

RF Exposure Evaluation

LIMIT

☉ **Single transmitter:**

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500	-	-	f/300	6
1500–100,000	-	-	5	6
(B) Limits for General Population/Uncontrolled Exposure				
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

Note: f = frequency in MHz

☉ **Simultaneous transmission:**

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0.

EVALUATION METHOD

Transmission formula: $Pd = (Pout * G) / (4 * \pi * r^2)$

Where

Pd = power density in mW/cm², **Pout** = output power to antenna in mW, **G** = gain of antenna in linear scale;

Pi = 3.1416, **R** = distance between observation point and center of the radiator in cm

TEST RESULT

Passed

Not Applicable

Single transmitter:

Type	Worst Case Frequency (MHz)	Maximum Output Power(dBm) ^{#1}	Antenna Gain ^{#2} (dBi)	Minimum use distance (cm)	Power density (mW/cm ²)	Power density limit (mW/cm ²)	Result
LTE Cat M/NB Band 2	1850	24.00	3.50	20	0.112	1.000	PASS
LTE Cat M/NB Band 4	824	24.00	3.50	20	0.112	1.000	PASS
LTE Cat M/NB Band 5	1710	24.00	3.50	20	0.112	0.549	PASS
LTE Cat M/NB Band 12	699	24.00	3.50	20	0.112	0.466	PASS
LTE Cat M/NB Band 13	777	24.00	3.50	20	0.112	0.518	PASS
LTE Cat M/NB Band 25	1850	24.00	3.50	20	0.112	1.000	PASS
LTE Cat M/NB Band 26	814	24.00	3.50	20	0.112	0.543	PASS
LTE Cat M/NB Band 66	1710	24.00	3.50	20	0.112	1.000	PASS
LORA	902.3	18.73	3.50	20	0.033	0.602	PASS
BLE	2480	7.90	0.41	20	0.001	1.000	PASS

Note:

#1: LTE Cat M/NB Refer to module FCC ID:2ANPO00NRF9160, LORA Refer to module FCC ID: VPYCMABZ, BLE Refer to module FCC ID: SH6MDBT50Q.

#2: The antenna gain is provided by the applicant, and the applicant should be responsible for its authenticity, HTW lab has not verified the authenticity of its information.

Simultaneous transmission (Worst Case): LTE Cat M/NB Band 12+LORA+BLE

$(0.112/0.466) + (0.033/0.602) + (0.001/1.000) = 0.296$. The value is less than or equal to 1.0, and the result is PASS.