Excellence in Compliance Testing

Certification Exhibit

FCC ID: SM6-HUBXRRL

FCC Rule Part: 15.247

ACS Project Number: 15-0033

Manufacturer: Mueller Systems, LLC
Model: MIHUBXR-RL

RF Exposure

General Information:

Applicant: Mueller Systems, LLC
Device Category: Mobile
Environment: General Population/Uncontrolled Exposure

The MIHUBXR-RL is intended for outdoor use as an unattended data collector for automatic meter monitoring and control applications. The MIHUBXR-RL can transmit simultaneously with the on-board Telit Communications S.p.A. WWAN module HE910, FCC ID: RI7HE910.

Technical Information:

Table 1: Technical Information (Including Collocated Transmitters)

	Mueller 900 MHz LAN module Model MIHUBXR-RL *FCC ID: SM6-HUBXRRL*	**Telit Communications S.p.A. WWAN Module Model HE910 FCC ID: RI7HE910**
Antenna Type	Dipole	Omnidirectional
Antenna Gain	6 dBi	GSM/GPRS (850MHz): -0.7 dBi GSM/GPRS (1900MHz): 2.5 dBi WCDMA Band 4 (1700MHz): 1.7 dBi
Conducted Power	897.43 mW	GSM/GPRS (850MHz): 1995 mW* GSM/GPRS (1900MHz): 993 mW* WCDMA Band 4 (1700MHz): 226 mW*
Maximum Peak EIRP	3572.73 mW	GSM/GPRS (850MHz): 1698.02 mW GSM/GPRS (1900MHz): 1765.83 mW WCDMA Band 4 (1700MHz): 334.28 mW
Maximum Peak ERP	2177.71 mW	GSM/GPRS (850MHz): 1035.01 mW GSM/GPRS (1900MHz): 1076.34 mW WCDMA Band 4 (1700MHz): 203.76 mW

* Power provided for FCC ID: RI7HE910 is power as listed on the grant and measured in the original FCC certification filing.

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 Devices)

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)
912.310059	29.53	0.61	897.43	6	3.981	27	0.390
909.950256	29.3	0.61	851.14	6	3.981	27	0.370
824.2	33	0.55	1995.26	-0.7	0.851	27	0.185
1850.2	29.97	1.00	993.12	2.5	1.778	27	0.193
1712.4	23.54	1.00	225.94	1.7	1.479	27	0.036

NOTE: Operation in the 900MHz band is limited to one mode at a time. Therefore, the highest power of the 900MHz band was used for calculations.

Summation of Power Densities – Simultaneous Transmissions

This device contains multiple transmitters which can operate simultaneously and is collocated with additional transmitters in host integration; 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:

HE910 Module Operating in the 850 MHz Band:
900 LAN MPE Ratio + HE910 850 MPE Ratio
(0.390 / 0.61) + (0.185 / 0.55) = (0.639) + (0.336) = 0.976
0.976 < 1

HE910 Module Operating in the 1900 MHz Band:
900 LAN MPE Ratio + HE910 1900 MPE Ratio
(0.390 / 0.61) + (0.193 / 1.00) = (0.639) + (0.193) = 0.832
0.832 < 1

HE910 Module Operating in the 1700 MHz Band:
900 LAN MPE Ratio + HE910 1700 MPE Ratio
(0.390 / 0.61) + (0.036 / 1.00) = (0.639) + (0.036) = 0.675
0.675 < 1