



EMC TEST REPORT

Product Name : USB Dongle

Model Number : MS-6861

Brand Name : MSI

Marketing Name : US54G

Applicant : MICRO-STAR INT' LCO., LTD.

Address : No. 69, Li-De St, Jung-He City,
Taipei Hsien 235, Taiwan

Received Date : July 01, 2004

Tested Date : July 01 ~ August 19, 2004

Notes :

1. This report will be invalid if duplicated or photocopied in part.
2. This report refers only to the specimen(s) submitted to testing, and be invalid as separately used.
3. This report is invalid without examination stamp and signature of this institute.
4. The tested specimen(s) will be preserved for thirty days from the data issued.
5. The report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.



Test Report Verification

Product Name : USB Dongle
Model Number : MS-6861
Brand Name : MSI
Marketing Name : US54G
Applicant : MICRO-STAR INT' LCO., LTD.

Measurement Standard :

ETSI EN 301 489-01 V1.4.1 (2002)

ETSI EN 301 489-17 V1.2.1 (2002)

EN 55022+A2 (2003), Class B

EN 61000-4-2+A2 (2001)

EN 61000-4-3+A1 (2002)

Tested By : Stan Peng, Date: August 26, 2004
(Stan Peng)

Approved By : Chieh-De Tsai, Date: August 26, 2004
(Chieh-De Tsai, Manager)



WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.



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1. SUMMARY OF TEST RESULTS

ETSI EN 301 489-01 V1.4.1 (2002)

ETSI EN 301 489-17 V1.2.1 (2002)

Emission

Standard	Item	Result	Remarks
EN 55022+A2 (2003), Class B	Conducted	PASS	
	Radiated	PASS	

Immunity

Standard	Item	Result	Remarks
EN 61000-4-2+A2 (2001)	ESD	PASS	
EN 61000-4-3+A1 (2002)	RS	PASS	



2. GENERAL INFORMATION

2.1 General Statement

MEASUREMENT DEVIATION : Comply with standard in full

TRACEABILITY : This test result is traceable to National or International std.

2.2 Description of EUT

Product Name	USB Dongle
Model Number	MS-6861
Marketing Name	US54G
Frequency Range	2457MHz to 2472MHz for France 2412MHz to 2472MHz for other countries in EU
Channel Spacing	5MHz
Channel Number	4 for France 13 for other countries in EU
Air Data Rate	11Mbps (802.11b mode), 54Mbps (802.11g mode)
Type of Modulation	802.11b : DSSS (CCK, DQPSK, DBPSK) 802.11g : OFDM (64QAM, 16AQM, QPSK, BPSK)
Frequency Selection	by software / firmware
Antenna Type	Soldered on PCB Chip Antenna, Antenna Gain : -4dBi.
Power Source	5VDC(From Notebook)

Note :

The difference of model names (MS-6861 and US54G) is just the market reason. The all circuit are the same between two models.

Engineering Sample , Product Sample , Mass Product Sample.

2.3 Description of Peripherals

(1) Notebook PC

MANUFACTURER : COMPAQ CORP.
MODEL NUMBER : N800V
SERIAL NUMBER : 5Y33KSQZM0YV 1YR
INPUT POWER : 18.5VDC,65W,3.5A
OUTPUT POWER : -----

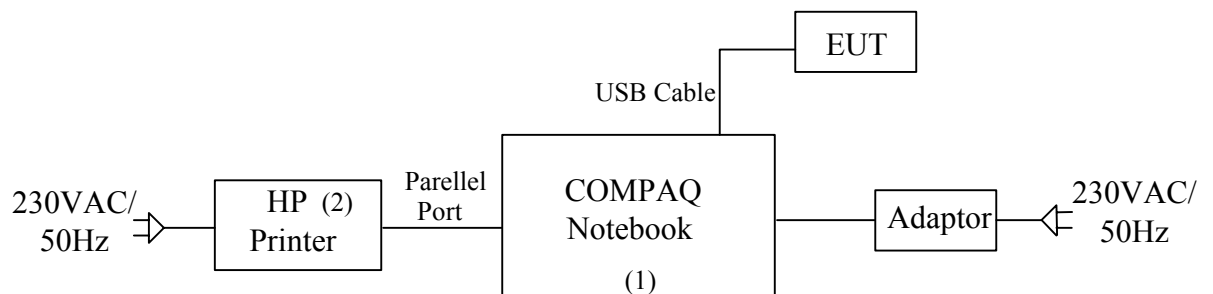
Adapter

MANUFACTURER : COMPAQ CORP.
MODEL NUMBER : PPP009H
SERIAL NUMBER : 2Y18650504
INPUT POWER : 100-240VAC 50/60Hz,1.6A
OUTPUT POWER : 18.5VDC, 65W, 3.5A

(2) Printer

MANUFACTURER : HP CORP.
MODEL NUMBER : C6431D
SERIAL NUMBER : CN19T6S011
FCC ID : DOC
POWER SOURCE : 100~240VAC,50/60Hz,0.7A
SIGNAL CABLE : Shielded , Undetachable , 1.8m

2.4 EUT & Peripherals Setup Diagram



The indicated numbers (1)(2).....,please refer to item 2.3



2.5 EUT Operating Procedure

- (1) Run the RF test software “ Ra Config 2500 USB_QA.exe ”
Choice “ Use Ra Config (Without WPA support) ”
- (2) Choice “ QA Mode – TX/RX ”
Start TX mode test :
 - (a) for 802.11b mode
Channel : 1, 6, 11
Preamble : LONG
Rate : 11
Choice Conti. TX
Click Start TX
 - (b) for 802.11g mode
Channel : 1, 6, 11
Preamble : OFDM
Rate : 6
Choice Conti. TX
Click Start TX
- (3) Start RX mode test :
Channel : 1, 6, 11
Click Start RX

2.6 Description of Open Site

SITE DESCRIPTION

FCC Certificate NO. : 90585
BSMI Certificate NO. : SL2-IN-E-0002
NVLAP Lab Code : 200118-0
CNLA Certificate NO. : CNLA-ZL97018
VCCI Certificate NO. : R-1189, C-1250
TÜV Rheinland Certificate NO. : 10008375

NAME OF SITE : Ecom Sertech Corp. Hsin-Chu Lab.
(Spin-off from ITRI / ERSO on Apr. 01, 2003)
SITE LOCATION : Rm.258, Bldg.17, NO.195 , Sec. 4, Chung Hsing Rd.,
Chu-Tung Chen. Hsin-Chu, Taiwan 310 R.O.C.



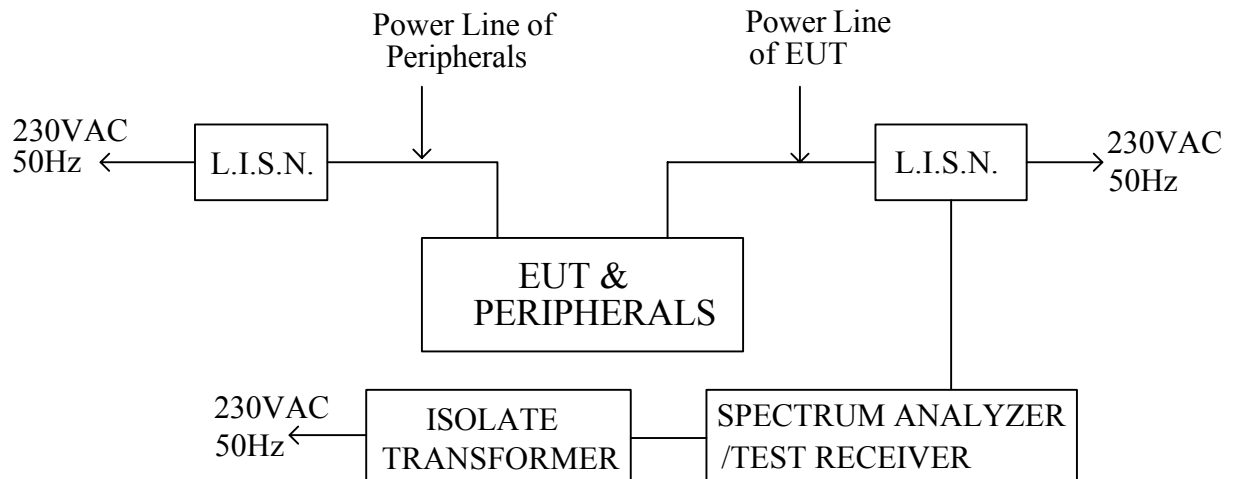
3. EMISSION TEST

3.1 Line Conducted Emission Measurement

3.1.1 Test Equipments

Manufacturer or Type	Model No.	Serial No.	Date of Calibration	Calibration Period	Remark
HP SPECTRUM ANALYZER & DISPLAY	8594E	3801A05627	April 26, 2004	1 Year	PRETEST
SOLAR ISOLATION TRANSFORMER	7032-1	N/A	N/A	N/A	FINAL
EMCO L.I.S.N.	3850/2	9311-1025 9401-1028	January 08, 2004 For Characteristic impedance	1 Year	FINAL
			May 18, 2004 For Insertion loss		
R & S TEST RECEIVER	ESHS 30	838550/003	February 11, 2004	1 Year	FINAL
KEENE SHIELDED ROOM	5983	No.1	N/A	N/A	FINAL
R & S PULSE LIMIT	EHS3Z2	357.8810.52	July 10, 2004	1 Year	FINAL
N TYPE COAXIAL CABLE	-----	-----	July 10, 2004	1 Year	FINAL
50 TERMINATOR	-----	-----	July 10, 2004	1 Year	FINAL

3.1.2 Test Setup





3.1.3 Conducted Power Line Emission Limit

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56	56-46
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

3.1.4 Test Procedure

The test procedure is performed in a 12ft×12ft×8ft(L×W×H) shielded room. The EUT along with its peripherals were placed on a 1.0m(W)× 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chasis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chasis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

3.1.5 Measurement Uncertainty of Conducted Emission

The uncertainty of conducted emission is ± 1.36 dB.

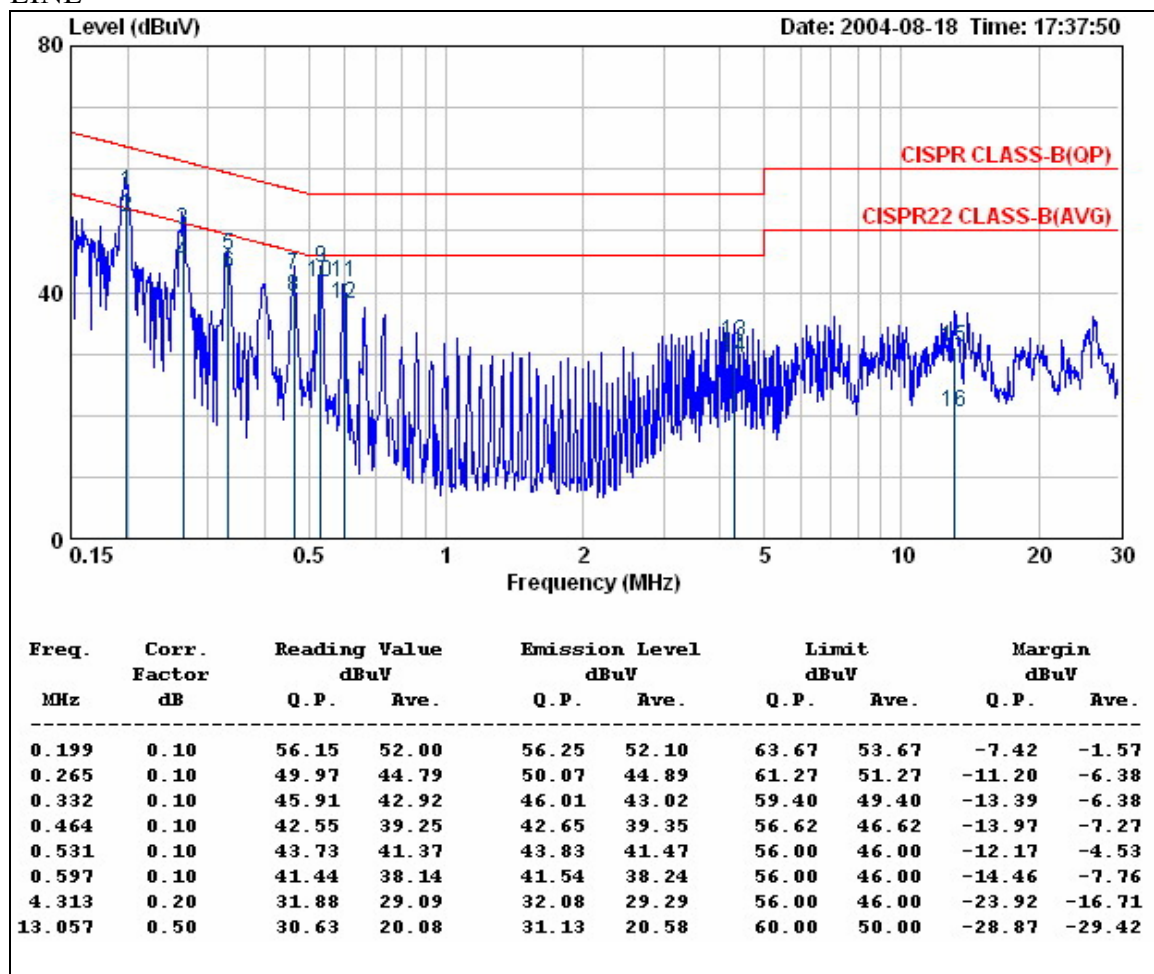


3.1.6 Conducted Power Line Emission Measurement

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/08/18
Product Name	USB Dongle	Test By	Stan Peng
Model Name	MS-6861	TEMP&Humidity	33.4 , 54%

LINE



REMARKS :

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. For 802.11b mode.



Ecom Sertech Corp.

Rm. 258, Bldg. 17, NO.195, Sec. 4 Chung Hsing Rd., ChuTung Chen, Hsinchu, Taiwan 310, R.O.C
 TEL:886-3-5918012 FAX : 886-3-5825720

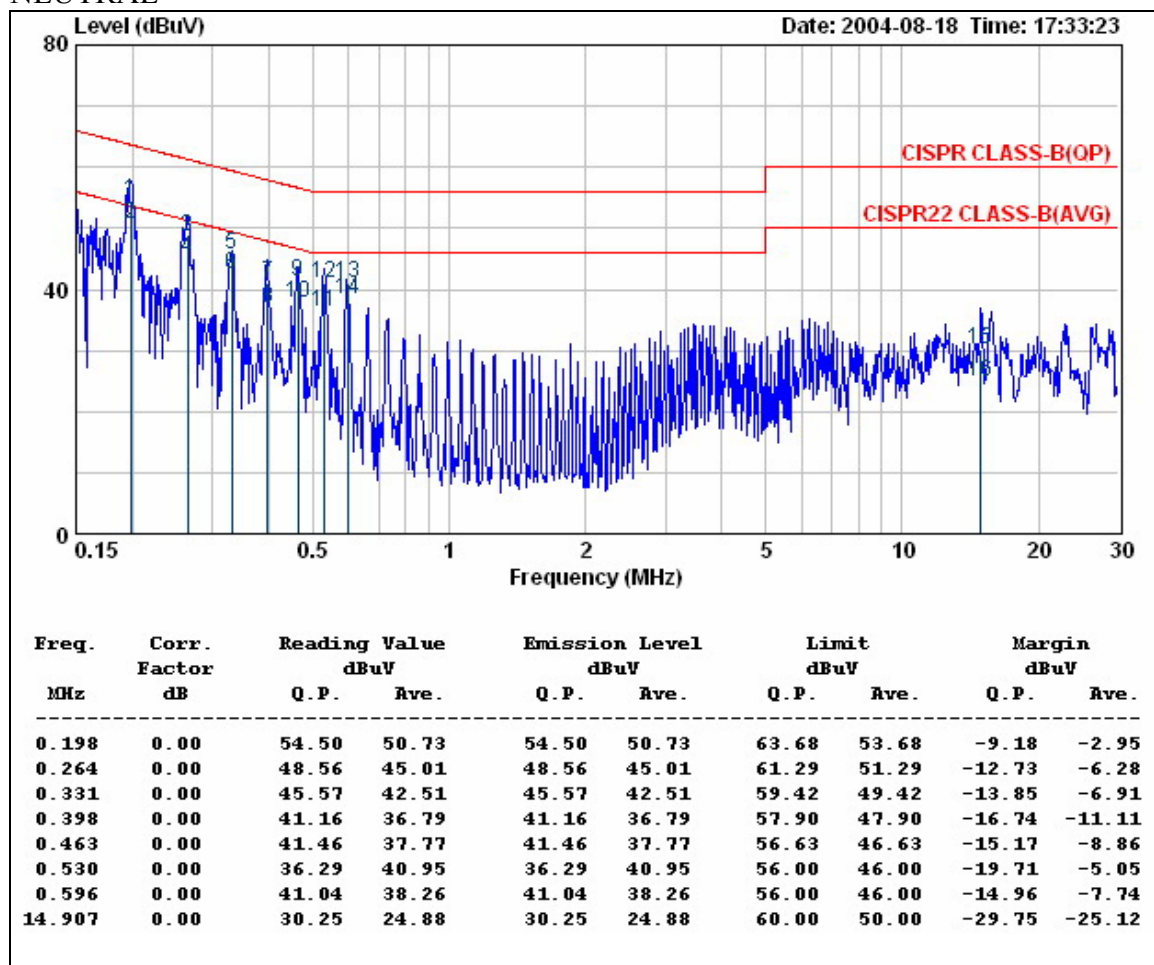
Report No. : ER04-07-005C

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The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/08/18
Product Name	USB Dongle	Test By	Stan Peng
Model Name	MS-6861	TEMP&Humidity	33.4 , 54%

NEUTRAL



REMARKS :

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. For 802.11b mode.



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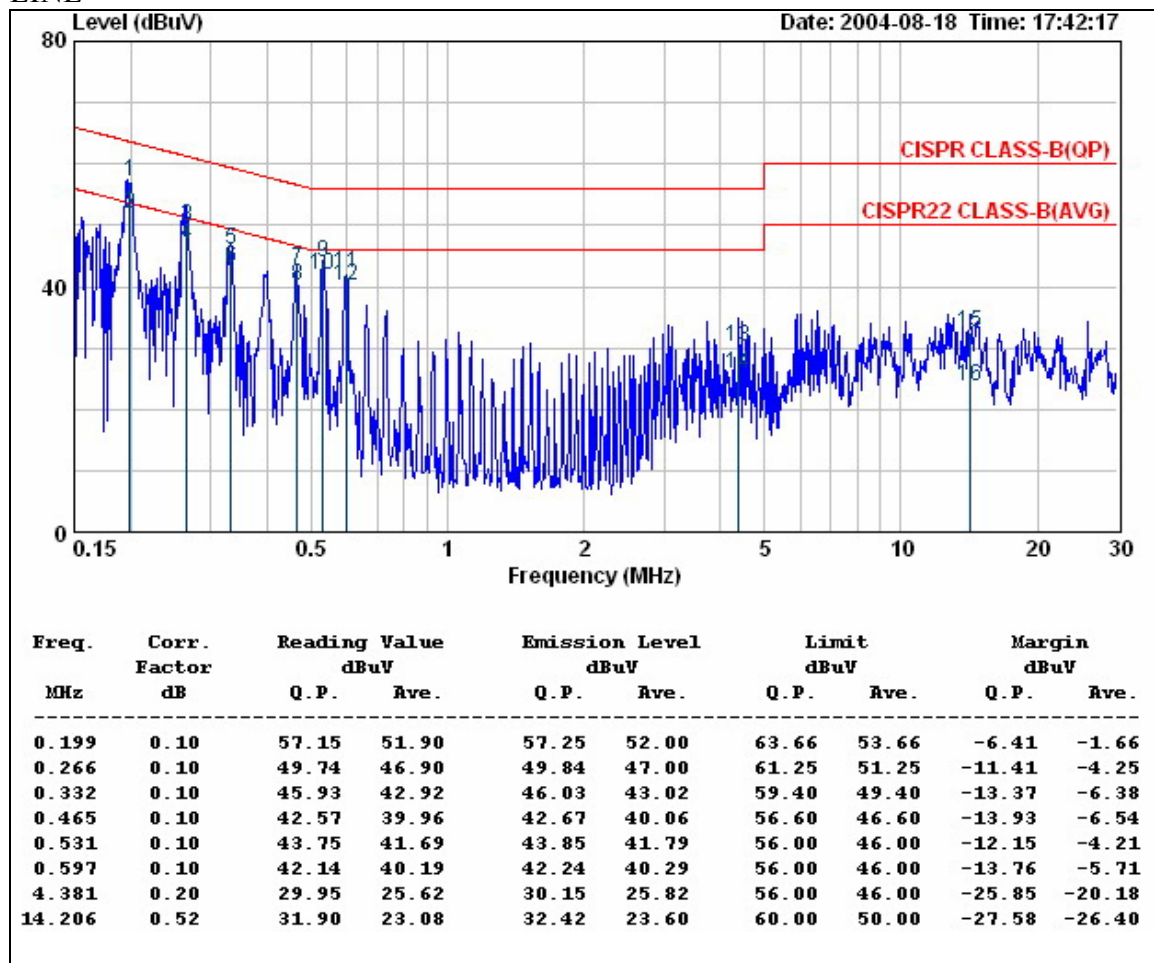
Report No. : ER04-07-005C

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The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/08/18
Product Name	USB Dongle	Test By	Stan Peng
Model Name	MS-6861	TEMP&Humidity	33.4 , 54%

LINE



REMARKS :

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. For 802.11g mode.



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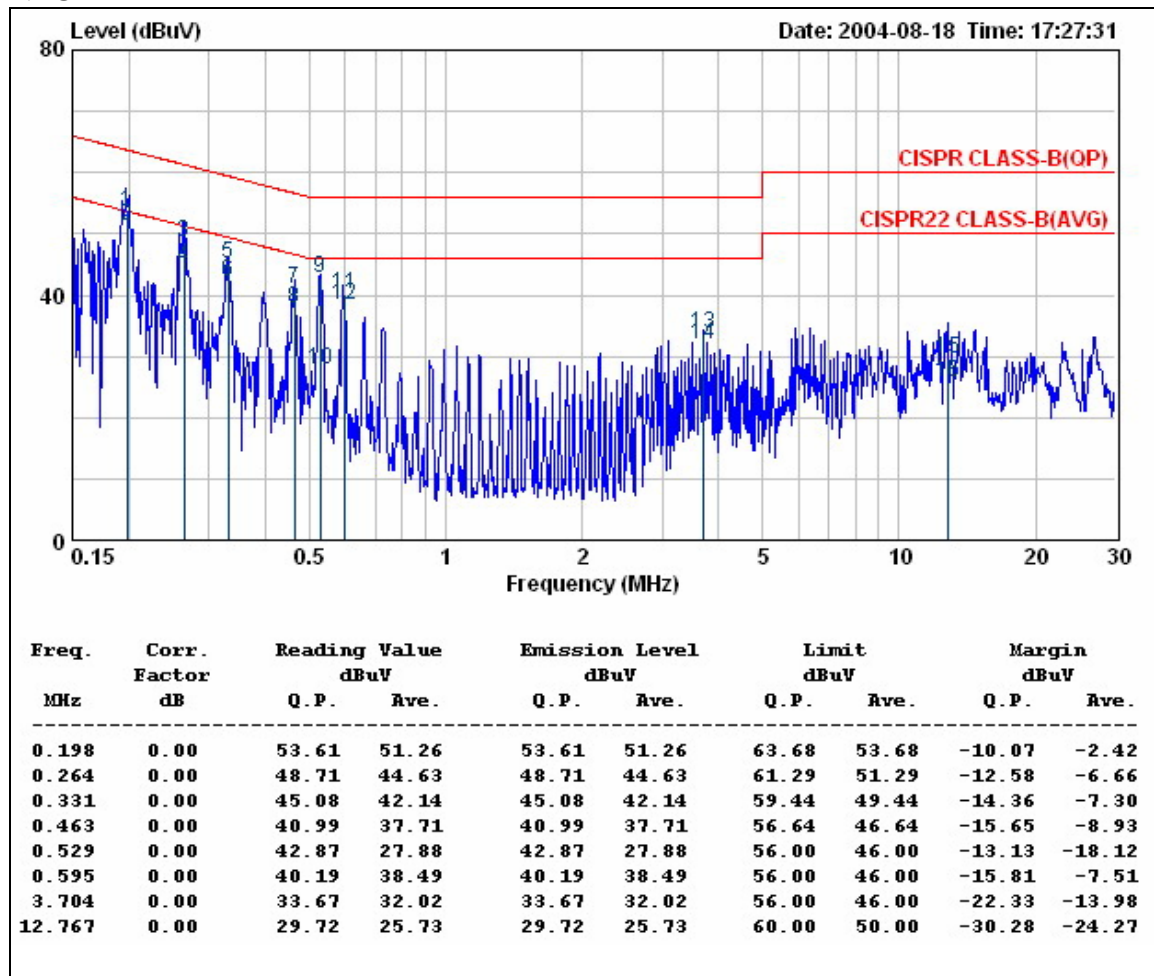
Report No. : ER04-07-005C

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The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/08/18
Product Name	USB Dongle	Test By	Stan Peng
Model Name	MS-6861	TEMP&Humidity	33.4 , 54%

NEUTRAL



REMARKS :

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. For 802.11g mode.

3.1.7 Photos of Conduction Test



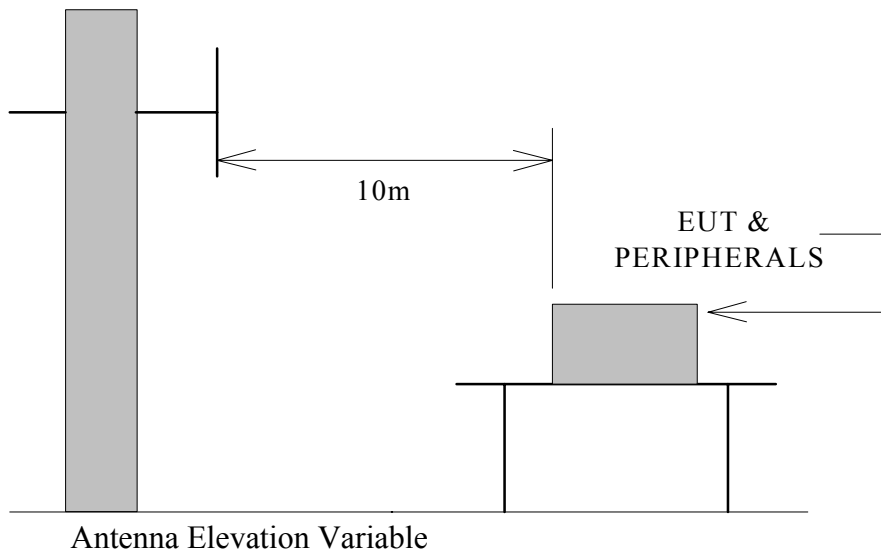
3.2 Radiated Emission Test

3.2.1 Test Equipments

Manufacturer or Type	Model No.	Serial No.	Date of Calibration	Calibration Period	Remark
CHASE BI-LOG ANTENNA	CBL6112B	2562	May 07, 2004	1 Year	FINAL
R/S TEST RECEIVER	ESCS 30	826547/004	June 17, 2004	1 Year	FINAL
OPEN SITE	-----	No.2	May 07, 2004	1 Year	FINAL
N TYPE COAXIAL CABLE	CHA9525	015	July 13, 2004	1 Year	FINAL

3.2.2 Test Setup

The diagram below shows the test setup which is utilized to make these measurements.



3.2.3 Radiation Limit

All emanation from a class B computing device or system , including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below :

Frequency (MHz)	Distance (METERS)	Field Strengths(dB μ V/m)	
		CLASS A	CLASS B
30—230	10	40	30
230—1000	10	47	37

Note :

1. The tighten limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closest point of any part of the device or system.

3.2.4 Test Procedure

The devices under test were placed on a rotatable table top 0.8 meter above ground. The table was rotated 360 degrees to determine the position of the highest radiation. EUT is set 10 meters from the interference receiving antenna which is mounted on the top of a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength Both horizontal polarization and vertical polarization of the antenna are set to make the measurement. The bandwidth setting on the E.M.I. meter (R/S TEST RECEIVER) is 120 KHz.

The levels are quasi peak value readings. The frequency spectrum from 30MHz to 1000MHz was investigated.

3.2.5 Measurement Uncertainty of Radiated Emission

The uncertainty of radiated emission is ± 2.72 dB.



3.2.6 Radiated RF Noise Measurement

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

All readings are quasi-peak values.

Company	MICRO-STAR INT'L CO., LTD.	Test Date	2004/08/18
Product Name	USB Dongle	Test By	Stan Peng
Model Name	MS-6861	TEMP & Humidity	33.4 , 54%

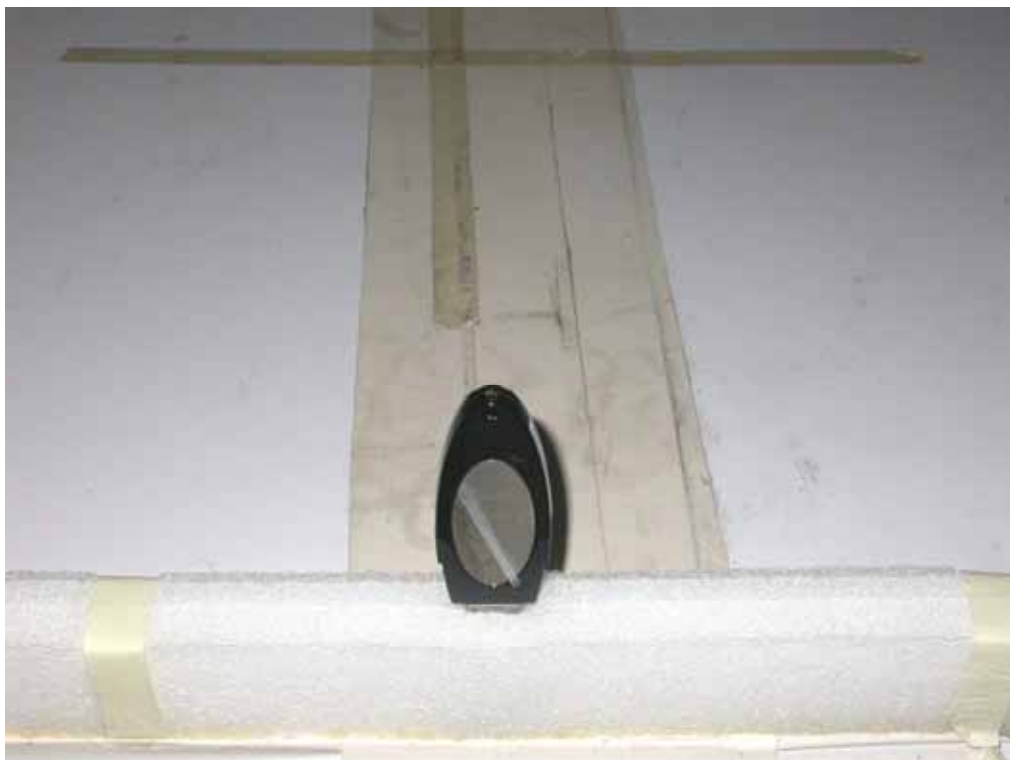
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading at 10m(dBμV)		Limits (dBμV/m)	Emission Level at 10m(dBμV/m)	
			Horizontal	Vertical		Horizontal	Vertical
30.00	17.98	0.97	*	*	30.00	*	*
199.99	9.30	3.14	2.40	2.10	30.00	14.84	14.54
299.99	13.71	4.30	3.30	3.50	37.00	21.31	21.51
399.99	16.76	4.85	2.00	1.60	37.00	23.61	23.21
499.99	18.13	5.19	2.10	0.80	37.00	25.42	24.12
599.99	18.97	5.65	1.60	1.30	37.00	26.22	25.92
699.99	18.94	6.27	0.60	0.40	37.00	25.81	25.61
799.99	19.87	6.80	0.50	0.10	37.00	27.17	26.77
1000.00	25.89	7.66	*	*	37.00	*	*

REMARKS :

- * Undetectable
- Emission level (dBμV/m) = Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBμV).
- The RF-Chip combined with 802.11b&g mode. It will auto-detect the radio situation then switch the mode. The 802.11g mode is the worse case than the 802.11b mode. So only the 802.11g mode data are recorded in final test report.

3.2.7 Photos of Open Site







4. IMMUNITY TEST

4.1 Test Equipment

Use	Manufacturer or Type	Model No.	Date of Calibration
	HP VEI8 PIII	DTPC-17	N/A
	HP VGA Monitor	D1193A	N/A
	HP Keyboard	C1405B #ABO	N/A
	HP VE 4/66 Computer	VE 4/66	N/A
	IBM VGA Monitor	2248-002	N/A
	HP Keyboard	C1405B#ABO	N/A
	KeyTek Control Center	ECAT 103	N/A
	Pacific Programmable Controller	ERI3	June 09, 2004
	Pacific AC Power Source	EP74	June 09, 2004
	KeyTek Control Center	ECAT 103	N/A
	KeyTek EFT/B Source	E421	November 23, 2003
	KeyTek Surge Network	E510,E503	November 23, 2003
	KeyTek EFT/B & Surge Coupler/Decoupler	E4552	November 23, 2003
	KeyTek Swell/Dip Interrupt Source	EP62	November 13, 2003
	Noise Lightning Surge Simulator	LSS-712	March 16, 2004
	KeyTek EFT Source	CE-40	July 16, 2003
	Noise Impulse Noise Simulator	INS-410	February 18, 2004
√	NoiseKen ESD Simulator	ESS-2000	February 23, 2004
	KeyTek Surge Network	E503, E510A, E505A, E4554	April 21, 2004
√	SCHWARZBGCK Bilog Antenna	VULB 9163	May 30, 2004
√	R&S Signal Generator Freq. Range : 9KHz ~ 2.08GHz	SMY02	September 10, 2003
√	Boonton RF Voltmeter	9200B	September 15, 2003
	HOLADAY FIELD PROBE	HI-4422	October 23, 2003
	FCC Coupling Decoupling Network Freq. range : 150KHz~230MHz	801-M4-25	September 31, 2003
	SCHAFFNER Coupling Decoupling Network Freq. range : 150KHz~230MHz	CDN M325	October 07, 2003
	FCC Coupling Decoupling Network Freq. range : 150KHz~230MHz	801-M2-25	September 31, 2003
	FRANKONIA Coupling Decoupling Network Freq. Range : 150MHz ~ 230MHz	CDN RJ45	May 02, 2004
√	AR Amplifier Freq. Range : 10KHz ~ 220MHz	100W/150L	N/A
√	AR Amplifier Freq. Range : 25MHz ~ 1000MHz	100W1000M1A	N/A
	DANA TORINO-ITALY .Power Frequenty Magnetic Field	.DAS-G60 .DAS 1S 1000	N/A
	SCHAFFNER EM CLAMP	KEMZ 801	November 05, 2003
√	MILMEGA LINEAR AMPLIFIER Freq. range : 0.8 ~ 2.5 GHz	AS0825-35	N/A



4.2 Performance Criteria Description

Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note 1). Shall be no loss of function. Shall be no unintentional transmission.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmission.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note2).

Note 1 : Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonable expect from the apparatus if used as intended.

Note 2 : No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonable expect from the apparatus if user as intended.



4.3 Description of Peripherals

(1) Notebook PC

MANUFACTURER : IBM CORP.
MODEL NUMBER : 2662-9HT
SERIAL NUMBER : FXW5780
INPUT POWER : 16VDC, 3.5A

Adapter

MANUFACTURER : IBM CORP.
MODEL NUMBER : 02K6809
SERIAL NUMBER : (P/N)02K6815
INPUT POWER : 100-240VAC, 50/60Hz, 1.5A
OUTPUT POWER : 16VDC,3.5A

(2) Monitor

MANUFACTURER : HP CORP.
MODEL NUMBER : D8894A
SERIAL NUMBER : CN94689372
INPUT POWER : 100-240VAC, 50/60Hz, 1.5A
OUTPUT POWER : -----

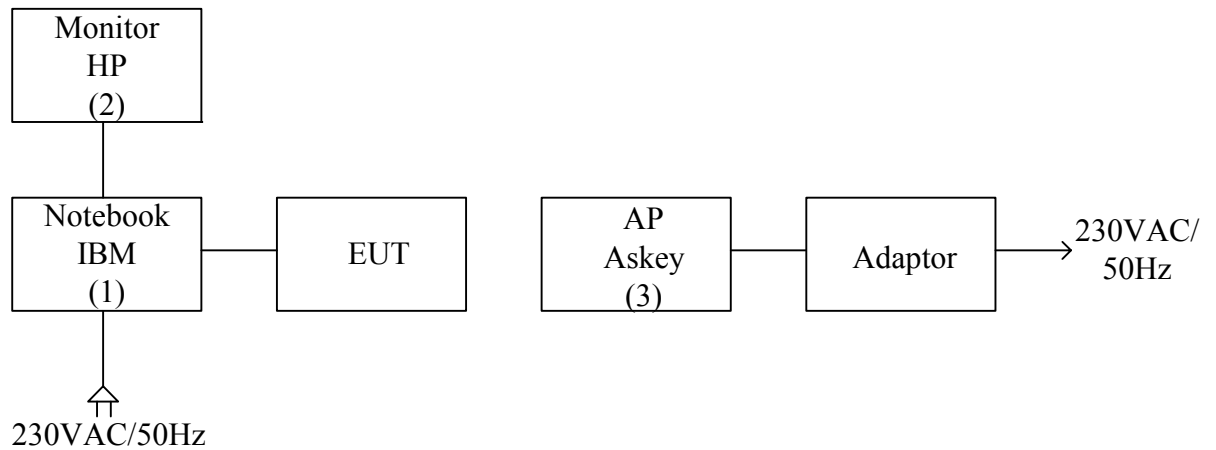
(3) AP

MANUFACTURER : ASKEY CORP.
MODEL NUMBER : HN294d
INPUT POWER : 12VDC, 1A

Adapter

MANUFACTURER : yHi
MODEL NUMBER : YC-1015-12
SERIAL NUMBER : 00021966
INPUT POWER : 100-120VAC, 60Hz, 0.4A
OUTPUT POWER : 12VDC, 1A

4.4 EUT & Peripherals Setup Diagram



The indicated numbers (1)(2)....., please refer to item 4.3

4.5 EUT Operating Condition

- (1) Such as 4.4 EUT & Peripherals setup Diagram.
- (2) Notebook ping 192.168.1.1 to Access point.
- (3) Start test.



4.6 Electrostatic Discharge Test

4.6.1 Climatic Conditions

Ambient temperature : 24 °C ~ 26 °C

Relative humidity : 55 % ~ 60 %

Atmospheric pressure : 99.0 kpa

4.6.2 Test Requirement and Procedure

The test was based on ETSI EN 301 489-17 (2002) and EN 61000-4-2+A2 (2001)

4.6.3 Test Conditions

Source voltage and frequency : 230VAC/50Hz, Single phase

R-C network : 330 Ω, 150 PF.

Test Level :

Air Discharge : 2 , 4 , 8 KV

HCP Discharge : 2 , 4 KV

VCP Discharge : 2 , 4 KV

Polarity : Positive / Negative

Number of test :

10 Discharges / Sensitive Polarity for Air, Contact, HCP and VCP Discharge.

Time between test : 1 Sec.

4.6.4 Measurement Uncertainty of Electrostatic Discharge Test

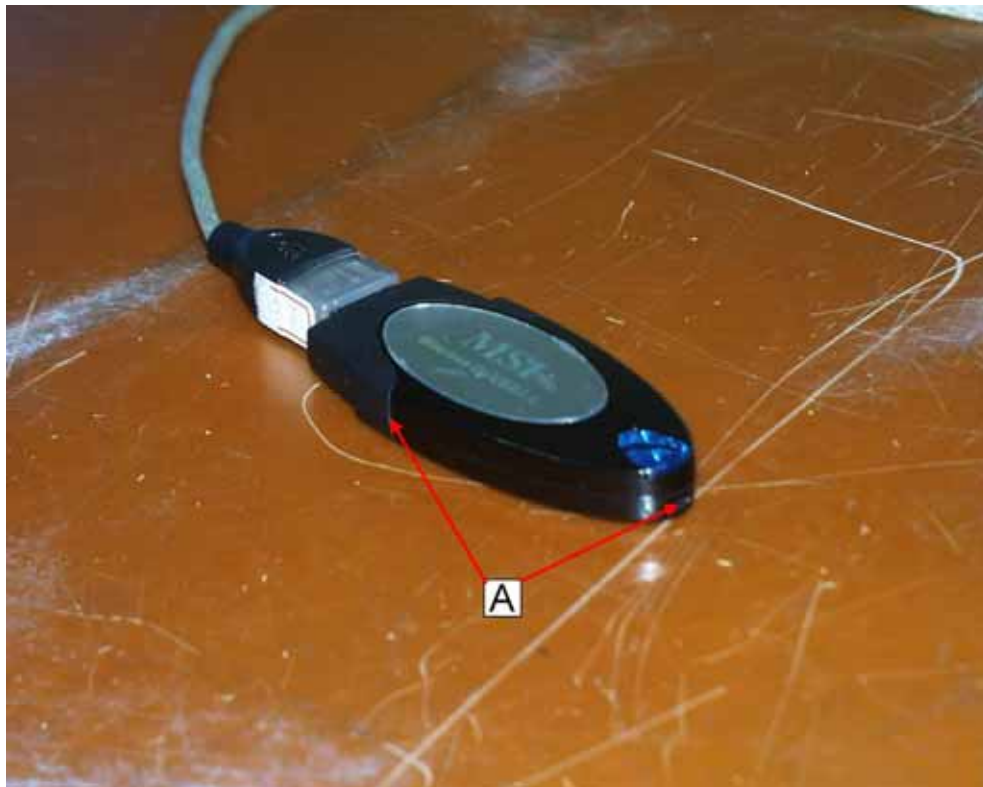
The uncertainty of output voltage indication is ± 5%

4.6.5 Test Results

Severity Level	Test Requirement Polarity	ETSI EN 301 489-17 (2002) requirement				Performance verification (criteria)				Test results
		Air discharge	Contact discharge	HCP discharge	VCP discharge	Air discharge	Contact discharge	HCP discharge	VCP discharge	
2 KV	+	B	B	B	B	A	A	A	A	PASS
	-	B	B	B	B	A	A	A	A	PASS
4 KV	+	B	B	B	B	A	A	A	A	PASS
	-	B	B	B	B	A	A	A	A	PASS
8 KV	+	B	NR	NR	NR	A	NR	NR	NR	PASS
	-	B	NR	NR	NR	A	NR	NR	NR	PASS

Note : NR means there is no requirement.

4.6.6 Photos of Electrostatic Discharge Test



※ A : Air Discharge



※ A : Air Discharge

4.7 Radiated Susceptibility Test

4.7.1 Climatic Conditions

Ambient temperature : 24 °C ~ 26 °C

Relative humidity : 55 % ~ 60 %

Atmospheric pressure : 99.0 kpa

4.7.2 Test Requirement and Procedure

The test was based on ETSI EN 301 489-17 (2002) and EN 61000-4-3+A1 (2002)

4.7.3 Test Conditions

Source voltage and frequency : 230VAC/50Hz, Single phase

Sweeping frequency : 80 MHz ~ 1000MHz, 1400MHz ~ 2000MHz.

Test Level : 3V/m.

Measuring distance : 3 meters

The four sides of EUT are tested (Front, Rear, Left, Right).

Antenna Polarization : Horizontal and Vertical polarizations.

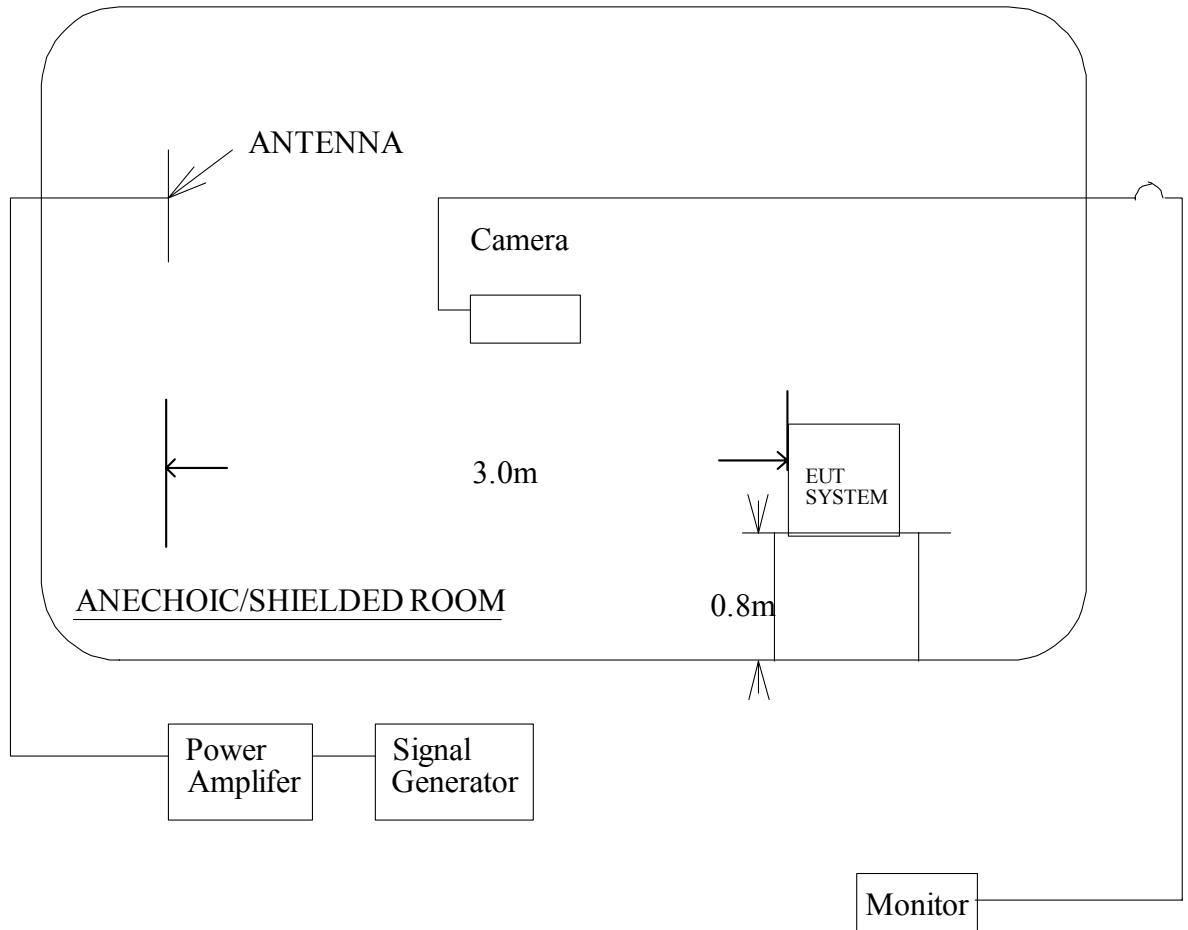
The generated signal amplitude was 80% AM (1KHz) amplitude modulated, the step size was 1% and test duration was 1000ms

4.7.4 Measurement Uncertainty of Radiated Susceptibility Test

The uncertainty of radiated susceptibility is $\pm 2.93\text{dB}$

4.7.5 Structure of The Test :

Setup configuration



4.7.6 Test Result

Frequency range : 80 MHz ~ 1000MHz, 1400MHz ~ 2000MHz.

Severity level (V/m)	ETSI EN 301 489-17 (2002) requirement	Performance verification (criteria)	Test results
3	A	A	PASS

4.7.7 Photos of Radiated Susceptibility Test

