

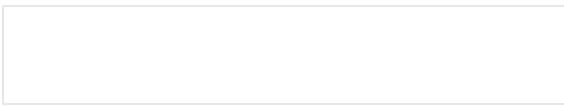
## Maximum Permissible Exposure (MPE) & Exposure evaluation

**Report identification number: 1-3977/22-02-18-A Exemption / MPE (FCC)**

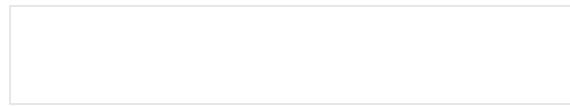
Certification numbers and labeling requirements	
FCC ID	VW3FAST5688W

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:



Alexander Hnatovskiy  
Lab Manager  
Radio Communications & EMC



Marco Scigliano  
Testing Manager  
Radio Communications & EMC

### Document History:

Version	Applied Changes	Date of Release
	Initial Release	2022-07-18
-A	Output power for LTE 66 corrected on page 2 and 4.	2022-08-02

**EUT technologies:**

Technologies:	Power Average Conducted [dBm]			Power EIRP <sup>2</sup> [dBm]	Max. Power for RF Exposure [dBm]	Data taken from (#)
	Measured Value	Max. declared (Tune-Up)	Difference <sup>1</sup> (Tune-Up Correction)			
LTE FDD 2 1900 MHz	22.7	23.0 (+1/-2 dB)	1.3	25.8	27.1	A, C
LTE FDD 4 1750 MHz	22.2	23.0 (+1/-2 dB)	1.8	25.8	28.6	A, D
LTE FDD 5 850 MHz	22.6	23.0 (+1/-2 dB)	1.4	26.35	27.75	A, B
LTE FDD 12 700 MHz	21.9	22.9 (+1/-2 dB)	2.0	25.45	27.45	A, D
LTE FDD 25 1900 MHz	22.0	23.0 (+1/-2 dB)	2.0	25.45	27.45	A, F
LTE FDD 26 850 MHz	22.7	23.0 (+1/-2 dB)	1.3	26.35	27.65	A, B, E
LTE FDD 41 2600 MHz	25.7	26.0 (+1/-2 dB)	1.3	28.6	29.9	A, G
LTE FDD 66 1750 MHz	22.3	23.0 (+1/-2 dB)	1.7	25.9	27.6	A, H
LTE FDD 71 680 MHz	22.2	23.0 (+1/-2 dB)	1.8	23.95	25.75	A, I
NR TDD n41 2600 MHz	27.8	26.0 (+2/-2 dB)	0.2	32.0	32.2	A, G
NR FDD n71 680 MHz	23.0	23.0 (+1/-2 dB)	1.0	22.6	23.6	A, I
BT LE 2450 MHz	8.9	N/A	N/A	12.1 <sup>3</sup>	12.1 <sup>3</sup>	J
WLAN 2450 MHz	29.6	N/A	N/A	34.8 <sup>3</sup>	34.8 <sup>3</sup>	K
WLAN 5000 MHz	28.8	N/A	N/A	33.6 <sup>3</sup>	33.6 <sup>3</sup>	L

<sup>1</sup>Difference (Tune-Up Correction) = Max. declared conducted power (Tune-Up) – measured conducted Power<sup>2</sup>Output power below 1 GHz is corrected with 2.15 dB<sup>3</sup>Antenna Gain added

Technologies:	Power Average Conducted [dBm]			Power EIRP <sup>2</sup> [dBm]	Max. Power for RF Exposure [dBm]	Data taken from (#)
	Measured Value	Max. declared (Tune-Up)	Difference <sup>1</sup> (Tune-Up Correction)			
NR FDD n25 1900 MHz	23.4	23.0 (+1/-2 dB)	0.6	26.5	27.1	A, M
NR FDD n66 1750 MHz	23.0	23.0 (+1/-2 dB)	1.0	26.7	27.7	A, N
NR TDD n77 3500 MHz	26.1	26.0 (+1/-3 dB)	0.9	27.9	28.8	A, O
NR TDD n77 3850 MHz	26.4	26.0 (+1/-3 dB)	0.6	28.9	29.5	A, P

<sup>1</sup>Difference (Tune-Up Correction) = Max. declared conducted power (Tune-Up) – measured conducted Power

<sup>2</sup>Output power below 1 GHz is corrected with 2.15 dB

<sup>3</sup> Antenna Gain added

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

#	Results from:
A	Tune up info from customer
B	1-3977/22-02-02 CTC Advanced GmbH report (p.22 max. meas. cond. / p.17 max. meas. ERP)
C	1-3977/22-02-03 CTC Advanced GmbH report (p.22 max. meas. cond. / p.23 max. meas. EIRP)
D	1-3977/22-02-04 CTC Advanced GmbH report <ul style="list-style-type: none"> <li>- LTE 4 (p.23 max. meas. cond. / p.24 max. meas. ERP)</li> <li>- LTE 12 (p.149 max. meas. cond. / p.150 max. meas. ERP)</li> </ul>
E	1-3977/22-02-05 CTC Advanced GmbH report (p.17 max. meas. cond. / p.19 max. meas. ERP)
F	1-3977/22-02-06 CTC Advanced GmbH report (p.21 max. meas. cond. / p.22 max. meas. EIRP)
G	1-3977/22-02-08 CTC Advanced GmbH report (p.22/109 max. meas. cond. / p.24/115 max. meas. EIRP)
H	1-3977/22-02-09 CTC Advanced GmbH report (p.20 max. meas. cond. / p.21 max. meas. ERP)
I	1-3977/22-02-10 CTC Advanced GmbH report (p.19/108 max. meas. cond. / p.22/114 max. meas. ERP)
J	1-3977/22-01-03-A CTC Advanced GmbH report <ul style="list-style-type: none"> <li>- Max. meas. cond. (p.24)</li> <li>- Max Gain declared: 3.2 dB (p.20)</li> </ul>
K	1-3977/22-01-04-A CTC Advanced GmbH report <ul style="list-style-type: none"> <li>- Max. meas. cond. (p.24) theoretical <math>23.9 + 5.8 = 29.7</math> / Max: 29.8</li> <li>- Max combined Gain declared: 5.8 dB (p.21)</li> </ul>
L	1-3977/22-01-05 CTC Advanced GmbH report <ul style="list-style-type: none"> <li>- Max. meas. cond. (p.33) theoretical <math>28.8 + 5.7 = 34.5</math></li> <li>- Max combined Gain declared: 5.7 dB (p.29)</li> </ul>
M	1-3977/22-02-15 CTC Advanced GmbH report (p.22 max. meas. cond. / p.23 max. meas. ERP)
N	1-3977/22-02-16 CTC Advanced GmbH report (p.19 max. meas. cond. / p.22 max. meas. EIRP)
O	1-3977/22-02-11 CTC Advanced GmbH report (p.22 max. meas. cond. / p.29 max. meas. EIRP)
P	1-3977/22-02-11 CTC Advanced GmbH report (p.35 max. meas. cond. / p.41 max. meas. EIRP)

**Declared minimum safety distances: 31cm**
**Collocation overview:**

Technology	Active scenario:
	1
LTE (Carrier Aggregation)*	x
BT LE	x
WLAN 2.4 GHz	x
WLAN 5 GHz	x

\*) CA\_12A-66A  
Sum of LTE FDD 12 & LTE FDD 66 (27.5 dBm + 27.6 dBm)

**Prediction of MPE limit at given distance (KDB 447498 D01 General RF Exposure Guidance v06)**

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 <sup>2</sup> )	Averaging Time (minutes)
300 -1500	f/1500	30
1500 - 100000	1.0	30

where f = Frequency (MHz)

**Prediction: worst case**

Technologies:		CA_12A-66A	BLE	WLAN 2.4	WLAN 5
	Frequency (MHz)	700	1750	2450	2450
PG	Declared max power (EIRP)	27.5	27.6	12.1	34.8
R	Distance	31.0	31.0	31.0	31.0
S	MPE limit for uncontrolled exposure	0.4667	1.0000	1.0000	1.0000
	<b>Calculated Power density:</b>	0.0461	0.0477	0.0013	0.2502
	<b>Calculated percentage of Limit:</b>	9.87%	4.77%	0.13%	25.02%
	<b>Collocation:</b>				
	LTE (CA_12A-66A) + BLE + WLAN 2.4 GHz + WLAN 5 GHz Calculated percentage of Limit:				<b>58.77%</b>

**This prediction demonstrates the following:**

The power density levels for FCC at a distance of 31 cm are below the maximum levels allowed by regulations.

**Conclusion:** RF exposure evaluation is not required.