Maximum Public Exposure to RF (MPE) CFR 1.1310 (e) & RSS-102, clause 4

The maximum exposure level to the public from the EUT shall not exceed a power density, **S**, per the table below.

NOTE: The calculation performed for this EUT were performed for antenna with a maximum gain of 6 dBi, to determine the minimum distance required in order to remain compliant with the permissible exposure levels. If different antenna gain or distance is to be used, the permissible exposure levels of Table 1 below must be respected.

Table 1—Limits for Maximum Permissible Exposure (MPE)

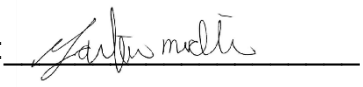
Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

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

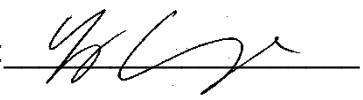
Equation for S (Power density):

$S= P*G/(4\pi R^2)$

All calculations performed by:
Date: May 24, 2024
Test Engineer: Gabriel Medina

Signature: 

All calculations performed by:
Date: February 4, 2025
Test Engineer: George Yang

Signature: 

Therefore, for:

In the band 150-174 MHz:

Peak Power (dBm)= 36.41 dBm (rated power = 37 dBm)
Peak Power (mW) = 4375 mW (rated power= 5011.9 mW)
Antenna Gain (dBi)= 6 dBi (3.98 numeric)
MPE limit (S) from Table 1 above = 0.2 mW/cm^2

Minimum distance from human=

$R = \sqrt{((PG)/(4\pi S))}, = \sqrt{((5011.9*3.98)/(4\pi*0.2))}= 89.1$ cm

RSS-102 (Issue 6), Exposure Compliance for 48-300 MHz:

According to RSS-102 Issue 6, Table 7, the limit for EUT operating in this band is 1.29 W/m^2. The FCC limit is much lower than this value therefore compliance with the FCC requirements for MPE at the calculated minimum distance will ensure compliance with the General Public Uncontrolled Environment of RSS-102.

In the band of 401-467.54 MHz:

Peak Power (dBm)= 36.96 dBm (rated power = 37 dBm)
Peak Power (mW) = 4966 mW (rated power = 5011.9 mW)
Antenna Gain (dBi)= 6 dBi (3.98 numeric)
MPE limit (S) from Table 1 above = 0.27 mW/cm^2

Minimum distance from human=

$R = \sqrt{((PG)/(4\pi S))}, = \sqrt{((5011.9*3.98)/(4\pi*0.27))}= 76.7$ cm

RSS-102, Clause 4 Exposure Compliance for 406-467.54 MHz:

According to RSS-102 Issue 6, Table 7, the limit for EUT operating in this band is 1.59 W/m^2 @ 406 MHz. The FCC limit is much lower than this value therefore compliance with the FCC requirements for MPE at the calculated minimum distance will ensure compliance with the General Public Uncontrolled Environment of RSS-102.

In the band of 467.74-512 MHz:

Peak Power (dBm)= 33.32 dBm (rated power = 37 dBm)
Peak Power (mW) = 2148 mW (rated power = 5011.9 mW)
Antenna Gain (dBi)= 6 dBi (3.98 numeric)
MPE limit (S) from Table 1 above = 0.31 mW/cm^2

Minimum distance from human=

$R = \sqrt{((PG)/(4\pi S))}, = \sqrt{((5011.9*3.98)/(4\pi*0.31))}= 71.6$ cm

RSS-102, Clause 4 Exposure Compliance for 467.74-512.0 MHz:

According to RSS-102 Issue 6, Table 7, the limit for EUT operating in this band is 1.75 W/m^2 @ 467.75. The FCC limit is much lower than this value therefore compliance with the FCC requirements for MPE at the calculated minimum distance will ensure compliance with the General Public Uncontrolled Environment of RSS-102.

In the band of 758-805 MHz:

Peak Power (dBm)= 36.15 dBm (rated power = 37 dBm)
Peak Power (mW) = 4120 mW (rated power = 5011.9 mW)
Antenna Gain (dBi)= 6 dBi (3.98 numeric)
MPE limit (S) from Table 1 above = 0.51 mW/cm^2

Minimum distance from human=

$R = \sqrt{(((PG))/(4\pi S))}, = \sqrt{((5011.9*3.98)/(4\pi*0.51))}= 55.8$ cm

RSS-102, Clause 4 Exposure Compliance for 768-775 MHz:

According to RSS-102 Issue 6, Table 7, the limit for EUT operating in this band is 2.43 W/m^2@ 758 MHz. The FCC limit is much lower than this value therefore compliance with the FCC requirements for MPE at the calculated minimum distance will ensure compliance with the General Public Uncontrolled Environment of RSS-102.

In the band of 806-869 MHz:

Peak Power (dBm)= 36.15 dBm (rated power = 37 dBm)
Peak Power (mW) = 4120 mW (rated power = 5011.9 mW)
Antenna Gain (dBi)= 6 dBi (3.98 numeric)
MPE limit (S) from Table 1 above = 0.54 mW/cm^2

Minimum distance from human=

$R = \sqrt{((PG)/(4\pi S))}, = \sqrt{((5011.9*3.98)/(4\pi*0.54))}= 54.2$ cm

RSS-102, Clause 4 Exposure Compliance for 806-869 MHz:

According to RSS-102 Issue 6, Table 7, the limit for EUT operating in this band is 2.54 W/m^2 @ 806 MHz. The FCC limit is much lower than this value therefore compliance with the FCC requirements for MPE at the calculated minimum distance will ensure compliance with the General Public Uncontrolled Environment of RSS-102.

In the band of 896-901 MHz:

Peak Power (dBm)= 33.35 dBm
Peak Power (mW) = 2162.7 mW
Antenna Gain (dBi)= 6 dBi (3.98 numeric)
MPE limit (S) = 0.597 mW/cm^2

Minimum distance from human=

$R = \sqrt{((PG)/(4\pi S))}, = \sqrt{((2162.7*3.98)/(4\pi*0.597))}= 33.87$ cm

RSS-102, Clause 5 Exposure Compliance for 896-901 MHz:

According to RSS-102 Issue 6, Table 7, the limit for EUT operating in this band is 2.72 W/m^2 @ 896MHz. The FCC limit is much lower than this value therefore compliance with the FCC requirements for MPE at the calculated minimum distance will ensure compliance with the General Public Uncontrolled Environment of RSS-102.

In the band of 930-941 MHz:

Peak Power (dBm)= 34.33 dBm
Peak Power (mW) = 2710.2 mW
Antenna Gain (dBi)= 6 dBi (3.98 numeric)
MPE limit (S) = 0.62 mW/cm^2

Minimum distance from human=

$R = \sqrt{((PG)/(4\pi S))}, = \sqrt{((2710.2*3.98)/(4\pi*0.62))}= 37.20$ cm

RSS-102, Clause 5 Exposure Compliance for 930-941 MHz:

According to RSS-102 Issue 6, Table 7, the limit for EUT operating in this band is 2.79 W/m2 @ 930 MHz. The FCC limit is much lower than this value therefore compliance with the FCC requirements for MPE at the calculated minimum distance will ensure compliance with the General Public Uncontrolled Environment of RSS-102.