EMC TEST REPORT

FCC EVALUATION REPORT FOR CERTIFICATION

Korea Standard Technology

Test report No.: KST-FCC0305

Manufacturer's Name : **Techsan I&C Co., Ltd.**
Manufacturer's Address : **436, Mogok-Dong, Pyoung Taek-City, Kyungki-Do, Korea**

EUT's:

FCC ID	**:**	**RJ5LTDW1700U**
Product Name	**:**	**LCD TV DVD Combo & Monitor**
Model Number(s)	**:**	**LTDW1700U & 70170 & 80000 & 81000**
Product Options	**:**	**With DVD & Analog RGB (D-sub) / Request for enter a multi list of model name by manufacturer**
Category	**:**	**FCC Part 15 sub. part B TV interface devices / Class B computing digital devise**

Supplementary Information

The device bearing the brand name and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with measurement procedures specified in ANSI C63.4-1992.

I attest to the accuracy of data and all measurements reported herein were performed by or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Test Date: 2003.08.5 - 6

Issue Date : 2003. 8. 9

Tested by: 

Jeong, Seok-Jin

Approved by: 

Lee, Weon-woo

Contents

1. Description of Device

1) Kind of equipment:	LCD TV DVD Combo
2) FCC ID:	RJ5LTDW1700U
3) Model Name:	LTDW1700U & 70170 & 80000 & 81000
4) Serial No.:	None
5) Type of Sample Tested:	Pre-production
6) High Frequency Used:	20.250MHz , 18.432MHz 14.318MHz , 10.000MHz
7) Adapter	Model name: 0217B1250 Manufacturer:LISHIN INTERNATIONAL ENTERPRISE CORP. Serial no: A20317090115
8) Power Rating:	1phase AC100-250V, 10A, 50/60Hz Output: DC 12V, 5A
9) Tested Power supply:	1phase AC120V, 60Hz
10) Date of Manufacture:	June, 2003
11) Manufacture:	Techsan I & C Co.,Ltd.
12) Description of Operating:	TV tuner mode and DVD play and “H” pattern scroll
13) Dates of Test:	August 5 ~ 6 , 2003
14) Place of Tests:	Korea Standard Technology EMC site
15) Test Report No:	KST-FCC0305

2. Test Facility

The open field test site and conducted measurement facility are used for these testing, where are located following address and drawing. This site was fully described in a report dated November 14, 2002, that was submitted to the FCC.

Korea Standard Technology (KOSTEC Co., Ltd)

Head office:
302 City Bild, 1600-3 Kwanyang-dong, Dongan-gu, Anyang-shi, Kyunggi-do, Korea
Telephone No : 82-31-388-2051
Facsimile No: 82-31-388-2052

Test Lab
:180-254, Annyung-Ri, Taean-Yup, Hwasung-shi, Kyunggi-do, Korea
Telephone No : 82-31-222-4251
Facsimile No: 82-31-222-4252

MIC(Ministry of Information and Communication) No: **KR0042**

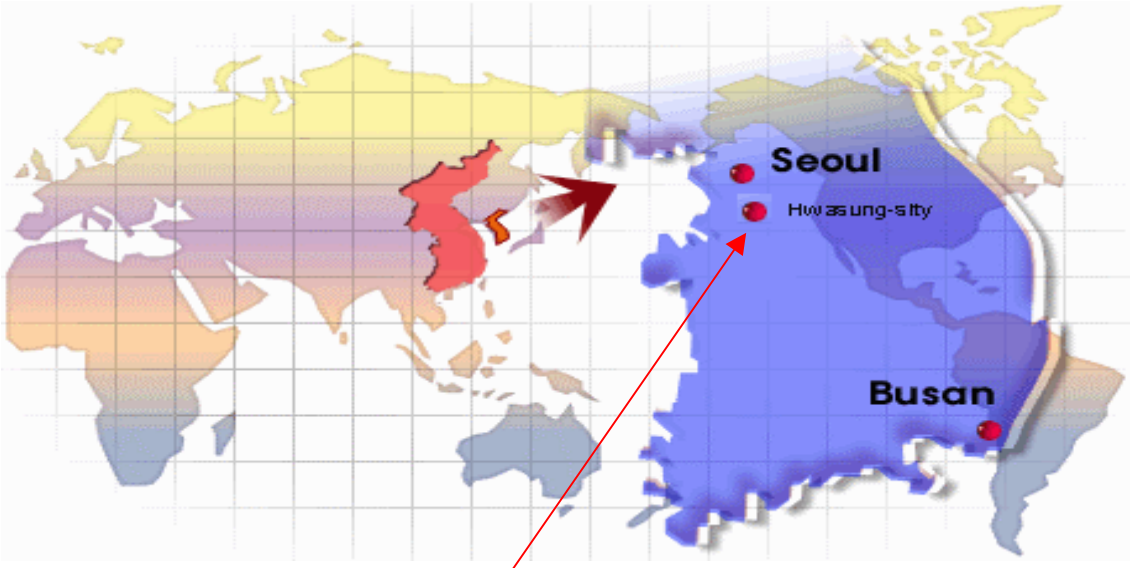
FCC Filing No. : **525762**

VCCI Membership Number : **2005**

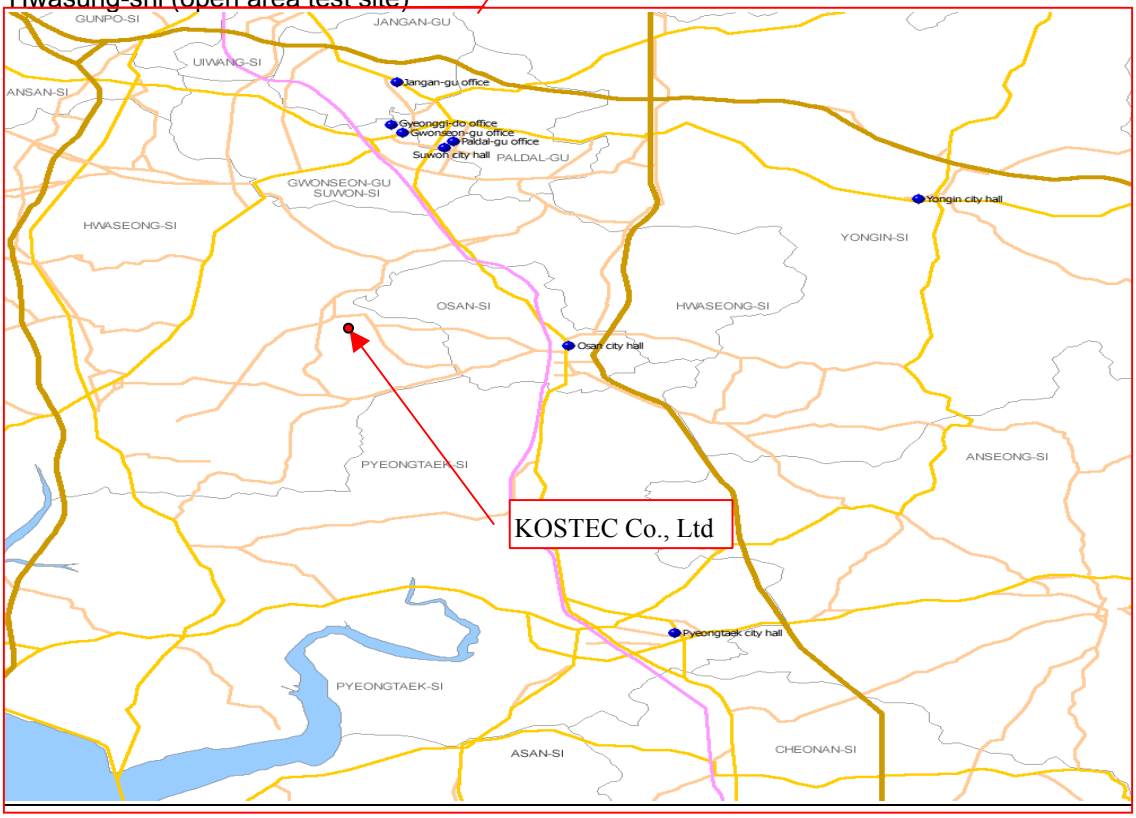
VCCI Registration Number : **R-1657 / C-1763**

3. Route Map of Measurement Facility

Korea



Hwasung-shi (open area test site)



4. Operation Environment

Ambient	Temperature (° C)	Humidity (%)	Pressure (hPa)
10m Open Area site	30.1	41	1014
Shielded room:	25.5	46	1013

Test site
These testing were performed following locations ;

Shielded room : Conducted Emission,

10m Open Area Site: Radiated Emission

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC.
The factors contributing to uncertainties are test receiver, Cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna frequency interpolation, measurement distance variation, ite imperfection, mismatch, and system repeatability.
Based on NIS 80,81, The measurement uncertainty level with a 95% confidence level were applied.

sample calculation

Conducted emission

The field strength is calculated by adding the LISN factor, cable loss from the measured reading.
The sample calculation is as follows:

FS = MR + LF + CL
MR = Meter Reading
LF = LISN Factor
CL = Cable Loss

If MR is 30dB, LISN Factor 1dB, CL 1dB
The result (MR) is
30 + 1 + 1 = 32dBuV

5. Description of E.U.T.

Product Description

Manufactured By:	Techsan I & C Co.,Ltd.
Address:	436, Mogok-Dong, Pyoung Taek-City, Kyungki-Do, Korea
Model:	LTDW1700U & 70170 & 80000 & 81000
Serial Number:	None

Configuration of EUT

Description	Manufacturer	Model / Part #	Serial Number
AD Board	Techsan I & C Co.,Ltd.	62010-2003	None
LCD Pannel	Samsung	LTM170W1-L01	4D3F18609D
Tuner	Techsan I & C Co.,Ltd.	FI1236MK2	None
Inverter	D & D Corp.	17W4P0	None
OSD	Techsan I & C Co.,Ltd.	DTV17000	None
DVD	DSV KOREA CO.,LTD.	DSS-813	DSS813HSA07000 0230
AC/DC Adapter	LI SHIN International Enterprise Corp	0218B1260	A20317090115
Remote controller	Techsan I & C Co.,Ltd.	None	None

EUT Used cables

Cable Type	Shield	Length (m)	Ferrite	Connector	Connection Point 1	Connection Point 2
Power Line	Y	1.2	-	DC INLET	AC/DC Adapter	EUT
VGA	Y	1.5	Y	D-sub	EUT	PC
RCA	Y	1.5	-	Jack	EUT	-
Sound Out	Y	1.5	-	Jack	EUT	Headset

Operating conditions

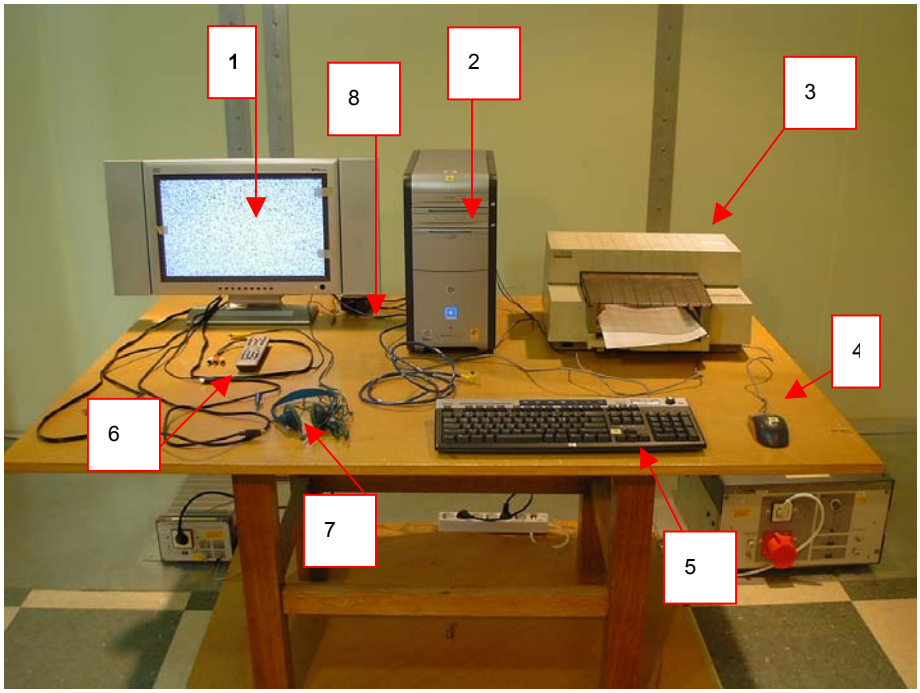
The operating mode/system were as follows in details:

Operating: After connected from analog RGB port of E.U.T. to VGA port of PC by RGB cable(D-sub). And connected from E.U.T. to Headset by RCA cable(Jack). And then use to data transmission and continuously “H” pattern scroll displayed on the EUT. And TV tuner mode & DVD play mode.

Configuration of Peripherals

No	Description	Manufacturer	Model / Part #	Serial Number
1	**EUT**	**Techsan I & C Co.,Ltd.**	**LTDW1700U**	**None**
2	PC	HP	HP Pabilion t212	KRJ32101BH
3	Printer	HP	C2605A	SG42R1C05B
4	Mouse	HP	M042K0	30205141
5	Keyboard	HP	5219	BN31719954
6	Remote Control	Techsan I & C Co.,Ltd	None	None
7	Headset	None	None	None
8	AC/DC Adaptor	LI SHIN International Enterprise Corp	0218B1260	A20317090115

E.U.T Test Configuration (Example)



6. Summary of test results

Modification to the E.U.T.

- None

7. Test Results

7.1 Conducted emission

Measurement procedure

Mains
The measurements were performed in a shielded room. EUT was placed on a non-metallic table height of 0.4m above the reference ground plane. They were folded back and forth forming a bundle 30cm to 40Cm long and were hanged at a 40cm height to the ground plane.
Each EUT power lead, except ground (safety) lead, were individually connected through a LISN to input power source.
Both lines of power cord, hot and neutral, were measured.

Used equipment

Equipment	Model no.	Serial no.	Makers	Next cal date	Used
Test receiver	ESPI3	100109	R&S	2004.03.11	●
L.I.S.N.	ESH2-Z5	100044	R&S	2004.04.25	●
	ESH2-Z5	100147	R&S	2004.04.25	●

Measurement uncertainty

Conducted Emission measurement : ± 2.4 (K=2)

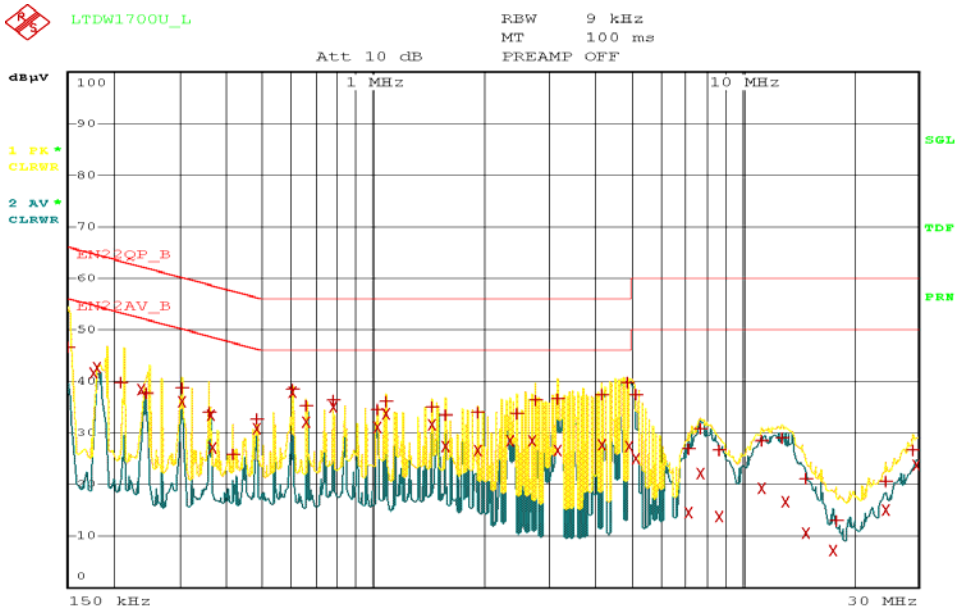
Test Data : Without Ground

FREQ. (MHz)	LEVEL(dBμV)		LINE Pol	Loss (dB)	LIMIT(dBμV)		MARGIN(dBμV)	
	QP	AV			QP	AV	QP	AV
0.162	47.31	23.97	N	0.08	66.00	56.00	18.61	31.95
0.218	41.30	38.77	N	0.29	66.00	56.00	24.41	16.94
0.302	38.72	36.14	L	0.29	66.00	56.00	26.99	19.57
4.886	39.65	27.30	L	0.68	56.00	46.00	15.67	18.02
5.194	38.69	27.79	N	0.75	60.00	50.00	20.56	21.46
6.278	32.36	21.42	N	0.97	60.00	50.00	26.67	27.61
12.814	29.98	20.20	L	1.52	60.00	50.00	28.50	28.28

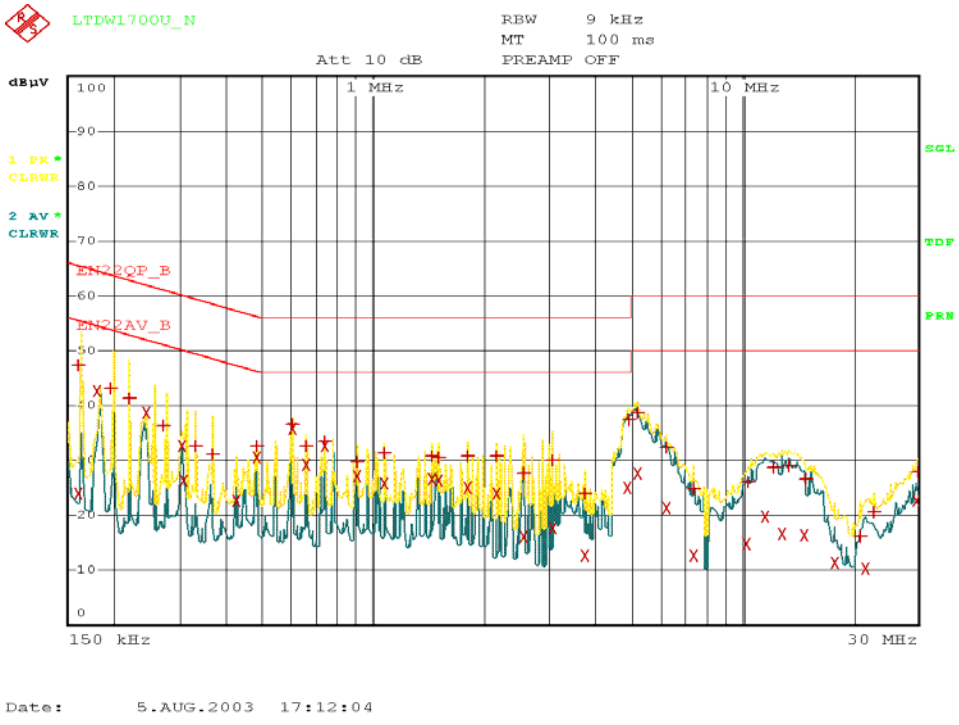
* Level = test receiver reading value * Loss = LISN insertion Loss + Cable Loss

Conducted emission test graph

Without Ground
Line. Live



Line. Neutral



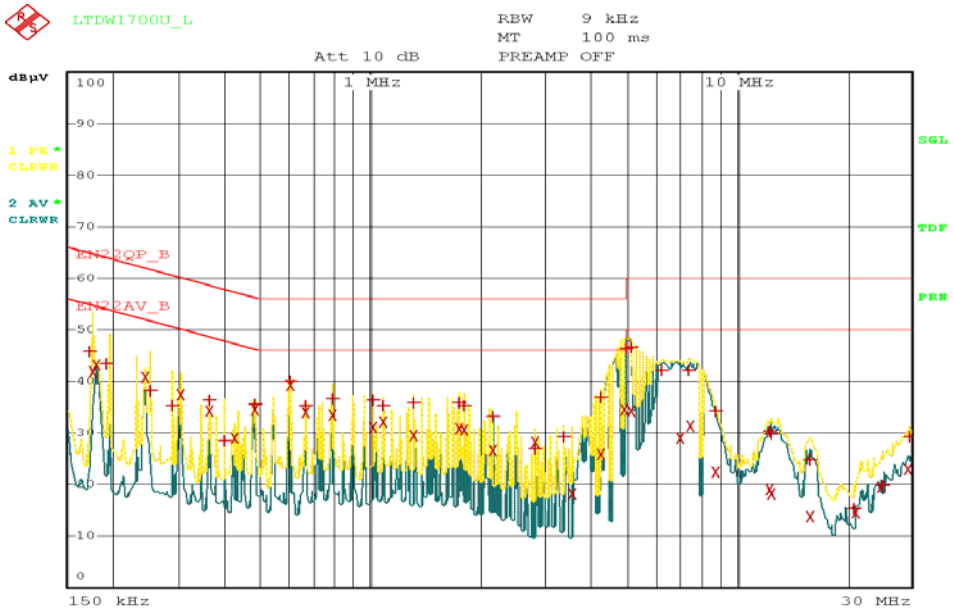
Test Data : With Ground

FREQ.	LEVEL(dBμV)		LINE	Loss	LIMIT(dBμV)		MARGIN(dBμV)	
(MHz)	QP	AV	Pol	(dB)	QP	AV	QP	AV
0.162	47.26	41.89	N	0.08	66.00	56.00	18.66	14.03
0.194	43.37	42.39	L	0.08	66.00	56.00	22.55	13.53
0.218	41.19	39.45	N	0.29	66.00	56.00	24.52	16.26
0.602	39.90	39.29	L	0.90	56.00	46.00	15.20	5.81
2.526	37.87	30.50	N	0.57	56.00	46.00	17.56	14.93
5.190	47.38	35.27	N	0.75	60.00	50.00	11.87	13.98
7.430	45.55	35.56	N	1.20	60.00	50.00	13.25	13.24

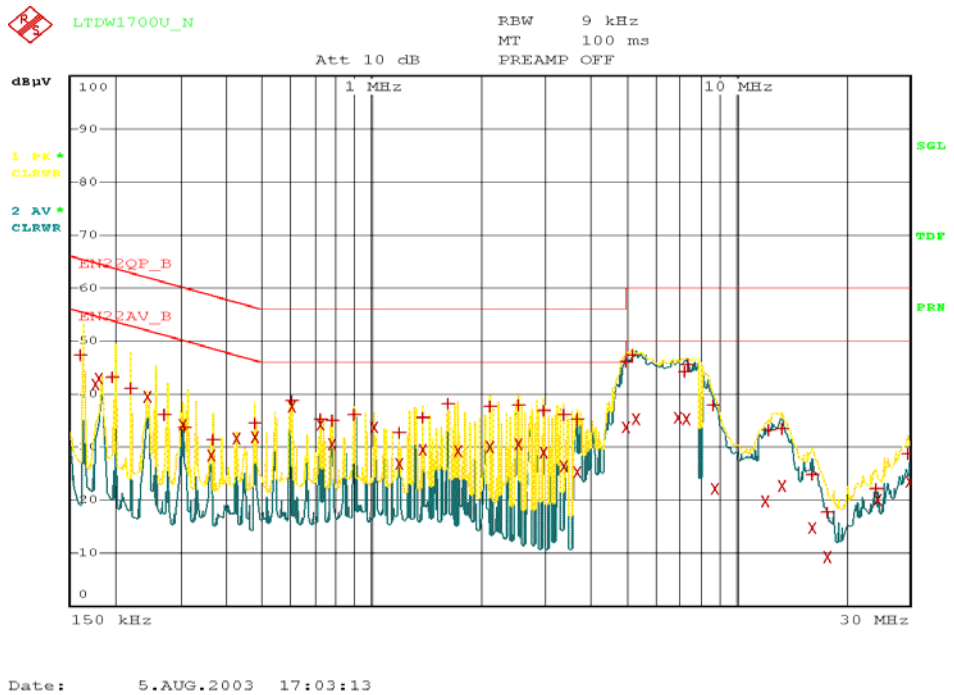
* Level = test receiver reading value * Loss = LISN insertion Loss + Cable Loss

Conducted emission test graph

With Ground
Line. Live



Line. Neutral



7.2 Radiated Emission

Measurement procedure

A pretest was performed at 3m distances in a semi-anechoic chamber for searching correct frequency.
The final test was done at a 10m open area test site with a quasi-peak detector.
EUT was placed on a non-metallic table height of 0.8m above the reference ground plane.
Cables connected to EUT were fixed to cause maximum emission.
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.
The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

Used equipment

Equipment	Model no.	Serial no.	Makers	Next cal date
Test receiver	ESCS30	100111	R&S	2004.03.17
Ultra broadband antenna	HL562	100075	R&S	2004.03.18
Antenna Mast	AT14	none	Daeil EMC	-
Turn Table	TT15	none	Daeil EMC	-
10m Open area site	none	none	KOSTEC Lab	-
chamber(3m)	none	none	FRANCONIA	-

Measurement uncertainty

Radiated Emission measurement : 30-300MHz +3.96dB / -4.04dB
300-1000MHz +3.04dB / -3.00dB

Test data : Other Frequency (“H” pattern scroll)

Freq (MHz)	Reading (dBuV/m)	P (H/V)	H (m)	A (.)	Antenna (dB)	Cable Loss (dB)	Result (dBuV/m)	Limit (dB)	Margin (dB)
65.62	19.30	H	3.80	250	4.80	3.30	27.40	39.0	11.60
131.25	23.20	H	3.70	130	8.60	4.10	35.90	43.5	7.60
196.87	25.94	H	3.50	220	7.22	4.94	38.10	43.5	5.40
262.49	17.45	V	2.00	45	9.84	6.11	33.40	43.5	10.10
393.74	18.41	V	2.00	250	13.36	7.33	39.10	46.4	7.30
459.36	18.56	H	2.30	110	14.78	7.86	41.20	46.4	5.20
721.91	11.97	V	1.70	135	18.81	10.22	41.00	46.4	5.40

Reading = Test receiver reading / P= antenna Polarization / H=antenna Height
A=turn table Angle / Antenna = antenna factor / Cable loss = used cable loss
Result = reading + antenna + loss / Margin = Limit - result
* Receiving Antenna Mode: Horizontal, Vertical / * Test site: 10m Open area site

Test data : Other Frequency (DVD Play mode)

Freq (MHz)	Reading (dBuV/m)	P (H/V)	H (m)	A (.)	Antenna (dB)	Cable Loss (dB)	Result (dBuV/m)	Limit (dB)	Margin (dB)
65.62	18.00	H	3.80	250	4.80	3.30	26.10	39.0	12.90
80.00	21.90	H	3.70	130	8.20	3.40	33.50	43.5	10.00
197.05	23.08	H	3.50	220	7.24	4.98	35.30	43.5	8.20
256.57	21.62	V	2.00	45	9.64	5.94	37.20	43.5	6.30
328.18	13.88	V	2.00	250	11.84	6.78	32.50	46.4	13.90
525.00	15.80	H	2.30	110	16.05	8.35	40.20	46.4	6.20
620.99	14.03	V	1.70	135	17.30	9.37	40.70	46.4	5.70

Reading = Test receiver reading / P= antenna Polarization / H=antenna Height
A=turn table Angle / Antenna = antenna factor / Cable loss = used cable loss
Result = reading + antenna + loss / Margin = Limit - result
* Receiving Antenna Mode: Horizontal, Vertical / * Test site: 10m Open area site

Disturbance radiation due to local oscillator (TV tuner mode)

Channel	Frequency (MHz)	Reading (dBuV)	Pol (H/V)	Total Loss (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
2 (55.25MHz)	101.0			12.8		43.5	
	202.0			12.5		43.5	
	303.0	17.9	V	17.6	35.7	46.0	10.3
	404.0			21.0		46.0	
	505.0			23.4		46.0	
	606.0			26.4		46.0	
	707.0			28.5		46.0	
	808.0			30.5		46.0	
	909.0			32.7		46.0	
4 (67.25MHz)	108.5			12.9		43.5	
	217.0	20.3	H	13.0	33.3	46.0	12.7
	325.5			18.5		46.0	
	434.0	18.7	H	22.0	40.7	46.0	5.3
	542.5			25.0		46.0	
	651.0	12.4	V	27.5	39.9	46.0	6.1
	759.5			29.8		46.0	
	868.0			31.5		46.0	
	976.5			33.7		54.0	
6 (83.25MHz)	131.2	23.0	H	12.9	35.9	43.5	7.6
	258.0	17.8	V	15.7	31.9	46.0	15.1
	387.0	19.5	V	20.5	40.0	46.0	6.0
	516.0			24.0		46.0	
	645.0			27.2		46.0	
	774.0	13.2	H	30.0	43.2	46.0	2.8
	903.0			32.6		46.0	
7 (175.25MHz)	221.0	22.9	H	13.2	36.1	46.0	9.9
	442.0			22.3		46.0	
	663.0			27.9		46.0	
	884.0			32		46.0	
10 (193.25MHz)	239.0	22.8	H	14.3	37.1	46.0	8.9
	478.0			22.9		46.0	
	717.0			28.9		46.0	
	956.0			33.4		46.0	
13 (211.25MHz)	257.0	21.0	H	15.7	36.7	46.0	9.3
	514.0			23.9		46.0	
	771.0			29.9		46.0	
14	517.0	17.9	V	24.1	42.0	46.0	4.0
19	547.0	14.8	H	25.2	40.0	46.0	6.0
28	601.0	15.9	V	26.3	42.2	46.0	3.8
36	649.0	12.2	V	27.4	39.6	46.0	6.4
44	697.0			28.3		46.0	
53	751.0	10.3	V	29.8	40.1	46.0	5.9
61	799.0	11.9	H	30.4	42.3	46.0	3.7
69	847.0	9.5	H	31.1	40.6	46.0	5.4

Total loss = Antenna factor + cable loss