

RF Exposure Evaluation Declaration

Product Name : Smart Display
Trade Name : Verizon
Model No. : LVD1
FCC ID : NKR-LVD1-IDU

Applicant : Wistron NeWeb Corporation

Address : No. 20, Yuanqu 2nd Rd., Baoshan

Township,,Hsinchu County 30844 Taiwan

Date of Receipt : May 06, 2021
Issued Date : Jun. 16, 2021
Report No. : 2150109R-E3082100013
Report Version : V1.0



The test results relate only to the samples tested.

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Product Name : Smart Display

Applicant : Wistron NeWeb Corporation

Address : No. 20, Yuanqu 2nd Rd., Baoshan Township,,Hsinchu County
30844 Taiwan

Manufacturer : Wistron NeWeb Corporation

Address : No. 20, Yuanqu 2nd Rd., Baoshan Township,,Hsinchu County
30844 Taiwan

Trade Name : Verizon

Model No. : LVD1

FCC ID : NKR-LVD1-IDU

EUT Voltage : AC 100-120V, 60Hz for adapter 1
AC 100-120V, 60Hz for adapter 2

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

:



(Scott Chang / Senior Engineer)

Approved By

:



(Louis Hsu / Deputy Manager)

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Jun. 16, 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.

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	2020/11/30	2021/11/29
Pulse Power Sensor	Anritsu	MA2411B	1531043	2020/11/30	2021/11/29
Pulse Power Sensor	Anritsu	MA2411B	1531044	2020/11/30	2021/11/29
Power Meter	Keysight	8990B	MY51000248	2021/05/21	2022/05/20
Power Sensor	Keysight	N1923A	MY57240005	2021/05/21	2022/05/20

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

1.3. Uncertainty

Test item	Uncertainty
Peak Output Power	± 1.27 dB

Note: 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/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

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/m ²)	Reference Period (minutes)
0.003-1023	170	180	-	Instantaneous*
0.1-10	-	1.6/ <i>f</i>	-	6**
1.29-10	193/ <i>f</i> 0.5	-	-	6**
10-20	61.4	0.163	10	6
20-48	129.8/ <i>f</i> 0.25	0.3444/ <i>f</i> 0.25	44.72/ <i>f</i> 0.5	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 <i>f</i> 0.25	0.04138 <i>f</i> 0.25	0.6455 <i>f</i> 0.5	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ <i>f</i> 1.2
150000-300000	0.354 <i>f</i> 0.5	9.40 x 10 ⁻⁴ <i>f</i> 0.5	3.33 x 10 ⁻⁴ <i>f</i>	616000/ <i>f</i> 1.2
Note: <i>f</i> is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

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

P_d is the limit of MPE, 1 mW/cm². 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	Smart Display
Test Mode	Transmit Mode
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum antenna gain is 1.11dBi for WiFi 2.4GHz 、3.5dBi for WiFi 5GHz and 3.21dBi for Bluetooth.

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)	(dBm)		
802.11b	2412	18.740	74.817	0.019	1.000
	2437	23.240	210.863	0.054	1.000
	2462	21.520	141.906	0.036	1.000
802.11g	2412	14.930	31.117	0.008	1.000
	2437	23.430	220.293	0.057	1.000
	2462	19.520	89.536	0.023	1.000
802.11n (20MHz)	2412	17.283	53.492	0.014	1.000
	2437	25.021	317.730	0.082	1.000
	2462	18.105	64.645	0.017	1.000
802.11n (40MHz)	2422	17.076	50.999	0.013	1.000
	2437	19.811	95.735	0.025	1.000
	2452	17.891	61.534	0.016	1.000

WLAN Function					
5GHz Band					
Mode	Frequency (MHz)	Maximum Conducted Output Power		Maximum Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)
		(dBm)	(dBm)		
802.11a	5180	20.640	115.878	0.052	1.000
	5220	21.660	146.555	0.065	1.000
	5240	21.630	145.546	0.065	1.000
	5260	21.590	144.212	0.064	1.000
	5300	21.720	148.594	0.066	1.000
	5320	18.610	72.611	0.032	1.000
	5500	20.030	100.693	0.045	1.000
	5580	21.520	141.906	0.063	1.000
	5700	19.740	94.189	0.042	1.000
	5745	24.180	261.818	0.117	1.000
	5785	24.140	259.418	0.116	1.000
	5825	24.020	252.348	0.112	1.000
802.11n (20MHz)	5180	20.058	101.340	0.045	1.000
	5220	22.219	166.702	0.074	1.000
	5240	22.356	172.034	0.077	1.000
	5260	22.419	174.529	0.078	1.000
	5300	22.614	182.558	0.081	1.000
	5320	20.806	120.393	0.054	1.000
	5500	21.171	130.940	0.058	1.000
	5580	22.371	172.633	0.077	1.000
	5700	18.779	75.497	0.034	1.000
	5745	26.295	426.125	0.190	1.000
	5785	25.672	369.110	0.164	1.000
	5825	26.020	399.982	0.178	1.000

Mode	Frequency (MHz)	Maximum Conducted Output Power		Maximum Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)
		(dBm)	(mW)		
802.11n (40MHz)	5190	16.485	44.511	0.020	1.000
	5230	23.264	212.012	0.094	1.000
	5270	21.756	149.841	0.067	1.000
	5310	17.810	60.397	0.027	1.000
	5510	18.397	69.128	0.031	1.000
	5550	23.787	239.157	0.107	1.000
	5670	22.008	158.771	0.071	1.000
	5755	26.377	434.167	0.193	1.000
	5795	25.997	397.877	0.177	1.000
802.11n (80MHz)	5210	15.919	39.077	0.017	1.000
	5290	17.492	56.135	0.025	1.000
	5530	17.226	52.792	0.024	1.000
	5610	22.974	198.337	0.088	1.000
	5775	24.714	296.076	0.132	1.000

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.

BT					
Mode	Frequency (MHz)	Maximum Conducted Output Power		Maximum Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)
		(dBm)	(dBm)		
GFSK	2402	2.540	1.795	0.001	1.000
	2441	2.580	1.811	0.001	1.000
	2480	2.380	1.730	0.001	1.000
8DQPSK	2402	3.190	2.084	0.001	1.000
	2441	3.180	2.080	0.001	1.000
	2480	2.740	1.879	0.001	1.000
GFSK_1M	2402	4.070	2.553	0.001	1.000
	2440	4.150	2.600	0.001	1.000
	2480	3.930	2.472	0.001	1.000
GFSK_2M	2402	4.110	2.576	0.001	1.000
	2440	4.200	2.630	0.001	1.000
	2480	3.990	2.506	0.001	1.000

Cat-M1

Band	Frequency (MHz) (Lowest Frequency)	Tune-up power (dBm)	Tune-up power (mW)	Power Density (mW/cm ²)	Antenna Gain (dBi)	Antenna Gain (linear)	Duty cycle (%)	FCC MPE limit (mW/cm ²)	Evaluation distance for compliance with MPE limits (cm)
LTE Band 13	779.5	25.700	371.535	0.089	0.830	1.211	100	0.520	20
LTE Band 4	1710.7	25.700	371.535	0.114	1.900	1.549	100	1.000	20

Co-location 1:

Power Density for LTE Band 4 (mW/cm ²)	Power Density for WiFi 2.4GHz (mW/cm ²)	Power Density for Bluetooth (mW/cm ²)	Collocation Power Density (mW/cm ²)	Limit (mW/cm ²)
0.114	0.082	0.001	0.197	1

Co-location 2:

Power Density for LTE Band 4 (mW/cm ²)	Power Density for WiFi 2.4GHz (mW/cm ²)	Power Density for WiFi 5GHz (mW/cm ²)	Collocation Power Density (mW/cm ²)	Limit (mW/cm ²)
0.114	0.082	0.193	0.389	1

Co-location 3:

Power Density for LTE Band 13 (mW/cm ²)	Power Density for WiFi 2.4GHz (mW/cm ²)	Power Density for Bluetooth (mW/cm ²)	Collocation Power Density (mW/cm ²)	Limit (mW/cm ²)
0.089	0.082	0.001	0.255	1

Co-location 4:

Power Density for LTE Band 13 (mW/cm ²)	Power Density for WiFi 2.4GHz (mW/cm ²)	Power Density for WiFi 5GHz (mW/cm ²)	Collocation Power Density (mW/cm ²)	Limit (mW/cm ²)
0.089	0.082	0.193	0.447	1