Amphitech Systems

Safety distance calculation for PSR-1400 radar

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In this evaluation of the safe distance to PSR-1400 we considered the fact that it is rotating with a constant velocity of *1.08 second per turn*.
This allows us to determine the average exposure of a human to RF fields over time with the following equation:

$$S_{average} = S_{peak} * \frac{T_{exposed}}{T_{rotation}} = S_{peak} * \frac{R_{Human}}{2 * \pi * R_{safedistance}} \qquad (1)$$

where $S_{average}$: average power density at $R_{safedistance}$
Speak : peak power density at $R_{safedistance}$
$T_{exposed}$: time over which a human is directly exposed to RF fields
$T_{rotation}$: time over which the radar completes a full rotation
R_{human} : approximate width of a human
$R_{safedistance}$: distance that ensure $S_{average}$ less or equal to MPE limits

Absolute maximum transmitter power at antenna terminal =	27	**dBm**
Absolute maximum transmitter power at antenna terminal [decimal] =	0,501	**W**
Absolute maximum antenna gain =	33	**dB**
Absolute maximum antenna gain [decimal] =	1995,3	
Operating frequency =	35000	**MHz**
MPE limit for uncontrolled environment average over 30 minutes time period =	1	**mW/cm^2/sec**
UUT rotation velocity =	1,08	**Sec/turn**
approximate Human width, R_{human} =	100	**cm**
Calculated safe distance, $R_{safedistance}$ =	108,2	**cm**
Calculated Peak Power Density at safe distance, S_{peak} =	6,80	**mW/cm^2**
Calculated Average Power Density at safe distance, $S_{average}$ =	1	**mW/cm^2/sec**

The velocity of rotation being constant and $S_{average}$ over 1 complete rotation of the UUT being within limits we can conclude that the average power density over the averaging period of 30 minutes for uncontrolled environment is also within limits.

Please note that these calculations use absolute maximum values of transmitter power and antenna gain and that we indicated in User's Manual a safe distance of 1,1 meter.

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