

RF Exposure Evaluation Declaration

Product Name : 802.11n Wireless LAN Module

Model No. : N611

FCC ID : I88N611

Applicant : ZyXEL Communication Corporation

Address : No.6, Innovation Rd II, Science-Based Industrial
Park, Hsin-Chu, Taiwan

Date of Receipt : 2008/08/12

Issued Date : 2008/09/08

Report No. : 088S063-RF-US

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by CNLA, NVLAP, NIST or any agency of the Government.

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Test Report Certification

Issued Date : 2008/09/08

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Product Name : 802.11n Wireless LAN Module
Applicant : ZyXEL Communication Corporation
Address : No.6, Innovation Rd II, Science-Based Industrial Park,
Hsin-Chu, Taiwan
Applicant : ZyXEL Communication (Wuxi) Corp.
Address : Wuxi New District 60#-E Jiangsu PRC
Model No. : N611
FCC ID : I88N611
EUT Voltage : DC 3.3V
Trade Name : ZyXEL
Applicable Standard : FCC OET 65
Test Result : Complied
Performed Location : SuZhou EMC laboratory
No.99 Hongye Rd., Suzhou Industrial Park Loufeng
Hi-Tech Development Zone., SuZhou, China
TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098
FCC Registration Number: 800392

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(Gene Chang)

Laboratory Information

We , **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited by the following accreditation Bodies in compliance with ISO 17025, EN 45001 and Guide 25:

Taiwan R.O.C.	: BSMI, DGT, CNLA
Germany	: TUV Rheinland
Norway	: Nemko, DNV
USA	: FCC, NVLAP
Japan	: VCCI

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://tw.quietek.com/modules/myalbum/>
 The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>
 If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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1. RF Exposure Evaluation

1.1. 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

Friis Formula

Friis transmission formula: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd 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.

1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18°C and 78% RH.

1.3. Test Result of RF Exposure Evaluation

Product	:	802.11n Wireless LAN Module
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-4

802.11b (DAC0) (2412 - 2462MHz)

RF Exposure Measurement Results: Antenna Gain (5dBi)

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	56.1048	0.0353
06	2437.00	50.5825	0.0318
11	2462.00	49.2040	0.0310

802.11b (DAC1) (2412 - 2462MHz)

RF Exposure Measurement Results: Antenna Gain (5dBi)

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	59.7035	0.0376
06	2437.00	61.3762	0.0386
11	2462.00	66.9885	0.0421

802.11g (DAC0) (2412 - 2462MHz)

RF Exposure Measurement Results: Antenna Gain (5dBi)

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	103.7528	0.0653
06	2437.00	101.1579	0.0636
11	2462.00	94.8418	0.0597

802.11g (DAC1) (2412 - 2462MHz)

RF Exposure Measurement Results: Antenna Gain (5dBi)

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	112.7197	0.0709
06	2437.00	121.6186	0.0765
11	2462.00	129.1219	0.0812

802.11n (20MHz) (DAC0) (2412 - 2462MHz)

RF Exposure Measurement Results: Antenna Gain (5dBi)

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	97.9490	0.0616
06	2437.00	101.8591	0.0641
11	2462.00	97.2747	0.0612

802.11n (20MHz) (DAC1) (2412 - 2462MHz)

RF Exposure Measurement Results: Antenna Gain (5dBi)

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	112.9796	0.0711
06	2437.00	120.2264	0.0756
11	2462.00	128.8250	0.0810

802.11n (20MHz) (DAC0 and DAC1) (2412 - 2462MHz)

RF Exposure Measurement Results: Antenna Gain (5dBi)

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	181.9701	0.1145
06	2437.00	190.9853	0.1202
11	2462.00	215.2782	0.1354

802.11n (40MHz) (DAC0) (2422 - 2452MHz)

RF Exposure Measurement Results: Antenna Gain (5dBi)

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
03	2422.00	87.9023	0.0553
06	2437.00	95.7194	0.0602
09	2452.00	89.5365	0.0563

802.11n (40MHz) (DAC1) (2422 - 2452MHz)

RF Exposure Measurement Results: Antenna Gain (5dBi)

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
03	2422.00	11.6950	0.0074
06	2437.00	121.0598	0.0762
09	2452.00	126.1828	0.0794

802.11n (40MHz) (DAC0 and DAC1) (2422 - 2452MHz)

RF Exposure Measurement Results: Antenna Gain (5dBi)

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
03	2422.00	153.8155	0.0968
06	2437.00	211.3489	0.1330
09	2452.00	196.7886	0.1238