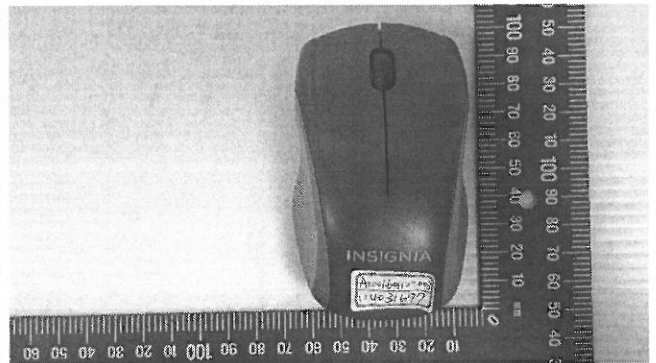


Prüfbericht-Nr.: Test Report No.:	10050128 002	Auftrags-Nr.: Order No.:	114031677	Seite 1 von 24 Page 1 of 24
Kunden-Referenz-Nr.: Client Reference No.:	N/A	Auftragsdatum: Order date:	23-Jan-2015	
Auftraggeber: Client:	ACROX Technologies Co., Ltd., 4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C.			
Prüfgegenstand: Test item:	2.4GHz mouse			
Bezeichnung / Typ-Nr.: Identification / Type No.:	NS-PNM6003-BU, NS-PNM6003-BK, NS-PNM6003-SV, NS-PNM6003-RD, NS-PNM6003-WH, NS-PNM6003-BU-C, NS-PNM6003-BK-C, NS-PNM6003-SV-C, NS-PNM6003-RD-C, NS-PNM6003-WH-C			
Auftrags-Inhalt: Order content:	FCC / 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:	23-Jan-2015			
Prüfmuster-Nr.: Test sample No.:	A000160112-004			
Prüfzeitraum: Testing period:	4-Feb-2015 - 3-Mar-2015			
Ort der Prüfung: Place of testing:	EMC Laboratory Taipei			
Prüflaboratorium: Testing laboratory:	TUV Rheinland Taiwan Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von / tested by: 2015-05-12 Ryan Chen/Project Engineer Datum Name / Stellung Unterschrift Date Name / Position Signature		kontrolliert von / reviewed by: 2015-05-12 Rene Charton/Senior Project Manager Datum Name / Stellung Unterschrift Date Name / Position Signature		
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt 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				
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. This test report only 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 test mark.				



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 SPURIOUS EMISSION

RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS

RESULT: Passed

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1. General Remarks

1.1 Complementary Materials

The following attachments are integral parts of this test report:

Appendix P: Photo Documentation

(File Name: 10050128APPENDIX P)

Appendix D: Test Result of Radiated Emissions

(File Name: 10050128-2APPENDIX 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, December 2010 RSS-Gen, Issue 4, November 2014 ANSI C63.4:2009, ANSI C63.10:2009 (FCC Part 15) ANSI C63.10:2013 (RSS-Gen)

2. Test Sites

2.1 Test Laboratory

TUV Rheinland Taiwan Ltd.
Taichung Branch Office

No.9, Lane 36, Minsheng Rd., Sec. 3, Daya District,
Taichung City 428
Taiwan (R.O.C.)

2.2 Test Facility

TUV Rheinland Taiwan Ltd.
Taipei Office

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

FCC Registration No.: 365730
IC Canada Registration No.: 9465A-1
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2013-Jul-1st to 2016-Jun-30th



Testing Laboratory
0759

2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Last Calibration	Next Calibration
EMI Test Receiver	R&S	ESR7	101062	31-Aug-14	30-Aug-15
Bilog Antenna	TESEQ	CBL6111D	29802	4-Jul-14	3-Jul-16
Spectrum Analyzer	R&S	FSV 40	100921	17-Dec-14	16-Dec-15
Spectrum Analyzer	Agilent	N9010A	MY53470241	1-Apr-15	30-Mar-16
Horn Antenna	ETS-Lindgren	3117	138160	12-Jan-15	11-Jan-17
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101031	30-Oct-13	29-Oct-15
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	23-Aug-14	22-Aug-15
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	26-Aug-14	25-Aug-15
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM30180	60558	4-Nov-14	3-Nov-15
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	22-Oct-14	21-Oct-15
EMI Test Receiver	R&S	ESCI7	100797	28-Dec-14	27-Dec-15
LISN (1 phase)	R&S	ENV216	101243	31-May-14	30-May-15
LISN	Rolf Heine	NNB-2/16Z	99080	26-Aug-14	25-Aug-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 basis using in house standards or comparisons.

2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are $\pm 3\text{dB}$.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
RF power, conducted	$\pm 1.5 \text{ dB}$
Adjacent channel power	$\pm 3 \text{ dB}$
Radiated emission of transmitter, valid up to 26 GHz	$\pm 6 \text{ dB}$
Radiated emission of receiver, valid up to 26 GHz	$\pm 6 \text{ dB}$
Temperature	$\pm 2 \text{ }^{\circ}\text{C}$
Humidity	$\pm 10 \text{ \%}$

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Wireless mouse operating in the 2.4 GHz Band
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	2.4GHz mouse
Type Designation	NS-PNM6003-BU-C, NS-PNM6003-BK-C, NS-PNM6003-SV-C, NS-PNM6003-RD-C, NS-PNM6003-WH-C
FCC ID	PRDMU33
Canada ID	6180A-GOM

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	2.408GHz-2.474GHz
Channel Spacing	2 MHz minimum
Channel number	34
Operation Voltage	1.5V
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 an internal test mode which makes it possible to select the operating channel.

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.

4.3 Special Accessories and Auxiliary Equipment

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

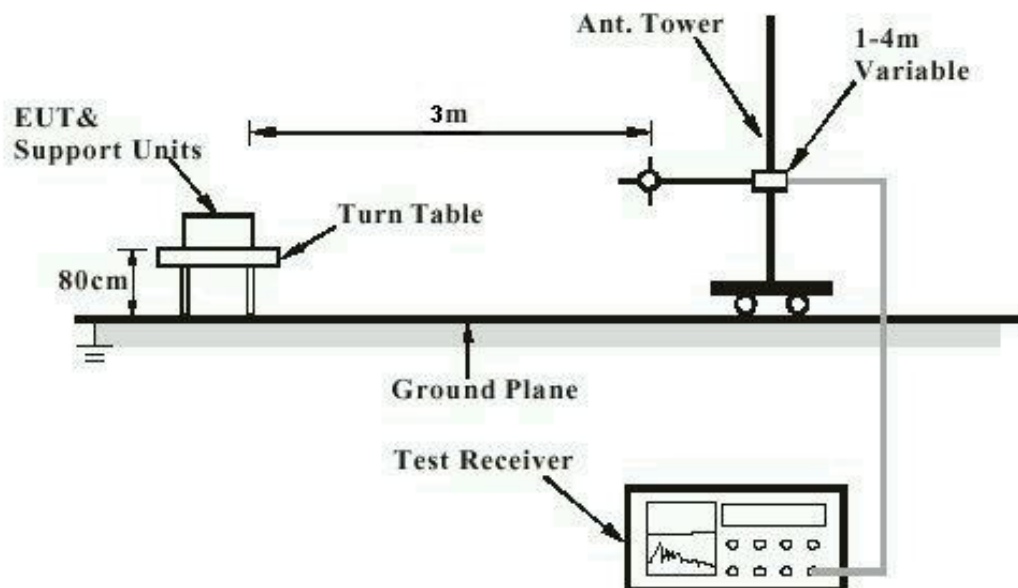
None.

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



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Passed**

Standard : LP0002(2011): 2.2
Part 15.203 and RSS-Gen 7.1.4
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 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: 874 us

Pulse repetition interval: 100 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

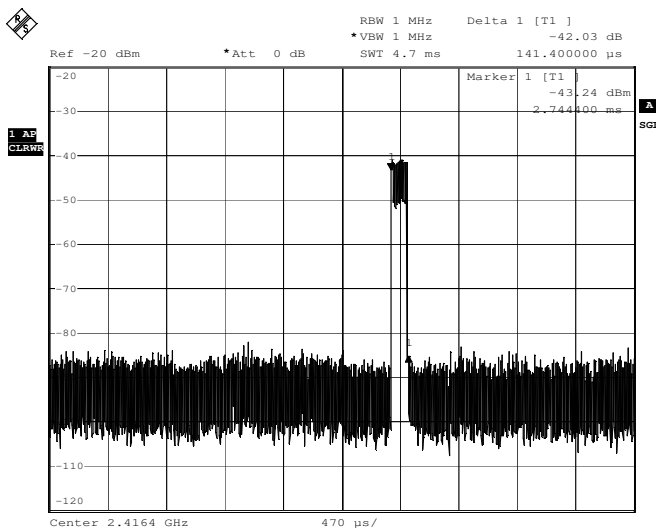
Duty cycle calculation:

Duty cycle correction (dB) = $20 \log (874 \text{ us} / 100 \text{ ms}) = -41 \text{ dB}$.

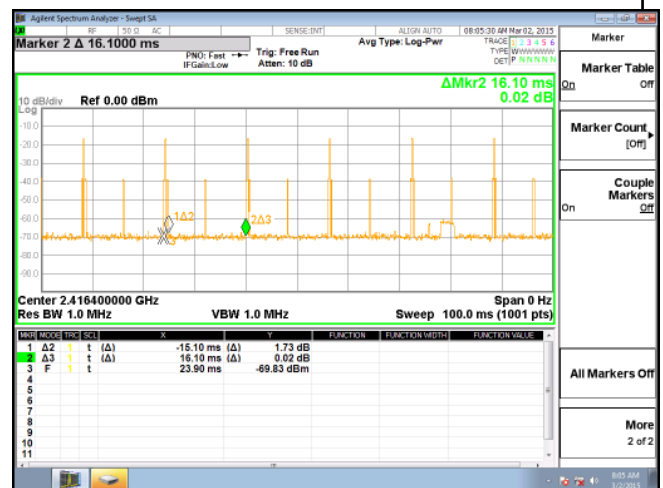
Table 6: Test result of Field strength of fundamental

Channel Frequency (MHz)	Test result			
	Level (dBuV/m)	Limit (dBuV/m)	Antenna orientation	Detector
2408	93.7	114	Horizontal	Peak
2408	52.7	94		Average
2408	83.83	114	Vertical	Peak
2408	42.83	94		Average
2440	93.29	114	Horizontal	Peak
2440	52.29	94		Average
2440	81.39	114	Vertical	Peak
2440	40.39	94		Average
2474	82.53	114	Horizontal	Peak
2474	41.53	94		Average
2474	82.06	114	Vertical	Peak
2474	41.06	94		Average

Remark: For details refer to Appendix D.

Duty Cycle Measurement:


Date: 2.MAR.2015 08:45:09



5.1.3 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

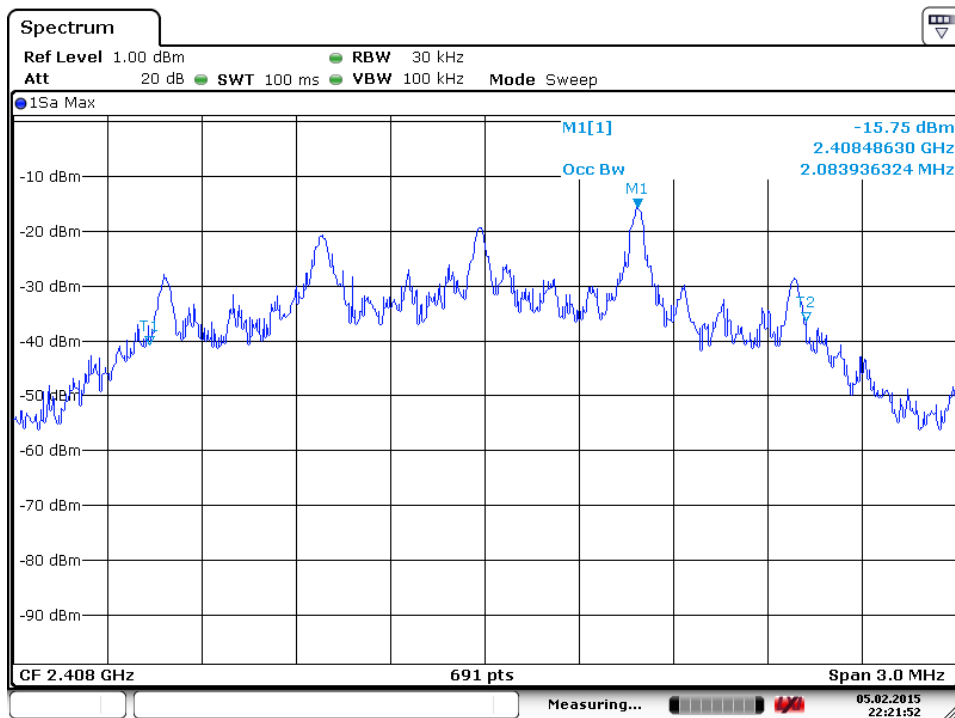
Ambient temperature : 22-26 °C
Relative humidity : 50-65 %
Atmospheric pressure : 100-103 kPa

Table 7: Test result of 99% Bandwidth,

Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)	
Low Channel	2408	2.084	
Mid Channel	2440	2.071	
High Channel	2474	2.119	

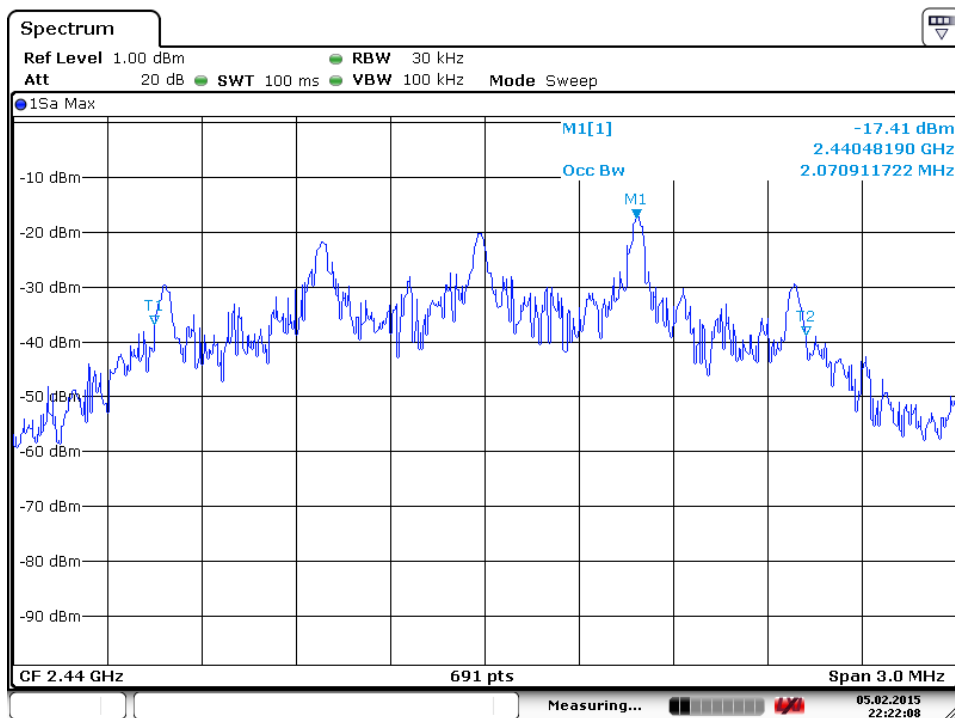
Test Plot of 99% Bandwidth

Low Channel

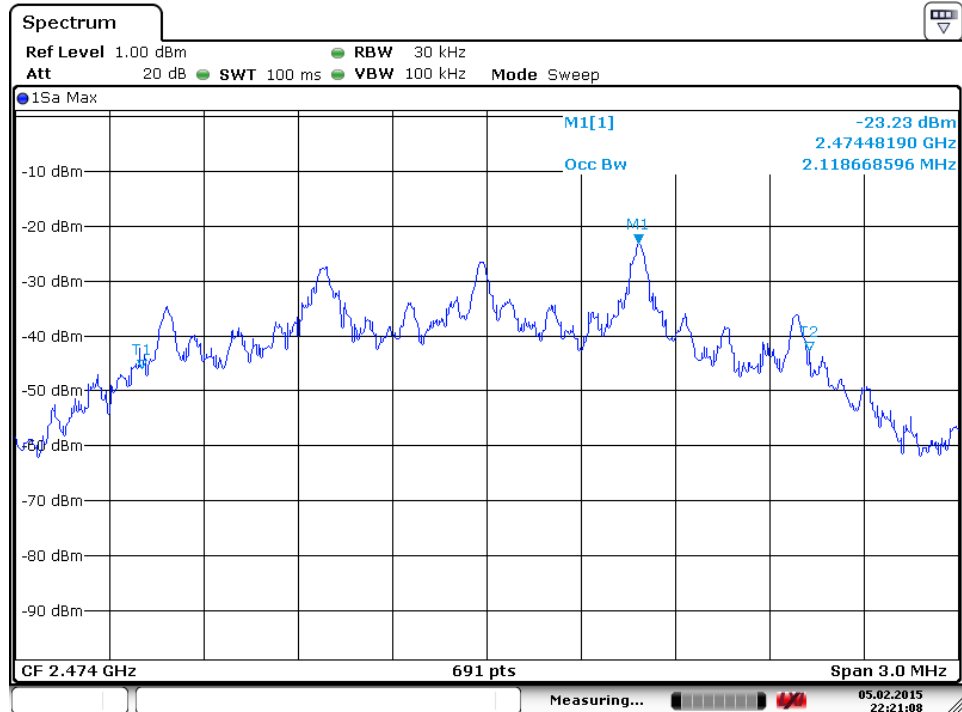


Date: 5.FEB.2015 22:21:52

Middle Channel



Date: 5.FEB.2015 22:22:08

High Channel


Date: 5.FEB.2015 22:21:08

5.1.4 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 8.9 LP0002: 2.8
Basic standard	:	ANSI C63.10
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) or 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.

6. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Passed**

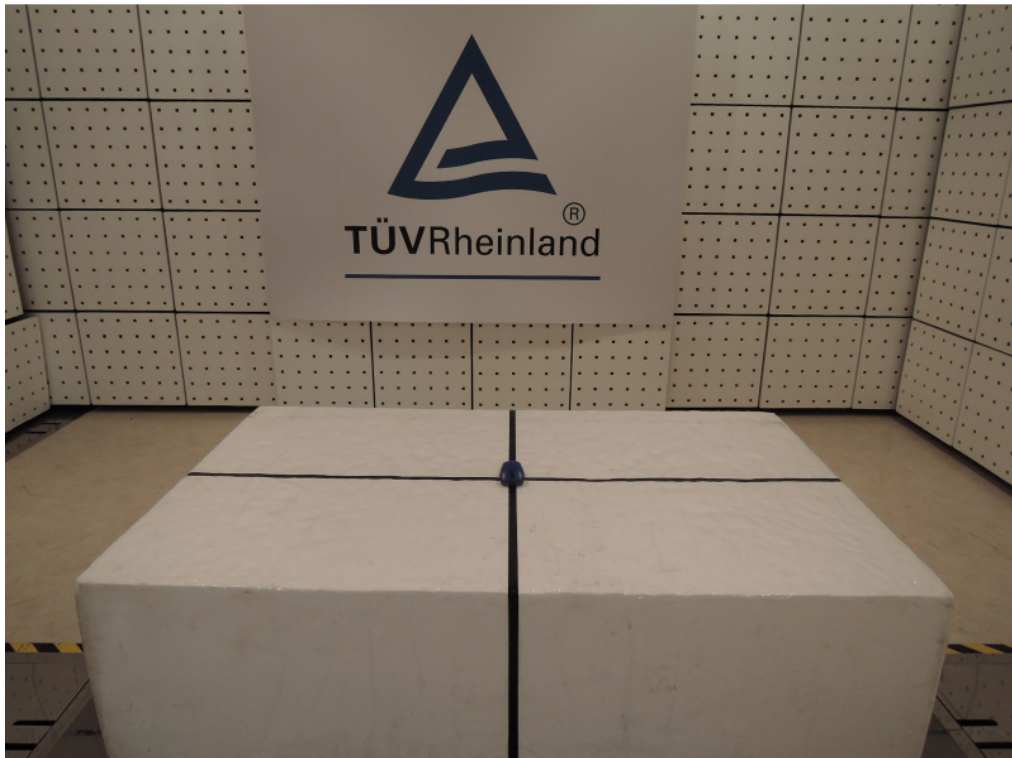
Test standard : FCC KDB Publication 447498

The maximum average field strength for this device is below 52.7 dBuV/m.

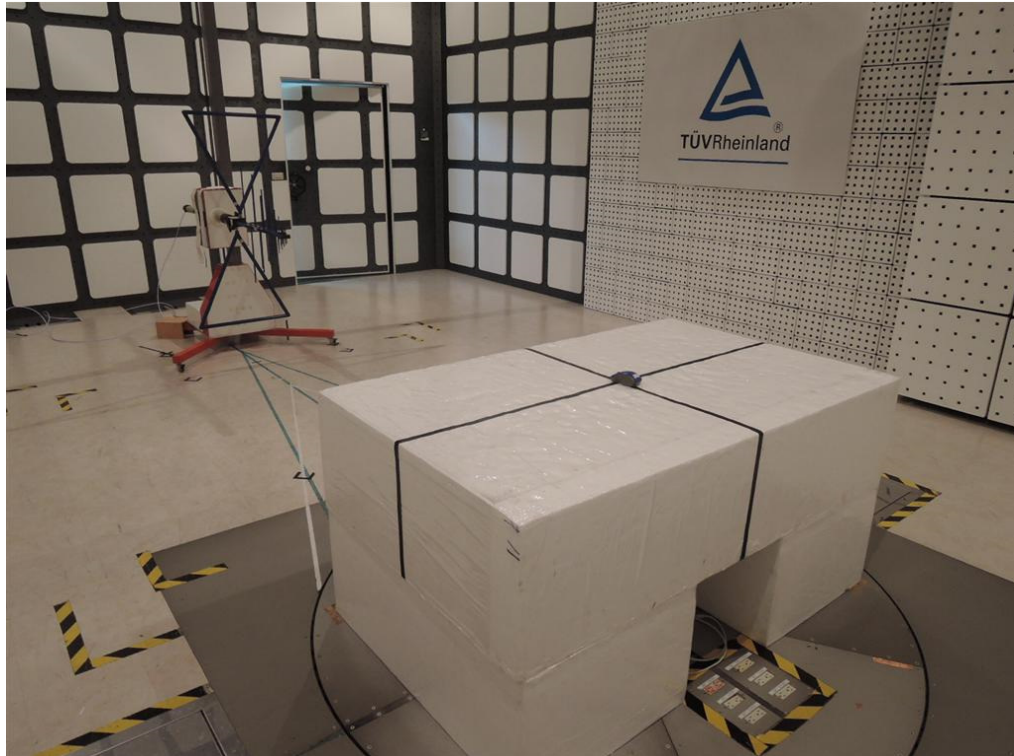
Therefore the maximum output power of the transmitter is < 1mW, hence the EUT is excluded from SAR evaluation according to FCC KDB publication 447498 D01 v05: Mobile Portable RF Exposure.

7. Photographs of the Test Set-Up

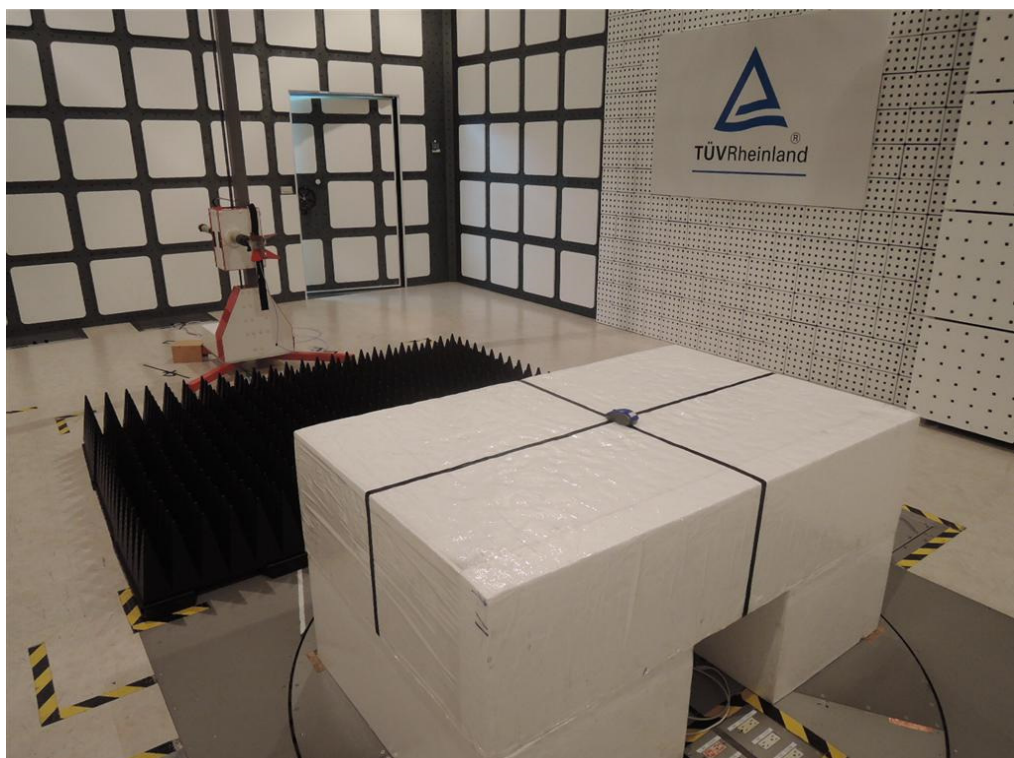
Photograph 1: Set-up for Spurious Emissions (Front View)



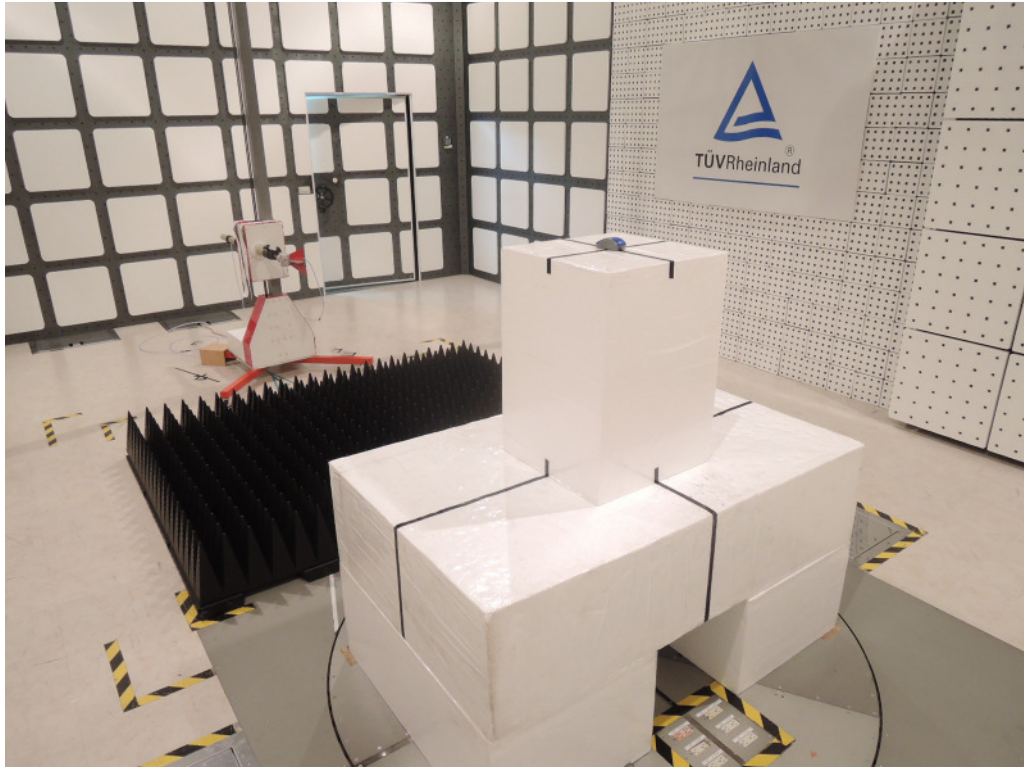
Photograph 2: Set-up for Spurious Emissions (Back View1 TX)



Photograph 3: Set-up for Spurious Emissions (Back View2 TX)



Photograph 4: Set-up for Spurious Emissions (Back View3 TX)



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