



# Test Report

Report No.: E20230509197301-4

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 16, 2023

Test Date: May 17, 2023~ June 4, 2023

Reference Document: FCC PART 90§90.223-RF exposure

Test Result: PASS

FCC ID: PX8RH78V3-A

Prepared by: *Chen Hailing* Reviewed by: *Chen Yuxia* Approved by: *Wang Jui*

GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: June 15, 2023



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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 ~861MHz, Uplink: 806MHz ~ 816MHz  
 Nominal Output Power: Downlink:  $32 \pm 1$ dBm (Center Frequency)  
 Uplink:  $27 \pm 1$ dBm(Center Frequency)  
 Nominal System Gain: Downlink:  $90 \pm 2$ dB(Center Frequency)  
 Uplink:  $90 \pm 2$ dB(Center Frequency)  
 EUT Operating Temperature:  $-40^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$   
 Operating Humidity: 5% to 95%  
 Antenna Type: N/A<sup>①</sup>

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

NOTE 2: <sup>①</sup> 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 4dBi for downlink and 9 dBi for uplink when the project is used by manufacturer's statement.

NOTE 3: Public Safety DAS system consists of Main Unit (MU), Expansion Unit (EU) and Remote Unit (RU), and MU and EU are auxiliary equipment, while RU is the main equipment.

**3. Assessment result summary**

| Item        | Assessment Requirement | Assessment Method  |
|-------------|------------------------|--|
| RF exposure | FCC PART 90§90.223     | FCC PART 1.1307(b)<br>FCC PART 2.1091<br>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 (CHENGDU) CO., LTD.

Testing Certificate Number: 2861.02

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P.C. : 610045

Tel : 028-86496437

Fax : 028-86496437

##### 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 <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes) |
|-----------------------|--------------------------|--------------------------|-----------------------------------|---|
| 0.3-1.34              | 614                      | 1.63                     | (100)*                            | 30  |
| 1.34-30               | 824/f                    | 2.19/f                   | (180/f <sub>2</sub> )*            | 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:

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

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/m<sup>2</sup>. The maximum output power by manufacturer statement is not more than 33dBm for Downlink and 28dBm for Uplink, the sum of antenna gain shall not exceed 4dBi 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:

5.3.1.1. Downlink

|  |      |
|--|------|
| Prediction frequency (MHz):  | 769  |
| Maximum peak output power at antenna input terminal (dBm):                         | 33.0 |
| Maximum peak output power at antenna input terminal (W):                           | 2.0  |
| Maximum antenna gain (dBi):  | 4.0  |
| Maximum RF output power (W):   | 5.0  |
| MPE limit for uncontrolled exposure at predication frequency (W/ m <sup>2</sup> ): | 0.51 |
| S= f/1500=769/1500   |      |

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

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

## 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<sup>2</sup>): 0.53  
 $S = f/1500 = 798.0/1500$

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

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

## 5.3.2. 800MHz Band:

## 5.3.2.1. Downlink

Prediction frequency (MHz): 851

Maximum peak output power at antenna input terminal (dBm): 33.0

Maximum peak output power at antenna input terminal (W): 2.0

Maximum antenna gain (dBi): 4.0

Maximum RF output power (W): 5.0

MPE limit for uncontrolled exposure at predication frequency (W/ m<sup>2</sup>): 0.57  
 $S = f/1500 = 851/1500$

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

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

## 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/ m<sup>2</sup>): 0.54  
 $S = f/1500 = 806/1500$

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

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

#### 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.

## APPENDIX A. PHOTOGRAPHS OF EUT

### A.1 External photos



Top surface



Front surface



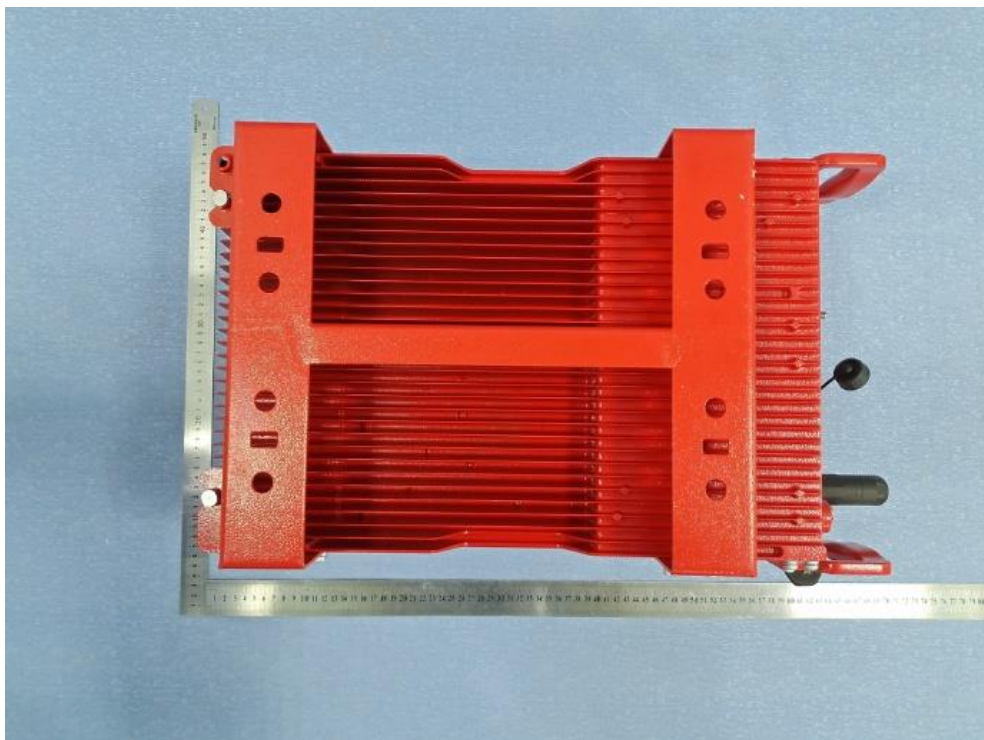
Side surface-1



Side surface-2



Behind surface



Bottom surface

----- End of Report -----