

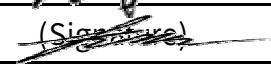


ESTECH Co., Ltd.
Rm.1015, World Venture Center II,
426-5, Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea

*Testing and Certification
Laboratory*

Test Report for FCC

FCC ID:TL9NUVENIONVHD

Report Number		ESTF150808-001			
Applicant	Company name	COOL SKY CO. LTD			
	Address	ShinSung Bldg., A-511 #1588-1, Seocho-Dong, Seocho-Gu, Seoul, Korea			
	Telephone	82-2-6203-0812			
Product	Product name	Digital Satellite Receiver			
	Model name	NUVENIO NV HD	Manufacturer	COOL SKY CO. LTD	
	Serial Number	NONE	Country of origin	KOREA	
Test date	2008-08-07 ~ 2008-08-29	Date of issue	2008-08-30		
Test location	ESTECH. Co., Ltd. 97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea				
Standard	FCC PART 15 (2007) 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
	☒ Antenna Conducted Power Measurements	☐ Class A	☐ Class B	Test result	OK
	☐ Output Signal Conducted Level	☐ Class A	☐ Class B	Test result	N/A
	☒ Output Terminal Conducted Spurious Emission	☐ Class A	☐ Class B	Test result	OK
	☒ Antenna Transfer Switch	☐ Class A	☐ Class B	Test result	OK
Measurement facility registration number		94696			
Tested by	Senior Engineer J.H.Kim 				
Reviewed by	Engineering Manager J.M.Yang 				
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable				
* Note - This is certified that the above mentioned products have been tested for the sample provided by client - No part of this document may be duplicated or reproduced by any means without the express written permission of the Estech Co., Ltd.					



Contents

1. Laboratory Information	3
2. Description of EUT	4
3. Test Standards	5
4. Measurement condition	6
5. Measurement of radiated disturbance	8
5.1 Radiated Emission	8
5.2 Radiated Emission(Harminics)	8
5.3 Measurement Equipments	8
5.4 Environmental conditions	8
5.5 Test data	9
5.6 Test data(Harminics)	9
6. Measurement of conducted disturbance	11
6.1 Measurement equipment	11
6.2 Environmental conditions	11
6.3 Test data(Digital)	12
6.4 Test data(Satellite)	13
7. Measurement of antenna conducted power	14
7.1 Measurement equipment	14
7.2 Environmental conditions	14
7.3 Test data(Digital)	15
7.4 Test data(Satellite)	16
8. Measurement of output signal conducted level(N/A).....	17
8.1 Measurement equipment	17
8.2 Environmental conditions	17
8.3 Test data	18
9. Measurement of output terminal conducted spurious emission.....	19
9.1 Measurement equipment	19
9.2 Environmental conditions	19
9.3 Test data(Digital)	20
9.4 Test data(Satellite)	21
10. Measurement of antenna transfer switch	22
10.1 Measurement equipment	22
10.2 Environmental conditions	22
10.3 Test data	23
11. Photographs of test setup	24
12. Photographs of EUT	27
Appendix 1. Special diagram (Digital)	
Appendix 2. Special diagram (Satellite)	
Appendix 3. Special diagram (PC MODE)	



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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 attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH 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



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2. Description of EUT

2.1 Summary of Equipment Under Test

Product : Digital Satellite Receiver

Model Number : NUVENIO NV HD

Serial Number : NONE

Manufacturer : COOL SKY CO. LTD

Country of origin : KOREA

Rating : AC100~240V 50Hz/60Hz 45W

Receipt Date : 2008-07-15

Clock list(s) : 30.0MHz,27MHz,25MHz,25MHz,16MHz

2.2 General descriptions of EUT

LNB/Tuner	RF input frequency	950 to 2,150MHz
	RF input level	-65 to -25dBm
	LNB control	DiSEqC1.0/1.2 ,USALS
	LNB power	13V/18V(Max.1000mA)
	LNB tone switch	22KH $\pm$ 2KHz(0.6 ~ 0.9Vp-p)
MPEG	Video	MPEG-II Main Profile@Main Level
	Audio	MPEG-II layer I&II
VIDEO	Resolution	720 $\times$ 576
	Video output level	1Vp-p into 75
	Aspect ratio	4:3, 16:9
Audio	Frequency range	20Hz to 20KHz
	Sampling frequency	32/44.1/48KHz
	Frequency response	20Hz to 20KHz Hi-Fi Quality Digital stereo
	Audio output level	2V rms into 600
General Data	Supply voltage	(100~240V AC, 50/60Hz)
	Power consumption	45W(Standby 20W)
	Operating temp.	0 $^{\circ}$ C ~ 50 $^{\circ}$ C
	Storage temp.	-40 $^{\circ}$ C ~65 $^{\circ}$ C
	Dimensions	340(W) $\times$ 247(D) $\times$ 67.5(H)mm
	Weight	3Kg



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3. Test Standards

Test Standard : FCC PART 15 (2007)

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.

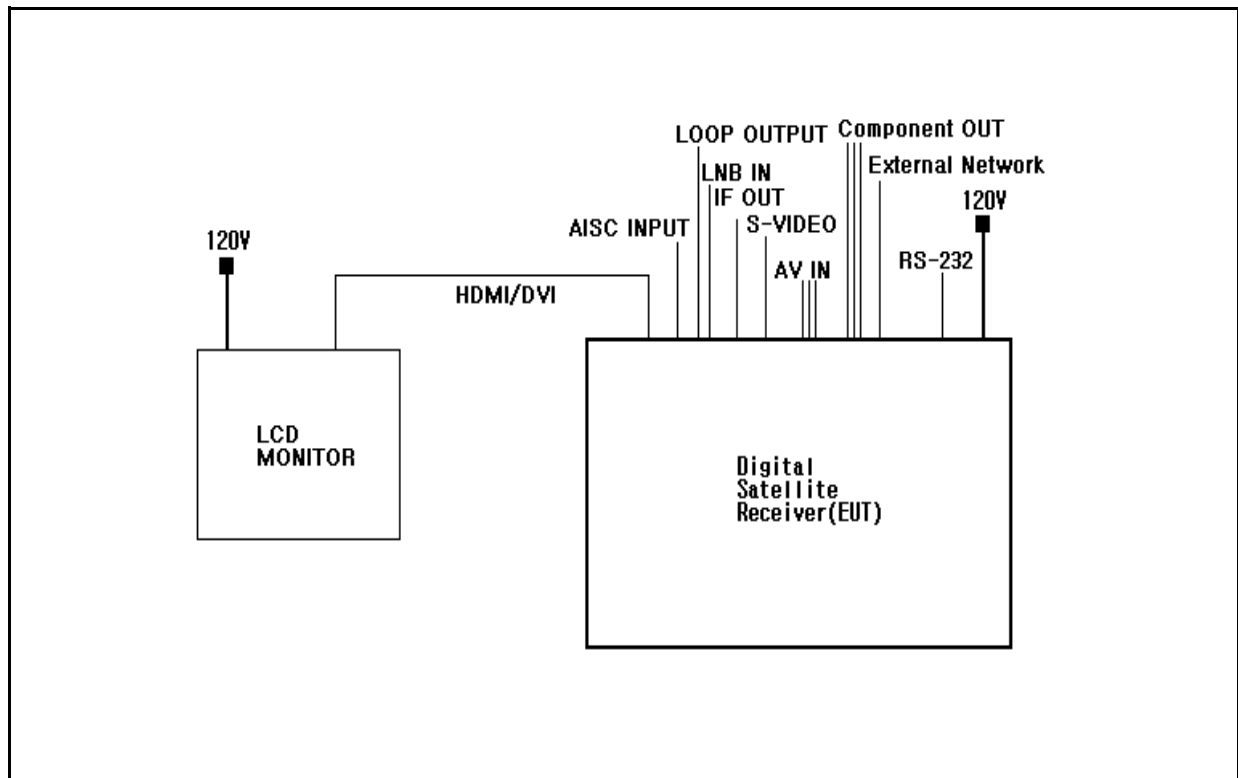


4. Measurement Condition (Receiver mode)

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 highest level of emission
- * The EUT was set to the normal receiving mode in a TV mode during all the testing in a manner similar to a typical use.
- * For the EUT operation, the satellite live signal was fed to the EUT through the LNB input.

4.2 Configuration and Peripherals (Receiver mode)



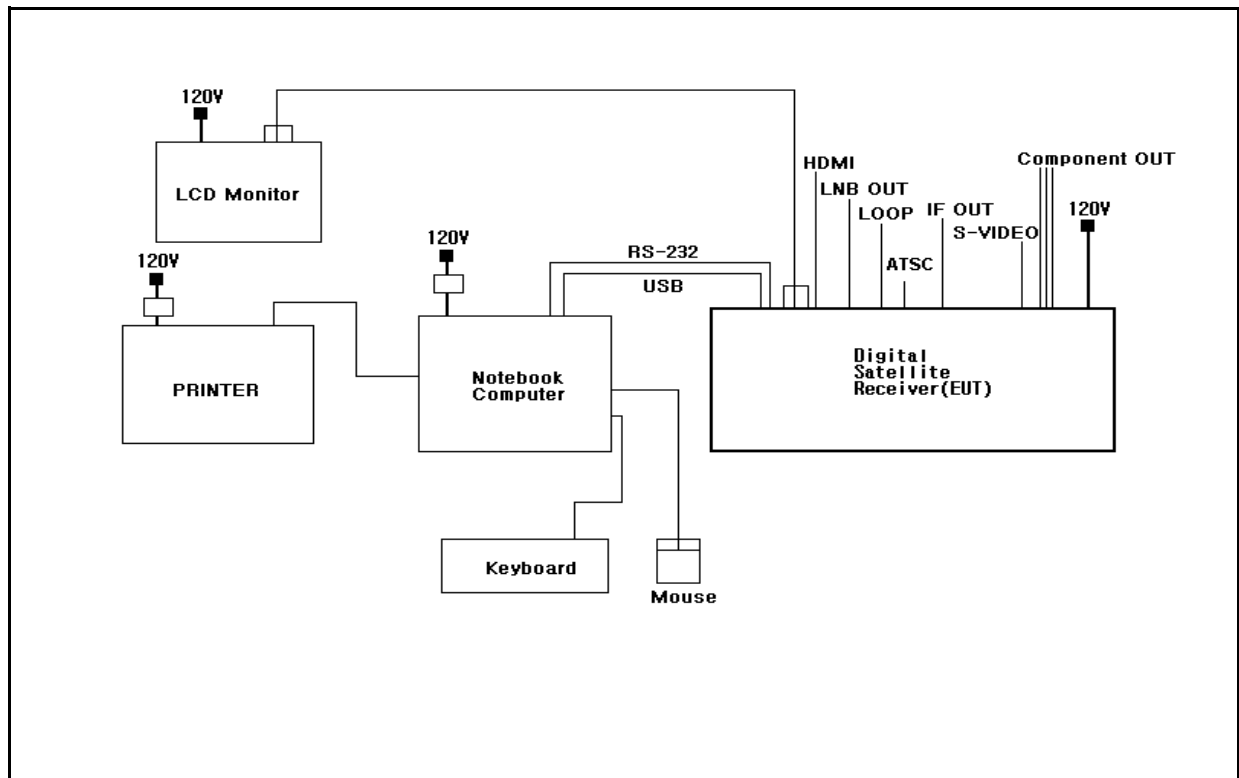


4. Measurement Condition (PC mode)

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 highest level of emission

4.2 Configuration and Peripherals (PC mode)





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4.3 EUT and Support equipment (Receiver mode)

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
Digital Satellite Receiver	NUVENIO NV HD	NONE	COOL SKY CO. LTD	EUT
LCD Monitor	2408WFPb	CN-ONN793-74261-84P-0GVS	Dell Asia Pacific Sdn.	

4.4 Cable Connecting (Receiver mode)

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Digital Satellite Receiver	HDMI	LCD Monitor	DVI	2	Y	
Digital Satellite Receiver	LAN	External Network	LAN	20	N	
Digital Satellite Receiver	RS-232	-	-	2	N	
Digital Satellite Receiver	Component x 3port	-	-	2	N	
Digital Satellite Receiver	AV IN x3port	-	-	2	N	
Digital Satellite Receiver	S-VIDEO	-	-	2	N	
Digital Satellite Receiver	IF OUT	-	-	2	N	
Digital Satellite Receiver	LOOP OUTPUT	-	-	2	N	
Digital Satellite Receiver	LNB IN	ANTENNA	-	20	Y	
Digital Satellite Receiver	AISC INPUT	ANTENNA	-	20	Y	



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4.3 EUT and Support equipment (PC mode)

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
Digital Satellite Receiver	NUVENIO NV HD	NONE	COOL SKY CO. LTD	EUT
Notebook Computer	HSTNN-105C	CNU7281VY6	HEWLETT-PACKARD	
Adapter	PPP0009L	5978A0ALLUREGE	DONGGUANG LITE POWER 2nd PLANT	
LCD Monitor	M1717AD	703SRT206897	LG Electronics Inc.	
Printer	MJC-5750	NA34BFFP313402V	SAMSUNG ELECTRONICS(SHADONG) DIGITAL PRINTING CO.,LTD.	
Adapter	PA8040WB	0703016518	Bestec Electronics (Dongguan)Co.,Ltd.	
Mouse	M0CSU0	H0W02FRS	Dell Inc.	
Keyboard	L100	CNOR6596589085	Dell Inc.	

4.4 Cable Connecting (PC mode)

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Digital Satellite Receiver	RS-232	Notebook Computer	RS-232	2	N	
Digital Satellite Receiver	USB	Notebook Computer	USB	2	Y	
Digital Satellite Receiver	LAN	External Network	LAN	20	N	
Digital Satellite Receiver	LNB-IN	-	-	2	N	
Digital Satellite Receiver	IF OUT	-	-	2	N	
Digital Satellite Receiver	S-VIDEO	-	-	2	N	
Digital Satellite Receiver	ATSC	-	-	2	N	
Digital Satellite Receiver	LOOP OUTPUT	-	-	2	N	
Digital Satellite Receiver	Component x3port	-	-	2	N	
Digital Satellite Receiver	HDMI	-	-	2	N	
Digital Satellite Receiver	AV IN x3port	LCD Monitor	AV IN x 3port	2	N	
Notebook Computer	USB	Mouse	USB	2	Y	
Notebook Computer	USB	Keyboard	USB	2	Y	
Notebook Computer	USB	Printer	USB	2	Y	
Notebook Computer	POWER	Adpater	-	2	N	
PRINTER	POWER	Adpater	-	2	N	



5. Measurement of radiated disturbance (Receiver mode)

5.1 Radiated Emission

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2007) & ANSI C 63.4 (2003). The test setup was made according to FCC Part 15 (2007) & 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 setup.

5.2 Radiated Emission(Harmonics)

This is the additional radiatd emission test due to the local oscillator of the satellite receiver part in the EUT. The fundamental and 2nd harmonic frequencies of the local oscillator of the satellite receiver part was tested on a near top, middle and bottom tuning frequencies of the EUT according to section 15.31(m) and 15.33(b)(3)

5.3 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Test Receiver	ESVS10	Rohde & Schwarz	838562/002	2009. 1. 24
Spectrum Analyzer	R3261C	ADVANTEST	61720116	2009. 4. 22
LogBicon Antenna	VULB 9160	Schwarzbeck	3142	2009. 5. 15
Amplifier	8447F	HP	2805A02972	2009. 6. 26
Test Receiver	ESPI7	Rohde & Schwarz	100185	2008. 8. 27

5.4 Environmental Condition

Test Place : Open site(3m)
Temperature (°C) : 29 °C
Humidity (%) : 45 %



5. Measurement of radiated disturbance (PC mode)

5.1 Radiated Emission

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2007) & ANSI C 63.4 (2003). The test setup was made according to FCC Part 15 (2007) & 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 setup.

5.2 Radiated Emission(Harmonics)

This is the additional radiatd emission test due to the local oscillator of the satellite receiver part in the EUT. The fundamental and 2nd harmonic frequencies of the local oscillator of the satellite receiver part was tested on a near top, middle and

5.3 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Test Receiver	ESVS10	Rohde & Schwarz	838562/002	2009. 1. 24
Spectrum Analyzer	R3261C	ADVANTEST	61720116	2009. 4. 22
LogBicon Antenna	VULB 9160	Schwarzbeck	3142	2009. 5. 15
Amplifier	8447F	HP	2805A02972	2009. 6. 26

5.4 Environmental Condition

Test Place : Open site(3m)
Temperature (°C) : 28 °C
Humidity (%) : 52 %



5.5 Test data(Digital)

Test Date : 8-Aug-08

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 (dB)
42.61	11.40	V	1.0	11.71	0.3	40.0	23.43	-16.57
73.88	15.20	V	1.0	9.83	0.9	40.0	25.97	-14.03
111.71	14.20	V	1.0	10.26	1.3	43.5	25.77	-17.73
137.25	17.50	H	2.2	12.07	1.5	43.5	31.03	-12.47
162.00	13.10	H	2.0	12.75	1.7	43.5	27.57	-15.93
188.98	14.50	H	1.6	11.26	2.0	43.5	27.73	-15.77
215.99	14.70	H	1.5	10.17	2.2	43.5	27.12	-16.38
242.98	16.60	V	1.0	11.13	2.6	46.0	30.35	-15.65
349.06	13.40	H	1.0	14.02	3.4	46.0	30.78	-15.22
399.95	8.40	V	1.0	15.11	3.7	46.0	27.24	-18.76
405.01	10.40	H	1.0	15.24	3.7	46.0	29.38	-16.62
486.00	8.20	V	1.0	16.83	4.2	46.0	29.22	-16.78
567.02	6.40	H	1.0	18.67	4.8	46.0	29.90	-16.10
620.99	3.40	H	1.0	19.67	5.2	46.0	28.28	-17.72
780.14	7.20	V	1.0	21.76	6.2	46.0	35.16	-10.84
Remark	H : Horizontal, V : Vertical *CL = Cable Loss - Amplifier Gain(In case of above1000Mhz) *CL = Cable Loss(In case of below1000Mhz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120KHz for Quasi-peak detection at frequency below 1GHz. *Checked in each test mode and operation mode, and the maximum measured data were reported. *To meet the radiated emission, the EUT was measured at LAN port after connecting with Ferrite Bead(CU1330(b))							



5.6 Test data(Satellite)

Test Date : 8-Aug-08

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 (dB)
31.36	13.40	H	3.9	11.28	0.2	40.0	24.89	-15.11
71.75	15.40	V	1.0	9.80	0.9	40.0	26.11	-13.89
110.62	6.00	H	3.3	10.24	1.3	43.5	17.55	-25.95
147.42	8.30	H	2.8	12.85	1.6	43.5	22.71	-20.79
189.00	14.40	V	1.0	11.26	2.0	43.5	27.63	-15.87
214.00	8.40	V	1.0	10.12	2.2	43.5	20.75	-22.75
271.48	13.20	V	1.0	12.05	2.8	46.0	28.06	-17.94
349.07	13.20	H	2.3	14.02	3.4	46.0	30.58	-15.42
486.02	10.90	V	1.0	16.83	4.2	46.0	31.92	-14.08
571.17	7.90	V	1.0	18.77	4.9	46.0	31.52	-14.48
621.24	6.20	H	1.7	19.67	5.2	46.0	31.09	-14.91
649.74	6.20	V	1.0	19.98	5.4	46.0	31.58	-14.42
700.10	5.50	H	1.4	20.53	5.6	46.0	31.63	-14.37
Remark	H : Horizontal, V : Vertical *CL = Cable Loss-Amplifier Gain(In case of above1000Mhz) *CL = Cable Loss(In case of below1000Mhz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120KHz for Quasi-peak detection at frequency below 1GHz. *Checked in each test mode and operation mode, and the maximum measured data were reported. *To meet the radiated emission, the EUT was measured at LAN port after connecting with Ferrite Bead(CU1330(b))							

5.7 Test data(Harmonics)

950	-	-	-	23.90	6.6	46.0	-	-
955	-	-	-	23.97	6.6	46.0	-	-
960	-	-	-	24.04	6.6	54.0	-	-
Remark	There was no found any emission during the above test							



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5.8 Test data(PC mode)

Test Date : 29-Aug-08

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 (dB)
39.64	14.40	V	1.0	11.12	0.3	40.0	25.86	-14.14
48.00	15.80	V	1.0	12.19	0.4	40.0	28.42	-11.58
120.00	16.90	V	1.0	11.18	1.4	43.5	29.48	-14.02
144.00	15.20	H	2.6	12.81	1.5	43.5	29.55	-13.95
162.04	14.80	H	2.1	12.75	1.7	43.5	29.27	-14.23
200.01	16.60	H	1.6	9.67	2.2	43.5	28.47	-15.03
225.00	17.20	H	1.3	10.49	2.3	43.5	30.03	-13.47
250.00	19.80	V	1.0	11.40	2.5	46.0	33.70	-12.30
272.03	16.50	V	1.0	12.07	2.8	46.0	31.38	-14.62
300.62	18.80	H	1.1	12.96	3.0	46.0	34.77	-11.23
360.12	17.20	H	1.0	14.27	3.4	46.0	34.87	-11.13
480.00	16.50	H	1.1	16.71	4.1	46.0	37.31	-8.69
567.01	11.80	V	1.0	18.67	4.8	46.0	35.30	-10.70
620.94	7.20	V	1.0	19.67	5.2	46.0	32.08	-13.92
750.02	5.80	H	1.1	21.30	5.9	46.0	32.95	-13.05
960.00	4.10	H	1.0	24.04	6.6	46.0	34.74	-11.26
Remark	H : Horizontal, V : Vertical *CL = Cable Loss-Amplifier Gain(In case of above1000Mhz) *CL = Cable Loss(In case of below1000Mhz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120KHz for Quasi-peak detection at frequency below 1GHz. *Checked in each test mode and operation mode, and the maximum measured data were reported. *To meet the radiated emission, the EUT was measured at LAN port after connecting with Ferrite Bead(CU1330(b))							



6. Measurement of conducted disturbance (Receiver mode)

The continuous disturbance voltage of AC Mains in the frequency from 0.15 to 30 MHz was measured in accordance to FCC Part 15 (2007) & ANSI C 63.4 (2003). The test setup was made according to FCC Part 15 (2007) & 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	NNLA8120A	Schwarzbeck	8120161	2009. 2. 28
LISN	ESH3-Z5	Schwarzbeck	838979/010	2009. 2. 28
TEST Receive	ESPI7	Rohde & Schwarz	100185	2008. 8. 27
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	-

6.2 Environmental Condition

Test Place : Shield Room

Temperature (°C) : 22°C

Humidity (%) : 42%



6. Measurement of conducted disturbance (PC mode)

The continuous disturbance voltage of AC Mains in the frequency from 0.15 to 30 MHz was measured in accordance to FCC Part 15 (2007) & ANSI C 63.4 (2003). The test setup was made according to FCC Part 15 (2007) & 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	NNLA8120A	Schwarzbeck	8120161	2009. 2. 28
LISN	ESH3-Z5	Schwarzbeck	838979/010	2009. 2. 28
TEST Receive	ESPI7	Rohde & Schwarz	100185	2009. 8. 27
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	-

6.2 Environmental Condition

Test Place : Shield Room

Temperature (°C) : 22°C

Humidity (%) : 46%



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6.3 Test data(Digital)

Test date : 7-Aug-08

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	0.15	0.8	N	66.00	54.76	55.66	56.00	34.48	35.38
0.20	0.17	0.8	N	63.61	52.08	53.04	53.61	40.15	41.11
0.27	0.20	0.9	N	61.15	47.22	48.27	51.15	38.61	39.66
0.34	0.21	0.9	H	59.28	37.14	38.21	49.28	37.14	38.21
0.40	0.20	0.8	N	57.83	47.95	48.98	47.83	38.48	39.51
0.47	0.20	0.8	N	56.57	46.07	47.07	46.57	33.11	34.11
0.67	0.20	0.8	H	56.00	39.69	40.69	46.00	39.69	40.69
0.74	0.20	0.8	N	56.00	50.53	51.54	46.00	41.60	42.61
0.87	0.19	0.8	N	56.00	50.07	51.07	46.00	40.03	41.03
1.14	0.19	0.8	N	56.00	49.72	50.70	46.00	38.45	39.43
1.20	0.19	0.8	H	56.00	39.51	40.50	46.00	39.51	40.50
2.21	0.24	0.8	N	56.00	50.65	51.74	46.00	39.85	40.94
5.49	0.37	1.0	H	60.00	33.96	35.32	50.00	33.96	35.32
5.62	0.38	1.0	N	60.00	46.49	47.87	50.00	32.37	33.75
6.49	0.44	1.1	H	60.00	34.02	35.52	50.00	34.02	35.52
6.62	0.45	1.1	N	60.00	47.19	48.71	50.00	33.54	35.06
7.09	0.48	1.1	N	60.00	47.65	49.23	50.00	33.82	35.40
7.17	0.48	1.1	H	60.00	29.29	30.88	50.00	29.29	30.88
Remark	H : Hot Line, N : Neutral Line *Checked in each test mode and operation mode, and the maximum measured data were reported.								



6.4 Test data(Satellite)

Test date : 7-Aug-08

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	0.15	0.8	N	66.00	54.74	55.64	56.00	34.29	35.19
0.20	0.17	0.8	N	63.57	52.14	53.10	53.57	38.92	39.88
0.27	0.20	0.9	N	61.21	47.40	48.45	51.21	38.99	40.04
0.34	0.21	0.9	N	59.30	46.89	47.96	49.30	38.73	39.80
0.40	0.20	0.8	N	57.81	47.82	48.85	47.81	38.82	39.85
0.47	0.20	0.8	H	56.58	44.54	45.54	46.58	32.62	33.62
0.74	0.20	0.8	H	56.00	50.19	51.20	46.00	41.77	42.78
0.80	0.20	0.8	N	56.00	49.53	50.55	46.00	41.33	42.35
0.87	0.19	0.8	N	56.00	49.32	50.32	46.00	39.77	40.77
1.20	0.19	0.8	H	56.00	49.69	50.68	46.00	40.19	41.18
1.74	0.22	0.8	N	56.00	50.15	51.19	46.00	39.70	40.74
2.14	0.23	0.8	H	56.00	50.77	51.85	46.00	35.80	36.88
5.42	0.36	1.0	H	60.00	45.47	46.82	50.00	33.22	34.57
6.09	0.41	1.0	N	60.00	47.89	49.33	50.00	32.04	33.48
6.35	0.43	1.0	N	60.00	47.62	49.10	50.00	31.17	32.65
6.75	0.46	1.1	H	60.00	45.62	47.15	50.00	33.29	34.82
7.16	0.48	1.1	N	60.00	47.12	48.71	50.00	32.46	34.05
7.30	0.48	1.1	H	60.00	45.15	46.75	50.00	26.68	28.28
Remark	H : Hot Line, N : Neutral Line *Checked in each test mode and operation mode, and the maximum measured data were reported.								



6.4 Test data(PC mode)

Test date : 29-Aug-08

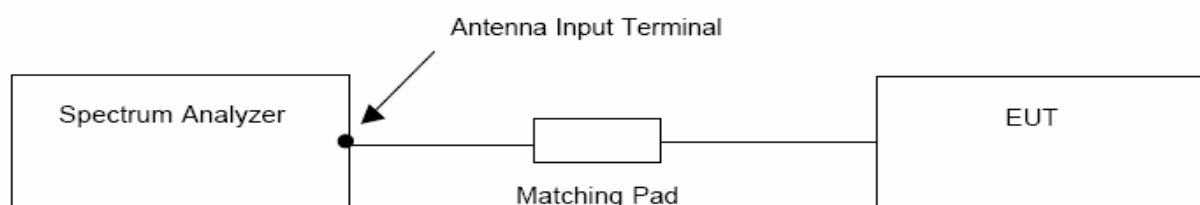
Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dBμV)	Reading (dBμV)	Result (dBμV)	Limit (dBμV)	Reading (dBμV)	Result (dBμV)
0.15	0.15	0.8	N	66.00	58.64	59.54	56.00	35.97	36.87
0.20	0.17	0.8	H	63.61	51.72	52.68	53.61	39.97	40.93
0.27	0.20	0.9	H	61.18	47.13	48.18	51.18	38.41	39.46
0.33	0.21	0.9	H	59.40	46.20	47.27	49.40	36.19	37.26
0.40	0.20	0.8	H	57.83	46.28	47.31	47.83	35.80	36.83
0.47	0.20	0.8	N	56.58	48.44	49.44	46.58	37.19	38.19
0.87	0.19	0.8	H	56.00	50.58	51.58	46.00	41.89	42.89
1.41	0.20	0.8	H	56.00	50.24	51.25	46.00	40.06	41.07
1.47	0.20	0.8	H	56.00	50.55	51.57	46.00	38.41	39.43
1.94	0.23	0.8	H	56.00	50.85	51.91	46.00	39.49	40.55
3.14	0.27	0.9	N	56.00	50.04	51.19	46.00	39.58	40.73
5.49	0.37	1.0	N	60.00	48.24	49.60	50.00	36.19	37.55
5.55	0.37	1.0	H	60.00	48.44	49.81	50.00	32.15	33.52
6.49	0.44	1.1	H	60.00	48.53	50.03	50.00	36.38	37.88
6.55	0.45	1.1	N	60.00	47.15	48.66	50.00	36.45	37.96
7.02	0.48	1.1	H	60.00	47.25	48.82	50.00	33.92	35.49
7.09	0.48	1.1	N	60.00	46.92	48.50	50.00	34.81	36.39
Remark	H : Hot Line, N : Neutral Line *Checked in each test mode and operation mode, and the maximum measured data were reported.								



7. Measurement of Antenna conducted power

Power on the receive antenna terminals was to be determined by measurement of the voltage present at these terminals. Antenna-conducted power measurements is performed with the EUT antenna terminals connected directly to a spectrum analyzer, if the antenna impedance matches the impedance of the measuring instrument. Otherwise, use an impedance-matching network to connect the measuring instrument to the antenna terminals of the EUT. Losses in decibels in any impedance-matching network used is added to the measured value in dBμV.

With the EUT tuned to one of the frequency over which device operates , measure both the frequency and voltage present at the antenna input terminals over the frequency range specified in the individual equipment requirements. Repeat this measurement with the receiver tuned to another frequency until the number of frequencies specified have been successively measured. Power on the receive antenna terminals is the ratio of V^2/R , where V is the loss-corrected voltage measured at the antenna terminals, and R is the impedance of the measuring instrument.



7.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Matching Pad	358.5414.02	R/S	862571/051	-
Spectrum Analyzer	R3261C	ADVANTEST	61720116	2009. 4. 22

7.2 Environmental Condition

Test Place : Shield Room
Temperature (°C) : 22°C
Humidity (%) : 41%



7.3 Test data (Digital)

Test date : 8-Aug-08

Frequency (MHz)	Reading (dBμV)	Emission level (dBμV)	Cable loss (dB)	Result Value	
				Limit (dBμV)	Margin (dB)
123.1	17.64	23.56	5.92	50.0	26.44
709.3	14.32	20.60	6.28	50.0	29.40
1415.7	14.27	21.57	7.30	50.0	28.43
1520.7	14.87	22.29	7.42	50.0	27.71

Notes :

1. Emission level = Reading level + Cable loss / Margin = limit - Emission level
2. Cable loss = Cable loss+Matching Pad
- 3.Checked in each test mode and operation mode,and the maximum measured data were reported.



7.4 Test data (Satellite)

Test date : 8-Aug-08

Frequency (MHz)	Reading (dBμV)	Emission level (dBμV)	Cable loss (dB)	Result Value	
				Limit (dBμV)	Margin (dB)
37	22.50	28.29	5.79	50.0	21.71
66.4	23.60	29.40	5.80	50.0	20.60
81.6	23.54	29.46	5.92	50.0	20.54
226.4	18.65	24.73	6.08	50.0	25.27
416.8	16.40	22.59	6.19	50.0	27.41
973.3	14.27	20.80	6.53	50.0	29.20
1497.9	14.12	21.32	7.20	50.0	28.68
1856.1	14.69	22.19	7.50	50.0	27.81

Notes :

1. Emission level = Reading level + Cable loss / Margin = limit - Emission level
2. Cable loss = Cable loss+Matching Pad
- 3.Checked in each test mode and operation mode,and the maximum measured data were reported.



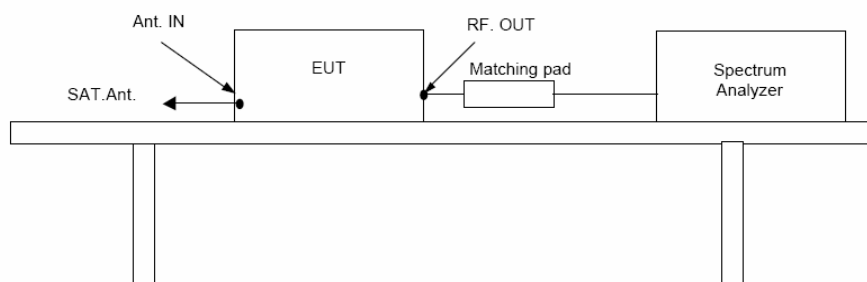
8. Measurement of output signal conducted level(N/A)

The output signal level is the maximum voltage level present at the output terminals of the EUT on a particular frequency during normal use of the device.

The signal level was measured by direct connection to the spectrum analyzer with 50/75 ohm matching transformer between the spectrum analyzer and the TV interface device. The RF output signal level measured was the highest RF level present at the output terminals during normal use of the device. Measurements were made of the levels of both the visual (61.25 MHz) and audio (71.75 MHz) carrier for each TV channel(3 and 4) on which the device operates. The cable was supported between the EUT and the measuring instrument in a straight horizontal line so it had at least 75cm clearance from any conducting surface.

The EUT is provided with a typical signal consistent with normal operation. For each channel on which the EUT operates and in each mode in which the device operates, the video and audio carrier level is measured and recorded.

The voltage corresponding to the peak envelope power of the video modulated signal during maximum amplitude peaks across a resistance (R ohms) matching the rated output impedance of the device, must not exceed $346.4 R^{1/2} \mu V$ for all other TV interface device. The voltage corresponding to peak envelope power of the audio modulated signal, if provided by the TV interface device, must not exceed $155 R^{1/2} \mu V$ for cable system terminal device of TV interface device used with a master antenna, and $77.5 R^{1/2} \mu V$ for all other TV interface device. Losses in decibels in any impedance-matching network used is added to the measured value in dBmV. The EUT was configured in accordance with ANSI C 63.4 2003 Section 12.2 as below configuration block diagram and the EUT configuration can also be seen in Appendix B. Photographs of the test setup.



8.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Spectrum Analyzer	R3261C	ADVANTEST	61720116	2009. 4. 22
Matching Pad	358.5414.02	R/S	862571/051	-

8.2 Environmental Condition

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



8.3 Test data(N/A)

Test date :

Test RF channel	Emission frequency (MHz)	Reading (dBμV)	Cable loss (dB)	Emission level (dBμV)	Result Value	
					Limit (dBμV)	Margin (dB)
Remark	It does not need this requirement because this device no have modulator output function					

Notes :

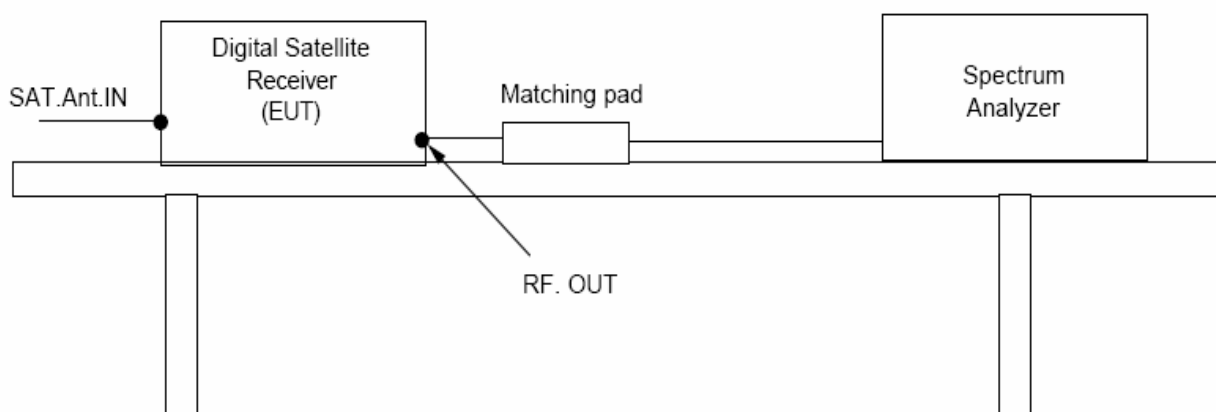
1. Emission level = Reading level + Cable loss / Margin = limit - Emission level.
2. Cable loss = Cable loss + Matching Pad
3. Checked in each test mode and operation mode, and the maximum measured data were reported.



9. Measurement of output terminal conducted spurious emission

The RF output signal was fed to the TV receiver via coaxial cable. Measurements were made by direct connection to the spectrum analyzer and TV interface device with 50/75 ohm matching transformer. The frequency range 30 to 1000 MHz was investigated for significant emission.

The maximum RMS voltage of any emission appearing on frequencies removed by more than 4.6 MHz below and 7.4 MHz above the video carrier frequency on which the TV interface device is operated must not exceed $692.8 R^{1/2} \mu V$ for cable system terminal device or TV interface device used with a master antenna and $10.95 R^{1/2} \mu V$ for all other TV interface device when terminated with a resistance (R ohms) matching the rated output impedance of the TV interface device. The EUT was configured in accordance with ANSI C 63.4 2003 Section 12.2 as below configuration block diagram and the EUT configuration can also be seen in Appendix B. Photographs of the test setup.



9.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Spectrum Analyzer	R3261C	ADVANTEST	61720116	2009. 4. 22
Matching Pad	358.5414.02	R/S	862571/051	-

9.2 Environmental Condition

Test Place : Shield Room
Temperature (°C) : 22°C
Humidity (%) : 41%



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9.3 Test data(Digital)

Test date : 7-Aug-08

Emission frequency (MHz)	Reading (dBμV)	Cable loss (dB)	Emission level (dBμV)	Result Value	
				Limit (dBμV)	Margin (dB)
106.50	16.62	5.92	22.54	39.5	16.96
225.40	13.92	9.08	23.00	39.5	16.50
797.90	15.92	6.28	22.20	39.5	17.30
1197.10	15.27	7.2	22.47	39.5	17.03
1702.60	14.62	7.56	22.18	39.5	17.32
Remark	There was no found any output conducted spurious emission during the above test *Note - NF:Noise Floor				

Notes :

1. Emission level = Reading level + Cable loss / Margin = limit - Emission level.
2. Cable loss = Cable loss + Matching Pad
3. The spectrum was checked in each test mode and operation mode, and the maximum measured data were reported.



9.4 Test data (Satellite)

Test date : 7-Aug-08

Emission frequency (MHz)	Reading (dBμV)	Cable loss (dB)	Emission level (dBμV)	Result Value	
				Limit (dBμV)	Margin (dB)
36.80	23.56	5.79	29.35	39.5	10.15
66.40	22.1	5.91	28.01	39.5	11.49
109.70	18.5	5.92	24.42	39.5	15.08
384.00	18.3	6.05	24.35	39.5	15.15
666.40	14.18	6.41	20.59	39.5	18.91
Remark	There was no found any output conducted spurious emission during the above test *Note - NF:Noise Floor				

Notes :

1. Emission level = Reading level + Cable loss / Margin = limit - Emission level.
2. Cable loss = Cable loss + Matching Pad
3. The spectrum was checked in each test mode and operation mode, and the maximum measured data were reported.



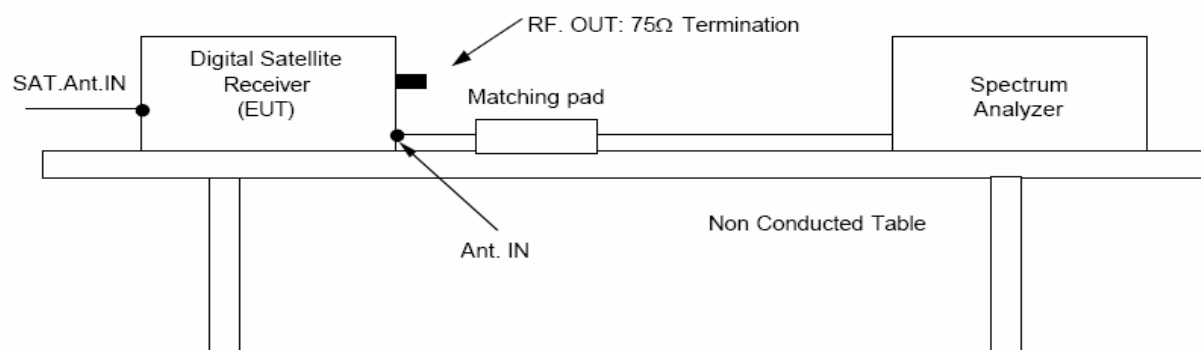
10. Measurement of antenna transfer switch

Isolation was measured for all positions of an antenna transfer switch on all output channels of the EUT. TV interface device transfer switch isolation is the difference the levels of a signal going into one antenna input port of the switch and that of the same signal coming out of another antenna terminal of transfer switch. The isolation of an antenna transfer switch equipped with coaxial connectors is performed by measuring the maximum voltage of the visual carrier. Measurements were made of the maximum RMS voltage at the antenna input terminals of the switch for all positions of the transfer switch. The maximum voltage corresponds to the peak envelope power of the video signal during maximum amplitude peaks. In either position of the receiver transfer switch, the maximum voltage at the receiving antenna input terminals of the switch when terminated with a resistance (R ohms) matching the rated impedance of the antenna input of the switch, must not exceed $0.346 R^{1/2} \mu V$.

The maximum voltage corresponds to the peak envelope power of the video modulated signal during maximum amplitude.

The EUT was configured in accordance with ANSI C 63.4 2003 Section 12.2 as below configuration block diagram. and the EUT configuration can also be seen in Appendix B. Photographs of the test setup.

The unused RF input/output terminals are terminated in a proper impedance. The antenna input terminal is connected to the input of preamplifier through the matching transformer coaxial cable. And the output of preamplifier is connected to the spectrum analyzer. Then, the signal level on the antenna input terminal is measured under the EUT condition produced the maximum signal level.



10.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
Spectrum Analyzer	R3261C	ADVANTEST	61720116	2009. 4. 22
Matching Pad	358.5414.02	R/S	862571/051	-

10.2 Environmental Condition

Test Place : Shield Room
Temperature (°C) : 22°C
Humidity (%) : 41%



10.3 Test data

Test date : 7-Aug-08

Test RF channel	Emission frequency (MHz)	Meter Reading (dBμV)	Correction Factor (dB)	Emission level (dBμV)	Result Value	
					Limit (dBμV)	Margin (dB)
Remark	There was no found any antenna transfer switch emission during the above test					

Notes :

1. Emission level = Reading level + Cable loss / Margin = limit - Emission level.
2. Cable loss = Cable loss + 6dB(Matching Pad)
- 3.The specturm was checked in each test mode and operation mode, and the maximum measured data were reported.



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11. Photographs of test setup(Receiver mode)

Setup for Radiated Test

[Front]



[Rear]





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11. Photographs of test setup(PC mode)

Setup for Radiated Test

[Front]



[Rear]





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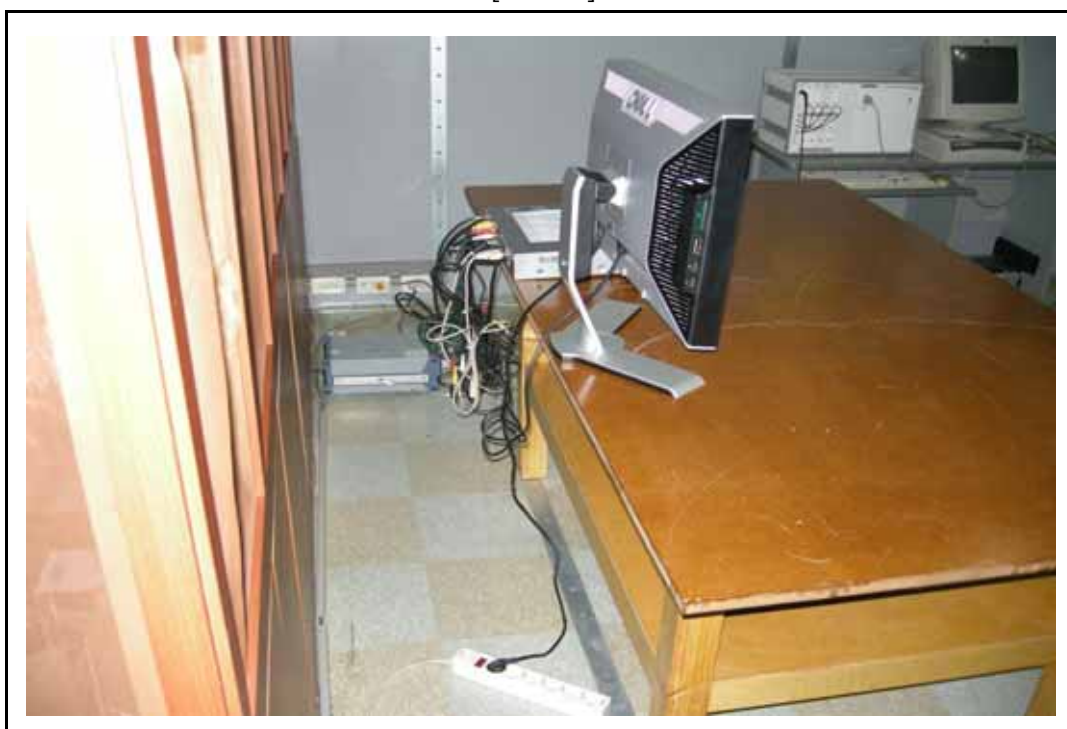
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Setup for Conducted Test : 0.15 ~ 30 MHz(Receiver mode)

[Front]



[Rear]





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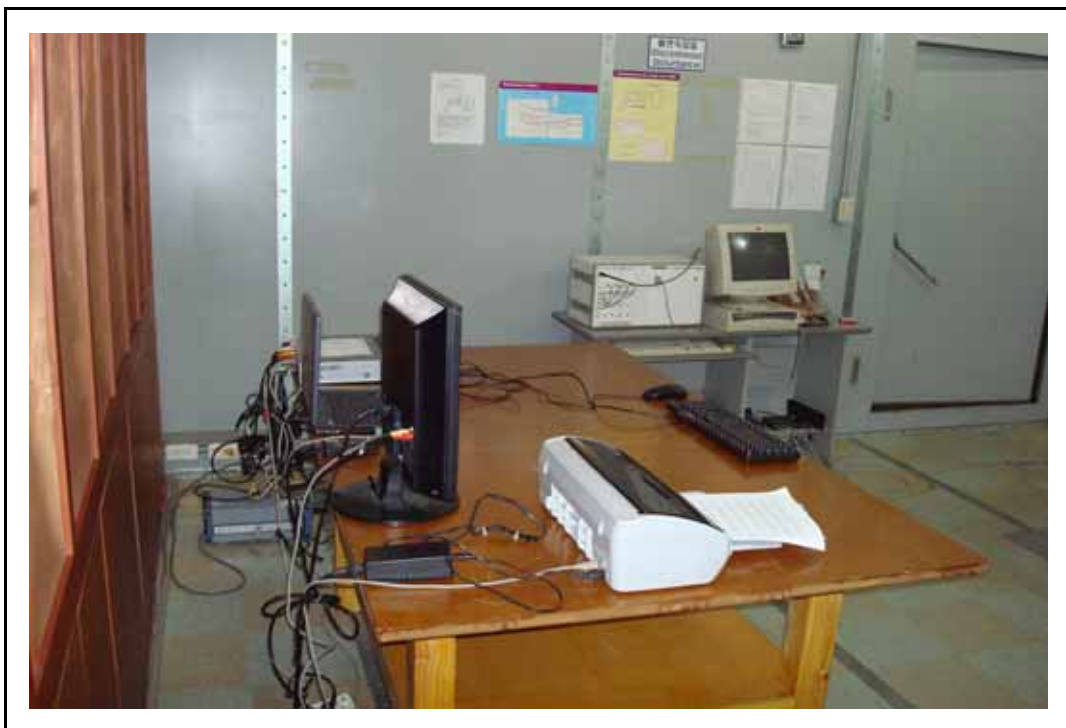
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Setup for Conducted Test : 0.15 ~ 30 MHz(PC mode)

[Front]



[Rear]

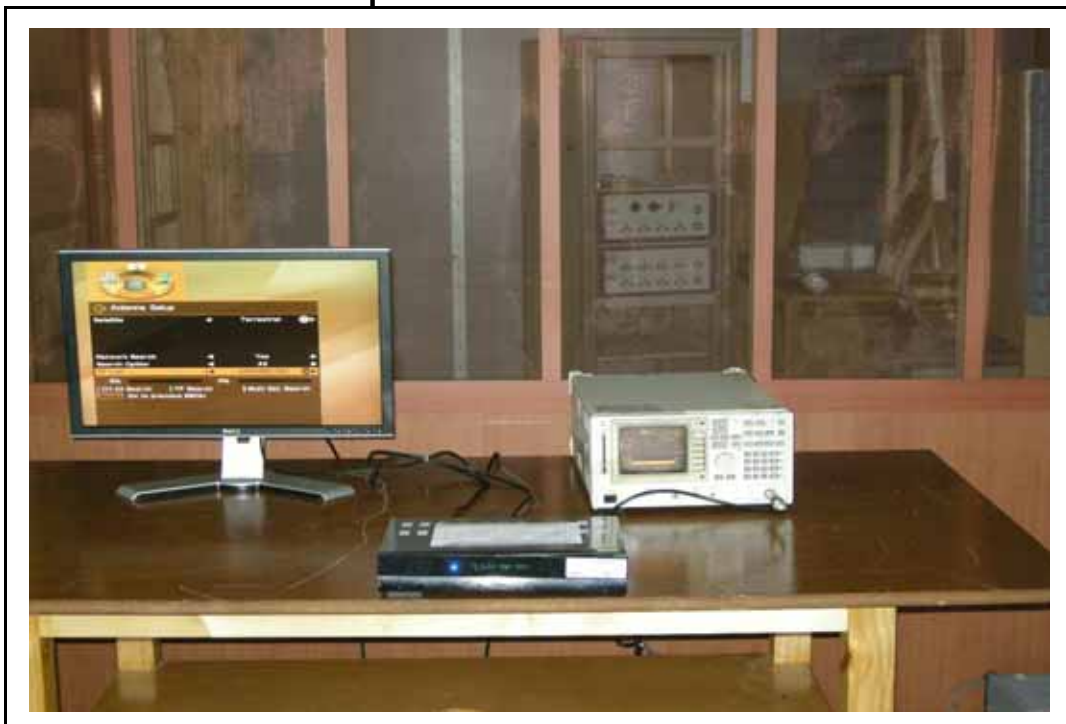




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Antenna conducted power & antenna transfer switch



output terminal conducted spurious emission





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12. Photographs of EUT

[Front]



[Rear]



Appendix 1. Special diagram (Digital)

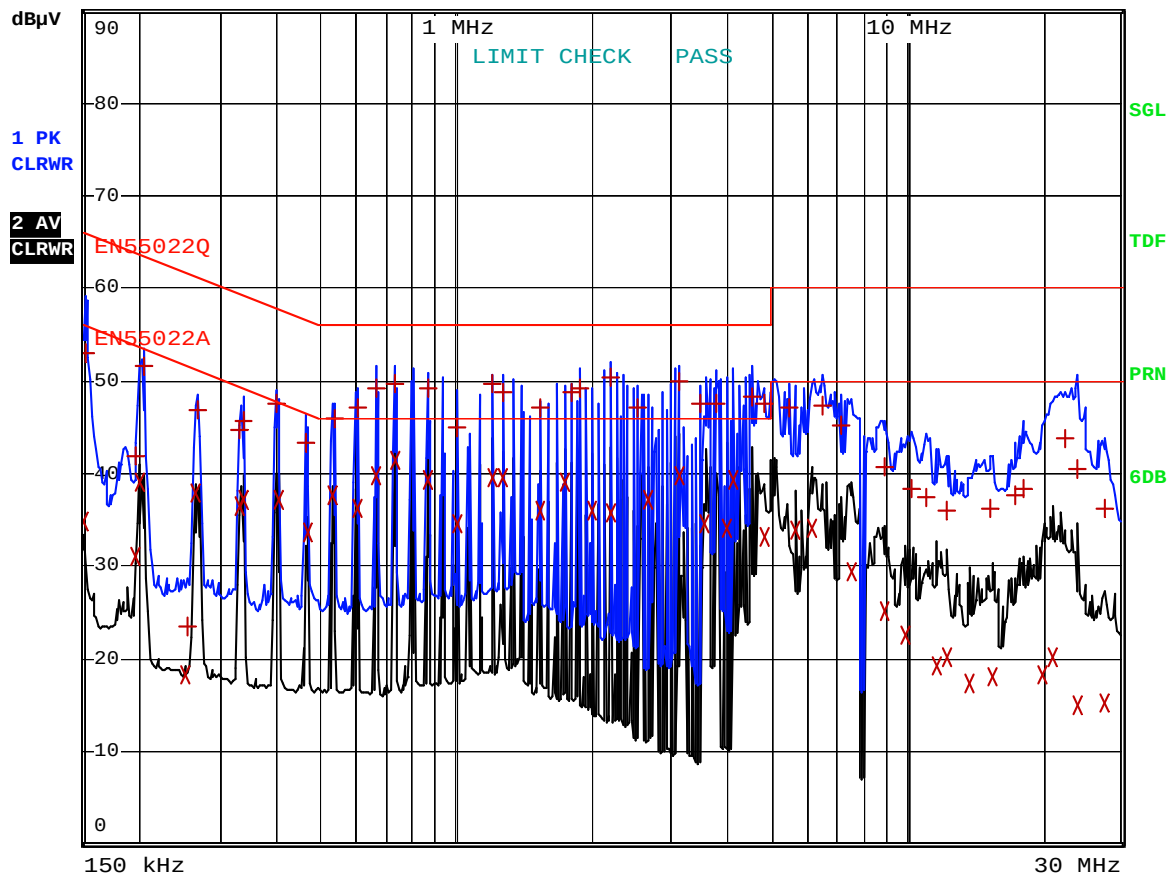
*HOT



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



Comment: NUVENIO NV HD(DIGITAL)_HOT

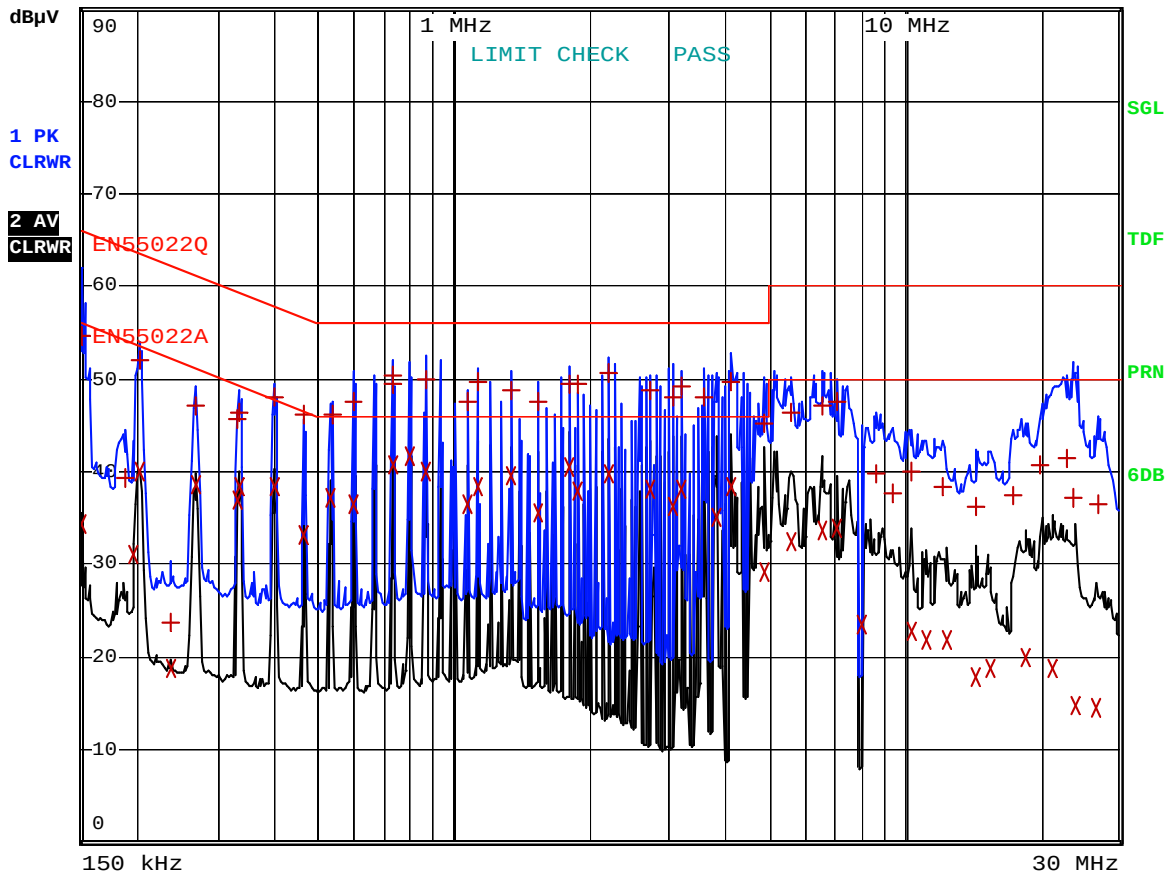
Date: 7.AUG.2008 10:09:57

*NETRUL



RBW 9 kHz
MT 1 s

Att 10 dB AUTO PREAMP OFF



Comment: NUVENIO NV HD(DIGITAL)_NEUTRAL
Date: 7.AUG.2008 10:04:29

Appendix 2. Special diagram (Satellite)

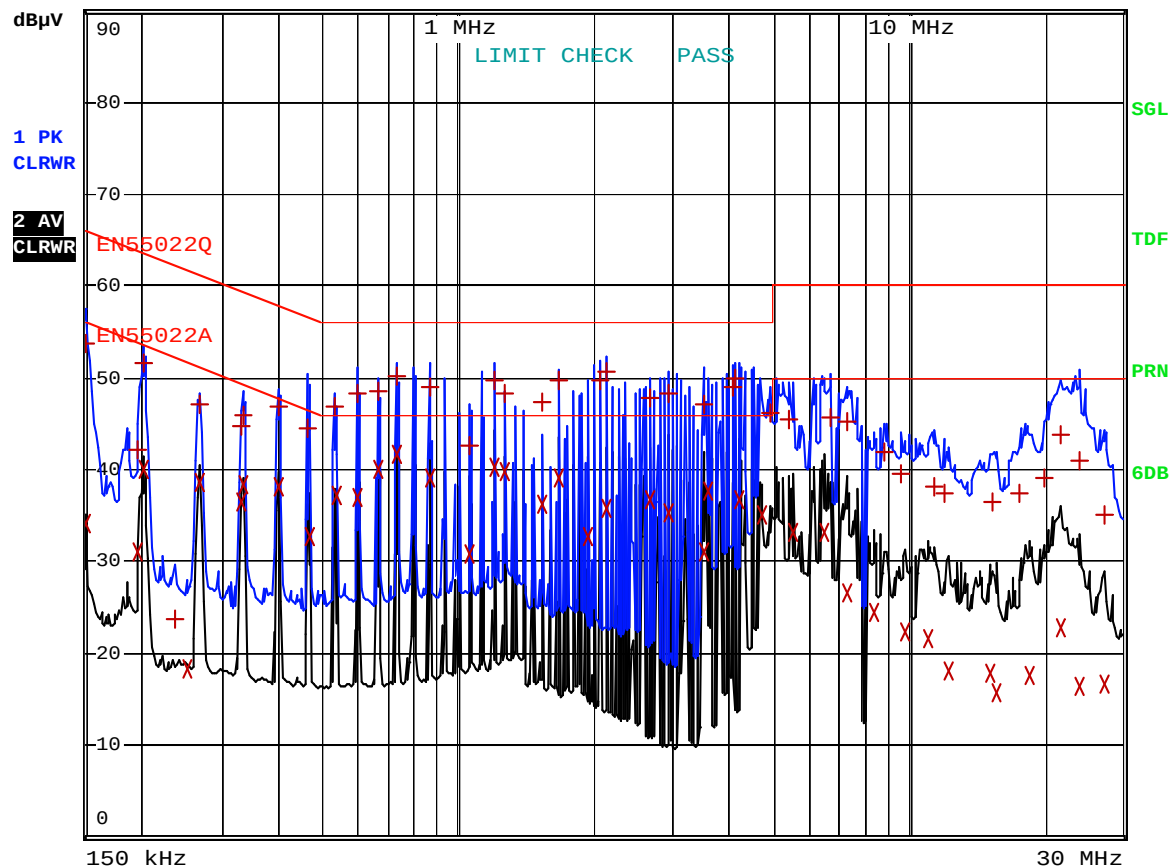
*HOT



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



Comment: NUVENIO NV HD(SATELLITE)_HOT

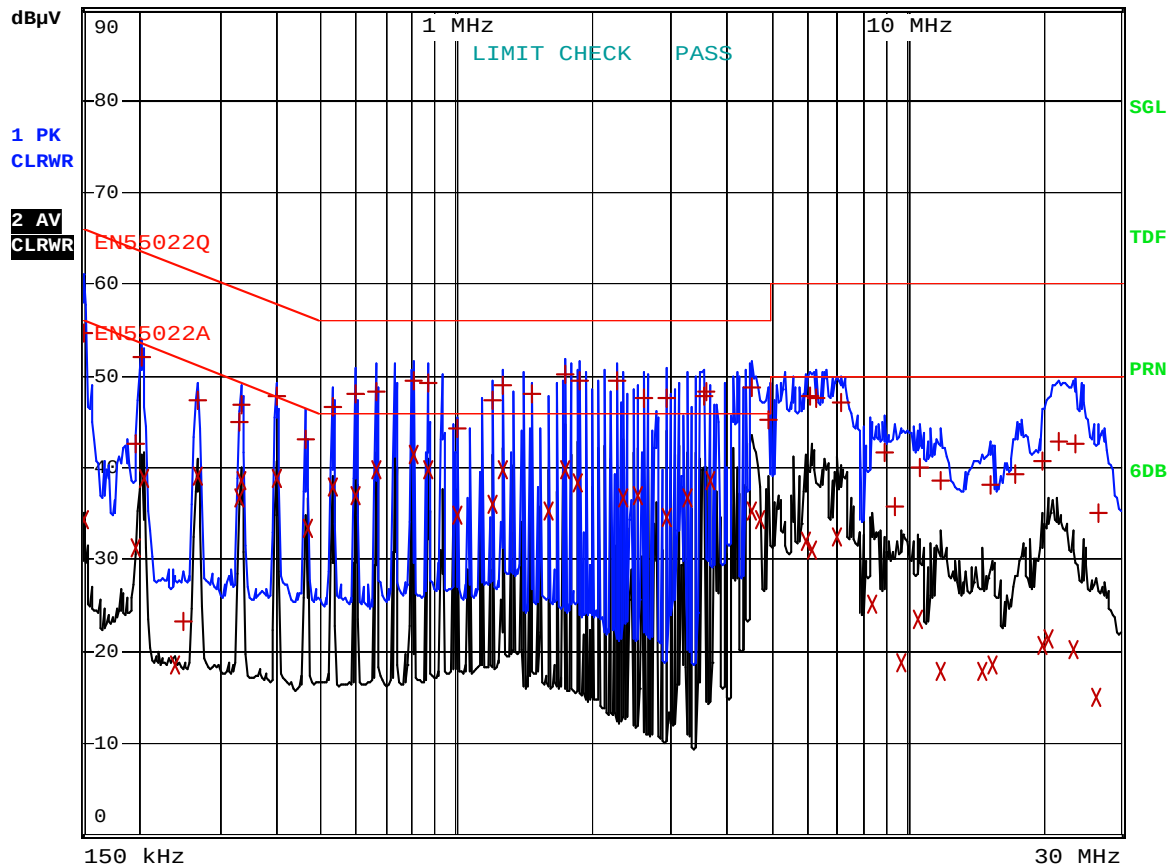
Date: 7.AUG.2008 10:19:58

*NETRUL



RBW 9 kHz
MT 1 s

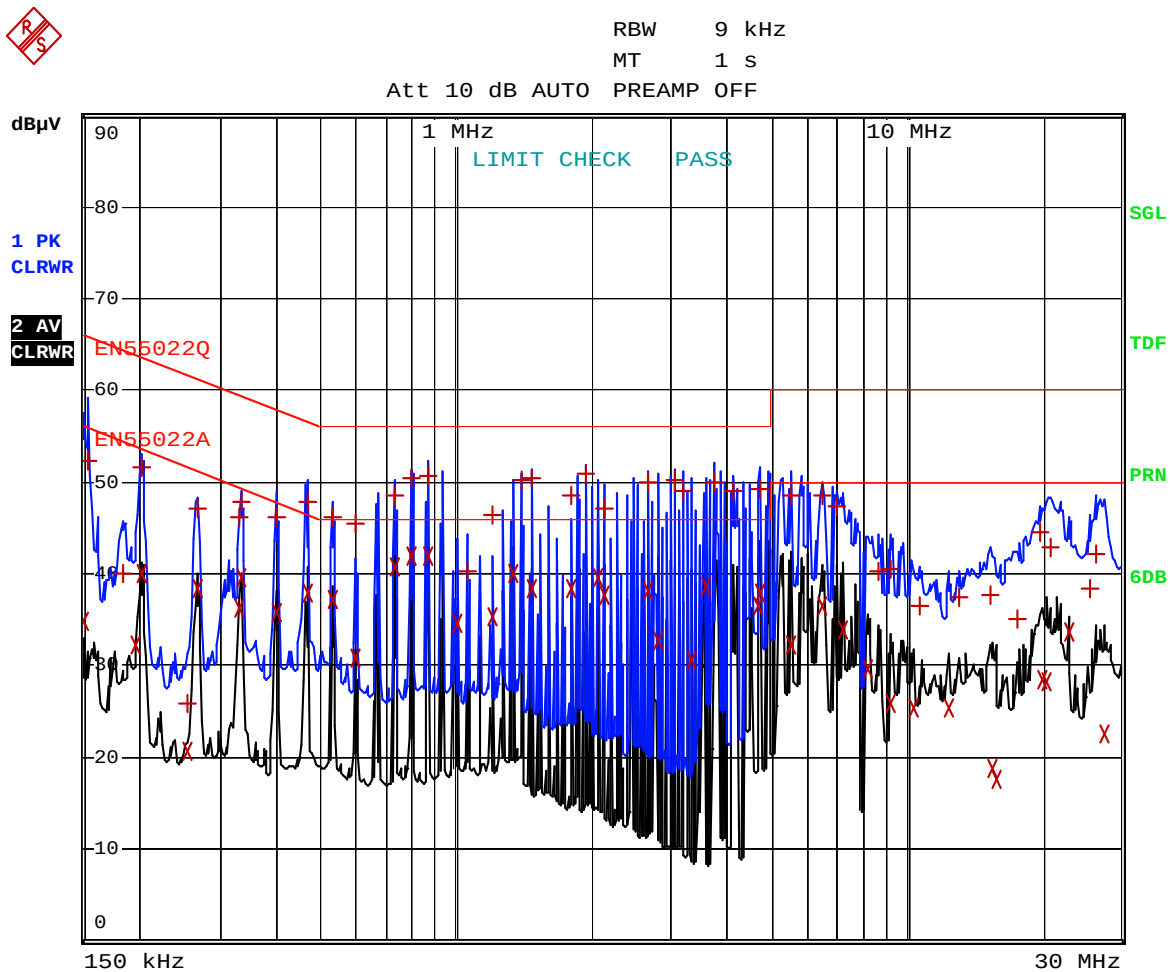
Att 10 dB AUTO PREAMP OFF



Comment: NUVENIO NV HD(SATELLITE)_NEUTRAL
Date: 7.AUG.2008 10:25:07

Appendix 3. Special diagram (PC mode)

*HOT



Comment: NUVENIO NV HD HOT
Date: 29.AUG.2008 15:55:38

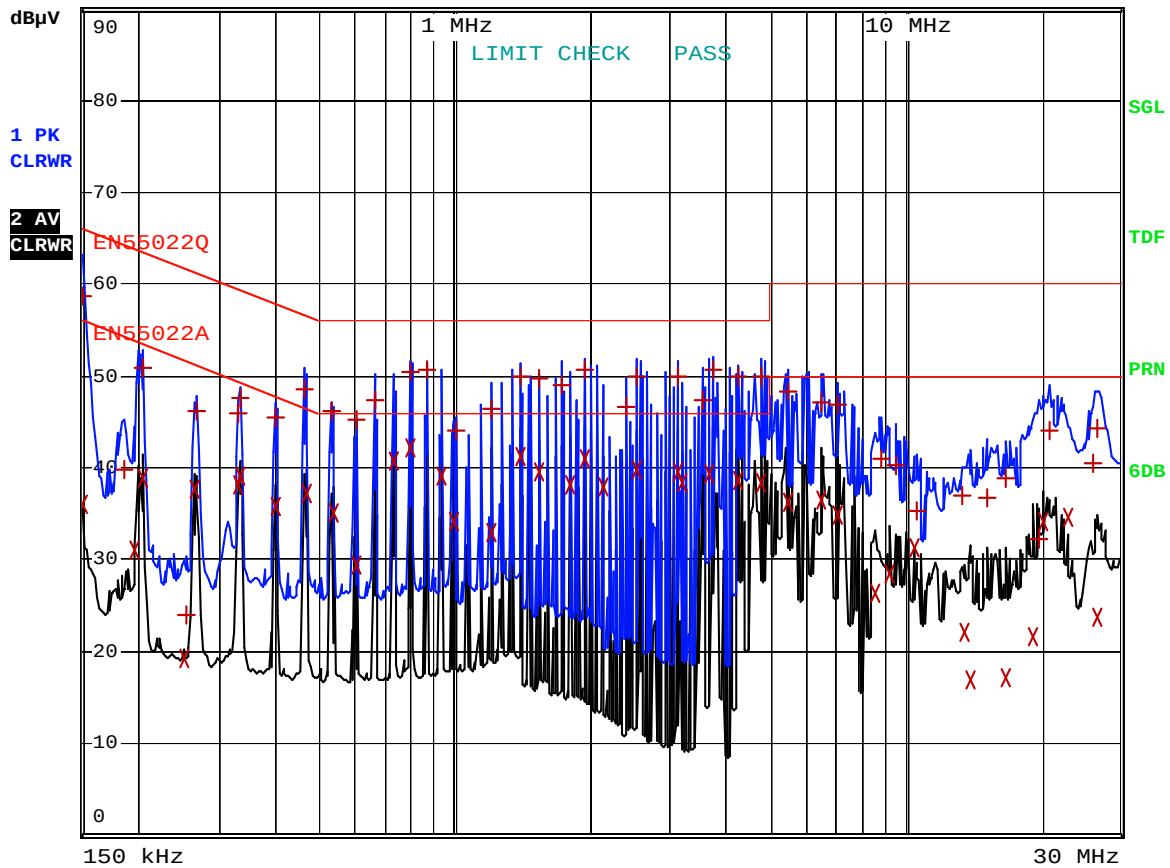
*NETRUL



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



Comment: NUVENIO NV HD NEUTRAL
Date: 29.AUG.2008 16:03:27