

MPE TEST REPORT

Applicant UAB TELTONIKA TELEMATICS
FCC ID 2A3HUFMM80A
Product Fleet Management System
Brand TELTONIKA TELEMATICS
Model FMM80A-Q2IB0
Report No. R2303A0264-M1
Issue Date May 24, 2023

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.

Wei Fangying

Prepared by: Wei Fangying

Fan Guangchang

Approved by: Fan Guangchang

TA Technology (Shanghai) Co., Ltd.

Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000

Table of Contents

1	Test Laboratory.....	3
1.1	Notes of the Test Report.....	3
1.2	Test Facility.....	3
1.3	Testing Location.....	3
1.4	Laboratory Environment.....	3
2	Description of Equipment Under Test.....	4
3	Maximum Tune up and Antenna Gain.....	5
4	Test Result.....	6
	ANNEX A: The EUT Appearance.....	9

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.
 Address: Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China
 City: Shanghai
 Post code: 201201
 Country: P. R. China
 Contact: Fan Guangchang
 Telephone: +86-021-50791141/2/3
 Fax: +86-021-50791141/2/3-8000
 Website: <http://www.ta-shanghai.com>
 E-mail: fanguangchang@ta-shanghai.com

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, LT-08105, Vilnius, Lithuania
Manufacturer	UAB TELTONIKA TELEMATICS
Manufacturer address	Saltoniskiu st. 9B-1, LT-08105, Vilnius, Lithuania
Factory	UAB TELTONIKA EMS
Factory address	Ditvos st. 6, LT-02121, Vilnius, Lithuania

General Technologies

Model	FMM80A-Q2IB0
IMEI	862464068700505
Hardware Version	FMM80A-80
Software Version	FMB.Ver.03.28.02
Date of Sample Received	March 15, 2023
<p>Note:</p> <ol style="list-style-type: none"> The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant. 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 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	Maximum Tune up Power		Antenna Gain (dBi)	Numeric Gain
	(dBm)	(mW)		
LTE-M Band 2	22.0	158.489	2.50	1.778
LTE-M Band 4	22.0	158.489	2.50	1.778
LTE-M Band 5	22.0	158.489	2.50	1.778
LTE-M Band 12	22.0	158.489	2.50	1.778
LTE-M Band 13	22.0	158.489	2.50	1.778
LTE-M Band 25	22.0	158.489	2.50	1.778
LTE-M Band 66	22.0	158.489	2.50	1.778
LTE-M Band 85	22.0	158.489	2.50	1.778
Bluetooth	6.0	3.981	-1.43	0.719
Bluetooth (Low Energy)	-3.0	0.501	-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)
LTE-M Band 2	1.000
LTE-M Band 4	1.000
LTE-M Band 5	0.549
LTE-M Band 12	0.466
LTE-M Band 13	0.518
LTE-M Band 25	1.000
LTE-M Band 66	1.000
LTE-M Band 85	0.465
Bluetooth	1.000
Bluetooth LE	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
LTE-M Band 2	2.50	22.0	24.500	281.838	0.056	1.000	0.056
LTE-M Band 4	2.50	22.0	24.500	281.838	0.056	1.000	0.056
LTE-M Band 5	2.50	22.0	24.500	281.838	0.056	0.549	0.102
LTE-M Band 12	2.50	22.0	24.500	281.838	0.056	0.466	0.120
LTE-M Band 13	2.50	22.0	24.500	281.838	0.056	0.518	0.108
LTE-M Band 25	2.50	22.0	24.500	281.838	0.056	1.000	0.056
LTE-M Band 66	2.50	22.0	24.500	281.838	0.056	1.000	0.056
LTE-M Band 85	2.50	22.0	24.500	281.838	0.056	0.465	0.121
Bluetooth	-1.43	6.0	4.570	2.864	0.001	1.000	0.001
Bluetooth LE	-1.43	-3.0	-4.430	0.361	0.000	1.000	0.000
Note: R = 20cm $\pi = 3.1416$ The MPE ratio = Mac Test Result ÷ Limit Value							

So the simultaneous transmitting antenna pairs as below:

∑ of MPE ratios = WWAN Antenna + Bluetooth = 0.121 + 0.001 = 0.122 < 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.