

EMC TEST REPORT for UNII device
No. 140601396SHA-003R01

Applicant : Aruba Networks, Inc
1344 Crossman Ave. Sunnyvale, CA, 94089
Manufacturer : Aruba Networks, Inc
1344 Crossman Ave. Sunnyvale, CA, 94089
Product Name : Wireless Access Point
Type/Model : APINH103

SUMMARY

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

47CFR Part 15 (2013): Radio Frequency Devices (Subpart B)

ANSI C63.4 (2009): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Date of issue: June, 26, 2014

Prepared by:



Wade Zhang (*Project Engineer*)

Reviewed by:



Daniel Zhao (*Reviewer*)



FCC ID: Q9DAPINH103

IC: 4675A-APINH103

Description of Test Facility

Name: Intertek Testing Services Limited Shanghai

Address: Building 86, No. 1198 Qinzhou Rd., North, Shanghai 200233, P.R. China

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1. General Information

1.1 Applicant Information

Applicant : Aruba Networks, Inc
1344 Crossman Ave. Sunnyvale, CA,94089
Name of contact : Rob Hastings
Tel : (408) 990 2557
Fax : /
Email : rhastings@arubanetworks.com
Manufacturer : Aruba Networks, Inc
1344 Crossman Ave. Sunnyvale, CA,94089

1.2 Identification of the EUT

Product Name : Wireless Access Point
Type/model : APINH103
FCC ID : Q9DAPINH103
IC : 4675A-APINH103

1.3 Technical specification

Operation Frequency : 2412~2462 MHz;
 Band : 5745~5825 MHz;
 5180- 5240 MHz

Type of Modulation : CCK,BPSK,QPSK,DSSS,OFDM
 OFDM(BPSK,QPSK,16QAM,64QAM)

EUT Modes of : 802.11a/b/g;
 Modulation : 802.11n HT20,HT40;

Description of EUT : The EUT is a wireless access point, and it is a MIMO product. It is classified as Class B equipment.

Port identification : power port 1;
 RJ45 ports 5

Antenna : 1: R-AN-WLL-ARB-1:
 Integral, 3.5dBi for 2.4GHz band, 3.7dBi for 5GHz band;
 2: R-AN-WLL-ARB-3:
 Integral, 3.6dBi for 2.4GHz band, 3.3dBi for 5GHz band;

Rating : DC 12V, 1A (Adaptor) or DC 57V, 350 mA(PoE)

Declared : 0°C ~ 40°C

Temperature range

Category of EUT : Class B

EUT type : ☒ Table top ☐ Floor standing

Sample received date : May. 13, 2014

Sample Identification : /
 No

Date of test : May. 14, 2014 – June. 10, 2014

MIMO Function Description:

Freq. Band	Modulation	Tx/Rx Function	Beam forming	Array Gain	Note
2412-2462MHz	802.11b	2TX/2RX	NO	0 dBi	
	802.11g	2TX/2RX	NO	0 dBi	
	802.11n HT20	2TX/2RX	NO	0 dBi	
	802.11n HT40	2TX/2RX	NO	0 dBi	
5745-5825MHz	802.11a	2TX/2RX	NO	0 dBi	
	802.11n HT20	2TX/2RX	NO	0 dBi	
	802.11n HT40	2TX/2RX	NO	0 dBi	
Note: The mimo mode (IEEE 802.11) is Cyclic Delay Diversity, and the array gain is 0 dBi according to clause f) of KDB 662911.					

2. Test Specification

2.1 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESCS 30	R&S	EC 2107	2013-10-21	2014-10-20
Test Receiver	ESIB 26	R&S	EC 3045	2013-10-20	2014-10-19
Test Receiver	ESCI 7	R&S	EC4501	2013-12-29	2014-12-28
Spectrum Analyzer	N9010	Agilent	EC4890	2013-10-21	2014-10-20
Spectrum Analyzer	E4446	Agilent	/	2013-10-21	2014-10-20
Power meter	ML 2495A	Anritsu	EC 4895	2013-10-21	2014-10-20
A.M.N.	ESH2-Z5	R&S	EC 3119	2014-1-9	2015-1-8
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2014-5-15	2015-5-14
Horn antenna	HF 906	R&S	EC 3049	2014-5-12	2015-5-11
Pre-amplifier	Pre-amp 18	R&S	EC 3222	2014-4-11	2015-4-10
Pre-amplifier	Tpa0118-40	R&S	EC 4792-2	2014-4-11	2015-4-10
Log-period antenna	AT 1080	AR	EC 3044-7	2014-5-21	2015-5-20
Biconical antenna	3109PX	ETS	EC3564	2013-8-25	2014-8-24
Semi-anechoic chamber	-	Albatross project	EC 3048	2014-5-20	2015-5-19
Shielded room	-	Zhongyu	EC 2838	2014-1-12	2015-1-9
Shielded room	-	Zhongyu	EC 2839	2014-1-12	2015-1-9
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2014-2-1	2015-1-31
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC4297-2	2014-2-1	2015-1-31
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC4297-3	2014-2-1	2015-1-31
Band Reject Filter	WRCGV 2400/2483-2390/2493-35/10SS	Wainwright	EC4297-4	2014-2-1	2015-1-31

2.2 Test Standard

47CFR Part 15:2013
 ANSI C63.4: 2009

2.3 Mode of operation during the test / Test peripherals used

While testing transmitting mode of EUT, the product is working on normal mode (Transmitting and receiving data with a notebook). And there is two working mode, one is supplied by an AC-DC adaptor, the other is supplied by a POE adaptor.

Test peripherals used:

Item No	Name	Band and Model	Description	S/No
1	Laptop computer	HP ProBook 6470b	100-240V AC 50/60Hz	NA
2	Controller	Aruba 3600	100-240V AC 50/60Hz	NA
3	AC/DC Adaptor	Sunny SYS1357-1812	Input:100-240V~1.0A MAX,50-60Hz Output:+12V DC 1.0A	NA
4	POE DC Power	PowerDsine PD-6555G300	Input:100-240Vac,50/60Hz,0.5A Output:57VDC 0.35A	NA
5	LAN Cable	/	1.5m un-shielding *2 10m un-shielding *4	NA



2.3 Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	FCC REFERANCE	RESULT
Power line conducted emission	15.107	Pass
Radiated emission	15.109	Pass

3. Radiated emission

Test result: PASS

3.1 Radiated emission limits

3.1.1 Limits for radiated disturbance of class A device

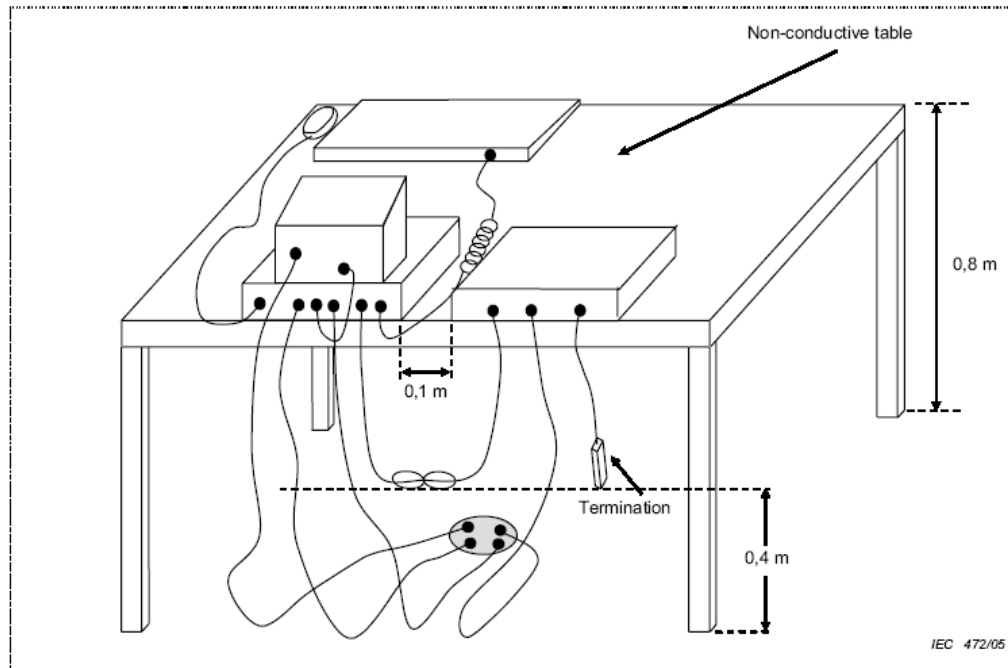
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 10m
30 – 88	39
88 – 216	43.5
216 – 960	46.4
Above 960	49.5
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

3.1.1 Limits for radiated disturbance of class B device

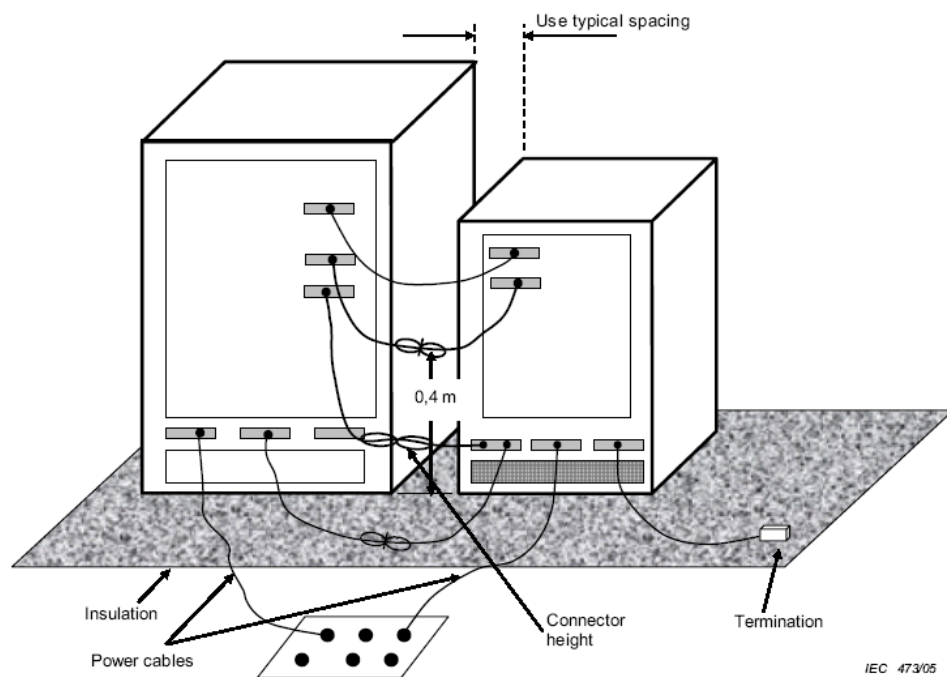
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 3m
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
Above 960	54.0
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

3.2 Block diagram and test set up

☒ For table top equipment



☐ For floor standing equipment



3.3 Test Setup and Test Procedure

The measurement was performed in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, the pre-amplifier (and high pass filter if necessary) is equipped just at the output terminal of the antenna.

The distance from EUT to receiving antenna is **3 meter**.

Measurement was performed according to clause 4 and clause 5 of ANSI 63.4.

Test procedure was according to clause 8.3 of ANSI 63.4.

EUT arrangement and operate condition were according to clause 6 and clause 8 of ANSI 63.4.

The radiated emission was measured using the test receiver with the resolutions bandwidth set as:

RBW = 100kHz, VBW = 300kHz (30MHz~1GHz)

RBW = 1MHz, VBW = 3MHz (>1GHz for PK)

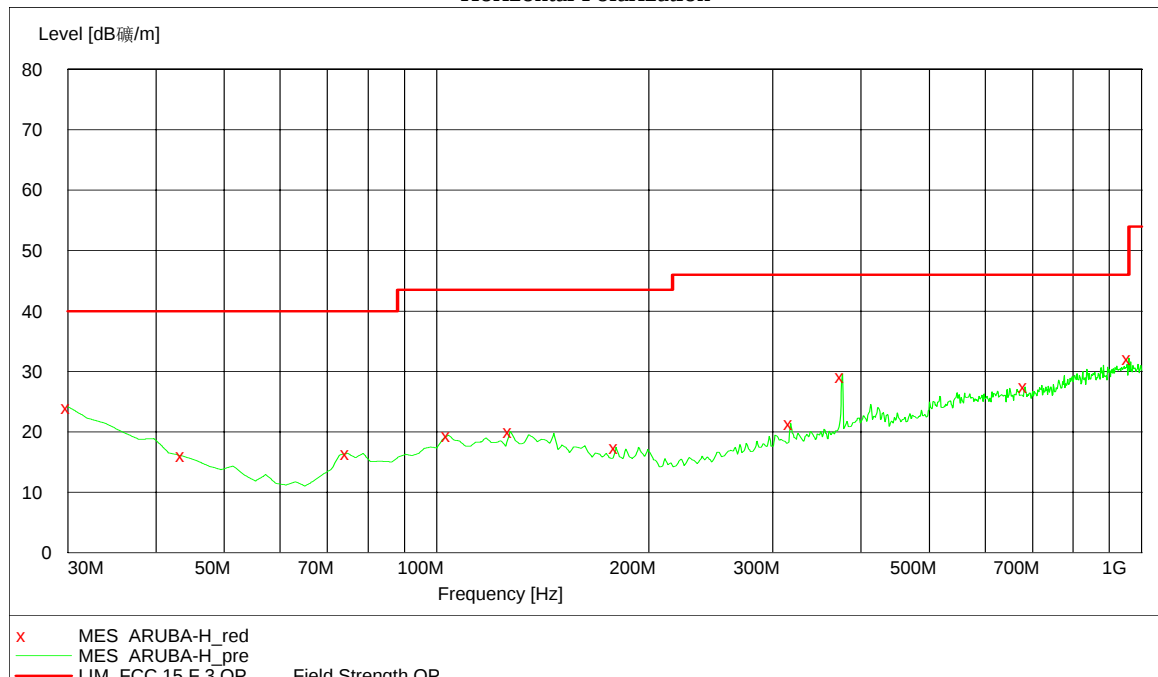
RBW = 1MHz, VBW = 10Hz (>1GHz for AV)

6.4 Test protocol

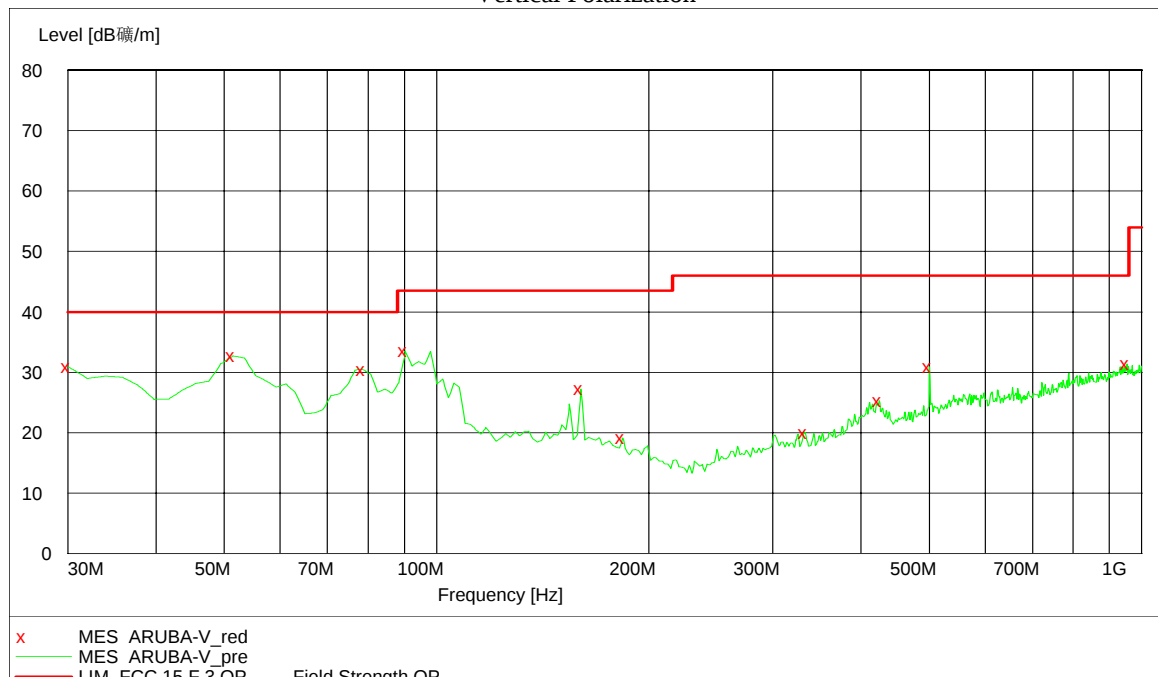
Temperature : 25 °C
Relative Humidity : 55 %

Supplied by AC –DC adaptor:

Horizontal Polarization



Vertical Polarization

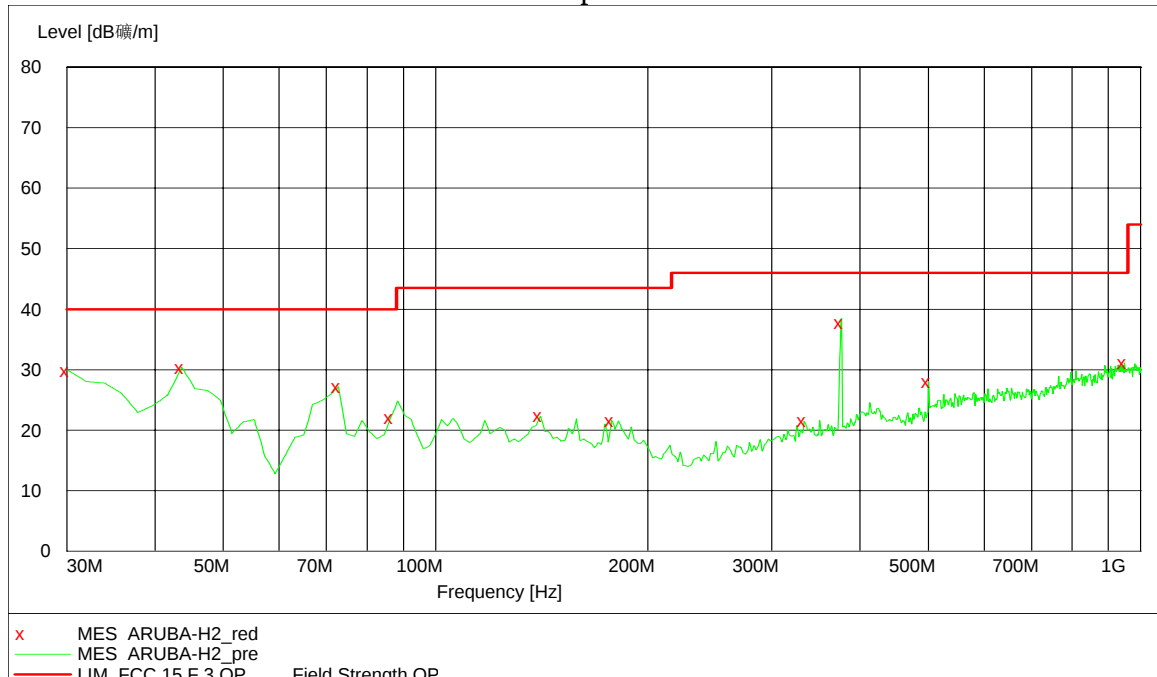


Test data:

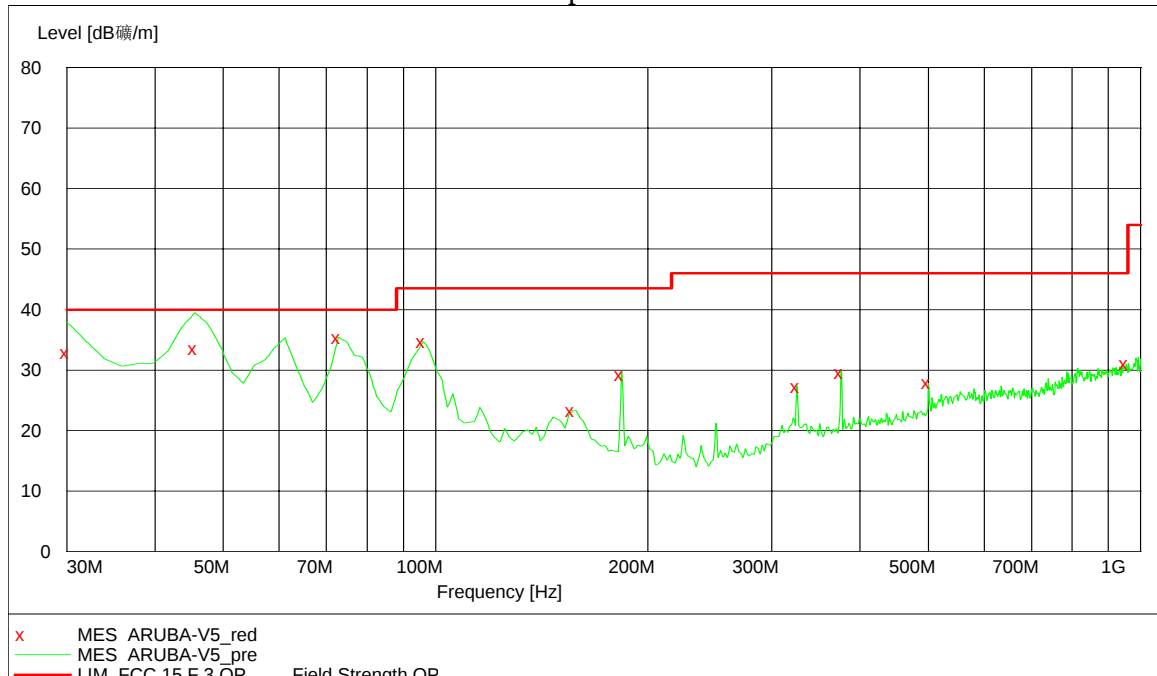
Polarization	Frequency (MHz)	Emission level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB μ V/m)	Detector
H	30.00	24.10	40.00	15.90	PK
	127.19	20.10	43.50	23.40	PK
	317.70	21.40	46.00	24.60	PK
	376.01	29.20	46.00	16.80	PK
	683.15	27.40	46.00	18.60	PK
	959.18	32.20	46.00	13.80	PK
	1930.32	44.50	74.00	29.50	PK
	1932.11	40.40	54.00	13.60	AV
	2684.33	42.30	74.00	31.70	PK
	2687.12	35.40	54.00	18.60	AV
	5989.44	39.70	74.00	34.30	PK
	5991.75	31.80	54.00	22.20	AV
V	30.00	30.90	40.00	9.10	PK
	51.38	32.70	40.00	7.30	PK
	78.60	30.40	40.00	9.60	PK
	90.26	33.50	43.50	10.00	PK
	424.61	25.30	46.00	20.70	PK
	500.42	30.90	46.00	15.10	PK
	953.35	31.40	46.00	14.60	PK
	1912.66	40.20	74.00	33.80	PK
	1921.12	33.30	54.00	20.70	AV
	2641.83	41.90	74.00	32.10	PK
	2645.63	32.40	54.00	21.60	AV
	6143.77	41.50	74.00	32.50	PK
	6134.45	32.30	54.00	21.70	AV

Supplied by POE adaptor:

Horizontal polarization



Vertical polarization



Test data:

Polarization	Frequency (MHz)	Emission level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB μ V/m)	Detector
V	30.00	32.90	40.00	7.10	QP
	45.55	33.50	40.00	6.50	QP
	72.77	35.40	40.00	4.60	PK
	96.09	34.70	43.50	8.80	PK
	183.57	29.30	43.50	14.20	PK
	953.35	31.00	46.00	15.00	PK
	1344.54	37.70	74.00	36.30	PK
	1354.22	34.50	54.00	19.50	AV
	2778.66	43.70	74.00	30.30	PK
	2778.12	35.90	54.00	18.10	AV
	3449.43	46.40	74.00	27.60	PK
	3446.23	32.60	54.00	21.40	AV
H	30.00	29.90	40.00	10.10	PK
	43.61	30.40	40.00	9.60	PK
	72.77	27.20	40.00	12.80	PK
	86.37	22.10	40.00	17.90	PK
	376.01	37.80	46.00	8.20	PK
	949.46	31.10	46.00	14.90	PK
	1354.34	36.80	74.00	37.20	PK
	1349.22	33.80	54.00	20.20	AV
	2548.18	46.20	74.00	27.80	PK
	2552.44	37.70	54.00	16.30	AV
	5899.52	46.80	74.00	27.20	PK
	5906.48	34.50	54.00	19.50	AV

4. Power line conducted emission

Test result: Pass

4.1 Limits

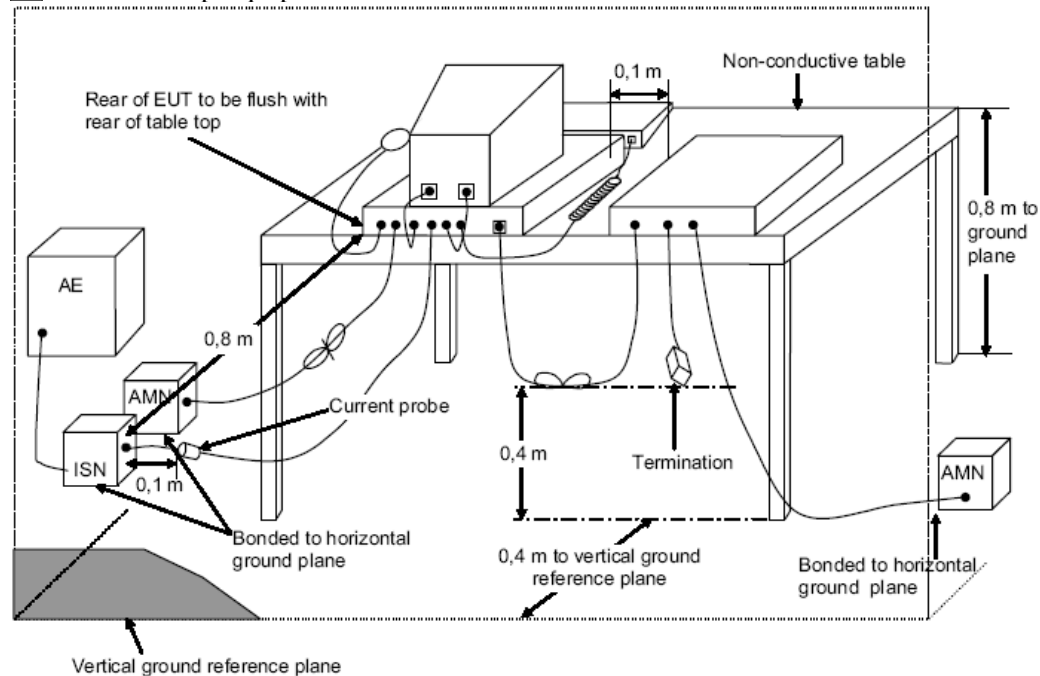
4.1.1 Limits for conducted disturbance voltage at the mains ports of class A device

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

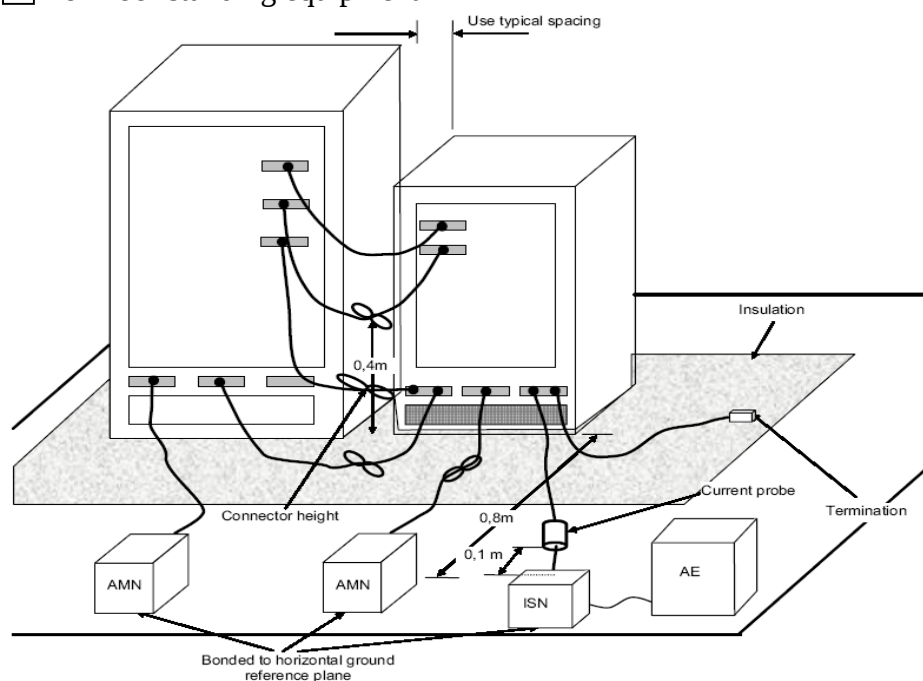
4.1.2 Limits for conducted disturbance voltage at the mains ports of class B device

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz 2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.		

4.2 Test setup

☐ For table top equipment

☐ For floor standing equipment



4.3 Test Setup and Test Procedure

Measurement was performed in shielded room, and instruments used were following clause 4 and clause 5 of ANSI 63.4.

Detailed test procedure was following clause 7.2 of ANSI 63.4.

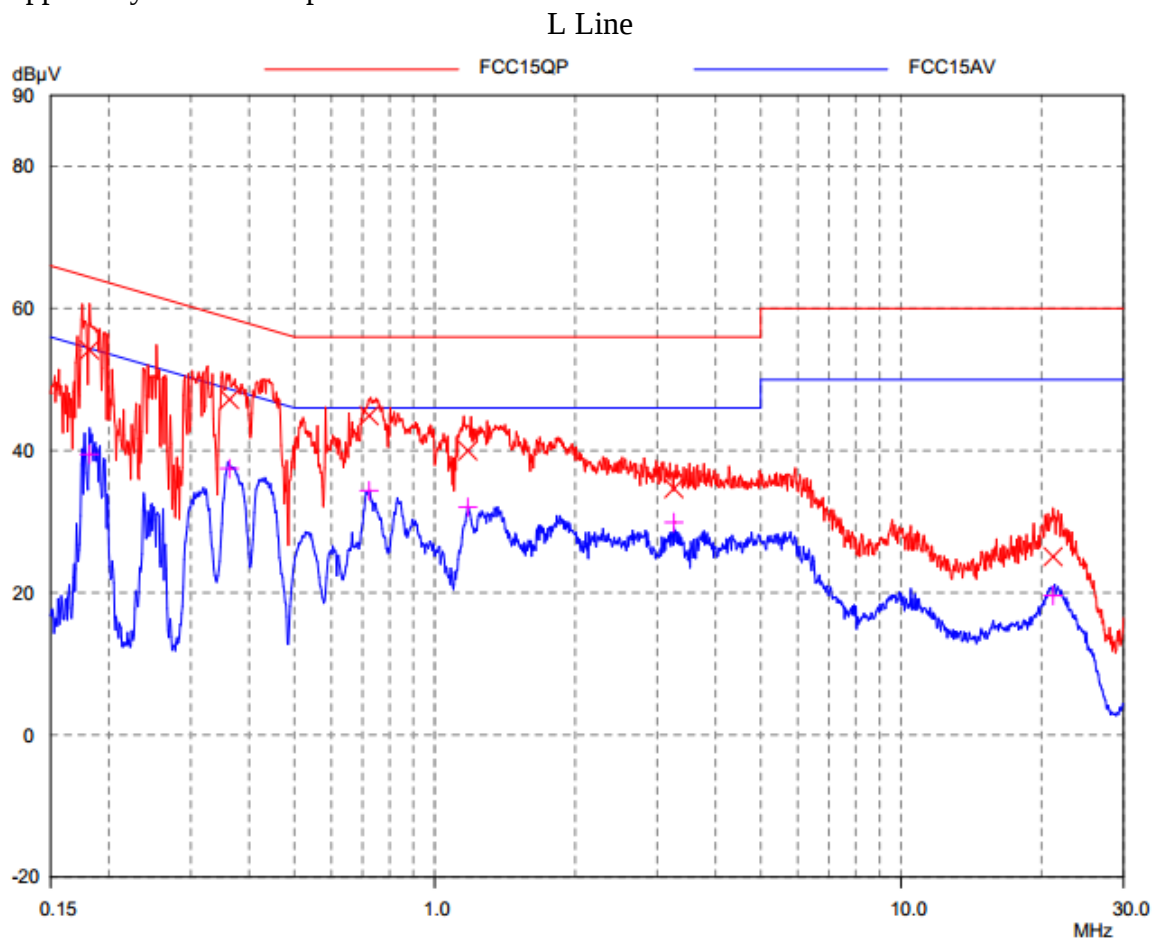
EUT arrangement and operation conditions were according to clause 6 and clause 7 of ANSI 63.4.

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

4.4 Test protocol

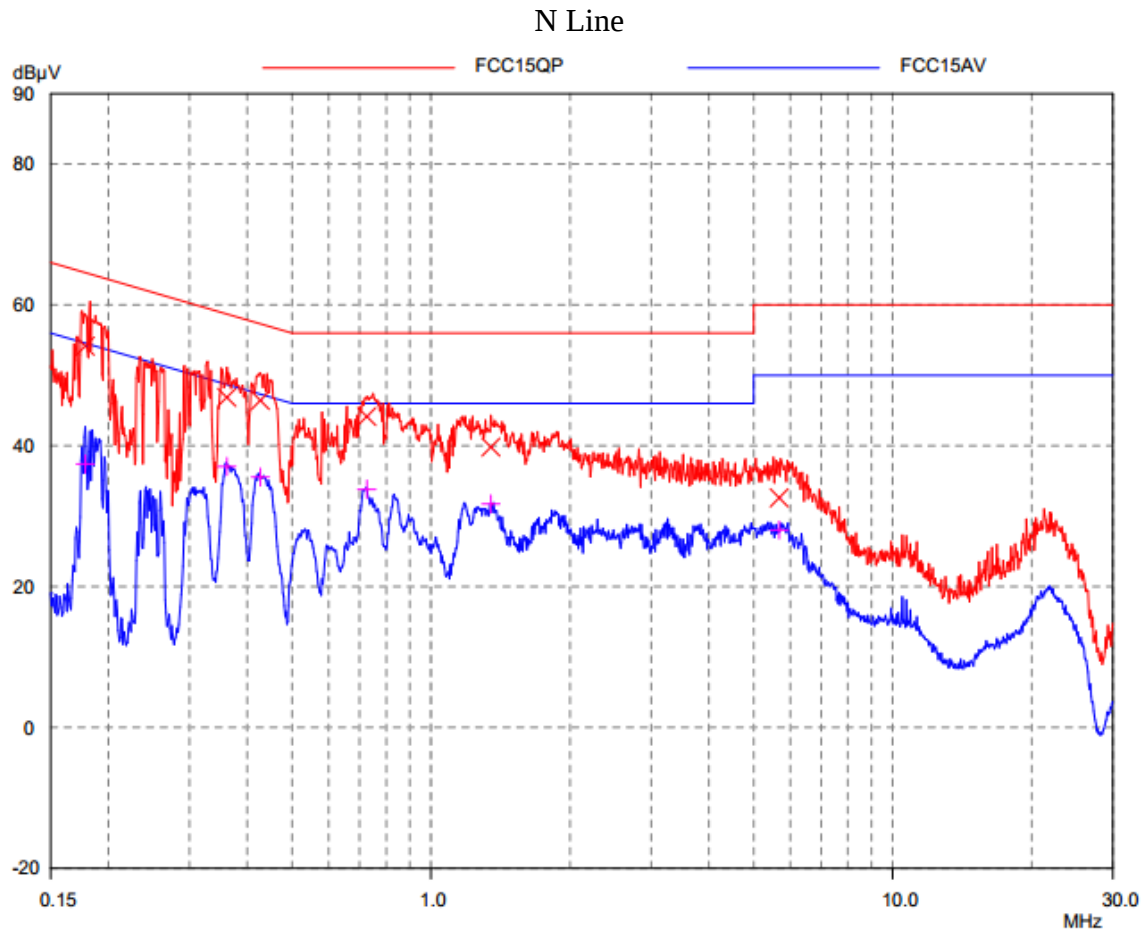
Temperature : 25 °C
Relative Humidity : 55 %

Supplied by AC-DC adaptor:



Test Data:

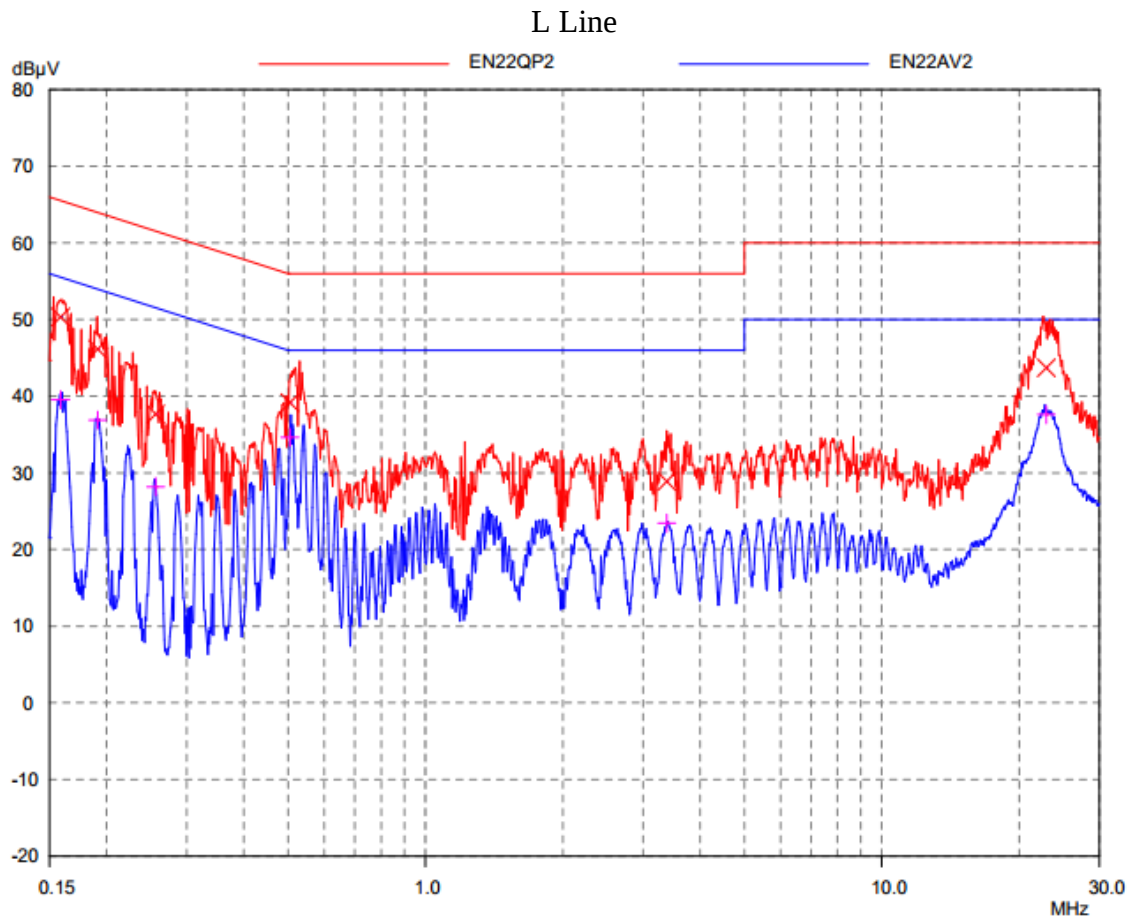
Frequency (MHz)	Quasi-peak			Average		
	level dB(μV)	Limit dB(μV)	Margin (dB)	level dB(μV)	limit dB(μV)	Margin (dB)
0.182	54.17	64.41	10.24	39.50	54.41	14.91
0.362	47.23	58.67	11.44	37.48	48.67	11.19
0.723	44.92	56.00	11.08	34.35	46.00	11.65
1.177	39.99	56.00	16.01	32.05	46.00	13.95
3.257	34.68	56.00	21.32	29.89	46.00	16.11
21.178	25.08	60.00	34.92	19.61	50.00	30.39



Test Data:

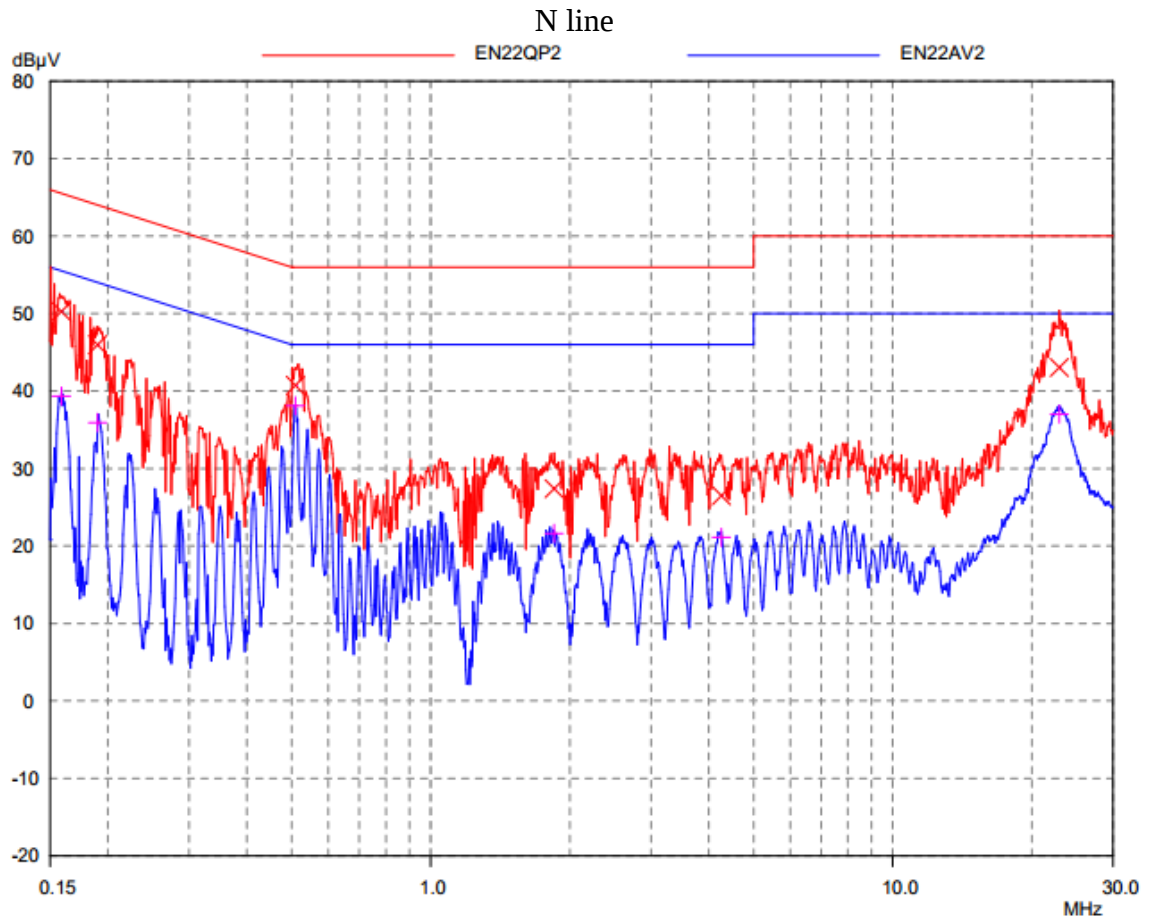
Frequency (MHz)	Quasi-peak			Average		
	level dB(μV)	Limit dB(μV)	Margin (dB)	level dB(μV)	limit dB(μV)	Margin (dB)
0.178	54.16	64.57	10.41	37.40	54.57	17.17
0.361	46.87	58.71	11.84	37.05	48.71	11.66
0.427	46.44	57.31	10.87	35.55	47.31	11.76
0.726	44.14	56.00	11.86	33.81	46.00	12.19
1.348	39.81	56.00	16.19	31.74	46.00	14.26
5.672	32.60	60.00	27.40	28.04	50.00	21.96

Supplied by POE adaptor:



Test Data:

Frequency (MHz)	Quasi-peak			Average		
	level dB(μV)	Limit dB(μV)	Margin (dB)	level dB(μV)	limit dB(μV)	Margin (dB)
0.159	50.33	65.54	15.21	39.55	55.54	15.99
0.191	46.13	63.98	17.85	36.88	53.98	17.10
0.256	37.66	61.56	23.90	28.19	51.56	23.37
0.505	39.16	56.00	16.84	34.62	46.00	11.38
3.376	28.89	56.00	27.11	23.43	46.00	22.57
22.939	43.71	60.00	16.29	37.60	50.00	12.40



Test Data:

Frequency (MHz)	Quasi-peak			Average		
	level dB(μV)	Limit dB(μV)	Margin (dB)	level dB(μV)	limit dB(μV)	Margin (dB)
0.159	50.27	65.54	15.27	39.36	55.54	16.18
0.190	45.97	64.04	18.07	35.93	54.04	18.11
0.509	40.73	56.00	15.27	38.10	46.00	7.90
1.848	27.40	56.00	28.60	21.62	46.00	24.38
4.255	26.49	56.00	29.51	21.12	46.00	24.88
22.939	43.03	60.00	16.97	37.02	50.00	12.98