

Report No: ER/2012/10002-02 Issue Date: Jan. 19, 2012

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RADIO FREQUENCY RADIATION EXPOSURE REPORT

Mobiles /Fixed Base Station Maximum Permissible Exposure (MPE)

OF

Product Name: Universal WiFi N 5 Port Ethernet Hub

Brand Name: IOGEAR

Model Name: GWU647, GWU647W6

Model Different: For market segmentation

FCC ID: QLEGWU647

Report No.: ER/2012/10002-02

Issue Date: Jan. 19, 2012

Prepared for: ATEN Technology Inc. dba IOGEAR

19641 Da Vinci, Foothill Ranch, CA 92610

Prepared by: SGS Taiwan Ltd.

Electronics & Communication Laboratory

No. 134, Wu Kung Rd., Wuku Industrial Zone,

Taipei County, Taiwan.

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VERIFICATION OF COMPLIANCE

Applicant: ATEN Technology Inc. dba IOGEAR

19641 Da Vinci, Foothill Ranch, CA 92610

Product Name: Universal WiFi N 5 Port Ethernet Hub

Brand Name: IOGEAR

FCC ID: QLEGWU647

Model No.: GWU647, GWU647W6

Model Difference: For market segmentation

File Number: ER/2011/10002-02

Date of test: Jan. 02, 2012 ~ Jan. 18, 2012

Date of EUT Received: Jan. 02, 2012

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd., Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in FCC OET Bulletin 65 Supplement C and 47 CFR §2.1091 and RSS102.

The test results of this report relate only to the tested sample identified in this report.

Test By:	Cion Wang	Date	Jan. 19, 2012	
Prepared By:	Lion Wang / Engineer Gigi yek	Date	Jan. 19, 2012	
Approved By:	Gigi Yeh / Clerk Jim Chang / Supervisor	Date 	Jan. 19, 2012	

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Report Version

Version No.	Date	Description
00	Jan. 19, 2012	Initial creation of document

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1. GENERAL INFORMATION

General:

Product Name:	WLAN 11n Router
Brand Name:	IOGEAR
Model No.:	GWU647, GWU647W6
Model Difference:	For market segmentation
Hardware Version:	289G129704-B0
Software Version:	00-029700-01[F/W,WA-6212]
Power Supply:	5V from AC/DC adapter, model: DSC-6PFC-05FUS, Supplier: DVE

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WLAN: 802.11 b/g/n

VLAN. 002.11 D/g/II	
Frequency Range:	802.11b / g / n_20MHz: 2412 – 2462 MHz 802.11 n_40MHz: 2422 – 2452 MHz
	802.11 h_40MHz. 2422 - 2432 MHz 802.11b / g / n_20MHz: 11 channels
Channel number:	802.11 n_40MHz: 9 channels
Max. Output Power:	802.11 b: 20.09 dBm (Peak) 802.11 g: 18.25 dBm (Peak) 802.11 n _20MHz: 13.23dBm (Peak) 802.11 n _40MHz: 13.57dBm (Peak) 802.11 n _20MHz(MIMO): 16.04dBm (Peak) 802.11 n _40MHz(MIMO): 16.40dBm (Peak)
Modulation Technology:	DSSS, OFDM
Modulation type:	CCK, DQPSK, DBPSK for DSSS 64QAM. 16QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 7.2 – 144.4Mbps 802.11 n_40MHz: 15 – 300Mbps
Antenna Spec:	2.4G Dipole Antenna 30G000036-00 Antenna 80mm: 2 dBi 30G000025-07 Antenna 140mm: 2 dBi
Antenna Designation:	2.4G Dipole Antenna 2dBi+10log(2)=5.01 dBi
Type of Emission:	802.11 b : 15M0G1D 802.11 g : 16M5G1D 802.11 n_20MHz : 17M7G1D 802.11 n_40MHz : 36M0G1D

The EUT is compliance with IEEE 802.11 b/g/n Standard. This report applies for frequency IEEE 802.11 b/g/n

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1.1 Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range	Electric Field	Magnetic Field	Power Density	Averaging Time
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm^2)	(minute)
	Limits for Gene	ral Population/Uncon	trolled Exposure	
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
1500-15000	/	/	1.0	30

F = frequency in MHz

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^{* =} Plane-wave equipment power density



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1.2 Maximum Permissible Exposure (MPE) Evaluation

MPE Prediction (802.11b/g)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

 $S=PG/4 \pi R^2$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

2412MHz

Maximum peak output power at antenna input terminal:	20.09	(dBm)
Maximum peak output power at antenna input terminal:	102.0939484	(mW)
Duty cycle:	100	(%)
Maximum Pav :	102.0939484	(mW)
Antenna gain (typical):	5.01	(dBi)
Maximum antenna gain:	3.169567463	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2462	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.0644096	(mW/cm^2)
Measurement Result:		
The predicted power density level at 20 cm is	0.644095655	(W/m^2)
This is below the uncontrolled exposure limit of 1 mW/cm	2462	MHz

Measurement Result

The predicted power density level at 20 cm is $0.64409565~\text{W/cm}^2$. This is below the uncontrolled exposure limit of $1~\text{mW/cm}^2$ at 2462MHz.

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MPE Prediction (802.11n_20M) (MIMO mode)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

 $S=PG/4 \pi R^2$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

The worst case: 802.11n_20M MIMO mode

Maximum peak output power at antenna input terminal:	16.04	(dBm)
Maximum peak output power at antenna input terminal:	40.17908108	(mW)
Duty cycle:	100	(%)
Maximum Pav :	40.17908108	(mW)
Antenna gain (typical):	5.01	(dBi)
Maximum antenna gain:	3.169567463	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2412	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.0253484	(mW/cm^2)
Measurement Result:		
The predicted power density level at 20 cm is	0.253483894	(W/m^2)
This is below the uncontrolled exposure limit of 1 mW/cm	2412	MHz

1.

Measurement Result

The predicted power density level at 20 cm is 0.0253484 W/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 2412MHz.

Note: directional gain = Gain + 10 Log (N) dBi = 2 + 3.0103 = 5.01 dBi, where n is number of antenna used with host, is employed as Max. Gain as per 662911

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MPE Prediction (802.11n_40mM (MIMO mode)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

 $S=PG/4 \pi R^2$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

The worst case: 802.11n_40M MIMO mode

Maximum peak output power at antenna input terminal:	16.4	(dBm)
Maximum peak output power at antenna input terminal:	43.65158322	(mW)
Duty cycle:	100	(%)
Maximum Pav :	43.65158322	(mW)
Antenna gain (typical):	5.01	(dBi)
Maximum antenna gain:	3.169567463	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2.422	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.0275391	(mW/cm^2)
Measurement Result:		
The predicted power density level at 20 cm is	0.275391397	(W/m^2)
This is below the uncontrolled exposure limit of 1 mW/cm	2.422	MHz

Measurement Result

The predicted power density level at 20 cm is 0.0275391 W/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 2422MHz.

Note: directional gain = Gain + 10 Log (N) dBi = 2 + 3.0103 = 5.01 dBi, where n is number of antenna used with host, is employed as Max. Gain as per 662911

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APPENDIX 1 PHOTOGRPHS OF EUT

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All of EUT



Front View of EUT



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Back View of EUT



Side View of EUT - 1



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Side View of EUT – 2



Side View of EUT - 3



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Side View of EUT - 4



Adapter



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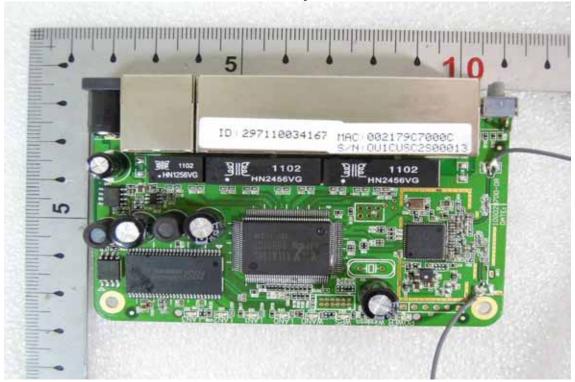
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Open View of EUT - 1



Internal View of EUT - 1



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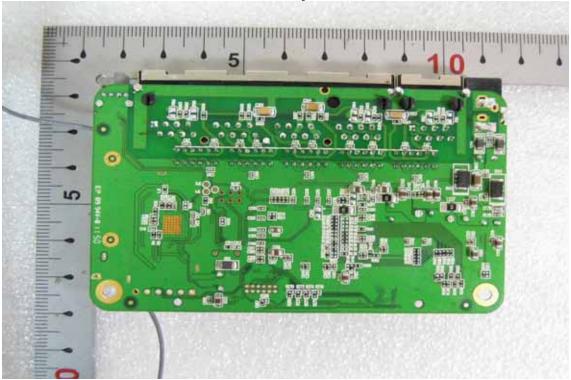


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Internal View of EUT - 2



~ End of Report ~

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