

# EMI TEST REPORT

**Test report no.:** EMC-FCC-0569  
**Type of equipment:** DIGITAL COLOR CAMERA  
**Model Name:** SCC-C4333  
**Variant Model:** SCC-C4233, SCC-C4233P, SCC-C4333P  
SCC-C 4235, SCC- C4335  
**Applicant:** SAMSUNG ELECTRONICS CO., LTD  
**Factory:** Tianjin Samsung Electronics Co.,Ltd  
**Test standards:** FCC part 15 subpart B, Class A

## Test Procedure and Items

- AC Power Line Conducted Emissions Measurement: ANSI C63.4-2003
- Radiated Emissions Measurement : ANSI C63.4-2003

**Testing Laboratory:** EMC Compliance Ltd.

**Test result :** Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.

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.

**Date of test:** 2007. 09. 15

**Date of Issue:** 2007. 09. 19

**Tested by:** 

**Approved by:** 

BAEK, JEONG-SOO

CHUNG, MIN-SEOK

**EMC Compliance Ltd.**

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## 1. Client information

**Applicant:** SAMSUNG ELECTRONICS CO., LTD  
**Address:** 416, Maetan 3-dong, Youngtong-gu, Suwon city, Kyunggi-do, Korea.  
**Telephone Number:** +82-31-277-2635  
**Facsimile number** +82-31-277-2784  
**Contact Person** Eum Chang Seub

**Factory:** Tianjin Samsung Electronics Co.,Ltd  
**Address:** 300457 CHINA TIANJIN NO 12.  
FOURTH AVENUE, TEDA, TIANJIN CHINA

## 2. Laboratory information

### Address

#### **EMC compliance Ltd.**

82-1 Jeil-ri, Yangji-myun, Churingu, Yongin-city, Kyunggi-do 449-825, Korea

Telephone Number : 82 31 336 9919

Facsimile Number : 82 31 336 4767

CBTL Testing Laboratory

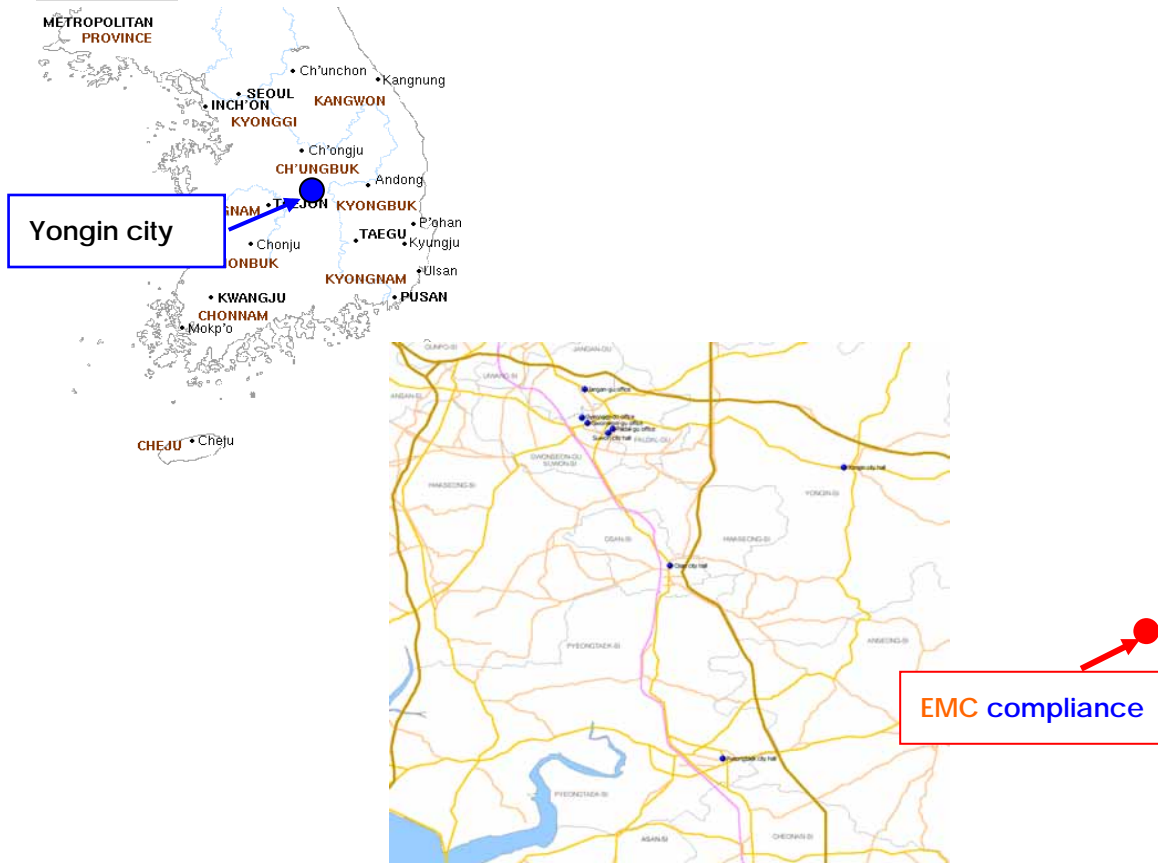
FCC Filing No.: 793334

FCC CAB.: KR0040

VCCI Registration No. : C-1713, R-1606, T-258

KOLAS NO.: 231

### **SITE MAP**



#### **EMC Compliance Ltd.**

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### 3. Test system configuration

#### 3.1 Operation Environment

	Temperature	Humidity	Pressure
OATS :	24 °C	57 %	-
Shielded room :	22 °C	50 %	-

#### Test site

These testing were performed following locations;

Shielded Room: Conducted Emission

OATS (10m) : Radiated Emission

#### 3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMI. 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, mismatching, and system repeatability.

Based on NIS 80, 81, the measurement uncertainty level with a 95% confidence level was 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 follow:

$$FS = MR + LF + CL$$

MR = Meter Reading

LF = LISN Factor

CL = Cable Loss

If MR is 30dB, LISN Factor 2dB, CL 1dB

The result (MR) is

$$30 + 2 + 1 = 33\text{dBuV}$$

#### Radiated emission

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

The sample calculation is as follow:

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

MR = Meter Reading

AF = Antenna Factor

CL = Cable Loss

AP = Antenna Pad

AG=Amplifier Gain

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

The result (MR) is

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

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## 4. Description of EUT

### 4.1 Product description

Applicant:	SAMSUNG ELECTRONICS CO., LTD
Address:	416, Maetan 3-dong, Youngtong-gu, Suwon city, Kyunggi-do, Korea.
Manufacturer:	Tianjin Samsung Electronics Co.,Ltd
Address:	300457 CHINA TIANJIN NO 12. FOURTH AVENUE, TEDA, TIANJIN CHINA
Brand name:	Samsung
Type of approval:	Verification
Type of equipment:	DIGITAL COLOR CAMERA
Basic Model:	SCC-C4333
Variant Model:	SCC-C4233, SCC-C4233P, SCC-C4333P SCC-C 4235, SCC- C4335
Serial number:	-
Tuner Type No. :	
Tuner manufacturer :	SAMSUNG
Rating:	AC 24V / DC 12V

### 4.2 Peripherals

Description	Model / Part #	Serial number	Manufacturer
Monitor	RB19NS	N434H4JX31771F	SAMSUNG

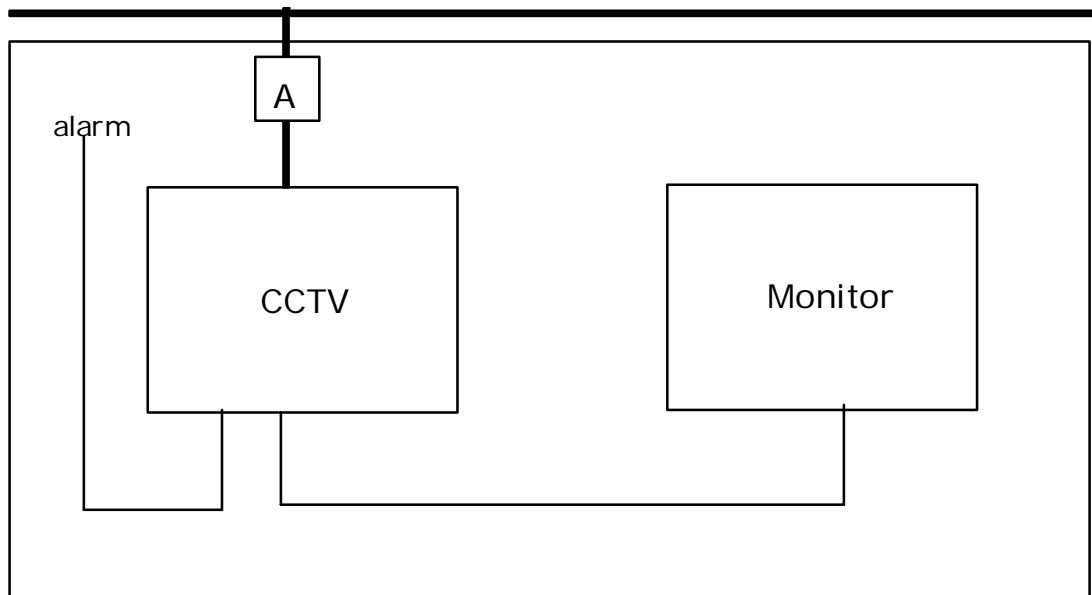
### 4.3 Operating conditions

- Operating mode.

#### 4.4 Used cables

Start		END		Cable Spec.	
Name	I/O Port	Name	I/O Port	Length	Shield
EUT	Monitor	-	Monitor	3.0	Shield

#### 4.5 E.U.T. test configuration



## 5. Summary of test results

### 5.1 Modification to the E.U.T.

- None

### 5.2 Standards & results

FCC Part 15 Subpart B (Class B)

ANSI C63.4: 2003

<b>Test items</b>	<b>Test method</b>	<b>Result</b>
Conducted emission	ANSI C63.4:2003	Pass
Radiated emission	ANSI C63.4:2003	Pass
Antenna/RF Terminal Disturbance Voltage	ANSI C63.4:2003	Pass

## 6. Test results

### 6.1 Conducted Emission

#### 6.1.1 Measurement procedure

##### Mains

The measurements were performed in a shielded room.

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

The rear of table was located 0.4 m to the vertical conducted plane.

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

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

#### 6.1.2 Used equipments

Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Test Receiver	ESHS30	844827/001	R&S	08.08.07	<input checked="" type="checkbox"/>
LISN	ESH3-Z5	846128/024	R&S	08.07.30	<input checked="" type="checkbox"/>
LISN	L3-32	0120J20305	PMM	-	<input checked="" type="checkbox"/>

#### 6.1.3 Measurement uncertainty

Conducted emission measurement : (k=2, 95%)

9kHz-150 kHz : ±3.281dB]

150kHz-30 MHz : ±2.977dB]

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#### 6.1.4 Test data

Frequency [MHz]	Correction Factor		Line	Quasi-peak			Average		
	LISN	Cable		Limit	Reading	Result	Limit	Reading	Result
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.180	0.25	0.3	N	64.49	43.69	44.24	54.49	40.27	40.82
0.183	0.25	0.3	H	64.35	47.66	48.21	54.35	43.99	44.54
0.273	0.25	0.3	H	61.03	40.07	40.62	51.03	34.72	35.27
0.357	0.22	0.4	N	58.80	39.32	39.94	48.80	31.10	31.72
0.534	0.16	0.2	N	56.00	32.85	33.21	46.00	22.97	23.33
0.549	0.26	0.2	H	56.00	29.93	30.39	46.00	22.10	22.56
0.732	0.16	0.3	N	56.00	27.13	27.59	46.00	18.07	18.53
0.807	0.16	0.2	N	56.00	28.54	28.90	46.00	17.03	17.39
5.520	0.42	0.4	H	60.00	17.85	18.67	50.00	10.51	11.33
5.720	0.34	0.4	N	60.00	18.09	18.83	50.00	10.08	10.82
8.010	0.49	0.5	H	60.00	18.27	19.26	50.00	11.71	12.70
14.560	0.58	0.2	N	60.00	16.92	17.70	50.00	10.97	11.75

- Note. QP = Quasi-Peak, AV= Average
- Loss = LISN Loss + Cable Loss
- Measurement time : 1 s

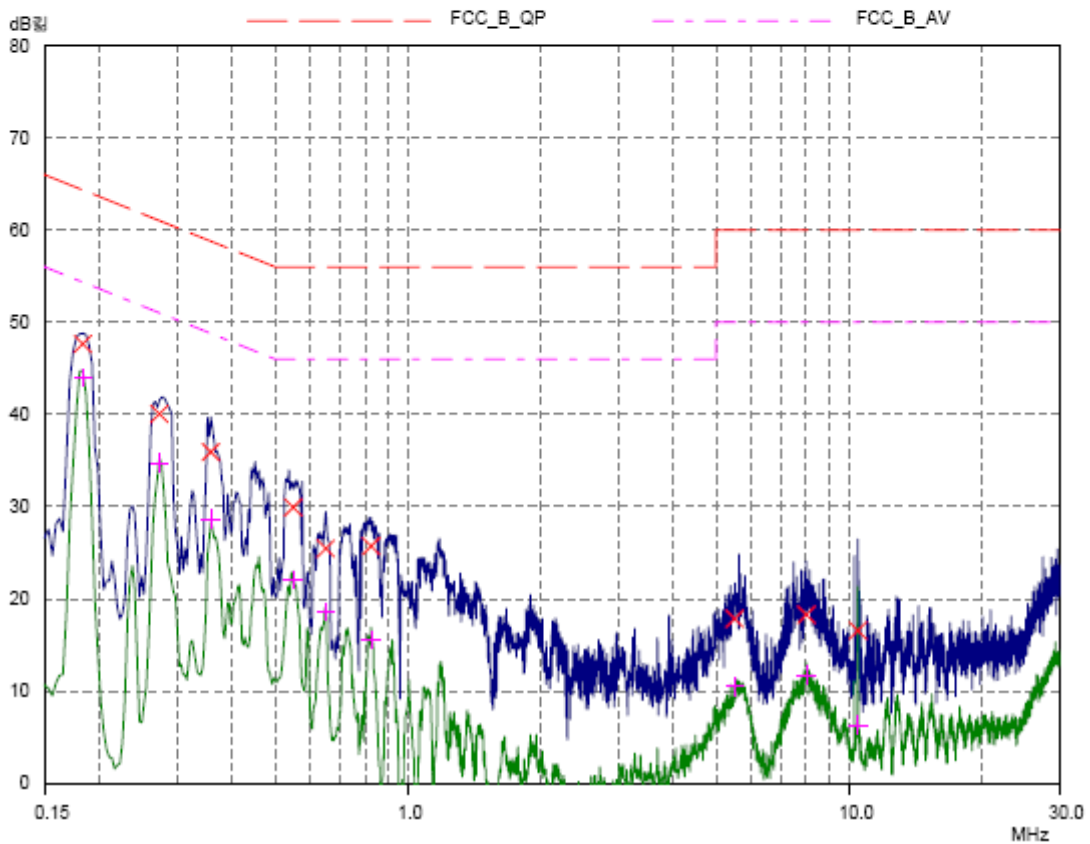
EUT: AT87K7  
 Manuf: SEC  
 Op Cond: H  
 Operator:  
 Test Spec: FCC Class B Conducted Emission  
 Comment:

Result File: at87k7ah.dat : SAMSUNG AT87K7(ANALOG) H

Scan Settings (2 Ranges)

Frequencies				Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	3MHz	3kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB
3MHz	30MHz	10kHz	10kHz	PK+AV	2msec	Auto	OFF	60dB

Final Measurement: Detectors: X QP / + AV  
 Meas Time: 1sec  
 Peaks: 8  
 Acc Margin: 25 dB



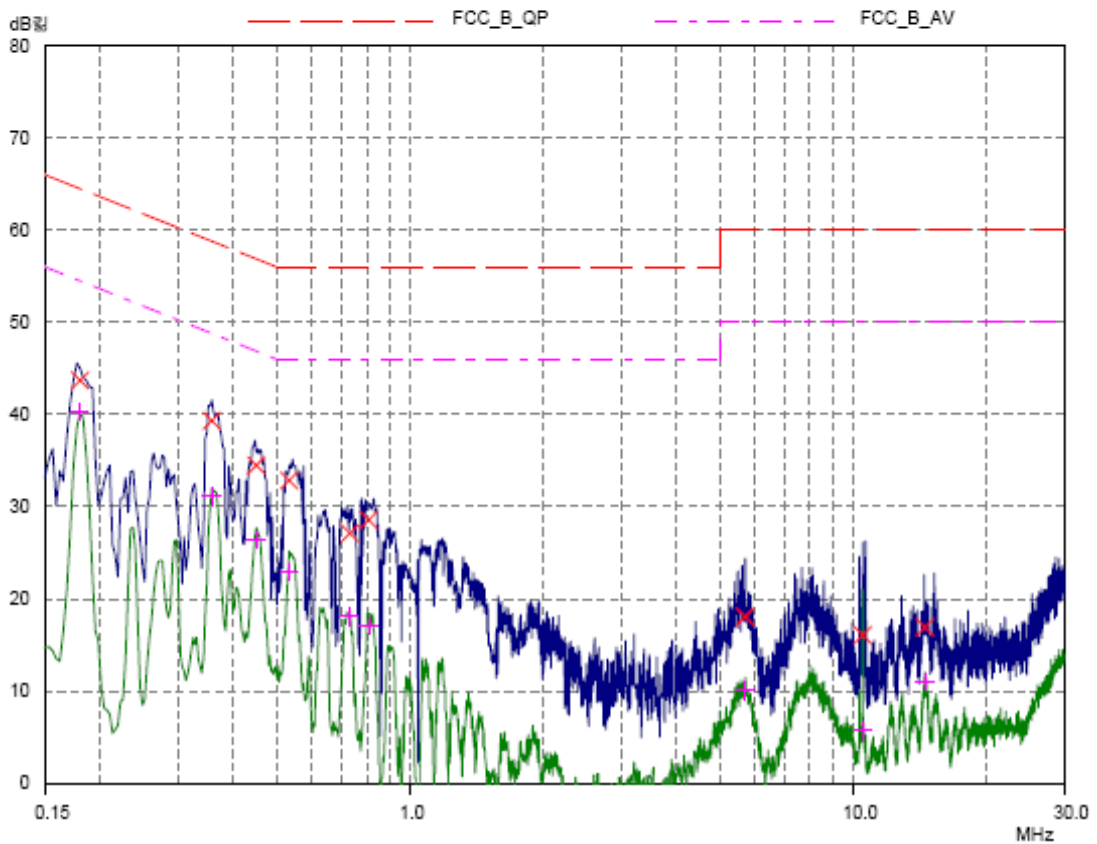
EUT: AT67K7  
 Manuf: SEC  
 Op Cond: N  
 Operator:  
 Test Spec: FCC Class B Conducted Emission  
 Comment:

Result File: at67k7an.dat : SAMSUNG AT67K7(ANALOG) N

Scan Settings (2 Ranges)

Frequencies			Receiver Settings						
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz	3MHz	3kHz	10kHz	PK+AV	5msec	Auto	OFF	60dB	
3MHz	30MHz	10kHz	10kHz	PK+AV	2msec	Auto	OFF	60dB	

Final Measurement: Detectors: X QP / + AV  
 Meas Time: 1sec  
 Peaks: 8  
 Acc Margin: 25 dB



-Digital mode-

Frequency [MHz]	Correction Factor		Line	Quasi-peak			Average		
	LISN	Cable		Limit	Reading	Result	Limit	Reading	Result
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.210	0.25	0.3	N	79.00	32.74	33.29	66.00	31.86	32.41
0.270	0.25	0.3	N	79.00	33.37	33.92	66.00	32.99	33.54
0.273	0.25	0.3	H	79.00	35.14	35.69	66.00	34.75	35.30
0.543	0.16	0.2	N	73.00	35.75	36.11	60.00	34.73	35.09
0.546	0.26	0.2	H	73.00	35.73	36.19	60.00	35.19	35.65
0.816	0.25	0.2	H	73.00	36.73	37.18	60.00	36.30	36.75
1.533	0.29	0.3	H	73.00	26.21	26.80	60.00	24.56	25.15
1.908	0.21	0.3	N	73.00	31.98	32.49	60.00	29.67	30.18
1.914	0.29	0.3	H	73.00	31.21	31.80	60.00	28.77	29.36
8.330	0.40	0.5	N	73.00	46.27	47.17	60.00	43.46	44.36
8.760	0.41	0.5	N	73.00	45.61	46.52	60.00	41.82	42.73
8.850	0.51	0.5	H	73.00	31.75	32.76	60.00	24.68	25.69
21.480	0.83	0.2	H	73.00	39.39	40.42	60.00	32.79	33.82

- Note. QP = Quasi-Peak, AV= Average
- Loss = LISN Loss + Cable Loss
- Measurement time : 1 s



#### 6.1.5. Result

Minimum limit margin is 17.27 dB at 8.760 MHz.

## 6.2 Radiated emission

### 6.2.1 Measurement procedure

A pretest was performed at 3m distance in a semi-anechoic chamber for searching correct frequency. The final test was done at a 3m 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 were folded back and forth forming a bundle 0.3m to 0.4m long and were hanged at a 0.4m height to the 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.

### 6.2.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next cal. date	Used
Test Receiver	ESCI	100001	R&S	2007.10.31	<input checked="" type="checkbox"/>
TRILOG SUPER BROADBAND ANT	VULB 9160	3228	Schwarzbeck Mess-Electronik	2008.02.12	<input checked="" type="checkbox"/>
Antenna Mast	A109	N/A	DEAIL	-	<input checked="" type="checkbox"/>
Turn Table	TS14	N/A	DEAIL	-	<input checked="" type="checkbox"/>
10m OATS	-	-	EMC Compliance	-	<input checked="" type="checkbox"/>

### 6.2.3 Measurement uncertainty

Radiated Emission measurement : (k=2, 95%)

30-300 MHz ; 3 m:  $\pm 3.721$  [dB], 10 m:  $+3.706, -3.707$  [dB]

300-1000 MHz ; 3 m:  $\pm 3.818$  [dB], 10 m:  $\pm 3.802$  [dB]

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## 6.2.4 Test data

-Analog mode-

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	angle	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
					Antenna	Cable			
157.50	1.5	H	4.0	200	12.75	2.49	30.0	16.74	13.26
257.74	12.2	H	4.0	200	11.71	3.19	37.0	27.11	9.89
357.96	11.9	H	2.3	270	14.47	3.77	37.0	30.14	6.86
386.60	10.8	H	2.6	220	15.17	3.89	37.0	29.86	7.14
408.09	3.6	H	2.0	257	15.68	4.02	37.0	23.30	13.70
429.56	2.9	H	2.6	241	16.11	4.16	37.0	23.18	13.82

\* 10 m OATS

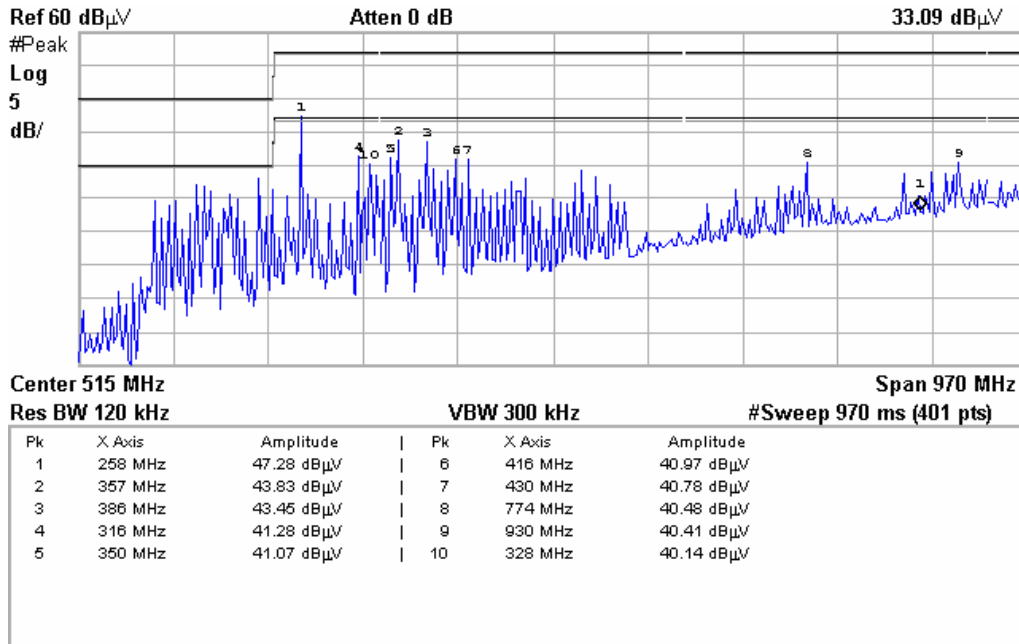
\* Note : Reading = Test Receiver meter,

*P* = Polarization → POL H = Horizontal, POL V = Vertical

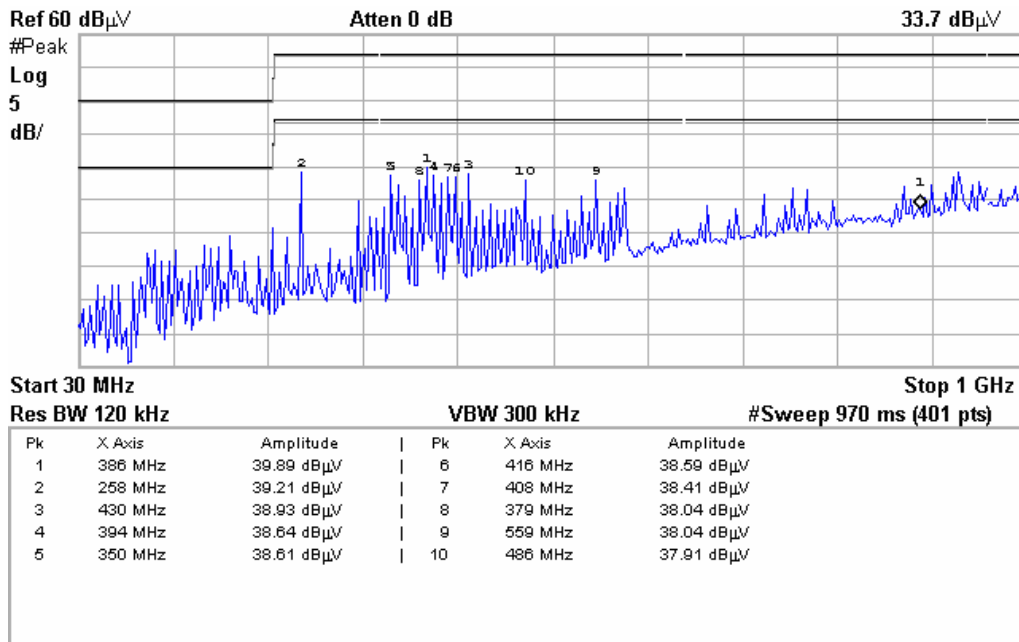
\* Result = Field Strength (Antenna factor + Cable factor + Reading)

\* Above 1GHz is measured with average detection.

-3M Chamber Pre-scan Data-  
- Horizontal



-Vertical



6.2.5. Result

Minimum limit margin is 6.86 dB at 357.96 MHz.

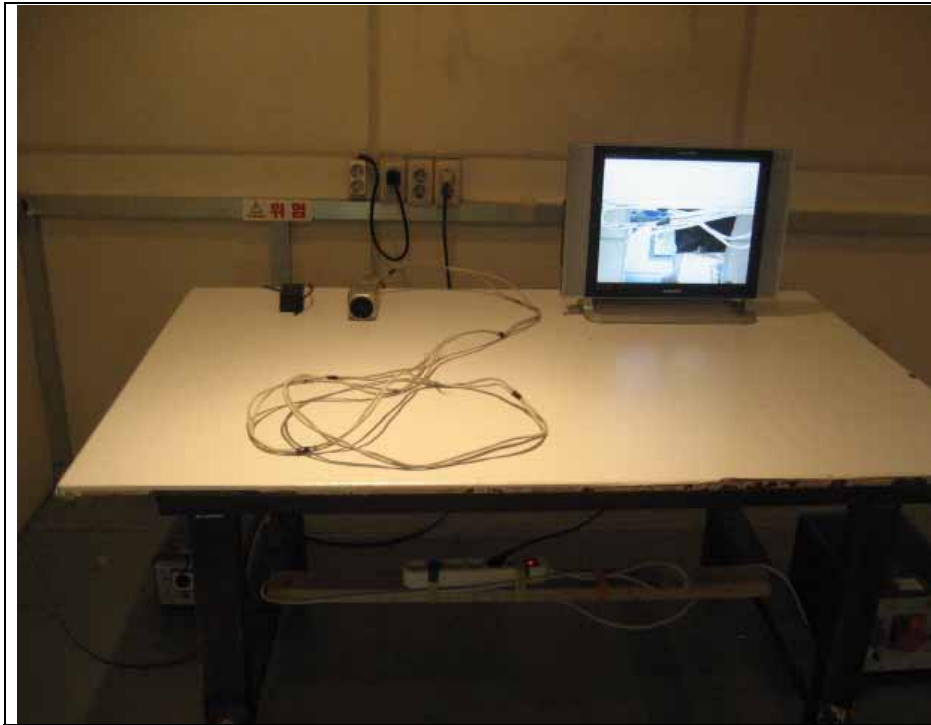
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## 7. Test photographs

### Conducted emission



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Radiated Emission



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## 8. E.U.T. photographs

### Front View



### Rear View



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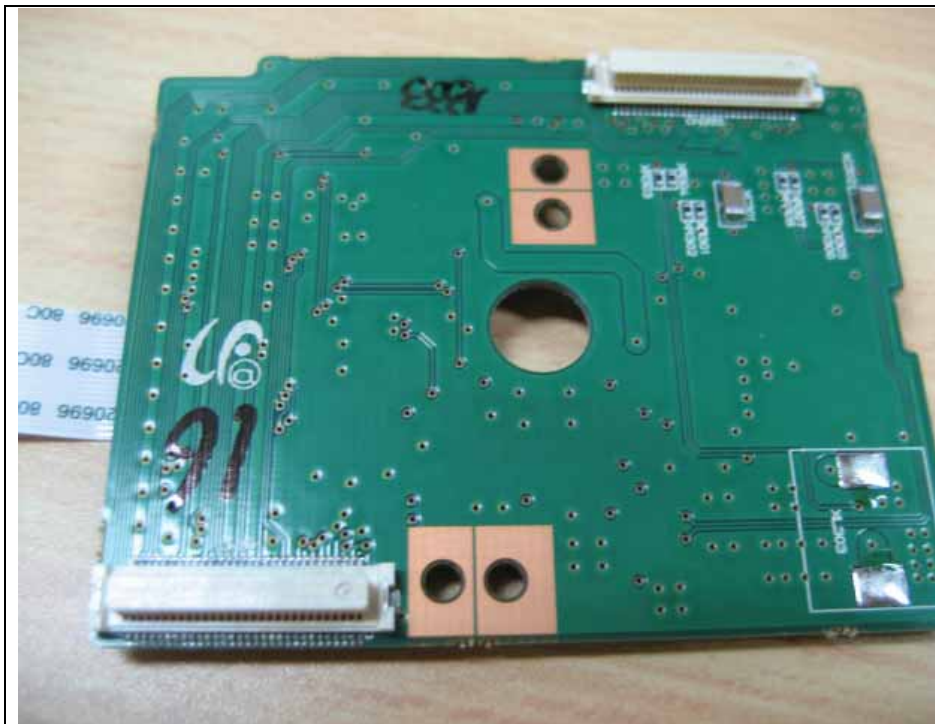
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Inside



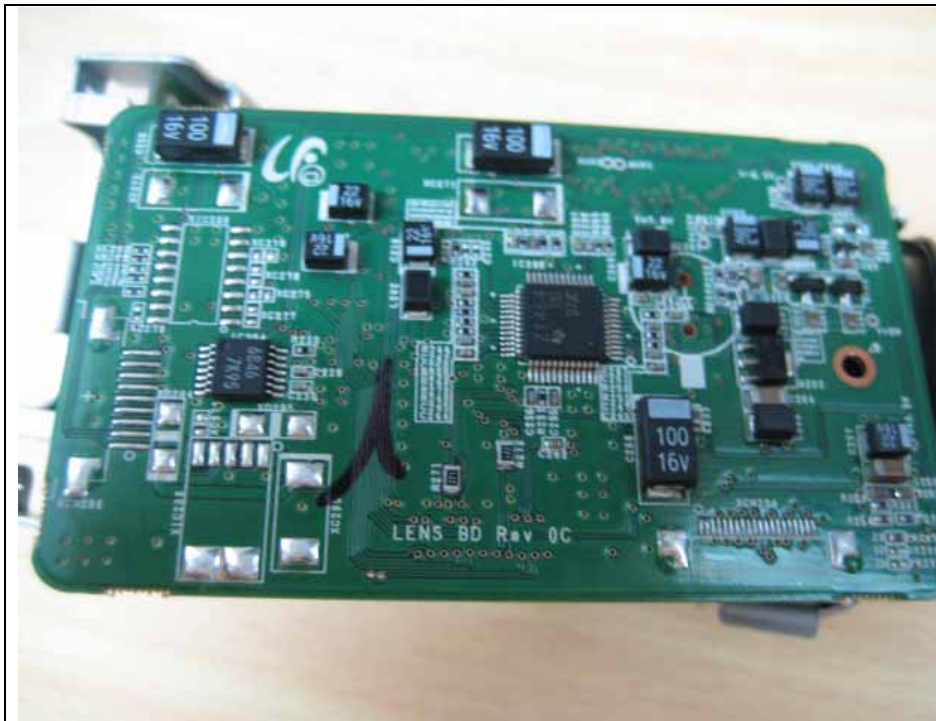
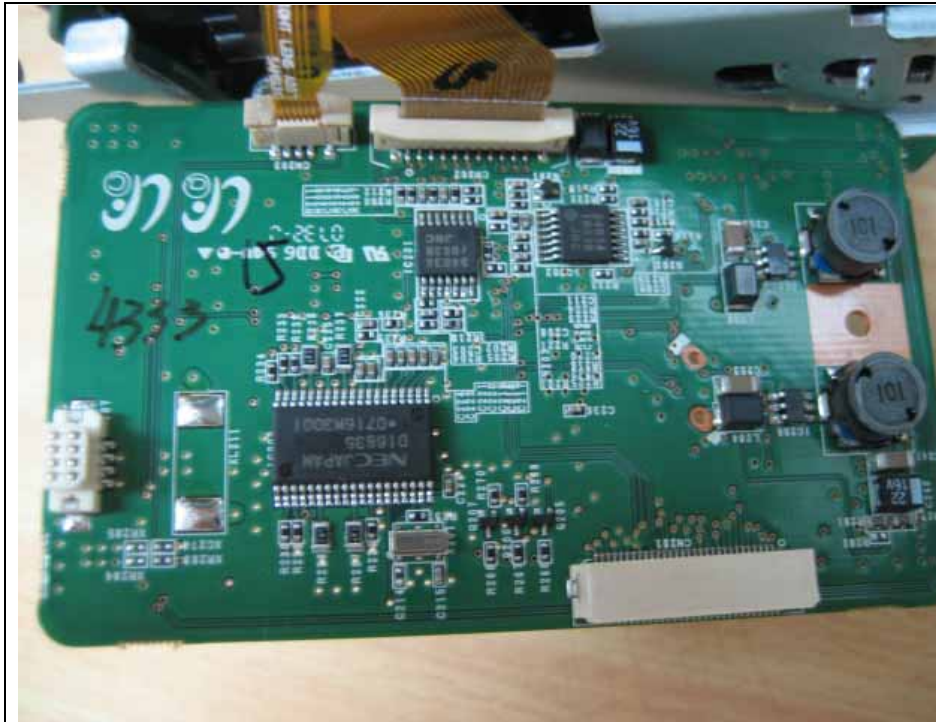




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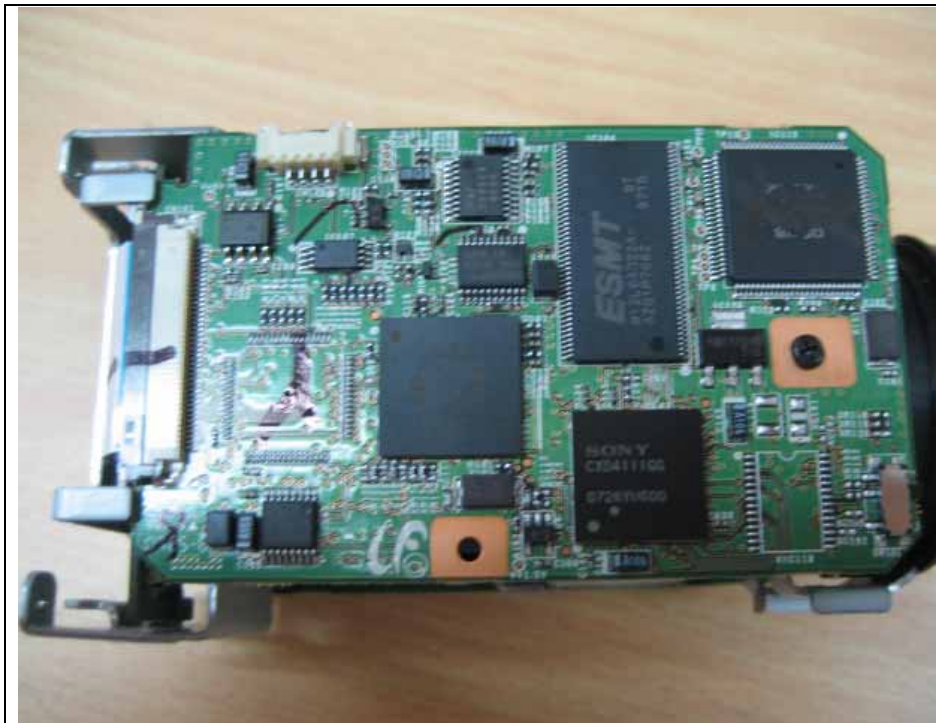
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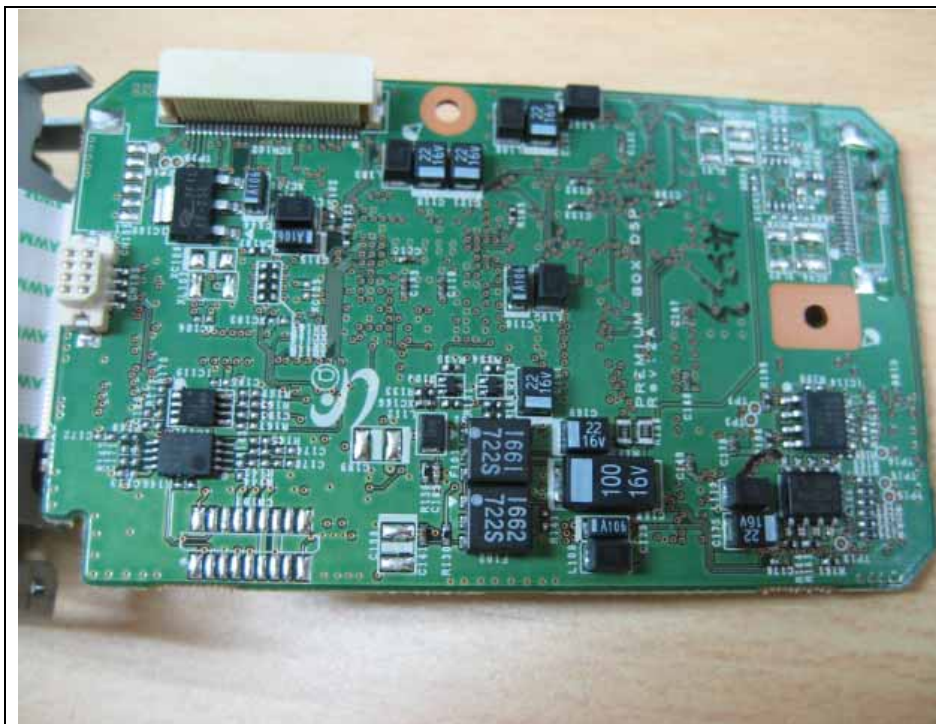


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