



**Spectrum Research
& Testing Lab., Inc.**
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.: A02061707
Report No.: FCBA02061707
Page: 1 of 17
Date: July 24, 2002

Product Name: Motherboard
Model Number: P845GL
Applicant: 8/F., BLOCK A, GOODVIEW INDUSTRIAL BUILDING,
11 KIN FAT STREET, TUEN MUN, N.T., HONG KONG
Date of Receipt: June 17, 2002
Finished date of Test: July 24, 2002
Applicable Standards: 47 CFR Part 15, Subpart B, Class B
ANSI C63.4:1992

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Tested By : Jack Wang , Date: Jul. 24, 2002
(Jack Wang)
Checked By : Spring Wang , Date: Jul. 24, 2002
(Spring Wang)
Approved By : Harris W. Lai , Date: Jul. 24, 2002
(Harris W. Lai, Director)

NVLAQ[®]

Lab Code: 200099-0

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1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the applicant to claim that the product is endorsed by NVLAP.
- The NVLAP logo applies only to the applicable standards specified in this report.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- AC power source, 120 Vac/60 Hz, was used during the test.

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2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Motherboard
MODEL NO.	P845GL
POWER SUPPLY	DC from PC
CABLE	N/A

- NOTE :**
- Features:
 - Support Intel 478pin Pentium4 FC-PGA2(Willamette/Northwood).
 - Support 400MHz Bus.
 - Intel 845GL + ICH4 Chipset.
 - Two DIMM slots support up to 2G Memory Capacity.
 - Modem Ring Wakeup for External Modem.
 - Integrated 2D & 3D Graphic Accelerate port and AC 97 Audio onboard.
 - Intel P4 1.8GHz CPU was installed on the EUT.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

DEVICE	BRAND / MAKER	MODEL #	FCC ID/DOC	REMARK
N/A				

2.3 DESCRIPTION OF TEST MODE

The EUT was tested with the following two mode:

1. Close case
2. Open case

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2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL #	FCC ID / DOC	CABLE
1	MONITOR	SAMSUNG	PG17IS	DOC	1.5m unshielded power cord 1.2m shielded data cable
2	PRINTER	EPSON	STULUS C20SX	DOC	1.5m unshielded power cord 1.2m shielded data cable
3	MODEM	SMARTEAM	1200AT	EF56A1200AT	1.5m unshielded power cord 1.2m shielded data cable
4	KEYBOARD	ACER	6311-TA	DOC	1.2m shielded data cable
5	MOUSE	LOGITECH	M-S34	DZL211209	1.2m shielded data cable
6	USB MOUSE	LOGITECH	M-BE58	DOC	1.2m shielded data cable
7	USB MOUSE	LOGITECH	M-BE58	DOC	1.2m shielded data cable
8	MICROPHONE	TAKY	UDM-606	DOC	1.2m shielded data cable
9	WALKMAN	AIWA	HP-P102	DOC	1.2m shielded data cable
10	JOYSTICK	LOGITECH	J-YG8	DOC	1.2m shielded data cable
11	SPEAKER	JS	J-205A	DOC	1.5m unshielded power cord 1.2m shielded data cable
12	POWER SUPPLY	DELTA	DPS-300KB-1A	DOC	N/A
13	HDD	FUJITSU	MPC3032AT	DOC	N/A
14	FDD	PANASONIC	JU-257A606P	DOC	N/A
15	CD ROM	ASUS	CD-S400/A	DOC	N/A

NOTE :

1. Item 12-15 and EUT was assembled as a typical personal computer for the test.
2. For the actual test configuration, please refer to the photos of testing.

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3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of ITE and according to the specifications provided by the client, it must comply with the requirements of the following standards:

47 CFR Part 15 Subpart B, Class B

All tests have been performed and recorded as per the above standards.

4. CONDUCTED EMISSION TEST

4.1 CONDUCTED EMISSION LIMIT

FREQUENCY (MHz)	Class A (dBμV)		Class B (dBμV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.5 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

- NOTE :**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2 TEST EQUIPMENT

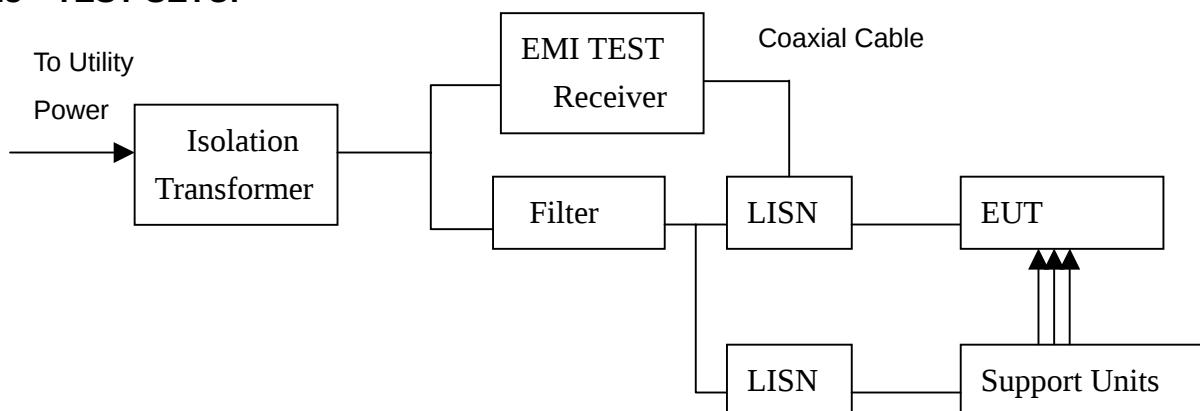
The following test equipment was used for the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz TO 2750 MHz	ROHDE & SCHWARZ	ESCS30/ 830245/012	JUL. 2002 ETC
LISN	50 μH, 50 ohm	SOLAR ELECTRONICS	8215-50-R-24-BNC / 924839	JUN. 2003 ETC
LISN	50μH, 50 ohm	SOLAR ELECTRONICS	9252-50-R-24-BNC / 951318	JUN. 2003 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

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4.3 TEST SETUP



NOTE :

1. The EUT was put on a wooden table with 0.8m height above ground plane, and 0.4m away from reference ground plane (> 2m*2m)
2. For the actual test configuration, please refer to the photos of testing.

4.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50μH as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

4.5 EUT OPERATING CONDITION

1. Under Windows ME run "EMI TEST" program.
 PC sent "H" pattern or accessed the following peripherals :
 - Color Monitor
 - RS232 (modem)
 - Keyboard
 - Mouse
 - Printer
 - FDD
 - HDD
2. Under Windows ME run "WINFCC" program.

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4.6 TEST RESULT

Temperature:	26 °C	Humidity:	57 %RH
Ferquency Range:	0.15 – 30 MHz	Test Mode	N/A
Receiver Detector:	Q.P. and AV.	Tested By:	Jack Wang

Power Line Measured : Line

Frequency (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.213	0.20	49.2	-	49.4	-	63.1	53.1	-13.7	-
0.318	0.20	37.8	-	38.0	-	59.7	49.7	-21.7	-
0.634	0.20	23.9	-	24.1	-	56.0	46.0	-31.9	-
7.802	0.36	30.6	-	31.0	-	60.0	50.0	-29.0	-
10.943	0.42	34.9	-	35.3	-	60.0	50.0	-24.7	-
22.666	0.65	29.8	-	30.5	-	60.0	50.0	-29.5	-

Power Line Measured : Neutral

Frequency (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.213	0.20	48.5	-	48.7	-	63.1	53.1	-14.4	-
0.318	0.20	36.8	-	37.0	-	59.7	49.7	-22.7	-
0.630	0.20	25.3	-	25.5	-	56.0	46.0	-30.5	-
1.685	0.20	22.2	-	22.4	-	56.0	46.0	-33.6	-
10.849	0.42	34.7	-	35.1	-	60.0	50.0	-24.9	-
15.591	0.51	23.9	-	24.4	-	60.0	50.0	-35.6	-

- NOTE :**
1. Measurement uncertainty is less than +/- 2dB
 2. Emission level = Reading valus + Correction factor
 3. Correction Factor = Cable loss + Insertion loss of LISN
 4. "": Measurement does not apply for this frequency.
 5. Margin value = Emission level - Limit
 6. The emission of other frequencies were very low against the limit.
 7. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

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5. RADIATED EMISSION TEST

5.1 RADIATED EMISSION LIMIT

CISPR 22 limits of radiated emission measurement for frequency below 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dB μ V/m	dB μ V/m
30 – 230	40	30
230 - 1000	47	37

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dB μ V/m) = 20 log Emission level (μ V/m).

FCC Part 15, Subpart B limit of radiated emission for frequency above 1000 MHz

FREQUENCY (MHz)	Class A (dB μ V/m) (at 3m)		Class B (dB μ V/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

FCC Part 15, Subpart B limit of radiated emission for open case frequency below 1GHz

FREQUENCY (MHz)	Class B (dB μ V/m) (at 3m)
	Q.P. or PK.
30-88	46.0
88-216	49.5
216-960	52.0
Above 960	60.0

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5.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test :

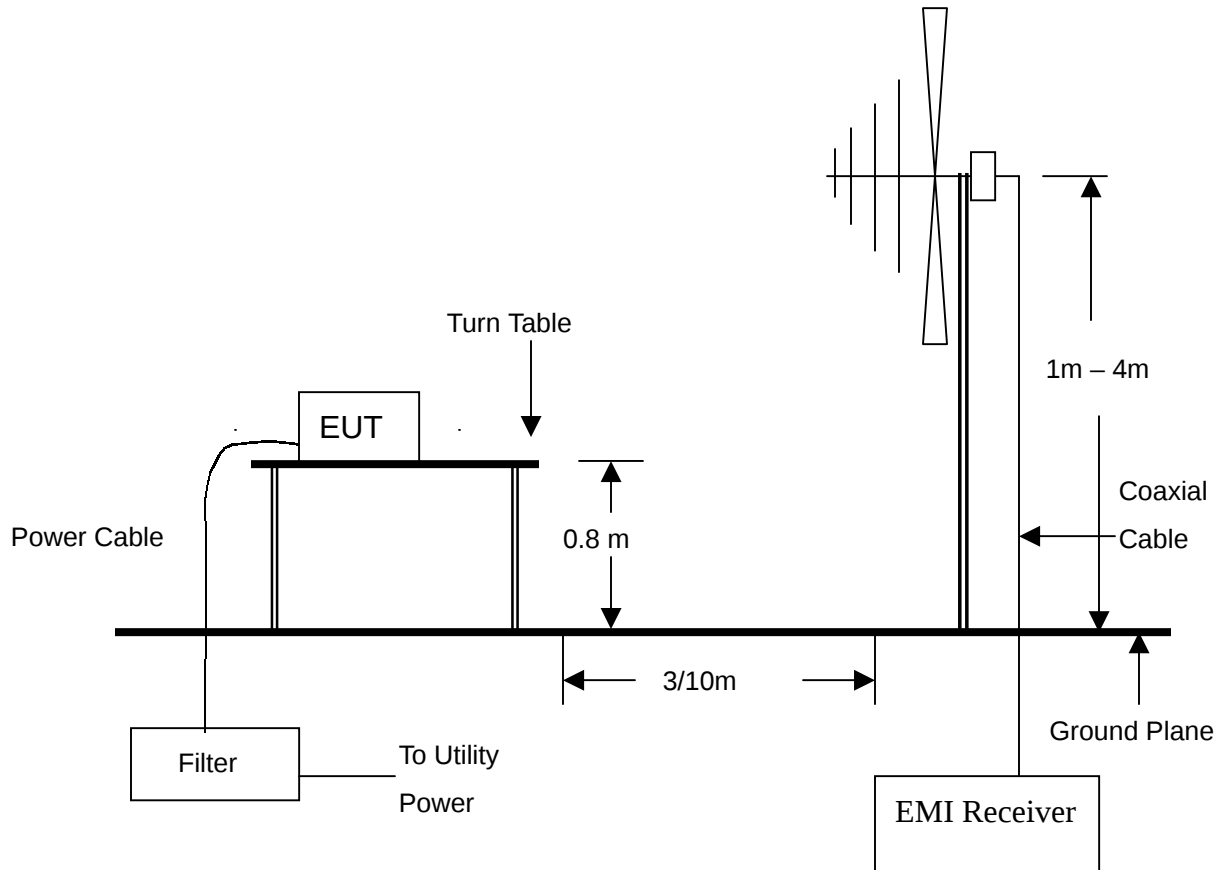
EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
TEST RECEIVER	9 kHz TO 2750 MHz	ROHDE & SCHWARZ	ESCS30/ 830245/012	JUL. 2002 ETC
BI-LOG ANTENNA	30 MHz TO 2 GHz	SCHAFFNER- CHASE	CBL6141A/ 4181	JUL. 2002 ETC
OATS	3 - 10 M measurement	SRT	SRT-2	DEC. 2002

NOTE:

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.
2. The Open Area Test Site (SRT-1) is registered by FCC with No. 90957 and VCCI with No. R-1081.
3. The Open Area Test Site (SRT-2) is registered by FCC with No. 98458 and VCCI with No. R-1168.

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5.3 TEST SET-UP



NOTE :

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.

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5.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4. The measurements were made at an open area test site with 10 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

5.5 EUT OPERATING CONDITION

Same as section 4.5 of this report.

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5.6 RADIATED EMISSION TEST RESULT

Temperature:	30 °C	Humidity:	58 %RH
Ferquency Range:	30 – 1000 MHz	Measured Distance:	10m
Receiver Detector:	Q.P. or AV.	Tested Mode:	Close case
Tested by:	Jack Wang		

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL (m)
184.3180	2.2	10.6	15.9	28.7	30.0	-1.3	267.5	4.0
258.0450	2.3	13.2	17.8	33.3	37.0	-3.7	217.0	4.0
265.6975	2.3	13.1	13.8	29.2	37.0	-7.8	251.0	4.0
332.1250	2.7	14.2	17.9	34.8	37.0	-2.2	274.0	4.0
599.5370	3.2	19.2	9.8	32.2	37.0	-4.8	294.0	3.0
666.1550	3.8	20.1	8.9	32.8	37.0	-4.2	273.0	3.0

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL (m)
48.2100	1.1	15.3	12.0	28.4	30.0	-1.7	353.0	1.0
208.8925	2.2	11.4	15.0	28.6	30.0	-1.4	256.0	1.0
332.1250	2.7	14.2	18.2	35.1	37.0	-1.9	230.0	1.0
466.3070	3.1	17.2	12.0	32.3	37.0	-4.7	359.0	4.0
599.5375	3.2	19.2	10.7	33.1	37.0	-3.9	178.0	4.0
724.9800	4.2	21.1	8.3	33.6	37.0	-3.4	81.0	3.0

- NOTE :**
1. Measurement uncertainty is less than +/- 4dB
 2. "*": Measurement does not apply for this frequency.
 3. Emission Level = Reading Value + Ant. Factor + Cable Loss
 4. The field strength of other emission frequencies were very low against the limit.

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Temperature:	30 °C	Humidity:	58 %RH
Ferquency Range:	1 GHz-9 GHz	Measured Distance:	3m
Receiver Detector:	Q.P. or AV.	Tested Mode:	Close case
Tested by:	Jack Wang		

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL (m)
1508.4620	3.7	26.0	15.63	45.3	54.0	-8.7	276.5	1.0
1804.0920	3.9	27.6	8.93	40.4	54.0	-13.6	294.3	1.0
3591.6070	6.0	31.2	9.26	46.2	54.0	-7.8	284.5	1.0
3987.0520	6.7	33.0	8.75	48.4	54.0	-5.6	291.4	1.0
4161.3720	6.8	33.0	8.51	48.2	54.0	-5.8	173.8	1.0

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL (m)
1788.6050	3.9	27.5	9.66	41.1	54.0	-13.0	322.4	1.0
2844.4930	5.4	29.7	9.56	44.6	54.0	-9.4	79.3	1.0
3537.4920	5.9	30.9	9.78	46.6	54.0	-7.4	322.7	1.0
4026.4620	6.7	33.1	9.2	49.0	54.0	-5.0	86.4	1.0
4092.8310	6.7	33.0	8.83	48.6	54.0	-5.4	325.1	1.0

- NOTE :**
1. Measurement uncertainty is less than +/- 4dB
 2. "": Measurement does not apply for this frequency.
 3. Emission Level = Reading Value + Ant. Factor + Cable Loss
 4. The field strength of other emission frequencies were very low against the limit.
 5. The EUT frequency was 1.8 GHz for the test.

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Temperature:	30 °C	Humidity:	58 %RH
Ferquency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P. or AV.	Tested Mode:	Open case
Tested by:	Jack Wang		

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL (m)
166.6650	1.9	11.8	17.2	30.9	49.5	-18.6	278.0	2.0
233.4680	2.2	12.8	28.5	43.5	52.0	-8.6	257.0	1.0
258.0430	2.3	13.2	25.1	40.6	52.0	-11.4	241.0	1.0
466.3070	3.1	17.2	26.9	47.2	52.0	-4.8	115.0	1.0
799.3850	4.2	21.6	21.3	47.1	52.0	-4.9	12.0	1.0
866.0000	4.4	22.2	17.2	43.8	52.0	-8.2	301.0	1.0

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL (m)
333.0770	2.7	14.2	28.9	45.8	52.0	-6.2	316.0	1.0
365.3330	2.7	15.3	25.4	43.4	52.0	-8.6	88.0	1.0
399.6950	2.7	16.0	28.7	47.4	52.0	-4.6	105.0	1.0
599.5380	3.2	19.2	20.2	42.6	52.0	-9.4	34.7	1.5
666.1550	3.8	20.1	23.8	47.7	52.0	-4.3	279.0	1.0
932.0420	4.7	23.1	19.3	47.1	52.0	-4.9	12.0	1.0

- NOTE :**
1. Measurement uncertainty is less than +/- 4dB
 2. "": Measurement does not apply for this frequency.
 3. Emission Level = Reading Value + Ant. Factor + Cable Loss
 4. The field strength of other emission frequencies were very low against the limit.

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Temperature:	30 °C	Humidity:	58 %RH
Ferquency Range:	1 GHZ – 9 GHZ	Measured Distance:	3m
Receiver Detector:	Q.P. or AV.	Tested Mode:	Open case
Tested by:	Jack Wang		

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL (m)
1514.0930	3.7	26.0	19.3	49.0	60.0	-11.0	275.1	1.0
1808.7350	3.9	27.6	14.6	46.1	60.0	-13.9	294.3	1.0
4041.2830	6.7	33.1	14.7	54.5	60.0	-5.5	173.8	1.0
4212.7080	6.8	32.9	14.6	54.3	60.0	-5.7	184.6	1.0

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL (m)
1504.2700	3.7	25.9	21.7	51.3	60.0	-8.7	322.7	1.0
1814.5070	3.9	27.6	14.9	46.4	60.0	-13.6	316.5	1.0
4041.6270	6.7	33.1	14.7	54.5	60.0	-5.5	318.3	1.0
4287.3050	6.8	33.0	14.9	54.6	60.0	-5.4	322.7	1.0

- NOTE :**
1. Measurement uncertainty is less than +/- 4dB
 2. "": Measurement does not apply for this frequency.
 3. Emission Level = Reading Value + Ant. Factor + Cable Loss
 4. The field strength of other emission frequencies were very low against the limit.
 5. The EUT frequency was 1.8 GHz for the test.

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6. TERMS OF ABRIVATION

AV.	Average detection
AZ(°)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction