Excellence in Compliance Testing

Certification Exhibit

FCC ID: SK9AMI-2A
IC: 864G-AMI2A

FCC Rule Part: 15.247, 15.249
IC Radio Standards Specification: RSS-210

ACS Report Number(s): 09-0085

Manufacturer: Itron Electricity Metering Inc.
Model(s): CVSOR-A

RF Exposure

General Information:

Applicant: Itron Electricity Metering Inc.
ACS Project: 09-0085
FCC ID: SK9AMI-2A
Device Category: Mobile
Environment: General Population/Uncontrolled Exposure
Exposure Conditions: Greater than 20 centimeters
Simultaneous Tx: Yes

Technical Information:

Radio	900 MHz LAN	2.4GHz Zigbee (Register PCB)	2.4GHz Zigbee (Cell Relay PCB)	CDMA Modem Module *FCC ID: N7NMC8790 IC:2417C-MC8790*
Antenna Type	single-band patch	half wavelength slot	single-band slot	Omni - printed flexible circuit
Antenna Gain	3dBi	1dBi	4dBi	GSM850: -1dBi GSM 1900: 1dBi
Conducted Power	21.92dBm	18.71dBm	-13.99dBm	GSM 850: 31.8dBm GSM 1900: 28.7dBm
Maximum EIRP	0.310W	0.094W	0.10mW	GSM 850: 1.202W GSM 1900: 0.933W
Maximum ERP	0.189W	0.057W	0.06mW	GSM 850: 0.732W GSM 1900: 0.569W

MPE Calculation:

Calculated Conducted Power (15.249) – Cell Relay 2.4GHz Zigbee Radio
For the purpose of determining Power Density for the 2.4GHz Zigbee radio on the Cell Relay PCB the conducted RF power must first be calculated.

The power was calculated using the following equation:

$$P = \frac{(E * d)^2}{30 * G}$$

Where: G = Numeric Gain of the transmitting antenna with reference to an isotropic radiator
d = The distance in meters from which the field strength was measured
E = The measured maximum fundamental field strength in V/m

Table 1: Maximum Fundamental Field Strength

Frequency (MHz)	Uncorrected Reading (dBµV/m)	Antenna Polarity (H/V)	Total Correction Factor (dB)	Corrected Reading (dBµV/m)
2480	84.71	H	0.53	85.24

Table 2: Peak Output Power

Frequency (MHz)	Numeric Gain	Distance (m)	Max. Fund. Field Strength (V/m)	Output Power (dBm)
2480	2.51	3	0.02	-14

Power Density

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)**
902.25	21.92	0.60	155.60	3	1.995	20	0.062
2405	18.71	1.00	74.30	1	1.259	20	0.019
2480	-14	1.00	0.04	4	2.512	20	0.000
824	31.8	0.55	1513.56	-1	0.794	20	0.239
1850	28.7	1.00	741.31	1	1.259	20	0.186

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 MHz LAN and high power Zigbee radio can not operate simultaneously there it is not appropriate to include both of those power density values in the same summation of power densities. For the sake of providing the worst case data, the highest power density from those two transmitters 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:

GSM Modem Operating in the 800MHz Cellular Band:

900MHz LAN:	0.062 (mW/cm^2)
2.4GHz Zigbee:	0.000 (mW/cm^2)
GSM 850:	0.239 (mW/cm^2)
TOTAL:	**0.301 (mW/cm^2)**

GSM Modem Operating in the 1900MHz PCS Band:

900MHz LAN:	0.062 (mW/cm^2)
2.4GHz Zigbee:	0.000 (mW/cm^2)
GSM 1900:	0.186 (mW/cm^2)
TOTAL:	**0.248 (mW/cm^2)**

Installation Guidelines:

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

"RF Exposure (Intentional Radiators Only)
In accordance with FCC requirements of human exposure to radiofrequency fields, the radiating element shall be installed such that a minimum separation distance of 20cm is maintained from the general population."

Conclusion:

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