

MPE TEST REPORT

Applicant	Tag-N-Trac Inc.
FCC ID	2A24I-V03G13J17
Product	Smart Sense Tag
Brand	Tag-N-Trac
Model	ST300-MM
Report No.	R2303A0333-M1V1
Issue Date	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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Version	Revision description	Issue Date
Rev.0	Initial issue of report.	May 29, 2023
Rev.1	Update data.	June 19, 2023
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.		

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

General Technologies

Model	ST300-MM
IMEI	868617060007848
Hardware Version	QHY004_V1.02_PCB
Software Version	MCU_02_02_06_00_20361_APP_00_11TEST_LO.bin
Date of Sample Received	March 28, 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 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 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 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/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)	Result (mW/cm ²)	Limit Value (mW/cm ²)
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.