FCC TEST REPORT

CATEGORY	:	Portable End Product
PRODUCT NAME	:	USB Flash wireless LAN Card
FCC ID.	:	QS3WBGZP2
FILING TYPE	:	Certification
BRAND NAME	:	TwinMOS
MODEL NAME	:	B241
APPLICANT	:	**TwinMOS Technologies Inc.** 303 No. 3, Tzu Chiang Rd., Hu Kou Xiang, Hsin Chu, Taiwan, R.O.C.
MANUFACTURER	:	Same as Applicant
ISSUED BY	:	**SPORTON INTERNATIONAL INC.** 6F, No. 106, Sec. 1, Hsin Tai Wu Rd., His Chih, Taipei Hsien, Taiwan, R.O.C.

Statements:

The test result in this report refers exclusively to the presented test model / sample.

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

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

Dr. Alan Lane
Vice General Manager
Sporton International Inc.

Lab Code: 200079-0

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Appendix A. Photographs of EUT ..... A1 ~ A3

History of this test report

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. General Description of Equipment under Test

1.1. Applicant

TwinMOS Technologies Inc.
303 No. 3, Tzu Chiang Rd.,
Hu Kou Xiang, Hsin Chu, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

This product is a wireless LAN with IEEE 802.11b protocol. The technical data has been listed on section " Feature of Equipment under Test " . And it is used for host equipment with USB interface.

1.4. Feature of Equipment under Test

Type of Modulation	DBPSK,DQPSK,CCK
Number of Channels	11
Frequency Band	2400MHz-2483.5MHz
Carrier Frequency of each channel	Please reference section 1.5
Bandwidth of each channel	22MHz
Output Power to Antenna	17.1dBm
Antenna Type / Class and Gain	Dipole Antenna / 2dBi
Function Type	Transceiver
Power Rating (DC/AC , Voltage)	5 VDC
Duty Cycle	45%~55%
Temperature Range (Operating)	0-55℃
Humidity	15%~95%

1.5. Table for Carrier Frequencies

The table below is the summary of the operating frequencies.

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412 MHz	5	2432 MHz	9	2452 MHz		
2	2417 MHz	6	2437 MHz	10	2457 MHz		
3	2422 MHz	7	2442 MHz	11	2462 MHz		
4	2427 MHz	8	2447 MHz				

2. Test Configuration of the Equipment under Test

2.1. Description of the Test

a. During testing, the equipment was placed on a non-conducting support.
b. The following test modes were performed:
   Mode 1: Flash 128M (below 1GHz)
   Mode 2: Flash 256M (below 1GHz)
   Mode 3: Flash 512M (below 1GHz)
   Mode 4: CH 01 2412MHz (above 1GHz)
   Mode 5: CH 06 2437MHz (above 1GHz)
   Mode 6: CH 11 2462MHz (above 1GHz)
c. Spurious emission below 1GHz is independent of channel selection, Channel 11 with CCK modulation was tested.
d. For spurious emission above 1GHz under lowest, middle and highest channel with 11Mbps data rate was tested.
e. The EUT has been programmed to continuously transmit or receive during testing. The used peripherals as well as the configuration fulfill the requirements of ANSI C63.4:2001.
f. The configuration is operated in a manner which tends to maximize its emission characteristics in a typical application.
g. 3 meters measurement distance in semi-anechoic chamber was used in this test.

2.2. Frequency Range Investigated

a. Conducted power line test: from 150 kHz to 30 MHz
b. Radiated emission test: from 30 MHz to 25000 MHz

2.3. Description of Test Supporting Units

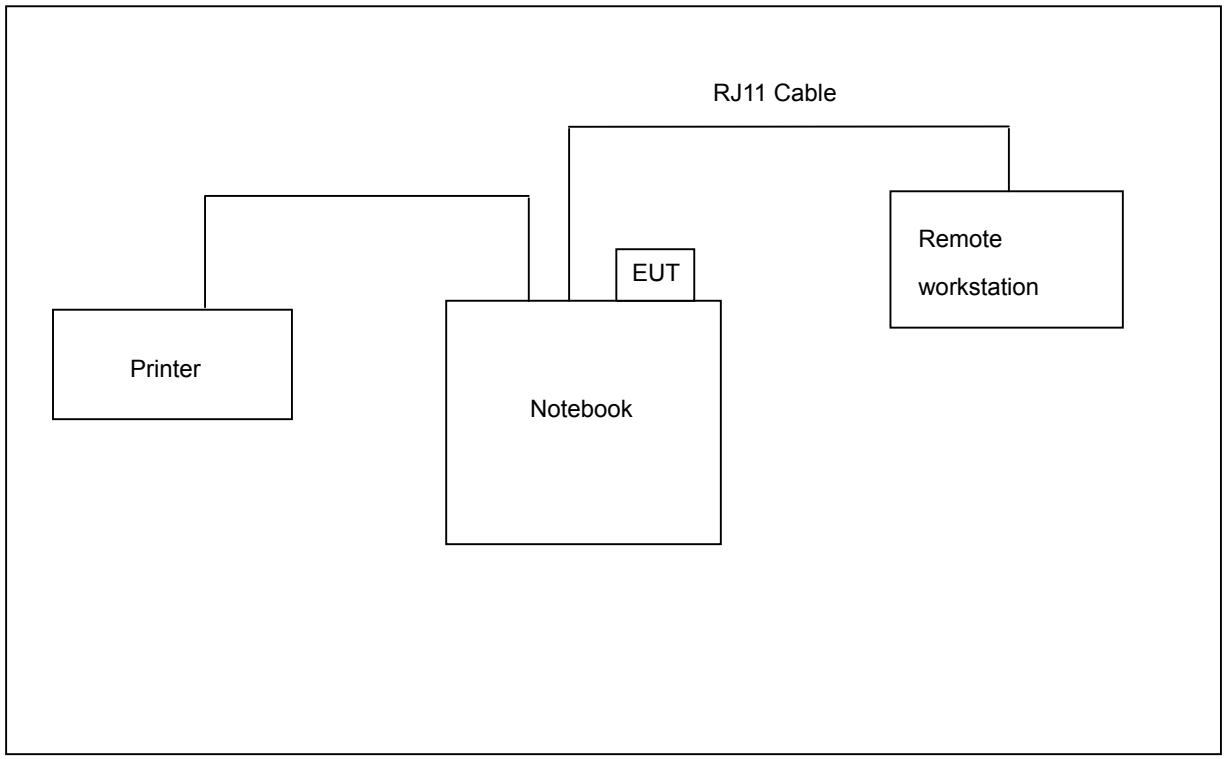
Support Unit 1. – Notebook (COMPAQ)

FCC ID	: N/A
Model No.	: Presario 1500
Serial No.	: SP0004
Remark	: This support device was tested to comply with FCC standards and authorized under Declaration of Conformity.

Support Unit 2. – Printer (EPSON)

FCC ID	: N/A
Model No.	: Stylus Color 680
Serial No.	: SP0016
Remark	: This support device was tested to comply with FCC standards and authorized under Declaration of Conformity and data cable is 1.35m of the shielded.

2.4. Connection Diagram of Test System



2.5. Test Software

There are 2 softwares may be used in the testing.

a. 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.

b. “H” Pattern Generator: Except Access Point, the supporting equipment such as monitor or printer is always available. Under testing, these supporting equipment has to also under working condition. “H” Pattern Generator is able to continuously transmitting “H” character to those supporting equipments.

3. Test Location and Standards

3.1. Test Location

Test Location : Sporton Hwa Ya Testing Building

Address : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
Tel: +886 3 327 3456 Fax: +886 3 318 0055

Test Site No. : CO01-HY, 03CH03-HY

3.2. Test Conditions

Normal Voltage	: 120V/60Hz
Extreme Voltage	: 138V and 102V
Normal Temperature	: 20 ℃
Extreme Temperature	: -20 ℃ and 50 ℃

3.3. Standards for Methods of Measurement

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

ANSI C63.4-2001

47 CFR Part 15 Subpart C (Section 15.247)

3.4. DoC Statement

This EUT is also classified as a device of computer peripheral Class B which DoC has to be followed. It has been verified according to the rule of 47 CFR part 15 Subpart B, and found that all the requirements has been fulfilled.

4. List of Measurements

4.1. Summary of the Test Results

Applied Standard: 47 CFR Part 15 and Part 2			
Paragraph	**FCC Rule**	**Description of Test**	**Result**
5.1	15.247(a)(2)	6dB Spectrum Bandwidth (DSSS System)	Pass
5.2	15.247(b)	Maximum Peak Output Power	Pass
5.3	15.247(d)	Peak Power Spectral Density	Pass
5.4	15.247(c)	Band Edges Emission	Pass
5.5	15.107/15.207	AC Power Line Conducted Emission	Pass
5.6	15.209/15.247(c)	Spurious Radiated Emission	Pass
5.7	15.203	Antenna Requirement	Pass

5. Test Result

5.1. Test of 6dB Spectrum Bandwidth (DSSS System)

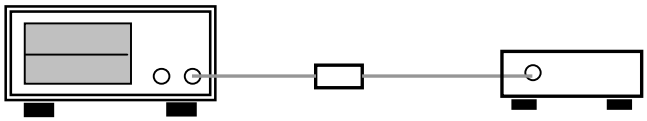
5.1.1. Measuring Instruments

Item 9 of the table on section 6.

5.1.2. Test Procedures

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 6dB bandwidth is defined as the spectrum width with level higher than 6dB below the peak level.
4. Repeat above 1~3 points for the middle and highest channel of the EUT.

5.1.3. Test Setup Layout

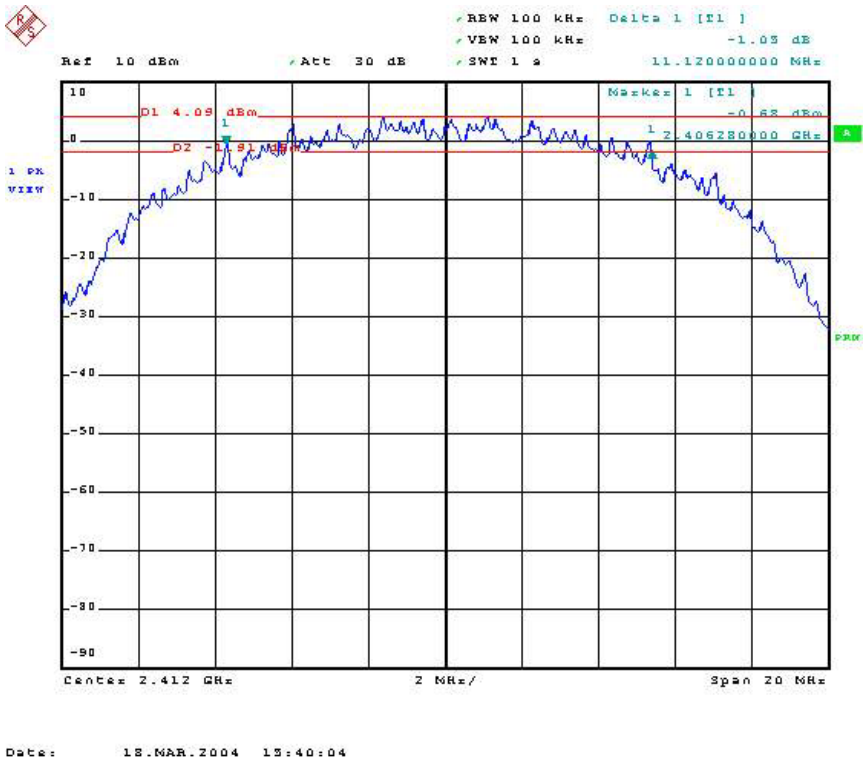


5.1.4. Test Result : See spectrum analyzer plots below

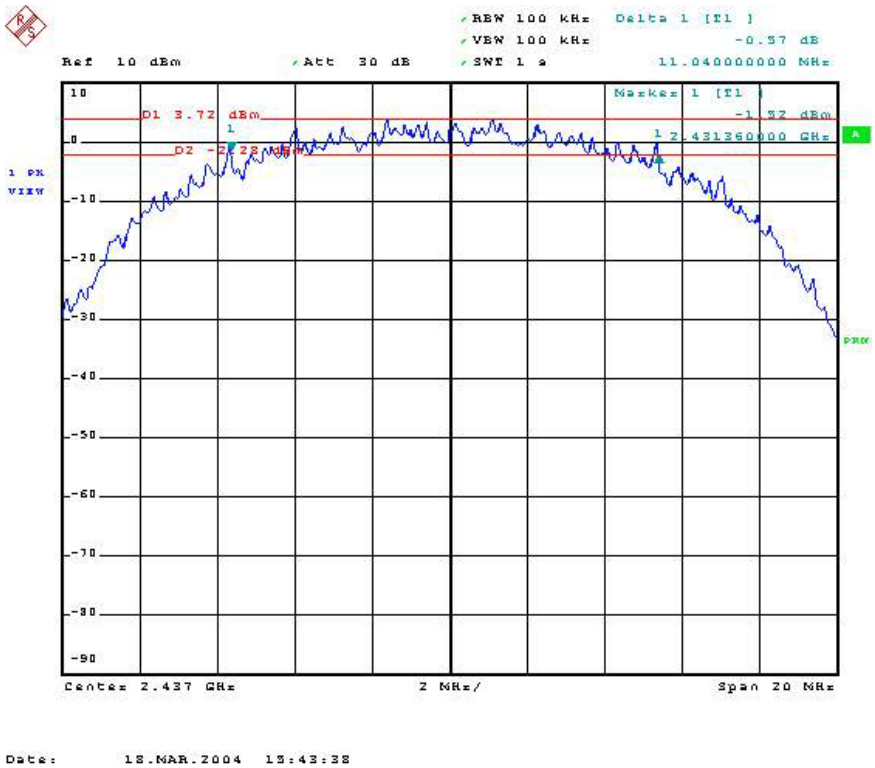
- Temperature: 21.9°C
- Relative Humidity: 60 %
- Duty cycle of the equipment during the test: 100%

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Min. Limit (MHz)
01	2412	11.12	0.5
06	2437	11.04	0.5
11	2462	11.08	0.5

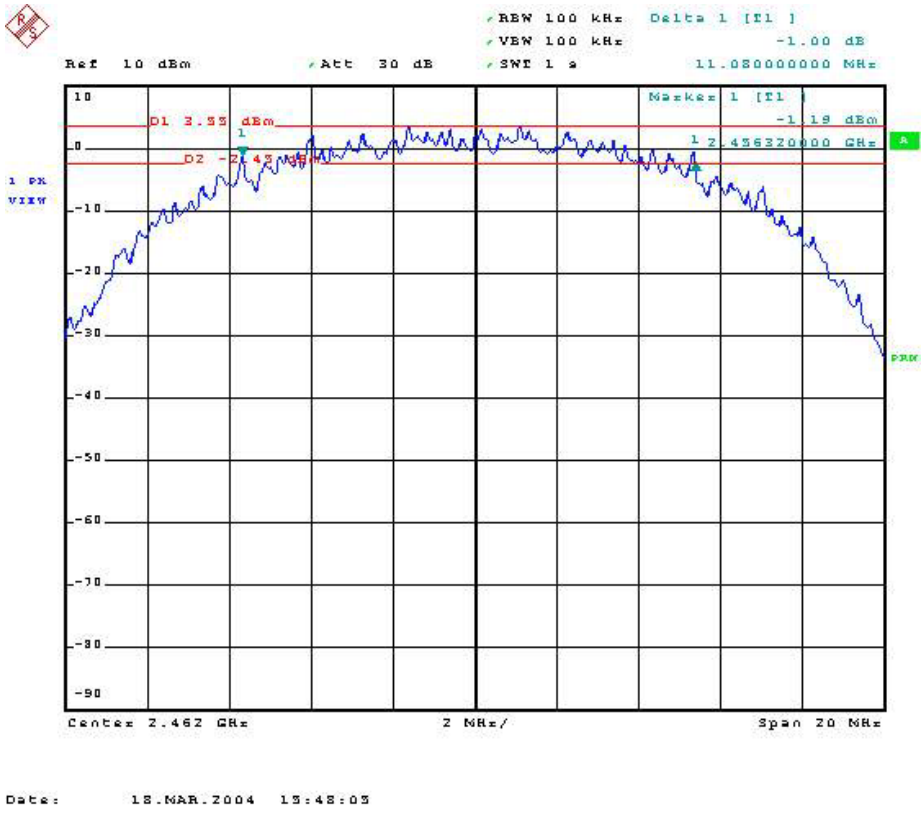
(Channel 01) :



(Channel 06) :



(Channel 11) :


RBW 100 kHz
VBW 100 kHz
SWT 1 s
Delta 1 [T1]
-1.00 dB
11.080000000 MHz
Ref 10 dBm
Att 30 dB
Marker 1 [T1]
-1.19 dBm
2.456320000 GHz
D1 3.55 dBm
D2 -2.45 dBm
1 PK
VIEW
Center 2.462 GHz
2 MHz/
Span 20 MHz
Date: 18.MAR.2004 15:48:05

5.2. Test of Maximum Peak Output Power

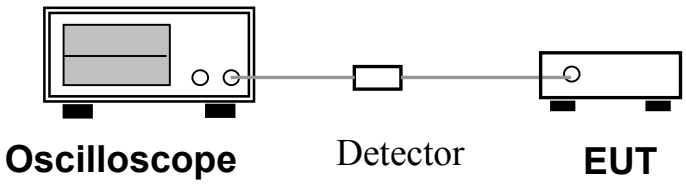
5.2.1. Measuring Instruments

Item 9 of the table on section 6.

5.2.2. Test Procedures

1. The transmitter output was connected to the vertical channel of the oscilloscope through a detector.
2. Observe the duty cycle X from the oscilloscope and the record the detected voltage level A.
3. Replace the EUT via the signal generator, calibrate the reading via the carrier frequency.
4. The duty cycle X has to be calibrated on the output power of the signal generator.
5. Repeated the 1~4 for the middle and highest channel of the EUT.

5.2.3. Test Setup Layout



5.2.4. Test Result：See spectrum analyzer plots below

- Temperature: 21.9°C
- Relative Humidity: 60 %
- Duty cycle of the equipment during the test : 100%

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mWatt)	Limits (dBm)
01	2412	17.1	51.286	30 dBm
06	2437	16.8	47.863	30 dBm
11	2462	16.5	44.668	30 dBm

5.3. Test of Peak Power Spectral Density

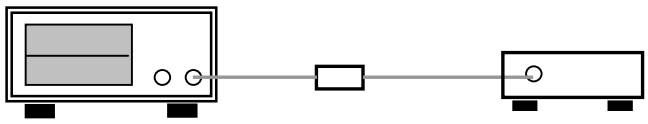
5.3.1. Measuring Instruments

Item 9 of the table on section 6.

5.3.2. Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 3kHz and VBW to 30kHz.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum
4. Set the span to 1.5MHz and the sweep time to 500s and record the maximum peak value.
5. Repeated the 1~4 for the middle and highest channel of the EUT.

5.3.3. Test Setup Layout

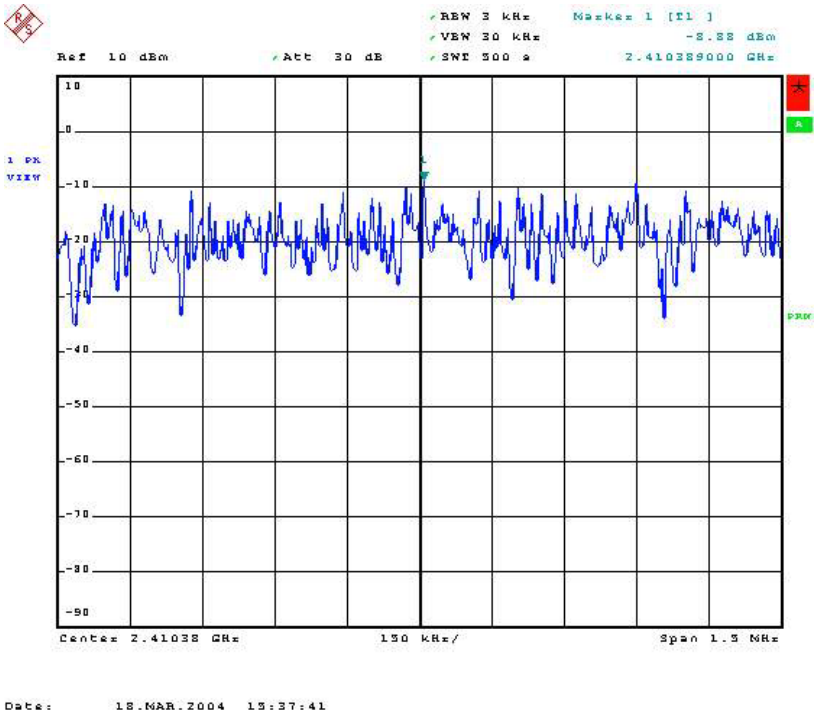


5.3.4. Test Result : See spectrum analyzer plots below

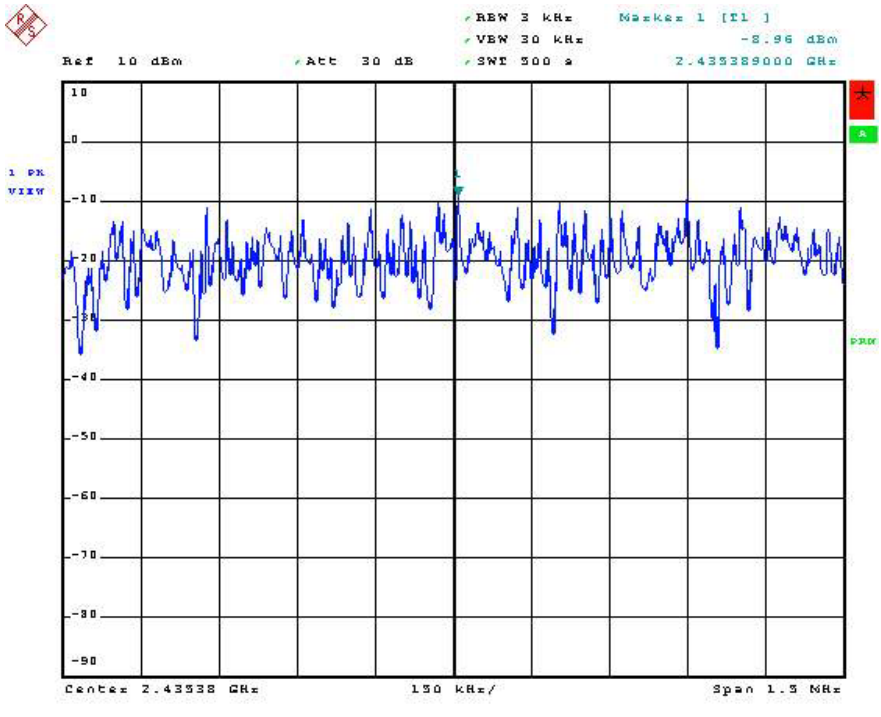
- Temperature: 21.9°C
- Relative Humidity: 60 %
- Duty cycle of the equipment during the test: 100%

Channel	Frequency (MHz)	Power Density (dBm)	Limits (dBm)
01	2412	-8.88	8
06	2437	-8.96	8
11	2462	-8.83	8

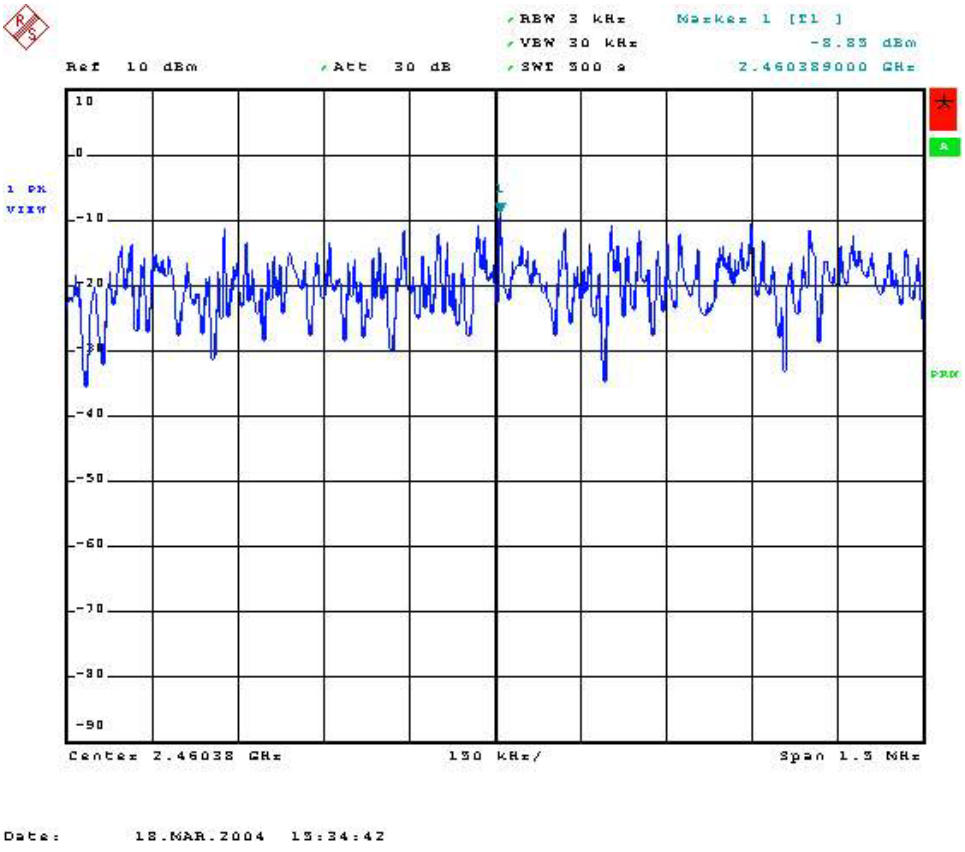
(Channel 01) :



(Channel 06) :



(Channel 11) :


RBW 3 kHz
VBW 30 kHz
SWT 500 s
Marker 1 [T1]
-8.83 dBm
2.460389000 GHz
Ref 10 dBm
Att 30 dB
1 PK
VIEW
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
PRN
Center 2.46038 GHz
130 kHz/
Span 1.3 MHz
Date: 18.MAR.2004 15:34:42

5.4. Test of Band Edges Emission

5.4.1. Measuring Instruments

Item 9 of the table on section 6.

5.4.2. Test Procedures

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.
4. The lowest band edges emission was measured and recorded.
5. The transmitter set to the highest channel and repeated 2~4.

5.4.3. Test Result

(A) Left Edge

The band edge emission plot shows 58.21dB delta between carrier maximum power and local maximum emission in the restricted band.

CH01 Carrier power strength (dB μV/m)	Dalta (dB)	The maximum field strength in restrict band (dB μV/m)	Limit (dB μV/m)	Margin (dB)
102.29	58.21	44.08	54.00	-9.92

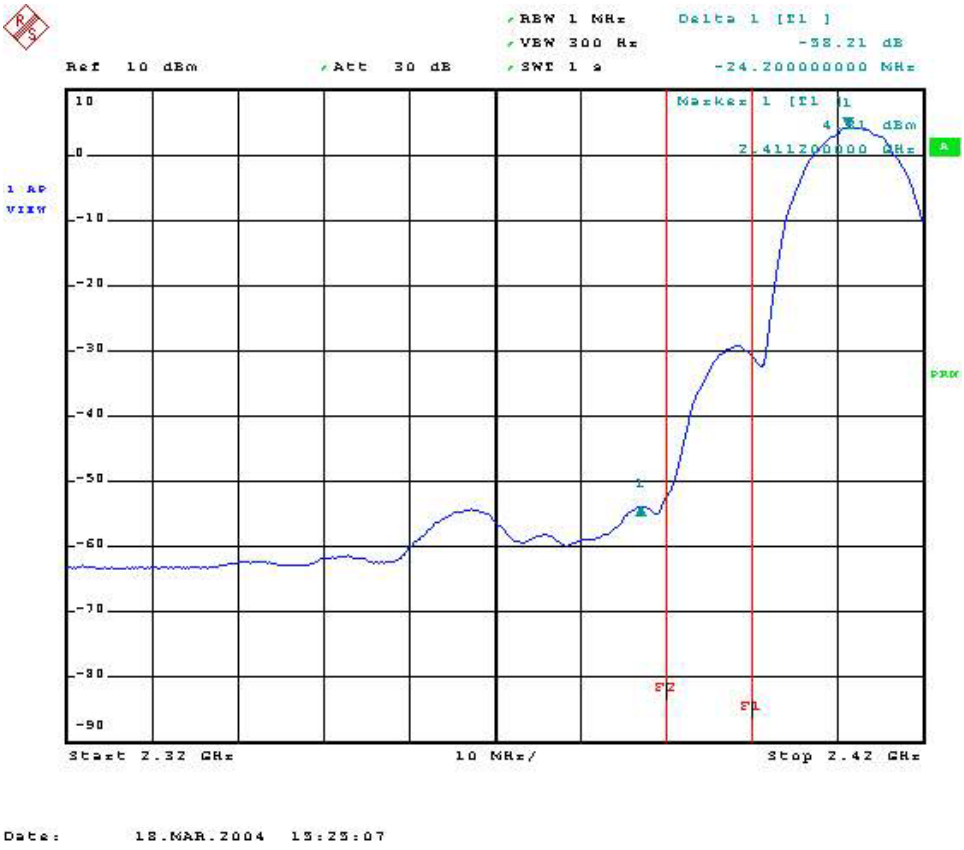
(B) Right Edge

The band edge emission plot shows 54.00dB delta between carrier maximum power and local maximum emission in the restricted band.

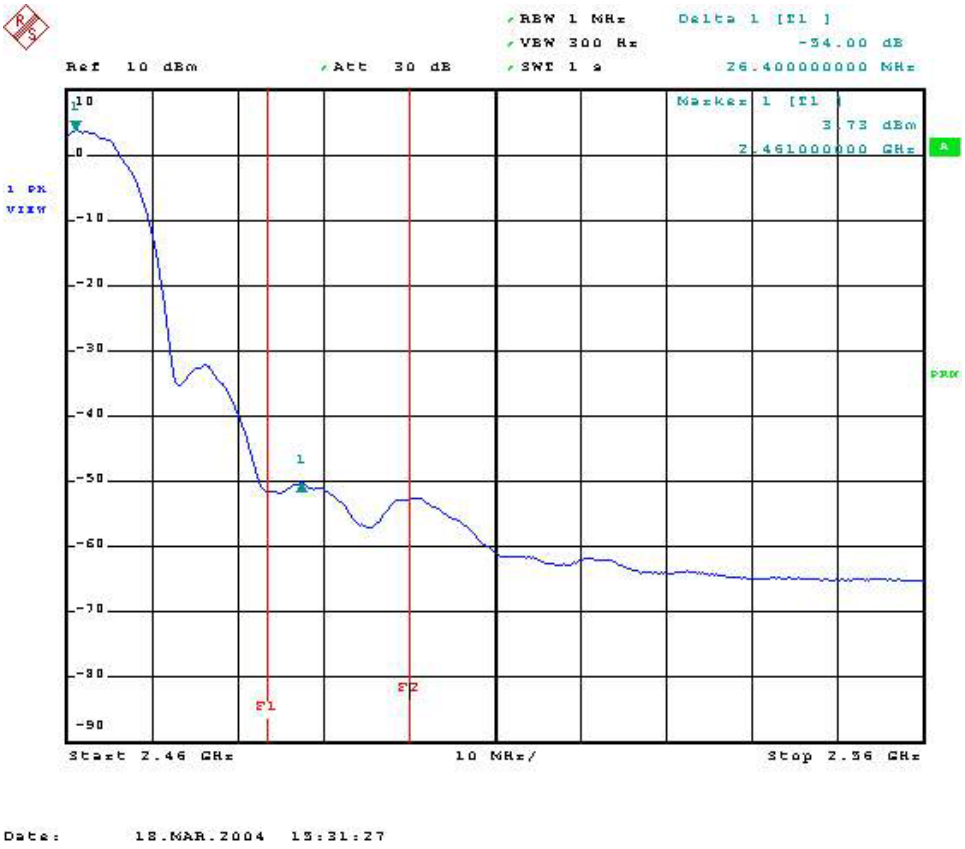
CH11 Carrier power strength (dB μ V/m)	Dalta (dB)	The maximum field strength in restrict band (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
99.28	54.00	45.28	54.00	-8.72

∗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.

(Channel 01) :


RBW 1 MHz
VBW 300 Hz
SWT 1 s
Delta 1 [T1]
-58.21 dB
-24.200000000 MHz
Ref 10 dBm
Att 30 dB
Marker 1 [T1]
4.81 dBm
2.411200000 GHz
1 AP
VIEW
PKDT
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 2.32 GHz
10 MHz/
Stop 2.42 GHz
Date: 18.MAR.2004 15:25:07

(Channel 11)：



Observation： All emissions in the 100kHz bandwidth are 20dB lower than the carrier strength.

5.5. Test of AC Power Line Conducted Emission

5.5.1. Measuring Instruments

Please reference item 1~7 in chapter 6 for the instruments used for testing.

5.5.2. Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provides 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Use the Channel & Power Controlling software to make the EUT working on selected channel and expected output power, then use the “H” Patter Generator software to make the supporting equipments stay on working condition.
7. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
8. The measurement has to be done between each power line and ground at the power terminal for each RF channel. Only one RF channel has to be investigated since this test is independent with the RF channel selection.

5.5.3. Test Result of Conducted Emission

Test Mode	Mode 4 (2412MHz)	Tested By	John Huang
Temperature / Humidity	21.9 deg. C / 60%		

Line to Ground

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.169	43.99	-21.02	65.01	43.85	0.10	0.04	QP
2	0.169	27.67	-27.34	55.01	27.53	0.10	0.04	Average
3	0.227	42.28	-20.28	62.56	42.14	0.10	0.04	QP
4	0.227	25.82	-26.74	52.56	25.68	0.10	0.04	Average
5	0.297	31.96	-28.36	60.32	31.81	0.10	0.05	QP
6	0.297	22.47	-27.85	50.32	22.32	0.10	0.05	Average
7	2.840	30.94	-25.06	56.00	30.73	0.10	0.11	QP
8	2.840	24.39	-21.61	46.00	24.18	0.10	0.11	Average
9	4.720	32.23	-23.77	56.00	31.95	0.12	0.16	QP
10	4.720	27.00	-19.00	46.00	26.72	0.12	0.16	Average
11	15.470	34.70	-25.30	60.00	34.12	0.21	0.37	QP
12	15.470	30.22	-19.78	50.00	29.64	0.21	0.37	Average

Neutral to Ground

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	46.41	-19.48	65.89	46.26	0.10	0.05	QP
2	0.152	35.20	-20.69	55.89	35.05	0.10	0.05	Average
3	0.160	27.40	-28.06	55.46	27.26	0.10	0.04	Average
4	0.160	45.19	-20.27	65.46	45.05	0.10	0.04	QP
5	0.197	36.56	-17.18	53.74	36.43	0.10	0.03	Average
6	0.197	40.66	-23.08	63.74	40.53	0.10	0.03	QP
7	0.222	43.20	-19.54	62.74	43.07	0.10	0.03	QP
8	0.222	27.26	-25.48	52.74	27.13	0.10	0.03	Average
9	2.900	32.14	-23.86	56.00	31.88	0.15	0.11	QP
10	2.900	23.95	-22.05	46.00	23.69	0.15	0.11	Average
11	4.750	32.33	-23.67	56.00	31.96	0.20	0.17	QP
12	4.750	27.20	-18.80	46.00	26.83	0.20	0.17	Average

Test Mode	Mode 5 (2437MHz)	Tested By	John Huang
Temperature / Humidity	21.9 deg. C / 60%		

Line to Ground

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.169	43.25	-21.76	65.01	43.11	0.10	0.04	QP
2	0.169	27.53	-27.48	55.01	27.39	0.10	0.04	Average
3	0.244	38.66	-23.32	61.98	38.52	0.10	0.04	QP
4	0.244	31.06	-20.92	51.98	30.92	0.10	0.04	Average
5	0.289	31.47	-29.08	60.55	31.32	0.10	0.05	QP
6	0.289	19.03	-31.52	50.55	18.88	0.10	0.05	Average
7	0.346	27.48	-31.58	59.06	27.33	0.10	0.05	QP
8	0.346	18.21	-30.85	49.06	18.06	0.10	0.05	Average
9	3.010	30.97	-25.03	56.00	30.75	0.10	0.12	QP
10	3.010	24.53	-21.47	46.00	24.31	0.10	0.12	Average
11	4.720	32.32	-23.68	56.00	32.04	0.12	0.16	QP
12	4.720	27.00	-19.00	46.00	26.72	0.12	0.16	Average

Neutral to Ground

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	45.78	-20.11	65.89	45.63	0.10	0.05	QP
2	0.152	35.20	-20.69	55.89	35.05	0.10	0.05	Average
3	0.195	42.85	-20.99	63.84	42.72	0.10	0.03	QP
4	0.195	39.39	-14.45	53.84	39.26	0.10	0.03	Average
5	0.241	33.67	-18.40	52.07	33.53	0.10	0.04	Average
6	0.241	39.69	-22.38	62.07	39.55	0.10	0.04	QP
7	0.294	31.89	-28.52	60.41	31.74	0.10	0.05	QP
8	0.294	23.68	-26.73	50.41	23.53	0.10	0.05	Average
9	2.953	32.33	-23.67	56.00	32.06	0.16	0.11	QP
10	2.953	24.36	-21.64	46.00	24.09	0.16	0.11	Average
11	4.500	32.45	-23.55	56.00	32.09	0.20	0.16	QP
12	4.500	27.57	-18.43	46.00	27.21	0.20	0.16	Average

Test Mode	Mode 6 (2462MHz)	Tested By	John Huang
Temperature / Humidity	21.9 deg. C / 60%		

Line to Ground

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	47.06	-18.92	65.98	46.91	0.10	0.05	QP
2	0.150	37.28	-18.70	55.98	37.13	0.10	0.05	Average
3	0.194	39.90	-13.96	53.86	39.77	0.10	0.03	Average
4	0.194	42.81	-21.05	63.86	42.68	0.10	0.03	QP
5	0.221	26.65	-26.13	52.78	26.52	0.10	0.03	Average
6	0.221	43.00	-19.78	62.78	42.87	0.10	0.03	QP
7	2.660	30.87	-25.13	56.00	30.66	0.10	0.11	QP
8	2.660	23.60	-22.40	46.00	23.39	0.10	0.11	Average
9	4.600	32.30	-23.70	56.00	32.02	0.12	0.16	QP
10	4.600	27.21	-18.79	46.00	26.93	0.12	0.16	Average
11	15.150	34.55	-25.45	60.00	33.99	0.20	0.36	QP
12	15.150	30.26	-19.74	50.00	29.70	0.20	0.36	Average

Neutral to Ground

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.192	43.26	-20.68	63.94	43.13	0.10	0.03	QP
2	0.192	39.71	-14.23	53.94	39.58	0.10	0.03	Average
3	0.242	33.95	-18.09	52.04	33.81	0.10	0.04	Average
4	0.242	39.74	-22.30	62.04	39.60	0.10	0.04	QP
5	2.050	31.00	-25.00	56.00	30.82	0.10	0.08	QP
6	2.050	24.16	-21.84	46.00	23.98	0.10	0.08	Average
7	2.500	24.46	-21.54	46.00	24.23	0.13	0.10	Average
8	2.500	30.99	-25.01	56.00	30.76	0.13	0.10	QP
9	2.950	32.41	-23.59	56.00	32.14	0.16	0.11	QP
10	2.950	24.36	-21.64	46.00	24.09	0.16	0.11	Average
11	4.720	32.29	-23.71	56.00	31.93	0.20	0.16	QP
12	4.720	27.13	-18.87	46.00	26.77	0.20	0.16	Average

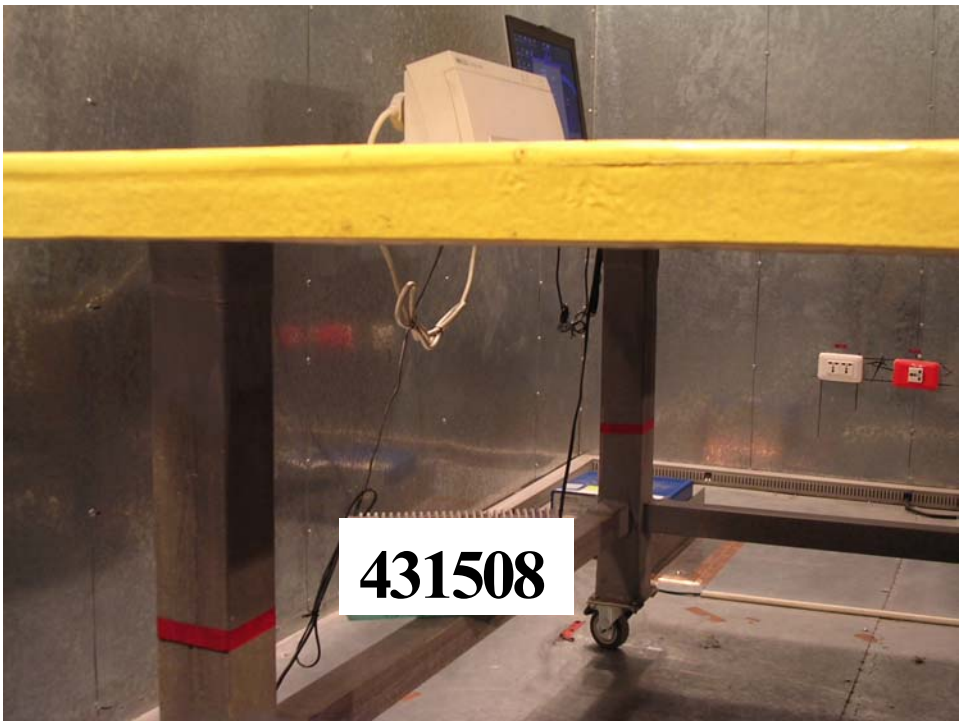
5.5.4. Photographs of Conducted Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW

REAR VIEW

SIDE VIEW



5.6. Test of Spurious Radiated Emission

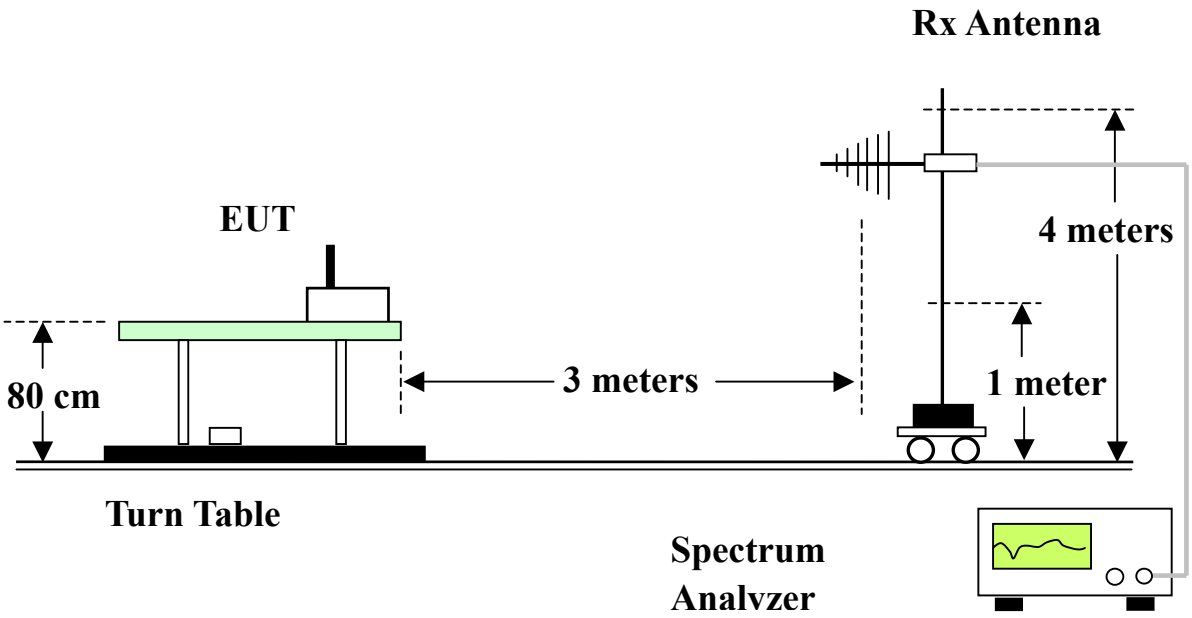
5.6.1. Measuring Instruments

Please reference item 8~19 in chapter 6 for the instruments used for testing.

5.6.2. Test Procedures

a) Configure the EUT according to ANSI C63.4.
b) The EUT was placed on the top of the turn table 0.8 meter above ground.
c) 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 turn table.
d) Power on the EUT and all the supporting units.
e) The turn table was rotated by 360 degrees to determine the position of the highest radiation.
f) 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.
g) For each suspected 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.
h) Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
i) For emission above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
j) 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.
k) 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.

5.6.3. Test Setup Layout



5.6.4. Test Results and Limit

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

Test Mode	Mode 1 (Flash 128M)	**Temperature**	27 deg. C	**Tested By**	Steve Chen
Freq. Range	30MHz~1GHz	**Humidity**	63%		

(A) Polarization: Horizontal

		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		132.510	29.73	-13.77	43.50	44.32	11.46	1.78	27.83	Peak	---	---
2		166.340	36.16	-7.34	43.50	48.84	13.05	2.04	27.77	Peak	---	---
3		184.190	30.24	-13.26	43.50	41.59	13.99	2.39	27.73	Peak	---	---
1		343.200	35.88	-10.12	46.00	44.86	15.30	3.23	27.51	Peak	---	---
2	!	397.600	42.49	-3.51	46.00	50.74	15.74	3.80	27.79	Peak	100	125
3		432.000	33.73	-12.27	46.00	41.98	16.24	3.60	28.09	Peak	---	---

(B) Polarization: Vertical

		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	!	77.260	34.46	-5.54	40.00	51.64	9.25	1.51	27.94	Peak	---	---
2	!	115.510	39.85	-3.65	43.50	55.34	10.52	1.86	27.87	Peak	---	---
3	!	119.420	38.64	-4.86	43.50	54.03	10.57	1.90	27.86	Peak	---	---
1		343.200	34.07	-11.93	46.00	43.05	15.30	3.23	27.51	Peak	---	---
2		396.800	34.10	-11.90	46.00	42.35	15.73	3.80	27.78	Peak	---	---

Test Mode	Mode 2 (Flash 256M)	Temperature	27 deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	63%		

(A) Polarization: Horizontal

	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	133.020	34.95	-8.55	43.50	49.05	11.48	2.25	27.83	Peak	---	---
2	184.190	30.43	-13.07	43.50	41.59	13.99	2.58	27.73	Peak	---	---
3	195.580	35.23	-8.27	43.50	45.50	14.70	2.74	27.71	Peak	---	---
1	343.200	36.49	-9.51	46.00	44.95	15.30	3.75	27.51	Peak	---	---
2 !	396.800	41.15	-4.85	46.00	49.19	15.73	4.01	27.78	Peak	---	---
3	432.000	34.92	-11.08	46.00	42.61	16.24	4.16	28.09	Peak	---	---

(B) Polarization: Vertical

	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	127.580	32.60	-10.90	43.50	47.09	11.18	2.17	27.84	Peak	---	---
2	132.340	35.90	-7.60	43.50	50.07	11.45	2.21	27.83	Peak	---	---
3	165.830	30.64	-12.86	43.50	42.95	13.02	2.44	27.77	Peak	---	---
1	343.200	34.86	-11.14	46.00	43.32	15.30	3.75	27.51	Peak	---	---
2	397.600	36.75	-9.25	46.00	44.79	15.74	4.01	27.79	Peak	---	---
3	787.200	36.99	-9.01	46.00	39.69	20.28	5.81	28.79	Peak	---	---

Test Mode	Mode 3 (Flash 512M)	Temperature	27 deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	63%		

(A) Polarization: Horizontal

	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	133.020	34.95	-8.55	43.50	49.05	11.48	2.25	27.83	QP	---	---
2	184.190	30.43	-13.07	43.50	41.59	13.99	2.58	27.73	QP	---	---
3	195.580	35.23	-8.27	43.50	45.50	14.70	2.74	27.71	QP	---	---
1	343.200	36.49	-9.51	46.00	44.95	15.30	3.75	27.51	QP	---	---
2 !	396.800	41.15	-4.85	46.00	49.19	15.73	4.01	27.78	QP	100	205
3	432.000	34.92	-11.08	46.00	42.61	16.24	4.16	28.09	QP	---	---

(B) Polarization: Vertical

	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	127.580	32.60	-10.90	43.50	47.09	11.18	2.17	27.84	QP	---	---
2	132.340	35.90	-7.60	43.50	50.07	11.45	2.21	27.83	QP	---	---
3	165.830	30.64	-12.86	43.50	42.95	13.02	2.44	27.77	QP	---	---
1	343.200	34.86	-11.14	46.00	43.32	15.30	3.75	27.51	QP	---	---
2	397.600	36.75	-9.25	46.00	44.79	15.74	4.01	27.79	QP	---	---
3	787.200	36.99	-9.01	46.00	39.69	20.28	5.81	28.79	QP	---	---

Test Mode	Mode 4 (2412MHz)	Temperature	27 deg. C	Tested By	Steve Chen
Freq. Range	1GHz~25GHz	Humidity	63%		

(A) Polarization: Horizontal

	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	1328.440	44.50	-29.50	74.00	58.67	24.92	1.35	40.44	Peak	---	---
2	1593.400	46.89	-27.11	74.00	60.31	25.74	1.50	40.66	Peak	---	---
3	2367.580	53.65	-20.35	74.00	64.93	28.16	1.68	41.12	Peak	---	---
4	2367.580	42.90	-11.10	54.00	54.18	28.16	1.68	41.12	Average	---	---
1	4822.000	56.41	-17.59	74.00	59.40	33.06	2.47	38.52	Peak	---	---
3	4822.000	49.19	-4.81	54.00	52.18	33.06	2.47	38.52	Average	100	215

(B) Polarization: Vertical

	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	1324.300	47.19	-26.81	74.00	61.36	24.91	1.36	40.44	Peak	---	---
2	1594.780	51.78	-22.22	74.00	65.18	25.75	1.51	40.66	Peak	---	---
3	1594.780	41.95	-12.05	54.00	55.35	25.75	1.51	40.66	Average	---	---
4	2367.580	56.07	-17.93	74.00	67.35	28.16	1.68	41.12	Peak	---	---
5	2367.580	46.20	-7.80	54.00	57.48	28.16	1.68	41.12	Average	---	---

Test Mode	Mode 5 (2437MHz)	Temperature	27 deg. C	Tested By	Steve Chen
Freq. Range	1GHz~25GHz	Humidity	63%		

(A) Polarization: Horizontal

	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	1195.960	43.01	-30.99	74.00	57.50	24.60	1.22	40.31	Peak	---	---
2	1324.300	45.07	-28.93	74.00	59.24	24.91	1.36	40.44	Peak	---	---
3	1594.780	46.99	-27.01	74.00	60.39	25.75	1.51	40.66	Peak	---	---
1	4876.000	57.74	-16.26	74.00	64.49	33.17	2.52	42.44	Peak	---	---
3	4876.000	50.87	-3.13	54.00	57.62	33.17	2.52	42.44	Average	100	206

(B) Polarization: Vertical

	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	1455.400	46.33	-27.67	74.00	60.21	25.23	1.46	40.57	Peak	---	---
2	1593.400	52.08	-21.92	74.00	65.50	25.74	1.50	40.66	Peak	---	---
3	1593.400	41.81	-12.19	54.00	55.23	25.74	1.50	40.66	Average	---	---
4	2301.340	49.51	-24.49	74.00	60.83	28.02	1.75	41.09	Peak	---	---
1	4876.000	56.22	-17.78	74.00	62.97	33.17	2.52	42.44	Peak	---	---
2	4876.000	48.61	-5.39	54.00	55.36	33.17	2.52	42.44	Average	---	---

Test Mode	Mode 6 (2462MHz)	Temperature	27 deg. C	Tested By	Steve Chen
Freq. Range	1GHz~25GHz	Humidity	63%		

(A) Polarization: Horizontal

	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	1324.300	45.00	-29.00	74.00	59.17	24.91	1.36	40.44	Peak	---	---
2	1593.400	47.29	-26.71	74.00	60.71	25.74	1.50	40.66	Peak	---	---
3	1720.360	44.28	-29.72	74.00	57.30	26.27	1.45	40.74	Peak	---	---
1	2500.000	54.88	-19.12	74.00	65.89	28.40	1.79	41.20	Peak	---	---
2	2500.000	44.15	-9.85	54.00	55.16	28.40	1.79	41.20	Average	---	---
1	4926.000	55.80	-18.20	74.00	62.56	33.28	2.47	42.51	Peak	---	---
2	4926.000	47.29	-6.71	54.00	54.05	33.28	2.47	42.51	Average	---	---

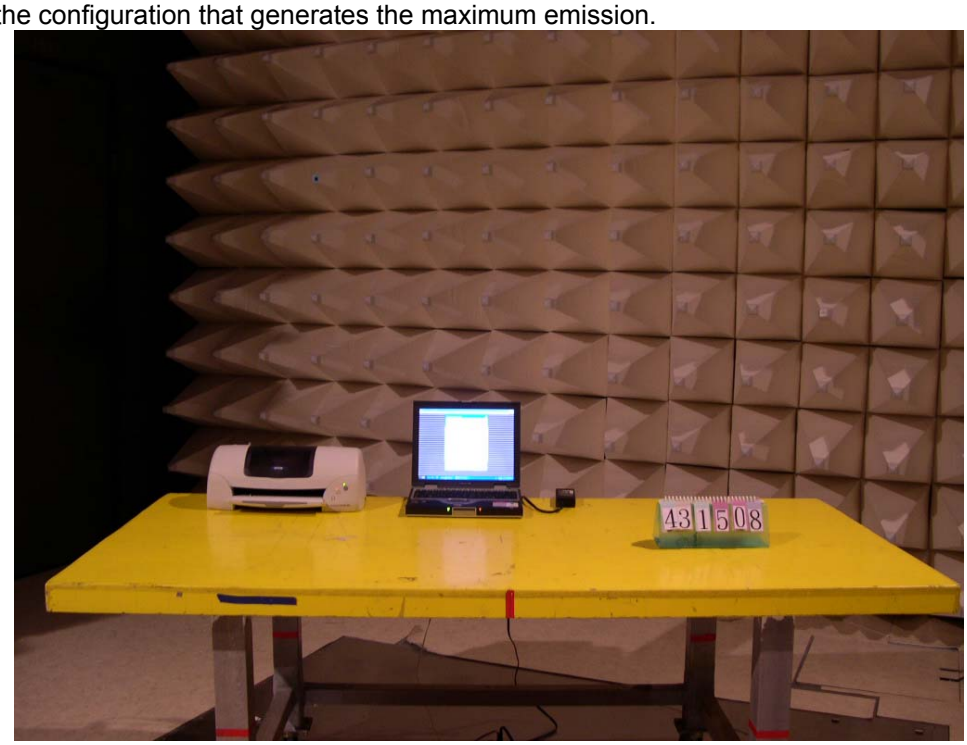
(B) Polarization: Vertical

	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	1455.400	47.02	-26.98	74.00	60.90	25.23	1.46	40.57	Peak	---	---
2	1587.880	51.40	-22.60	74.00	64.84	25.72	1.50	40.66	Peak	---	---
3	2294.440	49.62	-24.38	74.00	60.94	28.01	1.75	41.08	Peak	---	---
1	2500.000	58.26	-15.74	74.00	69.27	28.40	1.79	41.20	Peak	---	---
2	2500.000	48.41	-5.59	54.00	59.42	28.40	1.79	41.20	Average	---	---
1	4924.000	57.85	-16.15	74.00	64.62	33.27	2.47	42.51	Peak	---	---
3	4924.000	49.35	-4.65	54.00	56.12	33.27	2.47	42.51	Average	100	215

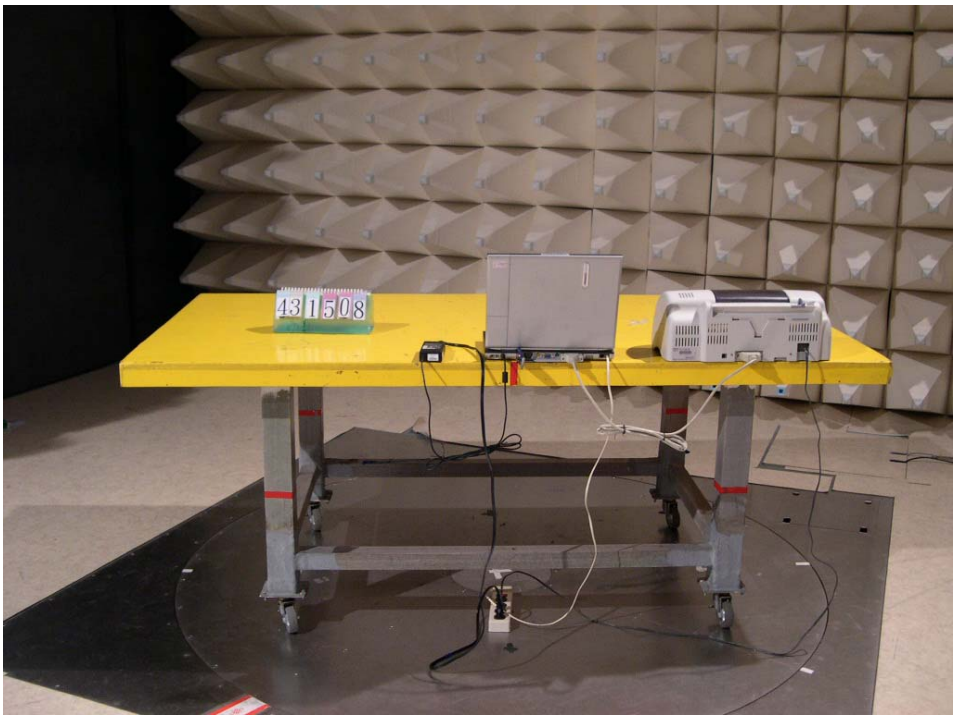
5.6.5. Photographs of Radiated Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW



5.7. Antenna Requirements

5.7.1. Standard Applicable

47 CFR Part15 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.

47 CFR Part15 Section 15.247 (b):

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.

5.7.2. Antenna Connected Construction

The maximum Gain antenna used in this product is integral antenna, antenna connector is UFL type inside the host.

6. List of Measuring Equipments Used

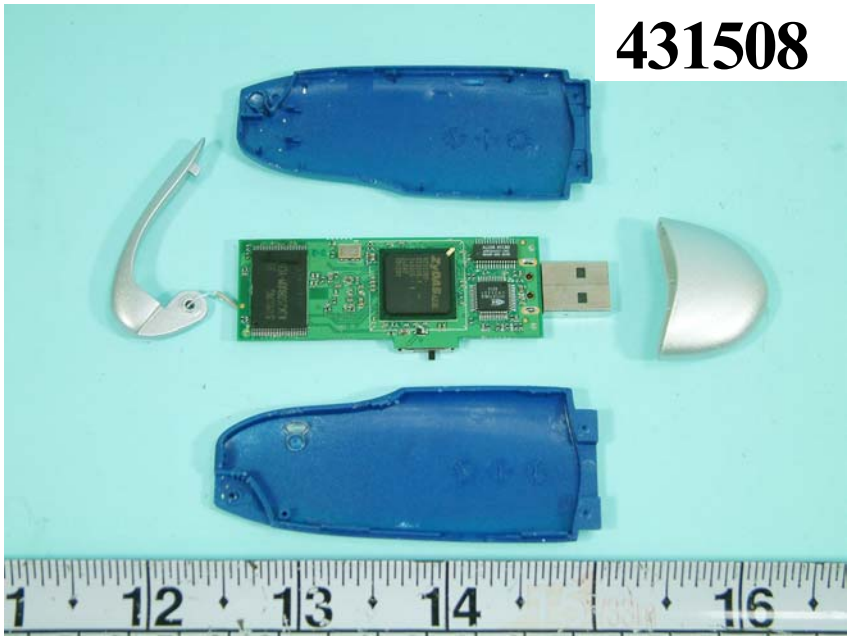
Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
1	EMC Receiver	R&S	ESCS 30	100132	9 KHz – 2.75 GHz	Jun. 12, 2003	Conduction (CO01-HY)
2	LISN	MessTec	NNB-2/16Z	2001-008	9 KHz – 30 MHz	Apr. 29, 2003	Conduction (CO01-HY)
3	LISN (Support Unit)	MessTec	NNB-2/16Z	2001-009	9 KHz – 30 MHz	Apr. 29, 2003	Conduction (CO01-HY)
4	EMI Filter	LINDGREN	LRE-2060	1004	< 450 Hz	N/A	Conduction (CO01-HY)
5	EMI Filter	LINDGREN	N6006	201052	0 ~ 60 Hz	N/A	Conduction (CO01-HY)
6	RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9KHz~30MHz	Dec. 24, 2003	Conduction (CO01-HY)
7	50 ohm BNC type Terminal	NOBLE	50ohm	TM009	50 ohm	Apr. 24, 2003	Conduction (CO01-HY)
8	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2003	Radiation (03CH03-HY)
9	Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 07, 2003	Radiation (03CH03-HY)
10	Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Radiation (03CH03-HY)
11	Bilog Antenna	SCHAFFNER	CBL6112B	2687	30MHz –2GHz	Dec. 21, 2002	Radiation (03CH03-HY)
12	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 03, 2003	Radiation (03CH03-HY)
13	Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Jul. 23, 2003	Radiation (03CH03-HY)
14	Horn Antenna	COM-POWER	AH-118	10094	1GHz – 18GHz	Apr. 10, 2003	Radiation (03CH03-HY)
15	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
16	Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
17	Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170154	15GHz~40GHz	Jun. 02, 2003	Radiation (03CH03-HY)
18	RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Dec. 05, 2003	Radiation (03CH03-HY)

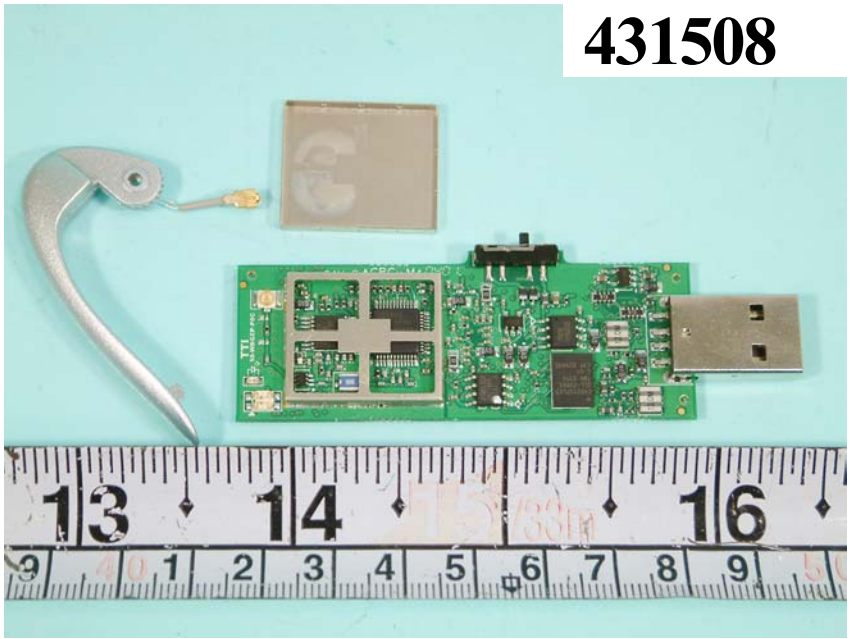
※ Calibration Interval of instruments listed above is one year.

Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
19	Power meter	R&S	NRVS	100444	DC~40GHz	May 28, 2003	Conducted
20	Power sensor	R&S	NRV-Z55	100049	DC~40GHz	May 28, 2003	Conducted
21	Power Sensor	R&S	NRV-Z32	100057	30MHz-6GHz	May 28, 2003	Conducted
22	AC power source	HPC	HPA-500W	HPA-9100024	AC 0~300V	May 27, 2003	Conducted
23	Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2003	Conducted
24	Oscilloscope	Tektronix	TDS1012	C038520	100MHz 2Ch.	Jan. 28, 2004	Conducted
25	DC Detector	Narda	FSCM99899	4503A	0.1MHZ~18GHz	Jan. 25, 2004	Conducted
26	Signal Generator	R&S	SMR40	837900/23	1GHz~40GHz	Nov. 06, 2003	Conducted

※ Calibration Interval of instruments listed above is one year.

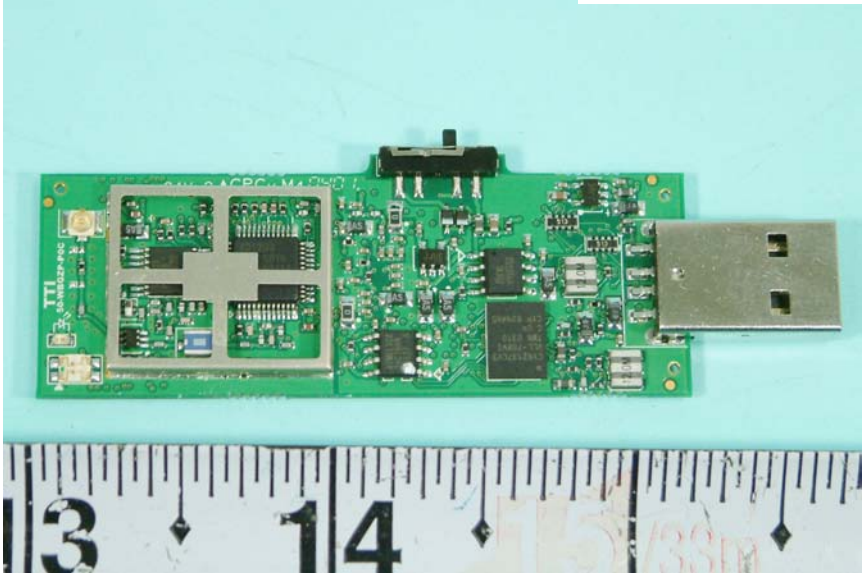
APPENDIX A. Photographs of EUT



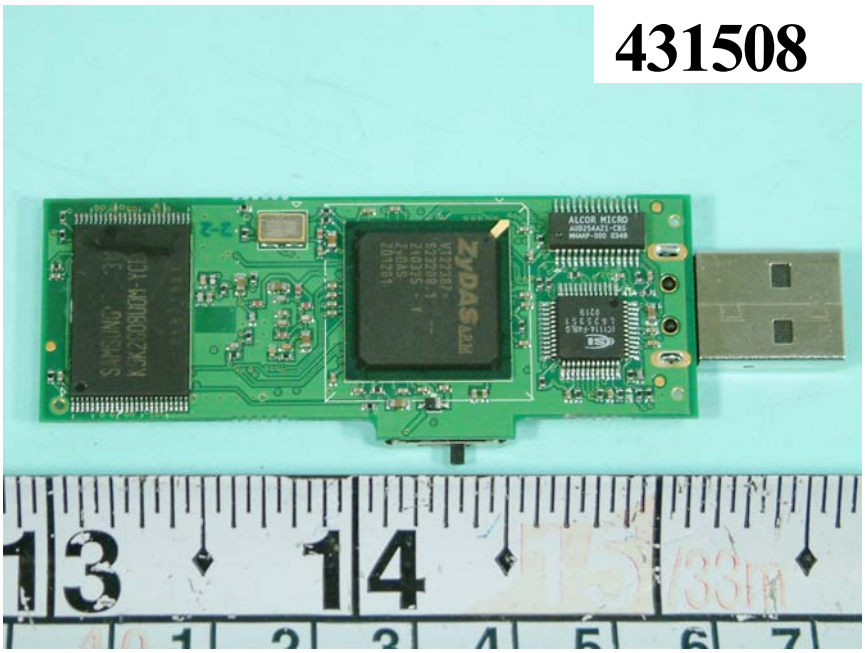


SPORTON International Inc.
TEL : 886-2-2696-2468
FAX : 886-2-2696-2255

431508



431508



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