

FCC RF Exposure Test Report

Report No.: PBJ-NQN2412130113SA01
Product Name: Industrial Cellular Router
Model Name: IR624
Series Models NO: IR654, IR694
HVIN: NRQ3-WLAN-S
Applicant: Beijing InHand Networks Technology Co., Ltd.
FCC ID: 2AANY-IR624

Reference Specification

FCC Part §1.1310

CERTIFICATION: The above equipment have been tested by **BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO., LTD.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA or any government agencies.

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1. GENERAL INFORMATION

1.1 Notes of the test report

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The certification and accreditation identifiers used in this report shall not be applicable to the tested or calibrated samples thereof. The manufacturer shall not mark the tested samples or items (or a separate part of the item) with the identifiers of certification and accreditation to mislead relevant parties about the tested samples or items.

1.2 Information about the testing laboratory

Company:	BV 7Layers Communications Technology (Shenzhen) Co., Ltd
Address:	Room B37, Warehouse A5, No.3 Chiwan 4th Road, Zhaoshang Street, Nanshan District Shenzhen, Guangdong, People's Republic of China
City:	Shenzhen
Country or Region:	P.R.China
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Designation Number:	CN1171
Registration number:	525120

1.3 Applicant's details

Company:	Beijing InHand Networks Technology Co., Ltd.
Address:	Room 501, floor 5, building 3, yard 18, ziyue road, chaoyang district, Beijing
City:	Beijing
Country or Region:	China
Contacted person:	GuJichi
Tel:	15281366255
Email:	gujc@inhand.com.cn

1.4 Manufacturer's details

Company:	Beijing InHand Networks Technology Co., Ltd.
Address:	Room 501, floor 5, building 3, yard 18, ziyue road, chaoyang district, Beijing
City:	Beijing
Country or Region:	China

Contacted person:	GuJichi
Tel:	15281366255
Email:	gujc@inhand.com.cn

1.5 Test environment

Date of Receipt of test sample:	2024/11/6
Testing Start Date:	2024/11/7
Testing End Date:	2024/12/2

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	40
Maximum Extreme	70	---
Minimum Extreme	-10	---

Normal Supply Voltage (V d.c.):	5.0
Maximum Extreme Supply Voltage (V d.c.):	5.5
Minimum Extreme Supply Voltage (V d.c.):	4.5

2. DESCRIPTION OF THE EQUIPMENT UNDER TEST

2.1 Final equipment build status

Frequency Range:	LTE Band 2: Tx:1850~1910MHz Rx:1930~1990MHz LTE Band 4: Tx: 1710~1755MHz Rx: 2110~2155MHz LTE Band 5: Tx: 824~849MHz Rx: 869~894MHz LTE Band 7: Tx: 2500~2570MHz Rx: 2620~2690MHz LTE Band 12: Tx:699~716MHz Rx: 729~746MHz LTE Band 13: Tx: 777~787MHz Rx: 746~756MHz LTE Band 14: Tx: 788 ~798 MHz Rx: 758 ~768 MHz LTE Band 17: Tx: 704 ~ 716 MHz Rx: 734 ~ 746 MHz LTE Band 25: Tx: 1850 ~ 1915 MHz Rx: 1930 ~ 1995 MHz LTE Band 26: Tx: 814~849MHz Rx: 859~894MHz LTE Band 30: Tx: 2305 ~ 2315 MHz Rx: 2350 ~ 2360 MHz LTE Band 38: Tx:2570~2620MHz Rx:2570~2620MHz LTE Band 41: Tx: 2496~2690MHz Rx: 2496~2690MHz LTE Band 42: Tx: 3400 ~3600 MHz Rx: 3400 ~ 3600 MHz LTE Band 43: Tx: 3600 ~ 3800 MHz Rx: 3600 ~ 3800 MHz LTE Band 48: Tx:3550~3700MHz Rx:3550~3700MHz LTE Band 66: Tx: 1710~1780MHz Rx: 2110~2200MHz LTE Band 71: Tx: 663 ~698 MHz Rx: 617 ~652 MHz
Frequency Range:(CA)	ULCA:CA_2C, CA_5B, CA_7C, CA_38C, CA_41C, CA_42C, CA_43C, CA_48C, CA_66B, CA_66C (See note1)
Modulation Type(Uplink):	QPSK/16QAM
Antenna Type:	Sucker antenna

Antenna Gain:	LTE B2: 0.8dBi	LTE B4:0.0dBi(Max)	LTE B5:-2.5dBi
	LTE B7:0.4dBi(Max)	LTE B12:-0.7dBi	LTE B13:-0.7dBi (Max)
	LTE B14: :-0.7dBi (Max)	LTE B17: -0.7dBi (Max)	LTE B25:0.8dBi
	LTE B26:-2.5dBi	LTE B30:-0.6dBi (Max)	LTE B38:-0.1dBi
	LTE B41:-0.1dBi	LTE B42:-0.7dBi	LTE B43:-0.7dBi

	LTE B48:-0.7dBi	LTE B66:0dBi(Max)	LTE B71:-3.5dBi
	ERP = EIRP(Power+Gain) – 2.15 (dB)		
Power Supply:	DC supply		
Software Revision:	V3.0		
Hardware Revision:	V1.1		
IMEI:	866407060011582		



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Freq uenc y Ran ge:	n2: Tx:1850~1910 MHz Rx:1930~1990 MHz n5: Tx: 824~849 MHz Rx:869~894 MHz n7: Tx:2500~2570 MHz Rx:2620~2690 MHz n12: Tx: 699~716 MHz Rx:729~746 MHz n13: Tx: 777~787 MHz Rx:746~756 MHz n14: Tx: 788~798 MHz Rx:758~768 MHz n25: Tx: 1850~1915 MHz Rx:1930~1995 MHz n26: Tx: 814~849 MHz Rx:859~894 MHz n30: Tx: 2305~2315 MHz Rx:2350~2360 MHz n38: Tx: 2570~2620 MHz Rx:2570~2620 MHz n41: Tx:2496~2690 MHz Rx: 2496~2690 MHz n48: Tx: 3550~3700 MHz Rx:3550~3700 MHz n66: Tx:1710~1780 MHz Rx:1995~2020 MHz n70: Tx: 1695~1710 MHz Rx:617~652 MHz n71: Tx: 663~698 MHz Rx:617~652 MHz n77: Tx: 3450~3550 MHz Rx:3450~3550 MHz 3700~3980 MHz Rx:3700~3980 MHz n78: Tx: 3450~3550 MHz Rx:3450~3800 MHz 3700~3800 MHz Rx:3700~3800 MHz
Freq uenc y Ran ge:(CA)	UL: n25A-n41A;n41A-n66A;n41A-n71A;n7A-n78A;n5A-n78An66A-n78A:n7A-n77A:n2A-n77 A:n5A-n77A:n66A-n77An30A-n77A;n71A-n77A:n71A-n78A:n25A-n78A:n38A-n66An25A -n77A;n25A-n38A;n13A-n77A; n2A-n41A
Singl e band singl e SCS singl e carri er	n2/n5/n7/n12/ n13/n14/n25/ n26/n30/ n38/n41/n48/n66/ n70/n71/n77/n78

Single band single SCS HPUE	n41/n77/n78		
SA Bandwidth	n2: 5MHz/ 10MHz/ 15MHz/ 20MHz n5: 5MHz/ 10MHz/ 15MHz/ 20MHz n7: 5MHz/ 10MHz/ 15MHz/ 20MHz/ 25MHz/ 30MHz/ 40MHz n12: 5MHz/ 10MHz/ 15MHz n13: 5MHz/ 10MHz n14: 5MHz/ 10MHz n25: 5MHz/ 10MHz/ 15MHz/ 20MHz/ 25MHz/ 30MHz/ 40MHz n26: 5MHz/ 10MHz/ 15MHz/ 20MHz n30: 5MHz/ 10MHz n38: 10MHz/ 15MHz/ 20MHz/ 30MHz/ 40MHz n41: 20MHz/ 30MHz/ 40MHz/ 50MHz/ 60MHz/ 70MHz/ 80MHz/ 90MHz/ 100MHz n48: 10MHz/ 20MHz/ 30MHz/ 40MHz n66: 5MHz/ 10MHz/ 15MHz/ 20MHz/ 30MHz/ 40MHz n70: 5MHz/ 10MHz/ 15MHz n71: 5MHz/ 10MHz/ 15MHz/ 20MHz n77: 10MHz/ 15MHz/ 20MHz/ 30MHz/ 40MHz/ 50MHz/ 60MHz/70MHz/ 80MHz/90MHz/100MHz n78: 10MHz/ 15MHz/20MHz/ 30MHz/ 40MHz/ 50MHz/ 60MHz/ 70MHz/ 80MHz/ 90MHz/ 100MHz		
NSA Band	See note2		
Modulation Type:	PI/2 BPSK, QPSK,16QAM,64QAM,256QAM		
Antenna Type:	External antenna		
Antenna Gain:	n2: 0.8dBi	n5: -2.5dBi	n7: 0.4dBi(Max)
	n12: -0.7dBi	n13: -0.7dBi(Max)	n14: :-0.7dBi(Max)
	n25: 0.8dBi	n26: -2.5dBi	n30: -0.6dBi(Max)
	n38: -0.1dBi	n41: -0.1dBi	n48: -0.7dBi
	n66: 0dBi(Max)	n70:-0.3dBi	n71: -3.5dBi
	n77:-0.7dBi	n78:-0.7dBi	
	ERP = EIRP(Power +Gain) – 2.15 (dB)		
Power Supply:	DC supply		
Software Revision:	V3.0		
Hardware Revision:	V1.1		
IMEI/SN:	866407060011582/RN6242408PWEZ7N		

NOTE1 : Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N_{ANT}]$ dBi(Uncorrelated)

NOTE2 : Except LTE&NR are quoted from the report SEWM2304000122RG04

3. SPECIFICATION

Specification	Version	Title
Part 1.1310	Latest	Radio frequency radiation exposure limits.

4. RESULT SUMMARY

Case	Verdict
MPE	Pass

5. CALCULATION RESULT

5.1 Maximum permissible exposure (MPE)

Limit:

(A) Limits for Occupational/Controlled Exposure ☐

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	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
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure ☒

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm 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

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

Result:

According to §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$\text{The } S = PG / (4\pi R^2)$$

Where S = power density in mW/cm²

P = transmit power in mW

G = numeric gain of transmit antenna

R = distance (cm)

Standalone Transmission Result

Band	Freq. (MHz)	Maximum Power (dBm)	ANT Gain (dBi)	Maximum EIRP (dBm)	Maximum EIRP(mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
LTE Band 2/LTE CA 2C	1850.7	25.00	0.8	25.80	380.189	0.076	1
LTE Band 4	1710.7	25.00	0	25.00	316.228	0.063	1
LTE Band 5/LTE CA 5B	824.7	25.00	-2.5	22.50	177.828	0.035	1
LTE Band 7/LTE CA 7C	2502.5	25.00	0.4	25.40	346.737	0.069	1
LTE Band 12	699.7	25.00	-0.7	24.30	269.153	0.049	0
LTE Band 13	779.5	25.00	-0.7	24.30	269.153	0.044	1
LTE Band 14	790.5	25.00	-0.7	24.30	269.153	0.040	1
LTE Band 17	706.5	25.00	-0.7	24.30	269.153	0.037	0
LTE Band 25	1850.7	25.00	0.8	25.80	380.189	0.048	1



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LTE Band 26(814-824)	814.7	25.00	-2.5	22.50	177.828	0.021	1
LTE Band 26(824-849)	824.7	25.00	-2.5	22.50	177.828	0.019	1
LTE Band 30	2307.5	25.00	-0.6	24.40	275.423	0.028	1
LTE Band 38/LTE CA 38C	2572.5	28.00	-0.1	27.90	616.595	0.058	1
LTE Band 41/LTE CA 41C	2498.5	28.00	-0.1	27.90	616.595	0.055	1
LTE Band 42(3450-3550) /LTE CA 42C	3452.5	28.00	-0.7	27.30	537.032	0.044	1
LTE Band 43(3700 3800)/LTE CA_43C	3702.5	28.00	-0.7	27.30	537.032	0.042	1
LTE Band 48/LTE CA 48C	3690	23.88	-0.7	23.18	207.970	0.015	1

LTE Band 66/LTE CA_66B/LTE CA 66C	1710.7	25.00	0	25.00	316.228	0.022	1
LTE Band 71	665.5	25.00	-3.5	21.50	141.254	0.009	0
NR Band n2	1852.5	25.00	0.8	25.80	380.189	0.023	1
NR Band n5	826.5	25.00	-2.5	22.50	177.828	0.010	1
NR Band n7	2502.5	25.00	0.4	25.40	346.737	0.019	1
NR Band n12	701.5	25.00	-0.7	24.30	269.153	0.014	0
NR Band n13	779.5	25.00	-0.7	24.30	269.153	0.013	1
NR Band n14	790.5	25.00	-0.7	24.30	269.153	0.013	1
NR Band n25	1852.5	25.00	0.8	25.80	380.189	0.017	1
NR Band n26(814- 824)	816.5	25.00	-2.5	22.50	177.828	0.008	1
NR Band n26(824- 849)	826.5	25.00	-2.5	22.50	177.828	0.007	1
NR Band n30	2307.5	25.00	-0.6	24.40	275.423	0.011	1
NR Band n38	2575	28.00	-0.1	27.90	616.595	0.023	1
NR Band n38(MIMO)	2575	28.00	-0.23	27.77	598.412	0.022	1
NR Band n41	2506	28.00	-0.1	27.90	616.595	0.021	1
NR Band n41(MIMO)	2506	30.00	-0.1	29.90	977.237	0.032	1
NR Band n48*	3685	24.09	-0.7	23.39	218.273	0.007	1



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NR Band n48(MIMO)	3685	24.09	-0.7	23.39	218.273	0.007	1
NR Band n66	1712.5	25.00	0	25.00	316.228	0.009	1
NR Band n70	1697.5	25.00	-0.3	24.70	295.121	0.008	1
NR Band n71	665.5	25.00	-3.5	21.50	141.254	0.004	0
NR Band n77 (3450-3550)	3455	28.00	-0.7	27.30	537.032	0.014	1
NR Band n77 (3450-3550)(MIMO)	3455	30.00	-0.7	29.30	851.138	0.022	1
NR Band n77 (3700-3980)	3707.5	28.00	-0.7	27.30	537.032	0.013	1
NR Band n77 (3700-3980)(MIMO)	3707.5	30.00	-0.7	29.30	851.138	0.020	1
NR Band n78 (3450-3550)	3455	28.00	-0.7	27.30	537.032	0.012	1
NR Band n78 (3450-3550)(MIMO)	3455	30.00	-0.7	29.30	851.138	0.019	1
NR Band n78 (3700-3800)	3705	28.00	-0.7	27.30	537.032	0.011	1



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NR Band n78 (3700-3800)(MIMO)	3705	30.00	-0.7	29.30	851.138	0.018	1
WLAN2.4GHz	2412	23.00	2.69	25.69	370.681	0.007	1
WLAN5GHz	5180	23.00	0.6	23.60	229.087	0.004	1

NOTE : Except for the data marked with *, other data are quoted from the report
SEWM2304000122RG04

Simultaneous Transmission Result

Power Density1 / Limit	Power Density2 / Limit	$\Sigma(\text{Power Density} / \text{Limit})$
0.117 (WWAN MAX)	0.007+0.004 (WIFI 2.4G+WIFI 5G)	0.128

Note: Simultaneous Transmission Limit = $\text{Power Density}_1 / \text{Limit}_1 + \text{Power Density}_2 / \text{Limit}_2 < 1$.

---End of Test Report---