TEST REPORT

EUT Number:	61-1280
Equipment Under Test:	Smart Optimizer ECOD
Trade Name:	Smart Optimizer ECOD
Model:	-
Serial Number:	-
Reference Number:	-
Manufactured by:	Feigin Electric Co., LTD.
Customer:	FEIGIN ELECTRIC CO., LTD.
Address:	40/1 Moo.5 Huay Yai Rd., Huay Yai, Banglamung, Chonburi 20150
Receipt Date:	12 September 2018
Date of Test:	13 - 19 September 2018
Issued Date of Report:	16 October 2018

Approved by

MR. Anake Meemoosor

Operation Manager

CONTENTS

1 SUMMARY OF TESTING

This product was tested and complied according to following specification standards:

EN 61000-6-4 Generic standard-Emission standard for industrial environments.

EN 61000-6-2 Generic standard-Immunity for industrial environment.

Test Item	Test Specification	Test Method	Result
Conducted Emission	EN61000-6-4:2007+A1:2011	CISPR 16-2-3:2006	PASS
Radiated Emission	EN61000-6-4:2007+A1:2011	CISPR 16-2-3:2006	PASS
Harmonic Emission	EN 61000-3-2:2014	IEC/EN 61000-3-2:2014	PASS
Voltage Fluctuation	EN 61000-3-3:2013	IEC/EN 61000-3-3:2013	PASS
Electrostatic Discharge	EN61000-6-2:2005, 8kV air, 4kV contact, Criterion B	IEC61000-4-2:2008 (Ed 2.0)	PASS
Radiated Immunity	EN61000-6-2:2005,80MHz to 1000 MHz, 10V/m 1KHz 80% AM Criterion A	IEC61000-4-3:2008 (Ed 3.1)	PASS
	EN61000-6-2:2005,1400MHz to 2000 MHz, 3V/m 1KHz 80% AM Criterion A		
	EN61000-6-2:2005,2000MHz to 2700 MHz, 1V/m 1KHz 80% AM Criterion A		
Electrical Fast Transient	EN61000-6-2:2005, 2kV 5/50ns 5kHz, Criterion B	IEC 61000-4-4:2004 (Ed 2.0)	PASS
Surge	EN61000-6-2:2005 1.2/50us, 2kV CM, 1kV DM, Criterion B	IEC61000-4-5:2014 (Ed2.0)	PASS
Conducted Immunity	EN61000-6-2:2005 0.15MHz to 80 MHz, 10V 1KHz 80% AM, Criterion A	IEC 61000-4-6:2008 (Ed 3.0)	PASS
Power frequency Magnetic	EN61000-6-2:2005, 30A/m 50Hz, Criterion A	EN61000-4-8:2009 (Ed 2.0)	PASS
Voltage Dips	EN61000-6-2:2005, Dip 60% 10P, Dip30% 25P, Interrupt 0.5P, Criterion C	IEC61000-4-11:2004 (Ed2.0)	PASS

Note: -

2 TEST PLAN AND DEVIATIONS FROM STANDARD

2.1 Test Plan

No.	Test Item	Input Voltage	Mode	Test Port	Test Specification
1	Conducted Emission	380V 50Hz	A	AC Main	EN61000-6-4:2007+A1:2011
2	Radiated Emission	380V 50Hz	A	Enclosure	EN61000-6-4:2007+A1:2011
3	Harmonic Emission	380V 50Hz	A	AC Main	EN 61000-3-2:2014
4	Voltage Fluctuation	380V 50Hz	A	AC Main	EN 61000-3-3:2013
5	Electrostatic Discharge	380V 50Hz	A	Enclosure	EN61000-6-2:2005, 8kV air, 4kV contact, Criterion B
6	Radiated Immunity	380V 50Hz	A	Enclosure	EN61000-6-2:2005,80MHz to 1000 MHz, 10V/m 1KHz 80% AM Criterion A
					EN61000-6-2:2005,1400MHz to 2000 MHz, 3V/m 1KHz 80% AM Criterion A
					EN61000-6-2:2005,2000MHz to 2700 MHz, 1V/m 1KHz 80% AM Criterion A
7	Electrical Fast Transient	380V 50Hz	A	AC Main	EN61000-6-2:2005, 2kV 5/50ns 5kHz, Criterion B
8	Surge	380V 50Hz	A	AC Main	EN61000-6-2:2005 1.2/50us, 2kV CM, 1kV DM, Criterion B
9	Conducted Immunity	380V 50Hz	A	AC Main	EN61000-6-2:2005 0.15MHz to 80 MHz, 10V 1KHz 80% AM, Criterion A
10	Power frequency Magnetic	380V 50Hz	A	Enclosure	EN61000-6-2:2005, 30A/m 50Hz, Criterion A
11	Voltage Dips	380V 50Hz	A	AC Main	EN61000-6-2:2005, Dip 60% 10P, Dip30% 25P, Interrupt 0.5P, Criterion C

2.2 Deviations from standard

3 TEST CONDITIONS

3.1 Operation Mode

A: Normal Operated.

3.2 Uncertainty Application

3.2.1 Uncertainty application according to CISPR 16-4-2:2003 for Conducted Emission, Radiated Disturbance and Disturbance Power Testing.

Compliance or Non-Compliance with a disturbance limit was determined in the following manner

If U_{lab} is less than or equal to U_{clspr} in table 1, then:

- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit.
- Non-Compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

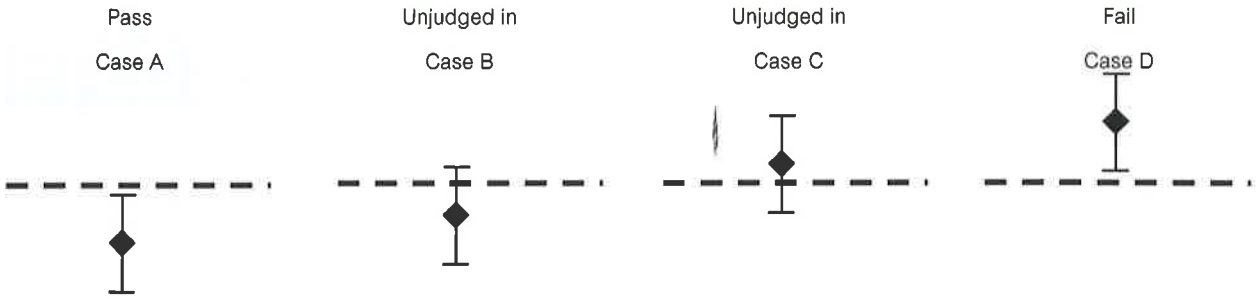
If U_{lab} is greater than U_{clspr} in table 1, then:

- Compliance is deemed to occur if no measured disturbance, increased by (U_{lab}- U_{clspr}), exceeds the disturbance limit.
- Non-Compliance is deemed to occur if any measured disturbance, increased by (U_{lab}-U_{clspr}), exceeds the disturbance limit.

Table 1 - Values of U_{clspr}

Abbreviation	Testing system	Frequency range	U_{lab}	U_{clspr}	U_{lab}- U_{clspr}
CE	Conducted Emission	9 kHz - 150 kHz	2.88	4.00	-1.12
CE	Conducted Emission	150 kHz - 30 MHz	3.51	3.60	-0.09
RE	Radiated Disturbance	30 MHz - 1000 MHz	4.80	5.20	-0.40
PE	Disturbance Power	30 MHz - 300 MHz	2.42	4.50	-2.08

3.2.2 Uncertainty Application according to LAB 34 Edition 1 (Figure 1) for other testing system.



The measured result is within the limit, even when extended by the uncertainty interval. The product therefore complies with the specification.

◆ = measured result

= uncertainty interval

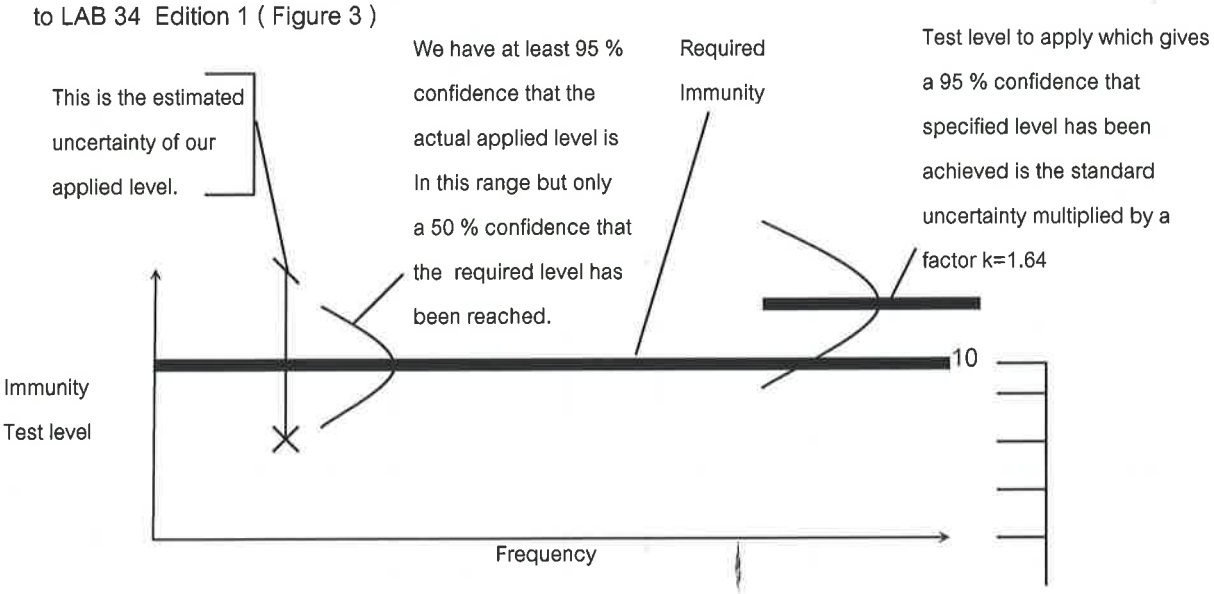
The measured result is below the upper limit, but by a margin less than half of the uncertainty interval; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance is more probable than non-compliance.

The measured result is above the upper limit, but by a margin less than half of the uncertainty interval; it is therefore not possible to state non-compliance based on the 95% level of confidence. However, the result indicates that non-compliance is more probable than compliance.

The measured result is beyond the upper limit, even when extended downwards by half of the uncertainty interval. The product therefore does not comply with the specification.

3.2.3 Uncertainty Application for immunity testing.

Uncertainty of each test systems are applied for compliance with related standard according to LAB 34 Edition 1 (Figure 3)



3.3 Equipment Classifications

Class A for EN 61000-3-2

3.4 Protection Classifications

Class I

3.5 Performance Criteria of Test Specification

a) Performance criterion A: The apparatus 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 apparatus 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, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

b) Performance criterion B: apparatus 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 apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, Degradation of performance is however allowed. 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 apparatus if used as intended.

C) Performance criterion C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

3.6 EUT Function Monitoring

The specific phenomena are monitored by lighting.

4 TEST SYSTEM CONFIGURATION

4.1 EUT Exercise Software

-

4.2 EUT Modifications

-

5 EUT DESCRIPTION

5.1 EUT Specification

Input Voltage	380 V / 50Hz
Input Current/Power	≤16 A
Clock/Oscillator	-

5.2 EUT Configuration

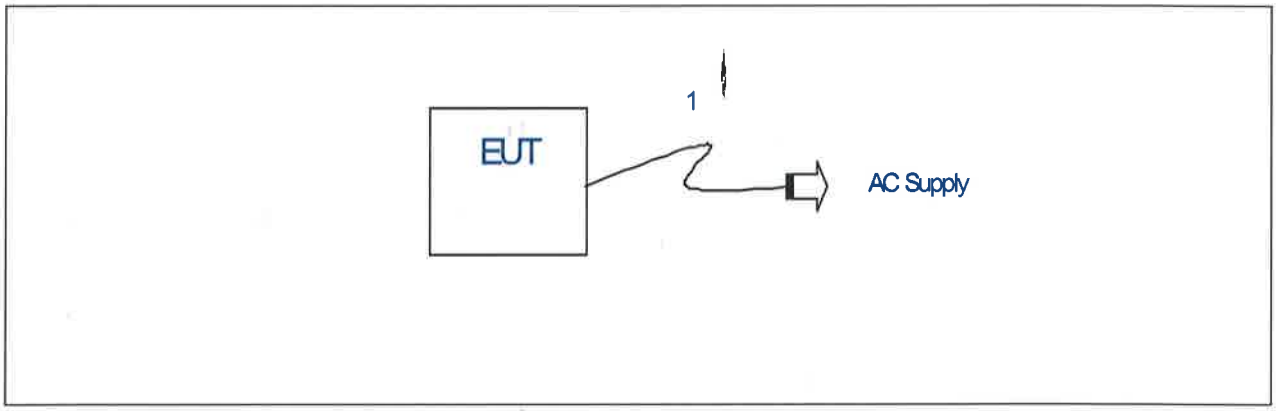


FIGURE 1 - EUT Configuration.

5.3 Peripherals Description

Diagram	Description	Trade Name	Model	Serial Number
-	-	-	-	-

5.4 Cables Description

Ref	Cable Type	Shield	Length (meters)	Ferrite	Connector	Connection Point 1	Connection Point 2
1	AC Power line	No	1.5	No	AC	EUT	AC Supply

6 TEST SETUP AND RESULT

6.1 Test Item: Conducted Emission

6.1.1 Test Setup

- **Test Specification**

  See 1 and 2.1

- **Test Equipment**

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
EMI Test Receiver	Rohde & Schwarz	ESU26	100572	DKD	26-05-19
LISN	Rohde & Schwarz	ESH2-Z5	831886/009	NIMT	01-02-19

- **Customer's Equipment**

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- **Test Uncertainty:** ±3.51 dB

- **Test Location:** TRM-001

- **Test Environment**

Temperature (°C)	25	Humidity (%)	55

- **Test Setup Description**

The disturbance voltage at the main terminals testing measurements were performed with the EMI receiver to observe the emission characteristics and to identify the frequency of emission that had the highest amplitude related to the EUT configuration for the disturbance voltage at the main terminals testing.

The EUT was placed on an 80 cm from ground plane in the Shield room. The power line of the EUT was connected to the LISN, which was located in the Test area. The EMI receiver measured the noise signals from the EUT. The testing method and the EUT setup were performed according to CISPR 16-2-3:2006. The EUT configuration for the disturbance voltage at the main terminals testing is shown in FIGURE 2 and 3, respectively.

● Test Picture

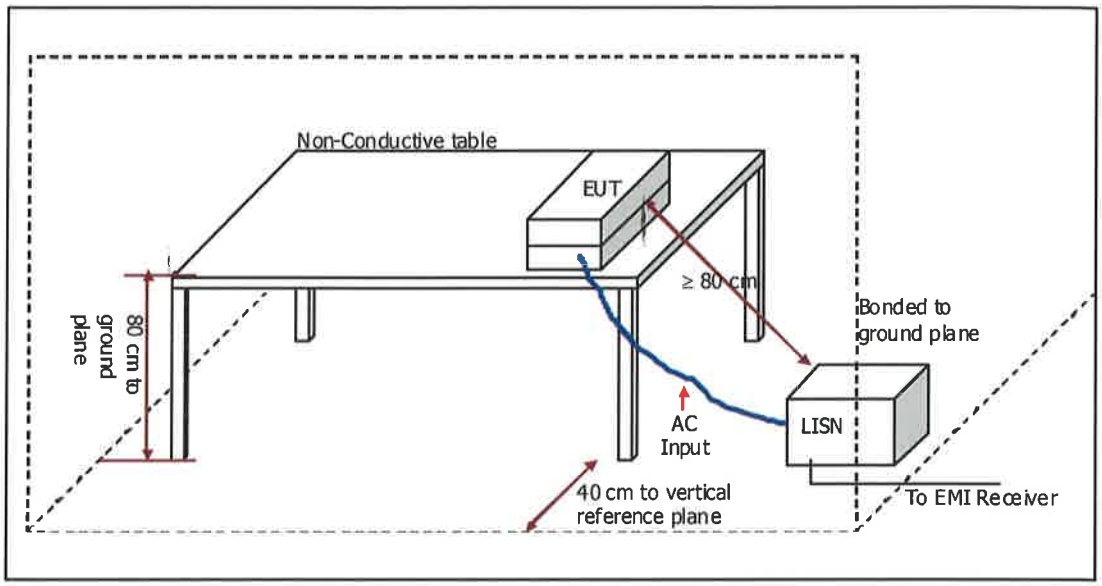


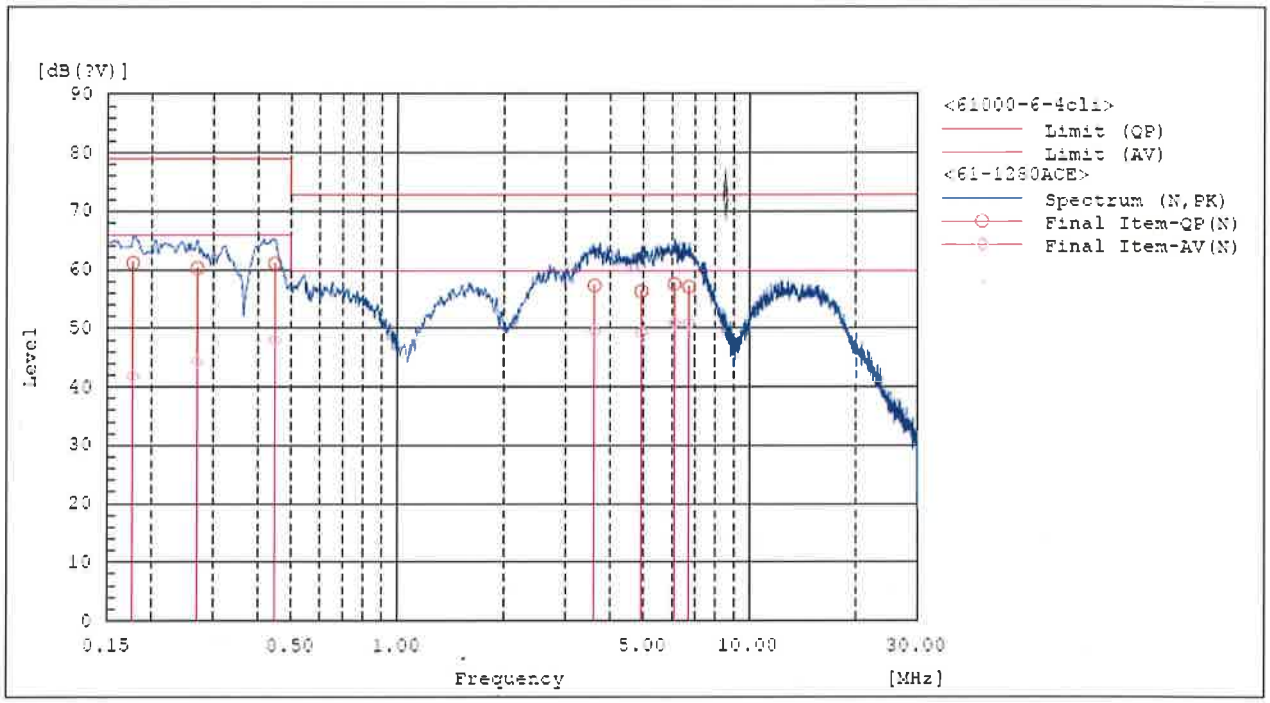
FIGURE 2 - The setup diagram.

FIGURE 3 - The test setup picture

- Test Result.

Measurement Port	AC Main	Operation Mode	A (See 3.1)

Test Result for Neutron.

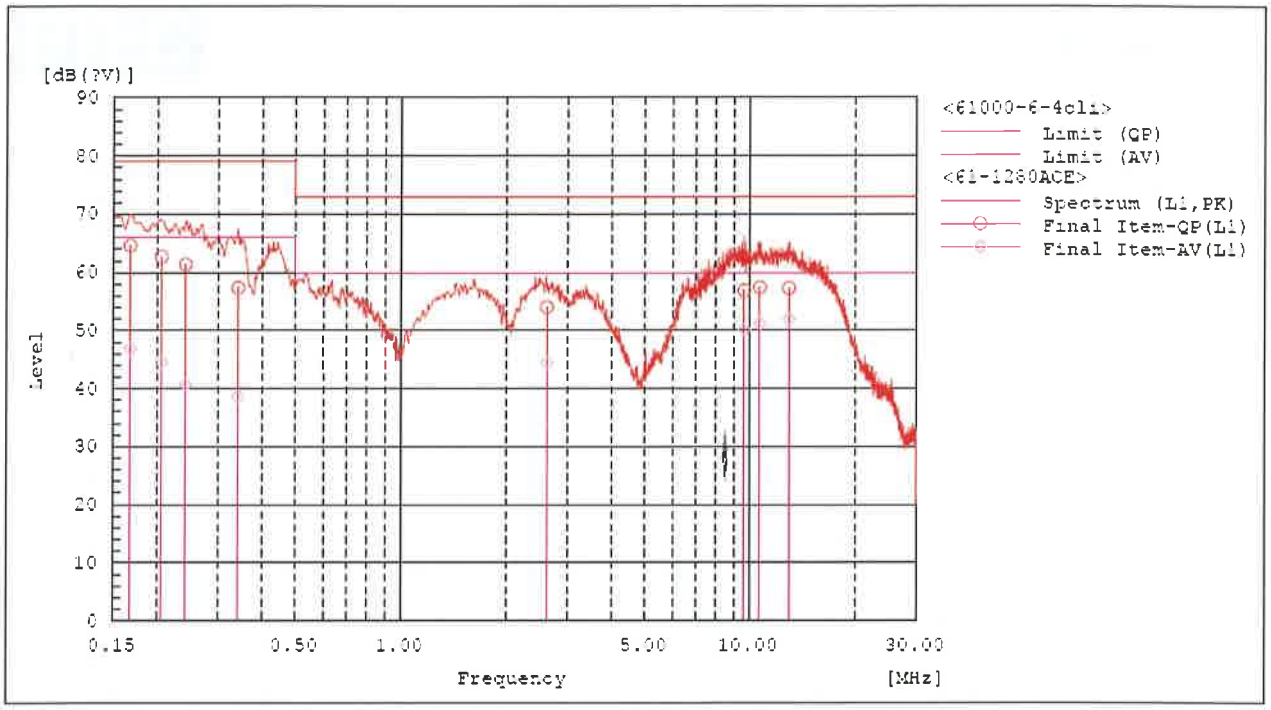


Measurement Result of Quasi-Peak and Average Detector.

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(?V)]	Reading CAV [dB(?V)]	c.f [dB]	Result QP [dB(?V)]	Result CAV [dB(?V)]	Limit QP [dB(?V)]	Limit AV [dB(?V)]	Margin QP [dB]	Margin CAV [dB]
1	0.17694	51.1	31.7	10.2	61.3	41.9	79.0	66.0	17.7	24.1
2	0.26982	50.2	34.2	10.2	60.4	44.4	79.0	66.0	18.6	21.6
3	0.44817	51.0	37.9	10.2	61.2	48.1	79.0	66.0	17.8	17.9
4	6.1193	47.2	40.6	10.4	57.6	51.0	73.0	60.0	15.4	9.0
5	3.62864	47.0	39.1	10.4	57.4	49.5	73.0	60.0	15.6	10.5
6	6.730	46.8	40.5	10.4	57.2	50.9	73.0	60.0	15.8	9.1
7	4.93248	46.0	38.9	10.4	56.4	49.3	73.0	60.0	16.6	10.7

Test Result for Line 1.

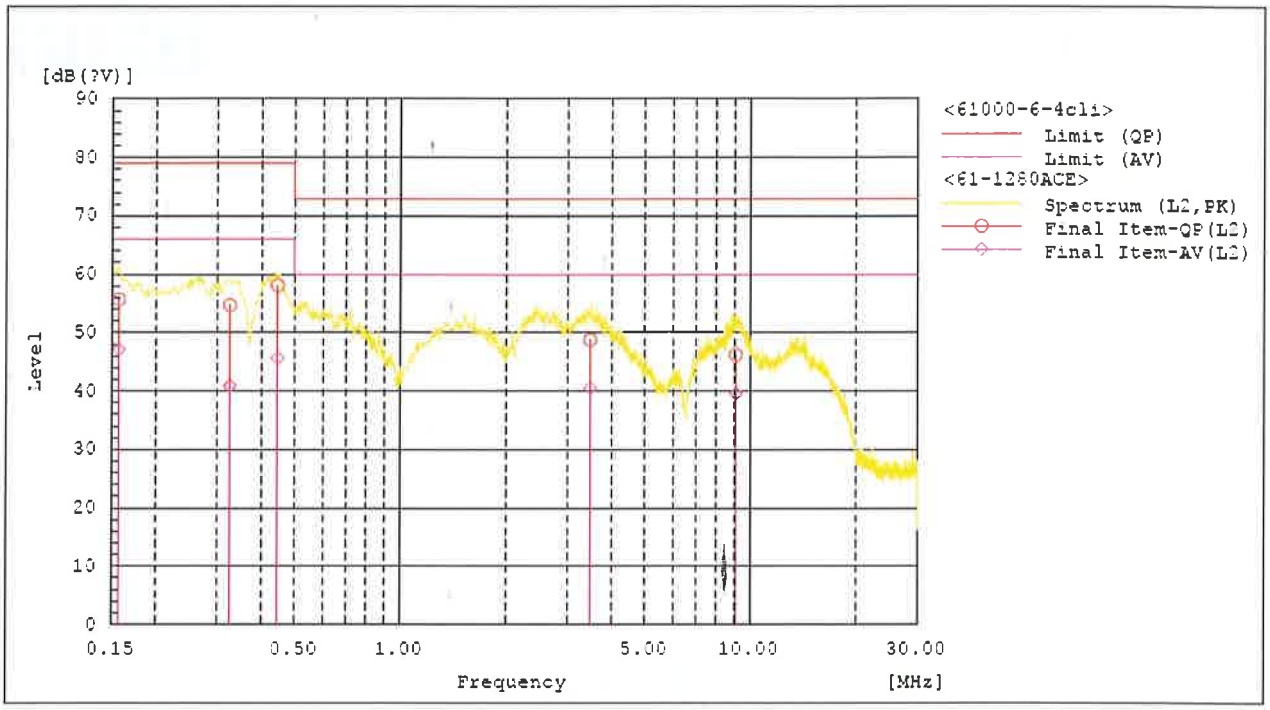


Measurement Result of Quasi-Peak and Average Detector.

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(?V)]	Reading CAV [dB(?V)]	c.f [dB]	Result QP [dB(?V)]	Result CAV [dB(?V)]	Limit QP [dB(?V)]	Limit AV [dB(?V)]	Margin QP [dB]	Margin CAV [dB]
1	0.16757	54.4	36.7	10.2	64.6	46.9	79.0	66.0	14.4	19.1
2	0.2416	51.2	30.5	10.2	61.4	40.7	79.0	66.0	17.6	25.3
3	0.34188	47.2	28.5	10.2	57.4	38.7	79.0	66.0	21.6	27.3
4	9.6561	46.4	39.7	10.5	56.9	50.2	73.0	60.0	16.1	9.8
5	10.7082	46.8	40.6	10.6	57.4	51.2	73.0	60.0	15.6	8.8
6	12.9584	46.6	41.2	10.7	57.3	51.9	73.0	60.0	15.7	8.1
7	0.20585	52.5	34.4	10.2	62.7	44.6	79.0	66.0	16.3	21.4
8	2.61784	43.8	34.1	10.3	54.1	44.4	73.0	60.0	18.9	15.6

Test Result for Line 2.

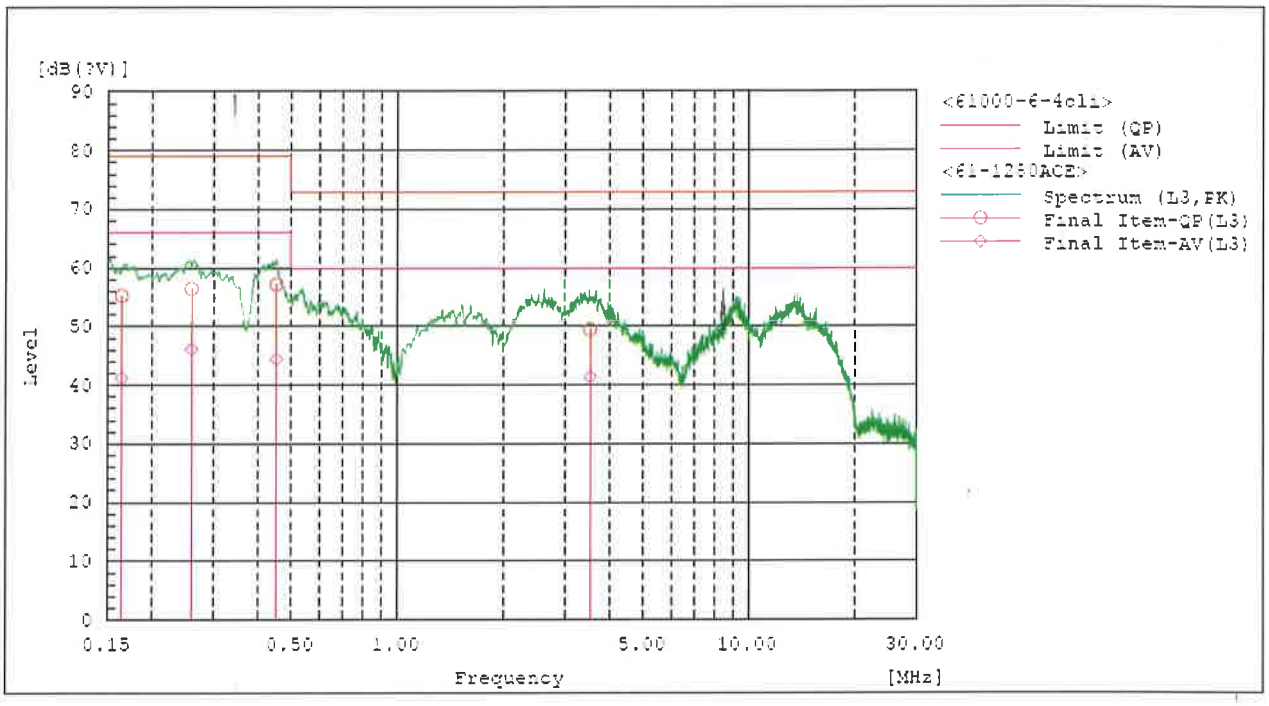


Measurement Result of Quasi-Peak and Average Detector.

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(?V)]	Reading CAV [dB(?V)]	c.f [dB]	Result QP [dB(?V)]	Result CAV [dB(?V)]	Limit QP [dB(?V)]	Limit AV [dB(?V)]	Margin QP [dB]	Margin CAV [dB]
1	0.15669	45.6	37.0	10.1	55.7	47.1	79.0	66.0	23.3	18.9
2	0.32624	44.6	30.8	10.1	54.7	40.9	79.0	66.0	24.3	25.1
3	0.44627	48.1	35.7	10.0	58.1	45.7	79.0	66.0	20.9	20.3
4	3.48608	38.7	30.4	10.1	48.8	40.5	73.0	60.0	24.2	19.5
5	9.1049	36.0	29.4	10.2	46.2	39.6	73.0	60.0	26.8	20.4

Test Result for Line 3.



Measurement Result of Quasi-Peak and Average Detector.

--- L3 Phase ---

No.	Frequency [MHz]	Reading QP [dB(?V)]	Reading CAV [dB(?V)]	c.f [dB]	Result QP [dB(?V)]	Result CAV [dB(?V)]	Limit QP [dB(?V)]	Limit AV [dB(?V)]	Margin QP [dB]	Margin CAV [dB]
1	0.45304	47.2	34.5	10.0	57.2	44.5	79.0	66.0	21.8	21.5
2	0.25908	46.4	36.1	10.1	56.5	46.2	79.0	66.0	22.5	19.8
3	0.1642	45.2	31.2	10.1	55.3	41.3	79.0	66.0	23.7	24.7
4	3.53584	39.4	31.4	10.1	49.5	41.5	73.0	60.0	23.5	18.5

Result: ***Pass***

Tested by: MR. Itsarapong Poolpram

6.2 Test Item: Radiated Emission

6.2.1 Test Setup

- Test Specification

See1 and 2.1

- Test Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
EMI Test Receiver	Rohde & Schwarz	ESU26	100572	DKD	26-05-19
Amplifier	Sonoma	310 N	186897	NIMT	01-02-19
Bilog Antenna	Schaffner	CBL6141A	4146	UKAS	17-10-18
Trilog - Broadband Antenna	SCHWARZBECK	VULB9162	9162-088	UKAS	20-05-19

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- Test Uncertainty: ±4.80 dB

- Test Location: SAC 1

- Test Environment

Temperature (°C)	25	Humidity (%)	56

- Test Setup Description

The radiated emission measurement was performed with EMI receiver to observe the emission characteristic and identify the frequency of emission that has the highest amplitude relative to limit by operating the EUT with a typical configuration. The EUT configuration, cable configurations of operation are determined for producing the maximum level of emissions.

The EUT was placed on the 80 cm height non-metallic table on a 1 m radius turntable.

The Trilog - Broadband Antenna (30 MHz - 7GHz) was used for received the noise of EUT and put on the antenna mast, which they were in side the semi-anechoic chamber. The testing method and the EUT setup were performed according to CISPR 16-2-3:2006). The EUT configuration setup is shown in figures 4 and 5, respectively.

● Test Picture

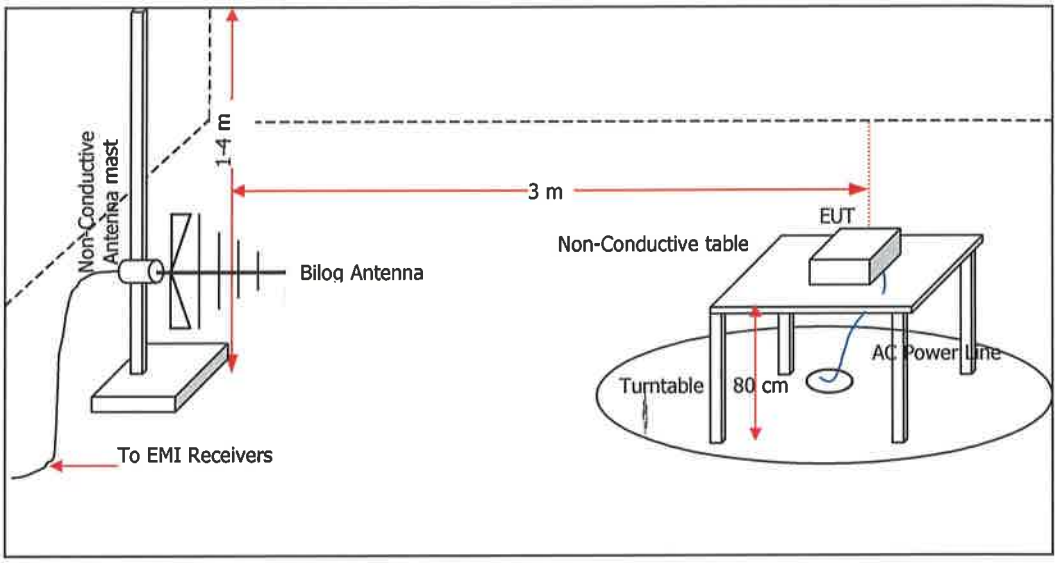


FIGURE 4 - The test setup diagram.

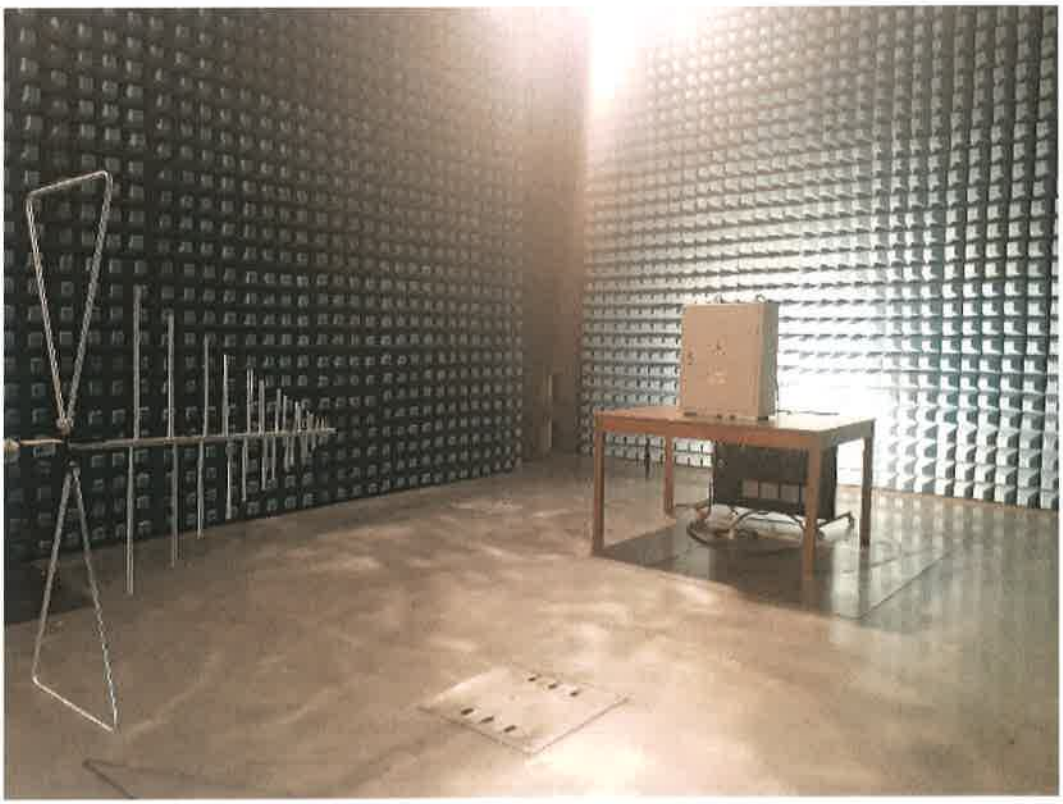
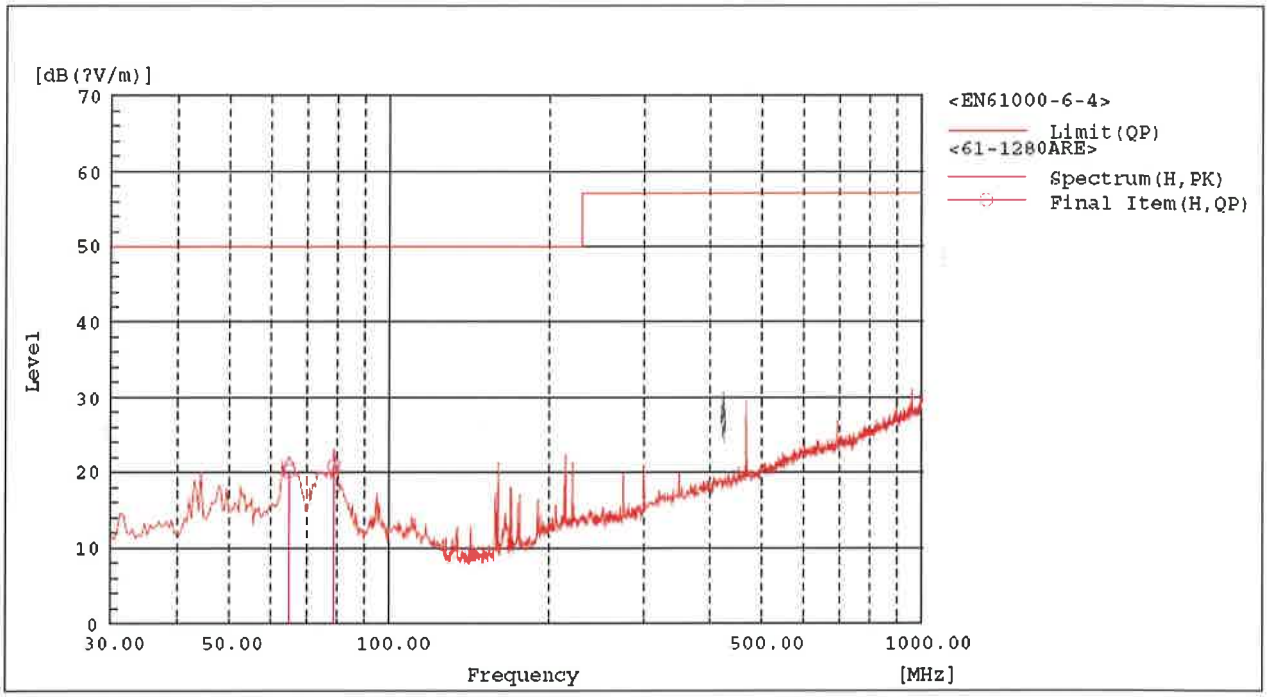


FIGURE 5 - The test setup picture.

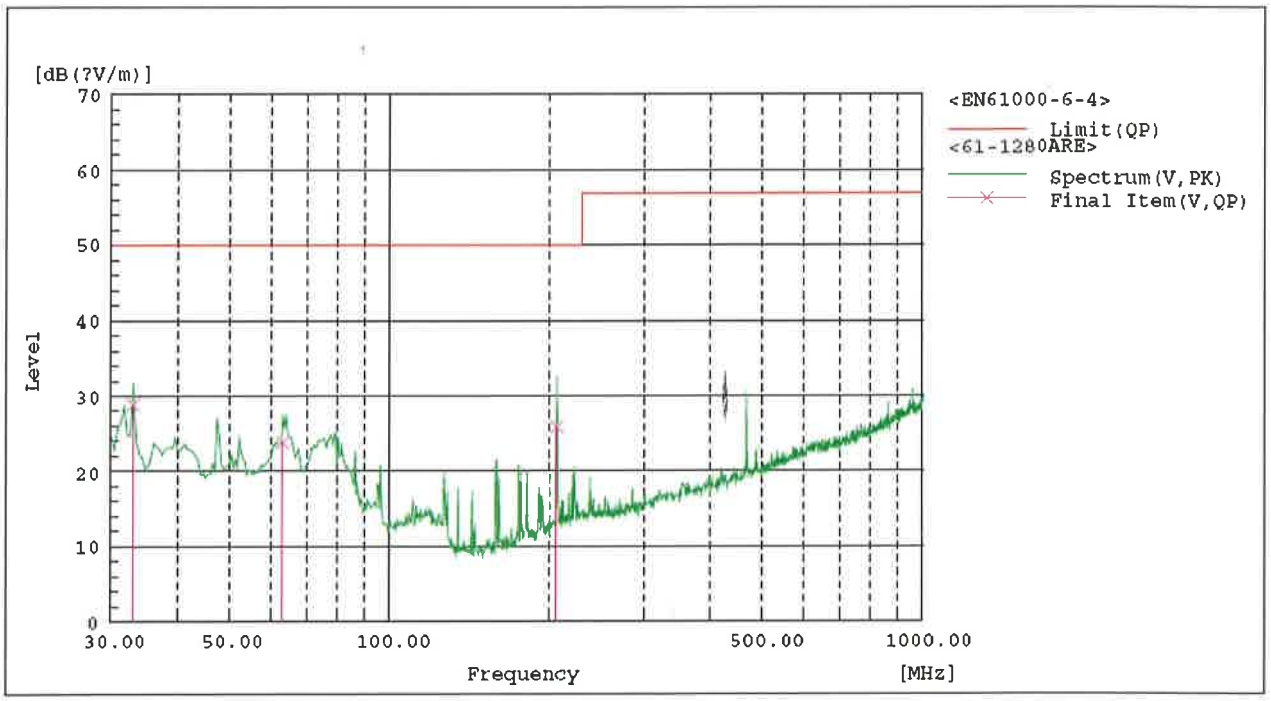
6.2.2 Test Result

Measurement Port	Enclosure	Operation Mode	A (See 3.1)

Test result for horizontal polarization



Test result for vertical polarization



Measurement Result of Quasi-Peak Detector

No.	Frequency [MHz]	(P)	Reading QP [dB(?V)]	c.f [dB(1/m)]	Result QP [dB(?V/m)]	Limit QP [dB(?V/m)]	Margin QP [dB]	Height [cm]	Angle [?]
1	33.059	V	46.4	-17.5	28.9	50.0	21.1	100.0	0.0
2	63.213	V	41.6	-17.7	23.9	50.0	26.1	100.0	0.0
3	206.119	V	42.4	-16.4	26.0	50.0	24.0	100.0	0.0
4	64.962	H	38.4	-18.1	20.3	50.0	29.7	100.0	0.0
5	78.946	H	42.2	-21.2	21.0	50.0	29.0	100.0	0.0

Result: ***Pass***

Tested by: MR. Itsarapong Poolpram

6.3 Test Item: Harmonic Emission

6.3.1 Test Setup

- **Test Specification**

  See 1 and 2.1

- **Test Equipment**

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
Signal Conditioning Unit	TESEQ	CCN1000-3	1347A01034	A2LA	20-02-19
AC-Power Source	TESEQ	NSG1007	1347A01034	-	20-02-19

- **Customer's Equipment**

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- **Test Uncertainty:** ±3.85 %

- **Test Location:** Test area

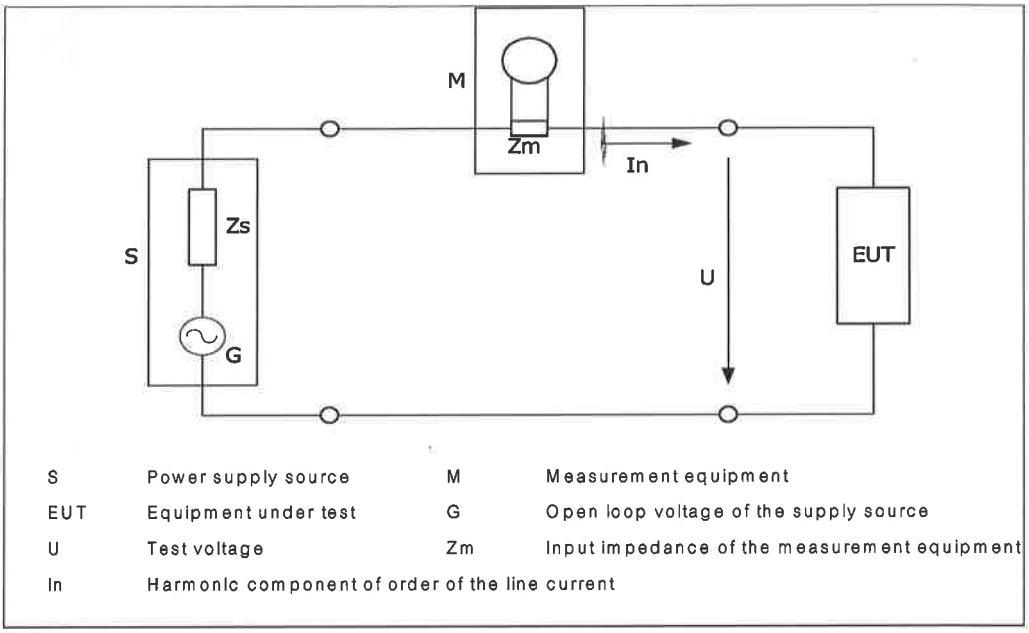
- **Test Environment**

Temperature: (°C)	25	Humidity (%)	55

- **Test Setup Description**

The harmonic load currents were measured according to EN 61000-3-2:2014. The EUT was connected to AC power source, which was decoupled from the public mains connection. The analysis was performed with a measurement in a time domain of transient harmonic load currents. The data was transformed into a frequency range and assessed up to the 40^{th} harmonic by using the Discrete Fourier Transforms. The EUT configuration for the harmonic current emission testing is shown in FIGURE 6 and 7, respectively.

● Test Picture



S	Power supply source	M	Measurement equipment
EUT	Equipment under test	G	Open loop voltage of the supply source
U	Test voltage	Zm	Input impedance of the measurement equipment
In	Harmonic component of order of the line current		

FIGURE 6 - The setup diagram.

FIGURE 7 - The test setup picture.

- Test Result

Measurement Port	AC Main	Operation Mode	A (See 3.1)

Phase A

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	0.166	N/A	0.004	0.248	N/A	Pass
3	0.091	N/A	N/A	0.095	N/A	N/A	N/A
4	0.001	0.083	N/A	0.002	0.124	N/A	Pass
5	0.061	0.221	27.6	0.063	0.332	19.1	Pass
6	0.001	0.055	N/A	0.002	0.083	N/A	Pass
7	0.064	0.149	43.1	0.073	0.223	32.8	Pass
8	0.001	0.041	N/A	0.001	0.062	N/A	Pass
9	0.032	N/A	N/A	0.035	N/A	N/A	N/A
10	0.001	0.033	N/A	0.002	0.050	N/A	Pass
11	0.012	0.064	18.6	0.014	0.096	14.4	Pass
12	0.000	0.028	N/A	0.001	0.041	N/A	Pass
13	0.015	0.041	37.1	0.017	0.062	28.0	Pass
14	0.000	N/A	N/A	0.001	N/A	N/A	N/A
15	0.011	N/A	N/A	0.012	N/A	N/A	N/A
16	0.000	N/A	N/A	0.001	N/A	N/A	N/A
17	0.008	N/A	N/A	0.009	N/A	N/A	N/A
18	0.001	N/A	N/A	0.001	N/A	N/A	N/A
19	0.005	N/A	N/A	0.006	N/A	N/A	N/A
20	0.000	N/A	N/A	0.000	N/A	N/A	N/A
21	0.003	N/A	N/A	0.004	N/A	N/A	N/A
22	0.000	N/A	N/A	0.000	N/A	N/A	N/A
23	0.003	N/A	N/A	0.003	N/A	N/A	N/A
24	0.000	N/A	N/A	0.000	N/A	N/A	N/A
25	0.001	N/A	N/A	0.003	N/A	N/A	N/A
26	0.000	N/A	N/A	0.000	N/A	N/A	N/A
27	0.001	N/A	N/A	0.003	N/A	N/A	N/A
28	0.000	N/A	N/A	0.000	N/A	N/A	N/A
29	0.002	N/A	N/A	0.002	N/A	N/A	N/A
30	0.000	N/A	N/A	0.000	N/A	N/A	N/A

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
31	0.002	N/A	N/A	0.002	N/A	N/A	N/A
32	0.000	N/A	N/A	0.000	N/A	N/A	N/A
33	0.002	N/A	N/A	0.003	N/A	N/A	N/A
34	0.000	N/A	N/A	0.000	N/A	N/A	N/A
35	0.002	N/A	N/A	0.003	N/A	N/A	N/A
36	0.000	N/A	N/A	0.000	N/A	N/A	N/A
37	0.002	N/A	N/A	0.002	N/A	N/A	N/A
38	0.000	N/A	N/A	0.000	N/A	N/A	N/A
39	0.002	N/A	N/A	0.003	N/A	N/A	N/A
40	0.000	N/A	N/A	0.000	N/A	N/A	N/A

Measurement Port	AC Main	Operation Mode	A (See 3.1)

Phase B

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	0.161	N/A	0.003	0.242	N/A	Pass
3	0.091	N/A	N/A	0.110	N/A	N/A	N/A
4	0.001	0.081	N/A	0.002	0.121	N/A	Pass
5	0.037	0.215	17.0	0.038	0.323	11.9	Pass
6	0.001	0.054	N/A	0.002	0.081	N/A	Pass
7	0.057	0.145	39.2	0.064	0.217	29.2	Pass
8	0.001	0.040	N/A	0.001	0.060	N/A	Pass
9	0.032	N/A	N/A	0.020	N/A	N/A	N/A
10	0.000	0.032	N/A	0.001	0.048	N/A	Pass
11	0.007	0.062	11.3	0.015	0.094	16.1	Pass
12	0.000	0.027	N/A	0.000	0.040	N/A	Pass
13	0.008	0.040	19.8	0.009	0.060	15.0	Pass
14	0.000	N/A	N/A	0.000	N/A	N/A	N/A
15	0.003	N/A	N/A	0.003	N/A	N/A	N/A
16	0.000	N/A	N/A	0.001	N/A	N/A	N/A
17	0.006	N/A	N/A	0.006	N/A	N/A	N/A
18	0.000	N/A	N/A	0.000	N/A	N/A	N/A
19	0.006	N/A	N/A	0.006	N/A	N/A	N/A
20	0.000	N/A	N/A	0.000	N/A	N/A	N/A
21	0.001	N/A	N/A	0.001	N/A	N/A	N/A
22	0.000	N/A	N/A	0.000	N/A	N/A	N/A
23	0.002	N/A	N/A	0.003	N/A	N/A	N/A
24	0.000	N/A	N/A	0.000	N/A	N/A	N/A
25	0.002	N/A	N/A	0.002	N/A	N/A	N/A
26	0.000	N/A	N/A	0.000	N/A	N/A	N/A
27	0.001	N/A	N/A	0.001	N/A	N/A	N/A
28	0.000	N/A	N/A	0.000	N/A	N/A	N/A
29	0.000	N/A	N/A	0.000	N/A	N/A	N/A
30	0.000	N/A	N/A	0.000	N/A	N/A	N/A
31	0.001	N/A	N/A	0.001	N/A	N/A	N/A

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
32	0.000	N/A	N/A	0.000	N/A	N/A	N/A
33	0.000	N/A	N/A	0.001	N/A	N/A	N/A
34	0.000	N/A	N/A	0.000	N/A	N/A	N/A
35	0.000	N/A	N/A	0.000	N/A	N/A	N/A
36	0.000	N/A	N/A	0.000	N/A	N/A	N/A
37	0.001	N/A	N/A	0.001	N/A	N/A	N/A
38	0.000	N/A	N/A	0.000	N/A	N/A	N/A
39	0.000	N/A	N/A	0.001	N/A	N/A	N/A
40	0.000	N/A	N/A	0.000	N/A	N/A	N/A

Measurement Port	AC Main	Operation Mode	A (See 3.1)

Phase C

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	0.154	N/A	0.003	0.231	N/A	Pass
3	0.091	N/A	N/A	0.110	N/A	N/A	N/A
4	0.001	0.077	N/A	0.002	0.115	N/A	Pass
5	0.037	0.206	18.0	0.039	0.309	12.5	Pass
6	0.001	0.051	N/A	0.001	0.077	N/A	Pass
7	0.044	0.138	32.1	0.051	0.208	24.4	Pass
8	0.001	0.038	N/A	0.002	0.058	N/A	Pass
9	0.032	N/A	N/A	0.033	N/A	N/A	N/A
10	0.000	0.031	N/A	0.001	0.046	N/A	Pass
11	0.004	0.060	N/A	0.013	0.089	N/A	Pass
12	0.000	0.026	N/A	0.000	0.038	N/A	Pass
13	0.004	0.038	N/A	0.005	0.058	N/A	Pass
14	0.000	N/A	N/A	0.001	N/A	N/A	N/A
15	0.002	N/A	N/A	0.003	N/A	N/A	N/A
16	0.000	N/A	N/A	0.000	N/A	N/A	N/A
17	0.004	N/A	N/A	0.004	N/A	N/A	N/A
18	0.000	N/A	N/A	0.000	N/A	N/A	N/A
19	0.002	N/A	N/A	0.003	N/A	N/A	N/A
20	0.000	N/A	N/A	0.000	N/A	N/A	N/A
21	0.001	N/A	N/A	0.001	N/A	N/A	N/A
22	0.000	N/A	N/A	0.000	N/A	N/A	N/A
23	0.001	N/A	N/A	0.001	N/A	N/A	N/A
24	0.000	N/A	N/A	0.000	N/A	N/A	N/A
25	0.001	N/A	N/A	0.002	N/A	N/A	N/A
26	0.000	N/A	N/A	0.000	N/A	N/A	N/A
27	0.000	N/A	N/A	0.001	N/A	N/A	N/A
28	0.000	N/A	N/A	0.000	N/A	N/A	N/A
29	0.000	N/A	N/A	0.001	N/A	N/A	N/A
30	0.000	N/A	N/A	0.000	N/A	N/A	N/A
31	0.001	N/A	N/A	0.001	N/A	N/A	N/A

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
32	0.000	N/A	N/A	0.000	N/A	N/A	N/A
33	0.000	N/A	N/A	0.001	N/A	N/A	N/A
34	0.000	N/A	N/A	0.000	N/A	N/A	N/A
35	0.000	N/A	N/A	0.001	N/A	N/A	N/A
36	0.000	N/A	N/A	0.000	N/A	N/A	N/A
37	0.001	N/A	N/A	0.001	N/A	N/A	N/A
38	0.000	N/A	N/A	0.000	N/A	N/A	N/A
39	0.000	N/A	N/A	0.001	N/A	N/A	N/A
40	0.000	N/A	N/A	0.000	N/A	N/A	N/A

Result: ***Pass***

Tested by: MR. Itsarapong Poolpram

6.4 Test Item: Voltage Fluctuation

6.4.1 Test Setup

- Test Specification

See 1 and 2.1

- Test Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
Signal Conditioning Unit	TESEQ	CCN1000-3	1347A01034	A2LA	20-02-19
Three Phase Impedance Network	TESEQ	INA2197	1347A01034	A2LA	20-02-19

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- Test Uncertainty: ±2.46%

- Test Location: Test area

- Test Environment

Temperature: (°C)	25	Humidity (%)	55

- Test Setup Description

The Voltage fluctuation (flicker) was tested according to EN 61000-3-3:2013. The EUT was decoupled from the public main and connected to the reference impedance according to IEC 725. The voltage fluctuation testing was performed automatically with the Harmonic& Flicker Analyzer and the software. The EUT was operated continuously. The measurement was made after a steady state has been reached. The EUT configuration for the voltage fluctuation testing is shown in FIGURE 8 and 9, respectively.

- Test Picture

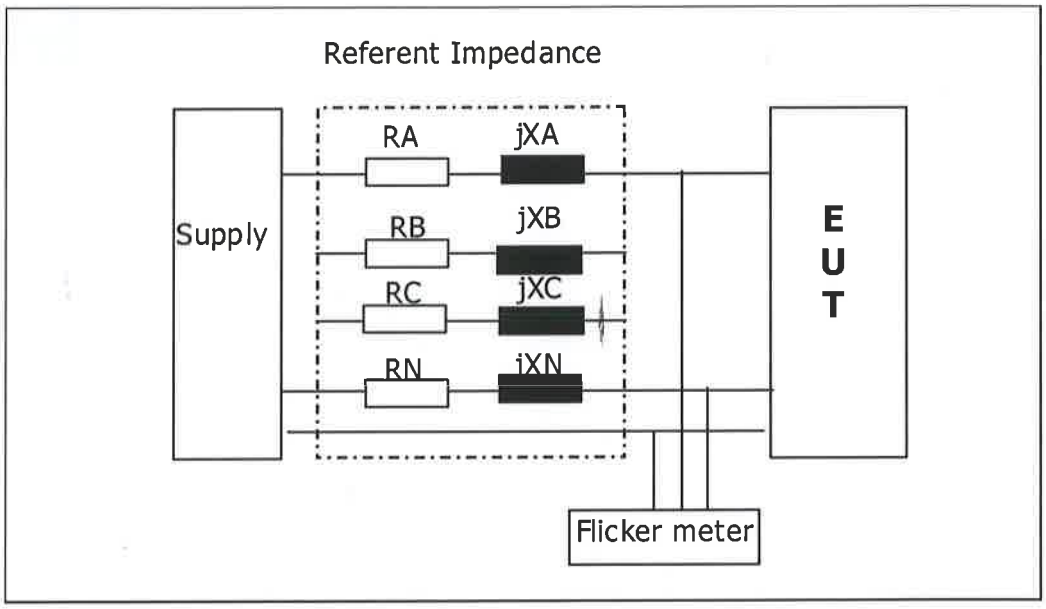


FIGURE 8 - The setup diagram.

FIGURE 9 - The test setup picture.

6.4.1 Test Result

Measurement Port	AC Main	Operation Mode	A (See 3.1)

Maximum Flicker Results Phase A

T-max (mS):	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.32	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.102	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.048	Test limit:	0.650	Pass

Calculated dmax(%): 0.424
Calculated dc(%): 0.000
Calculated Pst : 0.136
Calculated Plt : 0.064
The maximum permissible system impedance Zsys:
Z-phase A = 4.793 Ohm + j 2.996 Ohm (4.793 Ohm + 9535 µH)
Z-neutral A = 3.195 Ohm + j 1.997 Ohm (3.195 Ohm + 6357 µH)

Maximum Flicker Results Phase B

T-max (mS):	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.46	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.113	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.052	Test limit:	0.650	Pass

Calculated dmax(%): 0.613
Calculated dc(%): 0.000
Calculated Pst : 0.150
Calculated Plt : 0.069
The maximum permissible system impedance Zsys :
Z-phase B = 4.111 Ohm + j 2.569 Ohm (4.111 Ohm + 8179 µH)
Z-neutral B = 2.741 Ohm + j 1.713 Ohm (2.741 Ohm + 5453 µH)

Maximum Flicker Results Phase C

T-max (mS):	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.07	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.097	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.046	Test limit:	0.650	Pass

Calculated dmax(%): 0.000
Calculated dc(%): 0.000
Calculated Pst : 0.130
Calculated Plt : 0.062
The maximum permissible system impedance Zsys :
Z-phase C = 5.139 Ohm + j 3.212 Ohm (5.139 Ohm + 10224 µH)
Z-neutral C = 3.426 Ohm + j 2.141 Ohm (3.426 Ohm + 6816 µH)

Result: ***Pass***

Tested by: MR. Itsarapong Poolpram

6.5 Test Item: Electrostatic Discharge

6.8.1 Test Setup

- Test Specification

See 1 and 2.1

- Test Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
ESD Generator	TESEQ	NSG438	1226	NIST	20-11-18

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- Test Uncertainty: ± 7.09 %

- Test Location: Test area

- Test Environment

Temperature (°C)	24	Humidity (%)	52

- Test Setup Description

The ESD was executed at a few weak points which can be normally touched by an operator or customer. The repetition rate between the impulses was at least 1 sec. The EUT was placed on the ground plane. The test points are shown in Figure 10.

The EUT configuration and diagram for the electrostatic discharge testing are shown in FIGURE 11 and 12 respectively.

Electrostatic Discharge Testing Description

No.	Test Points	Type of Testing	Test Voltage (KV)	Number of Discharge per pol.	Operation Mode (see3.1)	Performance Criterion
1	A1-A9	Air	± 8	10	A	B
2	C10-C16	Contact	± 4	10	A	B
3	VCP-HCP	Contact	± 4	10	A	B

- Test Picture

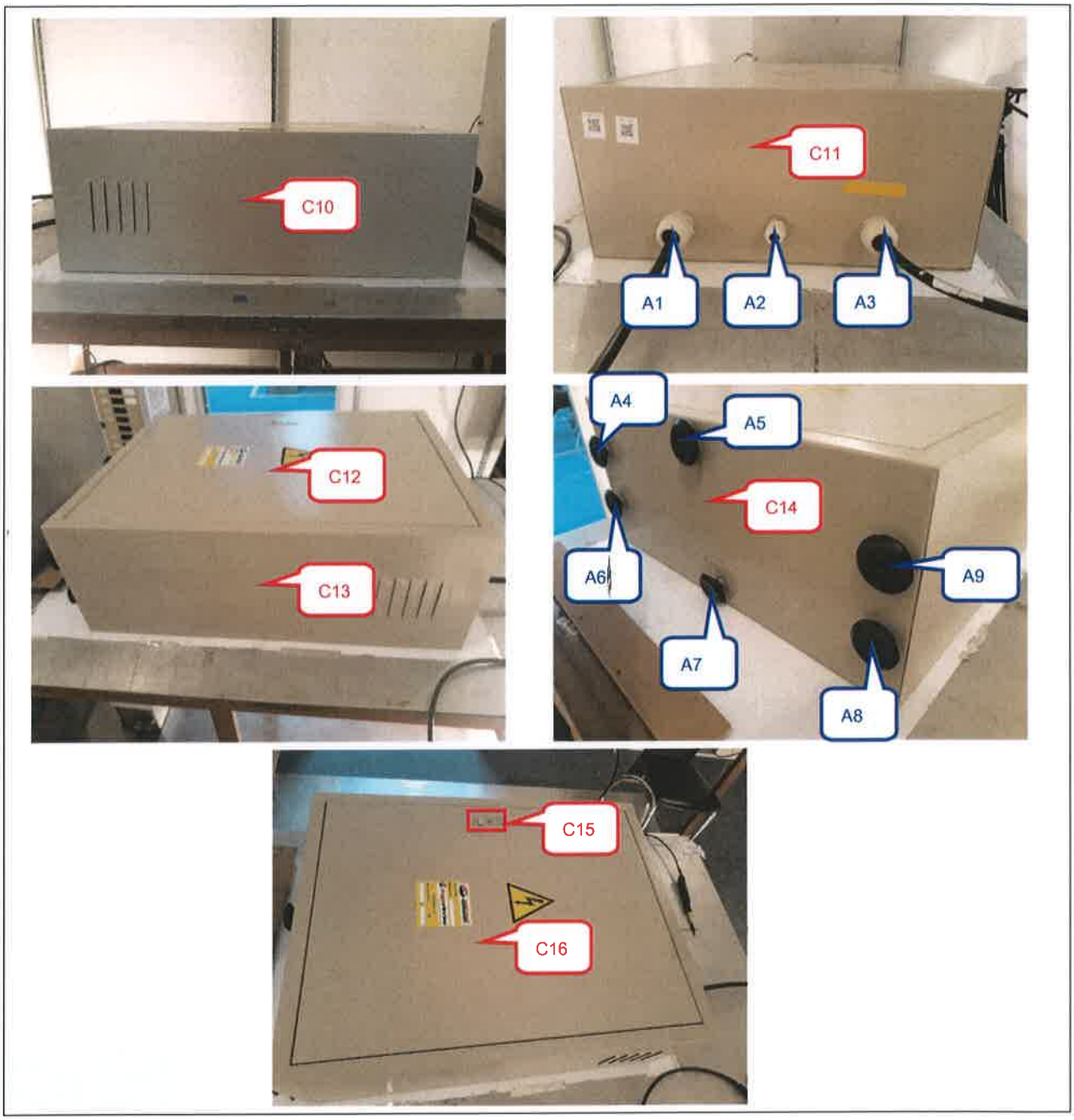


FIGURE 10 - Test points.

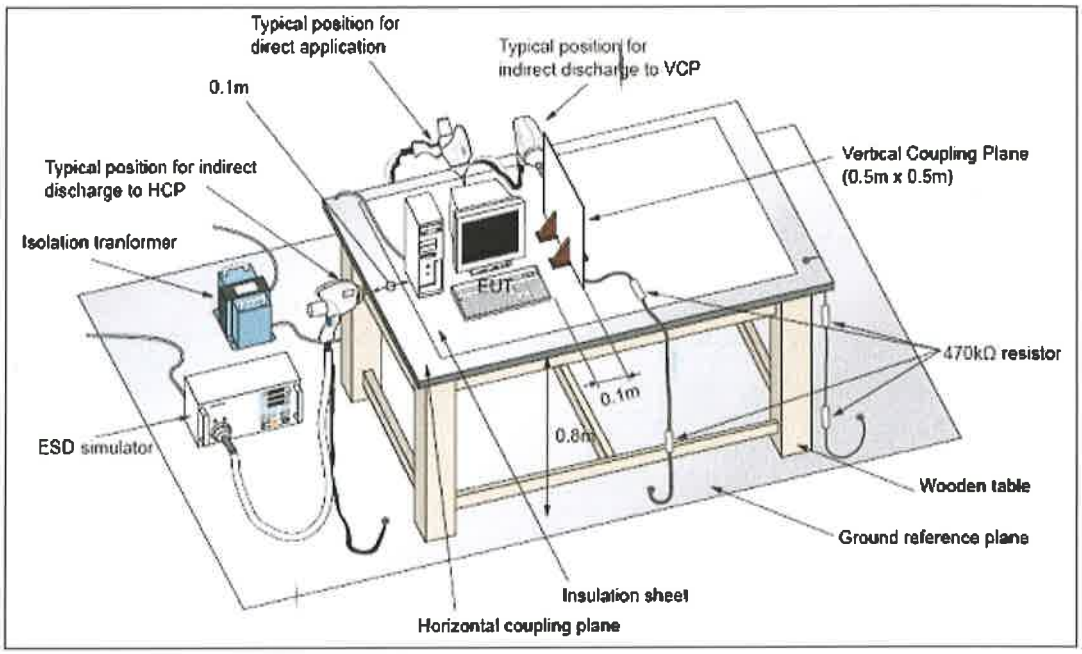


FIGURE 11 - The setup diagram.

FIGURE 12 - The test setup picture.

6.2.3 Test Result

Contact Discharge

Test Point	Operation Mode	Test Execution ESD Test Level (kV) / Number of Discharge (Times)							
		+ 4/10	- 4/10	+ 6/10	- 6/10	+ 8/10	- 8/10	+ 10/10	- 10/10
C10	A	NORM	NORM	-	-	-	-	-	-
C11	A	NORM	NORM	-	-	-	-	-	-
C12	A	NORM	NORM	-	-	-	-	-	-
C13	A	NORM	NORM	-	-	-	-	-	-
C14	A	NORM	NORM	-	-	-	-	-	-
C15	A	NORM	NORM	-	-	-	-	-	-
C16	A	NORM	NORM	-	-	-	-	-	-
VCP	A	NORM	NORM	-	-	-	-	-	-
HCP	A	NORM	NORM	-	-	-	-	-	-

Note: "-" : Not Test "ND" : Not Discharge "NORM" : Normal "AB" : Abnormal

Air Discharge

Test Point	Operation Mode	Test Execution ESD Test Level (kV) / Number of Discharge (Times)							
		+ 4/10	- 4/10	+ 6/10	- 6/10	+ 8/10	- 8/10	+ 10/10	- 10/10
A1	A	-	-	-	-	ND	ND	-	-
A2	A	-	-	-	-	ND	ND	-	-
A3	A	-	-	-	-	ND	ND	-	-
A4	A	-	-	-	-	ND	ND	-	-
A5	A	-	-	-	-	ND	ND	-	-
A6	A	-	-	-	-	ND	ND	-	-
A7	A	-	-	-	-	ND	ND	-	-
A8	A	-	-	-	-	ND	ND	-	-
A9	A	-	-	-	-	ND	ND	-	-

Note: "-" : Not Test "ND" : Not Discharge "NORM" : Normal "AB" : Abnormal

Phenomena Observed/Comments
-

Result: **Pass** Tested by: MR. Piyawit Sripodok

6.6 Test Item: Radiated Immunity

6.6.2 Test Setup

- Test Specification

See 1 and 2.1

- Test Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
RF Generator	TESEQ	ITS6006	37556	NIST	15-05-19
Power Meter	TESEQ	PM6006	74528	NIST	15-05-19
Power Meter	TESEQ	PM6006	74529	NIST	15-05-19
Power Meter	TESEQ	PM6006	74530	NIST	15-05-19
Power Amplifier	TESEQ	CBA1G-275	T44430	NIST	15-05-19
Power Amplifier	TESEQ	CBA3G-100	T44429	NIST	15-05-19
RF immunity testing	TESEQ	AS1860-50	1067826	NIST	15-05-19
Bilog Antenna	AR	ATL80M1G	0343177	NIST	15-05-19
Horn Antenna	AMETEK	AM0.2-2HA	14635	NIST	19-05-19

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- Test Uncertainty: ± 1.78 dB

- Test Location: CHC

- Test Environment

Temperature (°C)	25	Humidity (%)	55

- Test Setup Description

The RF power used in this testing was pre-calibrated according to the IEC61000-4-3:2008 (Ed 3.1). standard. The EUT was placed on the 0.8 m high non-metallic table which located in the Medium Compact Diagnostic Chamber (CHC). The EUT was placed only four sides directly to the antenna. The transmitter antenna was operated in both the vertical and horizontal polarizations.

The EUT was located on the table in the uniform field area. The distance between the transmitter antenna and the outer edge of the EUT was 3 meters. The EUT configurations for radiated immunity testing are shown in FIGURE 13 and 14.

- Test Picture

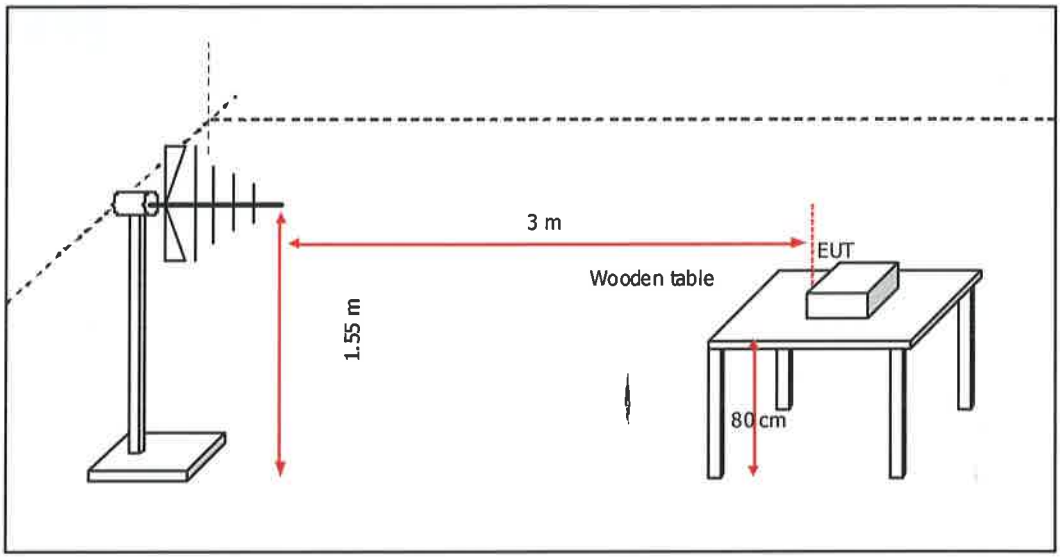


FIGURE 13 - The setup diagram.

FIGURE 14 - The test setup picture.

6.2.4 Test Result

Test Condition 1					
Operation Mode	A (See 3.1)				
Test Level:	10 V/m	Start Frequency:	80 MHz	Stop Frequency:	1000 MHz
Step Size:	1%	Modulation Frequency:	1 KHz	Modulation Type:	AM, 80%
Step mode:	Log	Dwell time	3 Sec	Port:	Enclosure

Side	Polarity	Result
Front	Vertical	NORM
Front	Horizontal	NORM
Right	Vertical	NORM
Right	Horizontal	NORM
Back	Vertical	NORM
Back	Horizontal	NORM
Left	Vertical	NORM
Left	Horizontal	NORM

Note: "-" : Not Test "NORM" : Normal "AB" : Abnormal

Phenomena Observed/Comments
-

Test Condition 2					
Operation Mode	A (See 3.1)				
Test Level:	3 V/m	Start Frequency:	1.4 GHz	Stop Frequency:	2.0 GHz
Step Size:	1%	Modulation Frequency:	1 KHz	Modulation Type:	AM, 80%
Step mode:	Log	Dwell time	3 Sec	Port:	Enclosure

Side	Polarity	Result
Front	Vertical	NORM
Front	Horizontal	NORM
Right	Vertical	NORM
Right	Horizontal	NORM
Back	Vertical	NORM
Back	Horizontal	NORM
Left	Vertical	NORM
Left	Horizontal	NORM

Note: "-" : Not Test "NORM" : Normal "AB" : Abnormal

Phenomena Observed/Comments
-

Test Condition 3					
Operation Mode	A (See 3.1)				
Test Level:	1 V/m	Start Frequency:	2.0 GHz	Stop Frequency:	2.7 GHz
Step Size:	1%	Modulation Frequency:	1 KHz	Modulation Type:	AM, 80%
Step mode:	Log	Dwell time	3 Sec	Port:	Enclosure

Side	Polarity	Result
Front	Vertical	NORM
Front	Horizontal	NORM
Right	Vertical	NORM
Right	Horizontal	NORM
Back	Vertical	NORM
Back	Horizontal	NORM
Left	Vertical	NORM
Left	Horizontal	NORM

Note: "-" : Not Test "NORM" : Normal "AB" : Abnormal

Phenomena Observed/Comments
-

Result: ***Pass***

Tested by: MR. Piyawit Sripodok

6.7 Test Item: Electrical Fast Transient

6.7.1 Test Setup

- Test Specification

See 1 and 2.1

- Test Equipment

Equipment Name	Manufacturer	Model	S/N	Traceability	Due Date
EFT Simulator	TESEQ	NSG 3040/ CDN 3043/ FTM 3425-40	1943/2026/419	NIST	20-11-18
Capacitive Coupling Clamp	TESEQ	CDN 3425	1752	-	-

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- Test Uncertainty: ± 5.03 %

- Test Location: Test area

- Test Environment

Temperature : (°C)	25	Humidity (%)	52

- Test Setup Description

The EUT was arranged and connected to the auxiliary equipment for operating. For the power line testing, the coupling decoupling network (CDN) was used for coupling the EFT signal to the EUT's power line. For the control line testing, the capacitive coupling clamp (CCL) was used for coupling the EFT signal to the EUT's control line. The EUT configuration for the electrical fast transient testing is shown in FIGURE 15 and 16 respectively.

The Electrical Fast Transient Testing Descriptions

Test Line	Voltage	Port	Repetition Rate (kHz)	During Time (Sec/Polarity)	Performance criteria
L-G	± 2 kV	AC	5	120	B
N-G	± 2 kV	AC	5	120	B
PE-G	± 2 kV	AC	5	120	B
L,N,PE-G	± 2 kV	AC	5	120	B

- Test Picture

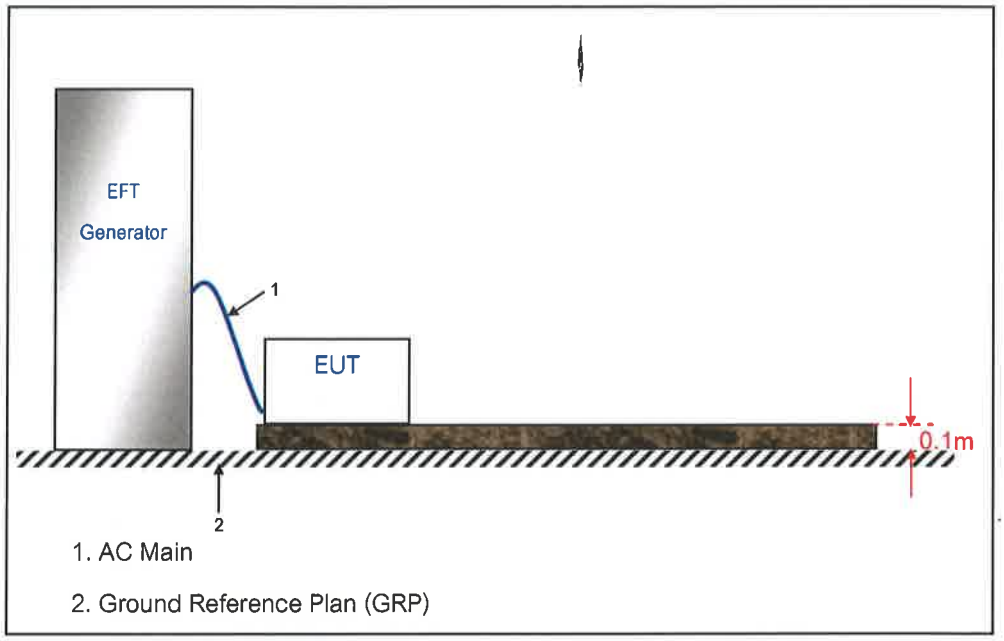


FIGURE 15 - The setup diagram.

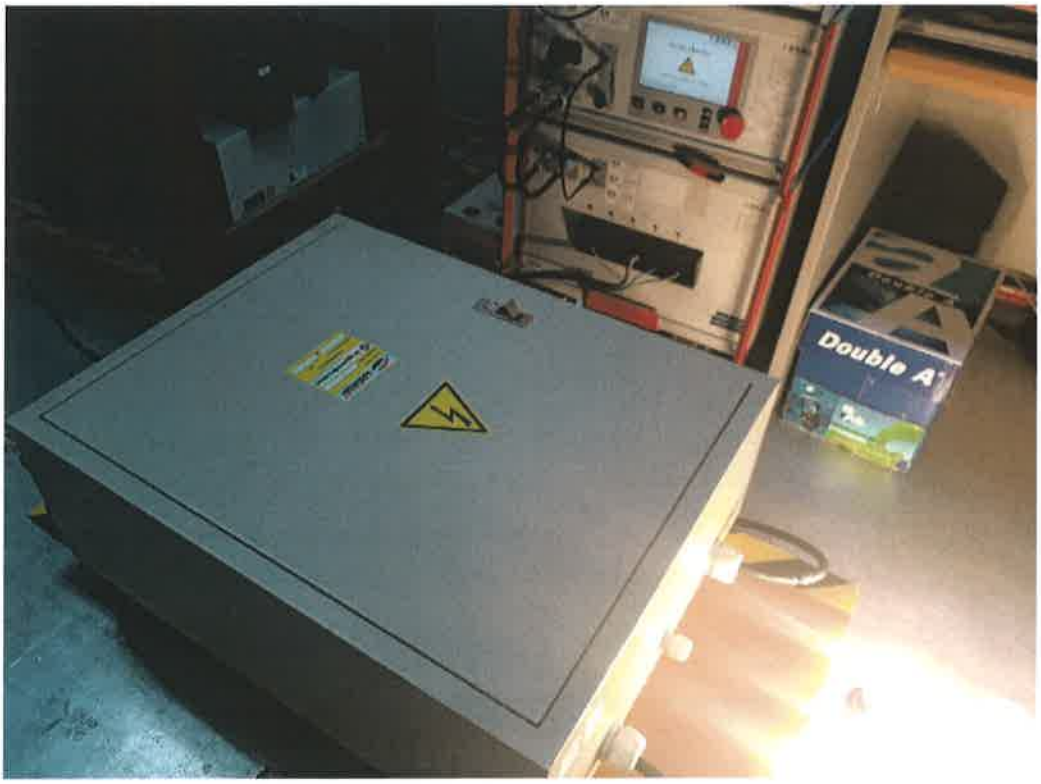


FIGURE 16 - The test setup picture.

6.7.2 Test Result

Test Parameters			
Rise time :	5 ns	Period Time :	300 ms
Impulse Duration :	50 ns	Duration of Burst :	15 ms
Positive Burst :	2 min	Negative Burst :	2 min

Test Line	Voltage (kV)	Port	Repetition Rate (kHz)	During Time (Sec/Polarity)	Result
L-G	± 2 kV	AC	5	120	NORM
N-G	± 2 kV	AC	5	120	NORM
PE-G	± 2 kV	AC	5	120	NORM
L,N,PE-G	± 2 kV	AC	5	120	NORM

Note: "-": Not Test "NORM": Normal "AB": Abnormal

Phenomena Observed/Comments
-

Result: ***Pass***

Tested by: MR. Piyawit Sripodok

6.8 Test Item: Surge

6.10.1 Test Setup

- Test Specification

See 1 and 2.1

- Test Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
Surge Simulator	TESEQ	NSG3040/ CDN 3043/ CWM 3450-40	1943/2026/1093	NIST	20-11-18

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- Test Uncertainty: ± 6.78 %
- Test Location: Test area
- Test Environment

Temperature : (°C)	24	Humidity (%)	52

- Test Setup Description

The EUT was placed on the 10 cm height isolator above the ground reference plane. The EUT was arranged and connected to the auxiliary equipment for operating. The distance from the EUT to the other conductive materials was more than 1 m.

For the Surge testing of the power line, the CDN (coupling decoupling network) was used for coupling the surge to the EUT. The AC power cord between EUT and CDN was 1 m. The EUT configuration for the surge immunity testing is shown in FIGURE 17 and 18 respectively.

Surge Testing Description

Voltage (kV)	Test Point	Port	Number of apply Per polarity	Phase angle	Performance criteria
+ 1	L-L	AC	5	90°	B
- 1	L-L	AC	5	270°	B
+ 2	L-PE	AC	5	90°	B
- 2	L-PE	AC	5	270°	B
+ 2	N-PE	AC	5	90°	B
- 2	N-PE	AC	5	270°	B

● Test Picture

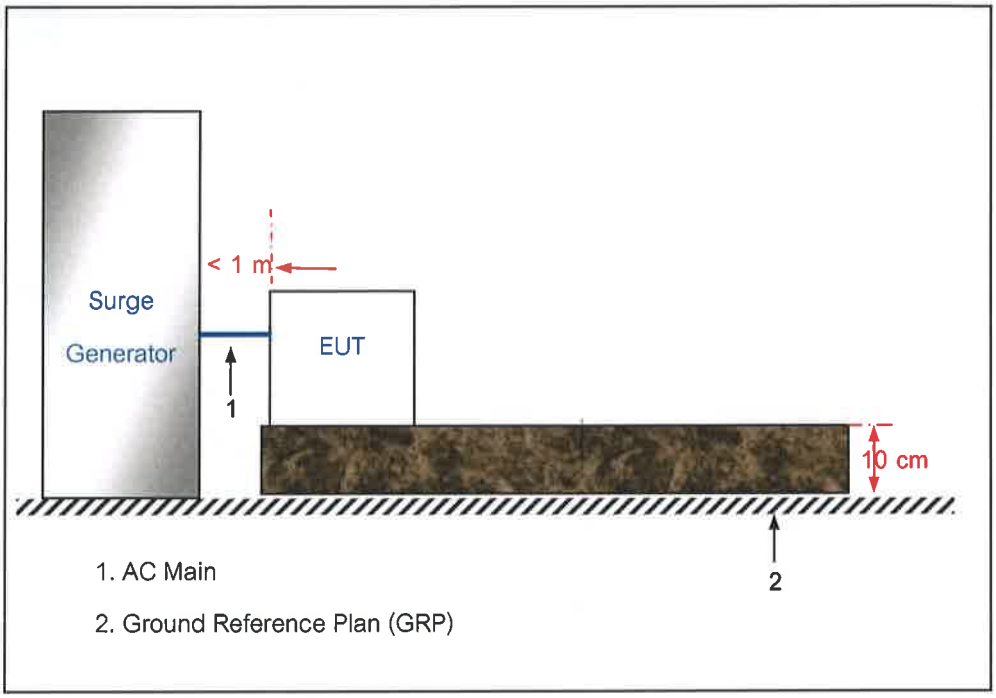


FIGURE 17 - The setup diagram.

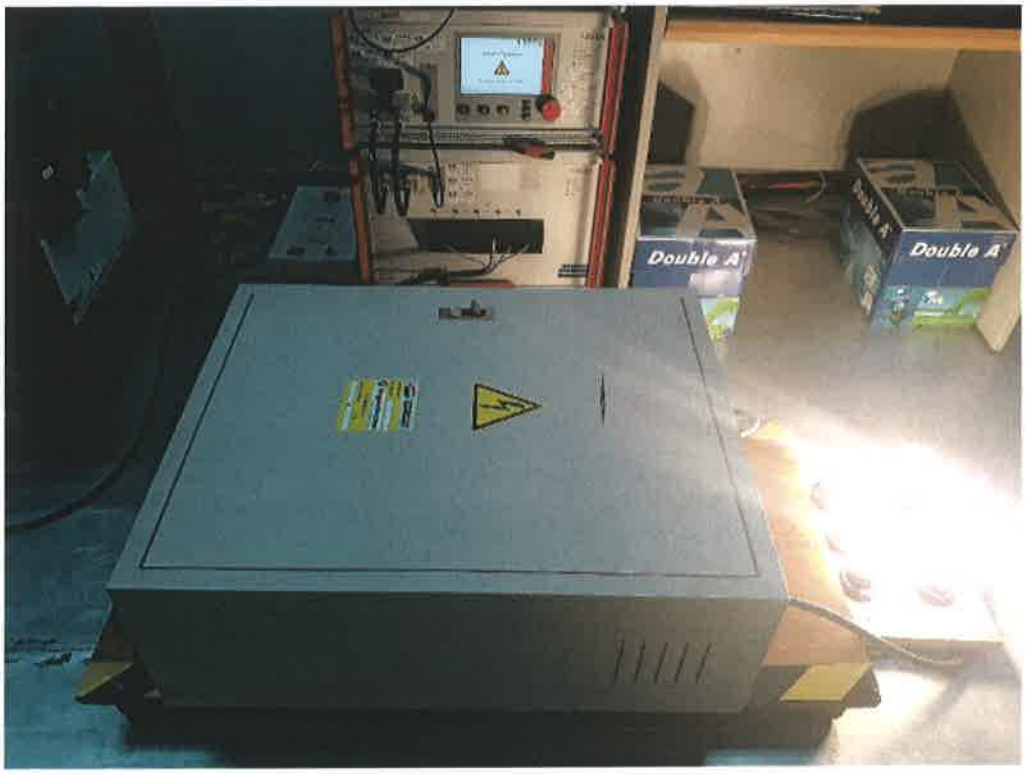


FIGURE 18 - The test setup picture.

6.10.2 Test Result

Test Parameters					
Wave Form:	1.2/50μS	Generator Source Impedance:	2 Ω	Surge Repetition Rate:	1Pulse/min

Coupling Mode	Phase	+ 0.5 kV	- 0.5 kV	+ 1 kV	- 1 kV	+ 2 kV	- 2 kV	+ 4 kV	- 4 kV
L-L	90°	-	-	NORM	-	-	-	-	-
L-L	270°	-	-	-	NORM	-	-	-	-

Note: "-": Not Test "NORM": Normal "AB": Abnormal

Test Parameters					
Wave Form:	1.2/50μS	Generator Source Impedance:	12 Ω	Surge Repetition Rate:	1Pulse/min

Coupling Mode	Phase	+ 0.5 kV	- 0.5 kV	+ 1 kV	- 1 kV	+ 2 kV	- 2 kV	+ 4 kV	- 4 kV
L-PE	90°	-	-	-	-	NORM	-	-	-
L-PE	270°	-	-	-	-	-	NORM	-	-
N-PE	90°	-	-	-	-	NORM	-	-	-
N-PE	270°	-	-	-	-	-	NORM	-	-

Note: "-": Not Test "NORM": Normal "AB": Abnormal

Phenomena Observed/Comments
-

Result: ***Pass***

Tested by: MR. Piyawit Sripodok

6.9 Test Item: Conducted Immunity

6.9.1 Test Setup

- Test Specification

See 1 and 2.1

- Test Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
EM clamp	TESEQ	KEMZ 801AS50	38662	TESEQ	14-05-19
Compact immunity test system	TESEQ	NSG 4070B-30	39604	DKD	04-05-19
Dual directional coupler	TESEQ	DCP 0100A	40093	TESEQ	04-05-19
Power Amplifier	TESEQ	CBA400M-110	T44431	TESEQ	20-05-19
Current injection probe	TESEQ	CIP 9136A	35442	TESEQ	15-05-19
Coupling/Decoupling network	TESEQ	CDN M332S	37751	TESEQ	14-05-19

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- Test Uncertainty: ± 2.09 dB

- Test Location: Test area

- Test Environment

Temperature : (°C)	25	Humidity (%)	52

- Test Setup Description

The EUT was set up according to IEC61000-4-6:2013 (Ed 3.0). The conducted interference signal was connected to the 6 dB attenuator before connected to the CDN and the EM-Clamp for injecting the RF signal to the EUT at the power cord and the signal line respectively. The test setup diagram and the test setup picture are shown in the FIGURE 19 and 20.

● Test Picture

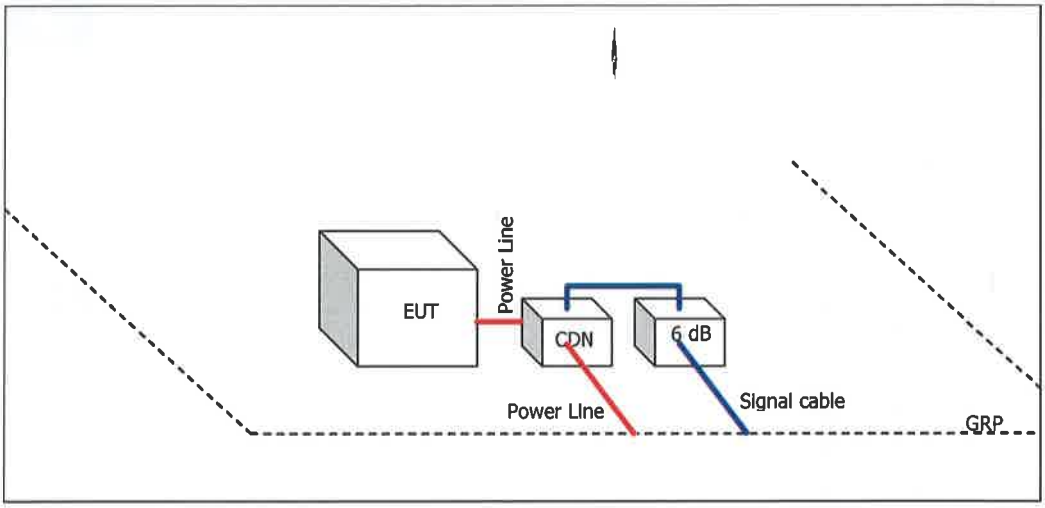


FIGURE 19 - The setup diagram.

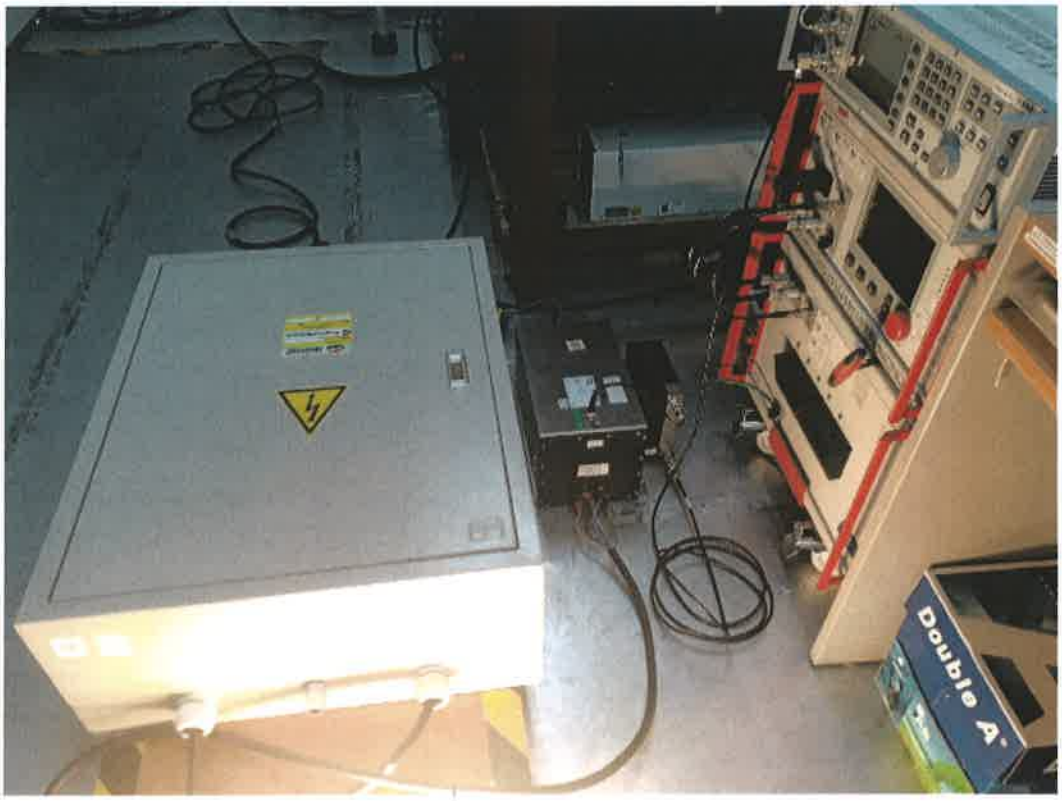


FIGURE 20 - The test setup picture.

6.9.2 Test Result

Test port	Test level	Frequency	Step frequency	Modulation	Dwell time	Result
AC Power Line	10 V	150 KHz-80 MHz	1% Log	AM 80% with 1kHz	3 Sec	NORM

Note: "-": Not Test "NORM": Normal "AB": Abnormal

Phenomena Observed/Comments
-

Result: ***Pass***

Tested by: MR. Poomares Pomsri

6.10 Test Item: Power Frequency Magnetic

6.10.1 Test Setup

- Test Specification

See 1 and 2.1

- Test Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
Induction Coil Interface	TESEQ	INA2141	1423	UKAS	06-02-19
Induction Coil	TESEQ	INA703	1987	UKAS	06-02-19

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- Test Uncertainty: ±1.15 %

- Test Location: Test area

- Test Environment

Temperature (°C)	25	Humidity (%)	54

- Test Setup Description

The power frequency magnetic field was tested according to the immersion method of EN61000-4-8:2009 (Ed 2.0).

The induction coil was rotated by 90° in order to expose the EUT to the test field with different orientations.

The EUT was placed on the reference ground plane is shown in the FIGURE 21 and 22.

- Test Picture

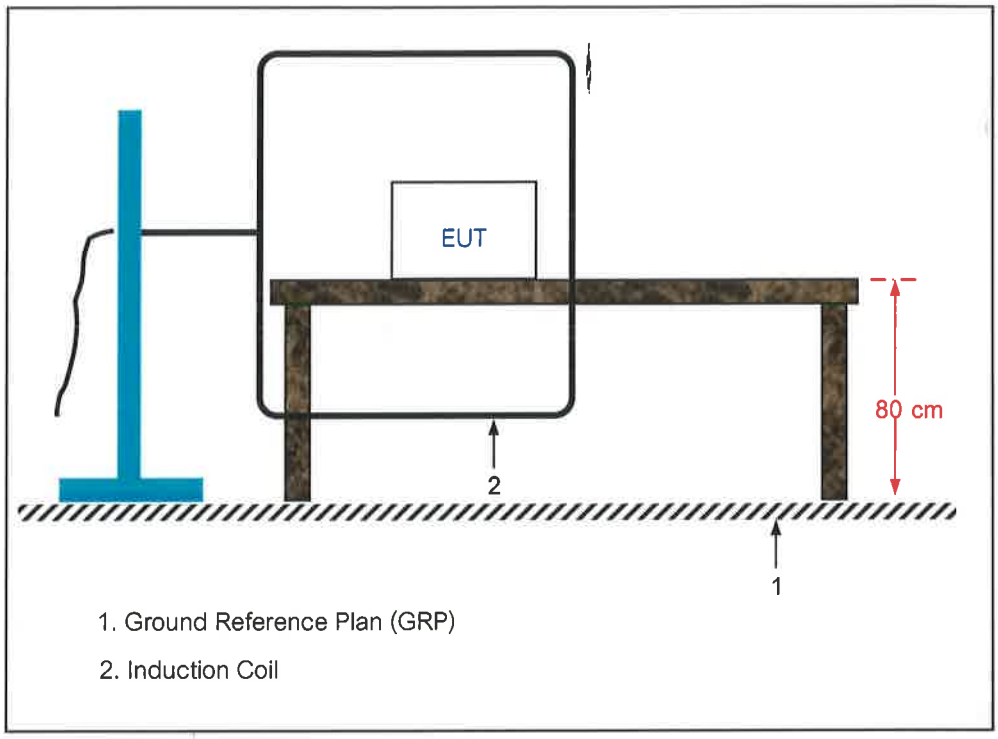


FIGURE 21 - The setup diagram.

FIGURE 22 - The test setup picture.

- Test Result

Magnetic Field (A/m)	Axis	Result
30 A/m	X,Y,Z	NORM

Note: "-" : Not Test "NORM" : Normal "AB" : Abnormal

Phenomena Observed/Comments
-

Result: ***Pass***

Tested by: MR. Piyawit Sripodok

6.11 Test Item: Voltage Dips

6.11.1 Test Setup

- Test Specification

  See 1 and 2.1

- Test Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
PQF Simulator	TESEQ	NSG 3041/ PQM 3403/ INA 6501	1943/1035/223	NIST	20-11-18

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Due date
-	-	-	-	-	-

- Test Uncertainty: ± 3.17%

- Test Location: Test area

- Test Environment

Temperature : (°C)	24	Humidity (%)	54

- Test Setup Description

The power cord of the EUT was connected to the voltage dip and the interruption generator. The EUT was arranged and connected to the auxiliary equipment for operating.

The EUT configuration for the voltage dip and the short interruption testing are shown in FIGURE 23 and 24 respectively.

The voltage dip and the interruption testing descriptions

Phenomena	Test Level in% (ut)	Cycle	Phase angle	Performance criteria
Interruption	0	1	0°	C
Interruption	0	250	0°	C
V. Dip	40	10	0°	C
V. Dip	70	25	0°	C

- Test Picture

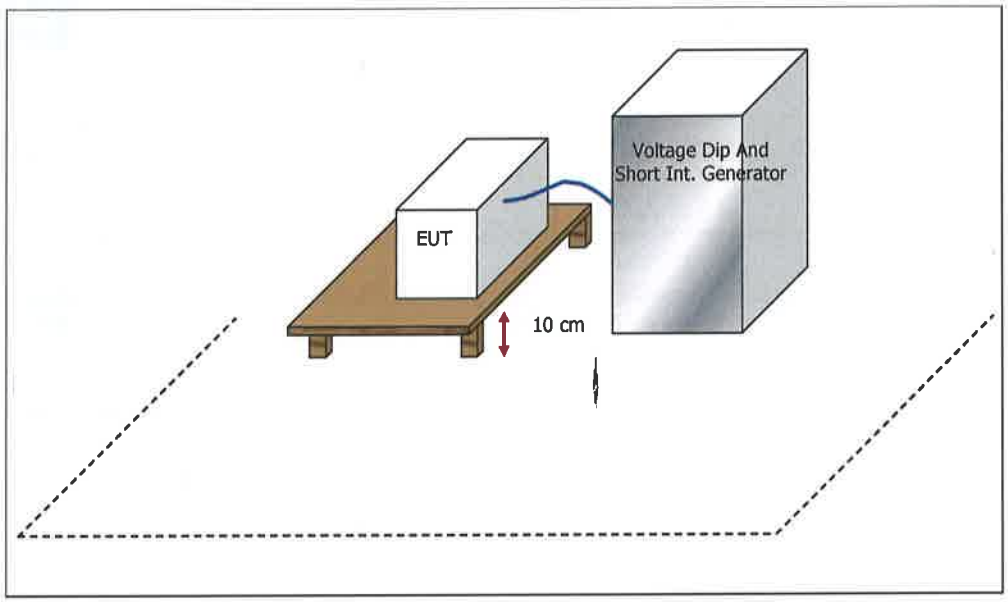


FIGURE 23 - The setup diagram.

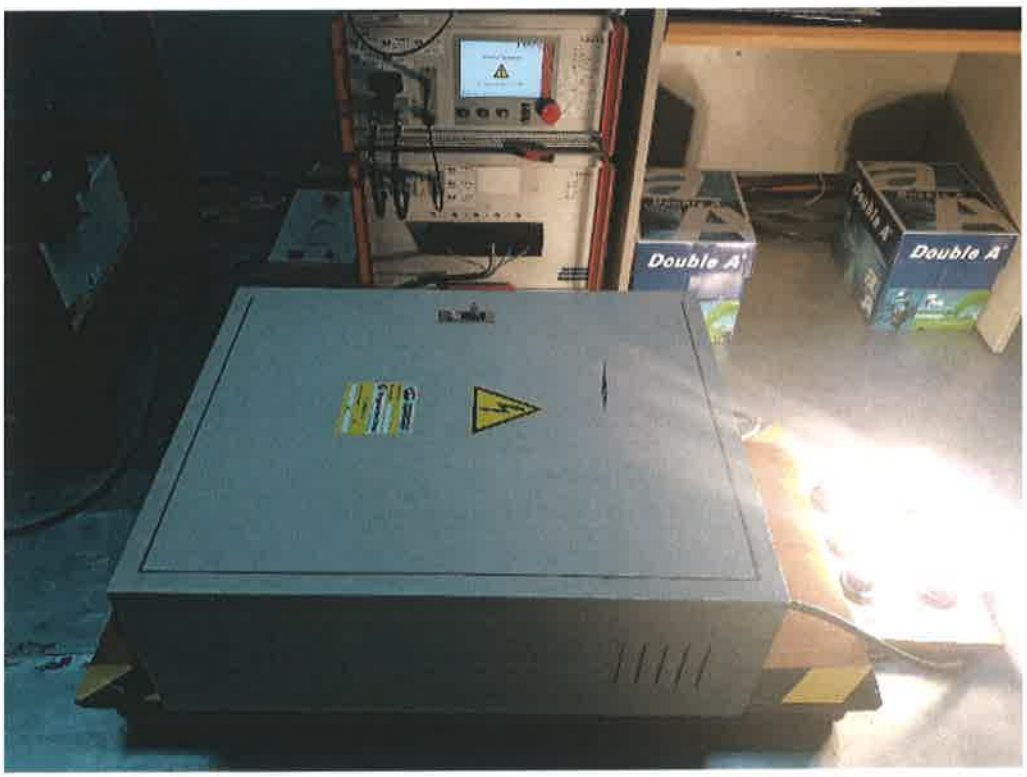


FIGURE 24 - The test setup picture.

6.11.2 Test Result

Test Phenomena	Number of Test	I/P Voltage / Frequency	Test Level in% (ut)	Phase angle (°)	Cycle	Result
Interruption	3	380 V /50Hz	0	0°	1	NORM
Interruption	3	380 V / 50Hz	0	0°	250	NORM
V. Dip	3	380 V/ 50Hz	40	0°	10	NORM
V. Dip	3	380 V/ 50Hz	70	0°	25	NORM

Note: "-" : Not Test "NORM" : Normal "AB" : Abnormal

Phenomena Observed/Comments
-

Result: ***Pass***

Tested by: MR. Piyawit Sripodok

---------- End of Report ----------