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Subject: RF exposure analysis for the equipment with FCC ID: **2AISJ-1**

The device model: **GSEtracker 1000** (FCC ID:**2AISJ-1**) is designed to be installed in and used in mobile exposure conditions.

The antennas used for this device 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.

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

Compliance analysis

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

where: S = power density (in appropriate units, e.g. mW/cm^2)
   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 center of radiation of the antenna (appropriate units, e.g., cm)

compliance with FCC MPE limits is demonstrated based on the following calculations:

1.   Standalone analysis
1.1   RF exposure

Calculations done using specified antenna gains:

Frequency Band	Mode	Frequency Range (MHz)	Reference frequency (Lowest freq.) (MHz)	Maximum conducted output power (dBm)	TX slots	Duty cicle (%)	Evaluation distance (cm)	Antenna gain (dBi)	S (mW/cm^2)	MPE limit in USA (mW/cm^2)	MPE Ratio (S/MPE limit)
900 MHz	LoRa	903 - 907,2	903,0	18,43	N/A	100,0%	20	5,70	0,0516	0,6020	0,0857
2,4 GHz ISM	BLE	2402 - 2480	2402,0	2,05	N/A	100,0%	20	3,10	0,0007	1,0000	0,0007

2.   Co-location analysis
2.1   Co-location with other transmitter in mobile exposure conditions

As specified in the operational description, both transmitters can work simultaneously so an analysis of the co-location in mobile exposure conditions is required.

According to KDB 447498 D01 General RF Exposure Guidance v06, 7.2:

   Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on calculated or measured field strengths or power density, is ≤ 1.0.

The sum of MPE ratios when both transmitters work simultaneously is 0.0857 + 0.0007 = 0.864 ≤ *1.0.*

3   Conclusion

The sum of MPE ratios when both transmitters work simultaneously is 0.0857 + 0.0007 = 0.864 ≤ *1.0*.

The sum of S for both modes is 0.0516 + 0.0007 = 0.0523 (mW/cm^2) → **S = 0.523 W/m^2**

In compliance

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