

RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2305000484AT
Applicant: SZJJ COMMUNICATION TECHNOLOGY CO., LIMITED
Address of Applicant: 0488, 306 Room, 3rd FL Guangshen Building No.2023, Shennan East Road, Xinnan Community Nanhu Street Luohu, Shenzhen, Guangdong, China
Manufacturer: SZJJ COMMUNICATION TECHNOLOGY CO., LIMITED
Address of Manufacturer: 0488, 306 Room, 3rd FL Guangshen Building No.2023, Shennan East Road, Xinnan Community Nanhu Street Luohu, Shenzhen, Guangdong, China
Factory: SZJJ COMMUNICATION TECHNOLOGY CO., LIMITED
Address of Factory: 0488, 306 Room, 3rd FL Guangshen Building No.2023, Shennan East Road, Xinnan Community Nanhu Street Luohu, Shenzhen, Guangdong, China
Equipment Under Test (EUT):
EUT Name: Signal Booster
Model No.: NST-A17-LCPA
Standard(s) : 47 CFR Part 2.1091
47 CFR Part 1.1310, Part 1.1307
Date of Receipt: 2023-05-09
Date of Evaluation: 2023-07-20
Date of Issue: 2023-07-20

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.





Ricky Liu
Manager



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Revision Record			
Version	Chapter	Date	Modifier Remark
01	GZCR230500048403	2023-07-20	Original

Authorized for issue by:			
			
	Kevin Zhang /Project Engineer		
			
	Jerry Chan /Reviewer		



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2 Evaluation Summary

Radio Spectrum Technical Requirement				
Item	Standard	Requirement	Method	Result
RF Exposure	47 CFR Part 2.1091 47 CFR Part 1.1310 47 CFR Part 1.1307	47 CFR Part 1.1310	47 CFR Part 1.1310	PASS



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4 General Information

4.1 Details of EUT

Power Supply:	AC 100-240V, 50/60Hz by AC/DC adapter		
	MODEL: JY-9V3A		
	INPUT: 100-240V, 50/60Hz		
	OUTPUT: 9.0V--3.0A		
Cable:	DC output cable (unshielded, 1m)		
Operating Temperature:	-25 to +55 °C		
	Lower 700MHz	Uplink:	698MHz to 716MHz
		Downlink:	728MHz to 746MHz
	Upper 700MHz	Uplink:	777MHz to 787MHz
		Downlink:	746MHz to 756MHz
	Cellular	Uplink:	824MHz to 849MHz
		Downlink:	869MHz to 894MHz
	AWS-1	Uplink:	1710MHz to 1755MHz
		Downlink:	2110MHz to 2155MHz
	Broadband PCS	Uplink:	1850MHz to 1915MHz
		Downlink:	1930MHz to 1995MHz
Technology:	GSM, WCDMA, LTE		
Interface:	RF Port:	2 (N-F)	
	Power Jack:	1	
Max. Output Power:	Uplink:	17~20.5dBm	
(Conducted)	Downlink:	8dBm	
Max. Gain:	Uplink:	63dB	
	Downlink:	63dB for Lower 700MHz, Upper 700, Cellular 71dB for AWS-1, Broadband PCS	
Antenna Type:	External Dedicated Antenna		
Permission Antenna Gain:	10dBi or less		
Software Version:	NTS_A17_V1.1.00		
Booster type	Fixed Consumer Signal Booster		



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4.2 Evaluated Location

All evaluation were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.4 Deviation from Standards

None

4.5 Abnormalities from Standard Conditions

None



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5 Radio Spectrum Technical Requirement

5.1 RF Exposure

5.1.1 Requirement

In accordance with 47 CFR FCC Part 2.1091, this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

According to 47 CFR FCC Part 1310, the criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in Part1.1307(b).

TABLE 1 TO §1.1310(E)(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)
(i) Limits for Occupational/Controlled Exposure				
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
(ii) 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



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5.1.2 Method

According to IEEE C95.3:2002 section 5.5.1.1, the power density S at a point on the axis at a distance d from a transmitting antenna is given by the Friis free-space transmission formula:

$$S = \frac{PG}{4\pi d^2}$$

S = power density (mW/cm²)
P = the net power delivered to the antenna (mW)
G = gain of the antenna in linear scale
d = distance between observation point and center of the radiator (cm)

From the maximum EUT RF output power, as well as the gain of the used antenna, according to the RF power density limit stated in above table, the minimum distance between the antenna and human body will be calculated.

5.1.3 Conclusion

Normal use condition for Distance between antenna and body: >=50cm declared by the manufacturer, the worst case 20cm used for exposure calculation.

Antenna Gain: 10 dBi or less, the worst case 10dBi used for exposure calculation.

RF exposure evaluation for UL and DL simultaneous emission: Product manual request the min cable length for both connect donor antenna to booster and server antenna to booster is 5 meters, So the exposure evaluation only the UL and DL single transmission be concerned in this report even if the product UL and DL simultaneous emission during operation.

For DL

Band	Max. Antenna Gain (Numeric)	Max. tune up tolerance power (dBm)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Result
700MHz	10	8	0.0021	0.4853	Complies
Cellular	10	8	0.0021	0.5793	Complies
AWS-1	10	8	0.0021	1	Complies
Broadband PCS	10	8	0.0021	1	Complies

Remark:
 For 700MHz band, the limit is $f/1500 = 728/1500 = 0.4853 \text{ mW/cm}^2$ for the stringent limit.
 For Cellular band, the limit is $f/1500 = 869/1500 = 0.57933 \text{ mW/cm}^2$ for the stringent limit.



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For UL

Band	Max. Antenna Gain (Numeric)	Max. tune up tolerance power (dBm)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Result
Lower 700MHz	10	20.5	0.03574	0.4653	Complies
Upper 700MHz	10	20.5	0.03574	0.518	Complies
Cellular	10	20.5	0.03574	0.5493	Complies
AWS-1	10	20.5	0.03574	1	Complies
Broadband PCS	10	20.5	0.03574	1	Complies

Remark:
 For Lower 700MHz band, the limit is $f/1500 = 698/1500 = 0.4653 \text{ mW/cm}^2$ for the stringent limit.
 For Lower 700MHz band, the limit is $f/1500 = 777/1500 = 0.518 \text{ mW/cm}^2$ for the stringent limit.
 For Cellular band, the limit is $f/1500 = 824/1500 = 0.5493 \text{ mW/cm}^2$ for the stringent limit.

For uplink, all bands can simultaneous transmitting, the maximum rate of MPE is
 $(0.03574/0.4653) + (0.03574/0.518) + (0.03574/0.5493) + (0.03574/1) + (0.03574/1) = 0.29 \leq 1.0$

For downlink, all bands can simultaneous transmitting, the maximum rate of MPE is
 $(0.0021/0.4853) + (0.0021/0.5793) + (0.0021/1) + (0.0021/1) = 0.013 \leq 1.0$

So SAR report is not required.

Remark:

The donor antenna and service antenna must maintain sufficient distance to ensure isolation, otherwise the EUT will be shut down due to oscillation.
 Therefore, the exposure evaluation only the UL and DL single transmission was concerned in this report even if the product UL and DL simultaneous emission during operation.

5.2 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Photos for GZCR2305000484AT.

- End of the Report -



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