

# EMI TEST REPORT

Test report No. : EMC- FCC- 0108

Type of equipment : CAR DVD-PLAYER

Model No. : DA-150

FCC ID. : QV3DA150TFDS

Applicant : DAESUNG ELTEC CO., LTD.

Test standards : FCC part 15 subpart B, Class B  
FCC part 15 subpart C

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: 2003.11.14~11.15

Issued date: 2003 . 11. 17

Tested by: J. S. Kim

Approved by: M. S. Chung

Kim, Jung-Soo

Chung, Min-Seok

# Contents

1. Client information
2. Laboratory information
3. Test system configuration
  - 3.1 Operation environment
  - 3.2 Measurement Uncertainty
  - 3.3 Sample calculation
4. Descriptions of EUT
  - 4.1 Product description
  - 4.2 Peripherals
  - 4.3 Used cables
  - 4.4 Operating conditions
  - 4.6 EUT test configuration
5. Summary of test results
  - 5.1 Modification to the EUT
  - 5.2 Standards & results
6. Test results
  - 6.1 Radiated Electric Field Emission
    - 6.1.1 Measurement procedure
    - 6.1.2 Used equipments
    - 6.1.3 Measurement uncertainty
    - 6.1.4 Test data
  - 6.2 Intentional radiator 200 kHz Bandwidth
    - 6.2.1 Used equipments
    - 6.2.2 Instrument settings
    - 6.2.3 Test data
  - 6.3 Intentional radiator field strength of radiation
    - 6.3.1 Measurement procedure
    - 6.3.2 Used equipments
    - 6.3.3 Measurement uncertainty
    - 6.3.4 Test data
  - 6.4 Intentional radiator field strength of spurious
    - 6.4.1 Measurement procedure
    - 6.4.2 Used equipments

- 6.4.3 Measurement uncertainty
- 6.4.4 Test data
- 6.5 TV Antenna power
- 6.6 Noise Figure

## 1. Client information

**Applicant:** DAESUNG ELTEC CO., LTD.  
**Address:** 371-6, Kasan-Dong, Kumchon-Gu, Seoul, 153-023, Korea  
**Telephone number:** 82-2-866-4131  
**Facsimile number:** 82-2-838-9051  
**President:** Yoon, Jong-Kyung

**Manufacture:** DAESUNG ELTEC CO., LTD.  
**Address:** 371-6, Kasan-Dong, Kumchon-Gu, Seoul, 153-023, Korea  
**Telephone number:** 82-2-866-4131  
**Facsimile number:** 82-2-838-9051

## 2. Laboratory information

### Address

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

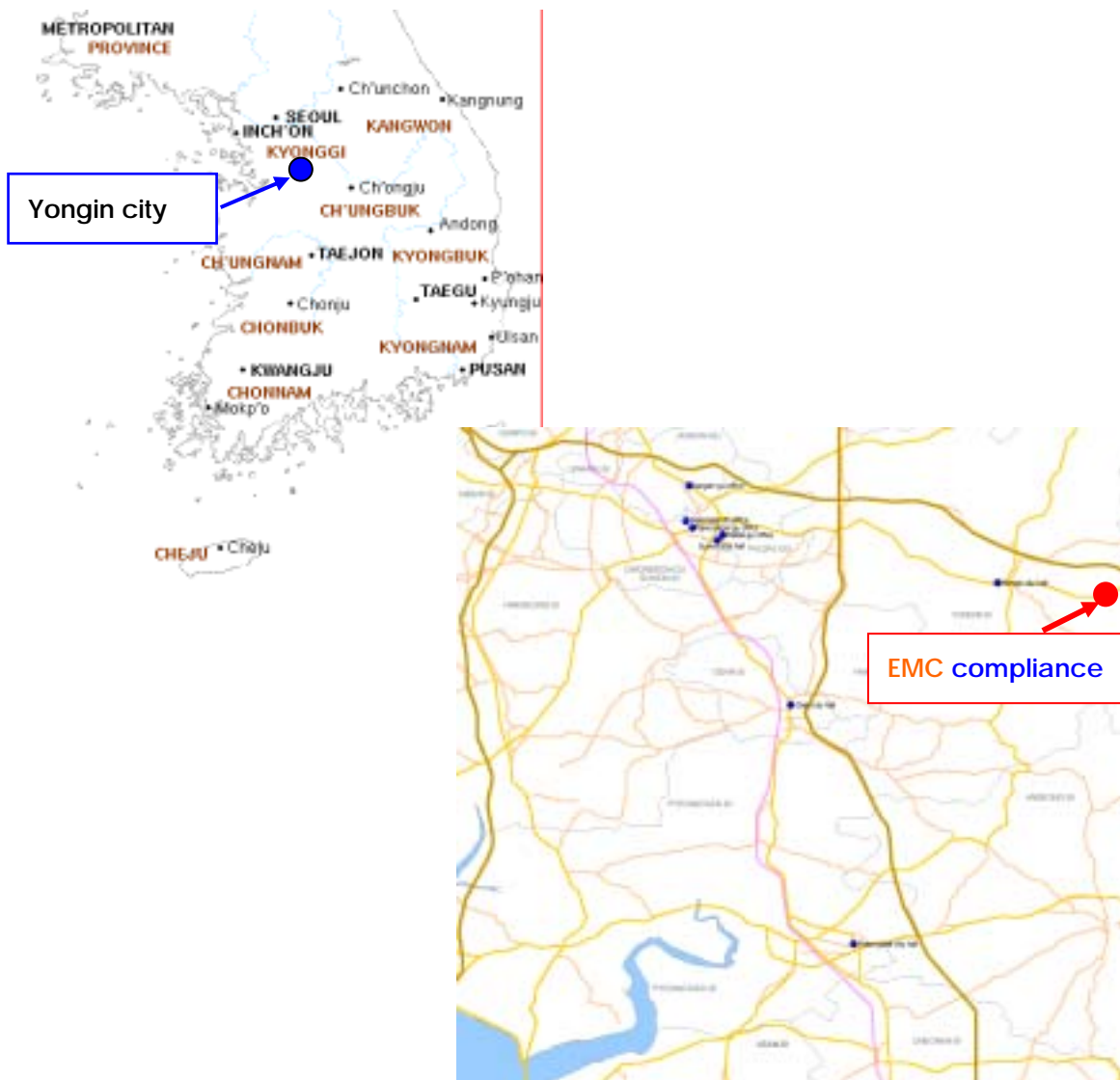
82-1, JEIL-RI, YANGJI-MYUN, YONGIN-CITY, KYUNGGI-DO, KOREA

Telephone Number : 82 31 336 9919

Facsimile Number : 82 31 336 4767

FCC Filing No. : 793334

### SITE MAP



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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### 3. TEST SYSTEM CONFIGURATION

#### 3.1 Operation Environment

	Temperature	Humidity	Pressure
OATS :	17 °C	37 %	1014 hPa

#### Test site

These testing were performed following locations;

OATS (3m) : 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

#### 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 :

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

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

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

## 4. Description of EUT

### 4.1 Product Description

Manufactured by:	DAESUNG ELTEC CO., LTD.
Address:	371-6 , Kasan-Dong, Kumchon-Gu, Seoul, 153-023, Korea
Type of equipment:	CAR DVD-PLAYER
Model:	DA-150
Serial Number:	N/A
Power source:	DC 11 V~16 V, 30W(Max.)

### 4.2 Peripherals

Description	Model / Part #	Serial Number	Manufacture
DC Power Supply	6032A	US38322201	HP

### 4.3 Used cables

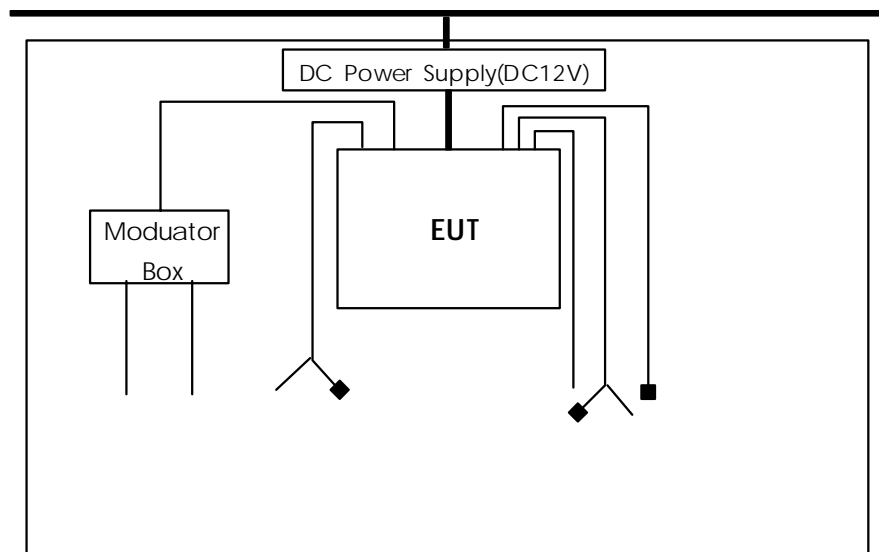
EUT Port	Type	Shield (Y/N)	Length (m)	Connection point 1	Connection point 2
AUX in (Video)	RCA	N	1.5	EUT	75 terminator
AUX in (Audio)	RCA	N	1.5		Open cable
AUX out (Video)	RCA	N	1.5		75 terminator
AUX out (Audio)	RCA	N	1.5		Open cable
TV Tuner	Coaxial	N	2.0		75 terminator
Digital out	RCA	N	5.0		Open cable
Input (Video)	RCA	N	1.5		75 terminator
Input (Audio)	RCA	N	1.5		Open cable
FM Modulator	-	N	1.5		Open cable

#### 4.4 Operating conditions

Operating : 1. DVD play mode  
2. MP3 play mode  
3. FM transmitter mode  
4. TV mode

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

#### 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)

FCC Part 15 Subpart C (Class B)

- ANSI C63.4 – 1992

Test items	Test methods	Result
Radiated Electric Field emission	ANSI C63.4-1992	Pass
Intentional radiator 200kHz bandwidth	ANSI C63.4-1992	Pass
Intentional radiator field strength of radiation	ANSI C63.4-1992	Pass
Intentional radiator field strength of spurious	ANSI C63.4-1992	Pass
TV antenna power	ANSI C63.4-1992	Pass
TV tuner	ANSI C63.4-1992	Pass
Noise figure	ANSI C63.4-1992	Pass

**\* Conducted emission test was waived because the EUT used in vehicle.**

## 6. Test results

### 6.1 Radiated Electric Field Emission

#### 6.1.1 Measurement procedure

The 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.

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.

#### 6.1.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Test receiver	ESVS10	827864/006	R&S	04.05.13	<input checked="" type="checkbox"/>
Spectrum	E7401A	US39150191	Agilent	04.07.30	<input checked="" type="checkbox"/>
TRILOG Broadband Ant.	VULB 9160	3138	SCHWARZBECK	04.03.26	<input checked="" type="checkbox"/>
Antenna Mast	A109	N/A	DEAIL	.	<input checked="" type="checkbox"/>
Turn Table	TS14	N/A	DEAIL	.	<input checked="" type="checkbox"/>
3m OATS	-	-	EMC Compliance	-	<input checked="" type="checkbox"/>

#### 6.1.3 Measurement uncertainty

Radiated Emission measurement : (K=2)

30-300 MHz ; 3 m:  $\pm 3.67$ , 10 m:  $\pm 4.4$

300-1000 MHz ; 3 m:  $+4.6/-2.92$ , 10 m:  $+2.94/-2.88$

### 6.1.4 Test data

#### [ DVD play mode]

Frequency	Reading	Pol.	Height	angle	Correction		Limits	Result	Margin
					Factor				
[MHz]	[dBuV/m]		[m]		Antenna	Cable	[dBuV/m]	[dBuV/m]	[dB]
86.01	27.2	H	1.0	133	7.74	1.80	40.0	36.74	3.26
108.20	29.1	H	1.4	51	9.84	1.80	43.5	40.74	2.76
154.20	25.4	H	2.0	115	12.84	2.20	43.5	40.44	3.06
166.00	25.2	H	2.3	201	12.49	2.40	43.5	40.09	3.41
200.08	29.6	H	1.1	223	9.53	2.60	43.5	41.73	1.77
216.99	30.0	H	1.0	323	9.97	2.80	46.0	42.77	3.23
406.00	22.7	H	1.0	91	15.64	4.00	46.0	42.34	3.66
433.46	21.2	H	1.6	330	16.30	4.20	46.0	41.70	4.30
550.30	18.6	H	1.3	164	18.42	5.00	46.0	42.02	3.98
796.11	12.3	V	1.0	360	22.45	6.20	46.0	40.95	5.05
994.88	10.8	V	1.1	228	24.30	6.80	54.0	41.90	12.10

#### [ MP3 play mode]

Frequency	Reading	Pol.	Height	angle	Correction		Limits	Result	Margin
					Factor				
[MHz]	[dBuV/m]		[m]		Antenna	Cable	[dBuV/m]	[dBuV/m]	[dB]
32.01	24.2	V	1.0	58	11.16	1.20	40.0	36.56	3.44
60.00	23.3	V	1.1	218	11.62	1.50	40.0	36.42	3.58
162.60	23.7	H	2.1	46	12.72	2.30	43.5	38.72	4.78
184.67	25.1	H	2.2	289	10.89	2.40	43.5	38.39	5.11
200.00	29.3	H	1.9	102	9.53	2.60	43.5	41.43	2.07
352.60	25.8	H	1.4	355	14.30	3.80	46.0	43.90	2.10
539.99	19.6	V	1.0	327	18.14	4.90	46.0	42.64	3.36
550.30	19.6	H	1.0	214	18.42	5.00	46.0	43.02	2.98
796.10	12.0	V	1.0	357	22.45	6.20	46.0	40.65	5.35

## [ TV tuner]

U.S.A CH. [NO.]	Pic Freq [MHz]	Local Frequency	Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	angle	Correction		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
								Factor				
								Antenna	Cable			
2	55.25	Fundamental	101.00	21.6	V	1.0	251	9.26	1.80	43.5	32.66	10.84
		Harmonics	202.05	15.5	H	1.6	236	9.59	2.60	43.5	27.69	15.82
			303.09	4.9	H	1.3	134	13.11	3.50	46.0	21.51	24.49
			404.10	7.6	V	1.1	62	15.60	4.00	46.0	27.20	18.80
			606.16	5.6	V	1.2	140	19.73	5.20	46.0	30.53	15.47
			807.99	3.8	V	1.0	213	22.56	6.10	46.0	32.46	13.54
3	61.25	Fundamental	107.00	20.1	V	1.0	59	9.76	1.80	43.5	31.66	11.84
		Harmonics	214.07	15.6	H	1.4	238	9.99	2.70	43.5	28.29	15.21
			321.09	10.3	V	1.0	64	13.60	3.70	46.0	27.60	18.40
			428.12	9.8	V	1.0	53	16.16	4.20	46.0	30.16	15.84
			856.00	9.6	V	1.0	238	22.85	6.00	46.0	38.45	7.55
5	77.25	Fundamental	123.03	14.8	V	1.1	115	11.14	2.00	43.5	27.94	15.56
		Harmonics	246.07	11.8	V	1.0	248	11.36	3.00	46.0	26.16	19.84
			369.10	4.3	V	1.0	181	14.70	3.90	46.0	22.90	23.10
			492.13	7.4	V	1.4	182	17.38	4.70	46.0	29.48	16.52
			983.99	4.6	V	1.0	111	24.29	6.60	54.0	35.49	18.51
9	187.25	Fundamental	233.00	13.6	H	1.4	116	10.81	2.90	46.0	27.31	18.69
		Harmonics	931.99	7.3	V	1.0	118	23.90	6.20	46.0	37.40	8.60
12	205.25	Fundamental	251.00	12.0	H	1.0	149	11.50	3.10	46.0	26.60	19.40
		Harmonics	502.12	4.1	V	1.0	308	17.49	4.80	46.0	26.39	19.61
21	513.25	Fundamental	559.00	7.9	V	1.2	170	18.65	5.00	46.0	31.55	14.45
28	555.25	Fundamental	601.00	5.9	V	1.0	54	19.71	5.10	46.0	30.71	15.29
36	603.25	Fundamental	648.98	4.8	V	1.0	248	20.19	5.40	46.0	30.39	15.61
40	627.25	Fundamental	673.00	5.0	V	1.0	225	20.45	5.40	46.0	30.85	15.15
53	705.25	Fundamental	751.00	9.0	V	1.0	81	22.06	5.90	46.0	36.96	9.04
69	801.25	Fundamental	846.99	5.1	V	1.0	120	22.82	6.00	46.0	33.92	12.08

## 6.1.5 Result

Complied

## 6.2 Intentional radiator 200kHz Bandwidth

### 6.2.1 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Test receiver	ESVS10	827864/006	R&S	04.05.13	<input type="checkbox"/>
Spectrum	E7401A	US39150191	Agilent	04.07.30	<input checked="" type="checkbox"/>
TRILOG Broadband Ant.	VULB 9160	3138	SCHWARZBECK	04.03.26	<input checked="" type="checkbox"/>
Antenna Mast	A109	N/A	DEAIL	.	<input checked="" type="checkbox"/>
Turn Table	TS14	N/A	DEAIL	.	<input checked="" type="checkbox"/>
3m OATS	-	-	EMC Compliance	-	<input checked="" type="checkbox"/>

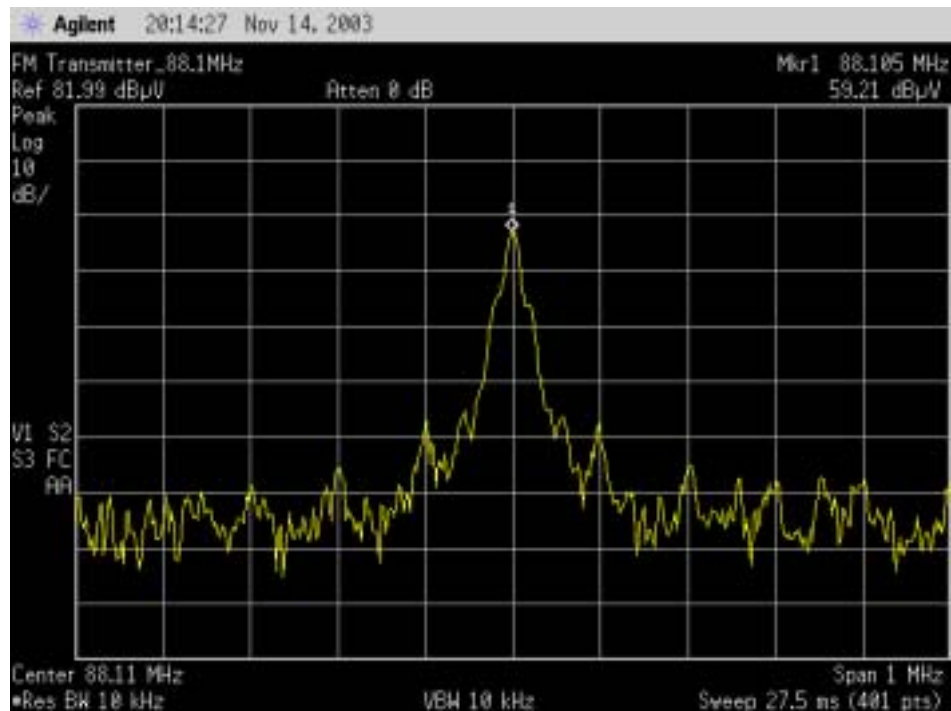
### 6.2.2 Instrument Settings

RES BW : 10 kHz

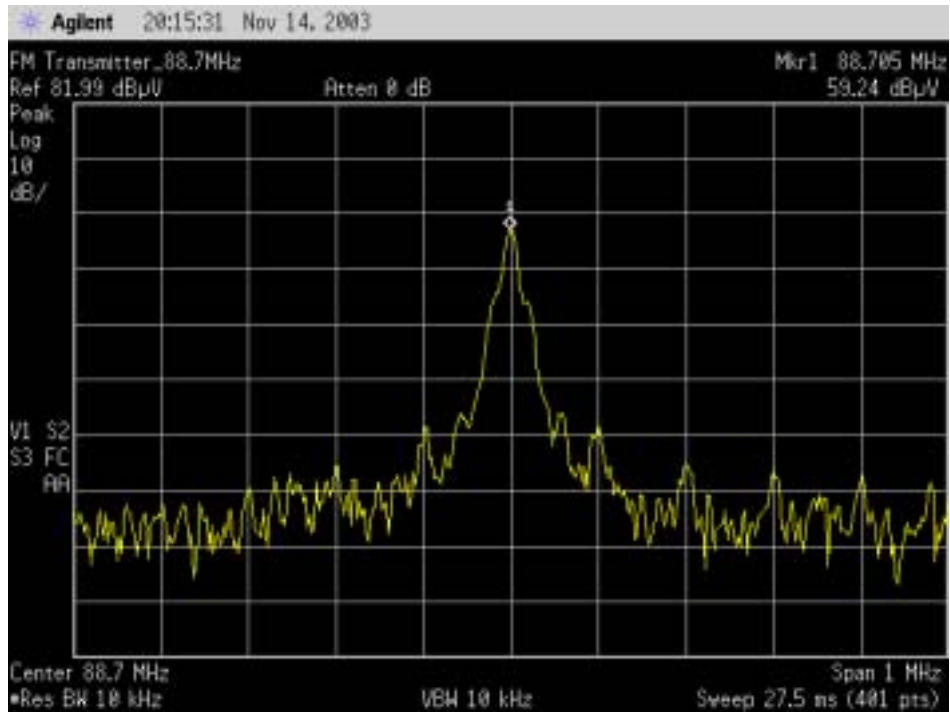
VBW : 10 kHz

### 6.2.3 Test data

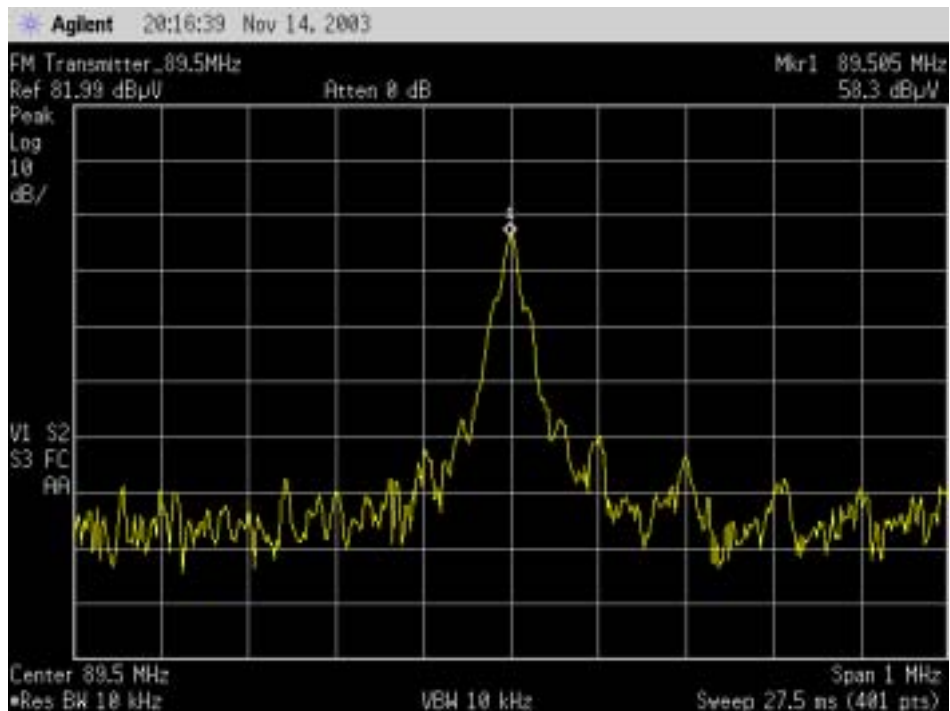
[ 88.1MHz]



[ 88.7MHz]



[ 89.5MHz]



**6.2.4 Result**  
Complied

### 6.3 Intentional radiator Field Strength of Radiation

#### 6.3.1 Measurement procedure

The test was done at a 3m open area test site with an average 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.

#### 6.3.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Test receiver	ESVS10	827864/006	R&S	04.05.13	<input checked="" type="checkbox"/>
Spectrum	E7401A	US39150191	Agilent	04.07.30	<input checked="" type="checkbox"/>
TRILOG Broadband Ant.	VULB 9160	3138	SCHWARZBECK	04.03.26	<input checked="" type="checkbox"/>
Antenna Mast	A109	N/A	DEAIL	.	<input checked="" type="checkbox"/>
Turn Table	TS14	N/A	DEAIL	.	<input checked="" type="checkbox"/>
3m OATS	-	-	EMC Compliance	-	<input checked="" type="checkbox"/>

#### 6.3.3 Measurement uncertainty

Radiated Emission measurement : (K=2)

30-300 MHz ; 3 m:  $\pm 3.67$ , 10 m:  $\pm 4.4$

300-1000 MHz ; 3 m:  $+4.6/-2.92$ , 10 m:  $+2.94/-2.88$

### 6.3.4 Test data

#### [Average]

Frequency	Reading	Pol.	Height	angle	Correction		Limits	Result	Margin
					Factor				
[MHz]	[dBuV/m]		[m]		Antenna	Cable	[dBuV/m]	[dBuV/m]	[dB]
88.10	35.1	H	2.3	256	7.99	1.80	48.0	44.89	3.11
88.70	34.8	H	2.0	86	7.99	1.80	48.0	44.59	3.41
89.50	35.7	H	1.4	244	7.11	1.80	48.0	44.61	3.39

#### [Peak]

Frequency	Reading	Pol.	Height	angle	Correction		Limits	Result	Margin
					Factor				
[MHz]	[dBuV/m]		[m]		Antenna	Cable	[dBuV/m]	[dBuV/m]	[dB]
88.10	35.3	H	2.3	256	7.99	1.80	48.0	45.09	2.91
88.70	35.0	H	2.0	86	7.99	1.80	48.0	44.79	3.21
89.50	35.9	H	1.4	244	7.11	1.80	48.0	44.81	3.19

\* Receiving Antenna Mode : P= Polarization → POL H = Horizontal, POL V = Vertical

\* IF Bandwidth : 120kHz

\* Note : Reading = Test Receiver meter,

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

### 6.3.5 Result

Complied



## 6.4 Intentional radiator Field Strength of Spurious

### 6.4.1 Measurement procedure

The 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.

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.

### 6.4.2 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. date	Used
Test receiver	ESVS10	827864/006	R&S	04.05.13	<input checked="" type="checkbox"/>
Spectrum	E7401A	US39150191	Agilent	04.07.30	<input checked="" type="checkbox"/>
TRILOG Broadband Ant.	VULB 9160	3138	SCHWARZBECK	04.03.26	<input checked="" type="checkbox"/>
Antenna Mast	A109	N/A	DEAIL	.	<input checked="" type="checkbox"/>
Turn Table	TS14	N/A	DEAIL	.	<input checked="" type="checkbox"/>
3m OATS	-	-	EMC Compliance	-	<input checked="" type="checkbox"/>

### 6.4.3 Measurement uncertainty

Radiated Emission measurement : (K=2)

30-300 MHz ; 3 m:  $\pm 3.67$ , 10 m:  $\pm 4.4$

300-1000 MHz ; 3 m:  $+4.6/-2.92$ , 10 m:  $+2.94/-2.88$

#### 6.4.4 Test data

Frequency	Reading	Pol.	Height	angle	Correction		Limits	Result	Margin
					Factor				
[MHz]	[dBuV/m]		[m]		Antenna	Cable	[dBuV/m]	[dBuV/m]	[dB]
176.01	25.3	V	1.0	200	11.73	2.40	43.5	39.43	4.07
200.00	25.8	H	1.8	110	9.53	2.60	43.5	37.93	5.57
218.20	26.4	H	1.4	212	10.03	2.80	46.0	39.23	6.78
352.01	22.2	H	1.2	34	14.30	3.80	46.0	40.30	5.70
354.02	20.8	H	1.2	152	14.34	3.80	46.0	38.94	7.06
530.78	12.6	H	2.2	234	17.97	4.90	46.0	35.45	10.55
796.09	9.3	V	1.0	350	22.45	6.20	46.0	37.95	8.05

\* Receiving Antenna Mode : P= Polarization → POL H = Horizontal, POL V = Vertical

\* IF Bandwidth : 120kHz

\* Note : Reading = Test Receiver meter,

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

#### 6.4.5 Result

Complied

## 6.5 TV Antenna power

U.S.A CH. [NO.]	Pic Freq [MHz]	Loacl Oscillator	Frequency [MHz]	Reading [dBuV/m]	Limits [dBuV/m]	Margin [dB]
2	55.25	Fundamental	101.00	23.6	50.0	26.40
		Harmonics	202.00	14.4	50.0	35.60
			303.00	5.7	50.0	44.30
			606.00	11.1	50.0	38.90
			808.00	7.9	50.0	42.10
			909.00	8.5	50.0	41.50
3	61.25	Fundamental	107.00	27.5	50.0	22.50
		Harmonics	214.00	12.7	50.0	37.30
			641.99	10.1	50.0	39.90
			855.99	17.4	50.0	32.60
			962.99	8.2	50.0	41.80
5	77.25	Fundamental	123.00	25.2	50.0	24.80
		Harmonics	246.00	16.4	50.0	33.60
			492.00	4.6	50.0	45.40
			615.00	3.8	50.0	46.20
			737.99	12.2	50.0	37.80
			983.99	25.2	50.0	24.80
9	187.25	Fundamental	233.00	24.3	50.0	25.70
		Harmonics	931.99	26.8	50.0	23.20
12	205.25	Fundamental	251.00	27.1	50.0	22.90
		Harmonics				
21	513.25	Fundamental	559.00	27.3	50.0	22.70
28	555.25	Fundamental	601.00	33.5	50.0	16.50
36	603.25	Fundamental	649.00	30.1	50.0	19.90
40	627.25	Fundamental	673.00	33.6	50.0	16.40
53	705.25	Fundamental	750.99	35.1	50.0	14.90
69	801.25	Fundamental	847.00	43.8	50.0	6.20

## 6.6 Noise Figure

CH/BAND	Result(dB)
UHF	10.0
VHF	9.5
	8.5