5. RF EXPOSURE EVALUATION

5.1 Applicable Standard

According to subpart 15.247(i)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/f²)	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.

Calculation formula:

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = 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);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

5.2 Measurement Result

Mode	Frequency Range (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm2)	MPE Limit (mW/cm2)
		(dBi)	(numeric)	(dBm)	(mW)			
Bluetooth	2402-2480	3.6	2.291	10.0	10.00	20	0.005	1
2.4GHz WLAN	2412-2462	3.6	2.291	19.5	89.13	20	0.041	1
5GHz WLAN	5150~5250	5.5	3.548	18.5	70.79	20	0.050	1
915MHz SRD	902.2-927.8	3.5	2.239	28	630.96	20	0.281	0.6
LTE B2	1850-1910	2.8	1.905	25	316.23	20	0.120	1
LTE B4	1710-1755	2.8	1.905	25	316.23	20	0.120	1
LTE B5	824-849	-6.1	0.245	25	316.23	20	0.015	0.55
LTE B12	699-716	-2.1	0.617	25	316.23	20	0.039	0.47
LTE B13	777-787	-2.1	0.617	25	316.23	20	0.039	0.52
LTE B14	788-798	-2.1	0.617	25	316.23	20	0.039	0.53
LTE B25	1850-1910	2.8	1.905	25	316.23	20	0.120	1
LTE B26	814-824	-2.1	0.617	25	316.23	20	0.039	0.54
LTE B26	824-849	-6.1	0.245	25	316.23	20	0.015	0.55
LTE B41	2535-2655	2.1	1.622	25	316.23	20	0.102	1
LTE B66	1710-1780	2.8	1.905	25	316.23	20	0.120	1
LTE B71	663-698	-2.1	0.617	25	316.23	20	0.039	0.44

Note:
1. The device contains a certified WWAN & WLAN Module, FCC ID: XMR2022SC200ENA.
2. The max conducted power including tune-up tolerance was provided by manufacturer.

The 2.4GHz WLAN/5GHz WLAN/ Bluetooth, 915MHz SRD and WWAN can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$=S_{WLAN}/S_{limit\text{-}WLAN}+ S_{WWAN}/S_{limit\text{-}WWAN}+ S_{SRD}/S_{limit\text{-}SRD}$

$=0.639$

< 1.0

Result: The device meets FCC MPE at **20 cm** distance

===== END OF REPORT =====