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

Applicable Standard

According to §15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

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.

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = 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:

Mode	Frequency Range	Antenna Gain		Output Power		Evaluation Distance	Power Density	MPE Limit
	(MHz)	(dBi)	(numeric)	(dBm)	(mW)	(cm)	(mW/cm^2)	(mW/cm^2)
802.11b	2412-2462	1.0	1.26	18.00	63.10	20	0.0158	1
802.11g	2412-2462	1.0	1.26	18.00	63.10	20	0.0158	1
802.11n HT20	2412-2462	1.0	1.26	18.00	63.10	20	0.0158	1
BLE	2402-2480	1.0	1.26	4.00	2.51	20	0.0006	1
BT	2402-2480	1.0	1.26	7.00	5.01	20	0.0013	1
802.11a	5150-5250	1.0	1.26	14.00	25.12	20	0.0063	1
802.11n-HT20		1.0	1.26	14.00	25.12	20	0.0063	1
802.11a	5725-5850	1.0	1.26	14.00	25.12	20	0.0063	1
802.11n-HT20		1.0	1.26	14.00	25.12	20	0.0063	1

Note: (1) The target output power:
802.11b： 17±1dBm, which declared by the Manufacturer.
802.11g： 17±1dBm, which declared by the Manufacturer.
802.11n HT20： 17±1dBm, which declared by the Manufacturer.
BLE：3±1dBm, which declared by the Manufacturer.
BT：5±2dBm,which declared by the Manufacturer.
802.11a： 12±2 dBm, which declared by the Manufacturer.
802.11n-HT20： 12±2 dBm, which declared by the Manufacturer.

(2) The EUT has the BT, 2.4GHz WIFI, 5GHz WIFI functions, they can transmitting simultaneously. According to KDB 447498 D01 General RF Exposure Guidance v06 and test data, the BT, 2.4G WIFI (802.11n HT20), 5GHz WIFI (802.11a 5150-5250) model is the worst case, their sum of MPE ratio is 0.0234 which is less than 1.0,so the collocation exposure exclusion applies.

Result: The device meet FCC MPE at 20 cm distance.