

31st March 2014

**Telecommunications Certification Body
UL VS Ltd
Ashwood Park
Ashwood Way
Basingstoke
Hampshire
RG23 8BG**

RE: PCI Express Mini Module FCC ID: PKTPEMAMW1 MPE Calculation

To Whom It May Concern,

The General Dynamics Broadband PCI Express Mini Module is considered to be mobile equipment and intended for operation with a minimum separation distance of 20cm between the user and the equipment, The equipment is categorically excluded from routine RF exposure evaluation as it meets the exclusion requirements of FCC rule 2.1091 (c), therefore the RF Exposure performance can be assessed by a Maximum Permissible Exposure (MPE) calculation.

The General Dynamics Broadband PCI Express Mini module is a tri--band device so three MPE assessments are provided to cover all three bands of operation. The device is not capable of operating on multiple bands simultaneously therefore no simultaneous transmission situation exists for the device.

All frequency bands utilise FDD operation therefore source based averaging is not applied.

1. Stand-alone Power Density (S).

MPE Distance Calculation	10MHz Channel	
Antenna Gain	5	dBi
Line Loss	0	dB
Antenna Gain Ratio	3.16227766	
PCIe Mini Module Model AMW Tx Output Power	23	dBm
Upper Power Tolerance	2	dB
Output Power	316.23	mW
Maximum EIRP (per Channel)	1000.00	mW
Maximum ERP (per Channel)	609.54	mW
Frequency	1710	MHz
MPE Limit from 1.1310	1.000	mW/cm ²
Un-controlled/General Public Limit		
Assessment Distance from Antenna	20	cm
MPE at Assessment Distance from Antenna	0.1989	mW/cm²

Table 1: Band 4 MPE Calculation

MPE Distance Calculation	5MHz Channel	
Antenna Gain	8.6	dBi
Line Loss	0	dB
Antenna Gain Ratio	7.244359601	
PCIe Mini Module Model AMW Tx Output Power	23	dBm
Upper Power Tolerance	2	dB
Output Power	316.23	mW
Maximum EIRP (per Channel)	2290.87	mW
Maximum ERP (per Channel)	1396.37	mW
Frequency	699	MHz
MPE Limit from 1.1310	0.466	mW/cm ²
Un-controlled/General Public Limit		
Assessment Distance from Antenna	20	cm
MPE at Assessment Distance from Antenna	0.4558	mW/cm²

Table 2: Band 12 MPE Calculation

MPE Distance Calculation	10MHz Channel	
Antenna Gain	8.9	dBi
Line Loss	0	dB
Antenna Gain Ratio	7.762471166	
PCIe Mini Module Model AMW Tx Output Power	23	dBm
Upper Power Tolerance	2	dB
Output Power	316.23	mW
Maximum EIRP (per Channel)	2454.71	mW
Maximum ERP (per Channel)	1496.24	mW
Frequency	788	MHz
MPE Limit from 1.1310	0.525	mW/cm ²
Un-controlled/General Public Limit		
Assessment Distance from Antenna	20	cm
MPE at Assessment Distance from Antenna	0.4883	mW/cm²

Table 3: Band 14 MPE Calculation

The calculations above show the LTE PCI Express Mini Module FCC ID: PKTPEMAMW1 in stand-alone configuration complies with the Un-controlled /General Public limits at a minimum distance of 20cm for operation using all bands.

Yours Faithfully



P Warburg
Principal Engineer
General Dynamics Broadband