Excellence in Compliance Testing

Certification Exhibit

FCC ID: VEYXMODR1W1

FCC Rule Part: 15.247

ACS Project Number: 13-2019

Manufacturer: xG Technology, Inc.
Model: xMaxW

RF Exposure

General Information:

Applicant: xG Technology, Inc.
ACS Project: 13-2019
Device Category: Mobile
Environment: General Population/Uncontrolled Exposure

Technical Information:

Antenna Type: Flex Dipole Antenna
Antenna Gain: 3.4 dBi
Maximum Transmitter Conducted Power: 14.77 dBm, 29.99 mW
Maximum System EIRP: 18.17 dBm, 65.6145 mW
Exposure Conditions: Greater than 20 centimeters

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 1: WLAN 2.4 GHz MPE Calculations

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 eg.)**	**Distance (cm)**	**Power Density (mW/cm^2)**
2400	14.77	1.00	29.99	3.4	2.188	20	0.013

Summation of Power Densities

The WLAN xMaxW module (FCC ID: VEYXMODR1W1) is integrated inside the xG Technology xMod wireless modem (FCC ID: VEYXMODR1). The xMod includes a 900 MHz xMax radio which uses a (4 RX x 2 TX) planar inverted-F antenna array. Each antenna in the array provides an individual gain of 0 dBi. The directional gain of the array is calculated per FCC KDB Publication No. 662911 D01 Multiple Transmitter Output v01r02.

Directional Gain = G_{ANT} + Array Gain
*Array Gain = 10*log(N_{ANT}/N_{SS}) dB*

Where,
G_{ANT} = Antenna Gain
N_{ANT} = number of transmit antennas and
N_{SS} = number of spatial streams. (Assume N_{SS} = *1* unless you have specific information to the contrary.)

*Directional Gain = 0 + 10*log(2/1) = 3.01 dBi*

The MPE calculations for the xMod operating single-handedly using the directional gain are provided below:

Table 2: xMax 900 MHz MPE Calculations

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)**
900	24.3	0.60	269.15	3.01	2.000	20	0.107

The 900 MHz and 2.4 GHz radios can operate simultaneously. Therefore, the maximum RF exposure is determined by the summation of the MPE ratios. The limits is such that the total MPE ratio is less or equal to 1.0

The maximum MPE ratio is calculated as such:

900 MHz xMax and 2.4 GHz WLAN Operating Simultaneously:
900 MHz xMax MPE Ratio + 2.4 GHz WLAN MPE Ratio
(0.107/0.6) + (0.013/1) =
(0.1783 + 0.013) =
0.1913 < 1

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 20 centimeters will be maintained.

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