

EN 62311 REPORT

REPORT NO.: SE980630H04X

MODEL NO.: WLE200N2

ACCORDING: EN 62311: 2008

APPLICANT: Compex Systems Pte Ltd.

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ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

TEST LOCATION: No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung
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A D T

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SE980630H04X	Original release	Apr. 02, 2013



A D T

1. CERTIFICATION

PRODUCT: WIRELESS-BGN 2X2 NETWORK MINI PCIE ADAPTER

BRAND: COMPEX


MODEL NO.: WLE200N2

APPLICANT: Compex Systems Pte Ltd.

TEST SAMPLE: R&D SAMPLE

STANDARD: EN 62311: 2008

The above equipment (model: WLE200N2) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY :  , **DATE:** Apr. 02, 2013
(Claire Kuan, Specialist)

APPROVED BY :  , **DATE:** Apr. 02, 2013
(May Chen, Manager)

2. GENERAL DESCRIPTION OF EUT

2.1. GENERAL DESCRIPTION OF EUT

PRODUCT	WIRELESS-BGN 2X2 NETWORK MINI PCIE ADAPTER
MODEL NO.	WLE200N2
SOURCE VOLTAGE	Vnom= 230Vac Vmin= 207Vac Vmax= 253Vac
POWER SUPPLY	DC 3.3V from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11 / 5.5 / 2 / 1Mbps 802.11a / g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps HT20 MCS0~7 (800ns GI): 65 / 58.5 / 52 / 39 / 26 / 19.5 / 13 / 6.5Mbps. HT20 MCS8~15 (800ns GI): 130 / 117 / 104 / 78 / 52 / 39 / 26 / 13Mbps. HT40 MCS0~7 (800ns GI): 135 / 121.5 / 108 / 81 / 54 / 40.5 / 27 / 13.5Mbps. HT40 MCS8~15 (800ns GI): 270 / 243 / 216 / 162 / 108 / 81 / 54 / 27Mbps. HT40 MCS0~7 (400ns GI): 150 / 135 / 120 / 90 / 60 / 45 / 30 / 15Mbps. HT40 MCS8~15 (400ns GI): 300 / 270 / 240 / 180 / 120 / 90 / 60 / 30Mbps.
OPERATING FREQUENCY	For 802.11b, 802.11g, 802.11n (20MHz): 2412 ~ 2472 MHz For 802.11n (40MHz): 2422 ~ 2462 MHz
NUMBER OF CHANNEL	For 802.11b, 802.11g, 802.11n (20MHz): 13 For 802.11n (40MHz): 9

RATED RF OUTPUT POWER (FOR CCK)	19.79dBm (Measured Max. Average)
RATED RF OUTPUT POWER (FOR OFDM)	18.71dBm (Measured Max. Average)
RATED RF OUTPUT POWER (FOR 802.11n (20MHz))	18.43dBm (Measured Max. Average)
RATED RF OUTPUT POWER (FOR 802.11n (40MHz))	19.97dBm (Measured Max. Average)
TEMPERATURE RANGE	-20°C ~ 55°C
ANTENNA TYPE	Please see note 1
DATA CABLE	NA
I/O PORT	NA
ASSOCIATED DEVICES	NA

NOTE:

- There are two sets of antennas provided to this EUT, please refer to the following table:

Set 1					
Transmitter Circuit	Brand	Model	Antenna Type	Antenna Gain (dBi)	Antenna Connector
Chain(0)	Inpaq	DAMA1BM3000402	Dipole	3.2	RPSMA
Chain(1)	Inpaq	DAMA1BM3000402	Dipole	3.2	RPSMA
Set 2					
Transmitter Circuit	Brand	Model	Antenna Type	Antenna Gain (dBi)	Antenna Connector
Chain(0)	Wistron	81.EBJ15.005	PIFA	3.6	IPEX
Chain(1)	Wistron	81.EBJ15.005	PIFA	3.6	IPEX

- The EUT incorporates CDD function with 802.11b, 802.11g and MIMO function with 802.11n.
- The EUT is 2 * 2 spatial MIMO (2Tx & 2Rx) without beam forming function. The antenna configurations are two transmitter antennas and two receiver antennas, as there are 2 Dipole antennas or PIFA antennas. Spatial multiplexing modes for simultaneous transmission using 2 antennas, and for simultaneous receiver using 2 antennas.

4. There are two different versions of DUT, the only difference is version -141 has switch regulator installed, and version -041 has the transistors installed instead of switch regulator. The worst-case scenario has been investigated with the same output power, which version -141 shows the worst results. The test data reflects the worst-case scenarios.

5. The EUT was pre-tested under the following modes:

Test Mode	Data rate
Mode A	400ns GI
Mode B	800ns GI

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

6. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3. RF EXPOSURE MEASUREMENT

3.1 INTRODUCTION

This International Standard applies to electronic and electrical equipment for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies.

The frequency range covered is 0 Hz to 300 GHz.

The object of this generic standard is to provide assessment methods and criteria to evaluate such equipment against basic restrictions or reference levels on exposure of the general public related to electric, magnetic and electromagnetic fields and induced and contact current.

3.2 LIMIT

According to EN 62311: 2008, the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified 1999/519/EC.

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 S_{eq} (W/m ²)
0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	$4\,000/f$	$5\,000/f$	—
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	0,073	0,092	2
400-2 000 MHz	$1,375\, f^{1/2}$	$0,0037\, f^{1/2}$	$0,0046\, f^{1/2}$	$f/200$
2-300 GHz	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, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any $68/f^{0.05}$ -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.

3.3 CLASSIFICATION OF THE ASSESSMENT METHODS

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. So, this product under normal use is located on electromagnetic far field between the human body.

Far Field Calculation Formula

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

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
 η_0 = Characteristic impedance of free space

3.4 EUT OPERATING CONDITION

The software provided by Manufacturer enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3.5 TEST RESULTS

Since the maximum eirp power is used as the output power to antenna, so the Gain of the antenna can be assumed as 0dBi.

Antenna gain 3.6dBi:

802.11b:

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	Pass / Fail
1	2412	19.76	94.687	8.427	61	PASS
7	2442	19.79	95.343	8.456	61	PASS
13	2472	19.46	88.367	8.141	61	PASS

802.11g:

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	Pass / Fail
1	2412	18.71	74.281	7.464	61	PASS
7	2442	18.07	64.106	6.934	61	PASS
13	2472	18.51	70.981	7.296	61	PASS

802.11n (20MHz):

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	Pass / Fail
1	2412	18.43	69.642	7.227	61	PASS
7	2442	17.76	59.686	6.691	61	PASS
13	2472	18.31	67.769	7.129	61	PASS

802.11n (40MHz):

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	Pass / Fail
1	2422	18.84	76.497	7.575	61	PASS
5	2442	18.74	74.756	7.488	61	PASS
9	2462	19.97	99.412	8.635	61	PASS

Antenna gain 0dBi:

802.11b:

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	Pass / Fail
1	2412	19.76	94.687	8.427	61	PASS
7	2442	19.79	95.343	8.456	61	PASS
13	2472	19.46	88.367	8.141	61	PASS

802.11g:

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	Pass / Fail
1	2412	18.71	74.281	7.464	61	PASS
7	2442	18.07	64.106	6.934	61	PASS
13	2472	18.51	70.981	7.296	61	PASS

802.11n (20MHz):

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	Pass / Fail
1	2412	18.43	69.642	7.227	61	PASS
7	2442	17.76	59.686	6.691	61	PASS
13	2472	18.31	67.769	7.129	61	PASS

802.11n (40MHz):

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	Pass / Fail
1	2422	18.84	76.497	7.575	61	PASS
5	2442	18.74	74.756	7.488	61	PASS
9	2462	19.97	99.412	8.635	61	PASS

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