

# MPE TEST REPORT

<b>Applicant</b>	Tag-N-Trac Inc.
<b>FCC ID</b>	2A24I-V03G13J17
<b>Product</b>	Smart Sense Tag
<b>Brand</b>	Tag-N-Trac
<b>Model</b>	ST300-MM
<b>Report No.</b>	R2303A0333-M1V1
<b>Issue Date</b>	June 19, 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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*Approved by: Fan Guangchang*

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Version	Revision description	Issue Date
Rev.0	Initial issue of report.	May 29, 2023
Rev.1	Update data.	June 19, 2023
<p>Note: This revised report (Report No.: R2303A0333-M1V1) supersedes and replaces the previously issued report (Report No.: R2303A0333-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.  
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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 $\Omega$
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

<b>Applicant</b>	Tag-N-Trac Inc.
<b>Applicant address</b>	Executive So.#675, La Jolla, California, United States, 92037
<b>Manufacturer</b>	Chongqing Huiye IoT Technology Co.,Ltd. Shanghai Branch
<b>Manufacturer address</b>	FL.5, Haibo Building 2, No.829, Yishan Rd, Xuhui, Shanghai. 200233

### General Technologies

<b>Model</b>	ST300-MM
<b>IMEI</b>	868617060007848
<b>Hardware Version</b>	QHY004_V1.02_PCB
<b>Software Version</b>	MCU_02_02_06_00_20361_APP_00_11TEST_LO.bin
<b>Date of Sample Received</b>	March 28, 2023
<p>Note:</p> <ol style="list-style-type: none"> <li>1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.</li> <li>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.</li> </ol>	

### 3 Maximum Output Power (Measured)/ 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	25.70	371.535	0.62	1.153	
LTE-M Band 4	25.70	371.535	0.93	1.239	
LTE-M Band 5	25.70	371.535	1.02	1.265	
LTE-M Band 12	25.70	371.535	1.99	1.581	
LTE-M Band 13	25.70	371.535	2.48	1.770	
LTE-M Band 25	25.70	371.535	0.62	1.153	
LTE-M Band 26	25.70	371.535	1.20	1.318	
LTE-M Band 66	25.70	371.535	0.95	1.245	
NB-IoT Band 2	25.70	371.535	0.62	1.153	
NB-IoT Band 4	25.70	371.535	0.93	1.239	
NB-IoT Band 5	25.70	371.535	1.02	1.265	
NB-IoT Band 12	25.70	371.535	1.99	1.581	
NB-IoT Band 13	25.70	371.535	2.48	1.770	
NB-IoT Band 17	25.70	371.535	1.99	1.581	
NB-IoT Band 25	25.70	371.535	0.62	1.153	
NB-IoT Band 66	25.70	371.535	0.95	1.245	
Wi-Fi 2.4G	802.11b	20.00	100.000	3.96	2.489
	802.11g	19.00	79.433	3.96	2.489
	802.11n HT20	19.00	79.433	3.96	2.489
	802.11n HT40	18.50	70.795	3.96	2.489
Bluetooth (Low Energy) (ESP32-C3-MINI-1)	6.00	3.981	3.96	2.489	
Bluetooth (Low Energy) (DA14531 (QFN))	4.50	2.818	1.42	1.387	

## 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 <sup>2</sup> )	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 <sup>2</sup> )	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 <sup>2</sup> )	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 <sup>2</sup> )
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
NB-IoT Band 2	1.000
NB-IoT Band 4	1.000
NB-IoT Band 5	0.549
NB-IoT Band 12	0.466
NB-IoT Band 13	0.518
NB-IoT Band 17	0.469
NB-IoT Band 25	0.543
NB-IoT Band 66	1.000
Wi-Fi 2.4GHz	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/cm<sup>2</sup>)

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)	Result (mW/cm <sup>2</sup> )	Limit Value (mW/cm <sup>2</sup> )	
LTE-M Band 2	25.70	0.62	26.320	428.549	0.085	1.000	
LTE-M Band 4	25.70	0.93	26.630	460.257	0.092	1.000	
LTE-M Band 5	25.70	1.02	26.720	469.894	0.093	0.549	
LTE-M Band 12	25.70	1.99	27.690	587.489	0.117	0.466	
LTE-M Band 13	25.70	2.48	28.180	657.658	0.131	0.518	
LTE-M Band 25	25.70	0.62	26.320	428.549	0.085	1.000	
LTE-M Band 26	25.70	1.20	26.900	489.779	0.097	0.543	
LTE-M Band 66	25.70	0.95	26.650	462.381	0.092	1.000	
NB-IoT Band 2	25.70	0.62	26.320	428.549	0.085	1.000	
NB-IoT Band 4	25.70	0.93	26.630	460.257	0.092	1.000	
NB-IoT Band 5	25.70	1.02	26.720	469.894	0.093	0.549	
NB-IoT Band 12	25.70	1.99	27.690	587.489	0.117	0.466	
NB-IoT Band 13	25.70	2.48	28.180	657.658	0.131	0.518	
NB-IoT Band 17	25.70	1.99	27.690	587.489	0.117	0.469	
NB-IoT Band 25	25.70	0.62	26.320	428.549	0.085	0.543	
NB-IoT Band 66	25.70	0.95	26.650	462.381	0.092	1.000	
Wi-Fi 2.4G (ESP32-C3-MINI-1)	802.11b	20.00	3.96	23.960	248.886	0.050	1.000
	802.11g	19.00	3.96	22.960	197.697	0.039	1.000
	802.11n HT20	19.00	3.96	22.960	197.697	0.039	1.000
	802.11n HT40	18.50	3.96	22.460	176.198	0.035	1.000
Bluetooth (Low Energy) (ESP32-C3-MINI-1)	6.00	3.96	9.960	9.908	0.002	1.000	
Bluetooth (Low Energy) (DA14531 (QFN))	4.50	1.42	5.920	3.908	0.001	1.000	

Note: R = 20cm  
π = 3.1416

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.