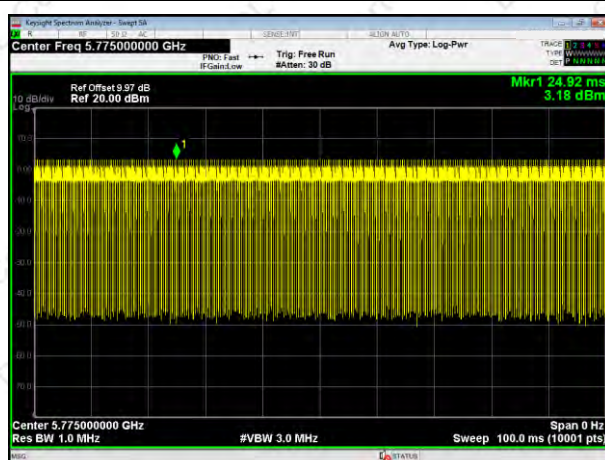
802.11ac HT20



802.11ac HT40



802.11ac HT80



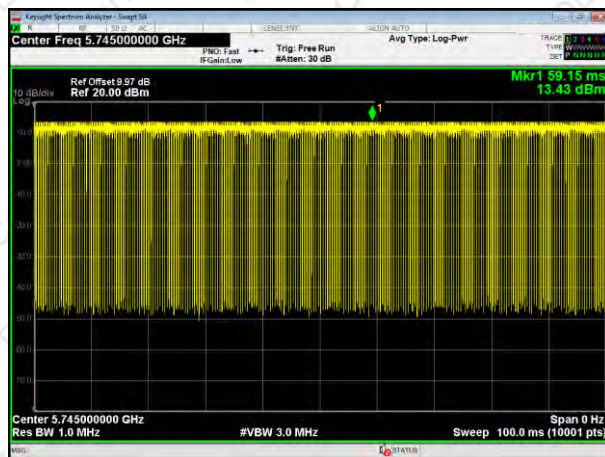
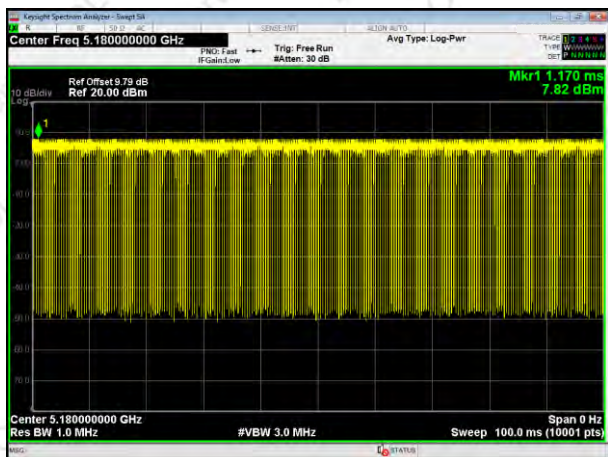


Ant2

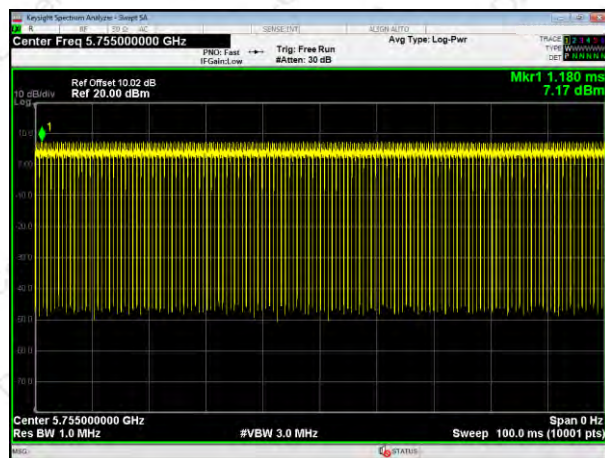
802.11a



802.11n HT20

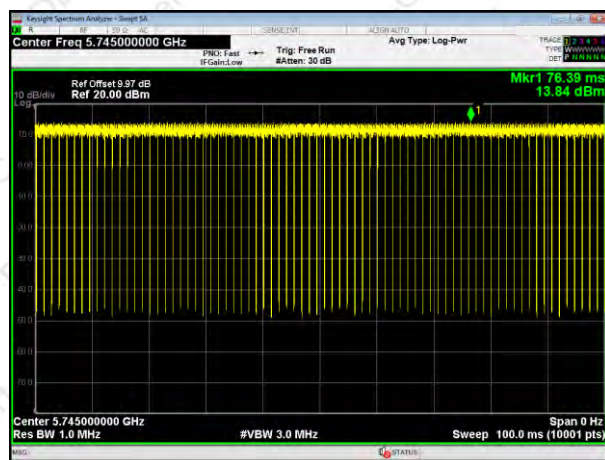


802.11n HT40

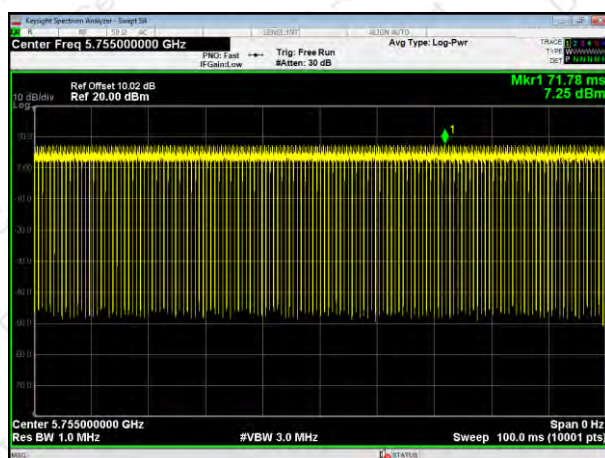
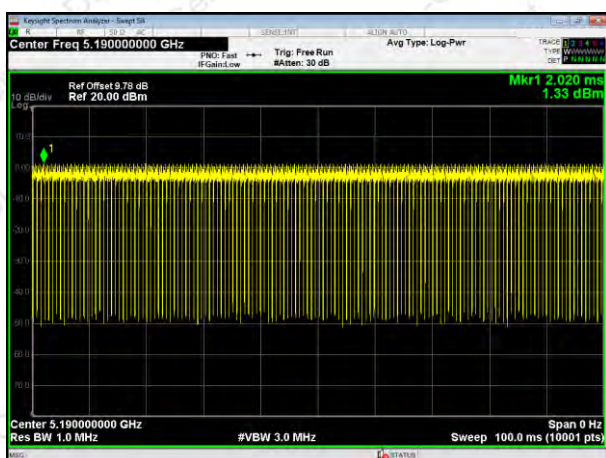




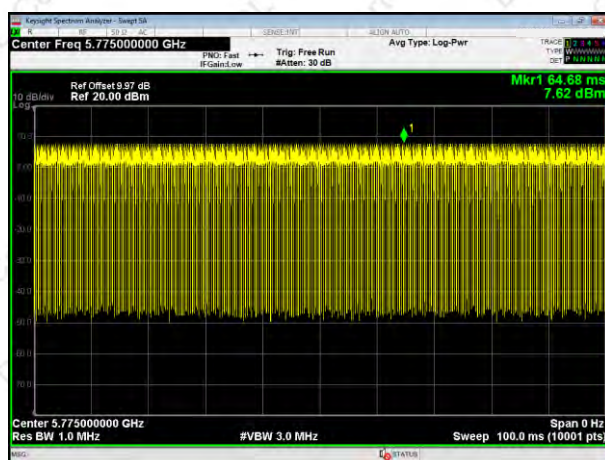
802.11ac HT20



802.11ac HT40



802.11ac HT80





8. FREQUENCY STABILITY

8.1 APPLIED PROCEDURES / 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.

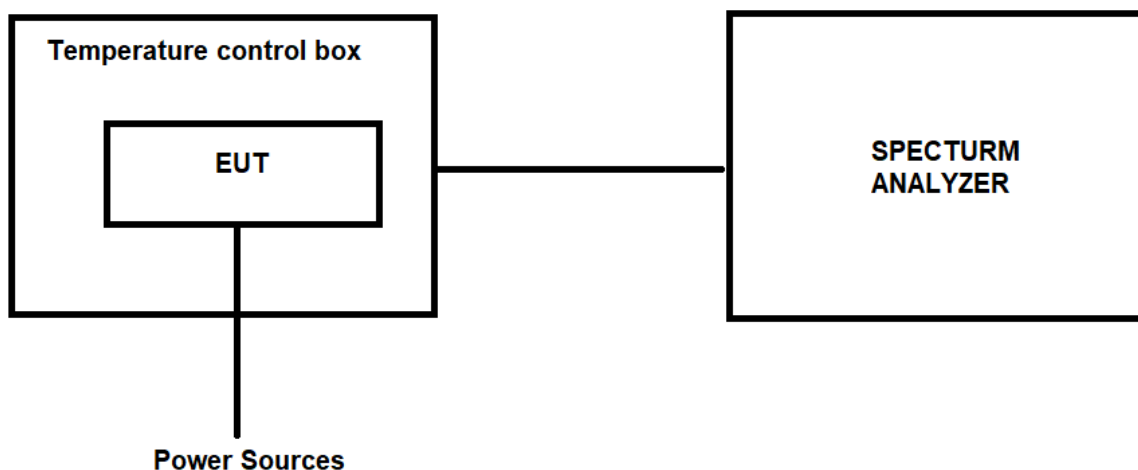
8.1.1 TEST PROCEDURE

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.

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



8.1.5 TEST RESULTS

ANT1

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)			Δ Frequency (MHz)		
			802.11a	802.11n HT20	802.11ac HT20	802.11a	802.11n HT20	802.11ac HT20
5.5V	-20℃	5180.000	5180.0308	5180.0310	5180.0347	-0.0308	-0.0310	-0.0347
		5220.000	5220.0299	5220.0335	5220.0295	-0.0299	-0.0335	-0.0295
		5240.000	5240.0217	5240.0220	5240.0269	-0.0217	-0.0220	-0.0269
		5745.000	5745.0311	5745.0341	5745.0319	-0.0311	-0.0341	-0.0319
		5785.000	5785.0331	5785.0310	5785.0337	-0.0331	-0.0310	-0.0337
		5825.000	5825.0346	5825.0329	5825.0309	-0.0346	-0.0329	-0.0309
4.5V	-20℃	5180.000	5180.0242	5180.0260	5180.0231	-0.0242	-0.0260	-0.0231
		5220.000	5220.0298	5220.0336	5220.0307	-0.0298	-0.0336	-0.0307
		5240.000	5240.0247	5240.0212	5240.0231	-0.0247	-0.0212	-0.0231
		5745.000	5745.0238	5745.0200	5745.0206	-0.0238	-0.0200	-0.0206
		5785.000	5785.0309	5785.0334	5785.0357	-0.0309	-0.0334	-0.0357
		5825.000	5825.0468	5825.0420	5825.0409	-0.0468	-0.0420	-0.0409
5.0V	25℃	5180.000	5180.0525	5180.0518	5180.0529	-0.0525	-0.0518	-0.0529
		5220.000	5220.0251	5220.0248	5220.0220	-0.0251	-0.0248	-0.0220
		5240.000	5240.0336	5240.0300	5240.0332	-0.0336	-0.0300	-0.0332
		5745.000	5745.0335	5745.0367	5745.0309	-0.0335	-0.0367	-0.0309
		5785.000	5785.0446	5785.0439	5785.0440	-0.0446	-0.0439	-0.0440
		5825.000	5825.0201	5825.0236	5825.0239	-0.0201	-0.0236	-0.0239
5.5V	50℃	5180.000	5180.0336	5180.0365	5180.0320	-0.0336	-0.0365	-0.0320
		5220.000	5220.0220	5220.0199	5220.0198	-0.0220	-0.0199	-0.0198
		5240.000	5240.0328	5240.0316	5240.0350	-0.0328	-0.0316	-0.0350
		5745.000	5745.0635	5745.0635	5745.0619	-0.0635	-0.0635	-0.0619
		5785.000	5785.0416	5785.0438	5785.0435	-0.0416	-0.0438	-0.0435
		5825.000	5825.0657	5825.0646	5825.0630	-0.0657	-0.0646	-0.0630
4.5V	50℃	5180.000	5180.0336	5180.0298	5180.0340	-0.0336	-0.0298	-0.0340
		5220.000	5220.0220	5220.0280	5220.0217	-0.0220	-0.0280	-0.0217
		5240.000	5240.0325	5240.0311	5240.0331	-0.0325	-0.0311	-0.0331
		5745.000	5745.0446	5745.0446	5745.0439	-0.0446	-0.0446	-0.0439
		5785.000	5785.0201	5785.0197	5785.0222	-0.0201	-0.0197	-0.0222
		5825.000	5825.0719	5825.0741	5825.0754	-0.0719	-0.0741	-0.0754



ANT1

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)		Δ Frequency (MHz)	
			802.11n HT40	802.11ac HT40	802.11n HT40	802.11ac HT40
5.5V	-20℃	5190.000	5190.0231	5190.0247	-0.0231	-0.0247
		5230.000	5230.0310	5230.0298	-0.0310	-0.0298
		5755.000	5755.0497	5755.0546	-0.0497	-0.0546
		5795.000	5795.0619	5795.0641	-0.0619	-0.0641
4.5V		5190.000	5190.0236	5190.0228	-0.0236	-0.0228
		5230.000	5230.0328	5230.0347	-0.0328	-0.0347
		5755.000	5755.0246	5755.0616	-0.0246	-0.0616
		5795.000	5795.0401	5795.0468	-0.0401	-0.0468
5.0V	25℃	5190.000	5190.0247	5190.0231	-0.0247	-0.0231
		5230.000	5230.0631	5230.0647	-0.0631	-0.0647
		5755.000	5755.0219	5755.0241	-0.0219	-0.0241
		5795.000	5795.0497	5795.0530	-0.0497	-0.0530
5.5V	50℃	5190.000	5190.0636	5190.0639	-0.0636	-0.0639
		5230.000	5230.0550	5230.0547	-0.0550	-0.0547
		5755.000	5755.0430	5755.0438	-0.0430	-0.0438
		5795.000	5795.0319	5795.0311	-0.0319	-0.0311
4.5V	50℃	5190.000	5190.0536	5190.0531	-0.0536	-0.0531
		5230.000	5230.0331	5230.0340	-0.0331	-0.0340
		5755.000	5755.0319	5755.0311	-0.0319	-0.0311
		5795.000	5795.0411	5795.0439	-0.0411	-0.0439

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
			802.11ac HT80	802.11ac HT80
5.5V	-20℃	5210.000	5210.0140	-0.0140
		5775.000	5775.0124	-0.0124
4.5V		5210.000	5210.0219	-0.0219
		5775.000	5775.0319	-0.0319
5.0V	25℃	5210.000	5210.0436	-0.0436
		5775.000	5775.0394	-0.0394
5.5V	50℃	5210.000	5210.0320	-0.0320
		5775.000	5775.0231	-0.0231
4.5V	50℃	5210.000	5210.0340	-0.0340
		5775.000	5775.0546	-0.0546



ANT2

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)			Δ Frequency (MHz)		
			802.11a	802.11n HT20	802.11ac HT20	802.11a	802.11n HT20	802.11ac HT20
5.5V	-20℃	5180.000	5180.0288	5180.0290	5180.0327	-0.0288	-0.0290	-0.0327
		5220.000	5220.0278	5220.0314	5220.0274	-0.0278	-0.0314	-0.0274
		5240.000	5240.0196	5240.0199	5240.0248	-0.0196	-0.0199	-0.0248
		5745.000	5745.0288	5745.0318	5745.0296	-0.0288	-0.0318	-0.0296
		5785.000	5785.0308	5785.0287	5785.0314	-0.0308	-0.0287	-0.0314
		5825.000	5825.0322	5825.0305	5825.0285	-0.0322	-0.0305	-0.0285
4.5V	-20℃	5180.000	5180.0222	5180.0240	5180.0211	-0.0222	-0.0240	-0.0211
		5220.000	5220.0277	5220.0315	5220.0286	-0.0277	-0.0315	-0.0286
		5240.000	5240.0226	5240.0191	5240.0210	-0.0226	-0.0191	-0.0210
		5745.000	5745.0215	5745.0177	5745.0183	-0.0215	-0.0177	-0.0183
		5785.000	5785.0286	5785.0311	5785.0334	-0.0286	-0.0311	-0.0334
		5825.000	5825.0444	5825.0396	5825.0385	-0.0444	-0.0396	-0.0385
5.0V	25℃	5180.000	5180.0505	5180.0498	5180.0509	-0.0505	-0.0498	-0.0509
		5220.000	5220.0230	5220.0227	5220.0199	-0.0230	-0.0227	-0.0199
		5240.000	5240.0315	5240.0279	5240.0311	-0.0315	-0.0279	-0.0311
		5745.000	5745.0312	5745.0344	5745.0286	-0.0312	-0.0344	-0.0286
		5785.000	5785.0423	5785.0416	5785.0417	-0.0423	-0.0416	-0.0417
		5825.000	5825.0177	5825.0212	5825.0215	-0.0177	-0.0212	-0.0215
5.5V	50℃	5180.000	5180.0316	5180.0345	5180.0300	-0.0316	-0.0345	-0.0300
		5220.000	5220.0199	5220.0178	5220.0177	-0.0199	-0.0178	-0.0177
		5240.000	5240.0307	5240.0295	5240.0329	-0.0307	-0.0295	-0.0329
		5745.000	5745.0612	5745.0612	5745.0596	-0.0612	-0.0612	-0.0596
		5785.000	5785.0393	5785.0415	5785.0412	-0.0393	-0.0415	-0.0412
		5825.000	5825.0633	5825.0622	5825.0606	-0.0633	-0.0622	-0.0606
4.5V	50℃	5180.000	5180.0316	5180.0278	5180.0320	-0.0316	-0.0278	-0.0320
		5220.000	5220.0199	5220.0259	5220.0196	-0.0199	-0.0259	-0.0196
		5240.000	5240.0304	5240.0290	5240.0310	-0.0304	-0.0290	-0.0310
		5745.000	5745.0423	5745.0423	5745.0416	-0.0423	-0.0423	-0.0416
		5785.000	5785.0178	5785.0174	5785.0199	-0.0178	-0.0174	-0.0199
		5825.000	5825.0695	5825.0717	5825.0730	-0.0695	-0.0717	-0.0730



ANT2

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)		Δ Frequency (MHz)	
			802.11n HT40	802.11ac HT40	802.11n HT40	802.11ac HT40
5.5V	-20℃	5190.000	5190.0211	5190.0227	-0.0211	-0.0227
		5230.000	5230.0289	5230.0277	-0.0289	-0.0277
		5755.000	5755.0474	5755.0523	-0.0474	-0.0523
		5795.000	5795.0595	5795.0617	-0.0595	-0.0617
4.5V		5190.000	5190.0216	5190.0208	-0.0216	-0.0208
		5230.000	5230.0307	5230.0326	-0.0307	-0.0326
		5755.000	5755.0223	5755.0593	-0.0223	-0.0593
		5795.000	5795.0377	5795.0444	-0.0377	-0.0444
5.0V	25℃	5190.000	5190.0227	5190.0211	-0.0227	-0.0211
		5230.000	5230.0610	5230.0626	-0.0610	-0.0626
		5755.000	5755.0196	5755.0218	-0.0196	-0.0218
		5795.000	5795.0473	5795.0506	-0.0473	-0.0506
5.5V	50℃	5190.000	5190.0616	5190.0619	-0.0616	-0.0619
		5230.000	5230.0529	5230.0526	-0.0529	-0.0526
		5755.000	5755.0407	5755.0415	-0.0407	-0.0415
		5795.000	5795.0295	5795.0287	-0.0295	-0.0287
4.5V	50℃	5190.000	5190.0516	5190.0511	-0.0516	-0.0511
		5230.000	5230.0310	5230.0319	-0.0310	-0.0319
		5755.000	5755.0296	5755.0288	-0.0296	-0.0288
		5795.000	5795.0387	5795.0415	-0.0387	-0.0415

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
			802.11ac HT80	802.11ac HT80
5.5V	-20℃	5210.000	5210.0120	-0.0120
		5775.000	5775.0101	-0.0101
4.5V		5210.000	5210.0199	-0.0199
		5775.000	5775.0296	-0.0296
5.0V	25℃	5210.000	5210.0416	-0.0416
		5775.000	5775.0371	-0.0371
5.5V	50℃	5210.000	5210.0300	-0.0300
		5775.000	5775.0208	-0.0208
4.5V	50℃	5210.000	5210.0320	-0.0320
		5775.000	5775.0523	-0.0523



9. TRANSMISSION IN THE ABSENCE OF DATA

9.1 STANDARD REQUIREMENT

According to §15.407(c)

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 signaling 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.

9.2 TEST RESULT

No non-compliance noted:
Refer to the theory of operation.

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

10.2 EUT ANTENNA

The EUT antenna is internal antenna, It comply with the standard requirement.



11. TEST SEUUP PHOTO

Please see annex setup photos

12. EUT PHOTO

Please see annex external and internal photos

***** END OF REPORT *****