# EMI TEST REPORT

## Test Report No. : 25IE0043-YK-1

| | | |
|---|---|---|
| **Applicant** | : | **TOYOTA INDUSTRIES CORPORATION** |
| **Type of Equipment** | : | **Wireless LAN Module** |
| **Model No.** | : | **6180210** |
| **FCC ID** | : | **M4B6180210** |
| **Test Standard** | : | **FCC Part15 Subpart C, Section 15.207, Section 15.247: 2005** |
| **Test Result** | : | **Complied** |

1. This test report shall not be reproduced except in full, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this test report are traceable to the national or international standards.

**Date of test:** April 19, 28 and May 6, 2005

**Tested by:** T. Imamura
Toyokazu Imamura

**Approved by:** O. Watatani
Osamu Watatani
Site Manager of Yamakita EMC Lab.

## Table of Contents Page

## 1 Applicant Information

Company Name : TOYOTA INDUSTRIES CORPORATION

Address : Hamamatsucho-Central Building 6F 1-29-6, Hamamatsu-cho, Minato-ku, Tokyo-to, 105-0013 JAPAN

Telephone Number : +81-3-5733-5019

Facsimile Number : +81-3-3432-0568

Contact Person : Hideki Fujii

## 2 Product Description

Type of Equipment : Wireless LAN Module

Model No. : 6180210

Serial No. : ES0021

Rating : DC3.3V

Country of Manufacture : Japan

Receipt Date of Sample : April 19, 2005

Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)

Model: 6180210 (referred to as the EUT in this report) is a Wireless LAN Module.

The clock frequency used in EUT: 44MHz (Local Oscillator)

| | | |
|---|---|---|
| Equipment type | : | Transceiver |
| Frequency of operation | : | 2412 - 2462 MHz |
| Bandwidth | : | 16 MHz |
| Channel spacing | : | 5 MHz |
| Channel number | : | 11 channels |
| Type of modulation | : | DSSS |
| Antenna type | : | Chip dielectric antenna |
| Antenna connector type | : | None |
| Antenna gain | : | 3.8dBi (Max.) |
| Mode of operation | : | Simplex |
| Emission Designation | : | G1D |
| Operation temperature range: | | -20 ~ 60 deg. C. |

*FCC Part15.31 (e)

Host devise (PC) provides the Wireless LAN Module with stable power supply (DC3.3V), and the power is not changed when voltage of the PC is varied. Therefore, the equipment complies power supply regulation.

*FCC Part15.203

The Wireless LAN Module and its antenna comply with this requirement since this antenna is built in the equipment and it cannot be replaced by end users.

# 3 Test Specification, Procedures and Results

## 3.1 Test specification

Test specification : FCC Part15 Subpart C: 2005
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits: 2005
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz: 2005

## 3.2 Procedures & Results

| Item | Test Procedure | Specification | Remarks | Deviation | Worst Margin | Results |
|---|---|---|---|---|---|---|
| Conducted Emission | ANSI C63.4:2003 7. AC powerline conducted emission measurements | Section 15.207 | - | N/A | 14.3dB (0.1954MHz, AV, Transmitting 2412MHz) | Complied |
| 6dB Bandwidth | ANSI C63.4:2003 13. Measurement of intentional radiators | Section 15.247 (a)(2) | Conducted | N/A | *See data. | Complied |
| Maximum Peak Output Power | ANSI C63.4:2003 13. Measurement of intentional radiators | Section 15.247 (b)(3) | Conducted | N/A | | Complied |
| Spurious Emission | ANSI C63.4:2003 13. Measurement of intentional radiators | Section 15.247 (d) | Conducted/ Radiated | N/A | Radiated: 2.0dB (665.96MHz, QP, Horizontal, Transmitting 2412MHz) | Complied |
| Restricted Band Edges | ANSI C63.4:2003 13. Measurement of intentional radiators | Section 15.247 (d) | Radiated | N/A | *See data. | Complied |
| Power Density | ANSI C63.4:2003 13. Measurement of intentional radiators | Section 15.247 (e) | Conducted | N/A | | Complied |

Note: UL Apex's EMI Work Procedures No.QPM05.
These tests were also referred to "Guidance on Measurement for Digital Transmission Systems Section15.247".

* No addition, exclusion nor deviation has been made from the standard.

## 3.3 Uncertainty

Conducted emission
The measurement uncertainty (with a 95% confidence level) for this test was ±1.3dB.
The data listed in this test report has enough margin, more than site margin.

Radiated emission
The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is ±4.8dB.
The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ±5.2dB.
The measurement uncertainty (with 95% confidence level) for this test using Horn antenna is ±6.6dB.
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

### 3.4 Test Location

UL Apex Co., Ltd. Yamakita EMC Lab.
907, Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken 258-0124 JAPAN
Telephone number : +81 465 77 1011
Facsimile number : +81 465 77 2112
NVLAP Lab. code : 200441-0

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on September 20, 2002 (Registration No.: 95486).
IC Registration No. : IC3489

No. 2 test site has been fully described in a report submitted to FCC office, and accepted on April 4, 2005 (Registration No.: 466226).
IC Registration No. : IC3489-2

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on November 8, 2002 (Registration No.: 95967).
IC Registration No. : IC3489-B

| Test room | Width x Depth x Height (m) | Test room | Width x Depth x Height (m) |
|---|---|---|---|
| No.1 shielded room | 8.0 x 5.0 x 2.5 | No.1 EMS lab. (Semi-anechoic chamber) | 10.0 x 7.5 x 5.7 |
| No.2 shielded room | 5.0 x 4.0 x 2.5 | | |
| No.3 shielded room | 4.0 x 5.0 x 2.7 | | |

# 4 System Test Configuration

## 4.1 Justification

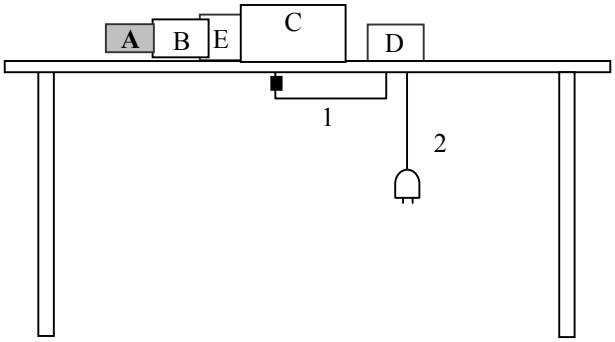
The system was configured in typical fashion (as a customer would normally use it) for testing.

Test mode: Transmitting mode
- Low channel : 2412MHz
- Middle channel : 2437MHz
- High channel : 2462MHz

### 4.2 Configuration of Tested System

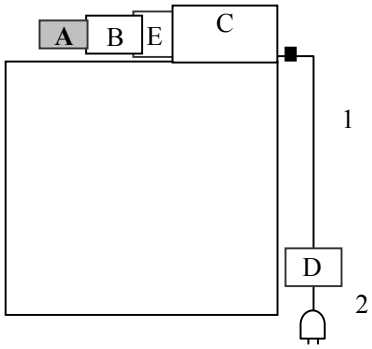
■: Ferrite core (Standard attachment of PC)

*Front View (Conducted emission)*



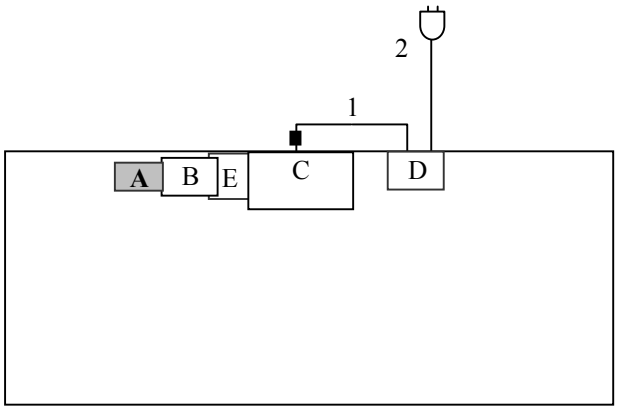

AC120V/60Hz

*Front View (Radiated emission)*

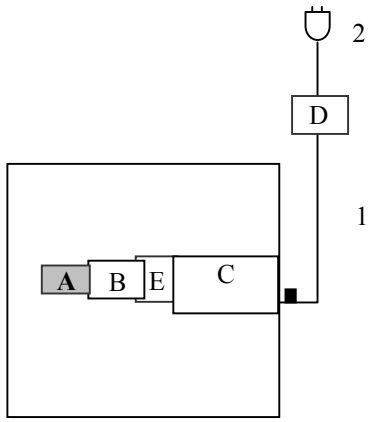



AC120V/60Hz

*Top View (Conducted emission)*




*Top View (Radiated emission)*




* Test data was taken under worse case conditions.

**Description of EUT and support equipment**

| No. | Item | Model number | Serial number | Manufacturer | FCC ID (Remarks) |
|---|---|---|---|---|---|
| **A** | Wireless LAN Module | 6180210 | ES0021 | TOYOTA INDUSTRIES CORPORATION | M4B6180210 (EUT) |
| **B** | PC Card Adapter | WLI-CF-OP | E20725 | BUFFALO | - |
| **C** | Notebook PC | X30 2672-12J | 99TAH27 | IBM | - |
| **D** | AC Adapter | 02K6808 | 11S02K6808Z1Z3BG342MHT | IBM | - |
| **E** | Extend Board | - | - | - | (Test jig) |

**List of cables used**

| No. | Name | Length (m) | Shield | Backshell material | Remark |
|---|---|---|---|---|---|
| **1** | DC cable | 1.9 | Unshielded | Polyvinyl chloride | - |
| **2** | AC cable | 1.0 | Unshielded | Polyvinyl chloride | - |

# 5 Conducted Emissions

## 5.1 Operating environment

The test was carried out in a shielded room.

## 5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.8m, raised 80cm above the conducting ground plane.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT's host device (PC), including peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN) and excess AC cable was bundled in center. I/O cable were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

## 5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT operation mode : Transmitting

## 5.4 Test procedure

The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.
The Conducted emission measurements were made with the following detector function of the test receiver.
Detector: QP/AV
IF Bandwidth: 10kHz

## 5.5 Results

Summary of the test results : Pass
Test data : APPENDIX 2 Page 17 to 21

Date : May 6, 2005 Test engineer : Toyokazu Imamura

## 6 6dB Bandwidth

**Test Procedure**
The bandwidth was measured with a spectrum analyzer connected to the antenna port.

| | | | |
|---|---|---|---|
| Summary of the test results: | Pass | Test data: | APPENDIX 2 Page 22 |
| Date: | May 6, 2005 | Test engineer : | Toyokazu Imamura |

## 7 Maximum Peak Output Power

**Test Procedure**
The Maximum Peak Output Power was measured with a spectrum analyzer connected to the antenna port.

| | | | |
|---|---|---|---|
| Summary of the test results: | Pass | Test data: | APPENDIX 2 Page 23 to 24 |
| Date: | May 6, 2005 | Test engineer : | Toyokazu Imamura |

## 8 Out of Band Emissions (Antenna Port Conducted)

**Test Procedure**
The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

| | | | |
|---|---|---|---|
| Summary of the test results: | Pass | Test data: | APPENDIX 2 Page 25 to 30 |
| Date: | May 6, 2005 | Test engineer : | Toyokazu Imamura |

# 9 Out of Band Emissions (Radiated)

## 9.1 Operating environment

The test was carried out in an anechoic chamber.

## 9.2 Test configuration

EUT was placed on a platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane.
A drawing of the set up is shown in the photos of Appendix 1.

## 9.3 Test conditions

Frequency range : 30MHz - 26GHz
Test distance : 3m
EUT operation mode : Transmitting

## 9.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m.
The measuring antenna height was 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.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

Measurements were performed with QP, PK, and AV detector.
The radiated emission measurements were made with the following detector function of the test receiver.

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

The equipment was previously checked at each position of three axes X, Y and Z. The position in which the maximum noise occurred was chosen to put into measurement. See the table below and photographs in page 16.
With the position, the noise levels of all the frequencies were measured.

| Frequency | Below 1GHz | Above 1GHz | |
|---|---|---|---|
| | | Spurious | Fundamental |
| Antenna: Horizontal | X | Z | Z |
| Antenna: Vertical | Y | Z | X |

## 9.5 Results

Summary of the test results : Pass
Test data : APPENDIX 2 Page 31 to 33 (30 - 1000MHz)
: APPENDIX 2 Page 34 to 39 (1 - 26GHz)
: APPENDIX 2 Page 40 to 43 (Band Edges: 2390MHz/ 2483.5MHz, Restricted band Charts)

Date : April 19, 28 and May 6, 2005 Test engineer : Toyokazu Imamura

## 10 Peak Power Density (Antenna Port Conducted)

**Test Procedure**
The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

| | | | |
|---|---|---|---|
| Summary of the test results: | Pass | Test data: | APPENDIX 2 Page 44 to 45 |
| Date: | May 6, 2005 | Test engineer : | Toyokazu Imamura |

## APPENDIX 1: Photographs of test setup



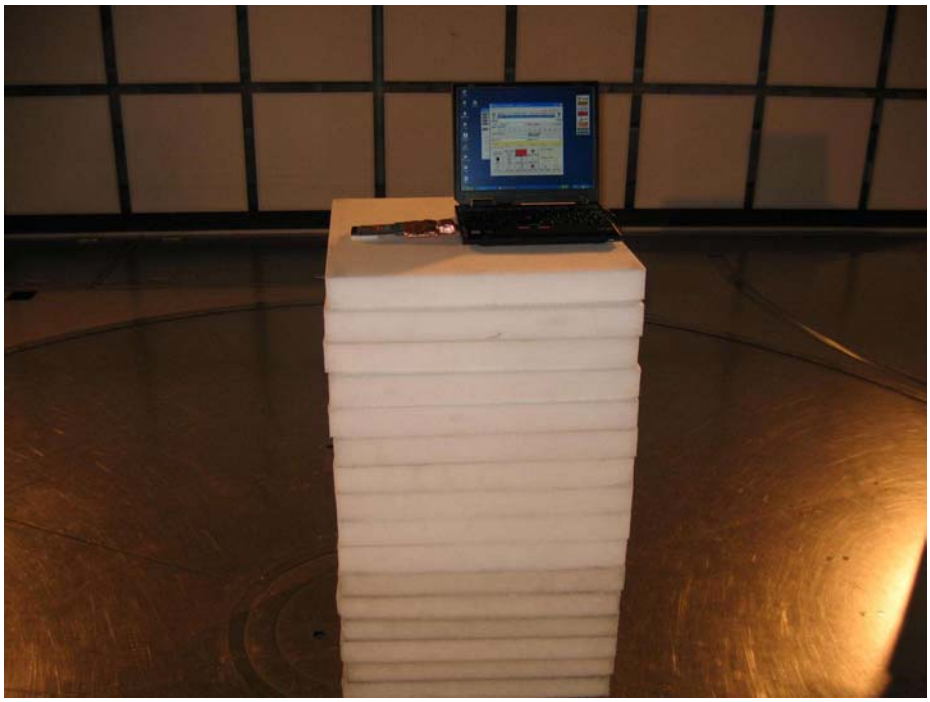
## APPENDIX 2: Test Data

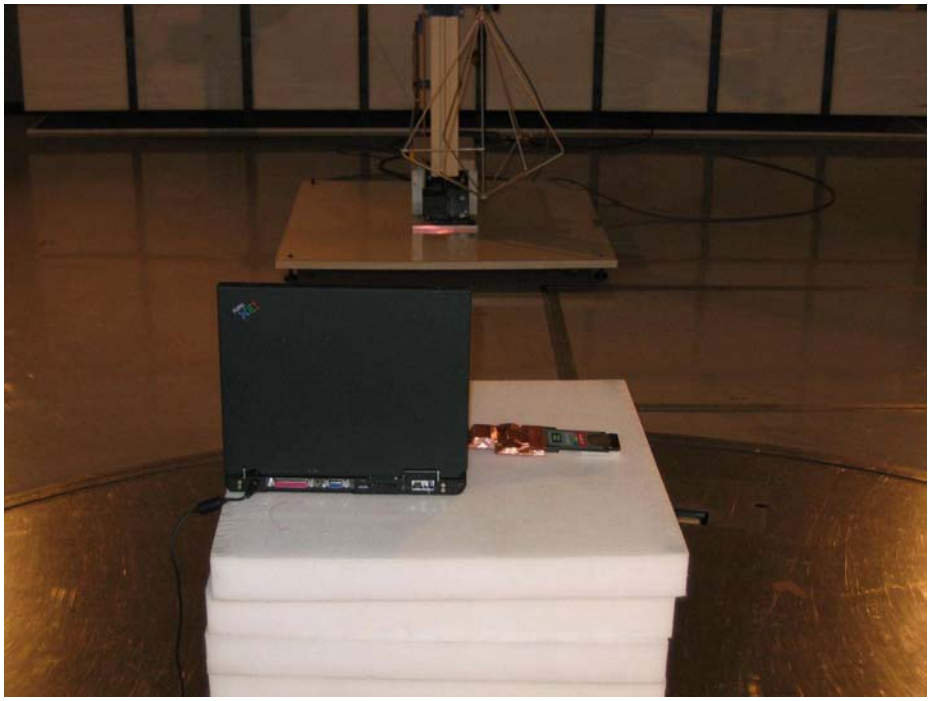


## APPENDIX 3: Test instruments

**Conducted emission**

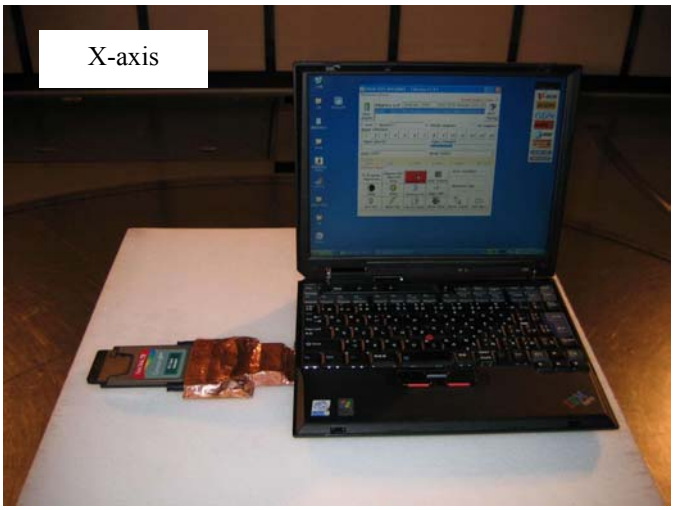
**Radiated emission**





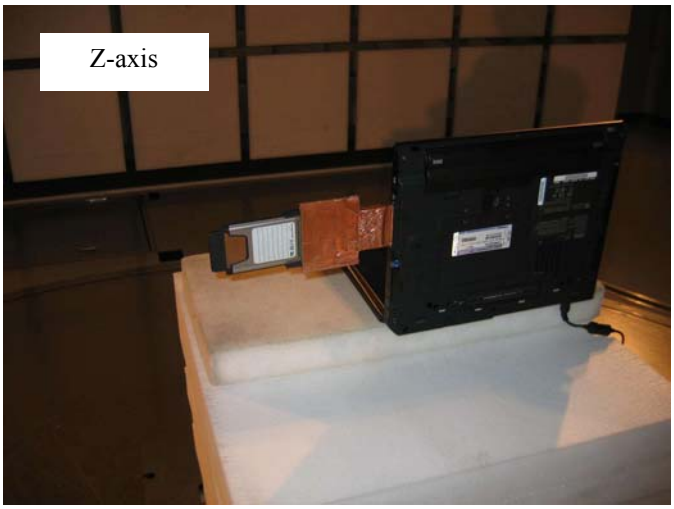
**Pre check of worse-case position**

X-axis



Y-axis

Z-axis



# DATA OF CONDUCTION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 SHIELD TEST ROOM
Report No.: 25IE0043-YK-1

| | | | |
|---|---|---|---|
| Applicant | : | TOYOTA INDUSTRIES CORPORATION | |
| Kind of Equipment | : | Wireless LAN Module | |
| Model No. | : | 6180210 | |
| Serial No. | : | ES0021 | |
| Power | : | AC120V/60Hz | |
| Mode | : | Transmitting:ch1(2412MHz) | |
| Remarks | : | | |
| Date | : | 5/6/2005 | |
| Phase | : | Single Phase | |
| Temperature | : | 22 ℃ | Engineer : Toyokazu Imamura |
| Humidity | : | 47 % | |
| Regulation | : | FCC Part15C §15.207.(CISPR Pub.22 ) | |

| No. | FREQ. | READING(N) | | READING(L1) | | LISN | CABLE | ATTEN. | RESULT | | LIMITS | | MARGIN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | QP | AV | QP | AV | FACTOR | LOSS | | QP | AV | QP | AV | QP | AV |
| | [MHz] | [dBμV] | | [dBμV] | | [dB] | [dB] | [dB] | [dB] | | [dBμV] | | [dB] | |
| 1. | 0.1954 | 45.2 | 37.9 | 45.7 | 39.4 | 0.0 | 0.1 | 0.0 | 45.8 | 39.5 | 63.8 | 53.8 | 18.0 | 14.3 |
| 2. | 0.2597 | 37.9 | - | 37.4 | - | 0.0 | 0.1 | 0.0 | 38.0 | - | 61.4 | 51.4 | 23.4 | - |
| 3. | 0.4544 | 28.5 | - | 30.0 | - | 0.0 | 0.2 | 0.0 | 30.2 | - | 56.8 | 46.8 | 26.6 | - |
| 4. | 0.5189 | 28.6 | - | 28.6 | - | 0.0 | 0.2 | 0.0 | 28.8 | - | 56.0 | 46.0 | 27.2 | - |
| 5. | 0.5834 | 27.9 | - | 28.4 | - | 0.0 | 0.2 | 0.0 | 28.6 | - | 56.0 | 46.0 | 27.4 | - |
| 6. | 26.7244 | 24.0 | - | 23.2 | - | 0.7 | 1.9 | 0.0 | 26.6 | - | 60.0 | 50.0 | 33.4 | - |

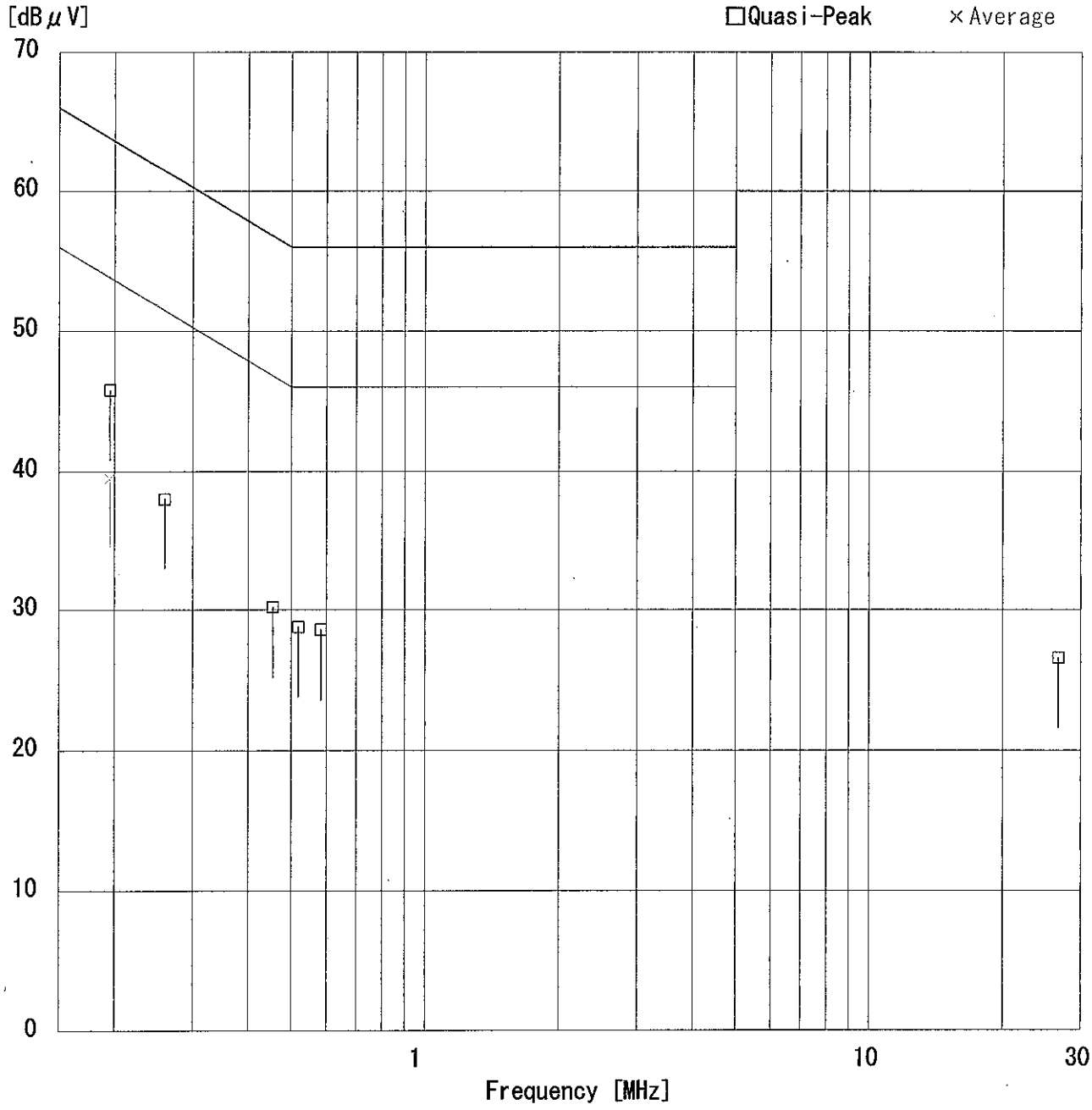
CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

■LISN :KLS-01(NSLK8126) ■COAXIAL CABLE:KCC-14/15/16/18
■PULSE LIMTTER:KPL-01(PL01) ■EMI RECEIVER:KTR-02(ESCS30)

# DATA OF CONDUCTION TEST

UL Apex Co.,Ltd.
YAMAKITA No.1 SHIELD TEST ROOM
Report No.: 25IE0043-YK-1

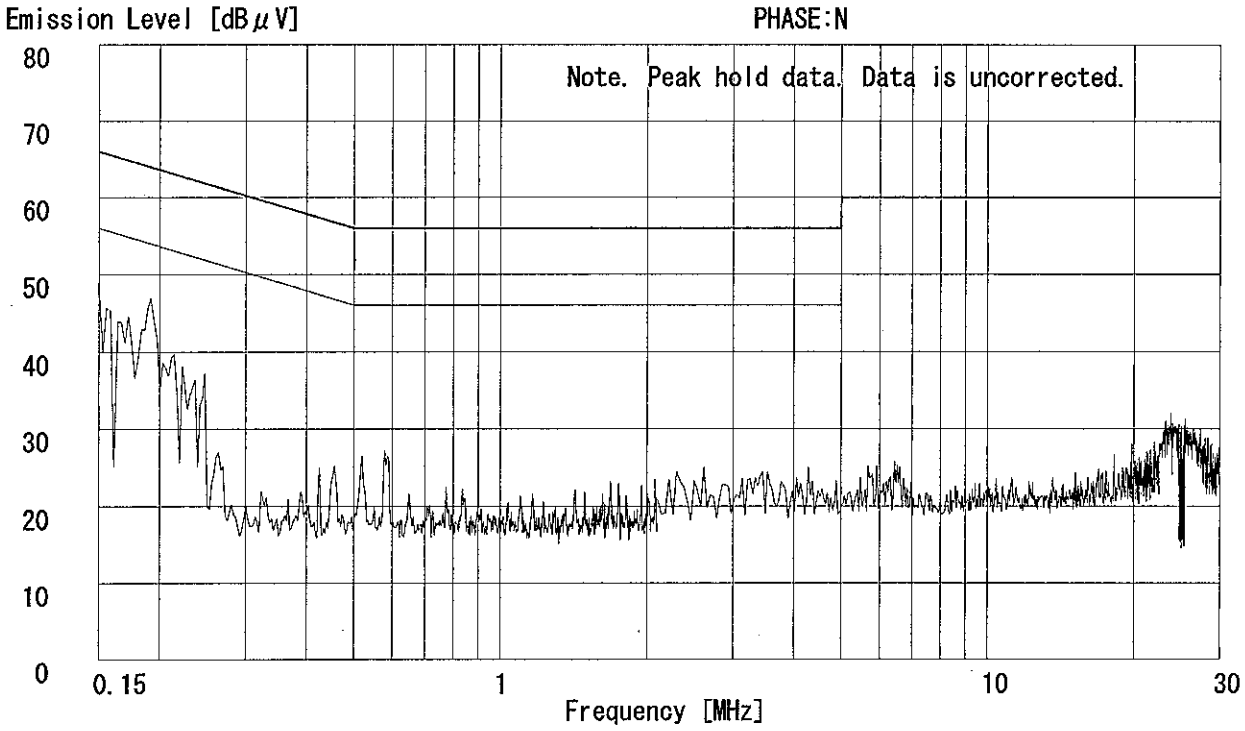
| | | | |
|---|---|---|---|
| Applicant | : TOYOTA INDUSTRIES CORPORATION | | |
| Kind of Equipment | : Wireless LAN Module | | |
| Model No. | : 6180210 | | |
| Serial No. | : ES0021 | | |
| Power | : AC120V/60Hz | | |
| Mode | : Transmitting:ch1(2412MHz) | | |
| Remarks | : | | |
| Date | : 5/6/2005 | | |
| Phase | : Single Phase | | |
| Temperature | : 22 ℃ | Engineer | : Toyokazu Imamura |
| Humidity | : 47 % | | |
| Regulation | : FCC Part15C §15.207.(CISPR Pub.22 ) | | |

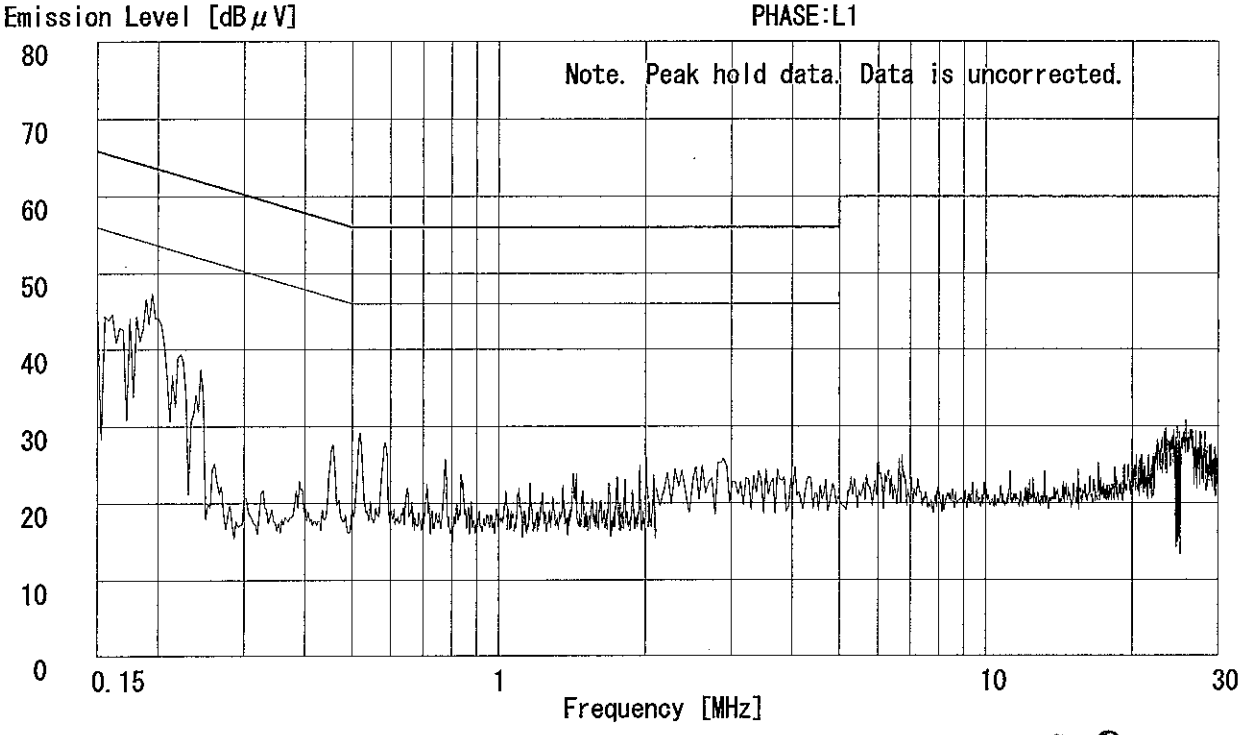


# DATA OF CONDUCTION TEST CHART

UL Apex Co.,Ltd.
YAMAKITA No.1 SHIELD TEST ROOM
Report No. : 25IE0043-YK - 1

| | | | |
|---|---|---|---|
| Applicant | : TOYOTA INDUSTRIES CORPORATION | | |
| Kind of Equipment | : Wireless LAN Module | | |
| Model No. | : 6180210 | | |
| Serial No. | : ES0021 | | |
| Power | : AC120V/60Hz | | |
| Mode | : Transmitting:ch1(2412MHz) | | |
| Remarks | : | | |
| Date | : 5/6/2005 | | |
| Phase | : Single Phase | | |
| Temperature | : 22 ℃ | Engineer | : Toyokazu Imamura |
| Humidity | : 47 % | | |
| Regulation 1 | : FCC Part15C §15.207.(CISPR Pub.22 ) | | |
| Regulation 2 | : None | | |

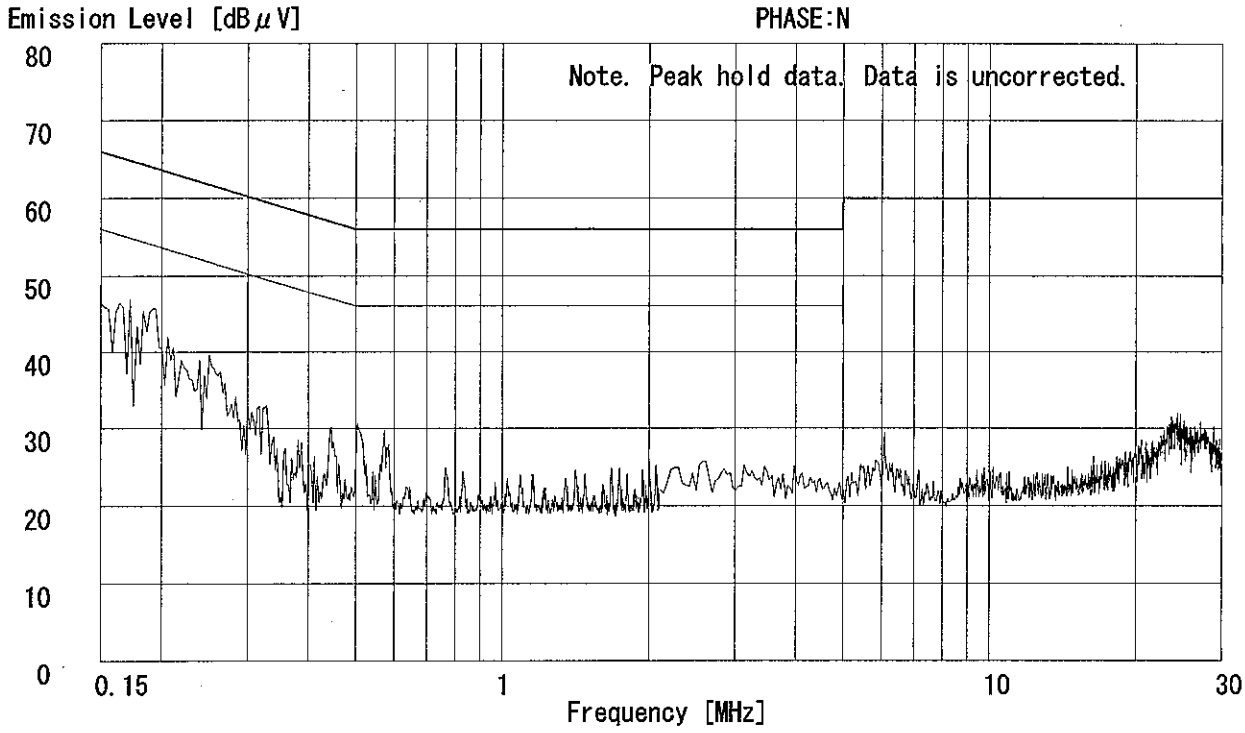


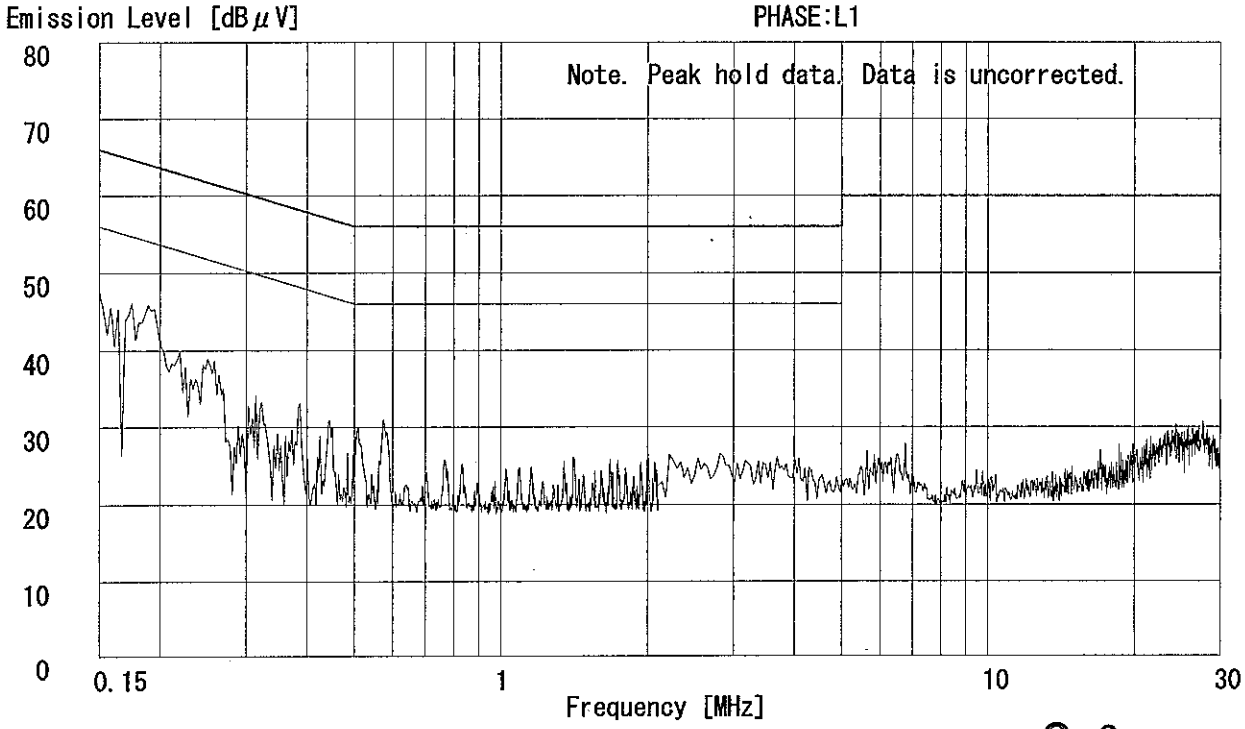



# DATA OF CONDUCTION TEST CHART

UL Apex Co.,Ltd.
YAMAKITA No.1 SHIELD TEST ROOM
Report No. : 25IE0043-YK - 1

| | | | |
|---|---|---|---|
| Applicant | : TOYOTA INDUSTRIES CORPORATION | | |
| Kind of Equipment | : Wireless LAN Module | | |
| Model No. | : 6180210 | | |
| Serial No. | : ES0021 | | |
| Power | : AC120V/60Hz | | |
| Mode | : Transmitting:ch6(2437MHz) | | |
| Remarks | : | | |
| Date | : 5/6/2005 | | |
| Phase | : Single Phase | | |
| Temperature | : 22 ℃ | Engineer | : Toyokazu Imamura |
| Humidity | : 47 % | | |
| Regulation 1 | : FCC Part15C §15.207.(CISPR Pub.22 ) | | |
| Regulation 2 | : None | | |

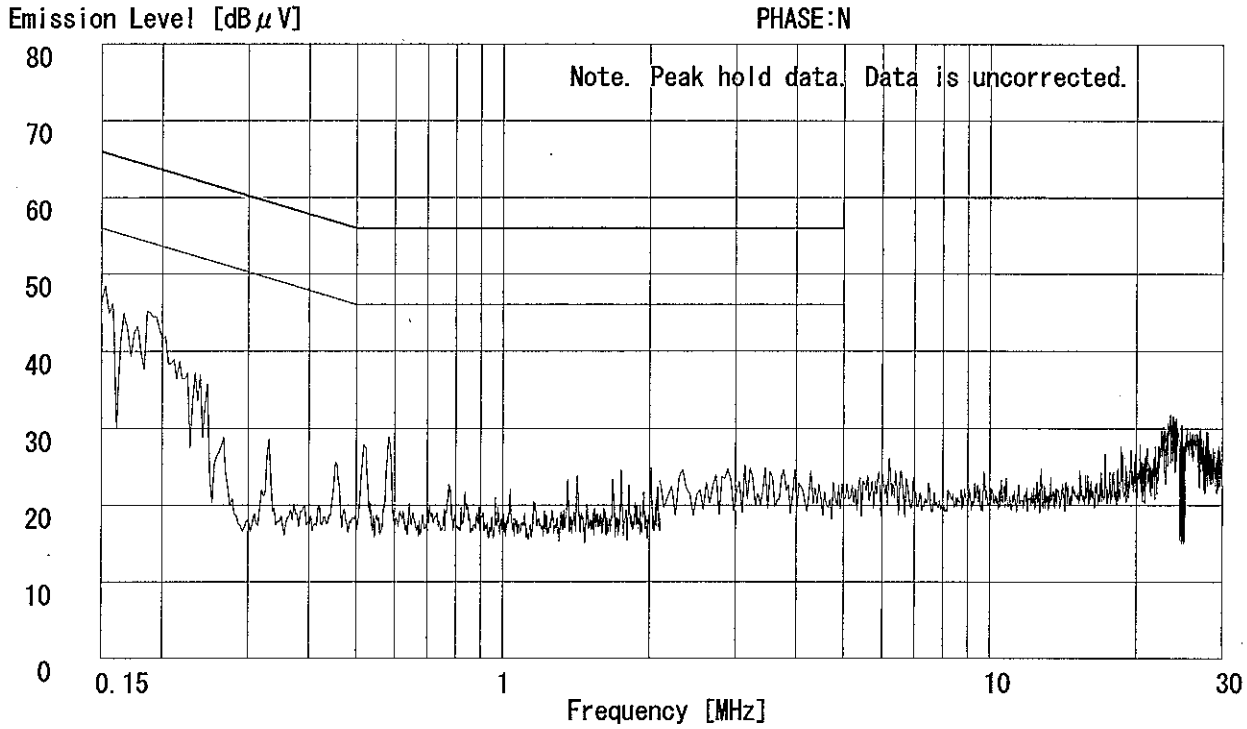


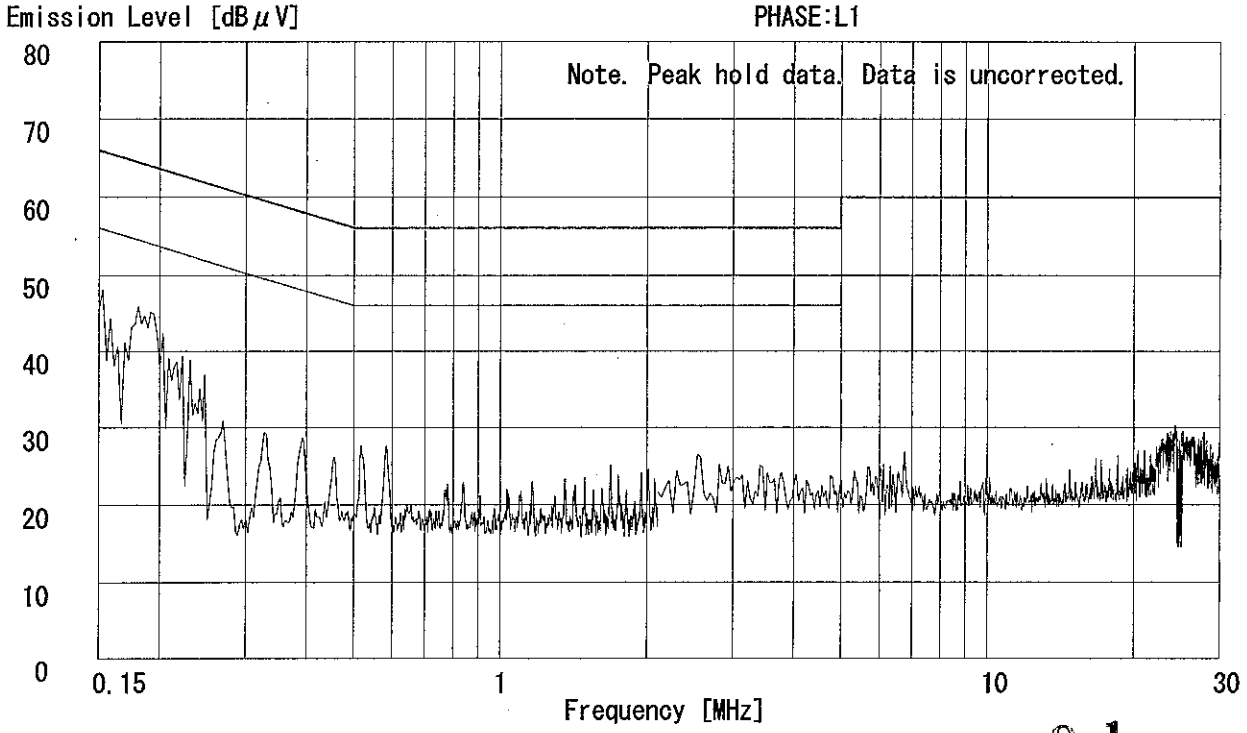



# DATA OF CONDUCTION TEST CHART

UL Apex Co.,Ltd.
YAMAKITA No.1 SHIELD TEST ROOM
Report No.: 25IE0043-YK - 1

| | | | |
|---|---|---|---|
| Applicant | : TOYOTA INDUSTRIES CORPORATION | | |
| Kind of Equipment | : Wireless LAN Module | | |
| Model No. | : 6180210 | | |
| Serial No. | : ES0021 | | |
| Power | : AC120V/60Hz | | |
| Mode | : Transmitting:ch11(2462MHz) | | |
| Remarks | : | | |
| Date | : 5/6/2005 | | |
| Phase | : Single Phase | | |
| Temperature | : 22 ℃ | Engineer | : Toyokazu Imamura |
| Humidity | : 47 % | | |
| Regulation 1 | : FCC Part15C §15.207.(CISPR Pub.22 ) | | |
| Regulation 2 | : None | | |



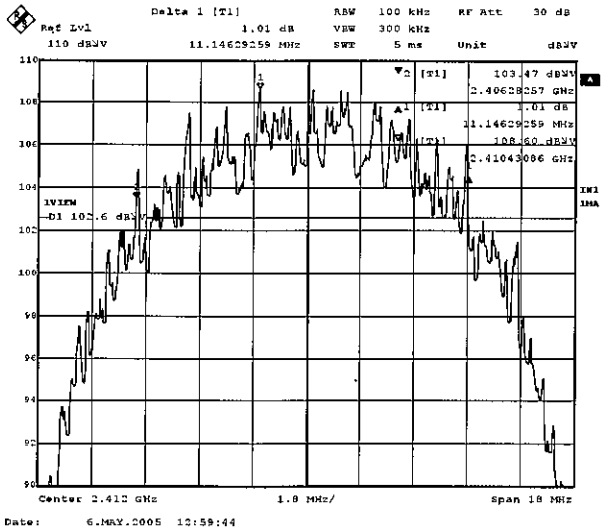
# 6dB Bandwidth: FCC 15.247(a)(2)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

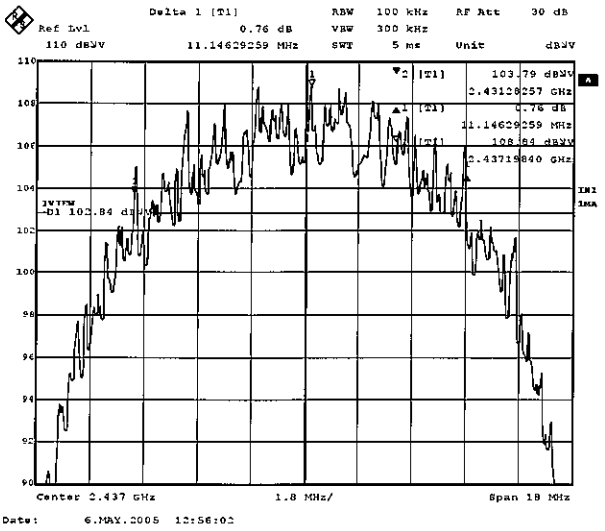
| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATION | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : FCC Part15SubpartC 247(a)(2) |
| MODEL NUMBER | : 6180210 | DATE | : 2005/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25℃/46% |
| FCC ID | : M4B6180210 | TEST MODE | : Transmitting |
| POWER | : DC3.3V(AC120V/60Hz) | ENGINEER | : Toyokazu Imamura |

[IEEE802.11b(11Mbps)]

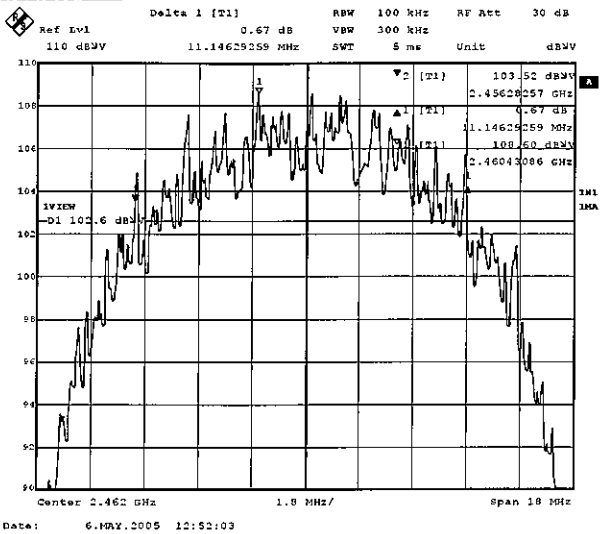
1. ch 1: 2412MHz/6dB Bandwidth:11.15MHz




2. ch 6: 2437MHz/6dB Bandwidth:11.15MHz




3. ch 11: 2462MHz/6dB Bandwidth:11.15MHz



# Maximum Peak Conducted Output Power

UL Apex Co.,Ltd
YAMAKITA NO.2 Shielded Room

| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATI | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : Fcc Part15SubpartC 247(b)(3) |
| MODEL NUMBE | : 6180210 | DATE | : 2004/5/6 |
| SERIAL NUMBE | : ES0021 | TEMP./HUMI | : 25℃/46% |
| FCC ID | : M4B6180210 | | |
| POWER | : DC3.3V(PC:AC120V/60Hz) | | |
| TEST MODE | : Transmitting | | |

ENGINEER : Toyokazu Imamura

IEEE802.11b(11Mbps)

| CH | FREQ [GHz] | S/A Reading [dBm] | Cable Loss [dB] | Results [dBm] | Limit (1W) [dBm] | MARGIN [dB] |
|---|---|---|---|---|---|---|
| Low | 2412.00 | 18.32 | 0.60 | 18.92 | 30.0 | 11.08 |
| Mid | 2437.00 | 18.32 | 0.60 | 18.92 | 30.0 | 11.08 |
| High | 2462.00 | 18.61 | 0.60 | 19.21 | 30.0 | 10.79 |

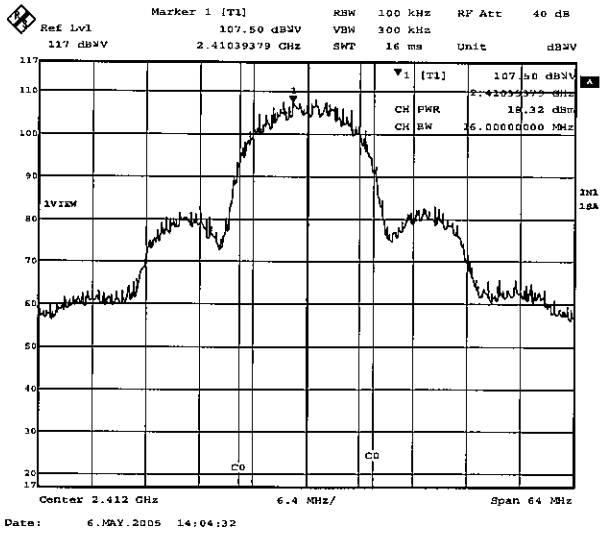
# Maximum Peak Conducted Output Power: FCC 15.247(b)(3)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

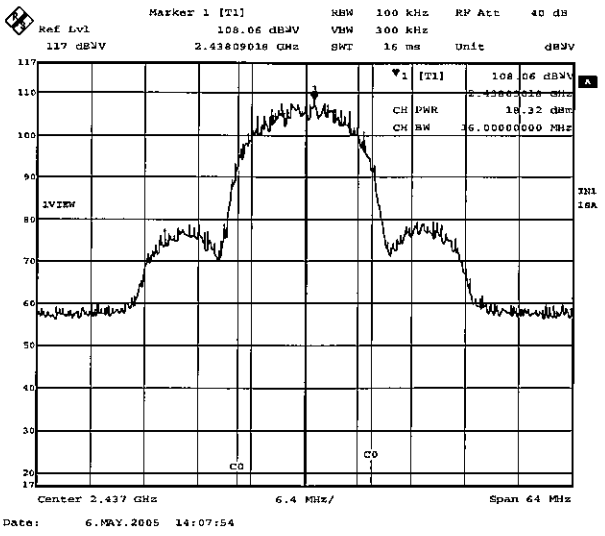
| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATION | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : Fcc Part15SubpartC 247(b)(3) |
| MODEL NUMBER | : 6180210 | DATE | : 2005/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25°C/46% |
| FCC ID | : M4B6180210 | TEST MODE | : Transmitting |
| POWER | : DC3.3V(AC120V/60Hz) | ENGINEER | : Toyokazu Imamura |

[Spectrum Analyzer data ]

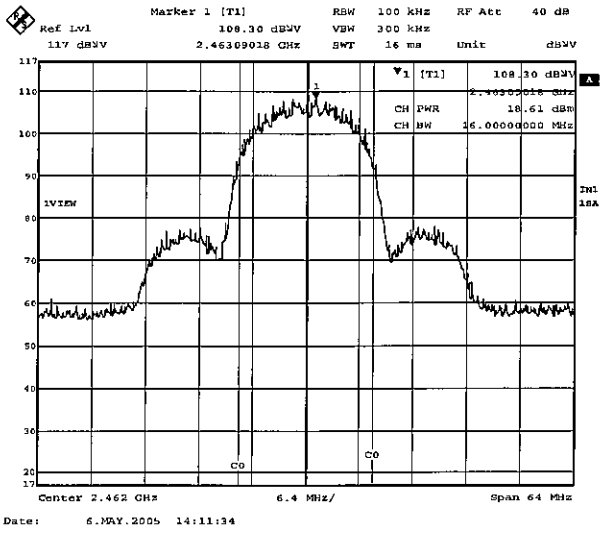
1. ch : 2412MHz




2. ch : 2437MHz




3. ch : 2462MHz



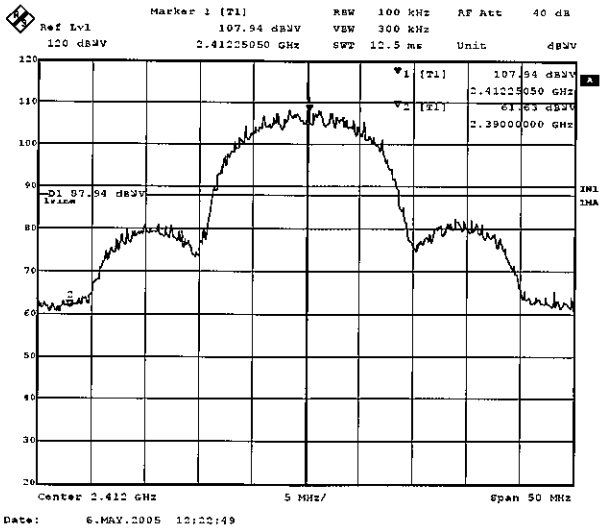
# Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATION | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : FCC Part15SubpartC 247(d) |
| MODEL NUMBER | : 6180210 | DATE | : 2005/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25℃/46% |
| FCC ID | : M4B6180210 | TEST MODE | : Transmitting |
| POWER | : DC3.3V(AC120V/60Hz) | ENGINEER | : Toyokazu Imamura |

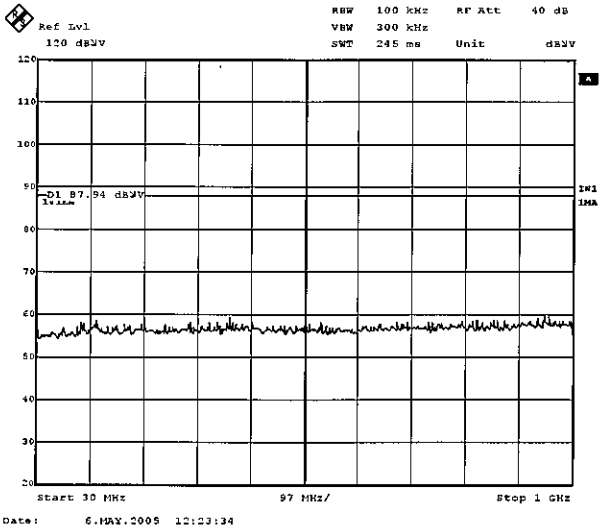
[IEEE802.11b(11Mbps)]

Ch1:2412MHz

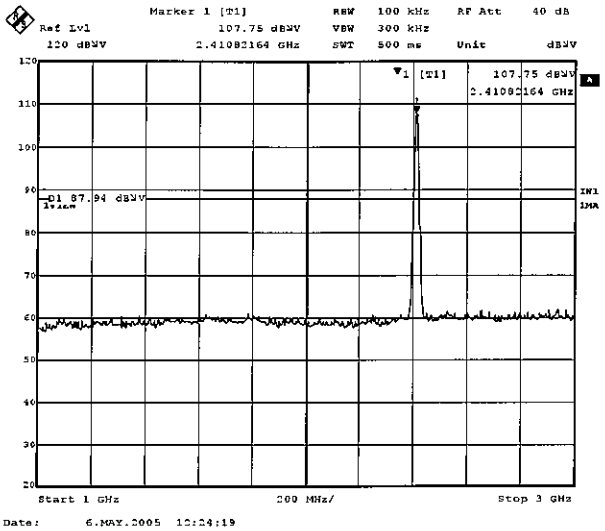
1.




2.




3.



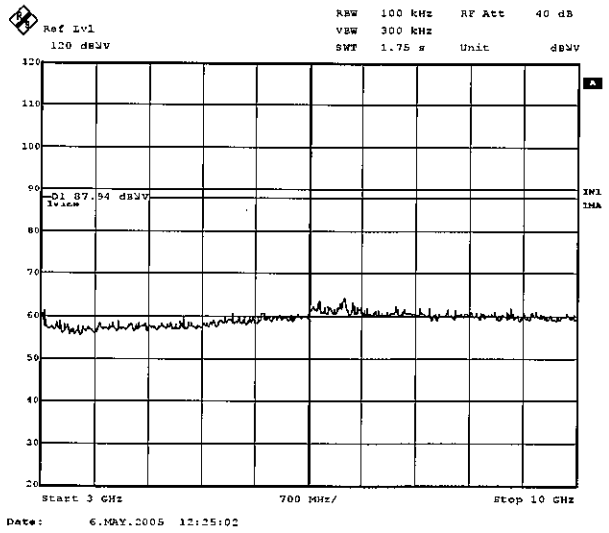
# Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATION | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : FCC Part15SubpartC 247(d) |
| MODEL NUMBER | : 6180210 | DATE | : 2005/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25℃/46% |
| FCC ID | : M4B6180210 | TEST MODE | : Transmitting |
| POWER | : DC3.3V(AC120V/60Hz) | ENGINEER | : Toyokazu Imamura |

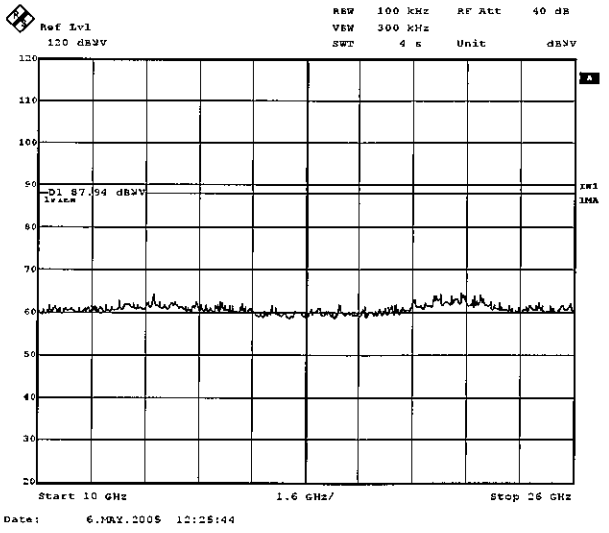
[IEEE802.11b(11Mbps)]

Ch1:2412MHz

4.




5.



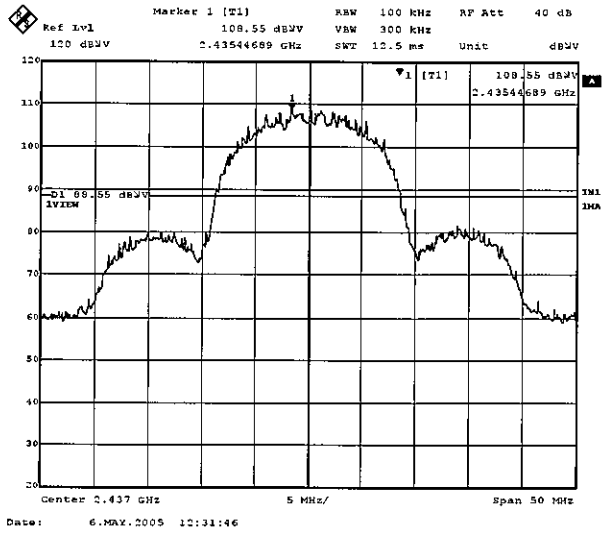
# Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATION | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : FCC Part15SubpartC 247(d) |
| MODEL NUMBER | : 6180210 | DATE | : 2005/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25℃/46% |
| FCC ID | : M4B6180210 | TEST MODE | : Transmitting |
| POWER | : DC3.3V(AC120V/60Hz) | ENGINEER | : Toyokazu Imamura |

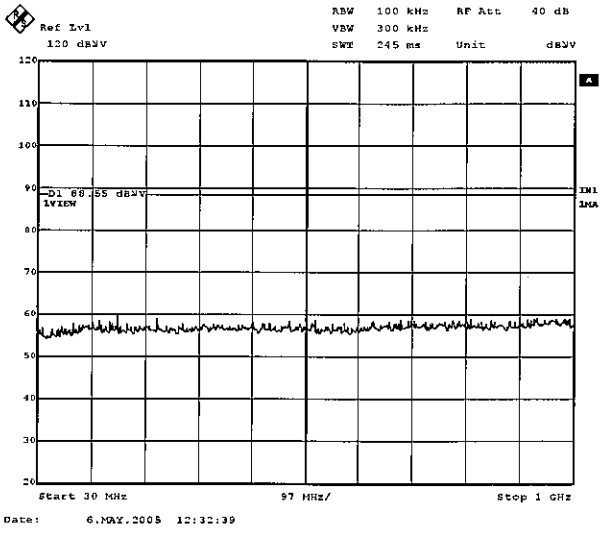
[IEEE802.11b(11Mbps)]

Ch6:2437MHz

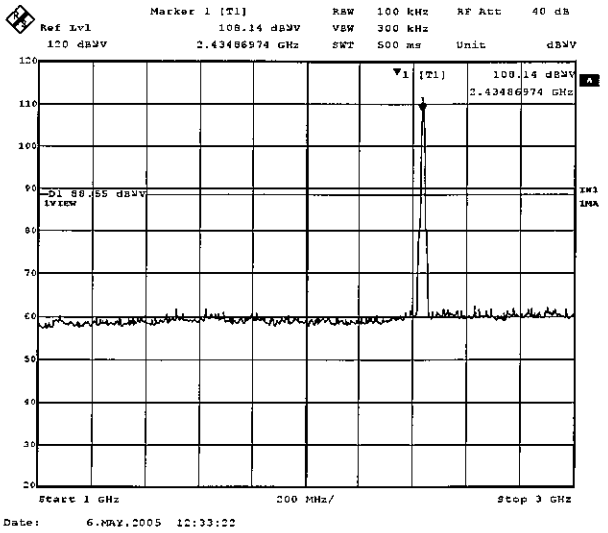
1.




2.




3.



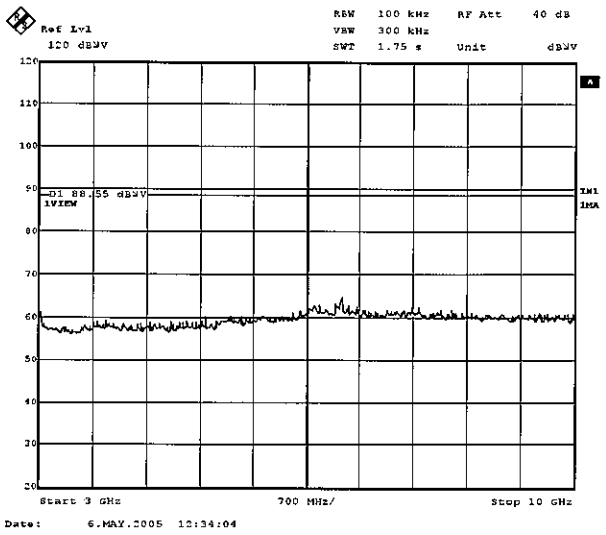
# Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATION | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : FCC Part15SubpartC 247(d) |
| MODEL NUMBER | : 6180210 | DATE | : 2005/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25℃/46% |
| FCC ID | : M4B6180210 | TEST MODE | : Transmitting |
| POWER | : DC3.3V(AC120V/60Hz) | ENGINEER | : Toyokazu Imamura |

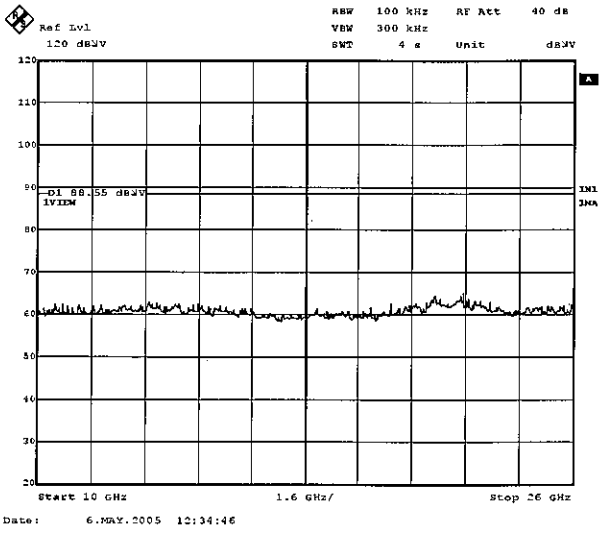
[IEEE802.11b(11Mbps)]

Ch6:2437MHz

4.




5.



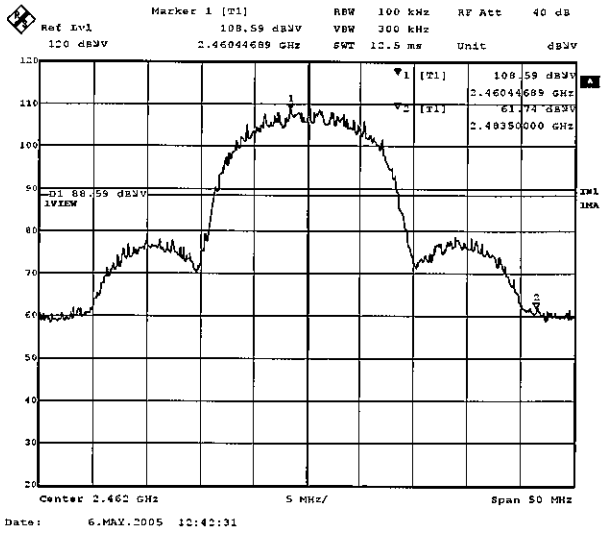
# Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATION | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : FCC Part15SubpartC 247(d) |
| MODEL NUMBER | : 6180210 | DATE | : 2005/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25°C/46% |
| FCC ID | : M4B6180210 | TEST MODE | : Transmitting |
| POWER | : DC3.3V(AC120V/60Hz) | ENGINEER | : Toyokazu Imamura |

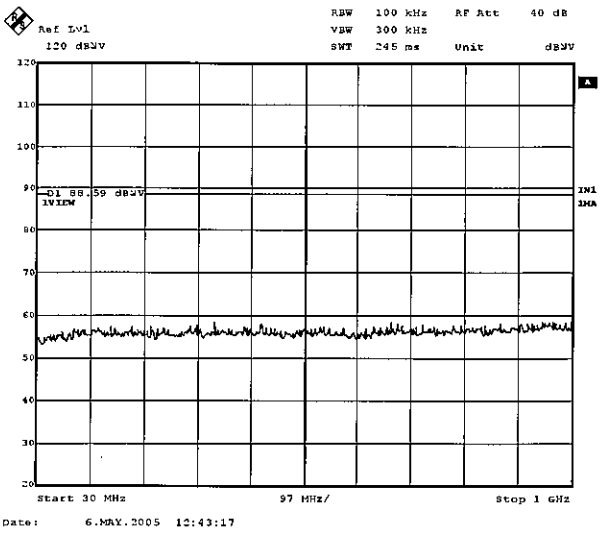
[IEEE802.11b(11Mbps)]

Ch11:2462MHz

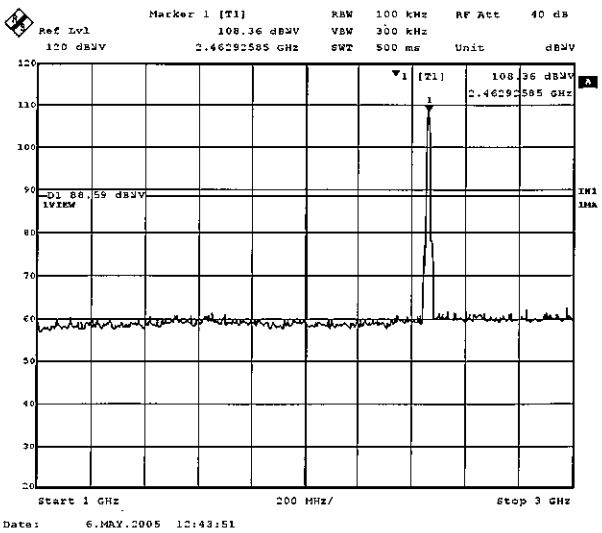
1.




2.




3.



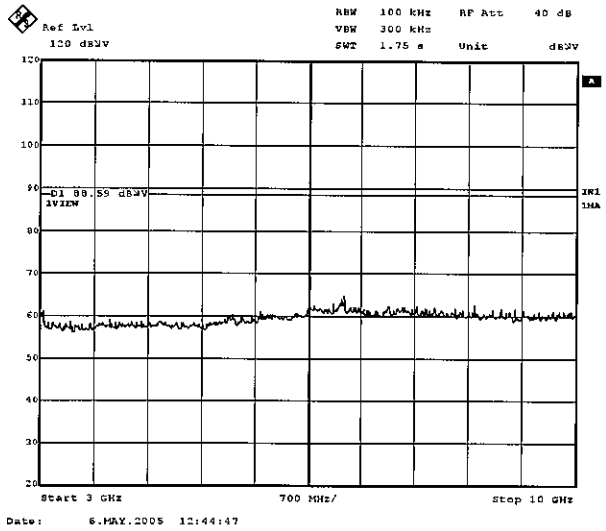
# Out of Band Emission(Antenna Terminal Conducted): FCC 15.247(d)

| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATION | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : FCC Part15SubpartC 247(d) |
| MODEL NUMBER | : 6180210 | DATE | : 2005/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25℃/46% |
| FCC ID | : M4B6180210 | TEST MODE | : Transmitting |
| POWER | : DC3.3V(AC120V/60Hz) | ENGINEER | : Toyokazu Imamura |

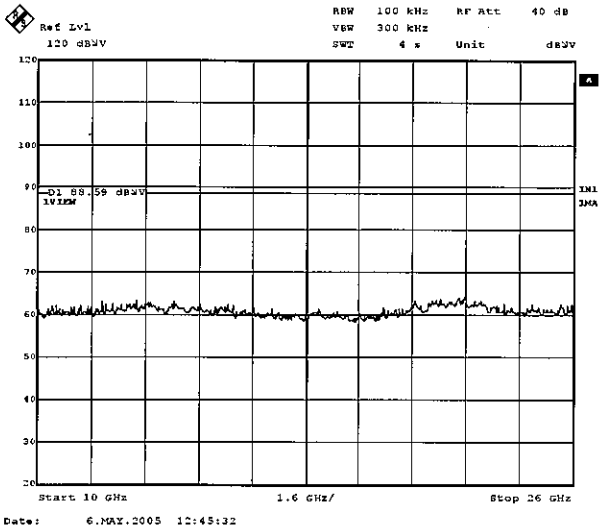
[IEEE802.11b(11Mbps)]

Ch11:2462MHz

4.




5.



# DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Anechoic Chamber
Report No.: 25IE0043-YK-1

Applicant : TOYOTA INDUSTRIES CORPORATION
Kind of Equipment : Wireless LAN Module
Model No. : 6180210
Serial No. : ES0021
Power : DC3.3V
Mode : Transmitting:ch1(2412MHz)
Remarks :
Date : 4/19/2005
Test Distance : 3 m
Temperature : 22 ℃ Engineer : Toyokazu Imamura
Humidity : 45 %
Regulation : FCC Part15C §15.209

| No. | FREQ. [MHz] | ANT TYPE | READING HOR [dBμV] | READING VER [dBμV] | ANT FACTOR [dB/m] | AMP GAIN [dB] | CABLE LOSS [dB] | ATTEN. [dB] | RESULT HOR [dBμV/m] | RESULT VER [dBμV/m] | LIMITS [dBμV/m] | MARGIN HOR [dB] | MARGIN VER [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 166.40 | BB | 35.7 | 31.1 | 15.7 | 28.3 | 2.5 | 6.0 | 31.6 | 27.0 | 43.5 | 11.9 | 16.5 |
| 2. | 176.00 | BB | 37.6 | 31.9 | 16.3 | 28.3 | 2.6 | 6.0 | 34.2 | 28.5 | 43.5 | 9.3 | 15.0 |
| 3. | 187.00 | BB | 42.5 | 37.5 | 16.8 | 28.3 | 2.7 | 6.0 | 39.7 | 34.7 | 43.5 | 3.8 | 8.8 |
| 4. | 240.00 | BB | 38.4 | 35.1 | 17.5 | 28.0 | 3.1 | 6.0 | 37.0 | 33.7 | 46.0 | 9.0 | 12.3 |
| 5. | 266.45 | BB | 38.2 | 33.5 | 18.5 | 28.1 | 3.3 | 6.0 | 37.9 | 33.2 | 46.0 | 8.1 | 12.8 |
| 6. | 308.01 | BB | 38.0 | 34.6 | 14.4 | 27.9 | 3.6 | 6.0 | 34.1 | 30.7 | 46.0 | 11.9 | 15.3 |
| 7. | 499.59 | BB | 32.5 | 39.6 | 18.3 | 29.2 | 4.6 | 6.0 | 32.2 | 39.3 | 46.0 | 13.8 | 6.7 |
| 8. | 665.96 | BB | 41.7 | 36.2 | 20.4 | 29.4 | 5.3 | 6.0 | 44.0 | 38.5 | 46.0 | 2.0 | 7.5 |
| 9. | 792.00 | BB | 32.0 | 29.4 | 21.5 | 29.2 | 5.9 | 6.0 | 36.2 | 33.6 | 46.0 | 9.8 | 12.4 |
| 10. | 880.00 | BB | 32.9 | 31.5 | 22.8 | 29.0 | 6.2 | 6.0 | 38.9 | 37.5 | 46.0 | 7.1 | 8.5 |

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KBA-03(BBA9106)30-299MHz/KLA-03(USLP9143)300-1000MHz
■AMP:KAF-05(8447D) ■RECEIVER:KTR-01(ES140) ■KCC-30_31_32_34(RE)

# DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Anechoic Chamber
Report No.: 251E0043-YK - 1

| | | | |
|---|---|---|---|
| Applicant | : | TOYOTA INDUSTRIES CORPORATION | |
| Kind of Equipment | : | Wireless LAN Module | |
| Model No. | : | 6180210 | |
| Serial No. | : | ES0021 | |
| Power | : | DC3.3V | |
| Mode | : | Transmitting:ch6(2437MHz) | |
| Remarks | : | | |
| Date | : | 4/19/2005 | |
| Test Distance | : | 3 m | |
| Temperature | : | 22 ℃ | Engineer : Toyokazu Imamura |
| Humidity | : | 45 % | |
| Regulation | : | FCC Part15C §15.209 | |

| No. | FREQ. [MHz] | ANT TYPE | READING HOR [dBμV] | READING VER [dBμV] | ANT FACTOR [dB/m] | AMP GAIN [dB] | CABLE LOSS [dB] | ATTEN. [dB] | RESULT HOR [dBμV/m] | RESULT VER [dBμV/m] | LIMITS [dBμV/m] | MARGIN HOR [dB] | MARGIN VER [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 166.40 | BB | 37.4 | 31.9 | 15.7 | 28.3 | 2.5 | 6.0 | 33.3 | 27.8 | 43.5 | 10.2 | 15.7 |
| 2. | 176.00 | BB | 37.7 | 31.0 | 16.3 | 28.3 | 2.6 | 6.0 | 34.3 | 27.6 | 43.5 | 9.2 | 15.9 |
| 3. | 187.00 | BB | 41.4 | 37.1 | 16.8 | 28.3 | 2.7 | 6.0 | 38.6 | 34.3 | 43.5 | 4.9 | 9.2 |
| 4. | 240.00 | BB | 36.9 | 30.7 | 17.5 | 28.0 | 3.1 | 6.0 | 35.5 | 29.3 | 46.0 | 10.5 | 16.7 |
| 5. | 266.45 | BB | 36.9 | 32.8 | 18.5 | 28.1 | 3.3 | 6.0 | 36.6 | 32.5 | 46.0 | 9.4 | 13.5 |
| 6. | 308.01 | BB | 37.2 | 33.8 | 14.4 | 27.9 | 3.6 | 6.0 | 33.3 | 29.9 | 46.0 | 12.7 | 16.1 |
| 7. | 499.59 | BB | 36.4 | 36.5 | 18.3 | 29.2 | 4.6 | 6.0 | 36.1 | 36.2 | 46.0 | 9.9 | 9.8 |
| 8. | 665.89 | BB | 36.5 | 32.7 | 20.4 | 29.4 | 5.3 | 6.0 | 38.8 | 35.0 | 46.0 | 7.2 | 11.0 |
| 9. | 792.00 | BB | 37.1 | 33.6 | 21.5 | 29.2 | 5.9 | 6.0 | 41.3 | 37.8 | 46.0 | 4.7 | 8.2 |
| 10. | 880.00 | BB | 32.2 | 31.4 | 22.8 | 29.0 | 6.2 | 6.0 | 38.2 | 37.4 | 46.0 | 7.8 | 8.6 |

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KBA-03(BBA9106)30-299MHz/KLA-03(USLP9143)300-1000MHz
■AMP:KAF-05(8447D) ■RECEIVER:KTR-01(ESI40) ■KCC-30_31_32_34(RE)

# DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Anechoic Chamber
Report No.: 25IE0043-YK-1

Applicant : TOYOTA INDUSTRIES CORPORATION
Kind of Equipment : Wireless LAN Module
Model No. : 6180210
Serial No. : ES0021
Power : DC3.3V
Mode : Transmitting:ch11(2462MHz)
Remarks :
Date : 4/19/2005
Test Distance : 3 m
Temperature : 22 ℃ Engineer : Toyokazu Imamura
Humidity : 45 %
Regulation : FCC Part15C §15.209

| No. | FREQ. [MHz] | ANT TYPE | READING HOR [dBμV] | READING VER [dBμV] | ANT FACTOR [dB/m] | AMP GAIN [dB] | CABLE LOSS [dB] | ATTEN. [dB] | RESULT HOR [dBμV/m] | RESULT VER [dBμV/m] | LIMITS [dBμV/m] | MARGIN HOR [dB] | MARGIN VER [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 166.40 | BB | 38.0 | 31.9 | 15.7 | 28.3 | 2.5 | 6.0 | 33.9 | 27.8 | 43.5 | 9.6 | 15.7 |
| 2. | 176.00 | BB | 37.4 | 31.0 | 16.3 | 28.3 | 2.6 | 6.0 | 34.0 | 27.6 | 43.5 | 9.5 | 15.9 |
| 3. | 187.00 | BB | 41.6 | 36.9 | 16.8 | 28.3 | 2.7 | 6.0 | 38.8 | 34.1 | 43.5 | 4.7 | 9.4 |
| 4. | 240.00 | BB | 36.7 | 28.9 | 17.5 | 28.0 | 3.1 | 6.0 | 35.3 | 27.5 | 46.0 | 10.7 | 18.5 |
| 5. | 266.45 | BB | 35.3 | 31.4 | 18.5 | 28.1 | 3.3 | 6.0 | 35.0 | 31.1 | 46.0 | 11.0 | 14.9 |
| 6. | 308.01 | BB | 36.9 | 33.9 | 14.4 | 27.9 | 3.6 | 6.0 | 33.0 | 30.0 | 46.0 | 13.0 | 16.0 |
| 7. | 499.59 | BB | 39.6 | 33.3 | 18.3 | 29.2 | 4.6 | 6.0 | 39.3 | 33.0 | 46.0 | 6.7 | 13.0 |
| 8. | 665.70 | BB | 37.2 | 33.3 | 20.4 | 29.4 | 5.3 | 6.0 | 39.5 | 35.6 | 46.0 | 6.5 | 10.4 |
| 9. | 792.00 | BB | 35.3 | 32.2 | 21.5 | 29.2 | 5.9 | 6.0 | 39.5 | 36.4 | 46.0 | 6.5 | 9.6 |
| 10. | 880.00 | BB | 30.5 | 30.3 | 22.8 | 29.0 | 6.2 | 6.0 | 36.5 | 36.3 | 46.0 | 9.5 | 9.7 |

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KBA-03(BBA9106)30-299MHz/KLA-03(USLP9143)300-1000MHz
■AMP:KAF-05(8447D) ■RECEIVER:KTR-01(ESI40) ■KCC-30_31_32_34(RE)

# DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Anechoic Chamber
Report No. : 25IE0043-YK - 1

| | | | |
|---|---|---|---|
| Applicant | : | TOYOTA INDUSTRIES CORPORATION | |
| Kind of Equipment | : | Wireless LAN Module | |
| Model No. | : | 6180210 | |
| Serial No. | : | ES0021 | |
| Power | : | DC3.3V | |
| Mode | : | Transmitting:ch1(2412MHz) | |
| Remarks | : | | |
| Date | : | 4/28/2005 | |
| Test Distance | : | 3 m | |
| Temperature | : | 20 ℃ | Engineer : Toyokazu Imamura |
| Humidity | : | 40 % | |
| Regulation | : | FCC Part15C §15.209(PK Detection) | |

| No. | FREQ. [MHz] | ANT TYPE | READING HOR [dBμV] | READING VER [dBμV] | ANT FACTOR [dB/m] | AMP GAIN [dB] | CABLE LOSS [dB] | ATTEN. [dB] | RESULT HOR [dBμV/m] | RESULT VER [dBμV/m] | LIMITS [dBμV/m] | MARGIN HOR [dB] | MARGIN VER [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 2390.00 | BB | 49.3 | 49.4 | 31.5 | 37.5 | 4.0 | 10.0 | 57.3 | 57.4 | 74.0 | 16.7 | 16.6 |
| 2. | 4824.00 | BB | 49.0 | 48.3 | 35.4 | 37.0 | 5.5 | 0.5 | 53.4 | 52.7 | 74.0 | 20.6 | 21.3 |
| 3. | 7236.00 | BB | 45.2 | 45.5 | 37.9 | 37.0 | 6.6 | 0.2 | 52.9 | 53.2 | 74.0 | 21.1 | 20.8 |
| 4. | 9648.00 | BB | 47.2 | 47.8 | 39.0 | 37.1 | 7.4 | 0.4 | 56.9 | 57.5 | 74.0 | 17.1 | 16.5 |
| 5. | 12060.00 | BB | 45.2 | 45.0 | 43.2 | 36.1 | 8.2 | 0.0 | 60.5 | 60.3 | 74.0 | 13.5 | 13.7 |
| 6. | 14472.00 | BB | 44.8 | 44.8 | 41.5 | 35.0 | 8.9 | 0.3 | 60.5 | 60.5 | 74.0 | 13.5 | 13.5 |
| 7. | 16884.00 | BB | 45.0 | 45.2 | 42.5 | 34.7 | 9.6 | 0.6 | 63.0 | 63.2 | 74.0 | 11.0 | 10.8 |
| 8. | 19296.00 | BB | 44.7 | 45.7 | 40.3 | 34.4 | 10.3 | 0.0 | 60.9 | 61.9 | 74.0 | 13.1 | 12.1 |
| 9. | 21708.00 | BB | 44.9 | 45.3 | 39.1 | 34.5 | 10.7 | 0.0 | 60.2 | 60.6 | 74.0 | 13.8 | 13.4 |
| 10. | 24120.00 | BB | 45.6 | 45.7 | 39.9 | 34.1 | 11.1 | 0.0 | 62.5 | 62.6 | 74.0 | 11.5 | 11.4 |

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■CABLE:KCC-D3/D7■PREAMP:KAF-02(8449B)■EMI RECEIVER:KTR-01(ESI40)

# DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Anechoic Chamber
Report No.: 25IE0043-YK - 1

Applicant : TOYOTA INDUSTRIES CORPORATION
Kind of Equipment : Wireless LAN Module
Model No. : 6180210
Serial No. : ES0021
Power : DC3.3V
Mode : Transmitting:ch1(2412MHz)
Remarks :
Date : 4/28/2005
Test Distance : 3 m
Temperature : 20 ℃ Engineer : Toyokazu Imamura
Humidity : 40 %
Regulation : FCC Part15C §15.209(AV Detection)

| No. | FREQ. [MHz] | ANT TYPE | READING HOR [dBμV] | READING VER [dBμV] | ANT FACTOR [dB/m] | AMP GAIN [dB] | CABLE LOSS [dB] | ATTEN. [dB] | RESULT HOR [dBμV/m] | RESULT VER [dBμV/m] | LIMITS [dBμV/m] | MARGIN HOR [dB] | MARGIN VER [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 2390.00 | BB | 38.5 | 38.2 | 31.5 | 37.5 | 4.0 | 10.0 | 46.5 | 46.2 | 54.0 | 7.5 | 7.8 |
| 2. | 4824.00 | BB | 42.5 | 41.8 | 35.4 | 37.0 | 5.5 | 0.5 | 46.9 | 46.2 | 54.0 | 7.1 | 7.8 |
| 3. | 7236.00 | BB | 32.6 | 32.7 | 37.9 | 37.0 | 6.6 | 0.2 | 40.3 | 40.4 | 54.0 | 13.7 | 13.6 |
| 4. | 9648.00 | BB | 36.9 | 36.4 | 39.0 | 37.1 | 7.4 | 0.4 | 46.6 | 46.1 | 54.0 | 7.4 | 7.9 |
| 5. | 12060.00 | BB | 32.4 | 32.3 | 43.2 | 36.1 | 8.2 | 0.0 | 47.7 | 47.6 | 54.0 | 6.3 | 6.4 |
| 6. | 14472.00 | BB | 31.8 | 31.7 | 41.5 | 35.0 | 8.9 | 0.3 | 47.5 | 47.4 | 54.0 | 6.5 | 6.6 |
| 7. | 16884.00 | BB | 32.2 | 32.3 | 42.5 | 34.7 | 9.6 | 0.6 | 50.2 | 50.3 | 54.0 | 3.8 | 3.7 |
| 8. | 19296.00 | BB | 32.1 | 32.1 | 40.3 | 34.4 | 10.3 | 0.0 | 48.3 | 48.3 | 54.0 | 5.7 | 5.7 |
| 9. | 21708.00 | BB | 32.3 | 32.4 | 39.1 | 34.5 | 10.7 | 0.0 | 47.6 | 47.7 | 54.0 | 6.4 | 6.3 |
| 10. | 24120.00 | BB | 32.6 | 32.6 | 39.9 | 34.1 | 11.1 | 0.0 | 49.5 | 49.5 | 54.0 | 4.5 | 4.5 |

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■CABLE:KCC-D3/D7■PREAMP:KAF-02(8449B)■EMI RECEIVER:KTR-01(ESI40)

# DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Anechoic Chamber
Report No.: 251E0043-YK-1

| | | | |
|---|---|---|---|
| Applicant | : | TOYOTA INDUSTRIES CORPORATION | |
| Kind of Equipment | : | Wireless LAN Module | |
| Model No. | : | 6180210 | |
| Serial No. | : | ES0021 | |
| Power | : | DC3.3V | |
| Mode | : | Transmitting:ch6(2437MHz) | |
| Remarks | : | | |
| Date | : | 4/28/2005 | |
| Test Distance | : | 3 m | |
| Temperature | : | 20 ℃ | Engineer : Toyokazu Imamura |
| Humidity | : | 40 % | |
| Regulation | : | FCC Part15C §15.209(PK Detection) | |

| No. | FREQ. [MHz] | ANT TYPE | READING HOR [dBμV] | READING VER [dBμV] | ANT FACTOR [dB/m] | AMP GAIN [dB] | CABLE LOSS [dB] | ATTEN. [dB] | RESULT HOR [dBμV/m] | RESULT VER [dBμV/m] | LIMITS [dBμV/m] | MARGIN HOR [dB] | MARGIN VER [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 4874.00 | BB | 49.9 | 49.4 | 35.7 | 37.0 | 5.5 | 0.5 | 54.6 | 54.1 | 74.0 | 19.4 | 19.9 |
| 2. | 7311.00 | BB | 45.7 | 45.3 | 38.0 | 37.0 | 6.7 | 0.2 | 53.6 | 53.2 | 74.0 | 20.4 | 20.8 |
| 3. | 9748.00 | BB | 46.7 | 47.6 | 39.0 | 37.1 | 7.4 | 0.3 | 56.3 | 57.2 | 74.0 | 17.7 | 16.8 |
| 4. | 12185.00 | BB | 45.0 | 45.5 | 43.4 | 35.9 | 8.2 | 0.0 | 60.7 | 61.2 | 74.0 | 13.3 | 12.8 |
| 5. | 14622.00 | BB | 45.2 | 45.3 | 42.3 | 35.1 | 8.9 | 0.4 | 61.7 | 61.8 | 74.0 | 12.3 | 12.2 |
| 6. | 17059.00 | BB | 44.9 | 44.9 | 42.6 | 34.5 | 9.7 | 0.6 | 63.3 | 63.3 | 74.0 | 10.7 | 10.7 |
| 7. | 19496.00 | BB | 45.3 | 44.7 | 39.9 | 34.5 | 10.5 | 0.0 | 61.2 | 60.6 | 74.0 | 12.8 | 13.4 |
| 8. | 21933.00 | BB | 46.1 | 46.3 | 39.2 | 34.3 | 10.8 | 0.0 | 61.8 | 62.0 | 74.0 | 12.2 | 12.0 |
| 9. | 24370.00 | BB | 45.3 | 46.0 | 40.2 | 34.1 | 11.1 | 0.0 | 62.5 | 63.2 | 74.0 | 11.5 | 10.8 |

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■CABLE:KCC-D3/D7■PREAMP:KAF-02(8449B)■EMI RECEIVER:KTR-01(ESI40)

# DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Anechoic Chamber
Report No.: 251E0043-YK-1

| | | | |
|---|---|---|---|
| Applicant | : TOYOTA INDUSTRIES CORPORATION | | |
| Kind of Equipment | : Wireless LAN Module | | |
| Model No. | : 6180210 | | |
| Serial No. | : ES0021 | | |
| Power | : DC3.3V | | |
| Mode | : Transmitting:ch6(2437MHz) | | |
| Remarks | : | | |
| Date | : 4/28/2005 | | |
| Test Distance | : 3 m | | |
| Temperature | : 20 ℃ | Engineer | : Toyokazu Imamura |
| Humidity | : 40 % | | |
| Regulation | : FCC Part15C §15.209(AV Detection) | | |

| No. | FREQ. [MHz] | ANT TYPE | READING HOR [dBμV] | READING VER [dBμV] | ANT FACTOR [dB/m] | AMP GAIN [dB] | CABLE LOSS [dB] | ATTEN. [dB] | RESULT HOR [dBμV/m] | RESULT VER [dBμV/m] | LIMITS [dBμV/m] | MARGIN HOR [dB] | MARGIN VER [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 4874.00 | BB | 43.1 | 43.0 | 35.7 | 37.0 | 5.5 | 0.5 | 47.8 | 47.7 | 54.0 | 6.2 | 6.3 |
| 2. | 7311.00 | BB | 32.6 | 32.5 | 38.0 | 37.0 | 6.7 | 0.2 | 40.5 | 40.4 | 54.0 | 13.5 | 13.6 |
| 3. | 9748.00 | BB | 36.4 | 36.6 | 39.0 | 37.1 | 7.4 | 0.3 | 46.0 | 46.2 | 54.0 | 8.0 | 7.8 |
| 4. | 12185.00 | BB | 32.4 | 32.4 | 43.4 | 35.9 | 8.2 | 0.0 | 48.1 | 48.1 | 54.0 | 5.9 | 5.9 |
| 5. | 14622.00 | BB | 32.2 | 32.7 | 42.3 | 35.1 | 8.9 | 0.4 | 48.7 | 49.2 | 54.0 | 5.3 | 4.8 |
| 6. | 17059.00 | BB | 32.1 | 32.1 | 42.6 | 34.5 | 9.7 | 0.6 | 50.5 | 50.5 | 54.0 | 3.5 | 3.5 |
| 7. | 19496.00 | BB | 32.0 | 31.9 | 39.9 | 34.5 | 10.5 | 0.0 | 47.9 | 47.8 | 54.0 | 6.1 | 6.2 |
| 8. | 21933.00 | BB | 33.5 | 33.4 | 39.2 | 34.3 | 10.8 | 0.0 | 49.2 | 49.1 | 54.0 | 4.8 | 4.9 |
| 9. | 24370.00 | BB | 33.0 | 33.0 | 40.2 | 34.1 | 11.1 | 0.0 | 50.2 | 50.2 | 54.0 | 3.8 | 3.8 |

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■CABLE:KCC-D3/D7■PREAMP:KAF-02(8449B)■EMI RECEIVER:KTR-01(ESI40)

# DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Anechoic Chamber
Report No.: 25IE0043-YK- 1

| | | | |
|---|---|---|---|
| Applicant | : | TOYOTA INDUSTRIES CORPORATION | |
| Kind of Equipment | : | Wireless LAN Module | |
| Model No. | : | 6180210 | |
| Serial No. | : | ES0021 | |
| Power | : | DC3.3V | |
| Mode | : | Transmitting:ch11(2462MHz) | |
| Remarks | : | | |
| Date | : | 4/28/2005 | |
| Test Distance | : | 3 m | |
| Temperature | : | 20 ℃ | Engineer : Toyokazu Imamura |
| Humidity | : | 40 % | |
| Regulation | : | FCC Part15C §15.209(PK Detection) | |

| No. | FREQ. [MHz] | ANT TYPE | READING HOR [dBμV] | READING VER [dBμV] | ANT FACTOR [dB/m] | AMP GAIN [dB] | CABLE LOSS [dB] | ATTEN. [dB] | RESULT HOR [dBμV/m] | RESULT VER [dBμV/m] | LIMITS [dBμV/m] | MARGIN HOR [dB] | MARGIN VER [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 2483.50 | BB | 53.4 | 50.9 | 32.0 | 37.6 | 4.0 | 10.0 | 61.8 | 59.3 | 74.0 | 12.2 | 14.7 |
| 2. | 2498.85 | BB | 50.6 | 49.7 | 32.1 | 37.6 | 4.0 | 10.0 | 59.1 | 58.2 | 74.0 | 14.9 | 15.8 |
| 3. | 4924.00 | BB | 49.9 | 50.1 | 36.0 | 37.0 | 5.6 | 0.5 | 55.0 | 55.2 | 74.0 | 19.0 | 18.8 |
| 4. | 7386.00 | BB | 45.9 | 45.3 | 38.2 | 37.1 | 6.7 | 0.2 | 53.9 | 53.3 | 74.0 | 20.1 | 20.7 |
| 5. | 9848.00 | BB | 46.4 | 46.5 | 39.0 | 37.1 | 7.4 | 0.2 | 55.9 | 56.0 | 74.0 | 18.1 | 18.0 |
| 6. | 12310.00 | BB | 45.3 | 45.8 | 43.5 | 35.7 | 8.1 | 0.0 | 61.2 | 61.7 | 74.0 | 12.8 | 12.3 |
| 7. | 14772.00 | BB | 45.5 | 45.0 | 43.1 | 35.2 | 9.0 | 0.6 | 63.0 | 62.5 | 74.0 | 11.0 | 11.5 |
| 8. | 17234.00 | BB | 44.9 | 44.1 | 42.8 | 34.6 | 9.6 | 0.3 | 63.0 | 62.2 | 74.0 | 11.0 | 11.8 |
| 9. | 19696.00 | BB | 45.5 | 45.0 | 39.9 | 34.7 | 10.5 | 0.0 | 61.2 | 60.7 | 74.0 | 12.8 | 13.3 |
| 10. | 22158.00 | BB | 46.1 | 45.9 | 39.6 | 34.2 | 11.0 | 0.0 | 62.5 | 62.3 | 74.0 | 11.5 | 11.7 |
| 11. | 24620.00 | BB | 46.4 | 46.7 | 40.3 | 34.0 | 11.3 | 0.0 | 64.0 | 64.3 | 74.0 | 10.0 | 9.7 |

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■CABLE:KCC-D3/D7■PREAMP:KAF-02(8449B)■EMI RECEIVER:KTR-01(ESI40)

# DATA OF RADIATION TEST

UL Apex Co.,Ltd.
Yamakita No.1 Anechoic Chamber
Report No.: 25IE0043-YK - 1

Applicant : TOYOTA INDUSTRIES CORPORATION
Kind of Equipment : Wireless LAN Module
Model No. : 6180210
Serial No. : ES0021
Power : DC3.3V
Mode : Transmitting:ch11(2462MHz)
Remarks :
Date : 4/28/2005
Test Distance : 3 m
Temperature : 20 °C Engineer : Toyokazu Imamura
Humidity : 40 %
Regulation : FCC Part15C §15.209(AV Detection)

| No. | FREQ. [MHz] | ANT TYPE | READING HOR [dBμV] | READING VER [dBμV] | ANT FACTOR [dB/m] | AMP GAIN [dB] | CABLE LOSS [dB] | ATTEN. [dB] | RESULT HOR [dBμV/m] | RESULT VER [dBμV/m] | LIMITS [dBμV/m] | MARGIN HOR [dB] | MARGIN VER [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 2483.50 | BB | 42.0 | 39.7 | 32.0 | 37.6 | 4.0 | 10.0 | 50.4 | 48.1 | 54.0 | 3.6 | 5.9 |
| 2. | 2498.85 | BB | 40.1 | 38.0 | 32.1 | 37.6 | 4.0 | 10.0 | 48.6 | 46.5 | 54.0 | 5.4 | 7.5 |
| 3. | 4924.00 | BB | 43.5 | 43.7 | 36.0 | 37.0 | 5.6 | 0.5 | 48.6 | 48.8 | 54.0 | 5.4 | 5.2 |
| 4. | 7386.00 | BB | 32.6 | 32.3 | 38.2 | 37.1 | 6.7 | 0.2 | 40.6 | 40.3 | 54.0 | 13.4 | 13.7 |
| 5. | 9848.00 | BB | 34.7 | 35.5 | 39.0 | 37.1 | 7.4 | 0.2 | 44.2 | 45.0 | 54.0 | 9.8 | 9.0 |
| 6. | 12310.00 | BB | 32.4 | 32.4 | 43.5 | 35.7 | 8.1 | 0.0 | 48.3 | 48.3 | 54.0 | 5.7 | 5.7 |
| 7. | 14772.00 | BB | 33.0 | 32.1 | 43.1 | 35.2 | 9.0 | 0.6 | 50.5 | 49.6 | 54.0 | 3.5 | 4.4 |
| 8. | 17234.00 | BB | 31.9 | 31.9 | 42.8 | 34.6 | 9.6 | 0.3 | 50.0 | 50.0 | 54.0 | 4.0 | 4.0 |
| 9. | 19696.00 | BB | 32.1 | 32.1 | 39.9 | 34.7 | 10.5 | 0.0 | 47.8 | 47.8 | 54.0 | 6.2 | 6.2 |
| 10. | 22158.00 | BB | 33.3 | 33.3 | 39.6 | 34.2 | 11.0 | 0.0 | 49.7 | 49.7 | 54.0 | 4.3 | 4.3 |
| 11. | 24620.00 | BB | 33.3 | 33.4 | 40.3 | 34.0 | 11.3 | 0.0 | 50.9 | 51.0 | 54.0 | 3.1 | 3.0 |

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KHA-01(SAS-200 571)1-18GHz/KHA-03(3160-09)18-26GHz
■CABLE:KCC-D3/D7■PREAMP:KAF-02(8449B)■EMI RECEIVER:KTR-01(ESI40)

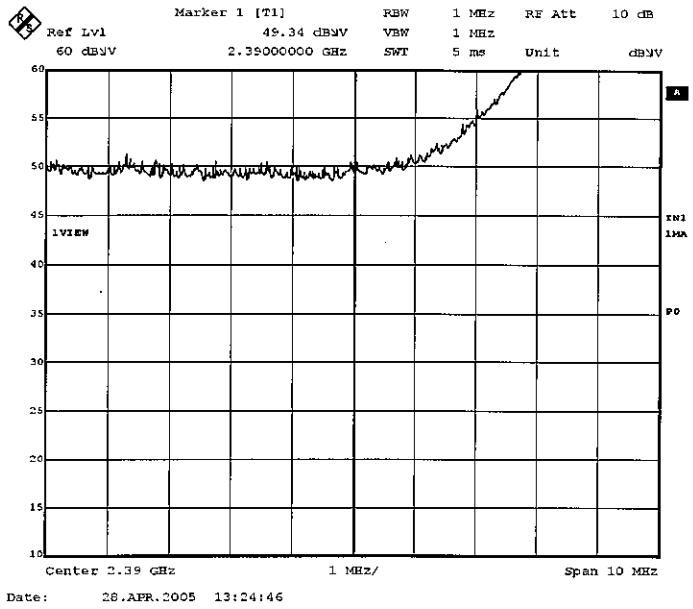
## Restricted band edges: FCC 15.247(d)

| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATION | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : FCC Part15SubpartC 247(d) |
| MODEL NUMBER | : 6180210 | DATE | : 2005/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25℃/46% |
| FCC ID | : M4B6180210 | TEST MODE | : Transmitting |
| POWER | : DC3.3V(AC120V/60Hz) | ENGINEER | : Toyokazu Imamura |

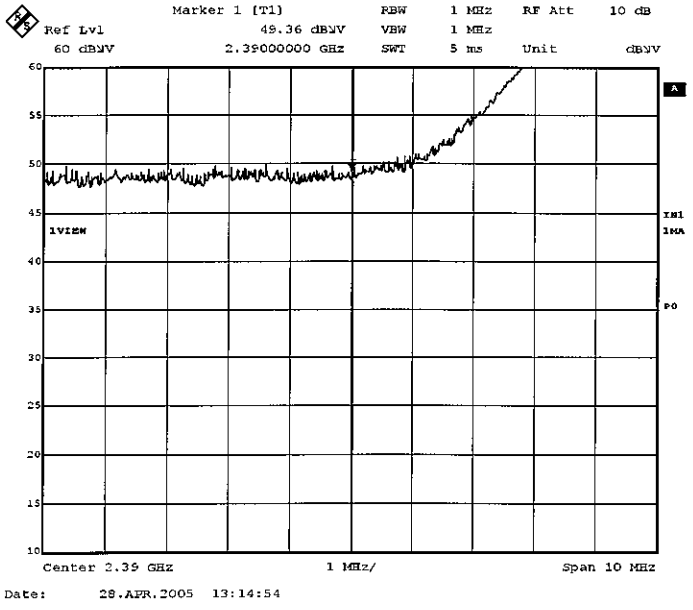
[IEEE802.11b(11Mbps)]

2.39GHz(CH1:2412MHz)

1. Horizontal/PK




2. Vertical/PK



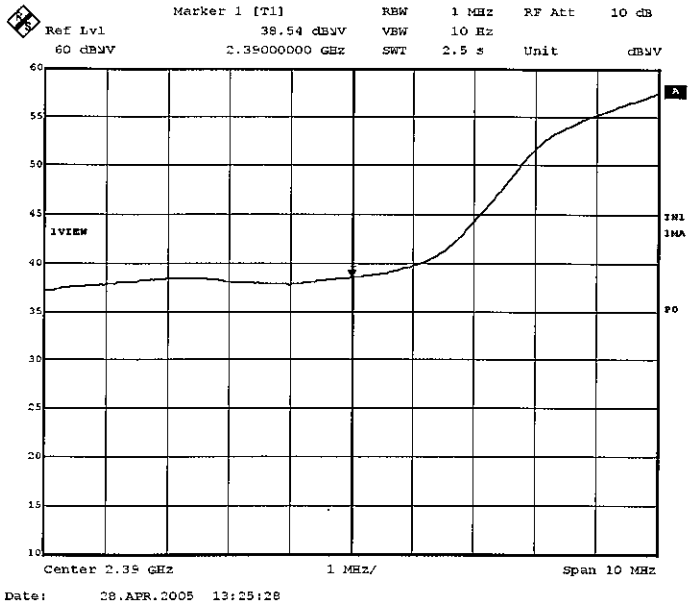
# Restricted band edges: FCC 15.247(d)

| | | | |
|---|---|---|---|
| **COMPANY** | : TOYOTA INDUSTRIES CORPORATION | **REPORT NO** | : 25IE0043-YK-1 |
| **EQUIPMENT** | : Wireless LAN Module | **REGULATION** | : FCC Part15SubpartC 247(d) |
| **MODEL NUMBER** | : 6180210 | **DATE** | : 2005/5/6 |
| **SERIAL NUMBER** | : ES0021 | **TEMP./HUMI** | : 25℃/46% |
| **FCC ID** | : M4B6180210 | **TEST MODE** | : Transmitting |
| **POWER** | : DC3.3V(AC120V/60Hz) | **ENGINEER** | : Toyokazu Imamura |

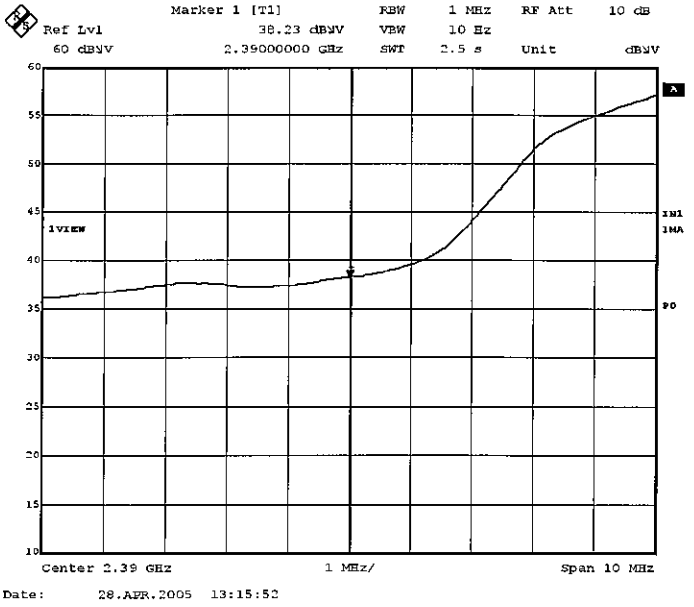
**[IEEE802.11b(11Mbps)]**

**2.39GHz(CH1:2412MHz)**

**1. Horizontal/AV**




**2. Vertical/AV**



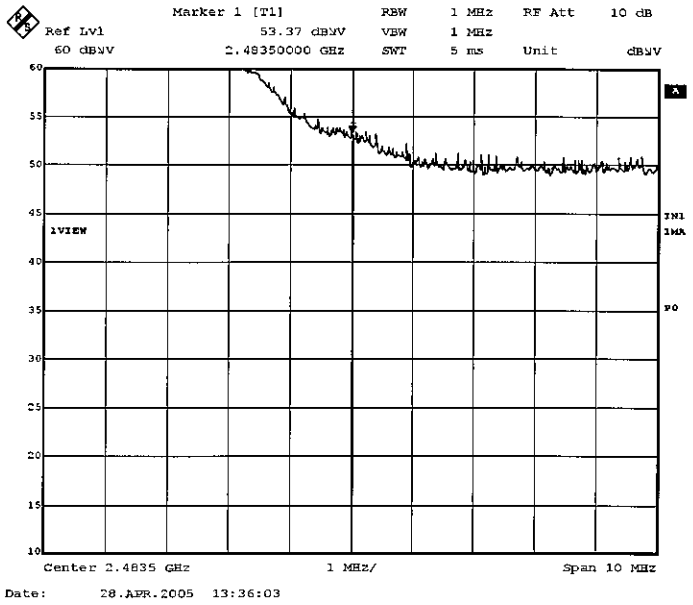
# Restricted band edges: FCC 15.247(d)

| | | | |
|---|---|---|---|
| **COMPANY** | : TOYOTA INDUSTRIES CORPORATION | **REPORT NO** | : 25IE0043-YK-1 |
| **EQUIPMENT** | : Wireless LAN Module | **REGULATION** | : FCC Part15SubpartC 247(d) |
| **MODEL NUMBER** | : 6180210 | **DATE** | : 2005/5/6 |
| **SERIAL NUMBER** | : ES0021 | **TEMP./HUMI** | : 25℃/46% |
| **FCC ID** | : M4B6180210 | **TEST MODE** | : Transmitting |
| **POWER** | : DC3.3V(AC120V/60Hz) | **ENGINEER** | : Toyokazu Imamura |

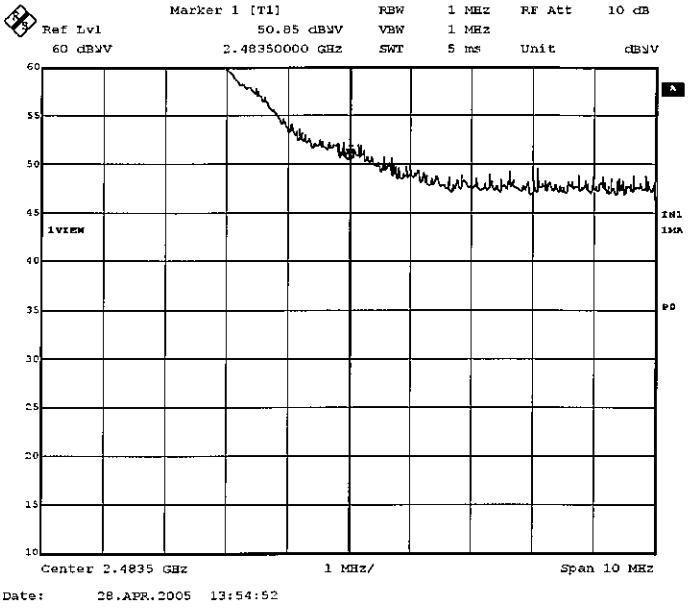
**[IEEE802.11b(11Mbps)]**

**2.4835GHz(CH11:2462MHz)**

**1. Horizontal/PK**




**2. Vertical/PK**



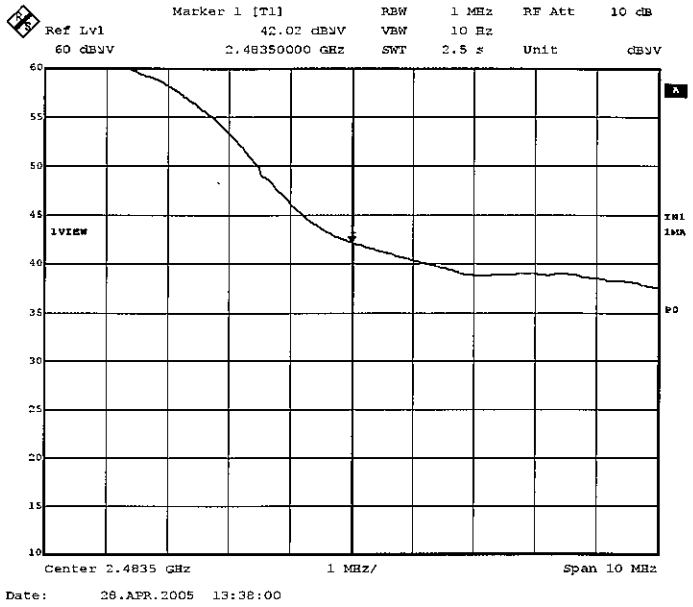
## Restricted band edges: FCC 15.247(d)

| | | | |
|---|---|---|---|
| **COMPANY** | : TOYOTA INDUSTRIES CORPORATION | **REPORT NO** | : 25IE0043-YK-1 |
| **EQUIPMENT** | : Wireless LAN Module | **REGULATION** | : FCC Part15SubpartC 247(d) |
| **MODEL NUMBER** | : 6180210 | **DATE** | : 2005/5/6 |
| **SERIAL NUMBER** | : ES0021 | **TEMP./HUMI** | : 25℃/46% |
| **FCC ID** | : M4B6180210 | **TEST MODE** | : Transmitting |
| **POWER** | : DC3.3V(AC120V/60Hz) | **ENGINEER** | : Toyokazu Imamura |

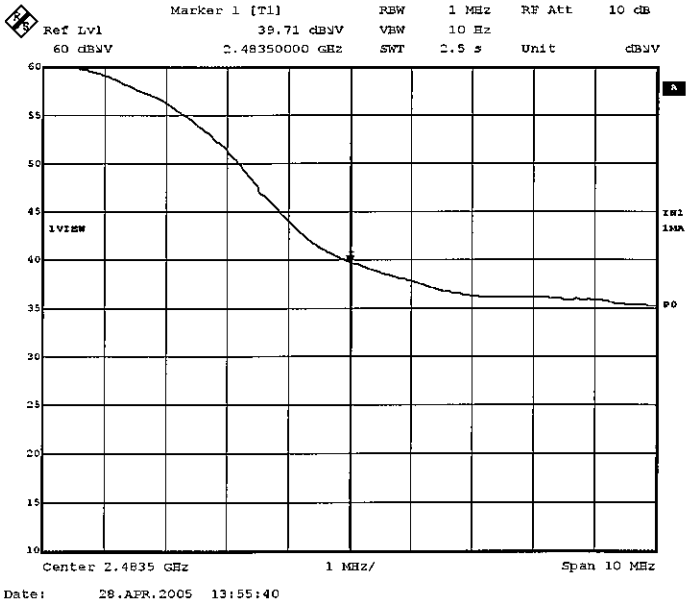
**[IEEE802.11b(11Mbps)]**

**2.4835GHz(CH11:2462MHz)**

**1. Horizontal/AV**




**2. Vertical/AV**



# Power Density (Conducted)

UL Apex Co.,Ltd
YAMAKITA NO.2 Shielded Room

| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATI( | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : Fcc Part15SubpartC 247(e) |
| MODEL NUMBER | : 6180210 | DATE | : 2004/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25℃/46% |
| FCC ID | : M4B6180210 | | |
| POWER | : DC3.3V(PC:AC120V/60Hz) | | |
| TEST MODE | : Transmitting | | |

ENGINEER : Toyokazu Imamura

IEEE802.11b(11Mbps)

| CH | FREQ [GHz] | S/A Reading [dBm] | Cable Loss [dB] | Results [dBm] | Limit [dBm] | MARGIN [dB] |
|---|---|---|---|---|---|---|
| Low | 2.41039379 | -11.11 | 0.6 | -10.51 | 8.0 | 18.5 |
| Mid | 2.43614679 | -11.76 | 0.6 | -11.16 | 8.0 | 19.2 |
| High | 2.46114629 | -12.17 | 0.6 | -11.57 | 8.0 | 19.6 |

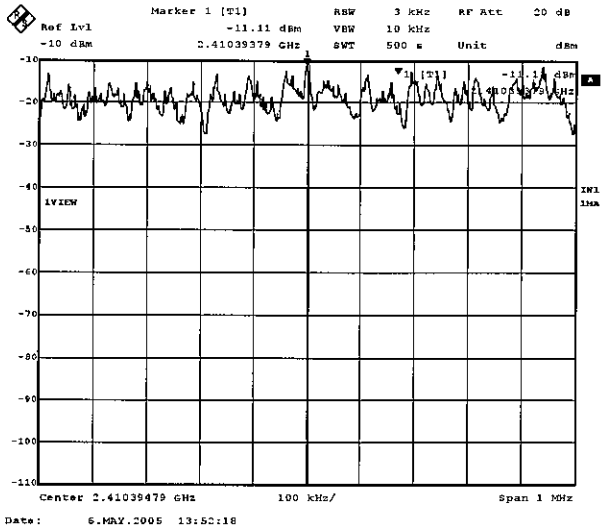
# Power Density: FCC 15.247(e)

UL Apex Co.,Ltd. Yamakita No.2 Shielded Room

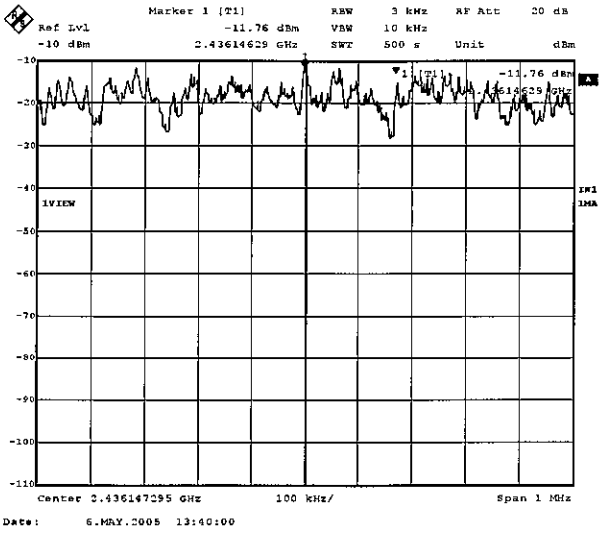
| | | | |
|---|---|---|---|
| COMPANY | : TOYOTA INDUSTRIES CORPORATION | REPORT NO | : 25IE0043-YK-1 |
| EQUIPMENT | : Wireless LAN Module | REGULATION | : FCC Part15SubpartC 247(e) |
| MODEL NUMBER | : 6180210 | DATE | : 2005/5/6 |
| SERIAL NUMBER | : ES0021 | TEMP./HUMI | : 25℃/46% |
| FCC ID | : M4B6180210 | TEST MODE | : Transmitting |
| POWER | : DC3.3V(AC120V/60Hz) | ENGINEER | : Toyokazu Imamura |

[IEEE802.11b(11Mbps)]

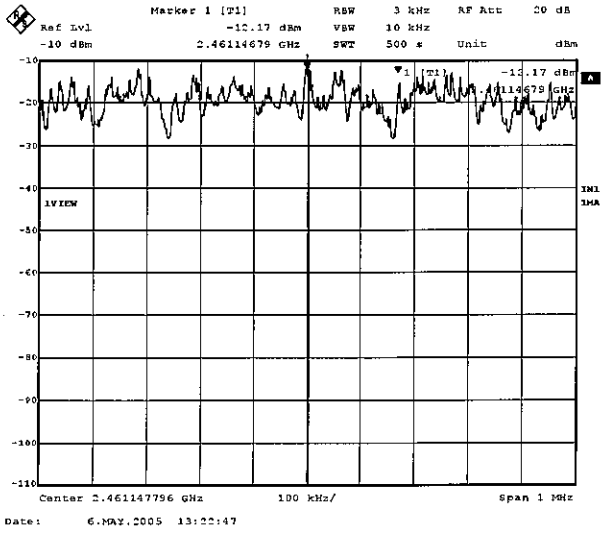
1. ch 1: 2412MHz




2. ch 6: 2437MHz




3. ch 11: 2462MHz



Test Report No :25IE0043-YK-1

## APPENDIX 3
## Test Instruments

**EMI test equipment**

| Control No. | Instrument | Manufacturer | Model No | Test Item | Calibration Date * Interval(month) |
|---|---|---|---|---|---|
| KAEC-01(NSA) | Anechoic Chamber | JSE | Semi 3m | RE | 2004/09/05 * 12 |
| KAF-02 | Pre Amplifier | Hewlett Packard | 8449B | RE | 2005/04/28 * 12 |
| KAF-05 | Pre Amplifier | Agilent | 8447D | RE | 2004/05/26 * 12 |
| KAT10-S1 | Attenuator | Agilent | 8449D 010 | RE | 2005/04/12 * 12 |
| KAT6-02 | Attenuator | INMET | 18N-6dB | RE | 2005/04/07 * 12 |
| KBA-03 | Biconical Antenna | Schwarzbeck | BBA9106 | RE | 2005/01/29 * 12 |
| KCC-14/15/16 /18/KPL-01 | Coaxial Cable/Pulse Limitter | Fujikura/Suhner/PMM | 5D-2W/8D-2W/S042 72B/S04272B/PL01 | CE | 2004/07/10 * 12 |
| KCC-30/31/32 /34 | Coaxial Cable | Fujikura/Suhner | 5D-2W/S04272B | RE | 2005/01/06 * 12 |
| KCC-D3/D7 | Coaxial Cable | Rosenberger/Advantest | 2201/JUN-08-01-06 1 | RE | 2005/04/12 * 12 |
| KFL-01 | Highpass Filter | Hewlett Packard | 84300 80038 | RE | 2005/04/12 * 12 |
| KHA-01 | Horn Antenna | A.H.Systems | SAS-200/571 | RE | 2004/07/30 * 12 |
| KHA-03 | Horn Antenna | EMCO | 3160-09 | RE | 2004/05/01 * 12 |
| KLA-03 | Logperiodic Antenna | Schwarzbeck | USLP9143 | RE | 2005/01/29 * 12 |
| KLS-01 | LISN(AMN) | Schwarzbeck | NSLK8126 | CE | 2004/06/23 * 12 |
| KSA-01 | Spectrum Analyzer | Advantest | R3365 | CE | 2004/07/06 * 12 |
| KSA-04 | Spectrum Analyzer | Advantest | R3271A | RE | 2004/09/15 * 12 |
| KTR-01 | Test Receiver | Rohde & Schwarz | ESI40 | RE, AT 1,2,3,4 | 2004/07/28 * 12 |
| KTR-02 | Test Receiver | Rohde & Schwarz | ESCS30 | CE | 2004/11/25 * 12 |
| KCC-D7 | Coaxial Cable | Advantest | A01002 | AT 1,2,3,4 | 2005/04/12 * 12 |
| | | | | | |
| | | | | | |

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item:

CE: Conducted Emission
RE: Out of Band Emission (Radiated)
AT: Antenna terminal conducted test
1: 6dB Bandwidth
2: Maximum Peak Output Power
3: Out of Band Emission (Conducted)
4: Peak Power Density