



MPE TEST REPORT

Report Reference No..... : TRE1605015202 R/C.....:31880
FCC ID..... : 2AE6CER9000U1
Applicant's name..... : Shenzhen Excera Technology Co., Ltd.
Address..... : 3rd Floor, Jiada R&D Building, No.5 Songpingshan Road , Hi-Tech Park North, Nanshan District , Shenzhen, China
Manufacturer..... : Shenzhen Excera Technology Co., Ltd.
Address..... : 3rd Floor, Jiada R&D Building, No.5 Songpingshan Road , Hi-Tech Park North, Nanshan District , Shenzhen, China
Test item description : Digital Repeater
Trade Mark : EXCERA
Model/Type reference..... : ER9000 U1
Listed Model(s) : -
Standard : FCC Per 47 CFR 2.1091(b); KDB447498 v05r02
Date of receipt of test sample..... : May 26, 2016
Date of testing..... : May 27, 2016 – June 24, 2016
Date of issue..... : June 24, 2016
Result..... : PASS

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The test report merely corresponds to the test sample.

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1. SUMMARY

1.1. Client Information

Applicant:	Shenzhen Excera Technology Co., Ltd.
Address:	3rd Floor, Jiada R&D Building, No.5 Songpingshan Road , Hi-Tech Park North, Nanshan District , Shenzhen
Manufacturer:	Shenzhen Excera Technology Co., Ltd.
Address:	3rd Floor, Jiada R&D Building, No.5 Songpingshan Road , Hi-Tech Park North, Nanshan District , Shenzhen

1.2. Product Description

Name of EUT:	Digital Repeater	
Trade mark:	EXCERA	
Model/Type reference:	ER9000 U1	
Listed mode(s):	-	
Power supply:	DC 13.6V, AC 120V/60Hz	
Battery information:	-	
Charger information:	-	
Adapter information:	-	
Operation Frequency Range:	From 400MHz to 470 MHz	
Rated Output Power:	High Power: 47 W (46.72dBm)/Low Power: 5W (36.98dBm)	
Modulation Type:	Analog Voice:	FM
	Digital Voice /Digital Data:	4FSK
Digital Type:	DMR	
Channel Separation:	Analog Voice:	<input checked="" type="checkbox"/> 12.5kHz
	Digital Voice /Digital Data:	<input checked="" type="checkbox"/> 12.5kHz <input type="checkbox"/> 6.25kHz
Emission Designator:	Analog Voice:	<input checked="" type="checkbox"/> 12.5kHz Channel Separation: 8K17F3E <input type="checkbox"/> 25kHz Channel Separation: ---
	Digital Voice& Data:	<input checked="" type="checkbox"/> 12.5kHz Channel Separation: 9K52FXW <input type="checkbox"/> 6.25kHz Channel Separation: ---
	Digital Data:	<input checked="" type="checkbox"/> 12.5kHz Channel Separation: 9K52FXD <input type="checkbox"/> 6.25kHz Channel Separation: ---
Support data rate:	9.6kbps	
Antenna Type:	External	
Maximum Transmitter Power:	Digital	48.87W for 12.5kHz Channel Separation
	Analog	48.42W for 12.5kHz Channel Separation

Note: The product has the same digital working characters when operating in both two digitized voice/data mode. So only one set of test results for digital modulation modes are provided in this test report.

1.3. Test frequency list

Mode	Modulation	Operation Frequency Range	Test Frequency (MHz)	
Digital	4FSK	406.1MHz~420MHz	CH _L	406.1125
			CH _M	413.0500
			CH _H	419.9875
		421MHz~470MHz	CH _L	421.0125
			CH _M	445.0000
			CH _H	469.9875
Analog	FM	406.1MHz~420MHz	CH _L	406.1125
			CH _M	413.0500
			CH _H	419.9875
		421MHz~470MHz	CH _L	421.0125
			CH _M	445.0000
			CH _H	469.9875

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above listed frequency for testing.

1.4. EUT operation mode

Test mode	Transmitting	Power level	Digital	Analog
		High	12.5kHz	12.5kHz
TX1	√	√	√	
TX2	√	√		√

√: is operation mode.

1.5. EUT configuration

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

● - supplied by the manufacturer

○ - supplied by the lab

●	Power Cable	Length (m) :	3.00
		Shield :	Unshielded
		Detachable :	Undetachable
○	Multimeter	Manufacturer :	/
		Model No. :	/

1.6. Modifications

No modifications were implemented to meet testing criteria.

2. TEST ENVIRONMENT

2.1. Address of the test laboratory

1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

2.2. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

2.3. 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 Huatongwei International Inspection 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 Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

3. Method of measurement

3.1. Applicable Standard

According to §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 §1.1310 and §2.1091 RF exposure is calculated.

KDB447498 v05r02:Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

3.2. Limit

FCC Part 2.1091:

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

F=frequency in MHz

*=Plane-wave equivalent power density

3.3. 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

As declared by the Applicant, the EUT transmits with the maximum source-based Duty Cycle of 100%-see the User manual, and the EUT is a wireless device used in a mobile application, at least 380cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum mobile separation distance, $r=380\text{cm}$, as well as the gain of the used antenna is 6.5dBi, the RF power density can be obtained.

TEST RESULTS

FCC Part 2.1091:
DC 13.6V

TX1										
Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (1) (dBm)	Output Power (2) (W)	Output Power (3) (dBm)	Output Power (4) (W)	Output Power (5) (mW)	Antenna Gain (Numeric)	Power Density At 380cm (mW/cm ²)	Power Density Limit FCC (mW/cm ²)	Test Results
406.1125	380	46.56	45.34	47.56	57.08	57078	4.4668	0.1406	1.3537	PASS
413.05	380	46.67	46.50	47.67	58.55	58546	4.4668	0.1442	1.3768	
419.9875	380	46.79	47.70	47.79	60.05	60051	4.4668	0.1479	1.4000	
421.0125	380	46.85	48.42	47.85	60.95	60954	4.4668	0.1501	1.4034	
445	380	46.76	47.37	47.76	59.64	59637	4.4668	0.1469	1.4833	
469.9875	380	46.66	46.40	47.66	58.41	58411	4.4668	0.1439	1.5666	

TX2										
Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (1) (dBm)	Output Power (2) (W)	Output Power (3) (dBm)	Output Power (4) (W)	Output Power (5) (mW)	Antenna Gain (Numeric)	Power Density At 380cm (mW/cm ²)	Power Density Limit FCC (mW/cm ²)	Test Results
406.1125	380	46.48	44.51	47.48	56.03	56034	4.4668	0.1380	1.3537	PASS
413.05	380	46.84	48.26	47.84	60.75	60753	4.4668	0.1496	1.3768	
419.9875	380	46.65	46.29	47.65	58.28	58276	4.4668	0.1435	1.4000	
421.0125	380	46.50	44.72	47.50	56.29	56293	4.4668	0.1386	1.4034	
445	380	46.32	42.90	47.32	54.00	54002	4.4668	0.1330	1.4833	
469.9875	380	46.66	46.40	47.66	58.41	58411	4.4668	0.1439	1.5666	

Note: Output Power(1)=Measured power,

Output Power(2)= $(10^{(\text{Output Power}(1)/10)}) / 1000$

Output Power(3)=Output Power(1)+Tolerance, Tolerance=1dB

Output Power(4)= $(10^{(\text{Output Power}(3)/10)}) / 1000$

Output Power(5)= Output Power(2)* (Output Power(4)/Output Power(2))

AC 120V:

TX1										
Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (1) (dBm)	Output Power (2) (W)	Output Power (3) (dBm)	Output Power (4) (W)	Output Power (5) (mW)	Antenna Gain (Numeric)	Power Density At 380cm (mW/cm ²)	Power Density Limit FCC (mW/cm ²)	Test Results
406.1125	380	46.45	44.16	47.45	55.59	55590	4.4668	0.1369	1.3537	PASS
413.05	380	46.56	45.29	47.56	57.02	57016	4.4668	0.1404	1.3768	
419.9875	380	46.67	46.45	47.67	58.48	58479	4.4668	0.1440	1.4000	
421.0125	380	46.89	48.87	47.89	61.52	61518	4.4668	0.1515	1.4034	
445	380	46.64	46.13	47.64	58.08	58076	4.4668	0.1430	1.4833	
469.9875	380	46.55	45.19	47.55	56.89	56885	4.4668	0.1401	1.5666	

TX2										
Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (1) (dBm)	Output Power (2) (W)	Output Power (3) (dBm)	Output Power (4) (W)	Output Power (5) (mW)	Antenna Gain (Numeric)	Power Density At 380cm (mW/cm ²)	Power Density Limit FCC (mW/cm ²)	Test Results
406.1125	380	46.37	43.35	47.37	54.58	54576	4.4668	0.1344	1.3537	PASS
413.05	380	46.85	48.42	47.85	60.95	60954	4.4668	0.1501	1.3768	
419.9875	380	46.54	45.08	47.54	56.75	56754	4.4668	0.1398	1.4000	
421.0125	380	46.39	43.55	47.39	54.83	54828	4.4668	0.1350	1.4034	
445	380	46.21	41.78	47.21	52.60	52602	4.4668	0.1296	1.4833	
469.9875	380	46.55	45.19	47.55	56.89	56885	4.4668	0.1401	1.5666	

Note: Output Power(1)=Measured power,

Output Power(2)= $(10^{(\text{Output Power}(1)/10)}) / 1000$

Output Power(3)=Output Power(1)+Tolerance, Tolerance=1dB

Output Power(4)= $(10^{(\text{Output Power}(3)/10)}) / 1000$

Output Power(5)= Output Power(2)* (Output Power(4)/Output Power(2))

4. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the controlled RF Exposure.

.....End of Report.....