



EMC Test Report

Product Name: Wireless LAN Access Point

Product Model: AP5010DN-AGN
AP5010SN-GN
AP7110DN-AGN
AP7110SN-GN

Report Number: SYBH (E) 00742056EB

Reliability Laboratory of Huawei Technologies Co., Ltd.

Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District,
Shenzhen, 518129, P.R.C
Tel: +86 755 28780808 Fax: +86 755 89652518



Notice

1. The laboratory has passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.
2. The laboratory has been listed by the US Federal Communications Commission to perform electromagnetic emission measurements. The site recognition number is 97456.
3. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-1 and 6369A-3.
4. The laboratory has been listed by the VCCI to perform EMC measurements. The accreditation numbers of test site No.1 are R-3892, G-415, C-4361, and T-1348, and the accreditation numbers of test site No.2 are R-3760, G-485, C-4210 and T-1237.
5. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
6. The test report is invalid if there is any evidence of erasure and/or falsification.
7. The test report is only valid for the test samples.
8. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.



Applicant: Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Product Name: Wireless LAN Access Point
Product Model: AP5010DN-AGN
AP5010SN-GN
AP7110DN-AGN
AP7110SN-GN
Date of Receipt Sample: 2012-10-09
Start Date of Test: 2012-10-10
End Date of Test: 2012-10-19

Test Result: Pass

Approved by Senior Engineer: 2012-10-25 Zhang Xinghai
Date Name Signature

Zhang Xing Hai

Prepared by: 2012-10-24 Wang Sumin
Date Name Signature

Wang Sumin



Content

1	General Information	5
1.1	Applied Standard	5
1.2	Test Location	5
1.3	Test Environment Condition	5
2	Summary of Test Results	6
3	Equipment Specification	7
3.1	General Description	7
3.2	Specification.....	7
3.3	Board and Sub-Assembly	10
4	System Configuration during EMC Test	11
4.1	Ports and Cables	11
4.2	Auxiliary Equipment	11
4.3	Test Configurations.....	11
4.4	Test Condition and Connection	13
5	Details of Test Items	14
5.1	Radiated Emission 30 MHz to 6 GHz	14
5.2	Conducted Disturbance 0.15 MHz to 30 MHz.....	16
6	Main Test Instruments	17
7	System Measurement Uncertainty	18
8	Graph and Data of Emission Test	19
8.1	Radiated Disturbance	19
8.2	Conducted Disturbance	25
9	Photographs of Test Set-up.....	27
9.1	Radiated Emission.....	27
9.2	Conducted Emission.....	29
	Appendix: Abbreviation	30



1 General Information

1.1 Applied Standard

Applied Product Standard: FCC CFR47 Part 15 Subpart B:2011
ICES-003:2012

Test Method: ANSI C63.4:2003

1.2 Test Location

Test Location 1: Reliability Laboratory of Huawei Technologies Co., Ltd.
Address: No.2222,Xin Jinqiao Road, Pudong New Area, Shanghai,
201206, P.R.C

1.3 Test Environment Condition

Ambient Temperature: 20-25°C
Relative Humidity: 45-55%
Atmospheric Pressure: 101kPa



2 Summary of Test Results

Table 1 Summary of test results

EUT Classification: Class B Digital Device				
Test Items	Test Configuration	Limit	Test Result	Location
<u>Radiated Emissions</u> Enclosure Port	TC1~TC4	Class B	Pass	Location1
<u>Conducted Emissions</u> AC Power Port	TC1,TC3	Class B	Pass	Location1
Note: 1, Measurement taken is within the uncertainty of measurement system. 2, TC = Test configuration				



3 Equipment Specification

3.1 General Description

The AP5010DN-AGN is a standard indoor dual-band 2x2 MIMO access point (AP) that supports 2.4 GHz and 5 GHz frequency bands. It complies with IEEE 802.11a/b/g/n, supports 2.4 GHz and 5 GHz frequency bands, and has enhanced coverage performance and protection capabilities. It supports wireless bridging, complies with IEEE 802.11a/b/g/n, connects a large number of users, and works as a Fit AP.

The AP5010SN-GN is a standard indoor single-band 2x2 MIMO access point (AP) that supports 2.4 GHz frequency band. It complies with IEEE 802.11b/g/n, and works as a Fit AP.

The AP7110DN-AGN is an enhanced indoor dual-band 3x3 MIMO access point (AP) that supports 2.4 GHz and 5 GHz frequency bands. It complies with IEEE 802.11a/b/g/n, supports 2.4 GHz and 5 GHz frequency bands, and has enhanced coverage performance and protection capabilities. It supports wireless bridging, complies with IEEE 802.11a/b/g/n, connects a large number of users, and works as a Fit AP.

The AP7110SN-GN is a standard indoor single-band 3x3 MIMO access point (AP) that supports 2.4 GHz. It complies with IEEE 802.11b/g/n, and works as a Fit AP.

3.2 Specification

Table 1 Main equipment specification

Rated Input Voltage	~ 90-270 V/50-60 Hz == -48V (Powered over Ethernet)
Rated Power (W)	AP5010DN-AGN: 13W AP5010SN-GN: 13W AP7110DN-AGN: 25W AP7110SN-GN: 25W
Dimensions(W x D x H)	AP5010DN-AGN:180 mm (W) x 180 mm (D) x 40 mm (H) AP5010SN-GN:180 mm (W) x 180 mm (D) x 40 mm (H) AP7110DN-AGN:200 mm (W) x 200 mm (D) x 40 mm (H) AP7110SN-GN:200 mm (W) x 200 mm (D) x 40 mm (H)
Weight (kg)	AP5010DN-AGN: 0.4 kg AP5010SN-GN: 0.4 kg AP7110DN-AGN: 1 kg AP7110SN-GN: 1 kg
Transmit frequency	AP5010DN-AGN: 2.4GHz~2.4835GHz(2.4G); 5.150GHz~5.350GHz&5.725~5.850GHz(5G) AP5010SN-GN: 2.4GHz~2.4835GHz(2.4G) AP7110DN-AGN: 2.4GHz~2.4835GHz(2.4G); 5.150GHz~5.350GHz&5.725~5.850GHz(5G) AP7110SN-GN: 2.4GHz~2.4835GHz(2.4G)
Receive frequency	AP5010DN-AGN: 2.4GHz~2.4835GHz(2.4G); 5.150GHz~5.350GHz&5.725~5.850GHz(5G) AP5010SN-GN: 2.4GHz~2.4835GHz(2.4G) AP7110DN-AGN:

	2.4GHz~2.4835GHz(2.4G); 5.150GHz~5.350GHz&5.725~5.850GHz(5G) AP7110SN-GN: 2.4GHz~2.4835GHz(2.4G)
Maximum output power	AP5010DN-AGN: 17dBm AP5010SN-GN: 17dBm AP7110DN-AGN: 20dBm AP7110SN-GN: 20dBm
Frequency of the Internal Source (MHz)	25 MHz, 40 MHz

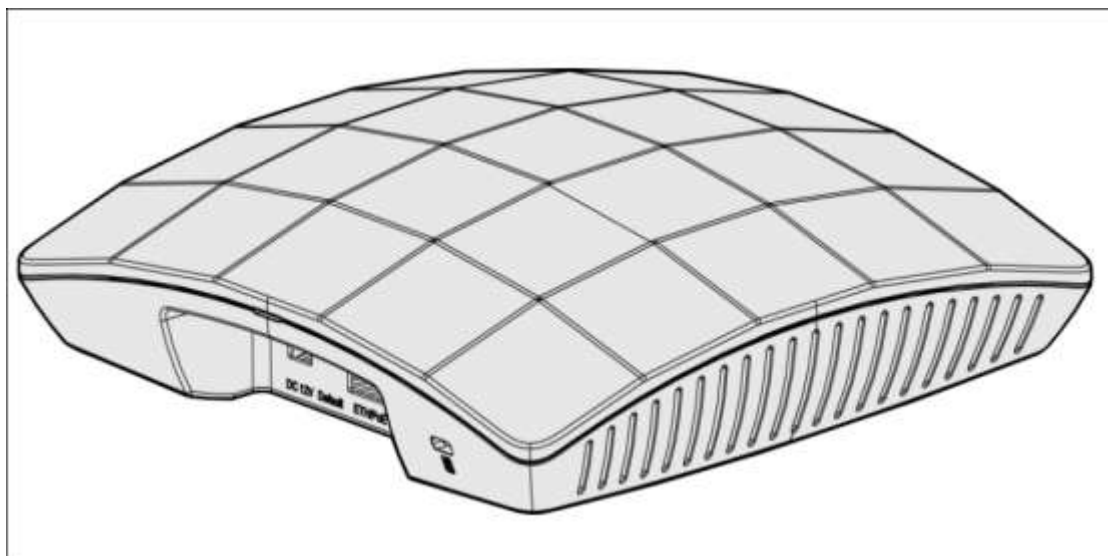


Figure 1. EUT appearance (AP5010DN-AGN & AP5010SN-GN)



Figure 2. EUT appearance (AP7110DN-AGN)



Figure 3.EUT appearance (AP7110SN-GN)



3.3 Board and Sub-Assembly

Table 2 Board list

Board		
Board Name	Hardware Version	Description
H85D2TD1D200	VER.B	Manufactured Board,H85D2TD1D200,2.4GHz and 5.8GHz 50mW WLAN AP General ,2T2R RF Control Board for AP5010DN-AGN
H85D2TD1L200	VER.B	Manufactured Board,AP5010SN-GN,H85D2TD1L200,2.4GHz 50mW WLAN AP 2T2R RF Control Board2*1 for AP5010SN-GN
H87D2TT1D200	VER.C	Manufactured Board,H87D2TT1D200,2.4GHz and 5.8GHz 100mW WLAN AP General ,3T3R RF Control Board for AP7110DN-AGN
H87D2TT1L200	VER.C	Manufactured Board,H87D2TT1D200,2.4GHz 100mW WLAN AP General ,3T3R RF Control Board for AP7110SN-GN

Table 3 Subassembly list

Subassembly			
Subassembly Name	Model	Manufacturer	Description
Adapter	HW-120200C1W	FuHua	Input voltage: ~ 90-270 V/50-60 Hz Output voltage: --- +12 V, 2 A Rate power: 24 W
Adapter	HKA024120 20-1K	Huntkey	Input voltage: ~ 90-270 V/50-60 Hz Output voltage: --- +12 V, 2 A Rate power: 24 W



4 System Configuration during EMC Test

The Equipment under Test (EUT) functions correctly during all tests. The EUT was installed within the test site and was configured to simulate a typical configuration.

4.1 Ports and Cables

Table 4 Port and cables

Port	Quantity	Length (m)	Connector	Type of Cable
Power port	1	2	NA	Shielded
Console	1	10	NA	Shielded
GE /POE	1	10	RJ45	USTP-5
RF port (AP7110DN-AGN)	6	0.1	N connector	Shielded
RF port (AP7110SN-GN)	3	0.1	N connector	Shielded
Earth (AP7110DN-AGN)	1	2	/	Unshielded
Earth (AP7110SN-GN)	1	2	/	Unshielded

4.2 Auxiliary Equipment

Table 5 Auxiliary equipment

Name	Model	Manufacturer	S/N	Calibration Date	Cal Interval (month)	Remark
Access Controller	AC6605	Huawei	00199320	N/A	N/A	N/A
Personal computer	ThinkPad X61	Lenovo	3108065264 3108060574 3108040583	N/A	N/A	N/A

4.3 Test Configurations

For the four models, the “SN-GN” type and “DN-AGN” type have the same hardware; the difference is “DN-AGN” types have 2.4G WiFi and 5.8G WiFi function, and the “SN-GN” types have 2.4G WiFi function only, so only two models AP5010DN-AGN and AP7110DN-AGN are adapted during test.

The EUT was connected to auxiliary equipment in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

There were four test configurations. TC1~ TC4 were shown in the following tables and figures:

Table 6 Test configuration

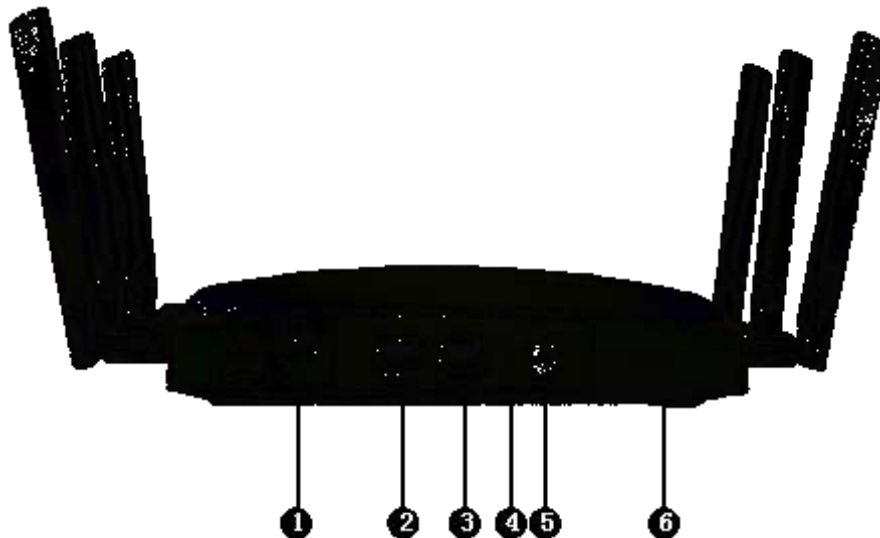
Configuration	Configuration Description
TC1	AP5010DN-AGN, powered by Adapter
TC2	AP5010DN-AGN, powered over Ethernet
TC3	AP7110DN-AGN, powered by Adapter
TC4	AP7110DN-AGN, powered over Ethernet



Note:

1. Console port.
2. ETH/PoE: 10/100/1000M port, which connects to the Ethernet. The port can connect to a PoE switch or a PoE power source to receive power.
3. Default: restores factory settings.
4. Power input port: 12 V DC.
5. Lock port: protects the AP5010DN-AGN/AP5010SN-GN against theft.

Figure 4. Test configuration1&2 (TC1&TC2)



Note:

1. Ground port: connects to a ground cable to ground an AP.
2. Console port.
3. ETH/PoE: 10/100/1000M port, which connects to the Ethernet. The port can connect to a PoE switch or a PoE power source to provide power for APs.
4. Default: restores factory settings.
5. Power input port: 12 V DC.
6. Lock port: protects the AP7110DN-AGN against theft.

Figure 5. Test configuration3&4 (TC3&TC4)

4.4 Test Condition and Connection

4.4.1 Test Condition and Connection for TC1&TC3

In this connection, the AP functions as a Fit AP that provides Only data forwarding function. The Access Controller (AC) is responsible for user access, authentication, AP management, and configurations of security protocols, routing, and Qos. The sta is used as WLAN terminal user and Powered by +12VDC adapter.

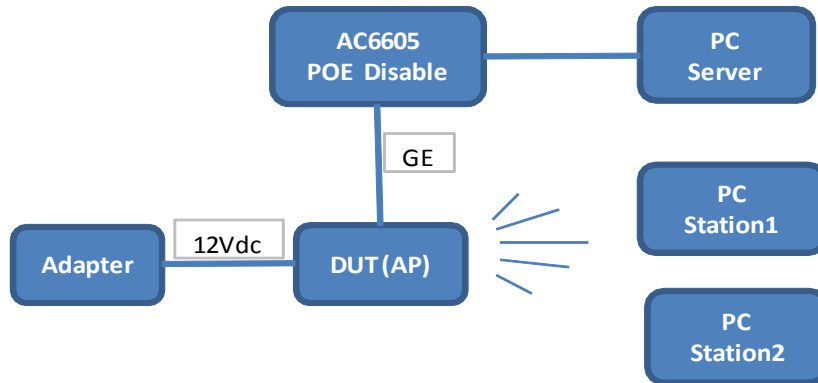


Figure 1. Test connection (TC1&TC3)

4.4.2 Test Condition and Connection for TC2&TC4

In this connection, the AP functions as a Fit AP that provides only data forwarding function. The Access Controller (AC) is responsible for user access, authentication, AP management, and configurations of security protocols, routing, and Qos. The sta is used as WLAN terminal user and Powered over Ethernet.

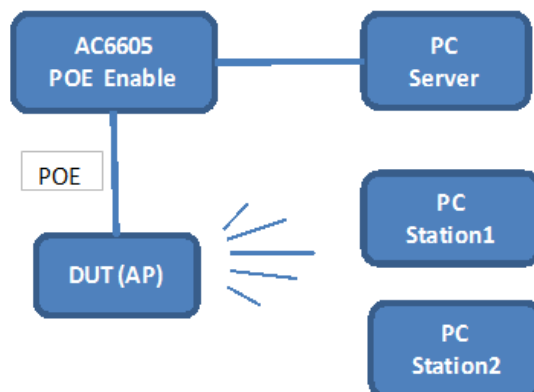


Figure 2. Test connection (TC2&TC4)

5 Details of Test Items

5.1 Radiated Emission 30 MHz to 6 GHz

5.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance was 3m. The set-up and test methods were according to ANSI C63.4.

A preliminary scan and a final scan of the emissions were made from 30 MHz to 6 GHz by using test script of software; the emissions were measured using Quasi-Peak Detector for 30 MHz to 1 GHz, Average and PK detector for above 1 GHz. The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1 m to 4 m, the azimuth range of turntable was 0° to 360°, The receive antenna has two polarizations V and H.

The test set-up is shown in diagram as below:

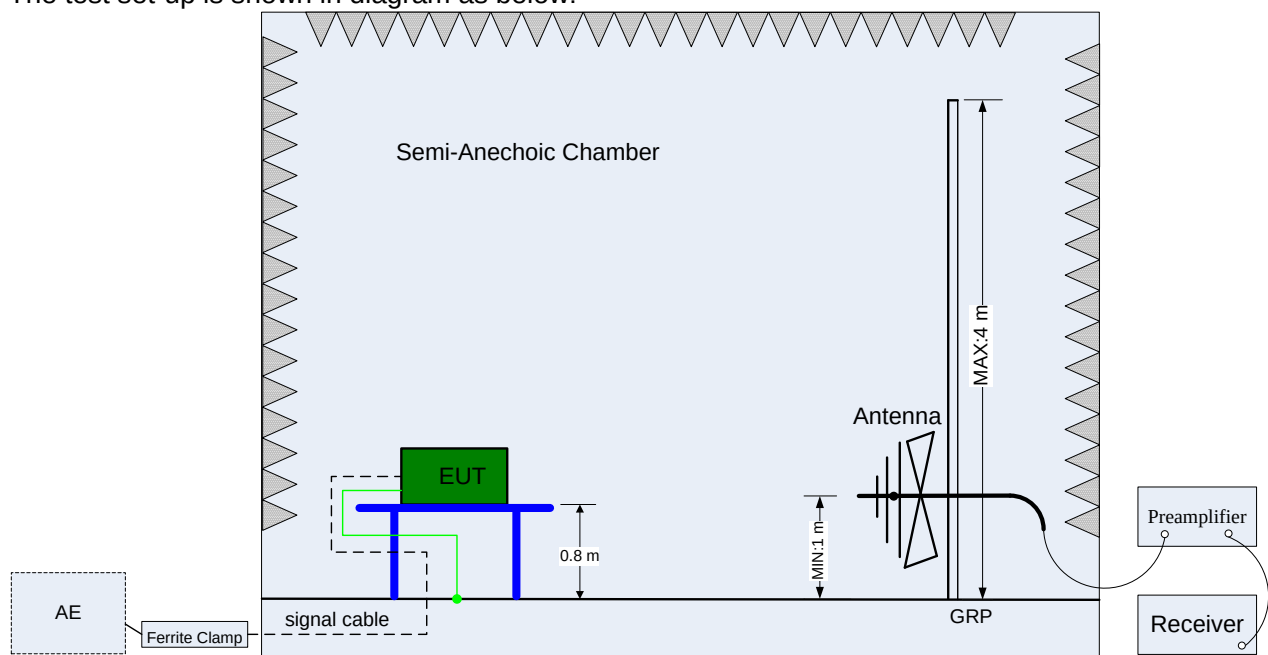


Figure 3. Test set-up of radiated disturbance (30 MHz-1 GHz)

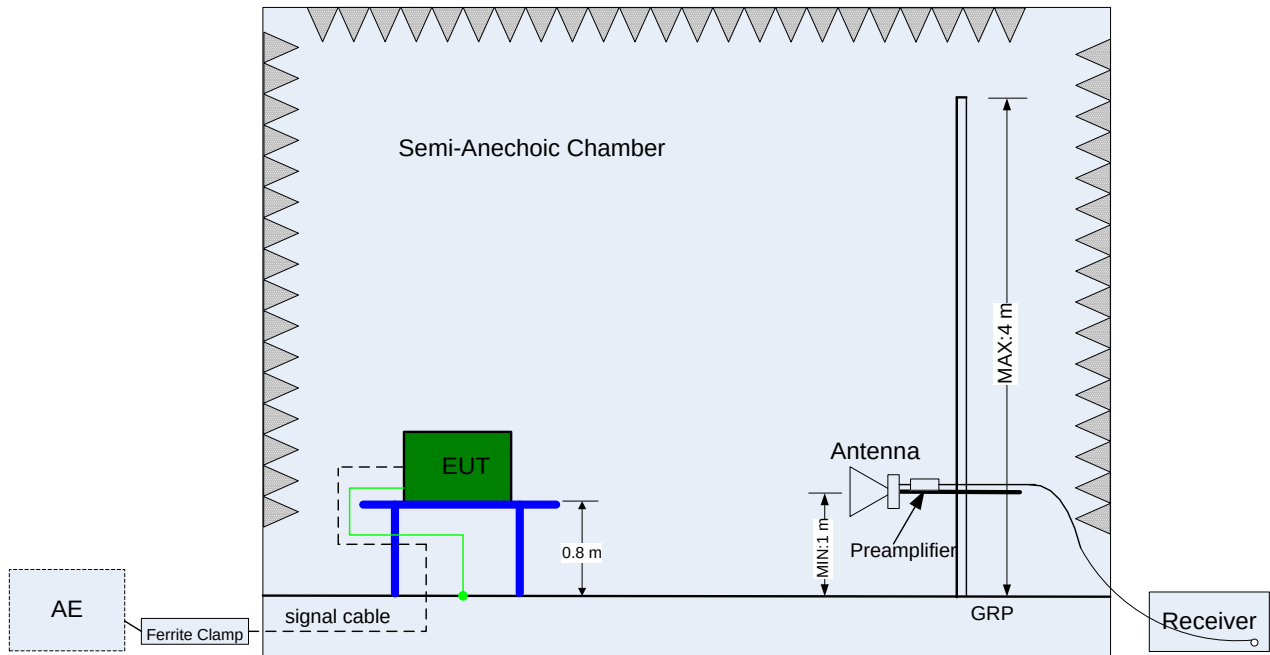


Figure 4. Test set-up of radiated disturbance (above 1 GHz)

5.1.2 Test Results

The EUT has met the requirements for radiated emission of enclosure port.
For the test data, see section 8.1.

Table 7 Test limits for 30MHz to 1GHz at a measuring distance of 3m

Frequency range	30 MHz to 1 GHz	
Measuring distance	3 m	
Classification	CLASS B	
Limits(Class B)	30 MHz to 88 MHz	40.0 dB μ V/m
	88 MHz to 216 MHz	43.5 dB μ V/m
	216 MHz to 960 MHz	46.0 dB μ V/m
	960 MHz to 6 GHz	53.9 dB μ V/m

Table 8 Test limits for above 1GHz at a measuring distance of 3m

Frequency range	1 GHz to 6 GHz	
Measuring distance	3 m	
Classification	CLASS B	
Limits(Class B)	AV Detector	PK Detector
	53.9 dB μ V/m	73.9 dB μ V/m

Note: The highest frequency of the internal sources of the EUT is 40 MHz, the measurement was made up to 6 GHz.

5.2 Conducted Disturbance 0.15 MHz to 30 MHz

5.2.1 Test Procedure

The EUT was configured as described in section 4. The mains cable of the EUT must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

The test set-up is shown in diagram as below:

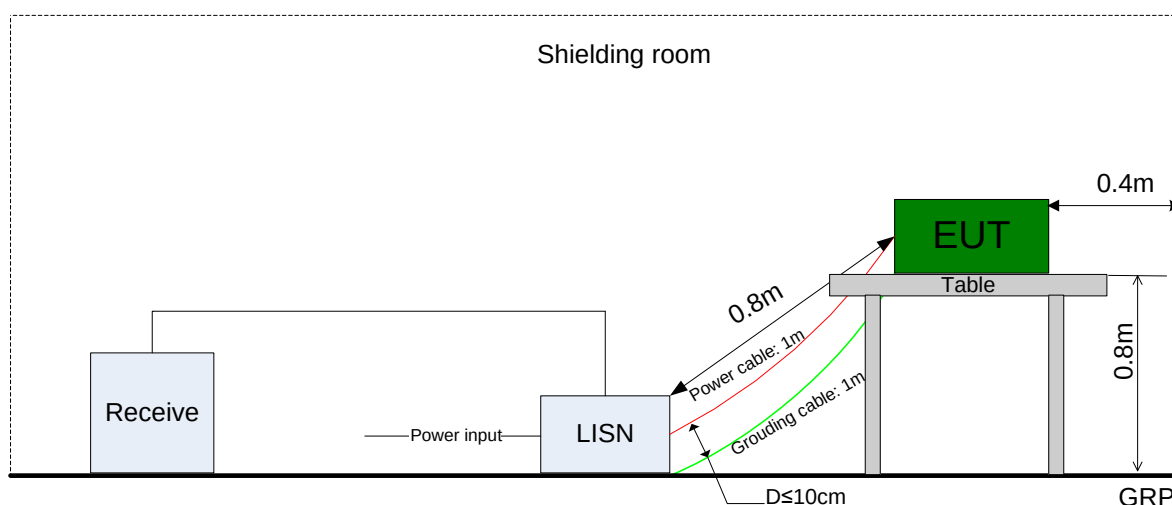


Figure 5. Test set-up of conducted disturbance for power port

5.2.2 Test Results

The EUT has met the requirements of FCC Part15 for Conducted Disturbance of AC Power Port
For the test data, see section 8.2.

Table 9 Limits of AC power port

Frequency range	150 kHz to 30 MHz	
Classification	CLASS B	
Limit(Class B)	Voltage limits (dBμV)	
	QP	AV
0.15 to 0.5 MHz	66 to 56	56 to 46
0.5 to 5 MHz	56	46
5 to 30 MHz	60	50



6 Main Test Instruments

Table 10 Main test instrument

Test item	Test Instrument	Model	Manufacturer	Calibration Date	Calibration Interval (month)
Radiated Emission	EMI Test receiver	ESU40	R&S	2011-12-20	12
	Bilog antenna	VULB 9163	SCHWARZBECK	2012-02-11	12
	Horn antenna	9120D	SCHWARZBECK	2012-02-11	12
	Chamber _NSA	3m chamber	Albatross	2011-12-02	24
	Chamber _SVSWR	3m chamber	Albatross	2011-12-02	24
Conducted Emission	EMI Test receiver	ESCI 3	R&S	2012-02-27	12
	Artificial Mains Network	ENV4200	R&S	2011-12-20	12
Software Information					
Test Item		Software Name	Manufacturer	Version	
Radiated Emission		EMC32	R&S	V8.5.1	
Conducted Emission		EMC32	R&S	V8.3	



7 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Table 11 System measurement uncertainty

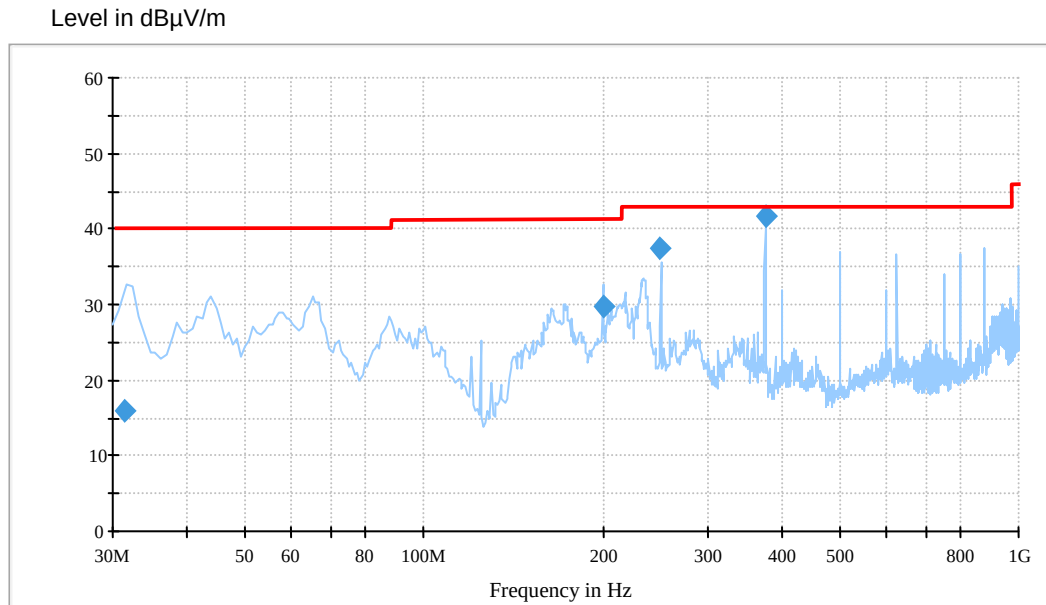
Items		Extended Uncertainty
Radiated emission (G2 3m chamber)	Field strength (dB μ V/m)	U=4.15 dB; k=2 (30 MHz-1 GHz)
		U=3.64 dB; k=2 (1 GHz-6 GHz)
Conducted Emission	Disturbance Voltage (dB μ V)	U=3.3 dB; k=2

8 Graph and Data of Emission Test

8.1 Radiated Disturbance

8.1.1 Radiated Disturbance of TC1

(30 MHz-1 GHz)



Measurement Result: QP Detector

Frequency (MHz)	Level (dB μ V/m)	Transd (dB)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
31.536480	16.0	-29.2	40.0	24.0	100.0	146.0	HORIZONTAL
199.984500	29.8	-28.6	43.5	13.7	100.0	325.0	VERTICAL
249.980000	37.5	-26.2	46.0	8.5	117.0	106.0	HORIZONTAL
374.987000	41.6	-22.6	46.0	4.4	100.0	32.0	HORIZONTAL

Note:

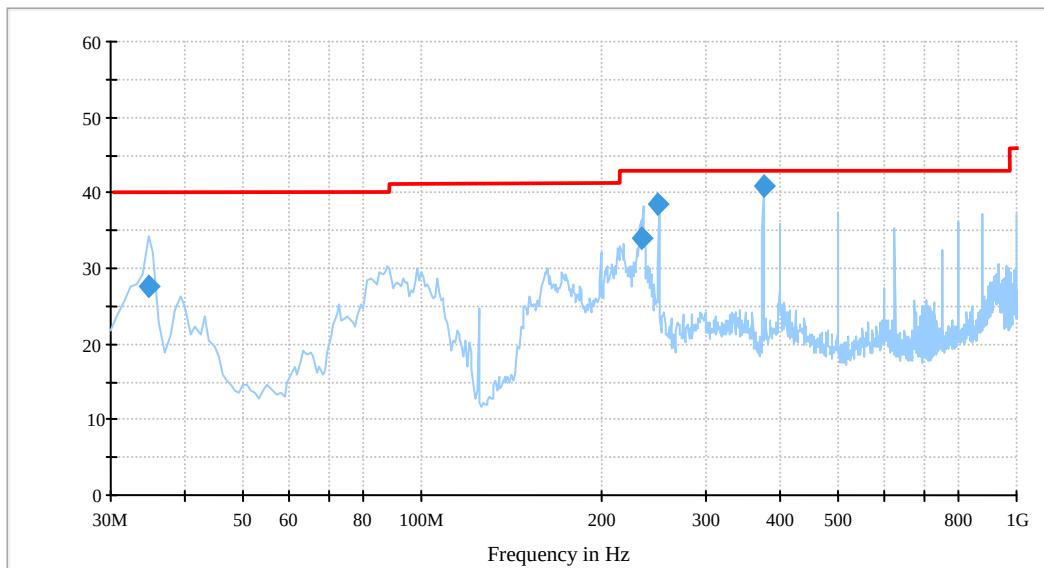
Level = Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is used to calculate by software which is not shown in the sheet.

8.1.1 Radiated Emission of TC2

(30 MHz-1 GHz)

Level in dB μ V/m

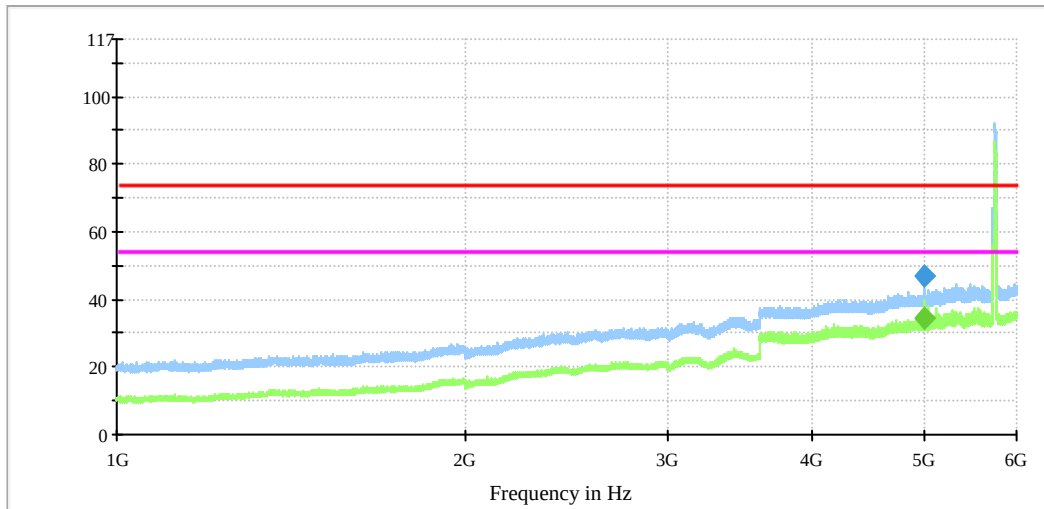


Measurement Result: QP Detector

Frequency (MHz)	Level (dB μ V/m)	Transd (dB)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
34.849440	27.7	-29.2	40.0	12.3	100.0	29.0	HORIZONTAL
235.083500	33.9	-26.8	46.0	12.1	129.0	152.0	HORIZONTAL
249.980000	38.5	-26.2	46.0	7.5	100.0	105.0	HORIZONTAL
374.987000	40.9	-22.6	46.0	5.1	100.0	98.0	HORIZONTAL

(above 1 GHz)

Level in dB μ V/m



MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
4999.965667	34.6	2.5	53.9	19.3	106.0	212.00	VERTICAL

MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
4999.965667	46.8	2.5	73.9	27.1	145.0	211.00	VERTICAL

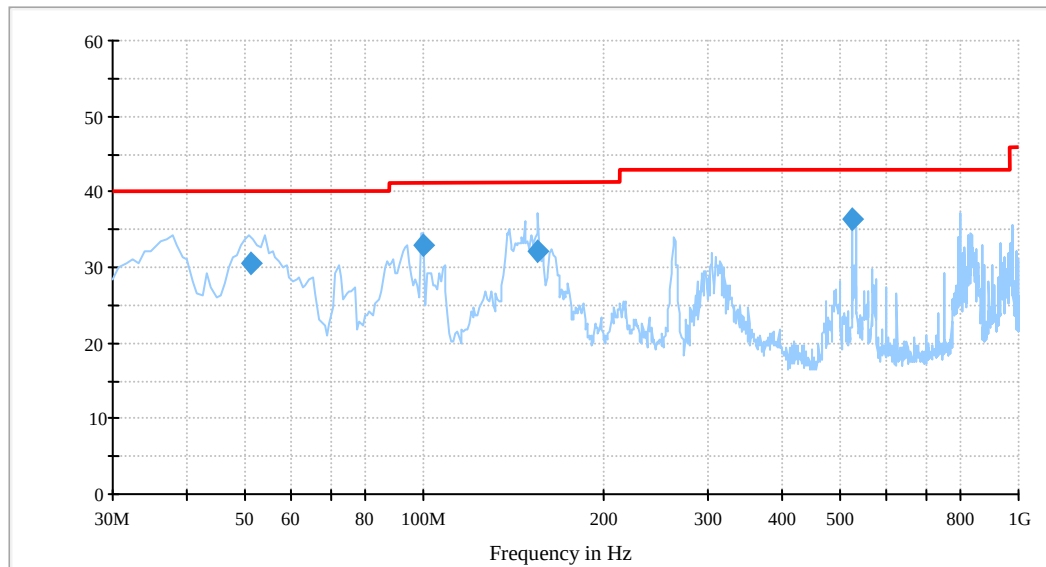
Note:

- 1.Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. All the test configurations TC1-TC2 were tested, and the worst test result is supplied.

8.1.2 Radiated Emission of TC3

(30 MHz-1 GHz)

Level in dB μ V/m



Measurement Result: QP Detector

Frequency (MHz)	Level (dB μ V/m)	Transd (dB)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
51.042500	30.6	-28.1	40.0	9.4	100.0	164.0	HORIZONTAL
99.561500	33.0	-27.8	43.5	10.5	100.0	235.0	VERTICAL
155.655000	32.0	-31.4	43.5	11.5	100.0	221.0	HORIZONTAL
524.997000	36.5	-18.9	46.0	9.5	191.0	237.0	HORIZONTAL

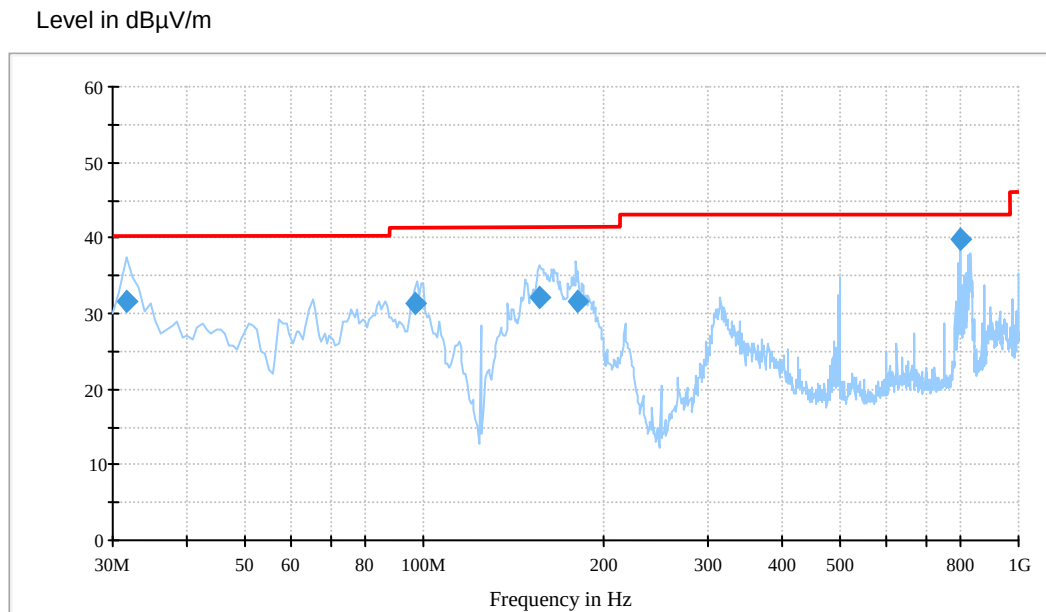
Note:

Level = Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is used to calculate by software which is not shown in the sheet.

8.1.1 Radiated Emission of TC4

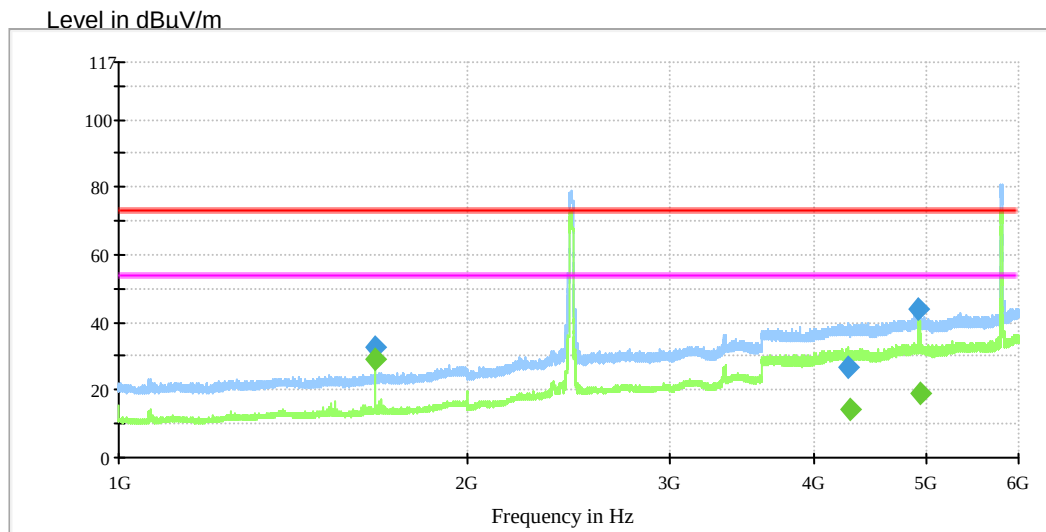
(30 MHz-1 GHz)



Measurement Result: QP Detector

Frequency (MHz)	Level (dB μ V/m)	Transd (dB)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
31.709760	31.5	-29.2	40.0	8.5	100.0	276.0	VERTICAL
97.084440	31.3	-27.9	43.5	12.2	227.0	199.0	HORIZONTAL
157.085500	32.2	-31.3	43.5	11.3	100.0	127.0	VERTICAL
181.141500	31.6	-29.7	43.5	11.9	100.0	62.0	VERTICAL
799.985000	39.9	-13.6	46.0	6.1	100.0	296.0	HORIZONTAL

(above 1 GHz)



MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
1666.733167	28.9	-10.8	53.9	25.0	100.0	79.0	HORIZONTAL
4291.488167	14.0	0.0	53.9	39.9	135.0	177.0	VERTICAL
4928.980000	19.1	2.3	53.9	34.8	131.0	142.0	VERTICAL

MEASUREMENT RESULT: PK Detector

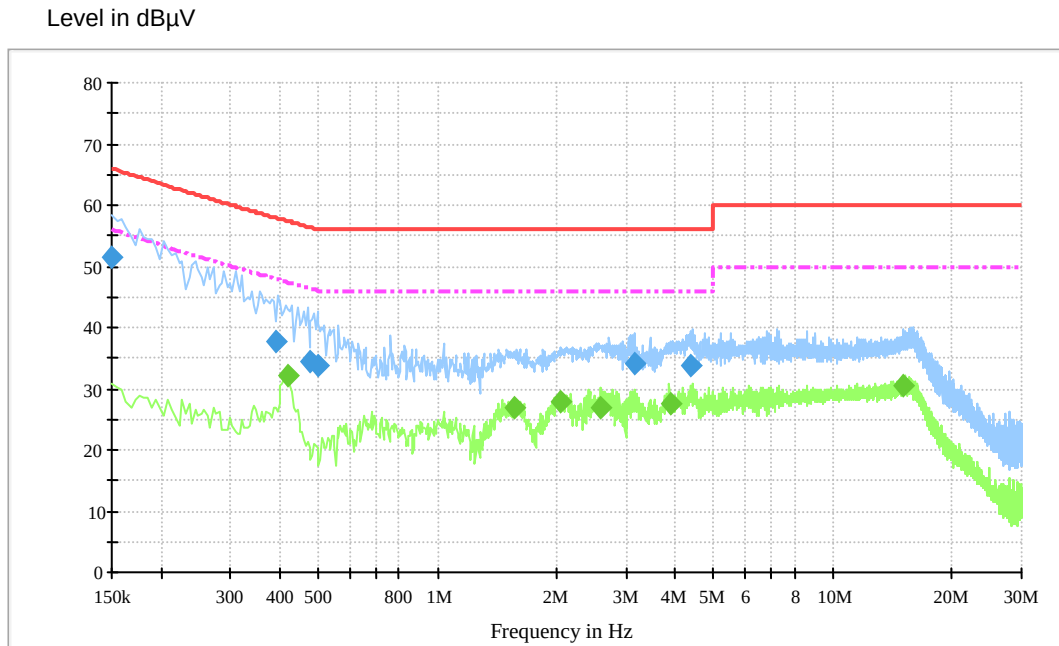
Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
1666.733167	32.4	-10.8	73.9	41.5	100.0	76.0	HORIZONTAL
4268.688167	26.9	0.0	73.9	47.0	200.0	200.0	VERTICAL
4924.180000	43.7	2.3	73.9	30.2	114.0	154.0	VERTICAL

Note:

1. Level = Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.
2. All the test configurations TC3-TC4 were tested, and the worst test result is supplied.

8.2 Conducted Disturbance

8.2.1 AC Power Port Test Data of AP5010DN-AGN and AP5010SN-GN



Measurement Result: QP Detector

Frequency (MHz)	Level (dB μ V)	Transd (dB)	Limit (dB μ V)	Margin (dB)	Line	PE
0.150000	51.4	10.6	66.0	14.6	L2	GND
0.388500	37.7	10.4	58.0	20.3	L2	GND
0.474000	34.5	10.4	56.4	21.9	L2	GND
0.496499	33.8	10.4	56.1	22.3	L2	GND
3.149288	34.1	10.4	56.0	21.9	L1	GND
4.384965	33.7	10.4	56.0	22.3	L2	GND

Measurement Result: AV Detector

Frequency (MHz)	Level (dB μ V)	Transd (dB)	Limit (dB μ V)	Margin (dB)	Line	PE
0.420000	32.1	10.4	47.3	15.2	L2	GND
1.559662	26.8	10.4	46.0	19.2	L2	GND
2.038778	27.8	10.4	46.0	18.2	L1	GND
2.585055	26.8	10.4	46.0	19.2	L2	GND
3.883665	27.6	10.4	46.0	18.4	L1	GND
15.153555	30.3	10.3	50.0	19.7	L1	GND

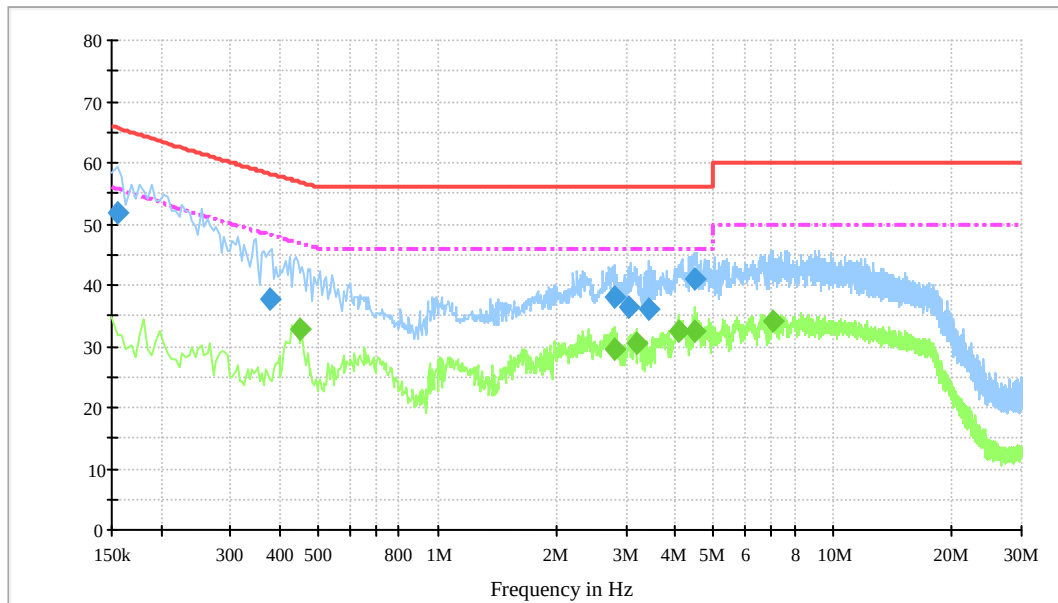
Note:

1. Level= Reading level+ Transd (cable loss + correction factor)

The reading level is used to calculate by software which is not shown in the sheet.

8.2.2 AC Power Port Test Data of AP7110DN-AGN and AP7110SN-GN

Level in dBμV



Measurement Result: QP Detector

Frequency (MHz)	Level (dBμV)	Transd (dB)	Limit (dBμV)	Margin (dB)	Line	PE
0.154500	52.0	10.6	65.7	13.7	L1	GND
0.374999	37.8	10.4	58.2	20.4	L2	GND
2.808975	38.0	10.4	56.0	18.0	L2	GND
3.059625	36.4	10.4	56.0	19.6	L1	GND
3.422370	36.1	10.4	56.0	19.9	L2	GND
4.492425	41.0	10.4	56.0	15.0	L2	GND

Measurement Result: AV Detector

Frequency (MHz)	Level (dBμV)	Transd (dB)	Limit (dBμV)	Margin (dB)	Line	PE
0.447000	32.9	13.9	46.8	13.9	L1	GND
2.800020	29.6	16.4	46.0	16.4	L1	GND
3.198540	30.5	15.5	46.0	15.5	L2	GND
4.076040	32.4	13.6	46.0	13.6	L2	GND
4.456605	32.5	13.5	46.0	13.5	L1	GND
7.053870	34.2	15.8	50.0	15.8	L2	GND

Note:

Level= Reading level+ Transd (cable loss + correction factor)

The reading level is used to calculate by software which is not shown in the sheet.