

Afore New Energy Technology (Shanghai) Co., Ltd.

TEST REPORT

SCOPE OF WORK:

EMC directive (2014/30/EU) – EMC report

Model:

BNT017KTA, BNT020KTA, BNT025KTA, BNT030KTA,
BNT030KTL, BNT036KTL, BNT040KTL, BNT050KTL,
BNT060KTL

REPORT NUMBER

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ISSUE DATE

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DOCUMENT CONTROL NUMBER

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201112

Manufacturer : Afore New Energy Technology (Shanghai) Co., Ltd.

Manufacturing site : Building 7, No.333 Wanfang Rd, Minhang District, Shanghai. China.
201112

Summary

The equipment complies with the requirements according to the following standard(s) or Specification:

EN IEC 61000-6-2: 2019: Electromagnetic compatibility (EMC) - General standards – Immunity for residential, commercial and light-industrial environment

EN IEC 61000-6-4: 2019: General standards – Emission standard for residential, commercial and light-industrial environment

EN 61000-3-12:2011: Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase

EN IEC 61000-3-11:2019: Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection

EN 62920:2017+A1:2021: Photovoltaic power generating systems – EMC requirements and test methods for power conversion equipment

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Revision History

Report No.	Version	Description	Issued Date
2404B0470SHA-001	Rev. 01	Initial issue of report	2024-04-17

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Measurement result summary

TEST ITEM	TEST RESULT	NOTE
Conducted disturbance voltage at mains terminals	Pass	
Electromagnetic radiation disturbance	Pass	
Harmonic current	Pass	
Voltage fluctuations and flicker	Pass	
Electrostatic discharge	Pass	
Radio frequency electromagnetic field	Pass	
Fast transients	Pass	
Surges	Pass	
Radio frequency, common mode	Pass	
Voltage dips	Pass	
Power frequency magnetic field	Pass	

Notes: 1: NA =Not Applicable

2: Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

3: Additions, Deviations and Exclusions from Standards: None.

TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name	: PV Grid interactive inverter
Type/Model	: BNT017KTA, BNT020KTA, BNT025KTA, BNT030KTA, BNT030KTL, BNT036KTL, BNT040KTL, BNT050KTL, BNT060KTL
Description	The testing unit is a Class I grid-interactive PV inverter for outdoor installation (IP65). The unit is providing EMC filtering at the output toward mains. All models are identical with hardware version and software version, the output power is derating by software. Model BNT030KTL has 2 MPPT tracker with 5 input strings. Model BNT036KTL and BNT040KTL has 3 MPPT trackers with 6 input strings. Model BNT050KTL has 3 MPPT trackers with 7 input strings. Model BNT060KTL has 4 MPPT trackers with 8 input strings. Model BNT030KTL, BNT036KTL, BNT040KTL have 1 internal fan and 2 external fans. Model BNT050KTL, BNT060KTL have 1 internal fan and 5 external fans. The output power is derated by software. Except as noted, the model BNT060KTL was the representative test model in this report. This report is based on 230601231SHA-002. The modification is add new test datas on harmonics, flicker, and immunity items for meet EN62920 standard requirements.
Rating	: See Appendix I specifications table
Trade Mark	: Afore
EUT type	☒ Table-top ☐ Floor standing
Category of environment	☒ Class A PCE ☐ Class B PCE
Sample received date	: 2023-06-28
Sample identification number	: NA
Date of test	: 2023-06-28 to 2023-07-17, 2024-03-14 to 2024-03-16

TEST REPORT**1.2 Description of Test Facility**

Name : Intertek Testing Services Shanghai

Address : Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R.
China

Telephone : 86 21 61278200

Telefax : 86 21 54262353

The test facility is : CNAS Accreditation Lab
recognized, certified, Registration No. CNAS L0139
or accredited by these FCC Accredited Lab
organizations Designation Number: CN0175

IC Registration Lab
CAB identifier.: CN0051

VCCI Registration Lab
Registration No.: R-14243, G-10845, C-14723, T-12252

A2LA Accreditation Lab
Certificate Number: 3309.02

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2 TEST SPECIFICATIONS

2.1 Normative references

EN IEC 61000-6-2: 2019: Electromagnetic compatibility (EMC) - General standards – Immunity for residential, commercial and light-industrial environment

EN IEC 61000-6-4: 2019: General standards – Emission standard for residential, commercial and light-industrial environment

EN 61000-3-12:2011: Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase

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EN 62920:2017+A1:2021: Photovoltaic power generating systems – EMC requirements and test methods for power conversion equipment

2.2 Mode of operation during the test

Within this test report, EUT was tested under all available operation modes and tested under its rating voltage and frequency. Other voltage and frequency is specified if used.

2.3 Test peripherals used

Item No	Description	Brand and Model	S/No
-	-	-	-

TEST REPORT

2.4 Record of climatic conditions

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (Kpa)
Mains terminal disturbance voltage	24	37	NA
Electromagnetic radiation disturbance	24	37	NA
Harmonic current	25	36	NA
Voltage fluctuations and flicker	23	38	NA
Electrostatic discharge	24	37	101
Radio frequency electromagnetic field	24	37	NA
Fast transients	24	37	NA
Surges	23	36	NA
Radio frequency, common mode	24	37	NA
Voltage dips	24	37	NA
Power frequency magnetic field	24	37	NA

Notes: NA =Not Applicable

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2.5 Instrument list

Conducted Emission/Disturbance Power/Tri-loop Test/CDN method					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESCS 30	EC 2107	2024-07-14
☒	A.M.N.	R&S	ESH2-Z5	EC 3119	2024-11-29
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	EC 3045	2024-09-11
☒	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2024-06-09
ESD					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	ESD generator	TESEQ	NSG 437	EC 4792-4	2024-03-21
EFT/Surge Voltage Dips					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Conduct immunity system	EM TEST	UCS 500M6B	EC 2958	2024-04-06
☒	Automatic transformer	EM TEST	MV2616	EC 2957	2024-04-06
Conducted Immunity					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Signal generator	R&S	SML 01	EC 2338	2024-09-09
☒	Power amplifier	AR	75A250	EC 3043-1	2024-07-14
☒	Attenuator	EM TEST	ATT6/75	EC 3043-3	2024-02-04
☒	CDN	Frankonia	CDN M2M316	EC 5969	2024-03-14
Radiated Immunity					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Signal generator	R&S	SMR 20	EC 3044-1	2024-01-29
☒	Power amplifier	AR	250W1000B	EC 5818-2	2024-04-18

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☒	Power amplifier	BONN	BLMA1060-100	EC 5818-4	2024-04-18
☒	Log-period antenna	AR	AT 1080	EC 3044-7	2024-01-03
☒	Horn antenna	Schwarzbeck	STLP 9149	EC5881	2024-06-18
☒	Field meter	AR	FL17000	EC 5818-1	2024-05-20
☒	Power sensor	Keysight	N1914A	EC 5818-3	2024-04-18
Test Site					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Shielded room	Zhongyu	-	EC 2838	2024-01-14
☒	Shielded room	Zhongyu	-	EC 2839	2024-01-14
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2024-07-30
☒	Fully-anechoic chamber	Albatross project	-	EC 3047	2024-07-30
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Spectrum analyzer	Agilent	E7402A	EC 2254	2024-07-14
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3783	2024-02-27
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 2122	2024-03-10
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 5198	2024-01-18
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3326	2024-03-27
☒	Pressure meter	YM3	Shanghai Mengde	EC 3320	2024-06-30

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2.6 Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted emission at mains ports	9kHz ~ 150kHz	3.71 dB
	150kHz ~ 30MHz	3.31 dB
Continuous disturbance measurements using a VP	0.09MHz ~ 30MHz	2.75dB
Continuous disturbance voltage at telecom ports with AAN	150kHz ~ 30MHz	4.10 dB
Continuous disturbance current at telecom ports	150kHz ~ 30MHz	2.73 dB
Continuous disturbance power	30MHz ~ 300MHz	4.42 dB
Discontinuous disturbance voltage/click	150kHz ~ 30MHz	3.87dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.04 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.97 dB
	6GHz ~ 18GHz	5.29 dB
Harmonic current emission	-	3.90%
Voltage fluctuations and flicker	-	10.34%
ESD	-	6.65%
Radiated susceptibility	80MHz ~ 1000MHz	2.38%
EFT test at main terminal	-	11.57%
EFT test at signal/telecom terminal	-	11.62%
Surge test at main terminal	-	11.57%
Surge test at signal/telecom line	-	11.89%
Injected current test at main terminal	-	1.88 dB
Injected current test at unshielded signal terminal	-	3.41 dB
Injected current test at shielded signal terminal	-	3.30dB
Voltage dips and interruption	-	6.05%

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3 Mains terminal disturbance voltage

Test result: **PASS**

3.1 Limits

3.1.1 Limits at the AC mains ports

Frequency range (MHz)	Limits (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
Note: 1. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.		

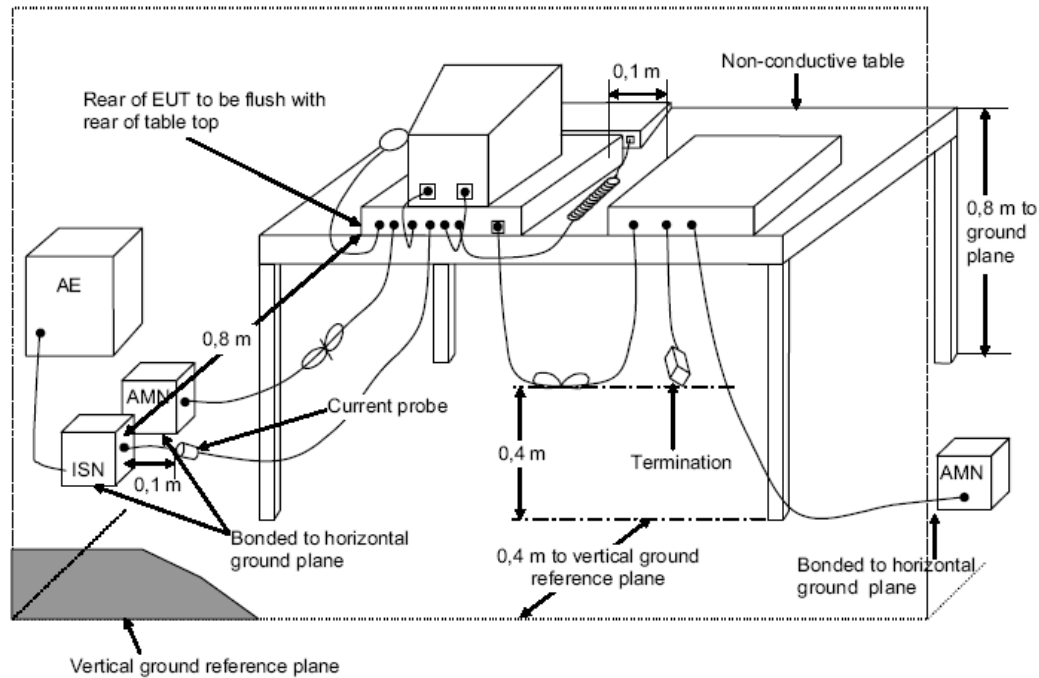
3.1.2 Limits at the DC mains ports

Frequency range (MHz)	Limits (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.5	89	76
0.5 ~ 30	83	70
Note: 1. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.		

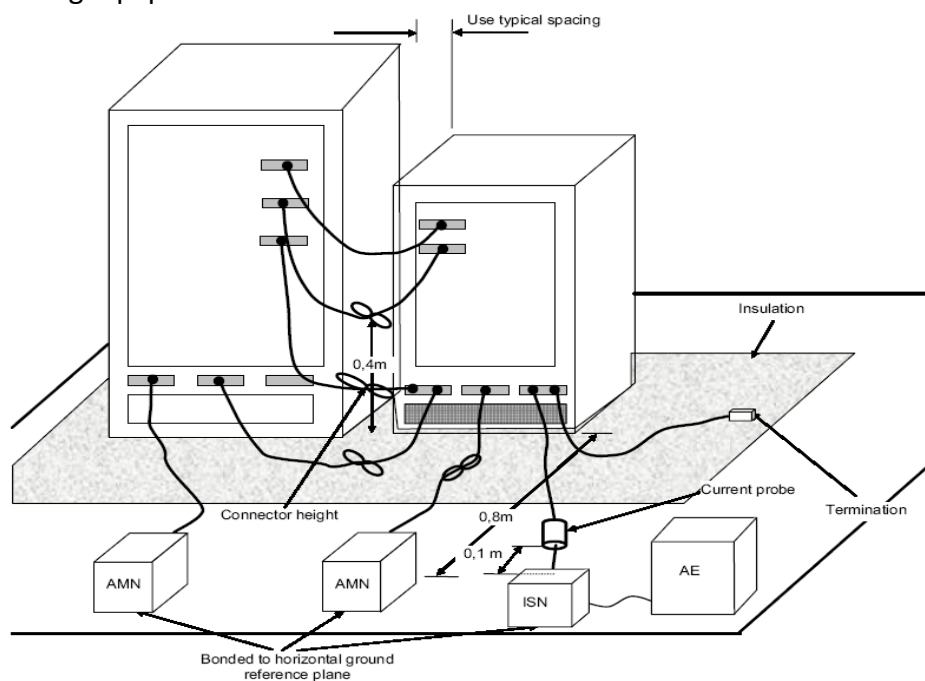
TEST REPORT

3.2 Test setup

For table top equipment



For floor standing equipment



TEST REPORT

3.3 Test Procedure

Measurement was performed in shielded room, and instruments used were following CISPR 16-1-2 clause 4.3.

Detailed test procedure was following CISPR 16-2-1 clause 7.4

EUT arrangement and operation conditions were according to CISPR 16-2-1 clause 7.4.

Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9 kHz.

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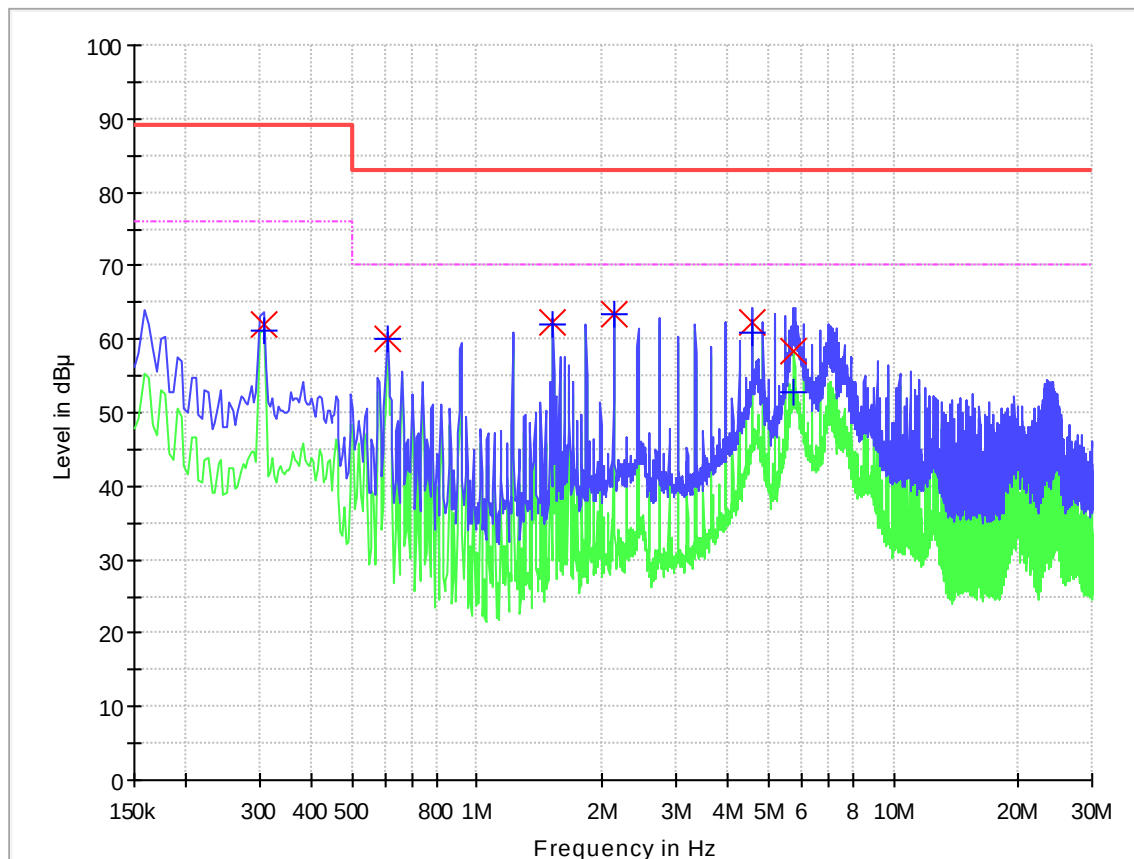
3.4 Test Result

TEST RESULT: PASS

Discharging mode—PV1

Positive:

Test Curve:



Test Data:

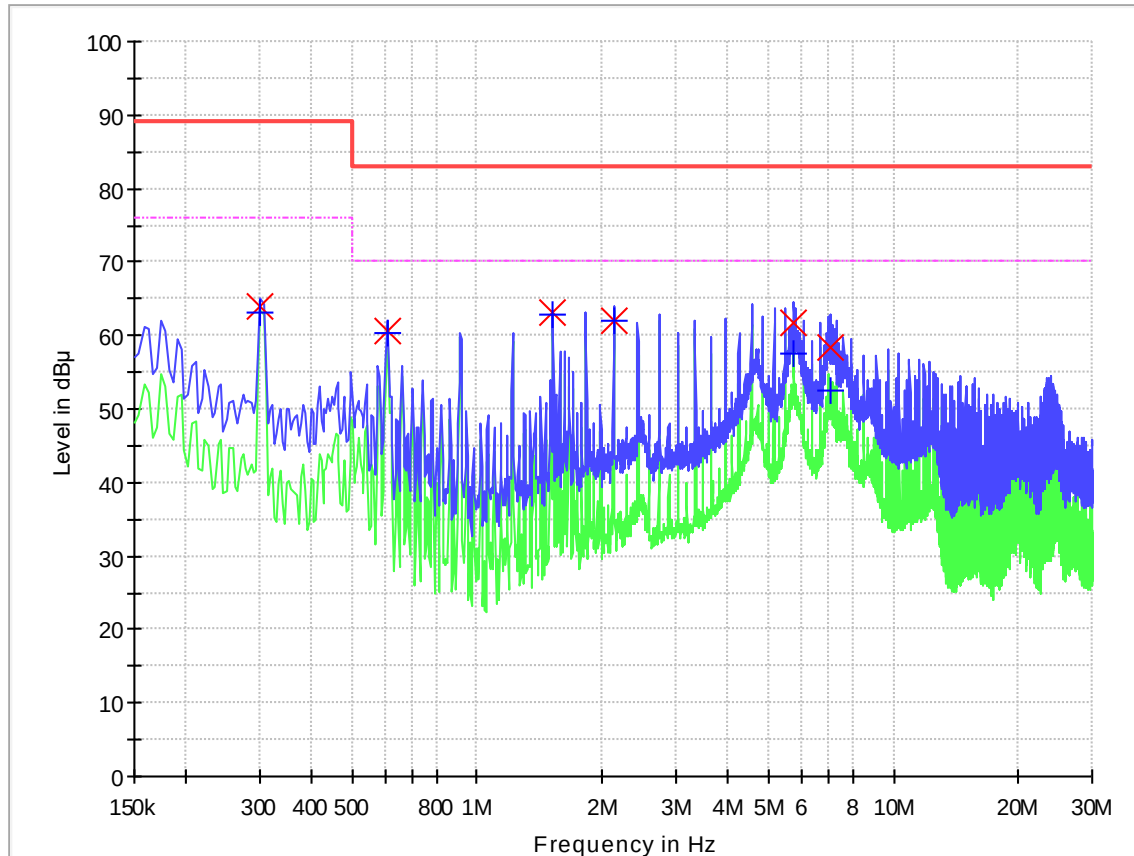
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.306000	61.9	61.2	9.000	L1	29.7	27.1	89.0	14.8	76.0
0.610000	60.2	60.0	9.000	L1	29.6	22.8	83.0	10.0	70.0
1.522000	62.2	62.0	9.000	L1	28.1	20.8	83.0	8.0	70.0
2.130000	63.3	63.3	9.000	L1	29.5	19.7	83.0	6.7	70.0
4.562000	62.2	61.0	9.000	L1	29.7	20.8	83.0	9.0	70.0
5.758000	58.3	52.8	9.000	L1	29.7	24.7	83.0	17.2	70.0

TEST REPORT

Discharging mode

Negative:

Test Curve:



Test Data:

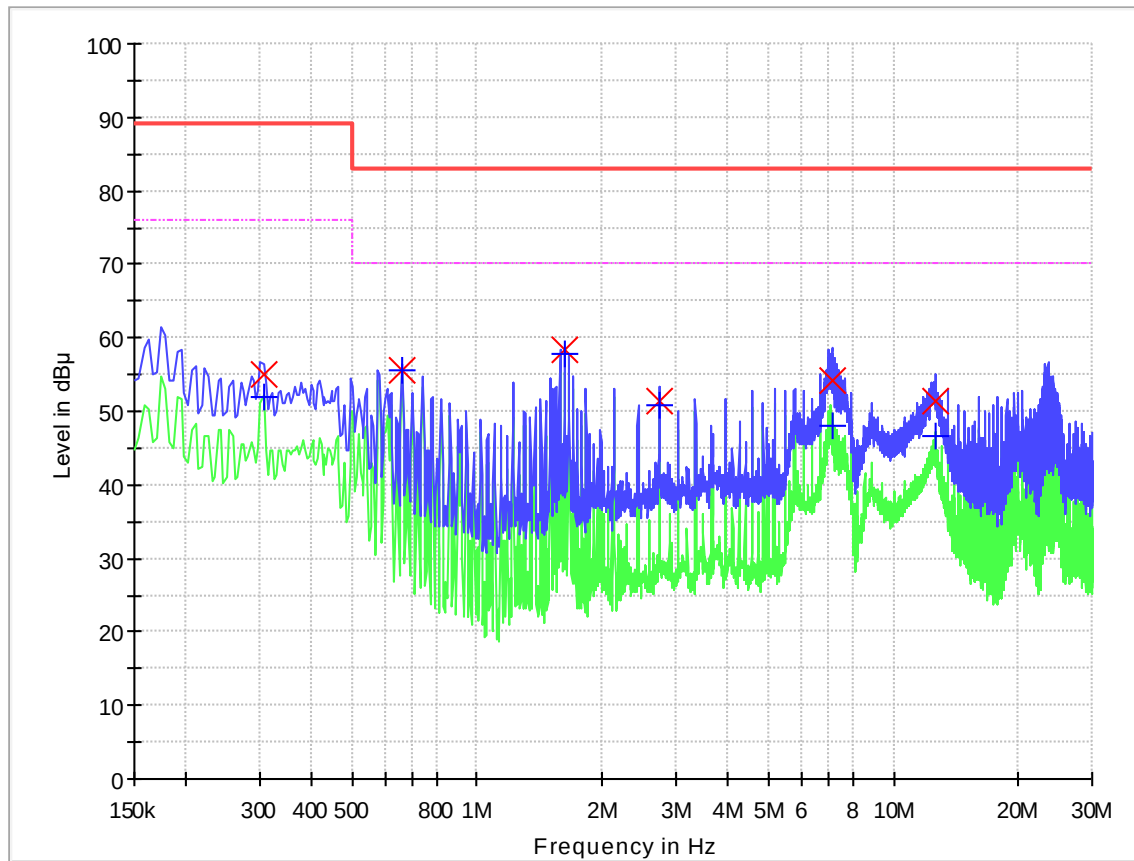
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.302000	64.0	63.3	9.000	N	29.7	25.0	89.0	12.7	76.0
0.606000	60.6	60.2	9.000	N	29.6	22.4	83.0	9.8	70.0
1.518000	63.0	62.7	9.000	N	29.5	20.0	83.0	7.3	70.0
2.126000	62.1	62.0	9.000	N	29.5	20.9	83.0	8.0	70.0
5.774000	61.7	57.7	9.000	N	29.7	21.3	83.0	12.3	70.0
7.086000	58.4	52.4	9.000	N	29.7	24.6	83.0	17.6	70.0

TEST REPORT

Discharging mode—PV2

Positive:

Test Curve:



Test Data:

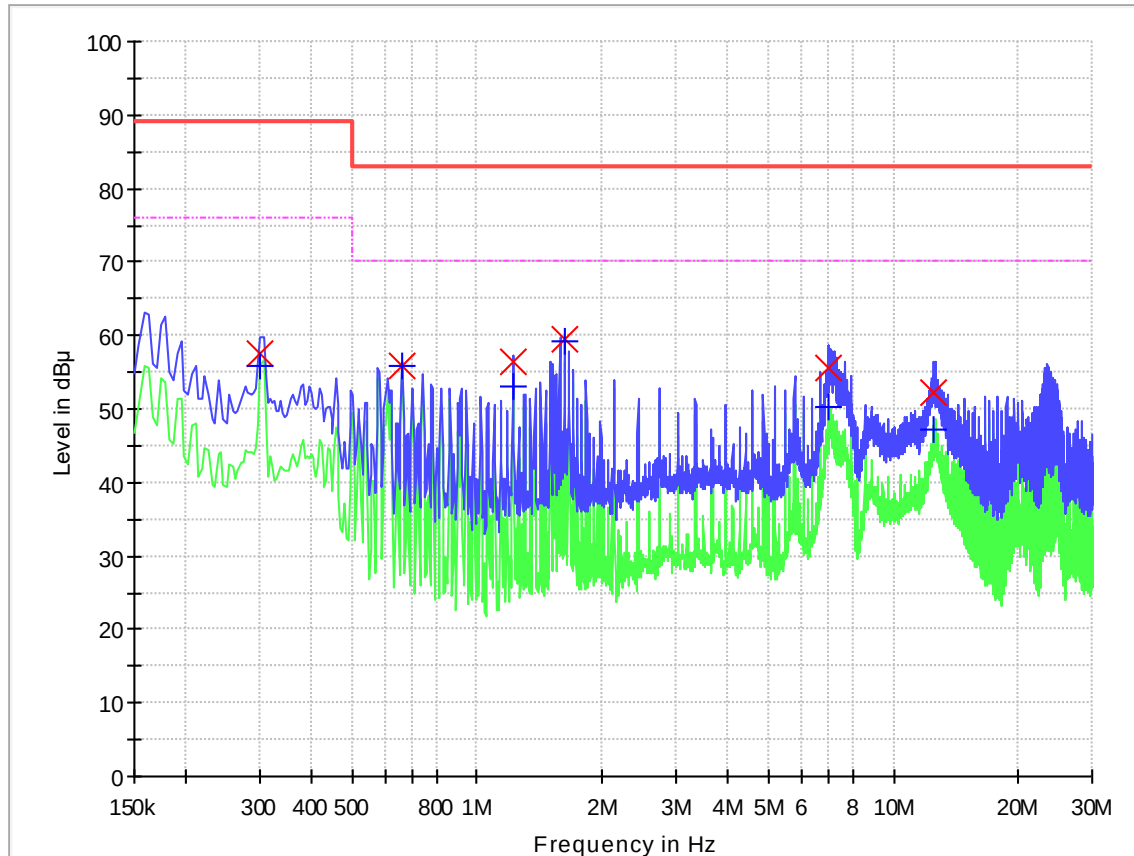
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.306000	55.1	52.0	9.000	L1	29.7	33.9	89.0	24.0	76.0
0.662000	55.6	55.5	9.000	L1	29.6	27.4	83.0	14.5	70.0
1.622000	58.3	57.9	9.000	L1	28.4	24.7	83.0	12.1	70.0
2.738000	51.3	50.9	9.000	L1	29.6	31.7	83.0	19.1	70.0
7.102000	54.1	48.1	9.000	L1	29.7	28.9	83.0	21.9	70.0
12.610000	51.5	46.5	9.000	L1	29.9	31.5	83.0	23.5	70.0

TEST REPORT

Discharging mode

Negative:

Test Curve:



Test Data:

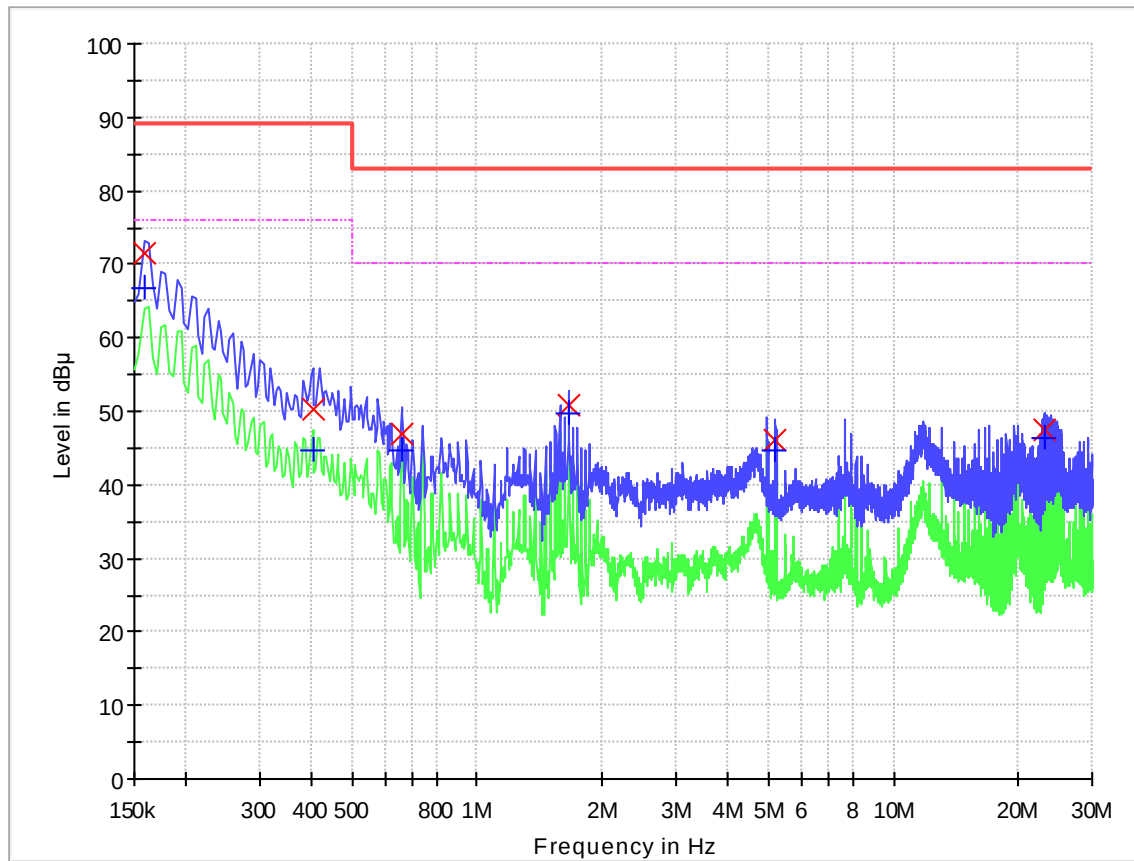
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.302000	57.7	55.8	9.000	N	29.7	31.3	89.0	20.2	76.0
0.662000	55.7	55.8	9.000	N	29.6	27.3	83.0	14.2	70.0
1.218000	56.5	53.2	9.000	N	29.5	26.5	83.0	16.8	70.0
1.618000	59.4	59.1	9.000	N	29.5	23.6	83.0	10.9	70.0
7.002000	55.5	50.3	9.000	N	29.7	27.5	83.0	19.7	70.0
12.478000	52.3	47.2	9.000	N	29.9	30.7	83.0	22.8	70.0

TEST REPORT

Discharging mode—PV3

Positive:

Test Curve:



Test Data:

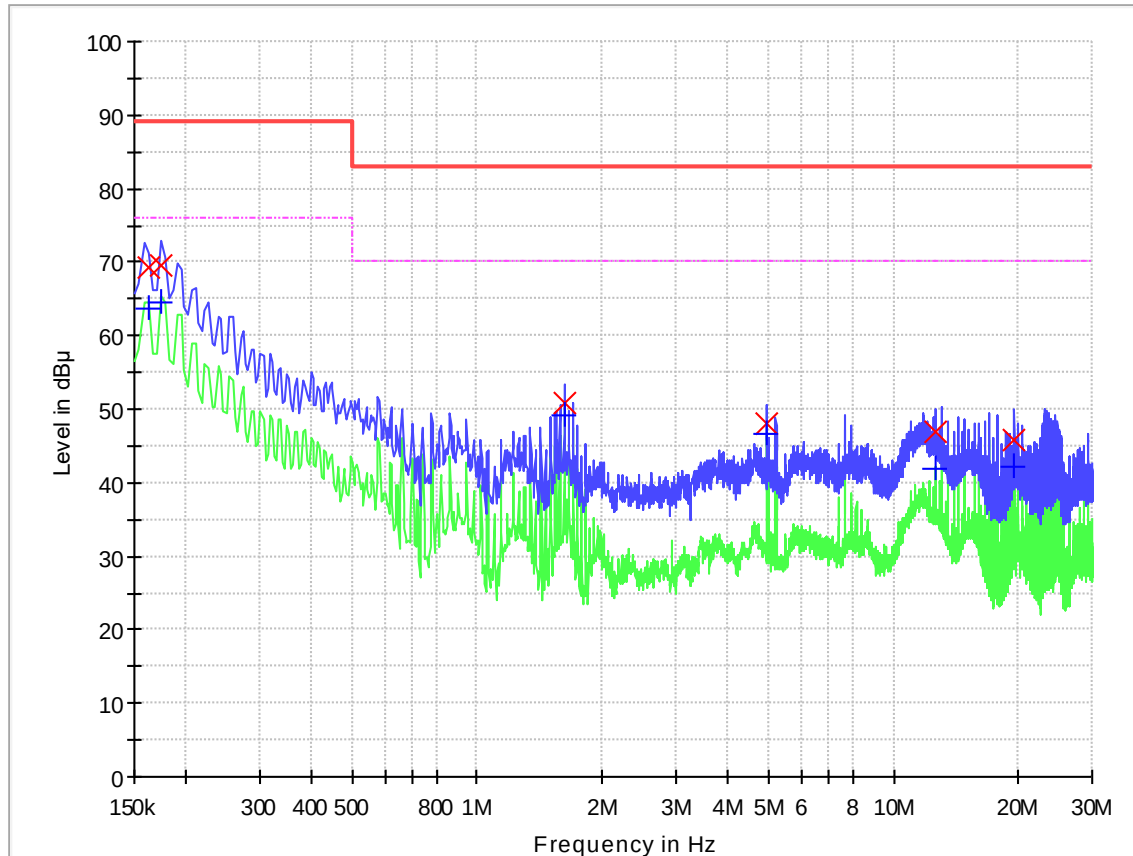
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.158000	71.6	66.6	9.000	L1	31.0	17.4	89.0	9.4	76.0
0.402000	50.4	44.6	9.000	L1	29.6	38.6	89.0	31.4	76.0
0.658000	46.9	44.8	9.000	L1	29.6	36.1	83.0	25.2	70.0
1.658000	50.9	49.8	9.000	L1	28.5	32.1	83.0	20.2	70.0
5.214000	46.0	44.8	9.000	L1	29.7	37.0	83.0	25.2	70.0
23.122000	47.5	46.3	9.000	L1	30.0	35.5	83.0	23.7	70.0

TEST REPORT

Discharging mode

Negative:

Test Curve:



Test Data:

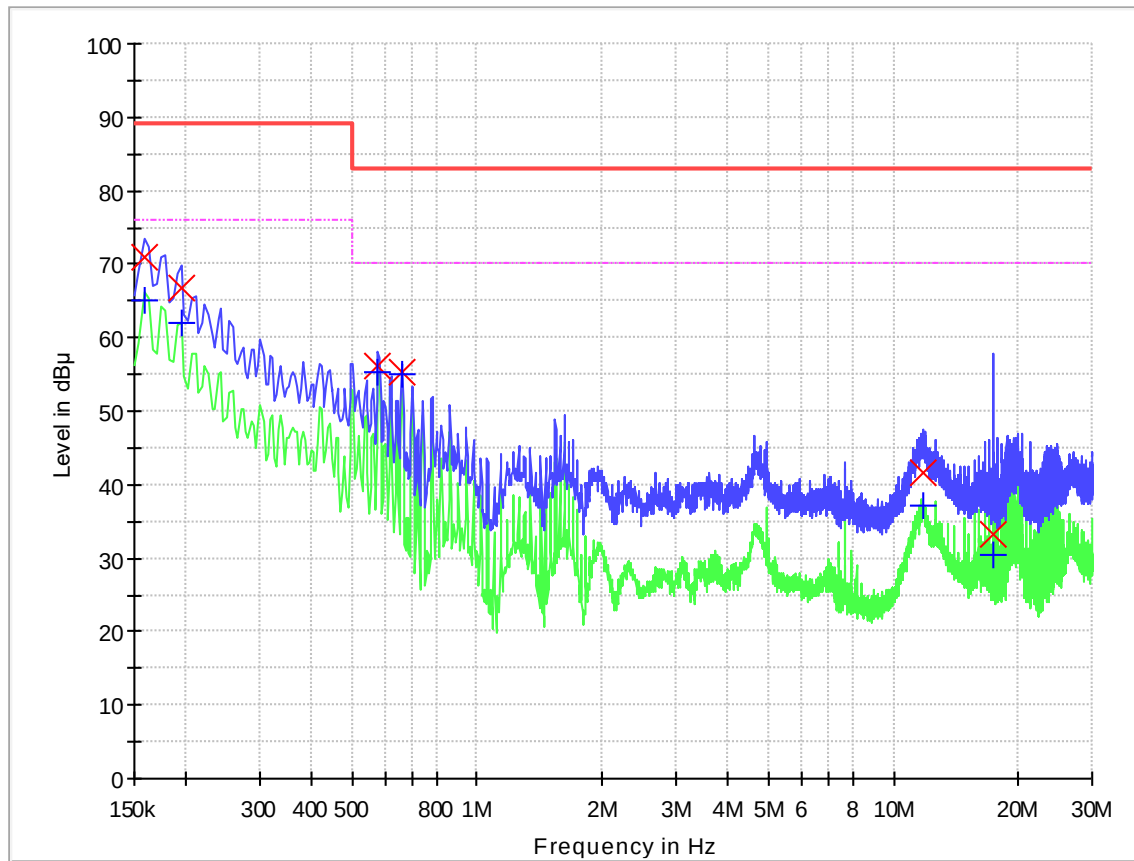
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.162000	69.2	63.7	9.000	N	30.9	19.8	89.0	12.3	76.0
0.174000	69.5	64.6	9.000	N	30.6	19.5	89.0	11.4	76.0
1.618000	50.7	49.0	9.000	N	29.5	32.3	83.0	21.0	70.0
4.974000	48.1	46.8	9.000	N	29.7	34.9	83.0	23.2	70.0
12.610000	46.8	41.8	9.000	N	29.9	36.2	83.0	28.2	70.0
19.566000	45.9	42.3	9.000	N	29.9	37.1	83.0	27.7	70.0

TEST REPORT

Discharging mode—PV4

Positive:

Test Curve:



Test Data:

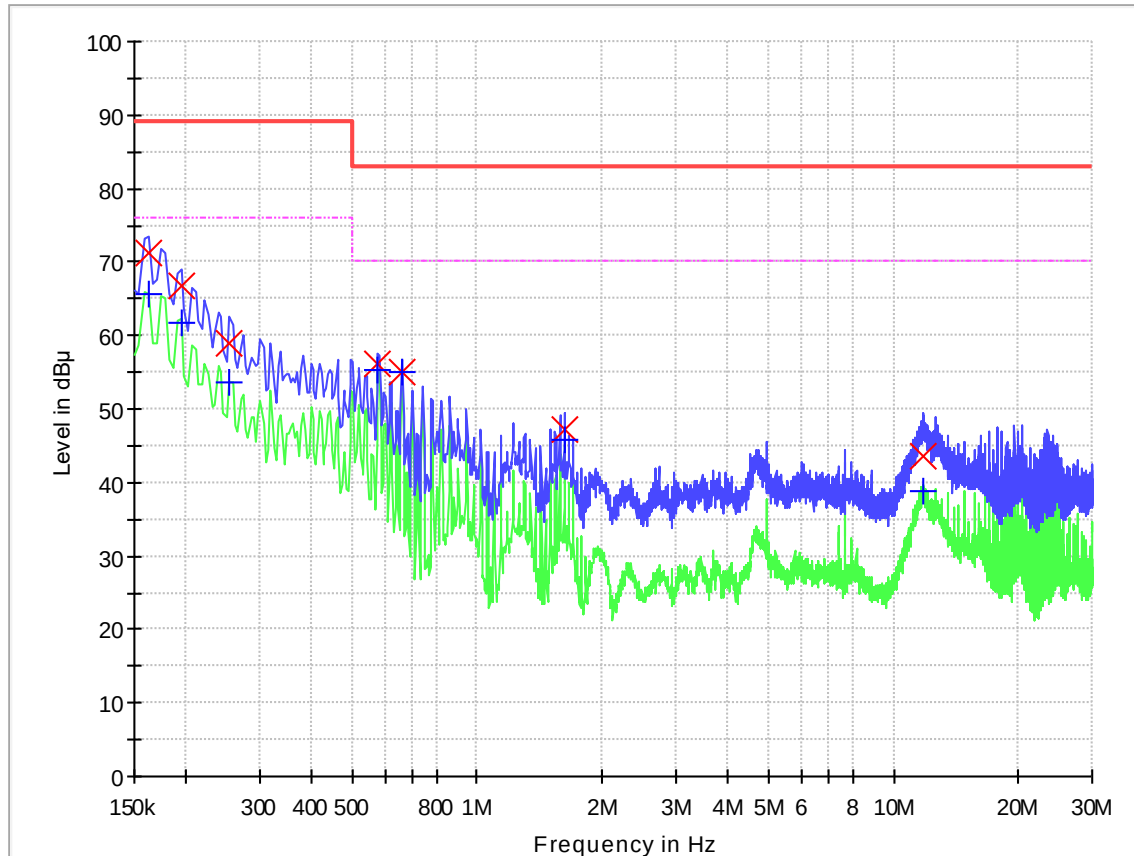
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.158000	70.8	65.2	9.000	L1	31.0	18.2	89.0	10.8	76.0
0.194000	66.9	62.1	9.000	L1	30.3	22.1	89.0	13.9	76.0
0.578000	56.2	55.4	9.000	L1	29.6	26.8	83.0	14.6	70.0
0.658000	55.4	55.0	9.000	L1	29.6	27.6	83.0	15.0	70.0
11.782000	41.7	37.1	9.000	L1	29.9	41.3	83.0	32.9	70.0
17.338000	33.3	30.4	9.000	L1	30.0	49.7	83.0	39.6	70.0

TEST REPORT

Discharging mode

Negative:

Test Curve:



Test Data:

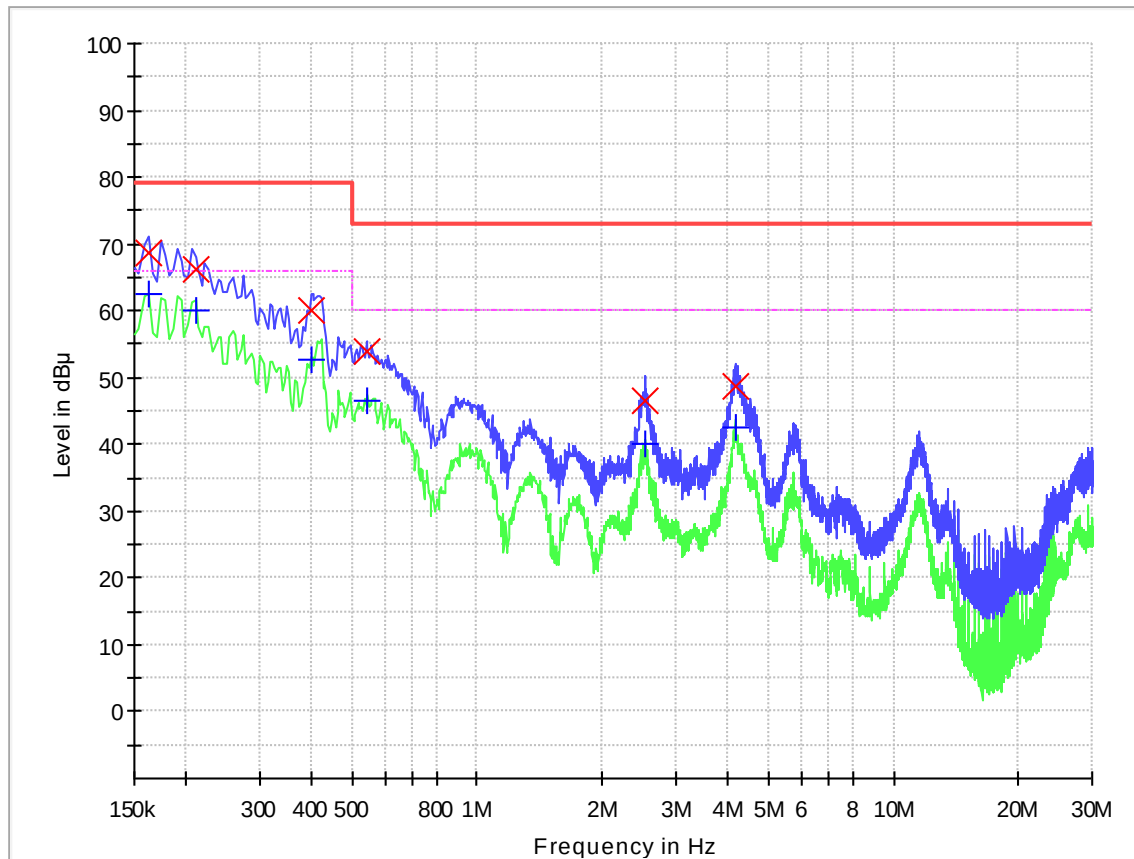
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.162000	71.2	65.7	9.000	N	30.9	17.8	89.0	10.3	76.0
0.194000	66.7	61.6	9.000	N	30.3	22.3	89.0	14.4	76.0
0.254000	59.0	53.7	9.000	N	29.9	30.0	89.0	22.3	76.0
0.578000	56.1	55.2	9.000	N	29.6	26.9	83.0	14.8	70.0
0.662000	55.1	54.9	9.000	N	29.6	27.9	83.0	15.1	70.0
1.622000	47.3	45.8	9.000	N	29.5	35.7	83.0	24.2	70.0
11.758000	43.7	38.9	9.000	N	29.8	39.3	83.0	31.1	70.0

TEST REPORT

Discharging mode

L1 line:

Test Curve:



Test Data:

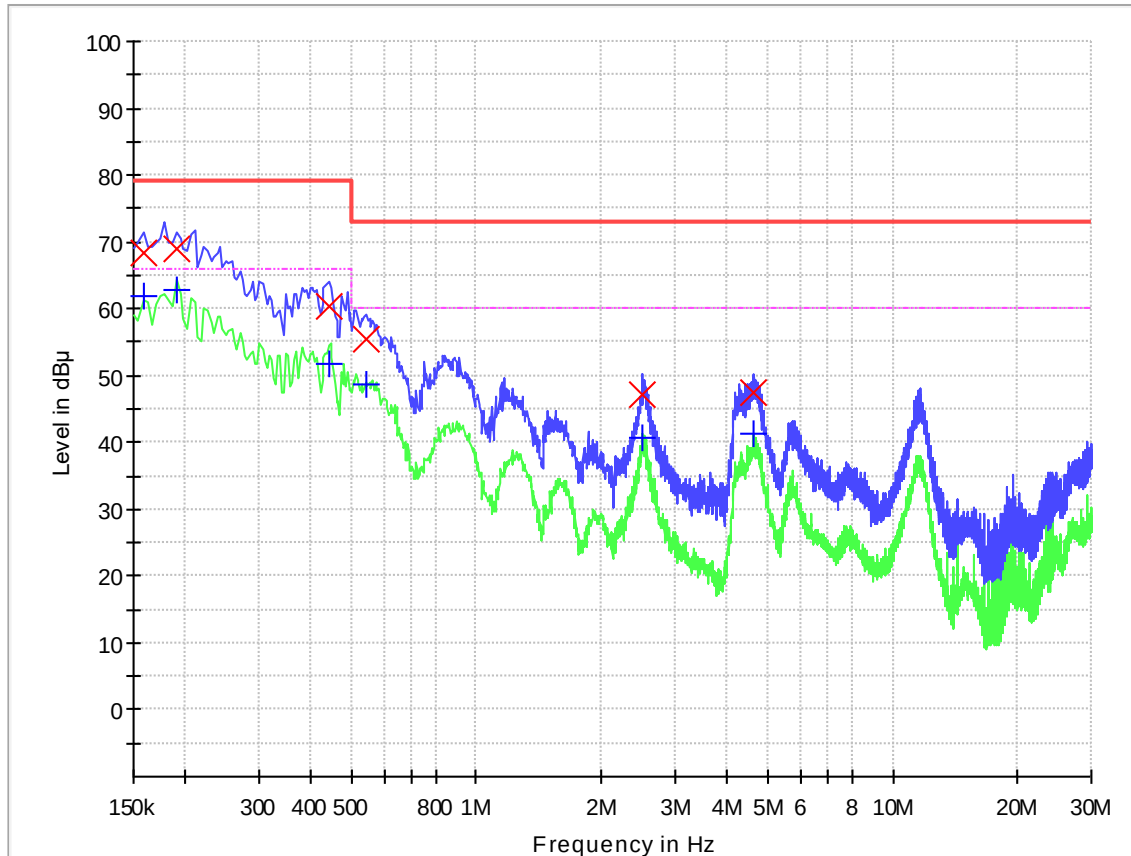
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.162000	68.8	62.6	9.000	L1	9.9	10.2	79.0	3.4	66.0
0.210000	66.1	60.2	9.000	L1	9.9	12.9	79.0	5.8	66.0
0.398000	60.0	52.6	9.000	L1	9.9	19.0	79.0	13.4	66.0
0.542000	53.9	46.6	9.000	L1	10.0	19.1	73.0	13.4	60.0
2.526000	46.4	40.0	9.000	L1	10.0	26.6	73.0	20.0	60.0
4.190000	48.6	42.7	9.000	L1	10.0	24.4	73.0	17.3	60.0

TEST REPORT

Discharging mode

L2 line:

Test Curve:



Test Data:

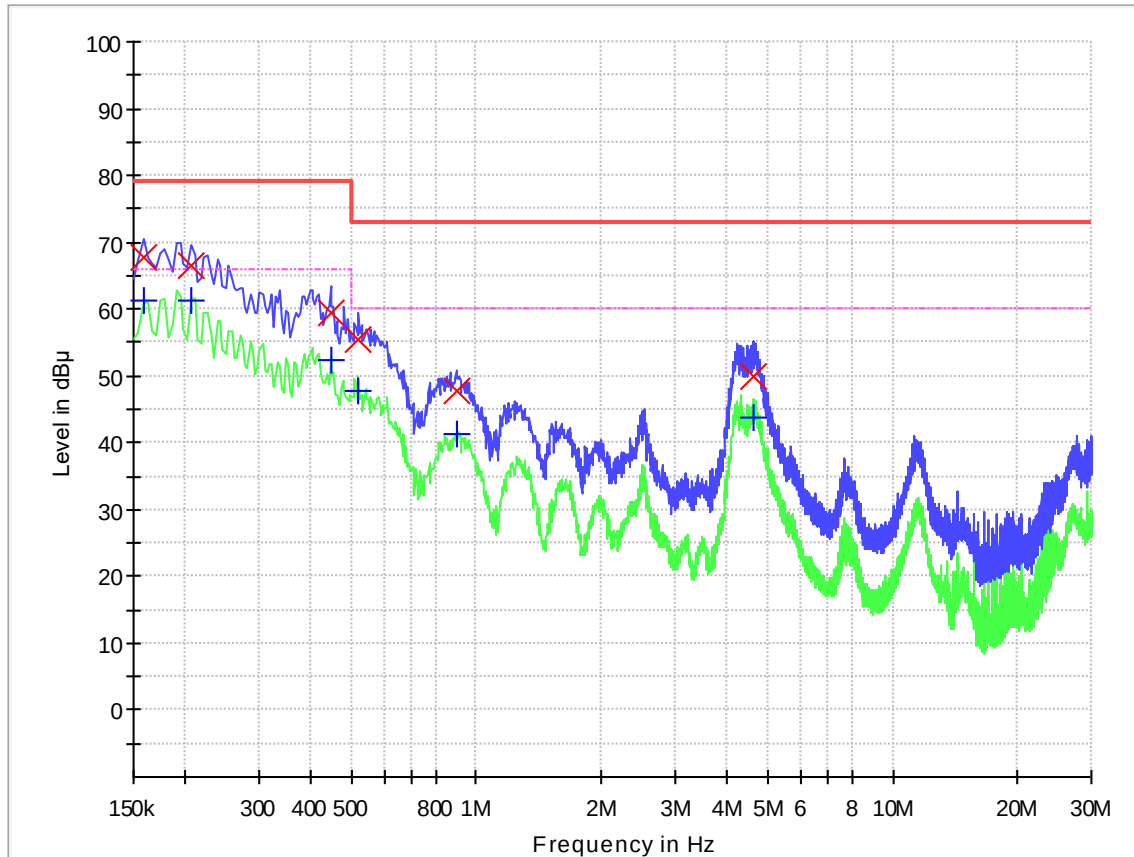
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.158000	68.3	61.9	9.000	L2	9.9	10.7	79.0	4.1	66.0
0.190000	68.9	62.8	9.000	L2	9.9	10.1	79.0	3.2	66.0
0.442000	60.3	51.8	9.000	L2	10.0	18.7	79.0	14.2	66.0
0.542000	55.4	48.6	9.000	L2	10.0	17.6	73.0	11.4	60.0
2.510000	47.1	40.7	9.000	L2	10.0	25.9	73.0	19.3	60.0
4.654000	47.3	41.3	9.000	L2	10.1	25.7	73.0	18.7	60.0

TEST REPORT

Discharging mode

L3 line:

Test Curve:



Test Data:

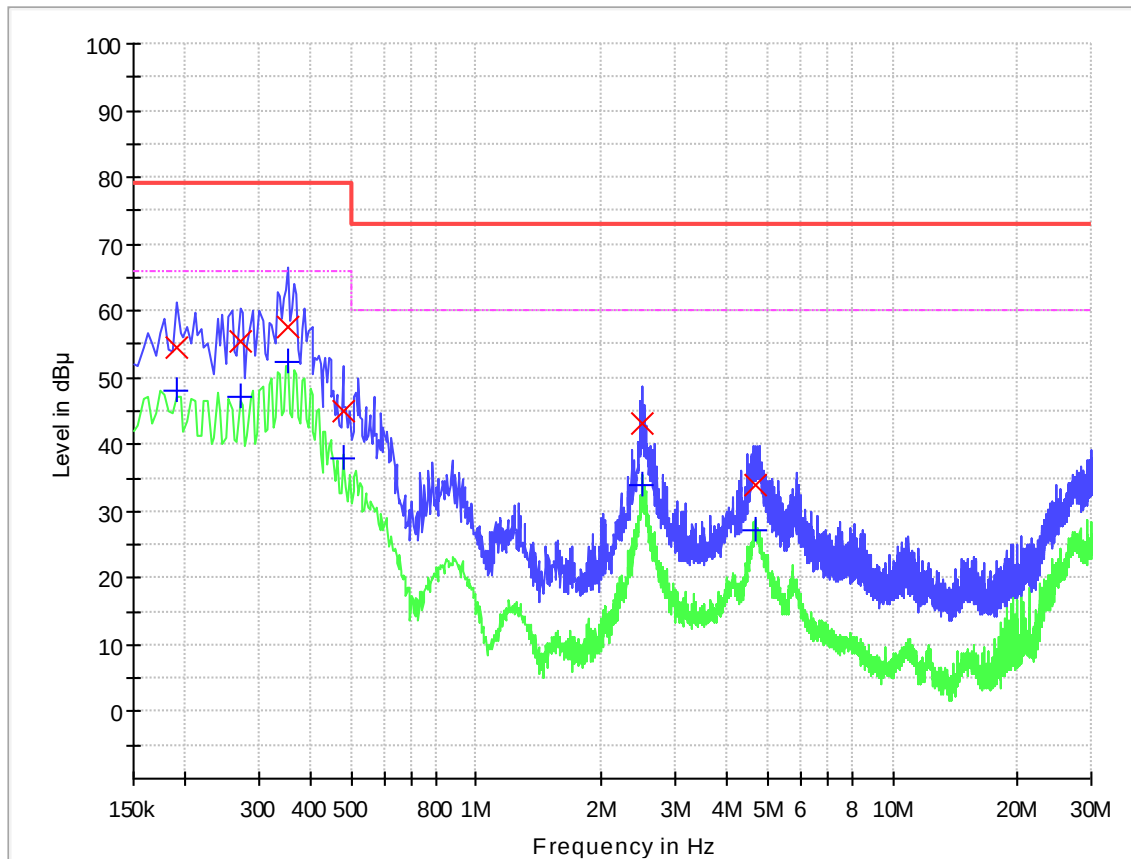
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.158000	67.8	61.2	9.000	L3	9.9	11.2	79.0	4.8	66.0
0.206000	66.5	61.4	9.000	L3	9.9	12.5	79.0	4.6	66.0
0.446000	59.5	52.2	9.000	L3	10.0	19.5	79.0	13.8	66.0
0.522000	55.4	47.7	9.000	L3	10.0	17.6	73.0	12.3	60.0
0.894000	47.7	41.4	9.000	L3	10.0	25.3	73.0	18.6	60.0
4.614000	50.0	43.8	9.000	L3	10.1	23.0	73.0	16.2	60.0

TEST REPORT

Discharging mode

N line:

Test Curve:



Test Data:

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.190000	54.6	48.0	9.000	N	9.9	24.4	79.0	18.0	66.0
0.270000	55.5	47.1	9.000	N	9.9	23.5	79.0	18.9	66.0
0.354000	57.6	52.4	9.000	N	9.9	21.4	79.0	13.6	66.0
0.478000	45.0	38.0	9.000	N	10.0	34.1	79.0	28.0	66.0
2.510000	43.1	34.0	9.000	N	10.0	29.9	73.0	26.0	60.0
4.658000	33.8	27.1	9.000	N	10.1	39.2	73.0	32.9	60.0

TEST REPORT

4 Radiated emission

Test result: **PASS**

4.1 Limits

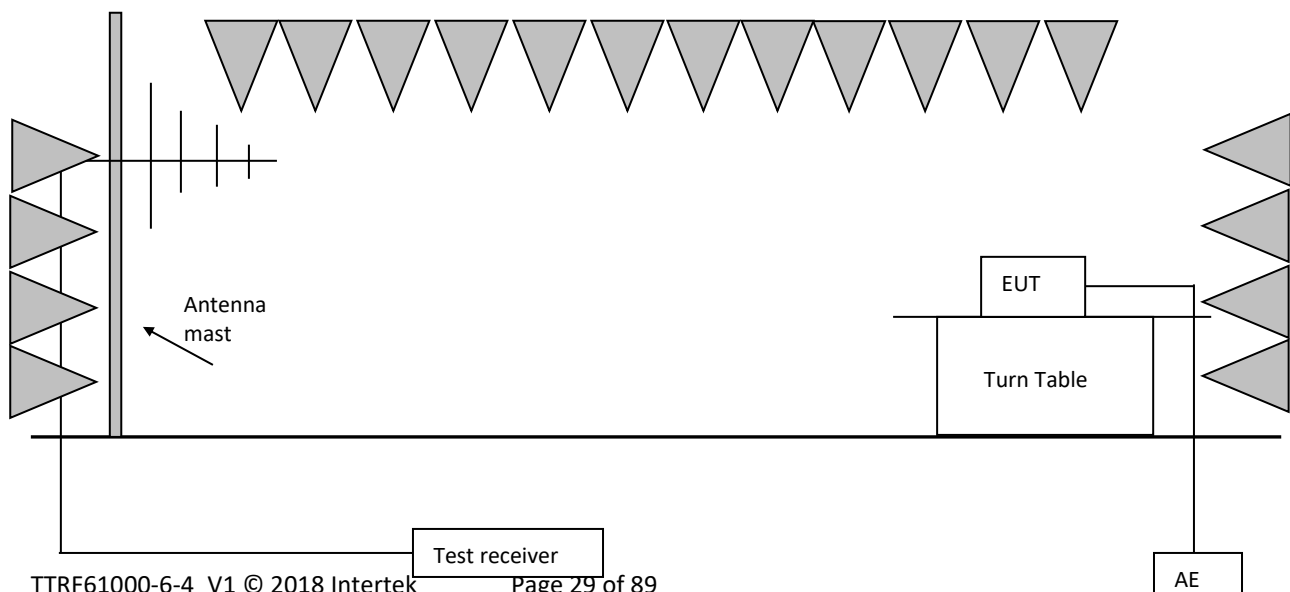
4.1.1 Limits for requirement below 1GHz

Frequency range (MHz)	Limit in dBuV/m (Quasi-peak) Of measurement distance 3m	Limit in dBuV/m (Quasi-peak) Of measurement distance 10m
30-230	50	40
230-1000	57	47
Note: 1. for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades. 2. The gray rows are selected items. 3. If the internal emission source is operating at a frequency below 9kHz then measurements need only to be performed up to 230MHz.		

4.1.2 Limits for requirement above 1GHz

Frequency range (GHz)	Limit in dBuV/m (Peak) Of measurement distance 3m	Limit in dBuV/m (Average) Of measurement distance 3m
1-3	76	56
3-6	80	60
Note: 1. for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades. 2. The gray rows are selected items.		

4.2 Block diagram of test set up



TEST REPORT

4.3 Test Procedure

The measurement was applied in a semi-anechoic chamber.

Measurement was performed according to CISPR 16-2-3.

Setting of EUT is according to CISPR 16-2-3.

The bandwidth setting on R&S Test Receiver ESI26 was 120 kHz.

The frequency range from 30MHz to 1000MHz was checked.

The bandwidth setting on R&S Test Receiver ESI26 was 1MHz.

The frequency range from 1000MHz to 6000MHz was checked.

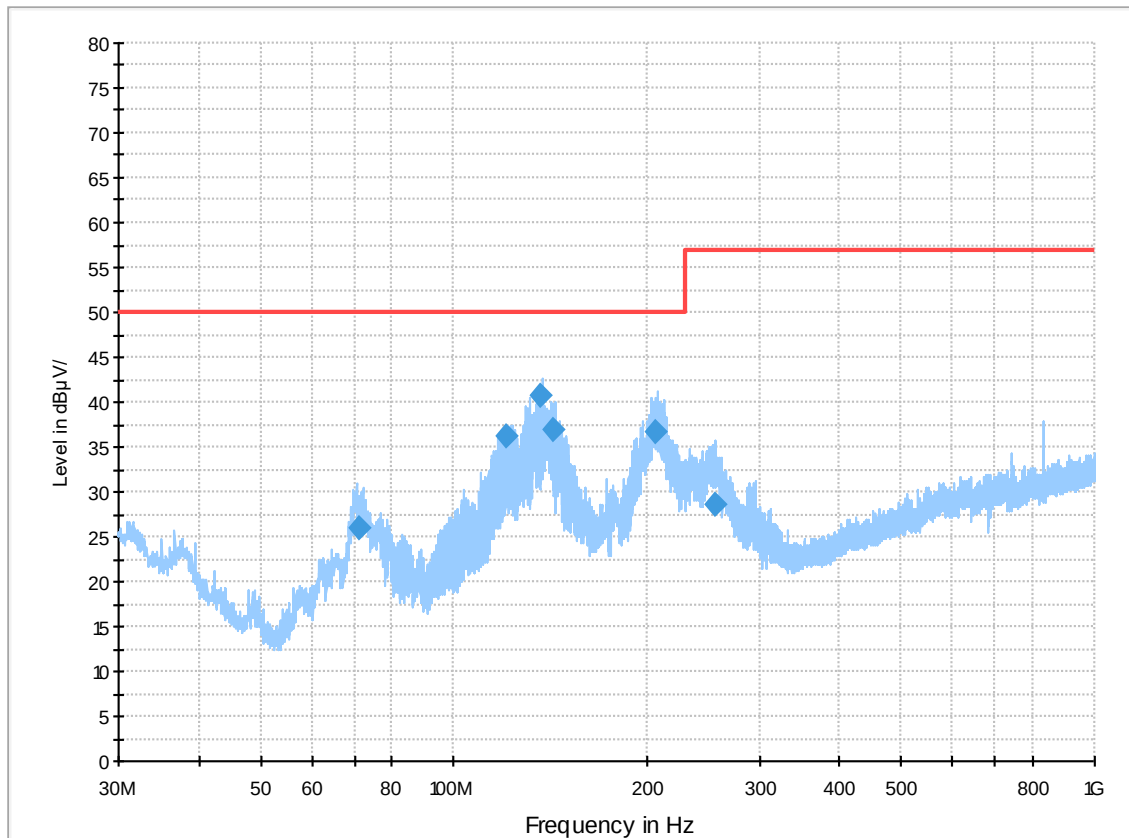
TEST REPORT

4.4 Test Result

Discharging mode

Test Curve:

Horizontal polarization



Test Data:

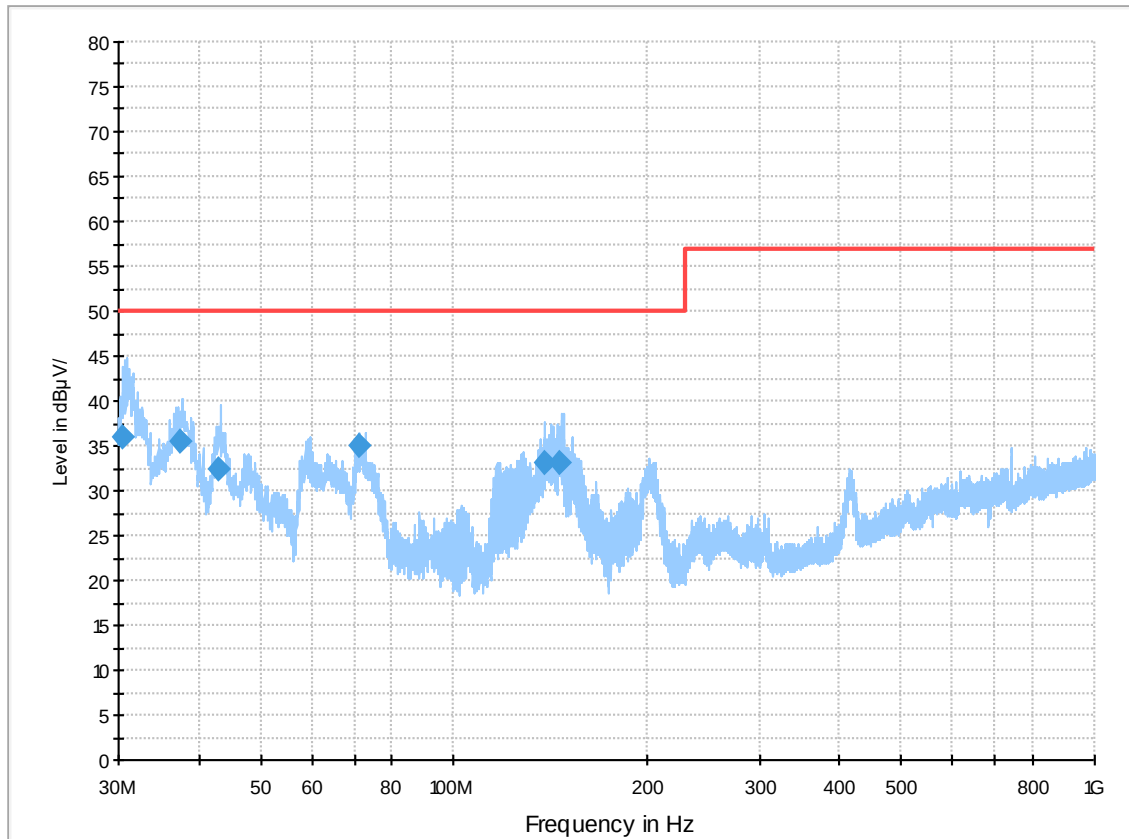
Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
71.000000	26.0	120.000	H	6.0	24.0	50.0
121.160000	36.1	120.000	H	12.5	13.9	50.0
136.400000	40.8	120.000	H	11.9	9.2	50.0
142.640000	36.9	120.000	H	11.4	13.1	50.0
206.280000	36.7	120.000	H	10.1	13.3	50.0
256.520000	28.5	120.000	H	14.2	28.5	57.0

TEST REPORT

Discharging mode

Test Curve:

Vertical polarization



Test Data:

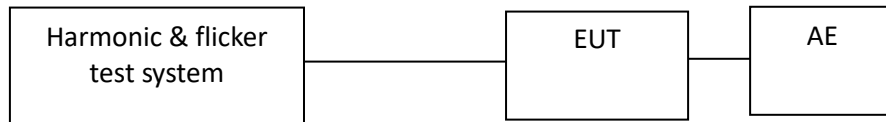
Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Polarization	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
30.400000	35.8	120.000	V	17.5	14.2	50.0
37.480000	35.5	120.000	V	13.9	14.5	50.0
43.120000	32.4	120.000	V	10.8	17.6	50.0
138.720000	33.1	120.000	V	11.2	16.9	50.0
146.760000	33.1	120.000	V	11.2	16.9	50.0
71.000000	35.1	120.000	V	6.0	14.9	50.0

TEST REPORT

5 Harmonic current emission

Test result: **PASS**

5.1 Test Setup



5.2 Test Procedure

Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyzer which was integrated in the harmonic & flicker test system. The measurements were carried out under steady conditions.

- ☐ Measuring instrumentation according to IEC 61000-4-7:2002+A1:2008
- ☐ This product is not defined as lighting equipment, and has rated power less than 75W, therefore, no limit applies according to EN 61000-3-2
- ☐ The EUT is kitchen machines as listed in the scope of IEC 60335-2-14, therefore, is deemed to conform to the harmonic current limits of this standard without further testing.

5.3 Test limit

TEST REPORT

5.3.1 Limits for equipment with input current $\leq 16A$ per phase

Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

5.3.2 Limits for equipment with input current $> 16A$ and $\leq 75A$ per phase

☐ Current emission limits for professional equipment with $I_{1max} \leq 75 A$ other than balanced three-phase equipment

Minimal R_{sce}	Admissible individual harmonic current I_n/I_1^a %						Admissible harmonic current distortion factors %	
	I_3	I_5	I_7	I_9	I_{11}	I_{13}	THD	$PWHD$
33	21,6	10,7	7,2	3,8	3,1	2	23	23
66	24	13	8	5	4	3	26	26
120	27	15	10	6	5	4	30	30
250	35	20	13	9	8	6	40	40
≥ 350	41	24	15	12	10	8	47	47
NOTE 1 The relative values of even harmonics up to order 12 must not exceed $16/n$ %. Even harmonics above order 12 are taken into account in THD and $PWHD$ in the same way as odd order harmonics.								
NOTE 2 Linear interpolation between successive R_{sce} values are permitted.								
^a I_1 = reference fundamental current; I_n = harmonic current component.								

TEST REPORT

☐ Current emission limits for professional balanced three-phase equipment
with $I_{1\max} \leq 75 \text{ A}$

Minimal R_{scs}	Admissible individual harmonic current I_n/I_1^a				Admissible harmonic current distortion factors	
	%				%	
	I_5	I_7	I_{11}	I_{13}	THD	$PWHD$
33	10,7	7,2	3,1	2	13	22
66	14	9	5	3	16	25
120	19	12	7	4	22	28
250	31	20	12	7	37	38
≥ 350	40	25	15	10	48	46
NOTE 1 The relative values of even harmonics up to order 12 must not exceed $16/n$ %. Even harmonics above order 12 are taken into account in THD and $PWHD$ in the same way as odd order harmonics.						
NOTE 2 Linear interpolation between successive R_{scs} values are permitted.						
^a I_1 = reference fundamental current; I_n = harmonic current component.						

☐ Current emission limits for professional balanced three-phase equipment
with $I_{1\max} \leq 75 \text{ A}$ under specified conditions

Minimal R_{scs}	Admissible individual harmonic current I_n/I_1^a				Admissible harmonic current distortion factors	
	%				%	
	I_5	I_7	I_{11}	I_{13}	THD	$PWHD$
33	10,7	7,2	3,1	2	13	22
≥ 120	40	25	15	10	48	46
NOTE 1 The relative values of even harmonics up to order 12 must not exceed $16/n$ %. Even harmonics above order 12 are taken into account in THD and $PWHD$ in the same way as odd order harmonics.						
NOTE 2 Linear interpolation between successive R_{scs} values are permitted.						
^a I_1 = reference fundamental current; I_n = harmonic current component.						

TEST REPORT

5.4 Test Result

100 % of nominal power

L1:

Wide-Band Harmonics

Uover:■■■■

PLL Source: U1

YOKOGAWA

Iover:■■■■

PLL	U1	Or.	I1 [A]	hdf[%]	Or.	I1 [A]	hdf[%]	Σ A(3P4W)
Freq	50.000 Hz	Tot.	86.447		dc			U1 300v
U1	231.453 V	1	86.437	99.989	2	0.279	0.323	I1 200mV
I1	86.447 A	3	0.542	0.627	4	0.173	0.201	U2 300v
P1	20.0023kW	5	0.276	0.319	6	0.018	0.020	I2 200mV
S1	20.0034kVA	7	0.402	0.465	8	0.058	0.067	U3 300v
Q1	0.2132kvar	9	0.147	0.170	10	0.055	0.064	I3 200mV
λ1	0.99994	11	0.862	0.997	12	0.032	0.037	
φ1	0.611 °	13	0.096	0.111	14	0.046	0.053	
Uthd1	1.439 %	15	0.105	0.122	16	0.070	0.081	Element4
Ithd1	1.495 %	17	0.264	0.306	18	0.007	0.008	U4 1000v
Pthd1	0.003 %	19	0.249	0.289	20	0.064	0.074	I4 30A
Uthf1	0.518 %	21	0.034	0.039	22	0.056	0.065	
Ithf1	0.932 %	23	0.176	0.203	24	0.030	0.034	
Utif1	18.690	25	0.113	0.131	26	0.030	0.035	
Itif1	33.422	27	0.037	0.042	28	0.038	0.043	
		29	0.079	0.091	30	0.010	0.012	
		31	0.092	0.106	32	0.006	0.007	
		33	0.017	0.019	34	0.046	0.053	
		35	0.036	0.042	36	0.015	0.017	
		37	0.083	0.096	38	0.016	0.019	
		39	0.013	0.015	40	0.053	0.061	

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TEST REPORT

L2:

Wide-Band Harmonics

Uover: ■ ■ ■ ■

PLL Source: U1

YOKOGAWA ◆

Iover: ■ ■ ■ ■

PLL	U1	Or.	I2 [A]	hdf[%]	Or.	I2 [A]	hdf[%]	Σ A(3P4W)
Freq	50.000 Hz	Tot.	86.646		dc			U1 300V
		1	86.634	99.986	2	0.330	0.380	I1 200mV
U2	231.479 V	3	0.562	0.648	4	0.215	0.248	
I2	86.646 A	5	0.487	0.562	6	0.072	0.083	U2 300V
P2	20.0509kW	7	0.368	0.424	8	0.063	0.072	I2 200mV
S2	20.0518kVA	9	0.163	0.188	10	0.048	0.056	
Q2	0.1956kvar	11	0.973	1.123	12	0.051	0.058	U3 300V
λ2	0.99995	13	0.184	0.213	14	0.076	0.088	I3 200mV
φ2	0.559 °	15	0.083	0.095	16	0.082	0.095	
Uthd2	1.479 %	17	0.334	0.386	18	0.013	0.015	Element4
Ithd2	1.701 %	19	0.268	0.309	20	0.067	0.077	U4 1000V
Pthd2	0.001 %	21	0.035	0.040	22	0.051	0.059	I4 30A
Uthf2	0.545 %	23	0.195	0.225	24	0.018	0.020	
Ithf2	1.030 %	25	0.096	0.111	26	0.051	0.059	
Utif2	19.575	27	0.044	0.051	28	0.034	0.039	
Itif2	36.291	29	0.084	0.096	30	0.003	0.003	
		31	0.110	0.126	32	0.031	0.036	
		33	0.025	0.028	34	0.032	0.037	
		35	0.050	0.057	36	0.009	0.011	
		37	0.051	0.059	38	0.030	0.035	
		39	0.024	0.027	40	0.022	0.025	

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TEST REPORT

L3:

Wide-Band Harmonics

Uover: ■ ■ ■ ■

PLL Source: U1

YOKOGAWA ◆

Iover: ■ ■ ■ ■

PLL	U1	Or.	I3 [A]	hdf[%]	Or.	I3 [A]	hdf[%]	Σ A(3P4W)
Freq	50.000 Hz	Tot.	86.459		dc			U1 300v I1 200mV
U3	231.513 V	1	86.446	99.986	2	0.424	0.491	U2 300v I2 200mV
I3	86.459 A	3	0.147	0.170	4	0.219	0.254	
P3	20.0110kW	5	0.613	0.709	6	0.074	0.085	
S3	20.0119kVA	7	0.601	0.695	8	0.017	0.019	
Q3	0.1918kvar	9	0.039	0.045	10	0.056	0.065	
λ3	0.99995	11	0.916	1.059	12	0.018	0.020	U3 300v I3 200mV
φ3	0.549 °	13	0.154	0.178	14	0.062	0.072	
Uthd3	1.430 %	15	0.041	0.047	16	0.063	0.073	
Ithd3	1.683 %	17	0.257	0.297	18	0.009	0.011	Element4
Pthd3	0.003 %	19	0.286	0.330	20	0.057	0.066	U4 1000v I4 30A
Uthf3	0.519 %	21	0.027	0.032	22	0.050	0.058	
Ithf3	0.974 %	23	0.183	0.211	24	0.005	0.006	
Utif3	18.676	25	0.105	0.121	26	0.063	0.073	
Itif3	34.529	27	0.019	0.022	28	0.030	0.035	
		29	0.114	0.132	30	0.007	0.008	
		31	0.071	0.082	32	0.009	0.010	
		33	0.020	0.023	34	0.033	0.038	
		35	0.062	0.072	36	0.022	0.026	
		37	0.061	0.071	38	0.026	0.030	
		39	0.013	0.015	40	0.028	0.033	

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TEST REPORT

50 % of nominal power

L1:

Wide-Band Harmonics

Uover:■■■■

U1-3 : 300V

YOKOGAWA

◆

Iover:■■■■

change items

PLL	U1	Or.	I1 [A]	hdf[%]	Or.	I1 [A]	hdf[%]
Freq	50.000 Hz	Tot.	41.920		dc		
		1	41.913	99.981	2	0.405	0.966
U1	230.293 V	3	0.396	0.945	4	0.095	0.226
I1	41.920 A	5	0.102	0.244	6	0.052	0.124
P1	9.6504kW	7	0.077	0.183	8	0.028	0.066
S1	9.6526kVA	9	0.110	0.261	10	0.036	0.086
Q1	0.2059kvar	11	0.332	0.792	12	0.038	0.091
λ1	0.99977	13	0.328	0.782	14	0.011	0.026
φ1	G 1.222 °	15	0.025	0.059	16	0.020	0.047
Uthd1	0.335 %	17	0.134	0.321	18	0.025	0.059
Ithd1	1.930 %	19	0.141	0.336	20	0.028	0.068
Pthd1	0.004 %	21	0.028	0.066	22	0.019	0.046
Uthf1	0.286 %	23	0.051	0.122	24	0.017	0.041
Ithf1	1.134 %	25	0.051	0.122	26	0.011	0.027
Utif1	10.727	27	0.026	0.061	28	0.009	0.020
Itif1	43.364	29	0.045	0.107	30	0.009	0.022
		31	0.029	0.070	32	0.018	0.042
		33	0.010	0.023	34	0.010	0.023
		35	0.034	0.081	36	0.037	0.087
		37	0.043	0.103	38	0.009	0.021
		39	0.012	0.030	40	0.005	0.012

Σ A(3P4W)

U1 300V

I1 100mV

U2 300V

I2 100mV

U3 300V

I3 100mV

Element4

U4 1000V

I4 30A

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Update 363

TEST REPORT

L2:

Wide-Band Harmonics

Uover:■■■■

U1-3 : 300V

YOKOGAWA

■■■■

Iover:■■■■

change items

PLL	U1	Or.	I2 [A]	hdf[%]	Or.	I2 [A]	hdf[%]	Σ A(3P4W)
Freq	49.999 Hz	Tot.	42.116		dc			U1 300V
		1	42.107	99.980	2	0.264	0.627	I1 100mV
U2	230.615 V	3	0.353	0.839	4	0.084	0.198	U2 300V
I2	42.116 A	5	0.309	0.734	6	0.092	0.219	I2 100mV
P2	9.7087kW	7	0.130	0.310	8	0.027	0.063	U3 300V
S2	9.7110kVA	9	0.126	0.299	10	0.020	0.048	I3 100mV
Q2	0.2114kvar	11	0.429	1.018	12	0.049	0.116	
λ2	0.99976	13	0.324	0.769	14	0.017	0.039	
φ2	G 1.247 °	15	0.035	0.082	16	0.028	0.067	
Uthd2	0.347 %	17	0.141	0.334	18	0.015	0.036	Element4
Ithd2	1.986 %	19	0.099	0.235	20	0.009	0.022	U4 1000V
Pthd2	0.005 %	21	0.062	0.148	22	0.017	0.041	I4 30A
Uthf2	0.294 %	23	0.073	0.173	24	0.014	0.034	
Ithf2	1.157 %	25	0.029	0.068	26	0.021	0.049	
Utif2	11.027	27	0.009	0.021	28	0.016	0.037	
Itif2	43.423	29	0.056	0.133	30	0.012	0.028	
		31	0.040	0.096	32	0.009	0.022	
		33	0.016	0.039	34	0.012	0.028	
		35	0.030	0.072	36	0.013	0.032	
		37	0.047	0.111	38	0.031	0.073	
		39	0.011	0.025	40	0.018	0.044	

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Update 378

TEST REPORT

L3:

Wide-Band Harmonics

Uover:■■■■

U1-3 : 300V

YOKOGAWA ◆

Iover:■■■■

change items

PLL	U1	Or.	I3 [A]	hdf[%]	Or.	I3 [A]	hdf[%]
Freq	50.000 Hz	Tot.	42.047		dc		
		1	42.040	99.983	2	0.482	1.147
U3	230.649 V	3	0.191	0.454	4	0.123	0.293
I3	42.047 A	5	0.077	0.184	6	0.160	0.380
P3	9.6966kW	7	0.182	0.433	8	0.037	0.089
S3	9.6969kVA	9	0.111	0.264	10	0.049	0.116
Q3	0.0773kvar	11	0.263	0.627	12	0.090	0.214
λ3	0.99997	13	0.280	0.667	14	0.034	0.081
φ3	G 0.457 °	15	0.030	0.072	16	0.052	0.125
Uthd3	0.359 %	17	0.136	0.323	18	0.023	0.055
Ithd3	1.843 %	19	0.129	0.307	20	0.020	0.047
Pthd3	0.005 %	21	0.026	0.061	22	0.038	0.091
Uthf3	0.242 %	23	0.054	0.129	24	0.014	0.034
Ithf3	1.116 %	25	0.052	0.124	26	0.029	0.070
Utif3	9.319	27	0.021	0.051	28	0.023	0.054
Itif3	43.486	29	0.047	0.111	30	0.002	0.005
		31	0.021	0.050	32	0.029	0.069
		33	0.019	0.046	34	0.017	0.040
		35	0.074	0.177	36	0.042	0.100
		37	0.049	0.116	38	0.018	0.042
		39	0.020	0.048	40	0.016	0.038

Σ A(3P4W)

U1 300V

I1 100mV

U2 300V

I2 100mV

U3 300V

I3 100mV

Element4

U4 1000V

I4 30A

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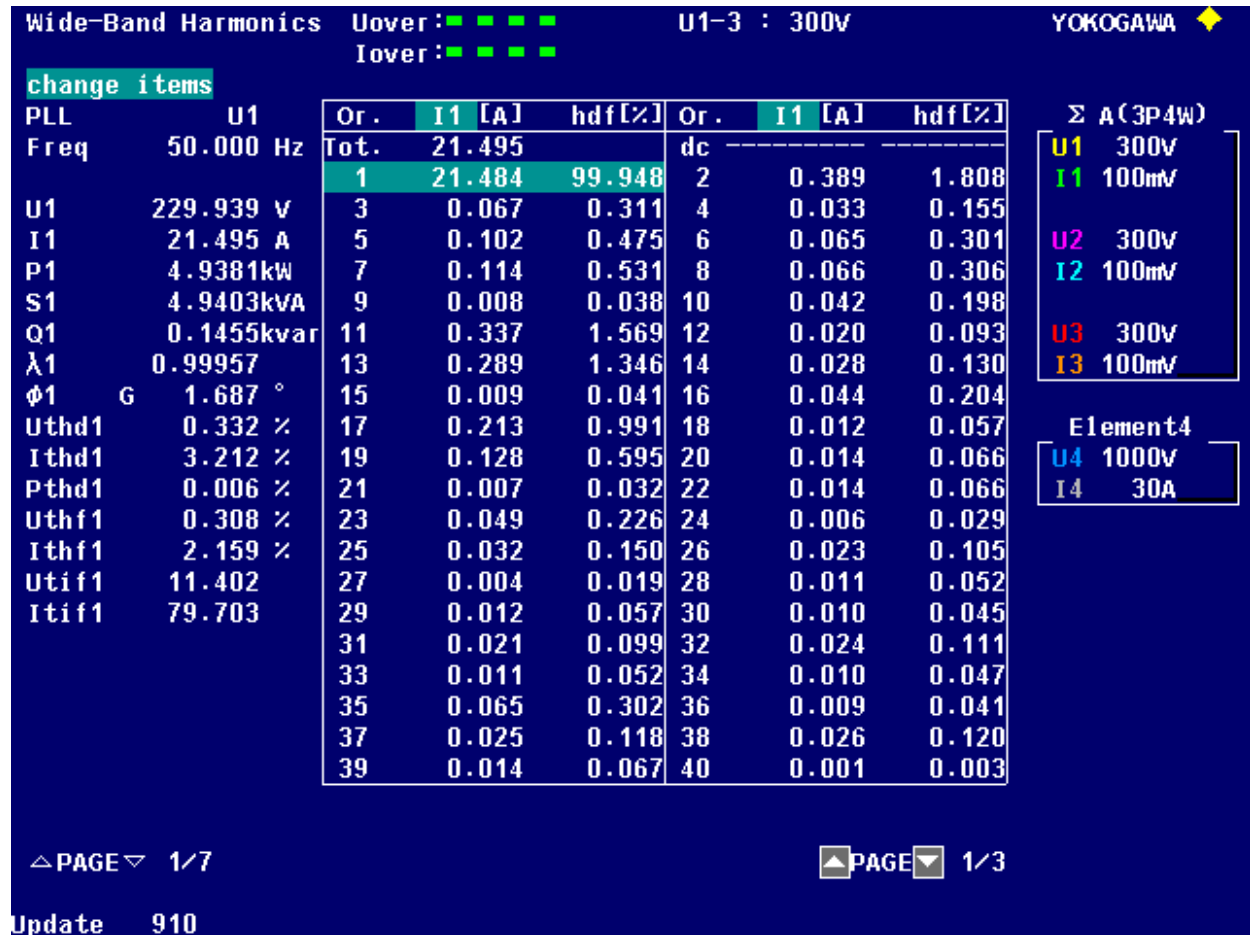
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Update 393

TEST REPORT

25 % of nominal power

L1:



TEST REPORT

L2:

Wide-Band Harmonics

Uover:■■■■

U1-3 : 300V

YOKOGAWA

◆

Iover:■■■■

change items

PLL	U1	Or.	I2 [A]	hdf[%]	Or.	I2 [A]	hdf[%]
Freq	49.999 Hz	Tot.	21.420		dc		
		1	21.410	99.954	2	0.310	1.445
U2	230.298 V	3	0.087	0.404	4	0.069	0.321
I2	21.420 A	5	0.066	0.308	6	0.069	0.321
P2	4.9287kW	7	0.096	0.447	8	0.018	0.086
S2	4.9310kVA	9	0.011	0.052	10	0.006	0.029
Q2	0.1501kvar	11	0.349	1.629	12	0.053	0.248
λ2	0.99954	13	0.316	1.474	14	0.019	0.087
φ2	G 1.744 °	15	0.010	0.046	16	0.007	0.031
Uthd2	0.321 %	17	0.196	0.917	18	0.022	0.102
Ithd2	3.048 %	19	0.116	0.543	20	0.009	0.040
Pthd2	0.006 %	21	0.005	0.023	22	0.012	0.055
Uthf2	0.306 %	23	0.049	0.229	24	0.012	0.055
Ithf2	2.129 %	25	0.040	0.188	26	0.010	0.049
Utif2	11.155	27	0.009	0.043	28	0.002	0.011
Itif2	78.151	29	0.021	0.096	30	0.008	0.038
		31	0.027	0.126	32	0.005	0.024
		33	0.011	0.051	34	0.005	0.023
		35	0.020	0.094	36	0.036	0.166
		37	0.051	0.237	38	0.015	0.069
		39	0.015	0.072	40	0.005	0.022

Σ A(3P4W)

U1 300v

I1 100mV

U2 300v

I2 100mV

U3 300v

I3 100mV

Element4

U4 1000v

I4 30A

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Update 922

TEST REPORT

L3:

Wide-Band Harmonics

Uover: ■ ■ ■ ■

U1-3 : 300V

YOKOGAWA ◆

Iover: ■ ■ ■ ■

change items

PLL	U1	Or.	I3 [A]	hdf[%]	Or.	I3 [A]	hdf[%]	Σ A(3P4W)
Freq	50.000 Hz	Tot.	21.800		dc			U1 300V
		1	21.788	99.947	2	0.417	1.911	I1 100mV
U3	230.344 V	3	0.109	0.498	4	0.050	0.229	U2 300V
I3	21.800 A	5	0.082	0.377	6	0.079	0.361	I2 100mV
P3	5.0179kW	7	0.097	0.444	8	0.054	0.248	U3 300V
S3	5.0192kVA	9	0.021	0.094	10	0.050	0.228	I3 100mV
Q3	0.1157kvar	11	0.328	1.507	12	0.062	0.284	
λ3	0.99973	13	0.292	1.342	14	0.036	0.167	
φ3	G 1.321 °	15	0.007	0.034	16	0.036	0.165	
Uthd3	0.334 %	17	0.191	0.874	18	0.016	0.074	Element4
Ithd3	3.270 %	19	0.143	0.655	20	0.011	0.051	U4 1000V
Pthd3	0.009 %	21	0.004	0.019	22	0.006	0.027	I4 30A
Uthf3	0.264 %	23	0.059	0.272	24	0.020	0.091	
Ithf3	2.259 %	25	0.048	0.220	26	0.017	0.076	
Utif3	9.862	27	0.005	0.025	28	0.021	0.097	
Itif3	85.918	29	0.019	0.086	30	0.015	0.071	
		31	0.024	0.109	32	0.035	0.161	
		33	0.015	0.070	34	0.027	0.122	
		35	0.078	0.358	36	0.044	0.200	
		37	0.035	0.162	38	0.003	0.014	
		39	0.005	0.025	40	0.002	0.007	

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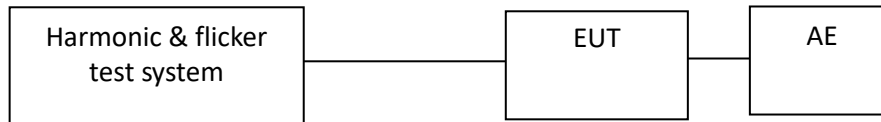
Update 940

TEST REPORT

6 Voltage fluctuations and flicker

Test result: **PASS**

6.1 Test Setup



6.2 Test Procedure

6.2.1 Definition

- Flicker: impression of unsteadiness of visual sensation induced by a lighting stimulus whose luminance or spectral distribution fluctuates with time.
- Pst: Short-term flicker indicator the flicker severity evaluated over a short period (in minutes); Pst=1 is the conventional threshold of irritability
- Plt: long-term flicker indicator; the flicker severity evaluated over a long period (a few hours) using successive Pst values.
- dc: the relative steady-state voltage change
- dmax: the maximum relative voltage change
- d(t): the value during a voltage change

6.2.2 Test condition

The EUT was set to produce the most unfavorable sequence of voltage changes according to EN IEC 61000-3-11: 2019.

6.2.3 Test protocol

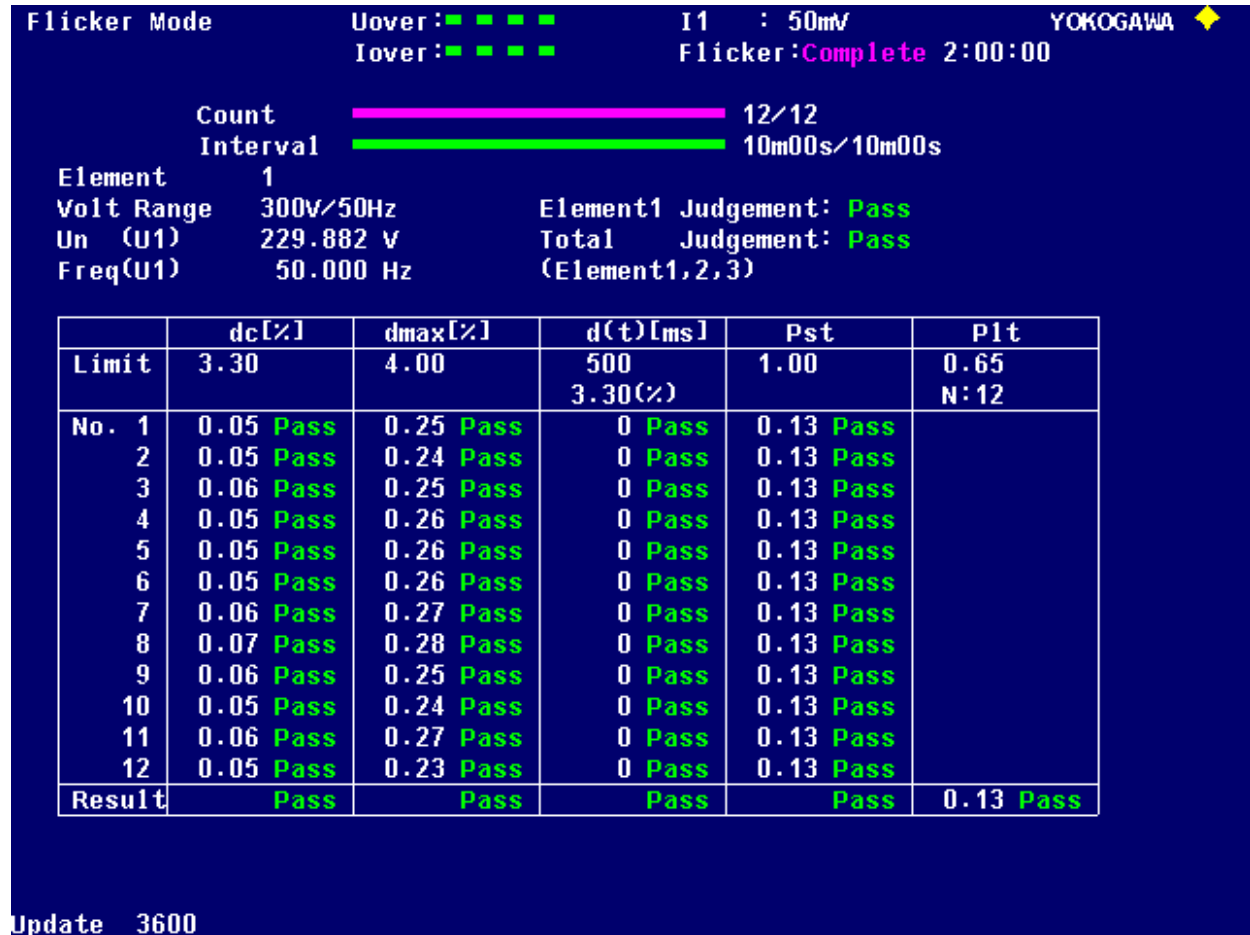
The tested object operated under the operating condition specified in EN IEC 61000-3-11: 2019.

TEST REPORT

6.3 Test Result

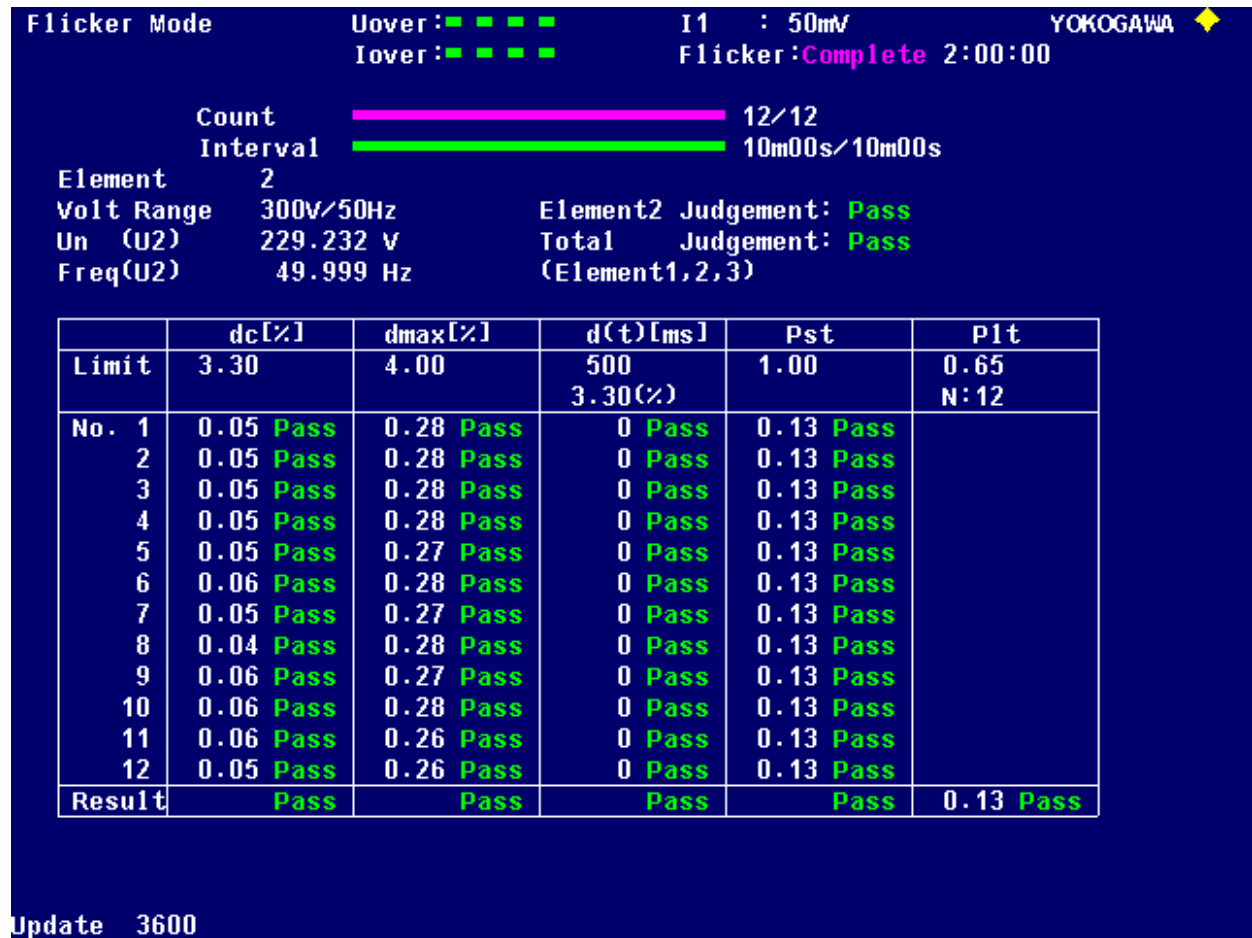
100 % of nominal power

L1:



TEST REPORT

L2:



TEST REPORT

L3:

Flicker Mode Uover: ■■■■ I1 : 50mV YOKOGAWA ◆
Iover: ■■■■ Flicker: Complete 2:00:00

Count 12/12
Interval 10m00s/10m00s

Element 3
Volt Range 300V/50Hz Element3 Judgement: Pass
Un (U3) 229.346 V Total Judgement: Pass
Freq(U3) ----- (Element1,2,3)

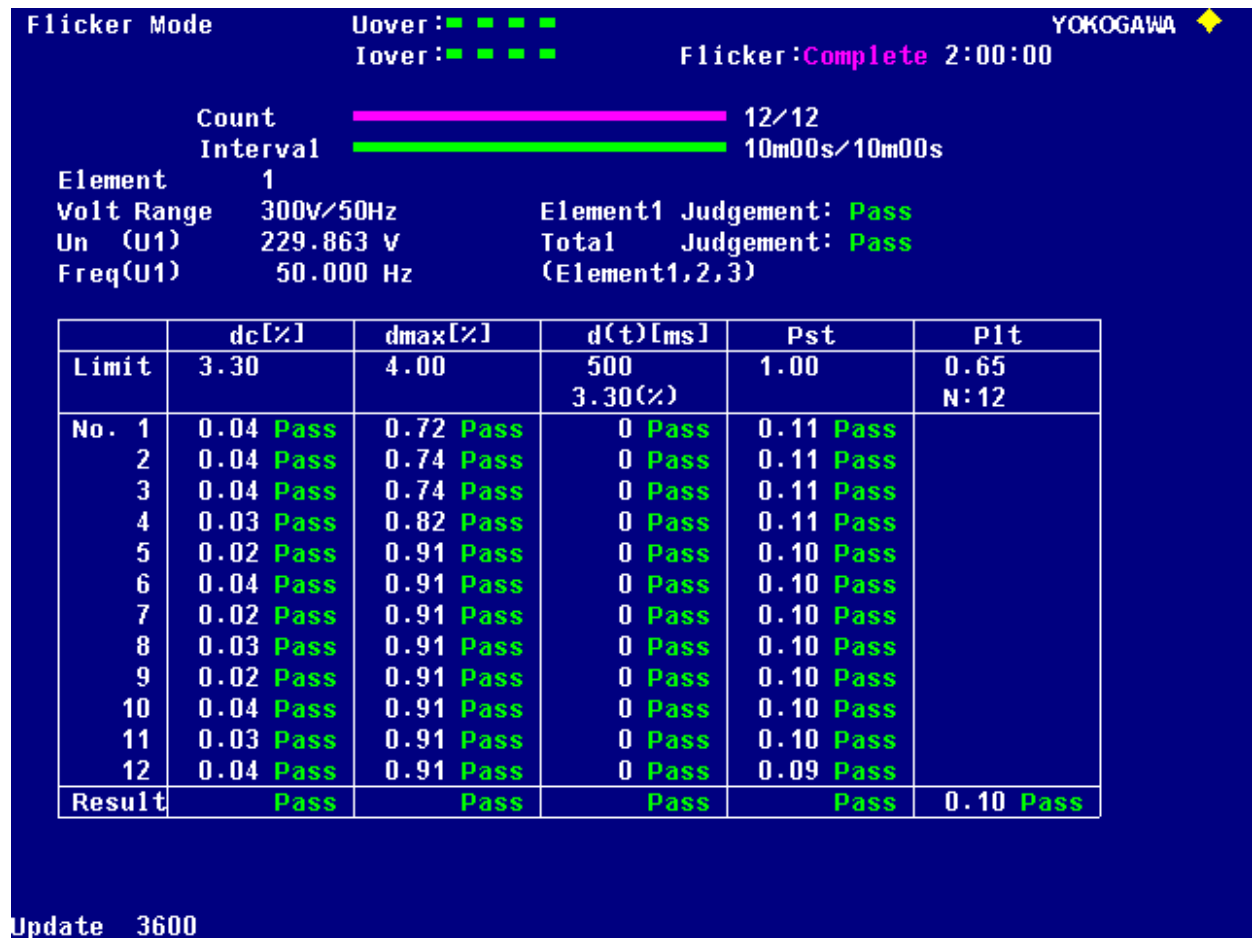
	dc[%]	dmax[%]	d(t)[ms]	Pst	Plt
Limit	3.30	4.00	500 3.30(%)	1.00	0.65 N:12
No. 1	0.06 Pass	0.28 Pass	0 Pass	0.14 Pass	
2	0.05 Pass	0.27 Pass	0 Pass	0.14 Pass	
3	0.06 Pass	0.26 Pass	0 Pass	0.14 Pass	
4	0.05 Pass	0.28 Pass	0 Pass	0.14 Pass	
5	0.05 Pass	0.27 Pass	0 Pass	0.14 Pass	
6	0.04 Pass	0.27 Pass	0 Pass	0.15 Pass	
7	0.05 Pass	0.29 Pass	0 Pass	0.14 Pass	
8	0.05 Pass	0.27 Pass	0 Pass	0.14 Pass	
9	0.05 Pass	0.25 Pass	0 Pass	0.14 Pass	
10	0.06 Pass	0.26 Pass	0 Pass	0.14 Pass	
11	0.05 Pass	0.24 Pass	0 Pass	0.15 Pass	
12	0.05 Pass	0.24 Pass	0 Pass	0.14 Pass	
Result	Pass	Pass	Pass	Pass	0.14 Pass

Update 3600

TEST REPORT

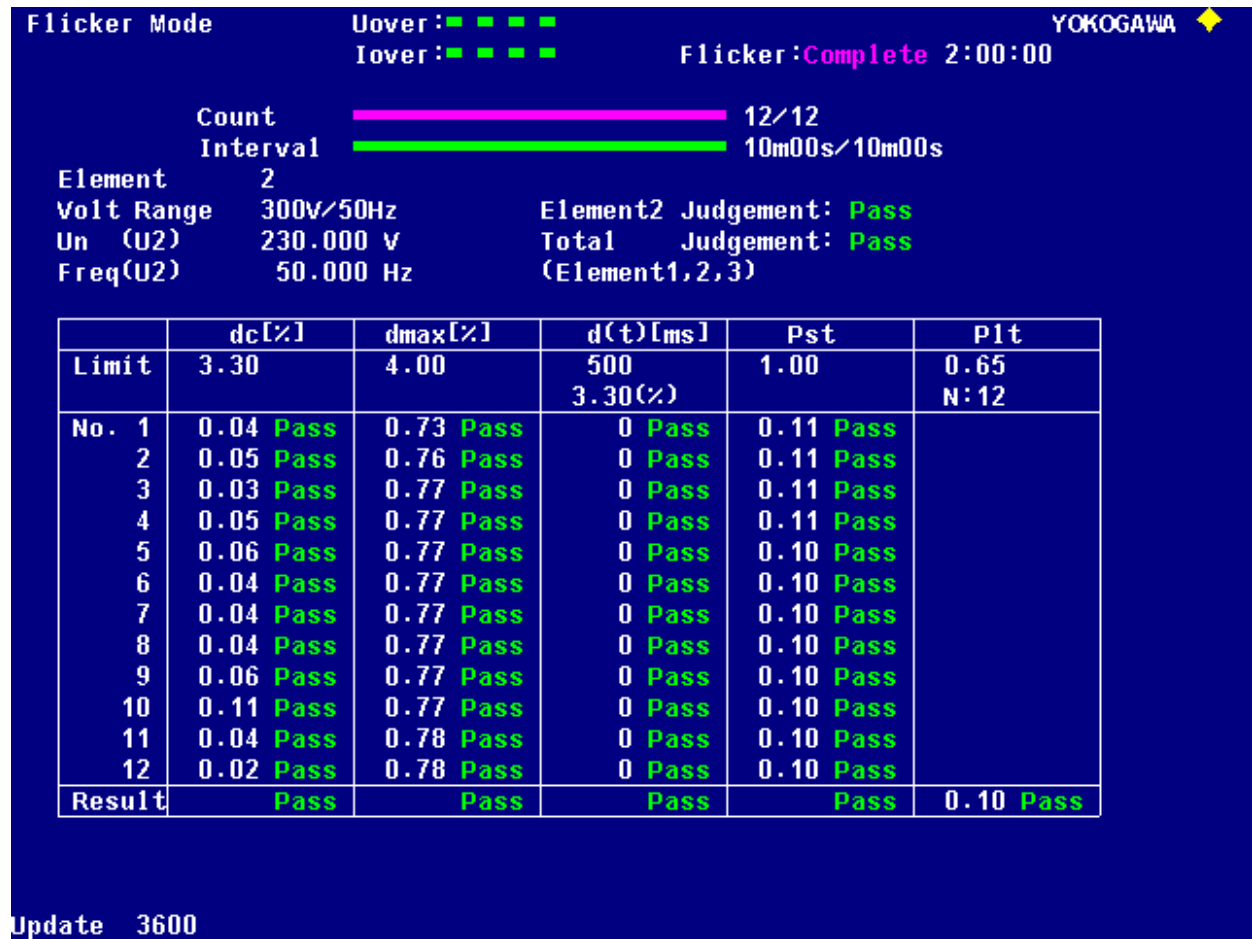
50 % of nominal power

L1:



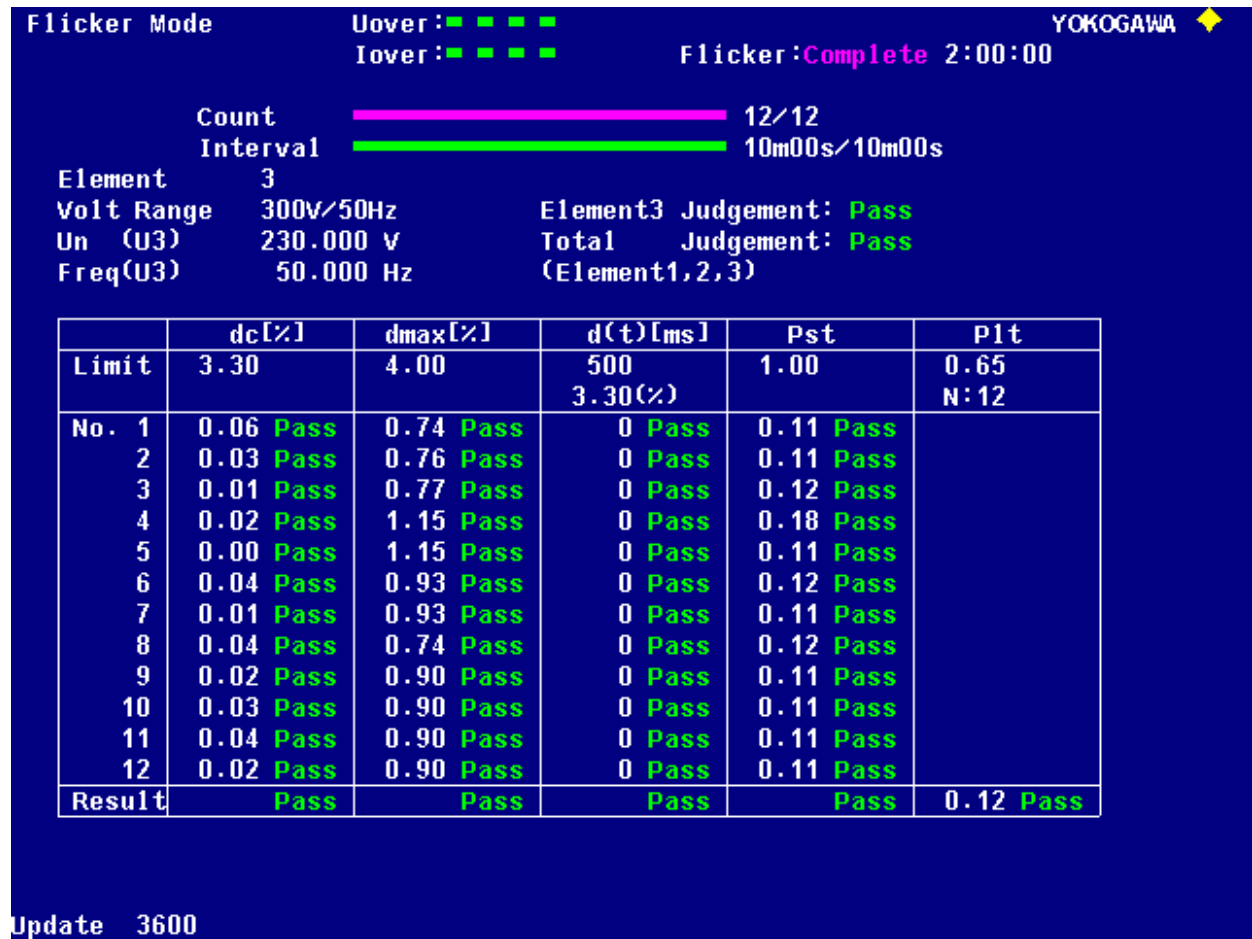
TEST REPORT

L2:



TEST REPORT

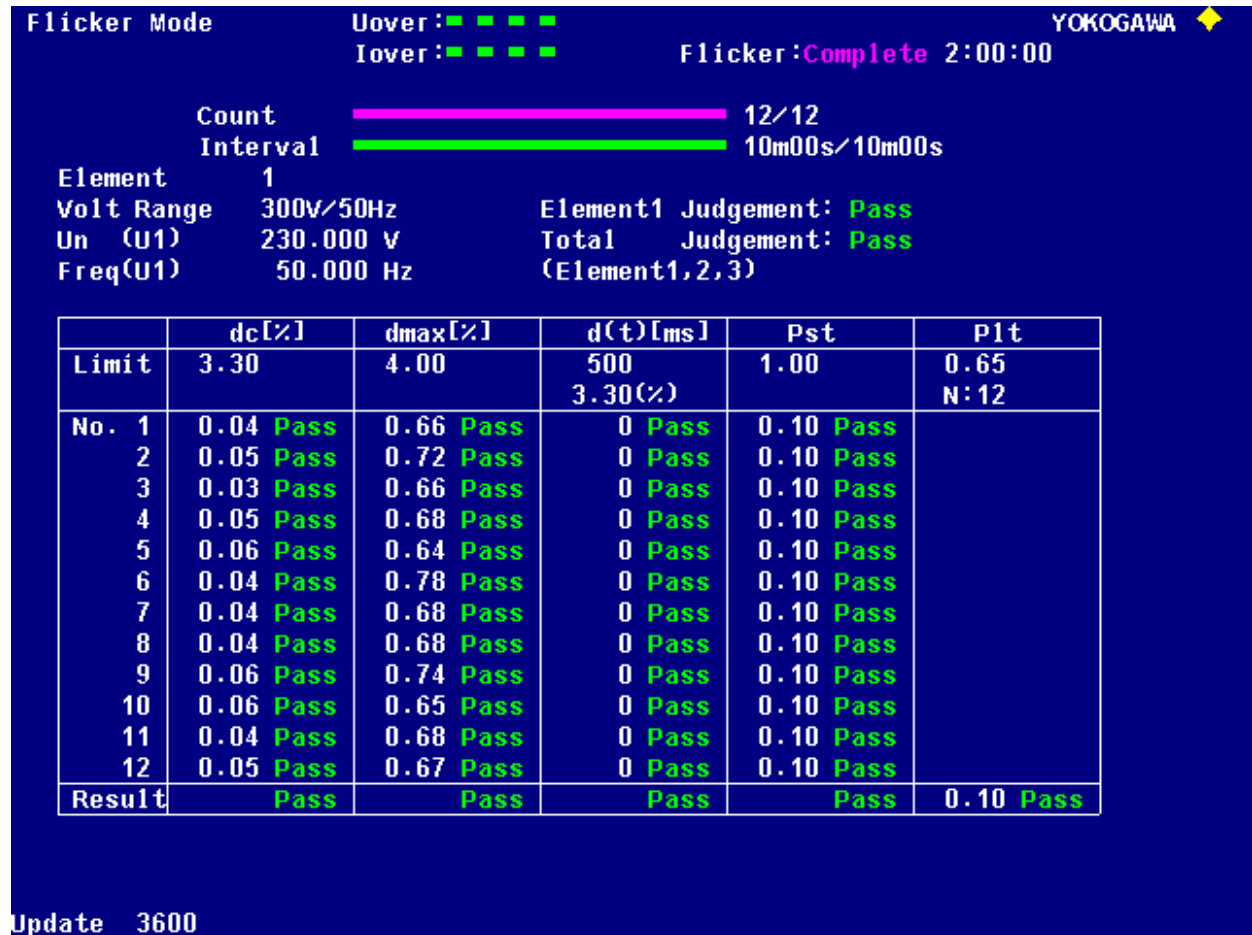
L3:



TEST REPORT

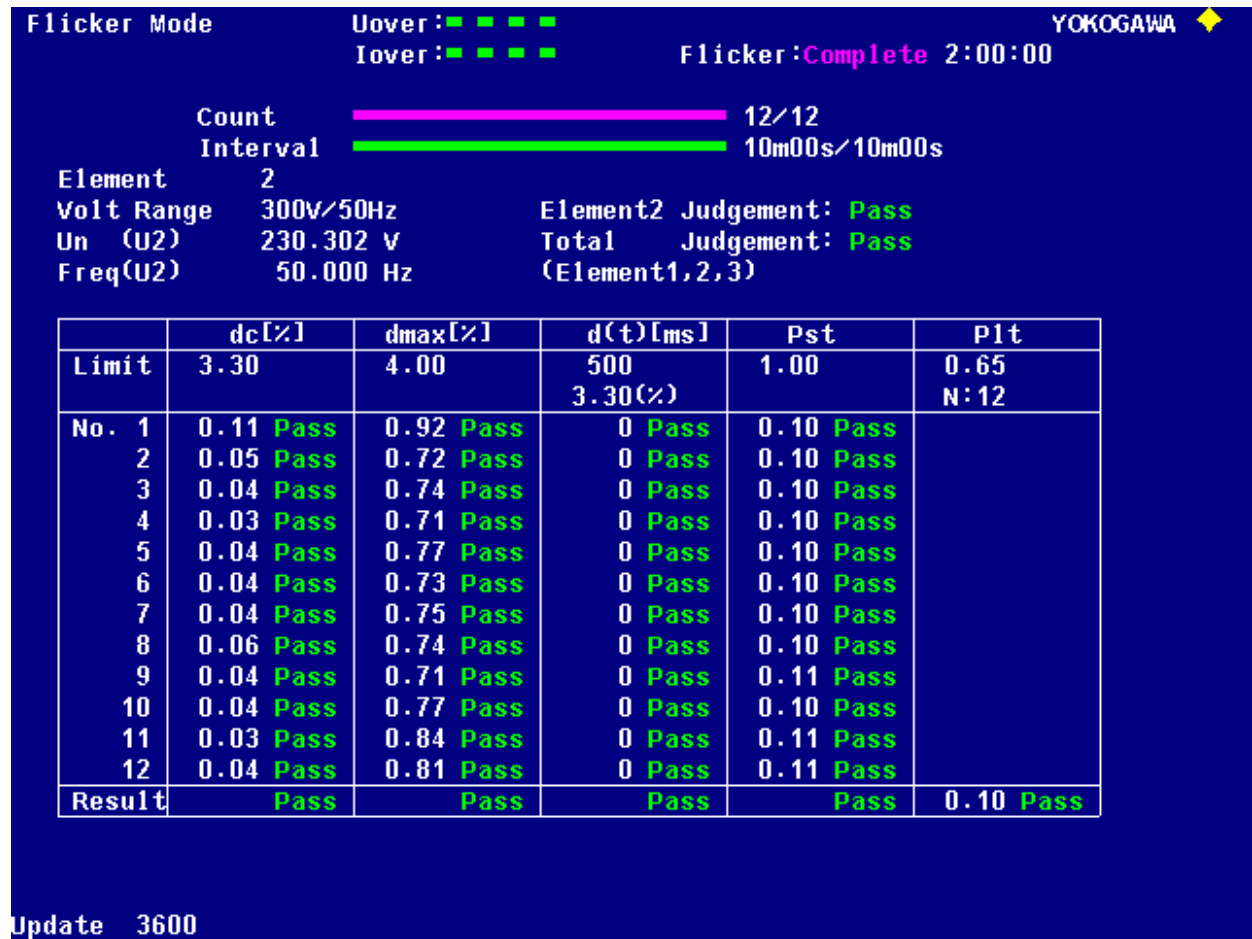
25 % of nominal power

L1:



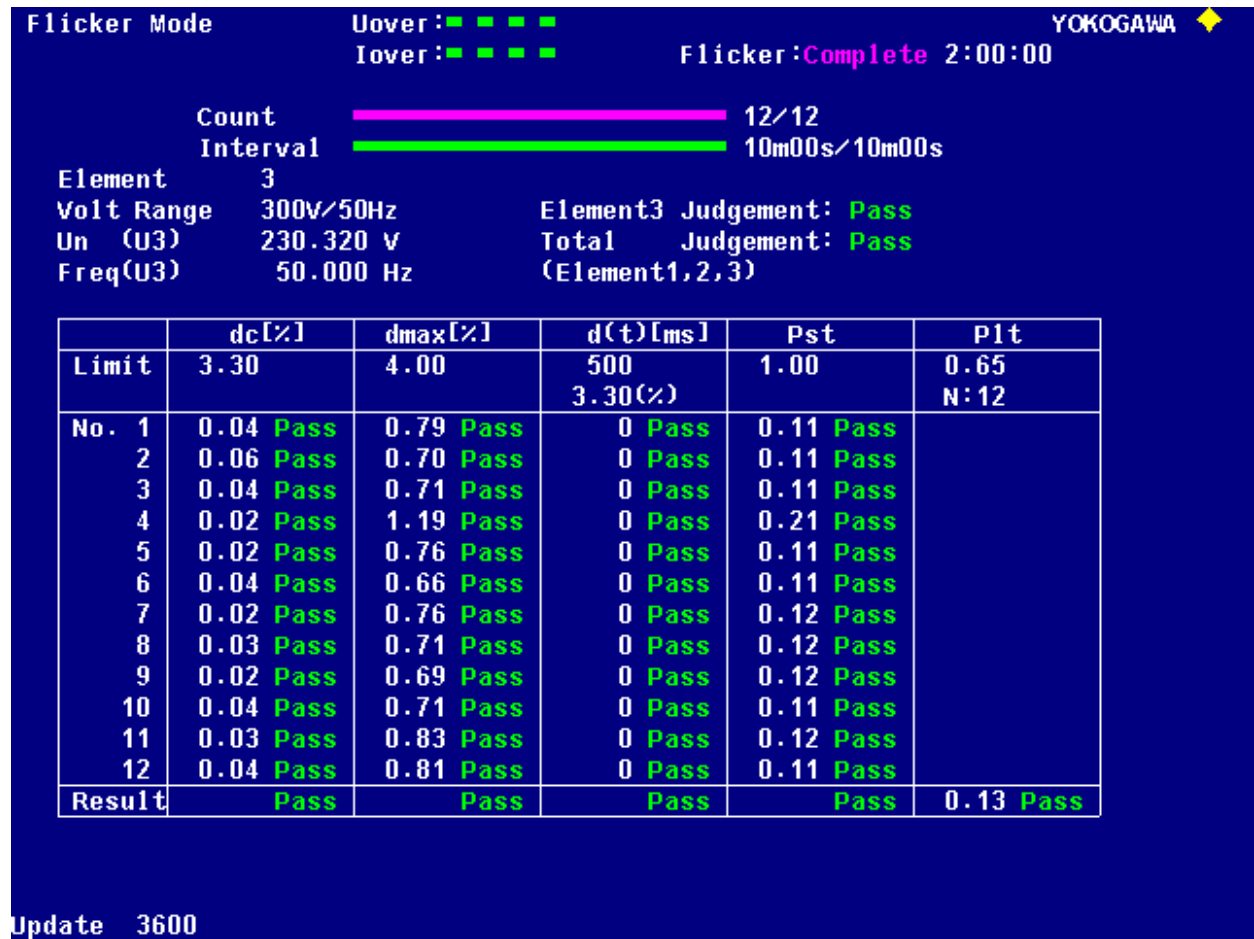
TEST REPORT

L2:



TEST REPORT

L3:



TEST REPORT**Immunity Test****Performance criteria**

Criterion A: The EUT shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the EUT is used as intended. If the performance level is not specified by the manufacturer, this may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Criterion B: The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. However, during the test degradation of performance is allowed but no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Criterion C: Temporary loss of function is allowed during the test, provided the function is self-recoverable or can be restored by the operation of the controls.

TEST REPORT

7 Electrostatic Discharge (ESD)

Test result **PASS**

7.1 Severity Level and Performance Criterion

7.1.1 Test level

Contact discharge		Air discharge	
Level	Test voltage (kV)	Level	Test voltage (Kv)
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15
X	Special	X	Special
Notes: 1. "X" is an open level. The level has to be specified in the dedicated equipment specification. If higher voltages than those shown are specified, special test equipment may be needed. 2. The gray rows were the selected test level.			

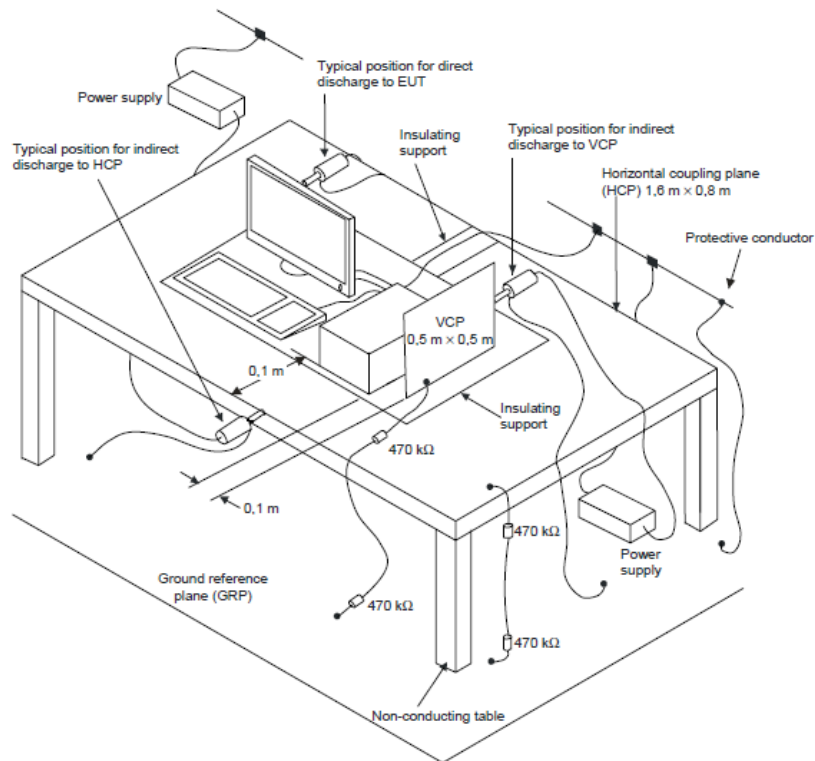
7.1.2 Performance Criterion

Criterion B

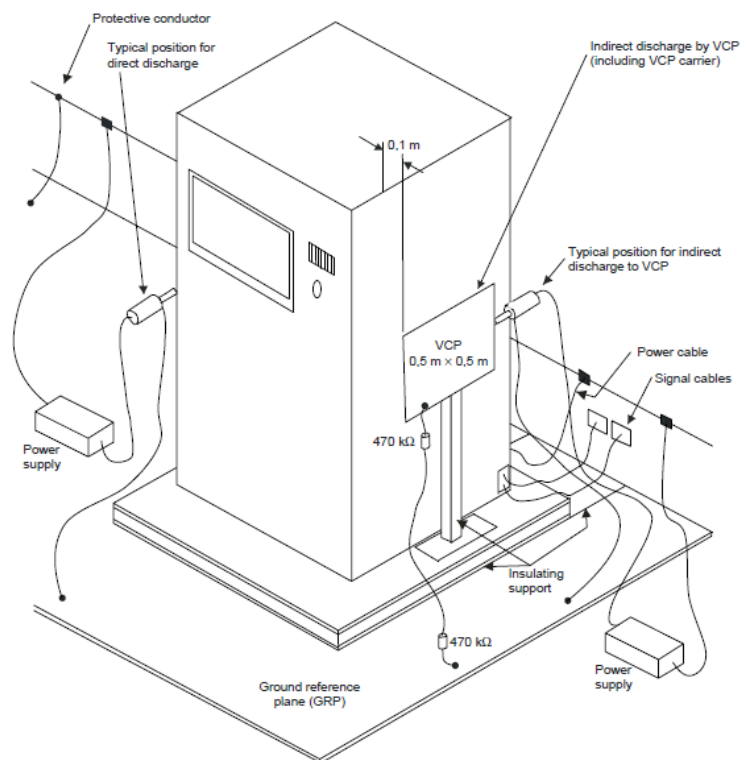
TEST REPORT

7.2 Test Setup

For table-top equipment



For floor standing equipment



TEST REPORT

7.3 Test Procedure

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-2 clause 8.

The test method and equipment was specified by EN 61000-4-2.

TEST REPORT

7.4 Test Result

Direct discharges were applied at the following selected points:

Test level [kV]	Air/Contact	Polarity (+/-)	Pass/Fail/NA	Comment
2/4	Contact	+/-	Pass	Accessible metal parts of the EUT
2/4	Contact	+/-	Pass	All touchable screws of enclosure
2/4/8	Air	+/-	Pass	Air gaps of the switch, button, connectors, fans
2/4/8	Air	+/-	Pass	Slots around the EUT, LED panel,

Indirect contact discharges were applied to the VCP and the HCP at the following selected points:

For table-top equipment

Position	Description	Point	Pass/Fail/NA
HCP front	0,1m from the front of the EUT	Edge of centre on HCP	Pass
HCP back	0,1m from the back of the EUT	Edge of centre on HCP	Pass
HCP right	0,1m from the right side of the EUT	Edge of centre on HCP	Pass
HCP left	0,1m from the left side of the EUT	Edge of centre on HCP	Pass
VCP front	0,1m from the front of the EUT	Edge of centre on VCP	Pass
VCP back	0,1m from the back of the EUT	Edge of centre on VCP	Pass
VCP right	0,1m from the right of the EUT	Edge of centre on VCP	Pass
VCP left	0,1m from the left of the EUT	Edge of centre on VCP	Pass

For floor standing equipment

Position	Description	Point	Pass/Fail/NA
CP front	0,1m from the front of the EUT	Edge of centre on VCP	NA
CP back	0,1m from the back of the EUT	Edge of centre on VCP	NA
CP right	0,1m from the right of the EUT	Edge of centre on VCP	NA
CP left	0,1m from the left of the EUT	Edge of centre on VCP	NA

Observation: All the functions were operated as normal after the test.

Conclusion: The EUT can meet the requirement of Performance Criterion B.

TEST REPORT

8 Radio frequency electromagnetic field

Test result **PASS**

8.1 Severity Level and Performance Criterion

8.1.1 Test level

Level	Test field strength V/m
1	1
2	3
3	10
X	Special
Note: 1. X is an open test level. This level may be given in the product specification. 2. The gray row is the selected test level.	

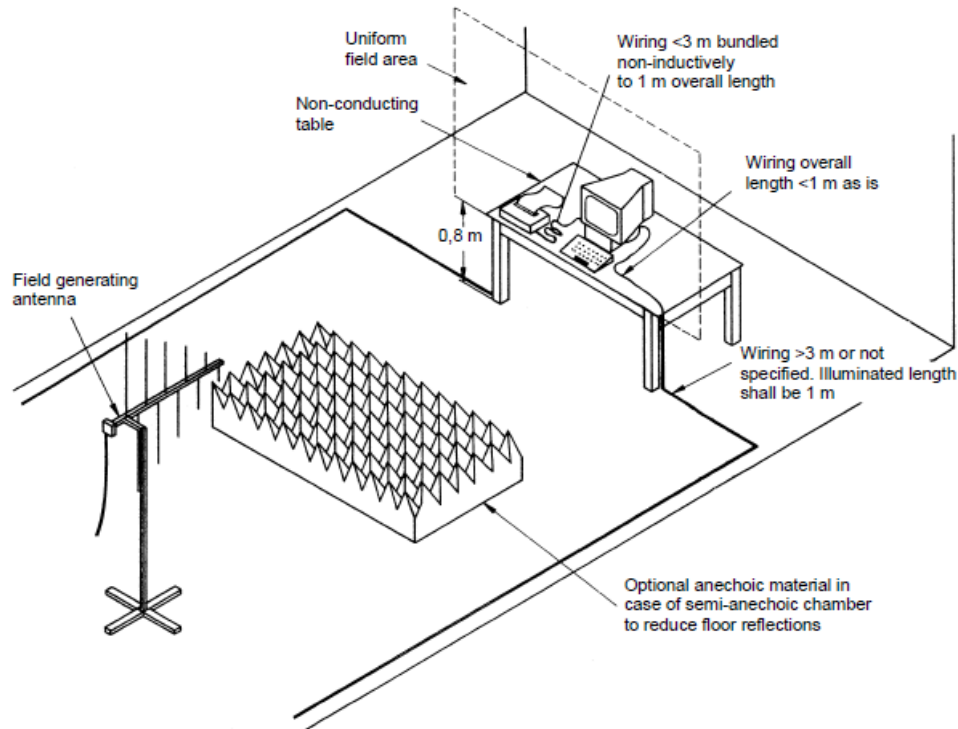
8.1.2 Performance Criterion

Criterion A

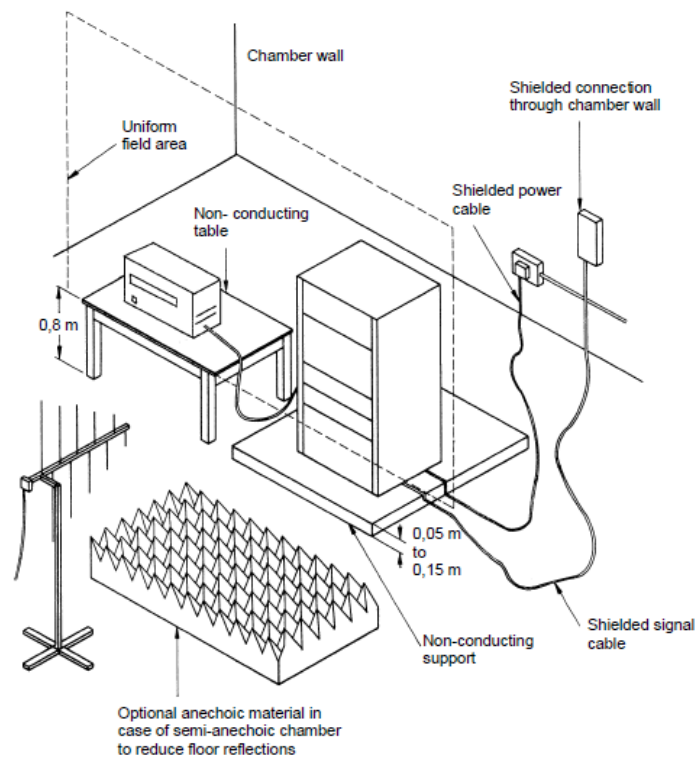
TEST REPORT

8.2 Test Setup

For table-top equipment



For floor standing equipment



TEST REPORT

8.3 Test Procedure

Measurement was performed in full-anechoic chamber.

Measurement procedure was applied according to EN 61000-4-3 clause 8.

The test method and equipment was specified by EN 61000-4-3.

TEST REPORT

8.4 Test Result

Test no.	Frequency (MHz)	Polarization	Test level (V/m)	Modulation	Exposed location	Pass/Fail/NA
1	80-1000	H & V	10	1 kHz, 80% AM 1 % increment	All sides	Pass
2	1400-6000	H & V	3	1 kHz, 80% AM 1 % increment	All sides	Pass

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT can meet the requirement of Performance Criterion A

TEST REPORT

9 Fast transients, common mode

Test result **PASS**

9.1 Severity Level and Performance Criterion

9.1.1 Test level

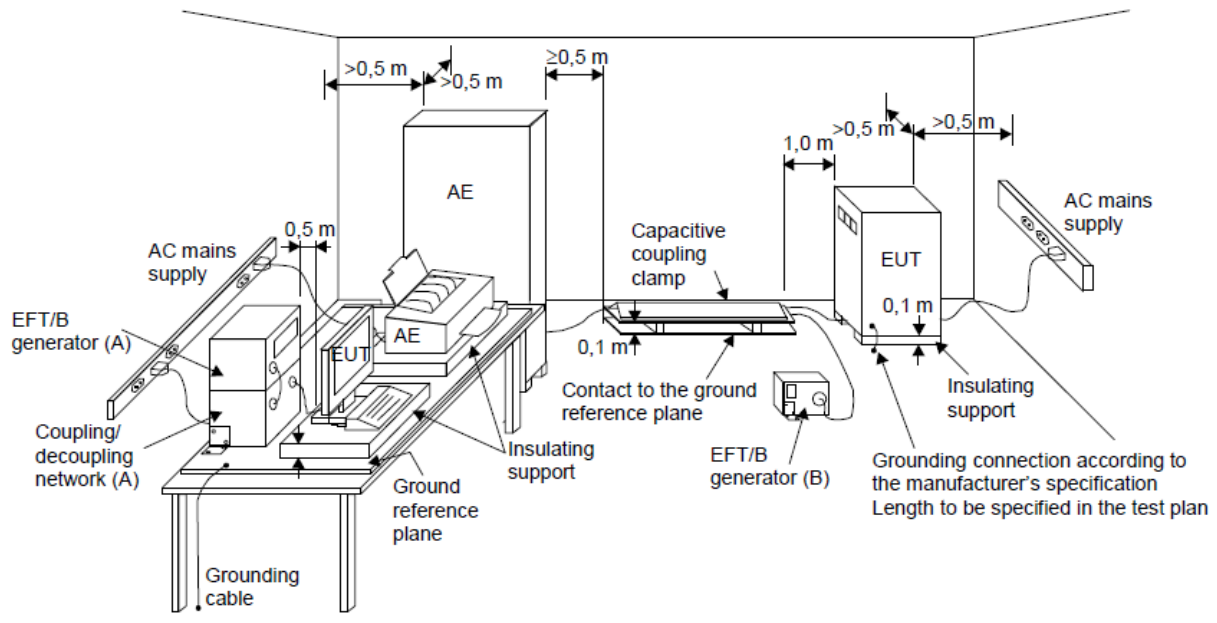
Open circuit output test voltage and repetition rate of the impulses				
Level	AC power ports		Signal ports, DC power ports	
	Voltage peak (kV)	Repetition rate (kHz)	Voltage peak (kV)	Repetition rate (kHz)
1	0.5	5/100	0.25	5/100
2	1	5/100	0.5	5/100
3	2	5/100	1	5/100
4	4	2.5	2	5/100
X	Special	Special	Special	Special
Notes: 1. "X" is an open level. The level has to be specified in the dedicated equipment specification. 2. The gray rows were the selected test level.				

9.1.2 Performance Criterion

Criterion B

TEST REPORT

9.2 Test Setup



- (A) location for supply line coupling
- (B) location for signal lines coupling

9.3 Test Procedure

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-4 clause 8.

The test method and equipment was specified by EN 61000-4-4.

TEST REPORT

9.4 Test Result

Test No.	Level (kV)	Polarity (+/-)	Line for test	Pass/Fail/NA
1	2	+/-	AC power ports	Pass
2	1	+/-	Signal ports	NA
3	1	+/-	DC power ports	Pass

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT can meet the requirement of Performance Criterion B

TEST REPORT

10 Surges

Test result **PASS**

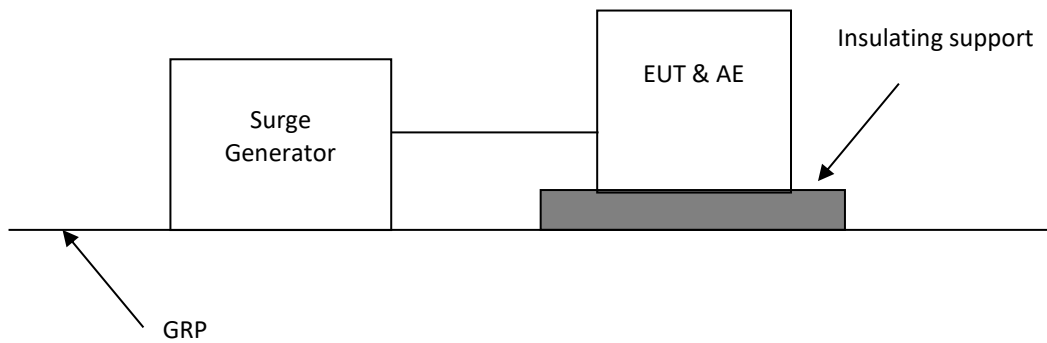
10.1 Severity Level and Performance Criterion

10.1.1 Test level

Level	Open-circuit test voltage (kV)
1	0.5
2	1.0
3	2.0
4	4.0
X*	Special
Notes: 1. "X" is an open class. This level can be specified in the product specification 2. The gray rows are the selected level.	

10.1.2 Performance Criterion

Criterion B

TEST REPORT**10.2 Test Setup****10.3 Test Procedure**

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-5 clause 8.

The test method and equipment was specified by EN 61000-4-5.

TEST REPORT

10.4 Test Result

Test No.	Level [kV]	Polarity +/-	Line for test	Pass/Fail/NA
1	0.5/1	+/-	AC power ports (line to line)	Pass
2	0.5/1/2	+/-	AC power ports (line to earth)	Pass
3	0.5/1	+/-	DC power ports	Pass
4	0.5/1	+/-	Signal ports	NA

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT can meet the requirement of Performance Criterion B

TEST REPORT

11 Radio frequency, common mode

Test result **PASS**

11.1 Severity Level and Performance Criterion

11.1.1 Test level

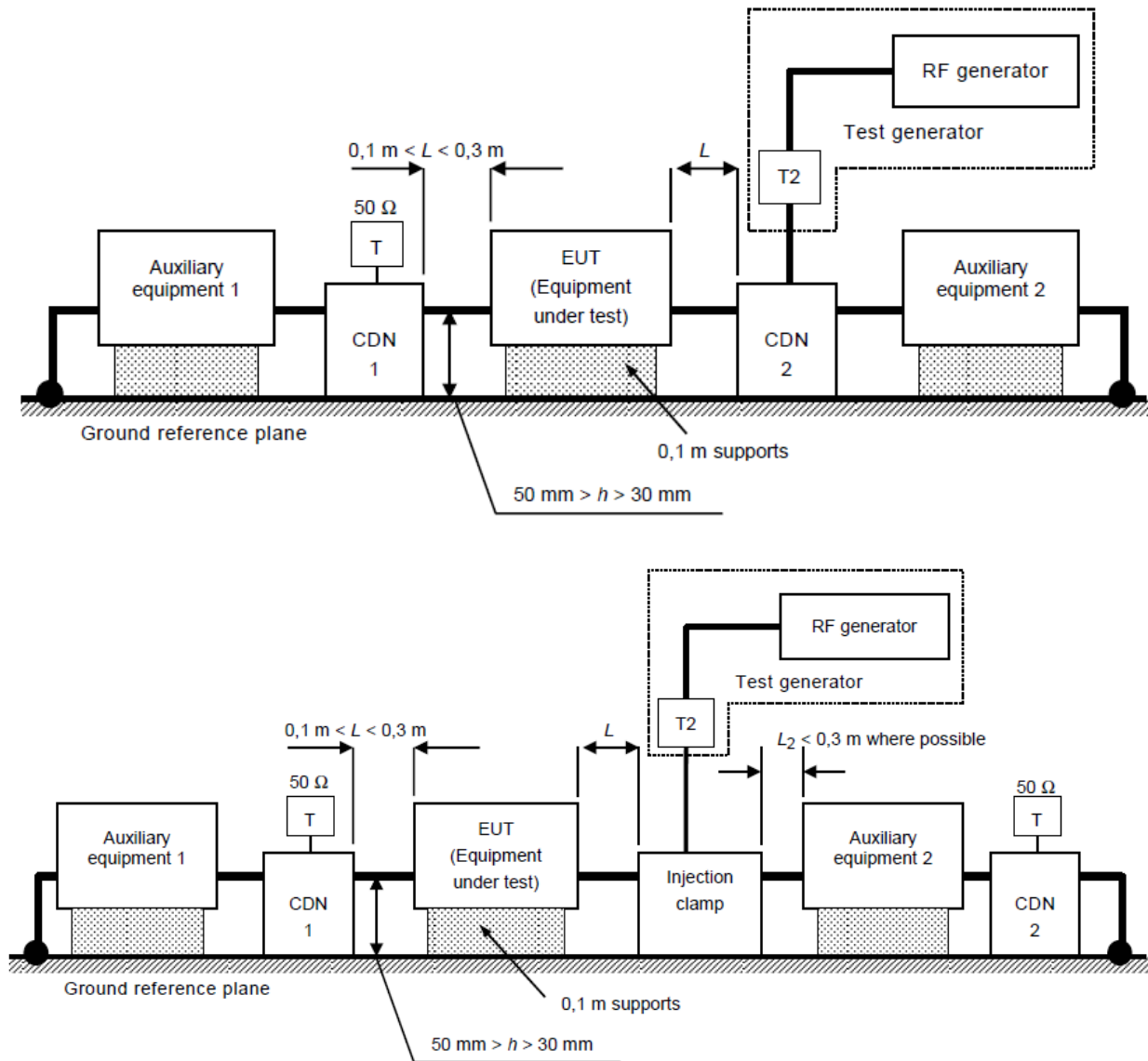
Frequency range 150kHz – 80MHz		
Level	Voltage level	
	U ₀ (dBuV)	U ₀ (V)
1	120	1
2	130	3
3	140	10
X	Special	Special
Notes: 1. "X" is an open level 2. The gray row is the selected test level.		

11.1.2 Performance Criterion

Criterion A

TEST REPORT

11.2 Block Diagram of Test Setup



- T termination 50 Ω
- T2 power attenuator (6 dB)
- CDN coupling and decoupling network

11.3 Test Procedure

Measurement procedure was applied according to EN 61000-4-6 clause 8.
The test method and equipment was specified by EN 61000-4-6.

TEST REPORT

11.4 Test Result

Test No.	Frequency (MHz)	Level (V)	Modulation	Injected point	Pass/Fail/NA
1	0.15~80	10	80%, 1 kHz, AM	AC power port	Pass
2	0.15~80	10	80%, 1 kHz, AM	signal ports	NA
3	0.15~80	10	80%, 1 kHz, AM	DC power ports	Pass

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT can meet the requirement of Performance Criterion A

TEST REPORT

12 Voltage dips

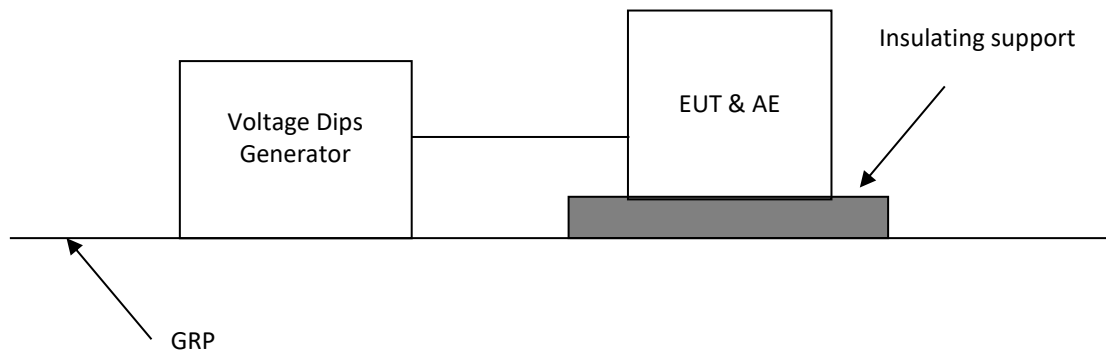
Test result **PASS**

12.1 Severity Level and Performance Criterion

12.1.1 Test level

Test level Reduction (%)	Voltage level in % of rated Ut	Duration (cycles)	Performance criterion
100	0	1	B
		250 (at 50Hz) 300 (at 60Hz)	C
60	40	10 (at 50Hz) 12 (at 60Hz)	C
30	70	25 (at 50Hz) 30 (at 60Hz)	C

Notes: The gray rows are selected test level.

TEST REPORT**12.2 Test Setup****12.3 Test Procedure**

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-11 clause 8.

The test method and equipment was specified by EN 61000-4-11.

TEST REPORT

12.4 Test Result

Test no.	Test level % U _T	Voltage dip and short interruptions % U _T	Duration (in periods)	Pass/ Fail	Comment
1	70	30%	25 cycles at 50Hz	Pass	-
			30 cycles at 60Hz	NA	
2	40	60%	10 cycles at 50Hz	Pass	-
			12 cycles at 60Hz	NA	
3	0	100%	1 cycle	Pass	-
4	0	100%	250 cycles at 50Hz	Pass	-
			300 cycles at 60Hz	NA	
Note: “NA” means not applicable.					

Observation: During test at 0% during 250 cycles and 70% during 25 cycles, the EUT stopped working. Once the interference was removed, it restarted ant once.

Conclusion: 0 % during 1 cycle: Performance B;

Others: Performance C

TEST REPORT

13 Power Frequency Magnetic field

Test result: **PASS**

13.1 Severity Level and Performance Criterion

13.1.1 Test level

Level	Magnetic field strength A/m
1	1
2	3
3	10
4	30
5	100
X	Special
Note: 1. X is an open test level; this level may be given in the product specification. 2. The gray row is the selected test level.	

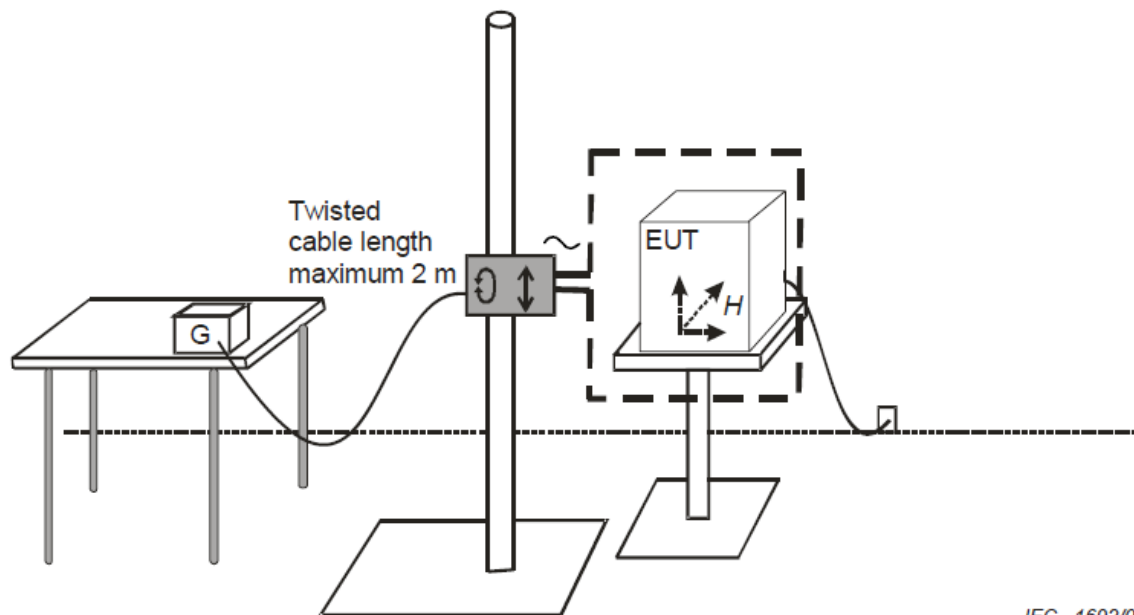
13.1.2 Performance Criterion

Performance criterion A

TEST REPORT

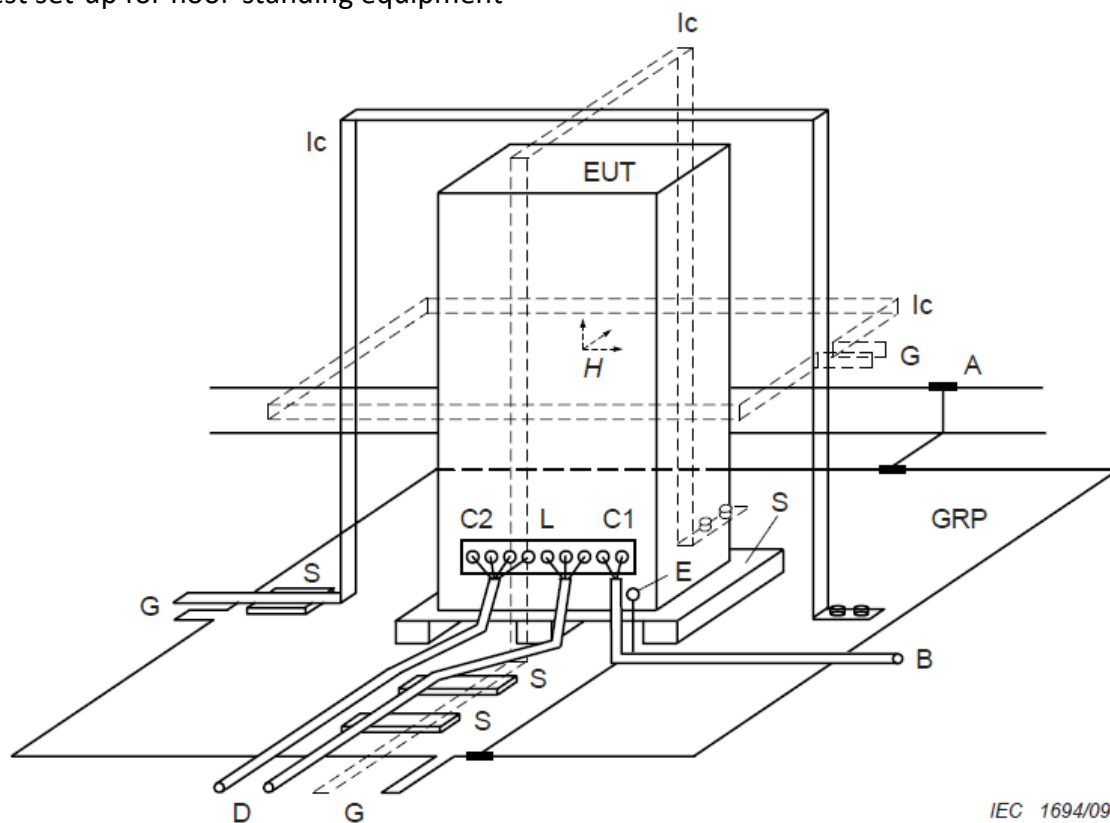
13.2 Diagram of Test Setup

Test set-up for table-top equipment



IEC 1692/09

Test set-up for floor-standing equipment



IEC 1694/09

TEST REPORT

13.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to clause 7 of IEC 61000-4-8.

The test method and equipment was specified by IEC 61000-4-8 with the modifications by clause 8 of EN 61000-6-1.

13.4 Test Protocol

Test No.	Level A/m	Axis	Result
1	30	X	PASS
2	30	Y	PASS
3	30	Z	PASS

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT can meet the requirement of Performance Criterion A

TEST REPORT

Appendix I: Specifications table

Specifications table				
Model	BNT017KTA	BNT020KTA	BNT025KTA	BNT030KTA
PV input				
P pv Max(W)	25500	30000	37500	45000
Vmax PV (Vdc) (absolute Max.)	750	750	750	750
Isc PV (absolute Max.) (A)	48 x2	48x3	48x3	48x4
Number MPP trackers	2	3	3	4
Number input strings	2/3	2/2/2	2/2/3	2/2/2/2
Max. PV input current (A)	38x 2	38 x3	40x3	38 x4
MPPT voltage range (Vdc)	200-700	200-700	200-700	200-700
Vdc range @ full power (Vdc)	310-600	320-600	300-600	300-600
AC Grid (output)				
Normal AC Voltage (VAC)	3P+PE/3P 133/230			
Frequency (Hz)	50			
Normal AC Current (A)	42.7	50.2	62.7	75.2
Max. cont. output current (A)	48	60	80	96
Normal Power (W)	17000	20000	25000	30000
Rated Apparent Power (VA)	17000	20000	25000	30000
Max. cont. Power (W)	17000	20000	25000	30000
Max. cont. Apparent Power (VA)	17000	20000	25000	30000
Power factor(adjustable)	1.0(-0.8~ +0.8)			
Others				
Protective class	Class I			
Ingress protection (IP)	IP65			
Temperature (°C)	-25°C to +60°C (Derating 45°C)			
Inverter Isolation	Non-isolated			
Overvoltage category	OVC III (AC Main), OVC II (PV)			
Software version	DSP:V06 CPLD:V06 HMI:V06			

TEST REPORT

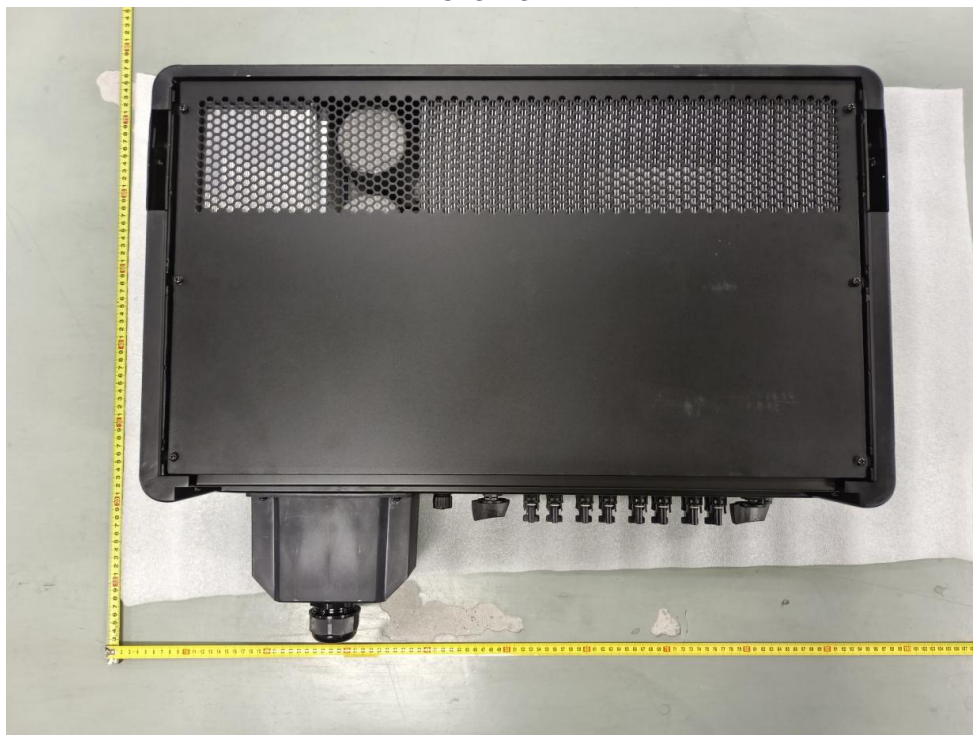
Specifications table					
Model	BNT030KTL	BNT036KTL	BNT040KTL	BNT050KTL	BNT060KTL
PV input					
P _{pv} Max(W)	45000	54000	60000	75000	90000
V _{max} PV (Vdc) (absolute Max.)	1100	1100	1100	1100	1100
I _{sc} PV (absolute Max.) (A)	48 x 2	48 x 3	48 x 3	48 x 3	48 x 4
Max. PV input current / strings (A)	38 x 2	38 x 3	38 x 3	40 x 3	38 x 4
Number MPP trackers	2	3	3	3	4
Number input strings	2/3	2/2/2	2/2/2	2/2/3	2/2/2/2
MPPT voltage range (Vdc)	200-1000	200-1000	200-1000	200-1000	200-1000
Vdc range @ full power (Vdc)	500-850	500-850	500-850	500-850	500-850
AC Grid output					
Normal AC Voltage (VAC)	3P+N+PE/3P+PE 230/400				
Frequency (Hz)	50Hz				
Normal AC Current (A)	43.5	52.2	58	72.5	87
Max. cont. output current (A)	48	60	65	80	96
Normal Power (kW)	30	36	40	50	60
Rated Apparent Power (kVA)	30	36	40	50	60
Max. cont. Power (kW)	30	36	40	50	60
Max. cont. Apparent Power (kVA)	30	36	40	50	60
Power factor	1 (-0.8~+0.8 adjustable)				
Others					
Ingress protection (IP)	IP65				
Protective class	Class I				
Temperature (°C)	-25°C to +60°C (Derating 45°C)				
Inverter Isolation	☒ Non-isolated				
Overvoltage category	OVC III (AC Main), OVC II (PV)				
Software Version	DSP:V06 CPLD:V06 HMI:V06				

Appendix II: Photograph of equipment under test

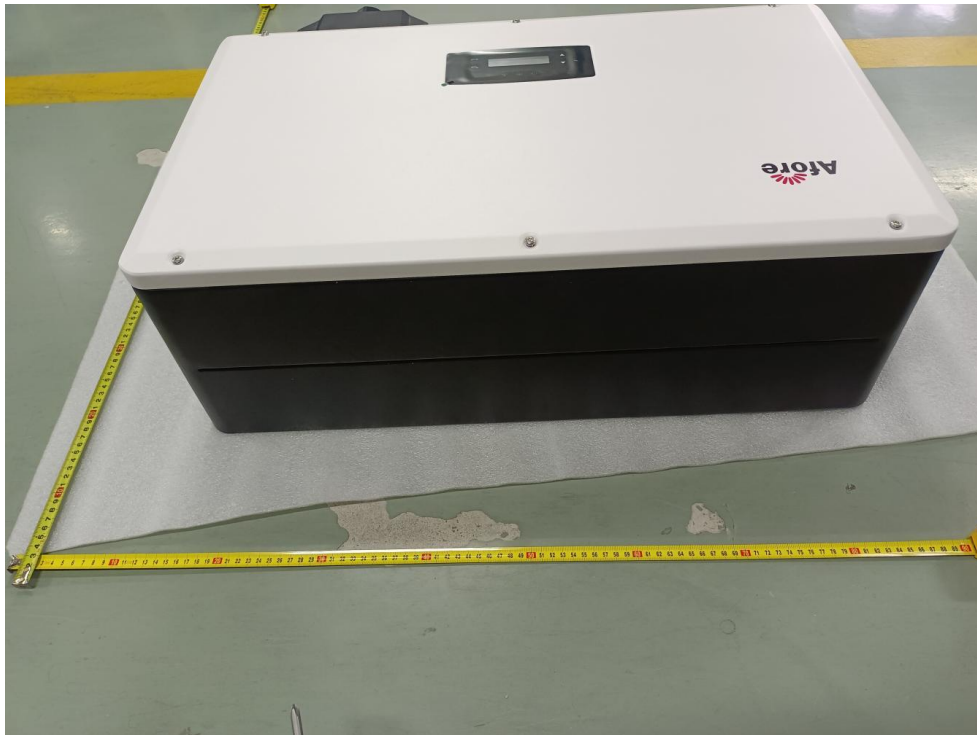
Overview



Overview



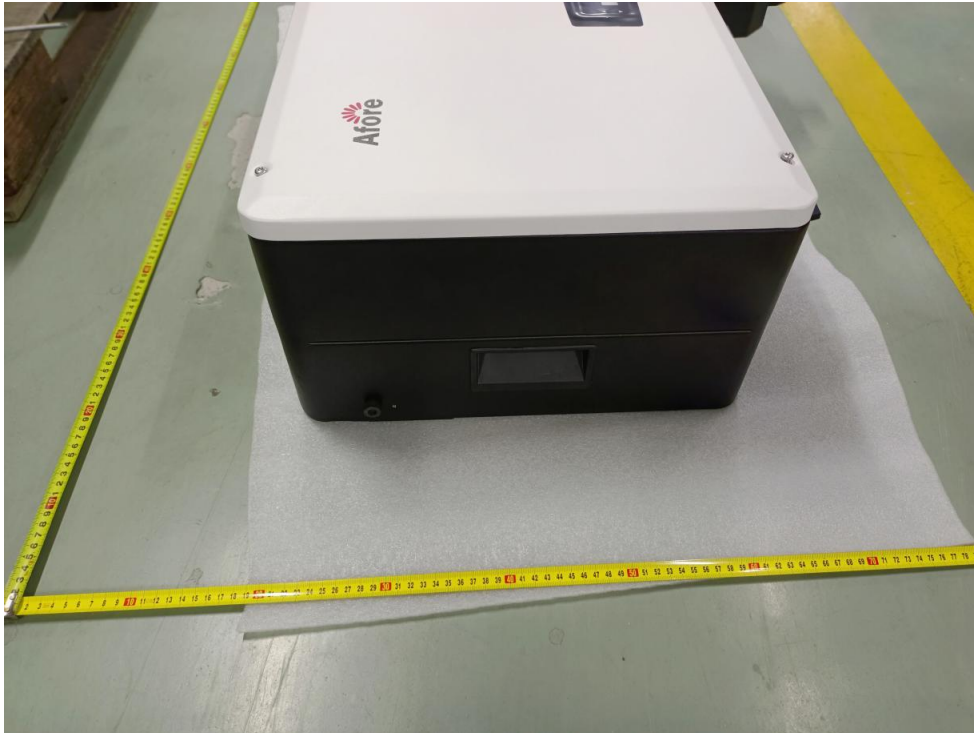
Overview



Overview



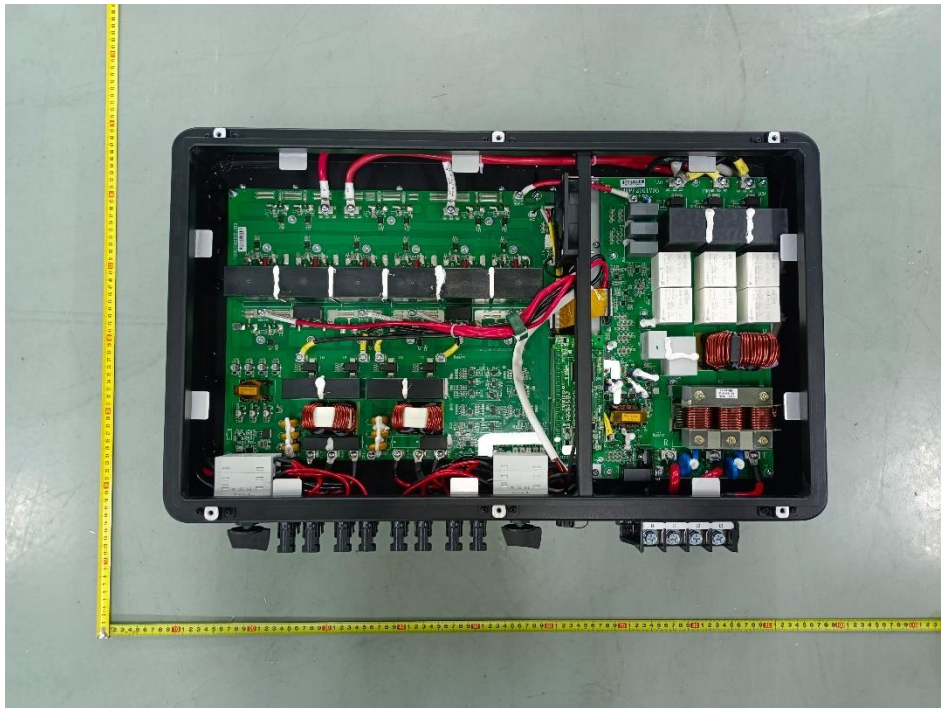
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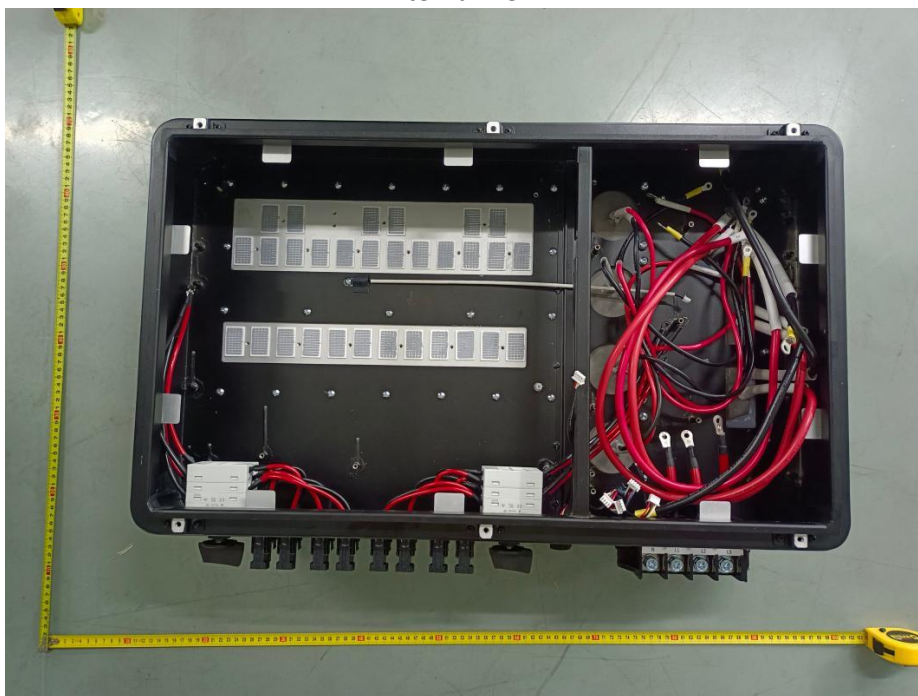
Overview-



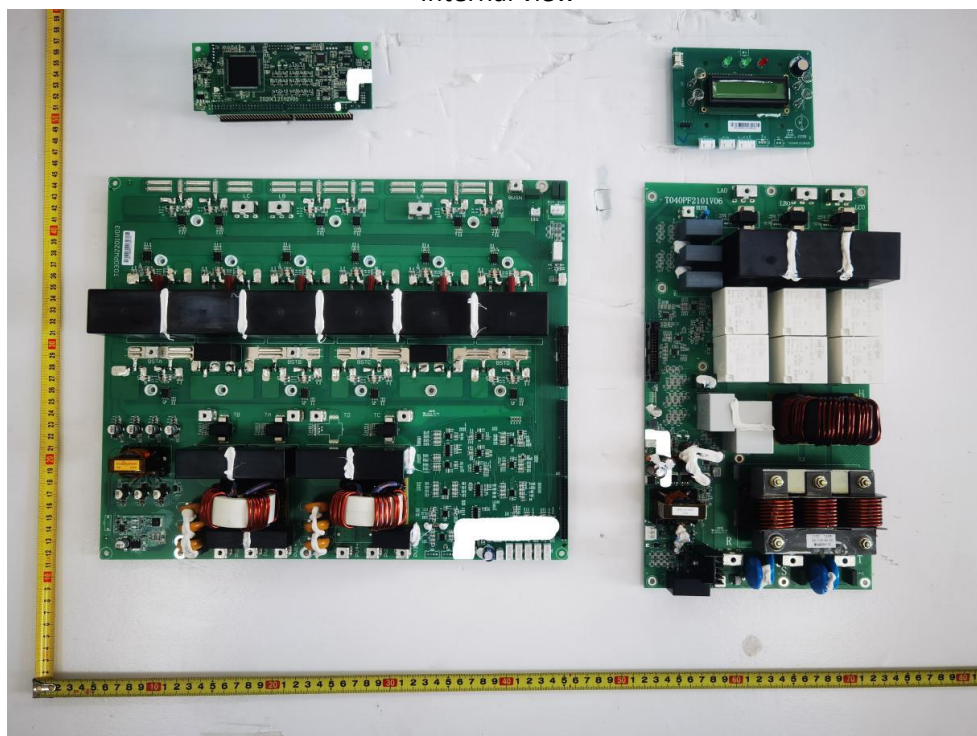
Internal view



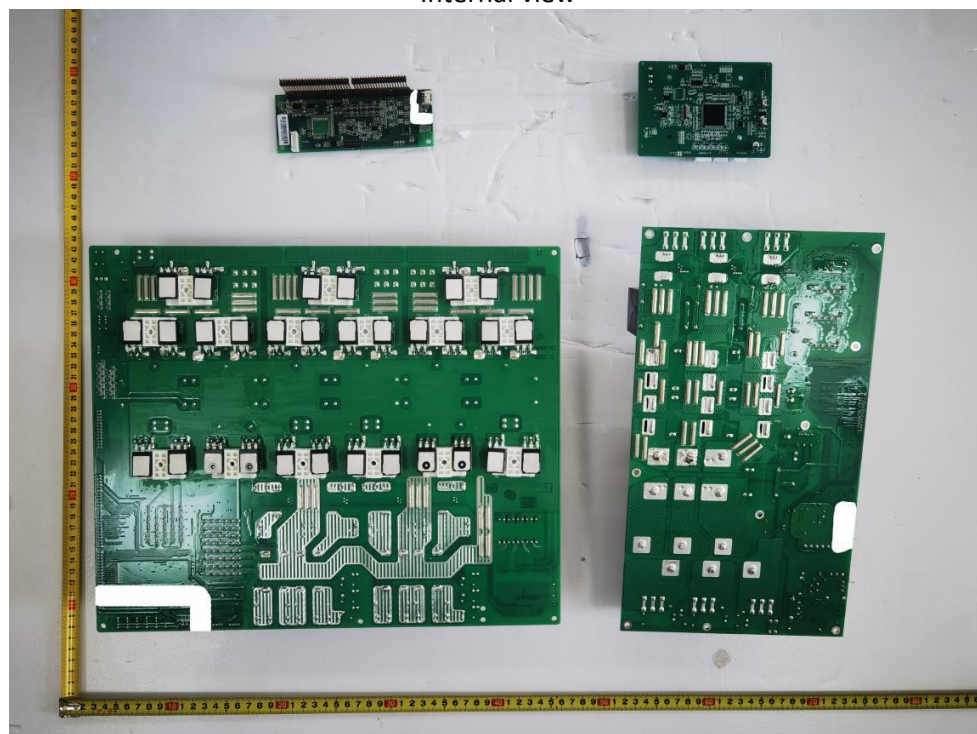
Internal view-



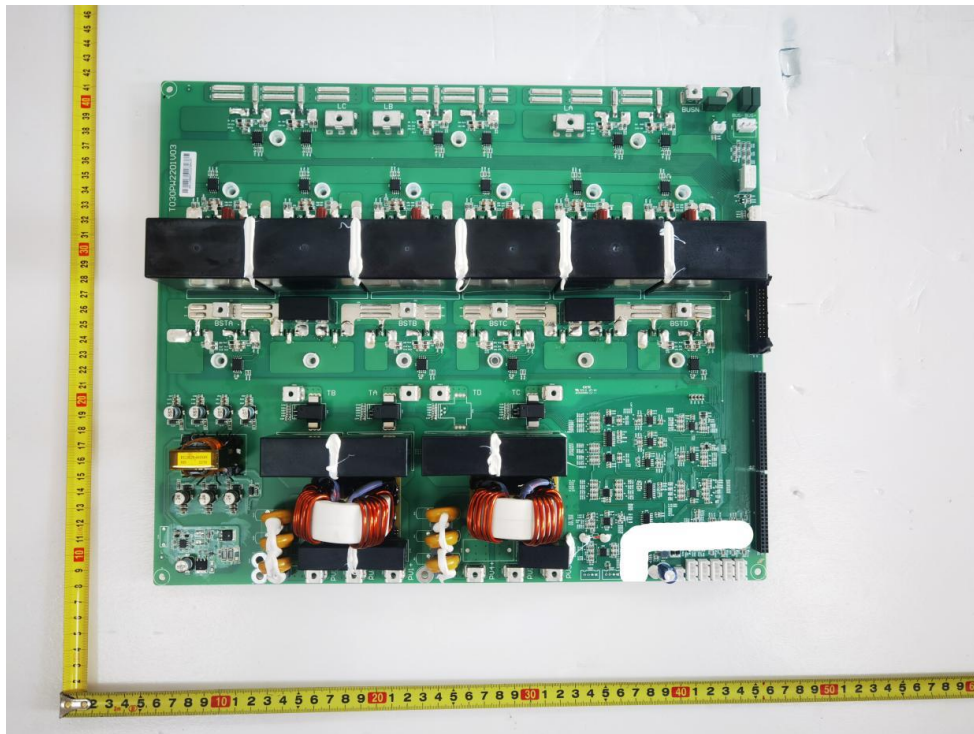
Internal view



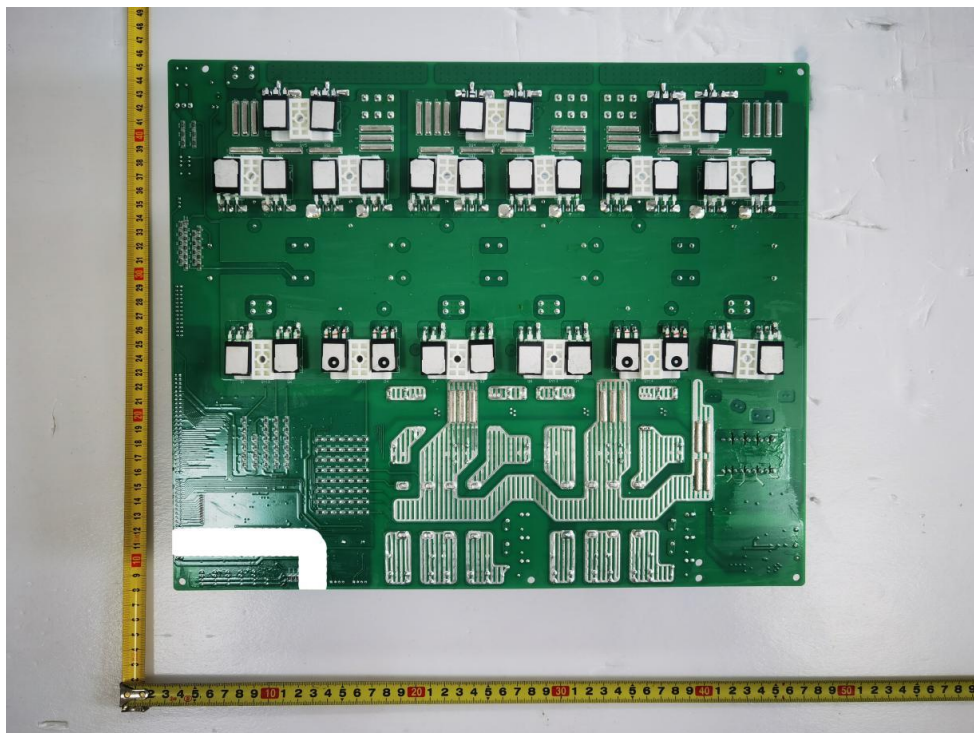
Internal view



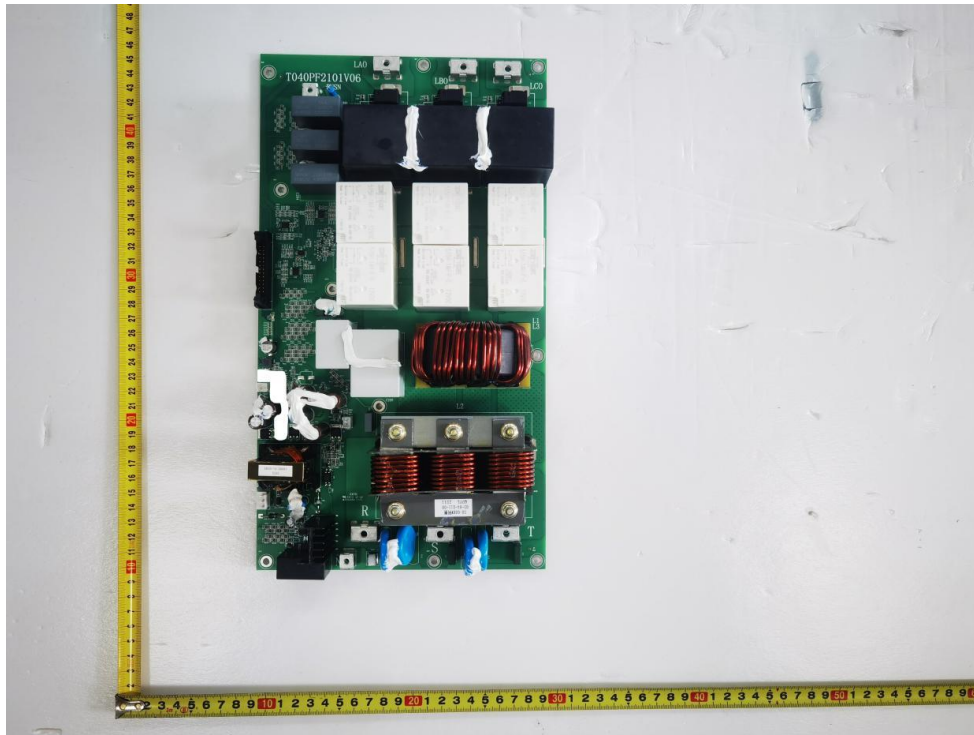
Internal view



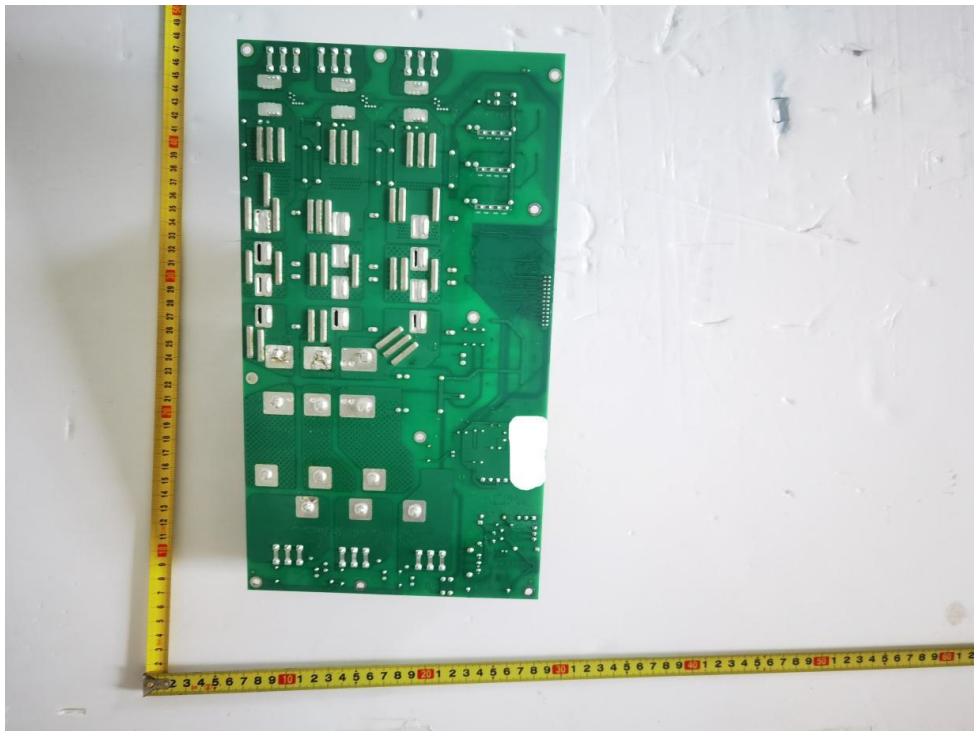
Internal view-



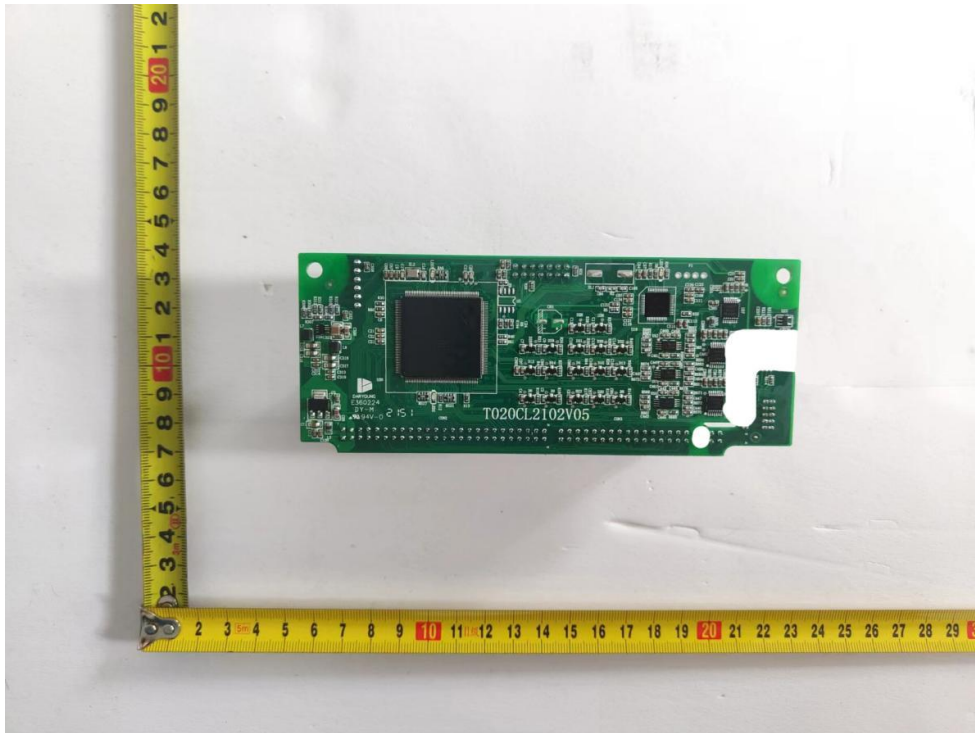
Internal view



Internal view-



Internal view



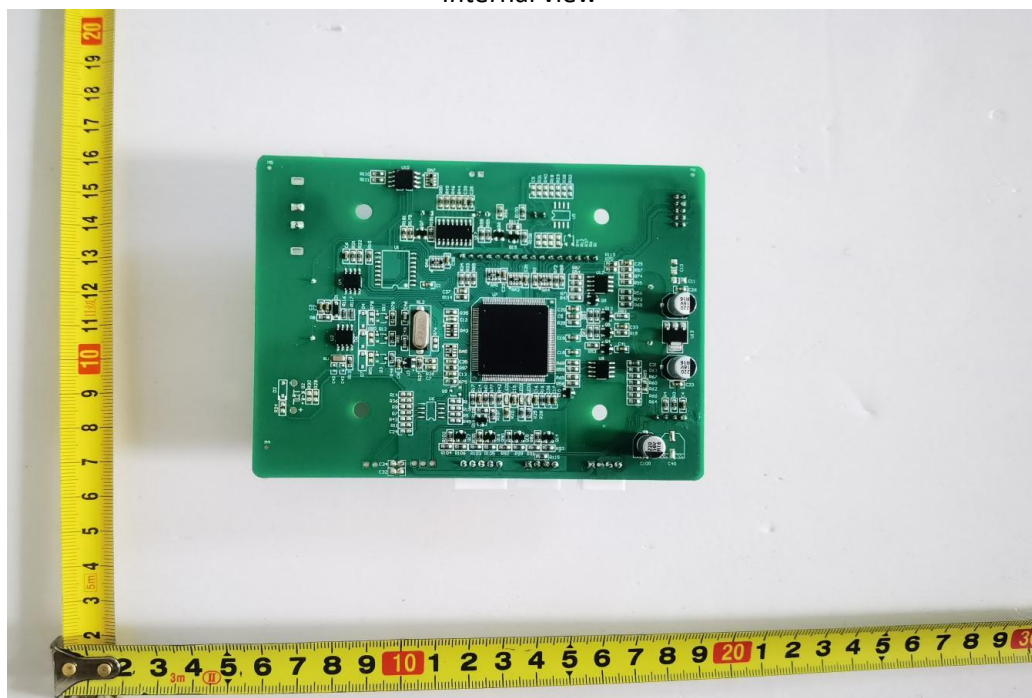
Internal view-



Internal view



Internal view-



*** END OF REPORT ***