



Underwriters Laboratories Inc.

korea.ul.com

Order: 10775484

Report: 15-10775484-FCC

Date: May 15, 2015

Model: UP100S12WH

FCC Verification Report

For

LED DRIVER

Unionelecom Co., Ltd
102-1207, Chunui Techno Park 1, #200-1, Chunui-dong, Wonmi-ku, Buchun-si,
Kyungki-do, Korea

Copyright © 2005 Underwriters Laboratories Inc.

Underwriters Laboratories Inc. authorizes the above-named company to reproduce this Report provided it is reproduced in its entirety.

Summary of Test Results:

The following tests were performed on a sample submitted for evaluation of compliance with 47 CFR Part 15.107(a) / 47 CFR Part 15.109 (a) & ICES-003				
Test #	Test Name Test Requirement/Specification	Compliant	Not Compliant	See Remark
1	AC Power line Conducted Emission Test	X	-	-
2	Radiated Emission Test	X	-	-

Conclusion:

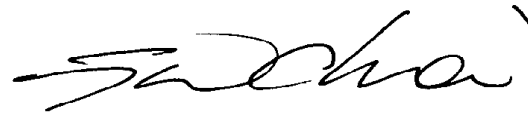
The tests listed in the Summary of Testing section of this report have been performed as a witness testing and the results recorded by UL Korea Ltd. in accordance with the procedures stated in each test requirement and specification. The test list was determined by the Applicant as being applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

The equipment under test has

- Met the technical requirements
- Not met the technical requirements



Witness tested by
Daemin Cho, WiSE Laboratory Engineer
Consumer Technology Division
UL Korea Ltd.
May 15, 2015



Reviewed by
Jeawoon, Choi, WiSE Operations Manager
Consumer Technology Division
UL Korea Ltd.
May 15, 2015

Test Report Details


Test Report No: 15-10775484-FCC

Tests Performed By: UL Korea Ltd.
26th FL. GFC Bldg. 737 Yeoksam-dong, Kangnam-ku, Seoul,
135-984, Korea

Test Site: ENG Co.,Ltd
135-60 Gyeongchungdae-ro, Gonjiam-eup, Gwangju-si, Gyeonggi-
do, Korea 464-942
The test facility was deemed to have the environment and capabilities
necessary to perform the tests included in the test package.

Applicant: Unionelecom Co., Ltd
102-1207,Chunui Techno Park 1, #200-1, Chunui-dong, Wonmi-ku,
Buchun-si, Kyungki-do, Korea

Manufacturer: Unionelecom Co., Ltd
102-1207,Chunui Techno Park 1, #200-1, Chunui-dong, Wonmi-ku,
Buchun-si, Kyungki-do, Korea

Trademark: 

Order Number: 10775484
Model Number: UP100S12WH

Page 4 of 29

Applicant Contact: Chang-Man Ma
Title: Researcher
Phone: 82-32-668-9560
E-mail: cmma@unionelecom.co.kr
Product Type: LED DRIVER
Model Number: UP100S12WH
Multiple Model Name: N/A
Product standards: 47CFR Part 15.107 (a) / 47CFR Part 15.109 (g) Class B
& ICES-003, Class B
Test Procedure: ANSI C63.4 : 2014
Sample Serial Number: N/A
Sample Receive Date: May 6, 2015
Testing Start Date: May 6, 2015
Date Testing Complete: May 11, 2015
Overall Results: Complied

UL Korea Ltd. reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. UL Korea Ltd. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from UL Korea Ltd. issued reports.

REPORT DIRECTORY

1. GENERAL PRODUCT DESCRIPTION	6
1.1 REPORT REVISION HISTORY	6
1.2 EQUIPMENT DESCRIPTION	6
1.3 DETAILS OF TEST EQUIPMENT (EUT)	6
1.4 EUT INTERNAL OPERATING FREQUENCY	6
1.5 DETAILS INFORMATION OF MULITI-LISTING MODEL:	6
1.6 TECHNICAL DATA:	7
1.7 TECHNICAL DESCRIPTIONS AND DOCUMENTS:	7
1.8 EQUIPMENT MARKING PLATE:	7
2. TEST CONDITION	8
2.1 EQUIPMENT USED DURING TEST:	8
2.2 INPUT/OUTPUT PORTS:	8
2.3 POWER INTERFACE:	8
2.4 EUT OPERATION MODES:	8
2.5 TEST CONFIGURATION:	9
2.6 EUT TEST CONDITION FOR CONDUCTED & RADIATED EMISSION:	10
2.7 RESULT OF TESTING	10
3. TEST CONDITION AND RESULTS	11
3.1 MAINS TERMINAL DISTURBANCE VOLTAGE TEST	11
3.2 RADIATED DISTURBANCE	17
APPENDIX A - ACCREDITATIONS AND AUTHORIZATIONS	23
APPENDIX B - MEASUREMENT UNCERTAINTIES	24
APPENDIX C - EUT PHOTOGRAPH	25

1. GENERAL PRODUCT DESCRIPTION

1.1 Report Revision History

Revision Date	Description	Remarks
-	Original	-

1.2 Equipment Description

Description:
LED DRIVER

1.3 Details of Test Equipment (EUT)

Equipment Configuration:				
No.	Product Type	Manufacturer	Model	Comments
1	LED DRIVER	Unionelecom Co., Ltd	UP100S12WH	-

1.4 EUT Internal operating frequency

Frequency (MHz)	Description	Frequency (MHz)	Description
-	-	-	-

***Note:** Internal operating Frequency of EUT are below that 108MHz.

1.5 Details information of Multi-listing model:

-	Model	Description	Comment
1	N/A	N/A	N/A

***Note:** The manufacturer has declared to all the multiple model names into the basic model without any further evaluation by UL.

1.6 Technical Data:

Specification	
Rating	AC 100-277 V, 50/60 Hz, 125 W, 2 A

1.7 Technical descriptions and documents:

No.	Document Title and Description
1	Project Application Letter and Manual
The manufacturer provided the following document.	

1.8 Equipment Marking Plate:

N/A

2. TEST CONDITION

2.1 Equipment Used During Test:

Use*	Product Type	Manufacturer	Model	Comments
EUT	LED DRIVER	Unionelecom Co., Ltd	UP100S12WH	-
AE	LED Module 1	Unionelecom Co., Ltd	-	-
AE	LED Module 2	Unionelecom Co., Ltd	-	-

* **Note:** EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, SIM - Simulator (Not Subjected to Test)

2.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
1	A.C. input port	AC	3.0	Non shielded	A.C. Power Cord
2	D.C. output port	DC	0.3	Non shielded	-

* **Note:** * AC = AC Power Port, DC = DC Power Port, N/E = Non-Electrical, I/O = Signal Input or Output Port (Not Involved in Process Control), TP = Telecommunication Ports

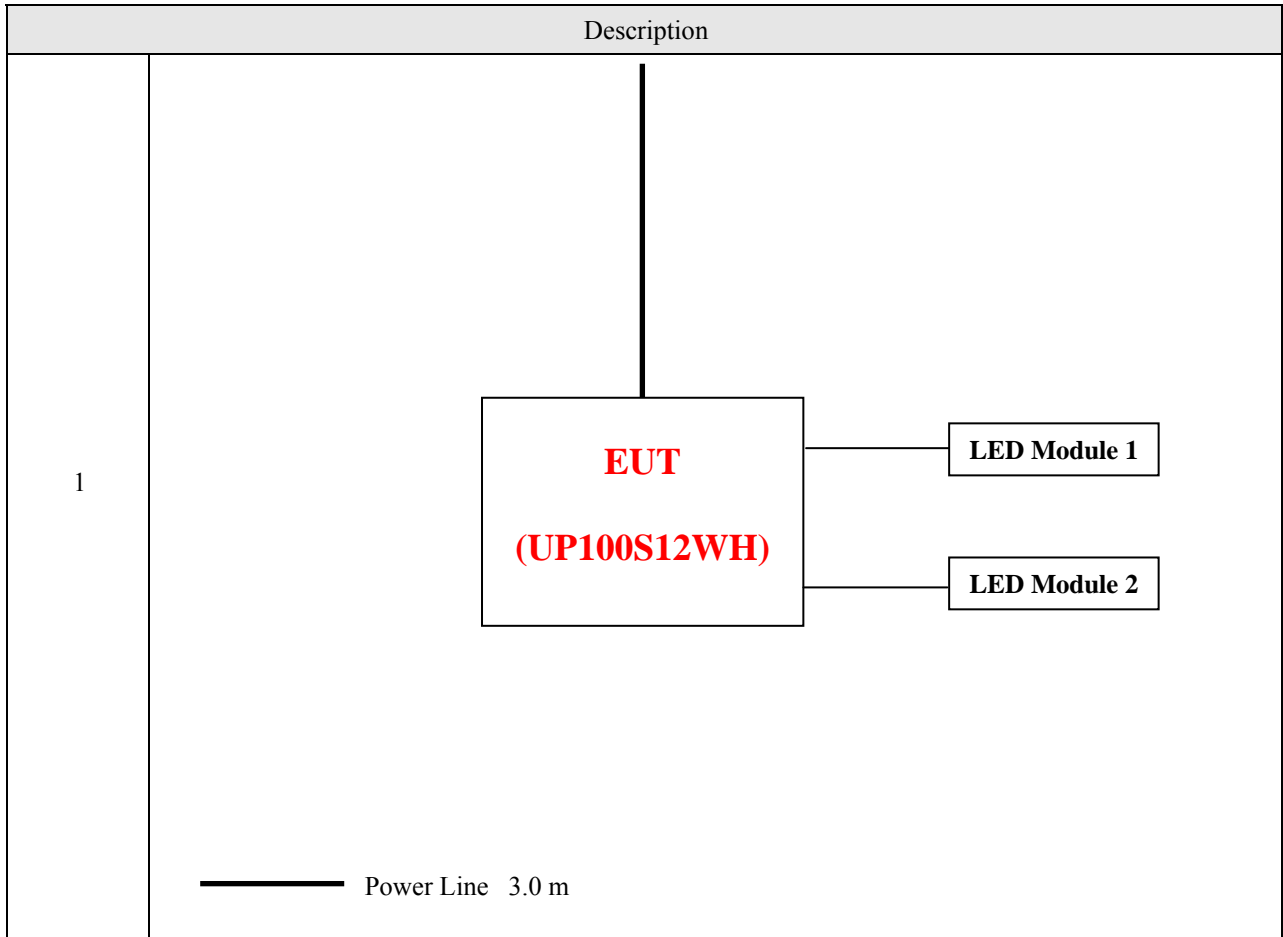
2.3 Power Interface:

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Comments
Rated	100-277	2	125	50/60	-
1	120	-	-	60	-
2	277	-	-	60	

2.4 EUT Operation Modes:

Mode #	Description
1	Continuous lighting mode (AC 120 V / AC 277 V)

2.5 Test Configuration:



2.6 EUT Test Condition for Conducted & Radiated Emission:

Test Item	Test condition
At the mains terminals	All frequencies at which there is a maximum disturbance found in the initial survey has been investigated during the preliminary testing and selected. One case as worst-case condition for final measurements
Radiated electromagnetic disturbances	All frequencies at which there is a maximum disturbance found in the initial survey has been investigated during the preliminary testing and selected. One case as worst-case condition for final measurements

2.7 Result of Testing

No	Test requirements	Standard	Results	Verdict
1	AC Power line Conducted Emission Test	47CFR Part 15.107 (a) / 47CFR Part 15.109 (g) Class B & ICES-003, Class B	Met limit Class B	Complied
2	Radiated Emission Test		Met limit Class B	Complied
<p>Note: This product has been tested in accordance with the measurement procedures specified 47 CFR part 15.107 (a) / 47 CFR Part 15.109 (g) & ICES-003, ENG. Co., Ltd and the test results has been shown to be complied with the EMC requirements specified in the standard above.</p>				

3. TEST CONDITION AND RESULTS

3.1 MAINS TERMINAL DISTURBANCE VOLTAGE TEST

TEST: Limits of mains terminal disturbance voltage					
Method	Measurements were made on a ground plane that extends 1-meter minimum beyond all sides of the system under test. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.				
Parameters recorded during the test	Laboratory Ambient Temperature		26 °C		
	Relative Humidity		56 %		
-	Frequency range on each side of line		Measurement Point		
Fully configured sample scanned over the following frequency range	0.15 MHz to 30 MHz		AC input port of EUT		
Limits - Class B					
Frequency (MHz)	Limit (dB μ V)				
	Quasi-Peak	Result	Average	Result	
0.15 to 0.50	66 to 56	Pass	56 to 46	Pass	
0.50 to 5	56	Pass	46	Pass	
5 to 30	60	Pass	50	Pass	
EUT Configuration Settings:					
Power Interface Mode # (See Section 2.3)	EUT Operation Mode # (See 2.4)		EUT Configurations Mode # (See Section 2.5)		
1, 2	1		1		
Conducted Emissions Test Equipment used:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	Rohde & Schwarz	ESC17	100722	2014.06.13	2015.06.13
LISN	Rohde & Schwarz	ENV4200	100042	2015.05.06	2016.05.06
LISN	Rohde & Schwarz	ENV216	100110	2014.12.17	2015.12.17

Figure 1. Conducted Emission Test Setup

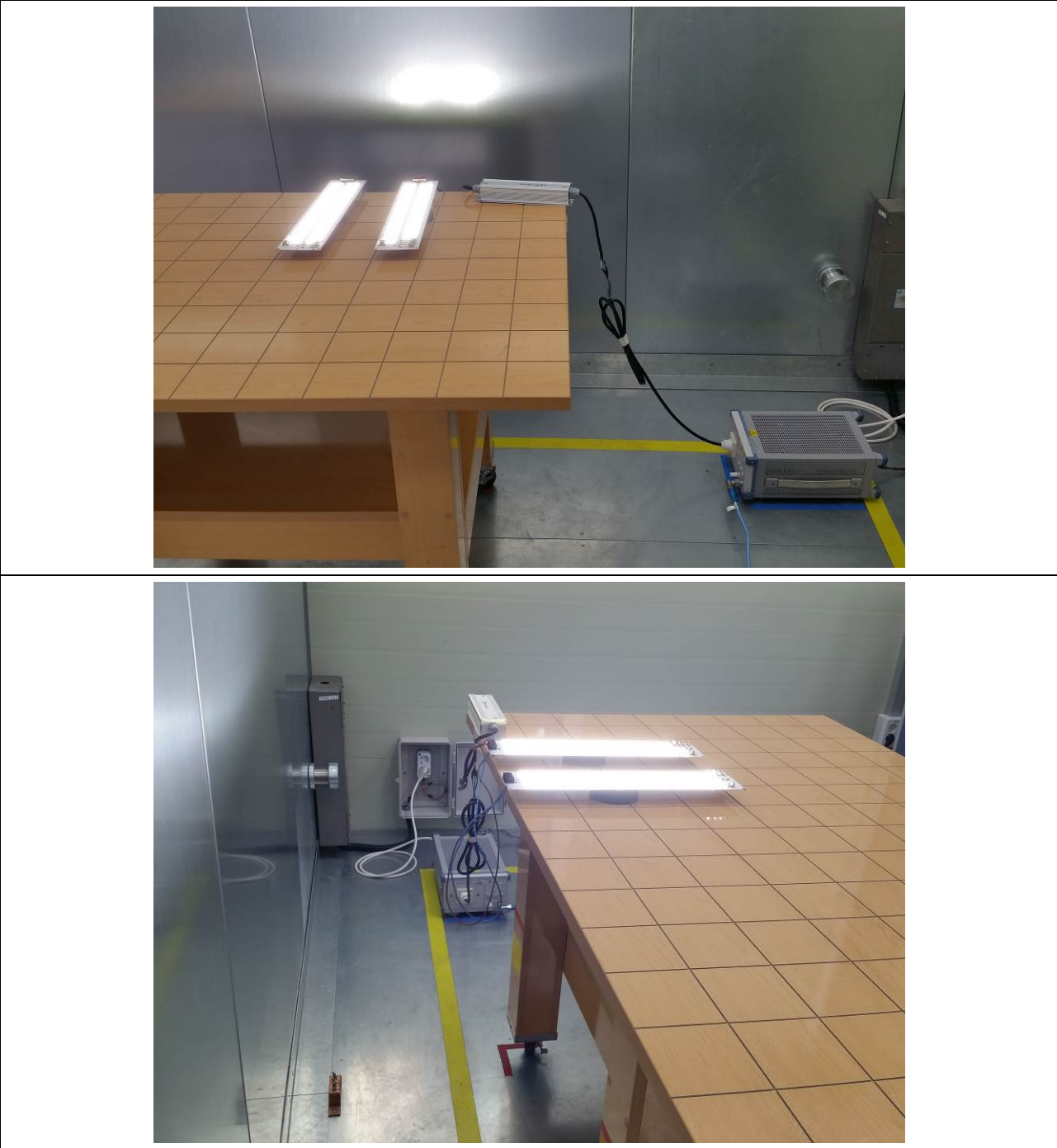


Figure 2. Graphical representation _120 V, 60 Hz

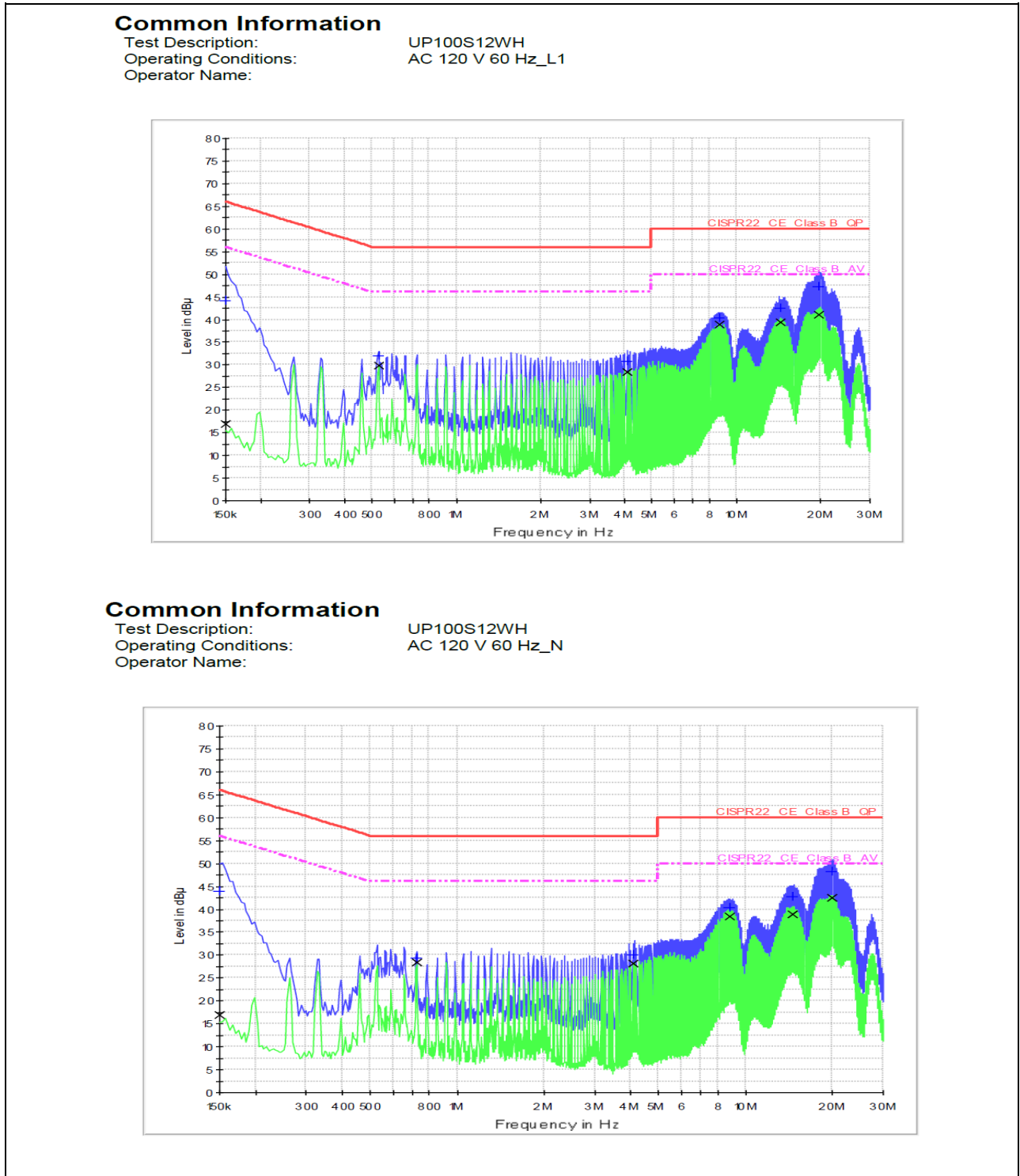


Table.1. Test data _120 V, 60 Hz

[L1]

Limit and Margin

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.150000	44.2	16.9	9.000	L1	9.6	21.8	66.0	39.1	56.0
0.526000	31.9	29.8	9.000	L1	9.6	24.1	56.0	16.2	46.0
4.062000	30.8	28.4	9.000	L1	9.7	25.2	56.0	17.6	46.0
8.718000	40.3	39.0	9.000	L1	9.8	19.7	60.0	11.0	50.0
14.418000	42.4	39.4	9.000	L1	9.9	17.6	60.0	10.6	50.0
19.790000	47.3	41.2	9.000	L1	9.9	12.7	60.0	8.8	50.0

[NEUTRAL]

Limit and Margin

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.150000	44.0	16.9	9.000	N	9.6	22.0	66.0	39.1	56.0
0.722000	29.5	28.4	9.000	N	9.6	26.5	56.0	17.6	46.0
4.062000	30.1	28.2	9.000	N	9.7	25.9	56.0	17.8	46.0
8.778000	40.3	38.4	9.000	N	9.8	19.7	60.0	11.6	50.0
14.478000	42.6	38.9	9.000	N	9.9	17.4	60.0	11.1	50.0
19.850000	48.2	42.4	9.000	N	10.0	11.8	60.0	7.6	50.0

Figure 3. Graphical representation _277 V, 60 Hz

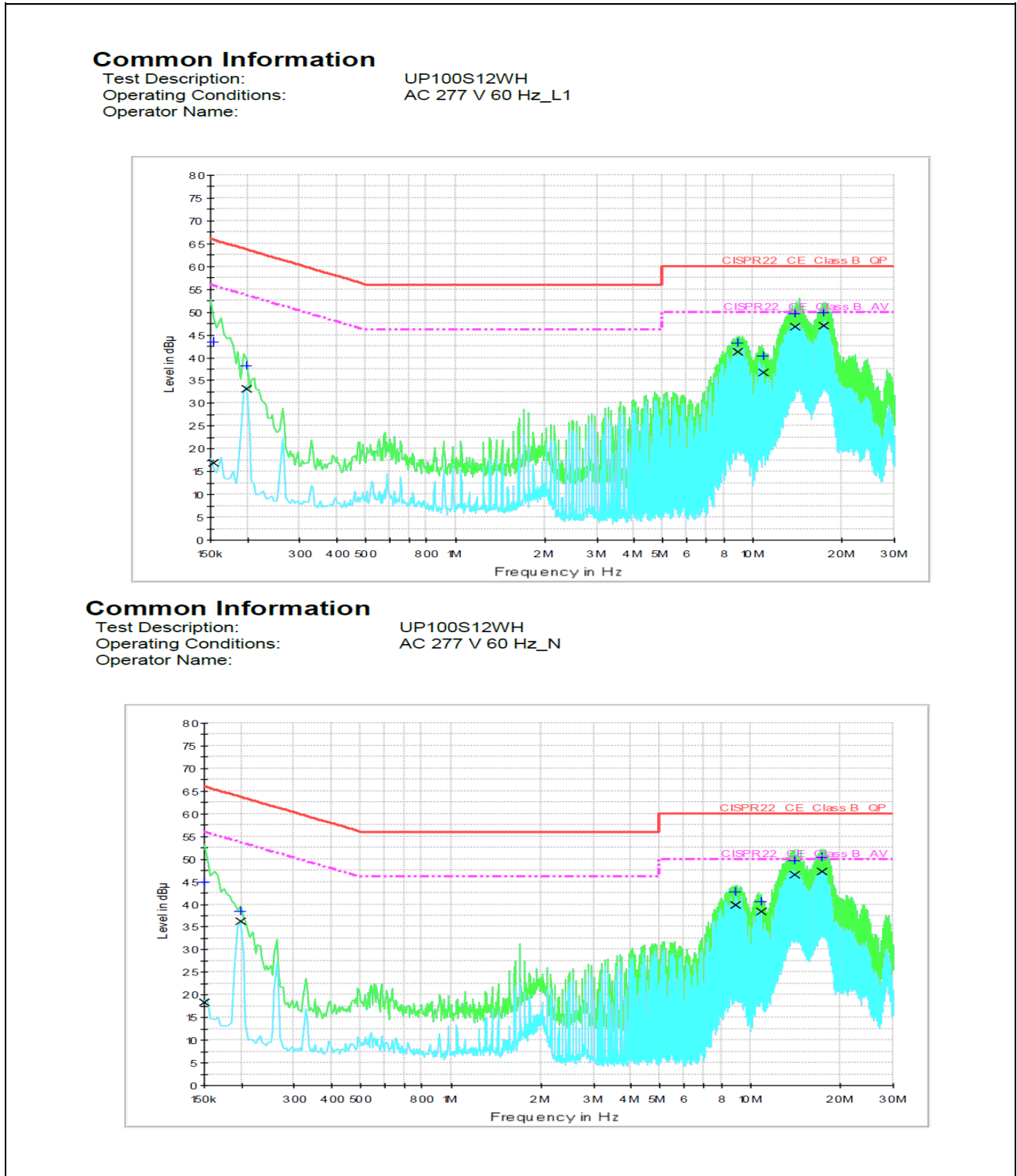


Table.2. Test data_ 277 V, 60 Hz

[L1]

Limit and Margin

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.154000	43.5	17.0	9.000	L1	10.5	22.3	65.8	38.7	55.8
0.198000	38.1	33.2	9.000	L1	10.5	25.6	63.7	20.5	53.7
8.954000	43.3	41.4	9.000	L1	11.0	16.7	60.0	8.6	50.0
10.850000	40.4	36.8	9.000	L1	11.2	19.6	60.0	13.2	50.0
13.922000	49.7	46.9	9.000	L1	11.5	10.3	60.0	3.1	50.0
17.390000	50.0	47.1	9.000	L1	12.0	10.0	60.0	2.9	50.0

[NEUTRAL]

Limit and Margin

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)	Margin - CAV (dB)	Limit - CAV (dBμV)
0.150000	45.0	18.4	9.000	N	10.6	21.0	66.0	37.6	56.0
0.198000	38.5	36.4	9.000	N	10.5	25.2	63.7	17.3	53.7
8.898000	42.8	40.0	9.000	N	11.0	17.2	60.0	10.0	50.0
10.858000	40.5	38.4	9.000	N	11.3	19.5	60.0	11.6	50.0
13.994000	49.7	46.6	9.000	N	11.7	10.3	60.0	3.4	50.0
17.330000	50.4	47.4	9.000	N	12.2	9.6	60.0	2.6	50.0

3.2 RADIATED DISTURBANCE

TEST: Limits for radiated disturbance					
Method	A pretest was performed at 3m distances in an anechoic screened enclosure, scanning the frequency range, and locating any frequencies at the which EUT radiated. Frequency scans were conducted with a peak detector with horizontal and vertical polarization of the antenna. Measurements were done in the frequency range 30-1000 MHz. The main test was then conducted by measurements at each frequency found in the pretest. These measurements were done at an open area test site at 10m distances, with a quasi-peak detector. EUT was positioned on a wooden table 0.8m above the floor, at the edge of the turntable. Cables connected to EUT were fixed to cause maximum emission. A maximum emitting point for each frequency was found by turning EUT 0-360 degrees, and adjust the antenna height between 1-4m. A quasi-peak detector measurement was then done at the maximum emitting point.				
Parameters recorded during the test	Laboratory Ambient Temperature		24 °C		
	Relative Humidity		41 %		
-	Frequency range		Measurement Point		
Fully configured sample scanned over the following frequency range	30 MHz to 1.0 GHz		3 meter measurement distance		
Limits – Class B					
Frequency (MHz)	Limit (dBµV/m)				
	Quasi-Peak		Results		
30 to 88	40.00		Pass		
88 to 216	43.52		Pass		
216 to 960	46.02		Pass		
960 to 1000	53.97		Pass		
EUT Configuration Settings:					
Power Interface Mode # (See Section 2.3)	EUT Operation Mode # (See 2.4)		EUT Configurations Mode # (See Section 2.5)		
1 and 2	1		1		
Radiated Emissions Test Equipment:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Test Receiver	Rohde & Schwarz	ESU 26	100722	2015.02.27	2016.02.27
TRILOG Broadband Antenna	Rohde & Schwarz	VULB 9163	9163-770	2015.02.09	2016.02.09
Controller	Innco System	CO3000	N/A	N/A	N/A
Turn Table	Innco System	DT3000	N/A	N/A	N/A
Antenna Mast	Innco System	MA4000-EP	N/A	N/A	N/A

Photo of Radiated emission test setup

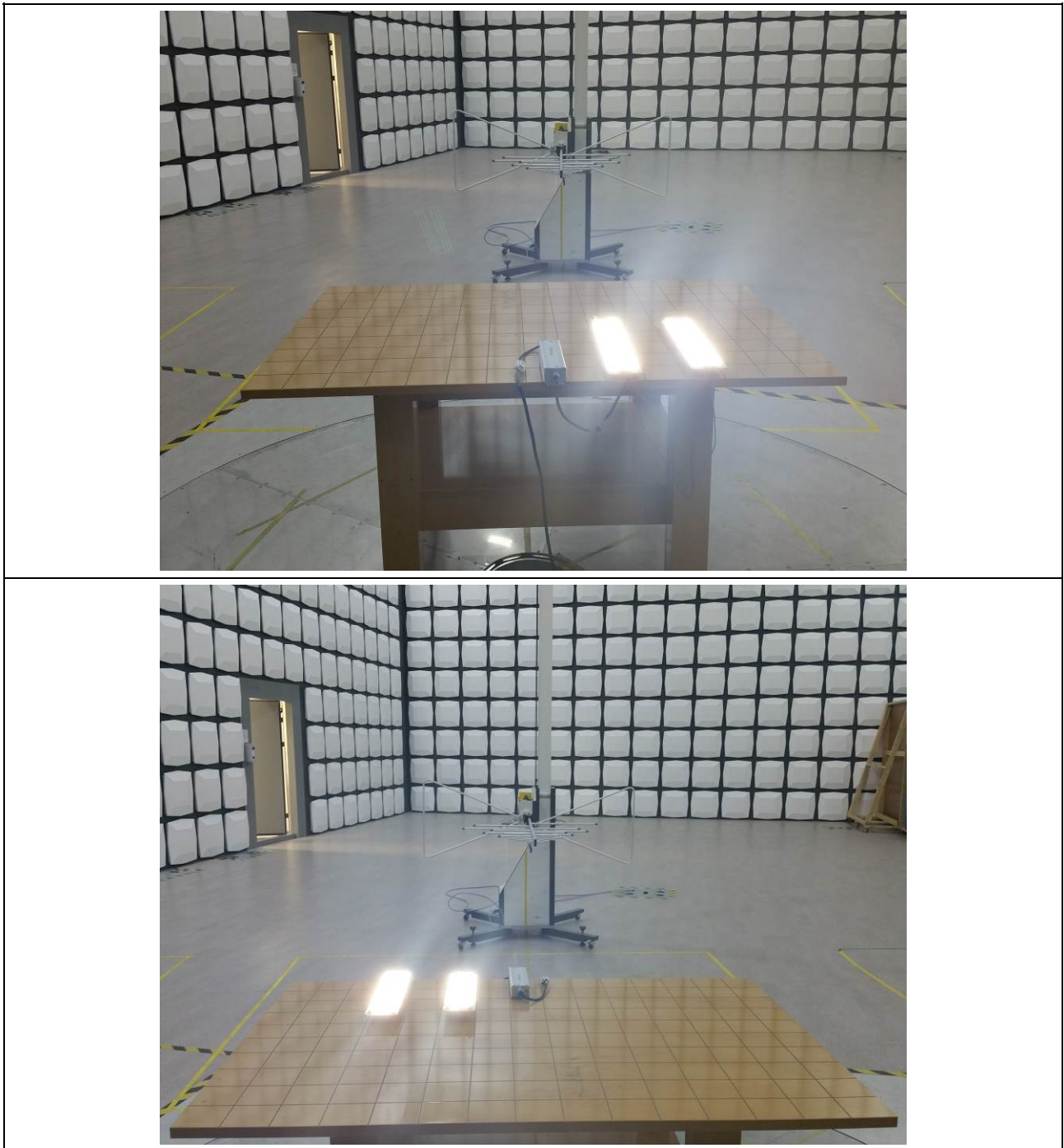


Figure 4. Graphical representation _ 120 V, 60 Hz

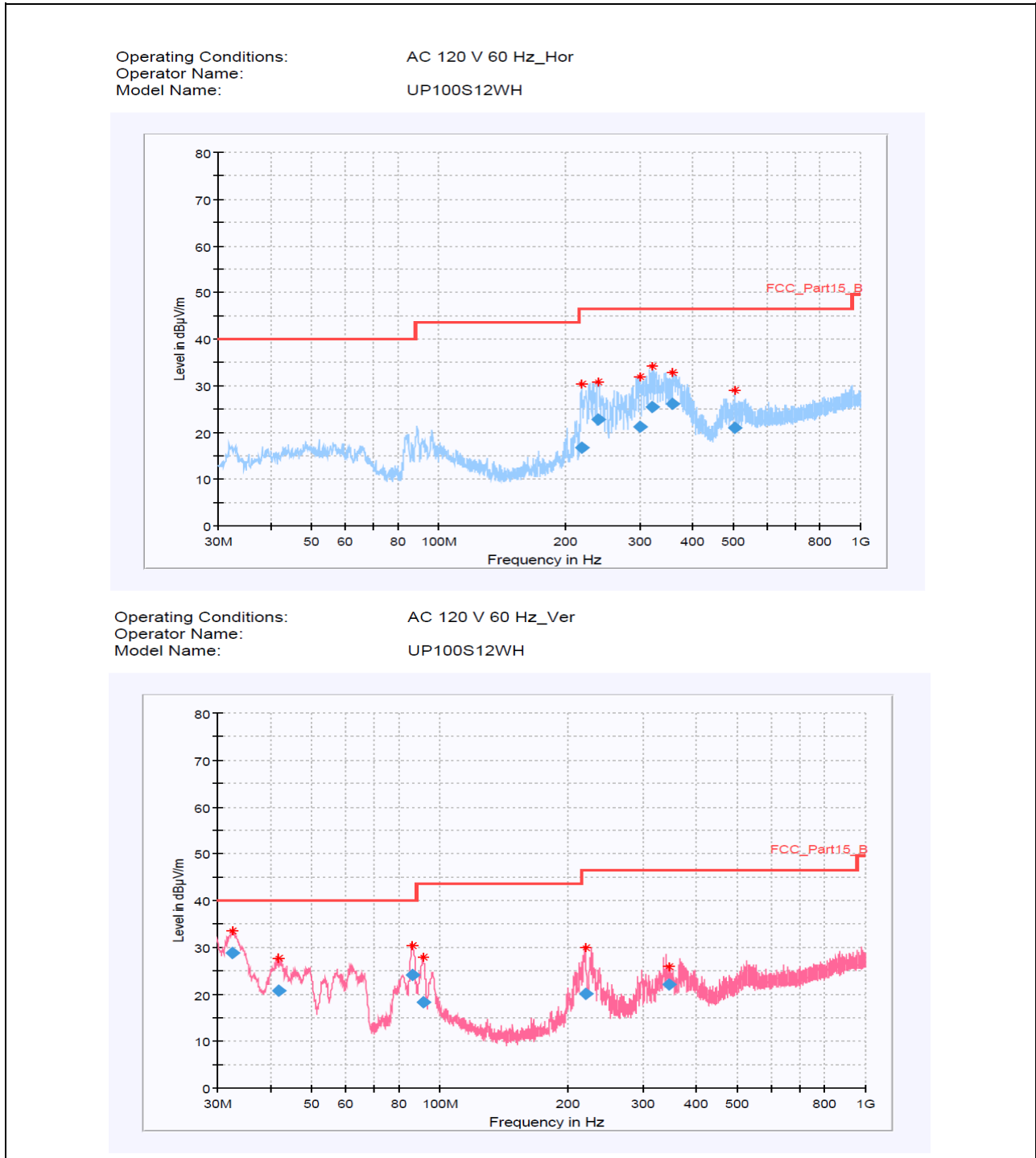


Table.3. Test data_ 120 V, 60 Hz

[HORIZONTAL]

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
218.083000	16.68	46.40	29.72	1000.0	120.000	125.1	H	286.0	13.3
237.968000	22.70	46.40	23.70	1000.0	120.000	125.0	H	107.0	13.7
299.660000	21.25	46.40	25.15	1000.0	120.000	125.0	H	85.0	14.8
321.776000	25.43	46.40	20.97	1000.0	120.000	100.1	H	60.0	15.5
359.315000	26.05	46.40	20.35	1000.0	120.000	100.0	H	59.0	16.6
502.875000	21.02	46.40	25.38	1000.0	120.000	174.9	H	297.0	18.7

[VERTICAL]

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.425000	28.86	40.00	11.14	1000.0	120.000	100.0	V	265.0	12.4
41.834000	20.78	40.00	19.22	1000.0	120.000	125.1	V	217.0	14.6
85.969000	24.23	40.00	15.77	1000.0	120.000	125.0	V	208.0	10.7
91.304000	18.40	43.50	25.10	1000.0	120.000	100.0	V	337.0	11.9
220.023000	20.01	46.40	26.39	1000.0	120.000	118.3	V	146.0	13.3
345.541000	22.04	46.40	24.36	1000.0	120.000	197.2	V	201.0	16.3

Figure 5. Graphical representation _ 277 V, 60 Hz

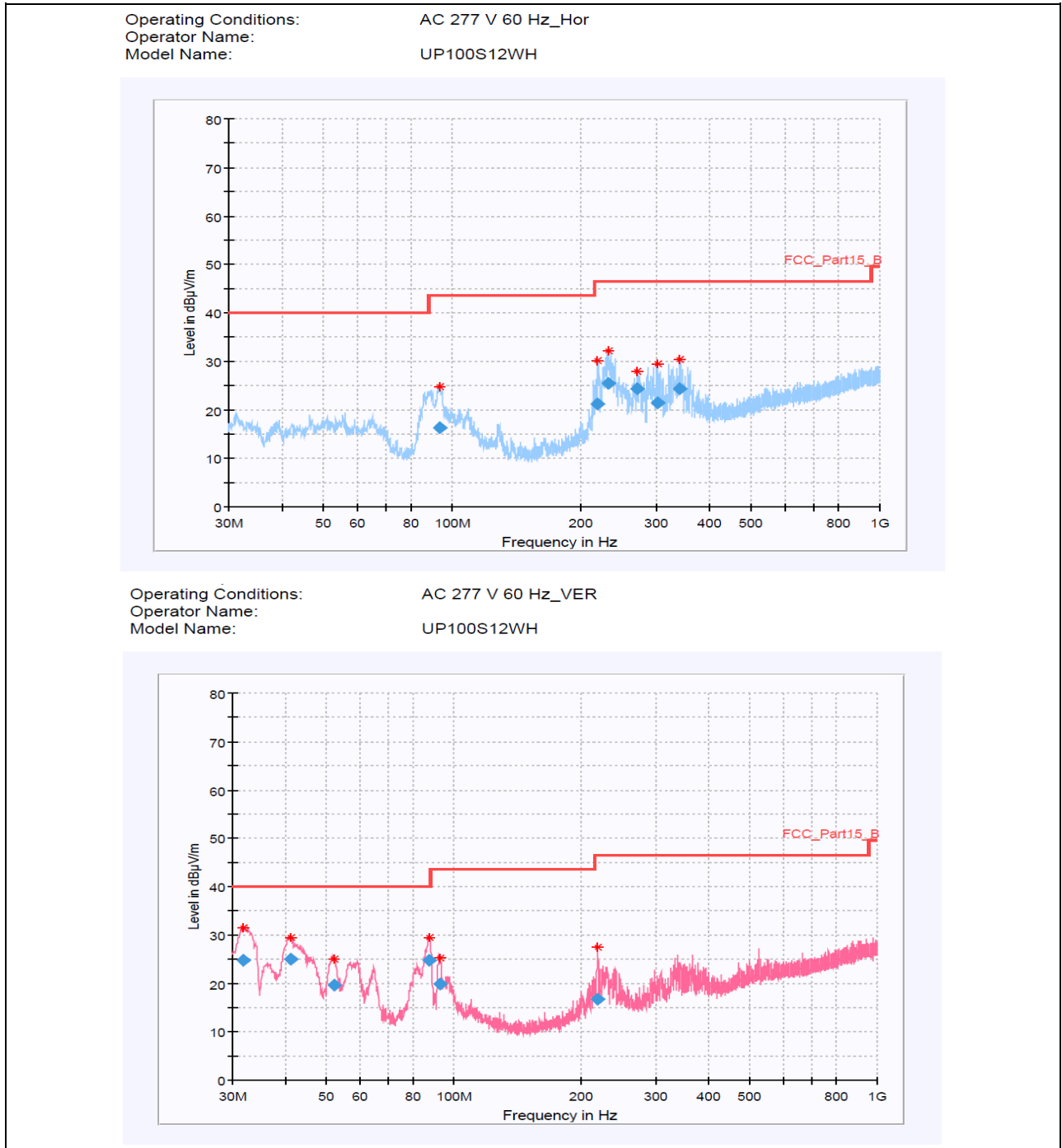


Table.4. Test data_ 277 V, 60 Hz

[HORIZONTAL]

Final Result



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
93.438000	16.29	43.50	27.21	1000.0	120.000	325.0	H	35.0	12.2
219.247000	21.15	46.40	25.25	1000.0	120.000	125.0	H	129.0	13.3
232.439000	25.50	46.40	20.90	1000.0	120.000	125.0	H	100.0	13.6
271.433000	24.27	46.40	22.13	1000.0	120.000	125.0	H	82.0	14.3
301.503000	21.45	46.40	24.95	1000.0	120.000	118.9	H	83.0	14.9
341.176000	24.40	46.40	22.00	1000.0	120.000	100.0	H	64.0	16.2

[VERTICAL]

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
31.940000	24.72	40.00	15.28	1000.0	120.000	119.0	V	261.0	12.4
41.155000	25.03	40.00	14.97	1000.0	120.000	100.0	V	210.0	14.4
52.019000	19.73	40.00	20.27	1000.0	120.000	99.9	V	356.0	14.8
87.424000	24.79	40.00	15.21	1000.0	120.000	121.3	V	11.0	11.0
92.759000	19.98	43.50	23.52	1000.0	120.000	125.0	V	207.0	12.1
218.859000	16.87	46.40	29.53	1000.0	120.000	118.4	V	154.0	13.3

Appendix A - Accreditations and Authorizations

Country	Agency	Scope of Accreditation	Logo
USA	FCC	10 m SAC and Conducted Test Site to perform FCC Part 15/18 measurements.	 955964
Canada	Industry Canada	10 m SAC and Conducted Test Site.	 12721A

Appendix B - Measurement Uncertainties

Test Item	Measurement uncertainty
Conducted emission	± 2.93 dB, Note 1
Radiated emission (30 MHz ~ 300 MHz)	± 4.43 dB, Note 1
Radiated emission (300 MHz ~ 1 000 MHz)	± 3.80 dB, Note 1
Radiated emission (1GHz Over)	± 4.11 dB, Note 1
Note 1: Measurement uncertainty is calculated in according with CISPR 16-4-2 (2011-06). The measurement uncertainty is given with a confidence of 95 % with the coverage factor, $k=2$.	

Appendix C - EUT PHOTOGRAPH

EUT View

