

**FCC CFR47 PART 15 SUBPART C  
CERTIFICATION**



**TEST REPORT**

**FOR**

**TOUCH SCREEN PLATFORM WITH  
802.11A/B COMBO WIRELESS LAN MODULE  
(WITH OPTION CO-WORKING WITH BLUETOOTH CARD)**

**MODEL: PP350X-XXXXXX**

**FCC ID: CJ6UPP350WL2**

**REPORT NUMBER: 02U1584-2**

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## 1. TEST RESULT CERTIFICATION

**COMPANY NAME:** TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY  
2-9, SUEHIRO-CHO, OME  
TOKYO, 198-8710 JAPAN

**EUT DESCRIPTION:** TOUCH SCREEN PLATFORM WITH 802.11A/B COMBO  
WIRELESS LAN MODULE (WITH OPTION CO-WORKING WITH  
BLUETOOTH CARD)

**MODEL:** PP350X-XXXXX

**DATE TESTED:** DECEMBER 12 – JANUARY 17, 2003

| APPLICABLE STANDARDS     |                         |
|--------------------------|-------------------------|
| STANDARD                 | TEST RESULTS            |
| FCC 15 Subpart E, 15.407 | NO NON-COMPLIANCE NOTED |

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note 1:** This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

**Note 2:** This report documents the collocation performance of the two transceiver modules; Section 2 below lists the cross reference to other reports that document the performance of the separate modules and the laptop as a digital device.

**Note 3:** The 5.2 GHz band is applicable to this report; other bands of operation (2.4 GHz and 5.8 GHz) are documented in a separate report

Approved & Released For CCS By:

Tested By:



MIKE HECKROTTE  
CHIEF ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

NEELESH RAJ  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. CROSS REFERENCES TO OTHER APPLICABLE REPORTS

The Bluetooth Transmitter Module has a limited module approval under FCC ID: CJ6UPA3232BT.

The WLAN Transmitter Module has a limited module approval under FCC ID CJ6UPA3233WL.

The performance of the Laptop, with respect to AC Mains Line Conducted emissions and radiated emissions as a Digital Device, is documented by Toshiba Document Number OFD-H3395 dated October 18, 2002.

## 3. DESCRIPTION OF EUT

The EUT is a Touch Screen Platform with 802.11a/B Combo Wireless Lan Module (With Option Co-Working with Bluetooth Card).

The WLAN module is an 802.11 a/b wireless Spread Spectrum transceiver. This unit provides a power output of +17 dBm (50 mW) in the 5150 – 5350 MHz band. It is designed to use two dual band inverted F film antennas. A single antenna is used for transmit. Both antennas are used for receive diversity. The highest intended antenna gain is 4.8 dBi.

The CSR Bluetooth module is a wireless Frequency Hopping Spread Spectrum transceiver that operates from 2402 – 2480 MHz. This unit provides a maximum power output of +1.4 dBm (1.38 mW) and is connected to an internal film antenna with a 1.22 dBi gain.

## 4. TEST METHODOLOGY

Conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.407.

## 5. FACILITIES AND ACCREDITATION

### 5.1. FACILITIES AND EQUIPMENT

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specifications for "Radio Interference Measuring Apparatus and Measurement Methods," Publication 16.

### 5.2. LABORATORY ACCREDITATIONS AND LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2)).

### 5.3. TABLE OF ACCREDITATIONS AND LISTINGS

| Country | Agency          | Scope of Accreditation                                                                                                                                                                                                          | Logo                                                                                                         |
|---------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| USA     | NVLAP*          | FCC Part 15, CISPR 22, AS/NZS 3548, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438                                                                         | <br>200065-0              |
| USA     | FCC             | 3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements                                                                                                                                                          | <br>1300                  |
| Japan   | VCCI            | CISPR 22 Two OATS and one conducted Site                                                                                                                                                                                        | <br>R-1014, R-619, C-640  |
| Norway  | NEMKO           | EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1 |  ELA 117                  |
| Norway  | NEMKO           | EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC                                                                                                           |  ELA-171                 |
| Taiwan  | BSMI            | CNS 13438                                                                                                                                                                                                                       | <br>SL2-IN-E-1012       |
| Canada  | Industry Canada | RSS210 Low Power Transmitter and Receiver                                                                                                                                                                                       | <br>IC2324 A,B,C, and F |

\* No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

## 6. CALIBRATION AND UNCERTAINTY

### 6.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 6.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Radiated Emission             |             |
|-------------------------------|-------------|
| 30MHz – 200 MHz               | +/- 3.3dB   |
| 200MHz – 1000MHz              | +4.5/-2.9dB |
| 1000MHz – 2000MHz             | +4.6/-2.2dB |
| Power Line Conducted Emission |             |
| 150kHz – 30MHz                | +/-2.9      |

Any results falling within the above values are deemed to be marginal.

### 6.3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST AND MEASUREMENT EQUIPMENT LIST |               |             |               |                      |
|-------------------------------------|---------------|-------------|---------------|----------------------|
| Name of Equipment                   | Manufacturer  | Model       | Serial Number | Calibration Due Date |
| Spectrum Analyzer                   | HP            | 8566B       | 3014A06685    | 6/1/03               |
| Spectrum Display                    | HP            | 85662A      | 2152A03066    | 6/1/03               |
| Quasi-Peak Detector                 | HP            | 85650A      | 3145A01654    | 6/1/03               |
| Spectrum Analyzer                   | HP            | 8593EM      | 3710A00205    | 6/11/03              |
| Preamplifier (1 - 26.5GHz)          | Miteq         | NSP10023988 | 646456        | 4/26/03              |
| Horn Antenna (1 - 18GHz)            | EMCO          | 3115        | 6717          | 1/31/03              |
| Horn Antenna (18 - 26.5GHz)         | ARA           | MWH 1826/B  | 1049          | 11/7/03              |
| High Pass Filter (4.57GHz)          | FSY Microwave | FM-4570-9SS | 003           | N.C.R.               |

## 7. SETUP OF EQUIPMENT UNDER TEST

### SUPPORT EQUIPMENT

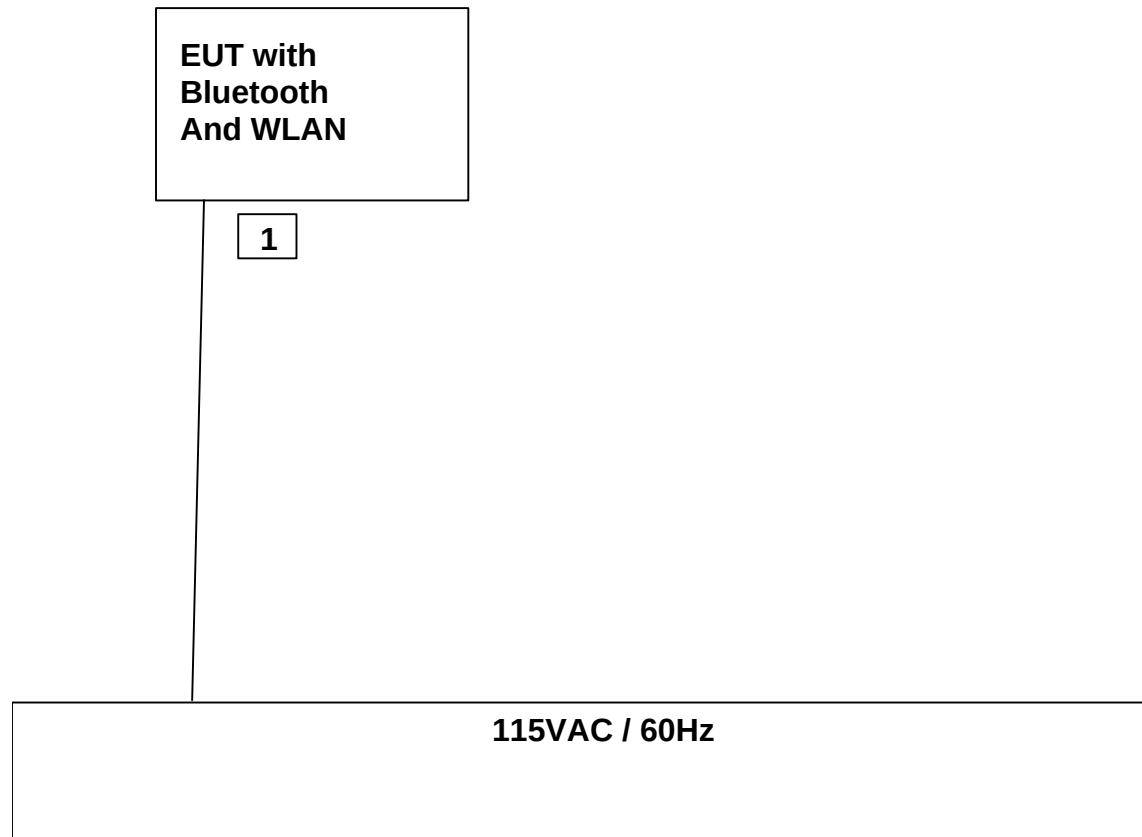
| PERIPHERAL SUPPORT EQUIPMENT LIST |              |              |               |                 |
|-----------------------------------|--------------|--------------|---------------|-----------------|
| Device Type                       | Manufacturer | Model        | Serial Number | FCC ID          |
| Touch Screen Platform             | Toshiba      | Portege 3500 | 92027903      | Prototype / EUT |
| AC Adapter                        | Toshiba      | PA3083U-1ACA | 1230257G      | DoC             |

### I/O CABLES

| Cable No. | Port | # of Identical Ports | Connector Type | Cable Type | Cable Length | Remarks                    |
|-----------|------|----------------------|----------------|------------|--------------|----------------------------|
| 1         | AC   | 1                    | US115          | Unshielded | 2 m          | Integrated with AC Adapter |

### TEST SETUP

The Bluetooth transceiver in the EUT is operated in a standalone mode by a utility program. The WLAN transceiver in the EUT is also operated in a standalone mode by a utility program.

**SETUP DIAGRAM FOR TRANSMITTER TESTS**

## 8. APPLICABLE RULES

### §15.247 (c)- SPURIOUS EMISSIONS

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### §15.205- RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                        | MHz                   | MHz             | GHz              |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525   | 608 - 614       | 5.35 - 5.46      |
| 2.1735 - 2.1905            | 16.80425 - 16.80475   | 960 - 1240      | 7.25 - 7.75      |
| 4.125 - 4.128              | 25.5 - 25.67          | 1300 - 1427     | 8.025 - 8.5      |
| 4.17725 - 4.17775          | 37.5 - 38.25          | 1435 - 1626.5   | 9.0 - 9.2        |
| 4.20725 - 4.20775          | 73 - 74.6             | 1645.5 - 1646.5 | 9.3 - 9.5        |
| 6.215 - 6.218              | 74.8 - 75.2           | 1660 - 1710     | 10.6 - 12.7      |
| 6.26775 - 6.26825          | 108 - 121.94          | 1718.8 - 1722.2 | 13.25 - 13.4     |
| 6.31175 - 6.31225          | 123 - 138             | 2200 - 2300     | 14.47 - 14.5     |
| 8.291 - 8.294              | 149.9 - 150.05        | 2310 - 2390     | 15.35 - 16.2     |
| 8.362 - 8.366              | 156.52475 - 156.52525 | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.7 - 156.9         | 2655 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475          | 162.0125 - 167.17     | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293             | 167.72 - 173.2        | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025        | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 322 - 335.4           | 3600 - 4400     | ( <sup>2</sup> ) |
| 13.36 - 13.41              |                       |                 |                  |

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

**§15.209- RADIATED EMISSION LIMITS**

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meters) |
|--------------------|--------------------------------------|----------------------------------|
| 30 - 88            | 100 **                               | 3                                |
| 88 - 216           | 150 **                               | 3                                |
| 216 - 960          | 200 **                               | 3                                |
| Above 960          | 500                                  | 3                                |

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

| Frequency Range<br>(MHz) | Field Strength<br>(uV/m at 3 m) | Field Strength<br>(dBuV/m at 3 m) |
|--------------------------|---------------------------------|-----------------------------------|
| 30-88                    | 100                             | 40                                |
| 88-216                   | 150                             | 43.5                              |
| 216-960                  | 200                             | 46                                |
| Above 960                | 500                             | 54                                |

## 9. TEST SETUP, PROCEDURE AND RESULT

### 9.1. UNDESIRABLE EMISSIONS – RADIATED MEASUREMENTS

#### TEST SETUP

The EUT is placed on the wooden table. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4/1992.

Both transmitters in the EUT are set to transmit simultaneously in a continuous mode.

#### TEST PROCEDURE

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

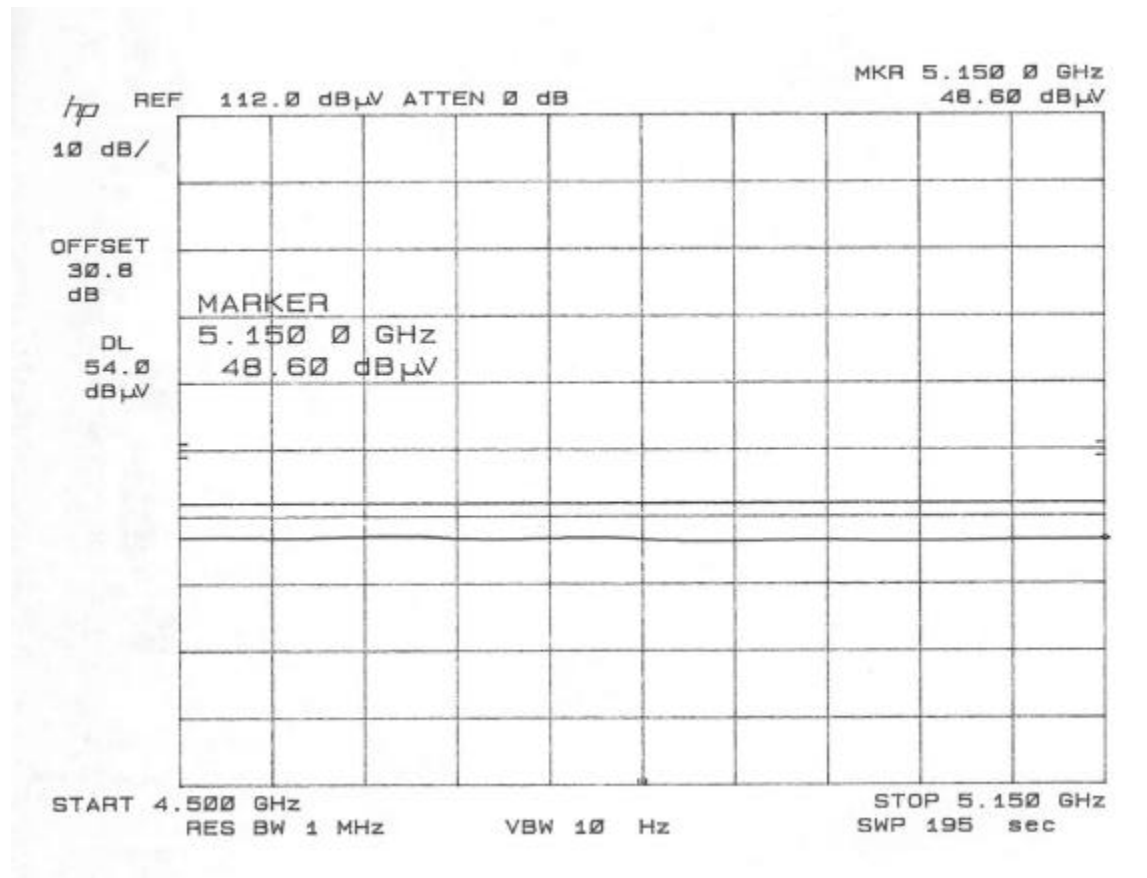
For measurements above 1 GHz within restricted bands, the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

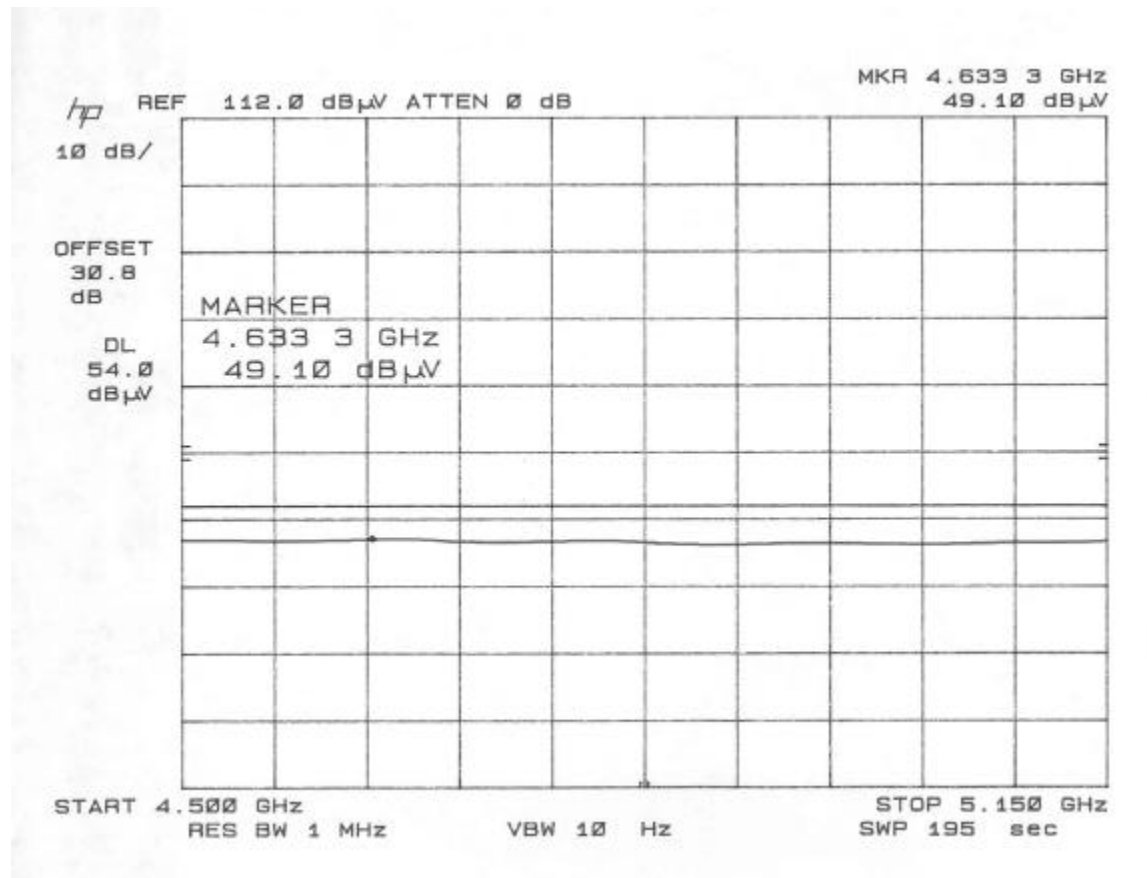
The spectrum from 30 MHz to 40 GHz is investigated.

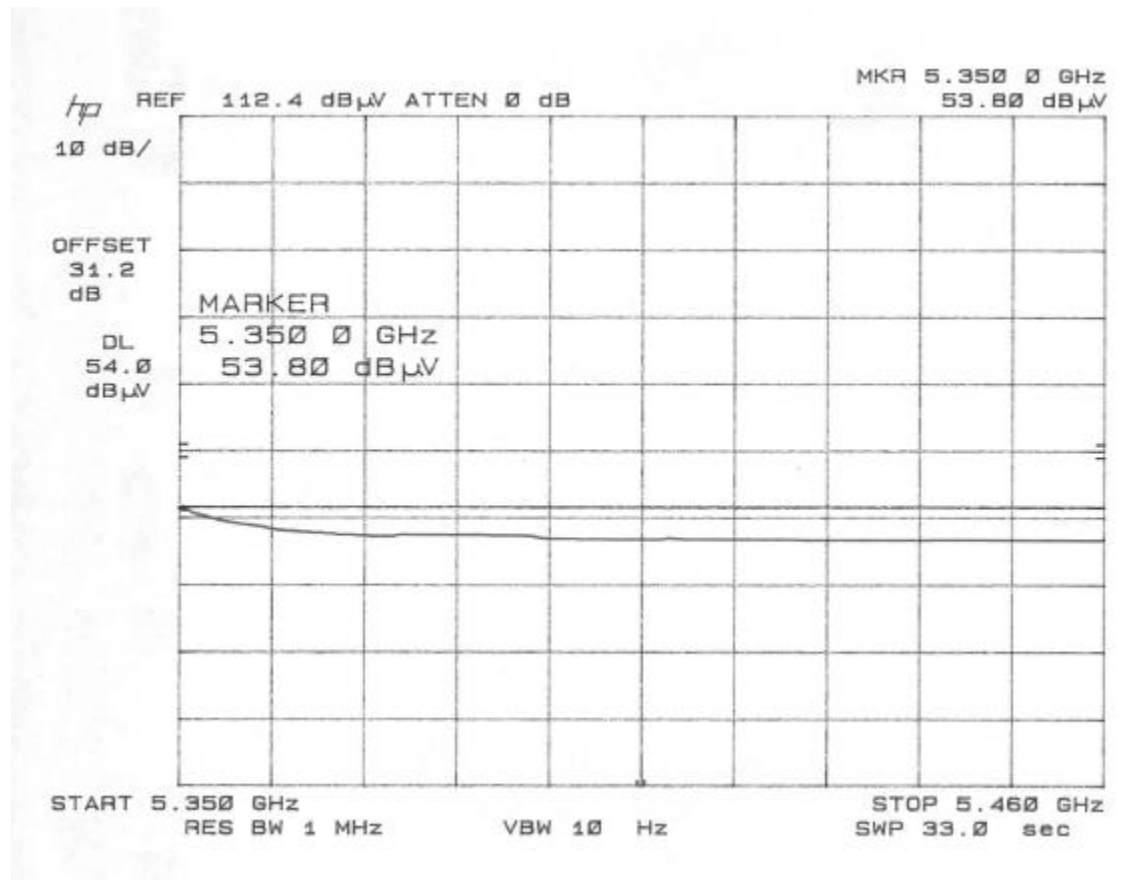
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The frequency span is set small enough to easily differentiate between broadcast stations, intermittent ambient signals and EUT emissions. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the suspected signal. Measurements were made with the antenna polarized in both the vertical and the horizontal positions.

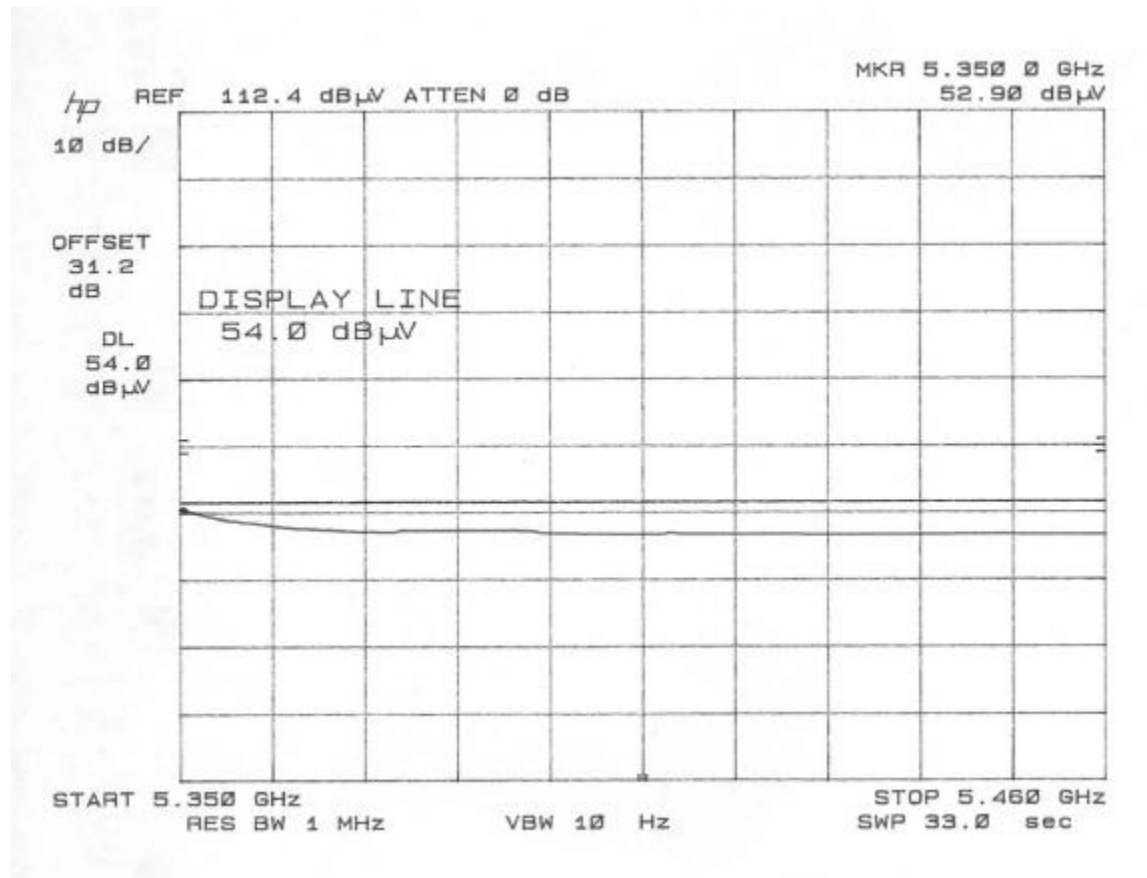
#### TEST RESULTS

Worst-case results are reported. No non-compliance noted:

**WORST CASE LOWER RESTRICTED BAND WITH CO-LOCATED BLUETOOTH – VERTICAL AVERAGE**

**WORST CASE LOWER RESTRICTED BAND WITH CO-LOCATED BLUETOOTH – HORIZONTAL AVERAGE**

**WORST CASE UPPER RESTRICTED BAND WITH CO-LOCATED BLUETOOTH - VERTICAL AVERAGE**

**WORST CASE UPPER RESTRICTED BAND WITH CO-LOCATED BLUETOOTH – HORIZONTAL AVERAGE**

**WORST CASE SPURIOUS RADIATED EMISSIONS WITH CO-LOCATED BLUETOOTH**

01/17/03 High Frequency Measurement

Compliance Certification Services, Morgan Hill Open Field Site

**Test Engr:** NEELESH RAJ  
**Project #:** 02U1584  
**Company:** TOSHIBA  
**EUT Descrip.:** TOUCH SCREEN LAPTOP PC WITH CSR BT AND 802.11 a/b COMBO WIRELESS LAN MODULE  
**EUT M/N:** NIMBUS  
**Test Target:** FCC  
**Mode Oper:** TX

**Test Equipment:**

| Cable (feet) | EMCO Horn 1-18GHz | Pre-amplifier 1-26GHz | Spectrum Analyzer | Horn > 18GHz |
|--------------|-------------------|-----------------------|-------------------|--------------|
| 15           | T73; S/N: 6717    | Miteq NSP2600-44      | 8566B Analyzer    |              |

**Peak Measurements:**

1 MHz Resolution Bandwidth  
1 MHz Video Bandwidth

**Average Measurements:**

1 MHz Resolution Bandwidth  
10Hz Video Bandwidth

| f GHz                                                                                            | Dist feet             | Read Pk dBuV | Read Avg. dBuV | AF dB/m | CL dB | Amp dB | D Corr dB                      | HPF | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB                    | Avg Mar dB | Notes |
|--------------------------------------------------------------------------------------------------|-----------------------|--------------|----------------|---------|-------|--------|--------------------------------|-----|-------------|------------|---------------|----------------|------------------------------|------------|-------|
| WLAN                                                                                             |                       |              |                |         |       |        |                                |     |             |            |               |                |                              |            |       |
| Worst case WLAN harmonic in 5.2 band: 5.32 GHz, Max Power + Blue tooth ON @ 2.466 GHz, Max Power |                       |              |                |         |       |        |                                |     |             |            |               |                |                              |            |       |
| 10.640                                                                                           | 3.3                   | 62.0         | 49.0           | 39.2    | 8.9   | -35.6  | -9.5                           | 1.0 | 66.0        | 53.0       | 74.0          | 54.0           | -8.0                         | -1.0       | V     |
| 10.640                                                                                           | 3.3                   | 58.4         | 46.9           | 39.2    | 8.9   | -35.6  | -9.5                           | 1.0 | 62.4        | 50.9       | 74.0          | 54.0           | -11.6                        | -3.1       | H     |
| f                                                                                                | Measurement Frequency |              |                |         |       | Amp    | Preamp Gain                    |     |             |            |               | Avg Lim        | Average Field Strength Limit |            |       |
| Dist                                                                                             | Distance to Antenna   |              |                |         |       | D Corr | Distance Correct to 3 meters   |     |             |            |               | Pk Lim         | Peak Field Strength Limit    |            |       |
| Read                                                                                             | Analyzer Reading      |              |                |         |       | Avg    | Average Field Strength @ 3 m   |     |             |            |               | Avg Mar        | Margin vs. Average Limit     |            |       |
| AF                                                                                               | Antenna Factor        |              |                |         |       | Peak   | Calculated Peak Field Strength |     |             |            |               | Pk Mar         | Margin vs. Peak Limit        |            |       |
| CL                                                                                               | Cable Loss            |              |                |         |       | HPF    | High Pass Filter               |     |             |            |               |                |                              |            |       |

## 9.2. SETUP PHOTOS





**END OF REPORT**