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SAR EXCLUSION DOCUMENT

Document 75943624-12 Issue 01

CE4 Tagger V4
13.56 MHz Transmitter:

FCC Standalone SAR Test Exclusion Considerations (KDB 447498 D01) Section 4.3.1 c)

<100 MHz – Separation Distance ≤50 mm or Separation Distance >50 mm and <200 mm

The 1g head or body SAR test exclusion thresholds for <100 MHz are determined by the following steps:

Step a) Threshold result from Formula in Section 4.3.1 a);

[(max power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1g SAR.

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz.
- Power and distance are rounded to the nearest mW and mm before calculation.
- The result is rounded to one decimal place for comparison
- When the maximum test separation distance is < 5 mm, a distance of 5 mm is applied.

Step b) requires formula to be re-arranged to give power allowed at numeric threshold at 50 mm test separation distance and Step c) requires $f_{(GHz)}$ to be set to 100 MHz (0.1 GHz) giving:

Step a) Power threshold = (3 * 50) / ($\sqrt{0.1}$) = 474.3 mW

Step b) Threshold result from Formula in Section 4.3.1 b) 1);

{[Power allowed at numeric threshold for 50 mm {Formula Step A})] + [(test separation distance – 50 mm)·($f_{(MHz)}$/150)]} mW

- f_{MHz} is the RF channel transmit frequency in MHz.
- Power and distance are rounded to the nearest mW and mm before calculation.
- The result is rounded to one decimal place for comparison

Power threshold = 474.3 mW + [(test separation distance – 50 mm)·($f_{(MHz)}$/150)]} mW

Step c) requires $f_{(MHz)}$ to be set to 100 MHz giving:

Step b) Power threshold = 474.3 mW + [(test separation distance – 50 mm)·(100)/150)] mW

Approved by ..... **Date** 21 November 2018

Matthew Russell
Authorised Signatory

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Step c) 1) Threshold result from Formula in Section 4.3.1 c) 1); >50 mm and <200 mm

Threshold result from Formula in Section 4.3.1 b) 1) is multiplied by [1+log(100/f_{MHz})]

Power threshold = [474.3 mW + (test separation distance – 50 mm)· (100)/150)] * [1+log(100/f_{MHz})] mW

- f_{MHz} is the RF channel transmit frequency in MHz.
- Power and distance are rounded to the nearest mW and mm before calculation.
- The result is rounded to one decimal place for comparison

Step c) 2) Threshold result from Formula in Section 4.3.1 c) 2); ≤50 mm

Threshold result from the formula in 4.3.1 c) 1) above for >50 mm and <200 mm for 50 mm and 100 MHz is multiplied by 0.5.

Power threshold = [474.3 mW + (50 mm – 50 mm)· (100)/150)] * [1+log(100/f_{MHz})] * 0.5 mW

Which simplifies to:

Power threshold = 474.3 mW * [1+log(100/f_{MHz})] * 0.5 mW

- f_{MHz} is the RF channel transmit frequency in MHz.
- Power and distance are rounded to the nearest mW and mm before calculation.
- The result is rounded to one decimal place for comparison

SAR Exclusion Result (1 g Head or Body)

Frequency (MHz)	Maximum Power (Tune up Value) * (mW)	Test Separation Distance (mm)	SAR Exclusion Power Threshold Section 4.3.1 c) (mW)	SAR Test Exclusion (Yes/No)
13.56	4	25	443	Yes

*Tune-up value is the maximum declared conducted output power of the device.

The SAR exclusion threshold has been evaluated using the formula described above from information supplied by the manufacturer below. Based on the calculation above, the EUT is categorically excluded from SAR testing

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Manufacturer's Declaration of Product information (extract):

Product Description:	Hand held electronic tester
Model number:	CE4 Tagger V4

Antenna length (cm):	4.5 x 4.5 (4 turn coil)	Centimetres (cm)
Frequency range:		
Bottom frequency:		MHz
Middle frequency:	13.56	MHz
Top frequency:		MHz

Maximum power (input to the antenna including a tolerance):	0.00398	W
Antenna gain (or maximum gain allowed):	0	dBi

Or

Field Strength Measurement		dBµA/M
Measurement Distance		cm

Separation distance from antenna to the user/bystander:	2.5	cm
Transmitter Duty Cycle:	20	%