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Date: October 5th, 2018

Report: 57538_ME910C1-NA

RF exposure analysis for the equipment – Maximum Antenna Gain

Model: ME910C1-NA **FCC ID:** RI7ME910C1NA **IC:** 5131A-ME910C1NA

The ME910C1-NA is a module designed to be installed in other devices. This device is to be used only for fixed and mobile applications. If the final product after integration is intended for portable use, new applications and FCC and ISED are required.

The antenna(s) used for these transmitters must be installed to provide a separation distance of at least 20 cm from all the persons and must not be co-located or operating in conjunction with any other antenna or transmitter except as under the conditions described KDB 447498 D01 General RF Exposure Guidance.

MPE exposure limits

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure:

| Frequency Range (MHz) | Power density (mW/cm ²) | Averaging time (minutes) |
|-----------------------|-------------------------------------|--------------------------|
| 300 – 1500 | f (MHz) /1500 | 30 |
| 1500 – 100.000 | 1,0 | 30 |

The table below is excerpted from RSS-102, Issue 5, 4, titled “Table 4: RF Field Strength Limits for Devices Used by the General Public”:

| Frequency Range (MHz) | Power density (W/m ²) | Averaging time (minutes) |
|-----------------------|-----------------------------------|--------------------------|
| 300 – 6000 | $0.02619 \cdot f^{0.6834}$ | 6 |

EIRP limits

| Band | Frequency (MHz) (Lowest Frequency) | FCC MPE limit (mW/cm ²) | ISED MPE limit (mW/cm ²) | FCC/IC MPE limit (mW/cm ²) | FCC EIRP limit (W) | ISED EIRP limit (W) |
|--------|------------------------------------|-------------------------------------|--------------------------------------|--|--------------------|---------------------|
| FDD 4 | 1710,7 | 1,000 | 0,424 | 0,42431 | 1,00 | 1,00 |
| FDD 2 | 1850,7 | 1,000 | 0,448 | 0,44775 | 2,00 | 2,00 |
| FDD 12 | 699,0 | 0,466 | 0,230 | 0,23017 | 4,92 | 5,00 |
| FDD 13 | 777,0 | 0,518 | 0,247 | 0,24743 | 4,92 | 5,00 |

Using the equation $S = \frac{PG}{4\pi R^2}$ to calculate the exposure to electromagnetic fields

where: S = 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
R = distance to the centre of radiation of the antenna (appropriate units, e.g., cm)

The maximum antenna gain that can be used in the ME910C1-NA is shown in the following table:

| Band | Frequency (MHz) (Lowest Frequency) | Maximum conducted output power (per tune-up) (dBm) | Duty cycle (%) | FCC MPE limit (mW/cm ²) | ISED MPE limit (mW/cm ²) | FCC/IC MPE limit (mW/cm ²) | FCC ERP limit (W) | ISED ERP limit (W) | Evaluation distance for compliance with MPE limits (cm) | Antenna gain to meet FCC/ISED MPE limit (dBi) | Antenna gain to meet FCC ERP limit (dBi) | Antenna gain to meet ISED ERP limit (dBi) | Maximum antenna gain to meet all the limits (dBi) | Maximum antenna gain to meet all the limits per frequency band (dBi) |
|--------|------------------------------------|--|----------------|-------------------------------------|--------------------------------------|--|-------------------|--------------------|---|---|--|---|---|--|
| FDD 4 | 1710.7 | 24.00 | 100.0% | 1,000 | 0,424 | 0,42431 | 1,00 | 1,00 | 20 | 9,28 | 6,00 | 6,00 | 6,00 | 6,00 |
| FDD 2 | 1850.7 | 24.00 | 100.0% | 1,000 | 0,448 | 0,44775 | 2,00 | 2,00 | 20 | 9,52 | 9,01 | 9,01 | 9,01 | 9,01 |
| FDD 12 | 699.0 | 24.45 | 100.0% | 0,466 | 0,230 | 0,23017 | 4,92 | 5,00 | 20 | 6,18 | 12,46 | 12,53 | 6,18 | 6,18 |
| FDD 13 | 777.0 | 24.00 | 100.0% | 0,518 | 0,247 | 0,24743 | 4,92 | 5,00 | 20 | 6,94 | 12,91 | 12,98 | 6,94 | 6,94 |

| Band | Frequency (MHz) (Lowest Frequency) | Maximum conducted output power (per tune-up) (dBm) | Duty cycle (%) | Antenna gain (dBi) | FCC/IC MPE limit (mW/cm ²) | FCC ERP limit (W) | ISED ERP limit (W) | FCC/ISED ERP limit (W) | Evaluation distance for compliance with MPE limits (cm) | $S = \frac{PG}{4\pi R^2}$ (mW/cm ²) | MPE Ratio (S/MPE limit) |
|--------|------------------------------------|--|----------------|--------------------|--|-------------------|--------------------|------------------------|---|---|-------------------------|
| FDD 4 | 1710.7 | 24.00 | 100.0% | 6.00 | 0,42431 | 1,00 | 1,00 | 1,00 | 20 | 0,19894 | 0,46886 |
| FDD 2 | 1850.7 | 24.00 | 100.0% | 9.01 | 0,44775 | 2,00 | 2,00 | 2,00 | 20 | 0,39786 | 0,88858 |
| FDD 12 | 699.0 | 24.45 | 100.0% | 6.18 | 0,23017 | 4,92 | 5,00 | 4,92 | 20 | 0,23000 | 0,99926 |
| FDD 13 | 777.0 | 24.00 | 100.0% | 6.94 | 0,24743 | 4,92 | 5,00 | 4,92 | 20 | 0,24702 | 0,99835 |

Sincerely,
P.A.



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