

	ESTECH Co., Ltd. Rm 1015, World Venture Center II, 426-5 Gasan-dong, Guncheon-gu, Seoul, 158-803, Korea	  	Electromagnetic Interference Test Report

Test Report for FCC

FCC ID:TKWXSM

Report Number		ESTF151011-010			
Applicant	Company name	Suprema Inc.			
	Address	16F Parkview Office Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863 Korea			
	Telephone	82-31-783-4505			
Product	Product name	X-Station			
	Model No.	XSM	Manufacturer	Suprema Inc.	
	Serial No.	NONE	Country of origin	KOREA	
Test date	2010-11-16		Date of issue	30-Nov-10	
Testing location	ESTECH. Co., Ltd. 97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea				
Standard	FCC PART 15 2010 , 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 G.H.KO (Signature) 				
Reviewed by	Engineering Manager J.M.Yang (Signature) 				
Abbreviation	OK, Pass = Complied, 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)

KCC : 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

3. Test Standards

Test Standard : FCC PART 15 (2010)

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)

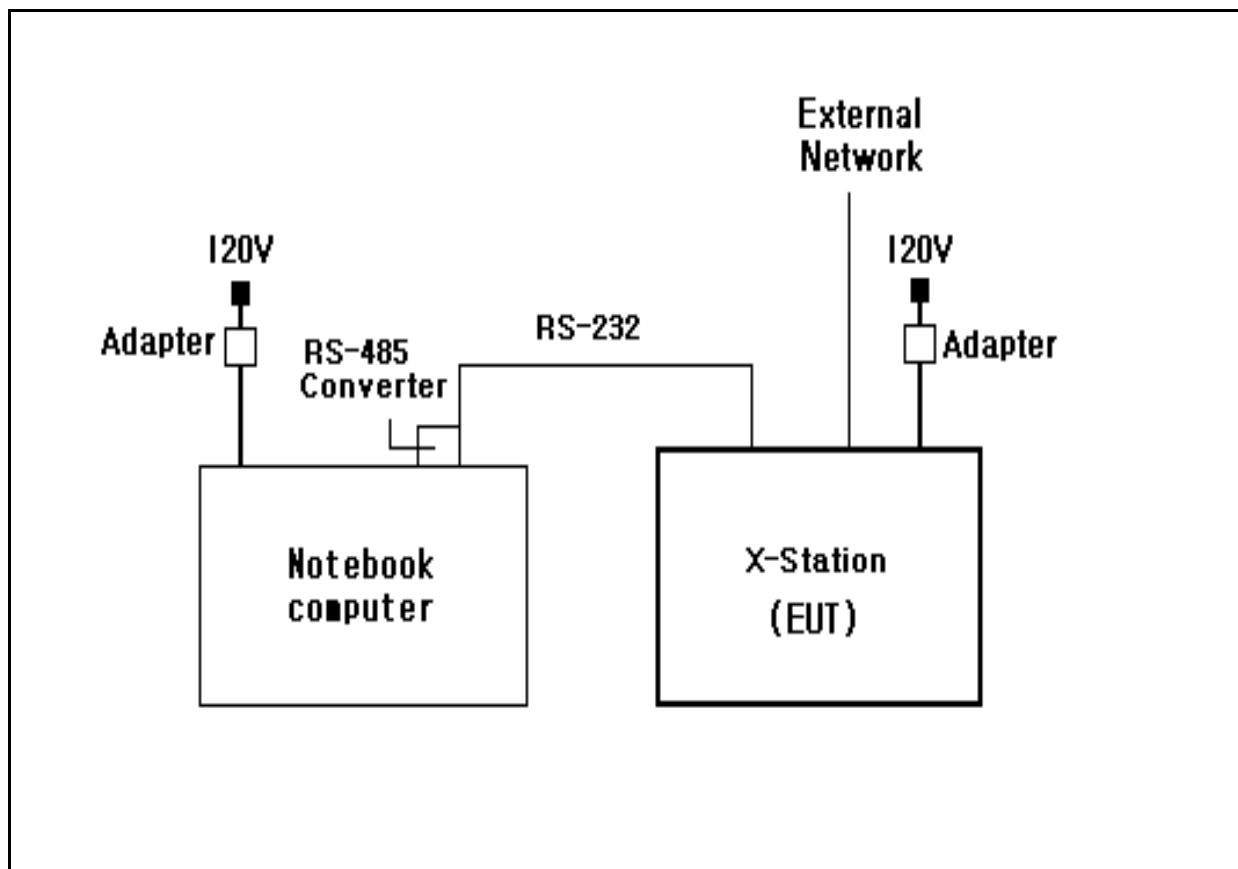
This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices 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 methods apply to the measurement of individual units or systems comprised of multiple units.

4. Measurement Condition

4.1 EUT Operation.

1. Check to normal mode operation
2. Connect the EUT with Note PC and external network.
3. Check normal communication status by Note PC's RS-232 port.
4. 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)
X-Station	XSM	NONE	Suprema Inc.	EUT
Adapter	JPW128	KA1200N06	AULT KOREA Corp.	
Notebook Computer	PPT	NONE	Dell Asia Pacific Sdn.	
Adapter	PA-1650-05DK	NONE	LITE-ON ELECTRONICS, INC.	
RS-485 Converter	TCC-80	NONE	Moxa Technologies Co., Ltd.	

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
X-Station	LAN	External Network	LAN	20	No	
X-Station	RS-232	-	-	3	No	
Notebook Computer	POWER	Adapter	-	2	No	
X-Station	POWER	Adapter	-	2	No	
X-Station	RS-485	RS-485 Converter	RS-485	3	No	
Notebook Computer	RS-232	RS-485 Converter	RS-232	-	-	

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2010) & ANSI C 63.4 (2003). The test setup was made according to FCC Part 15 (2010) & ANSI C 63.4 (2003) on an open test site, which allows a 3 m distance measurement. The EUT was placed in the center of wooden turntable. The height of this table was 0.8 m. 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 setup.

5.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Receiver	ESVS10	Rohde & Schwarz	838562/002	2011. 2. 1
Spectrum Analyzer	R3273	ADVANTEST	110600592	2011. 2. 1
Logbicon Antenna	VULB9160	Schwarzbeck	3142	2011.5.13
Horn Antenna	BBHA 9120 D	Schwarzbeck	469	2011. 7. 14
PREAMPLIFIER	8449B	Sonoma Instrument	3008A00581	2011. 2. 1
Amplifier	8447F	HP	2805A02972	2011. 2. 1
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(3 m)

Temperature (°C) : 13 °C

Humidity (% R.H.) : 51 % R.H.

5.3 Test data (Below 1 GHz)

Test Date : 16-Nov-10

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
33.51	13.90	H	3.0	10.57	0.9	40.0	25.37	-14.63
113.68	13.20	H	2.8	10.32	1.7	43.5	25.18	-18.32
146.32	13.90	V	1.0	12.57	2.0	43.5	28.46	-15.04
159.74	10.20	V	1.0	12.94	2.0	43.5	25.18	-18.32
169.27	11.10	H	2.5	12.23	2.2	43.5	25.52	-17.98
217.64	13.20	V	1.0	11.71	2.5	46.0	27.41	-18.59
279.31	10.60	V	1.0	12.89	3.1	46.0	26.57	-19.43
313.56	13.30	V	1.0	13.85	3.3	46.0	30.47	-15.53
332.49	21.70	H	1.5	14.27	3.5	46.0	39.50	-6.50
338.56	12.10	V	1.0	14.41	3.6	46.0	30.09	-15.91
362.74	15.30	H	1.4	14.95	3.7	46.0	33.97	-12.03
465.54	10.20	H	1.4	17.11	4.6	46.0	31.88	-14.12
503.80	8.30	H	1.2	17.90	4.8	46.0	30.98	-15.02
Remark	H : Horizontal, V : Vertical *There is no detected Radiated Emission above 1 GHz *CL = Cable Loss-Amplifier Gain(In case of above1000 Mhz) *CL = Cable Loss(In case of below1000 Mhz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection at frequency below 1 GHz. *The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 10Hz for average detection at frequency above 1 GHz.							

5.4 Test data (Above 1 GHz)

Test Date : 22-Nov-10

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
Peak(RBW:1 MHz VBW:1 MHz)								
1064.00	48.96	H	1.1	25.69	-35.3	74.0	39.35	-34.65
1064.00	54.56	V	1.1	25.69	-35.3	74.0	44.95	-29.05
1330.00	54.19	H	1.1	25.69	-35.3	74.0	44.58	-29.42
1330.00	49.97	V	1.1	25.69	-35.3	74.0	40.36	-33.64
1462.00	48.24	H	1.1	25.89	-32.0	74.0	42.13	-31.87
1462.00	47.82	V	1.1	25.89	-32.0	74.0	41.71	-32.29
Average(RBW:1 MHz VBW:10 Hz)								
1064.00	38.73	H	1.1	25.69	-35.3	54.0	29.12	-24.88
1064.00	46.94	V	1.1	25.69	-35.3	54.0	37.33	-16.67
1330.00	48.22	H	1.1	25.69	-35.3	54.0	38.61	-15.39
1330.00	41.11	V	1.1	25.69	-35.3	54.0	31.50	-22.50
1462.00	39.51	H	1.1	25.89	-32.0	54.0	33.40	-20.60
1462.00	39.16	V	1.1	25.89	-32.0	54.0	33.05	-20.95
Remark	H : Horizontal, V : Vertical *CL = Cable Loss-Amplifier Gain(In case of above1000 MHz) *CL = Cable Loss(In case of below1000 MHz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection *The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 10Hz for average detection at frequency above 1 GHz.							

6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 MHz to 30 MHz was measured in accordance to FCC Part 15 (2010) & ANSI C 63.4 (2003). The test setup was made according to FCC Part 15 (2010) & ANSI C 63.4 (2003) in a shielded Room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plan. A grounded vertical reference plane was positioned in a distance of 0.4 m from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. 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 1.0 m. The test receiver with Quasi Peak detector complies with CISPR 16.

6.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESPI7	Rohde & Schwarz	100185	2011.8. 24
LISN	ESH3-Z5	Rohde & Schwarz	838979/010	2011.2.1
LISN	ENV 216	Rohde & Schwarz	101231	2011. 8. 13
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	2011.2.1

6.2 Environmental Condition

Test Place : Shielded Room

Temperature (°C) : 21 °C

Humidity (% R.H.) : 42 % R.H.

6.3 Test data

Test Date : 16-Nov-10

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.17	0.10	0.4	N	64.96	24.30	24.78	54.96	19.52	20.00
0.20	0.10	0.4	H	63.61	38.48	38.97	53.61	36.80	37.29
0.31	0.11	0.4	N	59.92	32.50	33.01	49.92	24.39	24.90
0.33	0.11	0.4	H	59.35	29.78	30.30	49.35	27.31	27.83
0.40	0.12	0.4	H	57.81	27.74	28.28	47.81	25.16	25.70
0.47	0.12	0.4	H	56.55	30.68	31.23	46.55	29.25	29.80
0.67	0.12	0.5	N	56.00	37.42	38.00	46.00	37.41	37.99
0.94	0.12	0.5	H	56.00	43.44	44.05	46.00	35.49	36.10
3.07	0.23	0.6	H	56.00	37.01	37.86	46.00	36.33	37.18
3.14	0.23	0.6	N	56.00	37.53	38.39	46.00	36.86	37.72
4.54	0.29	0.7	N	56.00	39.59	40.62	46.00	38.53	39.56
4.94	0.31	0.8	H	56.00	38.34	39.42	46.00	34.58	35.66
5.95	0.34	0.8	N	60.00	44.68	45.83	50.00	43.40	44.55
6.55	0.36	0.8	N	60.00	45.42	46.61	50.00	44.79	45.98
7.21	0.37	0.9	N	60.00	43.57	44.80	50.00	42.92	44.15
8.02	0.38	0.9	N	60.00	40.51	41.77	50.00	39.36	40.62
10.02	0.39	1.0	N	60.00	37.32	38.67	50.00	35.55	36.90
10.49	0.41	1.0	N	60.00	35.39	36.78	50.00	32.57	33.96
Remark	H : Hot Line, N : Neutral Line								

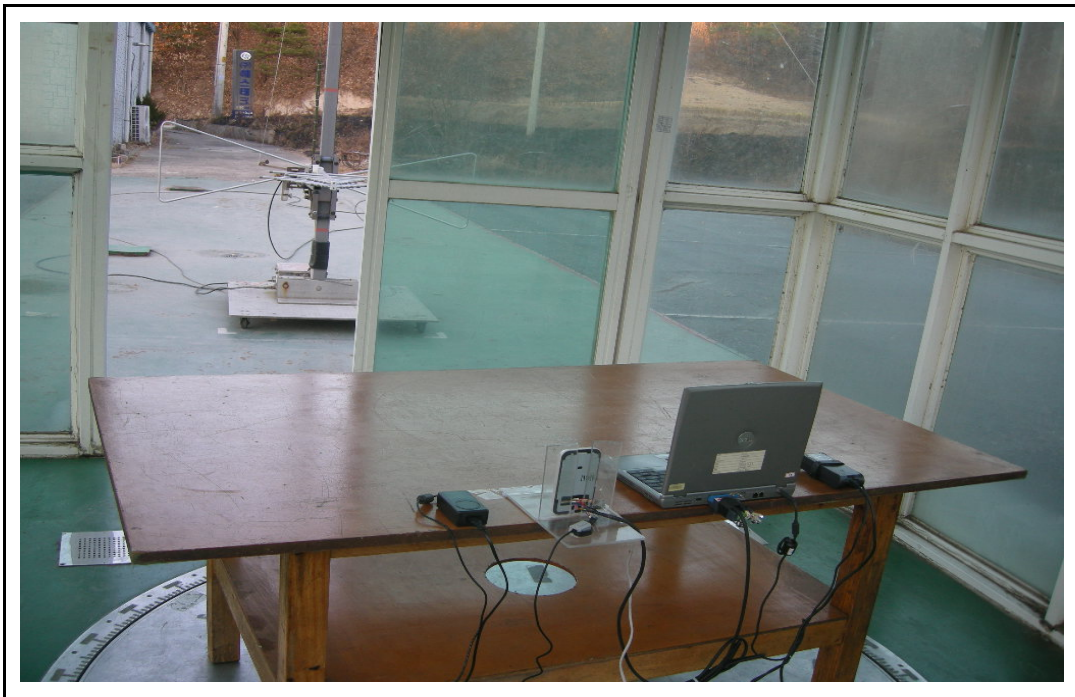
7. Photographs of test setup

7.1 Setup for Radiated Test

[Front]

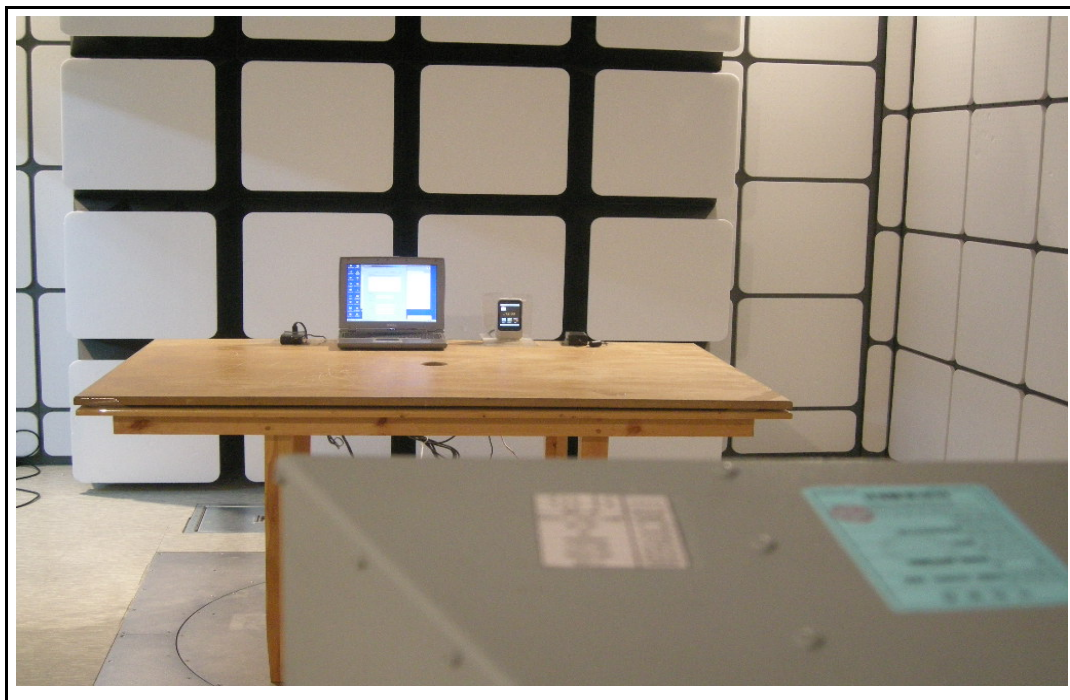


[Rear]

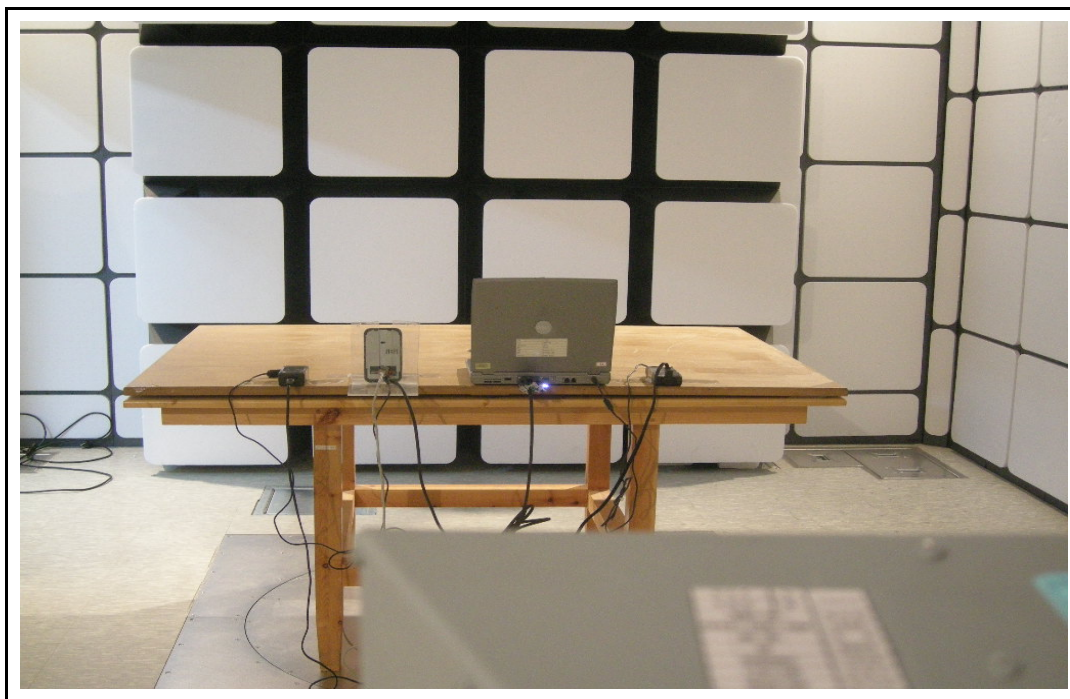


7.2 Setup for Radiated Test : Above 1 GHz

[Front]



[Rear]



7.3 Setup for Conducted Test : 0.15 MHz ~ 30 MHz

[Front]



[Rear]



8. Photographs of EUT

[Front]



[Rear]



8.1 Photographs of EUT

[Front]



[Label]



Appendix 1. Spectral diagram

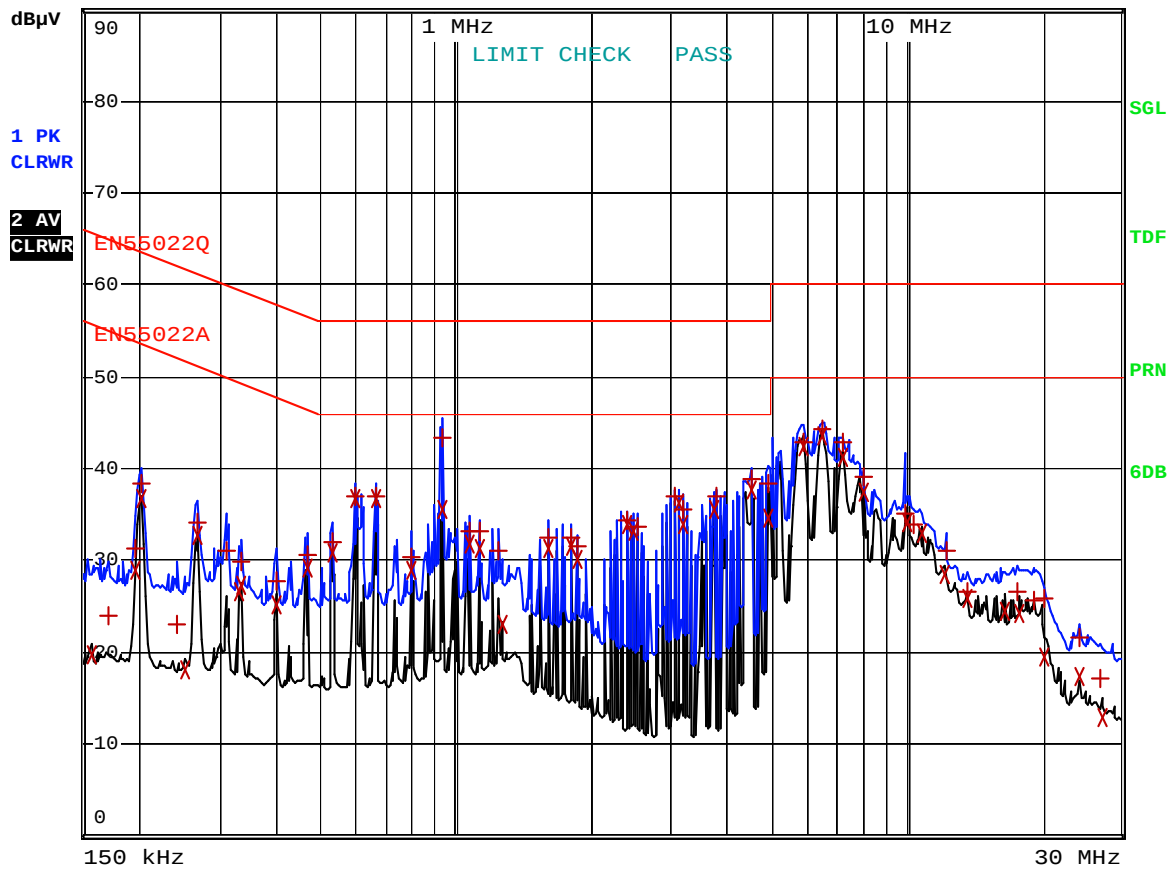
*HOT



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



Comment: XSM HOT

Date: 16.NOV.2010 11:27:28

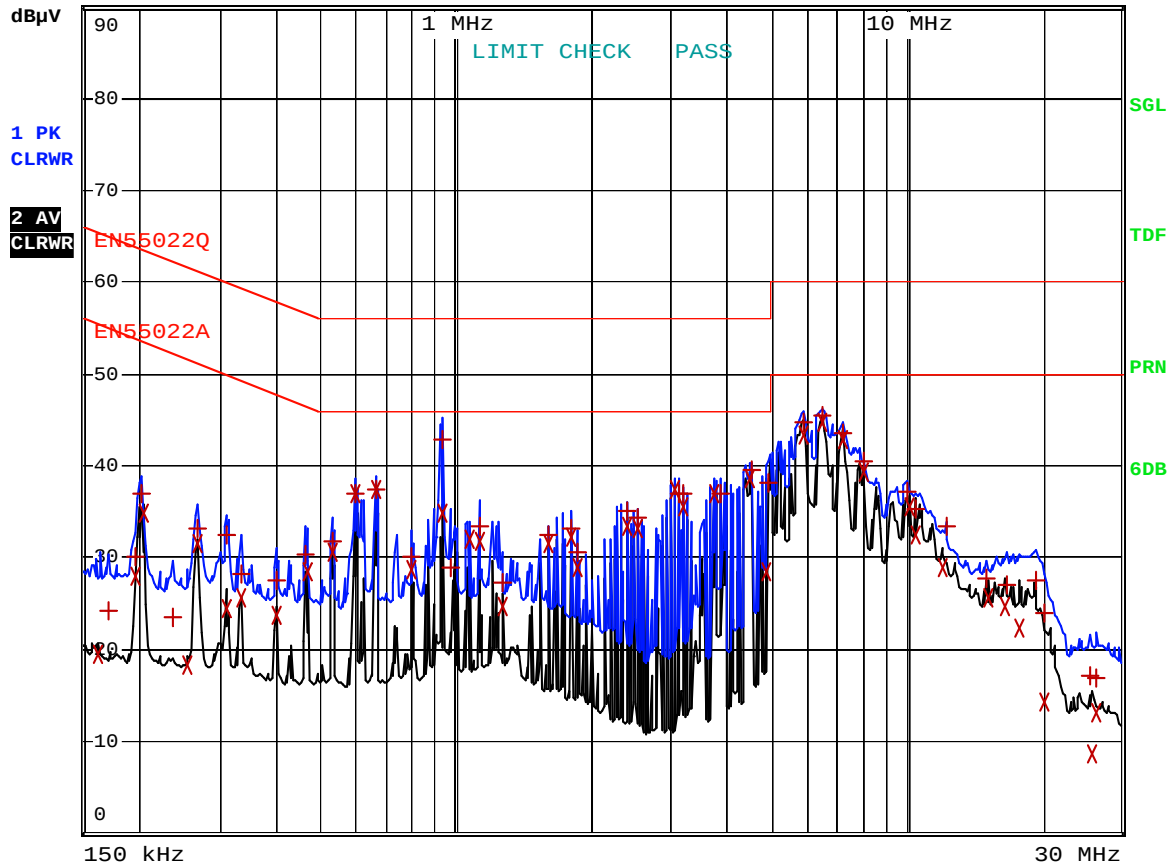
*NEUTRAL



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



Comment: XSM NEUTRAL

Date: 16.NOV.2010 11:18:41

Appendix 2. Photographs of EUT inside

[Inside]

