

SECTION RF Exposure

1. SUMMARY OF TEST RESULTS

Requirements	FCC Rule	Compliance
RF Exposure evaluation	1.1310	Complied

2. MPE Evaluation of Mobile Device

2.1 Rule

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure		
300-1,500	f/300	6
1,500-100,000	5	6
(B) Limits for General Population/Uncontrolled Exposure		
300-1,500	f/1500	30
1,500-100,000	1.0	30

Note) f = Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2 Test Results - Complied

- Calculation Result of RF Exposure

Mode	Frequency (MHz)	Target Power (dBm)	Tune up Tolerance (dB)	Max Tune up Power (dB)	Antenna Gain (dBi)	Power Density at 20 cm (mW/cm ²)	Limit (mW/cm ²)
GFSK	2 402	-3.5	±1.0	-2.5	2.437	0.000 199	1
	2 440	-3.5	±1.0	-2.5	2.437	0.000 199	1
	2 480	-3.5	±1.0	-2.5	2.437	0.000 199	1

Note: Max Tune up Power(mW) = 0.56 mW, Antenna Gain(mW) = 1.75 mW

- Target power and Tolerance, Max tune up power

Mode	Frequency (MHz)	Target Power (dBm)	Tolerance (dB)	Max Tune up Power (dBm)	Average Power (dBm)	Measured Average Power (dBm)
GFSK	2 402	-3.5	±1.0	-2.5	-3.25	-5.32
	2 440	-3.5	±1.0	-2.5	-3.56	-5.63
	2 480	-3.5	±1.0	-2.5	-4.14	-6.21

Note 1): Average Power(dBm) = Measured Average Power(dBm) + D.C.C.F(dB)

e.g., 2 480 MHz: -6.21 dB + 2.068 dB = -4.14 dB

Note 2): D.C.C.F = $10 \log(1/x) = 10 \log(1/0.621) = 2.068$ dB,

$x = 0.388 \text{ 5(On Time)} / 0.625 \text{ 5(Period)} = 0.621$

$D = 62.1 \%$ (duty cycle < 98 %)

Note 3): Measured Average Power was tested by Power meter & sensor(VBW = 50 MHz)