



MPE TEST REPORT

Applicant UAB TELTONIKA TELEMATICS
FCC ID 2A3HUFMM920
Product Fleet Management System
Brand TELTONIKA TELEMATICS
Model FMM920-Q3IB0
Report No. R2208A0723-M1
Issue Date September 16, 2022

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC 47 CFR Part 1 1.1310**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
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1.4 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

2 Description of Equipment under Test

Client Information

Applicant	UAB TELTONIKA TELEMATICS
Applicant address	Saltoniskiu st. 9B-1, Vilnius, Lithuania
Manufacturer	UAB TELTONIKA TELEMATICS
Manufacturer address	Saltoniskiu st. 9B-1, Vilnius, Lithuania
Factory	UAB TELTONIKA EMS
Factory address	Ditvos st. 6, Vilnius, Lithuania

General Technologies

Model	FMM920-Q3IB0
IMEI	863257068183666
Hardware Version	FMM920-03
Software Version	FMB.Ver.03.28.02
Date of Testing	August 11, 2022 ~ August 21, 2022
Date of Sample Received	August 5, 2022
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant. 2. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.	

3 Maximum Tune up power and antenna Gain

The numeric gain (G) of the antenna with a gain specified in dB is determined by

$$\text{Numeric gain (G)} = 10^{(\text{antenna gain}/10)}$$

Band		Burst Tune up Power(dBm)	Division Factors (dB)	Time-Averaged Tune up Power (dBm)
GSM850	GSM	35.000	-9.03	25.97
GSM1900	GSM	32.000	-9.03	22.97

Note:

Division Factors

To average the power, the division factor is as follows:

1Txslot = 1 transmit time slot out of 8 time slots

=> conducted power divided by (8/1) => -9.03 dB

Band	Maximum Tune up Power		Antenna Gain (dBi)	Numeric gain
	(dBm)	(mW)		
GSM850	25.970	395.367	2.07	1.611
GSM1900	22.970	198.153	1.67	1.469
LTE Band 2	22.700	186.209	1.67	1.469
LTE Band 4	22.700	186.209	0.83	1.211
LTE Band 5	22.700	186.209	2.07	1.611
LTE Band 12	22.700	186.209	2.12	1.629
LTE Band 13	22.700	186.209	2.10	1.622
LTE Band 25	22.700	186.209	1.67	1.469
LTE Band 66	22.700	186.209	0.83	1.211
LTE Band 85	22.700	186.209	2.07	1.611
NB-IoT Band 2	22.700	186.209	1.67	1.469
NB-IoT Band 4	22.700	186.209	0.83	1.211
NB-IoT Band 5	22.700	186.209	2.07	1.611
NB-IoT Band 12	22.700	186.209	2.12	1.629
NB-IoT Band 13	22.700	186.209	2.10	1.622
NB-IoT Band 25	22.700	186.209	1.67	1.469
NB-IoT Band 66	22.700	186.209	0.83	1.211
NB-IoT Band 71	22.700	186.209	1.74	1.493
NB-IoT Band 85	22.700	186.209	2.07	1.611
Bluetooth	7.000	5.012	-1.43	0.719
Bluetooth (Low Energy)	-2.000	0.631	-1.43	0.719

4 Test Result

According to section 1.1310 of FCC 47 CFR Part 1, limits for maximum permissible exposure (MPE) are as following

TABLE 1 – LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500 .....	.....	.....	f/300	6
1500-100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500 .....	.....	.....	f/1500	30
1500-100,000 .....	.....	.....	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Note1. Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational / controlled limits apply provided he or she is made aware of the potential for exposure.

Note2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.



The maximum permissible exposure for 300~1500 MHz is $f/1500$, for 1500~100,000MHz is 1.0. So

Band	The maximum permissible exposure (mW/cm ²)
GSM850	0.566
GSM1900	1.000
LTE Band 2	1.000
LTE Band 4	1.000
LTE Band 5	0.566
LTE Band 12	0.477
LTE Band 13	0.525
LTE Band 25	1.000
LTE Band 66	1.000
LTE Band 85	0.477
NB-IoT Band 2	1.000
NB-IoT Band 4	1.000
NB-IoT Band 5	0.566
NB-IoT Band 12	0.477
NB-IoT Band 13	0.525
NB-IoT Band 25	1.000
NB-IoT Band 66	1.000
NB-IoT Band 71	0.465
NB-IoT Band 85	0.477
Bluetooth	1.000
Bluetooth (Low Energy)	1.000

**RF Exposure Calculations:**

The following information provides the minimum separation distance for the highest gain antenna provided. This calculation is based on the conducted power, considering maximum power and antenna gain. The formula shown in KDB 447498 D01 is used in the calculation.

Equation from KDB 447498 D01 General RF Exposure Guidance v06 (10/23/2015) is:

$$S = PG / 4\pi R^2$$

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = Time-average maximum tune up procedure (in appropriate units, e.g., mW)

G = the numeric gain of the antenna

R = distance to the center of radiation of the antenna (20 cm = limit for MPE)

Band	Antenna Gain (dBi)	Maximum tune up (dBm)	Maximum EIRP (dBm)	PG (mW)	Test Result (mW/cm ²)	Limit Value (mW/cm ²)	The MPE ratio
GSM850	2.07	25.970	28.040	636.796	0.1267	0.566	0.2238
GSM1900	1.67	22.970	24.640	291.072	0.0579	1.000	0.0579
LTE Band 2	1.67	22.700	24.370	273.527	0.0544	1.000	0.0544
LTE Band 4	0.83	22.700	23.530	225.424	0.0448	1.000	0.0448
LTE Band 5	2.07	22.700	24.770	299.916	0.0597	0.566	0.1054
LTE Band 12	2.12	22.700	24.820	303.389	0.0604	0.477	0.1265
LTE Band 13	2.10	22.700	24.800	301.995	0.0601	0.525	0.1144
LTE Band 25	1.67	22.700	24.370	273.527	0.0544	1.000	0.0544
LTE Band 66	0.83	22.700	23.530	225.424	0.0448	1.000	0.0448
LTE Band 85	2.07	22.700	24.770	299.916	0.0597	0.477	0.1251
NB-IoT Band 2	1.67	22.700	24.370	273.527	0.0544	1.000	0.0544
NB-IoT Band 4	0.83	22.700	23.530	225.424	0.0448	1.000	0.0448
NB-IoT Band 5	2.07	22.700	24.770	299.916	0.0597	0.566	0.1054
NB-IoT Band 12	2.12	22.700	24.820	303.389	0.0604	0.477	0.1265
NB-IoT Band 13	2.10	22.700	24.800	301.995	0.0601	0.525	0.1144
NB-IoT Band 25	1.67	22.700	24.370	273.527	0.0544	1.000	0.0544
NB-IoT Band 66	0.83	22.700	23.530	225.424	0.0448	1.000	0.0448
NB-IoT Band 71	1.74	22.700	24.440	277.971	0.0553	0.465	0.1189
NB-IoT Band 85	2.07	22.700	24.770	299.916	0.0597	0.477	0.1251
Bluetooth	-1.43	7.000	5.570	3.606	0.0007	1.000	0.0007
Bluetooth (Low Energy)	-1.43	-2.000	-3.430	0.454	0.0001	1.000	0.0001

Note: R = 20cm
 $\pi = 3.1416$
The MPE ratio = Mac Test Result ÷ Limit Value

So the simultaneous transmitting antenna pairs as below:

$$\sum \text{of MPE ratios} = \text{Main Antenna} + \text{Bluetooth} = 0.2238 + 0.0007 = 0.2245 < 1$$

Note: For transmitters, minimum separation distance is 20cm, even if calculations indicate MPE distance is less.

*****END OF REPORT*****



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.