Excellence in Compliance Testing

Certification Exhibit

FCC ID: VEYXMODR1

FCC Rule Part: 15.247

ACS Project Number: 13-2019

Manufacturer: xG Technology, Inc.
Model: xMod

RF Exposure

General Information:

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

Transmitter Signal Correlation Information:

The xMod 900 MHz output signals are correlated using cyclic delay diversity (CDD). The maximum output power listed corresponds to the summation of the output power at both TX antenna ports. The directional gain 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*

Technical Information:

Antenna Type: Planar Inverted-F Antenna Array (4 RX x 2 TX)
Antenna Gain: 0 dBi
Directional Gain: 3.01 dBi
Maximum Transmitter Conducted Power: 24.3 dBm, 269.154 mW
Maximum System EIRP: 27.31 dBm, 538.27 mW (Considering Directional Gain)
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: 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

Summation of Power Densities

The xMod contains a WLAN module model xMaxW (FCC ID: VEYXMODR1W1). The module uses a 3.4 dBi Flex PCB Dipole antenna. The MPE calculations for the xMaxW operating single-handedly are provided below:

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

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:

<u>900 MHz xMax and 2.4 GHz WLAN Operating Simultaneously:</u>
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.