

MPE TEST REPORT

Applicant Positioning Universal Inc
FCC ID 2AHRH-FJ970M
Product TM97M 4G Vehicle Telematics Unit
Brand Positioning Universal
Model FJ970M
Report No. R2303A0303-M1V1
Issue Date May 12, 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.

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Version	Revision description	Issue Date
Rev.0	Initial issue of report.	May 6, 2023
Rev.1	Update information and data.	May 12, 2023
<p>Note: This revised report (Report No.: R2303A0303-M1V1) supersedes and replaces the previously issued report (Report No.: R2303A0303-M1). Please discard or destroy the previously issued report and dispose of it accordingly.</p>		

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
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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	Positioning Universal Inc
Applicant address	4660 La Jolla Village Drive, Suite 1100, San Diego, CA92122
Manufacturer	Positioning Universal Inc
Manufacturer address	4660 La Jolla Village Drive, Suite 1100, San Diego, CA92122

General Technologies

Model	FJ970M
IMEI	356995842147952
Hardware Version	P3
Software Version	1.2.0
Date of Testing	April 1, 2023 ~ April 26, 2023
Date of Sample Received	March 23, 2023

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 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-Averaged output power (adjusted for tune up) (dBm)	Division Factors	Frame-Averaged output power (adjusted for tune up) (dBm)
GSM850	1 Txslot	35.000	-9.03	25.97
GSM1900	1 Txslot	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	25.97	395.367	0.20	1.047
GSM1900	22.97	198.153	1.10	1.288
LTE-M Band 2	24.00	251.189	1.10	1.288
LTE-M Band 4	24.00	251.189	1.20	1.318
LTE-M Band 5	24.00	251.189	0.20	1.047
LTE-M Band 12	24.00	251.189	0.10	1.023
LTE-M Band 13	24.00	251.189	3.80	2.399
LTE-M Band 25	24.00	251.189	1.00	1.259
LTE-M Band 26	24.00	251.189	0.20	1.047
LTE-M Band 66	24.00	251.189	4.30	2.692
LTE-M Band 85	24.00	251.189	0.10	1.023
Bluetooth (Low Energy)	-0.52	0.887	4.97	3.141

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	0.549
GSM1900	1.000
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 26	0.543
LTE-M Band 66	1.000
LTE-M Band 85	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	Maximum Tune up (dBm)	Antenna Gain (dBi)	Maximum EIRP (dBm)	PG (mW)	Test Result (mW/cm ²)	Limit Value (mW/cm ²)	The MPE Ratio
GSM850	25.97	0.20	26.170	414.000	0.082	0.549	0.150
GSM1900	22.97	1.10	24.070	255.270	0.051	1.000	0.051
LTE-M Band 2	24.00	1.10	25.100	323.594	0.064	1.000	0.064
LTE-M Band 4	24.00	1.20	25.200	331.131	0.066	1.000	0.066
LTE-M Band 5	24.00	0.20	24.200	263.027	0.052	0.549	0.095
LTE-M Band 12	24.00	0.10	24.100	257.040	0.051	0.466	0.110
LTE-M Band 13	24.00	3.80	27.800	602.560	0.120	0.518	0.231
LTE-M Band 25	24.00	1.00	25.000	316.228	0.063	1.000	0.063
LTE-M Band 26	24.00	0.20	24.200	263.027	0.052	0.543	0.096
LTE-M Band 66	24.00	4.30	28.300	676.083	0.135	1.000	0.135
LTE-M Band 85	24.00	0.10	24.100	257.040	0.051	1.000	0.051
Bluetooth LE	-0.52	4.97	4.450	2.786	0.001	1.000	0.001
Note: R = 20cm $\pi = 3.1416$ The MPE Ratio = Mac Test Result ÷ Limit Value							

So the simultaneous transmitting antenna pairs as below:

$$\sum \text{of MPE Ratios} = \text{WWAN Antenna} + \text{Bluetooth Antenna} = 0.231 + 0.001 = 0.232 < 1$$

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.