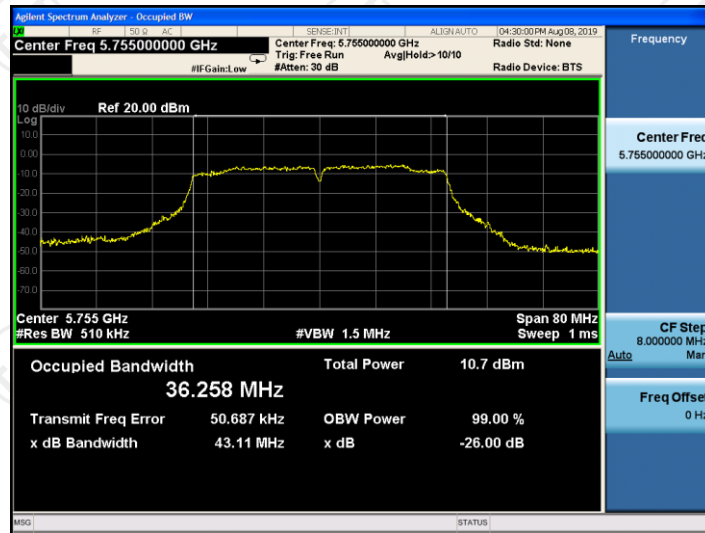
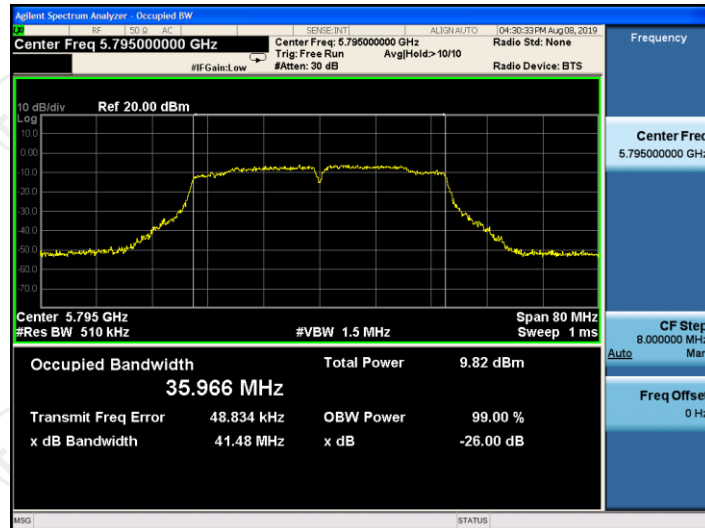


11n(HT40)

CH151

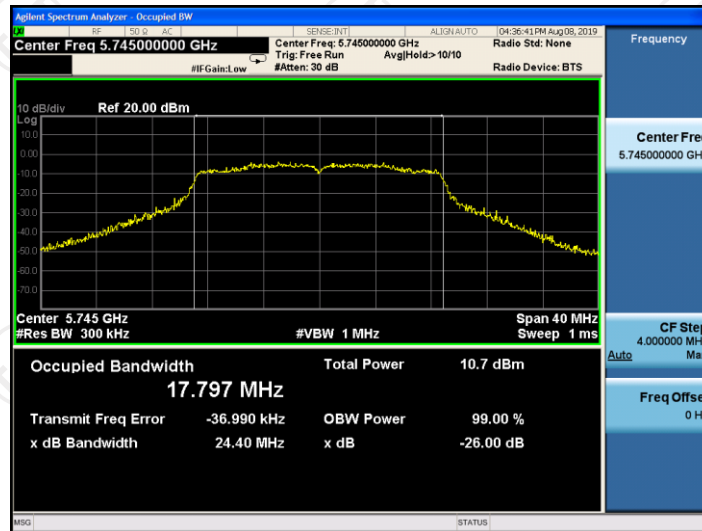


CH159

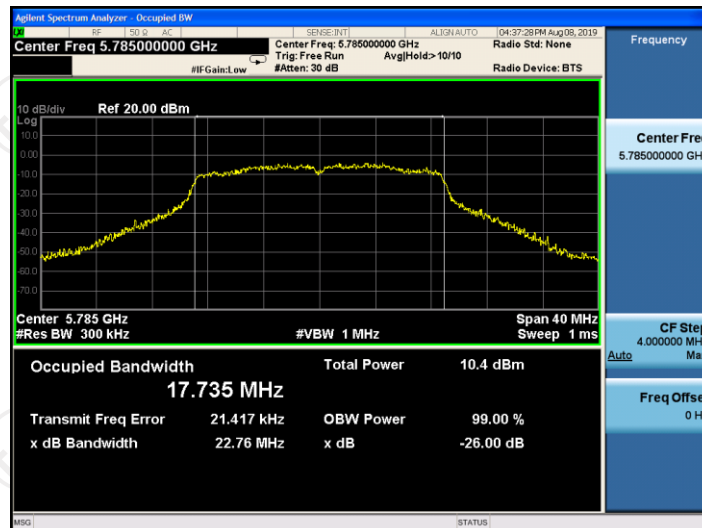


11ac(VHT20)

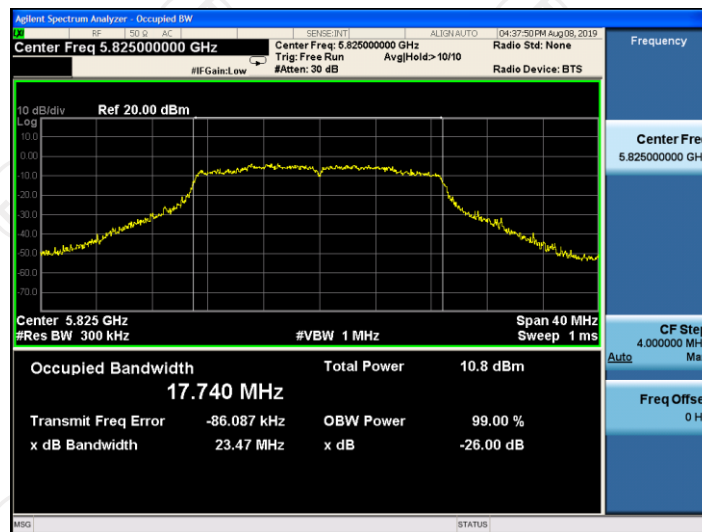
CH149



CH157

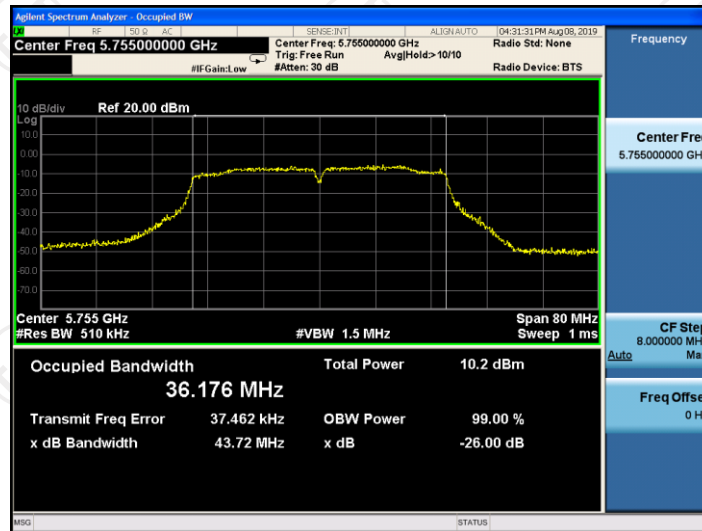


CH165

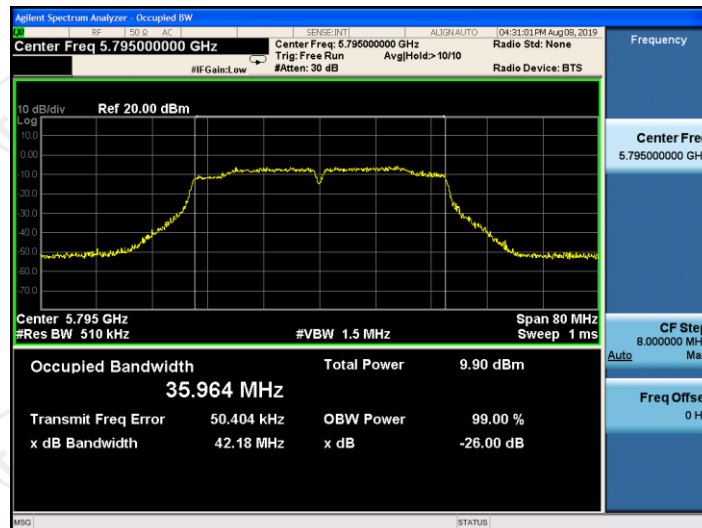


11ac(VHT40)

CH151

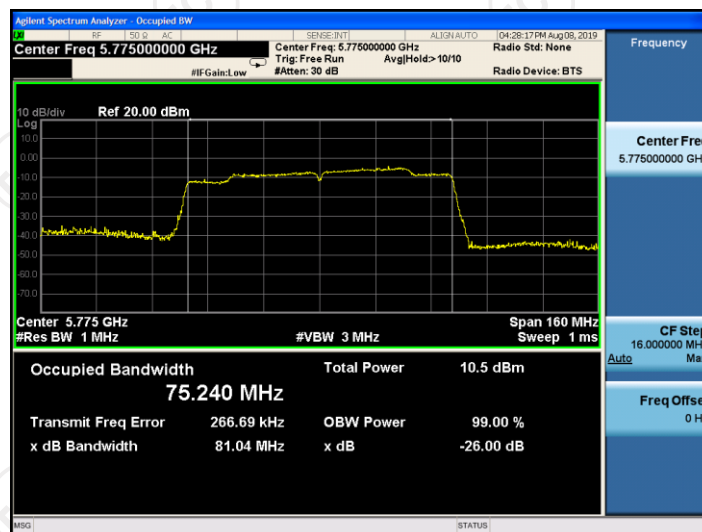


CH159



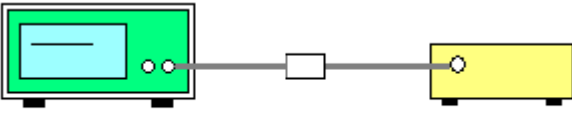
11ac(VHT80)

CH155



6.6. Power Spectral Density

6.6.1. Test Specification

Test Requirement:	FCC Part15 E Section 15.407 (a)
Test Method:	KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section F
Limit:	≤30.00dBm/500KHz for Band 3 5725MHz-5850MHz
Test Setup:	 <p style="text-align: center;">Spectrum Analyzer EUT</p>
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none"> 1. Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth. 1. Set RBW = 510 kHz/1 MHz, VBW ≥ 3*RBW, Sweep time = Auto, Detector = RMS. 2. Allow the sweeps to continue until the trace stabilizes. 3. Use the peak marker function to determine the maximum amplitude level. 4. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.
Test Result:	PASS

6.6.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100619	Sep. 20, 2019
RF Cable (9KHz-40GHz)	TCT	RE-03	N/A	Sep. 20, 2019
Antenna Connector	TCT	RFC-03	N/A	Sep. 20, 2019

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.6.3. Test data

Configuration Band 3(5745-5825MHz) / Antenna 0+Antenna 1						
Mode	Test channel	Power Spectral Density			Limit (dBm/MHz)	Result
		Ant0	Ant1	Total		
11a	CH52	2.484	1.937	/	30	PASS
11a	CH60	1.430	1.428	/	30	PASS
11a	CH64	1.357	2.583	/	30	PASS
11n(HT20)	CH52	-2.025	-1.890	1.053	30	PASS
11n(HT20)	CH60	-0.925	-1.286	1.909	30	PASS
11n(HT20)	CH64	-0.211	-0.963	2.440	30	PASS
11n(HT40)	CH54	-4.756	-4.503	-1.617	30	PASS
11n(HT40)	CH62	-5.113	-4.132	-1.585	30	PASS
11ac(VHT20)	CH52	-0.411	-1.228	2.210	30	PASS
11ac(VHT20)	CH60	-1.414	-1.718	1.447	30	PASS
11ac(VHT20)	CH64	-1.045	-0.895	2.041	30	PASS
11ac(VHT40)	CH54	-4.723	-4.726	-1.714	30	PASS
11ac(VHT40)	CH62	-4.017	-3.704	-0.847	30	PASS
11ac(VHT80)	CH58	-6.199	-6.194	-3.186	30	PASS

Note: 1. In the MIMO mode, $G_{ANT}=2.7\text{dBi}$, Array Gain= $10\log(N_{ANT}/N_{SS})=3.01\text{dBi}$

Directional Gain= $G_{ANT} + \text{Array Gain}=5.71\text{dBi} < 6\text{dBi}$, so limit= 30dBm/MHz

2. The total PSD method used the sum spectra maxima across the outputs.

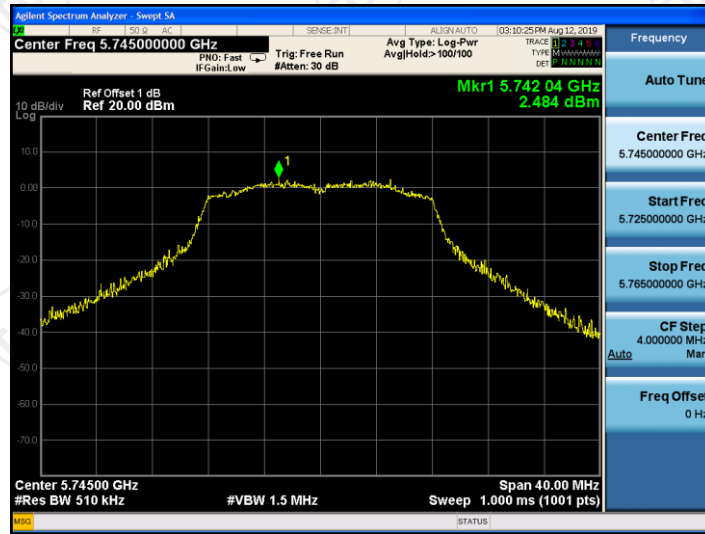
Test plots as follows:

ANT 0

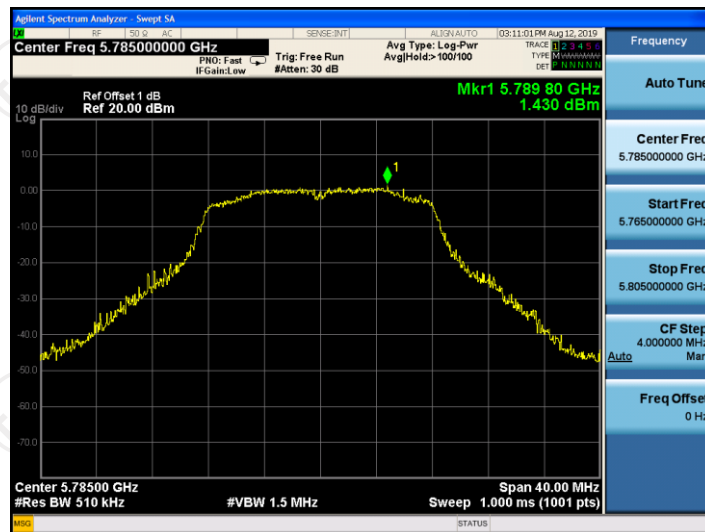
Band 3 (5745-5825MHz)

11a

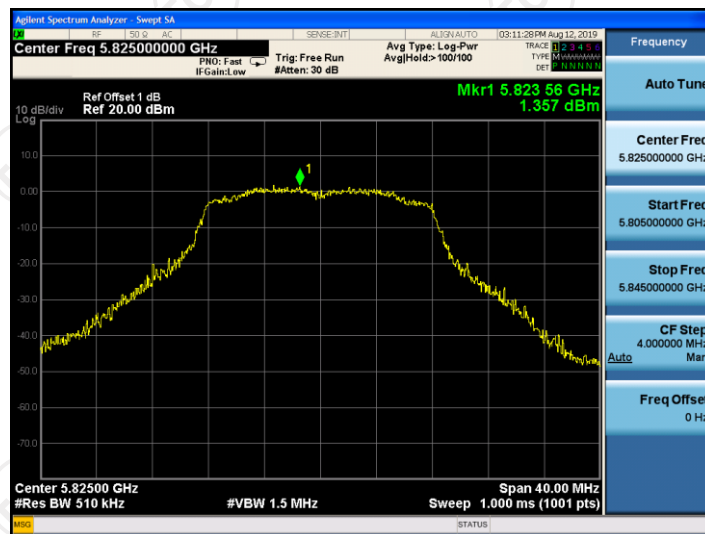
CH149



CH157

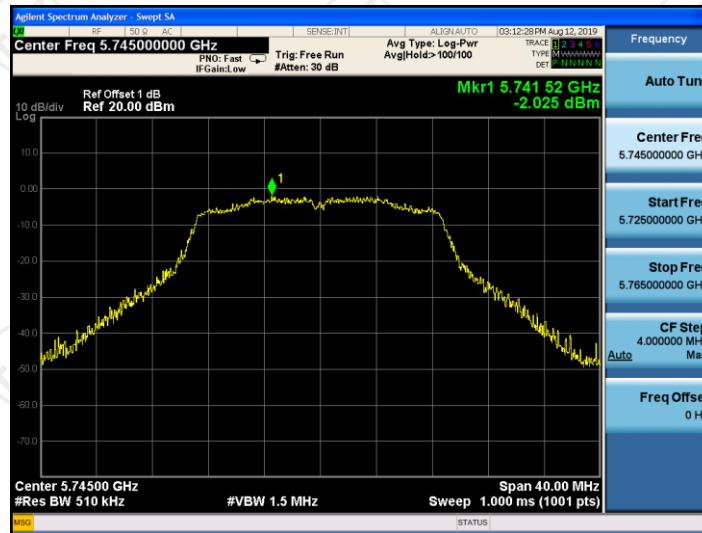


CH165

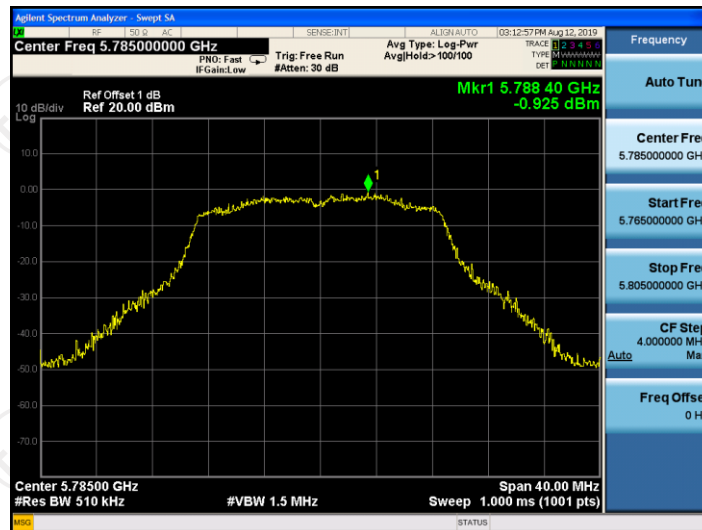


11n(HT20)

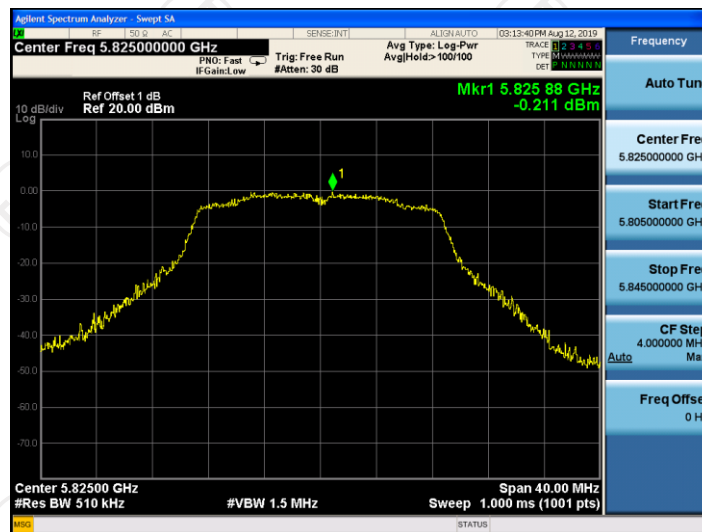
CH149



CH157

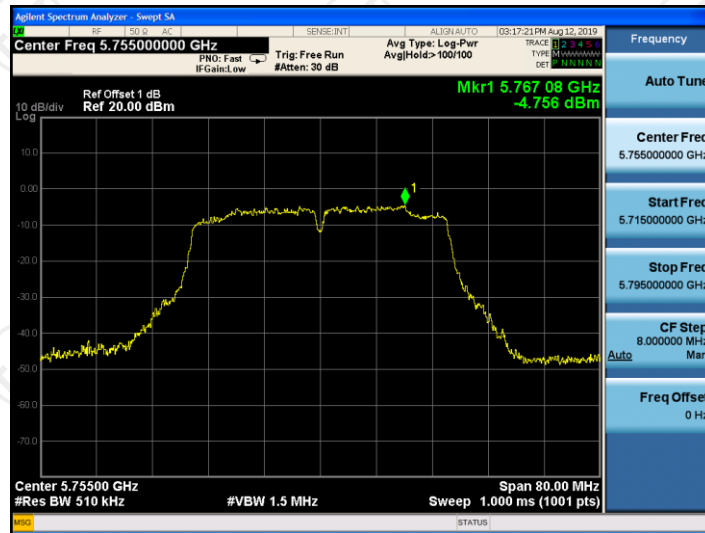


CH165

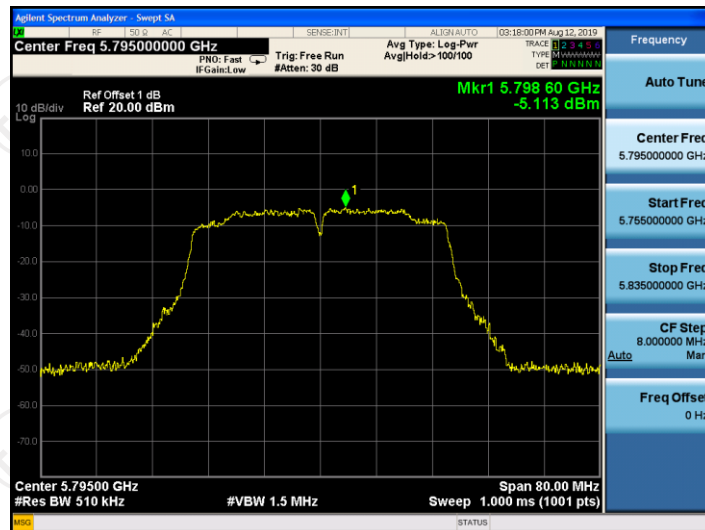


11n(HT40)

CH151

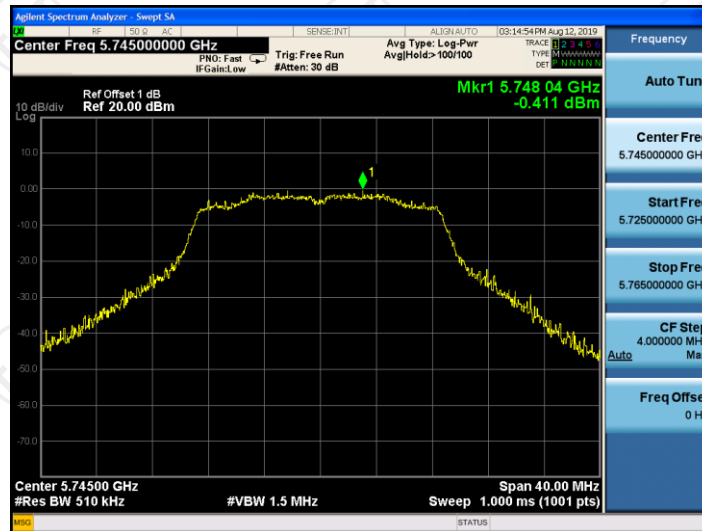


CH159

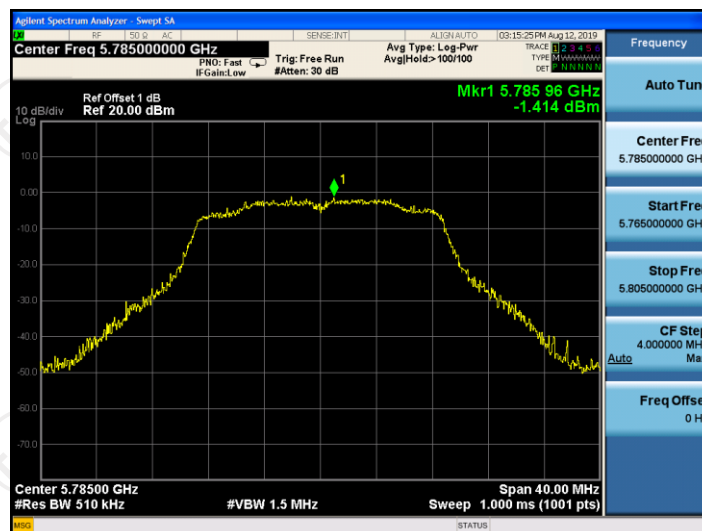


11ac(VHT20)

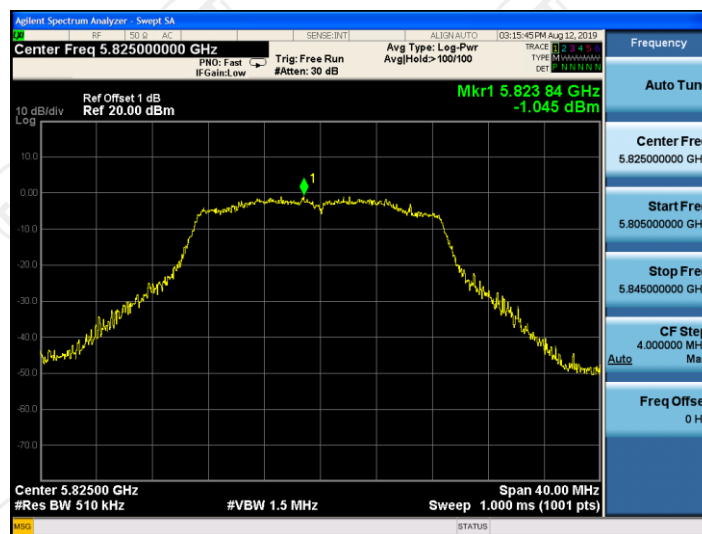
CH149



CH157

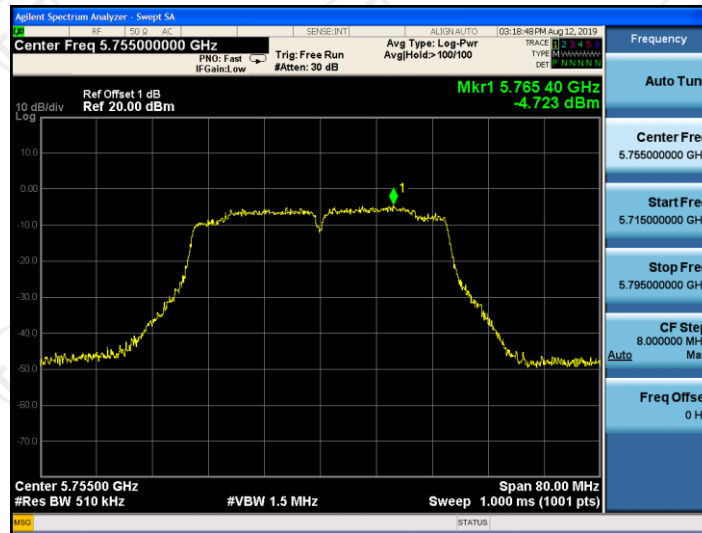


CH165

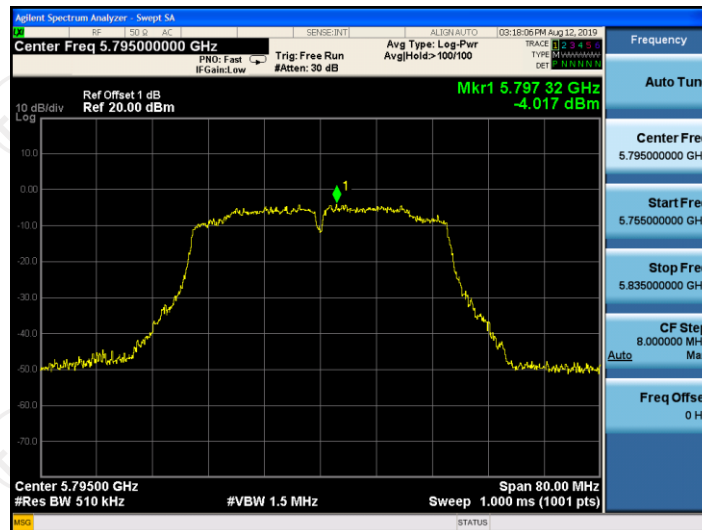


11ac(VHT40)

CH151

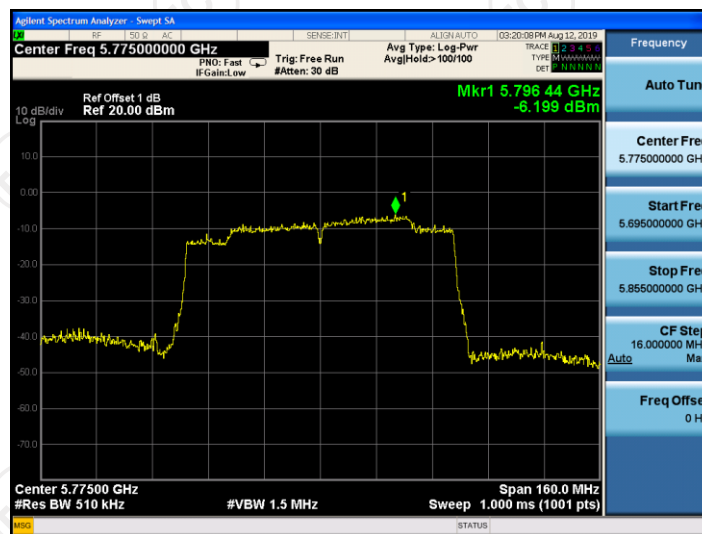


CH159



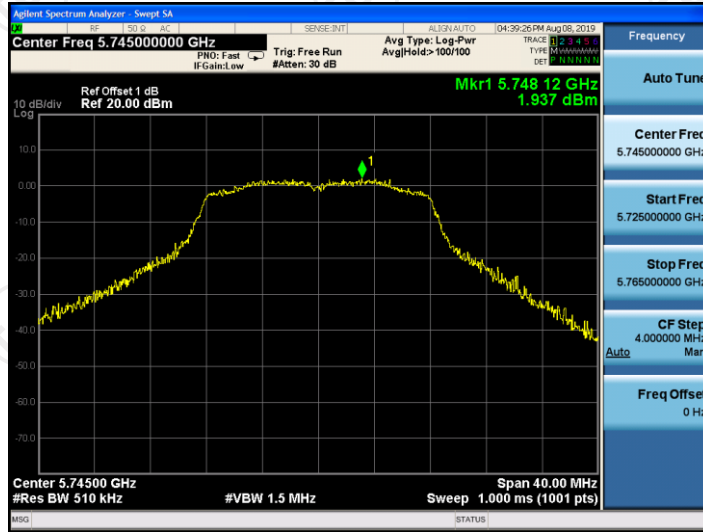
11ac(VHT80)

CH155

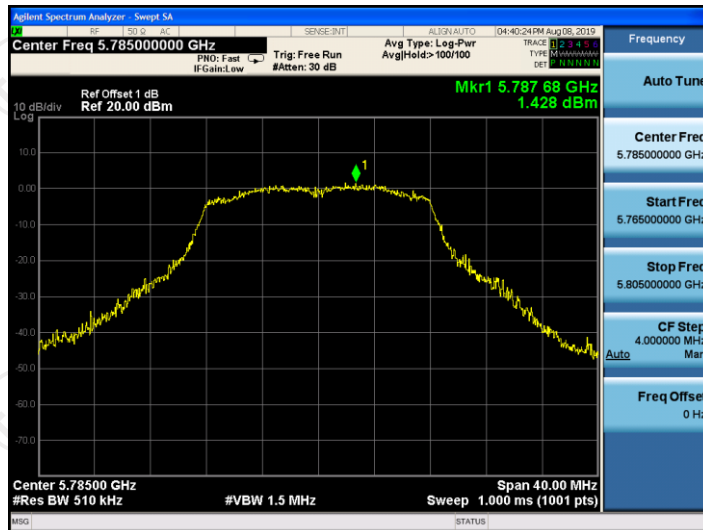


ANT 1
Band 3 (5745-5825MHz)
11a

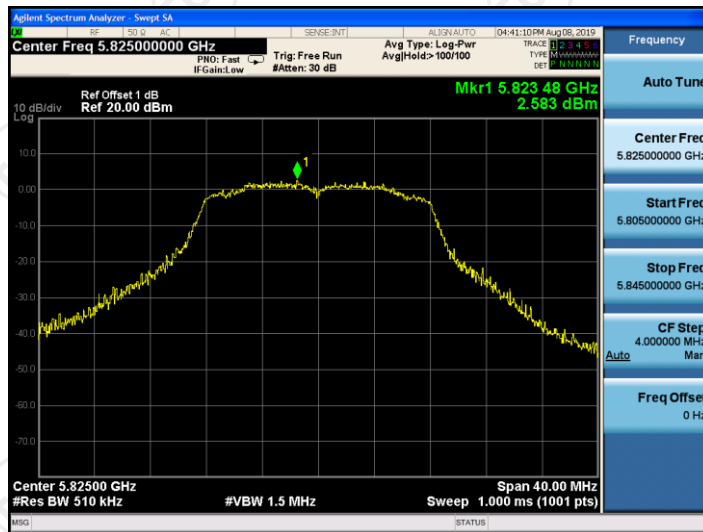
CH149



CH157

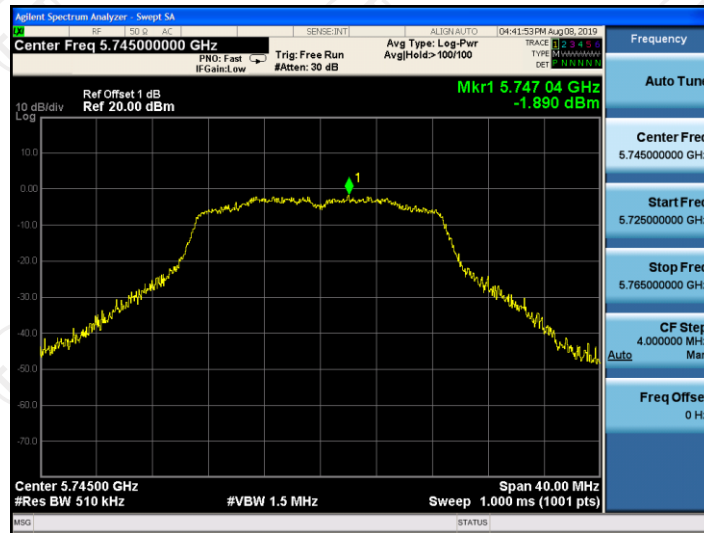


CH165

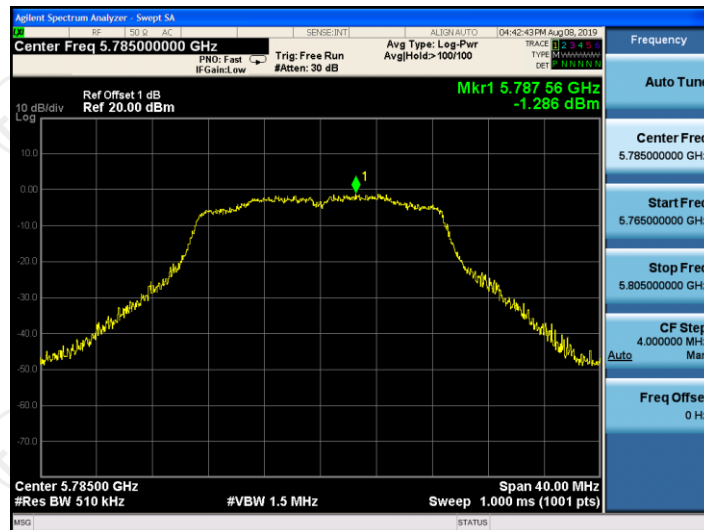


11n(HT20)

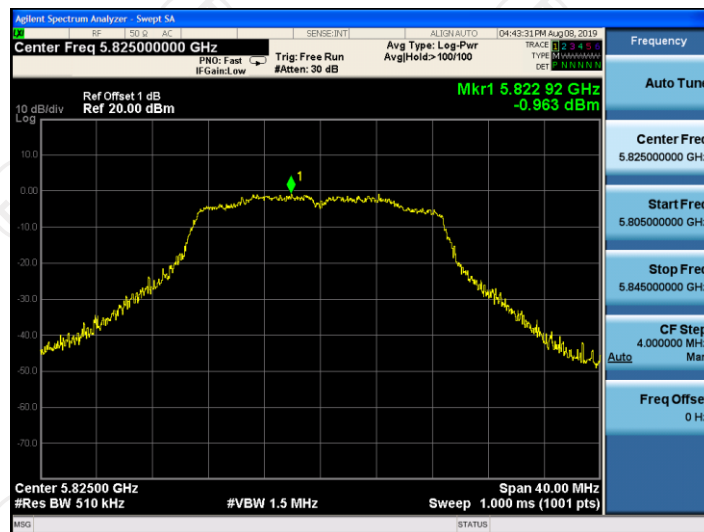
CH149



CH157

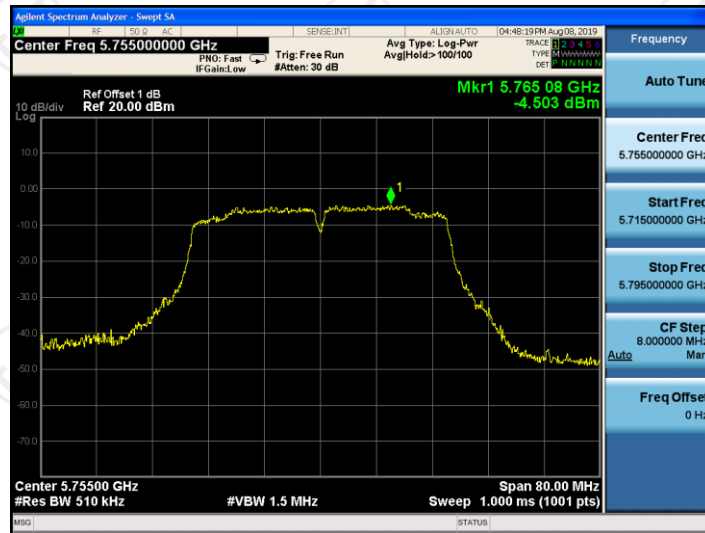


CH165

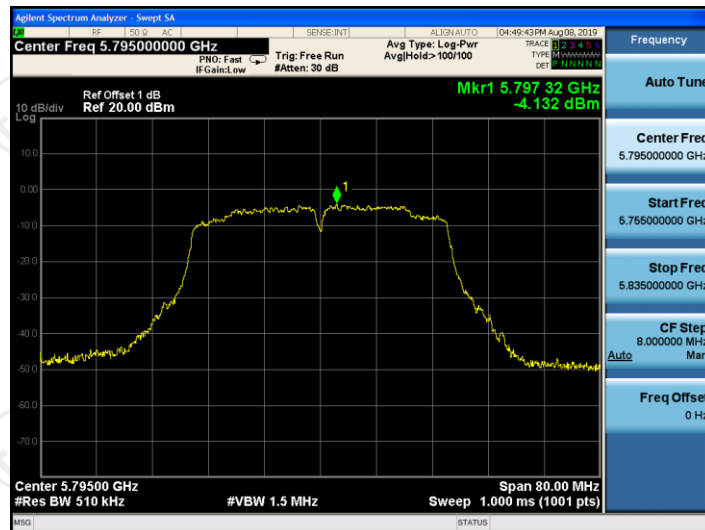


11n(HT40)

CH151

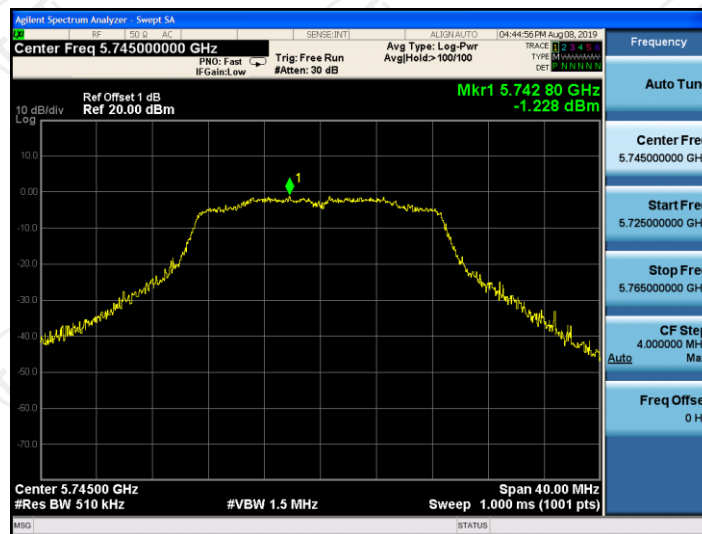


CH159

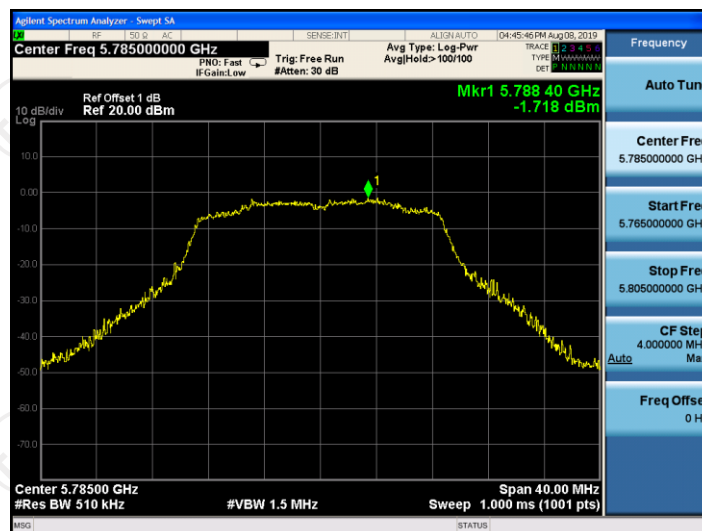


11ac(VHT20)

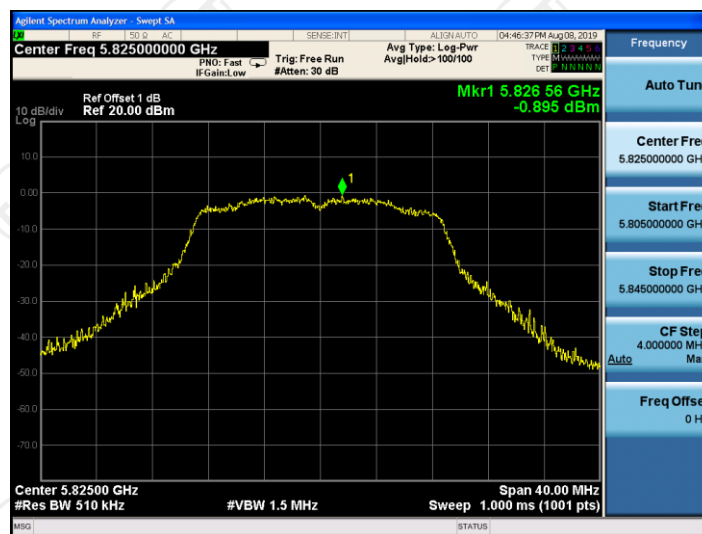
CH149



CH157

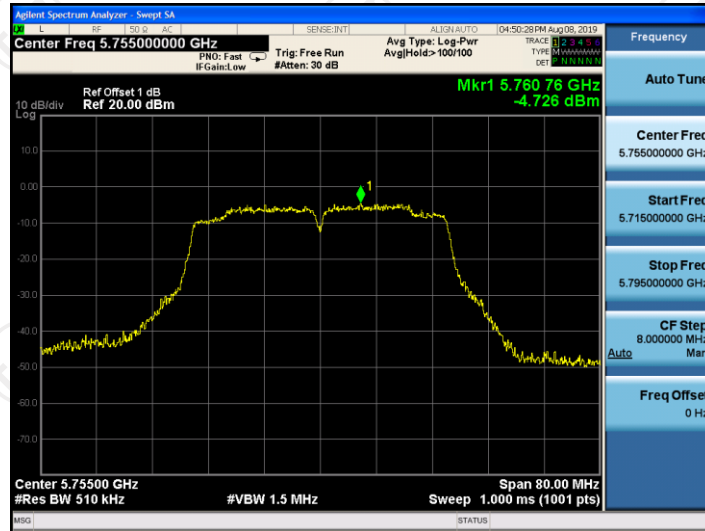


CH165

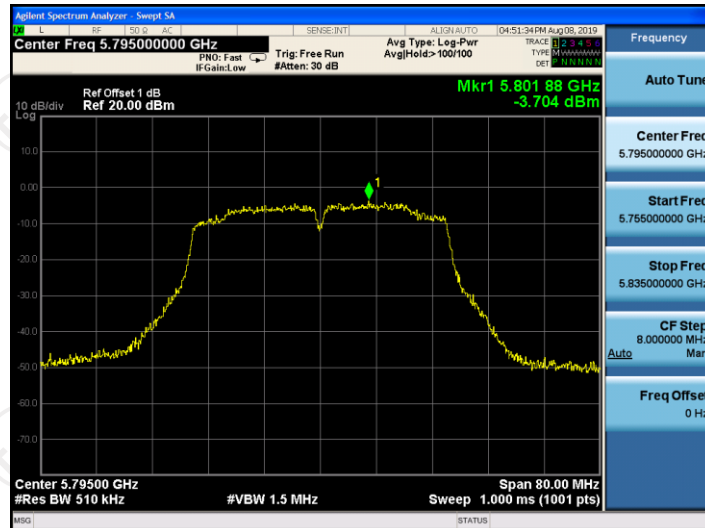


11ac(VHT40)

CH151



CH159



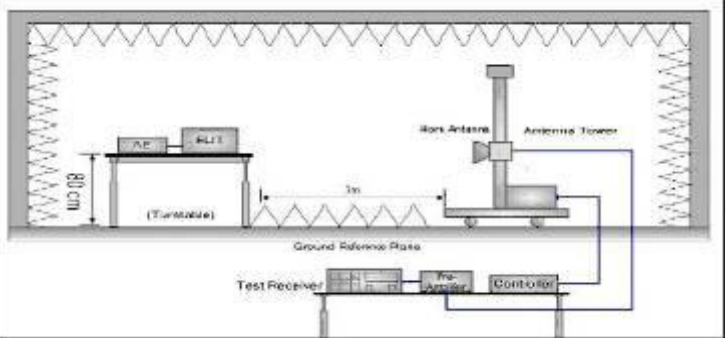
11ac(VHT80)

CH155



6.7. Band edge

6.7.1. Test Specification

Test Requirement:	FCC CFR47 Part 15E Section 15.407
Test Method:	ANSI C63.10 2013
Limit:	For Band 3(5715-5725MHz&5850-5860MHz): $E[dB\mu V/m] = EIRP[dBm] + 95.2 = 78.2 \text{ dB}\mu V/m$, for $EIRP(dBm) = -17\text{dBm}$; For Band 3(other un-restricted band): $E[dB\mu V/m] = EIRP[dBm] + 95.2 = 68.2 \text{ dB}\mu V/m$, for $EIRP(dBm) = -27\text{dBm}$
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasipeak or average method as specified and then reported in a data sheet.
Test Result:	PASS

6.7.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESIB7	100197	Sep. 17, 2019
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ40	200061	Sep. 20, 2019
Spectrum Analyzer	ROHDE&SCHW ARZ	FSP40	100056	Sep. 20, 2019
Spectrum Analyzer	Agilent	N9020A	MY4910061 9	Sep. 20, 2019
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 16, 2019
Pre-amplifier	HP	8447D	2727A05017	Sep. 16, 2019
Loop antenna	ZHINAN	ZN30900A	12024	Oct. 20, 2019
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 02, 2019
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Oct. 20, 2019
Horn Antenna	A-INFO	LB-180400-KF	J211020657	Sep. 16, 2019
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Sep. 16, 2019
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Sep. 16, 2019
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Sep. 16, 2019
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Sep. 16, 2019
Antenna Mast	Keleto	RE-AM	N/A	N/A
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.7.3. Test Data

802.11a	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 3	Lowest	5470	43.72	5.82	49.54	68.2	54	-4.46	H
		5470	38.21	5.82	44.03	68.2	54	-9.97	V
	Highest	5850	46.59	6.52	53.11	68.2	54	-0.89	H
		5850	42.64	6.52	49.16	68.2	54	-4.84	V
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor									

802.11n HT20	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 3	Lowest	5470	43.48	8.21	51.69	78.2	54	-2.31	H
		5470	43.25	8.21	51.46	78.2	54	-2.54	V
	Highest	5850	42.46	8.87	51.33	78.2	54	-2.67	H
		5850	40.91	8.87	49.78	78.2	54	-4.22	V
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor									

802.11n HT40	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 3	Lowest	5470	43.85	5.82	49.67	68.2	54	-4.33	H
		5470	38.37	5.82	44.19	68.2	54	-9.81	V
	Highest	5850	45.56	6.52	52.08	68.2	54	-1.92	H
		5850	42.84	6.52	49.36	68.2	54	-4.64	V
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor									

802.11ac HT20	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 3	Lowest	5470	43.04	8.21	51.25	78.2	54	-2.75	H
		5470	43.72	8.21	51.93	78.2	54	-2.07	V
	Highest	5850	42.26	8.87	51.13	78.2	54	-2.87	H
		5850	40.58	8.87	49.45	78.2	54	-4.55	V

Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor

802.11ac HT40	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 3	Lowest	5470	44.19	5.82	50.01	68.2	54	-3.99	H
		5470	38.54	5.82	44.36	68.2	54	-9.64	V
	Highest	5850	45.37	6.52	51.89	68.2	54	-2.11	H
		5850	43.71	6.52	50.23	68.2	54	-3.77	V

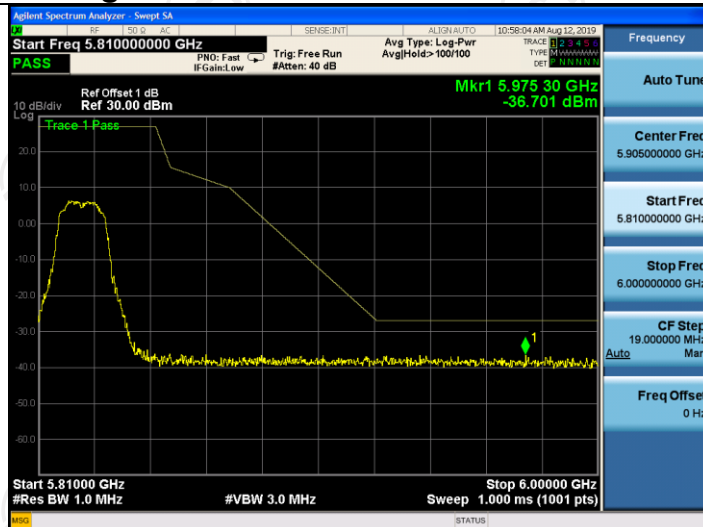
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor

802.11ac HT80	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band 3	Lowest	5470	43.57	8.21	51.78	78.2	54	-2.22	H
		5470	43.93	8.21	52.14	78.2	54	-1.86	V
	Highest	5850	42.28	8.87	51.15	78.2	54	-2.85	H
		5850	40.41	8.87	49.28	78.2	54	-4.72	V

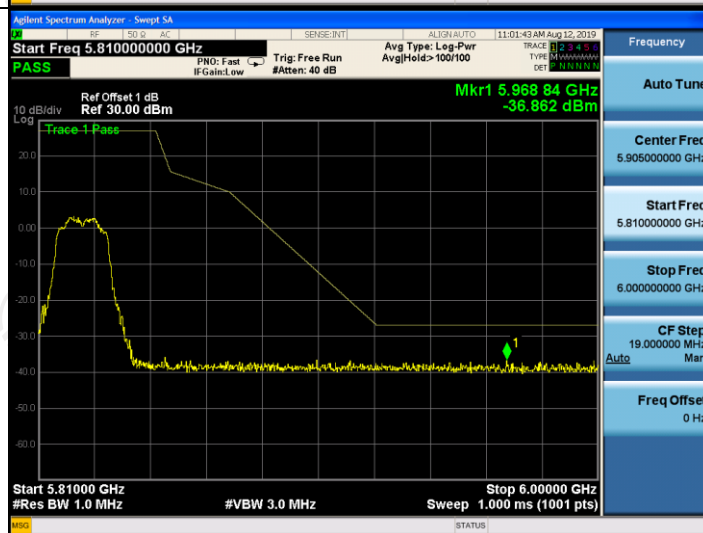
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor

Band 3 Band-edge for RF Conducted Emissions

802.11a
/HCH

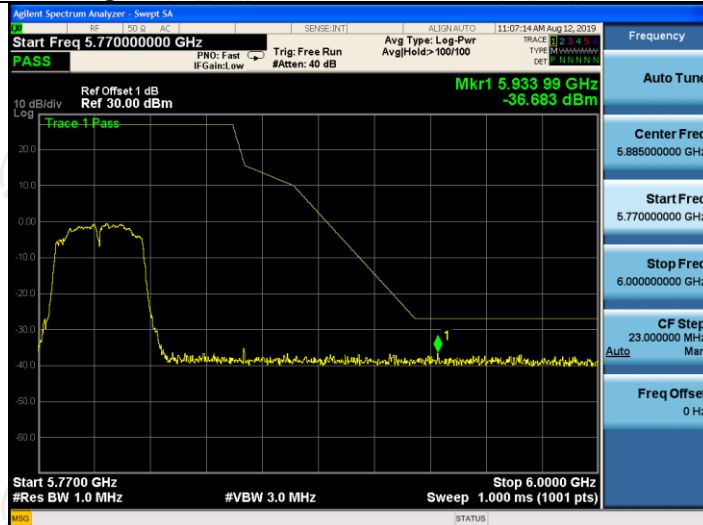


802.11n
HT20 / HCH

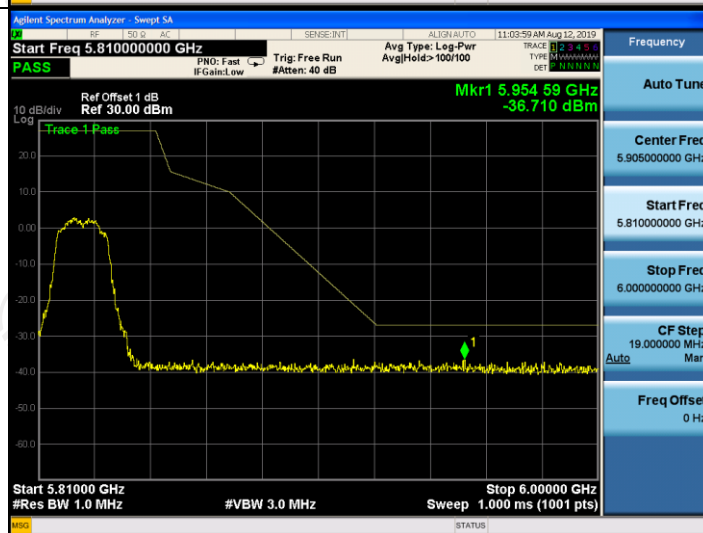


Band 3 Band-edge for RF Conducted Emissions

802.11n
HT40 /HCH

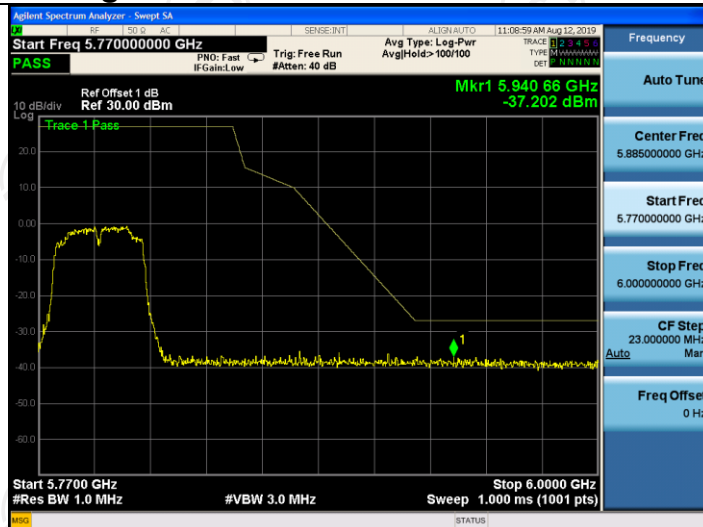


802.11ac
HT20 / HCH

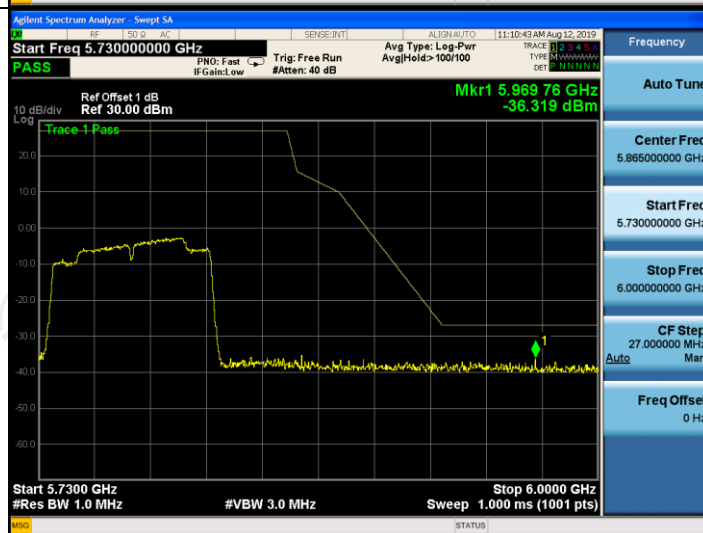


Band 3 Band-edge for RF Conducted Emissions

802.11ac
HT40 / HCH



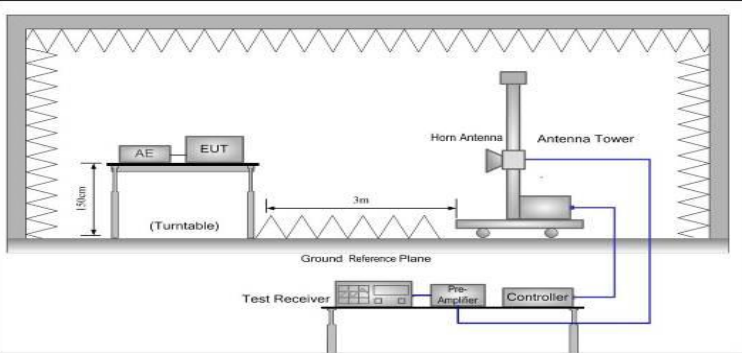
802.11ac
HT80 / HCH



6.8. Spurious Emission

6.8.1. Restrict Bands Measurement

6.8.1.1. Test Specification

Test Requirement:	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205				
Test Method:	KDB 789033 D02 v02r01				
Frequency Range:	Band 3: 5.35 GHz to 5.46 GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Operation mode:	Transmitting mode with modulation				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency	Limit (dBuV/m @3m)	Remark		
	Above 1GHz	74	Peak Value		
		54	Average Value		
Test setup:	Above 1GHz				
					
Test Procedure:	<ol style="list-style-type: none"> The testing follows FCC KDB Publication No. 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement. For the radiated emission test below 1GHz: The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used 				

	<p>for the test in order to get better signal level. For the radiated emission test above 1GHz: Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.</p> <p>3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level</p> <p>4. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.</p> <p>5. Use the following spectrum analyzer settings:</p> <p>(1) Span shall wide enough to fully capture the emission being measured;</p> <p>(2) Set RBW=100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold;</p> <p>(3) Set RBW = 1 MHz, VBW= 3MHz for $f > 1$ GHz for peak measurement.</p> <p>For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</p> <p>(4) A 5.8GHz high -PASS filter is used during radiated emissions above 1GHz measurement.</p>
Test results:	PASS

6.8.1.1 Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESIB7	100197	Sep. 17, 2019
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ40	200061	Sep. 20, 2019
Spectrum Analyzer	ROHDE&SCHW ARZ	FSP40	100056	Sep. 20, 2019
Spectrum Analyzer	Agilent	N9020A	MY49100619	Sep. 20, 2019
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 16, 2019
Pre-amplifier	HP	8447D	2727A05017	Sep. 16, 2019
Loop antenna	ZHINAN	ZN30900A	12024	Oct. 20, 2019
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 02, 2019
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Oct. 20, 2019
Horn Antenna	A-INFO	LB-180400-KF	J211020657	Sep. 16, 2019
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Sep. 16, 2019
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Sep. 16, 2019
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Sep. 16, 2019
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Sep. 16, 2019
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.8.1.2 Test Data

Restrict band around fundamental

11a CH149: 5745MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (DbμV)	AV reading (dBUV)	Correction Factor (Db/m)	Emission Level		Peak limit (DbμV/m)	AV limit (DbμV/m)	Margin (Db)
					Peak (DbμV/m)	AV (DbμV/m)			
5448.1	H	41.65	---	6.87	48.52	---	74	54	-5.48
5460.0	V	41.68	---	6.90	48.58	---	74	54	-5.42

11a CH157: 5785MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (DbμV)	AV reading (DbμV)	Correction Factor (Db/m)	Emission Level		Peak limit (DbμV/m)	AV limit (DbμV/m)	Margin (Db)
					Peak (DbμV/m)	AV (DbμV/m)			
5439.6	H	41.81	---	6.83	48.64	---	74	54	-5.36
5460.0	V	42.32	---	6.90	49.22	---	74	54	-4.78

11a CH165: 5825MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (DbμV)	AV reading (dBUV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBUV/m)	AV limit (dBUV/m)	Margin (dB)
					Peak (dBUV/m)	AV (dBUV/m)			
5446.2	H	41.77	---	6.85	48.62	---	74	54	-5.38
5460.0	V	41.81	---	6.90	48.71	---	74	54	-5.29

11n(HT20) CH149: 5745MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (DbμV)	AV reading (dBUV)	Correction Factor (Db/m)	Emission Level		Peak limit (DbμV/m)	AV limit (DbμV/m)	Margin (Db)
					Peak (DbμV/m)	AV (DbμV/m)			
5448.1	H	40.37	---	6.87	47.24	---	74	54	-6.76
5460.0	V	42.75	---	6.90	49.65	---	74	54	-4.35

11n(HT20) CH157: 5785MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (DbμV)	AV reading (DbμV)	Correction Factor (Db/m)	Emission Level		Peak limit (DbμV/m)	AV limit (DbμV/m)	Margin (Db)
					Peak (DbμV/m)	AV (DbμV/m)			
5439.6	H	41.25	---	6.83	48.08	---	74	54	-5.92
5460.0	V	43.06	---	6.90	49.96	---	74	54	-4.04

11n(HT20) CH165: 5825MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBUV)	AV reading (dBUV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBUV/m)	AV limit (dBUV/m)	Margin (dB)
					Peak (dBUV/m)	AV (dBUV/m)			
5446.2	H	40.36	---	6.85	47.21	---	74	54	-6.79
5460.0	V	42.82	---	6.90	49.72	---	74	54	-4.28

11ac (VHT20) CH149: 5745MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (DbμV)	AV reading (dBUV)	Correction Factor (Db/m)	Emission Level		Peak limit (DbμV/m)	AV limit (DbμV/m)	Margin (Db)
					Peak (DbμV/m)	AV (DbμV/m)			
5448.1	H	40.37	---	6.87	47.24	---	74	54	-6.76
5460.0	V	42.75	---	6.90	49.65	---	74	54	-4.35

11ac (VHT20) CH157: 5785MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (DbμV)	AV reading (DbμV)	Correction Factor (Db/m)	Emission Level		Peak limit (DbμV/m)	AV limit (DbμV/m)	Margin (Db)
					Peak (DbμV/m)	AV (DbμV/m)			
5439.6	H	41.25	---	6.83	48.08	---	74	54	-5.92
5460.0	V	43.06	---	6.90	49.96	---	74	54	-4.04

11ac (VHT20) CH165: 5825MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBUV)	AV reading (dBUV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBUV/m)	AV limit (dBUV/m)	Margin (dB)
					Peak (dBUV/m)	AV (dBUV/m)			
5446.2	H	40.36	---	6.85	47.21	---	74	54	-6.79
5460.0	V	42.82	---	6.90	49.72	---	74	54	-4.28

11n(HT40) CH151: 5755MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB μ V)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
					Peak (dB μ V/m)	AV (dB μ V/m)			
5442.3	H	41.34	---	6.83	48.17	---	74	54	-5.83
5460.0	V	42.03	---	6.90	48.93	---	74	54	-5.07

11n(HT40) CH159: 5795MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB μ V)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
					Peak (dB μ V/m)	AV (dB μ V/m)			
5452.4	H	41.57	---	6.88	48.45	---	74	54	-5.55
5460.0	V	41.72	---	6.90	48.62	---	74	54	-5.38

11ac(VHT40) CH151: 5755MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB μ V)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
					Peak (dB μ V/m)	AV (dB μ V/m)			
5442.3	H	41.12	---	6.83	47.95	---	74	54	-6.05
5460.0	V	42.19	---	6.90	49.09	---	74	54	-4.91

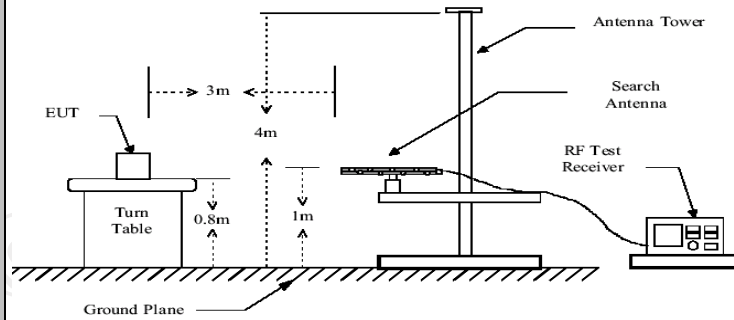
11ac(VHT40) CH159: 5795MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB μ V)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
					Peak (dB μ V/m)	AV (dB μ V/m)			
5452.4	H	42.84	---	6.88	49.72	---	74	54	-4.28
5460.0	V	39.51	---	6.90	46.41	---	74	54	-7.59

11ac(VHT80) CH155: 5775MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB μ V)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
					Peak (dB μ V/m)	AV (dB μ V/m)			
5440.5	H	41.54	---	6.83	48.37	---	74	54	-5.63
5460.0	V	42.11	---	6.90	49.01	---	74	54	-4.99

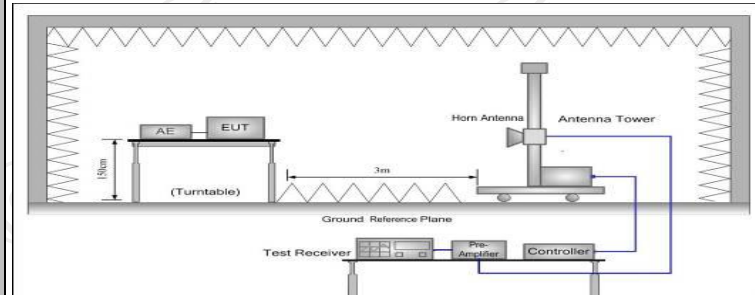
6.8.2. Unwanted Emissions out of the Restricted Bands

6.8.2.1. Test Specification

Test Requirement:	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205				
Test Method:	KDB 789033 D02 v02r01				
Frequency Range:	9kHz to 40GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Operation mode:	Transmitting mode with modulation				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit:	Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,				
	Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)		
	0.009-0.490	2400/F(KHz)	300		
	0.490-1.705	24000/F(KHz)	30		
	1.705-30	30	30		
	30-88	100	3		
	88-216	150	3		
	216-960	200	3		
	Above 960	500	3		
		Frequency	Limit (dBuV/m @3m)	Detector	
	Above 1G	74.0	Peak		
		54.0	Average		
Test setup:	For radiated emissions below 30MHz				
	<p>Distance = 3m</p> <p>EUT</p> <p>Turn table</p> <p>Ground Plane</p> <p>Pre -Amplifier</p> <p>Receiver</p> <p>Computer</p>				
	30MHz to 1GHz				



Above 1GHz



Test Procedure:

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotating table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

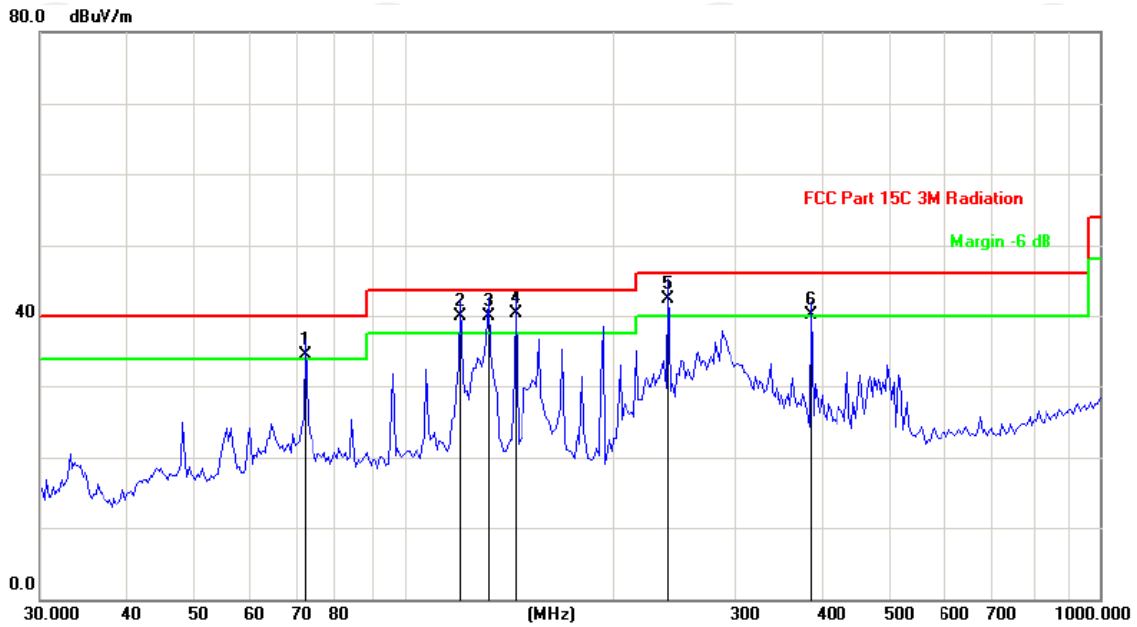
Test results:

PASS

6.8.3. Test Data

Please refer to following diagram for individual
Below 1GHz

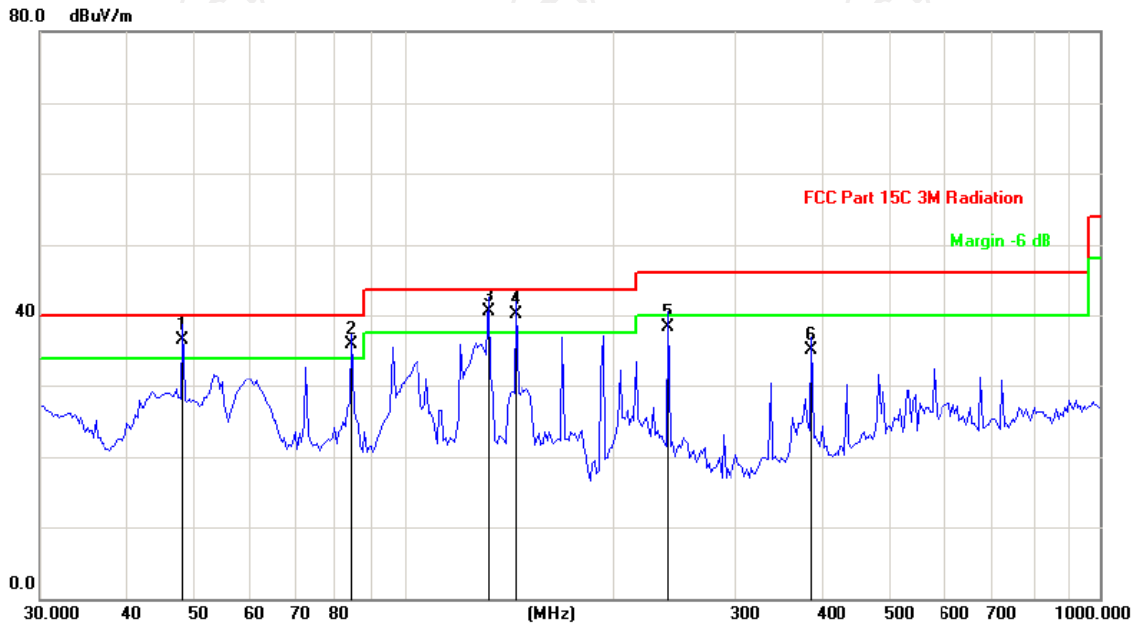
Horizontal:



Site: Polarization: **Horizontal** Temperature: 25
Limit: FCC Part 15C 3M Radiation Power: DC 12V Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1	!	72.2111	50.36	-15.87	34.49	40.00	-5.51	QP
2	!	120.6118	51.77	-11.78	39.99	43.50	-3.51	QP
3	!	132.1489	55.47	-15.56	39.91	43.50	-3.59	QP
4	*	144.7898	56.50	-16.17	40.33	43.50	-3.17	QP
5	!	240.1442	55.25	-12.85	42.40	46.00	-3.60	QP
6	!	384.5446	49.21	-9.18	40.03	46.00	-5.97	QP

Vertical:



Site: Polarization: **Vertical** Temperature: 25
Limit: FCC Part 15C 3M Radiation Power: DC 12V Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1	!	48.0392	46.78	-10.22	36.56	40.00	-3.44	QP
2	!	84.2839	50.00	-14.01	35.99	40.00	-4.01	QP
3	*	132.1489	56.00	-15.56	40.44	43.50	-3.06	QP
4	!	144.7898	56.21	-16.17	40.04	43.50	-3.46	QP
5		240.1442	51.11	-12.85	38.26	46.00	-7.74	QP
6		384.5446	44.20	-9.18	35.02	46.00	-10.98	QP

Note: 1. The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported

2. Measurements were conducted in all three channels (high, middle, low) and all modulation (802.11a, 802.11n(HT20), 802.11n(HT40), 802.11n(VHT20), 802.11ac(VHT40) 802.11ac(VHT80), and the worst case Mode (Lowest channel and 11a) was submitted only.

Modulation Type: Band 3

11a(HT20) CH149: 5745MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11490	H	40.28	---	8.09	48.37	---	74	54	-5.63
17235	H	39.74	---	9.67	49.41	---	74	54	-4.59
---	H	---	---	---	---	---	---	---	---
11490	V	42.36	---	8.09	50.45	---	74	54	-3.55
17235	V	42.80	---	9.67	52.47	---	74	54	-1.53
---	V	---	---	---	---	---	---	---	---

11a(HT20) CH157: 5785MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11570	H	42.53	---	8.10	50.63	---	74	54	-3.37
17355	H	41.17	---	9.65	50.82	---	74	54	-3.18
---	H	---	---	---	---	---	---	---	---
11570	V	40.69	---	8.10	48.79	---	74	54	-5.21
17355	V	41.91	---	9.65	51.56	---	74	54	-2.44
---	V	---	---	---	---	---	---	---	---

11a(HT20) CH161: 5825MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11650	H	40.42	---	8.12	48.54	---	74	54	-5.46
17475	H	39.05	---	9.62	48.67	---	74	54	-5.33
---	H	---	---	---	---	---	---	---	---
11650	V	41.38	---	8.12	49.50	---	74	54	-4.50
17475	V	40.84	---	9.62	50.46	---	74	54	-3.54
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH151: 5745MHz

Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11510	H	41.65	---	8.09	49.74	---	74	54	-4.26
17265	H	40.51	---	9.67	50.18	---	74	54	-3.82
---	H	---	---	---	---	---	---	---	---
11510	V	42.16	---	8.09	50.25	---	74	54	-3.75
17265	V	40.83	---	9.67	50.50	---	74	54	-3.50
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH157: 5785MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11570	H	41.92	---	8.10	49.52	---	74	54	-4.48
17355	H	42.38	---	9.65	52.03	---	74	54	-1.97
---	H	---	---	---	---	---	---	---	---
11570	V	40.14	---	8.10	49.07	---	74	54	-4.93
17355	V	40.67	---	9.65	50.31	---	74	54	-3.69
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH165: 5825MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11650	H	40.75	---	8.12	48.90	---	74	54	-5.10
17475	H	39.29	---	9.62	49.15	---	74	54	-4.85
---	H	---	---	---	---	---	---	---	---
11650	V	43.06	---	8.12	51.87	---	74	54	-2.13
17475	V	41.51	---	9.62	51.29	---	74	54	-2.71
---	V	---	---	---	---	---	---	---	---

11n(HT40) CH151: 5755MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11510	H	42.68	---	8.09	50.77	---	74	54	-3.23
17265	H	43.49	---	9.67	53.16	---	74	54	-0.84
---	H	---	---	---	---	---	---	---	---
11510	V	42.83	---	8.09	50.92	---	74	54	-3.08
17265	V	41.17	---	9.67	50.84	---	74	54	-3.16
---	V	---	---	---	---	---	---	---	---

11n(HT40) CH159: 5795MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11590	H	41.92	---	8.10	50.02	---	74	54	-3.98
17385	H	42.64	---	9.65	52.29	---	74	54	-1.71
---	H	---	---	---	---	---	---	---	---
11590	V	41.16	---	8.10	49.26	---	74	54	-4.74
17385	V	39.88	---	9.65	49.53	---	74	54	-4.47
---	V	---	---	---	---	---	---	---	---

11ac(VHT40) CH149: 5745MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11490	H	42.16	---	8.09	50.25	---	74	54	-3.75
17235	H	42.90	---	9.67	52.57	---	74	54	-1.43
---	H	---	---	---	---	---	---	---	---
11490	V	41.74	---	8.09	49.83	---	74	54	-4.17
17235	V	43.59	---	9.67	53.26	---	74	54	-0.74
---	V	---	---	---	---	---	---	---	---

11ac(VHT20) CH157: 5785MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11570	H	40.37	---	8.10	48.47	---	74	54	-5.53
17355	H	38.62	---	9.65	48.27	---	74	54	-5.73
---	H	---	---	---	---	---	---	---	---
11570	V	39.95	---	8.10	48.05	---	74	54	-5.95
17355	V	40.28	---	9.65	49.93	---	74	54	-4.07
---	V	---	---	---	---	---	---	---	---

11ac(VHT20) CH165: 5825MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11650	H	41.03	---	8.12	49.15	---	74	54	-4.85
17475	H	40.81	---	9.62	50.43	---	74	54	-3.57
---	H	---	---	---	---	---	---	---	---
11650	V	41.26	---	8.12	49.38	---	74	54	-4.62
17475	V	42.75	---	9.62	52.37	---	74	54	-1.63
---	V	---	---	---	---	---	---	---	---

11ac(VHT40) CH151: 5755MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11510	H	41.36	---	8.09	49.45	---	74	54	-4.55
17265	H	39.81	---	9.67	49.48	---	74	54	-4.52
---	H	---	---	---	---	---	---	---	---
11510	V	42.42	---	8.09	50.51	---	74	54	-3.49
17265	V	39.65	---	9.67	49.32	---	74	54	-4.68
---	V	---	---	---	---	---	---	---	---

11ac(VHT40) CH159: 5795MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB μ V)	AV reading (dB μ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
					Peak (dB μ V/m)	AV (dB μ V/m)			
11590	H	41.62	---	8.10	49.72	---	74	54	-4.28
17385	H	39.48	---	9.65	49.13	---	74	54	-4.87
---	H	---	---	---	---	---	---	---	---
11590	V	42.86	---	8.10	50.96	---	74	54	-3.04
17385	V	41.21	---	9.65	50.86	---	74	54	-3.14
---	V	---	---	---	---	---	---	---	---

11ac(VHT80) CH155: 5775MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB μ V)	AV reading (dB μ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
					Peak (dB μ V/m)	AV (dB μ V/m)			
11550	H	41.56	---	8.09	49.65	---	74	54	-4.35
17325	H	42.84	---	9.66	52.50	---	74	54	-1.50
---	H	---	---	---	---	---	---	---	---
11550	V	42.69	---	8.09	50.78	---	74	54	-3.22
17325	V	40.37	---	9.66	50.03	---	74	54	-3.97
---	V	---	---	---	---	---	---	---	---

Note:

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak) (dB μ V/m)-Average limit (dB μ V/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 40GHz.
5. Data of measurement shown “---“in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

6.9. Frequency Stability Measurement

6.9.1. Test Specification

Test Requirement:	FCC Part15 Section 15.407(g) &Part2 J Section 2.1055
Test Method:	ANSI C63.10: 2013
Limit:	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 45 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
Test Setup:	<pre> graph LR SA[Spectrum Analyzer] --- EUT[EUT] subgraph TC [Temperature Chamber] EUT end P[AC/DC Power supply] --- EUT </pre>
Test Procedure:	The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Test Result:	PASS
Remark:	Pre-scan was performed at Antenna 0 and Antenna 1, the worst case was found. Only the test data of Antenna 0 was shown in this report.

Test plots as follows:

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5180
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.6V	5180.0091	9100	PASS
35		5180.0064	6400	PASS
25		5179.9878	-12200	PASS
15		5179.9983	-1700	PASS
5		5180.0039	3900	PASS
0		5180.0042	4200	PASS
20	6.4	5179.9831	-16900	PASS
	7.6	5180.0034	3400	PASS
	8.4	5179.9826	-17400	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5200
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.6V	5200.0092	9200	PASS
35		5200.0089	8900	PASS
25		5200.0078	7800	PASS
15		5200.0043	4300	PASS
5		5199.9980	-2000	PASS
0		5199.9879	-12100	PASS
20	6.4	5199.9957	-4300	PASS
	7.6	5200.0031	3100	PASS
	8.4	5200.0054	5400	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5240
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.6V	5240.0042	4200	PASS
35		5240.0029	2900	PASS
25		5240.0024	2400	PASS
15		5239.9992	-800	PASS
5		5239.9983	-1700	PASS
0		5239.9979	-2100	PASS
20	6.4	5240.0034	3400	PASS
	7.6	5240.0010	1000	PASS
	8.4	5239.9985	-1500	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5745
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.6V	5745.0012	1200	PASS
35		5745.0015	1500	PASS
25		5744.9960	-4000	PASS
15		5744.9955	-4500	PASS
5		5745.0034	3400	PASS
0		5745.0041	4100	PASS
20	6.4	5745.0076	7600	PASS
	7.6	5745.0071	7100	PASS
	8.4	5745.0021	2100	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5785
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.6V	5785.0082	8200	PASS
35		5785.0030	3000	PASS
25		5785.0028	2800	PASS
15		5785.0008	800	PASS
5		5785.0025	2500	PASS
0		5785.0043	4300	PASS
20	6.4	5785.0057	5700	PASS
	7.6	5785.0024	2400	PASS
	8.4	5784.9975	-2500	PASS

Test mode:		802.11ac(VHT20)	Frequency(MHz):	5825
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.6V	5824.9813	-18700	PASS
35		5825.0081	8100	PASS
25		5824.9953	-4700	PASS
15		5824.9985	-1500	PASS
5		5825.0015	1500	PASS
0		5825.0046	4600	PASS
20	6.4	5825.0042	4200	PASS
	7.6	5824.9987	-1300	PASS
	8.4	5825.0024	2400	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5190
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.6V	5190.0127	12700	PASS
35		5190.0110	11000	PASS
25		5190.0104	10400	PASS
15		5190.0035	3500	PASS
5		5190.0062	6200	PASS
0		5190.0078	7800	PASS
20	6.4	5189.9910	-9000	PASS
	7.6	5189.9978	-2200	PASS
	8.4	5190.0042	4200	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5230
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.6V	5230.0127	12700	PASS
35		5230.0120	12000	PASS
25		5230.0098	9800	PASS
15		5229.9988	-1200	PASS
5		5229.9981	-1900	PASS
0		5230.0052	5200	PASS
20	6.4	5230.0043	4300	PASS
	7.6	5230.0029	2900	PASS
	8.4	5229.9979	-2100	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5755
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.6V	5755.0273	27300	PASS
35		5755.0120	12000	PASS
25		5755.0117	11700	PASS
15		5755.0096	9600	PASS
5		5755.0035	3500	PASS
0		5755.0074	7400	PASS
20	6.4	5755.0046	4600	PASS
	7.6	5755.0032	3200	PASS
	8.4	5755.0063	6300	PASS

Test mode:		802.11ac(VHT40)	Frequency(MHz):	5795
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.6V	5794.9802	-19800	PASS
35		5794.9843	-15700	PASS
25		5795.0045	4500	PASS
15		5795.0032	3200	PASS
5		5795.0029	2900	PASS
0		5795.0066	6600	PASS
20		6.4	5795.0052	5200
	7.6	5794.9983	-1700	PASS
	8.4	5795.0086	8600	PASS

Appendix A: Photographs of Test Setup

Refer to test report TCT190725E017

Appendix B: Photographs of EUT

Refer to test report TCT190725E017

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