

Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-3494/21-01-09 MPE (FCC)

Certification numbers and labeling requirements	
FCC ID	2A4L8-FKU8X8V2

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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: 49.4 dBm 14.125 GHz: 49.9 dBm 14.495 GHz: 49.6 dBm (peak values)	--	35.17 dBm (=3.29 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	1-3494/21-01-02 CTC advanced GmbH	Max PEAK-EIRP page 21 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

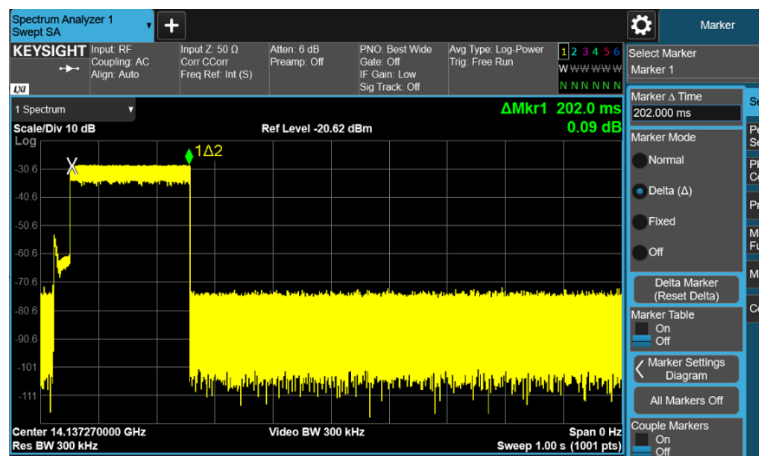
where f = Frequency (MHz)

Prediction: worst case

Technologies:		Wlan	BT EDR	KU Band	
	Frequency (MHz)	2450	2450	13755	
PG	Declared max power (EIRP)	11	3	35.17	dBm
R	Distance	20	20	20	cm
S	MPE limit for uncontrolled exposure	1	1	1	mW/cm ²
	Calculated Power density:	0.0025	0.0004	0.6546	mW/cm ²
	Calculated percentage of Limit:	0.25%	0.04%	65.46%	
Collocation:					
	Scenario 4: ALL ACTIVE	65.75%			
	Calculated percentage of Limit:				

This prediction demonstrates the following:

The power density levels for FCC at a distance of 20 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: $60 \cdot 202\text{ms} = 12.12\text{s}$