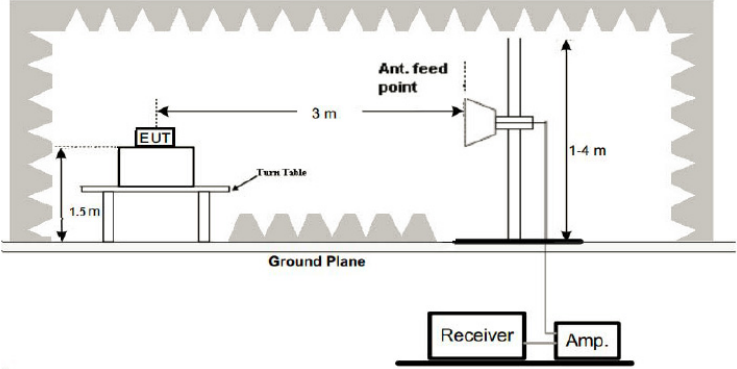




4.6 Band Edge

4.6.1 Test Specification

Test Requirement:	FCC CFR47 Part 15E Section 15.407
Test Method:	ANSI C63.10: 2020
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 bands 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. 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



4.6.2 Test Instruments

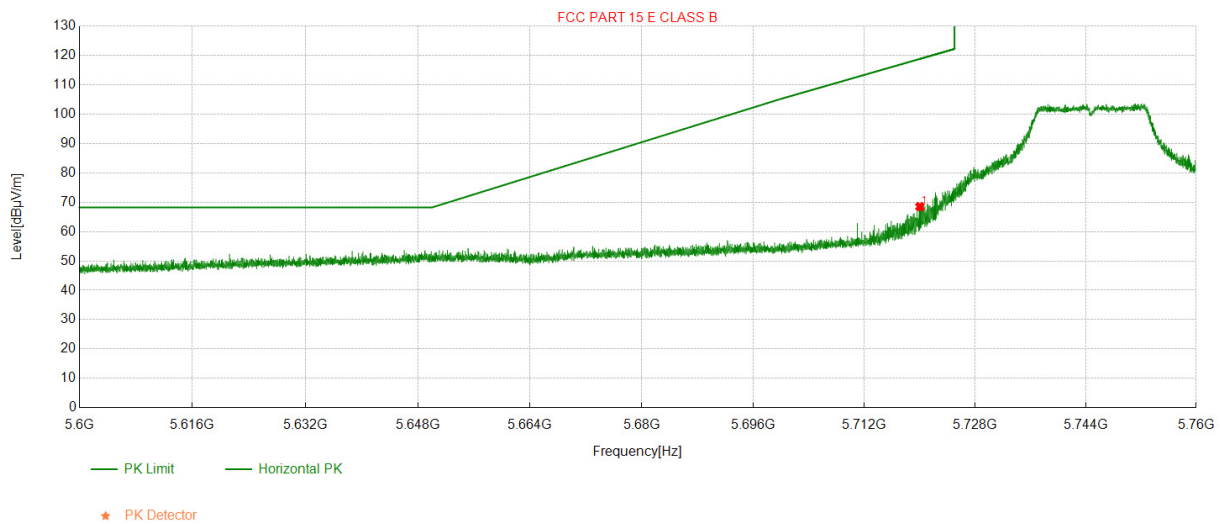
Radiated Emission Test Site (966)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 06, 2026	Feb. 05, 2027
Spectrum analyzer	KEYSIGHT	N9020A	HKE-117	Feb. 06, 2026	Feb. 05, 2027
Spectrum analyzer	R&S	FSV3044	HKE-126	Feb. 06, 2026	Feb. 05, 2027
Preamplifier	Schwarzbeck	EMC051845SE	HKE-006	Feb. 04, 2026	Feb. 03, 2027
Preamplifier	Agilent	83051A	HKE-016	Feb. 04, 2026	Feb. 03, 2027
Preamplifier	QJD	QJD18-40-50	HKE-030	Feb. 05, 2026	Feb. 04, 2027
6dB Attenuator	Pasternack	6dB	HKE-007	Feb. 06, 2026	Feb. 05, 2027
EMI Test Receiver	R&S	ESR-7	HKE-010	Feb. 06, 2026	Feb. 05, 2027
Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	Feb. 06, 2026	Feb. 05, 2028
Loop Antenna	COM-POWER	AL-130R	HKE-014	Feb. 06, 2026	Feb. 05, 2028
Horn Antenna	Schwarzbeck	9120D	HKE-013	Feb. 06, 2026	Feb. 05, 2028
Broadband Horn Antenna	A-INFO	LB-180400-KF	HKE-031	Feb. 06, 2026	Feb. 05, 2028
EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/
RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE-184	/	/

4.6.3 Test Data

All the test modes completed for test. Only the worst result was reported as below:

802.11n(HT20)-5745

Antenna polarity: Horizontal

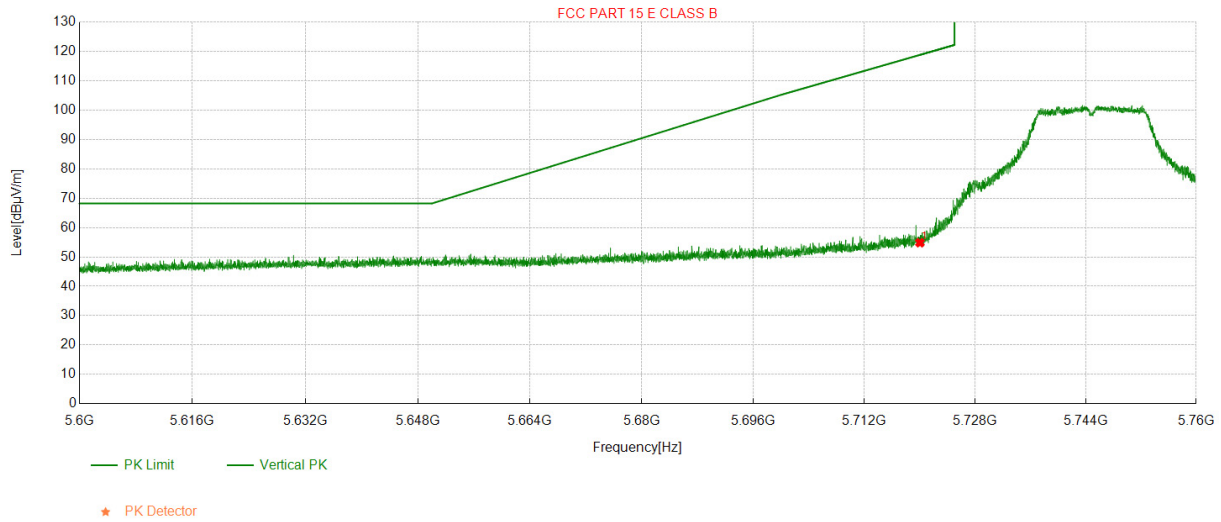


Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5720.000	74.55	68.48	-6.07	118.80	50.32	150	268	Horizontal

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

Antenna polarity: Vertical



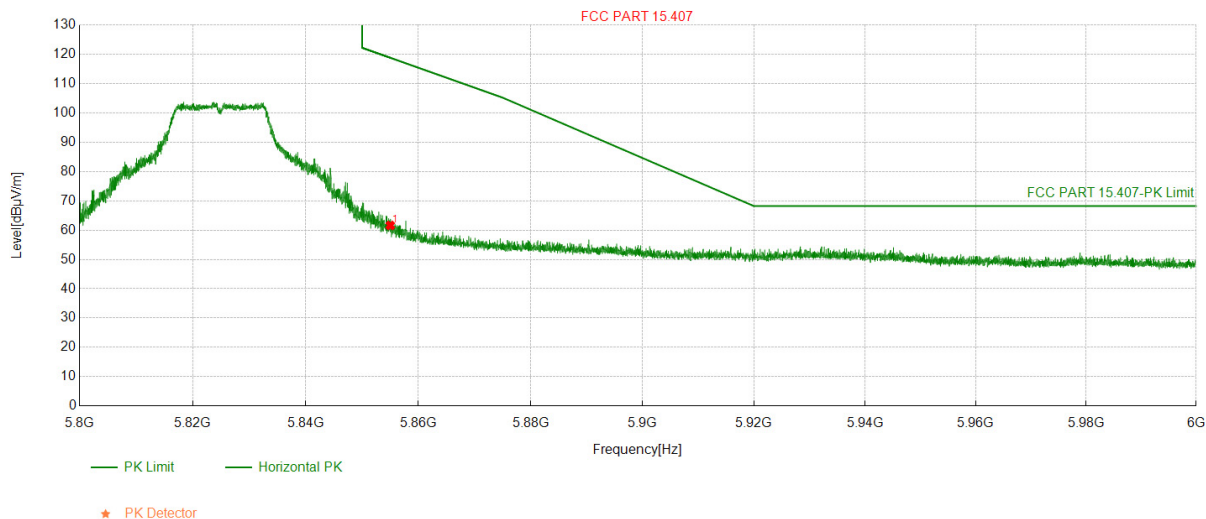
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5720.000	60.92	54.85	-6.07	118.80	63.95	150	198	Vertical

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

802.11n(HT20)-5825

Antenna polarity: Horizontal

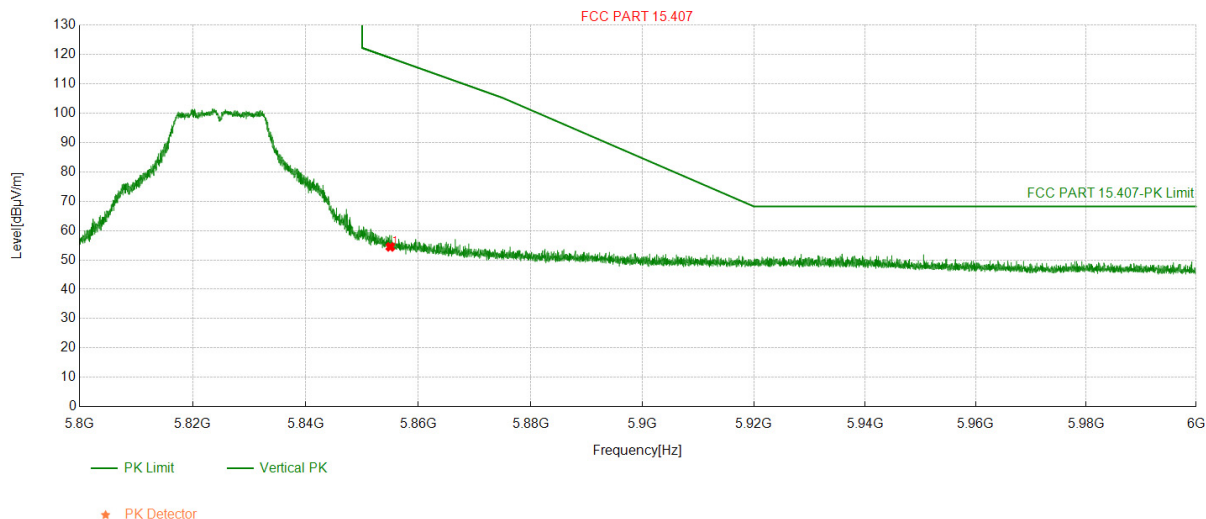


Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5855.000	67.41	61.62	-5.79	118.80	57.18	150	255	Horizontal

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

Antenna polarity: Vertical



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5855.000	60.23	54.44	-5.79	118.80	64.36	150	191	Vertical

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



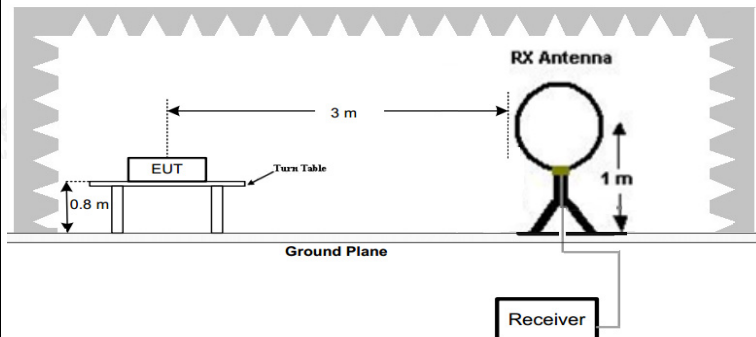
4.7 Spurious Emission

4.7.1 Test Specification

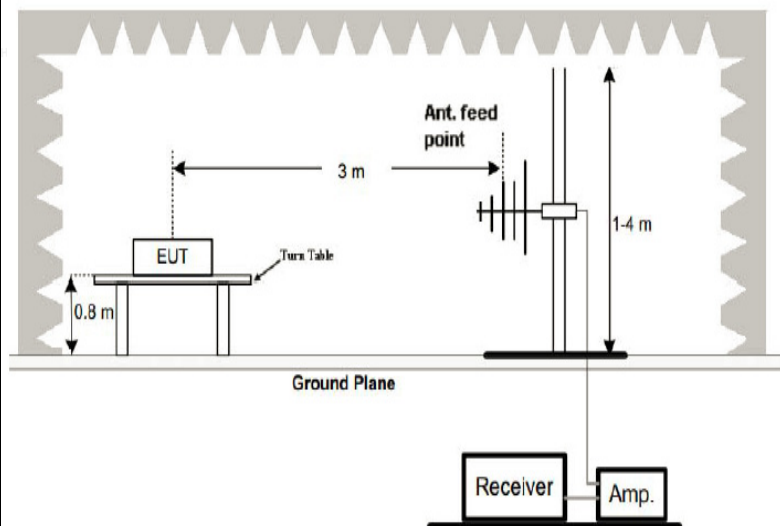
Test Requirement:	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205				
Test Method:	KDB 789033 D02 v02r01				
Frequency Range:	9kHz to 40GHz				
Measurement Distance:	3 m				
Antenna Polarization:	Horizontal & Vertical				
Operation Mode:	Transmitting mode with modulation				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit:	(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 bands should comply 15.209.				

Test Setup:

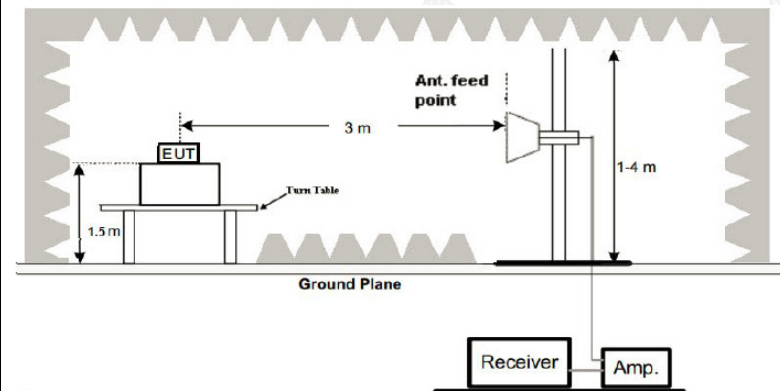
For radiated emissions below 30MHz



30MHz to 1GHz



Above 1GHz



Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the 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.
Test Results:	PASS



4.7.2 Test Instruments

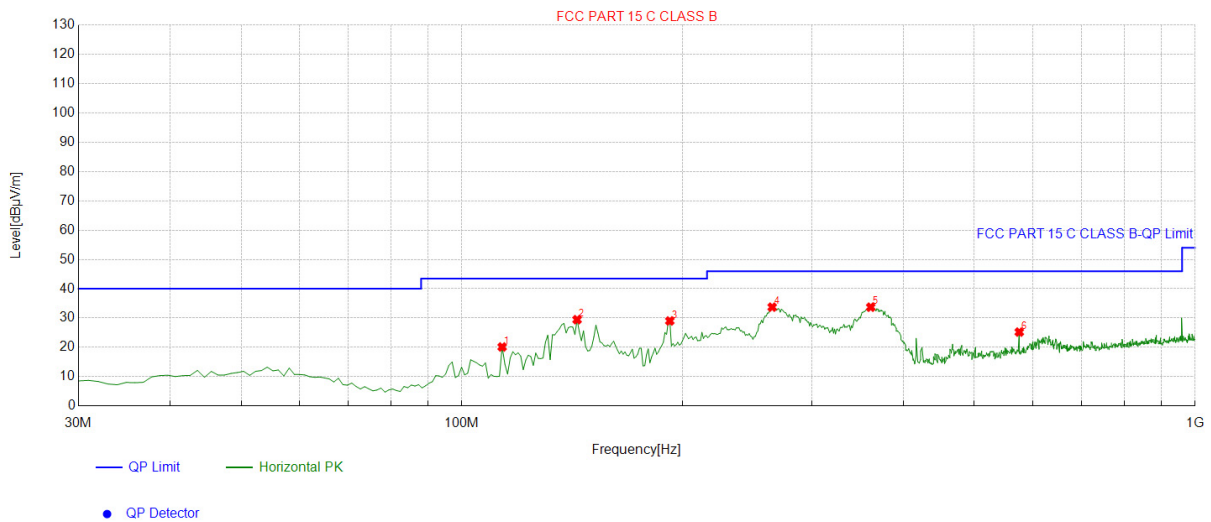
Radiated Emission Test Site (966)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 06, 2026	Feb. 05, 2027
Spectrum analyzer	KEYSIGHT	N9020A	HKE-117	Feb. 06, 2026	Feb. 05, 2027
Spectrum analyzer	R&S	FSV3044	HKE-126	Feb. 06, 2026	Feb. 05, 2027
Preamplifier	Schwarzbeck	EMC051845SE	HKE-006	Feb. 04, 2026	Feb. 03, 2027
Preamplifier	Agilent	83051A	HKE-016	Feb. 04, 2026	Feb. 03, 2027
Preamplifier	QJD	QJD18-40-50	HKE-030	Feb. 05, 2026	Feb. 04, 2027
6dB Attenuator	Pasternack	6dB	HKE-007	Feb. 06, 2026	Feb. 05, 2027
EMI Test Receiver	R&S	ESR-7	HKE-010	Feb. 06, 2026	Feb. 05, 2027
Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	Feb. 06, 2026	Feb. 05, 2028
Loop Antenna	COM-POWER	AL-130R	HKE-014	Feb. 06, 2026	Feb. 05, 2028
Horn Antenna	Schwarzbeck	9120D	HKE-013	Feb. 06, 2026	Feb. 05, 2028
Broadband Horn Antenna	A-INFO	LB-180400-KF	HKE-031	Feb. 06, 2026	Feb. 05, 2028
EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/
RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE-184	/	/

4.7.3 Test Data

Below 1GHz Test Results

All the test modes completed for test. Only the worst result was reported as below:

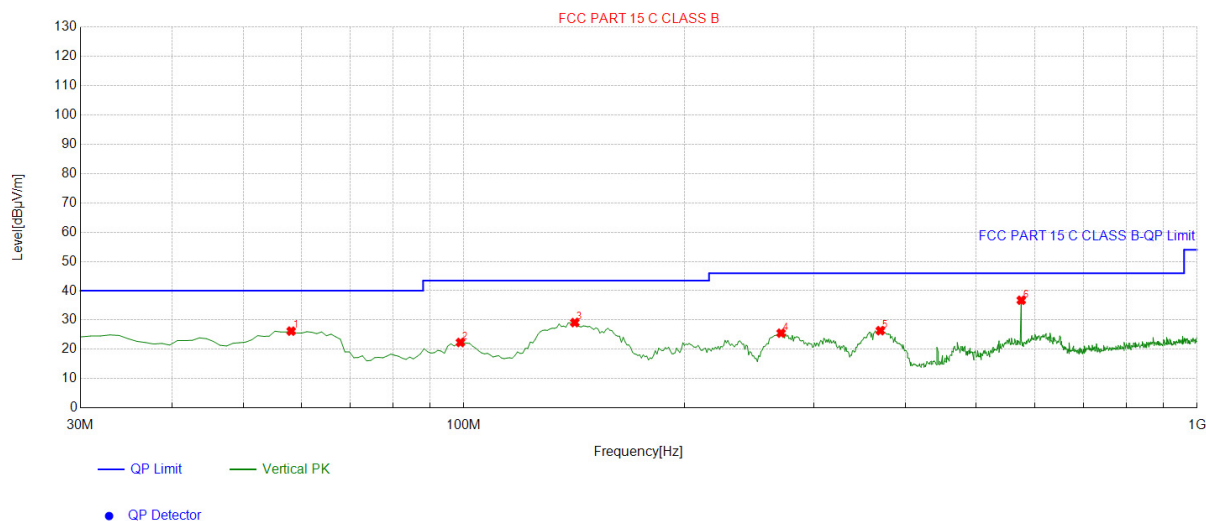
Antenna polarity: Horizontal



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	113.504	-15.19	35.34	20.15	43.50	23.35	100	101	Horizontal
2	143.604	-18.41	47.87	29.46	43.50	14.04	100	76	Horizontal
3	192.152	-15.24	44.27	29.03	43.50	14.47	100	79	Horizontal
4	264.975	-12.71	46.44	33.73	46.00	12.27	100	155	Horizontal
5	361.101	-10.49	44.21	33.72	46.00	12.28	100	158	Horizontal
6	575.686	-6.25	31.48	25.23	46.00	20.77	100	65	Horizontal

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

Antenna polarity: Vertical



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	58.158	-13.92	40.16	26.24	40.00	13.76	100	272	Vertical
2	98.939	-14.72	37.09	22.37	43.50	21.13	100	146	Vertical
3	141.662	-18.38	47.53	29.15	43.50	14.35	100	182	Vertical
4	270.801	-12.77	38.32	25.55	46.00	20.45	100	100	Vertical
5	369.840	-10.64	37.03	26.39	46.00	19.61	100	150	Vertical
6	575.686	-6.25	43.02	36.77	46.00	9.23	100	258	Vertical

Remark: Factor = Cable loss + Antenna factor + Attenuator – 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

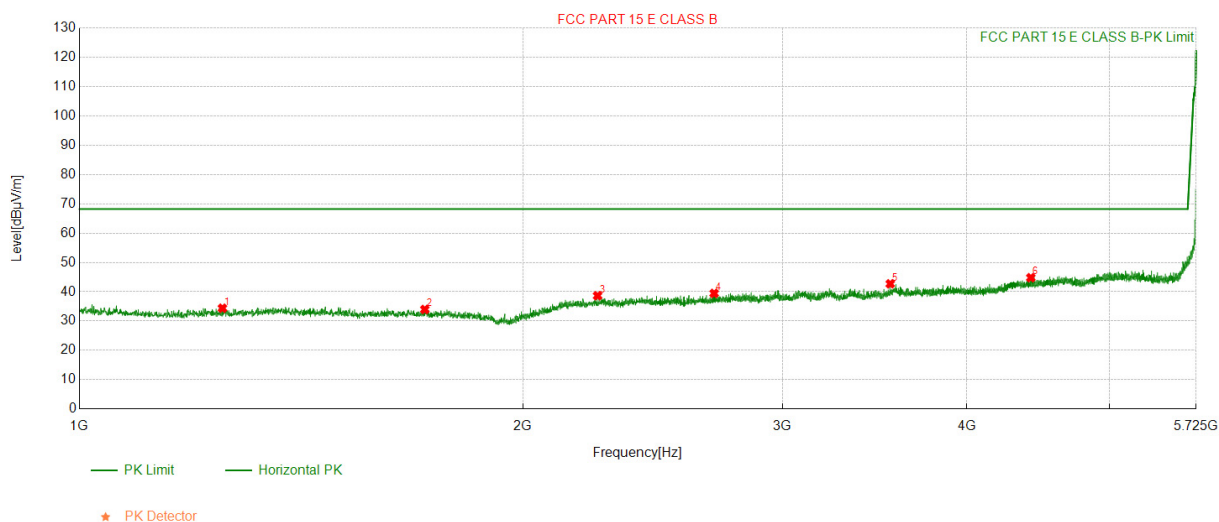
2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Above 1GHz Test Results

All the test modes completed for test. Only the worst result was reported as below:

For 1GHz to 5.725GHz

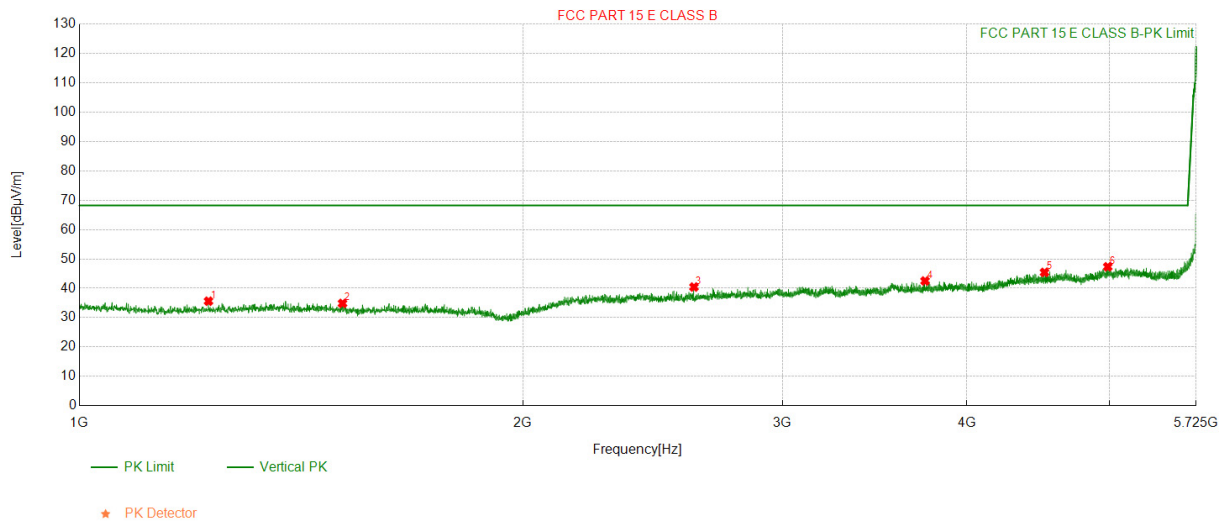
Antenna polarity: Horizontal



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1250.450	52.98	34.38	-18.60	68.20	33.82	150	360	Horizontal
2	1715.437	52.24	33.96	-18.28	68.20	34.24	150	53	Horizontal
3	2247.052	53.44	38.65	-14.79	68.20	29.55	150	329	Horizontal
4	2695.972	53.51	39.46	-14.05	68.20	28.74	150	212	Horizontal
5	3549.865	54.03	42.71	-11.32	68.20	25.49	150	35	Horizontal
6	4421.715	52.63	44.80	-7.83	68.20	23.40	150	226	Horizontal

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

Antenna polarity: Vertical

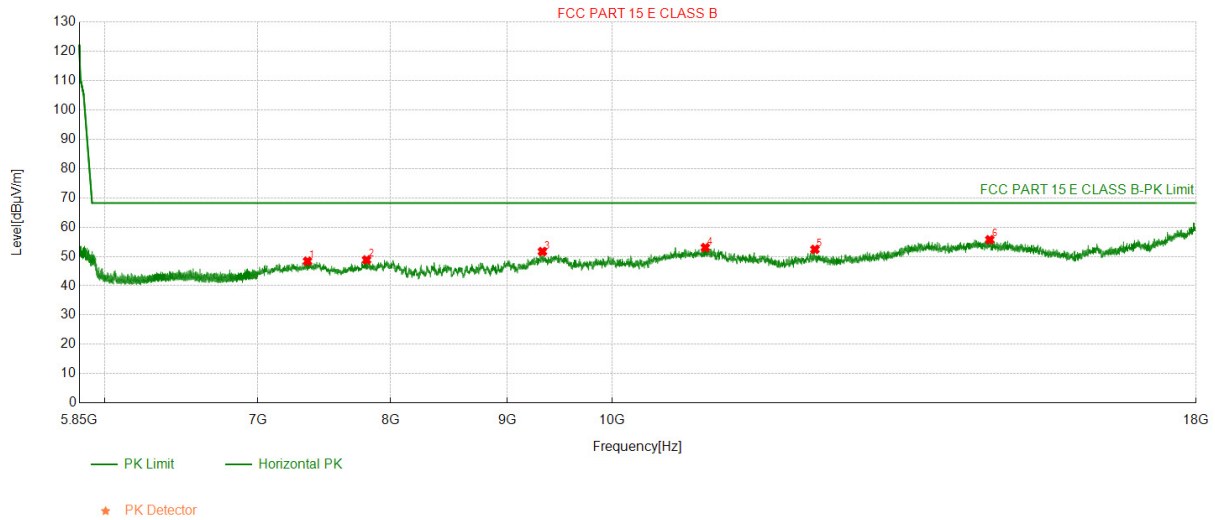


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1223.515	54.37	35.63	-18.74	68.20	32.57	150	59	Vertical
2	1508.461	53.37	34.86	-18.51	68.20	33.34	150	59	Vertical
3	2612.331	54.80	40.44	-14.36	68.20	27.76	150	63	Vertical
4	3748.335	52.86	42.50	-10.36	68.20	25.70	150	257	Vertical
5	4517.642	52.80	45.42	-7.38	68.20	22.78	150	22	Vertical
6	4986.881	51.89	47.33	-4.56	68.20	20.87	150	149	Vertical

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

For 5.85GHz to 18GHz

Antenna polarity: Horizontal

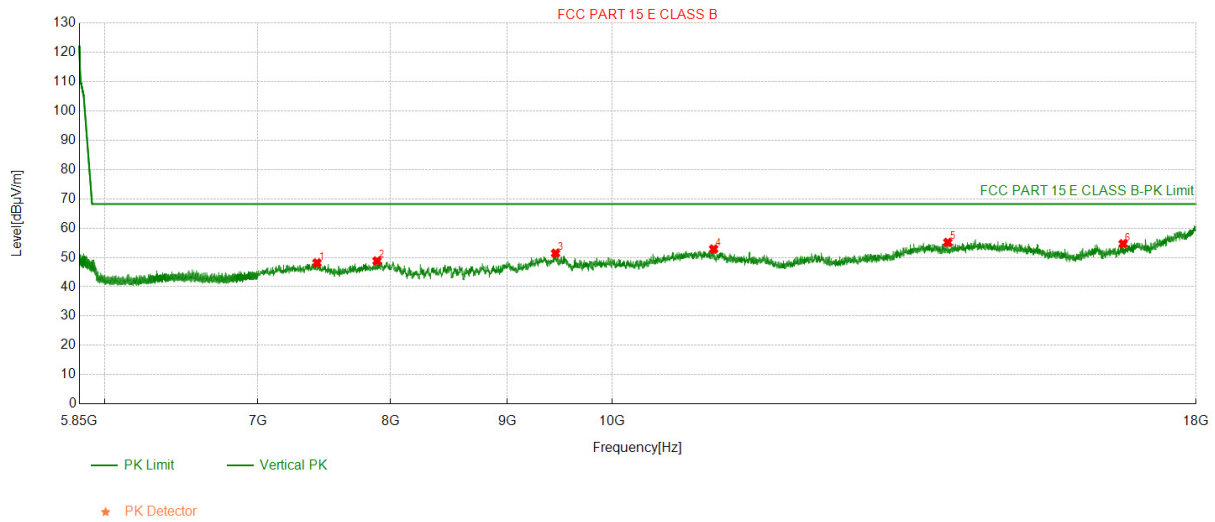


Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	7359.736	51.51	48.38	-3.13	68.20	19.82	150	29	Horizontal
2	7810.781	51.82	48.82	-3.00	68.20	19.38	150	151	Horizontal
3	9322.332	51.96	51.66	-0.30	68.20	16.54	150	251	Horizontal
4	10983.498	50.28	53.03	2.75	68.20	15.17	150	256	Horizontal
5	12264.026	49.46	52.40	2.94	68.20	15.80	150	0	Horizontal
6	14623.762	47.84	55.71	7.87	68.20	12.49	150	264	Horizontal

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

Antenna polarity: Vertical

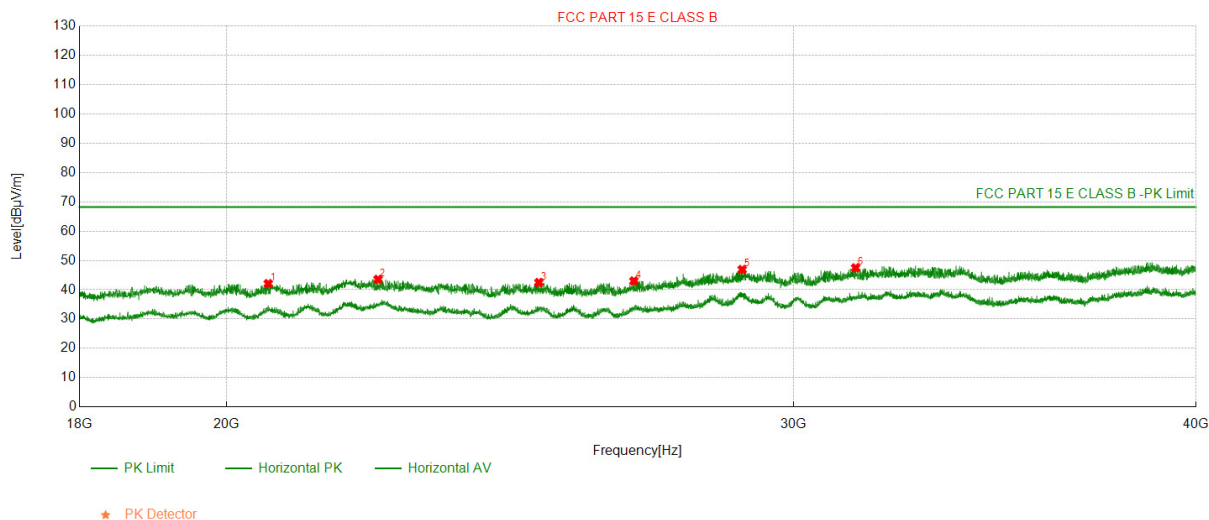


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	7430.143	51.17	48.13	-3.04	68.20	20.07	150	338	Vertical
2	7893.289	51.69	48.81	-2.88	68.20	19.39	150	110	Vertical
3	9446.645	51.22	51.42	0.20	68.20	16.78	150	220	Vertical
4	11075.908	50.20	52.86	2.66	68.20	15.34	150	160	Vertical
5	14019.802	48.69	55.12	6.43	68.20	13.08	150	188	Vertical
6	16724.972	48.17	54.65	6.48	68.20	13.55	150	69	Vertical

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

For 18GHz to 40GHz

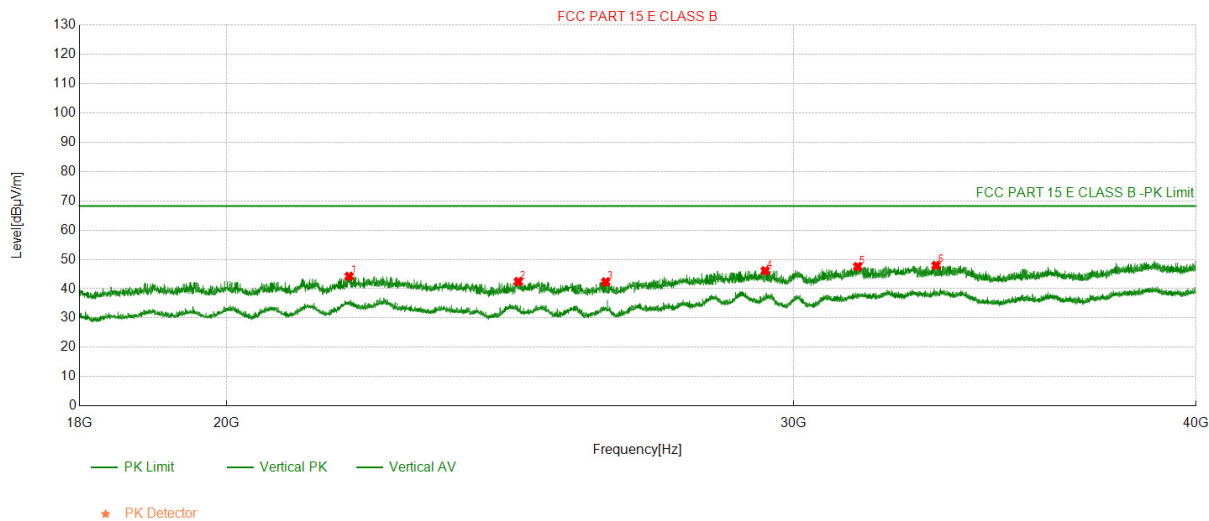
Antenna polarity: Horizontal



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	20602.860	36.21	42.08	5.87	68.20	26.12	150	270	Horizontal
2	22286.029	37.81	43.54	5.73	68.20	24.66	150	20	Horizontal
3	25001.100	36.03	42.45	6.42	68.20	25.75	150	250	Horizontal
4	26759.076	35.68	42.99	7.31	68.20	25.21	150	50	Horizontal
5	28913.091	37.89	46.88	8.99	68.20	21.32	150	300	Horizontal
6	31355.336	37.49	47.47	9.98	68.20	20.73	150	130	Horizontal

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

Antenna polarity: Vertical



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	21828.383	38.66	44.24	5.58	68.20	23.96	150	90	Vertical
2	24635.864	36.55	42.46	5.91	68.20	25.74	150	70	Vertical
3	26224.422	35.57	42.33	6.76	68.20	25.87	150	330	Vertical
4	29392.739	37.21	46.14	8.93	68.20	22.06	150	40	Vertical
5	31401.540	37.58	47.56	9.98	68.20	20.64	150	60	Vertical
6	33212.321	37.01	47.95	10.94	68.20	20.25	150	140	Vertical

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



4.8 Frequency Stability Measurement

4.8.1 Test Specification

Test Requirement:	FCC Part15 Section 15.407(g)
Test Method:	ANSI C63.10: 2020
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:	<pre>graph LR; SA[Spectrum Analyzer] --- EUT[EUT]; EUT --- P[AC/DC Power supply]; subgraph TC [Temperature Chamber]; EUT; end</pre>
Test Procedure:	- The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. - Turn the EUT on and couple its output to a spectrum analyzer. - Turn the EUT off and set the chamber to the highest temperature specified. - Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. - Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. - 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



4.8.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 06, 2026	Feb. 05, 2027
Spectrum analyzer	KEYSIGHT	N9020A	HKE-117	Feb. 06, 2026	Feb. 05, 2027
Power meter	KEYSIGHT	E4419B	HKE-144	Feb. 06, 2026	Feb. 05, 2027
Power Sensor	Agilent	E9304A H18	HKE-165	Feb. 06, 2026	Feb. 05, 2027
RF cable	Times	1-40G	N/A	Feb. 06, 2026	Feb. 05, 2027
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 06, 2026	Feb. 05, 2027
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	/	/

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

4.8.3 Test Result

Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	12.75	5744.999	-1	5824.977	-23
	15.00	5745.024	24	5825.021	21
	17.25	5745.009	9	5824.982	-18

Mode	Temperature (°C)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
5.8G Band	-30	5744.979	-21	5824.983	-17
	-20	5744.982	-18	5824.981	-19
	-10	5744.993	-7	5825.031	31
	0	5745.022	22	5825.022	22
	10	5744.980	-20	5825.019	19
	20	5745.016	16	5824.973	-27
	30	5744.989	-11	5825.025	25
	40	5744.978	-22	5825.011	11
	50	5745.140	140	5825.021	21

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.

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

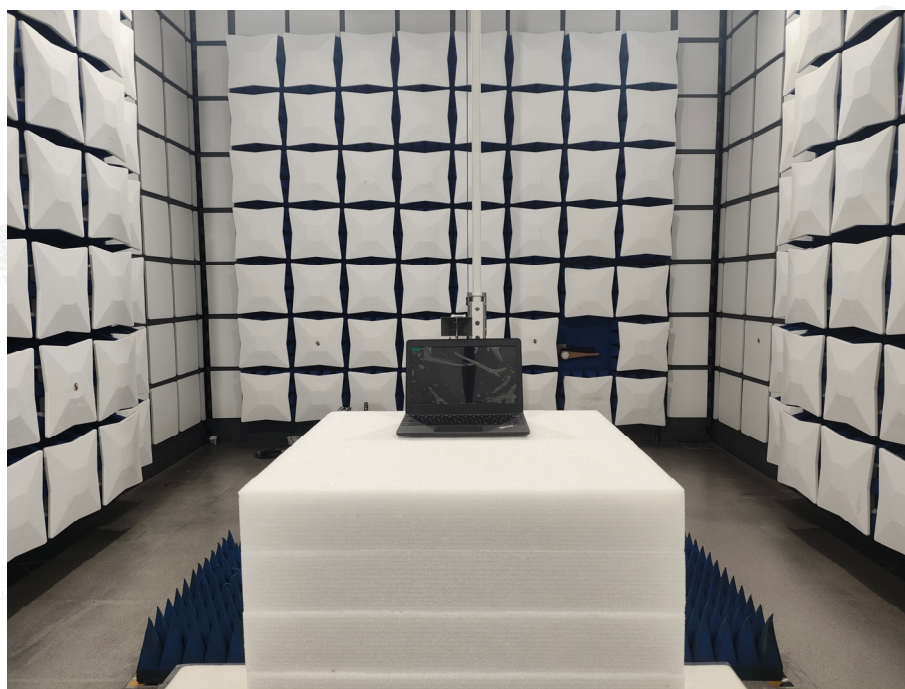
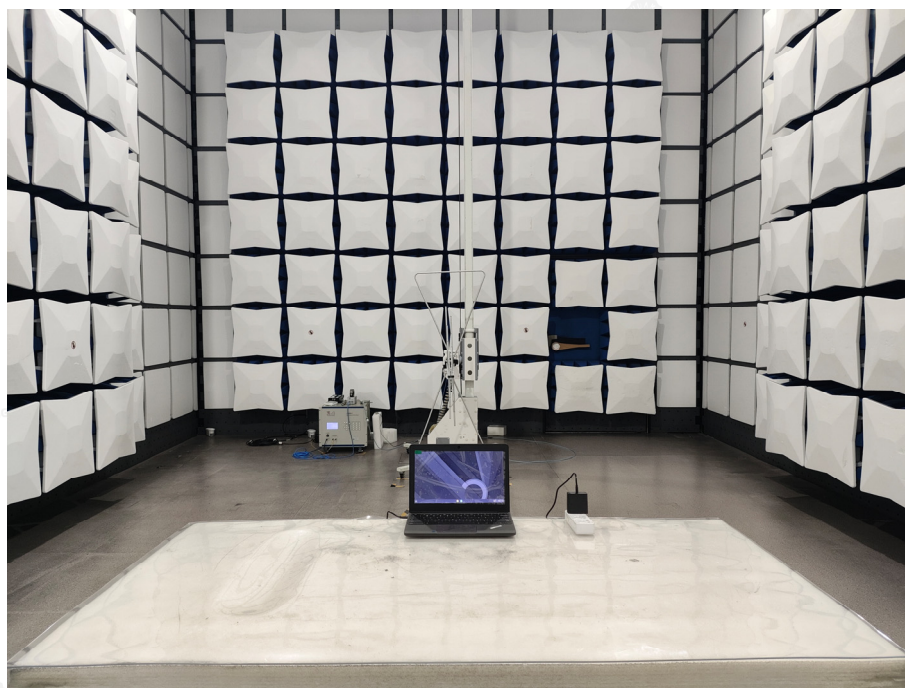
The antenna used in this product is a FPC antenna, need professional installation, not easy to remove. It conforms to the standard requirements. And the best case gain of the antenna is Antenna port 1: 1.35dBi and Antenna port 2: 1.71dBi.

WIFI ANTENNA

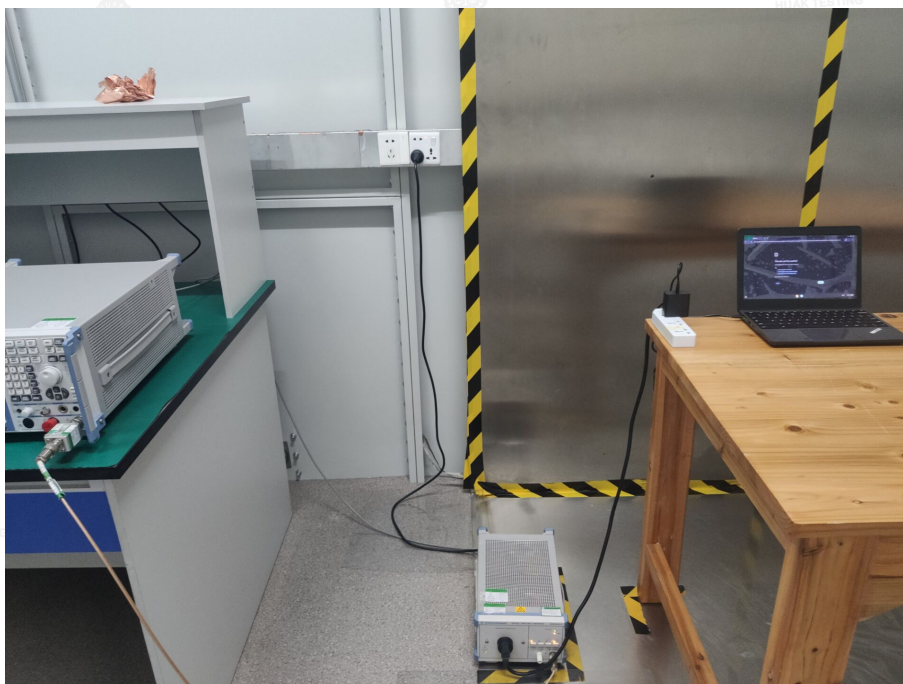


5. Photographs of Test Setup

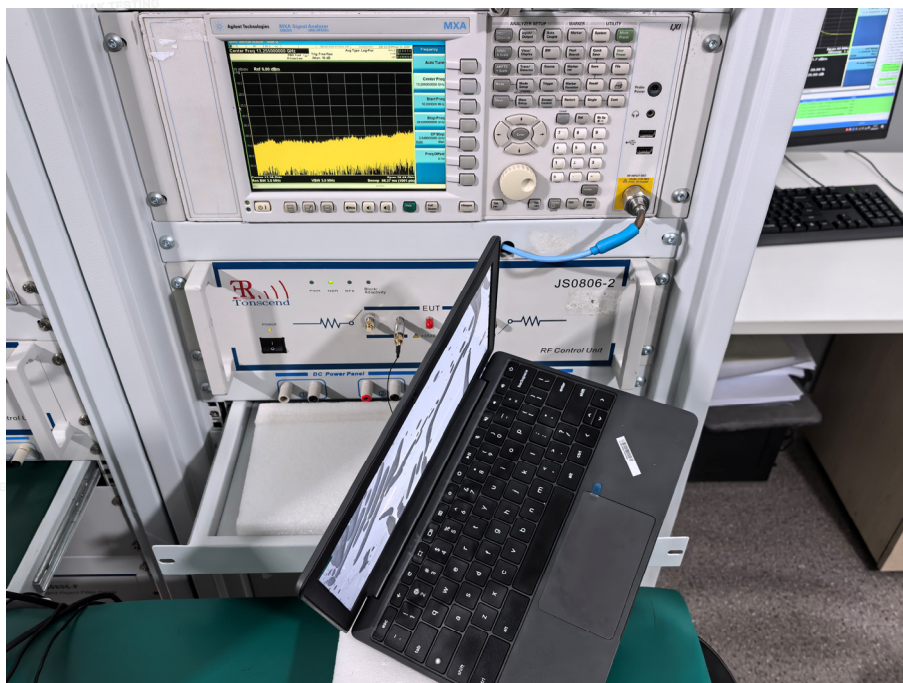
Radiated Emission



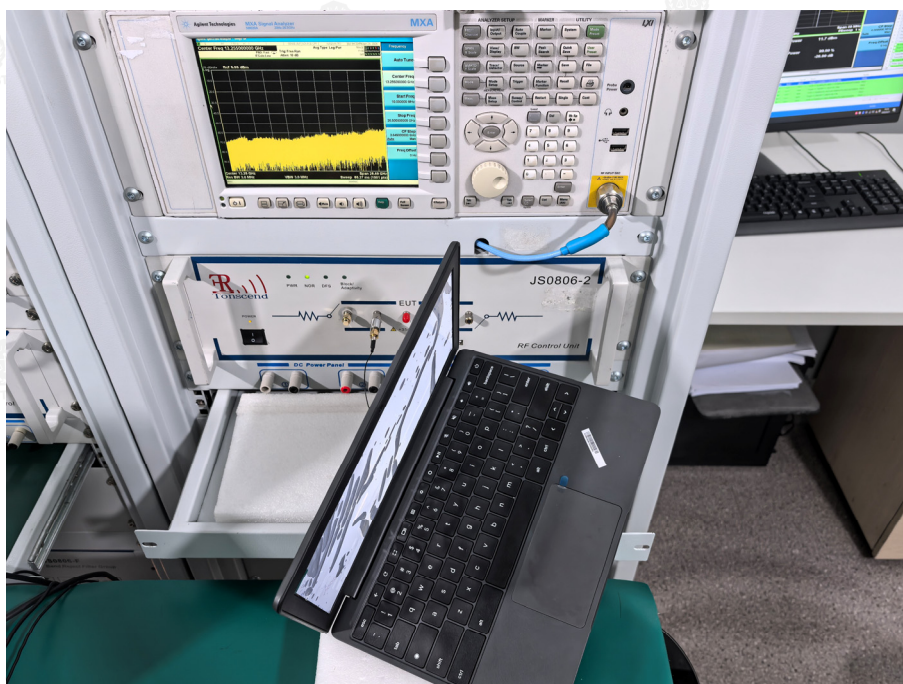
AC Conducted Emission



RF Conducted Emission ANT 1



ANT 2



6. Photos of the EUT

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

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