RF Exposure MPE

Report Reference No..... :	**CTA25021001504**
FCC ID..... :	**2BOU9-R82**
Compiled by (position+printed name+signature) . :	File administrators Joan Wu
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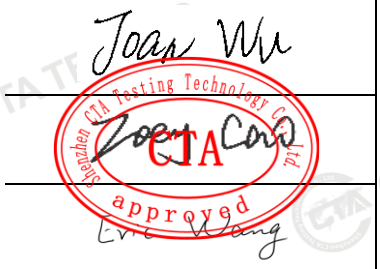
Approved by (position+printed name+signature) . :	RF Manager Eric Wang
Date of issue ..... :	Apr. 11, 2025



Testing Laboratory Name.....:	**Shenzhen CTA Testing Technology Co., Ltd.**
Address.....:	Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name.....:	**Shenzhen Yuntian Intelligent Terminal Co.,LTD.**
Address.....:	Room 201, Building 2, No.13, Hourui Second Industrial Zone, Hourui Community, Hangcheng Street, Bao'an District, Shenzhen, China
Standard.....:	**47CFR §1.1310** **47CFR §2.1091** **KDB447498 D01 General RF Exposure Guidance v06**

Test item description .....:	**SMART LOCK**
Manufacturer .....:	**Shenzhen Yuntian Intelligent Terminal Co.,LTD.**
Trade Mark	N/A
Model/Type reference .....:	R82
Rating .....:	DC 12.0V From external circuit
Result .....:	**PASS**

TEST REPORT

Equipment under Test	:	SMART LOCK
Model /Type	:	R82
Listed Models	:	R55, R83, R85, R87, R88, YT51, R80, R81, R86
Model difference	:	The PCB board, circuit, structure and internal of these models are the same, Only model number and colour is different for these model.
Applicant	:	**Shenzhen Yuntian Intelligent Terminal Co.,LTD.**
Address	:	Room 201, Building 2, No.13, Hourui Second Industrial Zone, Hourui Community, Hangcheng Street, Bao'an District, Shenzhen, China
Manufacturer	:	**Shenzhen Yuntian Intelligent Terminal Co.,LTD.**
Address	:	Room 201, Building 2, No.13, Hourui Second Industrial Zone, Hourui Community, Hangcheng Street, Bao'an District, Shenzhen, China

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
FCC KDB 447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device, RF Exposure, Equipment Authorization Procedures.
FCC CFR 47 part1 1.1310: Radiofrequency radiation exposure limits.
FCC CFR 47 part2 2.1091: Radiofrequency radiation exposure evaluation: mobile devices

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Feb. 10, 2025
Testing commenced on	:	Feb. 10, 2025
Testing concluded on	:	Apr. 11, 2025

2.2 Product Description

Product Name:	SMART LOCK
Model/Type reference:	R82
Power supply:	DC 12.0V From external circuit
Smart lock auxiliary power device (Supplied by the manufacturer)	Model: R90
Hardware version:	Z1079Q-V1.4-20240827A
Software version:	YTL-WB20-V1.0.5.0--YTL-LX17-V1.2.12--HK-M3039-V6.0.0.6
Testing sample ID：	CTA250210015-1# (Engineer sample) CTA250210015-2# (Normal sample)
Bluetooth :	
Supported Type:	Bluetooth BR/EDR
Modulation:	GFSK, π/4DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	PCB antenna
Antenna gain:	0.95dBi
Bluetooth BLE	
Supported type:	Bluetooth low Energy
Modulation:	GFSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	40
Channel separation:	2 MHz
Antenna type:	PCB antenna
Antenna gain:	0.95dBi
13.56MHz RFID	
Operation frequency:	13.56MHz
Modulation :	ASK
No. of Channel :	1
Antenna type:	PCB antenna
Antenna gain:	0.68 dBi

2.3 Special Accessories

The following is the EUT test of the auxiliary equipment provided by the laboratory:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
Adapter	/	/	Input: AC 100-240V 50/60Hz Output: DC 12V 3A	/	/

2.4 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen CTA Testing Technology Co., Ltd.
Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community,
Fuhai Street, Bao'an District, Shenzhen, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:
FCC-Registration No.: 517856 Designation Number: CN1318

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6534.01
Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.
The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen CTA Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.
Hereafter the best measurement capability for Shenzhen CTA Testing Technology Co., Ltd. :

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MHz	3.02 dB	(1)
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)
Output Peak power	30MHz~18GHz	0.55 dB	(1)
Power spectral density	/	0.57 dB	(1)
Spectrum bandwidth	/	1.1%	(1)
Radiated spurious emission (30MHz-1GHz)	30~1000MHz	4.10 dB	(1)
Radiated spurious emission (1GHz-18GHz)	1~18GHz	4.32 dB	(1)
Radiated spurious emission (18GHz-40GHz)	18-40GHz	5.54 dB	(1)

4 Test limit

4.1 Requirement

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 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

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 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

4.2 MPE Calculation Method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

$S=PG/4\pi R^2$
Where: S=power density
P=power input to antenna
G=power gain of the antenna in the direction of interest relative to an isotropic radiator
R=distance to the center of radiation of the antenna

4.3 Conducted Power Results

Type	Channel	Output power (dBm)
GFSK 1Mbps	00	-2.20
	19	-2.84
	39	-3.10

Type	Channel	Output power (dBm)
GFSK	00	1.06
	39	0.46
	78	0.28
π/4DQPSK	00	0.28
	39	-0.32
	78	-0.45
8DPSK	00	0.27
	39	-0.29
	78	-0.43

NFC:
13.56MHz: 90.33dBuV/m@ 3m
@20cm=@3m+40*log(3/0.2)=137.37dBuV/m
For 13.56MHz: 137.37dBuV/m=7.391V/m< 60.77 V/m.

4.4 Manufacturing tolerance

Mode	Max. Peak Conducted Output Power (dBm)	Max. tune-up
BT	1.06	1.0±1
Mode	Max. Peak Conducted Output Power (dBm)	Max. tune-up
BLE	-2.20	-2.0±1

4.5 Standalone MPE Result

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, r =20cm, as well as the gain of the used antenna is refer to section 2.2, the RF power density can be obtained.

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm^2)	MPE Limits (mW/cm^2)
	dBm	mW				
BT	2.0	1.5849	0.95	1.2445	0.0004	1.0000
BLE	-1.0	0.7943	0.95	1.2445	0.0002	1.0000

Remark:
1. Output power (Peak) including turn-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer.
3. *The sample support one BLE modular and NFC modular, they supports difference antenna, support simultaneous transmission;*

4.6 Simultaneous Transmission for MPE Result

BT MPE (Ratio)	NFC MPE (Ratio)	simultaneous MPE (Ratio)	MPE Limits (Ratio)
0.0004	0.1216	0.122	1.0000

5 Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device Threshold per KDB 447498 D01v06

********** End of Report **********