

EXHIBIT C - RF EXPOSURE EVALUATION

Maximum Permissible Exposure (MPE)

Applicable Standard

According to subpart §1.1310,15.247(i) 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.

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/cm²);

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:

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

Calculated Data:

For NFC(13.56MHz):

Mode	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance [▲]		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
NFC	13.56	/	/	-45.81	0.00003	20.00	<<0.0001	0.98
Note: NFC field strength is 49.39dBμV/m @ 3m = -45.81 dBm EIRP. That equal to antenna gain is 0dBi and used the EIRP value as conducted power.								

For BLE and WWAN:

Mode	Frequency (MHz)	Antenna Gain [▲]		Conducted output power including Tune-up Tolerance [▲]		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
BLE	2402-2480	1.17	1.31	4.0	2.51	20.00	0.0007	1.0
GSM 850	824-849	2.0	1.58	26.0	398.11	20.00	0.126	0.5
PCS 1900	1850-1910	2.4	1.74	23.0	199.53	20.00	0.069	1.0
WCDMA B2	1850-1910	2.4	1.74	25	316.23	20.00	0.109	1.0
WCDMA B4	1710-1755	3.2	2.09	25	316.23	20.00	0.132	1.0
WCDMA B5	824-849	2.0	1.58	25	316.23	20.00	0.100	0.5
LTE B2	1850-1910	2.4	1.74	25	316.23	20.00	0.109	1.0
LTE B4	1710-1755	3.2	2.09	25	316.23	20.00	0.132	1.0
LTE B5	824-849	2.0	1.58	25	316.23	20.00	0.100	0.5
LTE B7	2500-2570	1.2	1.32	25	316.23	20.00	0.083	1.0
LTE B12	699-716	2.8	1.91	25	316.23	20.00	0.120	0.5
LTE B13	777-787	1.3	1.35	25	316.23	20.00	0.085	0.5
LTE B25	1850-1915	2.4	1.74	25	316.23	20.00	0.109	1.0
LTE B26	814-824	1.1	1.29	25	316.23	20.00	0.081	0.5
LTE B26	824-849	2.0	1.58	25	316.23	20.00	0.100	0.5
LTE B38	2570-2620	1.8	1.51	25	316.23	20.00	0.095	1.0
LTE B41	2496-2690	2.8	1.91	25	316.23	20.00	0.120	1.0
Note: The device built in a certified WWAN module, model: EG25-G, FCC ID: XMR201903EG25G, certified on 2019/3/29.								

Note: The Antenna Gain and Conducted output power including Tune-up Tolerance provided by manufacturer.

BLE and WWAN can transmit simultaneously with NFC:

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

$$= S_{BLE} / S_{limit-BLE} + S_{WWAN} / S_{limit-WWAN} + S_{NFC} / S_{limit-NFC}$$

$$= 0.0007/1.0 + 0.126/0.5 + 0.0001/0.98$$

$$= 0.253$$

$$< 1$$

Result: The device meet FCC MPE at 20 cm distance

******* END OF REPORT *******