



Shenzhen CTL Electromagnetic Technology Co., Ltd.
Tel: +86-755-89486194 Fax: +86-755-89486187

MPE TEST REPORT

FCC Per 47 CFR 2.1091(b)

Report Reference No.....: CTL120509408-WF

FCC ID.....: NZ3WS-WN518N2

Compiled by

(position+printed name+signature)...: File administrators Jacky Chen

Name of the organization performing the tests

Test Engineer Nie Quan

(position+printed name+signature)...:

Approved by

(position+printed name+signature)...: Manager Tracy Qi

Date of issue.....: July 09, 2012

Representative Laboratory Name : Shenzhen CTL Electromagnetic Technology Co., Ltd.

Address.....: Zone B, 4/F, Block 20, Guangqian Industrial Park, Longzhu Road, Nanshan, Shenzhen 518055 China.

Test Firm.....: Bontek Compliance Testing Laboratory Ltd

Address.....: 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

Applicant's name.....: Winstars Technology Limited

Address.....: Block 4, Taisong Industrial Park, Dalang Street, Longhua Town, Bao'an District, Shenzhen, China

Test specification:

Standard: FCC Per 47 CFR 2.1091(b)

TRF Originator.....: Shenzhen CTL Electromagnetic Technology Co., Ltd.

Master TRF.....: Dated 2011-01

Shenzhen CTL Electromagnetic Technology Co., Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen CTL Electromagnetic Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen CTL Electromagnetic Technology Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description: WIFI Repeater

Trade Mark: /

Operation Frequency.....: From 2400MHz to 2483.5MHz

Model/Type reference.....: WS-WN518N2

Listed Models:

Result.....: Positive

T E S T R E P O R T

Test Report No. :	CTL120509408-WF	July 09, 2012
		Date of issue

Equipment under Test : WIFI Repeater

Model /Type : WS-WN518N2

Listed Models : /

Applicant : Winstars Technology Limited

Address : Block 4, Taisong Industrial Park, Dalang Street, Longhua Town, Bao'an District, Shenzhen, China

Manufacturer : Winstars Technology Limited

Address : Block 4, Taisong Industrial Park, Dalang Street, Longhua Town, Bao'an District, Shenzhen, China

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1.	<u>SUMMARY</u>	<u>4</u>
1.1.	EUT configuration	4
1.2.	Power supply system utilised	4
1.3.	Description of the test mode	4
1.4.	NOTE	4
2.	<u>TEST ENVIRONMENT.....</u>	<u>6</u>
2.1.	Address of the test laboratory	6
2.2.	Environmental conditions	6
2.3.	Statement of the measurement uncertainty	6
3.	<u>METHOD OF MEASUREMENT</u>	<u>7</u>
3.1.	Applicable Standard	7
3.2.	Limit	7
3.3.	MPE Calculation Method	7
4.	<u>CONCLUSION</u>	<u>8</u>

1. SUMMARY

1.1. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

<input type="radio"/> Power Cable	Length (m) :	/
	Shield :	/
	Detachable :	/
<input type="radio"/> Multimeter	Manufacturer :	/
	Model No. :	/

1.2. Power supply system utilised

Power supply voltage	:	<input checked="" type="radio"/> 120V / 60 Hz	<input type="radio"/> 115V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input type="radio"/> Other (specified in blank below)	

1.3. Description of the test mode

IEEE 802.11b/g/n: Thirteen channels are provided to the EUT, but only eleventh channels used for USA.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

1.4. NOTE

The EUT is an 802.11b/g/n WIFI Repeater, The functions of the EUT listed as below:

	Test Standards	Reference Report
WLAN 802.11b/g, 802.11n	FCC Part 15 Subpart C (Section15.247)	CTL120509408-WF
WLAN 802.11b/g, 802.11n	FCC Per 47 CFR 2.1091(b)	CTL120509408-WM

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
802.11b	√	—	—	—
802.11g	√	—	—	—
802.11n(20MHz)	√	—	—	—
802.11n(40MHz)	√	—	—	—

3. The EUT incorporates a MIMO function, Physically, the EUT provides two completed transmitter and two completed receivers.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

2. TEST ENVIRONMENT

2.1. Address of the test laboratory

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

2.2. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

2.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Bontek Compliance Testing Laboratory Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Bontek laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~12.75GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Method of measurement

3.1. Applicable Standard

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

According to §1.1310 and §2.1091 RF exposure is calculated.

3.2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density

3.3. MPE Calculation Method

Predication 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

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna is 2.0 dBi, the RF power density can be obtained.

TEST RESULTS**For 802.11 b**

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density Limit (mW/cm ²)	Power Density At 20 cm (mW/cm ²)	Test Results
2412	20.00	20.72	118.0321	1.5849	1.000	0.0372	Pass
2437	20.00	22.39	173.3804	1.5849	1.000	0.0547	Pass
2462	20.00	22.55	179.8871	1.5849	1.000	0.0567	Pass

For 802.11 g

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density Limit (mW/cm ²)	Power Density At 20 cm (mW/cm ²)	Test Results
2412	20.00	19.90	97.7237	1.5849	1.000	0.0308	Pass
2437	20.00	24.27	267.3006	1.5849	1.000	0.0843	Pass
2462	20.00	20.75	118.8502	1.5849	1.000	0.0375	Pass

For 802.11 n (20MHz)

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)			Output Power (mW)	Antenna Gain (Nemeric)	Power Density Limit (mW/c m ²)	Power Density At 20 cm (mW/cm ²)	Test Results
		Antenna 1	Antenna 2	Total					
2412	20.00	20.64	19.95	23.32	214.7830	1.5849	1.0000	0.0677	Pass
2437	20.00	24.14	22.24	26.30	426.5795	1.5849	1.0000	0.1345	Pass
2462	20.00	22.24	21.25	24.78	300.6076	1.5849	1.0000	0.0948	Pass

For 802.11 n (40MHz)

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)			Output Power (mW)	Antenna Gain (Nemeric)	Power Density Limit (mW/c m ²)	Power Density At 20 cm (mW/cm ²)	Test Results
		Antenna 1	Antenna 2	Total					
2422	20.00	18.24	17.46	20.88	122.4616	1.5849	1.0000	0.0386	Pass
2437	20.00	23.60	21.87	25.83	382.8247	1.5849	1.0000	0.1207	Pass
2452	20.00	16.14	14.32	18.33	68.0769	1.5849	1.0000	0.0215	Pass

4. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 (b) for the controlled RF Exposure.

.....**End of Report**.....