



EMC TEST REPORT for Unintentional Radiator
No. 130101217SHA-001

Applicant : Shanghai Feixun Communication Co., Ltd.
Wing B, 15/F, GDC Building, NO.9 Gaoxinzhong
3rd Ave., Nanshan, Shenzhen, Guangdong, China

Manufacturer : Shanghai Feixun Communication Co., Ltd.
Wing B, 15/F, GDC Building, NO.9 Gaoxinzhong
3rd Ave., Nanshan, Shenzhen, Guangdong, China

Product Name : 300M Wireless N NAS router

Type/Model : FWR-714U

SUMMARY

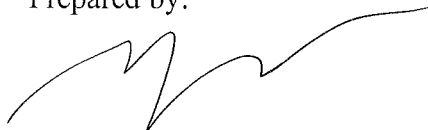
The equipment complies with the requirements according to the following standard(s):

47CFR Part 15 (2011): Radio Frequency Devices

ANSI C63.4 (2003): 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

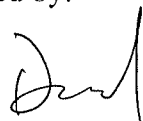
Date of issue: March 6, 2013

Prepared by:



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Description of Test Facility

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1. General Information

1.1 Applicant Information

Applicant: Shanghai Feixun Communication Co., Ltd.
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3rd Ave., Nanshan, Shenzhen, Guangdong, China

Manufacturer: Shanghai Feixun Communication Co., Ltd.
Wing B, 15/F, GDC Building, NO.9 Gaoxinzhong
3rd Ave., Nanshan, Shenzhen, Guangdong, China

Sample received date : January 18, 2013

Date of test : January 18, 2013 ~ March 4, 2013

1.2 Identification of the EUT

Equipment: 300Mbps Wireless N Router

Type/model: FWR-714U

1.3 Technical specification

Rating: DC voltage supplied from AC/DC adapter:
 Model: RD1200500-CS5-8MG
 I/P: 100-240V~ 50/60Hz 250mA
 O/P: 12VDC 0.5A

Description of EUT: The EUT has only one model.
 The EUT supports wireless network of 802.11b/g/n .The intentional emission assessment is excluded from this report.

Port identification:

Port	Description	Type	Number
1	Storage	USB2.0	1
2	LAN	RJ45	4
3	WAN	RJ45	1

Dimension: 185mm x 124mm x 27mm
 Declared Temperature range: 0°C ~ 40°C
 Category of EUT: Class B
 Highest working frequency : >1GHz
 EUT type: Table top
 Floor standing

1.4 Mode of operation during the test / Test peripherals used

The EUT was set to normal operation and all the operation modes were observed.

Test peripherals used:

Item No	Description	Band and Model	S/No
1	Laptop computer	HP Probook 6460b	NA

2. Test Specification

2.1 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESIB 26	R&S	EC 3045	2012-10-21	2013-10-20
Semi-anechoic chamber	-	Albatross project	EC 3048	2012-5-21	2013-5-20
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2011-5-16	2013-5-15
Horn antenna	HF 906	R&S	EC 3049	2011-5-13	2013-5-12
Pre-amplifier	Pre-amp 18	R&S	EC 3222	2012-4-12	2013-4-11
Test Receiver	ESCS 30	R&S	EC 2107	2012-10-21	2013-10-20
A.M.N.	ESH2-Z5	R&S	EC 3119	2013-1-9	2014-1-8
A.M.N.	ESH3-Z5	R&S	EC 2109	2013-1-10	2014-1-9
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2013-2-8	2014-2-7
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC4297-2	2013-2-8	2014-2-7
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC4297-3	2013-2-8	2014-2-7
Band Reject Filter	WRCGV 2400/2483- 2390/2493- 35/10SS	Wainwright	EC4297-4	2013-2-8	2014-2-7
Test Receiver	FSV40	R&S	/	2012-10-21	2013-10-20
Preamplifier	AP-025C	Quietek	QT-AP003	2012-11-25	2013-11-24
Preamplifier	AP-180C	Quietek	CHM- 0602013	2012-11-25	2013-11-24
Broad-Band Horn Antenna	BBHA9120D	Schwarzbeck	496	2012-11-25	2013-11-24
Broad-Band Horn Antenna	BBHA9170	Schwarzbeck	294	2012-11-25	2013-11-24

2.2 Test Standard

47CFR Part 15 (2011)
ANSIC63.4 (2003)



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. Power line conducted emission for Unintentional Radiator

Test result: **PASS**

3.1 Limits

3.1.1 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.

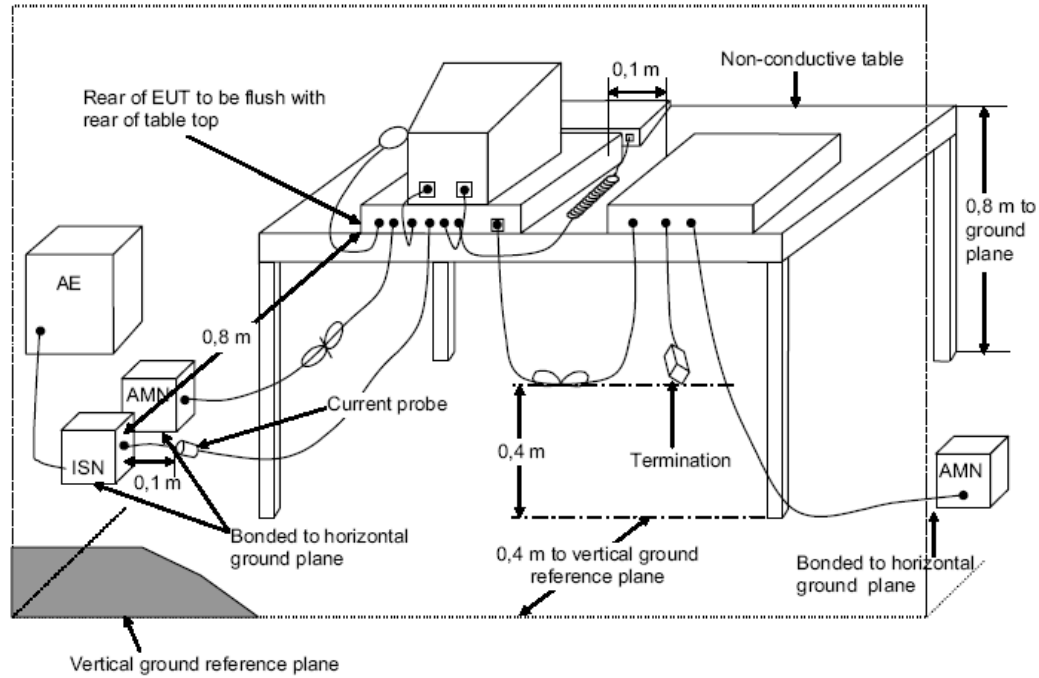
3.1.2 Limits for conducted disturbance voltage at the mains ports of class B device

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

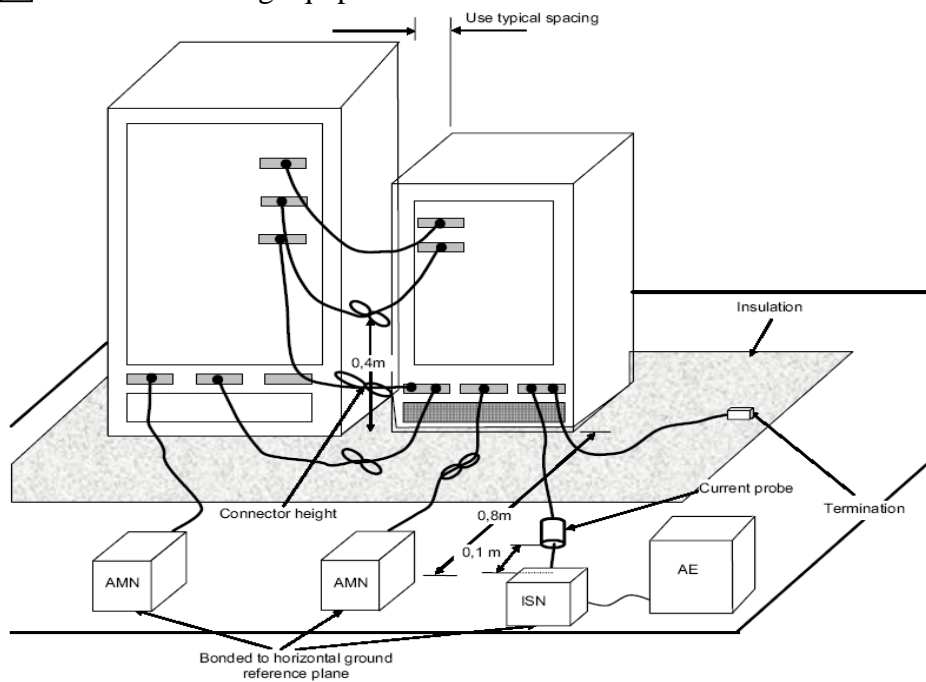
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
 2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

3.2 Test setup

For table top equipment



For floor standing equipment



3.3 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.

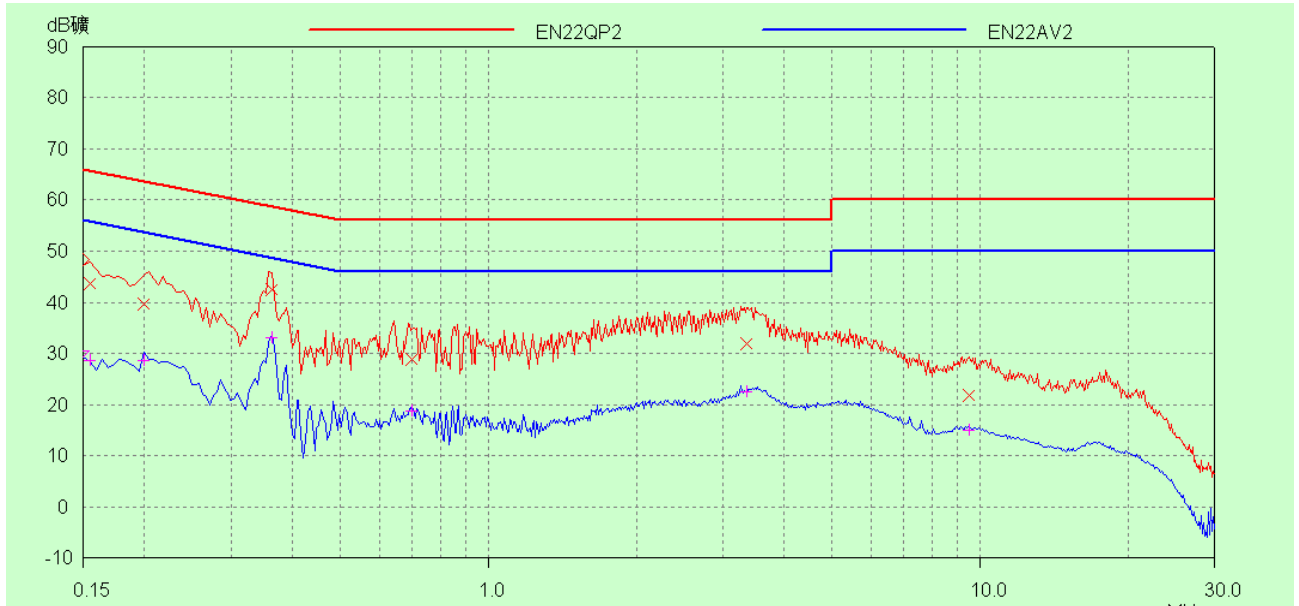
EUT arrangement and operation conditions were according to clause 6 and clause 7 of ANSI 63.4.

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

3.4 Test Protocol

Temperature : 22 °C
 Relative Humidity : 43 %

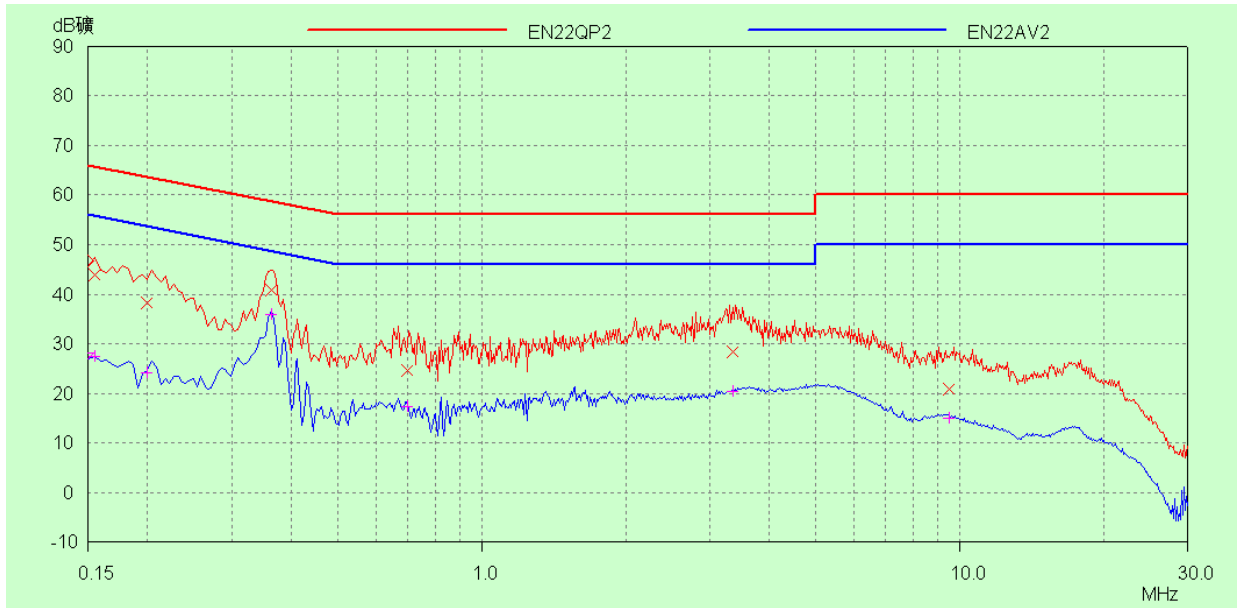
10Mbps
 L line



Frequency	Correct Factor (dB)	Corrected Reading (dBUV)		Limit (dBUV)		Margin (dB)	
		QP	AV	QP	AV	QP	AV
0.15	3.00	43.72	28.52	65.75	55.75	22.03	27.23
0.20	3.00	39.66	28.48	63.63	53.63	23.97	25.15
0.36	3.00	42.36	33.05	58.69	48.69	16.33	15.64
0.70	3.00	28.77	18.68	56.00	46.00	27.23	27.32
3.35	3.00	31.94	22.41	56.00	46.00	24.06	23.59
9.47	3.00	21.84	14.98	60.00	50.00	38.16	35.02

Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB).
 2. Margin (dB) = Limit - Corrected Reading.

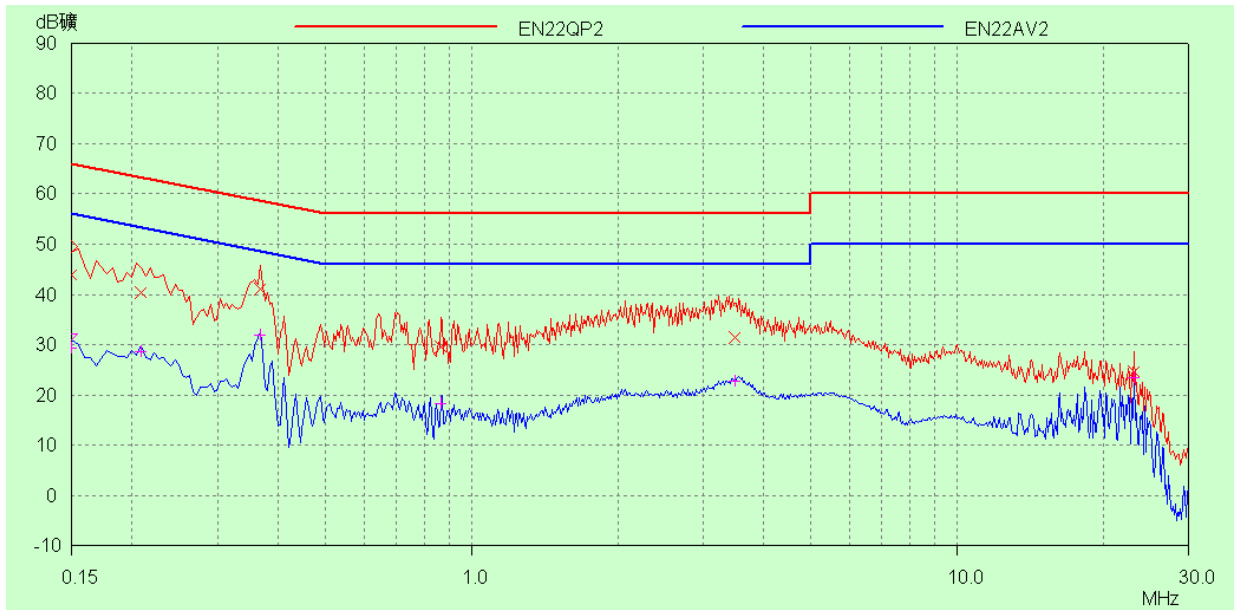
N line



Frequency	Correct Factor (dB)	Corrected Reading (dBUV)		Limit (dBUV)		Margin (dB)	
		QP	AV	QP	AV	QP	AV
0.15	3.00	44.00	27.43	65.75	55.75	21.75	28.32
0.20	3.00	38.33	24.18	63.63	53.63	25.30	29.45
0.36	3.00	40.84	35.79	58.69	48.69	17.85	12.90
0.70	3.00	24.62	17.42	56.00	46.00	31.38	28.58
3.35	3.00	28.30	20.28	56.00	46.00	27.70	25.72
9.47	3.00	20.76	14.91	60.00	50.00	39.24	35.09

Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB).
 2. Margin (dB) = Limit - Corrected Reading.

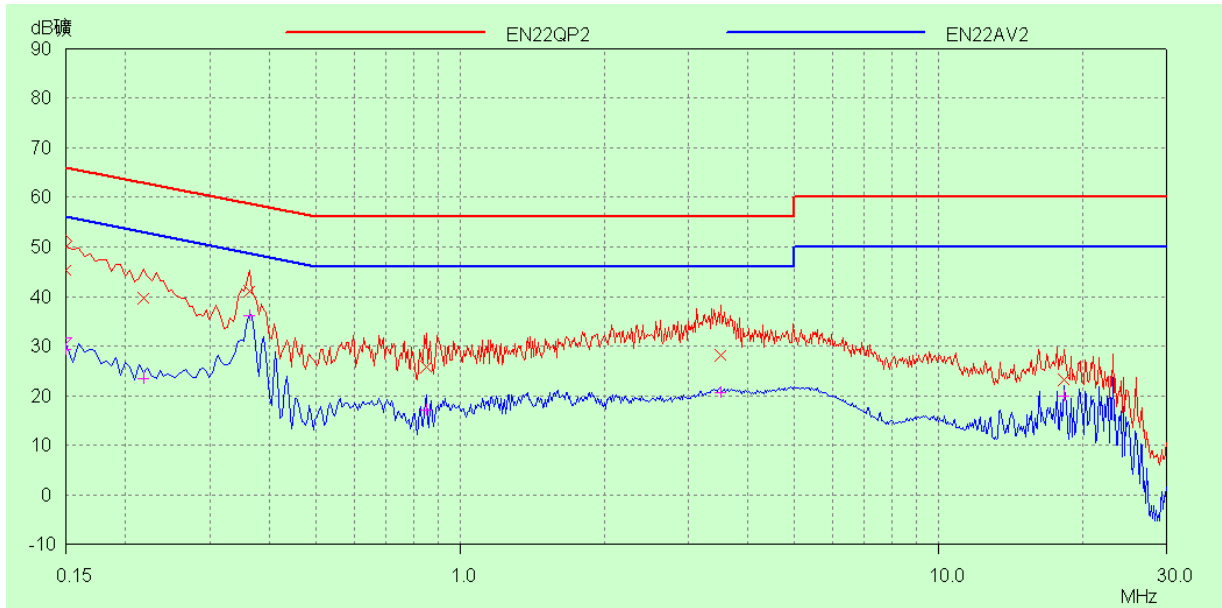
100Mbps
L line



Frequency	Correct Factor (dB)	Corrected Reading (dBuV)		Limit (dBuV)		Margin (dB)	
		QP	AV	QP	AV	QP	AV
0.15	3.00	43.98	29.30	66.00	56.00	22.02	26.70
0.21	3.00	40.40	28.58	63.26	53.26	22.86	24.68
0.37	3.00	40.96	31.88	58.59	48.59	17.63	16.71
0.87	3.00	29.44	18.27	56.00	46.00	26.56	27.73
3.49	3.00	31.34	22.74	56.00	46.00	24.66	23.26
23.13	3.00	24.58	23.42	60.00	50.00	35.42	26.58

Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB).
 2. Margin (dB) = Limit - Corrected Reading.

N line



Frequency	Correct Factor (dB)	Corrected Reading (dBUV)		Limit (dBUV)		Margin (dB)	
		QP	AV	QP	AV	QP	AV
0.15	3.00	45.40	29.40	66.00	56.00	20.60	26.60
0.22	3.00	39.75	23.33	62.91	52.91	23.16	29.58
0.36	3.00	40.98	36.16	58.69	48.69	17.71	12.53
0.85	3.00	25.75	17.17	56.00	46.00	30.25	28.83
3.51	3.00	28.14	20.67	56.00	46.00	27.86	25.33
18.24	3.00	23.27	19.92	60.00	50.00	36.73	30.08

Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB).
 2. Margin (dB) = Limit - Corrected Reading.

4. Radiated emission for Unintentional Radiator

Test result: Pass

4.1 Radiated emission limits

4.1.1 Limits for radiated disturbance of class A device

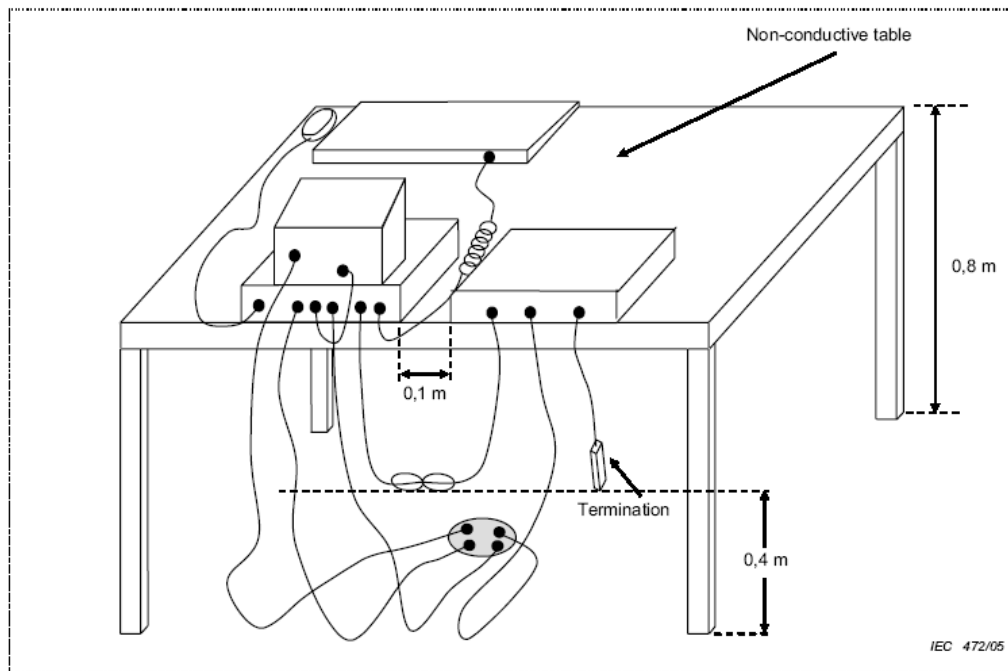
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 10m
30 – 88	39
88 – 216	43.5
216 – 960	46.4
Above 960	49.5
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.1.1 Limits for radiated disturbance of class B device

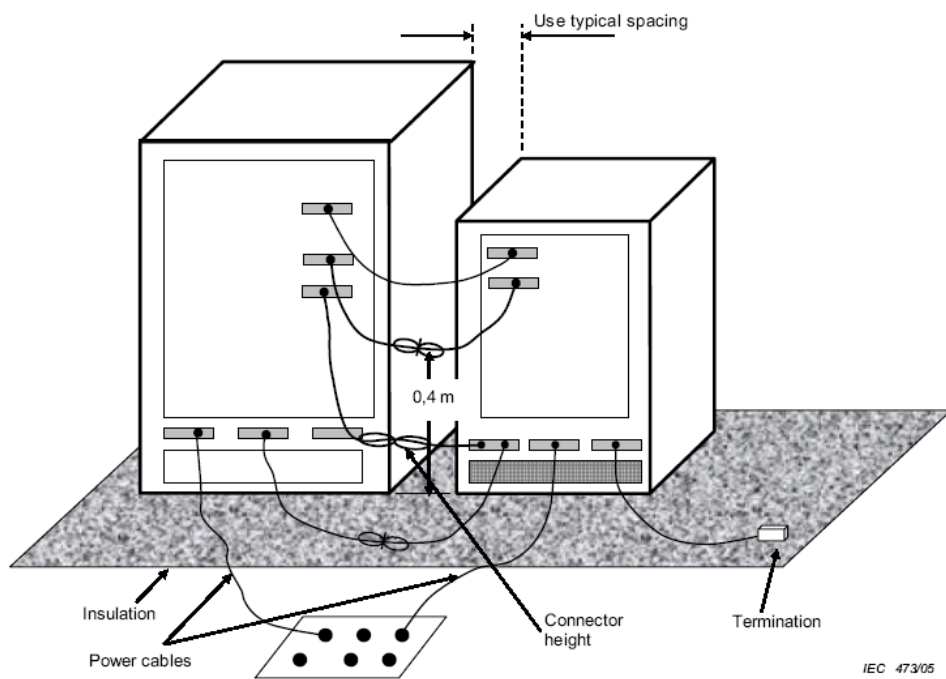
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 3m
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
Above 960	54.0
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.2 Block diagram and test set up

For table top equipment



For floor standing equipment





4.3 Test Setup and Test Procedure

The measurement was performed in a semi-anechoic chamber.

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 bandwidth setting on R&S Test Receiver ESI26 was 120 kHz.

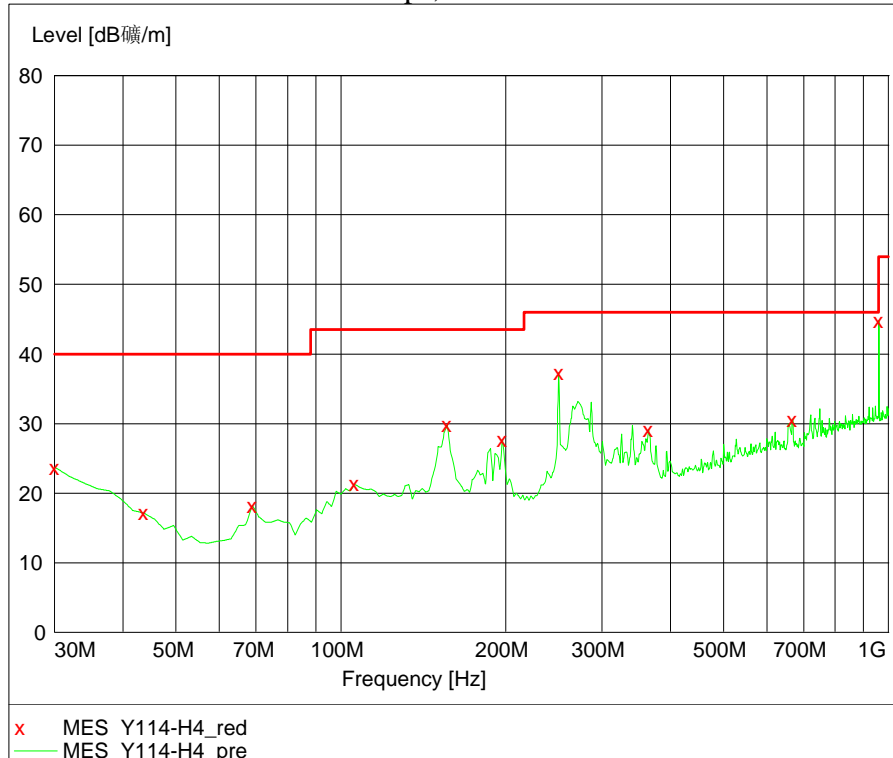
The required measurement frequency range was checked.

Highest operating frequency (MHz)	Upper frequency of measurement range (MHz)
<input type="checkbox"/> Below 1.705	30
<input type="checkbox"/> 1.705–108	1000
<input type="checkbox"/> 108–500	2000
<input type="checkbox"/> 500–1000	5000
<input checked="" type="checkbox"/> Above 1000	5th harmonic or 40 GHz which is lower.

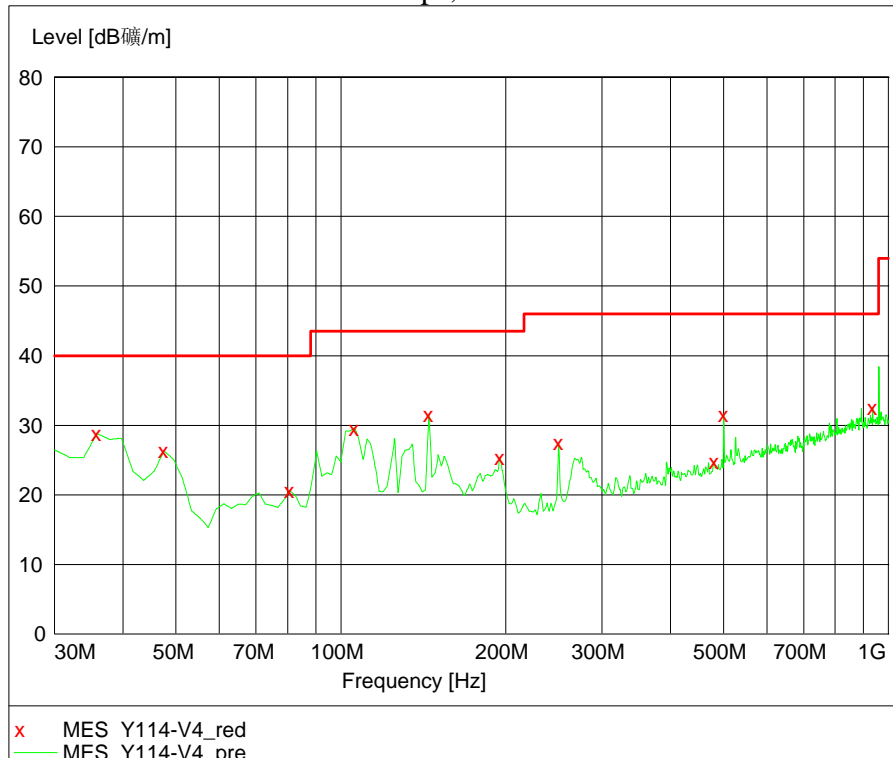
4.4 Test Protocol

Temperature : 22 °C
Relative Humidity : 43 %

10Mbps, Horizontal



10Mbps, Vertical

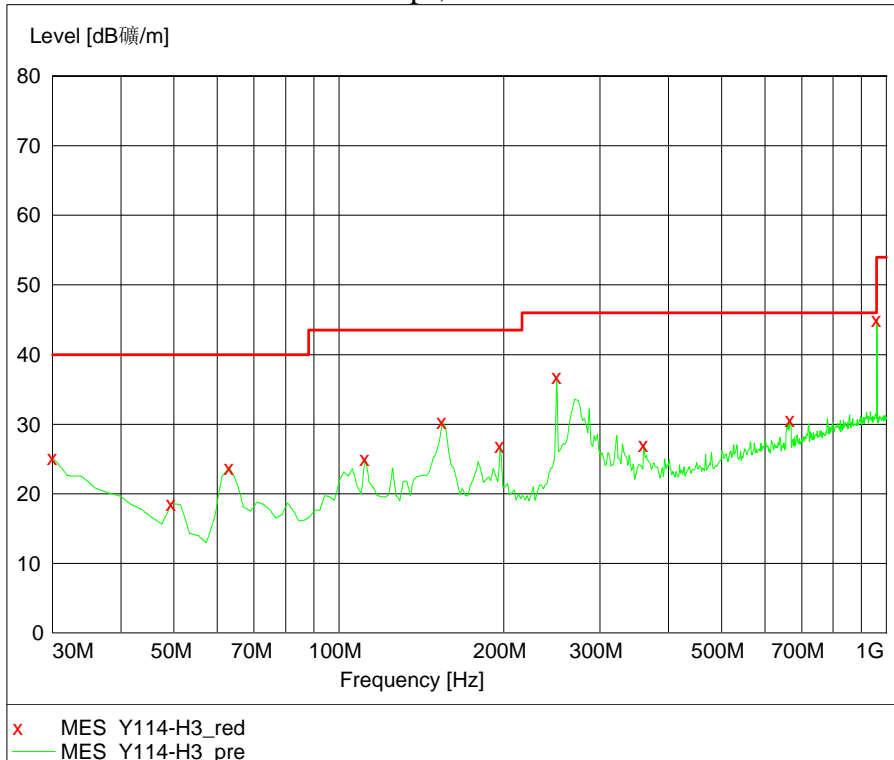


Ant	Frequency (MHz)	Emission level (dB μ V/m)	Transducer (dB/m)	Limits (dB μ V/m)	Margin (dB)	Detector
H	156.35	29.80	13.70	43.50	13.70	PK
	197.17	27.70	12.70	43.50	15.80	PK
	250.01	37.30	13.20	46.00	8.70	PK
	364.34	29.20	17.40	46.00	16.80	PK
	960.02	42.80	24.50	54.00	11.20	QP
	2226.45	40.70	-8.00	54.00	13.30	PK
V	35.83	28.80	17.70	40.00	11.20	PK
	47.49	23.30	11.90	40.00	16.70	QP
	105.81	29.60	14.60	43.50	13.90	PK
	144.68	31.50	14.50	43.50	12.00	PK
	250.01	27.50	13.20	46.00	18.50	PK
	2226.45	41.60	-8.00	54.00	12.40	PK

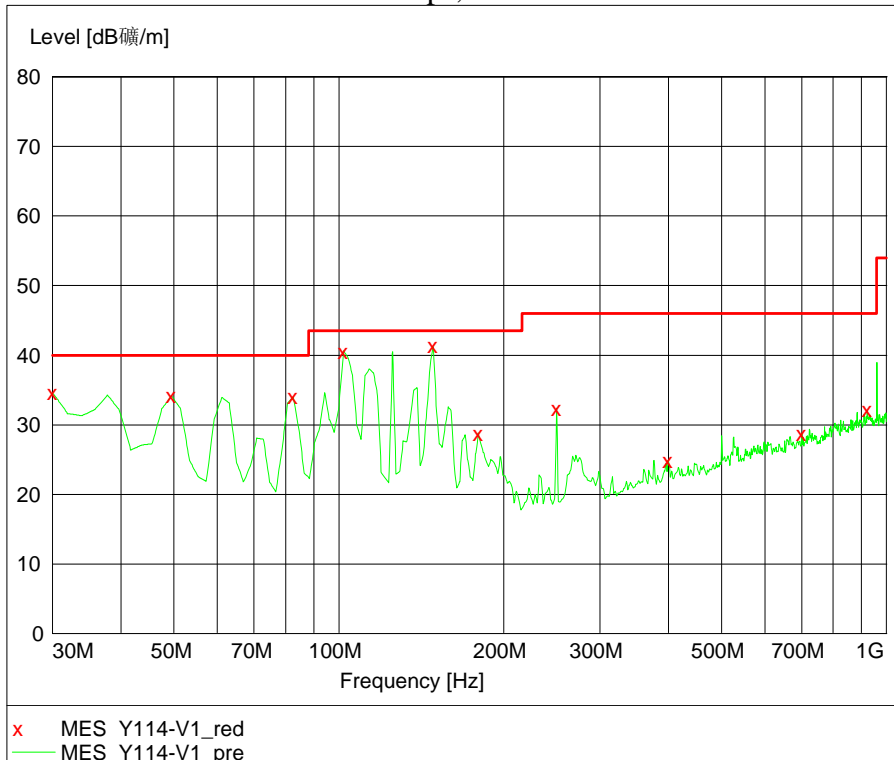
- Remark: 1. Transducer = Antenna Factor + Cable Loss (-Amplifier, is employed)
 2. Corrected Reading = Original Receiver Reading + Transducer
 3. Margin = limit – Corrected Reading
 4. The test is performed from 30MHz to 40GHz.
 5. For the frequency points assessed with QP detector, it has been confirmed the pulse-repetition frequency of their emission is higher than 20 Hz.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
 Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
 Then Transducer = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading =
 10dBuV + 0.20dB/m = 10.20dBuV/m
 Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin =
 54 - 10.20 = 43.80dBuV/m

100Mbps, Horizontal



100Mbps, Vertical



Ant	Frequency (MHz)	Emission level (dBμV/m)	Transducer (dB/m)	Limits (dBμV/m)	Margin (dB)	Detector
H	111.64	25.00	15.00	43.50	18.50	PK
	154.40	30.40	13.90	43.50	13.10	PK
	197.17	26.90	12.70	43.50	16.60	PK
	250.02	36.80	13.20	46.00	9.20	PK
	960.02	43.00	24.50	54.00	11.00	QP
	2226.45	40.80	-8.00	54.00	13.20	PK
V	30.00	34.60	21.00	40.00	5.40	PK
	49.43	34.20	11.00	40.00	5.80	PK
	82.48	32.00	10.50	40.00	8.00	QP
	101.92	40.60	14.30	43.50	2.90	PK
	148.57	41.30	14.20	43.50	2.20	PK
	2260.52	39.50	-7.90	54.00	14.50	PK

- Remark: 1. Transducer = Antenna Factor + Cable Loss (-Amplifier, is employed)
 2. Corrected Reading = Original Receiver Reading + Transducer
 3. Margin = limit – Corrected Reading
 4. The test is performed from 30MHz to 40GHz.
 5. For the frequency points assessed with QP detector, it has been confirmed the pulse-repetition frequency of their emission is higher than 20 Hz.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
 Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
 Then Transducer = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading =
 10dBuV + 0.20dB/m = 10.20dBuV/m
 Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin =
 54 - 10.20 = 43.80dBuV/m