



4.7 Band Edge

4.7.1. 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 comply 15.209.
Test Setup:	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 m. The turn table is positioned 3 m away from an antenna feed point. The antenna is mounted on a vertical structure with a height of 1-4 m. Below the antenna, a receiver and an amplifier (Amp.) are connected to the ground plane.
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 rotating table was turned from 0 degrees to 360 degrees to find the maximum reading.



	5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi peak or average method as specified and then reported in a data sheet.
Test Result:	PASS

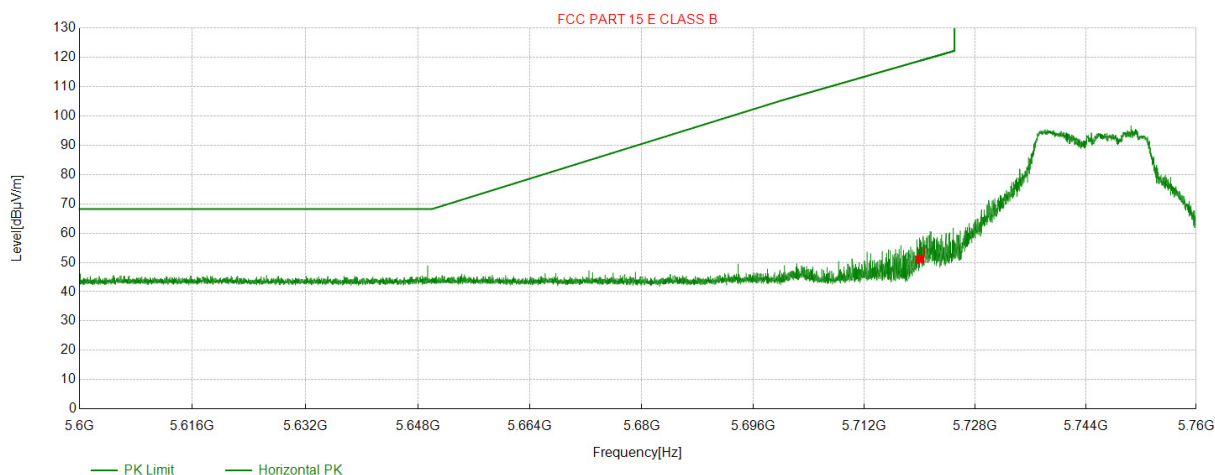


4.7.2. Test Data

All the test modes completed for test. Only the worst mode of 802.11a low channel TX is reflected.

802.11n(HT20)-5745

Antenna polarity: Horizontal



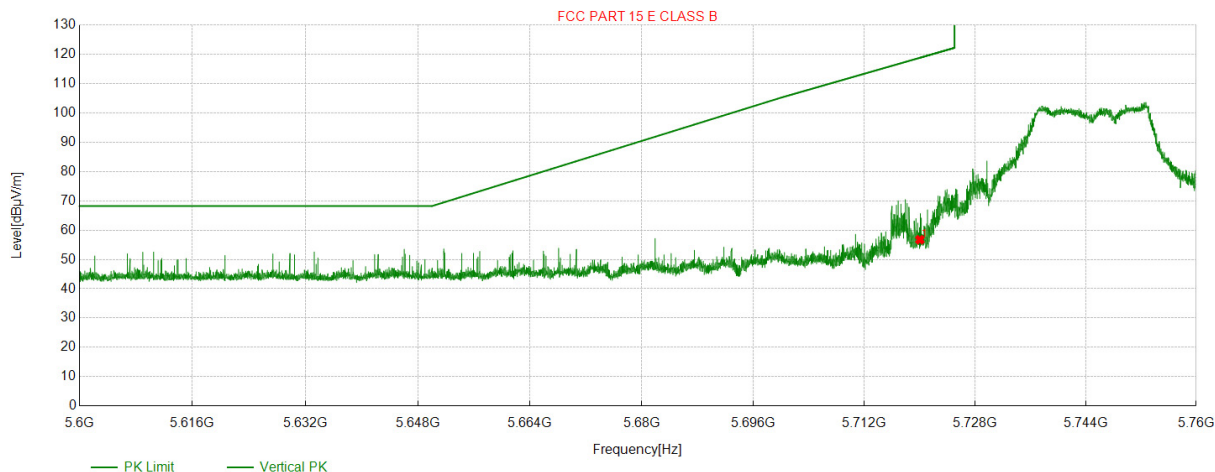
Suspected Data List

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	57.22	51.15	-6.07	118.81	67.66	150	57	Horizontal

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



Antenna polarity: Vertical



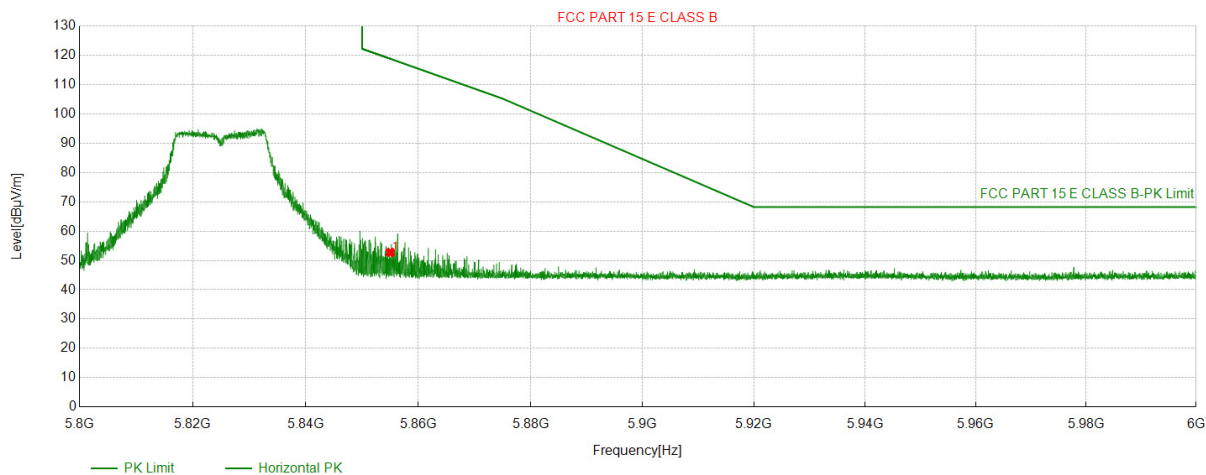
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5720.000	62.80	56.73	-6.07	118.81	62.08	150	210	Vertical

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



802.11n(HT20)-5825

Antenna polarity: Horizontal

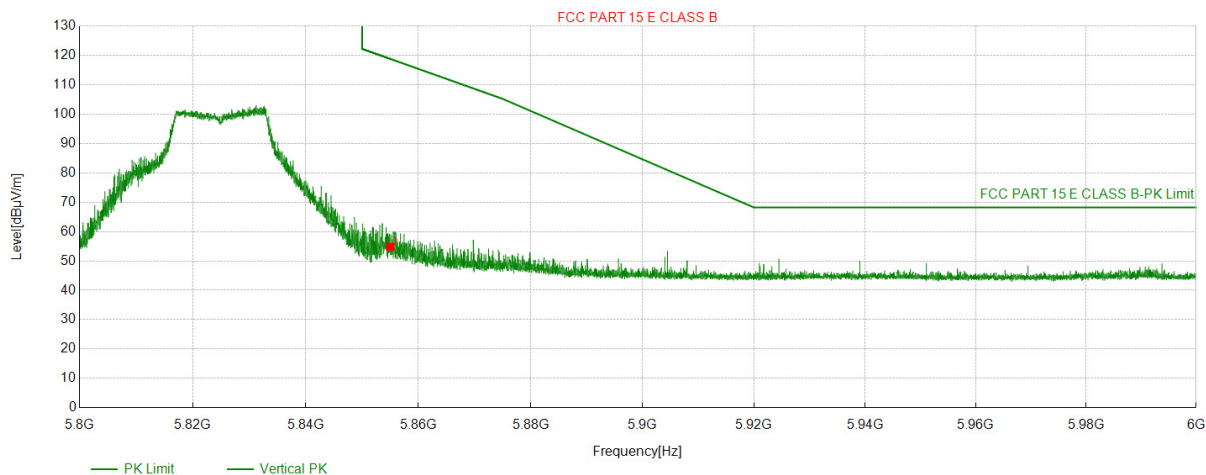


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5855.000	58.55	52.76	-5.79	118.80	66.04	150	48	Horizontal

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	60.59	54.80	-5.79	118.80	64.00	150	284	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 --- ACDC[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 Result

Test Mode	Frequency [MHz]	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)
802.11a	5745	NV	NT	4600.00	0.800696
802.11a	5745	LV	NT	4600.00	0.800696
802.11a	5745	HV	NT	4500.00	0.783290
802.11a	5785	NV	NT	4700.00	0.812446
802.11a	5785	LV	NT	4400.00	0.760588
802.11a	5785	HV	NT	4400.00	0.760588
802.11a	5825	NV	NT	5600.00	0.961373
802.11a	5825	LV	NT	5200.00	0.892704
802.11a	5825	HV	NT	4900.00	0.841202

Test Mode	Frequency [MHz]	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)
802.11a	5745	NV	-30	4200.00	0.731070
802.11a	5745	NV	-20	4500.00	0.783290
802.11a	5745	NV	-10	4400.00	0.765883
802.11a	5745	NV	0	4600.00	0.800696
802.11a	5745	NV	10	4300.00	0.748477
802.11a	5745	NV	20	4000.00	0.696258
802.11a	5745	NV	30	4300.00	0.748477
802.11a	5745	NV	40	4100.00	0.713664
802.11a	5745	NV	50	3900.00	0.678851
802.11a	5785	NV	-30	4100.00	0.708729
802.11a	5785	NV	-10	4400.00	0.760588
802.11a	5785	NV	0	4300.00	0.743302
802.11a	5785	NV	10	4400.00	0.760588
802.11a	5785	NV	20	4600.00	0.795160
802.11a	5785	NV	30	4200.00	0.726016
802.11a	5785	NV	40	4100.00	0.708729
802.11a	5785	NV	50	4300.00	0.743302
802.11a	5785	NV	-20	4300.00	0.743302
802.11a	5825	NV	-30	4900.00	0.841202
802.11a	5825	NV	-20	4700.00	0.806867
802.11a	5825	NV	-10	4800.00	0.824034
802.11a	5825	NV	0	4600.00	0.789700
802.11a	5825	NV	10	4400.00	0.755365
802.11a	5825	NV	20	4000.00	0.686695
802.11a	5825	NV	30	4400.00	0.755365
802.11a	5825	NV	40	4100.00	0.703863
802.11a	5825	NV	50	4200.00	0.721030



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 an External Antenna, with non-standard SMA connector, need professional installation. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 3.39dBi.

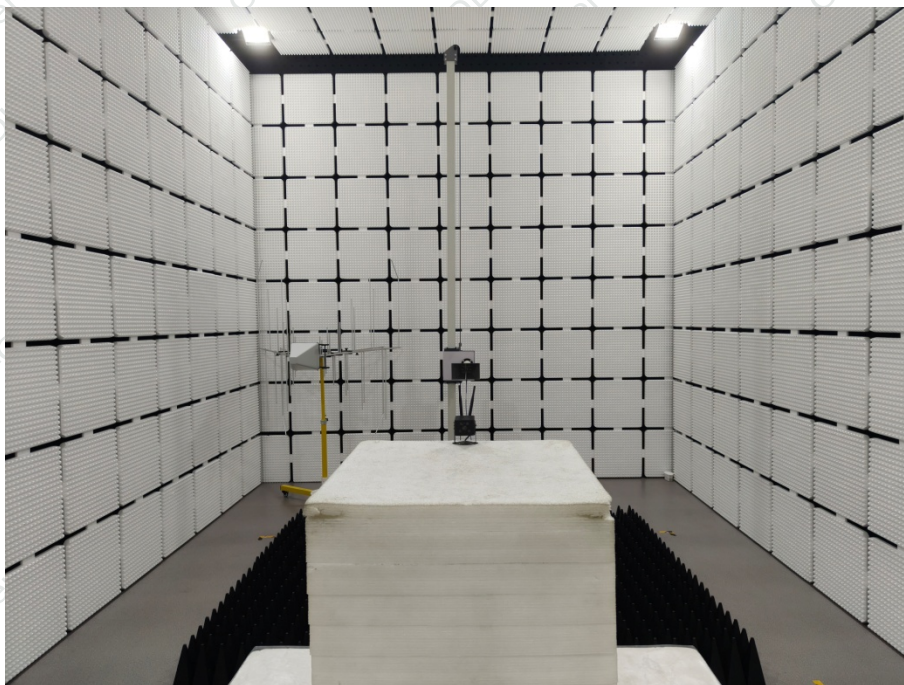
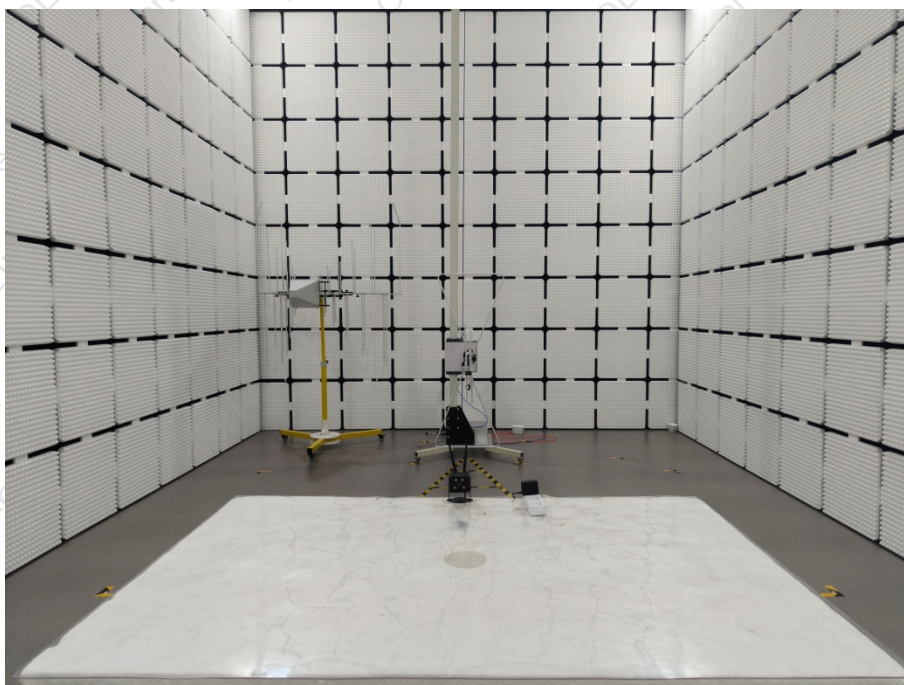
WIFI ANTENNA





5. Test Setup Photos of the EUT

Radiated Emission

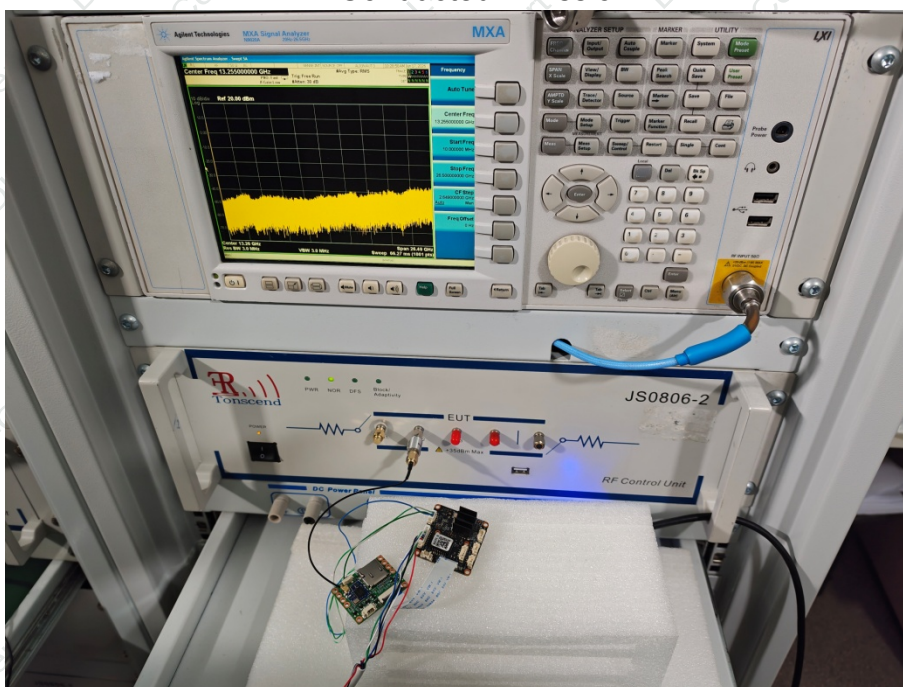




AC Conducted Emission



RF Conducted Emission





6. Photos of the EUT

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

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