


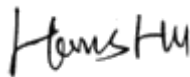


MPE TEST REPORT

Report No. : **CHTEW2202001101** Report verification: 
 Project No. : **SHT2112110001EW**
 FCC ID..... : **2AE6C-EM8100U1**
 Applicant's name : **Shenzhen Excera Technology Co., Ltd.**
 Address..... : Room 201C, Block C, HUAHAN Innovation Park, No.16
 Langshan Road, Nanshan District, Shenzhen, P.R.C.
 Test item description : **Digital Mobile Radio**
 Trade Mark : EXCERA
 Model/Type reference..... : EM8100 U1
 Listed Model(s) : -
 Standard : **FCC CFR Title 47 part 2.1091(b)**
 Date of receipt of test sample..... : Jan.12, 2022
 Date of testing..... : Jan.13, 2022-Feb.10, 2022
 Date of issue..... : Feb.11, 2022
 Result..... : **PASS**

Compiled by (position+printed name+signature)...	File administrators Fanghui Zhu	
Supervised by (position+printed name+signature)...	Project Engineer Cheng Xiao	
Approved by (position+printed name+signature)...	RF Manager Hans Hu	

Testing Laboratory Name : **Shenzhen Huatongwei International Inspection Co., Ltd**
 Address..... : 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road,
 Tianliao, Gongming, Shenzhen, China

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The test report merely corresponds to the test sample.

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1 TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 1.1310](#): Radiofrequency radiation exposure limits.

[FCC Rules Part 1.1307](#): Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

[FCC Rules Part 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices.

[KDB447498 v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

[IEEE Std C95.1: 2005](#): "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz".

[FCC OET Bulletin 65, Edition 97-01](#): "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields".

[FCC Supplement C to OET Bulletin 65, Edition 01-01](#): "Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emission".

[IEEE Std C95.3: 2002](#): "IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields with Respect to Human Exposure to Such Fields, 100 kHz – 300 GHz",

1.2. Report revised information

Revised No.	Date of issued	Description
N/A	2022-02-11	Original

2 SUMMARY

2.1 Client Information

Applicant:	Shenzhen Excera Technology Co., Ltd.
Address:	Room 201C, Block C, HUAHAN Innovation Park, No.16 Langshan Road, Nanshan District, Shenzhen, P.R.C.
Manufacturer:	Shenzhen Excera Technology Co., Ltd.
Address:	Room 201C, Block C, HUAHAN Innovation Park, No.16 Langshan Road, Nanshan District, Shenzhen, P.R.C.
Factory:	Shenzhen Excera Technology Co., Ltd.
Address:	Room 201C, Block C, HUAHAN Innovation Park, No.16 Langshan Road, Nanshan District, Shenzhen, P.R.C.

2.2 Product Description

Name of EUT:	Digital Mobile Radio
Trade Mark:	EXCERA
Model No.:	EM8100 U1
Listed Model(s):	-
Power supply:	DC13.6V
Hardware version:	EM8100-P
Software version:	EXCERA OneKeyUpdate 1.4.01.15D

2.3 Radio Specification Description

Support Frequency Range:	400MHz~470MHz
	400MHz~406MHz, 406.1MHz~470MHz
Modulation Type:	<input checked="" type="checkbox"/> Analog <input checked="" type="checkbox"/> Digital
Emission Designator: *1	Analog: 11K0F3E
	Digital: 7K60FXW, 7K60FXD
Antenna Type:	External Antenna
Antenna Gain:	0dBi

Bluetooth version:	V4.0
Support function ² :	EDR
Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	Intenal Antenna
Antenna gain:	0dBi

Bluetooth version:	V4.0
Support function ^{*2} :	BLE
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	Intenal Antenna
Antenna gain:	0dBi

2.4 Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Connect information:	Tel: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn	
Qualifications	Type	Accreditation Number
	FCC	762235

3 TEST CONFIGURATION

3.1 Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?					
✓ No					
Item	Equipement	Trade Name	Model No.	FCC ID	Power cord
1					
2					

3.2 Equipment Used during the Test

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.
Field Probe	ETS-LINDGREN	HI-6005	00064170	2022/11/12
Field Meter	AR	FM 5004	300239	2022/11/12

3.3 Applicable Standard

According to FCC Part 1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to FCC Part 1.1310 and FCC Part 2.1091 RF exposure is calculated.

IEEE Std C95.1: 2005: "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz".

FCC OET Bulletin 65, Edition 97-01: "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields".

FCC Supplement C to OET Bulletin 65, Edition 01-01: "Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emission".

IEEE Std C95.3: 2002: "IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields with Respect to Human Exposure to Such Fields, 100 kHz – 300 GHz",

4 TEST CONDITIONS AND RESULTS

4.1. Limit

FCC Part 1.1310(e):

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 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
300-1,500			f/300	6
1,500-100,000			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
300-1,500			f/1500	30
1,500-100,000			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

Type	Test Frequency (MHz)	Max. Output Power (dBm)	Max Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Numeric)	Power Density Limit (mW/cm ²)	Safety Distance(cm)
PMR	438.0125	46.70	46770	0	1	1.46	50.50
BLE	2440	7.23	5.28	0	1	1	0.75
EDR	2441	7.26	5.32	0	1	1	0.75

Consider the BT and PMR can transmitting simultaneously, The customer's declared Safety Distance(cm) is 70cm,the total transmitting MPE rate as below formula:

$$\text{MPE rate} = \text{Power density of BT-EDR/limit} + \text{Power density of PMR/limit} < 1$$

The worst case is BT-EDR and PMR transmitting simultaneously, the result as below:

Evaluation mode	Power density/limit	Sum of the MPE rate	limit
BT-EDR	0.001	0.522	1
PMR	0.521		

Note: If the antenna gain is 0 dBi.

4.3. Measurement Procedure

1. Polarization of the EUT's antenna was vertical, which is its polarization in actual use.
2. The EUT at the chosen modulation was set to transmit at the chosen frequency at maximum RF power and at 50% duty cycle (50% duty cycle is simulated either by lowering the radio's power by 3dB or by using a 3 dB pad on the output of the radio). During preliminary measurements, we set the distance between the power density probe and the investigated EUT's antenna equal to the average calculated R_{safe} applicable either for controlled or uncontrolled environments.
3. Power density measurements were taken at different heights of the probe from the ground (0.1 to 2 meters) while rotating versus azimuth (from 0° to 360°) the antenna.
4. The azimuth between the probe and the antenna position corresponding to the highest MPE level was chosen as the "worst case" position for the final measurements.
5. For the final measurements, we adjusted the distance between the test probe and the tested antenna to the real safe distance, R_{real} , such that the measured highest power density in the "worst case" position was the same or slightly less than the test limit.
6. The measurement results of final measurements conducted at the chosen azimuth and different heights of the probe above the ground.
7. Average values of power density were calculated for the imaginary whole human body (0.1–2.0 m), for the lower part of the body (0.1–0.9 m) and for the upper part of the body (1.0–2.0 m).

4.4. Test Results

EME Data:

Measuring Antenna Height (cm)	FCC Part 2.1091		
	Controlled RF Exposure(mW/cm ²)		
	0dBi Antenna 50.50cm	0dBi Antenna 60.50cm	0dBi Antenna 70.50cm
10	0.13	0.10	0.16
20	0.12	0.12	0.14
30	0.16	0.11	0.18
40	0.29	0.28	0.28
50	0.25	0.22	0.22
60	0.22	0.25	0.25
70	0.25	0.27	0.26
80	0.20	0.23	0.23
90	0.19	0.14	0.18
100	0.18	0.13	0.11
110	0.16	0.13	0.14
120	0.14	0.14	0.12
130	0.13	0.12	0.13
140	0.12	0.17	0.14
150	0.11	0.13	0.16
160	0.10	0.18	0.13
170	0.11	0.13	0.17
180	0.02	0.06	0.03
190	0.05	0.04	0.07
200	0.03	0.03	0.05

EME for Body Parts:

Part of the body/averaging points(m)	FCC Part 2.1091	
	Controlled RF Exposure	
	0dBi Antenna 50.50cm (mW/cm ²)	
Whole body (0.1 to 2.0)	0.28	
Lower body (0.1 to 0.9)	0.27	
Upper body (1.0 to 2.0)	0.20	

4.5. Conclusion

The User Manual shall include RF radiation safety warnings:

The antenna of this device must be installed on the roof or trunk of the vehicle. If the gain of the used antenna is 0dBi, the minimum mobile separation distance $R_{safe} = 70.00\text{cm}$.

5 TEST SETUP PHOTOS OF THE EUT



6 EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Reference to the test report No.: CHTEW22020009

-----End of Report-----