Prüfbericht-Nr.: *Test Report No.:*	**10045004 001**	**Auftrags-Nr.:** *Order No.:*	114017241	Seite 1 von 24 *Page 1 of 24*
Kunden-Referenz-Nr.: *Client Reference No.:*	N/A	**Auftragsdatum:** *Order date:*	December 20, 2013	
Auftraggeber: *Client:*	ACROX Technologies Co., Ltd., 4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C.			
Prüfgegenstand: *Test item:*	2.4 GHz Dongle			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	MQ6			
Auftrags-Inhalt: *Order content:*	FCC Part 15C and IC test report			
Prüfgrundlage: *Test specification:*	FCC 47CFR Part 15: Subpart C Section 15.249 RSS-210 issue 8 (12-2010) Annex 2.9			

Wareneingangsdatum: *Date of receipt:*	12/24/2013
Prüfmuster-Nr.: *Test sample No.:*	A000033193-005
Prüfzeitraum: *Testing period:*	27-Dec-2013 - 31-Dec-2013
Ort der Prüfung: *Place of testing:*	EMC Laboratory Taipei
Prüflaboratorium: *Testing laboratory:*	TUV Rheinland Taiwan Ltd.
Prüfergebnis*: *Test result*:*	Pass

geprüft von / *tested by:*

2014-01-14	Danny S. C. Sung/Project Manager	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

kontrolliert von / *reviewed by:*

2014-01-14	Rene Charton/Senior Project 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 FIELD STRENGTH OF FUNDAMENTAL
RESULT: Passed

5.1.2 99% BANDWIDTH
RESULT: Passed

5.1.3 SPURIOUS EMISSION
RESULT: Passed

5.2.1 SPURIOUS EMISSION
RESULT: Passed

5.3.1 CONDUCTED EMISSIONS LINE AND NEUTRAL
RESULT: Passed

Contents

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:
Appendix P: Photo Documentation
(File Name: 10045004APPENDIX P)
Appendix D: Test Result of Radiated Emissions
(File Name: 10045004APPENDIX 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 8 (12-2010) Annex 2.9 ANSI C63.4:2009

2. Test Sites

2.1 Test Facilities

TUV Rheinland Taiwan Ltd.

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

FCC Registration No.: 365730
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2013-Jul-1st to 2016-Jun-30th

Testing Laboratory
0759

2.2 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	R&S	ESCI 7	101062	1-Sep-14
Bilog Antenna	TESEQ	CBL6111D	29802	29-Jun-14
Spectrum Analyzer	R&S	FSV 40	100921	10-Dec-14
Horn Antenna	ETS-Lindgren	3117	138160	10-Jan-14
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101031	29-Oct-15
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	2-Sep-14
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	2-Sep-14
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM30180	60558	23-Oct-14
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	28-Sep-14
EMI Test Receiver	R&S	ESCI	101094	29-Aug-14
LISN (1 phase)	R&S	ENV216	101243	5-Jun-14
LISN	Rolf Heine	NNB-2/16Z	99080	30-Aug-14

2.3 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.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements:.

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 set: A Wireless Mouse which sends control information to a Wireless Dongle, that can be inserted into a Computer. This report covers the Dongle
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	2.4 GHz Dongle
Type Designation	MQ6
Brand Name	
FCC ID	PRDRX09

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	2408 2440 2474 MHz
Channel Spacing	2 MHz minimum
Channel number	32
Operation Voltage	5 V
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 USBI interface which makes it possible to control them through a test software installed on a notebook computer.

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.

Emission Level Measurement Results are obtained with the EUT set to continuous transmission mode. The pulse timing of the actual operation mode is obtained by exercising the optical sensor of the mouse Mouse, in the normal operating mode, with a paper slip attached to the rotor of a DC Fan. Please also refer to the Photo in the Test Setup Section.

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

4.3 Special Accessories and Auxiliary Equipment

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

Kind of Equipment	Manufacturer	Model Name	S/N
Laptop	HP	HSTNN-Q78C-3	CNF0339QBM

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested containing the noise suppression parts as shown in the Photo Appendix and the Test Setup Photos. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

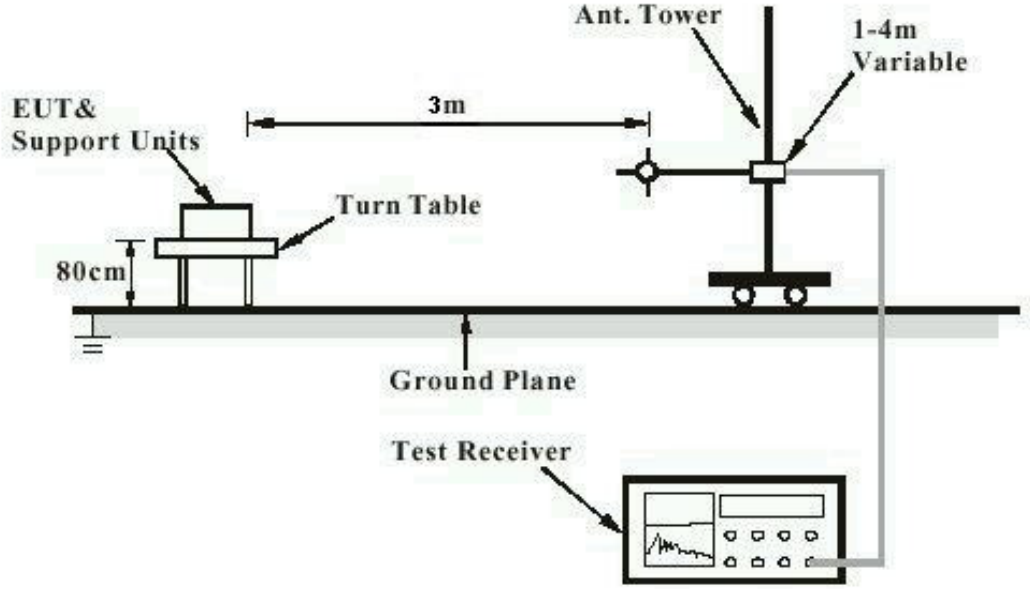
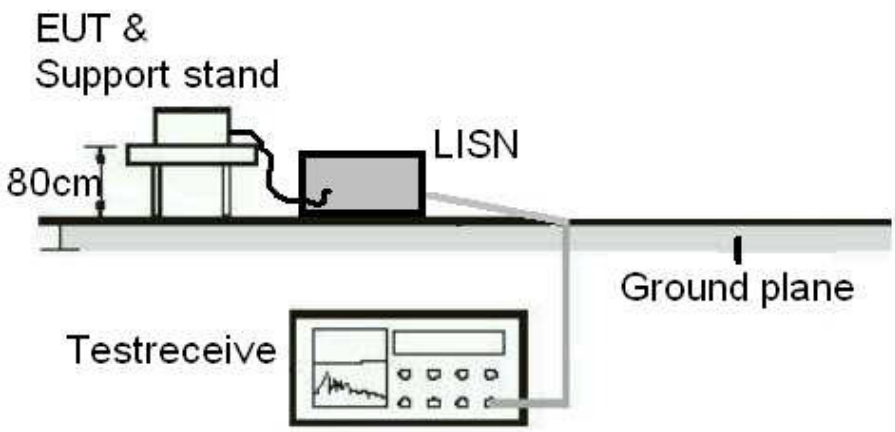


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Field strength of fundamental

RESULT: **Passed**

Test standard	:	FCC Part 15.249(a), RSS-210 A2.9 LP0002: 3.10.2(2)
Basic standard	:	ANSI C63.10:2009
Kind of test site	:	Semi-Anechoic Chamber

Test setup

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

The EUT employs pulsed operation.
The pulse width is: 480 us
Pulse repetition interval: 8 ms

The Tables below show calculated average values from the pulsed emissions measurement data, corrected with the worst case duty cycle factor over 100 msec.

The average values noted are calculated through the application of a duty cycle correction, according to part 15.35c

Duty cycle calculation:
Duty cycle correction (dB) = 20 log (480 us / 8 ms) = - 24 dB.

Test Plot pulse width

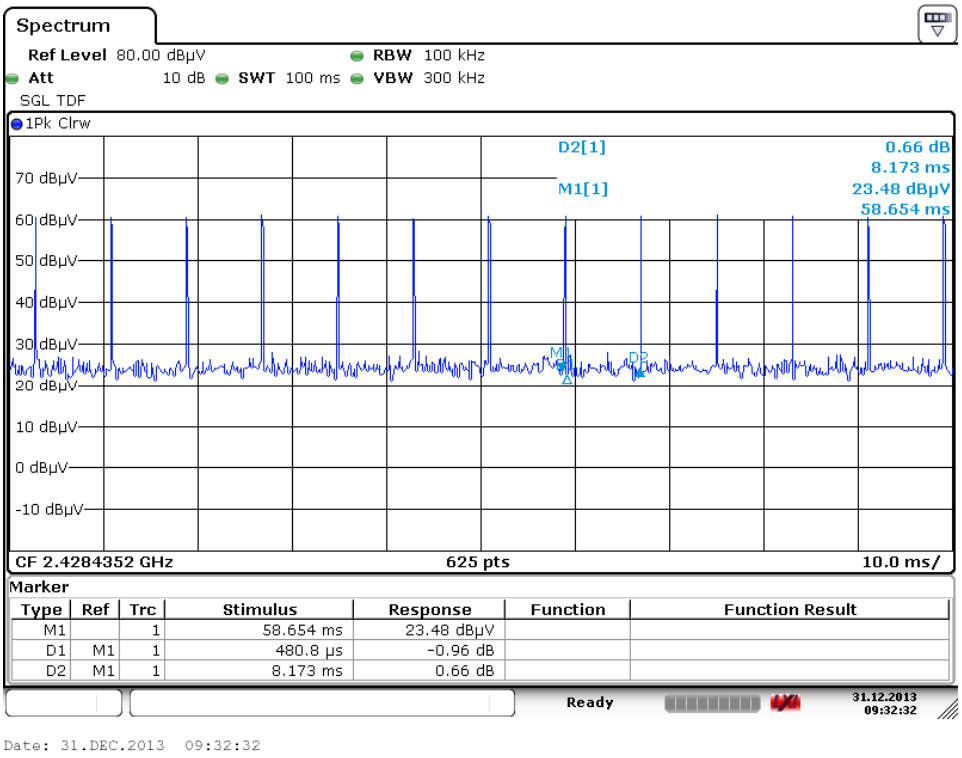


Table 6: Test result of Field strength of fundamental

Channel Frequency (MHz)	Test result			
	Level (dBuV/m)	Limit (dBuV/m)	Antenna orientation	Detector
2408	92.32	114	Horizontal	Peak
2408	<92.32	94		Average
2408	87.15	114	Vertical	Peak
2408	<87.15	94		Average
2440	91.91	114	Horizontal	Peak
2440	<91.91	94		Average
2440	89.29	114	Vertical	Peak
2440	<89.29	94		Average
2474	90.35	114	Horizontal	Peak
2474	<90.35	94		Average
2474	88.69	114	Vertical	Peak
2474	<88.69	94		Average

Remark: For details refer to Appendix D.

5.1.2 99% Bandwidth

RESULT: **Passed**

Test standard	:	RSS-Gen
Basic standard	:	ANSI C63.10:2009
Kind of test site	:	Semi-Anechoic Chamber

Test setup

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

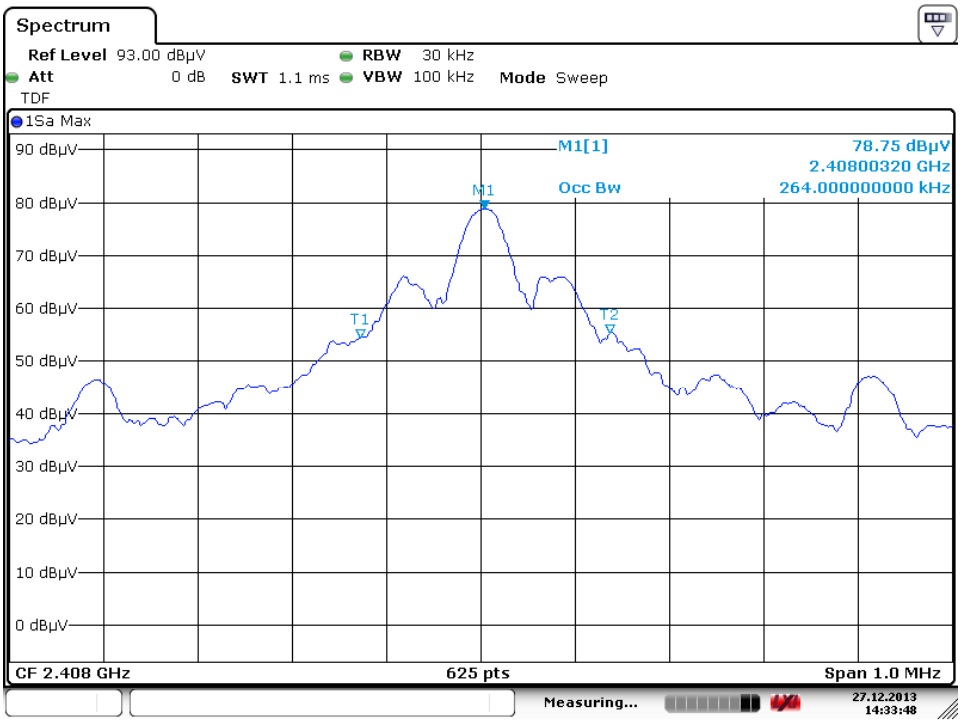
Ambient temperature	:	22-26 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

Table 7: Test result of 99% Bandwidth,

Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)	
Low Channel	2408	0.264	
Mid Channel	2440	0.292	
High Channel	2474	0.289	

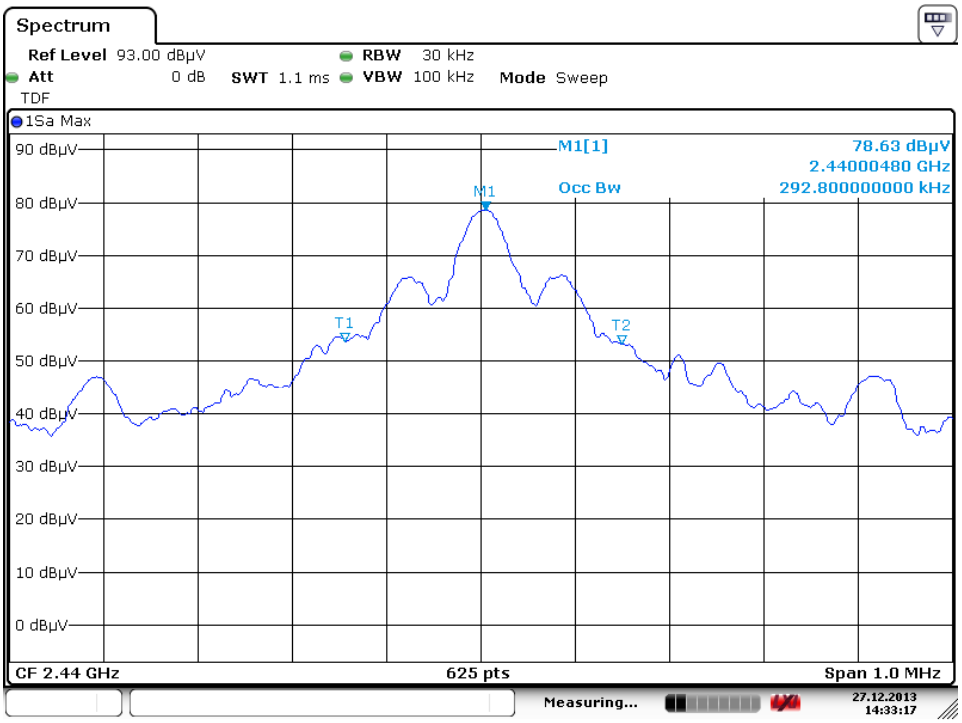
Test Plot of 99% Bandwidth

Low Channel



Date: 27.DEC.2013 14:33:48

Middle Channel



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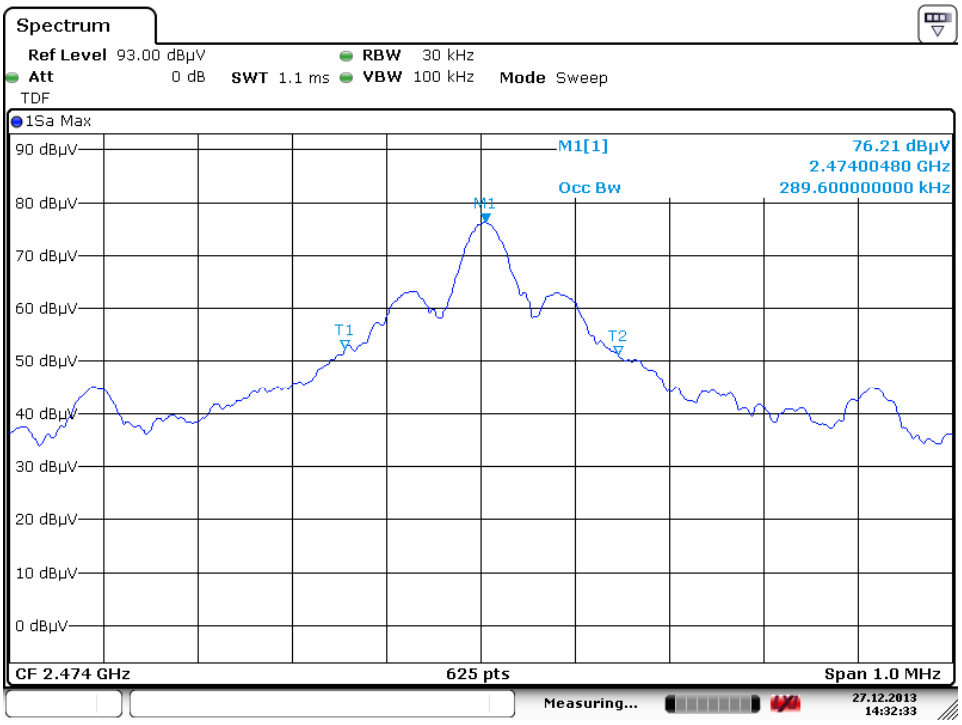
High Channel



Date: 27.DEC.2013 14:32:33

5.1.3 Spurious Emission

RESULT: **Passed**

Test standard	:	FCC part 15.249(d), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-210 A2.9(b), RSS-Gen 7.2.1
Basic standard	:	ANSI C63.10: 2009
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

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 X Axis orientation is the worst-case and recorded in this test report. Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

The EUT employs pulsed operation.
The pulse width is: 480 us
Pulse repetition interval: 8 ms

The average values shown in the appendix are measured with the EUT set to a continuous signal.
In case the limit of 54 dBuV is exceeded, the duty cycle correction factor according to part 15.35c is applied to the measurement result obtained with the peak detector.

Duty cycle calculation:
Duty cycle correction (dB) = 20 log (480 us / 8 ms) = - 24 dB.

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 7.2.4
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

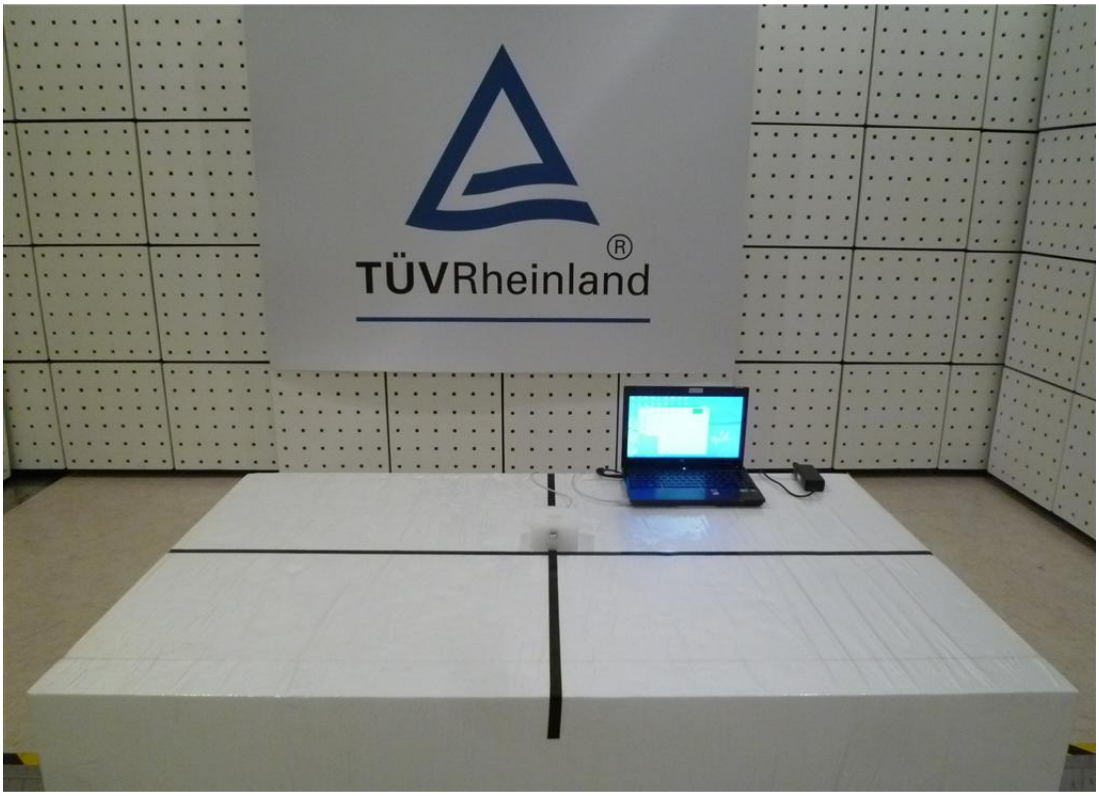
Test setup

Test Channel	:	Middle
Operation mode	:	Charging

Remark: For details refer to Appendix D.

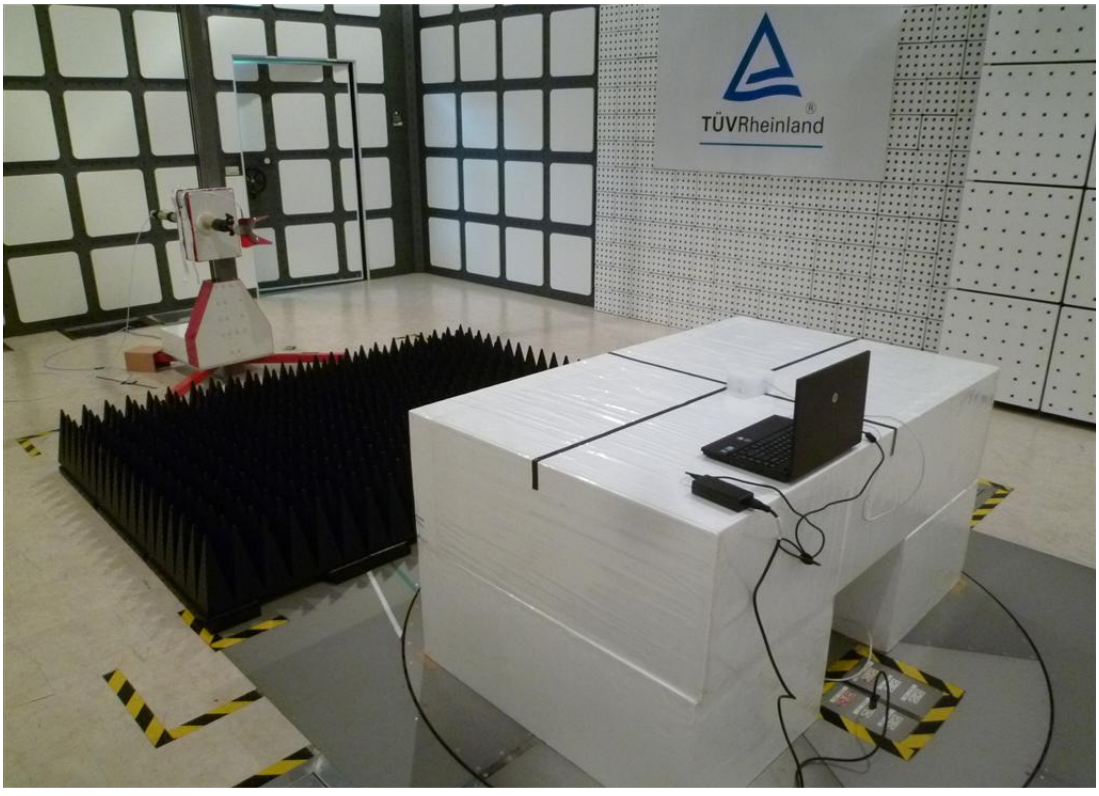
6. Photographs of the Test Set-Up

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

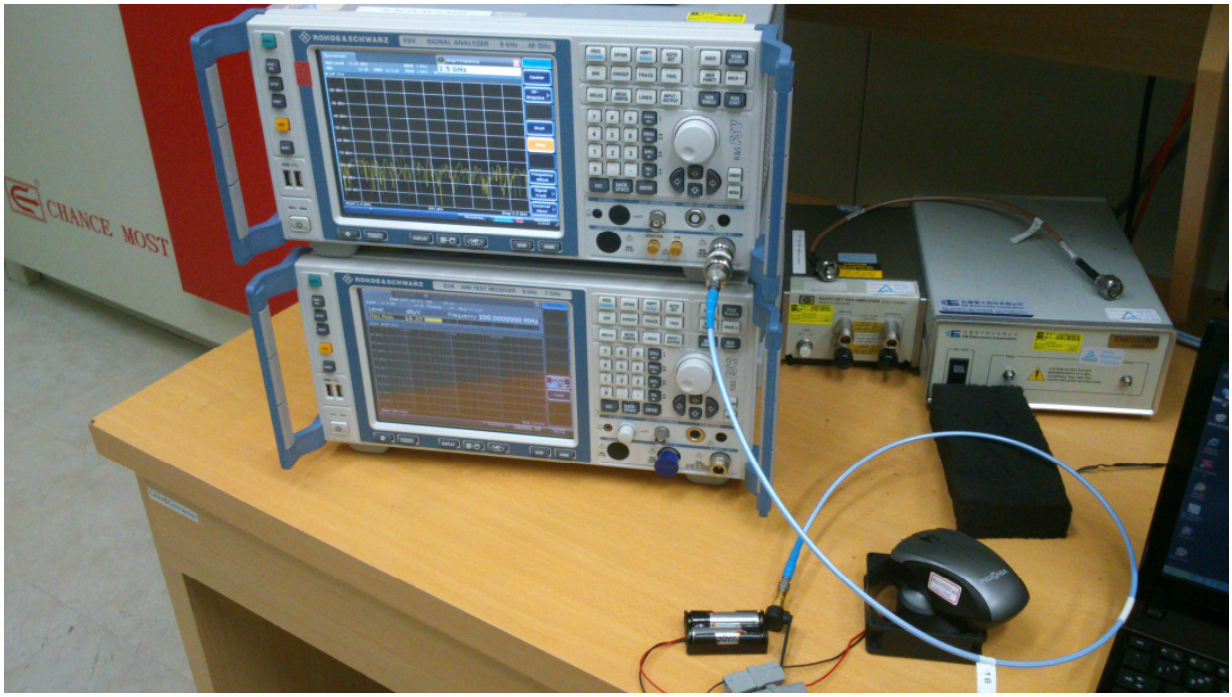


Photograph 2: Set-up for Spurious Emissions (Back View 1 TX)

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



Photograph 4: Set-up for Exercising Mouse in Normal Operation Mode



Photograph 5: Set-up for for Mains Conducted testing, Back

Photograph 6: Set-up for for Mains Conducted testing, Front

7. List of Tables

8. List of Photographs