
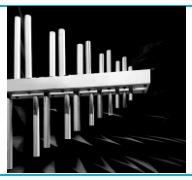
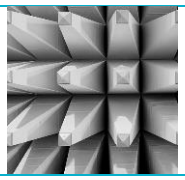

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BNetzA-CAB-02/21-102

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Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-2816/21-01-04 MPE (FCC_ISED)

Certification numbers and labeling requirements	
FCC ID	VW3UMCM413B
ISED number	9140A-UMCM413B
HVIN (Hardware Version Identification Number)	UM20-CM4-13
PMN (Product Marketing Name)	WATERMETER UM
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:	Max. power [dBm]		Antenna gain max.: [dBi]	Max. conducted output power as declared by customer	#
	conducted	EIRP			
LTE FDD 4 (CAT-M only) 1700 MHz	23.8	--	3.0	23.0 dBm +/- 2.7 dB	A
LTE FDD 13 (CAT-M only) 750 MHz	24.0	--	3.0		
BT LE 2450 MHz	8.6	8.9	0.5	8.0 dBm +/- 1.0 dB	B

For FCC ERP values have to be used for the calculation: EIRP: 25.7 dBm + 3 dBi = 28.7 dBm
ERP: 28.7 -2.1 = 26.6 dBm

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

#	Results from:	Additional information
A	SCOM_GWA_Water_UserManual_US_EN_rev1.0_v1	CAT-M (page 12) / low power
B	1-2816/21-01-03 CTC advanced GmbH	Antenna gain page 20, Max conducted page 23

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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:	LTE FDD 13	BT LE	
	Frequency (MHz)	750	2450	
PG	Declared max power (ERP)	26.6	9	dBm
R	Distance	20	20	cm
S	MPE limit for uncontrolled exposure	0.5	1	mW/cm^2
	Calculated Power density:	0.0910	0.0016	mW/cm^2
	Calculated percentage of Limit:	18.20%	0.16%	
	Collocation:			
	Scenario 1: LTE + BT LE 2.4 MHz Calculated percentage of Limit:	18.35%		

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.

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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

		13	0.3 - 6 GHz	
	Frequency	750	2450	MHz
R	Distance	20	20	cm
PG	Maximum EIRP	28.7	9	dBm
PG	**Maximum EIRP**	741.3	7.9	mW
	Exclusion Limit from above:	1.21	2.71	W
	Calculated percentage of Limit:	61.36%	0.29%	
	Collocation:			
	Scenario 1: LTE + BT LE 2.4 MHz Calculated percentage of Limit:	61.66%		

Conclusion: RF exposure evaluation is not required.

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