

MPE TEST REPORT

Applicant	Cognition Controls Co.
FCC ID	2BCO5CC301
Product	Smart Commercial Control
Brand	Cognition Controls
Model	CC-301
Report No.	R2312A1440-M1
Issue Date	March 4, 2024

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 **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. = 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	Cognition Controls Co.
Applicant address	68 Harrison Ave. #605, Boston, MASSACHUSETTS, USA
Manufacturer	Cognition Controls Co.
Manufacturer address	68 Harrison Ave. #605, Boston, MASSACHUSETTS, USA

General Technologies

EUT Description			
Model	CC-301		
Lab internal SN	R2312A1440/S01		
Hardware Version	V1		
Software Version	1.0.0		
Frequency	Band	TX (MHz)	RX (MHz)
	LTE-M Band 2	1850 ~ 1910	1930 ~ 1990
	LTE-M Band 4	1710 ~ 1755	2110 ~ 2155
	LTE-M Band 5	824 ~ 849	869 ~ 894
	LTE-M Band 12	699 ~ 716	729 ~ 746
	LTE-M Band 13	777 ~ 787	746 ~ 756
	LTE-M Band 25	1850 ~ 1915	1930 ~ 1995
	LTE-M Band 26A	814 ~ 824	859 ~ 869
	LTE-M Band 26B	824 ~ 849	869 ~ 894
	LTE-M Band 66	1710 ~ 1780	2110 ~ 2180
	LTE-M Band 85	698 ~ 716	728 ~ 746
	Bluetooth	2400 ~ 2483.5	2400 ~ 2483.5
Wi-Fi 2.4G	2400 ~ 2483.5	2400 ~ 2483.5	
Date of Sample Received	December 25, 2023		
<p>Note:</p> <ol style="list-style-type: none"> The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant. 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

Numeric gain (G)=10^(antenna gain/10)

Band	Maximum Tune up Power		Antenna Gain (dBi)	Numeric Gain
	(dBm)	(mW)		
LTE-M Band 2	22.00	158.489	1.60	1.445
LTE-M Band 4	22.00	158.489	1.90	1.549
LTE-M Band 5	22.00	158.489	3.00	1.995
LTE-M Band 12	22.00	158.489	4.00	2.512
LTE-M Band 13	22.00	158.489	4.50	2.818
LTE-M Band 25	22.00	158.489	1.70	1.479
LTE-M Band 26A	22.00	158.489	3.00	1.995
LTE-M Band 26B	22.00	158.489	3.00	1.995
LTE-M Band 66	22.00	158.489	2.00	1.585
LTE-M Band 85	22.00	158.489	4.00	2.512
Wi-Fi 2.4G	20.00	100.000	3.96	2.489
Bluetooth LE	6.00	3.981	3.96	2.489

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 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 26A	0.543
LTE-M Band 26B	0.543
LTE-M Band 66	1.000
LTE-M Band 85	0.465
Wi-Fi 2.4G	1.000
Bluetooth LE	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/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)	The MPE Ratio
LTE-M Band 2	22.00	1.60	23.600	229.087	0.046	1.000	0.046
LTE-M Band 4	22.00	1.90	23.900	245.471	0.049	1.000	0.049
LTE-M Band 5	22.00	3.00	25.000	316.228	0.063	0.549	0.115
LTE-M Band 12	22.00	4.00	26.000	398.107	0.079	0.466	0.170
LTE-M Band 13	22.00	4.50	26.500	446.684	0.089	0.518	0.172
LTE-M Band 25	22.00	1.70	23.700	234.423	0.047	1.000	0.047
LTE-M Band 26A	22.00	3.00	25.000	316.228	0.063	0.543	0.116
LTE-M Band 26B	22.00	3.00	25.000	316.228	0.063	0.543	0.116
LTE-M Band 66	22.00	2.00	24.000	251.189	0.050	1.000	0.050
LTE-M Band 85	22.00	4.00	26.000	398.107	0.079	0.465	0.170
Wi-Fi 2.4G	20.00	3.96	23.960	248.886	0.050	1.000	0.050
Bluetooth LE	6.00	3.96	9.960	9.908	0.002	1.000	0.002
Note: R = 20cm $\pi = 3.1416$ The MPE Ratio = Mac Result ÷ Limit Value							

So the simultaneous transmitting antenna pairs as below:

\sum of MPE ratios = Main Antenna + Wi-Fi Antenna + Bluetooth = 0.172 + 0.050 + 0.002 = 0.224 < 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 *****