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To Whom it may concern

RE: Radio Frequency Hazard Exposure for Radio model E2-455

As per Section 1.1310 and Section 2.1091 certification of this transmitter is sought using the General Public / Uncontrolled exposure limits as detailed in OET Bulletin KDB 447498 D01 v06 section 7.1, as a power of up to 10 watts is to be used in a base / fixed environment.

In addition calculations have been made using the Occupational / Controlled Exposure limits as it is possible that this transmitter could be used during the course of employment.

In accordance with Section 1.1310 the following Maximum Permissible Exposure (MPE) power density limits have been applied:

- Occupational / Controlled Exposure of (f/300) mW/cm^2, which is a has a minimum value of 1.333 mW/cm^2 at the minimum operating frequency of 400MHz.
- General Population / Uncontrolled exposure of (f/1500) mW/cm^2 which has a minimum value of 0.2667 mW/cm^2 at the minimum operating frequency of 400MHz.

Table 1 from Section 1.1310 is reproduced here with relevant sections highlighted.

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 Exposures				
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
300–1500			f/300	6
1500–100,000			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
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

The minimum distance from the antenna at which the MPE is met is calculated from the equation relating Maximum Permissible Exposure, transmit power in dBm, transmit antenna gain in dB, transmitter operating frequency in MHz and separation distance in centimeters.

This is derived from the guidance in “KDB 447498 D01 general RF exposure guidance V06 section 7.1”.

$$S = \left(\frac{EIRP}{4 \times \pi \times R^2}\right)$$

In the equations below:

- $EIRP$ is transmitter power (dBm) plus any gain from the antenna system (dBi).
- F_{op} is the operating frequency of the transmitter in MHz
- MPE is the Maximum Permissible Exposure field strength in mW/cm^2
- d_{min} is the minimum allowable distance

For Occupational / Controlled Exposure, MPE is $\{ F_{op} / 300MHz \}$ mW/cm^2 (Table 1(A))

$$d_{min} = \sqrt{\frac{10^{EIRP(dBm)/10}}{4 \times \pi \times \{F_{op} / 300MHz\}}}\, cm$$

For General Public / Uncontrolled Exposure, MPE is $\{ F_{op} / 1500MHz \}$ mW/cm^2 (Table 1(B))

$$d_{min} = \sqrt{\frac{10^{EIRP(dBm)/10}}{4 \times \pi \times \{F_{op} / 1500MHz\}}}\, cm$$

The following table shows the calculated d_{min} for offered antenna / cable combinations calculated at the maximum power level (+40dBm) and at worst case frequency (400MHz).

		Minimum Distance (cm) at 400MHz	
Antenna / Coax	Gain (dBi)	Occupational / Controlled Exposure	General Public / Uncontrolled Exposure
UDP400-3 (Includes 3m Coax)	1	9	20
UDP400-5 (Includes 5m Coax)	0	8	18
BU-3/400 + CC10/450	2.5	11	24
BU-6/400 + CC10/450	5.5	15	33
YU3/400 + CC10/450	3.5	12	26
YU6/400 + CC10/450	6.5	17	37
YU9/400 + CC20/450	5	14	31
YU16/400 + CC20/450	10	25	55

Yours sincerely,

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