# MPE TEST REPORT

| | |
|---|---|
| **Applicant** | Smawave Technology Co. ,Ltd |
| **FCC ID** | 2AU8HSRT321 |
| **Product** | Indoor CPE |
| **Brand** | smawave |
| **Model** | SRT321 |
| **Report No.** | R2111A0978-M1V2 |
| **Issue Date** | December 21, 2021 |

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.

Fangying Wei　　Guangchang Fan

Prepared by: Fangying Wei　　Approved by: Guangchang Fan


## TA Technology (Shanghai) Co., Ltd.

*No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China*

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

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

# Table of Contents

| Version | Revision description | Issue Date |
|---|---|---|
| Rev.0 | Initial issue of report. | December 3, 2021 |
| Rev.1 | Update data in Page 10. | December 15, 2021 |
| Rev.2 | Update data in Page 10. | December 20, 2021 |
| Note: This revised report (Report No. R2111A0978-M1V2) supersedes and replaces the previously issued report (Report No. R2111A0978-M1V1). 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: | No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, 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.<br>Reflection of surrounding objects is minimized and in compliance with requirement of standards. | |

# 2 Description of Equipment under Test

**Client Information**

| | |
|---|---|
| **Applicant** | Smawave Technology Co. ,Ltd |
| **Applicant address** | 3/F, Building 8, 1001 North Qinzhou Road, Xuhui District, Shanghai, China |
| **Manufacturer** | Smawave Technology Co. ,Ltd |
| **Manufacturer address** | 3/F, Building 8, 1001 North Qinzhou Road, Xuhui District, Shanghai, China |

**General Technologies**

| | |
|---|---|
| **Model** | SRT321 |
| **SN** | RT321X02214300006 |
| **Hardware Version** | V1.0 |
| **Software Version** | ST_V2.1.4 |
| **Date of Testing** | November 20, 2021 ~ December 6, 2021 |
| Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.<br>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 tolerance (dBm) and antenna Gain

The numeric gain (G) of the antenna with a gain specified in dB is determined by
Numeric gain (G)=10^(antenna gain/10)

| Band | Maximum tune-up tolerance(dBm) | | Antenna Gain (dBi) | Numeric gain |
|---|---|---|---|---|
| | (dBm) | (mW) | | |
| LTE Band 2 | 23 | 199.526 | 2.36 | 1.722 |
| LTE Band 4 | 23 | 199.526 | 3.64 | 2.312 |
| LTE Band 42 | 24 | 251.189 | 1.79 | 1.510 |
| Wi-Fi 2.4G | 22 | 158.489 | 2.27 | 1.687 |
| Wi-Fi 5G U-NII-1 | 22 | 158.489 | 3.14 | 2.061 |
| Wi-Fi 5G U-NII-3 | 26 | 398.107 | 3.17 | 2.075 |

# 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 MAXIMUN PERMISSIBLE EXPOSURE (MPE)

| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm2) | 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/f2) | 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/f2) | 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 Band 2 | 1.000 |
| LTE Band 4 | 1.000 |
| LTE Band 42 | 1.000 |
| Wi-Fi 2.4GHz | 1.000 |
| Wi-Fi 5GHz | 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. $mW/cm^2$)

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 Band 2 | 2.36 | 23 | 25.36 | 343.558 | 0.068 | 1.000 | 0.068 |
| LTE Band 4 | 3.64 | 23 | 26.64 | 461.318 | 0.092 | 1.000 | **0.092** |
| LTE Band 42 | 1.79 | 24 | 25.79 | 379.315 | 0.075 | 1.000 | 0.075 |
| Wi-Fi 2.4GHz | 2.27 | 22 | 24.27 | 267.301 | 0.053 | 1.000 | **0.053** |
| Wi-Fi 5G U-NII-1 | 3.14 | 22 | 25.14 | 326.588 | 0.065 | 1.000 | 0.065 |
| Wi-Fi 5G U-NII-3 | 3.17 | 26 | 29.170 | 826.038 | 0.164 | 1.000 | **0.164** |
| Note: **R** = 20cm<br>**π**= 3.1416<br>The EMF ratio = Mac Test Result ÷Limit Value | | | | | | | |

So the simultaneous transmitting antenna pairs as below:

∑of MPE ratios = Main Antenna + Wi-Fi 2.4G Antenna + Wi-Fi 5G Antenna = 0.092 + 0.164 + 0.053= 0.309 <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.**