Mid

High

802.11ac(HT40)

Low

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High

802.11ac(T80)

802.11ax(HT20)

Low

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Mid

High

802.11ax(HT40)

Low

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High

802.11ax(T80)

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For MIMO antenna port 1+antenna port 2

Configuration Band IV (5725 - 5850 MHz)				
Mode	Test channel	Power Density (dBm)	Limit (dBm)	Result
11n(HT20)	CH149	0.05	30	PASS
11n(HT20)	CH157	1.90	30	PASS
11n(HT20)	CH161	3.96	30	PASS
11n(HT40)	CH151	-1.23	30	PASS
11n(HT40)	CH159	1.36	30	PASS
11ac(HT20)	CH149	-0.43	30	PASS
11ac(HT20)	CH157	1.73	30	PASS
11ac(HT20)	CH161	3.57	30	PASS
11ac(HT40)	CH151	-0.78	30	PASS
11ac(HT40)	CH159	0.49	30	PASS
11ac(HT80)	CH155	-1.61	30	PASS
11ax(HT20)	CH149	3.83	30	PASS
11ax(HT20)	CH157	4.75	30	PASS
11ax(HT20)	CH161	5.38	30	PASS
11ax(HT40)	CH151	1.33	30	PASS
11ax(HT40)	CH159	1.81	30	PASS
11ax(HT80)	CH155	-0.80	30	PASS
	Note: 1 According to KDB 662911, Result power = $10\log(10^{(ant1/10)}+10^{(ant2/10)})$. 2 Result unit: W, The end result is converted to units of dBm.			

Note: This product supports antenna 1 and antenna 2 launch, but only support 802.11 n/ac/ax for MIMO mode, not support 802.11 a for MIMO mode.

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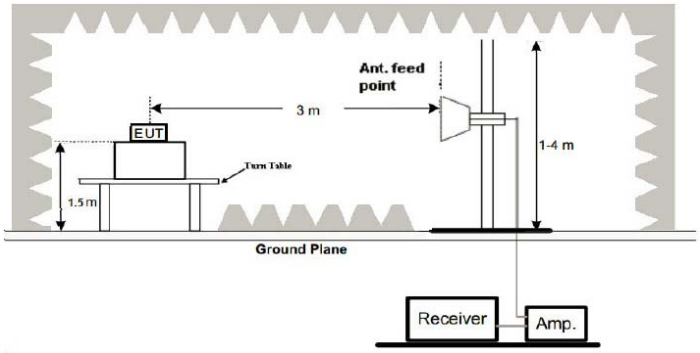
4.6. BAND EDGE

4.6.1. Test Specification

Test Requirement:	FCC CFR47 Part 15E Section 15.407
Test Method:	ANSI C63.10 2013
Limit:	(1)For transmitters operating in the 5.725-5.85 GHz band: (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. The limit of frequency below 1GHz and which fall in restricted ba nds should complies 15.209.
Test Setup:	
Test Mode:	Transmitting mode with modulation
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 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.

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	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 Result:	PASS

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4.6.2. Test Instruments

Radiated Emission Test Site (966)					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Receiver	R&S	ESRP3	HKE-005	Feb. 17, 2023	Feb. 16, 2024
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	Feb. 16, 2024
Preamplifier	EMCI	EMC051845SE	HKE-015	Feb. 17, 2023	Feb. 16, 2024
Preamplifier	Agilent	83051A	HKE-016	Feb. 17, 2023	Feb. 16, 2024
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Feb. 17, 2023	Feb. 16, 2024
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Feb. 17, 2023	Feb. 16, 2024
Horn antenna	Schwarzbeck	9120D	HKE-013	Feb. 17, 2023	Feb. 16, 2024
Antenna Mast	Keleto	CC-A-4M	N/A	N/A	N/A
Position controller	Taiwan MF	MF7802	HKE-011	Feb. 17, 2023	Feb. 16, 2024
Radiated test software	Tonscend	TS+ Rev 2.5.0.0	HKE-082	N/A	N/A
RF cable (9KHz-1GHz)	Times	381806-001	N/A	N/A	N/A
Hf antenna	Schwarzbeck	LB-180400-KF	HKE-031	Feb. 17, 2023	Feb. 16, 2024
RF cable	Tonscend	1-18G	HKE-099	Feb. 17, 2023	Feb. 16, 2024
RF cable	Times	1-40G	HKE-034	Feb. 17, 2023	Feb. 16, 2024
Horn Antenna	Schewarzbeck	BBHA 9170	HKE-017	Feb. 17, 2023	Feb. 16, 2024
Spectrum analyzer	R&S	FSP40	HKE-025	Feb. 17, 2023	Feb. 16, 2024

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

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4.6.3. Test Data

All modes of operation were investigated and the worst-case emissions of Ant. 1 are reported.

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	52.83	-2.06	50.77	68.2	-17.43	peak
5700	83.79	-1.96	81.83	105.2	-23.37	peak
5720	87.97	-2.87	85.1	110.8	-25.7	peak
5725	105.66	-2.14	103.52	122.2	-18.68	peak
Remark: Factor = Antenna Factor + Cable Loss – 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	55.33	-2.06	53.27	68.2	-14.93	peak
5700	82.71	-1.96	80.75	105.2	-24.45	peak
5720	89.65	-2.87	86.78	110.8	-24.02	peak
5725	104.23	-2.14	102.09	122.2	-20.11	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	101.71	-1.97	99.74	122.2	-22.46	peak
5855	89.9	-2.13	87.77	110.8	-23.03	peak
5875	81.8	-2.65	79.15	105.2	-26.05	peak
5925	52.31	-2.28	50.03	68.2	-18.17	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
5850	101.27	-1.97	99.3	122.2	-22.9	peak
5855	92.46	-2.13	90.33	110.8	-20.47	peak
5875	82.36	-2.65	79.71	105.2	-25.49	peak
5925	51.69	-2.28	49.41	68.2	-18.79	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	53.18	-2.06	51.12	68.2	-17.08	peak
5700	81.76	-1.96	79.8	105.2	-25.4	peak
5720	88.25	-2.87	85.38	110.8	-25.42	peak
5725	105.34	-2.14	103.2	122.2	-19	peak
Remark: Factor = Antenna Factor + Cable Loss – 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	52.81	-2.06	50.75	68.2	-17.45	peak
5700	83.84	-1.96	81.88	105.2	-23.32	peak
5720	87.56	-2.87	84.69	110.8	-26.11	peak
5725	107.03	-2.14	104.89	122.2	-17.31	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	100.81	-1.97	98.84	122.2	-23.36	peak
5855	90.65	-2.13	88.52	110.8	-22.28	peak
5875	80.95	-2.65	78.3	105.2	-26.9	peak
5925	51.69	-2.28	49.41	68.2	-18.79	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
5850	100.81	-1.97	98.84	122.2	-23.36	peak
5855	90.65	-2.13	88.52	110.8	-22.28	peak
5875	80.95	-2.65	78.3	105.2	-26.9	peak
5925	51.69	-2.28	49.41	68.2	-18.79	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	54.98	-2.06	52.92	68.2	-15.28	peak
5700	82.13	-1.96	80.17	105.2	-25.03	peak
5720	87.92	-2.87	85.05	110.8	-25.75	peak
5725	106.75	-2.14	104.61	122.2	-17.59	peak
Remark: Factor = Antenna Factor + Cable Loss – 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	55.6	-2.06	53.54	68.2	-14.66	peak
5700	83.26	-1.96	81.3	105.2	-23.9	peak
5720	88.26	-2.87	85.39	110.8	-25.41	peak
5725	106.03	-2.14	103.89	122.2	-18.31	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	100.17	-1.97	98.2	122.2	-24	peak
5855	92.37	-2.13	90.24	110.8	-20.56	peak
5875	82.56	-2.65	79.91	105.2	-25.29	peak
5925	50.11	-2.28	47.83	68.2	-20.37	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
5850	101.93	-1.97	99.96	122.2	-22.24	peak
5855	89.64	-2.13	87.51	110.8	-23.29	peak
5875	82.58	-2.65	79.93	105.2	-25.27	peak
5925	52.24	-2.28	49.96	68.2	-18.24	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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Operation Mode: 802.11ac20 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	54.87	-2.06	52.81	68.2	-15.39	peak
5700	84.15	-1.96	82.19	105.2	-23.01	peak
5720	87.99	-2.87	85.12	110.8	-25.68	peak
5725	104.59	-2.14	102.45	122.2	-19.75	peak
Remark: Factor = Antenna Factor + Cable Loss – 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	55.09	-2.06	53.03	68.2	-15.17	peak
5700	82.35	-1.96	80.39	105.2	-24.81	peak
5720	89.91	-2.87	87.04	110.8	-23.76	peak
5725	106.33	-2.14	104.19	122.2	-18.01	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	100.8	-1.97	98.83	122.2	-23.37	peak
5855	89.94	-2.13	87.81	110.8	-22.99	peak
5875	82.33	-2.65	79.68	105.2	-25.52	peak
5925	51.74	-2.28	49.46	68.2	-18.74	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
5850	100.28	-1.97	98.31	122.2	-23.89	peak
5855	90.5	-2.13	88.37	110.8	-22.43	peak
5875	81.11	-2.65	78.46	105.2	-26.74	peak
5925	52.47	-2.28	50.19	68.2	-18.01	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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Operation Mode: 802.11ac40 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	54.46	-2.06	52.4	68.2	-15.8	peak
5700	82.27	-1.96	80.31	105.2	-24.89	peak
5720	88.84	-2.87	85.97	110.8	-24.83	peak
5725	104.98	-2.14	102.84	122.2	-19.36	peak
Remark: Factor = Antenna Factor + Cable Loss – 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	53.84	-2.06	51.78	68.2	-16.42	peak
5700	84.12	-1.96	82.16	105.2	-23.04	peak
5720	87.28	-2.87	84.41	110.8	-26.39	peak
5725	106.96	-2.14	104.82	122.2	-17.38	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	100.81	-1.97	98.84	122.2	-23.36	peak
5855	89.98	-2.13	87.85	110.8	-22.95	peak
5875	81.36	-2.65	78.71	105.2	-26.49	peak
5925	49.54	-2.28	47.26	68.2	-20.94	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
5850	101.64	-1.97	99.67	122.2	-22.53	peak
5855	90.48	-2.13	88.35	110.8	-22.45	peak
5875	80.1	-2.65	77.45	105.2	-27.75	peak
5925	50.91	-2.28	48.63	68.2	-19.57	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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Operation Mode: 802.11ac80 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	53.06	-2.06	51	68.2	-17.2	peak
5700	82.83	-1.96	80.87	105.2	-24.33	peak
5720	87.27	-2.87	84.4	110.8	-26.4	peak
5725	107.04	-2.14	104.9	122.2	-17.3	peak
Remark: Factor = Antenna Factor + Cable Loss – 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	53.21	-2.06	51.15	68.2	-17.05	peak
5700	82.91	-1.96	80.95	105.2	-24.25	peak
5720	88.34	-2.87	85.47	110.8	-25.33	peak
5725	107.06	-2.14	104.92	122.2	-17.28	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	100.82	-1.97	98.85	122.2	-23.35	peak
5855	91.36	-2.13	89.23	110.8	-21.57	peak
5875	82.34	-2.65	79.69	105.2	-25.51	peak
5925	49.82	-2.28	47.54	68.2	-20.66	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
5850	100.92	-1.97	98.95	122.2	-23.25	peak
5855	91.27	-2.13	89.14	110.8	-21.66	peak
5875	82.24	-2.65	79.59	105.2	-25.61	peak
5925	49.87	-2.28	47.59	68.2	-20.61	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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Operation Mode: 802.11ax20 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	53.57	-2.06	51.51	68.2	-16.69	peak
5700	83.98	-1.96	82.02	105.2	-23.18	peak
5720	88.87	-2.87	86	110.8	-24.8	peak
5725	106.28	-2.14	104.14	122.2	-18.06	peak
Remark: Factor = Antenna Factor + Cable Loss – 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	55.24	-2.06	53.18	68.2	-15.02	peak
5700	81.44	-1.96	79.48	105.2	-25.72	peak
5720	88.16	-2.87	85.29	110.8	-25.51	peak
5725	104.83	-2.14	102.69	122.2	-19.51	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	100.76	-1.97	98.79	122.2	-23.41	peak
5855	90.23	-2.13	88.1	110.8	-22.7	peak
5875	80.35	-2.65	77.7	105.2	-27.5	peak
5925	52.38	-2.28	50.1	68.2	-18.1	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
5850	100.09	-1.97	98.12	122.2	-24.08	peak
5855	90.93	-2.13	88.8	110.8	-22	peak
5875	80.15	-2.65	77.5	105.2	-27.7	peak
5925	51.59	-2.28	49.31	68.2	-18.89	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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Operation Mode: 802.11ax40 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	54.75	-2.06	52.69	68.2	-15.51	peak
5700	82.98	-1.96	81.02	105.2	-24.18	peak
5720	88.11	-2.87	85.24	110.8	-25.56	peak
5725	106.78	-2.14	104.64	122.2	-17.56	peak
Remark: Factor = Antenna Factor + Cable Loss – 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	54.64	-2.06	52.58	68.2	-15.62	peak
5700	83.81	-1.96	81.85	105.2	-23.35	peak
5720	87.85	-2.87	84.98	110.8	-25.82	peak
5725	106.84	-2.14	104.7	122.2	-17.5	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	100.57	-1.97	98.6	122.2	-23.6	peak
5855	92.39	-2.13	90.26	110.8	-20.54	peak
5875	81.25	-2.65	78.6	105.2	-26.6	peak
5925	51.52	-2.28	49.24	68.2	-18.96	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
5850	100.98	-1.97	99.01	122.2	-23.19	peak
5855	89.85	-2.13	87.72	110.8	-23.08	peak
5875	81.42	-2.65	78.77	105.2	-26.43	peak
5925	50.33	-2.28	48.05	68.2	-20.15	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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Operation Mode: 802.11ax80 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	52.78	-2.06	50.72	68.2	-17.48	peak
5700	83	-1.96	81.04	105.2	-24.16	peak
5720	87.41	-2.87	84.54	110.8	-26.26	peak
5725	105.83	-2.14	103.69	122.2	-18.51	peak
Remark: Factor = Antenna Factor + Cable Loss – 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	53.97	-2.06	51.91	68.2	-16.29	peak
5700	82.38	-1.96	80.42	105.2	-24.78	peak
5720	88.89	-2.87	86.02	110.8	-24.78	peak
5725	106.58	-2.14	104.44	122.2	-17.76	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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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	101.45	-1.97	99.48	122.2	-22.72	peak
5855	90.29	-2.13	88.16	110.8	-22.64	peak
5875	82.65	-2.65	80	105.2	-25.2	peak
5925	49.73	-2.28	47.45	68.2	-20.75	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
5850	99.92	-1.97	97.95	122.2	-24.25	peak
5855	91.84	-2.13	89.71	110.8	-21.09	peak
5875	81.54	-2.65	78.89	105.2	-26.31	peak
5925	49.64	-2.28	47.36	68.2	-20.84	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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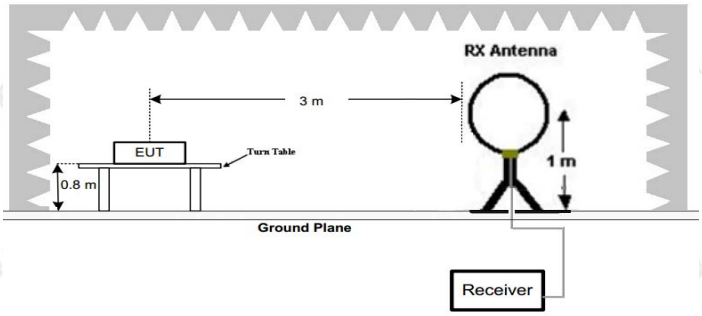
4.7. SPURIOUS EMISSION

4.7.1.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205</td></tr>
<tr><td>Test Method:</td><td>KDB 789033 D02 v02r01</td></tr>
<tr><td>Frequency Range:</td><td>9kHz to 40GHz</td></tr>
<tr><td>Measurement Distance:</td><td>3 m</td></tr>
<tr><td>Antenna Polarization:</td><td>Horizontal & Vertical</td></tr>
<tr><td>Operation mode:</td><td>Transmitting mode with modulation</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<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>
</table>
</td></tr>
<tr><td>Limit:</td><td>(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.
(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.
(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.
(4) For transmitters operating in the 5.725-5.85 GHz band:
(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.
The limit of frequency below 1GHz and which fall in restricted b ands should complies 15.209.</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions below 30MHz
 

30MHz to 1GHz</td></tr>
</table>

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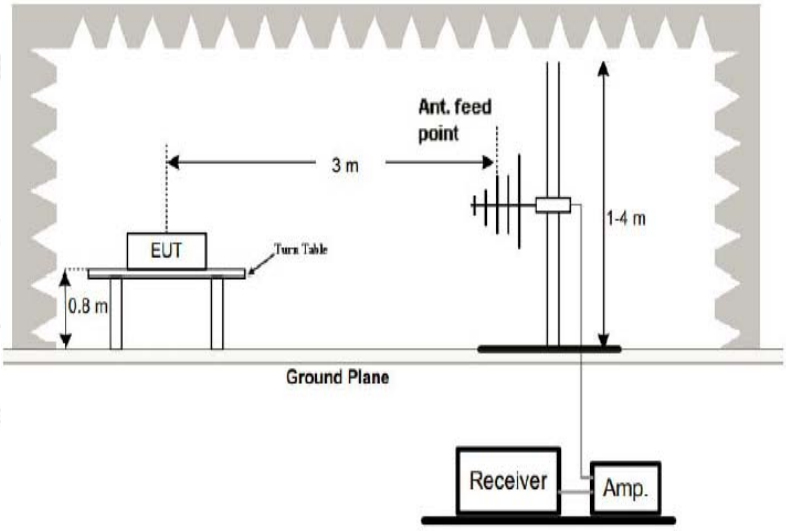
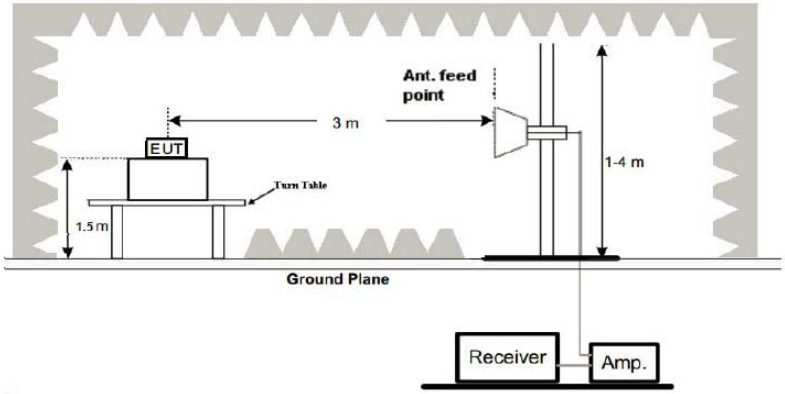
	 Above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted 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.

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	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 bere-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test results:	PASS

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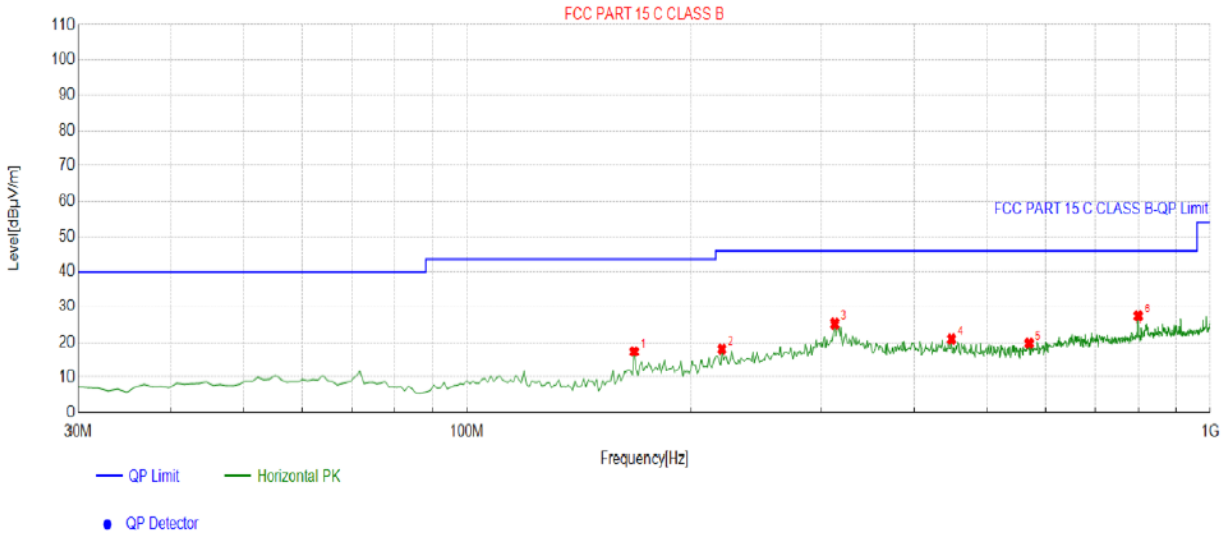
4.7.2. Test Data

test mode: TX 802.11a 5745MHz

All the test modes completed for test. The worst case of Radiated Emission; the test data of this mode was reported.

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	167.8779	-16.99	34.31	17.32	43.50	26.18	100	93	Horizontal
2	220.3103	-14.26	32.36	18.10	46.00	27.90	100	101	Horizontal
3	312.5526	-11.77	36.89	25.12	46.00	20.88	100	61	Horizontal
4	448.4885	-8.27	29.22	20.95	46.00	25.05	100	261	Horizontal
5	570.8308	-5.65	25.40	19.75	46.00	26.25	100	44	Horizontal
6	799.9800	-1.81	28.91	27.10	46.00	18.90	100	152	Horizontal

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

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Vertical

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	71.7518	-16.40	33.35	16.95	40.00	23.05	100	311	Vertical
2	163.9940	-17.19	37.95	20.76	43.50	22.74	100	195	Vertical
3	215.4555	-14.43	30.12	15.69	43.50	27.81	100	230	Vertical
4	264.0040	-12.71	30.70	17.99	46.00	28.01	100	22	Vertical
5	328.0881	-11.59	33.83	22.24	46.00	23.76	100	64	Vertical
6	819.3994	-1.47	27.85	26.38	46.00	19.62	100	356	Vertical

Remark: Factor = Cable loss + Antenna factor – Preamplifier; 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)
--	--	--
--	--	--
--	--	--
--	--	--

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

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Above 1GHz

RADIATED EMISSION TEST

All modes of operation were investigated and the worst-case of Ant 1 are reported.

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	48.72	-4.59	44.13	68.2	-24.07	peak
11096	46.43	4.21	50.64	74	-23.36	peak
11096	34.3	4.21	38.51	54	-15.49	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
3368	49.41	-4.59	44.82	68.2	-23.38	peak
11096	46.73	4.21	50.94	74	-23.06	peak
11096	36.23	4.21	40.44	54	-13.56	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3172	54.16	-4.59	49.57	68.2	-18.63	peak
10523	52.79	4.21	57	68.2	-11.2	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
3172	54.16	-4.59	49.57	68.2	-18.63	peak
10523	53.67	4.21	57.88	68.2	-10.32	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2705	57.46	-4.59	52.87	74	-21.13	peak
2705	47.32	-4.59	42.73	54	-11.27	AVG
11717	51.69	4.84	56.53	74	-17.47	peak
11717	35.66	4.84	40.5	54	-13.5	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
2705	61.34	-4.59	56.75	74	-17.25	peak
2705	45.67	-4.59	41.08	54	-12.92	AVG
11717	50.79	4.84	55.63	74	-18.37	peak
11717	36.44	4.84	41.28	54	-12.72	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; 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.

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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	58.88	-4.59	54.29	68.2	-13.91	peak
11096	54.35	4.21	58.56	74	-15.44	peak
11096	38.09	4.21	42.3	54	-11.7	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
3368	60.47	-4.59	55.88	68.2	-12.32	peak
11096	54.04	4.21	58.25	74	-15.75	peak
11096	36.76	4.21	40.97	54	-13.03	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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MID CH157

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3172	53.47	-4.59	48.88	68.2	-19.32	peak
10523	52.99	4.21	57.2	68.2	-11	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
3172	55.79	-4.59	51.2	68.2	-17	peak
10523	52.47	4.21	56.68	68.2	-11.52	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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HIGH CH165

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2705	57.45	-4.59	52.86	74	-21.14	peak
2705	48.44	-4.59	43.85	54	-10.15	AVG
11717	50.23	4.84	55.07	74	-18.93	peak
11717	36.49	4.84	41.33	54	-12.67	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
2705	59.37	-4.59	54.78	74	-19.22	peak
2705	45.16	-4.59	40.57	54	-13.43	AVG
11717	50.23	4.84	55.07	74	-18.93	peak
11717	36.66	4.84	41.5	54	-12.5	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; 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.

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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	57.41	-4.59	52.82	68.2	-15.38	peak
11096	56.34	4.21	60.55	74	-13.45	peak
11096	38.14	4.21	42.35	54	-11.65	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
3368	64.15	-4.59	59.56	68.2	-8.64	peak
11096	55.38	4.21	59.59	74	-14.41	peak
11096	38.14	4.21	42.35	54	-11.65	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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MID CH159

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3172	55.02	-4.59	50.43	68.2	-17.77	peak
10523	53.16	4.21	57.37	68.2	-10.83	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
3172	54.02	-4.59	49.43	68.2	-18.77	peak
10523	52.36	4.21	56.57	68.2	-11.63	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; 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.

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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	58.16	-4.59	53.57	68.2	-14.63	peak
11096	51.34	4.21	55.55	74	-18.45	peak
11096	35.79	4.21	40	54	-14	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
3368	61.35	-4.59	56.76	68.2	-11.44	peak
11096	52.99	4.21	57.2	74	-16.8	peak
11096	36.16	4.21	40.37	54	-13.63	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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MID CH157

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3172	54.16	-4.59	49.57	68.2	-18.63	peak
10523	50.22	4.21	54.43	68.2	-13.77	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
3172	56.34	-4.59	51.75	68.2	-16.45	peak
10523	52.97	4.21	57.18	68.2	-11.02	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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HIGH CH165

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2705	57.16	-4.59	52.57	74	-21.43	peak
2705	47.25	-4.59	42.66	54	-11.34	AVG
11717	53.62	4.84	58.46	74	-15.54	peak
11717	36.49	4.84	41.33	54	-12.67	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
2705	58.16	-4.59	53.57	74	-20.43	peak
2705	47.61	-4.59	43.02	54	-10.98	AVG
11717	51.34	4.84	56.18	74	-17.82	peak
11717	36.66	4.84	41.5	54	-12.5	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; 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.

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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	58.52	-4.59	53.93	68.2	-14.27	peak
11096	54.8	4.21	59.01	74	-14.99	peak
11096	32.29	4.21	36.5	54	-17.5	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
3368	59.91	-4.59	55.32	68.2	-12.88	peak
11096	52.73	4.21	56.94	74	-17.06	peak
11096	31.24	4.21	35.45	54	-18.55	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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5.8G 802.11ac80 Mode

CH 155

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	61.05	-4.59	56.46	68.2	-11.74	peak
11096	54.16	4.21	58.37	74	-15.63	peak
11096	32.94	4.21	37.15	54	-16.85	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
3368	59.26	-4.59	54.67	68.2	-13.53	peak
11096	54	4.21	58.21	74	-15.79	peak
11096	31.74	4.21	35.95	54	-18.05	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; 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.

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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	59.5	-4.59	54.91	68.2	-13.29	peak
11096	54.27	4.21	58.48	74	-15.52	peak
11096	31.56	4.21	35.77	54	-18.23	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
3368	60.3	-4.59	55.71	68.2	-12.49	peak
11096	54.6	4.21	58.81	74	-15.19	peak
11096	33.74	4.21	37.95	54	-16.05	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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MID CH157

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3172	56.49	-4.59	51.9	68.2	-16.3	peak
10523	51.02	4.21	55.23	68.2	-12.97	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
3172	54.19	-4.59	49.6	68.2	-18.6	peak
10523	53.26	4.21	57.47	68.2	-10.73	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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HIGH CH165

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2705	55.7	-4.59	51.11	74	-22.89	peak
2705	48.69	-4.59	44.1	54	-9.9	AVG
11717	51.04	4.84	55.88	74	-18.12	peak
11717	38.12	4.84	42.96	54	-11.04	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
2705	57.44	-4.59	52.85	74	-21.15	peak
2705	49.09	-4.59	44.5	54	-9.5	AVG
11717	50.04	4.84	54.88	74	-19.12	peak
11717	36.31	4.84	41.15	54	-12.85	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; 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.

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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	58.13	-4.59	53.54	68.2	-14.66	peak
11096	52.55	4.21	56.76	74	-17.24	peak
11096	32.66	4.21	36.87	54	-17.13	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
3368	58.97	-4.59	54.38	68.2	-13.82	peak
11096	51.23	4.21	55.44	74	-18.56	peak
11096	33.72	4.21	37.93	54	-16.07	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit						

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MID CH159

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3172	56.32	-4.59	51.73	68.2	-16.47	peak
10523	53.17	4.21	57.38	68.2	-10.82	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
3172	54.19	-4.59	49.6	68.2	-18.6	peak
10523	52.33	4.21	56.54	68.2	-11.66	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; 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.

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MID CH159

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3172	51.34	-4.59	46.75	68.2	-21.45	peak
10523	53.26	4.21	57.47	68.2	-10.73	peak
Remark: Factor = Antenna Factor + Cable Loss – 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
3172	54.02	-4.59	49.43	68.2	-18.77	peak
10523	53.61	4.21	57.82	68.2	-10.38	peak
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; 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.

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5.8G 802.11ax80 Mode

CH 155

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
3368	56.34	-4.59	51.75	68.2	-16.45	peak
11096	54	4.21	58.21	74	-15.79	peak
11096	51.72	4.21	55.93	54	1.93	AVG
Remark: Factor = Antenna Factor + Cable Loss – 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
3368	53.16	-4.59	48.57	68.2	-19.63	peak
11096	54.76	4.21	58.97	74	-15.03	peak
11096	35.86	4.21	40.07	54	-13.93	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; 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.

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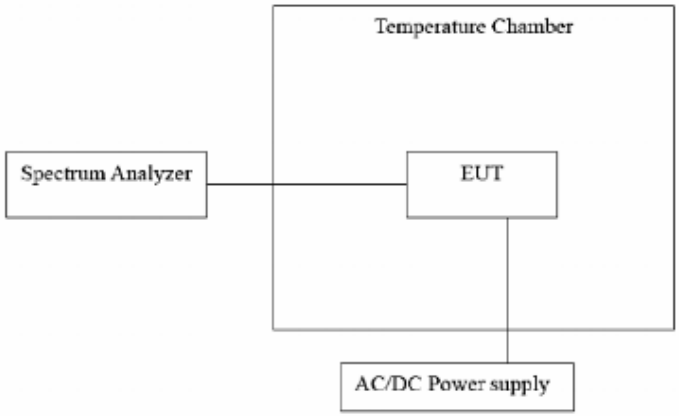
4.8. FREQUENCY STABILITY MEASUREMENT

4.8.1. Test Specification

Test Requirement:	FCC Part15 Section 15.407(g)
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 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.
Test Setup:	
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:	N/A

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Test Result as follows:

Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	4.5V	5744.980	-20	5824.981	-19
	5V	5744.959	-41	5825.008	8
	5.5V	5745.046	46	5825.012	12

Mode	Temperature (℃)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	-30	5745.030	30	5825.018	18
	-20	5744.952	-48	5825.024	24
	-10	5744.982	-18	5825.037	37
	0	5744.968	-32	5824.963	-37
	10	5744.978	-22	5825.019	19
	20	5744.995	-5	5825.012	12
	30	5745.029	29	5825.021	21
	40	5744.972	-28	5825.010	10
	50	5744.990	-10	5825.027	27

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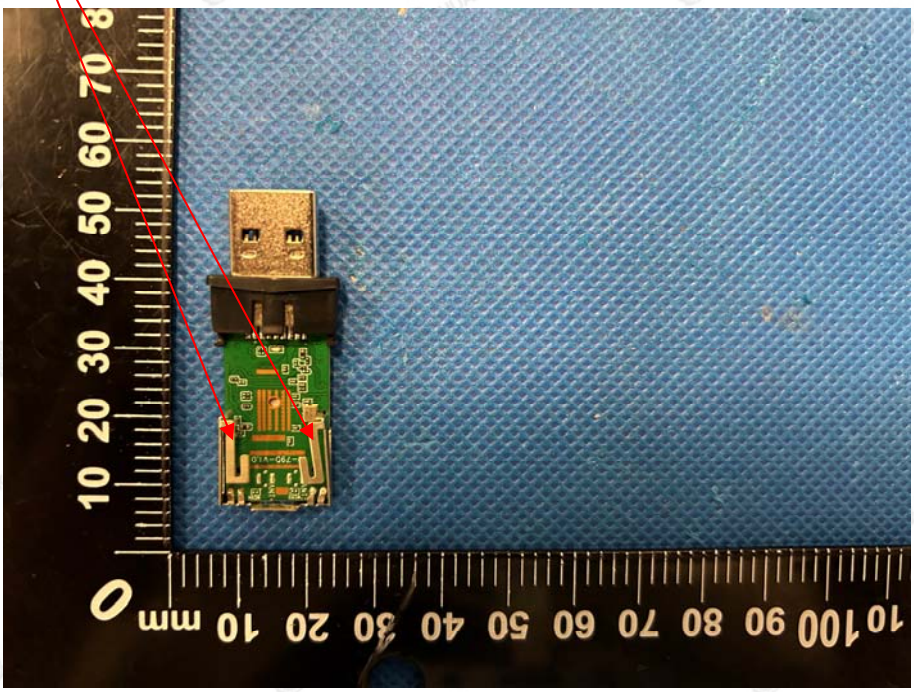
4.9. ANTENNA REQUIREMENT

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 a Shrapnel antenna, which permanently attached. It conforms to the standard requirements. and the best case gain of the antenna is Antenna port 1: 2.68dBi and Antenna port 2: 2.68dBi.

ANTENNA



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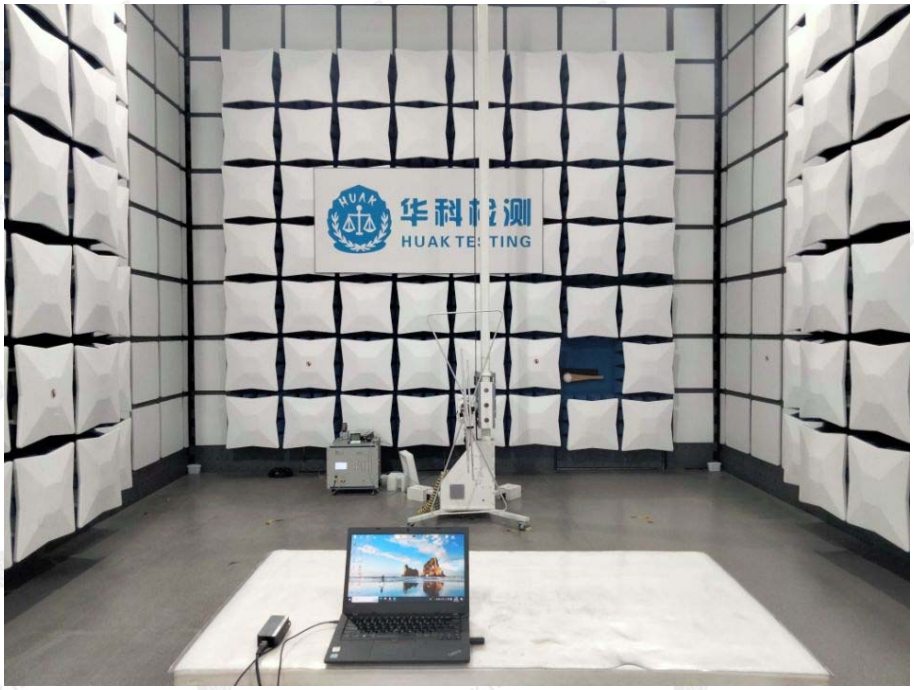
5. PHOTOGRAPHS OF TEST SETUP

Radiated Emission



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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---------

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