RF Exposure for GWX 68

The GWX 68 is an aircraft mounted weather radar system operating in the aviation services authorized under part 87 of CFR 47. Per 2.1091(c) of CFR 47, the equipment is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use. The radiating structure for the device is typically mounted more than 200 centimeters away and located outside the crafts helm. Due to the location of the antenna, normal operating conditions, and use the unit will satisfy the requirements for RF Exposure per CFR rule 1.1311. MPE calculations are shown below demonstrating compliance.

GWX 68 MPR calculations.

MPE Calculator

MPE uses EIRP for calculation. EIRP is based on TX power added to the antenna gain in dBi.
dBi = dB gain compared to an isotropic radiator.
S = power density in mW/cm^2

				Antenna Gain (dBi)	26.5
		Output Power		dBd + 2.17 = dBi dBi to dBd	2.17
Tx Frequency (MHz)	9400	Average (Watts)	3.3000	Antenna Gain (dBd)	24.33
Cable Loss (dB)	0.0	(dBm)	35.19	Antenna minus cable (dBi)	26.50

Calculated ERP (mw) 894363.239
Calculated EIRP (mw) 1474055.854

EIRP = Po(dBM) + Gain (dB)
Radiated (EIRP) dBm 61.685
ERP = EIRP - 2.17 dB
Radiated (ERP) dBm 59.515

Occupational Limit
5.00000 mW/cm²

General Public Limit
1.00000 mW/cm²

Power density (S)

$$S = \frac{EIRP}{4\pi r^2} \text{ mW/cm}^2$$

r (cm) EIRP (mW)

FCC radio frequency radiation exposure limits per 1.1310		
Frequency (MHz)	Occupational Limit	Public Limit
300-1,500	f/300	f/1500
1,500-10,000	5	1

FCC radio frequency radiation exposure limits per 1.1310		
Frequency (MHz)	Occupational Limit @ Tx Freq (mW/cm^2)	Public Limit @ Tx Freq (mW/cm^2)
300-1,500	31.33333333	6.26666667
1,500-10,000	5	1

EIRP	Distance	Distance	S	Distance
milliwatts	cm	inches	mW/cm²	Feet
1474055.854	345.00	135.83	0.98552	11.3189
1474055.854	300.00	118.11	1.30335	9.84252
1474055.854	275.00	108.27	1.55110	9.02231
1474055.854	250.00	98.43	1.87683	8.2021
1474055.854	225.00	88.58	2.31707	7.38189
1474055.854	200.00	78.74	2.93254	6.56168
1474055.854	175.00	68.90	3.83026	5.74147
1474055.854	170.00	66.93	4.05888	5.577428
1474055.854	160.00	62.99	4.58210	5.249344
1474055.854	150.00	59.06	5.21341	4.92126
1474055.854	140.00	55.12	5.98478	4.593176
1474055.854	130.00	51.18	6.94093	4.265092
1474055.854	120.00	47.24	8.14595	3.937008
1474055.854	110.00	43.31	9.69435	3.608924
1474055.854	100.00	39.37	11.73016	3.28084
1474055.854	90.00	35.43	14.48168	2.952756
1474055.854	85.00	33.46	16.23552	2.788714
1474055.854	80.00	31.50	18.32838	2.624672
1474055.854	79.00	31.10	18.79533	2.591864
1474055.854	78.00	30.71	19.28035	2.559055
1474055.854	77.00	30.31	19.78439	2.526247
1474055.854	76.00	29.92	20.30846	2.493438
1474055.854	75.00	29.53	20.85362	2.46063
1474055.854	70.00	27.56	23.93911	2.296588
1474055.854	60.00	23.62	32.58379	1.968504
1474055.854	50.00	19.69	46.92066	1.64042
1474055.854	40.00	15.75	73.31352	1.312336
1474055.854	30.00	11.81	130.33515	0.984252
1474055.854	20.00	7.87	293.25409	0.656168
1474055.854	10.00	3.94	1173.01638	0.328084
1474055.854	5.00	1.97	4692.06551	0.164042

Frequency (MHz)	Occupational Limit minimum Distance (feet)	Public Limit minimum distance (feetm)
300-1,500	N/A	N/A
1,500-10,000	5.20	11.30