

## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

### UN-INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART B CERTIFICATION REQUIREMENT

OF

**Product Name:** POS terminal

**Brand Name:** ingenico

**Model Name:** iWP220

**FCC ID:** XKBIWP220

**Report No.:** EI/2009/30013-02

**Issue Date:** Oct. 01, 2009

**FCC Rule Part:** Part 15 B, Class B

**Filing Type:** Certification

**Prepared for:** INGENICO  
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Guilherand-Granges France

**Prepared by:** SGS Taiwan Ltd.  
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## VERIFICATION OF COMPLIANCE

**Applicant:** INGENICO  
1 rue Claude Chappe BP346 Guilhaerand-Granges France

**Manufacturer:** INGENICO  
1 rue Claude Chappe BP346 Guilhaerand-Granges France

**Product Name:** POS terminal

**Brand Name:** ingenico

**Model Name:** iWP220

**FCC ID:** XKBIWP220

**File Number:** EI/2009/30013-02

**Date of test:** Jul. 17, 2009 ~ Aug. 23, 2009

**Date of EUT Receive:** Mar. 27, 2009

### We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15B, Class B. The test results of this report relate only to the tested sample identified in this report.

**Test By:**



**Date:**

Oct. 01, 2009

*Eric Su / Asst. Supervisor*

**Prepared By:**



**Date:**

Oct. 01, 2009

*Gloria Huang / Clerk*

**Approved By:**



**Date:**

Oct. 01, 2009

*Vincent Su / Manager*

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## Version

Version No.	Date	Description
00	Oct. 01, 2009	Initial creation of document

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## 1. GENERAL INFORMATION

### General:

Product Name:	POS terminal	
FCC ID:	XKBIWP220	
Brand Name:	ingenico	
Model Name:	iWP220	
Data Cable:	N/A	
Simple Hands-free (SHF)	N/A	
Power Supply:	24Vdc by AC/DC power adapter	
	Adapter:	Model: EA11002B, Supplier: EDAC

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**EUT Key Part:**

NO.	Equipment	Trade Name	Model Name	Remark
1	Application Processor	NVIDIA	APX2600	600MHz
2	PMU	NXP	PCF50626	
3	NAND Flash Memory	HYNIX	HY27UF082G2B-TP	2Gb
4	DRAM (LP-DDR)	Samsung	K4X1G323PD-8GC6	1Gb
5	Display	CHI HSIN	LS080HT9601	With Touch function / 8'' TFT LCM / 800x600 / RGB / 262K Colors
6	Audio Codec	WOLFSON	WM8903	
7	Speaker	ZEETEK	ZK-040G3-4-H19.5-P5	
8	Printer	Seiko	LTPF347E	Thermal Printer
9	Magnetic Stripe Read	Apollo	APOLLO_3350-45C-C-C150	Triple Track MagStripe Read Head
10	USB Hub	SMSC	USB2517	1:7 USB Hub
11	SPI to UART	NXP	SC161S752	1:2

**I/O Port:**

NO.	Type	Quantity	Remark
1	RS232	2	
2	AUDIO/IN	1	
3	AUDIO/OUT	1	
4	RJ45	1	
5	RJ11	1	Connector for drawer
6	USB	3	

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## 1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: XKBIWP220 filing to comply with Part15 Subpart B, class B of the FCC CFR 47 Rules.

## 1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

## 1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 & 10 meters) and FCC Registration Number: 94644

## 1.5 Special Accessories

Not available for this EUT intended for grant.

## 1.6 Equipment Modifications

Not available for this EUT intended for grant.

## 2. System Test Configuration

### 2.1 EUT Configuration

The EUT was tested with I/O port and all function with full test.

### 2.2 EUT Exercise

The EUT was tested with the following steps:

1. Run emctest.exe to activate all peripherals and display “H” pattern on monitor screen.
2. Run emctest.exe and choose HDD device to test.
3. Through iPod playing 1kHz to earphone, microphone.
4. Telecom ports through PC sever ping IP.
5. RS232 link to Modem device.

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

#### 2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.4-2003.



## 2.4 Limitation

### (1) Conducted Emission

According to section 15.107(a), Conducted Emission Class B Limits is as following.

Frequency range MHz	Class B Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

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

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**(2) Radiated Emission**

a. According to section 15.109(a), Radiated Emission Class B Limits is as following:

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance (m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark: 1. Emission level in  $\text{dB}\mu\text{V/m} = 20 \log(\mu\text{V/m})$

2. Measurement was performed at an antenna to the closed point of EUT distance of 3 meters.

b. According to section EN55022, Radiated Emission Class B Limits is as following:

Frequency range MHz	Limits $\text{dB}\mu\text{V/m}$ (10m)	
	Quasi-peak	
30 to 230	30	
230 to 1000	37	

Frequency range GHz	Limits $\text{dB}\mu\text{V/m}$ 3m)	
	Average	Peak
1 to 3	50	70
3 to 6	54	74

Remark: Measurement was performed at an antenna to the closed point of EUT distance of 10 meters.

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## 2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

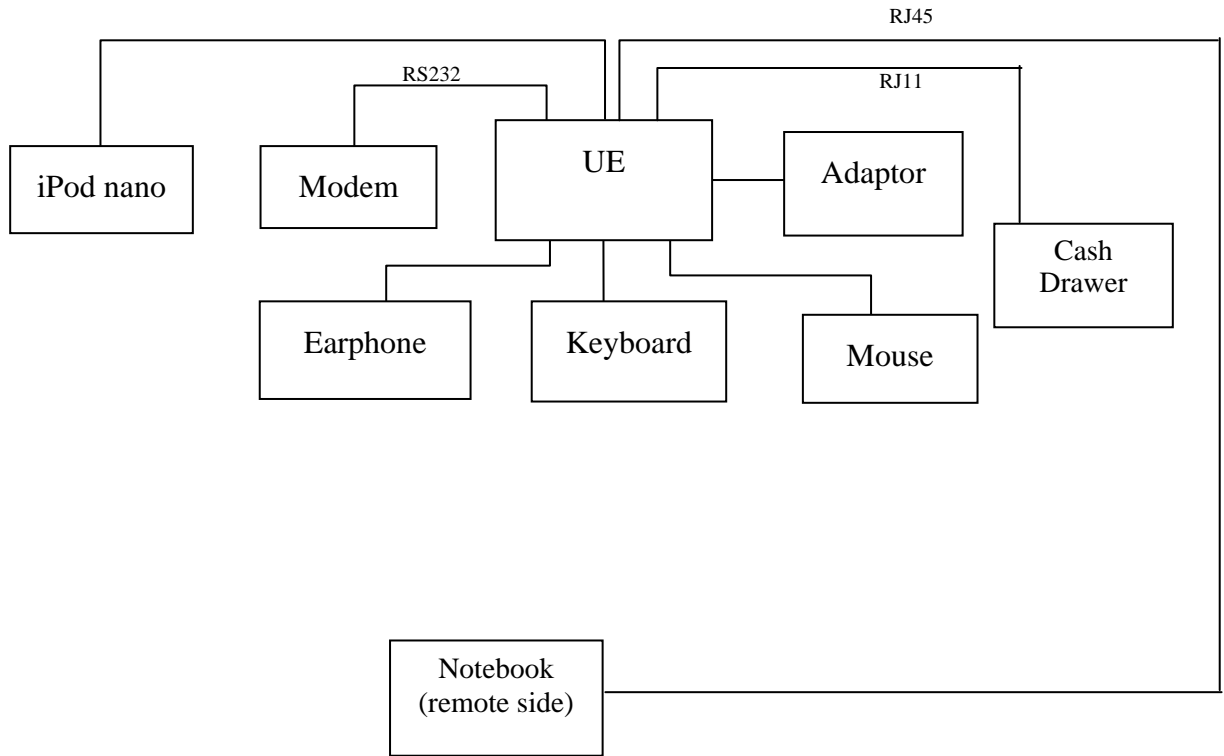


Table 2-2 Support Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Modem	LEMEL	1456VQE-C	N/A	shielding	Un-shielding
2.	Keyboard	HP	KB-0316	N/A	shielding	N/A
3.	USB Mouse	HP	MO19UCA	020507020	shielding	N/A
4.	Earphone	Ergotech	N/A	N/A	shielding	N/A
5.	iPod nano	APPLE	A1137	6U6025WCS2B	shielding	N/A
6.	Cash Drawer	TYSSO	PCD-426P	N/A	N/A	N/A
7.	Notebook (remote side)	IBM	T43	L3LKVL9	N/A	Un-shielding

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### 3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.107	Conducted Emission Class B	Compliant
§15.109	Radiated Emission Class B	Compliant

### 4. Description of test modes

The EUT was stayed in normal operation mode.

Test Plan: Full System

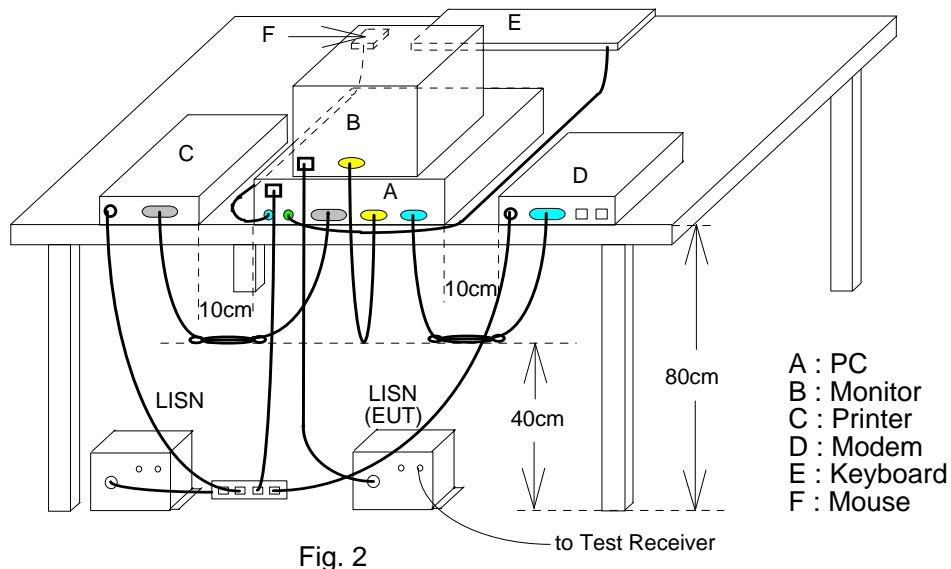
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## 5. Conducted Emissions Test

### 5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### 5.2 Test SET-UP (Block Diagram of Configuration)



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### 5.3 Measurement Equipment Used:

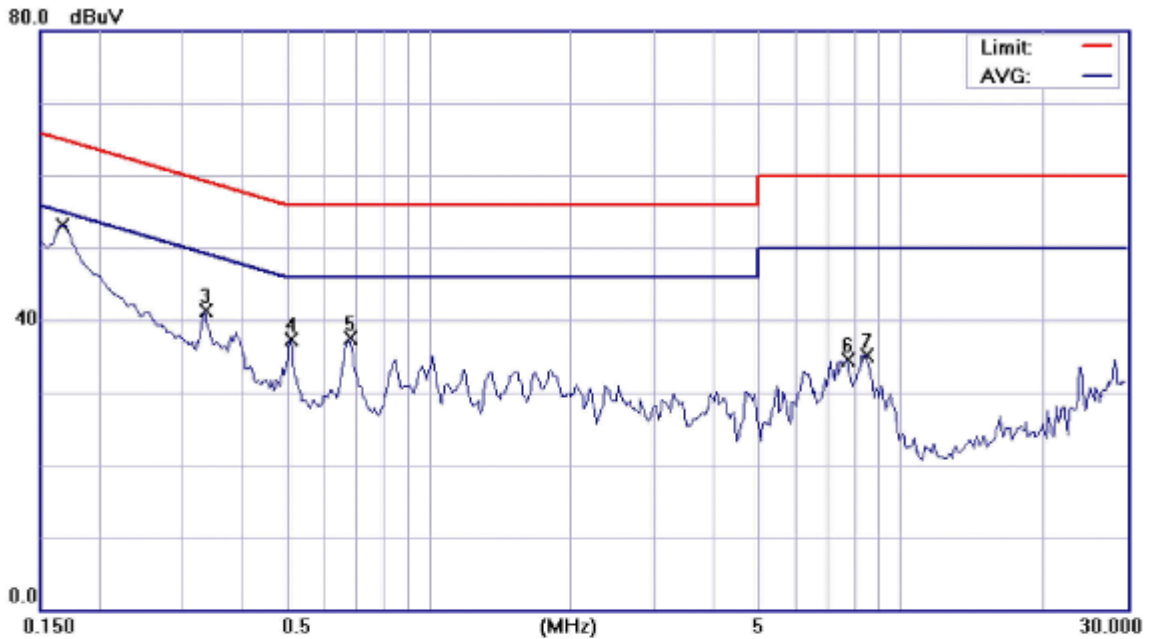
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	828985/004	09/15/2009	09/14/2010
LISN	Rolf-Heine	NNB-2/16Z	99012	02/18/2009	02/17/2010
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/18/2009	02/17/2010
Coaxial Cables	N/A	WK CE Cable	N/A	10/30/2008	10/29/2009

### 5.4 Measurement Result

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

### AC POWER LINE CONDUCTED EMISSION TEST DATA

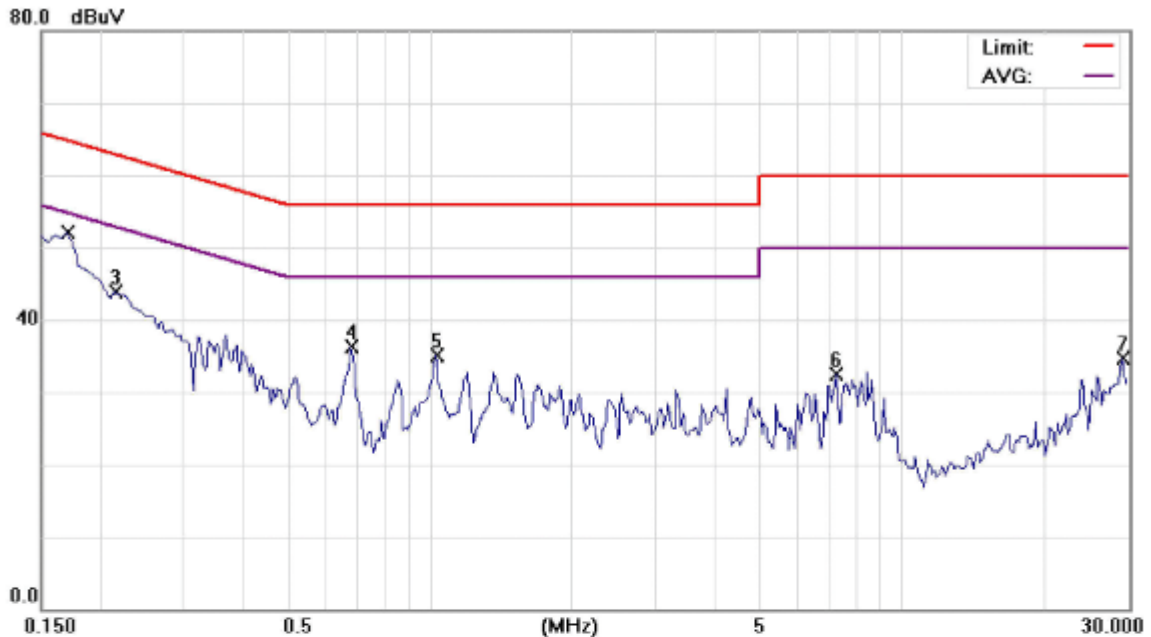
Operation Mode:	Full System	Test Date:	Aug. 20, 2009
		Test By:	Eric



Site SGS CONDUCTED #1 Phase: **L1** Temperature: 23 °C  
 Limit: CISPR22/11/EN55022 Class B Power: AC 120V/60Hz Humidity: 58 %  
 EUT: POS terminal Distance: Air Pressure: hpa

No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1660	46.84	0.16	47.00	65.16	-18.16	QP	
2	*	0.1660	43.27	0.16	43.43	55.16	-11.73	AVG	
3		0.3350	41.14	0.09	41.23	59.33	-18.10	peak	
4		0.5100	37.17	0.07	37.24	56.00	-18.76	peak	
5		0.6800	37.36	0.08	37.44	56.00	-18.56	peak	
6		7.7000	34.18	0.28	34.46	60.00	-25.54	peak	
7		8.5000	34.85	0.33	35.18	60.00	-24.82	peak	

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Site SGS CONDUCTED #1

Limit: CISPR22/11/EN55022 Class B

EUT: POS terminal

Phase: **N**

Power: AC 120V/60Hz

Distance:

Temperature: 23 °C

Humidity: 58 %

Air Pressure: hpa

No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1696	45.58	0.17	45.75	64.98	-19.23	QP	
2	*	0.1696	42.53	0.17	42.70	54.98	-12.28	AVG	
3		0.2150	43.67	0.14	43.81	63.01	-19.20	peak	
4		0.6800	36.15	0.11	36.26	56.00	-19.74	peak	
5		1.0300	34.94	0.12	35.06	56.00	-20.94	peak	
6		7.2800	32.15	0.28	32.43	60.00	-27.57	peak	
7		29.2400	34.37	0.39	34.76	60.00	-25.24	peak	

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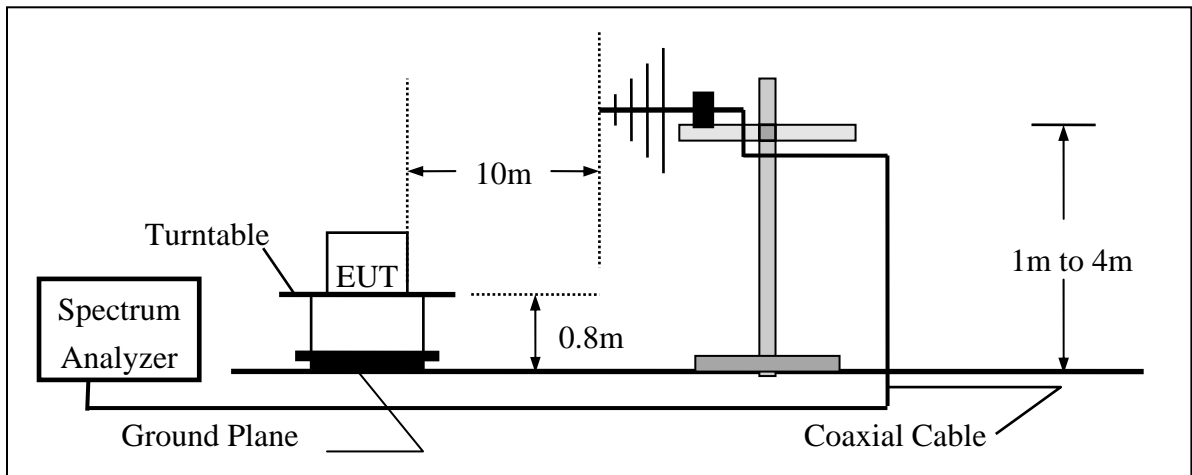
## 6. Radiated Emission Test

### 6.1 Measurement Procedure

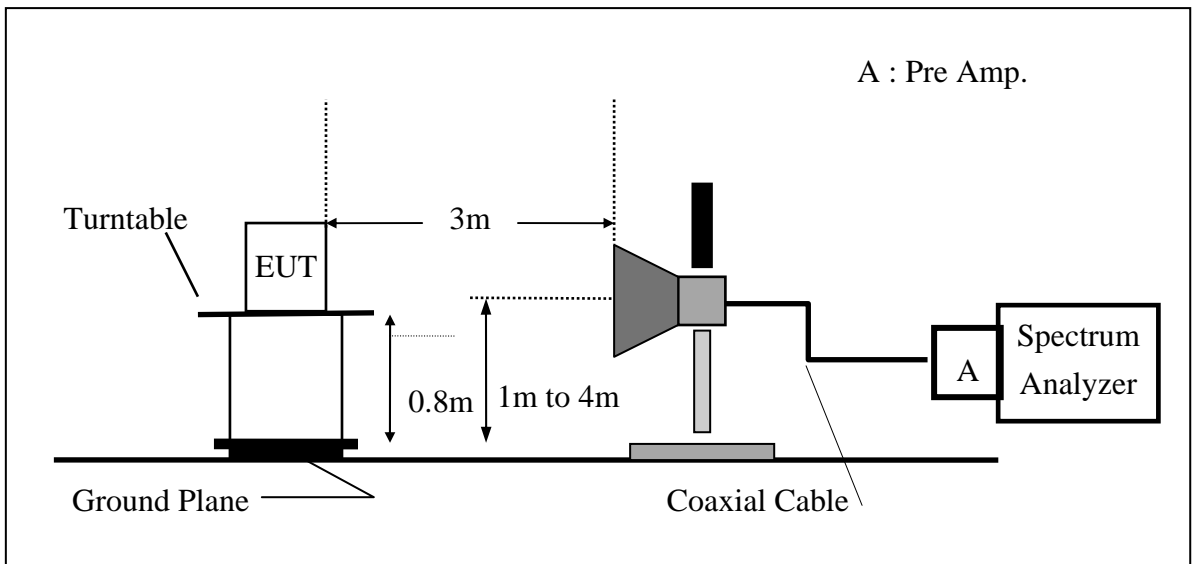
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

### 6.2 Test SET-UP (Block Diagram of Configuration)

#### (A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



#### (B) Radiated Emission Test Set-Up Frequency Over 1 GHz



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**6.3 Measurement Equipment Used:**

10m Open Area Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI	100335	02/05/2009	02/04/2010
RF-Amplifier	Agilent	8447D	2944A09469	11/30/2008	11/29/2009
Broadband Antenna	SCHWAZBECK	VULB9160	9160-3224	03/11/2009	03/02/2010
Turn Table	HD	DT420	420/542	N/A	N/A
Antenna Master	HD	MA 240	240/515	N/A	N/A
Controller	HD	HD 100	100/589	N/A	N/A
Low Loss Cable	N/A	OS RE Cable	N/A	11/30/2008	11/29/2009

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	02/12/2009	02/11/2010
Bilog Antenna	SCHWAZBECK	VULB9160	9160-3136	11/15/2008	11/14/2009
Horn antenna	SCHWAZBECK	BBHA 9120D	9120D-320	03/14/2009	03/13/2010
Pre-Amplifier	Agilent	8447D	1937A02834	11/30/2008	11/29/2009
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2009	01/04/2010
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	01/05/2009	01/04/2010
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2009	01/04/2010

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### 6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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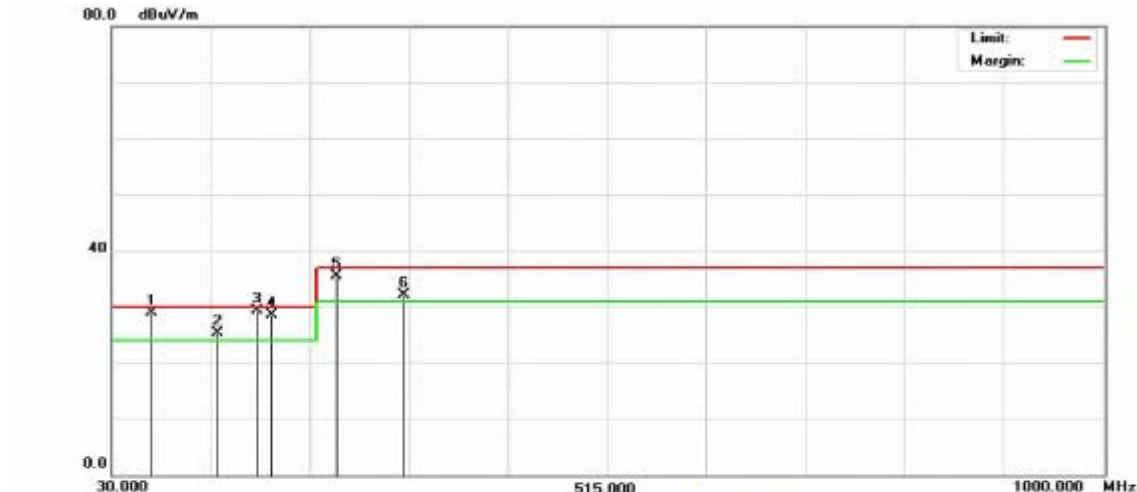
### 6.5 Measurement Result (below 1G)

Test Mode: Full System

Test Date : Aug. 20, 2009

Frequency Range: 30MHz-1GHz

Test By: Eric



Site :10M Open Site      Polarization: **Vertical**      Temperature: 24 °C  
 Limit: CISPR22\CISPR11\EN55022 Class B 10M      Power: AC 120V/50Hz      Humidity: 63 %  
 Distance: 10m      Air Pressure: hpa

Note: Full system

No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	!	67.8370	47.01	-18.16	28.85	30.00	-1.15	QP	
2	!	132.7080	41.32	-16.03	25.29	30.00	-4.71	QP	
3	*	171.3710	44.08	-14.76	29.32	30.00	-0.68	QP	
4	!	185.6610	44.82	-16.38	28.44	30.00	-1.56	QP	
5	!	250.0010	49.82	-14.27	35.55	37.00	-1.45	QP	
6	!	314.1790	43.93	-11.85	32.08	37.00	-4.92	QP	

Remark :

- (1) Measuring frequencies from 30 MHz to the 10GHz ◦
- (2) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurement as necessary.
- (3) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz and 1GHz to 10GHz was 1MHz

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Test Mode: Full System  
 Frequency Range: 30MHz-1GHz

Test Date: Aug. 20, 2009  
 Test By: Eric



Note: Full system

No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		132.1130	36.53	-16.07	20.46	30.00	-9.54	QP	
2	*	146.3870	43.18	-15.20	27.98	30.00	-2.02	QP	
3		160.6630	36.76	-14.54	22.22	30.00	-7.78	QP	
4	!	171.3880	42.31	-14.76	27.55	30.00	-2.45	QP	
5		185.6560	37.15	-16.38	20.77	30.00	-9.23	QP	
6	!	250.0020	47.20	-14.27	32.93	37.00	-4.07	QP	

Remark :

- (1) Measuring frequencies from 30 MHz to the 10GHz °
- (2) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurement as necessary.
- (3) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz and 1GHz to 10GHz was 1MHz

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Test Mode: Full System	Test Date :	Aug. 20, 2009
Detector Function: Peak/AV	Test By:	Eric
Frequency Range: 1000MHz – 13GHz		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/AV)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
---	V	Peak					
---	H	Peak					

Remark

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- (4) Spectrum Peak Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (5) Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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