RF Exposure Evaluation Declaration

Product Name	:	Consumer Home Router
Trade Name	:	Verizon
Model No.	:	CR1000A
FCC ID	:	NKR-LVSK-R2

Applicant	:	Wistron NeWeb Corporation
Address	:	20 Park Ave. II, Hsinchu Science Park, Hsinchu 308, Taiwan

Date of Receipt	:	Oct. 21, 2020
Date of Declaration	:	May 19, 2021
Report No.	:	20A0549R-E3082100013
Report Version	:	V2.0

RF Exposure Evaluation Declaration

Issued Date : May 19, 2021

Report No. : 20A0549R-E3082100013

Product Name	:	Consumer Home Router
Applicant	:	Wistron NeWeb Corporation
Address	:	20 Park Ave. II, Hsinchu Science Park, Hsinchu 308, Taiwan
Manufacturer	:	Wistron NeWeb Corporation
Address	:	20 Park Ave. II, Hsinchu Science Park, Hsinchu 308, Taiwan
Trade Name	:	Verizon
Model No.	:	CR1000A
FCC ID	:	NKR-LVSK-R2
EUT Voltage	:	AC 100~120V, 50~60Hz
Testing Voltage	:	AC 120V/60Hz
Applicable Standard	:	FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.
Test Lab	:	Hsin Chu Laboratory
Address	:	No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 310, Taiwan, R.O.C. TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result	:	Complied

Tested By : Elwin Lin

(Elwin Lin / Senior Engineer)

Approved By : Louis Hsu

(Louis Hsu / Deputy Manager)

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Feb. 19, 2021
V2.0	Update Model No.	May 19, 2021

1.1. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required	Test Site
Temperature (°C)	Peak Output Power	15 - 35	1
Humidity (%RH)		25 - 75	

Note: Test site information refers to Laboratory Information.

USA	**:**	**FCC Registration Number: TW3024**
Canada	**:**	**IC Registration Number: 22397-1 / 22397-2 / 22397-3**

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw

If you have any comments, please don't hesitate to contact us. Our test sites as below:

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
Address	1. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 2. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
Phone number	1. +886-3-582-8001 2. +886-3-582-8001
Fax number	1. +886-3-582-8958 2. +886-3-582-8958
Email address	info.tw@dekra.com
Website	http://www.dekra.com.tw

1.2. List of Test Equipment

Peak Output Power / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2019/12/02 2020/11/30	2020/12/01 2021/11/29
Pulse Power Sensor	Anritsu	MA2411B	1531043	2019/12/02 2020/11/30	2020/12/01 2021/11/29
Pulse Power Sensor	Anritsu	MA2411B	1531044	2019/12/02 2020/11/30	2020/12/01 2021/11/29
Power Meter	Keysight	8990B	MY51000248	2020/05/20	2021/05/19
Power Sensor	Keysight	N1923A	MY57240005	2020/05/20	2021/05/19

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

1.3. Uncertainty

Test item	Uncertainty
Peak Output Power	± 2.26 dB

Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2. RF Exposure Evaluation

2.1. 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/cm2)	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

RF Field Strength Limits for Controlled Use Devices (Controlled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m2)	Reference Period (minutes)
0.003-1023	170	180	-	Instantaneous*
0.1-10	-	1.6/ f	-	6**
1.29-10	193/ f 0.5	-	-	6**
10-20	61.4	0.163	10	6
20-48	129.8/ f 0.25	0.3444/ f 0.25	44.72/ f 0.5	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 f 0.25	0.04138 f 0.25	0.6455f0.5	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ f 1.2
150000-300000	0.354 f 0.5	9.40 x 10-4 f 0.5	3.33 x 10-4 f	616000/ f 1.2
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

Friis Formula

Friis transmission formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

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

Pd id the limit of MPE, 1 mW/cm^2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

2.3. Test Result of RF Exposure Evaluation

Product	Consumer Home Router		
Test Mode	Transmit Mode		
Test Condition	RF Exposure Evaluation		
Date of Test	2020/11/07	Test Site	SR12-H
Temperature(°C)	23.0℃	Test Humidity	58.0%

Antenna Gain: The maximum antenna gain is 4.64dBi.

Output Power into Antenna & RF Exposure Evaluation Distance:

WLAN Function 2.4GHz Band					
Mode	Frequency (MHz)	Maximum Conducted Output Power		Maximum Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)
		dBm	mW		
802.11b (CDD Mode)	2412	29.846	965.162	0.559	1
	2437	29.513	893.923	0.518	1
	2462	29.640	920.450	0.533	1
802.11g (CDD Mode)	2412	28.592	723.103	0.419	1
	2437	29.757	945.584	0.548	1
	2462	29.269	845.084	0.489	1
802.11ax (20MHz) (RU Mode_Full)	2412	23.059	202.255	0.117	1
	2437	29.934	984.918	0.570	1
	2462	24.830	304.089	0.176	1
802.11ax (40MHz) (RU Mode_Full)	2422	24.131	258.881	0.150	1
	2437	26.506	447.301	0.259	1
	2452	25.062	320.775	0.186	1
802.11ax (20MHz) (RU Mode_Center)	2412	21.847	153.003	0.089	1
	2437	29.830	961.612	0.557	1
	2462	22.798	190.458	0.110	1
802.11ax (40MHz) (RU Mode_Center)	2422	24.867	306.690	0.178	1
	2437	25.191	330.446	0.191	1
	2452	25.699	371.450	0.215	1

WLAN Function 2.4GHz Band					
Mode	Frequency (MHz)	Maximum Conducted Output Power		Maximum Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)
		dBm	mW		
802.11ax (20MHz) (RU Mode_Edge)	2412	21.946	156.531	0.091	1
	2437	29.793	953.455	0.552	1
	2462	22.594	181.719	0.105	1
802.11ax (40MHz) (RU Mode_Edge)	2422	24.480	280.543	0.162	1
	2437	25.124	325.387	0.188	1
	2452	25.315	340.017	0.197	1
802.11ax (20MHz) (Beamforming Mode)	2412	28.666	735.529	0.426	1
	2437	29.847	965.384	0.559	1
	2462	29.685	930.037	0.539	1
802.11ax (40MHz) (Beamforming Mode)	2422	26.782	476.650	0.276	1
	2437	29.019	797.811	0.462	1
	2452	27.677	585.733	0.339	1

Note:

1. The antenna information is from the customer declaration.
2. The EUT description is from the customer declaration.
3. The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.
4. The results are evaluated using the maximum power.

Product	Consumer Home Router		
Test Mode	Transmit Mode		
Test Condition	RF Exposure Evaluation		
Date of Test	2020/11/26	Test Site	SR12-H
Temperature(°C)	23.0℃	Test Humidity	64.0%

Antenna Gain: The maximum antenna gain is 4.94 (5GHz B1) & 5.05 (5GHz B3) dBi.

Output Power into Antenna & RF Exposure Evaluation Distance:

WLAN Function					
5GHz Band					
Mode	Frequency (MHz)	Conducted Output Power		Power Density at R = 20cm (mW/cm^2)	Limit (mW/cm^2)
		dBm	W		
802.11a (CDD Mode)	5180	27.965	625.893	0.388	1
	5220	29.038	801.309	0.497	1
	5240	29.032	800.203	0.497	1
	5745	28.218	663.437	0.422	1
	5785	29.957	990.148	0.630	1
	5825	29.402	871.365	0.555	1
802.11ax (20MHz) (RU Mode_Full)	5180	26.068	404.390	0.251	1
	5220	29.716	936.699	0.581	1
	5240	29.730	939.723	0.583	1
	5745	29.375	865.964	0.551	1
	5785	28.626	728.786	0.464	1
	5825	27.467	558.085	0.355	1
802.11ax (40MHz) (RU Mode_Full)	5190	23.010	199.986	0.124	1
	5230	28.861	769.308	0.477	1
	5755	25.136	326.287	0.208	1
	5795	28.158	654.335	0.416	1
802.11ax (80MHz) (RU Mode_Full)	5210	24.199	262.966	0.163	1
	5775	26.467	443.302	0.282	1

WLAN Function					
5GHz Band					
Mode	Frequency (MHz)	Conducted Output Power		Power Density at R = 20cm (mW/cm^2)	Limit (mW/cm^2)
		dBm	W		
802.11ax (20MHz) (RU Mode_Center)	5180	23.674	233.024	0.145	1
	5220	28.865	770.016	0.478	1
	5240	28.823	762.606	0.473	1
	5745	29.104	813.580	0.518	1
	5785	28.482	705.018	0.449	1
	5825	27.388	548.025	0.349	1
802.11ax (40MHz) (RU Mode_Center)	5190	22.986	198.884	0.123	1
	5230	27.013	502.690	0.312	1
	5755	24.763	299.433	0.191	1
	5795	26.923	492.380	0.313	1
802.11ax (80MHz) (RU Mode_Center)	5210	21.535	142.397	0.088	1
	5775	21.140	130.017	0.083	1
802.11ax (20MHz) (RU Mode_Edge)	5180	23.832	241.657	0.150	1
	5220	28.873	771.436	0.479	1
	5240	28.791	757.007	0.470	1
	5745	29.673	927.470	0.590	1
	5785	29.111	814.892	0.519	1
	5825	29.455	882.064	0.561	1
802.11ax (40MHz) (RU Mode_Edge)	5190	23.009	199.940	0.124	1
	5230	26.993	500.380	0.310	1
	5755	24.954	312.896	0.199	1
	5795	26.932	493.401	0.314	1
802.11ax (80MHz) (RU Mode_Edge)	5210	21.547	142.791	0.089	1
	5775	21.511	141.612	0.090	1

WLAN Function					
5GHz Band					
Mode	Frequency (MHz)	Conducted Output Power		Power Density at R = 20cm (mW/cm^2)	Limit (mW/cm^2)
		dBm	W		
802.11ax (20MHz) (Beamforming Mode)	5180	28.383	689.117	0.488	1
	5220	29.595	910.972	0.645	1
	5240	29.541	899.762	0.637	1
	5745	28.276	672.357	0.428	1
	5785	28.619	727.612	0.463	1
	5825	27.727	592.516	0.377	1
802.11ax (40MHz) (Beamforming Mode)	5190	25.760	376.740	0.267	1
	5230	29.409	872.728	0.617	1
	5755	24.365	273.212	0.174	1
	5795	29.120	816.582	0.520	1
802.11ax (80MHz) (Beamforming Mode)	5210	24.746	298.256	0.211	1
	5775	25.397	346.497	0.221	1

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4. The results are evaluated using the maximum power.

Product	Consumer Home Router		
Test Mode	Transmit Mode		
Test Condition	RF Exposure Evaluation		
Date of Test	2020/12/21	Test Site	SR12-H
Temperature(°C)	21.0	Humidity (%RH)	60.0

Antenna Gain: The maximum antenna gain is 2.15 dBi.

Output Power into Antenna & RF Exposure Evaluation Distance:

BT 4.0					
Mode	Frequency (MHz)	Conducted Output Power		Power Density at R = 20cm (mW/cm^2)	Limit (mW/cm^2)
		dBm	mW		
GFSK	2402	0.160	1.038	0.0003	1
	2440	0.180	1.042	0.0003	1
	2480	0.170	1.040	0.0003	1

Note:

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