



Excellence in Compliance Testing

Certification Exhibit

**FCC ID: SDBTXCVRBB01
IC: 2220A-TXCVRBB01**

**FCC Rule Part: CFR 47 Part 24 Subpart D, Part 90 Subpart I, Part 101
IC Radio Standards Specification: RSS-134, RSS-119**

Manufacturer: Sensus Metering Systems, Inc.
Model: TXCVRBB01

RF Exposure

General Information:

Applicant: Sensus Metering Systems, Inc.
ACS Project: 09-0212
Device Category: Fixed
Environment: General Population/Uncontrolled Exposure

The Sensus TXCVRBB01 transceiver is collocated in a Sensus FRP host device with either a MultiTech Model MTCBA-C CDMA modem module FCC ID: AU792U04A22760 / IC: 125A-0010 or Wavecom Fastrack Supreme 20 GSM modem module FCC ID: O9EQ2687 / IC: 3651C-Q2687. The FRP device is used only in a fixed operating environment therefore the MPE calculations provided below address only fixed operating conditions as the FRP is not used in a mobile environment.

Technical Information – FCC ID: SDBTXCVRBB01 / IC: 2220A-TXCVRBB01:

Antenna Type: Omni Directional
Antenna Gain Maximum: 11dBi
Max Transmitter Output Power: 30.38 dBm
Max System EIRP: 41.38 dBm

Technical Information – FCC ID: AU792U04A22760 / IC: 125A-0010 (CDMA Modem Module):

Manufacturer: MultiTech Systems
Antenna Type: Omni Directional (Nearson W765FL-12-AM-AGDP)
Antenna Gain: 1.2dBi (850), 2dBi (1900 PCS)
Max Transmitter Output Power: 23.5 dBm
Max System EIRP: 24.7 dBm (850), 25.5 dBm (1900 PCS)

Technical Information – FCC ID: O9EQ2687 / IC: 3651C-Q2687 (GSM Modem Module):

Manufacturer: Wavecom SA
Antenna Type: Omni Directional (Nearson W765FL-12-AM-AGDP)
Antenna Gain: 1.2dBi (850), 2dBi (1900 PCS)
Max Transmitter Output Power: 32.1 dBm (850), 30 dBm (1900 PCS)
Max System EIRP: 33.3 dBm (850), 32 dBm (1900 PCS)

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/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)

MPE Calculator for Mobile Equipment - Fixed 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)
901.9875	30.38	0.60	1091.44	11	12.589	50	0.437
CDMA							
824.7	23.5	0.55	223.87	1.2	1.318	50	0.009
1851.25	23.5	1.00	223.87	2	1.585	50	0.011
GSM							
824.2	32.1	0.55	1621.81	1.2	1.318	50	0.068
1850.2	30	1.00	1000.00	2	1.585	50	0.050

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 power densities. The 900 radio will be co-located with either with the CDMA or the GSM modem, but not both. Additionally the modems cannot operate in both the 850 and 1900 bands simultaneously. For the sake of providing the worst case data, the highest power density from the two modem bands will be applied for the calculations.

The maximum power density as calculated by a summation of power densities for each simultaneous transmission combination as follows. The lowest power density limit from each band was used for determining the overall limit.

900 MHz radio Co-Located with CDMA Modem:

900MHz Radio: 0.437 (mW/cm²)
 CDMA 850: 0.009 (mW/cm²)
 CDMA 1900: 0.011 (mW/cm²)
TOTAL(CDMA 850): 0.446 (mW/cm²) – Limit 0.55 (mW/cm²)
TOTAL(CDMA 1900): 0.448 (mW/cm²) – Limit 0.60 (mW/cm²)

900 MHz radio Co-Located with GSM Modem:

900MHz Radio: 0.437 (mW/cm²)
 GSM 850: 0.068 (mW/cm²)
 GSM 1900: 0.058 (mW/cm²)
TOTAL (GSM 850): 0.505 (mW/cm²) – Limit 0.55 (mW/cm²)
TOTAL (GSM 1900): 0.495 (mW/cm²) – Limit 0.60 (mW/cm²)

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 50cm is maintained for fixed operating conditions.

Conclusion

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