
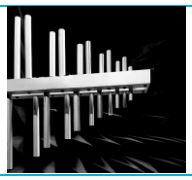
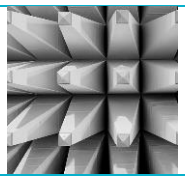

CTC advanced
member of RWTÜV group

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: 1-1622/20-01-13 MPE (FCC_ISED)

Certification numbers and labeling requirements	
FCC ID	PQMPL444
ISED number	4071A-PL444
HVIN (Hardware Version Identification Number)	PL444
PMN (Product Marketing Name)	PL444
FVIN (Firmware Version Identification Number)	-/-
HMN (Host Marketing Name)	-/-

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:	Declared by customer
E GPRS 850 MHz	26.0 dBm ± 1 dB
E GPRS 1900 MHz	20.5 dBm ± 1 dB
UMTS FDD II 1880MHz	23.5 dBm ± 1 dB
UMTS FDD IV 1700 MHz	23.5 dBm ± 1 dB
UMTS FDD V 850 MHz	23.5 dBm ± 1 dB
LTE FDD 2 1900 MHz	23.0 dBm ± 1 dB
LTE FDD 4 1750 MHz	23.0 dBm ± 1 dB
LTE FDD 5 850 MHz	23.0 dBm ± 1 dB
LTE FDD 12 700 MHz	23.0 dBm ± 1 dB
LTE FDD 13 700 MHz	23.0 dBm ± 1 dB
LTE FDD 26 850 MHz	23.0 dBm ± 1 dB
BT LE 2450 MHz	8.0 dBm

Collocation overview:

Active scenario: / **Technology**	**1**	**2**	**3**	**4**
E GPRS / UMTS / LTE	x		x	
BT LE	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:	GSM / UMTS / LTE	BT LE	
	Frequency (MHz)	835	2450	
PG	Declared max power (EIRP)	27	8	dBm
R	Distance	20	20	cm
S	MPE limit for uncontrolled exposure	0.56	1	mW/cm^2
	Calculated Power density:	0.0998	0.0013	mW/cm^2
	Calculated percentage of Limit:	17.92%	0.13%	
	Collocation:			
	Scenario 1: GSM / UMTS / LTE + BT LE Calculated percentage of Limit:	18.05%		

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.

Prediction of MPE limit at given distance - ISED

RSS-102, Issue 5, 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2}\ f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

Prediction: worst case

		GSM /UMTS /LTE	BT LE	
	Frequency	835	2450	MHz
R	Distance	20	20	cm
PG	Maximum EIRP	27	8	dBm
PG	**Maximum EIRP**	501.2	6.3	mW
	Exclusion Limit from above:	1.30	2.71	W
	Calculated percentage of Limit:	38.55%	0.23%	
	Collocation:			
	Scenario 1: GSM /UMTS / LTE + BT LE Calculated percentage of Limit:	38.78%		

Conclusion: RF exposure evaluation is not required.