EMC Test Report

According to FCC Part 15 Subpart B

Project No.		**LBE042073**
Equipment under Test		
	Address	416 Maetan3-Dong,Yeongtong-Gu,Suwon-City,Gyeonggi-Do, Korea,443-742
	Product Name	**Digital Camcorder**
	Model Name	**SC-M110**
	Manufacturer	SAMSUNG
	Brand Name	SAMSUNG
	Variant Model	See Page 3
Date of Test		October 15 ~ 15, 2004
Issued Date		November 8, 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

Table of Contents

1. General Information

1.1 Basic Information related Product

Applicant	Samsung Electronics Co. Ltd;
Model name	SC-M110
Applicant Address	Samsung Electronics Co. Ltd; 416 Maetan3- Dong, Yeongtong-Gu, Suwon-City, Gyeonggi-Do, Korea, 443-742
Contact Person	Sung Wook, Choi
Kind of product	Digital Camcorder
Valiant list	SC-M102, SC-M105
Manufacturer	Samsung Electronics Co.Ltd;
New / Alternative / Permissive change Information	This report is original report #

1.2 Detail Information related Product

Specification

Model Name	SC-M102/SC-M105/SC-M110
the CAM System	
Video Recording System	MPEG4 AVI Format
Photo System	JPEG (DPOF, Exif 2.2)
MP3	Stereo Playing
Voice	WAVE file record/play (8KHz Sampling, 16 bit, Stereo)
Memory	Internal flash memory/Memory stick/Memory stick pro
Recording/Playing time	TBD (MPEG4)
Bit Rate	TBD (MPEG4)
CCD Pixel	1/6 inch CCD, 680K(Maximum)
Optical Zoom Ratio	10x
Focal Length	2.3~23mm, F: 1.8~2.0mm
Minimum Illumination	3.0 Lux
LCD Monitor	2.0" Trans Reflective, 210K
Cradle Connectors	
USB	USB 2.0 High Speed
The CAM Connector	Special 22Pin Connector
AV Input/Output	Video (1.0Vp_p), Audio (-7.5dBm 47KΩ, Stereo)
DC Power In Connector	Special 22Pin Connector
General	
Operating Temperature	0°C~40°C
Operating Humidity	10%~80%
Power Source	3.7V (Li-Polymer Battery pack), 4.8V (AC Adapter)
Power Consumption	2.9W (LCD ON)
Dimension(WxHxD)	58.8mm x 92.7mm x 26.3mm
Weight	170g (Including the Lithium Polymer Battery Pack)
Built-in Microphone	Omni-directional Stereo condenser microphone

Model Name	SC-M102/SC-M105/SC-M110
The CAM Connectors	
AV Input/Output	3.5 Special Mini jack, Video (1.0Vp_p, 75Ω), Audio (-7.5dBm 47KΩ, Stereo)
Cradle Connector	Special 22Pin Connector
DC Power In Connector	Special 22Pin Connector
AV Adapter	
Power Requirement	AC 100~240V, 50/60Hz
DC Output	DC 4.8V, 1.0A
Dimensions	70mm x 30mm x 42mm
Weight	80g (Including DC cable)

1.3 Operating Mode and Condition

The system was configured for testing in typical fashion use.

The mode of operation utilized for testing was selected to best simulate typical EUT use.

- PLAY
- RECORDING
- PC

1.4 Equipment Modifications

No equipment modifications were required.

1.5 Test Configuration

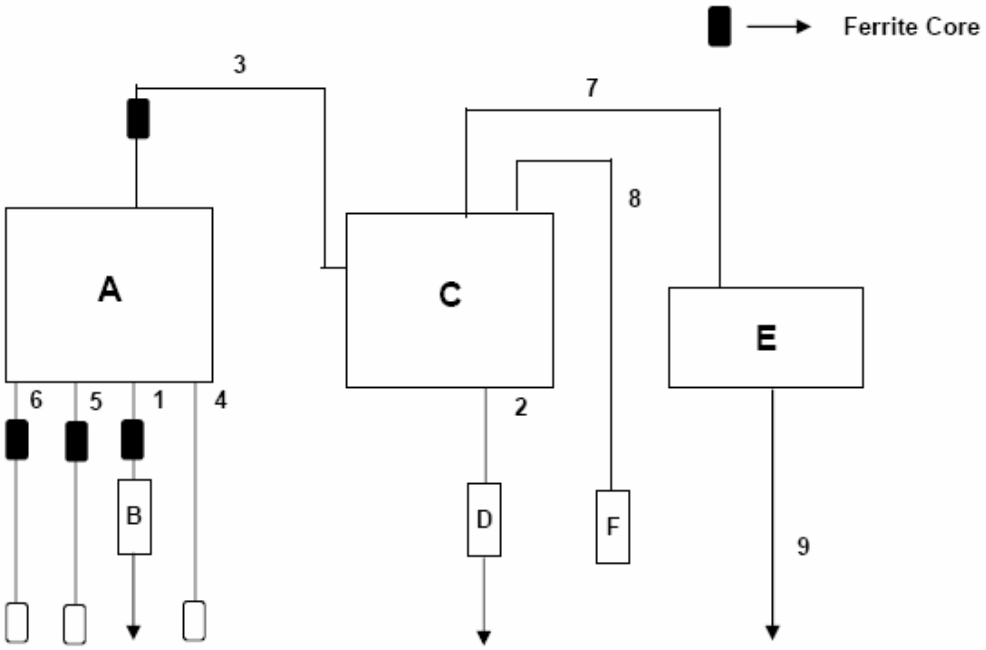
Used EUT and Peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	FCC ID
A	Digital Camcorder	SC-M110	-	SAMSUNG	A3L04SPIDER
B	Adapter	-	-	SAMSUNG	DOC
C	Note PC	OX-138-A01-T	1009-007	DELL	DOC
D	Adapter	ADP-50FH	TH-08H051-17971-19A-01DV	DELL	DOC
E	Printer	ML-1750	RP1750-120V-018	SAMSUNG	A3LML-1750
F	Mouse	M-S48a	LZA00153189	SAMSUNG	DOC

Used Cable Description

	Connect Cable	Length [m]	Shielded [Y/N]	Remark
1	AC Power cable	1.7	No	
2	AC Power cable	1.7	No	
3	USB	1.5	No	
4	Earphones	1.5	No	
5	AV	1.5	No	
6	1394 Cable	1.5	No	
7	Printer	1.5	No	
8	Mouse	1.5	No	
9	Printer cable	1.5	No	

Block Diagram



1.6 Applied Standards

List

Product or Generic Standards	Basic Standards
FCC Part15 Subpart B	ANSI 63.4 : 2000

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	Radiated Emission	FCC Part15 Subpart B	Complied

3. Description of Individual Tests

3.1 Conducted Emission

Test Information		
	Test Engineer	Sung Wook, Choi
	Test Date	October 15, 2004
	Climate Condition	Ambient Temperature : 24℃ Relative Humidity : 34%
	Test Place	Shield Room #5

Test Equipments

Equipment	Modal Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
Test Software	EP5CE	TOYO	None	N/A	N/A
Field strength meter	ESS	R&S	844661/005	2005-01-05	12
RF Relais Matrix	PSU	R&S	861206/024	N/A	N/A
L.I.S.N	ESH3-Z5	R&S	100260	2005-07-06	12
Spectrum Analyzer	ESI	R&S	100067	2005-01-09	12

EUT Test Setup

EUT was placed on a platform of nominal size, raised 80cm above the conducting ground plane. The rear of table top was located 40cm to the vertical conducting plane. The rear of EUT was aligned and flushed with rear of tabletop. All other surfaces of tabletop was at least 80cm from any other grounded conducting surface. All unused 50 ohm connectors of the LISN were resistively terminated in 50 ohm when not connected to the measuring equipment See photo.

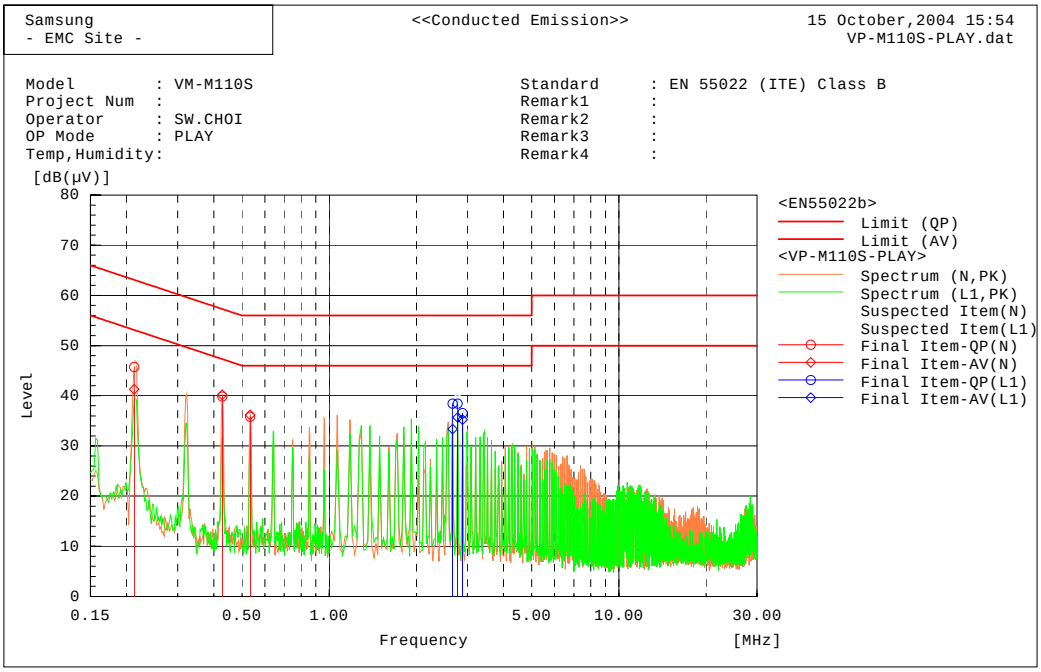
Test Result

Measurement Results	Pass The measured emissions of the EUT have found to be below the specified limits.

Test Data

■ Operating Mode : PLAY

[Graph and Data]



Final Result

--- N Phase ---

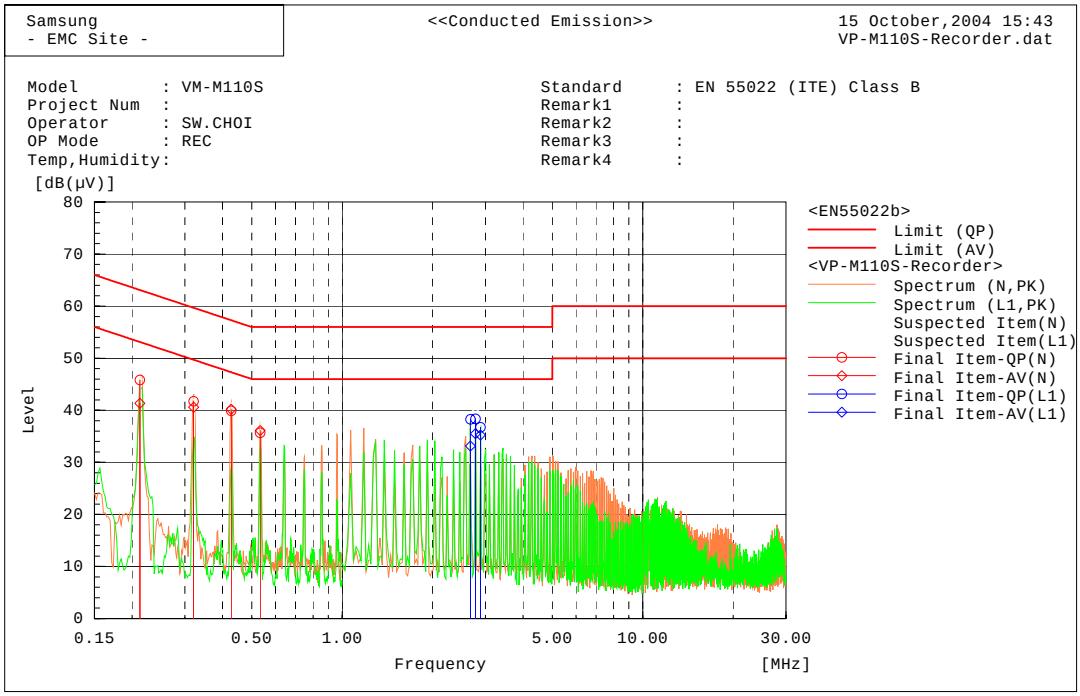
No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
1	0.21245	45.6	41.2	0.1	45.7	41.3	63.1	53.1	17.4	11.8
2	0.42763	39.8	40.1	0.1	39.9	40.2	57.3	47.3	17.4	7.1
3	0.53367	35.7	36.1	0.1	35.8	36.2	56.0	46.0	20.2	9.8

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
1	2.6709	38.3	33.3	0.1	38.4	33.4	56.0	46.0	17.6	12.6
2	2.7777	38.3	35.6	0.1	38.4	35.7	56.0	46.0	17.6	10.3
3	2.8846	36.5	35.1	0.1	36.6	35.2	56.0	46.0	19.4	10.8

■ Operating Mode : RECORDING

[Graph and Data]



Final Result

--- N Phase ---

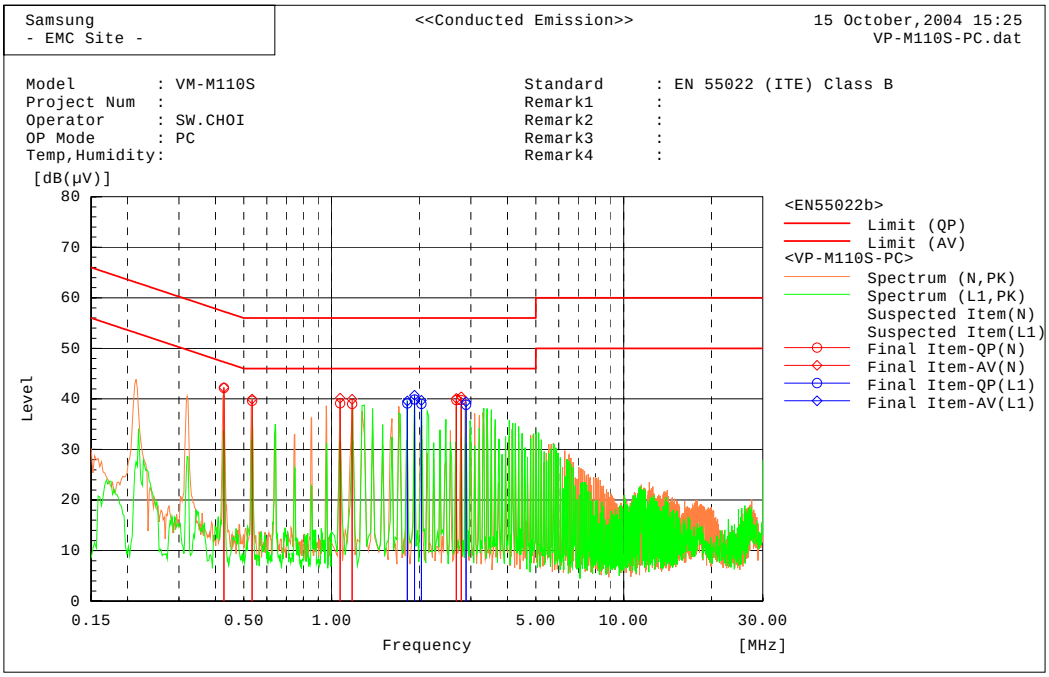
No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
1	0.21231	45.7	41.3	0.1	45.8	41.4	63.1	53.1	17.3	11.8
2	0.32047	41.6	40.5	0.1	41.7	40.6	59.7	49.7	18.0	9.1
3	0.42736	39.8	40.1	0.1	39.9	40.2	57.3	47.3	17.4	7.1
4	0.53414	35.6	36.0	0.1	35.7	36.1	56.0	46.0	20.3	9.9

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
1	2.6713	38.2	33.0	0.1	38.3	33.1	56.0	46.0	17.7	12.9
2	2.7784	38.3	35.4	0.1	38.4	35.5	56.0	46.0	17.7	10.5
3	2.8851	36.6	35.2	0.1	36.7	35.3	56.0	46.0	19.3	10.7

■ Operating Mode : PC

[Graph and Data]



Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
1	0.42719	42.1	42.1	0.1	42.2	42.2	57.3	47.3	15.1	5.1
2	0.53405	39.5	39.9	0.1	39.6	40.0	56.0	46.0	16.4	6.0
3	1.0684	39.1	40.0	0.1	39.2	40.1	56.0	46.0	16.8	5.9
4	1.1753	38.9	39.8	0.1	39.0	39.9	56.0	46.0	17.0	6.1
5	2.6711	39.6	40.0	0.1	39.7	40.1	56.0	46.0	16.3	5.9
6	2.7782	39.7	40.3	0.1	39.8	40.4	56.0	46.0	16.2	5.6

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(µV)]	Reading AV [dB(µV)]	c.f [dB]	Result QP [dB(µV)]	Result AV [dB(µV)]	Limit QP [dB(µV)]	Limit AV [dB(µV)]	Margin QP [dB]	Margin AV [dB]
1	1.8165	38.9	39.4	0.2	39.1	39.6	56.0	46.0	16.9	6.4
2	1.9236	39.7	40.5	0.2	39.9	40.7	56.0	46.0	16.1	5.3
3	2.0303	38.9	39.6	0.1	39.0	39.7	56.0	46.0	17.0	6.3
4	2.8851	38.7	39.4	0.1	38.8	39.5	56.0	46.0	17.2	6.5

3.2 Radiated Emission

Test Information		
	Test Engineer	Sung Wook, Choi
	Test Date	October 15, 2004
	Climate Condition	Ambient Temperature : 23℃ Relative Humidity : 36%
	Test Place	10m Semi Anechoic chamber

Test Equipments

Equipment	Modal Name	Manufacturer	Serial No.	Calibration	
				Next Date	Interval
RF Selector	NS4900	TOYO	0303-015	N/A	N/A
Biconilog Antenna	6112B	SCHAFFNER	2767	2005-05-22	12
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
TV Signal Generator	PM5418-TDSI	PHILIPS	LO627116	2005-01-28	12
Signal Generator	SMG	R&S	860288036	2004-11-06	12
Spectrum Analyzer	E7405A	Agilent	MY42000109	2004-11-27	12
Field strength meter	ESCS30	R&S	839809/002	2005-04-28	12
AMPLIFIER	310N	SONOMA	185861	2005-09-20	12

EUT Test Setup

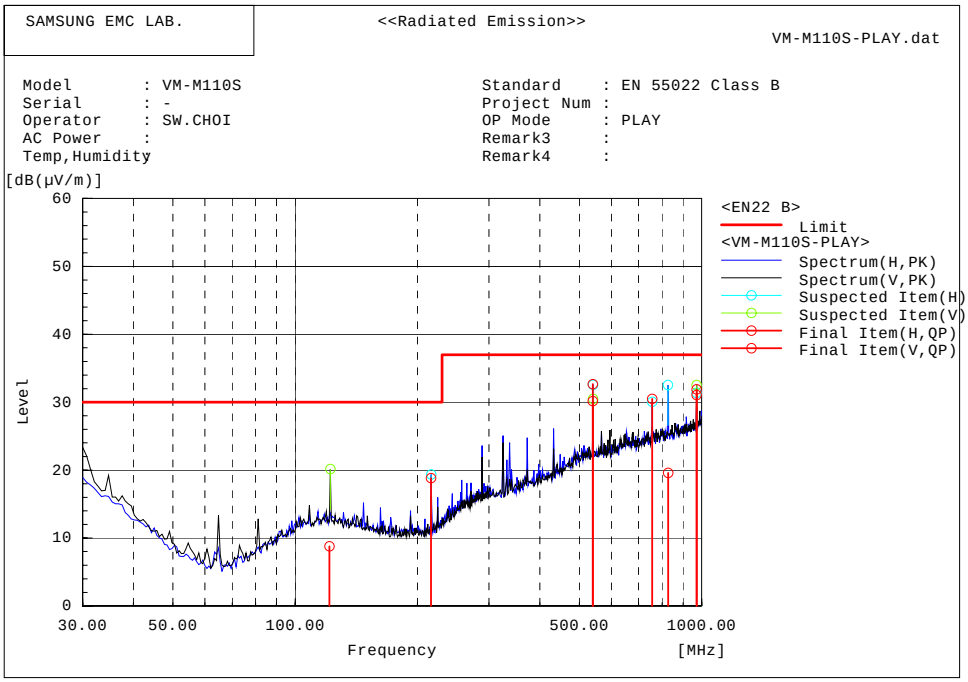
EUT was placed on a platform of nominal size and raised 80cm above the conducting ground plane. The rear of EUT was aligned and flushed with rear of tabletop. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. See photo.

Test Result

Measurement Results	Pass The measured emissions of the EUT have found to be below the specified limits.

Test Data (Other Frequency)

■ Operating Mode : PLAY



Final Result

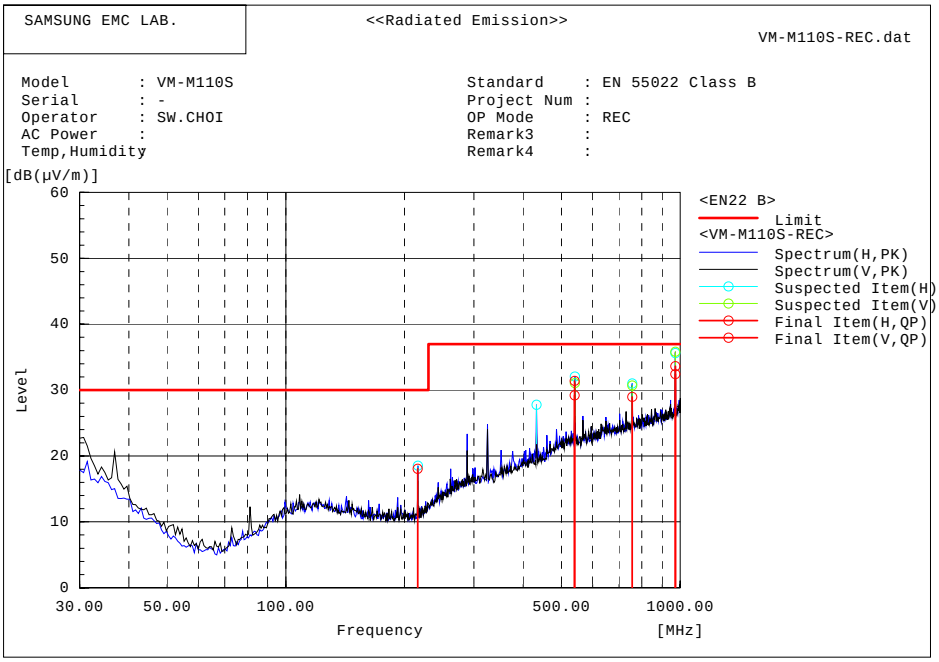
--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(µV)]	c.f [dB(1/m)]	Result [dB(µV/m)]	Limit [dB(µV/m)]	Margin [dB]	Remark
1	540.000	37.7	-5.0	32.7	37.0	4.3	
2	827.680	21.4	-1.8	19.6	37.0	17.4	
3	972.000	30.6	0.5	31.1	37.0	5.9	
4	756.000	32.7	-2.2	30.5	37.0	6.5	
5	216.003	34.4	-15.6	18.8	30.0	11.2	

--- 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	972.000	31.4	0.5	31.9	37.0	5.1	
2	540.000	35.2	-5.0	30.2	37.0	6.9	
3	121.510	22.8	-14.0	8.8	30.0	21.2	

■ Operating Mode : RECORDING



Final Result

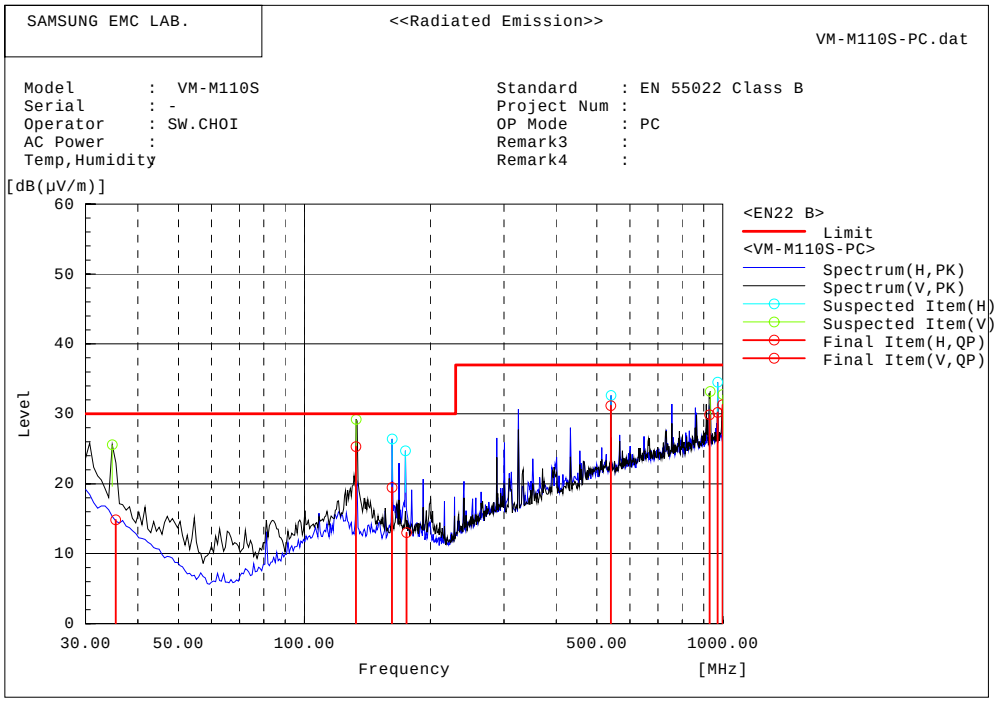
--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(µV)]	c.f [dB(1/m)]	Result [dB(µV/m)]	Limit [dB(µV/m)]	Margin [dB]	Remark
1	216.003	33.7	-15.6	18.1	30.0	11.9	
2	972.000	31.9	0.5	32.4	37.0	4.6	
3	540.000	36.4	-5.0	31.4	37.0	5.6	
4	756.000	31.2	-2.2	29.0	37.0	8.0	

--- 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	972.000	33.1	0.5	33.6	37.0	3.4	
2	540.000	34.2	-5.0	29.2	37.0	7.8	

■ Operating Mode : RECORDING



Final Result

--- Horizontal Polarization (QP)---

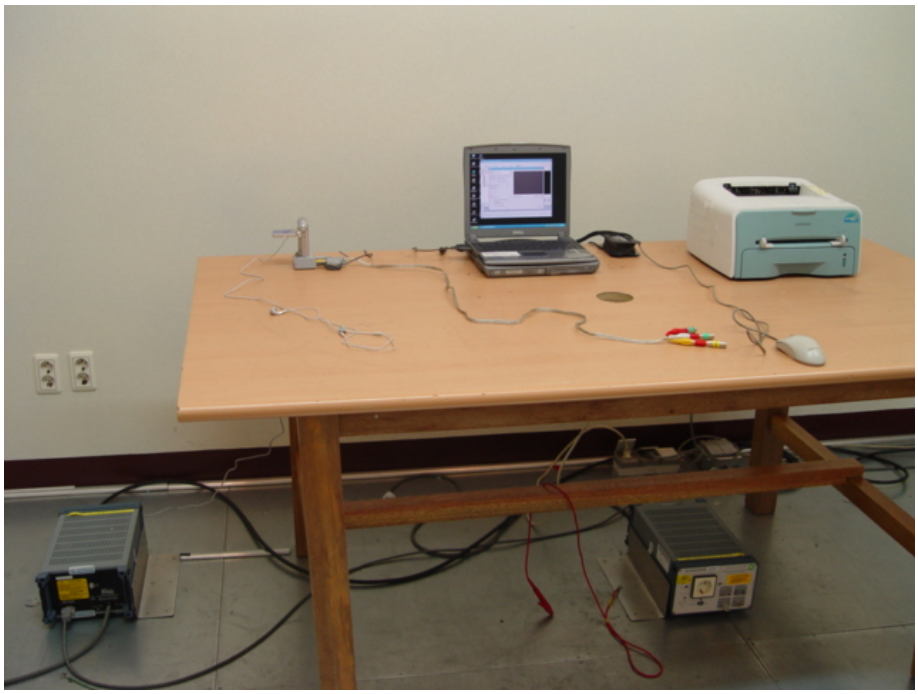
No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	972.000	29.7	0.5	30.2	37.0	6.8	
2	162.003	35.6	-16.1	19.5	30.0	10.5	
3	540.000	36.2	-5.0	31.2	37.0	5.9	
4	175.503	29.1	-16.1	13.0	30.0	17.0	

--- Vertical Polarization (QP)---

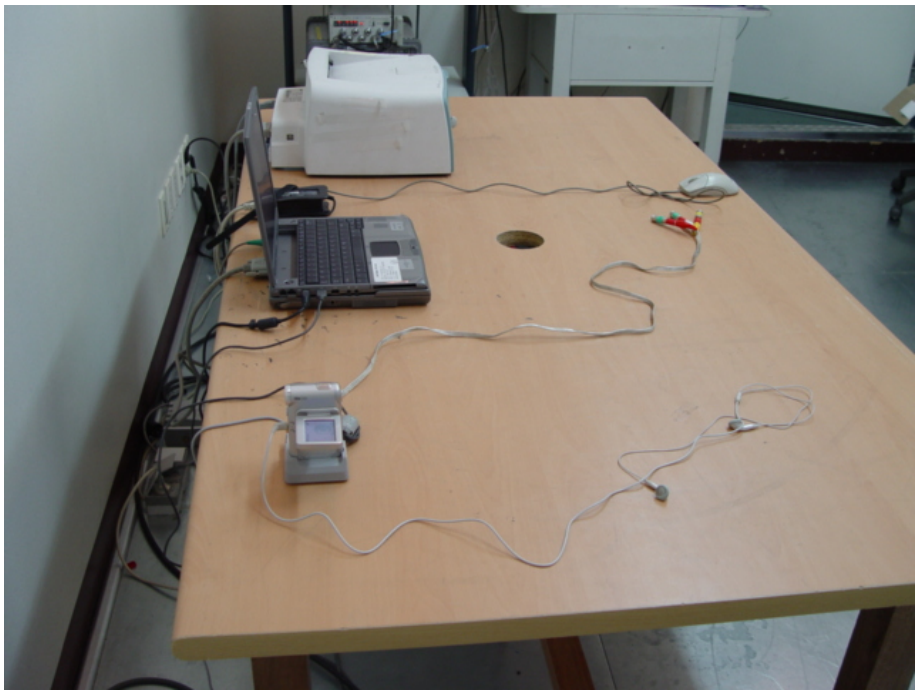
No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	132.816	39.9	-14.6	25.3	30.0	4.7	
2	930.090	30.0	-0.1	29.9	37.0	7.1	
3	998.580	30.4	0.9	31.3	37.0	5.7	
4	35.441	26.5	-11.7	14.8	30.0	15.2	

4. Appendix A

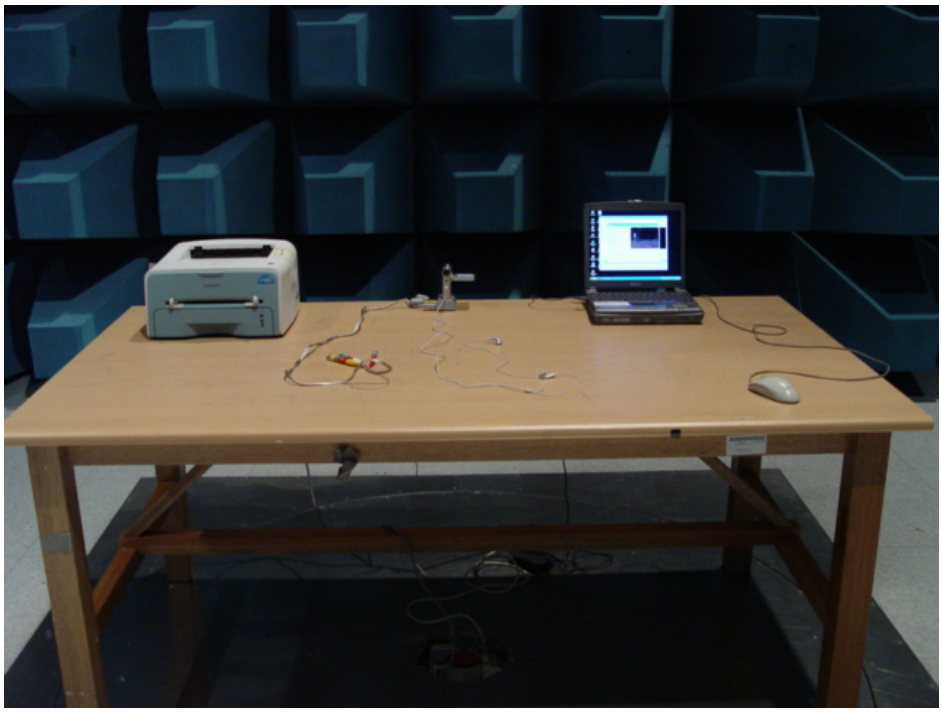
4.1 Test Photography



Picture 1. Conducted Emission (Front)



Picture 2. Conducted Emission (Rear)



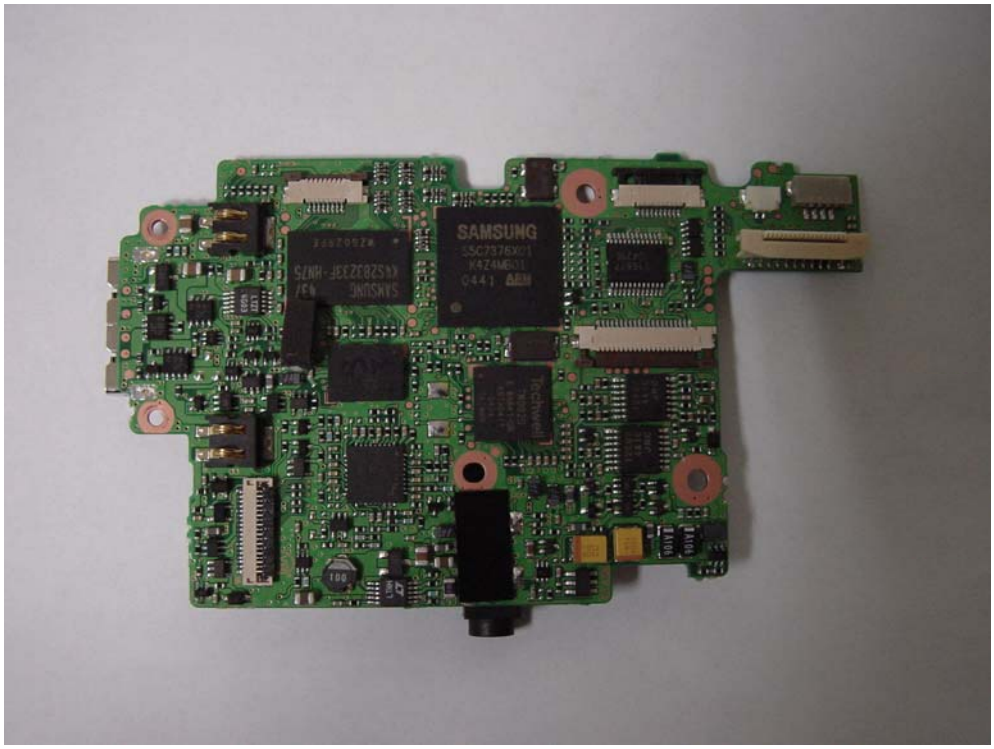
Picture 3. Radiated Emission (Front)

Picture 4. Radiated Emission (Rear)

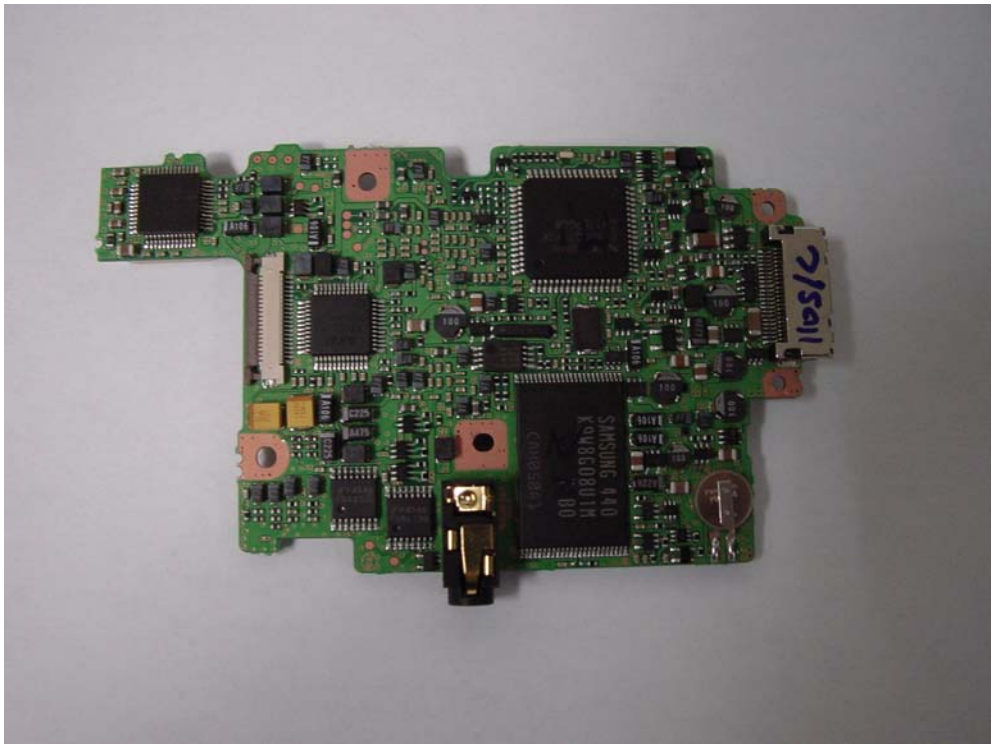
4.2 EUT Photography

Picture 5. EUT (Front)

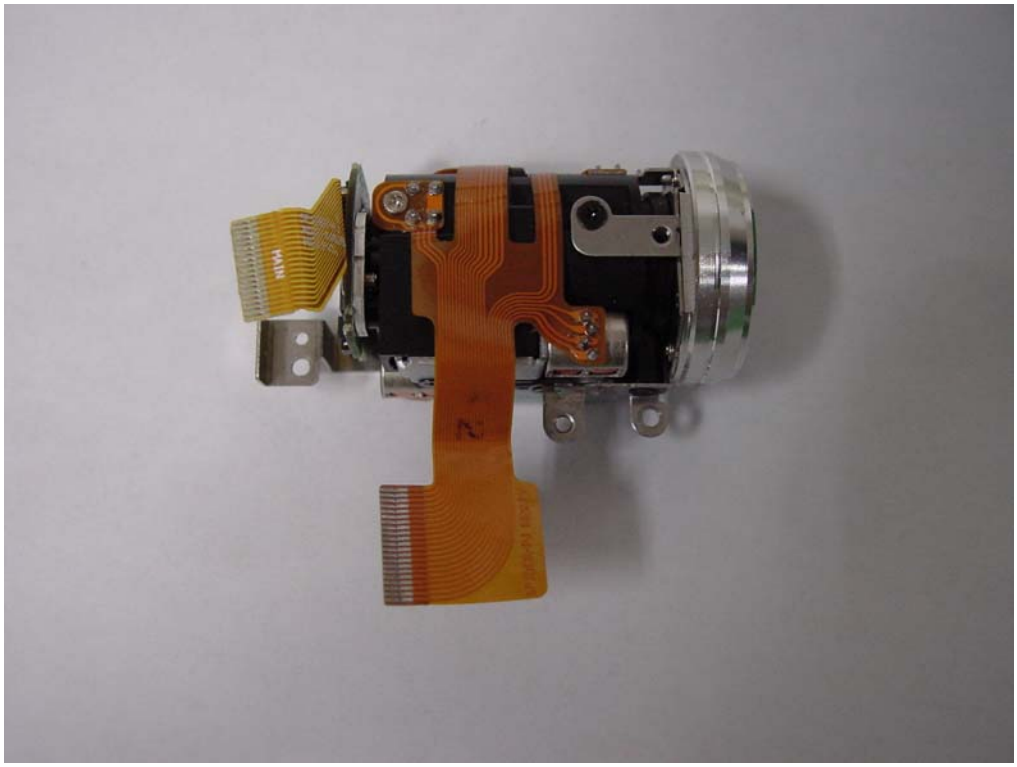
Picture 6. EUT (Rear)



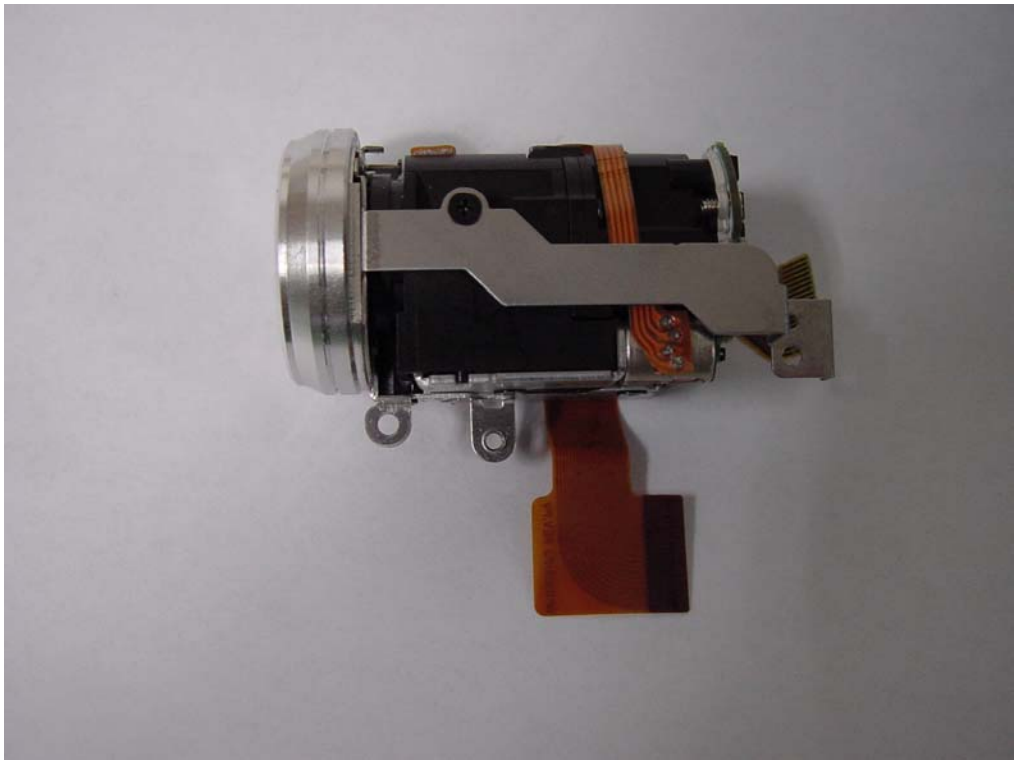
[Picture 7]



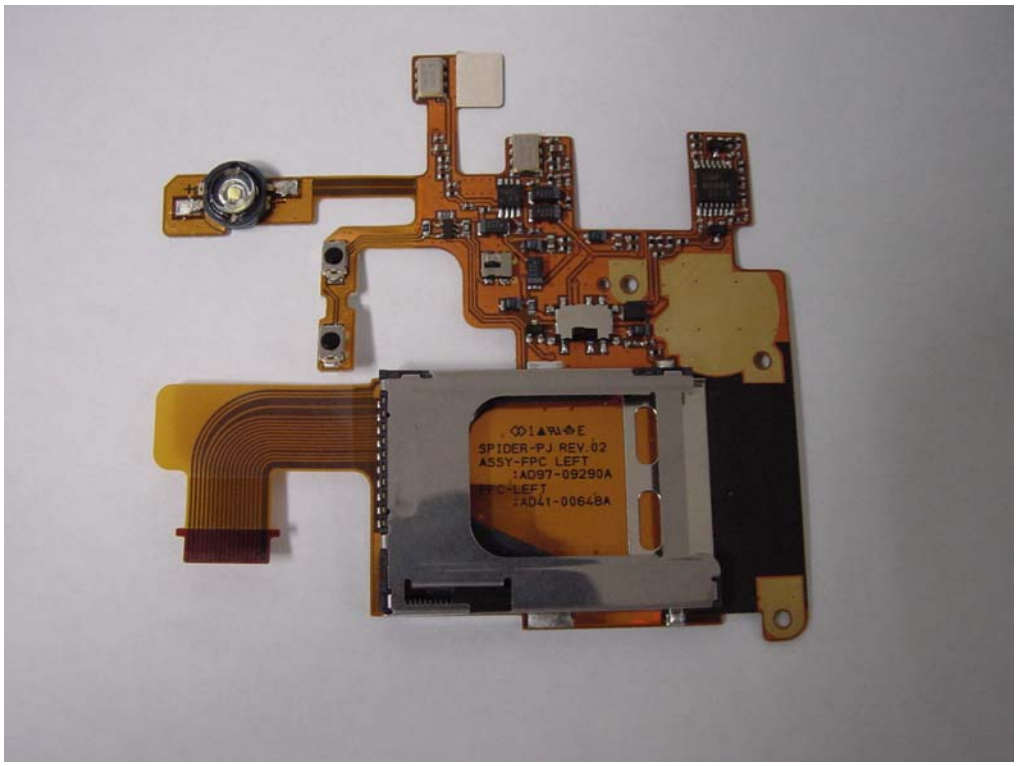
[Picture 8]



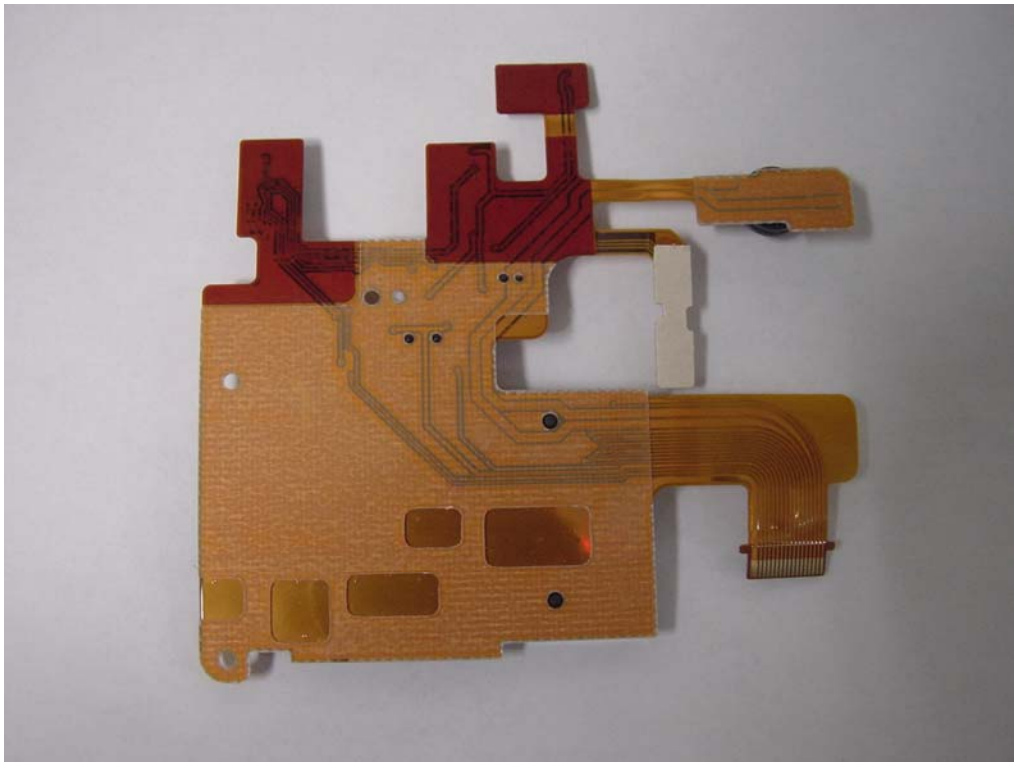
[Picture 9]



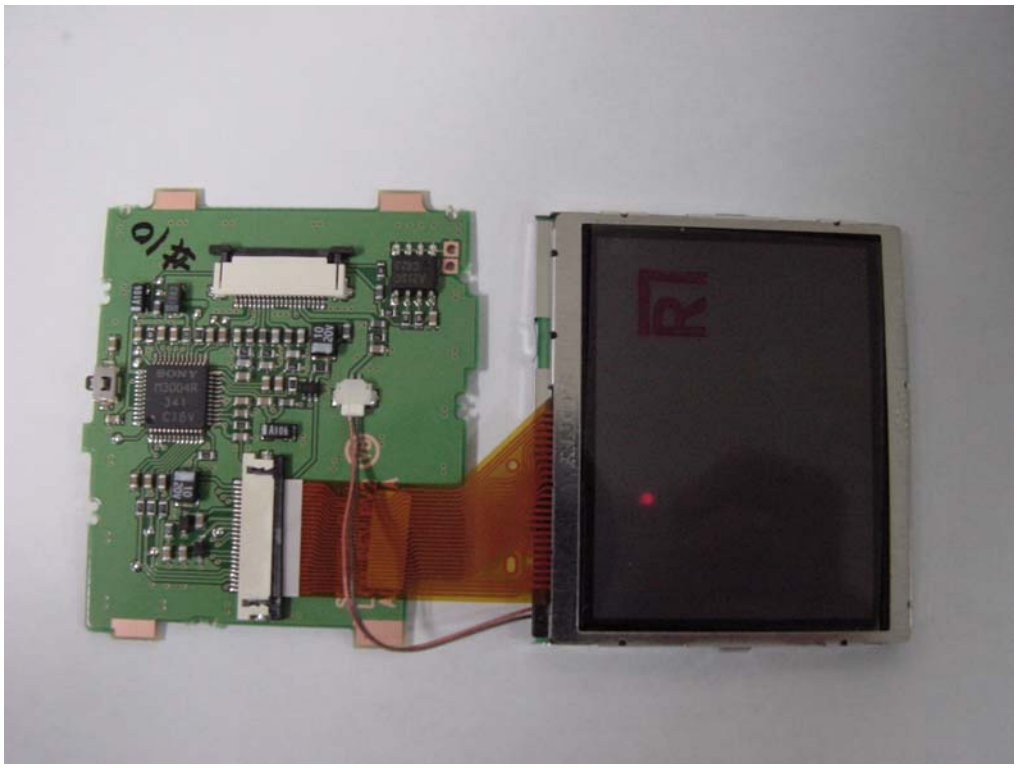
[Picture 10]



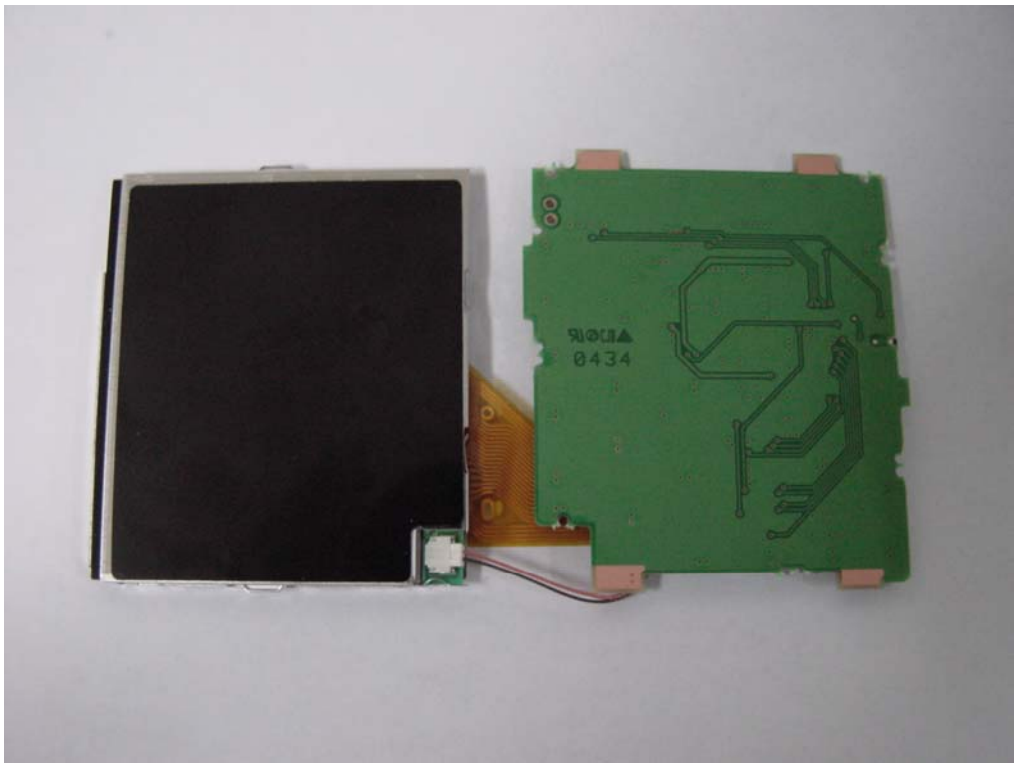
[Picture 11]



[Picture 12]



[Picture 13]



[Picture 14]

[Label]