RF Exposure Evaluation Declaration

Product Name ： WIRELESS-N NETWORK MINI PCI ADAPTER

Model No. ： IWAVEPORT WLM200NX

Applicant ： Compex Systems Pte Ltd

Address ： 135 Joo Seng Road, #08-01 PM Industrial Building
Singapore 368363

Date of Receipt ： 2008/09/10

Issued Date ： 2008/10/30

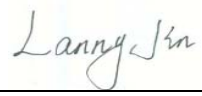
Report No. ： 089S061R-RF-CE

Test Report Certification

Issued Date : 2008/10/30
Report No. : 089S061R-RF-CE

QuieTek

Product Name	:	WIRELESS-N NETWORK MINI PCI ADAPTER
Applicant	:	Compex Systems Pte Ltd
Address	:	135 Joo Seng Road, #08-01 PM Industrial Building Singapore 368363
Manufacturer	:	Compex Systems Pte Ltd
Address	:	135 Joo Seng Road, #08-01 PM Industrial Building Singapore 368363
Model No.	:	IWAVEPORT WLM200NX
Rated Voltage	:	AC 230 V / 50 Hz
EUT Voltage	:	DC 3.3V
Trade Name	:	COMPEX
Applicable Standard	:	EN 50392: 2004
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

Documented By : 
(Lanny Jin)

Reviewed By : 
(Marlin Chen)

Approved By : 
(Gene Zhang)

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:

HsinChu Testing Laboratory :

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TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : service@quietek.com

NVLAP Lab Code : 200347-0

LinKou Testing Laboratory :

No. 5, Ruei-Shu Valley, Ruei-Ping Tsuen, Lin-Kou Shiang, Taipei, Taiwan, R.O.C.
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NVLAP Lab Code: 200533-0

Suzhou Testing Laboratory :

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TEL : +86-512-6251-5088 / FAX : 86-512-6251-5098 E-Mail : service@quietek.com

NVLAP Lab Code : 200743-0

1. RF Exposure Measurement

The scope of this standard is limited to apparatus which is intended for use by the general public as defined in the Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (Official Journal L 199 of 30 July 1999).
This generic standard applies to electronic and electrical apparatus for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies.
This generic standard does not cover equipment, which fulfils the requirements given in EN 50371 or is medical equipment as defined in the Council Directive 93/42/EEC of 14 June 1993 concerning medical devices.
The frequency range covered is 0 Hz to 300 GHz.
The object of this standard is to demonstrate the compliance of such apparatus with the basic restrictions or reference levels on exposure of the general public related to electric, magnetic, electromagnetic fields and induced and contact current.

1.1. Limits

The electronic and electrotechnical apparatus shall comply with the basic restriction as specified in Annex II of Council Recommendation 1999/519/EC.
The reference levels in the Council Recommendation 1999/519/EC on public exposure to electromagnetic fields are derived from the basic restrictions using worst-case assumptions about exposure.
According to EN50392, the reference level listed in the following table 2 shall be used to evaluate the environment impact of human exposure human exposure to electromagnetic fields (0 Hz - 300 GHz) as specified in 1999/519/EC.

Council Recommendation 1999/519/EC of 12 July 1999

Table 2

Reference levels for electric, magnetic and electromagnetic fields
(0 Hz to 300 GHz, unperturbed rms values)

Frequency Range	E-field Strength (V/m)	H-field Strength (A/m)	B-field (μT)	Equivalent plane wave power density Seq (W/m2)
0-1 Hz	–	3.2 x 104	4 x 104	–
1-8 Hz	10000	3.2 x 104/f2	4 x 104/f2	–
8-25 Hz	10000	4000/f	5000/f	–
0.025-0.8 kHz	250/f	4/f	5/f	–
0.8-3 kHz	250/f	5	6.25	–
3-150 kHz	87	5	6.25	–
0.15-1 MHz	87	0.73/f	0.92/f	–
1-10 MHz	87/f1/2	0.73/f	0.92/f	–
10-400 MHz	28	0.73	0.092	2
400-2000 MHz	1.375 f1/2	0.0037 f1/2	0.0046 f1/2	f/200
2-300G Hz	61	0.16	0.20	10

Notes:

1. f as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz, Seq, E2, H2, and B2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, Seq, E2, H2, and B2 are to be averaged over any 68/f1.05 -minute period (f in GHz).
4. No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.

1.2. Assessment methods

Under normal use of condition, this device has a separation distance of at least 20cm between the antenna and the body of the user. A radiation exposure statement ”this equipment should be installed and operated with minimum distance between the antenna

and your body" is shown on the user manual. So human exposure to the electromagnetic field of this product is at far-field region under normal use.

Far-field region Calculation Fomular:
P watts is radiated, from a point, uniformly over the surface of sphere of radius r.
The POYNTING VECTOR gives the power flux density: S=E ∧ H=E2/ =P/4 π r2

In free space

$$E = \eta_0 H = \frac{\sqrt{30PG(\theta,\phi)}}{r}$$

Where

G = antenna gain relative to an isotropic antenna
θ ,ϕ = elevation and azimuth angles to point of investigation
r = distance from observation point to the antenna (m)
η = characteristic impedance of free space

1.3. 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℃and 78％ RH.

1.4. Test Result of RF Exposure Evaluation

Product	:	WIRELESS-N NETWORK MINI PCI ADAPTER
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-4

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0dBi in logarithm scale.

802.11b (2412 - 2472MHz) – chain 010

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
1	2412.00	47.0977	0.014850	61	Pass
6	2437.00	48.4172	0.015266	61	Pass
13	2472.00	49.8884	0.015730	61	Pass

802.11g (2412 - 2472MHz) – chain 010

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
1	2412.00	51.2861	0.016171	61	Pass
6	2437.00	50.3501	0.015876	61	Pass
13	2472.00	51.5229	0.016245	61	Pass

802.11n (20MHz) (2412 - 2472MHz) – chain 010

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
1	2412.00	49.7737	0.015694	61	Pass
6	2437.00	50.1187	0.015803	61	Pass
13	2472.00	50.4661	0.015912	61	Pass

802.11n (40MHz) (2412 - 2472MHz) – chain 010

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
1	2422.00	51.2861	0.016171	61	Pass
6	2437.00	51.9996	0.016396	61	Pass
13	2452.00	50.6991	0.015986	61	Pass

802.11b (2412 - 2472MHz) – chain 100

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
1	2412.00	50.2343	0.015839	61	Pass
6	2437.00	49.3174	0.015550	61	Pass
13	2472.00	49.5450	0.015622	61	Pass

802.11g (2412 - 2472MHz) – chain 100

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
1	2412.00	49.7737	0.015694	61	Pass
6	2437.00	52.3600	0.016509	61	Pass
13	2472.00	51.0505	0.016096	61	Pass

802.11n (20MHz) (2412 - 2472MHz) – chain 100

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
1	2412.00	49.6592	0.015658	61	Pass
6	2437.00	52.7230	0.016624	61	Pass
13	2472.00	51.1682	0.016134	61	Pass

802.11n (40MHz) (2412 - 2472MHz) – chain 100

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
1	2422.00	49.5450	0.015622	61	Pass
6	2437.00	51.8800	0.016358	61	Pass
13	2452.00	48.1948	0.015196	61	Pass

802.11n (20MHz) (2412 - 2472MHz) – chain 110

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
1	2412.00	52.1195	0.016434	61	Pass
6	2437.00	51.4044	0.016208	61	Pass
13	2472.00	52.4807	0.016547	61	Pass

802.11n (40MHz) (2412 - 2472MHz) – chain 110

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
1	2422.00	53.4564	0.016855	61	Pass
6	2437.00	53.2108	0.016778	61	Pass
13	2452.00	52.9663	0.016701	61	Pass

802.11a (5180 - 5825MHz) – chain 010

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
36	5180	164.4372	13.9808	61	Pass
64	5320	162.5549	13.9005	61	Pass
100	5500	109.1440	11.3902	61	Pass
140	5700	111.6863	11.5221	61	Pass

802.11n (20MHz) (5180 - 5825MHz) – chain 010

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
36	5180	162.1810	13.8845	61	Pass
64	5320	157.0363	13.6625	61	Pass
100	5500	99.5405	10.8775	61	Pass
140	5700	104.2317	11.1309	61	Pass

802.11n (40MHz) (5190 - 5670MHz) – chain 010

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
38	5190	162.9296	13.9165	61	Pass
62	5310	153.1087	13.4906	61	Pass
102	5510	111.6863	11.5221	61	Pass
134	5670	110.4079	11.4559	61	Pass

802.11a (5180 - 5825MHz) – chain 100

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
36	5180	160.6941	13.8207	61	Pass
64	5320	156.6751	13.6468	61	Pass
100	5500	96.8278	10.7283	61	Pass
140	5700	93.7562	10.5568	61	Pass

802.11n (20MHz) (5180 - 5825MHz) – chain 100

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
36	5180	153.4617	13.5061	61	Pass
64	5320	154.8817	13.5685	61	Pass
100	5500	80.7235	9.7956	61	Pass
140	5700	86.2979	10.1282	61	Pass

802.11n (40MHz) (5190 - 5670MHz) – chain 100

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
38	5190	162.1810	13.8845	61	Pass
62	5310	159.2209	13.7572	61	Pass
102	5510	73.9605	9.3763	61	Pass
134	5670	76.0326	9.5067	61	Pass

802.11a (5180 - 5825MHz) – chain 110

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
36	5180	149.9685	13.3515	61	Pass
64	5320	149.2794	13.3208	61	Pass
100	5500	243.2204	17.0032	61	Pass
140	5700	266.6859	17.8045	61	Pass

802.11n (20MHz) (5180 - 5825MHz) – chain 110

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
36	5180	163.6817	13.9486	61	Pass
64	5320	159.2209	13.7572	61	Pass
100	5500	263.6331	17.7023	61	Pass
140	5700	258.2260	17.5199	61	Pass

802.11n (40MHz) (5190 - 5670MHz) – chain 110

RF Exposure Measurement Results: Antenna Gain (2dBi)

Channel	Frequency (MHz)	Output Power to Antenna (mW)	E-Field Strength (V/m)	Limit of E-Field Strength (V/m)	Result
38	5190	162.9296	13.9165	61	Pass
62	5310	153.1087	13.4906	61	Pass
102	5510	111.6863	11.5221	61	Pass
134	5670	110.4079	11.4559	61	Pass