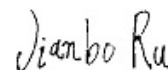



TEST REPORT ELECTROMAGNETIC COMPATIBILITY (EMC)

Report Reference No.....: 367802
Supervised by (name & signature) ...: Jianbo Ru

Approved by (name & signature).....: Juno Wong

Date of issue.....: 2019-02-26
Report issued by: Nemko Shanghai Ltd Shenzhen Branch
**Address: Unit CD, Floor 10, Tower 2, Financial base, Kefa Road 8#,
Hi-Technology Park, Nanshan District, Shenzhen, China**
Testing procedure.....: Supervised testing at external laboratory
Testing location/ address.....: See page 9
Applicant's name.....: New Nanfang Electrical Appliance Co., Ltd.
**Address: No.213, Wenzhang Cun, Cunjin Road, Chikan District,
Zhanjiang, Guangdong**
Test specification:
Standards for Emission: EN55014-1:2017
EN61000-3-3:2013
EN61000-3-2:2014
Standards for Immunity: EN55014-2:2015
Arrival of EUT: 2012-02-01, 2012-06-08, 2012-11-27, 2015-10-12
**Test date of EUT: 2012-02-01 to 2012-02-22, 2012-06-08, 2012-11-28,
2015-10-13 to 2015-10-19**
Test item description: Rice Cooker
Trade Mark: 
Manufacturer: New Nanfang Electrical Appliance Co., Ltd.
**Address: No.213, Wenzhang Cun, Cunjin Road, Chikan District,
Zhanjiang, Guangdong**
**Type.....: MRC-XXXY, LED-XXX, RC-YYYY, MRCD-4, MRCD-5,
MRCD-7**
Serial number: See page 7-8

Index of the test report:

1	Summary Emission	5
1.1	Standards	5
1.2	Results.....	5
2	Summary Immunity	6
2.1	Standards	6
2.2	Results.....	6
2.3	Performance criteria according to product or product family standards.....	6
3	General information	7
3.1	Description of Equipment under test (EUT).....	7
3.2	Measurement uncertainty	8
3.3	Test Mode (TM)	8
3.4	Climatic conditions.....	8
3.5	Testing location	9
4	Measurement of Conducted disturbance	10
4.1	Standards	10
4.2	Measurement equipment.....	10
4.3	Test set-up.....	10
4.4	Test result.....	11
4.5	Diagrams	13
4.5.1	Diagram 001	13
4.5.2	Diagram 002	13
4.5.3	Diagram 003	14
4.5.4	Diagram 004	14
4.5.5	Diagram 005	15
4.5.6	Diagram 006	16
4.5.7	Diagram 007	17
4.5.8	Diagram 008	18
4.5.9	Diagram 009	19
4.5.10	Diagram 010	20
5	Measurement of Discontinuous Disturbance	21
5.1	Standards	21
5.2	Measurement equipment.....	21
5.3	Test set-up.....	21
5.4	Test result.....	21
5.5	Diagrams	22
5.5.1	Diagram 011	22
5.5.2	Diagram 012	23

6	Measurement of Disturbance Power.....	24
6.1	Standards	24
6.2	Measurement equipment.....	24
6.3	Test set-up.....	24
6.4	Test result.....	25
6.5	Diagrams	26
6.5.1	Diagram 013	26
6.5.2	Diagram 014	26
6.5.3	Diagram 015	27
6.5.4	Diagram 016	28
6.5.5	Diagram 017	29
7	Harmonic current	30
7.1	Standard	30
7.2	Measurement equipment.....	30
7.3	Test set-up.....	30
7.4	Test results	30
7.5	Tables	31
7.5.1	Table 018	31
7.5.2	Table 019	34
7.5.3	Table 020	37
7.5.4	Table 021	40
8	Voltage fluctuations and flicker	43
8.1	Standard	43
8.2	Measurement equipment.....	43
8.3	Test set-up.....	43
8.4	Test results	43
8.5	Tables	44
8.5.1	Table 022	44
8.5.2	Table 023	44
9	Electrostatic discharge.....	45
9.1	Standard	45
9.2	Measurement equipment.....	45
9.3	Test set-up.....	45
9.4	Test results	45
9.5	Table.....	45
9.5.1	Table 024	45
10	Electrical Fast Transients/Bursts Immunity	46
10.1	Standard	46
10.2	Measurement equipment.....	46
10.3	Test set-up.....	46

10.4 Test results	46
10.5 Table.....	47
10.5.1 Table 025	47
11 Surge Immunity.....	48
11.1 Standard	48
11.2 Measurement equipment.....	48
11.3 Test set-up.....	48
11.4 Test results	48
11.5 Table.....	49
11.5.1 Table 026	49
12 Conducted Immunity	50
12.1 Standard	50
12.2 Measurement equipment.....	50
12.3 Test set-up.....	50
12.4 Test results	50
12.5 Table.....	51
12.5.1 Table 027	51
13 Voltage dips and interruptions Immunity	52
13.1 Standard	52
13.2 Measurement equipment.....	52
N LAB.....	52
13.3 Test set-up.....	52
13.4 Test results	52
13.5 Table.....	53
13.5.1 Table 028	53
Annex A.....	54
EUT / technical data.....	54
Annex B.....	67
EUT set-up -details- for MRCD-7	67
EUT set-up -details- for MRC-12F	71
EUT set-up -details- for RC-280	73

1 Summary Emission

1.1 Standards

Generic standard

EN61000-3-3:2013

EN61000-3-2:2014

Product or product family standard

EN55014-1:2017

Product category

Tabletop Equipment

1.2 Results

Environmental phenomena	Port / Test module	Basic standard and test setup	Limit class	Result
Conducted Emission	AC input power ports	CISPR 16	Table 5 of EN55014-1	Pass
Discontinuous disturbance	AC input power ports	CISPR 16	Clause 4.4 of EN55014-1	Pass
Disturbance power	AC input power port	CISPR 16	Table 7 of EN55014-1	Pass
Radiated emission	Enclosure	CISPR 16	Table 9 of EN55014-1	N/A*
Harmonic current emission	AC input power ports	EN61000-3-2:2014	Class A	Pass**
Voltage fluctuations and flicker	AC input power ports	EN61000-3-3:2013	Clause 5 of EN61000-3-3	Pass***

Remarks: N/A-Not Applicable

*) The internal frequency is lower than 30 MHz and the Margin from 200~300MHz of disturbance power is more than 0~10dB, radiated emission measurements is not required.
(EN55014-1:2006+A1:2009+A2:2011)

**) For devices with a rated power of 75 W or less, not being lighting equipment, no limit values are effective.
(EN61000-3-2)
For professionally used devices with a total rated power exceeding 1 kW no limit values are effective. (EN61000-3-2)

***) There is no testing required if the device does not generate any significant voltage fluctuations or flicker.
(EN61000-3-3)
A short time measurement confirmed the assumption that this is the fact. The details in the test module are representing the results of the short time measurement.

2 Summary Immunity

2.1 Standards

Generic standard	/
Product or product family standard	EN55014-2:2015
Product category:	Category I & Category II
Performance criteria:	As below

2.2 Results

Environmental phenomena	Port / Test module	Basic standard and test setup	Performance criteria	Result (C.I)	Result (C.II)
Electrostatic Discharge	Enclosure port	EN 61000-4-2:2009	B	N/A	Pass
Radiated Electromagnetic field Susceptibility Test	Enclosure port	EN 61000-4-3:2006 /A1:2008/A2:2010	A	N/A	N/A
Electrical Fast Transient /Burst Test	Input AC Power port	EN 61000-4-4:2012	B	N/A	Pass
Surge Test	Input AC Power port	EN 61000-4-5: 2014/A1:2017	B	N/A	Pass
Conducted Susceptibility Test	Input AC Power port	EN 61000-4-6:2014	A	N/A	Pass
Voltage Dips and Interruptions Test	Input AC Power port	EN 61000-4-11: 2004+A1:2017	C	N/A	Pass

Remarks: N/A-Not Applicable

2.3 Performance criteria according to product or product family standards

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

3 General information

3.1 Description of Equipment under test (EUT)

Type of equipment	Table top	<input checked="" type="checkbox"/>
	Floor standing	<input type="checkbox"/>
	Combination	<input type="checkbox"/>
	Hand held EUT	<input type="checkbox"/>

The EUT is Rice Cooker

Main model: MRC-XXXY

The "XXX" can be 4C, 5C, 5D, 5S, 5B, 5F, 5H, 7C, 7D, 7B, 7F, 9C, 9D, 9S, 9B, 9F, 7H, 7SB, 7SH, 10F or 12F;

The "Y" can be M or blank (M represent for the appliance has micro switch).

Rating(s): 400W, 500W, 700W, 900W, 1000W or 1200W 220-240V~ 50-60Hz, Class I

MRC-XXXY is category I equipment, without any active electric component. Only the rating, switch and capacity are different.

Variant 1: LED-XXX

The "XXX" in the model can be 150 or 180.

Model difference:

Model No.	LED-180	LED-150
Rated Voltage (V)	220-240	220-240
Rated Power (W)	700	500
Capacity (L)	1,8	1,5

Rating(s): 500 or 700W 220-240V~ 50-60Hz, Class I

Variant 2: RC-YYYY

The "YYYY" in the model can be 280A, 280, 220, 210, 200, 180, 150C, 150B, 150A, 150, 100C, 100B, 100A, 100 or 60.

Rating(s): 1000W, 700W, 500W, 400W or 300W 220-240V~ 50-60Hz, Class I

Model difference:

Model	Power rating	Rated capacity
RC-60	300W	0.6L
RC-100	400W	1.0L
RC-100A		
RC-100B		
RC-100C		
RC-150	500W	1.5L
RC-150A		
RC-150B		
RC-150C		
RC-180	700W	1.8L
RC-210		
RC-200		1.8L
RC-220		
RC-280	1000W	2.8L
RC-280A		

Variant 3: MRCD-4, MRCD-5, MRCD-7
Rating(s): 400W, 500W or 700W 220-240V~ 50-60Hz, Class I

MRC-XXXY series and RC-YYYY series which are category I are electricity identical, only the power, appearance and the capacitor are different.

LED-XXX series which are category II are electricity identical, only the power and the capacitor are different.

In the original report, the model MRC-9F, MRC-12F and RC-280 do the Conducted emission, disturbance power, harmonic current and voltage flicker test.

The model LED-180 and MRCD-7 has biggest power are representative test models for full testing.

Remark: This report 303999 is on the basis of the original report 294849, standard are updated, change the RC-180 and RC-210 input power, but do not have any change, additional test is not need, All test data are from the original report.

This report 367802 is on the basis of the original report 303999, Update manufacturer address and update standard, additional test is not need, All test data are from the original report 303999.

3.2 Measurement uncertainty

Conducted Emission :	0.15~30MHz	2.7dB
Radiated Emission:	30MHz~1000MHz	4.4dB
Disturbance power:	30MHz-300MHz	3.4dB

3.3 Test Mode (TM)

Working mode

TM1	220~240VAC 50/60Hz, Maximum power state mode (0.9-1.1 times test voltage is 198-264VAC)
TM2	230VAC 50/60Hz, Maximum power state mode

Remark: By pre-scan, only list the worse mode in this report

3.4 Climatic conditions

parameter	admissible range	actual range	Result
Ambient temperature	15 °C - 35 °C	23°C	OK
Relative humidity	30 % - 60 %	55%	OK
Atmospheric pressure	86-106kPa	101kPa	OK

3.5 Testing location

Address 1#: Global United Technology Services Co., Ltd.-- Nemko ELA 632

2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Address 2#: NEMKO ELA 608

25 South Ronggui Rd, Shunde District, Foshan, Guangdong, China

Address 3#: CENTRE TESTING INTERNATIONAL CORPORATION – ELA 503

Build C, Hongwei Industrial Zone, Baoan 70 District, Shenzhen, China

Address 4#: Shenzhen Timeway Technology Consulting Co., Ltd.

East 5/Block 4, Anhua Industrial Zone, No.8, Tairan Rd. Chegongmiao, Futian District, Shenzhen, China—ELA 611

*Address 5#:*Shenzhen Huatongwei International Inspection Co., Ltd.

Keji Nan No.12 road ,Hi-tech park Shenzhen, P.R. China – ELA 125

*Address 6#:*Nemko Shanghai Ltd. Shenzhen Branch

Unit C&D, Floor 10,Tower 2,Financial Base, Kefa Road 8#, Hi-Technology Park, Nanshan District, Shenzhen 518057, China

Remark: All tests have been supervised by a Nemko engineer.

4 Measurement of Conducted disturbance

4.1 Standards

Generic standard	/
Product or product family standard	EN55014-1:2017
Limit class	Table 5 of EN55014-1
Basic standard	CISPR 16
Date of testing	2012-02-01, 2012-06-08, 2012-11-28, 2015-10-13

4.2 Measurement equipment

GTS:

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Shielding Room	Jul. 04 2019	7.0(L)x3.0(W)x3.0(H)	GTS252	ZhongYu Electron
<input checked="" type="checkbox"/>	EMI Test Receiver	Jul. 04 2019	ESCS30	1102.4500K30	Rohde & Schwarz
<input checked="" type="checkbox"/>	10dB Pulse Limit	Jul. 04 2019	N/A	GTS224	Rohde & Schwarz
<input checked="" type="checkbox"/>	LISN	Jul. 04 2019	NSLK 8127	8127549	SCHWARZBECK MESS-ELEKTRONIK
<input checked="" type="checkbox"/>	Coaxial Cable	Apr. 01 2019	N/A	N/A	GTS
<input checked="" type="checkbox"/>	EMI Test Software	Jul. 04 2019	E3	N/A	AUDIX

Timeway:

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	EMI Receiver	2019.5.14	ESH3	860905/006	R & S
<input checked="" type="checkbox"/>	Spectrum Analyzer	2019.5.14	ESA-L1500A	US37451154	R & S
<input checked="" type="checkbox"/>	PULSE LIMITER	2019.5.14	ESH3-Z2	100281	R & S
<input checked="" type="checkbox"/>	LISN	2019.5.14	ESH3-Z5	100294	R & S

CTI:

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Receiver	07/06/2019	ESCI	100009	R&S
<input checked="" type="checkbox"/>	LISN	07/06/2019	ENV216	100098	R&S

N LAB:

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	EMI Test Receiver	2020.01.14	ESCI	100657	ROHDE & SCHWARZ
<input checked="" type="checkbox"/>	Artificial Mains	2020.01.14	ENV216	100065	ROHDE & SCHWARZ
<input checked="" type="checkbox"/>	Pulse Limiter	2020.01.14	ESH3-Z2	100860	ROHDE & SCHWARZ
<input checked="" type="checkbox"/>	EMI Test Software	N/A	EMC32	N/A	ROHDE & SCHWARZ

4.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.
The test has been performed as following:

EUT is placed 0.8m above an earthed conducting surface of at least 2m x 2m in size and at a distance of 0.8m from the artificial mains V-network. If the measurement is made in a screened enclosure, the distance of 0.4m is referred to one of the walls of the enclosure. For floor standing EUT, it is placed on 0.1m insulation above the Grd. The power line of the EUT is connected to the AC

mains through a Artificial Mains Network (A.M.N.). A EMI test receiver used to test the emissions form both sides of AC line. The bandwidth of EMI test receiver is set at 9 kHz. The voltage probe shall be used when measuring on terminals other than mains terminals e.g. load and control terminals . The voltage probe contains a resistor having a resistance value of at least 1 500 Ω in series with a capacitor with a reactive value negligible to the resistance (in the range 150 kHz to 30 MHz) (see 5.2 of CISPR 16-1-2).

A test at about 160 kHz shall be made over a range of 0,9 to 1,1 times the rated voltage in order to check whether the level of disturbance varies considerably with the supply voltage; in which case, the measurements are to be made at the voltage that causes maximum disturbance.

If an appliance has a rated voltage range, the multipliers 0,9 and 1,1 apply to the lowest and highest, most common nominal supply voltages that fall within the rated voltage range that is specified by the manufacturer.

If an appliance has more than one rated voltage the multipliers 0,9 and 1,1 apply to the rated voltage that causes maximum disturbance.

For appliances with a frequency range of 50 Hz to 60 Hz, a test at about 160 kHz shall be made using supply frequencies of 50 Hz and 60 Hz at the above determined supply voltage, in order to check whether the level of disturbance varies considerably with the supply frequency; in which case, the measurements are to be made at the supply frequency which causes maximum disturbance.

The regulating control shall be adjusted to give a maximum indication on the meter at each frequency of measurement. After the value of the disturbance is registered at each preferred frequency (see 7.4.1.3) the frequency band adjacent to the preferred frequency is scanned without adjustment to the regulating control and the highest disturbance values are noted (for instance scan between 150 kHz and 240 kHz with the regulating control set at the value that gave the maximum on the meter at 160 kHz).

4.4 Test result

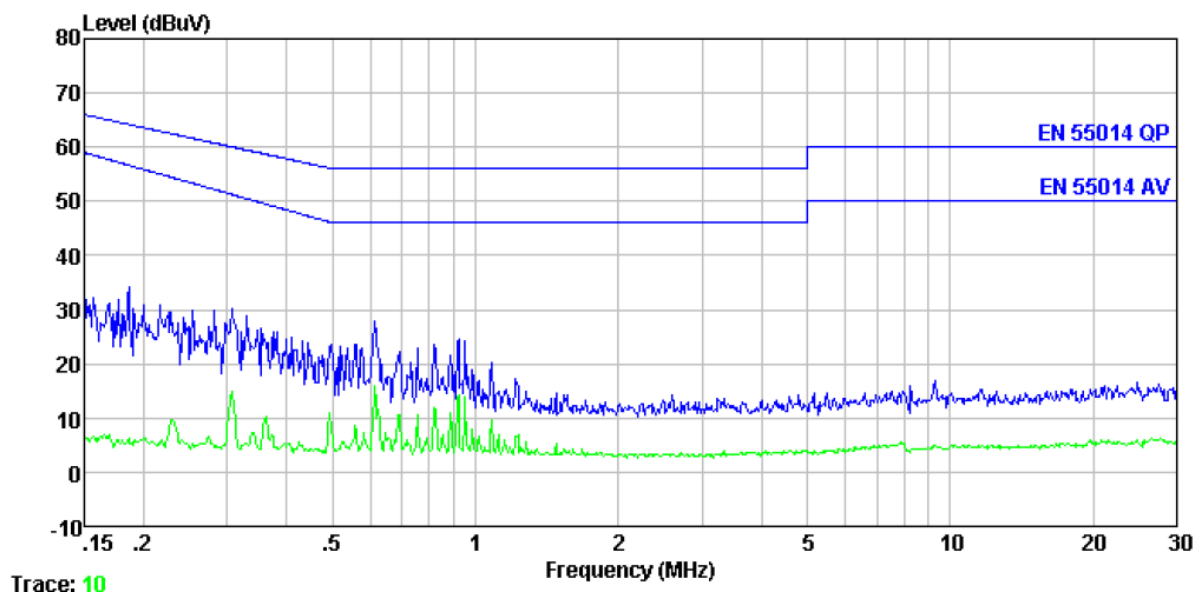
Power ports: AC input

Test mode	Model	Diagram	Description	Result
TM1	MRC-9F	001	Line L	Pass
		002	Line N	Pass
TM1	LED-180	003	Line L	Pass
		004	Line N	Pass
TM1	MRC-12F	005	Line L	Pass
		006	Line N	Pass
TM1	RC-280	007	Line L	Pass
		008	Line N	Pass
TM1	MRCD-7	009	Line L	Pass
		010	Line N	Pass

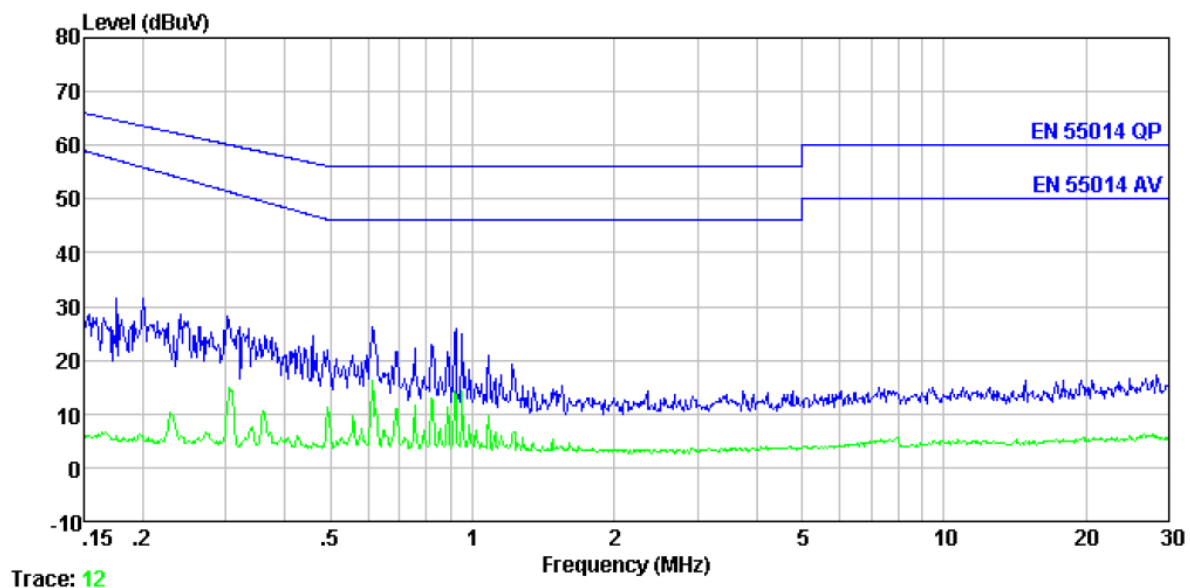
Remark:	Scan setting:					
	Freq range			Receiver setting		
	Start	Stop	Step	IF BW	Detector	Meas Time
	9k	150k	100Hz	200Hz	PK+AV	10ms
	150k	30M	4.5k	9k	PK+AV	10ms
	Final measurement:					
	Detector		Meas time			
	QP/AV		1s			
	A test at about 160KHz is made over a range of 0.9 to 1.1 times the rated voltage, and found that <u>264V~ 50Hz</u> causes maximum disturbance.					
	If the Peak measurement value is comply with the Average Limit, then both of QP and AVG is comply with the limit, and only list the peak and AVG value in this report.					

4.5 Diagrams

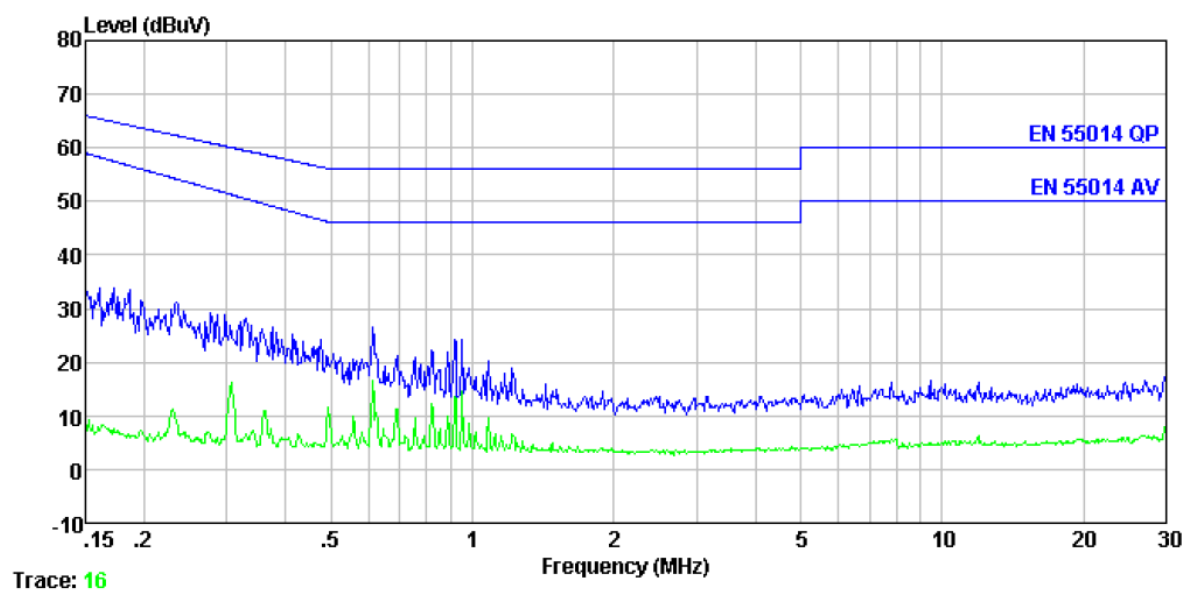
4.5.1 Diagram 001



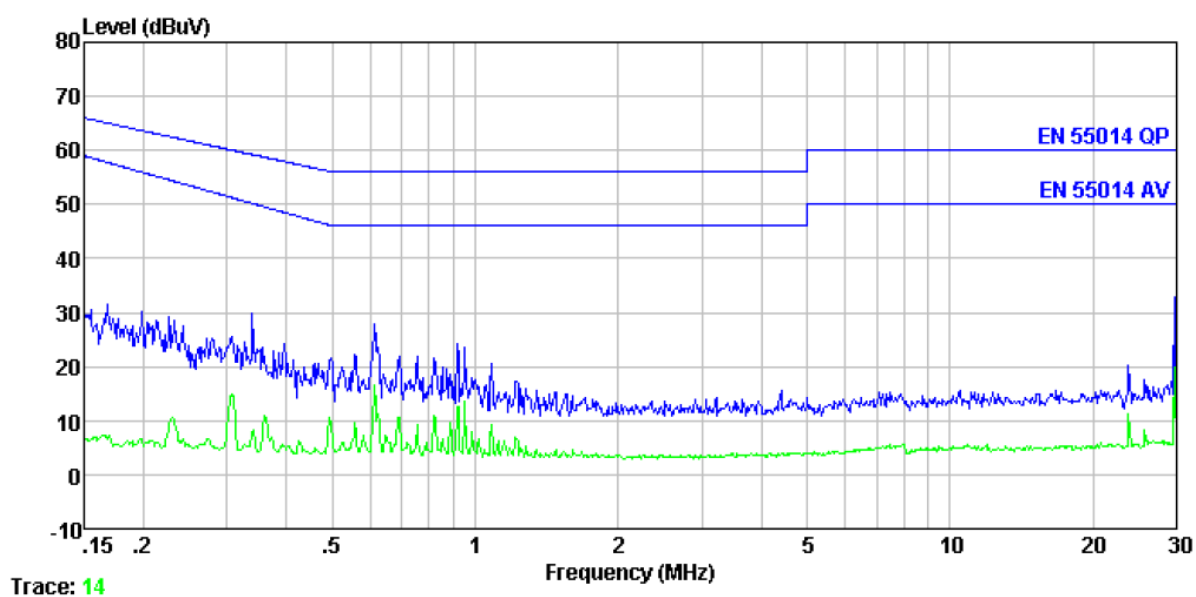
4.5.2 Diagram 002



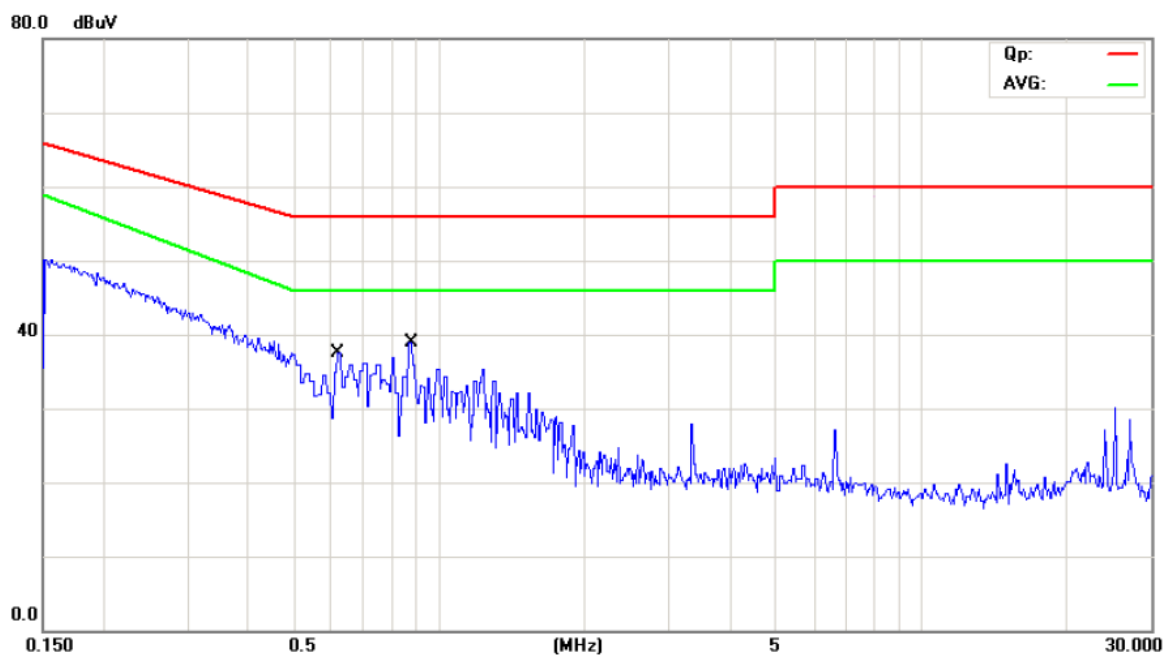
4.5.3 Diagram 003



4.5.4 Diagram 004

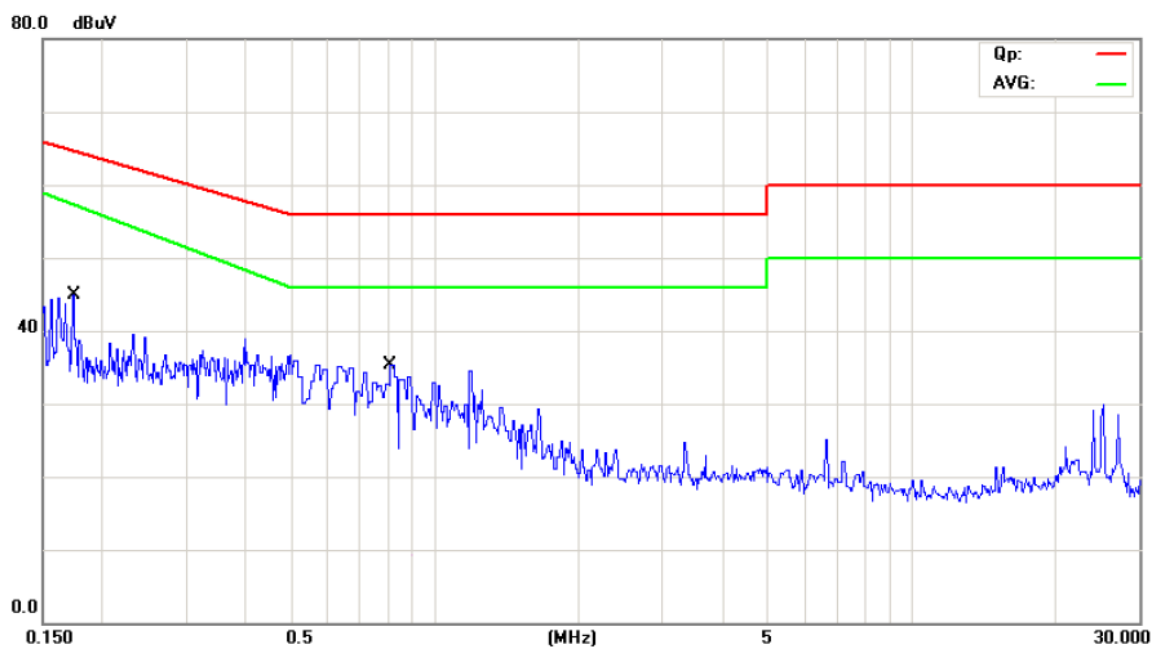


4.5.5 Diagram 005



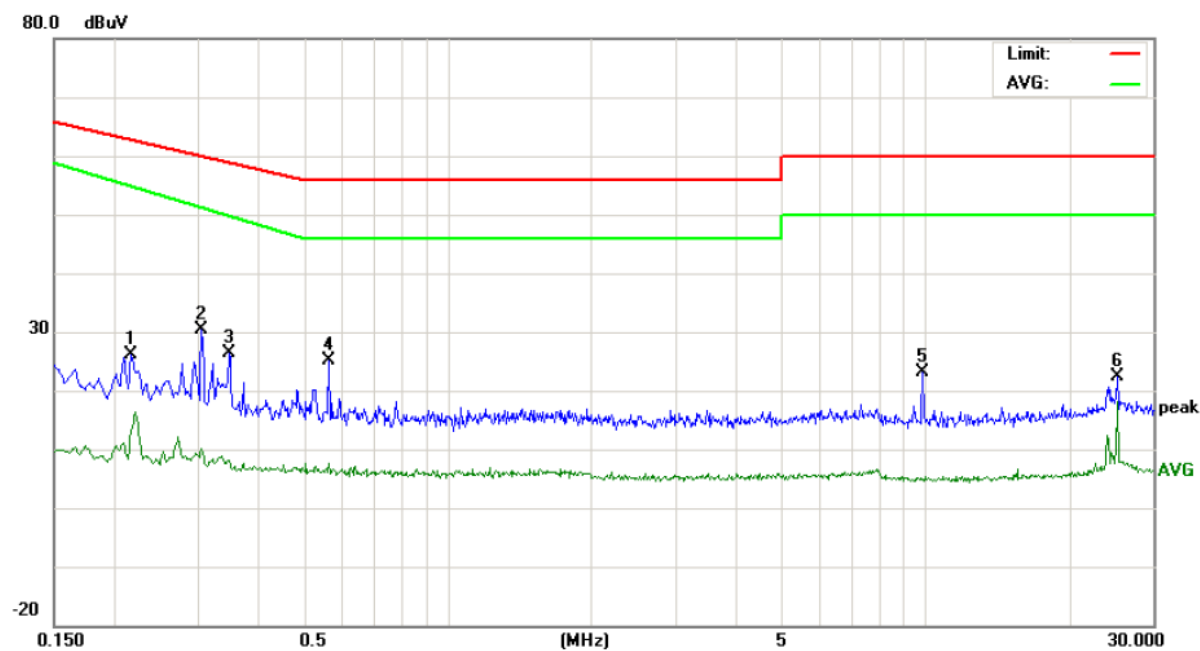
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.6237	25.94	11.50	37.44	56.00	-18.56	QP	
2		0.6237	12.24	11.50	23.74	46.00	-22.26	AVG	
3	*	0.8712	27.12	11.76	38.88	56.00	-17.12	QP	
4		0.8712	15.36	11.76	27.12	46.00	-18.88	AVG	

4.5.6 Diagram 006



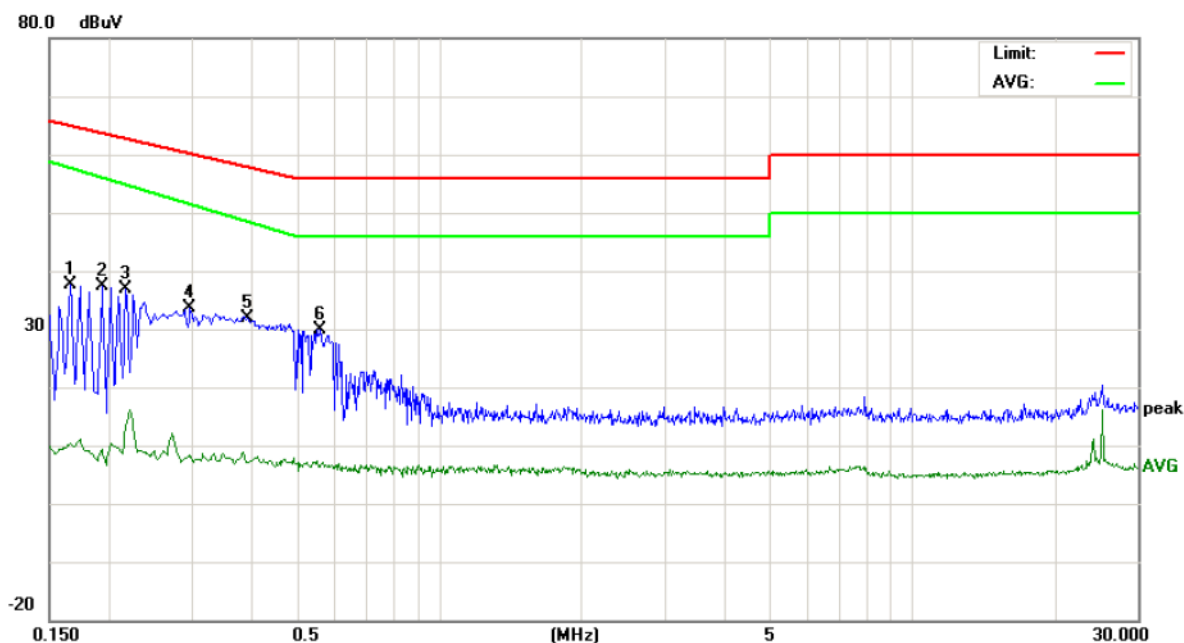
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1736	33.83	11.02	44.85	64.79	-19.94	QP	
2		0.1736	25.36	11.02	36.38	57.42	-21.04	AVG	
3		0.8150	23.64	11.70	35.34	56.00	-20.66	QP	
4	*	0.8150	16.24	11.70	27.94	46.00	-18.06	AVG	

4.5.7 Diagram 007



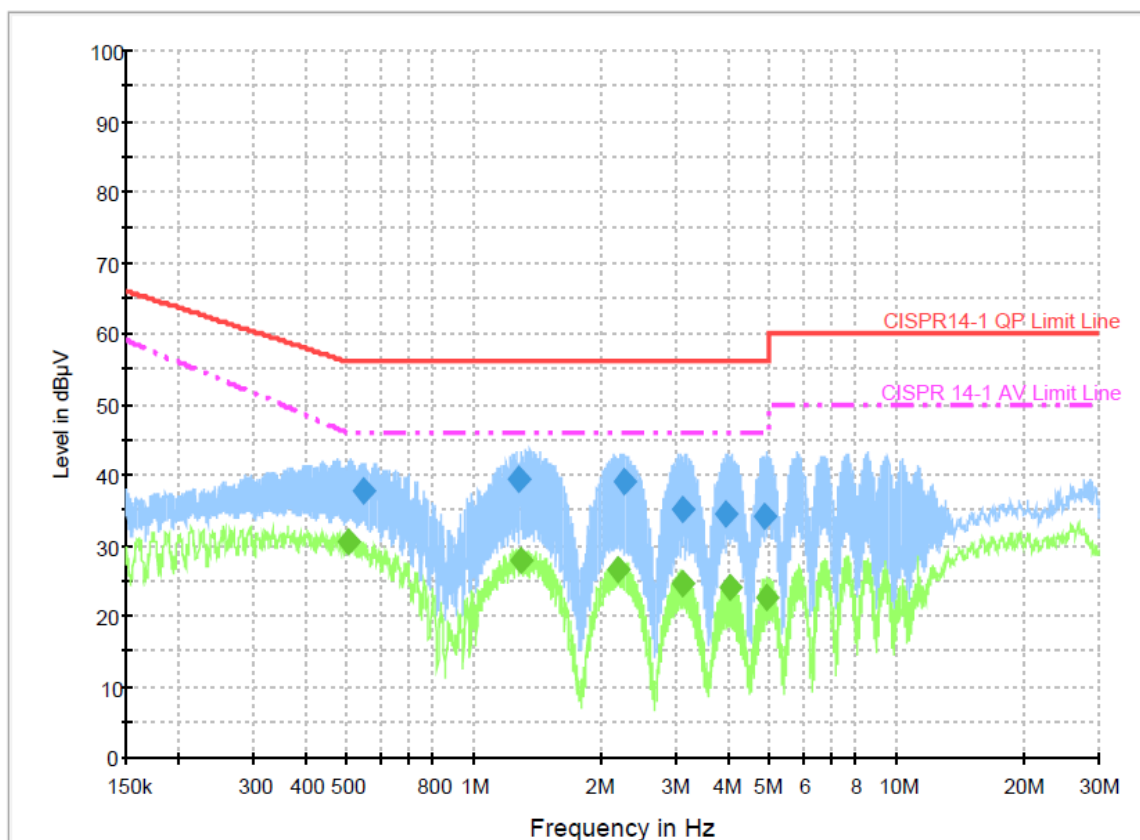
No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)	
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG
1	0.2180	16.10		3.25	9.90	26.00		13.15	62.89	54.96	-36.89	-41.81
2	0.3060	20.48		0.24	9.90	30.38		10.14	60.08	51.30	-29.70	-41.16
3	0.3500	16.49		-1.67	9.90	26.39		8.23	58.96	49.85	-32.57	-41.62
4	0.5660	15.13		-2.26	9.90	25.03		7.64	56.00	46.00	-30.97	-38.36
5	9.8979	13.15		-5.15	10.10	23.25		4.95	60.00	50.00	-36.75	-45.05
6	25.2020	11.71		7.46	10.75	22.46		18.21	60.00	50.00	-37.54	-31.79

4.5.8 Diagram 008



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)	
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG
1	0.1660	27.78		0.42	9.90	37.68		10.32	65.15	57.90	-27.47	-47.58
2	0.1940	27.58		-0.50	9.90	37.48		9.40	63.86	56.22	-26.38	-46.82
3	0.2180	26.93		3.41	9.90	36.83		13.31	62.89	54.96	-26.06	-41.65
4	0.2980	23.61		-1.42	9.90	33.51		8.48	60.30	51.58	-26.79	-43.10
5	0.3940	21.89		-2.89	9.90	31.79		7.01	57.98	48.57	-26.19	-41.56
6	0.5620	20.04		-3.35	9.90	29.94		6.55	56.00	46.00	-26.06	-39.45

4.5.9 Diagram 009



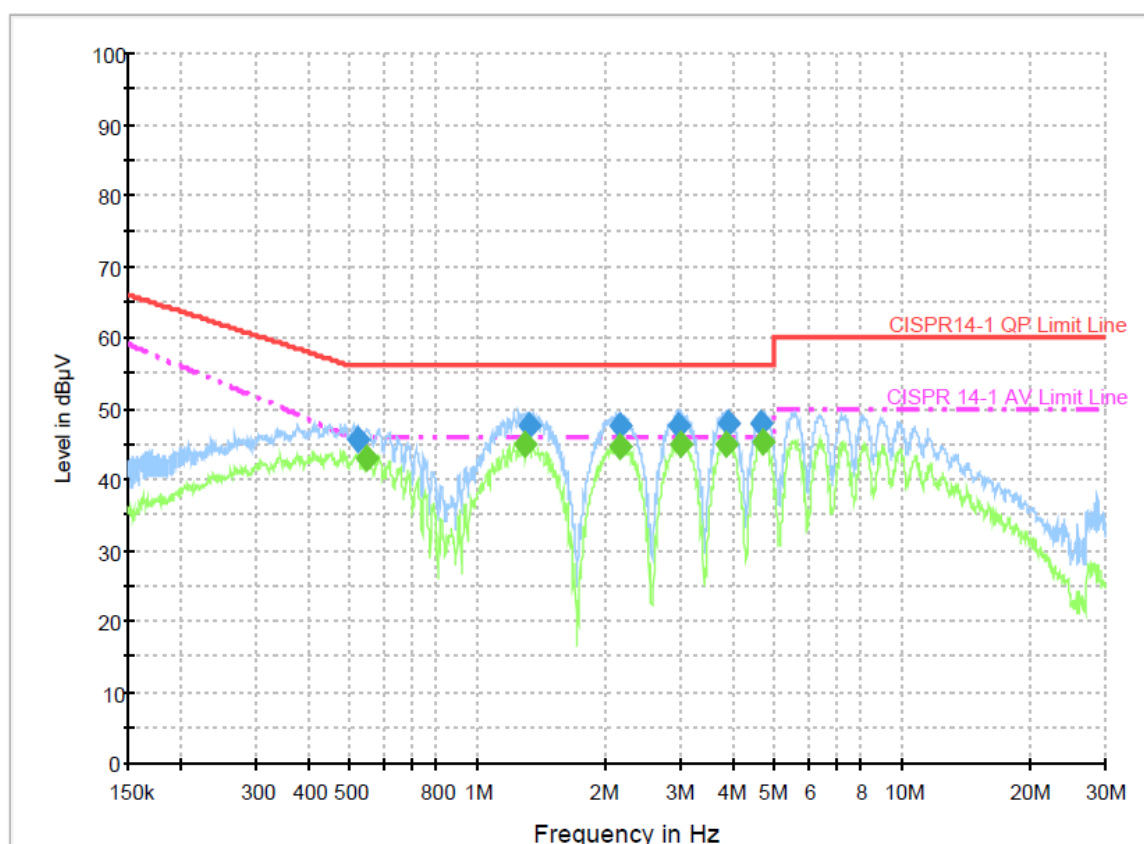
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.548630	37.7	L1	20.3	18.3	56.0
1.279534	39.3	L1	20.3	16.7	56.0
2.269798	38.9	L1	20.3	17.1	56.0
3.117705	35.2	L1	20.3	20.8	56.0
3.951201	34.5	L1	20.4	21.5	56.0
4.854216	34.1	L1	20.4	21.9	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.504960	30.5	L1	20.3	15.5	46.0
1.288238	27.9	L1	20.3	18.1	46.0
2.187061	26.4	L1	20.3	19.6	46.0
3.099208	24.5	L1	20.3	21.5	46.0
4.034849	24.2	L1	20.4	21.8	46.0
4.931486	22.6	L1	20.4	23.4	46.0

4.5.10 Diagram 010



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.520630	45.6	N	19.4	10.4	56.0
1.311020	47.5	N	19.4	8.5	56.0
2.155061	47.4	N	19.4	8.6	56.0
2.981338	47.7	N	19.5	8.3	56.0
3.892456	47.7	N	19.5	8.3	56.0
4.651640	47.9	N	19.5	8.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.545716	43.0	N	19.4	3.0	46.0
1.282467	44.9	N	19.4	1.1	46.0
2.161416	44.5	N	19.4	1.5	46.0
2.989338	44.9	N	19.5	1.1	46.0
3.849819	45.1	N	19.5	0.9	46.0
4.667500	45.1	N	19.5	0.9	46.0

5 Measurement of Discontinuous Disturbance

5.1 Standards

Product or product family standard	EN55014-1:2017
Limit class	Clause 4.4 of CISPR14-1
Basic standard	CISPR 16
Date of testing	2012-02-22, 2015-10-13

5.2 Measurement equipment

Nemko ELA 608 Lab:

608	Equipment	Calibration due	Type	Equipment No.	Manufacturer
<input checked="" type="checkbox"/>	LISN	2020-01-14	4825/2	1161	ETS
<input checked="" type="checkbox"/>	Discontinuous Interference Analyzer	2020-01-14	DIA1512D	9966	Schaffner

N LAB

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Artificial Mains Network	2020.01.14	LS16C	16010744219	AFJ
<input checked="" type="checkbox"/>	Click Analyzer	2020.01.14	CL55C	55040744142	AFJ

5.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The test has been performed as following:

The discontinuous interference on AC mains in the frequency range from 0.15 to 30MHz was measured in accordance to EN 55014-1. The measurement setup was made in a shielded room. The clicks were measured at the frequency of 0.15MHz, 0.5 MHz, 1.4MHz and 30MHz according to Clause 7.4.2.5 of EN 55014-1 respectively.

In accordance with the EN 55014-1, Appliances which have a click rate N of not more than five and the duration of each click is less than 20ms and the duration of 90% click is less than 10ms, shall be deemed to comply with the limits, independent of the amplitude of the clicks.

5.4 Test result

Mode	Model	Diagram	Remarks	Result
LED-180	TM2	011	AC INPUT PORT	Pass
MRCD-7	TM2	012	AC INPUT PORT	Pass

5.5 Diagrams

5.5.1 Diagram 011

Test Equipment:	Model No.	Serial No.	Manufacturer
Equipment Name			
Discontinuous Interference Analyzer:	DIA1512D	24234	SCHAFFNER
Artificial mains network (LISN):	4825/2	1161	ETS

Frequency	150kHz	500kHz	1.4MHz	30MHz
Limit value (L)(dB/uV)	66	56	56	60
Amount of clicks > L	short: 40 long: 0	short: 0 long: 0	short: 0 long: 0	short: 0 long: 0
Registration ">2 in 2sec"?	N	N	N	N
DIA Continuous (sec)	cont: 0.00	cont: 0.00	cont: 0.00	cont: 0.00
Only if "cont" > 0:				
Conform with exceptions 4.2.3?				
Total amount of clicks > L (short + long)	n = 0.70	n = 0	n = 0	n = 0
Switching operations: s = 0				
Observation time T = 56 min 20 sec				
Click Rate (N = n/T)	N = 0.70	N = 0.00 (used for 0,5 MHz to 30 MHz)		
New limit: $L_q = L + 20 \log 30/N$ (maximum L + 44)	-	-	-	-
Amount of clicks > L_q	-	-	-	-
Observation time = -				
% > L_q (max 25%)	-	-	-	-
Remarks:	Apparatus Passes (subject to exceptions) Click rate not > 5 and no long clicks. Count limit reached			
Conformity:	YES			

5.5.2 Diagram 012



AFJ CL55c Click Analyser ver 6.05

Test Report - Printed 13-10-2015 12:09:23

Title Click Test Test# 1
Date 13/10/2015 11:55:53 Time 38:06.293
Required
Executed by RJB
Description
Model MRCD-7
SN /
Type /
Report /

Pass

Mode: Switch Op ☐ f= 1.00 Click Rate ☒

Rx1 150kHz Instantaneous switchings: Exempt from amplitude limits
Rx2 500kHz Instantaneous switchings: Exempt from amplitude limits
Rx3 1.4MHz Instantaneous switchings: Exempt from amplitude limits
Rx4 30MHz No Clicks

Remote	Input Offset	External Attenuator
NONE	0.0	0 dB

Att. Rx1 150kHz	Att. Rx2 500kHz	Att. Rx3 1.4MHz	Att. Rx4 30MHz
15dB	15dB	15dB	15dB

ClickMeter for Windows™

c:\Data\Default\Test021611 - Analysis print n#: 1

First Pass		Rx1 150kHz	Rx2 500kHz	Rx3 1.4MHz	Rx4 30MHz
CISPR	Short	40	40	25	0
14-1:2005 + A1:2008	Long	0	0	0	0
	Fast Long	0	0	0	0
	Total Clicks	40	40	25	0
Continuous Int.	Events	0	0	0	0
Correction	TIME (s)	0.00	0.00	0.00	0.00
Manual	Switch Op	0	0	0	0
	2 Click	0	0	0	0
	Limit dBuV	66.0	56.0	56.0	60.0
7.4.2.2	N	1.05	1.05	1.05	1.05

Limit dBuV

Allowed Clicks

Second Pass		Short	Long	Preview	Total Clicks
	Long	0	0	0	0
	Total Clicks	0	0	0	0
Continuous Int.	Events	0	0	0	0
	TIME (s)	0.00	0.00	0.00	0.00
	2 Click	0	0	0	0
PASS		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Peak Clipping		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

6 Measurement of Disturbance Power

6.1 Standards

Generic standard	/
Product or product family standard	EN55014-1:2017
Limit class	Table 7 of EN55014-1
Basic standard	CISPR 16
Date of testing	2012-02-01, 2012-06-08, 2012-11-28, 2015-10-14

6.2 Measurement equipment

GTS:

	Equipment	Calibration due	Type	Equipment No.	Manufacturer
<input checked="" type="checkbox"/>	Shielding Room	Jul. 04 2019	7.0(L)x3.0(W)x3.0(H)	GTS252	ZhongYu Electron
<input checked="" type="checkbox"/>	EMI Test Receiver	Jul. 04 2019	ESCS30	GTS223	Rohde & Schwarz
<input checked="" type="checkbox"/>	10dB Pulse Limita	Jul. 04 2019	N/A	GTS224	Rohde & Schwarz
<input checked="" type="checkbox"/>	Absorbing clamp	Jul. 05 2019	MDS21	GTS229	Elektronik-Feinmechanik
<input checked="" type="checkbox"/>	Coaxial Cable	Apr. 01 2019	N/A	GTS228	GTS

Timeway:

	Equipment	Calibration due	Type	Equipment No.	Manufacturer
<input checked="" type="checkbox"/>	EMI Receiver	2019.5.14	ESVP	893417/012	R&S
<input checked="" type="checkbox"/>	Absorbing Clamp	2019.5.14	MDS-21	100126	R&S
<input checked="" type="checkbox"/>	Spectrum Analyzer	2019.5.14	ESA-L1500A	US37451154	HP
<input checked="" type="checkbox"/>	RF Switch	2019.5.14	EMSW18	N/A	EM Electronics Corporation

CTI:

	Equipment	Calibration due	Type	Equipment No.	Manufacturer
<input checked="" type="checkbox"/>	Receiver	07/06/2019	ESCI	100009	R&S
<input checked="" type="checkbox"/>	Clamp	07/06/2019	MDS21	3717	EM TEST

ELA 125

	Equipment	Calibration due	Type	Equipment No.	Manufacturer
<input checked="" type="checkbox"/>	EMI Test Receiver	2019.10	ESCS	100038	R&S
<input checked="" type="checkbox"/>	Absorbing Clamp	2019.10	MDS-21	100011	R&S
<input checked="" type="checkbox"/>	EMI In Motion	2019.10	KMS 560	560/385 BJ:01	HD
<input checked="" type="checkbox"/>	Controller	2019.10	HD 050	050/477 BJ:01	HD
<input checked="" type="checkbox"/>	EMI Test Software	2019.10	ESK1	N/A	R&S

6.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.
The test has been performed as following:

The EUT shall be place on a non-metallic table 0.8 meter height above the floor with the lead (having the absorbing clamp attached) stretched horizontally straight out from the unit connected to the lead, On each lead, the absorbing clamp is moved a distance of a half wavelength for each frequency of measurement ,starting with the clamp positioned close to the case of the EUT and the current transformer of the clamp pointing towards the EUT ,For each lead the maximum measurement value at each frequency ,which is obtained, when the absorbing clamp is moved along the lead the distance

specified is to be registered.

A test at about 50 MHz shall be made over a range of 0,9 to 1,1 times the rated voltage in order to check whether the level of disturbance varies considerably with the supply voltage; in which case, the measurements are to be made at the voltage that causes maximum disturbance.

If an appliance has a rated voltage range, the multipliers 0,9 and 1,1 apply to the lowest and highest, most common nominal supply voltages that fall within the rated voltage range that is specified by the manufacturer.

If an appliance has more than one rated voltage the multipliers 0,9 and 1,1 apply to the rated voltage that causes maximum disturbance.

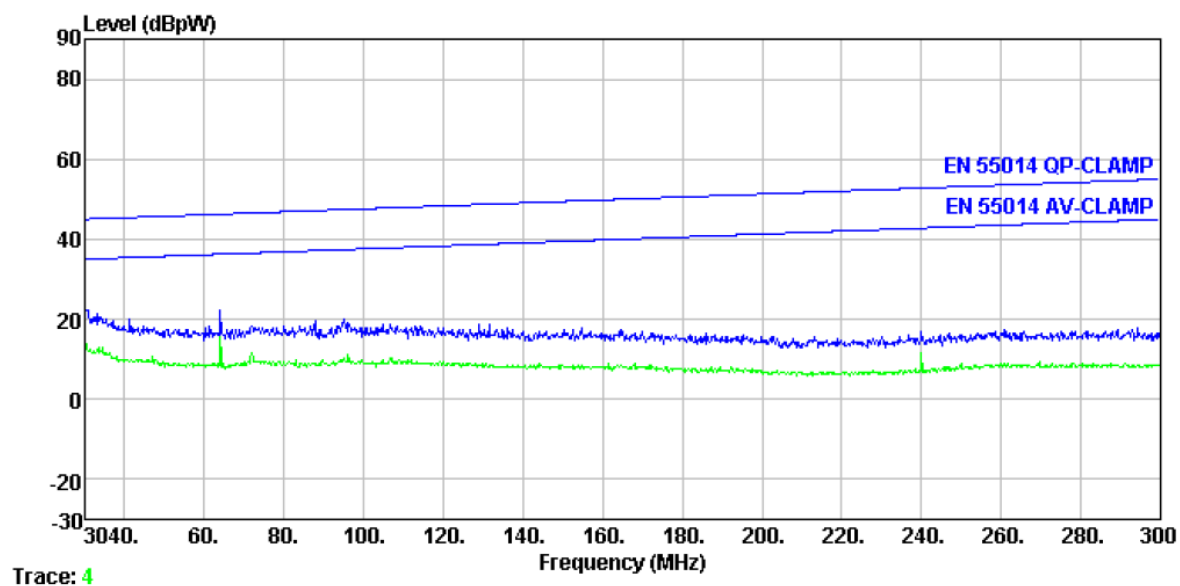
For appliances with a frequency range of 50 Hz to 60 Hz, a test at about 50 MHz shall be made using supply frequencies of 50 Hz and 60 Hz at the above determined supply voltage, in order to check whether the level of disturbance varies considerably with the supply frequency; in which case, the measurements are to be made at the supply frequency which causes maximum disturbance.

6.4 Test result

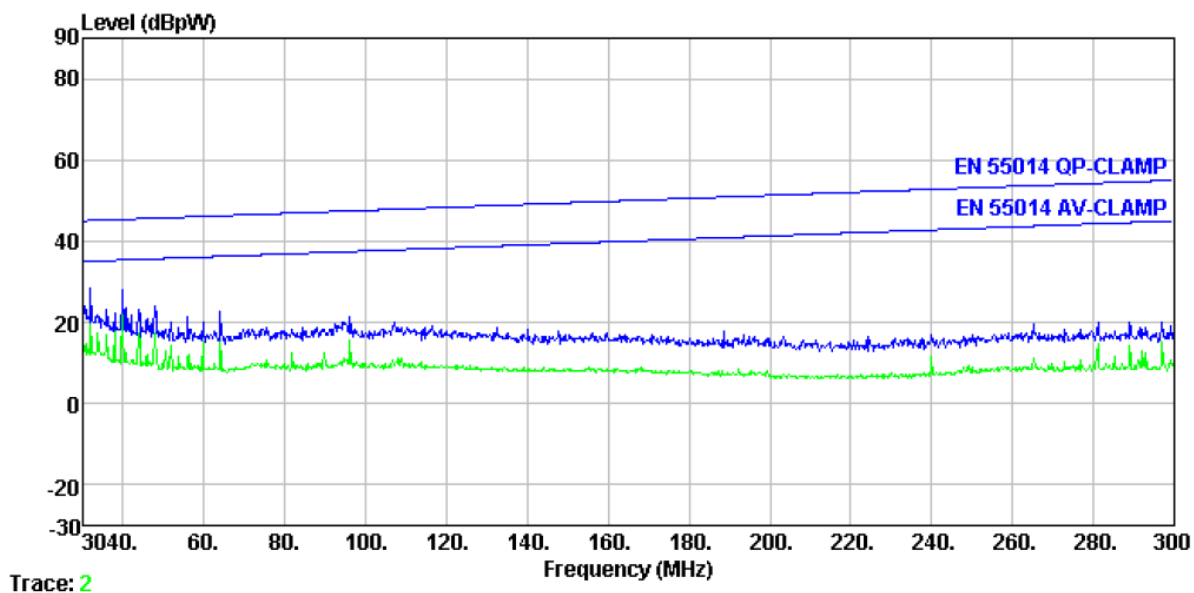
Test mode	Model	Diagram	Description	Result																						
TM1	MRC-9F	013	AC Mains	Pass																						
TM1	LED-180	014	AC Mains	Pass																						
TM1	MRC-12F	015	AC Mains	Pass																						
TM1	RC-280	016	AC Mains	Pass																						
TM1	MRCD-7	017	AC Mains	Pass																						
Remark:	<div>Scan setting:</div> <table><tr><th colspan="2">Freq range</th><th colspan="4">Receiver setting</th></tr><tr><th>Start</th><th>Stop</th><th>Step</th><th>IF BW</th><th>Detector</th><th>Meas Time</th></tr><tr><td>30MHz</td><td>300MHz</td><td>60kHz</td><td>120kHz</td><td>PK+AV</td><td>20ms</td></tr></table> <div>Final measurement:</div> <table><tr><th>Detector</th><th>Meas time</th></tr><tr><td>QP/AV</td><td>1s</td></tr></table> <p>A test at about 50MHz is made over a range of 0.9 to 1.1 times the rated voltage, and found that <u>264V~ 50Hz</u> causes maximum disturbance.</p> <p>If the Peak measurement value is comply with the Average Limit, so both of QP and AVG is comply with the limit, and only list the peak and AVG value in this report.</p>				Freq range		Receiver setting				Start	Stop	Step	IF BW	Detector	Meas Time	30MHz	300MHz	60kHz	120kHz	PK+AV	20ms	Detector	Meas time	QP/AV	1s
Freq range		Receiver setting																								
Start	Stop	Step	IF BW	Detector	Meas Time																					
30MHz	300MHz	60kHz	120kHz	PK+AV	20ms																					
Detector	Meas time																									
QP/AV	1s																									

6.5 Diagrams

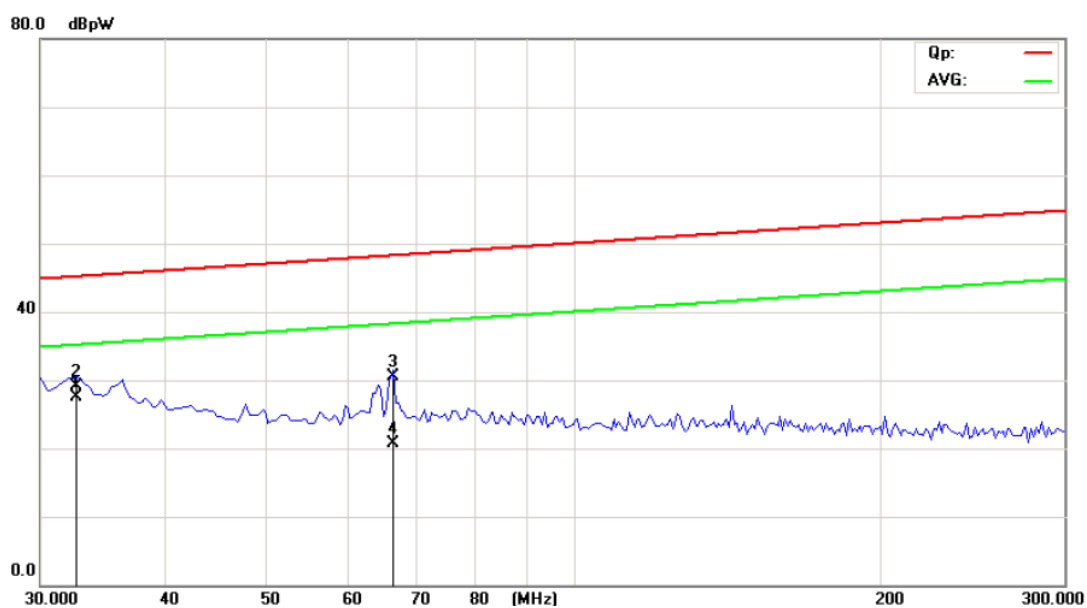
6.5.1 Diagram 013



6.5.2 Diagram 014

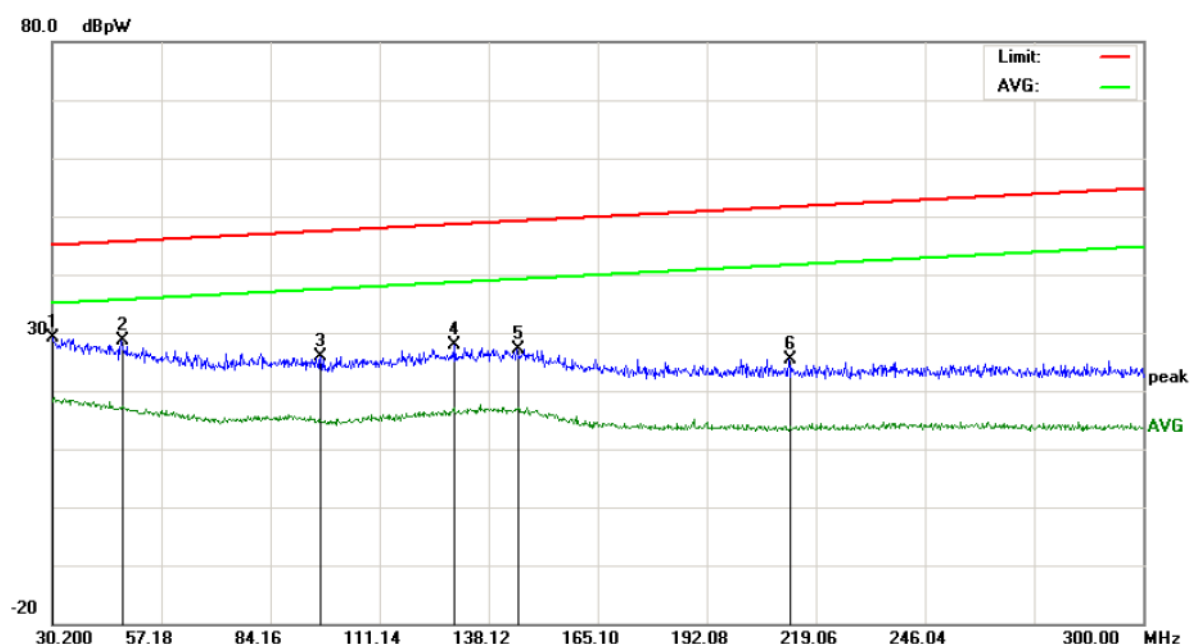


6.5.3 Diagram 015



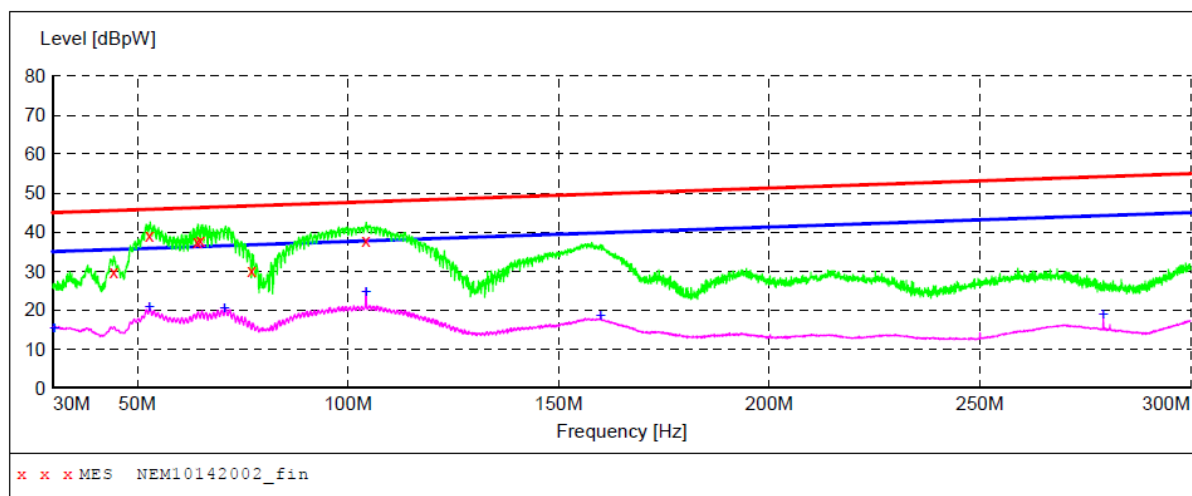
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBpW	Limit dBpW	Over dB	Detector
1		32.7000	17.56	9.87	27.43	45.37	-17.94	QP
2	*	32.7000	19.28	9.87	29.15	35.37	-6.22	AVG
3		66.4500	23.21	7.21	30.42	48.45	-18.03	QP
4		66.4500	13.58	7.21	20.79	38.45	-17.66	AVG

6.5.4 Diagram 016



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBpW)			Limit (dBpW)		Margin (dB)	
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG
1	30.2000	19.10		8.63	9.96	29.06		18.59	45.01	35.01	-15.95	-16.42
2	47.2800	20.04		8.31	8.56	28.60		16.87	45.64	35.64	-17.04	-18.77
3	96.4400	19.16		8.17	6.67	25.83		14.84	47.46	37.46	-21.63	-22.62
4	129.7200	19.67		8.14	8.12	27.79		16.26	48.69	38.69	-20.90	-22.43
5	145.2000	19.10		8.80	8.04	27.14		16.84	49.27	39.27	-22.13	-22.43
6	212.4400	19.85		7.60	5.63	25.48		13.23	51.76	41.76	-26.28	-28.53

6.5.5 Diagram 017



MEASUREMENT RESULT: "NEM10142002_fin"

10/14/2015 1:24PM

Frequency MHz	Level dBpW	Transd dB	Limit dBpW	Margin dB	Det.	Position cm
44.460000	30.00	5.7	46	15.5	QP	530.0
52.920000	39.20	5.6	46	6.6	QP	530.0
64.200000	37.40	6.0	46	8.9	QP	530.0
65.100000	37.80	6.1	46	8.5	QP	530.0
77.160000	30.30	7.1	47	16.4	QP	530.0
104.280000	38.00	8.4	48	9.8	QP	530.0

MEASUREMENT RESULT: "NEM10142002_fin2"

10/14/2015 1:24PM

Frequency MHz	Level dBpW	Transd dB	Limit dBpW	Margin dB	Det.	Position cm
30.360000	15.40	8.1	35	19.6	AV	530.0
52.860000	20.70	5.6	36	15.1	AV	530.0
70.740000	20.40	6.6	37	16.1	AV	530.0
104.280000	24.80	8.4	38	13.0	AV	530.0
160.020000	18.60	7.2	40	21.2	AV	530.0
279.300000	19.00	8.0	44	25.2	AV	530.0

7 Harmonic current

7.1 Standard

Basic standard **EN61000-3-2:2014**
Limit class **Class A**
Date of testing **2012-02-01, 2012-06-08, 2015-10-12**

7.2 Measurement equipment

GTS:

	Equipment	Calibration due	Type	Equipment No.	Manufacturer
<input checked="" type="checkbox"/>	Power Analyzer	Jul. 04 2019	DPA500	GTS235	EMTEST
<input checked="" type="checkbox"/>	AC Power Source	Jul. 04 2019	ACS500	GTS236	EMTEST
<input checked="" type="checkbox"/>	Test software	N/A	ACS	N/A	EMTEST

Timeway:

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Harmonics Flicker Test System	2019.5.14	PACS-1	72305	CI
<input checked="" type="checkbox"/>	5K VA AC Power Source	2019.5.14	5001lx	56060	CI

N LAB

	Equipment	Calibration due	Type	Equipment No.	Manufacturer
<input checked="" type="checkbox"/>	AC Power Source	2020.01.14	NSG 1007	57877	SCHAFFNER
<input checked="" type="checkbox"/>	Signal Conditioning unit	2020.01.14	CCN1000-1	72538	SCHAFFNER

7.3 Test set-up

Devices with an active input power of $P < 75 \text{ W}$ ☐

Balanced three-phase equipment and all other equipment, except that stated in one of the following classes **Class A** ☒

Portable tools **Class B** ☐

Lightning equipment, including dimming devices **Class C** ☐

Equipment having an input current with a "special wave shape" as defined in figure 1 in the standard and an active input power, $P \leq 600 \text{ W}$ and motor driven with phase angle control **Class D** ☐

The power cord of the EUT is connected to the output of the test systems, Turn on the power of the EUT and use the test system to test the harmonic current level. Observation time: 150s

If Harmonic current less than 0.6% of the input current measured under the test condition, or less than 5Ma, then whichever is greater, are disregarded.

7.4 Test results

Model	Mode	Table	Power	Result
MRC-9F	TM2	018	810.44W	Pass
LED-180	TM2	019	633.84 W	Pass
MRC-12F	TM2	020	1083.1W	Pass
MRCD-7	TM2	021	729.8W	Pass

7.5 Tables

7.5.1 Table 018

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	3.514			
2	275.151E-6	0.025	1.08	PASS
3	794.825E-6	0.035	2.30	PASS
4	279.870E-6	0.065	430.00E-3	PASS
5	391.733E-6	0.034	1.14	PASS
6	202.291E-6	0.067	300.00E-3	PASS
7	579.488E-6	0.075	770.00E-3	PASS
8	233.607E-6	0.102	230.00E-3	PASS
9	885.959E-6	0.221	400.00E-3	PASS
10	223.163E-6	0.121	184.00E-3	PASS
11	1.031E-3	0.312	330.00E-3	PASS
12	197.425E-6	0.129	153.33E-3	PASS
13	842.477E-6	0.401	210.00E-3	PASS
14	206.307E-6	0.157	131.43E-3	PASS
15	575.909E-6	0.384	150.00E-3	PASS
16	156.316E-6	0.136	115.00E-3	PASS
17	260.174E-6	0.197	132.35E-3	PASS
18	146.740E-6	0.144	102.22E-3	PASS
19	434.565E-6	0.367	118.42E-3	PASS
20	140.633E-6	0.153	92.00E-3	PASS
21	758.165E-6	0.472	160.71E-3	PASS
22	145.097E-6	0.173	83.64E-3	PASS
23	1.363E-3	0.929	146.74E-3	PASS
24	148.647E-6	0.194	76.66E-3	PASS
25	1.113E-3	0.825	135.00E-3	PASS
26	138.473E-6	0.196	70.77E-3	PASS
27	785.049E-6	0.628	124.99E-3	PASS
28	156.936E-6	0.239	65.71E-3	PASS
29	280.091E-6	0.241	116.39E-3	PASS
30	147.819E-6	0.241	61.33E-3	PASS
31	472.960E-6	0.434	108.87E-3	PASS
32	225.299E-6	0.392	57.50E-3	PASS
33	918.376E-6	0.898	102.27E-3	PASS
34	141.310E-6	0.261	54.12E-3	PASS
35	1.068E-3	1.108	96.44E-3	PASS
36	142.512E-6	0.279	51.11E-3	PASS
37	940.934E-6	1.032	91.21E-3	PASS
38	148.381E-6	0.306	48.42E-3	PASS
39	494.555E-6	0.572	86.53E-3	PASS
40	133.740E-6	0.291	46.00E-3	PASS

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	3.525			
2	504.880E-6	0.031	1.62	PASS
3	1.104E-3	0.032	3.45	PASS
4	388.632E-6	0.060	645.00E-3	PASS
5	520.693E-6	0.030	1.71	PASS
6	311.245E-6	0.069	450.00E-3	PASS
7	678.767E-6	0.059	1.15	PASS
8	304.761E-6	0.088	345.00E-3	PASS
9	965.708E-6	0.161	600.00E-3	PASS
10	289.645E-6	0.105	276.00E-3	PASS
11	1.119E-3	0.226	495.00E-3	PASS
12	278.990E-6	0.121	229.99E-3	PASS
13	932.228E-6	0.296	315.00E-3	PASS
14	306.442E-6	0.155	197.15E-3	PASS
15	657.379E-6	0.292	225.00E-3	PASS
16	199.630E-6	0.116	172.50E-3	PASS
17	351.352E-6	0.177	198.52E-3	PASS
18	202.159E-6	0.132	153.33E-3	PASS
19	513.063E-6	0.289	177.63E-3	PASS
20	191.123E-6	0.138	138.00E-3	PASS
21	830.570E-6	0.517	160.71E-3	PASS
22	186.047E-6	0.148	125.46E-3	PASS
23	1.902E-3	1.296	146.74E-3	PASS
24	212.835E-6	0.185	114.99E-3	PASS
25	1.210E-3	0.896	135.00E-3	PASS
26	190.063E-6	0.179	106.16E-3	PASS
27	876.535E-6	0.701	124.99E-3	PASS
28	218.596E-6	0.222	98.57E-3	PASS
29	368.621E-6	0.317	116.39E-3	PASS
30	193.409E-6	0.210	92.00E-3	PASS
31	593.183E-6	0.545	108.87E-3	PASS
32	434.866E-6	0.504	86.25E-3	PASS
33	1.016E-3	0.993	102.27E-3	PASS
34	201.843E-6	0.249	81.18E-3	PASS
35	1.169E-3	1.212	96.44E-3	PASS
36	199.045E-6	0.260	76.66E-3	PASS
37	1.046E-3	1.147	91.21E-3	PASS
38	241.879E-6	0.333	72.63E-3	PASS
39	598.559E-6	0.692	86.53E-3	PASS
40	198.998E-6	0.288	69.00E-3	PASS

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	231.93	100.839		
2	44.74E-3	0.019	0.2	PASS
3	84.72E-3	0.037	0.9	PASS
4	20.85E-3	0.009	0.2	PASS
5	33.64E-3	0.015	0.4	PASS
6	17.15E-3	0.007	0.2	PASS
7	24.90E-3	0.011	0.3	PASS
8	13.10E-3	0.006	0.2	PASS
9	60.06E-3	0.026	0.2	PASS
10	17.98E-3	0.008	0.2	PASS
11	85.54E-3	0.037	0.1	PASS
12	19.05E-3	0.008	0.1	PASS
13	82.47E-3	0.036	0.1	PASS
14	12.25E-3	0.005	0.1	PASS
15	56.83E-3	0.025	0.1	PASS
16	10.09E-3	0.004	0.1	PASS
17	13.35E-3	0.006	0.1	PASS
18	8.36E-3	0.004	0.1	PASS
19	43.90E-3	0.019	0.1	PASS
20	9.72E-3	0.004	0.1	PASS
21	69.87E-3	0.030	0.1	PASS
22	8.71E-3	0.004	0.1	PASS
23	86.78E-3	0.038	0.1	PASS
24	9.87E-3	0.004	0.1	PASS
25	76.98E-3	0.033	0.1	PASS
26	11.34E-3	0.005	0.1	PASS
27	49.35E-3	0.021	0.1	PASS
28	9.99E-3	0.004	0.1	PASS
29	14.38E-3	0.006	0.1	PASS
30	9.04E-3	0.004	0.1	PASS
31	44.87E-3	0.020	0.1	PASS
32	8.91E-3	0.004	0.1	PASS
33	68.07E-3	0.030	0.1	PASS
34	9.59E-3	0.004	0.1	PASS
35	72.35E-3	0.031	0.1	PASS
36	8.77E-3	0.004	0.1	PASS
37	59.40E-3	0.026	0.1	PASS
38	8.18E-3	0.004	0.1	PASS
39	33.28E-3	0.014	0.1	PASS
40	9.28E-3	0.004	0.1	PASS

7.5.2 Table 019

Average harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	2.760			
2	206.851E-6	0.019	1.08	PASS
3	4.578E-3	0.199	2.30	PASS
4	241.299E-6	0.056	430.00E-3	PASS
5	2.654E-3	0.233	1.14	PASS
6	178.247E-6	0.059	300.00E-3	PASS
7	575.477E-6	0.075	770.00E-3	PASS
8	225.139E-6	0.098	230.00E-3	PASS
9	482.578E-6	0.121	400.00E-3	PASS
10	176.333E-6	0.096	184.00E-3	PASS
11	458.158E-6	0.139	330.00E-3	PASS
12	165.122E-6	0.108	153.33E-3	PASS
13	228.723E-6	0.109	210.00E-3	PASS
14	222.742E-6	0.169	131.43E-3	PASS
15	404.067E-6	0.269	150.00E-3	PASS
16	142.789E-6	0.124	115.00E-3	PASS
17	890.589E-6	0.673	132.35E-3	PASS
18	132.248E-6	0.129	102.22E-3	PASS
19	992.179E-6	0.838	118.42E-3	PASS
20	128.830E-6	0.140	92.00E-3	PASS
21	517.079E-6	0.322	160.71E-3	PASS
22	150.523E-6	0.180	83.64E-3	PASS
23	1.112E-3	0.758	146.74E-3	PASS
24	138.313E-6	0.180	76.66E-3	PASS
25	932.830E-6	0.691	135.00E-3	PASS
26	142.803E-6	0.202	70.77E-3	PASS
27	989.783E-6	0.792	124.99E-3	PASS
28	149.561E-6	0.228	65.71E-3	PASS
29	608.808E-6	0.523	116.39E-3	PASS
30	146.271E-6	0.238	61.33E-3	PASS
31	275.011E-6	0.253	108.87E-3	PASS
32	212.913E-6	0.370	57.50E-3	PASS
33	746.690E-6	0.730	102.27E-3	PASS
34	130.691E-6	0.241	54.12E-3	PASS
35	830.982E-6	0.862	96.44E-3	PASS
36	129.745E-6	0.254	51.11E-3	PASS
37	511.029E-6	0.560	91.21E-3	PASS
38	148.280E-6	0.306	48.42E-3	PASS
39	169.629E-6	0.196	86.53E-3	PASS
40	129.770E-6	0.282	46.00E-3	PASS

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	2.761			
2	332.576E-6	0.021	1.62	PASS
3	4.775E-3	0.138	3.45	PASS
4	324.035E-6	0.050	645.00E-3	PASS
5	2.807E-3	0.164	1.71	PASS
6	265.031E-6	0.059	450.00E-3	PASS
7	702.592E-6	0.061	1.15	PASS
8	297.591E-6	0.086	345.00E-3	PASS
9	553.905E-6	0.092	600.00E-3	PASS
10	233.035E-6	0.084	276.00E-3	PASS
11	550.789E-6	0.111	495.00E-3	PASS
12	213.371E-6	0.093	229.99E-3	PASS
13	296.750E-6	0.094	315.00E-3	PASS
14	319.340E-6	0.162	197.15E-3	PASS
15	458.756E-6	0.204	225.00E-3	PASS
16	200.873E-6	0.116	172.50E-3	PASS
17	969.555E-6	0.488	198.52E-3	PASS
18	184.805E-6	0.121	153.33E-3	PASS
19	1.069E-3	0.602	177.63E-3	PASS
20	174.327E-6	0.126	138.00E-3	PASS
21	590.037E-6	0.367	160.71E-3	PASS
22	199.975E-6	0.159	125.46E-3	PASS
23	1.462E-3	0.996	146.74E-3	PASS
24	196.005E-6	0.170	114.99E-3	PASS
25	1.035E-3	0.767	135.00E-3	PASS
26	178.254E-6	0.168	106.16E-3	PASS
27	1.068E-3	0.854	124.99E-3	PASS
28	188.736E-6	0.191	98.57E-3	PASS
29	697.064E-6	0.599	116.39E-3	PASS
30	194.207E-6	0.211	92.00E-3	PASS
31	387.750E-6	0.356	108.87E-3	PASS
32	342.381E-6	0.397	86.25E-3	PASS
33	800.108E-6	0.782	102.27E-3	PASS
34	172.882E-6	0.213	81.18E-3	PASS
35	903.623E-6	0.937	96.44E-3	PASS
36	175.161E-6	0.228	76.66E-3	PASS
37	605.918E-6	0.664	91.21E-3	PASS
38	232.185E-6	0.320	72.63E-3	PASS
39	230.295E-6	0.266	86.53E-3	PASS
40	178.742E-6	0.259	69.00E-3	PASS

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	231.98	100.859		
2	46.35E-3	0.020	0.2	PASS
3	74.28E-3	0.032	0.9	PASS
4	20.18E-3	0.009	0.2	PASS
5	21.97E-3	0.010	0.4	PASS
6	16.50E-3	0.007	0.2	PASS
7	56.24E-3	0.024	0.3	PASS
8	12.35E-3	0.005	0.2	PASS
9	76.85E-3	0.033	0.2	PASS
10	18.31E-3	0.008	0.2	PASS
11	62.51E-3	0.027	0.1	PASS
12	19.14E-3	0.008	0.1	PASS
13	11.23E-3	0.005	0.1	PASS
14	12.59E-3	0.005	0.1	PASS
15	58.45E-3	0.025	0.1	PASS
16	10.65E-3	0.005	0.1	PASS
17	87.85E-3	0.038	0.1	PASS
18	7.33E-3	0.003	0.1	PASS
19	74.00E-3	0.032	0.1	PASS
20	9.87E-3	0.004	0.1	PASS
21	34.52E-3	0.015	0.1	PASS
22	9.33E-3	0.004	0.1	PASS
23	42.14E-3	0.018	0.1	PASS
24	8.83E-3	0.004	0.1	PASS
25	80.19E-3	0.035	0.1	PASS
26	8.49E-3	0.004	0.1	PASS
27	81.67E-3	0.036	0.1	PASS
28	9.53E-3	0.004	0.1	PASS
29	50.12E-3	0.022	0.1	PASS
30	8.93E-3	0.004	0.1	PASS
31	20.33E-3	0.009	0.1	PASS
32	8.60E-3	0.004	0.1	PASS
33	61.32E-3	0.027	0.1	PASS
34	8.67E-3	0.004	0.1	PASS
35	69.74E-3	0.030	0.1	PASS
36	8.68E-3	0.004	0.1	PASS
37	53.61E-3	0.023	0.1	PASS
38	9.36E-3	0.004	0.1	PASS
39	17.25E-3	0.007	0.1	PASS
40	8.88E-3	0.004	0.1	PASS

7.5.3 Table 020

Harmonics – Class-A per Ed. 3.0 (2006)(Run time)

EUT: MRC-12F

Test category: Class-A per Ed. 3.0 (2006) (European limits)

Test date: 2012-6-8

Test duration (min): 3

Comment: ON

Customer: Customer

Tested by: YANG

Test Margin: 100

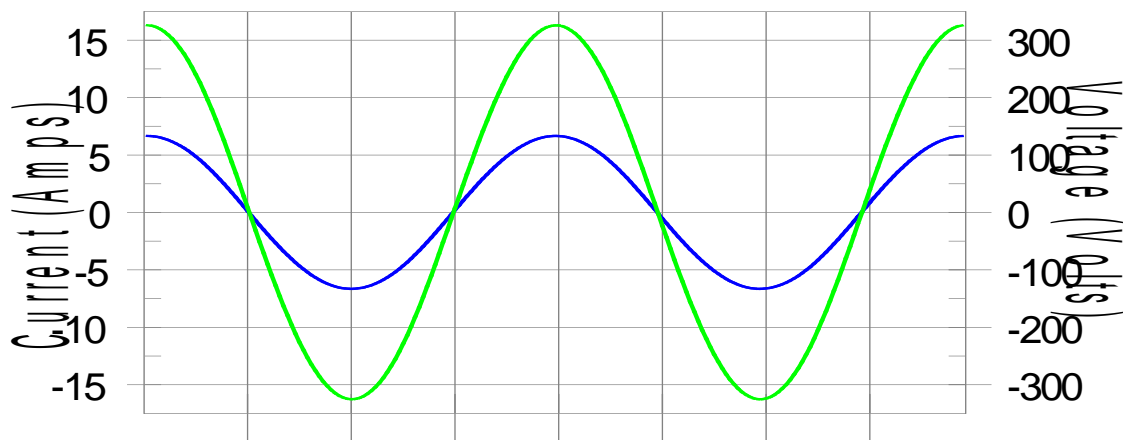
End time: 15:19:20

Start time: 15:16:00

Data file name: H-000295.cts_data

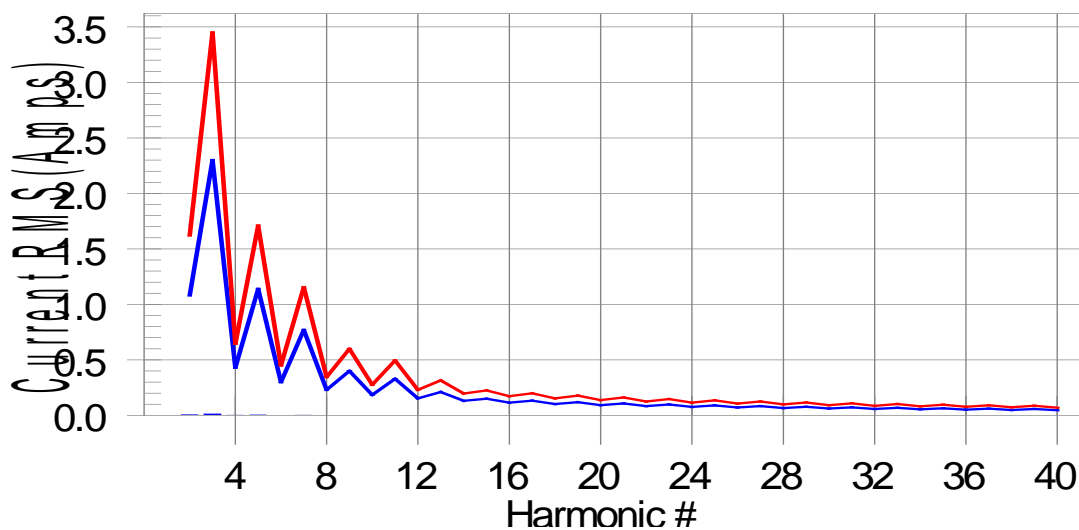
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonic was #3 with 0.51% of the limit.

Ident. Nr.: 367802
Date: 2019-02-26



Current Test Result Summary (Run time)

EUT: MRC-12F Tested by: YANG
Test category: Class-A per Ed. 3.0 (2006) (European limits) Test Margin: 100
Test date: 2012-6-8 Start time: 15:16:00 End time: 15:19:20
Test duration (min): 3 Data file name: H-000295.cts_data
Comment: ON
Customer: Customer

Test Result: Pass Source qualification: Normal
THC(A): 0.01 I-THD(%): 0.25 POHC(A): 0.000 POHC Limit(A): 0.320
Highest parameter values during test:

V_RMS (Volts):	230.22	Frequency(Hz):	50.00
I_Peak (Amps):	6.662	I_RMS (Amps):	4.707
I_Fund (Amps):	4.706	Crest Factor:	1.416
Power (Watts):	1083.1	Power Factor:	1.000

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.003	1.080	0.0	0.004	1.620	0.27	Pass
3	0.012	2.300	0.5	0.013	3.450	0.39	Pass
4	0.001	0.430	0.0	0.002	0.645	0.28	Pass
5	0.002	1.140	0.0	0.003	1.710	0.15	Pass
6	0.001	0.300	0.0	0.001	0.450	0.18	Pass
7	0.001	0.770	0.0	0.001	1.155	0.12	Pass
8	0.000	0.230	0.0	0.001	0.345	0.16	Pass
9	0.001	0.400	0.0	0.001	0.600	0.12	Pass
10	0.000	0.184	0.0	0.001	0.276	0.23	Pass
11	0.000	0.330	0.0	0.001	0.495	0.13	Pass
12	0.000	0.153	0.0	0.000	0.230	0.08	Pass
13	0.000	0.210	0.0	0.000	0.315	0.16	Pass
14	0.000	0.131	0.0	0.000	0.197	0.11	Pass
15	0.000	0.150	0.0	0.000	0.225	0.22	Pass
16	0.000	0.115	0.0	0.000	0.173	0.26	Pass
17	0.000	0.132	0.0	0.000	0.199	0.23	Pass
18	0.000	0.102	0.0	0.000	0.153	0.19	Pass
19	0.000	0.118	0.0	0.000	0.178	0.18	Pass
20	0.000	0.092	0.0	0.000	0.138	0.32	Pass
21	0.000	0.107	0.0	0.000	0.161	0.19	Pass
22	0.000	0.084	0.0	0.000	0.125	0.19	Pass
23	0.000	0.098	0.0	0.000	0.147	0.16	Pass
24	0.000	0.077	0.0	0.000	0.115	0.10	Pass
25	0.000	0.090	0.0	0.000	0.135	0.20	Pass
26	0.000	0.071	0.0	0.000	0.106	0.16	Pass
27	0.000	0.083	0.0	0.000	0.125	0.14	Pass
28	0.000	0.066	0.0	0.000	0.099	0.15	Pass
29	0.000	0.078	0.0	0.000	0.116	0.17	Pass
30	0.000	0.061	0.0	0.000	0.092	0.18	Pass
31	0.000	0.073	0.0	0.000	0.109	0.16	Pass
32	0.000	0.058	0.0	0.000	0.086	0.19	Pass
33	0.000	0.068	0.0	0.000	0.102	0.17	Pass
34	0.000	0.054	0.0	0.000	0.081	0.11	Pass
35	0.000	0.064	0.0	0.000	0.096	0.11	Pass
36	0.000	0.051	0.0	0.000	0.077	0.12	Pass
37	0.000	0.061	0.0	0.000	0.091	0.15	Pass
38	0.000	0.048	0.0	0.000	0.073	0.17	Pass
39	0.000	0.058	0.0	0.000	0.087	0.10	Pass
40	0.000	0.046	0.0	0.000	0.069	0.22	Pass

Ident. Nr.: 367802
Date: 2019-02-26



Voltage Source Verification Data (Run time)

EUT: MRC-12F
Test category: Class-A per Ed. 3.0 (2006) (European limits)
Test date: 2012-6-8
Test duration (min): 3
Comment: ON
Customer: Customer

Tested by: YANG
Test Margin: 100
Start time: 15:16:00
End time: 15:19:20
Data file name: H-000295.cts_data

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	230.22	Frequency(Hz):	50.00
I_Peak (Amps):	6.662	I_RMS (Amps):	4.707
I_Fund (Amps):	4.706	Crest Factor:	1.416
Power (Watts):	1083.1	Power Factor:	1.000

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.178	0.460	38.68	OK
3	0.648	2.070	31.32	OK
4	0.078	0.460	16.88	OK
5	0.139	0.920	15.06	OK
6	0.039	0.460	8.56	OK
7	0.053	0.691	7.61	OK
8	0.027	0.460	5.86	OK
9	0.028	0.460	6.17	OK
10	0.031	0.460	6.79	OK
11	0.028	0.230	12.32	OK
12	0.010	0.230	4.28	OK
13	0.015	0.230	6.47	OK
14	0.010	0.230	4.56	OK
15	0.016	0.230	7.11	OK
16	0.022	0.230	9.45	OK
17	0.017	0.230	7.29	OK
18	0.014	0.230	6.16	OK
19	0.008	0.230	3.59	OK
20	0.022	0.230	9.35	OK
21	0.008	0.230	3.47	OK
22	0.011	0.230	4.88	OK
23	0.006	0.230	2.56	OK
24	0.005	0.230	2.33	OK
25	0.007	0.230	3.04	OK
26	0.009	0.230	3.81	OK
27	0.005	0.230	2.14	OK
28	0.007	0.230	3.10	OK
29	0.005	0.230	2.39	OK
30	0.008	0.230	3.33	OK
31	0.005	0.230	2.04	OK
32	0.008	0.230	3.29	OK
33	0.005	0.230	2.30	OK
34	0.004	0.230	1.82	OK
35	0.002	0.230	1.05	OK
36	0.004	0.230	1.84	OK
37	0.004	0.230	1.59	OK
38	0.006	0.230	2.69	OK
39	0.002	0.230	1.05	OK
40	0.007	0.230	3.11	OK

7.5.4 Table 021

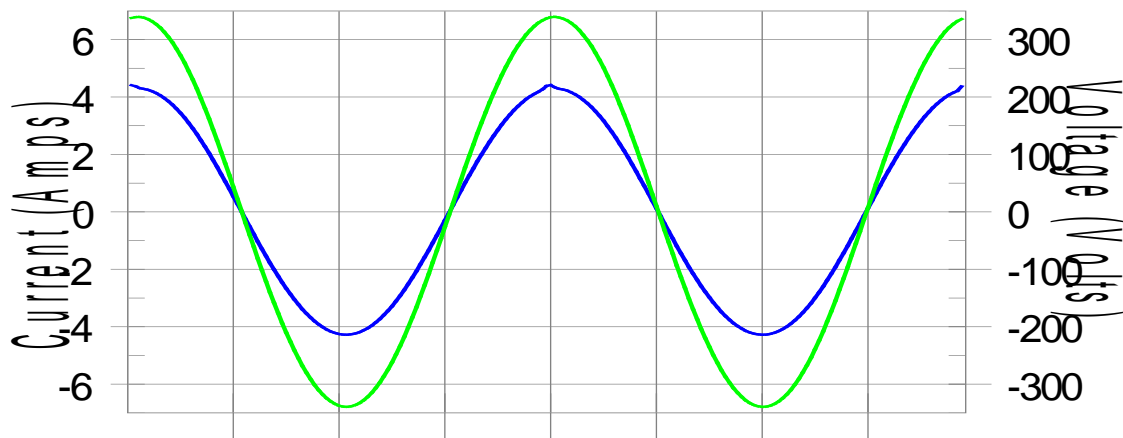
Harmonics – Class-A per Ed. 4.0 (2014)(Run time)

EUT: MRCD-7
Test category: Class-A per Ed. 4.0 (2014) (European limits)
Test date: 10/12/2015
Test duration (min): 2.5
Comment: Working
Customer: Customer information

Tested by: RJB
Test Margin: 100
Start time: 4:08:07 PM
End time: 4:10:58 PM
Data file name: H-000221.cts_data

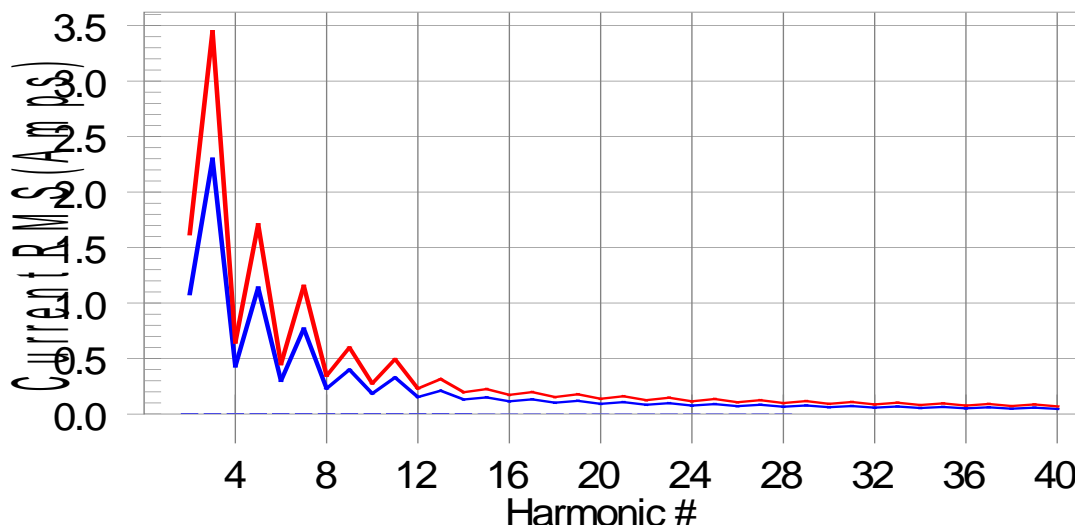
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonic was #0 with 0.0% of the limit.

Ident. Nr.: 367802
Date: 2019-02-26



Current Test Result Summary (Run time)

EUT: MRCD-7
Test category: Class-A per Ed. 4.0 (2014) (European limits)
Test date: 10/12/2015
Test duration (min): 2.5
Comment: Working
Customer: Customer information

Tested by: RJB
Test Margin: 100
Start time: 4:08:07 PM
End time: 4:10:58 PM
Data file name: H-000221.cts_data

Test Result: Pass Source qualification: Normal
THC(A): 0.011 I-THD(%): 2.7 POHC(A): 0.000 POHC Limit(A): 0.251
Highest parameter values during test:

V_RMS (Volts):	230.25	Frequency(Hz):	50.00
I_Peak (Amps):	4.424	I_RMS (Amps):	3.044
I_Fund (Amps):	3.039	Crest Factor:	9.666
Power (Watts):	729.8	Power Factor:	1.000

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.003	1.080	N/A	0.015	1.620	N/A	Pass
3	0.003	2.300	N/A	0.013	3.450	N/A	Pass
4	0.003	0.430	N/A	0.007	0.645	N/A	Pass
5	0.003	1.140	N/A	0.007	1.710	N/A	Pass
6	0.003	0.300	N/A	0.006	0.450	N/A	Pass
7	0.003	0.770	N/A	0.007	1.155	N/A	Pass
8	0.002	0.230	N/A	0.005	0.345	N/A	Pass
9	0.002	0.400	N/A	0.004	0.600	N/A	Pass
10	0.002	0.184	N/A	0.005	0.276	N/A	Pass
11	0.002	0.330	N/A	0.005	0.495	N/A	Pass
12	0.002	0.153	N/A	0.004	0.230	N/A	Pass
13	0.002	0.210	N/A	0.004	0.315	N/A	Pass
14	0.002	0.131	N/A	0.004	0.197	N/A	Pass
15	0.002	0.150	N/A	0.004	0.225	N/A	Pass
16	0.002	0.115	N/A	0.003	0.173	N/A	Pass
17	0.002	0.132	N/A	0.003	0.198	N/A	Pass
18	0.002	0.102	N/A	0.003	0.153	N/A	Pass
19	0.002	0.118	N/A	0.003	0.178	N/A	Pass
20	0.002	0.092	N/A	0.003	0.138	N/A	Pass
21	0.002	0.107	N/A	0.003	0.161	N/A	Pass
22	0.002	0.084	N/A	0.003	0.125	N/A	Pass
23	0.001	0.098	N/A	0.002	0.147	N/A	Pass
24	0.001	0.077	N/A	0.002	0.115	N/A	Pass
25	0.001	0.090	N/A	0.002	0.135	N/A	Pass
26	0.001	0.071	N/A	0.002	0.107	N/A	Pass
27	0.001	0.083	N/A	0.002	0.125	N/A	Pass
28	0.001	0.066	N/A	0.002	0.099	N/A	Pass
29	0.001	0.078	N/A	0.001	0.116	N/A	Pass
30	0.001	0.061	N/A	0.001	0.092	N/A	Pass
31	0.001	0.073	N/A	0.001	0.109	N/A	Pass
32	0.001	0.058	N/A	0.001	0.086	N/A	Pass
33	0.001	0.068	N/A	0.001	0.102	N/A	Pass
34	0.001	0.054	N/A	0.001	0.081	N/A	Pass
35	0.001	0.064	N/A	0.001	0.096	N/A	Pass
36	0.001	0.051	N/A	0.001	0.077	N/A	Pass
37	0.000	0.061	N/A	0.001	0.091	N/A	Pass
38	0.000	0.048	N/A	0.001	0.073	N/A	Pass
39	0.000	0.058	N/A	0.001	0.087	N/A	Pass
40	0.000	0.046	N/A	0.001	0.069	N/A	Pass

Ident. Nr.: 367802
Date: 2019-02-26



Voltage Source Verification Data (Run time)

EUT: MRCD-7
Test category: Class-A per Ed. 4.0 (2014) (European limits)
Test date: 10/12/2015
Test duration (min): 2.5
Comment: Working
Customer: Customer information

Tested by: RJB
Test Margin: 100
Start time: 4:08:07 PM
End time: 4:10:58 PM
Data file name: H-000221.cts_data

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	230.25	Frequency(Hz):	50.00
I_Peak (Amps):	4.424	I_RMS (Amps):	3.044
I_Fund (Amps):	3.039	Crest Factor:	9.666
Power (Watts):	729.8	Power Factor:	1.000

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.080	0.480	16.64	OK
3	0.580	2.161	26.82	OK
4	0.090	0.480	18.69	OK
5	0.077	0.961	7.98	OK
6	0.048	0.480	10.01	OK
7	0.064	0.720	8.84	OK
8	0.024	0.480	5.05	OK
9	0.026	0.480	5.51	OK
10	0.019	0.480	4.05	OK
11	0.015	0.240	6.14	OK
12	0.011	0.240	4.68	OK
13	0.012	0.240	5.11	OK
14	0.010	0.240	4.00	OK
15	0.012	0.240	4.90	OK
16	0.011	0.240	4.48	OK
17	0.006	0.240	2.52	OK
18	0.012	0.240	5.16	OK
19	0.010	0.240	4.37	OK
20	0.023	0.240	9.46	OK
21	0.011	0.240	4.70	OK
22	0.009	0.240	3.71	OK
23	0.005	0.240	2.24	OK
24	0.003	0.240	1.29	OK
25	0.003	0.240	1.45	OK
26	0.002	0.240	1.03	OK
27	0.005	0.240	2.12	OK
28	0.003	0.240	1.13	OK
29	0.006	0.240	2.57	OK
30	0.004	0.240	1.70	OK
31	0.003	0.240	1.40	OK
32	0.003	0.240	1.20	OK
33	0.004	0.240	1.80	OK
34	0.002	0.240	0.95	OK
35	0.004	0.240	1.68	OK
36	0.003	0.240	1.24	OK
37	0.005	0.240	2.00	OK
38	0.002	0.240	0.88	OK
39	0.006	0.240	2.56	OK
40	0.011	0.240	4.56	OK

8 Voltage fluctuations and flicker

8.1 Standard

Basic standard

EN61000-3-3:2013

Date of testing

2012-02-01, 2015-10-12

8.2 Measurement equipment

GTS

	Equipment	Calibration due	Type	Equipment No.	Manufacturer
<input checked="" type="checkbox"/>	Power Analyzer	Jul. 04. 2019	DPA500	GTS235	EMTEST
<input checked="" type="checkbox"/>	AC Power Source	Jul. 04 .2019	ACS500	GTS236	EMTEST
<input checked="" type="checkbox"/>	Test software	N/A	ACS	N/A	EMTEST

N LAB

	Equipment	Calibration due	Type	Equipment No.	Manufacturer
<input checked="" type="checkbox"/>	AC Power Source	2020.01.14	NSG 1007	57877	SCHAFFNER
<input checked="" type="checkbox"/>	Signal Conditioning unit	2020.01.14	CCN1000-1	72538	SCHAFFNER

8.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The following limits apply:

- the value of Pst shall not be greater than 1.0;
- the value of Plt shall not be greater than 0.65;
- the value of d(t) during a voltage change shall not exceed 3.3 % for more than 500 ms;
- the relative steady-state voltage change, dc, shall not exceed 3.3 %;
- the maximum relative voltage change, dmax, shall not exceed;

a) 4 % without additional conditions;

b) 6 % for equipment which is:

- switched manually, or
- switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Note: The cycling frequency will be further limited by the Pst and Plt limit. For example: a dmax of 6% producing a rectangular voltage change characteristic twice per hour will give a P1t of about 0.65.

c) 7 % for equipment which is:

- attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
- switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching.

Test duration time: 10min

8.4 Test results

Model	Mode	Table	Remarks	Result
MRC-9F,LED-180	TM2	022	AC Input port	Pass
MRCD-7	TM2	023	AC Input port	Pass

8.5 Tables

8.5.1 Table 022

	MRC-9F values	LED-180 values	Limit	Result
Pst	0.028	0.188	1.00	PASS
dc [%]	0.008	0.586	3.30	PASS
dmax [%]	0.090	0.696	4.00	PASS
dt [s]	0.000	0.000	0.50	PASS

8.5.2 Table 023

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: MRCD-7
Test category: All parameters (European limits)
Test date: 10/12/2015
Test duration (min): 10
Comment: Working
Customer: Customer information

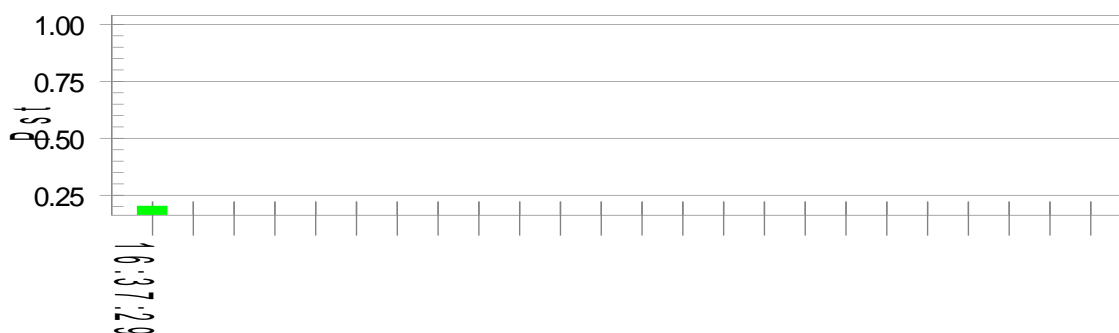
Tested by: RJB
Test Margin: 100
Start time: 4:26:59 PM
End time: 4:37:30 PM
Data file name: F-000223.cts_data

Test Result: Pass

Status: Test Completed

Pst_i and limit line

European Limits



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.13		
Highest dt (%):	0.51	Test limit (%):	3.30 Pass
T-max (mS):	0	Test limit (mS):	500.0 Pass
Highest dc (%):	-0.53	Test limit (%):	3.30 Pass
Highest dmax (%):	0.55	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.202	Test limit:	1.000 Pass

9 Electrostatic discharge

9.1 Standard

Basic standard **EN 61000-4-2:2009**
Date of testing **2012-02-03, 2015-10-18**
Performance criteria: **B**

9.2 Measurement equipment

GTS

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	ESD Simulator	Jul. 04. 2019	ESD-2030A	GTS242	EMPEK

N LAB

	Equipment	Calibration due.	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	ESD generator power	2020.01.14	NSG437	161	TESEQ
<input checked="" type="checkbox"/>	ESD generator	2020.01.14	NSG437	130-149	TESEQ

9.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The EUT and cables shall be isolated from the ground reference plane by an insulating support about 0,4 m thick. Any mounting feet associated with the EUT shall remain in place.

Contact discharge is the preferred test method. 20 discharges (10 with positive and 10 with negative polarity) shall be applied on each accessible metal part of the enclosure, In case of a non-conductive enclosure, discharges shall be applied on the HCP and VCP, and Air discharges shall be used where contact discharges cannot be applied.

The 4kV contact discharge shall be applied to conductive accessible parts, metallic contacts, such as battery compartments or in socket outlets, are excluded from this requirement.

9.4 Test results

Test Port: Enclosure			
Mode	Model	Table	Result
TM2	LED-180,MRC-D-7	024	Pass

9.5 Table

9.5.1 Table 024

Location	Voltage	Amount of test points	Amount of discharge	Discharge Method	Performance
Nonconductive Enclosure	±8kV	14	280	Air	A
Conductive Enclosure	±4kV	12	240	Contact	A
HCP	±4kV	4	80	Contact	A
VCP	±4kV	4	80	Contact	A

10 Electrical Fast Transients/Bursts Immunity

10.1 Standard

Basic standard **EN 61000-4-4:2012**
Date of testing **2012-02-03, 2015-10-17**
Performance criteria: **B**

10.2 Measurement equipment

GTS

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	EMTEST system	Jul. 03 2019	UCS500N	GTS239	EMTEST
<input checked="" type="checkbox"/>	Capacitive Clamp	Jul. 03 2019	N/A	GTS241	Thermo ELECTRON

N LAB

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Multi-function generator	2020.01.14	NSG 3060	083	TESEQ
<input checked="" type="checkbox"/>	Coupling- decoupling Network	2020.01.14	CDN3061	083	TESEQ

10.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The EUT located $0.1\text{m} \pm 0.01\text{m}$ above the ground reference plane. The ground reference plane shall project beyond the EUT at least 0.1m on all side,

The minimum distance between the EUT and all other conductive structures (e.g. the walls of a shielded room), except the ground reference plane shall be more than 0,5 m.

All cables to the EUT shall be placed on the insulation support 0,1 m above the ground reference plane. Cables not subject to electrical fast transients shall be routed as far as possible from the cable under test to minimize the coupling between the cables.

Fast transients are carried out during 2min with a positive polarity and during 2min with a negative polarity.

10.4 Test results

Test Port:			AC input port
Model	Mode	Table	Result
LED-180, MRCD-7	TM2	025	Pass

10.5 Table

10.5.1 Table 025

Test specification	1KV(peak); 5/50ns Tr/Th; 5kHz repetition frequency			
Injected Line	Voltage (kV)	Test Time (s)	Injected Method	Performance
L	+1	120	Direct	A
	-1	120	Direct	A
N	+1	120	Direct	A
	-1	120	Direct	A
PE	+1	120	Direct	A
	-1	120	Direct	A
L,PE	+1	120	Direct	A
	-1	120	Direct	A
N,PE	+1	120	Direct	A
	-1	120	Direct	A
L,N,PE	+1	120	Direct	A
	-1	120	Direct	A

11 Surge Immunity

11.1 Standard

Basic standard **EN 61000-4-5: 2014/A1:2017**
Date of testing **2012-02-03, 2015-10-19**
Performance criteria: **B**

11.2 Measurement equipment

GTS

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	EMTEST system	Jul. 03 2019	UCS500N	GTS239	EMTEST
<input checked="" type="checkbox"/>	Capacitive Clamp	Jul. 03 2019	N/A	GTS241	Thermo ELECTRON

N LAB

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Multi-function generator	2020.01.14	NSG 3060	083	TESEQ
<input checked="" type="checkbox"/>	Coupling- decoupling Network	2020.01.14	CDN 3061	083	TESEQ

11.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

If not otherwise specified the power cord between the EUT and the coupling/decoupling network shall not exceed 2m in length.

5 positive and 5 negative pulses is applicable :

- between phase to phase 1kV
- between phase to neutral 1kV
- between phase to protective earth 2kV
- between protective earth to neutral 2kV

11.4 Test results

Port:	AC input			
Mode	Model	Table	Test specification	Result
TM2	LED-180, MRCD-7	026	1.2/50(8/20) μ s Tr/Th 1KV L-N 2KV L-PE, N-PE	Pass

11.5 Table

11.5.1 Table 026

Injected Line	Wave Form	Voltage (kV)	Phase	Number of Pulse	Interval time	Performance
L-N	1.2/50 μ s	+1	90°	5	60s	A
		-1	270°	5	60s	A
L-PE	1.2/50 μ s	+2	90°	5	60s	A
		-2	270°	5	60s	A
N-PE	1.2/50 μ s	+2	90°	5	60s	A
		-2	270°	5	60s	A

12 Conducted Immunity

12.1 Standard

Basic standard

EN 61000-4-6:2014

Date of testing

2012-02-16, 2015-10-17

Performance criteria:

A

12.2 Measurement equipment

CTI LAB

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Signal Generator	03/29/2019	2023B	202307/883	IFR
<input checked="" type="checkbox"/>	Power Amplifier	03/29/2019	75A 250A	320297	AR
<input checked="" type="checkbox"/>	Attenuator	07/06/2019	ATT6/75	0320837	EM-Test
<input checked="" type="checkbox"/>	CDN	07/06/2019	CDN M2/M3	0204-01	EM-Test
<input checked="" type="checkbox"/>	EM-Clamp	07/06/2019	EM101	35770	EM-Test

N LAB

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Conducted immunity test system	2020.01.14	NSG4070	25795	SCHAFFNER
<input checked="" type="checkbox"/>	Attenuator	2020.01.14	ATN6075	25366	TESEQ
<input checked="" type="checkbox"/>	CDN	2020.01.14	M016	25127	TESEQ
<input checked="" type="checkbox"/>	EM Injection Clamp	2020.01.14	KEMZ 801	25468	TESEQ

12.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

Set up the EUT, CDN and test generators as shown above. The equipment to be tested is placed on an insulating support of 0.1m height above a ground reference plane, all cable exiting the EUT shall be supported at a height of at least 30mm above the ground reference plane. The distance between eut and CDN is 0.1 to 0.3m.

The test is performed with the generator contacted to each CDN in turn. The frequency range is swept from 150kHz to 80MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

Only applicable to ports interfacing with cables whose total length according to the manufacturer's specification may exceed 1 m.

Artificial hand need to be used when EUT is a hand held equipment.

12.4 Test results

Port:		AC input port		
Mode	Model	Table	Test specification	Result
TM2	LED-180, MRCD-7	027	0.15MHz~230MHz 3V(r.m.s.) (unmodulated) 1kHz ,80%AM ,sine wave Source impedance 150 Ω	Pass

12.5 Table

12.5.1 Table 027

Frequency Range(MHz)	Injected Position	Strength	Performance
0.15MHz ~230MHz	AC Input port	3V(rms, Unmodulated)	A
Dwell time: 1s; Steps: 1%			

13 Voltage dips and interruptions Immunity

13.1 Standard

Basic standard **EN 61000-4-11: 2004+A1:2017**
Date of testing **2012-02-03, 2015-10-18**
Performance criteria: **C**

13.2 Measurement equipment

GTS

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	EMTEST system	Jul. 03 2019	UCS500N	GTS239	EMTEST
<input checked="" type="checkbox"/>	Capacitive Clamp	Jul. 03 2019	N/A	GTS241	Thermo ELECTRON

N LAB

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Multi-function generator	2020.01.14	NSG 3060	083	TESEQ
<input checked="" type="checkbox"/>	Coupling- decoupling Network	2020.01.14	CDN3061	083	TESEQ
<input checked="" type="checkbox"/>	Automated Step transformer	2020.01.14	INA 6502	112	TESEQ

13.3 Test set-up

Annex B with a photo or a rough figure of the test set-up is attached.

The EUT is tested for each selected combination of test level and duration with a sequence of three Dips/interruptions with intervals of 10s minimum.

Voltage shift shall occur at Zero crossing.

13.4 Test results

Model: LED-180, MRCD-7		Test Port: AC input		
Test Mode	Table	Test specification (50Hz)	Test specification (60Hz)	Result
TM2	028	Voltage reduction 30% Number of periods 25; Voltage reduction 60% Number of periods 10; Voltage reduction 100% Number of periods 0.5 Performance criteria:C	Voltage reduction 30% Number of periods 30; Voltage reduction 60% Number of periods 12; Voltage reduction 100% Number of periods 0.5 Performance criteria:C	Pass

13.5 Table

13.5.1 Table 028

Test level %UT	Voltage Dips & Short Interruptions % UT	Duration (ms) (50Hz)	Duration (ms) (60Hz)	Phase Angle	Performance
0	100	10	8.3	0°, 180°	A
40	60	200	200	0°, 180°	A
70	30	500	500	0°, 180°	B

Annex A

EUT / technical data

Port	Label	Description		
Enclosure	GH	Enclosure port plastic		
Mains input AC	NAC.E	220~240V 50/60Hz, CI.I		
Mains input DC	NDC.E	N.A		
Mains output AC	NAC.E	N.A		
Mains output DC	NAC.A	N.A		
Process measurement and control ports	PMS.E/A	N.A		
I/O and communication ports	SD.E/A	N.A		
Protective earth connection	EA	Yes		
Interface Cables	Length	Shielded	Type	Special
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Figure A-1 External photo of LED-XXX series



Figure A-2 External photo of LED-180

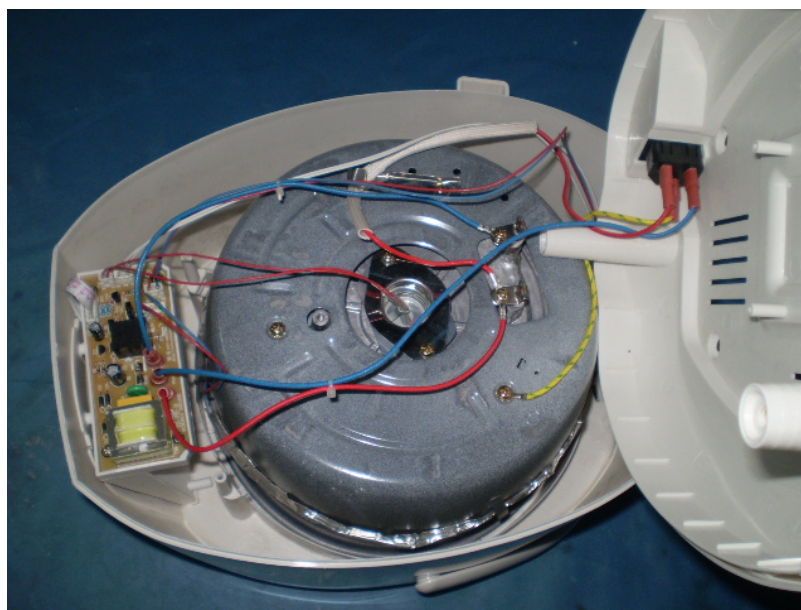


Figure A-3 Internal photo of LED-180

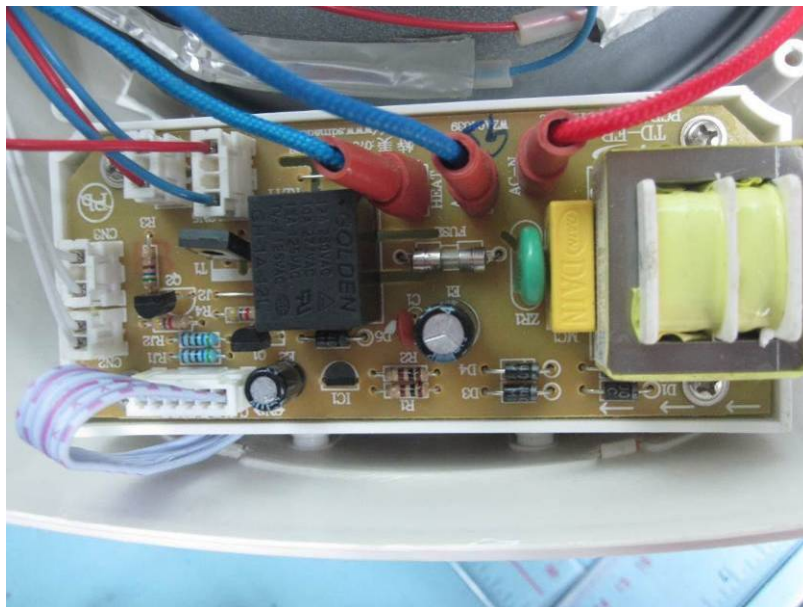


Figure A-4 Internal photo of LED-180

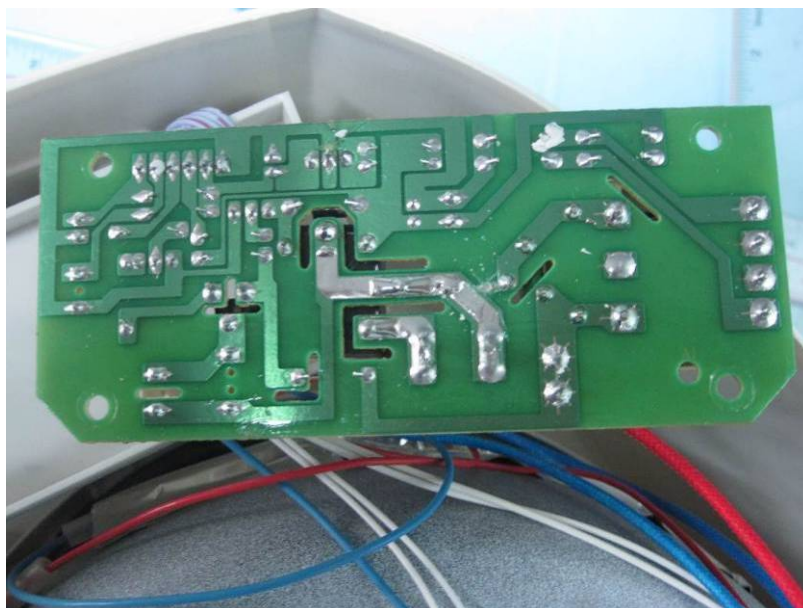


Figure A-5 Internal photo of LED-180



Figure A-6 Internal photo of LED-180

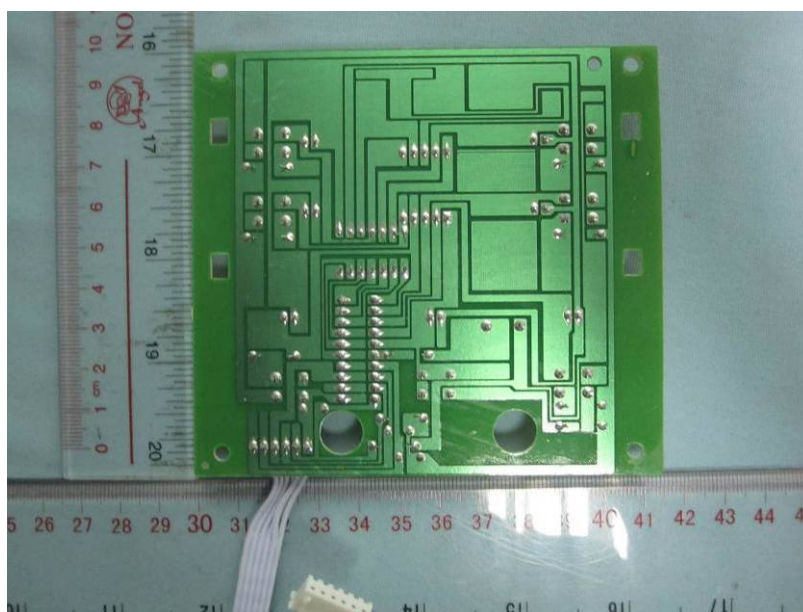


Figure A-7 Internal photo of LED-180



Figure A-8 Internal photo of LED-180



Figure A-9 External photo of MRC-XXXY series



Figure A-10 External photo of MRC-9F

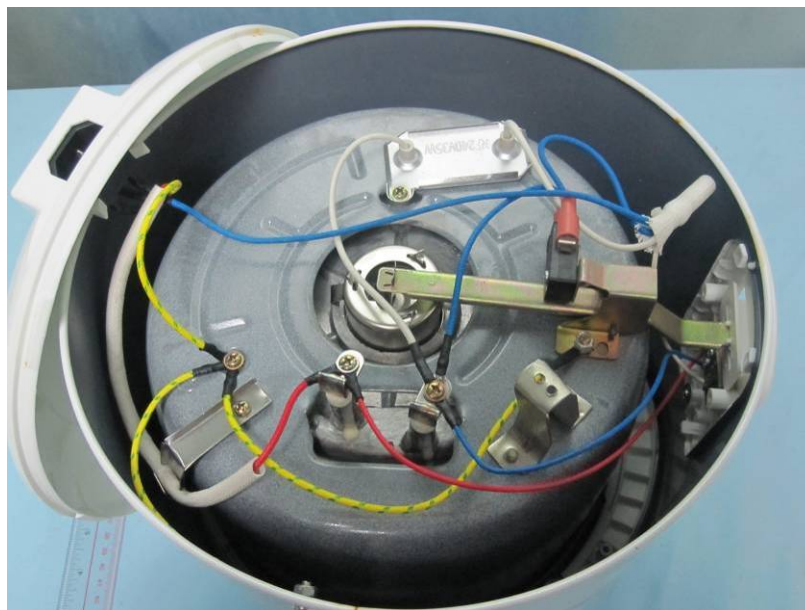


Figure A-11 Internal photo of MRC-9F



Figure A-12 External photo of MRC-12F



Figure A-13 External photo of MRC-12F

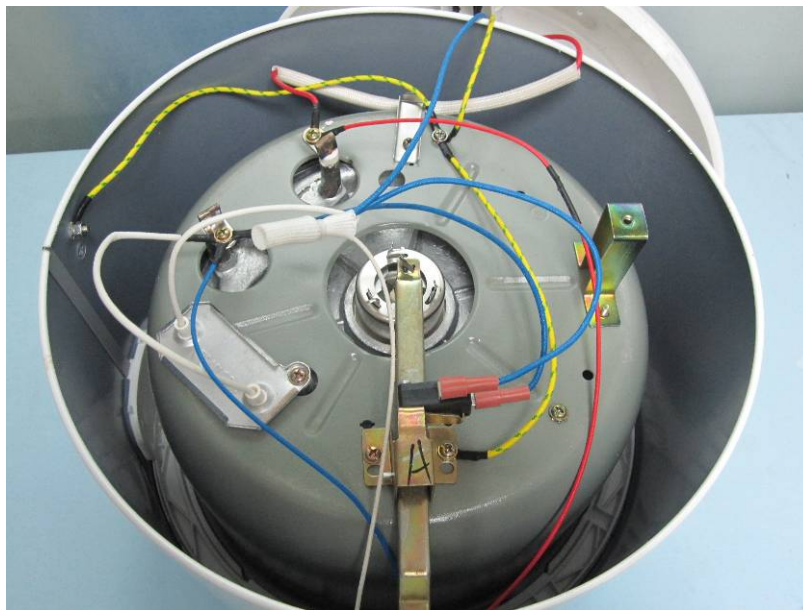


Figure A-14 Internal photo of MRC-12F



Figure A-15 External photo of RC-YYYY series



Figure A-16 External photo of MRCD-7



Figure A-17 External photo of MRCD-7



Figure A-18 External photo of MRCD-7



Figure A-19 Internal photo of MRCD-7

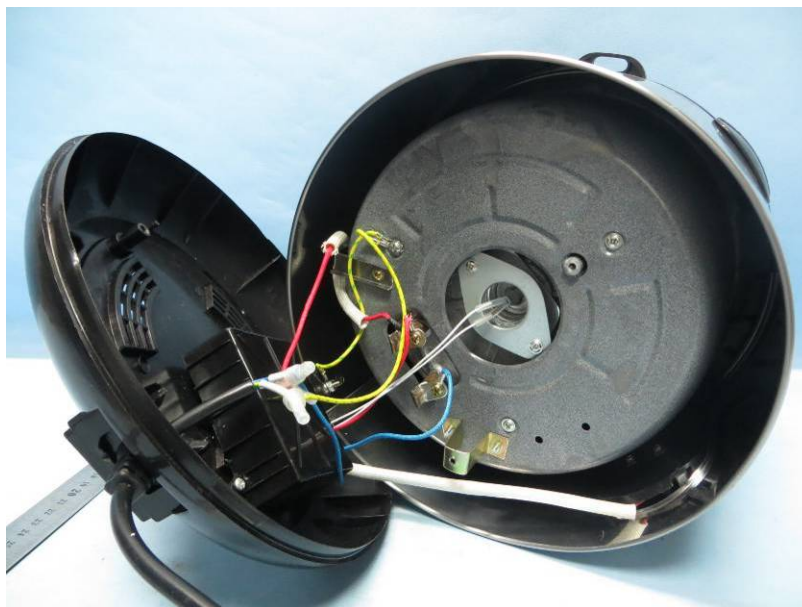


Figure A-20 Internal photo of MRCD-7

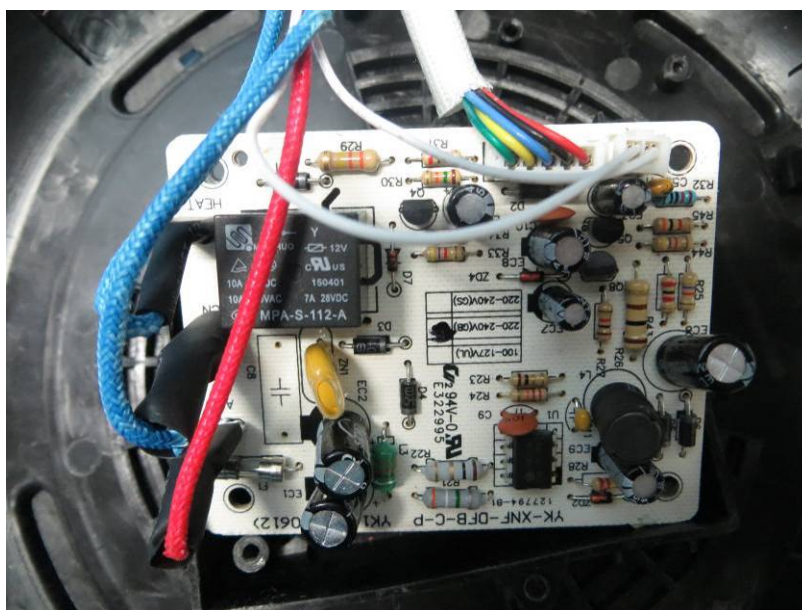


Figure A-21 Internal photo of MRCD-7

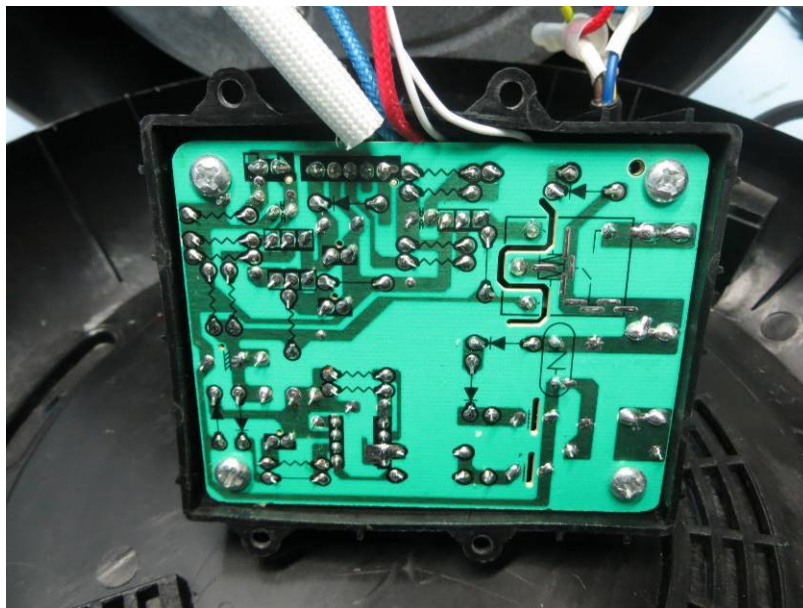


Figure A-22 Internal photo of MRCD-7

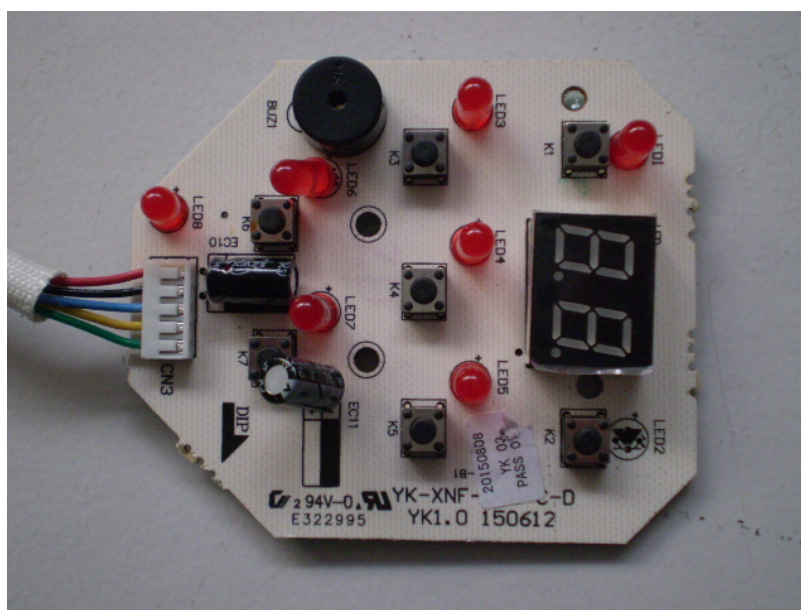


Figure A-23 Internal photo of MRCD-7

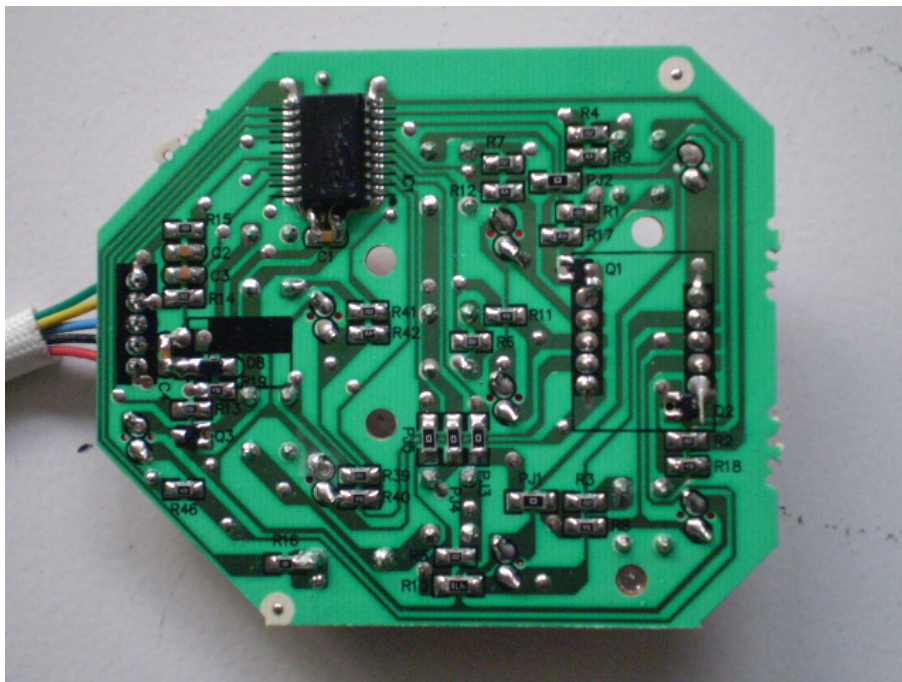


Figure A-24 Internal photo of MRCD-7

Annex B

EUT set-up -details- for MRCD-7



Figure B-1 Setup for conducted emission



Figure B-2 Setup for discontinuous disturbance



Figure B-3 Setup for disturbance power



Figure B-4 Setup for Harmonics and flicker



Figure B-5 Setup for ESD



Figure B-6 Setup for EFT, Surge, Voltage dips and Interruption



Figure B-7 Setup for Conducted Immunity

EUT set-up -details- for MRC-12F



Figure B-8 Setup for conducted emission



Figure B-9 Setup for disturbance power

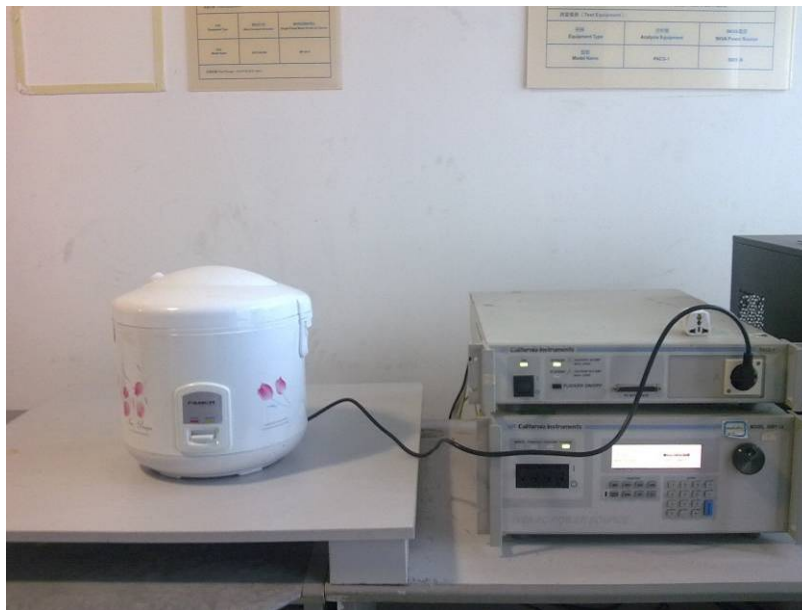


Figure B-10 Setup for Harmonics and flicker

EUT set-up -details- for RC-280



Figure B-11 Setup for conducted emission



Figure B-12 Setup for disturbance power

***** End of Test Report *****