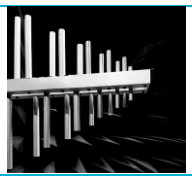
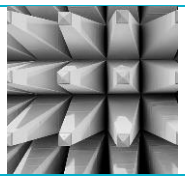




CTC advanced
member of RWTÜV group

Bundesnetzagentur

BNetzA-CAB-02/21-102

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

Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-2751/21-01-13 MPE (FCC)

Certification numbers and labeling requirements	
FCC ID	2A4L8-DKU8X8V2

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:

cn=Alexander Hnatovskiy, o=CTC advaced GmbH, ou=HNA-211126, email=alexander.hnatovskiy@ctcadvaced.com, c=DE
2022.07.25 10:43:48 +02'00'

Alexander Hnatovskiy
Lab Manager
Radio Communications & EMC

cn=Marco Scigliano, o=CTC advanced GmbH, ou=SCI-211118, email=marco.scigliano@ctcadvanced.com, c=DE
2022.07.25 10:39:44 +02'00'

Marco Scigliano
Testing Manager
Radio Communications & EMC

EUT technologies:

Technologies:	Max. power		Antenna gain max.: [dBi] *	Max average EIRP Declared by customer	#
	conducted	EIRP			
KU Band 13.75 to 14.50 GHz	--	13.755 GHz: 51.7 dBm 14.125 GHz: 50.2 dBm 14.495 GHz: 50.3 dBm (peak values)	--	37.0 dBm (=5.01 W)	A
WLAN 2450 MHz	--	10.9 dBm	< 0	11.0 dBm (=12.59 mW)	B
BT EDR / LE	--	2.2 dBm (EDR) -1.9 dBm (LE)	--	3.0 dBm (= 2.00 mW)	C

)* worst case of all antenna types, channels and modulations (overrated)

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

#	Results from:		Additional information
A	1-2751/21-01-02 1-2751/21-01-17	CTC advanced GmbH	Max PEAK-EIRP page 2 Duty Cycle correction of 3.37% (See Annex A of this document)
B	1-2751/21-01-08-A	CTC advanced GmbH	Antenna gain page 15, Max. EIRP page 18
C	1-2751/21-01-09-A	CTC advanced GmbH	Max. EIRP page 11 (BT EDR) Max. EIRP page 12 (BT LE)

Collocation overview:

Technology / Active scenario:	1	2	3	4
KU Band	x		x	x
WLAN 2450 MHz	x	x		x
BT EDR / LE 2450 MHz		x	x	x

Prediction of MPE limit at given distance - FCC

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG / 4\pi R^2$

where: S = Power density
P = Power input to the antenna
G = Antenna gain
R = Distance to the center of radiation of the antenna
PG = Output Power including antenna gain

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled “Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure”

Frequency Range (MHz)	Power Density (mW/cm^2)	Averaging Time (minutes)
300 -1500	f/1500	30
1500 - 100000	1.0	30

where f = Frequency (MHz)

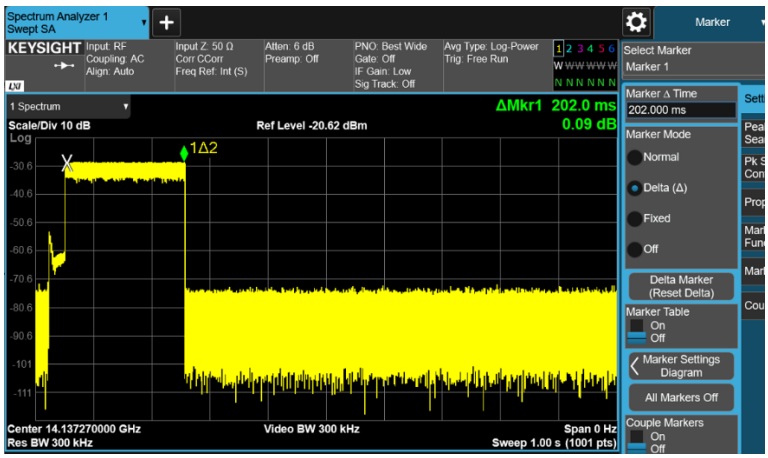
Prediction: worst case

	Technologies:	Wlan	BT EDR	KU Band	
	Frequency (MHz)	2450	2450	13755	
PG	Declared max power (EIRP)	11	3	37	dBm
R	Distance	25	25	25	cm
S	MPE limit for uncontrolled exposure	1	1	1	mW/cm^2
	Calculated Power density:	0.0016	0.0003	0.6385	mW/cm^2
	Calculated percentage of Limit:	0.16%	0.03%	63.85%	
	Collocation:				
	Scenario 4: ALL ACTIVE Calculated percentage of Limit:	64.03%			

This prediction demonstrates the following:

The power density levels for FCC at a distance of 25 cm are below the maximum levels allowed by regulations.

Annex A: Duty cycle of the EUT (KU Band):



Duty Cycle 3.37%

Plot data:
Transmission Period: 6s
Pulse Duration: 202 ms
Number of pulses in 360 Seconds = 60
Total Transmission time in 360 Seconds: 60 · 202ms = 12.12s