8. RADIO FREQUENCY EXPOSURE

8.1．Limit

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

Table: Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Power Density (S) (mW/cm2)
0.3—1.34	*(100)
1.34—30	*(180/f^2)
30—300	0.2
300—1500	f/1500
1500—100,000	1.0

F = frequency in MHz
* = Plane-wave equivalent power density

Maximum Permissible Exposure
The MPE was calculated at 20cm to show compliance with the power density limit.
$S = PG/4\pi R^2$
S = Power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna.
Note:
1. Manufacturer declared that the maximum antenna gain is 2.0 dBi(Max.) for 2412~2462MHz and 2.0dBi(Max.) for 5150.00~5250.00MHz/5725.00~5850.00MHz.
2. Manufacturer declared that the nearest distance between human and the EUT is 20cm.
3. Only record worst case data.

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8.2 Test Results

Standalone MPE

5G WIFI

Test	Channel	ANT Power (dBm)	ANT Max. Tune Up Power (dBm)	ANT Max. Tune Up Power (mW)	ANT MPE (mW/cm^2)	Limit (mW/cm^2)
802.11a	36	17.12	17.0±1.0	63.0957	0.0198	1.0
	40	17.16	17.0±1.0	63.0957	0.0198	1.0
	48	17.24	17.0±1.0	63.0957	0.0198	1.0
	149	16.24	17.0±1.0	63.0957	0.0198	1.0
	157	16.49	17.0±1.0	63.0957	0.0198	1.0
	165	16.31	17.0±1.0	63.0957	0.0198	1.0
802.11n20	36	17.04	17.0±1.0	63.0957	0.0198	1.0
	40	17.12	17.0±1.0	63.0957	0.0198	1.0
	48	17.09	17.0±1.0	63.0957	0.0198	1.0
	149	16.54	17.0±1.0	63.0957	0.0198	1.0
	157	16.47	17.0±1.0	63.0957	0.0198	1.0
	165	16.24	17.0±1.0	63.0957	0.0198	1.0
802.11n40	38	16.21	17.0±1.0	63.0957	0.0198	1.0
	46	16.27	17.0±1.0	63.0957	0.0198	1.0
	151	14.24	15.0±1.0	39.8107	0.0125	1.0
	159	14.18	15.0±1.0	39.8107	0.0125	1.0
802.11ac20	36	17.16	17.0±1.0	63.0957	0.0198	1.0
	40	17.07	17.0±1.0	63.0957	0.0198	1.0
	48	17.22	17.0±1.0	63.0957	0.0198	1.0
	149	16.10	17.0±1.0	63.0957	0.0198	1.0
	157	16.25	17.0±1.0	63.0957	0.0198	1.0
	165	16.37	17.0±1.0	63.0957	0.0198	1.0
802.11ac40	38	16.08	17.0±1.0	63.0957	0.0198	1.0
	46	16.11	17.0±1.0	63.0957	0.0198	1.0
	151	14.32	15.0±1.0	39.8107	0.0125	1.0
	159	14.37	15.0±1.0	39.8107	0.0125	1.0
802.11ac80	42	15.11	15.0±1.0	39.8107	0.0125	1.0
	155	13.33	13.0±1.0	25.1189	0.0079	1.0

2.4G wifi:

Test	Channel	ANT Power (dBm)	ANT Max. Tune Up Power (dBm)	ANT Max. Tune Up Power (mW)	ANT MPE (mW/cm^2)	Limit (mW/cm^2)
802.11b	1	17.39	17.0±1.0	63.0957	0.0198	1.0
	6	17.20	17.0±1.0	63.0957	0.0198	1.0
	11	17.51	17.0±1.0	63.0957	0.0198	1.0
802.11g	1	15.23	15.0±1.0	39.8107	0.0125	1.0
	6	15.69	15.0±1.0	39.8107	0.0125	1.0
	11	15.27	15.0±1.0	39.8107	0.0125	1.0
802.11n20	1	15.20	15.0±1.0	39.8107	0.0125	1.0
	6	15.28	15.0±1.0	39.8107	0.0125	1.0
	11	15.39	15.0±1.0	39.8107	0.0125	1.0

2.4G Bluetooth:

Test	Channel	ANT Power (dBm)	ANT Max. Tune Up Power (dBm)	ANT Max. Tune Up Power (mW)	ANT MPE (mW/cm^2)	Limit (mW/cm^2)
1M	1	2.754	2.0±1.0	1.9953	0.0006	1.0
	40	2.562	2.0±1.0	1.9953	0.0006	1.0
	79	2.584	2.0±1.0	1.9953	0.0006	1.0
2M	1	0.165	0.0±1.0	1.2589	0.0004	1.0
	40	0.174	0.0±1.0	1.2589	0.0004	1.0
	79	0.098	0.0±1.0	1.2589	0.0004	1.0
3M	1	0.821	0.0±1.0	1.2589	0.0004	1.0
	40	0.642	0.0±1.0	1.2589	0.0004	1.0
	79	0.567	0.0±1.0	1.2589	0.0004	1.0
BLE	1	1.87	1.0±1.0	1.5849	0.0005	1.0
	20	0.65	1.0±1.0	1.5849	0.0005	1.0
	40	0.91	1.0±1.0	1.5849	0.0005	1.0

Note: The estimation distance is 20cm

Simultaneous MPE

Not required as the 5GWifi, 2.4GWifi and Bluetooth can't transmit simultaneously.

Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.