

SAR Exclusion Calculation

Project: C6399

Report number: C14481TR2

Customer Details

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Equipment Under Test: TechRitePRO test tool for tyre pressure monitoring devices
Operating frequency: 125kHz

SAR Exclusion Calculation - FCC

The calculation is according to the FCC Knowledge Database (KDB) document KDB 447498 D01 General RF Exposure Guidance V06.

Section 4.3.1 General SAR Test Exclusion Bands was applied.

Section 4.3.1 c) for frequencies below 100MHz and test separation distances $\leq 50\text{mm}$ was specifically applied. According to this section the SAR test exclusion thresholds are determined by the following:

$$\text{Threshold} = \frac{1}{2} \cdot \left[\left(\left[\frac{P(\text{mW})}{d(\text{mm})} \right] \cdot \sqrt{f(\text{GHz})} \right) + \left((d(\text{mm}) - 50) \cdot \left(\frac{f(\text{MHz})}{150} \right) \right) \right] \cdot \left[1 + \log \left(\frac{100}{f(\text{MHz})} \right) \right]$$

Where

P is the maximum measured power of the channel including tune-up tolerance in mW

d is the minimum test separation distance in mm

f is the RF channel frequency in GHz or MHz as specified

The minimum test separation distance was considered to be 5mm in consultation with Section 4.2.3 Extremity exposure conditions.

This evaluation of the test exclusion threshold is compared to the threshold limit.

- a. Limit for 1-g head or body worn devices: threshold limit ≤ 3
- b. Limit for 10-g extremity worn devices: threshold limit ≤ 7.5

Since the device is (hand held) extremity worn the limit "b" applies.

1) Output power measurement results (see test report 14347TR3):

Frequency (MHz)	Antenna Orientation	Measurement distance (m)	Electric field strength (dBuV/m)	Electric field strength (V/m)	ERP (mW)
0.125	Perpendicular	3.0	-10.56	2.96E-07	2.64E-11
0.125	Parallel	3.0	16.48	6.67E-06	1.33E-08

2) Rated conducted RF output power and tune-up tolerances:

The rated conducted RF output power tune-up tolerances are declared are not applicable.

3) The calculated threshold for test exclusion was determined while using a distance of 5mm, and the results are tabulated in the table below (stand-alone test exclusion in accordance with KDB publication 447498 D01 General RF Exposure Guidance v06, section 4.3.1 c) 2):

Frequency (MHz)	Antenna Orientation	ERP (mW)	Separation distance (mm)	Calculated threshold	Threshold limit
0.125	Perpendicular	2.64E-11	5	4.8	7.5
0.125	Parallel	1.33E-08	5	4.8	7.5

Conclusion: TechRitePRO meets the exemption limit requirements for test exclusion in a stand-alone configuration.

SAR Exclusion Calculation - ISED**Standard:**

RSS-102 Radio Frequency (RF) ~Exposure Compliance of Radio communication Apparatus (All Frequency Bands), Issue 5 March 2015 incl. Amendment 1 of February 2, 2021.
 Notice 2016-DRS001, July 2020

- 1) Output power measurement results (see test report 14347TR3):

Frequency (MHz)	Antenna Orientation	Measurement distance (m)	Electric field strength (dBuV/m)	Electric field strength (V/m)	ERP (mW)
0.125	Perpendicular	3.0	-10.56	2.96E-07	2.64E-11
0.125	Parallel	3.0	16.48	6.67E-06	1.33E-08

- 2) Rated conducted RF output power and tune-up tolerances:

The rated conducted RF output power tune-up tolerances are declared are not applicable.

- 3) Test exclusion was determined while using a distance of ≤ 5 mm and the results are tabulated in the table below (stand-alone test exclusion in accordance with RSS-102, section 2.5.1):

Frequency (MHz)	Antenna Orientation	ERP (mW)	Separation distance (mm)	Exemption limit (mW)
0.125	Perpendicular	2.64E-11	≤ 5	71
0.125	Parallel	1.33E-08	≤ 5	71

Conclusion: TechRitePRO meets the exemption limit requirements for test exclusion.