



TEST REPORT

Product Name : Wireless 11g + Bluetooth combo miniPCI

Model Number : MS-6855

Marketing Name : MP54GBT

Brand Name : MSI

FCC ID : I4L-MS6855

Applicant : MICRO-STAR INT'L CO., LTD.

Address : No. 69, Li-De St, Jung-He City,
Taipei Hsien 235, Taiwan

Received Date : July 22, 2004

Tested Date : July 22 ~ August 04, 2004

Notes :

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2. This report refers only to the specimen(s) submitted to testing, and be invalid as separately used.
3. This report is invalid without examination stamp and signature of this institute.
4. The tested specimen(s) will be preserved for thirty days from the data issued.
5. The report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.



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FCC ID : I4L-MS6855

Report No. : ER04-07-054FRF

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Test Report Certification

Product Name : Wireless 11g + Bluetooth combo miniPCI
Model Number : MS-6855
Marketing Name : MP54GBT
Brand Name : MSI
FCC ID : I4L-MS6855
Applicant : MICRO-STAR INT'L CO., LTD.

Measurement Standard :

47 CFR Part 15, Subpart B and Subpart C (Section 15.247)
 ANSI C63.4-2001

Tested By : Ken Tu, **Date**: August 10, 2004
 (Ken Tu)

Approved By : Chieh-De Tsai, **Date**: August 10, 2004
 (Chieh-De Tsai, Manager)



WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.



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1. GENERAL INFORMATION

1.1 Description of EUT & Power

Product Name	Wireless 11g + Bluetooth combo miniPCI
Model Number	MS-6855
Market Name	MP54GBT
Frequency Range	2400 MHz to 2483.5MHz
Frequency Channel	2412MHz + 5×n (MHz), n = 0, 1, 2,.....10 for WLAN 2402 MHz + 1×n (MHz), n = 0, 1, 2,78 for Bluetooth
Channel Spacing	1MHz for Bluetooth, 5MHz for WLAN
Air Data Rate	723Kbps for Bluetooth 54Mbps (802.11g Mode), 11Mbps(802.11b Mode) for WLAN
Type of Modulation	Frequency Hopping Spread Spectrum for Bluetooth 802.11b : DSSS(CCK, DQPSK, DBPSK) 802.11g : OFDM(64QAM, 16AQM, QPSK, BPSK)
Frequency Selection	by software
EUT Description	A Combo Wireless Wireless 11g + Bluetooth combo miniPCI with 2.4GHz FHSS(FREQUENCY HOPPING SPREAD SPECTRUM) Bluetooth Technology, 2.4GHz (Direct Sequence Spread Spectrum and Orthogonal Frequency Division Multiplex) Data Transceiver for WLAN application
Antenna Type	PIFA Antenna for Bluetooth, PIFA Antenna for WLAN
Power Source	3.3VDC (From Notebook)

1.2 Description of Peripherals

(1) Notebook PC

MANUFACTURER : DELL
MODEL NUMBER : PP01L
SERIAL NUMBER : CN-09C748-48155-1AP-6630
FCC ID : DOC
INPUT POWER : 20VDC/3.5A

Adapter

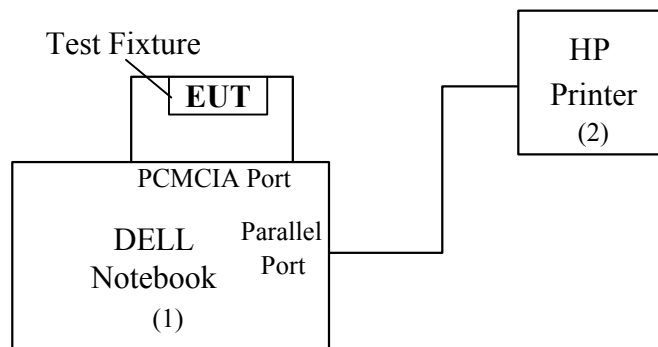
MANUFACTURER : DELL
MODEL NUMBER : ADP-70EB
INPUT POWER : 100-240V, 1.5A, 70W
OUTPUT POWER : 20VDC/3.5A

(2) Printer

MANUFACTURER : HP CORP.
MODEL NUMBER : C8952D
SERIAL NUMBER : CN29B181H7
INPUT POWER : 100-240VAC, 50/60Hz, 0.7A
SIGNAL CABLE : Shielded, Undetachable, 1.8m

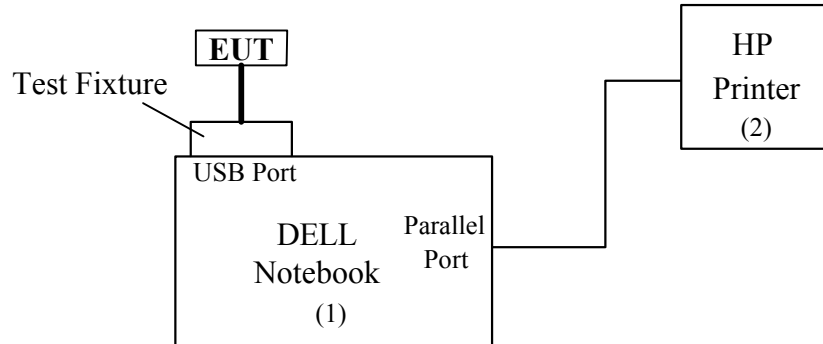
1.3 EUT & Peripherals Setup Diagram

I. WLAN mode



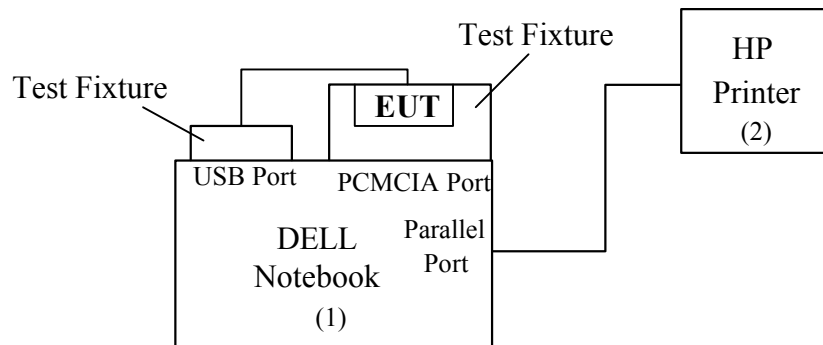
The indicated numbers (1)(2), please refer to item 1.3

II. Bluetooth mode



The indicated numbers (1)(2), please refer to item 1.3

III. Combo mode



The indicated numbers (1)(2), please refer to item 1.3



1.4 EUT Operating Procedure

I. WLAN mode

1. Run In Pro Comm RF Test Utility
2. Select Channel 1, 6, 11 ; Tx Power default
Tx Filter : North American
Rx Antenna : A
Tx Rate : 6M for 802.11g mode
11M for 802.11b mode
3. Start test
Tx mode : Select Tx Output Power
Rx mode : Select Continuous Packet Rx

II. Bluetooth mode

1. Run WDS Commander Version 5.0.2.6
2. Open “ Enable DUT Mode ”
3. Transmit mode setting
 - (a) Select “ Tx Only (Burst) ”
 - (b) Select channel 0 (2402MHz), 39 (2441MHz), 78 (2480MHz)
 - (c) Number of Slots : 1 – Slot
 - (d) Power : 7
 - (e) Transmit Patter : Psendo Random
4. Receive mode setting :
Script → Open the file “ Continuous_Rx_for Siw 3000 EMI test.td ”
Script → Start Script

1.5 Description of Test Site

SITE DESCRIPTION

FCC Certificate NO. : 90585
BSMI Certificate NO. : SL2-IN-E-0002
NVLAP Lab Code : 200118-0
CNLA Certificate NO. : CNLA-ZL97018
VCCI Certificate NO. : R-1189, C-1250
TÜV Rheinland Certificate NO. : 10008375

NAME OF SITE : Ecom Sertech Corp. Hsin-Chu Lab.
(Spin-off from ITRI / ERSO on Apr. 01, 2003)
SITE LOCATION : Rm.258, Bldg.17, NO.195 , Sec. 4, Chung Hsing Rd.,
Chu-Tung Chen. Hsin-Chu, Taiwan 310 R.O.C.



1.6 Summary of Test Results

The EUT has been tested according to the following specifications :

APPLIED STANDARD : 47 CFR Part 15, Subpart B and Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
For Bluetooth Transmitter			
15.107 15.207	AC Power Conducted Emission Limit : Sec 15.107	PASS	Meet the requirement of limit
15.109 15.205 15.209	Transmitter Radiated Emissions Limit : Table 15.209	PASS	Meet the requirement of limit
15.247(a) 1(i)-(ii)	Transmitter 20dB Bandwidth Limit < 1MHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Limit : max. 30dBm	PASS	Meet the requirement of limit
15.247(a)1	Carrier Frequency Separation	PASS	Meet the requirement of limit
15.247(a) 1(ii)	Number of Hopping Frequency	PASS	Meet the requirement of limit
15.247(a) 1(ii)	Time of Occupancy (dwell time)	PASS	Meet the requirement of limit
15.247(c)	Band Edge Compliance	PASS	Meet the requirement of limit
15.247(c)	Out of Band Measurements	PASS	Meet the requirement of limit
For WLAN Transmitter			
15.107 15.207	AC Power Conducted Emission Limit : Sec 15.107	PASS	Meet the requirement of limit
15.247(a)(2)	Spectrum Bandwidth of a Orthogonal Frequency Division Multiplex System Limit : 6dB bandwidth > 500KHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Limit : max. 30dBm	PASS	Meet the requirement of limit
15.109 15.205 15.209	Transmitter Radiated Emissions Limit : Table 15.209	PASS	Meet the requirement of limit
15.247(d)	Power Spectral Density Limit : max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Out of Band Emission and Restricted Band Radiation Limit:20dB less than peak value of fundamental frequency Restricted band Limit:Table 15.209	PASS	Meet the requirement of limit

2. CONDUCTED POWERLINE TEST

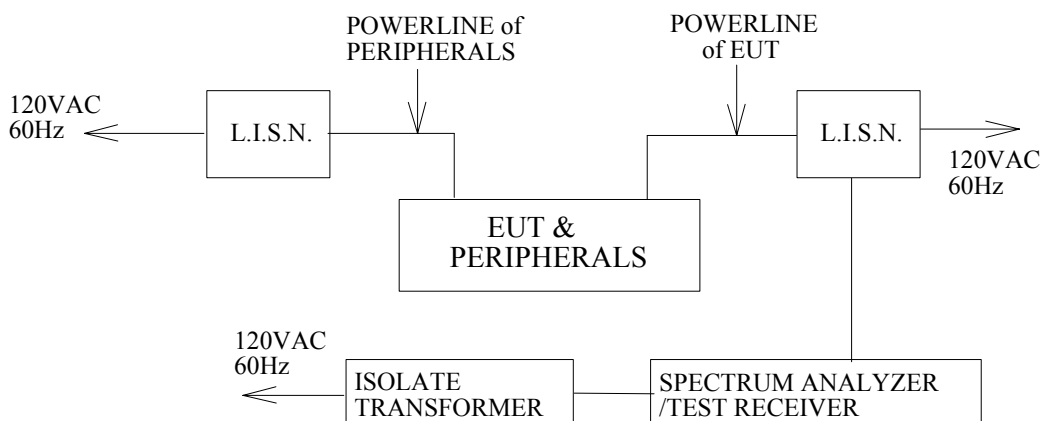
For DSSS and FHSS transmitter, this test item is required in FCC's Code of Regulation.
 For intentional device, according to § 15.207(a) Line Conducted Emission Limit is required to verify the EUT.

2.1 Test Equipments

The following test equipments are used during the conducted power line tests :

Manufacturer or Type	Model No.	Serial No.	Date of Calibration	Calibration Period	Remark
HP SPECTRUM ANALYZER & DISPLAY	8594E	3801A05627	April 26, 2004	1 Year	PRETEST
SOLAR ISOLATION TRANSFORMER	7032-1	N/A	N/A	N/A	FINAL
EMCO L.I.S.N.	3850/2	9311-1025 9401-1028	January 08, 2004 For Characteristic impedance	1 Year	FINAL
			May 18, 2004 For Insertion loss		
R & S TEST RECEIVER	ESHS 30	838550/003	February 11, 2004	1 Year	FINAL
KEENE SHIELDED ROOM	5983	No.1	N/A	N/A	FINAL
R & S PULSE LIMIT	EHS3Z2	357.8810.52	July 10, 2004	1 Year	FINAL
N TYPE COAXIAL CABLE	-----	-----	July 10, 2004	1 Year	FINAL
50Ω TERMINATOR	-----	-----	July 10, 2004	1 Year	FINAL

2.2 Test Setup



2.3 Conducted Power Line Emission Limit

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following :

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56	56-46
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

For intentional device, according to § 15.207(a) Line Conducted Emission Limit is same as above table.

2.4 Test Procedure

The test procedure is performed in a 12ft×12ft×8ft(L×W×H) shielded room. The EUT along with its peripherals were placed on a 1.0m(W)× 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

The test was performed in three modes.

Mode1: WLAN transmitting, Bluetooth Off

Mode2: WLAN Off, Bluetooth transmitting

Mode3: WLAN transmitting, Bluetooth transmitting

2.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is ±1.36dB.



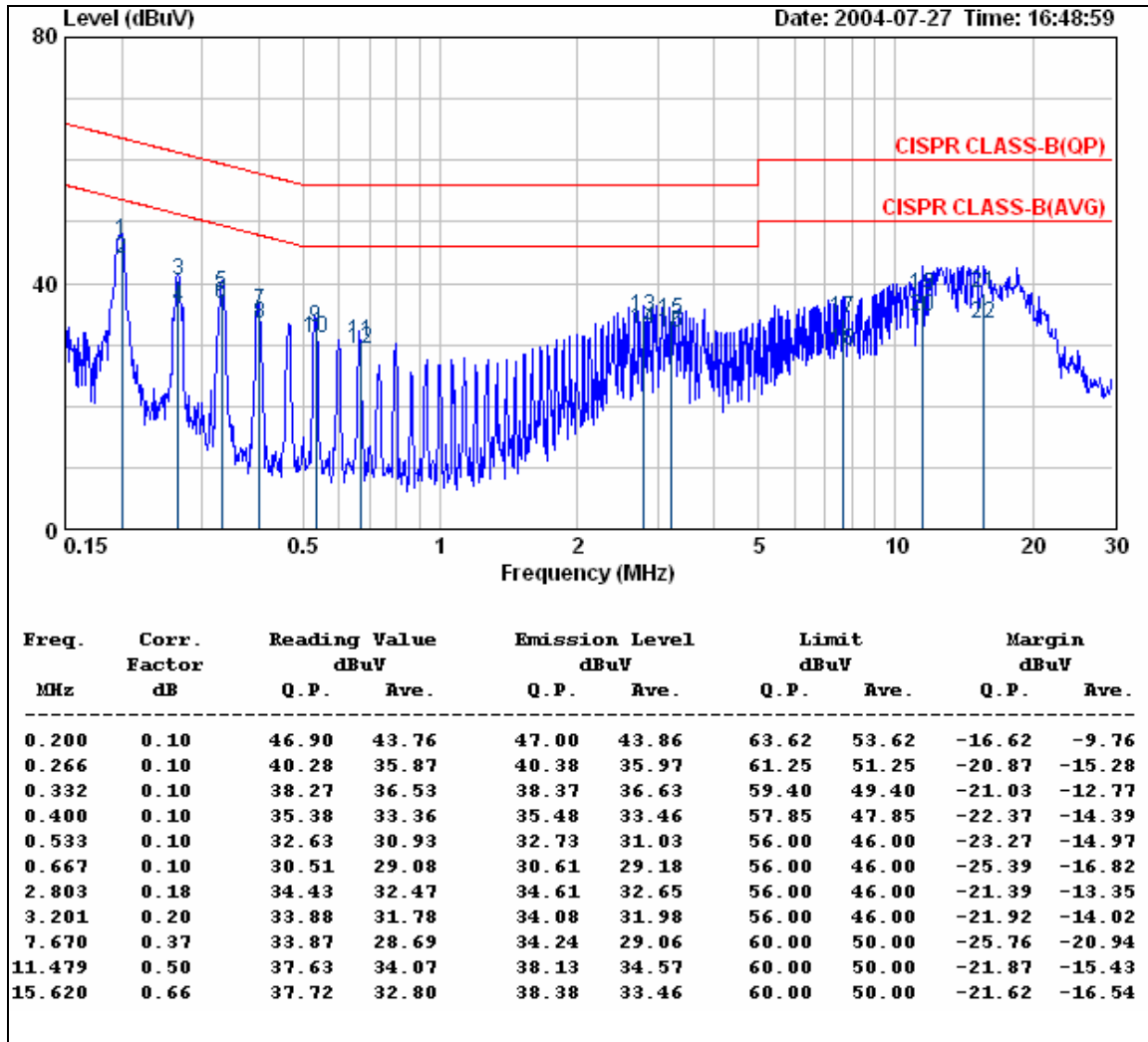
2.6 Test Results

2.6.1 Model1, WLAN transmitting, Bluetooth Off

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/07/27
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	30°C, 60%

LINE



REMARKS :

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The WLAN module is in TX mode(2412MHz), Bluetooth module off.
4. For 802.11b mode.
5. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.



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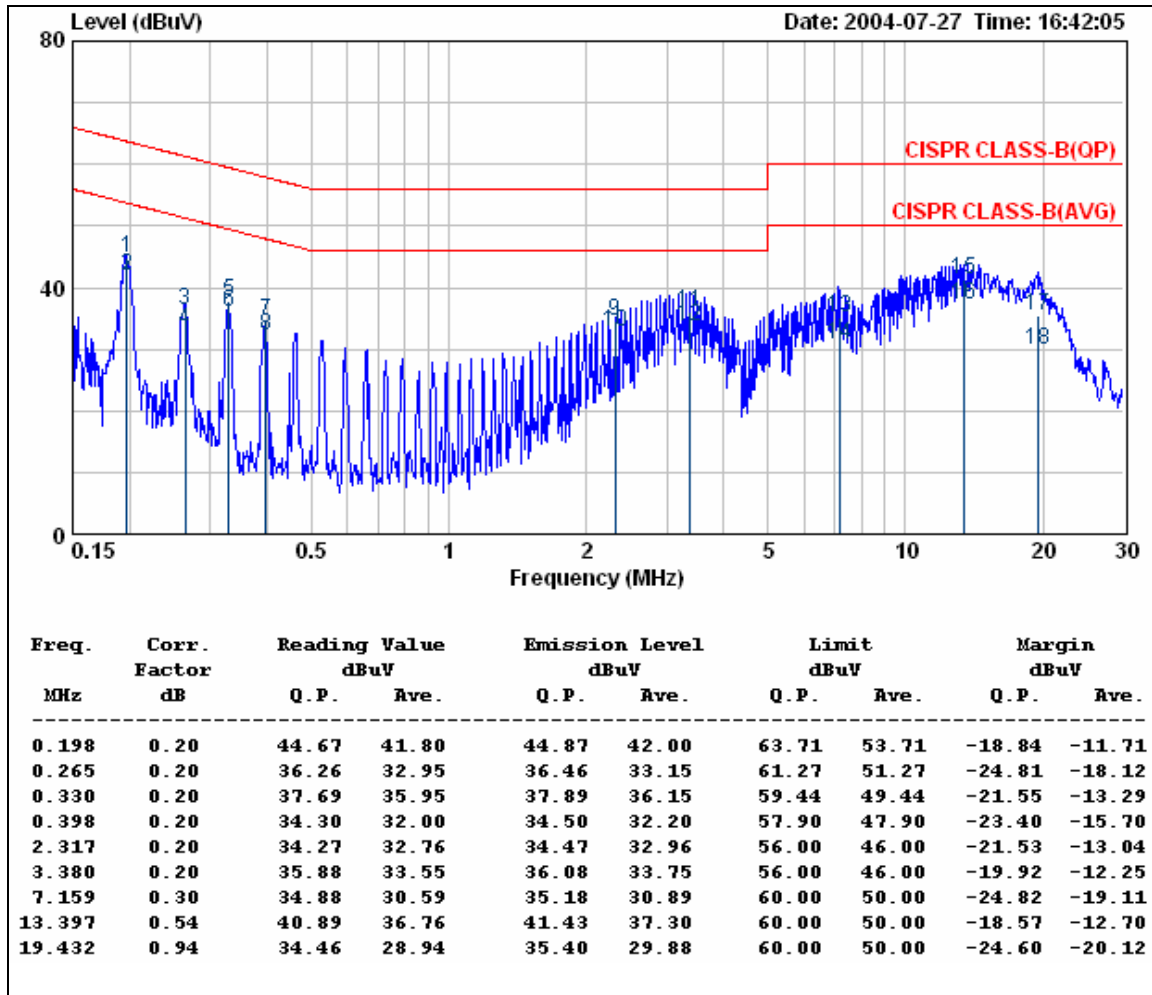
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FCC ID : I4L-MS6855
 Report No. : ER04-07-054FRF
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The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/07/27
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	30°C, 60%

NEUTRAL



REMARKS :

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The WLAN module is in TX mode(2412MHz), Bluetooth module off.
4. For 802.11b mode.
5. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.



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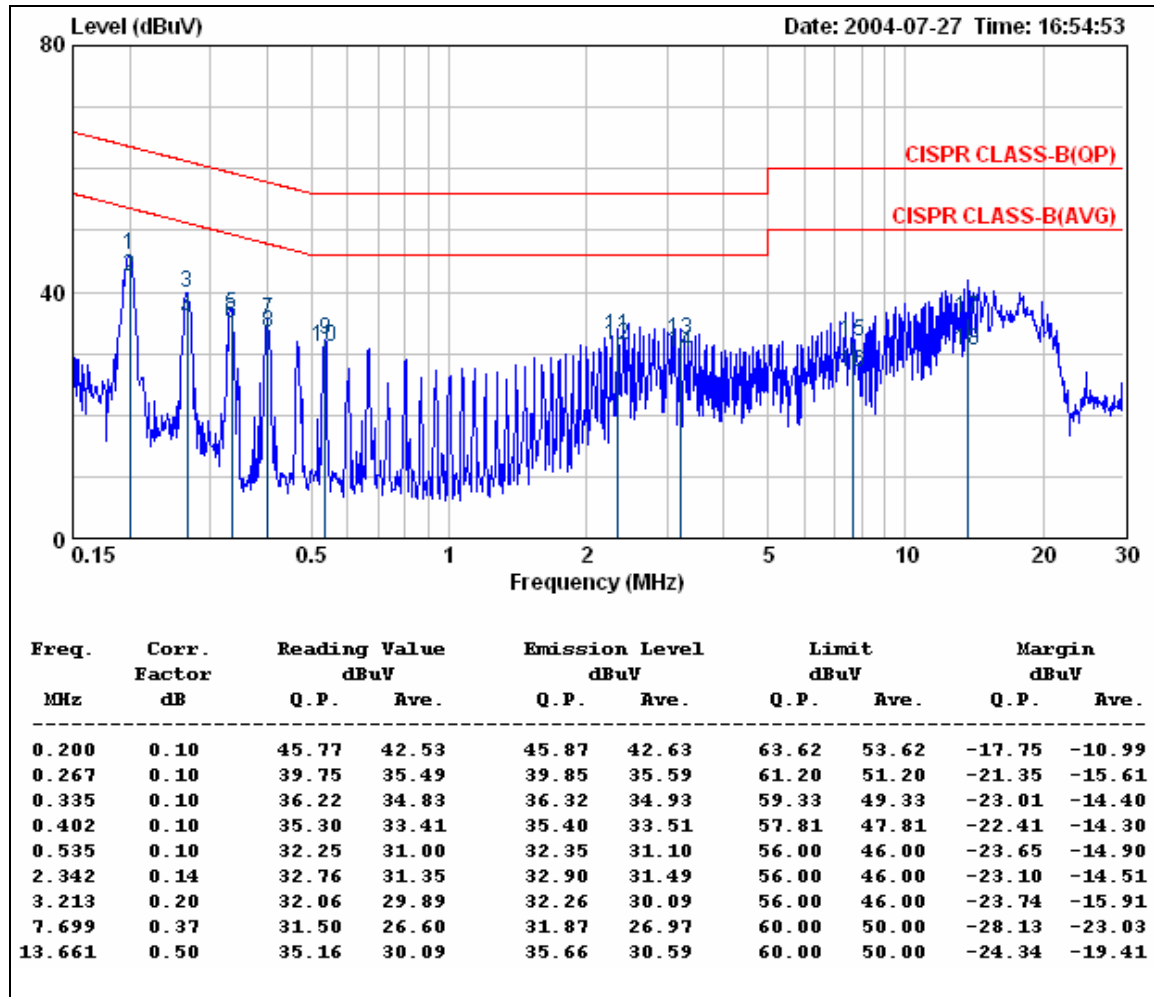
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Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	30°C, 60%

LINE



REMARKS :

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The WLAN module is in TX mode(2412MHz), Bluetooth module off.
4. For 802.11g mode.
5. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.



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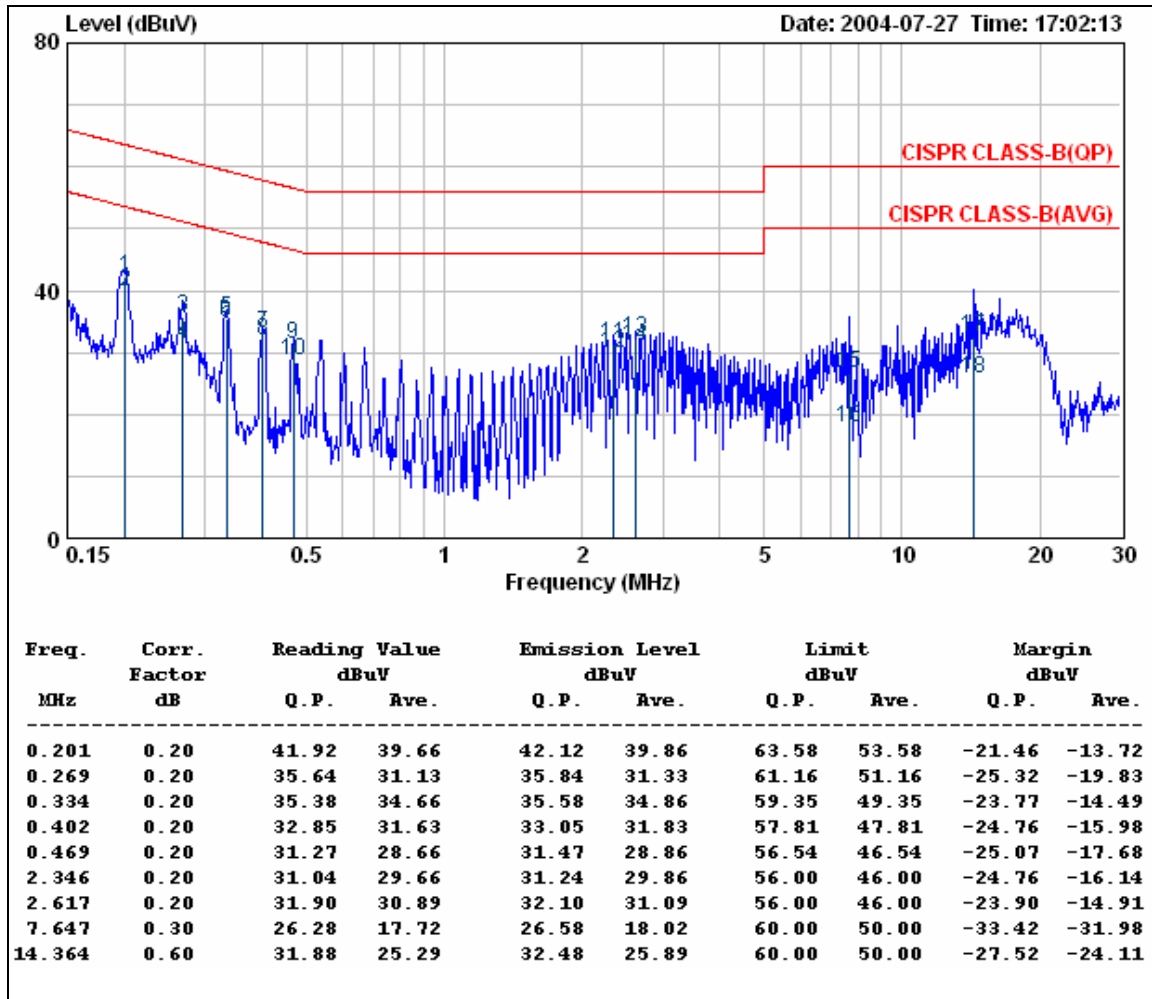
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The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/07/27
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	30°C, 60%

NEUTRAL



REMARKS :

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The WLAN module is in TX mode(2412MHz), Bluetooth module off.
4. For 802.11g mode.
5. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.

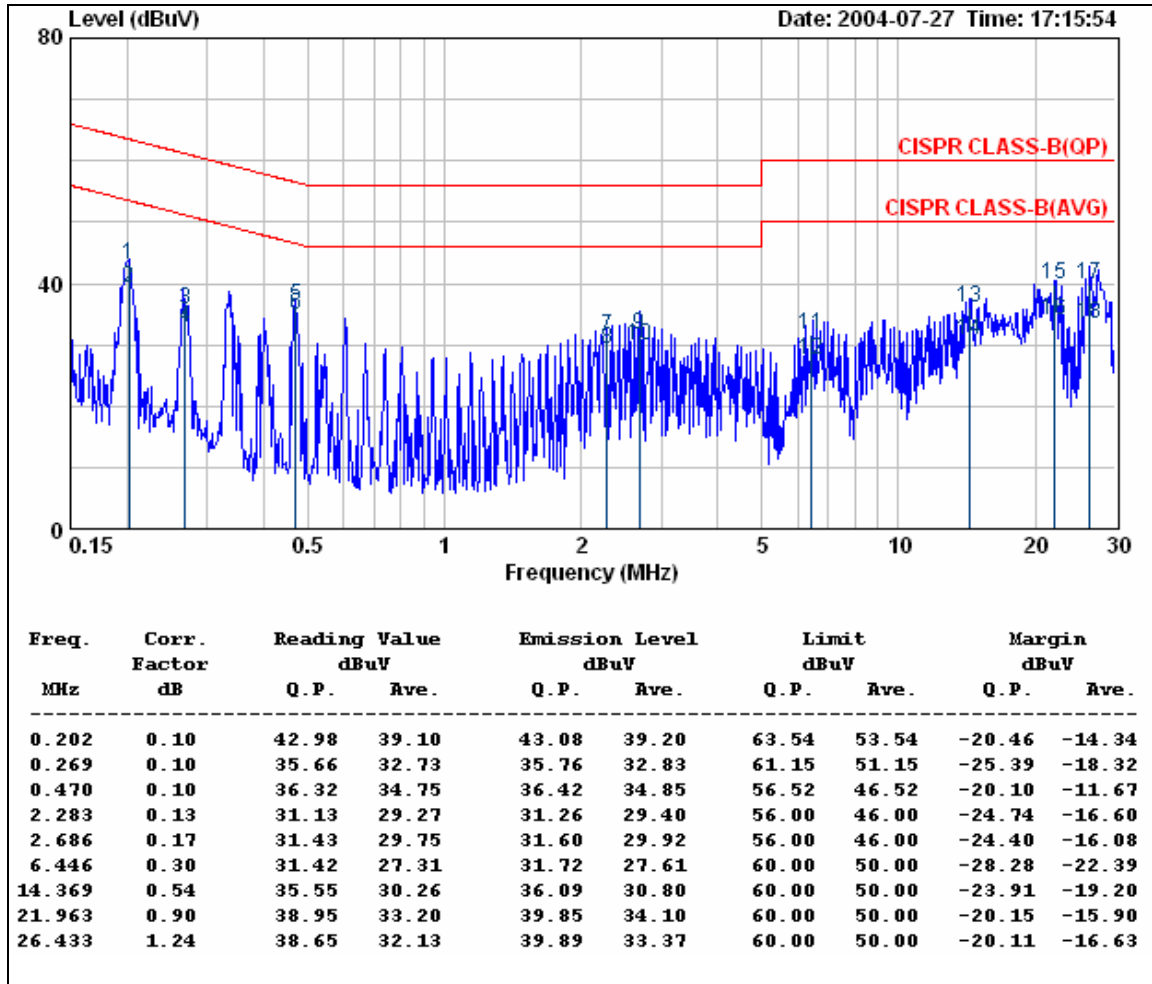


2.6.2 Mode2, WLAN Off, Bluetooth transmitting

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/07/27
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	30°C, 60%

LINE



REMARKS :

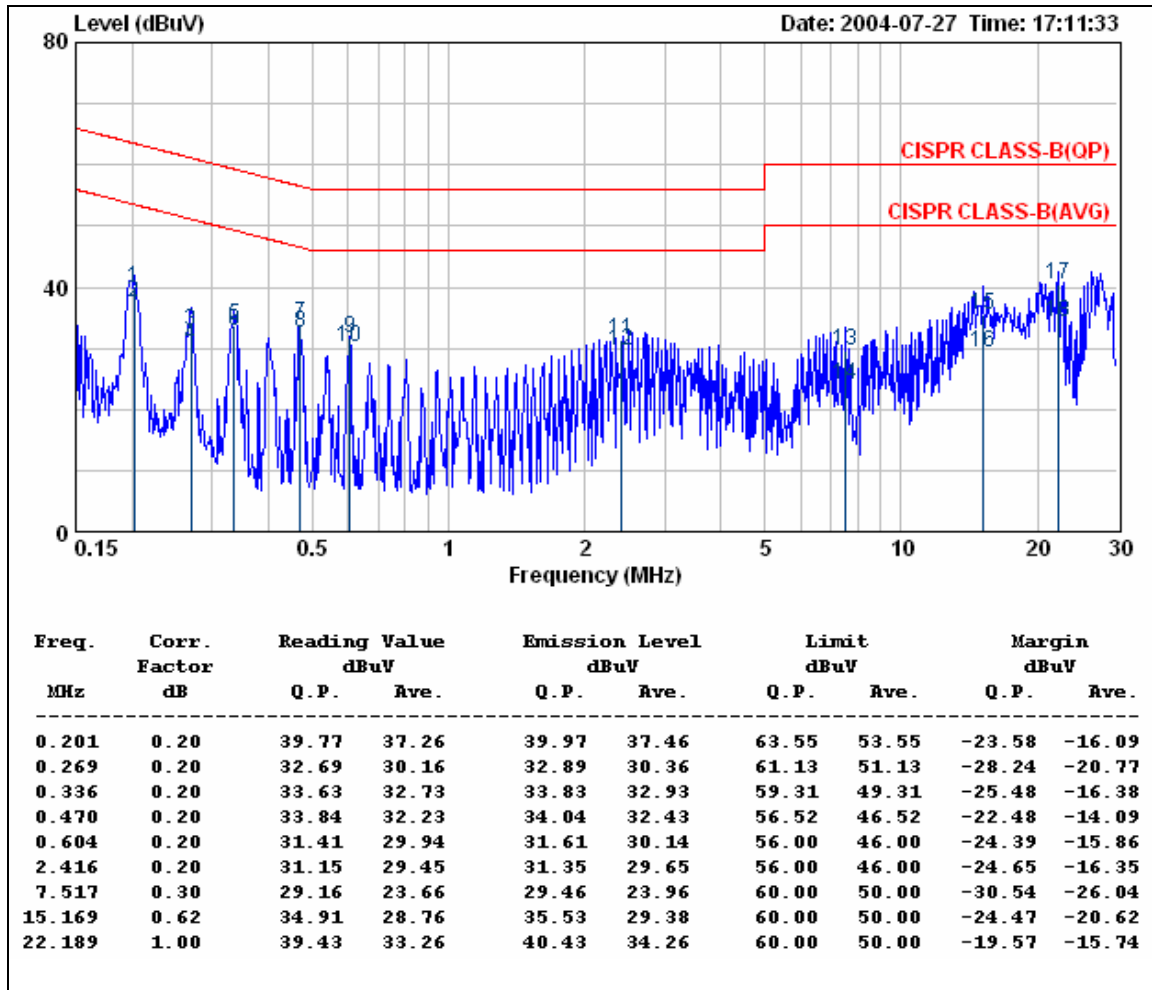
1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The Bluetooth module is in TX mode (2402MHz), WLAN module off.
4. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.



The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/07/27
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	30°C, 60%

NEUTRAL



REMARKS :

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The Bluetooth module is in TX mode (2402MHz), WLAN module off.
4. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.

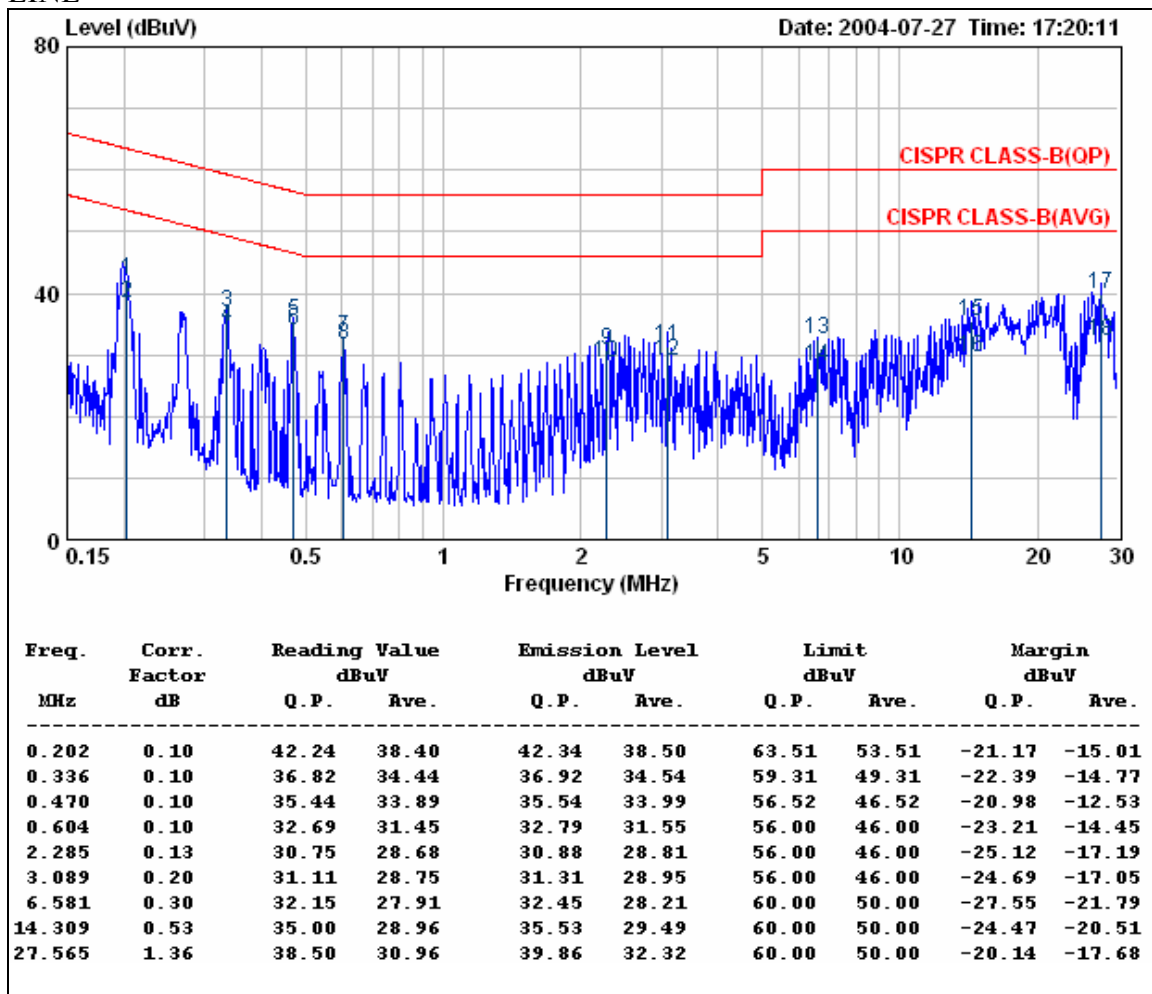


2.6.3 Mode3, WLAN transmitting, Bluetooth transmitting

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/07/27
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	30°C, 60%

LINE



REMARKS :

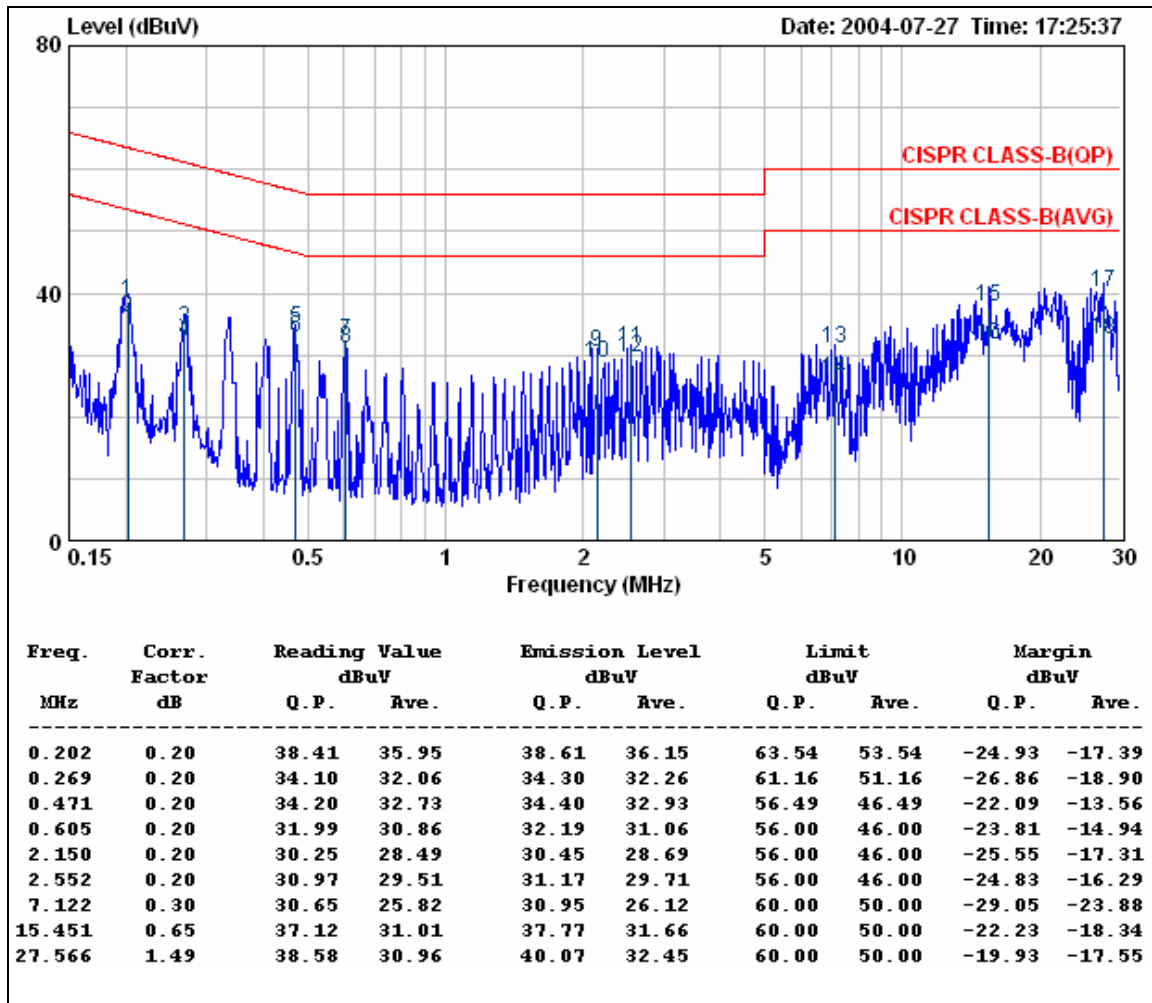
1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The Bluetooth module is in TX mode(2402MHz).
 The WLAN module is in TX mode(2412MHz) for 802.11g mode.
4. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.
5. The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/07/27
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	30°C, 60%

NEUTRAL



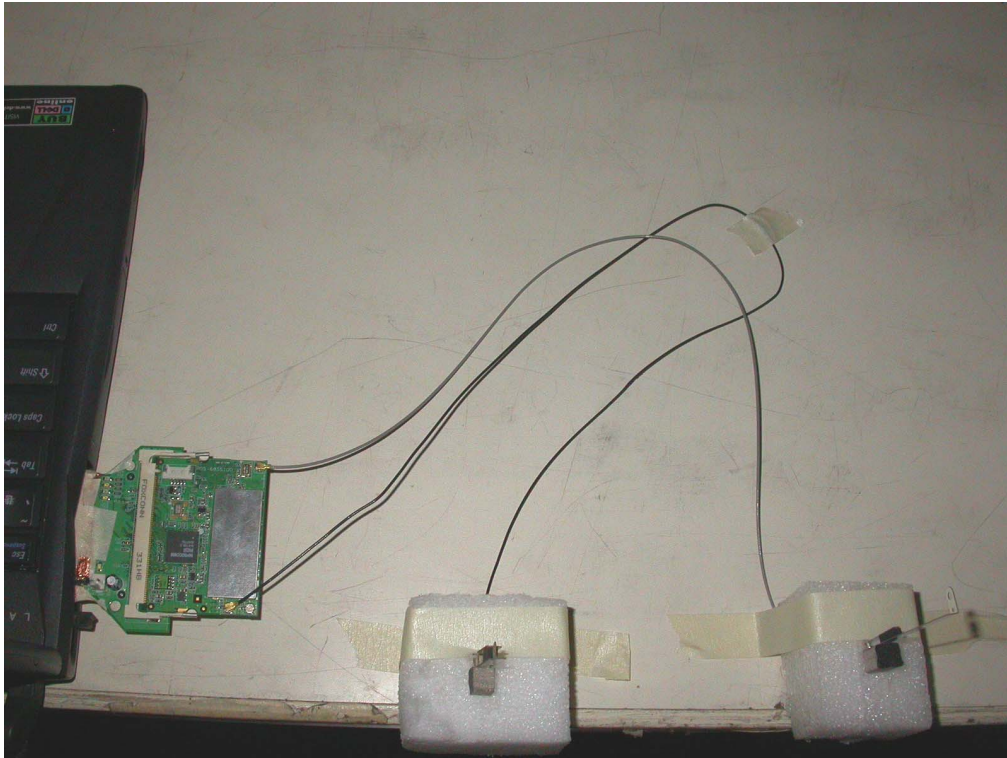
REMARKS :

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The Bluetooth module is in TX mode(2402MHz).
The WLAN module is in TX mode(2412MHz) for 802.11g mode.
4. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.
5. The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.

2.7 Photos of Conduction Test

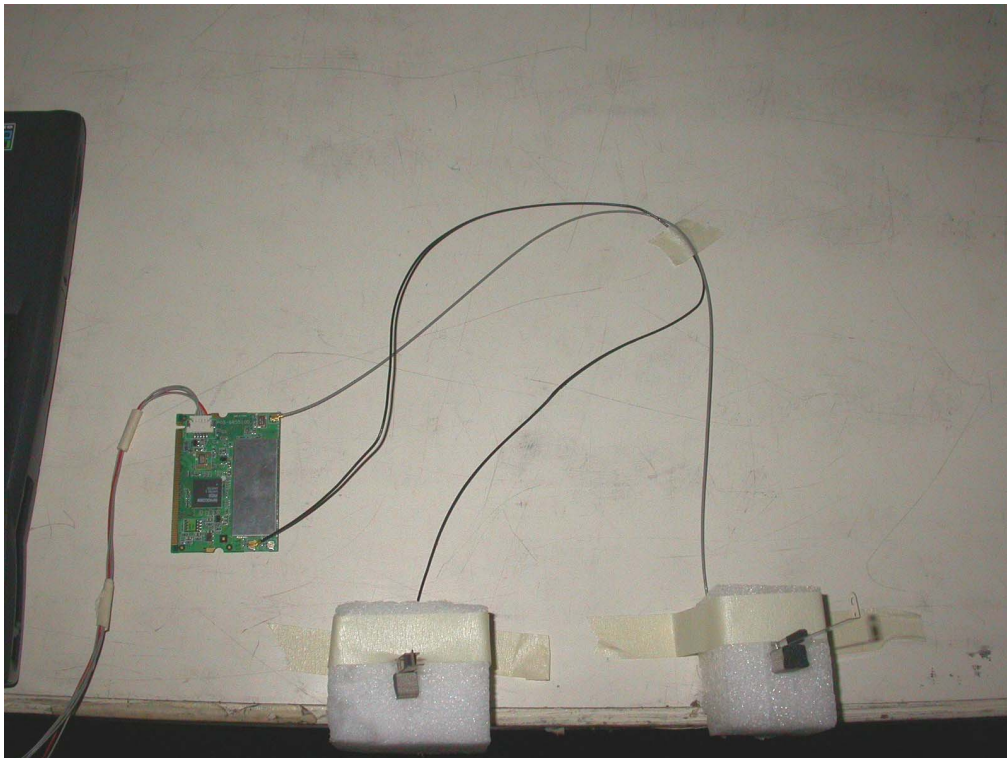
WLAN mode :





Bluetooth mode :





COMBO mode :





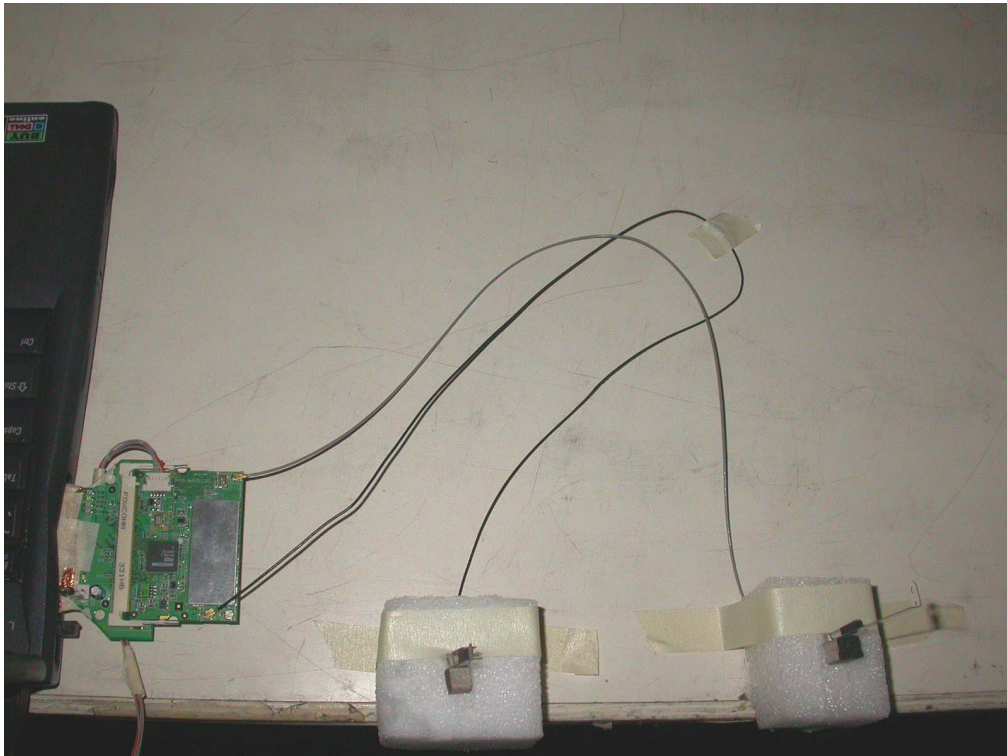
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3. 20dB BANDWIDTH MEASUREMENT for FHSS

Test Requirement: 15.247(a)(1)(ii)

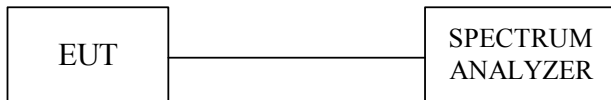
3.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2003

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

3.2 Test Setup



3.3 Limits of 20db Bandwidth Measurement

Limit: 20dB band width < 1MHz

3.4 Test Procedure

The 20dB bandwidth was measured with a spectrum analyzer connected to RF antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate frequencies.

The highest, middle, and lowest channel of the Bluetooth transmitter was verified in transmitting modes. The WLAN module was powered off while testing.

The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 20dB bandwidth of the emission was determined.



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3.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is ± 10 KHz.

3.6 Test Results

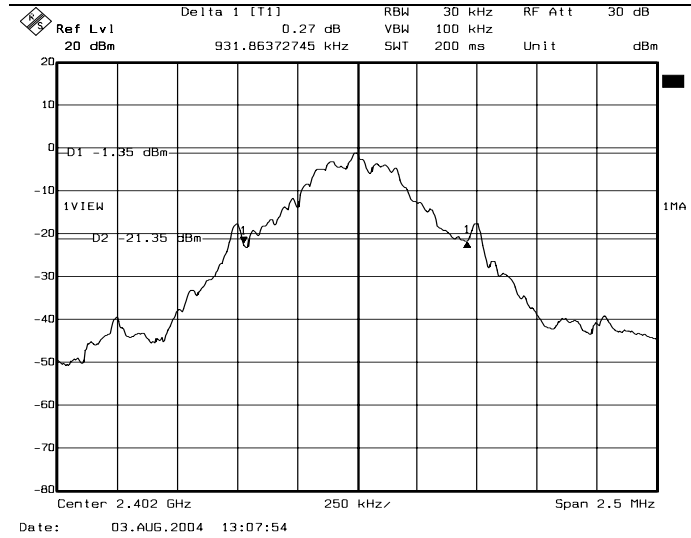
Refer to attached spectrum analyzer data chart.

Input Power (System)	3.3VDC (From Notebook)	Environmental Conditions	30°C, 60%RH
Tested By	Ken Tu		

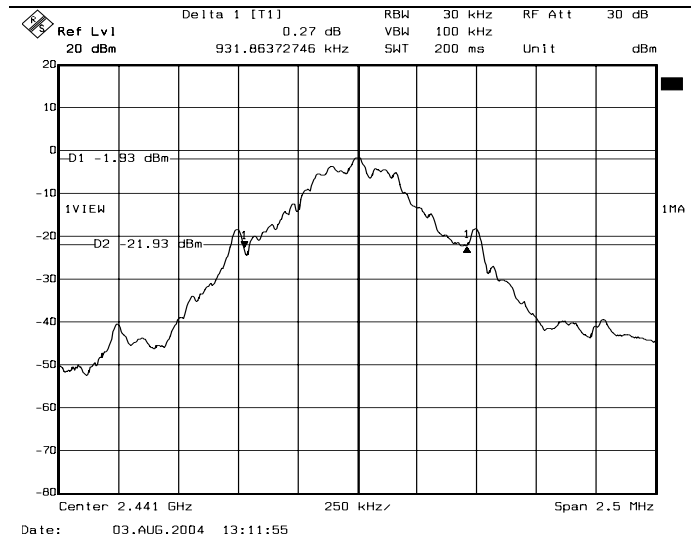
Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)	Maximum Limit (MHz)	Pass / Fail
00(Low)	2402	0.932	<1	PASS
39(Mid)	2441	0.932	<1	PASS
78(High)	2480	0.932	<1	PASS



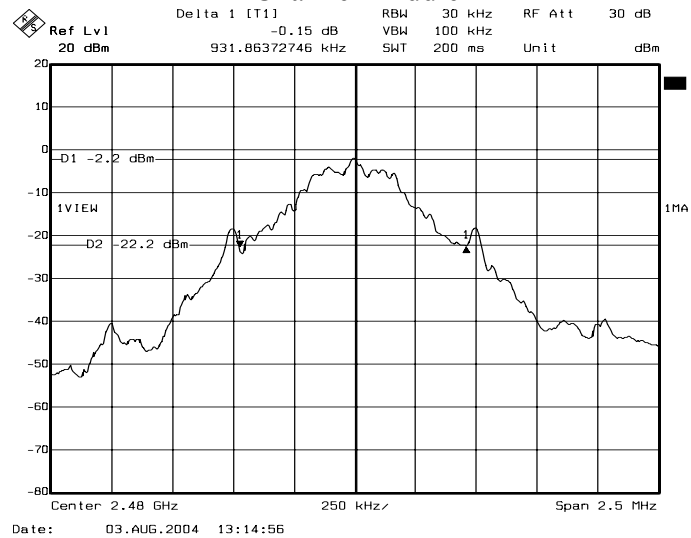
3.7 Photo of 20db Bandwidth Measurement



Channel Low



Channel Middle



Channel High

4. 6dB BANDWIDTH MEASUREMENT

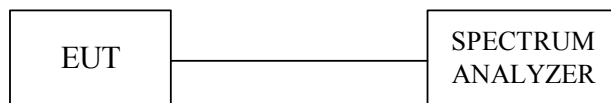
4.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2004

Note : 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.2 Test Setup



4.3 Limits of 6db Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500KHz

4.4 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 10 MHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

The highest, middle, and lowest channel of the WLAN transmitter was verified in transmitting modes. The Bluetooth module was powered off while testing.



4.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is $\pm 200\text{KHz}$.

4.6 Test Results

Input Power (System)	3.3VDC (From Notebook)	Environmental Conditions	30°C, 60%RH
Tested By	Ken Tu		

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.74	0.5	PASS
6	2437	10.18	0.5	PASS
11	2462	10.10	0.5	PASS

Note :

1. For 802.11b Mode

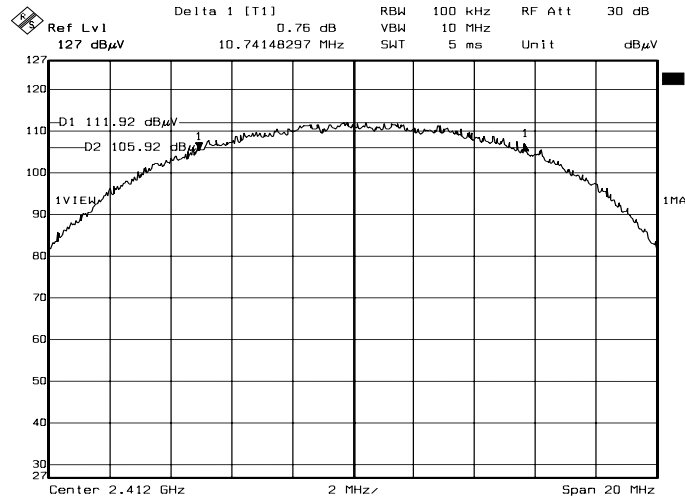
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.43	0.5	PASS
6	2437	16.51	0.5	PASS
11	2462	16.47	0.5	PASS

Note :

1. For 802.11g Mode

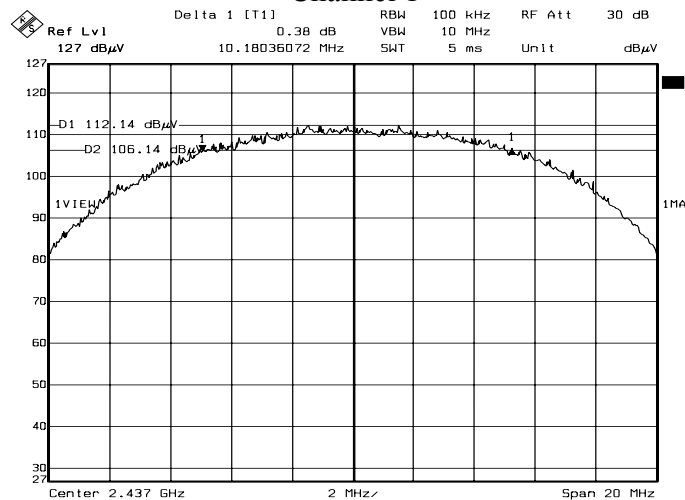


4.7 Photo of 6db Bandwidth Measurement



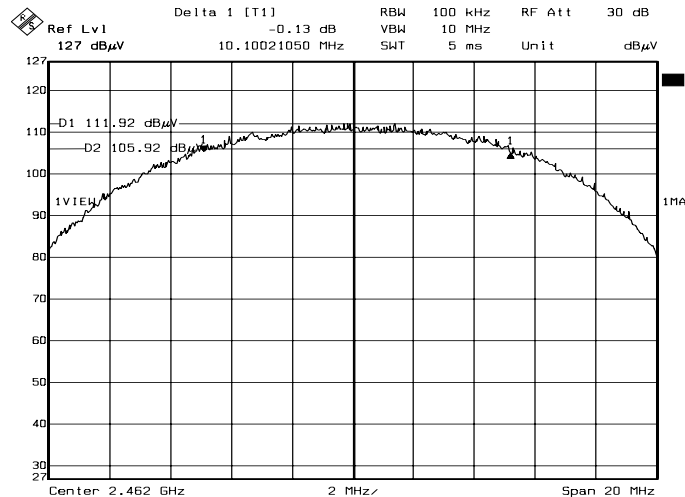
Date: 28.JUL.2004 07:55:19

Channel 1



Date: 28.JUL.2004 08:12:18

Channel 6



Date: 28.JUL.2004 08:17:02

Channel 11

Note: For 802.11b Mode



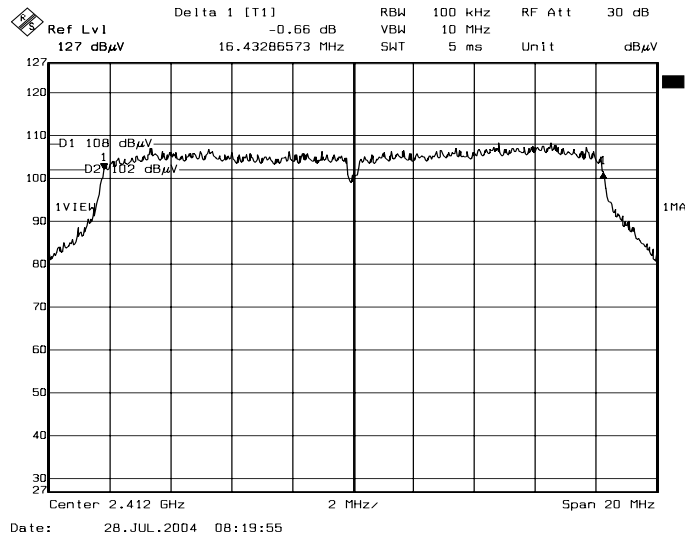
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TEL:886-3-5918012 FAX: 886-3-5825720

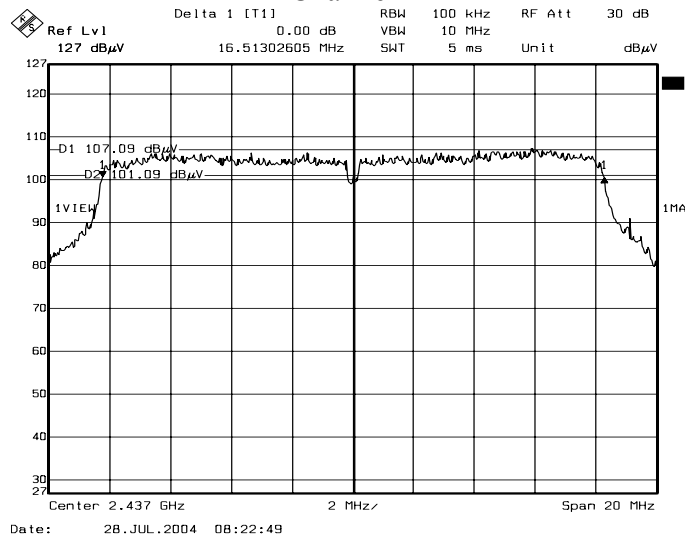
FCC ID : I4L-MS6855

Report No. : ER04-07-054FRF

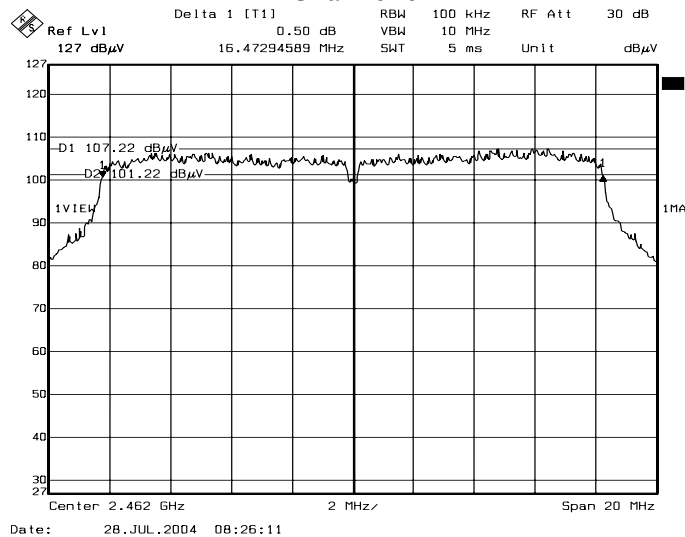
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Channel 1



Channel 6



Channel 11

Note: For 802.11g Mode

5. MAXIMUM PEAK OUTPUT POWER

For DSSS or OFDM and FHSS transmitter, this test item is required in FCC's Code of Regulation.

Test Requirement: 15.247(b)(1) for FHSS

Test Requirement: 15.247(b)(3) for Digital Modulation

5.1 Test Equipments

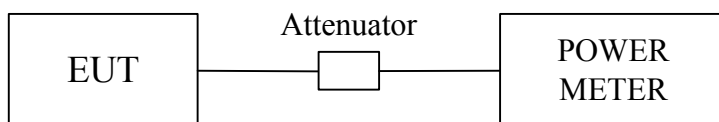
Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2004
Agilent ATTENUATOR	8491B	57321	CAL. ON USE
ANRITSU	ML2487A MAL2491A	6K00001783 030982	February 10, 2004

Note : 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

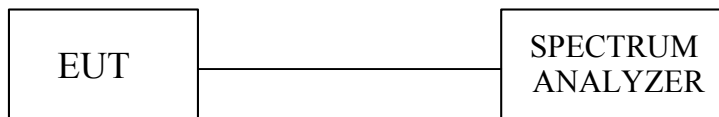
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.2 Test Setup

I. WLAN mode



II. Bluetooth mode



5.3 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Limit is 1W(30dBm) for Frequency Hopping Spread Spectrum System in 2400 ~ 2483.5MHz employing at least 75 hopping channels.

The Maximum Peak Output Power Limit is 1W (30dBm) for Direct Sequence Spread Spectrum System .



5.4 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency, A spectrum analyzer was used to record the shape of the transmit signal see 4.7 for the measurement set up.

According to FCC recommended DTS test procedure, a peak power meter is used to measure the peak conducted power.

5.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is $\pm 1.82\text{dB}$.

5.6 Test Results

5.6.1 For WLAN Transmitter

Input Power (System)	3.3VDC (From Notebook)	Environmental Conditions	30°C, 60%RH
Tested By	Ken Tu		

Channel	Channel Frequency (MHz)	Average Power Output (dBm)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
1	2412	15.62	17.50	30	PASS
6	2437	15.04	16.69	30	PASS
11	2462	14.88	16.81	30	PASS

- Note :
- For 802.11b mode.
 - At final test to get the worst-case emission at 11Mbps.
 - Cable loss = 0.5dB, Attenuator = 10dB.
 - The results are calculated as the following equation :

$$\text{Peak Power Output} = \text{Peak Power Reading} + \text{Cable loss} + \text{Attenuator}$$



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Channel	Channel Frequency (MHz)	Average Power Output (dBm)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
1	2412	14.73	21.39	30	PASS
6	2437	14.78	21.57	30	PASS
11	2462	14.50	21.40	30	PASS

- Note :
1. For 802.11g mode.
 2. At final test to get the worst-case emission at 6Mbps.
 3. Cable loss = 0.5dB, Attenuator = 10dB.
 4. The results are calculated as the following equation :
 $Peak\ Power\ Output = Peak\ Power\ Reading + Cable\ loss + Attenuator$

5.6.2 For Bluetooth Transmitter

Input Power (System)	3.3VDC (From Notebook)	Environmental Conditions	30°C, 60%RH
Tested By	Ken Tu		

Cable loss = 0.5dB

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
00(Low)	2402	0.18	30	PASS
39(Mid)	2441	-0.40	30	PASS
78(High)	2480	-0.66	30	PASS

- Note :
1. The result was calculated as follow :
 $Peak\ Power\ Output = Peak\ Power\ Reading + Cable\ loss$
 2. Refer to attached spectrum analyzer data chart.



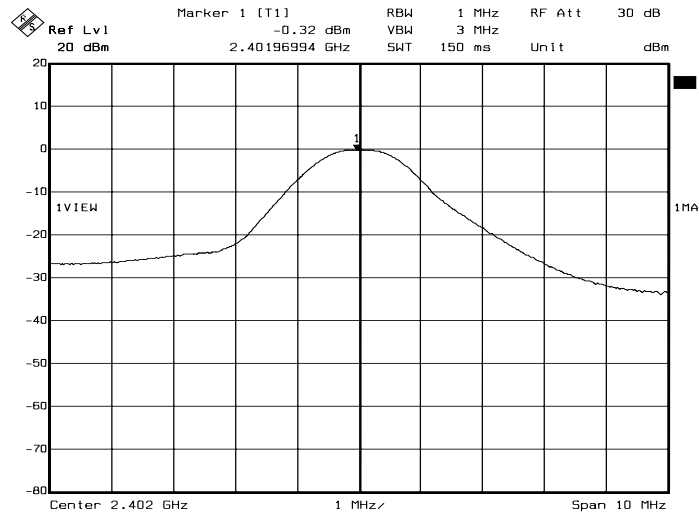
Ecom Sertech Corp.

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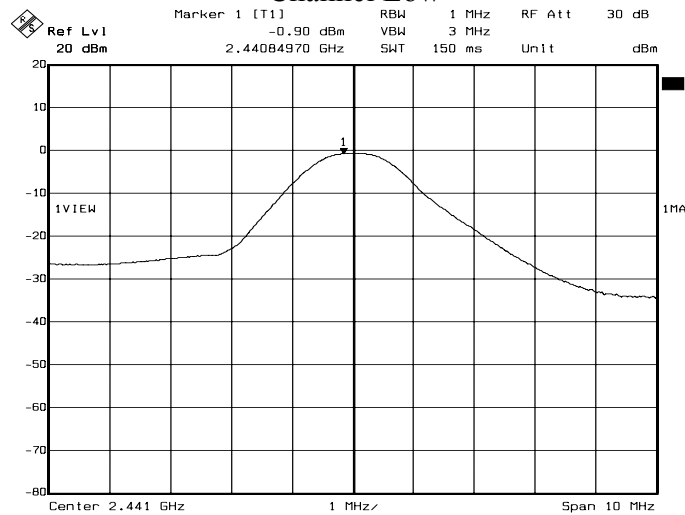
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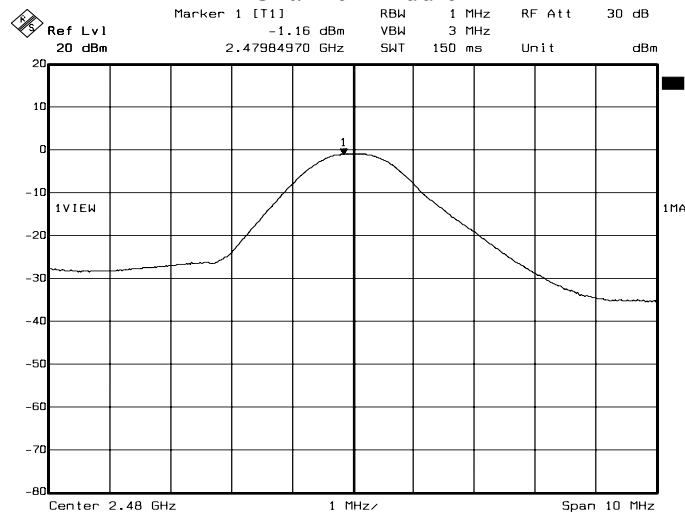
Date: 03.AUG.2004 13:18:19

Channel Low



Date: 03.AUG.2004 13:20:05

Channel Middle



Date: 03.AUG.2004 13:21:19

Channel High

6. POWER SPECTRAL DENSITY MEASUREMENT

6.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2003

Note : 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

6.2 Test Setup



6.3 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm/3kHz.



6.4 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3KHz RBW and 30KHz VBW, set sweep time=span / 3KHz.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

6.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is ± 1.82dB.

6.6 Test Results

Input Power (System)	3.3VDC (From Notebook)	Environmental Conditions	30°C, 60%RH
Tested By	Ken Tu		

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maxmum Limit (dBm)	Pass / Fail
1	2412	-8.92	8	PASS
6	2437	-8.94	8	PASS
11	2462	-8.89	8	PASS

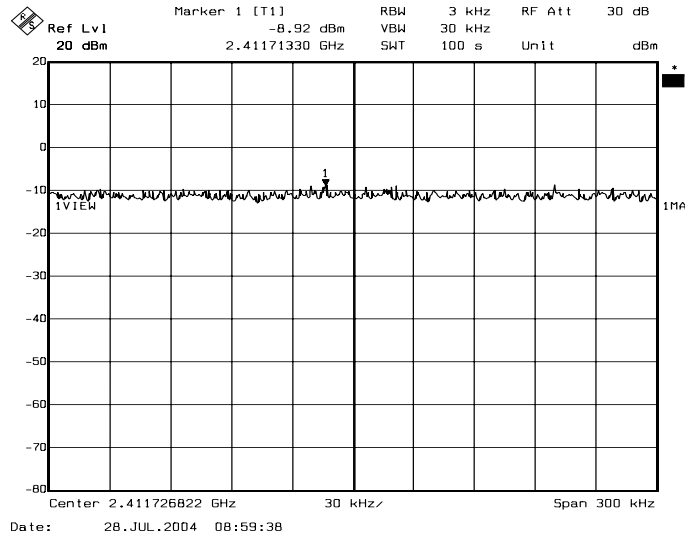
Note: For 11Mbps (802.11b mode) at finial test to get the worst-case emission at 11Mbps.

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maxmum Limit (dBm)	Pass / Fail
1	2412	-9.81	8	PASS
6	2437	-10.42	8	PASS
11	2462	-10.23	8	PASS

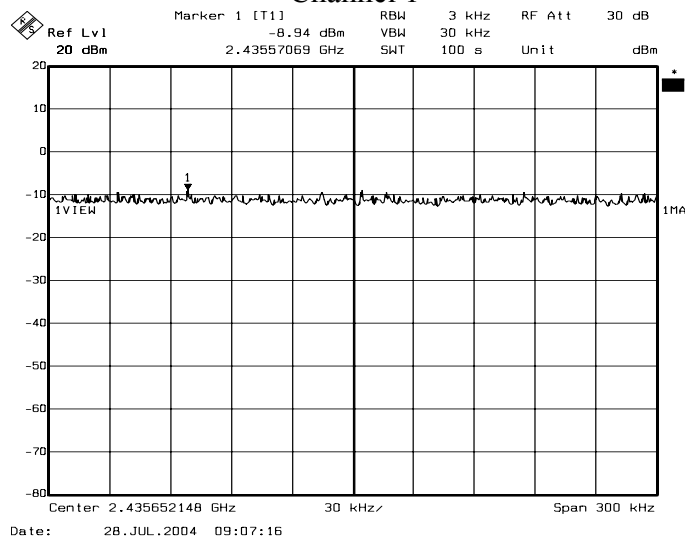
Note: For 54Mbps (802.11g mode) at finial test to get the worst-case emission at 6Mbps.



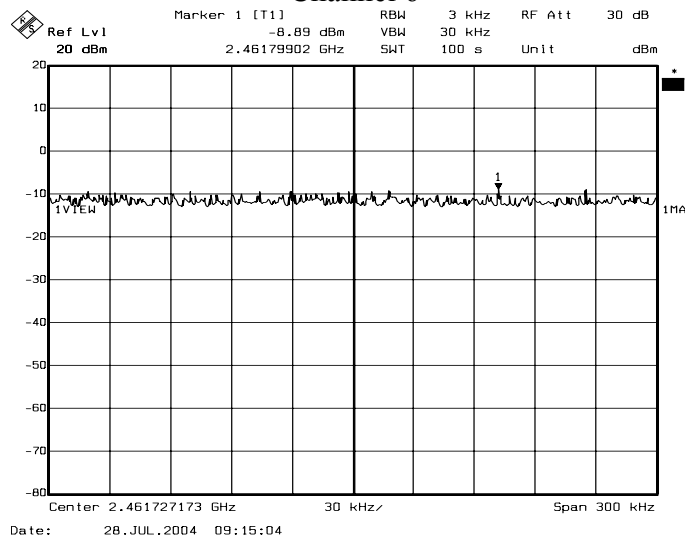
6.7 Photo of Power Spectral Density Measurement



Channel 1



Channel 6



Channel 11

Note: For 802.11b Mode



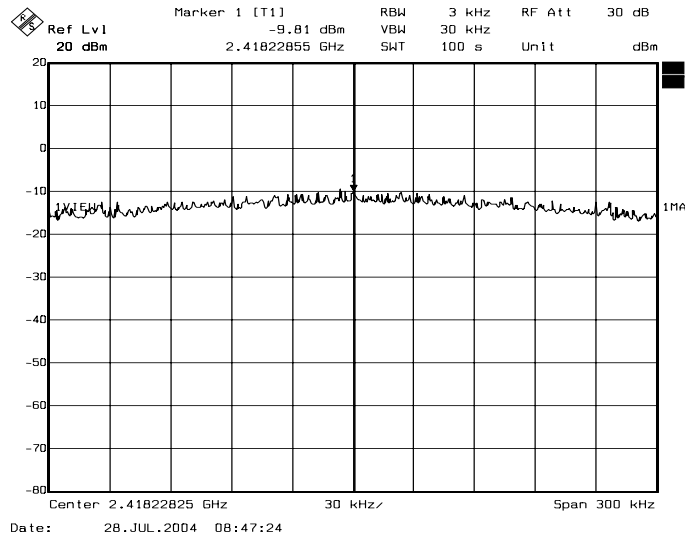
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TEL:886-3-5918012 FAX: 886-3-5825720

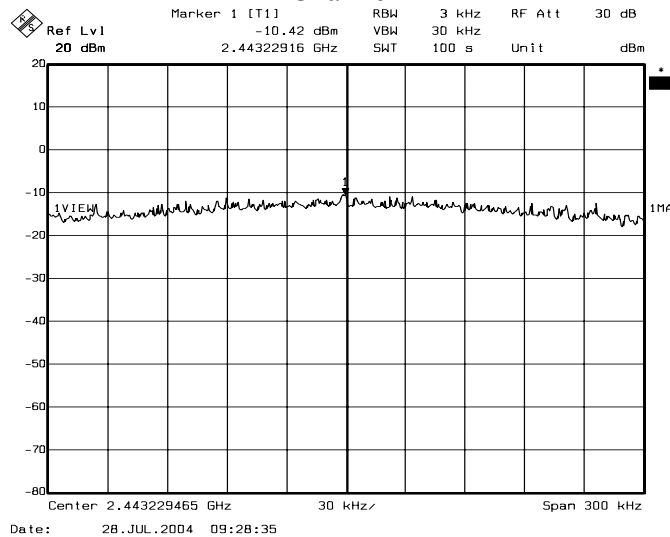
FCC ID : I4L-MS6855

Report No. : ER04-07-054FRF

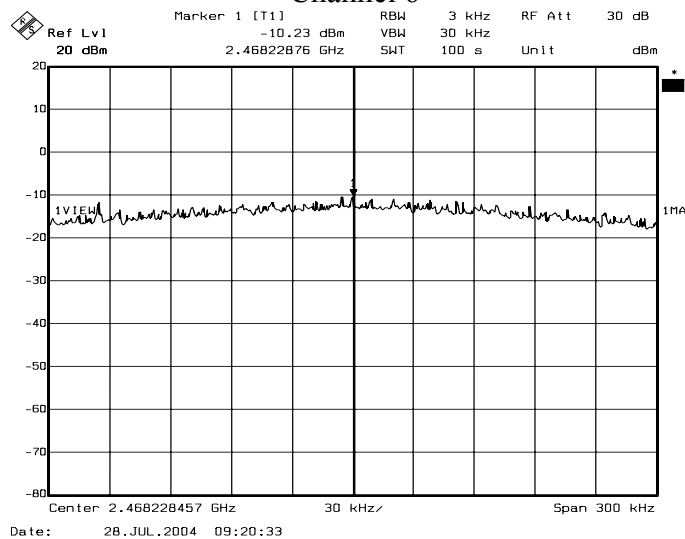
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Channel 1



Channel 6



Channel 11

Note: For 802.11g Mode

7. HOPPING CHANNEL SEPARATION for FHSS

Test Requirement: 15.247(a)(1)

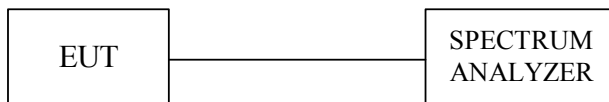
7.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2004

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

7.2 Test Setup



7.3 Limits of Hopping Channel Separation

According to 15.247(a)(1), frequency hopping system shall have, hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

7.4 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. Because of the property of test software and hardware, the TX signal can not be modulated while test.
4. By using the MaxHold function record the separation of adjacent channels.
5. Measure the frequency difference of these two adjacent channels by spectrum analyzer MARK function. And then plot the result on spectrum analyzer screen.

Repeat above procedures until all frequencies measured were complete.

7.5 Uncertainty of Conducted Emission

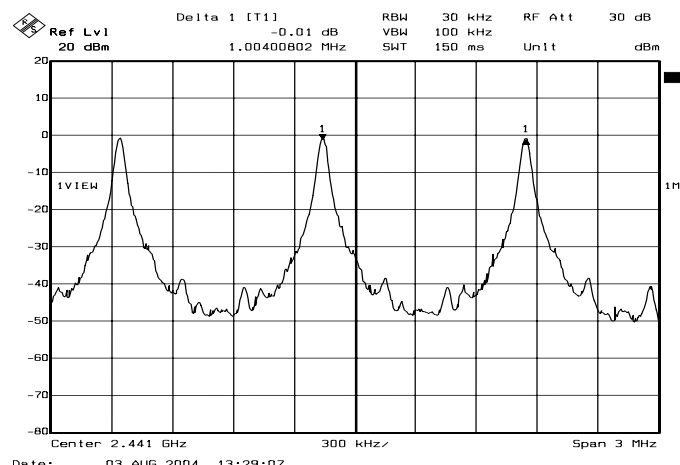
The uncertainty of conducted emission is ± 10 KHz.

7.6 Test Results

Refer to section 3, 20dB bandwidth measurement, the measured channel separation should be greater than 20dB bandwidth or Minimum bandwidth.

Channel	Adjacent Hopping Channel Separation (kHz)	20dB bandwidth (kHz)	Minimum Bandwidth	Result
2441MHz (Mid)	1004 kHz	932 kHz	25 kHz	PASS

7.7 Photo of Hopping Channel Separation



Channel (Mid)



8. NUMBER OF HOPPING FREQUENCY for FHSS

Test Requirement: 15.247(a)(1)(ii)

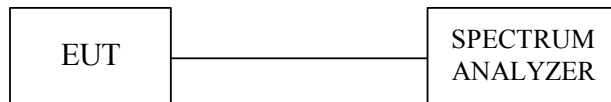
8.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ TEST RECEIVER	ESMI	842088/005 841978/008	JUL. 18, 2003

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

8.2 Test Setup



8.3 Limits of Number of Hopping Frequency Used

According to 15.247(a)(1)(ii), for frequency hopping system operating in the 2400-2483.5MHz and 5725-5850 MHz bands shall use at least 75 hopping frequencies

8.4 Test Procedure

1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set the spectrum analyzer on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the spectrum analyzer on View mode and then plot the result on spectrum analyzer screen.
5. Repeat above procedures until all frequencies measured were complete.

8.5 Uncertainty of Conducted Emission

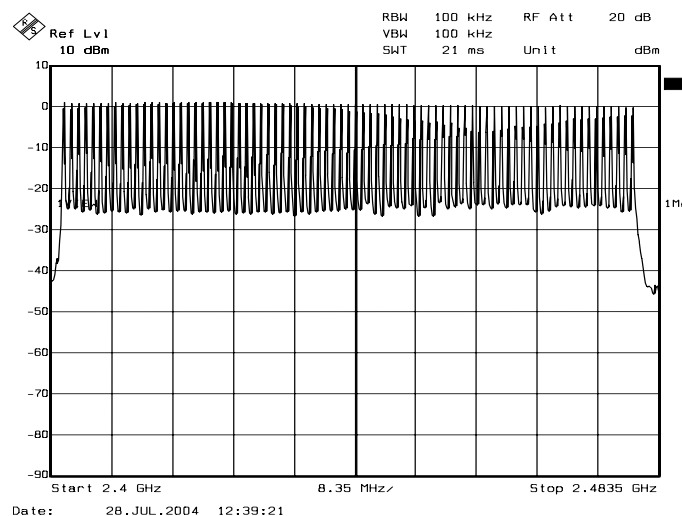
The uncertainty is not applicable.

8.6 Test Results

Refer to attached graph.

There are 79 hopping frequencies in a hopping sequence.

8.7 Photo of Number of Hopping Frequency Used



9. DWELL TIME ON EACH CHANNEL for FHSS

Test Requirement: 15.247(a)(1)(ii)

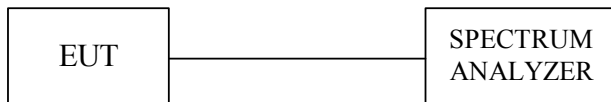
9.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2004

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

9.2 Test Setup



9.3 Limits of Dwell Time On Each Channel

According to 15.247(a)(1)(ii), for frequency hopping system operating in the 2400-2483.5MHz and 5725-5850 MHz band, the average time of occupancy on any frequency shall not be greater than **0.4** second within a 31.6 second period



9.4 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of spectrum analyzer on any frequency be measured and set spectrum analyzer to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.
6. The Bluetooth USB dongle has 3 type of payload, DH1, DH3 and DH5. The hopping rates is 1600 per second. The longer the payload is, the slower the hopping rate is.

9.5 Uncertainty of Conducted Emission

The uncertainty of time is ± 5.25ms.

9.6 Test Results

Time of occupancy on the TX channel in 31.6sec = time domain slot length × hop rate ÷ number of hop per channel × 31.6

Refer to the attached graph.

The hopping rates of Bluetooth devices change with different types of payload. The longer the payload is, the slower the hopping rate. The hopping rate scenario is defined in Bluetooth core specification.

Transmitting Frequency	Packet type	Dwell time (ms)	Time of occupancy on the TX channel in 31.6sec (ms)	Limit for Time of occupancy on the TX channel in 31.6sec (ms)	Results
2441MHz	DH1	0.370	112.41	400	PASS
2441MHz	DH3	1.633	216.28	400	PASS
2441MHz	DH5	2.895	308.80	400	PASS

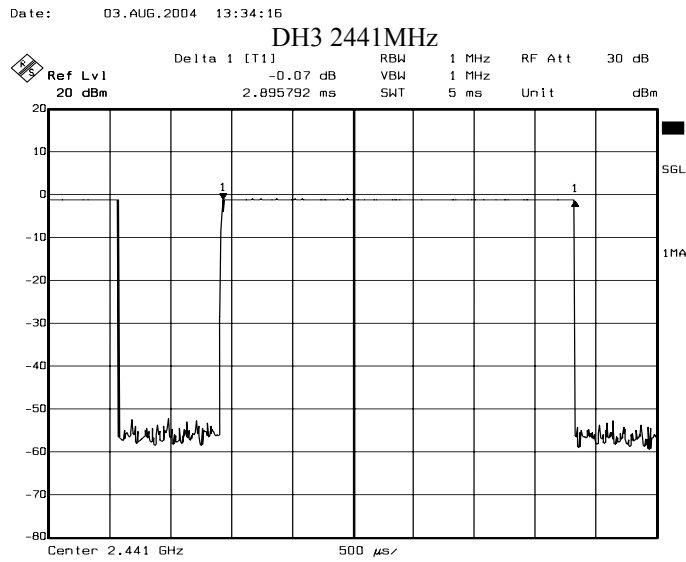
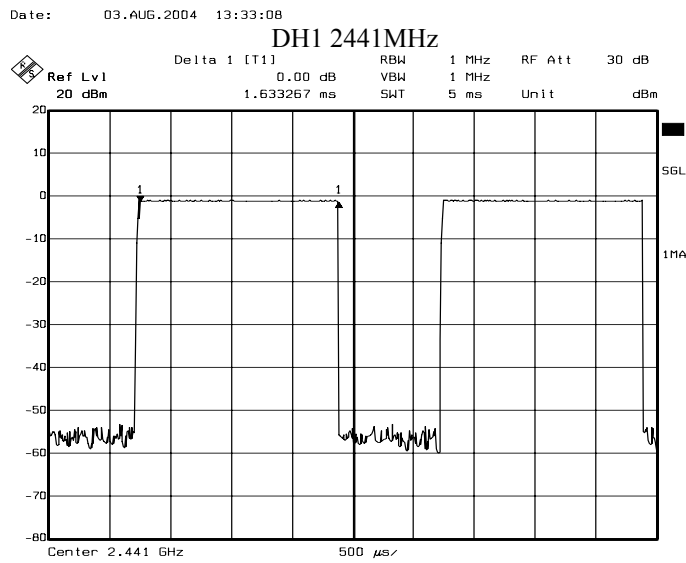
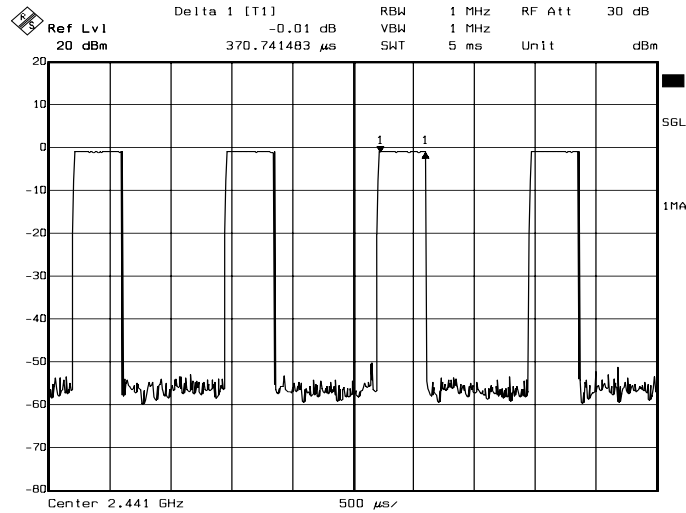
DH1 Dwell time = 0.370 ms × (1600÷2) ÷ 79 × 31.6 = 112.41 (ms)

DH3 Dwell time = 1.633 ms × (1600÷4) ÷ 79 × 31.6 = 216.28 (ms)

DH5 Dwell time = 2.895 ms × (1600÷6) ÷ 79 × 31.6 = 308.80 (ms)



9.7 Photo of Dwell Time On Each Channel



10. Out of Band Spurious Emissions -Conducted Measurements

Test Requirement: 15.247(c)

10.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2004

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

10.2 Test Setup



10.3 Limits of Out of Band Measurements

I. WLAN mode

Below -20dB of the highest emission level in operating band.

Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

II. Bluetooth mode

Below -20dB of the highest emission level of operating band (in 100KHz Resolution Bandwidth).

Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.



10.4 Test Procedure

I. WLAN mode

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer with suitable frequency span including 100KHz bandwidth from band edge. The band edges was measured and recorded.

II. Bluetooth mode

Section 15.247(c): Spurious emissions. The following tests are required:

Set the span wide enough to capture the peak level of the emission operating on the channel closest to the band edge. Set the RBW and VBW and maxhold the trace. Allow the trace to stabilize. Enable the marker-delta function, then use the marker-delta value function to move the marker to the peak of the in-band emission submit the plot.

10.5 Uncertainty of Conducted Emission

I. WLAN mode

The uncertainty of conducted emission is $\pm 1.82\text{dB}$.

II. Bluetooth mode

The uncertainty of Frequency : $\pm 100\text{kHz}$.

The uncertainty of Amplitude : $\pm 2\text{dB}$.



10.6 Test Results

10.6.1 For WLAN Transmitter

A. Conducted

Refer to photo of out band Emission measurement

B. Radiated

Input Power (System)	3.3VDC (From Notebook)	Environmental Conditions	25.6°C, 53%RH
Tested By	Ken Tu		

For 802.11b mode

Refer to the section 11.6.1, the measured radiated band edge emissions are listed below :

Band edge Frequency (MHz)		Measured radiated band edge field strength (dBuV/m)		Radiated band edge field strength limit (dBuV/m)		Test result
		Horizontal	Vertical	Horizontal	Vertical	
2399.90	PK	53.97	55.60	78.05	79.68	PASS
	AV	45.69	47.73	71.12	81.34	
2483.50	PK	50.34	52.43	74.00	74.00	PASS
	AV	42.43	44.33	54.00	54.00	

For 802.11g mode

Refer to the section 11.6.1, the measured radiated band edge emissions are listed below :

Band edge Frequency (MHz)		Measured radiated band edge field strength (dBuV/m)		Radiated band edge field strength limit (dBuV/m)		Test result
		Horizontal	Vertical	Horizontal	Vertical	
2399.90	PK	70.56	71.71	78.40	79.55	PASS
	AV	51.09	53.50	68.81	71.22	
2483.50	PK	56.40	58.64	74.00	74.00	PASS
	AV	42.03	43.89	54.00	54.00	

- Note :
1. Radiated band edge field strength is measured with FCC recommended mark-delta method.
 2. Measured radiated band edge field strength Test Results = Radiated fundamental emission field strength - DELTA.
 3. DELTA = Relative measurement between conducted measured peak level of fundamental emission and relevant band edge emission. Please refer to 7.7 photo of Band Edge Measurement.



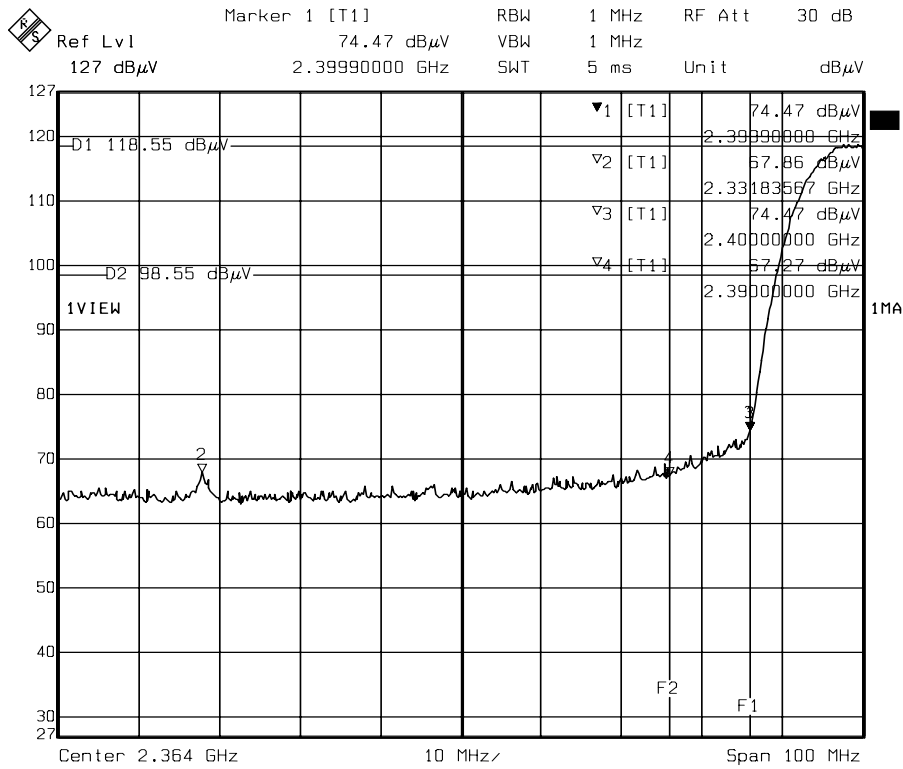
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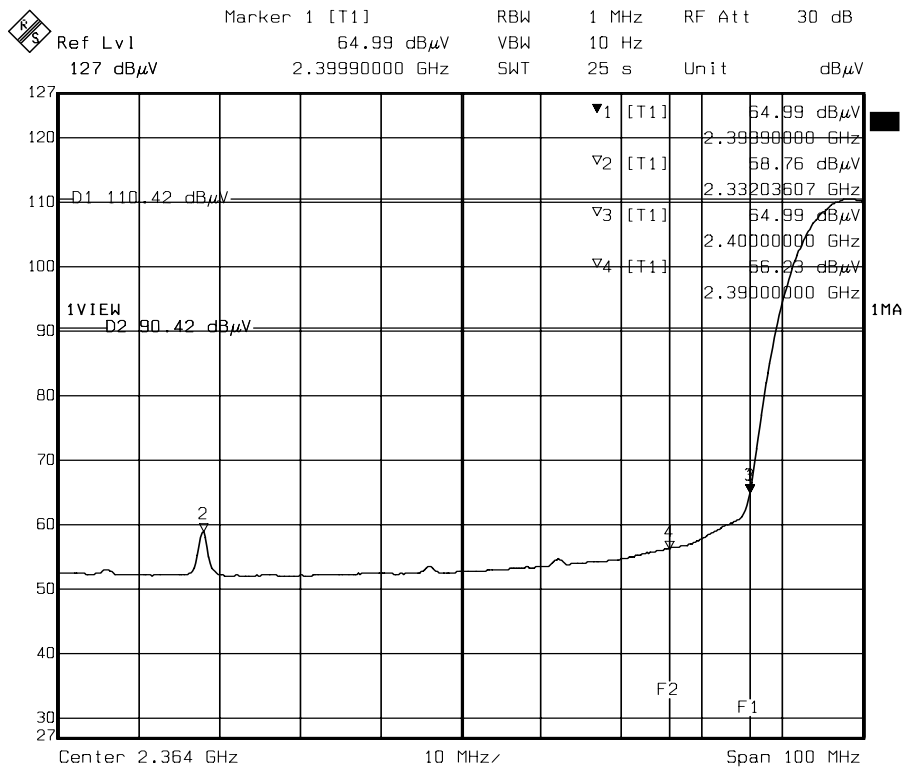
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Date: 28.JUL.2004 09:44:33

Lower Band edge (Peak)



Date: 28.JUL.2004 09:41:35

Lower Band edge (Average)

Note: For 802.11b Mode



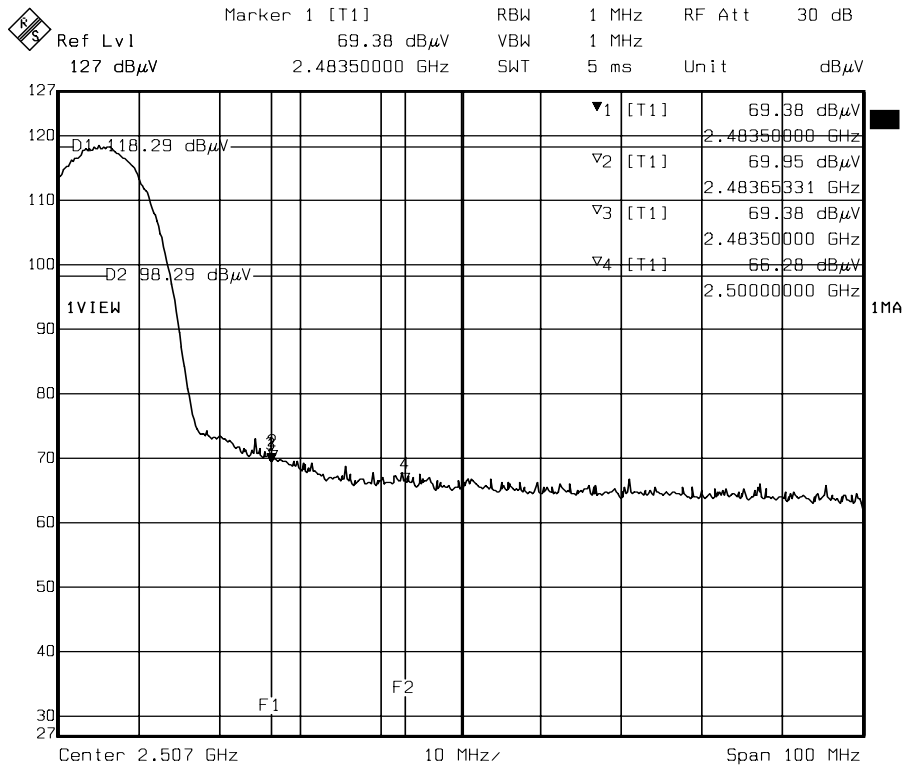
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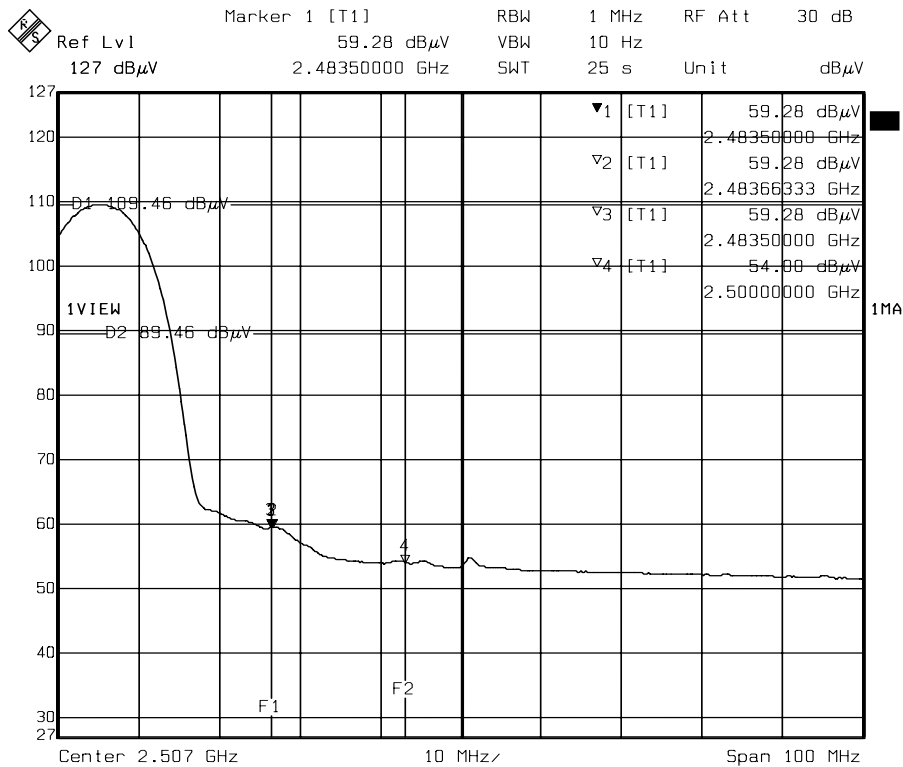
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Date: 28.JUL.2004 09:53:11

Higher Band edge (Peak)



Date: 02.AUG.2004 03:12:03

Higher Band edge (Average)

Note: For 802.11b Mode



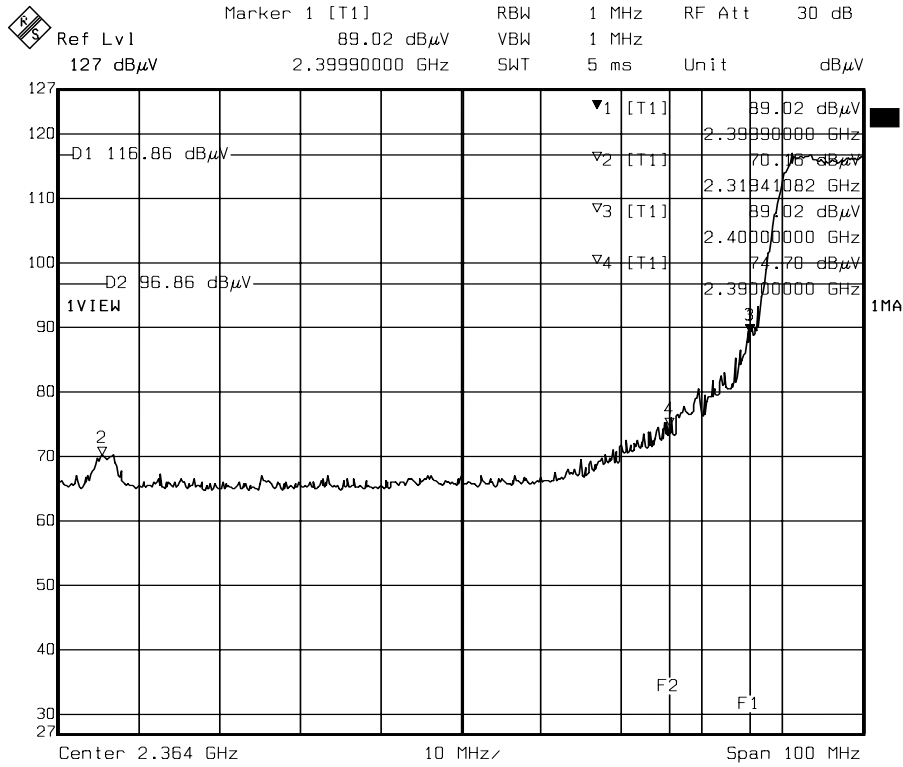
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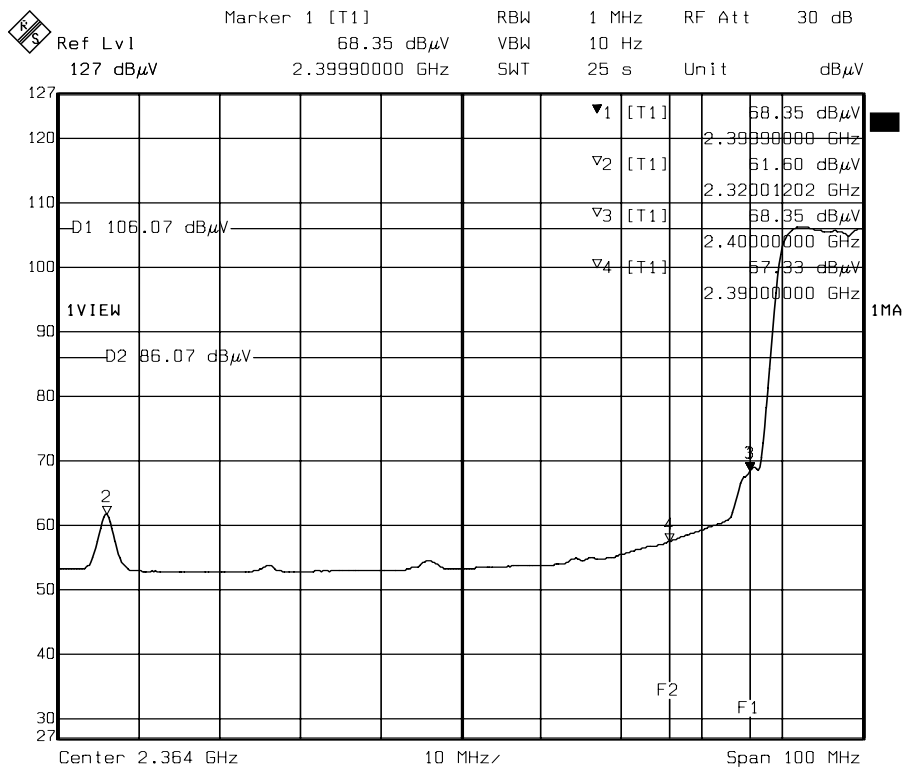
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Date: 28.JUL.2004 10:14:19

Lower Band edge (Peak)



Date: 28.JUL.2004 10:07:41

Lower Band edge (Average)

Note: For 802.11g Mode



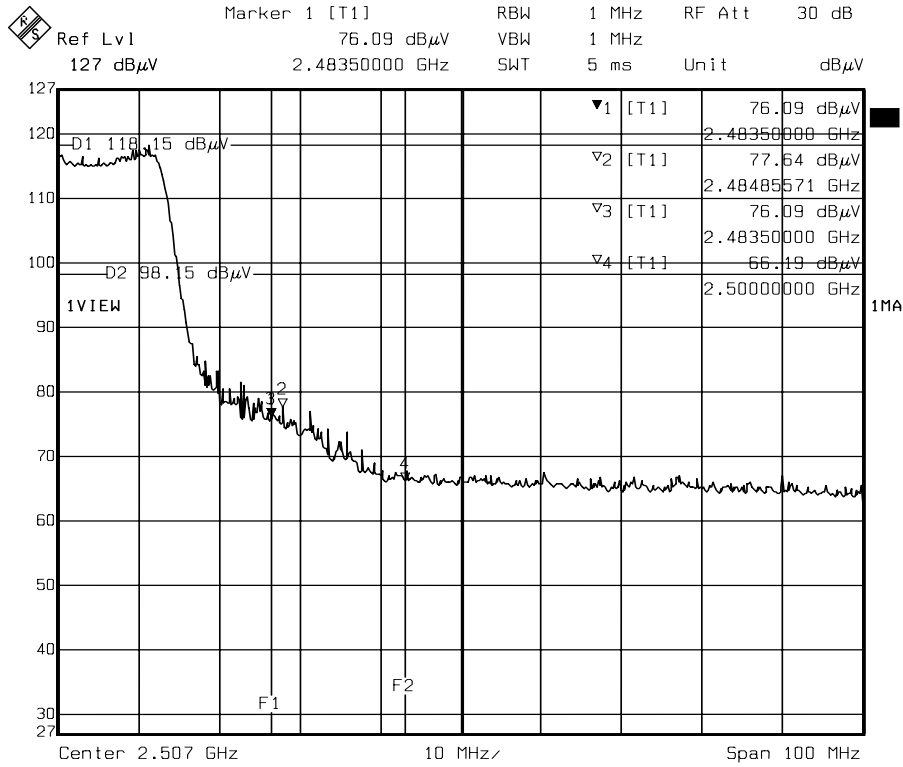
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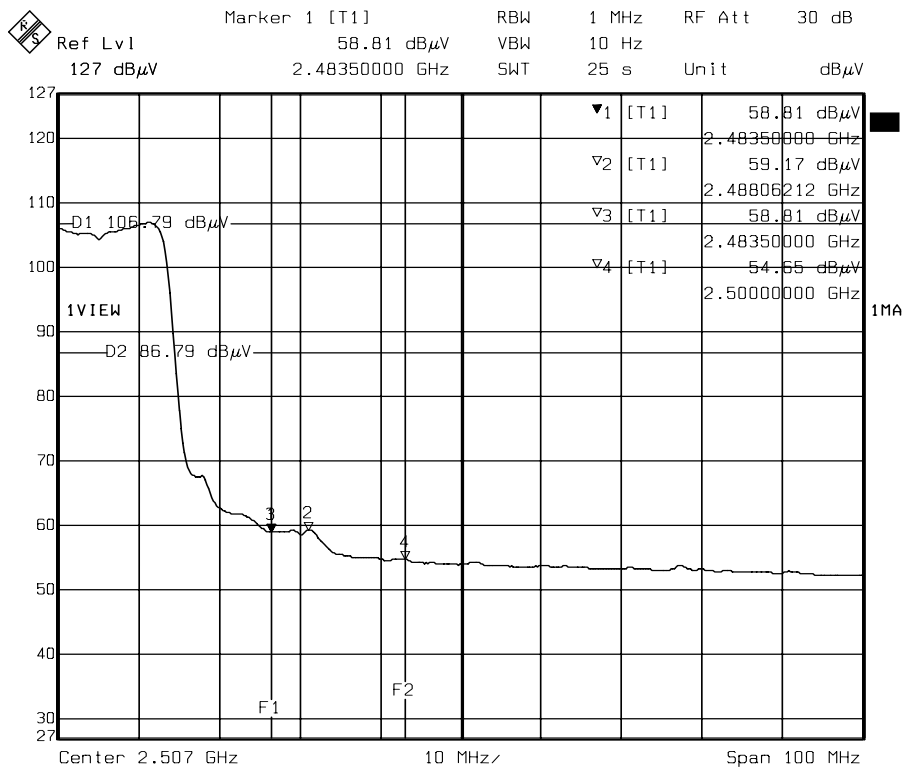
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Date: 28.JUL.2004 09:57:37

Higher Band edge (Peak)



Date: 28.JUL.2004 10:02:55

Higher Band edge (Average)

Note: For 802.11g Mode



10.6.2 For Bluetooth Transmitter

Band edge Frequency (MHz)		Measured radiated band edge field strength (dBuV/m)		Radiated band edge field strength limit (dBuV/m)		Test result
		Horizontal	Vertical	Horizontal	Vertical	
2399.90	PK	45.81	49.75	69.20	73.14	PASS
	AV	45.39	49.41	68.78	72.80	
2483.50	PK	37.85	38.39	74.00	74.00	PASS
	AV	37.17	37.94	54.00	54.00	

Note :

Radiated band edge field strength is measured with FCC recommended mark-delta method.

Measured radiated band edge field strength Test Results = Radiated fundamental emission field strength - DELTA.

DELTA = Relative measurement between conducted measured peak level of fundamental emission and relevant band edge emission. Please refer to 8.7 photo of band edge Measurement.



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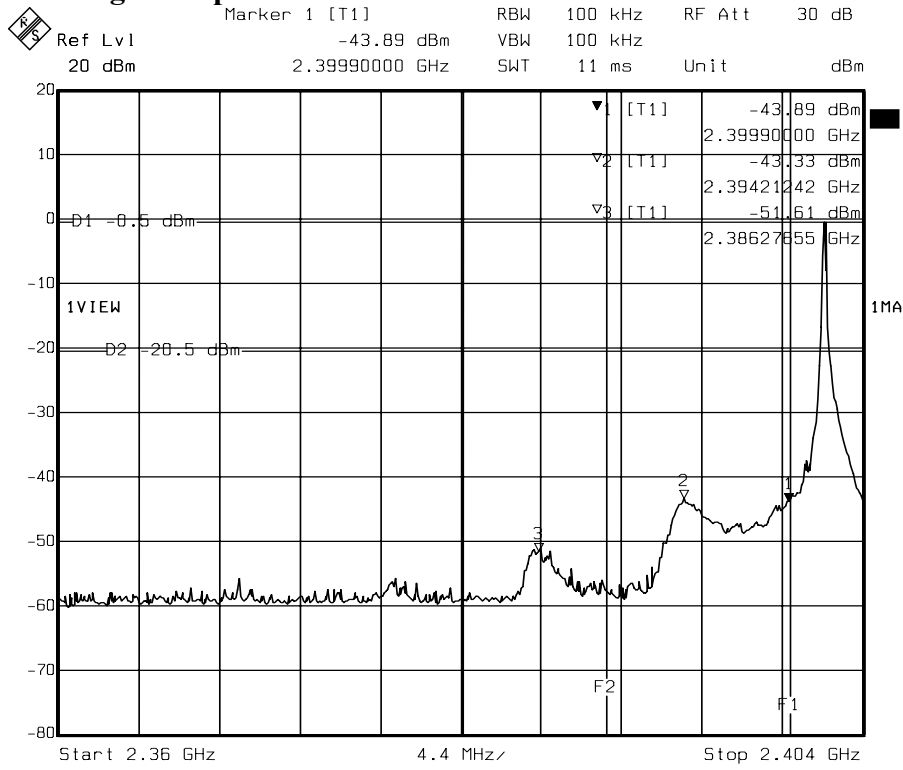
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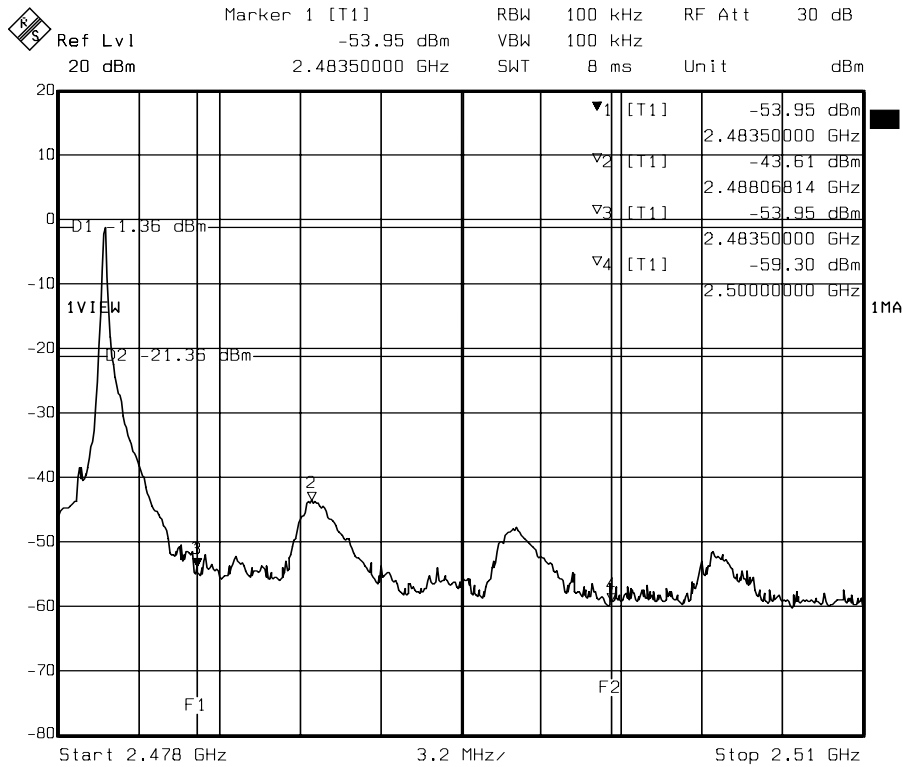
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Band edge Compliance of RF Conducted Emissions



Date: 03.AUG.2004 13:45:41

FRONT



Date: 03.AUG.2004 13:51:36

REAR



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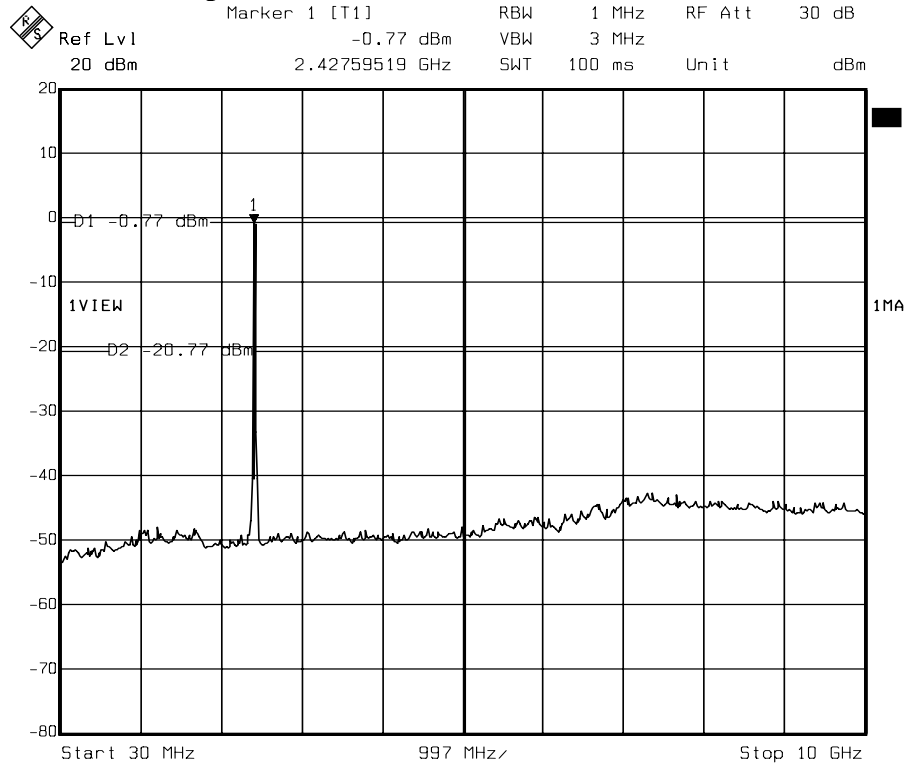
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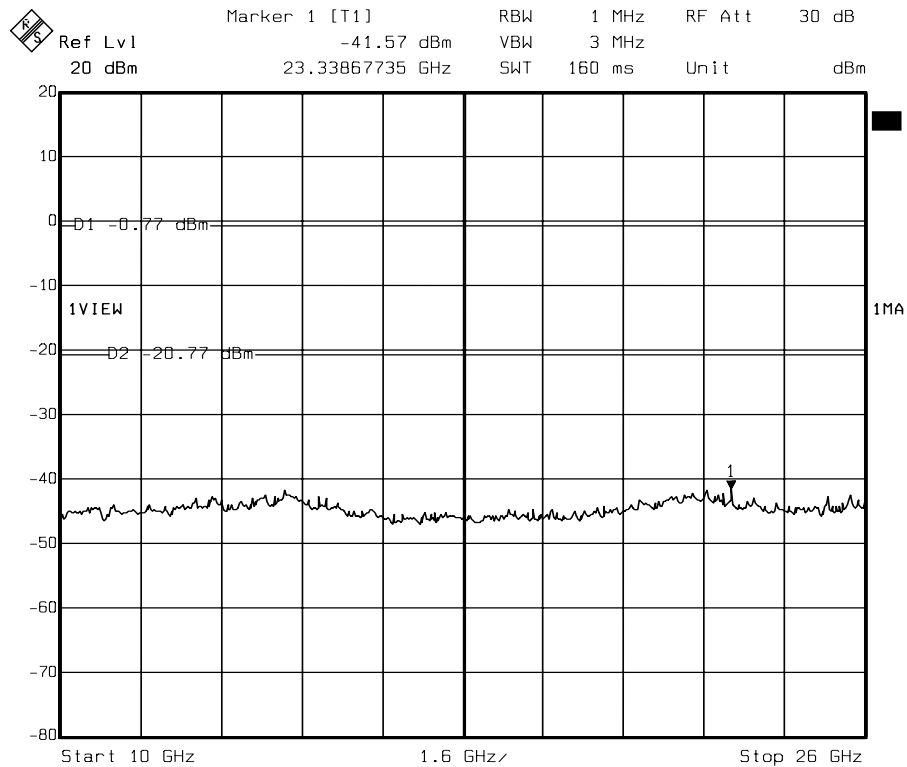
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Out-of-band Spurious Emissions-conducted measurement



Date: 03.AUG.2004 13:56:29



Date: 03.AUG.2004 13:57:54

11. Out of Band Spurious Emissions -Radiated Measurements

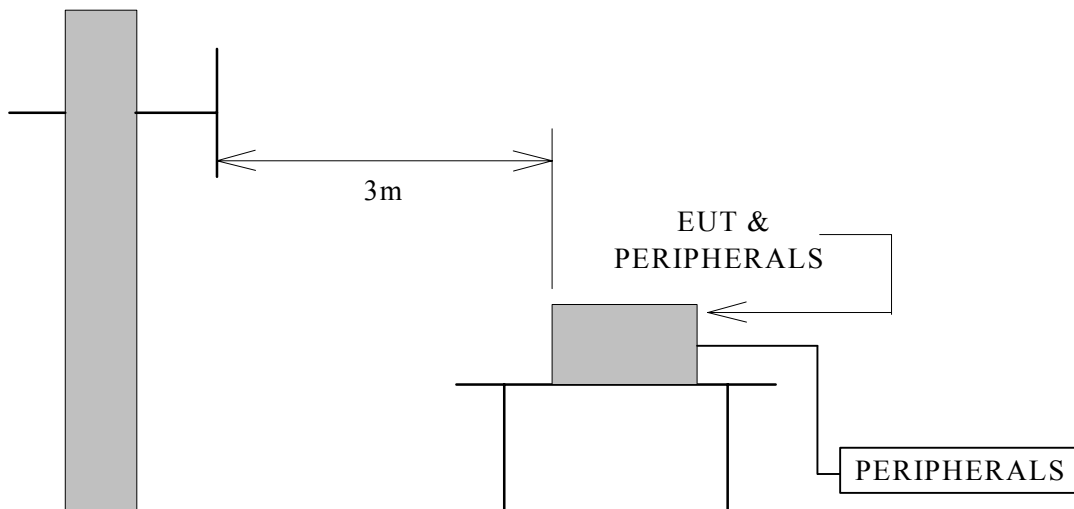
11.1 Test Equipments

The following test equipments are utilized in making the measurements contained in this report.

Manufacturer or Type	Model No	Serial No	Date of Calibration	Calibration Period	Remark
CHASE BI-LOG ANTENNA	CBL6112B	2421	May 07, 2004	1 Year	FINAL
R/S SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2004	1 Year	FINAL
OPEN SITE	-----	No.2	May 07, 2004	1 Year	FINAL
N TYPE COAXIAL CABLE	CHA9525	4	July 13, 2004	1 Year	FINAL
Horn Antenna	AH-118	10089	February 25, 2004	1 Year	FINAL
HP Pre-amplifier	8449B	3008A01471	October 11, 2003	1 Year	FINAL
HP High pass filter	84300/80038	011	CAL. ON USE	1 Year	FINAL
Horn Antenna	AH-840	03077	February 25, 2004	1 Year	FINAL

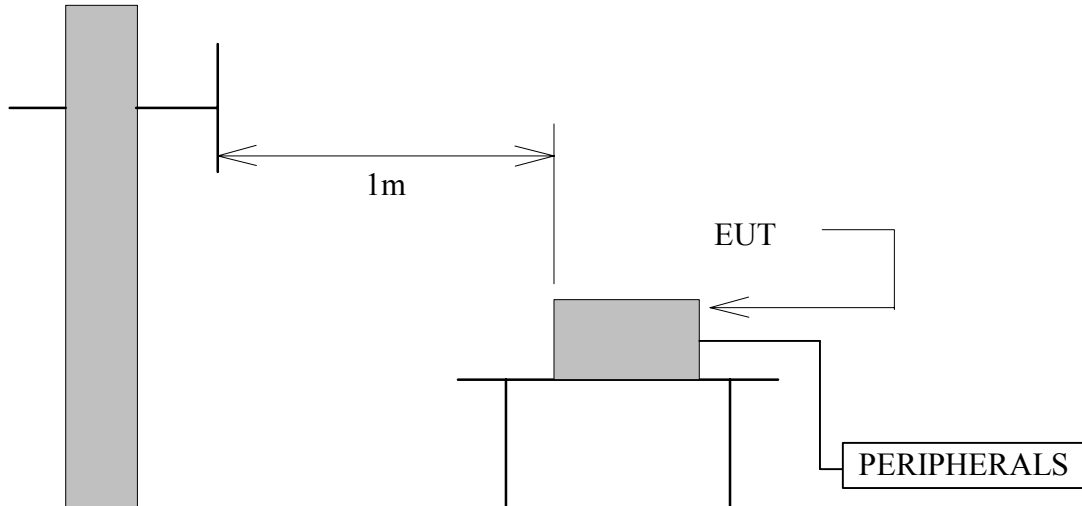
11.2 Test Setup

The diagram below shows the test setup which is utilized to make these measurements.



Antenna Elevation Variable

The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



Antenna Elevation Variable

11.3 Radiation Limit

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/M)	Radiated (μ V/M)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

11.4 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

11.5 Uncertainty of Radiated Emission

The uncertainty of radiated emission is ± 2.72 dB.



11.6 Radiated RF Noise Measurement

11.6.1 Model, WLAN transmitting, Bluetooth Off

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

All readings are quasi-peak values.

Temperature : 35.3 °C

Humidity : 45 % RH

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Meter Reading at 3m(dBμV/M)		Limits at 3m (dBμV/M)	Emission Level at 3m(dBμV/M)	
			Horizontal	Vertical		Horizontal	Vertical
30.00	17.01	0.97	*	*	40.00	*	*
66.85	8.42	1.53	17.20	16.20	40.00	27.15	26.15
166.25	11.15	2.72	18.60	9.40	43.50	32.46	23.26
199.25	9.84	3.13	21.40	27.30	43.50	34.37	40.27
319.99	14.49	4.41	12.00	8.40	46.00	30.90	27.30
399.97	18.41	4.85	10.80	2.90	46.00	34.06	26.16
439.24	18.18	4.98	11.00	5.50	46.00	34.17	28.67
479.97	17.95	5.12	6.40	3.00	46.00	29.47	26.07
701.98	19.52	6.28	12.10	12.30	46.00	37.90	38.10
1000.00	21.84	7.66	*	*	54.00	*	*

REMARKS :

- * Undetectable
- Emission level (dBμV/m) = Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBμV).
- After the preliminary scan, we found the EUT in Transmitting mode produces the highest emission level. And the output power at channel 1 has the highest power. So the EUT was set to TX mode at channel 1 (2412 MHZ), the worst case, to generate the highest unwanted radiated emission in final test.
- The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.
- WLAN on, Bluetooth off.
- For 802.11b mode.



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The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported are much lower than the prescribed limits.
All readings are quasi-peak values.

Temperature : 35.3 °C

Humidity : 45 % RH

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Meter Reading at 3m(dBμV/M)		Limits at 3m (dBμV/M)	Emission Level at 3m(dBμV/M)	
			Horizontal	Vertical		Horizontal	Vertical
30.00	17.01	0.97	*	*	40.00	*	*
66.86	8.42	1.53	17.10	16.30	40.00	27.05	26.25
166.25	11.15	2.72	18.50	9.50	43.50	32.36	23.36
199.25	9.84	3.13	21.50	27.50	43.50	34.47	40.47
319.99	14.49	4.41	12.10	8.30	46.00	31.00	27.20
399.97	18.41	4.85	11.00	2.80	46.00	34.26	26.06
439.24	18.18	4.98	10.80	5.20	46.00	33.97	28.37
479.97	17.95	5.12	6.50	3.00	46.00	29.57	26.07
701.98	19.52	6.28	12.10	12.50	46.00	37.90	38.30
1000.00	21.84	7.66	*	*	54.00	*	*

REMARKS :

- * Undetectable
- Emission level (dBμV/m) = Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBμV).
- After the preliminary scan, we found the EUT in Transmitting mode produces the highest emission level. And the output power at channel 1 has the highest power. So the EUT was set to TX mode at channel 1 (2412 MHZ), the worst case, to generate the highest unwanted radiated emission in final test.
- The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.
- WLAN on, Bluetooth off.
- For 802.11g mode.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH1 RX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2037.86	46.63	32.16	3.42	35.30	9.50	0.00	37.41	74	-36.59	P	1.0
2037.86	35.77	32.16	3.42	35.30	9.50	0.00	26.55	54	-27.45	A	1.0
4076.01	45.37	32.55	4.84	34.90	9.50	0.00	38.37	74	-35.63	P	1.0
4076.01	33.82	32.55	4.84	34.90	9.50	0.00	26.82	54	-27.18	A	1.0
6114.82	44.87	37.33	6.42	34.30	9.50	0.00	44.82	74	-29.18	P	1.0
6114.82	33.08	37.33	6.42	34.30	9.50	0.00	33.03	54	-20.97	A	1.0
8152.04	46.52	39.45	7.37	35.94	9.50	0.00	47.90	74	-26.10	P	1.0
8152.04	35.24	39.45	7.37	35.94	9.50	0.00	36.62	54	-17.38	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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FCC ID : I4L-MS6855
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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH1 RX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2038.31	46.46	32.16	3.42	35.30	9.50	0.00	37.24	74	-36.76	P	1.0
2038.31	36.83	32.16	3.42	35.30	9.50	0.00	27.61	54	-26.39	A	1.0
4076.03	45.94	32.55	4.84	34.90	9.50	0.00	38.94	74	-35.06	P	1.0
4076.03	33.92	32.55	4.84	34.90	9.50	0.00	26.92	54	-27.08	A	1.0
6114.28	44.71	37.33	6.42	34.30	9.50	0.00	44.66	74	-29.34	P	1.0
6114.28	32.80	37.33	6.42	34.30	9.50	0.00	32.75	54	-21.25	A	1.0
8152.00	46.75	39.45	7.37	35.94	9.50	0.00	48.12	74	-25.88	P	1.0
8152.00	35.62	39.45	7.37	35.94	9.50	0.00	36.99	54	-17.01	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH6 RX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2063.03	46.88	32.14	3.43	35.30	9.50	0.00	37.64	74	-36.36	P	1.0
2063.03	36.52	32.14	3.43	35.30	9.50	0.00	27.28	54	-26.72	A	1.0
4126.05	45.36	32.52	4.86	34.90	9.50	0.00	38.34	74	-35.66	P	1.0
4126.05	33.54	32.52	4.86	34.90	9.50	0.00	26.52	54	-27.48	A	1.0
6189.05	44.98	37.48	6.43	34.30	9.50	0.00	45.09	74	-28.91	P	1.0
6189.05	33.05	37.48	6.43	34.30	9.50	0.00	33.16	54	-20.84	A	1.0
8252.02	46.25	39.35	7.45	35.18	9.50	0.00	48.36	74	-25.64	P	1.0
8252.02	35.74	39.35	7.45	35.18	9.50	0.00	37.85	54	-16.15	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH6 RX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2063.02	46.79	32.14	3.43	35.30	9.50	0.00	37.55	74	-36.45	P	1.0
2063.02	38.35	32.14	3.43	35.30	9.50	0.00	29.11	54	-24.89	A	1.0
4125.92	45.67	32.52	4.86	34.90	9.50	0.00	38.65	74	-35.35	P	1.0
4125.92	33.75	32.52	4.86	34.90	9.50	0.00	26.73	54	-27.27	A	1.0
6189.03	45.10	37.48	6.43	34.30	9.50	0.00	45.21	74	-28.79	P	1.0
6189.03	33.10	37.48	6.43	34.30	9.50	0.00	33.21	54	-20.79	A	1.0
8251.98	46.86	39.35	7.45	35.18	9.50	0.00	48.97	74	-25.03	P	1.0
8251.98	36.02	39.35	7.45	35.18	9.50	0.00	38.13	54	-15.87	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH11 RX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2087.98	46.85	32.11	3.44	35.30	9.50	0.00	37.60	74	-36.40	P	1.0
2087.98	37.24	32.11	3.44	35.30	9.50	0.00	27.99	54	-26.01	A	1.0
4176.05	45.67	32.49	4.88	34.90	9.50	0.00	38.64	74	-35.36	P	1.0
4176.05	33.85	32.49	4.88	34.90	9.50	0.00	26.82	54	-27.18	A	1.0
6246.25	46.02	37.59	6.44	34.30	9.50	0.00	46.26	74	-27.74	P	1.0
6246.25	33.03	37.59	6.44	34.30	9.50	0.00	33.27	54	-20.73	A	1.0
8352.03	46.02	39.25	7.53	34.42	9.50	0.00	48.88	74	-25.12	P	1.0
8352.03	35.23	39.25	7.53	34.42	9.50	0.00	38.09	54	-15.91	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH11 RX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2087.86	47.19	32.11	3.44	35.30	9.50	0.00	37.94	74	-36.06	P	1.0
2087.86	37.97	32.11	3.44	35.30	9.50	0.00	28.72	54	-25.28	A	1.0
4176.02	45.54	32.49	4.88	34.90	9.50	0.00	38.51	74	-35.49	P	1.0
4176.02	33.73	32.49	4.88	34.90	9.50	0.00	26.70	54	-27.30	A	1.0
6264.00	45.59	37.63	6.45	34.30	9.50	0.00	45.87	74	-28.13	P	1.0
6264.00	33.01	37.63	6.45	34.30	9.50	0.00	33.29	54	-20.71	A	1.0
8351.76	46.38	39.25	7.53	34.43	9.50	0.00	49.23	74	-24.77	P	1.0
8351.76	35.43	39.25	7.53	34.43	9.50	0.00	38.28	54	-15.72	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH1 TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2389.90	28.10	31.81	3.57	0.00	9.50	0.00	53.98	74	-20.02	P	1.00
* 2389.90	15.41	31.81	3.57	0.00	9.50	0.00	41.29	54	-12.71	A	1.00
2413.28	72.18	31.79	3.58	0.00	9.50	0.00	98.05	Fundamental Frequency		P	1.00
2413.28	65.25	31.79	3.58	0.00	9.50	0.00	91.12			A	1.00
* 4824.29	48.62	34.44	5.08	35.16	9.50	2.00	45.49	74	-28.51	P	1.00
* 4824.29	36.85	34.44	5.08	35.16	9.50	2.00	33.72	54	-20.28	A	1.00
7236.04	45.67	39.81	6.74	35.65	9.50	2.00	49.06	74	-24.94	P	1.00
7236.04	33.51	39.81	6.74	35.65	9.50	2.00	36.90	54	-17.10	A	1.00
9648.06	48.66	38.54	8.29	36.44	9.50	0.61	50.16	74	-23.84	P	1.00
9648.06	35.25	38.54	8.29	36.44	9.50	0.61	36.75	54	-17.25	A	1.00
* 12066.40	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
* 14479.68	-----	-----	-----	-----	9.50	0.68	-----	-----	-----	-----	1.00
16892.96	-----	-----	-----	-----	9.50	0.44	-----	-----	-----	-----	1.00
* 19306.24	-----	-----	-----	-----	9.50	1.97	-----	-----	-----	-----	1.00
21719.52	-----	-----	-----	-----	9.50	0.81	-----	-----	-----	-----	1.00
24132.80	-----	-----	-----	-----	9.50	2.89	-----	-----	-----	-----	1.00

- Note :
- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
 - AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
 - Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
 - Remark “*” means the Restricted band.
 - Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
 - The result basic equation calculation is as follow:
 Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
 - The other emission levels were very low against the limit
 - The test limit distance is 3M limit.
 - For 802.11b mode at 11Mbps.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH1 TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2389.90	26.77	31.81	3.57	0.00	9.50	0.00	52.65	74	-21.35	P	1.00
* 2389.90	15.41	31.81	3.57	0.00	9.50	0.00	41.29	54	-12.71	A	1.00
2411.57	73.81	31.79	3.58	0.00	9.50	0.00	99.68	Fundamental Frequency		P	1.00
2411.57	67.29	31.79	3.58	0.00	9.50	0.00	93.16			A	1.00
* 4824.03	54.13	34.44	5.08	35.16	9.50	2.00	51.00	74	-23.00	P	1.00
* 4824.03	42.70	34.44	5.08	35.16	9.50	2.00	39.57	54	-14.43	A	1.00
7236.05	45.32	39.81	6.74	35.65	9.50	2.00	48.71	74	-25.29	P	1.00
7236.05	33.71	39.81	6.74	35.65	9.50	2.00	37.10	54	-16.90	A	1.00
9647.98	47.62	38.54	8.29	36.44	9.50	0.61	49.12	74	-24.88	P	1.00
9647.98	37.50	38.54	8.29	36.44	9.50	0.61	39.00	54	-15.00	A	1.00
* 12057.85	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14469.42	-----	-----	-----	-----	9.50	0.66	-----	-----	-----	-----	1.00
16880.99	-----	-----	-----	-----	9.50	0.43	-----	-----	-----	-----	1.00
* 19292.56	-----	-----	-----	-----	9.50	1.95	-----	-----	-----	-----	1.00
21704.13	-----	-----	-----	-----	9.50	0.82	-----	-----	-----	-----	1.00
24115.70	-----	-----	-----	-----	9.50	2.91	-----	-----	-----	-----	1.00

- Note :
- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
 - AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
 - Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
 - Remark “*” means the Restricted band.
 - Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
 - The result basic equation calculation is as follow:
 $Level = Reading + AF + Cable - Preamp + Filter - Dist$, $Margin = Level - Limit$
 - The other emission levels were very low against the limit
 - The test limit distance is 3M limit.
 - For 802.11b mode at 11Mbps.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH6 TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2438.35	72.54	31.76	3.59	0.00	9.50	0.00	98.39	Fundamental Frequency		P	1.00
2438.35	65.69	31.76	3.59	0.00	9.50	0.00	91.54			A	1.00
* 4874.13	53.15	34.77	5.10	35.20	9.50	1.80	50.12	74	-23.88	P	1.00
* 4874.13	41.38	34.77	5.10	35.20	9.50	1.80	38.35	54	-15.65	A	1.00
* 7310.66	46.47	39.78	6.79	35.64	9.50	2.00	49.90	74	-24.10	P	1.00
* 7310.66	34.20	39.78	6.79	35.64	9.50	2.00	37.63	54	-16.37	A	1.00
9748.02	47.40	38.53	8.33	36.60	9.50	0.55	48.71	74	-25.29	P	1.00
9748.02	35.79	38.53	8.33	36.60	9.50	0.55	37.10	54	-16.90	A	1.00
* 12191.75	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14630.10	-----	-----	-----	-----	9.50	0.60	-----	-----	-----	-----	1.00
17068.45	-----	-----	-----	-----	9.50	0.53	-----	-----	-----	-----	1.00
* 19506.80	-----	-----	-----	-----	9.50	2.21	-----	-----	-----	-----	1.00
21945.15	-----	-----	-----	-----	9.50	0.72	-----	-----	-----	-----	1.00
24383.50	-----	-----	-----	-----	9.50	2.49	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.
- For 802.11b mode at 11Mbps.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH6 TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2438.05	75.18	31.76	3.59	0.00	9.50	0.00	101.03	Fundamental Frequency		P	1.00
2438.05	68.32	31.76	3.59	0.00	9.50	0.00	94.17			A	1.00
* 4873.94	57.55	34.77	5.10	35.20	9.50	1.80	54.52	74	-19.48	P	1.00
* 4873.94	46.04	34.77	5.10	35.20	9.50	1.80	43.01	54	-10.99	A	1.00
* 7311.16	47.10	39.78	6.79	35.64	9.50	2.00	50.53	74	-23.47	P	1.00
* 7311.16	34.56	39.78	6.79	35.64	9.50	2.00	37.99	54	-16.01	A	1.00
9747.95	47.78	38.53	8.33	36.60	9.50	0.55	49.09	74	-24.91	P	1.00
9747.95	38.24	38.53	8.33	36.60	9.50	0.55	39.55	54	-14.45	A	1.00
* 12190.25	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14628.30	-----	-----	-----	-----	9.50	0.60	-----	-----	-----	-----	1.00
17066.35	-----	-----	-----	-----	9.50	0.53	-----	-----	-----	-----	1.00
* 19504.40	-----	-----	-----	-----	9.50	2.20	-----	-----	-----	-----	1.00
21942.45	-----	-----	-----	-----	9.50	0.72	-----	-----	-----	-----	1.00
24380.50	-----	-----	-----	-----	9.50	2.49	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level = Reading + AF + Cable - Preamp + Filter - Dist$, $Margin = Level - Limit$
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.
- For 802.11b mode at 11Mbps.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH11 TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2461.26	73.41	31.74	3.60	0.00	9.50	0.00	99.25	Fundamental Frequency		P	1.00
2461.26	66.77	31.74	3.60	0.00	9.50	0.00	92.61			A	1.00
* 2483.60	29.99	31.72	3.61	0.00	9.50	0.00	55.82	74	-18.18	P	1.00
* 2483.60	20.52	31.72	3.61	0.00	9.50	0.00	46.35	54	-7.65	A	1.00
* 4923.80	48.68	35.10	5.12	35.24	9.50	1.60	45.76	74	-28.24	P	1.00
* 4923.80	36.72	35.10	5.12	35.24	9.50	1.60	33.80	54	-20.20	A	1.00
* 7386.87	46.58	39.75	6.84	35.62	9.50	2.00	50.05	74	-23.95	P	1.00
* 7386.87	33.92	39.75	6.84	35.62	9.50	2.00	37.39	54	-16.61	A	1.00
9848.03	47.58	38.52	8.37	36.76	9.50	0.49	48.69	74	-25.31	P	1.00
9848.03	34.88	38.52	8.37	36.76	9.50	0.49	35.99	54	-18.01	A	1.00
* 12306.30	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14767.56	-----	-----	-----	-----	9.50	0.49	-----	-----	-----	-----	1.00
17228.82	-----	-----	-----	-----	9.50	0.59	-----	-----	-----	-----	1.00
* 19690.08	-----	-----	-----	-----	9.50	2.39	-----	-----	-----	-----	1.00
* 22151.34	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00
24612.60	-----	-----	-----	-----	9.50	2.14	-----	-----	-----	-----	1.00

- Note :
- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
 - AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
 - Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
 - Remark “*” means the Restricted band.
 - Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
 - The result basic equation calculation is as follow:
 $Level = Reading + AF + Cable - Preamp + Filter - Dist$, $Margin = Level - Limit$
 - The other emission levels were very low against the limit
 - The test limit distance is 3M limit.
 - For 802.11b mode at 11Mbps.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH11 TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2461.26	75.50	31.74	3.60	0.00	9.50	0.00	101.34	Fundamental Frequency		P	1.00
2461.26	68.67	31.74	3.60	0.00	9.50	0.00	94.51			A	1.00
* 2483.60	32.81	31.72	3.61	0.00	9.50	0.00	58.64	74	-15.36	P	1.00
* 2483.60	21.43	31.72	3.61	0.00	9.50	0.00	47.26	54	-6.74	A	1.00
* 4923.69	54.34	35.10	5.12	35.24	9.50	1.61	51.42	74	-22.58	P	1.00
* 4923.69	42.63	35.10	5.12	35.24	9.50	1.61	39.71	54	-14.29	A	1.00
* 7386.33	46.12	39.75	6.84	35.62	9.50	2.00	49.59	74	-24.41	P	1.00
* 7386.33	33.97	39.75	6.84	35.62	9.50	2.00	37.44	54	-16.56	A	1.00
9848.10	48.12	38.52	8.37	36.76	9.50	0.49	49.23	74	-24.77	P	1.00
9848.10	38.57	38.52	8.37	36.76	9.50	0.49	39.68	54	-14.32	A	1.00
* 12306.30	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14767.56	-----	-----	-----	-----	9.50	0.49	-----	-----	-----	-----	1.00
17228.82	-----	-----	-----	-----	9.50	0.59	-----	-----	-----	-----	1.00
* 19690.08	-----	-----	-----	-----	9.50	2.39	-----	-----	-----	-----	1.00
* 22151.34	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00
24612.60	-----	-----	-----	-----	9.50	2.14	-----	-----	-----	-----	1.00

- Note :
- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
 - AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
 - Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
 - Remark “*” means the Restricted band.
 - Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
 - The result basic equation calculation is as follow:
 $Level = Reading + AF + Cable - Preamp + Filter - Dist$, $Margin = Level - Limit$
 - The other emission levels were very low against the limit
 - The test limit distance is 3M limit.
 - For 802.11b mode at 11Mbps.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH1 TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2389.90	29.93	31.81	3.57	0.00	9.50	0.00	55.81	74	-18.19	P	1.00
* 2389.90	15.41	31.81	3.57	0.00	9.50	0.00	41.29	54	-12.71	A	1.00
2418.13	72.53	31.78	3.58	0.00	9.50	0.00	98.40	Fundamental Frequency		P	1.00
2418.13	62.94	31.78	3.58	0.00	9.50	0.00	88.81			A	1.00
* 4828.60	48.09	34.47	5.09	35.16	9.50	1.99	44.97	74	-29.03	P	1.00
* 4828.60	36.16	34.47	5.09	35.16	9.50	1.99	33.04	54	-20.96	A	1.00
7237.90	45.81	39.80	6.74	35.65	9.50	2.00	49.20	74	-24.80	P	1.00
7237.90	33.75	39.80	6.74	35.65	9.50	2.00	37.14	54	-16.86	A	1.00
9647.89	47.46	38.54	8.29	36.44	9.50	0.61	48.96	74	-25.04	P	1.00
9647.89	36.16	38.54	8.29	36.44	9.50	0.61	37.66	54	-16.34	A	1.00
* 12090.65	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14508.78	-----	-----	-----	-----	9.50	0.69	-----	-----	-----	-----	1.00
16926.91	-----	-----	-----	-----	9.50	0.46	-----	-----	-----	-----	1.00
* 19345.04	-----	-----	-----	-----	9.50	2.01	-----	-----	-----	-----	1.00
21763.17	-----	-----	-----	-----	9.50	0.79	-----	-----	-----	-----	1.00
24181.30	-----	-----	-----	-----	9.50	2.81	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.
- For 802.11g mode at 6Mbps.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH1 TX				Measurement Distance at 1m					Vertical polarity			
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height	
(MHz)	(dBuV)	(dBuV)	(dB)	(dB)	dB	dB	(dBuV/m)	(dBuV/m)	(dB)	(P/Q/A)	(Meter)	
* 2389.90	32.86	31.81	3.57	0.00	9.50	0.00	58.74	74	-15.26	P	1.00	
* 2389.90	17.00	31.81	3.57	0.00	9.50	0.00	42.88	54	-11.12	A	1.00	
2417.50	73.68	31.78	3.58	0.00	9.50	0.00	99.55	Fundamental Frequency		P	1.00	
2417.50	65.35	31.78	3.58	0.00	9.50	0.00	91.22			A	1.00	
* 4834.28	52.77	34.51	5.09	35.17	9.50	1.96	49.66	74	-24.34	P	1.00	
* 4834.28	39.52	34.51	5.09	35.17	9.50	1.96	36.41	54	-17.59	A	1.00	
7237.80	45.76	39.80	6.74	35.65	9.50	2.00	49.15	74	-24.85	P	1.00	
7237.80	33.56	39.80	6.74	35.65	9.50	2.00	36.95	54	-17.05	A	1.00	
9647.85	47.81	38.54	8.29	36.44	9.50	0.61	49.31	74	-24.69	P	1.00	
9647.85	37.23	38.54	8.29	36.44	9.50	0.61	38.73	54	-15.27	A	1.00	
* 12087.50	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00	
14505.00	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00	
16922.50	-----	-----	-----	-----	9.50	0.45	-----	-----	-----	-----	1.00	
* 19340.00	-----	-----	-----	-----	9.50	2.01	-----	-----	-----	-----	1.00	
21757.50	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00	
24175.00	-----	-----	-----	-----	9.50	2.82	-----	-----	-----	-----	1.00	

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level = Reading + AF + Cable - Preamp + Filter - Dist$, $Margin = Level - Limit$
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.
- For 802.11g mode at 6Mbps.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH6 TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2442.11	72.07	31.76	3.59	0.00	9.50	0.00	97.92	Fundamental Frequency		P	1.00
2442.11	63.77	31.76	3.59	0.00	9.50	0.00	89.62			A	1.00
* 4874.35	50.67	34.77	5.10	35.20	9.50	1.80	47.64	74	-26.36	P	1.00
* 4874.35	39.58	34.77	5.10	35.20	9.50	1.80	36.55	54	-17.45	A	1.00
* 7311.11	46.58	39.78	6.79	35.64	9.50	2.00	50.01	74	-23.99	P	1.00
* 7311.11	34.04	39.78	6.79	35.64	9.50	2.00	37.47	54	-16.53	A	1.00
9748.19	46.53	38.53	8.33	36.60	9.50	0.55	47.84	74	-26.16	P	1.00
9748.19	34.52	38.53	8.33	36.60	9.50	0.55	35.83	54	-18.17	A	1.00
* 12210.55	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14652.66	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
17094.77	-----	-----	-----	-----	9.50	0.54	-----	-----	-----	-----	1.00
* 19536.88	-----	-----	-----	-----	9.50	2.24	-----	-----	-----	-----	1.00
21978.99	-----	-----	-----	-----	9.50	0.71	-----	-----	-----	-----	1.00
24421.10	-----	-----	-----	-----	9.50	2.43	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.
- For 802.11g mode at 6Mbps.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH6 TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2442.81	76.80	31.76	3.59	0.00	9.50	0.00	102.65	Fundamental Frequency		P	1.00
2442.81	67.83	31.76	3.59	0.00	9.50	0.00	93.68			A	1.00
* 4872.44	55.84	34.76	5.10	35.20	9.50	1.81	52.81	74	-21.19	P	1.00
* 4872.44	43.66	34.76	5.10	35.20	9.50	1.81	40.63	54	-13.37	A	1.00
* 7310.82	46.74	39.78	6.79	35.64	9.50	2.00	50.17	74	-23.83	P	1.00
* 7310.82	34.16	39.78	6.79	35.64	9.50	2.00	37.59	54	-16.41	A	1.00
9748.10	47.11	38.53	8.33	36.60	9.50	0.55	48.42	74	-25.58	P	1.00
9748.10	34.34	38.53	8.33	36.60	9.50	0.55	35.65	54	-18.35	A	1.00
* 12214.05	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14656.86	-----	-----	-----	-----	9.50	0.57	-----	-----	-----	-----	1.00
17099.67	-----	-----	-----	-----	9.50	0.54	-----	-----	-----	-----	1.00
* 19542.48	-----	-----	-----	-----	9.50	2.24	-----	-----	-----	-----	1.00
21985.29	-----	-----	-----	-----	9.50	0.71	-----	-----	-----	-----	1.00
24428.10	-----	-----	-----	-----	9.50	2.42	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.
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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH11 TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2468.17	72.62	31.73	3.61	0.00	9.50	0.00	98.46	Fundamental Frequency		P	1.00
2468.17	64.17	31.73	3.61	0.00	9.50	0.00	90.01			A	1.00
* 2483.60	31.64	31.72	3.61	0.00	9.50	0.00	57.47	74	-16.53	P	1.00
* 2483.60	18.34	31.72	3.61	0.00	9.50	0.00	44.17	54	-9.83	A	1.00
* 4924.60	46.17	35.10	5.12	35.24	9.50	1.60	43.25	74	-30.75	P	1.00
* 4924.60	34.42	35.10	5.12	35.24	9.50	1.60	31.50	54	-22.50	A	1.00
* 7385.49	46.40	39.75	6.84	35.62	9.50	2.00	49.87	74	-24.13	P	1.00
* 7385.49	33.96	39.75	6.84	35.62	9.50	2.00	37.43	54	-16.57	A	1.00
9847.78	47.25	38.52	8.37	36.76	9.50	0.49	48.37	74	-25.63	P	1.00
9847.78	35.60	38.52	8.37	36.76	9.50	0.49	36.72	54	-17.28	A	1.00
* 12340.85	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14809.02	-----	-----	-----	-----	9.50	0.45	-----	-----	-----	-----	1.00
17277.19	-----	-----	-----	-----	9.50	0.61	-----	-----	-----	-----	1.00
* 19745.36	-----	-----	-----	-----	9.50	2.45	-----	-----	-----	-----	1.00
* 22213.53	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00
24681.70	-----	-----	-----	-----	9.50	2.05	-----	-----	-----	-----	1.00

- Note :
- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
 - AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
 - Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
 - Remark “*” means the Restricted band.
 - Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
 - The result basic equation calculation is as follow:
 $Level = Reading + AF + Cable - Preamp + Filter - Dist$, $Margin = Level - Limit$
 - The other emission levels were very low against the limit
 - The test limit distance is 3M limit.
 - For 802.11g mode at 6Mbps.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH11 TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2468.72	74.86	31.73	3.61	0.00	9.50	0.00	100.70	Fundamental Frequency		P	1.00
2468.72	66.03	31.73	3.61	0.00	9.50	0.00	91.87			A	1.00
* 2483.60	32.49	31.72	3.61	0.00	9.50	0.00	58.32	74	-15.68	P	1.00
* 2483.60	18.34	31.72	3.61	0.00	9.50	0.00	44.17	54	-9.83	A	1.00
* 4923.79	49.26	35.10	5.12	35.24	9.50	1.60	46.34	74	-27.66	P	1.00
* 4923.79	37.69	35.10	5.12	35.24	9.50	1.60	34.77	54	-19.23	A	1.00
* 7385.99	46.60	39.75	6.84	35.62	9.50	2.00	50.07	74	-23.93	P	1.00
* 7385.99	34.07	39.75	6.84	35.62	9.50	2.00	37.54	54	-16.46	A	1.00
9846.64	47.38	38.52	8.36	36.75	9.50	0.49	48.50	74	-25.50	P	1.00
9846.64	37.65	38.52	8.36	36.75	9.50	0.49	38.77	54	-15.23	A	1.00
* 12343.60	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14812.32	-----	-----	-----	-----	9.50	0.45	-----	-----	-----	-----	1.00
17281.04	-----	-----	-----	-----	9.50	0.61	-----	-----	-----	-----	1.00
* 19749.76	-----	-----	-----	-----	9.50	2.45	-----	-----	-----	-----	1.00
* 22218.48	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00
24687.20	-----	-----	-----	-----	9.50	2.04	-----	-----	-----	-----	1.00

- Note :
- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
 - AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
 - Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
 - Remark “*” means the Restricted band.
 - Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
 - The result basic equation calculation is as follow:
 $Level = Reading + AF + Cable - Preamp + Filter - Dist$, $Margin = Level - Limit$
 - The other emission levels were very low against the limit
 - The test limit distance is 3M limit.
 - For 802.11g mode at 6Mbps.



11.6.2 Mode2, WLAN off, Bluetooth transmitting

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

All readings are quasi-peak values.

Temperature : 35.3 °C

Humidity : 45 % RH

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Meter Reading at 10m(dBμV/M)		Limits at 10m (dBμV/M)	Emission Level at 10m(dBμV/M)	
			Horizontal	Vertical		Horizontal	Vertical
30.00	17.01	0.97	*	*	40.00	*	*
69.85	8.39	1.57	23.20	26.70	40.00	33.16	36.66
125.31	12.93	2.21	12.50	6.70	43.50	27.65	21.85
303.48	13.68	4.32	3.90	2.50	46.00	21.90	20.50
350.99	16.01	4.58	15.80	8.30	46.00	36.39	28.89
479.98	17.95	5.12	15.10	6.10	46.00	38.17	29.17
607.24	18.73	5.69	8.10	7.90	46.00	32.52	32.32
864.12	21.16	7.08	0.80	-0.50	46.00	29.04	27.74
1000.00	21.84	7.66	*	*	54.00	*	*

REMARKS :

- * Undetectable
- Emission level (dB μ V/M) = Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dB μ V).
- After the preliminary scan, we found the EUT in Transmitting mode produces the highest emission level. And the output power at channel 1 has the highest power. So the EUT was set to TX mode at channel 0 (2402 MHz), the worst case, to generate the highest unwanted radiated emission in final test.
- The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.
- WLAN off, Bluetooth on.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH00 (2402 MHz) RX (Low)				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
4804.52	43.50	34.31	5.08	35.14	9.50	0.00	38.24	74	-35.76	P	1.0
4804.52	32.62	34.31	5.08	35.14	9.50	0.00	27.36	54	-26.64	A	1.0
7205.97	44.86	39.82	6.72	35.66	9.50	0.00	46.24	74	-27.76	P	1.0
7205.97	33.86	39.82	6.72	35.66	9.50	0.00	35.24	54	-18.76	A	1.0
9608.20	45.75	38.54	8.28	36.37	9.50	0.00	46.70	74	-27.30	P	1.0
9608.20	34.62	38.54	8.28	36.37	9.50	0.00	35.57	54	-18.43	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH00 (2402 MHz) RX (Low)				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
4804.32	43.76	34.31	5.08	35.14	9.50	0.00	38.50	74	-35.50	P	1.0
4804.32	32.98	34.31	5.08	35.14	9.50	0.00	27.72	54	-26.28	A	1.0
7206.17	45.02	39.82	6.72	35.66	9.50	0.00	46.40	74	-27.60	P	1.0
7206.17	34.25	39.82	6.72	35.66	9.50	0.00	35.63	54	-18.37	A	1.0
9608.10	46.05	38.54	8.28	36.37	9.50	0.00	47.00	74	-27.00	P	1.0
9608.10	35.13	38.54	8.28	36.37	9.50	0.00	36.08	54	-17.92	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH39 (2441 MHz) RX (Mid)				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
4881.98	42.25	34.82	5.10	35.21	9.50	0.00	37.47	74	-36.53	P	1.0
4881.98	31.16	34.82	5.10	35.21	9.50	0.00	26.38	54	-27.62	A	1.0
7323.02	44.56	39.77	6.80	35.64	9.50	0.00	46.00	74	-28.00	P	1.0
7323.02	33.67	39.77	6.80	35.64	9.50	0.00	35.11	54	-18.89	A	1.0
9763.98	45.58	38.52	8.34	36.62	9.50	0.00	46.32	74	-27.68	P	1.0
9763.98	34.70	38.52	8.34	36.62	9.50	0.00	35.44	54	-18.56	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH39 (2441 MHz) RX (Mid)				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
4882.30	43.22	34.82	5.10	35.21	9.50	0.00	38.44	74	-35.56	P	1.0
4882.30	32.01	34.82	5.10	35.21	9.50	0.00	27.23	54	-26.77	A	1.0
7322.89	44.97	39.77	6.80	35.64	9.50	0.00	46.40	74	-27.60	P	1.0
7322.89	33.80	39.77	6.80	35.64	9.50	0.00	35.23	54	-18.77	A	1.0
9764.03	46.02	38.52	8.34	36.62	9.50	0.00	46.76	74	-27.24	P	1.0
9764.03	34.86	38.52	8.34	36.62	9.50	0.00	35.60	54	-18.40	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH78 (2480 MHz) RX (High)				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
4960.05	43.85	35.34	5.13	35.27	9.50	0.00	39.55	74	-34.45	P	1.0
4960.05	32.50	35.34	5.13	35.27	9.50	0.00	28.20	54	-25.80	A	1.0
7439.96	45.08	39.72	6.88	35.61	9.50	0.00	46.57	74	-27.43	P	1.0
7439.96	33.98	39.72	6.88	35.61	9.50	0.00	35.47	54	-18.53	A	1.0
9920.10	46.05	38.51	8.39	36.87	9.50	0.00	46.58	74	-27.42	P	1.0
9920.10	34.90	38.51	8.39	36.87	9.50	0.00	35.43	54	-18.57	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :
Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH78 (2480 MHz) RX (High)				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
4960.04	43.65	35.34	5.13	35.27	9.50	0.00	39.35	74	-34.65	P	1.0
4960.04	32.12	35.34	5.13	35.27	9.50	0.00	27.82	54	-26.18	A	1.0
7440.03	45.43	39.72	6.88	35.61	9.50	0.00	46.92	74	-27.08	P	1.0
7440.03	34.05	39.72	6.88	35.61	9.50	0.00	35.54	54	-18.46	A	1.0
9920.04	46.76	38.51	8.39	36.87	9.50	0.00	47.29	74	-26.71	P	1.0
9920.04	35.20	38.51	8.39	36.87	9.50	0.00	35.73	54	-18.27	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :
Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH00 (2402 MHz) TX (Low)				Measurement Distance at 1m				Horizontal polarity			
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
* 2386.24	32.06	31.81	3.57	0.00	9.50	0.00	57.94	74	-16.06	P	1.00
* 2386.24	13.48	31.81	3.57	0.00	9.50	0.00	39.36	54	-14.64	A	1.00
2402.02	63.33	31.80	3.58	0.00	9.50	0.00	89.20	Fundamental Frequency		P	1.00
2402.02	62.91	31.80	3.58	0.00	9.50	0.00	88.78			A	1.00
* 4803.96	47.23	34.31	5.08	35.14	9.50	2.08	44.05	74	-29.95	P	1.00
* 4803.96	37.56	34.31	5.08	35.14	9.50	2.08	34.38	54	-19.62	A	1.00
7206.14	46.10	39.82	6.72	35.66	9.50	2.00	49.48	74	-24.52	P	1.00
7206.14	33.48	39.82	6.72	35.66	9.50	2.00	36.86	54	-17.14	A	1.00
9608.03	46.48	38.54	8.28	36.37	9.50	0.64	48.06	74	-25.94	P	1.00
9608.03	33.75	38.54	8.28	36.37	9.50	0.64	35.33	54	-18.67	A	1.00
* 11999.50	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14399.40	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
16799.30	-----	-----	-----	-----	9.50	0.38	-----	-----	-----	-----	1.00
* 19199.20	-----	-----	-----	-----	9.50	1.84	-----	-----	-----	-----	1.00
21599.10	-----	-----	-----	-----	9.50	0.86	-----	-----	-----	-----	1.00
* 23999.00	-----	-----	-----	-----	9.50	3.11	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level=Reading+AF+Closs-Preamp+Filter-Dist, Margin=Level-Limit$
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH00 (2402 MHz)		TX (Low)			Measurement Distance at 1m					Vertical polarity	
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
* 2386.39	36.90	31.81	3.57	0.00	9.50	0.00	62.78	74	-11.22	P	1.00
* 2386.39	13.48	31.81	3.57	0.00	9.50	0.00	39.36	54	-14.64	A	1.00
2402.01	67.27	31.80	3.58	0.00	9.50	0.00	93.14	Fundamental Frequency		P	1.00
2402.01	66.93	31.80	3.58	0.00	9.50	0.00	92.80			A	1.00
* 4804.27	47.26	34.31	5.08	35.14	9.50	2.08	44.09	74	-29.91	P	1.00
* 4804.27	39.16	34.31	5.08	35.14	9.50	2.08	35.99	54	-18.01	A	1.00
7206.14	46.35	39.82	6.72	35.66	9.50	2.00	49.73	74	-24.27	P	1.00
7206.14	33.90	39.82	6.72	35.66	9.50	2.00	37.28	54	-16.72	A	1.00
9608.03	46.49	38.54	8.28	36.37	9.50	0.64	48.07	74	-25.93	P	1.00
9608.03	34.10	38.54	8.28	36.37	9.50	0.64	35.68	54	-18.32	A	1.00
* 11999.50	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14399.40	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
16799.30	-----	-----	-----	-----	9.50	0.38	-----	-----	-----	-----	1.00
* 19199.20	-----	-----	-----	-----	9.50	1.84	-----	-----	-----	-----	1.00
21599.10	-----	-----	-----	-----	9.50	0.86	-----	-----	-----	-----	1.00
* 23999.00	-----	-----	-----	-----	9.50	3.11	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level=Reading+AF+Closs-Preamp+Filter-Dist, Margin=Level-Limit$
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH39 (2441 MHz) TX (Mid)				Measurement Distance at 1m				Horizontal polarity			
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2440.98	61.60	31.76	3.59	0.00	9.50	0.00	87.45	Fundamental Frequency		P	1.00
2440.98	60.92	31.76	3.59	0.00	9.50	0.00	86.77			A	1.00
* 4883.99	46.09	34.83	5.10	35.21	9.50	1.76	43.08	74	-30.92	P	1.00
* 4883.99	33.53	34.83	5.10	35.21	9.50	1.76	30.52	54	-23.48	A	1.00
* 7323.50	44.25	39.77	6.80	35.64	9.50	2.00	47.69	74	-26.31	P	1.00
* 7323.50	34.56	39.77	6.80	35.64	9.50	2.00	38.00	54	-16.00	A	1.00
9764.00	44.22	38.52	8.34	36.62	9.50	0.54	45.50	74	-28.50	P	1.00
9764.00	34.78	38.52	8.34	36.62	9.50	0.54	36.06	54	-17.94	A	1.00
* 12204.90	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14645.88	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
17086.86	-----	-----	-----	-----	9.50	0.53	-----	-----	-----	-----	1.00
* 19527.84	-----	-----	-----	-----	9.50	2.23	-----	-----	-----	-----	1.00
21968.82	-----	-----	-----	-----	9.50	0.71	-----	-----	-----	-----	1.00
24409.80	-----	-----	-----	-----	9.50	2.44	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 Level=Reading+AF+Closs-Preamp+Filter-Dist, Margin=Level-Limit
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH39 (2441 MHz) TX (Mid)				Measurement Distance at 1m				Vertical polarity			
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2440.84	63.95	31.76	3.59	0.00	9.50	0.00	89.80	Fundamental Frequency		P	1.00
2440.84	63.32	31.76	3.59	0.00	9.50	0.00	89.17			A	1.00
* 4882.37	48.28	34.82	5.10	35.21	9.50	1.77	45.27	74	-28.73	P	1.00
* 4882.37	40.42	34.82	5.10	35.21	9.50	1.77	37.41	54	-16.59	A	1.00
* 7322.56	46.30	39.77	6.80	35.64	9.50	2.00	49.73	74	-24.27	P	1.00
* 7322.56	36.85	39.77	6.80	35.64	9.50	2.00	40.28	54	-13.72	A	1.00
9763.99	46.88	38.52	8.34	36.62	9.50	0.54	48.16	74	-25.84	P	1.00
9763.99	34.88	38.52	8.34	36.62	9.50	0.54	36.16	54	-17.84	A	1.00
* 12204.20	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14645.04	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
17085.88	-----	-----	-----	-----	9.50	0.53	-----	-----	-----	-----	1.00
* 19526.72	-----	-----	-----	-----	9.50	2.23	-----	-----	-----	-----	1.00
21967.56	-----	-----	-----	-----	9.50	0.71	-----	-----	-----	-----	1.00
24408.40	-----	-----	-----	-----	9.50	2.45	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level = Reading + AF + Closs - Preamp + Filter - Dist$, $Margin = Level - Limit$
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH78 (2480 MHz) TX (High)				Measurement Distance at 1m				Horizontal polarity			
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2480.13	64.61	31.72	3.61	0.00	9.50	0.00	90.44	Fundamental Frequency		P	1.00
2480.13	63.93	31.72	3.61	0.00	9.50	0.00	89.76			A	1.00
* 2488.19	39.29	31.71	3.61	0.00	9.50	0.00	65.12	74	-8.88	P	1.00
* 2488.19	13.48	31.71	3.61	0.00	9.50	0.00	39.31	54	-14.69	A	1.00
* 4960.06	46.97	35.34	5.13	35.27	9.50	1.46	44.13	74	-29.87	P	1.00
* 4960.06	36.08	35.34	5.13	35.27	9.50	1.46	33.24	54	-20.76	A	1.00
* 7439.99	46.30	39.72	6.88	35.61	9.50	2.00	49.79	74	-24.21	P	1.00
* 7439.99	34.30	39.72	6.88	35.61	9.50	2.00	37.79	54	-16.21	A	1.00
9920.00	46.79	38.51	8.39	36.87	9.50	0.45	47.77	74	-26.23	P	1.00
9920.00	35.06	38.51	8.39	36.87	9.50	0.45	36.04	54	-17.96	A	1.00
* 12400.65	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14880.78	-----	-----	-----	-----	9.50	0.40	-----	-----	-----	-----	1.00
17360.91	-----	-----	-----	-----	9.50	0.64	-----	-----	-----	-----	1.00
* 19841.04	-----	-----	-----	-----	9.50	2.54	-----	-----	-----	-----	1.00
* 22321.17	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00
24801.30	-----	-----	-----	-----	9.50	1.88	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level=Reading+AF+Closs-Preamp+Filter-Dist, Margin=Level-Limit$
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/08/02
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	29.9°C , 40%

CH78 (2480 MHz) TX (High)				Measurement Distance at 1m				Vertical polarity			
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2480.15	65.15	31.72	3.61	0.00	9.50	0.00	90.98	Fundamental Frequency		P	1.00
2480.15	64.70	31.72	3.61	0.00	9.50	0.00	90.53			A	1.00
* 2488.34	40.24	31.71	3.61	0.00	9.50	0.00	66.07	74	-7.93	P	1.00
* 2488.34	13.48	31.71	3.61	0.00	9.50	0.00	39.31	54	-14.69	A	1.00
* 4960.19	47.35	35.34	5.13	35.27	9.50	1.46	44.51	74	-29.49	P	1.00
* 4960.19	39.50	35.34	5.13	35.27	9.50	1.46	36.66	54	-17.34	A	1.00
* 7439.78	47.18	39.72	6.88	35.61	9.50	2.00	50.67	74	-23.33	P	1.00
* 7439.78	37.00	39.72	6.88	35.61	9.50	2.00	40.49	54	-13.51	A	1.00
9920.20	47.28	38.51	8.39	36.87	9.50	0.45	48.25	74	-25.75	P	1.00
9920.20	36.40	38.51	8.39	36.87	9.50	0.45	37.37	54	-16.63	A	1.00
* 12400.75	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14880.90	-----	-----	-----	-----	9.50	0.40	-----	-----	-----	-----	1.00
17361.05	-----	-----	-----	-----	9.50	0.64	-----	-----	-----	-----	1.00
* 19841.20	-----	-----	-----	-----	9.50	2.54	-----	-----	-----	-----	1.00
* 22321.35	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00
24801.50	-----	-----	-----	-----	9.50	1.88	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level=Reading+AF+Closs-Preamp+Filter-Dist, Margin=Level-Limit$
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.



11.6.3 Mode3, WLAN transmitting, Bluetooth transmitting

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

All readings are quasi-peak values.

Temperature : 35.3 °C

Humidity : 45 % RH

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Meter Reading at 10m(dBμV/M)		Limits at 10m (dBμV/M)	Emission Level at 10m(dBμV/M)	
			Horizontal	Vertical		Horizontal	Vertical
30.00	17.01	0.97	*	*	40.00	*	*
66.84	8.42	1.53	16.50	16.10	40.00	26.45	26.05
69.77	8.39	1.57	14.50	13.00	40.00	24.46	22.96
125.31	12.93	2.21	10.20	5.80	43.50	25.35	20.95
166.08	11.16	2.71	18.20	6.20	43.50	32.08	20.08
199.31	9.83	3.13	19.90	22.10	43.50	32.86	35.06
319.99	14.49	4.41	14.50	8.80	46.00	33.40	27.70
350.99	16.01	4.58	10.80	4.20	46.00	31.39	24.79
399.98	18.41	4.85	10.00	3.30	46.00	33.26	26.56
439.24	18.18	4.98	11.50	5.20	46.00	34.67	28.37
479.98	17.95	5.12	8.60	7.00	46.00	31.67	30.07
701.98	19.52	6.28	9.30	12.80	46.00	35.10	38.60
1000.00	21.84	7.66	*	*	54.00	*	*

REMARKS :

- * Undetectable
- Emission level (dB μ V/M) = Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dB μ V).
- After the preliminary scan, we found the EUT in Transmitting mode produces the highest emission level. And the output power at channel 1 has the highest power. So the EUT was set to TX mode at channel 0/1 (2402/2412 MHZ), the worst case, to generate the highest unwanted radiated emission in final test.
- The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.
- The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.
- WLAN on, Bluetooth on.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH0/1(2402/2412MHz) RX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2037.86	46.63	32.16	3.42	35.30	9.50	0.00	37.41	74	-36.59	P	1.0
2037.86	35.77	32.16	3.42	35.30	9.50	0.00	26.55	54	-27.45	A	1.0
4076.01	45.37	32.55	4.84	34.90	9.50	0.00	38.37	74	-35.63	P	1.0
4076.01	33.82	32.55	4.84	34.90	9.50	0.00	26.82	54	-27.18	A	1.0
6114.82	44.87	37.33	6.42	34.30	9.50	0.00	44.82	74	-29.18	P	1.0
6114.82	33.08	37.33	6.42	34.30	9.50	0.00	33.03	54	-20.97	A	1.0
8152.04	46.52	39.45	7.37	35.94	9.50	0.00	47.90	74	-26.10	P	1.0
8152.04	35.24	39.45	7.37	35.94	9.50	0.00	36.62	54	-17.38	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.
8. The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH0/1(2402/2412MHz) RX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2038.31	46.98	32.16	3.42	35.30	9.50	0.00	37.76	74	-36.24	P	1.0
2038.31	36.88	32.16	3.42	35.30	9.50	0.00	27.66	54	-26.34	A	1.0
4076.03	45.94	32.55	4.84	34.90	9.50	0.00	38.94	74	-35.06	P	1.0
4076.03	33.92	32.55	4.84	34.90	9.50	0.00	26.92	54	-27.08	A	1.0
6114.28	44.71	37.33	6.42	34.30	9.50	0.00	44.66	74	-29.34	P	1.0
6114.28	32.80	37.33	6.42	34.30	9.50	0.00	32.75	54	-21.25	A	1.0
8152.00	46.75	39.45	7.37	35.94	9.50	0.00	48.12	74	-25.88	P	1.0
8152.00	35.62	39.45	7.37	35.94	9.50	0.00	36.99	54	-17.01	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.
8. The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH39/6(2441/2437MHz) RX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2063.03	46.88	32.14	3.43	35.30	9.50	0.00	37.64	74	-36.36	P	1.0
2063.03	36.52	32.14	3.43	35.30	9.50	0.00	27.28	54	-26.72	A	1.0
4126.05	45.36	32.52	4.86	34.90	9.50	0.00	38.34	74	-35.66	P	1.0
4126.05	33.54	32.52	4.86	34.90	9.50	0.00	26.52	54	-27.48	A	1.0
6189.05	44.98	37.48	6.43	34.30	9.50	0.00	45.09	74	-28.91	P	1.0
6189.05	33.05	37.48	6.43	34.30	9.50	0.00	33.16	54	-20.84	A	1.0
8252.02	46.25	39.35	7.45	35.18	9.50	0.00	48.36	74	-25.64	P	1.0
8252.02	35.74	39.35	7.45	35.18	9.50	0.00	37.85	54	-16.15	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.
8. The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



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 Report No. : ER04-07-054FRF
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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH39/6(2441/2437MHz) RX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2063.02	46.79	32.14	3.43	35.30	9.50	0.00	37.55	74	-36.45	P	1.0
2063.02	38.35	32.14	3.43	35.30	9.50	0.00	29.11	54	-24.89	A	1.0
4125.92	45.67	32.52	4.86	34.90	9.50	0.00	38.65	74	-35.35	P	1.0
4125.92	33.75	32.52	4.86	34.90	9.50	0.00	26.73	54	-27.27	A	1.0
6189.03	45.10	37.48	6.43	34.30	9.50	0.00	45.21	74	-28.79	P	1.0
6189.03	33.10	37.48	6.43	34.30	9.50	0.00	33.21	54	-20.79	A	1.0
8251.98	46.86	39.35	7.45	35.18	9.50	0.00	48.97	74	-25.03	P	1.0
8251.98	36.02	39.35	7.45	35.18	9.50	0.00	38.13	54	-15.87	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.
8. The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH78/11(2480/2462MHz) RX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2087.98	46.85	32.11	3.44	35.30	9.50	0.00	37.60	74	-36.40	P	1.0
2087.98	37.24	32.11	3.44	35.30	9.50	0.00	27.99	54	-26.01	A	1.0
4176.05	45.67	32.49	4.88	34.90	9.50	0.00	38.64	74	-35.36	P	1.0
4176.05	33.85	32.49	4.88	34.90	9.50	0.00	26.82	54	-27.18	A	1.0
6246.25	46.02	37.59	6.44	34.30	9.50	0.00	46.26	74	-27.74	P	1.0
6246.25	33.03	37.59	6.44	34.30	9.50	0.00	33.27	54	-20.73	A	1.0
8352.03	46.02	39.25	7.53	34.42	9.50	0.00	48.88	74	-25.12	P	1.0
8352.03	35.23	39.25	7.53	34.42	9.50	0.00	38.09	54	-15.91	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.
8. The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH78/11(2480/2462MHz) RX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2087.86	47.21	32.11	3.44	35.30	9.50	0.00	37.96	74	-36.04	P	1.0
2087.86	36.59	32.11	3.44	35.30	9.50	0.00	27.34	54	-26.66	A	1.0
4176.02	45.54	32.49	4.88	34.90	9.50	0.00	38.51	74	-35.49	P	1.0
4176.02	33.73	32.49	4.88	34.90	9.50	0.00	26.70	54	-27.30	A	1.0
6264.00	45.59	37.63	6.45	34.30	9.50	0.00	45.87	74	-28.13	P	1.0
6264.00	33.01	37.63	6.45	34.30	9.50	0.00	33.29	54	-20.71	A	1.0
8351.76	46.38	39.25	7.53	34.43	9.50	0.00	49.23	74	-24.77	P	1.0
8351.76	35.43	39.25	7.53	34.43	9.50	0.00	38.28	54	-15.72	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz,VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :
Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.
8. The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH0/1(2402/2412MHz) TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2386.36	33.25	31.81	3.57	0.00	9.50	0.00	59.13	74	-14.87	P	1.00
* 2386.36	12.49	31.81	3.57	0.00	9.50	0.00	38.37	54	-15.63	A	1.00
2418.22	74.21	31.78	3.58	0.00	9.50	0.00	100.08	Fundamental Frequency		P	1.00
2418.22	65.43	31.78	3.58	0.00	9.50	0.00	91.30			A	1.00
* 4825.87	46.83	34.45	5.08	35.16	9.50	2.00	43.70	74	-30.30	P	1.00
* 4825.87	34.74	34.45	5.08	35.16	9.50	2.00	31.61	54	-22.39	A	1.00
7236.01	46.82	39.81	6.74	35.65	9.50	2.00	50.21	74	-23.79	P	1.00
7236.01	35.21	39.81	6.74	35.65	9.50	2.00	38.60	54	-15.40	A	1.00
9648.01	47.08	38.54	8.29	36.44	9.50	0.61	48.58	74	-25.42	P	1.00
9648.01	35.97	38.54	8.29	36.44	9.50	0.61	37.47	54	-16.53	A	1.00
* 11999.50	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14399.40	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
16799.30	-----	-----	-----	-----	9.50	0.38	-----	-----	-----	-----	1.00
* 19199.20	-----	-----	-----	-----	9.50	1.84	-----	-----	-----	-----	1.00
21599.10	-----	-----	-----	-----	9.50	0.86	-----	-----	-----	-----	1.00
* 23999.00	-----	-----	-----	-----	9.50	3.11	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH0/1(2402/2412MHz) TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2386.36	35.21	31.81	3.57	0.00	9.50	0.00	61.09	74	-12.91	P	1.00
* 2386.36	14.12	31.81	3.57	0.00	9.50	0.00	40.00	54	-14.00	A	1.00
2417.67	75.81	31.78	3.58	0.00	9.50	0.00	101.68	Fundamental Frequency		P	1.00
2417.67	66.45	31.78	3.58	0.00	9.50	0.00	92.32			A	1.00
* 4826.11	53.49	34.45	5.08	35.16	9.50	2.00	50.36	74	-23.64	P	1.00
* 4826.11	41.05	34.45	5.08	35.16	9.50	2.00	37.92	54	-16.08	A	1.00
7236.05	46.23	39.81	6.74	35.65	9.50	2.00	49.62	74	-24.38	P	1.00
7236.05	33.75	39.81	6.74	35.65	9.50	2.00	37.14	54	-16.86	A	1.00
9648.01	46.22	38.54	8.29	36.44	9.50	0.61	47.72	74	-26.28	P	1.00
9648.01	34.25	38.54	8.29	36.44	9.50	0.61	35.75	54	-18.25	A	1.00
* 11999.50	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14399.40	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
16799.30	-----	-----	-----	-----	9.50	0.38	-----	-----	-----	-----	1.00
* 19199.20	-----	-----	-----	-----	9.50	1.84	-----	-----	-----	-----	1.00
21599.10	-----	-----	-----	-----	9.50	0.86	-----	-----	-----	-----	1.00
* 23999.00	-----	-----	-----	-----	9.50	3.11	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.
- The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH39/6(2441/2437MHz) TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2440.98	74.02	31.76	3.59	0.00	9.50	0.00	99.87	Fundamental Frequency		P	1.00
2440.98	64.57	31.76	3.59	0.00	9.50	0.00	90.42			A	1.00
* 4873.96	51.11	34.77	5.10	35.20	9.50	1.80	48.08	74	-25.92	P	1.00
* 4873.96	42.03	34.77	5.10	35.20	9.50	1.80	39.00	54	-15.00	A	1.00
* 7311.03	46.21	39.78	6.79	35.64	9.50	2.00	49.64	74	-24.36	P	1.00
* 7311.03	33.79	39.78	6.79	35.64	9.50	2.00	37.22	54	-16.78	A	1.00
9748.05	46.77	38.53	8.33	36.60	9.50	0.55	48.08	74	-25.92	P	1.00
9748.05	35.03	38.53	8.33	36.60	9.50	0.55	36.34	54	-17.66	A	1.00
* 12204.90	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14645.88	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
17086.86	-----	-----	-----	-----	9.50	0.53	-----	-----	-----	-----	1.00
* 19527.84	-----	-----	-----	-----	9.50	2.23	-----	-----	-----	-----	1.00
21968.82	-----	-----	-----	-----	9.50	0.71	-----	-----	-----	-----	1.00
24409.80	-----	-----	-----	-----	9.50	2.44	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.
- The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH39/6(2441/2437MHz) TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2442.37	77.61	31.76	3.59	0.00	9.50	0.00	103.46	Fundamental Frequency		P	1.00
2442.37	68.23	31.76	3.59	0.00	9.50	0.00	94.08			A	1.00
* 4874.41	56.42	34.77	5.10	35.20	9.50	1.80	53.39	74	-20.61	P	1.00
* 4874.41	45.11	34.77	5.10	35.20	9.50	1.80	42.08	54	-11.92	A	1.00
* 7311.05	46.21	39.78	6.79	35.64	9.50	2.00	49.64	74	-24.36	P	1.00
* 7311.05	34.56	39.78	6.79	35.64	9.50	2.00	37.99	54	-16.01	A	1.00
9748.02	46.82	38.53	8.33	36.60	9.50	0.55	48.13	74	-25.87	P	1.00
9748.02	35.47	38.53	8.33	36.60	9.50	0.55	36.78	54	-17.22	A	1.00
* 12211.85	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14654.22	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
17096.59	-----	-----	-----	-----	9.50	0.54	-----	-----	-----	-----	1.00
* 19538.96	-----	-----	-----	-----	9.50	2.24	-----	-----	-----	-----	1.00
21981.33	-----	-----	-----	-----	9.50	0.71	-----	-----	-----	-----	1.00
24423.70	-----	-----	-----	-----	9.50	2.42	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.
- The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



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FCC ID : I4L-MS6855
 Report No. : ER04-07-054FRF
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The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	MICRO-STAR INT' LCO., LTD.	Test Date	2004/07/29
Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH78/11(2480/2462MHz) TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2468.11	73.52	31.73	3.61	0.00	9.50	0.00	99.36	Fundamental Frequency		P	1.00
2468.11	65.38	31.73	3.61	0.00	9.50	0.00	91.22			A	1.00
* 2488.46	34.28	31.71	3.61	0.00	9.50	0.00	60.11	74	-13.89	P	1.00
* 2488.46	15.21	31.71	3.61	0.00	9.50	0.00	41.04	54	-12.96	A	1.00
* 4960.06	47.21	35.34	5.13	35.27	9.50	1.46	44.37	74	-29.63	P	1.00
* 4960.06	35.72	35.34	5.13	35.27	9.50	1.46	32.88	54	-21.12	A	1.00
* 7386.03	46.54	39.75	6.84	35.62	9.50	2.00	50.01	74	-23.99	P	1.00
* 7386.03	34.71	39.75	6.84	35.62	9.50	2.00	38.18	54	-15.82	A	1.00
9848.05	46.99	38.52	8.37	36.76	9.50	0.49	48.10	74	-25.90	P	1.00
9848.05	35.84	38.52	8.37	36.76	9.50	0.49	36.95	54	-17.05	A	1.00
* 12340.55	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14808.66	-----	-----	-----	-----	9.50	0.45	-----	-----	-----	-----	1.00
17276.77	-----	-----	-----	-----	9.50	0.61	-----	-----	-----	-----	1.00
* 19744.88	-----	-----	-----	-----	9.50	2.44	-----	-----	-----	-----	1.00
* 22212.99	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00
24681.10	-----	-----	-----	-----	9.50	2.05	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
 $Level = Reading + AF + Cable - Preamp + Filter - Dist$, $Margin = Level - Limit$
- The other emission levels were very low against the limit
- The test limit distance is 3M limit.
- The EUT is a collocated transmitter with both IEEE802.11 b/g WLAN and Bluetooth. The Bluetooth transmitter can be operated with IEEE802.11b WLAN simultaneously. After a preliminary scan, the EUT has highest spurious emission when the Bluetooth and IEEE802.11g were functioned at the same time and this mode was chosen as representative in final test.



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Product Name	Wireless 11g + Bluetooth combo miniPCI	Test By	Ken Tu
Model Name	MS-6855	TEMP & Humidity	32°C , 45%

CH78/11(2480/2462MHz) TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
2467.96	75.86	31.73	3.61	0.00	9.50	0.00	101.70	Fundamental Frequency		P	1.00
2467.96	67.41	31.73	3.61	0.00	9.50	0.00	93.25			A	1.00
* 2488.54	35.70	31.71	3.61	0.00	9.50	0.00	61.53	74	-12.47	P	1.00
* 2488.54	16.10	31.71	3.61	0.00	9.50	0.00	41.93	54	-12.07	A	1.00
* 4924.16	50.90	35.10	5.12	35.24	9.50	1.60	47.98	74	-26.02	P	1.00
* 4924.16	39.96	35.10	5.12	35.24	9.50	1.60	37.04	54	-16.96	A	1.00
* 7386.05	46.87	39.75	6.84	35.62	9.50	2.00	50.34	74	-23.66	P	1.00
* 7386.05	35.21	39.75	6.84	35.62	9.50	2.00	38.68	54	-15.32	A	1.00
9848.02	47.02	38.52	8.37	36.76	9.50	0.49	48.13	74	-25.87	P	1.00
9848.02	35.86	38.52	8.37	36.76	9.50	0.49	36.97	54	-17.03	A	1.00
* 12339.80	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14807.76	-----	-----	-----	-----	9.50	0.45	-----	-----	-----	-----	1.00
17275.72	-----	-----	-----	-----	9.50	0.61	-----	-----	-----	-----	1.00
* 19743.68	-----	-----	-----	-----	9.50	2.44	-----	-----	-----	-----	1.00
* 22211.64	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00
24679.60	-----	-----	-----	-----	9.50	2.05	-----	-----	-----	-----	1.00

Note :

- The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark “*” means the Restricted band.
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11.7 Photos of Open Site

WLAN mode :





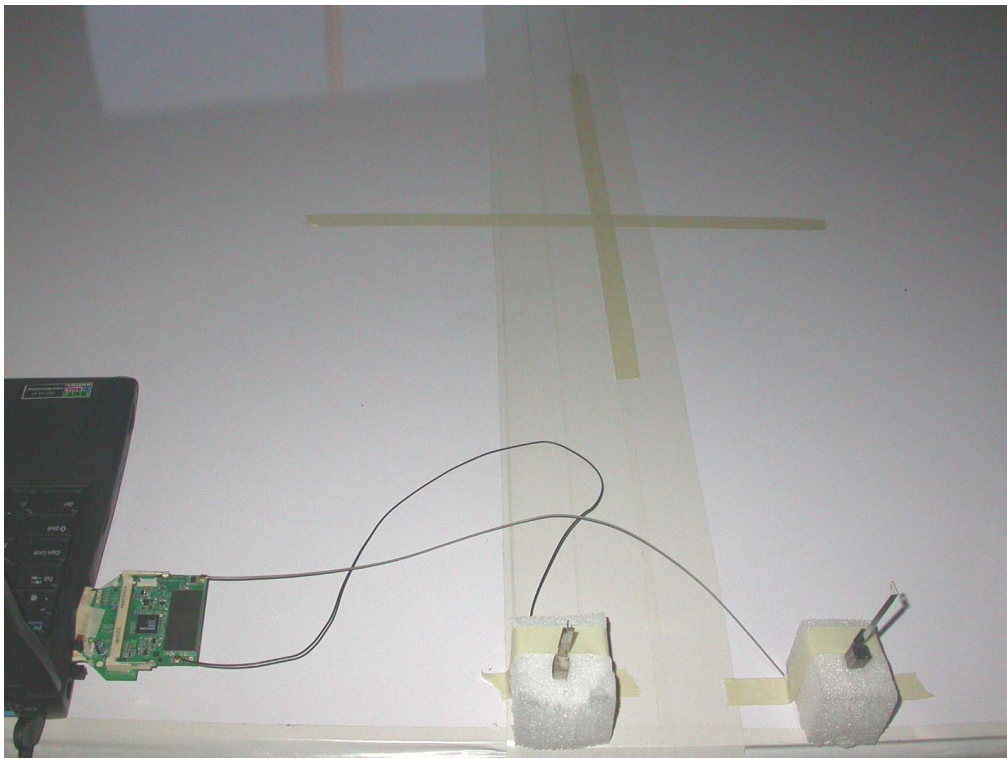
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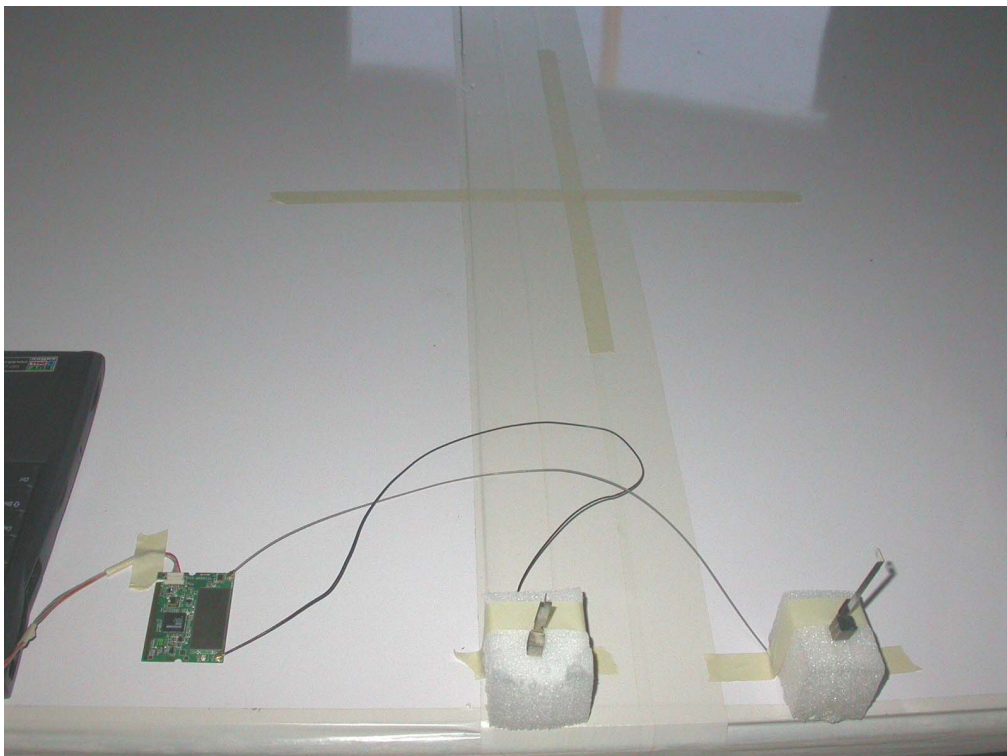
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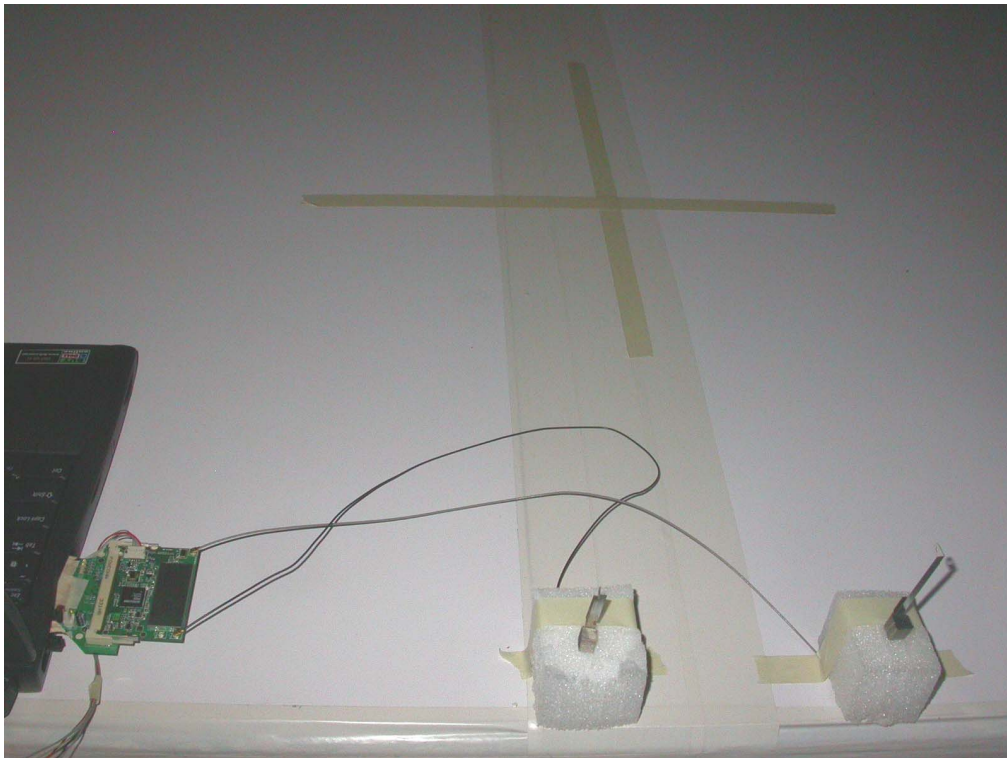
Bluetooth mode :





COMBO mode :







12. ANTENNA REQUIREMENT

12.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

12.2 Antenna Connected Construction

There are two antennas in this product. One PIFA antenna is used for WLAN, and another one PIFA antenna is used for Bluetooth . The maximum gain of each antenna is 3dBi.



13. RF EXPOSURE EVALUATION

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)
LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

13.1 Friis Formula

Friis transmission formula : $Pd = (Pout * G) / (4 * pi * r^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

13.2 EUT Operating Condition

A software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

13.3 Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data

Test Mode : Normal Operation



13.3.1 Antenna Gain

Antenna Gain : The maximum Gain measured in fully anechoic chamber is 3dBi linear scale.

13.3.2 Output Power into Antenna & RF Exposure Evaluation Distance

Channel	Channel Frequency (MHz)	Output Average Power to Antenna (dBm) e.i.r.p.	Antenna Gain	Power Density at 20cm (mW/cm ²)	LIMITS (mW/cm ²)
CH1(Low)	2402.00	18.62	3	0.014479	1
CH6(Mid)	2441.00	18.04	3	0.012669	1
CH11(High)	2480.00	17.88	3	0.012210	1

Note : 1. For 802.11b Mode (11Mbps)

2. Output Average Power to Antenna (dBm) e.i.r.p. = Average Power Output (dBm) + Antenna Gain

Channel	Channel Frequency (MHz)	Output Average Power to Antenna (dBm) e.i.r.p.	Antenna Gain	Power Density at 20cm (mW/cm ²)	LIMITS (mW/cm ²)
CH1(Low)	2402.00	17.73	3	0.011796	1
CH6(Mid)	2441.00	17.78	3	0.011932	1
CH11(High)	2480.00	17.50	3	0.011187	1

Note : 1. For 802.11g Mode (6Mbps)

2. Output Average Power to Antenna (dBm) e.i.r.p. = Average Power Output (dBm) + Antenna Gain

Channel	Channel Frequency (MHz)	Output Average Power to Antenna (dBm) e.i.r.p.	Antenna Gain	Power Density at 20cm (mW/cm ²)	LIMITS (mW/cm ²)
CH00(Low)	2402.00	1.51	3	0.00562	1
CH39(Mid)	2441.00	1.30	3	0.000535	1
CH78(High)	2480.00	0.63	3	0.000459	1

Note : 1. For Bluetooth mode

The power density Pd (4th column) at a distance of 20cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm². The EUT is classified as portable product and the output power is lower than the FCC low threshold. So, RF exposure limit warning or SAR test are not required.