Testing Laboratory 3787

RADIO EXPOSURE TEST REPORT

FCC ID	:	NKR-ATTC61W1
Equipment	:	Wireless Genie Mini
Brand Name	:	DirecTV
Model Name	:	C61W-400, C61WBP-400, C61WNC-400
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 Feb. 11, 2017, and testing was started from Feb. 11, 2017 and completed on Jul. 15, 2023. 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
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FA730747-01	01	Initial issue of report	Jul. 25, 2023

Summary of Test Result

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

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account. 2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sam Chen

Report Producer: Viola Huang

1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	**Frequency Range (MHz)**	**Operating Frequency (MHz)**	**Modulation Type**
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5720 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
RF4CE	2400-2483.5	2425-2475	O-QPSK

1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	2	WNC	ANT1	PCB	N/A	Note 1
2	1	WNC	ANT2	PCB	N/A	
3	1	Airgain	N5X35BCMY	PIFA	I-PEX	
4	2	Airgain	N5X35BCHY	PIFA	I-PEX	
5	3	Airgain	N5X35BC2MY	PIFA	I-PEX	
6	4	Airgain	N5X35BC2MY	PIFA	I-PEX	

Note 1:

Ant.	Gain (dBi)						
	2.4GHz	2.45G	2.4835G	5.2GHz	5.3GHz	5.6GHz	5.785GHz
1	1.66	2.79	2.77	-	-	-	-
2	3.72	3.49	2.32	-	-	-	-
3	-	-	-	1.89	1.77	1.83	2.06
4	-	-	-	1.73	2.2	1.35	1.77
5	-	-	-	2.07	1.91	1.25	2.61
6	-	-	-	2.94	2.67	3.22	3.11
Items	**Directional Gain (dBi)**						
4T1S	-	-	-	4.53	4.63	4.42	6
4T2S	-	-	-	2.94	2.67	3.22	3.11
4T4S	-	-	-	2.94	2.67	3.22	3.11

Note 2: The above information (except gain) was declared by manufacturer.

Note 3: 2.4GHz, 5GHz UNII 1~UNII 3: Maximum Directional Gain following KDB662911 D03.

For 2.4GHz:

For IEEE802.15.4 (1TX/1RX)

The EUT supports the antenna with TX and RX diversity functions.

Both Port 1 and Port 2 support transmit and receive functions, but only one of them will be used at one time.

The Port 1 generated the worst case, so it was selected to test and record in the report.

For 5GHz UNII 1~UNII 3:

For IEEE 802.11a/n/ac (4TX/4RX)

Port 1~Port 4 can be used as transmitting/receiving antenna.

Port 1~Port 4 could transmit/receive simultaneously.

1.3 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	Description
C61W-400	All the models are identical, the different model names served as package different.
C61WBP-400	
C61WNC-400	

Note 1: From the above models, model: C61W-400 was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

1.4 Accessories

N/A

1.5 EUT Support Function

Function	Supports Type	Supports band
AP	Master	5GHz UNII 1/3, RF4CE
Slave	Slave without Radar	5GHz UNII 1~3, RF4CE

1.6 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2.1091

KDB 447498 D04 Interim General RF Exposure Guidance v01

The following reference test guidance is not within the scope of accreditation of TAF.

- 47 CFR Part 1.1307
- 47 CFR Part 1.1310

1.7 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/f²)	<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/f²)	<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 MPE Exemption

Option (A): 1.1307(b)(3)(i)(A): Available maximum time-averaged power is < 1 mW

Option (B): 1.1307(b)(3)(i)(B): Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, <= Pth.

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

Option (C): 1.1307(b)(3)(i)(C): ERP is below a threshold calculated based on the distance R between the person and the antenna / radiating structure, where R > λ / 2 π.

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	**Threshold ERP (watts)**
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.
Note: R is in meters, f is in MHz.	

2.4 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For RF4CE

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	3.72	2.54	6.26	0.50	6.76	0.00474	20	0.00094	1.00000

For 5GHz / For AP mode UNII 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)
5.2G;D1D	4.53	27.46	31.99	0.50	32.49	1.77419	20	0.35296	1.00000

For Slave mode UNII 1~3 and AP mode UNII 3

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)
5.2G;D1D	4.53	22.76	27.29	0.50	27.79	0.60117	20	0.11960	1.00000
5.3G;D1D	4.63	23.14	27.77	0.50	28.27	0.67143	20	0.13357	1.00000
5.6G;D1D	4.42	23.48	27.90	0.50	28.40	0.69183	20	0.13763	1.00000
5.8G;D1D	6.00	27.66	33.66	0.50	34.16	2.60615	20	0.51847	1.00000

MPE Exemption Option B						
Frequency (MHz)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
2475	0.2	6.76	4.61	0.003	3.060	Complies
5755		34.16	32.01	1.589	3.060	Complies

Simultaneous Transmission Analysis Mode: WLAN 2.4GHz (RF4CE) + WLAN 5GHz

Simultaneous Transmissions Option B							
Frequency (MHz)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	Simultaneous Transmissions	Simultaneous Transmissions Limit
2475	0.2	6.76	4.61	0.003	3.060	0.52	<= 1
5755		34.16	32.01	1.589	3.060		

Note: The above antenna gain was declared by manufacturer.

———THE END———