EMC Test Report

Product Name: **IP Phone**

Product Model: **eSpace 7950; eSpace 7903X**

Report Number: **SYBH (E) 00744693EB**

Reliability Laboratory of Huawei Technologies Co., Ltd.

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

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2. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
3. The test report is invalid if there is any evidence of erasure and/or falsification.
4. The test report is only valid for the test samples.
5. 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:	IP Phone
Product Model:	eSpace 7950; eSpace 7903X

Date of Receipt Sample:	2012-10-19
Start Date of Test:	2012-10-22
End Date of Test:	2012-11-01

Test Result: Pass

Approved by Senior Engineer:	2012-11-05	Zhang Xinghai	Zhang Xing Hai
	Date	Name	Signature

Prepared by:	2012-11-02	Wang Jia	Wang Jia
	Date	Name	Signature

Modification Record

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

Content

1 General Information

1.1 Applied Standard	
Applied Product Standard:	FCC CFR47 Part 15 Subpart B:2011 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
Radiated Emissions Enclosure Port	TC1~TC12	Class B	Pass	Location1
Conducted Emissions AC Power Port	TC1~TC9	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

eSpace 7950 is a full-featured six-line business IP phone with excellent user experience.
eSpace 7950 has the following features:

- Six lines
- 5-inch true color Liquid Crystal Display (LCD) screen, 800 x 480 high-resolution
- Advanced Audio Coding-Low Delay (AAC-LD) super-wideband voice codec with a sample rate as high as 48 kHz
- Two GE ports;
- Support for Power over Ethernet (PoE)
- One embedded Bluetooth module
- One Universal Serial Bus (USB) port for connecting to standard USB devices, such as a USB headset or USB flash drive
- Multiple expansion modules

eSpace 7903X is a multi-functional IP phone expansion module, which is ideal for managers, secretaries, and receptionists at the front desk. eSpace 7903X is used with eSpace 7950 to provide various functions including speed dial, phone lock, and phone sleep. With a single eSpace 7903X, eSpace 7950 increases the number of programmable buttons to 40 and provides optimized viewing through the 5-inch color Liquid Crystal Display (LCD) screen. eSpace 7903X helps users use eSpace 7950 more efficiently with better user experience.
Product highlights:

- 5-inch color LCD screen with backlight
- 20 programmable buttons with dual-color LED indicators, and two page buttons with monochrome LED indicators
- A second page button that provides access to additional 20 programmable buttons (for a total of 40 buttons)
- Only one eSpace 7903X connected to each eSpace 7950 when powered by eSpace 7950
- Up to three eSpace 7903Xs connected to each eSpace 7950 when powered by external power supply
- Icons displayed for phone lock and sleep functions
- Dual-color LED indicators to tell different line states of contacts
- Multi-language support
- A rich set of functions including speed dial, phone lock, and phone sleep.

For typical application, only one eSpace 7903X connected to each eSpace 7950 IP Phone, below test data is obtained base on this typical application.

3.2 Specification

Table 2 Main equipment specification

Rated Input Voltage	eSpace 7950: ⎓ 5V (Powered by AC/DC adapter: ~ 100 V to 240 V ,50 /60Hz) ⎓ -48 V (Powered over Ethernet) eSpace 7903X: ⎓ 5V (Powered by AC/DC adapter: ~ 100 V to 240 V, 50 /60Hz) ⎓ 5 V (Powered by eSpace 7950)
Rated Power (W)	eSpace 7950: 6W eSpace 7903X: 3W
Dimensions (W x D x H)	eSpace 7950: 217mm (W) x208mm (D) x124 mm (H) eSpace 7903X: 207mm (W) x130mm (D) x68 mm (H)
Weight (kg)	eSpace 795: 0.92kg eSpace 7903X: 0.32kg
Transmit Frequency (MHz)	Bluetooth for eSpace 7950: 2400MHz--2483.5MHz
Receive Frequency (MHz)	Bluetooth for eSpace 7950: 2400MHz--2483.5MHz
Maximum Output Power (dBm)	Bluetooth for eSpace 7950: 0 dBm
Frequency of the Internal Source (MHz)	24MHz; 25MHz; 26MHz; 125MHz; 480MHz

Figure 1. EUT Appearance

3.3 Board and SubAssembly

Table 3 Board list

Board		
Board Name	Hardware Version	Description
EP11MPUA	VER.B	eSpace 7950 Main Board
EP11LKEA	VER.A	eSpace 7950 Linekey Board
EP21HKEA	VER.A	eSpace 7950 Hook Board
EP11USBA	VER.B	eSpace 7950 USB board
EP11ETUA	VER.B	eSpace 7903X Main Board
EP11PGUA	VER.A	eSpace 7903X Page Board

Table 4 Subassembly list

Subassembly			
Subassembly Name	Model	Manufacturer	Description
Adapter	HW-050200B2W	FUHUA	Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, BS
Adapter	HW-050200C2W	FUHUA	Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, CCC
Adapter	HW-050200E2W	FUHUA	Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, CE
Adapter	HW-050200U2W	FUHUA	Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, UL

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	Connector	Board	Length	Qty.	Type of Cable	Remark
Power Port	/	EP11MPUA	2m	1	Unshielded	/
Power Port	/	EP11ETUA	2m	1	Unshielded	/
WAN(PoE)	RJ45	EP11MPUA	10m	1	UTP-5,	Indoor signal port
LAN	RJ45	EP11MPUA	10m	1	UTP-5,	Indoor signal port
Audio Port	RJ9	EP11MPUA	0.5m	2	4-core telephone Unshielded Cable	/
Expansion port	RJ11	EP11MPUA	0.16m	1	Unshielded	/
Expansion port	RJ11	EP11ETUA	0.16m	2	Unshielded	/
USB	USB	EP11USBA	/	1	/	/

4.2 Auxiliary Equipment

Table 6 Auxiliary equipment

Equipment	Model	Manufacturer	S/N	Calibration Date	Calibration Interval (month)	Remark
Data network analyzer	Tesgine	Huawei	SZ05000 38428	N/A	N/A	N/A
Switch	SmartAX 5616	Huawei	NA	N/A	N/A	N/A
Enterprise Gateway	EGW 1530	Huawei	NA	N/A	N/A	N/A
IP Phone	eSpace 7830	Huawei	NA	N/A	N/A	N/A
Personal Computer	Lenovo/P4/ 2.66G	Lenovo	3106061 158	N/A	N/A	N/A
Bluetooth Headset	Voyager PRO HD	Plantronics	NA	N/A	N/A	N/A
U Disk	DTI/2GB	Kingston	NA	N/A	N/A	N/A

4.3 Test Configurations

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 twelve test configurations. TC1~TC12 were shown in the following tables and figures:

Table 7 Test configuration

Configuration No.	Configuration Description
TC1	eSpace 7950 Powered by Adapter and eSpace 7903X powered by eSpace 7950, Calling with handset.
TC2	eSpace7950 Powered by Adapter and eSpace7903X powered by eSpace 7950, Calling with handfree.
TC3	eSpace7950 Powered by Adapter and eSpace7903X powered by eSpace 7950, Calling with bluetooth headset.
TC4	eSpace 7950 Powered by Adapter and eSpace 7903X also powered by Adapter , Calling with handset.
TC5	eSpace7950 Powered by Adapter and eSpace7903X also powered by Adapter, Calling with handfree.
TC6	eSpace7950 Powered by Adapter and eSpace7903X also powered by Adapter, Calling with bluetooth headset.
TC7	eSpace7950 Powered over Ethernet and eSpace7903X powered by Adapter, Calling with handset.
TC8	eSpace7950 Powered over Ethernet and eSpace7903X powered by Adapter, Calling with handfree.
TC9	eSpace7950 Powered over Ethernet and eSpace7903X powered by Adapter, Calling with bluetooth headset.
TC10	eSpace7950 Powered over Ethernet and eSpace7903X powered by eSpace 7950, Calling with handset.
TC11	eSpace7950 Powered over Ethernet and eSpace7903X powered by eSpace 7950, Calling with handfree.
TC12	eSpace7950 Powered over Ethernet and eSpace7903X powered by eSpace 7950, Calling with bluetooth headset.

Note: The difference for the four adapters in section 3.3 is the plug, HW-050200B2W is for UK plug, HW-050200C2W is for China plug, HW-050200E2W is for EU plug, HW-050200U2W is for USA plug. So EMC full test was applied on one model only, other models are deemed to fulfill relevant EMC requirement without further test.

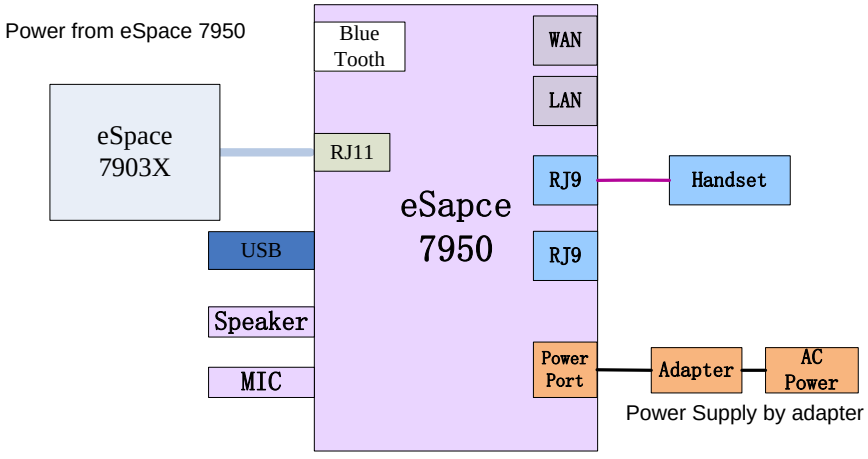


Figure 2. Test configuration 1, 2, 3 (TC1&TC2&TC3)

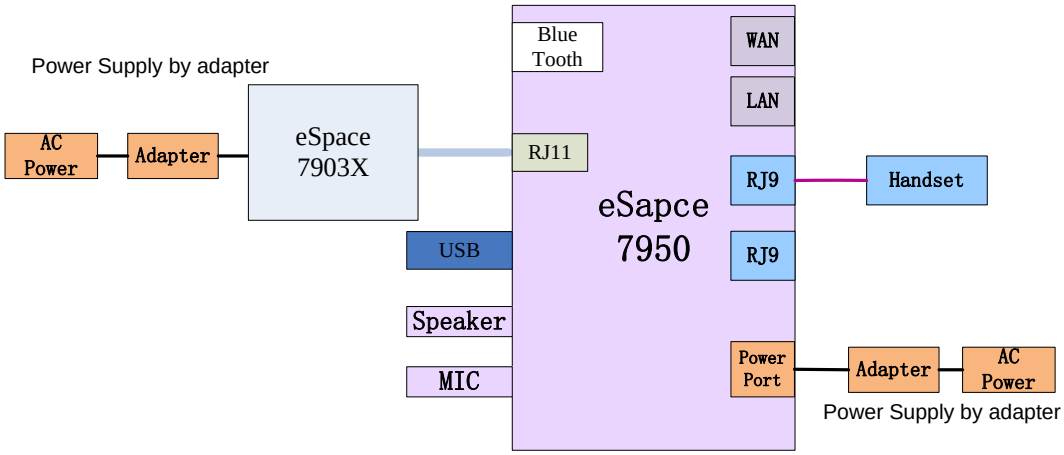


Figure 3. Test configuration 4, 5, 6 (TC4&TC5&TC6)

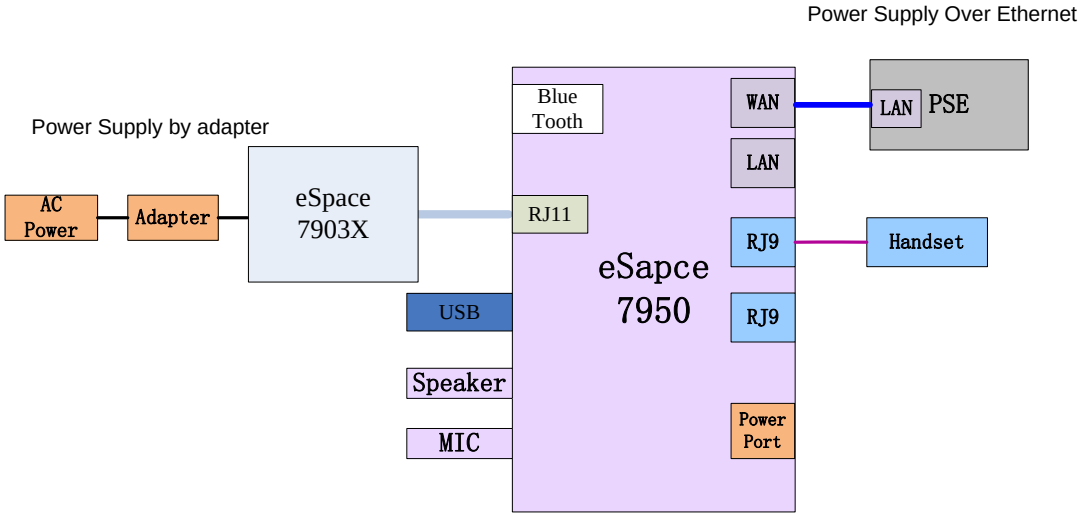


Figure 4. Test configuration 7, 8, 9 (TC7&TC8&TC9)

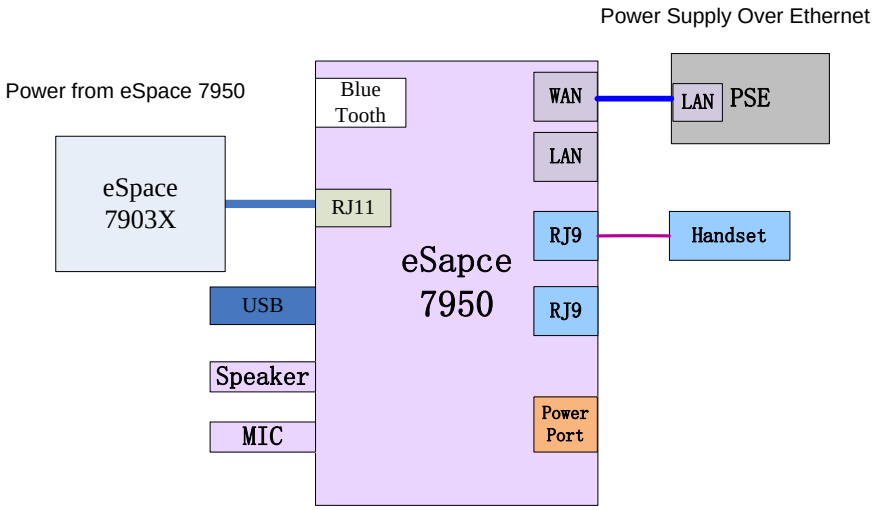
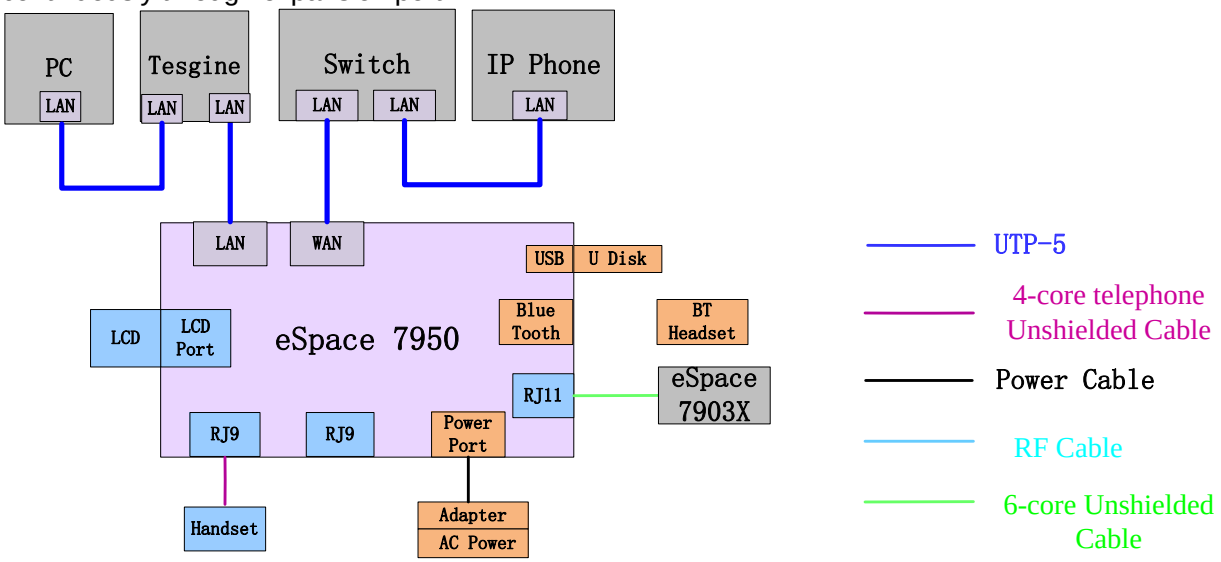


Figure 5. Test configuration 10, 11, 12 (TC10&TC11&TC12)

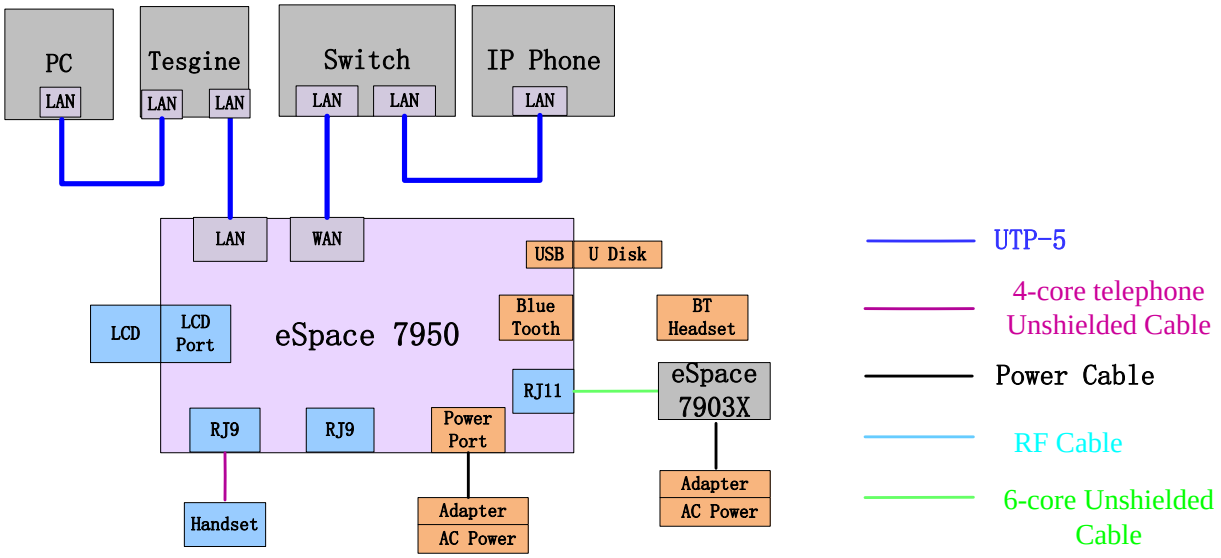
4.4 Test Conditions and Connections

The eSpace 7950 using the handset or handfree or bluetooth headset maintained call state with other Ip-phone through the Switch.
The tesgine generates the broadband service traffic through the LAN port, and then received it from the ring through the LAN port of eSpace 7950.
The USB port connect to USB flash disk and transmit USB data continuously.
The expansion module eSpace7903X connect to eSpace 7950 and intercommunicate with each other continuously through expansion port.



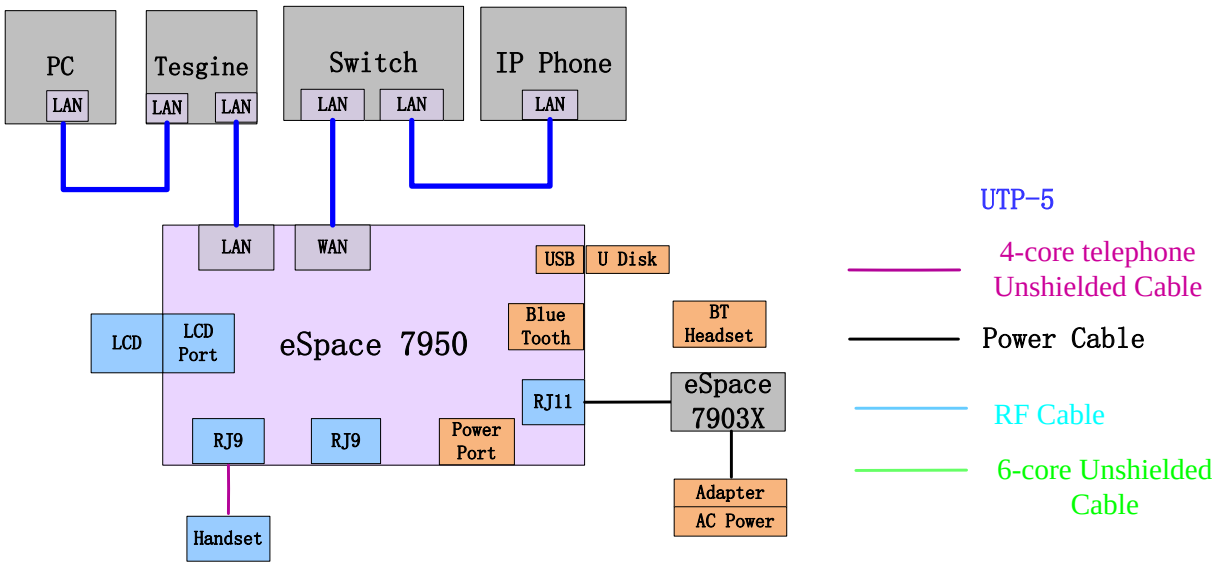
eSpace 7950 powered By Adapter
eSpace 7903X powered from eSpace 7950

Figure 6. Test connection of TC1&TC2&TC3



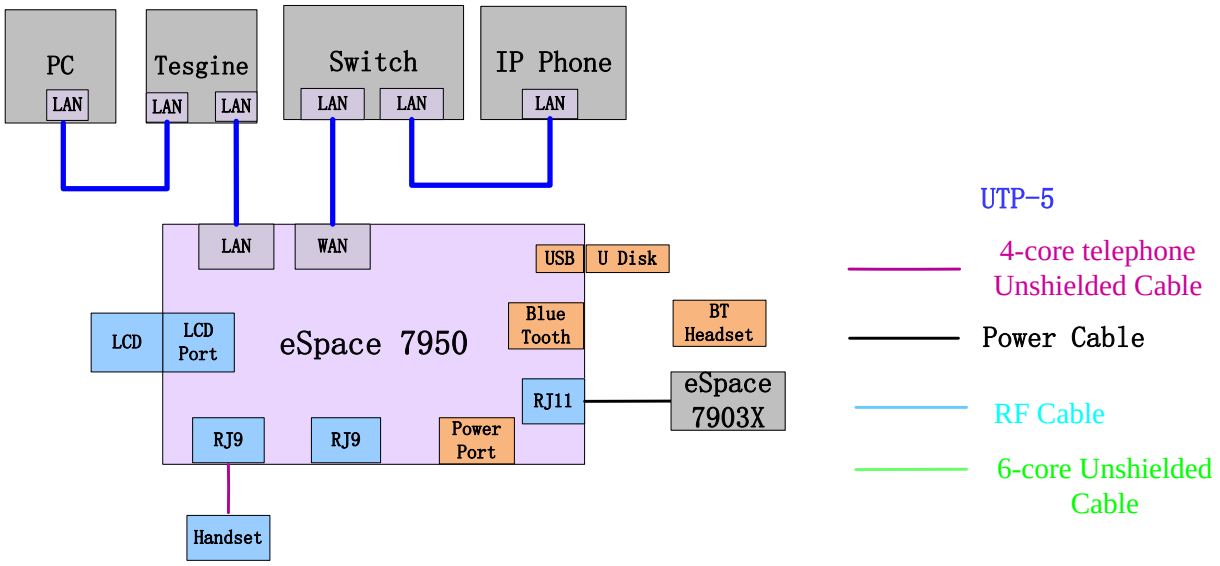
eSpace 7950 powered by Adapter
eSpace 7903X also powered by Adapter

Figure 7. Test connection of TC4&TC5&TC6



eSpace 7950 powered over Ethernet by WAN port
eSpace 7903X powered by Adapter

Figure 8. Test connection of TC7&TC8&TC9



eSpace 7950 powered over Ethernet by WAN port
eSpace 7903X powered from eSpace 7950

Figure 9. Test connection of TC10&TC11&TC12

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 to1 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:

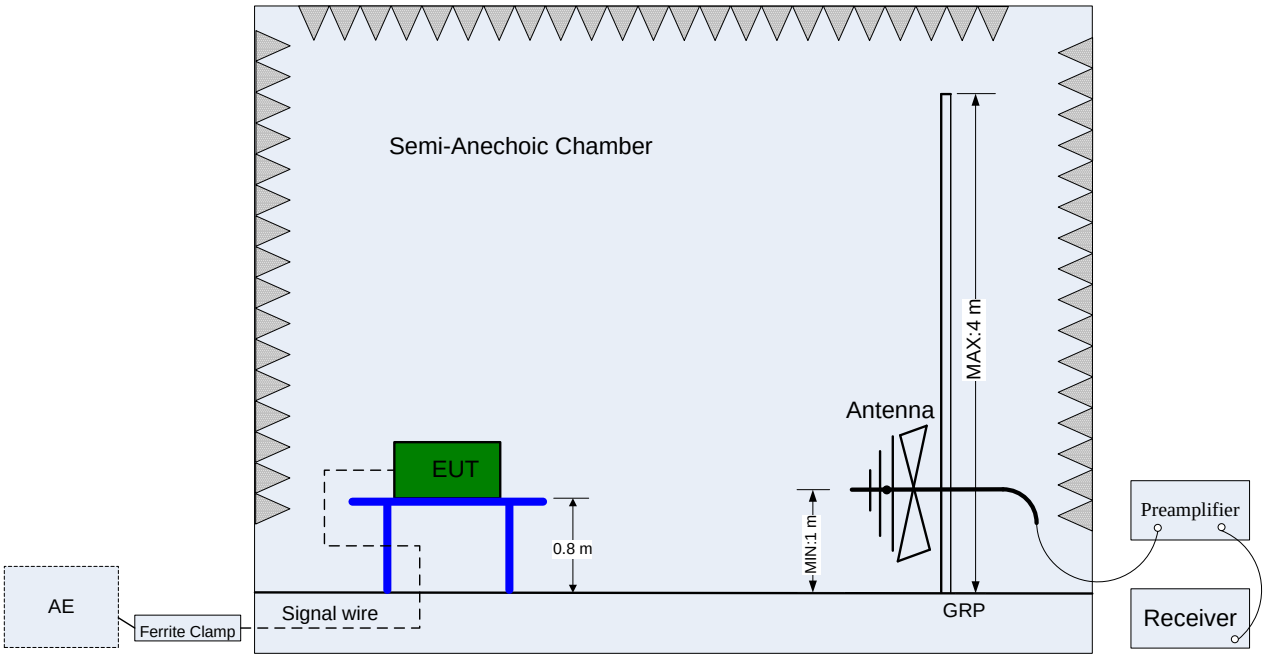


Figure 10. Test set-up of radiated disturbance (30 MHz-1 GHz)

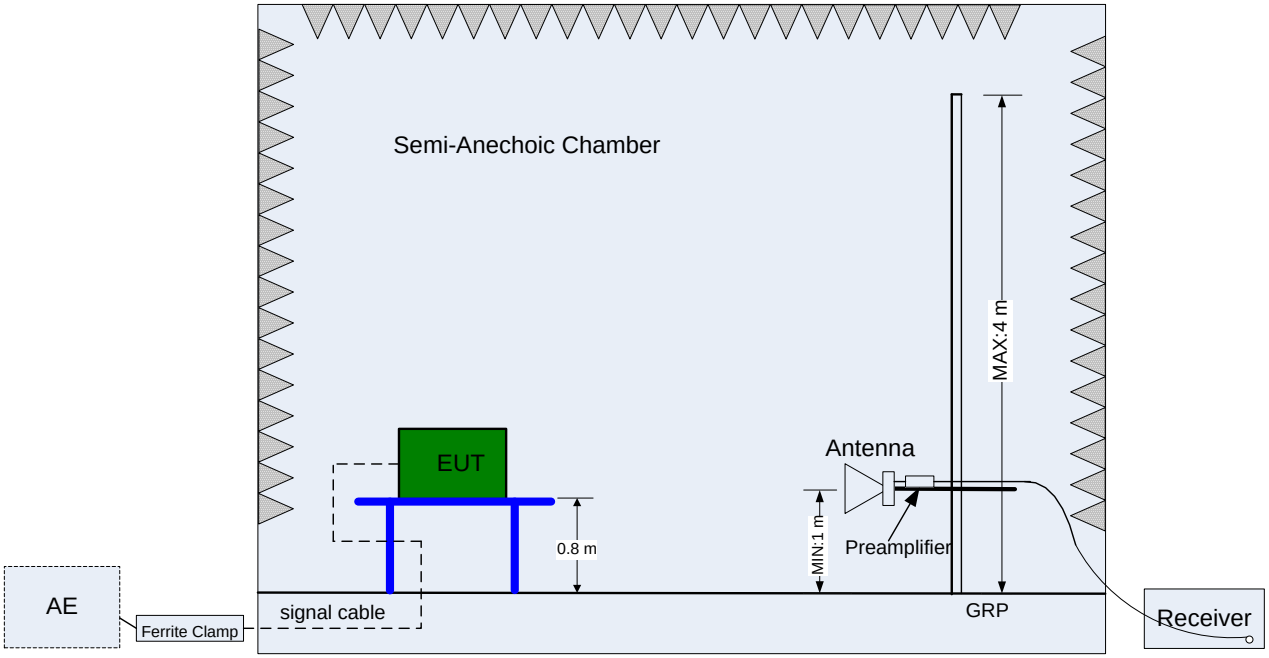


Figure 11. Test set-up of radiated disturbance (above 1 GHz)

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 1 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 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 26.5 GHz	40.0 dBµV/m 43.5 dBµV/m 46.0 dBµV/m 53.9 dBµV/m

Table 2 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 dBµV/m	73.9 dBµV/m

Note: The highest frequency of the internal sources of the EUT is 480 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:

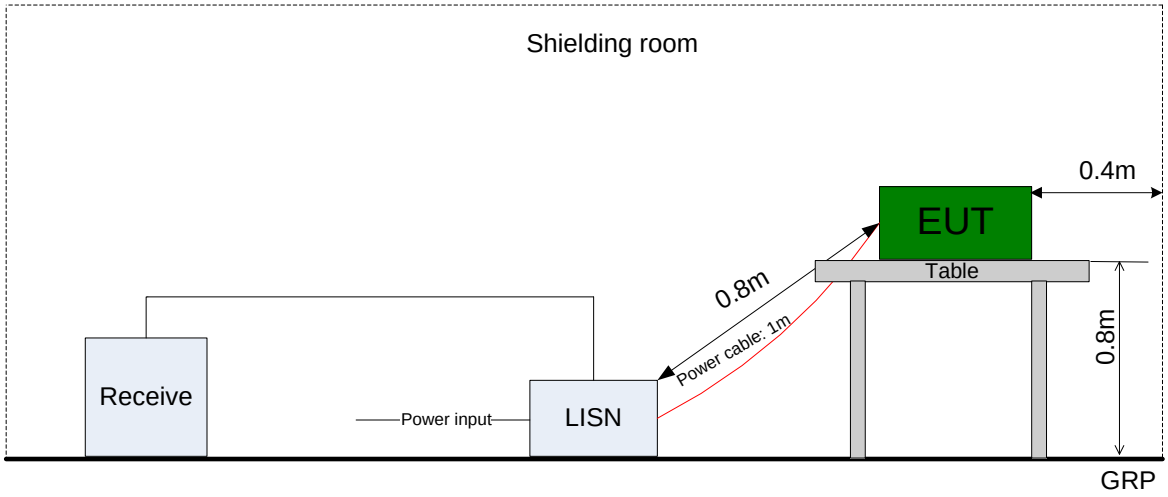


Figure 12. Test set-up of conducted disturbance for AC power port

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 3 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 4 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
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:

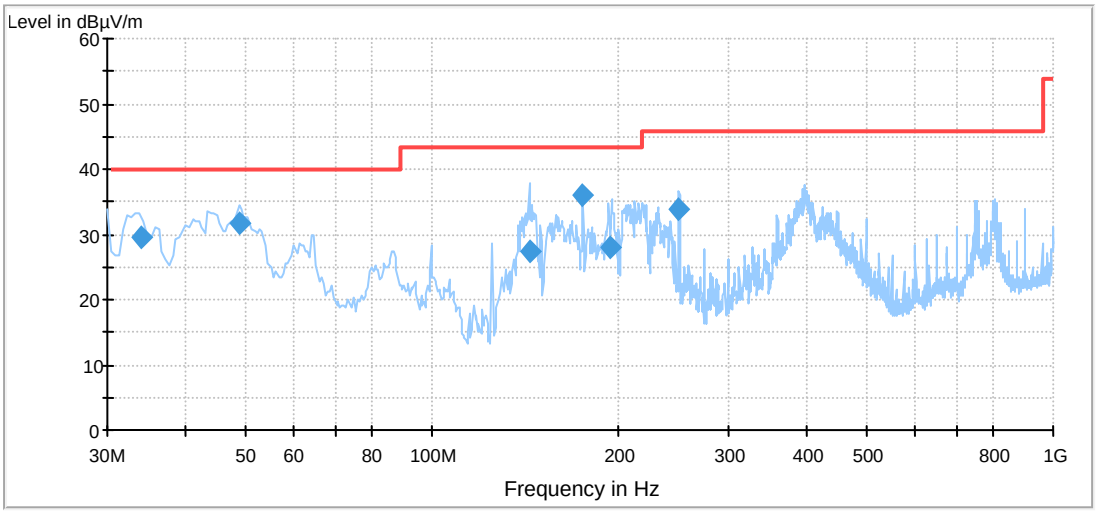
Table 5 System measurement uncertainty

Items		Extended Uncertainty
Radiated emission	Field strength (dBμV/m)	U=4.3 dB; k=2 (30MHz to 1GHz)
		U=4.20 dB; k=2(1Ghz to 6GHz)
Conducted emission	Disturbance voltage (dBμV)	U=2.71dB; k=2

8 Graph and Data of Emission Test

8.1 Radiated Disturbance

8.1.1 Radiated Disturbance (30MHz~1GHz) of TC1~TC3

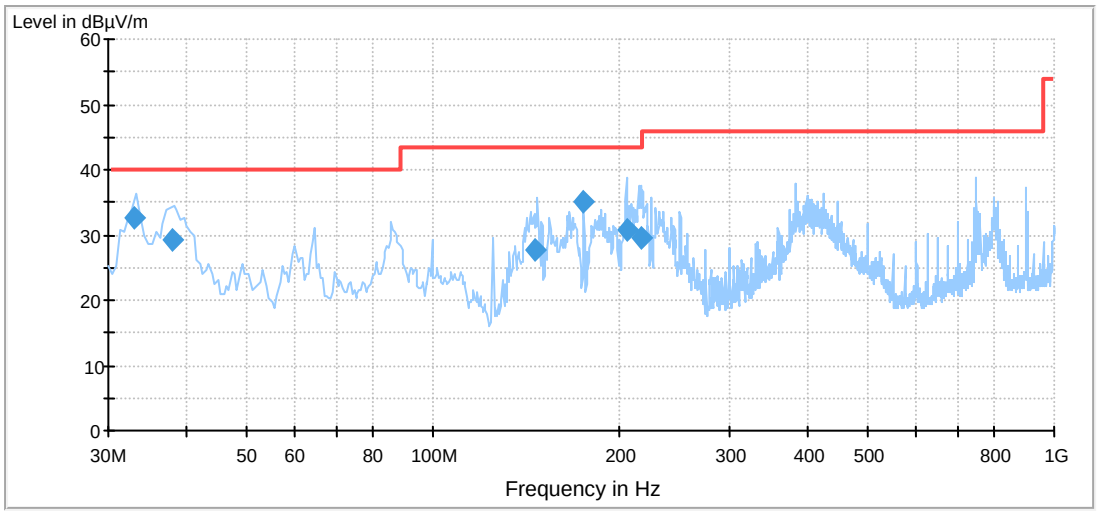


Measurement Result: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
34.081200	29.6	-29.2	40.0	10.4	116.0	88.0	V
49.145850	31.7	-28.0	40.0	8.3	100.0	221.0	V
143.435000	27.2	-31.9	43.5	16.3	167.0	170.0	H
175.005000	35.9	-30.3	43.5	7.6	141.0	137.0	H
193.491000	27.9	-28.7	43.5	15.6	166.0	256.0	H
250.028000	34.0	-26.2	46.0	12.0	100.0	37.0	H

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. TC1~TC3 were tested, and the diagram supplied is the worst result.

8.1.2 Radiated Disturbance (30MHz~1GHz) of TC4~TC6

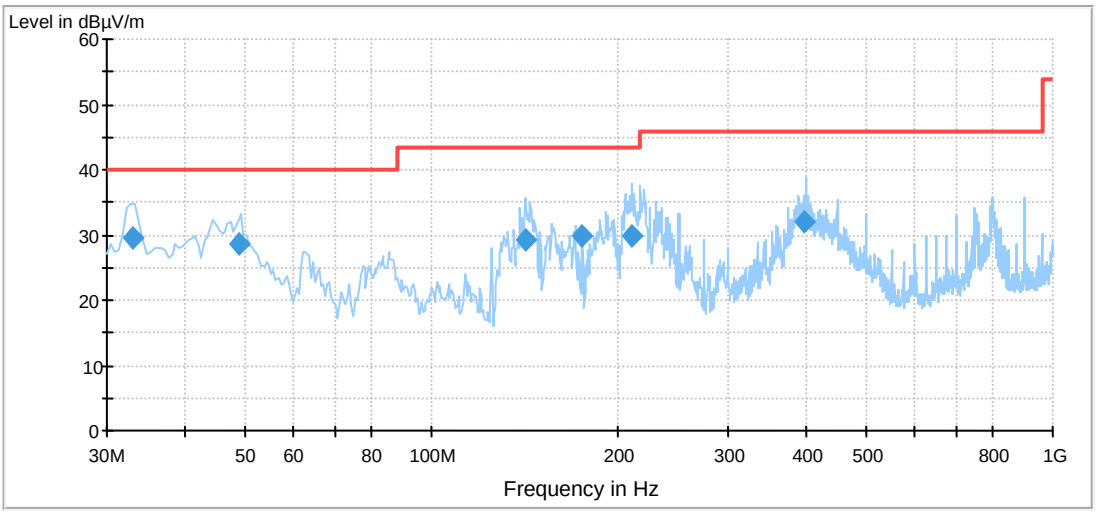


Measurement Result: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
33.121050	32.6	-29.2	40.0	7.4	100.0	28.0	V
37.982550	29.3	-28.4	40.0	10.7	100.0	50.0	V
146.196500	27.7	-31.9	43.5	15.8	183.0	47.0	H
175.005000	35.0	-30.3	43.5	8.5	116.0	41.0	H
205.074000	30.7	-28.5	43.5	12.8	141.0	53.0	H
217.077500	29.7	-27.9	46.0	16.3	100.0	33.0	H

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. TC4~TC6 were tested, and the diagram supplied is the worst result.

8.1.3 Radiated Disturbance (30MHz~1GHz) of TC7~TC9

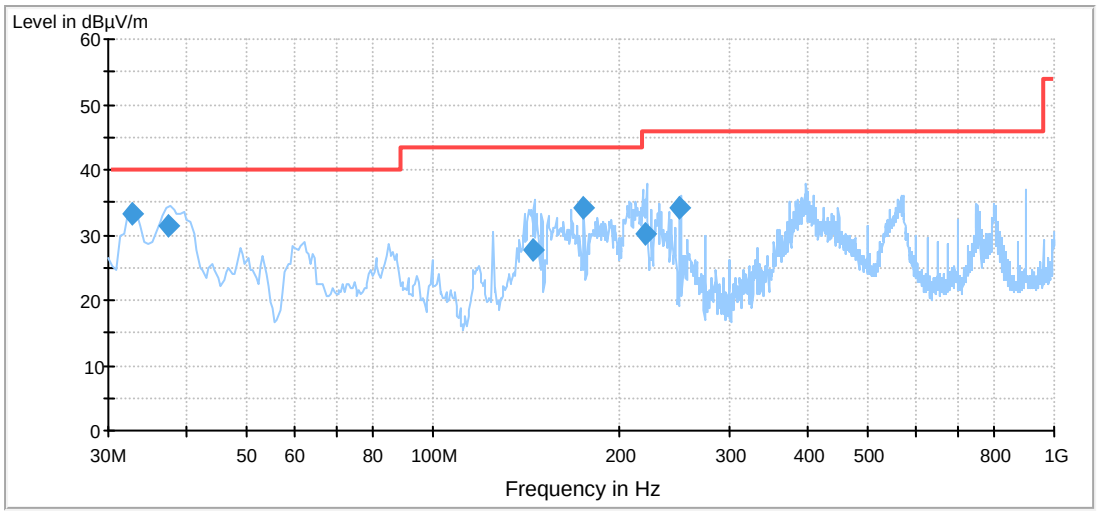


Measurement Result: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
33.120900	29.5	-29.2	40.0	10.5	100.0	286.0	V
49.146000	28.6	-28.0	40.0	11.4	100.0	310.0	V
141.934500	29.3	-32.0	43.5	14.2	178.0	58.0	H
175.005000	30.0	-30.3	43.5	13.5	128.0	36.0	H
209.816000	29.9	-28.4	43.5	13.6	100.0	39.0	H
399.474500	31.9	-21.8	46.0	14.1	100.0	190.0	H

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. TC7~TC9 were tested, and the diagram supplied is the worst result.

8.1.4 Radiated Disturbance (30MHz~1GHz) of TC10~TC12

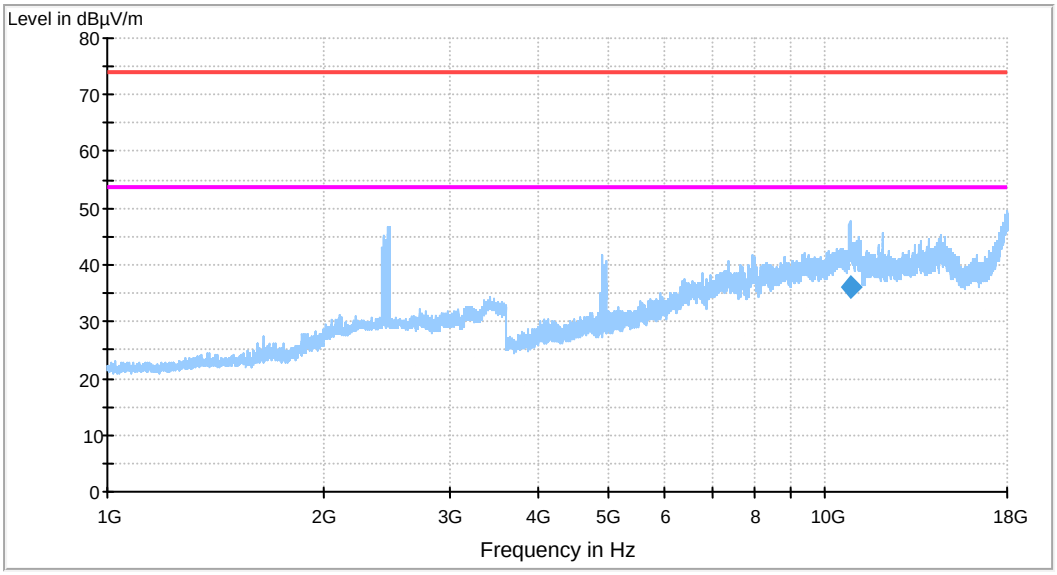


Measurement Result: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
32.880900	33.2	-29.2	40.0	6.8	100.0	7.0	V
37.442400	31.4	-28.5	40.0	8.6	141.0	120.0	V
144.756000	27.7	-31.9	43.5	15.8	173.0	42.0	H
175.005000	34.3	-30.3	43.5	9.2	129.0	141.0	H
219.899000	30.0	-27.7	46.0	16.0	100.0	46.0	H
250.028000	34.1	-26.2	46.0	11.9	128.0	12.0	H

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. TC10~TC12 were tested, and the diagram supplied is the worst result.

8.1.1 Radiated Disturbance (1GHz~18GHz) of TC1~TC12



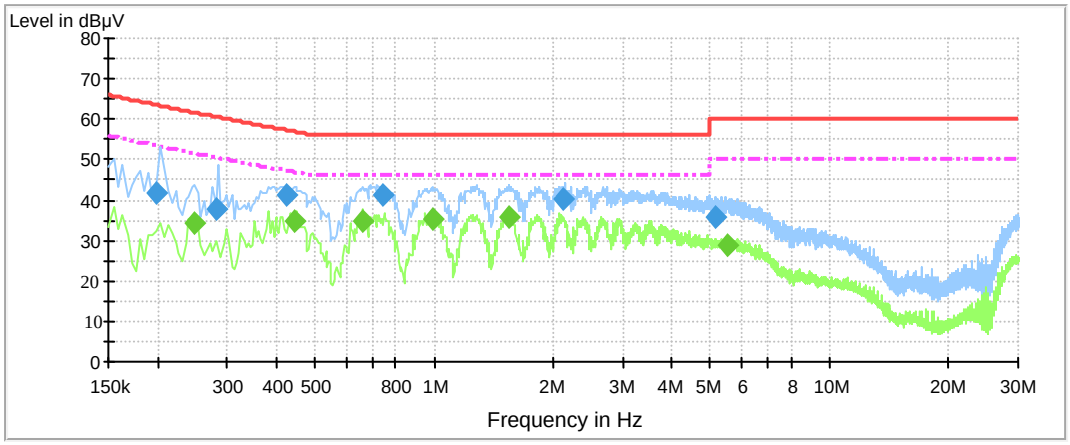
Measurement Result: AV Detector

Frequency (MHz)	Level (dBµV/m)	Transd (dB)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
10869.700000	35.9	21.0	53.9	18.0	200.0	269.0	H

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 were tested, and the diagram supplied is the worst result.

8.2 Conducted Disturbance

8.2.1 AC Power Port Test Data of eSpace 7950 in TC1~TC6



Measurement Result: QP Detector

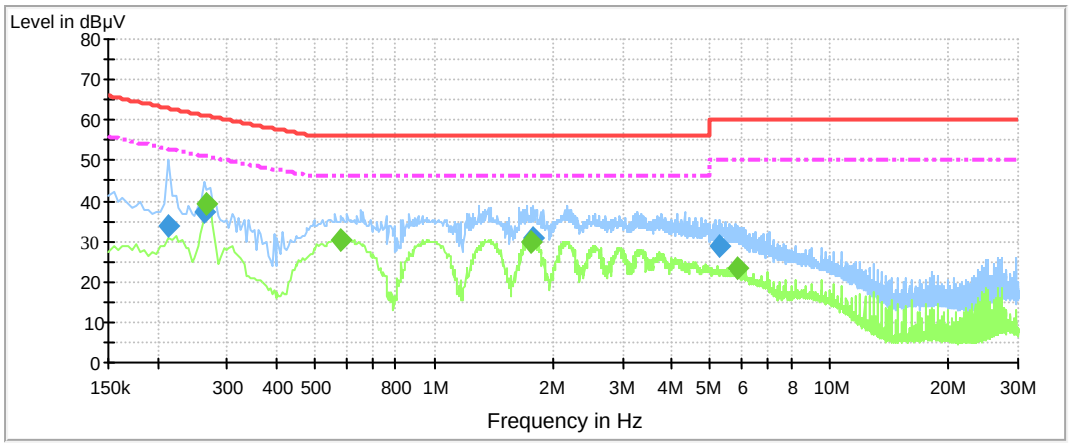
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line
0.199500	41.7	10.5	63.5	21.8	L3
0.280500	37.8	10.5	60.6	22.8	L3
0.424500	41.2	10.4	57.3	16.1	N
0.739500	41.0	10.4	56.0	15.0	N
2.128305	40.5	10.4	56.0	15.5	N
5.137298	36.0	10.4	60.0	24.0	L3

Measurement Result: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line
0.249000	34.1	10.5	51.5	17.4	N
0.442500	35.0	10.4	46.9	11.9	N
0.658500	34.7	10.4	46.0	11.3	N
0.991042	35.2	10.4	46.0	10.8	N
1.550752	35.8	10.4	46.0	10.2	N
5.544638	28.8	10.4	50.0	21.2	L3

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.
2. TC1~TC6 were tested, and the diagram supplied is the worst result.

8.2.2 AC Power Port Test Data of eSpace 7903X in TC4~TC9



Measurement Result: QP Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line
0.213000	33.6	10.5	62.9	29.3	N
0.262500	37.2	10.5	61.1	23.9	N
1.774628	31.0	10.4	56.0	25.0	N
5.258078	28.9	10.4	60.0	31.1	L3

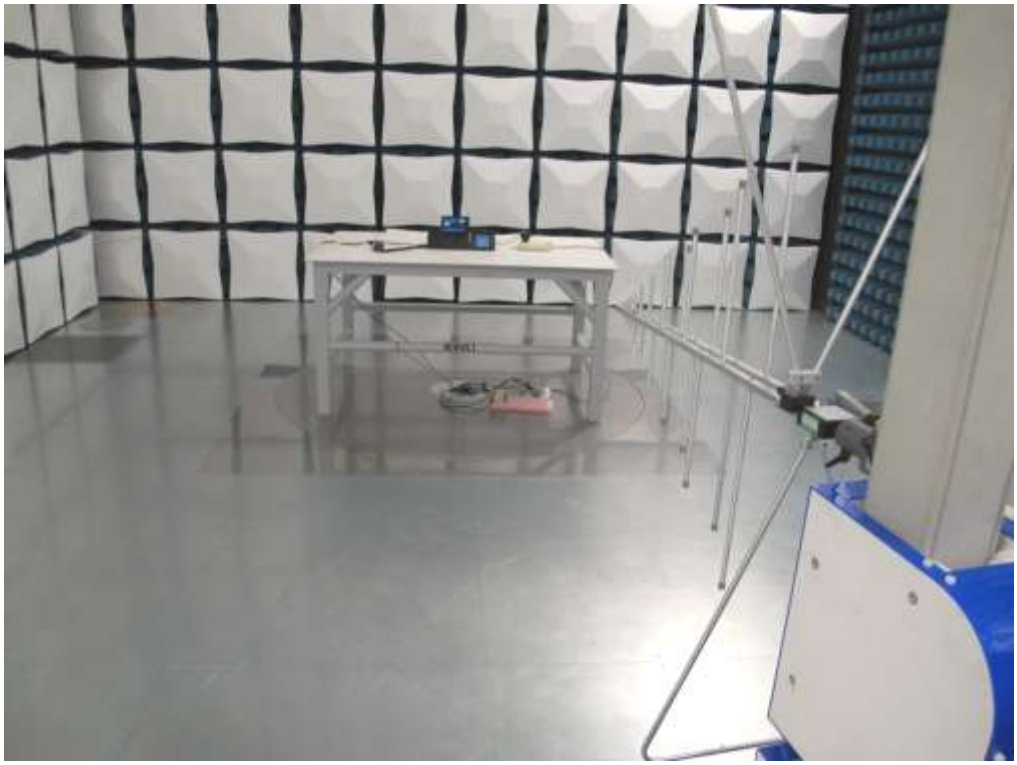
Measurement Result: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line
0.267000	39.1	10.5	51.0	11.9	N
0.577500	30.3	10.4	46.0	15.7	N
1.765628	29.8	10.4	46.0	16.2	N
5.835810	23.5	10.4	50.0	26.5	L3

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.
2. TC4~TC9 were tested, and the diagram supplied is the worst result.

9 Photographs of Test Set-up

9.1 Radiated Emission



Radiated emission for 30 MHz-1 GHz

Radiated emission for 1GHz to 18GHz

9.2 Conducted Emission

Conducted emissions of AC power port

Appendix: Abbreviation

Table 6 Abbreviation

Abbreviation	Full Name
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EUT	Equipment Under Test
AE	Auxiliary Equipment
AC	Alternate Current
DC	Direct Current
NSA	Normalized Site Attenuation
LISN	Line Impedance Stabilization Network
TC	Test configuration
N/A	Not Applicable

END