FCC RADIO EXPOSURE TEST REPORT

FCC ID	:	NKR-DHURAZ68
Equipment	:	DHUR-AZ68 11a/b/g/n/ac 2x2 module
Brand Name	:	WNC
Model Name	:	DHUR-AZ68
Applicant	:	Wistron NeWeb Corporation 20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan
Manufacturer	:	Wistron NeWeb Corporation 20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan
Standard	:	47 CFR Part 2.1091

The product was received on Oct. 20, 2017, and testing was started from Apr. 02, 2018 and completed on Apr. 23, 2018. We, SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.
The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory
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History of this test report

Report No.	Version	Description	Issued Date
FA7D1429-01	01	Initial issue of report	May 04, 2018

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Reviewed by: Sam Chen

Report Producer: Vicky Huang

1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	**Frequency Range (MHz)**	**Operating Frequency (MHz)**	**Modulation Type**
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
5GHz WLAN	5150-5250 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / π/4-DQPSK / 8DPSK) LE: DSSS (GFSK)

1.2 Antenna Information

Set	Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)		
							WLAN 2.4GHz	WLAN 5GHz	Bluetooth
1	1	1	WNC	-	Printed Antenna	N/A	5.31	5.92	-
	2	2	WNC	-	Printed Antenna	N/A	5.26	5.91	-
2	3	1	WNC	81.EK615.G69	PIFA Antenna	I-PEX	3.71	5.21	-
	4	2	WNC	81.EK615.G68	PIFA Antenna	I-PEX	2.44	6.64	-
3	5	1	WNC	81.EK615.G66	PIFA Antenna	I-PEX	2.02	5.20	-
	6	2	WNC	81.EK615.G65	PIFA Antenna	I-PEX	0.64	5.06	-
4	7	1	WNC	81.EK615.G72	PIFA Antenna	I-PEX	1.08	3.67	-
	8	2	WNC	81.EK615.G71	PIFA Antenna	I-PEX	0.68	2.47	-
5	9	1	WNC	81.EK615.G56	PIFA Antenna	I-PEX	1.97	3.83	-
	10	2	WNC	81.EK615.G57	PIFA Antenna	I-PEX	1.73	3.88	-
6	11	1	WNC	81.EK615.G58	PIFA Antenna	I-PEX	-	-	5.85
7	12	1	WNC	81.EK615.G59	PIFA Antenna	I-PEX	-	-	4.03
8	13	1	WNC	81.EK615.G51	PIFA Antenna	I-PEX	-	-	1.29
9	14	1	WNC	81.EK615.G64	PIFA Antenna	I-PEX	-	-	-0.5
10	15	1	WNC	81.EK615.G67	PIFA Antenna	I-PEX	-	-	1.84
11	16	1	WNC	81.EK615.G70	PIFA Antenna	I-PEX	-	-	0.73

Note: The EUT has eleven set antennas, and they have total of sixteen antennas.

For 2.4GHz / 5GHz WLAN function (2TX/2RX):

Antenna set 1~5 support 2.4GHz / 5GHz WLAN function.

Antenna set 2~5 are the same type antennas, only the higher gain antenna “Set 2” was tested and recorded in the report.

Port 1 and Port 2 could transmit/receive simultaneously.

For Bluetooth function (1TX/1RX):

Antenna set 6~11 support Bluetooth function.

Antenna set 6~11 are the same type antennas, only the higher gain antenna “Set 6” was tested and recorded in the report.

Only Port 1 can be used as transmitting/receiving.

1.3 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA7D1249

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
Adding 10 set antennas for PIFA antenna. (Set 2-Model Name: Port 1:81.EK615.G69/Port 2:81.EK615.G68, Set 3-Model Name: Port 1:81.EK615.G66/Port 2:81.EK615.G65, Set 4-Model Name: Port 1:81.EK615.G72/Port 2:81.EK615.G71, Set 5-Model Name: Port 1:81.EK615.G56/Port 2:81.EK615.G57, Set 6-Model Name: 81.EK615.G58, Set 7-Model Name: 81.EK615.G59, Set 8-Model Name: 81.EK615.G51, Set 9-Model Name: 81.EK615.G64, Set 10-Model Name: 81.EK615.G67, Set 11-Model Name: 81.EK615.G70)	It evaluated for Maximum Permissible Exposure.

Note: Maximum Permissible Exposure of Antenna “Set 1” is based on original test report.

1.4 Testing Location

Testing Location			
☐	HWA YA	ADD :	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
		TEL :	886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD :	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
		TEL :	886-3-656-9065 FAX : 886-3-656-9085

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(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/ cm²)	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)*	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/ cm²)	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)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

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

2.2 MPE Calculation Method

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:

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

Pd = $\frac{30 \times P \times G}{377 \times d^2}$

2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For EUT with Set 1 antennas:

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)
2.4G;G1D	5.31	23.43	28.74	0.50	29.24	0.83946	20	0.16708	1.00000
5.2G;D1D	5.92	23.82	29.74	0.50	30.24	1.05682	20	0.21025	1.00000
5.8G;D1D	5.92	25.73	31.65	0.50	32.15	1.64059	20	0.32655	1.00000

For EUT with Set 2 antennas:

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)
2.4G;G1D	3.71	25.32	29.03	0.50	29.53	0.89743	20	0.17854	1.00000
5.2G;D1D	6.64	23.10	29.74	0.26	30.00	1.00000	20	0.19894	1.00000
5.8G;D1D	6.64	25.93	32.57	0.50	33.07	2.02768	20	0.40339	1.00000

For EUT with Set 6 antennas:

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)
2.4G;BT-LE	5.85	6.63	12.48	0.50	12.98	0.01986	20	0.00395	1.00000
2.4G;BT-BR	5.85	6.84	12.69	0.50	13.19	0.02084	20	0.00415	1.00000
2.4G;BT-EDR	5.85	6.92	12.77	0.50	13.27	0.02123	20	0.00422	1.00000

Simultaneous Transmission Analysis Mode:

1. EUT with Set 1 and Set 6 antennas (2.4GHz WLAN + Bluetooth function)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)	Ratio (S/Limit)
2.4G;D1D	5.31	23.43	28.74	0.50	29.24	0.83946	20	0.16708	1	0.16708
2.4G;BT-EDR	5.85	6.92	12.77	0.50	13.27	0.02123	20	0.00422	1	0.00422
									Sum Ratio	0.17113
									Ratio Limit	1

2. EUT with Set 1 and Set 6 antennas (5GHz WLAN + Bluetooth function)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)	Ratio (S/Limit)
5.8G;D1D	5.92	25.73	31.65	0.50	32.15	1.64059	20	0.32655	1	0.32655
2.4G;BT-EDR	5.85	6.92	12.77	0.50	13.27	0.02123	20	0.00422	1	0.00422
									Sum Ratio	0.33077
									Ratio Limit	1

3. EUT with Set 2 and Set 6 antennas (2.4GHz WLAN + Bluetooth function)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)	Ratio (S/Limit)
2.4G;D1D	3.71	25.32	29.03	0.50	29.53	0.89743	20	0.17853	1	0.17853
2.4G;BT-EDR	5.85	6.92	12.77	0.50	13.27	0.02123	20	0.00422	1	0.00422
									Sum Ratio	0.18275
									Ratio Limit	1

4. EUT with Set 2 and Set 6 antennas (5GHz WLAN + Bluetooth function)

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)	Ratio (S/Limit)
5.8G;D1D	6.64	25.93	32.57	0.50	33.07	2.02768	20	0.40339	1	0.40339
2.4G;BT-EDR	5.85	6.92	12.77	0.50	13.27	0.02123	20	0.00422	1	0.00422
									Sum Ratio	0.40761
									Ratio Limit	1

THE END