

RF Exposure Evaluation Declaration

Product Name : WIRELESS-A/N 26DBM NETWORK MINI PCI
ADAPTER

Model No. : IWAVEPORT WLM200N5-26

Applicant : Compex Systems Pte Ltd

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

Date of Receipt : 2008/10/30

Issued Date : 2008/12/13

Report No. : 08BS034R-RF-CE

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

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Product Name : WIRELESS-A/N 26DBM 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

Model No. : IWAVEPORT WLM200N5-26

EUT Voltage : DC 3.3V

Trade Name : COMPEX

Applicable Standard : EN 50392: 2004

Test Result : Complied

Performed Location : SuZhou EMC laboratory
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FCC Registration number: 800392

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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	: TÜV 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/>

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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 (μ T)	Equivalent plane wave power density Seq (W/m ²)
0-1 Hz	–	3.2×10^4	4×10^4	–
1-8 Hz	10000	$3.2 \times 10^4/f^2$	$4 \times 10^4/f^2$	–
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	$87/f^{1/2}$	$0.73/f$	$0.92/f$	–
10-400 MHz	28	0.73	0.092	2
400-2000 MHz	$1.375 f^{1/2}$	$0.0037 f^{1/2}$	$0.0046 f^{1/2}$	$f/200$
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 $68/f^{1.05}$ -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: $S = E \wedge H = E^2 / \eta = P / 4 \pi r^2$

In free space

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

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°C and 78% RH.

1.4. Test Result of RF Exposure Evaluation

Product	:	WIRELESS-A/N 26DBM 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.

802.11a (5180 - 5700MHz) (chain 1X 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	36.5595	6.5922	61	Pass
64	5320	73.6207	9.3547	61	Pass
100	5500	185.3532	14.8433	61	Pass
140	5700	134.8963	12.6628	61	Pass

802.11n (20MHz) (5180 - 5700MHz) (chain 1X 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	72.9458	9.3117	61	Pass
64	5320	73.6207	9.3547	61	Pass
100	5500	178.2379	14.5556	61	Pass
140	5700	127.9381	12.3319	61	Pass

802.11n (40MHz) (5190 - 5670MHz) (chain 1X 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	74.6449	9.4196	61	Pass
62	5310	73.6207	9.3547	61	Pass
102	5510	201.8366	15.4893	61	Pass
134	5670	229.6149	16.5208	61	Pass

802.11a (5180 - 5700MHz) (chain 1X 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	77.6247	9.6057	61	Pass
64	5320	76.7361	9.5506	61	Pass
100	5500	146.8926	13.2139	61	Pass
140	5700	139.3157	12.8686	61	Pass

802.11n (20MHz) (5180 - 5700MHz) (chain 1X 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	18.96	78.7046	61	Pass
64	5320	18.9	77.6247	61	Pass
100	5500	22.55	179.8871	61	Pass
140	5700	123.8797	12.1347	61	Pass

802.11n (40MHz) (5190 - 5670MHz) (chain 1X 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	74.3019	9.3979	61	Pass
62	5310	72.4436	9.2796	61	Pass
102	5510	271.6439	17.9693	61	Pass
134	5670	232.8091	16.6353	61	Pass

802.11n (20MHz) (5180 - 5700MHz) (chain 1X 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	75.6833	9.4849	61	Pass
64	5320	77.9830	9.6279	61	Pass
100	5500	363.0781	20.7745	61	Pass
140	5700	342.7678	20.1851	61	Pass

802.11n (40MHz) (5190 - 5670MHz) (chain 1X 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	74.9894	9.4413	61	Pass
62	5310	79.4328	9.7170	61	Pass
102	5510	358.0964	20.6315	61	Pass
134	5670	371.5352	21.0151	61	Pass

802.11a (5745 - 5825MHz) (chain 1X 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
149	5745	201.8366	15.4893	61	Pass
165	5825	186.6380	14.8947	61	Pass

802.11n (20MHz) (5745 - 5825MHz) (chain 1X 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
149	5745	272.8978	18.0107	61	Pass
165	5825	229.0868	16.5018	61	Pass

802.11a (5745 - 5825MHz) (chain 1X 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
149	5745	181.5516	14.6903	61	Pass
165	5825	148.5936	13.2902	61	Pass

802.11n (20MHz) (5745 - 5825MHz) (chain 1X 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
149	5745	275.4229	18.0938	61	Pass
165	5825	236.0478	16.7506	61	Pass