EMC Test Report

Applicant	:	Edimax Technology Co., Ltd.
Product Type	:	11ac Wireless Dual-Band Selectable USB Adapter
Trade Name	:	EDIMAX
Model Number	:	EW-7822UNC, EW-7822ULC
Applicable Standard	:	AS/NZS CISPR 32: 2015
Received Date	:	Apr. 12, 2017
Test Period	:	Apr. 13 ~ Apr. 17, 2017
Issued Date	:	Jul. 20, 2020

Issued by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
Taoyuan City 33465, Taiwan (R.O.C.)
Tel：+886-3-2710188 / Fax：+886-3-2710190

Taiwan Accreditation Foundation accreditation number: 1330
Certified Scope: 9 kHz ~ 6 GHz

Note:

1. The test results are valid only for samples provided by customers and under the test conditions described in this report.
2. This report shall not be reproduced except in full, without the written approval of A Test Lab Technology Corporation.
3. The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.

Revision History

Rev.	Issued Date	Revisions	Revised By
00	Jul. 20, 2020	Initial Issue	Nina Lin

Verification of Compliance

Issued Date: Jul. 20, 2020

Applicant	:	Edimax Technology Co., Ltd.
Product Type	:	11ac Wireless Dual-Band Selectable USB Adapter
Trade Name	:	EDIMAX
Model Number	:	EW-7822UNC, EW-7822ULC
EUT Rated Voltage	:	DC 5.0 V
Test Voltage	:	240 Vac / 50 Hz
Applicable Standard	:	AS/NZS CISPR 32: 2015
Test Result	:	Complied
Performing Lab.	:	A Test Lab Techno Corp. No. 140-1, Changan Street, Bade District, Taoyuan City 33465, Taiwan (R.O.C.) Tel：+886-3-2710188 / Fax：+886-3-2710190 Taiwan Accreditation Foundation accreditation number: 1330 http://www.atl-lab.com.tw/e-index.htm

The above equipment has been tested by A Test Lab Techno Corp., and found compliance with the requirements set forth in the RCM technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved By : Terry Ljao

(Manager) (Terry Liao)

TABLE OF CONTENTS

1 General Information 5
1.1. Summary of Test Result 5
1.2. Measurement Uncertainty 5
1.3. Test Site Environment 5
2 EUT Description 6
3 Test Methodology 7
3.1. Decision of Test Mode 7
3.2. EUT Test Step 7
3.3. Configuration of Test System Details 8
3.4. Test Instruments 9
4 Measurement Procedure 10
4.1. Conducted Emission 10
4.2. Radiated Emission 12
5 Test Results 15
5.1. Conducted Emission 15
5.2. Radiated Emission 18

1 General Information

1.1. Summary of Test Result

Emission			
Standard	Item	Result	Remark
AS/NZS CISPR 32: 2015	Conducted Emission	PASS	Meet Class B limit
AS/NZS CISPR 32: 2015	Radiated Emission	PASS	Meet Class B limit

Decision Rule

■ Uncertainty is not included.

□ Uncertainty is included.

1.2. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty (dB)
Conducted Emission	AC Power Port	9 kHz ~ 150 kHz	± 2.7
		150 kHz ~ 30 MHz	± 2.7
	Telecommunication Port	150 kHz ~ 30 MHz	± 3.6

Test Item	Test Site	Frequency Range		Uncertainty (dB)
Radiated Emission	TE06	30 MHz ~ 1000 MHz	Horizontal	± 5.6
			Vertical	± 6.0
	TE01	1000 MHz ~ 6000 MHz		± 5.2
	TE09	1000 MHz ~ 6000 MHz		± 4.9
Note: The Vertical and Horizontal measurement uncertainty of 1 GHz to 6 GHz is evaluated and choose which polarity is worst value.				

1.3. Test Site Environment

Items	Test Item	Required (IEC 60068-1)	Actual
Temperature (°C)	Conducted Emission	15-35	15-30
Humidity (%RH)		25-75	45-75
Barometric pressure (mbar)		860-1060	990-1005
Temperature (°C)	Radiated Emission	15-35	15-30
Humidity (%RH)		25-75	45-75
Barometric pressure (mbar)		860-1060	990-1005

2 EUT Description

Applicant	Edimax Technology Co., Ltd. No.278, Xinhu 1st Rd., Neihu Dist., Taipei City, Taiwan
Manufacturer	Edimax Technology Co., Ltd. No.278, Xinhu 1st Rd., Neihu Dist., Taipei City, Taiwan
Product Type	11ac Wireless Dual-Band Selectable USB Adapter
Trade Name	EDIMAX
Model Number	EW-7822UNC, EW-7822ULC
Models different description	Those model numbers differ from each other in selling region.
I/O Ports	Refer to User Manual
Highest Frequency Generated	5850 MHz

3 Test Methodology

3.1. Decision of Test Mode

3.1.1. The following test mode(s) were scanned during the preliminary test:

Pre-Test Mode
Mode 1: Wi-Fi link mode

3.1.2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode			
Emission	Conducted Emission		Mode 1
	Radiated Emission	Below 1 GHz	Mode 1
		Above 1 GHz	Mode 1

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

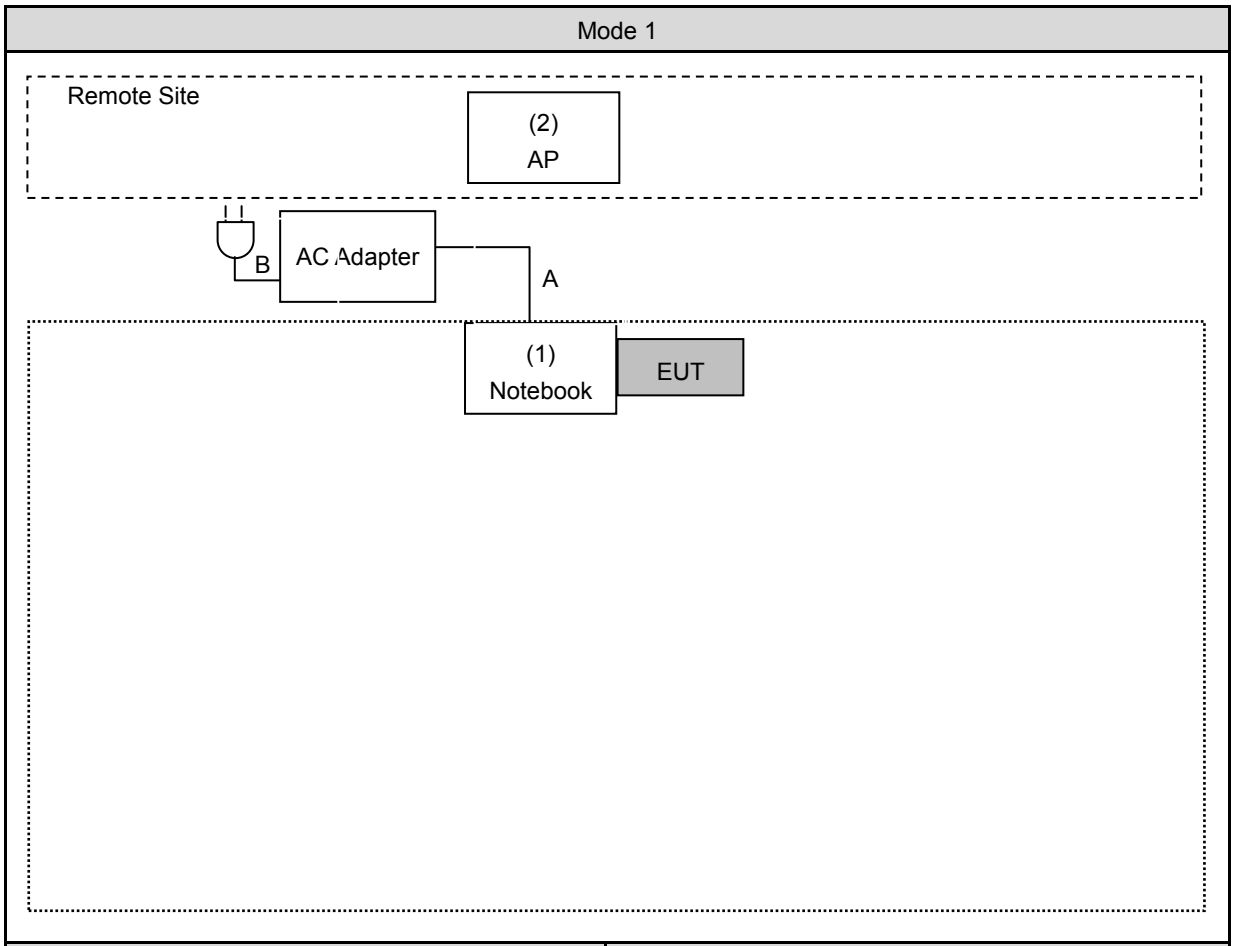
3.2. EUT Test Step

Mode 1

1	Setup the EUT and simulators as shown on 3.3.
2	Turn on the power of all equipment.
3	Notebook link to AP by EUT.
4	Data will be communicated between Notebook and AP through EUT.
5	Start to test get the worst reading.

Measurement Software			
No.	Description	Software	Version
1	Conducted Emission	EZ EMC	1.1.4.3
2	Radiated Emission _ Below 1 GHz	EZ EMC	1.1.4.2
3	Radiated Emission _ Above 1 GHz	EZ EMC	1.1.4.4

3.3. Configuration of Test System Details



Signal Cable Type		Signal Cable Description
A	DC Power Cable	Non-Shielded, 1.8 m
B	AC Power Cable	Non-Shielded, 1.8 m

Devices Description					
Product		Manufacturer	Model Number	Serial Number	Power Cord
(1)	Notebook	DELL	LAPTITU	25627158361	Non-Shielded, 1.8 m
(2)	AP	ASUS	MSQ-RTAC66U	D1IAGG000126	Non-Shielded, 1.8 m

3.4. Test Instruments

Test Period : Apr. 13, 2017

Testing Engineer : Marco Chiu

Conducted Emission test site					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Test Receiver	R&S	ESCI	100367	05/31/2016	1 year
LISN	R&S	ENV216	101040	03/22/2017	1 year
LISN	R&S	ENV216	101041	03/15/2017	1 year
Test Site	ATL	TE02	TE02	N.C.R.	-----

Test Period : Apr. 17, 2017

Testing Engineer : Frank Chen

Radiated Emission - 10 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Amplifier	EMCI	EMC9135	980298	02/09/2017	1 year
Amplifier	EMCI	EMC9135	980299	02/17/2017	1 year
Test Receiver	R&S	ESCI	100722	10/28/2016	1 year
Test Receiver	R&S	ESCI	101000	12/12/2016	1 year
Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	670	02/13/2017	1 year
Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	671	03/01/2017	1 year
Test Site	ATL	TE06	TE06	10/30/2016	1 year

Test Period : Apr. 13, 2017

Testing Engineer : Marco Chiu

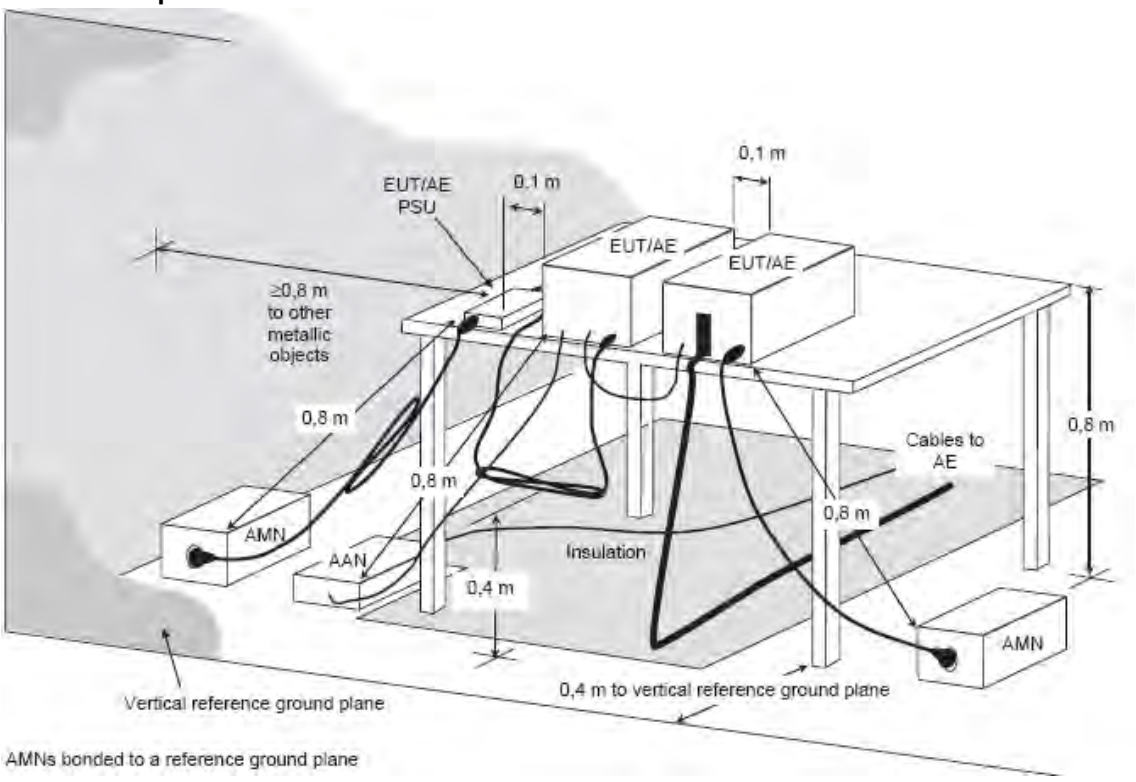
Radiated Emission - 3 Meter Chambe					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
RF Pre-selector	Agilent	N9039A	MY46520256	04/05/2017	1 year
Spectrum Analyzer	Agilent	E4446A	MY46180578	04/05/2017	1 year
Pre Amplifier	Agilent	8447D	2944A11119	01/12/2017	1 year
Pre Amplifier	EMCI	EMC012645SE	980289	01/16/2017	1 year
Pre Amplifier	EMCI	EMC2654045	980028	08/15/2016	1 year
Horn Antenna (1~18 GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/06/2016	1 year
Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	416	10/13/2016	1 year
Test Site	ATL	TE01	TE01	02/20/2017	1 year

Note: N.C.R. = No Calibration Request.

4 Measurement Procedure

4.1. Conducted Emission

■ **Test Setup**



■ **Test Procedure**

A.C. Mains Conducted Interference

Procedure of Preliminary Test

The EUT and support equipment, if needed, were set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN 55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane, which has a less than 15 cm non-conductive covering to insulate the EUT from the ground plane.

All I/O cables were positioned to simulate typical actual usage as per EN 55032.

The EUT installed by AC main power, through a Line Impedance Stabilization Network (LISN), which was supplied power source and was grounded to the ground plane.

All support equipment power by a second LISN.

The test program of the EUT was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
The Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.
During the above scans, the emissions were maximized by cable manipulation.
The test mode(s) described in Item 3.1 were scanned during the preliminary test.
After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
The test data of the worst-case condition(s) was recorded.
Cables connecting to AE located outside the measurement area shall drop directly to, but be insulated from, the RGP shall be used thickness of the insulation and shall not be more than 150 mm. However, cables which would normally be bonded to ground should be bonded to the RGP in accordance with normal practice or the manufacturer's recommendation

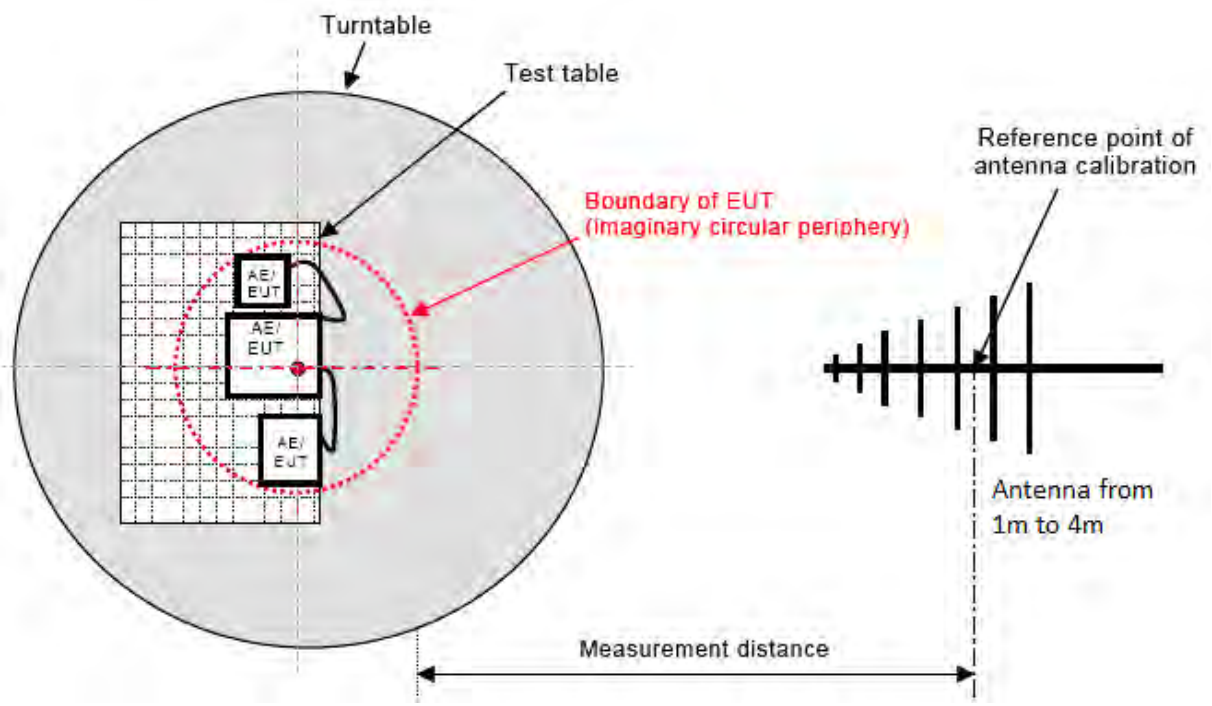
Telecommunication Port Conducted Interference

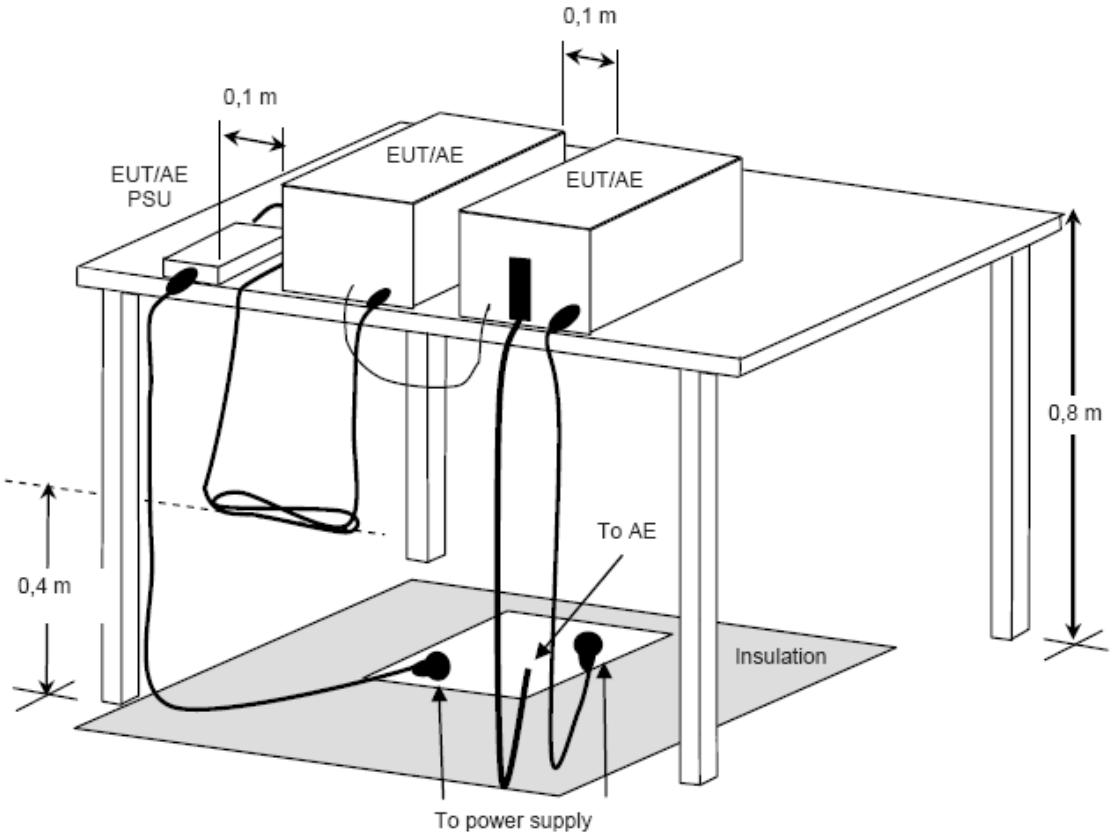
Selecting ISN for unscreened cable and screened cable to make measurement and Current probe for coaxial cable.
The port of the EUT was connected to the remote side support equipment through the ISN/Current Probe and communication in normal condition.
Making a overall range scan by using the test receiver controlled by controller and record at least six highest emissions for showing in the test report.
Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
In case of measuring on the screened cable, the current limit shall be applied; otherwise the voltage limit should be applied.

4.2. Radiated Emission

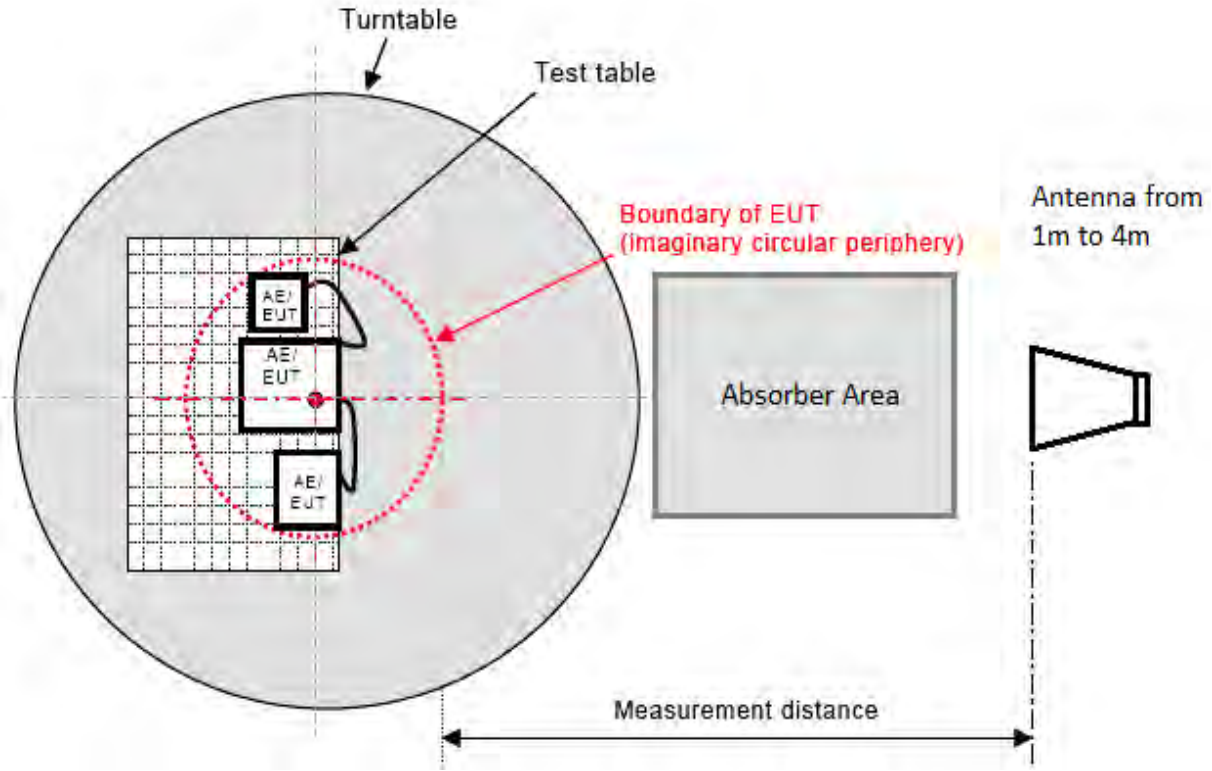
■ **Test Setup**

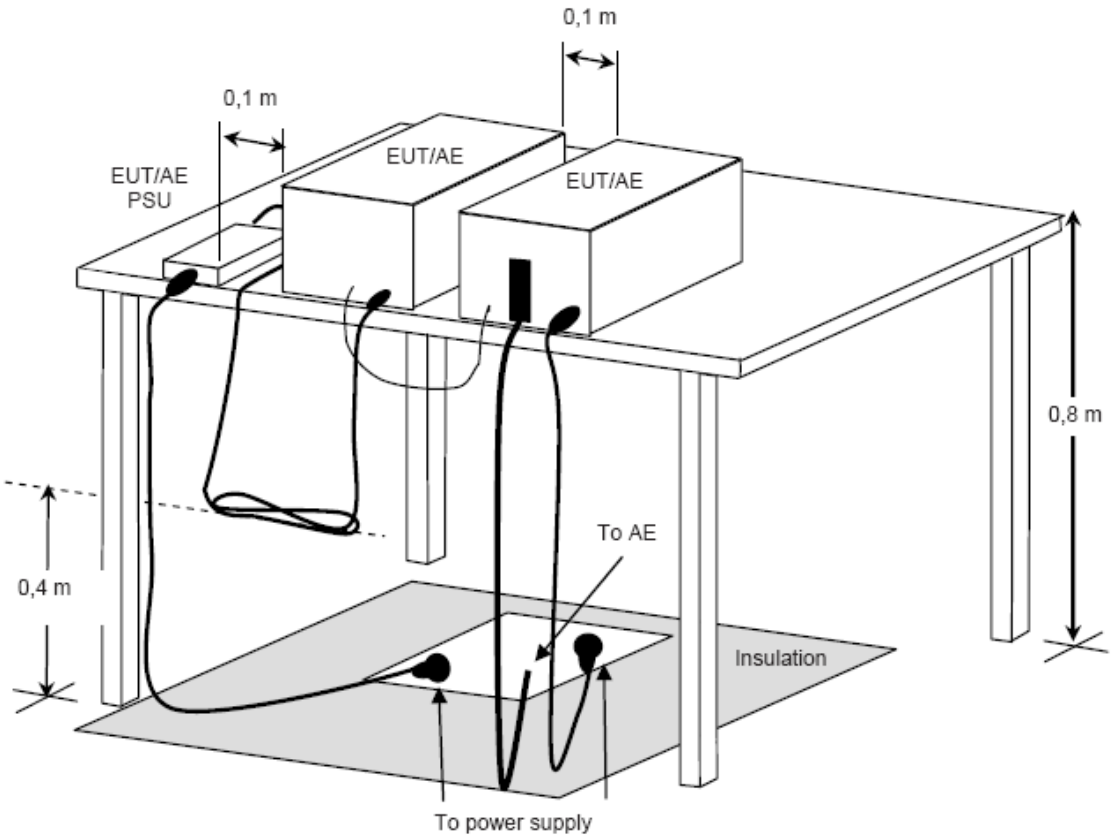
Below 1 GHz





Above 1 GHz


Turntable
Test table
Boundary of EUT
(imaginary circular periphery)
Antenna from
1m to 4m
AE/
EUT
AE/
EUT
AE/
EUT
Absorber Area
Measurement distance


0,1 m
0,1 m
EUT/AE
PSU
EUT/AE
EUT/AE
0,8 m
0,4 m
To AE
Insulation
To power supply

■ Test Procedure

Procedure of Preliminary Test

The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a less than 150 mm non-conductive covering to insulate the EUT from the ground plane.

Support equipment, if needed, was placed as per EN 55032.

All I/O cables were positioned to simulate typical usage as per EN 55032.

The EUT received AC power source from the outlet socket under the turntable. All support equipment power received from another socket under the turntable.

The antenna was placed at 3 or 10 meter away from the EUT as stated in EN 55032 Annex C.2.2.4 Figure C.1 and Annex D Table D.1. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The Analyzer / Receiver quickly scanned from 30 MHz to 6 GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level (For Below 1 GHz) and keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response (For Above 1 GHz).

The test mode(s) described in Item 3.1 were scanned during the preliminary test:

After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.

The worst configuration of EUT and cable, antenna position, polarization and turntable position of the above highest emission levels were recorded for the final test.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.

The Analyzer / Receiver scanned from 30 MHz to 6000 MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

Recording at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P. (For Below 1 GHz) or Peak/Average (For Above 1 GHz) reading is presented.

Cables connecting to AE located outside the measurement area shall drop directly to, but be insulated from, the RGP (or turntable where applicable), and then be routed directly to the place where they leave the test site. The thickness of the insulation shall not be more than 150 mm. However, cables which would normally be bonded to ground should be bonded to the RGP in accordance with normal practice or the manufacturer's recommendation

The test data of the worst-case condition(s) was recorded.

5 Test Results

5.1. Conducted Emission

■ **Limit**

A.C. Mains Conducted Interference Limit：

AS/NZS CISPR 32				
Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note: (1) The lower limit shall apply at the transition frequencies.

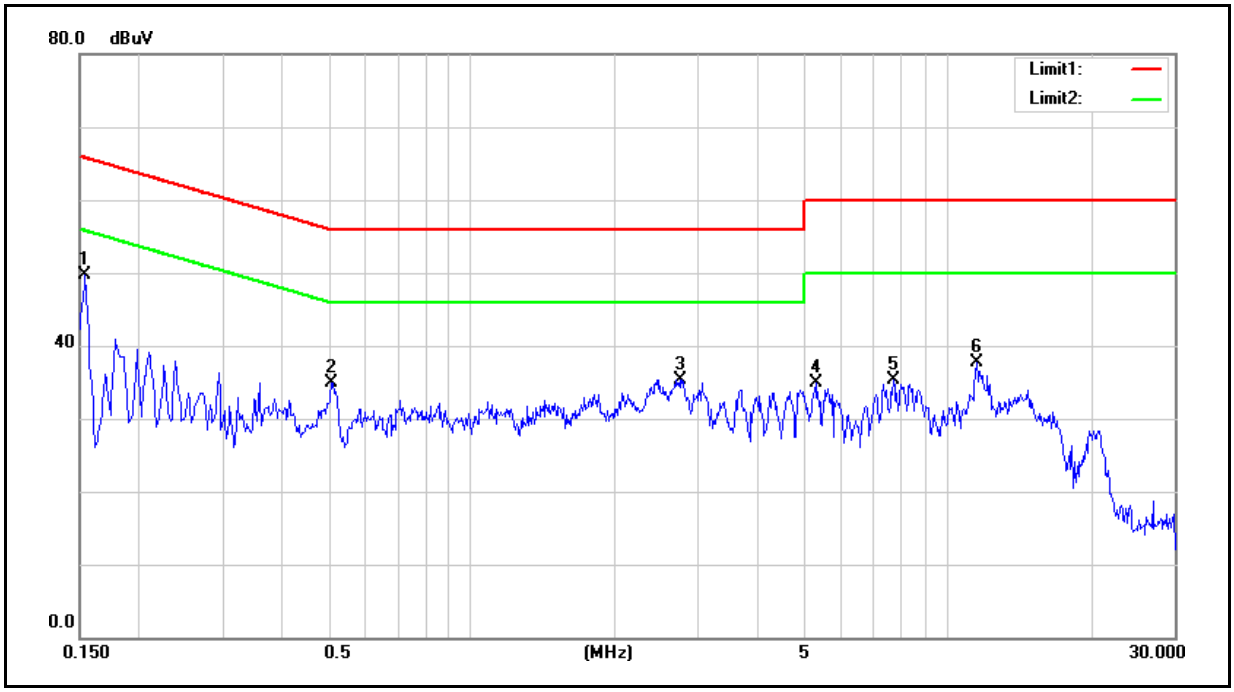
(2) The limit decreases in line with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Telecommunication Port Conducted Interference Limits:

AS/NZS CISPR 32								
Requirement (MHz)	Class A Equipment				Class B Equipment			
	Voltage Limit (dBμV)		Current Limit (dBμA)		Voltage Limit (dBμV)		Current Limit (dBμA)	
	QP	Avg.	QP	Avg.	QP	Avg.	QP	Avg.
0.15 to 0.50	97 to 87	84 to 74	53 to 43	40 to 30	84 to 74	74 to 64	40 to 30	30 to 20
0.50 to 30	87	74	43	30	74	64	30	20

■ Test Result

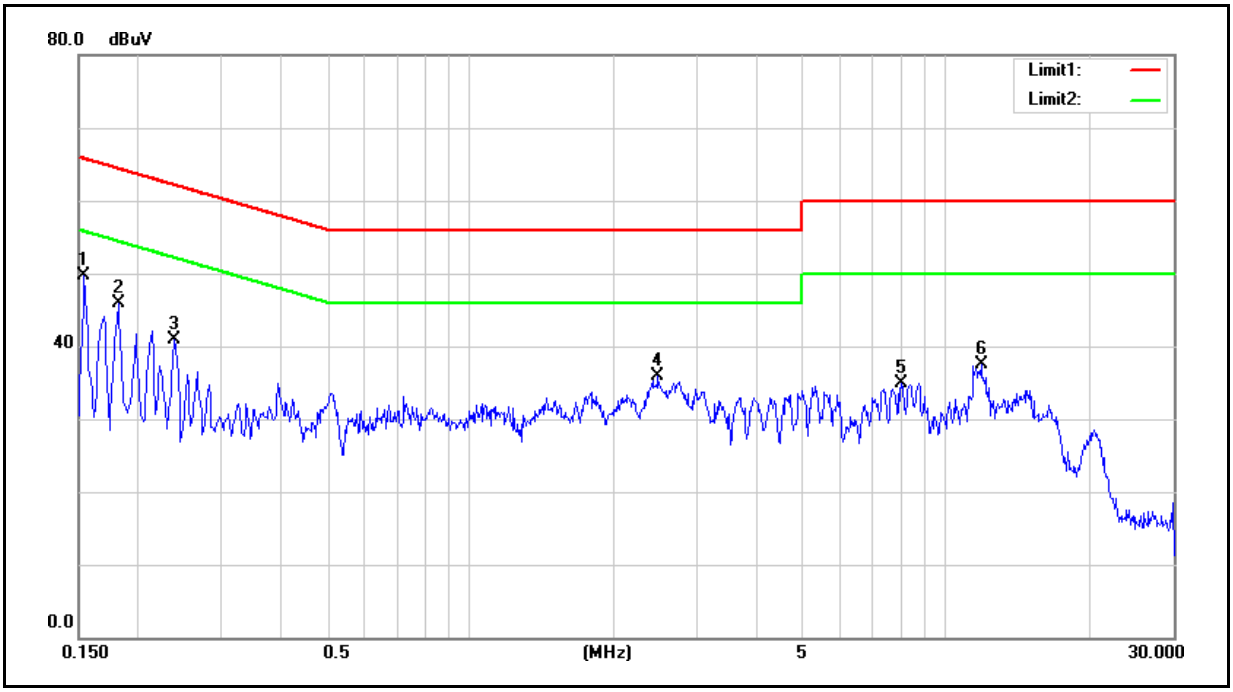
Test Standard:	AS/NZS CISPR32	Power Line:	L1
Test Mode:	Mode 1	Test Power:	AC 240 V / 50 Hz
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1540	32.31	16.89	9.54	41.85	26.43	65.78	55.78	-23.93	-29.35	Pass
2	0.5100	21.23	16.80	9.55	30.78	26.35	56.00	46.00	-25.22	-19.65	Pass
3	2.7500	22.27	17.62	9.66	31.93	27.28	56.00	46.00	-24.07	-18.72	Pass
4	5.2900	21.02	16.07	9.73	30.75	25.80	60.00	50.00	-29.25	-24.20	Pass
5	7.7060	21.03	16.43	9.79	30.82	26.22	60.00	50.00	-29.18	-23.78	Pass
6	11.5500	22.43	17.22	9.86	32.29	27.08	60.00	50.00	-27.71	-22.92	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Test Standard:	AS/NZS CISPR32	Power Line:	N
Test Mode:	Mode 1	Test Power:	AC 240 V / 50 Hz
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1540	32.27	16.65	9.63	41.90	26.28	65.78	55.78	-23.88	-29.50	Pass
2	0.1820	29.19	15.57	9.63	38.82	25.20	64.39	54.39	-25.57	-29.19	Pass
3	0.2380	23.47	14.69	9.63	33.10	24.32	62.17	52.17	-29.07	-27.85	Pass
4	2.4820	22.20	17.99	9.74	31.94	27.73	56.00	46.00	-24.06	-18.27	Pass
5	8.0580	21.01	16.19	9.91	30.92	26.10	60.00	50.00	-29.08	-23.90	Pass
6	11.8540	22.47	17.53	10.02	32.49	27.55	60.00	50.00	-27.51	-22.45	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

5.2. Radiated Emission

■ **Limit**

Frequency (MHz)	dBuV/m (Distance 10m)		dBuV/m (Distance 3m)	
	Class A	Class B	Class A	Class B
30 ~ 230	40	30	50	40
230 ~ 1000	47	37	57	47

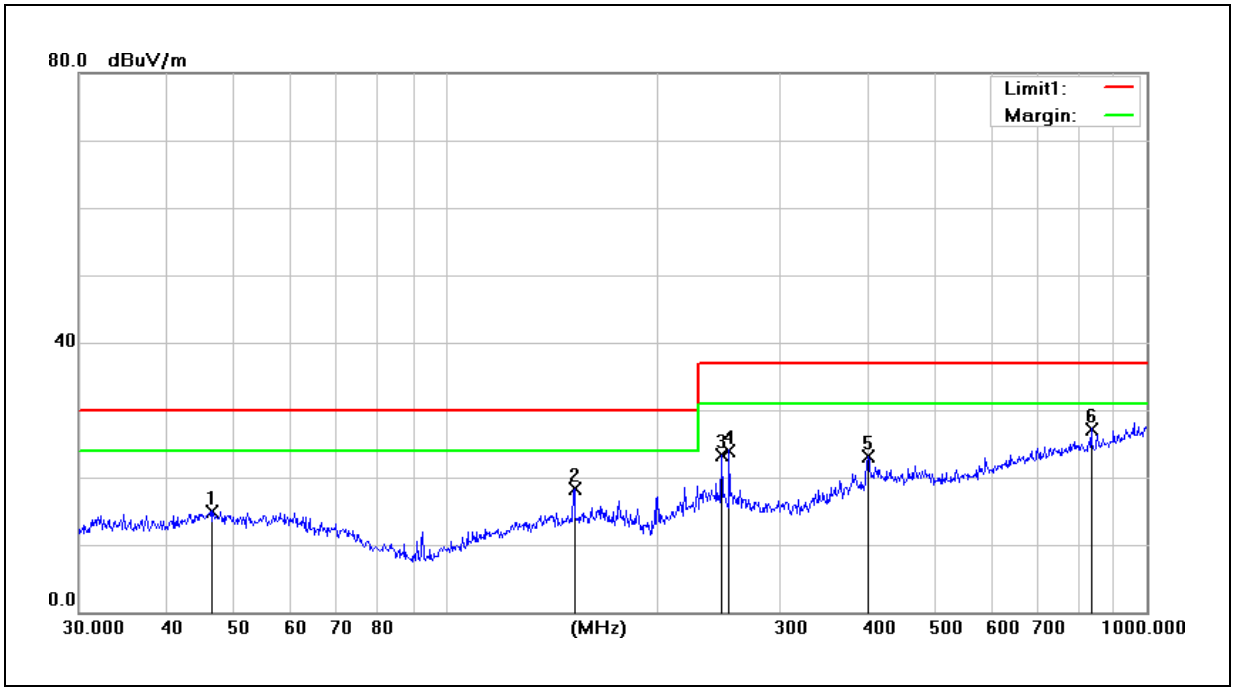
Note: The lower limit shall apply at the transition frequencies.

Frequency (MHz)	dBuV/m (Distance 3m)			
	Class A		Class B	
	Average	Peak	Average	Peak
1000 ~ 3000	56	76	50	70
3000 ~ 6000	60	80	54	74

Note: The lower limit shall apply at the transition frequencies.

■ Test Result

Test Standard:	AS/NZS CISPR32	Test Distance:	10 m
Test Mode:	Mode 1	Test Power:	AC 240 V / 50 Hz
Measurement Range:	30 MHz~1 GHz	Ant.Polar.:	Horizontal

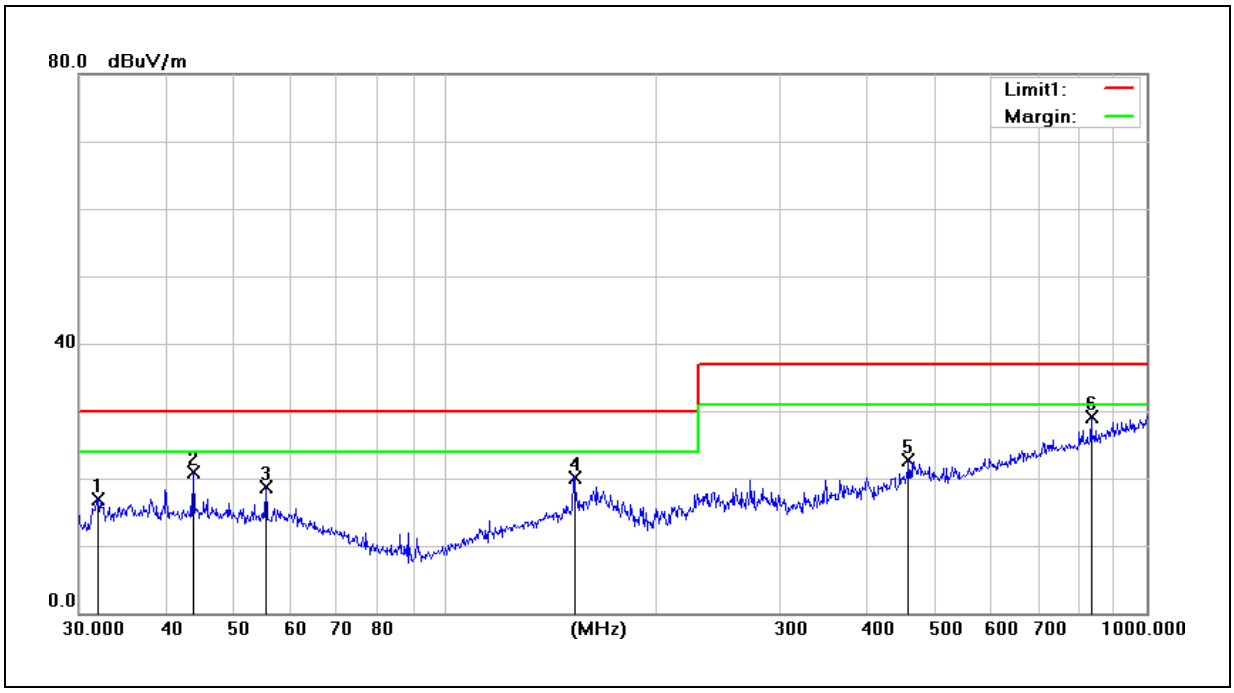


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	46.5030	31.57	-16.57	15.00	30.00	-15.00	300	1	QP
2	152.6641	34.12	-15.82	18.30	30.00	-11.70	400	60	QP
3	247.6820	40.13	-16.83	23.30	37.00	-13.70	400	64	QP
4	253.8367	40.65	-16.65	24.00	37.00	-13.00	400	159	QP
5	400.4320	35.72	-12.52	23.20	37.00	-13.80	200	95	QP
6	833.3171	32.45	-5.25	27.20	37.00	-9.80	400	87	QP

Note: 1. Result (dBuV/m) = Correction factor (dB/m) + Reading(dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

Test Standard:	AS/NZS CISPR32	Test Distance:	10 m
Test Mode:	Mode 1	Test Power:	AC 240 V / 50 Hz
Measurement Range:	30 MHz~1 GHz	Ant.Polar.:	Vertical

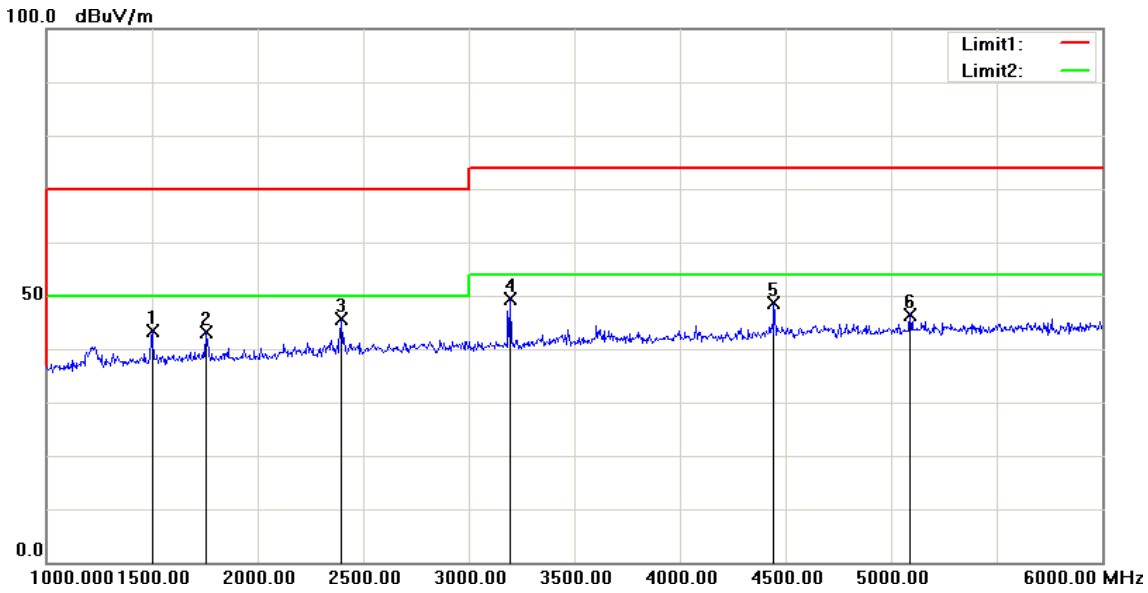


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	31.9546	34.28	-17.38	16.90	30.00	-13.10	100	0	QP
2	43.6584	36.86	-15.96	20.90	30.00	-9.10	300	2	QP
3	55.4147	34.51	-15.81	18.70	30.00	-11.30	301	0	QP
4	152.6641	34.81	-14.61	20.20	30.00	-9.80	100	109	QP
5	457.5073	31.49	-8.79	22.70	37.00	-14.30	400	115	QP
6	833.3171	31.40	-2.30	29.10	37.00	-7.90	240	360	QP

Note: 1. Result (dBuV/m) = Correction factor (dB/m) + Reading(dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

Test Standard:	AS/NZS CISPR32	Test Distance:	3 m
Test Mode:	Mode 1	Test Power:	AC 240 V / 50 Hz
Measurement Range:	1 GHz~6 GHz	Ant.Polar.:	Horizontal

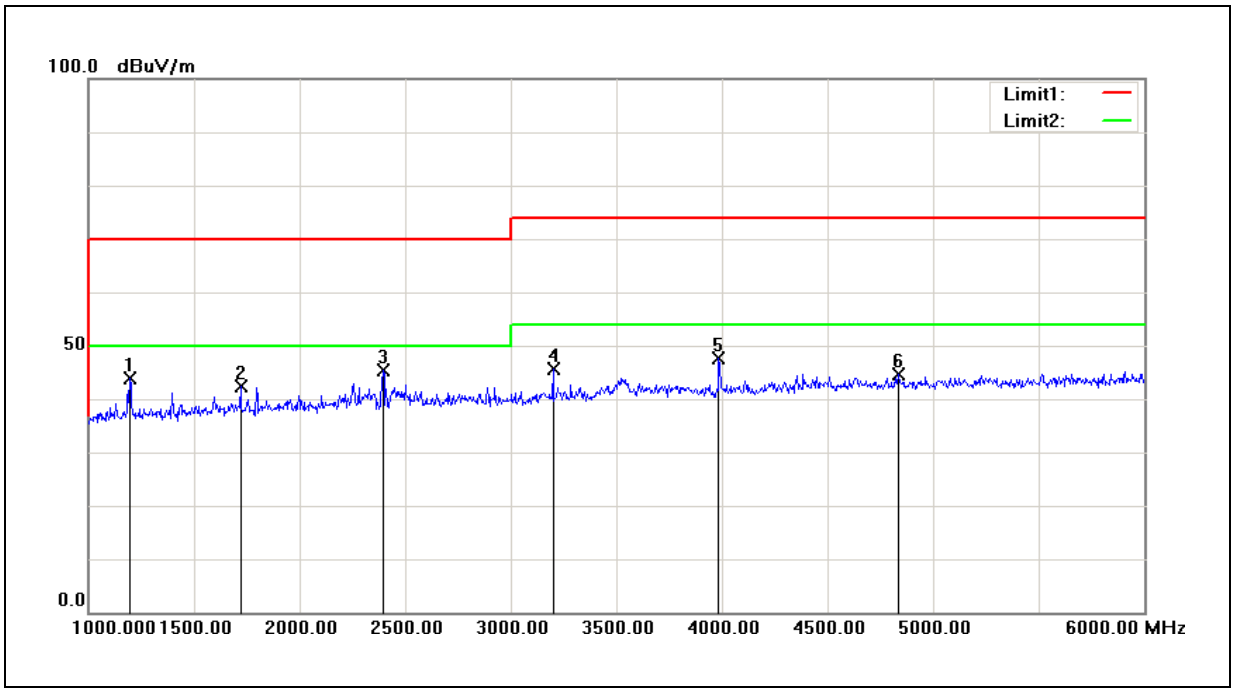


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	1500.000	60.41	-17.14	43.27	70.00	-26.73	200	266	peak
2	1755.000	59.48	-16.32	43.16	70.00	-26.84	100	71	peak
3	2395.000	59.52	-13.91	45.61	70.00	-24.39	100	305	peak
4	3195.000	60.85	-11.57	49.28	74.00	-24.72	100	253	peak
5	4445.000	56.79	-8.22	48.57	74.00	-25.43	120	342	peak
6	5090.000	52.98	-6.48	46.50	74.00	-27.50	100	186	peak

Note: 1. Result (dBuV/m) = Correction factor (dB/m) + Reading(dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

Test Standard:	AS/NZS CISPR32	Test Distance:	3 m
Test Mode:	Mode 1	Test Power:	AC 240 V / 50 Hz
Measurement Range:	1 GHz~6 GHz	Ant.Polar.:	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	1195.000	62.84	-18.96	43.88	70.00	-26.12	100	55	peak
2	1720.000	58.71	-16.44	42.27	70.00	-27.73	100	162	peak
3	2395.000	59.38	-13.91	45.47	70.00	-24.53	100	83	peak
4	3200.000	57.26	-11.54	45.72	74.00	-28.28	100	331	peak
5	3985.000	57.01	-9.41	47.60	74.00	-26.40	100	6	peak
6	4835.000	51.76	-7.06	44.70	74.00	-29.30	100	185	peak

Note: 1. Result (dBuV/m) = Correction factor (dB/m) + Reading(dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

--- END---