



EMC Test Report

Product Name: Enterprise Gateway

Product Model: eSpace EGW1530A
eSpace EGW1530B

Report Number: SYBH (E) 00882633EB

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



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Applicant: Huawei Technologies Co., Ltd.

Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

Product Name: Enterprise Gateway

Product Model: eSpace EGW1530A
eSpace EGW1530B

Date of Receipt Sample: 2013-02-25

Start Date of Test: 2013-02-27

End Date of Test: 2013-03-01

Test Result: Pass

Approved by Senior

2013-03-12

Zhang Xinghai

Zhang Xing Hai

Engineer:

Date

Name

Signature

Prepared by:

2013-03-08

Wang Jia

Wang Jia

Date

Name

Signature

**Modification Record**

No.	Last Report No.	Modification Description
1	N/A	First Report



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1 General Information

1.1 Applied Standard

Applied Product Standard: FCC CFR47 Part 15 Subpart B:2012
ICES-003 Issue 5:2012

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 Test summary

EUT Classification: Class B Digital Device				
Test Items	Test Configuration	Limit	Test Result	Location
<u>Radiated Emissions</u> Enclosure Port	TC1,TC2	Class B	Pass	Location1
<u>Conducted Emissions</u> AC Power Port	TC1,TC2	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**

Huawei eSpace EGW1500 series gateway, which includes EGW1500E, EGW1520, EGW1530A, and EGW1530B, is a new-generation enterprise gateway that provides a complete access solution and implements data, voice, broadband connection, wireless access, and security-related functions. It is an optimal choice for Small Office Home Office (SOHO) users and small-sized enterprises to establish an integrated office network.

The eSpace EGW1530 provides various uplink ports for different networking scenarios. It also provides diversified user ports to establish flexible office networks.

3.2 **Specification**

Table 2 Main equipment specification

Rated Input Voltage	Adapter input: ~100-240V (50/60HZ) Equipment input:  12V
Rated Power (W)	Max 24 W
Dimensions (W x D x H)	323 mm(W) x 206 mm(D) x 53.5 mm(H)
Weight (kg)	≤1.5kg (device weight, without the power adapter and other accessories)
Transmit Frequency (MHz)	2.4 GHz~2.4835 GHz for 802.11n Band
Receive Frequency (MHz)	2.4 GHz~2.4835 GHz for 802.11n Band
Maximum Output Power (dBm)	16±1.5 dBm
Frequency of the Internal Source (MHz)	7.68MHz; 20MHz; 25MHz; 33M Hz; 100MHz; 333MHz; 1000MHz;



Figure 1.EUT Appearance



Figure 2.Adapter Appearance HW-120200U6W (Huntkey)



Figure 3.Adapter Appearance HW-120200U6W (XinQiao)



3.3 Board and SubAssembly

Table 3 Board list

Board	
Board Name	Description
EG13MAUA0	Multi-Service Access Unit ATU Daughter Board
EG13MAUB0	Multi-Service Access Unit BRI Daughter Board

Table 4 Subassembly list

Subassembly			
Subassembly Name	Model	Manufacturer	Description
AC/DC Adapter	HW-120200U6W	Huntkey	Adapter, -10degC-45degC, 100V-240V, 12V/2A, AC UL/FCC,
AC/DC Adapter	HW-120200U6W	XinQiao	Adapter, -10degC-45degC, 100V-240V, 12V/2A, AC UL/FCC,



4 System Configuration during EMC Test

The Equipment under Test (EUT) was functioning 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 5 Ports and cables

Port	Quantity	Length (m)	Connector	Type of Cable
AC Power port	1	2	/	Unshielded
POE Power	1	2	/	Unshielded
GE(WAN)	1	10	RJ45	UTP-5
FE(LAN)	4	10	RJ45	UTP-5
FXS	2	10	RJ11	2-core telephone Unshielded Cable
ADSL	1	10	RJ11	2-core telephone Unshielded Cable
USB	2	/	/	Shielded
FXO (ATU Daughter Board)	8	10	RJ11	2-core telephone Unshielded Cable
FXO (Mother Board)	2	10	RJ11	2-core telephone Unshielded Cable
BRI	4	/	RJ45	Unshielded

4.2 Auxiliary Equipment

Table 6 Auxiliary equipment

Name	Model	Manufacturer	S/N	Calibration Date	Cal Interval (month)
Data network analyzer	Smartbits	SPIRENT	3607041927	2012-05-20	12
DSLAM	MA5616	Huawei	21023520356TA7 000160	N/A	N/A
IP Phone	eSpace 7820	Huawei	-	N/A	N/A
Telephone	HCD868	TCL	010Y0B206C091 2400150	N/A	N/A
Enterprise Gatewei	eSpace 1500E	Huawei	021FNU10B8000 02	N/A	N/A
PC	HP 2540p	HP	A101038556	N/A	N/A



4.3 Test Configurations

The equipment under test (EUT) was connected to ancillary devices in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment). There were two test configurations. TC1 and TC2, as shown in the following table and figures:

Table 7 Test configuration

Configuration No.	Configuration Description
TC1	EGW1503A+AC/DC Adapter(Huntkey)
TC2	EGW1503B+AC/DC Adapter(XinQiao)

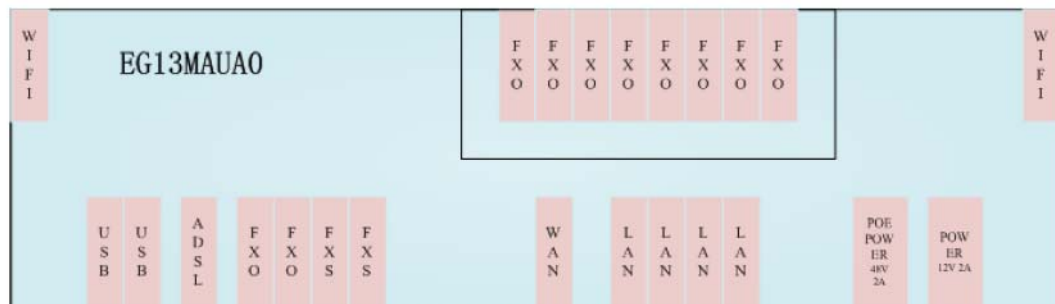


Figure 4.: Test configuration1 (TC1)

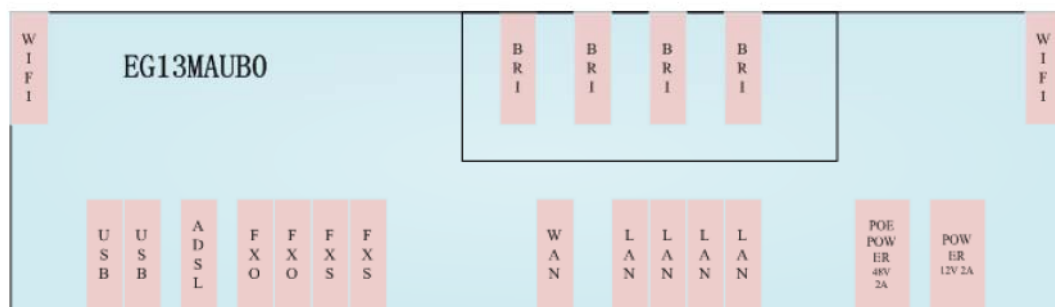


Figure 5.: Test configuration2 (TC2)



4.4 Test Conditions and Connections

The EGW1530 provides various uplink ports for different networking scenarios, including WAN, ADSL, BRI, USB, and FXO ports. The EGW1530 also provides diversified user ports such as Wi-Fi, POE LAN, FXS port to set up flexible office networks.

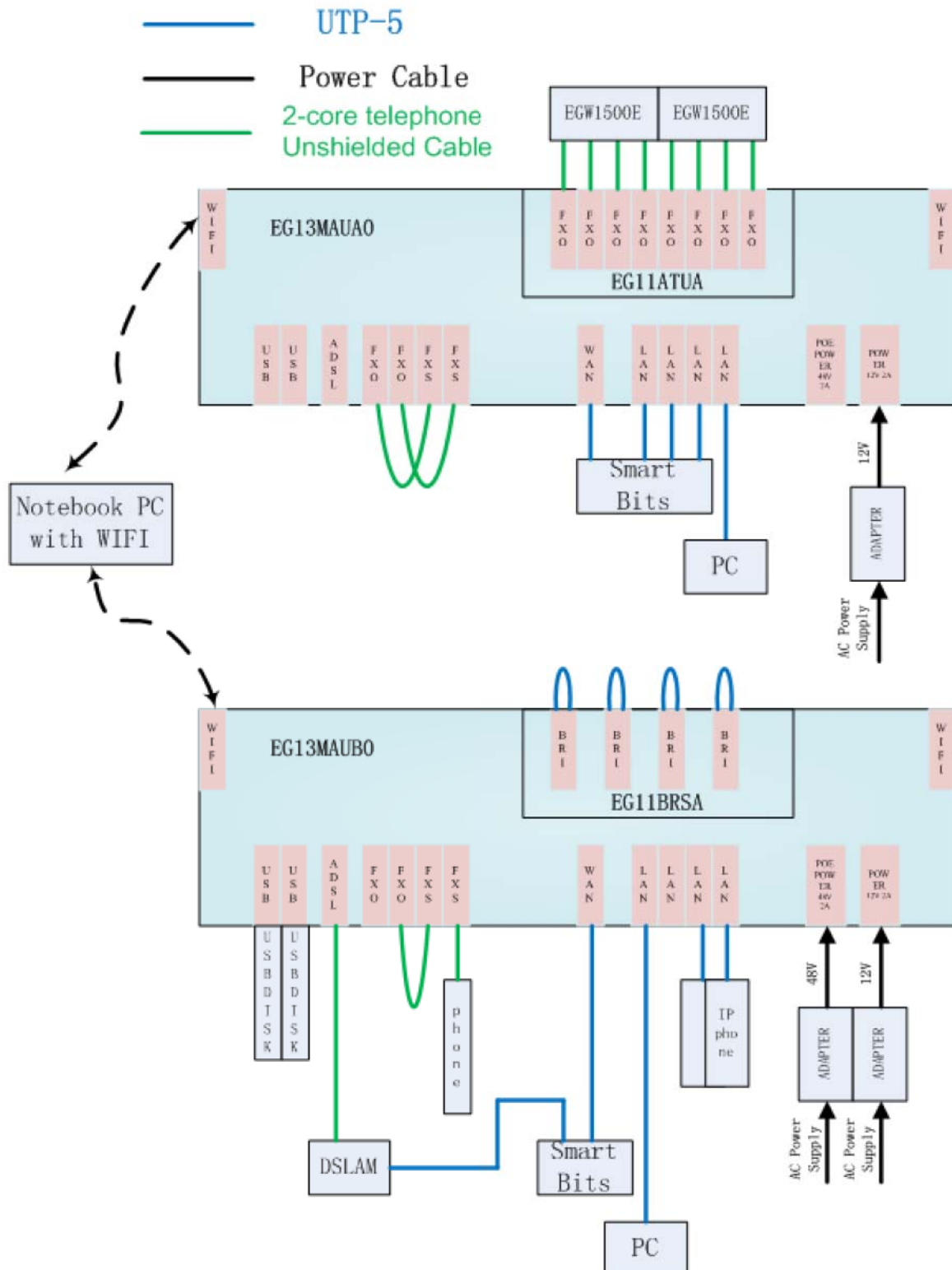


Figure 6. Test connection of TC1 and TC2

5 Details of Test Items

5.1 Radiated Emission 30 MHz to 18 GHz

5.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standard 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 18 GHz by using test script of software; the emissions were measured using Quasi-Peak Detector for 30 MHz to 1 GHz, Average and Peak 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:

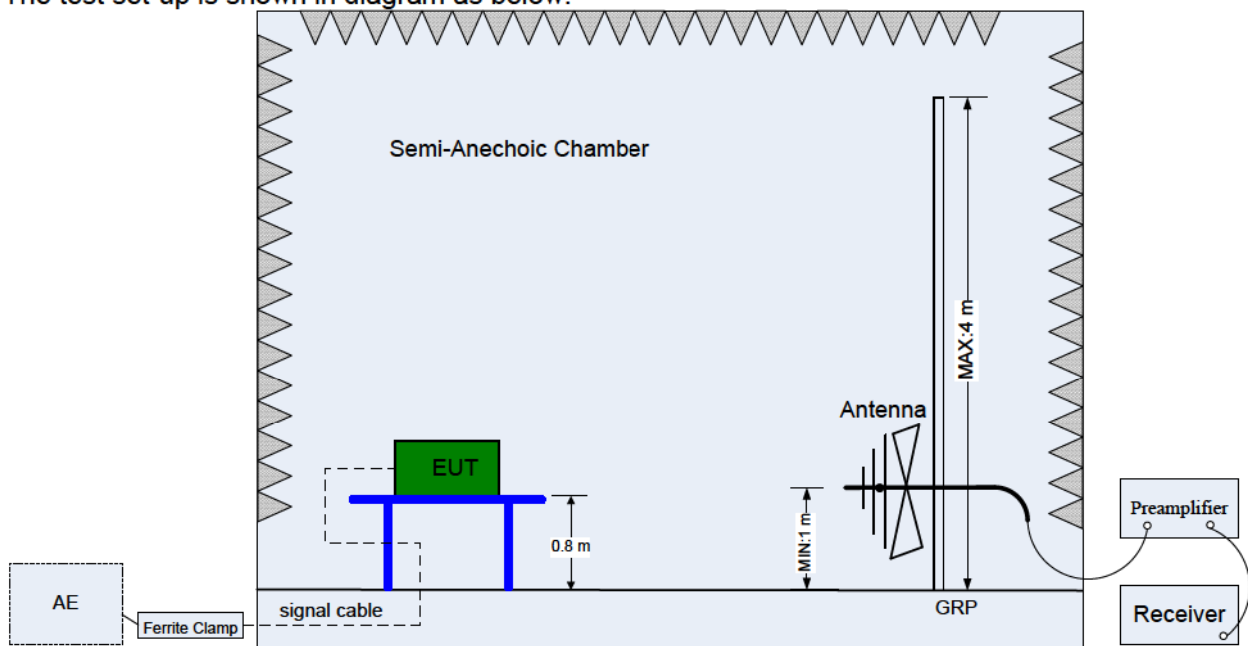


Figure 7. Test set-up of radiated disturbance (30 MHz-1 GHz)

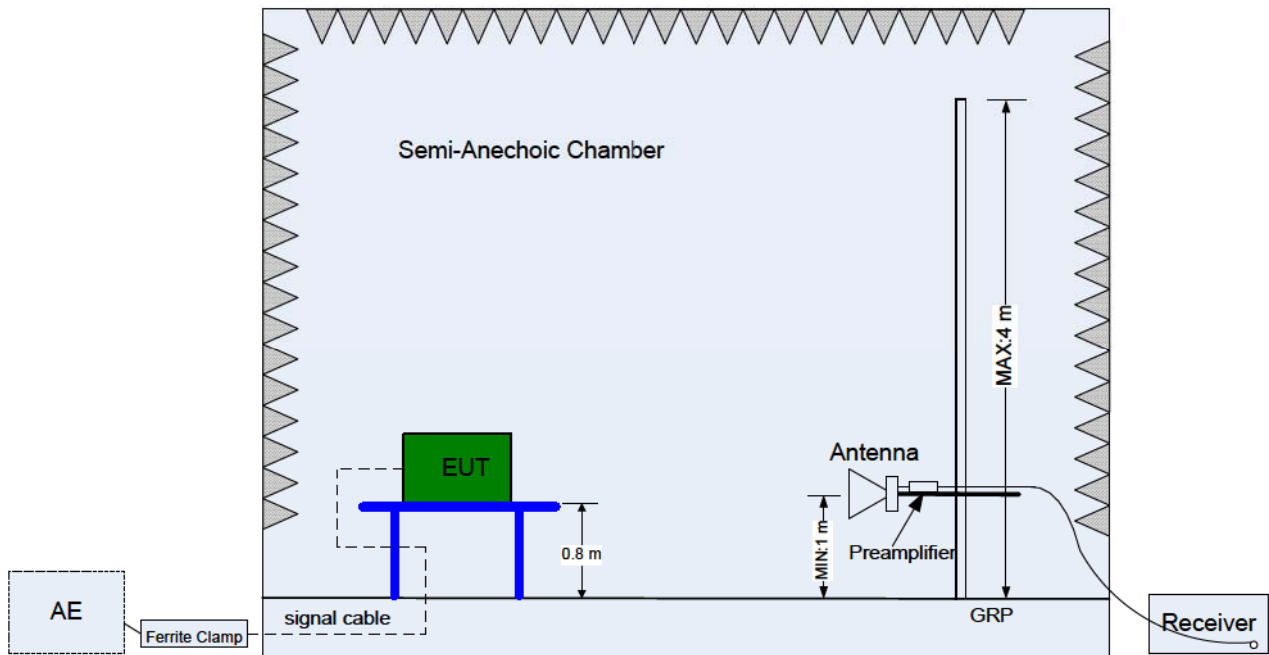


Figure 8. Test set-up of radiated disturbance (above 1 GHz)

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 8 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 26.5 GHz	53.9 dB μ V/m

Table 9 Test limits for above 1GHz at a measuring distance of 3m

Frequency range	1 GHz to 18 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 1000 MHz, the measurement was made up to 18 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:

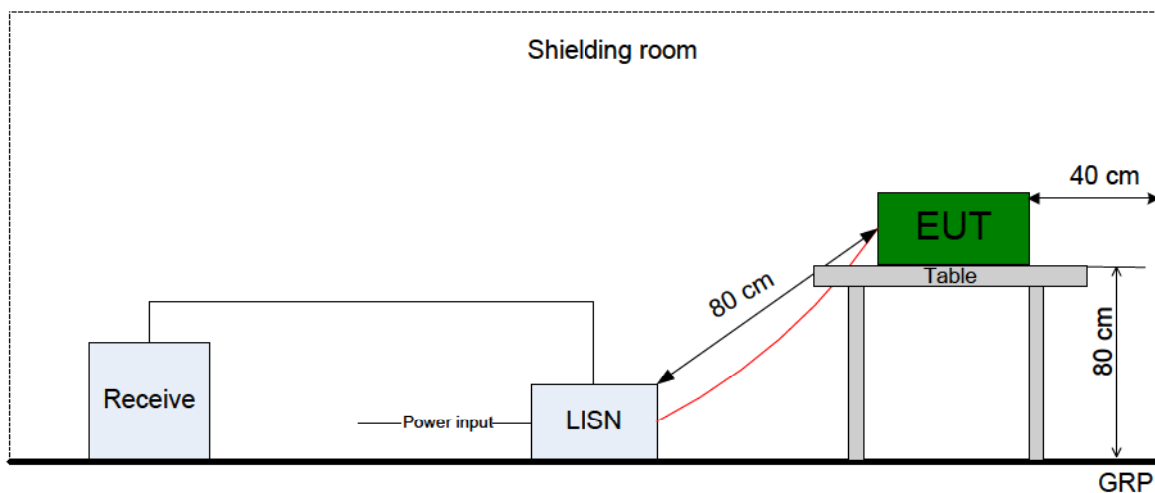


Figure 9. Test set-up of conducted disturbance for AC power port

5.2.2 Test Results

The EUT has met the requirements of FCC Part15 and ICES 003 for Conducted Disturbance of AC Power Port.

For the test data, see section 8.2.

Table 10 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 11 Main test instrument

Test Item	Test Instrument	Model	Manufacturer	Calibration Date	Calibration Interval (Month)
Radiated Emission	EMI Test Receiver	ESU40	R&S	2013-01-12	12
	Bilog antenna	VULB 9163	SCHWARZBECK	2013-02-02	12
	Horn antenna	9120D	SCHWARZBECK	2013-02-11	12
	Chamber_NSA	3m chamber	Albatross	2011-12-02	24
Conducted Emission	EMI test receiver	ESCI 3	R&S	2013-01-21	12
	Artificial Mains Network	ENV4200	R&S	2012-11-12	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 12 System measurement uncertainty

Items		Extended Uncertainty
Radiated emission	Field strength (dB μ V/m)	U=4.3 dB; k=2 (30MHz to 1GHz)
		U=3.1 dB; k=2(1Ghz to 18GHz)
Conducted emission	Disturbance voltage (dB μ V)	U=2.71dB; k=2

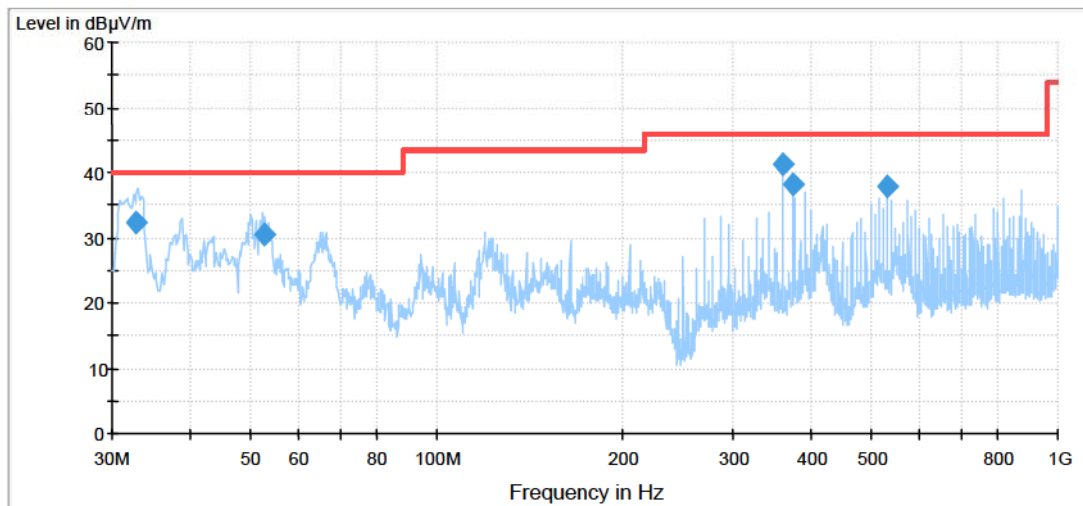


8 Graph and Data of Emission Test

8.1 Radiated Disturbance

8.1.1 Radiated Disturbance of TC1

Graph of Test result (30 MHz-1 GHz)



Measurement Result: QP Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
32.832960	32.4	-29.2	40.0	7.6	100.0	40.0	V
52.639000	30.5	-28.2	40.0	9.5	100.0	89.0	V
360.438000	41.2	-22.8	46.0	4.8	100.0	54.0	H
375.022500	38.2	-22.6	46.0	7.8	100.0	10.0	H
532.475500	37.8	-18.7	46.0	8.2	165.0	5.0	H

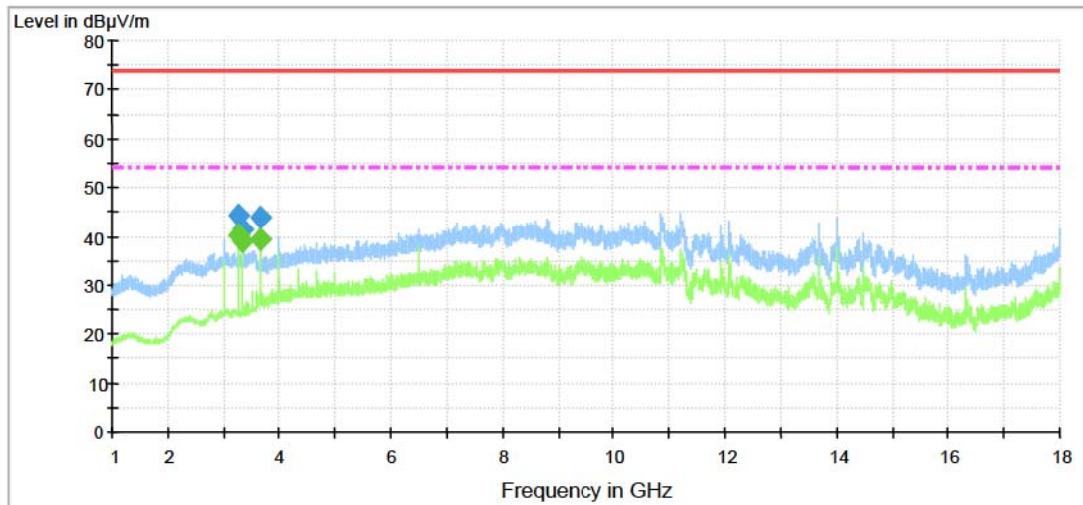
Notes:

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.



Graph of Test result (above 1 GHz)



Measurement Result: PK Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3249.418167	44.2	-4.5	73.9	29.7	100.0	68.0	V
3333.265833	41.4	-4.6	73.9	32.5	108.0	316.0	V
3666.799833	44.1	-3.4	73.9	29.8	180.0	155.0	V

Measurement Result: AV Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3249.254500	40.2	-4.5	53.9	13.7	174.0	20.0	V
3333.501667	39.1	-4.6	53.9	14.8	153.0	315.0	V
3666.799833	39.3	-3.4	53.9	14.6	100.0	115.0	V

Notes:

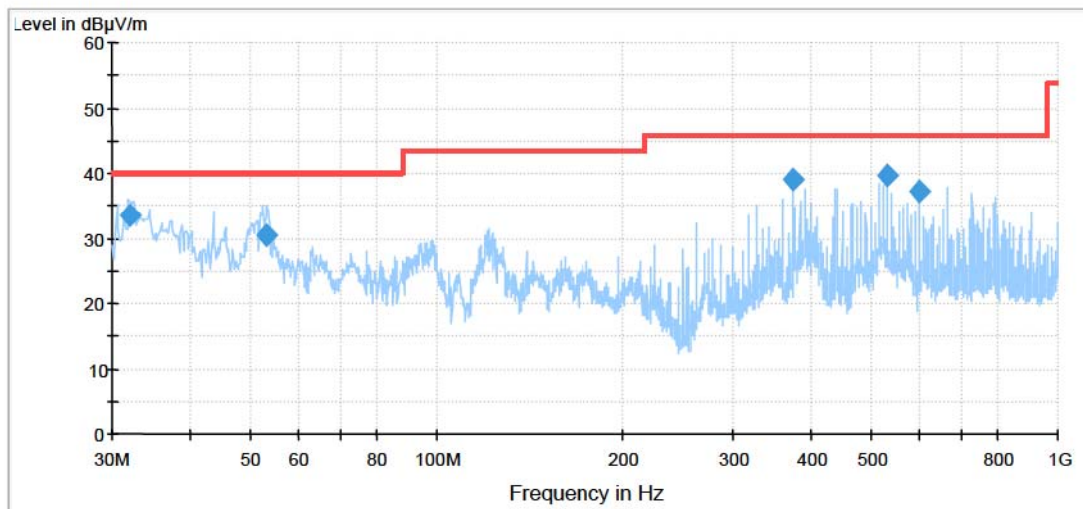
Level = Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

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



8.1.2 Radiated Disturbance of TC2

Graph of Test result (30 MHz-1 GHz)



Measurement Result: QP Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
32.040600	33.6	-29.2	40.0	6.4	100.0	95.0	V
52.987000	30.6	-28.2	40.0	9.4	100.0	252.0	V
375.022500	39.2	-22.6	46.0	6.8	100.0	19.0	H
532.475500	39.8	-18.7	46.0	6.2	190.0	1.0	H
598.051500	37.3	-16.8	46.0	8.7	100.0	12.0	V

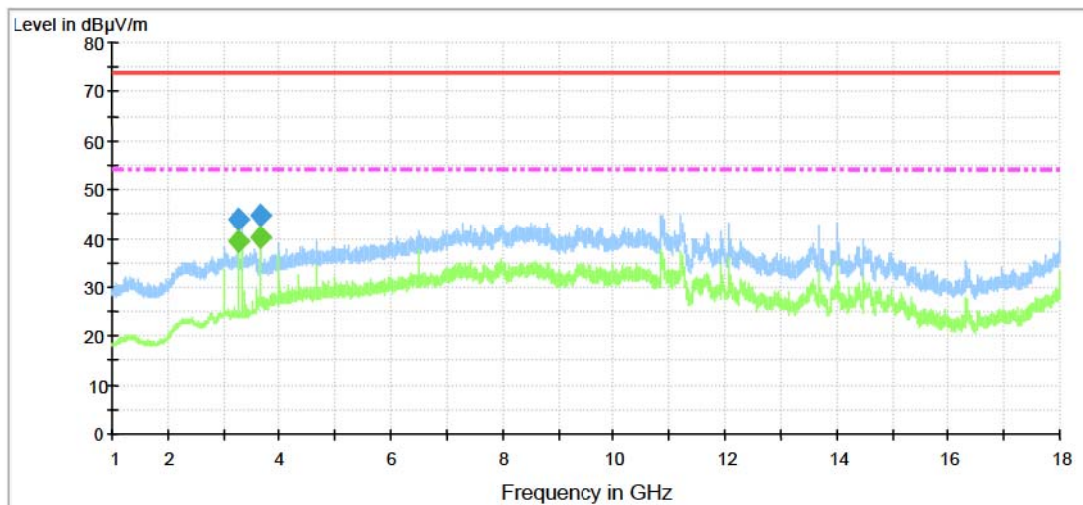
Notes:

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.



Graph of Test result (above 1 GHz)



Measurement Result: PK Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3249.254500	43.7	-4.5	73.9	30.2	100.0	69.0	V
3666.799833	44.6	-3.4	73.9	29.3	100.0	169.0	V

Measurement Result: AV Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3249.254500	39.3	-4.5	53.9	14.6	100.0	71.0	V
3666.799833	40.3	-3.4	53.9	13.6	100.0	169.0	V

Notes:

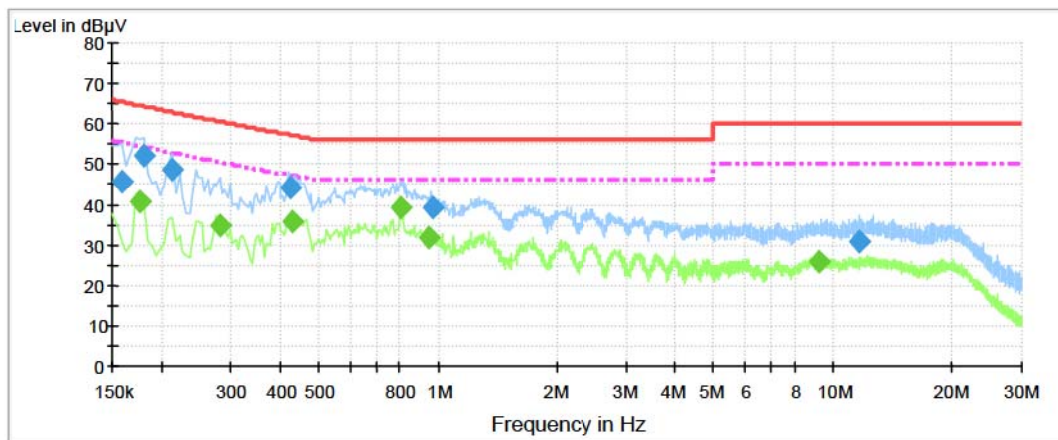
Level = Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

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



8.2 Conducted Disturbance

8.2.1 AC Power Port Test Data of TC1



Measurement Result: QP Detector

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.159000	45.5	10.6	65.5	20.0	L3	FLO
0.181500	52.3	10.6	64.3	12.0	N	FLO
0.213000	48.6	10.5	62.9	14.3	N	FLO
0.424500	44.0	10.4	57.3	13.3	N	FLO
0.968678	39.1	10.4	56.0	16.9	L3	FLO
11.652218	30.7	10.4	60.0	29.3	N	FLO

Measurement Result: AV Detector

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.177000	40.7	10.6	54.5	13.8	N	FLO
0.280500	34.8	10.5	50.6	15.8	L3	FLO
0.429000	36.0	10.4	47.2	11.2	L3	FLO
0.802500	39.1	10.4	46.0	6.9	L3	FLO
0.946710	31.9	10.4	46.0	14.1	L3	FLO
9.198615	26.0	10.5	50.0	24.0	N	FLO

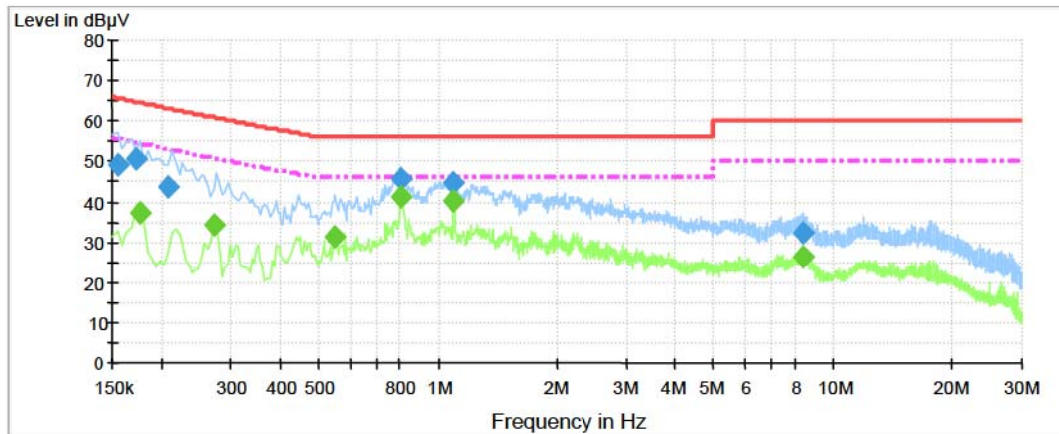
Note:

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

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



8.2.2 AC Power Port Test Data of TC2



Measurement Result: QP Detector

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.154500	49.2	10.6	65.7	16.5	N	FLO
0.172500	50.7	10.6	64.8	14.1	L3	FLO
0.208500	43.5	10.5	63.1	19.6	L3	FLO
0.807000	45.7	10.4	56.0	10.3	L3	FLO
1.094025	44.7	10.4	56.0	11.3	L3	FLO
8.401372	32.1	10.4	60.0	27.9	L3	FLO

Measurement Result: AV Detector

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.177000	37.4	10.6	54.5	17.1	N	FLO
0.271500	34.5	10.5	50.8	16.3	L3	FLO
0.550500	31.4	10.4	46.0	14.6	L3	FLO
0.802500	41.0	10.4	46.0	5.0	L3	FLO
1.094025	40.1	10.4	46.0	5.9	L3	FLO
8.388075	26.5	10.4	50.0	23.5	L3	FLO

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.