MPE TEST REPORT

Applicant	Shanghai Smawave Technology Co. ,Ltd
FCC ID	2AU8HSC421
Product	Cat12 Indoor CPE
Brand	Smawave
Model	SC421
Report No.	R2404A0415-M2
Issue Date	May 23, 2024

Eurofins 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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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 **Eurofins 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)

Eurofins 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:	Eurofins TA Technology (Shanghai) Co., Ltd.
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1.4 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25°C
Relative humidity	Min. = 20%, Max. = 80%
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	Shanghai Smawave Technology Co. ,Ltd
Applicant address	3/F, Building 8, 1001 North Qinzhou Road，Xuhui District, Shanghai, China
Manufacturer	Shanghai Smawave Technology Co. ,Ltd
Manufacturer address	3/F, Building 8, 1001 North Qinzhou Road，Xuhui District, Shanghai, China

General Technologies

EUT Description			
Model	SC421		
Lab internal SN	R2404A0415/S01		
Hardware Version	/		
Software Version	/		
Frequency	Band	TX (MHz)	RX (MHz)
	WCDMA Band II	1850 ~ 1910	1930 ~ 1990
	WCDMA Band V	824 ~ 849	869 ~ 894
	LTE Band 4	1710 ~ 1755	2110 ~ 2155
	LTE Band 5	824 ~ 849	869 ~ 894
	LTE Band 12	699 ~ 716	729 ~ 746
	LTE Band 41	2496 ~ 2690	2496 ~ 2690
	LTE Band 66	1710 ~ 1780	2110 ~ 2180
	Wi-Fi 2.4G	2400 ~ 2483.5	2400 ~ 2483.5
	Wi-Fi 5G (U-NII-1)	5150 ~ 5250	5150 ~ 5250
	Wi-Fi 5G (U-NII-3)	5725 ~ 5850	5725 ~ 5850
Date of Sample Received	April 15, 2024		

Note:
1. The EUT is sent from the applicant to Eurofins 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 Eurofins 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 Tune up 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 Power		Antenna Gain (dBi)	Numeric Gain
	(dBm)	(mW)		
WCDMA Band II	24.500	281.838	2.790	1.901
WCDMA Band V	24.500	281.838	0.690	1.172
LTE Band 4	24.000	251.189	3.320	2.148
LTE Band 5	24.000	251.189	0.690	1.172
LTE Band 12	24.000	251.189	0.000	1.000
LTE Band 41 (Power Class 3)	24.000	251.189	4.070	2.553
LTE Band 41 (Power Class 2)	27.000	501.187	4.070	2.553
LTE Band 66	24.000	251.189	3.320	2.148
Band	Maximum Tune up Power		Antenna Gain + Beamforming Gain (dBi)	Numeric Gain
	(dBm)	(mW)		
Wi-Fi 2.4G	22.000	158.489	5.920	3.908
Wi-Fi 5G	22.000	158.489	5.350	3.428

4 MPE Limit

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)
WCDMA Band II	1.000
WCDMA Band V	0.549
LTE Band 4	1.000
LTE Band 5	0.549
LTE Band 12	0.466
LTE Band 41	1.000
LTE Band 66	1.000
Wi-Fi 2.4GHz	1.000
Wi-Fi 5GHz	1.000

5 RF Exposure Evaluation Result

RF exposure evaluation method is based on KDB 447498 D01，this calculation is based on the conducted power, maximum power and antenna gain with provides the minimum separation distance. The formula shown below is from OET Bulletin 65 Edition 97-01 Per KDB 447498 D01:

$$S= PG / 4\pi R^2$$

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	Maximum Tune up (dBm)	Antenna Gain (dBi)	Maximum EIRP (dBm)	PG (mW)	Result (mW/cm2)	Limit Value (mW/cm^2)	The MPE Ratio
WCDMA Band II	24.500	2.790	27.290	535.797	0.107	1.000	0.107
WCDMA Band V	24.500	0.690	25.190	330.370	0.066	0.549	0.120
LTE Band 4	24.000	3.320	27.320	539.511	0.107	1.000	0.107
LTE Band 5	24.000	0.690	24.690	294.442	0.059	0.549	0.107
LTE Band 12	24.000	0.000	24.000	251.189	0.050	0.466	0.107
LTE Band 41 (Power Class 3)	24.000	4.070	28.070	641.210	0.128	1.000	0.128
LTE Band 41 (Power Class 2)	27.000	4.070	31.070	1279.381	0.255	1.000	**0.255**
LTE Band 66	24.000	3.320	27.320	539.511	0.107	1.000	0.107
Wi-Fi 2.4GHz	22.000	5.920	27.920	619.441	0.123	1.000	**0.123**
Wi-Fi 5GHz	22.000	5.350	27.350	543.250	0.108	1.000	**0.108**
Note: **R** = 20cm **π**= 3.1416 The MPE Ratio = Mac Result÷Limit Value							

So the simultaneous transmitting antenna pairs as below:
∑of MPE ratios = Main Antenna + Wi-Fi 2.4GHz + Wi-Fi 5GHz = 0.255 + 0.123 + 0.108 = 0.486 <1

Note: For transmitters, minimum separation distance is 20cm, even if calculations indicate MPE distance is less.

ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

********END OF REPORT ********