Safe RF Exposure Distance Calculation for Certus H2 Terminal

REVISION 1.1

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Revision History

Date	Version	Author	Description
8-4-2015	1.0	Jeff Bull	
4-18-2017	1.1	Jeremy Lavine	Added mention of FCC bulletin and added peak EIRP and associated minimum distance calculation.

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1 Introduction

Certus terminals will transmit various power levels and possess different gain antennas. This implies the Effective Isotropic Radiated Power (EIRP) will be different for the various terminals. In this technical note a "worst case" safe RF exposure distance is calculated based upon a Certus terminal of the greatest EIRP based upon Canadian Safety Code 6 and FCC 47 CFR 1.1310 (previously FCC OET Bulletin No. 65).

2 RF Exposure Calculation

Canadian Safety Code 6, "Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range of 3 KHz to 300 GHz", states an average power density of 10 Watts per square meter, (W/m^2), as a safe exposure level for humans of the general public.

FCC 47 CFR 1.1310 "Radiofrequency radiation exposure limits" paragraphs (c), (d)(2), (d)(4) and (e) indicate a power density limit of $1mW/cm^2$ averaged over an indefinite time period, i.e. $10W/m^2$ average, the same limit as specified in Canadian Safety Code 6, for the general population.

The power density, *PD*, can be calculated from the Effective Isotropic Radiated Power (EIRP) as:

$$PD = \frac{EIRP}{4\pi r^2}$$

Rearranging the above equation to solve for *r* yields:

$$r = \sqrt{EIRP/_{4\pi PD}}$$

The following table shows the maximum peak, bursted, and average EIRP for a Certus H2 terminal and the associated calculated minimum distance *r*.

Period	Max. EIRP (dBW)	Max. EIRP (Watts)	r (meters)
Instantaneous (peak)	27.7	589	2.16
8.28ms transmit burst	18.2	66.1	0.725
90ms frame (4 bursts per frame) or longer	13.9	24.5	0.442

3 Summary

A distance of 0.442 meters or greater from an H2 terminal is sufficient to meet the Canadian Safety Code 6 and FCC 47 CFR 1.1310 maximum limit of $10W/m^2$ average. A distance of 2.16 meters or greater assures that the peak power will meet the $10W/m^2$ average limit, and therefore may be used as a conservative figure.