Excellence in Compliance Testing

Certification Exhibit

FCC ID: YJ4CSAG200

FCC Rule Part: 15.247

ACS Project Number: 14-0047

Manufacturer: Consert, Inc.
Model: CSAG200-1.0

RF Exposure

General Information:

Applicant: Consert, Inc.
Device Category: Mobile
Environment: General Population/Uncontrolled Exposure

The CSAG200-1.0 Consert Stand Alone Gateway (SAG) is a device that acts as a multi-conduit data transmission controller for a load management system. It provides remote control and indication for the Consert Device Controller (DC) and radio thermostats via backhaul wireless network.

In addition to the integrated 2.4 GHz Zigbee radio (802.15.4), the CSAG200-1.0 Consert Stand Alone Gateway (SAG) contains a pre-approved Novatel Wireless Inc. Model E396 (FCC ID: PKRNVWE396) cellular modem.

Technical Information:

Table 1: Technical Information (Including Collocated Transmitter)

	Consert, Inc. Model CSAG200-1.0 (EUT) FCC ID: YJ4CSAG200	**Novatel Wireless Inc. Model E396 (Module) FCC ID: PKRNVWE396**
Antenna Type	Inverted-F PCB Trace	Pulse W3554 High Efficiency Wideband LTE Dipole Antenna
Antenna Gain	0 dBi	850 Band: 1.73 dBi 1700 Band: 2.64 dBi 1900 Band: 2.26 dBi
Conducted Power*	62.5 mW	850 Band: 2013.7 mW 1700 Band: 287.1 mW 1900 Band: 1199.5 mW
Source-based Time-averaged Power**	62.5 mW	850 Band: 503.5 mW 1700 Band: 287.1 mW 1900 Band: 299.9 mW
Maximum EIRP**	62.5 mW	850 Band: 749.74 mW 1700 Band: 527.27 mW 1900 Band: 504.63 mW
Maximum ERP**	38.1 mW	850 Band: 456.99 mW 1700 Band: 321.39 mW 1900 Band: 307.59 mW

* Power provided for FCC ID: PKRNVWE396 is power as measured in the original certification report. Worst case from all modes.
** Source-based Time-averaged power for GPRS/EDGE for 850/1900. Not applicable for AWS 1700 band.

Source-Based Time-Averaging (FCC ID: PKRNVWE396)

The FCC ID: PKRNVWE396 modem has a declared 25% source-based time-averaged duty factor for GPRS/EDGE (Cat 10 (Max 2 UL TX Slots)) operation. The purpose of evaluating compliance for maximum permissible exposure, the maximum conducted output power level was corrected by a factor of 0.25 or 6dB to account for the source-based time-averaging.

Corrected Output Power Level 850 = 2.0137W * 0.25 = 0.503W = 27.02dBm
Corrected Output Power Level 1900 = 1.1995W * 0.25 = 0.300W = 24.77dBm

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)

Table 2: MPE Calculation (Including Collocated Transmitter)

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)
2440	17.96	1.000	62.52	0	1.000	20	0.012
848.8	27.02	0.566	503.50	1.73	1.489	20	0.149
1712.4	24.58	1.000	287.08	2.64	1.837	20	0.105
1909.8	24.77	1.000	299.92	2.26	1.683	20	0.100

** Source-based Time-averaged power for GPRS/EDGE for 850/1900. Not applicable for AWS 1700 band or 2.4 GHz Zigbee radio.

Summation of Power Densities – Simultaneous Transmissions

This device contains (2) transmitters which are collocated and can operate simultaneously; therefore the maximum permissible exposure (MPE) 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:

E396 Modem Operating in the 850 Band:
802.15.4 MPE Ratio + E396 850 MPE Ratio
(0.012 / 1.000) + (0.149 / 0.566) = (0.012) + (0.263) = 0.275
0.275 < 1

E396 Modem Operating in the 1700 Band:
802.15.4 MPE Ratio + E396 850 MPE Ratio
(0.012 / 1.000) + (0.105 / 1.000) = (0.012) + (0.105) = 0.117
0.117 < 1

E396 Modem Operating in the 1900 PCS Band:
802.15.4 MPE Ratio + E396 1900 MPE Ratio
(0.012 / 1.000) + (0.100 / 1.000) = (0.012) + (0.100) = 0.112
0.112 < 1