

RF Exposure Evaluation Report

Product Name : 5G Extender Gen 2

Model No. : TR2V1

FCC ID : NKR-TR2V1-IDU

Applicant : Wistron Neweb Corporation

Address : 20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan

Date of Receipt : Mar. 04, 2021

Date of Declaration : Jul. 12, 2021

Report No. : 2130168R-E3082100013

Report Version : V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Issued Date: Jul. 12, 2021
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Product Name	5G Extender Gen 2	
Applicant	Wistron Neweb Corporation	
Address	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan	
Manufacturer	Wistron Neweb Corporation	
Model No.	TR2V1	
FCC ID.	NKR-TR2V1-IDU	
Trade Name	WNC	
Applicable Standard	KDB 447498 D01 v06	<input checked="" type="checkbox"/> Minimum test separation distance \geq 20 cm <input type="checkbox"/> For low power devices
Test Result	Complied	

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Approved By : Tim Sung
 (Manager / Tim Sung)

Revision History

Report No.	Version	Description	Issued Date
2130168R-E3082100013	V1.0	Initial issue of report.	Jul. 12, 2021

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	5G Extender Gen 2
Trade Name	WNC
Model No.	TR2V1
FCC ID.	NKR-TR2V1-IDU
WWAN Band	LTE Band 4: 1710MHz~1755MHz LTE Band 13: 777MHz~787MHz n260: 37000MHz~40000MHz n261: 27500MHz~28350MHz
Frequency Range	2402 – 2480MHz
Channel Number	V5.0: 40CH
Type of Modulation	V5.0: GFSK(1Mbps)
Channel Control	Auto
Antenna Type	PIFA Antenna
Antenna Gain	Refer to the table “Antenna List”

1.2. Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	WNC (BT)	TR2V1	PIFA Antenna	0.43 dBi for 2.4GHz
2	WNC (WWAN Main)	08.11684.027	PIFA	2.23 dBi for B4 1.06 dBi for B13
3	WNC (WWAN DIV)	08.11684.028	PIFA	4.55 dBi for B4 1.58 dBi for B13

2. RF Exposure Evaluation

2.1. Standard Applicable

According to KDB 447498 D01 (7.1), A minimum test separation distance ≥ 20 cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits.

2.2. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0

2.3. Test Result of RF Exposure Evaluation

Product : 5G Extender Gen 2
 Test Item : RF Exposure Evaluation

WLAN 2.4G Peak Gain: 0.43dBi

Band	Frequency (MHz)	Conducted maximum Peak Power (dBm)	Worst case Duty Cycle (%)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Pass/Fail
BLE	2402	8.12	13.74	47.208	0.0104	1	Pass

Note: The conducted output power is refer to report No.: 2130168R-E3032110108 from the DEKRA.

WWAN LTE Band 4 Peak Gain: 4.55dBi; LTE Band 13 Peak Gain: 1.58dBi

Band	Frequency (MHz)	Conducted Peak Power (pre tune-up) (dBm)	Maximum EIRP (W)	Maximum EIRP Limit(W)	Duty Cycle (%)	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Pass/Fail
4	1732.5	24.20	0.750	1	100	24.20	263.03	0.1492	1	Pass
13	779.5	24.27	0.234	3	100	24.27	267.30	0.0765	0.52	Pass

Note: The conducted output power is refer to report No.: 2130168R-E3042110012 from the DEKRA.

WWAN n261

Band	Side	Frequency (GHz)	Maximum EIRP (dBm)	Duty Cycle (%)	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Pass/Fail
n260	Donor	37-40	40.93	25	34.91	3097.0	0.616127	1	Pass
n261	Donor	27.5-28.3	40.96	25	34.94	3118.5	0.620398	1	Pass
n260	Relay	37-40	23.95	75	22.70	186.2	0.037050	1	Pass
n261	Relay	27.5-28.3	23.98	75	22.73	187.5	0.037307	1	Pass

Note: The EIRP power is refer to report No.: 1M2106230069-02-R1 .NKR from the PCTEST Lab.

2.4. Calculations for Multi-Transmitter

Mode	Ratios	result	Limit	Pass/Fail
WWAN LTE	0.1492	0.78	1	Pass
WWAN FR2	0.6204			
BT	0.0104			

Ratios = Power Density / Power Density Limit