



TESTREPORT

Applicant Name : NetComm Wireless Pty Ltd
Address : Level 5, 18-20 Orion Road, Lane Cove NSW 2066, Australia
Report Number: RA230725-44651E-RF-00BA1
FCC ID: XIA2023RG520NNA

Test Standard (s)

FCC PART 96

Sample Description

Product Type: 5G Sub-6 GHz LGA Module
Model No.: RG520N-NA
Multiple Model(s) No.: N/A
Trade Mark: N/A
Date Received: 2023/07/27
Report Date: 2023/08/02

Test Result:

Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Approved By:

Andy Yu
EMC Engineer

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

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Shenzhen Accurate Technology Co., Ltd.

1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86 755-26503290

Fax: +86 755-26503290

Web: www.atc-lab.com

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FCC - CBSD

REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1	RA230725-44651E-RF-00BA1	Original report	2023/08/02

Note:

This is a CIIPC application of the device, the differences between the original device (FCC Grant Date: 08/01/2023) and the current are as follows:

1. Reduce conducted power of LTE B48 and 5G NR Band n48, and n48 UL-MIMO was disabled by the manufacturer by means of software, No hardware change.

RF output power for LTE B48 and 5G NR Band n48 were performed to verify RF compliance.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	LTE Band 48: 3550-3700MHz (TX/RX)
Modulation Technique	QPSK, 16QAM, 64QAM, 256QAM
Carrier Aggregation	Intra-Band CA_48C
Antenna Specification*	LTE Band 48: 0.58dBi (provided by the applicant)
Voltage Range	3.3 ~ 4.4Vdc, typical 3.8Vdc
Sample serial number	28OJ2-1 (Assigned by ATC) (Assigned by ATC)
Sample/EUT Status	Good condition

Objective

This test report is in accordance with Part 2-Subpart J and Part 96 of the Federal Communication Commission's rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 96 –Citizens Broadband Radio Service

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		0.082×10^{-7}
RF output power, conducted		0.71dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.06dB
	30MHz - 1GHz	5.08dB
	1GHz - 18GHz	4.96dB
	18GHz - 26.5GHz	5.16dB
	26.5GHz - 40GHz	4.64dB
Temperature		1℃
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the Floor 1, KuMaKe Building, Dongzhou Community, Guangming Street, Guangming District, Shenzhen, Guangdong, China

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189.

Accredited by American Association for Laboratory Accreditation (A2LA). The Certificate Number is 4297.01

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. The Registration Number is 30241.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The final qualification test was performed with the EUT operating at normal mode.

Frequency band	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
LTE B48	5	3552.5	3625.0	3697.5
	10	3555	3625.0	3695
	15	3557.5	3625	3692.5
	20	3560	3625	3690

Frequency band	Bandwidth (MHz)	Test Frequency(MHz)					
		Low		Middle		High	
		PCC	SCC	PCC	SCC	PCC	SCC
CA_48C	5+20	3553.3	3565	3615.8	3627.5	3678.3	3690
	20+5	3560	3571.7	3622.5	3634.2	3685	3696.7
	10+20	3555.5	3569.9	3615.6	3630	3675.6	3690
	20+10	3560	3574.4	3620.1	3634.5	3680.1	3694.5
	15+20	3557.8	3574.9	3615.3	3632.4	3672.9	3690
	20+15	3560	3577.1	3617.6	3634.7	3675.1	3692.2
	20+20	3560	3579.8	3615.1	3634.9	3670.2	3690

Equipment Modifications

No modification was made to the EUT.

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §1.1307 (b) (3) & §2.1091	SAR-Based Exemption	Compliant
§2.1046; §96.41 (b) (g)	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049;§96.41	Occupied Bandwidth	Note**
§ 2.1051;§96.41	Spurious Emissions at Antenna Terminal	Note**
§ 2.1053; §96.41	Field Strength of Spurious Radiation	Note**
§2.1049,§96.41(e)	Out-Of-Band Emissions and Band Edge	Note**
§ 2.1055;§96.41	Frequency stability	Note**

Note*: Please refer to the original FCC ID report, report number: 2303RSU050-U11 which was issued by test lab MRT Technology (Suzhou) Co., Ltd on 2023-04-24..

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Anritsu	Radio Communication Test Station	MT8000A	6262309799	2023/04/15	2024/04/14
Anritsu	Radio Communication Analyzer	MT8821C	6262287697	2023/04/15	2024/04/14
Decentest	Filter Switch Test	DT7210FSU	DQ77930	2023/04/15	2024/04/14
Decentest	Multiplex Switch Test Control Set	DT7211CSU	DQ77929	2023/04/15	2024/04/14
Unknown	RF Coaxial Cable	No.31	RF-01	Each time	

* Statement of Traceability: Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§1.1307 (b) (3) & §2.1091- MPE-Based Exemption

Applicable Standard

According to subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 Interim General RF Exposure Guidance

SAR-Based Exemption:

A more comprehensive exemption, considering a variable power threshold that depends on both the separation distance and power, is provided in § 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz and 6 GHz, with test separation distances between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Result

For worst case:

Mode	Frequency (MHz)	Tune up conducted power	Antenna Gain		The Greater of Conducted Power or ERP		Evaluation Distance (m)	P _{th} (mW)
		(dBm)	(dBi)	(dBd)	(dBm)	(mW)		
LTE/NR B2	1850-1910	25	1.37	-0.78	25	316.2	0.2	3060.0
LTE B4	1710-1755	25	1.37	-0.78	25	316.2	0.2	3060.0
LTE/NR B5	824-849	25	1.18	-0.97	25	316.2	0.2	1681.0
LTE/NR B7	2500-2570	25	2.07	-0.08	25	316.2	0.2	3060.0
LTE/NR B12	699-716	25	1.18	-0.97	25	316.2	0.2	1426.0
LTE/NR B13	777-787	25	1.18	-0.97	25	316.2	0.2	1585.1
LTE/NR B14	788-798	25	1.18	-0.97	25	316.2	0.2	1607.5
LTE B17	704-716	25	1.18	-0.97	25	316.2	0.2	1436.2
LTE/NR B25	1850-1915	25	1.37	-0.78	25	316.2	0.2	3060.0
LTE/NR B26	814-849	25	1.18	-0.97	25	316.2	0.2	1660.6
LTE/NR B30	2305-2315	25	1.11	-1.04	25	316.2	0.2	3060.0
LTE/NR B38	2570-2620	25	2.07	-0.08	25	316.2	0.2	3060.0
LTE B41	2496-2690	28	2.07	-0.08	28	631	0.2	3060.0
NR B41	2496-2690	31	2.07	-0.08	31	1258.9	0.2	3060.0
LTE/NR B48	3550-3700	20	0.58	-1.57	20	100	0.2	3060.0
LTE/NR B66	1710-1780	25	1.37	-0.78	25	316.2	0.2	3060.0
LTE/NR B71	663-698	25	1.18	-0.97	25	316.2	0.2	1352.5
NR B77	3450-3550 3700-3980	31	0.58	-1.57	31	1258.9	0.2	3060.0
NR B78	3300-3800	31	0.58	-1.57	31	1258.9	0.2	3060.0

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
2. 0dBd=2.15dBi

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant.

FCC§2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 96, there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046&§96.41(b) (g)- RF OUTPUT POWER

Applicable Standard

According to §96.41

(b)Power limits:Unless otherwise specified in this section, the maximum effective isotropic radiated power (EIRP) and maximum Power Spectral Density (PSD) of any CBSD and End User Device must comply with the limits shown in the table in this paragraph (b):

Device must comply with the limits shown in the table in this paragraph (b).

Device	Maximum EIRP (dBm/10 megahertz)	Maximum PSD (dBm/MHz)
End User Device	23	n/a
Category A CBSD	30	20
Category B CBSD ¹	47	37

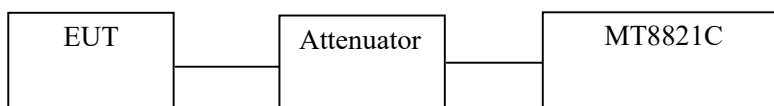
¹Category B CBSDs will only be authorized for use after an ESC is approved and commercially deployed consistent with §§96.15 and 96.67.

(g)Power measurement:The peak-to-average power ratio (PAPR) of any CBSD transmitter output power must not exceed 13 dB. PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities or another Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the MT8821C through sufficient attenuation.



Note: the path loss (cable loss and attenuator) was included to the test result.

Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

The testing was performed by Cat Kang on 2023/07/27.

LTE Band 48

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5	QPSK	RB25#0	18.85	18.79	18.91	19.43	19.37	19.49
	16QAM	RB25#0	17.87	17.89	17.94	18.45	18.47	18.52
	64QAM	RB25#0	16.83	15.65	16.98	17.41	16.23	17.56
	256QAM	RB25#0	13.62	13.35	13.63	14.2	13.93	14.21
10	QPSK	RB50#0	18.99	18.95	18.9	19.57	19.53	19.48
	16QAM	RB50#0	17.94	17.91	17.93	18.52	18.49	18.51
	64QAM	RB50#0	16.24	16.83	16.78	16.82	17.41	17.36
	256QAM	RB50#0	14.13	13.8	13.55	14.71	14.38	14.13
15	QPSK	RB75#0	18.89	18.88	18.86	19.47	19.46	19.44
	16QAM	RB75#0	17.93	17.87	17.89	18.51	18.45	18.47
	64QAM	RB75#0	16.88	16.87	16.49	17.46	17.45	17.07
	256QAM	RB75#0	13.88	13.55	13.62	14.46	14.13	14.2
20	QPSK	RB100#0	18.89	18.78	18.88	19.47	19.36	19.46
	16QAM	RB100#0	17.93	17.80	17.91	18.51	18.38	18.49
	64QAM	RB100#0	15.88	15.73	15.53	16.46	16.31	16.11
	256QAM	RB100#0	14.02	13.87	13.78	14.6	14.45	14.36

CA_48C

Bandwidth (MHz)	Modulation	PCC RB size/ RB Offset	SCC RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
				Low	Mid	High	Low	Mid	High
5+20	QPSK	RB25#0	RB100#0	18.97	18.81	18.92	19.55	19.39	19.5
	16QAM	RB25#0	RB100#0	17.79	17.63	17.58	18.37	18.21	18.16
	64QAM	RB25#0	RB100#0	16.41	16.49	16.32	16.99	17.07	16.9
	256QAM	RB25#0	RB100#0	15.27	15.19	15.01	15.85	15.77	15.59
20+5	QPSK	RB100#0	RB25#0	19.2	19.16	19.34	19.78	19.74	19.92
	16QAM	RB100#0	RB25#0	18.09	17.98	17.99	18.67	18.56	18.57
	64QAM	RB100#0	RB25#0	16.97	16.69	16.69	17.55	17.27	17.27
	256QAM	RB100#0	RB25#0	15.68	15.47	15.49	16.26	16.05	16.07
10+20	QPSK	RB50#0	RB100#0	18.87	18.78	19.25	19.45	19.36	19.83
	16QAM	RB50#0	RB100#0	17.53	17.55	18.04	18.11	18.13	18.62
	64QAM	RB50#0	RB100#0	16.22	16.41	16.97	16.8	16.99	17.55
	256QAM	RB50#0	RB100#0	15	15.11	15.7	15.58	15.69	16.28
20+10	QPSK	RB100#0	RB50#0	18.94	18.67	19.07	19.52	19.25	19.65
	16QAM	RB100#0	RB50#0	17.74	17.49	17.91	18.32	18.07	18.49
	64QAM	RB100#0	RB50#0	16.3	16.27	16.57	16.88	16.85	17.15
	256QAM	RB100#0	RB50#0	15.08	15.06	15.19	15.66	15.64	15.77
15+20	QPSK	RB75#0	RB100#0	18.8	18.91	19.13	19.38	19.49	19.71
	16QAM	RB75#0	RB100#0	17.7	17.68	17.8	18.28	18.26	18.38
	64QAM	RB75#0	RB100#0	16.44	16.36	16.71	17.02	16.94	17.29
	256QAM	RB75#0	RB100#0	15.21	15.01	15.45	15.79	15.59	16.03
20+15	QPSK	RB100#0	RB75#0	18.84	18.67	18.93	19.42	19.25	19.51
	16QAM	RB100#0	RB75#0	17.48	17.49	17.59	18.06	18.07	18.17
	64QAM	RB100#0	RB75#0	16.25	16.24	16.32	16.83	16.82	16.9
	256QAM	RB100#0	RB75#0	14.99	14.97	15.05	15.57	15.55	15.63

Bandwidth (MHz)	Modulation	PCC RB size/ RB Offset	SCC RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
				Low	Mid	High	Low	Mid	High
20+20	QPSK	RB100#0	RB100#0	18.64	18.88	19.01	19.22	19.46	19.59
	16QAM	RB100#0	RB100#0	17.36	17.46	17.66	17.94	18.04	18.24
	64QAM	RB100#0	RB100#0	16.03	16.09	16.33	16.61	16.67	16.91
	256QAM	RB100#0	RB100#0	14.87	14.8	15.08	15.45	15.38	15.66

Note:

$EIRP(dBm) = \text{Conducted Power}(dBm) + \text{Antenna Gain}(dBi)$

For Band48: Antenna Gain =0.58dBi

Limit: $EIRP \leq 23dBm/10MHz$

For 5MHz mode, the reference bandwidth(10MHz) is greater than the channel bandwidth(5MHz), so the channel power is equal to the test result in dBm/10MHz

For 10MHz mode, the channel power is equal to the test result in dBm/10MHz

For 15MHz/20MHz/25MHz/30MHz/35MHz/40MHz mode, the channel power is sum of 15MHz/20MHz bandwidth, the result is less than 23dBm, so in any 10MHz bandwidth, it will not exceed the limit

***** END OF REPORT *****