



EMI TEST REPORT

Test report no. : ERI-FCC-0110

Type of equipment : DIGITAL VIDEO CAMERA

Model no. : SCD87

Applicant. : SAMSUNG ELECTRONICS CO., LTD.

Test standards : FCC Part15 Subpart B (Class B)

Test Procedure and Items :

- AC Power line Conducted Emissions Measurement : ANSI C63.4-1992
- Radiated Emissions Measurement : ANSI C63.4-1992

Test result : Complied

This equipment has been tested to comply with the requirements of FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators.

The results in this report apply only to the sample tested.

This test report shall not be reproduced except in full, Without the written approval of ERI Laboratory.

Date of test: 2002. 4. 24 .30

Issued date: 2002. 5. 1

Tested by :

GWEON, HUR

approved by:

SANG-KYE, LEE

This laboratory is registered by KOLAS, KOREA.

This test report have been performed in accordance with Its terms of registration.

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Conducted Emission test

Radiated Emission Test

EUT(Front, Rear, Inner)

Main Board(Front, Rear)

LCD Board(Front, Rear)

Memory Board(Front, Rear)

1. Client information

Applicant : SAMSUNG ELECTRONIC CO., LTD
Address : 416, Maetan-3dong, Paldal-Gu, Suwon-City, Kyungki-Do, Korea
Telephone Number : 81-31-200-5754
Facsimile Number : 81-31-200-3458
Contact person : Kang jae soon

Manufacturer : SAMSUNG ELECTRONIC CO., LTD
Address : 416, Maetan-3dong, Paldal-Gu, Suwon-City, Kyungki-Do, Korea
Telephone Number : 81-31-200-5754
Facsimile Number : 81-31-200-3458

2. Laboratory information

Address

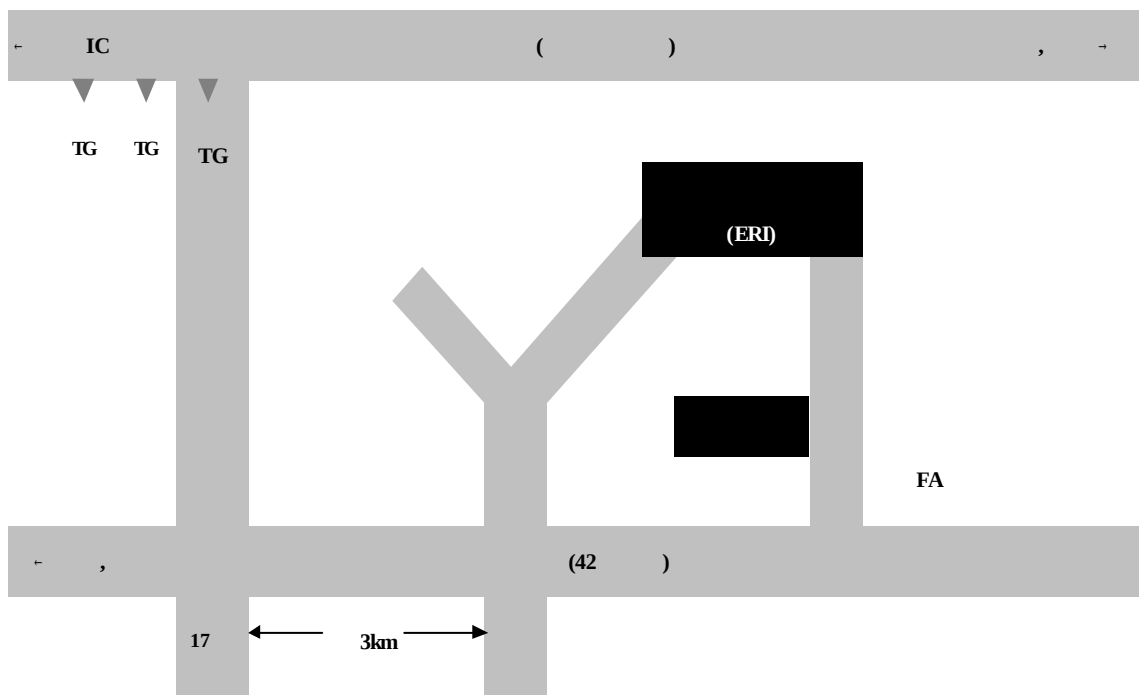
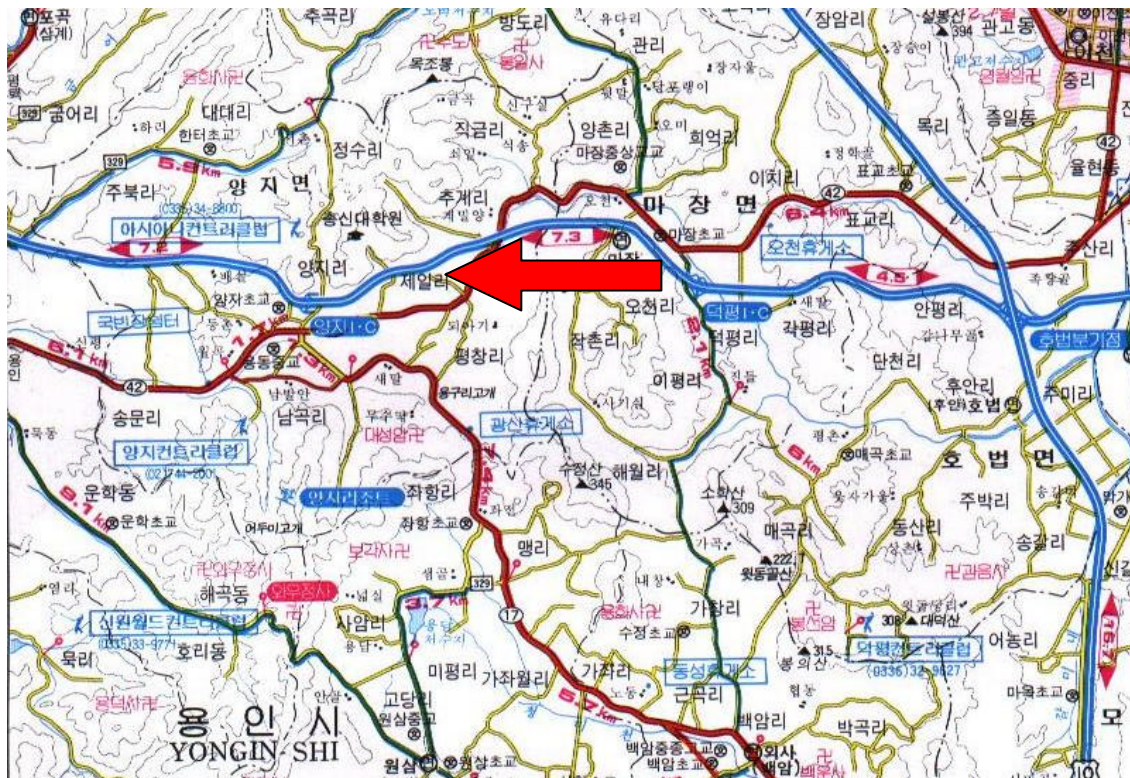
The open area test site and EMC facilities are used for these testing.
This facility was accredited by KOLAS, EK of Korea, MIC, FCC.

EMC RESEARCH INSTITUTE .
66-6, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGGI-DO, KOREA

Telephone Number : 82- 31- 336- 1186
Facsimile Number : 82- 31- 336 -1184

KOLAS No. : 111
EK : J
MIC : KR0030
FCC Filing No. : 302567

MAP



3. TEST SYSTEM CONFIGURATION

3.1 Operation Environment

	Temperature	Humidity	Pressure
3m OATS :	13.5 ° C	36 %	1001hPa
Shielded room :	22.0 ° C	39 %	998hPa

3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, specially in field of EMC.

The factors contributing to uncertainties are test receiver, Cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna Frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability.

Based on NIS 80,81, The measurement uncertainty level with a 95% confidence level were applied.

3.3 sample calculation

Conducted emission

The field strength is calculated by adding the LISN factor, cable loss from the measured reading.

The sample calculation is as follows :

$$FS = MR + LF + CL$$

MR = Meter Reading

LF = LISN Factor

CL = Cable Loss

If MR is 30dB, LISN Factor 1dB, CL 1dB

The result (MR) is

$$30 + 1 + 1 = 32\text{dBuV}$$

radiated emission

The field strength is calculated by adding the antenna Factor, cable loss and, Antenna pad subtracting the amplifier gain from the measured reading.

The sample calculation is as follows :

$$FS = MR + AF + CL + AT - AG$$

MR = Meter Reading

AF = Antenna Factor

CL = Cable Loss

AT = Antenna Pad

AG=Amplifier Gain

If MR is 30dB, AF 12dB, CL 5dB, AP 10dB, AG 35dB

The result (MR) is

$$30 + 12 + 5 + 10 - 35 = 22\text{dBuV/m}$$

4. Description of e.u.t.

4.1 Product Description

Manufactured By:	SAMSUNG ELECTRONICS CO., LTD
Address:	416, Maetan-3dong, Paldal-Gu, Suwon City, Kyungki-Do, Korea
Test Requested By:	SAMSUNG ELECTRONICS CO., LTD
Model:	SCD87
Serial Number:	N/A
IMAGE SENSOR	200,000 fixel
Supply Voltage	DC 8.4V
General Description:	This EUT(Equipment Under Test) is DIGITAL VIDEO CAMERA.

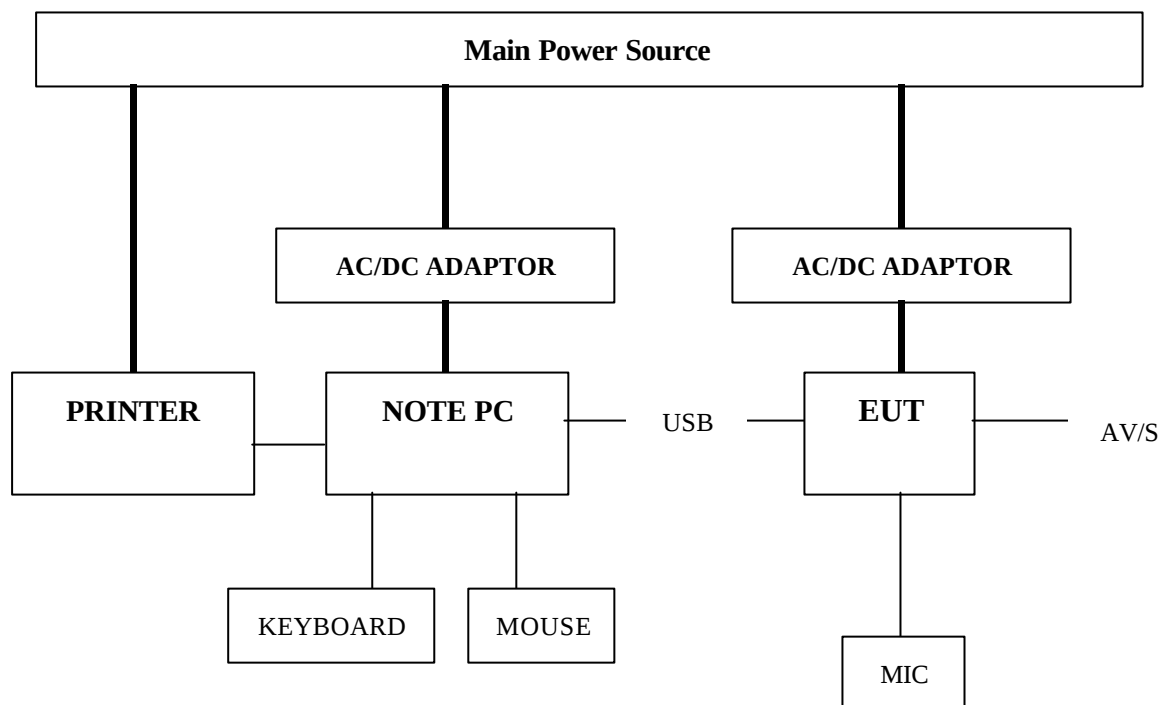
4.2 peripherals

Description	Model / Part #	Serial Number	Manufacture
DIGITAL VIDEO CAMERA	SCD87	N/A	SAMSUNG ELECTRONICS CO., LTD.
PRINTER	C6427A	CN13V1B1TD	HP
KEYBOARD	SDM4510UH	4M015720	SAMSUNG ELECTRONICS CO., LTD.
MOUSE	M-S34	LZB92800974	LOGITECH
NOTE PC	CM2080	5Y17JNZ9R892	COMPAQ
AC/DC ADAPTOR	AA-E7	6CAT3 00066	SAMSUNG ELECTRONICS CO., LTD.
MIC	N/A	N/A	N/A
AC/DC ADAPTOR	ADP-60DB	MJD0124008757	LG ELECTRONICS CO., LTD.

4.3 used cables

EUT Port	Type	Shield (Y/N)	Length (meters)	Pin	Connected To
USB	USB	Y	1.2	6	NOTE PC
POWER	LINE	N	1.2	2	POWER
MIC PORT	P-JACK	N	1.0	2	MIC
AV/S	P-JACK	N	1.2	4	- (OPEN)
S-VIDEO	DIN	Y	1.0	5	- (OPEN)

4.4 E.U.T Test Configuration



4.5 Operating conditions

Operating : USB Still camera mode, play mode, recording mode

- The system was configured in typical fashion (as a customer would normally use it) for testing.
- The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

5. TEST RESULTS

5.1 Conducted emission

5.1.1 Measurement procedure

Mains

The measurements were performed in a shielded room.

EUT was placed on a non-metallic table height of 0.8m above the reference ground plane.

The rear of tabletop was located 40Cm to the vertical conducted plane.

All other surfaces of tabletop was at least 80cm from any other grounded conducting surface.

I/O cables and AC cables that were connected to the peripherals were bundled in center.

They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

Each EUT power lead, except ground (safety) lead, were individually connected through a LISN to input power source.

Both lines of power cord, hot and neutral, were measured.

5.1.2 Used equipment

Equipment	Model	Serial No.	Makers	Next Cal.Date	Used
Test receiver	ESS	848588/006	R&S	02. 6. 08	
	ESC S30	100022	R&S	03. 3. 25	
L.I.S.N.	ESH3-Z5	100028	R&S	02. 5. 21	
	ESH3-Z5	100029	R&S	01.5. 21	

5.1.3 measurement uncertainty

Conducted Emission measurement : ± 2.4 (K=2)

5.1.3 test data(downloading)

Frequency	Tested	LISN	Meter	Total	Results	Margin	Limits
Range	Freq.	Pol.	Reading[A]	Loss	QP		
			QP	[B]	[A]+[B]	[C]-[A+B]	[C]
[MHz]	[MHz]		[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]
0.45-30	0.525	N	40.10	0.18	40.28	7.72	48.00
	0.591	N	43.50	0.18	43.68	4.32	48.00
	0.789	N	41.10	0.18	41.28	6.72	48.00
	0.918	H	39.20	0.19	39.39	8.61	48.00
	1.380	N	44.10	0.20	44.30	3.70	48.00
	1.641	N	41.90	0.21	42.11	5.89	48.00
	1.905	N	44.10	0.22	44.32	3.68	48.00
	2.037	N	43.60	0.22	43.82	4.18	48.00
	2.955	H	39.90	0.25	40.15	7.85	48.00
	3.020	H	39.40	0.25	39.65	8.35	48.00

* Results = Meter Reading(QP) + Total Loss(LISN Insertion loss + Cable loss)

* Margin = Limits - Result

* IF Bandwidth = 9kHz

* Detecting Mode : Quasi-Peak

* Used receiver : ESS (Rohde & Schwarz)

5.1.5 test data(rec)

Frequency	Tested	LISN	Meter	Total	Results	Margin	Limits
Range	Freq.	Pol.	Reading[A]	Loss	QP		
			QP	[B]	[A]+[B]	[C]-[A+B]	[C]
[MHz]	[MHz]		[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]
0.45-30	0.525	H	40.40	0.18	40.58	7.42	48.00
	0.591	H	42.90	0.18	43.08	4.92	48.00
	0.657	H	41.60	0.18	41.78	6.22	48.00
	0.789	H	40.40	0.18	40.58	7.42	48.00
	1.380	H	40.10	0.20	40.30	7.70	48.00
	1.641	H	40.40	0.21	40.61	7.39	48.00
	1.905	N	43.80	0.22	44.02	3.98	48.00
	2.037	H	42.60	0.22	42.82	5.18	48.00
	2.955	H	40.10	0.25	40.35	7.65	48.00

* Results = Meter Reading(QP) + Total Loss(LISN Insertion loss + Cable loss)

* Margin = Limits - Result

* IF Bandwidth = 9kHz

* Detecting Mode : Quasi-Peak

* Used receiver : ESS (Rohde & Schwarz)

5.1.6 test data(play)

Frequency	Tested	LISN	Meter	Total	Results	Margin	Limits
Range	Freq.	Pol.	Reading[A]	Loss	QP		
			QP	[B]	[A]+[B]	[C]-[A+B]	[C]
[MHz]	[MHz]		[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]
0.45-30	0.525	H	43.90	0.18	44.08	3.92	48.00
	0.591	H	40.70	0.18	40.88	7.12	48.00
	0.723	H	40.10	0.18	40.28	7.72	48.00
	0.855	H	41.90	0.18	42.08	5.92	48.00
	0.918	H	40.20	0.19	40.39	7.61	48.00
	1.446	H	41.60	0.20	41.80	6.20	48.00
	1.512	H	41.00	0.20	41.20	6.80	48.00
	1.971	H	44.00	0.22	44.22	3.78	48.00
	2.037	H	43.40	0.22	43.62	4.38	48.00
	2.562	H	41.00	0.23	41.23	6.77	48.00
	3.810	H	39.50	0.37	39.87	8.13	48.00
	4.270	H	39.4	0.38	39.78	8.22	48.00

* Results = Meter Reading(QP) + Total Loss(LISN Insertion loss + Cable loss)

* Margin = Limits - Result

* IF Bandwidth = 9kHz

* Detecting Mode : Quasi-Peak

* Used receiver : ESS (Rohde & Schwarz)

5.1.7 Result

Complied

5.2 Radiated Emission

5.2.1 Measurement procedure

A pretest was performed at 3m distance in an semi-anechoic chamber for searching correct frequency.

The final test was done at a 10m open area test site with a quasi-peak detector.

EUT was placed on a non-metallic table height of 0.8m above the reference ground plane.

Cables connected to EUT were fixed to cause maximum emission. 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.

5.2.2 Used equipment

Equipment	Model No.	Serial No.	Makers	Next Cal Date
Test receiver	ESMI	826210/007	R&S	03. 3. 8
	ESCS30	830986/015	R&S	03.3.18
	ESS	848588/006	R&S	02.6. 8
Biconnical antenna	HK116	825177/013	R&S	02. 5. 30
Log-Periodic antenna	HL223	825032/017	R&S	02. 5. 30
Antenna Mast	EMAT2014	N/A	EM	-
Turn Table	EMRT2015	N/A	EM	-
Test site	10m chamber	Test site	EM	-
	chamber(3m)		EM	-

5.2.3 measurement uncertainty

Radiated Emission measurement :

30-300MHz +3.96dB / -4.04dB

300-1000MHz +3.04dB / -3.00dB

5.2.4 test data(downloading)

Frequency Range [MHz]	Tested Frequency [MHz]	ANT Pol.	Meter Reading [A] [dBuV/m]	Total Loss [B] [dB]	Results [A+B] [dBuV/m]	Margine	Limits [dBuV/m]
30 - 88	88.67	H	15.1	10.06	25.16	14.84	40.0
88-216	90.21	V	15.7	10.62	26.32	17.18	43.5
	126.62	H	9.0	15.30	24.30	19.2	
	149.02	H	13.2	17.10	30.30	13.2	
216-960	216.10	H	9.2	19.30	28.50	17.5	46.0
	248.74	H	14.6	20.20	34.80	11.2	
	286.32	H	6.2	21.95	28.15	17.85	
	492.53	V	4.3	20.84	25.14	20.86	
	547.45	H	9.5	21.64	31.14	14.86	
	648.29	V	4.7	24.00	28.70	17.3	
	811.10	H	4.2	26.94	31.14	14.86	
960-above							54.0

5.2.5 test data(rec)

Frequency Range [MHz]	Tested Frequency [MHz]	ANT Pol.	Meter Reading [A] [dBuV/m]	Total Loss [B] [dB]	Results [A+B] [dBuV/m]	Margine	Limits [dBuV/m]
30 - 88	88.49	H	16.9	10.06	26.96	13.04	40.0
88-216	90.12	V	15.6	10.62	26.22	17.28	43.5
	125.15	H	11.4	15.30	26.70	16.80	
	147.96	H	12.0	17.10	29.10	14.40	
	198.74	H	11.2	19.05	30.25	13.25	
216-960	216.23	H	9.1	19.30	28.40	17.60	46.0
	232.54	H	6.5	19.90	26.40	19.60	
	242.95	H	7.0	20.20	27.20	18.80	
	265.10	V	7.1	21.00	28.10	17.90	
	463.75	V	3.5	20.84	24.34	21.66	
	648.26	V	3.9	24.00	27.90	18.10	
	748.13	V	3.4	25.56	28.96	17.04	
960-above							54.0

5.2.6 test data(play)

Frequency Range [MHz]	Tested Frequency [MHz]	ANT Pol.	Meter Reading [A] [dBuV/m]	Total Loss [B] [dB]	Results [A+B] [dBuV/m]	Margine	Limits [dBuV/m]
30 - 88							40.0
88-216	90.12	V	16.4	10.62	27.02	16.48	43.5
	148.98	H	12.1	17.10	29.20	14.30	
	166.46	H	12.7	18.20	30.90	12.60	
	190.01	H	9.1	19.10	28.20	15.30	
	198.50	H	10.2	19.05	29.25	14.25	
216-960	216.23	V	3.5	19.30	22.80	23.20	46.0
	365.91	V	4.1	18.11	22.21	23.79	
	492.46	V	9.0	20.84	29.84	16.16	
	548.70	H	9.3	21.64	30.94	15.06	
	646.23	H	7.9	24.00	31.90	14.10	
	748.25	V	3.2	25.56	28.76	17.24	
	810.75	H	2.4	26.94	29.34	16.66	
960-above							54.0

5.2.7 Result

Complied

6. TEST PHOTOGRAPHS

Conducted Emission

[FRONT]



[SIDE]

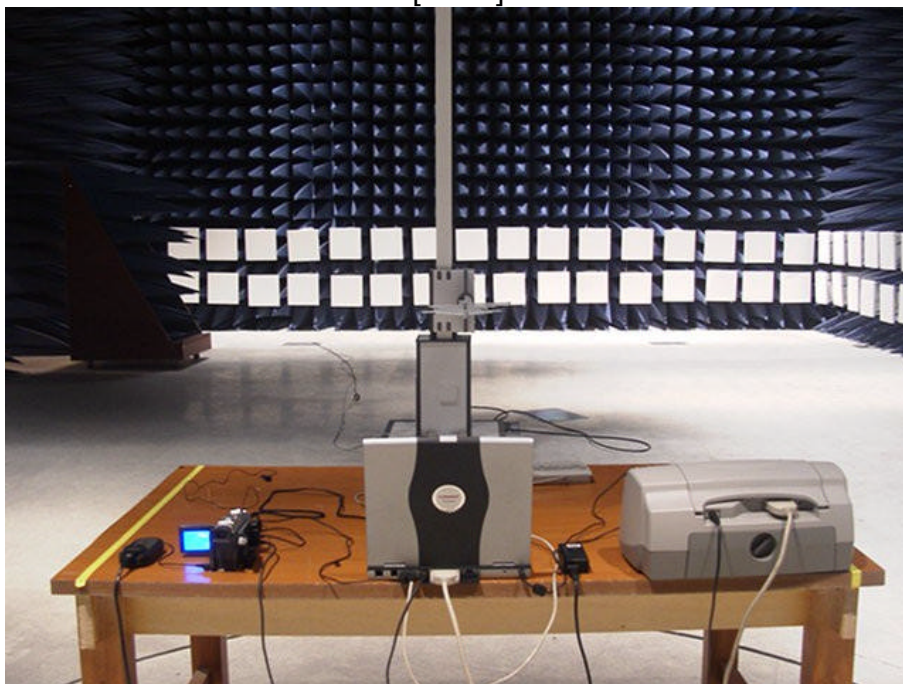


Radiated Emission

[FRONT]



[REAR]



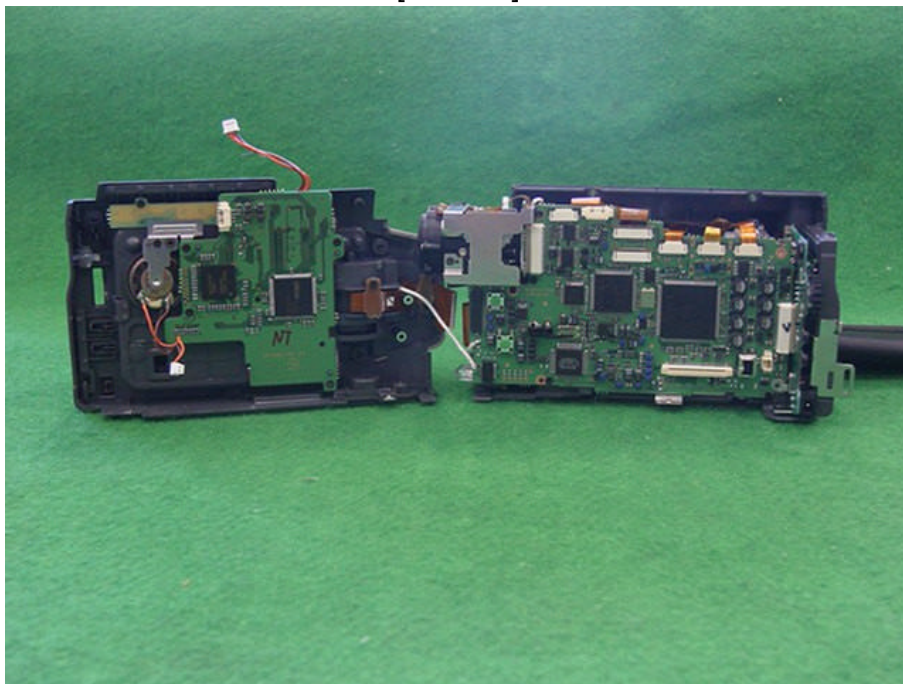
[EUT FRONT]



[EUT REAR]

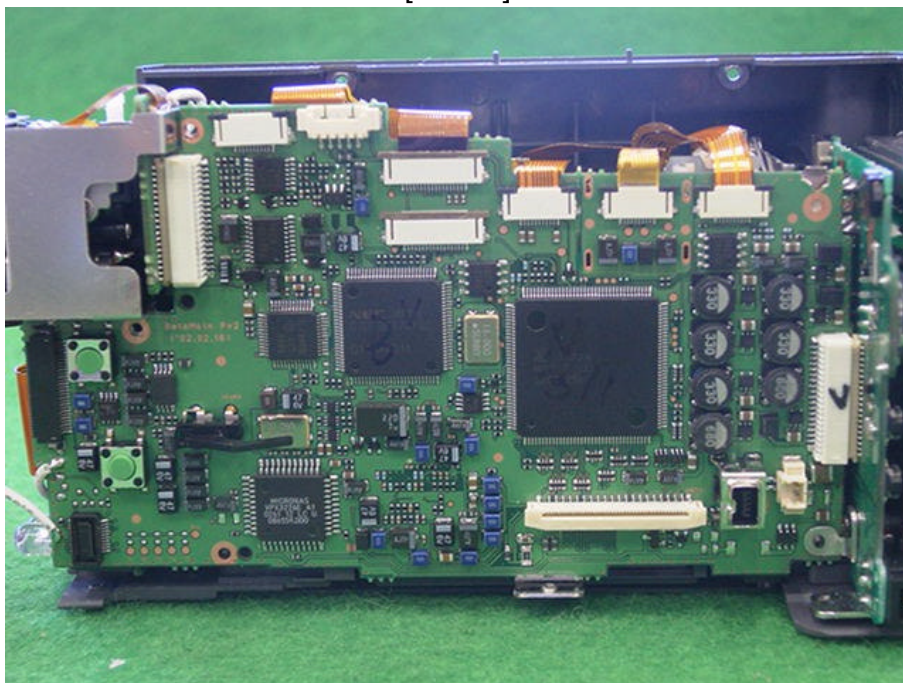


[INSIDE]

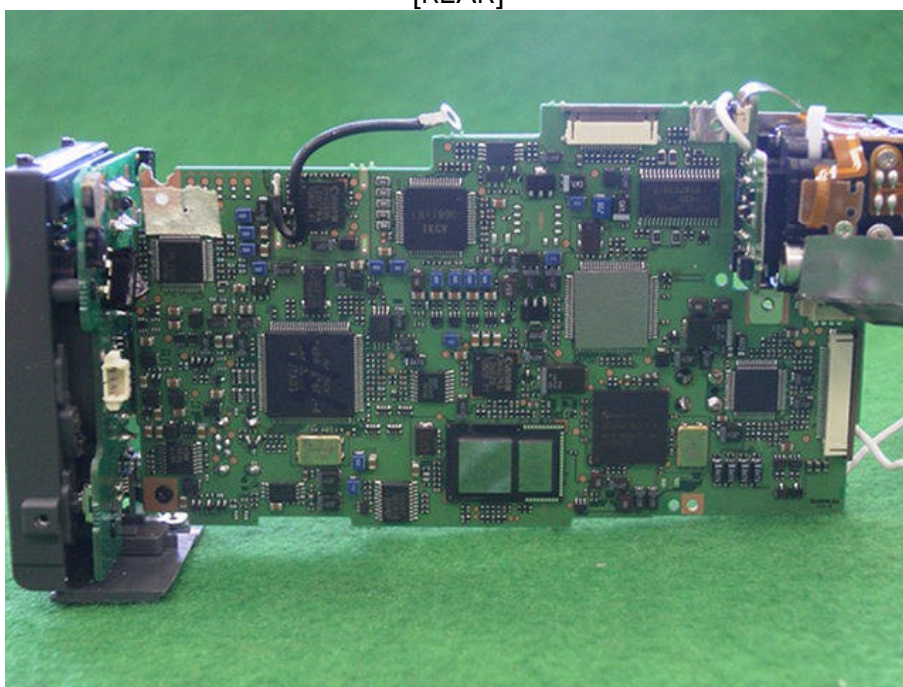


Main Board

[FRONT]



[REAR]

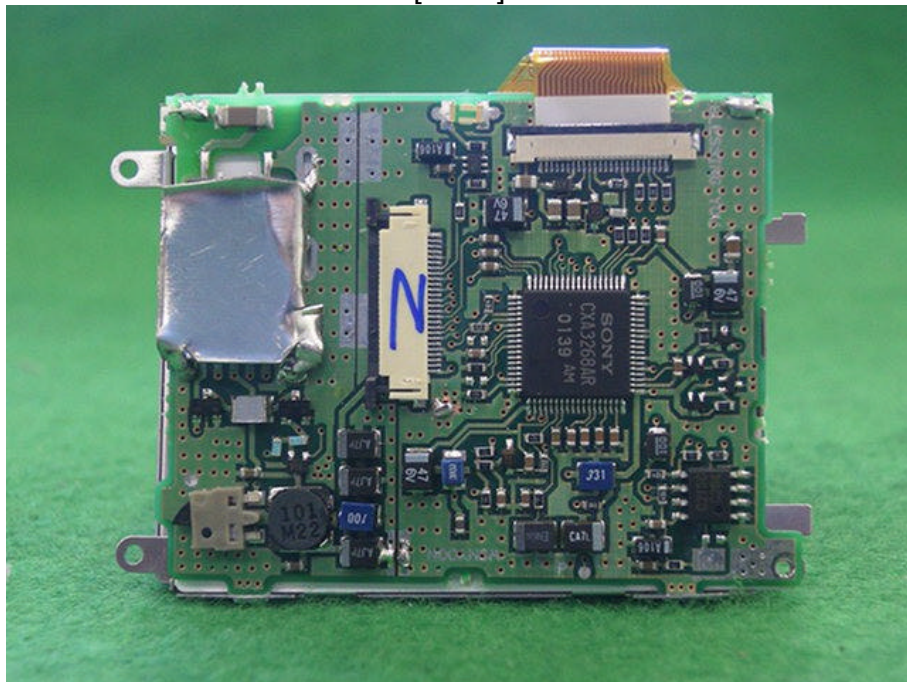


LCD Board

[FRONT]

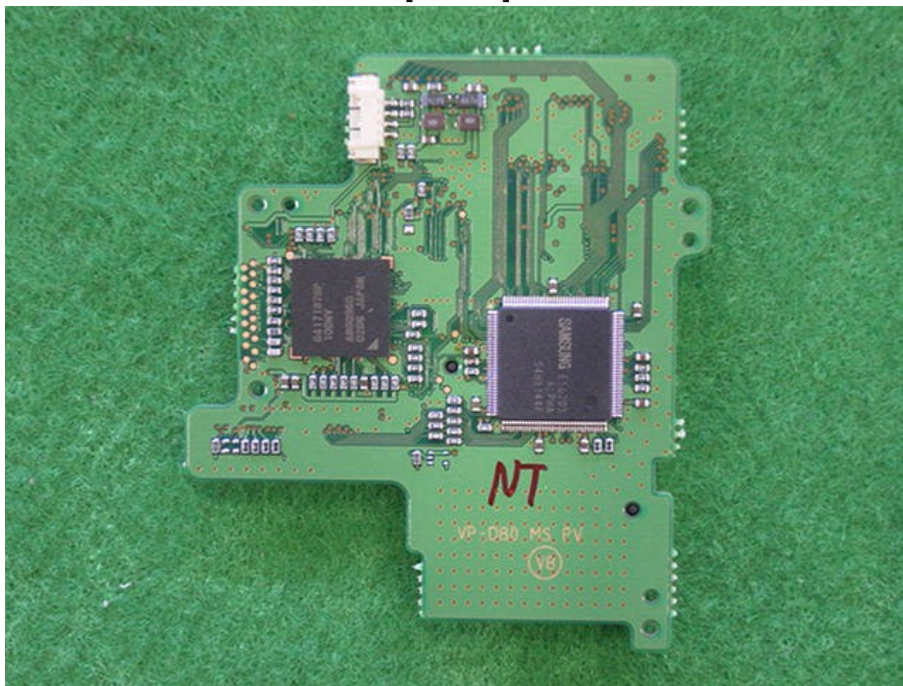


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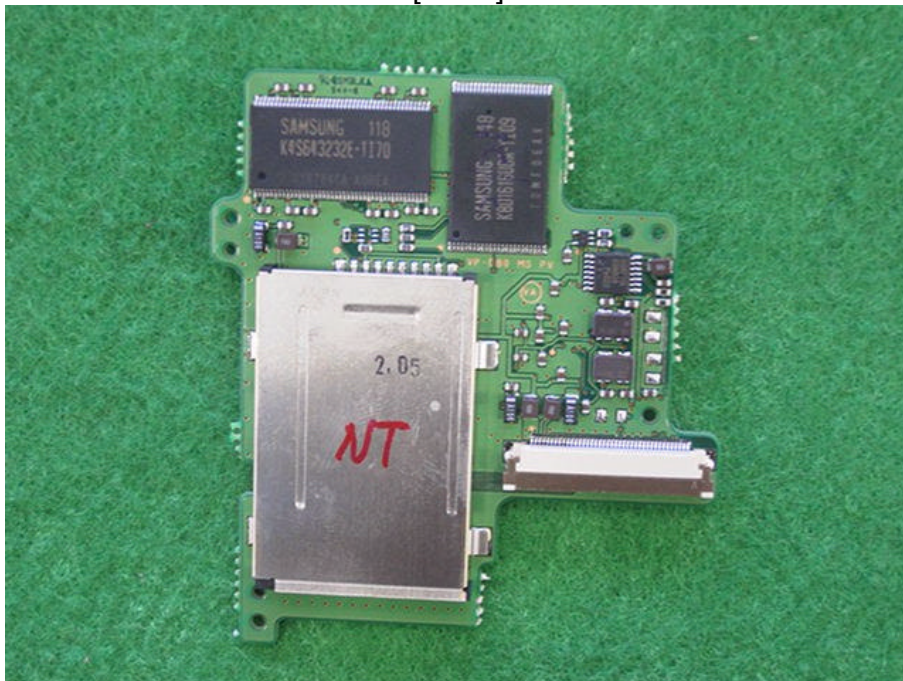


Memory Board

[FRONT]



[REAR]



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