

Cover Letter:

FCC ID: KEATNL450I

The original Grant for this modular device included the following comment:

“Output is conducted. RF exposure compliance is addressed at the time of licensing, as required by the responsible FCC Bureau(s), including antenna co-location requirements of Section 1.1307(b)(3).”

This device is now being configured with a particular antenna for use in a mobile RF Exposure configuration. This Class II Permissive Change application is being submitted to address RF Exposure in the application, along with possible co-location with other low-power transmitters.

Operating frequency: 410 – 470 MHz

The maximum Peak Conducted RF Power is 0.5 Watts

The Maximum antenna gain: 3dBi

EIRP = 27dBm + 3dBi = 30dBm = 1 Watt = 1000mW

The Power Density (S) Limit at 410MHz for an uncontrolled exposure is $f(\text{MHz})/1500 = 0.27\text{mW}/\text{cm}^2$

Power Density S (mW/cm²) = (EIRP)/(4 π R²) =

S = (1000mW) / (4 π (20cm)²)

S = 0.20 mW/cm² @ 20 cm

Therefore this device used with up to a 3dBi antenna at full power complies with the RF Exposure limits when used with at least 20cm separation to the body.

The percentage of the power density contribution of this transmitter to its limit is 0.20/0.27, which is approximately 75 % of its limit. Therefore collocation with another mobile category device that contributes less than 25% of its limit to the power density would still provide compliance to the RF Exposure power density limits.

If this device were to be co-located with another low power transmitter (for example a Bluetooth transmitter, the power density allowed

Worst case Bluetooth Transmitter specifications:

Power 5mW

Maximum antenna gain 3dBi

Maximum EIRP = 10mW

Power Density Limit at 2.4GHz = 1.0 mW/cm²

Power density calculation for the Bluetooth transmitter

$$S(\text{BT}) = 10\text{mW} / (4\pi(20\text{cm})^2)$$

$$S(\text{BT}) = 0.002 \text{ mW/cm}^2$$

Therefore the Bluetooth transmitter would contribute approximately 0.2% of power density with respect to its limit. The combined power density is still approximately 75% of the power density limits, and therefore complies.

The total percentage does not exceed 100 % per OET 65 requirements even when the spectral power density is calculated 20cm away from it.

I would recommend that the Grant note be modified to state the following:

“Output is conducted. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures. For antennas with gain greater than 3 dBi, RF exposure compliance may be addressed at the time of licensing, as required by the responsible FCC Bureau(s), including antenna co-location requirements of Section 1.1307(b)(3).