FCC §15.407(f) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.407(f)and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Per 447498 D01 General RF Exposure Guidance v05r02**,** simultaneous transmission MPE test exclusion applies when the sum of the MPE for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is $\leqslant$ 1.0.

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where:
S = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

DTS Band：

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2412	9	7.94	26.94	494.31	25	0.500	1.0
802.11g	2462	9	7.94	26.96	496.59	25	0.502	1.0
802.11n HT20	2437	9	7.94	26.73	470.98	25	0.477	1.0
802.11n HT40	2452	9	7.94	26.99	500.03	25	**0.506**	1.0

UNII Band：

5150-5250 MHz

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11a	5240	9	7.94	19.88	97.27	25	0.098	1.0
802.11ac VHT20	5180	9	7.94	19.86	96.83	25	0.098	1.0
802.11ac VHT40	5230	9	7.94	19.53	89.74	25	0.091	1.0
802.11ac VHT80	5210	9	7.94	19.48	88.72	25	0.090	1.0
802.11n HT20	5240	9	7.94	19.24	83.95	25	0.085	1.0
802.11n HT40	5230	9	7.94	19.38	86.70	25	0.088	1.0

5725-5850 MHz

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11a	5745	9	7.94	25.16	328.10	25	**0.332**	1.0
802.11ac VHT20	5745	9	7.94	25.05	319.89	25	0.324	1.0
802.11ac VHT40	5795	9	7.94	24.48	280.54	25	0.284	1.0
802.11ac VHT80	5775	9	7.94	24.71	295.80	25	0.299	1.0
802.11n HT20	5745	9	7.94	25.00	316.23	25	0.320	1.0
802.11n HT40	5755	9	7.94	24.70	295.12	25	0.299	1.0

Note:
For WIFI module, 2.4GHz and 5GHz can transmit simultaneously, the worst case for MPE was chosen to be added up. Total sum of MPE is 0.838 (0.506+0.332=0.838).

Result: 0.838<1.0, the device meet FCC MPE at 25 cm distance.