Compliance Test Report for FCC

Report Number		ESTF150504-004		
Applicant	Company name	Elesign Inc.		
	Address	#403, KOLON Techno-valley, 60-4, Kasan-dong, Kumcheon-gu, Seoul, 153-801, R.O.Korea		
	Telephone	82-2-866-6190		
Product	Product name	Residential Gateway		
	Model No.	ESC-2420	Manufacturer	Elesign Inc.
	Serial No.	0004B00043F4	Country of origin	KOREA
Test date	2005-03-21 ~2005-04-14		Date of issue	2005-04-14
Testing location	ESTECH. Co., Ltd. 97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea			
Standard	FCC PART 15 2002 , ANSI C 63.4 2001			
Test item	■ Conducted Emission	□ Class A ■ Class B	Test result	OK
	■ Radiated Emission	□ Class A ■ Class B	Test result	OK
Measurement facility registration number		94696		
Tested by	Senior Engineer J.M. Yang	(Signature)		
Reviewed by	Director T.K. Lee	(Signature)		
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable			

* Note

- This test report is not permitted to copy partly without our permission
- This test result is dependent on only equipment to be used
- This test result based on a single evaluation of one sample of the above mentioned

Contents

1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.
ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.
ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co. Ltd

Head Office : Rm 1015, World Venture Center II, 426-5, Gasan-dong, Geumcheon-gu, Seoul, Kor
(Safety & Telecom. Test Lab)

EMC Test Lab : 58-1 Osan-Ri, GaNam-Myon, YeoJoo-Gun, KyungKi-Do, Korea
97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea

1.3 Official Qualification(s)

MIC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication
KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements
FCC : Filed Laboratory at Federal Communications Commission
VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test

NONE : Residential Gateway
Model Number : ESC-2420
Serial Number : 0004B00043F4
Manufacturer : Elesign Inc.
Country of origin : KOREA
Rating : INPUT:AC120V / 60Hz
Receipt Date : 2005-03-21

2.2 General descriptions of EUT

Item		Specification
Adapter (Input/output/frequency)		120VA / 12VDC / 60Hz
Port	WAN	RJ-45 for LAN (10/100baseT)
	LAN	RJ-45 for PC (10/100baseT)
	Serial	RJ-45 for Serial Connector
	Phone	2 RJ-1 for Telephone
	Line	1 RJ-11 for PSTN
	Reset Switch	System Reset
Optional Features		Use with PBX & Key phone, Fax Support
Power Consumption		2.8W / 3.6W
Operating Temperature		0~60℃
Relative Humidity		5~95%
Volume		160mm(W) x 200mm(L) x 33mm(H)
Weight		355g

Using Freq. :25MHz/10MHz/12.288MHz

3. Test Standards

Test Standard : FCC PART 15 (2002)

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.4 (2001)

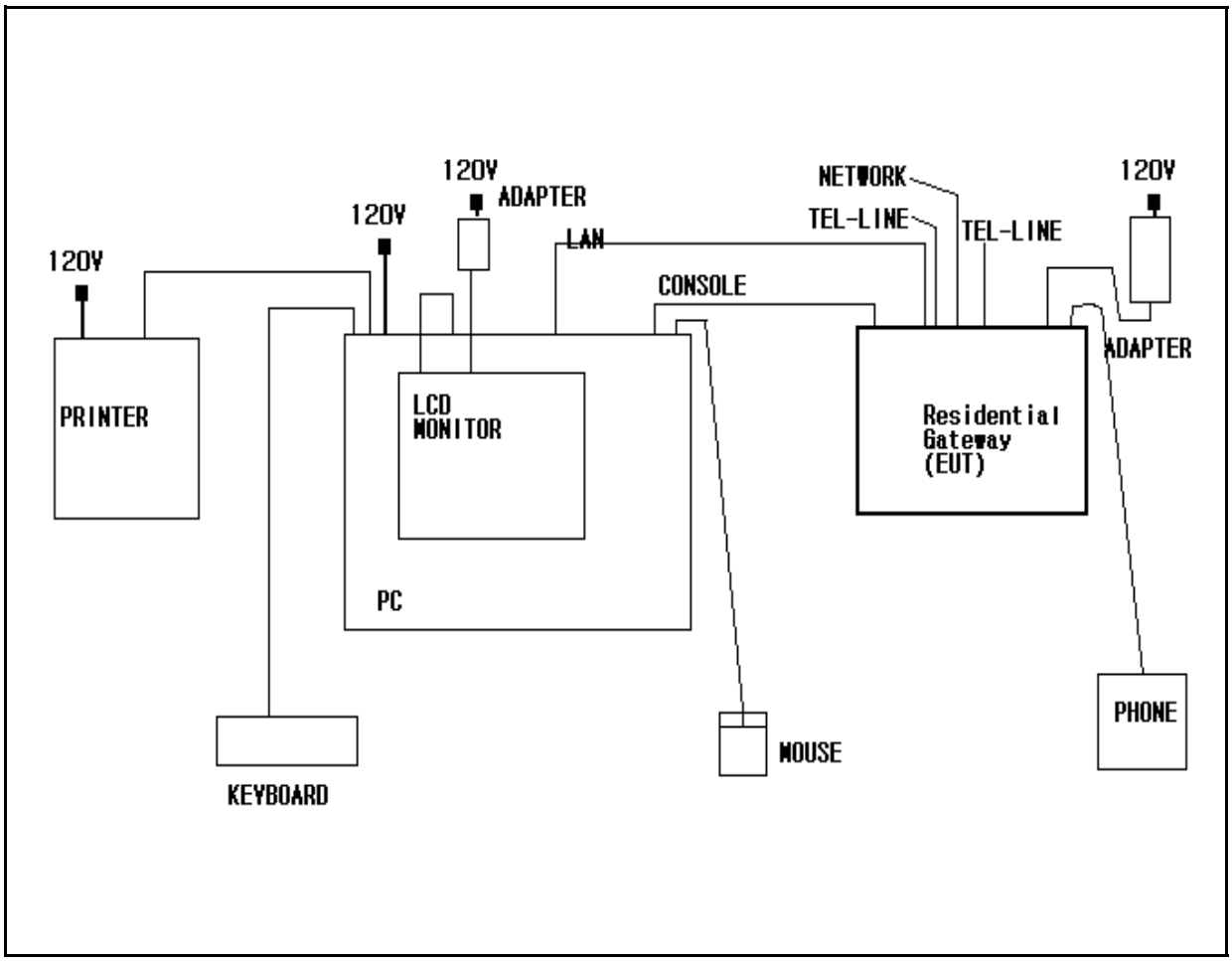
This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain decides that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment These method apply to the measurement of individual units or systems comprised of multiple units

4. Measurement Condition

4.1 EUT Operation.

* The EUT was in the following operation mode during all testing
* The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected hightest level of emission
* Using ping command between external Network, Transmission and Receiving test at between external Network

4.2 Configuration and Peripherals



4.3 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
Residential Gateway	ESC-2420	004B00043F4	Elesign Inc.	EUT
ADAPTER	TL-1212U	NONE	TAELM ELECTRONICS Co., Ltd.	-
PC	Optiplex GX50	NONE	DELL	-
KEYBOARD	SEM-DT35	32006557	Samsung Electro -mechanics Co., Ltd.	
MOUSE	M-S48a	HCA 11804896	LOGITECH	
PRINTER	LQ-570H+	B1021095782	TRIGEM	
LCD MONITOR	KD17NS	N433H4KX300852K	Samsung Electronics Co., Ltd.	-
ADAPTER	AP04914-UV	0401011616AC	AnamInstruments Co., Ltd.	-
PHONE	GS-460F	010KC14351	LG SRITHAI ELECTRONICS Co., Ltd.	-

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Residential Gateway	Console	PC	SERAL	2	N	-
Residential Gateway	LAN	PC	LAN	2	N	-
Residential Gateway	WAN	EXTERNAL NETWORK	WAN	25	N	-
Residential Gateway	TEL-LINE	EXTERNAL TEL-LINE	TEL-LINE	25	N	-
Residential Gateway	TEL-LINE	PHONE	TEL-LINE	2	N	-
Residential Gateway	TEL-LINE	-	TEL-LINE	2	N	-
Residential Gateway	POWER	ADAPTER	POWER	2	N	-
PC	VIDEO	LCD MONITOR	VIDEO	2	Y	-
PC	PS/2 KEYBOARD	MOUSE	PS/2 KEYBOARD	2	N	-
PC	PS/2 MOUSE	KEYBOARD	PS/2 MOUSE	2	N	-
PC	PARALLEL	PRINTER	PARALLEL	2	Y	-
LCD MONITOR	POWER	ADAPTER	POWER	2	N	
						-
						-
						-

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2002) & ANSI C 63.4 (2001). The test setup was made according to FCC Part 15 (2002) & ANSI C 63.4 (2001) on an open test site, which allows a 3m distance measurement. The EUT was placed in the center of wooden turntable. The height of this table was 0.8m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test set-up.

5.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receive	ESPI7	Rohde & Schwarz	100185	2005. 8. 20
Spectrum Analyzer	R3261C	ADVANTEST	61720116	2005. 4.14
LogBicon Antenna	VULB 9160	S/B	3142	2005.7.06
Horn Antenna	BBHA 9120 D	SCHWARZBECK	352	2006.4.06
Turn Table	2087	EMCO	2129	-
Antenna Mast	2070-01	EMCO	9702-203	-
ANT Mast Controller	2090	EMCO	1535	-
Turn Table Controller	2090	EMCO	1535	-

5.2 Environmental Condition

Test Place : Open site(3m)
Temperature (°C) : 8 ℃
Humidity (%) : 59 %

5.3 Test data

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dBμV/m)
66.28	18.20	V	1.0	12.35	1.2	40.0	31.76	-8.24
82.85	19.60	H	2.9	8.83	1.3	40.0	29.76	-10.24
92.43	18.90	H	2.6	9.35	1.5	43.5	29.73	-13.77
125.02	25.70	V	1.0	12.10	1.7	43.5	39.50	-4.00
150.03	12.70	H	1.9	13.90	1.9	43.5	28.48	-15.02
200.02	16.70	H	1.6	10.38	2.2	43.5	29.26	-14.24
214.79	14.20	V	1.0	10.69	2.3	43.5	27.16	-16.34
250.05	21.50	H	1.3	11.92	2.4	46.0	35.79	-10.21
300.05	14.60	H	1.1	13.19	2.7	46.0	30.49	-15.51
375.05	20.70	H	1.0	14.73	3.1	46.0	38.48	-7.52
400.06	17.50	H	1.0	15.32	3.2	46.0	35.97	-10.03
500.06	20.10	H	1.0	17.06	3.6	46.0	40.71	-5.29
625.08	18.60	V	1.0	19.28	4.0	46.0	41.89	-4.11
750.12	11.60	H	1.0	21.20	4.4	46.0	37.21	-8.79
875.10	12.60	H	1.0	22.28	4.8	46.0	39.69	-6.31
Remark	H : Horizontal, V : Vertical							

6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 to 30 MHz was measured in accordance to FCC Part 15 (2002) & ANSI C 63.4 (2001) The test setup was made according to FCC Part 15 (2002) & ANSI C 63.4 (2001) in a shielded. The EUT was placed on a non-conductive table at least 80 above the ground plan. A grounded vertical reference plane was positioned in a distance of 40cm from the EUT. The distance from the EUT to other metal surfaces was at least 0.8m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0m.. The test receiver with Quasi Peak detector complies with CISPR 16.

6.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
LISN	ESH3-Z5	Rohde & Schwarz	838979/010	2006. 2. 18
LISN	NNLA8120A	Schwarzbeck	NONE	2006. 2. 18
TEST Receive	ESPI7	Rohde & Schwarz	100185	2005. 8. 20
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	2005. 6. 15

6.2 Environmental Condition

Test Place : Shield Room
Temperature (°C) : 19 ℃
Humidity (%) : 46 %

6.3 Test data

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dBμV)	Reading (dBμV)	Result (dBμV)	Limit (dBμV)	Reading (dBμV)	Result (dBμV)
0.15	0.07	0.0	H	66.00	39.68	39.75	56.00		
0.20	0.07	0.0	H	63.74	31.29	31.39	53.74	20.89	20.99
0.24	0.07	0.1	H	62.20	26.28	26.41	52.20		
0.30	0.07	0.1	H	60.24	22.61	22.78	50.24		
0.34	0.07	0.1	N	59.15	22.05	22.24	49.15		
0.36	0.07	0.1	N	58.73	21.75	21.95	48.73		
0.77	0.09	0.2	H	56.00	24.82	25.11	46.00	21.67	21.96
1.10	0.09	0.2	H	56.00	23.15	23.45	46.00		
1.26	0.10	0.2	N	56.00	23.89	24.21	46.00		
1.34	0.10	0.2	H	56.00	24.26	24.59	46.00		
4.38	0.18	0.3	N	56.00	23.02	23.50	46.00	20.63	21.11
4.64	0.19	0.3	N	56.00	25.91	26.40	46.00		
6.76	0.27	0.4	N	60.00	31.11	31.77	50.00	29.07	29.73
6.89	0.28	0.4	N	60.00	29.81	30.48	50.00		
18.24	0.67	0.8	N	60.00	29.41	30.88	50.00	26.34	27.81
20.57	0.71	0.8	N	60.00	34.35	35.87	50.00		
20.65	0.72	0.8	H	60.00	29.94	31.47	50.00		
24.72	0.81	0.9	N	60.00	27.99	29.70	50.00		
Remark	H : Hot Line, N : Neutral Line								

7. Photographs of test setup

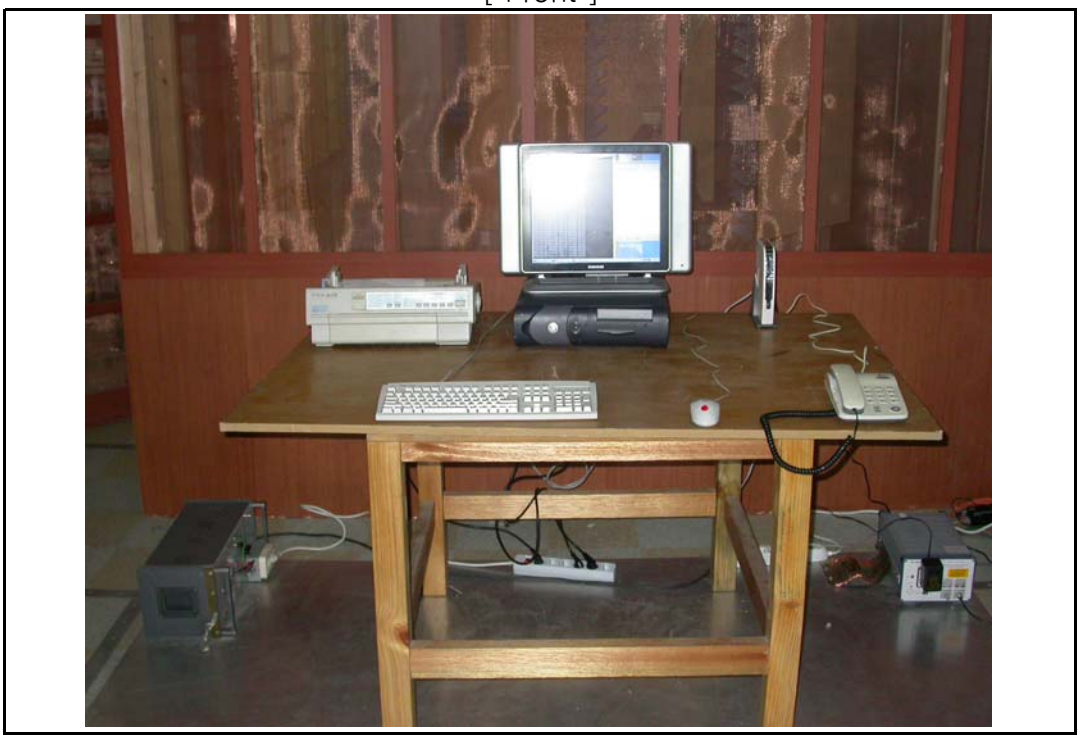
7.1 Setup for Radiated Test : 30 ~ 1000 MHz

[Front]

[Rear]

7.2 Setup for Conducted Test : 0.15 ~ 30 MHz

[Front]



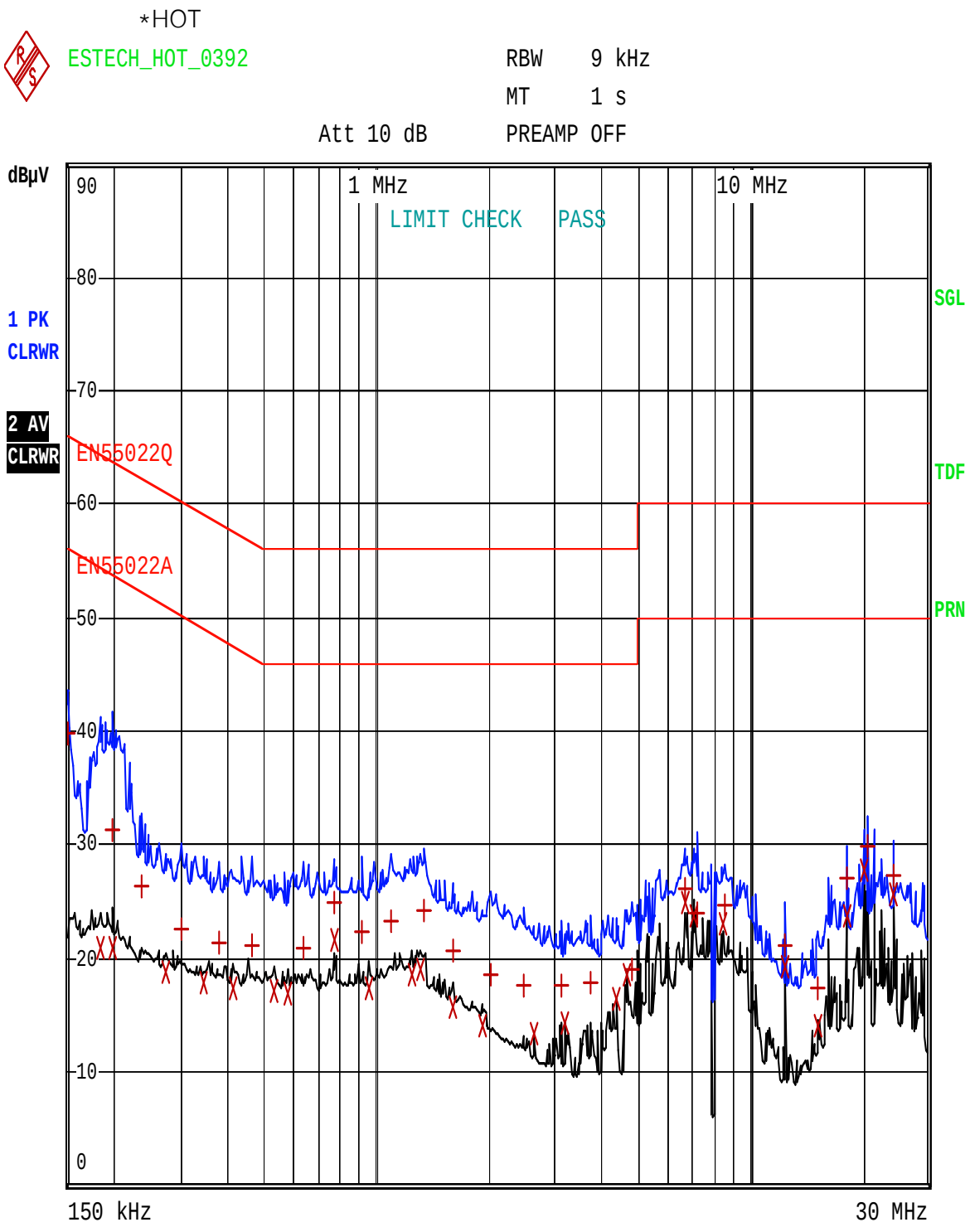
[Rear]

8. Photographs of EUT

[Front]

[Rear]

Appendix 1. Spectral diagram

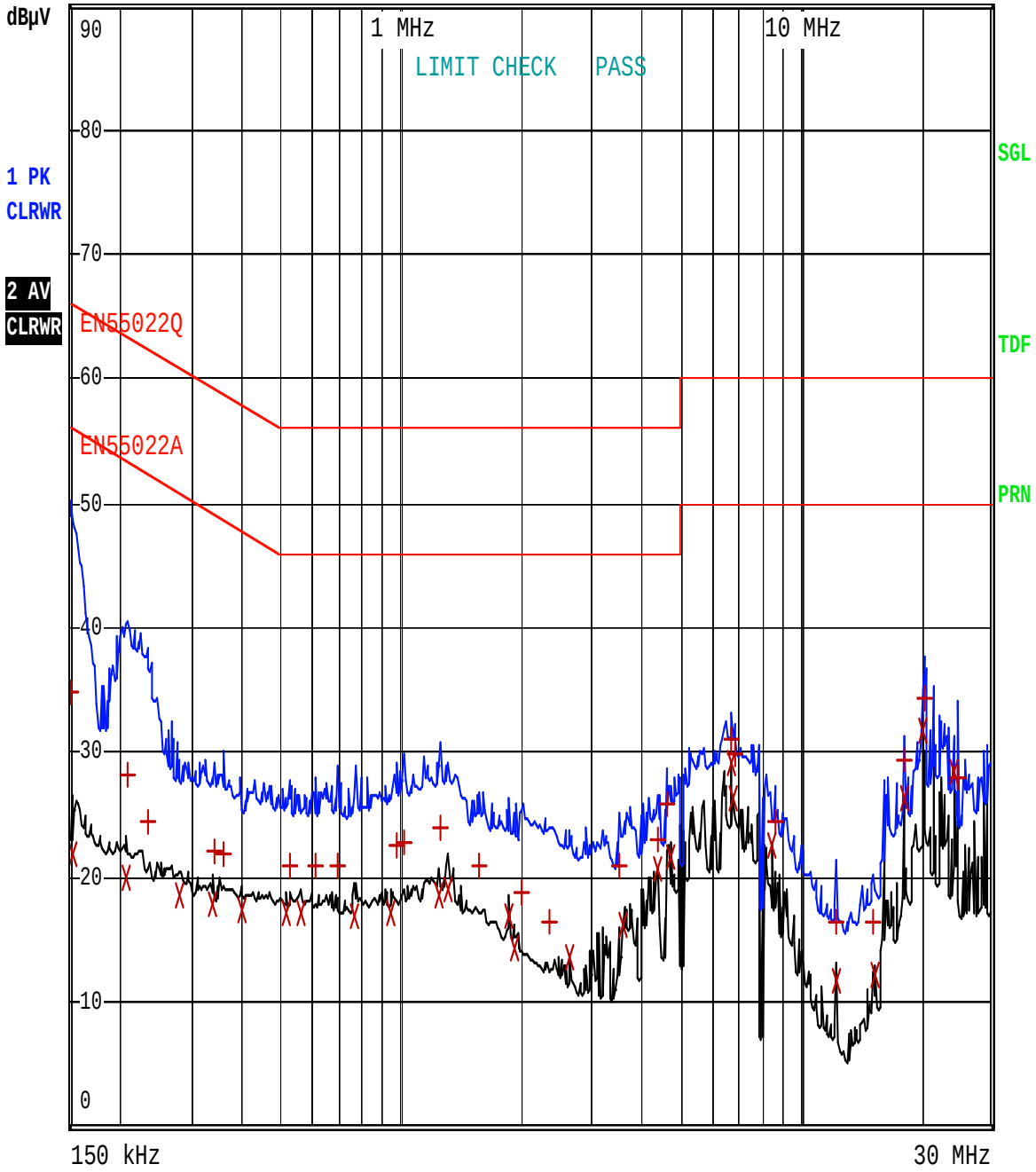


Comment: Elesign Inc ESC-2420 HOT
Date: 24.MAR.2005 16:42:13

*NEUTRAL

ESTECH_NEUTRAL_0392

RBW 9 kHz
MT 1 s
Att 10 dB PREAMP OFF



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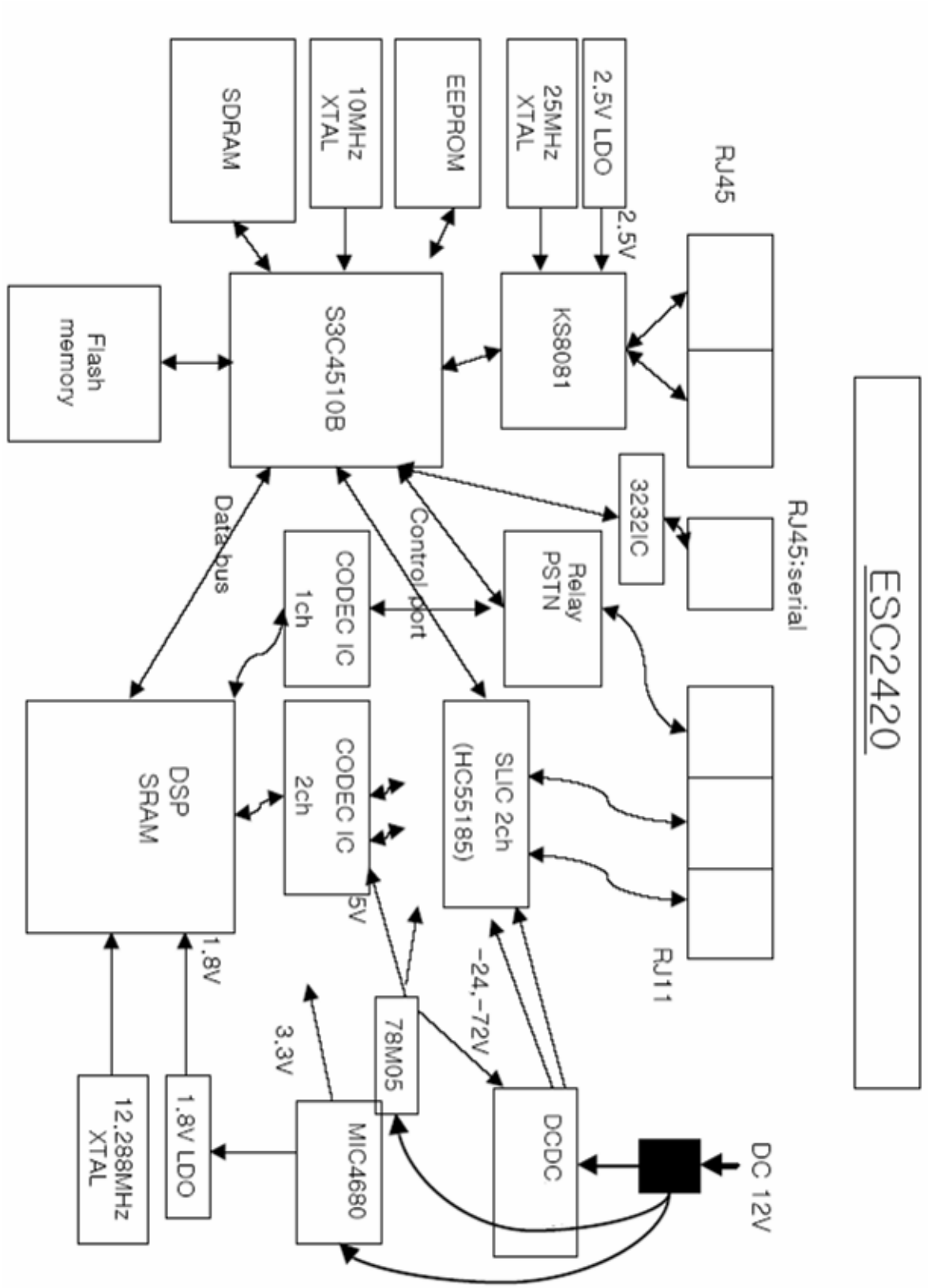
Date: 24.MAR.2005 16:50:01

Appendix 2. Phorographs of EUT in side PCB

Appendix 3. Block diagram of EUT



Appendix 4. Circuit Diagram