

EMC Test Report

According to FCC Part 15 Subpart B

Project No.		LBE040937
Equipment under Test		
	Address	416 Maetan3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, Korea,443-742
	Product Name	Digital Satellite Receiver
	Model Name	D10
	Manufacturer	SAMSUNG
	Brand Name	SAMSUNG
	Broadcasting System	Satellite
	Variant Model	See Page 3
Date of Test		June 01, 2004 ~ June 08, 2004
Issued Date		June 17, 2004

	Name/Position	Signature
Tested by	Sung Wook Choi Test Engineer	S. W. Choi
Reviewed by	No Cheon, Park Manager of EMC Lab.	N. C. Park
Authorized by	Kyu Baek, Chung Chief of EMC Lab.	K. B. Chung

1. This test reports does not constitute an endorsement by NIST/NVLAP or U.S Government.
2. This test report is to certify that the tested device properly complies with the requirements of FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators.

All tests necessary to show compliance to the requirements were and these results met the specifications requirement.

This laboratory is registered by the NIST/NVLAP, U.S.A.

The test reported herein have been performed in accordance with its terms of registration.



NVLAP LAB CODE 200623-0

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1. General Information

1.1 Basic Information related Product

Applicant	SAMSUNG
Model name	D10
Applicant Address	Samsung Electronics Co. Ltd; 416 Maetan3- Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, Korea, 443-742
Contact Person	Sung Wook,Choi
Kind of product	Digital Satellite Receiver
Valiant list	D10-200
Manufacturer	SAMSUNG
New / Alternative / Permissive change Information	This report is original report #

1.2 Detail Information related Product

Specification

Items		Decription
Tuner	FCC ID Number	A3LD10200
	Tuner Freq.Range	950 ~ 2150MHz
	Tuner Input signal level	-65 ~ -25 dBm
	Channel selection	PLL frequency synthesizer
	Input Impedance	75 ohm unbalanced
	LNB Power Control	13V/18V, 22kHz tone
RF modulator	Modulator Output	CH 3 or CH 4
	Video Type	NTSC
	UHF Output level	66 +/- 5dBuV
	Output connector	Female
	Ant. O/P connector	IEC female
	Tuning method	PLL frequency synthesizer

Operating Frequency

Tuner Freq. Range : 950 MHz ~ 2150 MHz

1.3 Operating Mode and Condition

This system have following operating mode(s).

- Satellite Signal Receiving

The system was configured for testing in typical fashion use. All connectors not used are terminated with resistors matching the nominal terminal impedance. The mode of operation utilized for testing was selected to best simulate typical EUT use.

1.4 Equipment Modifications

No equipment modifications were required.

1.5 Test Configuration

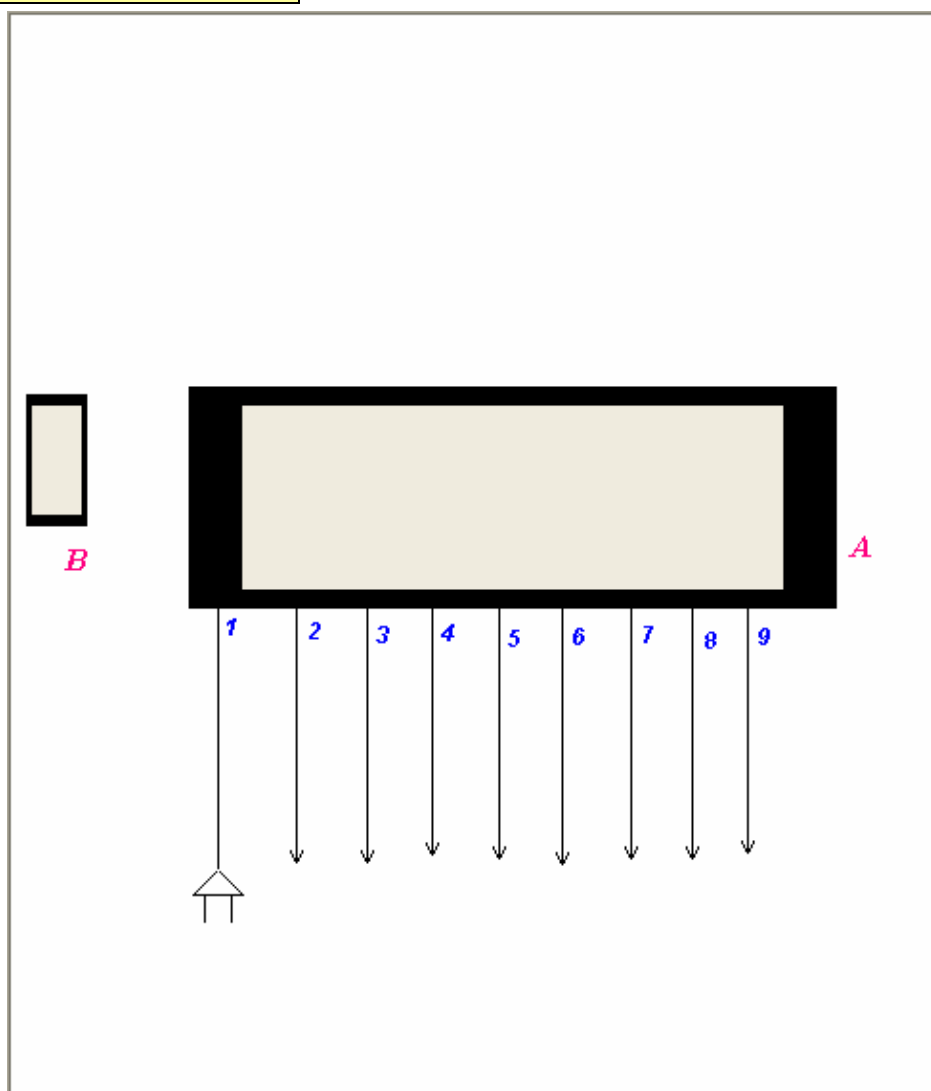
Used EUT and Peripherals

Seq	Device	Model Name	Serial #	Maker	Note
A	Digital Satellite Receiver	D10	None	SAMSUNG	EUT
B	Remote Controller	-	-	SAMSUNG	EUT

Used Cable Description

	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	Power	1.5	No	
2	ANT In	1.5	Yes	75 ohm Termination
3	RF Out	1.5	Yes	75 ohm Termination
4	Dish Input	1.5	Yes	75 ohm Termination
5	Loop	1.5	Yes	75 ohm Termination
6	AV Out 1	1.5	No	Video Out : 75 ohm Terminated Audio Out : 10 kohm Terminated
7	AV Out 2	1.5	No	Video Out : 75 ohm Terminated Audio Out : 10 kohm Terminated
8	Audio Out	1.5	No	Audio Out : 10 kohm Terminated
9	S-Video Out	1.5	No	75 ohm Terminated

Block Diagram



1.6 Applied Standards

List

Applied Standards	Test Procedure
FCC Part15 Subpart B	ANSI 63.4 : 1992

1.7 Test Facility

General Information

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR 22, 16-1, 16-2, 11.

This EMC Testing Lab. is accredited by Korea Laboratory Accreditation Scheme(KOLAS) which signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the above test item(s) and test method(s).

This Lab. is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:1998.

Accreditation and Listing



Uncertainty

(According to NAMAS Pub.NIS81)

Test Item	Expanded Uncertainty
Radiated Disturbance	5.09
Disturbance voltage at the mains terminals	1.64

2. Summary of Test Results

Result : PASS

The equipment under test(EUT) has been found to comply with the applied standards.

Test Name		Applied Standard	Result
Electromagnetic Emission Test			
3.1	Conducted Emission	FCC Part15 Subpart B	Complied
3.2	Antenna Terminals	FCC Part15 Subpart B	Complied
3.3	Radiated Emission	FCC Part15 Subpart B	Complied
3.4	Output Signal Level	FCC Part15 Subpart B	Complied
3.5	Output Terminal Conducted Spurious Emission	FCC Part15 Subpart B	Complied
3.6	Ant. Transfer Switch	FCC Part15 Subpart B	Complied

3. Description of Individual Tests

3.1 Conducted Emission

Test Information		
	Test Engineer	Sung Wook Choi
	Test Date	June 03, 2004
	Climate Condition	Ambient Temperature : 22.6 °C Relative Humidity : 32%
	Test Place	Shield Room #5

Test Equipments

Equipment	Modal Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
Spectrum Analyzer	E7405A	Agilent	US4110272	2005-06-14	12
RF Generator	RF-100	Doctor Design	-	N/A	12
Signal Generator	SMY01	R&S	840703/019	2004-11-06	12
L.I.S.N	ESH3-Z5	R&S	100261	2004-07-16	12
Field strength meter	ESS	R&S	844661	2005-05-31	12
RF Relais Matrix	PSU	R&S	861206/024	N/A	12
L.I.S.N	ESH3-Z5	R&S	100260	2004-07-16	12
Test Software	EP5CE	TOYO	None	N/A	N/A

EUT Test Setup

The EUT was set up as per normal use on a wooden table 0.4m from a vertical ground reference plane, at least 0.8m from other conduction surfaces and 0.8m from the LISN.

See photo..

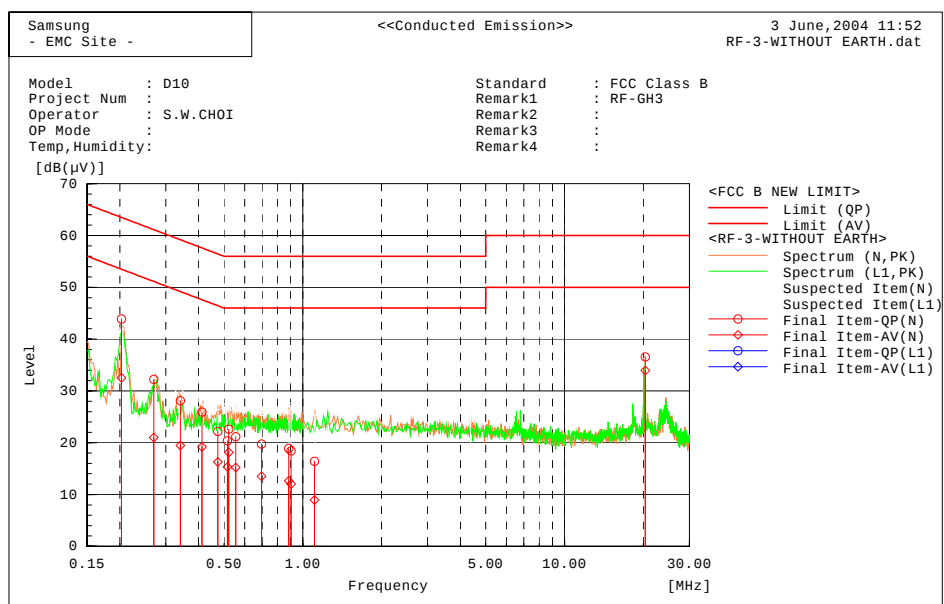
Test Result

Measurement Results	Pass No Operation errors were detected during or after the applied test.
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Test Data

■ Operating Mode : Satellite Signal Receiving-RF Out CH 03

[Graph and Data]



Final Result

--- N Phase ---

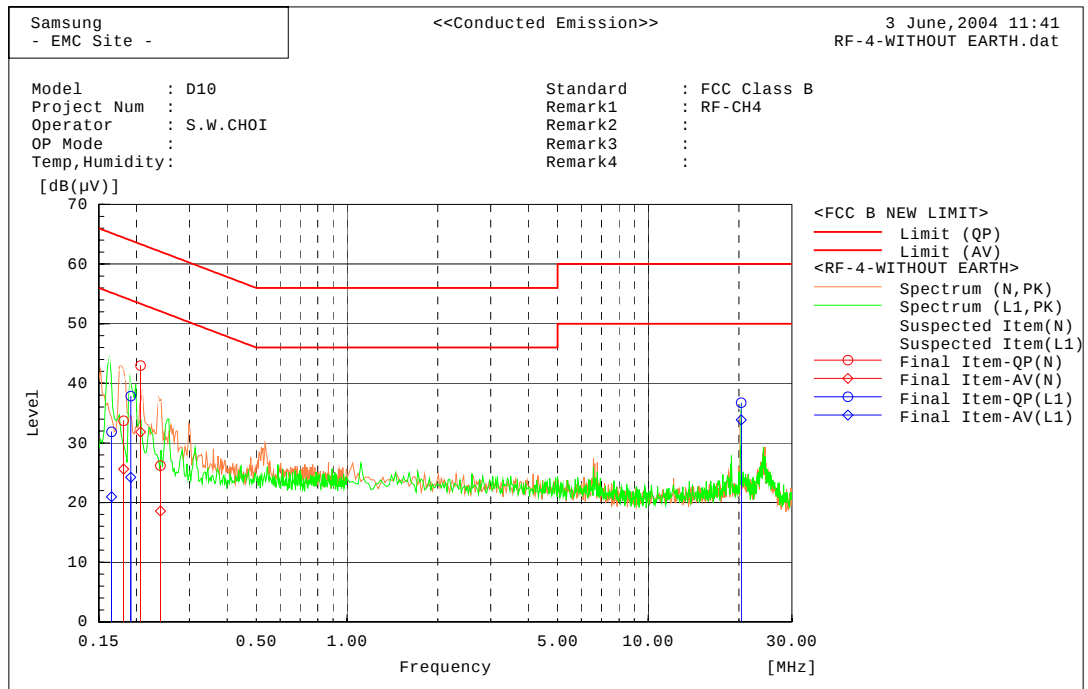
No.	Frequency	Reading	Reading	c.f	Result	Result	Limit	Limit	Margin	Margin
	[MHz]	QP	AV		QP	AV	QP	AV	QP	AV
		[dB(μV)]	[dB(μV)]		[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]
1	0.20302	43.8	32.4	0.1	43.9	32.5	63.5	53.5	19.6	21.0
2	0.26979	32.1	20.9	0.1	32.2	21.0	61.1	51.1	28.9	30.1
3	0.34095	28.0	19.4	0.1	28.1	19.5	59.2	49.2	31.1	29.8
4	0.41233	25.8	19.1	0.1	25.9	19.2	57.6	47.6	31.7	28.4
5	0.47353	22.1	16.2	0.1	22.2	16.3	56.5	46.5	34.3	30.2
6	0.51514	20.2	15.2	0.1	20.3	15.3	56.0	46.0	35.7	30.7
7	0.52196	22.5	18.0	0.1	22.6	18.1	56.0	46.0	33.4	27.9
8	0.55505	21.1	15.1	0.1	21.2	15.2	56.0	46.0	34.9	30.8
9	0.69549	19.7	13.4	0.1	19.8	13.5	56.0	46.0	36.3	32.5
10	0.88383	18.8	12.5	0.1	18.9	12.6	56.0	46.0	37.1	33.4
11	0.90225	18.3	11.9	0.1	18.4	12.0	56.0	46.0	37.6	34.0
12	1.1082	16.3	8.9	0.1	16.4	9.0	56.0	46.0	39.6	37.0
13	20.348	35.6	33.0	0.9	36.5	33.9	60.0	50.0	23.5	16.1

--- L1 Phase ---

No.	Frequency	Reading	Reading	c.f	Result	Result	Limit	Limit	Margin	Margin
		QP	AV		QP	AV	QP	AV	QP	AV
		[dB(μV)]	[dB(μV)]		[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]
1	4.3417	-1.7	-6.4	0.0	-1.7	-6.4	56.0	46.0	57.7	52.4

■ Operating Mode : Satellite Signal Receiving-RF Out CH 04

[Graph and Data]



Final Result

--- N Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]
1	0.18141	33.6	25.5	0.1	33.7	25.6	64.4	54.4	30.7	28.8
2	0.20642	42.9	31.7	0.1	43.0	31.8	63.3	53.3	20.4	21.5
3	0.24044	26.1	18.5	0.1	26.2	18.6	62.1	52.1	35.9	33.5

--- L1 Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]
1	0.16532	31.8	20.9	0.1	31.9	21.0	65.2	55.2	33.3	34.2
2	0.19169	37.8	24.1	0.1	37.9	24.2	64.0	54.0	26.1	29.8
3	20.3505	35.6	32.7	1.2	36.8	33.9	60.0	50.0	23.2	16.1

3.2 Disturbance voltage at the antenna terminals

Test Information	
Test Engineer	Sung Wook,Choi
Test Date	June 04, 2004
Climate Condition	Ambient Temperature : 22.6℃ Relative Humidity : 32%
Test Place	Shield Room #1

Test Equipments

Equipment	Modal Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
RF Generator	RF-100	Doctor Design	-	N/A	12
EMI Test Receiver	ESI	R&S	832692/002	2004-10-25	12
Signal Generator	SMY01	R&S	840703/019	2004-11-06	12
Power Divider	11636A	HP	02512	2004-10-14	12
Matching Pad	RAM	R&S	860175/025	2005-01-08	12
Matching Pad	RAM	R&S	834188/009	2005-01-08	12

EUT Test Setup

RF In terminal of EUT were connected to test receiver and signal generator via power divider as well as matching pad.

At frequencies above 1GHz the peak detector is used

(At 1GHz and below, Quasi-peak detector is used)

* Total Loss = Power Divider Loss + Matching Pad Loss + Cable Loss

Test Results

Measurement Results	Pass No Operation errors were detected during or after the applied test.
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Test Data (Oscillator)

■Operating Mode : TV Receiving

IF Frequency: 70MHz

Band	CH	Tuned Frequency [MHz]	Local Oscillator Frequency [MHz]		Meter Reading [dBuV]	Total Loss [dB]	Results [dBuV]	Limit [dBuV]
	31	1411	Fundamental	1481	-	13.6	-	51.8
			Harmonics					

Remark : There was no found any emission during the above test.

3.3 Radiated Emission

Test Information	
Test Engineer	Sung Wook Choi
Test Date	June 01, 2004
Climate Condition	Ambient Temperature : 22.6 °C Relative Humidity : 32%
Test Place	Semi Anechoic Chamber

Test Equipments

Equipment	Modal Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
Mast Controller	HD2000	HD	HD20000902027	N/A	N/A
Test Software	EP5RET	TOYO	None	N/A	N/A
EMI Receiver	ESI26	R&S	100067	2005-01-09	12
Test Software	EP5RE	TOYO	None	N/A	N/A
RF Generator	RF-100	Doctor Design	-	N/A	12
Signal Generator	SMY01	R&S	840703/019	2004-11-06	12
Biconilog Antenna	6112B	SCHAFFNER	2766	2005-06-03	12
Spectrum Analyzer	E7405A	Agilent	MY42000109	2004-11-27	12
Field strength meter	ESCS	R&S	100104	2004-10-17	12
RF Selector	NS4900	TOYO	0303-015	N/A	N/A

EUT Test Setup

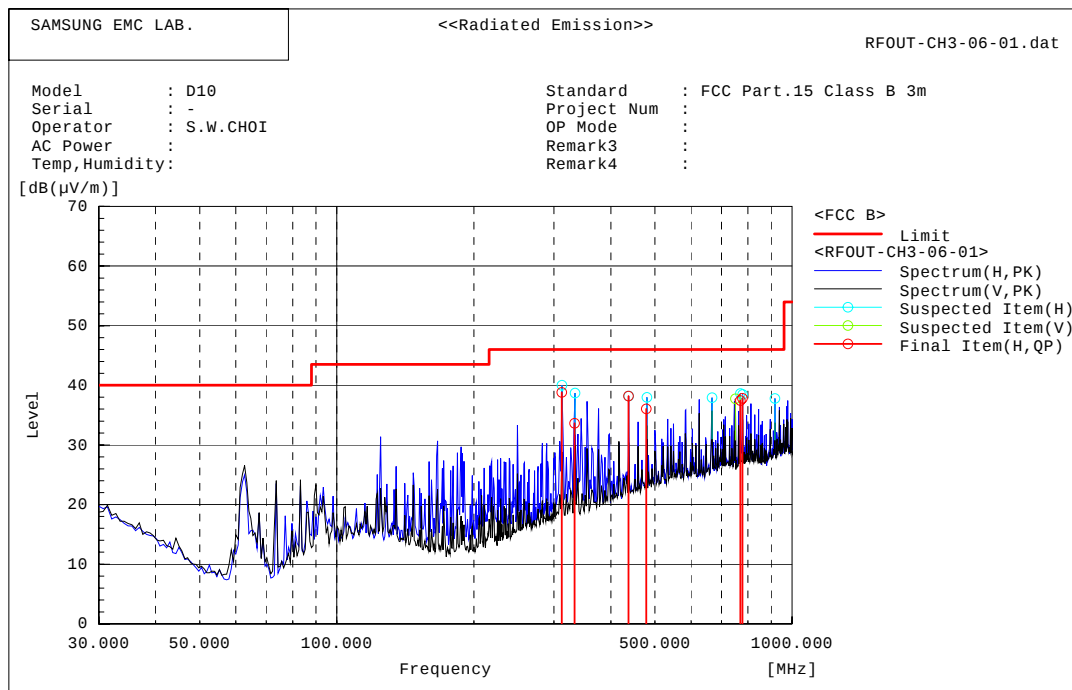
EUT set up in semi-anechoic chamber. EUT positioned at 3m from antenna in center of table.
All ports terminated into characteristic loads.

Test Result

Measurement Results	Pass No Operation errors were detected during or after the applied test.
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Test Data (Other Frequency)

■ Operating Mode : Satellite Signal Receiving-RF Out CH 03

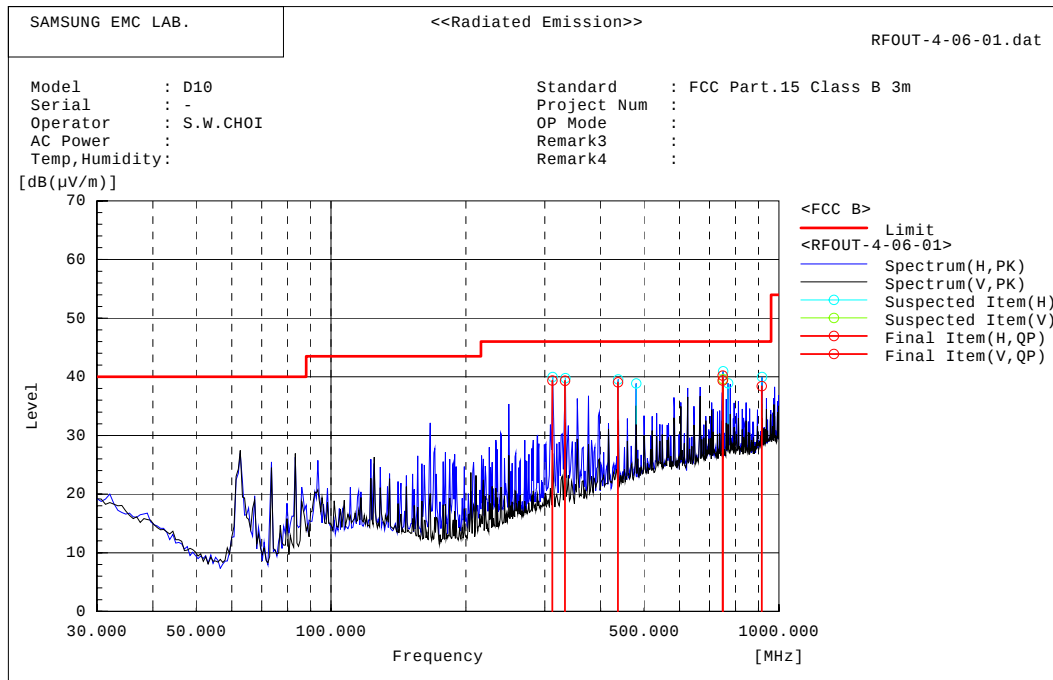


Final Result

--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	312.200	48.3	-9.5	38.8	46.0	7.2	
2	333.010	42.9	-9.3	33.6	46.0	12.4	
3	770.070	38.6	-1.2	37.4	46.0	8.6	
4	778.260	38.9	-1.1	37.8	46.0	8.2	
5	437.080	44.8	-6.6	38.2	46.0	7.8	
6	478.690	41.7	-5.6	36.1	46.0	10.0	

■ Operating Mode : Satellite Signal Receiving-RF Out CH 04



Final Result

--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	749.260	41.4	-1.2	40.2	46.0	5.8	
2	312.200	48.8	-9.5	39.3	46.0	6.7	
3	915.770	37.4	1.0	38.4	46.0	7.6	
4	333.010	48.6	-9.3	39.3	46.0	6.7	
5	437.080	45.7	-6.6	39.1	46.0	6.9	

--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	749.260	40.6	-1.2	39.4	46.0	6.7	

Test Data (Oscillator)

■Operating Mode : TV Receiving

IF Frequency : 70MHz

Tuned Frequency [MHz]	Local Oscillator Frequency [MHz]		Meter Reading [dBuV]		Total Loss [dB]	Results [dBuV]	Limit [dBuV]
			H	V			
1411	Fundamental	1481	-	-	-	-	54
	Harmonics						

Remark : There was no found any emission during the above test.

3.4 Output Signal Level

Test Information		
	Test Engineer	Sung Wook Choi
	Test Date	June 08, 2004
	Climate Condition	Ambient Temperature : 22.5 °C Relative Humidity : 32%
	Test Place	Shield Room #5

Test Equipments

Equipment	Modal Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
RF Generator	RF-100	Doctor Design	-	N/A	12
Pre-Amplifier	310N	SONOMA	185861	2004-09-20	12
Test Receiver	ESS	R&S	844861/005	2005-01-05	12
Matching Pad	RAM	R&S	834188/009	2005-01-08	12
Spectrum Analyzer	E7405A	Agilent	US41110272	2004-07-12	12
RF Matrix	PSU	R&S	861206/024	N/A	12

EUT Test Setup

The RF output terminal was connected to the test receiver through the matching pad(75-50 ohm) with a cable. Then, the RF output signal level was measured under the EUT Operating mode(s).

Test Result

Measurement Results	Pass No Operation errors were detected during or after the applied test.
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Test Data

■ Operating Mode : Satellite Signal Receiving

RF Output CH No. :3CH

Frequency	Reading	Factor	Level	Limit	Margin
[MHz]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dB]
56.748	75.3	-25.1	50.2	56.5	6.3
61.248	90.4	-25.1	65.3	69.5	4.2
65.748	75.1	-25.1	50	56.5	6.5

* Factor = Preamp Gain + Matching Pad Loss + Cable Loss

■ Operating Mode : Satellite Signal Receiving

RF Output CH No. :4CH

Frequency	Reading	Factor	Level	Limit	Margin
[MHz]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dB]
62.745	75.4	-25.1	50.3	56.5	6.2
67.248	90.5	-25.1	65.4	69.5	4.1
71.75	75.1	-25.1	50	56.5	6.5

* Factor = Preamp Gain + Matching Pad Loss + Cable Loss

3.5 Output Terminal Conducted Spurious

Test Information		
	Test Engineer	Sung Wook Choi
	Test Date	June 08, 2004
	Climate Condition	Ambient Temperature : 22.6 °C Relative Humidity : 32%
	Test Place	Shield Room #5

Test Equipments

Equipment	Modal Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
Pre-Amplifier	310N	SONOMA	185861	2004-09-20	12
RF Matrix	PSU	R&S	861206/024	N/A	12
Spectrum Analyzer	E7405A	Agilent	US41110272	2004-07-12	12
RF Generator	RF-100	Doctor Design	-	N/A	12

EUT Test Setup

The RF output terminal was connected to the test receiver through the matching pad(75-50 ohm) with a cable. Then, the RF output signal level was measured under the EUT Operating mode(s).

Tested frequency range were from 30MHz to more than 4.6MHz below the visual carrier frequency, and from more than 7.4MHz above the visual carrier frequency to 1000MHz

Test Result

Measurement Results	Pass No Operation errors were detected during or after the applied test.
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Test Data

■ Operating Mode : Satellite Signal Receiving

RF Output CH No. :3CH[Spurious Low]

Frequency	Reading	Factor	Level	Limit	Margin
[MHz]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dB]
47.7476	42.6	-25.1	17.5	39.5	22
49.258	36.5	-25.1	11.4	39.5	28.1
52.2474	37.9	-25.1	12.8	39.5	26.7

* Factor = Preamp Gain + Matching Pad Loss + Cable Loss

■ Operating Mode : Satellite Signal Receiving

RF Output CH No. :3CH[Spurious High]

Frequency	Reading	Factor	Level	Limit	Margin
[MHz]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dB]
74.75	41.9	-25.1	16.8	39.5	22.7
183.75	45.9	-24.9	21	39.5	18.5
249.76	42.4	-24.5	17.9	39.5	21.7

* Factor = Preamp Gain + Matching Pad Loss + Cable Loss

■ Operating Mode : Satellite Signal Receiving

RF Output CH No. :4CH[Spurious Low]

Frequency	Reading	Factor	Level	Limit	Margin
[MHz]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dB]
49.257	36.4	-25.1	11.3	39.5	28.2
53.7488	42.6	-25.1	17.5	39.5	22
58.2488	38	-25.1	12.9	39.5	26.6

* Factor = Preamp Gain + Matching Pad Loss + Cable Loss

■ Operating Mode : Satellite Signal Receiving

RF Output CH No. :4CH[Spurious High]

Frequency	Reading	Factor	Level	Limit	Margin
[MHz]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dB]
80.75	41.9	-25.1	16.8	39.5	22.8
201.74	43.8	-24.8	19	39.5	20.6
249.76	40.9	-24.5	16.4	39.5	23.1

* Factor = Preamp Gain + Matching Pad Loss + Cable Loss

3.6 Antenna Transfer Switch Measurement

Test Information		
	Test Engineer	Sung Wook Choi
	Test Date	June 08, 2004
	Climate Condition	Ambient Temperature : 22.6℃ Relative Humidity : 32%
	Test Place	Shield Room #5

Test Equipments

Equipment	Modal Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
RF Generator	RF-100	Doctor Design	-	N/A	12
Pre-Amplifier	310N	SONOMA	185861	2004-09-20	12
Matching Pad	RAM	R&S	834188/009	2005-01-08	12
RF Matrix	PSU	R&S	861206/024	N/A	12
Spectrum Analyzer	E7405A	Agilent	US4110272	2004-07-12	12
Test Receiver	ESS	R&S	844861/005	2005-01-05	12

EUT Test Setup

The Antenna input terminal is connected to the test receiver through the matching pad (75 – 50 ohm) with a calibrated cable. Then, the RF output leakage level is measured under the EUT operating mode(s).

Test Result

Measurement Results	Pass No Operation errors were detected during or after the applied test.
----------------------------	---

Test Data

■ Operating Mode : Satellite

RF Output CH No. :3CH

Frequency	Reading	Factor	Level	Limit	Margin
[MHz]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dB]
"There was no found any emission during the above test"					

* Factor = Preamp Gain + Matching Pad Loss + Cable Loss

■ Operating Mode : Satellite

RF Output CH No. :4CH

Frequency	Reading	Factor	Level	Limit	Margin
[MHz]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dB]
"There was no found any emission during the above test"					

* Factor = Preamp Gain + Matching Pad Loss + Cable Loss