



TEST REPORT

FOR

DC to DC Converter

MODEL : TMR 4-2411, TMR 4-2423WI

SERIES MODEL : Refer to item 5.1 for more details

REPORT NUMBER: 5402532.1340137B-EN-E0-V0

ISSUE DATE: Apr. 12, 2021

Prepared for

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Testing Laboratory

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	Apr. 12, 2021	Initial Issue	Sally Lu

Summary of Test Results				
EMISSION				
Standard	Test Item	Limit	Result	Remark
EN 55032:2015 +AC:2016	Conducted disturbance at mains terminals ports	Class A	PASS	N/A (Note 4)
	Conducted common mode (asymmetric mode) disturbance telecommunication ports	Class A	N/A	(Note 1)
	Radiated disturbance below 1GHz	Class A	PASS	N/A (Note 4)
	Radiated disturbance above 1 GHz	Class A	N/A	(Note 2)
EN 61000-3-2 : 2014	Harmonic current disturbance	Class A	N/A	(Note 3)
EN 61000-3-3 : 2013	Voltage Fluctuations & Flicker	Refer to 6.5.1	N/A	(Note 3)

Note 1: Since the EUT does not contain asymmetric port, the test is unnecessary.

Note 2: Since the highest frequency of EUT is less than 108 MHz, the measurement above 1 GHz is unnecessary.

Note 3: Since the EUT does not connect to mains power network directly, the test is unnecessary.

Note 4: Please refer to original report no.: 4789451449B-EN-E0-V0.

Summary of Test Results (EN 55024)					
IMMUNITY					
Basic Standard	Test Item	Class / Severity	Require Performance Criteria	Result	Remark
IEC 61000-4-2: 2008 EN 61000-4-2: 2009	Electrostatic discharge immunity	Contact ±4 kV Air ±8 kV	B	PASS	(Note 7)
IEC 61000-4-3: 2006+ A1: 2007+A2: 2010 EN 61000-4-3: 2006+ A1: 2008+A2: 2010	Radiated, radio frequency electromagnetic field immunity	3V/m 80%, 1kHz, AM	A	PASS	
IEC 61000-4-4: 2012 EN 61000-4-4: 2012	Electrical fast transient/burst immunity	1kV(AC Mains) 5/50ns, 5kHz	B	N/A (Note 4)	
		0.5kV(DC port) 5/50ns, 5kHz	B	PASS (Note 6)	
		0.5kV(Signal Lines) 5/50ns, 5kHz or 100kHz (Note 3)	B	N/A (Note 5)	
IEC 61000-4-5: 2014 + A1: 2017 EN 61000-4-5: 2014	Surge immunity	AC Mains 2.0kV(Common) 1.0kV(Differential) 1.2/50us	B	N/A (Note 4)	
		DC power port 0.5kV Line to ground 1.2/50us	B	PASS (Note 6)	
		Signal port 1.0kV(w/o primary protector) 4.0kV(w primary protector) 1.2/50us or 10/700us (Note 1)	C	N/A (Note 5)	
IEC 61000-4-6: 2013+ COR1: 2015 EN 61000-4-6: 2014 + AC: 2015	Immunity to conducted disturbances, induced by radio-frequency fields	AC Mains 3V (e.m.f), 80%, 1kHz Amp. Mod. (Note 2)	A	N/A (Note 4)	
		DC power port 3V (e.m.f), 80%, 1kHz Amp. Mod (Note 2)	A	PASS	
		Signal line 3V (e.m.f), 80%, 1kHz Amp. Mod. (Note 2)	A	N/A (Note 5)	
IEC 61000-4-8: 2009 EN 61000-4-8: 2010	Power frequency magnetic field immunity	50Hz, 1A/m(r.m.s)	A	PASS	

Summary of Test Results (EN 55024)					
IMMUNITY					
Basic Standard	Test Item	Class / Severity	Require Performance Criteria	Result	Remark
IEC 61000-4-11: 2014+ A1:2017 EN 61000-4-11: 2004	Voltage dips, short interruptions and voltage variations immunity	Voltage dips, >95% reduction with 0.5 period	B	N/A (Note 4)	(Note 7)
		Voltage dips, 30% reduction with 25 periods	C		
		Voltage interruptions >95% reduction with 250 periods	C		

Note 1: Where the coupling network for the 10/700 μs waveform affects the functioning of high speed data ports, the test shall be carried out using a 1,2/50 (8/20) μs waveform and appropriate coupling network.

Note 2: The frequency range is scanned as specified. However, when specified in EN 55024 Annex A, an additional comprehensive functional test shall be carried out at a limited number of frequencies. The selected frequencies for conducted tests are: 0,2; 1; 7,1; 13,56; 21; 27,12 and 40,68 MHz (±1 %).

Note 3: For xDSL equipment, the repetition frequency for EFT testing shall be 100 kHz .

Note 4: Since the EUT does not connect to mains power network directly, the test is unnecessary.

Note 5: Since the EUT does not contain signal port, the test is unnecessary.

Note 6: Customers add countermeasure components to the fixture board. For the corresponding components, please refer to the appendix III.

Note 7: Please refer to original report no.: 4789451449B-EN-E0-V0.

Summary of Test Results (EN 55035)					
IMMUNITY					
Basic Standard	Test Item	Class / Severity	Require Performance Criteria	Result	Remark
IEC 61000-4-2: 2008 EN 61000-4-2: 2009	Electrostatic discharge immunity	Contact ±4 kV Air ±8 kV	B	PASS	(Note 7)
IEC 61000-4-3: 2006+ A1: 2007+A2: 2010 EN 61000-4-3: 2006+ A1: 2008+A2: 2010	Continuous RF electromagnetic field disturbances, swept test	80-1000MHz 3V/m 80%, 1kHz, AM	A	PASS	
	Continuous RF electromagnetic field disturbances, spot test	1800 ;2600 ;3500 5000 MHz (±1%) 3V/m 80%, 1kHz, AM (Note 2)	A	PASS	
	immunity levels to common wireless communication devices	Refer to Table I.1	A	PASS	
IEC 61000-4-4: 2012 EN 61000-4-4: 2012	Electrical fast transient/burst immunity	1kV(AC Mains) 5/50ns, 5kHz	B	N/A (Note 4)	
		0.5kV(DC power port) 5/50ns, 5kHz	B	PASS (Note 6)	
		0.5kV(Signal Lines) 5/50ns, 5kHz or 100kHz (Note 3)	B	N/A (Note 5)	
IEC 61000-4-5: 2014 + A1: 2017 EN 61000-4-5: 2014	Surge immunity	AC Mains 2.0kV(Common) 1.0kV(Differential) 1.2/50us	B	N/A (Note 4)	
		DC power port 0.5kV Line to ground 1.2/50us	B	PASS (Note 6)	
		Signal port 1.0kV (w/o primary protector) 4.0kV (w primary protector) 1.2/50us or 10/700us 0.5kV Coaxial or shielded to ground 1.2/50 (8/20) us (Note 1)	C	N/A (Note 5)	

Summary of Test Results (EN 55035)					
IMMUNITY					
Basic Standard	Test Item	Class / Severity	Require Performance Criteria	Result	Remark
IEC 61000-4-6: 2013+ COR1: 2015 EN 61000-4-6: 2014 + AC: 2015	Continuous induced RF disturbances	AC Mains 0.15~10MHz, 3V 10~30MHz, 3~1V 30-80MHz, 1V with 1kHz 80% AM (Note 2)	A	N/A (Note 4)	(Note 7)
		DC Ports 0.15~10MHz, 3V 10~30MHz, 3~1V 30-80MHz, 1V with 1kHz 80% AM (Note 2)	A	PASS	
		Signal Line 0.15~10MHz, 3V 10~30MHz, 3~1V 30-80MHz, 1V with 1kHz 80% AM (Note 2)	A	N/A (Note 5)	
IEC 61000-4-8: 2009 EN 61000-4-8: 2010	Power frequency magnetic field immunity	50 Hz, 1 A/m(r.m.s)	A	PASS	
IEC 61000-4-11: 2014+ A1:2017 EN 61000-4-11: 2004	Voltage dips, short interruptions and voltage variations immunity	Voltage dips, >5% residual with 0.5cycles	B	N/A (Note 4)	
		Voltage dips, 70% residual with 25 cycles	C		
		Voltage interruptions, >5% residual with 250 cycles	C		

Note 1: Where the coupling network for the 10/700 μ s waveform affects the functioning of high speed data ports, the test shall be carried out using a 1,2/50 (8/20) μ s waveform and appropriate coupling network.

Note 2: The frequency range is scanned as specified. However, when specified in EN 55035, an additional EUT contains telephony functional test shall be carried out at a limited number of frequencies. The selected frequencies for conducted immunity tests are: 0,2; 1; 7,1; 13,56; 21; 27,12 and 40,68 MHz (± 1 %) and radiated immunity tests are 80; 120; 160; 230; 434; 460; 600; 863 and 900MHz (± 1 %).

Note 3: For xDSL equipment, the repetition frequency for EFT testing shall be 100 kHz.

Note 4: Since the EUT does not connect to mains power network directly, the test is unnecessary.

Note 5: Since the EUT does not contain signal port, the test is unnecessary.

Note 6: Customers add countermeasure components to the fixture board. For the corresponding components, please refer to the appendix III.

Note 7: Please refer to original report no.: 4789451449B-EN-E0-V0.

Table I.1 – Guidance on the selection of immunity levels to common wireless communication devices

Table clause	Approximate protection distance (m)	Calculated RF field strength in V/m for frequencies and protection distances simulating different radio transmission types, assuming a given ERP						
		LTE/UMTS (0,2 W)	GSM		WiMAX/3 G (1,26 W)	WiMAX (1,26 W)	Wi-Fi (1 W)	Maximum RF field strength at any frequency
			(2 W)	(1 W)				
		800 MHz	900 MHz	1,8 GHz	2,6 GHz	3,5 GHz	5 GHz	
I.1.1	3,0	0,6	1,8	1,3	1,5	1,5	1,3	3
I.1.2	1,5	1,2	3,7	2,6	2,9	2,9	2,6	4
I.1.3	1,0	1,7	5,5	3,9	4,4	4,4	3,9	6
I.1.4	0,5	3,3	10,5	10,5	11,8	11,8	10,5	12
I.1.5	0,2	8,3	26,4	26,4	29,6	29,6	26,4	30

The protection distance is not the test distance as defined in IEC 61000-4-3:2006/AMD1:2007/AMD2:2010, but the shortest expected operating distance between the EUT and the interfering wireless communication device at which the immunity performance criteria will be satisfied.

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: TRACO ELECTRONIC AG
SIHLBRUGGSTRASSE 111 CH-6340 BAAR, SWITZERLAND

EUT DESCRIPTION: DC to DC Converter

MODEL: TMR 4-2411, TMR 4-2423WI

SERIES MODEL : Refer to item 5.1 for more details

DATE of TESTED: May 5, 2020 ~ Dec. 9, 2020
(Refer to report no. 4789451449B-EN-E0-V0.)

APPLICABLE STANDARDS	
STANDARDS	TEST RESULTS
EN 55032: 2015+AC: 2016 EN 55024: 2010+A1: 2015 EN 55035: 2017	PASS

Underwriters Laboratories Taiwan Co., Ltd. Tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. Based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

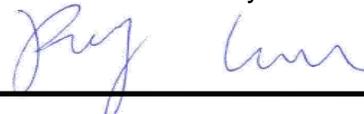
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. And all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. Will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:



Sally Lu Date : Apr. 12, 2021
Project Handler

Approved and Authorized By:



Roy Chen Date : Apr. 12, 2021
Operations Manager

2. TEST METHODOLOGY

All tests were performed in accordance with the procedures documented EN 55032, EN 55024, EN55035.

3. FACILITIES AND ACCREDITATION

Test Location	Underwriters Laboratories Taiwan Co., Ltd.,
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Description	All measurement facilities use to collect the measurement data are located at Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

4. CALIBRATION AND UNCERTAINTY

4.1. Measuring Instrument Calibration

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.

Electromagnetic interference:

Test Item	Measurement Frequency Range	K	U(dB)
Conducted disturbance at mains terminals ports	0.15MHz ~ 30MHz	2	1.5
966-1 Test Site			
Radiated disturbance below 1 GHz	30MHz ~ 1000MHz	2	5.2

Electromagnetic sensitivity:

Test Item	Measurement Frequency Range	K	U(dB)
Radiated, radio frequency electromagnetic field immunity	80MHz ~ 1000MHz	2	1.9
Immunity to conducted disturbances, induced by radio-frequency fields (CDN)	0.15MHz ~ 80MHz	2	2.4

Test Item	K	Voltage(%)	Rise Time(%)	First Peak Current (%)	Current @ 30ns (%)	Current @ 60ns (%)
Electrostatic discharge immunity	2	2.6	6.9	3.9	4.0	4.0

Test Item	K	Peak Voltage(%)	Rise Time(%)	Pulse width(%)	Burst duration & Period (%)	Repetition rate (%)
Electrical fast transient/burst immunity	2	1.0	2.4	5.1	0.74	0.22

Test Item	K	Phase Shifting (%)	Voltage (%)	Current (%)	Front Time & Duration(For waveform of the surge voltage)(%)	Front Time & Duration(For waveform of the surge current)(%)
Surge immunity	2	0.31	3.6	2.7	1.5	5.9

For test date: May 8, 2020

Test Item	K	Magnetic field Strength(%)	Current (mA/A)
Power Frequency Magnetic Field Immunity Test	2	1.0	31

For test date: Dec. 9, 2020

Test Item	K	Magnetic field Strength(%)
Power Frequency Magnetic Field Immunity Test	2	10.0

5. EQUIPMENT UNDER TEST

5.1. Description of EUT

EUT Name :	DC to DC Converter
Model:	TMR 4-2411, TMR 4-2423WI
Series Model:	TMR 4-1211, TMR 4-1212, TMR 4-1213, TMR 4-1215, TMR 4-1222, TMR 4-1223, TMR 4-2412, TMR 4-2413, TMR 4-2415, TMR 4-2422, TMR 4-2423, TMR 4-4811, TMR 4-4812, TMR 4-4813, TMR 4-4815, TMR 4-4822, TMR 4-4823, TMR 4-2411WI, TMR 4-2412WI, TMR 4-2413WI, TMR 4-2415WI, TMR 4-2422WI, TMR 4-4811WI, TMR 4-4812WI, TMR 4-4813WI, TMR 4-4815WI, TMR 4-4822WI, TMR 4-4823WI
Power Rating:	12Vdc from DC source 24Vdc from DC source 48Vdc from DC source
Highest Frequency within EUT:	Less than 108MHz
Condition of EUT:	Production Unit
Date Of Receipt Of Sample:	Apr. 23, 2020

Note :

1. This report was issued refer to original report which report number is 4789451449B-EN-E0-V0. This report was added test data of PFMF for customer request, For other test data, copied from original report 4789451449B-EN-E0-V0.

2. The models difference table as below:

Model Selection Guide (TMR 04 SERIES)		
Model Number	Input Voltage (Range)	Output Voltage
Standard	VDC	VDC
TMR 4-1211	12 (9 ~ 18)	5
TMR 4-1212		12
TMR 4-1213		15
TMR 4-1215		24
TMR 4-1222		±12
TMR 4-1223		±15
TMR 4-2411	24 (18 ~ 36)	5
TMR 4-2412		12
TMR 4-2413		15
TMR 4-2415		24
TMR 4-2422		±12
TMR 4-2423		±15
TMR 4-4811	48 (36 ~ 75)	5
TMR 4-4812		12
TMR 4-4813		15
TMR 4-4815		24
TMR 4-4822		±12
TMR 4-4823		±15

For each output

Model Selection Guide (TMR 04WI SERIES)		
Model Number	Input Voltage (Range)	Output Voltage
Standard	VDC	VDC
TMR 4-2411WI	24 (18 ~ 36)	5
TMR 4-2412WI		12
TMR 4-2413WI		15
TMR 4-2415WI		24
TMR 4-2422WI		±12
TMR 4-2423WI		±15
TMR 4-4811WI	48 (36 ~ 75)	5
TMR 4-4812WI		12
TMR 4-4813WI		15
TMR 4-4815WI		24
TMR 4-4822WI		±12
TMR 4-4823WI		±15

For each output

Note: Customer only provided model number TMR 4-1223, TMR 4-1211, TMR 4-2411, TMR 4-4811, TMR 4-4823, TMR 4-2423WI, TMR 4-4823WI, TMR 4-2412WI, TMR 4-2411WI, TMR 4-4811WI for the pretest and used worst mode do the final test.

5.2. Test Mode

The Pre-test modes :

Mode	Description	Conducted Emission	Radiated Emission
Mode 1	Full Load (TMR 4-1223)	v	v
Mode 2	Full Load (TMR 4-1211)	v	v
Mode 3	Full Load (TMR 4-2411)	v	v
Mode 4	Full Load (TMR 4-4811)	v	v
Mode 5	Full Load (TMR 4-4823)	v	v
Mode 6	Full Load (TMR 4-2423WI)	v	v
Mode 7	Full Load (TMR 4-4823WI)	v	v
Mode 8	Full Load (TMR 4-2412WI)	v	v
Mode 9	Full Load (TMR 4-2411WI)	v	v
Mode 10	Full Load (TMR 4-4811WI)	v	v

After pre-testing, the final test mode was displayed as below table.

Test Items		Test Mode
Emission	Conducted Emission	Mode 3、6
	Radiated Emission	Mode 3、6
Immunity	Electrostatic Discharge	Mode 3、6
	Radio Frequency Electromagnetic Field	Mode 3、6
	Electrical Fast Transients	Mode 1~10
	Surge immunity	Mode 1~10
	Conducted disturbances immunity	Mode 3、6
	Power frequency magnetic field	Mode 3、6

Note: The customer requires that the mode 1~2, 4~5, 7~10 test the EFT and surge .

5.3. EUT Operation Test Setup

For Conducted Emission & Radiated Emission test : (Mode 1)

- a. The EUT (TMR 4-1223) was linked to resistance load with full load during the testing.
- b. Power on the EUT and run test.

For Immunity test : (Mode 1)

- a. The EUT (TMR 4-1223) was linked to resistance load with full load and the resistance load was connected with a meter during the testing.
- b. Power on the EUT and run test.

For Conducted Emission & Radiated Emission test : (Mode 2)

- a. The EUT (TMR 4-1211) was linked to resistance load with full load during the testing.
- b. Power on the EUT and run test.

For Immunity test : (Mode 2)

- a. The EUT (TMR 4-1211) was linked to resistance load with full load and the resistance load was connected with a meter during the testing.
- b. Power on the EUT and run test.

For Conducted Emission & Radiated Emission test : (Mode 3)

- a. The EUT (TMR 4-2411) was linked to resistance load with full load during the testing.
- b. Power on the EUT and run test.

For Immunity test : (Mode 3)

- a. The EUT (TMR 4-2411) was linked to resistance load with full load and the resistance load was connected with a meter during the testing.
- b. Power on the EUT and run test.

For Conducted Emission & Radiated Emission test : (Mode 4)

- a. The EUT (TMR 4-4811) was linked to resistance load with full load during the testing.
- b. Power on the EUT and run test.

For Immunity test : (Mode 4)

- a. The EUT (TMR 4-4811) was linked to resistance load with full load and the resistance load was connected with a meter during the testing.
- b. Power on the EUT and run test.

For Conducted Emission & Radiated Emission test : (Mode 5)

- a. The EUT (TMR 4-4823) was linked to resistance load with full load during the testing.
- b. Power on the EUT and run test.

For Immunity test : (Mode 5)

- a. The EUT (TMR 4-4823) was linked to resistance load with full load and the resistance load was connected with a meter during the testing.
- b. Power on the EUT and run test.

For Conducted Emission & Radiated Emission test : (Mode 6)

- a. The EUT (TMR 4-2423WI) was linked to resistance load with full load during the testing.
- b. Power on the EUT and run test.

For Immunity test : (Mode 6)

- a. The EUT (TMR 4-2423WI) was linked to resistance load with full load and the resistance load was connected with a meter during the testing.
- b. Power on the EUT and run test.

For Conducted Emission & Radiated Emission test : (Mode 7)

- a. The EUT (TMR 4-4823WI) was linked to resistance load with full load during the testing.
- b. Power on the EUT and run test.

For Immunity test : (Mode 7)

- a. The EUT (TMR 4-4823WI) was linked to resistance load with full load and the resistance load was connected with a meter during the testing.
- b. Power on the EUT and run test.

For Conducted Emission & Radiated Emission test : (Mode 8)

- a. The EUT (TMR 4-2412WI) was linked to resistance load with full load during the testing.
- b. Power on the EUT and run test.

For Immunity test : (Mode 8)

- a. The EUT (TMR 4-2412WI) was linked to resistance load with full load and the resistance load was connected with a meter during the testing.
- b. Power on the EUT and run test.

For Conducted Emission & Radiated Emission test : (Mode 9)

- a. The EUT (TMR 4-2411WI) was linked to resistance load with full load during the testing.
- b. Power on the EUT and run test.

For Immunity test : (Mode 9)

- a. The EUT (TMR 4-2411WI) was linked to resistance load with full load and the resistance load was connected with a meter during the testing.
- b. Power on the EUT and run test.

For Conducted Emission & Radiated Emission test : (Mode 10)

- a. The EUT (TMR 4-4811WI) was linked to resistance load with full load during the testing.
- b. Power on the EUT and run test.

For Immunity test : (Mode 10)

- a. The EUT (TMR 4-4811WI) was linked to resistance load with full load and the resistance load was connected with a meter during the testing.
- b. Power on the EUT and run test.

5.4. Monitoring of EUT for All Immunity Test

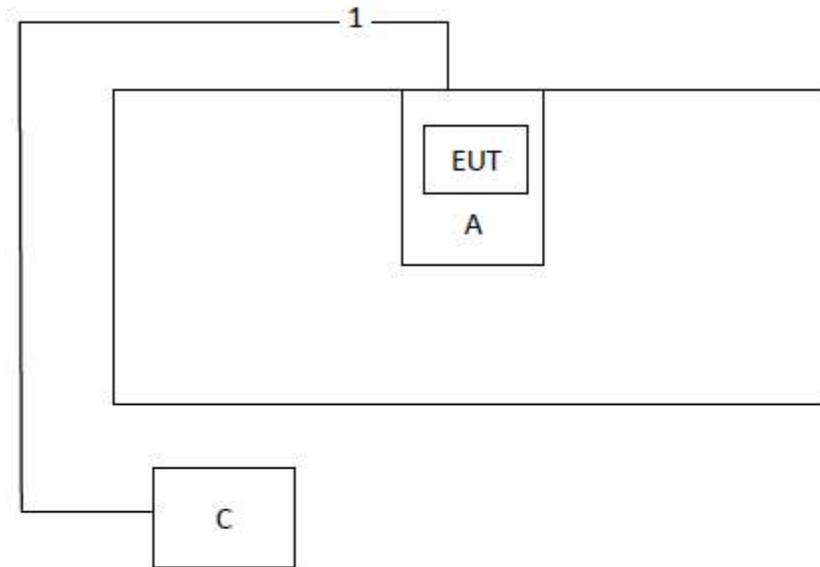
Audio	N/A
Visual	Monitor the output voltage through the meter.

5.5. Accessory

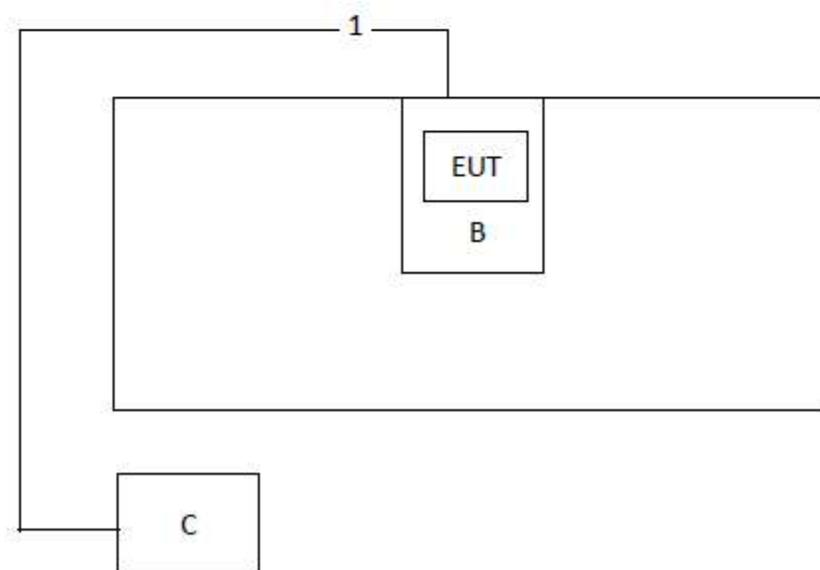
Item	Accessory	Brand Name	Model Name	Note
-	N/A	N/A	N/A	N/A

5.6. Block diagram showing the configuration of system tested

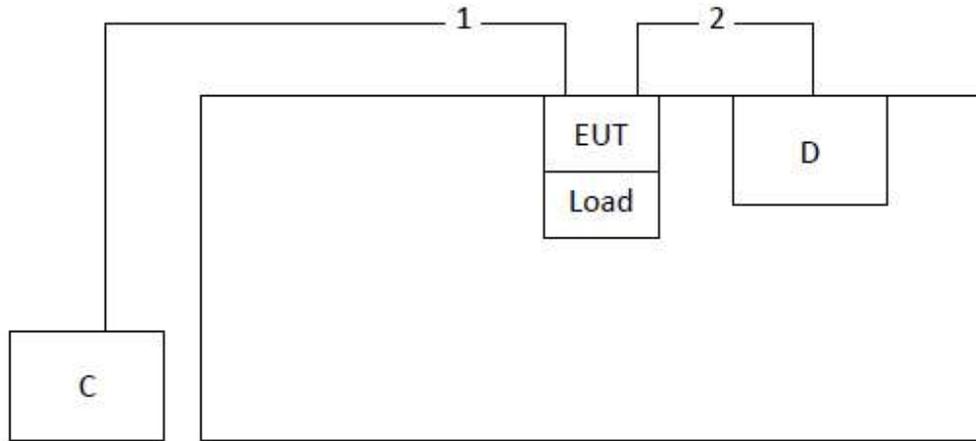
For Conducted Emission & Radiated Emission test : (Mode 3)



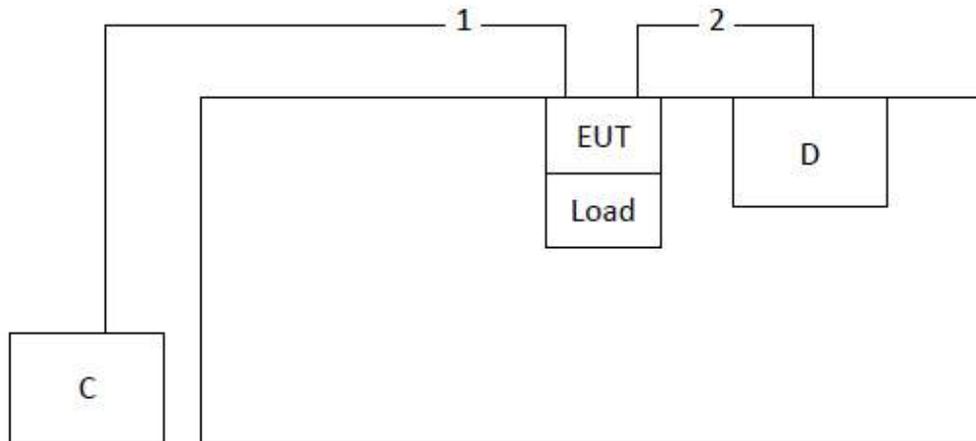
For Conducted Emission & Radiated Emission test : (Mode 6)



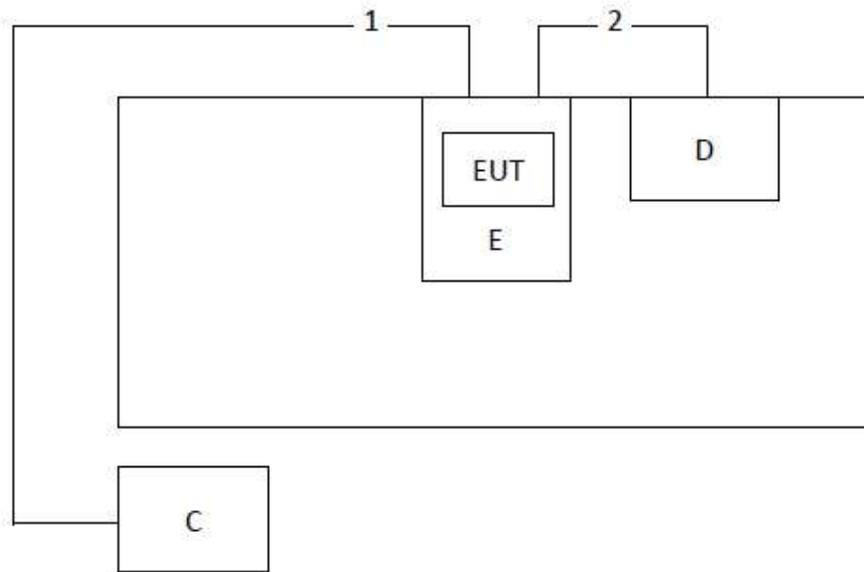
For Immunity - ESD, RS, CS, PFMF test : (Mode 3)



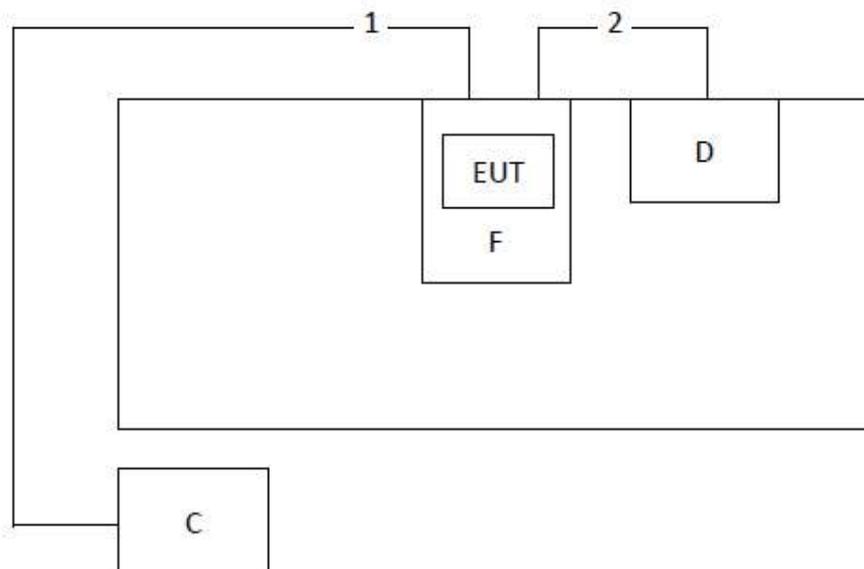
For Immunity - ESD, RS, CS, PFMF test : (Mode 6)



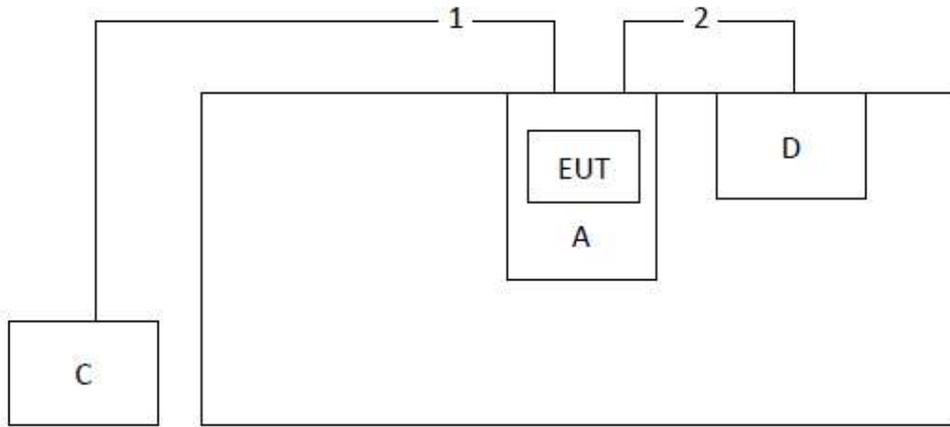
For Immunity - EFT, Surge test : (Mode 1)



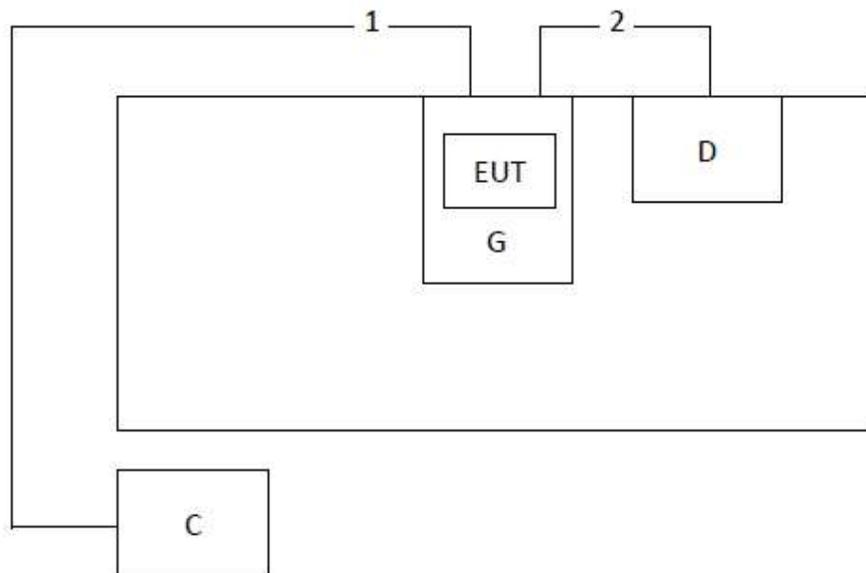
For Immunity - EFT, Surge test : (Mode 2)



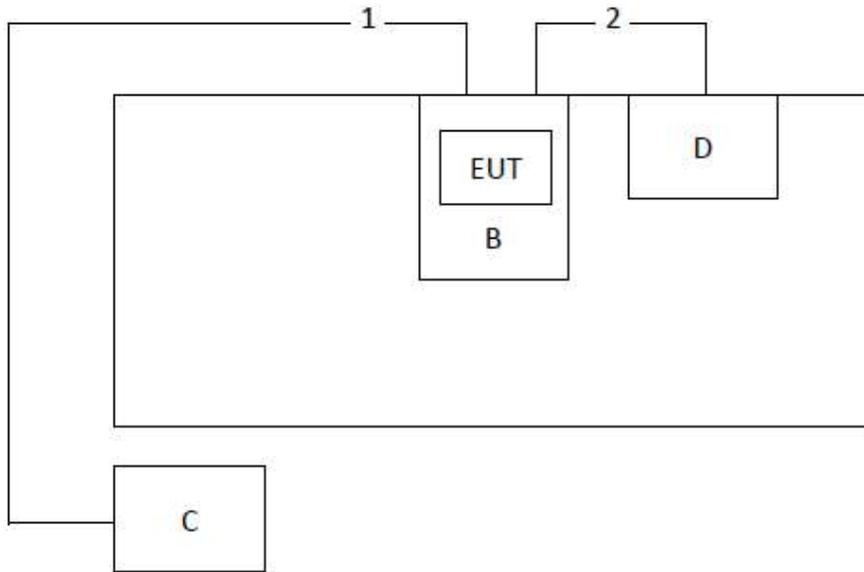
For Immunity - EFT, Surge test : (Mode 3)



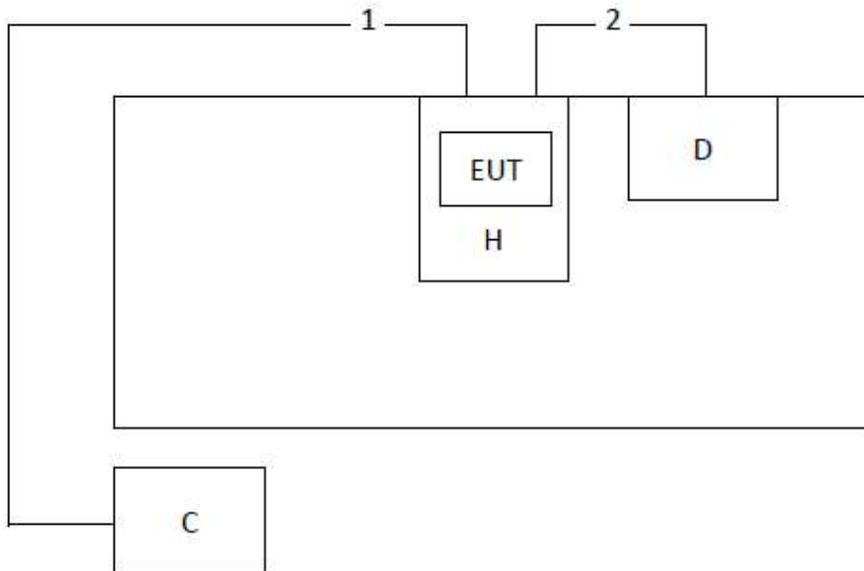
For Immunity - EFT, Surge test : (Mode 4)



For Immunity - EFT, Surge test : (Mode 5~7)



For Immunity - EFT, Surge test : (Mode 8~10)



5.7. Description of support units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	FCC ID	Note
A	Fixture board-1	N/A	N/A	N/A	N/A	N/A
B	Fixture board-2	N/A	N/A	N/A	N/A	N/A
C	DC source	Elektro-Automatik	PSI 9500-20	N/A	N/A	N/A
D	Meter	CNSCKJ	C85C17-V	N/A	N/A	N/A
E	Fixture board-3	N/A	N/A	N/A	N/A	N/A
F	Fixture board-4	N/A	N/A	N/A	N/A	N/A
G	Fixture board-5	N/A	N/A	N/A	N/A	N/A
H	Fixture board-6	N/A	N/A	N/A	N/A	N/A

Item	Connection	Shielded Type	Length	Note
1	Power Wire	Non-shielded	5 m	N/A
2	Power Wire	Non-shielded	1.8 m	N/A

5.8. Measuring Instrument List

Instrument					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Expired date
Conducted Disturbance					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	2019/11/19	2020/11/17
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	2019/8/8	2020/8/6
Two-Path V-LISN	SCHWARZBECK	NSLK 8127	8127-946	2019/10/17	2020/10/16
RF Current Probe	FCC	F-52	171502	2020/2/5	2021/2/3
Coupling and Decoupling Network	TESEQ	ISN ST08	45105	2020/2/10	2021/2/8
Impedance Stabilization Network	TESEQ	ISN T800	42830	2020/2/10	2021/2/8
Impedance Stabilization Network	TESEQ	ISN T8-Cat6	39923	2020/2/3	2021/2/1
Capacitive Voltage Probe	TESEQ	CVP 2200A	44922	2020/1/22	2021/1/20
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	2019/8/6	2020/8/4
Measurement Software	Farad	EZ-EMC Ver: EMEC-3A1	N/A	N/A	N/A
Cables	HARBOUR INDUSTRIES	LL142	170205-5000-1	2020/2/5	2021/2/3
Radiated Disturbance					
966-1					
EMI Test Receiver	Rohde & Schwarz	ESR7	101755	2019/12/4	2020/12/3
Trilog-Broadband Antenna with 5dB Attenuator	SCHWARZBECK	VULB 9168 & N-6-05	9168-773 & AT-N0539	2020/2/11	2021/2/9
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	1686	2019/12/27	2020/12/25
Preamplifier	EMC Instrument	EMC330E	980405	2020/2/4	2021/2/3
Preamplifier	EMC Instrument	EMC051835BE	980407	2020/1/15	2021/1/13
Measurement Software	Farad	EZ-EMC Ver: EMEC-3A1	N/A	N/A	N/A
Cables	UltraPhase&EMC Instrument	A1K50-UP0358-A1K50-1500&EMC106-NM-SM-2500/8000	170111-3&170104/170223	2020/2/5	2021/2/3

Instrument					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Expired date
Electrostatic discharge					
ESD Generator	TESEQ	NSG 437	1125	2019/12/9	2020/12/7
Radio frequency electromagnetic field immunity					
RF and Microwave Signal Generator	Rohde & Schwarz	SMB100A	113793	2020/2/26	2021/2/24
Power amplifier	Milmega	80RF1000-300	1077558	N/A	N/A
Power amplifier	Milmega	AS0860B	1077559	N/A	N/A
Directional coupler	Werlatone	C10117-10	111786	N/A	N/A
Directional coupler	Werlatone	C8719-20	111759	N/A	N/A
Antenna	AR	ATR80M6G	346008	N/A	N/A
Antenna	SCHWARZBECK	STLP 9149	00441	N/A	N/A
RF switch	OSP	OSP	N/A	N/A	N/A
Power Meter	Rohde & Schwarz	NRP2	105524	2019/10/21	2020/10/19
Power Sensor	Rohde & Schwarz	NRP-Z91	103732	2019/10/21	2020/10/19
Power Sensor	Rohde & Schwarz	NRP-Z91	103733	2019/10/21	2020/10/19
Measurement Software	Rohde & Schwarz	EMC32, VER.10.20.01	N/A	N/A	N/A
Electrical fast transient					
Ultra Compact Simulator	EM TEST	UCS 500N7	P1628180275	2019/12/12	2020/12/10
Capacitive Coupling Clamp	EM TEST	HFK	P1642185790	2019/11/27	2020/11/25
Measurement Software	TESEQ	IEC.control, VER.6.0.2	N/A	N/A	N/A
Surge					
Ultra Compact Simulator	EM TEST	UCS 500N7	P1628180275	2019/12/12	2020/12/10
Telecom Surge Generator	EM TEST	TSurge7	P1620180015	2019/12/11	2020/12/9
Coupling and Decoupling Network	EM TEST	CNV 508T5	P1637184038	2019/12/16	2020/12/14
Coupling and Decoupling Network	TESEQ	CDN HSS-2	45091	2019/12/16	2020/12/14
Measurement Software	TESEQ	IEC.control, VER.6.0.2	N/A	N/A	N/A

Instrument					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Expired date
Immunity to conducted disturbances, induced by radio-frequency fields					
Signal Generator	Rohde & Schwarz	SMC100A	105811	2019/10/24	2020/10/22
Power amplifier	Rohde & Schwarz	BBA150-A125B125	102340	N/A	N/A
Coupling and Decoupling Network	TESEQ	CDN M016	45073	2020/3/13	2021/3/12
Coupling and Decoupling Network	TESEQ	CDN T2-10	45003	2020/3/13	2021/3/12
Coupling and Decoupling Network	TESEQ	CDN T4-10	44939	2020/3/13	2021/3/12
Coupling and Decoupling Network	TESEQ	CDN T8-10	49203	2019/12/23	2020/12/21
EM Injection Clamp	TESEQ	CAL 801A & KEMZ 801A	75454.1, 75454.2 & 45181	2020/3/18	2021/3/17
Power - Sensor	Rohde & Schwarz	NRP-Z91	103730	2019/12/5	2020/12/3
Power - Sensor	Rohde & Schwarz	NRP-Z91	103731	2019/12/5	2020/12/3
Measurement Software	Rohde & Schwarz	EMC32, VER.10.20.01	N/A	N/A	N/A
Power frequency magnetic field immunity					
Ultra Compact Simulator	EM TEST	UCS 500N7	P1628180275	2019/12/12	2020/12/10
Current Transformer	EM TEST	MC 2630	P1644186773	2020/9/4	2021/9/3
Magnetic Field Test Antena	EM TEST	MS 100N	P1627181324	2020/9/4	2021/9/3
Current Transformer	EM TEST	MFT100	P2025241594	2020/9/4	2021/9/3
Motorized Variac	EM TEST	MV 2616 (varic NX1-260-16)	P1643186426	2019/12/11	2020/12/9

6. EMISSION TEST

6.1. Conducted Disturbance Measurement

6.1.1. Limits of conducted disturbance voltage and common mode disturbance.

AC mains port:

FREQUENCY (MHz)	<input checked="" type="checkbox"/> Class A (dB μ V)		<input type="checkbox"/> Class B (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46*
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Telecommunications/network port:

FREQUENCY (MHz)	<input type="checkbox"/> Class A			
	Voltage limit (dB μ V)		Current limit(dB μ A)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	97 - 87 *	84 - 74*	53 - 43 *	40 - 30*
0.50 -30.0	87.00	74.00	43.00	30.00
FREQUENCY (MHz)	<input type="checkbox"/> Class B			
	Voltage limit (dB μ V)		Current limit(dB μ A)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	84 - 74 *	74 - 64*	40 - 30 *	30 - 20*
0.50 -30.0	74.00	64.00	30.00	20.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
- (3) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
 Margin Level = Measurement Value - Limit Value
- (4) TMR 04 & TMR 04WI series with external components according to EMC solution

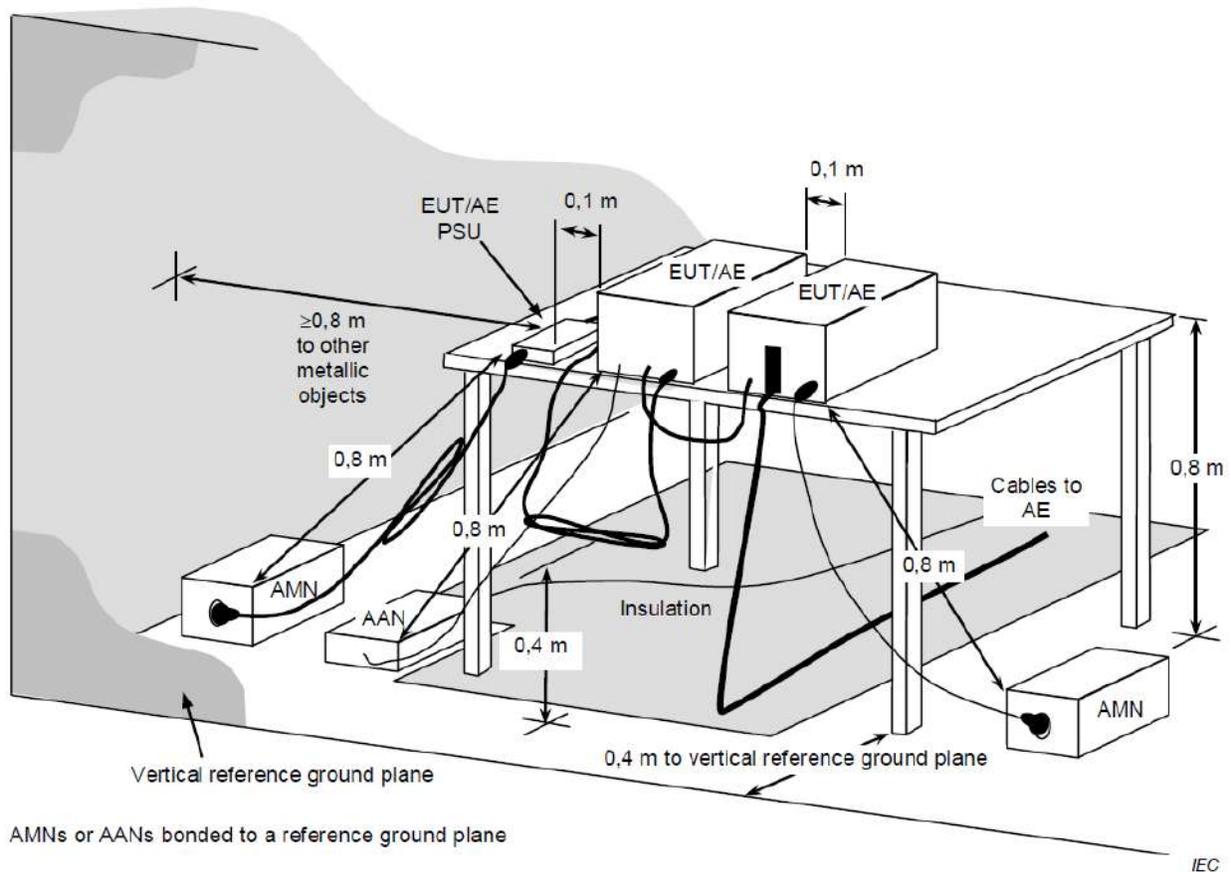
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

6.1.2. Test Procedure

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall at least 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item:EUT Test Photos.

6.1.3. Test Setup

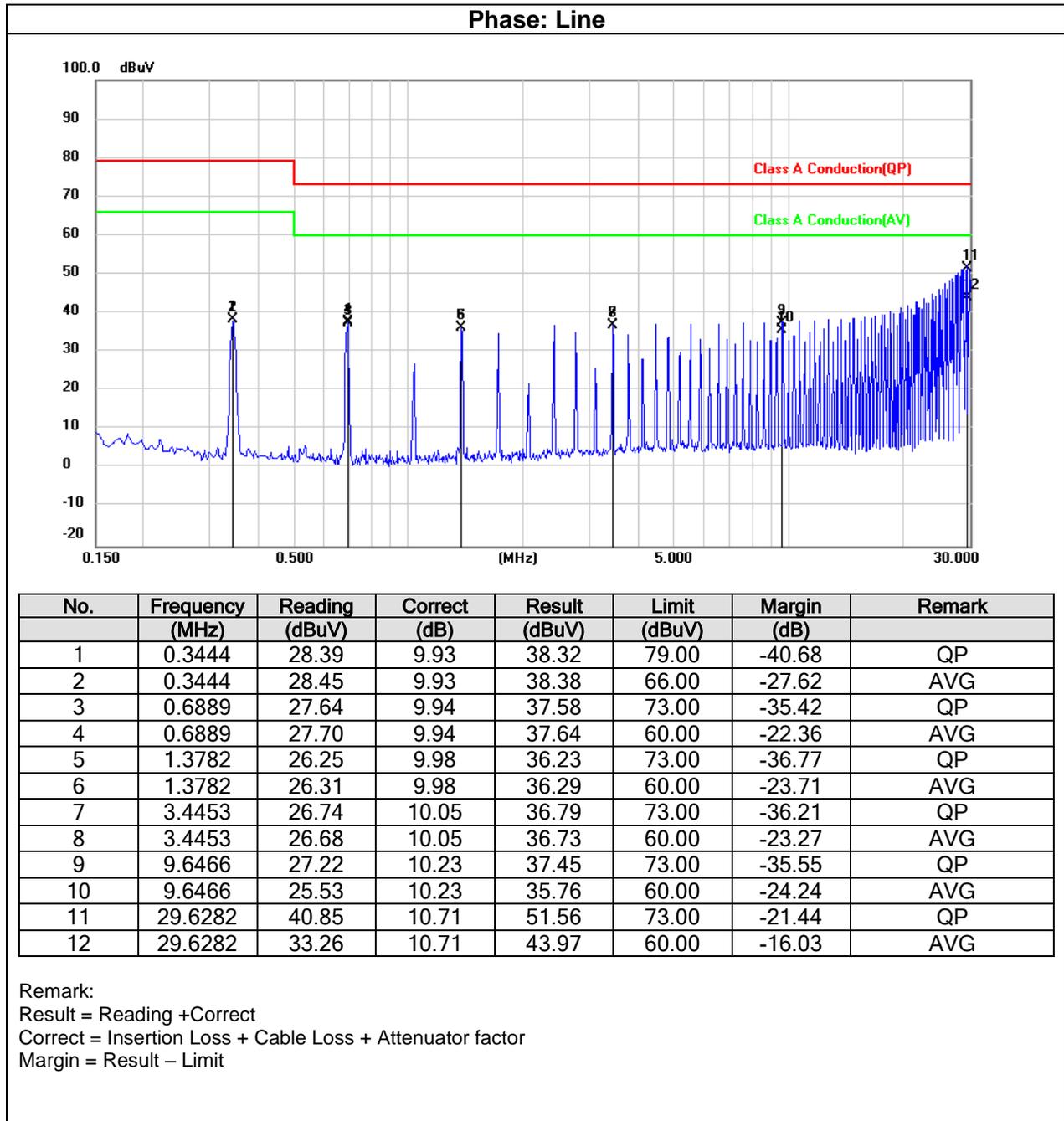


The 0,8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be $\geq 0,8$ m.

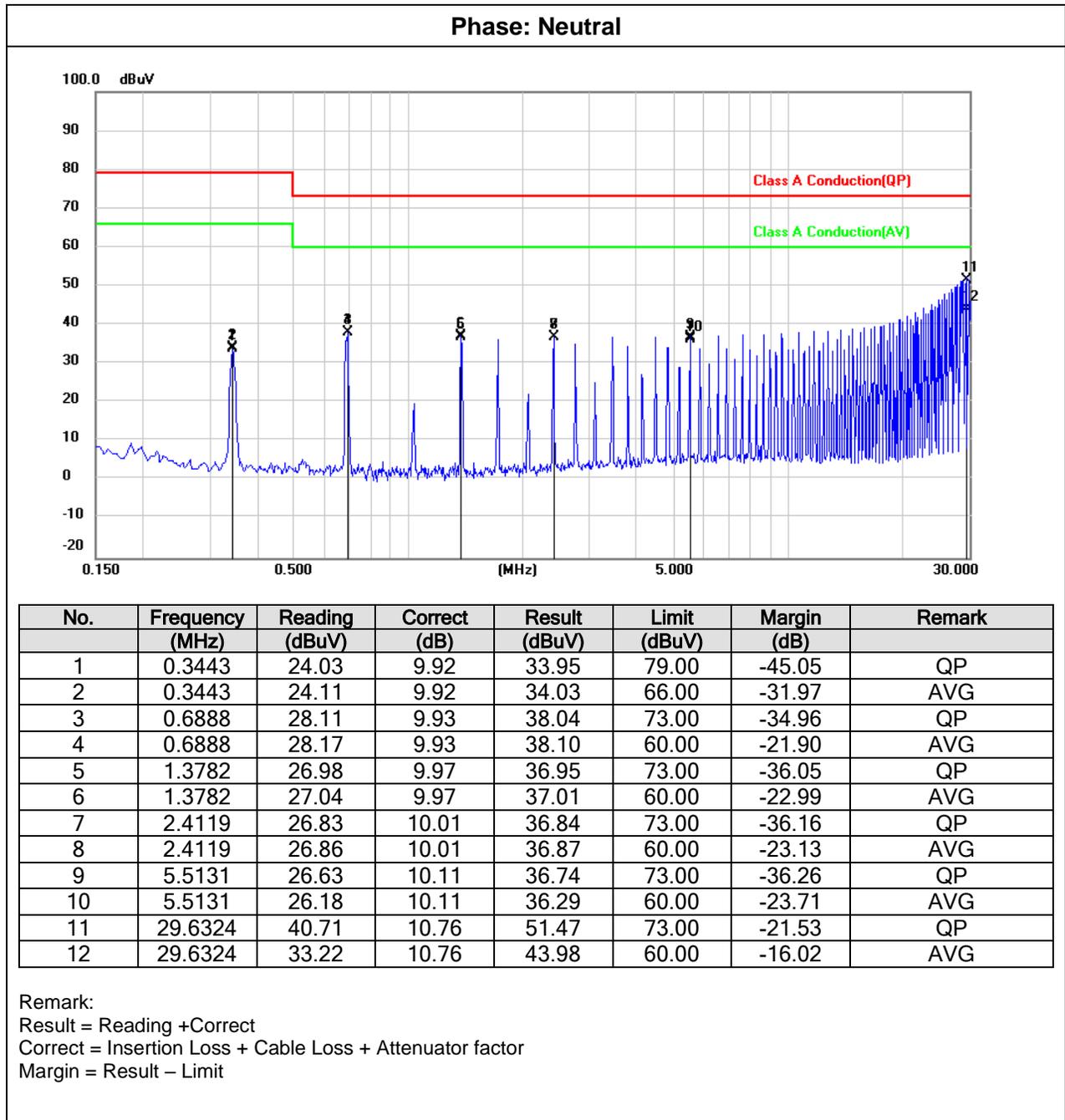
For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

6.1.4. Test Result

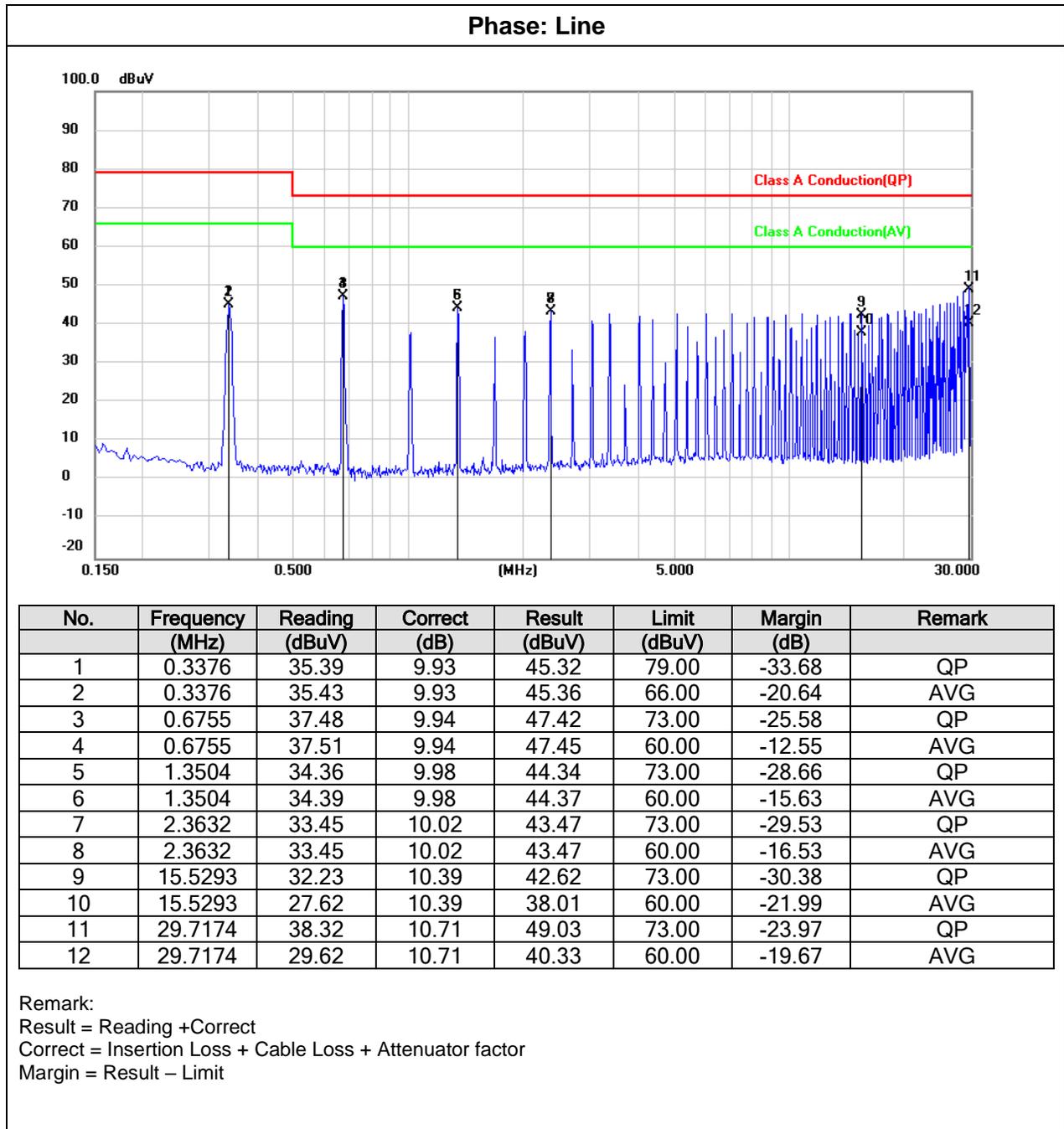
Test Mode:	Mode 3	Temperature:	23°C
Test Voltage:	24Vdc from DC source	Humidity:	60%RH
Tested By:	Edison Lin	Test Date:	May 6, 2020



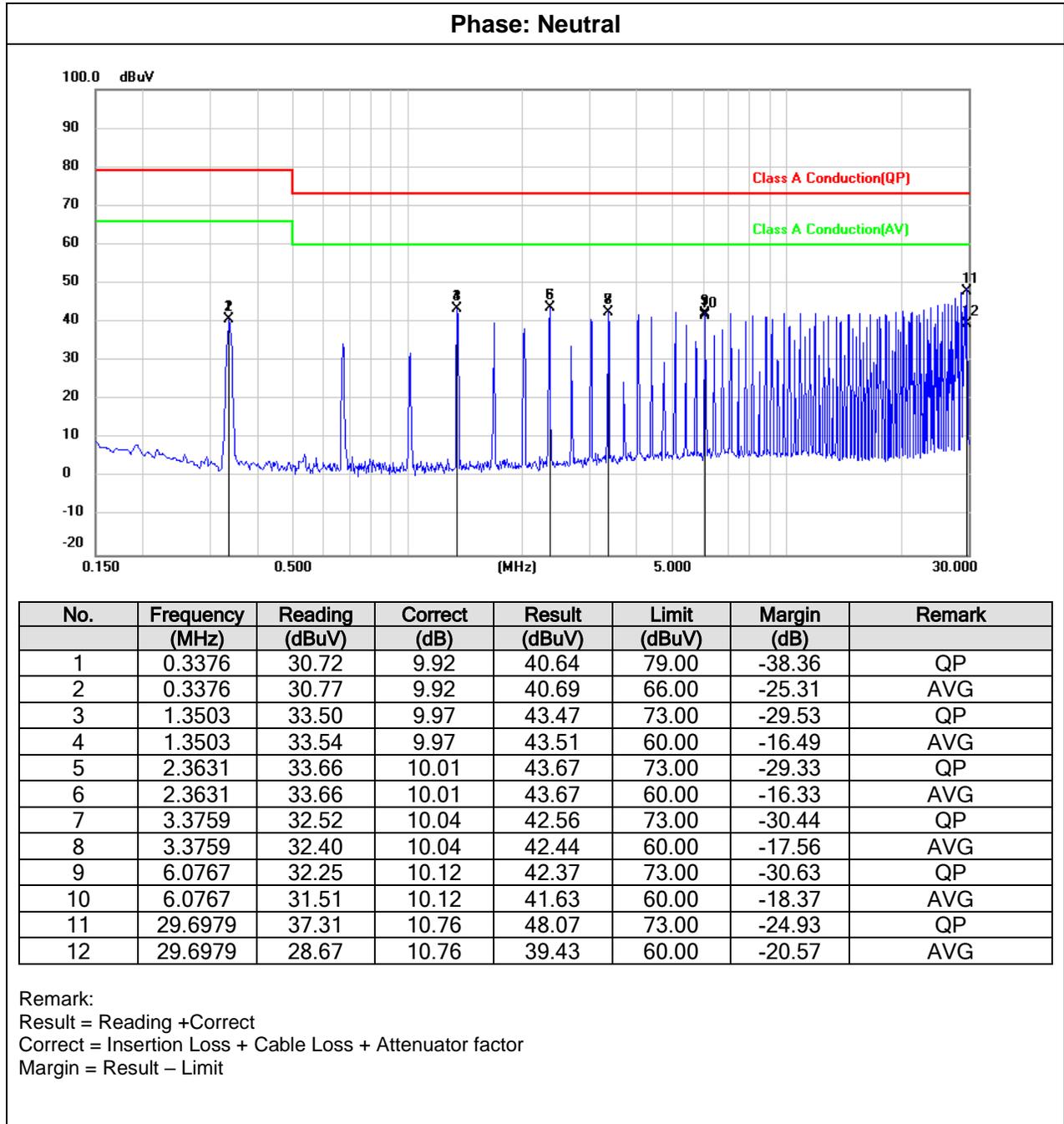
Test Mode:	Mode 3	Temperature:	23°C
Test Voltage:	24Vdc from DC source	Humidity:	60%RH
Tested By:	Edison Lin	Test Date:	May 6, 2020



Test Mode:	Mode 6	Temperature:	23°C
Test Voltage:	24Vdc from DC source	Humidity:	60%RH
Tested By:	Edison Lin	Test Date:	May 6, 2020



Test Mode:	Mode 6	Temperature:	23°C
Test Voltage:	24Vdc from DC source	Humidity:	60%RH
Tested By:	Edison Lin	Test Date:	May 6, 2020



6.2. Radiated Disturbance Measurement(below 1GHz)

6.2.1. Limits of radiated disturbance measurement

FREQUENCY (MHz)	<input checked="" type="checkbox"/> Class A		<input type="checkbox"/> Class B	
	<input type="checkbox"/> At 10m	<input checked="" type="checkbox"/> At 3m	<input type="checkbox"/> At 10m	<input type="checkbox"/> At 3m
	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
30 – 230	40	50	30	40
230 – 1000	47	57	37	47

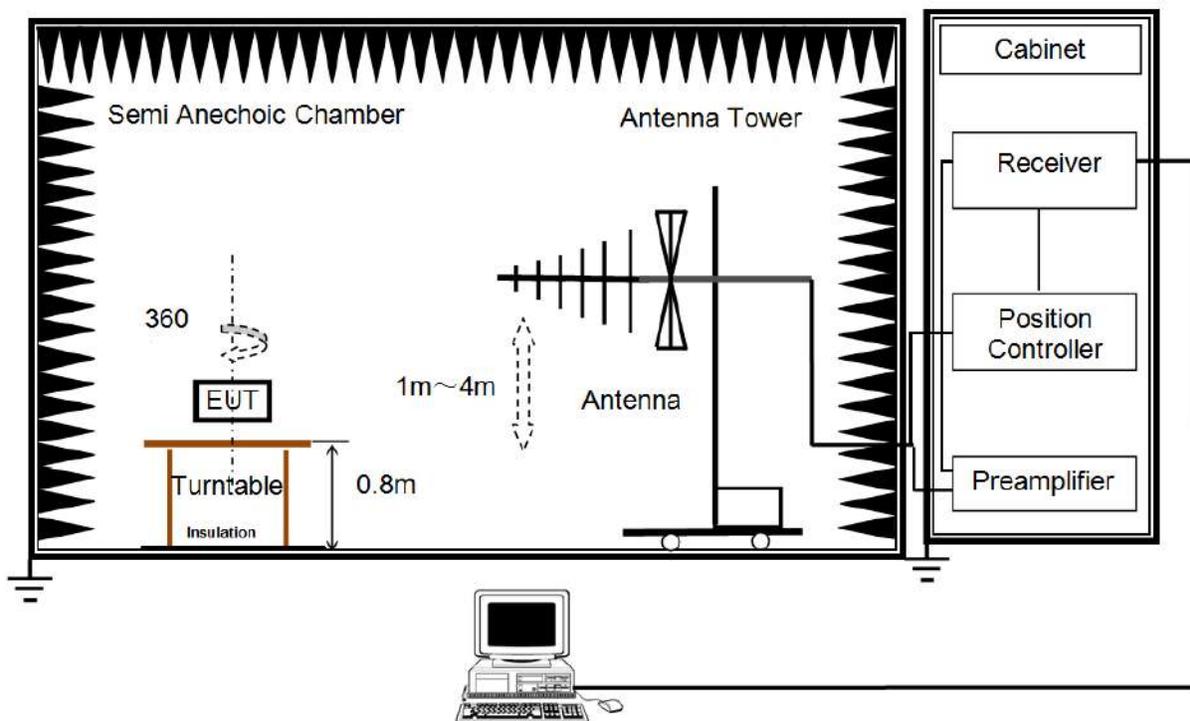
NOTE:

- (1) The limit for radiated test was performed according to EN55032.
- (2) The tighter limit applies at the band edges.
- (3) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor,
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use),
 Margin Level = Measurement Value - Limit Value.
- (4) TMR 04 & TMR 04WI series with external components according to EMC solution.

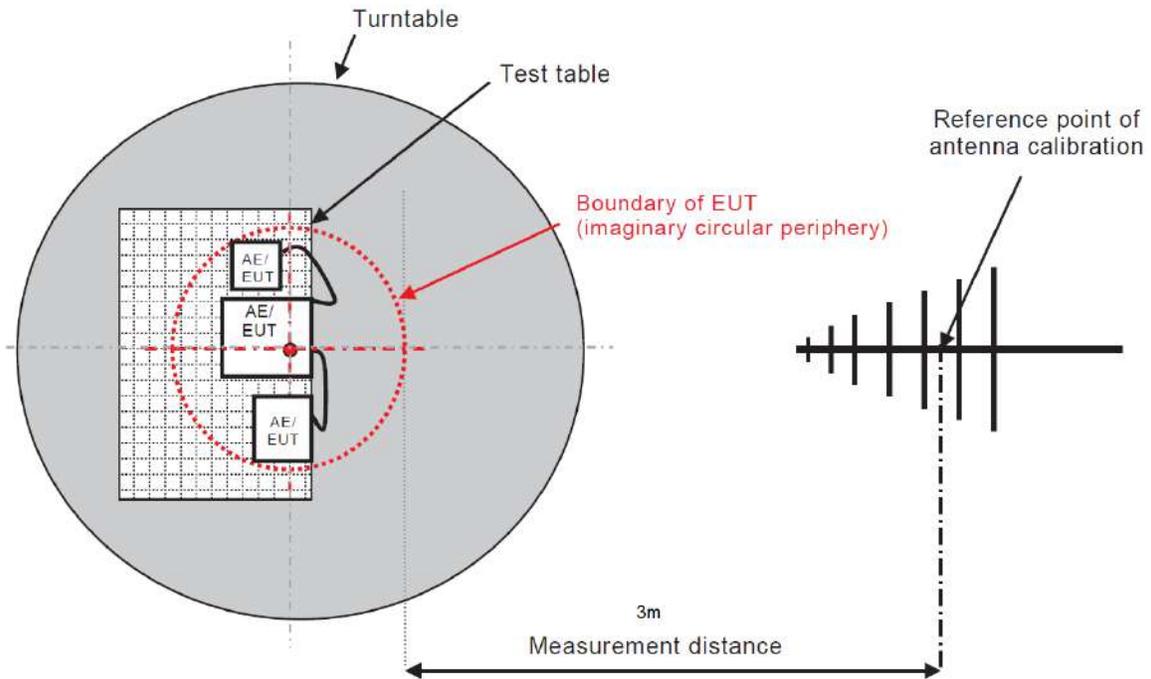
6.2.2. Test Procedure

- a. The measuring distance of at 3m shall be used for measurements at frequency from 30 to 1000MHz.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment shall be set at 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item:EUT Test Photos.

6.2.3. Test Setup

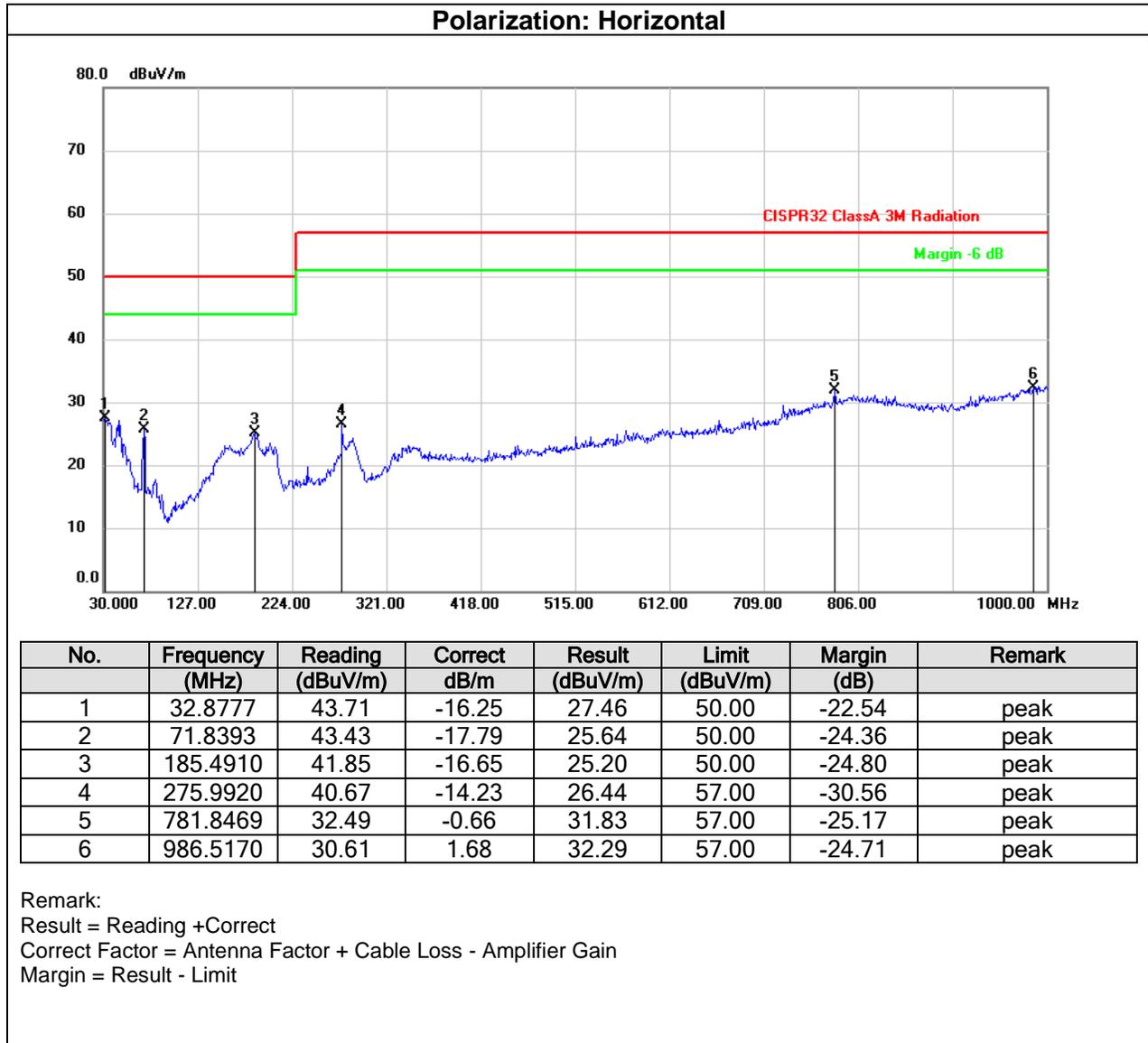


For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

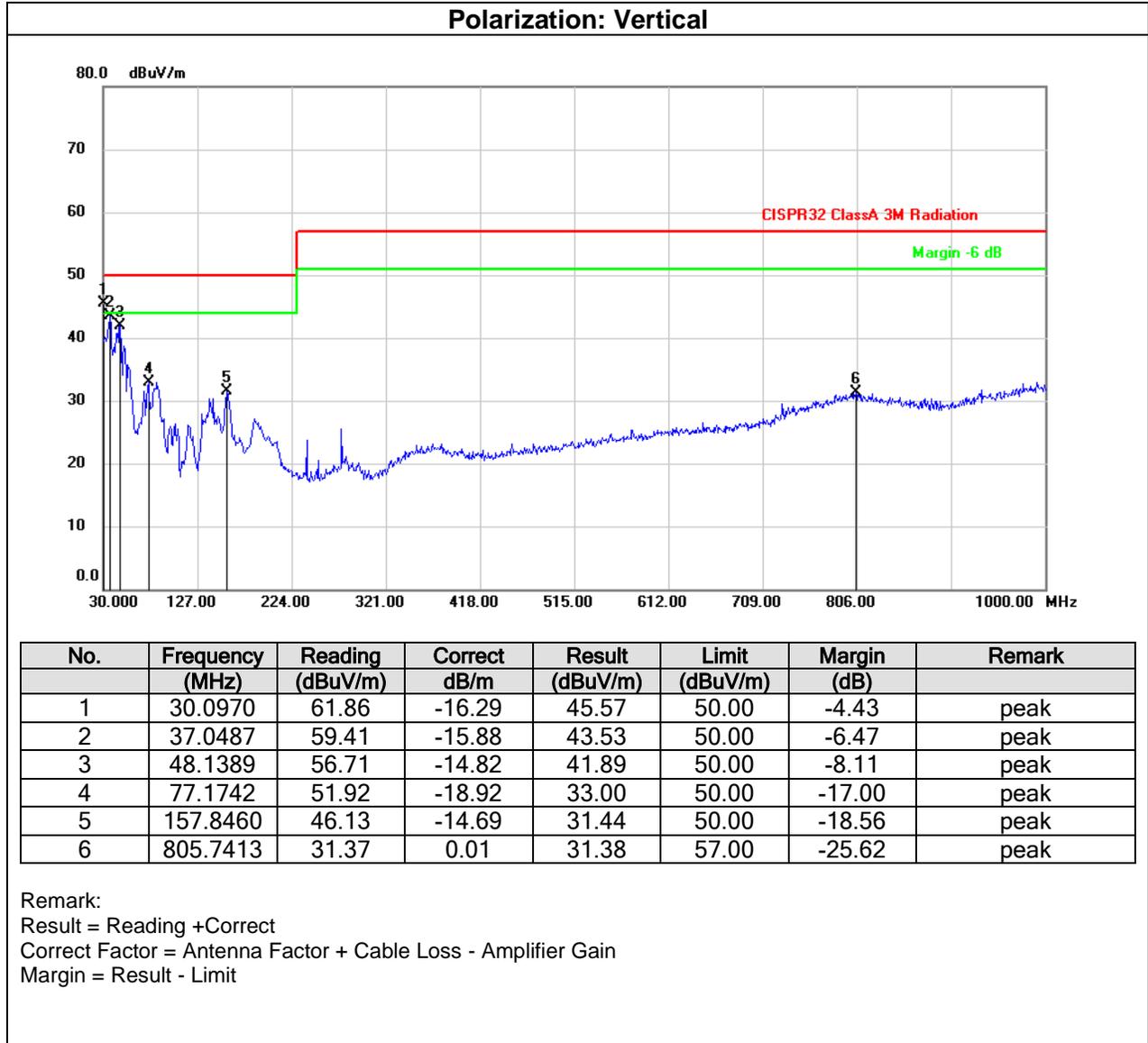


6.2.4. Test Result

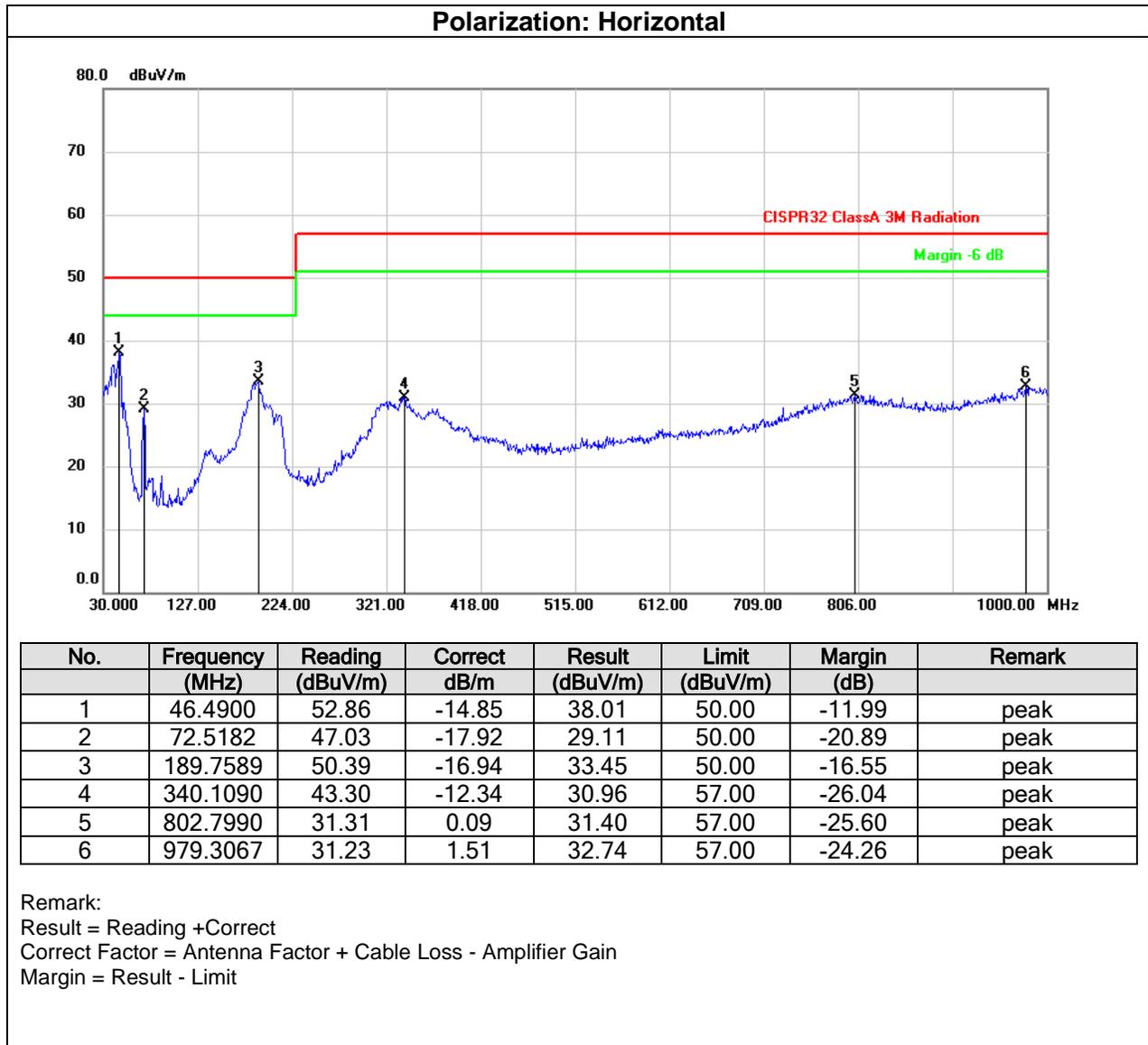
Test Mode:	Mode 3	Temperature:	25°C
Test Voltage:	24Vdc from DC source	Humidity:	59%RH
Tested By:	Edison Lin	Test Date:	May 5, 2020



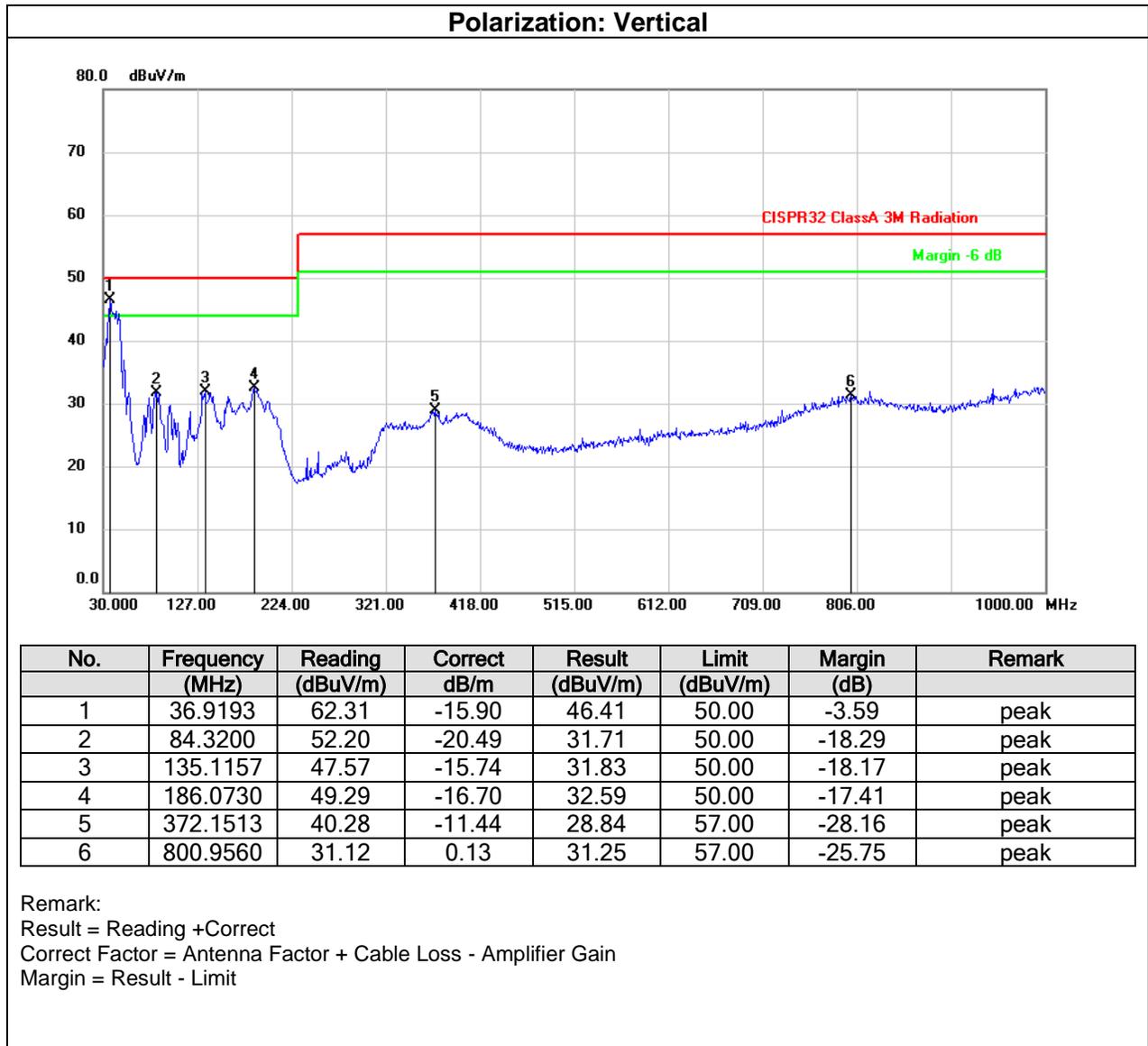
Test Mode:	Mode 3	Temperature:	25°C
Test Voltage:	24Vdc from DC source	Humidity:	59%RH
Tested By:	Edison Lin	Test Date:	May 5, 2020



Test Mode:	Mode 6	Temperature:	25°C
Test Voltage:	24Vdc from DC source	Humidity:	59%RH
Tested By:	Edison Lin	Test Date:	May 5, 2020



Test Mode:	Mode 6	Temperature:	25°C
Test Voltage:	24Vdc from DC source	Humidity:	59%RH
Tested By:	Edison Lin	Test Date:	May 5, 2020



7. IMMUNITY TEST

7.1. Performance Criteria

According to EN 55024/ EN 55035 standard, the general performance criteria as following:

Criteria A	<p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended.</p> <p>The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
Criteria B	<p>During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.</p> <p>After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
Criteria C	<p>Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.</p> <p>Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

7.2. Electrostatic Discharge Immunity Test

7.2.1. Test Specification

For EN 55024 & EN 55035

Standard:	EN 55024(Note)/ EN 55035 (refer to IEC/EN 61000-4-2)
Discharge Impedance:	330(1±10%)Ω / 150(1±10%)pF
Discharge Voltage:	Air Discharge: ±2kV/±4kV/±8kV (Direct)
Polarity:	Contact Discharge: ±2kV/±4kV (Direct/Indirect) Positive and Negative
Discharge Mode of Operation:	Single discharges
Discharge Period:	1 second minimum

7.2.2. Test Procedure

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

- a. Contact discharge was applied to conductive surfaces and coupling planes of the EUT. During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. On each pre-selected point at least 10 single discharges (at each polarity) shall be applied. Test shall be performed at a maximum repetition rate of one discharge per second.

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

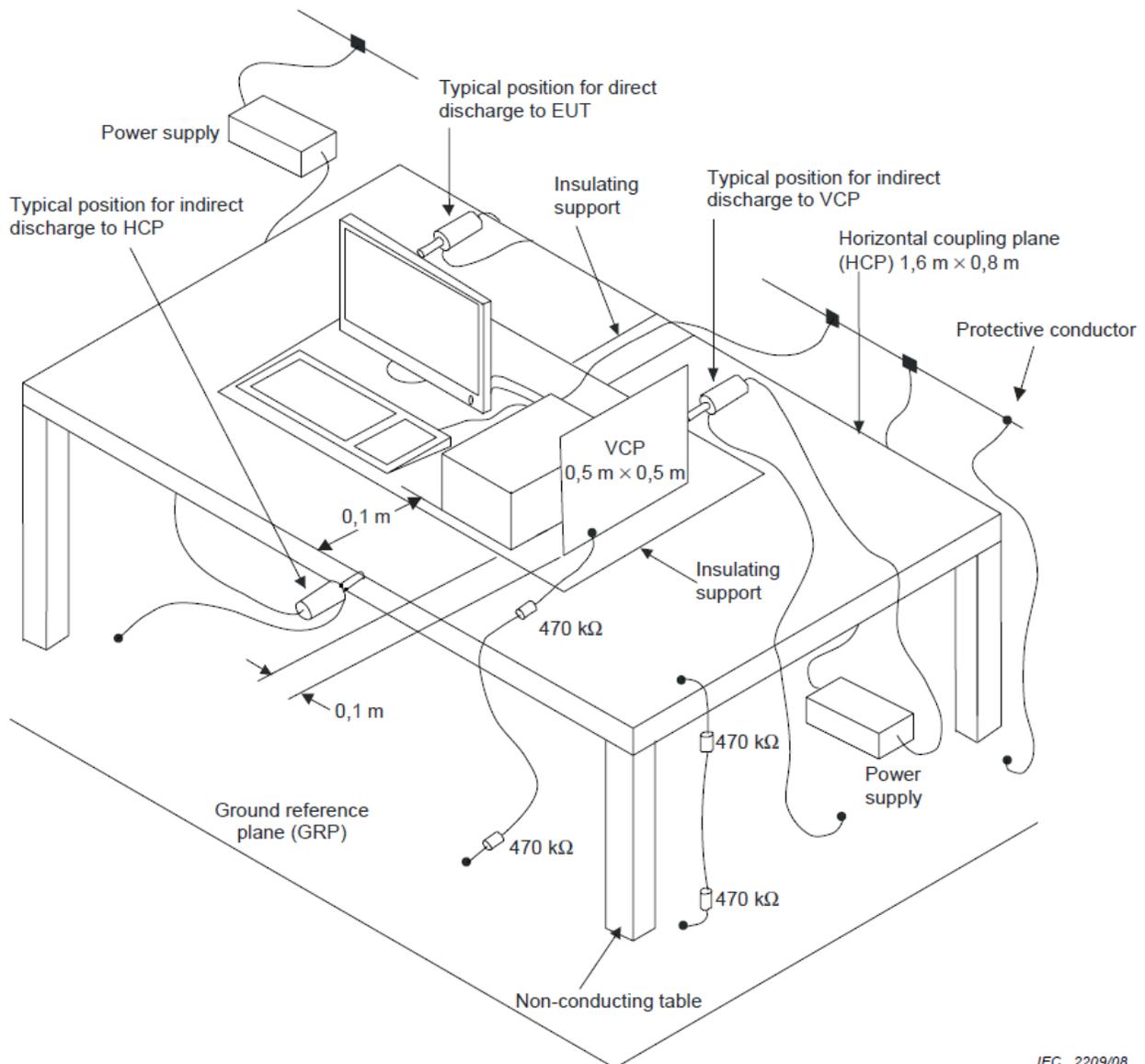
Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

For EN 55024, Step a shall be change to 25 single discharges at each polarity.

- b. Air discharges at insulation surfaces of the EUT.
It was at least 10 single discharges with positive and negative at the same selected point.
- c. For the actual test configuration, please refer to the related Item :EUT Test Photos.

7.2.3. Test Setup



A distance of 0,8 m minimum shall be provided between the EUT and the walls of the laboratory and any other metallic structure.

For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

7.2.4. Test Result

EN 55024 :

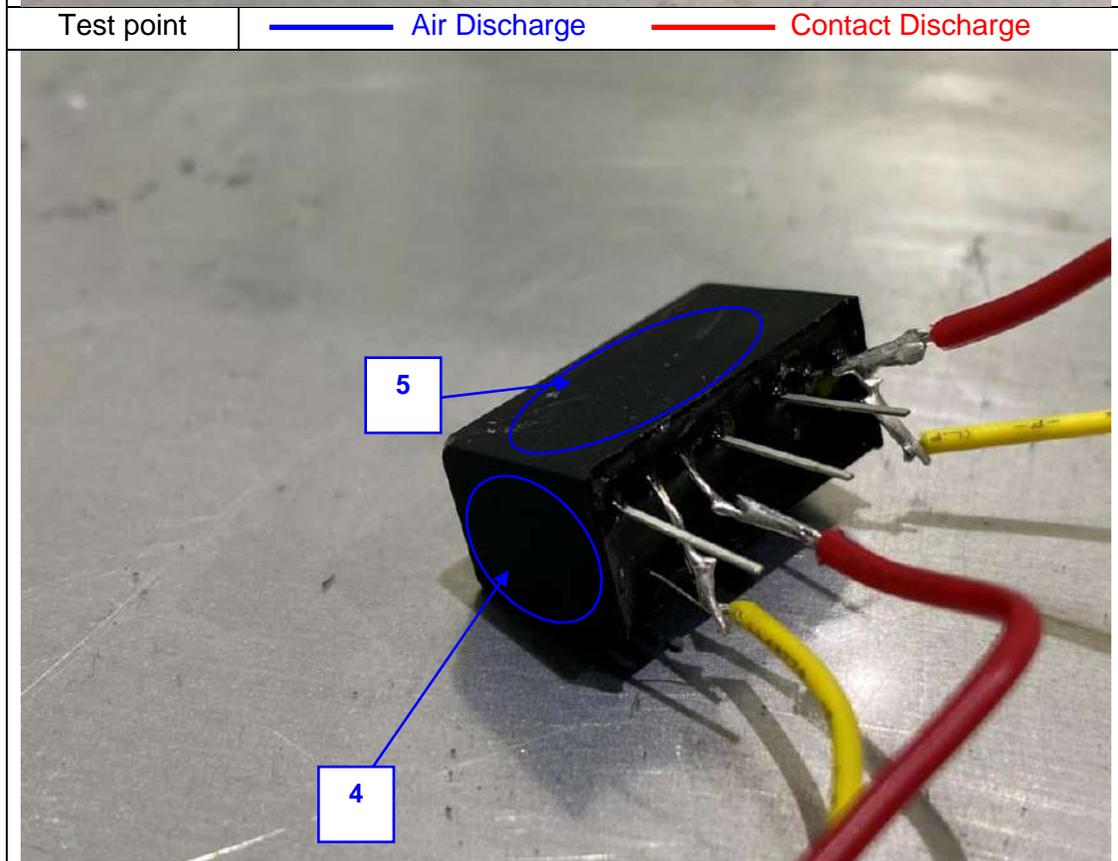
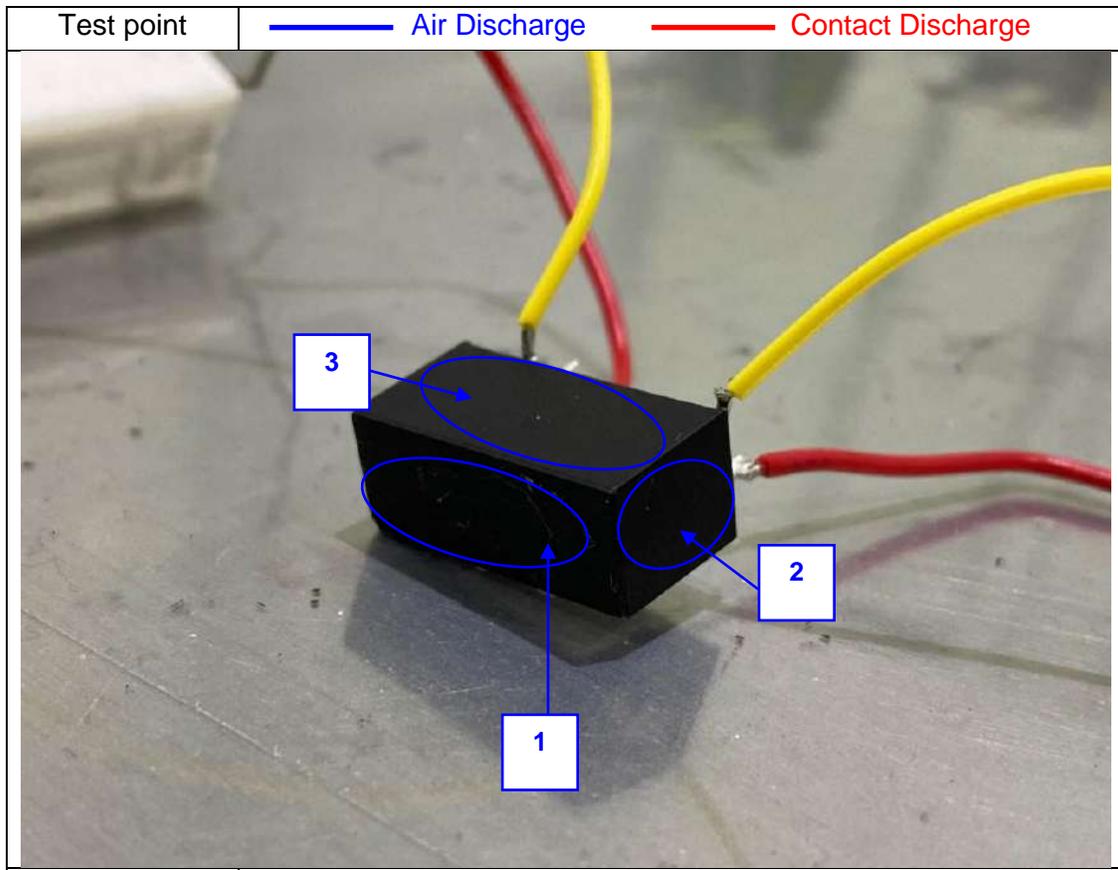
Test Mode:	Mode 3	Temperature:	25°C
Test Voltage:	24Vdc from DC source	Humidity:	44%RH
Discharge of times:	Air: 10 times Contact: 25 times	ATM pressure:	1018 hpa
Tested By:	Edison Lin	Test Date:	May 11, 2020

Mode	Air Discharge								Contact Discharge							
	2kV		4kV		8kV		-kV		2kV		4kV		-kV		-kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1~5	A	A	A	A	A	A	-	-	-	-	-	-	-	-	-	-
Criteria	B								-							
Results	A								-							
Judgment	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															

Mode	HCP Discharge								VCP Discharge							
	2kV		4kV		-kV		-kV		2kV		4kV		-kV		-kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
front	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
rear	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
left	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
right	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
Criteria	B				-				B				-			
Results	A				-				A				-			
Judgment	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															

Customer request:

Mode	HCP Discharge								VCP Discharge							
	2kV		4kV		6kV		15kV		2kV		4kV		6kV		15kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
front	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
rear	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
left	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
right	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
Criteria	B								B							
Results	A								A							
Judgment	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															



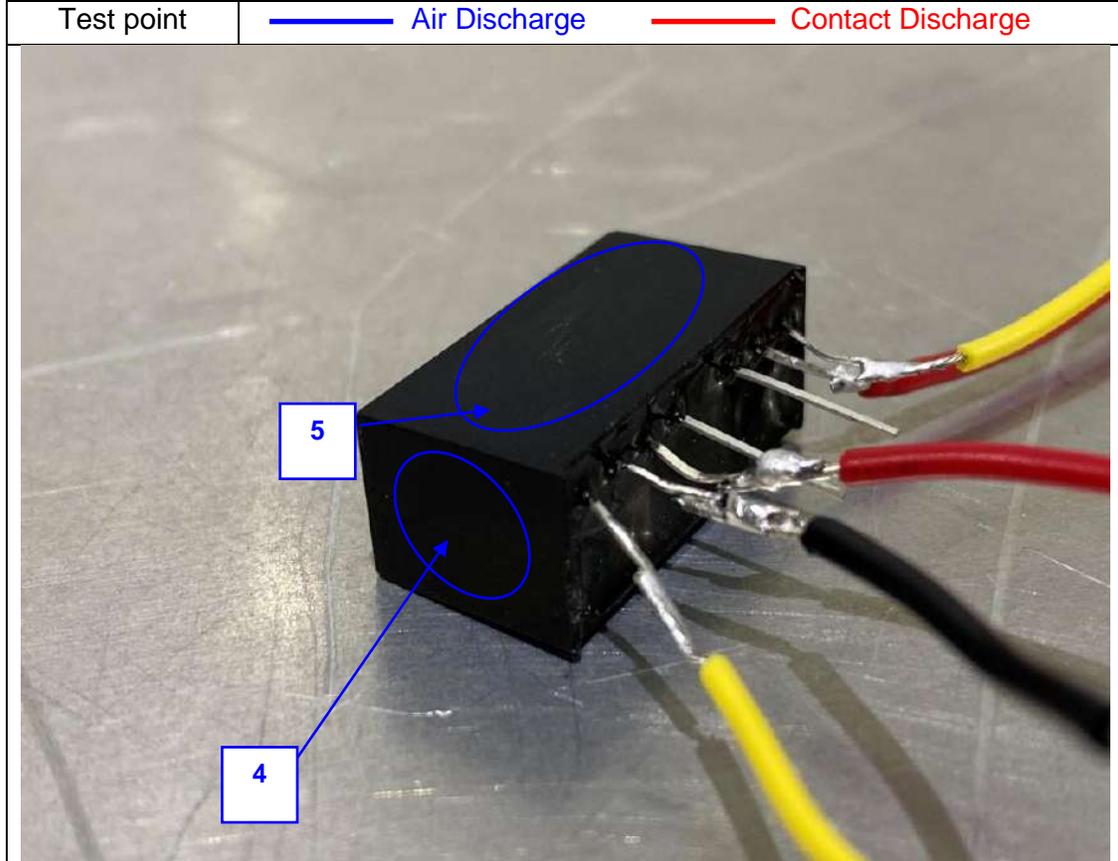
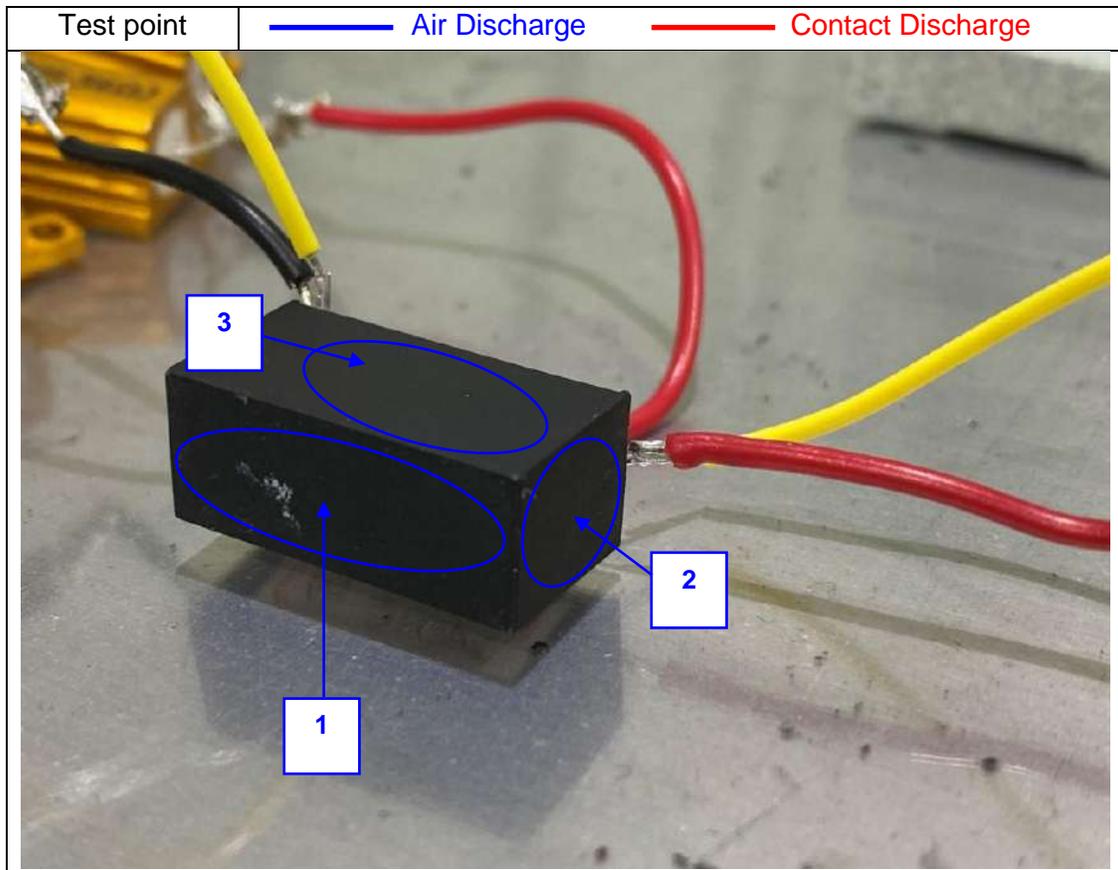
Test Mode:	Mode 6	Temperature:	25°C
Test Voltage:	24Vdc from DC source	Humidity:	44%RH
Discharge of times:	Air: 10 times Contact: 25 times	ATM pressure:	1018 hpa
Tested By:	Edison Lin	Test Date:	May 11, 2020

Mode	Air Discharge								Contact Discharge							
	2kV		4kV		8kV		-kV		2kV		4kV		-kV		-kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1~5	A	A	A	A	A	A	-	-	-	-	-	-	-	-	-	-
Criteria	B								-							
Results	A								-							
Judgment	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															

Mode	HCP Discharge								VCP Discharge							
	2kV		4kV		-kV		-kV		2kV		4kV		-kV		-kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
front	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
rear	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
left	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
right	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
Criteria	B				-				B				-			
Results	A				-				A				-			
Judgment	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															

Customer request:

Mode	HCP Discharge								VCP Discharge							
	2kV		4kV		6kV		15kV		2kV		4kV		6kV		15kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
front	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
rear	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
left	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
right	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
Criteria	B								B							
Results	A								A							
Judgment	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															



EN 55035:

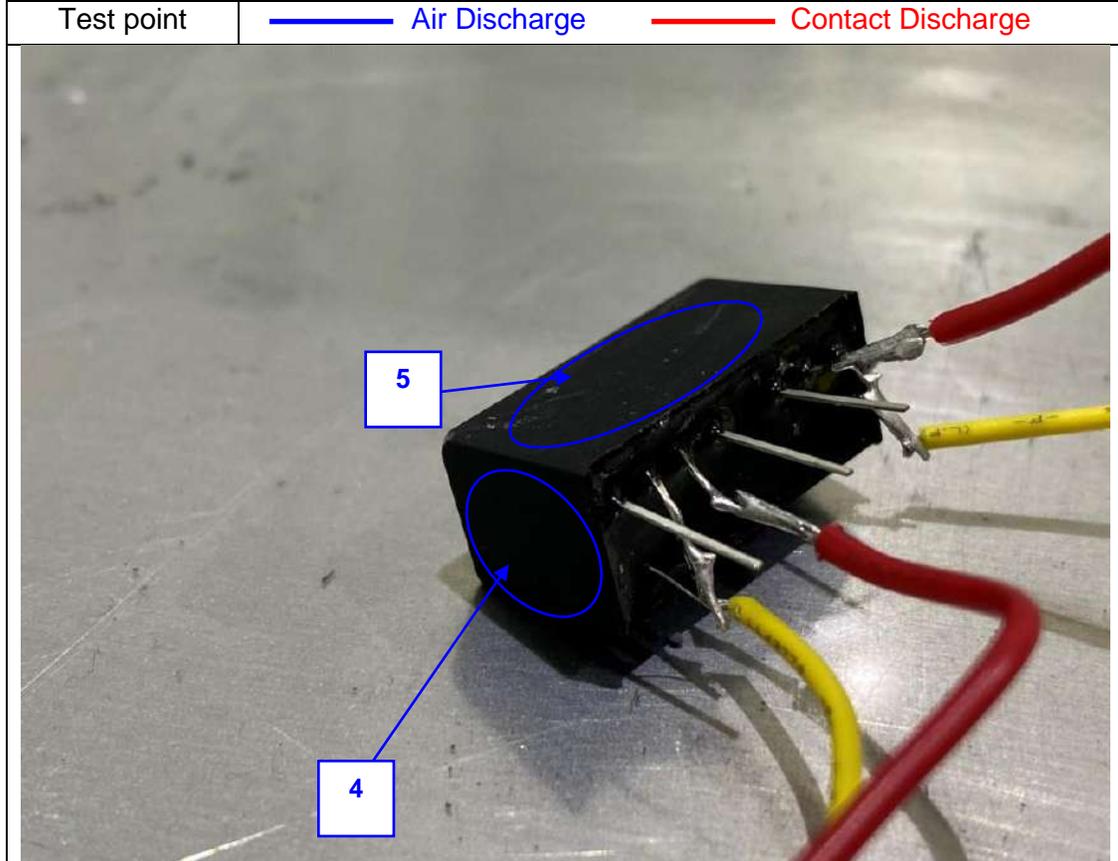
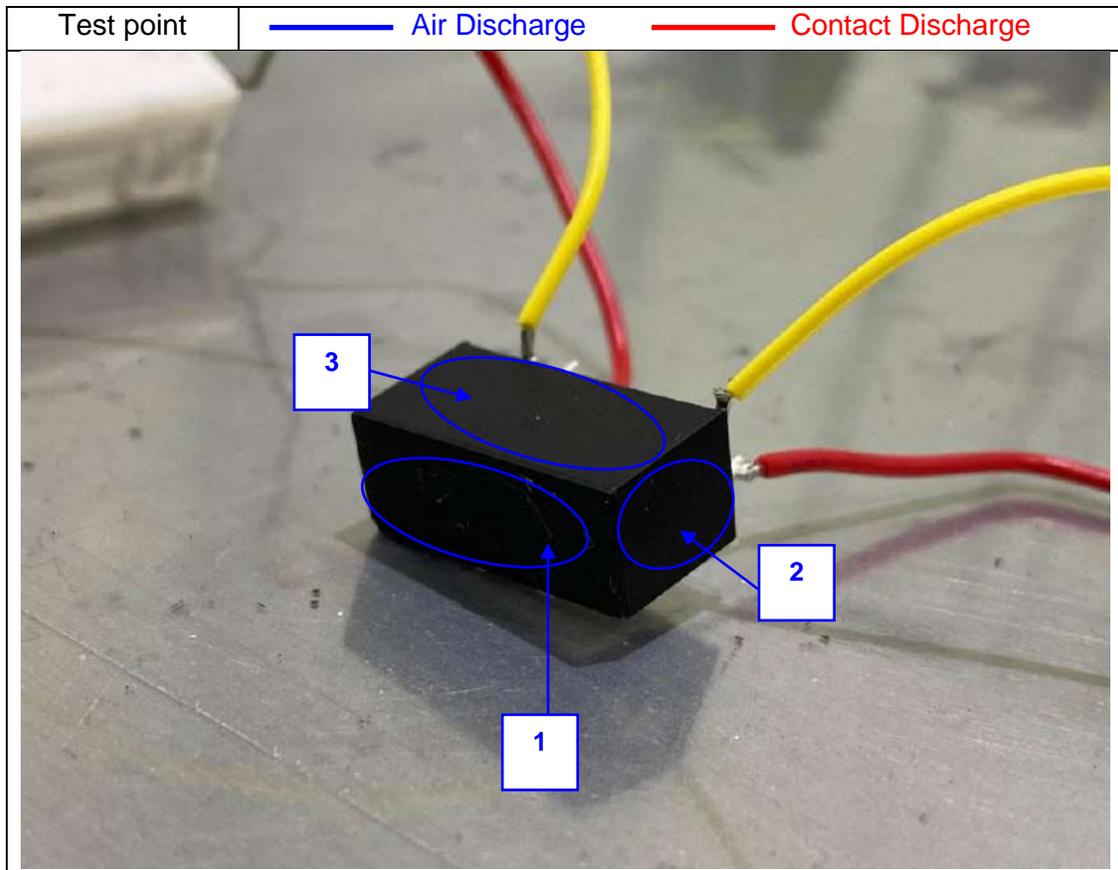
Test Mode:	Mode 3	Temperature:	25°C
Test Voltage:	24Vdc from DC source	Humidity:	44%RH
Discharge of times:	Air: 10 times Contact: 10 times	ATM pressure:	1018 hpa
Tested By:	Edison Lin	Test Date:	May 11, 2020

Mode	Air Discharge								Contact Discharge							
	2kV		4kV		8kV		-kV		2kV		4kV		-kV		-kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1~5	A	A	A	A	A	A	-	-	-	-	-	-	-	-	-	-
Criteria	B								-							
Results	A								-							
Judgement	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															

Mode	HCP Discharge								VCP Discharge							
	2kV		4kV		-kV		-kV		2kV		4kV		-kV		-kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
front	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
rear	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
left	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
right	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
Criteria	B				-				B				-			
Results	A				-				A				-			
Judgement	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															

Customer request:

Mode	HCP Discharge								VCP Discharge							
	2kV		4kV		6kV		15kV		2kV		4kV		6kV		15kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
front	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
rear	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
left	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
right	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
Criteria	B								B							
Results	A								A							
Judgement	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															



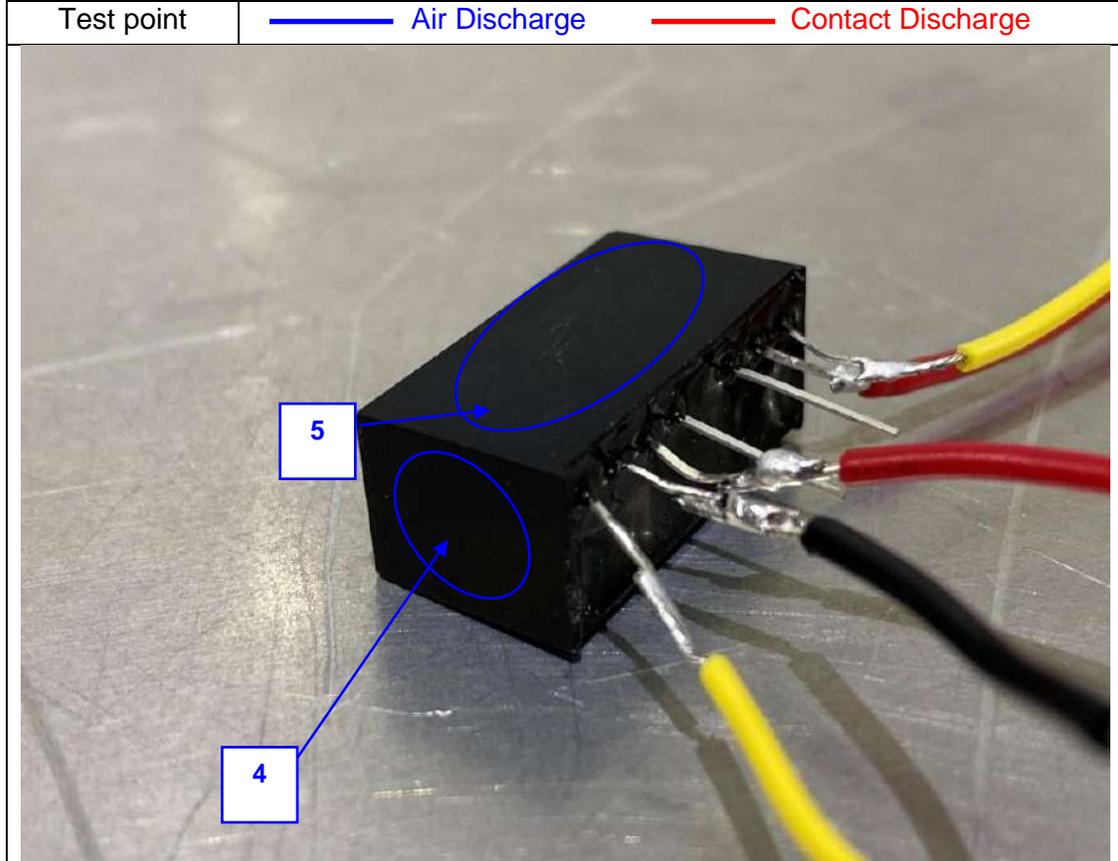
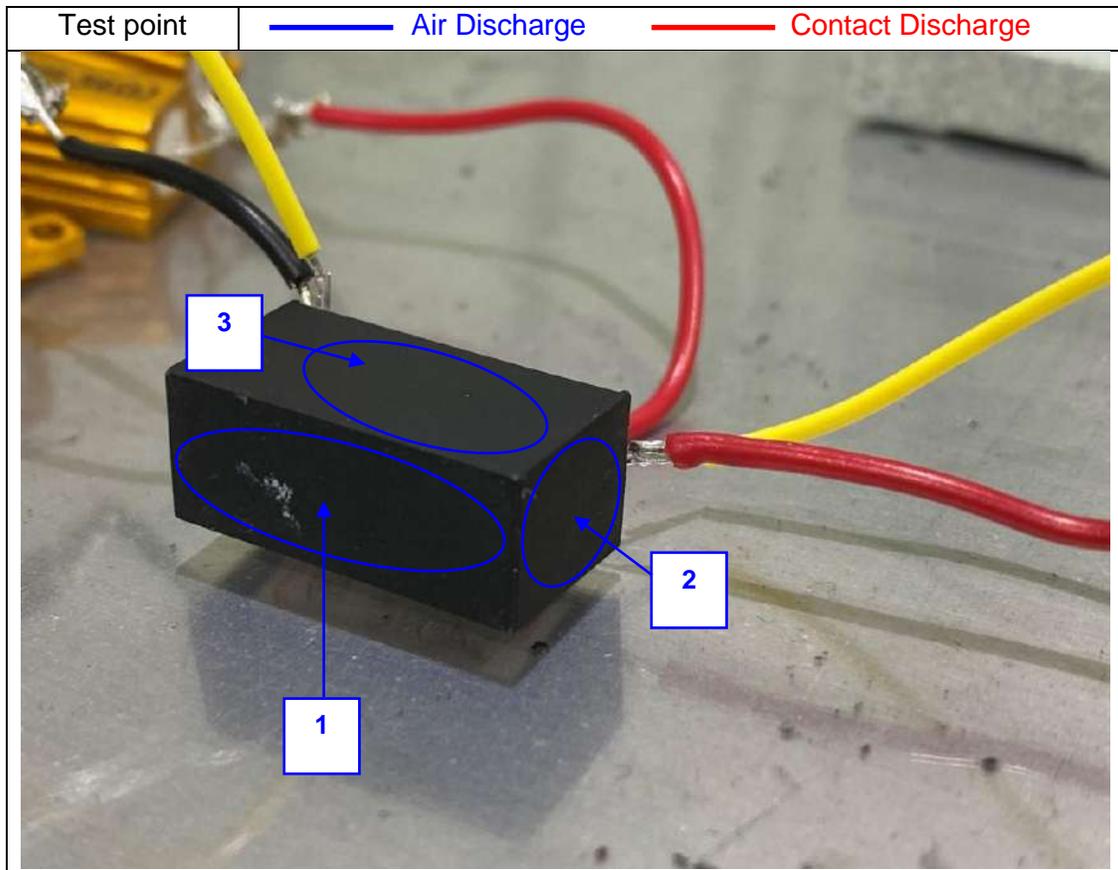
Test Mode:	Mode 6	Temperature:	25°C
Test Voltage:	24Vdc from DC source	Humidity:	44%RH
Discharge of times:	Air: 10 times Contact: 10 times	ATM pressure:	1018 hpa
Tested By:	Edison Lin	Test Date:	May 11, 2020

Mode	Air Discharge								Contact Discharge							
	2kV		4kV		8kV		-kV		2kV		4kV		-kV		-kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1~5	A	A	A	A	A	A	-	-	-	-	-	-	-	-	-	-
Criteria	B								-							
Results	A								-							
Judgement	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															

Mode	HCP Discharge								VCP Discharge							
	2kV		4kV		-kV		-kV		2kV		4kV		-kV		-kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
front	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
rear	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
left	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
right	A	A	A	A	-	-	-	-	A	A	A	A	-	-	-	-
Criteria	B				-				B				-			
Results	A				-				A				-			
Judgement	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															

Customer request:

Mode	HCP Discharge								VCP Discharge							
	2kV		4kV		6kV		15kV		2kV		4kV		6kV		15kV	
Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
front	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
rear	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
left	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
right	-	-	-	-	A	A	-	-	-	-	-	-	A	A	-	-
Criteria	B								B							
Results	A								A							
Judgement	PASS															
Note	There was no abnormal situation during the test compared with initial operation.															



7.3. Radio Frequency Electromagnetic Field Immunity Test

7.3.1. Test Specification

For Standard EN 55024 :

Standard:	EN 55024 (refer to IEC/EN 61000-4-3)
Frequency Range:	80 MHz to 1000MHz
Field Strength:	3V/m (unmodulated)
Modulation:	80%, AM(1 kHz)
Frequency Step:	1%
Polarity of Antenna	Vertical and Horizontal
Test Distance:	3 meters
Antenna Height:	1.55 meters
Dwell Time:	3 s

For Standard EN 55035 :

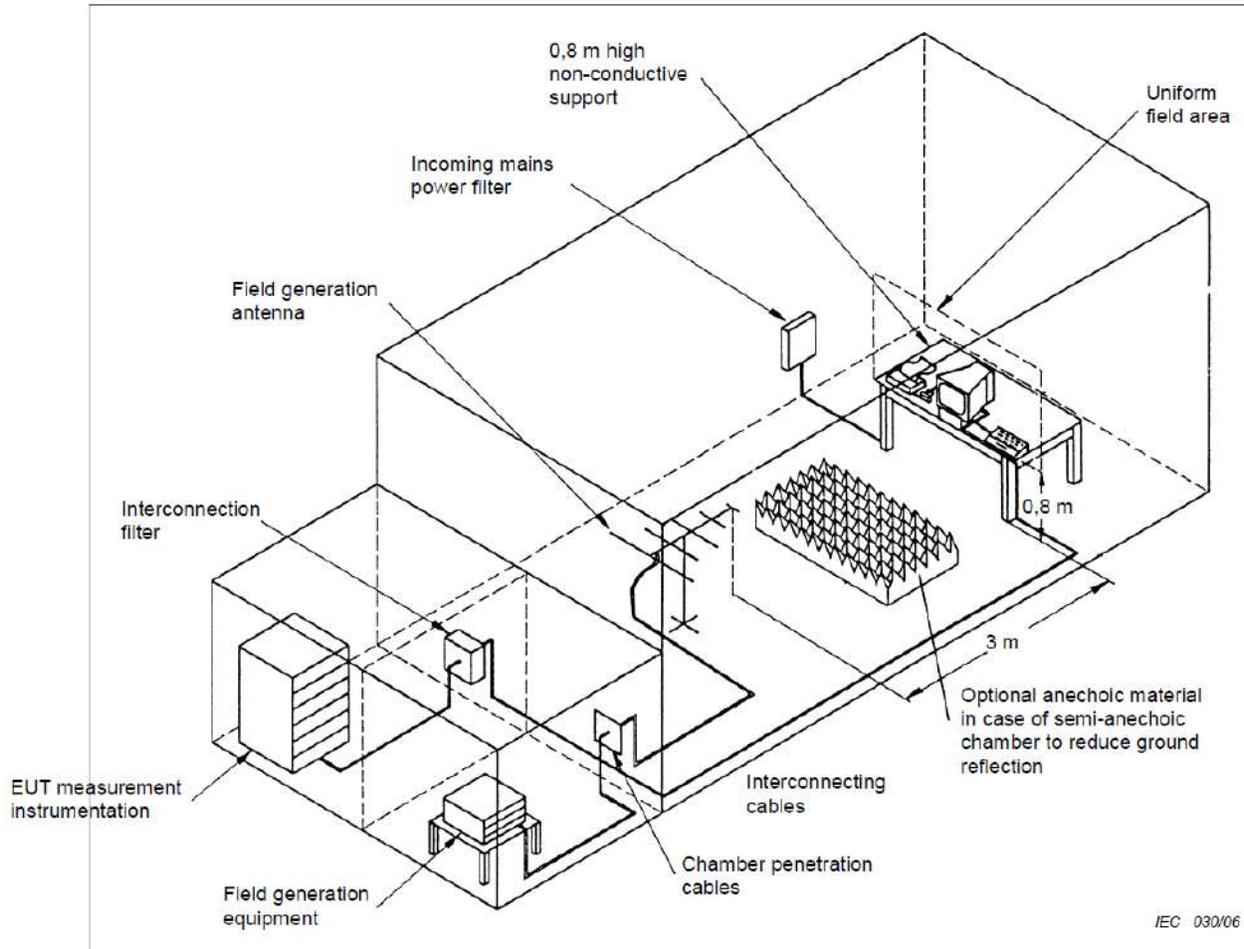
Standard:	EN 55035 (refer to IEC/EN 61000-4-3)
Frequency Range:	80 MHz to 1000MHz
Spot Frequency:	1800, 2600, 3500, 5000 MHz($\pm 1\%$)
Field Strength:	3V/m (unmodulated)
Immunity level to common wireless communication:	See Table I.1 for test frequency and level
Modulation:	80%, AM(1 kHz)
Frequency Step:	1%
Polarity of Antenna	Vertical and Horizontal
Test Distance:	3 meters
Antenna Height:	1.55 meters
Dwell Time:	3 s

7.3.2. Test Procedure

The test procedure was in accordance with IEC/EN 61000-4-3.

- a. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- b. The frequency range is swept from 80 MHz to 1000MHz with the signal 80% amplitude modulated with a 1 KHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. The field strength level from 80 MHz to 1000MHz was 3V/m.
- e. A special spot frequency test point are 1800, 2600, 3500 and 5000MHz ($\pm 1\%$)
- f. Wireless communication devices are considered to be the most significant sources of interference for MME in the range 800 MHz to 5 GHz. Consequently testing is only required at relevant spot frequencies refer to EN 55035 Annex I.
- g. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

7.3.3. Test Setup



For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

7.3.4. Test Result

EN 55024 :

Test Mode:	Mode 3, 6	Temperature:	25°C
Test Voltage:	24Vdc from DC source	Humidity:	67%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Freq. Range (MHz)	Position (Face)	Polarity (H or V)	Field Strength (V/m)	Criterion	Results	Judgment
80-1000	Front	H / V	3V/m	A	A	PASS
80-1000	Left	H / V	3V/m	A	A	PASS
80-1000	Right	H / V	3V/m	A	A	PASS
80-1000	Rear	H / V	3V/m	A	A	PASS

Note	There was no abnormal situation during the test compared with initial operation.
------	--

Customer request:

Freq. Range (MHz)	Position (Face)	Polarity (H or V)	Field Strength (V/m)	Criterion	Results	Judgment
80-1000	Front	H / V	10V/m	A	A	PASS
80-1000	Left	H / V	10V/m	A	A	PASS
80-1000	Right	H / V	10V/m	A	A	PASS
80-1000	Rear	H / V	10V/m	A	A	PASS

Note	There was no abnormal situation during the test compared with initial operation.
------	--

EN 55035 :

Test Mode:	Mode 3, 6	Temperature:	21°C
Test Voltage:	24Vdc from DC source	Humidity:	62%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Freq. Range (MHz)	Position (Face)	Polarity (H or V)	Field Strength (V/m)	Criterion	Results	Judgement
80-1000	Front / Left / Right / Rear	H / V	3V/m	A	A	PASS
80-1000	Front / Left / Right / Rear	H / V	3V/m	A	A	PASS
80-1000	Front / Left / Right / Rear	H / V	3V/m	A	A	PASS
80-1000	Front / Left / Right / Rear	H / V	3V/m	A	A	PASS
1800(±1%)	Front / Left / Right / Rear	H	3V/m	A	A	PASS
	Front / Left / Right / Rear	V	3V/m	A	A	PASS
2600(±1%)	Front / Left / Right / Rear	H	3V/m	A	A	PASS
	Front / Left / Right / Rear	V	3V/m	A	A	PASS
3500(±1%)	Front / Left / Right / Rear	H	3V/m	A	A	PASS
	Front / Left / Right / Rear	V	3V/m	A	A	PASS
5000(±1%)	Front / Left / Right / Rear	H	3V/m	A	A	PASS
	Front / Left / Right / Rear	V	3V/m	A	A	PASS
Note	There was no abnormal situation during the test compared with initial operation.					

Immunity Level to common wireless communication						
Freq. Range (MHz)	Position (Face)	Polarity (H or V)	Field Strength (V/m)	Criterion	Results	Judgement
800(±1%)	Front / Left / Right / Rear	H	3V/m	A	A	PASS
	Front / Left / Right / Rear	V	3V/m	A	A	PASS
900(±1%)	Front / Left / Right / Rear	H	3V/m	A	A	PASS
	Front / Left / Right / Rear	V	3V/m	A	A	PASS
1800(±1%)	Front / Left / Right / Rear	H	3V/m	A	A	PASS
	Front / Left / Right / Rear	V	3V/m	A	A	PASS
2600(±1%)	Front / Left / Right / Rear	H	3V/m	A	A	PASS
	Front / Left / Right / Rear	V	3V/m	A	A	PASS
3500(±1%)	Front / Left / Right / Rear	H	3V/m	A	A	PASS
	Front / Left / Right / Rear	V	3V/m	A	A	PASS
5000(±1%)	Front / Left / Right / Rear	H	3V/m	A	A	PASS
	Front / Left / Right / Rear	V	3V/m	A	A	PASS
Note	There was no abnormal situation during the test compared with initial operation.					

Customer request:

Freq. Range (MHz)	Position (Face)	Polarity (H or V)	Field Strength (V/m)	Criterion	Results	Judgement
80-1000	Front / Left / Right / Rear	H / V	10V/m	A	A	PASS
80-1000	Front / Left / Right / Rear	H / V	10V/m	A	A	PASS
80-1000	Front / Left / Right / Rear	H / V	10V/m	A	A	PASS
80-1000	Front / Left / Right / Rear	H / V	10V/m	A	A	PASS
1800(±1%)	Front / Left / Right / Rear	H	10V/m	A	A	PASS
	Front / Left / Right / Rear	V	10V/m	A	A	PASS
2600(±1%)	Front / Left / Right / Rear	H	10V/m	A	A	PASS
	Front / Left / Right / Rear	V	10V/m	A	A	PASS
3500(±1%)	Front / Left / Right / Rear	H	10V/m	A	A	PASS
	Front / Left / Right / Rear	V	10V/m	A	A	PASS
5000(±1%)	Front / Left / Right / Rear	H	10V/m	A	A	PASS
	Front / Left / Right / Rear	V	10V/m	A	A	PASS
Note	There was no abnormal situation during the test compared with initial operation.					

Immunity Level to common wireless communication						
Freq. Range (MHz)	Position (Face)	Polarity (H or V)	Field Strength (V/m)	Criterion	Results	Judgement
800(±1%)	Front / Left / Right / Rear	H	10V/m	A	A	PASS
	Front / Left / Right / Rear	V	10V/m	A	A	PASS
900(±1%)	Front / Left / Right / Rear	H	10V/m	A	A	PASS
	Front / Left / Right / Rear	V	10V/m	A	A	PASS
1800(±1%)	Front / Left / Right / Rear	H	10V/m	A	A	PASS
	Front / Left / Right / Rear	V	10V/m	A	A	PASS
2600(±1%)	Front / Left / Right / Rear	H	10V/m	A	A	PASS
	Front / Left / Right / Rear	V	10V/m	A	A	PASS
3500(±1%)	Front / Left / Right / Rear	H	10V/m	A	A	PASS
	Front / Left / Right / Rear	V	10V/m	A	A	PASS
5000(±1%)	Front / Left / Right / Rear	H	10V/m	A	A	PASS
	Front / Left / Right / Rear	V	10V/m	A	A	PASS
Note	There was no abnormal situation during the test compared with initial operation.					

7.4. Electrical Fast Transient/Burst Immunity Test

7.4.1. Test Specification

For Standard EN 55024 & EN 55035 :

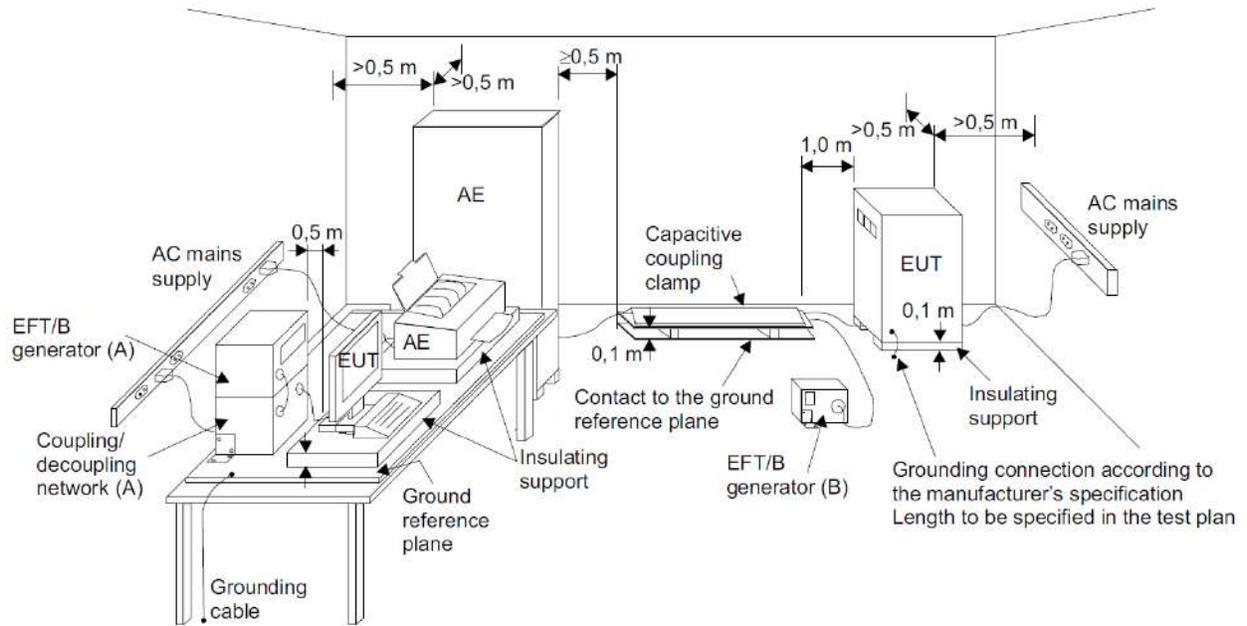
Standard:	EN 55024/ EN55035 (refer to IEC/EN 61000-4-4)
Test Voltage:	0.5,1 kV(Peak)
Polarity:	Positive and Negative
Impulse Frequency:	5 or 100 kHz
Impulse wave shape:	5/50 Tr/Th ns
Burst Duration:	15ms or 0.75ms
Burst Period:	300ms
Test Duration:	1 Minute

Note : TMR 04 & TMR 04WI series with external components according to EMC solution

7.4.2. Test Procedure

- a. The EUT was tested with 1000 volt discharges to the AC power input leads, 500 volt discharges to the signal/control ports.
- b. Both positive and negative polarity discharges were applied.
- c. Table-top equipment and equipment normally mounted on ceilings or walls as well as built-in equipment shall be tested with the EUT located $(0,1 \pm 0,01)$ m above the ground reference plane.
- d. The EUT and the auxiliary equipment were placed on a table of 0.8 m heights above a metal ground reference plane. The size of ground plane is greater than $0.8\text{m} \times 1\text{m}$ and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The minimum distance between the EUT and all other conductive structures (including the generator, AE and the walls of a shielded room), except the ground reference plane, shall be more than 0,5 m.
- e. The duration time of each test sequential was 1 minute.
- f. The transient/burst waveform was in accordance with IEC/EN 61000-4-4, 5/50ns.

7.4.3. Test Setup



IEC 645/12

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

For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

7.4.4. Test Result

EN 55024 :

Test Mode:	Mode 1~2	Temperature:	23°C
Test Voltage:	12Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	-	-			
DC power Port	DC(+)	A	A	-	-	-	-	B	A	PASS
	DC(-)	A	A	-	-	-	-	B	A	
	DC(+ & -)	A	A	-	-	-	-	B	A	
Note		There was no abnormal situation during the test compared with initial operation.								

Customer request:

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0			
DC power Port	DC(+)	-	-	-	-	A	A	A	A	PASS
	DC(-)	-	-	-	-	A	A	A	A	
	DC(+ & -)	-	-	-	-	A	A	A	A	
Note		There was no abnormal situation during the test compared with initial operation.								

Test Mode:	Mode 3, 6, 8~9	Temperature:	23°C
Test Voltage:	24Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	-	-			
DC power Port	DC(+)	A	A	-	-	-	-	B	A	PASS
	DC(-)	A	A	-	-	-	-	B	A	
	DC(+ & -)	A	A	-	-	-	-	B	A	
Note		There was no abnormal situation during the test compared with initial operation.								

Customer request:

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0			
DC power Port	DC(+)	-	-	-	-	A	A	A	A	PASS
	DC(-)	-	-	-	-	A	A	A	A	
	DC(+ & -)	-	-	-	-	A	A	A	A	
Note		There was no abnormal situation during the test compared with initial operation.								

Test Mode:	Mode 4~5, 7, 10	Temperature:	23°C
Test Voltage:	48Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	-	-			
DC power Port	DC(+)	A	A	-	-	-	-	B	A	PASS
	DC(-)	A	A	-	-	-	-	B	A	
	DC(+ & -)	A	A	-	-	-	-	B	A	
Note		There was no abnormal situation during the test compared with initial operation.								

Customer request:

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0			
DC power Port	DC(+)	-	-	-	-	A	A	A	A	PASS
	DC(-)	-	-	-	-	A	A	A	A	
	DC(+ & -)	-	-	-	-	A	A	A	A	
Note		There was no abnormal situation during the test compared with initial operation.								

EN 55035 :

Test Mode:	Mode 1~2	Temperature:	23°C
Test Voltage:	12Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	-	-			
DC power Port	DC(+)	A	A	-	-	-	-	B	A	PASS
	DC(-)	A	A	-	-	-	-	B	A	
	DC(+ & -)	A	A	-	-	-	-	B	A	
Note		There was no abnormal situation during the test compared with initial operation.								

Customer request:

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0			
DC power Port	DC(+)	-	-	-	-	A	A	A	A	PASS
	DC(-)	-	-	-	-	A	A	A	A	
	DC(+ & -)	-	-	-	-	A	A	A	A	
Note		There was no abnormal situation during the test compared with initial operation.								

Test Mode:	Mode 3, 6, 8~9	Temperature:	23°C
Test Voltage:	24Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	-	-			
DC power Port	DC(+)	A	A	-	-	-	-	B	A	PASS
	DC(-)	A	A	-	-	-	-	B	A	
	DC(+ & -)	A	A	-	-	-	-	B	A	
Note		There was no abnormal situation during the test compared with initial operation.								

Customer request:

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0			
DC power Port	DC(+)	-	-	-	-	A	A	A	A	PASS
	DC(-)	-	-	-	-	A	A	A	A	
	DC(+ & -)	-	-	-	-	A	A	A	A	
Note		There was no abnormal situation during the test compared with initial operation.								

Test Mode:	Mode 4~5, 7, 10	Temperature:	23°C
Test Voltage:	48Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	-	-			
DC power Port	DC(+)	A	A	-	-	-	-	B	A	PASS
	DC(-)	A	A	-	-	-	-	B	A	
	DC(+ & -)	A	A	-	-	-	-	B	A	
Note		There was no abnormal situation during the test compared with initial operation.								

Customer request:

Repetition Frequency		5kHz						Criteria	Results	Judgement
Test Port		Test Levels (kV)								
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0			
DC power Port	DC(+)	-	-	-	-	A	A	A	A	PASS
	DC(-)	-	-	-	-	A	A	A	A	
	DC(+ & -)	-	-	-	-	A	A	A	A	
Note		There was no abnormal situation during the test compared with initial operation.								

7.5. Surge Immunity Test

7.5.1. Test Specification

For Standard EN 55024 :

Standard:	EN 55024 (refer to IEC/EN 61000-4-5)
Waveform:	1.2/50 (8/20) Tr/Th μ s , 10/700 Tr/Th μ s
Test Voltage:	0.5,1 kV(Line to Line) 0.5,1,2 kV(Line to Earth)
Polarity:	Positive and Negative
Phase Angle:	0°/90°/180°/270°
Repetition Rate:	1 per minute
Times:	5 times each polarity

For Standard EN 55035 :

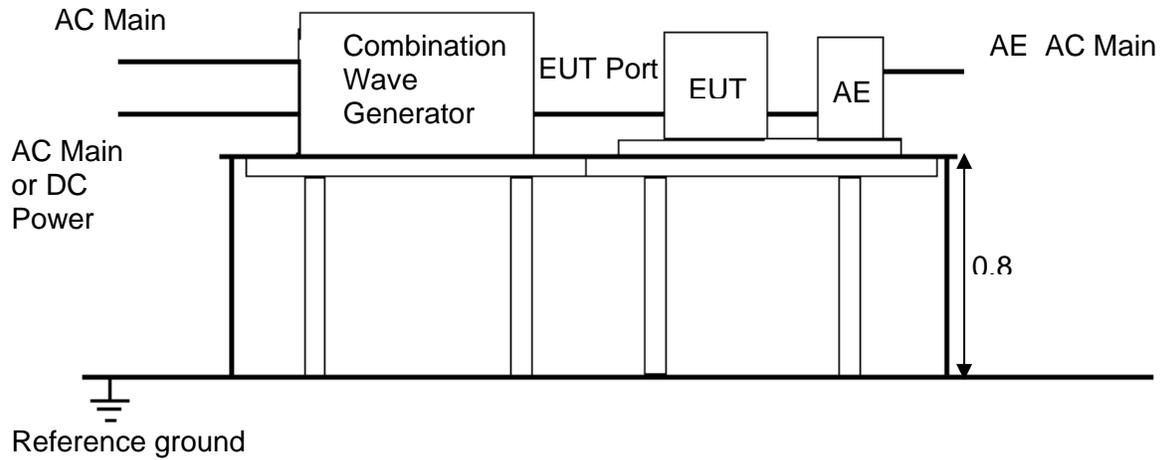
Standard:	EN 55035 (refer to IEC/EN 61000-4-5)
Waveform:	1.2/50 (8/20) Tr/Th μ s , 10/700 Tr/Th μ s
Test Voltage:	0.5,1 kV(Line to Line) 0.5,1,2 kV(Line to Earth)
Polarity:	Positive and Negative
Phase Angle:	90°/270°
Repetition Rate:	1 per minute
Times:	5 times each polarity

Note : TMR 04 & TMR 04WI series with external components according to EMC solution

7.5.2. Test Procedure

- a. The EUT and the auxiliary equipment were placed on a table of 0.8m heights above a metal ground reference plane. The size of ground plane is greater than 1m×1m and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT shall not exceed 2 meters (provided by the manufacturer).
- b. The EUT was connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise was applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).
- c. The surges were applied line to line and line(s) to earth. When testing line to earth the test voltage was applied successively between each of the lines and earth. Steps up to the test level specified increased the test voltage. All lower levels including the selected test level were tested. The polarity of each surge level included positive and negative test pulses.
- d. If EUT was included telecom port and connected to outdoor directly, test shall be applied to line to earth test using 10/700 surge wave form. If the wave form affects the functioning of high speed data port, the test shall be carried out using 1.2/50 wave form do the test.

7.5.3. Test Setup



For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

7.5.4. Test Result

EN 55024 :

Test Mode:	Mode 1~2	Temperature:	23°C
Test Voltage:	12Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgment
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-kV			
DC power Port + to -	+	-	A	-	-	-	B	A	PASS
	-	-	A	-	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

Customer request:

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgment
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-kV			
DC power Port + to -	+	-	-	A	-	-	A	A	PASS
	-	-	-	A	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

Test Mode:	Mode 3, 6, 8~9	Temperature:	23°C
Test Voltage:	24Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgment
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-kV			
DC power Port + to -	+	-	A	-	-	-	B	A	PASS
	-	-	A	-	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

Customer request:

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgment
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-kV			
DC power Port + to -	+	-	-	A	-	-	A	A	PASS
	-	-	-	A	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

Test Mode:	Mode 4~5, 7, 10	Temperature:	23°C
Test Voltage:	48Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgment
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-kV			
DC power Port + to -	+	-	A	-	-	-	B	A	PASS
	-	-	A	-	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

Customer request:

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgment
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-kV			
DC power Port + to -	+	-	-	A	-	-	A	A	PASS
	-	-	-	A	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

EN 55035 :

Test Mode:	Mode 1~2	Temperature:	23°C
Test Voltage:	12Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgement
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-			
DC power Port + to -	+	-	A	-	-	-	B	A	PASS
	-	-	A	-	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

Customer request:

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgement
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-			
DC power Port + to -	+	-	-	A	-	-	A	A	PASS
	-	-	-	A	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

Test Mode:	Mode 3, 6, 8~9	Temperature:	23°C
Test Voltage:	24Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgement
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-			
DC power Port + to -	+	-	A	-	-	-	B	A	PASS
	-	-	A	-	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

Customer request:

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgement
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-			
DC power Port + to -	+	-	-	A	-	-	A	A	PASS
	-	-	-	A	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

Test Mode:	Mode 4~5, 7, 10	Temperature:	23°C
Test Voltage:	48Vdc from DC source	Humidity:	61%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgement
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-			
DC power Port + to -	+	-	A	-	-	-	B	A	PASS
	-	-	A	-	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

Customer request:

Wave Form EUT Ports Tested	1.2/50(8/20)Ti/Th us						Criteria	Results	Judgement
	Polarity	Phase	Voltage						
			0.5kV	1kV	2kV	-			
DC power Port + to -	+	-	-	A	-	-	A	A	PASS
	-	-	-	A	-	-			
Note	There was no abnormal situation during the test compared with initial operation.								

7.6. Immunity to Conducted Disturbances Induced by RF Fields

7.6.1. Test Specification

For Standard EN 55024 :

Standard:	EN 55024 (refer to IEC/EN 61000-4-6)
Frequency Range:	0.15-80MHz
Field Strength:	3V (unmodulated, r.m.s.)
Modulation:	80% AM (1 kHz)
Frequency Step:	1%
Dwell Time:	3s

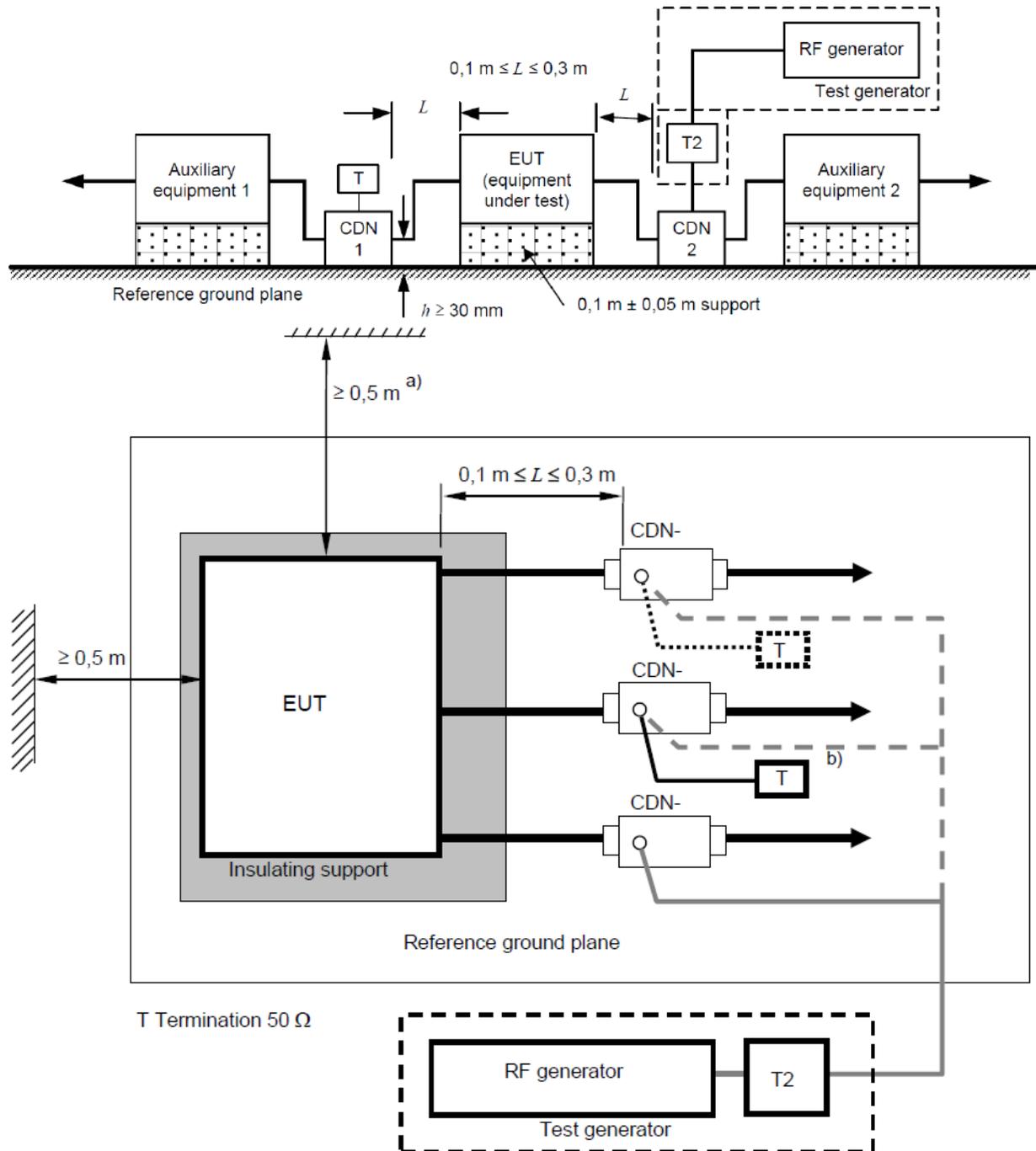
For Standard EN 55035 :

Standard:	EN 55035 (refer to IEC/EN 61000-4-6)
Frequency Range:	0.15-10; 10-30; 30-80MHz
Field Strength:	3V; 3 to 1V; 1V (unmodulated, r.m.s.)
Modulation:	80% AM (1 kHz)
Frequency Step:	1%
Dwell Time:	3s

7.6.2. Test Procedure

- a. The EUT shall be tested within its intended operating and climatic conditions.
- b. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.
- c. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80% amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value where the frequency is swept incrementally.
- d. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequencies and harmonics or frequencies of dominant interest, shall be analyzed separately.
- e. Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

7.6.3. Test Setup



- a) The EUT clearance from any metallic objects other than test equipment shall be at least 0,5 m.
- b) Only one of the CDNs not used for injection shall be terminated with 50 Ω, providing only a return path. All other CDNs shall be configured as decoupling networks.

For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

7.6.4. Test Result

EN 55024 :

Test Mode:	Mode 3, 6	Temperature:	26°C
Test Voltage:	24Vdc from DC source	Humidity:	57%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	CDN	Criteria	Results	Judgment
DC Power Port	0.15 --- 80	3V(rms) AM Modulated 1000Hz, 80%	M016(M2)	A	A	PASS
Note	There was no abnormal situation during the test compared with initial operation.					

Customer request:

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	CDN	Criteria	Results	Judgment
DC Power Port	0.15 --- 80	10V(rms) AM Modulated 1000Hz, 80%	M016(M2)	A	A	PASS
Note	There was no abnormal situation during the test compared with initial operation.					

EN 55035 :

Test Mode:	Mode 3, 6	Temperature:	26°C
Test Voltage:	24Vdc from DC source	Humidity:	57%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	CDN	Criteria	Results	Judgement
DC Power Port	0.15 --- 10	3V(rms) AM Modulated 1000Hz, 80%	M016(M2)	A	A	PASS
	10 --- 30	3 to 1V(rms) AM Modulated 1000Hz, 80%		A	A	PASS
	30 --- 80	1V(rms) AM Modulated 1000Hz, 80%		A	A	PASS
Note	There was no abnormal situation during the test compared with initial operation.					

Customer request:

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	CDN	Criteria	Results	Judgement
DC Power Port	0.15 --- 80	10V(rms) AM Modulated 1000Hz, 80%	M016(M2)	A	A	PASS
Note	There was no abnormal situation during the test compared with initial operation.					

7.7. Power frequency magnetic field immunity Test

7.7.1. Test Specification

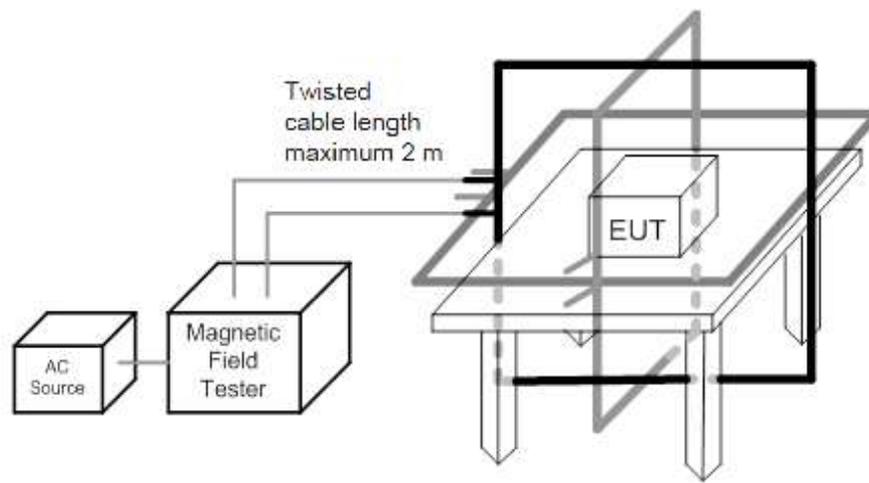
For Standard EN 55024 & EN 55035 :

Standard:	EN 55024/ EN 55035 (refer to IEC/EN 61000-4-8)
Frequency Range:	50 Hz
Field Strength:	1 A/m 3, 10, 30, 100 A/m for Continuous (Client request) 300, 1000 A/m for short duration (Client request)
Observation Time:	1 minute for continuous 1s to 3s for short duration
Inductance Coil:	Rectangular type, 1m*1m

7.7.2. Test Procedure

- a. The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.
- b. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
- c. The cables supplied or recommended by the equipment manufacturer shall be used 1 meter of all cables used shall be exposed to the magnetic field.
- d. The EUT with coil shall be leave all magnetic material and wall 1m away in any axis during the test.
- e. The cable length from generator to coil shall be less than 2m
- f. The background noise shall be 20dB less than test field strength.
- g. Test shall be applied to three axis X, Y, Z and disturbance over 1 minute and short term disturbance over 1 to 3 seconds.
- h. All cables shall be exposed to the magnetic field for 1m of their length.
- i. For magnetic field strength less than or equal to 30A/m the transformer shall be used MC 2630, for magnetic strength greater than 30A/m, the transformer shall be used MFT 100.

7.7.3. Test Setup



Note:

TABLE-TOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50% of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

For the actual test configuration, please refer to Appendix I: Photographs of the Test Configuration.

7.7.4. Test Results

EN 55024 :

Test Mode:	Mode 3, 6	Temperature:	24°C
Test Voltage:	24Vdc from DC source	Humidity:	56%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Level	Magnetic Field Strength (A/m)	Criterion	Results			Judgement
			X	Y	Z	
1	1	A	A	A	A	PASS
2	3	/	/	/	/	
3	10	/	/	/	/	
4	30	/	/	/	/	
5	100	/	/	/	/	
X	Special	/	/	/	/	
Note	There was no abnormal situation during the test compared with initial operation.					

Customer request:

Level	Magnetic Field Strength (A/m)	Criterion	Results			Judgement
			X	Y	Z	
1	1	/	/	/	/	PASS
2	3	A	A	A	A	
3	10	/	/	/	/	
4	30	/	/	/	/	
5	100	/	/	/	/	
X	Special	/	/	/	/	
Note	There was no abnormal situation during the test compared with initial operation.					

Test Mode:	Mode 3, 6	Temperature:	24°C
Test Voltage:	24Vdc from DC source	Humidity:	56%RH
Tested By:	Rupert Huang	Test Date:	Dec. 9, 2020

Customer request:

Level	Magnetic Field Strength (A/m)	Criterion	Results			Judgement
			X	Y	Z	
1	1	A	A	A	A	PASS
2	3	/	/	/	/	
3	10	/	/	/	/	
4	30	/	/	/	/	
5	100	A	A	A	A	
X	Special	/	/	/	/	
Note	There was no abnormal situation during the test compared with initial operation.					

(Short Term: 1 s)

Level	Magnetic Field Strength (A/m)	Criterion	Results			Judgement
			X	Y	Z	
4	300	/	/	/	/	PASS
5	1000	A	A	A	A	
X	Special	/	/	/	/	
Note	There was no abnormal situation during the test compared with initial operation.					

EN 55035 :

Test Mode:	Mode 3, 6	Temperature:	24°C
Test Voltage:	24Vdc from DC source	Humidity:	56%RH
Tested By:	Edison Lin	Test Date:	May 8, 2020

Level	Magnetic Field Strength (A/m)	Criterion	Results			Judgement
			X	Y	Z	
1	1	A	A	A	A	PASS
2	3	/	/	/	/	
3	10	/	/	/	/	
4	30	/	/	/	/	
5	100	/	/	/	/	
X	Special	/	/	/	/	
Note	There was no abnormal situation during the test compared with initial operation.					

Customer request:

Level	Magnetic Field Strength (A/m)	Criterion	Results			Judgement
			X	Y	Z	
1	1	/	/	/	/	PASS
2	3	A	A	A	A	
3	10	/	/	/	/	
4	30	/	/	/	/	
5	100	/	/	/	/	
X	Special	/	/	/	/	
Note	There was no abnormal situation during the test compared with initial operation.					

Test Mode:	Mode 3, 6	Temperature:	24°C
Test Voltage:	24Vdc from DC source	Humidity:	56%RH
Tested By:	Rupert Huang	Test Date:	Dec. 9, 2020

Customer request:

Level	Magnetic Field Strength (A/m)	Criterion	Results			Judgement
			X	Y	Z	
1	1	A	A	A	A	PASS
2	3	/	/	/	/	
3	10	/	/	/	/	
4	30	/	/	/	/	
5	100	A	A	A	A	
X	Special	/	/	/	/	
Note	There was no abnormal situation during the test compared with initial operation.					

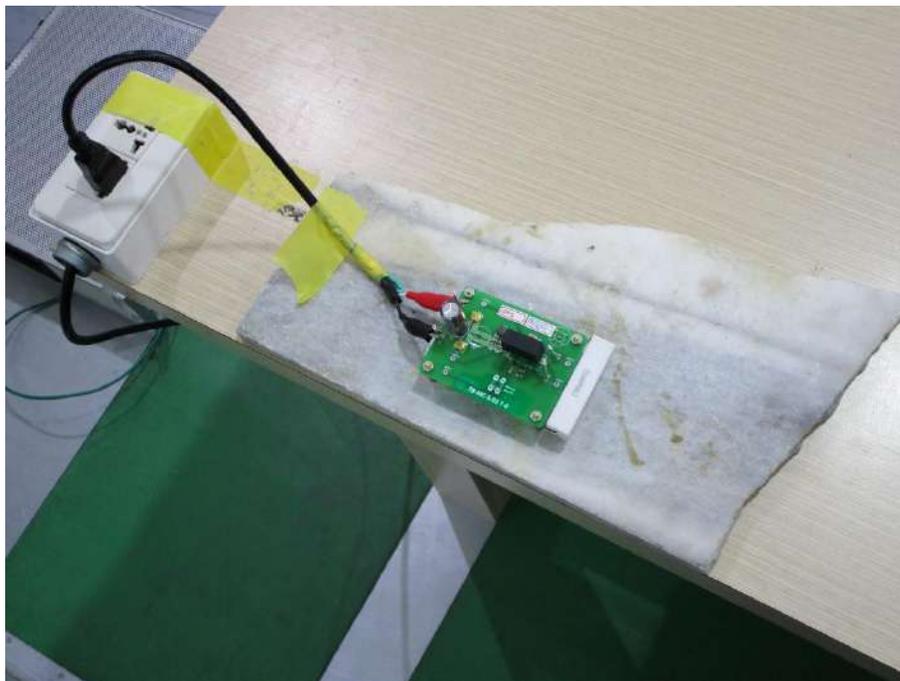
(Short Term: 1 s)

Level	Magnetic Field Strength (A/m)	Criterion	Results			Judgement
			X	Y	Z	
4	300	/	/	/	/	PASS
5	1000	A	A	A	A	
X	Special	/	/	/	/	
Note	There was no abnormal situation during the test compared with initial operation.					

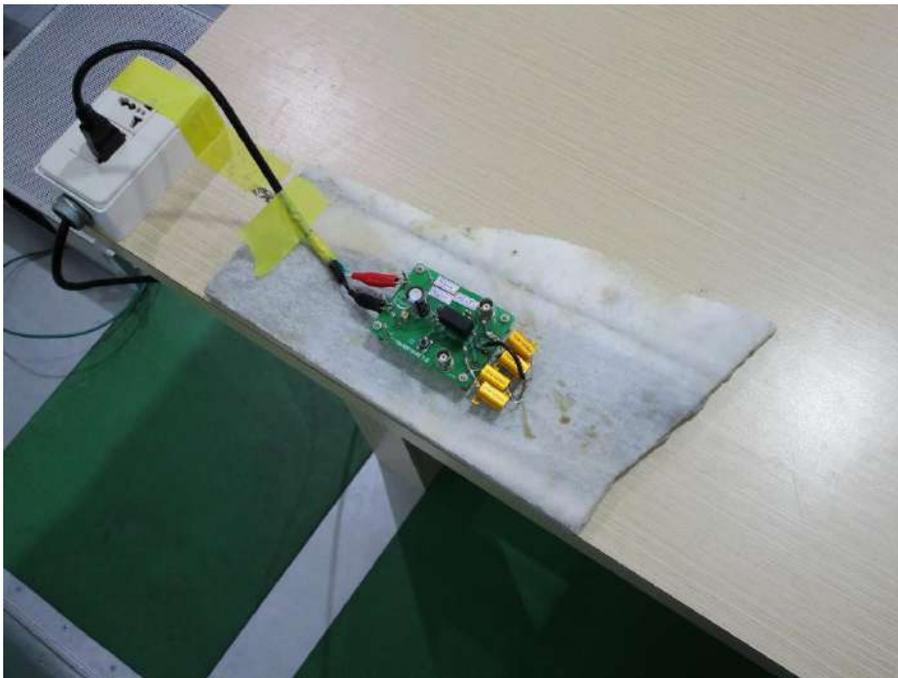
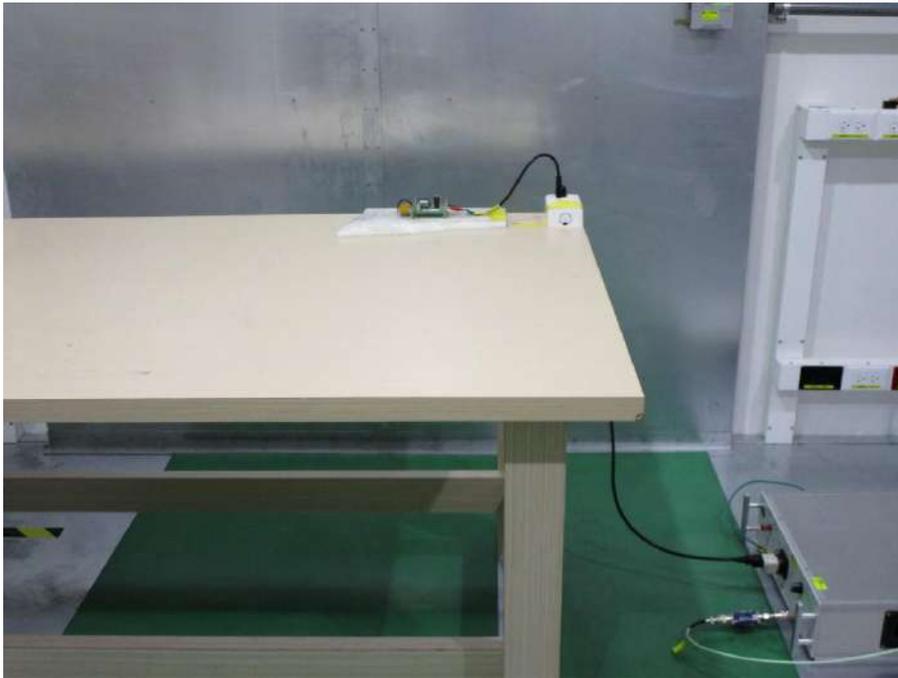
Appendix I: Photographs of EMC Test Configuration

Conducted Disturbance

Mode 3



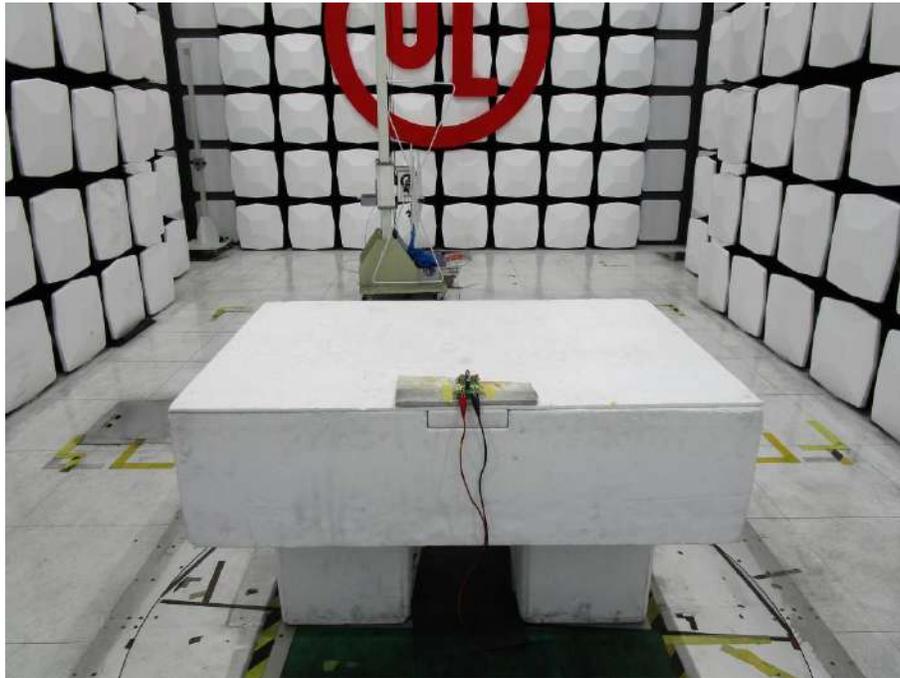
Mode 6



Radiated Disturbance
Below 1GHz
Mode 3



Mode 6

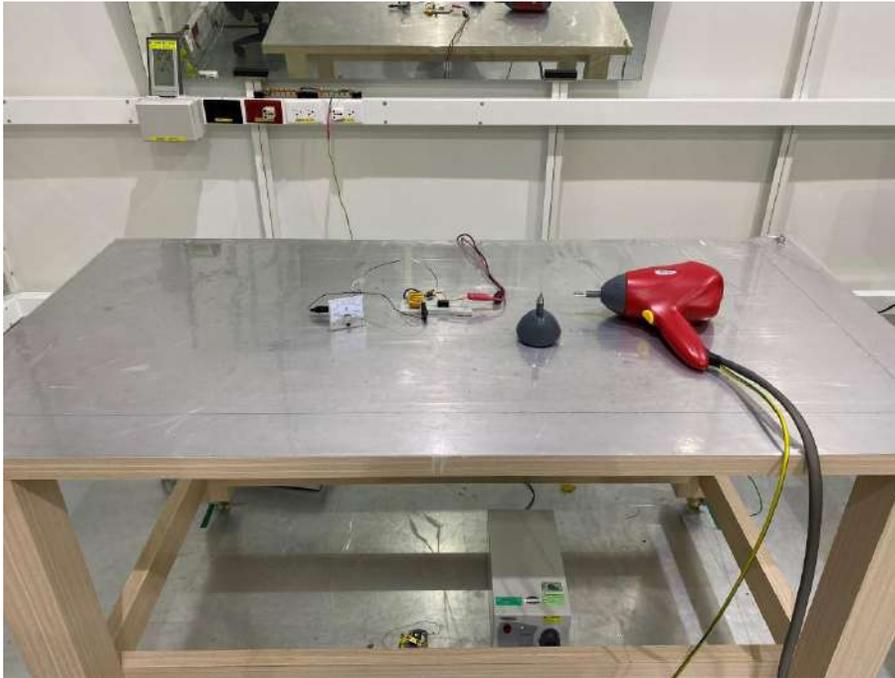


Electrostatic Discharge Immunity

Mode 3

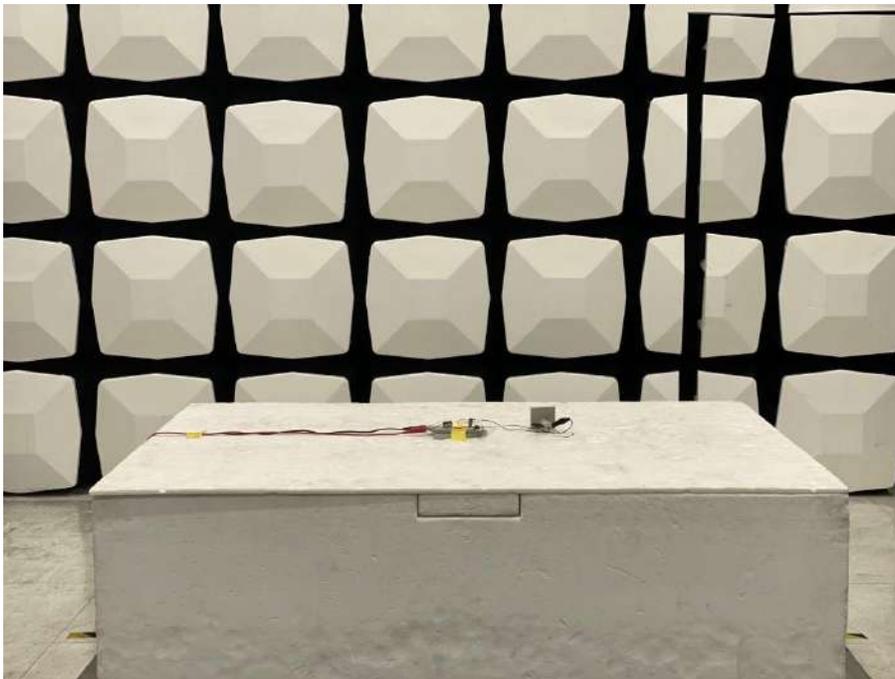
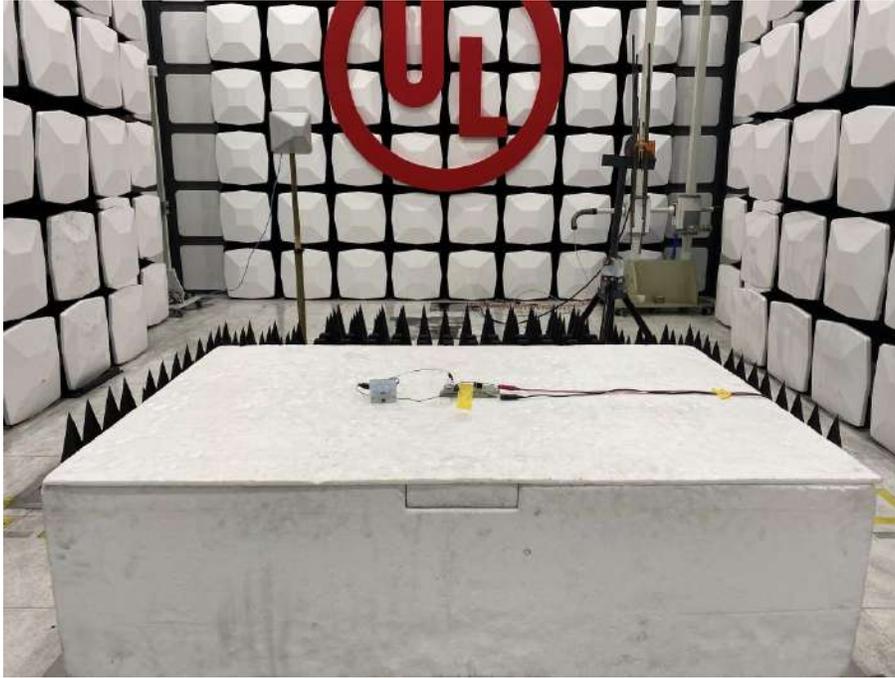


Mode 6

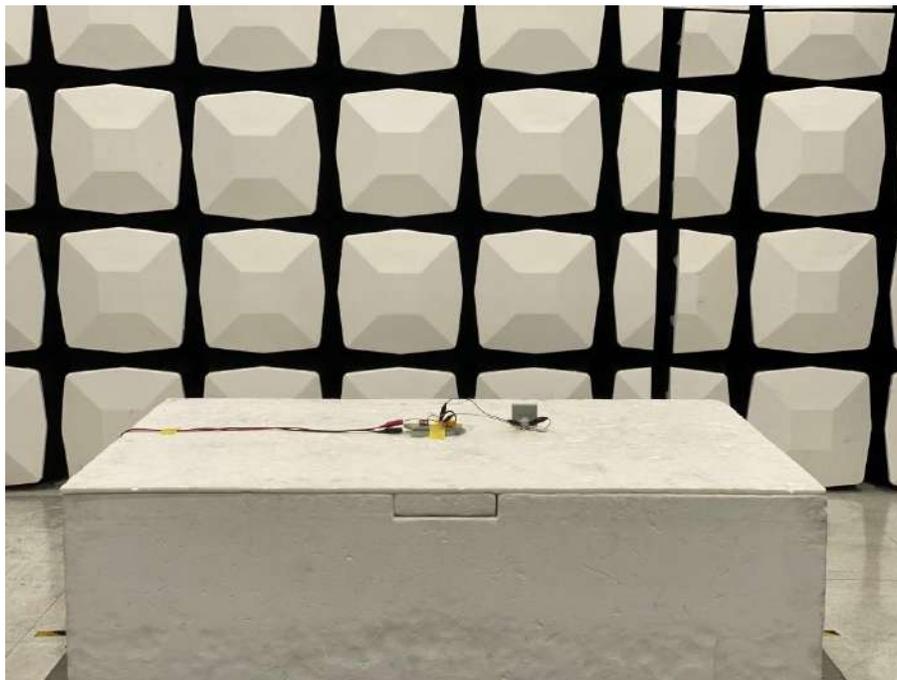
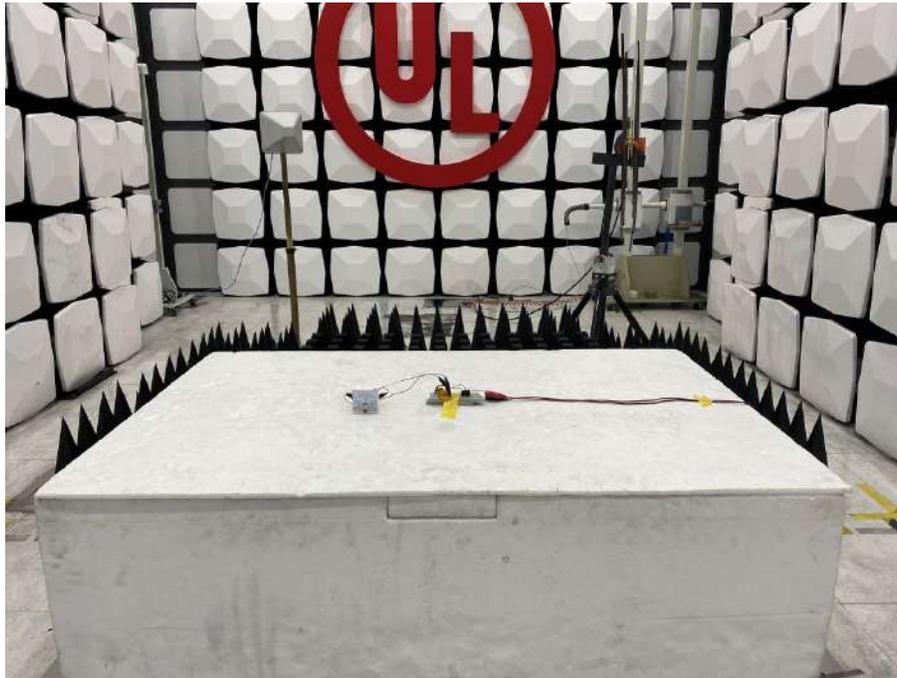


Radio Frequency Electromagnetic Field Immunity

Mode 3

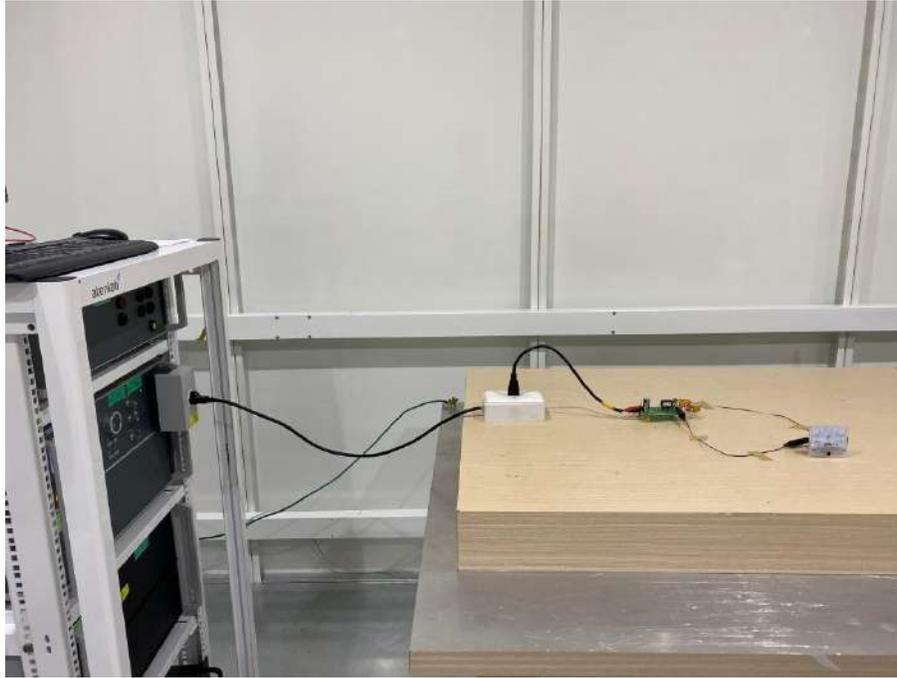


Mode 6

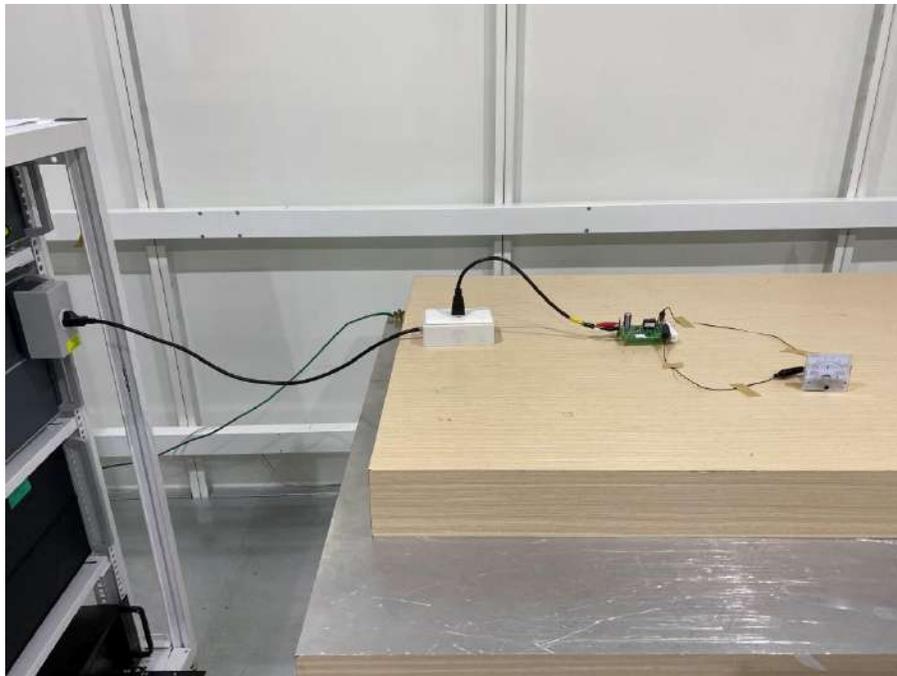


Electrical Fast Transient/ Surge Immunity

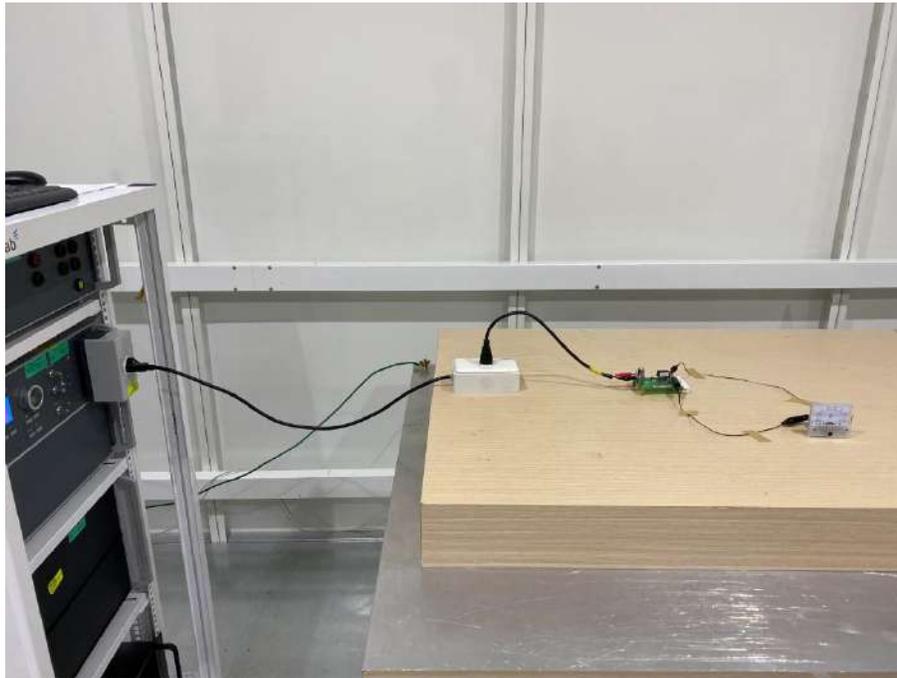
Mode 1



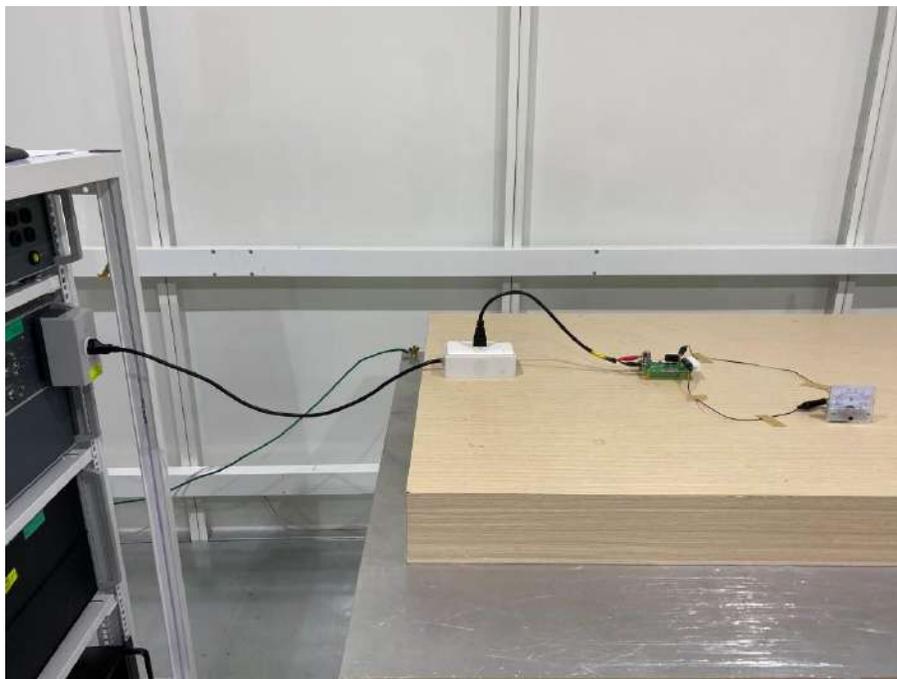
Mode 2



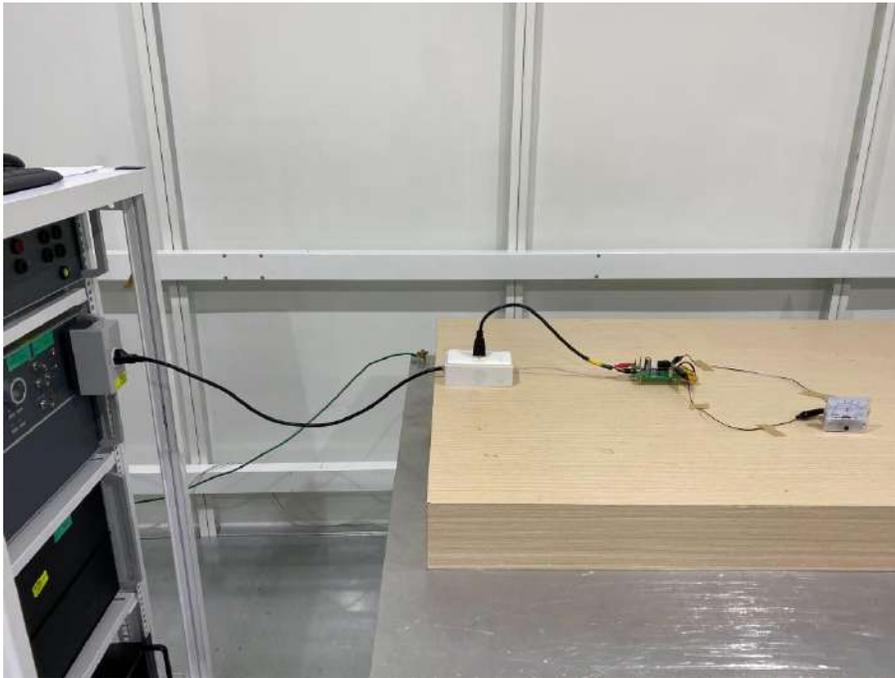
Mode 3



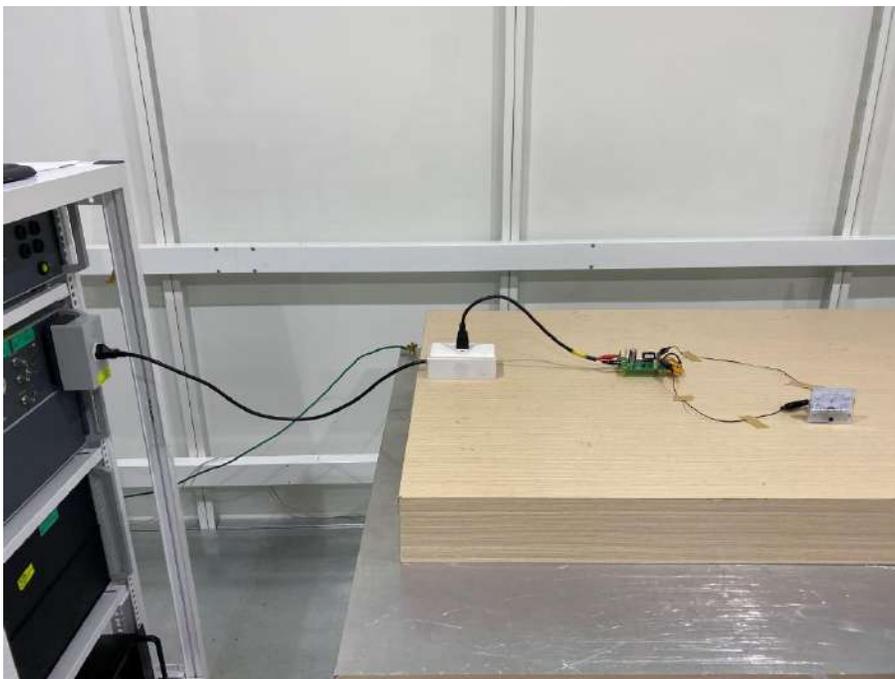
Mode 4



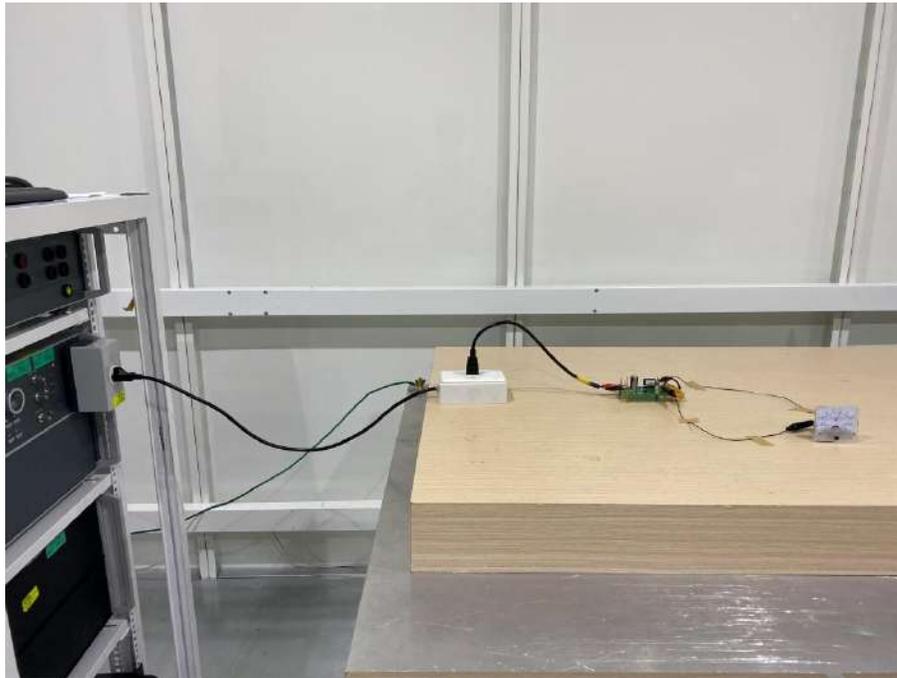
Mode 5



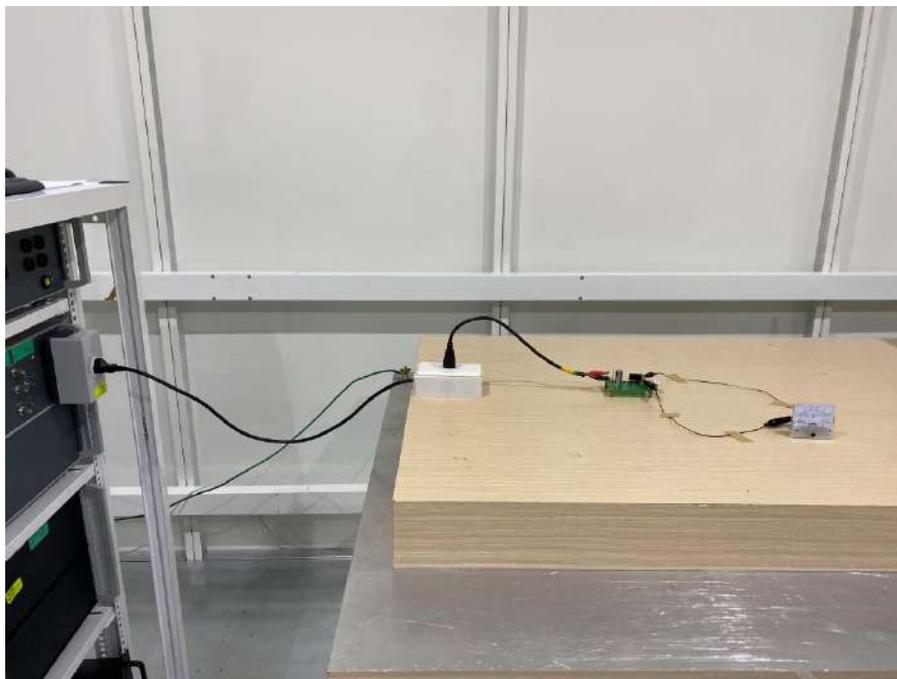
Mode 6



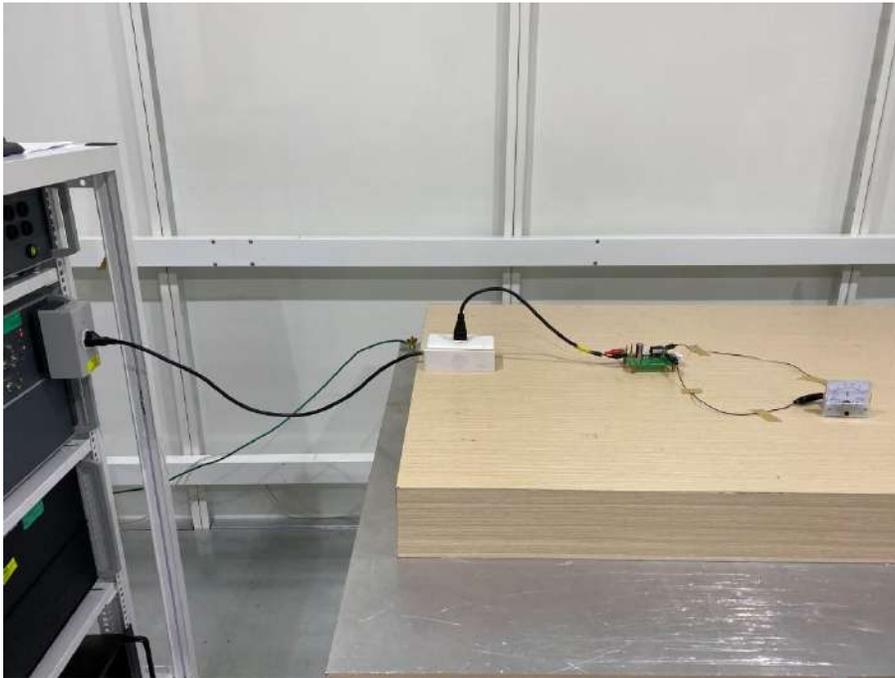
Mode 7



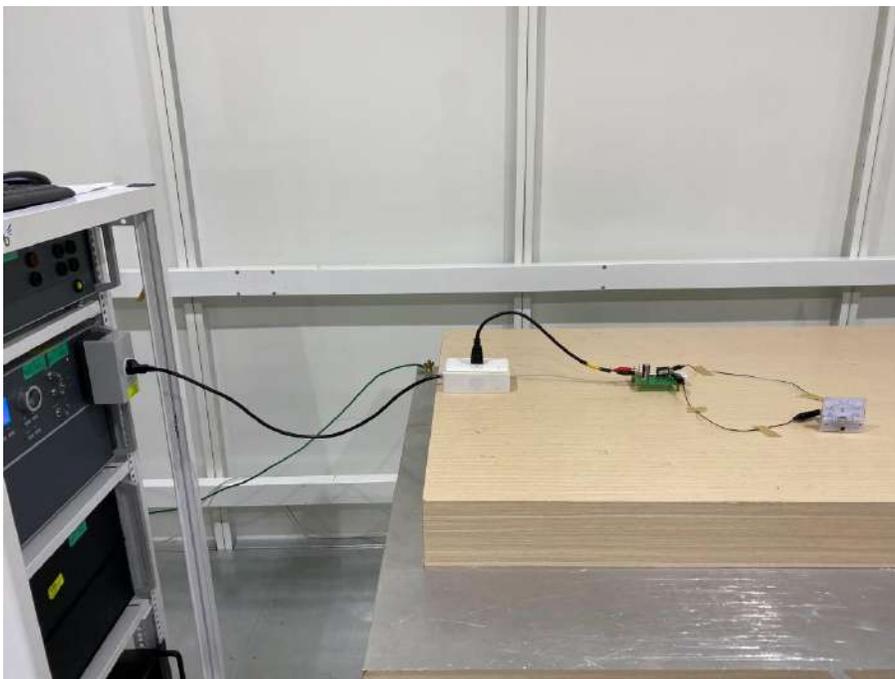
Mode 8



Mode 9

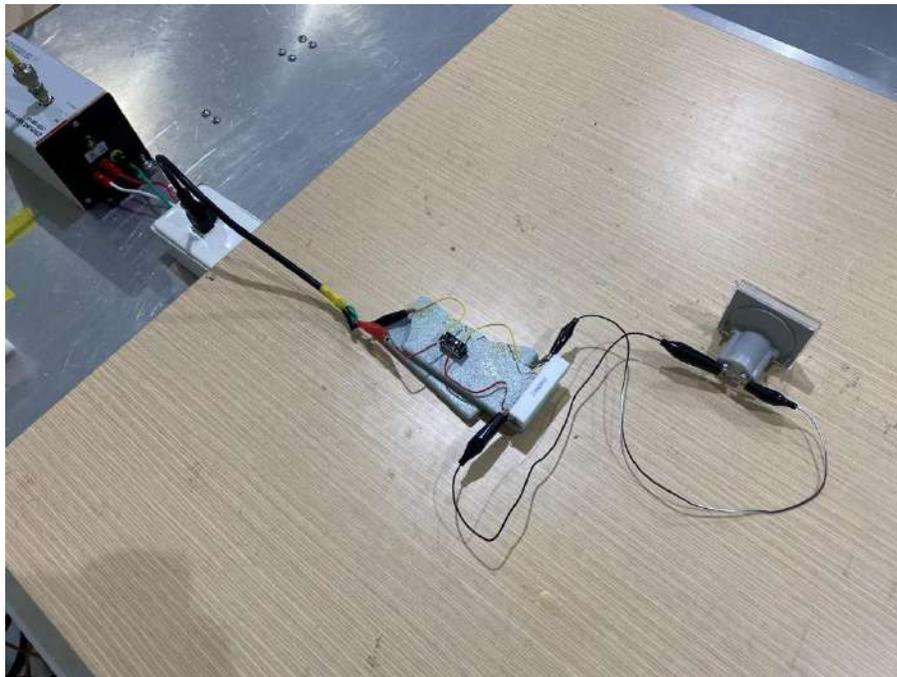
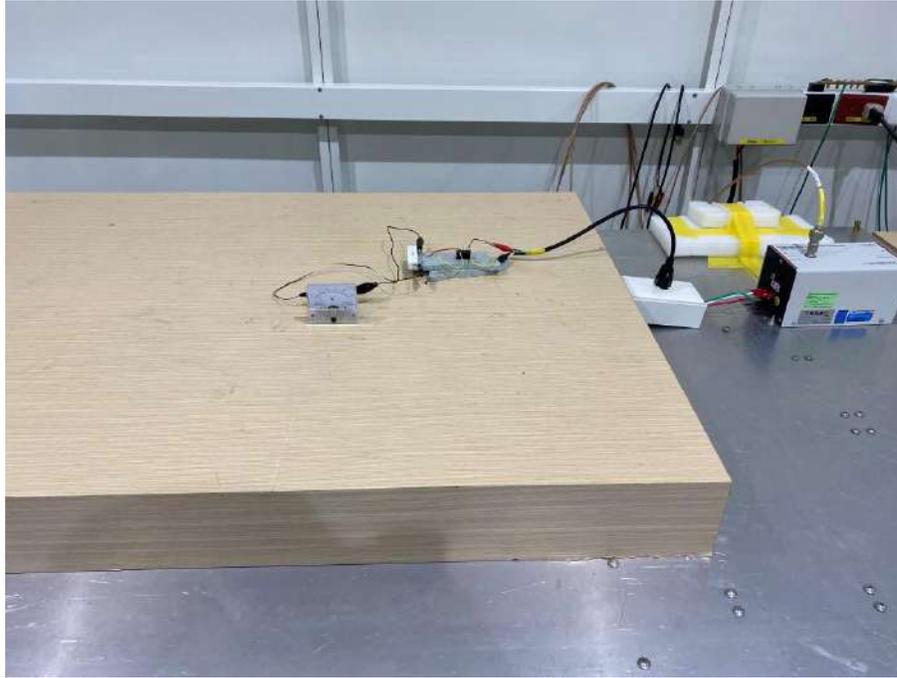


Mode 10

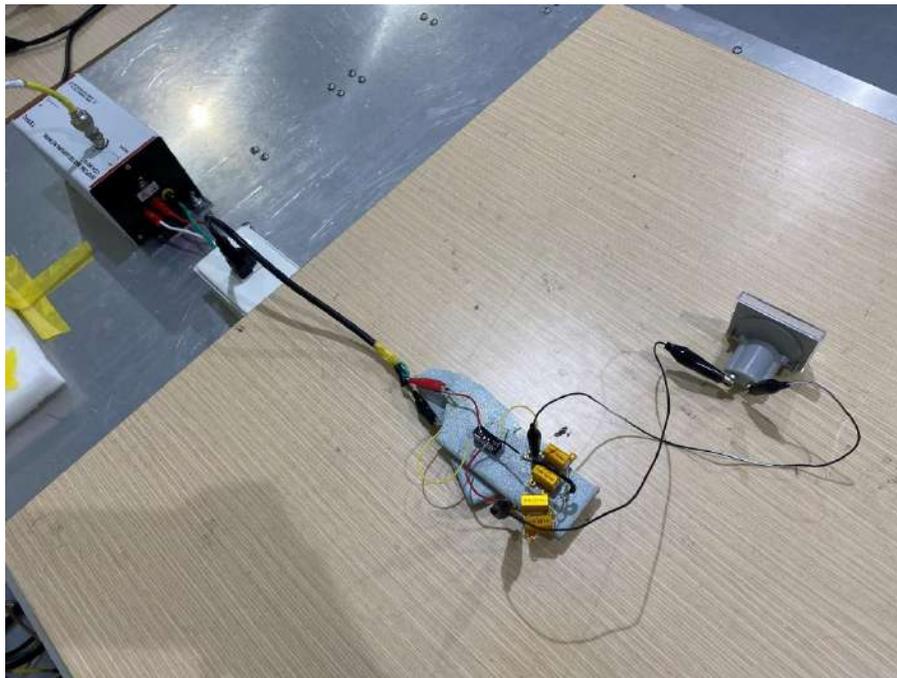
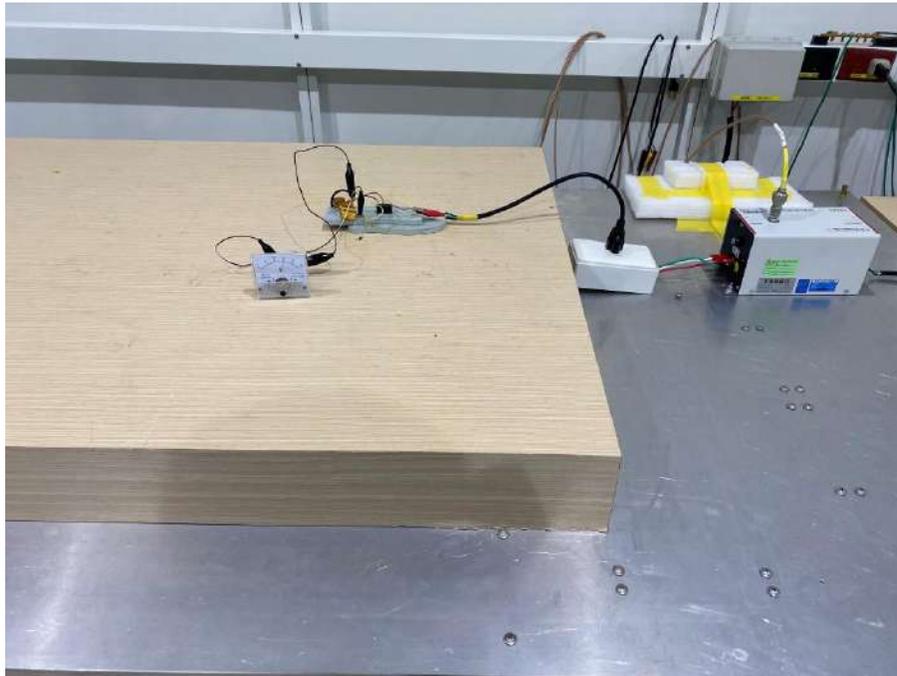


Immunity to conducted disturbances induced by RF fields

Mode 3

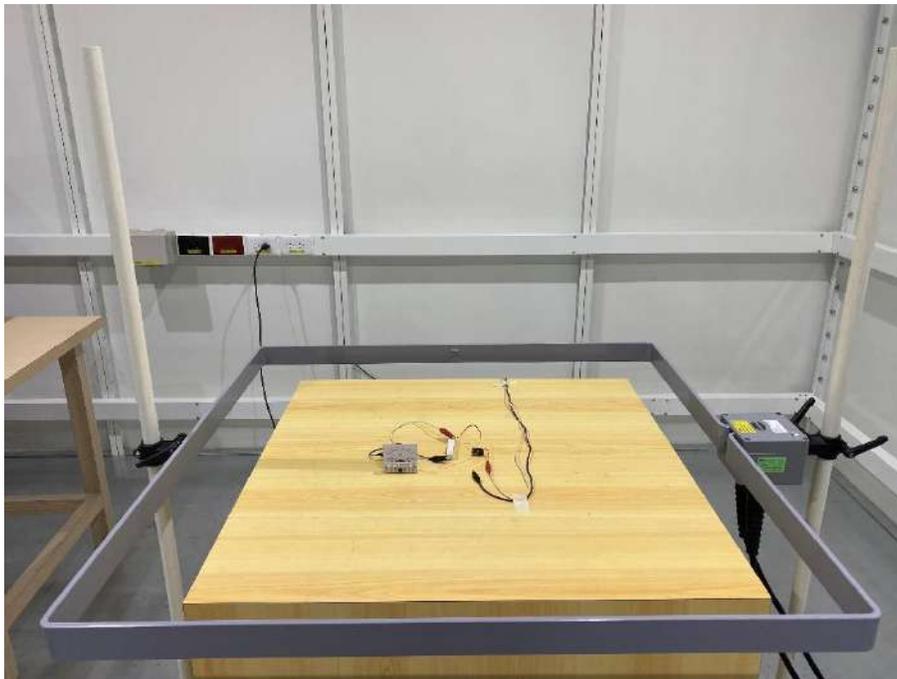
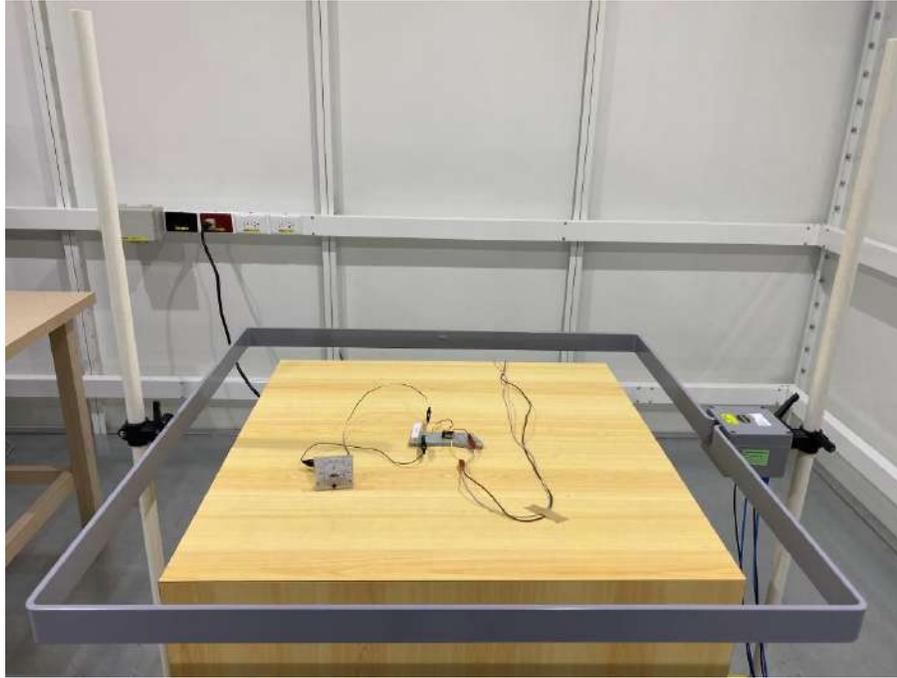


Mode 6

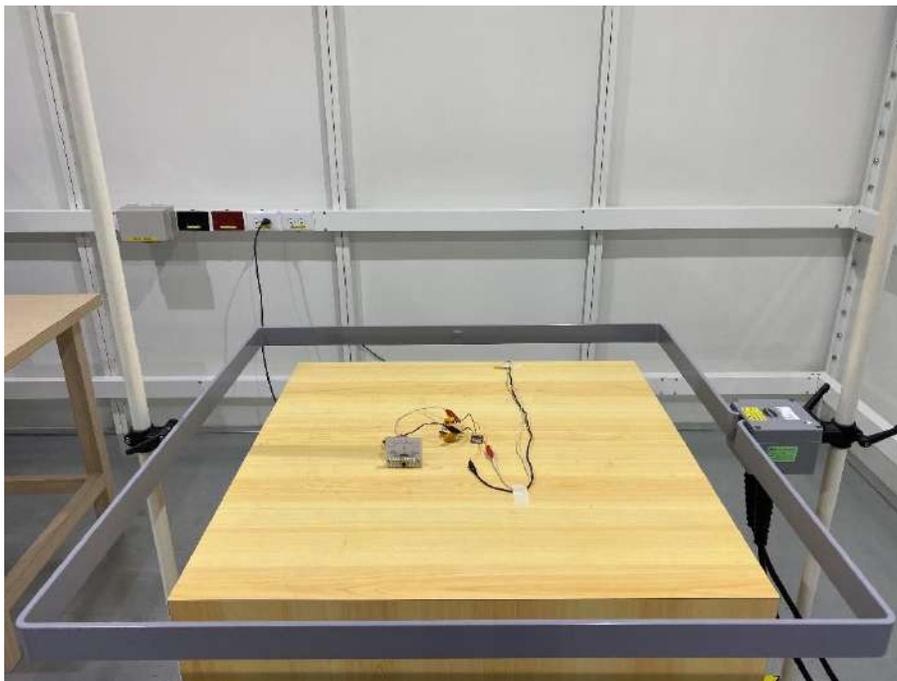
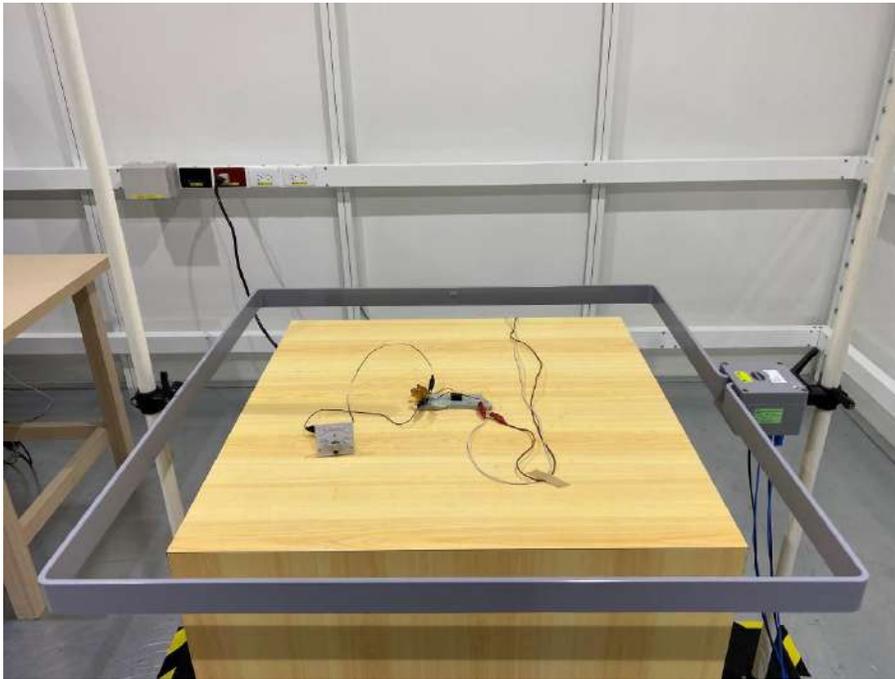


Power frequency magnetic field immunity

Mode 3

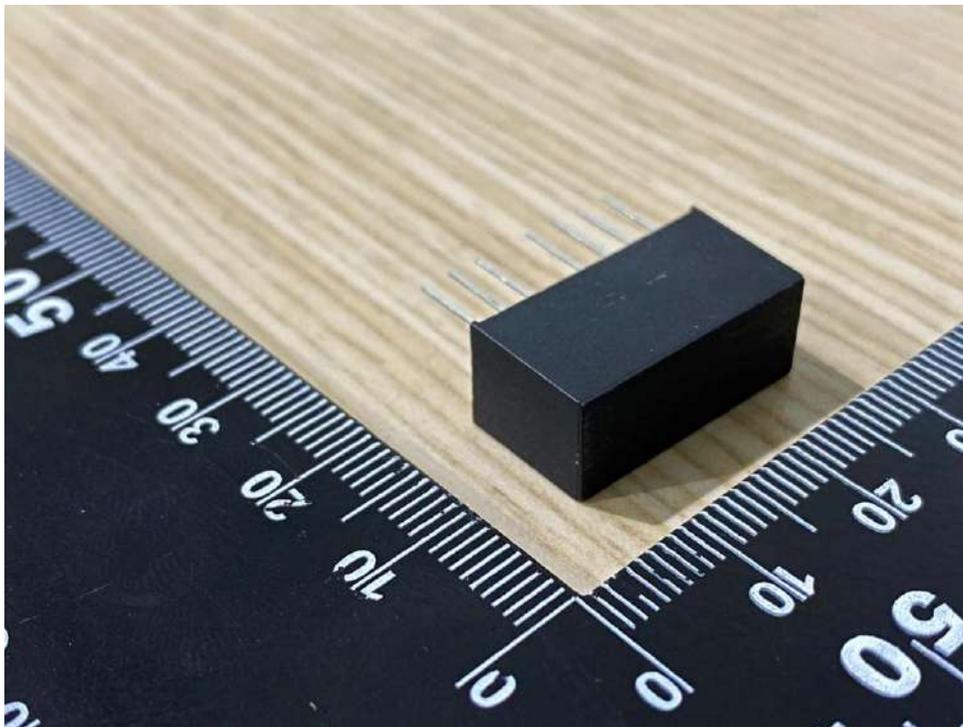
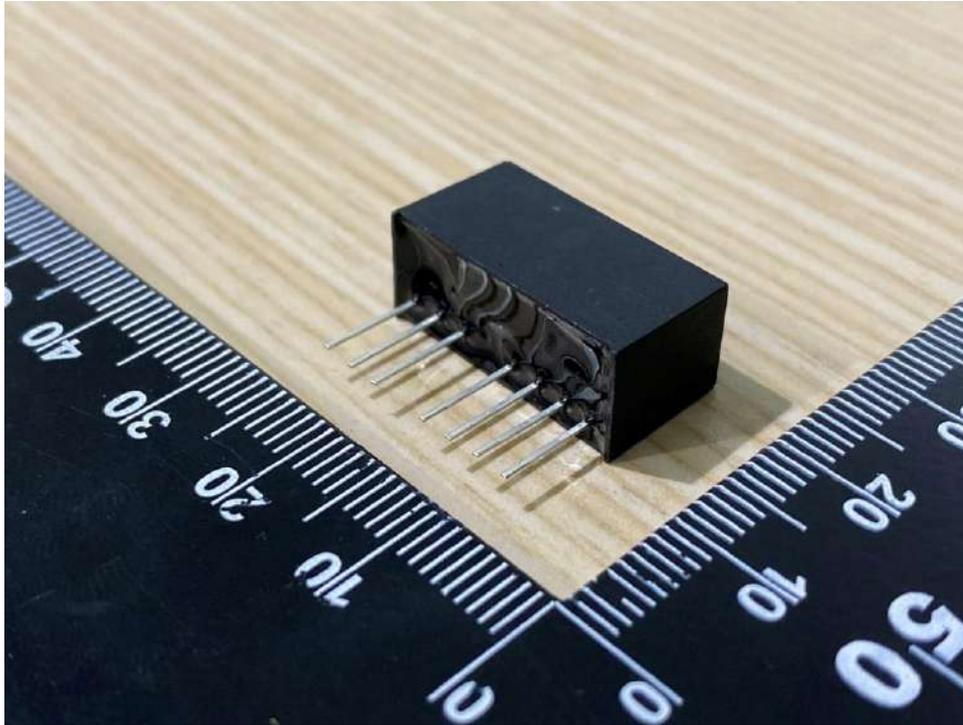


Mode 6

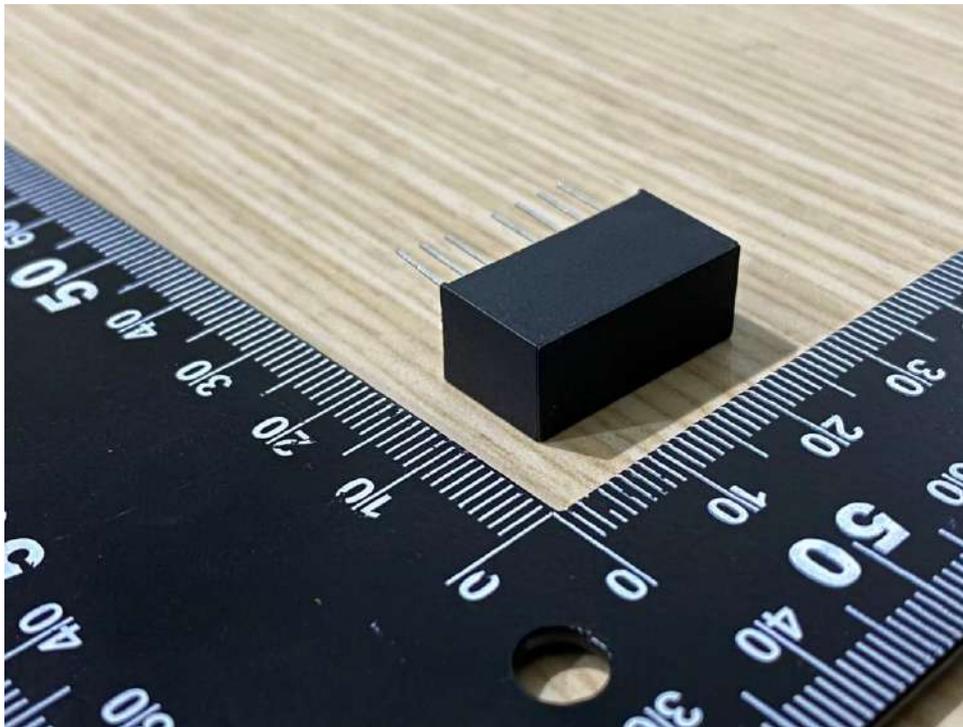
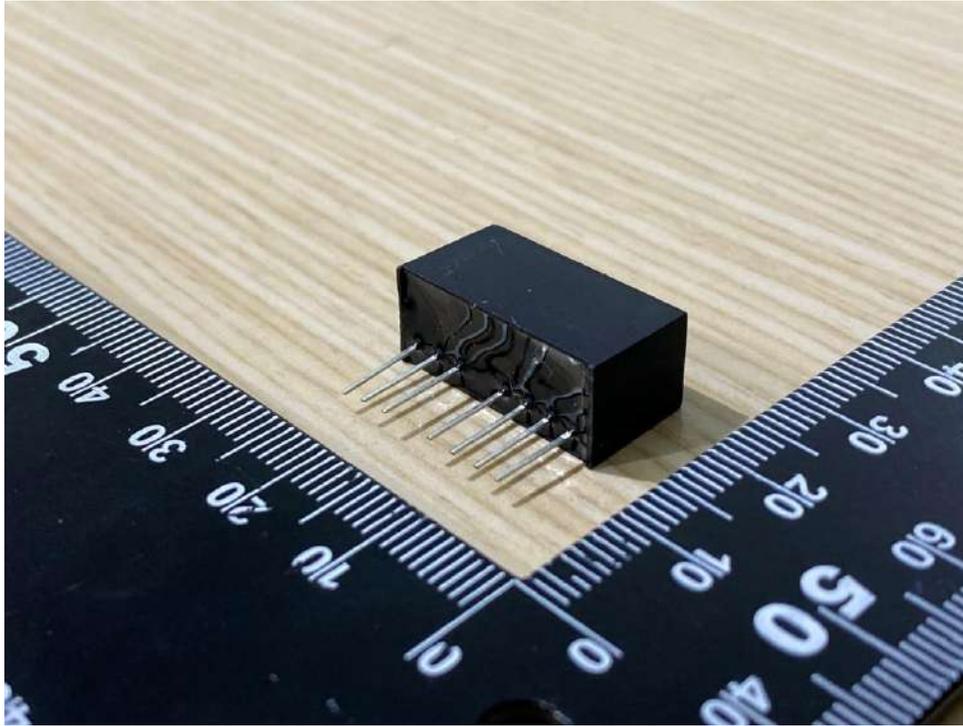


Appendix II: Photographs of the EUT

External
Model : TMR 4-2411



Model : TMR 4-2423WI

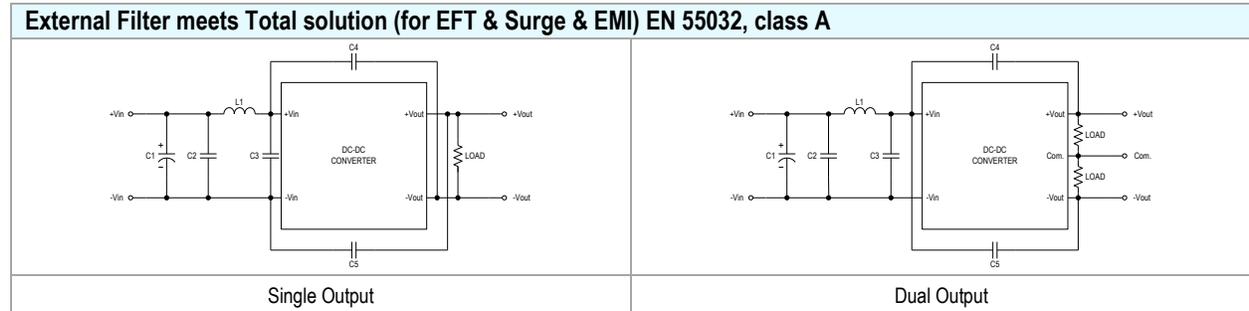


END OF REPORT

Appendix III : TMR 04 & TMR 04WI series with external components according to EMC solution

(1) EMC Solution:

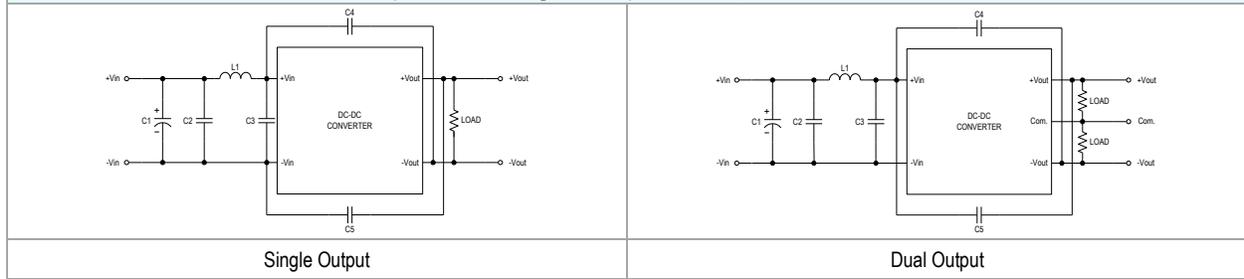
TMR 04 Series



Model	C1	C2	L1	C3	C4, C5
TMR 4-1211	330 μ F/50V CHEMI-CON KY Series	4.7 μ F/25V 1210 X5R	68 μ H/0.64A 744774168	4.7 μ F/25V 1210 X5R	220pF/2kV 1808 X7R
TMR 4-1212					
TMR 4-1213					
TMR 4-1215					
TMR 4-1222	330 μ F/50V CHEMI-CON KY Series	4.7 μ F/25V 1210 X5R	10 μ H/1.7A 7447745100	4.7 μ F/25V 1210 X5R	220pF/2kV 1808 X7R
TMR 4-1223					
TMR 4-2411	330 μ F/80V CHEMI-CON KY Series	4.7 μ F/50V 1210 X5R	68 μ H/0.64A 744774168	4.7 μ F/50V 1210 X5R	220pF/2kV 1808 X7R
TMR 4-2412					
TMR 4-2413					
TMR 4-2415					
TMR 4-2422	330 μ F/80V CHEMI-CON KY Series	4.7 μ F/50V 1210 X5R	4.7 μ H/1.82A 744773047	4.7 μ F/50V 1210 X5R	220pF/2kV 1808 X7R
TMR 4-2423					
TMR 4-4811	330 μ F/100V CHEMI-CON KY Series	4.7 μ F/100V 1210 X7S	100 μ H/0.57A 74477420	4.7 μ F/100V 1210 X7S	220pF/2kV 1808 X7R
TMR 4-4812					
TMR 4-4813					
TMR 4-4815					
TMR 4-4822	330 μ F/100V CHEMI-CON KY Series	4.7 μ F/100V 1210 X5R	4.7 μ H/1.82A 744773047	4.7 μ F/100V 1210 X5R	220pF/2kV 1808 X7R
TMR 4-4823					

TMR 04WI Series

External Filter meets Total solution (for EFT & Surge & EMI) EN 55032, class A

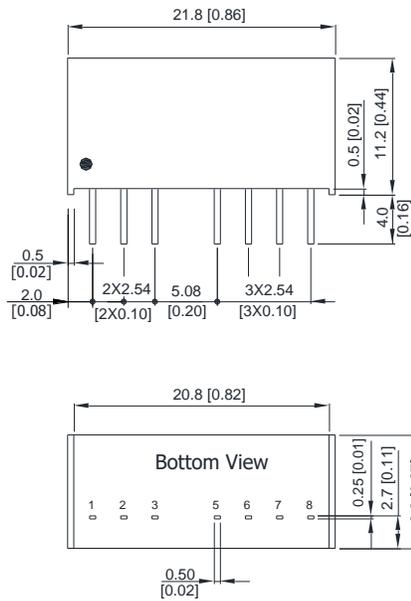


Model	C1	C2	L1	C3	C4, C5
TMR 4-2411WI TMR 4-2412WI TMR 4-2413WI TMR 4-2415WI TMR 4-2422WI TMR 4-2423WI	330 μ F/80V CHEMI-CON KY Series	4.7 μ F/50V 1210 X5R	SCD0403T 4.7 μ H	4.7 μ F/50V 1210 X5R	220pF/2kV 1808 X7R
TMR 4-4811WI TMR 4-4812WI TMR 4-4813WI TMR 4-4815WI TMR 4-4822WI TMR 4-4823WI	330 μ F/100V CHEMI-CON KY Series	4.7 μ F/100V 1210 X5R	SCD0403T 4.7 μ H	4.7 μ F/100V 1210 X5R	220pF/2kV 1808 X7R

(2) Package Specifications:

Package Specifications

Mechanical Dimensions



Pin Connections

Pin	Single Output	Dual Output
1	-Vin	-Vin
2	+Vin	+Vin
3	Remote On/Off	Remote On/Off
5	NC	NC
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout

NC: No Connection

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: X.X±0.5 (X.XX±0.02)
X.XX±0.25 (X.XXX±0.01)
- ▶ Pins: ±0.1(±0.004)

Physical Characteristics

Case Size	: 21.8x9.3x11.2 mm (0.86x0.37x0.44 inches)
Case Material	: Non-Conductive Black Plastic (flammability to UL 94V-0 rated)
Pin Material	: Tinned Copper
Weight	: 4.8g

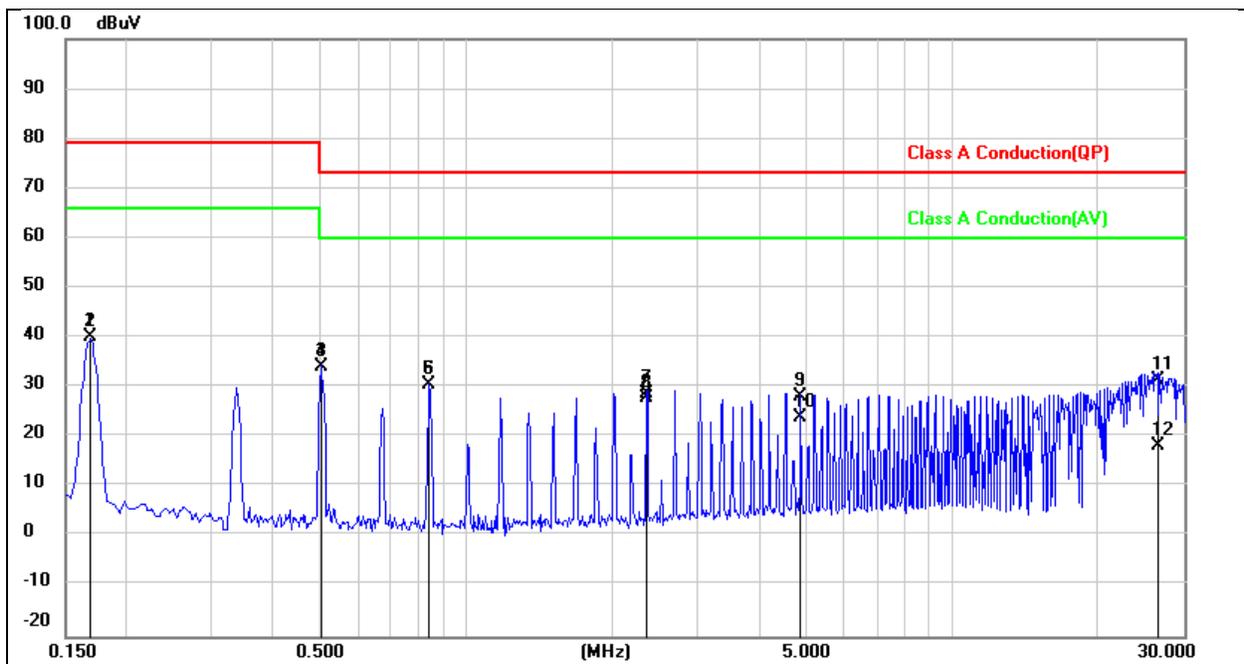
Appendix VI: Preliminary Test Raw Data

Each modes are correspond to original report no. 4789451449B-EN-E0-V0.

The difference are the list corresponding models(as below table) and applicant , others circuit design, enclosure and materials are the same.

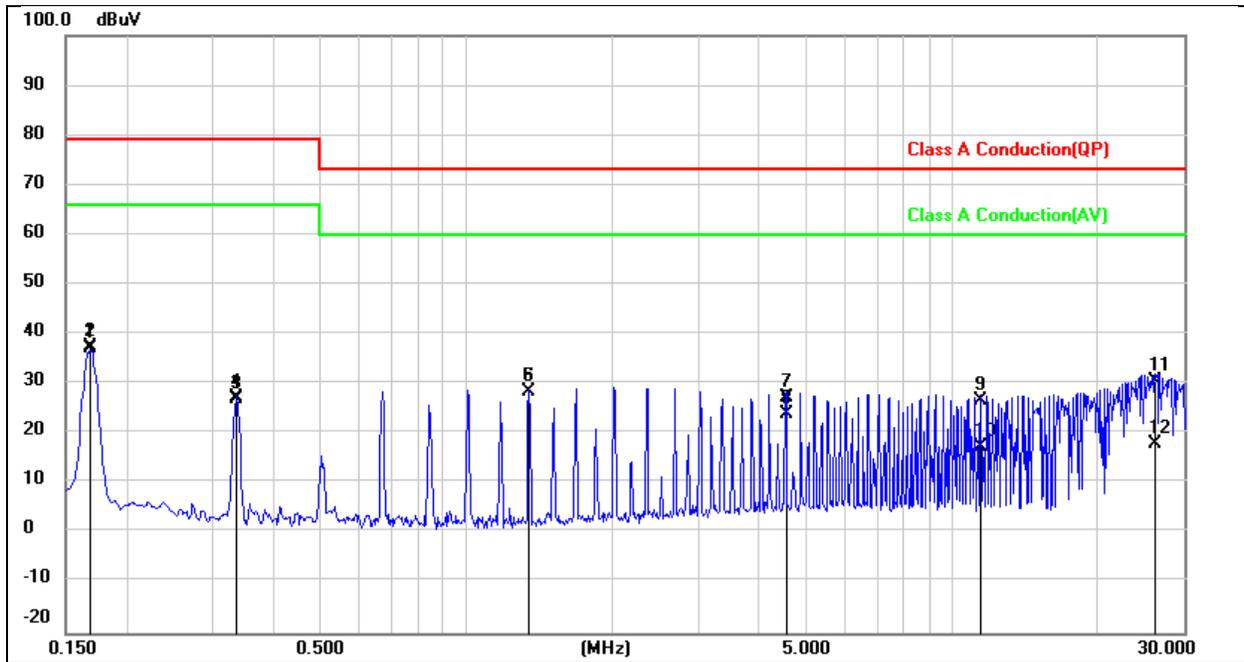
Conduction Emission:

Project No.:	4789451449	Probe:	L1
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	4:44:16 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 1		
Note:			



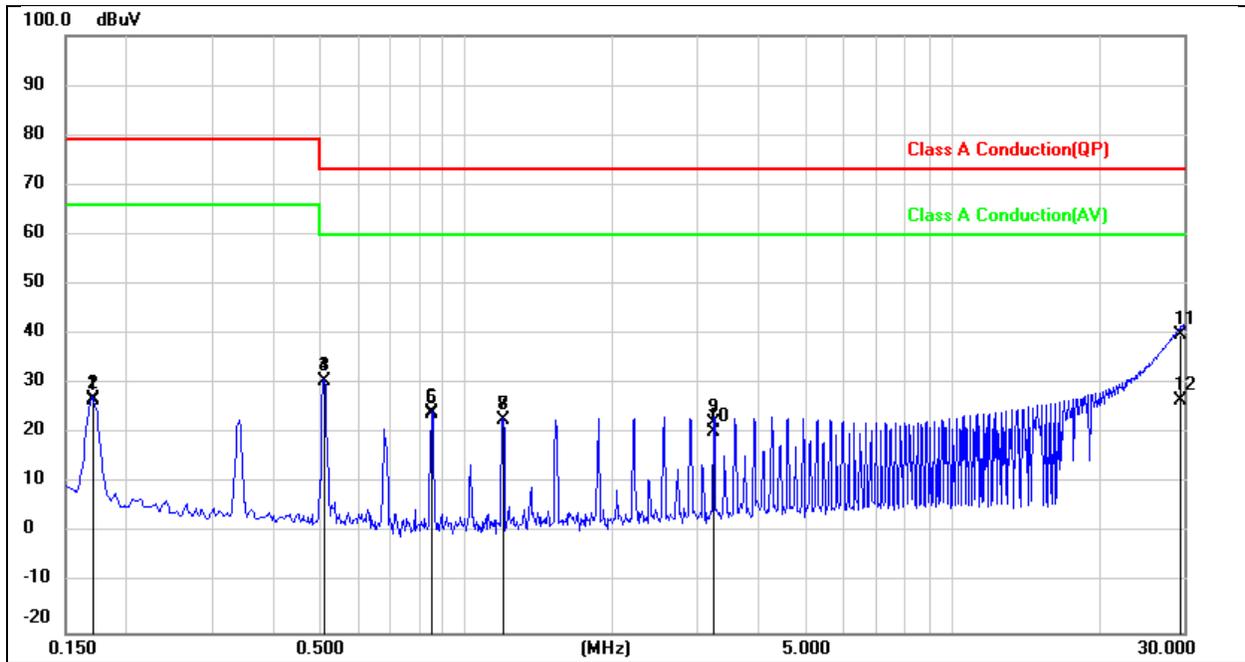
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1683	30.28	9.92	40.20	79.00	-38.80	QP
2	0.1683	30.35	9.92	40.27	66.00	-25.73	AVG
3	0.5061	24.25	9.94	34.19	73.00	-38.81	QP
4	0.5061	24.28	9.94	34.22	60.00	-25.78	AVG
5	0.8423	20.57	9.96	30.53	73.00	-42.47	QP
6	0.8423	20.62	9.96	30.58	60.00	-29.42	AVG
7	2.3587	18.71	10.02	28.73	73.00	-44.27	QP
8	2.3587	17.83	10.02	27.85	60.00	-32.15	AVG
9	4.8861	17.91	10.11	28.02	73.00	-44.98	QP
10	4.8861	13.90	10.11	24.01	60.00	-35.99	AVG
11	26.4247	20.70	10.62	31.32	73.00	-41.68	QP
12	26.4247	7.49	10.62	18.11	60.00	-41.89	AVG

Project No.:	4789451449	Probe:	N
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	4:48:19 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 1		
Note:			



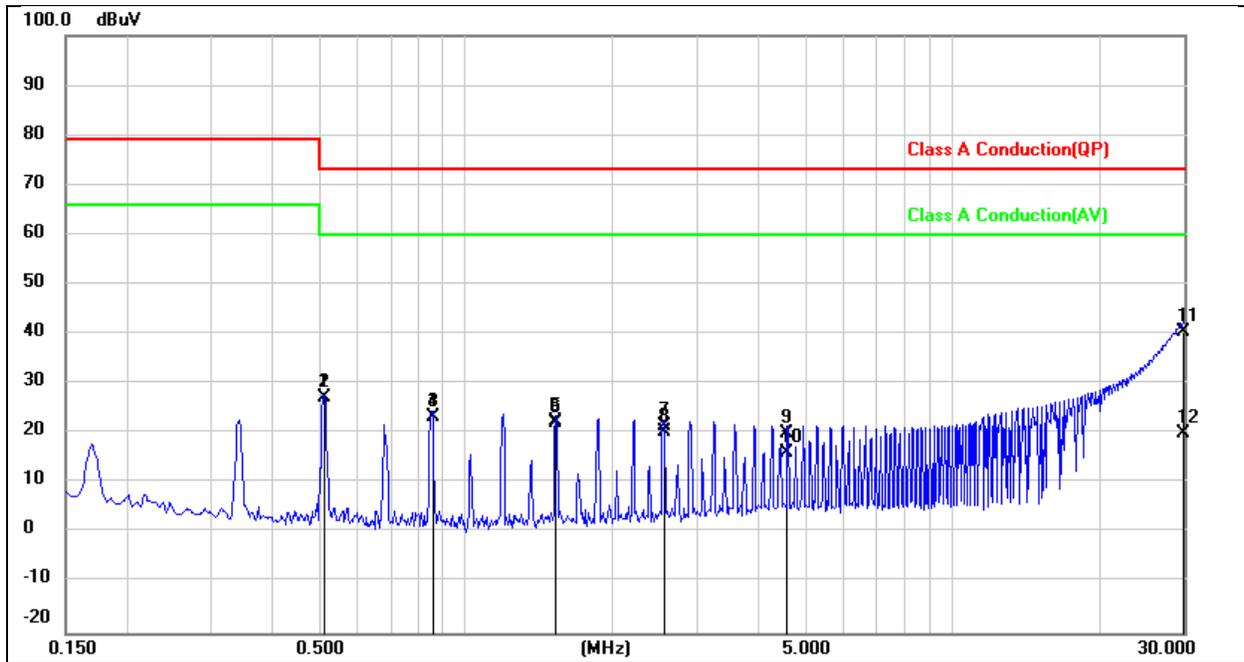
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1685	27.35	9.90	37.25	79.00	-41.75	QP
2	0.1685	27.43	9.90	37.33	66.00	-28.67	AVG
3	0.3369	17.15	9.92	27.07	79.00	-51.93	QP
4	0.3369	17.27	9.92	27.19	66.00	-38.81	AVG
5	1.3476	18.49	9.97	28.46	73.00	-44.54	QP
6	1.3476	18.37	9.97	28.34	60.00	-31.66	AVG
7	4.5486	17.30	10.08	27.38	73.00	-45.62	QP
8	4.5486	13.84	10.08	23.92	60.00	-36.08	AVG
9	11.4667	16.30	10.27	26.57	73.00	-46.43	QP
10	11.4667	7.02	10.27	17.29	60.00	-42.71	AVG
11	26.1402	20.02	10.65	30.67	73.00	-42.33	QP
12	26.1402	7.21	10.65	17.86	60.00	-42.14	AVG

Project No.:	4789451449	Probe:	L1
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	4:57:35 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 2		
Note:			



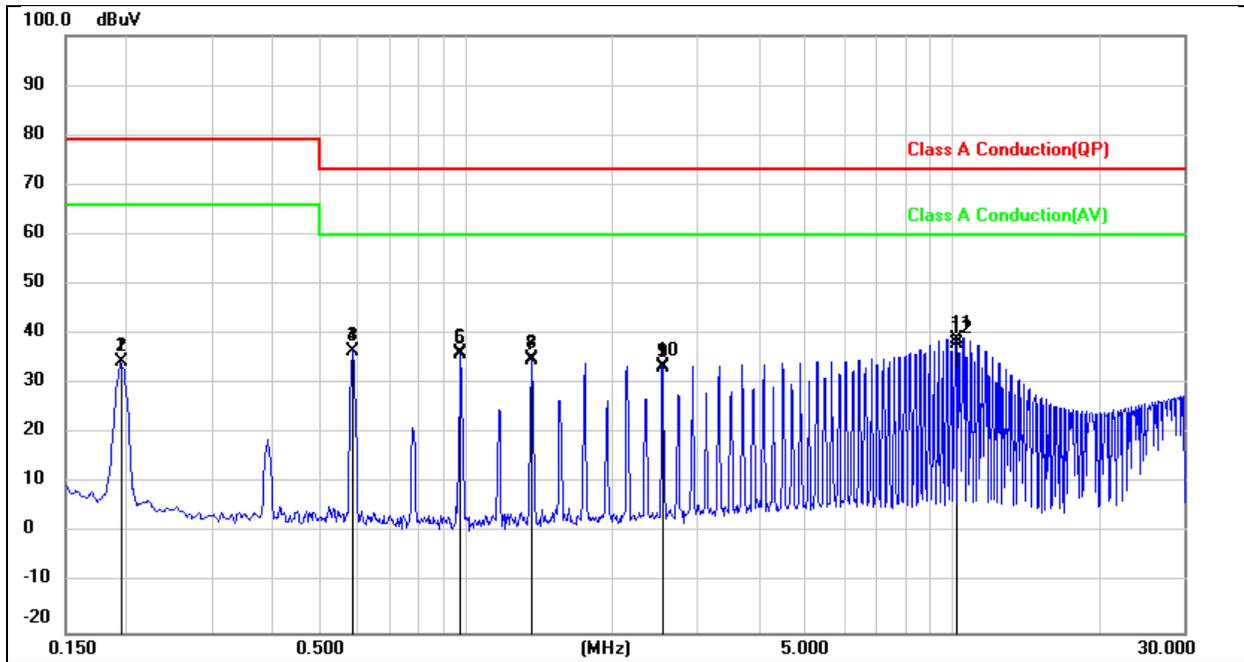
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1706	16.80	9.92	26.72	79.00	-52.28	QP
2	0.1706	16.93	9.92	26.85	66.00	-39.15	AVG
3	0.5112	20.54	9.94	30.48	73.00	-42.52	QP
4	0.5112	20.64	9.94	30.58	60.00	-29.42	AVG
5	0.8516	14.13	9.96	24.09	73.00	-48.91	QP
6	0.8516	14.19	9.96	24.15	60.00	-35.85	AVG
7	1.1928	12.68	9.96	22.64	73.00	-50.36	QP
8	1.1928	12.67	9.96	22.63	60.00	-37.37	AVG
9	3.2374	12.15	10.04	22.19	73.00	-50.81	QP
10	3.2374	10.19	10.04	20.23	60.00	-39.77	AVG
11	29.6766	29.01	10.71	39.72	73.00	-33.28	QP
12	29.6766	15.99	10.71	26.70	60.00	-33.30	AVG

Project No.:	4789451449	Probe:	N
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	4:53:40 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 2		
Note:			



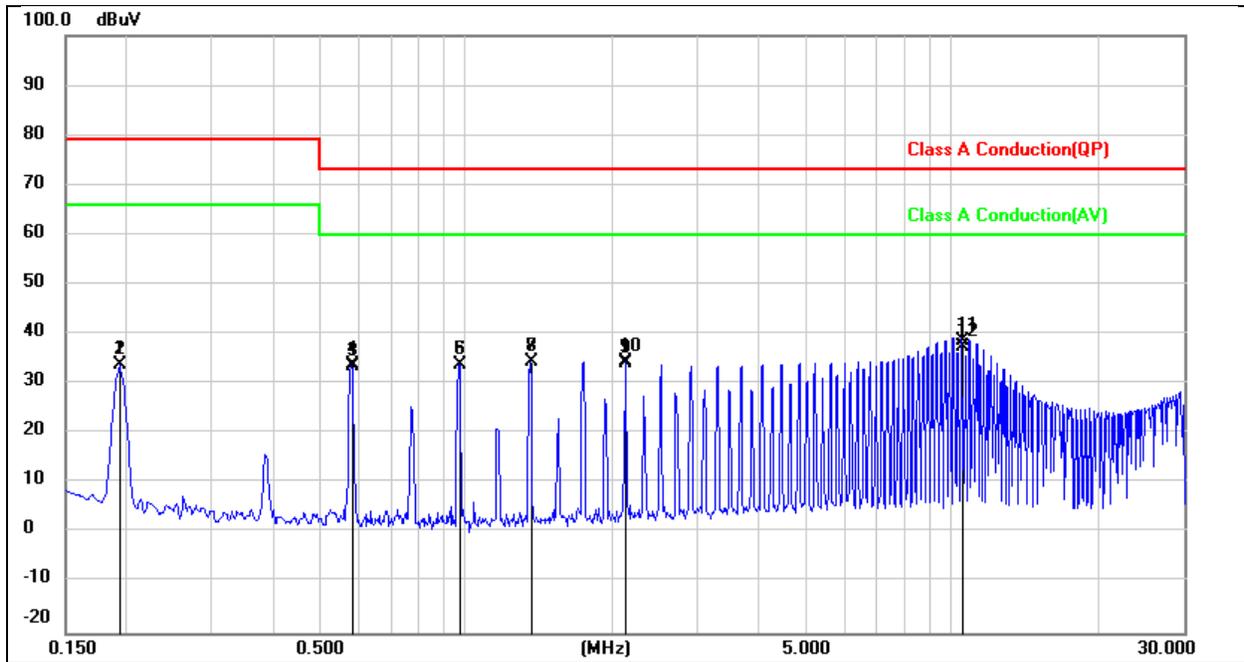
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.5103	17.25	9.93	27.18	73.00	-45.82	QP
2	0.5103	17.34	9.93	27.27	60.00	-32.73	AVG
3	0.8512	13.53	9.95	23.48	73.00	-49.52	QP
4	0.8512	13.47	9.95	23.42	60.00	-36.58	AVG
5	1.5305	12.47	9.98	22.45	73.00	-50.55	QP
6	1.5305	12.26	9.98	22.24	60.00	-37.76	AVG
7	2.5502	11.42	10.01	21.43	73.00	-51.57	QP
8	2.5502	10.31	10.01	20.32	60.00	-39.68	AVG
9	4.5896	9.99	10.08	20.07	73.00	-52.93	QP
10	4.5896	6.15	10.08	16.23	60.00	-43.77	AVG
11	29.9352	29.77	10.76	40.53	73.00	-32.47	QP
12	29.9352	9.15	10.76	19.91	60.00	-40.09	AVG

Project No.:	4789451449	Probe:	L1
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	5:17:10 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 4		
Note:			



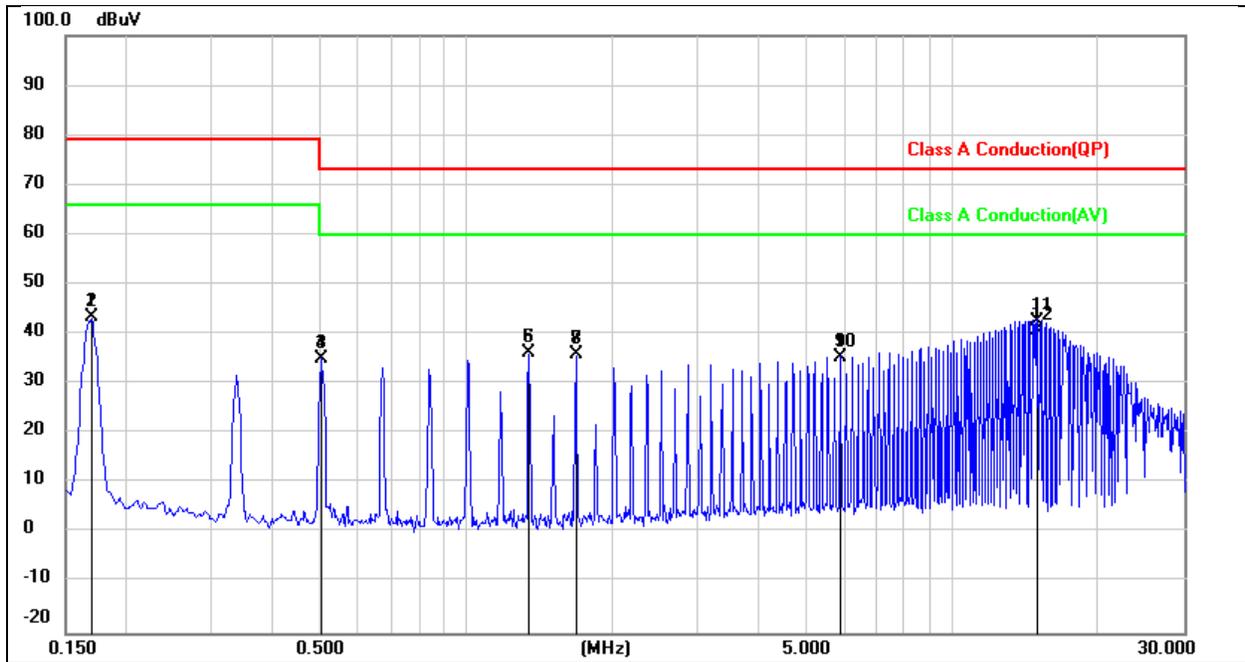
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1958	24.56	9.92	34.48	79.00	-44.52	QP
2	0.1958	24.65	9.92	34.57	66.00	-31.43	AVG
3	0.5873	26.60	9.94	36.54	73.00	-36.46	QP
4	0.5873	26.67	9.94	36.61	60.00	-23.39	AVG
5	0.9795	26.11	9.96	36.07	73.00	-36.93	QP
6	0.9795	26.18	9.96	36.14	60.00	-23.86	AVG
7	1.3714	24.87	9.98	34.85	73.00	-38.15	QP
8	1.3714	24.95	9.98	34.93	60.00	-25.07	AVG
9	2.5473	23.35	10.02	33.37	73.00	-39.63	QP
10	2.5473	23.42	10.02	33.44	60.00	-26.56	AVG
11	10.1909	28.73	10.24	38.97	73.00	-34.03	QP
12	10.1909	27.69	10.24	37.93	60.00	-22.07	AVG

Project No.:	4789451449	Probe:	N
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	5:13:14 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 4		
Note:			



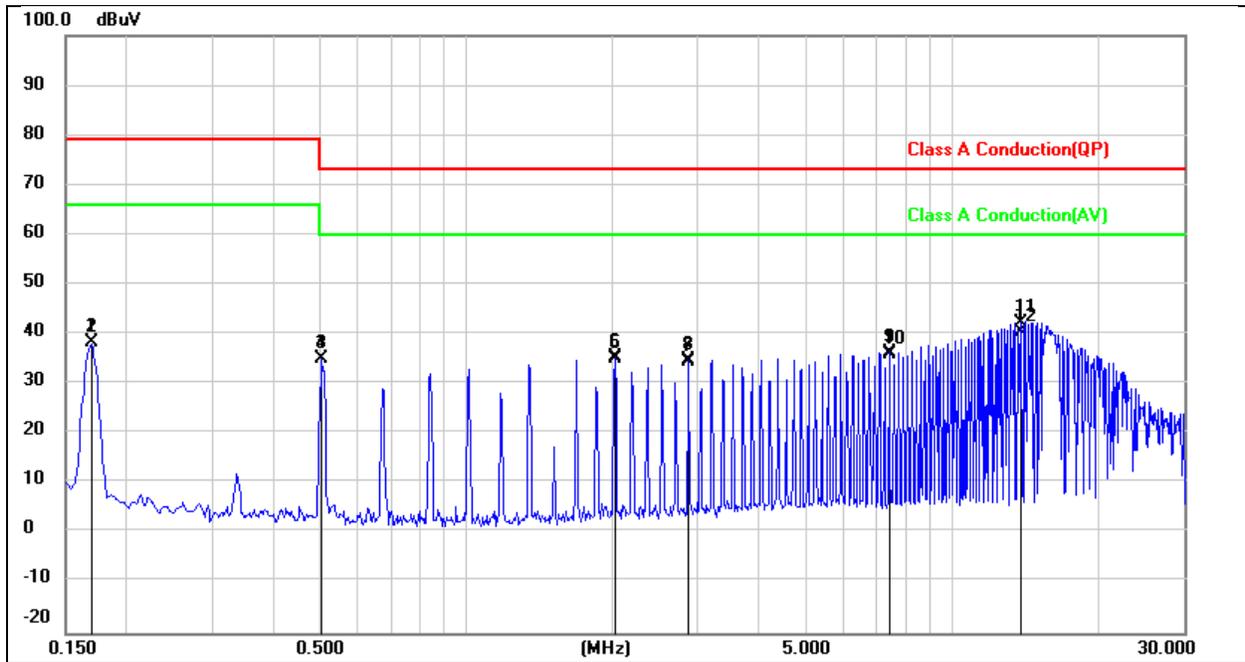
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1946	23.80	9.91	33.71	79.00	-45.29	QP
2	0.1946	23.89	9.91	33.80	66.00	-32.20	AVG
3	0.5834	23.69	9.93	33.62	73.00	-39.38	QP
4	0.5834	23.77	9.93	33.70	60.00	-26.30	AVG
5	0.9727	23.93	9.95	33.88	73.00	-39.12	QP
6	0.9727	24.01	9.95	33.96	60.00	-26.04	AVG
7	1.3622	24.39	9.97	34.36	73.00	-38.64	QP
8	1.3622	24.46	9.97	34.43	60.00	-25.57	AVG
9	2.1416	24.27	10.00	34.27	73.00	-38.73	QP
10	2.1416	24.34	10.00	34.34	60.00	-25.66	AVG
11	10.5163	28.44	10.25	38.69	73.00	-34.31	QP
12	10.5163	27.06	10.25	37.31	60.00	-22.69	AVG

Project No.:	4789451449	Probe:	L1
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	5:22:53 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 5		
Note:			



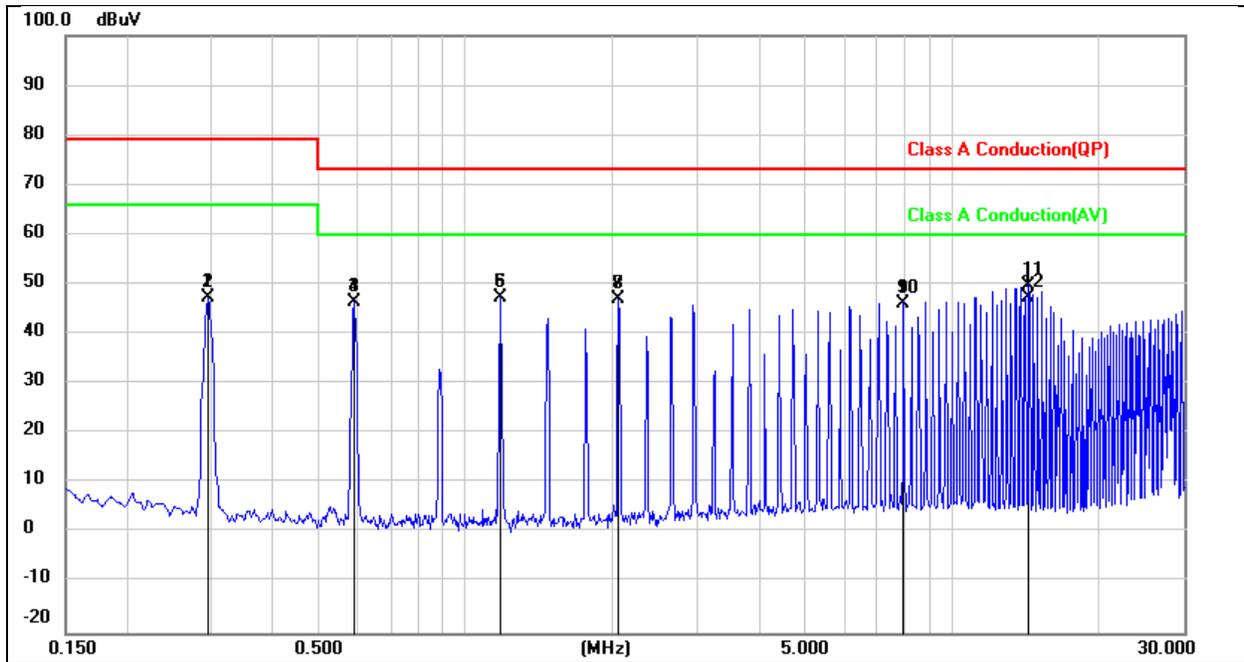
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1686	33.60	9.92	43.52	79.00	-35.48	QP
2	0.1686	33.65	9.92	43.57	66.00	-22.43	AVG
3	0.5059	25.10	9.94	35.04	73.00	-37.96	QP
4	0.5059	25.18	9.94	35.12	60.00	-24.88	AVG
5	1.3499	26.21	9.98	36.19	73.00	-36.81	QP
6	1.3499	26.28	9.98	36.26	60.00	-23.74	AVG
7	1.6876	25.99	9.99	35.98	73.00	-37.02	QP
8	1.6876	26.06	9.99	36.05	60.00	-23.95	AVG
9	5.9073	25.31	10.13	35.44	73.00	-37.56	QP
10	5.9073	25.20	10.13	35.33	60.00	-24.67	AVG
11	15.0233	32.07	10.38	42.45	73.00	-30.55	QP
12	15.0233	30.25	10.38	40.63	60.00	-19.37	AVG

Project No.:	4789451449	Probe:	N
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	5:30:28 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 5		
Note:			



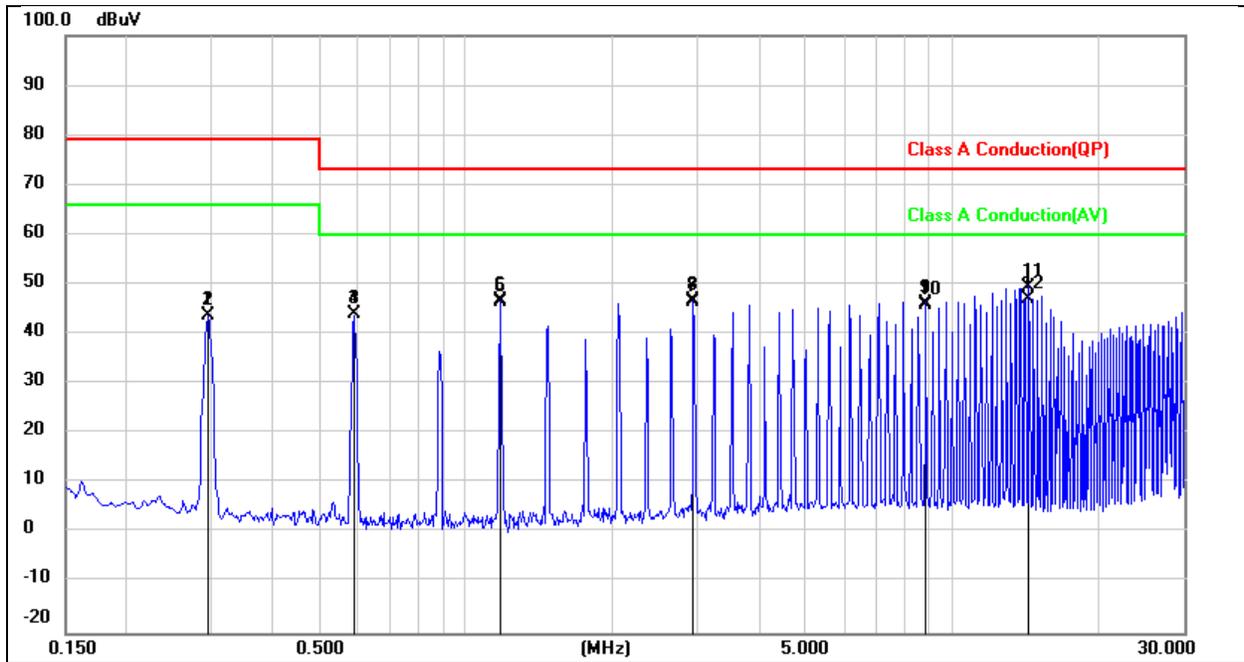
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1689	28.39	9.90	38.29	79.00	-40.71	QP
2	0.1689	28.46	9.90	38.36	66.00	-27.64	AVG
3	0.5070	25.04	9.93	34.97	73.00	-38.03	QP
4	0.5070	25.11	9.93	35.04	60.00	-24.96	AVG
5	2.0283	25.13	10.00	35.13	73.00	-37.87	QP
6	2.0283	25.20	10.00	35.20	60.00	-24.80	AVG
7	2.8736	24.55	10.02	34.57	73.00	-38.43	QP
8	2.8736	24.62	10.02	34.64	60.00	-25.36	AVG
9	7.4375	26.12	10.16	36.28	73.00	-36.72	QP
10	7.4375	25.77	10.16	35.93	60.00	-24.07	AVG
11	13.8608	31.85	10.36	42.21	73.00	-30.79	QP
12	13.8608	30.14	10.36	40.50	60.00	-19.50	AVG

Project No.:	4789451449	Probe:	L1
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	5:48:47 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 7		
Note:			



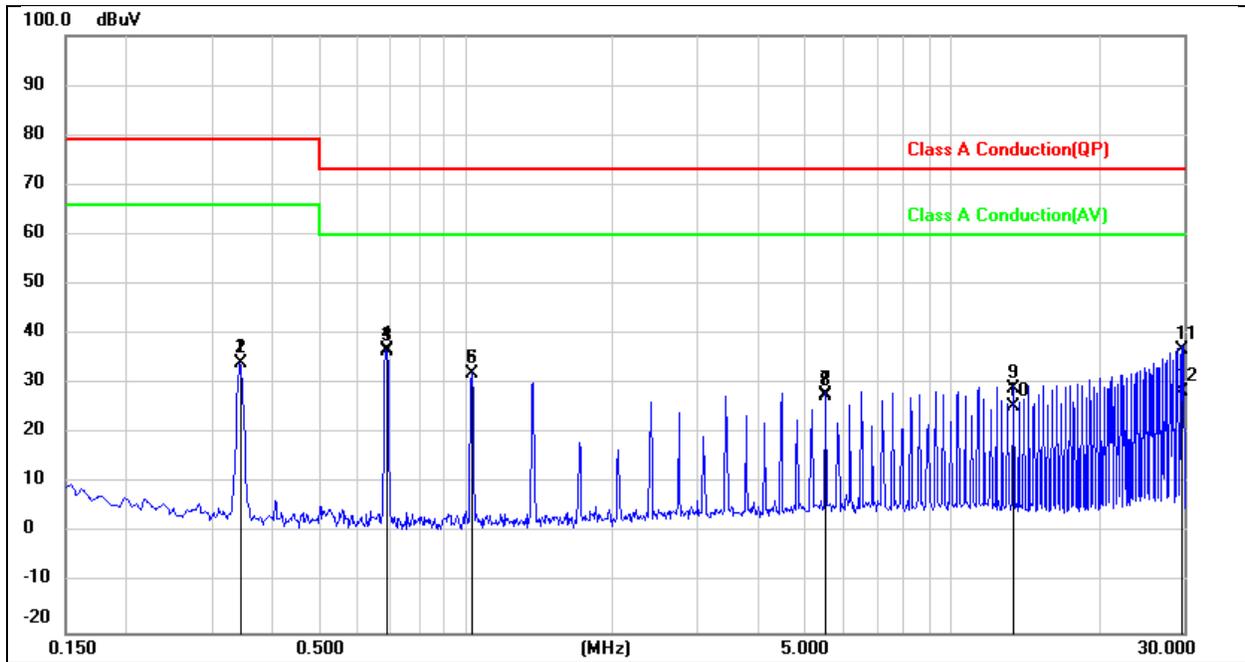
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2946	37.43	9.93	47.36	79.00	-31.64	QP
2	0.2946	37.46	9.93	47.39	66.00	-18.61	AVG
3	0.5888	36.60	9.94	46.54	73.00	-26.46	QP
4	0.5888	36.62	9.94	46.56	60.00	-13.44	AVG
5	1.1781	37.33	9.96	47.29	73.00	-25.71	QP
6	1.1781	37.36	9.96	47.32	60.00	-12.68	AVG
7	2.0616	37.15	10.01	47.16	73.00	-25.84	QP
8	2.0616	37.18	10.01	47.19	60.00	-12.81	AVG
9	7.9518	36.05	10.19	46.24	73.00	-26.76	QP
10	7.9518	35.86	10.19	46.05	60.00	-13.95	AVG
11	14.4309	39.49	10.36	49.85	73.00	-23.15	QP
12	14.4309	37.00	10.36	47.36	60.00	-12.64	AVG

Project No.:	4789451449	Probe:	N
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	5:52:41 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 7		
Note:			



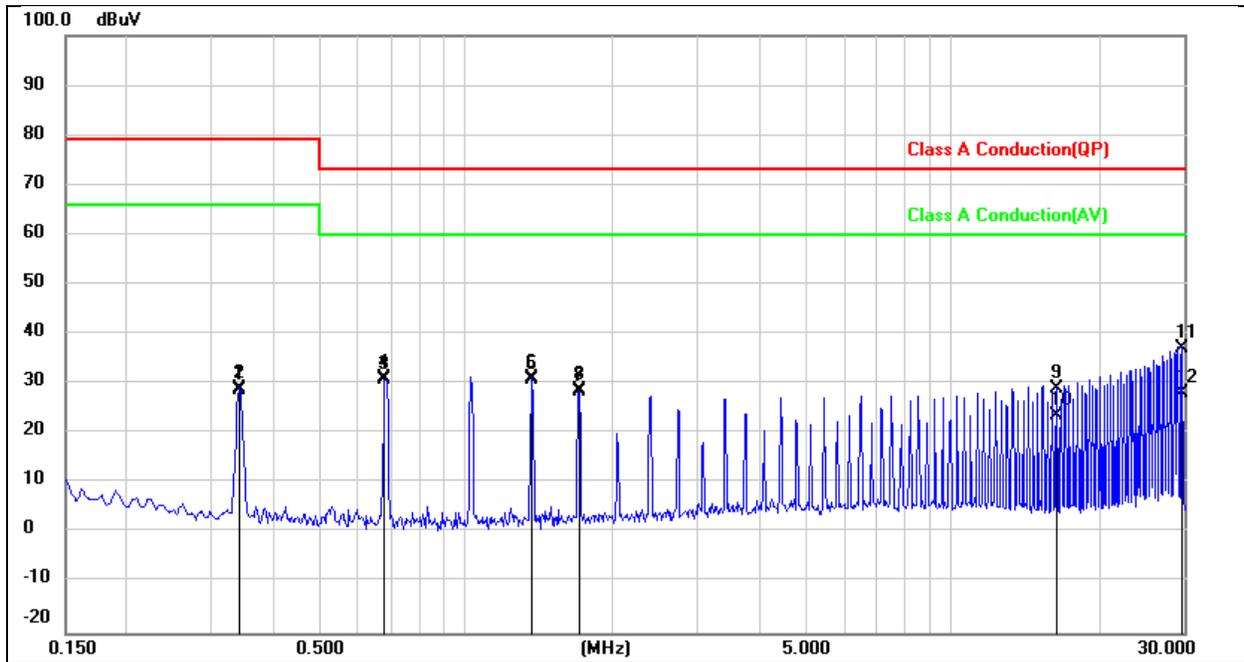
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2945	33.87	9.92	43.79	79.00	-35.21	QP
2	0.2945	33.90	9.92	43.82	66.00	-22.18	AVG
3	0.5892	34.00	9.93	43.93	73.00	-29.07	QP
4	0.5892	34.04	9.93	43.97	60.00	-16.03	AVG
5	1.1780	36.64	9.95	46.59	73.00	-26.41	QP
6	1.1780	36.67	9.95	46.62	60.00	-13.38	AVG
7	2.9448	36.57	10.02	46.59	73.00	-26.41	QP
8	2.9448	36.60	10.02	46.62	60.00	-13.38	AVG
9	8.8349	36.01	10.21	46.22	73.00	-26.78	QP
10	8.8349	35.71	10.21	45.92	60.00	-14.08	AVG
11	14.4303	39.08	10.37	49.45	73.00	-23.55	QP
12	14.4303	36.81	10.37	47.18	60.00	-12.82	AVG

Project No.:	4789451449	Probe:	L1
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	6:03:40 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 8		
Note:			



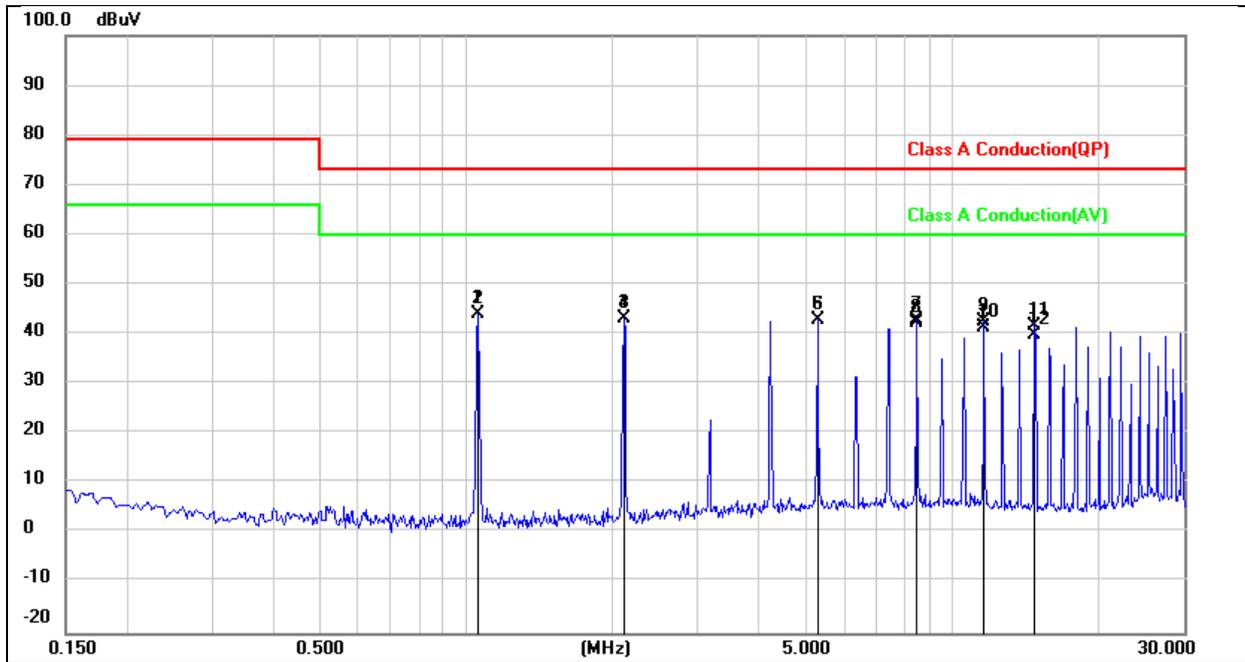
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.3429	24.10	9.93	34.03	79.00	-44.97	QP
2	0.3429	24.18	9.93	34.11	66.00	-31.89	AVG
3	0.6863	26.73	9.94	36.67	73.00	-36.33	QP
4	0.6863	26.79	9.94	36.73	60.00	-23.27	AVG
5	1.0294	22.11	9.96	32.07	73.00	-40.93	QP
6	1.0294	22.20	9.96	32.16	60.00	-27.84	AVG
7	5.4899	17.70	10.12	27.82	73.00	-45.18	QP
8	5.4899	17.32	10.12	27.44	60.00	-32.56	AVG
9	13.3821	18.59	10.33	28.92	73.00	-44.08	QP
10	13.3821	15.19	10.33	25.52	60.00	-34.48	AVG
11	29.8429	26.23	10.71	36.94	73.00	-36.06	QP
12	29.8429	17.66	10.71	28.37	60.00	-31.63	AVG

Project No.:	4789451449	Probe:	N
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	5:58:19 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 8		
Note:			



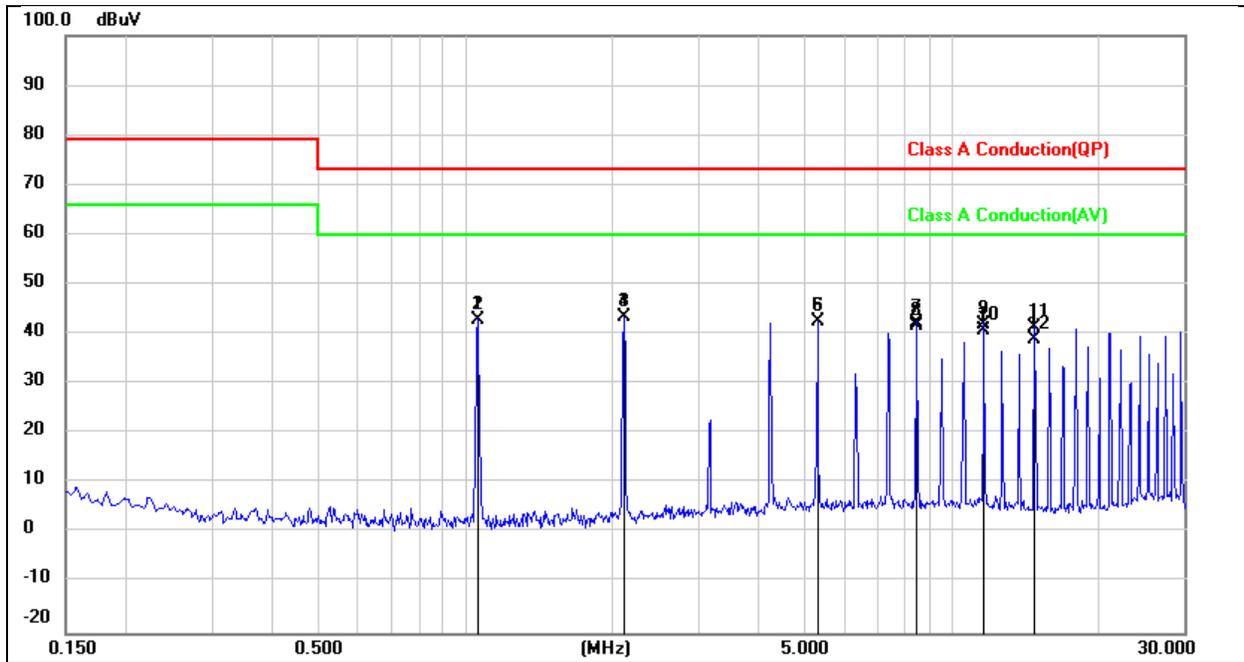
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.3426	18.91	9.92	28.83	79.00	-50.17	QP
2	0.3426	19.03	9.92	28.95	66.00	-37.05	AVG
3	0.6855	21.06	9.93	30.99	73.00	-42.01	QP
4	0.6855	21.15	9.93	31.08	60.00	-28.92	AVG
5	1.3705	20.99	9.97	30.96	73.00	-42.04	QP
6	1.3705	21.09	9.97	31.06	60.00	-28.94	AVG
7	1.7134	18.62	9.98	28.60	73.00	-44.40	QP
8	1.7134	18.73	9.98	28.71	60.00	-31.29	AVG
9	16.4509	18.54	10.43	28.97	73.00	-44.03	QP
10	16.4509	13.27	10.43	23.70	60.00	-36.30	AVG
11	29.8099	26.49	10.76	37.25	73.00	-35.75	QP
12	29.8099	17.37	10.76	28.13	60.00	-31.87	AVG

Project No.:	4789451449	Probe:	L1
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	6:12:18 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 9		
Note:			



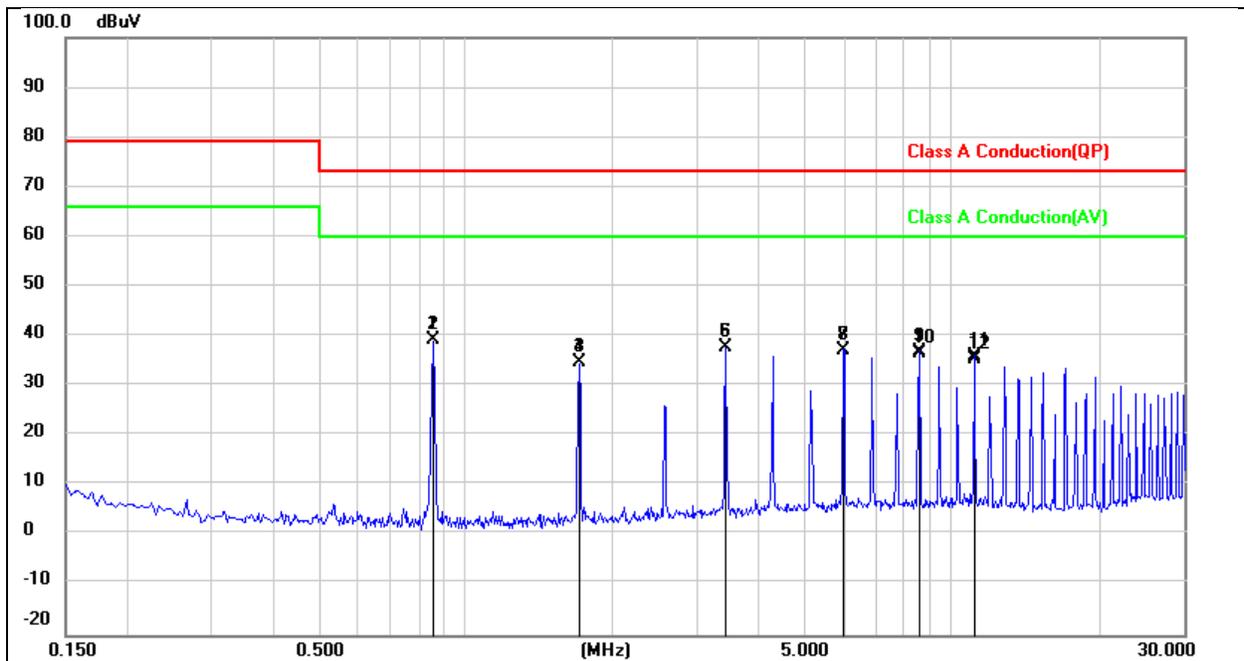
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	1.0582	34.09	9.96	44.05	73.00	-28.95	QP
2	1.0582	34.12	9.96	44.08	60.00	-15.92	AVG
3	2.1163	33.03	10.01	43.04	73.00	-29.96	QP
4	2.1163	33.06	10.01	43.07	60.00	-16.93	AVG
5	5.2905	32.75	10.12	42.87	73.00	-30.13	QP
6	5.2905	32.62	10.12	42.74	60.00	-17.26	AVG
7	8.4644	32.55	10.20	42.75	73.00	-30.25	QP
8	8.4644	31.98	10.20	42.18	60.00	-17.82	AVG
9	11.6380	32.19	10.29	42.48	73.00	-30.52	QP
10	11.6380	30.97	10.29	41.26	60.00	-18.74	AVG
11	14.8114	31.36	10.38	41.74	73.00	-31.26	QP
12	14.8114	29.35	10.38	39.73	60.00	-20.27	AVG

Project No.:	4789451449	Probe:	N
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	6:16:17 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 9		
Note:			



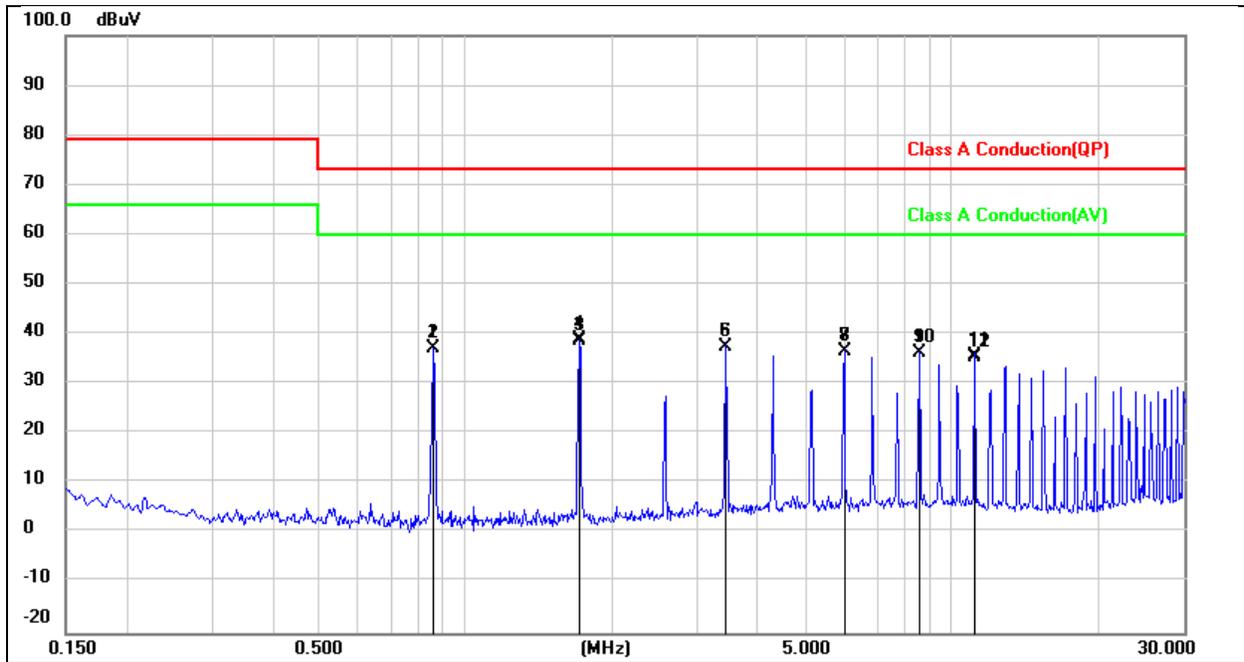
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	1.0576	32.96	9.95	42.91	73.00	-30.09	QP
2	1.0576	33.00	9.95	42.95	60.00	-17.05	AVG
3	2.1152	33.44	10.00	43.44	73.00	-29.56	QP
4	2.1152	33.47	10.00	43.47	60.00	-16.53	AVG
5	5.2879	32.45	10.11	42.56	73.00	-30.44	QP
6	5.2879	32.30	10.11	42.41	60.00	-17.59	AVG
7	8.4607	32.16	10.19	42.35	73.00	-30.65	QP
8	8.4607	31.50	10.19	41.69	60.00	-18.31	AVG
9	11.6334	31.72	10.29	42.01	73.00	-30.99	QP
10	11.6334	30.37	10.29	40.66	60.00	-19.34	AVG
11	14.8064	30.88	10.38	41.26	73.00	-31.74	QP
12	14.8064	28.68	10.38	39.06	60.00	-20.94	AVG

Project No.:	4789451449	Probe:	L1
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	6:29:18 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 10		
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.8556	29.39	9.96	39.35	73.00	-33.65	QP
2	0.8556	29.44	9.96	39.40	60.00	-20.60	AVG
3	1.7114	24.78	9.99	34.77	73.00	-38.23	QP
4	1.7114	24.86	9.99	34.85	60.00	-25.15	AVG
5	3.4228	27.58	10.05	37.63	73.00	-35.37	QP
6	3.4228	27.62	10.05	37.67	60.00	-22.33	AVG
7	5.9898	27.00	10.13	37.13	73.00	-35.87	QP
8	5.9898	26.97	10.13	37.10	60.00	-22.90	AVG
9	8.5568	26.50	10.20	36.70	73.00	-36.30	QP
10	8.5568	26.31	10.20	36.51	60.00	-23.49	AVG
11	11.1238	25.55	10.27	35.82	73.00	-37.18	QP
12	11.1238	25.14	10.27	35.41	60.00	-24.59	AVG

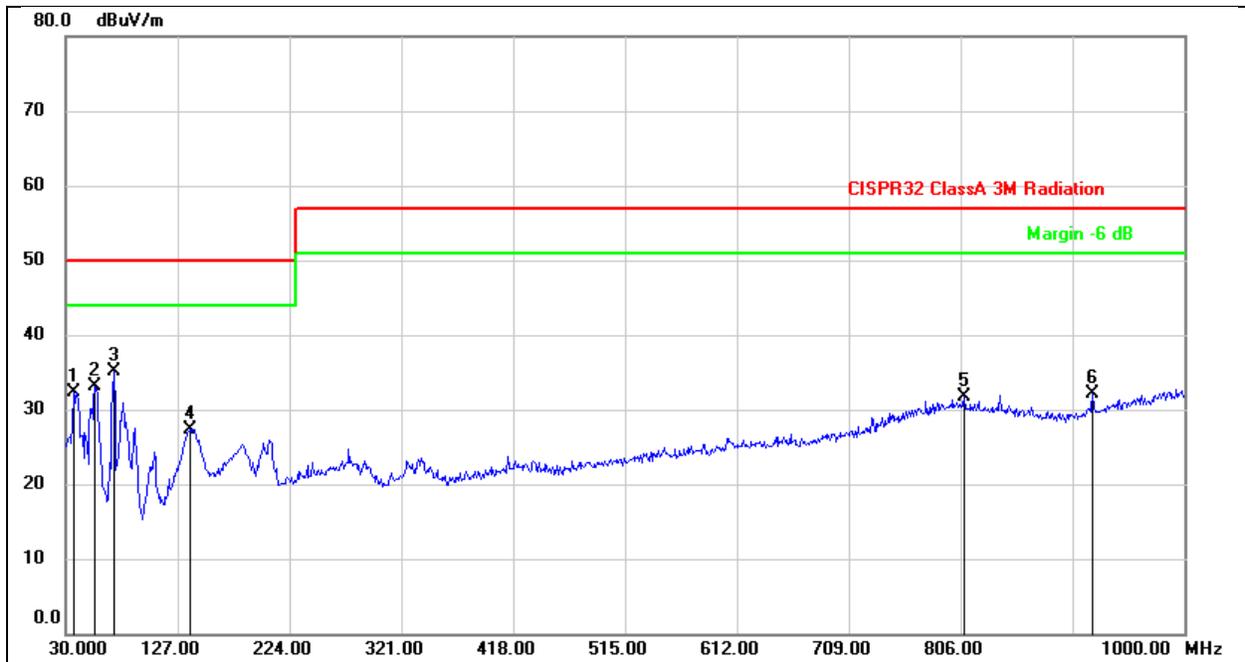
Project No.:	4789451449	Probe:	N
Standard:	Class A Conduction(QP)	Power Source:	from DC source
Test item:	Conduction Test	Date:	5/6/2020
Temp./Hum.(%RH):	23(C)/60%RH	Time:	6:23:31 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:			
Mode:	mode 10		
Note:			



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.8566	27.14	9.95	37.09	73.00	-35.91	QP
2	0.8566	27.20	9.95	37.15	60.00	-22.85	AVG
3	1.7127	28.82	9.98	38.80	73.00	-34.20	QP
4	1.7127	28.87	9.98	38.85	60.00	-21.15	AVG
5	3.4252	27.40	10.04	37.44	73.00	-35.56	QP
6	3.4252	27.45	10.04	37.49	60.00	-22.51	AVG
7	5.9936	26.51	10.12	36.63	73.00	-36.37	QP
8	5.9936	26.50	10.12	36.62	60.00	-23.38	AVG
9	8.5619	26.10	10.19	36.29	73.00	-36.71	QP
10	8.5619	25.93	10.19	36.12	60.00	-23.88	AVG
11	11.1300	25.34	10.26	35.60	73.00	-37.40	QP
12	11.1300	24.95	10.26	35.21	60.00	-24.79	AVG

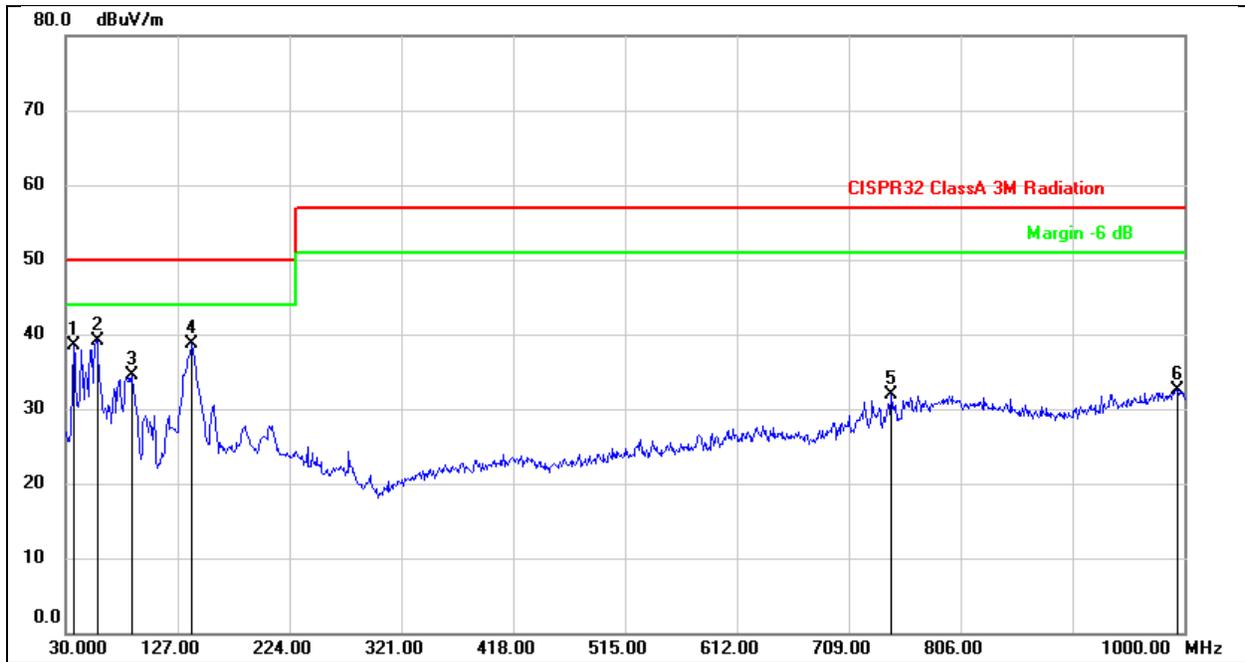
Radiation Emission:

Project No.:	4789451449	Polarization:	Horizontal
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	8:33:49 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 1		
Note:			



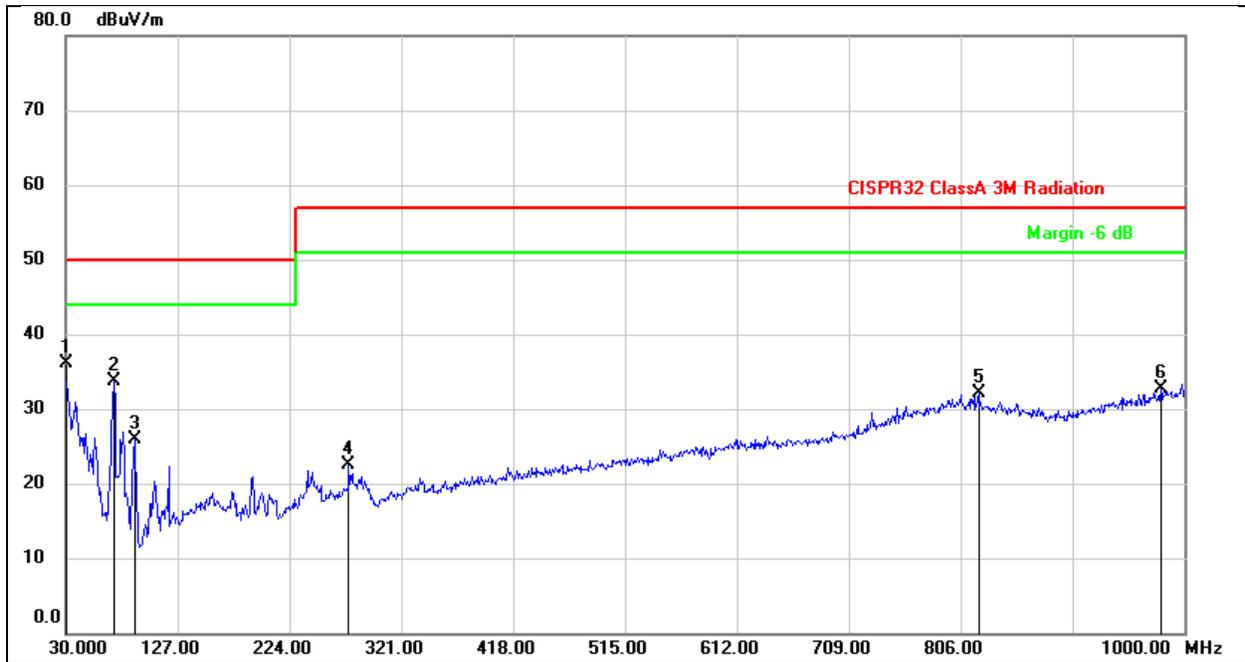
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	37.2427	48.20	-15.84	32.36	50.00	-17.64	peak
2	56.0930	48.21	-15.05	33.16	50.00	-16.84	peak
3	72.4860	53.08	-17.92	35.16	50.00	-14.84	peak
4	138.1550	42.71	-15.33	27.38	50.00	-22.62	peak
5	809.4920	31.76	-0.08	31.68	57.00	-25.32	peak
6	921.0097	32.64	-0.51	32.13	57.00	-24.87	peak

Project No.:	4789451449	Polarziation:	Vertical
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	8:37:33 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 1		
Note:			



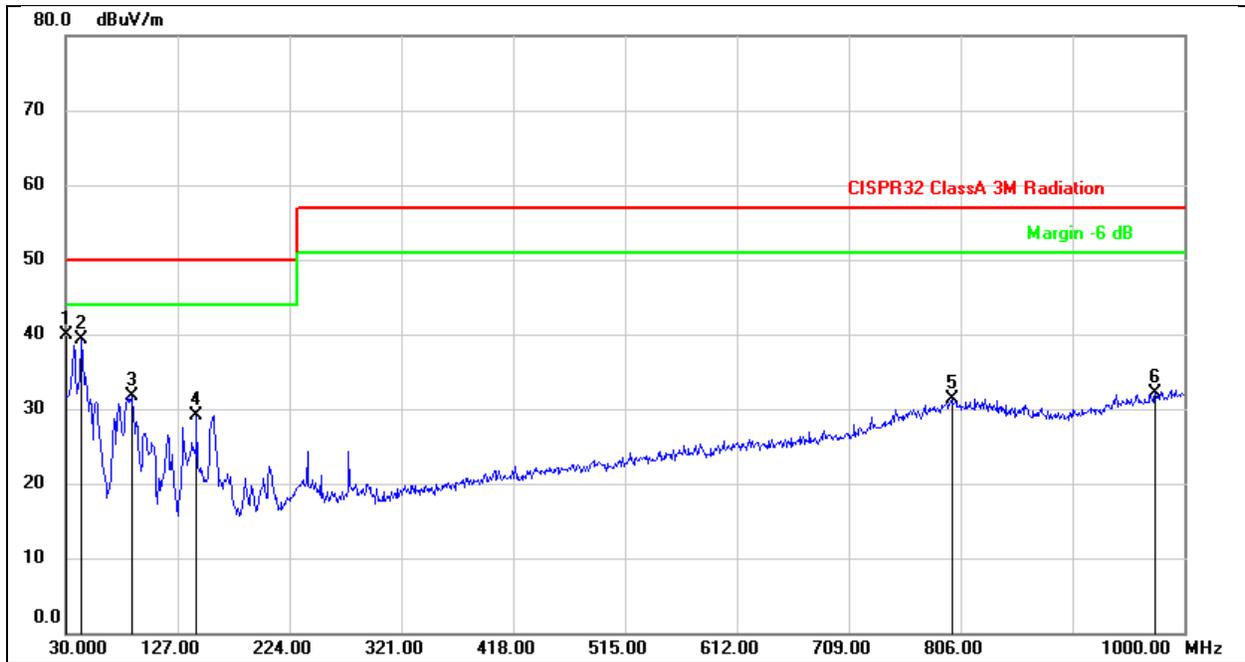
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	37.2427	54.31	-15.84	38.47	50.00	-11.53	peak
2	57.3217	54.21	-15.14	39.07	50.00	-10.93	peak
3	87.8443	55.37	-20.90	34.47	50.00	-15.53	peak
4	139.7070	53.99	-15.25	38.74	50.00	-11.26	peak
5	746.6360	33.96	-2.14	31.82	57.00	-25.18	peak
6	994.2123	30.75	1.79	32.54	57.00	-24.46	peak

Project No.:	4789451449	Polarization:	Horizontal
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	8:44:47 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 2		
Note:			



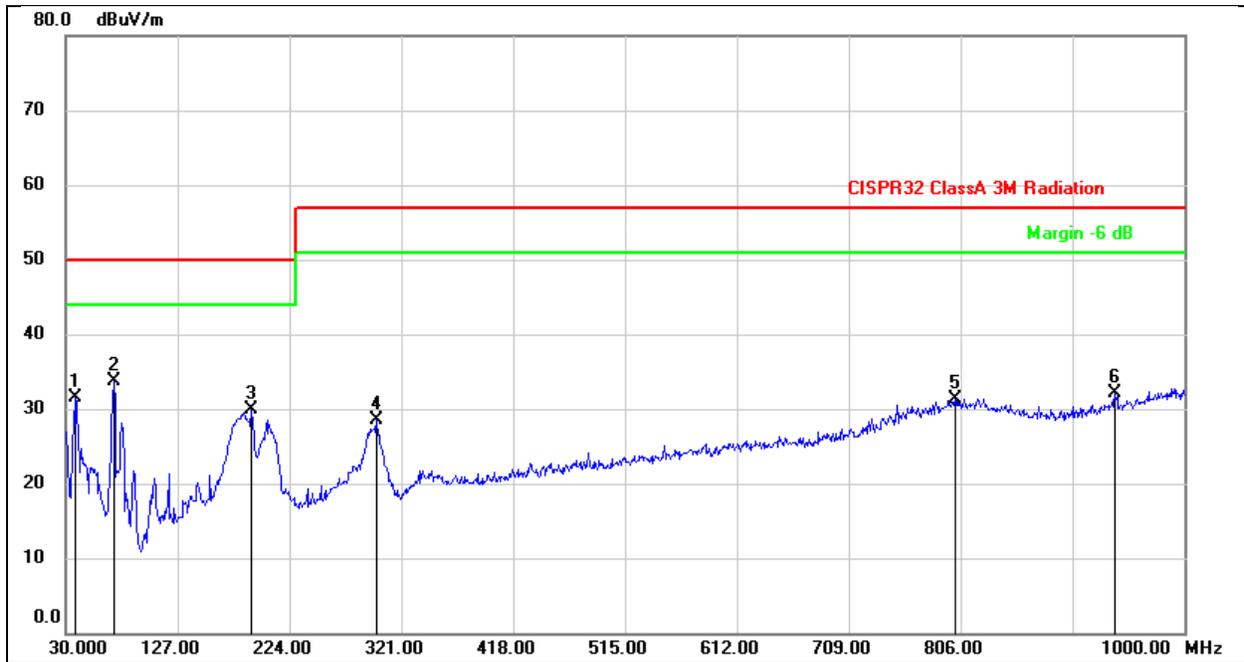
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.1617	52.31	-16.29	36.02	50.00	-13.98	peak
2	72.1950	51.56	-17.86	33.70	50.00	-16.30	peak
3	90.2693	47.02	-21.08	25.94	50.00	-24.06	peak
4	275.9920	36.81	-14.23	22.58	57.00	-34.42	peak
5	821.5200	32.29	-0.13	32.16	57.00	-24.84	peak
6	980.2120	31.15	1.53	32.68	57.00	-24.32	peak

Project No.:	4789451449	Polarziation:	Vertical
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	8:48:41 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 2		
Note:			



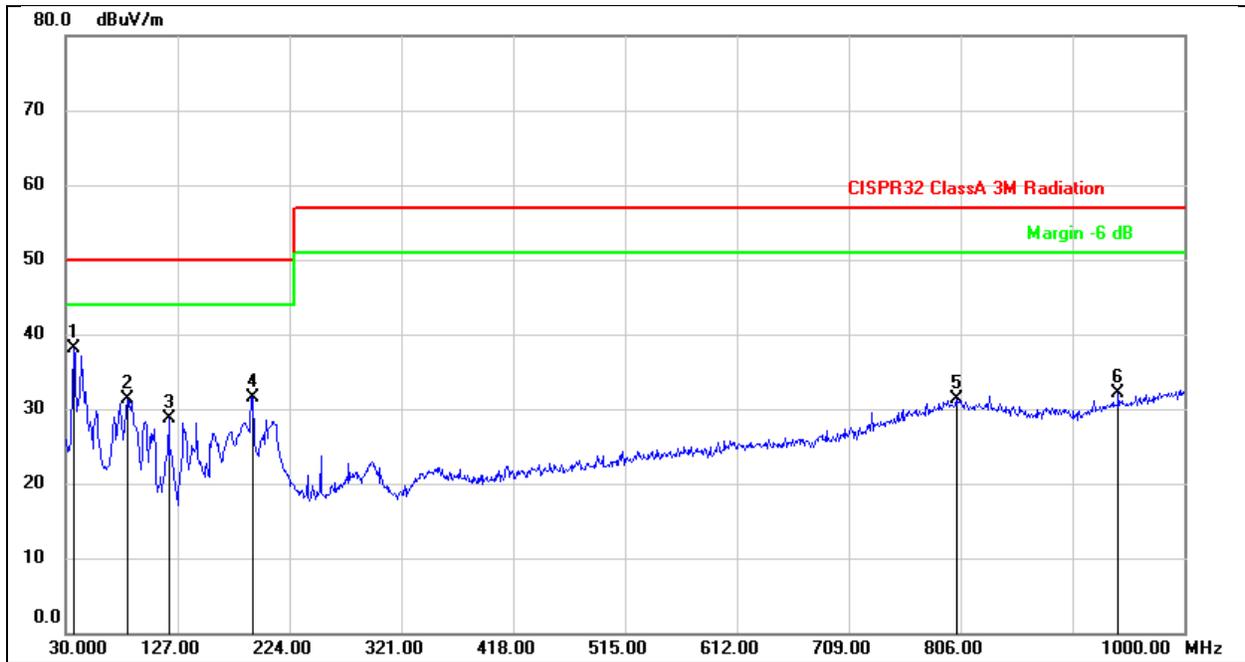
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.1293	56.11	-16.29	39.82	50.00	-10.18	peak
2	44.3883	54.29	-15.02	39.27	50.00	-10.73	peak
3	88.0060	52.68	-20.90	31.78	50.00	-18.22	peak
4	144.0073	44.19	-14.99	29.20	50.00	-20.80	peak
5	798.8220	31.12	0.14	31.26	57.00	-25.74	peak
6	975.3943	30.70	1.41	32.11	57.00	-24.89	peak

Project No.:	4789451449	Polarization:	Horizontal
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	9:53:38 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 4		
Note:			



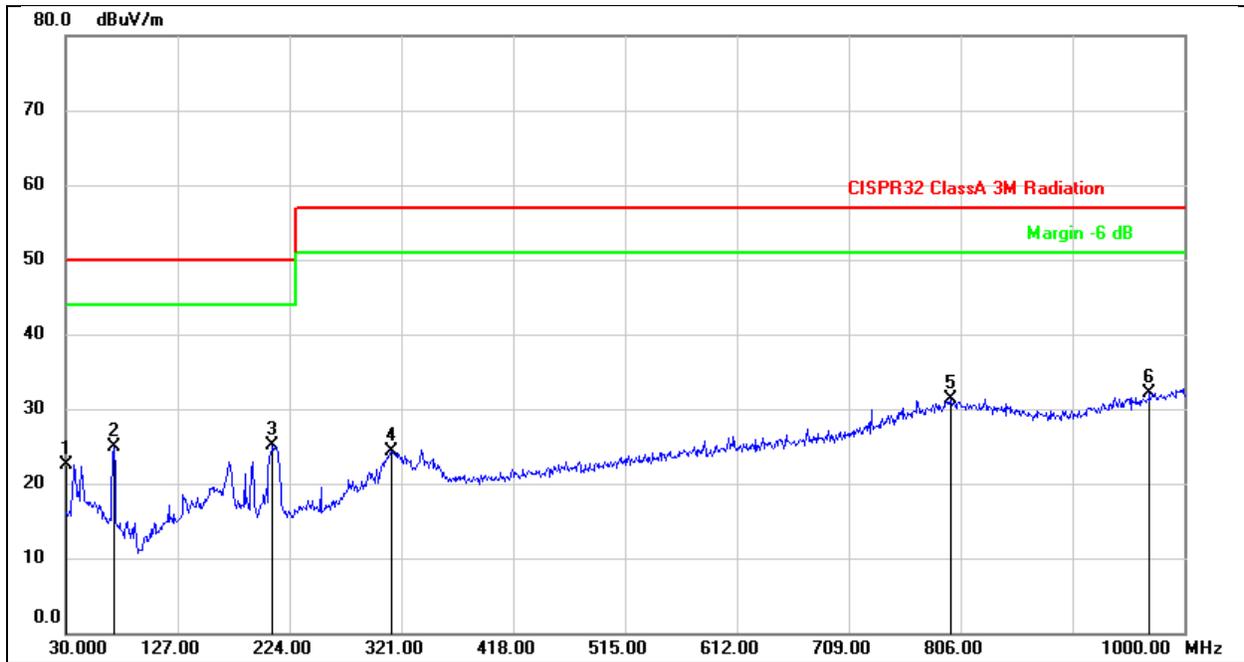
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	39.5707	46.96	-15.50	31.46	50.00	-18.54	peak
2	72.1627	51.58	-17.85	33.73	50.00	-16.27	peak
3	191.9253	47.13	-17.14	29.99	50.00	-20.01	peak
4	299.9833	42.15	-13.63	28.52	57.00	-28.48	peak
5	801.6027	31.24	0.12	31.36	57.00	-25.64	peak
6	940.7977	31.89	0.27	32.16	57.00	-24.84	peak

Project No.:	4789451449	Polarziation:	Vertical
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	10:01:55 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 4		
Note:			



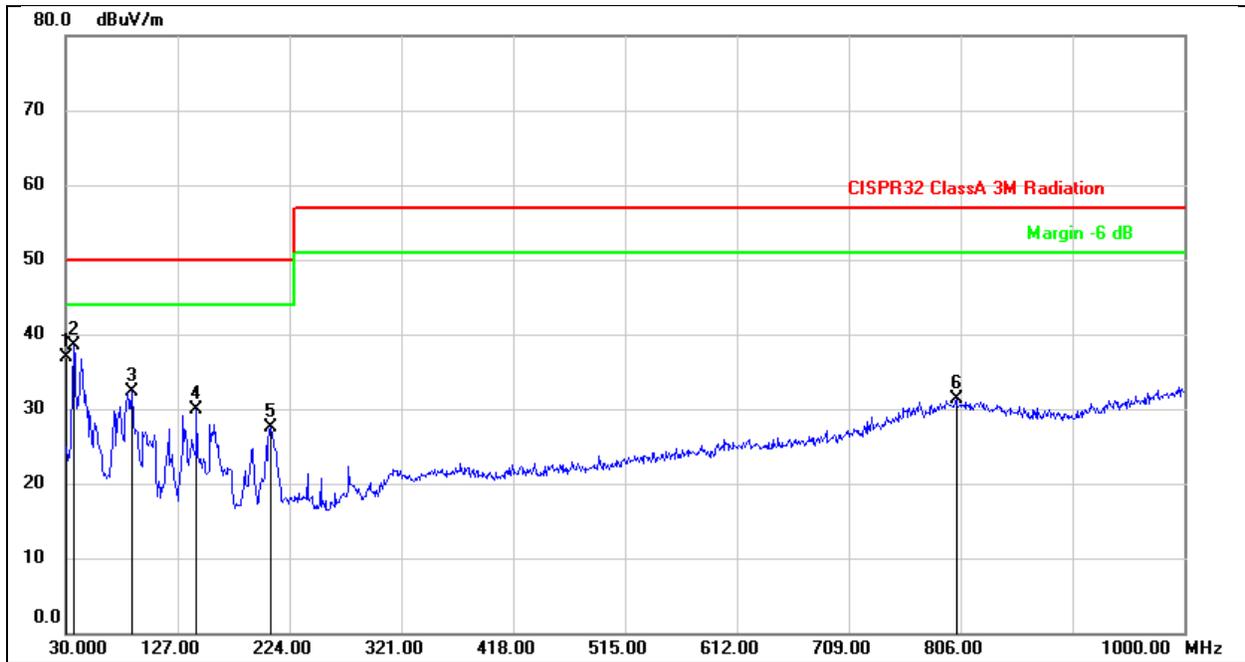
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	37.3073	53.87	-15.83	38.04	50.00	-11.96	peak
2	83.9967	51.66	-20.43	31.23	50.00	-18.77	peak
3	119.9837	45.99	-17.36	28.63	50.00	-21.37	peak
4	191.9900	48.68	-17.15	31.53	50.00	-18.47	peak
5	802.2493	31.14	0.10	31.24	57.00	-25.76	peak
6	943.1257	31.70	0.33	32.03	57.00	-24.97	peak

Project No.:	4789451449	Polarization:	Horizontal
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	9:09:01 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 5		
Note:			



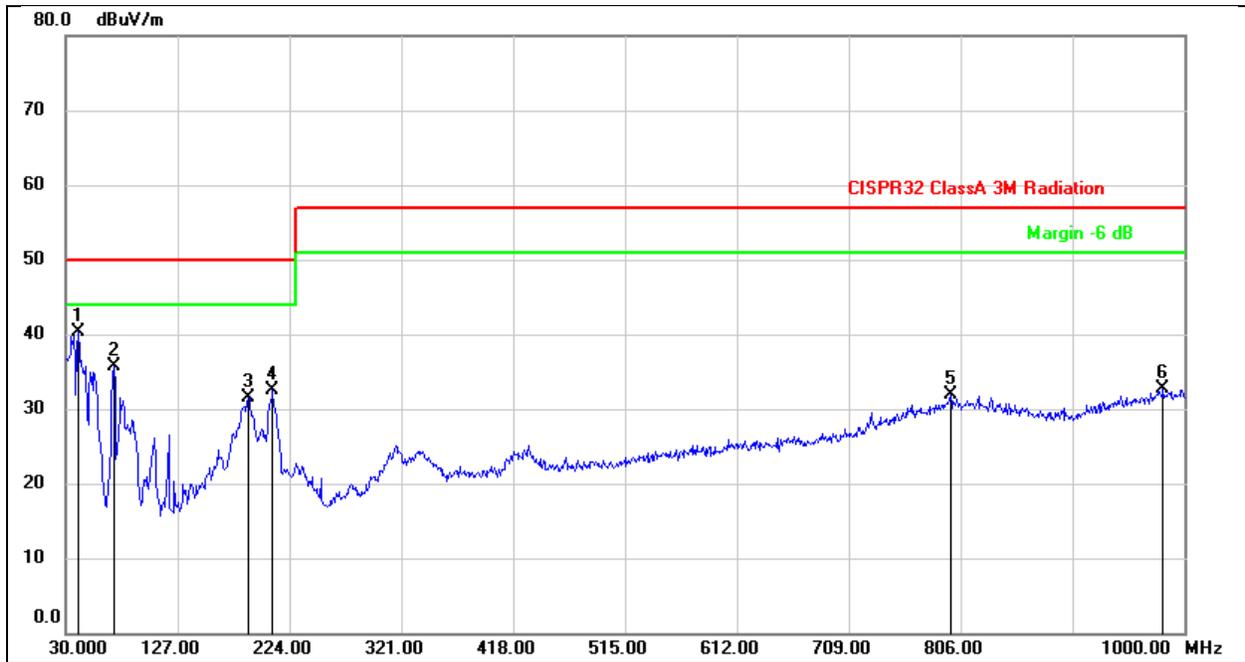
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.0323	38.89	-16.29	22.60	50.00	-27.40	peak
2	71.9687	42.73	-17.81	24.92	50.00	-25.08	peak
3	209.5147	42.17	-17.06	25.11	50.00	-24.89	peak
4	312.9166	37.58	-13.27	24.31	57.00	-32.69	peak
5	798.0460	31.07	0.14	31.21	57.00	-25.79	peak
6	970.8030	30.89	1.22	32.11	57.00	-24.89	peak

Project No.:	4789451449	Polarziation:	Vertical
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	9:12:17 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 5		
Note:			



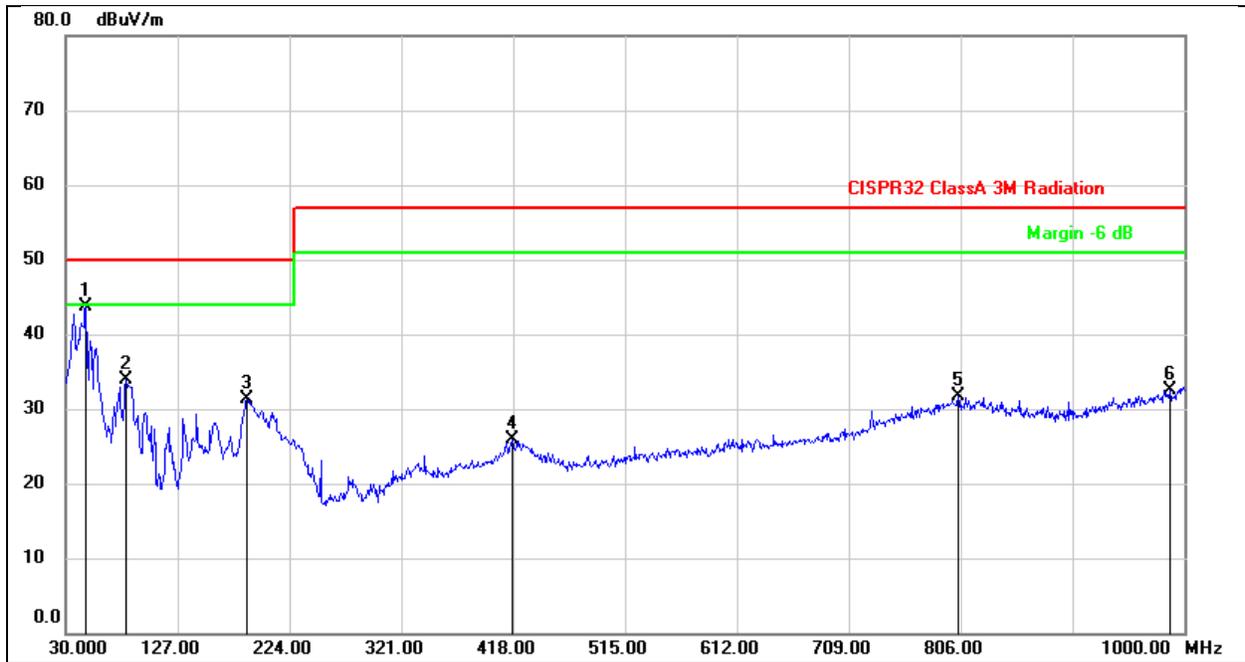
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.0506	53.25	-16.29	36.96	50.00	-13.04	peak
2	37.2427	54.38	-15.84	38.54	50.00	-11.46	peak
3	87.9090	53.20	-20.90	32.30	50.00	-17.70	peak
4	144.0073	44.89	-14.99	29.90	50.00	-20.10	peak
5	207.7040	44.57	-17.14	27.43	50.00	-22.57	peak
6	802.9607	31.18	0.09	31.27	57.00	-25.73	peak

Project No.:	4789451449	Polarization:	Horizontal
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	9:38:38 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 7		
Note:			



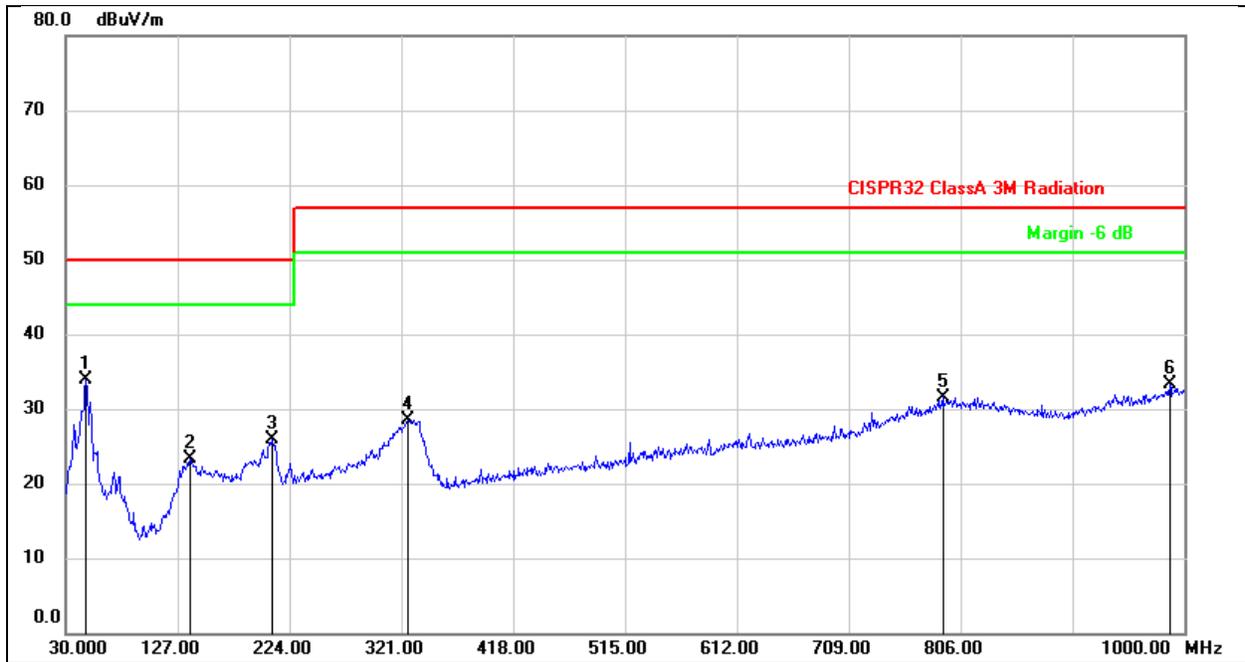
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	41.5753	55.46	-15.22	40.24	50.00	-9.76	peak
2	72.1950	53.58	-17.86	35.72	50.00	-14.28	peak
3	189.0477	48.35	-16.86	31.49	50.00	-18.51	peak
4	209.4500	49.52	-17.06	32.46	50.00	-17.54	peak
5	797.8520	31.79	0.13	31.92	57.00	-25.08	peak
6	982.4107	31.02	1.59	32.61	57.00	-24.39	peak

Project No.:	4789451449	Polarziation:	Vertical
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	9:47:16 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 7		
Note:			



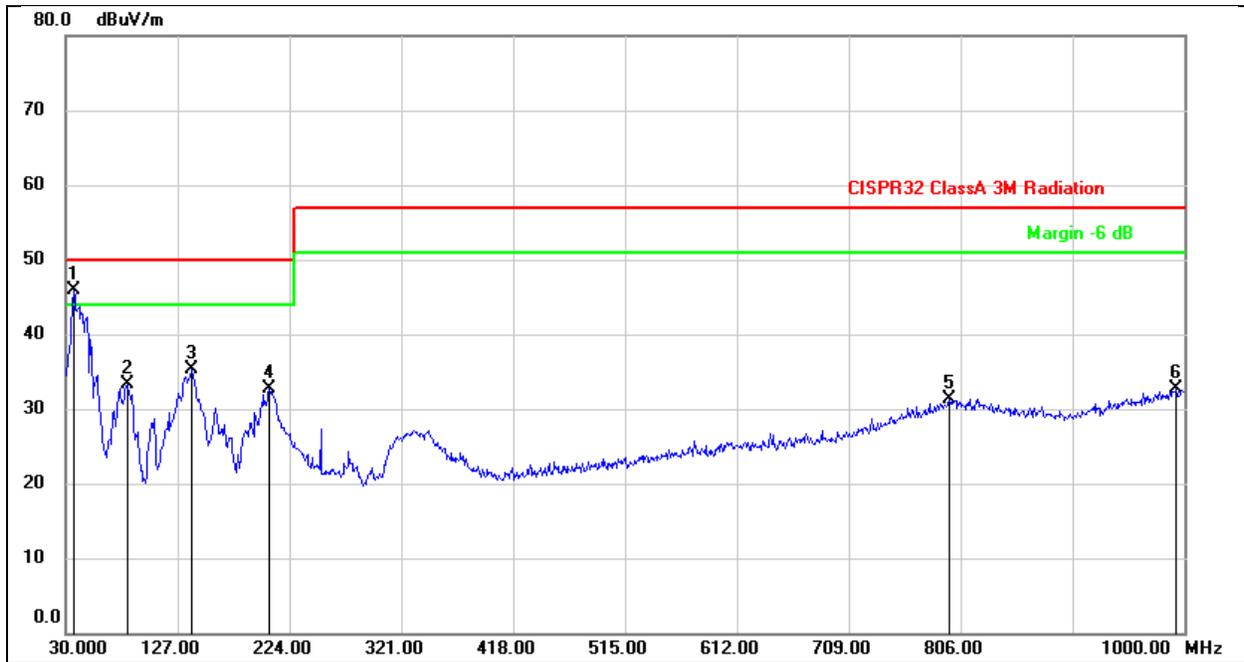
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	47.4600	58.46	-14.84	43.62	50.00	-6.38	peak
2	83.1237	54.07	-20.26	33.81	50.00	-16.19	peak
3	187.2046	48.09	-16.81	31.28	50.00	-18.72	peak
4	417.8060	36.16	-10.29	25.87	57.00	-31.13	peak
5	804.3832	31.72	0.05	31.77	57.00	-25.23	peak
6	987.5517	30.77	1.71	32.48	57.00	-24.52	peak

Project No.:	4789451449	Polarziation:	Horizontal
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/6/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	9:22:29 AM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 8		
Note:			



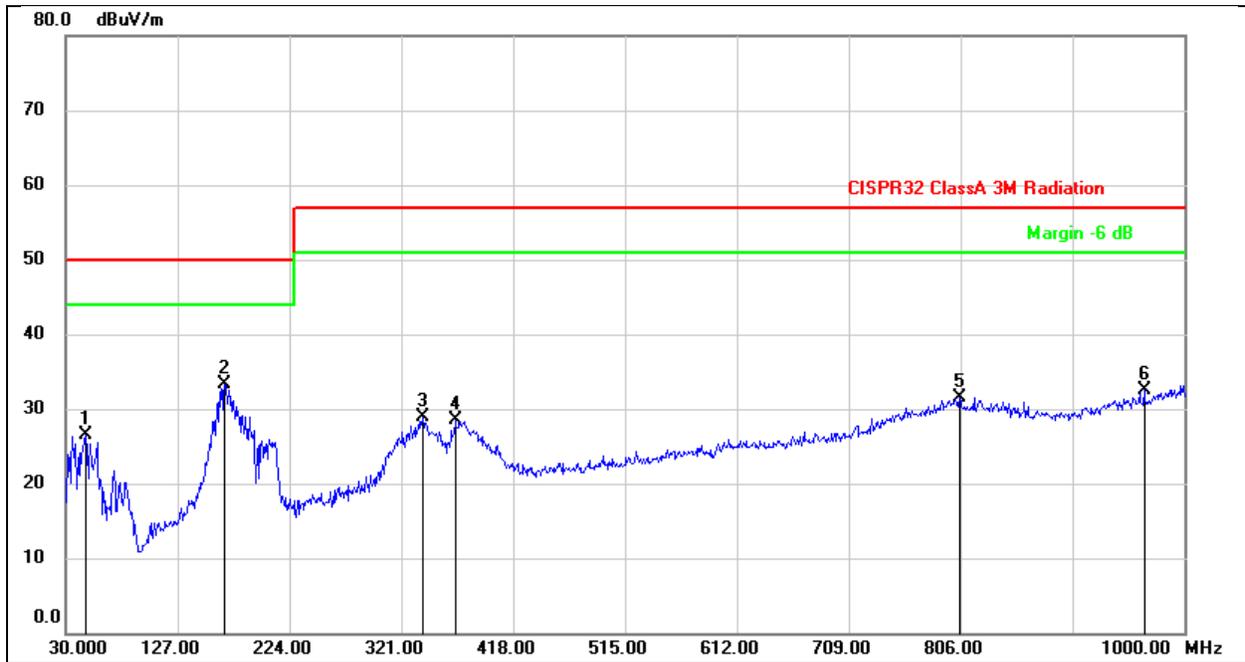
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	48.2037	48.80	-14.81	33.99	50.00	-16.01	peak
2	138.5753	38.53	-15.32	23.21	50.00	-26.79	peak
3	209.4177	43.06	-17.06	26.00	50.00	-24.00	peak
4	327.2727	41.14	-12.65	28.49	57.00	-28.51	peak
5	791.3530	31.71	-0.11	31.60	57.00	-25.40	peak
6	988.1983	31.64	1.73	33.37	57.00	-23.63	peak

Project No.:	4789451449	Polarziation:	Vertical
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/6/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	9:31:08 AM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 8		
Note:			



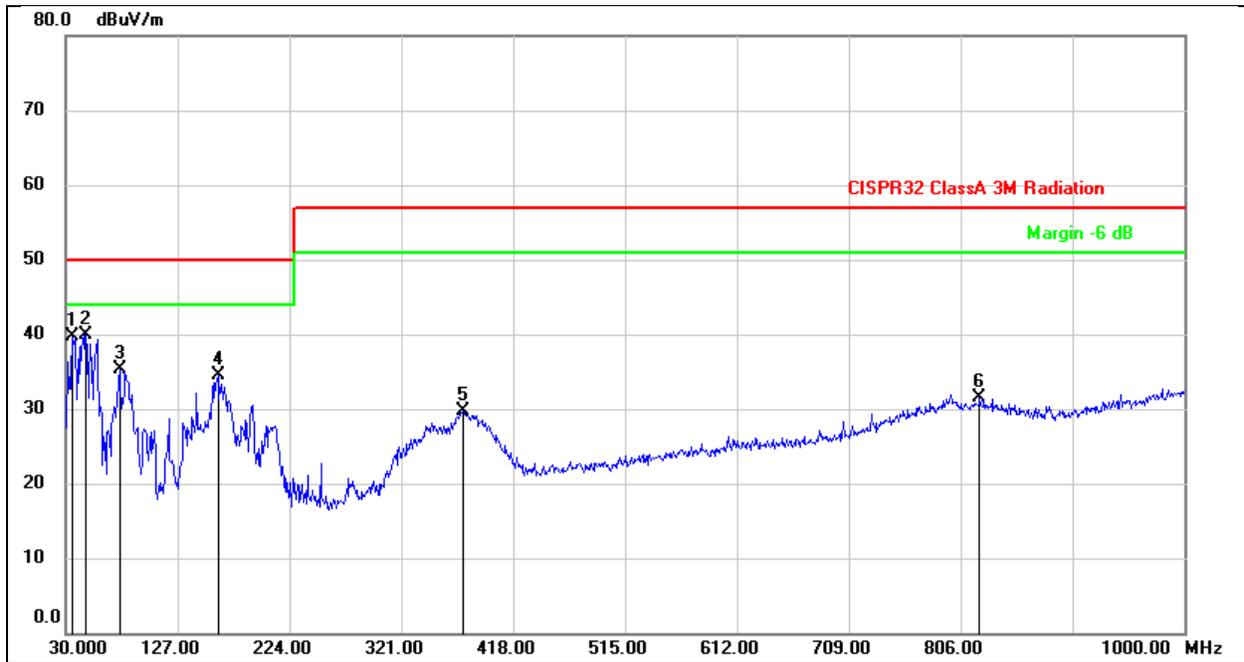
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	37.5337	61.69	-15.78	45.91	50.00	-4.09	peak
2	84.2229	53.86	-20.47	33.39	50.00	-16.61	peak
3	139.9980	50.44	-15.21	35.23	50.00	-14.77	peak
4	206.5399	49.80	-17.19	32.61	50.00	-17.39	peak
5	796.6557	31.17	0.11	31.28	57.00	-25.72	peak
6	993.7597	31.02	1.78	32.80	57.00	-24.20	peak

Project No.:	4789451449	Polarization:	Horizontal
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	10:07:20 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 9		
Note:			



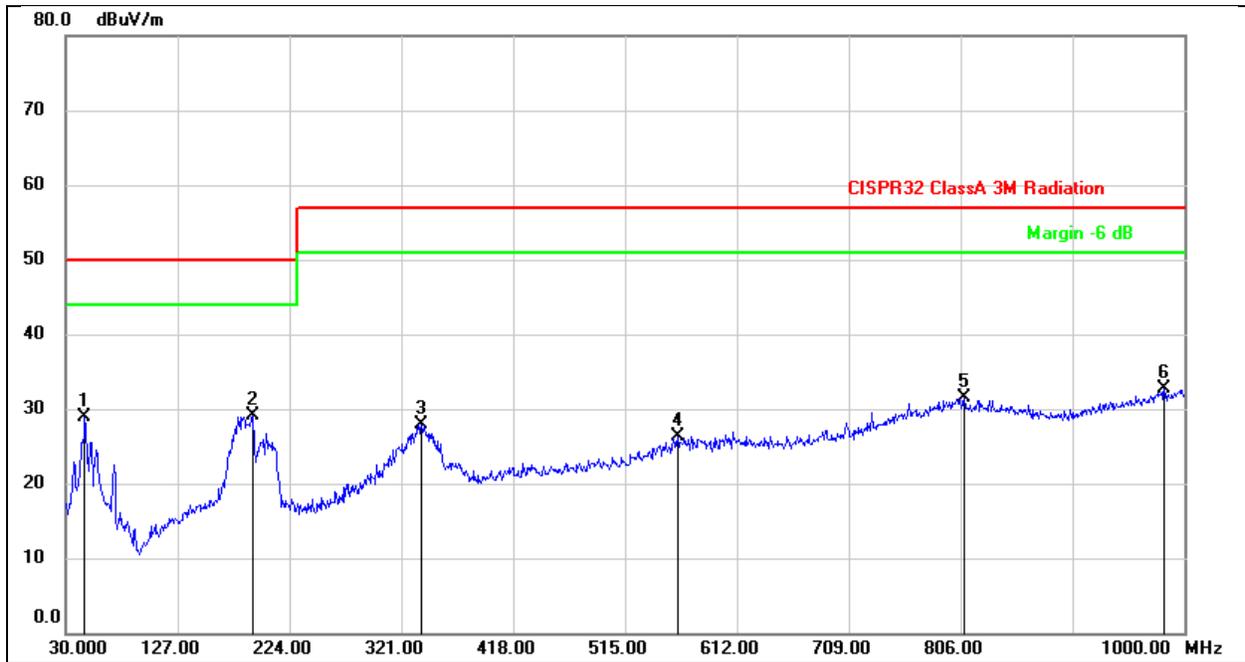
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	47.7833	41.30	-14.83	26.47	50.00	-23.53	peak
2	168.6777	48.01	-14.78	33.23	50.00	-16.77	peak
3	339.8180	41.25	-12.34	28.91	57.00	-28.09	peak
4	368.2713	40.09	-11.56	28.53	57.00	-28.47	peak
5	805.4180	31.39	0.02	31.41	57.00	-25.59	peak
6	966.0177	31.47	1.01	32.48	57.00	-24.52	peak

Project No.:	4789451449	Polarziation:	Vertical
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	10:12:18 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 9		
Note:			



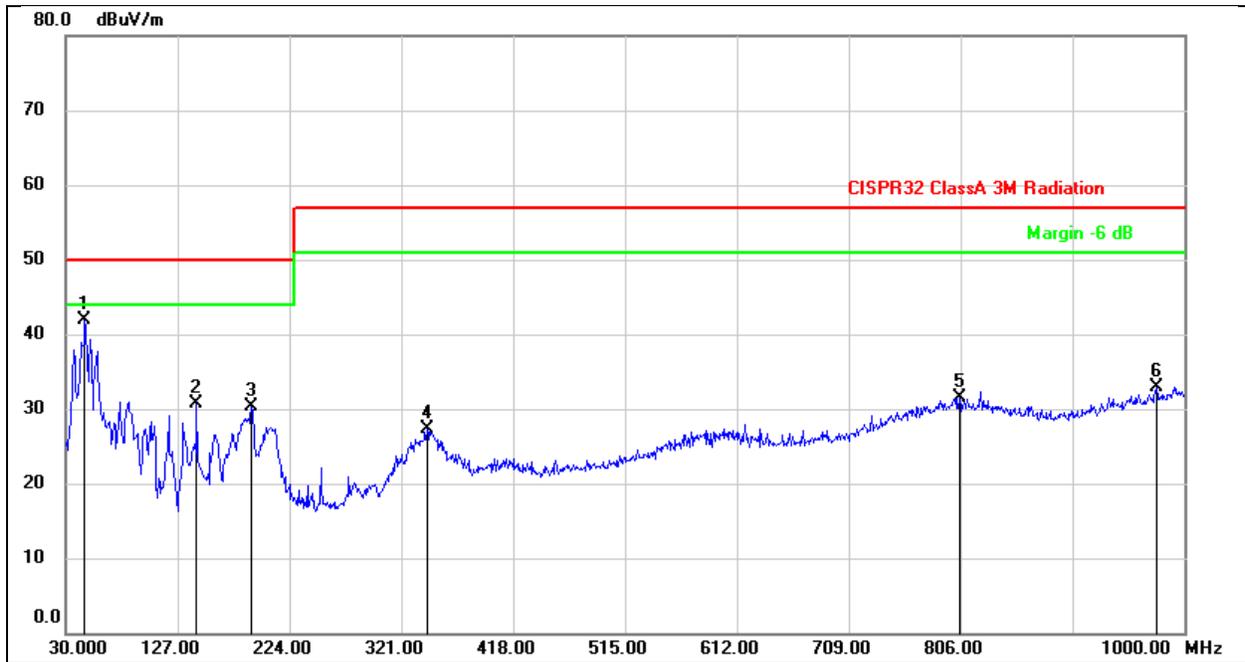
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	35.9817	55.62	-15.91	39.71	50.00	-10.29	peak
2	47.6540	54.65	-14.83	39.82	50.00	-10.18	peak
3	77.3037	54.25	-18.95	35.30	50.00	-14.70	peak
4	162.0817	49.10	-14.57	34.53	50.00	-15.47	peak
5	374.9643	41.10	-11.37	29.73	57.00	-27.27	peak
6	823.2013	31.55	-0.11	31.44	57.00	-25.56	peak

Project No.:	4789451449	Polarization:	Horizontal
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	10:17:06 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 10		
Note:			



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	47.1690	43.70	-14.84	28.86	50.00	-21.14	peak
2	191.9900	46.27	-17.15	29.12	50.00	-20.88	peak
3	338.7833	40.20	-12.36	27.84	57.00	-29.16	peak
4	561.2367	33.44	-7.05	26.39	57.00	-30.61	peak
5	809.0717	31.53	-0.07	31.46	57.00	-25.54	peak
6	983.0250	31.17	1.60	32.77	57.00	-24.23	peak

Project No.:	4789451449	Polarziation:	Vertical
Standard:	CISPR32 ClassA 3M Radiation	Power Source:	From DC source
Test item:	Radiation Test	Date:	5/5/2020
Temp./Hum.(%RH):	25(C)/59%RH	Time:	10:20:02 PM
EUT:	DC to DC Converter	Test By:	Edison
Model:		Distance:	3m
Mode:	Mode 10		
Note:			



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	47.0397	56.76	-14.84	41.92	50.00	-8.08	peak
2	144.0073	45.70	-14.99	30.71	50.00	-19.29	peak
3	191.9577	47.45	-17.15	30.30	50.00	-19.70	peak
4	344.1182	39.59	-12.31	27.28	57.00	-29.72	peak
5	805.4180	31.41	0.02	31.43	57.00	-25.57	peak
6	976.3320	31.38	1.44	32.82	57.00	-24.18	peak