
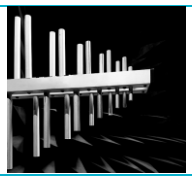
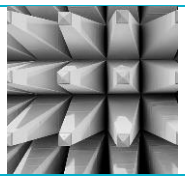

CTC advanced
member of RWTÜV group

Bundesnetzagentur

BNetzA-CAB-02/21-102

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-03

Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-6411/18-02-09 MPE (FCC_ISED)

Certification numbers and labeling requirements	
FCC ID	X46XT08
ISED number	8816A-XT08
HVIN (Hardware Version Identification Number)	XT640
PMN (Product Marketing Name)	XT640
FVIN (Firmware Version Identification Number)	-/-
HMN (Host Marketing Name)	-/-

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

Document authorised:

cn=Alexander Hnatovskiy, o=CTC advanced GmbH, ou=HNA-161129, email=Alexander.Hnatovskiy@ctcadvanced.com, c=DE
2019.09.23 11:00:35 +02'00'

Alexander Hnatovskiy
Lab Manager
Radio Communications & EMC

cn=Marco Scigliano, o=CTC advanced GmbH, ou=SCI-161125, email=marco.scigliano@ctcadvanced.com, c=DE
2019.09.23 11:01:01 +02'00'

Marco Scigliano
Testing Manager
Radio Communications & EMC

EUT technologies:

Technologies:	Max. power conducted: (AVG)	Max. antenna gain:	Max. EIRP:
ISM Band 902 to 928 MHz	--	--	meas.: 23.25 dBm [1] declared: **24.0 dBm**
UMTS FDD II 1880 MHz	meas.: 22.1[2]	≤ 3 dBi[2]	meas.: 25.1[2] declared: **26.0 dBm**
UMTS FDD V 850 MHz	meas.: 22.8[2] declared: **23.0 dBm**	≤ 0 dBi[2]	meas.: 20.7[2]
LTE 5 850 MHz	meas.: 22.3[3] declared: **23.0 dBm**	≤ 0 dBi[3]	meas.: 20.2[3]
LTE 2 1750 MHz	meas.: 22.0[4]	≤ 3 dBi[4]	meas.: 25.0[4] declared: **26.0 dBm**
LTE 4 1900 MHz	meas.: 21.8[5]	≤ 1.9 dBi[5]	meas.: 23.7[5] declared: **24.0 dBm**
LTE 12 700 MHz	meas.: 22.6[5] declared: **23.0 dBm**	≤ 0 dBi[5]	meas.: 15.0[5]
LTE 13 700 MHz	meas.: 22.0[5]	≤ 0 dBi[5]	meas.: 21.1[5] declared: **23.0 dBm**

measured in the following CTC advanced report:
[1]) 1-6411/18-02-02
[2]) 1-6411/18-02-06
[3]) 1-6411/18-02-03
[4]) 1-6411/18-02-04
[5]) 1-6411/18-02-05

Worst Case Configuration for Simultaneous Transmission:

Technologies:	Max. power conducted: (AVG)	Max. EIRP:	Simultaneous Scenarios:		
			1	2	3
ISM Band 902 to 928 MHz	--	decl.: **24.0 dBm**	x	x	x
LTE 12 / 13 700 MHz	decl.: **23.0 dBm**	decl.: **23.0 dBm**	x		
UMTS V / LTE 5 850 MHz	decl.: **23.0 dBm**	≤ conducted		x	
UMTS II 1880 MHz	--	decl.: **26.0 dBm**			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/cm²)	Averaging Time (minutes)
300 -1500	f/1500	30
1500 - 100000	1.0	30

where f = Frequency (MHz)

Prediction: worst case

	Technologies:	ISM 902 to 928	LTE 12 / 13	UMTS V / LTE 5	UMTS II	
	Frequency (MHz)	915	700	850	1880	
PG	Declared max power (EIRP)	24	23	23	26	dBm
R	Distance	20	20	20	20	cm
S	MPE limit for uncontrolled exposure	0.61	0.47	0.57	1	mW/cm²
	Calculated Power density:	0.0500	0.0397	0.0397	0.0792	mW/cm²
	Calculated percentage of Limit:	8.20%	8.51%	7.01%	7.92%	
	Collocation:					
	Scenario 1: ISM + LTE 12 / 13 Calculated percentage of Limit:	16.71%				
	Scenario 2: ISM + UMTS V / LTE 5 Calculated percentage of Limit:	15.20%				
	Scenario 3: ISM + UMTS II Calculated percentage of Limit:	16.12%				

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

		ISM 902 to 928	LTE 12 / 13	UMTS V / LTE 5	UMTS II	
	Frequency	915	700	850	1880	MHz
R	Distance	20	20	20	20	cm
PG	Maximum EIRP	24	23	23	26	dBm
PG	**Maximum EIRP**	251.2	199.5	199.5	398.1	mW
	Exclusion Limit from above:	1.38	1.15	1.32	2.26	W
	Calculated percentage of Limit:	18.15%	17.31%	15.16%	17.59%	
	Collocation:					
	Scenario 1: ISM + LTE 12 / 13 Calculated percentage of Limit:	35.46%				
	Scenario 2: ISM + UMTS V / LTE 5 Calculated percentage of Limit:	33.31%				
	Scenario 3: ISM + UMTS II Calculated percentage of Limit:	35.74%				

Conclusion: RF exposure evaluation is not required.