

# FCC EMC Test Report

according to

**47 CFR FCC Rules and Regulations Part 15 Subpart B,  
Class B Digital Device  
and  
Canada Standard ICES-003 Issue 5**

**Equipment : AC/DC ADAPTER**

**Model No. : ADP-25FW B**

**Filing Type : Verification**

**Applicant : DELTA ELECTORNICS, INC.**  
No. 3, Tungyuan Road, Chungli Industrial Zone,  
Taoyuan County 32063, Taiwan, R.O.C

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

***SPORTON International Inc.***

*No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.*



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## VERIFICATION OF COMPLIANCE

according to

**47 CFR FCC Rules and Regulations Part 15 Subpart B,  
Class B Digital Device  
and  
Canada Standard ICES-003 Issue 5**

**Equipment : AC/DC ADAPTER**

**Model No. : ADP-25FW B**


**Applicant : DELTA ELECTORNICS, INC.**

No. 3, Tungyuan Road, Chungli Industrial Zone,  
Taoyuan County 32063, Taiwan, R.O.C

**HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 2014** and the energy emitted by this equipment were **passed CISPR PUB. 22 and FCC Part 15 and Canada Standard ICES-003 Issue 5** in both radiated and conducted emission **Class B** limits.

The product sample received on Nov. 13, 2015 and completely tested on **Nov. 16, 2015**  
at **SPORTON International Inc. LAB**

  
\_\_\_\_\_  
Jack Deng / Engineering Manager

***SPORTON International Inc.***

*No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.*



## 1. General Description of Equipment under Test

### 1.1 Applicant

**DELTA ELECTORNICS, INC.**

No. 3, Tungyuan Road, Chungli Industrial Zone,  
Taoyuan County 32063, Taiwan, R.O.C

### 1.2 Manufacturer

Same as 1.1

### 1.3 Basic Description of Equipment under Test

Equipment : AC/DC ADAPTER  
Model No. : ADP-25FW B  
Data Cable Type : Please see section 2.2 of this test report for details  
Power Supply Type : Adapter  
AC Power Cord : Wall-mount, 2 pin  
Non-Shielded, 1.5 m

**The maximum operating frequency : 100 kHz**

### 1.4 Feature of Equipment under Test

Please refer to user manual.

### 1.5 Modification of EUT

None

## 2. Test Configuration of Equipment under Test

### 2.1 Test Manner

- a. The EUT has been associated with supporting units and peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.
- b. The equipment under test were performed the following test modes:

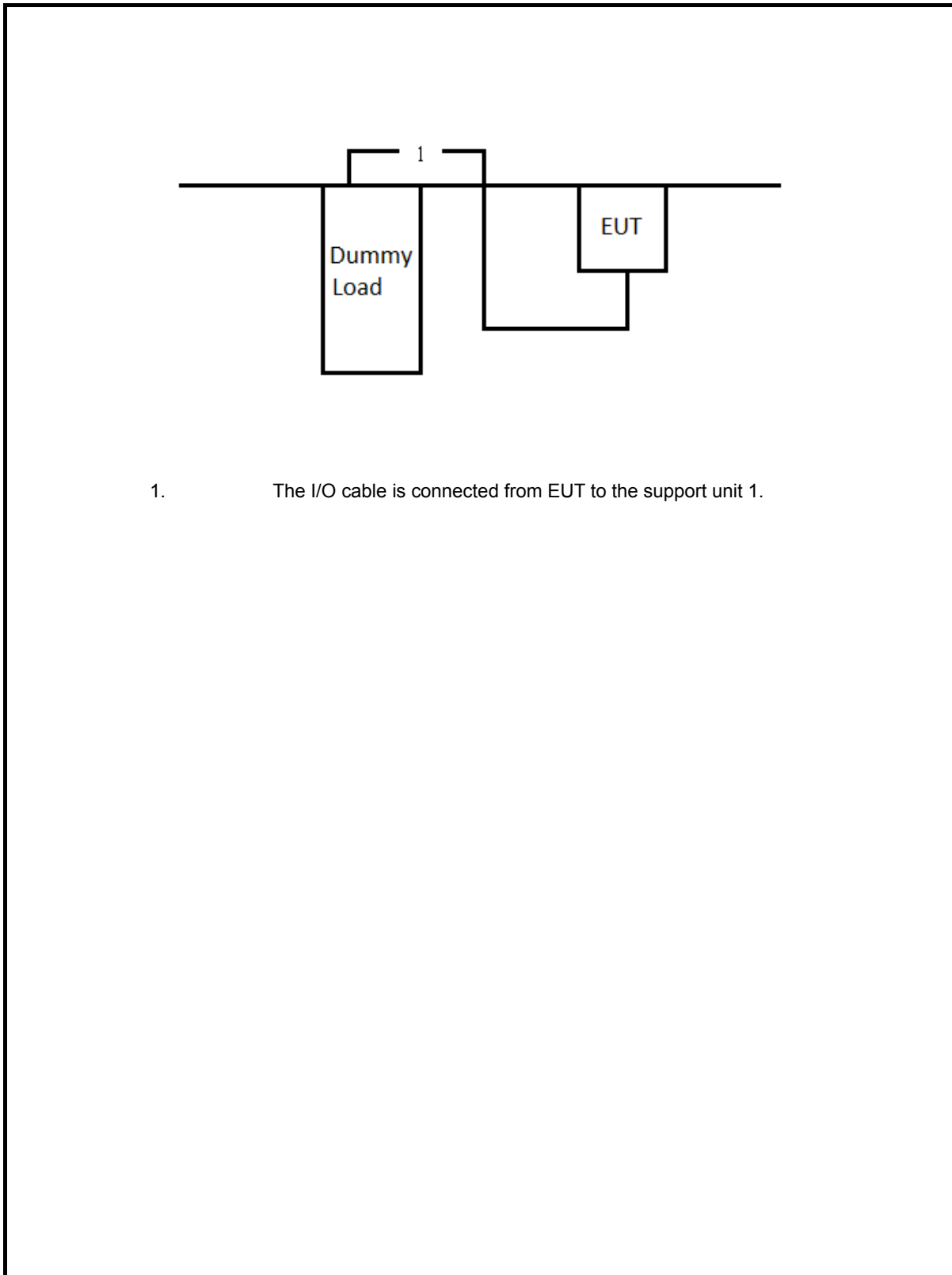
Test Items	Description of test modes
AC Conducted Emission	Mode 1. FULL LOAD
Radiated Emissions	Mode 1. FULL LOAD

- c. Frequency range investigated: Conducted 150 kHz to 30 MHz, Radiated 30 MHz to 1,000 MHz

### 2.2 Description of Test System

No.	Peripheral	Manufacturer	Model Number	FCC ID	Cable / Spec. Description
For Local					
1	Dummy Load	SSR	8Ω/400W	NA	-

### 2.3 Connection Diagram of Test System



1. The I/O cable is connected from EUT to the support unit 1.



### **3. Test Software**

No test software was used during testing.



## 4. General Information of Test

### 4.1 Test Facility

Test Site : SPORTON INTERNATIONAL INC.

Test Site Location : No. 3, Lane 238, Kang Lo Street, Nei Hwu District, Taipei 11424,  
Taiwan, R.O.C.  
TEL : 886-2-2631-4739  
FAX : 886-2-2631-9740

Test Site No. : CO01-NH, OS02-NH

### 4.2 Uncertainty of Test Site

Test Items	Test Site No.	Uncertainty	Remark
Conducted Emissions	CO01-NH	$\pm 2.6\text{dB}$	Confidence levels of 95%
Radiated Emissions below 1GHz	OS01-NH	$\pm 2.8\text{dB}$	Confidence levels of 95%

### 4.3 Test Voltage

120VAC / 60Hz

### 4.4 Standard for Methods of Measurement

ANSI C63.4-2014

### 4.5 Test in Compliance with

CISPR PUB. 22 and FCC Part 15 and Canada Standard ICES-003 Issue 5

### 4.6 Frequency Range Investigated

- a. Conducted emission test: from 150 kHz to 30 MHz
- b. Radiated emission test: from 30 MHz to 1,000 MHz
  - The test distance of radiated emission from antenna to EUT is 10 M

## 5. Test of Conducted Powerline

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in ANSI C63.4, Clause 7 and Canada Standard ICES-003. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meter above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

### 5.1 Test Procedures

- a. The EUT was warmed up for 15 minutes before testing started.
- b. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
- c. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- d. All the support units are connected to the other LISN.
- e. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- f. The CISPR states that a 50 ohm, 50 micro henry LISN should be used.
- g. Both sides of AC line were checked for maximum conducted interference.
- h. The frequency range from 150 kHz to 30 MHz was searched.
- i. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

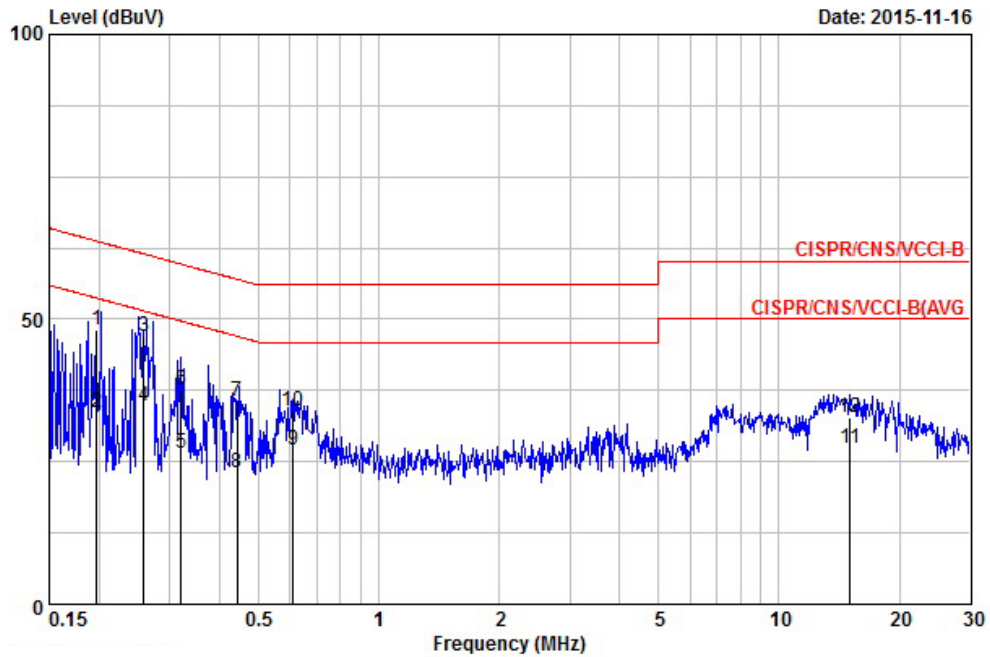
## 5.2 Typical Test Setup Layout of Conducted Powerline

- a. AMN is 80 cm from the EUT and at least 80 cm from other units and other metal planes.
- b. EUT is connected to one artificial mains network (AMN).
- c. All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
- d. Rear of EUT to be flushed with rear of table top.
- e. Peripherals shall be placed at a distance of 10 cm from each other and from the controller, except for the monitor which, if this is an acceptable installation practice, shall be placed directly on the top of the controller.
- f. If cables, which hang closer than 40 cm to the horizontal metal ground plane, cannot be shortened to appropriate length, the excess shall be folded back and forth forming a bundle 30 cm to 40 cm long.
- g. Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
- h. Cables of hand operated devices, such as keyboards, mice, etc. shall be placed as for normal usage.

5.3 Test Result of AC Powerline Conducted Emission

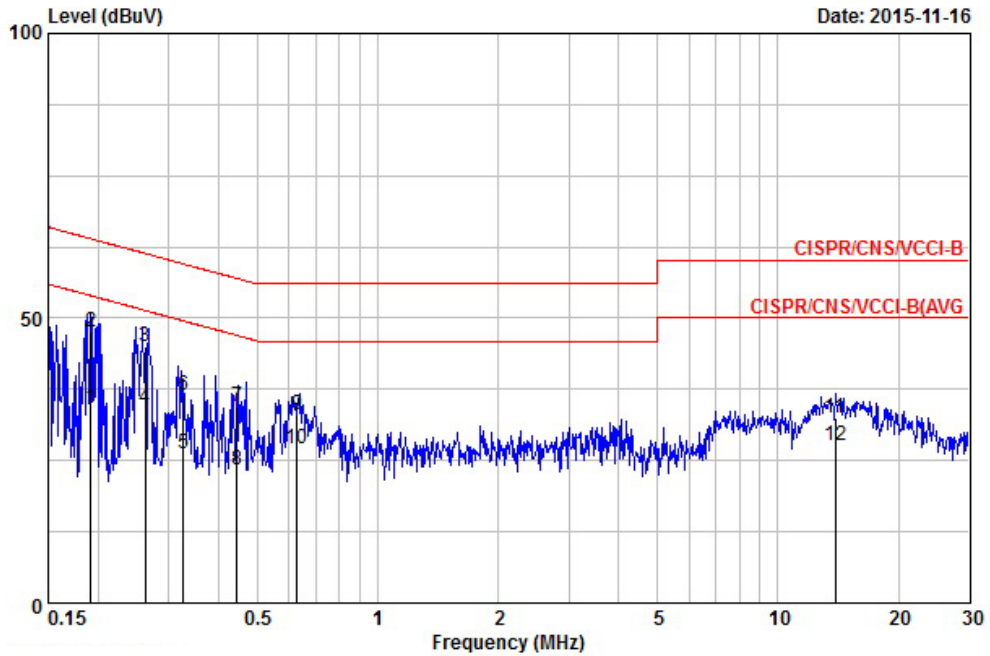
Test Mode	Mode 1	Test Site No.	CO01-NH
Test Frequency	0.15 MHz ~ 30 MHz	Test Engineer	Willy
Temperature	25 °C	Relative Humidity	50 %
Note: 1. Corrected Reading (dB $\mu$ V) = LISN Factor + Cable Loss + Read Level = Level			
2. All emissions not reported here are more than 10 dB below the prescribed limit.			
■The test was passed at the minimum margin that marked by the frame in the following data			

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.198	48.10	-15.62	63.71	37.53	10.47	0.10	QP
2	0.198	33.49	-20.23	53.71	22.92	10.47	0.10	AVERAGE
3	0.259	46.99	-14.48	61.47	36.42	10.47	0.10	QP
4	0.259	34.74	-16.73	51.47	24.17	10.47	0.10	AVERAGE
5	0.320	26.52	-23.19	49.71	15.94	10.48	0.10	AVERAGE
6	0.320	37.57	-22.14	59.71	26.99	10.48	0.10	QP
7	0.442	35.48	-21.54	57.02	24.90	10.48	0.10	QP
8	0.442	23.18	-23.84	47.02	12.60	10.48	0.10	AVERAGE
9	0.611	27.20	-18.80	46.00	16.62	10.48	0.10	AVERAGE
10	0.611	34.02	-21.98	56.00	23.44	10.48	0.10	QP
11	15.066	27.49	-22.51	50.00	16.56	10.73	0.20	AVERAGE
12	15.066	32.86	-27.14	60.00	21.93	10.73	0.20	QP

Neutral



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.191	34.10	-19.88	53.98	23.87	10.13	0.10	AVERAGE
2	0.191	47.67	-16.31	63.98	37.44	10.13	0.10	QP
3	0.262	45.07	-16.31	61.38	34.84	10.13	0.10	QP
4	0.262	34.17	-17.21	51.38	23.94	10.13	0.10	AVERAGE
5	0.327	26.29	-23.24	49.53	16.07	10.12	0.10	AVERAGE
6	0.327	36.40	-23.13	59.53	26.18	10.12	0.10	QP
7	0.444	34.58	-22.40	56.98	24.36	10.12	0.10	QP
8	0.444	23.29	-23.69	46.98	13.07	10.12	0.10	AVERAGE
9	0.627	33.05	-22.95	56.00	22.83	10.12	0.10	QP
10	0.627	27.17	-18.83	46.00	16.95	10.12	0.10	AVERAGE
11	13.915	32.36	-27.64	60.00	21.78	10.38	0.20	QP
12	13.915	27.69	-22.31	50.00	17.11	10.38	0.20	AVERAGE

## 6. Test of Radiated Emission

Radiated emissions from 30 MHz to 1,000 MHz were measured with a bandwidth of 120 kHz for 30 MHz to 1000 MHz according to the methods defines in ANSI C63.4, Clause 8 and Canada Standard ICES-003. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

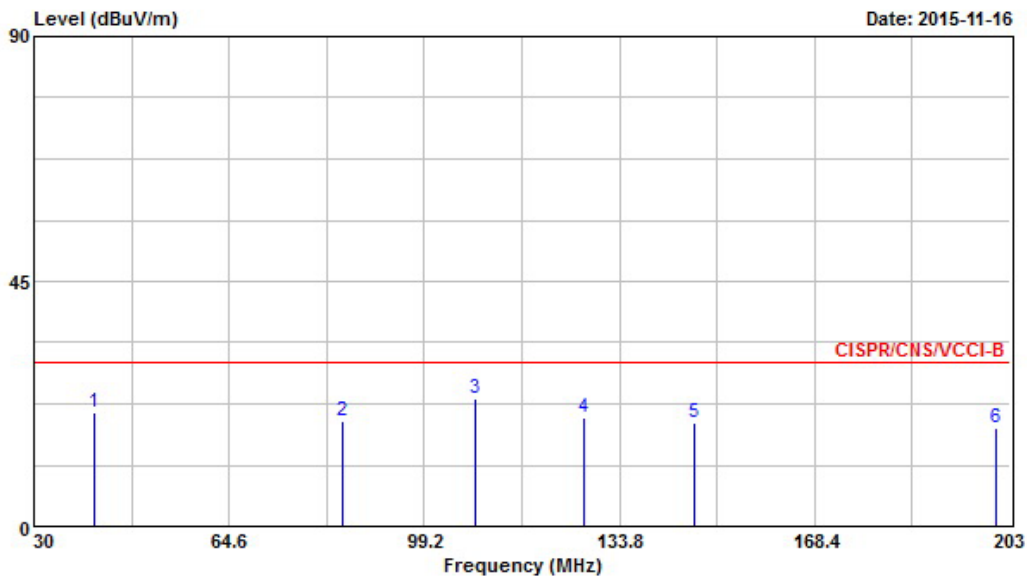
### 6.1 Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set at 10m(below 1GHz) from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. The FCC Part 15.109 (g) permit parties seeking to authorize a digital device to choose to demonstrate that the device complies with either the Part 15 standards or the international standards found in Publication 22 of the International Special Committee on Radio Interference (CISPR)
- j. The main board was tested in accordance with section 15.32 of the FCC rules. Testing for radiated emissions was first performed with the main board installed in a typical enclosure but with the enclosure's cover removed so that the internal circuitry is exposed at the top and on at least two sides. And then the EUT was tested with enclosure's cover unless it pass the required limits at first condition.

6.2 Test Result of Radiated Emission (Below 1GHz)

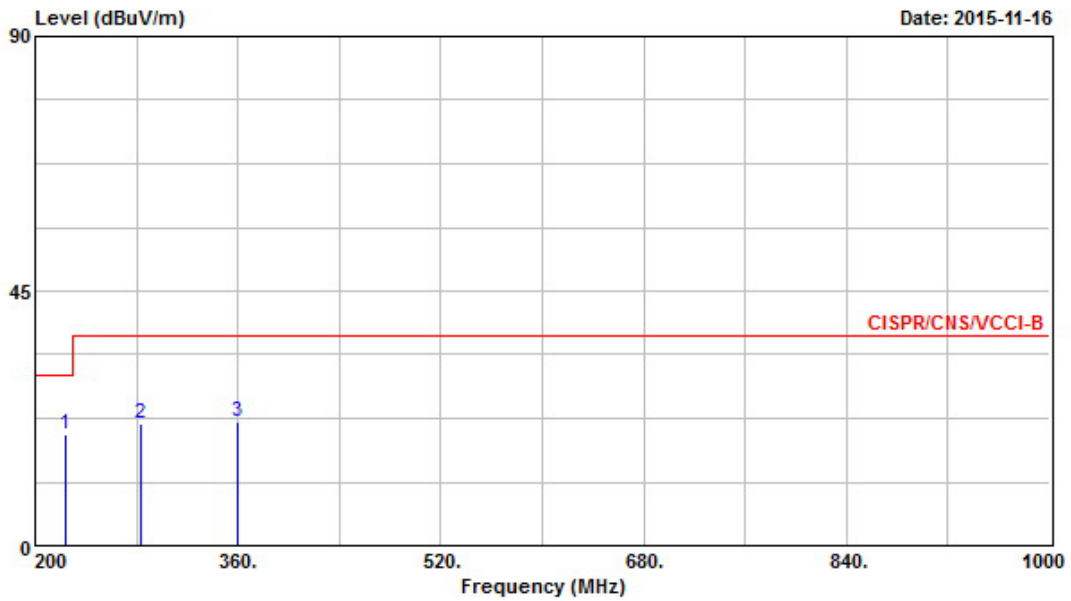
Test mode	Mode 1	Test Site No.	OS01-NH
Test frequency	30 MHz ~ 1000 MHz	Test Engineer	Louis
Temperature	26 °C	Relative Humidity	55 %
Note: 1. Emission level (dBμV/m) = 20 log Emission level (μV/m)			
2. Corrected Reading : Probe Factor + Cable Loss + Read Level – Preamp Factor = Level			
■The test was passed at the minimum margin that marked by the frame in the following data			

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	40.730	20.89	-9.11	30.00	35.48	12.76	0.00	27.35	QP	---	---
2	84.670	19.47	-10.53	30.00	38.99	7.78	0.00	27.30	QP	---	---
3	108.200	23.54	-6.46	30.00	39.84	10.95	0.00	27.25	QP	100	182
4	127.570	19.98	-10.02	30.00	35.43	11.71	0.00	27.16	QP	---	---
5	147.120	19.11	-10.89	30.00	34.83	11.35	0.00	27.07	QP	---	---
6	200.580	18.15	-11.85	30.00	36.02	8.96	0.00	26.83	QP	---	---

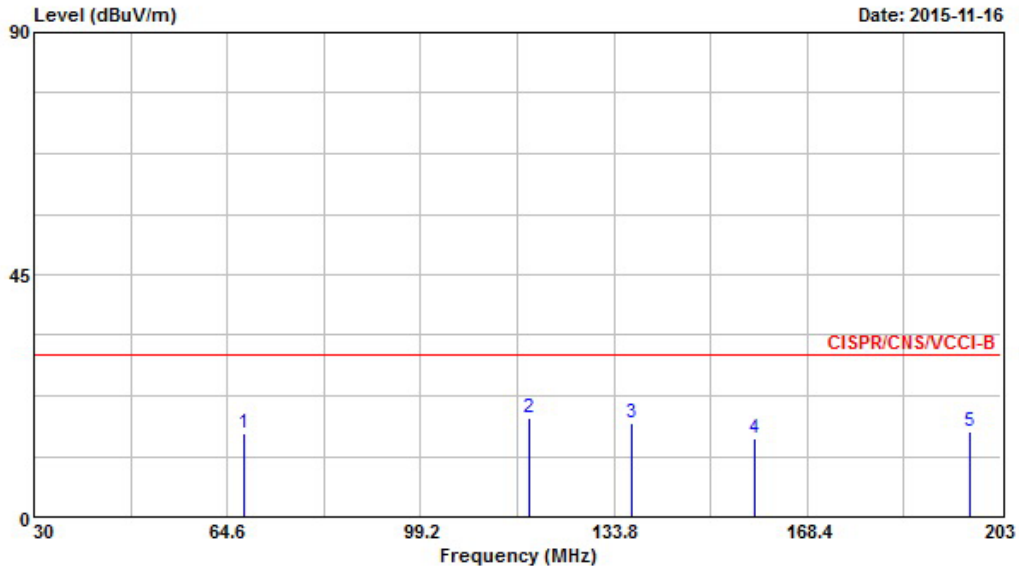
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	224.000	19.64	-10.36	30.00	34.48	9.64	2.30	26.78	Peak	---	---
2	283.200	21.68	-15.32	37.00	32.62	12.87	2.84	26.65	Peak	---	---
3	359.200	21.84	-15.16	37.00	31.34	14.60	3.00	27.10	Peak	---	---

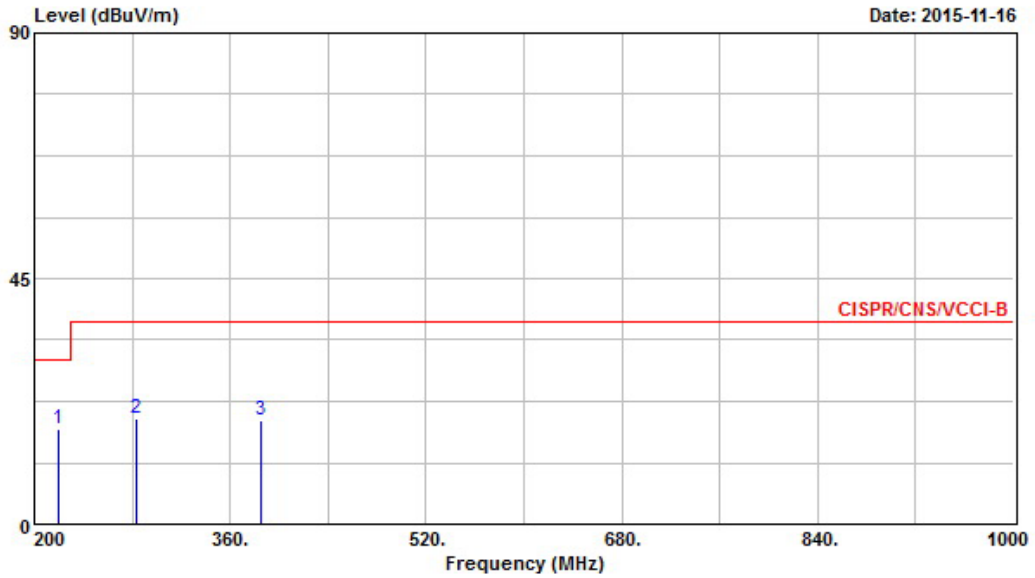


**Horizontal**



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	67.540	15.48	-14.52	30.00	35.21	6.30	1.29	27.32	Peak	---	---
2	118.580	18.39	-11.61	30.00	32.38	11.55	1.67	27.21	Peak	---	---
3	136.910	17.53	-12.47	30.00	31.13	11.71	1.81	27.12	Peak	---	---
4	159.060	14.58	-15.42	30.00	29.20	10.46	1.94	27.02	Peak	---	---
5	197.460	15.87	-14.13	30.00	31.53	8.95	2.23	26.84	Peak	---	---

Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	220.000	17.57	-12.43	30.00	32.78	9.30	2.28	26.79	Peak	---	---
2	283.200	19.22	-17.78	37.00	30.16	12.87	2.84	26.65	Peak	---	---
3	384.800	19.12	-17.88	37.00	27.89	15.22	3.32	27.31	Peak	---	---



### **6.3 Test Result of Radiated Emission (Above 1GHz)**

The maximum internal frequency generated of the EUT is 100 kHz, so the measurement above 1GHz is not required.



## 7. List of Measuring Equipment Used

### < Conducted Emission >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Receiver	R&S	ESCS 30	100357	9 kHz - 2.75 GHz	Jan. 21, 2015	Conduction (CO01-NH)
LISN	SCHAFFNER	NNB41	06/10024	9kHz - 30MHz	Dec. 04, 2014	Conduction (CO01-NH)
Power Filter	CORCOM	MR12030	N/A	30A*2	NCR	Conduction (CO01-NH)
RF Cable-CON	Suhner Switzerland	RG223/U	CB004	9kHz - 30MHz	Dec. 10, 2014	Conduction (CO01-NH)

Note: Calibration Interval of instruments listed above is one year. NCR: NO CALIBRATION REQUEST.

### < Radiated Emission below 1GHz >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Open Area Test Site	SPORTON	OATS-10	OS01-NH	30 MHz - 1 GHz 10m	Jul. 25, 2015	Radiation (OS01-NH)
Amplifier	HP	8447D	2944A06292	0.1 MHz - 1.3 GHz	Apr. 29, 2015	Radiation (OS01-NH)
Spectrum Analyzer	R&S	R&S	FSP	838858/038	Mar. 23, 2015	Radiation (OS01-NH)
Test Receiver	R&S	ESCS 30	100357	9 kHz - 2.75 GHz	Jan. 21, 2015	Radiation (OS01-NH)
Bilog Antenna	SCHAFFNER	CBL6111C	2738	30 MHz ~ 1 GHz	Mar. 06, 2015	Radiation (OS01-NH)
Turn Table	EMCO	1060-1.211	9507-1805	0 ~ 360 degree	NCR	Radiation (OS01-NH)
Antenna Mast	EMCO	1051-1.2	9503-1876	1 m ~ 4 m	NCR	Radiation (OS01-NH)
RF Cable-R10m	BELDEN	RG8/U	CB001	30 MHz ~ 1 GHz	Nov. 05, 2015	Radiation (OS01-NH)

Note: Calibration Interval of instruments listed above is one year. NCR: NO CALIBRATION REQUEST.

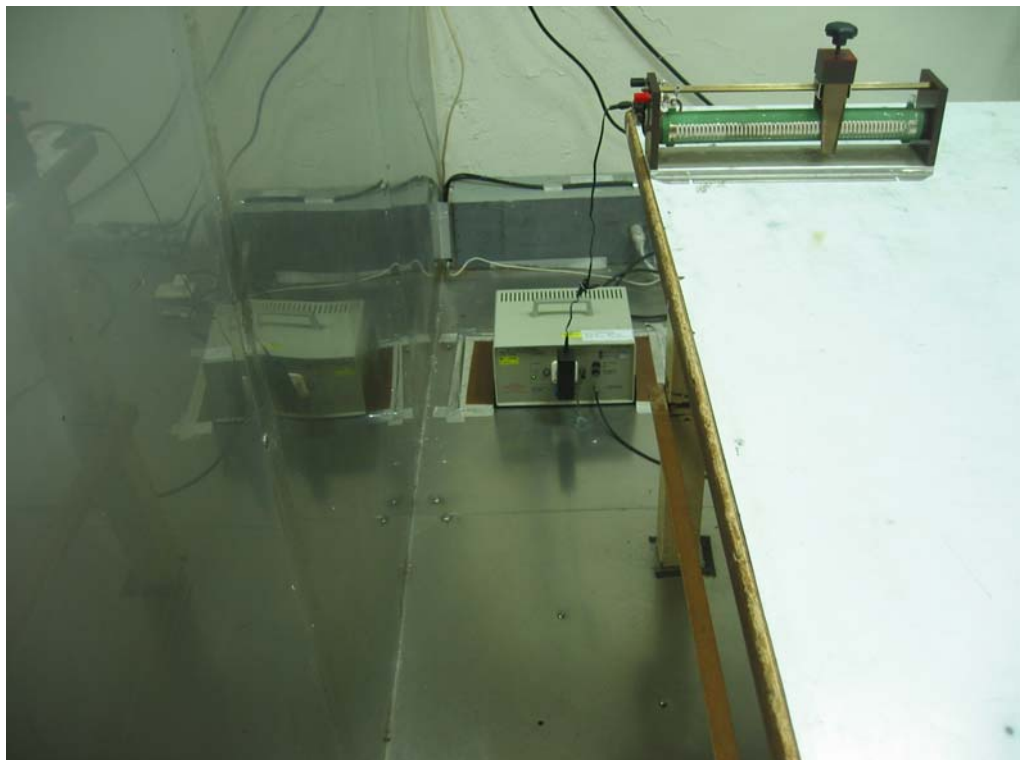
## Appendix A. Test Photos

### 1. Photographs of Conducted Emissions Test Configuration

Front view



Rear view



**Side view**



## 2. Photographs of Radiated Emissions Test Configuration

For radiated emissions below 1GHz

Front view



Rear view





## APPENDIX B. Photographs of EUT





