

RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2403000254AT
Applicant: Corning Optical Communication LLC
Address of Applicant: 840 N McCarthy Blvd Milpitas, CA 95035
Manufacturer: Comba Network Systems Company Limited
Address of Manufacturer: No. 10 Shenzhou Road, Guangzhou Science City, Guangzhou 510663, Guangdong, P.R. China
Product Name: HRU Digital High Power Amplifier Module supporting 3.5G
Model No.: dHRU-G2-35
Trade Mark: Corning
Standard(s) : 47 CFR Part 2.1091
47 CFR Part 1.1310, Part 1.1307
Date of Receipt: 2024-03-14
Date of Evaluation: 2024-04-12
Date of Issue: 2024-05-07

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



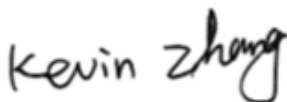

Ricky Liu
Manager



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Revision Record			
Version	Report No.	Date	Remark
01	GZCR240300025404	2024-05-07	Original

Authorized for issue by:			
			
		<hr/> Kevin Zhang/Project Engineer	
			
		<hr/> 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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3 Contents

	Page
1 Covers Page	1
2 Evaluation Summary	3
3 Contents	4
4 General Information.....	5
4.1 Details of E.U.T.....	5
4.2 Evaluated Location	6
4.3 Test Facility	6
4.4 Deviation from Standards	6
4.5 Abnormalities from Standard Conditions	6
5 Radio Spectrum Technical Requirement.....	7
5.1 RF Exposure	7
5.1.1 Requirement	7
5.1.2 Method	8
5.1.3 Conclusion	8
5.2 EUT Constructional Details (EUT Photos).....	9



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4 General Information

4.1 Details of E.U.T.

Power Supply:	AC 100-240V, 50/60Hz	
Test Voltage:	AC 110V	
Cable:	AC mains (4m, unshielded)	
Operating Temperature:	-40 to +55 °C	
Operating Humidity:	≤95%	
Frequency Range:	3.45GHz Service band	Uplink: 3450-3550MHz Downlink: 3450-3550MHz
	3.7GHz Service band	Uplink: 3700-3980MHz Downlink: 3700-3980MHz
Support Technology:	LTE 5G NR	
Support Channel BW:	LTE	5MHz/10MHz/20MHz
	5G NR	10MHz/20MHz/40MHz/50MHz/60MHz/80MHz/100MHz
Interface:	Antenna Port	4 (4.3-10 Female)
	CPRI Port	2 (SFP+)
	OMT Port	1 (RJ-45)
Normal Output Power: (per antenna port)	46dBm (only downlink)	
Normal System Gain:	23dB (only downlink)	
EUT MIMO property:	2×2 MIMO	
Antenna Type:	External Dedicated Antenna	
Permission Antenna Gain:	5dBi or less	
Software Version:	V01.00.00.04	
Remark:	The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.	



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4.2 Evaluated Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou,
Guangdong, China 510663

Tel: +86 20 82155555

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



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

For 3.45GHz Service (3450-3550MHz, downlink)

1. According to the the test report GZCR240300025402, the tested maximum conducted power was within the tune up power range (46±1dBm) and the maximum tune up power was utilized as worst case for RF exposure evaluation.
2. The maximum total tune up tolerance power is 47dBm+10lg(2)= 50.02dBm= 100.47W.
3. According to the declaration from the applicant, the permitted maximum antenna gain is 5dBi and the direction gain = G_{ANT}+10lg(N_{ANT}) dBi = 8dBi.

Maximum Antenna Gain (Numeric)	Max. total tune up tolerance power (W)	Limit of Power Density (S _{limit1}) (W/m ²)	Power Density (S ₁) (W/m ²)
6.310	100.47	10	50.5/d ²

For 3.7GHz Service (3700-3980MHz, downlink)

1. According to the the test report GZCR240300025403, the tested maximum conducted power was within the tune up power range (46±1dBm) and the maximum tune up power was utilized as worst case for RF exposure evaluation.
2. The maximum total tune up tolerance power is 47dBm+10lg(2)= 50.02dBm= 100.47W.
3. According to the declaration from the applicant, the permitted maximum antenna gain is 5dBi and the direction gain = G_{ANT}+10lg(N_{ANT}) dBi = 8dBi.

Maximum Antenna Gain (Numeric)	Max. total tune up tolerance power (W)	Limit of Power Density (S _{limit2}) (W/m ²)	Power Density (S ₂) (W/m ²)
6.310	100.47	10	50.5/d ²

For multiple simultaneous transmission sources, the calculated Power Density should comply with:

$$(S_1/S_{limit1}) + (S_2/S_{limit2}) \leq 1$$

$$(5.05/d^2) + (5.05/d^2) \leq 1$$

$$d \geq 3.2$$

So the permitted use distance away from EUT external antenna is larger than 3.2m.



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5.2 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Photos for GZCR2403000254AT.

- End of the Report -



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