FCC TEST REPORT

CATEGORY	:	Portable
PRODUCT NAME	:	Mobile Computer
FCC ID.	:	H9PMC3070
FILING TYPE	:	Certification (Class II Change)
BRAND NAME	:	SYMBOL
MODEL NAME	:	MC3070
APPLICANT	:	**SYMBOL Technologies, Inc.** One Symbol Plaza Holtsville, New York, 11742-1300 U.S.A
MANUFACTURER	:	**Universal Scientific Industrial Co., Ltd.** 141, Lane 351, Taiping Road, Sec.1, Tsao Yuen, Nan-Tou, Taiwan, R.O.C.
ISSUED BY	:	**SPORTON INTERNATIONAL INC.** 6F, No. 106, Sec. 1, Hsin Tai Wu Rd., His Chih, Taipei Hsien, Taiwan, R.O.C.

Statements:

This product is a modification on the used antenna of pre-certified project.

The test result in this report refers exclusively to the presented test model / sample.
Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

Certificate or Test Report could not be used by the applicant to claim the product endorsement by CNLA and any agency of U.S. government.

The test equipment used to perform the test is calibrated and traceable to NML/ROC or NIST/USA.

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HISTORY OF THIS TEST REPORT

Received Date: May 18, 2005
Test Date: May 18, 2005
Original Report Issue Date: May 20, 2005
Report No.: FR551327

■ No additional attachment.
☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

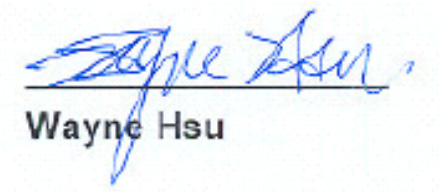
with

47 CFR FCC Part 15 Subpart C

PRODUCT NAME	:	Mobile Computer
BRAND NAME	:	SYMBOL
MODEL NAME	:	MC3070
APPLICANT	:	**SYMBOL Technologies, Inc.** One Symbol Plaza Holtsville, New York, 11742-1300 U.S.A
MANUFACTURER	:	**Universal Scientific Industrial Co., Ltd.** 141, Lane 351, Taiping Road, Sec.1, Tsao Yuen, Nan-Tou, Taiwan, R.O.C.

I **HEREBY** CERTIFY THAT:

The measurements shown in this test report were made in accordance with the procedures given in ANSI C63.4-2003 and all test are performed according to 47 CFR FCC Part 15 Subpart C. Testing was carried out on May 18, 2005 at SPORTON International Inc. LAB.



1. General Description of Equipment under Test

1.1. Applicant

SYMBOL Technologies, Inc.
One Symbol Plaza Holtsville, New York, 11742-1300 U.S.A

1.2. Manufacturer

Universal Scientific Industrial Co., Ltd.
141, Lane 351, Taiping Road, Sec.1, Tsao Yuen, Nan-Tou, Taiwan, R.O.C.

1.3. Basic Description of Equipment under Test

The device supplied for testing is a mobile computer with 21-21160 RF Module which offers 2.4GHz wireless local area network connectivity employing IEEE 802.11 b/g technologies. The technical data has been listed on section " Features of Equipment under Test ". This product is an extension of original one reported under Sporton project number: 453101. A new antenna in the same type with that of the pre-certified one was filed.

1.4. Features of Equipment under Test

ITEMS	DESCRIPTION
Type of Modulation	DSSS (CCK / QPSK / BPSK), OFDM (16, 64 QAM)
Number of Channel	11
Frequency Band	2400 ~ 2483.5 MHz
Carrier Frequencies	Please reference section 1.5.
Output Power	CCK: 19.30dBm (peak) OFDM: 19.07dBm (peak)
Channel Bandwidth	16 MHz
Function Type	Transceiver
Power Rating (DC/AC, Voltage)	3.3 VDC
Temperature Range (Operating)	-20 ~ +55 ℃

1.5. Antenna Description

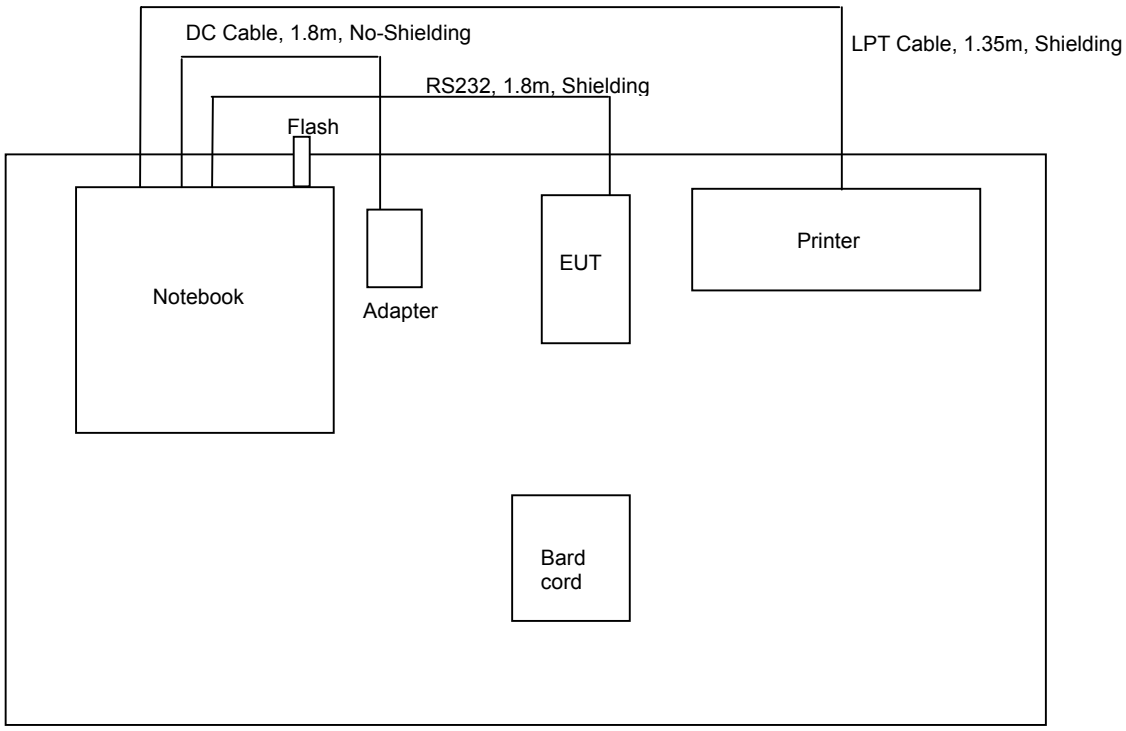
No.	Antenna Type	Gain (dBi)
1	PIFA Antenna	3.00

1.6. Table for Carrier Frequencies

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	05	2432 MHz	09	2452 MHz	-	-
02	2417 MHz	06	2437 MHz	10	2457 MHz	-	-
03	2422 MHz	07	2442 MHz	11	2462 MHz	-	-
04	2427 MHz	08	2447 MHz	-	-	-	-

2. Test Configuration of the Equipment under Test

2.1. Connection Diagram of Test System



2.2. The Test Mode Description

1. For DSSS modulation, CCK (11 Mbps) is the worst case on all test items.
2. For OFDM modulation, BPSK (6 Mbps) is the worst case on all test items.
3. Only spurious and band edge emission is required to be tested.
4. According to ANSI C63.4-2003: IF frequency range of EUT is more than 10 MHz, we have to test the lowest, middle and highest channels of EUT.
5. Spurious emission below 1GHz is independent of channel selection and modulation types. So only channel 06 with OFDM modulation was tested.

2.3. Description of Test Supporting Units

Support unit	Brand	Model No.	FCC ID
Notebook	DELL	PP10L	DoC
Printer	EPSON	Stylus Color 680	DoC
Bard Cord	-	-	-

2.4. Test Modes

The following are the configuration of host MC3070.

Test Mode	Model 1	Model 2
Mechanical	Straight Shooter - Brick	Straight Shooter - Brick
Processor	Intel Bulverde 520MHz	Intel Bulverde 416MHz
Flash	64MB	32MB
SDRAM	64MB	32MB
LCD Panel	Sharp LQ030B7DD01 (Color)	Sharp LQ030B7DD01 (Color)
Touch Panel	Liyitec TR4-030F-14G	NA
Keypad	48 Key	38 Key
Scanning	Symbol PICO Imager (20-60000-XX)	Symbol SE800hp
WLAN	Symbol Photon 802.11b/g (21-21160)	Symbol Photon 802.11b/g (21-21160)
Battery	Symbol 55-060112-86 3.7V 4400mAh	Symbol 55-060114-86 3.7V 2600mAh

Test Mode	Model 3	Model 4
Mechanical	Rotating Head – Brick	Rotating Head – Brick
Processor	Intel Bulverde 520MHz	Intel Bulverde 416MHz
Flash	64MB	32MB
SDRAM	64MB	32MB
LCD Panel	EDT ES50512FLWP (Mono)	EDT ES50512FLWP (Mono)
Touch Panel	Liyitec TR4-030F-14G	NA
Keypad	28 Key	38 Key
Scanning	Symbol SE800hp	Symbol SE800hp
WLAN	Symbol Photon 802.11b/g (21-21160)	Symbol Photon 802.11b/g (21-21160)
Battery	Symbol 55-060112-86 3.7V 4400mAh	Symbol 55-060114-86 3.7V 2600mAh

The above 4 models have been verified. Model 1 with RS232 accessory was found to be the worst case. So, only this model will be shown in this test report.

3. General Information of Test

3.1. Test Facility

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 : 03CH03-HY

3.2. Standards for Methods of Measurement

Here is the list of the standards followed in this test report.

ANSI C63.4-2003

47 CFR FCC Part 15 Subpart C

3.3. Frequency Range Investigated

Radiated emission test: from 30 MHz to 10th carrier harmonic.

3.4. Test Distance

The test distance of radiated emission (30MHz~1GHz) test from antenna to EUT is 3 M.
The test distance of radiated emission (1GHz~10th carrier harmonic) test from antenna to EUT is 3 M.

3.5. Test Software

Channel & Power Controlling Software: This was provided by the manufacturer and is able to let the test engineer select the operating channel as well as the RF output power. The parameters for channel selection is trying to offer the test engineer the ability to fix the operating channel for testing, both normal data and continuously transmitting modes are allowed, and that for RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

4. List of Measurements

4.1. Summary of the Test Results

Applied Standard: 47 CFR FCC Part 15 Subpart C			
Paragraph	**FCC Section**	**Description of Test**	**Result**
5.1	15.247(a)(2)	Test of Band Edges of the Operating Frequency	Pass
5.2	15.247(d)	Spurious Radiated Emission	Pass
5.3	15.203/15.247(b)/(c)	Antenna Requirement	Pass

5. Test Result

5.1. Test of Band Edges of the Operating Frequency

5.1.1. Applicable Standard

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

5.1.2. Measuring Instruments

Item 6~17 of the table on section 6 for radiated measurement.
Item 18 of the table on section 6 for conducted measurement.

5.1.3. Description of Major Test Instruments Setting

- Spectrum Analyzer : R&S FSP30 (Conducted Measurement)
  Attenuation : Auto
  Center Frequency : 2412 MHz / 2462 MHz
  Span Frequency : 100MHz
  RB : 100 kHz
  VB : 100 kHz
  Detector : Peak
  Trace : Max Hold
  Sweep Time : Auto

- Spectrum Analyzer : R&S FSP40 (Radiated Measurement)
  Attenuation : Auto
  Center Frequency : 2412 MHz / 2462 MHz
  Span Frequency : 100MHz
  RB : 1 MHz for PK value / 1 MHz for AV value
  VB : 1 MHz for PK value / 10 Hz for AV value
  Detector : Peak
  Trace : Max Hold
  Sweep Time : Auto

5.1.4. Test Procedures and Test Instruments Setting

Conducted Measurement

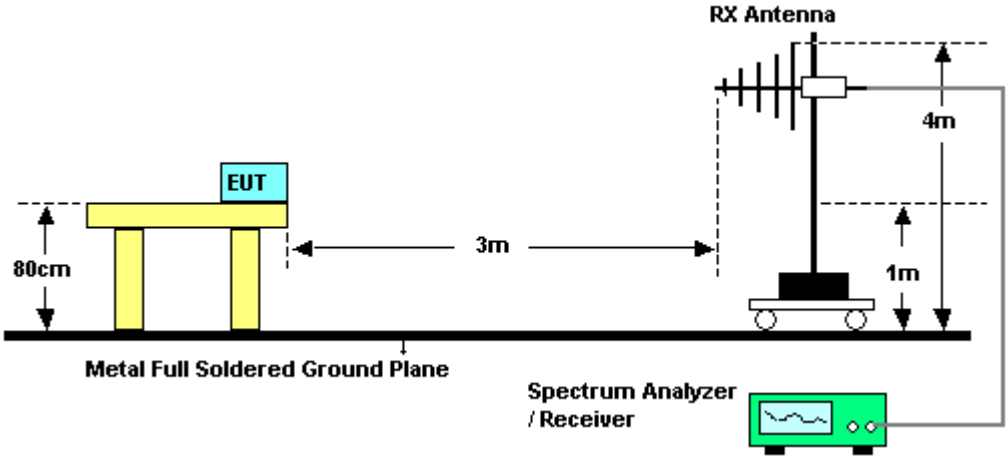
1. The transmitter is set to the lowest channel.
2. The transmitter output was connected to the spectrum analyzer via a cable and cable loss is used as the offset of the spectrum analyzer.
3. Set both RBW and VBW of spectrum analyzer to 100KHz with convenient frequency span including 100MHz bandwidth from lower band edge. Then detector set to peak and max hold this trace.
4. The lowest band edges emission was measured and recorded.
5. The transmitter set to the highest channel and repeated 2~4.

Radiated Measurement

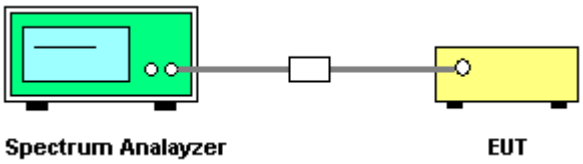
1. Configure the EUT according to ANSI C63.4.
2. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
4. For band edge emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. For band edge emission in restriction bands, use 10Hz VBW and 1MHz RBW for reading under AV and use 1MHz VBW and 1 MHz RBW for reading under PK.

5.1.5. Test Setup

Radiated Method



Conducted Method



5.1.6. Test Criteria

All test results complied with the requirements of 15.247(d). Measurement Uncertainty is $1x10^{-5}$.

5.1.7. Test Result of Radiated Emission

- Temperature: 24°C
- Relative Humidity: 60%
- Test Engineer: Ted Chiu

Modulation Type	Test Channel	Freq. (MHz)	Level* (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Trace (PK/AV)
DSSS	01	2389.990	59.73	-14.27	74	PK
DSSS	01	2389.990	48.14	-5.86	54	AV
DSSS	11	2483.660	58.37	-15.63	74	PK
DSSS	11	2483.660	47.56	-6.44	54	AV
OFDM	01	2389.990	58.84	-15.16	74	PK
OFDM	01	2389.990	45.38	-8.62	54	AV
OFDM	11	2483.660	58.23	-15.77	74	PK
OFDM	11	2483.660	46.34	-7.66	54	AV

Level*: The max field strength in the restricted bands.

5.2. Test of Spurious Radiated Emission

5.2.1. Applicable Standard

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

5.2.2. Measuring Instruments

Please reference item 1~17 in chapter 6 for the instruments used for testing.

5.2.3. Description of Major Test Instruments Setting

- Spectrum Analyzer : R&S FSP40
  Attenuation : Auto
  Start Frequency : 1000 MHz
  Stop Frequency : 10th carrier harmonic
  RB / VB : 1 MHz / 1MHz for Peak
  RB / VB : 1 MHz / 10Hz for Average

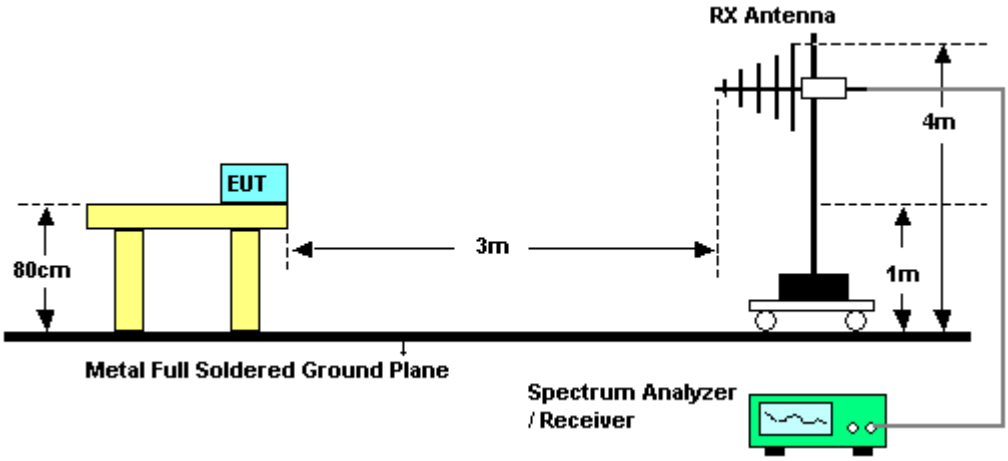
- Test Receiver : R&S ESCS 30
  Attenuation : Auto
  Start Frequency : 30 MHz
  Stop Frequency : 1000 MHz
  RB : 120 KHz for QP or PK

5.2.4. Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT was placed on the top of the turntable 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
4. Power on the EUT and all the supporting units.
5. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
7. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
8. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
9. For emission above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.

10. If the emission level of the EUT in peak mode was 3 dB lower than the average 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 for below 1GHz and average method for above the 1GHz. the reported.
11. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB higher 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.

5.2.5. Test Setup Layout



5.2.6. Test Criteria

All test results complied with the requirements of 15.247(d). Measurement Uncertainty is 2.26dB.

5.2.7. Test Results for CH 06 / 2437MHz (for emission below 1GHz)

- Modulation Type: OFDM
- Temperature: 24°C
- Relative Humidity: 60%
- Test Engineer: Ted Chiu

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	103.270	37.03	-6.47	57.14	43.50	-20.11	0.97	30.54	Peak
2	166.340	35.79	-7.71	51.33	43.50	-15.54	1.28	30.11	Peak
3	178.070	35.53	-7.97	50.05	43.50	-14.52	1.27	30.00	Peak
1	218.400	38.41	-7.59	52.45	46.00	-14.04	1.36	30.12	Peak
2	448.000	39.32	-6.68	51.73	46.00	-12.41	2.12	30.95	Peak
3	663.200	39.32	-6.68	46.75	46.00	-7.43	2.51	30.53	Peak

(B) Polarization: Vertical

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1 @	37.990	32.30	-7.70	49.87	40.00	-17.57	0.60	30.47	QP
2	103.100	33.75	-9.75	53.89	43.50	-20.14	0.97	30.54	QP
3	166.510	31.89	-11.61	47.41	43.50	-15.52	1.28	30.11	Peak
1	448.000	32.53	-13.47	44.94	46.00	-12.41	2.12	30.95	Peak
2	496.800	32.50	-13.50	45.08	46.00	-12.58	2.17	30.78	Peak
3	663.200	35.73	-10.27	43.16	46.00	-7.43	2.51	30.53	QP

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.2.8. Test Results for CH 01 / 2412 MHz (for emission above 1GHz)

- Modulation Type: DSSS
- Temperature: 24°C
- Relative Humidity: 60%
- Test Engineer: Ted Chiu

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1662.000	43.18	-30.82	55.98	74.00	-12.80	1.54	40.38	Peak
2	4824.000	50.06	-23.94	55.90	74.00	-5.84	2.84	41.80	PEAK
3	7676.000	49.44	-24.56	50.59	74.00	-1.15	3.77	41.71	PEAK

(B) Polarization: Vertical

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1662.000	45.96	-28.04	58.76	74.00	-12.80	1.54	40.38	Peak
2	4828.000	50.22	-23.78	56.06	74.00	-5.84	2.84	41.80	PEAK
3	7572.000	48.93	-25.07	50.34	74.00	-1.41	3.74	41.84	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

- Modulation Type: OFDM
- Temperature: 24°C
- Relative Humidity: 60%
- Test Engineer: Ted Chiu

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1662.000	42.75	-31.25	55.55	74.00	-12.80	1.54	40.38	Peak
2	3956.000	43.60	-30.40	50.15	74.00	-6.55	2.48	41.53	PEAK
3	7160.000	47.16	-26.84	50.05	74.00	-2.88	3.60	42.25	PEAK

(B) Polarization: Vertical

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1662.000	45.35	-28.65	58.15	74.00	-12.80	1.54	40.38	Peak
2	4828.000	44.88	-29.12	50.72	74.00	-5.84	2.84	41.80	PEAK
3	7560.000	48.56	-25.44	50.04	74.00	-1.48	3.73	41.87	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.2.9. Test Results for CH 06 / 2437 MHz (for emission above 1GHz)

- Modulation Type: DSSS
- Temperature: 24°C
- Relative Humidity: 60%
- Test Engineer: Ted Chiu

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1334.000	45.26	-28.74	59.01	74.00	-13.75	1.39	40.13	Peak
2	4874.000	42.88	-31.12	48.61	74.00	-5.72	2.87	41.80	PEAK
3	7632.000	48.88	-25.12	50.16	74.00	-1.28	3.76	41.77	PEAK

(B) Polarization: Vertical

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1662.000	45.76	-28.24	58.56	74.00	-12.80	1.54	40.38	Peak
2	4872.000	45.81	-28.19	51.53	74.00	-5.72	2.87	41.80	PEAK
3	7120.000	47.68	-26.32	50.71	74.00	-3.03	3.58	42.30	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

- Modulation Type: OFDM
- Temperature: 24°C
- Relative Humidity: 60%
- Test Engineer: Ted Chiu

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1662.000	42.83	-31.17	55.63	74.00	-12.80	1.54	40.38	Peak
2	4008.000	43.83	-30.17	50.33	74.00	-6.51	2.49	41.60	PEAK
3	7640.000	48.64	-25.36	49.91	74.00	-1.27	3.76	41.77	PEAK

(B) Polarization: Vertical

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1662.000	45.50	-28.50	58.30	74.00	-12.80	1.54	40.38	Peak
2	4792.000	43.52	-30.48	49.43	74.00	-5.91	2.82	41.80	PEAK
3	7184.000	47.88	-26.12	50.64	74.00	-2.76	3.61	42.23	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.2.10. Test Results for CH 11 / 2462 MHz (for emission above 1GHz)

- Modulation Type: DSSS
- Temperature: 24°C
- Relative Humidity: 60%
- Test Engineer: Ted Chiu

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1662.000	43.03	-30.97	55.83	74.00	-12.80	1.54	40.38	Peak
2	4924.000	48.61	-25.39	54.23	74.00	-5.62	2.89	41.80	PEAK
3	7256.000	46.89	-27.11	49.43	74.00	-2.54	3.62	42.18	PEAK

(B) Polarization: Vertical

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1662.000	45.59	-28.41	58.39	74.00	-12.80	1.54	40.38	Peak
2	4928.000	50.50	-23.50	56.13	74.00	-5.62	2.89	41.80	PEAK
3	7304.000	47.13	-26.87	49.47	74.00	-2.34	3.65	42.13	PEAK

Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

- Modulation Type: OFDM
- Temperature: 24°C
- Relative Humidity: 60%
- Test Engineer: Ted Chiu

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1660.000	42.83	-31.17	55.63	74.00	-12.80	1.54	40.38	Peak
2	4924.000	46.37	-27.63	51.99	74.00	-5.62	2.89	41.80	PEAK
3	7040.000	47.60	-26.40	50.94	74.00	-3.33	3.56	42.37	PEAK

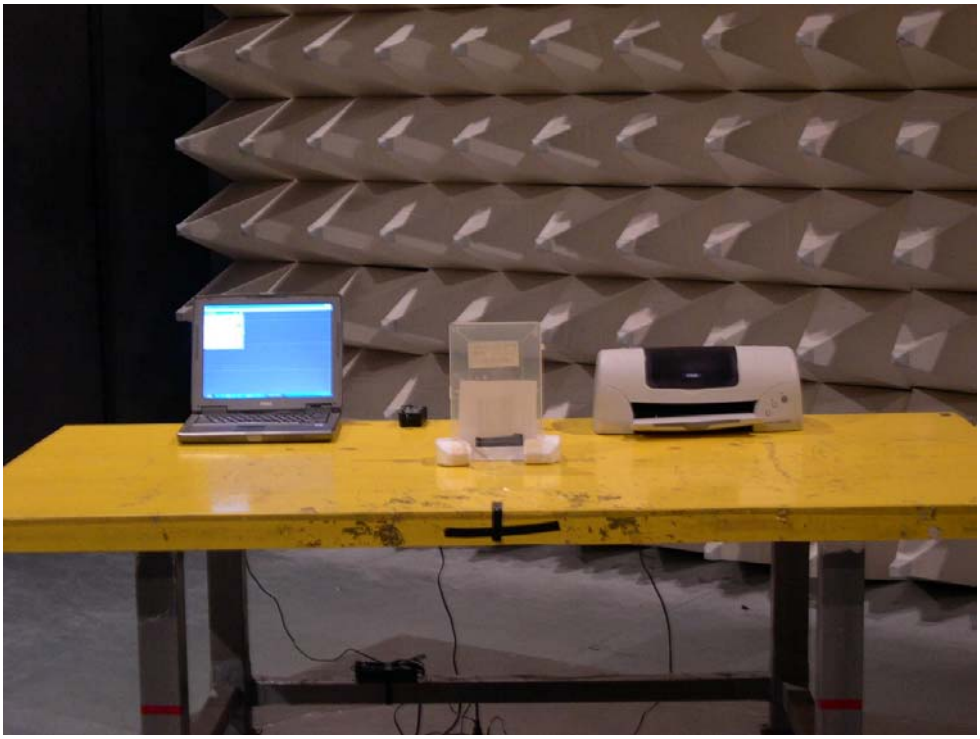
(B) Polarization: Vertical

	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	1662.000	45.81	-28.19	58.61	74.00	-12.80	1.54	40.38	Peak
2	4928.000	47.73	-26.27	53.35	74.00	-5.62	2.89	41.80	PEAK
3	7152.000	47.20	-26.80	50.11	74.00	-2.91	3.60	42.28	PEAK

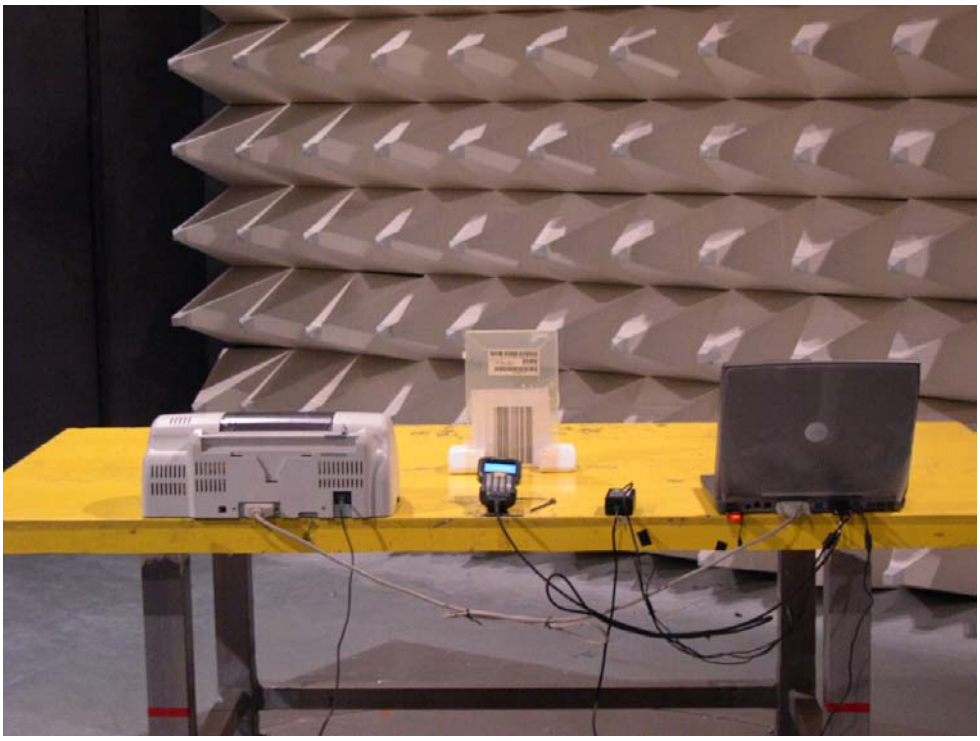
Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.2.11. Photographs of Radiated Emission Test Configuration

FRONT VIEW



REAR VIEW



5.3. Antenna Requirements

5.3.1. Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Section 15.247(b)/(c):
If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

5.3.2. Antenna Connected Construction

The antenna used in this product is PIFA antenna, antenna connector is Hirose (U.FL-R-SMT).

5.3.3. Antenna Gain

Antenna gain of EUT is less than 6dBi. Therefore peak conducted power limit shall not be degraded any more. Antenna report of manufacturer will have more detail antenna gain or antenna pattern.

5.3.4. Test Criteria

All test results complied with the requirements of 15.203/15.247(b)/(c).

6. List of Measuring Equipments Used

Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
1	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2004	Radiation (03CH03-HY)
2	Spectrum Analyzer	R&S	FSP40	100004	9KHZ~4GHz	Aug. 31, 2004	Radiation (03CH03-HY)
3	Amplifier	Schaffner	CPA9231A	18667	9KHz – 2GHz	Jan. 04, 2005	Radiation (03CH03-HY)
4	Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 23, 2004	Radiation (03CH03-HY)
5	Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 23, 2004	Radiation (03CH03-HY)
6	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 02, 2004	Radiation (03CH03-HY)
7	Amplifier	MITEQ	AFS44	879984	1GHz~26.5GHz	Mar. 25, 2005	Radiation (03CH03-HY)
8	Horn Antenna	COMPOWER	AH-118	10092	1GHz – 18GHz	Feb. 18, 2005	Radiation (03CH03-HY)
9	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
10	Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
11	Horn Antenna	Schwarzbeck	BBHA9170	154	15GHz~40GHz	Jun. 09, 2004	Radiation (03CH03-HY)
12	RF Cable-HIGH	SUHNER	SUCOFLES 106	SN30094/6	1GHz~26.5GHz	Mar. 05, 2005	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.

7. Company Profile

SPORTON Lab. was established in 1986 with one shielded room: the first private EMI test facility, offering local manufacturers an alternative EMI test familial apart from ERSO. In 1988, one 3M and 10M/3M open area test site were setup and also obtained official accreditation from FCC, VCCI and NEMKO. In 1993, a Safety laboratory was founded and obtained accreditation from UL of USA, CSA of Canada and TUV (Rhineland & PS) of Germany. In 1995, one EMC lab, including EMI and EMS test facilities was setup. In 1997, SPORTON Group has provided financial expense to relocate the headquarter to Orient Scientific Park in Taipei Hsien to offer more comprehensive, more qualified and better service to local suppliers and manufactures. In 1999, Safety Group and Component Group were setup. In 2001, SPORTON has established 3M/10M chamber in Hwa Ya Technology Park.

7.1. Certificate of Accreditation

Taiwan	BSMI, CNLA, DGT
USA	FCC, NVLAP, UL
EU	Nemko, TUV
Japan	VCCI
Canada	Industry Canada

7.2. Test Location

SHIJR	ADD :	6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL :	02-2696-2468
	FAX :	02-2696-2255
HWA YA	ADD :	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL :	03-327-3456
	FAX :	03-318-0055
LINKOU	ADD :	No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL :	02-2601-1640
	FAX :	02-2601-1695
DUNGHU	ADD :	No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL :	02-2631-4739
	FAX :	02-2631-9740
JUNGHE	ADD :	7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL :	02-8227-2020
	FAX :	02-8227-2626
NEIHU	ADD :	4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL :	02-2794-8886
	FAX :	02-2794-9777

8. CNLA Certificate of Accreditation

Test Lab.	:	Sporton International Inc.
Accreditation Number	:	1190
Originally Accredited	:	2003/12/15
Effective Period	:	2003/12/15~2006/12/14
Accredited Scope	:	47 CFR FCC Part 15 Subpart C (9kHz~40GHz)

Taiwan Accreditation Foundation
Chinese National Laboratory Accreditation
Certificate of Accreditation

Accreditation Criteria:	ISO 17025
Accreditation Number:	1190
Organization/Laboratory:	EMC & Wireless Communications Laboratory,Sporton International Inc.
Originally Accredited:	December 15, 2003
Effective Period:	December 15, 2003 To December 14, 2006
Accredited Scope:	Electrical Testing Field, 7 items, details shown in the following pages.
Specific Accreditation Program:	Recognition and Approval of Designated Laboratory for Commodities Inspection

President, Taiwan Accreditation Foundation
Date:July 19, 2004

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