ESTECH Co., Ltd. Rm 1015, World Venture Center II, 426-5 Gasan-dong, Gumcheon-gu, Seoul, 158-803, Korea	MIC KOLAS VCI FC	**Electromagnetic Interference Test Report**

Test Report for FCC

Report Number		ESTF150607-008		
Applicant	Company name	Tellion,Inc		
	Address	8th Fl, Leader's tower 60-15 Gasan-dong,Geumcheon-gu,Seoul,153-801,Korea		
	Telephone	82-2-2026-7047		
Product	Product name	IP-VDSL Modem		
	Model No.	EX-1202Q	Manufacturer	Tellion,Inc
	Serial No.	NONE	Country of origin	KOREA
Test date	2006-05-17 ~ 2006-07-20		Date of issue	20-Jul-06
Testing location	ESTECH. Co., Ltd. 97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea			
Standard	FCC PART 15 2006 , ANSI C 63.4 2003			
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	Engineer J.H.Kim	(Signature)		
Reviewed by	Engineering Manager J.M.Yang	(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

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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, Korea
(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 : IP-VDSL Modem
Model Number : EX-1202Q
Serial Number : NONE
Manufacturer : Tellion,Inc
Country of origin : KOREA
Rating : INPUT: 100~240V 50/60Hz OUTPUT:DC 5.0V ,2A
Receipt Date : 2006-05-17

2.2 General descriptions of EUT

Items	Specification
Standard	**VDSL standard**
	● ETSI VDSL Standard ● ITU ITU-T G.993.1
	IEEE v
	● IEEE 802.3 10Base-TX ● IEEE 802.3u 100Base-TX
Interface	**Ethernet Interface**
	● 10/100Base-TX (IEEE 802.3, Auto-negotiation) ● Connector : RJ-45
	VDSL Interface
	● Connector : RJ-11
	POTS Interface
	● Connector : RJ-11
VDSL	**Modulation**
	Quadrature Amplitude Modulation (QAM)
	Transmission
	Full-duplex, Frequency Division Multiplexing (FDD)
	data Rate
	● Asymmetrical : 50/6Mbps ~ 1.5/0.4Mbps(M1)
	Band Plan
	● Plan998
	PSD MASK
	ETSI, ANSI, ITU-T(G.993.1) VDSL Standards
	Upstream Power-back-off
	Support Upstream Power-back-off
	Loopback
	Support remote and local loopback for network connection test
	CPE Configuration
	● VDSL Automatic setting of line speed ● Automatic setting (10/100Base-T Auto-Negotiation) of port parameter.

Connector	● Two RJ-11 Connector (LINE, PHONE) ● Two RJ-45 Connector (LAN1, LAN2) ● P/W input terminal(tab) (DC 5V 2A)
LED	POWER, LAN2, LAN1, LINK, DATA
Environment	● Temperature: 0 ~ 50°C (in work), -40~70°C (in keeping) ● Humidity: 5 ~ 90%
Standard OF MODEM	● Dimension: 165mm (W) x 34mm (H) x 124mm (H) ● Weight: 200g
Power of MODEM	● Input: 100~240VAC, 50~60Hz, DC 5V/2A ● Electric power gauge : 5 Watt (Max)

Using Freq. : 25MHz

3. Test Standards

Test Standard : FCC PART 15 (2006)

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 (2003)

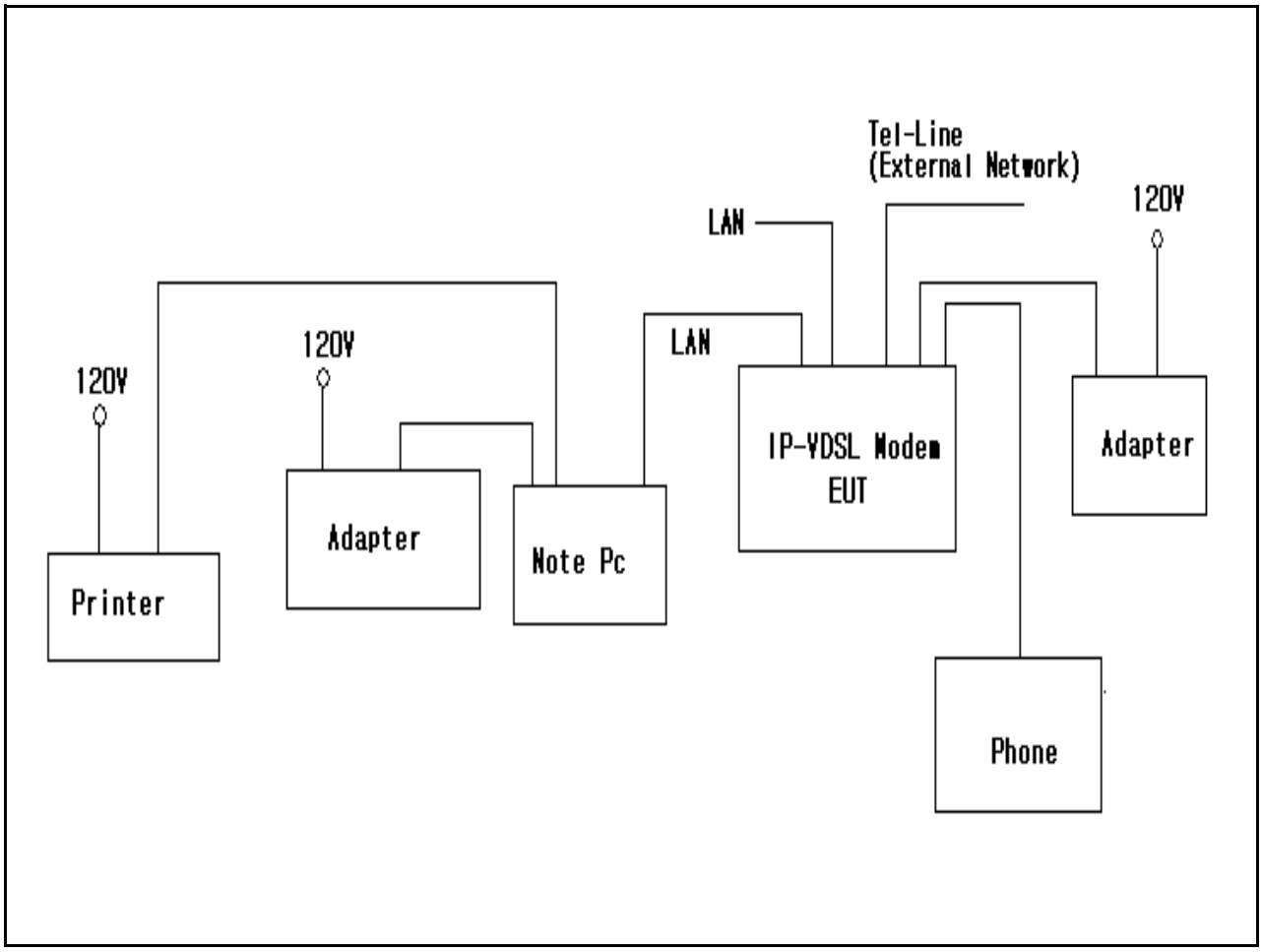
This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and 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



4.4 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
IP-VDSL Modem	EX-1202Q	NONE	Tellion,Inc	EUT
ADAPTER	VE10B-050	0402	Power tron Technology co.,Ltd	
NOTE PC	PPLLE	35748823888	Dell Asia Pacific Sdn	
ADAPTER	PA-1650-05DK	DLL00	Donggung Lite Power 2nd Plant	
PHONE	GS-460F	0009	LG Spithal Electronics co.,Ltd.	
PRINTER	LQ-570H+	B1021095782	Trigem Computer Inc.	

4.5 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
IP-VDSL Modem	TEL-LINE	External Network	TEL-LINE	25	N	
IP-VDSL Modem	Phone	Phone	-	1.5	N	
IP-VDSL Modem	LAN1	PC	LAN	2	N	
IP-VDSL Modem	LAN2	-	-	2	N	
IP-VDSL Modem	Power	Adapter	-	2	N	
Note Pc	Parallel	Printer	Parallel	2	Y	
Note Pc	Power	Adapter	-	2	N	

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2006). The test setup was made according to ANSI C 63.4 (2003) 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 Receiver	ESVS10	Rohde & Schwarz	838562/002	2007. 1. 23
Spectrum Analyzer	R3262C	ADVANTEST	61720116	2007. 4. 19
LogBicon Antenna	VULB 9160	Schwarzbeck	3142	2007. 5. 03
Amplifier	310N	Sonoma Instrument	185723	2006. 9. 21

5.2 Environmental Condition

Test Place : Open site(3m)

Temperature (°C) : 24 ℃

Humidity (%) : 55 %

5.3 Test data

Test Date : 6-Jul-06 Measurement Distance: 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Quasi-peak Value		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
75.75	13.80	V	1.0	9.88	1.3	40.0	24.97	-15.03
81.23	17.30	V	1.0	8.80	1.3	40.0	27.42	-12.58
108.82	11.80	V	1.0	10.39	1.5	43.5	23.71	-19.79
125.00	14.50	V	1.0	12.10	1.7	43.5	28.30	-15.20
165.01	16.30	V	1.0	13.92	2.0	43.5	32.22	-11.28
200.00	22.00	V	1.4	10.38	2.2	43.5	34.56	-8.94
225.00	22.00	V	1.0	10.88	2.3	46.0	35.21	-10.79
247.51	22.70	H	1.0	11.88	2.4	46.0	37.01	-8.99
250.00	20.20	V	1.0	11.92	2.4	46.0	34.49	-11.51
288.75	22.10	V	1.0	13.00	2.6	46.0	37.70	-8.30
330.00	26.30	H	1.0	13.86	2.8	46.0	42.96	-3.04
371.26	21.50	H	1.0	14.65	3.0	46.0	39.18	-6.82
453.75	15.20	H	1.0	16.42	3.4	46.0	34.99	-11.01
500.00	16.30	H	1.0	17.06	3.6	46.0	36.91	-9.09
536.24	19.40	H	1.0	17.61	3.6	46.0	40.65	-5.35
650.00	13.10	V	1.0	19.63	4.1	46.0	36.83	-9.18
700.00	17.50	V	1.0	20.14	4.3	46.0	41.92	-4.08
825.02	14.30	H	1.0	21.93	4.7	46.0	40.98	-5.02
907.49	13.30	H	1.0	22.70	4.9	46.0	40.89	-5.11
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 (2006). The test setup was made according to ANSI C 63.4 (2003) 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	2007. 2. 27
LISN	NNLA8120A	Schwarzbeck	8120161	2007. 2. 27
TEST Receiver	ESPI7	Rohde & Schwarz	100185	2006. 8. 22
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	2007. 6. 15

6.2 Environmental Condition

Test Place : Shield Room

Temperature (°C) : 20 ℃

Humidity (%) : 41 %

6.3 Test data

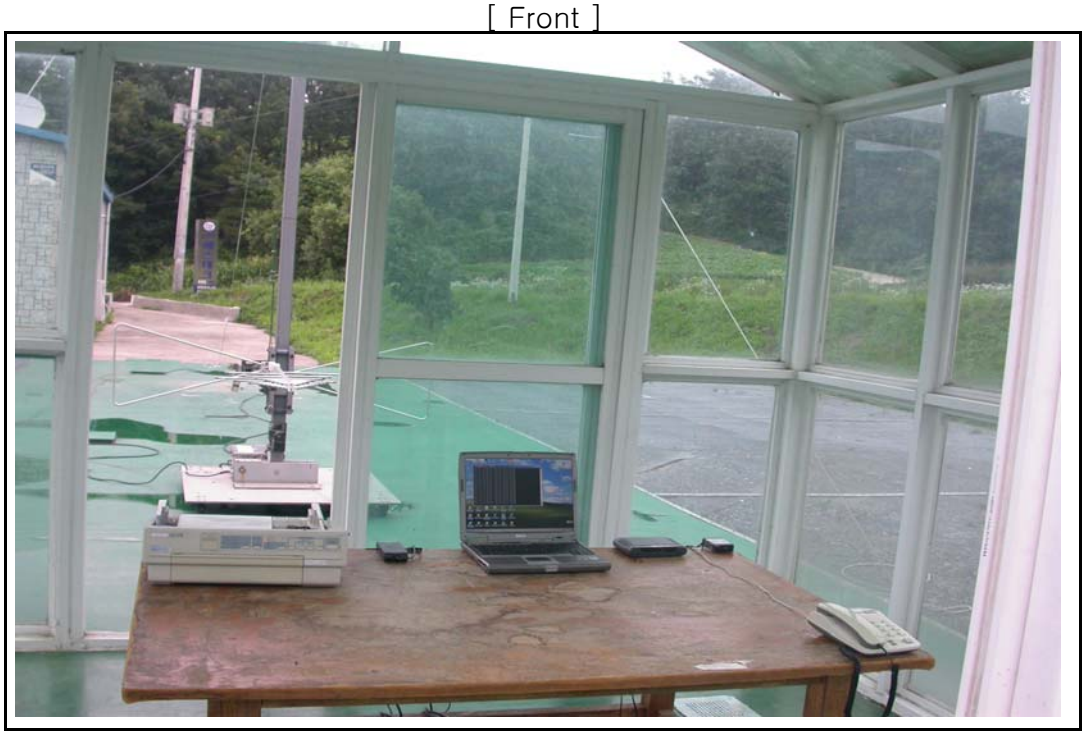
Test Date : 7-Jul-06

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 (dB)
0.32	0.07	0.1	H	59.66	39.92	40.10	49.66	35.49	35.67
0.56	0.07	0.2	H	56.00	41.70	41.97	46.00	32.99	33.26
0.57	0.07	0.2	H	56.00	40.69	40.96	46.00	32.64	32.91
0.58	0.08	0.2	N	56.00	41.22	41.50	46.00	32.00	32.28
0.66	0.08	0.2	N	56.00	41.06	41.34	46.00	30.11	30.39
0.80	0.09	0.2	H	56.00	43.50	43.79	46.00	32.46	32.75
0.83	0.09	0.2	N	56.00	42.78	43.07	46.00	-	-
0.91	0.09	0.2	N	56.00	42.11	42.40	46.00	-	-
1.07	0.09	0.2	N	56.00	43.79	44.09	46.00	-	-
1.20	0.00	0.0	N	56.00	43.33	43.33	46.00	30.07	30.07
1.52	0.10	0.3	H	56.00	41.54	41.89	46.00	27.54	27.89
1.68	0.07	0.0	H	63.99	40.30	40.84	53.99	-	-
Remark	H : Hot Line, N : Neutral Line								

7. Photographs of test setup

7.1 Setup for Radiated Test : 30 ~ 1000 MHz

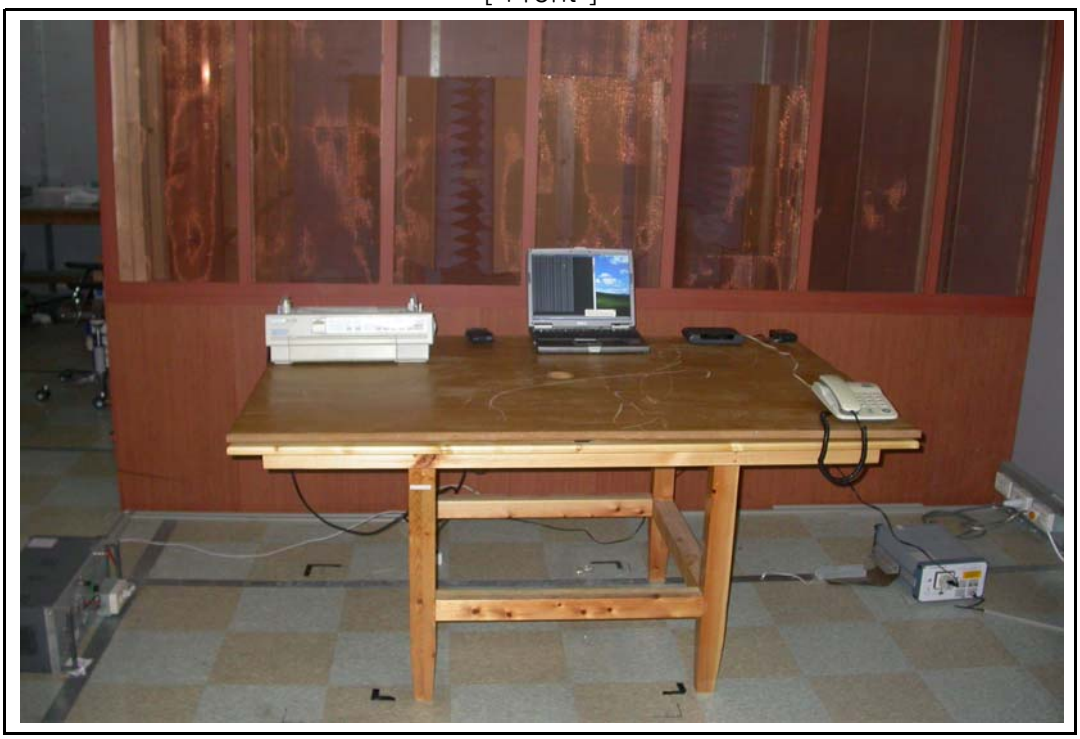
[Front]



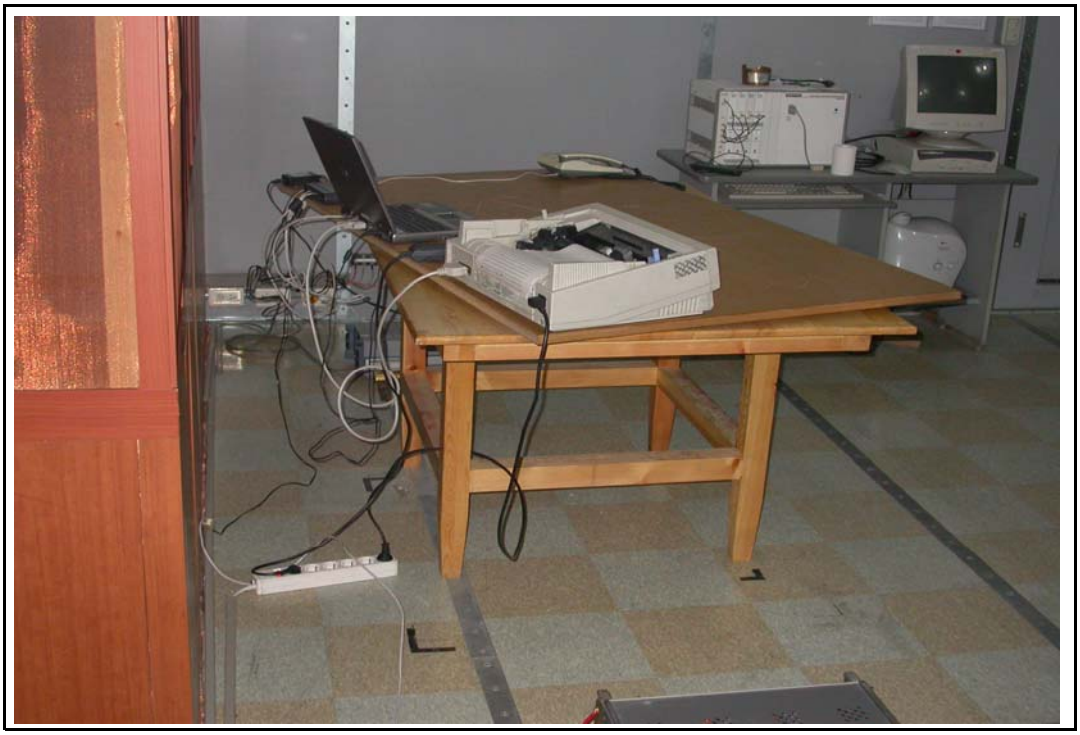
[Rear]

7.2 Setup for Conducted Test : 0.15 ~ 30 MHz

[Front]



[Rear]

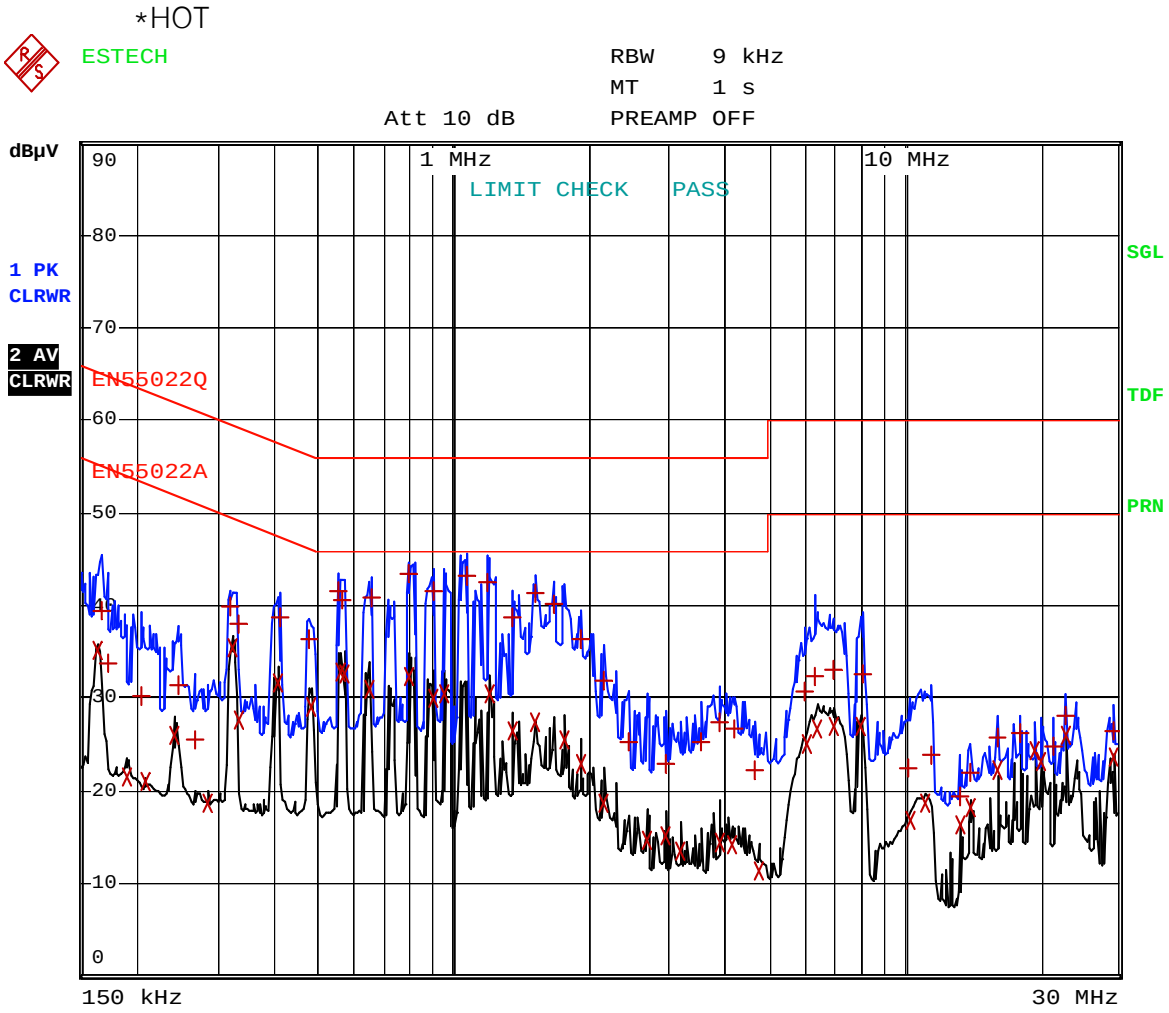


8. Photographs of EUT

[Front]

[Rear]

Appendix 1. Spectral diagram



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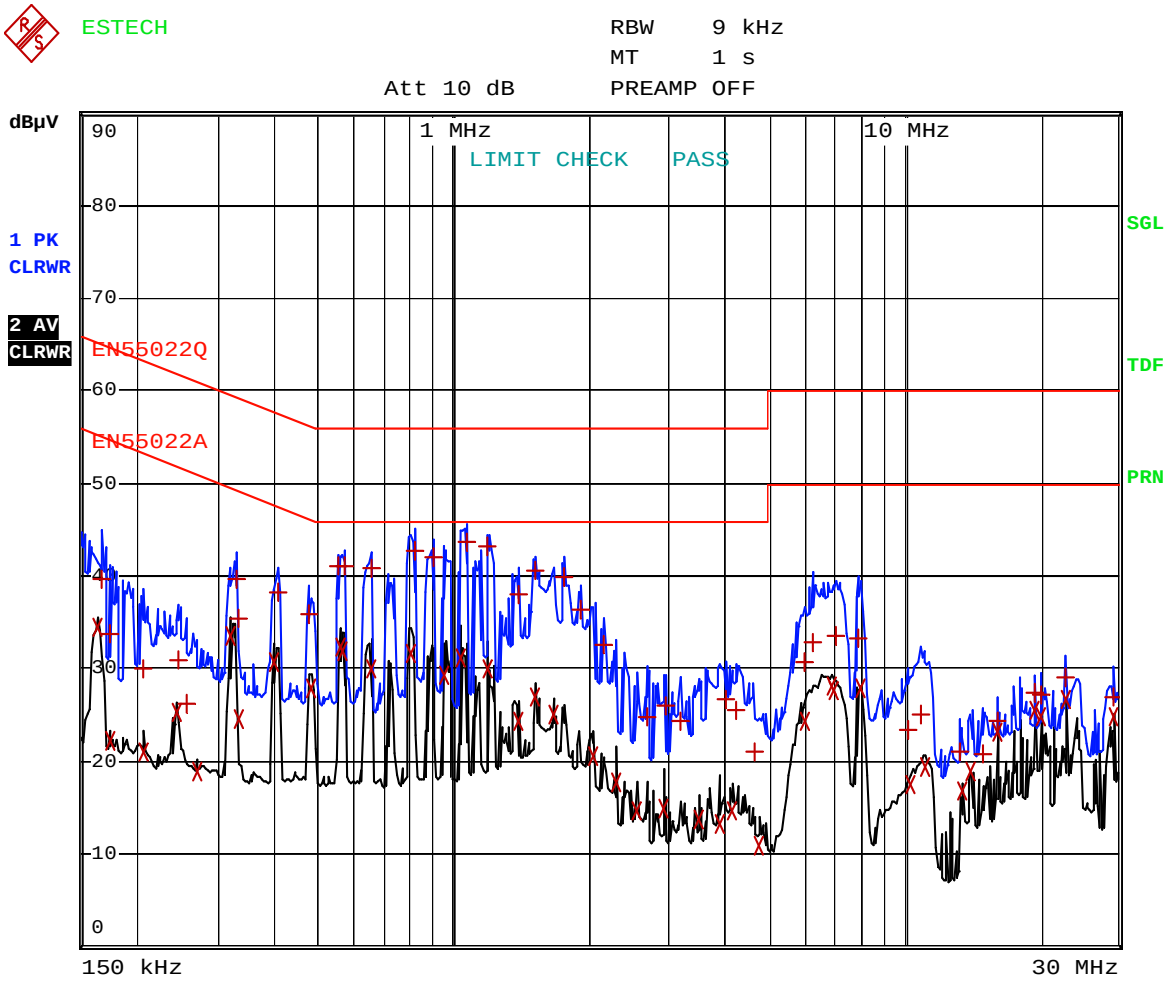

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