FCC CFR47 PART 15 TV INTERFACE DEVICE

TEST REPORT

FOR

DUAL-DECK VCR

MODEL: DDV 9650, DDV 9750, DDV 9550, DDV 9475, DDV 9150

FCC ID: A3LDDV99

REPORT NUMBER: 99U0198-1

ISSUE DATE: APRIL 21, 1999

Prepared for

SAMSUNG ELECTRONICS CO., LTD.
416 MAETAN DONG, PALDAL GU
SUWON SHI, KOREA

Prepared by

COMPLIANCE ENGINEERING SERVICES, INC.
d.b.a.
COMPLIANCE CERTIFICATION SERVICES
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LAB CODE:200065-0

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1. VERIFICATION OF COMPLIANCE

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
416 MAETAN DONG, PALDAL GU
SUWON SHI, KOREA

CONTACT PERSON: BEN KIM / MANAGER

TELEPHONE NO: 408-544-5124

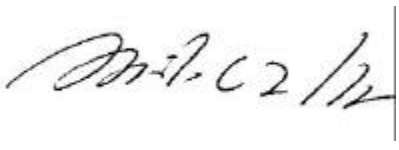
MODEL NO/NAME: DDV 9650, DDV 9750, DDV 9550, DDV 9475, DDV 9150

SERIAL NO: N/A DATE TESTED: APRIL 21, 1999

TYPE OF EQUIPMENT:	TV INTERFACE DEVICE
MEASUREMENT DISTANCE:	(X) 3 METER ( ) 10 METER
FCC RULES:	PART 15.115
MEASUREMENT PROCEDURE	ANSI C63.4:92
EQUIPMENT AUTHORIZATION PROCEDURE	CERTIFICATION
MODIFICATIONS MADE ON EUT	☒ YES ☐ NO
DEVIATIONS FROM MEASUREMENT PROCEDURE	☐ YES (refer to section 21 for comments) ☒ NO
TEST RESULT	PASSED

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, PART 15. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Reviewed By



MIKE C.I. KUO / VICE PRESIDENT
COMPLIANCE CERTIFICATION SERVICES

2. PRODUCT DESCRIPTION

CHASSIS TYPE	METAL
LIST OF EACH OSC. OR XTAL. FREQ. (FREQ.>=1 MHz)	3.58, 8.0, 14.31 MHz
NUMBER OF PCB LAYERS	1 LAYER
POWER REQUIREMENTS	110 V AC, 60 Hz
NO. OF EXTERNAL I/O CONNECTORS	17

Model Differences:

Model Name	Differences	Tested (Checked)
DDV 9650	**ORIGINAL MODEL**	☒
DDV 9750	**FOR MARKETING PURPOSES**	☐
DDV 9550	**FOR MARKETING PURPOSES**	☐
DDV 9475	**FOR MARKETING PURPOSES**	☐
DDV 9150	**FOR MARKETING PURPOSES**	☐

External Peripheral Devices

Device Type	Manufacturer	Model Number	Serial No.	FCC ID / DoC
TV	KONKA	K2088U	N/A	N/A

External I/O Cable Construction Description

CABLE NO: 1	
I/O Port: Antenna In	Number of I/O ports of this type: 1
Number of Conductors: 2	**Connector Type: F Connector**
Capture Type: Screw-In	**Type of Cable used: Shielded**
Cable Connector Type: Molded	**Cable Length: 4 M**
Bundled During Tests: Yes	**Data Traffic Generated: Yes**
Remark: N/A	

CABLE NO: 2	
I/O Port: RF Out	Number of I/O ports of this type: 1
Number of Conductors: 2	**Connector Type: F Connector**
Capture Type: Screw-In	**Type of Cable used: Shielded**
Cable Connector Type: Molded	**Cable Length: 1 M**
Bundled During Tests: No	**Data Traffic Generated: Yes**
Remark: N/A	

CABLE NO: 3	
I/O Port: S-Video	Number of I/O ports of this type: 1
Number of Conductors: 5	**Connector Type: S-Video**
Capture Type: Snap-In	**Type of Cable used: Unshielded**
Cable Connector Type: Molded	**Cable Length: 1.5 M**
Bundled During Tests: Yes	**Data Traffic Generated: Yes**
Remark: N/A	

CABLE NO: 4	
I/O Port: Audio Out	Number of I/O ports of this type: 4
Number of Conductors: 2	**Connector Type: RCA Jack**
Capture Type: Snap-In	**Type of Cable used: Unshielded**
Cable Connector Type: Molded	**Cable Length: 2 M**
Bundled During Tests: Yes	**Data Traffic Generated: Yes**
Remark: N/A	

CABLE NO: 5	
I/O Port: Video Out	Number of I/O ports of this type: 2
Number of Conductors: 2	**Connector Type: RCA jack**
Capture Type: Snap-In	**Type of Cable used: Unshielded**
Cable Connector Type: Molded	**Cable Length: 2 M**
Bundled During Tests: Yes	**Data Traffic Generated: Yes**
Remark: N/A	

CABLE NO: 6	
I/O Port: Audio In	Number of I/O ports of this type: 3
Number of Conductors: 2	**Connector Type: RCA Jack**
Capture Type: Snap-In	**Type of Cable used: Unshielded**
Cable Connector Type: Molded	**Cable Length: 1.5 M**
Bundled During Tests: Yes	**Data Traffic Generated: Yes**
Remark: Dummy cables	

CABLE NO: 7	
I/O Port: Video In	Number of I/O ports of this type: 1
Number of Conductors: 2	**Connector Type: RCA Jack**
Capture Type: Snap-In	**Type of Cable used: Unshielded**
Cable Connector Type: Molded	**Cable Length: 1.5 M**
Bundled During Tests: Yes	**Data Traffic Generated: Yes**
Remark: Dummy cable	

CABLE NO: 8	
I/O Port: Power	Number of I/O ports of this type: 1
Number of Conductors: 3	**Connector Type: USA 110 Type**
Capture Type: Snap-in	**Type of Cable used: Unshielded**
Cable Connector Type: Molded	**Cable Length: 1.5 M**
Bundled During Tests: No- Radiation, Yes- Line Conduction	**Data Traffic Generated: No**
Remark: N/A	

3. TESTED SYSTEM DETAILS

During the tests, TV is tuned to Channels 3 or 4 to play VHS tape **.**

4. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code:200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT(1300F2))

6. MEASUREMENT INSTRUMENTATION

Radiated emissions were measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, ridged waveguide, liner horn. EMI receivers were used for line conducted readings, spectrum analyzers with pre-selectors and quasi-peak detectors were used to perform radiated measurements. Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specification for “Radio Interference Measuring Apparatus and Measurement

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

7. MEASURING INSTRUMENT CALIBRATION

The measuring equipment which was utilized in performing the tests documented herein has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment which is traceable to recognized national standards.

8. UNITS OF MEASUREMENT

Measurements of radiated interference are reported in terms of dB(uV/m) at a specified distance. The indicated readings on the spectrum analyzer were converted to dB(uV/m) by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dB(uV).

The field strength is calculated by adding the Antenna Factor and Cable Factors, then by subtracting the Amplifier Gain from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4dB/m and a Cable Factor of 1.1dB is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/m. The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m.

FS = 52.5 + 7.4 + 1.1 - 29 = 32 dBuV/m

Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m

9. ANTENNAS

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 meters from the leading edge of the turn table.

10. CONDUCTED EMISSION TEST PROCEDURE

The EUT is located so that the distance between the boundary of the EUT and the closest surface to the LISN is 0.8m.

EUT test configuration is according to Section 7 of ANSI C63.4/1992.

Conducted disturbance shall be measured between the phase lead and the ground, and between the neutral lead and the ground. The frequency 0.450 - 30 MHz shall be investigated.

Set the EMI receiver to PEAK detector setting and sweep continuously over the frequency range to be investigated. Set resolution bandwidth to 9kHz minimum. Connect EMI receiver input cable to LINE 1 RF measurement connection on the LISN. Connect a 50ohm terminator to the unused RF connection on the LISN. For each mode of EUT operation, maximize emissions readings by manipulating cable and wire positions. Record the configuration for each EUT power cord which produces emissions closest to the limit. Repeat the same procedure for LINE 2 of each EUT power cord.

11. RADIATED EMISSION TEST PROCEDURE

The EUT and all other support equipment are placed on a wooden table 80 cm above the ground screen. Antenna to EUT distance is 3 meters. During the test, the table is rotated 360 degrees to maximize emissions and the antenna is positioned from 1 to 4 meters above the ground screen to further maximize emissions. The antenna is polarized in both vertical and horizontal positions.

EUT test configuration is according to Section 8 of ANSI C63.4/1992.

Monitor the frequency range of interest at a fixed antenna height and EUT azimuth. Frequency span should be small enough to easily differentiate between broadcast stations and intermittent ambients. Rotate EUT 360 degrees to maximize emissions received from EUT. If emission increases by more than 1 dB, or if another emission appears that is greater by 1 dB, return to azimuth where maximum occurred and perform additional cable manipulation to further maximize received emission.

Move antenna up and down to further maximize suspected highest amplitude signal. If emission increased by 1 dB or more, or if another emission appears that is greater by 1dB or more, return to antenna height where maximum signal was observed and manipulate cables to produce highest emissions, noting frequency and amplitude.

12. AMBIENT CONDITIONS

The ambient conditions at the time of final tests were as follows:

	Radiated Emission	Conducted Emission
Temperature	18° C	19° C
Humidity	**70%**	**70%**

13. EQUIPMENT MODIFICATIONS

To achieve compliance to 15.107 levels, the following change(s) were made during compliance testing:

Mod.#1 Change X Cap (part no. C1SS01) to 0.47µF.

14. EUT SETUP PHOTOS

15. TEST EQUIPMENT LIST

Equipment	Manufacturer	Model No.	Serial No.	Site	Cal Date	Due Date
Spectrum Analyzer	**H.P.**	**8568A**	**2314A02604**	**B**	02/1999	02/2000
Pre-Amp	**H.P.**	**8447D**	**2944A06589**	**B**	08/1998	08/1999
Antenna	**Eaton**	**94455-1**	**1197**	**B**	08/1998	08/1999
Antenna	**Emco**	**3146**	**2120**	**B**	08/1998	08/1999
Pre-Amp	**H.P.**	**8449B**	**3008A00369**	**B**	03/1999	03/2000
LISN	**Fischer**	**LISN2**	**N/A**	**Cond**	01/1999	01/2000
LISN	**Fischer**	**CISPR adapter**	**N/A**	**Cond**	01/1999	01/2000
EMI Receiver	**Rhode Schwarz**	**ESHS20**	**827129/006**	**Cond**	03/1999	03/2000
Abs. Clamp	**Fischer**	**F-201**	**251**	**Cond**	04/1999	04/2000
LISN	**Fischer**	**FCCLISN 50/250-25-2**	**114**	**Cond**	08/1998	08/1999
PATTERN GENERATOR	**PHILIP**	**PM5418TX**	**LO678084**	**N/A**	6/07/1998	06/8/1999

16. TEST RESULT SUMMARY

Model name: DDV 9650, DDV 9750, DDV 9550, DDV 9475, DDV 9150
1) Test Requirements: 15.109 (a), 15.107 (a)
Technical Limits: 15.109 (a), 15.107 (a)

Test Result: please refer to radiated emission data report number 990420B1. (Channel 3 & 4)

Preliminary Radiated Emission Test			
Frequency Range Investigated		30 MHz TO 1000 MHz	
Mode of operation	Date	Data Report No.	Worst Mode
PLAYING VIDEO/CH 3&4	**04/20/99**	**990420B1**	☒
RECORD VITS 5VVP	**04/21/99**	**990421B1**	☐
RECORD VITS 1VPP	**04/21/99**	**990421B1**	☐
NTSC RECORD	**04/21/99**	**990421B1**	☐

OATS No: B / 3 METER	Data Report No. 990420B1	Date 04/20/99	Tested By: PETE KREBILL

Six Highest Radiated Emission Readings							
Frequency Range Investigated				30 MHz TO 1000 MHz			
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB/m)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type (P/Q/A)	Polar (H/V)
64.0	**56.2**	**-19.66**	**36.54**	**40.0**	**-3.46**	**P**	**V**
128.0	**48.7**	**-12.71**	**35.99**	**43.5**	**-7.51**	**P**	**V**
85.92	**52.0**	**-15.67**	**36.33**	**40.0**	**-3.67**	**Q**	**V**
114.5	**56.0**	**-14.46**	**41.54**	**43.5**	**-1.96**	**Q**	**V**
85.9	**52.8**	**-16.19**	**36.61**	**40.0**	**-3.39**	**P**	**H**
114.5	**55.8**	**-14.46**	**41.34**	**43.5**	**-2.16**	**P**	**H**

PK

Compliance Engineering Services Inc.

Project No. : 99u0198
Report No. : 990420B1
Date : 04/20/1999
Time : 09:31
Test Engr : PETE K

>> 3 M RADIATED EMISSION DATA <<

Company : SAMSUNG
Equipment Under Test : VCR DDV 9650
Test Configuration : EUT/TV
Type of Test : FCC CLASS B
Mode of Operation : PLAYING VIDEO/CH 3 & 4

Freq.	dBuV	PreAmp	Ant	Cable	dBuV/m	Limit	Margin	Pol	Hgt(m)	Az
Biconical 1197 ; Pre-pamp = 8447D-P8 2944A06589:										
64.00	56.20	-27.59	6.36	1.57	36.54	40.00	-3.46	V	1.0	180
112.00	49.80	-27.54	10.90	2.16	35.32	43.50	-8.18	V	1.0	0
128.00	48.70	-27.46	12.45	2.30	35.99	43.50	-7.51	V	1.0	0
QP: 85.92	52.00	-27.59	10.10	1.82	36.33	40.00	-3.67	V	1.0	270
QP:114.50	56.00	-27.52	10.88	2.19	41.54	43.50	-1.96	V	1.0	180
85.90	52.80	-27.59	9.59	1.82	36.61	40.00	-3.39	H	2.0	0
114.50	55.80	-27.52	10.88	2.19	41.34	43.50	-2.16	H	2.0	180
LP 2120 ; Pre-pamp = 8447D-P8 2944A06589:										
208.00	38.30	-27.10	10.78	3.02	25.01	43.50	-18.49	V	1.0	0
208.00	43.20	-27.10	11.32	3.02	30.45	43.50	-13.05	H	1.0	180
216.00	38.60	-27.05	11.47	3.07	26.09	43.50	-17.41	H	1.5	90
224.00	39.60	-27.01	11.62	3.11	27.33	46.00	-18.67	H	2.0	180
229.10	40.00	-26.98	11.72	3.14	27.88	46.00	-18.12	H	1.5	0
315.00	37.30	-26.86	14.70	3.76	28.90	46.00	-17.10	H	1.0	180
343.60	37.80	-27.00	15.13	3.94	29.87	46.00	-16.13	H	1.0	180
372.30	34.50	-27.15	15.56	4.13	27.04	46.00	-18.96	H	1.0	180

Total # of data 15
V. b2.2

PK

Compliance Engineering Services Inc.

Project No. : 99U0198
Report No. : 990421B1
Date : 04/21/1999
Time : 10:15
Test Engr : PETE K

>> 3 M RADIATED EMISSION DATA <<

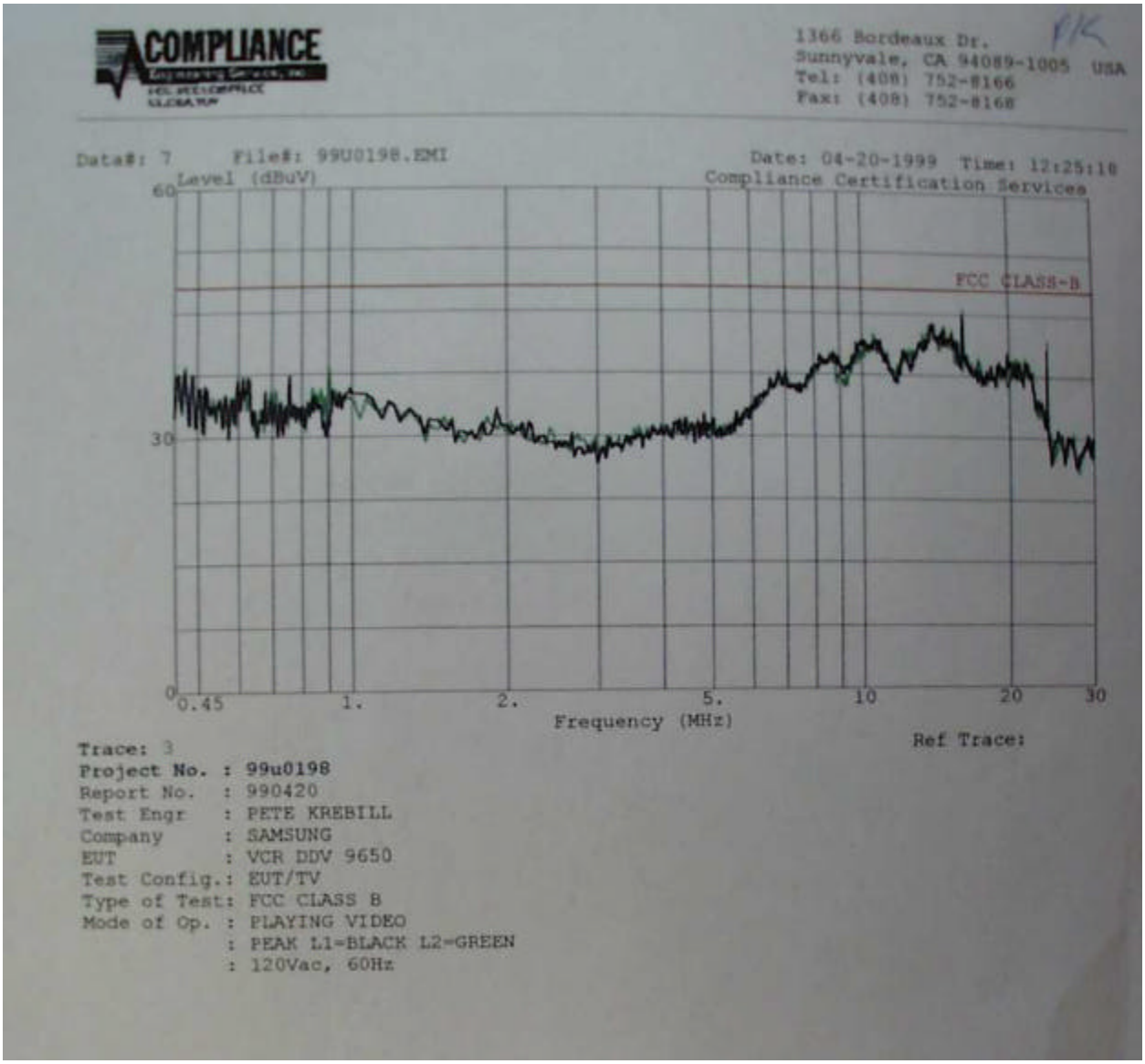
Company : SAMSUNG
Equipment Under Test : VCR DDV9650
Test Configuration : EUT/TV/PATTERN GENERATOR
Type of Test : FCC CLASS B
Mode of Operation : VARIOUS

Freq.	dBuV	PreAmp	Ant	Cable	dBuV/m	Limit	Margin	Pol	Hgt(m)	Az
NTSC RECORD:										
Biconical 1197 ; Pre-pamp = 8447D-P8 2944A06589:										
85.92	52.20	-27.59	10.10	1.82	36.53	40.00	-3.47	V	1.0	270
114.50	52.20	-27.52	10.88	2.19	37.74	43.50	-5.76	V	1.0	180
64.00	49.70	-27.59	6.36	1.57	30.04	40.00	-9.96	V	1.0	180
85.90	51.40	-27.59	9.59	1.82	35.21	40.00	-4.79	H	2.0	0
114.50	54.20	-27.52	10.88	2.19	39.74	43.50	-3.76	H	2.0	180
RECORD VITS 5VPP:										
64.00	55.80	-27.59	6.36	1.57	36.14	40.00	-3.86	V	1.0	180
112.00	46.80	-27.54	10.90	2.16	32.32	43.50	-11.18	V	1.0	0
85.90	53.00	-27.59	10.10	1.82	37.32	40.00	-2.68	V	1.0	270
114.50	52.50	-27.52	10.88	2.19	38.04	43.50	-5.46	V	1.0	180
114.50	55.70	-27.52	10.88	2.19	41.24	43.50	-2.26	H	2.0	180
85.90	52.10	-27.59	9.59	1.82	35.91	40.00	-4.09	H	2.0	0
RECORD VITS 1VPP:										
SAME READINGS AS W/ 5VPP.										
Total # of data 11										
V. b2.2										

Preliminary Conducted Emission Test			
Frequency Range Investigated		30 MHz TO 1000 MHz	
Mode of operation	Date	Data Report No.	Worst Mode
PLAYING VIDEO/CH 3&4	**04/20/99**	**99U0198**	☒
RECORD VITS 5VVP	**04/21/99**	**99U0198**	☐
RECORD VITS 1VPP	**04/21/99**	**99U0198**	☐
NTSC RECORD	**04/21/99**	**99U0198**	☐

Conducted Room	Plot No. 99U0198	Date 04/20/99	Tested By: PETE KREBILL

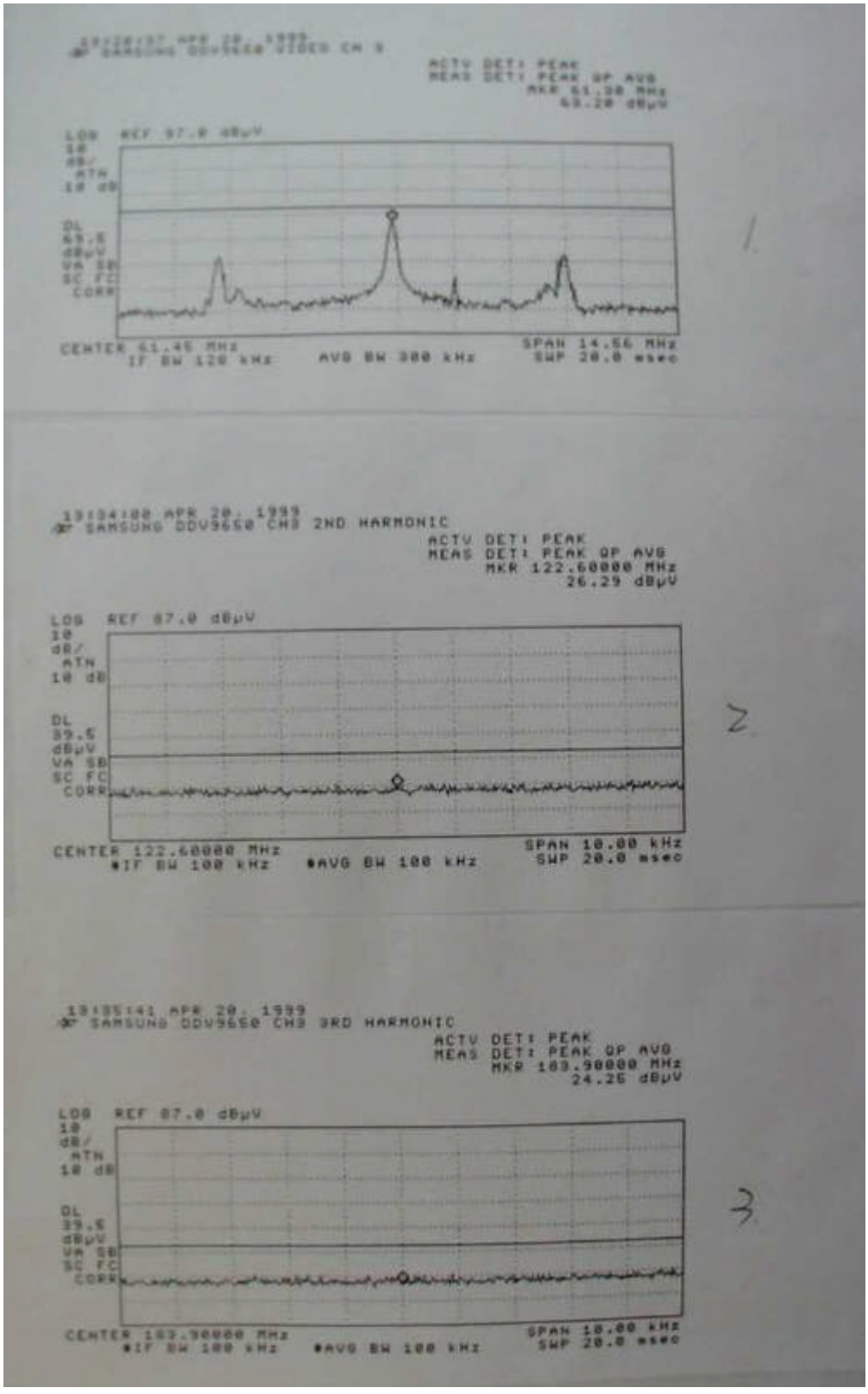
Six Highest Conducted Emission Readings							
Frequency Range Investigated				150 kHz TO 30 MHz			
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type (P/Q/A)	Line (L1/L2)
13.60	**43.50**	**0**	**43.50**	**48.0**	**-4.50**	**P**	**L1**
16.01	**45.42**	**0**	**45.42**	**48.0**	**-2.58**	**P**	**L1**
15.16	**43.17**	**0**	**43.17**	**48.0**	**-4.83**	**P**	**L1**
13.88	**43.83**	**0**	**43.83**	**48.0**	**-4.17**	**P**	**L2**
14.66	**43.37**	**0**	**43.37**	**48.0**	**-4.63**	**P**	**L2**
16.01	**44.85**	**0**	**44.85**	**48.0**	**-3.15**	**P**	**L2**

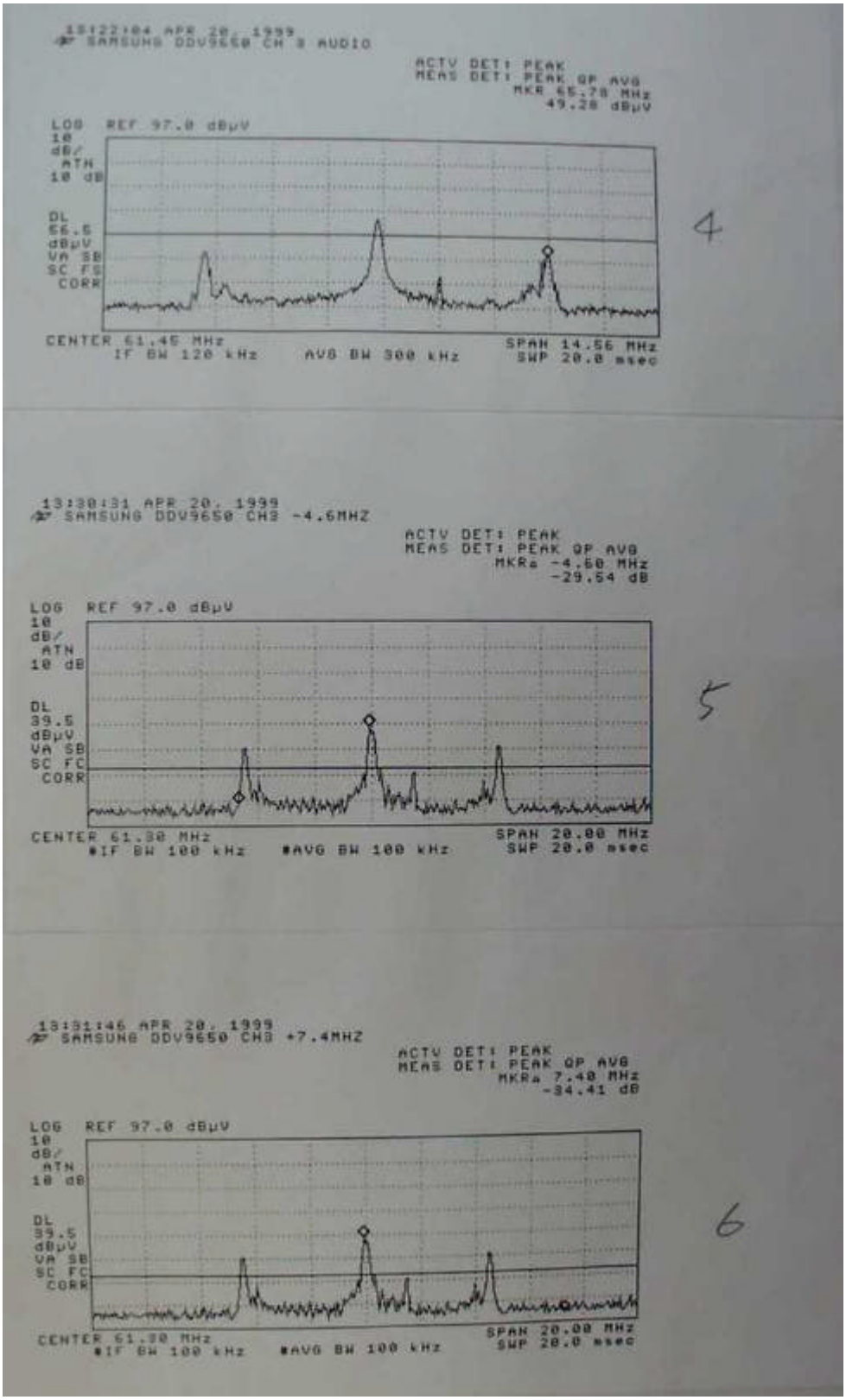


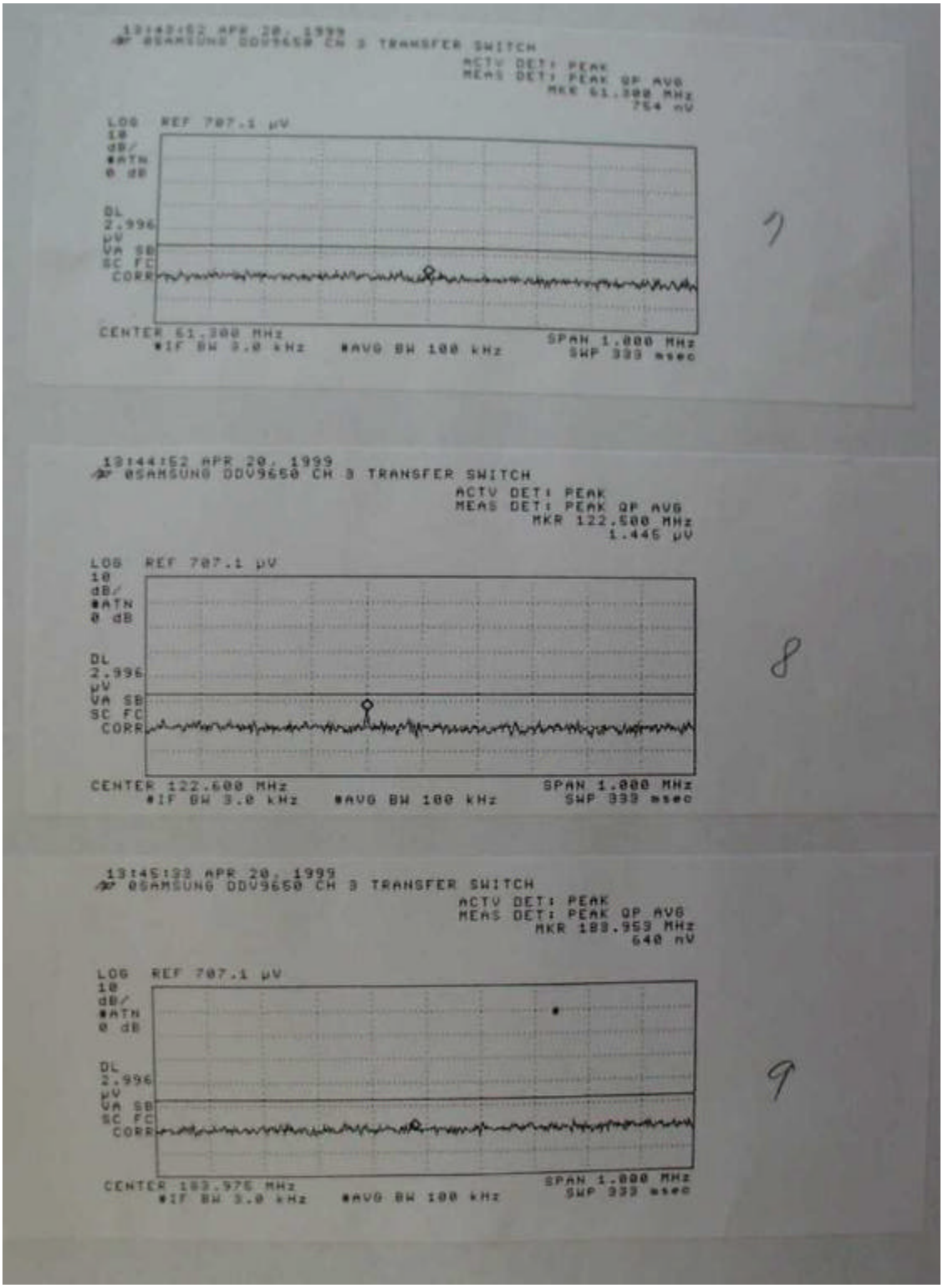
3. Output Signal limits and transfer switch limits:

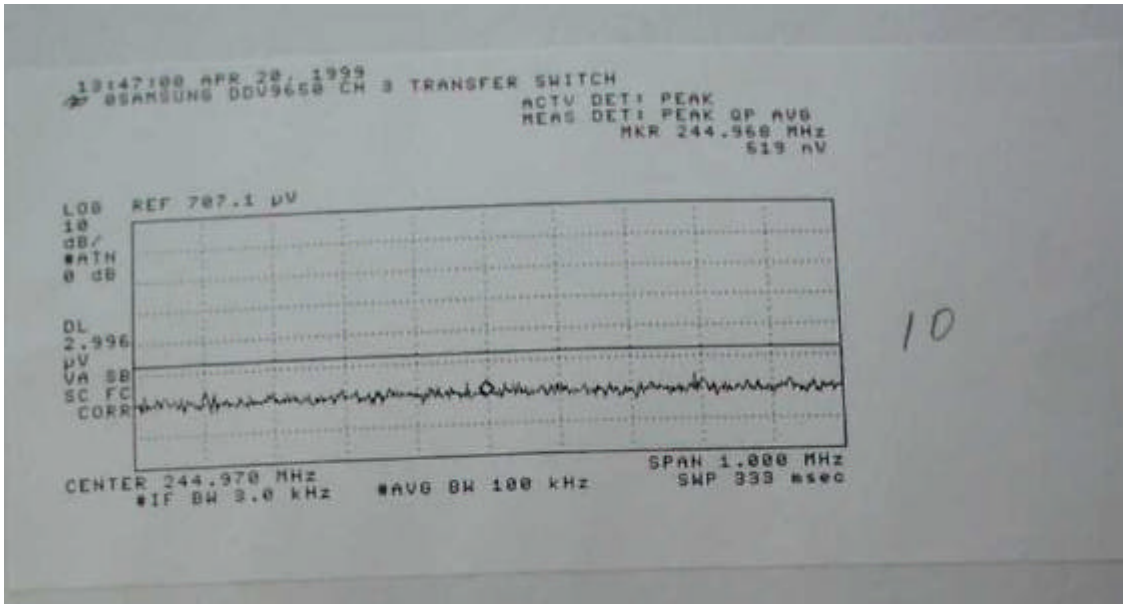
Technical requirement: 15.115 (b)(1)(ii), (b)(2)(ii), (c)(ii)

CHANNEL 3 – VITS, PLAY BACK	
VIDEO	1
2ND HARMONIC	2
3RD HARMONIC	3
AUDIO	4
-4.6 MHz	5
+7.4 MHz	6
TRANSFER SWITCH	7
TRANSFER SWITCH 2ND HARMONIC	8
TRANSFER SWITCH 3RD HARMONIC	9
TRANSFER SWITCH 4TH HARMONIC	10

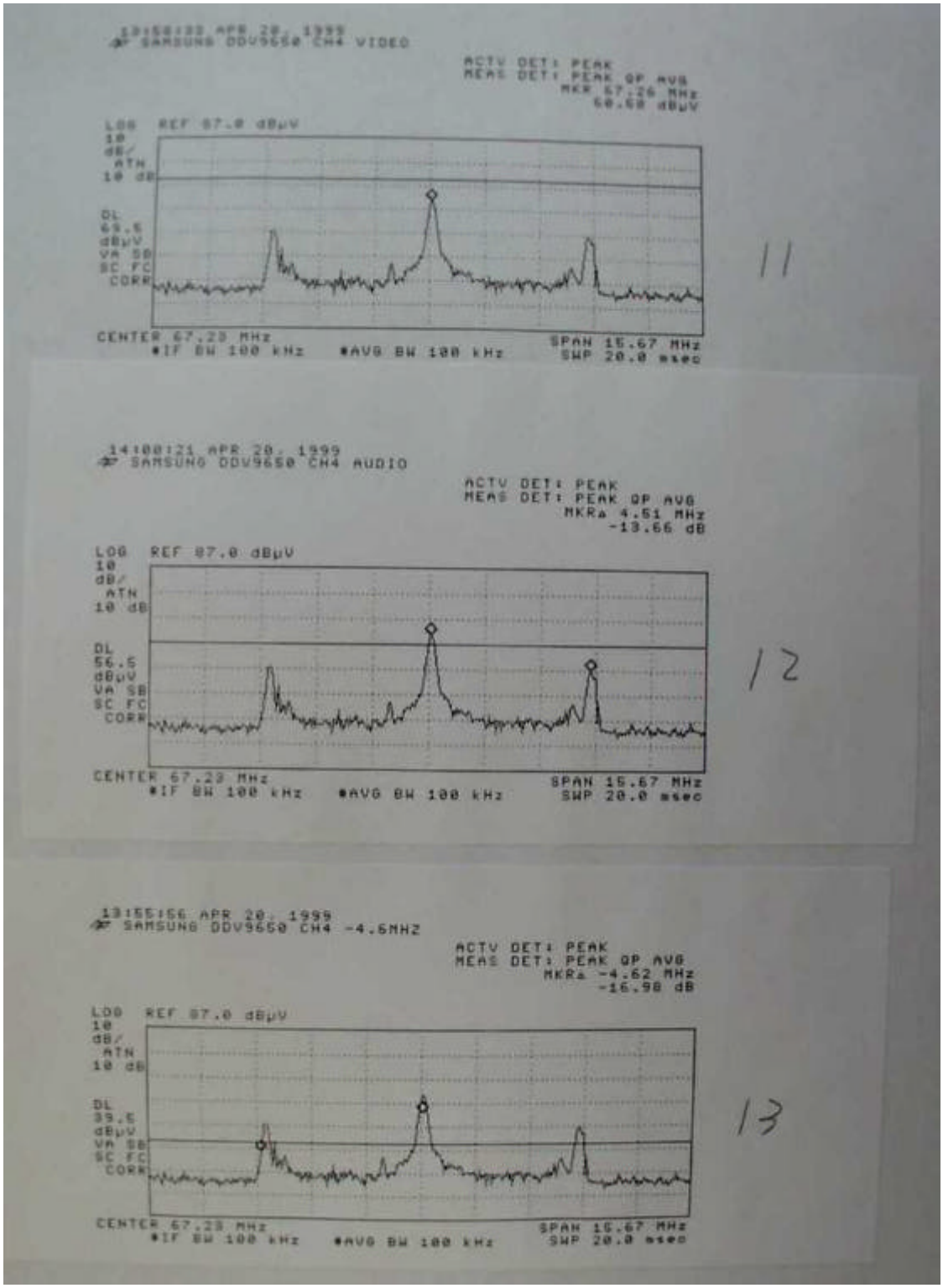


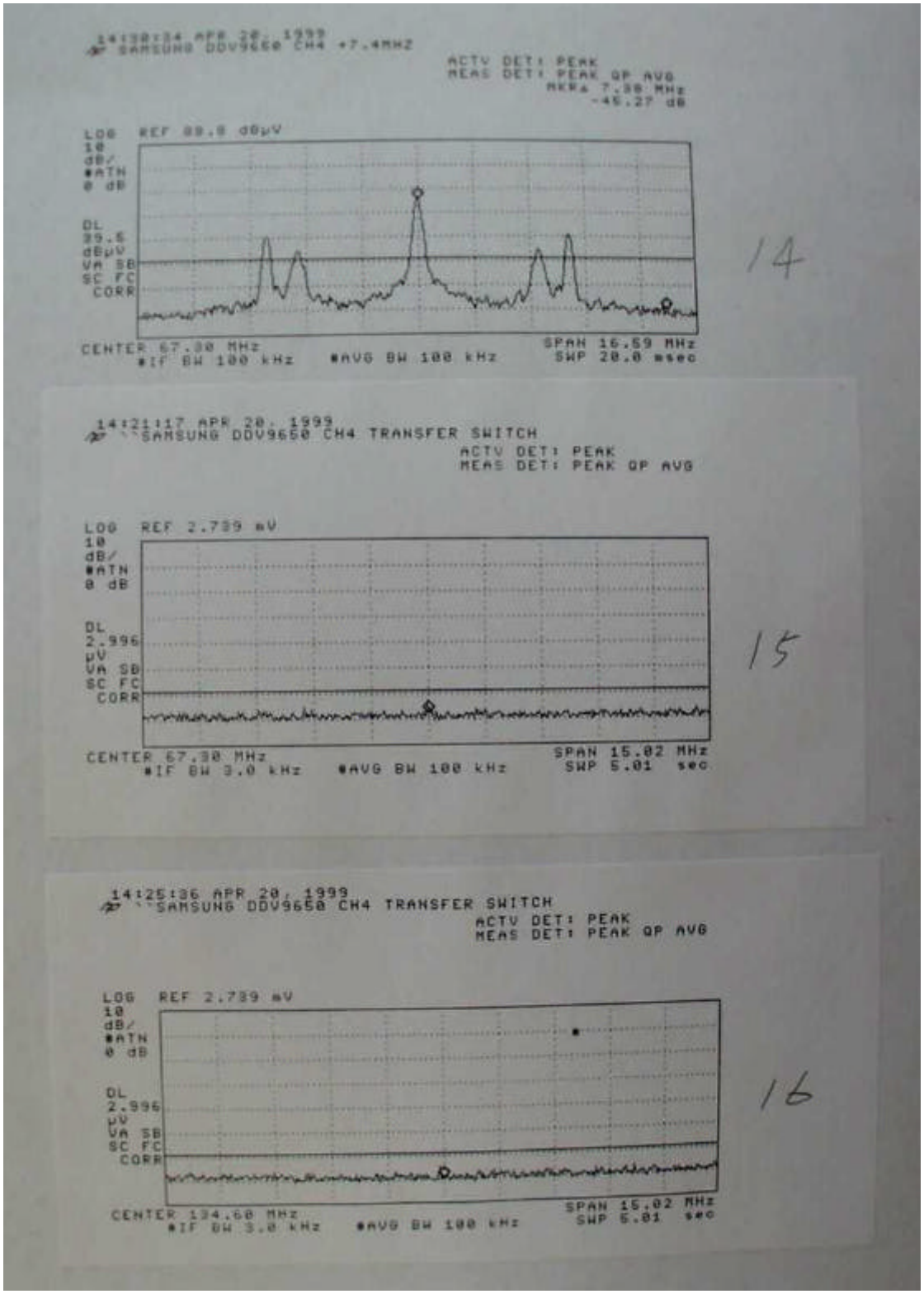


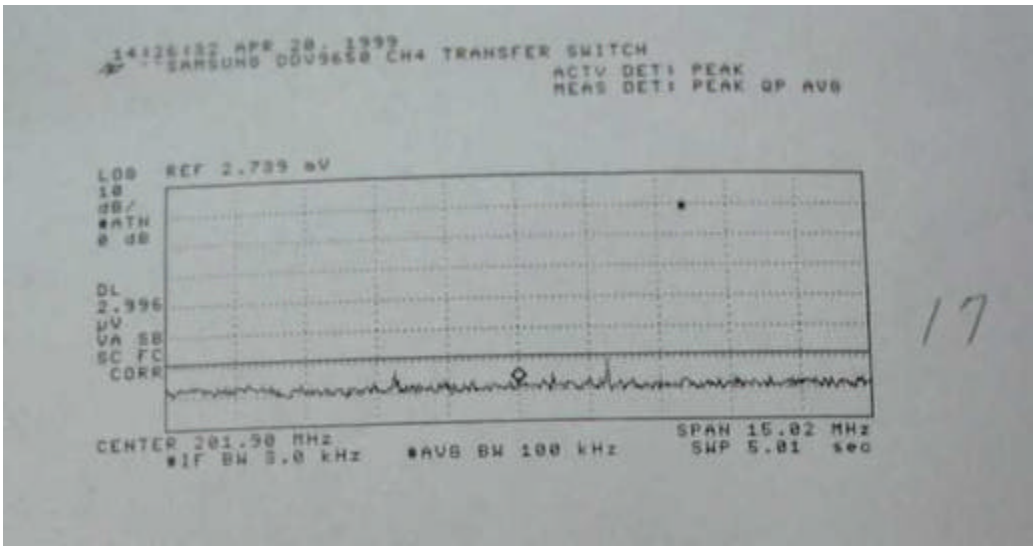




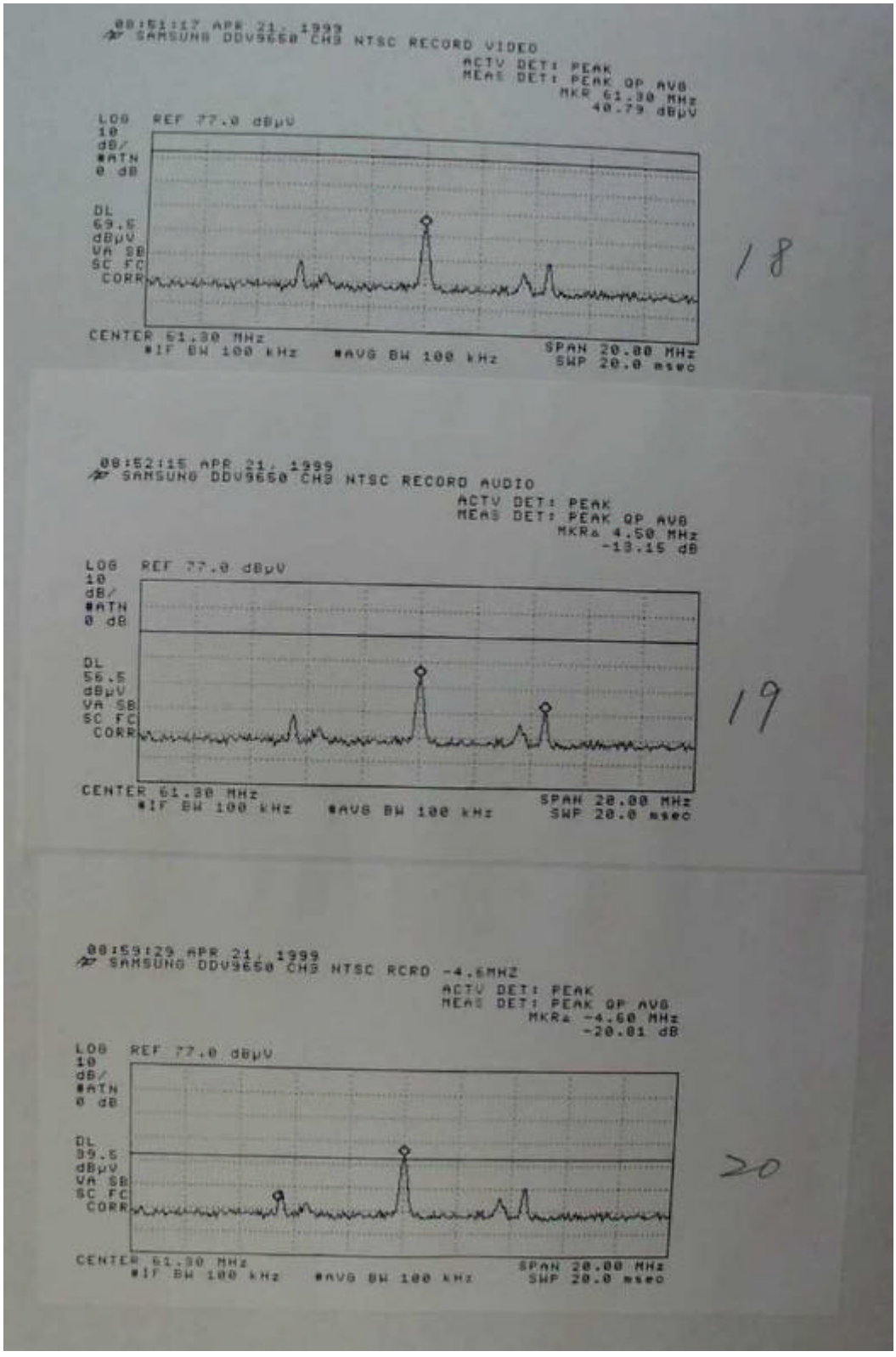
CHANNEL 4 – VITS, PLAY BACK	
VIDEO	11
AUDIO	12
-4.6 MHz	13
+7.4 MHz	14
TRANSFER SWITCH	15
TRANSFER SWITCH 2ND HARMONIC	16
TRANSFER SWITCH 3RD HARMONIC	17



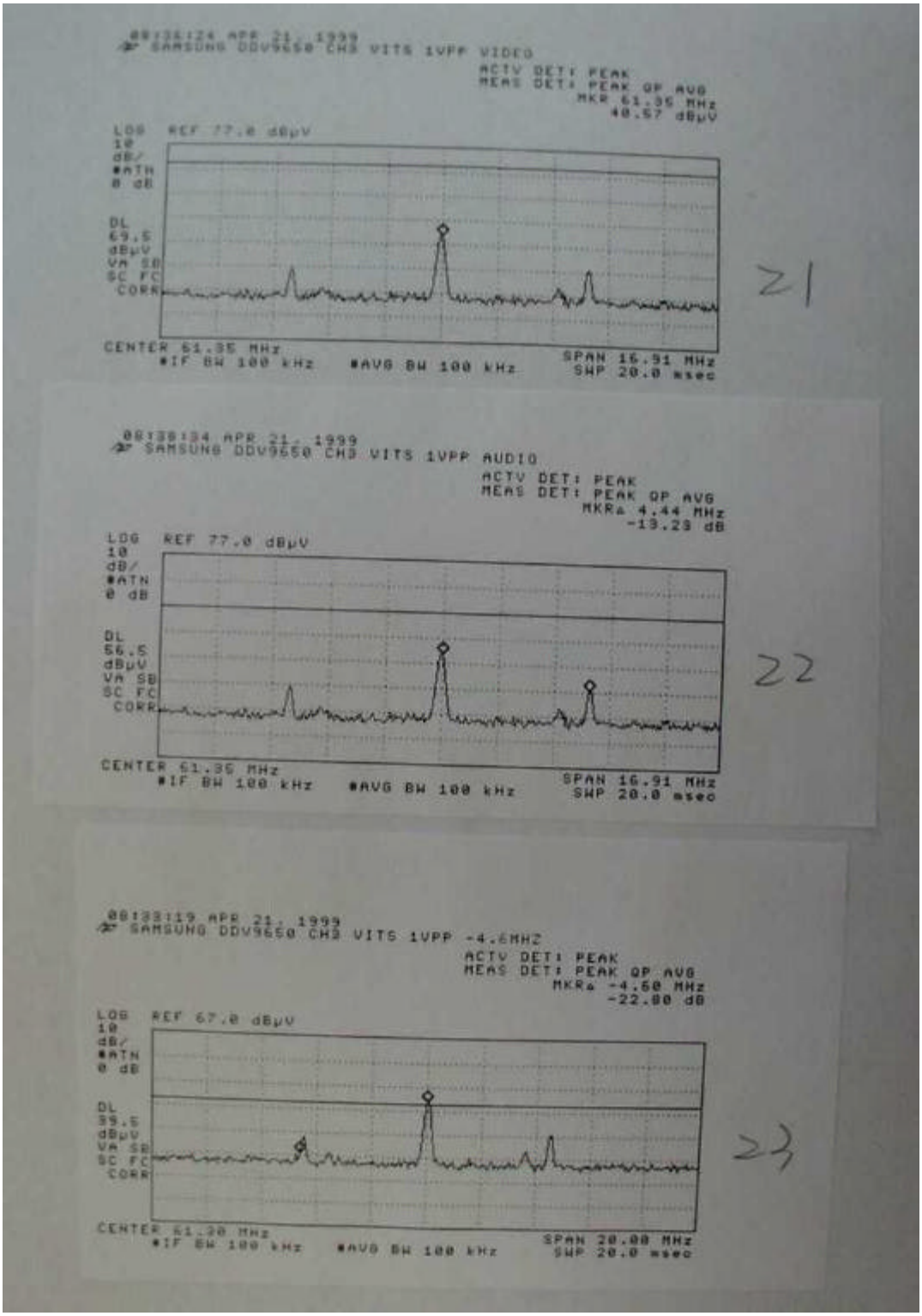


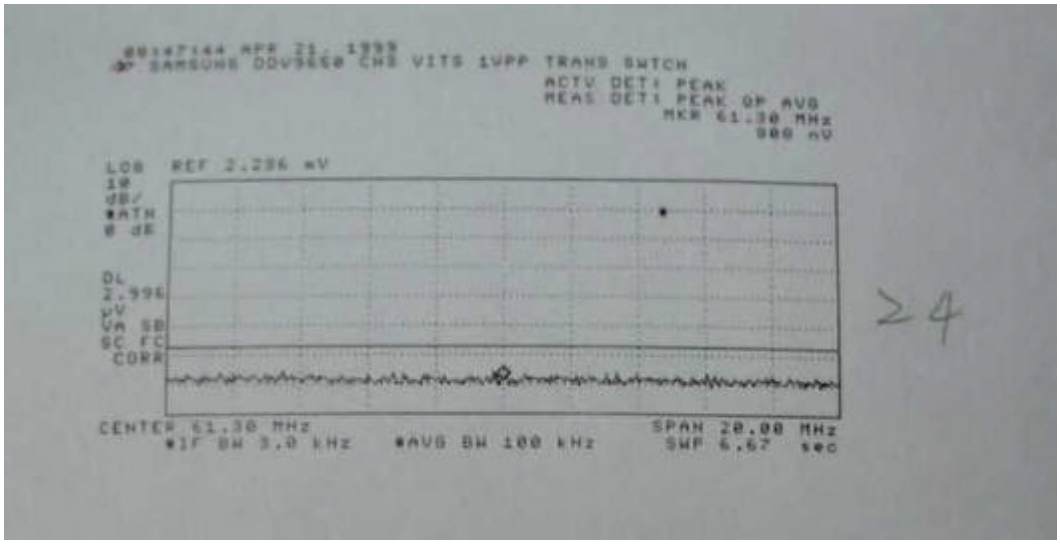


CHANNEL 3 – RECORD, NTSC	
VIDEO	18
AUDIO	19
-4.6 MHz, +7.4 MHz	20

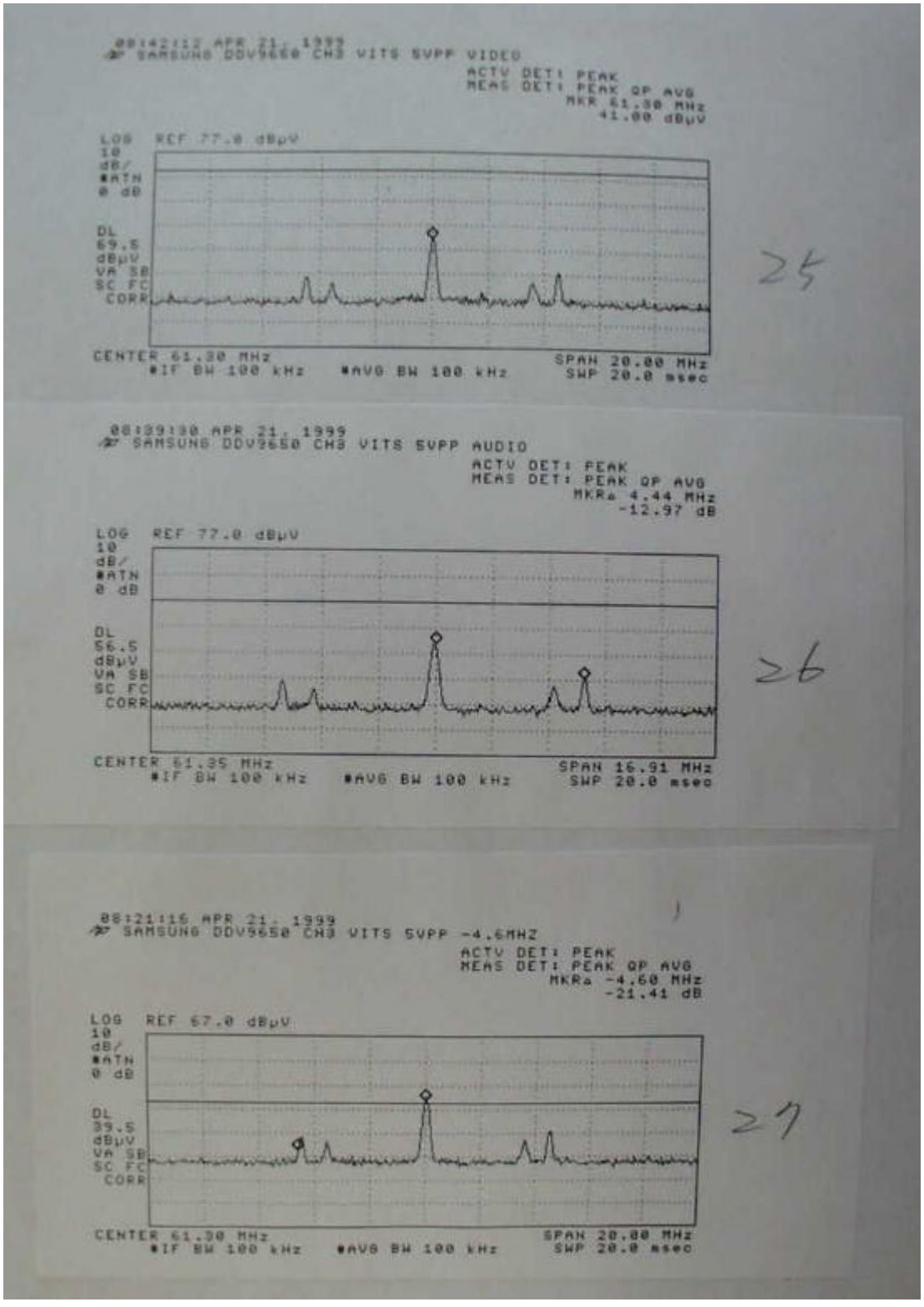


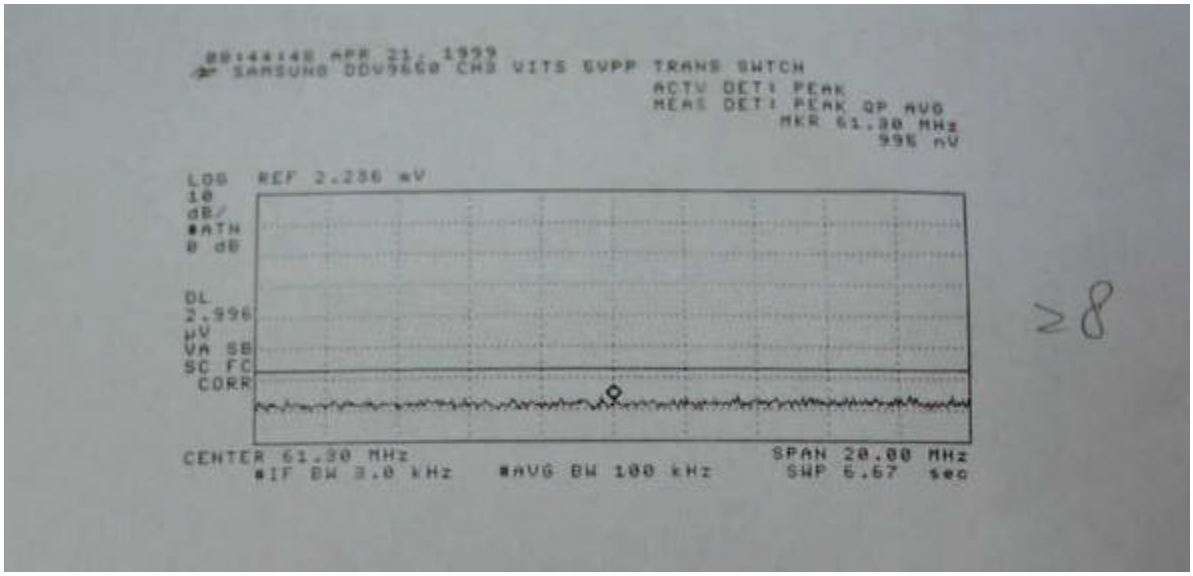
CHANNEL 3 – RECORD, VITS 1VPP	
VIDEO	21
AUDIO	22
-4.6 MHz, +7.4 MHz	23
TRANSFER SWITCH	24





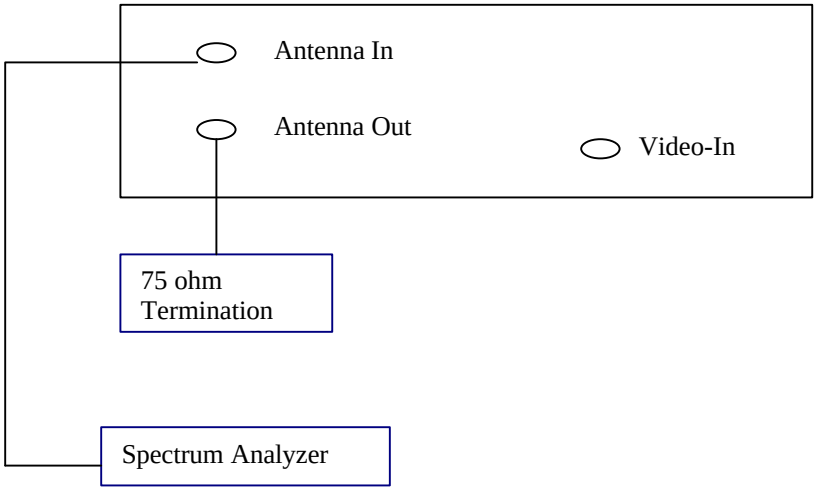
CHANNEL 3 – RECORD, VITS 5VPP	
VIDEO	25
AUDIO	26
-4.6 MHz, +7.4 MHz	27
TRANSFER SWITCH	28



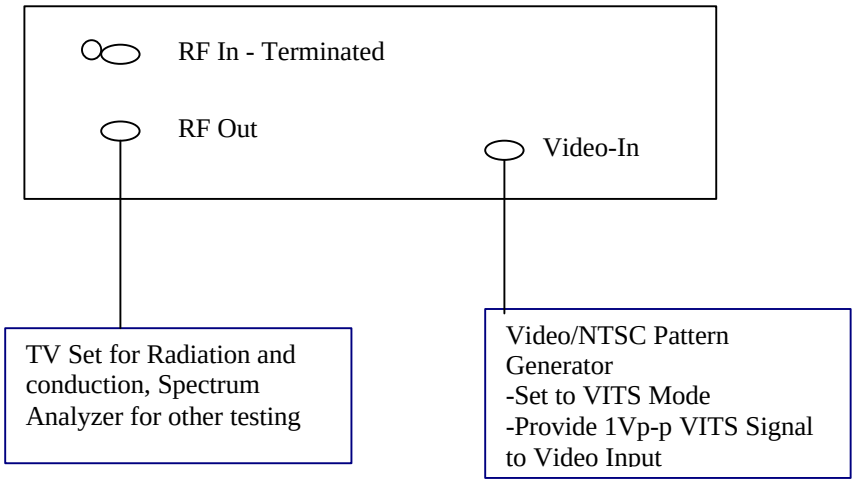


17. Configuration Block Diagram

VITS PLAYBACK MODE (CH.3, CH.4)



RECORD (1Vp-p / 5Vp-p) VITS MODE



RECORD (NTSC) MODE