

# TEST REPORT

Report No.: 6208F  
Date: 11<sup>th</sup> August 2006  
Applicant: TOSHIBA CORPORATION Digital Media Network Company  
2-9, Suehiro-cho, Ome, Tokyo 198-8710, Japan  
EUT: HDD portable audio player  
FCC ID: CJ6UMK30AWL  
Model No.: 1091 (Radiation Emission) 1089 (Conducted Emission)  
Serial No.: Keel-CS-T1 (Radiation Emission), Keel-CS-FB-31 (Conducted Emission)  
Receipt date of tested sample: 22<sup>nd</sup> August 2006  
Date of measurement: 23<sup>rd</sup>, 24<sup>th</sup>, 25<sup>th</sup>, 26<sup>th</sup>, 27<sup>th</sup>, August 2006 (Radiated Emission)  
2<sup>nd</sup> August 2006 (Conducted Emission)  
Test location: TAIYO YUDEN CO., LTD. EMC Center  
5607-2, Nakamuroda, Haruna-machi,  
Gunma-Gun, Gunma, 370-3347, Japan.  
Applied standard: FCC 47 CFR Part 15 Subpart C Section 15.247 (10-1-05 Edition)  
Procedure: ANSI C63.4-2003  
FCC Document "Measurement of Transmission Systems  
Operating under Section 15.247" (23<sup>rd</sup> March, 2005)  
Test results: PASS (Partially)

Approved by:

Manager / Kenzo Furuta

Reviewed by:

Chief Engineer / Takeshi Matsumura

Tested by:

Engineer / Yukihiro Minegishi

:

Assistant / Yasuko Hirata

**NVLAP**<sup>®</sup>

NVLAP LAB CODE 200607-0

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## Revised Record

| Revised Record         |                              |                  |                    |             |
|------------------------|------------------------------|------------------|--------------------|-------------|
| Number of Revised time | Date                         | Person in Charge | Detail of Revision | Approved by |
| Initial                | 11 <sup>th</sup> August 2006 | Y.Hirata         | -                  | -           |

## 1 Test report

- (1) This report summarizes the result of a single investigation and test result relate only to tested sample.
- (2) The report shall not be reproduced except in full without the written approval of the TAIYO YUDEN CO., LTD.
- (3) This test report must not be used by the client to claim product endorsement by any government agency.
- (4) We hereby certify that no party to the applications authorized hereunder is subject to a denial of benefits, including FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 853(a).

## 2 General Information

### 2.1 Product Description

|                                         |                                                                                                                                                                                                                          |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT:                                    | HDD portable audio player                                                                                                                                                                                                |
| Model No.:                              | 1091 (Radiation Emission), 1089 (Conducted Emission) *1                                                                                                                                                                  |
| Serial No.:                             | Keel-CS-T1 (Radiation Emission), Keel-CS-FB-31 (Conducted Emission)                                                                                                                                                      |
| FCC ID:                                 | CJ6UMEK30AWL                                                                                                                                                                                                             |
| Production stage:                       | Pre-Production                                                                                                                                                                                                           |
| Summary of EUT:                         | HDD portable audio player that have 1.8"HDD, 3.0inch low temperature polysilicone TFT LCD, FM tuner, and IEEE 802.11b/g wireless LAN.<br>EUT operates in the unlicensed 2.4GHz ISM (Industrial Scientific Medical) band. |
| Type of wide band Modulation:           | DSSS for 11b, OFDM for 11g                                                                                                                                                                                               |
| Type of Modulation:                     | DBPSK (1Mbps), DQPSK (2Mbps) and CCK (5.5/11Mbps) for 11b<br>BPSK (6/9Mbps), QPSK (12/18Mbps),<br>16QAM (24/36Mbps) and 64QAM (48/54Mbps) for 11g                                                                        |
| Power supply:                           | DC5.0V via USB port.<br>Nominal DC 3.7V Battery (Lithium)                                                                                                                                                                |
| Weight:                                 | 161g                                                                                                                                                                                                                     |
| Dimensions of EUT:                      | W63.0mm × D17.0mm × H113.0mm                                                                                                                                                                                             |
| Max antenna gain:                       | 2.00dBi                                                                                                                                                                                                                  |
| The clock frequencies used in this EUT: | 32.768kHz<br>19.2MHz<br>27MHz<br>528MHz<br>2.4GHz                                                                                                                                                                        |

\*1:please refer to Appendix 1

## 2.2 Summary of Test and Inspection Result

| No. | Item                            | Test Procedure                  | Specification | Remarks   | Deviation | Worst Margin                                                                                                                  | Results |
|-----|---------------------------------|---------------------------------|---------------|-----------|-----------|-------------------------------------------------------------------------------------------------------------------------------|---------|
| 1   | AC Powerline Conducted Emission | ANSI C63.4: 2003<br>47CFR15.247 | 15.207        | -         | N/A       | 7.8 dB<br>Transmitting mode: 2437MHz<br>Frequency: 1.289MHz<br>Power line: VB                                                 | Pass    |
| 2   | 6 dB Bandwidth                  |                                 | 15.247(a)(2)  | Conducted | N/A       | -                                                                                                                             | Pass    |
| 3   | Maximum peak Output Power       |                                 | 15.247(b)(3)  |           | N/A       | -                                                                                                                             | 1       |
| 4   | Band Edge Compliance            |                                 | 15.247(d)     |           | N/A       | -                                                                                                                             | Pass    |
| 5   | Power Spectral Density          |                                 | 15.247(e)     |           | N/A       | -                                                                                                                             | Pass    |
| 6   | Radiated Emission               |                                 | 15.247(d)     | Radiated  | N/A       | 6.0dB<br>Transmitting mode: 2412MHz<br>Frequency: 264.004MHz<br>Axial Direction: ZX-Plane<br>Antenna Polarization: Horizontal | Pass    |

1: This test have been Conducted separately. Please refer to test report issued by JQA (Report No. KL80060216)

## 2.3 Test Methodology

Interference measurements were made in accordance with ANSI C63.4-2003 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

## 2.4 Test Facility

1. FCC 47CFR, Part 15, Section 15.247 regulation test was performed on the shielded room and radiated interference field strength test was performed on the 10 meter semi-anechoic chamber located at Taiyo Yuden Co., LTD. EMC Center, 5607-2 Nakamuroda Haruna-Machi Gunma-Gun Gunma, 370-3347 Japan.
2. This Laboratory is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) by United States Department of Commerce, National Institute of Standard and Technology (NIST) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations.
3. These criteria encompass the requirements of ISO/IEC 17025:1999 and the relevant requirements of ISO 9002:1994 as suppliers of calibration or test results. Accreditation awarded for specific services, listed on the Scope of Accreditation for: ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS FCC. (NVLAP LAB CODE: 200607-0). Refer the certificate of the accreditation to Appendix 2.

### 3 System Test Configuration

#### 3.1 Justification

1. Emission tests were performed with no deviation from the ANSI C63.4-2003 and FCC 47CFR, Part 15, Section 15.247 regulation tests were performed with no deviation from the FCC Documents "Measurement of Digital Transmission Systems Operating under Section 15.247" March 23, 2005.
2. The system was configured for testing a typical fashion. (as a customer would normally use it.)
3. Radiate testing in the range of 1 GHz to 25 GHz was investigated with the spectrum (peak detector function) under the FCC regulation section 15.209 (e) and 15.35 (b). The test performed at an antenna to EUT distance of 1 meter. The level of any unwanted emissions from EUT did not exceed the level of the fundamental emission (Compliance with 15.209 (c)). And test result found to be compliance with FCC regulation section 15.209 (a) Radiated emission limits (500 micro-volts/meter). Data is presented for the "worst case" measurements, that E.U.T was normal operated.
4. Radiate testing in the range of 30 MHz to 1000 MHz was performed at an antenna to EUT distance of 3 meters under the 15.209 (e) and 15.31(f)(1).
5. All tests were performed with the representative channel operation as follows.
  - a. Lowest frequency channel: CH1 2412MHz
  - b. Middle frequency channel: CH6 2437MHz
  - c. Highest frequency channel: CH11 2462MHz

### 3.2 Operating modes

Modulation: DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
 BPSK (6Mbps) for IEEE 802.11g (OFDM)

Representative channel: CH1 2412MHz (Lowest frequency channel)  
 CH6 2437MHz (Middle frequency channel)  
 CH11 2462MHz (Highest frequency channel)

#### Remarks:

Software (controller): KS79xxTestSerial Ver.0.4.7 software supplied by Key Stream was used to set up to the Wireless LAN operating mode.

### 3.3 List of accessories

|   | Product name      | M/N          | S/N       | Manufacturer | Notes | FCC ID / DoC |
|---|-------------------|--------------|-----------|--------------|-------|--------------|
| a | Personal Computer | PSJ60N       | 36023351J | TOSHIBA      | -     | DoC          |
| b | AC Adaptor        | PA3282U-2ACA | 0042402   | TOSHIBA      | -     | -            |

### 3.4 Interface cable

|   | Cable Type      | M/N | Connection                     | Shielded | Ferrite core | Material of connector | Length | Treatment for the extra length      |
|---|-----------------|-----|--------------------------------|----------|--------------|-----------------------|--------|-------------------------------------|
| 1 | USB cable       | -   | EUT a<br>(Radiated, Conducted) | Yes      | No           | Metal                 | 1.21m  | Folded back and forth in the center |
| 2 | DC cable        | -   | a b                            | No       | No           | Metal                 | 1.78m  | -                                   |
| 3 | AC cable        | -   | b AC                           | No       | No           | Plastic               | 2.06m  | -                                   |
| 4 | Headphone cable | -   | EUT                            | No       | No.          | Plastic               | 1.36m  | -                                   |
| 5 | AC cable        | -   | LISN AC                        | No       | No           | Plastic               | 1.8m   | -                                   |

### 3.5 Special Accessories

Nothing.

### 3.6 Equipment Modifications

No modification has been carried out by the test laboratory.

### 3.7 Configuration of Tested System

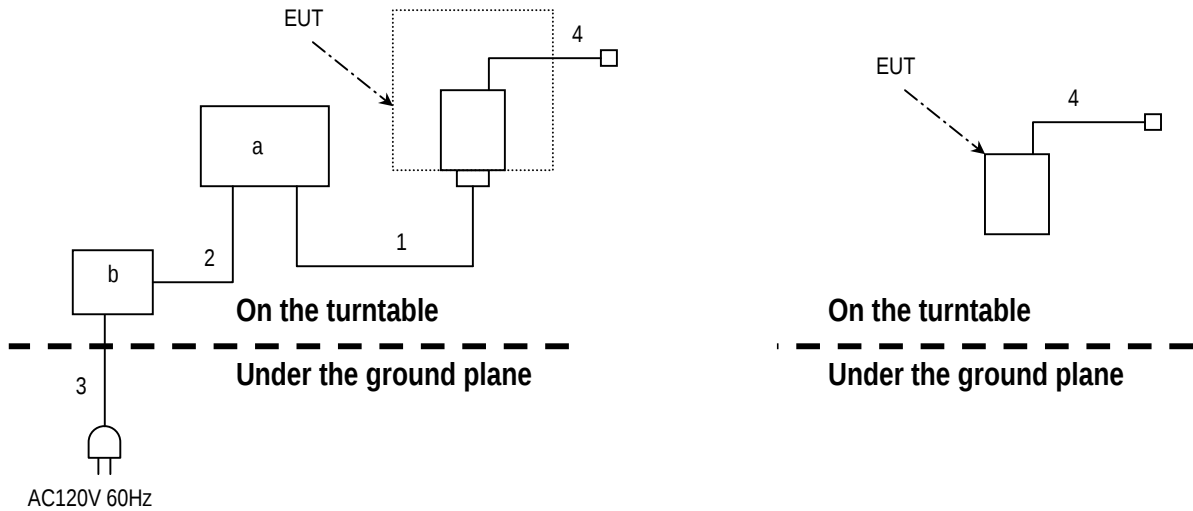
#### (1) Radiated Emission Test

These numbers and the marks in the picture are corresponding to the numbers and the marks in Tables shown at the Section 3.3 and 3.4.

##### USB Power Supply

Power supply of EUT: DC5.0V from Personal Computer "a" through the USB cable "1"

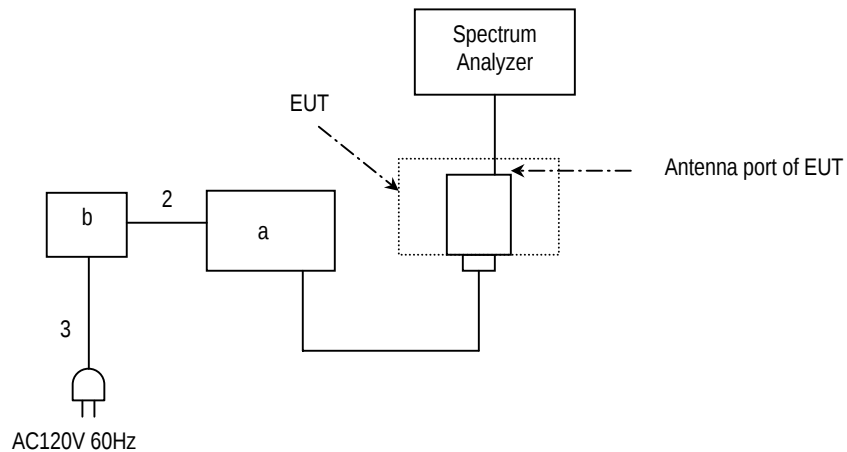
##### Battery Power Supply



#### (2) Conducted Emission Test

These numbers and the marks in the picture are corresponding to the numbers and the marks in Tables shown at the Section 3.3 and 3.4.

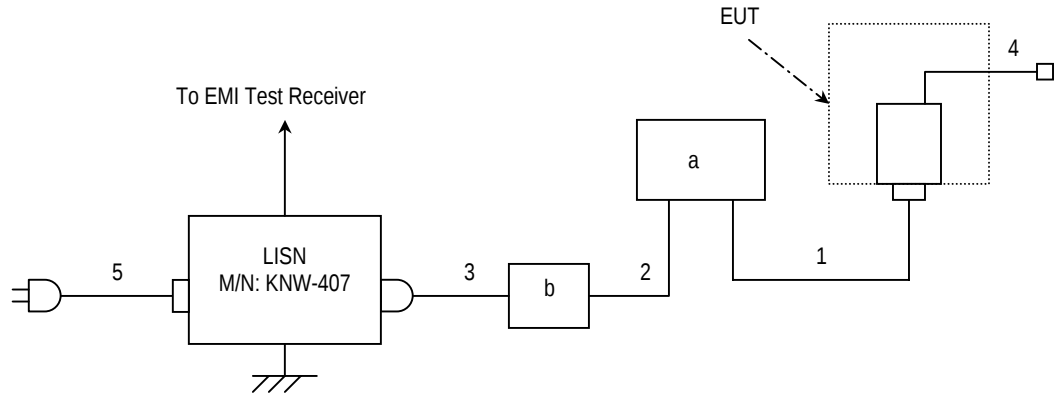
Power supply of EUT: DC5.0V from Personal Computer "a" through the USB cable "1"



**(3) AC Powerline Conducted Emission Test**

These numbers and the marks in the picture are corresponding to the numbers and the marks in Tables shown at the Section 3.3 and 3.4.

Power supply of EUT: DC5.0V from Personal Computer "a" through the USB cable "1"



## 4 Antenna Requirement

The EUT provides a permanently attached antenna and it was found to be compliant with FCC regulation section 15.203.

Antenna type: Helical antenna  
Model No.: AF216M245001  
Antenna gain: 2.00dBi

## 5 AC Powerline Conducted Emission Test

Preliminary test has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.

### 5.1 Test Setup

Conducted emission measurements were performed from 150kHz to 30 MHz.

The test setup was made according to ANSI STD C63.4-2001 clause 7 in the Shielded room.

The rear of non-conductive wooden table top was placed 0.4 m from a vertical metal reference plane that one of the wall.

Rears of the peripherals were all aligned and flush with rear of non-conductive wooden tabletop.

The height of this table was 0.8 m and 1.5 m wide x 1.0 m deep size.

The spacing between the each equipment was 10 cm.

Connection of the PC connected EUT USB Adaptor to the artificial mains network (LISN) was required.

The distance between the closet surface of the EUT and the closet surface of the artificial mains network (LISN) was 0.8 m.

Connection of the all other equipment to the second artificial mains network (LISN) was required. The distance between the peripherals and the closet surface of the second artificial mains network (LISN) was minimum 0.8 m.

The second artificial mains network is terminated with 50ohm terminator.

Where a mains flexible cord is provided by the manufacture this is 2.0 m long and excess cable was folded back and forth as far as possible to 0.8 m so as to form a bundle not exceeding 0.4 m in length.

Interconnecting cables of table top equipment that hang closer than 0.4 m to the floor ground plane were folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.

The measurement has been conducted with both VA and VB neutral power supply polarization.

The maximum voltage emission was verified with the cable routing and the location of the peripherals.

The highest voltage emission has been recorded.

For further description of the configuration refer to the photographs of this report.

#### Test Receiver Setting

|              |                                                      |
|--------------|------------------------------------------------------|
| 150kHz~30MHz | Detector: Quasi-Peak and Average<br>Bandwidth: 10kHz |
|--------------|------------------------------------------------------|

### 5.2 Test Instrumentation

| Facility/<br>Equipment | Manufacturer                | Model No.      | Serial No. | Calibration<br>Date        | Next<br>Calibration<br>Due | Note |
|------------------------|-----------------------------|----------------|------------|----------------------------|----------------------------|------|
| Shielded room          | TDK Co., Ltd                | DA-06912       | -          | -                          | -                          | -    |
| EMI Test Receiver      | R&S                         | ESHS 10        | 100005     | 10 <sup>th</sup> . 8. 2005 | 9 <sup>th</sup> . 8. 2006  | -    |
| LISN                   | KYORITSU<br>ELECTRICAL WORK | KNW-407        | 8-680-1    | 13 <sup>th</sup> . 3. 2006 | 12 <sup>th</sup> . 3. 2007 | -    |
| Cable                  | SUHNER                      | RG223          | CE-1       | 12 <sup>th</sup> . 5. 2006 | 11 <sup>th</sup> . 5. 2007 | -    |
|                        |                             | RG223          | CE-2       | 12 <sup>th</sup> . 5. 2006 | 11 <sup>th</sup> . 5. 2007 | -    |
|                        |                             | RG2214         | CE-3       | 12 <sup>th</sup> . 5. 2006 | 11 <sup>th</sup> . 5. 2007 | -    |
| Attenuator             | KYORITSU                    | KPD-602        | 5K325      | 12 <sup>th</sup> . 5. 2006 | 11 <sup>th</sup> . 5. 2007 | -    |
| RF Selector            | TDK Co., Ltd                | NS4900         | 0302-009   | 12 <sup>th</sup> . 5. 2006 | 11 <sup>th</sup> . 5. 2007 | -    |
| Software               | TOYO<br>Corporation         | EP5/CE Ver.2.0 | 0208085    | -                          | -                          | -    |

### 5.3 Conducted Emission Calculation

The basic equation with a sample calculation is as follows:

$$\begin{aligned} \text{c.f.} &= \text{CF} + \text{AL} \\ \text{CE} &= \text{RA} + \text{c.f.} \end{aligned}$$

Where    c.f. = Correction Factor [dB/m]  
            CE = Conducted Emission (Emission Level - Result) [dBuV]  
            RA = Receiver Amplitude (Reading Level) [dBuV]  
            CF = Cable Attenuation Loss [dB]  
            AL = Attenuator Loss [dB]

Assume a receiver reading of 27.3 dBuV is obtained.

The Factor of 3.4dB is added, giving a terminal voltage of 30.7 dBuV. The 30.7 dBuV value was mathematically converted to its corresponding level in uV.

$$\text{CE} = 27.3 + 3.4 = 30.7 \text{ dBuV}$$

Level in uV = Common Antilogarithm:  $(30.7 \text{ dBuV})/20 = 34.3 \text{ uV}$

## 5.4 Test Results

### AC Powerline Conducted Emission 2412MHz

Serial No.: Keel-CS-T1  
 Power: AC120V, 60Hz  
 Mode: Transmitting mode  
 BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: 23  
 Humidity: 67%

#### VA

| Frequency<br>[MHz] | Meter Reading<br>[dB(uV)] |      | Factor<br>[dB] | Conducted Emission<br>[dB(uV)] |      | Limits<br>[dB(uV)] |      | Margin<br>[ dB ] |      |
|--------------------|---------------------------|------|----------------|--------------------------------|------|--------------------|------|------------------|------|
|                    | QP                        | AV   |                | QP                             | AV   | QP                 | AV   | QP               | AV   |
|                    |                           |      |                |                                |      |                    |      |                  |      |
| 801.11g Mode       |                           |      |                |                                |      |                    |      |                  |      |
| 0.191              | 41.6                      | 29.7 | 3.4            | 45.0                           | 33.1 | 64.0               | 54.0 | 19.0             | 20.9 |
| 0.514              | 35.1                      | 32.8 | 3.3            | 38.4                           | 36.1 | 56.0               | 46.0 | 17.6             | 9.9  |
| 0.902              | 35.0                      | 32.0 | 3.3            | 38.3                           | 35.3 | 56.0               | 46.0 | 17.7             | 10.7 |
| 1.096              | 35.7                      | 32.0 | 3.3            | 39.0                           | 35.3 | 56.0               | 46.0 | 17.0             | 10.7 |
| 1.289              | 35.7                      | 31.7 | 3.4            | 39.1                           | 35.1 | 56.0               | 46.0 | 16.9             | 10.9 |
| 1.483              | 35.9                      | 31.0 | 3.3            | 39.2                           | 34.3 | 56.0               | 46.0 | 16.8             | 11.7 |

#### VB

| Frequency<br>[MHz] | Meter Reading<br>[dB(uV)] |      | Factor<br>[dB] | Conducted Emission<br>[dB(uV)] |      | Limits<br>[dB(uV)] |      | Margin<br>[ dB ] |      |
|--------------------|---------------------------|------|----------------|--------------------------------|------|--------------------|------|------------------|------|
|                    | QP                        | AV   |                | QP                             | AV   | QP                 | AV   | QP               | AV   |
|                    |                           |      |                |                                |      |                    |      |                  |      |
| 801.11g Mode       |                           |      |                |                                |      |                    |      |                  |      |
| 0.191              | 41.8                      | 32.5 | 3.4            | 45.2                           | 35.9 | 64.0               | 54.0 | 18.8             | 18.1 |
| 0.514              | 35.1                      | 32.7 | 3.3            | 38.4                           | 36.0 | 56.0               | 46.0 | 17.6             | 10.0 |
| 0.912              | 35.1                      | 32.0 | 3.3            | 38.4                           | 35.3 | 56.0               | 46.0 | 17.6             | 10.7 |
| 1.160              | 33.6                      | 26.3 | 3.3            | 36.9                           | 29.6 | 56.0               | 46.0 | 19.1             | 16.4 |
| 1.289              | 36.0                      | 32.2 | 3.4            | 39.4                           | 35.6 | 56.0               | 46.0 | 16.6             | 10.4 |
| 1.483              | 36.1                      | 31.8 | 3.3            | 39.4                           | 35.1 | 56.0               | 46.0 | 16.6             | 10.9 |

**AC Powerline Conducted Emission 2437MHz**

Serial No.: Keel-CS-T1  
 Power: AC120V, 60Hz  
 Mode: Transmitting mode  
 BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: 23  
 Humidity: 67%

**VA**

| Frequency<br>[MHz] | Meter Reading<br>[dB(μV)] |      | Factor<br>[dB] | Conducted Emission<br>[dB(μV)] |      | Limits<br>[dB(μV)] |      | Margin<br>[ dB ] |      |
|--------------------|---------------------------|------|----------------|--------------------------------|------|--------------------|------|------------------|------|
|                    | QP                        | AV   |                | QP                             | AV   | QP                 | AV   | QP               | AV   |
|                    |                           |      |                |                                |      |                    |      |                  |      |
| 801.11g Mode       |                           |      |                |                                |      |                    |      |                  |      |
| 0.191              | 42.1                      | 33.0 | 3.4            | 45.5                           | 36.4 | 64.0               | 54.0 | 18.5             | 17.6 |
| 0.321              | 34.0                      | 29.0 | 3.3            | 37.3                           | 32.3 | 59.7               | 49.7 | 22.4             | 17.4 |
| 0.514              | 34.8                      | 33.7 | 3.3            | 38.1                           | 37.0 | 56.0               | 46.0 | 17.9             | 9.0  |
| 0.902              | 35.1                      | 32.2 | 3.3            | 38.4                           | 35.5 | 56.0               | 46.0 | 17.6             | 10.5 |
| 1.095              | 35.8                      | 34.4 | 3.3            | 39.1                           | 37.7 | 56.0               | 46.0 | 16.9             | 8.3  |
| 1.679              | 35.2                      | 34.0 | 3.4            | 38.6                           | 37.4 | 56.0               | 46.0 | 17.4             | 8.6  |

**VB**

| Frequency<br>[MHz] | Meter Reading<br>[dB(μV)] |      | Factor<br>[dB] | Conducted Emission<br>[dB(μV)] |      | Limits<br>[dB(μV)] |      | Margin<br>[ dB ] |      |
|--------------------|---------------------------|------|----------------|--------------------------------|------|--------------------|------|------------------|------|
|                    | QP                        | AV   |                | QP                             | AV   | QP                 | AV   | QP               | AV   |
|                    |                           |      |                |                                |      |                    |      |                  |      |
| 801.11g Mode       |                           |      |                |                                |      |                    |      |                  |      |
| 0.191              | 42.0                      | 32.7 | 3.4            | 45.4                           | 36.1 | 64.0               | 54.0 | 18.6             | 17.9 |
| 0.514              | 35.2                      | 32.7 | 3.3            | 38.5                           | 36.0 | 56.0               | 46.0 | 17.5             | 10.0 |
| 0.901              | 35.1                      | 33.9 | 3.3            | 38.4                           | 37.2 | 56.0               | 46.0 | 17.6             | 8.8  |
| 1.161              | 33.6                      | 27.2 | 3.3            | 36.9                           | 30.5 | 56.0               | 46.0 | 19.1             | 15.5 |
| 1.289              | 36.0                      | 34.8 | 3.4            | 39.4                           | 38.2 | 56.0               | 46.0 | 16.6             | 7.8  |
| 1.483              | 36.1                      | 34.8 | 3.3            | 39.4                           | 38.1 | 56.0               | 46.0 | 16.6             | 7.9  |

**AC Powerline Conducted Emission 2462MHz**

Serial No.: Keel-CS-T1  
 Power: AC120V, 60Hz  
 Mode: Transmitting mode  
 BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: 23  
 Humidity: 67%

**VA**

| Frequency<br>[MHz] | Meter Reading<br>[dB(μV)] |      | Factor<br>[dB] | Conducted Emission<br>[dB(μV)] |      | Limits<br>[dB(μV)] |      | Margin<br>[ dB ] |      |
|--------------------|---------------------------|------|----------------|--------------------------------|------|--------------------|------|------------------|------|
|                    | QP                        | AV   |                | QP                             | AV   | QP                 | AV   | QP               | AV   |
|                    |                           |      |                |                                |      |                    |      |                  |      |
| 801.11g Mode       |                           |      |                |                                |      |                    |      |                  |      |
| 0.192              | 41.5                      | 29.5 | 3.4            | 44.9                           | 32.9 | 63.9               | 53.9 | 19.0             | 21.0 |
| 0.320              | 34.0                      | 29.1 | 3.3            | 37.3                           | 32.4 | 59.7               | 49.7 | 22.4             | 17.3 |
| 0.515              | 35.1                      | 32.8 | 3.3            | 38.4                           | 36.1 | 56.0               | 46.0 | 17.6             | 9.9  |
| 0.708              | 34.0                      | 31.1 | 3.3            | 37.3                           | 34.4 | 56.0               | 46.0 | 18.7             | 11.6 |
| 1.096              | 35.7                      | 32.7 | 3.3            | 39.0                           | 36.0 | 56.0               | 46.0 | 17.0             | 10.0 |
| 1.289              | 35.7                      | 31.8 | 3.4            | 39.1                           | 35.2 | 56.0               | 46.0 | 16.9             | 10.8 |

**VB**

| Frequency<br>[MHz] | Meter Reading<br>[dB(μV)] |      | Factor<br>[dB] | Conducted Emission<br>[dB(μV)] |      | Limits<br>[dB(μV)] |      | Margin<br>[ dB ] |      |
|--------------------|---------------------------|------|----------------|--------------------------------|------|--------------------|------|------------------|------|
|                    | QP                        | AV   |                | QP                             | AV   | QP                 | AV   | QP               | AV   |
| 801.11g Mode       |                           |      |                |                                |      |                    |      |                  |      |
| 0.191              | 41.6                      | 29.6 | 3.4            | 45.0                           | 33.0 | 64.0               | 54.0 | 19.0             | 21.0 |
| 0.321              | 33.6                      | 28.9 | 3.3            | 36.9                           | 32.2 | 59.7               | 49.7 | 22.8             | 17.5 |
| 0.514              | 35.2                      | 32.8 | 3.3            | 38.5                           | 36.1 | 56.0               | 46.0 | 17.5             | 9.9  |
| 0.902              | 35.1                      | 31.6 | 3.3            | 38.4                           | 34.9 | 56.0               | 46.0 | 17.6             | 11.1 |
| 1.096              | 36.0                      | 32.6 | 3.3            | 39.3                           | 35.9 | 56.0               | 46.0 | 16.7             | 10.1 |
| 1.483              | 36.1                      | 31.7 | 3.3            | 39.4                           | 35.0 | 56.0               | 46.0 | 16.6             | 11.0 |

## 6 Radiated Emission Test

### 6.1 Test Setup

The test setup was made according to ANSI STD C63.4-2003 clause 8 on the 10 meter semi-anechoic chamber, which allows a 3 or 1 m distance measurement.

EUT was placed on non-conductive table (foam polystyrene). The height of this table was 0.8 m.

The measurement has been conducted with both horizontal and vertical antenna polarization.

The turntable has been fully rotated. The highest radiation of the equipment has been recorded.

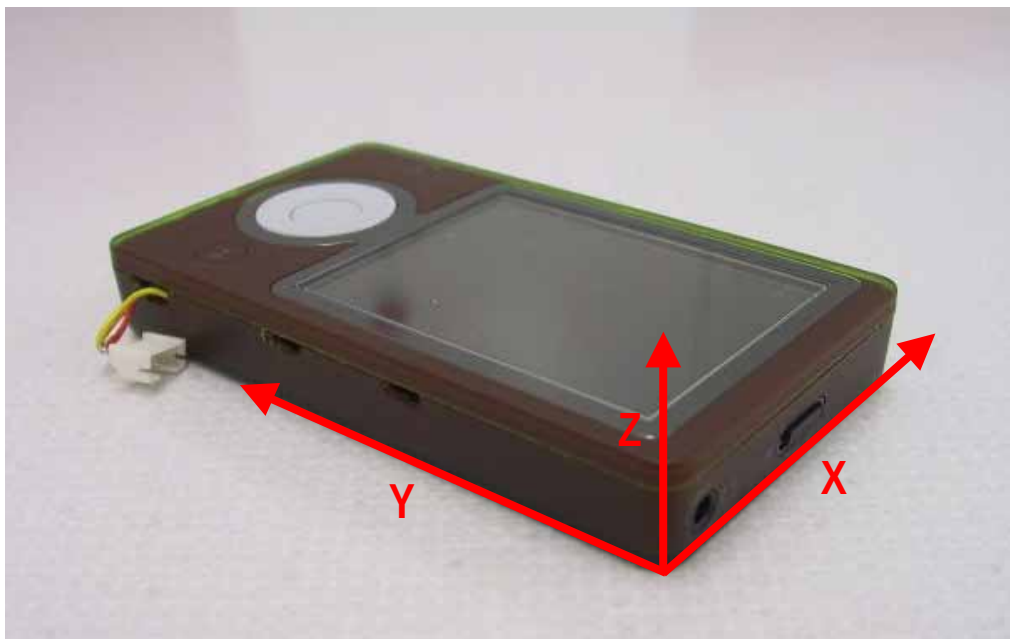
For further description of the configuration refer to the pictures of this report.

Distance between equipment and antenna: 3m (30MHz to 18GHz)  
: 1m (18GHz to 25GHz)

#### Spectrum Analyzer Setting

|              |                                               |
|--------------|-----------------------------------------------|
| 30 ~ 1000MHz | Detector: Quasi-Peak<br>Bandwidth: 120kHz     |
| 1 ~ 25GHz    | Detector: Peak and Average<br>Bandwidth: 1MHz |

#### Axial Direction



## 6.2 Test Instrumentation

| Facility/<br>Equipment | Manufacturer            | Model No.      | Serial No. | Frequency<br>Range | Calibration<br>Date                         | Next<br>Calibration Due    |
|------------------------|-------------------------|----------------|------------|--------------------|---------------------------------------------|----------------------------|
| 10m anechoic chamber   | TDK Co., Ltd            | DA-06912       | -          | -                  | 13 <sup>th</sup> -17 <sup>th</sup> .3.2006. | 12 <sup>th</sup> .3.2007.  |
| EMI Test Receiver      | R&S                     | ESCS 30        | 100148     | 30-1000MHz         | 11 <sup>th</sup> .8.2005.                   | 10 <sup>th</sup> .8.2006.  |
| Spectrum Analyzer      | Agilent<br>Technologies | 8563E          | 3416A02230 | 30-1000MHz         | 12 <sup>th</sup> .4.2006.                   | 11 <sup>th</sup> .4.2007.  |
| Amplifier              |                         | E4446A         | US42070181 | 1-40GHz            | 14 <sup>th</sup> .11.2005.                  | 13 <sup>th</sup> .11.2006. |
|                        |                         | 83017A         | 3950M00169 | 1-26.5GHz          | 25 <sup>th</sup> .4.2006.                   | 24 <sup>th</sup> .4.2007.  |
|                        |                         | 8447D          | 2944A06812 | 30-1000MHz         | 13 <sup>th</sup> .2.2006.                   | 12 <sup>th</sup> .2.2007.  |
| Tunable filter         | TOYO<br>Corporation     | NF-49BT        | No.1       | 1-6GHz             | 6 <sup>th</sup> .3.2006.                    | 5 <sup>th</sup> .3.2006.   |
| RF filter              | Microtronics            | ERM50702-01    | 020        | 6-18GHz            | 25 <sup>th</sup> .4.2006.                   | 24 <sup>th</sup> .4.2007.  |
| RF Selector            | TDK Co., Ltd            | NS4900         | 0302-010   | -                  | 13 <sup>th</sup> .2.2006.                   | 12 <sup>th</sup> .2.2007.  |
| RF Cable               | SUHNER                  | RG214          | RG 1       | 30-1000MHz         | 13 <sup>th</sup> .2.2006.                   | 12 <sup>th</sup> .2.2007.  |
|                        |                         | RG214          | RG 3       | 30-1000MHz         | 13 <sup>th</sup> .2.2006.                   | 12 <sup>th</sup> .2.2007.  |
|                        |                         | RG214          | RG 8       | 30-1000MHz         | 13 <sup>th</sup> .2.2006.                   | 12 <sup>th</sup> .2.2007.  |
|                        |                         | RG214          | RG 5       | 30-1000MHz         | 25 <sup>th</sup> .4.2006.                   | 24 <sup>th</sup> .4.2007.  |
|                        |                         | RG214          | RG 6       | 30-1000MHz         | 25 <sup>th</sup> .4.2006.                   | 24 <sup>th</sup> .4.2007.  |
|                        |                         | SUCOFLEX 106   | SU1        | 1-18GHz            | 25 <sup>th</sup> .4.2006.                   | 24 <sup>th</sup> .4.2007.  |
|                        |                         | SUCOFLEX 104   | SU4        | 1-18GHz            | 25 <sup>th</sup> .4.2006.                   | 24 <sup>th</sup> .4.2007.  |
|                        | HP                      | 85381C         | No.3       | 18-25GHz           | 25 <sup>th</sup> .4.2006.                   | 24 <sup>th</sup> .4.2007.  |
|                        |                         | 85381C         | No.5       | 18-25GHz           | 25 <sup>th</sup> .4.2006.                   | 24 <sup>th</sup> .4.2007.  |
| Attenuator             | KYORITSU                | KPD-602        | 220142     | 30-1000MHz         | 13 <sup>th</sup> .2.2006.                   | 12 <sup>th</sup> .2.2007.  |
| Antenna                | Schwarzbeck             | BBA9106        | No.4       | 30-300MHz          | 25 <sup>nd</sup> .2.2006.                   | 24 <sup>th</sup> .2.2007.  |
|                        |                         | UHALP9108-A    | 160        | 300-1000MHz        | 25 <sup>nd</sup> .2.2006.                   | 24 <sup>th</sup> .2.2007.  |
|                        | EMCO                    | 3115           | 9403-4232  | 1-18GHz            | 1 <sup>st</sup> .4.2005.                    | 31 <sup>st</sup> .3.2007.  |
|                        |                         | 3116           | 9311-2227  | 18-40GHz           | 1 <sup>st</sup> .4.2005.                    | 31 <sup>st</sup> .3.2007.  |
| Software               | TOYO<br>Corporation     | EP5/RE Ver.2.0 | 0208086    | -                  | -                                           | -                          |

### 6.3 Radiated Emission Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading.

The basic equation with a sample calculation is as follows:

$$\begin{aligned} \text{c.f.} &= \text{AF} + \text{CF} + \text{AL} - \text{AG} - \text{DF} \\ \text{RE} &= \text{RA} + \text{c.f.} \end{aligned}$$

Where

- c.f. = Correction Factor [dB/m]
- RE = Radiated Emission (Emission Level - Result) [dB(uV/m)]
- RA = Receiver Amplitude (Reading Level) [dBuV]
- AF = Antenna Factor [dB/m]
- CF = Cable Attenuation Loss [dB]
- AG = Amplifier Gain [dB]
- AL = Attenuator Loss [dB]
- DF = Distance Factor
  - Distance between equipment and antenna: 3m = 0 [dB]
  - Distance between equipment and antenna: 1m = 9.5 [dB]

Assume a receiver reading of 43.4 dBuV is obtained. The Correction Factor of -10.2 dB/m is added, giving a Radiated Emission of 33.2 dBuV/m. The 33.2 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$\begin{aligned} \text{RE} &= 43.4 + (-10.2) = 33.2 \text{ dBuV/m} \\ \text{Level in uV/m} &= \text{Common Antilogarithm } [(33.2 \text{ dBuV/m})/20] = 45.7 \text{ uV/m} \end{aligned}$$

## 6.4 Test Results

### Spurious Emission (Radiated) 2412MHz <USB Power Supply>

Serial No.: Keel-CS-T1  
 Power: AC120V, 60Hz  
 Mode: Transmitting mode  
       DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
       BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: Below 1GHz: 25  
               Above 1GHz: 25  
 Humidity: Below 1GHz: 68%  
            Above 1GHz: 63%

Axial Direction: XY-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 264.005            | Vertical                | 33.2                    | -1.6             | 31.6                         | 46.0                 | 14.4           |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.502            | Horizontal              | 33.1                    | -0.3             | 32.8                         | 46.0                 | 13.2           |

Above 1GHz

above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(μV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(μV/m)] |       | Limits<br>[dB(μV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.642           | Vertical                | 50.8                      | 56.1  | -11.4            | 39.4                         | 44.7  | 54.0                 | 74.0 | 14.6        | 29.3  |
| 1680.083           | Vertical                | 42.0                      | 49.2  | -7.1             | 34.9                         | 42.1  | 54.0                 | 74.0 | 19.1        | 31.9  |
| 2376.792           | Horizontal              | 44.3                      | 50.8  | -3.5             | 40.8                         | 47.3  | 54.0                 | 74.0 | 13.2        | 26.7  |
| 4824.000           | Horizontal              | 37.6                      | 45.9  | 3.3              | 40.9                         | 49.2  | 54.0                 | 74.0 | 13.1        | 24.8  |
| 4824.050           | Vertical                | 41.4                      | 47.0  | 3.3              | 44.7                         | 50.3  | 54.0                 | 74.0 | 9.3         | 23.7  |
| 7236.000           | Horizontal              | <37.8                     | <48.1 | 3.5              | <41.3                        | <51.6 | 54.0                 | 74.0 | >12.7       | >22.4 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.025           | Vertical                | 53.7                      | 56.8  | -11.3            | 42.4                         | 45.5  | 54.0                 | 74.0 | 11.6        | 28.5  |
| 1584.017           | Horizontal              | 46.8                      | 51.6  | -7.9             | 38.9                         | 43.7  | 54.0                 | 74.0 | 15.1        | 30.3  |
| 4824.002           | Vertical                | 39.7                      | 45.4  | 3.3              | 43.0                         | 48.7  | 54.0                 | 74.0 | 11.0        | 25.3  |
| 7236.000           | Horizontal              | <37.8                     | <48.1 | 3.5              | <41.3                        | <51.6 | 54.0                 | 74.0 | >12.7       | >22.4 |
| 9648.000           | Horizontal              | <32.0                     | <43.2 | 6.1              | <38.1                        | <49.3 | 54.0                 | 74.0 | >15.9       | >24.7 |

The Mark "<", ">" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: YZ-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 264.002            | Horizontal              | 37.2                    | -1.6             | 35.6                         | 46.0                 | 10.4           |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.504            | Horizontal              | 32.1                    | -0.3             | 31.8                         | 46.0                 | 14.2           |

Above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading |       | Factor<br>[dB/m] | Emission Level |       | Limits     |      | Margin [dB] |       |
|--------------------|-------------------------|---------------|-------|------------------|----------------|-------|------------|------|-------------|-------|
|                    |                         | [dB(uV)]      |       |                  | [dB(uV/m)]     |       | [dB(uV/m)] |      |             |       |
|                    |                         | Average       | Peak  |                  | Average        | Peak  | Average    | Peak | Average     | Peak  |
| 801.11b Mode       |                         |               |       |                  |                |       |            |      |             |       |
| 1055.775           | Horizontal              | 52.9          | 56.5  | -11.4            | 41.5           | 45.1  | 54.0       | 74.0 | 12.5        | 28.9  |
| 1680.200           | Vertical                | 46.3          | 52.1  | -7.1             | 39.2           | 45.0  | 54.0       | 74.0 | 14.8        | 29.0  |
| 2375.842           | Vertical                | 45.1          | 51.5  | -3.5             | 41.6           | 48.0  | 54.0       | 74.0 | 12.4        | 26.1  |
| 4823.950           | Horizontal              | 39.1          | 46.0  | 3.3              | 42.4           | 49.3  | 54.0       | 74.0 | 11.6        | 24.7  |
| 4824.130           | Vertical                | 41.3          | 47.3  | 3.3              | 44.6           | 50.6  | 54.0       | 74.0 | 9.4         | 23.4  |
| 7236.000           | Horizontal              | <37.8         | <48.1 | 3.5              | <41.3          | <51.6 | 54.0       | 74.0 | >12.7       | >22.4 |
| 801.11g Mode       |                         |               |       |                  |                |       |            |      |             |       |
| 1056.000           | Horizontal              | 53.1          | 57.0  | -11.3            | 41.8           | 45.7  | 54.0       | 74.0 | 12.2        | 28.4  |
| 1584.033           | Vertical                | 48.9          | 52.7  | -7.9             | 41.0           | 44.8  | 54.0       | 74.0 | 13.0        | 29.2  |
| 4823.992           | Horizontal              | 40.1          | 46.4  | 3.3              | 43.4           | 49.7  | 54.0       | 74.0 | 10.6        | 24.3  |
| 4824.000           | Vertical                | 42.2          | 47.7  | 3.3              | 45.5           | 51.0  | 54.0       | 74.0 | 8.5         | 23.0  |
| 7236.000           | Horizontal              | <37.8         | <48.1 | 3.5              | <41.3          | <51.6 | 54.0       | 74.0 | >12.7       | >22.4 |
| 9648.000           | Horizontal              | <32.0         | <43.2 | 6.1              | <38.1          | <49.3 | 54.0       | 74.0 | >15.9       | >24.7 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: ZX-Plane

Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 264.004            | Horizontal              | 41.6                    | -1.6             | 40.0                         | 46.0                 | 6.0            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.505            | Horizontal              | 32.2                    | -0.3             | 31.9                         | 46.0                 | 14.1           |

Above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading |       | Factor<br>[dB/m] | Emission Level |       | Limits     |      | Margin [dB] |       |
|--------------------|-------------------------|---------------|-------|------------------|----------------|-------|------------|------|-------------|-------|
|                    |                         | [dB(uV)]      |       |                  | [dB(uV/m)]     |       | [dB(uV/m)] |      |             |       |
|                    |                         | Average       | Peak  |                  | Average        | Peak  | Average    | Peak | Average     | Peak  |
| 801.11b Mode       |                         |               |       |                  |                |       |            |      |             |       |
| 1056.191           | Vertical                | 55.2          | 59.1  | -11.3            | 43.9           | 47.8  | 54.0       | 74.0 | 10.1        | 26.2  |
| 1680.330           | Horizontal              | 41.7          | 49.5  | -7.1             | 34.6           | 42.4  | 54.0       | 74.0 | 19.4        | 31.6  |
| 2375.375           | Horizontal              | 44.7          | 51.2  | -3.5             | 41.2           | 47.7  | 54.0       | 74.0 | 12.8        | 26.3  |
| 4823.780           | Vertical                | 42.2          | 47.2  | 3.3              | 45.5           | 50.5  | 54.0       | 74.0 | 8.5         | 23.5  |
| 4823.950           | Horizontal              | 43.9          | 47.6  | 3.3              | 47.2           | 50.9  | 54.0       | 74.0 | 6.8         | 23.1  |
| 7236.000           | Horizontal              | <37.8         | <48.1 | 3.5              | <41.3          | <51.6 | 54.0       | 74.0 | >12.7       | >22.4 |
| 801.11g Mode       |                         |               |       |                  |                |       |            |      |             |       |
| 1056.008           | Horizontal              | 49.3          | 55.0  | -11.3            | 38.0           | 43.7  | 54.0       | 74.0 | 16.0        | 30.4  |
| 1056.025           | Vertical                | 55.9          | 58.7  | -11.3            | 44.6           | 47.4  | 54.0       | 74.0 | 9.4         | 26.6  |
| 1584.008           | Horizontal              | 45.9          | 50.8  | -7.9             | 38.0           | 42.9  | 54.0       | 74.0 | 16.0        | 31.1  |
| 4823.983           | Vertical                | 36.8          | 44.9  | 3.3              | 40.1           | 48.2  | 54.0       | 74.0 | 13.9        | 25.8  |
| 4823.992           | Horizontal              | 42.0          | 46.6  | 3.3              | 45.3           | 49.9  | 54.0       | 74.0 | 8.7         | 24.1  |
| 7236.000           | Horizontal              | <37.8         | <48.1 | 3.5              | <41.3          | <51.6 | 54.0       | 74.0 | >12.7       | >22.4 |
| 9648.000           | Horizontal              | <32.0         | <43.2 | 6.1              | <38.1          | <49.3 | 54.0       | 74.0 | >15.9       | >24.7 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Spurious Emission (Radiated) 2437MHz <USB Power Supply>

Serial No.: Keel-CS-T1  
 Power: AC120V, 60Hz  
 Mode: Transmitting mode  
       DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
       BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: Below 1GHz: 25  
               Above 1GHz: 25  
 Humidity: Below 1GHz: 68%  
            Above 1GHz: 63%

Axial Direction: XY-Plane

Below 1GHz

Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 264.006            | Vertical                | 30.4                    | -1.6             | 28.8                         | 46.0                 | 17.2           |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.505            | Horizontal              | 32.5                    | -0.3             | 32.2                         | 46.0                 | 13.8           |

Above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading |       | Factor<br>[dB/m] | Emission Level |       | Limits     |      | Margin [dB] |       |
|--------------------|-------------------------|---------------|-------|------------------|----------------|-------|------------|------|-------------|-------|
|                    |                         | [dB(uV)]      |       |                  | [dB(uV/m)]     |       | [dB(uV/m)] |      |             |       |
|                    |                         | Average       | Peak  |                  | Average        | Peak  | Average    | Peak | Average     | Peak  |
| 801.11b Mode       |                         |               |       |                  |                |       |            |      |             |       |
| 1056.112           | Horizontal              | 50.3          | 55.6  | -11.3            | 39.0           | 44.3  | 54.0       | 74.0 | 15.0        | 29.7  |
| 1680.058           | Vertical                | 43.1          | 50.1  | -7.1             | 36.0           | 43.0  | 54.0       | 74.0 | 18.0        | 31.0  |
| 2375.783           | Vertical                | 44.5          | 50.9  | -3.5             | 41.0           | 47.4  | 54.0       | 74.0 | 13.0        | 26.6  |
| 4873.842           | Vertical                | 39.2          | 45.9  | 3.5              | 42.7           | 49.4  | 54.0       | 74.0 | 11.3        | 24.6  |
| 7311.000           | Horizontal              | <38.3         | <48.3 | 3.9              | <42.2          | <52.2 | 54.0       | 74.0 | >11.8       | >21.8 |
| 801.11g Mode       |                         |               |       |                  |                |       |            |      |             |       |
| 1056.025           | Vertical                | 53.2          | 56.4  | -11.3            | 41.9           | 45.1  | 54.0       | 74.0 | 12.1        | 29.0  |
| 1584.003           | Horizontal              | 46.5          | 51.5  | -7.9             | 38.6           | 43.6  | 54.0       | 74.0 | 15.4        | 30.4  |
| 4873.983           | Vertical                | 40.5          | 46.5  | 3.5              | 44.0           | 50.0  | 54.0       | 74.0 | 10.0        | 24.0  |
| 7311.000           | Horizontal              | <38.3         | <48.3 | 3.9              | <42.2          | <52.2 | 54.0       | 74.0 | >11.8       | >21.8 |
| 9748.000           | Horizontal              | <36.8         | <47.4 | 6.1              | <42.9          | <53.5 | 54.0       | 74.0 | >11.1       | >20.5 |

Axial Direction: YZ-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 264.003            | Horizontal              | 35.1                    | -1.6             | 33.5                         | 46.0                 | 12.5           |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.504            | Horizontal              | 31.5                    | -0.3             | 31.2                         | 46.0                 | 14.8           |

Above 1GHz

above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(μV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(μV/m)] |       | Limits<br>[dB(μV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.875           | Horizontal              | 53.6                      | 57.5  | -11.3            | 42.3                         | 46.2  | 54.0                 | 74.0 | 11.7        | 27.8  |
| 1680.067           | Vertical                | 41.1                      | 49.1  | -7.1             | 34.0                         | 42.0  | 54.0                 | 74.0 | 20.0        | 32.0  |
| 2376.025           | Vertical                | 42.1                      | 49.5  | -3.5             | 38.6                         | 46.0  | 54.0                 | 74.0 | 15.4        | 28.0  |
| 4873.708           | Vertical                | 40.8                      | 46.7  | 3.5              | 44.3                         | 50.2  | 54.0                 | 74.0 | 9.7         | 23.8  |
| 4873.792           | Horizontal              | 42.2                      | 47.2  | 3.5              | 45.7                         | 50.7  | 54.0                 | 74.0 | 8.3         | 23.3  |
| 7311.000           | Horizontal              | <38.3                     | <48.3 | 3.9              | <42.2                        | <52.2 | 54.0                 | 74.0 | >11.8       | >21.8 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.042           | Horizontal              | 52.2                      | 55.6  | -11.3            | 40.9                         | 44.3  | 54.0                 | 74.0 | 13.1        | 29.7  |
| 1584.017           | Vertical                | 47.6                      | 51.9  | -7.9             | 39.7                         | 44.0  | 54.0                 | 74.0 | 14.3        | 30.0  |
| 4874.008           | Vertical                | 42.0                      | 47.2  | 3.5              | 45.5                         | 50.7  | 54.0                 | 74.0 | 8.5         | 23.3  |
| 7311.000           | Horizontal              | <38.3                     | <48.3 | 3.9              | <42.2                        | <52.2 | 54.0                 | 74.0 | >11.8       | >21.8 |
| 9748.000           | Horizontal              | <36.8                     | <47.4 | 6.1              | <42.9                        | <53.5 | 54.0                 | 74.0 | >11.1       | >20.5 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: ZX-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 264.003            | Vertical                | 40.5                    | -1.6             | 38.9                         | 46.0                 | 7.1            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.504            | Horizontal              | 31.6                    | -0.3             | 31.3                         | 46.0                 | 14.7           |

Above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading |       | Factor<br>[dB/m] | Emission Level |       | Limits     |      | Margin [dB] |       |
|--------------------|-------------------------|---------------|-------|------------------|----------------|-------|------------|------|-------------|-------|
|                    |                         | [dB(μV)]      |       |                  | [dB(μV/m)]     |       | [dB(μV/m)] |      |             |       |
|                    |                         | Average       | Peak  |                  | Average        | Peak  | Average    | Peak | Average     | Peak  |
| 801.11g Mode       |                         |               |       |                  |                |       |            |      |             |       |
| 1056.125           | Vertical                | 52.9          | 57.5  | -11.3            | 41.6           | 46.2  | 54.0       | 74.0 | 12.4        | 27.8  |
| 1680.008           | Horizontal              | 43.3          | 50.4  | -7.1             | 36.2           | 43.3  | 54.0       | 74.0 | 17.8        | 30.7  |
| 2376.217           | Horizontal              | 46.6          | 52.3  | -3.5             | 43.1           | 48.8  | 54.0       | 74.0 | 10.9        | 25.2  |
| 4873.933           | Horizontal              | 42.0          | 47.2  | 3.5              | 45.5           | 50.7  | 54.0       | 74.0 | 8.5         | 23.3  |
| 4873.950           | Vertical                | 38.0          | 46.4  | 3.5              | 41.5           | 49.9  | 54.0       | 74.0 | 12.5        | 24.1  |
| 7311.000           | Horizontal              | <38.3         | <48.3 | 3.9              | <42.2          | <52.2 | 54.0       | 74.0 | >11.8       | >21.8 |
| 801.11g Mode       |                         |               |       |                  |                |       |            |      |             |       |
| 1056.017           | Vertical                | 53.3          | 56.5  | -11.3            | 42.0           | 45.2  | 54.0       | 74.0 | 12.0        | 28.8  |
| 1584.000           | Horizontal              | 47.1          | 51.2  | -7.9             | 39.2           | 43.3  | 54.0       | 74.0 | 14.8        | 30.7  |
| 4873.983           | Horizontal              | 41.9          | 47.0  | 3.5              | 45.4           | 50.5  | 54.0       | 74.0 | 8.6         | 23.5  |
| 7311.000           | Horizontal              | <38.3         | <48.3 | 3.9              | <42.2          | <52.2 | 54.0       | 74.0 | >11.8       | >21.8 |
| 9748.000           | Horizontal              | <36.8         | <47.4 | 6.1              | <42.9          | <53.5 | 54.0       | 74.0 | >11.1       | >20.5 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Spurious Emission (Radiated) 2462MHz <USB Power Supply>

Serial No.: Keel-CS-T1  
 Power: AC120V, 60Hz  
 Mode: Transmitting mode  
       DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
       BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: Below 1GHz: 23  
               Above 1GHz: 25  
 Humidity: Below 1GHz: 71%  
            Above 1GHz: 63%

Axial Direction: XY-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 264.004            | Vertical                | 33.0                    | -1.6             | 31.4                         | 46.0                 | 14.6           |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.504            | Horizontal              | 31.5                    | -0.3             | 31.2                         | 46.0                 | 14.8           |

Above 1GHz

above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(μV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(μV/m)] |       | Limits<br>[dB(μV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.833           | Horizontal              | 52.3                      | 56.4  | -11.4            | 40.9                         | 45.0  | 54.0                 | 74.0 | 13.1        | 29.0  |
| 1679.925           | Horizontal              | 43.2                      | 50.6  | -7.1             | 36.1                         | 43.5  | 54.0                 | 74.0 | 17.9        | 30.5  |
| 2376.233           | Vertical                | 45.8                      | 51.9  | -3.5             | 42.3                         | 48.4  | 54.0                 | 74.0 | 11.7        | 25.6  |
| 4924.083           | Horizontal              | 35.9                      | 44.7  | 3.7              | 39.6                         | 48.4  | 54.0                 | 74.0 | 14.4        | 25.6  |
| 4924.183           | Vertical                | 41.1                      | 46.4  | 3.7              | 44.8                         | 50.1  | 54.0                 | 74.0 | 9.2         | 23.9  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.008           | Vertical                | 53.8                      | 56.7  | -11.3            | 42.5                         | 45.4  | 54.0                 | 74.0 | 11.5        | 28.6  |
| 1584.008           | Horizontal              | 46.2                      | 51.1  | -7.9             | 38.3                         | 43.2  | 54.0                 | 74.0 | 15.7        | 30.8  |
| 4923.992           | Vertical                | 39.0                      | 45.6  | 3.7              | 42.7                         | 49.3  | 54.0                 | 74.0 | 11.3        | 24.7  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 9848.000           | Horizontal              | <36.8                     | <47.1 | 6.4              | <43.2                        | 53.5  | 54.0                 | 74.0 | >10.8       | >20.5 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: YZ-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 264.006            | Horizontal              | 34.6                    | -1.6             | 33.0                         | 46.0                 | 13.0           |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.510            | Horizontal              | 34.8                    | -0.3             | 34.5                         | 46.0                 | 11.5           |

Above 1GHz

Above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(uV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] |       | Limits<br>[dB(uV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.892           | Horizontal              | 53.6                      | 57.3  | -11.3            | 42.3                         | 46.0  | 54.0                 | 74.0 | 11.7        | 28.0  |
| 1680.175           | Vertical                | 44.7                      | 50.6  | -7.1             | 37.6                         | 43.5  | 54.0                 | 74.0 | 16.4        | 30.5  |
| 2376.008           | Vertical                | 43.1                      | 50.1  | -3.5             | 39.6                         | 46.6  | 54.0                 | 74.0 | 14.4        | 27.4  |
| 4923.875           | Horizontal              | 41.0                      | 47.0  | 3.7              | 44.7                         | 50.7  | 54.0                 | 74.0 | 9.3         | 23.3  |
| 4924.142           | Vertical                | 41.4                      | 46.6  | 3.7              | 45.1                         | 50.3  | 54.0                 | 74.0 | 8.9         | 23.7  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.008           | Horizontal              | 41.4                      | 45.1  | -11.3            | 41.4                         | 45.1  | 54.0                 | 74.0 | 12.6        | 28.9  |
| 1584.000           | Vertical                | 46.8                      | 51.6  | -7.9             | 38.9                         | 43.7  | 54.0                 | 74.0 | 15.1        | 30.3  |
| 4923.983           | Vertical                | 43.1                      | 47.2  | 3.7              | 46.8                         | 50.9  | 54.0                 | 74.0 | 7.2         | 23.1  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 9848.000           | Horizontal              | <36.8                     | <47.1 | 6.4              | <43.2                        | 53.5  | 54.0                 | 74.0 | >10.8       | >20.5 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: ZX-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 264.006            | Horizontal              | 40.7                    | -1.6             | 39.1                         | 46.0                 | 6.9            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.505            | Horizontal              | 31.6                    | -0.3             | 31.3                         | 46.0                 | 14.7           |

Above 1GHz

Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(uV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] |       | Limits<br>[dB(uV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.859           | Vertical                | 53.2                      | 57.9  | -11.3            | 41.9                         | 46.6  | 54.0                 | 74.0 | 12.1        | 27.4  |
| 1679.958           | Horizontal              | 42.5                      | 49.6  | -7.1             | 35.4                         | 42.5  | 54.0                 | 74.0 | 18.6        | 31.5  |
| 2375.592           | Horizontal              | 42.9                      | 50.2  | -3.5             | 39.4                         | 46.7  | 54.0                 | 74.0 | 14.6        | 27.3  |
| 4924.075           | Vertical                | 38.1                      | 45.1  | 3.7              | 41.8                         | 48.8  | 54.0                 | 74.0 | 12.2        | 25.2  |
| 4924.192           | Horizontal              | 43.0                      | 48.2  | 3.7              | 46.7                         | 51.9  | 54.0                 | 74.0 | 7.3         | 22.1  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.017           | Vertical                | 55.7                      | 58.8  | -11.3            | 44.4                         | 47.5  | 54.0                 | 74.0 | 9.6         | 26.5  |
| 1584.025           | Horizontal              | 46.6                      | 51.5  | -7.9             | 38.7                         | 43.6  | 54.0                 | 74.0 | 15.3        | 30.4  |
| 4924.025           | Horizontal              | 42.5                      | 46.8  | 3.7              | 46.2                         | 50.5  | 54.0                 | 74.0 | 7.8         | 23.5  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 9848.000           | Horizontal              | <36.8                     | <47.1 | 6.4              | <43.2                        | 53.5  | 54.0                 | 74.0 | >10.8       | >20.5 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Spurious Emission (Radiated) 2412MHz (Battery Power Supply)

Serial No.: Keel-CS-T1  
 Battery voltage: Before test 4.17V  
 After test 3.74V  
 Mode: Transmitting mode  
 DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
 BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: Below 1GHz: 23  
 Above 1GHz: 23 (11b), 24 (11g)  
 Humidity: Below 1GHz: 71%  
 Above 1GHz: 71% (11b), 71% (11g)

Axial Direction: XY-Plane

Below 1GHz

Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading | Factor<br>[dB/m] | Emission Level | Limits<br>[dB(μV/m)] | Margin<br>[dB] |
|--------------------|-------------------------|---------------|------------------|----------------|----------------------|----------------|
|                    |                         | [dBuV]        |                  | [dB(μV/m)]     |                      |                |
|                    |                         | QP            |                  | QP             |                      |                |
| 801.11b Mode       |                         |               |                  |                |                      |                |
| 280.505            | Horizontal              | 39.4          | -0.3             | 39.1           | 46.0                 | 6.9            |
| 801.11g Mode       |                         |               |                  |                |                      |                |
| 280.507            | Horizontal              | 36.8          | -0.3             | 36.5           | 46.0                 | 9.5            |

Above 1GHz

above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(μV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(μV/m)] |       | Limits<br>[dB(μV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.510           | Vertical                | 50.8                      | 55.8  | -11.4            | 39.5                         | 44.5  | 54.0                 | 74.0 | 14.5        | 29.5  |
| 1583.950           | Horizontal              | 49.7                      | 54.1  | -7.9             | 41.8                         | 46.2  | 54.0                 | 74.0 | 12.1        | 27.8  |
| 4823.750           | Horizontal              | 36.3                      | 44.9  | 3.3              | 39.6                         | 48.2  | 54.0                 | 74.0 | 14.4        | 25.8  |
| 4823.770           | Vertical                | 41.0                      | 47.1  | 3.3              | 44.3                         | 50.4  | 54.0                 | 74.0 | 9.7         | 23.6  |
| 7236.000           | Horizontal              | <37.8                     | <48.1 | 3.5              | <41.3                        | <51.6 | 54.0                 | 74.0 | >12.7       | >22.4 |
| 9648.000           | Horizontal              | <32.0                     | <43.2 | 6.1              | <38.1                        | <49.3 | 54.0                 | 74.0 | >15.9       | >24.7 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.120           | Vertical                | 51.2                      | 55.8  | -11.3            | 39.9                         | 44.5  | 54.0                 | 74.0 | 14.1        | 29.5  |
| 1583.667           | Horizontal              | 49.2                      | 53.4  | -7.9             | 41.3                         | 45.5  | 54.0                 | 74.0 | 12.7        | 28.5  |
| 4823.233           | Vertical                | 36.2                      | 45.2  | 3.3              | 39.5                         | 48.5  | 54.0                 | 74.0 | 14.5        | 25.5  |
| 7236.000           | Horizontal              | <37.8                     | <48.1 | 3.5              | <41.3                        | <51.6 | 54.0                 | 74.0 | >12.7       | >22.4 |
| 9648.000           | Horizontal              | <32.0                     | <43.2 | 6.1              | <38.1                        | <49.3 | 54.0                 | 74.0 | >15.9       | >24.7 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: YZ-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 280.508            | Horizontal              | 38.5                    | -0.3             | 38.2                         | 46.0                 | 7.8            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.511            | Horizontal              | 35.1                    | -0.3             | 34.8                         | 46.0                 | 11.2           |

Above 1GHz

Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(uV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] |       | Limits<br>[dB(uV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.820           | Horizontal              | 54.5                      | 57.5  | -11.4            | 43.1                         | 46.1  | 54.0                 | 74.0 | 10.9        | 27.9  |
| 1584.010           | Vertical                | 50.6                      | 54.5  | -7.9             | 42.7                         | 46.6  | 54.0                 | 74.0 | 11.3        | 27.4  |
| 4824.030           | Horizontal              | 42.7                      | 47.7  | 3.3              | 46.0                         | 51.0  | 54.0                 | 74.0 | 8.0         | 23.0  |
| 4824.100           | Vertical                | 41.8                      | 47.4  | 3.3              | 45.1                         | 50.7  | 54.0                 | 74.0 | 8.9         | 23.3  |
| 7236.000           | Horizontal              | <37.8                     | <48.1 | 3.5              | <41.3                        | <51.6 | 54.0                 | 74.0 | >12.7       | >22.4 |
| 9648.000           | Horizontal              | <32.0                     | <43.2 | 6.1              | <38.1                        | <49.3 | 54.0                 | 74.0 | >15.9       | >24.7 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.033           | Horizontal              | 53.7                      | 57.2  | -11.3            | 42.4                         | 45.9  | 54.0                 | 74.0 | 11.6        | 28.1  |
| 1583.853           | Vertical                | 50.3                      | 54.2  | -7.9             | 42.4                         | 46.3  | 54.0                 | 74.0 | 11.6        | 27.7  |
| 4824.008           | Vertical                | 41.2                      | 47.2  | 3.3              | 44.5                         | 50.5  | 54.0                 | 74.0 | 9.5         | 23.5  |
| 4824.217           | Horizontal              | 40.0                      | 46.2  | 3.3              | 43.3                         | 49.5  | 54.0                 | 74.0 | 10.7        | 24.5  |
| 7236.000           | Horizontal              | <37.8                     | <48.1 | 3.5              | <41.3                        | <51.6 | 54.0                 | 74.0 | >12.7       | >22.4 |
| 9648.000           | Horizontal              | <32.0                     | <43.2 | 6.1              | <38.1                        | <49.3 | 54.0                 | 74.0 | >15.9       | >24.7 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: ZX-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 280.512            | Horizontal              | 38.6                    | -0.3             | 38.3                         | 46.0                 | 7.7            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.498            | Horizontal              | 38.7                    | -0.3             | 38.4                         | 46.0                 | 7.6            |

Above 1GHz

Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(uV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] |       | Limits<br>[dB(uV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.320           | Vertical                | 53.9                      | 57.7  | -11.3            | 42.6                         | 46.4  | 54.0                 | 74.0 | 11.4        | 27.6  |
| 1584.120           | Horizontal              | 48.2                      | 53.0  | -7.9             | 40.3                         | 45.1  | 54.0                 | 74.0 | 13.7        | 28.9  |
| 4824.100           | Vertical                | 40.0                      | 46.1  | 3.3              | 43.3                         | 49.4  | 54.0                 | 74.0 | 10.7        | 24.6  |
| 4824.120           | Horizontal              | 42.3                      | 47.4  | 3.3              | 45.6                         | 50.7  | 54.0                 | 74.0 | 8.4         | 23.3  |
| 7236.000           | Horizontal              | <37.8                     | <48.1 | 3.5              | <41.3                        | <51.6 | 54.0                 | 74.0 | >12.7       | >22.4 |
| 9648.000           | Horizontal              | <32.0                     | <43.2 | 6.1              | <38.1                        | <49.3 | 54.0                 | 74.0 | >15.9       | >24.7 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.008           | Vertical                | 54.3                      | 57.5  | -11.3            | 43.0                         | 46.2  | 54.0                 | 74.0 | 11.0        | 27.8  |
| 1583.950           | Horizontal              | 46.7                      | 51.6  | -7.9             | 38.8                         | 43.7  | 54.0                 | 74.0 | 15.2        | 30.3  |
| 4823.875           | Horizontal              | 43.2                      | 47.9  | 3.3              | 46.5                         | 51.2  | 54.0                 | 74.0 | 7.5         | 22.8  |
| 4824.217           | Vertical                | 36.4                      | 44.9  | 3.3              | 39.7                         | 48.2  | 54.0                 | 74.0 | 14.3        | 25.8  |
| 7236.000           | Horizontal              | <37.8                     | <48.1 | 3.5              | <41.3                        | <51.6 | 54.0                 | 74.0 | >12.7       | >22.4 |
| 9648.000           | Horizontal              | <32.0                     | <43.2 | 6.1              | <38.1                        | <49.3 | 54.0                 | 74.0 | >15.9       | >24.7 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Spurious Emission (Radiated) 2437MHz <Battery Power Supply>

Serial No.: Keel-CS-T1  
 Battery voltage: Before test 4.17V  
 After test 3.74V  
 Mode: Transmitting mode  
 DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
 BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: Below 1GHz: 23  
 Above 1GHz: 23 (11b), 24 (11g)  
 Humidity: Below 1GHz: 71%  
 Above 1GHz: 71% (11b), 71% (11g)

Axial Direction: XY-Plane

Below 1GHz

Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 280.505            | Horizontal              | 36.8                    | -0.3             | 36.5                         | 46.0                 | 9.5            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.507            | Horizontal              | 39.1                    | -2.0             | 37.1                         | 46.0                 | 8.9            |

Above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading |       | Factor<br>[dB/m] | Emission Level |       | Limits     |      | Margin [dB] |       |
|--------------------|-------------------------|---------------|-------|------------------|----------------|-------|------------|------|-------------|-------|
|                    |                         | [dB(uV)]      |       |                  | [dB(uV/m)]     |       | [dB(uV/m)] |      |             |       |
|                    |                         | Average       | Peak  |                  | Average        | Peak  | Average    | Peak | Average     | Peak  |
| 801.11b Mode       |                         |               |       |                  |                |       |            |      |             |       |
| 1055.830           | Horizontal              | 51.5          | 55.9  | -11.4            | 40.1           | 44.5  | 54.0       | 74.0 | 13.9        | 29.5  |
| 1583.850           | Horizontal              | 47.8          | 52.5  | -7.9             | 39.9           | 44.6  | 54.0       | 74.0 | 14.1        | 29.4  |
| 4873.800           | Vertical                | 40.3          | 46.8  | 3.5              | 43.8           | 50.3  | 54.0       | 74.0 | 10.2        | 23.7  |
| 7311.000           | Horizontal              | <38.3         | <48.3 | 3.9              | <42.2          | <52.2 | 54.0       | 74.0 | >11.8       | >21.8 |
| 9748.000           | Horizontal              | <36.8         | <47.4 | 6.1              | <42.9          | <53.5 | 54.0       | 74.0 | >11.1       | >20.5 |
| 801.11g Mode       |                         |               |       |                  |                |       |            |      |             |       |
| 1056.050           | Horizontal              | 51.4          | 55.5  | -11.3            | 40.1           | 44.2  | 54.0       | 74.0 | 13.9        | 29.8  |
| 1584.208           | Horizontal              | 47.5          | 52.4  | -7.9             | 39.6           | 44.5  | 54.0       | 74.0 | 14.4        | 29.5  |
| 4874.067           | Vertical                | 38.9          | 46.7  | 3.5              | 42.4           | 50.2  | 54.0       | 74.0 | 11.6        | 23.8  |
| 7311.000           | Horizontal              | <38.3         | <48.3 | 3.9              | <42.2          | <52.2 | 54.0       | 74.0 | >11.8       | >21.8 |
| 9748.000           | Horizontal              | <36.8         | <47.4 | 6.1              | <42.9          | <53.5 | 54.0       | 74.0 | >11.1       | >20.5 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: YZ-Plane  
Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 280.503            | Horizontal              | 37.7                    | -0.3             | 37.4                         | 46.0                 | 8.6            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.510            | Horizontal              | 39.6                    | -0.3             | 39.3                         | 46.0                 | 6.7            |

Above 1GHz

above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(μV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(μV/m)] |       | Limits<br>[dB(μV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.580           | Horizontal              | 53.8                      | 57.0  | -11.4            | 42.4                         | 45.6  | 54.0                 | 74.0 | 11.6        | 28.4  |
| 1583.720           | Vertical                | 50.8                      | 55.1  | -7.9             | 42.9                         | 47.2  | 54.0                 | 74.0 | 11.1        | 26.8  |
| 4873.930           | Horizontal              | 42.1                      | 47.7  | 3.5              | 45.6                         | 51.2  | 54.0                 | 74.0 | 8.4         | 22.8  |
| 4874.170           | Vertical                | 39.5                      | 45.5  | 3.5              | 43.0                         | 49.0  | 54.0                 | 74.0 | 11.0        | 25.0  |
| 7311.000           | Horizontal              | <38.3                     | <48.3 | 3.9              | <42.2                        | <52.2 | 54.0                 | 74.0 | >11.8       | >21.8 |
| 9748.000           | Horizontal              | <36.8                     | <47.4 | 6.1              | <42.9                        | <53.5 | 54.0                 | 74.0 | >11.1       | >20.5 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.108           | Horizontal              | 53.8                      | 57.2  | -11.3            | 42.5                         | 45.9  | 54.0                 | 74.0 | 11.5        | 28.1  |
| 1584.033           | Vertical                | 48.1                      | 53.0  | -7.9             | 40.2                         | 45.1  | 54.0                 | 74.0 | 13.8        | 28.9  |
| 4873.767           | Vertical                | 41.4                      | 47.4  | 3.5              | 44.9                         | 50.9  | 54.0                 | 74.0 | 9.1         | 23.1  |
| 4873.942           | Horizontal              | 40.5                      | 46.9  | 3.5              | 44.0                         | 50.4  | 54.0                 | 74.0 | 10.0        | 23.6  |
| 7311.000           | Horizontal              | <38.3                     | <48.3 | 3.9              | <42.2                        | <52.2 | 54.0                 | 74.0 | >11.8       | >21.8 |
| 9748.000           | Horizontal              | <36.8                     | <47.4 | 6.1              | <42.9                        | <53.5 | 54.0                 | 74.0 | >11.1       | >20.5 |

The Mark "<", ">" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: ZX-Plane

Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 280.510            | Vertical                | 38.8                    | -0.3             | 38.5                         | 46.0                 | 7.5            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.510            | Horizontal              | 39.8                    | -0.3             | 39.5                         | 46.0                 | 6.5            |

Above 1GHz

above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(uV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] |       | Limits<br>[dB(uV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.733           | Vertical                | 53.5                      | 57.5  | -11.4            | 42.1                         | 46.1  | 54.0                 | 74.0 | 11.9        | 27.8  |
| 1583.917           | Horizontal              | 47.0                      | 52.0  | -7.1             | 39.1                         | 44.1  | 54.0                 | 74.0 | 14.9        | 29.9  |
| 4874.000           | Horizontal              | 43.3                      | 48.3  | 3.5              | 46.8                         | 51.8  | 54.0                 | 74.0 | 7.2         | 22.2  |
| 4874.308           | Vertical                | 38.2                      | 45.9  | 3.5              | 41.7                         | 49.4  | 54.0                 | 74.0 | 12.3        | 24.6  |
| 7311.000           | Horizontal              | <38.3                     | <48.3 | 3.9              | <42.2                        | <52.2 | 54.0                 | 74.0 | >11.8       | >21.8 |
| 9748.000           | Horizontal              | <36.8                     | <47.4 | 6.1              | <42.9                        | <53.5 | 54.0                 | 74.0 | >11.1       | >20.5 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.975           | Vertical                | 55.6                      | 58.7  | -11.3            | 44.3                         | 47.4  | 54.0                 | 74.0 | 9.7         | 26.6  |
| 1056.200           | Horizontal              | 49.2                      | 54.7  | -11.3            | 37.9                         | 43.4  | 54.0                 | 74.0 | 16.1        | 30.6  |
| 1583.875           | Horizontal              | 46.6                      | 52.0  | -7.9             | 38.7                         | 44.1  | 54.0                 | 74.0 | 15.3        | 29.9  |
| 4873.658           | Vertical                | 35.3                      | 45.0  | 3.5              | 38.8                         | 48.5  | 54.0                 | 74.0 | 15.2        | 25.5  |
| 4874.242           | Horizontal              | 43.4                      | 48.7  | 3.5              | 46.9                         | 52.2  | 54.0                 | 74.0 | 7.1         | 21.8  |
| 7311.000           | Horizontal              | <38.3                     | <48.3 | 3.9              | <42.2                        | <52.2 | 54.0                 | 74.0 | >11.8       | >21.8 |
| 9748.000           | Horizontal              | <36.8                     | <47.4 | 6.1              | <42.9                        | <53.5 | 54.0                 | 74.0 | >11.1       | >20.5 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Spurious Emission (Radiated) 2462MHz <Battery Power Supply>

Serial No.: Keel-CS-T1  
 Battery voltage: Before test 4.17V  
 After test 3.74V  
 Mode: Transmitting mode  
 DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
 BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: Below 1GHz: 23  
 Above 1GHz: 23 (11b), 24 (11g)  
 Humidity: Below 1GHz: 71%  
 Above 1GHz: 71% (11b), 71% (11g)

Axial Direction: XY-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 280.510            | Horizontal              | 38.4                    | -0.3             | 38.1                         | 46.0                 | 7.9            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.510            | Horizontal              | 39.8                    | -0.3             | 39.5                         | 46.0                 | 6.5            |

Above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(μV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(μV/m)] |       | Limits<br>[dB(μV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1056.075           | Horizontal              | 51.8                      | 55.8  | -11.3            | 40.5                         | 44.5  | 54.0                 | 74.0 | 13.5        | 29.5  |
| 1584.267           | Horizontal              | 49.3                      | 53.8  | -7.9             | 41.4                         | 45.9  | 54.0                 | 74.0 | 12.6        | 28.1  |
| 4924.075           | Horizontal              | 35.2                      | 44.8  | 3.7              | 38.9                         | 48.5  | 54.0                 | 74.0 | 15.1        | 25.5  |
| 4924.300           | Vertical                | 41.2                      | 47.0  | 3.7              | 44.9                         | 50.7  | 54.0                 | 74.0 | 9.1         | 23.3  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 9848.000           | Horizontal              | <36.8                     | <47.1 | 6.4              | <43.2                        | <53.5 | 54.0                 | 74.0 | >10.8       | >20.5 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.858           | Horizontal              | 51.7                      | 55.9  | -11.3            | 40.4                         | 44.6  | 54.0                 | 74.0 | 13.6        | 29.4  |
| 1583.850           | Horizontal              | 47.1                      | 52.5  | -7.9             | 39.2                         | 44.6  | 54.0                 | 74.0 | 14.8        | 29.4  |
| 4923.792           | Horizontal              | 33.8                      | 44.2  | 3.7              | 37.5                         | 47.9  | 54.0                 | 74.0 | 16.5        | 26.1  |
| 4924.033           | Vertical                | 40.8                      | 47.7  | 3.7              | 44.5                         | 51.4  | 54.0                 | 74.0 | 9.5         | 22.6  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 9848.000           | Horizontal              | <36.8                     | <47.1 | 6.4              | <43.2                        | <53.5 | 54.0                 | 74.0 | >10.8       | >20.5 |

The Mark "<", ">" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: YZ-Plane

Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 280.505            | Horizontal              | 36.8                    | -0.3             | 36.5                         | 46.0                 | 9.5            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.498            | Horizontal              | 39.6                    | -0.3             | 39.3                         | 46.0                 | 6.7            |

Above 1GHz

above 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(μV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(μV/m)] |       | Limits<br>[dB(μV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.792           | Horizontal              | 53.8                      | 58.1  | -11.4            | 42.4                         | 46.7  | 54.0                 | 74.0 | 11.6        | 27.3  |
| 1584.292           | Vertical                | 50.9                      | 55.2  | -7.9             | 43.0                         | 47.3  | 54.0                 | 74.0 | 11.0        | 26.7  |
| 4923.992           | Vertical                | 40.8                      | 47.6  | 3.7              | 44.5                         | 51.3  | 54.0                 | 74.0 | 9.5         | 22.7  |
| 4924.175           | Horizontal              | 40.9                      | 47.5  | 3.7              | 44.6                         | 51.2  | 54.0                 | 74.0 | 9.4         | 22.8  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 9848.000           | Horizontal              | <36.8                     | <47.1 | 6.4              | <43.2                        | <53.5 | 54.0                 | 74.0 | >10.8       | >20.5 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.900           | Horizontal              | 53.2                      | 57.0  | -11.3            | 41.9                         | 45.7  | 54.0                 | 74.0 | 12.6        | 28.3  |
| 1584.242           | Vertical                | 48.7                      | 53.5  | -7.9             | 40.8                         | 45.6  | 54.0                 | 74.0 | 13.2        | 28.4  |
| 4923.883           | Horizontal              | 39.1                      | 45.6  | 3.7              | 42.8                         | 49.3  | 54.0                 | 74.0 | 11.2        | 24.7  |
| 4923.958           | Vertical                | 42.7                      | 47.4  | 3.7              | 46.4                         | 51.1  | 54.0                 | 74.0 | 7.6         | 22.9  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 9848.000           | Horizontal              | <36.8                     | <47.1 | 6.4              | <43.2                        | <53.5 | 54.0                 | 74.0 | >10.8       | >20.5 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

Axial Direction: ZX-Plane

Below 1GHz

| Below 1GHz         |                         |                         |                  |                              |                      |                |
|--------------------|-------------------------|-------------------------|------------------|------------------------------|----------------------|----------------|
| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dBuV] | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] | Limits<br>[dB(uV/m)] | Margin<br>[dB] |
|                    |                         | QP                      |                  | QP                           |                      |                |
| 801.11b Mode       |                         |                         |                  |                              |                      |                |
| 280.509            | Horizontal              | 41.2                    | -2.0             | 39.2                         | 46.0                 | 6.8            |
| 801.11g Mode       |                         |                         |                  |                              |                      |                |
| 280.499            | Horizontal              | 40.4                    | -2.0             | 38.4                         | 46.0                 | 7.6            |

Above 1GHz

Below 1GHz

| Frequency<br>[MHz] | Antenna<br>Polarization | Meter Reading<br>[dB(uV)] |       | Factor<br>[dB/m] | Emission Level<br>[dB(uV/m)] |       | Limits<br>[dB(uV/m)] |      | Margin [dB] |       |
|--------------------|-------------------------|---------------------------|-------|------------------|------------------------------|-------|----------------------|------|-------------|-------|
|                    |                         | Average                   | Peak  |                  | Average                      | Peak  | Average              | Peak | Average     | Peak  |
| 801.11b Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.850           | Vertical                | 55.2                      | 58.4  | -11.3            | 43.9                         | 47.1  | 54.0                 | 74.0 | 10.1        | 26.9  |
| 1584.108           | Horizontal              | 46.8                      | 52.3  | -7.9             | 38.9                         | 44.4  | 54.0                 | 74.0 | 15.1        | 29.6  |
| 4923.933           | Vertical                | 36.3                      | 45.9  | 3.7              | 40.0                         | 49.6  | 54.0                 | 74.0 | 14.0        | 24.4  |
| 4924.067           | Horizontal              | 43.7                      | 48.5  | 3.7              | 47.4                         | 52.2  | 54.0                 | 74.0 | 6.6         | 21.8  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 9848.000           | Horizontal              | <36.8                     | <47.1 | 6.4              | <43.2                        | <53.5 | 54.0                 | 74.0 | >10.8       | >20.5 |
| 801.11g Mode       |                         |                           |       |                  |                              |       |                      |      |             |       |
| 1055.983           | Vertical                | 52.5                      | 56.6  | -11.3            | 41.2                         | 45.3  | 54.0                 | 74.0 | 12.8        | 28.7  |
| 1584.367           | Horizontal              | 48.1                      | 52.7  | -7.9             | 40.2                         | 44.8  | 54.0                 | 74.0 | 13.8        | 29.2  |
| 4923.967           | Horizontal              | 43.2                      | 48.6  | 3.7              | 46.9                         | 52.3  | 54.0                 | 74.0 | 7.1         | 21.7  |
| 4924.042           | Vertical                | 35.1                      | 44.8  | 3.7              | 38.8                         | 48.5  | 54.0                 | 74.0 | 15.2        | 25.5  |
| 7386.000           | Horizontal              | <38.5                     | <48.3 | 4.3              | <42.8                        | <52.6 | 54.0                 | 74.0 | >11.2       | >21.4 |
| 9848.000           | Horizontal              | <36.8                     | <47.1 | 6.4              | <43.2                        | <53.5 | 54.0                 | 74.0 | >10.8       | >20.5 |

The Mark "&lt;", "&gt;" in the table each means floor noise data and the data is below or over the shown value.

## 7 6dB Bandwidth

### 7.1 Test Setup

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE: PEAK  
 RBW: 100kHz  
 VBW: 100kHz  
 SPAN: 20MHz  
 SWEEP TIME: AUTO

### 7.2 Test Instrument

| Equipment         | Manufacture     | Model No.     | Serial No.  | Calibration Date         | Next Calibration Due     |
|-------------------|-----------------|---------------|-------------|--------------------------|--------------------------|
| Spectrum Analyzer | Rohde & Schwarz | FSIQ26        | 840061/0004 | 10 <sup>th</sup> .2.2006 | 9 <sup>th</sup> .2.2007  |
| RF Cable          | SUHNER          | SUCOFLEX 104E | RF2-2       | 4 <sup>th</sup> .7.2006  | 3 <sup>rd</sup> .7.2007  |
| Multi Meter       | R6451A          | 67840312      | Advantest   | 15 <sup>th</sup> .6.2006 | 14 <sup>th</sup> .6.2007 |

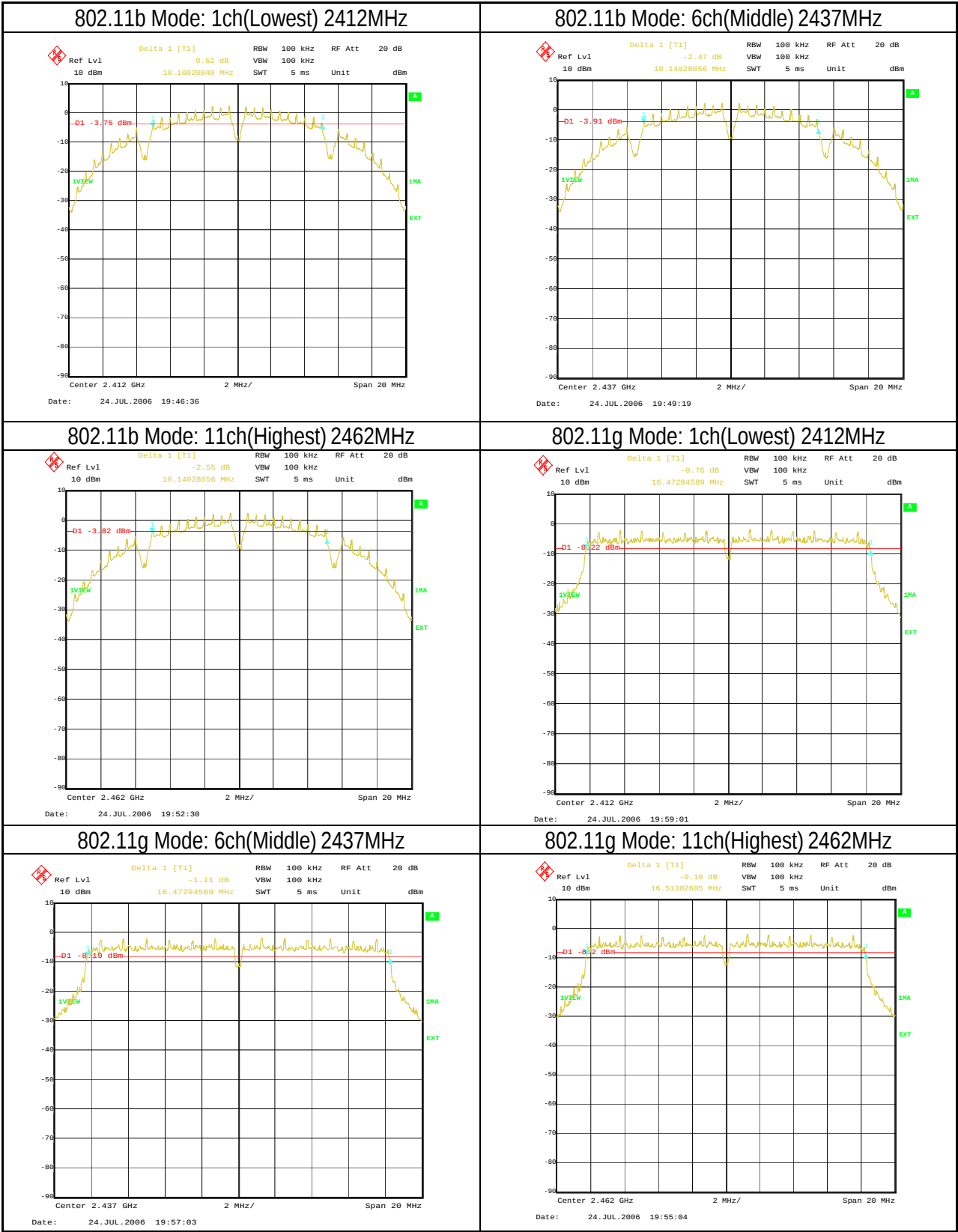
### 7.3 Test Results

Serial No.: Keel-CS-FB-31  
 Power: DC5.0V via USB port.  
 Mode: Transmitting mode, (1CH, 6CH, 11CH)  
 DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
 BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: 21.3  
 Humidity: 62.0 %  
 Regulation: FCC Part15 C §15.247 (a)(2)

| CH                         | Frequency [MHz] | 6dB Bandwidth [MHz] | Limit [MHz] |
|----------------------------|-----------------|---------------------|-------------|
| 802.11b Mode DBPSK (1Mbps) |                 |                     |             |
| 1ch (Lowest)               | 2412.0          | 10.10               | >=0.5       |
| 6ch (Middle)               | 2437.0          | 10.14               | >=0.5       |
| 11ch (Highest)             | 2462.0          | 10.14               | >=0.5       |
| 802.11g Mode BPSK (6Mbps)  |                 |                     |             |
| 1ch (Lowest)               | 2412.0          | 16.47               | >=0.5       |
| 6ch (Middle)               | 2437.0          | 16.47               | >=0.5       |
| 11ch (Highest)             | 2462.0          | 16.51               | >=0.5       |

The spectrum data are attached next page. Display line indicates the 6dB offset below highest level. It shows compliance with the requirement in part 15.247(a)(2).

Data of 6dB Bandwidth



## 8 Maximum Peak Output Power

This test have been conducted in JQA(Japan Quality Assurance Organization) KITA-KANSAI Testing Center separately.

The summary of test results : -

| CH            | Frequency<br>[MHz] | Result<br>[mW] | Margin<br>[dBm] |
|---------------|--------------------|----------------|-----------------|
| 802.11b Mode  |                    |                |                 |
| 11ch(Highest) | 2462.0             | 28.2           | 15.5            |
| 802.11g Mode  |                    |                |                 |
| 11ch(Highest) | 2462.0             | 144.5          | 8.4             |

For more detail, please refer to test report issued by JQA. (Report No. KL8006216)

## 9 Peak Power Spectral Density

### 9.1 Test Setup

The test is performed in accordance with FCC Document "Measurement of Transmission Systems Operating under section 15.247". PSD Option1 is used.

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE: PEAK  
 RBW: 3kHz  
 VBW: 10kHz  
 SPAN: 300kHz  
 SWEEP TIME: 100s

### 9.2 Test Instrument

| Equipment         | Manufacture     | Model No.     | Serial No.  | Calibration Date         | Next Calibration Due     |
|-------------------|-----------------|---------------|-------------|--------------------------|--------------------------|
| Spectrum Analyzer | Rohde & Schwarz | FSIQ26        | 840061/0004 | 10 <sup>th</sup> .2.2006 | 9 <sup>th</sup> .2.2007  |
| RF Cable          | SUHNER          | SUCOFLEX 104E | RF2-2       | 4 <sup>th</sup> .7.2006  | 3 <sup>rd</sup> .7.2007  |
| Multi Meter       | R6451A          | 67840312      | Advantest   | 15 <sup>th</sup> .6.2006 | 14 <sup>th</sup> .6.2007 |

### 9.3 Test Results

Serial No.: Keel-CS-FB-31  
 Power: DC5.0V via USB port.  
 Mode: Transmitting mode (1CH, 6CH, 11CH)  
 DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
 BPSK (6Mbps) for IEEE 802.11g (OFDM)  
 Temperature: 21.3  
 Humidity: 62.0 %  
 Regulation: FCC Part15 C. §15.247 (e)

| CH                         | Frequency [MHz] | Reading [dBm] | Cable Loss1 [dB] | Cable Loss2 [dB] | Result [dBm] | Limit [dBm/3kHz] |
|----------------------------|-----------------|---------------|------------------|------------------|--------------|------------------|
| 802.11b Mode DBPSK (1Mbps) |                 |               |                  |                  |              |                  |
| 1ch(Lowest)                | 2412.0          | -10.34        | 0.60             | 0.75             | -8.99        | <=8              |
| 6ch(Middle)                | 2437.0          | -10.32        | 0.57             | 0.78             | -8.97        | <=8              |
| 11ch(Highest)              | 2462.0          | -10.40        | 0.65             | 0.89             | -8.86        | <=8              |
| 802.11g Mode BPSK (6Mbps)  |                 |               |                  |                  |              |                  |
| 1ch(Lowest)                | 2412.0          | -18.07        | 0.60             | 0.75             | -16.72       | <=8              |
| 6ch(Middle)                | 2437.0          | -17.98        | 0.57             | 0.78             | -16.63       | <=8              |
| 11ch(Highest)              | 2462.0          | -18.16        | 0.65             | 0.89             | -16.62       | <=8              |

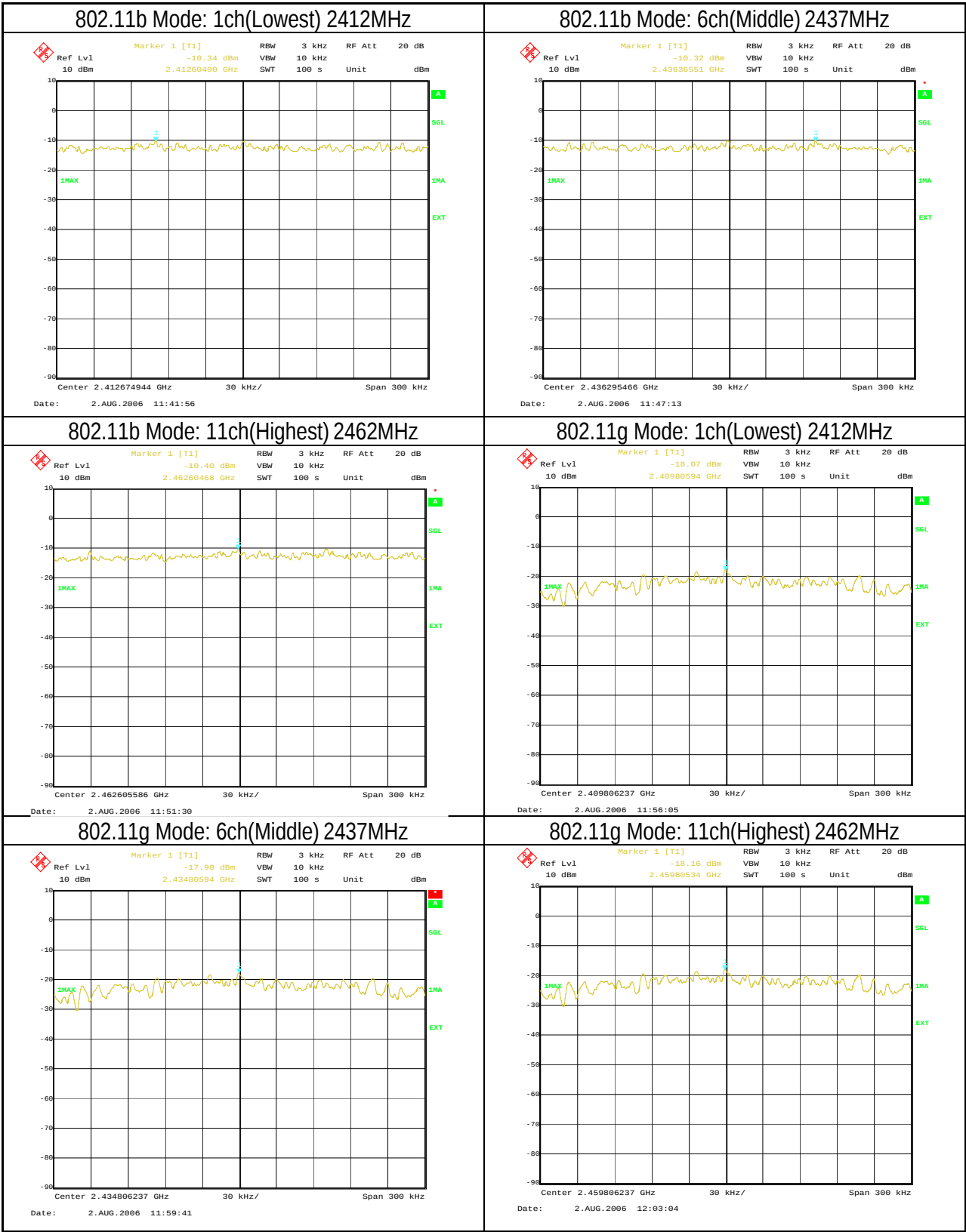
Result = Reading + Cable Loss

Note: Cable Loss1: RF2-2

Cable Loss2: Conversion cable used for connecting to SMA type

The spectrum data are attached next page.

Data of Peak Power Spectral Density



## 10 Band Edge Compliance

### 10.1 Test Setup

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE: PEAK  
RBW: 100kHz  
VBW: 300kHz  
Start Frequency: 50MHz  
SWEEP TIME: AUTO

### 10.2 Test Instrument

| Equipment         | Manufacture     | Model No.     | Serial No.  | Calibration Date         | Next Calibration Due     |
|-------------------|-----------------|---------------|-------------|--------------------------|--------------------------|
| Spectrum Analyzer | Rohde & Schwarz | FSIQ26        | 840061/0004 | 10 <sup>th</sup> .2.2006 | 9 <sup>th</sup> .2.2007  |
| RF Cable          | SUHNER          | SUCOFLEX 104E | RF2-2       | 4 <sup>th</sup> .7.2006  | 3 <sup>rd</sup> .7.2007  |
| Multi Meter       | R6451A          | 67840312      | Advantest   | 15 <sup>th</sup> .6.2006 | 14 <sup>th</sup> .6.2007 |

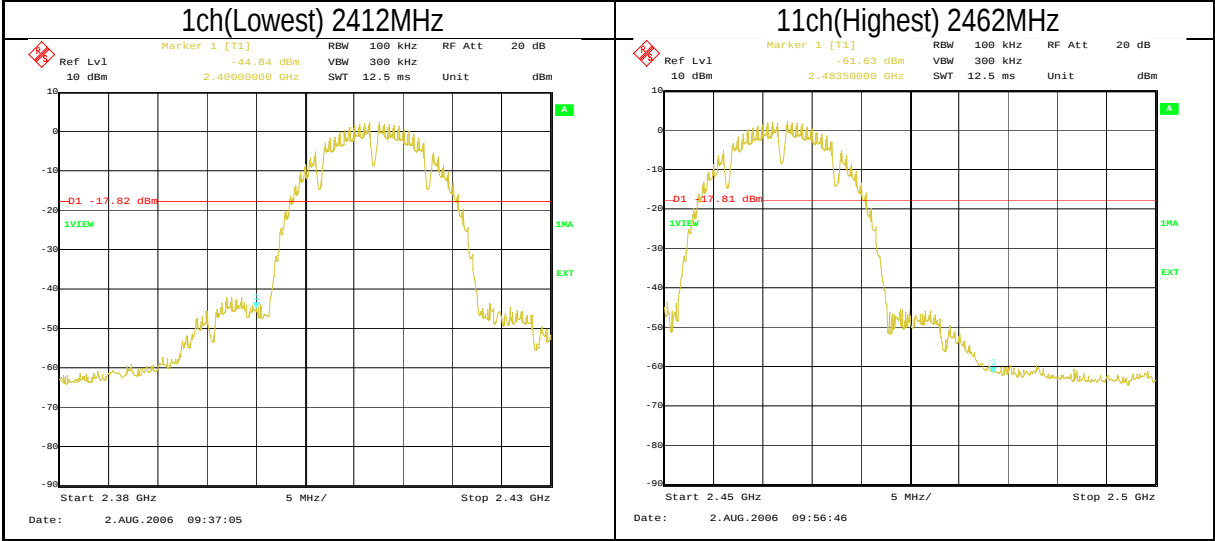
### 10.3 Test Results

Serial No.: Keel-CS-FB-31  
Power: DC5.0V via USB port.  
Mode: Transmitting mode, (1CH,11CH)  
DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
BPSK (6Mbps) for IEEE 802.11g (OFDM)  
Temperature: 21.3  
Humidity: 62.0 %  
Regulation: FCC Part15 C. §15.247 (d)

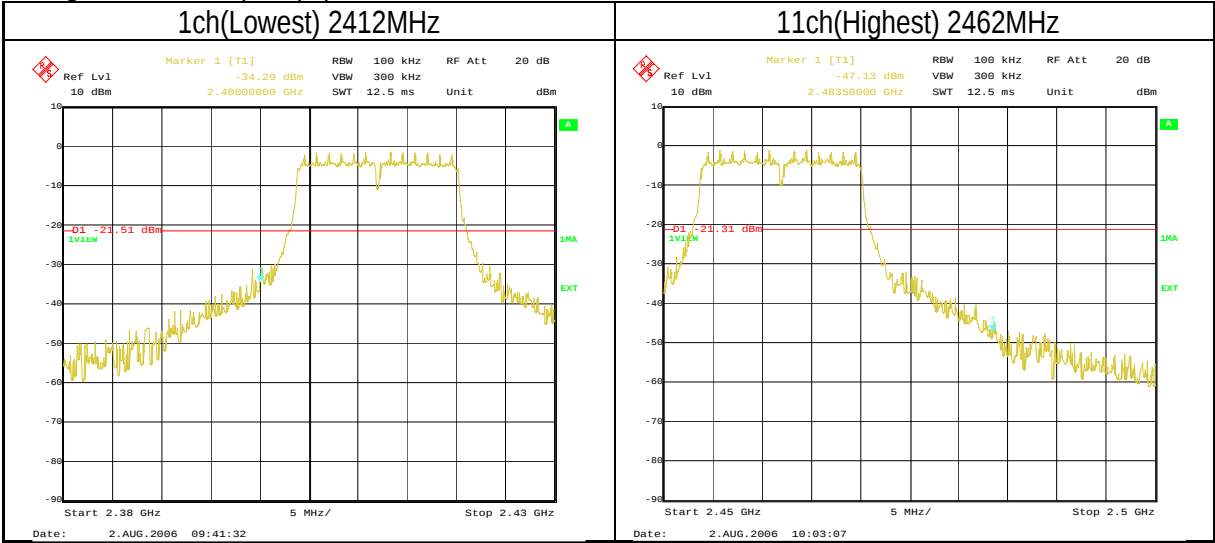
The spectrum data are attached next page. Display line indicates the 20dB offset below highest level.  
It shows compliance with the requirement in part 15.247(d)

Data of Band Edge Compliance

802.11b Mode DBPSK (1Mbps)



802.11g Mode BPSK (6Mbps)



## 11 Spurious RF Conducted Emission

### 11.1 Test Setup

The spectrum analyzer was connected to the transmitter output port through the RF cable.

Spectrum analyzer setting:

DETECTOR MODE: PEAK  
RBW: 100kHz  
VBW: 300kHz  
SWEEP TIME: AUTO

### 11.2 Test Instrument

| Equipment         | Manufacture     | Model No.     | Serial No.  | Calibration Date         | Next Calibration Due     |
|-------------------|-----------------|---------------|-------------|--------------------------|--------------------------|
| Spectrum Analyzer | Rohde & Schwarz | FSIQ26        | 840061/0004 | 10 <sup>th</sup> .2.2006 | 9 <sup>th</sup> .2.2007  |
| RF Cable          | SUHNER          | SUCOFLEX 104E | RF2-2       | 4 <sup>th</sup> .7.2006  | 3 <sup>rd</sup> .7.2007  |
| Multi Meter       | R6451A          | 67840312      | Advantest   | 15 <sup>th</sup> .6.2006 | 14 <sup>th</sup> .6.2007 |

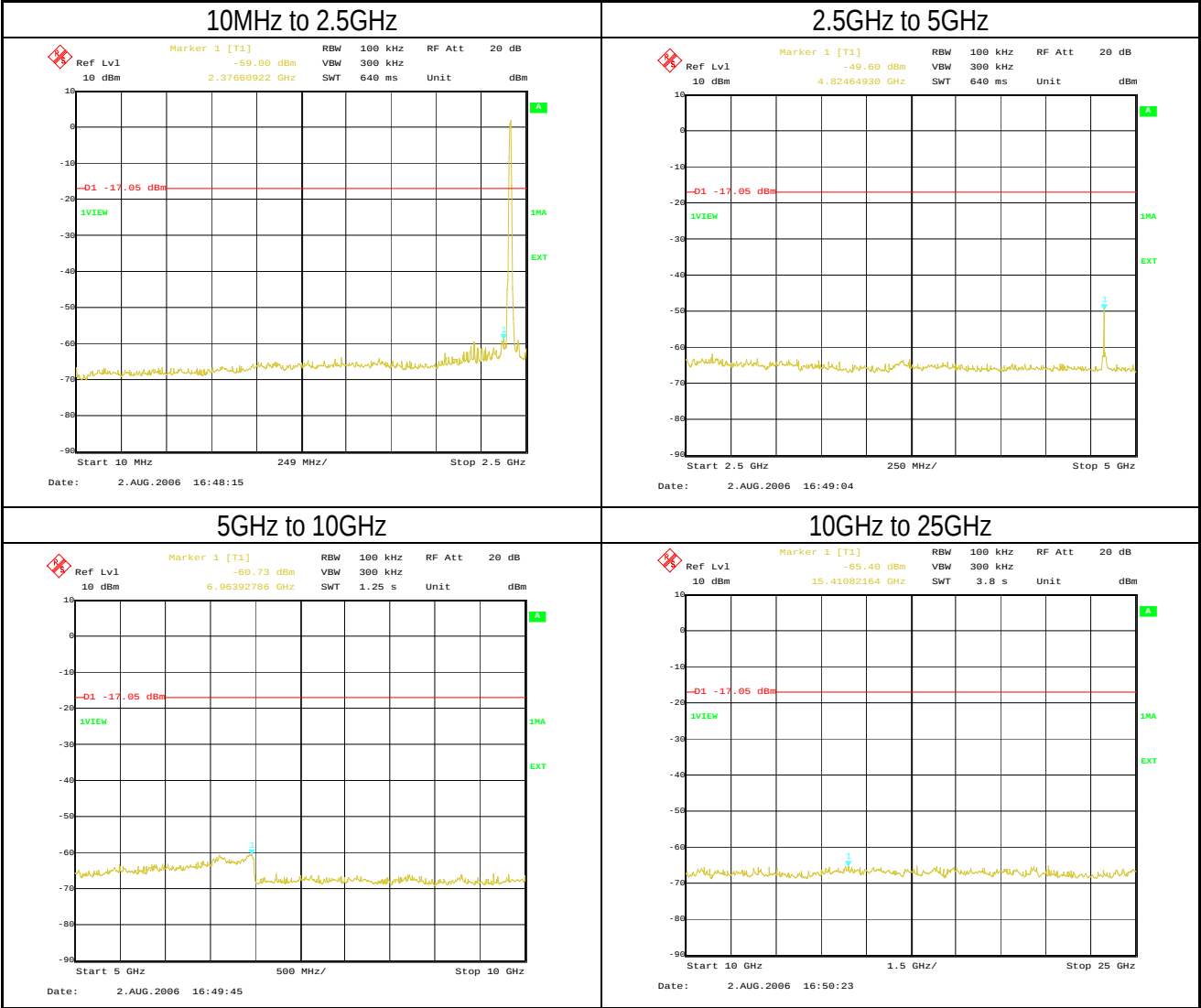
### 11.3 Test Results

Serial No.: Keel-CS-FB-31  
Power: DC5.0V via USB port.  
Mode: Transmitting mode, (1CH,6CH,11CH)  
DBPSK (1Mbps) for IEEE 802.11b (DSSS)  
BPSK (6Mbps) for IEEE 802.11g (OFDM)  
Temperature: 21.3  
Humidity: 62.0 %  
Regulation: FCC Part15 C §15.247 (d)

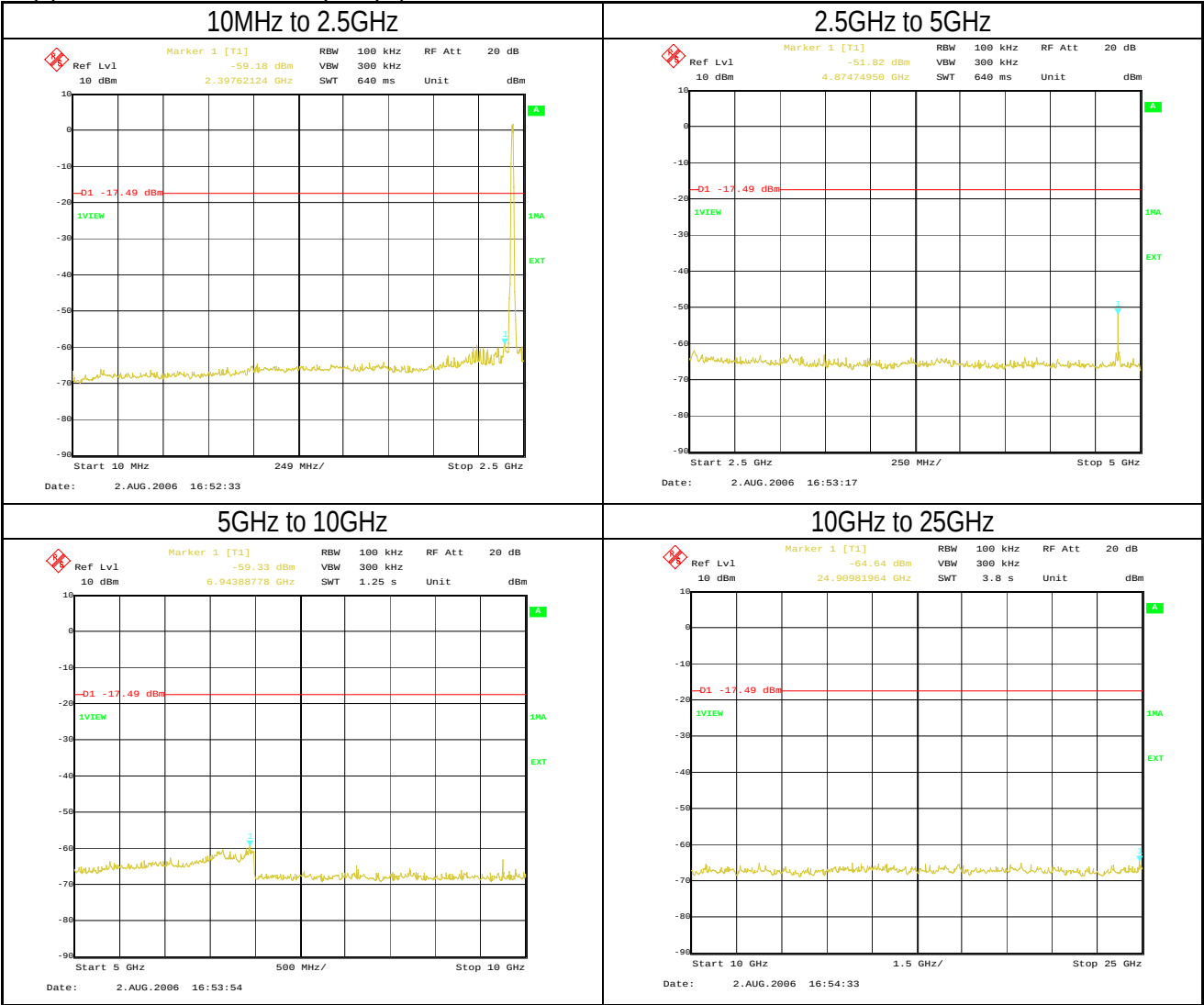
The spectrum data are attached next page. Display line indicates the 20dB offset below highest level.  
It shows compliance with the requirement in part 15.247(d)

Data of Spurious Conducted Emission

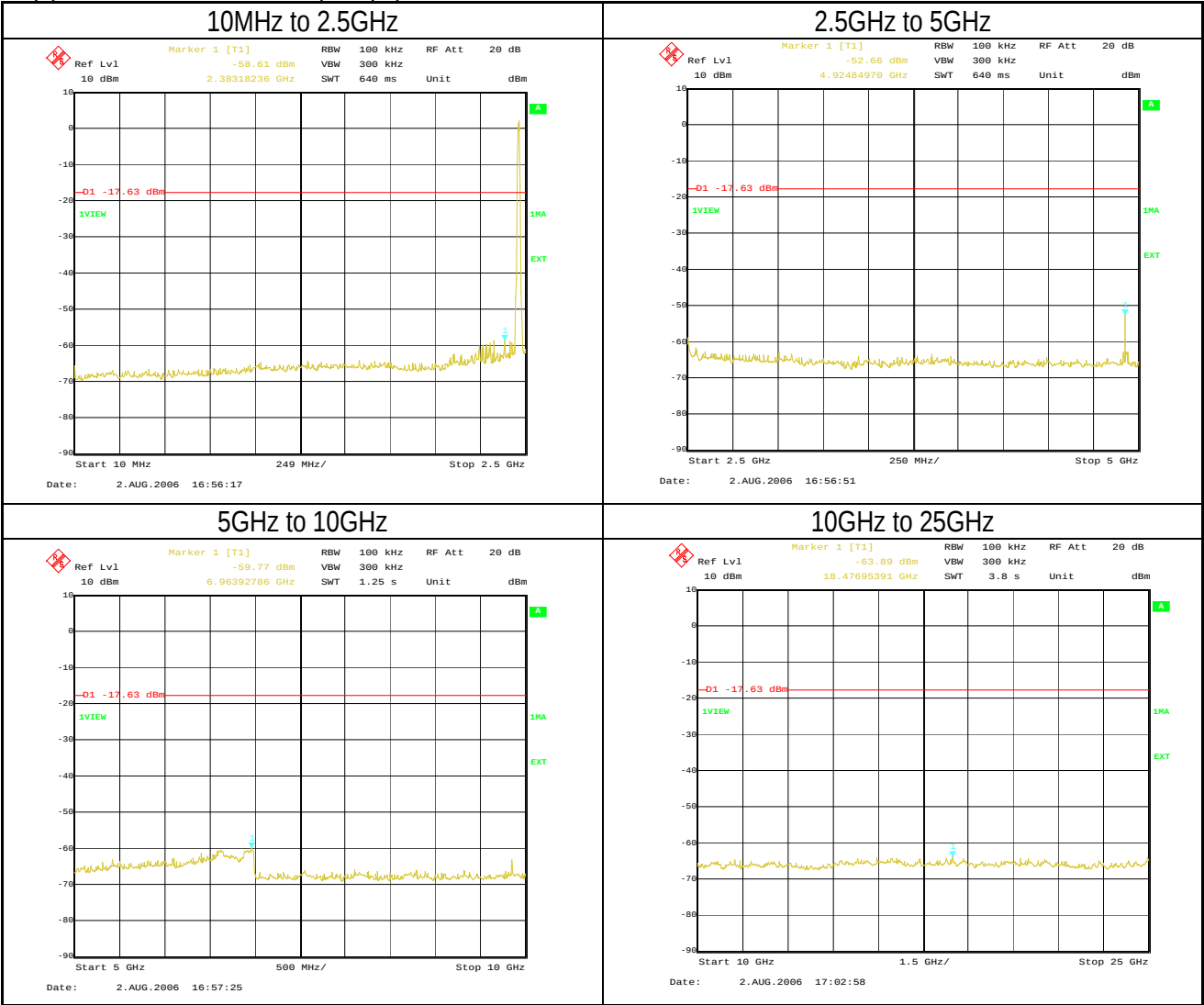
(1) 802.11b Mode DBPSK (1Mbps): 2412MHz



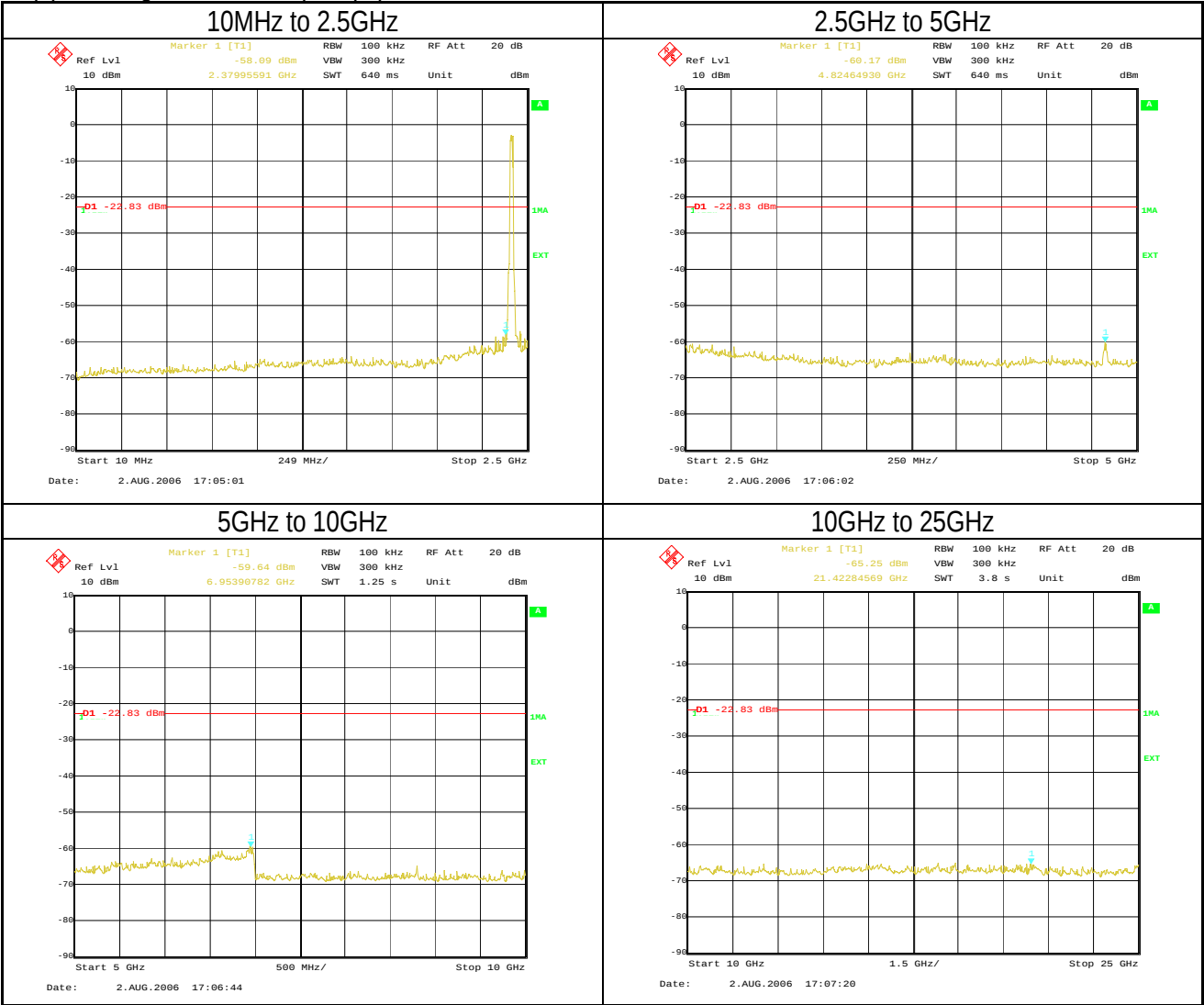
(2) 802.11b Mode DBPSK (1Mbps): 2437MHz



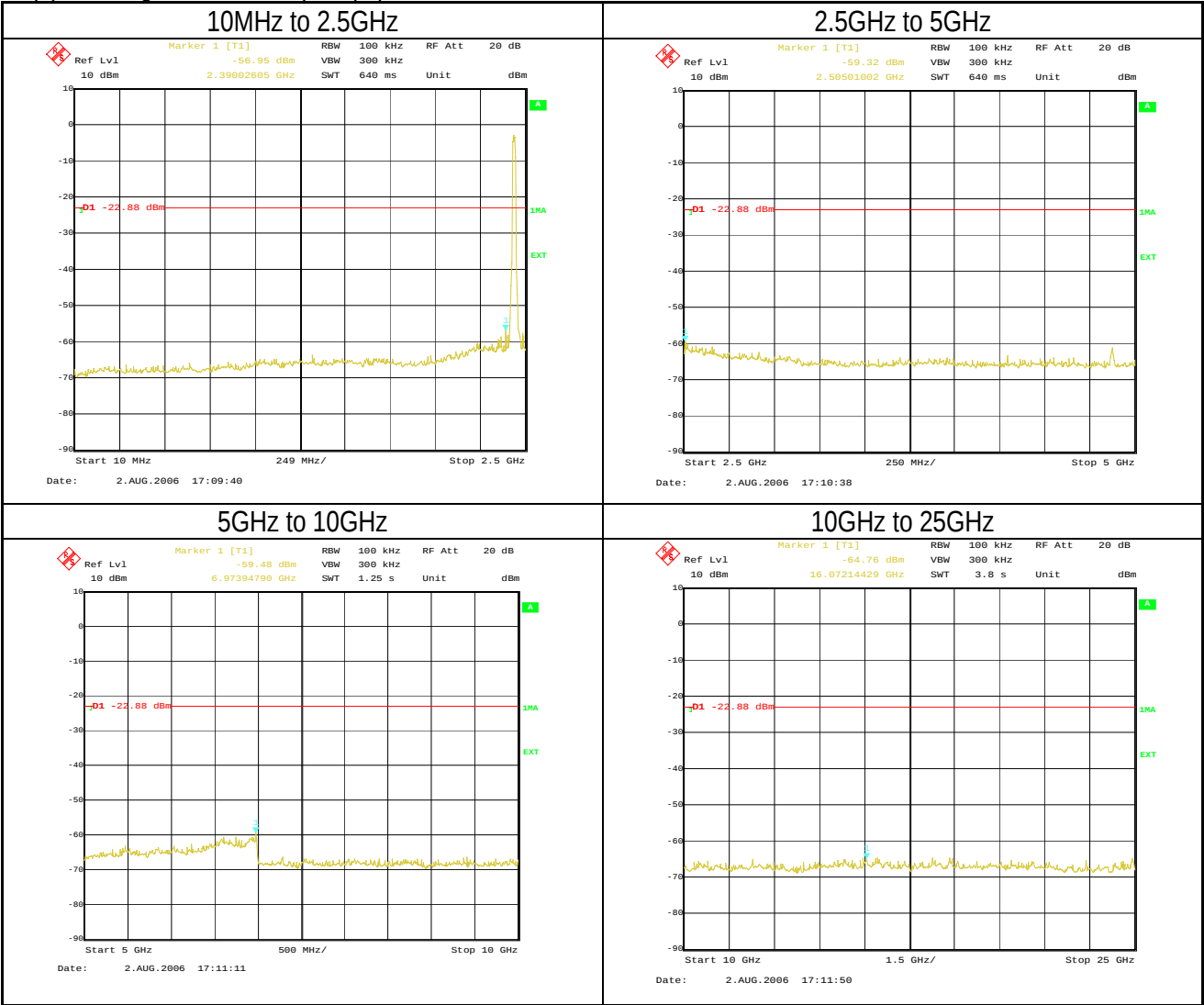
(3) 802.11b Mode DBPSK (1Mbps): 2462MHz



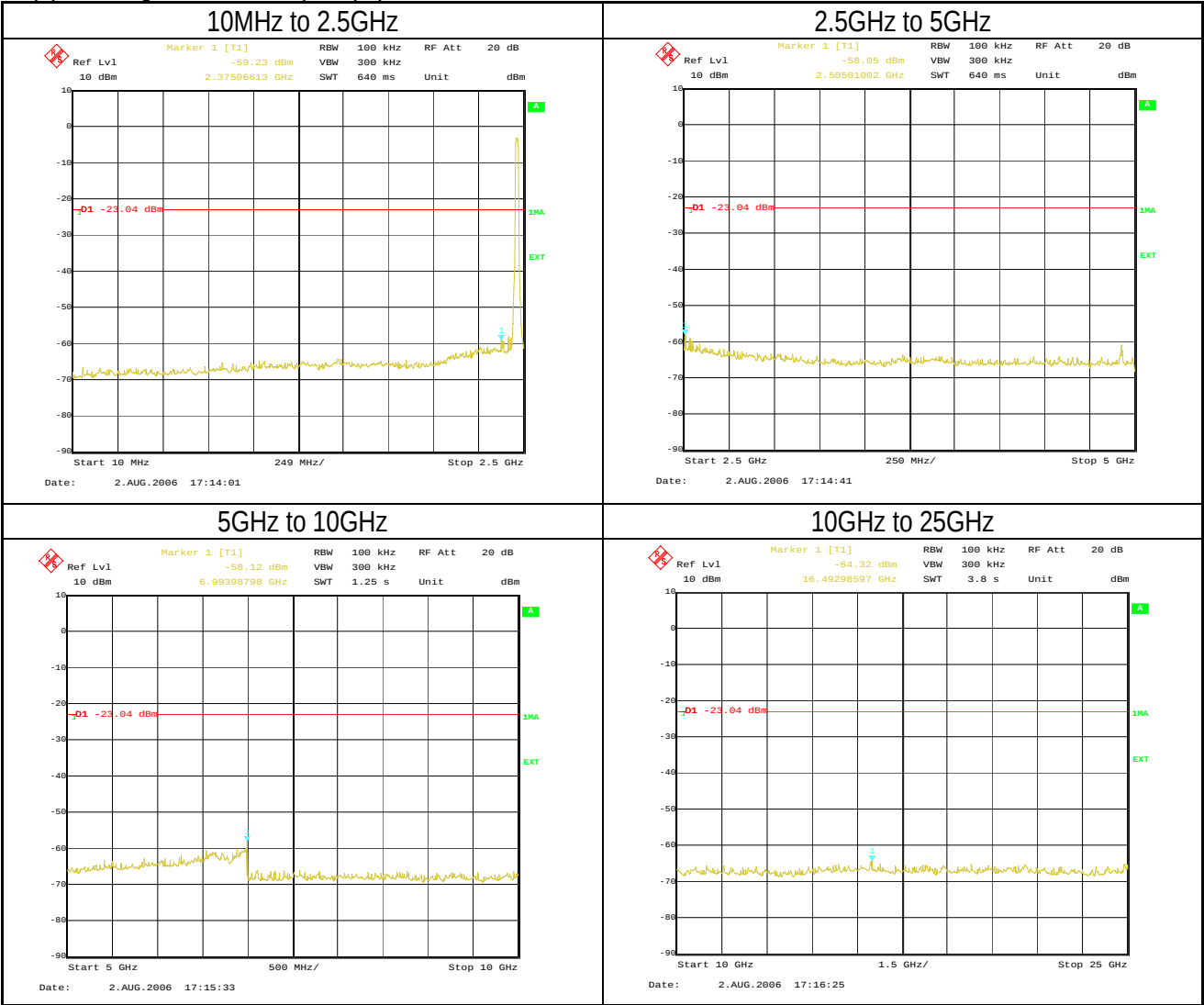
(4) 802.11g Mode BPSK (6Mbps): 2412MHz



(5) 802.11g Mode BPSK (6Mbps): 2437MHz



(6) 802.11g Mode BPSK (6Mbps): 2462MHz



## 12 PHOTOS OF TESTED EUT

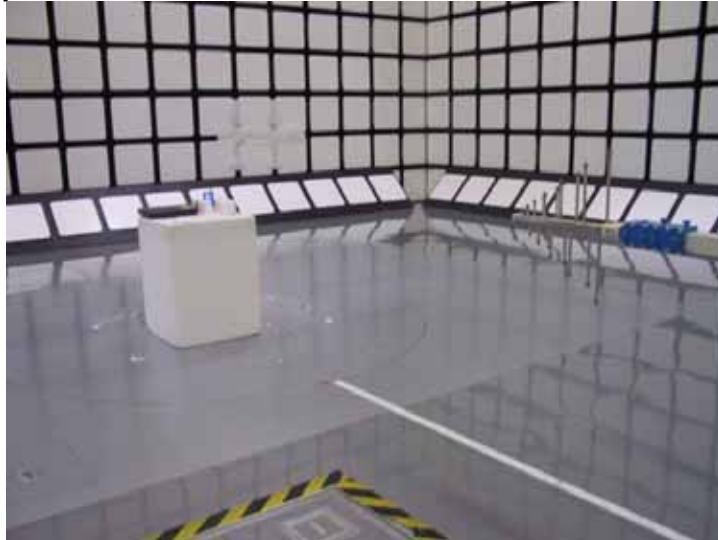
### 12.1 External Photos



## 13 PHOTOS OF TEST SETUP

### 13.1 Photos of Radiated Measurement

USB Power Supply



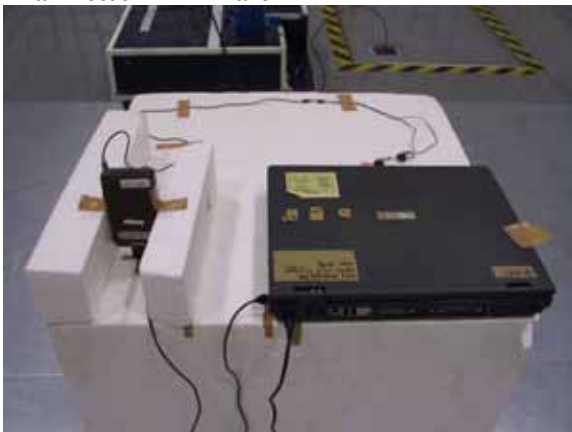
Axial Direction: XY-Plane



Axial Direction: YZ-Plane

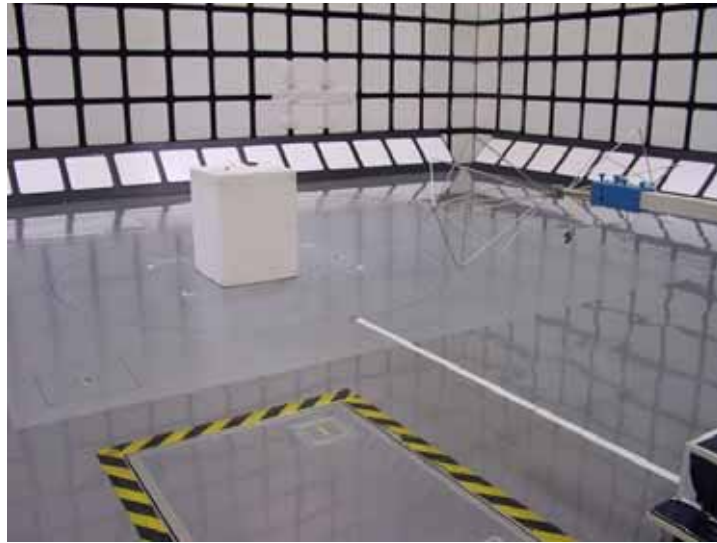


Axial Direction: ZX-Plane

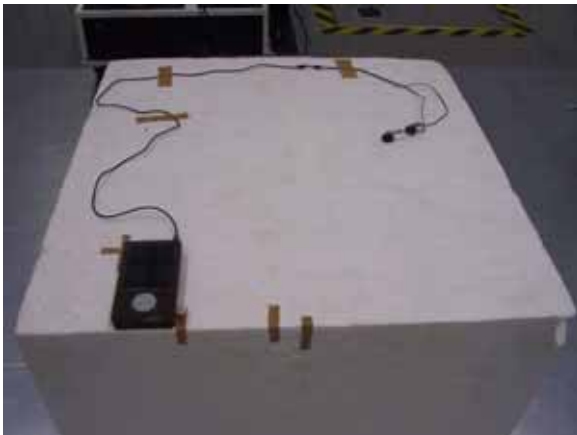


These photos show the instruments arrangement under testing, which records the maximum level of the radiation noise level.

## Battery Power Supply



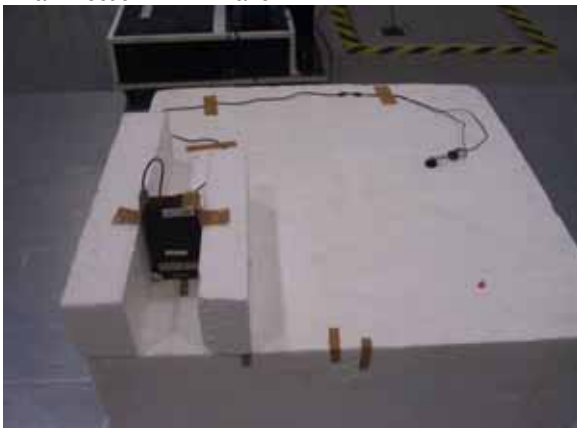
Axial Direction: XY-Plane



Axial Direction: YZ-Plane



Axial Direction: ZX-Plane



These photos show the instruments arrangement under testing, which records the maximum level of the radiation noise level.

## 13.2 Photos of Conducted Measurement



These photos show the instruments arrangement under testing, which records the maximum level of the radiation noise level.

## APPENDIX 1

**TOSHIBA**

**TOSHIBA CORPORATION**  
OME COMPLEX  
DIGITAL MEDIA NETWORK COMPANY  
2-9, SUEHIRO-CHO, OME, TOKYO 198-8710, JAPAN  
PHONE: +81(426)34-1050  
FACSIMILE: +81(426)30-7331

**Declaration of Identity**

We, Toshiba Corporation, hereby declare that these models described below product list are identical except color of enclosure and these color difference has no effect on electrical and RF characteristics.

**Product list**

Product name: HDD portable audio player

| Model No. | Body color |
|-----------|------------|
| 1089      | Black      |
| 1090      | White      |
| 1091      | Brown      |

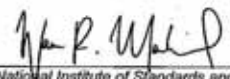
Sincerely,

  
K. Hoshino, Group Manager

Development & Design Group 1  
Mobile & Giga Technical Development Dept.  
Mobile Entertainment Products Div.  
Toshiba Corporation

Date: 9<sup>th</sup> August, 2006

## APPENDIX 2

|                                                                                                                                                                                                                                                                                                        |                                                                                     |                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| United States Department of Commerce<br>National Institute of Standards and Technology                                                                                                                                                                                                                 |                                                                                     | <b>COPY</b>                                                                                                                                     |
| <b>NVLAP<sup>®</sup></b>                                                                                                                                                                                                                                                                               |                                                                                     |                                                                                                                                                 |
| <b>Certificate of Accreditation to ISO/IEC 17025:1999</b>                                                                                                                                                                                                                                              |                                                                                     |                                                                                                                                                 |
| NVLAP LAB CODE: 200607-0                                                                                                                                                                                                                                                                               |                                                                                     |                                                                                                                                                 |
| <b>Taiyo Yuden Co., Ltd. EMC Center</b><br>Gunma-gun Gunma 370-3347<br>JAPAN                                                                                                                                                                                                                           |                                                                                     |                                                                                                                                                 |
| <i>is recognized by the National Voluntary Laboratory Accreditation Program for conformance with criteria set forth in<br/>NIST Handbook 150:2001 and all requirements of ISO/IEC Guide 17025:1999.<br/>Accreditation is granted for specific services, listed on the Scope of Accreditation, for:</i> |                                                                                     |                                                                                                                                                 |
| <b>ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS</b>                                                                                                                                                                                                                                            |                                                                                     |                                                                                                                                                 |
| 2005-10-01 through 2006-09-30<br>Effective dates                                                                                                                                                                                                                                                       |  | <br>For the National Institute of Standards and Technology |

NVLAP-01C (REV. 2005-05-19)