
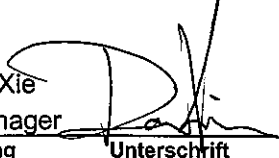


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Auftraggeber: <i>Client:</i>		Shenzhen Gongjin Electronics Co., Ltd. A211-A213, B201-B210, 2F Baiying Building, 1019# Nanhai RD, Shekou, Shenzhen, Guangdong, China			
Gegenstand der Prüfung: <i>Test item:</i>		85Mbps PLC Wallmount			
Bezeichnung: <i>Identification:</i>		Pi699E2.1U7-3 Pi699E2.1U16-3 Pi699E2.1U36-3 Pi699E2.1U62-3	FCC ID: <i>FCC ID</i>	V4VPI699E21	
Wareneingangs-Nr.: <i>Receipt No.:</i>		173042029	Eingangsdatum: <i>Date of receipt:</i>	16.12.2008	
Prüfört: <i>Testing location:</i>		Shenzhen Academy of Metrology and Quality Inspection Bldg, of Shenzhen Academy of Metrology and Quality Inspection, Longzhu Road, Nanshan, Shenzhen, P.R. China		Listed test laboratory according to FCC rules section 2.948 for measuring devices.	
Prüfgrundlage: <i>Test specification:</i>		ANSI C63.4: 2003 FCC Part 15: 20, Sep. 2007, Subpart B section 15.107 and 15.109			
Prüfergebnis: <i>Test Result:</i>		Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>			
Prüflaboratorium: <i>Testing Laboratory:</i>		TÜV Rheinland (Guangdong) Ltd.			
geprüft/ tested by:		kontrolliert/ reviewed by:			
02. Mar. 2009, Ricky Liu Project Manager 		02. Mar. 2009, Liangdong Xie Project Manager 			
<i>Datum</i> Date	<i>Name/Stellung</i> Name/Position	<i>Unterschrift</i> Signature	<i>Datum</i> Date	<i>Name/Stellung</i> Name/Position	<i>Unterschrift</i> Signature
Sonstiges/ Other Aspects:					
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet					
Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested					
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>					

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Test Summary

FCC and IC test specification		Test items	Result
Paragraph	Released Date		
Part 15 Per Section 15.107(c)	20. Sep, 2007	Conducted Emission	Pass
Part 15 Per Section 15.109(e)	20. Sep, 2007	Radiated Emission	Pass

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1 General Remarks

1.1 Complementary Materials

None

2 Test Sites

2.1 Test Facilities

Shenzhen Academy of Metrology and Quality Inspection

Bldg, of Shenzhen Academy of Metrology and Quality Inspection,
Longzhu Road, Nanshan, Shenzhen,
P.R. China

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2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Type	Manufacturer	S/N	Calibrated until	Calibrated Interval
EMI Test Receiver	ESCS30	Rohde & Schwarz	100003	Jan.24.2009	1 year
AMN	ESH3-Z5	Rohde & Schwarz	100002	Jan.24.2009	1 year
LISN	KNW-407	Kyoritsu	8-1441-8	Jan.24.2009	1 year
Limiter	ESH3-Z2	Rohde & Schwarz	357.881 0.52	Jan.24.2009	1 year
EMI Test Receiver	ESI26	Rohde & Schwarz	838786/ 013	Jan.24.2009	1 year
Bilog Antenna	CBL6112B	Chase	2591	Jan.24.2009	1 year
Signal Generator	SMR20	Rohde & Schwarz	100047	Jan.24.2009	1 year
Loop Field Strength Antenna	FMZB1516	Schwarzbeck	113	Jan.25.2009	2 year
Horn Antenna	HF906	Rohde & Schwarz	100013	Jan.24.2009	1 year
Horn Antenna	HF906	Rohde & Schwarz	100014	Jan.24.2009	1 year
Semi-anechoic chamber	9X6X6m	Albatross Projects	100014	July 12, 2009	2 year

2.3 Traceability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

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2.5 Measurement Uncertainty

Uncertainty for conducted emissions measurements is $\pm 3.5\text{dB}$.

Uncertainty for radiated emissions measurements is $\pm 4.5\text{dB}$

The reported expanded uncertainty is based on a standard uncertainty multiply by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

2.6 Location of original data

The original copies of test data taken during actual testing were attached at Appendix 1 of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Guangdong) file for certification follow-up purposes.

2.7 Status of facility used for testing

Shenzhen Academy of Metrology and Quality Inspection, Bldg, of Shenzhen Academy of Metrology and Quality Inspection, Longzhu Road, Nanshan, Shenzhen, P.R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements, the register no. 274801

3 General Product Information

The EUT are wall-mount In-house BPL Ethernet bridge devices. Data is transmitted between pair of the EUTs by conduction over electric power lines that are not owned, operated or controlled by an electric service provider.

The RJ-45 Ethernet port of the EUT can be connected to computer or other Ethernet-enabled network device. It is a personal computer peripheral (Class B) equipment.

All the 4 models have identical electronics design. The only difference of them is the shape and/or color of the enclosure (none metal). Others are same. Tests are performed on the model Pi699E2.1U7-3 only.

3.1 Product Function and Intended Use

Refer to user manual for more information.

3.2 Ratings and System Details

Type Designation	:	Pi699E2.1U7-3, Pi699E2.1U16-3 Pi699E2.1U36-3, Pi699E2.1U62-3
Carrier Frequency range	:	4MHz – 21MHz
PLC Data Rate	:	85M bps
Power supply	:	AC 100-240V; 50-60Hz
Ports	:	AC Mains, RJ-45 Ethernet port
Protection Class	:	II

Refer to the Technical Documentation for further information

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3.3 Independent Operation Modes

Off/On

For further information refer to User Manual

3.4 Submitted Documents

Operation Description
Block Diagram
Schematics
FCC label and its location
User Manual
Internal Photos
External Photos
Application form

4 Test Set-up and Operation Mode

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Refer to test set-up in chapter 5.

4.3 Special Accessories and Auxiliary Equipment

Kind of Equipment	Manufacturer	Type	Serial No.
Laptop computer	IBM	R51	99-F48C0 01/08
Ethernet Router	Shenzhen Gongjin Electronics Co., Ltd	AP699E1.1Z39-4	N/A
PC	COMPAQ	P9111A #AB2	CN31104346
Monitor	COMPAQ	P4825	CN3087A02
Adaptor of monitor	LITEON	PA-1400-02	3101571101LN
Keyboard (PS/2)	COMPAQ	KB-0133	CT:B55930DGANN3NU
Mouse (PS/2)	COMPAQ	M-S69	CT:F466BOMMSNS05J2
Printer	CANON	BJC-265SP	EVX81604
Adaptor for printer	CANON	AD-300	N/A
Modem (COM)	KPT	56000BPS	200060057
Adaptor for modem	KPT	AM-1280AV	

4.4 Countermeasures to achieve EMC Compliance

The test sample, which has been tested, contained the noise suppression parts as described in the technical document. No additional measures were employed to achieve compliance.

4.5 Test set-up

Diagram 1 of Measurement Equipment Configuration for Testing Radiated Emission below 1 GHz

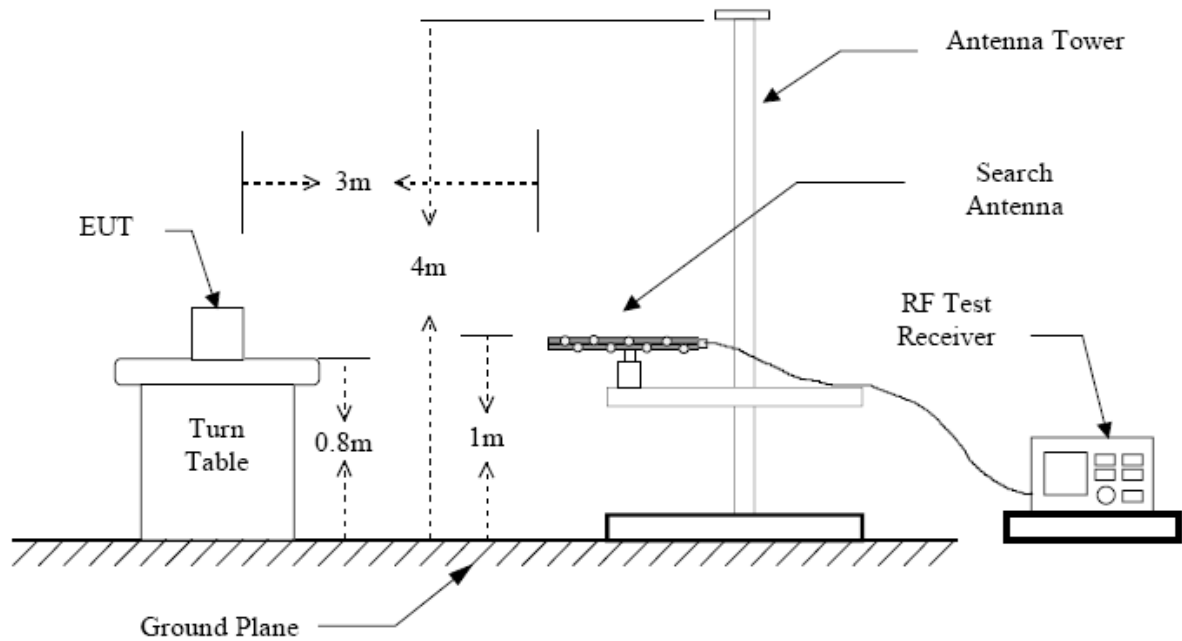


Diagram 2 of Measurement Equipment Configuration for Testing Conducted Emission

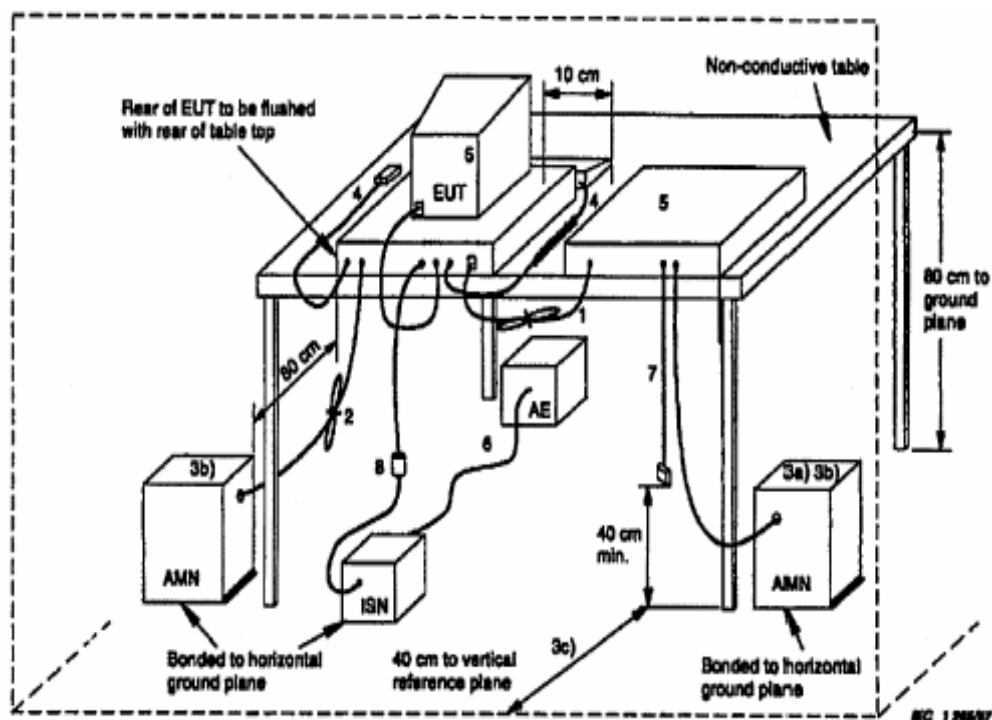
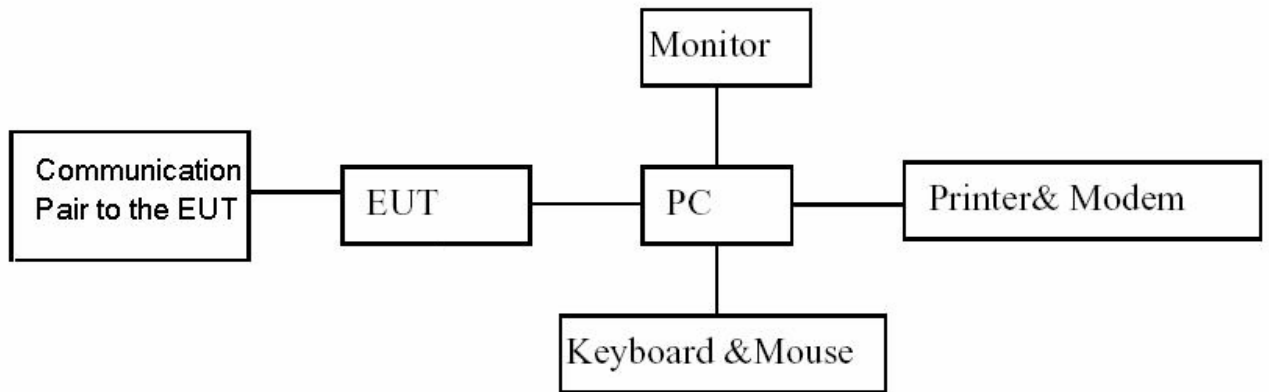


Diagram 3 of Operation Mode Configuration for the EUT



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5 Test Results EMISSION

5.1 Radiated Emission FCC Part 15 Per Section 15.109(e)

RESULT:

Pass

Date of testing	:	08.Jan.2009
Test specification	:	FCC Part 15 Per Section 15.109(e)
Limits	:	FCC Part 15 Per Section 15.109(a) FCC Part 15 Per Section 15.209(a) at 3m distance FCC Part 15 Per Section 15.31(f)(2)
Test procedure	:	Procedure specified in ANSI C63.4
Deviations from Standard Test procedures	:	None
Kind of test site	:	3m Semi-anechoic chamber
Operation mode	:	On with maximum net speed
Power supply	:	AC 120V/60Hz
Temperature	:	24°C
Humidity	:	42%

Test procedure:

1. The EUT was placed on the top of a rotatable table 0.8 meters above the ground with 3-orthogonal direction and be kept close enough to the receiving antenna. The table was rotated 360 degrees to determine the suspected emission frequency and the position of the worst radiation case with both horizontal and vertical antenna polarization.
2. The EUT was then set 3 meters away from the receiving antenna, which was mounted on a variable-height antenna tower.
3. For each suspected emission frequency recorded in step 1, the EUT was arranged to its worst case that the antenna was tuned to heights from 1 meter to 4 meters (for frequency above 30MHz) and the rotatable table was turned from 0 degree to 360 degree to read the maximum emission.

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Table 2: Radiated Emission

Frequency	Final Reading *3)			Ant. Polarity	Correction Factor *4)	Limit		
	QP	AV	PK			QP	AV	PK
[MHz]	[dB μ V/m]			(H/V)	dB	[dB μ V/m]		
0.5647	53.5	N/A	N/A	*1)	20.1	72.5	N/A	N/A
7.419	33.1	N/A	N/A	*1)	20.1	69.5	N/A	N/A
33.438	37.8	N/A	N/A	V	21.2	40.0	N/A	N/A
38.903	36.2	N/A	N/A	V	23.5	40.0	N/A	N/A
400.014	35.7	N/A	N/A	V	18.3	46.0	N/A	N/A
500.012	40.7	N/A	N/A	V	20.3	46.0	N/A	N/A
30.925	35.2	N/A	N/A	H	21.2	46.0	N/A	N/A
250.032	41.6	N/A	N/A	H	14.9	46.0	N/A	N/A
400.012	36.4	N/A	N/A	H	18.3	46.0	N/A	N/A
500.010	40.38	N/A	N/A	H	20.3	46.0	N/A	N/A
625.032	42.6	N/A	N/A	H	22.8	46.0	N/A	N/A
* 2)								

*1) A calibrated loop antenna is positioned with its plane vertical at the specified distance for the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT.

*2) Measurement is made from 9 kHz to 1000 MHz. Disturbances other than those mentioned above are small or not detectable.

*3) Final Readings are given by the test system software directly with the internal data processing formula: Final Level (dB μ V/m) = Raw Reading data (dB μ V/m) + Correction Factor(dB)

*4) Correction Factor (dB) = Antenna Factor (dB) + Cable Factor (dB)

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5.2 Conducted Emission for FCC Part 15 Per Section 15.107(c)

RESULT:

Pass

Date of testing	:	08.Jan.2009
Test specification	:	FCC Part 15 Per Section 15.107(c)
Limits	:	FCC Part 15 Per Section 15.107(c)(2)
Test procedure	:	Procedure specified in ANSI C63.4 were followed
Deviations from Standard Test procedures	:	None
Kind of test site	:	3m Semi-anechoic chamber
Operation mode	:	On with maximum net speed
Power supply	:	AC 120V/60Hz
Temperature	:	24°C
Humidity	:	42%

Test procedure:

1. Place the EUT as specified in ANSI C63.4 Clause 7.2.1
2. Plug the LISN to a correct power source (pay attention to: AC/DC, voltage, frequency).
4. Connect the EUT to LISN and choose N or L1 on the LISN.
5. Connect measurement receiver and LISN with a 50-ohm coaxial cable and a pulse limiter then begin exploratory measurement as specified in ANSI C63.4 Clause 7.2.3
6. Make final measurement as specified in ANSI C63.4 Clause 7.2.4
7. Switch to the other line on the LISN and repeat step 4 to 6.

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Table 3: Disturbance Voltage on AC Mains

Frequency	Line	Final Level *2)		Quasi-peak Limit	Average Limit	Correction Factor *3)
		QP	AV			
[MHz]	L/N	[dB μ V]	[dB μ V]	[dB μ V]	[dB μ V]	[dB]
0.951	L	45.0	36.2	60.0	60.0	9.8
0.991	L	41.4	30.2	60.0	60.0	9.8
1.119	L	44.2	34.5	60.0	60.0	9.8
1.379	L	47.9	39.3	60.0	60.0	9.8
1.551	L	45.2	36.5	60.0	60.0	9.8
1.655	L	50.6	42.4	60.0	60.0	9.8
0.691	N	45.8	37.3	60.0	60.0	9.8
0.819	N	45.2	37.0	60.0	60.0	9.8
1.011	N	40.1	28.9	60.0	60.0	9.8
1.095	N	43.2	33.9	60.0	60.0	9.8
1.111	N	44.1	34.5	60.0	60.0	9.8
1.571	N	43.8	34.9	60.0	60.0	9.8
*1)						

*1) Measurement is made from 535 kHz to 1705 kHz. Disturbances other than those mentioned above are small or not detectable.

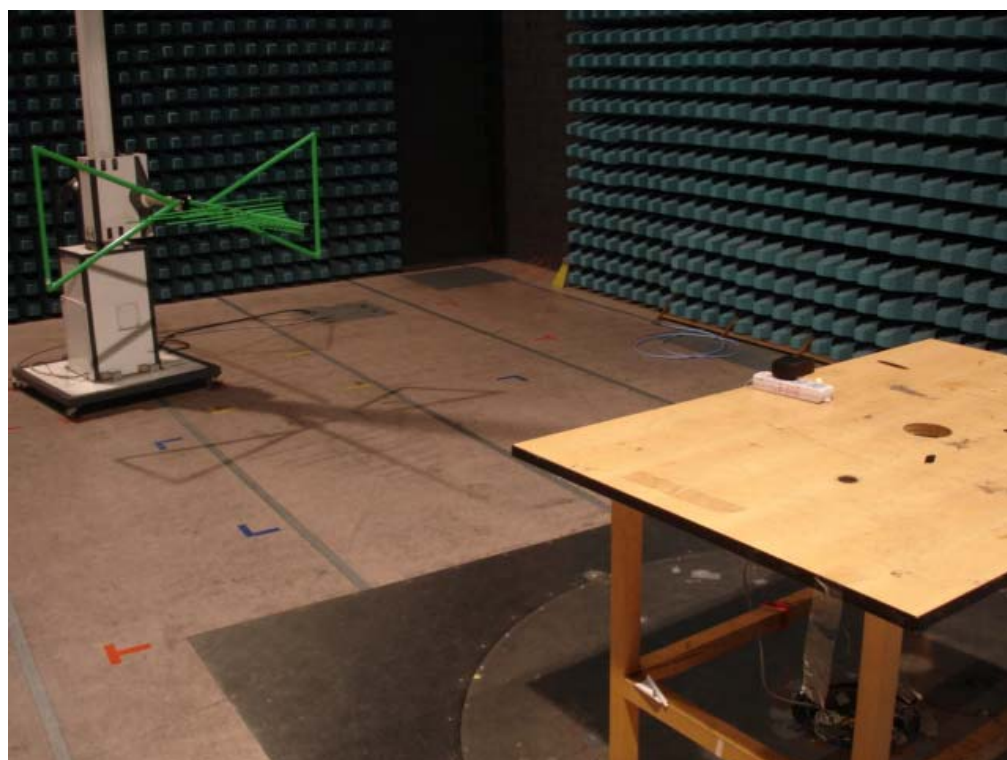
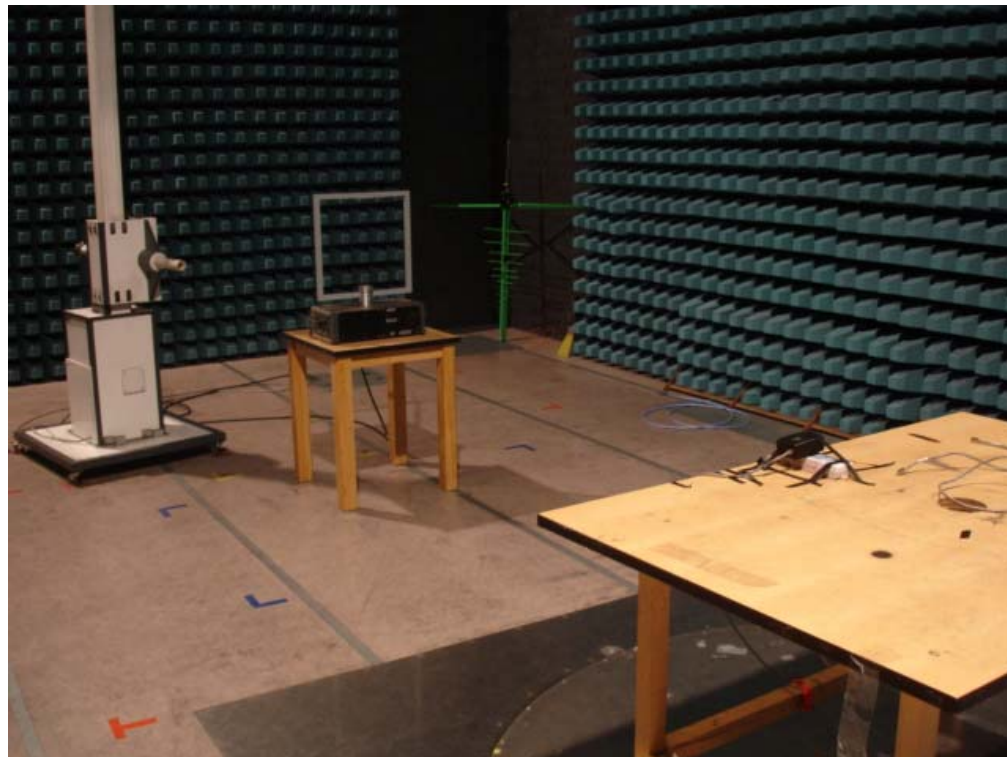
*2) Final Readings are given by the test system software directly with the internal data processing formula: Final Level (dB μ V) = Raw Reading data (dB μ V) + Correction Factor (dB)

*3) Correction Factor (dB) = LISN Factor (dB) + Cable Factor (dB) + Pulse limiter Factor (dB)

If the result of the measurement with the Quasi Peak detector is below the Average limit, the measurement with Average Detector may be omitted.

6 Photographs of the Test Set-Up

Photograph 1: Set-up for Radiated Emission Measurement



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Photograph 2: Set-up for Conducted Emission Measurement



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