



Bundesnetzagentur

BNetzA-CAB-02/21-102

## **SAR Test exemption documentation according to CFR 47 §1.1307**

**Report identification number: 1-1604/20-08-03 Exemption / MPE (FCC)**

<b>contains the module with the following certification numbers</b>	
FCC ID	PFJGA200A

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.

### **Document authorised:**



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**EUT technologies:**

SAR based exempted technologies:

Technologies:	Max. measured power [dBm]		Max. declared EIRP [dBm]	<b>Max. declared ERP [dBm]</b>	#
	conducted	EIRP			
BT LE 2450 MHz	2.2	4.3	5.0 (=3.16mW)	2.75 (=1.88mW)	A

MPE based exempted technologies:

Technologies:	Max. measured E.I.R.P. per BW=1MHz:		BW	Max. declared E.I.R.P. per BW=1MHz:	Max. Effective Power (Calculated) Max.meas.E.I.R.P. @ 1MHz x (BW/1MHz)	<b>Max. declared E.I.R.P. for Full BW:</b> Max.decl.E.I.R.P. @ 1MHz X (BW/1MHz)	#
	(dBm)	(μW)					
UWB 6.2 to 6.8 GHz	-42.1	0.062	570.7	< -41.3 (=0.07413μW)	35.38 μW	0.07413μW x 570.7 = <b>42.306μW</b> (ERP: 25.796 μW)	B
UWB 7.6 to 8.3 GHz	-42.7	0.054	555.7	< -41.3 (=0.07413μW)	30.01 μW	0.07413μW x 555.7 = <b>41.194μW</b> (ERP: 25.118 μW)	B

Details and origins of the measurements shown in the table above:

#	Results from:	Additional information
A	1-1604/20-02-02-A CTC Advanced GmbH	Antenna gain page 20, Max conducted page 24
B	1-1604/20-06-04 CTC Advanced GmbH	--

**Declared minimum safety distance: 1cm**

According the manual a safety distance of 1cm shall be applied between the user (and/or bystanders) to the EUT antenna whilst active transmitting.

### SAR-Based Exemption following 47 CFR 1.1307 amendment:

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold  $P_{th}$  (mW). This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{th}$  is given by Formula (B.2).

$$P_{th}(\text{mW}) = \begin{cases} \text{ERP}_{20\text{cm}} \left(\frac{d}{20\text{cm}}\right)^x & d \leq 20\text{cm} \\ \text{ERP}_{20\text{cm}} & 20\text{cm} \leq d \leq 40\text{cm} \end{cases} \quad (\text{B.2})$$

where

$$x = -\log_{10} \left( \frac{60}{\text{ERP}_{20\text{cm}} \sqrt{f}} \right)$$

and  $f$  is in GHz,  $d$  is the separation distance (cm), and  $\text{ERP}_{20\text{cm}}$  is per Formula (B.1).

$$P_{th}(\text{mW}) = \text{ERP}_{20\text{cm}}(\text{mW}) = \begin{cases} \text{ERP}_{20\text{cm}} \left(\frac{d}{20\text{cm}}\right)^x & d \leq 20\text{cm} \\ \text{ERP}_{20\text{cm}} & 20\text{cm} \leq d \leq 40\text{cm} \end{cases} \quad (\text{B.1})$$

Technology	Transmitter frequency (MHz)	Max. decl. ERP (mW)	Threshold ERP		Minimal Safety (mm)	Verdict
			(mW)	(dBm)		
BT	2450	1.88	10.26	10.1	10	EXCEMPTED

**MPE-Based Exemption following 47 CFR 1.1307 amendment:**

If the declared ERP does not exceed the specified threshold based on the calculations below, the device is exempt from routine evaluation.

Transmitter Frequency (MHz)	Threshold ERP (W)
0.3 – 1.34	1.920 R <sup>2</sup>
1.34 – 30	3.450 R <sup>2</sup> /f <sup>2</sup>
30 – 300	3.83 R <sup>2</sup>
300 – 1500	0.0128 R <sup>2</sup>
<b>1500 – 100 000</b>	<b>19.2 R<sup>2</sup>f</b>

where

f is the frequency (MHz)

R is the separation distance (at least  $\lambda/2\pi$ )

Prediction: worst case

Technology	Transmitter frequency (MHz)	R <sub>min</sub> (mm)	Max. decl. ERP (mW)	Treshold ERP		Minimal Safety Distance (mm)
				(mW)	(dBm)	
UWB	6200	8	0.02580	1.92	2.8	10
UWB	6800	7	0.02580	1.92	2.8	10
UWB	7600	6	0.02512	1.92	2.8	10
UWB	8300	6	0.02512	1.92	2.8	10

**Collocation:**

Overview:

Technology , [MHz]	BT, 2450	UWB , 6200	UWB , 6800	UWB , 7600	UWB , 8300
Exemption for 10mm distance based on	SAR	MPE	MPE	MPE	MPE
Limit ERP [mW]:	10.26	1.92	1.92	1.92	1.92
Result ERP [mW]:	1.88	0.0258	0.0258	0.02512	0.02512
Limit-Exhaustion [%]	18.3	1.3	1.3	1.3	1.3

**Collocation-Scenarios:**

Scenario 1:

BT + WC UWB = 19.6 % of Limit

**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.