# RADIO TEST REPORT

## Test Report No. : 29IE0011-HO-01-C

| | | |
|---|---|---|
| **Applicant** | : | **FUJITSU FRONTECH LIMITED** |
| **Type of Equipment** | : | **B-PAD** |
| **Model No.** | : | **FWT33E2WR** |
| **FCC ID** | : | **XGP-BPAD06** |
| **Test regulation** | : | **FCC Part 15 Subpart C 2009 Section 15.207, Section 15.247** |
| **Test Result** | : | **Complied** |

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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**Date of test:** April 27 to June 2, 2009

**Tested by:**

Hironobu Ohnishi
EMC Services

Takeshi Choda
EMC Services

**Approved by :**

Tetsuo Maeno
Site Manager of EMC Services

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## SECTION 1: Customer information

| | | |
|---|---|---|
| Company Name | : | FUJITSU FRONTECH LIMITED |
| Address | : | 1776 Yanokuchi, Inagi-shi, Tokyo 206-8555, Japan |
| Telephone Number | : | +81-42-377-0646 |
| Facsimile Number | : | +81-42-378-9765 |
| Contact Person | : | Hiroki Kishimoto |

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

### 2.1 Identification of E.U.T.

| | | |
|---|---|---|
| Type of Equipment | : | B-PAD |
| Model No. | : | FWT33E2WR |
| Serial No. | : | Refer to Clause 4.2 |
| Rating | : | AC100 - 240V, DC3.7V (Battery) |
| Receipt Date of Sample | : | April 18, 2009 |
| Country of Mass-production | : | Japan |
| Condition of EUT | : | Production prototype<br>(Not for Sale: This sample is equivalent to mass-produced items.) |
| Modification of EUT | : | No Modification by the test lab |

## 2.2 Product Description

Model No: FWT33E2WR (referred to as the EUT in this report) is the B-PAD.
The EUT contains IEEE802.11b/g Wireless LAN and Bluetooth modules. Those modules do not transmit simultaneously.
This EUT has variant models, IPAD100-xx and FWT3xxxxR.
'xx', 'xxxx' is described by '0-9', 'A-Z' which is distinguished by country of destination, adapting to PCI v1.3 or not.
And here is no influence in the product property.

**General Specification**

Clock frequencies of the EUT are as follows;

| | |
|---|---|
| CPU | 520MHz, 13MHz, 125MHz, 32.768kHz |
| 3.5 inch TFT color transmissive LCD (320x240 pixel), LED back light, touch panel | 6.25MHz |
| Built in numeric keypad | 4.033355MHz |
| Audio Codec | 24.576MHz |
| CF Card | 48MHz |
| Integrated Magnetic Card Reader | 4.915MHz |
| IEEE802.11b/g Wireless LAN Module | 40MHz |
| Bluetooth Module | 16MHz, 32.768kHz |

**Radio Specification**

| | | IEEE802.11b/g Wireless LAN |
|---|---|---|
| **Frequency band** | **Lower limit** | 2412MHz |
| | **Upper limit** | 2462MHz |
| **Type of Modulation** | | DSSS, OFDM |
| **Antenna Type** | | λ/4 dielectric chip antenna |
| **Antenna Connector Type** | | W. FL |
| **Antenna Gain** | | 1.8dBi |
| **ITU code** | | G1D(DSSS), D1D(OFDM) |
| **Power Supply (Inner)** | | DC 3.3V |

* For IEEE802.11b/g Wireless LAN module test, please see UL Japan Test Report No. 29IE0011-HO-01-A.

| | | Bluetooth |
|---|---|---|
| **Frequency band** | **Lower limit** | 2402MHz |
| | **Upper limit** | 2480MHz |
| **Bandwidth & Channel spacing** | | 1MHz & 1MHz / CH |
| **Type of Modulation** | | FHSS |
| **Antenna Type** | | λ/4 dielectric chip antenna |
| **Antenna Connector Type** | | U. FL |
| **Antenna Gain** | | -4.3dBi |
| **ITU code** | | F1D |
| **Power Supply (Inner)** | | DC 3.3V |

# SECTION 3: Test specification, procedures & results

## 3.1 Test Specification

| | | |
|---|---|---|
| Test Specification | : | FCC Part15 Subpart C: 2009, final revised on February 27, 2009 |
| Title | : | FCC 47CFR Part15 Radio Frequency Devices Subpart C Intentional Radiators<br>Section 15.207 Conducted limits<br>Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz |

* The EUT complies with FCC Part 15 Subpart B: 2009, final revised on February 27, 2009.

### 3.2 Procedures and results

**[FHSS]**

| No. | Item | Test Procedure | Specification | Remarks | Deviation | Worst Margin | Results |
|---|---|---|---|---|---|---|---|
| 1 | Conducted emission | **FCC:** ANSI C63.4:2003 7. AC powerline conducted emission measurements | **FCC:** Section 15.207 | Conducted | N/A | **[Tx]** QP 18.1dB 0.19280MHz, L AV 16.7dB 0.45763MHz, L **[Rx]** QP 19.3dB 0.19290MHz, N AV 17.7dB 0.19290MHz, N | Complied |
| | | **IC:** RSS-Gen 7.2.2 | **IC:** RSS-Gen 7.2.2 | | | | |
| 2 | Carrier Frequency Separation | **FCC:** FCC Public Notice DA 00-705 | **FCC:** Section15.247(a)(1) | Conducted | N/A | See data. | Complied |
| | | **IC:** - | **IC:** RSS-210 A8.1 (b) | | | | |
| 3 | 20dB Bandwidth | **FCC:** FCC Public Notice DA 00-705 | **FCC:** Section15.247(a)(1) | Conducted | N/A | | N/A |
| | | **IC:** - | **IC:** RSS-210 A8.1 (a) | | | | |
| 4 | Number of Hopping Frequency | **FCC:** FCC Public Notice DA 00-705 | **FCC:** Section15.247(a)(1)(iii) | Conducted | N/A | | Complied |
| | | **IC:** - | **IC:** RSS-210 A8.1 (d) | | | | |
| 5 | Dwell time | **FCC:** FCC Public Notice DA 00-705 | **FCC:** Section15.247(a)(1)(iii) | Conducted | N/A | | Complied |
| | | **IC:** - | **IC:** RSS-210 A8.1 (d) | | | | |
| 6 | Maximum Peak Output Power | **FCC:** FCC Public Notice DA 00-705 | **FCC:** Section15.247(b)(1) | Conducted | N/A | | Complied |
| | | **IC:** RSS-Gen 4.8 | **IC:** RSS-210 A8.4 (2) | | | | |
| 7 | Band Edge Compliance | **FCC:** FCC Public Notice DA 00-705 | **FCC:** Section15.247(d) | Conducted | N/A | | Complied |
| | | **IC:** - | **IC:** RSS-210 A8.5 | | | | |
| 8 | Spurious Emission | **FCC:** FCC Public Notice DA 00-705 | **FCC:** Section15.247(d) | Conducted/ Radiated | N/A | **[Tx]** 4.3dB 4960.0MHz, AV, Vertical **[Rx]** 7.0dB 287.522MHz, QP, Horizontal | Complied |
| | | **IC:** RSS-Gen 4.9 RSS-Gen 4.10 | **IC:** RSS-210 A8.5 RSS-Gen 7.2.1 and 7.2.3 | | | | |
| Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15. | | | | | | | |

* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

### 3.3 Addition to standard

| No. | Item | Test Procedure | Specification | Remarks | Deviation | Worst margin | Results |
|---|---|---|---|---|---|---|---|
| 1 | 99% Occupied Band Width | RSS-Gen 4.6.1 | RSS-Gen 4.6.1 | Radiated | N/A | N/A | N/A |

Other than above, no addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

**EMI**

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

| Test room (semi-anechoic chamber) | Conducted emission (±dB) |
|---|---|
| | 150kHz-30MHz |
| No.1 | 3.7dB |
| No.2 | 3.7dB |
| No.3 | 3.7dB |
| No.4 | 3.7dB |

| Test room (semi-anechoic chamber) | Radiated emission (10m*)(±dB) | | | Radiated emission (3m*)(±dB) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 9kHz-30MHz | 30MHz-300MHz | 300MHz-1GHz | 9kHz-30MHz | 30MHz-300MHz | 300MHz-1GHz | 1GHz-18GHz | 18GHz-26.5GHz | 26.5GHz-40GHz |
| No.1 | 3.1dB | 4.4dB | 3.9dB | 3.2dB | 3.8dB | 3.9dB | 5.0dB | 5.0dB | 5.4dB |
| No.2 | - | - | - | 3.2dB | 4.4dB | 4.0dB | 5.0dB | 5.2dB | 5.4dB |
| No.3 | - | - | - | 3.2dB | 4.2dB | 3.8dB | 5.0dB | 5.3dB | 5.3dB |
| No.4 | - | - | - | 3.2dB | 4.0dB | 3.8dB | 5.0dB | 5.3dB | 5.3dB |

*10m/3m = Measurement distance

| Power meter (±dB) | |
|---|---|
| Below 1GHz | Above 1GHz |
| 1.0dB | 1.0dB |

| Antenna terminal conducted emission and Power density (±dB) | | | Antenna terminal conducted emission (±dB) | | Channel power (±dB) |
|---|---|---|---|---|---|
| Below 1GHz | 1GHz-3GHz | 3GHz-18GHz | 18GHz-26.5GHz | 26.5GHz-40GHz | |
| 1.0dB | 1.1dB | 2.7dB | 3.2dB | 3.3dB | 1.5dB |

Conducted emission test

The data listed in this test report has enough margin, more than the site margin.(Tx/Rx)

Radiated emission test(3m)

The data listed in this test report has enough margin, more than the site margin. (Rx)
The data listed in this report meets the limits unless the uncertainty is taken into consideration. (Tx)

### 3.5 Test Location

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| | FCC Registration Number | IC Registration Number | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Other rooms |
|---|---|---|---|---|---|
| No.1 semi-anechoic chamber | 313583 | 2973C-1 | 19.2 x 11.2 x 7.7m | 7.0 x 6.0m | No.1 Power source room |
| No.2 semi-anechoic chamber | 655103 | 2973C-2 | 7.5 x 5.8 x 5.2m | 4.0 x 4.0m | - |
| No.3 semi-anechoic chamber | 148738 | 2973C-3 | 12.0 x 8.5 x 5.9m | 6.8 x 5.75m | No.3 Preparation room |
| No.3 shielded room | - | - | 4.0 x 6.0 x 2.7m | N/A | - |
| No.4 semi-anechoic chamber | 134570 | 2973C-4 | 12.0 x 8.5 x 5.9m | 6.8 x 5.75m | No.4 Preparation room |
| No.4 shielded room | - | - | 4.0 x 6.0 x 2.7m | N/A | - |
| No.5 semi-anechoic chamber | - | - | 6.0 x 6.0 x 3.9m | 6.0 x 6.0m | - |
| No.6 shielded room | - | - | 4.0 x 4.5 x 2.7m | 4.75 x 5.4 m | - |
| No.6 measurement room | - | - | 4.75 x 5.4 x 3.0m | 4.75 x 4.15 m | - |
| No.7 shielded room | - | - | 4.7 x 7.5 x 2.7m | 4.7 x 7.5m | - |
| No.8 measurement room | - | - | 3.1 x 5.0 x 2.7m | N/A | - |
| No.9 measurement room | - | - | 8.0 x 4.5 x 2.8m | 2.0 x 2.0m | - |
| No.10 measurement room | - | - | 2.6 x 2.8 x 2.5m | 2.4 x 2.4m | - |
| No.11 measurement room | - | - | 3.1 x 3.4 x 3.0m | 2.4 x 3.4m | - |

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

### 3.6 Test set up, Data of EMI, and Test instruments

Refer to APPENDIX.

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

## 4.1 Operating Mode(s)

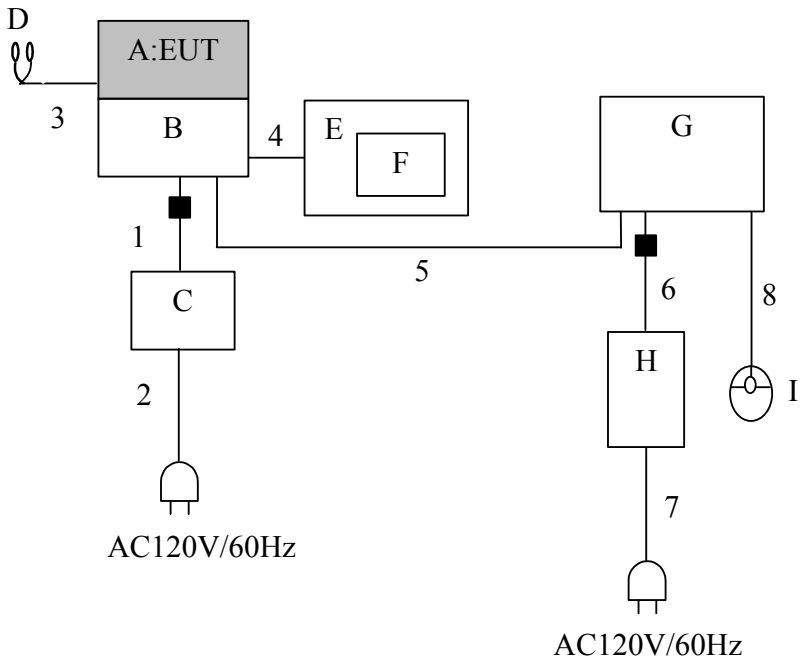
Bluetooth (BT): Transmitting (Tx), Payload: PRBS9
Receiving (Rx)
Inquiry

*The details of Operating Mode(s)

| Test Item | Mode | Tested frequency |
|---|---|---|
| Conducted Emission,<br>Spurious Emission<br>(Conducted/Radiated) | Tx (Hopping off) DH5 | 2402MHz<br>2441MHz<br>2480MHz |
| | Rx | 2441MHz |
| Carrier Frequency Separation | Tx (Hopping on) DH5<br>Inquiry | 2402MHz<br>2441MHz<br>2480MHz |
| 20dB Bandwidth | Tx (Hopping off) DH5<br>Inquiry | 2402MHz<br>2441MHz<br>2480MHz |
| Number of Hopping Frequency | Tx (Hopping on) DH5<br>Inquiry | - |
| Dwell time | Tx (Hopping on),<br>-DH1, DH3, DH5<br>Inquiry | - |
| Maximum Peak Output Power | Tx (Hopping off) DH5<br>Inquiry | 2402MHz<br>2441MHz<br>2480MHz |
| Band Edge Compliance<br>(Conducted) | Tx DH5<br>-Hopping on<br>-Hopping off | 2402MHz<br>2480MHz |
| 99% Occupied Bandwidth | Tx DH5<br>-Hopping on<br>-Hopping off | 2402MHz<br>2441MHz<br>2480MHz |
| ∗As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) | | |

### 4.2 Configuration and peripherals

<For Conducted emission test>




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

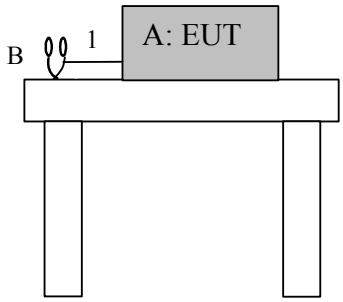
**Description of EUT and support equipment**

| No. | Item | Model number | Serial number | Manufacturer | Remarks |
|---|---|---|---|---|---|
| A | B-PAD | FWT33E2WR | 4 | FUJITSU FRONTECH LIMITED | EUT |
| B | Cradle | - | - | FUJITSU FRONTECH LIMITED | - |
| C | AC Adapter | CP360060-01 | 08601940A | FUJITSU LIMITED. | - |
| D | Earphone & Microphone | ATT-75 | - | audio-technica. | - |
| E | Battery Charger | FWTCA31R | - | FUJITSU LIMITED. | - |
| F | Li-ion Battery | CA50601-1000 | - | FUJITSU LIMITED. | - |
| G | PC | T23 ( = 2647-LJ3) | 97-ALT9W | IBM | - |
| H | AC Adapter | 02K6757 | 11S02K6750Z1Z2UP3561HY | IBM | - |
| I | Mouse | M-SAS51 | LZB92663446 | Logitech | - |

**List of cables used**

| No. | Name | Length (m) | Shield | | Remarks |
|---|---|---|---|---|---|
| | | | Cable | Connector | |
| 1 | DC Cable | 1.2 | Unshielded | Unshielded | Standard Ferrite Core x 1 |
| 2 | AC Cable | 1.9 | Unshielded | Unshielded | - |
| 3 | Signal Cable | 1.1 | Shielded | Shielded | - |
| 4 | DC Cable | 0.15 | Unshielded | Unshielded | - |
| 5 | USB Cable | 1.8 | Shielded | Shielded | - |
| 6 | DC Cable | 1.7 | Unshielded | Unshielded | Standard Ferrite Core x 1 |
| 7 | AC Cable | 1.9 | Unshielded | Unshielded | - |
| 8 | Signal Cable | 1.8 | Shielded | Shielded | - |

<For Radiated emission test>




*The test without Cradle had a worst noise level, so that the test was performed with above setup (without connecting USB cable).
*Setup(s) was taken into consideration and test data was taken under worse case conditions.

**Description of EUT and support equipment**

| No. | Item | Model number | Serial number | Manufacturer | Remarks |
|---|---|---|---|---|---|
| A | B-PAD | FWT33E2WR | 4 | FUJITSU FRONTECH LIMITED | EUT |
| B | Earphone & Microphone | ATT-75 | - | audio-technica. | - |

**List of cables used**

| No. | Name | Length (m) | Shield | | Remarks |
|---|---|---|---|---|---|
| | | | Cable | Connector | |
| 1 | Signal Cable | 1.1 | Shielded | Shielded | - |

## SECTION 5: Conducted Emission

**Test Procedure and conditions**

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

1) For the tests on EUT with other peripherals (as a whole system)
I/O cable and AC cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

**Detector : QP and AV**
**Measurement range : 0.15-30MHz**
**Test data : APPENDIX**
**Test result : Pass**

## SECTION 6: Radiated Spurious Emission

**Test Procedure**
EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.
The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m(Below 10GHz) and 1m(Upper 10GHz).
The height of the measuring varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The radiated emission measurements were made with the following detector function of the test receiver and the Spectrum analyzer.

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

**20dBc was applied to the frequency over the limit of FCC 15.209 / Table 2 of RSS-210 2.7 (IC) and outside the restricted band of FCC15.205 / Table 1 of RSS-210 2.7 (IC).**

| Frequency | Below 1GHz | Above 1GHz | |
|---|---|---|---|
| Instrument used | Test Receiver / Spectrum Analyzer | Spectrum Analyzer | |
| Detector | QP | PK | AV |
| IF Bandwidth | BW 120kHz(T/R) | RBW: 1MHz<br>VBW: 1MHz | RBW: 1MHz<br>VBW: 10Hz<br>or<br>RBW: 1MHz<br>VBW: 270Hz *1) |
| | 20dBc : RBW: 100kHz<br>VBW: 300kHz (S/A) | 20dBc : RBW:100kHz/VBW:300kHz | |
| Test Distance | 3m | 3m (below 10GHz),<br>1m*2) (above 10GHz),<br>0.5m*3) (above 26.5GHz) | |

*1) Used for the band edge of the carrier and the harmonics that can be measured. The VBW is based on the inverse of the duty cycle (see Page 32).
*2) Distance Factor: 20 x log (3.0m/1.0m) = 9.5dB
*3) Distance Factor: 20 x log (3.0m/0.5m) = 15.6dB

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT without Cradle and EUT on cradle to see the position of maximum noise, and the test was made at the position that has the maximum noise.

**Measurement range : 30M-25GHz**
**Test data : APPENDIX 2**
**Test result : Pass**

# SECTION 7: Antenna Terminal Conducted Tests

**Test Procedure**

The tests were made with below setting connected to the antenna port.

| Test | Span | RBW | VBW | Sweep time | Detector | Trace | Instrument used |
|---|---|---|---|---|---|---|---|
| 20dB Bandwidth | 2.5MHz or 3MHz | 30kHz | 91kHz | Auto | Peak | Max Hold | Spectrum Analyzer |
| 99% Occupied Bandwidth | Enough width to display 20dB Bandwidth | 1 to 3% of Span | Three times of RBW | Auto | Peak | Max Hold | Spectrum Analyzer |
| Maximum Peak Output Power | - | - | - | Including enough Duty Cycle | Peak | - | Power Meter (Sensor: 50MHz BW) |
| Carrier Frequency Separation | 3MHz or 5MHz | 100kHz | 300kHz | Auto | Peak | Max Hold | Spectrum Analyzer |
| Number of Hopping Frequency | 30MHz | 300kHz | 1MHz | Auto | Peak | Max Hold | Spectrum Analyzer |
| Dwell Time | Zero Span | 1MHz | 1MHz | As necessary capture the entire dwell time per hopping channel | Peak | Max Hold | Spectrum Analyzer |
| Conducted Spurious Emission | Less or equal to 5GHz (Range: 30MHz-25GHz) | 100kHz | 300kHz | Auto | Peak | Max Hold | Spectrum Analyzer |

The test results and limit are rounded off to two decimals place, so some differences might be observed.

**Test data : APPENDIX**
**Test result : Pass**