

Test Report

Report No.: E20240509968801-01-4

Customer: Comba Telecom Network Systems Limited

Address: Flat/Rm 10, 3/F, Bio-Informatics Ctr, 2 Science Park West Avenue, HK Science Park, Pak Shek Kok, N.T. Hong Kong

Sample Name: Public Safety DAS

Sample Model: RH78V3-A

Receive Sample Date: May 9, 2024

Test Date: May 14, 2024 ~ May 22, 2024

Reference Document: FCC PART 90§90.223-RF exposure

Test Result: PASS

FCC ID: PX8RH78V3-A

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GRG METROLOGY & TEST(CHENGDU)CO.,LTD.

Issued Date: June 25, 2024



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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20240509968801-01-4	Original Issue	2024-06-07

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1. Applicant information

1.1. Client information

Name: Comba Telecom Network Systems Limited
Address: Flat/Rm 10, 3/F, Bio-Informatics Ctr, 2 Science Park West Avenue, HK Science Park, Pak Shek Kok, N.T. Hong Kong

1.2. Manufacturer and Factory

Manufacture Name: Comba Network Systems Company Limited
Address: No. 10 Shenzhou Road, Guangzhou Science City, Guangzhou 510663, Guangdong, P.R.China
Factory: Comba Telecom Technology (Guangzhou) Ltd.
Address: No. 6 Jinbi Road, Economics and Technology Development District, Guangzhou, Guangdong, China

2. General description of EUT

2.1. Basic description of EUT

Product Name: Public Safety DAS
Product Model: RH78V3-A
Trade Name: Comba
Power Supply: Typical working voltage: AC 110V, 50/60Hz
Power cord: AC power cord
Frequency Band: 700MHz Band:
Downlink: 769MHz ~ 775MHz, Uplink: 799MHz ~ 805MHz
800MHz Band:
Downlink: 851MHz ~ 862MHz, Uplink: 806MHz ~ 817MHz
Nominal Output Power: Downlink: 33 ± 1 dBm
Uplink: 27 ± 1 dBm
Nominal System Gain: Downlink: 90 ± 2 dB
Uplink: 90 ± 2 dB
EUT Operating Temperature: -33°C to $+55^{\circ}\text{C}$
Operating Humidity: 5% to 95%
Antenna Type: N/A^①

NOTE 1: This EUT is a Broadband device, which belongs to Class B signal booster.

NOTE 2: ^① The EUT does not provide antenna by manufacturer's statement, but it is required that the sum of antenna gain and cable loss shall not exceed 3dBi for downlink and 9 dBi for uplink when the project is used by manufacturer's statement.

NOTE 3: According to the customer's requirements, the purpose of this test is to add 1MHz to the original operating frequency range according to FCC rules, which means that the original 800MHz operating frequency range (Downlink: 851MHz~861MHz, Uplink: 806MHz~816MHz) has been changed to (Downlink: 851MHz~862MHz, Uplink: 806MHz ~ 817MHz);

3. Assessment result summary

Item	Assessment Requirement	Assessment Method
RF exposure	FCC PART 90§90.223	FCC PART 1.1307(b) FCC PART 2.1091 FCC PART 2.1093

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4. Laboratory

4.1. Laboratory

The tests & measurements refer to this report were performed by GRG METROLOGY & TEST GROUP CO., LTD.

Testing Certificate Number: 2861.02

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4.2. Accreditations

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA: A2LA(Certificate #2861.02)

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5. Radio frequency radiation exposure

5.1. Applicable Standard

According to the requirements of FCC PART 90 § 90.223, the test method of RF exposure is based on FCC PART 1.1307(b), FCC PART 2.1091 and FCC PART 2.1093, so RF exposure is calculated.

5.2. Limits for Maximum Permissible Exposure (MPE)

The limits are shown in Table 4-1.

Table 4-1 Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Averaging Time E ² , H ² or S (minutes)
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
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

Note: f=frequency in MHz; *=Plane-wave equivalent power density

Prediction of MPE limit at given distance, equations from OET Bulletin 65, Edition 97 - 01:

$$S = (P * G) / (4 * \pi * R^2) \text{ (where PG = EIRP) Where:}$$

S = power density

P= power input to antenna

G= numeric gain of the antenna

R= distance to the center of radiation of the antenna

5.3. Test results

Devices that operate under CFR47 Part 90 are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and limit for power density for general population/uncontrolled exposure is f/1500 W/m². The maximum output power by manufacturer statement is not more than 34dBm for Downlink and 28dBm for Uplink, the sum of antenna gain shall not exceed 3dBi for downlink and 9 dBi for uplink by manufacturer's statement, therefore, in this report, MPE adopts the maximum output power evaluation, so it has the following assessment:

5.3.1. 700MHz Band (769MHz ~ 775MHz, Uplink: 799MHz ~805MHz):

5.3.1.1. Downlink

Prediction frequency (MHz):	769.0
Maximum peak output power at antenna input terminal (dBm):	34.0
Maximum peak output power at antenna input terminal (W):	2.5
Maximum antenna gain (dBi):	3.0
Maximum RF output power (W):	5.0
MPE limit for uncontrolled exposure at predication frequency (W/ m ²): S= f/1500=769/1500	0.51

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{5.0}{0.51 * 4 * 3.14}} \approx 0.88m$$

$$\text{Conversely, when } R > 0.88\text{m, and } S < \frac{PG}{4\pi R^2} = \frac{5.0}{4 \cdot 3.14 \cdot 0.88^2} \approx 0.51 (\text{W/m}^2)$$

5.3.1.2. Uplink

Prediction frequency (MHz):	799.0
Maximum peak output power at antenna input terminal (dBm):	28.0
Maximum peak output power at antenna input terminal (W):	0.63
Maximum antenna gain (dBi):	9.0
Maximum RF output power (W):	5.0
MPE limit for uncontrolled exposure at predication frequency (W/ m ²): S= f/1500=799.0/1500	0.53

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{5.0}{0.53 \cdot 4 \cdot 3.14}} \approx 0.87\text{m}$$

$$\text{Conversely, when } R > 0.87\text{m, and } S < \frac{PG}{4\pi R^2} = \frac{5.0}{4 \cdot 3.14 \cdot 0.87^2} \approx 0.53 (\text{W/m}^2)$$

5.3.2. 800MHz Band (851MHz ~862MHz, Uplink: 806MHz ~ 817MHz):

5.3.2.1. Downlink

Prediction frequency (MHz):	851
Maximum peak output power at antenna input terminal (dBm):	34.0
Maximum peak output power at antenna input terminal (W):	2.5
Maximum antenna gain (dBi):	3.0
Maximum RF output power (W):	5.0
MPE limit for uncontrolled exposure at predication frequency (W/ m ²): S= f/1500=851/1500	0.57

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{5.0}{0.57 \cdot 4 \cdot 3.14}} \approx 0.84\text{m}$$

$$\text{Conversely, when } R > 0.84\text{m, and } S < \frac{PG}{4\pi R^2} = \frac{4.79}{4 \cdot 3.14 \cdot 0.84^2} \approx 0.57 (\text{W/m}^2)$$

5.3.2.2. Uplink

Prediction frequency (MHz):	806
Maximum peak output power at antenna input terminal (dBm):	28.0
Maximum peak output power at antenna input terminal (W):	0.63
Maximum antenna gain (dBi):	9.0
Maximum RF output power (W):	5.0

MPE limit for uncontrolled exposure at predication frequency (W/ m²):
 $S = f/1500 = 806/1500$

0.54

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{5.0}{0.54 \times 4 \times 3.14}} \approx 0.86\text{m}$$

Conversely, when $R > 0.86\text{m}$, and $S < \frac{PG}{4\pi R^2} = \frac{5.0}{4 \times 3.14 \times 0.86^2} \approx 0.54(\text{W/m}^2)$

5.4. Test Results

The above all, when the Maximum antenna gain is 4dBi for downlink and the shortest distance from the human specific is 0.88m, the device is compliant with the requirement MPE limit for uncontrolled exposure.

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Appendix A. Photographs of EUT

A.1 External photos



Top surface



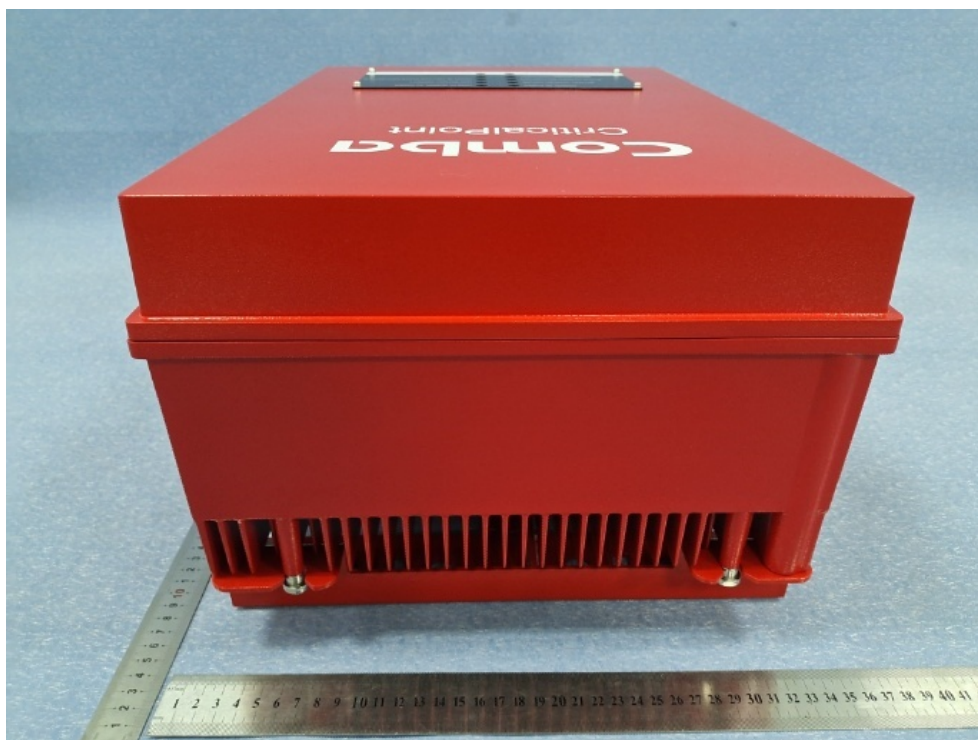
Front surface



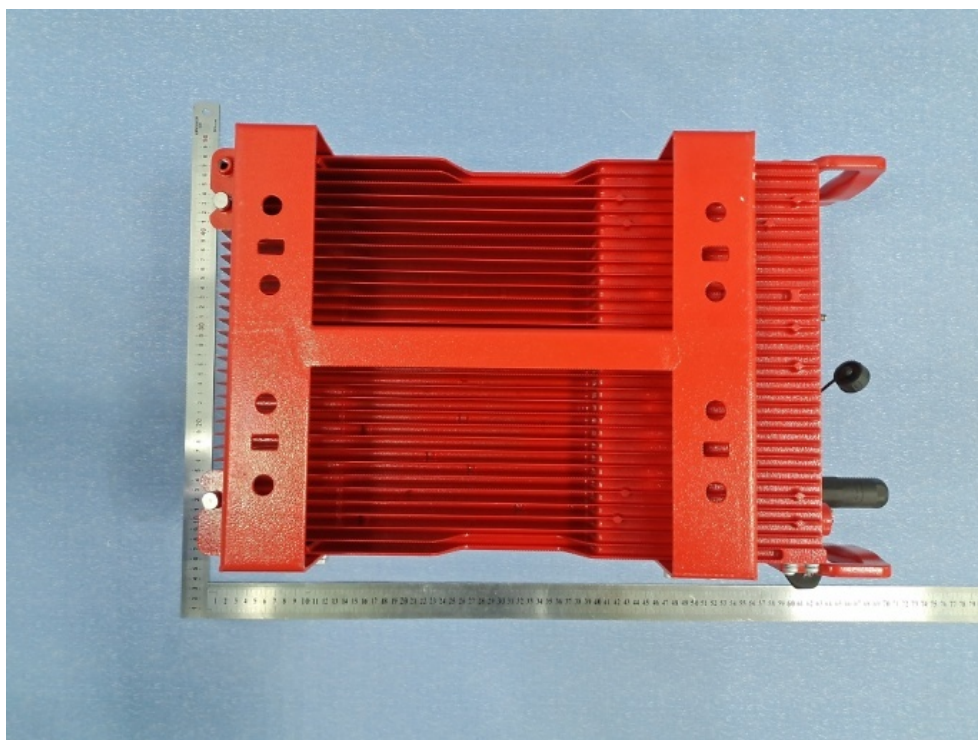
Side surface-1



Side surface-2



Behind surface



Bottom surface

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