MPE CALCULATION

FCC ID for Cellular module : N7NHL7588

Wi-Fi module   : W38-241083G

RFID module   : W38-UICFG

RF Exposure Requirements: 47 CFR §1. 1307(b)

RF Radiation Exposure Limits: 47 CFR §1. 1310

RF Radiation Exposure Guidelines: FCC OST/OET Bulletin Number 65

EUT Frequency Band: 13.56 MHz, 2412-2462 MHz, 5180-5825, 1850MHz-1910MHz,1710MHz to 1755MHz, 824MHZ to 849MHz,

777MHz to 787MHz, 704MHz to716 MHz

Limits for General Population/Uncontrolled Exposure in the band of:

Frequency Range (MHz)	Power Density (mW/cm^2)
1,500-100,000	1.0
300-1,500	f/1500

Equation: $S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

Where,   S = Power Density

P = Power Input to Antenna

G = Antenna Gain

R = distance to the center of radiated antenna

RFID:
Prediction distance 20cm

(RFID 13.56 Hz): Output Power = -21.65 dBm, Antenna Gain = 0 dBi, Power density =0 mW/cm^2

Type	CH Freq (MHz)	Max Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Pass/Fail
RFID	13.56	-21.65	20	0.00000137	1	Pass

WLAN:
Prediction distance 20cm

(WLAN 2.4GHz): Output Power = 17.9 dBm, Antenna Gain = 2.5 dBi, Power density =0.0218 mW/cm^2

Type	CH Freq (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Max Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Pass/Fail
WLAN 802.11B 2.4 GHz	2462	17.9	2.5	19.90	20	0.0218	1	Pass

(WLAN 5GHz): Output Power = 16.214 dBm, Antenna Gain = 3.5 dBi, Power density =0.0186 mW/cm^2

Type	CH Freq (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Max Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Pass/Fail
WLAN 802.11A 5 GHz	5180	16.214	3.5	19.714	20	0.0186	1	Pass

WCDMA / LTE:

Prediction distance 20cm

(WCDMA Band 2 - 1907.6MHz): Conducted Output Power = 27.50 dBm, Antenna Gain = 2 dBi

(LTE   Band 4 - 1754.3MHz): Conducted Output Power = 26.22 dBm, Antenna Gain = 2 dBi

CH Freq (MHz)	Average Output Power (dBm)	Antenna Gain (dBi)	Max Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Pass/Fail
WCDMA Band 2 (1907.6MHz)	25.50	2	27.50	20	0.1119	1	Pass
LTE Band 4 (1754.3 MHz)	24.22	2	26.22	20	0.0833	1	Pass

If RFID, WLAN (2.4GHz) and WCDMA transmit simultaneously.

Total MPE = 0.00000137 mW/cm2 + 0.0218 mW/cm2 + 0.1119 mW/cm2 = 0.1337 mW/cm2

If RFID, WLAN (2.4GHz) and LTE transmit simultaneously.

Total MPE = 0.00000137 mW/cm2 + 0.0218 mW/cm2 + 0.0833 mW/cm2 = 0.1051 mW/cm2

If RFID, WLAN (5 GHz) and WCDMA transmit simultaneously.

Total MPE = 0.00000137 mW/cm2 + 0.0186 mW/cm2 + 0.1119 mW/cm2 = 0.1305 mW/cm2

If RFID, WLAN (5 GHz) and LTE transmit simultaneously.

Total MPE = 0.00000137 mW/cm2 + 0.0186 mW/cm2 + 0.0833 mW/cm2 = 0.1019 mW/cm2

The Above Result had shown that the Device complied with MPE requirement.

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