1601 North A.W. Grimes Blvd., Suite B
Round Rock, TX 78665
e-mail: info@ptitest.com
(512) 244-3371 Fax: (512) 244-1846

1.0 Maximum Permissible Exposure Evaluation (Supplements the test report.)

The results of power measurement and intended use/proximity are compared against the requirements for safety of RF exposure.

1.2 Criteria

Section Reference	Date
KDB 447498 D01 Mobile Portable RF Exposure v05r01 // RSS-102 Issue 5, Notice 2013 DRS0911	8 Jun 2017

1.3 Procedure

Using measurement of peak power and considering the intended application, determine the permissible exposure level, applicability of exclusion, or whether additional exposure tests (SAR) are indicated. When applicable justify conclusion for selected exposure level and separation distance.

1.4 Exemption Calculation

The exposure distance selected for this calculation is 20 cm.

Table 1.4.1 Power Calculation for Exposure, Highest frequency 475 MHz

Conducted Peak Power mW	Calculated Peak Power dBm	Source Duty Cycle Factor dB	Maximum Antenna Gain dBi	Calculated EIRP dBm	EIRP In Linear Terms mW
9.8	9.9	0	4.0	13.9	24.6

1.5 FCC, SAR Exemption – Appendix A Criteria

Calculation (max power including tune up tolerance = 24.6 mW):

$$[(24.6\ \text{mW})/(200\ \text{mm})] \cdot [\sqrt{0.4750(\text{GHz})}] = 0.1$$

$$0.1 \leq 3.0$$

Therefore, the device meets the applicable FCC SAR exemption requirements.

1.6 IC, SAR Exemption

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003-10[21]	83	90	-	Instantaneous*
0.1-10	-	$0.73/f$	-	6**
1.1-10	$87/f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	$58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

Note: f is frequency in MHz.
*Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

Calculated field strength limit for lowest/highest operating frequency from table above and row for 300-6000 MHz:

$$\text{Limit} = 0.02619\ f^{0.6834} = 0.02619(420)^{0.6834} = 1.625\ W/m^2 = 1625\ mW/m^2 = 0.1625\ mW/cm^2$$
$$\text{Limit} = 0.02619\ f^{0.6834} = 0.02619(475)^{0.6834} = 1.768\ W/m^2 = 1768\ mW/m^2 = 0.1768\ mW/cm^2$$

Find field density at 20 cm for General Population (uncontrolled) exposure:

$S = (P \cdot G) / (4 \cdot \pi \cdot [\text{Distance}]^2)$ = given Pwr_{avg} = 24.6 mW, Gain = 1*, Distance = 20 cm.
**Antenna gain included in power.*

$$S = (24.6) / (4 \cdot \pi \cdot [20\ cm]^2) = 0.005\ mW/cm^2$$

$$0.005\ mW/cm^2 \leq 0.1625\ mW/cm^2$$

This device meets the SAR Evaluation Exemption criteria in RSS-102 Table 4.

Signed:

Eric Lifsey

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