

RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2207000916AT
Applicant: Corning Optical Communication LLC
Address of Applicant: 6 Concord Road, Shrewsbury, MA 01545 United States
Manufacturer: Comba Network System Company Limited
Address of Manufacturer: No.10 Shenzhou Road, Guangzhou Science City, Guangzhou, Guangdong
Factory: Comba Telecom Technology (Guangzhou) Ltd.
Address of Factory: No.6 Jinbi Road, Economics and Technology Development District, Guangdong, China

Equipment Under Test (EUT):

EUT Name: Digital Low-power Remote Unit High Band Supporting 3.5G
Model No.: dLRU-G2-35
Standard(s) : 47 CFR Part 2.1091
47 CFR Part 1.1310, Part 1.1307
Date of Receipt: 2022-07-15
Date of Evaluation: 2022-08-04
Date of Issue: 2022-08-05

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



Kobe Jian
EMC Laboratory Manager



Revision Record			
Version	Chapter	Date	Modifier Remark
01	GZCR220700091604	2022-08-05	Original

Authorized for issue by:			
	<i>Kevin Zhang</i>		
	Kevin Zhang /Project Engineer		
	<i>Jerry Chan</i>		
	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 E.U.T.

Power Supply:	DC 38-58V
Test Voltage:	DC 48V
Cable:	N/A
Operating Temperature:	-40 to +55 °C
Operating Humidity:	≤95%
Frequency Range:	Uplink: 3450-3550MHz Downlink: 3450-3550MHz Uplink: 3550-3700MHz Downlink: 3550-3700MHz Uplink: 3700-3980MHz Downlink: 3700-3980MHz
Support Technology:	<input type="checkbox"/> GSM <input type="checkbox"/> WCDMA <input checked="" type="checkbox"/> LTE <input checked="" type="checkbox"/> 5G NR
Modulation Type:	PSK/QPSK/QAM/16QAM/64QAM/256QAM
Support Channel Bandwidth:	LTE 10MHz/20MHz 5G NR 10MHz/20MHz/40MHz/60MHz/80MHz/100MHz
Interface:	CPRI Port 2 (SFP+) Antenna Port 2 (4.3-10-Female, ANT1~ANT2) Power Jack 1 Debug Port 1 (RJ45)
Normal Output Power: (only downlink, per antenna port)	3.45GHz Service: Maximum 24dBm CBRS: Maximum 19dBm/10MHz 3.7GHz Service: Maximum 24dBm
Maximum System Gain:	Uplink: 0dB Downlink: 0dB
EUT Configuration:	2T2R (2X2 MIMO, the internal circuit designs and the intend output power for each antenna port are identical, declared by the manufacturer)
Antenna Type:	External Dedicated Antenna
Permission Antenna Gain:	0dBi or less (declared by the manufacturer)
Software Version:	DLRUG2_V01.00.01.23



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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

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4.3 Test Facility

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

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **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.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **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

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

1. According to the the test report GZCR220700091602, the tested maximum conducted power was within the tune up power range (24+1dBm) and the maximum tune up power was utilized as worst case for RF exposure evaluation.
2. According to the declaration from the applicant, the permitted maximum antenna gain is 0dBi and the direction gain = G_{ANT}+10lg*(N_{ANT}) dBi = 3dBi.

Maximum Antenna Gain (Numeric)	Max. total tune up tolerance power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
1.995	630.96	1	10.2

For CBRS (3550-3700MHz, downlink)

1. According to the the test report FYCR220700027701, the tested maximum conducted power was within the tune up power range (24+1dBm) and the maximum tune up power was utilized as worst case for RF exposure evaluation.
2. According to the declaration from the applicant, the permitted maximum antenna gain is 0dBi and the direction gain = G_{ANT}+10lg*(N_{ANT}) dBi = 3dBi.

Maximum Antenna Gain (Numeric)	Max. total tune up tolerance power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
1.995	630.96	1	10.2



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

1. According to the the test report GZCR220700091603, the tested maximum conducted power was within the tune up power range (24+1dBm) and the maximum tune up power was utilized as worst case for RF exposure evaluation.
2. According to the declaration from the applicant, the permitted maximum antenna gain is 0dBi and the direction gain = $G_{ANT} + 10\lg^*(N_{ANT})$ dBi = 3dBi.

Maximum Antenna Gain (Numeric)	Max. total tune up tolerance power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
1.995	630.96	1	10.2

So the recommend use distance away from EUT external antenna is larger than 10.2cm.



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5.2 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for FYCR2207000277AT

- End of the Report -



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