



**CTS (NINGBO) TESTING SERVICE TECHNOLOGY
INTERNATIONAL**

OPERATE ACCORDING TO ISO/IEC 17025

EMC TEST REPORT

TEST REPORT NUMBER : CGZ3140815-00922-E-D



CTS (Ningbo) Testing Service Technology Co., Ltd.
2/F., South Tower, Huoju Building, No.181, Canghai Road,
Jiangdong Science and Technology Park, Ningbo, Zhejiang, China



TEST REPORT EN 55013:2013	
Sound and television broadcast receivers and associated equipment-Radio disturbance characteristics-Limits and methods of measurement.	
EN 55020: 2007+A11:2011	
Sound and television broadcast receivers and associated equipment-Immunity characteristics-Limits and methods of	
Report Reference No.	CGZ3140815-00922-E-D
Date of issue	19 August 2014
Testing Laboratory Name	CTS (Ningbo) Testing Service Technology Co., Ltd.
Address	GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China.
Testing location/ procedure	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
Applicant's name	Guangzhou BaoLun Electronics Co., Ltd.
Address	No.1 Building, Zhongcun Industrial B Zone,Zhongcun Street, Panyu, Guangzhou, China
Test specification:	
Standard	EN 55013: 2013 EN 61000-3-2: 2006+A2:2009, EN 61000-3-3: 2008 EN 55020: 2007+A11:2011
Test Report Form No.	CTSEMC-1.0
TRF Originator	CTS (Ningbo) Testing Service Technology Co., Ltd.
Master TRF	Dated 2009-01
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Test item description	MIXER AMPLIFIER
Trade Mark	ITC
Manufacturer	Guangzhou BaoLun Electronics Co., Ltd.
Model/Type reference	T-4120MP (T-4012)
Ratings	AC 220-230V, 50/60Hz
Result	PASSED

Compiled by:

Kate

Kate zhang / File administrators

Supervised by:

Duke

Duke yang / Technique principal

Approved by:

Vincent Yao

Vincent yao / Manager

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CTS (Ningbo) Testing Service Technology Co., Ltd.

2/F., South Tower, Huoju Building, No.181, Canghai Road, Jiangdong Science and Technology Park, Ningbo, Zhejiang, China

Tel: +86-20-85543113 (32 lines)

Fax: +86-20-38780406

Complaint line: +86-20-85533471

E-mail: cts@cts-lab.com.cn

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EMC -- TEST REPORT

Test Report No. : CGZ3140815-00922-E-D	<u>19 August 2014</u> Date of issue
--	--

Type / Model.....	T-4120MP (T-4012)
EUT.....	MIXER AMPLIFIER
Applicant	Guangzhou BaoLun Electronics Co., Ltd.
Address.....	No.1 Building, Zhongcun Industrial B Zone,Zhongcun Street, Panyu, Guangzhou, China
Telephone.....	+86- 020-84548170
Fax.....	+86-020-39907268
Contact.....	/
Manufacturer	Guangzhou BaoLun Electronics Co., Ltd.
Address.....	No.1 Building, Zhongcun Industrial B Zone,Zhongcun Street, Panyu, Guangzhou, China
Telephone.....	+86- 020-84548170
Fax.....	+86-020-39907268
Contact.....	/
Factory	Guangzhou BaoLun Electronics Co., Ltd.
Address.....	No.1 Building, Zhongcun Industrial B Zone,Zhongcun Street, Panyu, Guangzhou, China
Telephone.....	+86- 020-84548170
Fax.....	+86-020-39907268
Contact.....	/

Special description:

This is an additional test report which is based on the original report **CGZ3131107-01021-E-R1**. There are no any difference among the models except for the applicant and displace following identical model(s). After review, no additional test should be carried out.

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

EN 55013:2013 Sound and television broadcast receivers and associated equipment-Radio disturbance characteristics-Limits and methods of measurement.

EN 61000-3-2: 2006+A2:2009 Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).

EN 61000-3-3: 2008 Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.

EN 55020: 2007+A11:2011 Sound and television broadcast receivers and associated equipment-Immunity characteristics-Limits and methods of measurement.

2 SUMMARY

2.1 GENERAL REMARKS

Date of receipt of test sample	11 November 2013
Testing commenced on	11~22 November 2013
Testing concluded on	19 August 2014

2.2 FINAL ASSESSMENT

The EMC requirements pertaining to the technical standards and tested operation modes are

- fulfilled.
- **not** fulfilled.

The equipment under test

- fulfils the EMC requirements cited on page 1.
- **does not** fulfil the EMC requirements cited on page 1.



3 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage : AC 230V/50 Hz
 Other (Specified blank below)

3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: 1
Serial number: Prototype

3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

- Normal

Operation mode 1 : Normal

Emissions tests.....: According to EN 55013, searching for the highest disturbance.
Harmonic current..... : According to EN 61000-3-2, searching for the highest disturbance.
Voltage fluctuation.....: According to EN 61000-3-3, searching for the highest disturbance.
Immunity tests : According to EN 55020, searching for the highest susceptibility.

3.4 EUT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement:

Not Applicable

3.5 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

3.6 Definition related to the performance level

- based on the used product standard
- based on the declaration of the manufacturer, requestor or purchaser

Criterion A:

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

Criterion B:

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

Criterion C:

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

Criterion D:

Definition: loss of function or degradation of performance, which is not recoverable, owing to damage to hardware or software, or loss of data:

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China

Tel: +86-20-85543113 (32 lines)

Fax: +86-20-38780406

4.2 Test facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L3394

CTS (Ningbo) Testing Service Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

IC-Registration No.: 8374A

The 3m Alternate Test Site of CTS (Ningbo) Testing Service Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374A on May 22, 2014 .

FCC-Registration No.: 971995

CTS (Ningbo) Testing Service Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No.971995, July 13,2012.

4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 °C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

4.4 Definitions of symbols used in this test report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the CTS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	±1.22dB	(1)
Power disturbance	30MHz~300MHz	±1.38dB	(1)
Radiation emission (3m)	30MHz~300MHz	±3.14dB	(1)
	300MHz~1000MHz	±3.18dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

4.7 Test Description

4.7.1 Description of Standards and Results

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	EN 55013:2013	-----	PASS
Conducted disturbance at antenna port	EN 55013:2013	-----	N/A
Disturbance power	EN 55013:2013	-----	PASS
Harmonic current emissions	EN 61000-3-2:2006+A2:2009	Class A	PASS
Voltage fluctuations & flicker	EN 61000-3-3:2008	-----	PASS
IMMUNITY (EN 55020:2007+A1 :2011)			
Description of Test Item	Basic Standard	Performance Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2: 2008	B	PASS
Radio-frequency, Continuous radiated disturbance(900MHz, Keyed carrier)	IEC 61000-4-3:2006+A1:2007 +A2:2010	A	N/A
Electrical fast transient (EFT)	IEC 61000-4-4:2012	B	PASS
Immunity against RFI voltage (S2a)	EN 55020:2007+A11:2011	----	PASS
Immunity against radiated RFI(S3)	EN 55020:2007+A11:2011	----	PASS
Keyed Carrier (S5)	EN 55020:2007+A11:2011	----	PASS
N/A is an abbreviation for Not Applicable.			

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E-mail: cts@cts-lab.com.cn

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5 TEST CONDITIONS AND RESULTS

5.1 Conducted disturbance

For test instruments and accessories used see section 6 part 6.2.

5.1.1 Description of the test location

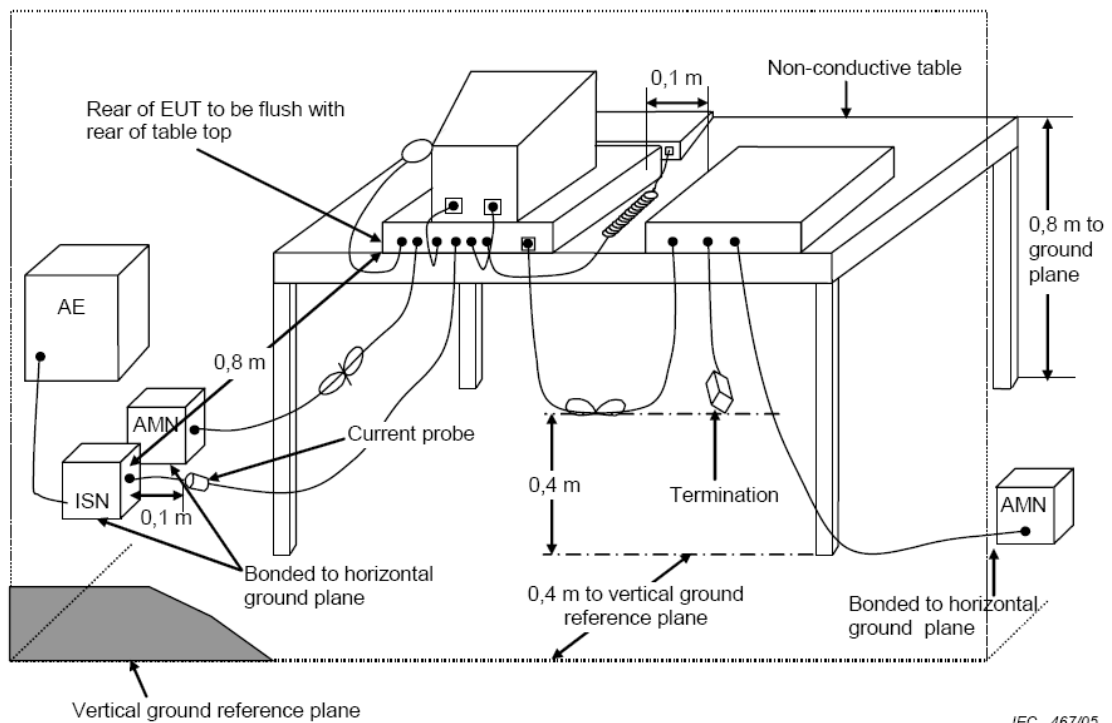
Test location: Shielded room

5.1.2 Description of the test set-up

5.1.2.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

5.1.2.2 Block Diagram of Test Setup



5.1.3 Limits disturbance

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 *	56 ~ 46 *
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

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5.1.4 Test result

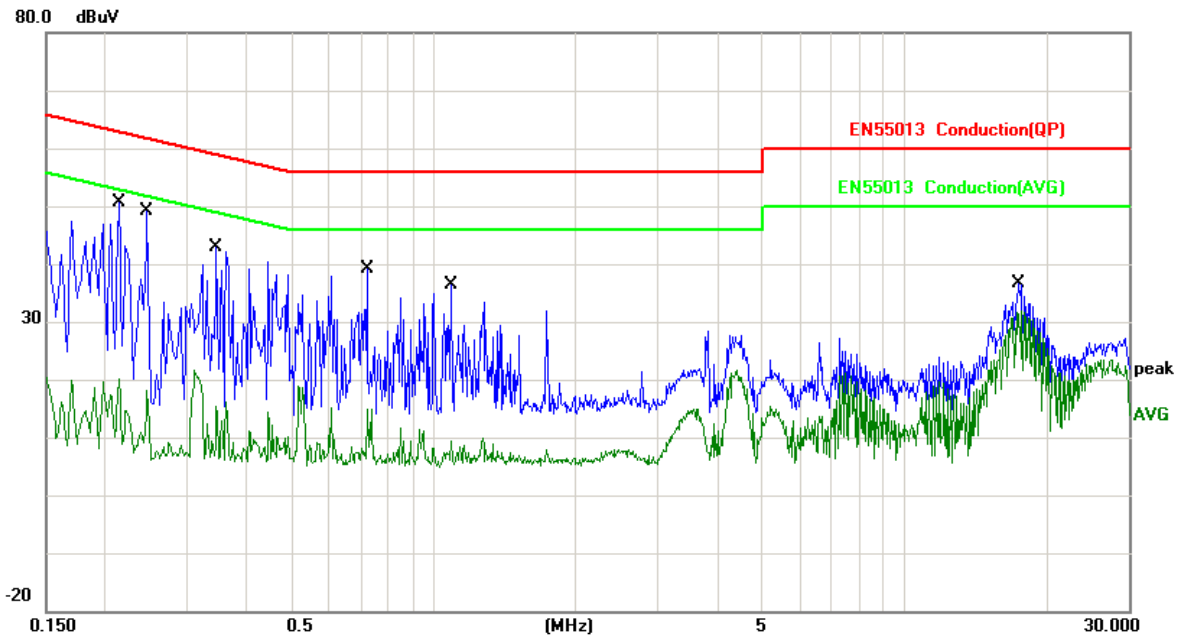
The requirements are	Fulfilled
Band width	9kHz
Frequency range	0.15 MHz - 30 MHz
Min. limit margin	>8.59 dB at 0.15 - 30 MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.1.5 Test protocol

Test point Operation mode 1 Remarks:	L Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
---	-------------	---------	---

EUT	MIXER AMPLIFIER
Power Supply	AC 230V/50Hz
Test Condition	Ambient Temperature:24°C Humidity: 56%
Operator	Eric
MODEL NO.	T-4120MP (T-4012)



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2140	9.78	19.22	29.00	63.04	-34.04	QP
2	0.2140	9.78	-0.81	8.97	53.04	-44.07	AVG
3	0.2460	9.78	18.63	28.41	61.89	-33.48	QP
4	0.2460	9.78	-2.33	7.45	51.89	-44.44	AVG
5	0.3460	9.80	5.00	14.80	59.06	-44.26	QP
6	0.3460	9.80	-3.79	6.01	49.06	-43.05	AVG
7	0.7220	9.84	4.88	14.72	56.00	-41.28	QP
8	0.7220	9.84	-4.34	5.50	46.00	-40.50	AVG
9	1.0900	9.83	-0.85	8.98	56.00	-47.02	QP
10	1.0900	9.83	-4.49	5.34	46.00	-40.66	AVG
11	17.5260	9.98	16.14	26.12	60.00	-33.88	QP
12	17.5260	9.98	12.45	22.43	50.00	-27.57	AVG

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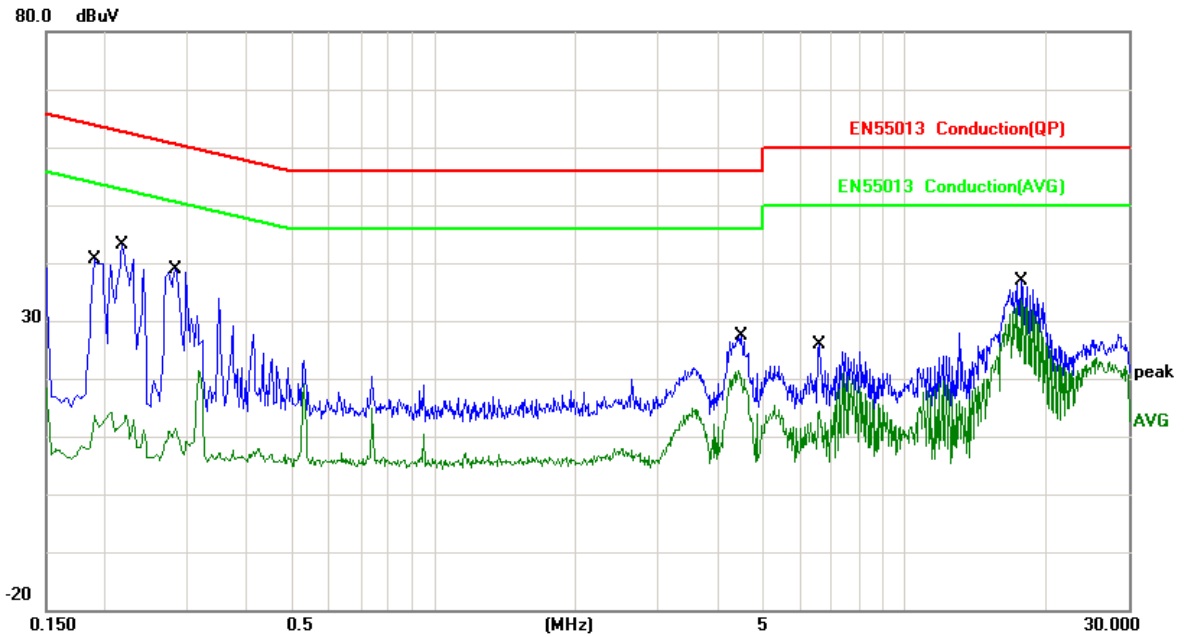
E-mail: cts@cts-lab.com.cn

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Test point: Operation mode 1 Remarks:	N Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
--	-------------	---------	---

EUT	MIXER AMPLIFIER
Power Supply	AC 230V/50Hz
Test Condition	Ambient Temperature:24°C Humidity: 56%
Operator	Eric
MODEL NO.	T-4120MP (T-4012)



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1900	9.78	-0.15	9.63	64.03	-54.40	QP
2	0.1900	9.78	-3.41	6.37	54.03	-47.66	AVG
3	0.2180	9.78	3.42	13.20	62.89	-49.69	QP
4	0.2180	9.78	-3.32	6.46	52.89	-46.43	AVG
5	0.2819	9.79	-0.61	9.18	60.76	-51.58	QP
6	0.2819	9.79	-3.95	5.84	50.76	-44.92	AVG
7	4.5020	9.91	15.23	25.14	56.00	-30.86	QP
8	4.5020	9.91	9.73	19.64	46.00	-26.36	AVG
9	6.6060	9.89	9.70	19.59	60.00	-40.41	QP
10	6.6060	9.89	2.29	12.18	50.00	-37.82	AVG
11	17.6700	9.98	19.16	29.14	60.00	-30.86	QP
12	17.6700	9.98	15.66	25.64	50.00	-24.36	AVG

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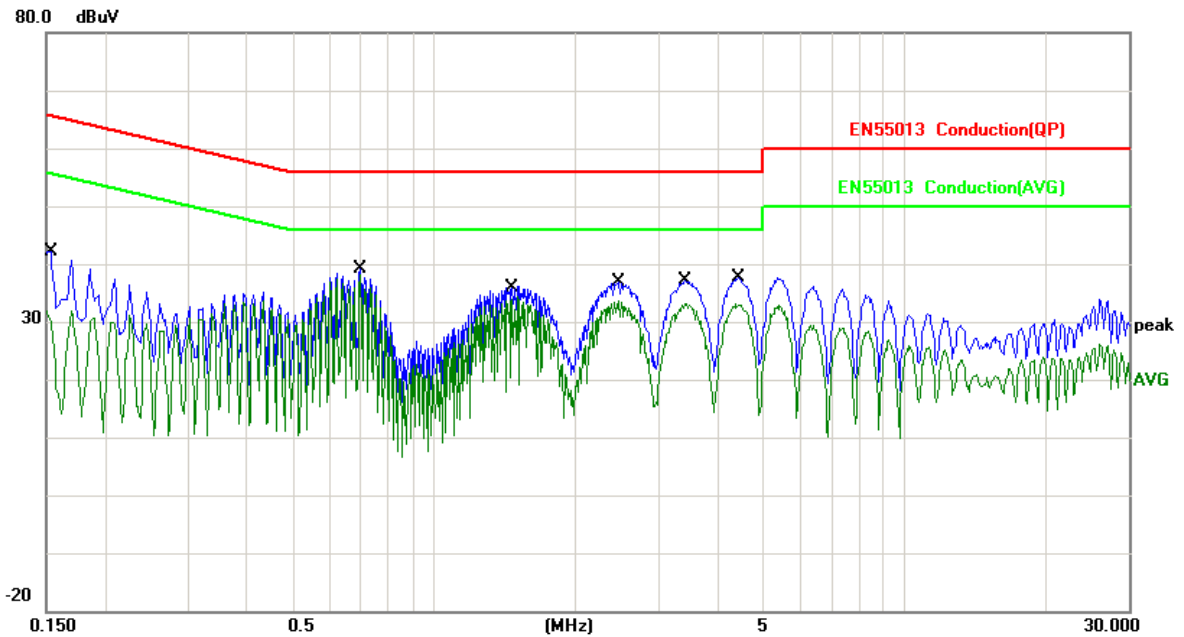
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Test point	L	Result:	<input checked="" type="checkbox"/> - passed
Operation mode 1	Normal		<input type="checkbox"/> - not passed
Remarks:	Microphone		

EUT	MIXER AMPLIFIER
Power Supply	AC 230V/50Hz
Test Condition	Ambient Temperature:24°C Humidity: 56%
Operator	Eric
MODEL NO.	T-4120MP (T-4012)



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1540	9.78	27.08	36.86	65.78	-28.92	QP
2	0.1540	9.78	18.52	28.30	55.78	-27.48	AVG
3	0.6980	9.84	27.92	37.76	56.00	-18.24	QP
4	0.6980	9.84	27.55	37.39	46.00	-8.61	AVG
5	1.4700	9.85	25.02	34.87	56.00	-21.13	QP
6	1.4700	9.85	23.59	33.44	46.00	-12.56	AVG
7	2.4860	9.88	25.91	35.79	56.00	-20.21	QP
8	2.4860	9.88	23.31	33.19	46.00	-12.81	AVG
9	3.4260	9.89	26.17	36.06	56.00	-19.94	QP
10	3.4260	9.89	22.93	32.82	46.00	-13.18	AVG
11	4.4420	9.91	26.42	36.33	56.00	-19.67	QP
12	4.4420	9.91	22.90	32.81	46.00	-13.19	AVG

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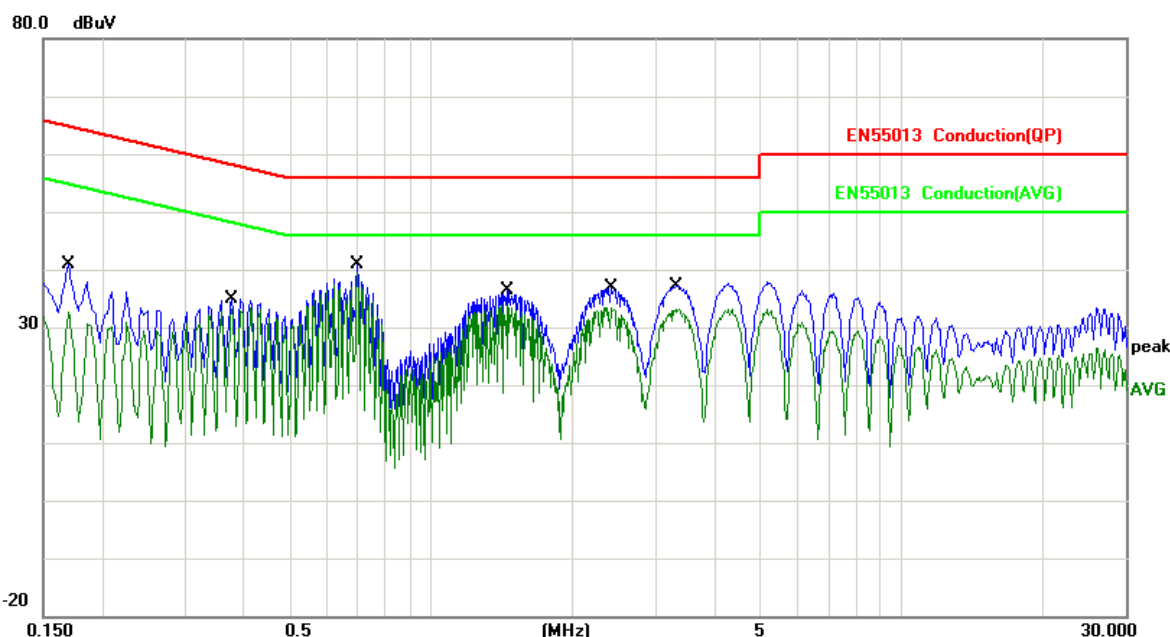
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Test point: Operation mode 1 Remarks:	N Normal Microphone	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
--	---------------------------	---------	---

EUT	MIXER AMPLIFIER
Power Supply	AC 230V/50Hz
Test Condition	Ambient Temperature:24°C Humidity: 56%
Operator	Eric
MODEL NO.	T-4120MP (T-4012)



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1700	9.78	28.12	37.90	64.96	-27.06	QP
2	0.1700	9.78	21.74	31.52	54.96	-23.44	AVG
3	0.3780	9.81	23.27	33.08	58.32	-25.24	QP
4	0.3780	9.81	23.04	32.85	48.32	-15.47	AVG
5	0.6980	9.84	28.01	37.85	56.00	-18.15	QP
6	0.6980	9.84	27.57	37.41	46.00	-8.59	AVG
7	1.4500	9.85	25.25	35.10	56.00	-20.90	QP
8	1.4500	9.85	23.89	33.74	46.00	-12.26	AVG
9	2.4300	9.88	25.88	35.76	56.00	-20.24	QP
10	2.4300	9.88	23.33	33.21	46.00	-12.79	AVG
11	3.3140	9.89	25.38	35.27	56.00	-20.73	QP
12	3.3140	9.89	22.29	32.18	46.00	-13.82	AVG

Note:Level=Reading+Factor. Margin= Limit-Level

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5.2 Disturbance power

For test instruments and accessories used see section 6 part 6.1.

5.2.1 Description of the test location

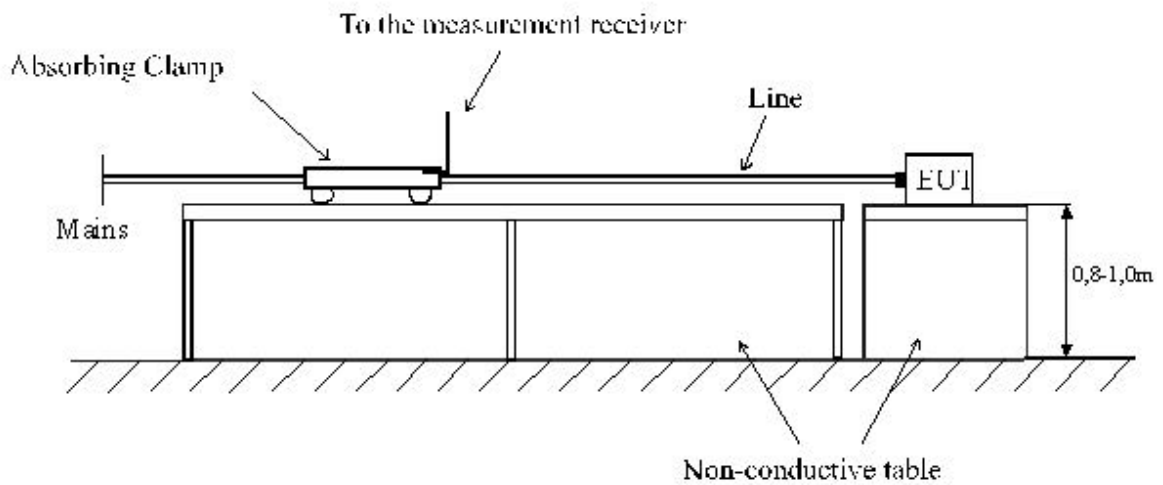
Test location: Shielded room

5.2.2 Description of the test set-up

5.2.2.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

5.2.2.2 Block Diagram of Test Setup



5.2.3 Limits disturbance

Frequency MHz	Interference Power Limits (dBpW)	
	Quasi-peak Value	Average Value
30 ~ 300	45 Increasing Linearly with Frequency to 55	35 Increasing Linearly with Frequency to 45

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5.2.4 Test result

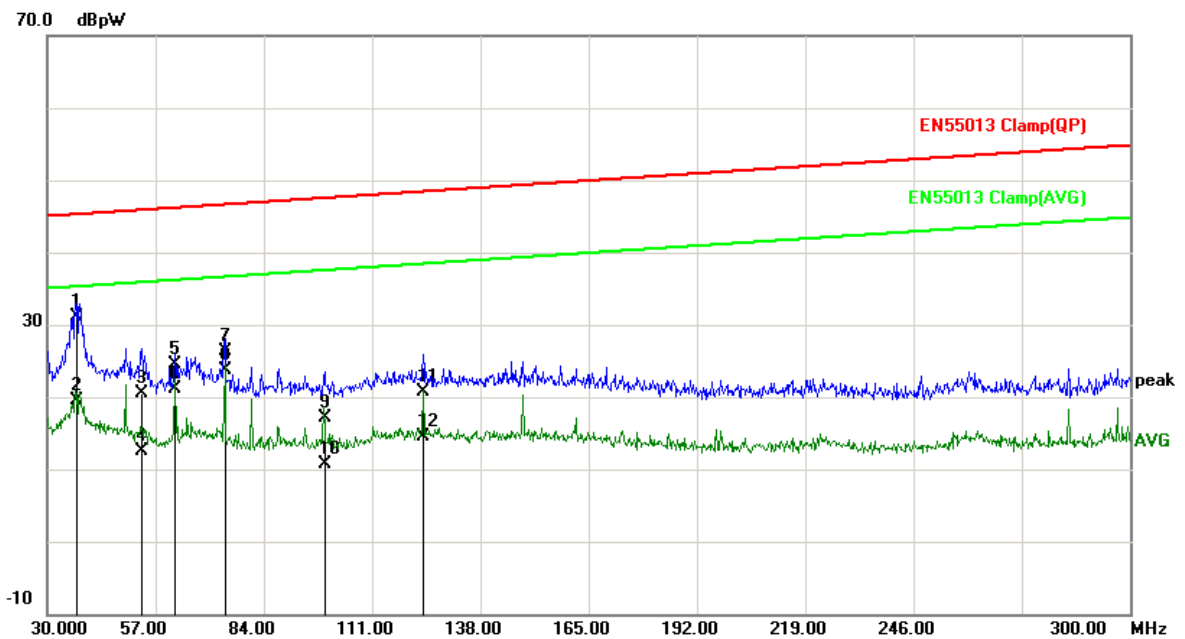
The requirements are	Fulfilled
Band width	120kHz
Frequency range	30 MHz - 300 MHz
Min. limit margin	>3.94 dB at 30 - 300 MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.2.5 Test protocol

Test point: Operation mode 1 Remarks:	DC LINE CLAMP Normal (Micophone)	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
--	--	---------	---

EUT	MIXER AMPLIFIER
Power Supply	AC 230V/50Hz
Test Condition	Ambient Temperature:24°C Humidity: 56%
Operator	Eric
MODEL NO.	T-4120MP (T-4012)



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	37.2800	5.34	25.67	31.01	45.27	-14.26	QP
2	37.2800	5.34	14.21	19.55	35.27	-15.72	AVG
3	53.6400	3.65	16.89	20.54	45.88	-25.34	QP
4	53.6400	3.65	8.87	12.52	35.88	-23.36	AVG
5	61.9200	3.39	21.05	24.44	46.18	-21.74	QP
6	61.9200	3.39	17.77	21.16	36.18	-15.02	AVG
7	74.3200	3.68	22.62	26.30	46.64	-20.34	QP
8	74.3200	3.68	19.97	23.65	36.64	-12.99	AVG
9	99.1200	3.22	13.81	17.03	47.56	-30.53	QP
10	99.1200	3.22	7.40	10.62	37.56	-26.94	AVG
11	123.8400	4.80	15.94	20.74	48.48	-27.74	QP
12	123.8400	4.80	9.78	14.58	38.48	-23.90	AVG

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Tel: +86-20-85543113 (32 lines)

Fax: +86-20-38780406

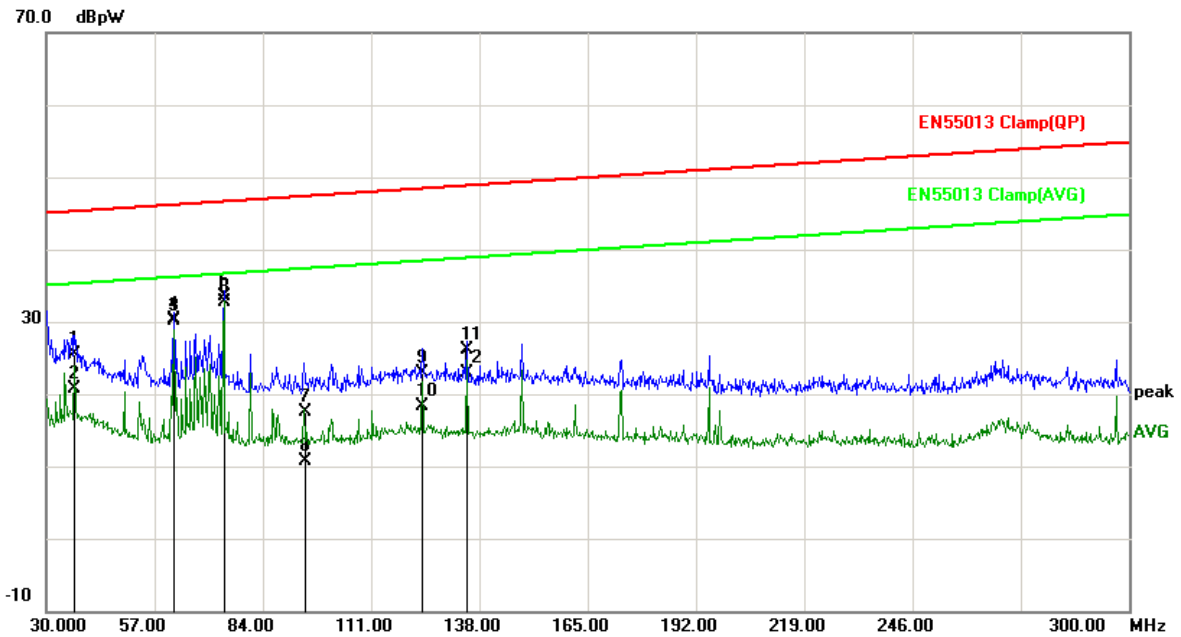
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E-mail: cts@cts-lab.com.cn

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Test point: Operation mode 1 Remarks:	MIC INPUT LINE CLAMP Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
--	--------------------------------	---------	---

EUT	MIXER AMPLIFIER
Power Supply	AC 230V/50Hz
Test Condition	Ambient Temperature:24°C Humidity: 56%
Operator	Eric
MODEL NO.	T-4120MP (T-4012)



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	37.1600	5.32	20.28	25.60	45.27	-19.67	QP
2	37.1600	5.32	15.38	20.70	35.27	-14.57	AVG
3	61.9200	3.39	26.73	30.12	46.18	-16.06	QP
4	61.9200	3.39	26.91	30.30	36.18	-5.88	AVG
5	74.3200	3.68	29.92	33.60	46.64	-13.04	QP
6	74.3200	3.68	29.02	32.70	36.64	-3.94	AVG
7	94.5200	3.31	14.18	17.49	47.39	-29.90	QP
8	94.5200	3.31	7.43	10.74	37.39	-26.65	AVG
9	123.8400	4.80	18.15	22.95	48.48	-25.53	QP
10	123.8400	4.80	13.55	18.35	38.48	-20.13	AVG
11	135.0000	4.53	21.62	26.15	48.89	-22.74	QP
12	135.0000	4.53	18.31	22.84	38.89	-16.05	AVG

Note:Level=Reading+Factor. Margin= Limit-Level

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5.3 Harmonic current

For test instruments and accessories used see section 6 part 6.3.

5.3.1 Description of the test location

Test location : Test location no. 1

5.3.2 Limits of harmonic current

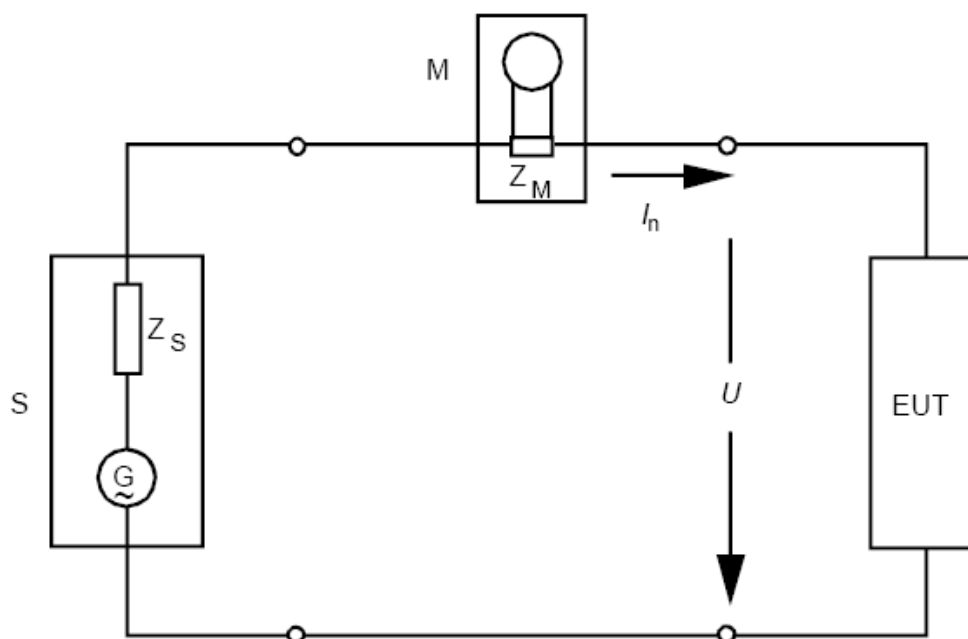
Test configuration and procedure see clause 7.1 of standard EN 61000-3-2: 2006+A2:2009.

5.3.3 Description of the test set-up

5.3.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

5.3.3.2 Block Diagram of Test Setup



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5.3.4 Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.3.5 Test protocol

Operation mode 1 Normal	Result:	<input checked="" type="checkbox"/> - passed
Remarks:		<input type="checkbox"/> - not passed

Standard used:	EN 61000-3-2 Quasi-Stationary – Equipment class A
Observation time:	5 min
Windows width:	10 periods – (EN/IEC 61000-4-7 Edition 2002)
Mains supply voltage:	AC 230V / 50Hz
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86-106kPa
E. U. T.:	MIXER AMPLIFIER
M/N:	T-4120MP (T-4012)
Date of test:	11 November 2013
Tester:	Eric

Test result

E. U. T.:	PASS
Power Source:	PASS

Check harmonics 2..40 [exception odd 21..39]:

Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 100%:	
Order (n):	None

Check odd harmonics 21..39:

All Partial Odd Harmonics below partial limits.
Harmonic(s) > 150%: Order (n): None
Harmonic(s) with average > 150%: Order (n): None

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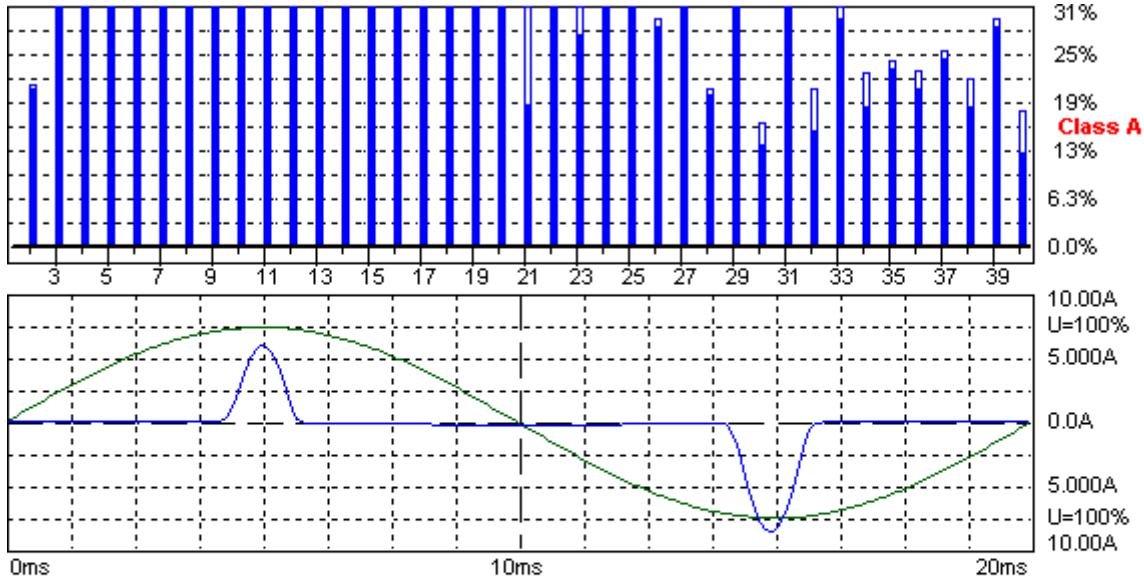
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Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2)

2013-11-11 15:31:20

Urms = 229.7 V P = 217.0 W THD(I) = 187 % Range: 10 A
 Irms = 1.987 A pf = 0.475 H1 (I) = 0.952 A V-nom: 230 V
 TestTime: 10 min (100%)

Eric

Test completed, Result: PASSED

HAR-1000 EMC-Partner

Order	Freq. [Hz]	Irms [A]	Imax [A]	Limit [A]	Status
1	50	0.9515	0.9540		
2	100	0.2197	0.2228	1.0800	
3	150	0.9070	0.9094	2.3000	
4	200	0.2057	0.2081	0.4300	
5	250	0.8398	0.8423	1.1400	
6	300	0.1825	0.1849	0.3000	
7	350	0.7446	0.7465	0.7700	
8	400	0.1526	0.1550	0.2300	
9	450	0.3287	0.3311	0.4000	
10	500	0.1202	0.1227	0.1840	
11	550	0.2629	0.2854	0.3300	
12	600	0.0897	0.0916	0.1533	
13	650	0.1766	0.1796	0.2100	
14	700	0.0641	0.0720	0.1314	
15	750	0.1306	0.1366	0.1500	
16	800	0.0470	0.0568	0.1150	
17	850	0.1263	0.1287	0.1324	
18	900	0.0391	0.0427	0.1022	
19	950	0.0751	0.0769	0.1184	
20	1000	0.0360	0.0366	0.0920	
21	1050	0.0195	0.0531	0.1071	
22	1100	0.0323	0.0330	0.0836	
23	1150	0.0269	0.0397	0.0978	
24	1200	0.0275	0.0275	0.0767	
25	1250	0.0446	0.0458	0.0900	

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Complaint line: +86-20-85533471

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26	1300	0.0201	0.0208	0.0708	
27	1350	0.0476	0.0494	0.0833	
28	1400	0.0128	0.0134	0.0657	
29	1450	0.0421	0.0433	0.0776	
30	1500	0.0079	0.0098	0.0613	
31	1550	0.0311	0.0323	0.0726	
32	1600	0.0085	0.0116	0.0575	
33	1650	0.0201	0.0214	0.0682	
34	1700	0.0098	0.0122	0.0541	
35	1750	0.0146	0.0153	0.0643	
36	1800	0.0104	0.0116	0.0511	
37	1850	0.0146	0.0153	0.0608	
38	1900	0.0085	0.0104	0.0484	
39	1950	0.0165	0.0171	0.0577	
40	2000	0.0055	0.0079	0.0460	

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Operation mode 1	Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
Remarks:	Microphone		

Standard used:	EN 61000-3-2 Quasi-Stationary – Equipment class A
Observation time:	5 min
Windows width:	10 periods – (EN/IEC 61000-4-7 Edition 2002)
Mains supply voltage:	AC 230V / 50Hz
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86-106kPa
E. U. T.:	MIXER AMPLIFIER
M/N:	T-4120MP (T-4012)
Date of test:	11 November 2013
Tester:	Eric

Test result

E. U. T.: PASS

Power Source: PASS

Check harmonics 2..40 [exception odd 21..39]:
Harmonic(s) > 150%:

Order (n): None

Harmonic(s) with average > 100%:

Order (n): None

Check odd harmonics 21..39:
All Partial Odd Harmonics below partial limits.
Harmonic(s) > 150%: Order (n): None

Harmonic(s) with average > 150%: Order (n): None

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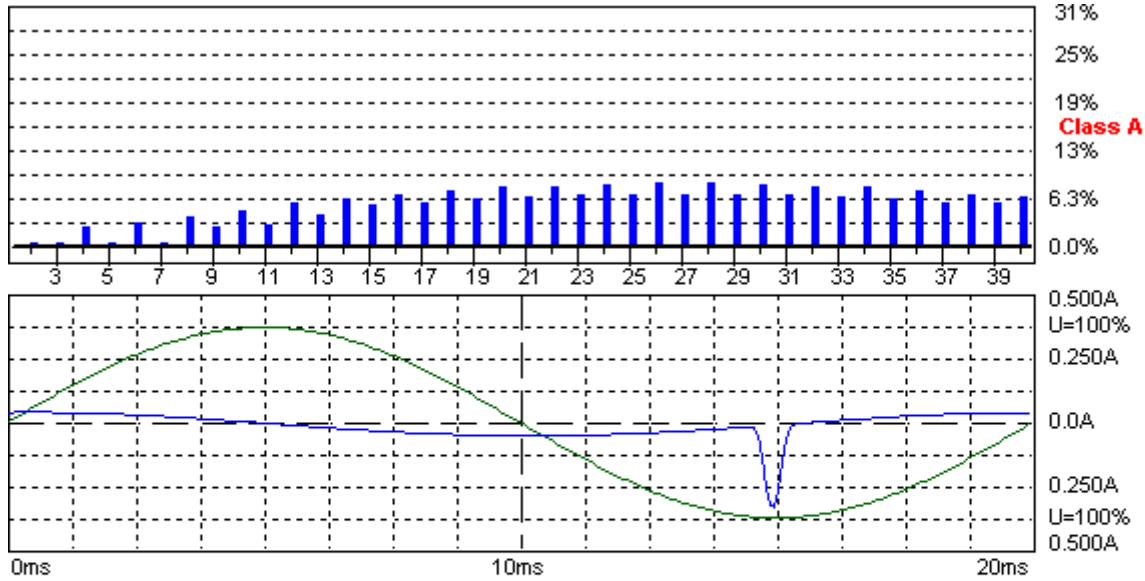
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Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2)

2013-11-11 14:36:50

Urms = 229.7 V P = 2.528 W THD(I) = 117 % Range: 0.5 A
 Irms = 0.052 A pf = 0.211 H1 (I) = 0.034 A V-nom: 230 V
 TestTime: 10 min (100%)

Eric

Test completed, Result: PASSED

HAR-1000 EMC-Partner

Order	Freq. [Hz]	Irms [A]	Imax [A]	Limit [A]	Status
1	50	0.0345	0.0345		
2	100	0.0085	0.0086	1.0800	
3	150	0.0084	0.0085	2.3000	
4	200	0.0085	0.0085	0.4300	
5	250	0.0084	0.0085	1.1400	
6	300	0.0084	0.0085	0.3000	
7	350	0.0083	0.0084	0.7700	
8	400	0.0082	0.0083	0.2300	
9	450	0.0081	0.0082	0.4000	
10	500	0.0081	0.0081	0.1840	
11	550	0.0080	0.0081	0.3300	
12	600	0.0078	0.0079	0.1533	
13	650	0.0077	0.0078	0.2100	
14	700	0.0076	0.0077	0.1314	
15	750	0.0074	0.0075	0.1500	
16	800	0.0073	0.0074	0.1150	
17	850	0.0071	0.0072	0.1324	
18	900	0.0070	0.0070	0.1022	
19	950	0.0069	0.0069	0.1184	
20	1000	0.0067	0.0067	0.0920	
21	1050	0.0064	0.0065	0.1071	
22	1100	0.0063	0.0063	0.0836	
23	1150	0.0061	0.0062	0.0978	
24	1200	0.0059	0.0060	0.0767	
25	1250	0.0056	0.0057	0.0900	

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26	1300	0.0055	0.0056	0.0708	
27	1350	0.0053	0.0054	0.0833	
28	1400	0.0051	0.0052	0.0657	
29	1450	0.0048	0.0049	0.0776	
30	1500	0.0047	0.0048	0.0613	
31	1550	0.0045	0.0046	0.0726	
32	1600	0.0043	0.0044	0.0575	
33	1650	0.0040	0.0041	0.0682	
34	1700	0.0038	0.0040	0.0541	
35	1750	0.0037	0.0038	0.0643	
36	1800	0.0034	0.0036	0.0511	
37	1850	0.0032	0.0033	0.0608	
38	1900	0.0030	0.0032	0.0484	
39	1950	0.0029	0.0031	0.0577	
40	2000	0.0027	0.0028	0.0460	

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5.4 Voltage fluctuations and flicker

For test instruments and accessories used see section 6 part 6.4.

5.4.1 Description of the test location

Test location : Test location no. 1

5.4.2 Limits of voltage fluctuation and flicker

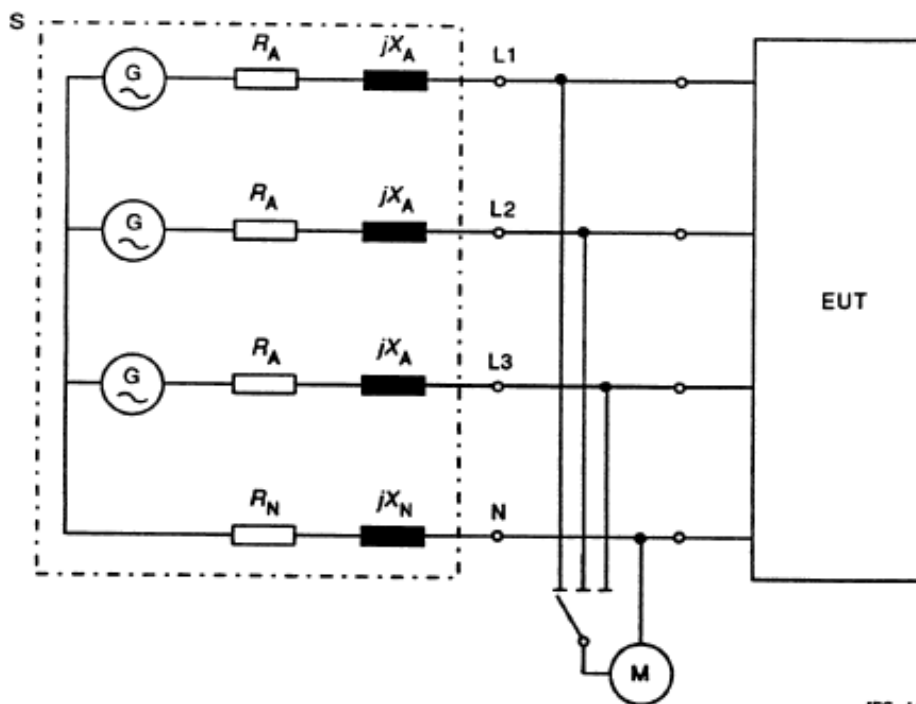
Test configuration and procedure see clause 5 of standard EN 61000-3-3: 2008.

5.4.3 Description of the test set-up

5.4.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

5.4.3.2 Block Diagram of Test Setup



IEC 103504

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5.4.4 Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.4.5 Test protocol

Operation mode 1	Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
Remarks:			

Standard used:	EN 61000-3-3 Flicker
Short time (Pst):	5 min
Observation time:	10 min (1 Flicker measurement)
Flickermeter:	AC 230V / 50Hz
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86-106kPa
E. U. T.:	MIXER AMPLIFIER
M/N:	T-4120MP (T-4012)
Date of test:	11 November 2013
Tester:	Eric

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.09	1.00	PASS
dc [%]	0.68	3.30	PASS
dmax [%]	0.29	4.00	PASS
dt [s]	0.00	0.50	PASS

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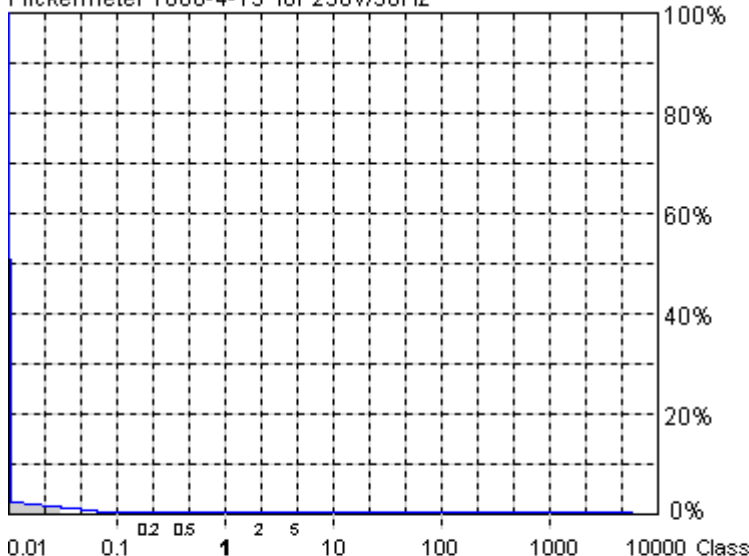
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Flickermeter 1000-4-15 for 230V/50Hz



Actual Flicker (Fli):	0.00
Short-term Flicker (Pst):	0.09
Limit (Pst):	1.00
Long-term Flicker (Plt):	0.09
Limit (Plt):	0.65
Maximum Relative Volt. Change (dmax):	0.29%
Limit (dmax):	4.00%
Relative Steady-state Voltage Change (dc):	0.68%
Limit (dc):	3.30%
Maximum Interval exceeding 3.30% (dt):	0.00ms
Limit (dt>Lim):	200ms

Flicker Emission - IEC 61000-3-3 , EN 61000-3-3 , (EN60555-3)

2013-11-11 15:48:20

Urms = 229.3 V P = 214.3 W
 Irms = 1.724 A pf = 0.542

Range: 10 A
 V-nom: 230 V
 TestTime: 10 min (100%)

Eric
 MICROPHONE

Test completed, Result: PASSED

HAR-1000 EMC-Partner

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Operation mode 1	Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
Remarks:	Microphone		

Standard used:	EN 61000-3-3 Flicker
Short time (Pst):	5 min
Observation time:	10 min (1 Flicker measurement)
Flickermeter:	AC 230V / 50Hz
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86-106kPa
E. U. T.:	MIXER AMPLIFIER
M/N:	T-4120MP (T-4012)
Date of test:	11 November 2013
Tester:	Eric

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.07	1.00	PASS
dc [%]	0.00	3.30	PASS
dmax [%]	0.00	4.00	PASS
dt [s]	0.00	0.50	PASS

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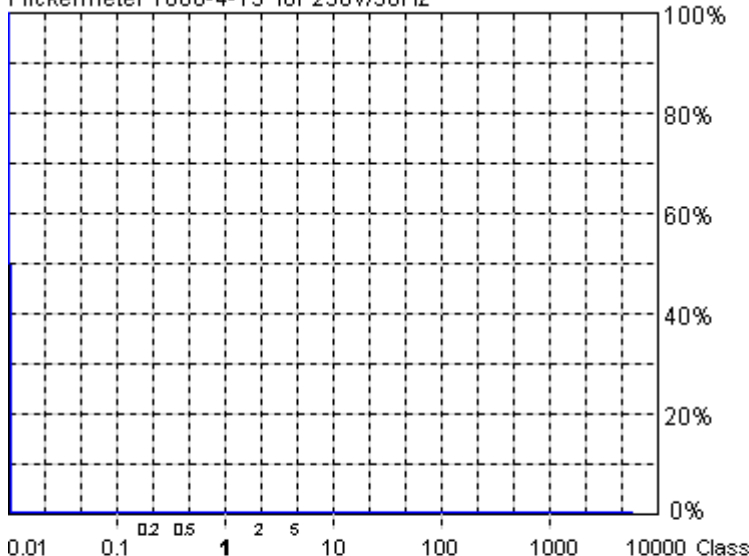
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Flickermeter 1000-4-15 for 230V/50Hz



Actual Flicker (Fli):	0.00
Short-term Flicker (Pst):	0.07
Limit (Pst):	1.00
Long-term Flicker (Plt):	0.07
Limit (Plt):	0.65
Maximum Relative Volt. Change (dmax):	0.00%
Limit (dmax):	4.00%
Relative Steady-state Voltage Change (dc):	0.00%
Limit (dc):	3.30%
Maximum Interval exceeding 3.30% (dt):	0.00ms
Limit (dt>Lim):	200ms

Flicker Emission - IEC 61000-3-3 , EN 61000-3-3 , (EN60555-3)

2013-11-11 14:20:14

Urms = 229.7 V P = 2.516 W
 Irms = 0.050 A pf = 0.221

Range: 25 A
 V-nom: 230 V
 TestTime: 10 min (100%)

Eric
 MICROPHONE

Test completed, Result: PASSED

HAR-1000 EMC-Partner

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Fax: +86-20-38780406

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5.5 Electrostatic discharge

For test instruments and accessories used see section 6 part 6.5.

5.5.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	11~22 November 2013
Operator :	Eric

5.5.2 Severity of levels electrostatic discharge

5.5.2.1 Severity level: Contact discharge at $\pm 4\text{KV}$ air discharge at $\pm 8\text{KV}$

Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

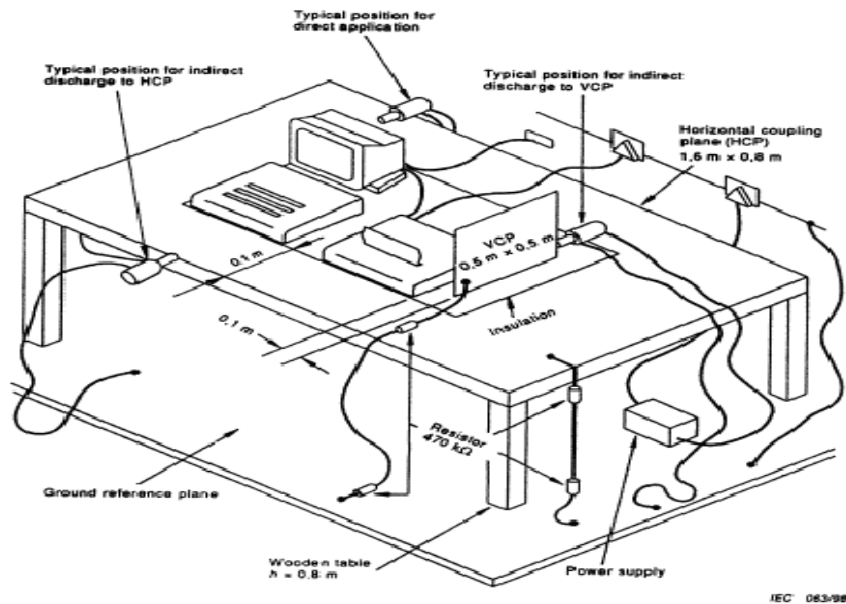
5.5.2.2 Performance criterion: B

5.5.3 Description of the test set-up

5.5.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

5.5.3.2 Block Diagram of Test Setup



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5.5.4 Test specification:

Contact discharge voltage:	<input checked="" type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 4 kV	
Air discharge voltage:	<input checked="" type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 8 kV
Discharge impedance:	<input checked="" type="checkbox"/> 330 Ω / 150 pF		
Discharge factor:	<input checked="" type="checkbox"/> ≥ 1 sec.		
Number of discharges:	<input checked="" type="checkbox"/> ≥ 10		
Type of discharge:	Direct discharge	<input checked="" type="checkbox"/> Air discharge	
		<input checked="" type="checkbox"/> Contact discharge	
	Indirect discharge	<input checked="" type="checkbox"/> Contact discharge	
Polarity:	<input checked="" type="checkbox"/> Positive	<input checked="" type="checkbox"/> Negative	
Discharge location:	<input checked="" type="checkbox"/> see photo documentation of the test set-up		
	<input checked="" type="checkbox"/> all external locations accessible by hand		
	<input checked="" type="checkbox"/> horizontal plate (HCP)		
	<input checked="" type="checkbox"/> vertical coupling plate (VCP)		

5.5.5 Test resultThe requirements are **Fulfilled**Performance Criterion: **B****Remarks:** During the test no deviation was detected to the selected operation mode(s).

5.6 Electrical fast transients / Burst

For test instruments and accessories used see section 6 part 6.6.

5.6.1 Description of the test location

Test location :	Test location no. 2
Power supply:	AC 230V/50Hz
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	11~22 November 2013
Operator :	Eric

5.6.2 Severity levels of electrical fast transients / Burst

5.6.2.1 Severity level: ±1000V for AC power supply lines

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O signal, data and control ports	
	V peak(KV)	Repetition rate (KHz)	Voltage peak	Repetition rate (KHz)
1.	0.5	5 or 100	0.25	5 or 100
2.	1	5 or 100	0.5	5 or 100
3.	2	5 or 100	1	5 or 100
4.	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

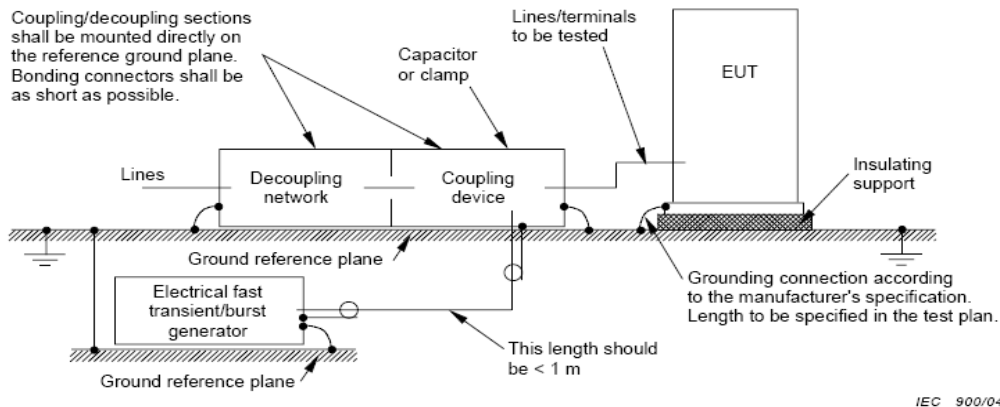
5.6.2.2 Performance criterion: B

5.6.3 Description of the test set-up

5.6.3.1 Operating Condition

The EUT is engraving during the test, and the results of the maximum emanation are recorded

5.6.3.2 Block Diagram of Test Setup



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5.7. Immunity from inducted voltages (S2a)

5.7.1 Test Requirements

Test Level Refer to Standard EN 55020.

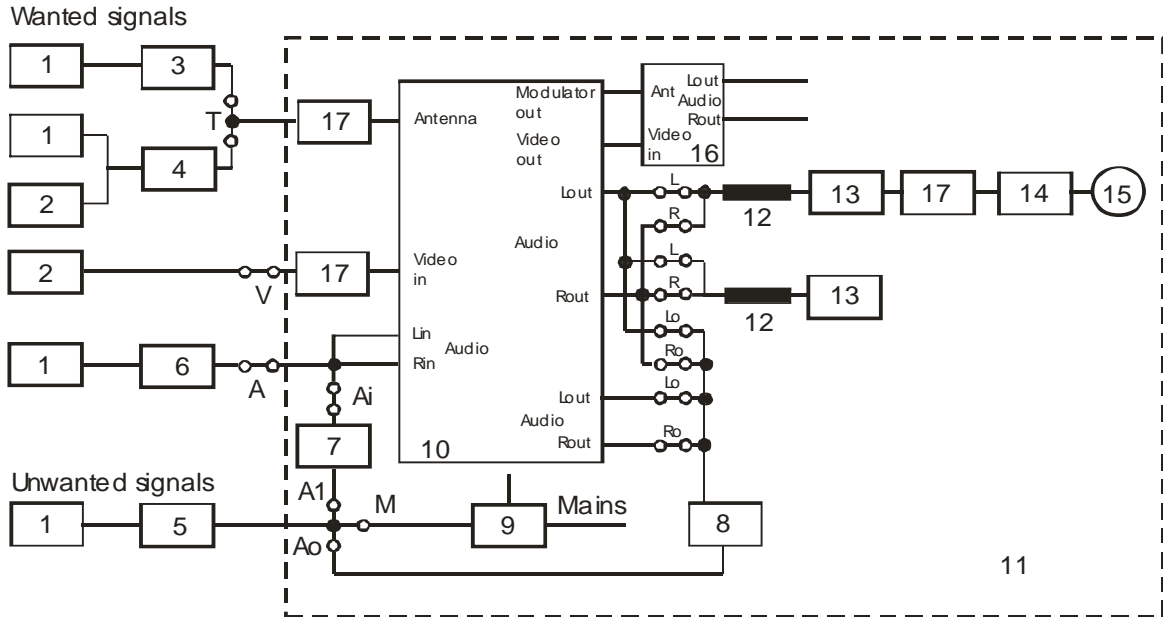
5.7.2 Test Setup and Procedure

The EUT is placed 0.1m above the center of a metallic ground plane of dimensions 2m by 1m. The mains lead shall be bundled to a length less than 0.3m and connected in the shortest possible way to the mains stop network.

In case the terminals of the equipment under test are non-shielded (e.g. loudspeaker terminals) the connection from the coaxial cable to the terminals shall be kept as short as possible. The shield of the coaxial cable shall be connected to the metal plate, as close as possible to the terminals of the coupling unit and by a connection as short as possible.

The unused input terminals and the loudspeaker and/or headphone or any other audio output terminals are terminated with appropriate load resistors as specified by the manufacturer or in the relevant standard.

Test procedure refers standard EN55020.



- 1 AF generator
- 2 Video generator
- 3 RF generator FM
- 4 RF generator TV
- 5 RF generator
- 6 Impedance
- 7 RC network audio inputs
- 8 RC network audio outputs
- 9 Mains filter
- 10 EUT
- 11 Metal plate 2m x 1m
- 12 RF choke
- 13 Rated load impedance of the audio output
- 14 Band-pass filter
- 15 Voltmeter
- 16 Test TV
- 17 Ferrite cores

5.7.3 Test specification:

Test frequency range:	■ 150kHz~30MHz
Test signal port	■ AC Port ■ AudioPort
Monitor port	■ Audio out

5.7.4 Test result

The requirements are **Fulfilled**

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5.8. Immunity from radiated fields (S3, 150 kHz– 150 MHz)

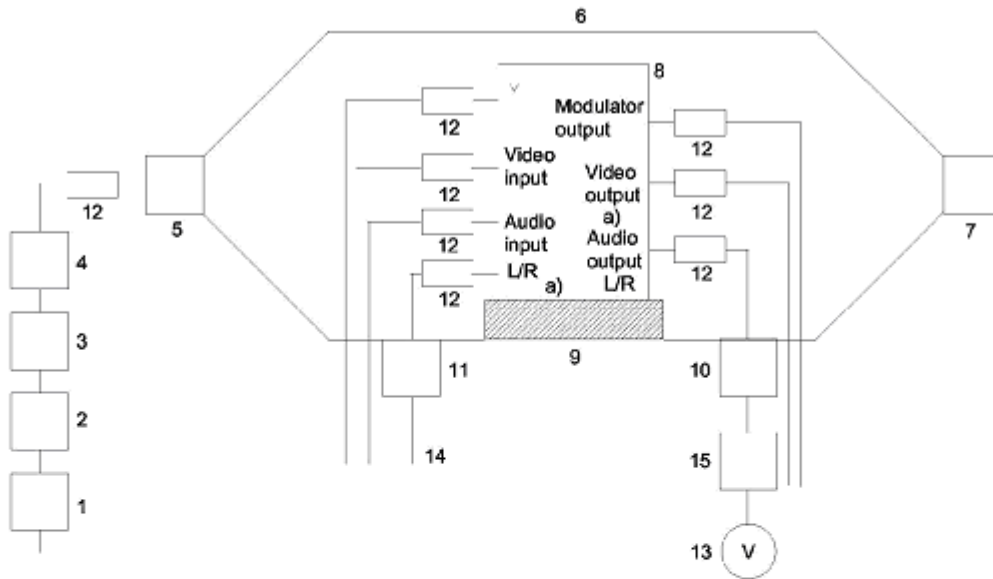
5.8.1 Test configuration

The test configuration is in corresponds to the standard EN 55020. The strip line is placed in the facility on a wooden table 0.8m high on the centre axis of the chamber. The equipment under test is placed on a platform on the centre of the strip line. The power supply and the RF connection points are close to the equipment under test at the floor of the chamber inside a connection box. The cables to this connection box are shielded and below the double floor. The RF-generators are placed in a special room adjacent to the chamber. The observation of the equipment under test is realized by 3 video cameras and by a microphone.

5.8.2 Test parameters and marginal conditions

The tests are carried out with a field strength by 125 $\mu\text{V}/\text{m}$ (measured in the unmodulated field) with amplitude modulated signal by a depth of 80 % by a sinusoidal audio signal of 1 kHz. The logarithmic step was 1% and the remaining time was 1s. Further information please find in test protocol.

Observation of the equipment under test.



IEC 454/02

Key

- | | |
|---|---|
| 1 AF generator 1 kHz G1 | 9 Non-metallic support |
| 2 RF generator G2 for unwanted signal | 10 Loudspeaker bandstop filter LBS (see figure E.8) |
| 3 Wideband power amplifier Am 0,15 MHz to 150 MHz | 11 Mains bandstop filter MBS (see figure E.7) |
| 4 Low-pass filter F | 12 Sheath current chokes Sh (ferrite cores) |
| 5 Matching network MN (see figure E.5) | 13 Audio frequency voltmeter V |
| 6 Open stripline device TEM | 14 Mains cable |
| 7 Terminating impedance 150 Ω (see figure E.6) | 15 Band pass filter (see figure B.1) |
| 8 Equipment under test | |

a) Channels 1 and 2 in the case of two-channel sound television equipment.

Measurement of the immunity of broadcast receivers from radiated fields in the frequency range 0,15 MHz to 150 MHz in an open stripline

5.8.3 Test specification:

Test frequency range:	■ 150kHz~30MHz
Modulation:	■ AM: 80 % ■ sinusoidal 1kHz
Monitor port	■ Audio out

5.8.4 Test result

The requirements are **Fulfilled**

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5.9. Immunity from radiated fields (900MHz, Keyed carrier)

5.9.1. Test Requirements

Test Level Refer to Standard EN 55020.

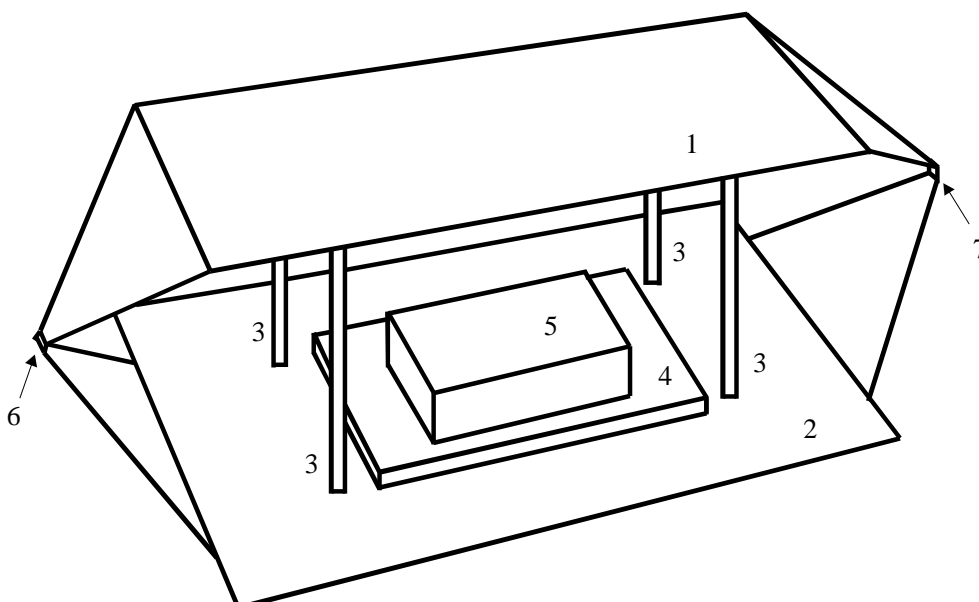
5.9.2 Test Setup and Procedure

The stripline shall be placed on non-metallic supports at least 0.8m from the floor, and the top conductor plate shall be no closer than 0.8m from the ceiling. RF absorbing plates shall be placed in the space between the sides of the stripline and the wall of the screening room. (picture 9)

The EUT is placed on a non-metallic support, 0.1m high, in the center of the stripline in the same position as for normal home usage.

Connecting leads to the EUT are inserted through holes in the base conductor plate of the stripline, the mains leads shall be bundled to a length less than 0.3m.

Test procedure refers to standard EN55020.



- 1 – metallic cover plate (2m x 0,6m) parallel to
- 2 – metallic base plate (2m x 0,9m)
- 3 – plastic supports
- 4 – non metallic pedestal
- 5 – Equipment under test
- 6 – connector for generator and network
- 7 – connector for terminating impedance

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5.9.3 Test specification:

Frequency range:	■ 900 MHz
Field strength:	■ 3 V/m
EUT - antenna separation:	■ 3 m
Modulation:	■ AM: 80 % ■ sinusoidal 217Hz
Frequency step:	■ 1 % with 3 s dwell time
Antenna polarisation:	■ horizontal ■ vertical

5.9.4 Test result

The requirements are **Fulfilled**

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6 USED TEST EQUIPMENT

6.1					
Power Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100868	2012/11/06
2	Absorbing clamp	ROHDE & SCHWARZ	MDS 21	03466	2013/03/29
3	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.2					
Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100868	2012/11/06
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2012/11/06
3	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z6	100140	2012/11/06
4	Pulse Limiter	ROHDE & SCHWARZ	ESHS-Z2	100301	2012/11/06
5	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.3					
Harmonic Current					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	Harmonics1000-1P	103488	2012/11/20
2	Harmonics-1000	EMC Partner	N/A	N/A	N/A

6.4					
Voltage Fluctuation and Flicker					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	Harmonics1000-1P	103488	2012/11/20
2	Harmonics-1000	EMC Partner	N/A	N/A	N/A

6.5					
Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	Schlöder	SESD 200	0302016	2013/03/29

6.6					
Electrical Fast Transient/Burst					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2012/11/06
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2012/11/06
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2012/11/06
4	Genecs Software	EMC Partner	N/A	N/A	N/A

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7 TEST PHOTOGRAPHS

7.1. Photo of power line conducted emission measurement (C.E.)



7.2. Photo of Power disturbance emission measurement (Clamp.)



7.3. Photo of harmonic current and flicker emission measurement (H.&F.)



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7.4. Photo of electrostatic discharge Immunity measurement (E.S.D.)



7.5. Photo of EFT immunity measurement (E.F.T.)



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8 EXTERNAL AND INTERNAL PHOTOS OF THE EUT



External view



External view 1.1



External view 1.2

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External view 1.3



External view 1.4



External view 1.5

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External view 1.6



External view 1.7



External view 1.8

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External view 2.1



External view 2.2



External view 2.3

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External view 2.4



External view 2.5



Internal view 1.1

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Internal view 2.1



Internal view 2.2



Internal view 2.3

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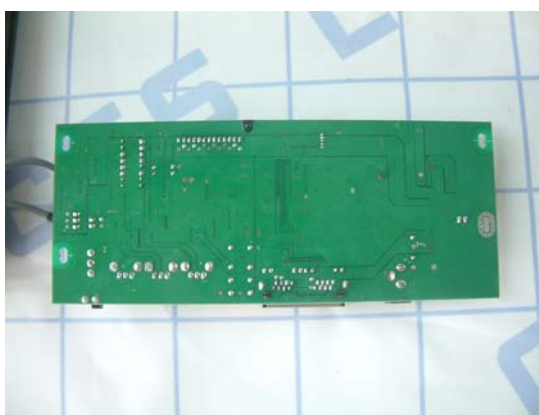
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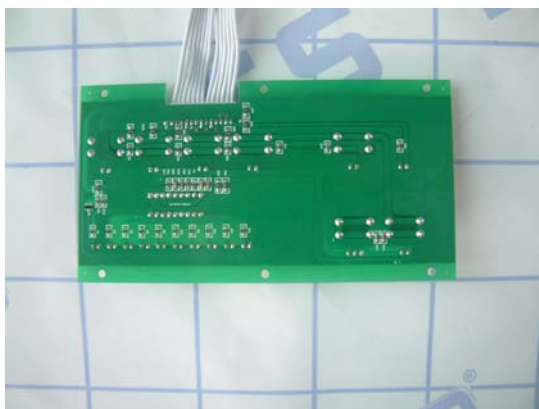
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PCB view 1 side 1.1



PCB view 1 side 1.2



PCB view 1 side 2.1

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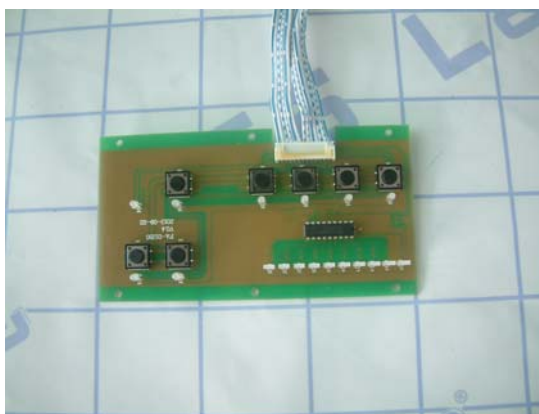
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9 Manufacturer/ Approval holder Declaration

The following identical model(s):

T-4060MP,	MPT120,	MPT240,	T-2E120,	T-2E240,
T-120E,	T-240E,	T-120MT,	T-240MT,	T-40MT,
T-60MT,	TI-120MT,	TI-240MT,	TI-240S,	TI-350S

Belong to the tested device:

Product description: **MIXER AMPLIFIER**
Model name: **T-4120MP (T-4012)**

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