

Verification of Compliance

Product Name : Audio Distribution System
Brand Name : **RTI**
Model No. : AD-4x
Applicant : Remote Technologies Inc.
Address : 5775 12th Ave. East, Suite 180, Shakopee, MN55379, U.S.A.
Report Number : O13-I210-1303-372
Issue Date : May 3, 2013
Applicable Standards : EN 55013:2001+A1:2003+A2:2006
AS/NZS CISPR13:2004
EN 61000-3-2:2006 +A1:2009 +A2:2009
EN 61000-3-3:2008
EN 55020:2007+A11:2011
IEC 61000-4-2:2008
IEC 61000-4-4:2004+A1:2010

Based on the EMC Directive 2004/108/EC and the specifications of the customer, one sample of the designated product has been tested in our laboratory and found to be in compliance with the EMC standards cited above.



TAF 0905
FCC CAB Code TW1053
NVLAP Lab Code 200575-0
IC Code 4699A
VCCI Accep. No. R-1527, C-1609, T-1441, G-10,
C-4400, G-614, T-1334

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(Tsun-Yu Shih/ General Manager)

Date: May 3, 2013

CE EMC Test Report

for

Audio Distribution System

Trade Name : 
Model Number : AD-4x
Report Number : O13-I210-1303-372
Date of Receipt : April 1, 2013
Date of Report : May 3, 2013

Prepared for

Remote Technologies Inc.

5775 12th Ave. East, Suite 180, Shakopee, MN55379, U.S.A.

Prepared by



Central Research Technology Co.

EMC Test Laboratory

11, Lane 41, Fushuen St., Jungshan Chiu, Taipei, Taiwan, 104, R.O.C.

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Verification of Compliance

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Model No. : AD-4x
Applicant : Remote Technologies Inc.
Address : 5775 12th Ave. East, Suite 180, Shakopee, MN55379, U.S.A.
Applicable Standards : **EN 55013:2001+A1:2003+A2:2006**
AS/NZS CISPR13:2004
EN 61000-3-2:2006 +A1:2009 +A2:2009
EN 61000-3-3:2008
EN 55020:2007+A11:2011
IEC 61000-4-2:2008
IEC 61000-4-4:2004+A1:2010



Date of Testing : April 10~25, 2013
Deviation : N/A
Condition of Test Sample : Pre-production Sample

We, **Central Research Technology Co.**, hereby certify that one sample of the designated product was tested in our facility during the period mentioned above. The test records, data evaluation and Equipment Under Test (EUT) configurations shown in the present report are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in the present report is in compliance with the requirements set forth in the standards mentioned above and apply to the tested sample identified in the present report only. The test report shall not be reproduced, except in its entirety, without the written approval of Central Research Technology Co.

PREPARED BY : Rosa Hsieh , **DATE** : May 3, 2013
(Rosa Hsieh/System Executive)
APPROVED BY : T. Y. Shih , **DATE** : May 3, 2013
(Tsun-Yu Shih/General Manager)

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Attachment 1 – Photographs of the Test Configurations

Attachment 2 – Photographs of EUT

1. General Description

1.1 General Description of EUT

Equipment Under Test : Audio Distribution System

Model No. : AD-4x

Power in : 230V/50Hz

Manufacturer : Amcli International Corp.

Function Description :

The EUT is a Pre-production Sample of the Audio Distribution System. Please refer to the user's manual for the details.

The I/O ports of EUT are listed below:

NO.	I/O Port Type	Quantity
1	ZONE SOURCE L&R	4 set
2	ZONE LOOP OUT L&R	4 set
3	ZONE PRE-OUT L&R	4 set
4	ZONE SPEAKERS OUT L&R	4 set
5	RS232	1
6	CTRL IN	1
7	CTRL OUT	1
8	MUTE	1
9	STATUS	1
10	ETHERNET	1
11	REMOTE SOURCE IR INPUT1~4,ALL	1
12	REMOTE SOURCE 1~4	1
13	+12VDC	1

1.2 Test Mode

Normal operating as the specification of manufacturer.

1.3 Applied standards

According to the specifications of the manufacturer and the requirements set in European Council EMC Directive 2004/108/EC, the applied standards to evaluate the compliance of the EUT are as following:

Applied Standards		Test Items	Results
☒ EN55013: 2001+A1:2003+A2:2006 ☒ AS/NZS CISPR 13:2004		☒ Conducted Emission Measurement	<u>PASS</u>
		☒ Disturbance Power Measurement	<u>PASS</u>
		☐ Radiated Emission Measurement	<u>N/A</u>
		☐ Disturbance Voltage at the Antenna Terminals Measurement	<u>N/A</u>
☒ EN 61000-3-2:2006 +A1:2009 +A2:2009		Harmonic Current Emission Measurement	<u>PASS</u>
☒ EN 61000-3-3:2008		Voltage Fluctuation and Flicker Emission Measurement	<u>PASS</u>
☒ EN 55020:2007+A11:2011		☐ Immunity Against Input Interference (S1)	<u>N/A</u>
		☒ Immunity Against RFI Voltage(S2a)	<u>PASS</u>
		☐ Immunity Against RFI Current(S2b)	<u>N/A</u>
		☒ Immunity Against Radiated RFI (S3)	<u>PASS</u>
		☐ Screening Effectiveness (S4)	<u>N/A</u>
		☒ Keyed Carrier(S5)	<u>PASS</u>
		☐ Immunity from Radiated field not fitting inside the open strip line (S6)	<u>N/A</u>
☒ EN 55020: 2007+A11:2011	☒ IEC 61000-4-2:2008	Electrostatic discharge Test (ESD)	<u>PASS</u>
	☒ IEC 61000-4-4:2004 +A1:2010	Electrical fast transient / burst immunity Test (EFT)	<u>PASS</u>

1.4 Test Setup for the EUT

The EUT is an unique unit connected with other necessary accessories and support units listed in the next section. It has been tested against each standard after the following setup steps:

EN 55013, EN 61000-3-2, EN 61000-3-3, ESD and EFT

- a. Connect the EUT and all the support units to the appropriate power source.
- b. Turn on the EUT and all the accessories and support units.
- c. The DVD player sends 1kHz audio signal to the speakers by the EUT.
- d. The DVD player sends 1kHz audio signal to Earphone by the EUT.(For EN 55013 Tests)
- e. Adjust the speaker output of the EUT to 1/8 rated power.
- f. Repeat and keep the setup steps listed above before and during all tests.

EN 55020 (S2a, S3, S5)

- a. Connect the EUT and all the support units to the appropriate power source.
- b. Turn on the EUT and all the accessories and support units.
- c. The TS9980 TV sound test signal system plays the wanted and unwanted signals to the EUT.
- d. Repeat and keep the setup steps listed above before and during all tests.

1.5 The Support Units

EN 55013

No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.
1	DVD Player	KVD-1080/ 0601000119	DoC	KOLIN	1.4m	✓
2	Earphone	CW-010M.V/ 20120821-07	N/A	i-Acom	N/A	✓
3	8Ω Resistor	N/A	N/A	N/A	N/A	✓

EN 61000-3-2, EN 61000-3-3, ESD and EFT

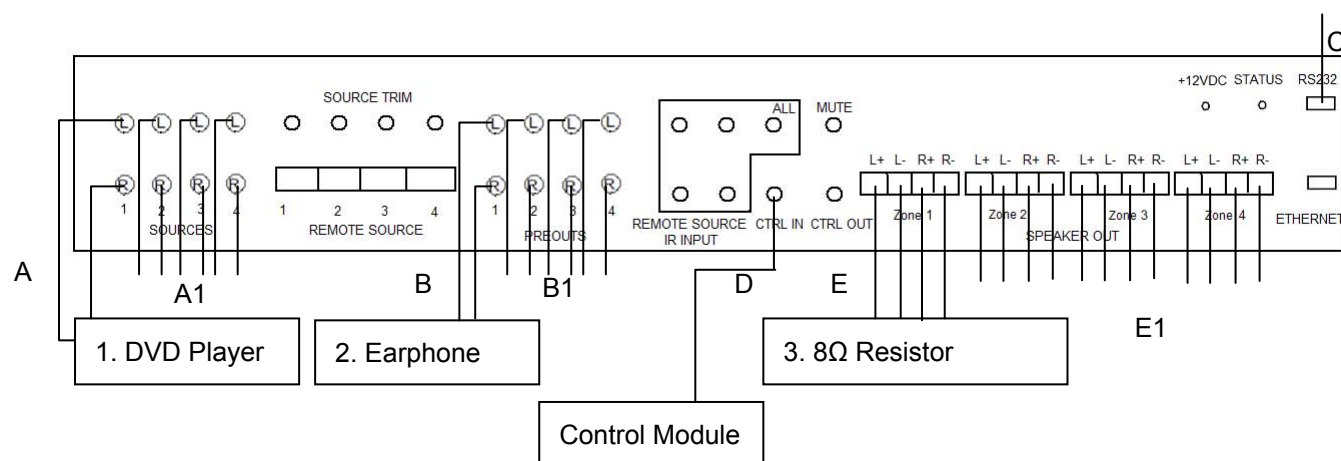
No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.
1	DVD Player	DVD-S660/ 7315194	N/A	Panasonic	1.4m	✓
2	Speaker	A215/ CN-0Y09266-69804- 5B6-0346	DoC	DELL	1.8m	✓
3	Speaker	SP-600R/ 70503509	N/A	TATUNG	N/A	✓

EN 55020 (S2a, S3, S5)

No.	Unit	Model No./ Serial No.	FCC ID	Trade Name	Power Cord	Supported by lab.
1	-	-	-	-	-	-

1.6 Layout of the Setup

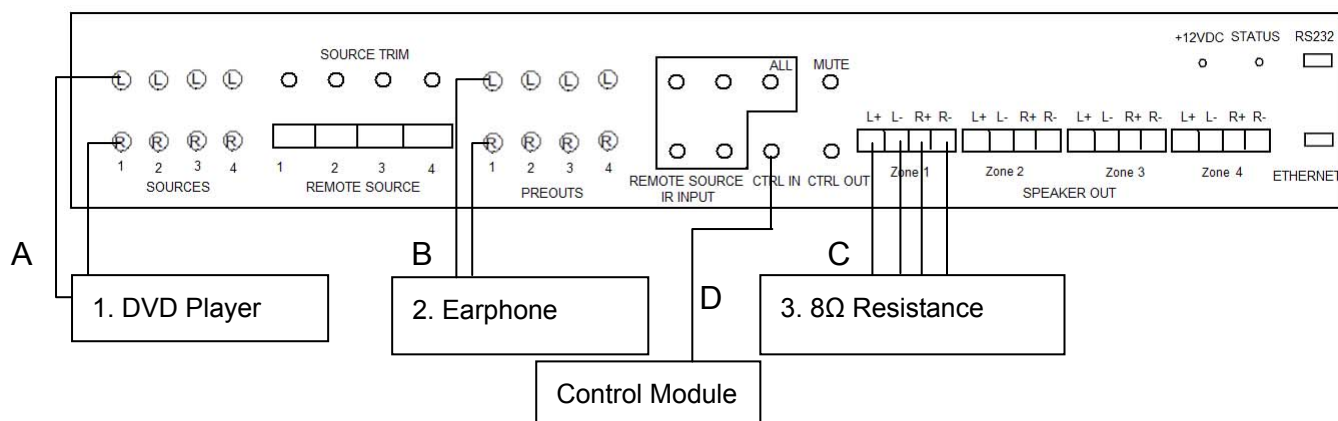
Conducted Emission Test



Connecting Cables :

No.	Cable	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	AV*2 Cable	1.2m	✓			✓	
A1		1.2m	✓			✓	Floating
B	Audio Cable	1.2m	✓			✓	
B1		1.2m	✓			✓	Floating
C	RS232 Cable	1.8m	✓			✓	Floating
D	Control Cable	1.5m	✓				
E	Speaker Cable	1.5m	✓			✓	
E1		1.5m	✓			✓	Floating

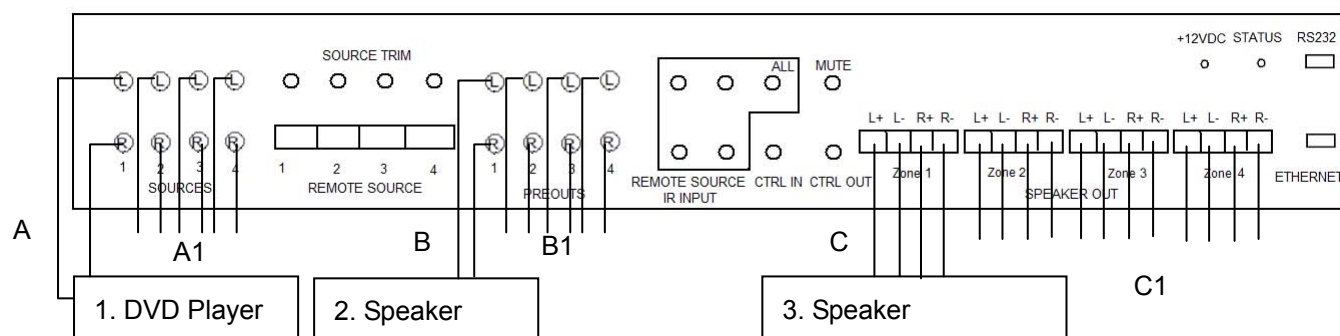
Disturbance Power Test



Connecting Cables :

No.	Cable	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	AV*2 Cable	21m	✓	✓		✓	Hitching Core
B	Audio Cable	8m	✓	✓		✓	Hitching Core
C	Speaker Cable	1.5m	✓	✓		✓	Hitching Core
D	Control Cable	1.5m	✓	✓			Hitching Core

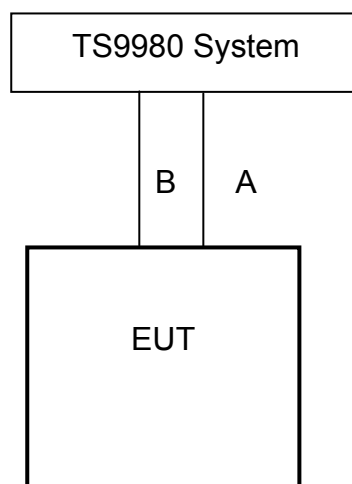
EN 61000-3-2, EN 61000-3-3, ESD and EFT Tests



Connecting Cables :

No.	Cable	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	AV*2 Cable	1.2m	✓			✓	
A1		1.2m	✓			✓	Floating
B	Audio Cable	1.2m	✓			✓	
B1		1.2m	✓			✓	Floating
C	Speaker Cable	1.5m	✓			✓	
C1		1.5m	✓			✓	Floating

EN 55020 (S2a, S3, S5)



Connecting Cables :

No.	Cable	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
A	AV*2 Cable	1.2m	✓			✓	
B	Signal Cable	>3m	✓			✓	

1.7 Test Capability

Test Facility

The test facility used for evaluating the conformance of the EUT with each standard in the present report meets what required in CISPR16-1-4, CISPR16-2-3.

Test Room	Type of Test Room	Descriptions
TR1	10m semi-anechoic chamber (23m×14m×9m)	Complying with the NSA requirements in documents CISPR 22/ EN 55022 for the radiated emission measurement.
TR1	3m fully-anechoic chamber (23m×14m×9m)	
TR11	3m semi-anechoic chamber (9m×6m×6m)	
TR5	Shielding Room (8m×5m×4m)	For the conducted emission measurement.
TR4	Shielding Room (5m×3m×3m)	
TR2	3m fully-anechoic chamber (7m×3m×3m)	Complying with the field uniformity requirements in standard IEC/ EN 61000-4-3 for the radiated immunity test.
TR7	Shielding Room (5m×3m×3m)	For the Current Harmonic / Voltage Flicker and other immunity tests.
TR8	Shielding Room (5m×3m×3m)	
AR	Shielding Room (3m×3m×3m)	
TR20	Shielding Room (8.5m×4m×2.5m)	For Input Immunity (S1) Immunity from conducted Voltage (S2a) Immunity to RF voltages (common mode) of antenna terminals (S2b) Immunity from Radiated field(S3) Screening Effectiveness (S4)
TR300	3m fully-anechoic chamber (8m×5m×5m)	Complying with the site VSWR requirements set in documents CISPR 16-1-4 for the radiated emission measurement.

Test Laboratory Competence Information

Central Research Technology Co. has been accredited / filed / authorized by the agencies listed in the following table.

Certificate	Nation	Agency	Code	Mark
Accreditation Certificate	USA	NVLAP	200575-0	ISO/IEC 17025
	R.O.C. (Taiwan)	TAF	0905	ISO/IEC 17025
	R.O.C. (Taiwan)	BSMI	SL2-IN-E-0033, SL2-IS-E-0033, SL2-R1/R2-E-0033, SL2-A1-E-0033 SL2-L1-E-0033	ISO/IEC 17025
Site Filing Document	USA	FCC	474046,TW1053	Test facility list & NSA Data
	Canada	IC	4699A-1,-3	Test facility list & NSA Data
	Japan	VCCI	R-1527,C-1609,T-1441,G-10, C-4400, G-614, T-1334	Test facility list & NSA Data
Authorization Certificate	Germany	TUV	10021687	ISO/IEC 17025
	Norway	Nemko	ELA 212	ISO/IEC 17025

The copy of each certificate can be downloaded from our web site: www.crc-lab.com

2. Conducted Emission Measurement

Test Result : **PASS**

2.1 Limits for Emission Measurement

☒ Limits for conducted disturbances at the power mains

Frequency (MHz)	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 to 0.5	66 – 56	56 – 46
0.5 to 5	56	46
5 to 30	60	50

Note 1- The lower limit shall apply at the transition frequency.
Note 2- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz for Class B equipment.

2.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ESCS 30/ 836858/021	Jan. 14, 2013	Jan. 14, 2014
LISN	R&S	ESH2-Z5/ 836613/001	June 5, 2012	June 5, 2013
2 nd LISN	R&S	ENV4200/ 833209/010	March 29, 2013	March 29, 2014
50Ω terminator	N/A	N/A/ 001	Aug. 20, 2012	Aug. 20, 2013
RF Switch	R&S	RSU28/ 338965/002	Feb. 19, 2013	Aug. 19, 2013
RF Cable	N/A	N/A/ C0052 ~ 56	Feb. 19, 2013	Aug. 19, 2013
Test Software	Audix	e3/ Ver. 5.2004-2-19k	NCR	NCR
TR5 shielded room	ETS LINDGREN	TR5/ 15353-F	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

Measurement Uncertainty

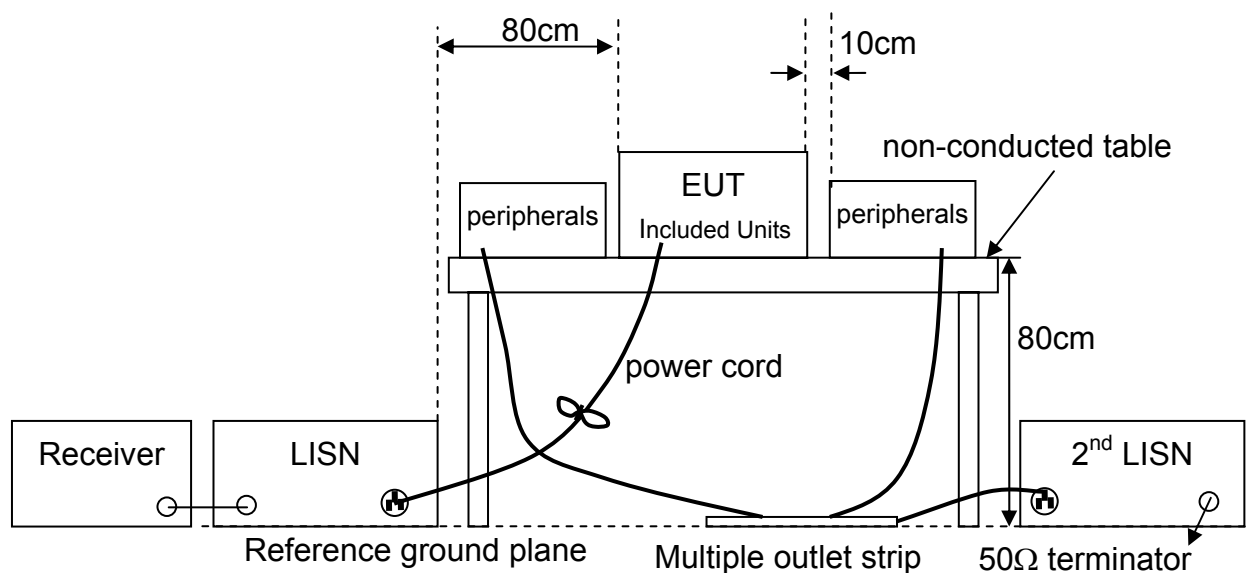
The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{cisper} in table 1 of CISPR 16-4-2.

Equipment	Model Number	Uncertainty Value
LISN	ESH2-Z5	3.1dB
	ENV 4200	2.7dB

2.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the reference ground plane and 0.4 meters from the conducting wall of the shielded room. Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 meters above the reference ground plane.
- c. Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN.
- d. All the other peripherals are connected to the 2nd LISN, if any.
- e. The LISN was placed 0.8 meters from the EUT and at least 0.8 meters from other units and other metal planes.
- f. Measure the conducted emissions on each power line (Neutral Line and Line 1 – Hot side) of the EUT's power source by using the test receiver connected to the coupling RF output port of LISN.
- g. Rapidly scan the signal from 150kHz to 30MHz by using the receiver through the Maximum-Peak detector to determine those frequencies associated with higher emission levels for each measured line.
- h. Then measure the maximum level of conducted disturbance for each frequency found from step g. by using the receiver through the Quasi-Peak and Average detectors per CISPR 16-1.
- i. Record the level for each frequency and compare with the required limit.
- j. If the peak emission level is lower than the specified Average limit, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. or Average values will be measured and presented.

2.4 Test Configurations

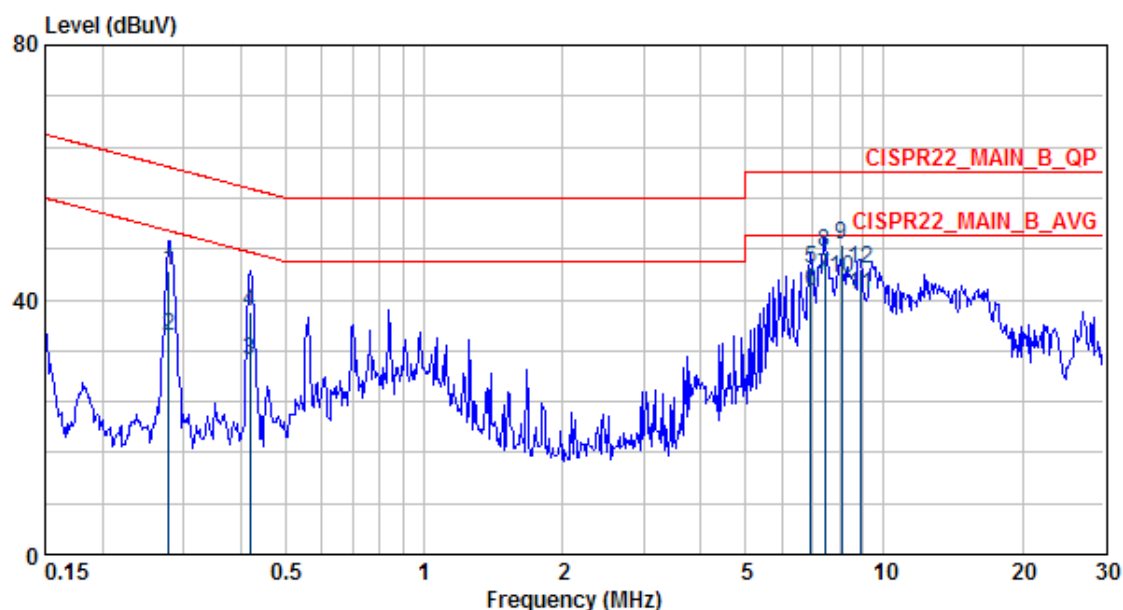


2.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

2.6 Test Results

Test Mode : Normal Test Voltage : 230V/50Hz
 Tester : Der-Jan Ken Temperature : 26°C
 Humidity : 56%RH Frequency Range : 150kHz~30MHz
 IF Bandwidth : 9kHz Phase : Line

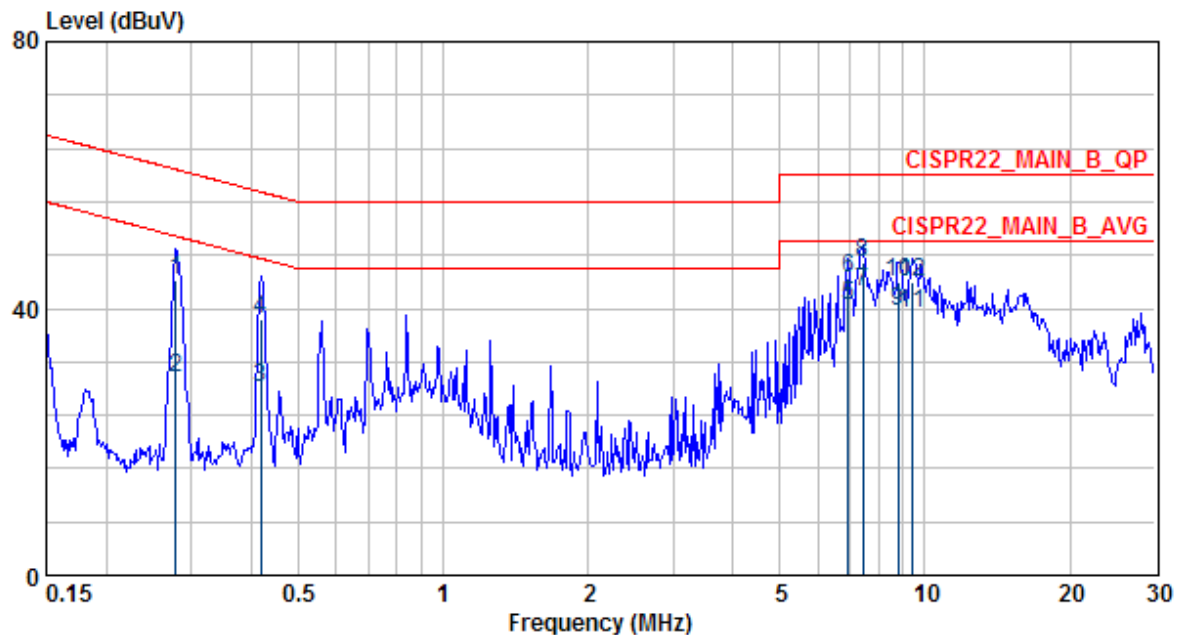


	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.279	44.48	0.30	44.18	60.85	-16.37	LINE	QP
2	0.279	34.35	0.30	34.05	50.85	-16.50	LINE	AVERAGE
3	0.419	30.48	0.30	30.18	47.46	-16.98	LINE	AVERAGE
4	0.419	38.19	0.30	37.89	57.46	-19.27	LINE	QP
5	6.929	44.98	0.57	44.41	60.00	-15.02	LINE	QP
6	6.929	41.33	0.57	40.76	50.00	-8.67	LINE	AVERAGE
7	7.446	43.58	0.58	43.00	50.00	-6.42	LINE	AVERAGE
8	7.446	47.61	0.58	47.03	60.00	-12.39	LINE	QP
9	8.097	48.50	0.59	47.91	60.00	-11.50	LINE	QP
10	8.097	43.45	0.59	42.86	50.00	-6.55	LINE	AVERAGE
11	8.937	40.75	0.61	40.14	50.00	-9.25	LINE	AVERAGE
12	8.937	44.70	0.61	44.09	60.00	-15.30	LINE	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode : Normal **Test Voltage** : 230V/50Hz
Tester : Der-Jan Ken **Temperature** : 26°C
Humidity : 56%RH **Frequency Range** : 150kHz~30MHz
IF Bandwidth : 9kHz **Phase** : Neutral



	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.279	44.28	0.18	44.10	60.85	-16.57	NEUTRAL	QP
2	0.279	29.65	0.18	29.47	50.85	-21.20	NEUTRAL	AVERAGE
3	0.419	27.99	0.18	27.81	47.46	-19.47	NEUTRAL	AVERAGE
4	0.419	38.30	0.18	38.12	57.46	-19.16	NEUTRAL	QP
5	6.929	40.32	0.52	39.80	50.00	-9.68	NEUTRAL	AVERAGE
6	6.929	44.42	0.52	43.90	60.00	-15.58	NEUTRAL	QP
7	7.446	42.46	0.54	41.92	50.00	-7.54	NEUTRAL	AVERAGE
8	7.446	46.93	0.54	46.39	60.00	-13.07	NEUTRAL	QP
9	8.809	39.53	0.59	38.94	50.00	-10.47	NEUTRAL	AVERAGE
10	8.809	43.92	0.59	43.33	60.00	-16.08	NEUTRAL	QP
11	9.456	39.33	0.61	38.72	50.00	-10.67	NEUTRAL	AVERAGE
12	9.456	43.91	0.61	43.30	60.00	-16.09	NEUTRAL	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of LISN.
3. Q.P. is abbreviation of quasi-peak.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

3. Disturbance Power Measurement

Test Result : PASS

3.1 Limits for Emission Measurement

☒ Disturbance power limits

Frequency (MHz)	Quasi-peak (dBpW)	Average (dBpW)
30 to 300	45 – 55	35 – 45
Note 1- The limit increases linearly with the frequency in the range 30 MHz to 300MHz.		

3.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ESCS 30/ 836858/021	Jan. 14, 2013	Jan. 14, 2014
Absorbing Clamp	R&S	MDS21/ 833711/029	June. 14, 2012	June. 14, 2013
RF Switch	R&S	RSU28/ 338965/002	Feb. 19, 2013	Aug. 19, 2013
RF Cable	N/A	N/A/ C0052 ~ 56	Feb. 19, 2013	Aug. 19, 2013
Test Software	Audix	e3/ Ver. 5.2004-2-19k	NCR	NCR
TR5 shielded room	ETS LINDGREN	TR5/ 15353-F	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

Measurement Uncertainty

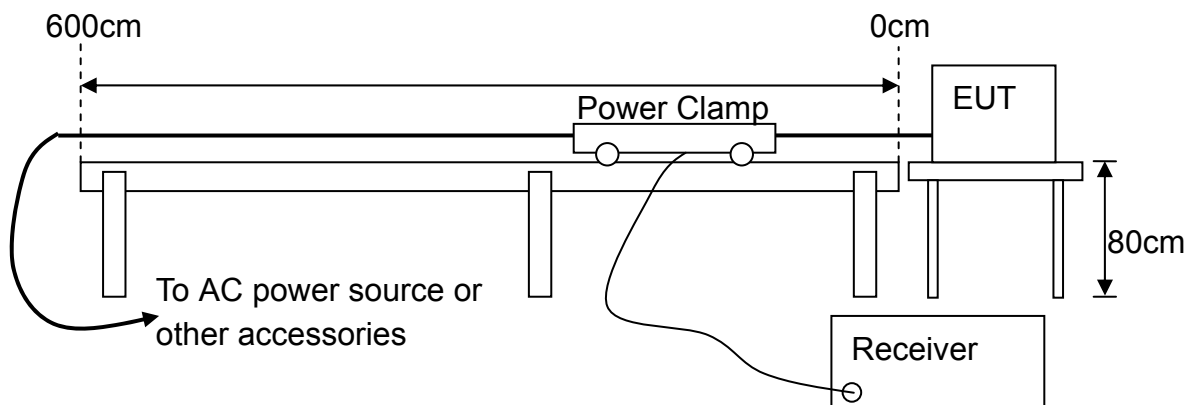
The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{cisper} in table 1 of CISPR 16-4-2.

Equipment	Model Number	Uncertainty Value
Clamp	MDS21	3.5 dB

3.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the reference ground plane and 0.4 meters from the conducting wall of the shielded room. Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the reference ground plane.
- c. Connect each of the EUT's terminal line to the appropriate auxiliaries / accessories thorough the absorbing clamp.
- d. Measure the emissions on each terminal line of the EUT by using the test receiver connected to the RF output port of absorbing clamp which is fixed at the 0cm position.
- e. Rapidly scan the signal from 30MHz to 300MHz by using the receiver through the Maximum-Peak detector to determine those frequencies associated with higher emission levels for each terminal line.
- f. Then measure each frequency found from step c by using the receiver through the Quasi-Peak and Average detectors per CISPR 16-1.with moving the absorbing clamp from the position 0cm to 500cm to determine the maximum level.
- g. Record the level for each frequency and compare with the required limit.
- h. If the peak emission level is lower than the specified Average limit, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. or Average values will be measured and presented.

3.4 Test Configurations



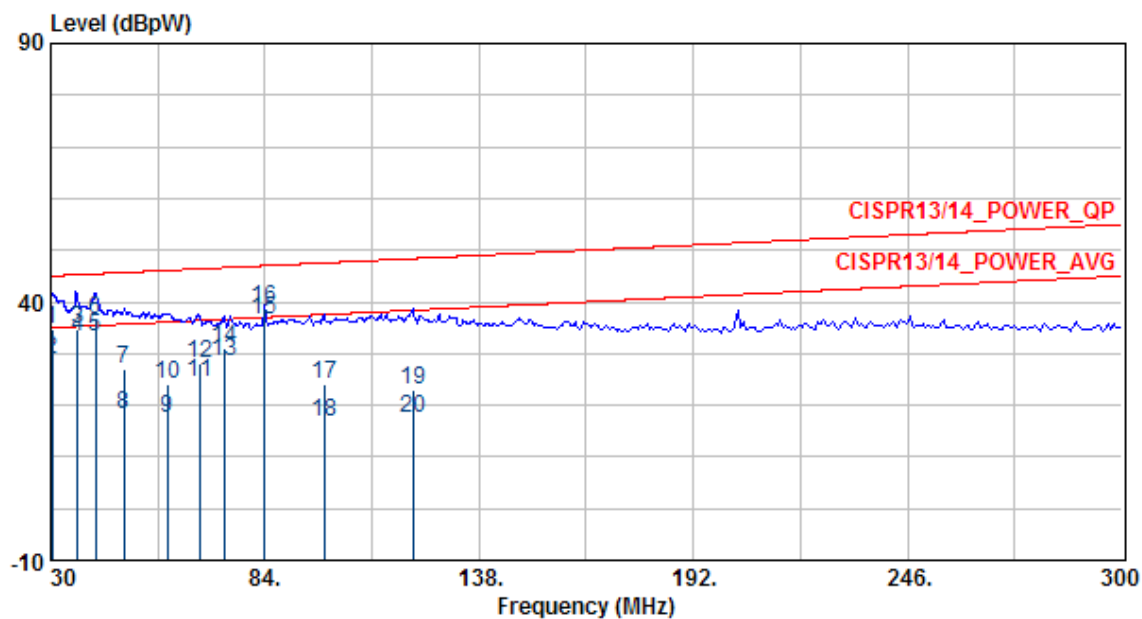
3.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

3.6 Test Results

Measurement at power line

Test Mode	: Normal	Test Voltage	: 230V/50Hz
Tester	: Der-Jan Ken	Temperature	: 26°C
Humidity	: 56%RH	Frequency Range	: 30MHz~300MHz
IF Bandwidth	: 120kHz	Cable	: Power Line



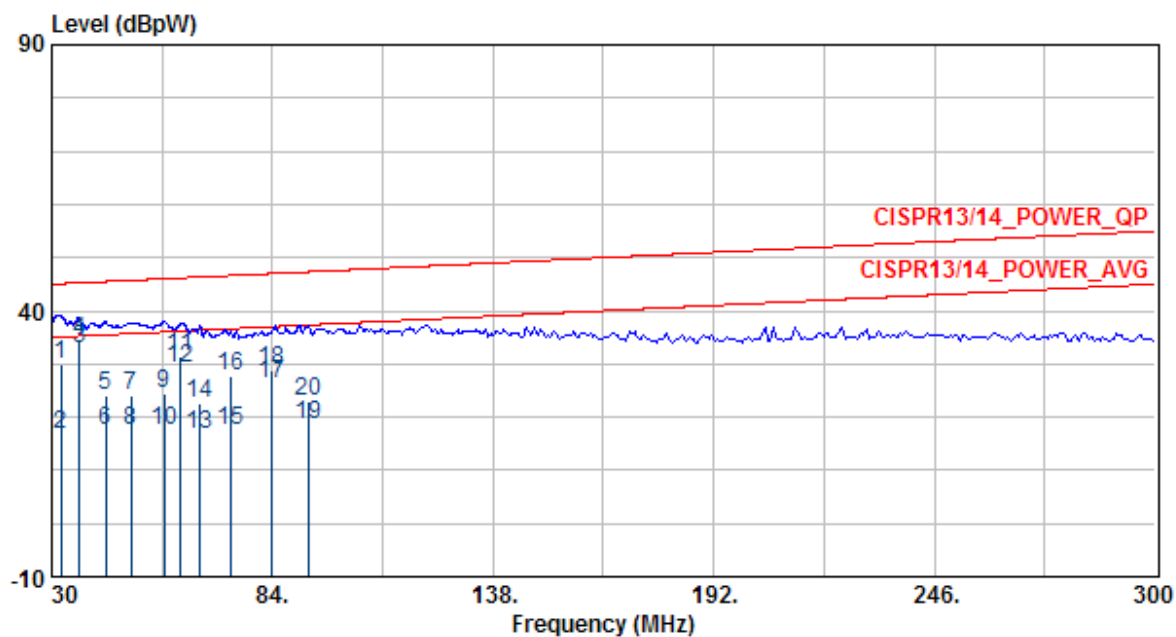
	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBpW	dB	dBpW	dBpW	dB	cm		
1	30.437	34.52	26.25	8.27	45.02	-10.50	0	LINE	QP
2	30.437	28.71	26.25	2.46	35.02	-6.31	0	LINE	AVERAGE
3	36.867	34.76	25.99	8.77	45.25	-10.49	255	LINE	QP
4	36.867	33.15	25.99	7.16	35.25	-2.10	255	LINE	AVERAGE
5	41.289	33.12	25.87	7.25	35.42	-2.29	90	LINE	AVERAGE
6	41.289	36.47	25.87	10.60	45.42	-8.94	90	LINE	QP
7	48.462	26.95	25.80	1.15	45.68	-18.73	0	LINE	QP
8	48.462	18.24	25.80	-7.56	35.68	-17.44	0	LINE	AVERAGE
9	59.309	17.57	25.45	-7.88	36.09	-18.51	0	LINE	AVERAGE
10	59.309	24.23	25.45	-1.22	46.09	-21.85	0	LINE	QP
11	67.590	24.56	24.06	0.50	36.39	-11.83	320	LINE	AVERAGE
12	67.590	28.20	24.06	4.14	46.39	-18.19	320	LINE	QP
13	73.734	28.47	23.68	4.79	36.62	-8.15	60	LINE	AVERAGE
14	73.734	30.93	23.68	7.25	46.62	-15.69	60	LINE	QP
15 @	84.000	36.44	24.00	12.44	37.00	-0.56	180	LINE	AVERAGE
16	84.000	38.60	24.00	14.60	47.00	-8.40	180	LINE	QP
17	98.883	23.93	24.51	-0.58	47.55	-23.62	0	LINE	QP
18	98.883	16.82	24.51	-7.69	37.55	-20.73	0	LINE	AVERAGE
19	121.373	22.82	24.60	-1.78	48.38	-25.56	0	LINE	QP
20	121.373	17.38	24.60	-7.22	38.38	-21.00	0	LINE	AVERAGE

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of absorbing clamp.
3. P.K., Q.P. and AV. are abbreviation of peak, quasi-peak and average respectively.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Measurement at connecting terminals

Test Mode	: Normal	Test Voltage	: 230V/50Hz
Tester	: Der-Jan Ken	Temperature	: 26°C
Humidity	: 56%RH	Frequency Range	: 30MHz~300MHz
IF Bandwidth	: 120kHz	Cable	: CTRL IN

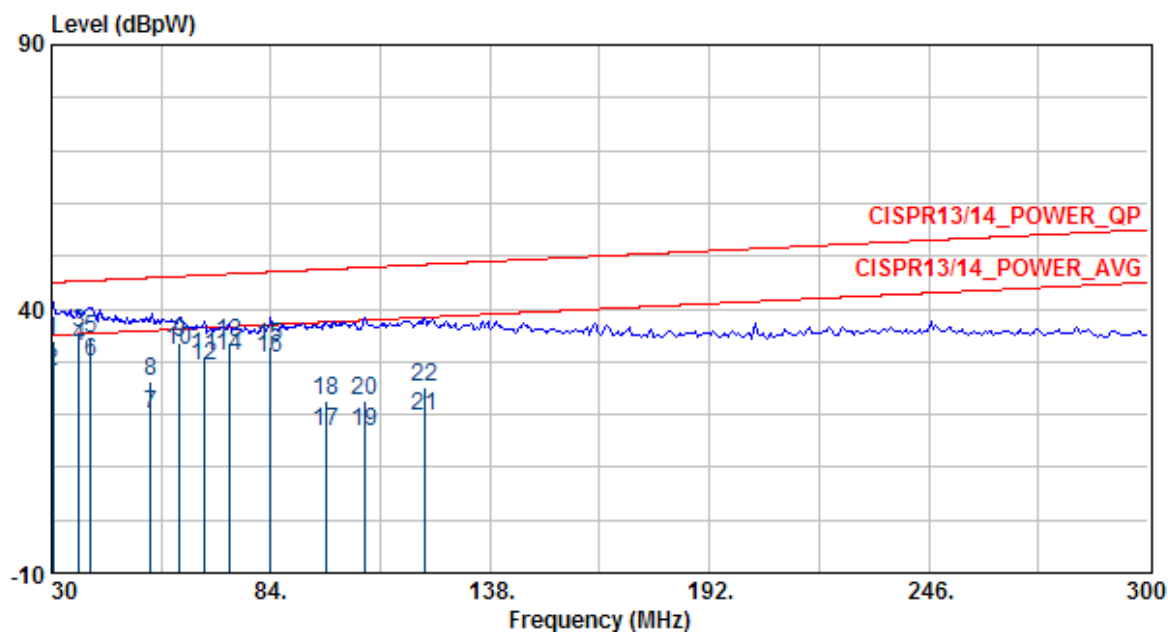


	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBpW	dB	dBpW	dBpW	dB	cm		
1	32.368	30.03	26.17	3.86	45.09	-15.06	0	LINE	QP
2	32.368	16.61	26.17	-9.56	35.09	-18.48	0	LINE	AVERAGE
3 @	36.867	32.67	25.99	6.68	35.25	-2.58	0	LINE	AVERAGE
4	36.867	34.19	25.99	8.20	45.25	-11.06	0	LINE	QP
5	43.164	24.05	25.85	-1.80	45.49	-21.43	0	LINE	QP
6	43.164	17.41	25.85	-8.44	35.49	-18.07	0	LINE	AVERAGE
7	49.331	23.99	25.80	-1.81	45.72	-21.73	0	LINE	QP
8	49.331	17.40	25.80	-8.40	35.72	-18.32	0	LINE	AVERAGE
9	57.428	24.31	25.51	-1.20	46.02	-21.70	0	LINE	QP
10	57.428	17.55	25.51	-7.96	36.02	-18.46	0	LINE	AVERAGE
11	61.445	31.28	25.16	6.12	46.16	-14.89	0	LINE	QP
12	61.445	29.07	25.16	3.91	36.16	-7.10	0	LINE	AVERAGE
13	66.393	16.75	24.27	-7.52	36.35	-19.60	0	LINE	AVERAGE
14	66.393	22.54	24.27	-1.73	46.35	-23.81	0	LINE	QP
15	73.734	17.48	23.68	-6.20	36.62	-19.14	90	LINE	AVERAGE
16	73.734	27.62	23.68	3.94	46.62	-19.00	90	LINE	QP
17	84.000	26.12	24.00	2.12	37.00	-10.88	105	LINE	AVERAGE
18	84.000	28.81	24.00	4.81	47.00	-18.19	105	LINE	QP
19	93.018	18.73	24.44	-5.71	37.33	-18.61	0	LINE	AVERAGE
20	93.018	22.94	24.44	-1.50	47.33	-24.40	0	LINE	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of absorbing clamp.
3. P.K., Q.P. and AV. are abbreviation of peak, quasi-peak and average respectively.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode	: Normal	Test Voltage	: 230V/50Hz
Tester	: Der-Jan Ken	Temperature	: 26°C
Humidity	: 56%RH	Frequency Range	: 30MHz~300MHz
IF Bandwidth	: 120kHz	Cable	: PREOUTS 1

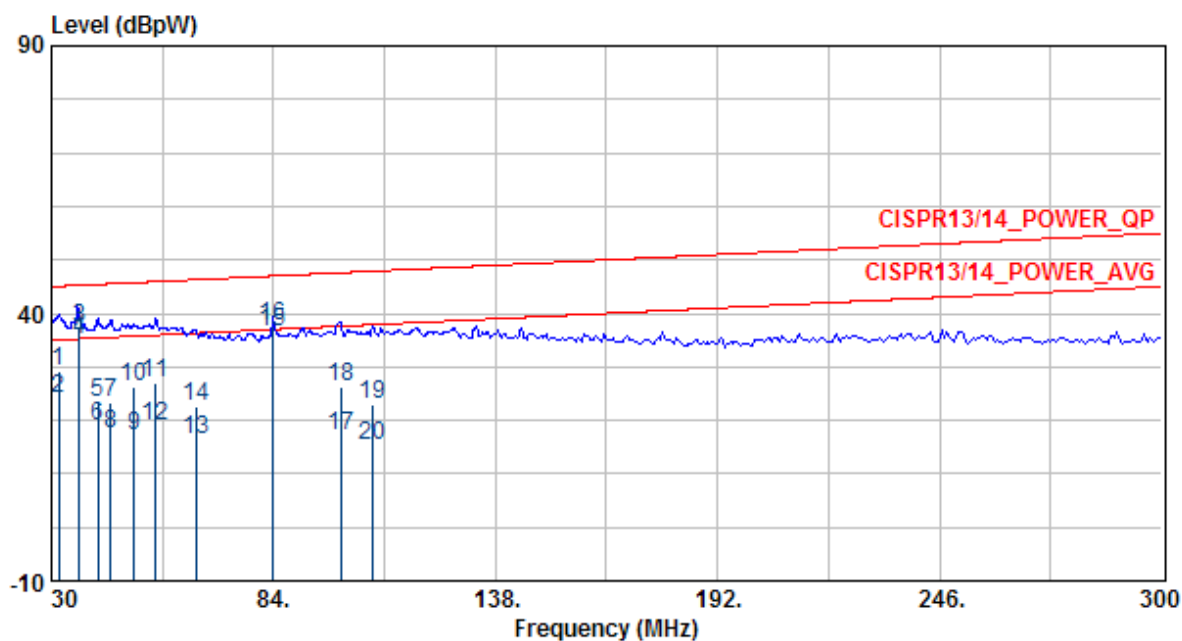


	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBpW	dB	dBpW	dBpW	dB	cm		
1	30.443	34.13	26.25	7.88	45.02	-10.89	0	LINE	QP
2	30.443	28.15	26.25	1.90	35.02	-6.87	0	LINE	AVERAGE
3	36.867	35.31	25.99	9.32	45.25	-9.94	0	LINE	QP
4 @	36.867	32.77	25.99	6.78	35.25	-2.48	0	LINE	AVERAGE
5	39.753	34.25	25.90	8.35	45.36	-11.11	295	LINE	QP
6	39.753	29.88	25.90	3.98	35.36	-5.48	295	LINE	AVERAGE
7	54.436	20.08	25.62	-5.54	35.91	-15.83	295	LINE	AVERAGE
8	54.436	26.22	25.62	0.60	45.91	-19.69	295	LINE	QP
9	61.445	33.48	25.16	8.32	46.16	-12.69	0	LINE	QP
10	61.445	31.97	25.16	6.81	36.16	-4.20	0	LINE	AVERAGE
11	67.589	31.02	24.06	6.96	46.39	-15.37	0	LINE	QP
12	67.589	29.05	24.06	4.99	36.39	-7.34	0	LINE	AVERAGE
13	73.733	33.53	23.68	9.85	46.62	-13.09	0	LINE	QP
14	73.733	30.86	23.68	7.18	36.62	-5.76	0	LINE	AVERAGE
15	83.999	32.77	24.00	8.77	47.00	-14.23	130	LINE	QP
16	83.999	30.64	24.00	6.64	37.00	-6.36	130	LINE	AVERAGE
17	97.526	16.83	24.49	-7.66	37.50	-20.67	0	LINE	AVERAGE
18	97.526	22.75	24.49	-1.74	47.50	-24.75	0	LINE	QP
19	106.935	16.83	24.57	-7.74	37.85	-21.02	0	LINE	AVERAGE
20	106.935	22.69	24.57	-1.88	47.85	-25.16	0	LINE	QP
21	121.742	19.58	24.58	-5.00	38.40	-18.82	0	LINE	AVERAGE
22	121.742	25.04	24.58	0.46	48.40	-23.36	0	LINE	QP

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of absorbing clamp.
3. P.K., Q.P. and AV. are abbreviation of peak, quasi-peak and average respectively.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode	: Normal	Test Voltage	: 230V/50Hz
Tester	: Der-Jan Ken	Temperature	: 26°C
Humidity	: 56%RH	Frequency Range	: 30MHz~300MHz
IF Bandwidth	: 120kHz	Cable	: Source 1 out

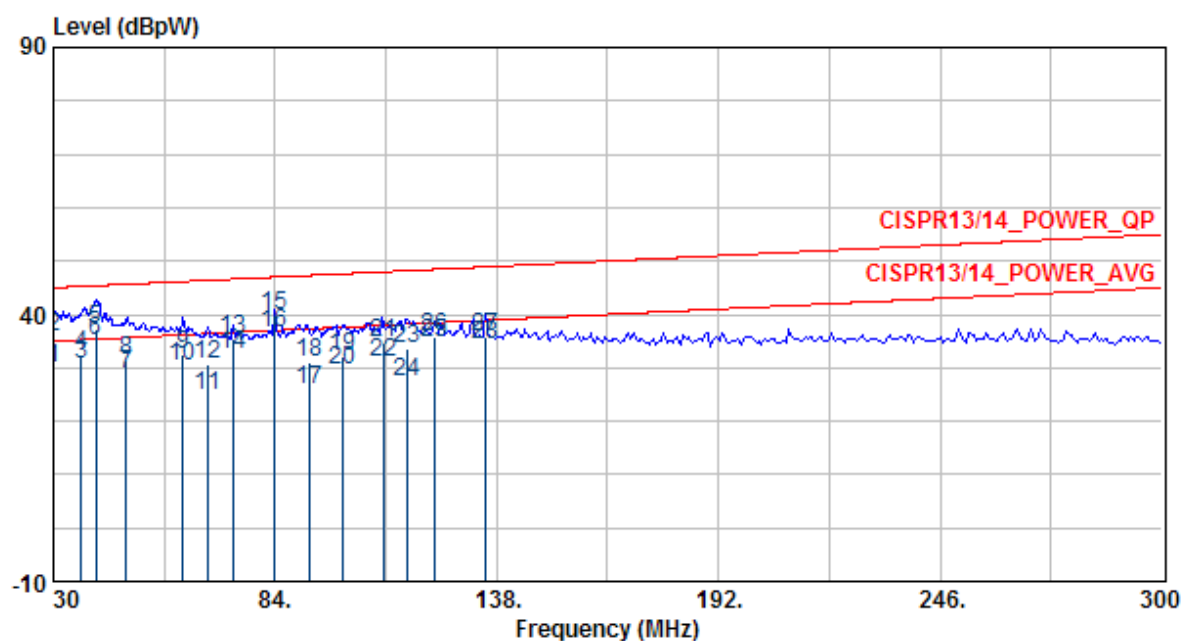


	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBpW	dB	dBpW	dBpW	dB	cm		
1	31.778	29.08	26.19	2.89	45.07	-15.98	0	LINE	QP
2	31.778	24.15	26.19	-2.04	35.07	-10.91	0	LINE	AVERAGE
3	36.866	37.18	25.99	11.19	45.25	-8.07	90	LINE	QP
4 @	36.866	34.94	25.99	8.95	35.25	-0.31	90	LINE	AVERAGE
5	41.221	23.24	25.88	-2.64	45.42	-22.18	0	LINE	QP
6	41.221	18.76	25.88	-7.12	35.42	-16.66	0	LINE	AVERAGE
7	44.476	23.28	25.84	-2.56	45.54	-22.26	0	LINE	QP
8	44.476	17.64	25.84	-8.20	35.54	-17.90	0	LINE	AVERAGE
9	50.118	17.27	25.79	-8.52	35.75	-18.48	0	LINE	AVERAGE
10	50.118	26.11	25.79	0.32	45.75	-19.64	0	LINE	QP
11	55.300	27.02	25.59	1.43	45.94	-18.92	0	LINE	QP
12	55.300	18.95	25.59	-6.64	35.94	-16.99	0	LINE	AVERAGE
13	65.031	16.25	24.50	-8.25	36.30	-20.04	0	LINE	AVERAGE
14	65.031	22.69	24.50	-1.81	46.30	-23.60	0	LINE	QP
15	84.000	36.57	24.00	12.57	37.00	-0.43	250	LINE	AVERAGE
16	84.000	37.53	24.00	13.53	47.00	-9.47	250	LINE	QP
17	100.259	17.24	24.52	-7.28	37.60	-20.36	0	LINE	AVERAGE
18	100.259	26.08	24.52	1.56	47.60	-21.52	0	LINE	QP
19	108.174	22.98	24.58	-1.60	47.90	-24.91	0	LINE	QP
20	108.174	15.16	24.58	-9.42	37.90	-22.73	0	LINE	AVERAGE

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of absorbing clamp.
3. P.K., Q.P. and AV. are abbreviation of peak, quasi-peak and average respectively.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

Test Mode	:	Normal	Test Voltage	:	230V/50Hz
Tester	:	Der-Jan Ken	Temperature	:	26°C
Humidity	:	56%RH	Frequency Range	:	30MHz~300MHz
IF Bandwidth	:	120kHz	Cable	:	Zone 1 out AMP speaker



	Freq	Level	Factor	Read Level	Limit Line	Over Limit	Ant Pos	Pol/Phase	Remark
	MHz	dBpW	dB	dBpW	dBpW	dB	cm		
1	30.058	30.09	26.27	3.82	35.00	-4.91	0	LINE	AVERAGE
2	30.058	35.61	26.27	9.34	45.00	-9.39	0	LINE	QP
3	36.866	30.62	25.99	4.63	35.25	-4.63	0	LINE	AVERAGE
4	36.866	32.61	25.99	6.62	45.25	-12.64	0	LINE	QP
5	40.416	37.13	25.88	11.25	45.39	-8.25	40	LINE	QP
6	40.416	35.03	25.88	9.15	35.39	-0.35	40	LINE	AVERAGE
7	47.817	28.69	25.81	2.88	35.66	-6.97	195	LINE	AVERAGE
8	47.817	31.39	25.81	5.58	45.66	-14.27	195	LINE	QP
9	61.444	32.32	25.16	7.16	46.16	-13.85	0	LINE	QP
10	61.444	30.26	25.16	5.10	36.16	-5.91	0	LINE	AVERAGE
11	67.855	24.88	24.02	0.86	36.40	-11.53	150	LINE	AVERAGE
12	67.855	30.50	24.02	6.48	46.40	-15.91	150	LINE	QP
13	73.733	35.38	23.68	11.70	46.62	-11.24	270	LINE	QP
14	73.733	32.35	23.68	8.67	36.62	-4.27	270	LINE	AVERAGE
15	84.001	39.92	24.00	15.92	47.00	-7.08	100	LINE	QP
16	84.001	36.67	24.00	12.67	37.00	-0.33	100	LINE	AVERAGE
17	92.230	25.98	24.43	1.55	37.30	-11.33	110	LINE	AVERAGE
18	92.230	30.98	24.43	6.55	47.30	-16.33	110	LINE	QP
19	100.555	32.15	24.52	7.63	47.61	-15.46	225	LINE	QP
20	100.555	29.44	24.52	4.92	37.61	-8.17	225	LINE	AVERAGE
21	110.423	34.65	24.60	10.05	47.98	-13.33	75	LINE	QP
22	110.423	30.89	24.60	6.29	37.98	-7.09	75	LINE	AVERAGE
23	115.973	33.75	24.64	9.11	48.18	-14.43	75	LINE	QP
24	115.973	27.51	24.64	2.87	38.18	-10.67	75	LINE	AVERAGE
25	122.888	34.86	24.53	10.33	38.44	-3.58	30	LINE	AVERAGE
26	122.888	35.84	24.53	11.31	48.44	-12.60	30	LINE	QP
27	135.177	35.76	23.96	11.80	48.90	-13.14	40	LINE	QP
28	135.177	34.15	23.96	10.19	38.90	-4.75	40	LINE	AVERAGE

Note:

1. Emission Level = reading value + correction factor.
2. Correction factor = cable loss + insertion loss of absorbing clamp.
3. P.K., Q.P. and AV. are abbreviation of peak, quasi-peak and average respectively.
4. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the EUT shall be deemed to meet both limits.

4. Harmonic Current Emission Measurement

Test Result : **PASS**

4.1 Limits for Emission Measurement

☒ Limits for Class A equipment

Harmonic order (n) Odd harmonics	Maximum permissible harmonic current (A)	Harmonic order (n) Even Harmonics	Maximum permissible harmonic current (A)
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.3
9	0.40	$8 \leq n \leq 40$	$0.23 \cdot 8/n$
11	0.33		
13	0.21		
$15 \leq n \leq 39$	$0.15 \cdot 15/n$		

☐ Limits for Class B equipment

It shall not exceed the values given in class A multiplied by a factor of 1.5.

☐ Limits for Class C equipment

Harmonic order (n)	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda$ (λ is the circuit power factor)
5	10
7	7
9	5
$11 \leq n \leq 39$ (odd harmonics only)	3

☐ Limits for Class D equipment

Harmonic order (n)	Maximum permissible harmonic current per watt (mA/W)	Maximum permissible harmonic current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
$13 \leq n \leq 39$ (odd harmonics only)	$3.85/n$	See class A

4.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Power Source	California Instrument	5001ix-208/ 56619	Oct. 17, 2012	Oct. 17, 2013
Power Analyzer		PACS-1/ 72398	Oct. 17, 2012	Oct. 17, 2013
Test Software	C.I.	CTS 3.0/ Ver. 3.2.0.18	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

4.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters in the shielded room.
- d. Decide the classification of the EUT as following:

Class A : - balanced three-phase equipment

- household appliances, excluding equipment identified as class D
- tools, excluding portable tools
- dimmers for incandescent lamps
- audio equipment
- equipments not specified in one of the three other classes

Class B : - portable tools

- arc welding equipment which is not professional equipment.

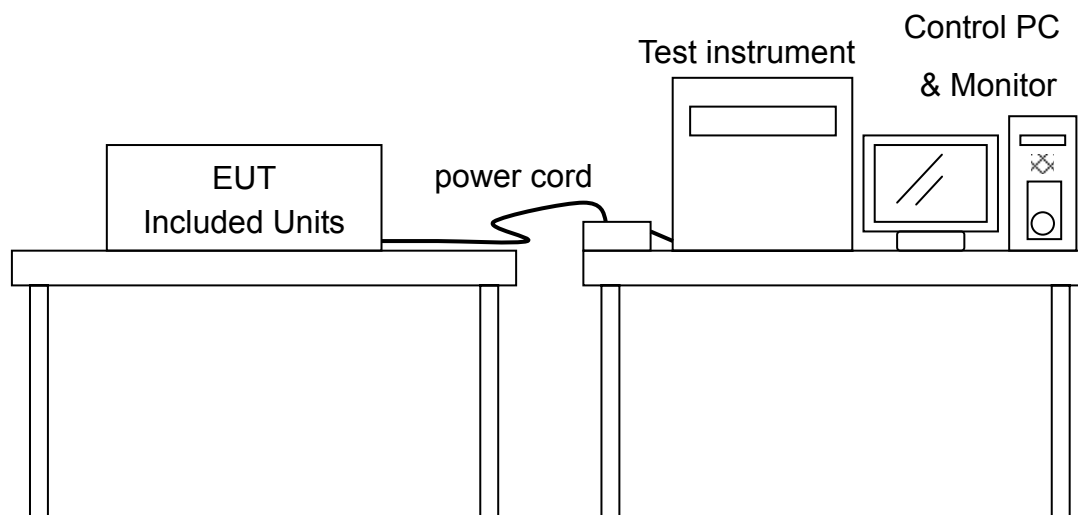
Class C : - lighting equipment

Class D : - Equipment specified power less than or equal to 600W of the following types

- personal computers and personal computer monitors
- television receivers

- e. Connects the EUT's power source to the mains power supplied by the test instrument. Turn on the EUT.
- f. Operating the EUT as required and measuring the harmonic current emissions on the current carrying lines of EUT's power source.

4.4 Test Configurations



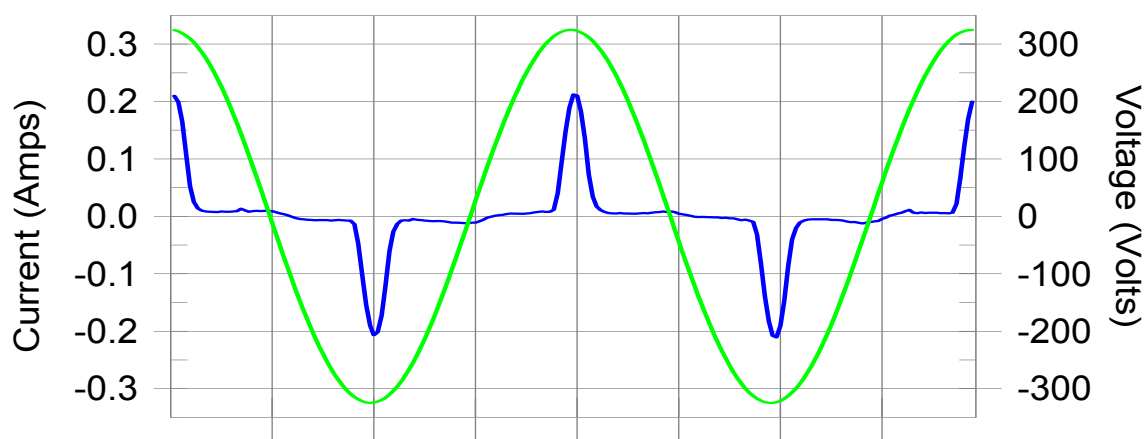
4.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

4.6 Test Results

Test Mode : Normal
Tester : Wilson
Temperature : 24°C
Humidity : 63%RH

TEST FREQ	50
TEST VOLTS	230
TEST TIME	10 Minutes
MAX WATTS	9 W



The EUT power level is below 75.0 Watts and therefore has no defined limits.

Test Raw Data:

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	0.1	0.001	1.620	0.07	N/L
3	0.031	2.300	1.3	0.031	3.450	0.89	N/L
4	0.001	0.430	0.2	0.001	0.645	0.14	N/L
5	0.028	1.140	2.5	0.028	1.710	1.65	N/L
6	0.000	0.300	0.0	0.000	0.450	0.07	N/L
7	0.021	0.770	2.8	0.021	1.155	1.85	N/L
8	0.000	0.230	0.0	0.000	0.345	0.08	N/L
9	0.016	0.400	3.9	0.016	0.600	2.61	N/L
10	0.000	0.184	0.0	0.000	0.276	0.09	N/L
11	0.010	0.330	3.0	0.010	0.495	2.02	N/L
12	0.000	0.153	0.0	0.000	0.230	0.13	N/L
13	0.006	0.210	2.6	0.006	0.315	1.76	N/L
14	0.000	0.131	0.0	0.000	0.197	0.08	N/L
15	0.002	0.150	1.5	0.002	0.225	1.01	N/L
16	0.000	0.115	0.0	0.000	0.173	0.10	N/L
17	0.000	0.132	0.0	0.000	0.199	0.11	N/L
18	0.000	0.102	0.0	0.000	0.153	0.17	N/L
19	0.001	0.118	1.0	0.001	0.178	0.65	N/L
20	0.000	0.092	0.0	0.000	0.138	0.12	N/L
21	0.001	0.107	1.4	0.001	0.161	0.92	N/L
22	0.000	0.084	0.0	0.000	0.125	0.10	N/L
23	0.001	0.098	1.3	0.001	0.147	0.90	N/L
24	0.000	0.077	0.0	0.000	0.115	0.12	N/L
25	0.001	0.090	1.0	0.001	0.135	0.70	N/L
26	0.000	0.071	0.0	0.000	0.106	0.09	N/L
27	0.000	0.083	0.0	0.000	0.125	0.39	N/L
28	0.000	0.066	0.0	0.000	0.099	0.15	N/L
29	0.000	0.078	0.0	0.000	0.116	0.14	N/L
30	0.000	0.061	0.0	0.000	0.092	0.22	N/L
31	0.000	0.073	0.0	0.000	0.109	0.31	N/L
32	0.000	0.058	0.0	0.000	0.086	0.15	N/L
33	0.000	0.068	0.0	0.000	0.102	0.42	N/L
34	0.000	0.054	0.0	0.000	0.081	0.12	N/L
35	0.000	0.064	0.0	0.000	0.096	0.43	N/L
36	0.000	0.051	0.0	0.000	0.077	0.15	N/L
37	0.000	0.061	0.0	0.000	0.091	0.34	N/L
38	0.000	0.048	0.0	0.000	0.073	0.12	N/L
39	0.000	0.058	0.0	0.000	0.087	0.21	N/L
40	0.000	0.046	0.0	0.000	0.069	0.15	N/L

5. Voltage Fluctuations and Flickers Emission Measurement

Test Result : PASS

5.1 Limits for Emission Measurement

- the short-term flicker indicator, P_{st} , shall not be greater than 1.0;
- the long-term flicker indicator, P_{lt} , shall not be greater than 0.65;
- the relative steady-state voltage change, d_c , shall not exceed 3.3%;
- the voltage change with time, $d(t)$, during a voltage change shall not exceed 3.3% for more than 500ms.
- the maximum relative voltage change, d_{max} , shall not exceed
 - ☒ a) 4% without additional conditions;
 - ☐ b) 6% for equipment which is switched manually
 - ☐ c) 7% for equipment which is attended whilst in use

5.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Power Source	California Instrument	5001ix-208/ 56619	Oct. 17, 2012	Oct. 17, 2013
Power Analyzer		PACS-1/ 72398	Oct. 17, 2012	Oct. 17, 2013
Test Software	C.I.	CTS 3.0/ Ver. 3.2.0.18	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

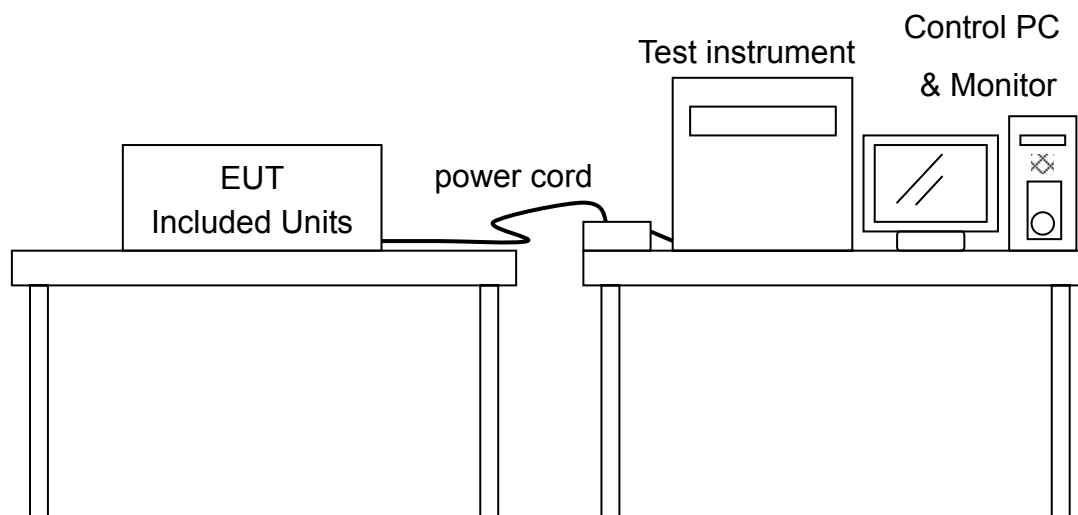
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

5.3 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters in the shielded room.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters in the shielded room.
- d. Decide the type of EUT to define the $d_{\max}$ limit and its corresponding test methods described in the relative standard.
- e. Maintain the supply voltage to be $\pm 2\%$ of the EUT's rated voltage and also the frequency to be $50\text{Hz} \pm 0.5\%$.
- f. Verify the total harmonic distortion of the supply voltage to be less than 3%.
- g. Connects the EUT's power source to the mains power supplied by the test instrument.
- h. Operating the EUT as required and measuring the voltage fluctuation and flickers of EUT's power source.
- i. Verify the fluctuations of the test supply voltage to be less than 0.4 before and after the test.

5.4 Test Configurations



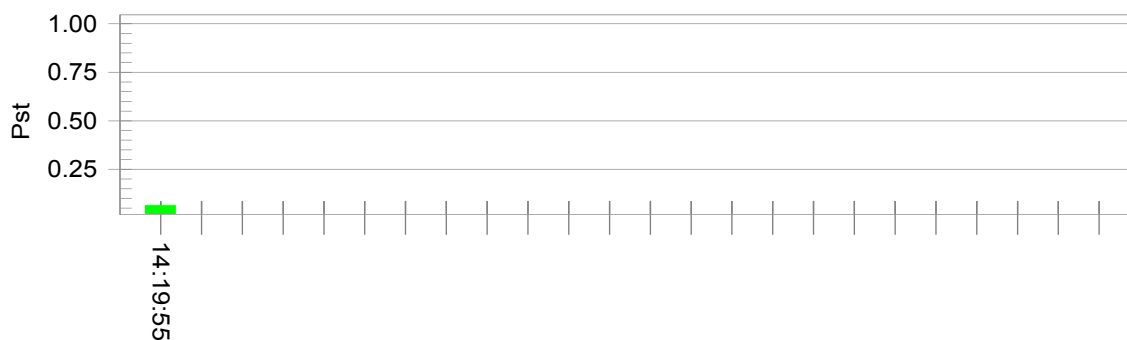
5.5 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

5.6 Test Results

Test Mode : Normal
Tester : Wilson
Temperature : 24°C
Humidity : 63%RH

TEST FREQ	50	
TEST VOLTS	230	
TEST TIME	10 Minutes	
	EUT Data	Limit
d(t)>3.3% (ms)	0	500
d _c (%)	0	3.3
d _{max} (%)	0	4
P _{st} max	0.064	1
P _{lt} max	0.028	0.65



6. Immunity Against RFI Voltage(S2a)

Test Result : PASS

6.1 Limits for Immunity Measurement

Limits of immunity to RF voltages of mains, loudspeaker and headphone terminals

Frequency (MHz)	Level dB(μ V) (e.m.f.)
0.15 to 30	130
30 to 100	120
100 to 150	120 – 110 ^a
^a Decreasing linearly with the logarithm of the frequency.	

Limits of immunity to RF voltages of audio input and output terminals (except loudspeaker and headphone terminals)

Frequency (MHz)	Level dB(μ V) (e.m.f.)
0.15 to 1.6	80 – 90 ^a
1.6 to 20	90 – 120 ^a
20 to 100	120
100 to 150	120 – 110 ^b
^a Increasing linearly with the logarithm of the frequency.	
^b Decreasing linearly with the logarithm of the frequency.	

Test Voltage : 230V/50Hz

Tester : Jacky Kao

Ambient Temperature : 25°C

Relative Humidity : 45%

Atmospheric Pressure : 1012mbar

6.2 Description of Performance Criteria

Performance criterion A

The equipment shall continue to operate as intended during the test. No change of actual operating state (for example change of channel) is allowed as a result of the application of the test. Multifunction equipment shall for each function meet the relevant requirements. Evaluation is carried out for audio and video functions. The equipment is supposed to operate as intended if the criteria of "Evaluation of audio quality" and/or "Evaluation of picture quality" are fulfilled.

Performance criterion B

The equipment shall continue to operate as intended after the test. No loss of function is allowed after the test when the apparatus is used as intended, but failures which are recovered automatically but which cause temporary delay in processing, are permissible. No change of actual operating state for example change of channel or stored data and settings is allowed as a result of the application of the test. During the test, degradation of performance is allowed.

6.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ESCI/ 100316	March 1, 2013	March 1, 2014
Signal Generator	R&S	SML01/ 104230	Dec. 15, 2011	Dec. 15, 2013
Signal Generator	R&S	SML02/ 101519	Dec. 15, 2011	Dec. 15, 2013
Audio Analyzer	R&S	UPL/ 101285	Dec. 16, 2011	Dec. 16, 2013
Power Amplifier	R&S	BSA 1515-25/ 055966-5	Dec. 16, 2011	Dec. 16, 2013
TV Test Transmitter	R&S	SFQ/ 100565	Dec. 14, 2011	Dec. 14, 2013
TV Test Transmitter	R&S	SFM/ 100182	Dec. 14, 2011	Dec. 14, 2013
TV Generator SECAM	R&S	SGSF/ 100062	Dec. 19, 2011	Dec. 19, 2013
TV Generator NTSC	R&S	SGMF/ 100043	Dec. 19, 2011	Dec. 19, 2013
TV Generator PAL	R&S	SGPF/ 100160	Dec. 19, 2011	Dec. 19, 2013
MPEG2 Measurement Generator	R&S	DVG/ 100403	Dec. 19, 2011	Dec. 19, 2013
Power Meter	R&S	NRVD/ 837333/066	Dec. 3, 2012	Dec. 3, 2013
RF Probe	R&S	URV5-Z4/ 100121	Oct. 18, 2012	Oct. 18, 2013
Test Software	R&S	T80-K1 V2.1	NCR	NCR
TR20 shielded room	ETS LINDGREN	TR20/ 17873-2	NCR	NCR

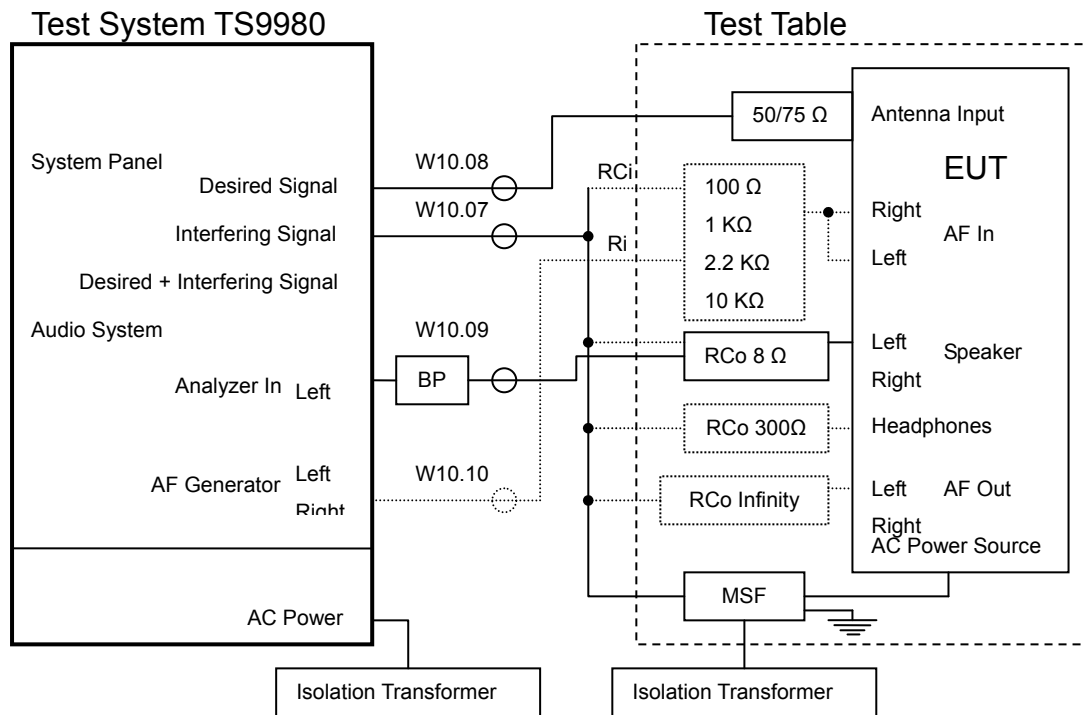
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

6.4 Test Procedures

- a. Network R_{Ci} matches the RF disturbance source to the input impedance of the relevant audio terminal and a similar network R_{Co} is used to match the output terminals.
- b. A mains stopfilter MSF is used to inject the unwanted signal at the mains terminal and acts as a stopfilter for unwanted signals from the mains network.
- c. The EUT is placed 0.1m above the center of a metal ground plane of dimensions 2m by 1m.
- d. The mains lead is bundled to a length less than 0.3m and connected to the mains stop filter MSF.
- e. The ground connection of the mains filter(MSF) is directly connected to the metal table.
- f. All unused input/output connections on the EUT are terminated with the proper resistance.
- g. The power supplied to the test system and to the mains filter (MSF) is attached to an isolation transformer.
- h. The 50ohm RF carrier signal is connected from the test system via a 50/75 ohm matching pad (RAM) to the EUT.
- i. The measurements are performed with test software T80-K1 Ver. 2.1.

6.5 Test Configurations



6.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

6.7 Test Results

Test: Immunity Conducted Voltages S2a

Test Mode: Amplifier -

Monitor: Speaker L

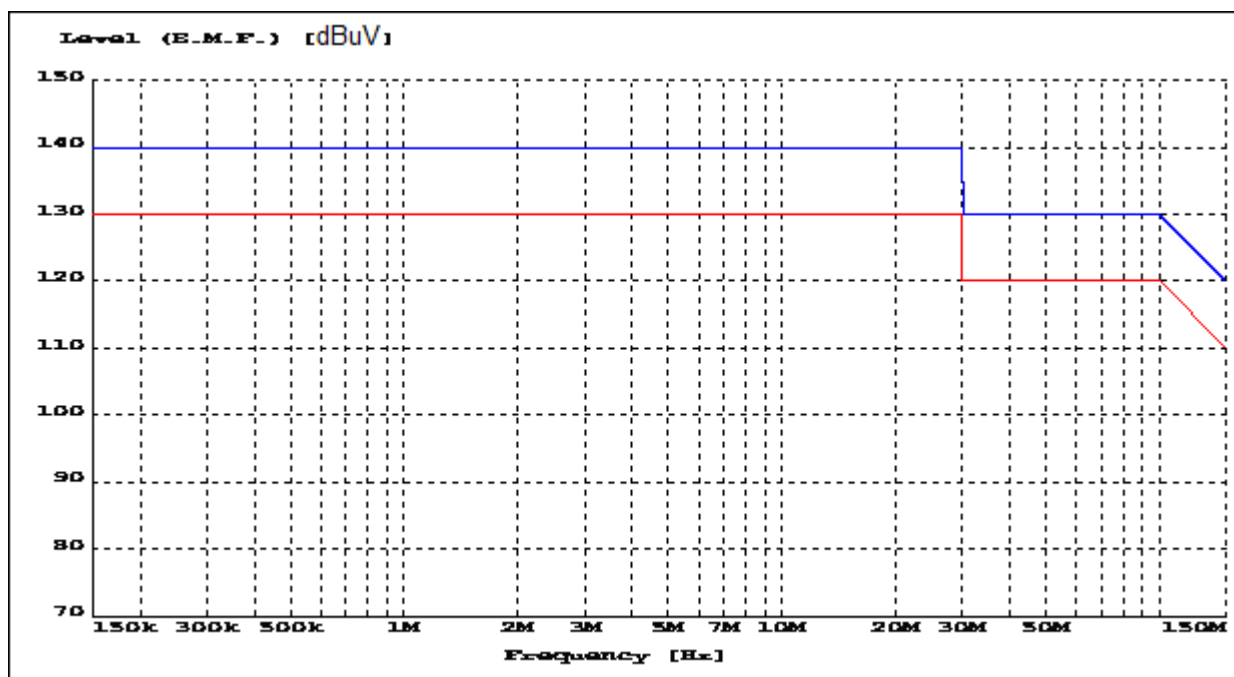
Operating Mode: AUX

S/N: 75.6 dB

Frequency: -

AF Level: 54.6 mW

Interf. Signal: Speaker L



Test Mode: Amplifier -

Monitor: Speaker L

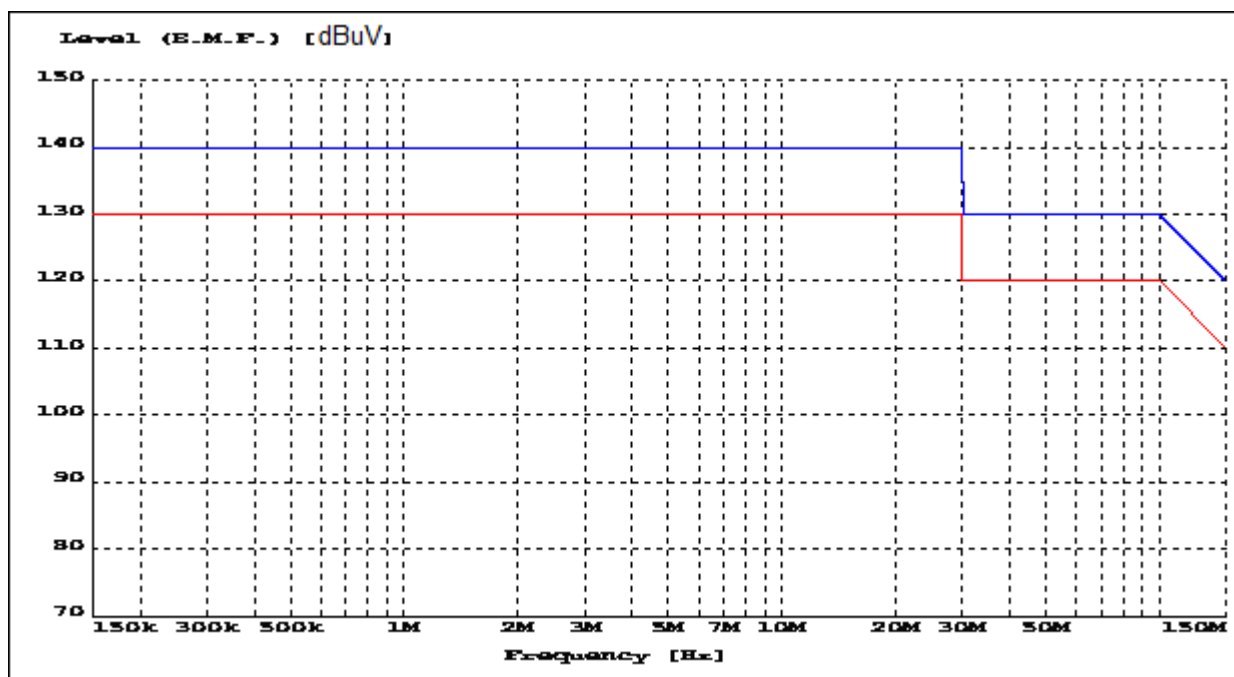
Operating Mode: AUX

S/N: 75.6 dB

Frequency: -

AF Level: 54.6 mW

Interf. Signal: Speaker R



Test: Immunity Conducted Voltages S2a

Test Mode: Amplifier -

Monitor: Speaker L

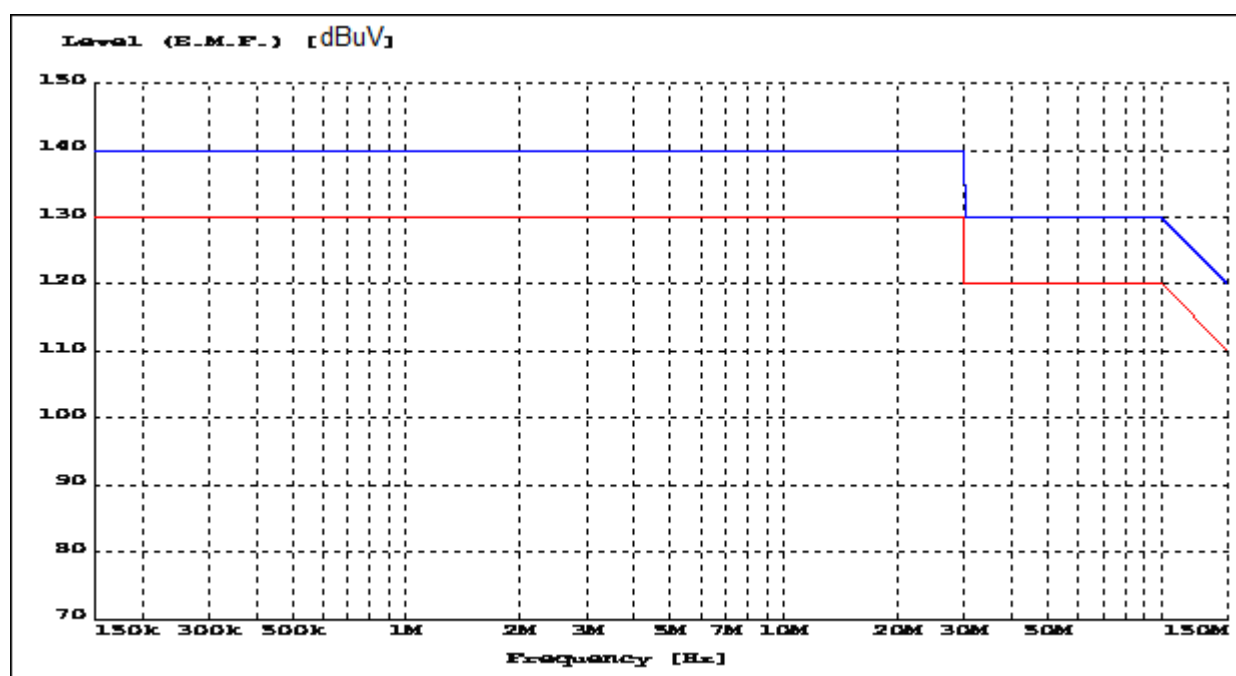
Operating Mode: AUX

S/N: 75.6 dB

Frequency: -

AF Level: 54.6 mW

Interf. Signal: Mains



Test Mode: Amplifier -

Monitor: Speaker L

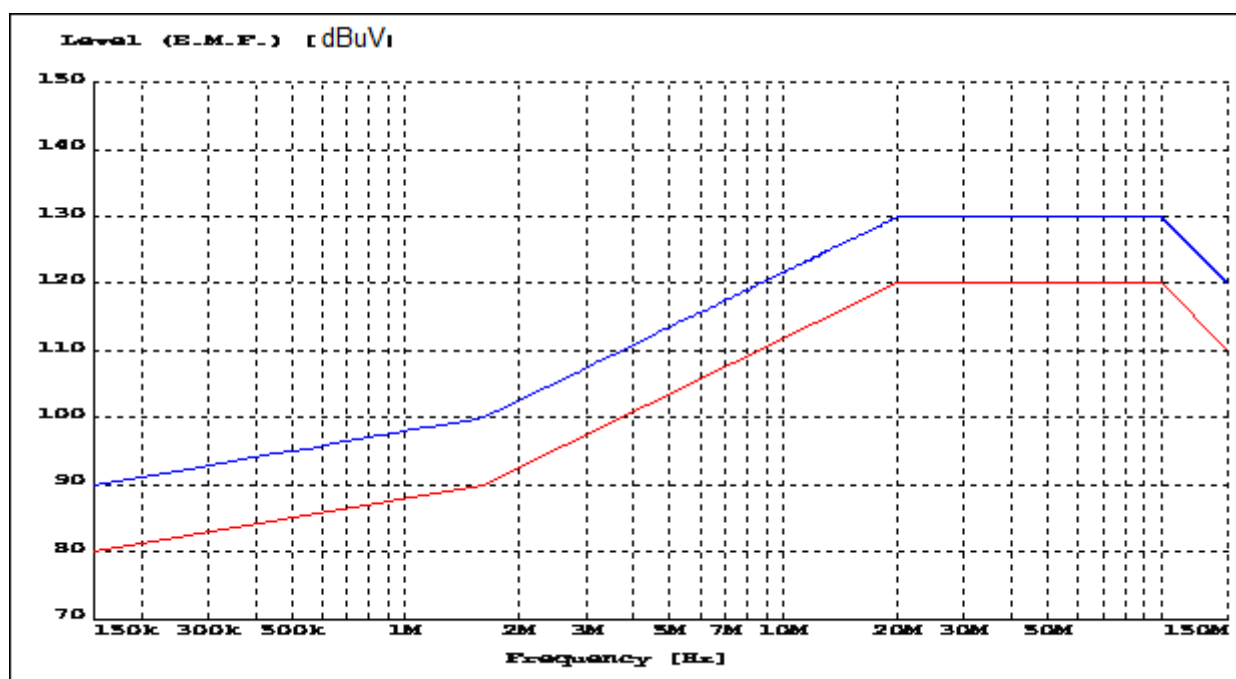
Operating Mode: AUX

S/N: 75.6 dB

Frequency: -

AF Level: 54.6 mW

Interf. Signal: Source1 L



Test: Immunity Conducted Voltages S2a

Test Mode: Amplifier -

Monitor: Speaker L

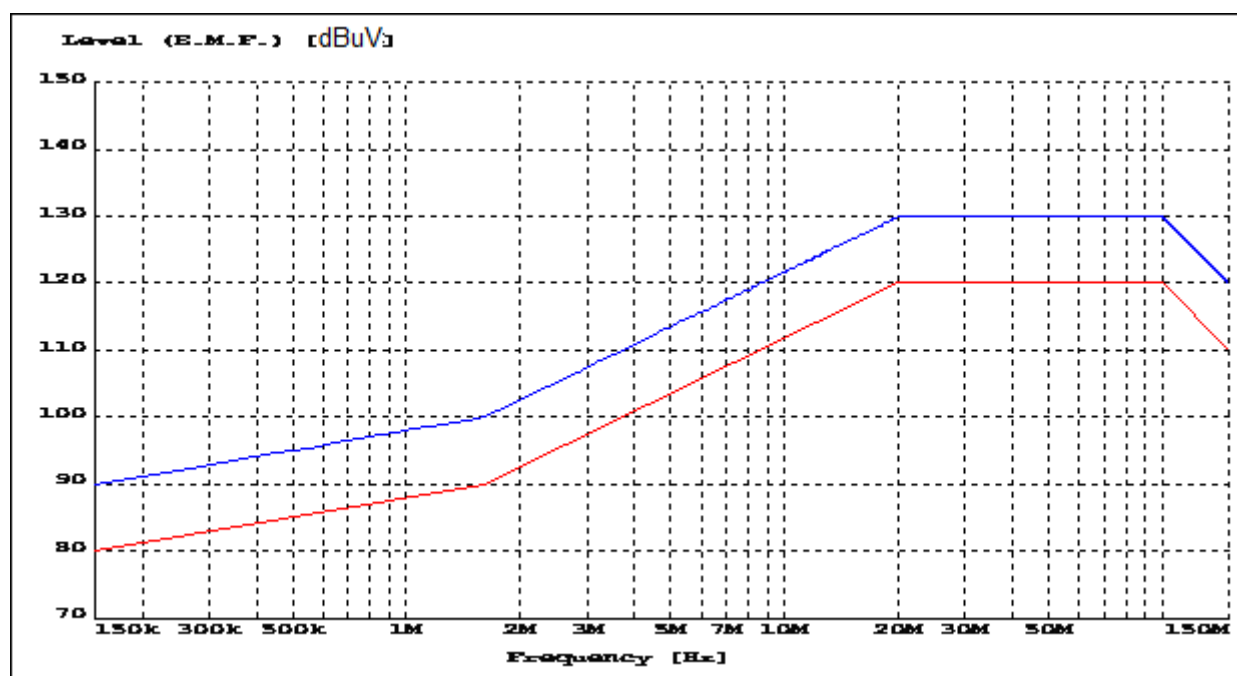
Operating Mode: AUX

S/N: 75.6 dB

Frequency: -

AF Level: 54.6 mW

Interf. Signal: Source1 R



Test Mode: Amplifier -

Monitor: Speaker L

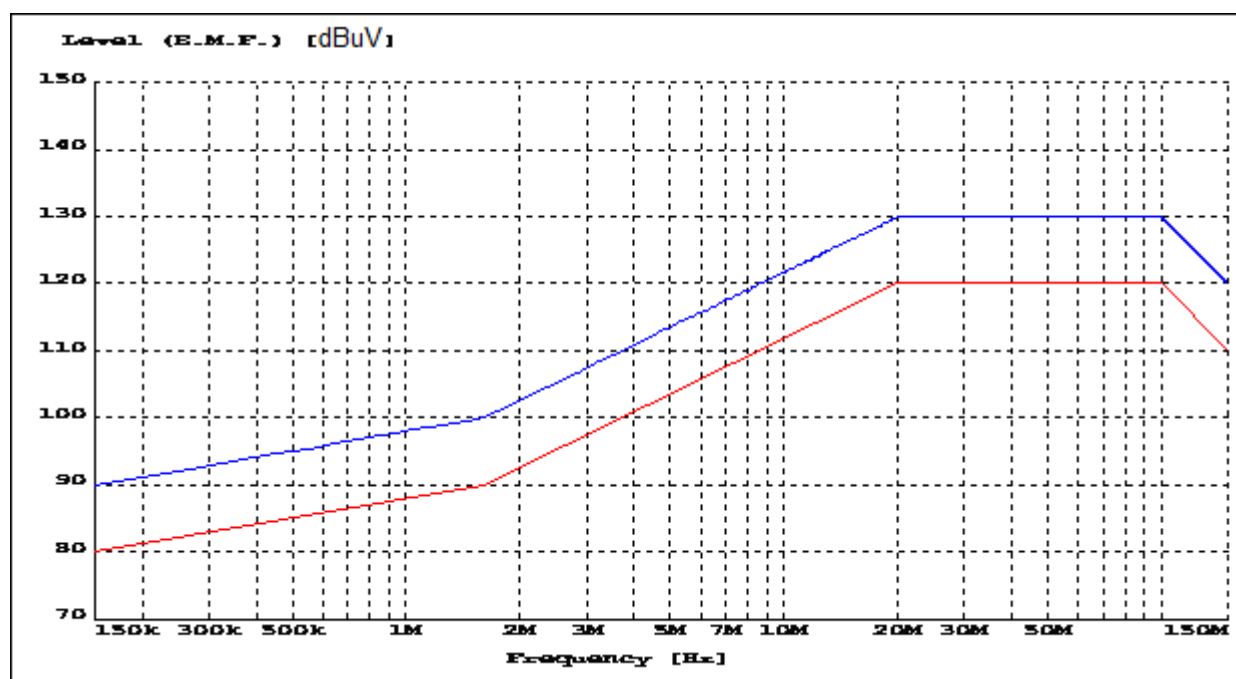
Operating Mode: AUX

S/N: 75.6 dB

Frequency: -

AF Level: 54.6 mW

Interf. Signal: Preouts1 L



Test: Immunity Conducted Voltages S2a

Test Mode: Amplifier -

Monitor: Speaker L

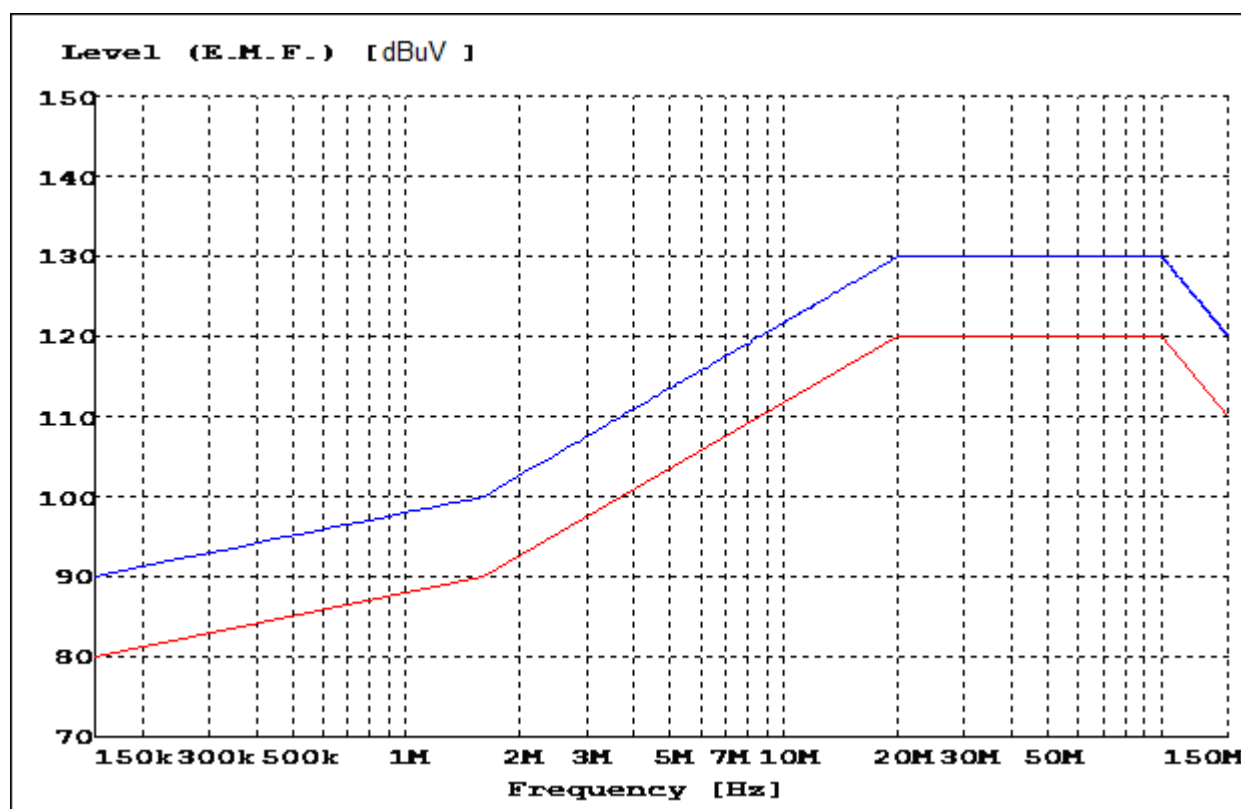
Operating Mode: AUX

S/N: 75.6 dB

Frequency: -

AF Level: 54.6 mW

Interf. Signal: Preouts1 R



Test: Immunity Conducted Voltages S2a

Test Mode: Amplifier -

Monitor: Speaker R

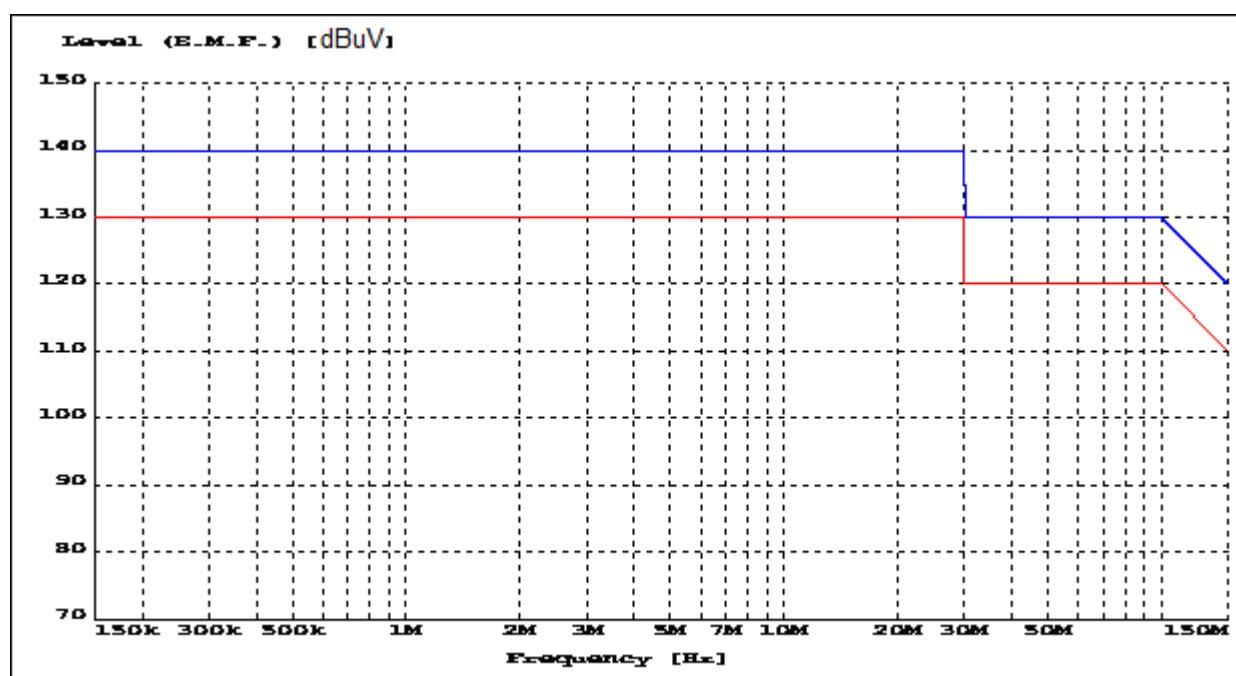
Operating Mode: AUX

S/N: 75.8 dB

Frequency: -

AF Level: 58.3 mW

Interf. Signal: Speaker L



Test Mode: Amplifier -

Monitor: Speaker R

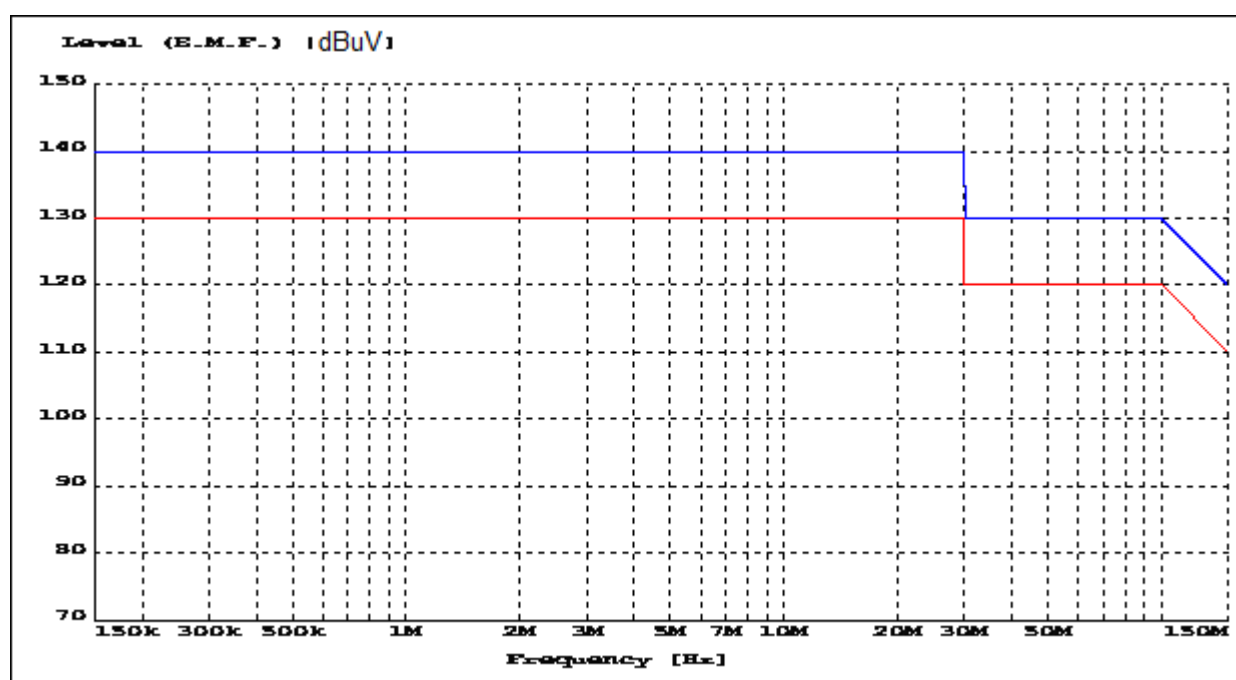
Operating Mode: AUX

S/N: 75.8 dB

Frequency: -

AF Level: 58.3 mW

Interf. Signal: Speaker R



Test: Immunity Conducted Voltages S2a

Test Mode: Amplifier -

Monitor: Speaker R

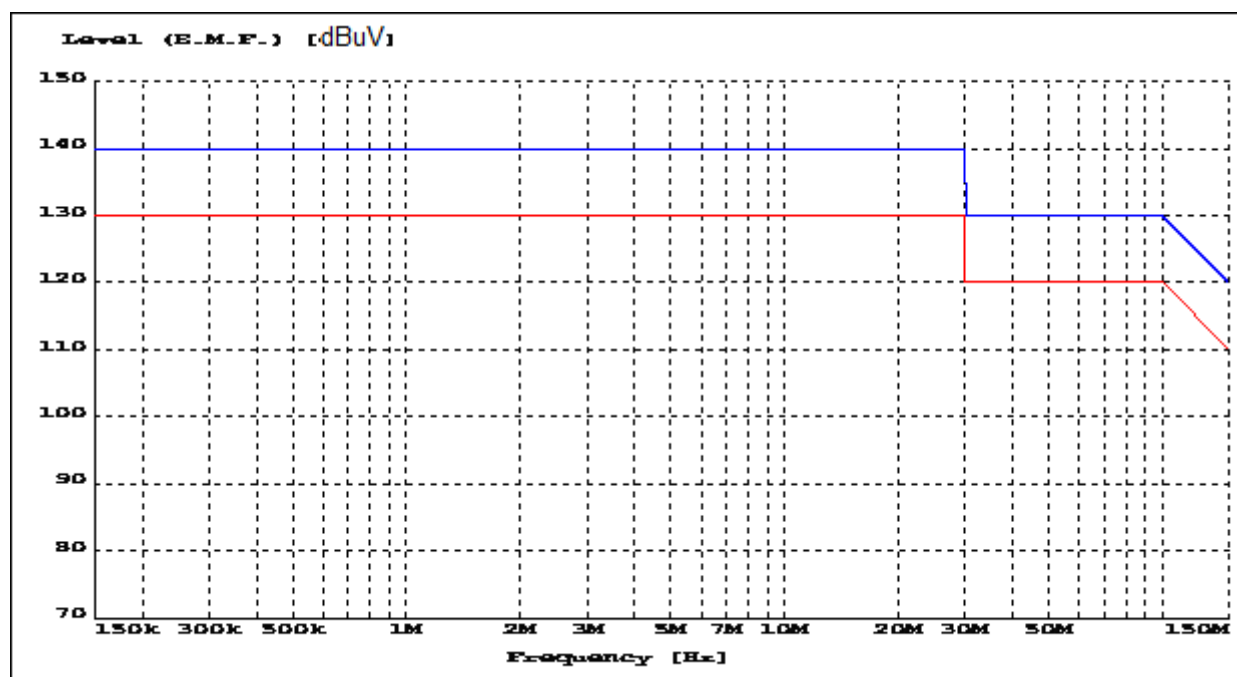
Operating Mode: AUX

S/N: 75.8 dB

Frequency: -

AF Level: 58.3 mW

Interf. Signal: Mains



Test Mode: Amplifier -

Monitor: Speaker R

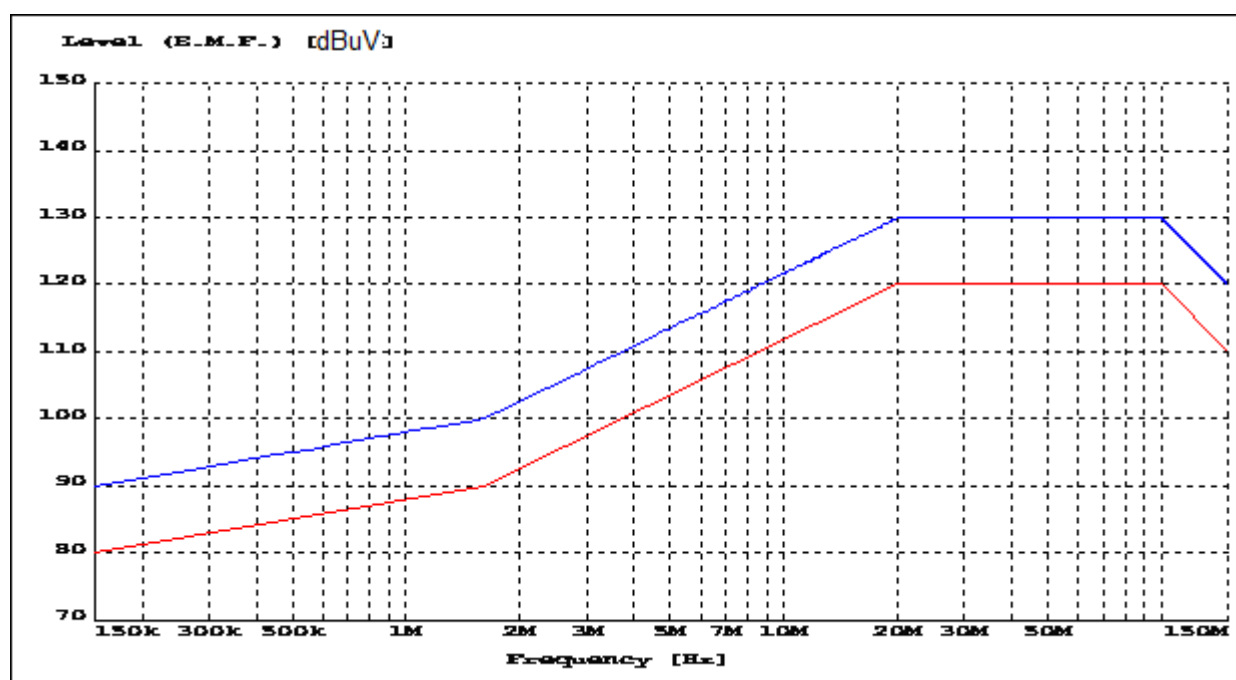
Operating Mode: AUX

S/N: 75.8 dB

Frequency: -

AF Level: 58.3 mW

Interf. Signal: Source1 L



Test: Immunity Conducted Voltages S2a

Test Mode: Amplifier -

Monitor: Speaker R

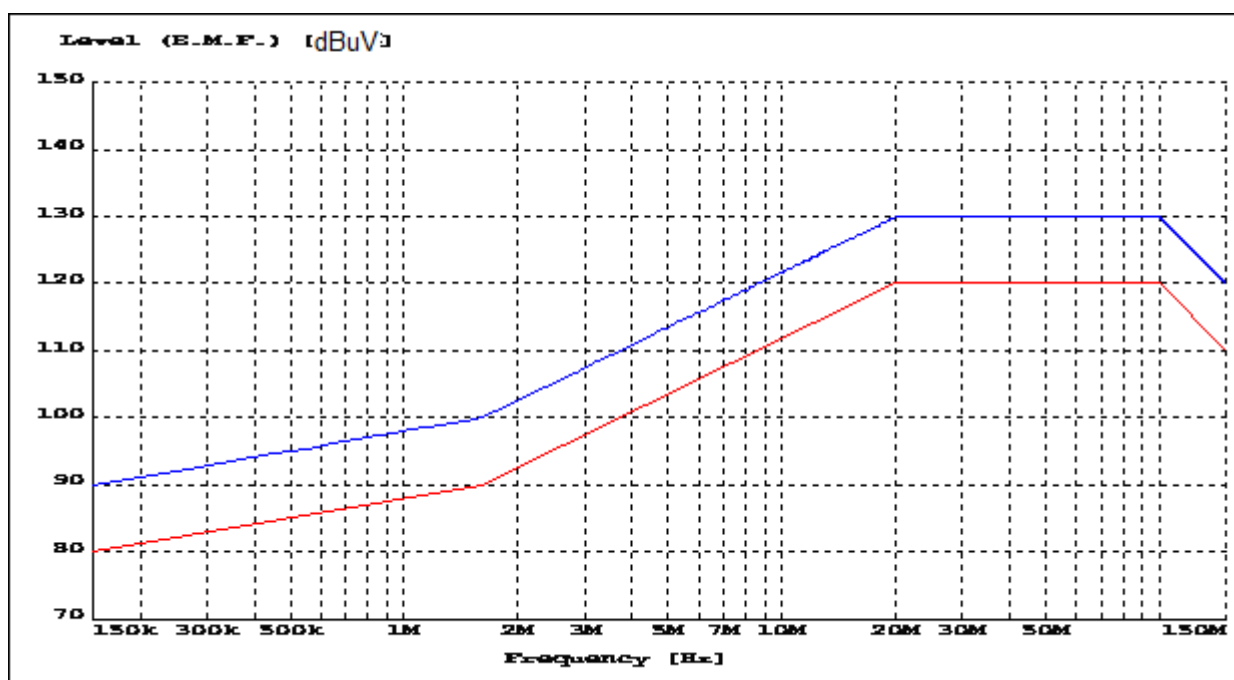
Operating Mode: AUX

S/N: 75.8 dB

Frequency: -

AF Level: 58.3 mW

Interf. Signal: Source1 R



Test Mode: Amplifier -

Monitor: Speaker R

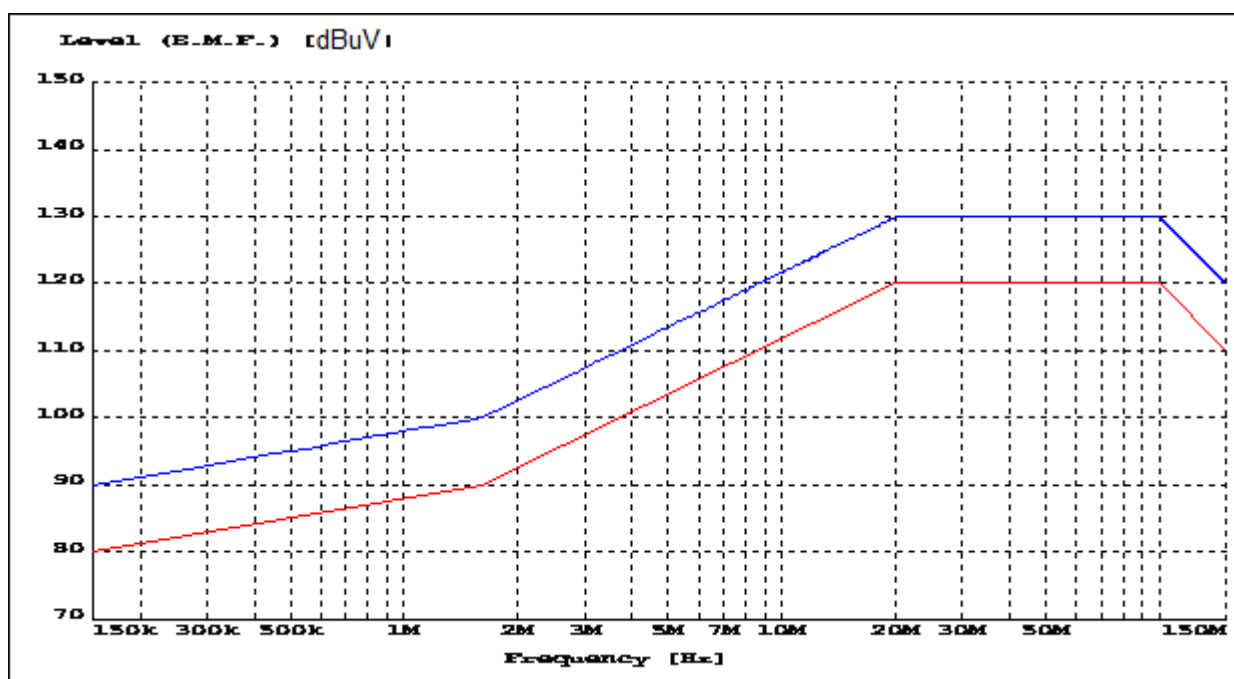
Operating Mode: AUX

S/N: 75.8 dB

Frequency: -

AF Level: 58.3 mW

Interf. Signal: Preouts1 L



Test: Immunity Conducted Voltages S2a

Test Mode: Amplifier -

Monitor: Speaker R

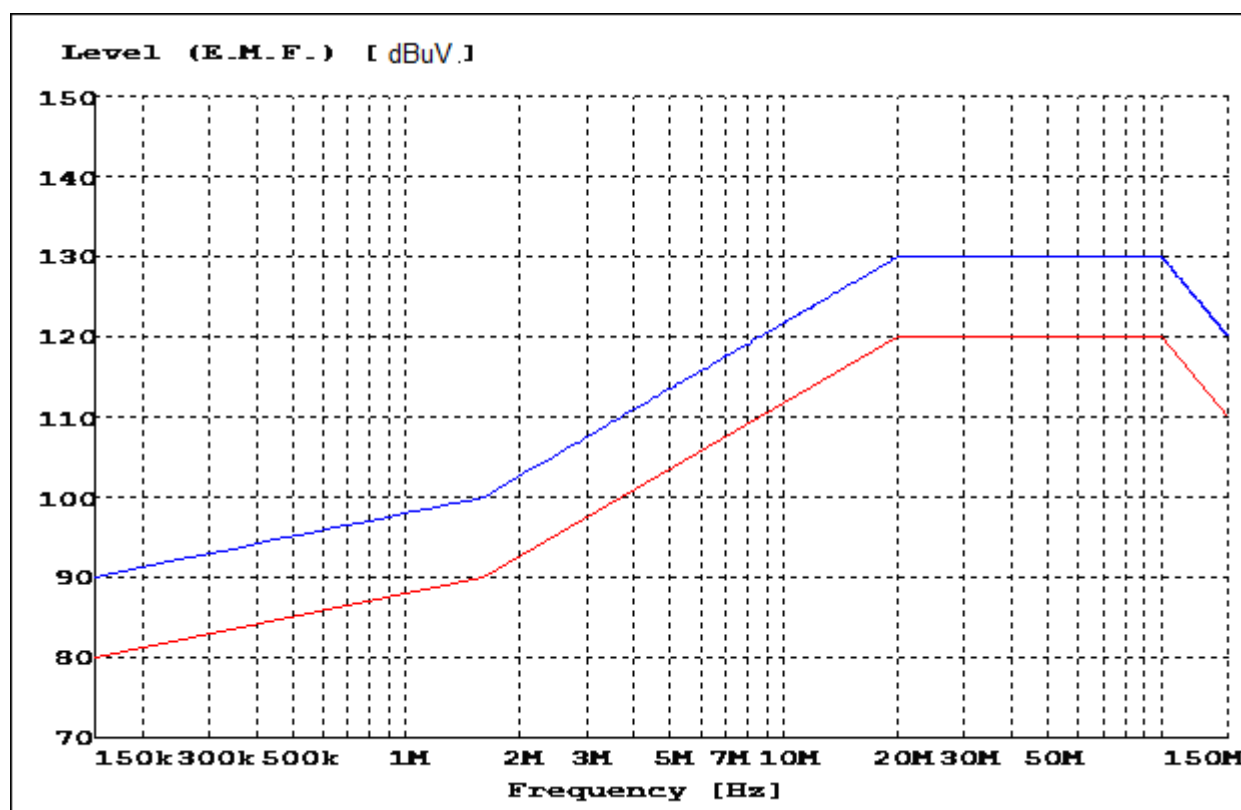
Operating Mode: AUX

S/N: 75.8 dB

Frequency: -

AF Level: 58.3 mW

Interf. Signal: Preouts1 R



7. Immunity Against Radiated RFI (S3)

7.1 Limits for Immunity Measurement

Limits of immunity to ambient electromagnetic fields of equipment with audio or video functions

Frequency (MHz)	Level dB(μ V/m)
0.15 to 150	125

Test Voltage : 230V/50Hz

Tester : Jacky Kao

Ambient Temperature : 25°C

Relative Humidity : 50%

Atmospheric Pressure : 1015mbar

7.2 Description of Performance Criteria

Performance criterion A

The equipment shall continue to operate as intended during the test. No change of actual operating state (for example change of channel) is allowed as a result of the application of the test. Multifunction equipment shall for each function meet the relevant requirements. Evaluation is carried out for audio and video functions. The equipment is supposed to operate as intended if the criteria of “Evaluation of audio quality” and/or “Evaluation of picture quality” are fulfilled.

Performance criterion B

The equipment shall continue to operate as intended after the test. No loss of function is allowed after the test when the apparatus is used as intended, but failures which are recovered automatically but which cause temporary delay in processing, are permissible. No change of actual operating state for example change of channel or stored data and settings is allowed as a result of the application of the test. During the test, degradation of performance is allowed.

7.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Receiver	R&S	ESCI/ 100316	March 1, 2013	March 1, 2014
Signal Generator	R&S	SML01/ 104230	Dec. 15, 2011	Dec. 15, 2013
Signal Generator	R&S	SML02/ 101519	Dec. 15, 2011	Dec. 15, 2013
Audio Analyzer	R&S	UPL/ 101285	Dec. 16, 2011	Dec. 16, 2013
Power Amplifier	R&S	BSA 1515-25/ 055966-5	Dec. 16, 2011	Dec. 16, 2013
TV Test Transmitter	R&S	SFQ/ 100565	Dec. 14, 2011	Dec. 14, 2013
TV Test Transmitter	R&S	SFM/ 100182	Dec. 14, 2011	Dec. 14, 2013
TV Generator SECAM	R&S	SGSF/ 100062	Dec. 19, 2011	Dec. 19, 2013
TV Generator NTSC	R&S	SGMF/ 100043	Dec. 19, 2011	Dec. 19, 2013
TV Generator PAL	R&S	SGPF/ 100160	Dec. 19, 2011	Dec. 19, 2013
MPEG2 Measurement Generator	R&S	DVG/ 100403	Dec. 19, 2011	Dec. 19, 2013
Power Meter	R&S	NRVD/ 837333/066	Dec. 3, 2012	Dec. 3, 2013
RF Probe	R&S	URV5-Z4/ 100121	Oct. 18, 2012	Oct. 18, 2013
Test Software	R&S	T80-K1 V2.1	NCR	NCR
TR20 shielded room	ETS LINDGREN	TR20/ 17873-2	NCR	NCR

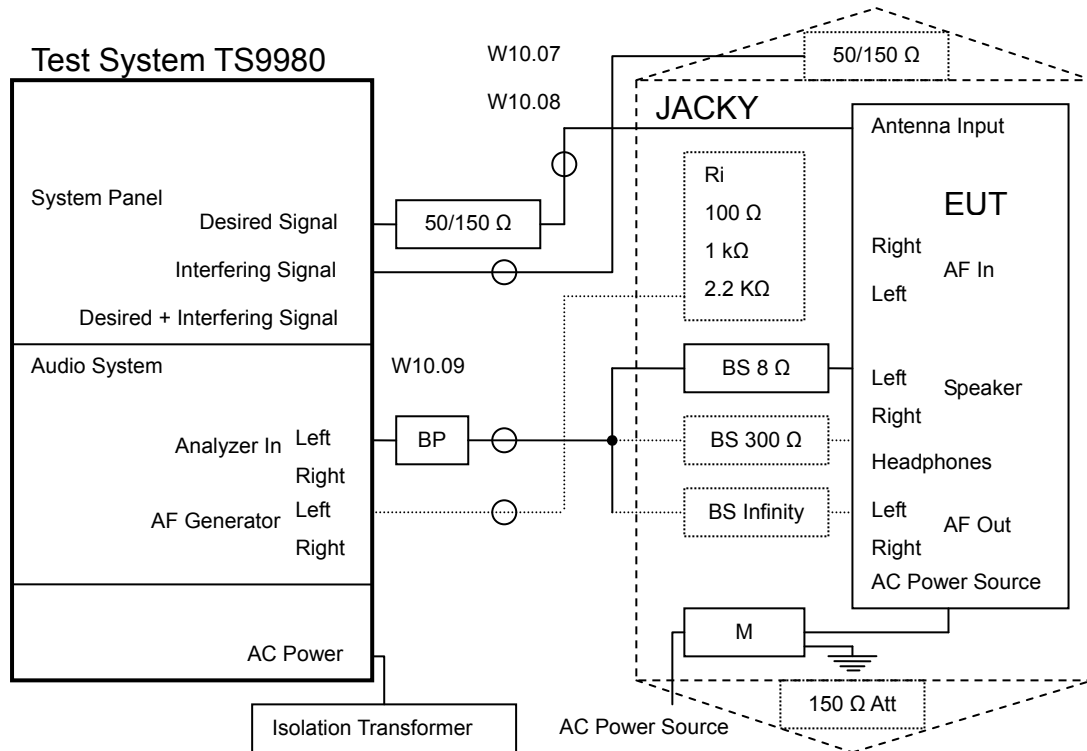
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

7.4 Test Procedures

- a. The EUT is placed on a non-metallic support, 0.1m high, in the center of the stripline.
- b. The wanted signal is fed to all input terminals respectively. The unwanted signal is fed to a matching network of the stripline.
- c. The ground connection of the mains filter(M) is directly connected to the JACKY.
- d. All unused input/output connections on the EUT are terminated and shielded with the proper resistance.
- e. The power supply to the mains of the EUT is attached to the mains filter(M).
- f. The measurements were performed with test software T80-K1 Ver. 2.1.

7.5 Test Configurations



7.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

7.7 Test Results

Test: Immunity Radiated Fields S3

Test Mode: Amplifier -

Monitor: Speaker L

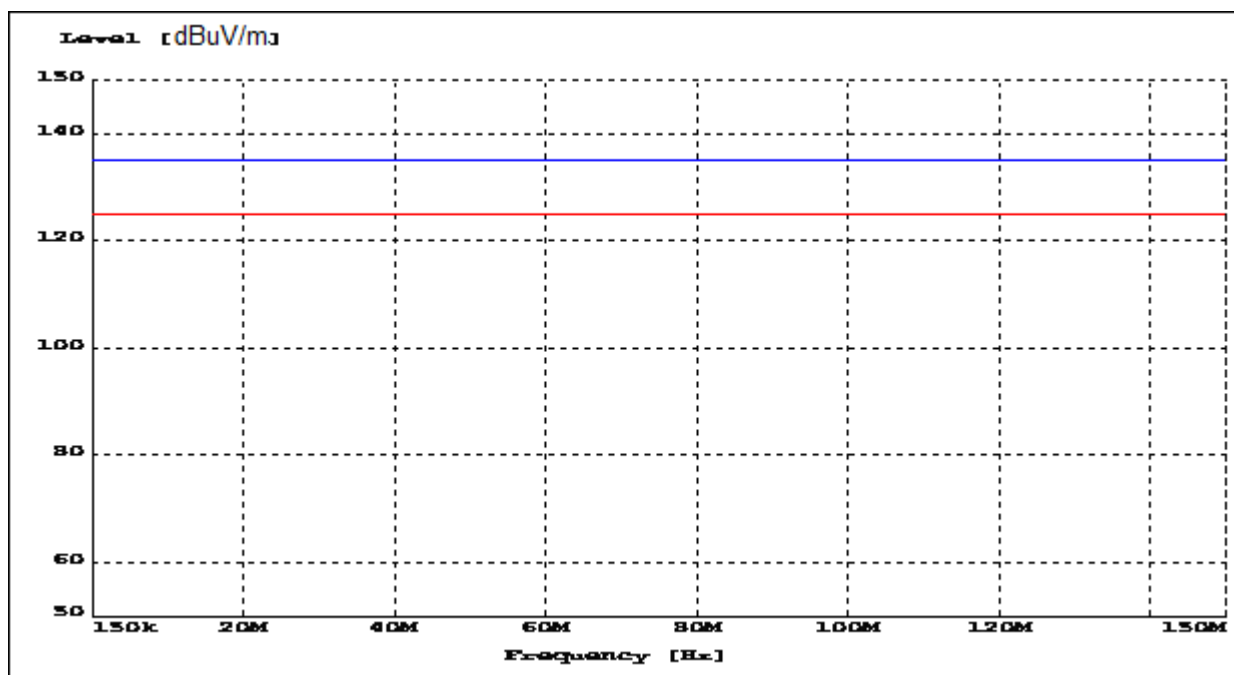
Operating Mode: AUX

S/N: 75.3 dB

Frequency: -

AF Level: 59.9 mW

Interf. Signal: Scan, K2 = 1.6 dB



Test Mode: Amplifier -

Monitor: Speaker R

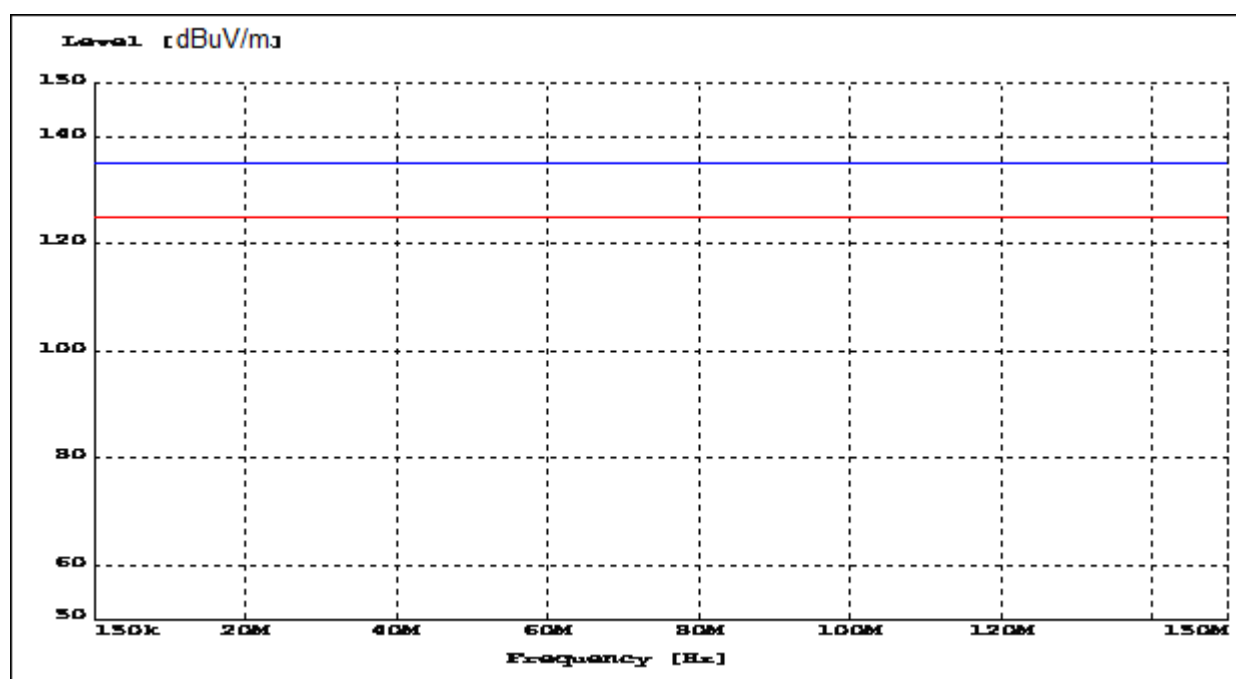
Operating Mode: AUX

S/N: 75.0 dB

Frequency: -

AF Level: 62.5 mW

Interf. Signal: Scan, K2 = 1.6 dB



8. Keyed Carrier(S5)**Test Result : PASS****8.1 Limits for Immunity Measurement**

Frequency (MHz)	Level dB(μV)/m
900	130

Test Voltage : 230V/50Hz**Tester** : Jacky Kao**Ambient Temperature** : 26°C**Relative Humidity** : 52%**Atmospheric Pressure** : 1016mbar

8.2 Description of Performance Criteria

Performance criterion A

The equipment shall continue to operate as intended during the test. No change of actual operating state (for example change of channel) is allowed as a result of the application of the test. Multifunction equipment shall for each function meet the relevant requirements. Evaluation is carried out for audio and video functions. The equipment is supposed to operate as intended if the criteria of “Evaluation of audio quality” and/or “Evaluation of picture quality” are fulfilled.

Performance criterion B

The equipment shall continue to operate as intended after the test. No loss of function is allowed after the test when the apparatus is used as intended, but failures which are recovered automatically but which cause temporary delay in processing, are permissible. No change of actual operating state for example change of channel or stored data and settings is allowed as a result of the application of the test. During the test, degradation of performance is allowed.

8.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Signal Generator	R&S	SML01/ 104230	Dec. 15, 2011	Dec. 15, 2013
Signal Generator	R&S	SML02/ 101519	Dec. 15, 2011	Dec. 15, 2013
Audio Analyzer	R&S	UPL/ 101285	Dec. 16, 2011	Dec. 16, 2013
TV Test Transmitter	R&S	SFQ/ 100565	Dec. 14, 2011	Dec. 14, 2013
TV Test Transmitter	R&S	SFM/ 100182	Dec. 14, 2011	Dec. 14, 2013
TV Generator SECAM	R&S	SGSF/ 100062	Dec. 19, 2011	Dec. 19, 2013
TV Generator NTSC	R&S	SGMF/ 100043	Dec. 19, 2011	Dec. 19, 2013
TV Generator PAL	R&S	SGPF/ 100160	Dec. 19, 2011	Dec. 19, 2013
MPEG2 Measurement Generator	R&S	DVG/ 100403	Dec. 19, 2011	Dec. 19, 2013
50/75 Ohm Matching Pad	MINI-CIRCUITS	UNMD-5075/ 3 0605	March 4, 2013	March 4, 2014
Power Meter	R&S	NRVD/ 837333/066	Dec. 3, 2012	Dec. 3, 2013
RF Probe	R&S	URV5-Z4/ 100121	Oct. 18, 2012	Oct. 18, 2013
Dual Directional Coupler	AR	DC6180/ 28730	Jan. 3, 2013	Jan. 3, 2014
Power Amplifier	AR	150W1000/ 29167	NCR	NCR
Bi-Log Antenna	EMCO	3142B/ 1716	NCR	NCR
Isotropic E Field Probe	AR	FL7006/ 0336500	April 12, 2013	April 12, 2014
Dual Channel Power Meter	R&S	NRVD/ 100499	Jan. 4, 2013	Jan. 4, 2014

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Test Software	R&S	T80-K1/ Ver. 2.1	NCR	NCR
TR2 fully-anechoic chamber	ETS. LINDGREN	TR2/ 15353-R	Sept. 16, 2012	Sept. 16, 2013

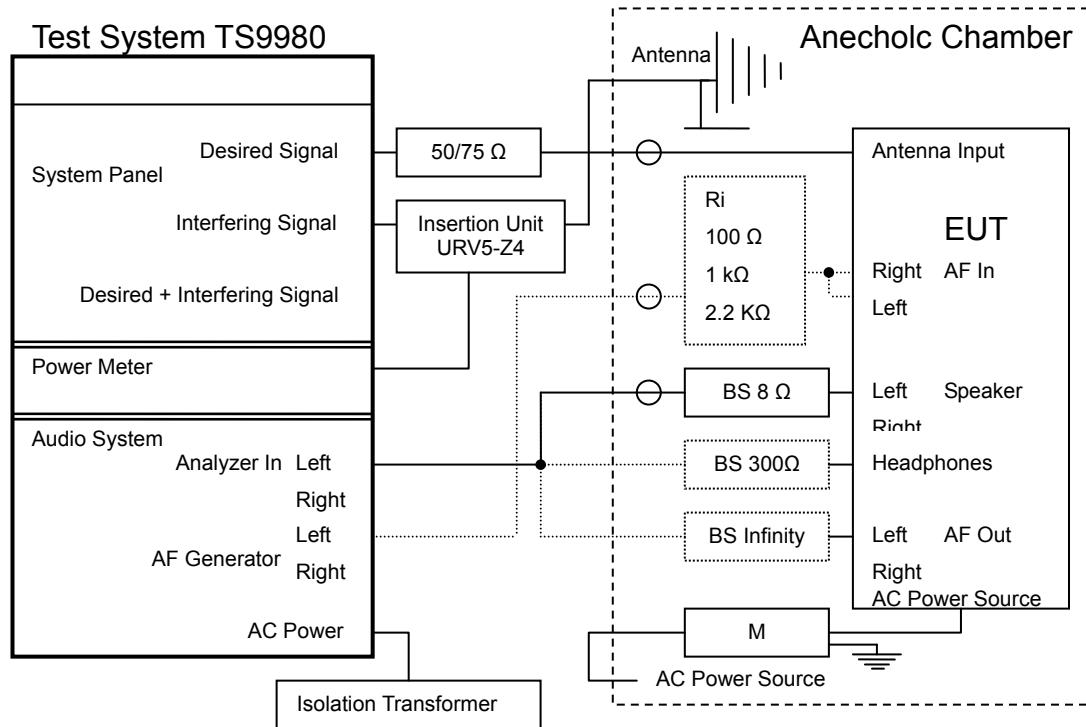
Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the fully-anechoic chamber listed above is the date of Field Uniformity Calibration measurement.

8.4 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters and 3 meters away from the transmitting antenna in the fully anechoic chamber.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters and 3 meters away from the transmitting antenna in the fully anechoic chamber. Also if the floor-standing equipment which is capable of being stood on a non-conducting 0.8m high platform may be so arranged.
- d. All EUT's individual faces shall be fully enclosed by the "uniform area" and its wires shall be arranged parallel to the uniform area of the field.
- e. Before testing the EUT, the intensity of the established field strength is checked by placing the field sensor at a calibration grid point to give the calibrated field strength to measure the EUT.
- f. After the calibration has been verified, the test field can be generated using the values obtained from the calibration.
- g. Perform the test with the specified immunity level in the test frequency range and with the specified modulation type.
- h. The transmitting antenna is normally facing the front side of the EUT with vertical polarization to perform the test.
- i. The dwell time shall be not less than the time necessary for the EUT to be exercised and be able to respond.
- j. Record the performance of the EUT.

8.5 Test Setup



8.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

8.7 Test Results

Test: Keyed Carrier S5

Test Mode: Amplifier -

Monitor: Speaker L

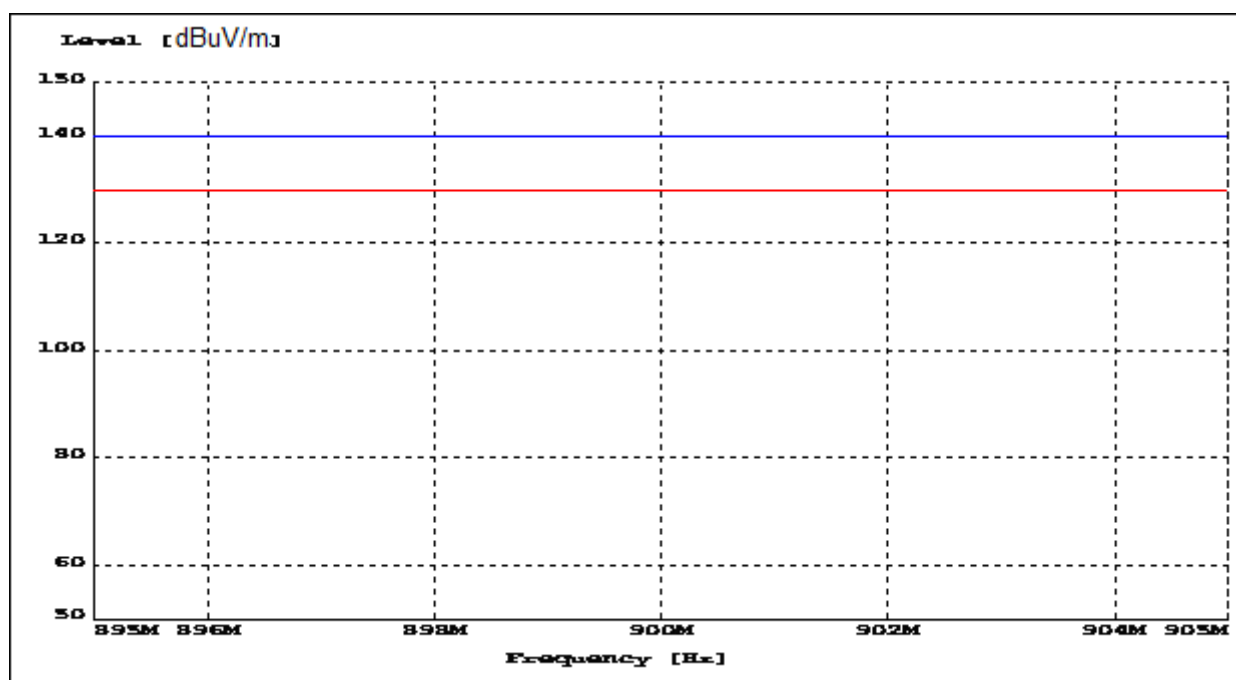
Operating Mode: AUX

S/N: 57.5 dB

Frequency: -

AF Level: 63.2 mW

Interf. Signal: Scan



Test Mode: Amplifier -

Monitor: Speaker R

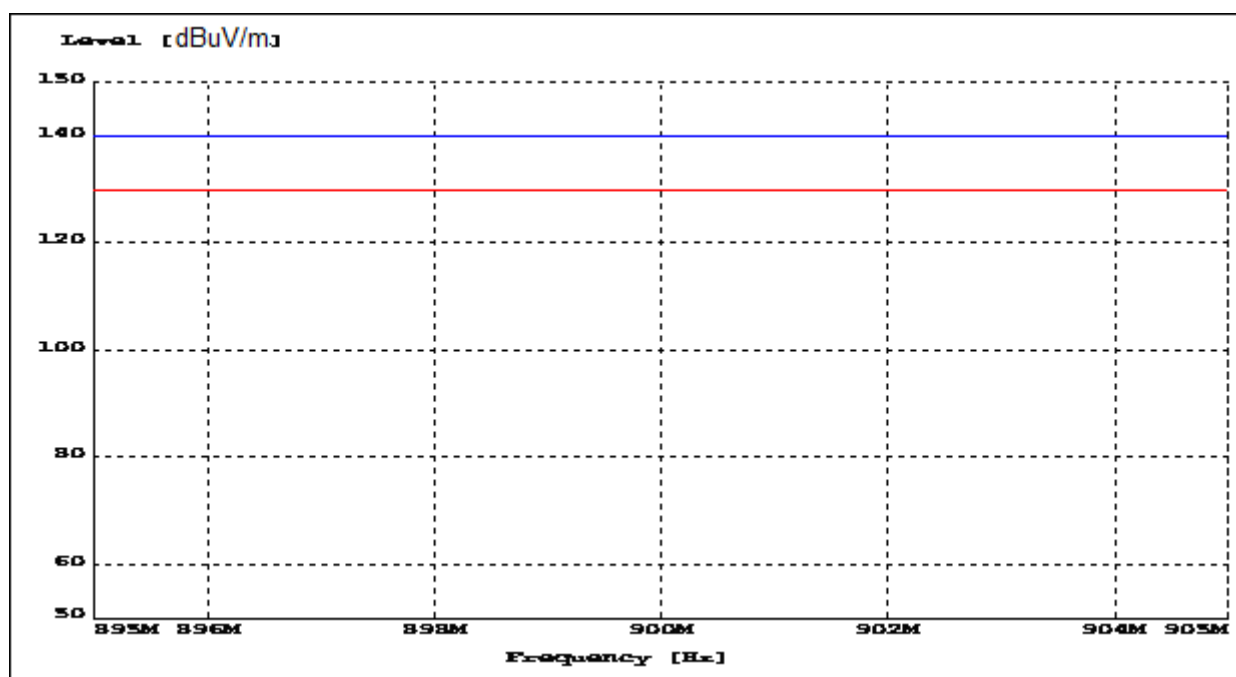
Operating Mode: AUX

S/N: 57.0 dB

Frequency: -

AF Level: 66.7 mW

Interf. Signal: Scan



9. Electrostatic Discharge (ESD) Immunity Test

9.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	: EN 55020:2007+A11:2011
Basic Standard	: IEC 61000-4-2:2008
Required Performance	: B
Test Level	: 2 (Contact discharge) : 3 (Air discharge)
Discharge Voltage	: Contact → ±4kV (Direct / Indirect discharge) : Air → ±2 kV, ±4kV, ±8kV (Direct discharge)
Time Interval	: 1 sec. minimum
Number of discharges	: Minimum 20 times at each test point
Test Voltage	: 230V/50Hz
Tester	: Rick
Ambient Temperature	: 22°C
Relative Humidity	: 48%
Atmospheric Pressure	: 1012mbar

9.2 Description of Performance Criteria

Performance criterion A

The equipment shall continue to operate as intended during the test. No change of actual operating state (for example change of channel) is allowed as a result of the application of the test. Multifunction equipment shall for each function meet the relevant requirements. Evaluation is carried out for audio and video functions. The equipment is supposed to operate as intended if the criteria of "Evaluation of audio quality" and/or "Evaluation of picture quality" are fulfilled.

Performance criterion B

The equipment shall continue to operate as intended after the test. No loss of function is allowed after the test when the apparatus is used as intended, but failures which are recovered automatically but which cause temporary delay in processing, are permissible. No change of actual operating state for example change of channel or stored data and settings is allowed as a result of the application of the test. During the test, degradation of performance is allowed.

9.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Electrostatic Generator	EM TEST	DITO/ V0537100716	July 5, 2012	July 5, 2013
TR8 shielded room	ETS. LINDGREN	TR8/ 15353-C	NCR	NCR

Note:

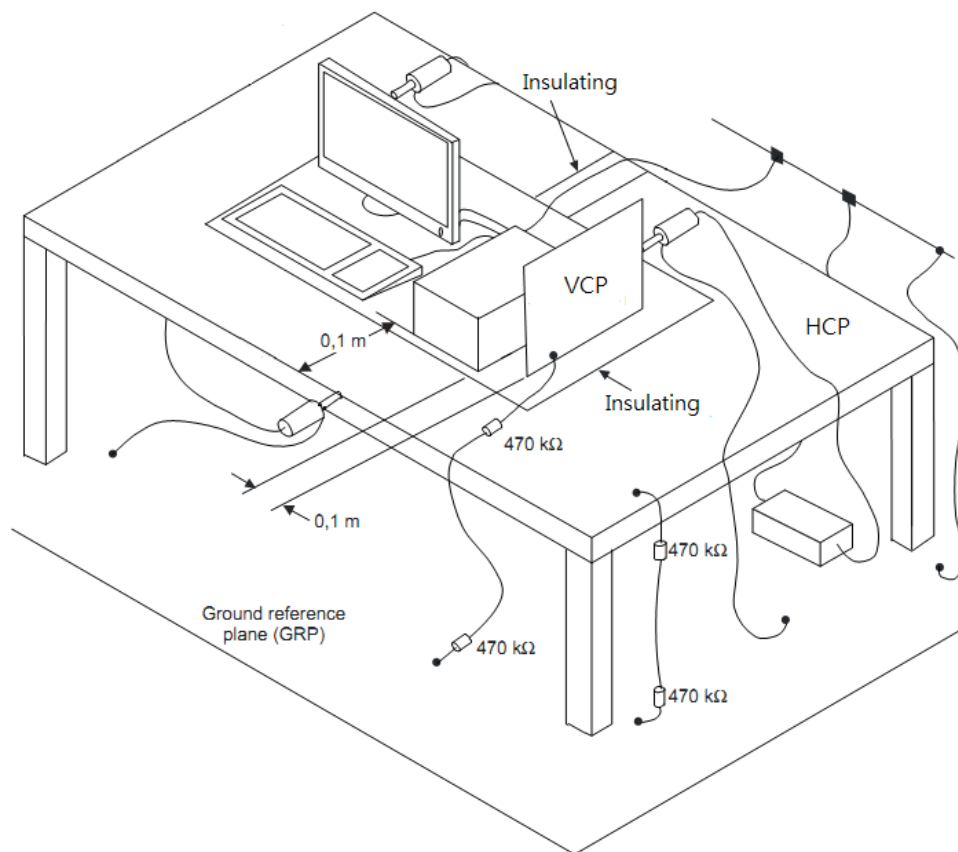
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

9.4 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the ground reference plane in the shielded room. Also a HCP (Horizontal Coupling Plane) which was connected to the ground reference plane via a cable with a 470k Ω resistor located at each end was placed on the wooden table and isolated with the EUT by an insulating support 0.5mm thick. The ground reference plane shall project beyond the EUT or HCP by at least 0.5m on all sides.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room. The ground reference plane shall project beyond the EUT by at least 0.5m on all sides.
- d. Keep the EUT 1m away from all other metallic walls in the shielded room as the minimum distance.
- e. The static electricity discharges shall be applied only to those points and surfaces of the EUT which are accessible to persons during normal use. Contact discharge is the preferred test method and it is applied to the conductive surfaces of EUT and coupling planes. Air discharge shall be used where contact discharge cannot be performed and it is applied to the insulating surfaces of EUT.
- f. The discharge return cable of the generator shall be kept at a distance of at least 0.2m from the EUT whilst the discharge is being applied.
- g. The time interval between successive single discharges was at least 1 second.
- h. Select appropriate points of the EUT for contact discharge and put marks on it to indicate the tested point(s). Then start the contact discharge with the tip of the discharge electrode to touch the EUT before the discharge switch is operated.
- i. Use the round discharge tip of the discharge electrode to scan the EUT to select the points for air discharge. Then start the air discharge by approaching the discharge electrode as fast as possible to touch the EUT. After each discharge, the ESD generator shall be removed from the EUT.
- j. The indirect HCP discharge test is applied at the front edge of each HCP opposite the center point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

- k. The indirect VCP (Vertical Coupling Plane) discharge test is applied to the center of one vertical edge of the coupling plane. The VCP, of dimensions 0.5m×0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. It shall be applied with sufficient different positions such that the four faces of the EUT are completely illuminated.

9.5 Test Configurations



9.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

9.7 Test Results

Test Mode : Normal

Discharge Voltage (kV)	Type of discharge	Label for Dischargeable Points	Performance		Result (Pass/Fail)
			Required	Observation	
±4	Contact	9~13	B	B(2)	Pass
±2	Air	1~8	B	A(1)	Pass
+4	Air	1,3~8	B	A(1)	Pass
-4	Air	2	B	B(2)	Pass
±8	Air	1~8	B	A(1)	Pass
±4	HCP-Bottom	Edge of the HCP	B	B(2)	Pass
±4	VCP-Front	Center of the VCP	B	B(2)	Pass
±4	VCP-Left	Center of the VCP	B	B(2)	Pass
±4	VCP-Back	Center of the VCP	B	B(2)	Pass
±4	VCP-Right	Center of the VCP	B	B(2)	Pass

Observation of Performance during Test

- (1) Normal operation condition specified by manufacturer during the test.
- (2) The noise would appear from speaker while test is performing, it could self-recover after finishing the test.

Photographs of the Test Points on the EUT for ESD Test





10. Electrical fast transient / burst (EFT) Immunity Test

10.1 Specifications of Immunity Test Requirement

Product (Generic) Standard	: EN 55020:2007+A11:2011
Basic Standard	: IEC 61000-4-4:2004+A1:2010
Required Performance	: B
Test Level	: 2
Voltage Peak	: ☒ ±1kV (on power supply port)
Impulse Frequency	: 5kHz
Wave Shape of the Pulse (T_r/T_h)	: 5ns / 50ns
Burst Duration	: 15ms
Burst Period	: 300ms
Time Duration	: 1 min
Test Voltage	: 230V/50Hz
Tester	: Wilson
Ambient Temperature	: 24°C
Relative Humidity	: 63%
Atmospheric Pressure	: 1008mbar

10.2 Description of Performance Criteria

Performance criterion A

The equipment shall continue to operate as intended during the test. No change of actual operating state (for example change of channel) is allowed as a result of the application of the test. Multifunction equipment shall for each function meet the relevant requirements. Evaluation is carried out for audio and video functions. The equipment is supposed to operate as intended if the criteria of “Evaluation of audio quality” and/or “Evaluation of picture quality” are fulfilled.

Performance criterion B

The equipment shall continue to operate as intended after the test. No loss of function is allowed after the test when the apparatus is used as intended, but failures which are recovered automatically but which cause temporary delay in processing, are permissible. No change of actual operating state for example change of channel or stored data and settings is allowed as a result of the application of the test. During the test, degradation of performance is allowed.

10.3 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
EFT/Burst Simulator	EMC PARTNER	TRA2000IN6/ 870	April 2, 2013	April 2, 2014
Coupling Clamp	EMC PARTNER	CN-EFT1000/ 532	NCR	NCR
Test Software	EMC PARTNER	TEMA/ Ver. 1.86	NCR	NCR
TR7 shielded room	ETS. LINDGREN	TR7/ 15353-D	NCR	NCR

Note:

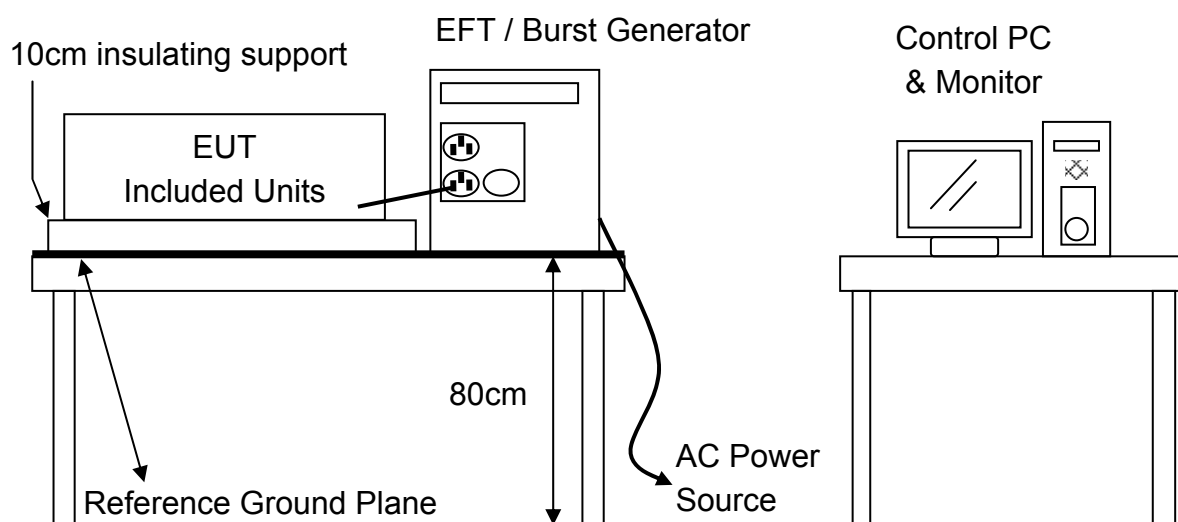
1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

10.4 Test Procedures

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the ground reference plane in the shielded room. The ground reference plane shall project beyond the EUT by at least 0.1m on all sides.
- c. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 0.1 meters above the ground reference plane in the shielded room. The ground reference plane shall project beyond the EUT by at least 0.1m on all sides.
- d. Keep the EUT 0.5m away from all other conductive structures, except the ground reference plane beneath the EUT as the minimum distance. Also if any, the minimum distance between the coupling clamp and all other conductive structures, except the ground reference plane beneath the coupling clamp and EUT shall be 0.5m.
- e. Keep the length of the power and signal lines, if required, between the coupling device and the EUT to be 1m or less. If a non-detachable supply cable more than 1m long, the excess length of this cable shall be gathered into a flat coil with a 0.4m diameter and situated at a distance of 0.1m above the ground reference plane.
- f. Connect the EUT's power source to the appropriate power through the coupling devices and perform the specified test level.
- g. If any, connect all the I/O signal, data and control lines between EUT and accessories/support units through the coupling devices and perform the specified test level.
- h. Record the performance of the EUT.

10.5 Test Configurations

Power supply port Test



10.6 Photographs of the Test Configurations

Please refer to the Attachment 1 of the present report.

10.7 Test Results

Test Mode : Normal

Injected Line	Voltage Peak (kV)	Injected Method	Performance		Result (Pass/Fail)
			Required	Observation	
L1 - L2 - PE	+1.0	Direct	B	B(1)	Pass
L1 - L2 - PE	-1.0	Direct	B	B(1)	Pass

Observation of Performance during Test

- (1) The noise would appear from speaker and 1kHz audio signal would disappear while test is performing, it could self-recover after finishing the test.

Attachment 1

Photographs of the Test Configurations

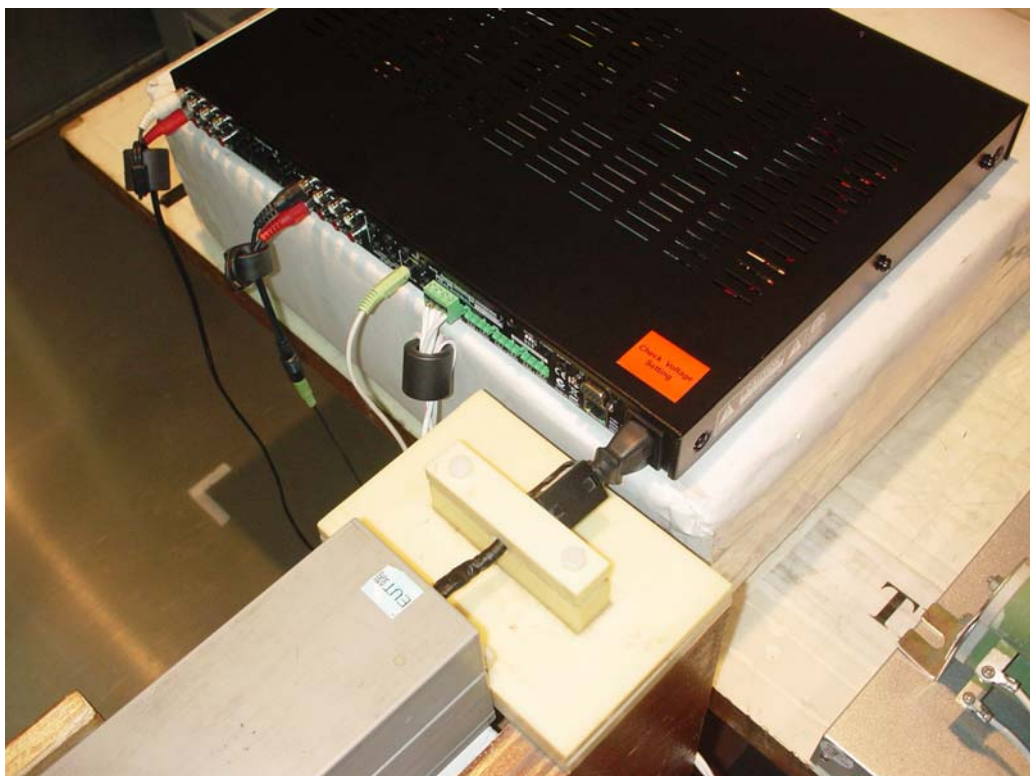
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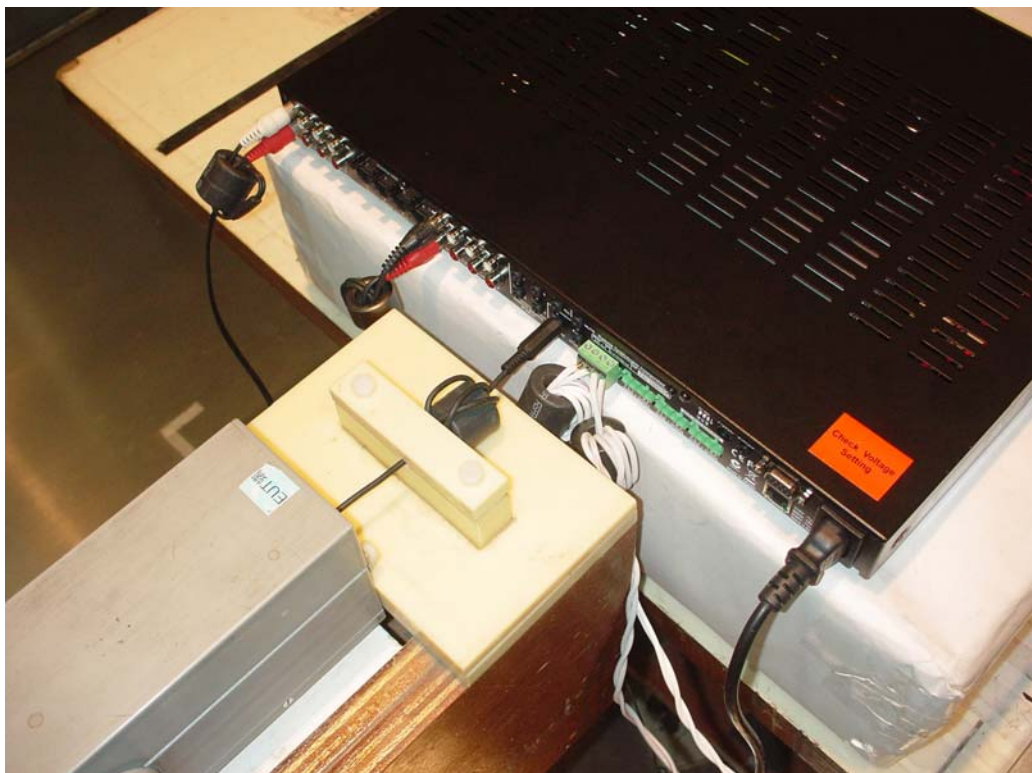
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2. Disturbance Power Measurement.....	2
3. Harmonic Current & Voltage Fluctuations Emission Measurement.....	7
4. Immunity Against RFI Voltage (S2a)	8
5. Immunity Against Radiated RFI (S3).....	9
6. Keyed Carrier (S5)	10
7. Electrostatic Discharge (ESD) Immunity Test	11
8. Electrical fast transient / burst (EFT) Immunity Test.....	11

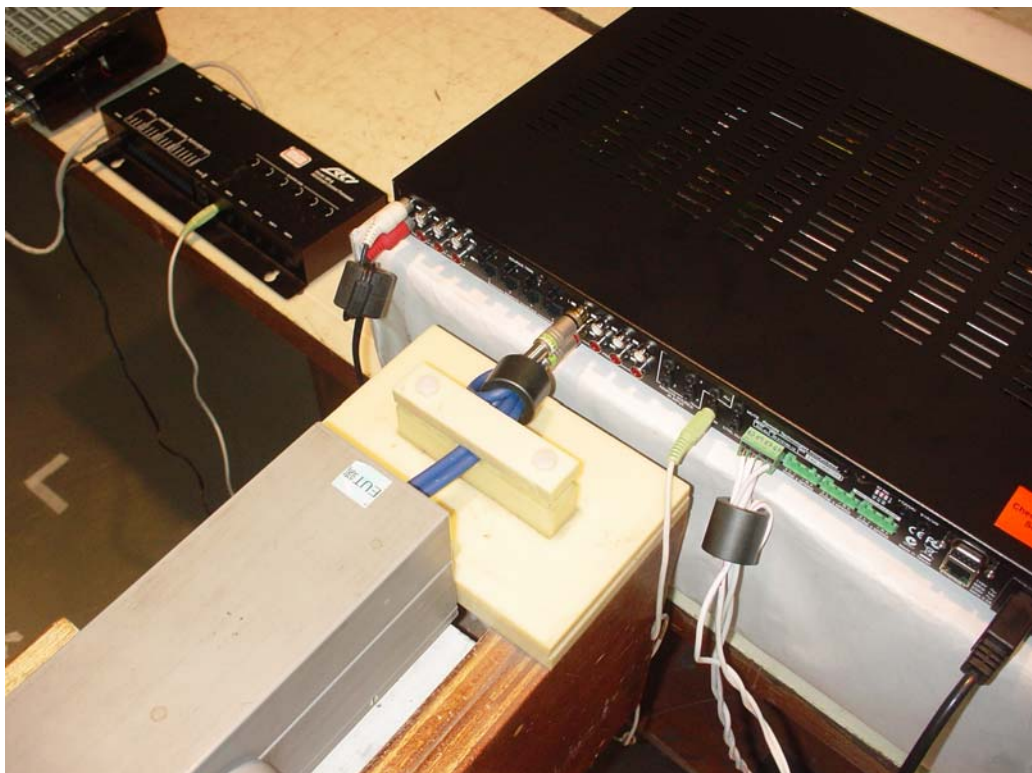
1. Conducted Emission Measurement

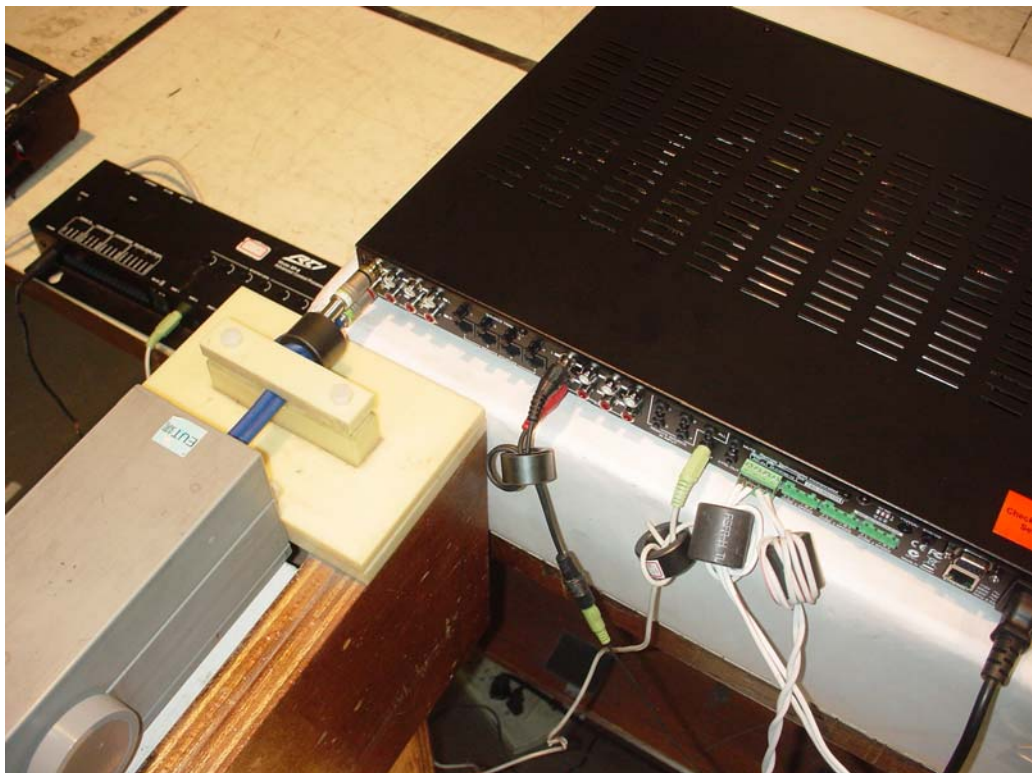


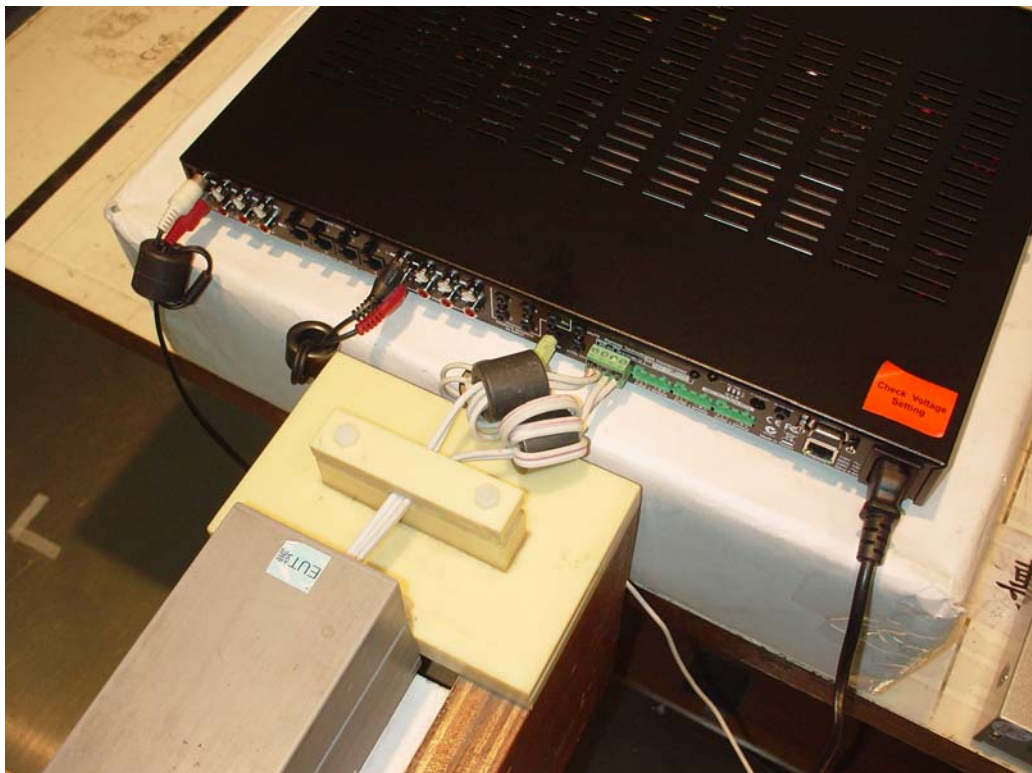
2. Disturbance Power Measurement







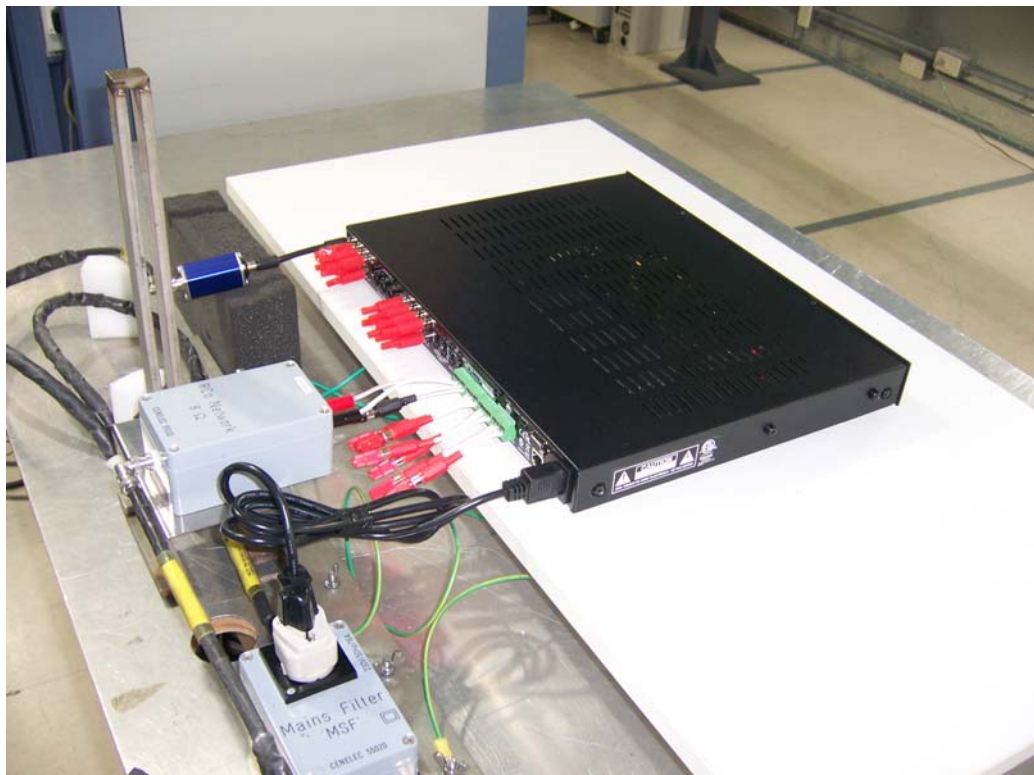




3. Harmonic Current & Voltage Fluctuations Emission Measurement



4. Immunity Against RFI Voltage (S2a)



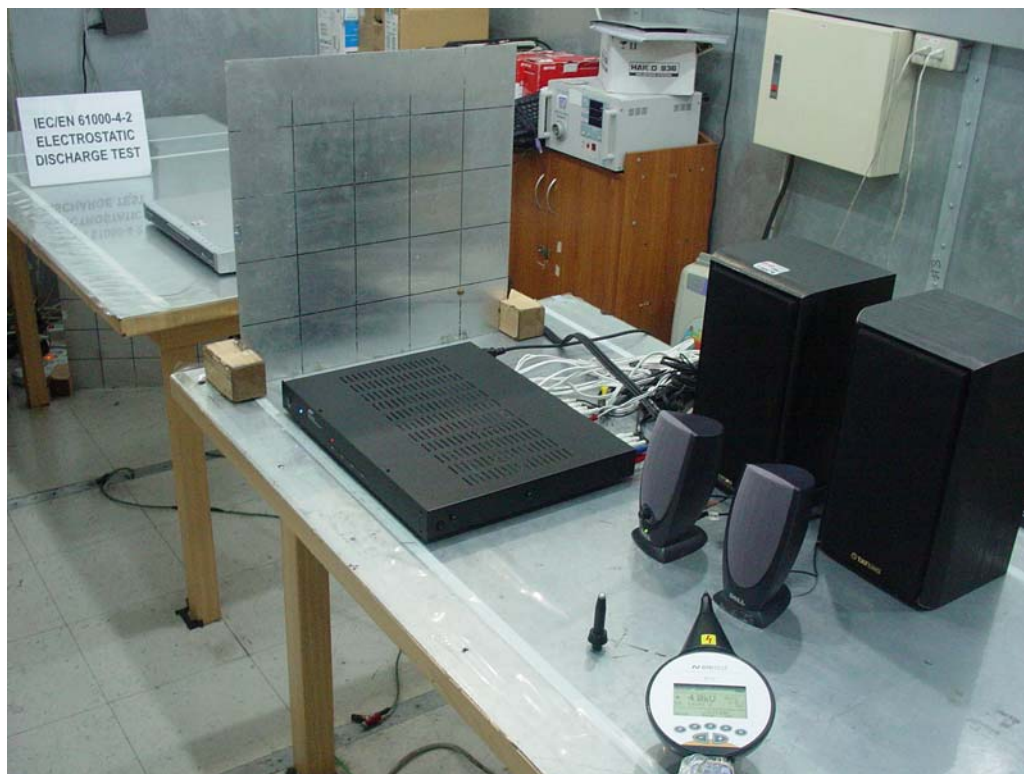
5. Immunity Against Radiated RFI (S3)



6. Keyed Carrier (S5)



7. Electrostatic Discharge (ESD) Immunity Test



8. Electrical fast transient / burst (EFT) Immunity Test



Attachment 2

Photographs of EUT





