

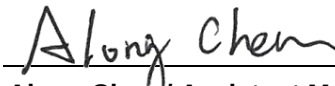
FCC RF Exposure Exemption Report

FCC ID : I88NR7112
Equipment : 5G NR Outdoor Router
Model No. : NR7112
(Please refer to section 1.1.1 for more details)
Brand Name : ZYXEL
(Please refer to section 1.1.1 for more details)
Applicant : Zyxel Communications Corporation
Address : No.2 Industry East RD. IX, Hsinchu Science
Park, Hsinchu 30075, Taiwan, R.O.C
Standard : 47 CFR FCC Part 2.1091
Received Date : Dec. 14, 2021
Tested Date : Jan. 14 ~ Jan. 26, 2022

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Approved by:


Along Chen / Assistant Manager

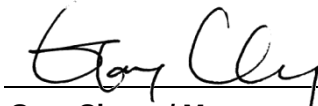

Gary Chang / Manager

Table of Contents

1	GENERAL DESCRIPTION	4
1.1	Information.....	4
2	RF EXPOSURE TEST EXEMPTIONS.....	5
2.1	1-mW TEST EXEMPTION	5
2.2	SAR-BASED EXEMPTION	5
2.3	MPE-BASED EXEMPTION	5
2.4	DEVIATION FROM TEST STANDARD AND MEASUREMENT PROCEDURE	6
2.5	MEASUREMENT UNCERTAINTY	6
2.6	EXEMPTION CALCULATION	7
3	TEST LABORATORY INFORMATION	9

Release Record

Report No.	Version	Description	Issued Date
FA1D1401	Rev. 01	Initial issue	Apr. 15, 2022

1 General Description

1.1 Information

1.1.1 Product Details

The following models are provided to this EUT.

Brand Name	Model Name	Product Name	Description
ZYXEL	NR7112	5G NR Outdoor Router	for marketing purpose.
Vodafone	MachineLink 5G	5G NR Outdoor Router	
✦ All models are electrically identical, different model names are for marketing purpose. ✦ The above models, model NR7112 was selected as a representative one for the final test and only its data was recorded in this report.			

2 RF Exposure Test Exemptions

2.1 1-mW TEST EXEMPTION

Available maximum time-averaged power is no more than 1 mW.

2.2 SAR-BASED EXEMPTION

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.

The maximum time-averaged power or effective radiated power (ERP), whichever is greater, $\leq P_{th}$

$$P_{th} \text{ (mW)} = ERP_{20cm} \text{ (mW)} = 2040f \quad 0.3\text{GHz} \leq f < 1.5 \text{ GHz}$$

$$P_{th} \text{ (mW)} = ERP_{20cm} \text{ (mW)} = 3060 \quad 1.5\text{GHz} \leq f < 6 \text{ GHz}$$

Frequency (MHz)	Power Thresholds	
	mW	dBm
663	1353	31.31
699	1426	31.54
704	1436	31.57
777	1585	32.00
824	1681	32.26
902	1840	32.65
1500 ~ 6000	3060	34.86

2.3 MPE-BASED EXEMPTION

For a much wider frequency range, from 300 kHz to 100 GHz, applicable for separation distances greater or equal to $\lambda/2\pi$, where λ is the free-space operating wavelength in meters.

Radio Source Frequency			Minimum Distance			Threshold ERP
F_L MHz		F_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	-	1.34	159 m	-	35.6 m	$1920 R^2$
1.34	-	30	35.6 m	-	1.6 m	$3450 R^2/f^2$
30	-	300	1.6 m	-	159 mm	$3.83 R^2$
300	-	1500	159 mm	-	31.8 mm	$0.0128 R^2f$
1500	-	100000	31.8 mm	-	0.5 mm	$19.2 R^2$

2.4 DEVIATION FROM TEST STANDARD AND MEASUREMENT PROCEDURE

None

2.5 MEASUREMENT UNCERTAINTY

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

Parameters	Uncertainty
Conducted power	± 0.808 dB

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

2.6 EXEMPTION CALCULATION

Single RF Source

Frequency Range (MHz)	Maximum Conducted Power (dBm)	Rated Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	ERP (dBm)	SAR-Based Exemption Thresholds (dBm)	Ratio	Pass/Fail
2412~2462	20.06	20.5	4.1	24.6	22.45	34.86	0.057	Pass

Note:

Minimum separation distance = 20 cm.

The device contains a certified module, FCC ID: XMR2020RM502QAE

Frequency Range (MHz)	Rated Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	ERP (dBm)	SAR-Based Exemption Thresholds (dBm)	Ratio	Pass/Fail
WCDMA							
1850 – 1910	23.31	5.5	28.81	26.66	34.86	0.152	Pass
1710 – 1785	23.28	5.54	28.82	26.67	34.86	0.152	Pass
824 – 849	23.01	1.4	24.41	22.26	32.26	0.100	Pass
LTE							
1850 – 1910	23.39	5.5	28.89	26.74	34.86	0.154	Pass
1710 – 1785	24.45	5.54	29.99	27.84	34.86	0.199	Pass
824 – 849	24.88	1.4	26.28	24.13	32.26	0.154	Pass
699 – 716	23.64	1.4	25.04	22.89	31.54	0.137	Pass
704 – 716	23.95	1.4	25.35	23.20	31.57	0.146	Pass
2496 – 2690	27.21	5.7	32.91	30.76	34.86	0.390	Pass
1710 – 1780	24.45	5.54	29.99	27.84	34.86	0.199	Pass
5G NR							
1850 – 1910	23.99	5.5	29.49	27.34	34.86	0.177	Pass
824 – 849	23.75	1.4	25.15	23.00	32.26	0.119	Pass
1850 – 1915	23.97	5.5	29.47	27.32	34.86	0.176	Pass
2496 – 2690	27.00	5.7	32.70	30.55	34.86	0.371	Pass
1710 – 1780	24.27	5.54	29.81	27.66	34.86	0.191	Pass
663 – 698	24.34	1.4	25.74	23.59	31.31	0.169	Pass

Conclusion

Wi-Fi and WWAN transmitter are qualify for stand-alone exemption

Simultaneous Transmission Test Exemption

Mode	Max Ratio of Each Mode
WLAN 2.4GHz	0.057
WWAN	0.390
Sum	0.447
Limit	1
Pass / Fail	Pass

Conclusion

Wi-Fi and WWAN transmitter are qualify for Simultaneous Transmission SAR exemption

3 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

Tel: 886-2-2601-1640

No.30-2, Ding Fwu Tsuen, Lin Kou
District, New Taipei City, Taiwan
(R.O.C.)

Kwei Shan

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

Kwei Shan Site II

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 333, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666

Fax: 886-3-318-0345

Email: ICC_Service@icertifi.com.tw

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