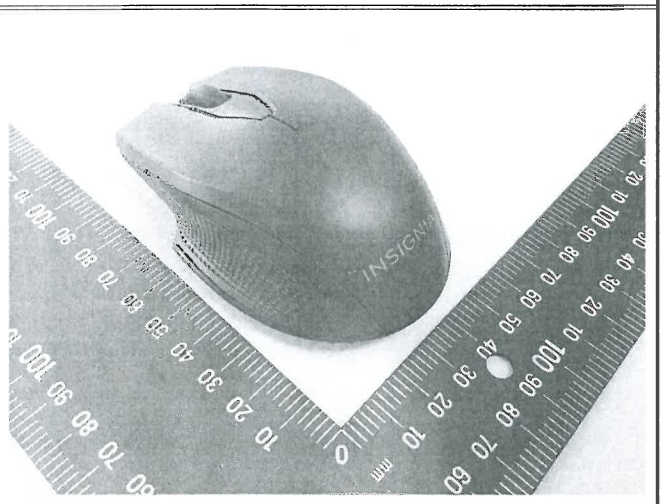
Prüfbericht-Nr.: *Test Report No.:*	**50041604 001**	**Auftrags-Nr.:** *Order No.:*	114048799	Seite 1 von 25 *Page 1 of 25*
Kunden-Referenz-Nr.: *Client Reference No.:*	N/A	**Auftragsdatum:** *Order date:*	March 25, 2016	
Auftraggeber: *Client:*	ACROX Technologies Co., Ltd., 4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C.			
Prüfgegenstand: *Test item:*	2.4 GHz Mouse			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	NS-PNM7013-BK ; NS-PNM7013-BL ; NS-PNM7013-RD;NS-PNM7013-BK-C ; NS-PNM7013-BL-C ; NS-PNM7013-RD-C;XXXX-PNMXXXXX-XXXXXXXXXX			
Auftrags-Inhalt: *Order content:*	FCC Part 15C / IC RSS-210 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:*	7-Apr-2016
Prüfmuster-Nr.: *Test sample No.:*	A000024807-006
Prüfzeitraum: *Testing period:*	7-Apr-2016 - 7-Apr-2016
Ort der Prüfung: *Place of testing:*	EMC Laboratory Taipei
Prüflaboratorium: *Testing laboratory:*	TUV Rheinland Taiwan Ltd.
Prüfergebnis*: *Test result*:*	Pass



geprüft von / *tested by:*			**kontrolliert von** / *reviewed by:*		
2016-05-10	Ryan W. T. Chen / Project Manager		2016-05-10	Rene Charton/Senior Project Manager	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other:*
XXXX-PNMXXXXX-XXXXXXXXXX (X can be A-Z, a-z, 0-9, "-" or blank, all models are identical except the model name or color)

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*

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

Contents

1. General Remarks 5
1.1 Complementary Materials 5
2. Test Sites 6
2.1 Test Laboratory 6
2.2 Test Facility 6
2.3 List of Test and Measurement Instruments 7
2.4 Traceability 8
2.5 Calibration 8
2.6 Measurement Uncertainty 8
3. General Product Information 9
3.1 Product Function and Intended Use 9
3.2 Ratings and System Details 9
3.3 Independent Operation Modes 10
3.4 Noise Generating and Noise Suppressing Parts 10
3.5 Submitted Documents 10
4. Test Set-up and Operation Modes 11
4.1 Principle of Configuration Selection 11
4.2 Test Operation and Test Software 11
4.3 Special Accessories and Auxiliary Equipment 11
4.4 Countermeasures to achieve EMC Compliance 12
4.5 Test Setup Diagram 12
5. Test Results 14
5.1 Transmitter Requirement & Test Suites 14
5.1.1 Antenna Requirement 14
5.1.2 Field strength of fundamental 15
5.1.3 99% Bandwidth 17
5.1.4 Spurious Emission 20
5.2 Receiver Requirement 21
5.2.1 Spurious Emission 21
6. Safety Human exposure 22
6.1 Radio Frequency Exposure Compliance 22
6.1.1 Electromagnetic Fields 22

7. PHOTOGRAPHS OF THE TEST SET-UP 23

8. LIST OF TABLES 25

9. LIST OF PHOTOGRAPHS 25

1. General Remarks

1.1 Complementary Materials

These attachments are integral parts of this test report.
Appendix P: Photo Documentation
(File Name: 50041604APPENDIX P)
Appendix D: Test Result of Radiated Emissions
(File Name: 50041604APPENDIX 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 C63.10:2013

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 RegistrationNo.: 799772
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
Test Software	Farad	EZ_EMC	Ver. TUV3A1	N/A	N/A
EMI Test Receiver	R&S	ESR7	101062	10-Sep-15	10-Sep-16
Spectrum Analyzer	R&S	FSV 40	100921	21-Dec-15	21-Dec-16
Spectrum Analyzer	Agilent	N9010A	MY53470241	15-Apr-15	15-Apr-16
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	31-Aug-15	31-Aug-16
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	19-Nov-15	19-Nov-16
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	060558	19-Nov-15	19-Nov-16
Bilog Antenna	TESEQ	CBL6111D	29802	4-Jul-14	4-Jul-16
Horn Antenna	ETS-Lindgren	3117	138160	12-Jan-15	12-Jan-17
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101031	22-Oct-15	21-Oct-17
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	21-Oct-14	20-Oct-16
EMI Test Receiver	R&S	ESCI7	100797	28-Dec-15	27-Dec-16
Spectrum Analyzer	R&S	FSL3	101943	7-Sep-15	7-Sep-16
Temp. & Humid. Chamber	Giant Force	GCT-099-40-S	MAF0103-007	13-Jul-15	12-Jul-16
LISN (1 phase)	R&S	ENV216	101243	1-Jun-15	31-May-16
LISN	R&S	ENV216	101262	16-Jun-15	15-Jun-16
Test Software	Audix	e3	Ver. 9	N/A	N/A

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 set of 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 Mouse
Type Designation	NS-PNM7013-BK；NS-PNM7013-BL；NS-PNM7013-RD;NS-PNM7013-BK-C；NS-PNM7013-BL-C；NS-PNM7013-RD-C;XXXXXXPNM7013XXXXXX
FCC ID	PRDMU40
Canada ID	6180A-GOR

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	1.5 Vdc
Modulation	FSK
Pulse Width	tested in continous mode
Pulse Repetiton Scheme	tested in continous mode

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 test mode software in mouse 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.

4.3 Special Accessories and Auxiliary Equipment

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

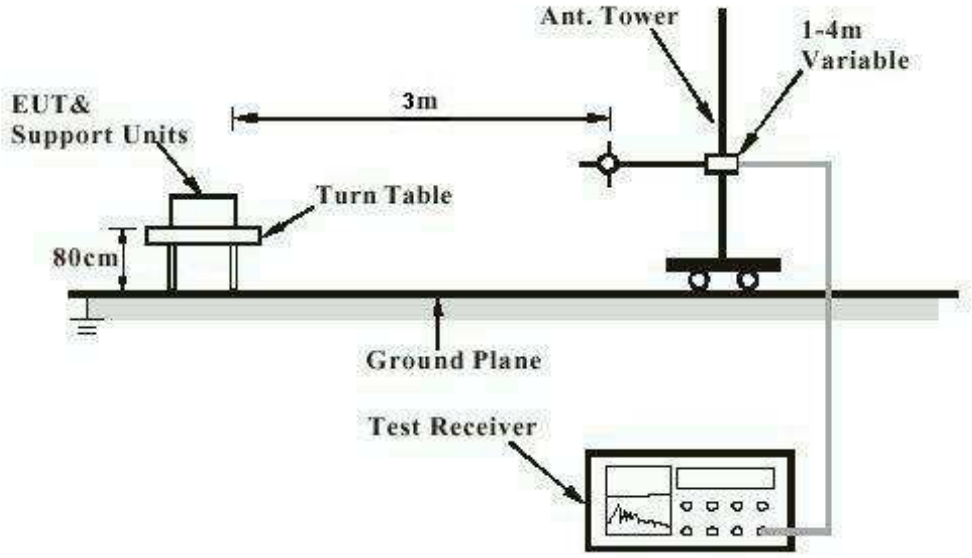
Description	Manufacturer	Model No.	Serial No.
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

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.

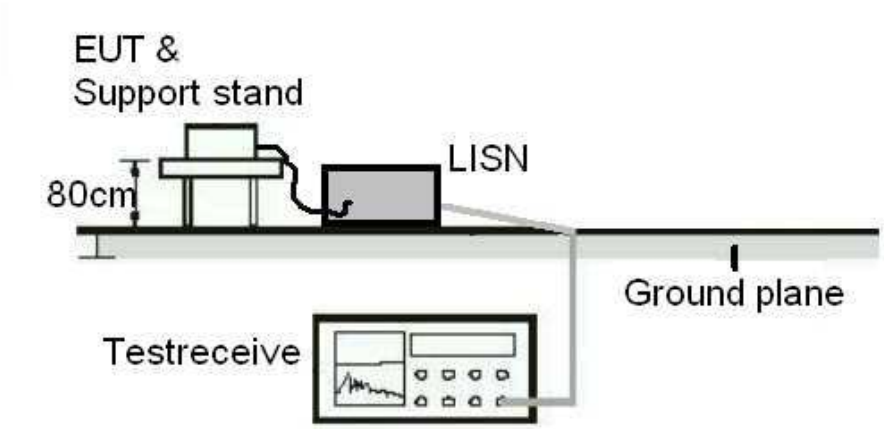
4.5 Test Setup Diagram

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	:	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 C63.10:2013
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.

Table 6: Test result of Field strength of fundamental

Channel Frequency (MHz)	Test result			
	Level (dBuV/m)	Limit (dBuV/m)	Antenna orientation	Detector
2408	93.85	114	Horizontal	Peak
2408	71.07	94		Average
2408	83.16	114	Vertical	Peak
2408	64.40	94		Average
2440	93.48	114	Horizontal	Peak
2440	70.70	94		Average
2440	82.08	114	Vertical	Peak
2440	63.68	94		Average
2474	90.64	114	Horizontal	Peak
2474	68.89	94		Average
2474	83.83	114	Vertical	Peak
2474	64.79	94		Average

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

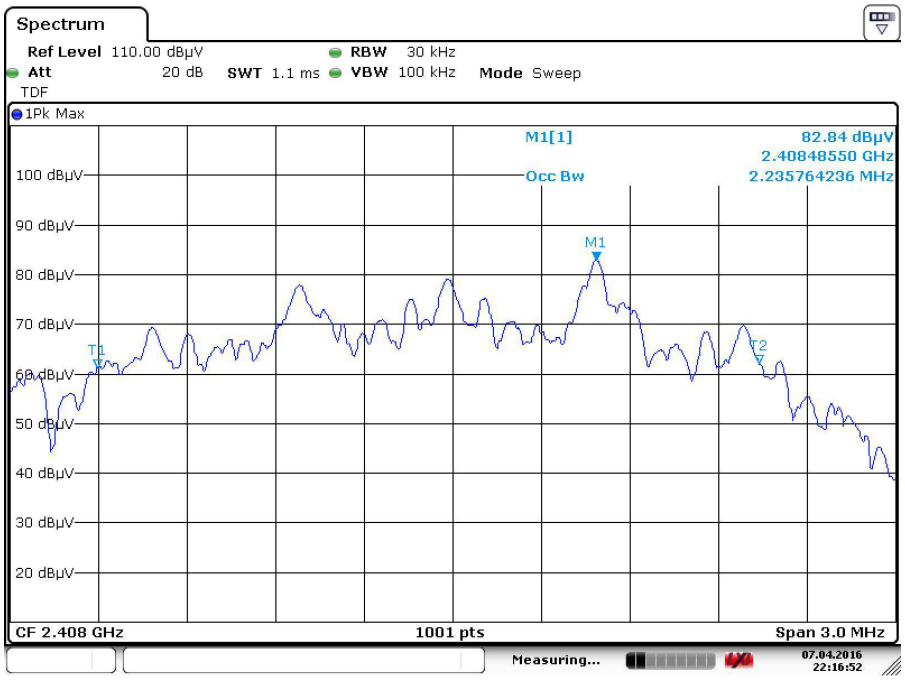
Ambient temperature	:	22-26 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

Table 7: Test result of 99% Bandwidth,

Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)
Low Channel	2408	2.236
Mid Channel	2440	2.197
High Channel	2474	2.185

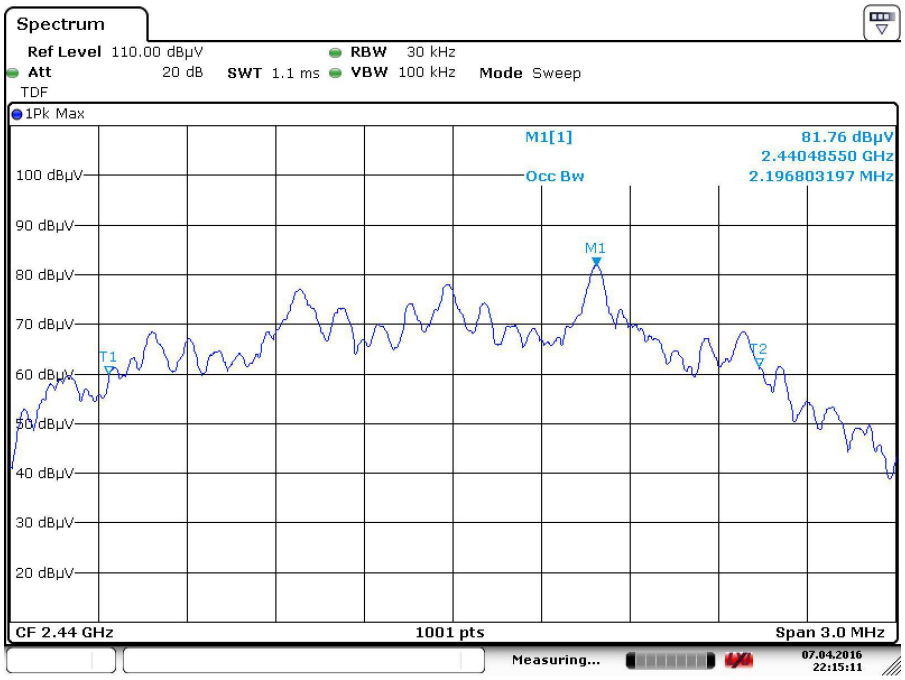
Test Plot of 99% Bandwidth

Low Channel



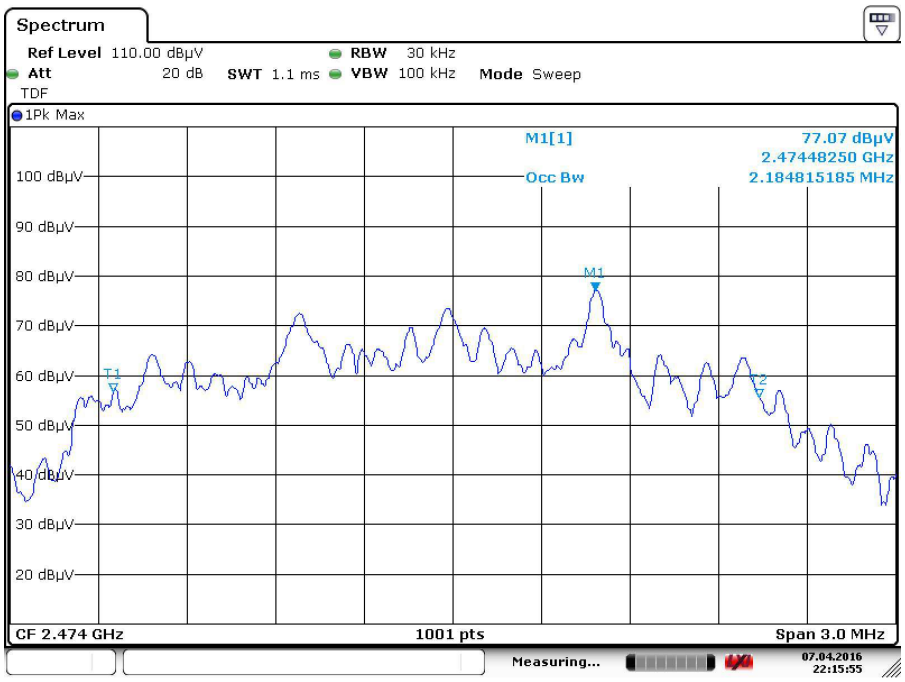
Date: 7.APR.2016 22:16:52

Middle Channel



Date: 7.APR.2016 22:15:11

High Channel



Date: 7.APR.2016 22:15:55

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 7.2.1 LP0002: 2.8
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

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. 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.

5.2 Receiver Requirement

5.2.1 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 LP0002: 2.8
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	:	B

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. 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

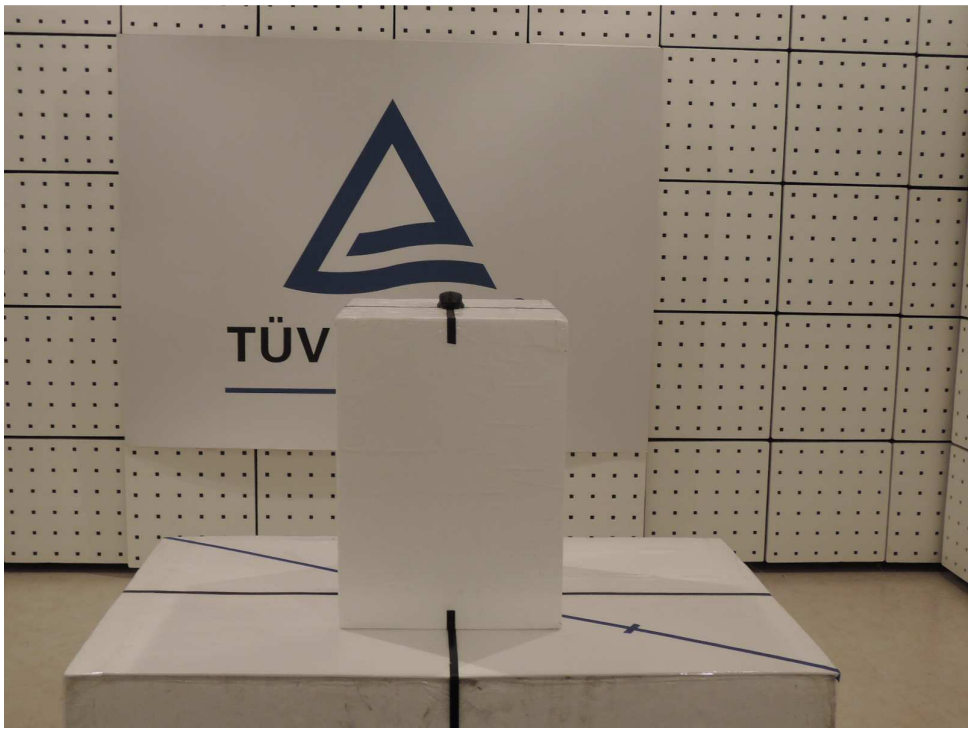
RESULT: **Passed**

Test standard : FCC KDB Publication 447498 D01 v05

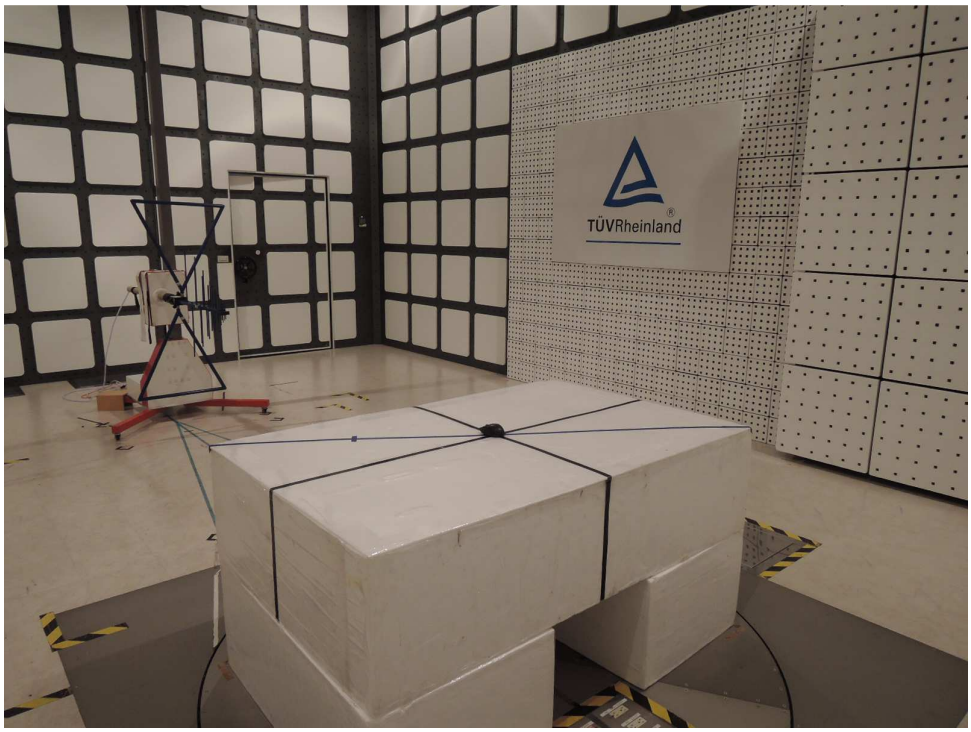
Since maximum peak output power of the transmitter is 0.048 mW < 1mW, hence the EUT is exclueded from SAR evaluation according to FCC KDB publication 447498 D01 v05: Mobile Portable RF Exposure.

7. Photographs of the Test Set-Up

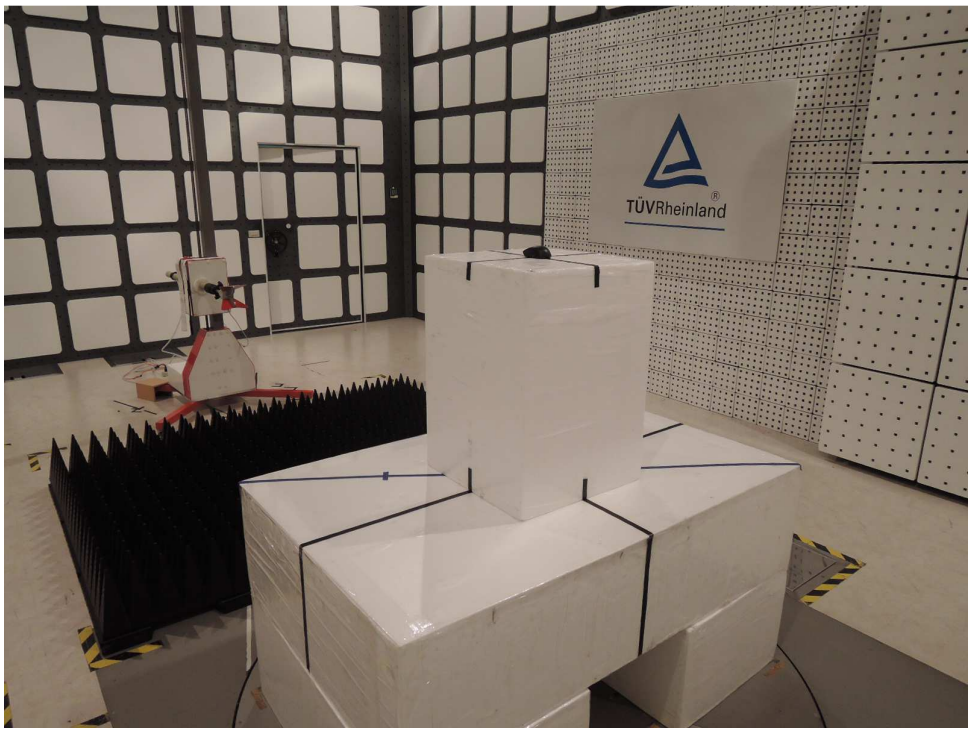
Photograph 1: Set-up for Spurious Emissions (Front View)



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



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



8. List of Tables

Table 1: Applied Standard and Test Levels 5
Table 2: List of Test and Measurement Equipment 7
Table 3: Emission Measurement Uncertainty.....8
Table 4: Basic Information of EUT 9
Table 5: Technical Specification of EUT 9
Table 6: Test result of Field strength of fundamental.....16
Table 7: Test result of 99% Bandwidth,.....17

9. List of Photographs

Photograph 1: Set-up for Spurious Emissions (Front View).....23
Photograph 2: Set-up for Spurious Emissions (Back View 1 TX) 24
Photograph 3: Set-up for Spurious Emissions (Back View 2 TX) 24