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

Report Number		ESTF150604-010			
Applicant	Company name	AMT CO., LTD			
	Address	Shin-young Bldg., 10F., #1597-1 Seocho-Dong, Seocho-Gu, Seoul, Korea			
	Telephone	82-2-3470-1207			
Product	Product name	Digital Satellite Receiver			
	Model No.	SAT CRUISER NOVA	Manufacturer	AMT CO., LTD	
	Serial No.	NONE	Country of origin	KOREA	
Test date	2006-03-24 ~ 2006-04-25		Date of issue	2006-04-26	
Test location	ESTECH. Co., Ltd. 97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea				
Standard	FCC PART 15 (2005) 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	OK
	■ 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	Engineer J.H.Kim (Signature)				
Reviewed by	Engineering Manager J.M.Yang (Signature)				
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable				

* Note

- STAR CRUISER NOVA,BLUE JAY PLUS and SAT CRUISER NOVA are same product,only model name is different.
- This is certified that the above mentioned producs 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

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, 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

Product : Digital Satellite Receiver

Model Number : SAT CRUISER NOVA

Serial Number : NONE

Manufacturer : AMT CO., LTD

Country of origin : KOREA

Rating : AC120V / 60HZ

Receipt Date : 2006-03-24

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
	LNB power	13V/18V(Max.400mA)
	LNB tone switch	22KH ±2KHz(0.6Vp-p)
	External LNB switch	0/12V(100mA)
MPEG	VIdeo	MPEG-II Main Profile@Main Level
	Audio	MPEG-II layer I&II
VIDEO	Resolution	720 × 576
	Video output level	1Vp-p into 75 Ω
	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 Ω
General Data	Supply voltage	100~240V (AC, 50/60Hz)
	Power consumption	Max.25W
	Operating temp.	0 °C ~ 50 °C
	Storage temp.	-40 °C ~65 °C
	Dimensions	340(W) × 247(D) × 67.5(H)mm
	Weight	3.0Kg

USING FRQ :27MHz

3. Test Standards

Test Standard : FCC PART 15 (2005)

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)

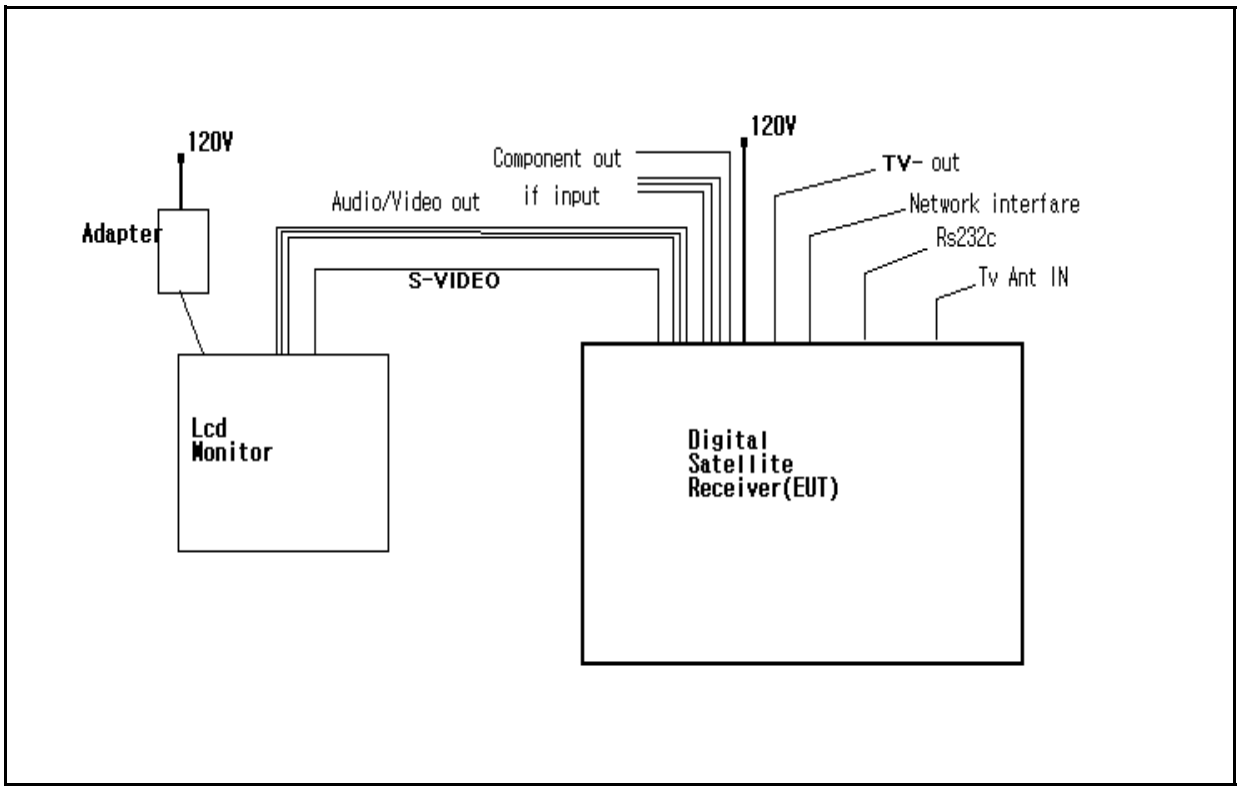
This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and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



4.3 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
Digital Satellite Receiver	SAT CRUISER NOVA	NONE	AMT CO., LTD	EUT
LCD Monitor	KD17NS	N433HKX300852K	SAMSUNG	
ADAPTER	AP04914-UV	0401011616AC	Anam Instruments Co., Ltd.	

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
Digital Satellite Receiver	S-Video	LCD MONITOR	S-Video	2	Y	
Digital Satellite Receiver	Audio Output	LCD MONITOR	Audio Input	2	N	
Digital Satellite Receiver	IF Input	Digital Satellite Receiver	RF	25	N	
Digital Satellite Receiver	Component out	-	-	2	N	
Digital Satellite Receiver	TV out	-	-	2	N	
Digital Satellite Receiver	TV ANT IN	-	-	2	N	
Digital Satellite Receiver	RS232C	-	-	2	N	
Digital Satellite Receiver	Network interface	-	-	2	N	
Digital Satellite Receiver	Video out	LCD MONITOR	Video in	2	N	
LCD MONITOR	Adapter	ADAPTER	-	2	N	

5. Measurement of radiated disturbance

5.1 Radiated Emission

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2005) & ANSI C 63.4 (2003). The test setup was made according to FCC Part 15 (2005) & 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 Receive	ESPI7	Rohde & Schwarz	100185	2006. 8. 22
Spectrum Analyzer	R3261C	ADVANTEST	61720116	2007. 4. 19
LogBicon Antenna	VULB 9160	S/B	3142	2006. 7. 04
Horn Antenna	BBHA 9120 D	SCHWARZBECK	352	2007. 3. 17
Turn Table	2087	EMCO	2129	-
Antenna Mast	2070-01	EMCO	9702-203	-
ANT Mast Controller	2090	EMCO	1535	-
Turn Table Controller	2090	EMCO	1535	-

5.4 Environmental Condition

Test Place : Open site(3m)
Temperature (°C) : 11 ℃
Humidity (%) : 48 %

5.5 Test data

Test Date : 27-Mar-06 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)
30.39	23.00	V	1.0	12.24	0.9	40.0	36.17	-3.83
32.62	23.50	V	1.0	12.27	0.9	40.0	36.70	-3.30
50.40	15.00	V	1.0	12.57	1.2	40.0	28.75	-11.25
79.42	21.00	V	1.0	9.93	1.4	40.0	32.31	-7.69
85.90	21.00	V	1.0	8.69	1.5	40.0	31.17	-8.83
94.43	18.50	V	1.0	9.36	1.5	43.5	29.39	-14.11
114.89	22.50	V	1.0	11.13	1.7	43.5	35.29	-8.21
152.32	16.50	V	1.0	13.93	1.9	43.5	32.33	-11.17
54.04	15.00	V	1.0	12.62	1.2	40.0	28.80	-11.20
162.03	23.00	V	1.0	13.90	2.0	43.5	38.86	-4.64
159.75	18.00	V	1.0	14.01	1.9	43.5	33.95	-9.55
216.01	22.00	H	1.6	10.65	2.3	43.5	34.92	-8.58
243.02	20.50	H	1.0	11.75	2.4	46.0	34.70	-11.30
250.02	21.50	V	1.0	11.92	2.6	46.0	35.98	-10.02
378.06	16.50	H	1.0	14.62	3.2	46.0	34.30	-11.70
432.00	20.50	H	1.0	15.85	3.6	46.0	39.91	-6.09
108.00	18.50	V	1.0	10.35	1.6	43.5	30.46	-13.04
675.00	7.50	V	1.0	19.92	4.6	46.0	32.02	-13.98
Remark	H : Horizontal, V : Vertical *Checked in each test mode and operation mode, and the maximum measured data were reported.							

5.6 Test data(Harmonics)

950	-	-	-	23.51	5.8	46.0	-	-
955	-	-	-	23.57	5.8	46.0	-	-
960	-	-	-	23.43	5.9	54.0	-	-
Remark	There was no found any emission during the above test							

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 (2005) & ANSI C 63.4 (2003) The test setup was made according to FCC Part 15 (2005) & 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	NONE	2007. 2. 27
TEST Receive	ESPI7	Rohde & Schwarz	100185	2006. 8. 22
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	2006. 6. 15

6.2 Environmental Condition

Test Place : Shield Room
Temperature (°C) : 21℃
Humidity (%) : 42%

6.3 Test data

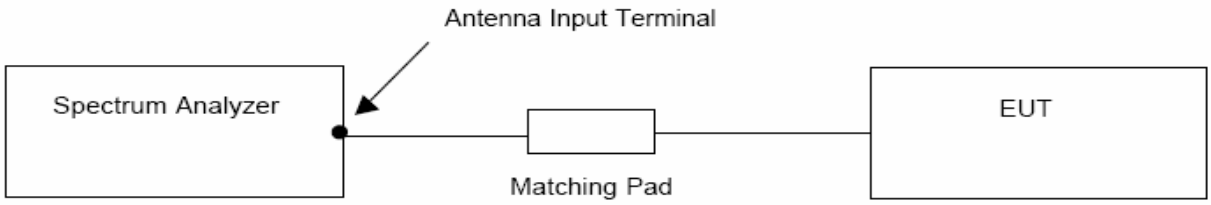
Test date : 27-Mar-06

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 (dBμV)
0.15	0.07	0.0	H	66.00	45.09	45.16	56.00	32.64	32.71
0.21	0.07	0.0	H	63.41	44.16	44.27	53.41	38.76	38.87
0.62	0.08	0.2	N	56.00	44.29	44.57	46.00	38.11	38.39
0.76	0.09	0.2	N	56.00	44.45	44.74	46.00	38.95	39.24
1.17	0.09	0.2	H	56.00	43.01	43.32	46.00	38.04	38.35
1.23	0.09	0.2	N	56.00	42.07	42.39	46.00	-	-
1.30	0.10	0.2	N	56.00	42.86	43.19	46.00	35.80	36.13
1.58	0.10	0.3	H	56.00	43.07	43.43	46.00	36.59	36.95
2.13	0.11	0.3	N	56.00	45.22	45.63	46.00	37.13	37.54
2.61	0.13	0.3	H	56.00	45.39	45.82	46.00	36.30	36.73
2.67	0.13	0.3	N	56.00	45.84	46.27	46.00	38.61	39.04
3.09	0.14	0.3	N	56.00	45.25	45.69	46.00	39.73	40.17
3.57	0.16	0.3	H	56.00	43.58	44.04	46.00	39.09	39.55
3.63	0.16	0.3	N	56.00	45.69	46.15	46.00	38.45	38.91
4.59	0.19	0.3	N	56.00	46.44	46.93	46.00	-	-
4.94	0.20	0.3	N	56.00	46.23	46.73	46.00	40.02	40.52
5.42	0.22	0.3	N	60.00	43.15	43.69	50.00	38.70	39.24
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	2007. 4. 19

7.2 Environmental Condition

Test Place : Shield Room
Temperature (°C) : 21℃
Humidity (%) : 44%

7.3 Test data

Test date : 29-Mar-06

Frequency (MHz)	Reading (dBμV)	Emission level (dBμV)	Cable loss (dB)	Result Value	
				Limit (dBμV)	Margin (dB)
85.2	15.65	22.65	7.00	50.0	27.35
92.5	25.87	32.87	7.00	50.0	17.13
184.7	24.75	31.75	7.00	50.0	18.25
368.7	16.87	24.07	7.20	50.0	25.93
648	12.75	20.05	7.30	50.0	29.95
717	13.62	20.92	7.30	50.0	29.08
900	13.15	20.55	7.40	50.0	29.45
1014.3	13.92	21.72	7.80	50.0	28.28
1102.9	13.60	21.60	8.00	50.0	28.40
1290.9	13.50	21.60	8.10	50.0	28.40

Notes :

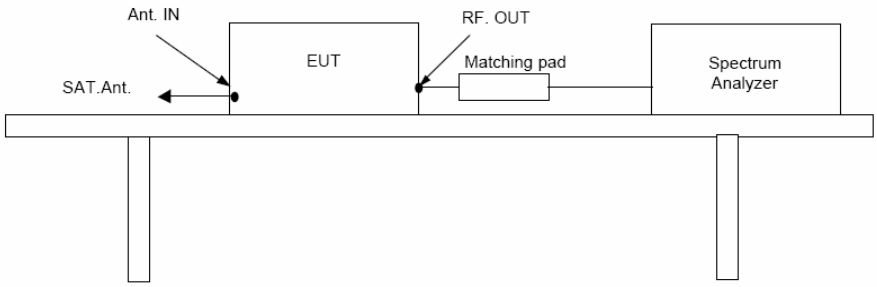
1. Emission level = Reading level + Cable loss / Margin = limit - Emission level

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

The output signal level is themaximum voltage level present ata the output terminals of the EUT on a particular frequency during mormal 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 $R^{1/2}$μV 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$R^{1/2}$μV for cable system terminal device of TV interface device used with a master antenna, and 77.5 $R^{1/2}$μV 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	2007. 4. 19
Matching Pad	358.5414.02	R/S	862571/051	-

8.2 Environmental Condition

Test Place : Shield Room
Temperature (°C) : 21℃
Humidity (%) : 44%

8.3 Test data

Test date : 29-Mar-06

Test RF channel	Emission frequency (MHz)	Reading (dBμV)	Cable loss (dB)	Emission level (dBμV)	Result Value	
					Limit (dBμV)	Margin (dB)
3	61.25	58.52	7	65.52	69.5	3.98
	65.75	42.25	7	49.25	56.5	7.25

Notes :

1. Emission level = Reading level + Cable loss / Margin = limit - Emission level.

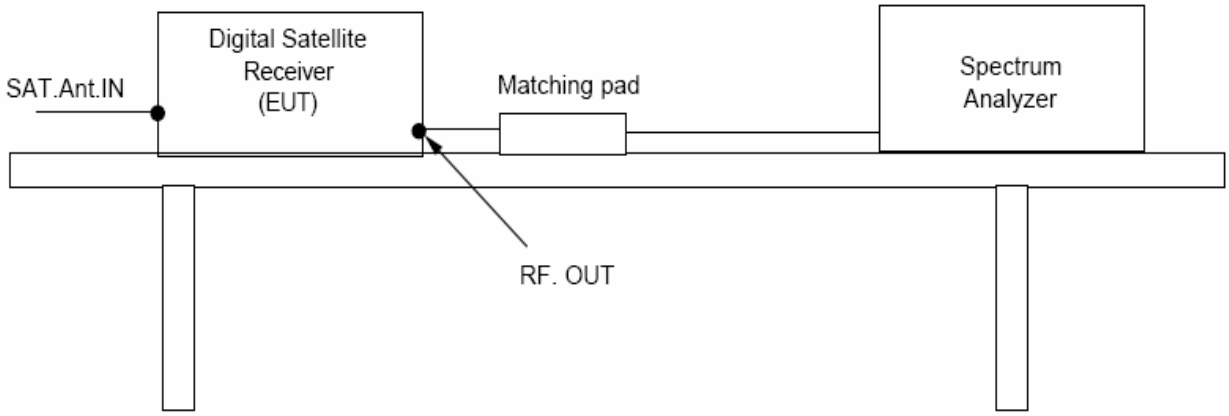
2. Cable loss = Cable loss + Matching Pad

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 $R^{1/2}$μV for cable system terminal device or TV interface device used with a master antenna and 10.95 $R^{1/2}$μV 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	2007. 4. 19
Matching Pad	358.5414.02	R/S	862571/051	-

9.2 Environmental Condition

Test Place : Shield Room

Temperature (°C) : 21℃

Humidity (%) : 44%

9.3 Test data

Test date : 29-Mar-06

Test RF channel	Emission frequency (MHz)	Reading (dBμV)	Cable loss (dB)	Emission level (dBμV)	Result Value	
					Limit (dBμV)	Margin (dB)
3	51.66	NF	7	-	39.5	-
	70.22	NF	7	-	39.5	-
	108.22	NF	7	-	39.5	-
	125.80	NF	7	-	39.5	-
	183.84	21.2	7	28.20	39.5	11.30
	306.00	NF	7.2	-	39.5	-
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 specturm was checked in each test mode and operation mode, and the maximum measured data were reported.

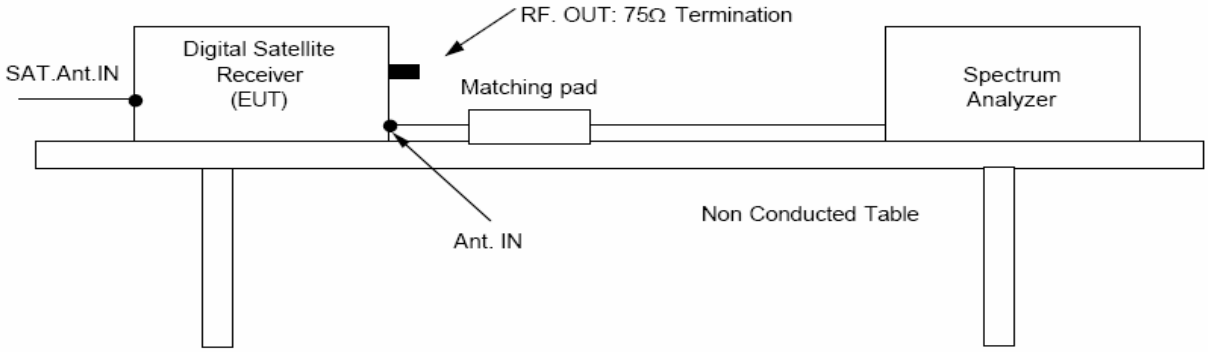
10. Measurement of antenna transfer switch

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 connectorsis 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 $R^{1/2}$ μV.

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 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	2007. 4. 19
Matching Pad	358.5414.02	R/S	862571/051	-

10.2 Environmental Condition

Test Place : Shield Room
Temperature (°C) : 21℃
Humidity (%) : 44%

10.3 Test data

Test date : 29-Mar-06

Test RF channel	Emission frequency (MHz)	Meter Reading (dB㎶)	Correction Factor (dB)	Emission level (dB㎶)	Result Value	
					Limit (dB㎶)	Margin (dB)
3	61.25	-	4.8	-	9.5	-
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.

11. Photographs of test setup

Setup for Radiated Test

[Front]

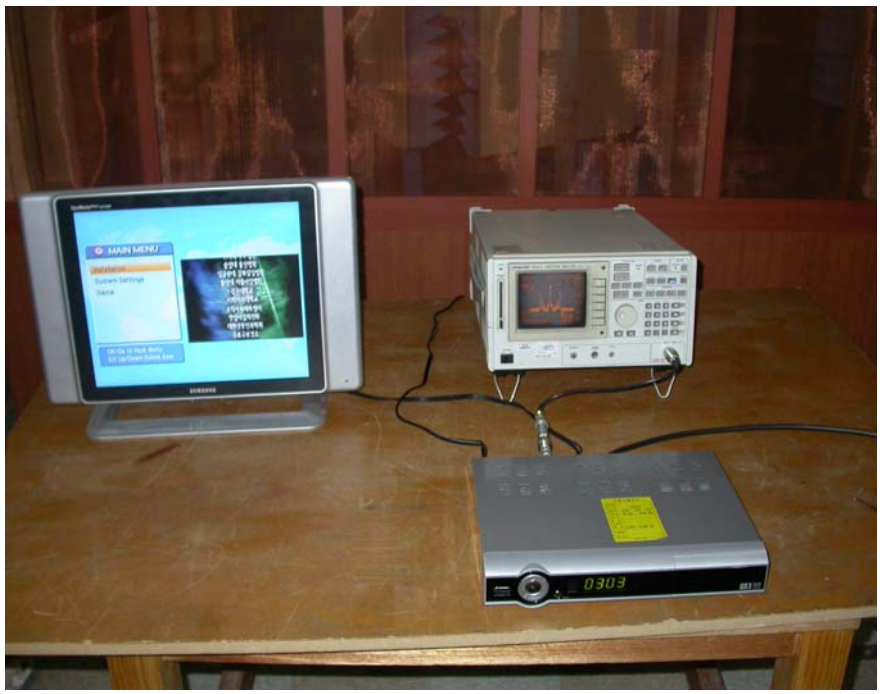
[Rear]

Setup for Conducted Test : 0.15 ~ 30 MHz

[Front]

[Rear]

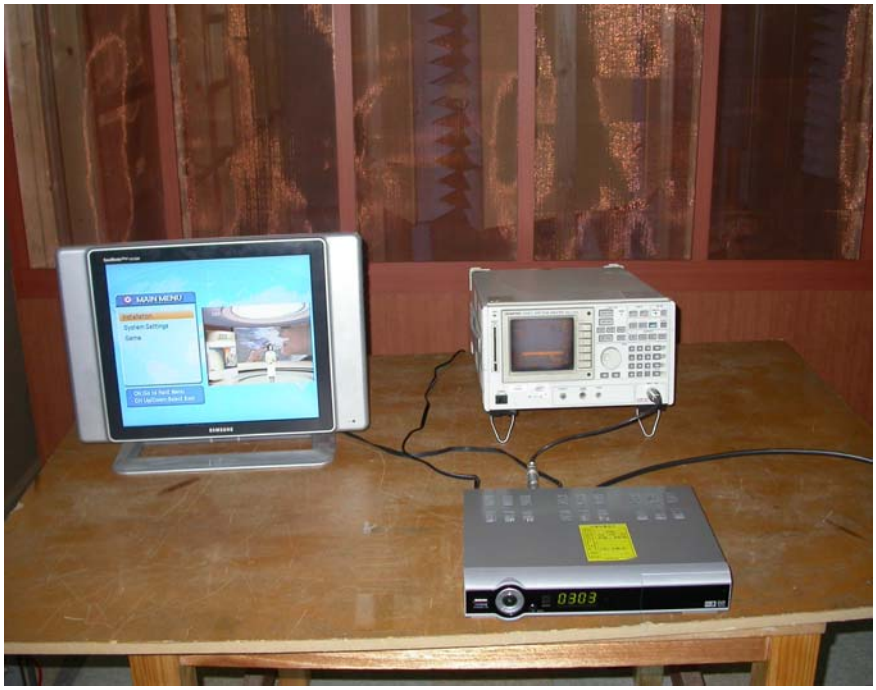
Setup for Antenna conducted power



Setup for Output signal conducted level

Setup for Output terminal conducted spurious emission

Setup for antenna transfer switch

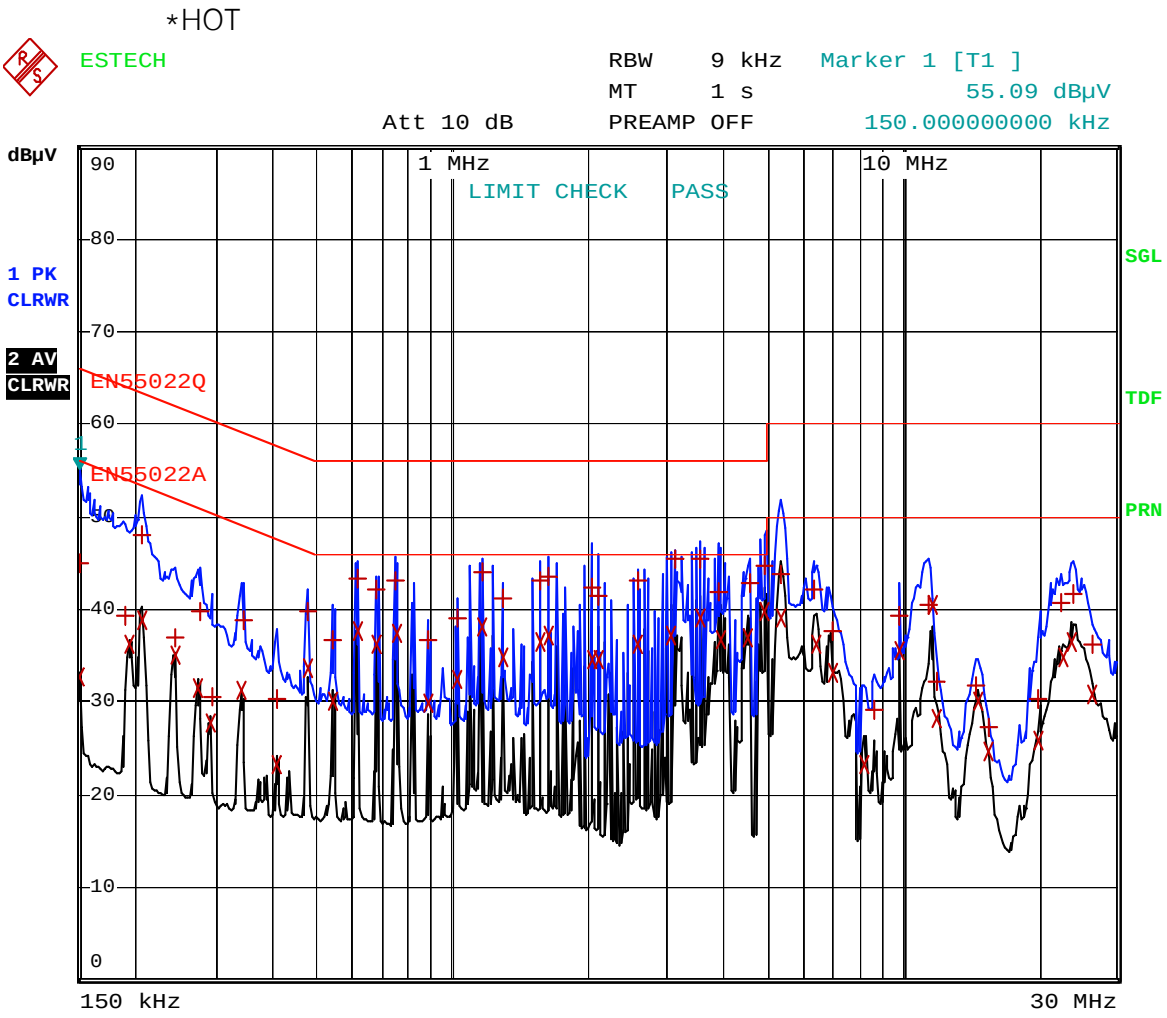


12. Photographs of EUT

[Front]

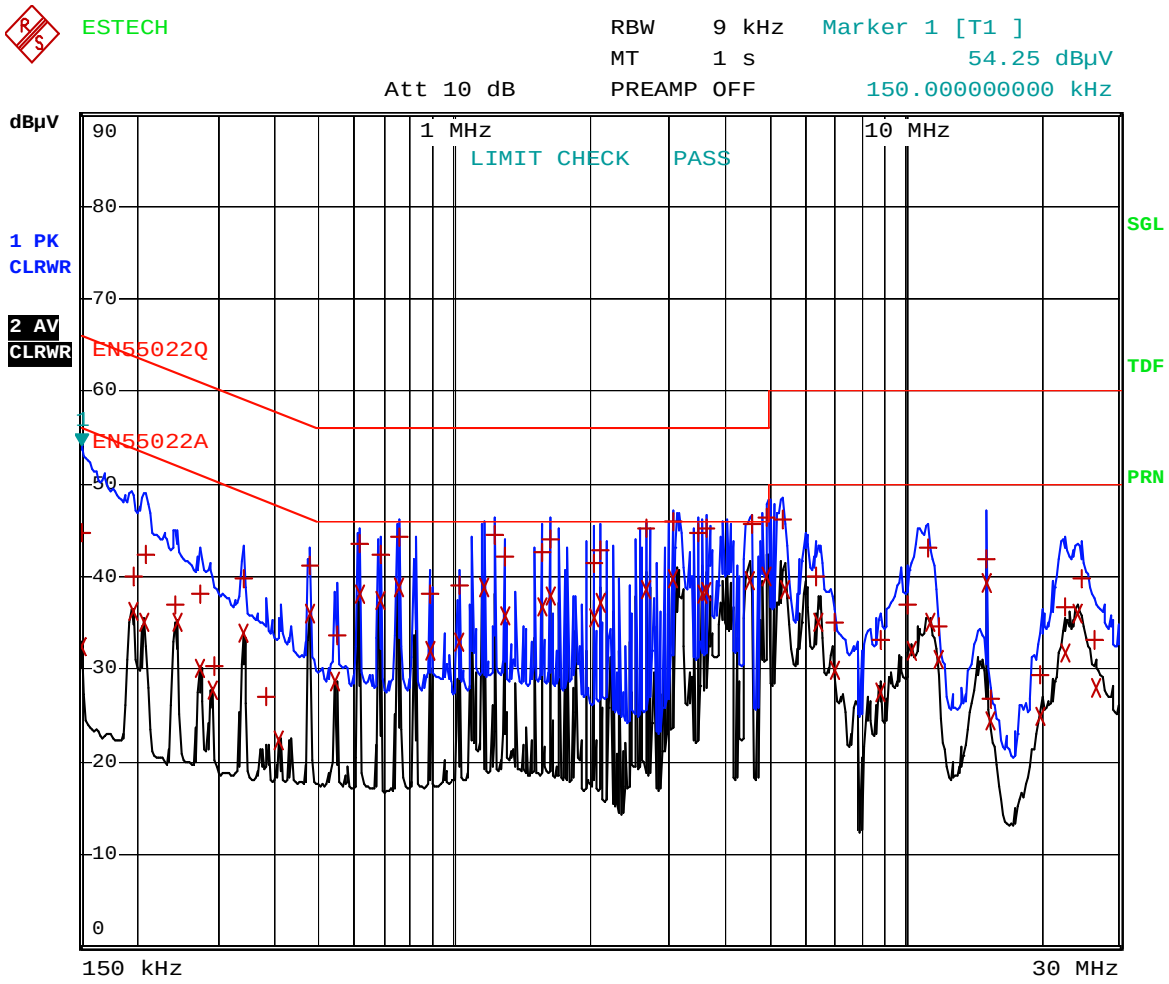
[Rear]

Appendix 1. Spectral diagram



Comment: AMT SAT CRUISER NOVA HOT
Date: 27.MAR.2006 18:35:56

*NETRUL



Comment: AMT SAT CRUISER NOVA NEUTRAL
Date: 27.MAR.2006 18:45:09