RADIO EXPOSURE TEST REPORT

FCC ID	:	NKR-DHURAZ63
Equipment	:	DHUR-AZ63 11a/b/g/n/ac 2x2 module
Brand Name	:	WNC
Model Name	:	DHUR-AZ63
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. 27, 2021, and testing was started from Nov. 05, 2021 and completed on Nov. 30, 2021. We, Sporton International Inc. Hsinchu 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 test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
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History of this test report

Report No.	Version	Description	Issued Date
FA1O2738	01	Initial issue of report	Dec. 13, 2021

Summary of Test Result

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

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.

Reviewed by: Sam Chen

Report Producer: Sandy Chuang

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 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5700 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: GFSK

1.2 Antenna Information

Set	Ant.	Port			Brand	Part Number	Antenna Type	Connector	Support Type	Equip EUT
		WLAN 2.4GHz (WLAN/BT)	WLAN 5GHz	BT						
1	1	1	1	-	WNC	Wifi Ant0	Printed	N/A	WLAN	1
	2	2	2	-	WNC	Wifi Ant1	Printed	N/A		
2	1	1	1	-	WNC	81.EK615.GAA	PIFA	I-PEX	WLAN	2
	2	2	2	-						
3	1	1	1	-	WNC	81.EK615.GAF	PIFA	I-PEX	WLAN	2
	2	2	2	-						
4	1	-	-	1	WNC	81.EK615.GAM	PIFA	I-PEX	BT	1 or 2
5	1	-	-	1	WNC	81.EK615.GAV	PIFA	I-PEX	BT	1 or 2
6	1	-	-	1	WNC	81.EK615.G90	PIFA	I-PEX	BT	1 or 2

Note1:

Set	Ant.	Port			Antenna Gain (dBi)		
		WLAN 2.4GHz (WLAN/BT)	WLAN 5GHz	BT	WLAN 2.4GHz	WLAN 5GHz	Bluetooth
1	1	1	1	-	5.31	5.92	-
	2	2	2	-	5.26	5.91	-
2	1	1	1	-	2.26	6.93	-
	2	2	2	-	2.26	6.93	-
3	1	1	1	-	3.09	5.35	-
	2	2	2	-	3.09	5.35	-
4	1	-	-	1	-	-	4.04
5	1	-	-	1	-	-	4.87
6	1	-	-	1	-	-	0.75

Note2: The above information was declared by manufacturer.

Only the highest gain antenna was selected from each different type of antenna to test. Thus, antenna set 1, 3 were selected to perform the WLAN 2.4GHz test, antenna set 1, 2 were selected to perform the WLAN 5GHz test, and antenna set 5 was selected to perform the Bluetooth test.

Note3:

<WLAN 2.4GHz Function>

For IEEE 802.11b/g/n/ax (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

<WLAN 5GHz Function>

For IEEE 802.11a/n/ac (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

<Bluetooth Function> (1TX/1RX)

Only Port 1 can be used as transmitting/receiving.

Note 4: Directional gain information

Maximum Output Power	Power Spectral Density
Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$Directional\ Gain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left[\sum_{k=1}^{N_{ANT}} g_{j,k}\right]^2}{N_{ANT}}\right]$

Ex.

Directional Gain (NSS1) formula : $Directional\ Gain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left[\sum_{k=1}^{N_{ANT}} g_{j,k}\right]^2}{N_{ANT}}\right]$

NSS1(g1,1) = $10^{G1/20}$; NSS1(g1,2)= $10^{G2/20}$

gj,k =(Nss1(g1,1) + Nss1(g1,2)

DG = 10 log[(Nss1(g1,1) + Nss1(g1,2) / N_{ANT}] => 10 log[($10^{G1/20}$ + $10^{G2/20}$ + / N_{ANT}]

Where ;

G1 = Ant 1 Gain ; G2 = Ant 2 Gain

<For EUT 1>

2.4GHz DG = 8.30 dBi

5 GHz U-NII-1 DG = 8.93 dBi

5 GHz U-NII-2A DG = 8.93 dBi

5 GHz U-NII-2C DG = 8.93 dBi

5 GHz U-NII-3 DG = 8.93 dBi

<For EUT 2>

2.4GHz DG = 6.10 dBi

5 GHz U-NII-1 DG = 9.94 dBi

5 GHz U-NII-2A DG = 9.94 dBi

5 GHz U-NII-2C DG = 9.94 dBi

5 GHz U-NII-3 DG = 9.94 dBi

1.3 Table for EUT Information

EUT	WLAN Antenna	Bluetooth Antenna	Equip Antenna Set
1	Internal	External	Set 1, 4~6
2	External	External	Set 2~6

1.4 Accessories

N/A

1.5 Testing Location

Testing Location Information	
Test Lab.：Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

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^2)	<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^2)	<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 1

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;D1D	5.31	25.71	31.02	0.50	31.52	1.41906	20	0.28231	1.00000
5.2G;D1D	5.92	22.44	28.36	0.50	28.86	0.76913	20	0.15301	1.00000
5.3G;D1D	5.92	22.59	28.51	0.50	29.01	0.79616	20	0.15839	1.00000
5.6G;D1D	5.92	22.72	28.64	0.50	29.14	0.82035	20	0.16320	1.00000
5.8G;D1D	5.92	25.28	31.20	0.50	31.70	1.47911	20	0.29425	1.00000
2.4G;BT-EDR	4.87	6.15	11.02	0.50	11.52	0.01419	20	0.00282	1.00000
2.4G;BT-LE	4.87	6.29	11.16	0.50	11.66	0.01466	20	0.00292	1.00000

For EUT 2

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;D1D	3.09	26.74	29.83	0.50	30.33	1.07895	20	0.21464	1.00000
5.2G;D1D	6.93	21.92	28.85	0.50	29.35	0.86099	20	0.17129	1.00000
5.3G;D1D	6.93	21.64	28.57	0.50	29.07	0.80724	20	0.16060	1.00000
5.6G;D1D	6.93	22.33	29.26	0.50	29.76	0.94624	20	0.18825	1.00000
5.8G;D1D	6.93	26.59	33.52	0.50	34.02	2.52348	20	0.50202	1.00000
2.4G;BT-EDR	4.87	6.15	11.02	0.50	11.52	0.01419	20	0.00282	1.00000
2.4G;BT-LE	4.87	6.29	11.16	0.50	11.66	0.01466	20	0.00292	1.00000

Simultaneous Transmission Analysis Mode:

For EUT 1 with 2.4GHz WLAN (Ant. Set 1) + Bluetooth (Ant. Set 5)

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	25.71	31.02	0.50	31.52	1.41906	20	0.28231	1.00000	0.28231
2.4G;BT-LE	4.87	6.29	11.16	0.50	11.66	0.01466	20	0.00292	1.00000	0.00292
									Sum Ratio	0.28523
									Ratio Limit	1

For EUT 1 with 5GHz WLAN (Ant. Set 1) + Bluetooth (Ant. Set 5)

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	25.28	31.20	0.50	31.70	1.47911	20	0.29425	1.00000	0.29425
2.4G;BT-LE	4.87	6.29	11.16	0.50	11.66	0.01466	20	0.00292	1.00000	0.00292
									Sum Ratio	0.29717
									Ratio Limit	1

For EUT 2 with 2.4GHz WLAN (Ant. Set 3) + Bluetooth (Ant. Set 5)

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	3.09	26.74	29.83	0.50	30.33	1.07895	20	0.21464	1.00000	0.21464
2.4G;BT-LE	4.87	6.29	11.16	0.50	11.66	0.01466	20	0.00292	1.00000	0.00292
									Sum Ratio	0.21756
									Ratio Limit	1

For EUT 2 with 5GHz WLAN (Ant. Set 2) + Bluetooth (Ant. Set 5)

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	6.93	26.59	33.52	0.50	34.02	2.52348	20	0.50202	1.00000	0.50202
2.4G;BT-LE	4.87	6.29	11.16	0.50	11.66	0.01466	20	0.00292	1.00000	0.00292
									Sum Ratio	0.50494
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

———THE END———