

# FCC RF Test Report

## (WCDMA)

**Report No.:** JYTSZ-R12-2301654

**Applicant:** RuxTek Co., Ltd

**Address of Applicant:** 4F., No. 61, Sanfu St., Shulin Dist., New Taipei City 238035 , Taiwan

### Equipment Under Test (EUT)

**Product Name:** RuxTek 4G Portable Router

**Model No.:** RTM-103

**Trade Mark:** RuxTek

**FCC ID:** 2BDRQRTM-103

**Applicable Standards:** FCC CFR Title 47 Part 2, 22H, 24E, 27L

**Date of Sample Receipt:** 24 Nov., 2023

**Date of Test:** 25 Nov., to 19 Dec., 2023

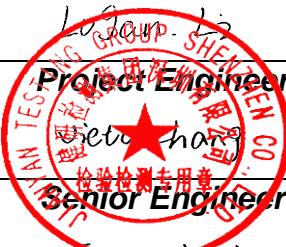
**Date of Report Issued:** 20 Dec., 2023

**Test Result:** PASS

**Tested by:** \_\_\_\_\_ **Date:** 20 Dec., 2023

**Reviewed by:** \_\_\_\_\_ **Date:** 20 Dec., 2023

**Approved by:** \_\_\_\_\_ **Date:** 20 Dec., 2023

  
JianYan Testing Group Shenzhen Co., Ltd.  
Project Engineer  
Senior Engineer

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

## 1 Version

Version No.	Date	Description
00	20 Dec., 2023	<i>Original</i>

## 2 Contents

	Page
<b>Cover Page .....</b>	<b>1</b>
<b>1 Version.....</b>	<b>2</b>
<b>2 Contents.....</b>	<b>3</b>
<b>3 General Information .....</b>	<b>4</b>
3.1 Client Information .....	4
3.2 General Description of E.U.T. ....	4
3.3 Test Mode and Environment .....	5
3.4 Description of Test Auxiliary Equipment .....	5
3.5 Measurement Uncertainty .....	5
3.6 Additions to, Deviations, or Exclusions from the Method.....	5
3.7 Laboratory Facility .....	6
3.8 Laboratory Location.....	6
3.9 Test Instruments List .....	7
<b>4 Measurement Setup and Procedure .....</b>	<b>9</b>
4.1 Test Channel.....	9
4.2 Test Setup .....	10
4.3 Test Procedure.....	11
<b>5 Test Results.....</b>	<b>12</b>
5.1 Summary .....	12
5.1.1 Clause and Data Summary.....	12
5.1.2 Test Limit.....	13
5.2 Field Strength of Spurious Radiation Measurement .....	14

### 3 General Information

#### 3.1 Client Information

Applicant:	RuxTek Co., Ltd
Address:	4F., No. 61, Sanfu St., Shulin Dist., New Taipei City 238035 , Taiwan
Manufacturer:	RuxTek Co., Ltd
Address:	4F., No. 61, Sanfu St., Shulin Dist., New Taipei City 238035 , Taiwan

#### 3.2 General Description of E.U.T.

Product Name:	RuxTek 4G Portable Router		
Model No.:	RTM-103		
Operation Frequency Range:	WCDMA band II:	1852.4 MHz - 1907.6 MHz	
Modulation Type:	<input type="checkbox"/> RMC(QPSK)	<input checked="" type="checkbox"/> HSUPA(QPSK)	<input checked="" type="checkbox"/> HSDPA(QPSK,16QAM)
Antenna Type:	Internal Antenna		
Antenna Gain:	WCDMA band II:	0.2 dBi (declare by Applicant)	
Power Supply:	Rechargeable Li-ion Battery DC3.8V, 2100mAh		
Test Sample Condition:	The test samples were provided in good working order with no visible defects.		

### 3.3 Test Mode and Environment

<b>Test Mode:</b>	
HSDPA mode:	Keep the EUT communication with simulated station in HSDPA mode
HSUPA mode:	Keep the EUT communication with simulated station in HSUPA mode
<b>Remark:</b> The EUT has been tested under continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing. The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for these modes. Just the worst case position (H mode) shown in report.	
<b>Operating Environment:</b>	
Temperature:	Normal: 15°C ~ 35°C, Extreme: -30°C ~ +50°C
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 3.80 Vdc, Extreme: Low 3.23 Vdc, High 4.35 Vdc
Test Engineer:	Logan (Conducted measurement) Kiran (Radiated measurement)

### 3.4 Description of Test Auxiliary Equipment

Test Equipment	Manufacturer	Model No.	Serial No.
Simulated Station	Anritsu	MT8820C	6201026545

### 3.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Radiated Emission (30MHz ~ 200MHz) (3m SAC)	4.6 dB
Radiated Emission (200MHz ~ 1000MHz) (3m SAC)	5.8 dB
Radiated Emission (1GHz ~ 6GHz) (3m SAC)	4.5 dB
Radiated Emission (6GHz ~ 18GHz) (3m SAC)	4.7 dB
Radiated Emission (18GHz ~ 40GHz) (3m SAC)	5.34 dB
Radiated Emission (30MHz ~ 1GHz) (3m FAR)	3.43 dB
Radiated Emission (1GHz ~ 6GHz) (3m FAR)	4.95 dB
Radiated Emission (6GHz ~ 18GHz) (3m FAR)	5.23 dB
Radiated Emission (18GHz ~ 40GHz) (3m FAR)	5.32 dB

**Note:** All the measurement uncertainty value were shown with a coverage  $k=2$  to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

### 3.6 Additions to, Deviations, or Exclusions from the Method

No
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### 3.7 Laboratory Facility

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

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

### 3.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.

Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info-JYTee@lets.com, Website: <http://jyt.lets.com>

### 3.9 Test Instruments List

Radiated Emission(3m SAC):					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	ETS	9m*6m*6m	WXJ001-1	04-14-2021	04-13-2024
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	02-09-2023	02-08-2024
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	02-09-2023	02-08-2024
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	01-10-2023	01-09-2024
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXJ001-3	01-10-2023	01-09-2024
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	01-11-2023	01-10-2024
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	01-10-2023	01-09-2024
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	01-18-2023	01-17-2024
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG001-5	01-18-2023	01-17-2024
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		

Radiated Emission(3m FAR):					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m FAR	YUNYI	9m*6m*6m	WXJ097	06-15-2023	06-14-2028
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ097-2	07-13-2023	07-12-2024
Biconical Antenna	Schwarzbeck	VUBA9117	WXJ002-1	07-02-2021	07-01-2024
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ097-3	07-14-2023	07-13-2024
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-3	01-09-2023	01-08-2024
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-5	01-09-2023	01-08-2024
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-6	01-09-2023	01-08-2024
Pre-amplifier (30MHz ~ 1GHz)	YUNYI	PAM-310N	WXJ097-5	05-14-2023	05-13-2024
Pre-amplifier (1GHz ~ 18GHz)	YUNYI	PAM-118N	WXJ097-6	05-14-2023	05-13-2024
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA-180400G45B	WXJ002-7	01-11-2023	01-10-2024
EMI Test Receiver	Rohde & Schwarz	ESCI3	WXJ003	01-10-2023	01-09-2024
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	01-10-2023	01-09-2024
Spectrum Analyzer	KEYSIGHT	N9010B	WXJ081-1	06-13-2023	06-12-2024
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-13M	WXG097-1	08-01-2023	07-31-2024
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG097-2	08-01-2023	07-31-2024
Coaxial Cable (18GHz ~ 40GHz)	JYTSZ	JYT3M-40G-SS-8M	WXG097-3	08-01-2023	07-31-2024
High Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Low Band Reject Filter Group	Tonscend	JS0806-F	WXJ097-4	N/A	
Test Software	Tonscend	TS+	Version: 5.0.0		

**Conducted Method:**

<b>Test Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Manage No.</b>	<b>Cal. Date (mm-dd-yy)</b>	<b>Cal. Due date (mm-dd-yy)</b>
Spectrum Analyzer	Keysight	N9020A	WXJ094	09-25-2023	09-24-2024
Simulated Station	Rohde & Schwarz	CMW500	WXJ081	06-13-2023	06-12-2024
Temperature Humidity Chamber	ZHONG ZHI	CZ-A-80D	WXJ032-3	01-09-2023	01-08-2025
DC Power Supply	Keysight	E3642A	WXJ025-2	N/A	
RF Control Unit	Tonscend	JS0806-1	WXG010	N/A	
Band Reject Filter Group	Tonscend	JS0806-F	WXG010-1	N/A	
Test Software	Tonscend	TS+	Version: 2.6.9.0526		

## 4 Measurement Setup and Procedure

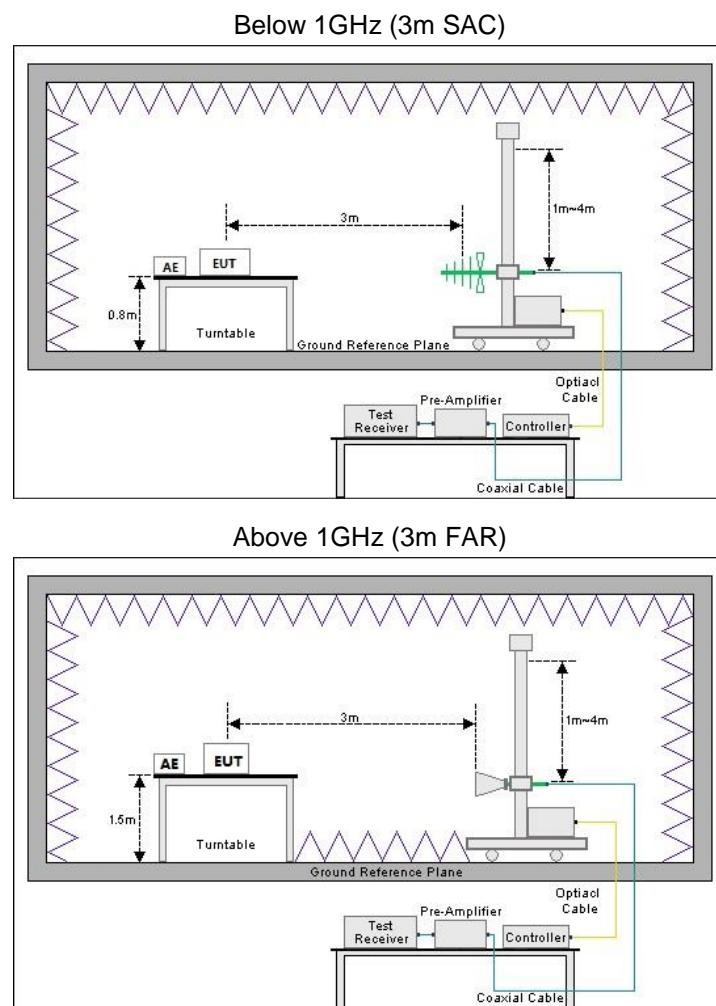
### 4.1 Test Channel

According to ANSI C63.26-2015 chapter 5.1.2.1 Table 2 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:

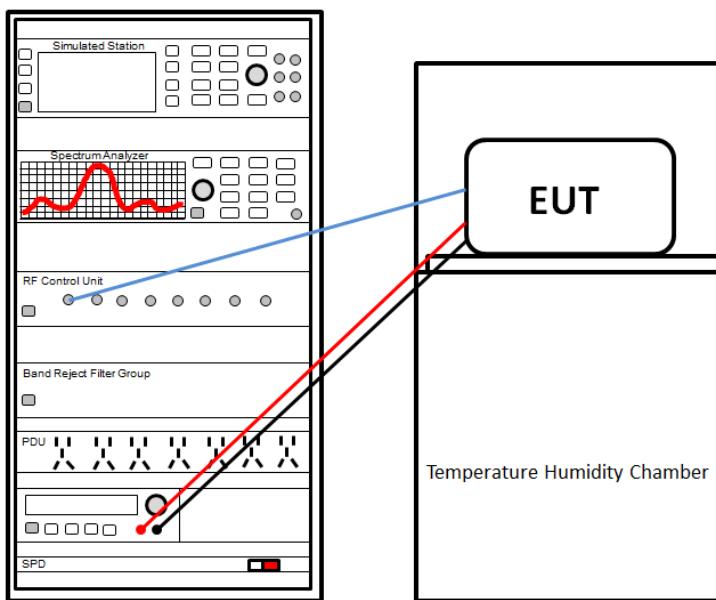
WCDMA band II					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
9262	1852.4	9400	1880.0	9538	1907.6

## 4.2 Test Setup

### 1) Radiated emission measurement:



### 2) Conducted test method



### 4.3 Test Procedure

Test method	Test step
Radiated emission	<p><b>For below 1GHz:</b></p> <ol style="list-style-type: none"> <li>1. The EUT was placed on the table top of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.</li> <li>2. EUT works in each mode of operation that needs to be tested , and having the EUT continuously working, respectively on 3 axis (X, Y &amp; Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.</li> <li>3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.</li> </ol> <p><b>For above 1GHz:</b></p> <ol style="list-style-type: none"> <li>1. The EUT was placed on the table top of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m.</li> <li>2. EUT works in each mode of operation that needs to be tested , and having the EUT continuously working, respectively on 3 axis (X, Y &amp; Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.</li> <li>3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.</li> </ol>
Conducted test method	<ol style="list-style-type: none"> <li>1. The WCDMA antenna port of EUT was connected to the test port of the test system through an RF cable.</li> <li>2. The EUT is keeping in continuous transmission mode and tested in all modulation modes.</li> <li>3. Open the test software, prepare a test plan, and control the system through the software. After the test is completed, the test report is exported through the test software.</li> </ol>

## 5 Test Results

### 5.1 Summary

#### 5.1.1 Clause and Data Summary

Test items	Standard clause	Test data	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	See SAR Report	Pass
RF Output Power	Part 2.1046 Part 22.913 (a)(5) Part 24.232 (c) Part 27.50 (d)(4)	Appendix – WCDMA	Pass
Peak-to-Average Power Ratio	Part 24.232 (d) Part 27.50(d)(5)	Appendix – WCDMA	Pass
Modulation Characteristics	Part 2.1047	Appendix – WCDMA	Pass
26dB Emission Bandwidth 99% Occupied Bandwidth	Part 2.1049	Appendix – WCDMA	Pass
Out of Band Emission at Antenna Terminals	Part 2.1051 Part 22.917 (a) Part 24.238 (a) Part 27.53(h)	Appendix – WCDMA	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a) Part 27.53(h)	See Section 5.2	Pass
Frequency Stability vs. Temperature	Part 22.355 Part 24.235 Part 27.54 Part 2.1055(a)(1)(b)	Appendix – WCDMA	Pass
Frequency Stability vs. Voltage	Part 22.355 Part 24.235 Part 27.54 Part 2.1055(d)(2)	Appendix – WCDMA	Pass
<b>Remark:</b>			
1. Pass: The EUT complies with the essential requirements in the standard.			
2. The cable insertion loss used by “RF Output Power” and other conduction measurement items is 0.5dB (Fundamental Frequency below 1GHz)/1.0dB (Fundamental Frequency above 1GHz) (provided by the customer).			
<b>Test Method:</b>	ANSI/TIA-603-E-2016 ANSI C63.26-2015		

**5.1.2 Test Limit**

Test items	Limit
RF Output Power	<b>WCDMA band II:</b> 2W EIRP
Peak-to-Average Power Ratio	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB
Modulation Characteristics	N/A
26dB Emission Bandwidth 99% Occupied Bandwidth	N/A
Out of Band Emission at Antenna Terminals	The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.
Field Strength of Spurious Radiation	
Frequency Stability vs. Temperature	<b>WCDMA band II:</b> The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
Frequency Stability vs. Voltage	

## 5.2 Field Strength of Spurious Radiation Measurement

WCDMA band II						
Lowest channel						
Frequency (MHz)	Reading Level (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Polarization
3704.80	-48.16	-1.18	-49.34	-13.00	36.34	Vertical
5557.20	-54.38	4.28	-50.10	-13.00	37.10	Vertical
3704.80	-44.36	-1.18	-45.54	-13.00	32.54	Horizontal
5557.20	-55.84	4.28	-51.56	-13.00	38.56	Horizontal
Middle channel						
Frequency (MHz)	Reading Level (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.00	-47.03	-0.14	-47.17	-13.00	34.17	Vertical
5640.00	-56.43	4.34	-52.09	-13.00	39.09	Vertical
3760.00	-43.60	-0.14	-43.74	-13.00	30.74	Horizontal
5640.00	-56.89	4.34	-52.55	-13.00	39.55	Horizontal
Highest channel						
Frequency (MHz)	Reading Level (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Polarization
3815.20	-47.27	1.02	-46.25	-13.00	33.25	Vertical
5722.80	-56.70	4.09	-52.61	-13.00	39.61	Vertical
3815.20	-43.64	1.02	-42.62	-13.00	29.62	Horizontal
5722.80	-56.58	4.09	-52.49	-13.00	39.49	Horizontal

**Remark:**

1. The emission levels of below 1 GHz are lower than the limit 10dB, so not show in test report.

-----End of report-----