


## 4.5 Power Spectral Density

### 4.5.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 E Section 15.407 (a)
<b>Test Method:</b>	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section F
<b>Limit:</b>	≤30.00dBm/500KHz for Band IV 5725MHz-5850MHz
<b>Test Setup:</b>	 <p style="text-align: center;">Spectrum Analyzer                      EUT</p>
<b>Test Mode:</b>	Transmitting mode with modulation
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>1. Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth.</li> <li>2. Set RBW = 510 kHz/1 MHz, VBW ≥ 3*RBW, Sweep time = Auto, Detector = RMS.</li> <li>3. Allow the sweeps to continue until the trace stabilizes.</li> <li>4. Use the peak marker function to determine the maximum amplitude level.</li> <li>5. 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.</li> </ol>
<b>Test Result:</b>	PASS

### 4.5.2. Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.3.23	HKE-083	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).



4.5.3. Test data

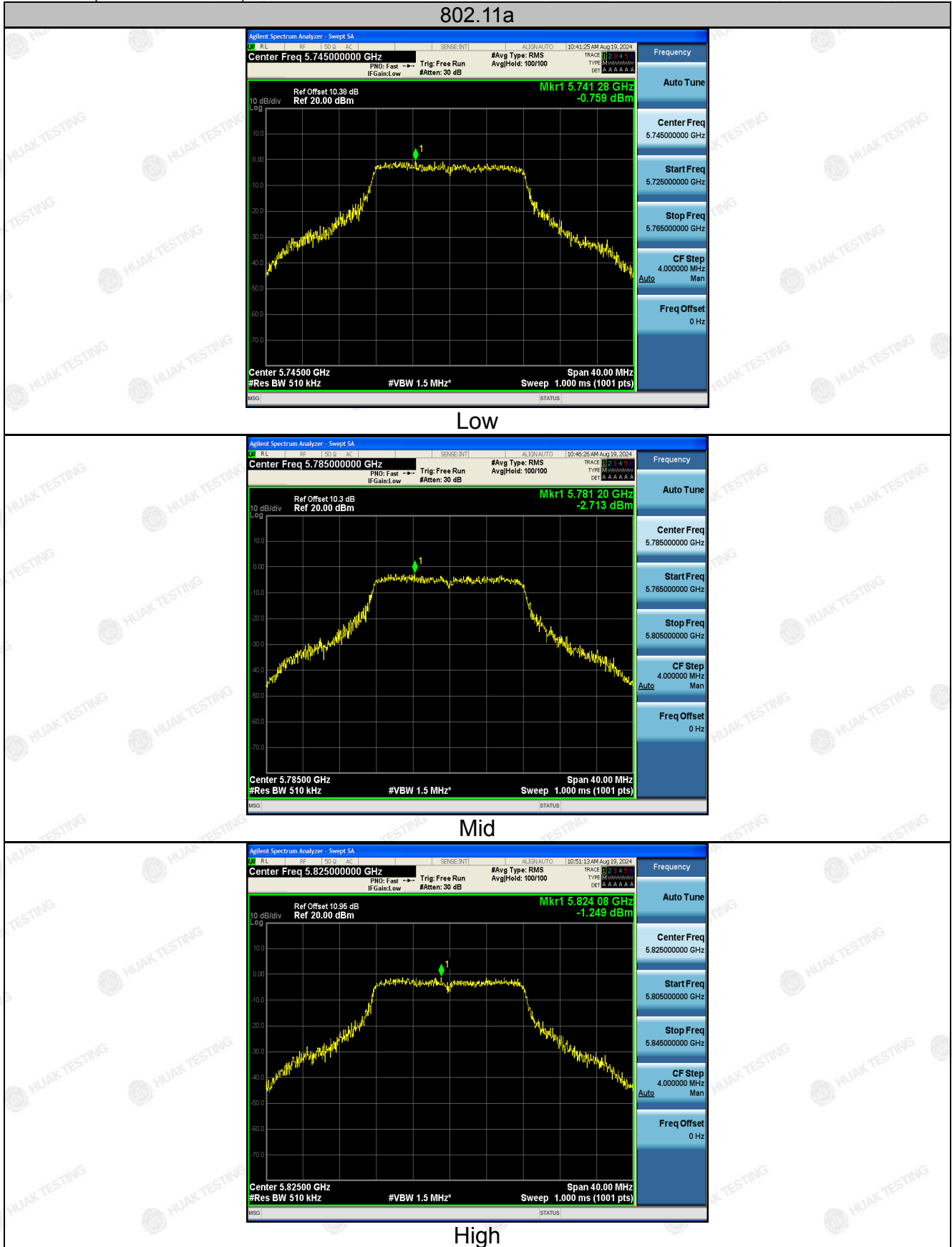
Configuration Band IV (5745 - 5825 MHz )						
Mode	Test channel	Level [dBm/510kHz]	10log (500/510)	Power Spectral Density	Limit (dBm/500kHz)	Result
802.11a	CH149	-0.76	-0.086	-0.846	30	PASS
802.11a	CH157	-2.71	-0.086	-2.796	30	PASS
802.11a	CH165	-1.25	-0.086	-1.336	30	PASS
802.11nHT20	CH149	-0.49	-0.086	-0.576	30	PASS
802.11n HT20	CH157	-0.97	-0.086	-1.056	30	PASS
802.11nHT20	CH165	-0.91	-0.086	-0.996	30	PASS
802.11nHT40	CH151	-1.70	-0.086	-1.786	30	PASS
802.11nHT40	CH159	-3.99	-0.086	-4.076	30	PASS
802.11acHT20	CH149	0.21	-0.086	0.124	30	PASS
802.11acHT20	CH157	-1.00	-0.086	-1.086	30	PASS
802.11acHT20	CH165	-1.03	-0.086	-1.116	30	PASS
802.11acHT40	CH151	-3.00	-0.086	-3.086	30	PASS
802.11acHT40	CH159	-4.23	-0.086	-4.316	30	PASS
802.11axHT20	CH149	2.46	-0.086	2.374	30	PASS
802.11axHT20	CH157	1.13	-0.086	1.044	30	PASS
802.11axHT20	CH165	0.35	-0.086	0.264	30	PASS
802.11axHT40	CH151	-0.43	-0.086	-0.516	30	PASS
802.11axHT40	CH159	-1.61	-0.086	-1.696	30	PASS

Note: Power Spectral Density= Level [dBm/510kHz]+(10log(Limit RBW/Test RBW))

Test plots as follows:



Band IV (5725-5850 MHz)



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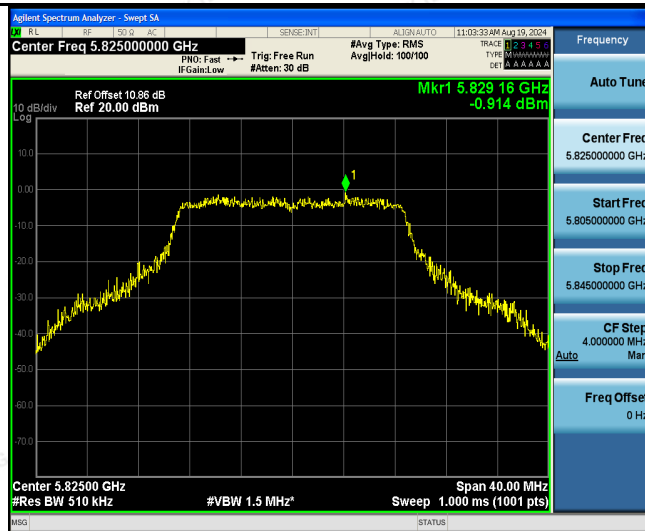
802.11n(HT20)



Low



Mid

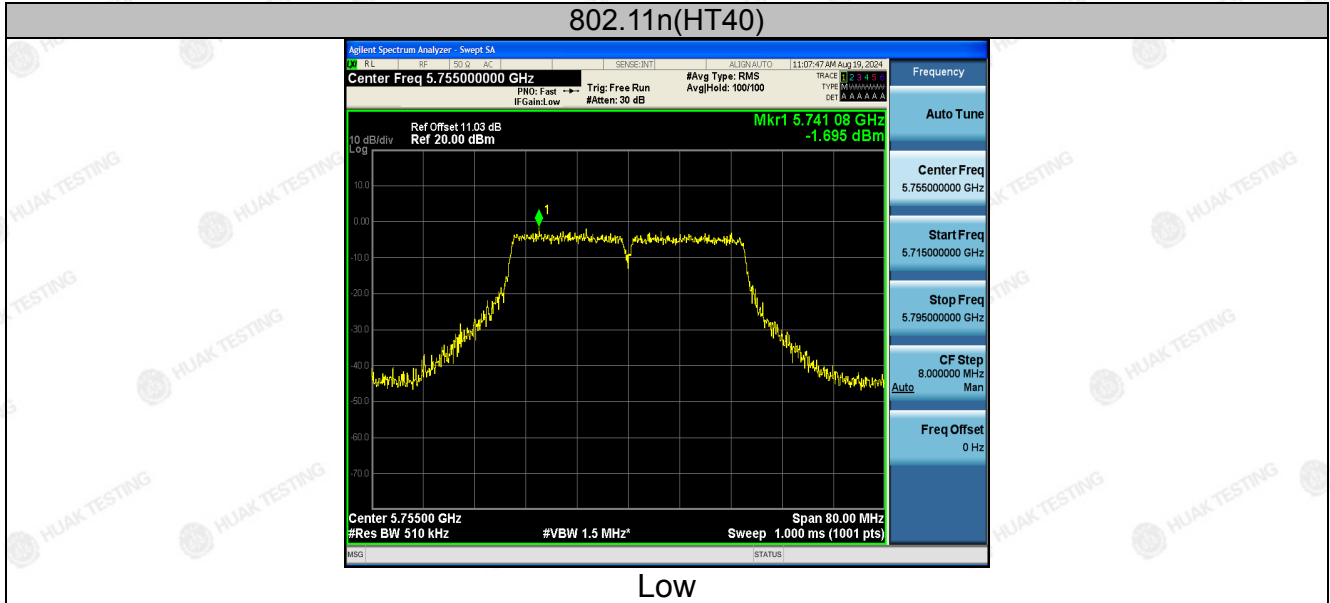


High

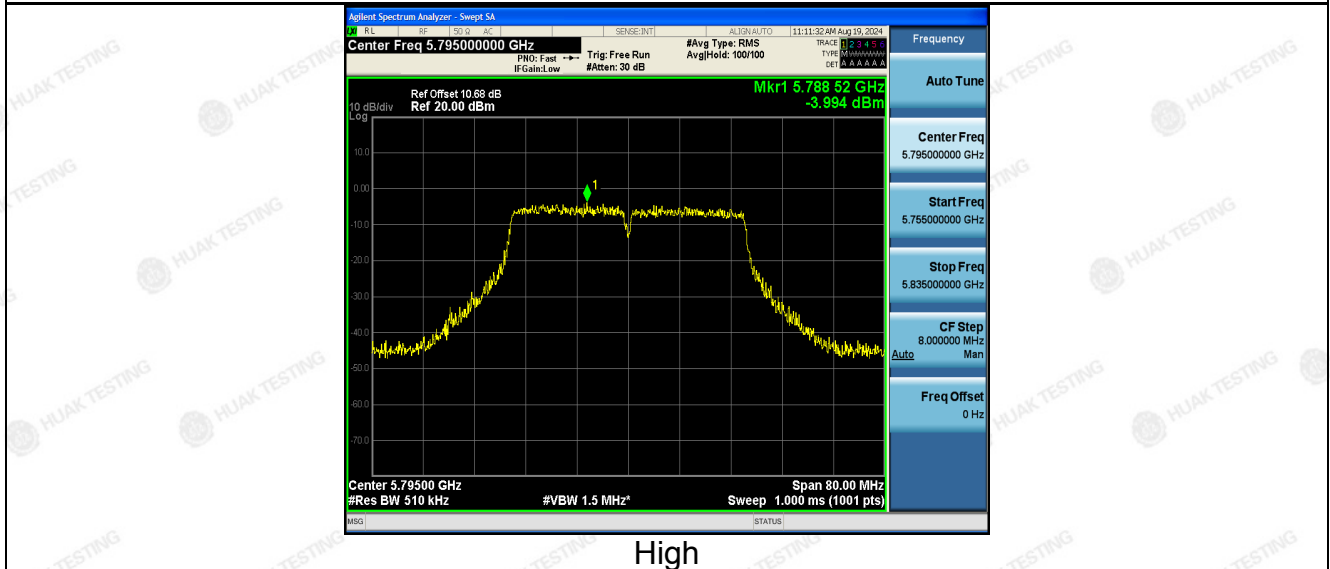
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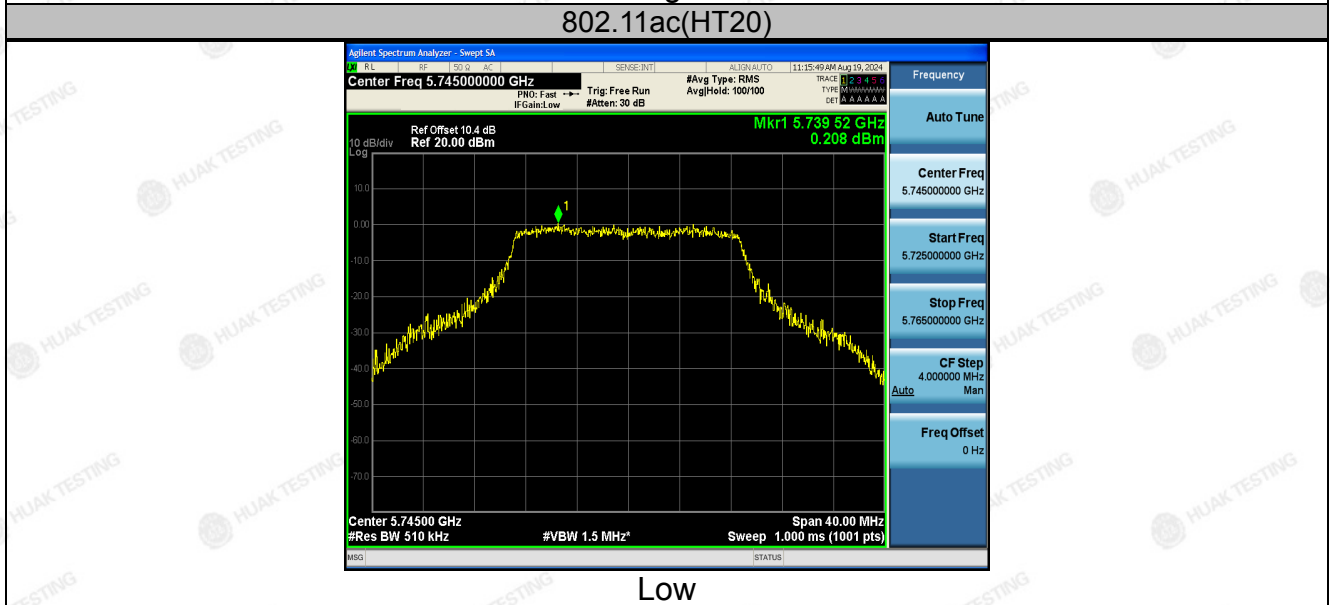
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Low



High

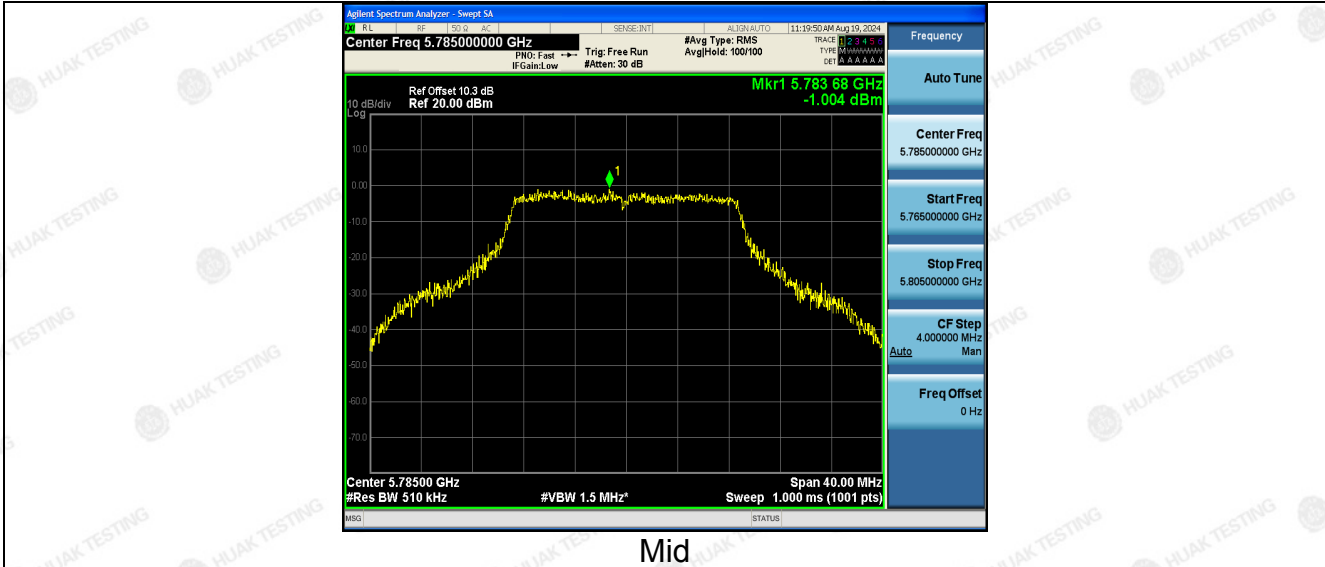


Low

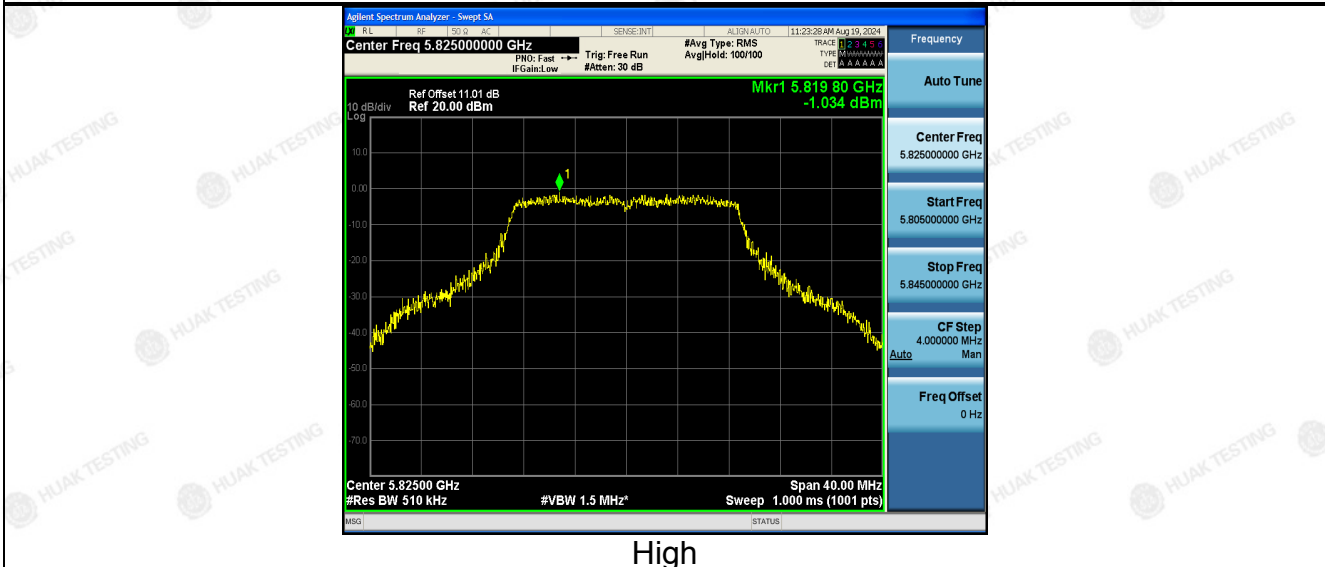
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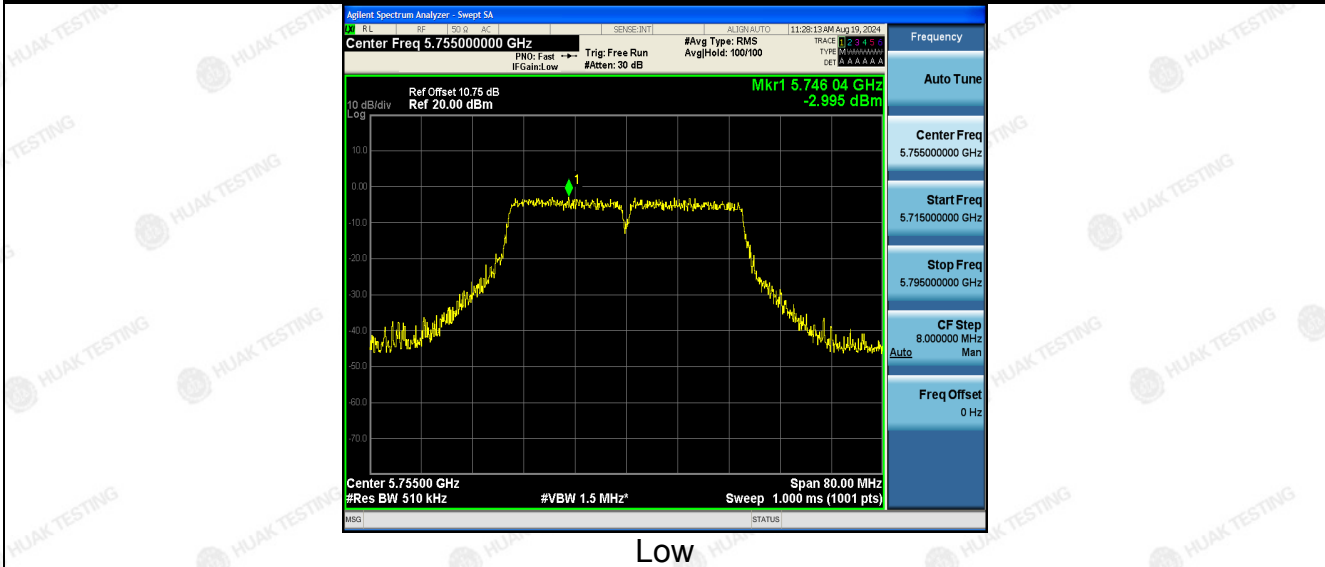


Mid



High

802.11ac(HT40)

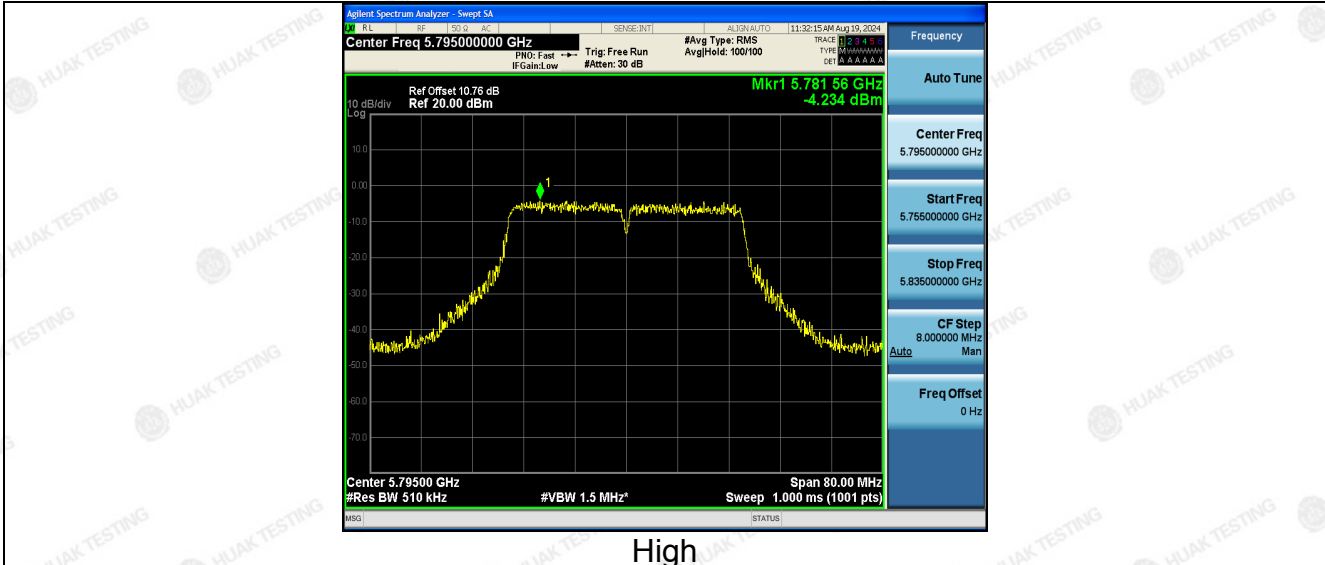


Low

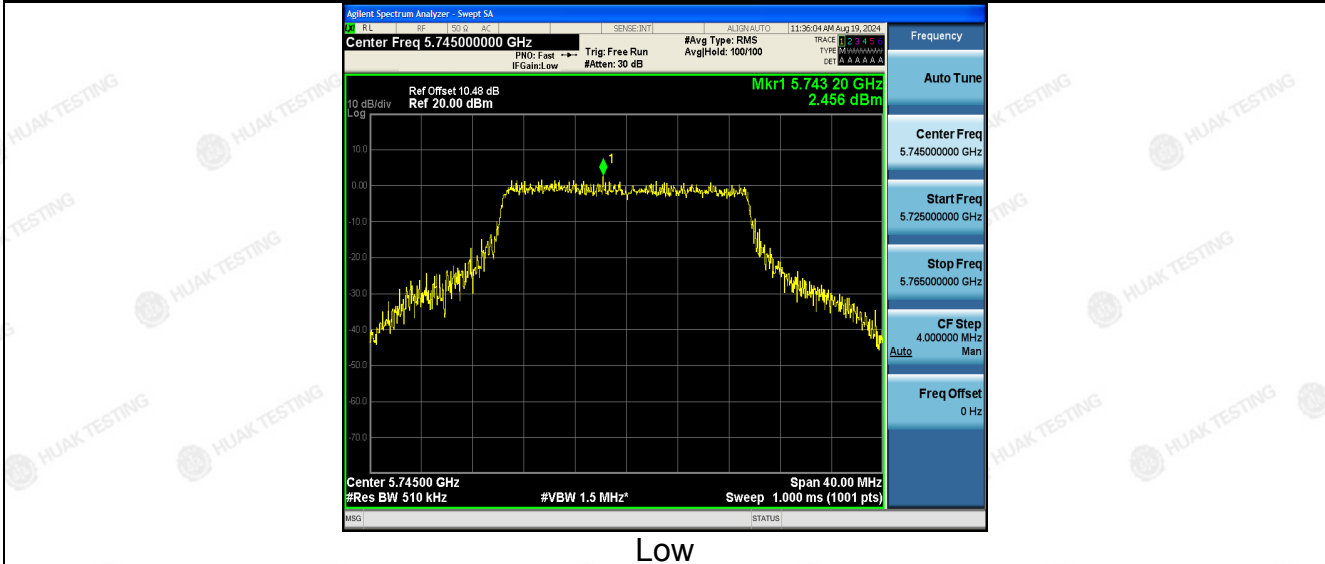
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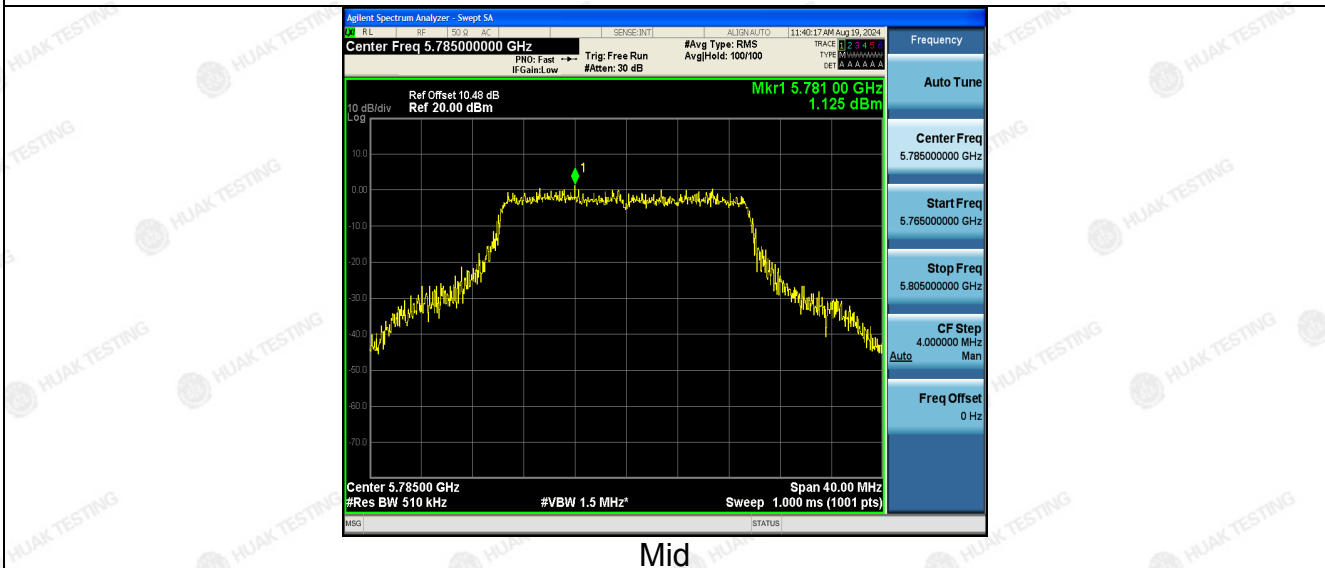
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802.11ax(HT20)



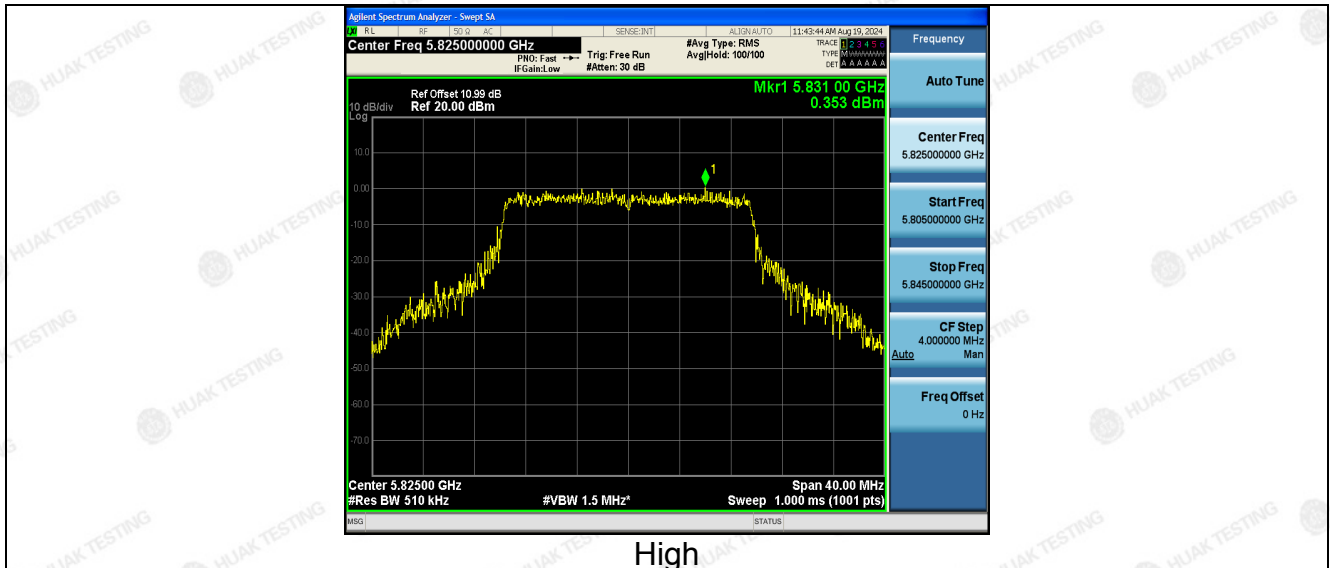
Low



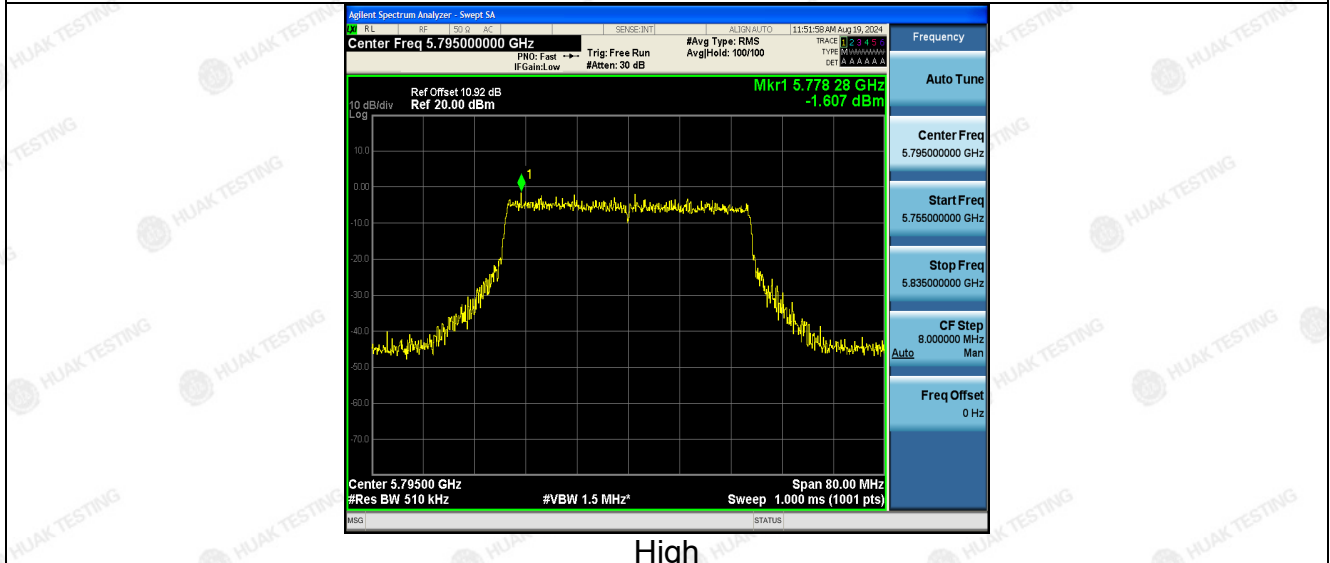
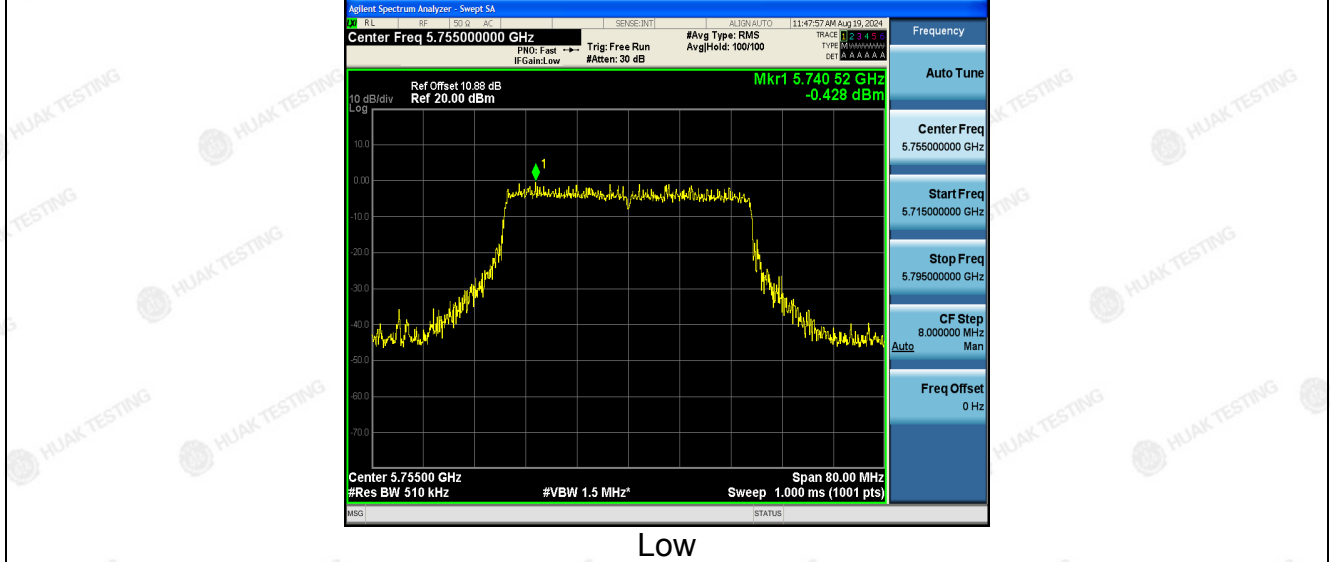
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802.11ax(HT40)



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## 4.6 Band Edge

### 4.6.1. Test Specification

<b>Test Requirement:</b>	FCC CFR47 Part 15E Section 15.407
<b>Test Method:</b>	ANSI C63.10 2013
<b>Limit:</b>	<p>(1) For transmitters operating in the 5.725-5.85 GHz band:</p> <p>(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</p> <p>The limit of frequency below 1GHz and which fall in restricted bands should comply 15.209.</p>
<b>Test Setup:</b>	<p>The diagram illustrates the test setup within an anechoic chamber. An Equipment Under Test (EUT) is placed on a turn table at a height of 1.5 meters. The turn table is positioned 3 meters away from an antenna tower. The antenna tower has a height of 1-4 meters. The antenna is labeled 'Ant. feed point'. A receiver and amplifier (Amp.) are connected to the antenna tower. The ground plane is indicated at the base of the chamber.</p>
<b>Test Mode:</b>	Transmitting mode with modulation
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> </ol>



	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.
<b>Test Result:</b>	PASS



4.6.2. Test Instruments

Radiated Emission Test Site (966)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
Spectrum analyzer	R&S	FSV3044	HKE-126	Feb. 20, 2024	Feb. 19, 2025
Preamplifier	EMCI	EMC051845S	HKE-006	Feb. 20, 2024	Feb. 19, 2025
Preamplifier	Schwarzbeck	BBV 9743	HKE-016	Feb. 20, 2024	Feb. 19, 2025
Preamplifier	A.H. Systems	SAS-574	HKE-182	Feb. 20, 2024	Feb. 19, 2025
6dB Attenuator	Pasternack	6db	HKE-184	Feb. 20, 2024	Feb. 19, 2025
EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-010	Feb. 20, 2024	Feb. 19, 2025
Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	Feb. 21, 2024	Feb. 20, 2026
Loop Antenna	COM-POWER	AL-130R	HKE-014	Feb. 21, 2024	Feb. 20, 2026
Horn Antenna	Schwarzbeck	9120D	HKE-013	Feb. 21, 2024	Feb. 20, 2026
EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	N/A	N/A
RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE-184	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).



4.6.3. Test Data

Operation Mode: 802.11a Mode with 5.8G TX CH Low

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	50.15	-2.06	48.09	68.2	-20.11	peak
5700	79.24	-1.96	77.28	105.2	-27.92	peak
5720	83.66	-2.87	80.79	110.8	-30.01	peak
5725	101.07	-2.14	98.93	122.2	-23.27	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	49.98	-2.06	47.92	68.2	-20.28	peak
5700	78.32	-1.96	76.36	105.2	-28.84	peak
5720	83.14	-2.87	80.27	110.8	-30.53	peak
5725	100.51	-2.14	98.37	122.2	-23.83	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



Operation Mode: TX CH High with 5.8G

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	101.69	-1.97	99.72	122.2	-22.48	peak
5855	83.37	-2.13	81.24	110.8	-29.56	peak
5875	76.71	-2.65	74.06	105.2	-31.14	peak
5925	44.36	-2.28	42.08	68.2	-26.12	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	101.29	-1.97	99.32	122.2	-22.88	peak
5855	82.08	-2.13	79.95	110.8	-30.85	peak
5875	75.41	-2.65	72.76	105.2	-32.44	peak
5925	44.32	-2.28	42.04	68.2	-26.16	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



Operation Mode: 802.11n20 Mode with 5.8G TX CH Low

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	50.14	-2.06	48.08	68.2	-20.12	peak
5700	78.31	-1.96	76.35	105.2	-28.85	peak
5720	81.72	-2.87	78.85	110.8	-31.95	peak
5725	101.18	-2.14	99.04	122.2	-23.16	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	50.92	-2.06	48.86	68.2	-19.34	peak
5700	78.45	-1.96	76.49	105.2	-28.71	peak
5720	81.09	-2.87	78.22	110.8	-32.58	peak
5725	101.81	-2.14	99.67	122.2	-22.53	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit



Operation Mode: TX CH High with 5.8G

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	102.96	-1.97	100.99	122.2	-21.21	peak
5855	82.34	-2.13	80.21	110.8	-30.59	peak
5875	74.16	-2.65	71.51	105.2	-33.69	peak
5925	44.64	-2.28	42.36	68.2	-25.84	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	100.35	-1.97	98.38	122.2	-23.82	peak
5855	83.58	-2.13	81.45	110.8	-29.35	peak
5875	76.72	-2.65	74.07	105.2	-31.13	peak
5925	43.19	-2.28	40.91	68.2	-27.29	peak
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit						



Operation Mode: 802.11n40 Mode with 5.8G TX CH Low

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	49.59	-2.06	47.53	68.2	-20.67	
5700	80.18	-1.96	78.22	105.2	-26.98	peak
5720	81.36	-2.87	78.49	110.8	-32.31	peak
5725	102.17	-2.14	100.03	122.2	-22.17	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5650	49.95	-2.06	47.89	68.2	-20.31	
5700	80.32	-1.96	78.36	105.2	-26.84	peak
5720	81.36	-2.87	78.49	110.8	-32.31	peak
5725	102.11	-2.14	99.97	122.2	-22.23	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit





Operation Mode: TX CH High with 5.8G

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	101.08	-1.97	99.11	122.2	-23.09	peak
5855	83.96	-2.13	81.83	110.8	-28.97	peak
5875	75.84	-2.65	73.19	105.2	-32.01	peak
5925	44.25	-2.28	41.97	68.2	-26.23	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5850	101.71	-1.97	99.74	122.2	-22.46	peak
5855	83.39	-2.13	81.26	110.8	-29.54	peak
5875	75.46	-2.65	72.81	105.2	-32.39	peak
5925	44.18	-2.28	41.9	68.2	-26.3	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



Operation Mode: 802.11ac20 Mode with 5.8G TX CH Low

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
5650	49.63	-2.06	47.57	68.2	-20.63	peak
5700	79.74	-1.96	77.78	105.2	-27.42	peak
5720	83.18	-2.87	80.31	110.8	-30.49	peak
5725	101.29	-2.14	99.15	122.2	-23.05	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
5650	49.41	-2.06	47.35	68.2	-20.85	peak
5700	78.58	-1.96	76.62	105.2	-28.58	peak
5720	81.32	-2.87	78.45	110.8	-32.35	peak
5725	101.99	-2.14	99.85	122.2	-22.35	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



Operation Mode: TX CH High with 5.8G

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	102.25	-1.97	100.28	122.2	-21.92	peak
5855	83.17	-2.13	81.04	110.8	-29.76	peak
5875	74.84	-2.65	72.19	105.2	-33.01	peak
5925	44.06	-2.28	41.78	68.2	-26.42	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	102.78	-1.97	100.81	122.2	-21.39	peak
5855	83.91	-2.13	81.78	110.8	-29.02	peak
5875	75.07	-2.65	72.42	105.2	-32.78	peak
5925	44.25	-2.28	41.97	68.2	-26.23	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



Operation Mode: 802.11ac40 Mode with 5.8G TX CH Low

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	48.63	-2.06	46.57	68.2	-21.63	peak
5700	80.29	-1.96	78.33	105.2	-26.87	peak
5720	82.03	-2.87	79.16	110.8	-31.64	peak
5725	101.39	-2.14	99.25	122.2	-22.95	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	49.36	-2.06	47.3	68.2	-20.9	peak
5700	79.48	-1.96	77.52	105.2	-27.68	peak
5720	82.03	-2.87	79.16	110.8	-31.64	peak
5725	103.15	-2.14	101.01	122.2	-21.19	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



Operation Mode: TX CH High with 5.8G

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	101.29	-1.97	99.32	122.2	-22.88	peak
5855	83.07	-2.13	80.94	110.8	-29.86	peak
5875	77.16	-2.65	74.51	105.2	-30.69	peak
5925	43.58	-2.28	41.3	68.2	-26.9	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	101.09	-1.97	99.12	122.2	-23.08	peak
5855	83.44	-2.13	81.31	110.8	-29.49	peak
5875	74.21	-2.65	71.56	105.2	-33.64	peak
5925	42.93	-2.28	40.65	68.2	-27.55	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



Operation Mode: 802.11ax20 Mode with 5.8G TX CH Low

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	48.09	-2.06	46.03	68.2	-22.17	peak
5700	78.73	-1.96	76.77	105.2	-28.43	peak
5720	81.28	-2.87	78.41	110.8	-32.39	peak
5725	102.11	-2.14	99.97	122.2	-22.23	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	49.35	-2.06	47.29	68.2	-20.91	peak
5700	78.49	-1.96	76.53	105.2	-28.67	peak
5720	82.06	-2.87	79.19	110.8	-31.61	peak
5725	100.85	-2.14	98.71	122.2	-23.49	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



Operation Mode: TX CH High with 5.8G

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
5850	100.72	-1.97	98.75	122.2	-23.45	peak
5855	84.98	-2.13	82.85	110.8	-27.95	peak
5875	75.11	-2.65	72.46	105.2	-32.74	peak
5925	43.47	-2.28	41.19	68.2	-27.01	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
5850	100.96	-1.97	98.99	122.2	-23.21	peak
5855	84.08	-2.13	81.95	110.8	-28.85	peak
5875	75.21	-2.65	72.56	105.2	-32.64	peak
5925	43.34	-2.28	41.06	68.2	-27.14	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



Operation Mode: 802.11ax40 Mode with 5.8G TX CH Low

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	51.14	-2.06	49.08	68.2	-19.12	peak
5700	79.25	-1.96	77.29	105.2	-27.91	peak
5720	82.06	-2.87	79.19	110.8	-31.61	peak
5725	103.85	-2.14	101.71	122.2	-20.49	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5650	51.22	-2.06	49.16	68.2	-19.04	peak
5700	79.07	-1.96	77.11	105.2	-28.09	peak
5720	82.78	-2.87	79.91	110.8	-30.89	peak
5725	103.56	-2.14	101.42	122.2	-20.78	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit





Operation Mode: TX CH High with 5.8G

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	101.22	-1.97	99.25	122.2	-22.95	peak
5855	83.34	-2.13	81.21	110.8	-29.59	peak
5875	74.78	-2.65	72.13	105.2	-33.07	peak
5925	44.51	-2.28	42.23	68.2	-25.97	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

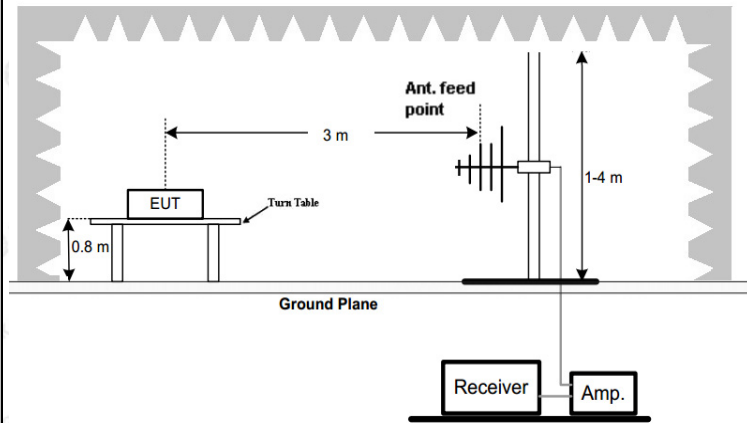
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5850	102.49	-1.97	100.52	122.2	-21.68	peak
5855	84.81	-2.13	82.68	110.8	-28.12	peak
5875	74.73	-2.65	72.08	105.2	-33.12	peak
5925	44.25	-2.28	41.97	68.2	-26.23	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

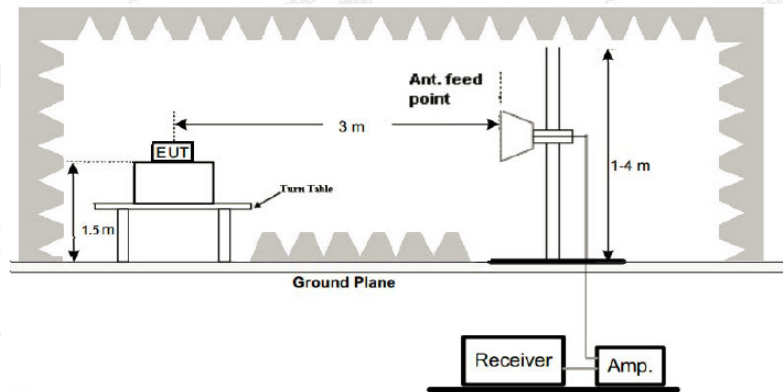
## 4.7 Spurious Emission

### 4.7.1.1. Test Specification

<b>Test Requirement:</b>	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205																													
<b>Test Method:</b>	KDB 789033 D02 v02r01																													
<b>Frequency Range:</b>	9kHz to 40GHz																													
<b>Measurement Distance:</b>	3 m																													
<b>Antenna Polarization:</b>	Horizontal & Vertical																													
<b>Operation mode:</b>	Transmitting mode with modulation																													
<b>Receiver Setup:</b>	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>9kHz- 150kHz</td> <td>Quasi-peak</td> <td>200Hz</td> <td>1kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td>150kHz- 30MHz</td> <td>Quasi-peak</td> <td>9kHz</td> <td>30kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>120KHz</td> <td>300KHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td rowspan="2">Above 1GHz</td> <td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak Value</td> </tr> <tr> <td>Peak</td> <td>1MHz</td> <td>10Hz</td> <td>Average Value</td> </tr> </tbody> </table>	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	120KHz	300KHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	Peak	1MHz	10Hz	Average Value
	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	120KHz	300KHz	Quasi-peak Value																									
Above 1GHz	Peak	1MHz	3MHz	Peak Value																										
	Peak	1MHz	10Hz	Average Value																										
<b>Limit:</b>	<p>(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.</p> <p>(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.</p> <p>(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.</p> <p>(4) For transmitters operating in the 5.725-5.85 GHz band:</p> <p>(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</p> <p>The limit of frequency below 1GHz and which fall in restricted bands should comply 15.209.</p>																													
<b>Test setup:</b>	<p>For radiated emissions below 30MHz</p> <p>30MHz to 1GHz</p>																													



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 rotatable 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.
<b>Test results:</b>	PASS

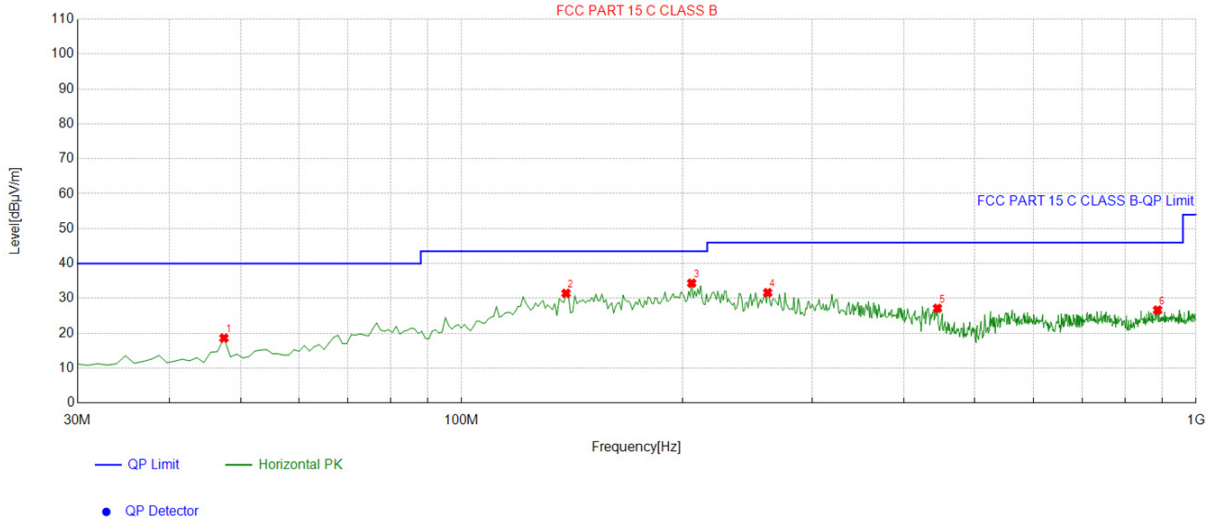


### 4.7.2. Test Data

Remark: All the test modes completed for test. Only the worst result of 802. 11a was reported as below:

#### Below 1GHz

Horizontal

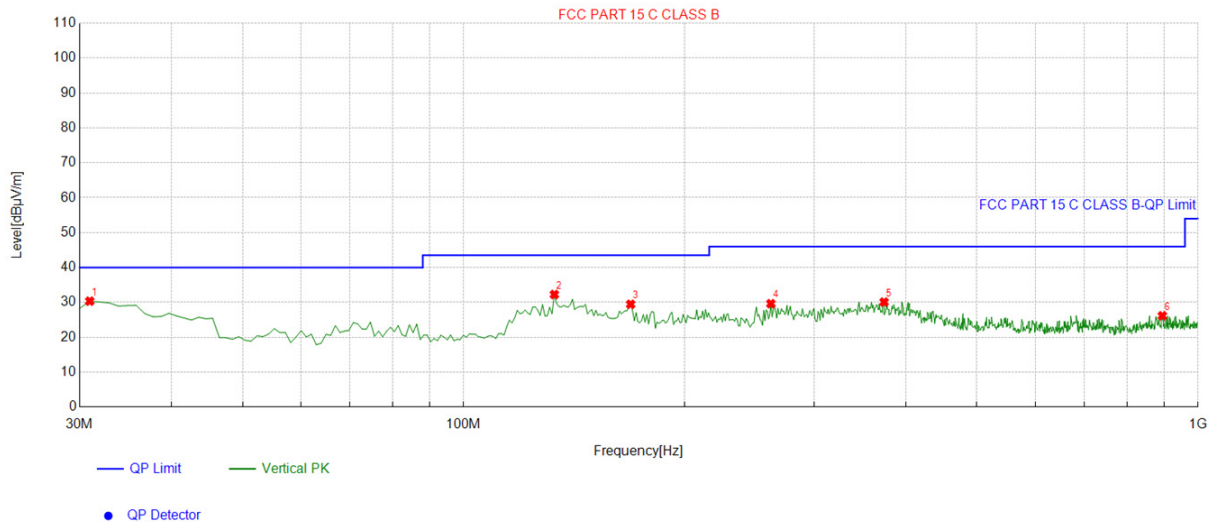


Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	47.477477	-13.86	32.48	18.62	40.00	21.38	100	197	Horizontal
2	138.74874	-17.98	49.43	31.45	43.50	12.05	100	249	Horizontal
3	205.74574	-15.25	49.60	34.35	43.50	9.15	100	169	Horizontal
4	261.09109	-13.28	44.92	31.64	46.00	14.36	100	106	Horizontal
5	444.60460	-8.64	35.79	27.15	46.00	18.85	100	155	Horizontal
6	886.39639	-1.64	28.29	26.65	46.00	19.35	100	306	Horizontal

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



Vertical



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.970971	-15.75	46.10	30.35	40.00	9.65	100	76	Vertical
2	132.92292	-17.24	49.50	32.26	43.50	11.24	100	204	Vertical
3	168.84884	-17.23	46.69	29.46	43.50	14.04	100	193	Vertical
4	262.06206	-13.24	42.87	29.63	46.00	16.37	100	186	Vertical
5	373.72372	-9.89	39.98	30.09	46.00	15.91	100	329	Vertical
6	894.16416	-1.20	27.35	26.15	46.00	19.85	100	232	Vertical

Remark: Factor = Cable loss + Antenna factor + Attenuator – Pre-amplifier; Level = Reading + Factor; Margin = Limit – Level

Harmonics and Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBµV/m)	Limit@3m (dBµV/m)
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--	--	--
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- Note:** 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor
- 2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement



Above 1GHz

Radiated Emission Test

LOW CH 149 (802.11 a Mode with 5.8G)/5745

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	52.17	-4.59	47.58	68.2	-20.62	peak
11096	51.24	4.21	55.45	74	-18.55	peak
11096	31.08	4.21	35.29	54	-18.71	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	52.07	-4.59	47.48	68.2	-20.72	peak
11096	50.55	4.21	54.76	74	-19.24	peak
11096	30.21	4.21	34.42	54	-19.58	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



MID CH157 (802.11 a Mode with 5.8G)/5785

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	52.15	-4.59	47.56	68.2	-20.64	peak
10523	51.24	4.21	55.45	68.2	-12.75	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	53.75	-4.59	49.16	68.2	-19.04	peak
10523	52.62	4.21	56.83	68.2	-11.37	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit





HIGH CH 165 (802.11a Mode with 5.8G)/5825

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	55.16	-4.59	50.57	74	-23.43	peak
2705	41.24	-4.59	36.65	54	-17.35	AVG
11717	50.82	4.84	55.66	74	-18.34	peak
11717	36.75	4.84	41.59	54	-12.41	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	56.04	-4.59	51.45	74	-22.55	peak
2705	41.21	-4.59	36.62	54	-17.38	AVG
11717	50.18	4.84	55.02	74	-18.98	peak
11717	34.77	4.84	39.61	54	-14.39	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



5.8G 802.11n20 Mode

LOW CH 149

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	53.12	-4.59	48.53	68.2	-19.67	peak
11096	49.35	4.21	53.56	74	-20.44	peak
11096	31.04	4.21	35.25	54	-18.75	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	51.11	-4.59	46.52	68.2	-21.68	peak
11096	52.26	4.21	56.47	74	-17.53	peak
11096	31.78	4.21	35.99	54	-18.01	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



MID CH157

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	53.43	-4.59	48.84	68.2	-19.36	peak
10523	52.52	4.21	56.73	68.2	-11.47	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	52.36	-4.59	47.77	68.2	-20.43	peak
10523	53.13	4.21	57.34	68.2	-10.86	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



HIGH CH165

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	60.27	-4.59	55.68	74	-18.32	peak
2705	43.68	-4.59	39.09	54	-14.91	AVG
11717	49.95	4.84	54.79	74	-19.21	peak
11717	36.41	4.84	41.25	54	-12.75	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	58.36	-4.59	53.77	74	-20.23	peak
2705	43.06	-4.59	38.47	54	-15.53	AVG
11717	49.15	4.84	53.99	74	-20.01	peak
11717	37.47	4.84	42.31	54	-11.69	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



5.8G 802.11n40 Mode

LOW CH 151

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	52.18	-4.59	47.59	68.2	-20.61	peak
11096	52.32	4.21	56.53	74	-17.47	peak
11096	31.06	4.21	35.27	54	-18.73	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	51.06	-4.59	46.47	68.2	-21.73	peak
11096	50.35	4.21	54.56	74	-19.44	peak
11096	31.88	4.21	36.09	54	-17.91	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



MID CH159

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
3172	52.44	-4.59	47.85	68.2	-20.35	peak
10523	50.96	4.21	55.17	68.2	-13.03	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
3172	54.31	-4.59	49.72	68.2	-18.48	peak
10523	53.25	4.21	57.46	68.2	-10.74	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



5.8G 802.11ac20 Mode

LOW CH 149

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	51.63	-4.59	47.04	68.2	-21.16	peak
11096	52.29	4.21	56.5	74	-17.5	peak
11096	30.44	4.21	34.65	54	-19.35	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	51.96	-4.59	47.37	68.2	-20.83	peak
11096	52.54	4.21	56.75	74	-17.25	peak
11096	30.37	4.21	34.58	54	-19.42	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



MID CH157

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	50.25	-4.59	45.66	68.2	-22.54	peak
10523	50.68	4.21	54.89	68.2	-13.31	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	56.37	-4.59	51.78	68.2	-16.42	peak
10523	50.65	4.21	54.86	68.2	-13.34	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit





HIGH CH165

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	54.05	-4.59	49.46	74	-24.54	peak
2705	41.26	-4.59	36.67	54	-17.33	AVG
11717	48.78	4.84	53.62	74	-20.38	peak
11717	35.49	4.84	40.33	54	-13.67	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	54.27	-4.59	49.68	74	-24.32	peak
2705	43.65	-4.59	39.06	54	-14.94	AVG
11717	48.35	4.84	53.19	74	-20.81	peak
11717	34.81	4.84	39.65	54	-14.35	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



5.8G 802.11ac40 Mode

LOW CH 151

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	52.16	-4.59	47.57	68.2	-20.63	peak
11096	51.26	4.21	55.47	74	-18.53	peak
11096	32.35	4.21	36.56	54	-17.44	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	52.63	-4.59	48.04	68.2	-20.16	peak
11096	50.27	4.21	54.48	74	-19.52	peak
11096	32.06	4.21	36.27	54	-17.73	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



5.8G 802.11ax20 Mode

LOW CH 149

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	51.96	-4.59	47.37	68.2	-20.83	peak
11096	50.66	4.21	54.87	74	-19.13	peak
11096	31.25	4.21	35.46	54	-18.54	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	53.02	-4.59	48.43	68.2	-19.77	peak
11096	52.24	4.21	56.45	74	-17.55	peak
11096	31.06	4.21	35.27	54	-18.73	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



MID CH157

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	50.26	-4.59	45.67	68.2	-22.53	peak
10523	51.05	4.21	55.26	68.2	-12.94	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
3172	51.16	-4.59	46.57	68.2	-21.63	peak
10523	50.45	4.21	54.66	68.2	-13.54	peak

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit



HIGH CH165

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	55.23	-4.59	50.64	74	-23.36	peak
2705	42.66	-4.59	38.07	54	-15.93	AVG
11717	49.71	4.84	54.55	74	-19.45	peak
11717	34.75	4.84	39.59	54	-14.41	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2705	56.48	-4.59	51.89	74	-22.11	peak
2705	43.85	-4.59	39.26	54	-14.74	AVG
11717	49.01	4.84	53.85	74	-20.15	peak
11717	34.49	4.84	39.33	54	-14.67	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



5.8G 802.11ax40 Mode

LOW CH 151

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	50.92	-4.59	46.33	68.2	-21.87	peak
11096	50.83	4.21	55.04	74	-18.96	peak
11096	30.92	4.21	35.13	54	-18.87	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	53.23	-4.59	48.64	68.2	-19.56	peak
11096	50.57	4.21	54.78	74	-19.22	peak
11096	31.86	4.21	36.07	54	-17.93	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level - Limit

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



### 4.8 Frequency Stability Measurement

#### 4.8.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 Section 15.407(g)
<b>Test Method:</b>	ANSI C63.10: 2013
<b>Limit:</b>	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 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.
<b>Test Setup:</b>	<pre> graph LR     SA[Spectrum Analyzer] --- EUT[EUT]     subgraph TC [Temperature Chamber]         EUT     end     P[AC/DC Power supply] --- EUT </pre>
<b>Test Procedure:</b>	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.
<b>Test Result:</b>	PASS
<b>Remark:</b>	N/A



Test Result as follows:

Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	10.8V	5744.961	-39	5825.012	12
	12.0V	5744.979	-21	5824.993	-7
	13.2V	5745.045	45	5825.011	11

Mode	Temperature (°C)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	-30	5744.962	-38	5824.951	-49
	-20	5745.015	15	5825.018	18
	-10	5744.982	-18	5824.963	-37
	0	5745.039	39	5824.988	-12
	10	5744.975	-25	5824.971	-29
	20	5744.974	-26	5824.976	-24
	30	5744.966	-34	5824.968	-32
	40	5744.975	-25	5825.029	29
	50	5744.962	-38	5824.982	-18

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## 4.9 Antenna Requirement

### Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.249, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

### Antenna Connected Construction

The antenna used in this product is an External Antenna, with non-standard SMA connector, need professional installation, not easy to remove. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 4.66dBi.

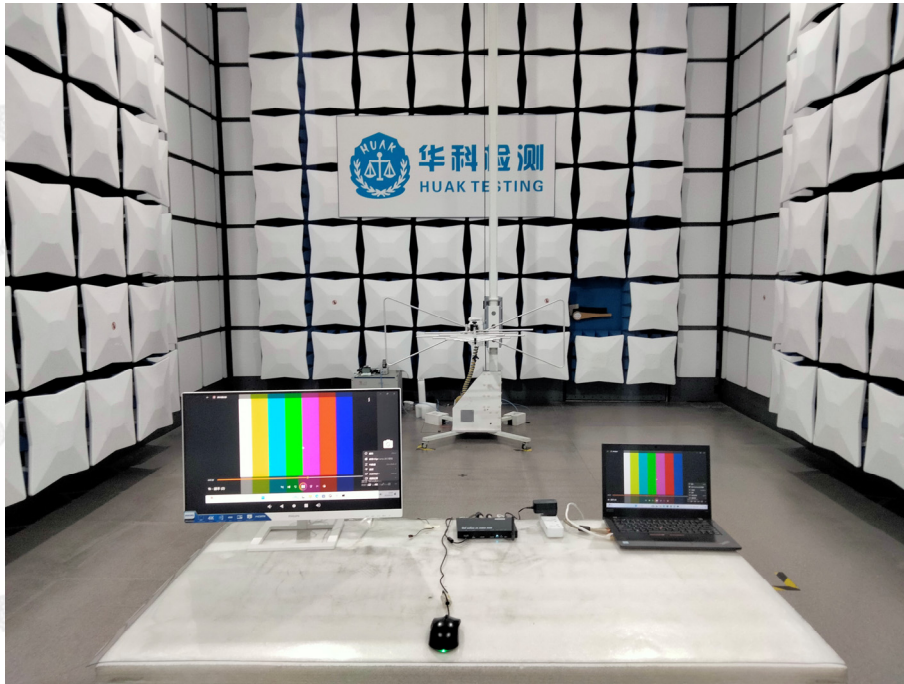
### WIFI ANTENNA





## 5. Photographs of Test Setup

### Radiated Emission





### Conducted Emission



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## 6. Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos

-----End of test report-----

