EMI TEST REPORT

Test report No. : **EMC- FCC- 0126**

Type of equipment : **DIGITAL CAMCORDER**

Model No. : **SCD303**

FCC ID. : **A3L04THETA2**

Applicant : **SAMSUNG ELECTRONICS CO., LTD.**

Test standards : **FCC part 15 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**

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: 2004. 1.156 Issued date: 2004 .1. 16

Tested by : J. S. Kim Approved by: M. S. Chung

Kim, Jung-Soo **Chung, Min-Seok**

82-1, JEIL-RI, YANGJI-MYUN, YONGIN-CITY, KYUNGGI-DO, KOREA
TEL: 82 31 336 9919 FAX : 82 31 336 4767
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   Conducted emission test graph

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1. Client information

Applicant:	SAMSUNG ELECTRONICS CO., LTD.
Address:	416, Maetan-3Dong, Paldal-Gu, Suwon City, Kyungki-Do, Korea
Telephone number:	82-31-200-5922
Facsimile number:	82-31-200-5938
Contact person:	Jei-Soon Kang / Manager

Manufacture:	SAMSUNG ELECTRONICS CO., LTD.
Address:	416, Maetan-3Dong, Paldal-Gu, Suwon City, Kyungki-Do, Korea
Telephone number:	82-31-200-5922
Facsimile number:	82-31-200-5938

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2. Laboratory information

Address

EMC compliance Ltd.

82-1, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGGI-DO, KOREA

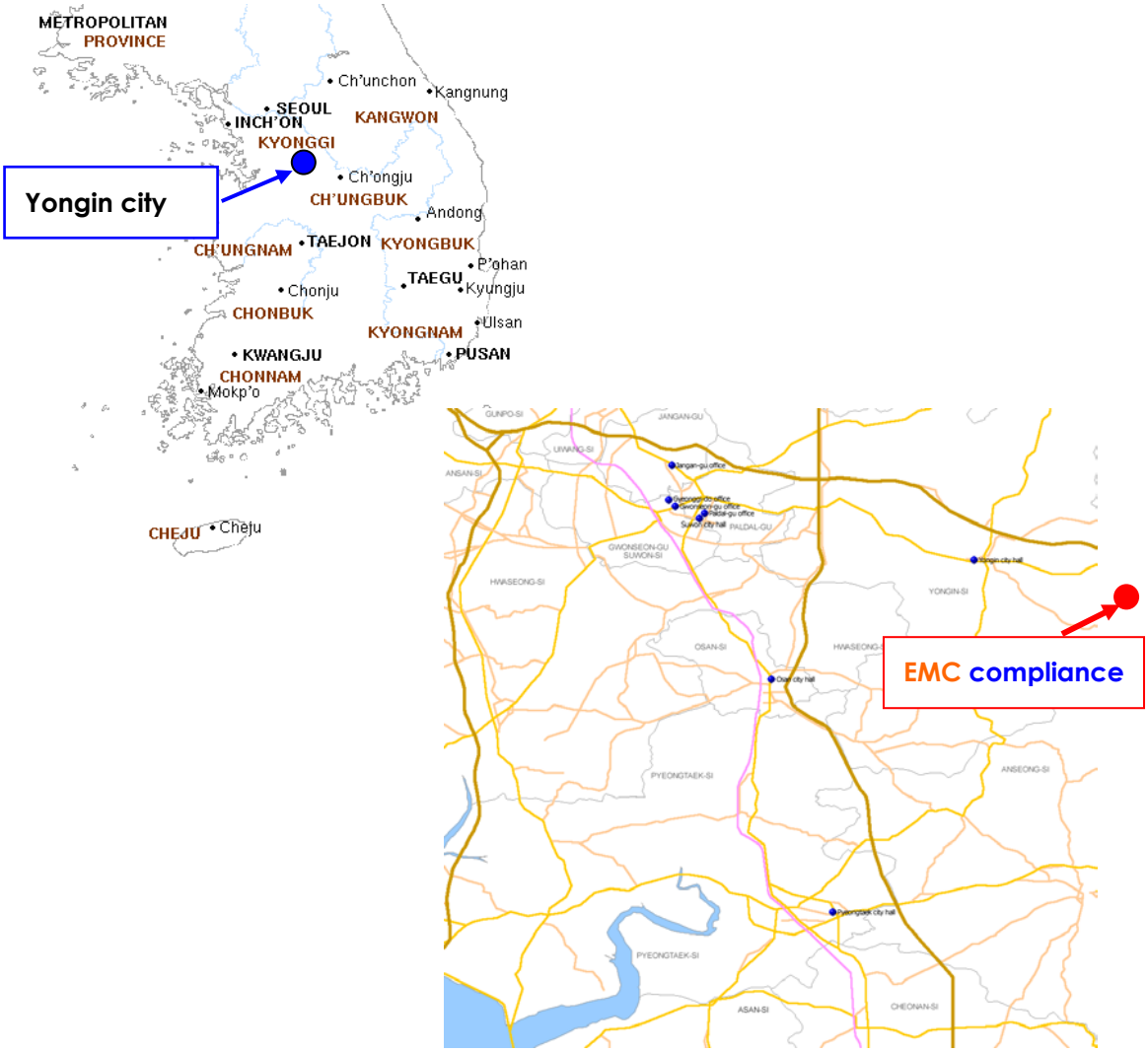
Telephone Number : 82 31 336 9919

Facsimile Number : 82 31 336 4767

FCC Filing No. : 793334

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

SITE MAP



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3. Test system configuration

3.1 Operation Environment

		Temperature	Humidity	Pressure
OATS	:	4 °C	36 %	1014 hPa
Shielded room	:	26 °C	33 %	1014 hPa

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.

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3.3 Sample calculation

Conducted emission

The field strength is calculated by adding the LISN factor, cable loss tr 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 = 32dBuV

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 follows :

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 = 22dBuV/m

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4. Description of EUT

4.1 Product Description

Manufactured by:	**SAMSUNG ELECTRONICS CO., LTD.**
Address:	416, Maetan-3Dong,Yeontong-Gu, Suwon City, Kyungki-Do, Korea
Type of equipment:	DIGITAL CAMCORDER
Model:	SCD303
Serial number:	None
Video recording system:	2 rotary heads, helical scanning system
Audio recording system:	Rotary heads, PCM system
Image device:	CCD(Charge Coupled Device)
Power supply:	DC 8.4V, Lithium Ion Battery pack 7.4V (Power Supply(100V-240V) or Lithium Ion battery pack)

4.2 Peripherals

Description	Model / Part #	Serial Number	Manufacture
PC	MP10	910992FT300709	SEC
LCD MONITOR	CT1810	MP02215088	CORNEA
PRINTER	EPSON STYLUS C60	DR5K014977	EPSON
KEYBOARD	KB-9963	B28AC0NGANB1A1	COMPAQ
SERIAL MOUSE	SWW-23	N/A	A4Tech
PS/2 MOUSE	M-S48a	HCA31712974	SEC
MIC	N/A	N/A	N/A
Headset	Stereo LS1 Headset	N/A	Microsoft

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4.3 Used cables

EUT Port	Type	Shield (Y/N)	Length (m)	Connection point 1	Connection point 2
USB	USB	Y	1.5	EUT	PC
AV	DIN	Y	1.5		LCD MONITOR
S-Video	DIN	Y	1.5		LCD MONITOR
MIC	P-Jack	N	2.0		MIC
DV	IEEE1394	Y	1.5		PC
VGA	D-Sub	Y	1.8	PC	MONITOR
Printer	Parallel	Y	2.0		PRINTER
PS/2	PS/2	Y	1.8		KEYBOARD
PS/2	PS/2	Y	1.8		PS/2 MOUSE
SERIAL	SERIAL	Y	1.8		SERIAL MOUSE
EAR-MIC	P-Jack	N	2.0		Headset

4.4 Operating conditions

Operating :

1. Recording through USB cable and IEEE1394 cable.
2. Data up/download with memory card.

- The system was configured in typical fashion (as a customer would normally use it) for testing.

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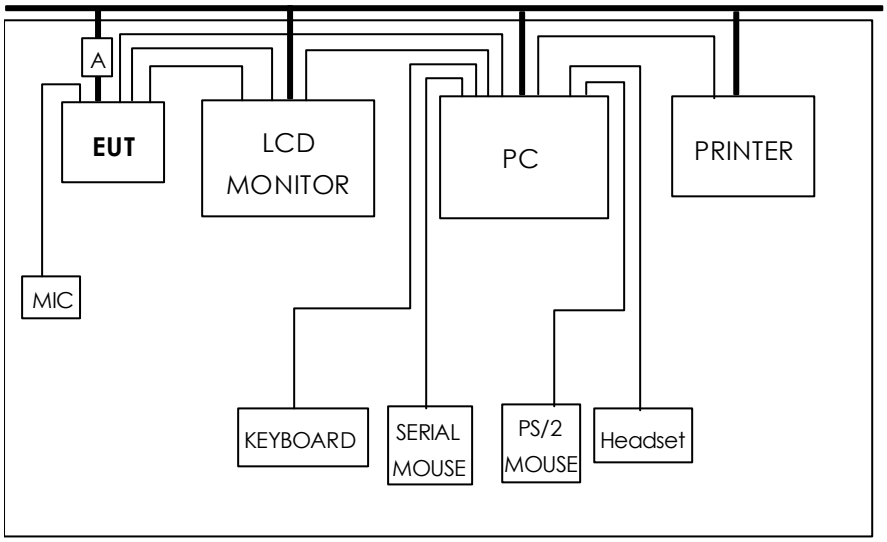
4.5 EUT test configuration



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 – 1992

Test items	Test methods	Result
Conducted emission	ANSI C63.4-1992	Pass
Radiated emission	ANSI C63.4-1992	Pass

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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 0.8m above the reference ground plane.
The rear of tabletop was located 0.4m to the vertical conducted plane.
All other surfaces of tabletop were at least 0.8m away from any other grounded conducting surface.
They 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.
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	ESHS10	843276/003	R&S	04.05.13	X
L.I.S.N.	ESH3-Z5	100267	R&S	04.06.17	X
	L3-32A	0120J20305	PMM	04.04.03	X
Test site	Shield room	-	-	-	X

6.1.3 Measurement uncertainty

Conducted emission measurement : ± 2.4 (K=2)

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6.1.4 Test data

[Test mode :Connect IEEE1394 cable]

Frequency	Correction Factor		Line	Quasi-peak			Average		
				Limit	Reading	Result	Limit	Reading	Result
[MHz]	LISN	Cable		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.150	0.06	0.2	L1	66.00	42.30	42.56	56.00	15.49	15.75
0.195	0.1	0.2	L2	63.82	56.53	56.78	53.82	46.36	46.61
0.198	0.05	0.2	L1	63.69	55.66	55.91	53.69	44.59	44.84
0.261	0.05	0.2	L2	61.40	48.22	48.47	51.40	36.85	37.10
0.321	0.05	0.1	L2	59.68	40.59	40.74	49.68	27.22	27.37
0.456	0.06	0.3	L1	56.77	36.97	37.33	46.77	27.78	28.14
0.525	0.06	0.3	L1	56.00	37.74	38.10	46.00	25.16	25.52
4.860	0.16	0.5	L1	56.00	36.71	37.37	46.00	25.77	26.43
16.740	0.50	0.4	L2	60.00	28.66	29.56	50.00	17.42	18.32

[Test mode : Connect USB cable]

Frequency	Correction Factor		Line	Quasi-peak			Average		
				Limit	Reading	Result	Limit	Reading	Result
[MHz]	LISN	Cable		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.150	0.06	0.2	L1	66.00	40.10	40.36	56.00	13.33	13.59
0.195	0.1	0.2	L1	63.82	56.15	56.40	53.82	46.32	46.57
0.258	0.05	0.2	L1	61.50	48.24	48.49	51.50	36.71	36.96
0.321	0.05	0.1	L1	59.68	40.91	41.06	49.68	29.32	29.47
0.459	0.06	0.3	L1	56.71	37.09	37.45	46.71	27.64	28.00
0.531	0.06	0.3	L1	56.00	37.44	37.80	46.00	24.43	24.79
3.990	0.14	0.5	L2	56.00	35.23	35.87	46.00	23.08	23.72
4.680	0.16	0.5	L1	56.00	37.13	37.79	46.00	26.30	26.96
12.000	0.35	0.4	L2	60.00	37.20	37.95	50.00	23.72	24.47
14.620	0.45	0.5	L2	60.00	35.58	36.53	50.00	26.30	27.25
24.000	0.66	0.3	L1	60.00	36.37	37.33	50.00	24.41	25.37

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[Test mode : Use Memory card]

Frequency	Correction Factor		Line	Quasi-peak			Average		
				Limit	Reading	Result	Limit	Reading	Result
[MHz]	LISN	Cable		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.150	0.06	0.2	L2	66.00	42.22	42.48	56.00	15.49	15.75
0.192	0.1	0.2	L2	63.95	57.11	57.36	53.95	45.17	45.42
0.261	0.05	0.2	L2	61.40	48.26	48.51	51.40	36.91	37.16
0.321	0.05	0.1	L1	59.68	40.57	40.72	49.68	29.16	29.31
0.528	0.06	0.3	L1	56.00	37.78	38.14	46.00	26.29	26.65
3.580	0.14	0.5	L1	56.00	38.48	39.12	46.00	31.77	32.41
14.860	0.45	0.5	L2	60.00	35.50	36.45	50.00	27.08	28.03
24.000	0.66	0.3	L2	60.00	36.07	37.03	50.00	29.98	30.94

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

6.1.5. Result

Complied

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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 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.
They 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	ESVS 10	82786/006	R&S	04.05.13	X
TRILOG Broadband Ant.	VULB 9160	3138	SCHWARZBECK	04.03.26	X
Antenna Mast	A109	N/A	DEAIL	-	X
Turn Table	TS14	N/A	DEAIL	-	X
10m OATS	-	-	EMC Compliance	-	X

6.2.3 Measurement uncertainty

Radiated Emission measurement : (K=2)
30-300 MHz : ±3.59
300-1000 MHz: ±2.76

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6.2.4 Test data

[Test mode :Connect IEEE1394 cable]

Frequency	Reading	Pol	Height	Angle	Correction Factor		Limits	Result	Margin
[MHz]	[dBuV]		[m]		Antenna	Cable	[dBuV/m]	[dBuV/m]	[dB]
296.79	14.0	H	2.4	124	12.93	4.20	37.0	31.13	5.87
342.00	14.3	H	3.8	331	14.12	4.50	37.0	32.92	4.08
432.67	10.0	H	2.0	345	16.27	5.00	37.0	31.27	5.73
505.00	9.6	H	4.0	85	17.54	5.70	37.0	32.84	4.16
755.03	3.2	H	3.7	46	22.08	7.30	37.0	32.58	4.42

* Receiving Antenna Mode : *Horizontal, Vertical*

* Note : Reading = Test Receiver meter,

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

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

[Test mode : Connect USB cable]

Frequency	Reading	Pol.	Height	Angle	Correction Factor		Limits	Result	Margin
[MHz]	[dBuV]		[m]		Antenna	Cable	[dBuV/m]	[dBuV/m]	[dB]
160.01	10.2	H	1.3	326	12.83	2.80	30.0	25.83	4.17
180.00	10.7	V	1.2	271	11.38	2.80		24.88	5.12
216.11	12.6	H	3.6	209	9.97	3.20		25.77	4.23
252.02	16.4	H	2.2	277	11.52	3.60	37.0	31.52	5.48
270.01	16.8	H	2.8	118	12.14	3.80		32.74	4.26
306.02	15.2	H	3.1	215	13.19	4.20		32.59	4.41
322.89	14.0	H	4.0	96	13.62	4.40		32.02	4.98
360.02	13.7	H	3.7	85	14.45	4.60		32.75	4.25
505.00	8.7	H	2.9	345	17.54	5.70		31.94	5.06

* Receiving Antenna Mode : *Horizontal, Vertical*

* Note : Reading = Test Receiver meter,

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

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

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[Test mode : Use Memory card]

Frequency	Reading	Pol.	Height	Angle	Correction Factor		Limits	Result	Margin
[MHz]	[dBuV]		[m]		Antenna	Cable	[dBuV/m]	[dBuV/m]	[dB]
306.02	14.7	H	3.2	112	13.19	4.20	37.0	32.09	4.91
378.97	13.1	H	2.9	302	14.95	4.60		32.65	4.35
486.00	9.7	V	1.0	206	17.31	5.50		32.51	4.49
522.21	7.7	H	1.8	283	17.82	5.80		31.32	5.68
774.03	2.9	V	1.4	39	22.14	7.50		32.54	4.46

* Receiving Antenna Mode : *Horizontal, Vertical*

* Note : Reading = Test Receiver meter,

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

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

6.2.5. Result

Complied

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7. Test Graph

Conducted Emission test graph

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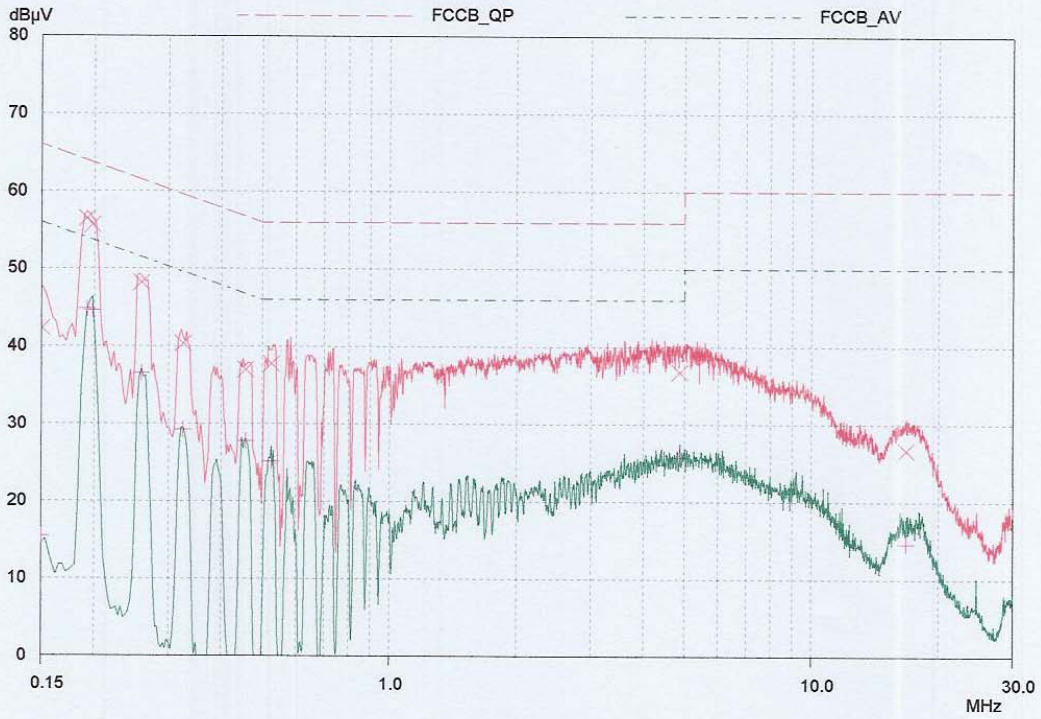
15 Jan 2004 18:02

EUT:	SCD303(DIGITAL CAMCORDER)
Manuf:	SAMSUNG
Op Cond:	L1
Operator:	JS.KIM
Test Spec:	FCC Class B Conducted Emission
Comment:	1394
Result File:	01012h.dat : SCD303_1394
Scan Settings	(2 Ranges)

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

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



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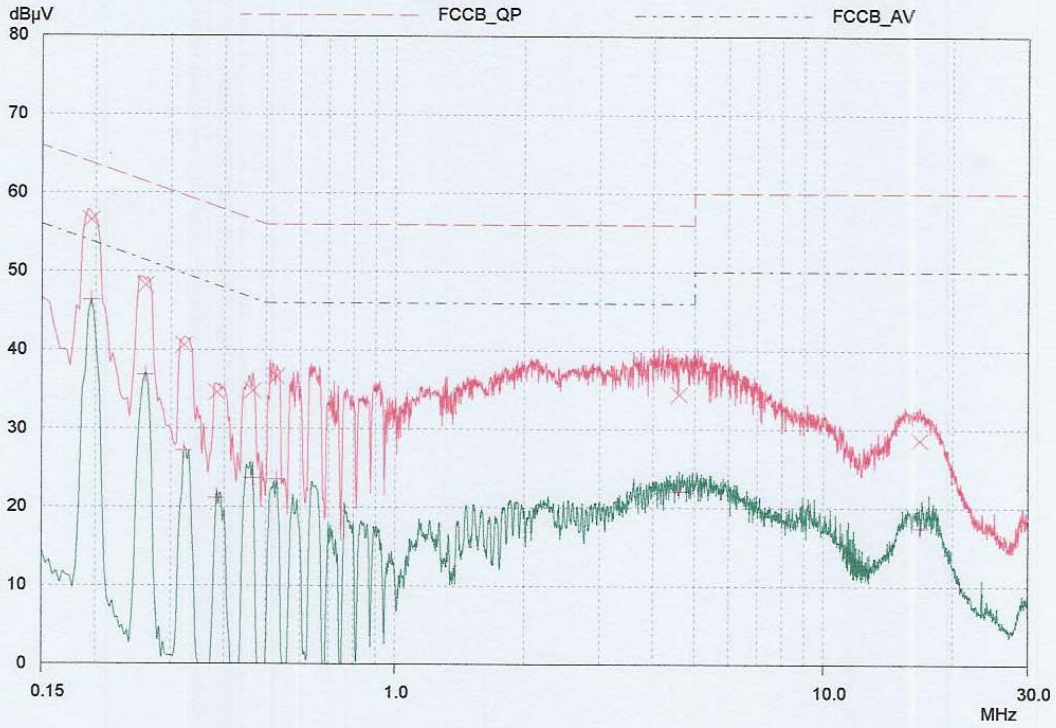
15 Jan 2004 17:53

EUT:	SCD303(DIGITAL CAMCORDER)
Manuf:	SAMSUNG
Op Cond:	L2
Operator:	JS.KIM
Test Spec:	FCC Class B Conducted Emission
Comment:	1394
Result File:	01012n.dat : SCD303_1394
Scan Settings	(2 Ranges)

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

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



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15 Jan 2004 17:35

EUT:	SCD303(DIGITAL CAMCORDER)
Manuf:	SAMSUNG
Op Cond:	L1
Operator:	JS.KIM
Test Spec:	FCC Class B Conducted Emission
Comment:	USB

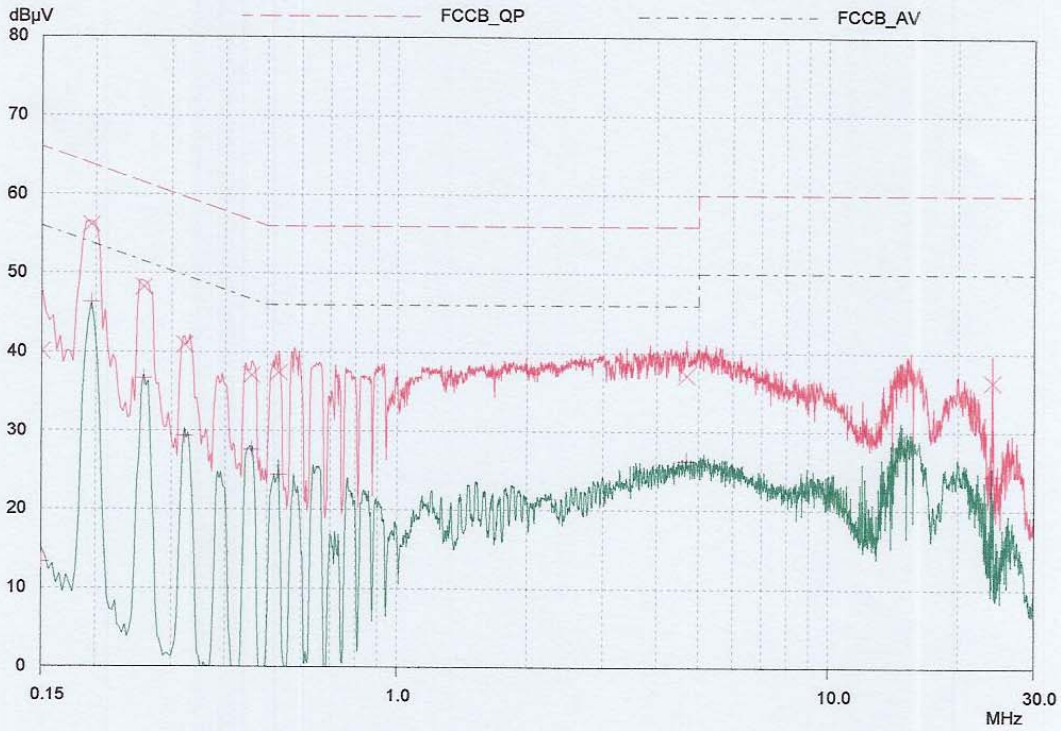
Result File: 401012l1.dat : SCD303_USB

Scan Settings (2 Ranges)

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

Final Measurement:

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



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15 Jan 2004 17:44

EUT:	SCD303(DIGITAL CAMCORDER)
Manuf:	SAMSUNG
Op Cond:	L2
Operator:	JS.KIM
Test Spec:	FCC Class B Conducted Emission
Comment:	USB

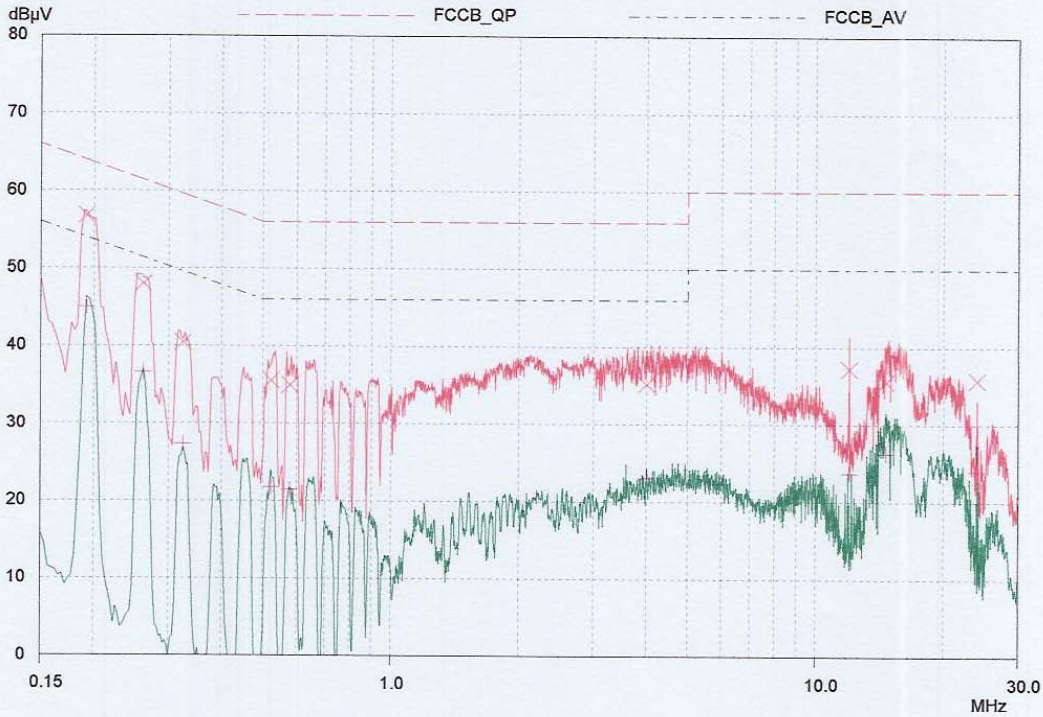
Result File: 401012l2.dat : SCD303_USB

Scan Settings (2 Ranges)

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

Final Measurement:

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



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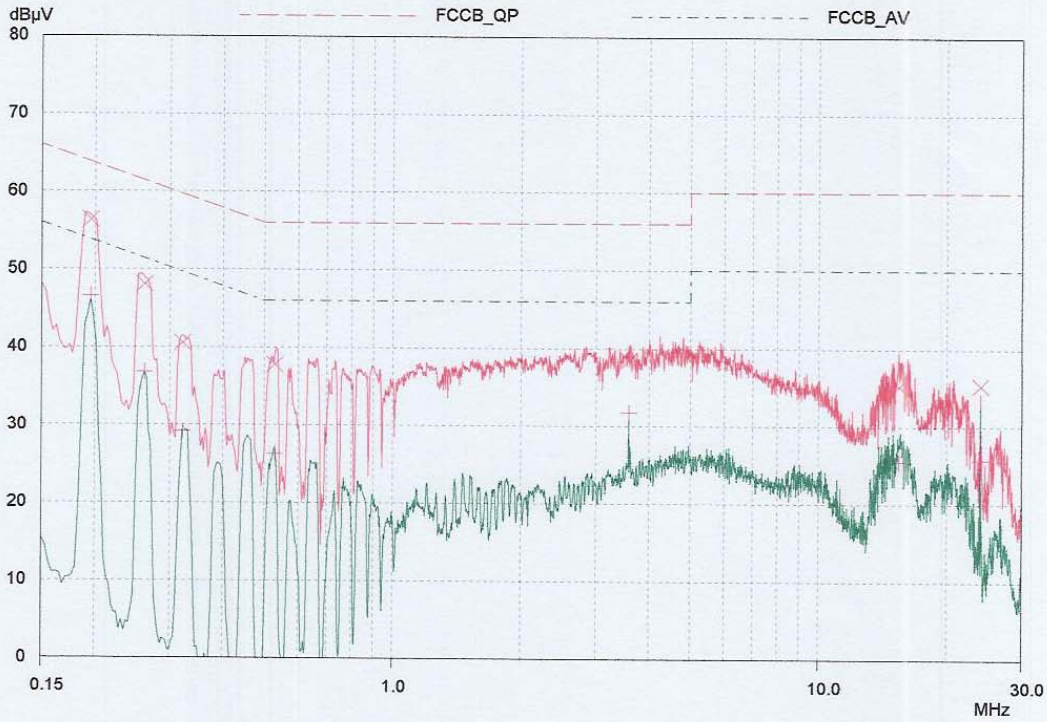
15 Jan 2004 17:15

EUT:	SCD303(DIGITAL CAMCORDER)
Manuf:	SAMSUNG
Op Cond:	L1
Operator:	JS.KIM
Test Spec:	FCC Class B Conducted Emission
Comment:	Memory card (up/down load)
Result File:	0401012h.dat : SCD303_memory card
Scan Settings	(2 Ranges)

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

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



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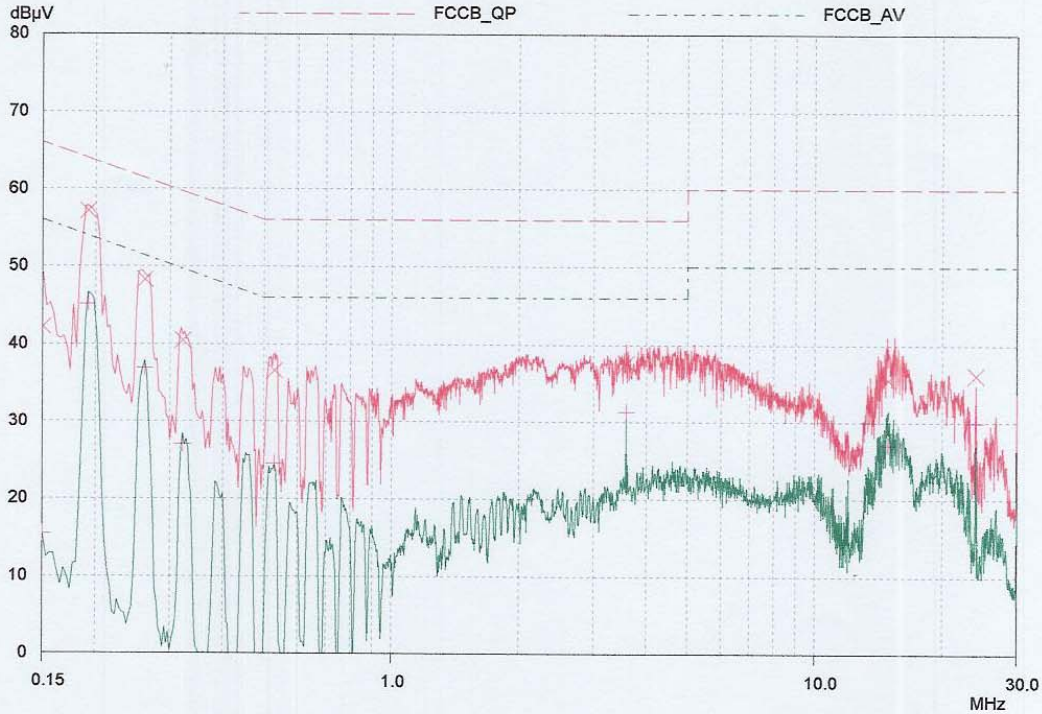
15 Jan 2004 17:08

EUT:	SCD303(DIGITAL CAMCORDER)
Manuf:	SAMSUNG
Op Cond:	L2
Operator:	JS.KIM
Test Spec:	FCC Class B Conducted Emission
Comment:	Memory card (up/down load)
Result File:	0401012N.dat : SCD303_memory card
Scan Settings	(2 Ranges)

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

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



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