Excellence in Compliance Testing

Certification Exhibit

FCC ID: AMH101001
IC: 10124A-101001

FCC Rule Part: 15.247
IC Radio Standards Specification: RSS-210

ACS Project: 12-2035

Manufacturer: Locus Solutions LLC
Model: SmartTraxx Portable

RF Exposure

General Information:

Applicant: Locus Solutions, LLC
ACS Project: 12-2035
Device Category: Mobile
Environment: General Population/Uncontrolled Exposure

Technical Information:

Antenna Type: ¼ Wave Dipole
Antenna Gain: 2.15 dB
Maximum Transmitter Conducted Power: 19.86 dBm, 96.82779 mW
Maximum System EIRP: 22.01 dBm, 158.8547 mW
Exposure Conditions: Greater than 20 centimeters

MPE Calculation

The Power Density (mW/cm^2) is calculated as follows:

$$S = \frac{PG}{4\pi R^2}$$

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 center of radiation of the antenna (appropriate units, e.g., cm)

MPE Calculator for Mobile Equipment Limits for General Population/Uncontrolled Exposure*							
Transmit Frequency (MHz)	**Radio Power (dBm)**	**Power Density Limit (mW/Cm2)**	**Radio Power (mW)**	**Antenna Gain (dBi)**	**Antenna Gain (mW eq.)**	**Distance (cm)**	**Power Density (mW/cm^2)**
2405	19.86	1.00	96.83	2.15	1.641	20	0.032

Collocation with GSM / GPRS Modem

This Locus Solutions SmartTraxx Portable contains a Quake Modem Q4000 in addition to the 2.4 GHz Zigbee transmitter. The Quake Modem Q4000 encloses a Telit GSM850/PCS1900 transceiver module (FCC ID: RI7GE865 / IC: 5131A-GE865). The Quake Q4000 modem and the Zigbee 2.4 GHz and can transmit simultaneously. The PCB antenna for the Telit transceiver module provides a 0 dBi gain for both GSM 850 and PCS 1900 bands.

Table 2: MPE Calculations – GSM 850 / PCS 1900 Radios

MPE Calculator for Mobile Equipment Limits for General Population/Uncontrolled Exposure*								
Mode of Operation	**Transmit Frequency (MHz)**	**Radio Power (dBm)**	**Power Density Limit (mW/Cm2)**	**Radio Power (mW)**	**Antenna Gain (dBi)**	**Antenna Gain (mW eq.)**	**Distance (cm)**	**Power Density (mW/cm^2)**
GSM 850	824	31.8	0.55	1513.56	0	1.000	20	0.301
PCS 1900	1850.2	29.4	1.00	870.96	0	1.000	20	0.173

Summation of Power Densities – Simultaneous Transmissions

This device contains multiple transmitters which can operate simultaneously and therefore the maximum RF exposure is determined by the summation of MPE ratios. The limit is such that the summation of MPE ratios is ≤ 1.0.

The summation of MPE ratios is as follows:

2.4 GHz Zigbee and GSM 850 Module operating simultaneously:
2.4 GHz Zigbee MPE Ratio + GSM 850 MPE Ratio
(0.032 / 1.00) + (0.301 / 0.55) = (0.032) + (0.547) = 0.579
0.579 < 1

2.4 GHz Zigbee and PCS 1900 Module operating simultaneously:
2.4 GHz Zigbee MPE Ratio + GSM 1900 MPE Ratio
(0.032 / 1.00) + (0.173 / 1.00) = (0.032) + (0.173) = 0.205
0.205 < 1

Installation Guidelines

The installation manual should contain text similar to the following advising how to install the equipment to maintain compliance with the FCC RF exposure requirements:

RF Exposure

In accordance with FCC requirements of human exposure to radio frequency fields, the radiating element shall be installed such that a minimum separation distance of 20 centimeters will be maintained.

Conclusion

This device complies with the MPE requirements by providing adequate separation between the device, any radiating structure and the general population.