



Excellence in Compliance Testing

Certification Exhibit

**FCC ID: SDBUSBXCVR2
IC: 2220A-USBXCVR2**

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

ACS Project Number: 13-2054

**Manufacturer: Sensus Metering Systems, Inc.
Model: USBXCVR2**

RF Exposure

General Information:

Applicant: Sensus Metering Systems, Inc.
ACS Project: 13-2054
Device Category: Mobile (Handheld)
Environment: General Population/Uncontrolled Exposure

Technical Information:

Antenna Type: Monopole
Antenna Gain: -1 dBi
Maximum Transmitter Conducted Power: 20.16 dBm, 103.75 mW
Maximum System EIRP: 19.16 dBm, 82.414 mW
Exposure Conditions: Greater than 20 centimeters

Justification for Exclusion

The Sensus USB Flexnet Micro-Transceiver (FMT), Model USBXCVR2, is a 900 MHz – 960 MHz transceiver which connects to a laptop, handheld PC or other USB 2.0 host (Master) device using a regular USB receptacle connector. The unit is used to configure Flexnet radio modules. Per the device typical operation and the customer appended justification, the minimum test distance is obtained when the unit is used in the handheld PC configuration.

The SAR exclusion can be determined using the parameters below based on the client appended justification:

Minimum Test Distance : 40 mm
Maximum Duty Cycle : 24.37%
Highest Operating Frequency: 960 MHz
Average Maximum Power: $103.75 \text{ mW} * 24.37 / 100 = 25.285 \text{ mW}$

Per KDB 447498 D01 General RF Exposure Guidance v05r01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$\begin{aligned} & [(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot \\ & [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR} \\ & = (25.285 / 40) * (\sqrt{0.960}) \\ & = 0.632 * 0.98 \\ & = 0.6 \end{aligned}$$

Based on the results above, the unit meets both body and extremities SAR exclusion requirements.

Appendix

Support Document for SAR Exemption

Justification for Exemption from SAR Evaluation

7/17/2013

ACS TCB

5015 B.U. Bowman Drive

Buford, GA 30518

Re: SAR Requirements for the USB FMT (USBXCVR2)

FCC ID: SDBUSBXCVR2

Device Description

The USB FMT is a radio module interrogation device connected via USB to either a third party handheld PC or laptop. It is used to install and configure FlexNet radio modules. The USB FMT has one radio that can be employed in two different modes, a long range mode (2-FSK) or a short range mode (ASK).

Operating Modes

The USB FMT is capable of the following transmissions and types:

5kb/s 2-FSK (5K90F1D), Po=20dBm, 896 to 960MHz

10kb/s 2-FSK (11K8F1D), Po=20dBm, 896 to 960MHz

12.5kb/s 2-FSK (14K8F1D), Po=20dBm, 896 to 960MHz

2700b/s ASK (10K30F2D), Po=14dBm, 896 to 960MHz

Typical Use

The USB FMT is typically used either with a handheld PC running an application called Field Logic for Flexnet radio installation and configuration or with a laptop running a utility called FlexNet Utility for Flexnet radio diagnostics. It can be shown in both cases that the recommended installation of the USB FMT provides ample distance to the body.

In both cases, the distance from the antenna to the body is greater than 14mm which is the minimum distance allowed by Section 4.3.1, Paragraph 1 of General RF Exposure Guidance v05r01 document from the FCC OET based on a worse case frequency of 960MHz and 20 dBm output power.

For the handheld PC, it is recommended by Sensus that the FMT be attached to the rear cover of the handheld as shown in the picture below. The typical distance between the hand and the USB FMT is 40mm.



For the laptop, it is recommended by Sensus to attach the USB FMT to the exterior of the display as shown. The typical distance between the USB FMT and the hand is 150mm.



Duty Cycle

- 1) FMT TX 90 bytes (This is the ON TIME for the FMT) = 144ms
- 2) End Point receives this data and delays 200ms before transmitting back
- 3) End Point TX 90 bytes of data back to FMT = 144ms
- 4) FMT sends 71 bytes at 9600 baud of data to Field Logic = 60ms
- 5) Field Logic sends 51 bytes at 9600 baud of data back to FMT to start a new TX packet = 43ms

So a FMT Transmitted packet of data would take:

$$144\text{ms} + 200\text{ms} + 144\text{ms} + 60\text{ms} + 43\text{ms} = 591\text{ms}$$

The duty cycle of the FMT TRANSMIT TIME of 144ms per packet would be

$$144\text{ms} / 591\text{ms} = 24.37\%$$

Sincerely,



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