Prüfbericht-Nr.: *Test Report No.:*	**50266112 001**	**Auftrags-Nr.:** *Order No.:*	238103157	Seite 1 von 26 *Page 1 of 26*
Kunden-Referenz-Nr.: *Client Reference No.:*	N/A	**Auftragsdatum:** *Order date:*	March 19, 2019	
Auftraggeber: *Client:*	Acrox Technologies Co., Ltd. 4F., No.89, Minshan St. TW-114 Neihu Dist., Taipei City Taiwan,R.O.C.			
Prüfgegenstand: *Test item:*	Wireless Optical Mouse			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	NS-PWM3R,NS-PWM3R-C,NS-PWM3,NS-PWN3-C,NS-PWM3B,NS-PWN3B-C			
Auftrags-Inhalt: *Order content:*	FCC Part15C / ISED RSS-210 Test report			
Prüfgrundlage: *Test specification:*	FCC 47CFR Part 15: Subpart C Section 15.249 RSS-210 issue 9 (08-2016) Annex B.10			

Wareneingangsdatum: *Date of receipt:*	06/12/2019
Prüfmuster-Nr.: *Test sample No.:*	A000935550-002 A000935550-001
Prüfzeitraum: *Testing period:*	14-Jun-2019 - 24-Jun-2019
Ort der Prüfung: *Place of testing:*	EMC/RF Laboratory Taipei
Prüflaboratorium: *Testing laboratory:*	TUV Rheinland Taiwan Ltd.
Prüfergebnis*: *Test result*:*	Pass

Report date / *tested by*:

02-Jul-2019 Mars Y.J. Lin/Project Engineer

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

kontrolliert von / *reviewed by*:

02-Jul-2019 Arvin Ho/Vice General Manager

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other*:

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT
RESULT: Passed

5.1.2 FIELD STRENGTH OF FUNDAMENTAL
RESULT: Passed

5.1.3 99% BANDWIDTH
RESULT: Passed

5.1.4 SPURIOUS EMISSION
RESULT: Passed

5.2.1 CONDUCTED EMISSIONS LINE AND NEUTRAL
RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS
RESULT: Passed

Contents

1. General Remarks

1.1 Complementary Materials

These attachments are integral parts of this test report.
Appendix P: Photo Documentation
(File Name: 50266112APPENDIX P)
Appendix D: Test Result of Radiated Emissions
(File Name: 50266112APPENDIX D)

Test Specifications
The following standards were applied.

Table 1: Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.249 RSS-210 issue 9 (08-2016) RSS-Gen, Issue 4, November 2014 ANSI C63.10:2013

1.2 Decision Rule of conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard

2. Test Sites

2.1 Test Laboratory

TUV Rheinland Taiwan Ltd.
Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

TUV Rheinland Taiwan Ltd.

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

FCC RegistrationNo.: 180491
IC Canada Registration No.: 9465A
TAF Accredited NCC Test Lab. No.:3567
TAF ISO17025 Certification effective period: 6th-May-2019 to 05th-May-2022

Testing Laboratory
3567

2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manu-facturer	Type	S/N	Last Calibration	Next Calibration
Test Software	Audix	e3	Ver.9	N/A	N/A
EMI Test Receiver	R&S	ESR 7	101549	2018/11/12	2019/11/10
Spectrum Analyzer	R&S	FSV 40	101514	2019/02/07	2020/02/07
EXA Signal Analyzer	KEYSIGHT	N9010A	MY52221334	2018/06/04	2019/07/03
Preamplifier (30MHz -1GHz)	Hewlett Packard	8447D	2944A06641	2018/08/31	2019/08/31
Preamplifier (18 GHz -40 GHz)	EMC Instruments	EMC184045SE	980652	2019/02/25	2020/02/25
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	60649	2018/08/24	2019/08/24
Bilog Antenna	TESEQ	CBL6111D	29804	2018/07/02	2019/07/02
Horn Antenna	ETS-Lindgren	3117	218931	2018/12/27	2019/12/27
Horn Antenna (18GHz~40GHz)	COM-POWER	AH-840	101029	2018/12/22	2019/12/22
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	2018/06/21	2019/07/21
EMI Test Receiver	R&S	ESR 7	101549	2018/11/12	2019/11/10
LISN	R&S	ENV216	101262	2018/07/10	2019/07/10
EXA Signal Analyzer	KEYSIGHT	N9010A	MY53470241	2019/02/15	2020/02/15

2.4 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.5 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 basics using in house standards or comparisons.

2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are ±3dB.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
RF power, conducted	± 1.5 dB
Adjacent channel power	± 3 dB
Radiated emission of transmitter, valid up to 26 GHz	± 6 dB
Radiated emission of receiver, valid up to 26 GHz	± 6 dB
Temperature	± 2 ºC
Humidity	± 10 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a 2.4GHz Wireless mouse. It contains a 2.4GHz compatible module enabling the user to communicate data through a Wireless interface.
For details Refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 Ratings and System Details

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment	Wireless Optical Mouse
Type Designation	NS-PWM3R,NS-PWM3R-C,NS-PWM3,NS-PWN3-C,NS-PWM3B,NS-PWN3B-C
Brand Name	NS-PWM3
FCC ID	PRDMU72
Canada ID	6180A-G3Y
HVIN	G3Y

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	2405MHz~2470MHz
Channel Spacing	2 MHz
Channel number	8
Operation Voltage	1.5V (Battery)
Modulation	FSK

3.3 Independent Operation Modes

Basic operation modes are:

A. Transmitting
   1. Low channel
   2. Middle channel
   3. High channel

B. Receiving
   1. Low channel
   2. Middle channel
   3. High channel

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum emission level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: Test samples are provided with a modified FW which makes it possible to control them through a button on the Mouse.

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 3.3 as appropriate.

Full test was applied on all test modes, but only worst case was shown.

Test Software	HID_Tool_1123_v1.01.exe

Frequency list (MHz)	
2405	2440
2413	2450
2422	2460
2430	2470

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

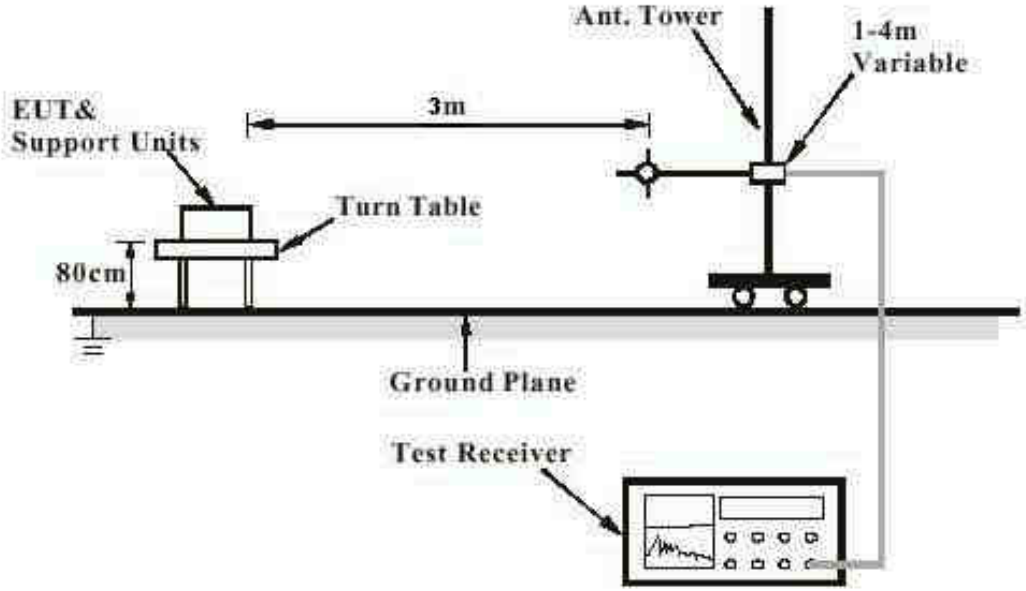
Description	**Manufacturer**	**Model No.**	**Serial No.**
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

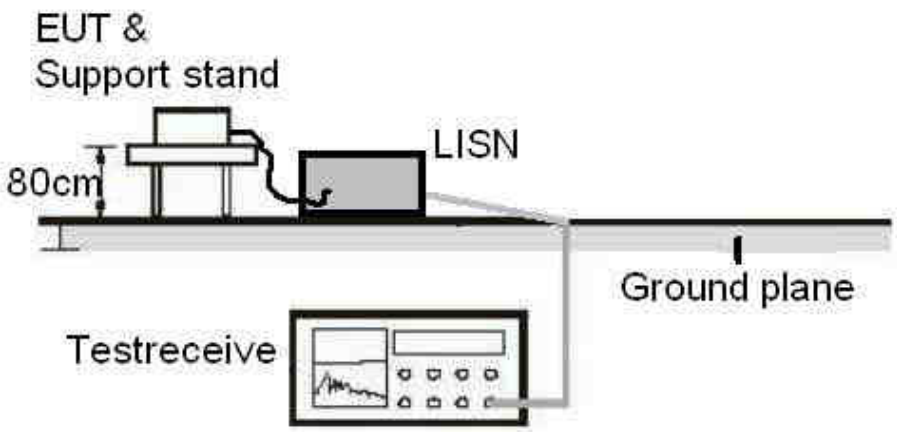
4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Standard	:	Part 15.203 and RSS-Gen 6.8
Requirement	:	use of approved antennas only

The antenna is a printed PCB trace with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

5.1.2 Field strength of fundamental

RESULT: **Passed**

Test standard	:	FCC Part 15.249(a), RSS-210 B.10
Basic standard	:	ANSI C63.10:2013
Kind of test site	:	Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A
Ambient temperature	:	22-26 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

In the table below the maximum results found are reported.

For detailed results of all frequencies tested, please Refer to Appendix D.

Table 6: Test result of Field strength of fundamental

TX Frequency (MHz)	Antenna Orientation	Detector Mode	Peak Power Frequency (MHz)	Peak Power Level (dBuV/m)	Limit (dBuV/m)	Result
2405	Horizontal	Peak	2404.472	67.62	114.00	PASS
		Average	2404.472	64.7	94.00	PASS
	Vertical	Peak	2404.478	53.7	114.00	PASS
		Average	2404.478	49.77	94.00	PASS
2430	Horizontal	Peak	2430.45	66.58	114.00	PASS
		Average	2430.45	63.53	94.00	PASS
	Vertical	Peak	2429.631	55.54	114.00	PASS
		Average	2429.631	51.41	94.00	PASS
2470	Horizontal	Peak	2470.411	66.43	114.00	PASS
		Average	2470.411	63.37	94.00	PASS
	Vertical	Peak	2470.528	58.69	114.00	PASS
		Average	2470.528	55.25	94.00	PASS

Remark: For details Refer to Appendix D.

5.1.3 99% Bandwidth

RESULT: **Passed**

Test standard	:	RSS-Gen
Basic standard	:	ANSI C63.10:2013
Kind of test site	:	Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A

Ambient temperature	:	22-26 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

Table 7: Test result of 99% Bandwidth

Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)
Low Channel	2405	2.2932
Mid Channel	2430	2.3118
High Channel	2470	2.3040

Test Plot of 99% Bandwidth

Low Channel

Middle Channel

High Channel

5.1.4 Spurious Emission

RESULT: **Passed**

Test standard	:	FCC part 15.249(d), FCC 15.205, FCC 15.209, RSS-210 B.10(b), RSS-Gen 6.13
Basic standard	:	ANSI C63.10:2013
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the radiated emission limits specified in FCC 15.209(a). Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in FCC 15.209(a) and FCC 15.249(a).
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A
Ambient temperature	:	Refer to Appendix D
Relative humidity	:	Refer to Appendix D
Atmospheric pressure	:	100-103 kPa

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic.

For details Refer to Appendix D.

The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report

5.2 Mains Conducted Emissions

5.2.1 Conducted Emissions Line and Neutral

RESULT: **Passed**

Test standard	:	FCC Part 15.207 FCC Part 15.107 RSS-Gen 7.2
Limits	:	Mains Conducted emissions as defined in above test standards must comply with the mains conducted emission limits specified
Kind of test site	:	Shielded Room

Test setup

Test Channel	:	Normal link
Operation mode	:	Normal link
Ambient temperature	:	Refer to Appendix D
Relative humidity	:	Refer to Appendix D
Atmospheric pressure	:	100-103 kPa

Remark: For details Refer to Appendix D.

6. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT: **Passed**

Test standard : FCC KDB Publication 447498 D01
RSS-102 issue 5, Table 1

FCC:
Since maximum peak output power of the transmitter is 0.00011 mW < 10mW, hence the EUT is excluded from SAR evaluation according to FCC KDB publication 447498: Mobile Portable RF Exposure

Canada:

Maximum conducted peak power: 0.00011 mW

Antenna Gain: 1.65 db -> x 1.462

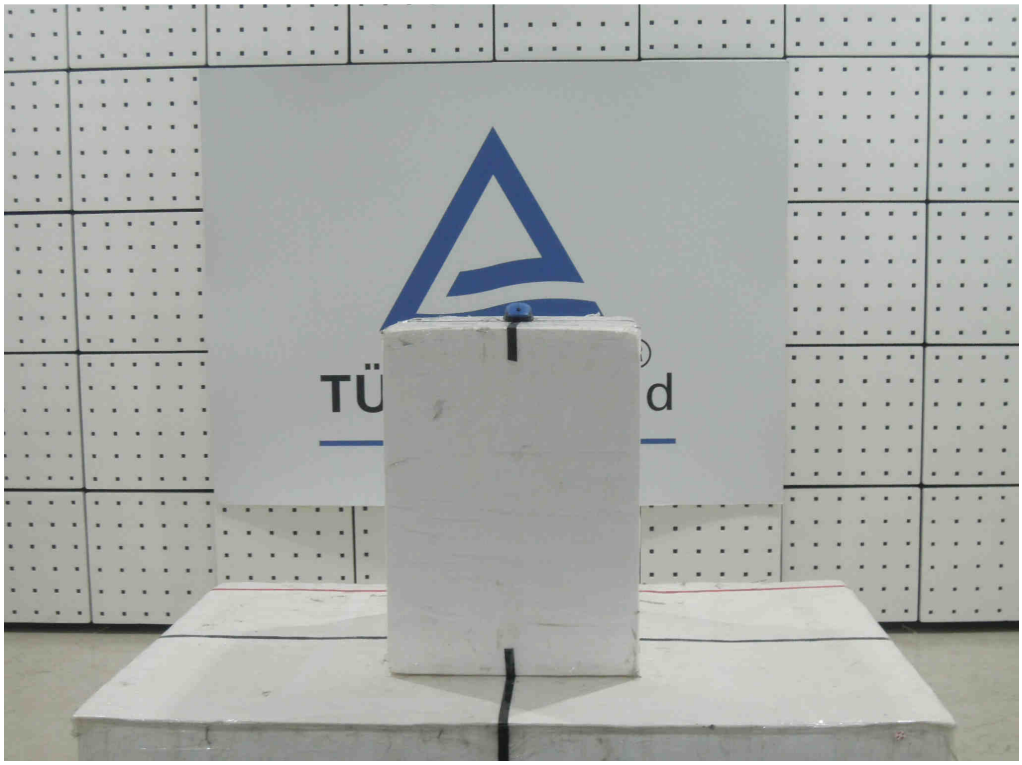
Maximum EIRP available 0.00016 mW

==========
Maximum Power available: 0.00016 mW
(higher of EIRP or conducted)

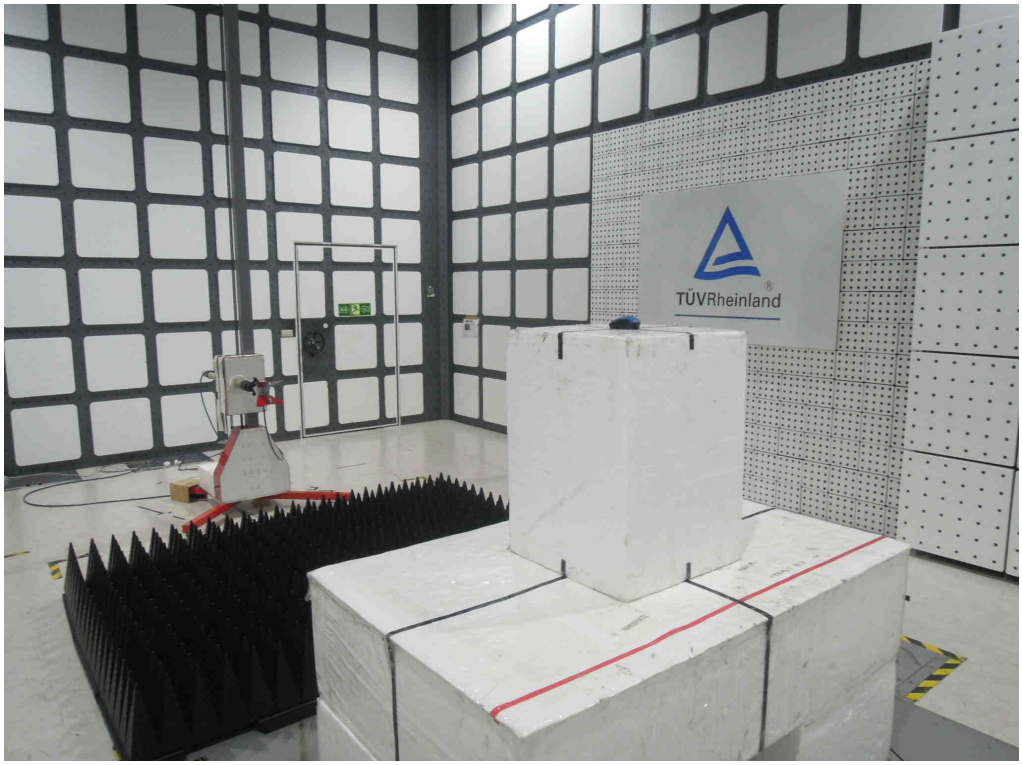
Since maximum output power of the transmitter is 0.00016 mW < 4mW, hence the EUT is excluded from SAR evaluation according to Table 1 in RSS-102

7. Photographs of the Test Set-Up

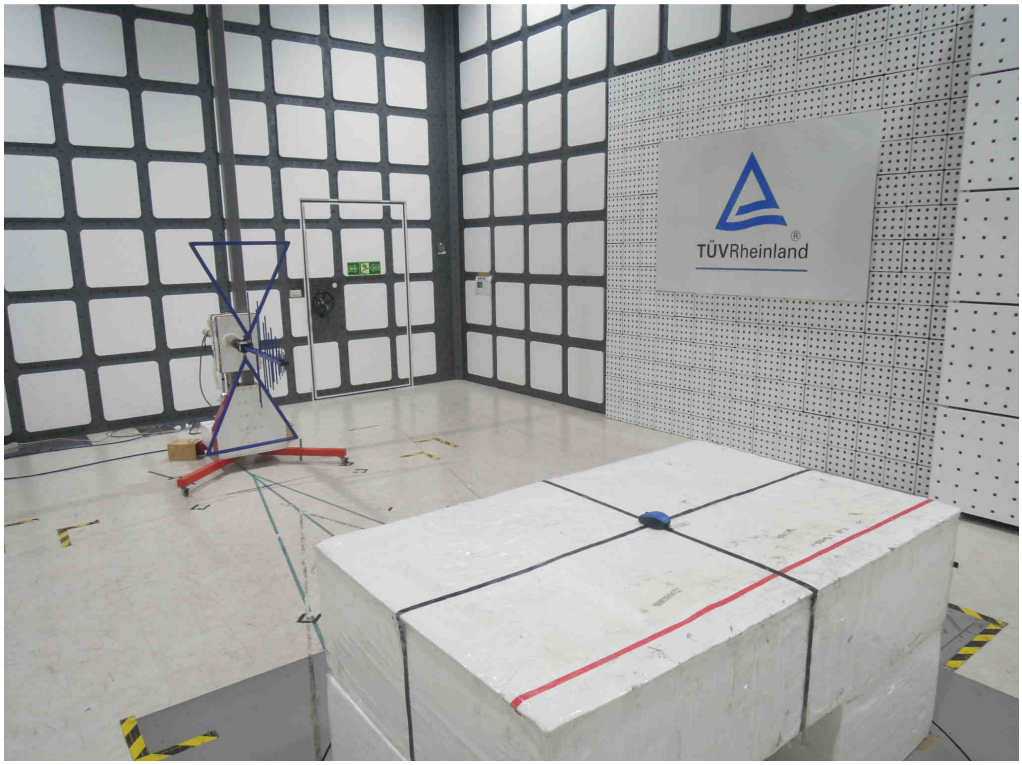
Photograph 1: Set-up for Radiated Emissions (Front View)



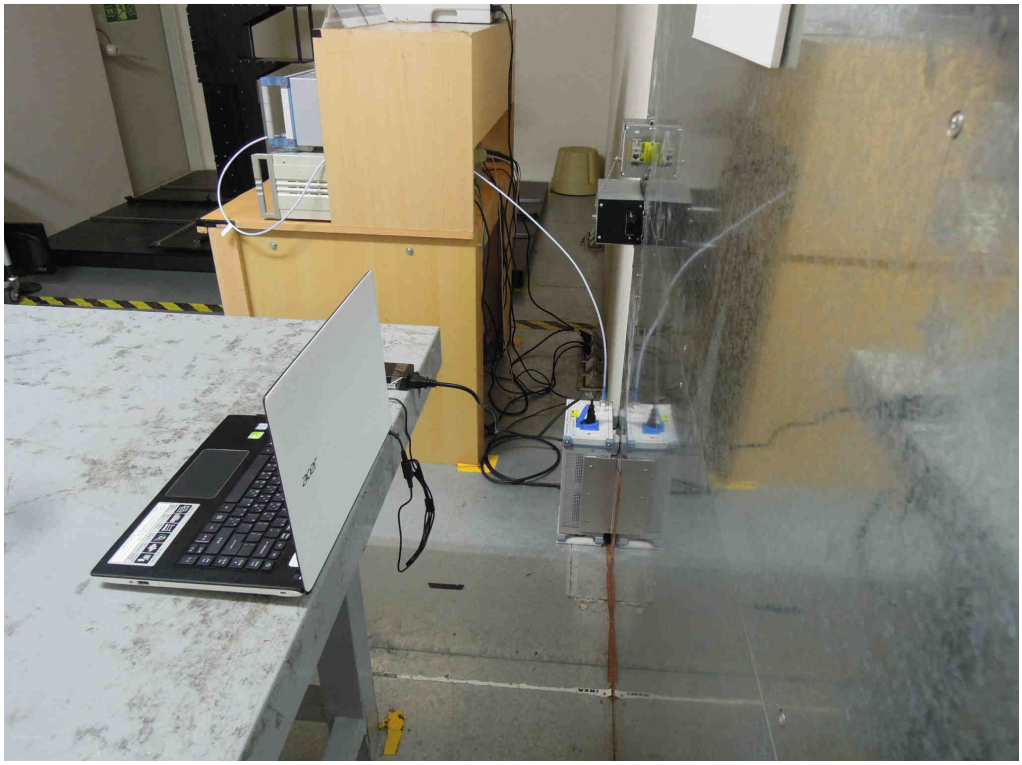
Photograph 2: Set-up for Radiated Emissions (Back View 1)



Photograph 3: Set-up for Radiated Emissions (Back View 2)



Photograph 4: Set-up for for Mains Conducted testing Back



Photograph 5: Set-up for for Mains Conducted testing Front

8. List of Tables

9. List of Photographs