

Emission Test Report
Standard: FCC Part 15 Subpart C / IC RSS-210
(Class II Permissive Change)

Document Number : FCC 19-0284-0

Model Number: AR5BMB-44

FCC ID: ANO20040600BTL
IC: 349E-AR5BMB44

November 25, 2004

**Prepared :
EMC R&D Staff Engineer**

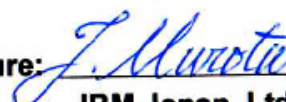
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MEASUREMENT / TECHNICAL REPORT – Part 15 Subpart C (Intentional Radiator)

FCC ID : ANO20040600BTL

**Model: AR5BMB-44 (802.11a/b/g Wireless LAN Adapter)
with**

IBM ThinkPad T40 Series

(Machine Type: 1871, 1875, 1873, 1874, 1875, 1876, 2373, 2374, 2375,
2376, 2378, 2379, 2668, 2669, 2678, 2679, 2686, 2687)

IBM ThinkPad R50 Series

(Machine Type: 1829, 1830, 1831, 1832, 1833, 1834, 1835, 1836, 1840,
1841, 1842, 2883, 2887, 2888, 2889, 2894, 2895)

IBM ThinkPad X30 Series

(Machine Type: 2672, 2673, 2884, 2885, 2890, 2891)

IBM ThinkPad X40 Series

(Machine Type: 2369, 2370, 2371, 2372, 2382, 2386)

November 25, 2004

This report concerns: (check one)

Original Grant ☐

Class I change ☐

Class II change ☒

Equipment type: Wireless LAN device

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The measurement results contained in this report relate only to the item which was tested.

Measurement procedure used is ANSI C63.4-2003 unless otherwise specified.

Other test procedure: _____

The FCC has issued provisional acceptance of this test laboratory for Declaration of Conformity testing per letter dated 1997.

APPLICANT ANTI-DRUG ABUSE CERTIFICATION:

By checking yes, the applicant certifies that, in the case of an individual applicant, he or she is not subject to a denial of federal benefits, that includes FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse of 1988, 21 U.S.C. 853(a), or, in the case of a non-individual applicant (e.g. corporation, partnership or other unincorporated association), no party to the application is subject to a denial of federal benefits, that includes FCC benefits, pursuant to that section. For the definition of a "party" for these purposes, see 47 CFR 1.2002(b).

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A. General Information

APPLICANT	: IBM Japan, Ltd.
TEST SITE	: IBM Japan, Ltd., Yamato Semi-anechoic chamber #1
TEST SITE ADDRESS	: 1623 – 14 Shimotsuruma, Yamato-shi, Kanagawa 242-8502 Japan Tel: +81-46-215-4779, Fax: +81-46-273-7420
REGULATION	: FCC Part 15 Subpart C Industry Canada RSS-210 (Issue No.5)
MODEL NUMBER (Advertising Name)	: AR5BMB-44 (IBM 11a/b/g Wireless LAN Mini PCI Adapter II)
FCC ID IC Certification Number	: ANO20040600BTL : 349E-AR5BMB44
SERIAL NUMBER	: 00S0SIT004
PHYSICAL CONDITION	: Preproduction
KIND OF EQUIPMENT	: Personal computer with a IEEE802.11a, 11b & 11g Wireless LAN Mini-PCI Combo Card (Composite application)
TESTED DATE	: November 2, 4, 8, 17 and 24, 2004

A.1 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

A.2 Test Facility / NVLAP Accreditation

The semi-anechoic chamber #1 used to correct the data are located in Yamato Laboratory, IBM Japan.

- This facility has been fully described in a report dated September 1998, submitted to the FCC office, and accepted in a letter, dated Nov. 2, 1998(31040/SIT).
- IBM Yamato EMC Engineering is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with Criteria established in Title 15, Part 285 Code of Federal Regulations.(**NVLAP Lab code: 200198-0**)
- These facilities are accepted by **Industry Canada** as number **IC 4221** for chamber #1 (expiry date: January 25, 2005), and as number **IC 4221-1** for chamber #2 (expiry date: February 16, 2007).

A.3 EUT details

Table A EUT details

Model and S/N	FCC ID IC Certification Number	Description
AR5BMB-44 (s/n 00S0SIT004)	FCC ID: ANO20040600BTL IC: 349E-AR5BMB44	Applying modular transmitter Built_in type IEEE802.11a/b/g Wireless LAN Mini-PCI card without antenna
ThinkPad R50 Series M/T 1829-38x (14 inch) (s/n ZZ-08189)		IBM Notebook PC with built_in antenna CPU: Intel® Pentium® M Processor, 1.5GHz
ThinkPad X40 Series M/T : 2371-SD1 (s/n SIT#15023)		IBM Notebook PC with built-in antenna CPU: Intel® Pentium M Processor, 1.4 GHz
J07M067 (s/n 05S5ARM4SIT023)	FCC ID: ANO20040700HER IC:349E-J07M067	Co-located built-in type Bluetooth modular transmitter device without antenna
P/N 02K6810	N/A	Universal AC adapter 56W, Unshielded power cord for ThinkPad X40 Series
P/N 02K6746		Universal AC adapter 72W, Unshielded power cord for ThinkPad R50 Series

B. Summary of Test Results

Table-B presents the list of the measurement items for DTS (Digital Transmissions System) devices under FCC Part 15 Subpart C and Industry Canada RSS-210.

The section numbers of upper portion are showing FCC number, and the other (lower) ones are for IC.

Table-B List of the measurements

Section(s)	Test Items : Transmit mode (TX):		Condition	Result
15.247(a)(2) 6.2.2(o) *1	Bandwidth at 6 dB below	At least 500kHz. (*1: RSS-210 Issue5: Amendment)	Conducted	Pass
15.215(c) 5.9.1	Occupied BW (Bandwidth at 20 dB below)	20 dB bandwidth of the emission to be within the allocation band.		Pass
15.247(c) 6.2.2(o)(e1)	Out of Band Emissions	The radiated emission in any 100kHz of outband shall be at least 20dB below the highest inband spectral density.		Pass
15.247(b)(3) 6.2.2(o)(b)	Conducted Peak Transmit Output Power	Shall not exceed 1.0 W.		Pass
15.247(d) 6.2.2(o)(b)	Transmitter power spectral Density	Shall not be greater than 8 dBm in any 3kHz band.		Pass
15.207 6.2.2(o)(e3) / 6.6	AC Wireline Conducted Emissions 150kHz – 30MHz	Class B: Freq.(MHz) QP(dBμV) Ave.(dBμV) 0.15 - 0.5 66 - 56 56 - 46 0.5 - 5 56 46 5 - 30 60 50		Pass
15.205 / 209 6.2.1 / 6.2.2(o)(e3) / 6.3	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Shall not exceed the limits specified in FCC 15.209 or RSS-210 Table3.	Radiated (30MHz-1GHz)	Pass
			Radiated (1– 25GHz)	Pass

	Test Items : Receive mode (RX):			
15.207 6.2.2(o)(e3) / 7.4	AC Wireline Conducted Emissions 150kHz – 30MHz	Class B: Freq.(MHz) QP(dBμV) Ave.(dBμV) 0.15 - 0.5 66 - 56 56 - 46 0.5 - 5 56 46 5 - 30 60 50	Conducted	Pass
15.205 / 209 6.2.1 / 6.2.2(o)(e3) / 7.3	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Shall not exceed the limits specified in FCC 15.209 or RSS-210 Table3.	Radiated (30MHz -1GHz)	Pass
			Radiated (1– 25GHz)	Pass

	Other requirements		Result
15.247(b)(4)(i) –	Antenna gain	Peak gain of the device : 1.67 dBi in 2.4GHz band, and 2.04dBi in 5.8GHz band	N/A
– 5.2	Supply Voltage	Main power source: Universal AC adapter 56W Mini-PCI PC bus to applying card : DC 3.3V ± 0.3V	N/A
15.203 6.2.2(o)(e2)	Unique antenna connector	The device employs an unique electronic connector so called Electronic Handshake . Refer to “Confidential_e-Handshake” exhibit.	complies

C. Operation Mode of EUT

1. All tests were performed using the “Atheros Radio Test” program. This tool supports the continuous transmission mode for the testing purpose.
2. The following frequencies were chosen for the measurements of each 2.4GHz or 5.8GHz band.
 - 2412MHz (lowest), 2437MHz(middle), and 2462MHz (highest) for 2.4GHz band
 - 5745MHz (lowest), 5785MHz(middle), and 5825MHz (highest) for 5.8GHz band
3. As for the RF receiving test, the middle channels (2437MHz or 5785MHz) were selected representatively.

Table-C Transmission mode of EUT

Note) The table shows the specification of **average** power for the applying device in ‘dBm’.

Operation Frequency [GHz]	Designed average output power (conducted) [dBm]										
	IEEE802.11b			IEEE802.11g							
	1/2M bps	5.5M bps	11M bps	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
2.412 (Ch. 1)	17	17	17	14	14	14	14	14	14	14	14
2.417 (Ch. 2)	18	18	18	17	17	17	17	17	17	15	14
2.422 (Ch. 3)	18	18	18	18	18	18	18	18	17	15	14
2.427 (Ch. 4)	18	18	18	18	18	18	18	18	17	15	14
2.432 (Ch. 5)	18	18	18	18	18	18	18	18	17	15	14
2.437 (Ch. 6)	18	18	18	18	18	18	18	18	17	15	14
2.442 (Ch. 7)	18	18	18	18	18	18	18	18	17	15	14
2.447 (Ch. 8)	18	18	18	18	18	18	18	18	17	15	14
2.452 (Ch. 9)	18	18	18	18	18	18	18	18	17	15	14
2.457 (Ch. 10)	18	18	18	17	17	17	17	17	17	15	14
2.462 (Ch. 11)	17	17	17	14	14	14	14	14	14	14	14
				IEEE802.11a							
5.745 (Ch.149)	N/A			16	16	16	16	16	15	14	11
5.765 (Ch.153)				16	16	16	16	16	15	14	11
5.785 (Ch.157)				16	16	16	16	16	15	14	11
5.805 (Ch.161)				16	16	16	16	16	15	14	11
5.825 (Ch.165)				16	16	16	16	16	15	14	11

D. Justification

1. The full testing results were already certified at the previous grants on July/26/2004 and September/10/2004 (Class II change). The results for conducted measurements and AC wireline conducted emissions are entirely the same as the certified values because neither hardware nor electrical modification was made to the applying modular transmitter itself.

This test report is a supplementary document that contains only the radiated emission results to examine the compliance for the multiple transmission with the new co-located Bluetooth device (FCC ID: ANO20040700HER).

2. Pursuant to the ET Docket 03–201; FCC 04–165, July 12/2004, and Federal Register / Vol. 69, No. 172, September 7/2004, the test was performed with the highest gain antenna among the supported host devices. The EUTs used in this test report are shown by Table-D in shading below.

Table-D Peak Antenna Gains of EUT

Host PC models		Granted date	2.4GHz band		5.8Ghz band	
			Main	Aux.	Main	Aux.
ThinkPad T40 Series	14"	July/26/2004	0.99 dBi	-0.48 dBi	-0.23 dBi	-0.37 dBi
	15"		1.24 dBi	0.38 dBi	1.04 dBi	-0.23 dBi
ThinkPad R50 Series	14"		1.52 dBi	1.84 dBi	0.02 dBi	0.19 dBi
	15"		1.18 dBi	1.71 dBi	1.78 dBi	1.51 dBi
ThinkPad X30 Series		September/10/2004	0.62 dBi	1.28 dBi	0.32 dBi	-0.87 dBi
ThinkPad X40 Series			0.39 dBi	1.67 dBi	1.74 dBi	2.04 dBi

3. The representative worse cases in the previous applications were selected and examined for the compliance of the multiple transmission with the new co-located Bluetooth device (FCC ID: ANO20040700HER) for each Tx mode. As for the Rx mode, the tests were performed with the middle bands (i.e. 2437MHz or 5785MHz).

E. Test Instruments

Table-E List of Measuring Instruments

Description	Model	Serial Number	Calibration Date	Calibration Interval
Computer	IBM 6868-30J	97-901X3	N/A	N/A
Spectrum Analyzer (100Hz-1.5GHz)	HP 85680B	2732A03651	07/21/04	1 year
Spectrum Analyzer (100Hz-1.5GHz)	HP 85680B	2841A04254	08/25/04	1 year
Spectrum Analyzer Display	HP 85662A	2648A15255	07/21/04	1 year
Spectrum Analyzer Display	HP 85662A	2816A16831	08/25/04	1 year
Quasi-Peak Adapter	HP 85650A	2521A00968	07/20/04	1 year
Quasi-Peak Adapter	HP 85650A	2811A01156	08/25/04	1 year
Amplifier (100KHz - 1.3GHz)				
- for 30-200MHz	MITEQ AM-3A	898433	04/23/04	1 year
- for 200-1000MHz	MITEQ AM-3A	898432	04/23/04	1 year
Amplifier (1GHz - 18GHz)	HP 8449B	3008A00582	06/01/04	1 year
Amplifier (18 – 40GHz)	Agilent 83051A	3950M00193	01/27/04	1 year
Spectrum Analyzer EMI Test Receiver	R&S ESI26	836119/003	05/10/04	1 year
Spectrum Analyzer	HP 8563E	3416A02248	09/10/04	1 year
Harmonic Mixer	Agilent 11970A	011269-001	08/04/04	1 year
Receiver (20MHz-1.3GHz)	R&S ESVP	893202/018	02/10/04	1 year
Biconical Antenna (30-200MHz)	EMCO 3108	2536	04/23/04	1 year
Log-Periodic Antenna (200-1000MHz)	EMCO 3146	2849	04/23/04	1 year
Horn Antenna (1- 18GHz)	EMCO 3115	9903-5774	07/20/04	1 year
Horn Antenna (3.95- 5.85GHz)	EMCO 3160-5	1099	07/20/04	1 year
Horn Antenna (5.85- 8.20GHz)	EMCO 3160-6	9712-1044	07/20/04	1 year
Horn Antenna (8.20- 12.4GHz)	EMCO 3160-7	1156	07/20/04	1 year
Horn Antenna (12.4- 18GHz)	EMCO 3160-8	1143	07/20/04	1 year
Horn Antenna (18- 26.5GHz)	EMCO 3160-9	0004-1202	07/20/04	1 year
Horn Antenna (26.5- 40GHz)	EMCO 3160-10	1175	07/20/04	1 year
Switch/control unit	HP 3488A	2719A17226	N/A	N/A
Coaxial cables (1 – 18GHz):	Length:			
- Horn Ant <=> RF Amp.	6 m	- EM206SCO	03/25/04	1 year
- RF Amp. <=> Spectrum Analyzer(<12GHz)	16m	- GEM0101	03/25/04	1 year
- RF Amp. <=> Spectrum Analyzer(>12GHz)	3m	- SF102-20166	04/08/04	1 year
Coaxial cables (18 – 40GHz):				
- Horn Ant <=> RF Amp.	3m	- SF102-20167	04/08/04	1 year
- RF Amp. <=> Spectrum Analyzer	1m	- SF102-21105	04/08/04	1 year
N-Coax cables:				
- Bi-coni Ant <=> 10m Cable	9 m	- EM103L01	04/23/04	1 year
- 10m Cable <=> Shield Panel	10 m	- EM103L02	04/23/04	1 year
- Shield Panel <=> RF Amp	7 m	- EM103L03	04/23/04	1 year
- RF Amp <=> Power Splitter	0.5m	- EM103L04	04/23/04	1 year
- Log-peri Ant <=> 10m Cable	9 m	- EM103H01	04/23/04	1 year
- 10m Cable <=> Shield Panel	10 m	- EM103H02	04/23/04	1 year
- Shield Panel <=> RF Amp	7 m	- EM103H03	04/23/04	1 year
- RF Amp <=> Power Splitter	0.5m	- EM103H04	04/23/04	1 year

Coax cables:				
- Power Splitter <=> SW/Con.unit (SW110)	1 m	- EM103L05	04/23/04	1 year
- Power Splitter <=> SW/Con.unit (SW300)	1 m	- EM103L06	04/23/04	1 year
- Power Splitter <=> SW/Con.unit (SW100)	1 m	- EM103H05	04/23/04	1 year
- Power Splitter <=> SW/Con.unit (SW301)	1 m	- EM103H06	04/23/04	1 year
- SW/Con.unit <=> Receiver (Input)	2 m	- EM1RCV	04/23/04	1 year
- SW/Con.unit <=> Spe Ana.(Signal In) for 30- 200MHz	2 m	- EM1SPL	04/23/04	1 year
- SW/Con.unit <=> Spe Ana.(Signal In) for 200-1000MHz	2 m	- EM1SPH	04/23/04	1 year

Notes. - The above equipment calibration is traceable to National standards.

- HP: Hewlett Packard, R&S: Rohde & Schwarz

F. Measurement Uncertainty

Uncertainties of the both, the Yamato EMI radiated test facilities (EMI chambers, #1 and #2) and the Yamato EMI conducted test facility are derived with the NIS 81 "Treatment of uncertainty in EMC measurements" 1994.

Estimated site uncertainty values are as follows.

EMI chamber #1 : 4.39dB

EMI chamber #2 : 4.40dB

EMI conducted measurement system : 2.4dB

Detail should be referred to "Treatment of Uncertainty, Calculations and Policy" report, document number TCR 10-0015.

G. Temperature and Humidity

The temperature is controlled within range of 17° to 28°

The relative humidity is controlled within range of 40% to 70%.

H. Related Submittal(s)/Grant(s)/Notes

During the applying modular device stops RF transmission, the host unit with full peripheral devices including the applying modular device is classified as an unintentional radiator, Digital Device under the FCC Part 15 Subpart B or the Industry Canada Class B Emission Compliance (ICES-003), and subject to DoC.

1. Restricted Bands Radiation (30MHz – 1GHz)

[FCC 15.205 / 209, RSS-210 6.3 / 7.3]

1.1 Test Procedure

Preliminary radiated emissions are measured in the semi-anechoic chamber at a 3 meter distance on every azimuth in both horizontal and vertical polarity. The antennas are also scanned in height. The emissions are recorded with a spectrum analyzer in peak hold mode. The identified emissions are further maximized by a cable manipulation. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120kHz. The highest emissions relative to the limit are listed.

1.2 Test Instruments and Measurement Setup

Table 1-1 Radiated Emission Test Instrumentation

Description	Model	Serial Number
Computer	IBM 6868-30J	97-901X3
Spectrum Analyzer (100Hz-1.5GHz) for 30-200MHz	HP 85680B	2732A03651
Spectrum Analyzer Display for 30-200MHz	HP 85662A	2648A15255
Quasi-Peak Adapter for 30-200MHz	HP 85650A	2521A00968
Spectrum Analyzer (100Hz-1.5GHz) for 200-1000MHz	HP 85680B	2841A04254
Spectrum Analyzer Display for 200-1000MHz	HP 85662A	2816A16831
Quasi-Peak Adapter for 200-1000MHz	HP 85650A	2811A01156
Amplifier (100KHz-1.3GHz)		
- for 30-200MHz	MITEQ AM-3A	898433
- for 200-1000MHz	MITEQ AM-3A	898432
Biconical Antenna (30-200MHz)	EMCO 3108	2536
Log-Periodic Antenna (200-1000MHz)	EMCO 3146	2849
Receiver (20MHz-1.3GHz)	R&S ESVP	893202/018
Switch/control unit	HP 3488A	2719A17226
N-Coax cables:	Length:	
- Bi-coni Ant <=> 10m Cable	9 m	- EM103L01
- 10m Cable <=> Shield Panel	10 m	- EM103L02
- Shield Panel <=> RF Amp	7 m	- EM103L03
- RF Amp <=> Power Splitter	0.5m	- EM103L04
- Log-peri Ant <=> 10m Cable	9 m	- EM103H01
- 10m Cable <=> Shield Panel	10 m	- EM103H02
- Shield Panel <=> RF Amp	7 m	- EM103H03
- RF Amp <=> Power Splitter	0.5m	- EM103H04
Coax cables:		
- Power Splitter <=> SW/Con.unit (SW110)	1 m	- EM103L05
- Power Splitter <=> SW/Con.unit (SW300)	1 m	- EM103L06
- Power Splitter <=> SW/Con.unit (SW100)	1 m	- EM103H05
- Power Splitter <=> SW/Con.unit (SW301)	1 m	- EM103H06
- SW/Con.unit <=> Receiver (Input)	2 m	- EM1RCV
- SW/Con.unit <=> Spe Ana.(Signal In) for 30- 200MHz	2 m	- EM1SPL
- SW/Con.unit <=> Spe Ana.(Signal In) for 200-1000MHz	2 m	- EM1SPH

Notes: HP: Hewlett Packard, R&S: Rohde & Schwarz

Prepared by T. Asano

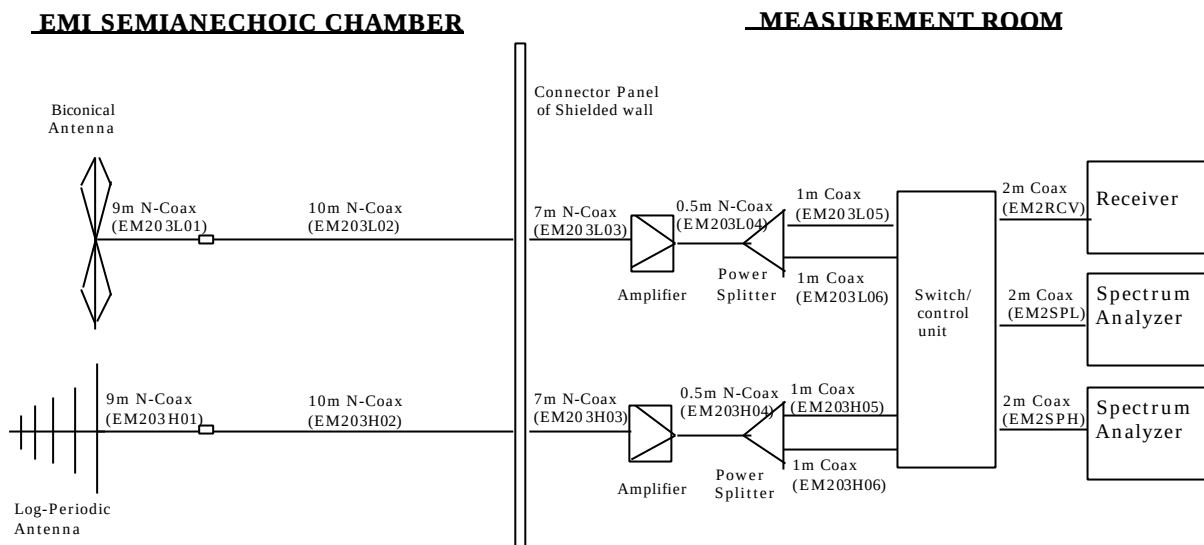


Figure 1 Cables for Radiated Emission Test

1.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver. All factors are included in the reported data.

$$FS = R + AF + CORR$$

where:

- FS = Field Strength
- R = Measured Receiver Input Amplitude
- AF = Antenna Factor
- CORR = Correction Factor = CL - AG
- CL = Cable Loss
- AG = Amplifier Gain

For example :

Given a Receiver input reading of 51.5dBμV; Antenna Factor of 8.5dB/m; Cable Loss of 1.3dB; and an Amplifier Gain of 26dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 = 35.3\text{dB}\mu\text{V/m}$$

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

$$\text{Level(dB}\mu\text{V/m)} = 20 \times \text{Log(Level(}\mu\text{V/m))}$$

$$40\text{dB}\mu\text{V/m} = 100\mu\text{V/m}$$

$$48\text{dB}\mu\text{V/m} = 250\mu\text{V/m}$$

1.4 Measurement Results

Pursuant to the ET Docket 03–201; FCC 04–165, July 12/2004, and Federal Register / Vol. 69, No. 172, September 7/2004, the test was performed with the highest gain antenna among the supported host devices.

i.e. IBM ThinkPad R50 Series, LCD 14” model, auxiliary antenna in 2.4GHz band,

IBM ThinkPad X40 Series, auxiliary antenna in 5.8GHz band

The representative worse cases in the previous applications were selected and examined for the compliance of the multiple transmission with the new co-located Bluetooth device (FCC ID: ANO20040700HER) for each Tx mode. As for the Rx mode, the tests were performed with the middle band (i.e. 2437MHz or 5785MHz). The tested Tx/Rx modes are as follows.

Table 1-2 Radiated Emission ,Tested Tx/Rx modes

2.4GHz band	DSSS	Tx	Ch.6 (2437MHz), 11Mb/s	Previous granted date T40/R50 Series: July/26/2004
		Rx	Ch.6 (2437MHz)	
	OFDM	Tx	Ch.1 (2412MHz), 6Mb/s	
		Rx	Ch.6 (2437MHz)	
5.8Ghz band	OFDM	Tx	Ch.157 (5785MHz), 6Mb/s	X30/X40 Series: September/10/2004
		Rx	Ch.157 (5785MHz)	

The EUT was found to comply to the limits of FCC Part 15 Subpart C and RSS-210 with a margin of 3.1dB at 30MHz - 1000MHz band.

The 6 highest emissions relative to the limits are reported.

Test Date: November 4, 2004

1.4.1 EUT in 2.4GHz DSSS/OFDM transmission mode with ThinkPad R50 Series, LCD 14” model, Auxiliary antenna

Table 1-3-1. Ch.6 (2437MHz) 11Mb/s DSSS **TX** mode with the co-located Bluetooth device in active

Frequency (MHz)	Polarity (H/V)	Measured (dBμV)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin to limit (dB)	Field Strength (μV/m)	Limit (μV/m)
195.801	H	48.7	13.6	-26.6	35.7	43.5	7.8	61.0	150
342.000	V	50.8	14.3	-22.8	42.3	46.0	3.7	130.3	200
354.002	V	50.9	14.4	-22.7	42.6	46.0	3.4	134.9	200
366.000	V	47.8	14.4	-22.3	39.9	46.0	6.1	98.9	200
729.014	H	36.7	21.1	-19.0	38.8	46.0	7.2	87.1	200
800.117	H	39.3	21.2	-18.5	42.0	46.0	4.0	125.9	200

Table 1-3-2. Ch.6 (2437MHz) DSSS **RX** mode with the co-located Bluetooth device in active

Frequency (MHz)	Polarity (H/V)	Measured (dBμV)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin to limit (dB)	Field Strength (μV/m)	Limit (μV/m)
170.674	H	48.8	12.5	-27.0	34.3	43.5	9.2	51.9	150
197.412	H	49.3	13.7	-26.8	36.2	43.5	7.3	64.6	150
341.999	V	50.8	14.3	-22.8	42.3	46.0	3.7	130.3	200
354.001	V	51.1	14.4	-22.7	42.8	46.0	3.2	138.0	200
366.001	V	47.7	14.4	-22.3	39.8	46.0	6.2	97.7	200
729.014	H	36.6	21.1	-19.0	38.7	46.0	7.3	86.1	200

Table 1-3-3. Ch.1 (2412MHz) 6Mb/s OFDM **TX** mode with the co-located Bluetooth device in active

Frequency (MHz)	Polarity (H/V)	Measured (dBμV)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin to limit (dB)	Field Strength (μV/m)	Limit (μV/m)
196.607	H	53.2	13.6	-26.7	40.1	43.5	3.4	101.2	150
342.000	V	51.0	14.3	-22.8	42.5	46.0	3.5	133.4	200
354.001	V	50.9	14.4	-22.7	42.6	46.0	3.4	134.9	200
365.999	V	47.6	14.4	-22.3	39.7	46.0	6.3	96.6	200
729.015	H	36.6	21.1	-19.0	38.7	46.0	7.3	86.1	200
800.122	H	39.5	21.2	-18.5	42.2	46.0	3.8	128.8	200

Table 1-3-4. Ch.6 (2437MHz) OFDM **RX** mode with the co-located Bluetooth device in active

Frequency (MHz)	Polarity (H/V)	Measured (dBμV)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin to limit (dB)	Field Strength (μV/m)	Limit (μV/m)
170.453	H	49.0	12.5	-27.0	34.5	43.5	9.0	53.1	150
196.607	H	49.1	13.6	-26.7	36.0	43.5	7.5	63.1	150
341.998	V	50.6	14.3	-22.8	42.1	46.0	3.9	127.4	200
354.000	V	51.2	14.4	-22.7	42.9	46.0	3.1	139.6	200
366.002	V	47.4	14.4	-22.3	39.5	46.0	6.5	94.4	200
729.014	H	36.5	21.1	-19.0	38.6	46.0	7.4	85.1	200

1.4.2 EUT in 5.8GHz OFDM transmission mode with ThinkPad X40 Series, Auxiliary antenna

Table 1-3-5. Ch.157 (5785MHz) 6Mb/s OFDM **TX** mode with the co-located Bluetooth device in active

Frequency (MHz)	Polarity (H/V)	Measured (dBμV)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin to limit (dB)	Field Strength (μV/m)	Limit (μV/m)
48.000	V	44.8	10.9	-28.9	26.8	40.0	13.2	21.9	100
60.000	V	50.5	9.3	-28.7	31.1	40.0	8.9	35.9	100
281.999	H	48.0	13.1	-23.5	37.6	46.0	8.4	75.9	200
293.999	V	42.3	13.7	-23.6	32.4	46.0	13.6	41.7	200
379.021	V	39.3	14.7	-22.5	31.5	46.0	14.5	37.6	200
665.995	V	28.0	20.5	-19.5	29.0	46.0	17.0	28.2	200

Table 1-3-6. Ch.157 (5785MHz) OFDM **RX** mode with the co-located Bluetooth device in active

Frequency (MHz)	Polarity (H/V)	Measured (dBμV)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin to limit (dB)	Field Strength (μV/m)	Limit (μV/m)
48.000	V	46.1	10.9	-28.9	28.1	40.0	11.9	25.4	100
53.999	V	45.0	10.1	-28.8	26.3	40.0	13.7	20.7	100
60.000	V	42.8	9.3	-28.7	23.4	40.0	16.6	14.8	100
275.999	H	44.8	12.8	-23.7	33.9	46.0	12.1	49.5	200
282.000	H	49.0	13.1	-23.5	38.6	46.0	7.4	85.1	200
379.220	H	40.6	14.7	-22.5	32.8	46.0	13.2	43.7	200

2. Restricted Bands Radiatio (1GHz – 40GHz)

[FCC 15.205 / 209, RSS-210 6.3 / 7.3]

2.1 Test Procedure

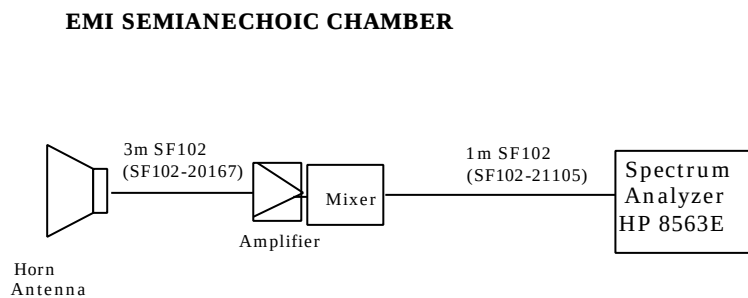
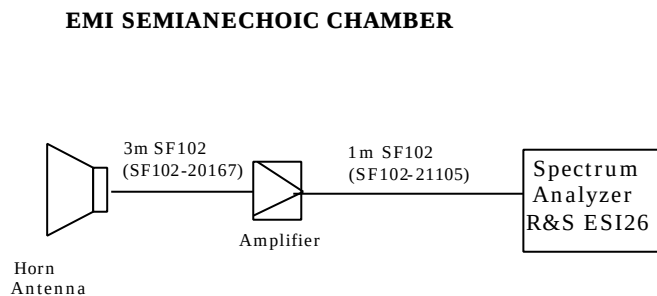
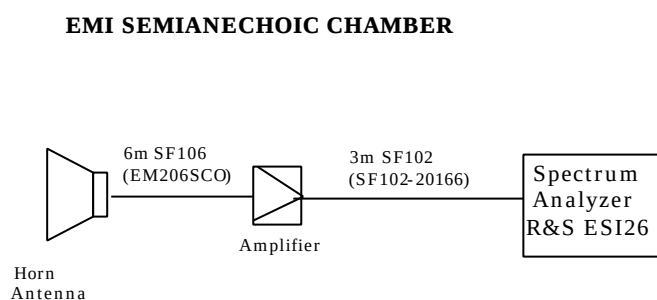
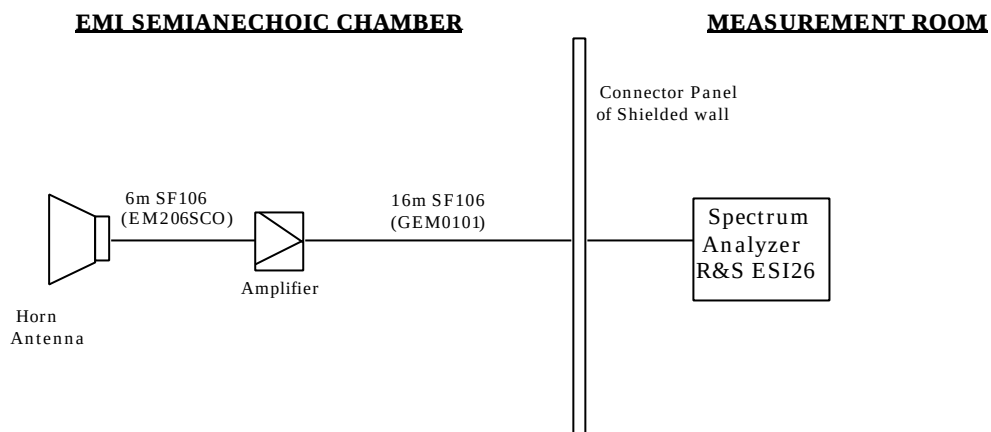
Radiated emissions were measured in the frequency range with 1 GHz to 40GHz in transmitting mode and 1 GHz to 25GHz in receiving mode. All tests were performed in the semi-anechoic chamber at a 3-meter distance (except for the frequency range with 18 GHz to 40 GHz where test distance was reduced to 1 meter) on both horizontal and vertical polarities. The antenna was also scanned in height. The emissions are recorded with a spectrum analyzer in peak hold mode. The identified emissions are further maximized as a function of cable manipulation, azimuth, and antenna height. The emissions closest to the limits are measured in the peak mode with the tuned spectrum analyzer using resolution bandwidth of 1MHz / video bandwidth of 1MHz, and the average setting mode with the tuned spectrum analyzer using resolution bandwidth of 1MHz / video bandwidth of 100Hz or 10Hz. The highest emissions relative to the limit are listed.

2.2 Test Instruments and Measurement Setup

Table 2 Radiated Emission Test Instrumentation (1GHz – 40GHz)

Description	Model	Serial Number
Spectrum Analyzer EMI Test Receiver	R&S ESI26	836119/003
Spectrum Analyzer	HP 8563E	3416A02248
Harmonic Mixer (26.5 – 40GHz)	Agilent 11970A	011269-001
Amplifier (1 - 18GHz)	HP 8449B	3008A00582
Amplifier (18 – 40GHz)	Agilent 83051A	3950M00193
Horn Antenna (1 - 18GHz)	EMCO 3115	9903-5774
Horn Antenna (3.95 – 5.85GHz)	EMCO 3160-5	1099
Horn Antenna (5.85 – 8.2GHz)	EMCO 3160-6	9712-1044
Horn Antenna (8.2 – 12.4GHz)	EMCO 3160-7	1156
Horn Antenna (12.4 – 18GHz)	EMCO 3160-8	1143
Horn Antenna (18 - 26.5GHz)	EMCO 3160-9	0004-1202
Horn Antenna (26.5 - 40GHz)	EMCO 3160-10	1175
Coaxial cables: - Horn Ant <=> RF Amp. (1-18GHz) - RF Amp. <=> Spectrum Analyzer (1-12.4GHz) - RF Amp. <=> Spectrum Analyzer (12.4-18GHz) - Horn Ant <=> RF Amp. (18-40GHz) - RF Amp. <=> Spectrum Analyzer (18-40GHz)	Length: 6 m 16 m 3m 3m 1m	- EM206SCO - GEM0101 - SF102-20166 - SF102-20167 - SF102-21105

Notes: HP: Hewlett Packard, R&S: Rohde & Schwarz



2.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

$$FS = R + AF + CORR - FO$$

where:

FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL-AG

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

For example:

Given a Spectrum Analyzer input reading of 51.5 dB μ V; Antenna Factor of 8.5 dB/m; Cable Loss of 1.3 dB; Falloff Factor of 0 dB; and an Amplifier Gain of 26 dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26 - 0.0 = 35.6 \text{ dB}\mu\text{V/m}$$

Conversions between dB μ V/m (or dB μ V) and μ V/m (or μ V) are done as :

$$\text{Level(dB}\mu\text{V/m)} = 20 \times \text{Log (Level}(\mu\text{V/m))}$$

$$40 \text{ dB}\mu\text{V/m} = 100 \mu\text{V/m}$$

$$48 \text{ dB}\mu\text{V/m} = 250 \mu\text{V/m}$$

2.4 Measurement Results

Pursuant to the ET Docket 03–201; FCC 04–165, July 12/2004, and Federal Register / Vol. 69, No. 172, September 7/2004, the test was performed with the highest gain antenna among the supported host devices.

i.e. IBM ThinkPad R50 Series, LCD 14” model, auxiliary antenna in 2.4GHz band,

IBM ThinkPad X40 Series, auxiliary antenna in 5.8GHz band

The representative worse cases in the previous applications were selected and examined for the compliance of the multiple transmission with the new co-located Bluetooth device (FCC ID: ANO20040700HER) for each Tx mode. As for the Rx mode, the tests were performed with the middle band (i.e. 2437Hz or 5785MHz). The tested Tx/Rx modes are as follows.

Table 2-2 Radiated Emission ,Tested Tx/Rx modes

2.4GHz band	DSSS	Tx	Ch.11 (2462MHz), 11Mb/s	Previous granted date T40/R50 Series: July/26/2004
		Rx	Ch.6 (2437MHz)	
	OFDM	Tx	Ch.1 (2412MHz), 6Mb/s	
		Rx	Ch.6 (2437MHz)	
5.8Ghz band	OFDM	Tx	Ch.157 (5785MHz), 6Mb/s	X30/X40 Series: September/10/2004
		Rx	Ch.157 (5785MHz)	

The EUT was found to comply to the limits of FCC Part 15 Subpart C and RSS-210 with a margin of 4.6 dB. The measurement was done for the frequency range of 1 GHz to 40 GHz in TX mode and 1 GHz to 25GHz in RX mode.

Test Date: November 2, 8, 17 and 24, 2004

2.4.1 EUT in 2.4GHz DSSS/OFDM transmission mode with ThinkPad R50 Series, LCD 14” model, Auxiliary antenna

*Note1: OB means “operation band” (2400-2483.5MHz); in this case limit is 1W (measured conducted with power meter)

*Note2: NR means “Non-Restricted band” (just reference only for EU compliance)

Table 2-3-1. Ch.11 (2462MHz) 11Mb/s DSSS **TX** mode with the co-located Bluetooth device in active

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) (peak)	Measured (dBμV) (average)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)
							(peak)			(average)		
Inband												
2.460	H	111.5	103.6	28.4	-29.2	0.0	110.7	OB*1	-	102.8	OB*1	-
bandedge	H	60.6	42.9	28.4	-29.1	0.0	59.9	74.0	14.1	42.2	54.0	11.8
2.484	H	61.3	45.1	28.4	-29.1	0.0	60.6	74.0	13.4	44.4	54.0	9.6
1.066	V	53.0	-	24.6	-31.7	0.0	45.9	74.0	28.1	-	54.0	-
1.094	V	50.6	-	24.4	-31.5	0.0	43.5	74.0	30.5	-	54.0	-
1.126	V	49.6	-	24.5	-31.5	0.0	42.6	74.0	31.4	-	54.0	-
1.194	V	54.1	-	25.2	-31.3	0.0	48.0	74.0	26.0	-	54.0	-
1.813	V	49.6	36.0	26.9	-29.9	0.0	46.6	NR*2	-	33.0	NR*2	-
1.816	V	49.4	36.0	26.9	-29.9	0.0	46.4	NR*2	-	33.0	NR*2	-
1.827	V	48.6	35.8	26.9	-29.9	0.0	45.6	NR*2	-	32.8	NR*2	-
2.346	H	51.6	-	28.1	-29.3	0.0	50.4	74.0	23.6	-	54.0	-
2.361	H	51.1	-	28.1	-29.2	0.0	50.0	74.0	24.0	-	54.0	-
2.377	H	51.6	-	28.2	-29.2	0.0	50.6	74.0	23.4	-	54.0	-
2.388	H	51.5	-	28.2	-29.2	0.0	50.5	74.0	23.5	-	54.0	-
4.816	H	51.2	-	27.1	-26.6	0.0	51.7	74.0	22.3	-	54.0	-
4.866	H	48.6	-	27.0	-26.6	0.0	49.0	74.0	25.0	-	54.0	-
4.924	H	60.6	26.3	27.0	-26.4	0.0	61.2	74.0	12.8	26.9	54.0	27.1
4.958	H	47.6	-	27.1	-26.6	0.0	48.1	74.0	25.9	-	54.0	-
5.236	H	36.6	24.6	27.1	-26.0	0.0	37.7	NR*2	-	25.7	NR*2	-
5.243	H	36.9	24.8	27.1	-26.0	0.0	38.0	NR*2	-	25.9	NR*2	-
7.299	H	43.6	-	29.9	-24.4	0.0	49.1	74.0	24.9	-	54.0	-
7.347	H	43.2	-	29.8	-24.5	0.0	48.5	74.0	25.5	-	54.0	-
7.385	H	47.6	-	29.8	-24.5	0.0	52.9	74.0	21.1	-	54.0	-

Table 2-3-2. Ch.6 (2437MHz) DSSS **RX** mode with the co-located Bluetooth transmitter

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) (peak)	Measured (dBμV) (average)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)
							(peak)			(average)		
1.065	V	50.8	-	24.6	-31.7	0.0	43.7	74.0	30.3	-	54.0	-
1.094	V	51.6	-	24.4	-31.5	0.0	44.5	74.0	29.5	-	54.0	-
1.129	V	50.1	-	24.5	-31.5	0.0	43.1	74.0	30.9	-	54.0	-
1.196	V	51.1	-	25.2	-31.3	0.0	45.0	74.0	29.0	-	54.0	-
1.818	V	42.6	29.0	26.9	-29.9	0.0	39.6	NR*2	-	26.0	NR*2	-
1.839	V	42.7	29.0	27.4	-29.9	0.0	40.2	NR*2	-	26.5	NR*2	-
1.870	V	41.9	29.1	27.5	-29.7	0.0	39.7	NR*2	-	26.9	NR*2	-
1.891	V	42.5	28.8	27.5	-29.7	0.0	40.3	NR*2	-	26.6	NR*2	-
5.236	V	36.8	24.6	27.1	-26.0	0.0	37.9	NR*2	-	25.7	NR*2	-
5.243	V	36.5	24.8	27.1	-26.0	0.0	37.6	NR*2	-	25.9	NR*2	-

Table 2-3-3. Ch.1 (2412MHz) 6Mb/s OFDM **TX** mode with the co-located Bluetooth device in active

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) (peak)	Measured (dBμV) (average)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)
							(peak)			(average)		
Inband												
2.415	H	107.2	96.0	28.3	-29.1	0.0	106.4	OB*1	-	95.2	OB*1	-
2.388	H	62.5	42.6	28.2	-29.2	0.0	61.5	74.0	12.5	41.6	54.0	12.4
2.389	H	66.0	45.7	28.2	-29.2	0.0	65.0	74.0	9.0	44.7	54.0	9.3
2.390	V	70.4	48.0	28.2	-29.2	0.0	69.4	74.0	4.6	47.0	54.0	7.0
1.006	V	53.0	-	24.1	-31.9	0.0	45.2	74.0	28.8	-	54.0	-
1.066	V	53.0	-	24.6	-31.7	0.0	45.9	74.0	28.1	-	54.0	-
1.094	V	51.6	-	24.4	-31.5	0.0	44.5	74.0	29.5	-	54.0	-
1.198	V	55.2	-	25.2	-31.3	0.0	49.1	74.0	24.9	-	54.0	-
1.812	V	42.6	29.0	26.9	-29.9	0.0	39.6	NR*2	-	26.0	NR*2	-
1.838	V	42.5	29.1	27.4	-29.9	0.0	40.0	NR*2	-	26.6	NR*2	-
1.873	V	43.2	29.4	27.5	-29.7	0.0	41.0	NR*2	-	27.2	NR*2	-
1.889	V	42.5	29.1	27.5	-29.7	0.0	40.3	NR*2	-	26.9	NR*2	-
2.353	H	50.6	-	28.1	-29.2	0.0	49.5	74.0	24.5	-	54.0	-
2.376	H	50.3	-	28.2	-29.2	0.0	49.3	74.0	24.7	-	54.0	-
2.380	H	55.8	38.8	28.2	-29.2	0.0	54.8	74.0	19.2	37.8	54.0	16.2
4.810	H	52.4	-	27.1	-26.7	0.0	52.8	74.0	21.2	-	54.0	-
4.822	H	49.6	-	27.1	-26.6	0.0	50.1	74.0	23.9	-	54.0	-
4.924	H	49.8	-	27.0	-26.4	0.0	50.4	74.0	23.6	-	54.0	-
4.938	H	48.2	-	27.1	-26.4	0.0	48.9	74.0	25.1	-	54.0	-
5.249	V	36.9	24.9	27.1	-26.0	0.0	38.0	NR*2	-	26.0	NR*2	-
5.292	V	38.7	24.8	27.1	-25.9	0.0	39.9	NR*2	-	26.0	NR*2	-
7.254	V	44.3	-	30.0	-24.5	0.0	49.8	74.0	24.2	-	54.0	-
7.321	H	43.7	-	29.8	-24.4	0.0	49.1	74.0	24.9	-	54.0	-
7.345	H	43.3	-	29.8	-24.5	0.0	48.6	74.0	25.4	-	54.0	-
7.383	H	41.2	-	29.8	-24.5	0.0	46.5	74.0	27.5	-	54.0	-

Table 2-3-4. Ch.6 (2437MHz) OFDM **RX** mode with the co-located Bluetooth transmitter

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) (peak)	Measured (dBμV) (average)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)
							(peak)			(average)		
1.066	V	51.0	-	24.6	-31.7	0.0	43.9	74.0	30.1	-	54.0	-
1.094	V	52.2	-	24.4	-31.5	0.0	45.1	74.0	28.9	-	54.0	-
1.128	V	50.4	-	24.5	-31.5	0.0	43.4	74.0	30.6	-	54.0	-
1.194	V	52.1	-	25.2	-31.3	0.0	46.0	74.0	28.0	-	54.0	-
1.814	H	42.3	28.9	26.9	-29.9	0.0	39.3	NR*2	-	25.9	NR*2	-
1.836	H	41.8	29.0	27.4	-29.9	0.0	39.3	NR*2	-	26.5	NR*2	-
1.856	H	43.2	28.8	27.5	-29.7	0.0	41.0	NR*2	-	26.6	NR*2	-
1.891	H	42.5	28.9	27.5	-29.7	0.0	40.3	NR*2	-	26.7	NR*2	-
5.236	H	39.0	24.6	27.1	-26.0	0.0	40.1	NR*2	-	25.7	NR*2	-
5.243	H	38.8	24.8	27.1	-26.0	0.0	39.9	NR*2	-	25.9	NR*2	-

2.4.2 EUT in 5.8GHz OFDM transmission mode with ThinkPad X40 Series, Auxiliary antenna

*Note: OB means “operation band” (5725-5875MHz); in this case limit is 1W (measured conducted with power meter)

Table 2-3-5. Ch.157 (5785MHz) 6Mb/s OFDM **TX** mode with the co-located Bluetooth device in active

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) (peak)	Measured (dBμV) (average)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)
							(peak)			(average)		
Inband 5.789	H	102.4	91.7	34.0	-25.5	0.0	110.9	OB*	-	100.2	OB*	-
1.008	V	49.5	-	24.1	-31.9	0.0	41.7	74.0	32.3	-	54.0	-
1.128	V	49.8	-	24.5	-31.5	0.0	42.8	74.0	31.2	-	54.0	-
1.194	V	49.5	-	25.2	-31.3	0.0	43.4	74.0	30.6	-	54.0	-
1.525	V	49.5	-	25.5	-30.4	0.0	44.6	74.0	29.4	-	54.0	-
4.912	V	58.5	25.4	27.0	-26.4	0.0	59.1	74.0	14.9	26.0	54.0	28.0
4.928	V	60.7	25.4	27.0	-26.4	0.0	61.3	74.0	12.7	26.0	54.0	28.0
4.936	V	60.7	25.3	27.1	-26.4	0.0	61.4	74.0	12.6	26.0	54.0	28.0
4.951	V	62.1	25.4	27.1	-26.6	0.0	62.6	74.0	11.4	25.9	54.0	28.1
7.251	V	42.7	-	30.0	-24.5	0.0	48.2	74.0	25.8	-	54.0	-
7.383	V	39.6	-	29.8	-24.5	0.0	44.9	74.0	29.1	-	54.0	-
11.573	V	44.1	30.7	33.5	-19.7	0.0	57.9	74.0	16.1	44.5	54.0	9.5
17.355	V	33.8	-	37.2	-21.4	0.0	49.6	74.0	24.4	-	54.0	-

Table 2-3-6. Ch.157 (5785MHz) OFDM **RX** mode with the co-located Bluetooth transmitter

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) (peak)	Measured (dBμV) (average)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)	Field Strength (dBμV/m)	FCC Limit (dBμV/m)	Margin to limit (dB)
							(peak)			(average)		
1.002	V	49.6	-	24.1	-31.9	0.0	41.8	74.0	32.2	-	54.0	-
1.138	V	51.2	-	24.6	-31.4	0.0	44.4	74.0	29.6	-	54.0	-
1.194	V	48.2	-	25.2	-31.3	0.0	42.1	74.0	31.9	-	54.0	-
1.537	V	49.8	-	25.4	-30.4	0.0	44.8	74.0	29.2	-	54.0	-

2.5 Bandedge Plots measured with the highest antenna gain

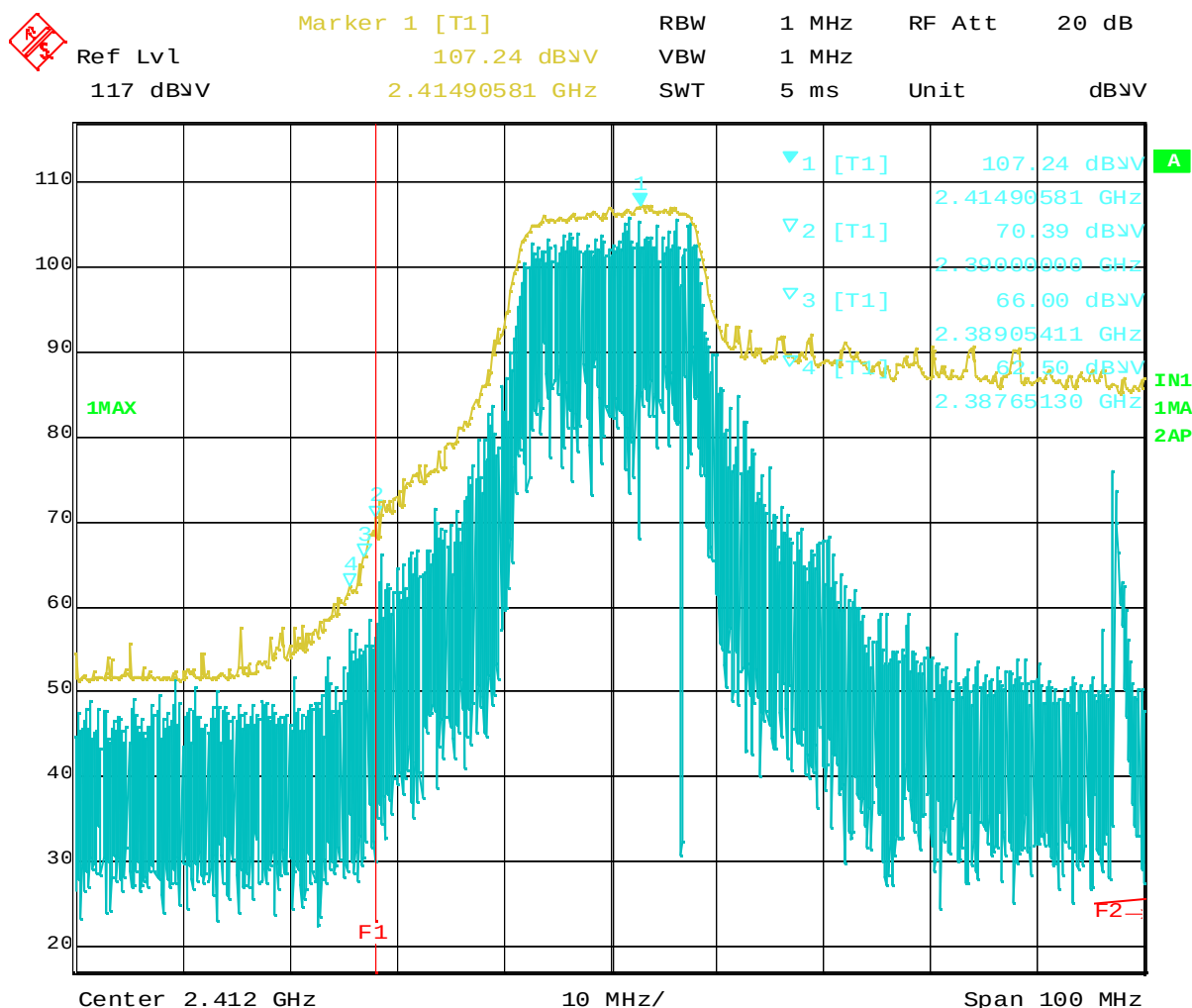
Measured host device: **ThinkPad R50 Series, LCD 14" model, Auxiliary antenna**

Table 2-4. Ch.1 (2412MHz) and Ch.11 (2462MHz) with the co-located Bluetooth transmitter

D: 11Mb/s DSSS mode O: 6Mb/s OFDM mode

	Frequency (GHz)	Polarity (H/V)	Reading (dBμV) (peak)	Reading (dBμV) (average)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m) (peak)	Margin to Limit (dB) (peak)	Field Strength (dBμV/m) (average)	Margin to Limit (dB) (average)
Ch.1	D 2.390	H	56.6	42.7	28.2	-29.2	0.0	55.6	18.4	41.7	12.3
	O 2.390	H	70.4	48.0	28.2	-29.2	0.0	69.4	4.6	47.0	7.0
Ch11	D 2.487	H	61.3	45.1	28.4	-29.1	0.0	60.6	13.4	44.4	9.6
	O 2.484	H	68.5	46.3	28.4	-29.1	0.0	67.8	6.2	45.6	8.4

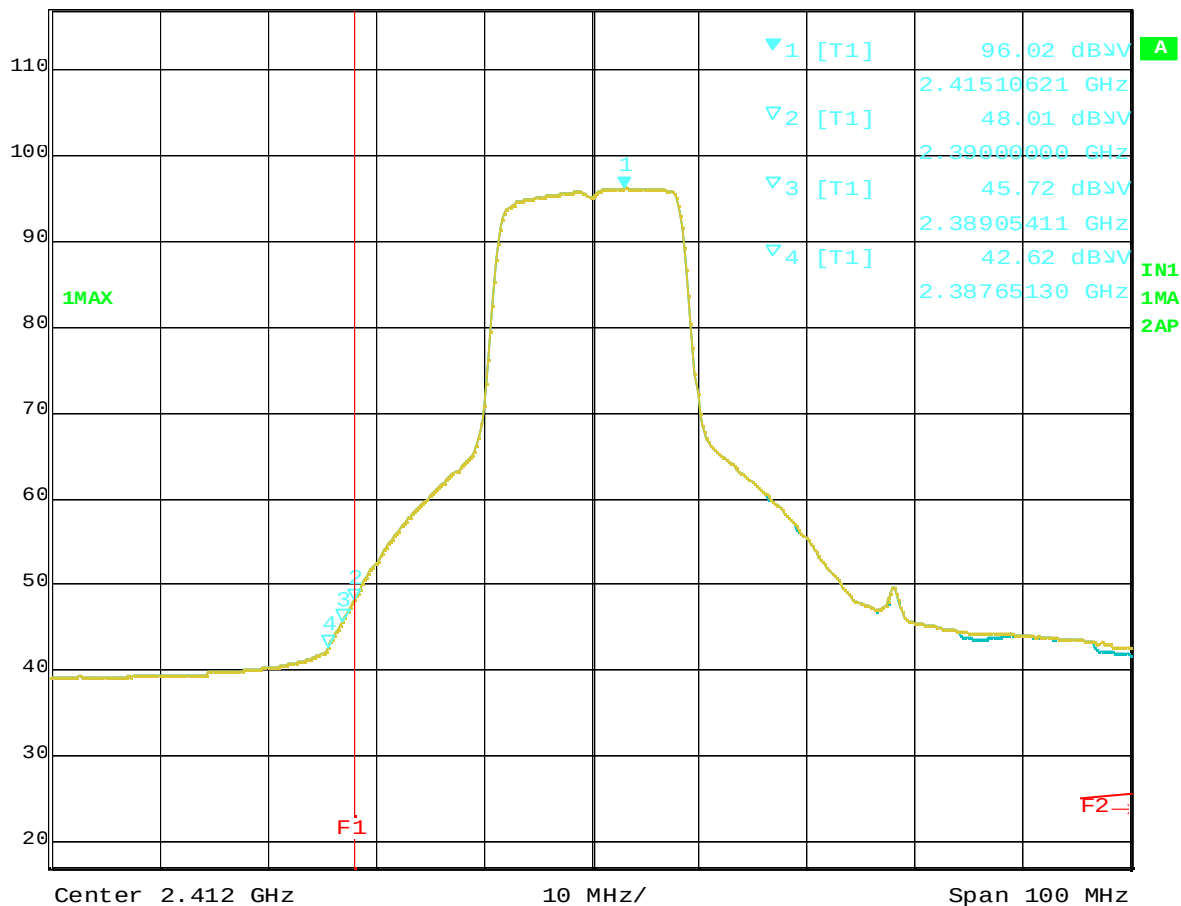
Note) The traces hereafter are the worst cases of each channel in Table 2-4.



Date: 2.NOV.2004 14:37:08

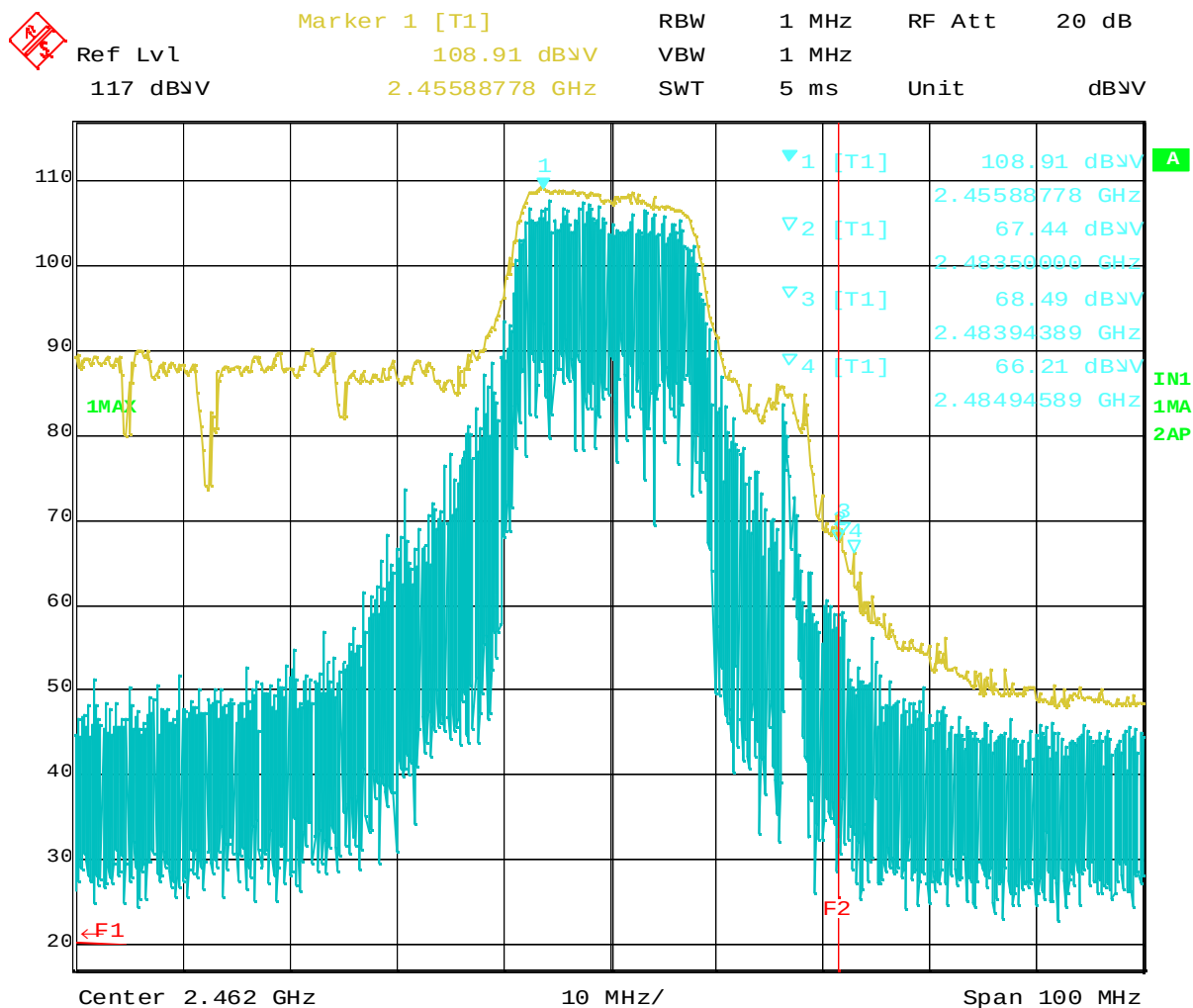
Plot-1 Ch.1 2412MHz TX, OFDM 6Mbps (Peak) with the co-located Bluetooth transmitter

Prepared by T. Asano

Ref Lvl
117 dBμVMarker 1 [T1]
96.02 dBμV
2.41510621 GHzRBW 1 MHz RF Att 20 dB
VBW 10 Hz
SWT 25 s Unit dBμV

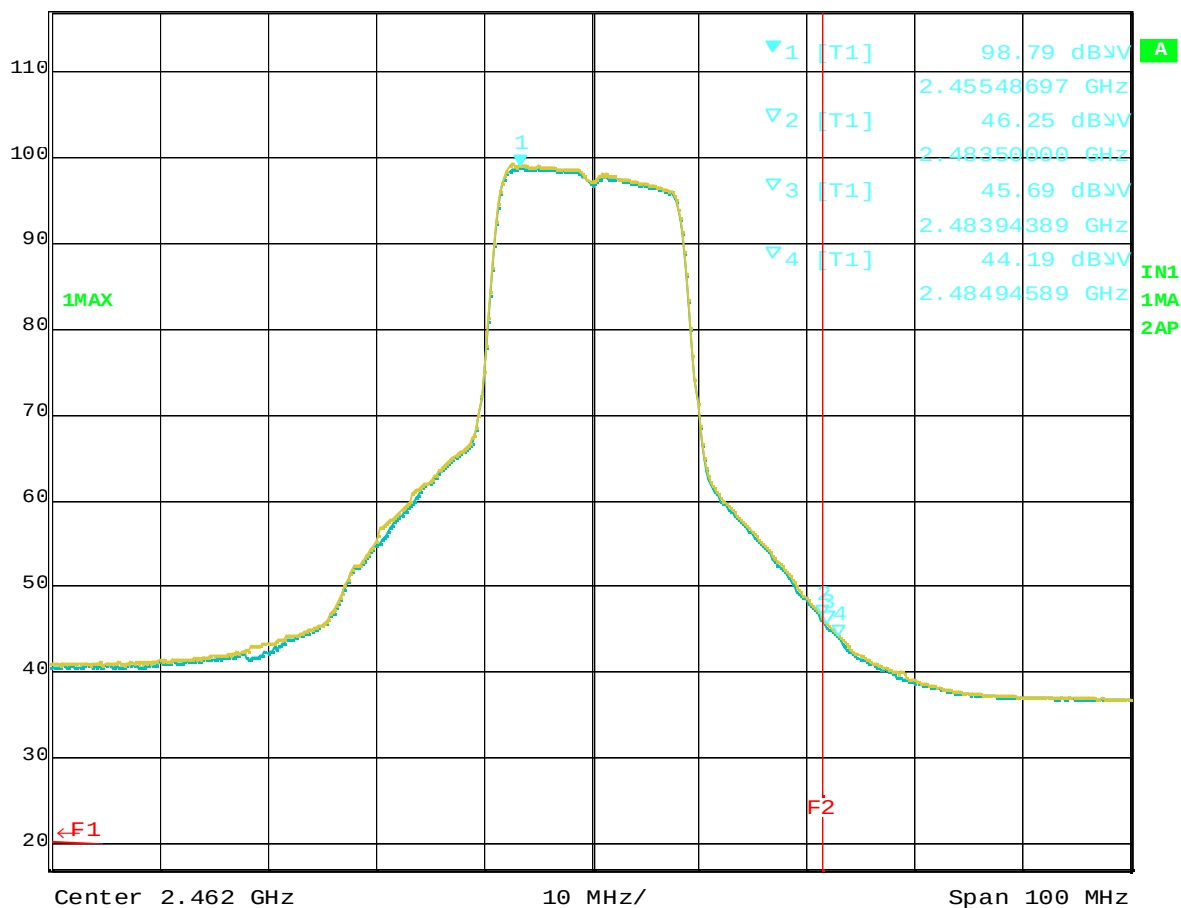
Date: 2.NOV.2004 14:39:32

Plot-2 Ch.1 2412MHz TX, OFDM 6Mbps (Average) with the co-located Bluetooth transmitter



Date: 2.NOV.2004 14:24:23

Plot -3 Ch.11 2462MHz TX. OFDM 6Mbps (Peak) with the co-located Bluetooth transmitter

Ref Lvl
117 dBμVMarker 1 [T1]
98.79 dBμV
2.45548697 GHzRBW 1 MHz RF Att 20 dB
VBW 10 Hz
SWT 25 s Unit dBμV

Date: 2.NOV.2004 14:31:56

Plot -4 Ch.11 2462MHz TX, OFDM 6Mbps (Average) with the co-located Bluetooth transmitter