
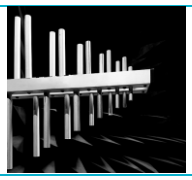
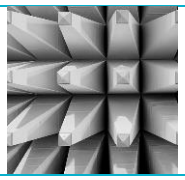

CTC advanced
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BNetzA-CAB-02/21-102

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-04

SAR Test exclusion documentation according to FCC KDB 447498

Report identification number: 1-3819/22-01-15 Exclusion (FCC)

contains the module with the following certification numbers	
FCC ID	2AHJWSENTIO1

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

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EUT technologies:

Technologies:	Max. declared cond. AVG Power	Max. measured EIRP	Antenna gain
Proprietary [1)] 120 kHz	11.47 dBm [3)] (=14.04mW)	1.45 dBµV@30m (Peak) = -73.85 dBm	< 0 dBi
BT LE [2)] 2450	-1.9 dBm (=0.65 mW)	--	< 0 dBi

NOTE:
The measured PEAK EIRP @30m proofs that the EUT antenna gain is far below 0dBi and that considering the max. declared output power is by far larger than the EIRP. Conducted values will be used for the RF exposure calculation. EIRP values are for information only.

[1)] Test results taken from CTC advanced GmbH report 1-3819/22-01-06 (page 15):
1.45 dBµV/m @30m → EIRP: -73.85 dBm

[2)] BT LE conducted results taken from CTC advanced GmbH report 1-3819/22-01-03 (page 23): -1.9 dBm

[3)] Max declared conducted output power according customer declaration

Collocation:

Active scenario: / **Technology**	**1**	**2**	**3**	**4**
Proprietary 120 kHz	x		x	
BT LE 2450 MHz	x	x		

SAR test exclusion according to KDB447498 (General RF Exposure Guidance v06)

Equation from Chapter 4.3.1: Standalone SAR test exclusion considerations page 11 and ff.

BT LE:

(1) Standalone SAR test exclusion for 100 MHz to 6 GHz at test separation distances ≤ 50mm

$$(Threshold_{1\text{-}g;10\text{-}g}) \times d_{seperation} / f^{0.5}$$

where

$Threshold_{1\text{-}g;10\text{-}g}$ is 3 for 1-g; 7.5 for 10-g
$d_{seperation}$ is the min. test separation distance; 5mm is used if the distance is less
f is the RF channel transmit frequency

The table below gives the calculated maximal power that could be used for source based time averaged conducted or radiated power, adjusted for tune up tolerance. If this is at or below the calculated value the DUT is exempted from SAR evaluation.

frequency [MHz]	$d_{separation}$ [mm]	$Threshold_{1\text{-}g}$	Powerlimit [mW]	$P_{max\text{-}declared}$		Exclusion
				[dBm]	[mW]	
2450.00	**5**	3	9.58	-1.90	0.65	yes

NFC:

(c) (2) Standalone SAR test exclusion below 100 MHz < 50mm

$$0.5 \times (Threshold_{100MHz}) \times (1+\log(100/f))$$

where

$Threshold_{1\text{-}g;10\text{-}g}$ is 3 for 1-g; 7.5 for 10-g
f is the RF channel transmit frequency
$Threshold_{100MHz,50mm}$ is $Threshold_{1\text{-}g;10\text{-}g} \times d / f^{0.5}$; with f = 100MHz and d=50mm

The table below gives the calculated maximal power that could be used for source based time averaged conducted power, adjusted for tune up tolerance. If this is below the calculated value
SAR testing is excluded.

frequency [MHz]	Threshold1-g;10-g	$Threshold_{100MHz,50mm}$	Powerlimit [mW]	$P_{max\text{-}declared}$		Exclusion
				[dBm]	[mW]	
0.120	3	474.34	929.90	11.47	14.0	yes

Collocation:

Overview:

Technology , [MHz]	Proprietary, 120 kHz	BT LE , 2450 MHz
Exemption based on	SAR exclusion	
Limit EIRP [mW]:	929.9	9.58
Result EIRP [mW]:	14.0	0.65
Limit-Exhaustion [%]	1.5	6.8
Collocated percentage [%] [Proprietary 120 kHz + BT LE]	8.3	
Verdict:	Pass	

This prediction demonstrates the following:

The power density levels for FCC that are larger than the minimum safety-distances stated above, are below the maximum levels allowed by regulations.

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