ncee labs
Product Compliance Solutions
4740 Discovery Drive | Lincoln, NE 68521
tel- 402.323.6233 | tel -888.657.6860 | fax - 402.323.6238
info@nceelabs.com | http://nceelabs.com

RF Exposure Evaluation

Reference: CFR 47 FCC Part 1.1310

Description: Both transmitters in the device have the possibility of transmitting simultaneously. The worst-case exposure for each transmitter was used to calculate the percentage of the allowable limit that each transmitter contributed. All of the percentages were then added together to verify that at the specified operating distance, they were below the allowable limit.

All measurements were peak or RMS power readings taken from test reports from accredited test labs. Antenna gains were taken from the manufacturer's specifications.

Limits: Maximum exposure limits from CFR 47, FCC Part 1.1310:

Table 1 - Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	$*900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

4740 Discovery Drive | Lincoln, NE 68521
tel- 402.323.6233 | tel -888.657.6860 | fax - 402.323.6238
info@nceelabs.com | http://nceelabs.com

RF Exposure Evaluation

FCC RFx Calculations:

Transmitter	Frequency	Antenna Gain	Power	Power +10% for tolerance	Power Density	Limit at specified distance	% of limit	Highest	Total
	MHz	numerical	mW	mW	mW/cm^2	mW/cm^2			
1A	902.3 - 927.8	1	61	67.1	0.0133	0.6015	2.22%	1	2.22%
1B	2402 - 2480	1	2.5	2.75	0.0005	1.0000	0.05%		
2A	663.2 - 848.8	1.99	148	162.8	0.0645	0.4421	14.58%		
2B	1710.2 - 1914.8	5.01	150	165	0.1645	1.0000	16.45%	1	16.45%
								TOTAL	18.66%

Table 2 - Calculations according to CFR 47, Part 1.1310, Table 1(B)

RESULT = COMPLIANT

Transmitter 1 = 902.3 – 927.8 MHz OR 2402 – 2480 MHz radio. Cannot transmit simultaneously.
Transmitter 2 = pre-certified module, 2 frequency ranges FCC ID: XMR201912BG77

Specified distance = 20 cm

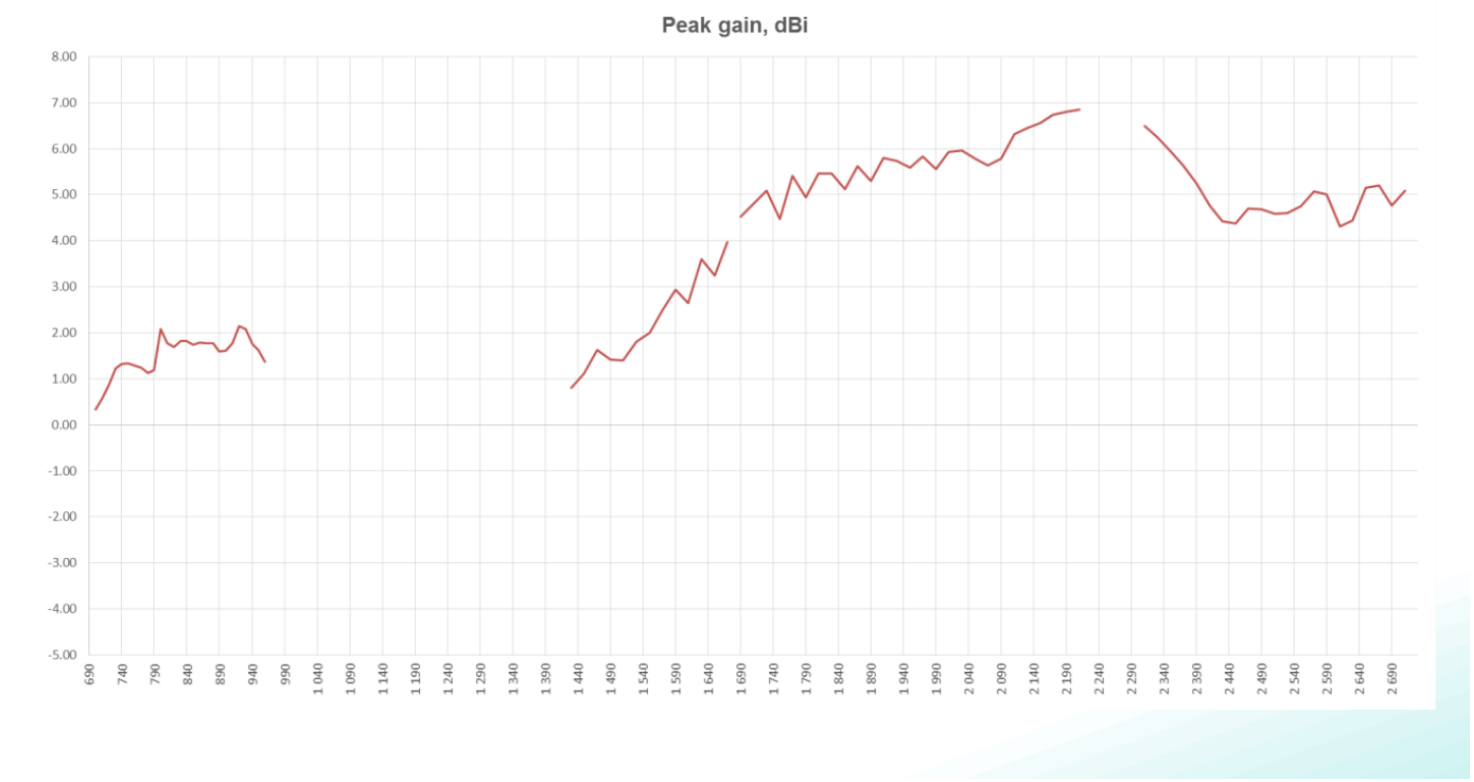
For each radio, the frequency with the lowest limit was used and the highest power of all frequency bands to calculate the worse-case RF exposure.

*When measurements were performed as EIRP, the antenna gain is not reported.

Transmitter 2 peak antenna gain = 3.0 dBi (1.99 numeric), 663.2 – 848.8 MHz
7.0 dBi (5.01 numeric) , 1710.02 – 1914.8 MHz

4740 Discovery Drive | Lincoln, NE 68521
tel- 402.323.6233 | tel -888.657.6860 | fax - 402.323.6238
info@nceelabs.com | http://nceelabs.com

RF Exposure Evaluation



From datasheet for Pulse W3796 antenna

Gain values were rounded up to the nearest 1.0 dBm from the chart above.