FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : WIRELESS 11B CARDBUS CARD

Model No. : CB11B2, MS-6829

FCC ID. : I4L-MS6829

Filing Type : Certification

Applicant : **Micro-Star Int'l Co., Ltd.**
No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan

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SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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History of this test report

Original Report Issue Date: Jul. 22, 2003

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No. : F362803

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 15, Subpart C

Equipment : WIRELESS 11B CARDBUS CARD

Model No. : CB11B2, MS-6829

FCC ID. : I4L-MS6828

Filing Type : Certification

Applicant : **Micro-Star Int'l Co., Ltd.**
No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 1992** and the equipment under test was ***passed*** all test items required in FCC Part 15 subpart C, relative to the equipment under test. Testing was carried out on Jul. 09, 2003 at **SPORTON International Inc.** LAB.

Alex Chen
Manager

SPORTON International Inc.
6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

Micro-Star Int'l Co., Ltd.
No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan

1.2. Manufacturer

1. Micro-Star Int'l Co., Ltd.
   No. 488, Ban-Nan Rd., Jung-He City, Taipei Hsien, Taiwan
2. MSI COMPUTER (SHENZHEN) Co., Ltd.
   Longma Information Technology Industrial Park, Shiyan, Tangtou Village, Shenzhen

1.3. Basic Description of Equipment under Test

Equipment	: WIRELESS 11B CARDBUSI CARD
Model No.	: CB11B2, MS-6829
FCC ID.	: I4L-MS6829
Trade Name	: MSI
Power Supply Type	: From Notebook
AC Power Cord	: N/A

1.4. Feature of Equipment under Test

Form Factor	CardBus
Operation voltage	3.3 V
Standard	IEEE802.11b
Frequency Range	2.4GHz to 2.4835GHz
Data Rate and Modulation Types	IEEE 802.11b(Auto-Fallback): - CCK @ 5.5 and 11 Mbps - DQPSK @ 2Mbps - DBPSK @ 1 Mbps
Operating Channels	11
Media Access Protocol	CSMA/CA
Security / Encryption	64-/128-bit WEP
Range	Open Space: - 170m @ 11 Mbps Indoor: - 120m @ 11 Mbps
Antenna	Internal diversity
Operating system	Microsoft® Windows® 98SE/ ME/2000/XP
Environmental	Operating Temperature: 0 ~ 55°C Operating Humidity: 0 ~ 95%, non-condensing
Dimensions (WxDxH)	115 X 54 X 7mm
Weight	38.5g

2. Test Configuration of Equipment under Test

2.1. Test Manner

a. The EUT has been associated with personal computer and peripherals pursuant to ANSI C63.4-1992 and configuration operated in a manner, which tended to maximize its emission characteristics in a typical application.
b. The complete test system included DELL NOTEBOOK, VIEWSONIC Monitor, LOGITECH PS/2 Keyboard, LOGITECH PS/2 Mouse, EPSON Printer, ACEEX Modem and EUT for EMI test.
c. The EUT can operate on eleven channels from 2412.0MHz to 2462.0MHz.
According to 15.31(m), three channels (one near top, one near middle and one near bottom) were performed as following:
Mode 1: 2412MHz（Channel 01）
Mode 2: 2437MHz（Channel 06）
Mode 3: 2462MHz（Channel 11）
b. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 25000MHz.

2.2. Description of Test System

Support Unit 1. – Notebook (DELL)

FCC ID	: N/A
Model No.	: PP01L
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0037
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- Monitor (VIEWSONIC)

FCC ID	: N/A
Model No.	: VCDTS21553-3P
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0050
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to compy with FCC standards and authorized under a declaration of conformity.

Support Unit 3. -- PS/2 Keyboard (LOGITECH)

FCC ID	: N/A
Model No.	: Y-SJ17
Serial No.	: SP0054
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 4. – PS/2 Mouse (LOGITECH)

FCC ID	: N/A
Model No.	: M-BE58
Serial No.	: SP0041
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

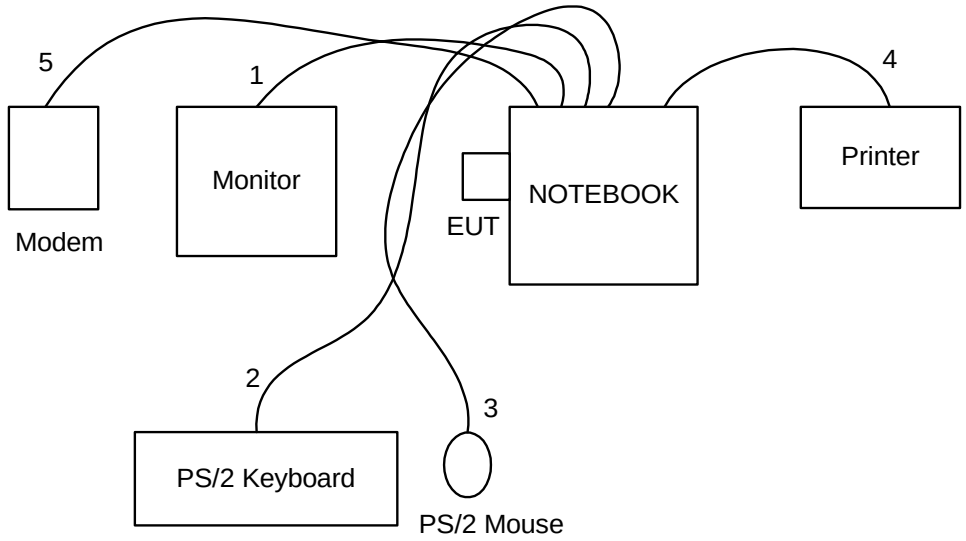
Support Unit 5. -- Printer (EPSON)

FCC ID	: N/A
Model No.	: STYLUS COLRO 680
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0048
Data Cable	: Shielded, 1.35m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 6. -- Modem (ACEEX)

FCC ID	: IFAXDM1414
Model No.	: DM1414
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0015
Data Cable	: Shielded, 1.15m

2.3. Connection Diagram of Test System



1. The I/O cable is connected from NOTEBOOK to the support unit 2.
2. The I/O cable is connected from NOTEBOOK to the support unit 3.
3. The I/O cable is connected from NOTEBOOK to the support unit 4.
4. The I/O cable is connected from NOTEBOOK to the support unit 5.
5. The I/O cable is connected from NOTEBOOK to the support unit 6.

3. Test Software

An executive program, EMCTEST.EXE under WIN XP, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows:

a. Turn on the power of all equipment.
b. The PC reads the test program from the hard disk drive and runs it.
c. The PC sends " H" messages to the monitor, and the monitor displays " H " patterns on the screen.
d. The PC sends " H " messages to the printer, then the printer prints them on the paper.
e. The PC sends " H " messages to the modem.
f. The PC sends " H " messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
g. Repeat the steps from c to f.

At the same time, "Qatest.exe" was executed to keep transmitting signals at fixed frequency.

4. General Information of Test

Test Site Location	:	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
Test Site No	:	CO01-HY, 03CH03-HY

4.1. Test Voltage

110V/60Hz

4.2. Standard for Methods of Measurement

ANSI C63.4-1992 for conducted power line test and radiated emission test,
“Guidance on Measurements for Direct Sequence Spread Spectrum Systems” for test of 6dB Bandwidth
“Guidance on Measurements for Direct Sequence Spread Spectrum Systems” for test of Maximum Peak Output Power
“Guidance on Measurements for Direct Sequence Spread Spectrum Systems” for test of 100kHz Bandwidth of Frequency Band Edges
“Guidance on Measurements for Direct Sequence Spread Spectrum Systems” for test of Power Spectral Density

4.3. Test in Compliance with

FCC Part 15, Subpart C 15.247

4.4. Frequency Range Investigated

a. Conduction: from 150 KHz to 30 MHz
b. Radiation: from 30 MHz to 25000MHz

4.5. Test Distance

The test distance of radiated emission from antenna to EUT is 3 M.

5. Report of Measurements and Examinations

5.1. List of Measurements and Examinations

FCC Rule	Description of Test	Result
15.247(a)(2)	6dB Bandwidth	Pass
15.247(b)	Maximum Peak Output Power	Pass
15.247(d)	Power Spectral Density	Pass
15.207	Conducted Emission	Pass
15.209	Radiated Emission	Pass
15.247(c)	100kHz Bandwidth of Frequency Band Edges	Pass
15.203	Antenna Requirement	Pass
1.1307 1.1310 2.1091 2.1093	RF Exposure Compliance	Pass

5.2. 6dB Bandwidth

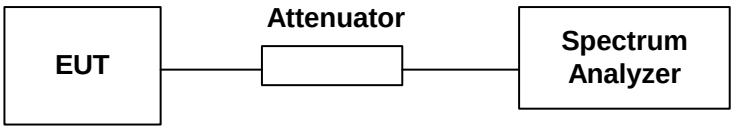
5.2.1. Measuring Instruments：

As described in chapter 7 of this test report.

5.2.2. Test Procedure：

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.
3. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

5.2.3. Test Setup Layout：



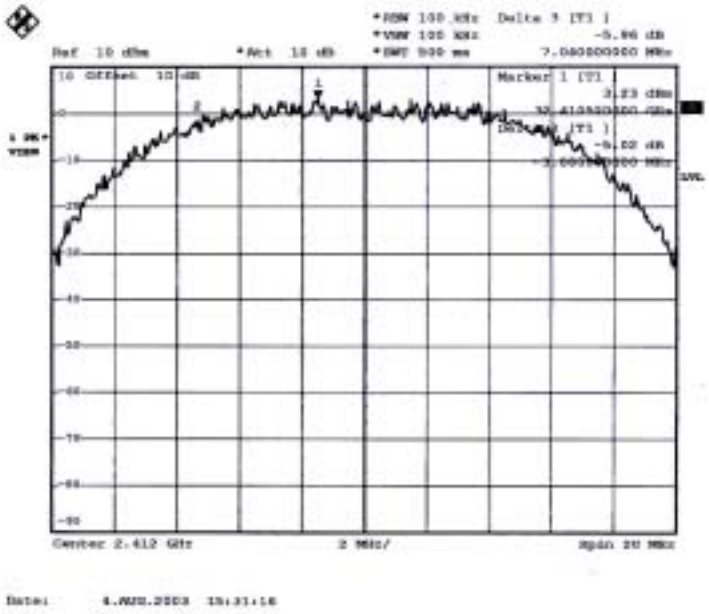
5.2.4. Test Result：The spectrum analyzer plots are attached as below

- Temperature : 26°C
- Relative Humidity : 63 %

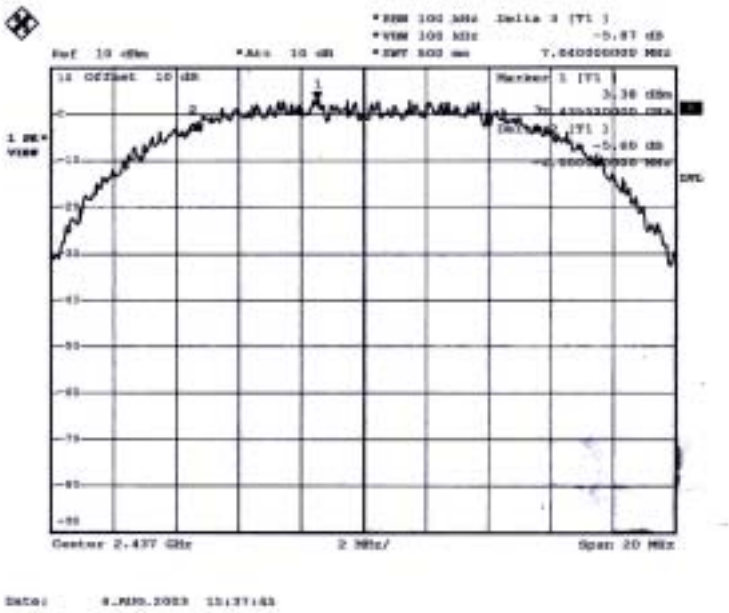
Channel	Frequency (MHz)	6dB Emission bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
1	2412	10.92	0.5	1
6	2437	11.04	0.5	2
11	2462	11.04	0.5	3

-

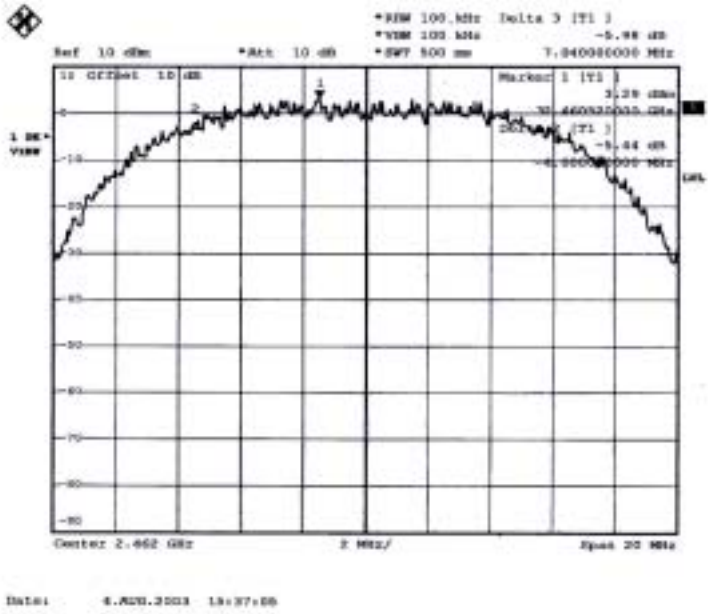
Plot1(Channel 1)：



Plot2(Channel 6)：



Plot3(Channel 11)：



Comments：6dB Emission bandwidth>500kHz

5.3. Peak Output Power

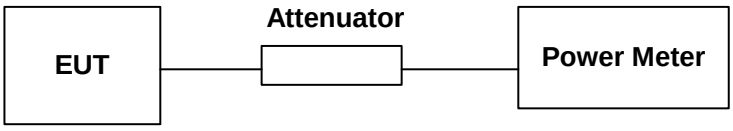
5.3.1. Measuring Instruments：

As described in chapter 7 of this test report.

5.3.2. Test Procedure：

The antenna port（RF output）of the EUT was connected to the input（RF input）of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

5.3.3. Test Setup Layout：



5.3.4. Test Result：See spectrum analyzer plots below

- Temperature: 26°C
- Relative Humidity: 63 %
- Antenna Gain: 3 dBi

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limits (Watt/dBm)
1	2412	13.27	21.23244462	1W/30 dBm
6	2437	13.63	23.06747189	1W/30 dBm
11	2462	13.48	22.28435149	1W/30 dBm

- Comments：Maximum Peak Output Power < 30dBm (1Watt)

5.4. Power Spectral Density

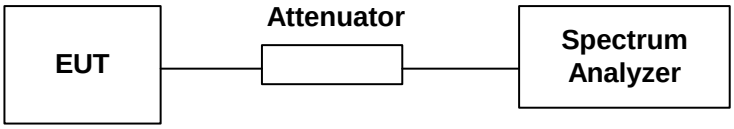
5.4.1. Measuring Instruments：

As described in chapter 7 of this test report.

5.4.2. Test Procedure：

1. The transmitter output was connected to spectrum analyzer through an attenuator.
2. The spectrum analyzer's resolution bandwidth were set at 3KHz RBW and 30KHz VBW as that of the fundamental frequency. Set the sweep time=span/3KHz.
3. The power spectral density was measured and recorded.
4. The Sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

5.4.3. Test Setup Layout：



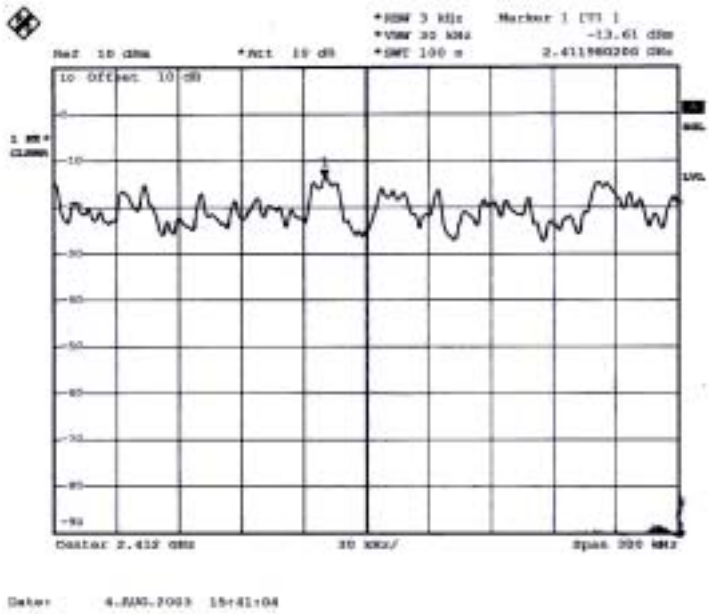
5.4.4. Test Result：See spectrum analyzer plots below

- Temperature: 26°C
- Relative Humidity: 63 %

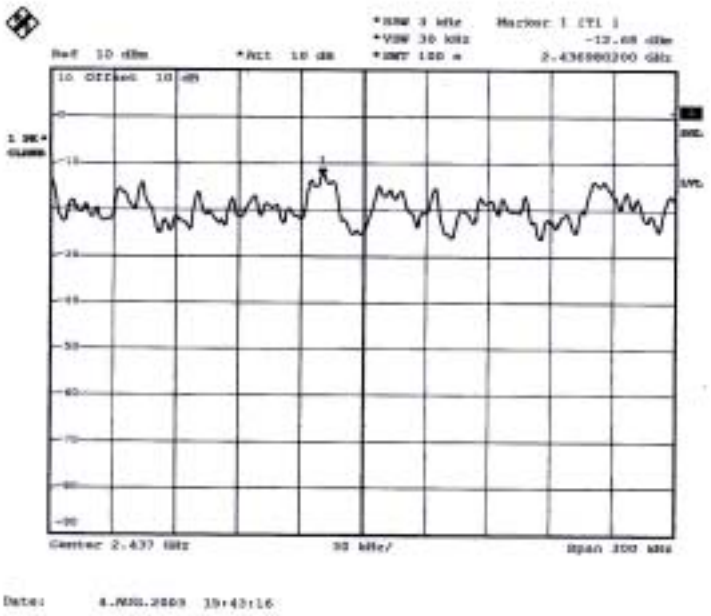
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)	Plot Ref. No.
1	2412	-13.61	8	1
6	2437	-12.68	8	2
11	2462	-11.74	8	3

-

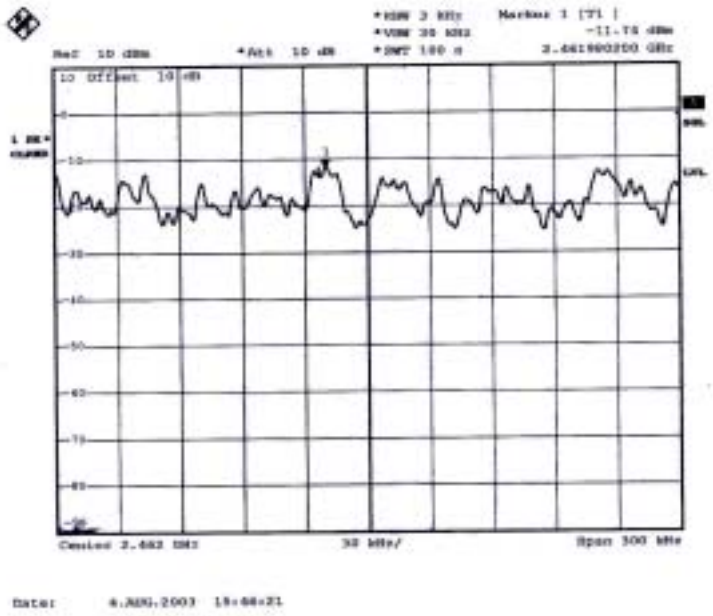
Plot1(Channel 1):



Plot2(Channel 6):



Plot3(Channel 11):



5.5. Test of Conducted Emission

Conducted Emissions were measured from 150 KHz to 30 MHz with a bandwidth of 9 KHz and return leads of the EUT according to the methods defined in ANSI C63.4-1992 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

5.5.1. Major Measuring Instruments：

● Test Receiver	(R&S ESCS 30)
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

5.5.2. Test Procedures：

a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connect to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 KHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5.5.3. Test Result of Conducted Emission：

- Test Mode: Mode 1
- Frequency Range of Test: from 150KHz to 30 MHz
- 6dB Bandwidth: 9KHz
- Temperature: 26.9 °C
- Relative Humidity: 59 %

■ **The test was passed at the minimum margin that marked by a frame in the following data**

Site : site
Condition : CISPR CLASS-B 2003 2001/008 LINE
EUT : PCI CARD
Power : FROM SYSTEM(110Vac/60Hz)
Model : MS-6828
Memo : 0.5m Antenna
Memo : TX CHANEL 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.185	48.07	-16.19	64.26	47.95	0.10	0.02	QP
2	0.185	48.61	-5.65	54.26	48.49	0.10	0.02	Average
3	0.369	43.11	-5.41	48.52	42.94	0.10	0.07	Average
4	0.369	43.60	-14.92	58.52	43.43	0.10	0.07	QP
5	0.463	39.70	-16.94	56.64	39.52	0.10	0.08	QP
6	0.463	39.99	-6.65	46.64	39.81	0.10	0.08	Average
7	0.645	39.26	-16.74	56.00	39.08	0.10	0.08	QP
8	0.645	37.69	-8.31	46.00	37.51	0.10	0.08	Average
9	0.739	38.76	-17.24	56.00	38.58	0.10	0.08	QP
10	0.739	37.56	-8.44	46.00	37.38	0.10	0.08	Average
11	0.923	35.41	-10.59	46.00	35.23	0.10	0.08	Average
12	0.923	38.12	-17.88	56.00	37.94	0.10	0.08	QP

Site : site
Condition : CISPR CLASS-B 2003 2001/008 NEUTRAL
EUT : PCI CARD
Power : FROM SYSTEM(110Vac/60Hz)
Model : MS-6828
Memo : 0.5m Antenna
Memo : TX CHANEL 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.185	45.89	-18.36	64.25	45.77	0.10	0.02	QP
2	0.185	46.48	-7.77	54.25	46.36	0.10	0.02	Average
3	0.277	38.09	-12.82	50.91	37.94	0.10	0.05	Average
4	0.277	37.72	-23.19	60.91	37.57	0.10	0.05	QP
5	0.647	32.00	-14.00	46.00	31.82	0.10	0.08	Average
6	0.647	35.97	-20.03	56.00	35.79	0.10	0.08	QP
7	0.922	36.81	-19.19	56.00	36.63	0.10	0.08	QP
8	0.922	33.38	-12.62	46.00	33.20	0.10	0.08	Average
9	1.479	33.50	-12.50	46.00	33.30	0.10	0.10	Average
10	1.479	35.88	-20.12	56.00	35.68	0.10	0.10	QP
11	2.030	33.75	-12.25	46.00	33.52	0.10	0.13	Average
12	2.030	37.11	-18.89	56.00	36.88	0.10	0.13	QP

Test Engineer : John

John Huang

- Test Mode: Mode 2
- Frequency Range of Test: from 150KHz to 30 MHz
- 6dB Bandwidth: 9KHz
- Temperature: 26.9 °C
- Relative Humidity: 59 %

■ The test was passed at the minimum margin that marked by a frame in the following data

Site : site
Condition : CISPR CLASS-B 2003 2001/008 LINE
EUT : PCI CARD
Power : FROM SYSTEM(110Vac/60Hz)
Model : MS-6828
Memo : 0.5m Antenna
Memo : TX CHANEL 6

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.185	48.13	-16.13	64.26	48.01	0.10	0.02	QP
2	0.185	48.74	-5.52	54.26	48.62	0.10	0.02	Average
3	0.369	43.11	-5.41	48.52	42.94	0.10	0.07	Average
4	0.369	43.58	-14.94	58.52	43.41	0.10	0.07	QP
5	0.462	39.92	-16.74	56.66	39.74	0.10	0.08	QP
6	0.462	40.22	-6.44	46.66	40.04	0.10	0.08	Average
7	0.645	37.58	-8.42	46.00	37.40	0.10	0.08	Average
8	0.645	39.33	-16.67	56.00	39.15	0.10	0.08	QP
9	0.923	38.01	-17.99	56.00	37.83	0.10	0.08	QP
10	0.923	35.18	-10.82	46.00	35.00	0.10	0.08	Average
11	1.016	36.86	-9.14	46.00	36.68	0.10	0.08	Average
12	1.016	38.39	-17.61	56.00	38.21	0.10	0.08	QP

Site : site
Condition : CISPR CLASS-B 2003 2001/008 NEUTRAL
EUT : PCI CARD
Power : FROM SYSTEM(110Vac/60Hz)
Model : MS-6828
Memo : 0.5m Antenna
Memo : TX CHANEL 6

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.185	45.93	-18.33	64.26	45.81	0.10	0.02	QP
2	0.185	46.57	-7.69	54.26	46.45	0.10	0.02	Average
3	0.277	38.04	-12.85	50.89	37.89	0.10	0.05	Average
4	0.277	37.70	-23.19	60.89	37.55	0.10	0.05	QP
5	0.922	36.68	-19.32	56.00	36.50	0.10	0.08	QP
6	0.922	33.38	-12.62	46.00	33.20	0.10	0.08	Average
7	1.110	32.82	-13.18	46.00	32.63	0.10	0.09	Average
8	1.110	35.34	-20.66	56.00	35.15	0.10	0.09	QP
9	1.753	33.40	-12.60	46.00	33.19	0.10	0.11	Average
10	1.753	35.92	-20.08	56.00	35.71	0.10	0.11	QP
11	2.030	33.46	-12.54	46.00	33.23	0.10	0.13	Average
12	2.030	37.15	-18.85	56.00	36.92	0.10	0.13	QP

Test Engineer : John

John Huang

- Test Mode: Mode 3
- Frequency Range of Test: from 150KHz to 30 MHz
- 6dB Bandwidth: 9KHz
- Temperature: 26.9 °C
- Relative Humidity: 59 %

■ The test was passed at the minimum margin that marked by a frame in the following data

Site : site
Condition : CISPR CLASS-B 2003 2001/008 LINE
EUT : PCI CARD
Power : FROM SYSTEM(110Vac/60Hz)
Model : MS-6828
Memo : 0.5m Antenna
Memo : TX CHANEL 11

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.184	48.21	-16.09	64.30	48.09	0.10	0.02	QP
2	0.184	48.81	-5.49	54.30	48.69	0.10	0.02	Average
3	0.369	43.17	-5.35	48.52	43.00	0.10	0.07	Average
4	0.369	43.56	-14.96	58.52	43.39	0.10	0.07	QP
5	0.461	39.99	-16.68	56.67	39.81	0.10	0.08	QP
6	0.461	40.22	-6.45	46.67	40.04	0.10	0.08	Average
7	0.647	37.69	-8.31	46.00	37.51	0.10	0.08	Average
8	0.647	39.18	-16.82	56.00	39.00	0.10	0.08	QP
9	0.739	37.62	-8.38	46.00	37.44	0.10	0.08	Average
10	0.739	38.78	-17.22	56.00	38.60	0.10	0.08	QP
11	0.923	35.18	-10.82	46.00	35.00	0.10	0.08	Average
12	0.923	38.16	-17.84	56.00	37.98	0.10	0.08	QP

Site : site
Condition : CISPR CLASS-B 2003 2001/008 NEUTRAL
EUT : PCI CARD
Power : FROM SYSTEM(110Vac/60Hz)
Model : MS-6828
Memo : 0.5m Antenna
Memo : TX CHANEL 11

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.185	45.97	-18.30	64.27	45.85	0.10	0.02	QP
2	0.185	46.57	-7.70	54.27	46.45	0.10	0.02	Average
3	0.277	38.15	-12.77	50.92	38.00	0.10	0.05	Average
4	0.277	37.82	-23.10	60.92	37.67	0.10	0.05	QP
5	0.645	35.67	-20.33	56.00	35.49	0.10	0.08	QP
6	0.645	31.47	-14.53	46.00	31.29	0.10	0.08	Average
7	0.921	36.75	-19.25	56.00	36.57	0.10	0.08	QP
8	0.921	33.38	-12.62	46.00	33.20	0.10	0.08	Average
9	1.477	33.50	-12.50	46.00	33.30	0.10	0.10	Average
10	1.477	36.18	-19.82	56.00	35.98	0.10	0.10	QP
11	2.030	33.70	-12.30	46.00	33.47	0.10	0.13	Average
12	2.030	37.23	-18.77	56.00	37.00	0.10	0.13	QP

Test Engineer : John Huang

5.6. Test of Radiated Emission

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

5.6.1. Major Measuring Instruments

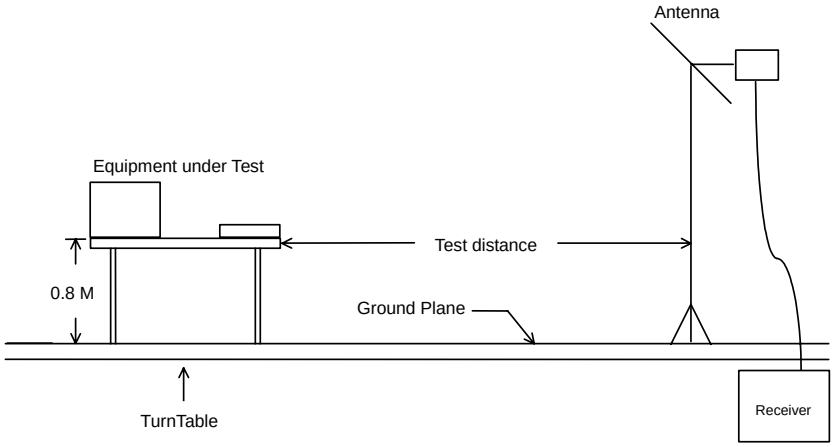
• Amplifier	(MITEQ AFS44)
RF Gain	40 dB
Signal Input	100 MHz to 26.5 GHz

• Spectrum analyzer	(R&S FSP40)
Attenuation	10 dB
Start Frequency	1 GHz
Stop Frequency	25 GHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	9 KHz to 40 GHz

5.6.2. Test Procedures

1. The EUT was placed on a rotatable table top 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
5. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

5.6.3. Typical Test Setup Layout of Radiated Emission



5.6.4. Test Result of Radiated Emission

- Test Mode: Mode 1
- Test Distance: 3M
- Temperature: 27 °C
- Relative Humidity: 65 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test was passed at the minimum margin that marked by the frame in the following test record

■ Spurious Emission

```
Site       : site
Condition  : 3m 03CH03-MAT HORIZONTAL
EUT        : CARD BUS
Power      : For N/B
MODEL      : MS-6829
MEMO       : TX CH01 2412MHz
```

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	205.770	31.77	-11.73	43.50	48.22	7.82	2.33	26.60	Peak	---	---
2	229.530	32.94	-13.06	46.00	47.04	10.02	2.48	26.60	Peak	---	---
3	279.210	31.22	-14.78	46.00	43.52	11.55	2.75	26.60	Peak	---	---

```
Site       : site
Condition  : 3m 03CH03-MAT HORIZONTAL
EUT        : CARD BUS
Power      : For N/B
MODEL      : MS-6829
MEMO       : TX CH01 2412MHz
```

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	332.200	34.08	-11.92	46.00	45.18	12.44	3.26	26.80	Peak	---	---
2	396.600	39.50	-6.50	46.00	48.65	14.52	3.51	27.18	Peak	---	---
3	452.600	34.81	-11.19	46.00	43.35	15.36	3.56	27.46	Peak	---	---

Site : site
Condition : 3m 03CH03-MAT VERTICAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEM0 : TX CH01 2412MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	139.890	30.87	-12.63	43.50	45.39	10.26	2.06	26.84	Peak	---	---
2	228.450	26.73	-19.27	46.00	40.95	9.91	2.47	26.60	Peak	---	---
3	279.210	28.61	-17.39	46.00	40.91	11.55	2.75	26.60	Peak	---	---

Site : site
Condition : 3m 03CH03-MAT VERTICAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEM0 : TX CH01 2412MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	343.400	31.53	-14.47	46.00	42.20	12.79	3.40	26.86	Peak	---	---
2	396.600	36.61	-9.39	46.00	45.76	14.52	3.51	27.18	Peak	---	---
3	452.600	35.84	-10.16	46.00	44.38	15.36	3.56	27.46	Peak	---	---

Site : site
Condition : 3m HORN-ANT-6741 HORIZONTAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH01 2412MHz
: F362803

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1460.000	44.16	-29.84	74.00	41.31	25.24	4.64	27.03	Peak	---	---
2	1460.000	39.45	-14.55	54.00	36.60	25.24	4.64	27.03	Average	---	---
3	1596.000	45.71	-28.29	74.00	42.12	25.75	4.89	27.05	Peak	---	---
4	1596.000	41.40	-12.60	54.00	37.81	25.75	4.89	27.05	Average	---	---
5	2038.000	50.72	-23.28	74.00	44.61	27.49	5.73	27.11	Peak	---	---
6 !	2038.000	49.00	-5.00	54.00	42.89	27.49	5.73	27.11	Average	---	---
7	2324.000	51.16	-22.84	74.00	44.13	28.07	6.11	27.15	Peak	---	---
8 !	2324.000	48.30	-5.70	54.00	41.27	28.07	6.11	27.15	Average	---	---
11	2500.000	52.30	-21.70	74.00	44.70	28.44	6.34	27.18	Peak	---	---
12	2500.000	46.72	-7.28	54.00	39.12	28.44	6.34	27.18	Average	---	---
13	2534.000	51.93	-22.07	74.00	44.17	28.54	6.40	27.18	Peak	---	---
14 !	2534.000	49.04	-4.96	54.00	41.28	28.54	6.40	27.18	Average	200	159

Site : site
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH01 2412MHz
: F362803

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1460.000	46.54	-27.46	74.00	43.69	25.24	4.64	27.03	Peak	---	---
2	1460.000	43.08	-10.92	54.00	40.23	25.24	4.64	27.03	Average	---	---
3	1590.000	46.67	-27.33	74.00	43.11	25.73	4.88	27.05	Peak	---	---
4	1590.000	43.44	-10.56	54.00	39.88	25.73	4.88	27.05	Average	---	---
5	1726.000	45.90	-28.10	74.00	41.53	26.29	5.15	27.07	Peak	---	---
6	1726.000	39.98	-14.02	54.00	35.61	26.29	5.15	27.07	Average	---	---
7	2038.000	50.75	-23.25	74.00	44.64	27.49	5.73	27.11	Peak	---	---
8 !	2038.000	48.19	-5.81	54.00	42.08	27.49	5.73	27.11	Average	---	---
11	2500.000	50.89	-23.11	74.00	43.29	28.44	6.34	27.18	Peak	---	---
12	2500.000	47.75	-6.25	54.00	40.15	28.44	6.34	27.18	Average	---	---
13	2534.000	51.04	-22.96	74.00	43.28	28.54	6.40	27.18	Peak	---	---
14 !	2534.000	48.31	-5.69	54.00	40.55	28.54	6.40	27.18	Average	---	---

- For 3GHz ~ 25GHz
  Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2412.000	H	28.24	6.22	70.33	-	-	104.79	173580.13		Peak
2412.000	H	28.24	6.22	61.54	-	-	96.94	70307.23		A.V.
2412.000	V	28.24	6.22	59.54	-	-	96.87	50118.72		A.V.
2412.000	V	28.24	6.22	68.28	-	-	102.74	69742.90		Peak
4824.000	V/H						-			Peak, A.V.
7236.000	V/H						-			Peak, A.V.
9648.000	V/H						-			Peak, A.V.
12060.000	V/H						-			Peak, A.V.
14472.000	V/H						-			Peak, A.V.
16884.000	V/H						-			Peak, A.V.
19296.000	V/H						-			Peak, A.V.
21708.000	V/H						-			Peak, A.V.
24120.000	V/H						-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer : Murray

Murray Lu

- Test Mode: Mode 2
- Test Distance: 3M
- Temperature: 27 °C
- Relative Humidity: 65 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ **The test was passed at the minimum margin that marked by the frame in the following test record**

■ Spurious Emission

Site : site
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH06 2437MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	210.900	34.96	-8.54	43.50	50.90	8.30	2.36	26.60	Peak	---	---
2	229.260	35.09	-10.91	46.00	49.22	9.99	2.48	26.60	Peak	---	---
3	274.620	33.58	-12.42	46.00	45.85	11.60	2.73	26.60	Peak	---	---

Site : site
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH06 2437MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	332.200	34.97	-11.03	46.00	46.07	12.44	3.26	26.80	Peak	---	---
2	396.600	39.64	-6.36	46.00	48.79	14.52	3.51	27.18	Peak	---	---
3	450.500	33.79	-12.21	46.00	42.34	15.34	3.56	27.45	Peak	---	---

Site : site
Condition : 3m 03CH03-MAT VERTICAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH06 2437MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	79.410	26.25	-13.75	40.00	45.02	5.91	1.56	27.04	Peak	---	---
2	139.890	28.44	-15.06	43.50	42.96	10.26	2.06	26.84	Peak	---	---
3	275.970	27.77	-18.23	46.00	40.04	11.59	2.74	26.60	Peak	---	---

Site : site
Condition : 3m 03CH03-MAT VERTICAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH06 2437MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	396.600	35.03	-10.97	46.00	44.18	14.52	3.51	27.18	Peak	---	---
2	452.600	33.52	-12.48	46.00	42.06	15.36	3.56	27.46	Peak	---	---
3	498.100	28.60	-17.40	46.00	36.49	16.00	3.80	27.69	Peak	---	---

```
Site       : site
Condition  : 3m HORN-ANT-6741 HORIZONTAL
EUT        : CARD BUS
Power      : For N/B
MODEL      : MS-6829
MEMO       : TX CH06 2437MHz
           : F362803
```

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1454.000	44.48	-29.52	74.00	41.66	25.22	4.63	27.03	Peak	---	---
2	1454.000	38.15	-15.85	54.00	35.33	25.22	4.63	27.03	Average	---	---
3	1598.000	45.90	-28.10	74.00	42.29	25.76	4.90	27.05	Peak	---	---
4	1598.000	42.06	-11.94	54.00	38.45	25.76	4.90	27.05	Average	---	---
5	2062.000	50.37	-23.63	74.00	44.19	27.53	5.76	27.11	Peak	---	---
6	2062.000	46.75	-7.25	54.00	40.57	27.53	5.76	27.11	Average	---	---
7	2308.000	50.27	-23.73	74.00	43.30	28.03	6.09	27.15	Peak	---	---
8	2308.000	45.85	-8.15	54.00	38.88	28.03	6.09	27.15	Average	---	---
9	2350.000	52.28	-21.72	74.00	45.17	28.12	6.14	27.15	Peak	---	---
10	2350.000	42.12	-11.88	54.00	35.01	28.12	6.14	27.15	Average	---	---
13	2566.000	51.94	-22.06	74.00	44.03	28.64	6.46	27.19	Peak	---	---
14	2566.000	42.80	-11.20	54.00	34.89	28.64	6.46	27.19	Average	---	---

```
Site       : site
Condition  : 3m HORN-ANT-6741 VERTICAL
EUT        : CARD BUS
Power      : For N/B
MODEL      : MS-6829
MEMO       : TX CH06 2437MHz
           : F362803
```

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1324.000	43.60	-30.40	74.00	41.27	24.91	4.43	27.01	Peak	---	---
2	1324.000	38.00	-16.00	54.00	35.67	24.91	4.43	27.01	Average	---	---
3	1462.000	44.80	-29.20	74.00	41.95	25.24	4.64	27.03	Peak	---	---
4	1462.000	39.09	-14.91	54.00	36.24	25.24	4.64	27.03	Average	---	---
5	1596.000	46.13	-27.87	74.00	42.54	25.75	4.89	27.05	Peak	---	---
6	1596.000	41.32	-12.68	54.00	37.73	25.75	4.89	27.05	Average	---	---
7	2062.000	51.10	-22.90	74.00	44.92	27.53	5.76	27.11	Peak	---	---
8 !	2062.000	48.87	-5.13	54.00	42.69	27.53	5.76	27.11	Average	200	132
9	2348.000	49.46	-24.54	74.00	42.35	28.12	6.14	27.15	Peak	---	---
10	2348.000	46.51	-7.49	54.00	39.40	28.12	6.14	27.15	Average	---	---
13	2564.000	50.23	-23.77	74.00	42.32	28.64	6.46	27.19	Peak	---	---
14 !	2564.000	48.23	-5.77	54.00	40.32	28.64	6.46	27.19	Average	---	---

- For 3GHz ~ 25GHz
  Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2436.000	H	28.29	6.26	69.18	-	-	103.73	153638.48		Peak
2436.000	H	28.29	6.26	61.65	-	-	96.20	64565.42		A.V.
2436.000	V	28.29	6.26	66.78	-	-	101.33	116546.71		Peak
2436.000	V	28.29	6.26	58.54	-	-	93.09	45133.60		A.V.
4874.000	V/H						-			Peak, A.V.
7311.000	V/H						-			Peak, A.V.
9748.000	V/H						-			Peak, A.V.
12185.000	V/H						-			Peak, A.V.
14622.000	V/H						-			Peak, A.V.
17059.000	V/H						-			Peak, A.V.
19496.000	V/H						-			Peak, A.V.
21933.000	V/H						-			Peak, A.V.
24370.000	V/H						-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer : Murray Lu

- Test Mode: Mode 3
- Test Distance: 3M
- Temperature: 27 °C
- Relative Humidity: 65 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ **The test was passed at the minimum margin that marked by the frame in the following test record**

■ Spurious Emission

Site : site
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	204.690	32.86	-10.64	43.50	49.44	7.70	2.32	26.60	Peak	---	---
2	210.900	34.18	-9.32	43.50	50.12	8.30	2.36	26.60	Peak	---	---
3	229.260	35.16	-10.84	46.00	49.29	9.99	2.48	26.60	Peak	---	---

Site : site
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	332.200	34.52	-11.48	46.00	45.62	12.44	3.26	26.80	Peak	---	---
2	396.600	38.79	-7.21	46.00	47.94	14.52	3.51	27.18	Peak	---	---
3	450.500	33.88	-12.12	46.00	42.43	15.34	3.56	27.45	Peak	---	---

Site : site
Condition : 3m 03CH03-MAT VERTICAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	139.620	29.86	-13.64	43.50	44.36	10.28	2.06	26.84	Peak	---	---
2	229.260	29.34	-16.66	46.00	43.47	9.99	2.48	26.60	Peak	---	---
3	242.220	30.37	-15.63	46.00	43.41	11.00	2.56	26.60	Peak	---	---

Site : site
Condition : 3m 03CH03-MAT VERTICAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	396.600	35.59	-10.41	46.00	44.74	14.52	3.51	27.18	Peak	---	---
2	452.600	34.24	-11.76	46.00	42.78	15.36	3.56	27.46	Peak	---	---
3	498.100	28.26	-17.74	46.00	36.15	16.00	3.80	27.69	Peak	---	---

Site : site
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH11 2462MHz
: F362803

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1324.000	43.67	-30.33	74.00	41.34	24.91	4.43	27.01	Peak	---	---
2	1324.000	38.09	-15.91	54.00	35.76	24.91	4.43	27.01	Average	---	---
3	1454.000	45.59	-28.41	74.00	42.77	25.22	4.63	27.03	Peak	---	---
4	1454.000	40.60	-13.40	54.00	37.78	25.22	4.63	27.03	Average	---	---
5	1590.000	46.55	-27.45	74.00	42.99	25.73	4.88	27.05	Peak	---	---
6	1590.000	42.42	-11.58	54.00	38.86	25.73	4.88	27.05	Average	---	---
7	2086.000	51.59	-22.41	74.00	45.32	27.58	5.80	27.11	Peak	---	---
8 !	2086.000	49.11	-4.89	54.00	42.84	27.58	5.80	27.11	Average	200	143
9	2332.000	48.44	-25.56	74.00	41.39	28.08	6.12	27.15	Peak	---	---
10	2332.000	43.55	-10.45	54.00	36.50	28.08	6.12	27.15	Average	---	---
13	2596.000	48.37	-25.63	74.00	40.30	28.74	6.52	27.19	Peak	---	---
14	2596.000	43.50	-10.50	54.00	35.43	28.74	6.52	27.19	Average	---	---

Site : site
Condition : 3m HORN-ANT-6741 HORIZONTAL
EUT : CARD BUS
Power : For N/B
MODEL : MS-6829
MEMO : TX CH11 2462MHz
: F362803

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1196.000	44.62	-29.38	74.00	42.77	24.60	4.24	26.99	Peak	---	---
2	1196.000	37.38	-16.62	54.00	35.53	24.60	4.24	26.99	Average	---	---
3	1590.000	46.26	-27.74	74.00	42.70	25.73	4.88	27.05	Peak	---	---
4	1590.000	43.17	-10.83	54.00	39.61	25.73	4.88	27.05	Average	---	---
5	2086.000	50.41	-23.59	74.00	44.14	27.58	5.80	27.11	Peak	---	---
6	2086.000	45.88	-8.12	54.00	39.61	27.58	5.80	27.11	Average	---	---
7	2334.000	36.17	-17.83	54.00	29.11	28.09	6.12	27.15	Average	---	---
8	2334.000	52.40	-21.60	74.00	45.34	28.09	6.12	27.15	Peak	---	---
9	2374.000	52.79	-21.21	74.00	45.61	28.17	6.17	27.16	Peak	---	---
10	2374.000	41.88	-12.12	54.00	34.70	28.17	6.17	27.16	Average	---	---
13	2590.000	50.74	-23.26	74.00	42.70	28.72	6.51	27.19	Peak	---	---
14	2590.000	45.89	-8.11	54.00	37.85	28.72	6.51	27.19	Average	---	---

- For 3GHz ~ 25GHz
  Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2460.000	H	28.34	6.29	66.45	-	-	101.08	113240.04		Peak
2460.000	H	28.34	6.29	58.42	-	-	93.05	44926.23		A.V.
2462.000	V	28.35	6.29	66.13	-	-	100.77	109269.76		Peak
2462.000	V	28.35	6.29	58.11	-	-	92.75	43401.03		A.V.
4924.000	V/H						-			Peak, A.V.
7386.000	V/H						-			Peak, A.V.
9848.000	V/H						-			Peak, A.V.
12310.000	V/H						-			Peak, A.V.
14772.000	V/H						-			Peak, A.V.
17234.000	V/H						-			Peak, A.V.
19696.000	V/H						-			Peak, A.V.
22158.000	V/H						-			Peak, A.V.
24620.000	V/H						-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer : Murray

Murray Lu

5.7. Band Edges Measurement

5.7.1. Measuring Instruments：

As described in chapter 7 of this test report.

5.7.2. Test Procedure：

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

5.7.3. Test Result：

- Test Result in lower band (Channel 1)： PASS
- Test Result in higher band(Channel 11)： PASS

5.7.4. Note on Band edge Emission

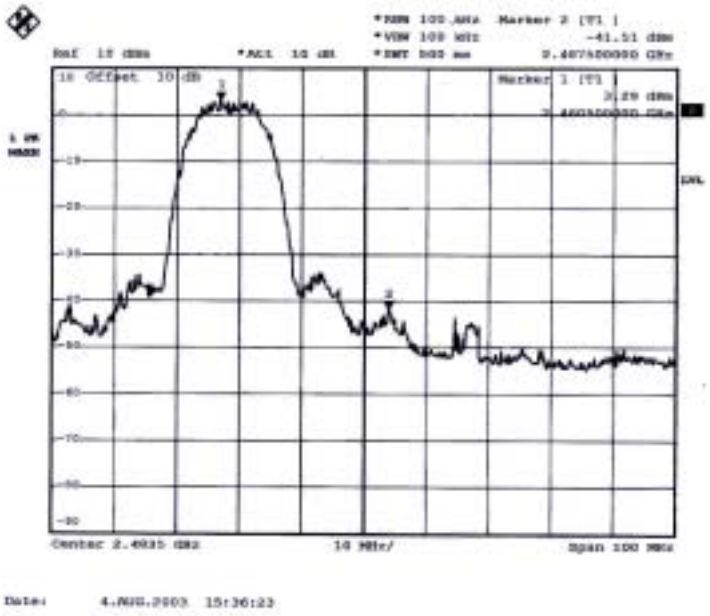
The band edge emission plot on page 39. shows 49.23dB delta between carrier maximum power and local maximum emission in the restricted band (2.4835GHz).

Polarity	The emission of carrier power strength (dB μ V/m)	The maximum field strength in restrict band (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
H	100.77	55.97	74.00	-18.03	Peak
H	92.75	47.95	54.00	-6.05	Average
V	101.08	56.28	74.00	-17.72	Peak
V	93.05	48.25	54.00	-5.75	Average

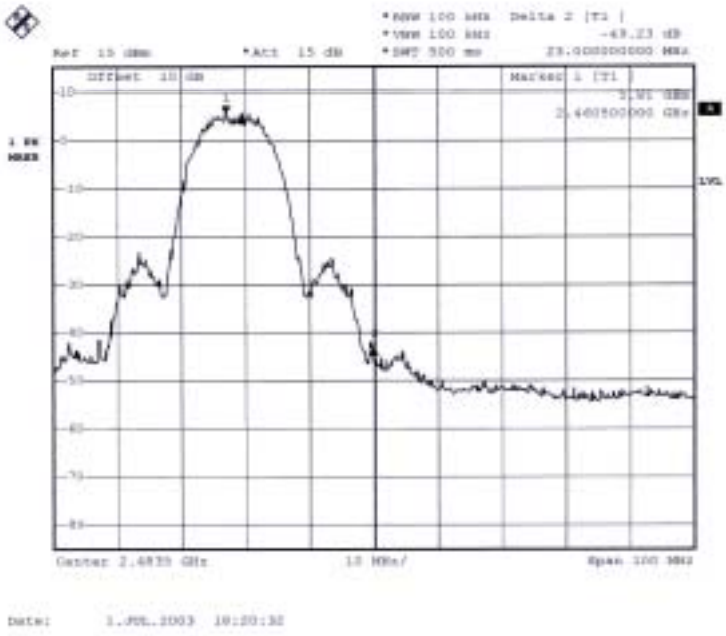
＊The maximum field strength in restricted band is the emission of carrier power strength subtract to the delta between carrier maximum power and local maximum emission in the restricted band.

The spectrum analyzer plots are attached as below：

Plot1 (Channel 1)：



Plot2 (Channel 11)：



Comments： All emissions in any 100kHz bandwidth outside the band edge are attenuated more then 20dB from the carrier.

5.8. Antenna Requirements

The EUT use a undetachable antenna via SMA-reversed external connector. It is considered meet antenna requirement of FCC.

5.8.1. 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.

5.8.2. Antenna Connected Construction

The maximum Gain antenna used in this product is dipole antenna. The antenna connector type is MMCX. The coaxial cable of the antenna is fixed to the antenna.

6. EMI Suppression Component List

No EMI suppression components.

7. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	15.15	1.11	1000	24.30	3.89
35	13.53	1.26	2000	31.10	5.41
40	12.51	1.50	3000	29.60	6.92
45	12.09	1.69	4000	30.80	8.24
50	7.77	1.93	5000	34.20	9.22
55	6.68	2.06	6000	33.30	10.25
60	5.58	1.97	7000	37.80	11.61
65	5.81	2.20	8000	39.40	11.78
70	6.03	2.27	9000	38.40	12.59
75	6.61	2.09	10000	38.90	13.84
80	7.31	2.23	11000	41.10	14.64
85	8.48	2.18	12000	42.70	14.12
90	9.64	2.42	13000	43.90	16.01
95	10.35	2.48	14000	43.70	13.76
100	11.08	2.50	15000	43.40	14.30
110	11.02	2.80	16000	40.90	15.16
120	10.97	3.09	17000	44.40	15.88
130	10.91	3.16	18000	47.10	16.09
140	11.32	3.22	19000	37.60	16.98
150	10.22	3.18	20000	37.30	16.21
160	9.29	3.13	21000	37.00	20.13
170	8.83	3.25	22000	38.00	19.24
180	9.20	3.41	23000	38.70	19.64
190	8.88	3.48	24000	38.60	20.54
200	8.56	3.56	25000	38.90	20.14
220	9.85	3.82	14000	43.70	13.76
240	11.08	4.09	15000	43.40	14.30
260	11.83	4.26	16000	40.90	15.16
280	12.00	4.41	17000	44.40	15.88
300	12.16	4.55	18000	47.10	16.09
320	12.77	4.65	19000	37.60	16.98
340	13.37	4.74	20000	37.30	16.21
360	13.95	4.85	21000	37.00	20.13
380	14.55	4.89	22000	38.00	19.24
400	15.13	5.13	23000	38.70	19.64
450	16.08	5.41	24000	38.60	20.54
500	17.03	5.97	25000	38.90	20.14
550	17.75	6.04			
600	18.49	6.43			
650	18.79	8.85			
700	19.10	7.11			
750	19.49	7.30			
800	19.89	7.32			
850	20.15	7.57			
900	20.42	7.85			
950	20.63	8.25			
1000	20.85	8.04			

8. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9 KHz – 2.75 GHz	Jun. 12, 2003	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001-008	9 KHz – 30 MHz	Apr. 29, 2003	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001-009	9 KHz – 30 MHz	Apr. 29, 2003	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450 Hz	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 ~ 60 Hz	N/A	Conduction (CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9KHz~30MHz	Jan. 07, 2003	Conduction (CO01-HY)
50 ohm BNC type	NOBLE	50ohm	TM009	50 ohm	Apr. 24, 2003	Conduction (CO01-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2003	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004/040	9KHZ~40GHz	Aug. 07, 2002	Radiation
Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Aug. 12, 2002	Radiation (03CH03-HY)
Horn Antenna	COM-POWER	AH-118	10094	1GHz – 18GHz	Apr. 10, 2003	Radiation
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Mar. 14, 2003	Radiation

※ Calibration Interval of instruments listed above is one year.

9. Uncertainty of Test Site

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	3m
Antenna factor calibration	normal(k=2)	±1
cable loss calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
Antenna Directivity	rectangular	±3
Antenna Factor V.S. Height	rectangular	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25
site imperfection	rectangular	±2
Mismatch Receiver VSWR Γ1=0.09 Antenna VSWR Γ2=0.67 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	±0.54
combined standard uncertainty Ue(y)	normal	±2.7
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±5.4

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+0.5^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.2$ for 10m test distance

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+3^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.7$ for 3m test distance

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
LISN coupling specification	rectangular	±1.5
Transducer factor frequency interpolation	rectangular	±0.2
Mismatch Receiver VSWR Γ1=0.09 LISN VSWR Γ2=0.33 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	0.2
combined standard uncertainty Ue(y)	normal	±1.66
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±3.32

$U=\sqrt{\{(0.3/2)^2+(2^2+1.5^2+0.2^2)/3+(0.2)^2/2\}}=1.66$