

### 3.9 RF Exposure

The 4-Channel/3-Channel WRU is a mobile device, and requires that the user be >20cm from the antenna while in operation. This use case is consistent with the operation of the device, as it will be deployed in outdoor environments and operated remotely.

MPE values have been calculated below using the maximum output power and peak antenna gain (Maximum EIRP). The calculated result at a 20cm exposure distance is well below the allowable threshold.

Professional Testing, EMI, Inc.											
15.247i, RSS-102: RF Exposure Analysis											
Test Date(s): 7/31/13 - 9/18/13						EUT Serial #: N/A					
Customer: Wireless Seismic						EUT Part #: 10-0023					
Project Number: 14464-15						Test Technician: Eric Lifesy					
Purchase Order #: N/A						Supervisor: Rob McCollough					
Equip. Under Test: 4-Channel Wireless Remote Unit						Witness' Name: N/A					
RF Exposure Calculations <input checked="" type="checkbox"/> Mobile (Ant >= 20cm) <input type="checkbox"/> Portable (Ant < 20cm)											
Channel	Frequency (MHz)	Port	Modulation	Peak Ant. Gain (dBi)	Pol.	EIRP (mW)	Waiver Limit (60/f(GHz)) (mW)	Minimum Exposure Distance (cm)	RF Field Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )	Result (P/F)
Low	2403	1	FHSS	5.5	Max	434.510	24.97	20	8.64E-02	1.00	PASS
Mid	2439	1	FHSS	5.5	Max	411.150	24.60	20	8.18E-02	1.00	PASS
High	2475	1	FHSS	5.5	Max	428.549	24.24	20	8.53E-02	1.00	PASS

  

Formulas Used for Calculations	
<p><b>RF Power Density Calculation</b></p> $S = \frac{PG}{4\pi R^2} \quad (3)$ <p>where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)                      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)</p> <p>or:</p> $S = \frac{EIRP}{4\pi R^2} \quad (4)$ <p>where: EIRP = equivalent (or effective) isotropically radiated power</p>	<p><b>Calculation for SAR Evaluation Power Threshold</b></p> $SAR\ Limit(mW) = 60/f(GHz)$

**Table 8: MPE Calculations for 4-Channel/3-Channel WRU @ 20cm Exposure Distance**