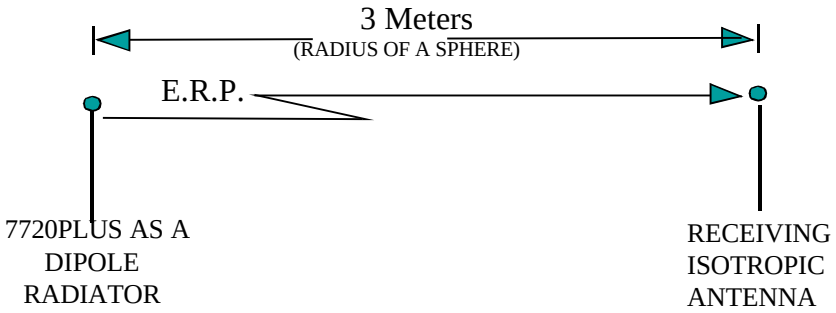
APPENDIX A

Derivation Of Limit For Field Strength Of Spurious Radiation For A 3 Meter Test Range, §2.1053

Assume the test sample has the gain of a Dipole Antenna, G_D, as provided by §2.1053(a).
Then the Effective Radiated Power (E.R.P) from the test sample is:

E.R.P. $= G_D * P_T$ (Watts) where : P_T= RF power into the Dipole Antenna (RF Peak Power Output = 5Watts)
G_D= Gain of Dipole Antenna (1.64)



Let the 7720PLUS be a Radiator having the gain of a dipole at the center of a sphere that has a radius of 3 meters (test range distance).

The Surface Area of a Sphere = $4\pi R^2$ [m^2]

The Power Density at the Receiving Isotropic Antenna = $P_{DRX} = (G_D * P_T)/4\pi R^2$ [W/m^2]

The Field Strength at the Receiving Isotropic Antenna = $F.S._{RX} = (120\pi * P_{DRX})^{1/2}$ [V/m]
where 120π = Impedence of Free Space

$F.S._{RX}$ in dBuV = $20*\log_{10}(((120\pi*(G_D*P_T)/4\pi R^2)^{1/2}))/1\mu V)$ [dBuV/m]

This reduces to: $F.S._{RX}$ in dBuV = $20*\log_{10}((30*G_D*P_T)^{1/2}/3)/1\mu V)$

As per §101.113(6)(iii), Spurious Emissions shall be < $-(43 + 10*\log_{10}(P_T)) = -50$dBc

then: Limit @ 3 Meters of Spurious Emission = $F.S.Max_{SPUR.\ EMISSION}$ [dBuV/m]
$F.S.Max_{SPUR.\ EMISSION} = 20*\log_{10}((30*G_D*P_T)^{1/2}/3)/1\mu V) - 50dB$ [dBuV/m]
where: P_T = 5Watts and G_D = 1.64

$F.S.Max_{SPUR.\ EMISSION} = 20*\log_{10}((30*1.64*5)^{1/2}/3)/1\mu V) - 50dB$ [dBuV/m]

Field Strength of Spurious Radiation Limit = $F.S.Max_{SPUR.\ EMISSION}$ = 84.4dBuV/m