RADIO TEST REPORT

Test Report No. : 27LE0273-HO-A

Applicant	:	**KOITO INDUSTRIES, LTD.**
Type of Equipment	:	**Wireless LAN Module**
Model No.	:	**KWM-DS540-N2**
FCC ID	:	**V5RKWMDS540N2V**
Test regulation	:	**FCC Part 15 Subpart C 2008 Section 15.247**
Test Result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.

Date of test:
February 23 to 27, 2008

Tested by:
Akio Hayashi
EMC Services

Approved by :
Hironobu Shimoji
Assistant Manager of EMC Services

NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address, http://uljapan.co.jp/emc/nvlap.htm

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SECTION 1: Customer information

Company Name	:	KOITO INDUSTRIES, LTD.
Address	:	100. Maeda-cho, Totsuka-ku, Yokohama, 244-8569, Japan
Telephone Number	:	+81-45-826-6738
Facsimile Number	:	+81-45-826-4591
Contact Person	:	Masahiro Kaneko

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Wireless LAN Module
Model No.	:	KWM-DS540-N2
Serial No.	:	AH0029646
Rating	:	DC5.0V
Country of Manufacture	:	Japan
Receipt Date of Sample	:	February 14, 2008
Condition of EUT	:	Production model
Modification of EUT	:	No modification by the test lab.

2.2 Product Description

Model No: KWM-DS540-N2 (referred to as the EUT in this report) is the Wireless LAN Module.
This EUT serves as a media converter, providing wireless communication when connected with a device equipped with a LAN port. It is capable of providing up to 9 channels (36,40,44,48,149,153,157,161,165ch) available under IEEE802.11a. In this report, only 165ch was tested. For the other channels, the tests were performed with Low band (36,44,48ch) and High band (149,153,161ch) as representaive channels. Please refer to Test Report No. 27LE0273-HO-B of UL Japan, Inc.

Clock frequency(ies) in the system	:	CPU:240MHz, SDRAM:120MHz
Equipment Type	:	Transceiver
Frequency of Operation	:	5180-5240MHz, 5745-5825MHz
Bandwidth & Channel Spacing	:	20MHz & 20MHz
Modulation	:	DSSS (OFDM)
Operating voltage (inner)	:	DC 3.3V
Antenna Type	:	Sleeve antenna
Antenna Gain	:	2.14 dBi max

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart C: 2008, final revised on January 30, 2008

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz

FCC 15.31 (e)
The RF part is constantly provided with the stable voltage (DC3.3V) via DC/DC Converter regardless of input voltage.
Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
The EUT has an external and particular antenna connector, but it is installed by the professionals.
Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	Section 15.207	-	N/A	N/A *1)	N/A
2	6dB Bandwidth	"Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	Section 15.247(a)(2)	Conducted	N/A	See data.	Complied
3	Maximum Peak Output Power	"Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	Section 15.247(b)(3)	Conducted	N/A		Complied
4	Restricted Band Edges	"Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	Section 15.247 (d)	Conducted/ Radiated	N/A		Complied
5	Spurious Emission	"Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	Section15.247(d)	Conducted/ Radiated	N/A	1.5dB 359.993MHz Horizontal, QP	Complied
6	Power Density	"Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	Section 15.247 (e)	Conducted	N/A	See data.	Complied

Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15.
*1) The test is excluded since this EUT is a DC-Drive Device. (This EUT cannot be connected with AC line.)

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Additions or deviations to standards

No addition, deviation, nor exclusion has been made from standards.

3.4 Uncertainty

EMI
The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room	Conducted emission	Radiated emission (10m*)			Radiated emission (3m*)			Radiated emission (3m*)	
	150kHz-30MHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	1GHz-18GHz	18GHz-40GHz
No.1 semi-anechoic Chamber (±)	3.7dB	3.1dB	4.7dB	4.4dB	3.2dB	3.7dB	4.4dB	5.9dB	6.1dB
No.2 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.3dB	3.9dB	5.9dB	6.1dB
No.3 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.2dB	4.4dB	5.9dB	6.1dB
No.4 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.2dB	4.4dB	5.9dB	6.1dB

*10m/3m = Measurement distance

Radiated emission test(3m)
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Other test except Conducted Emission and Spurious Emission (Radiated)
The measurement uncertainty for this test is 3.0dB.

3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

SECTION 4: Operation of E.U.T. during testing

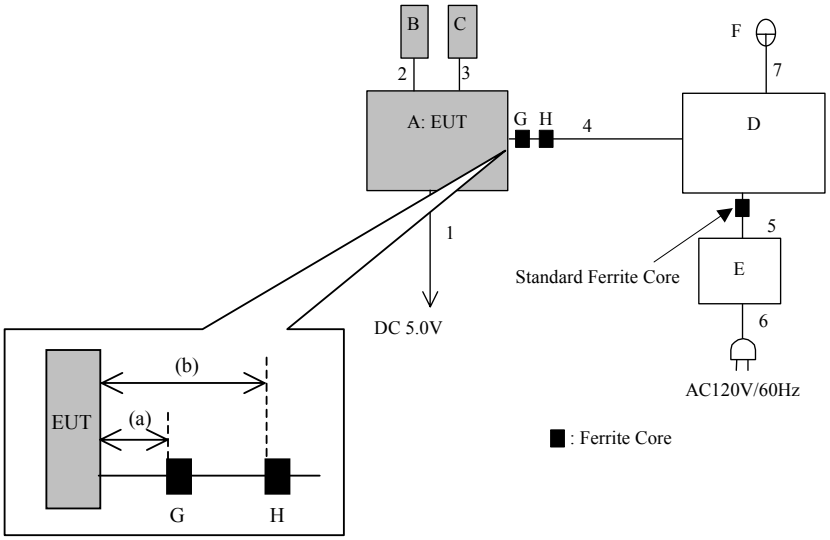
4.1 Operating Mode(s)

The mode(s)

Test items	Operating mode	Tested frequency
6dB Bandwidth	Transmitting (Tx) mode (24Mbps, Payload: PN9, Antenna B)	Channel 165: 5825MHz
Maximum Peak Output Power	Transmitting (Tx) mode (24Mbps, Payload: PN9, Antenna A and B)	Channel 165: 5825MHz
Restricted Band Edges	Transmitting (Tx) mode (24Mbps, Payload: PN9, Antenna B)	Channel 165: 5825MHz
Spurious Emission (Conducted/Radiated)	Transmitting (Tx) mode (24Mbps, Payload: PN9, Antenna B)	Channel 165: 5825MHz
Power Density	Transmitting (Tx) mode (24Mbps, Payload: PN9, Antenna B)	Channel 165: 5825MHz

*Remarks
As a result of preliminary test, the formal test was performed with the above modes, which had the maximum rated power.
This EUT has Antenna A and B, and These antennas cannot be transmitted at the same time.
Antenna B had Maximum transmission rate of 11a (Maximum noise level).
Therefore the tests were performed with Antenna B as a representative antenna.

4.2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless LAN Module	KWM-DS540-N2	AH0029646	Nippo Electronics	EUT
B	Antenna	AT626	1	Antenna Technology Inc.	EUT
C	Antenna	AT626	2	Antenna Technology Inc.	EUT
D	Notebook PC	1952 D65	L3DM298	IBM	-
E	AC Adapter	92P1160	11S92P1160Z1 ZBGH6B6DMD	lenovo	-
F	Mouse	1049	-	Microsoft	-
G	Ferrite Core	ZCAT2035-0930	-	TDK	*1)
H	Ferrite Core	ZCAT2017-0930	-	TDK	*2)

*1) The distance (a) from EUT to the side of Ferrite core is 30mm (One turn).
*2) The distance (b) from EUT to the side of Ferrite core is 80mm (One turn).

List of cables used

No.	Name	Length (m)	Shield	
			Cable	Connector
1	DC Cable	4.7	Unshielded	Unshielded
2	Antenna Cable	1.0	Shielded	Shielded
3	Antenna Cable	1.0	Shielded	Shielded
4	LAN Cable	0.9	Unshielded	Unshielded
5	AC Cable	0.9	Unshielded	Unshielded
6	DC Cable	1.8	Unshielded	Unshielded
7	USB Cable	0.8	Shielded	Shielded

SECTION 5: 6dB Bandwidth

Test Procedure

The 6dB bandwidth was measured with a spectrum analyzer connected to the antenna port.

<Set of Spectrum analyzer>
- RBW: 100kHz
- VBW: 300kHz
- Sweep: Auto
- Detector: Peak
- Trace: Max Hold

Test data : APPENDIX 2
Test result : Pass

SECTION 6: Maximum Peak Output Power

Test Procedure

The Maximum Peak Output Power was measured with a power meter (tested bandwidth: 50MHz) connected to the antenna port.
It was measured based on "Power Output Option 1" of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247 ".

Test data : APPENDIX 2
Test result : Pass

SECTION 7: Spurious Emission

[Conducted]
Test Procedure
The Out of Band Emission was measured with a spectrum analyzer connected to the antenna port.

<Set of Spectrum analyzer>
- RBW: 100kHz
- VBW: 300kHz
- Sweep: Auto
- Detector: Peak
- Trace: Max Hold

Test data : APPENDIX 2
Test result : Pass

[Radiated]
Test Procedure
EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 80cm above the conducting ground plane.
The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m(Below 10GHz) and 1m(Upper 18GHz), and 0.5m(Upper 26.5GHz).
The height of the measuring varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

The result also satisfied with the general limits specified in section FCC 15.209(a).

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz	PK: RBW:1MHz/VBW: 1MHz AV: RBW:1MHz/VBW:10Hz

The test was made on EUT at the normal use position.

Test data : APPENDIX 2
Test result : Pass

SECTION 8: Power Density

[Conducted]
Test Procedure
The Power Density was measured with a spectrum analyzer connected to the antenna port.
It was measured based on "PSD Option 1" of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247 ".

<Set of Spectrum analyzer>
- RBW: 3kHz
- VBW: 100kHz
- Sweep: 500sec
- Detector: Peak
- Span: 1.5MHz
- Trace: Clear Write

Test data : APPENDIX 2
Test result : Pass