Prüfbericht-Nr.: *Test Report No.:*	**50206324 001**	**Auftrags-Nr.:** *Order No.:*	114082387	**Seite 1 von 18** *Page 1 of 18*
Kunden-Referenz-Nr.: *Client Reference No.:*	N/A	**Auftragsdatum:** *Order date:*	28-Sep-2018	
Auftraggeber: *Client:*	千喆企業有限公司, 臺北市中山區雙城街 43 巷 29 號 1 樓			
Prüfgegenstand: *Test item:*	Sanwa RX-491			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	RX-491			
Auftrags-Inhalt: *Order content:*	NCC test report			
Prüfgrundlage: *Test specification:*	NCC Low-power Radio-frequency Devices Technical Regulations LP0002(2018) Section 2.8			

Wareneingangsdatum: *Date of receipt:*	02-Oct-2018
Prüfmuster-Nr.: *Test sample No.:*	A000816625-002
Prüfzeitraum: *Testing period:*	11-Feb-2019 - 11-Feb-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:*			**kontrolliert von** / *reviewed by:*		
15-Feb-2019	Jack Chang /Project Manager		15-Feb-2019	René Charton/Expert	
Datum *Date (Report Date)*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *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 SPURIOUS EMISSION

RESULT: Passed

Contents

1. GENERAL REMARKS 4
1.1 COMPLEMENTARY MATERIALS 4
1.2 DECISION RULE OF CONFORMITY 4
2. TEST SITES 5
2.1 TEST FACILITY 5
2.2 LIST OF TEST AND MEASUREMENT INSTRUMENTS 6
2.3 TRACEABILITY 7
2.4 CALIBRATION 7
2.5 MEASUREMENT UNCERTAINTY 7
3. GENERAL PRODUCT INFORMATION 8
3.1 PRODUCT FUNCTION AND INTENDED USE 8
3.2 SYSTEM DETAILS AND RATINGS 8
3.3 INDEPENDENT OPERATION MODES 9
3.4 NOISE GENERATING AND NOISE SUPPRESSING PARTS 9
3.5 SUBMITTED DOCUMENTS 9
4. TEST SET-UP AND OPERATION MODES 10
4.1 PRINCIPLE OF CONFIGURATION SELECTION 10
4.2 TEST OPERATION AND TEST SOFTWARE 10
4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT 10
4.4 COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE 11
4.5 TEST SETUP DIAGRAM 11
5. TEST RESULTS 13
5.1 TRANSMITTER REQUIREMENT & TEST SUITES 13
5.1.1 Antenna Requirement 13
5.1.2 Spurious Emission 14
6. PHOTOGRAPHS OF THE TEST SET-UP 15
7. LIST OF TABLES 18
8. LIST OF PHOTOGRAPHS 18

1. General Remarks

1.1 Complementary Materials

These attachments are integral parts of this test report:

Appendix P: Photo Documentation internal view
(File Name: 50206324 001 APPENDIXP)

Appendix D: Test Result of Radiated Emissions
(File Name: 50206324 001 APPENDIXD)

Test Specifications

The following standards were applied.

Table 1: Applied Standard and Test Levels

Radio
NCC Low-power Radio-frequency Devices Technical Regulations LP0002(2018)(107 年 1 月 10 日)

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 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.: 340738
IC Canada Registration No.: 9465A-1
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2016-Jul-1st to 2019-Jun-30th

Testing Laboratory
0759

2.2 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	Farad	EZ_EMC	Ver. TUV3A1	N/A	N/A
EMI Test Receiver	R&S	ESR 7	101062	2018/10/01	2019/10/01
Spectrum Analyzer	R&S	FSV 40	100921	2018/05/02	2019/05/02
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	2018/08/22	2019/08/22
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	060649	2018/08/24	2019/08/24
Bilog Antenna	TESEQ	CBL 6111D	29802	2018/08/22	2019/08/22
Horn Antenna	ETS-Lindgren	3117	00138160	2018/06/01	2019/06/01
Horn Antenna (18GHz~40GHz)	COM-POWER	AH-840	101031	2018/01/16	2019/01/16
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	2018/06/21	2019/06/21

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 in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular schedule 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
Radio Frequency	± 1 x 10^{-7}
RF power, conducted	± 1.5 dB
RF power density, conducted	± 3 dB
spurious emissions, conducted	± 3 dB
all emissions, radiated	± 6 dB
Temperature	± 1 ºC
Humidity	± 5 %
DC and low frequency voltages	±3 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is 2.4 GHz Receiver. They contain 2.4GHz compatible module enabling the user to communicate data through 2.4GHz interface.

For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	Sanwa RX-491
Type Identification	RX-491
Brand Name	Sanwa

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequency	2412 MHz ~ 2478 MHz
Channel Spacing	2 MHz
Channel number	34
Operation Voltage	6 Vdc
Modulation	GFSK
Antenna type / gain	Wire antenna / 2.14dBi

3.3 Independent Operation Modes

Basic operation modes are:

A. Receiving
B. Standby
C. Off

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 power 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 can enter test mode by pressing the buttons, so there is no test software is required.

The samples were used as follows:

TX: A000816625-002

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:

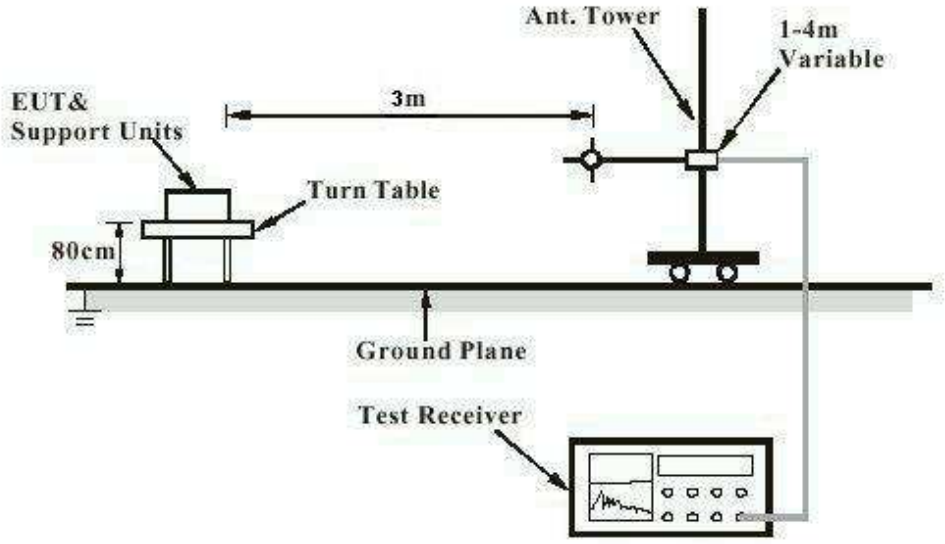
Description	Manufacturer	Model No.
RX channel setting	Sanwa	M17

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)

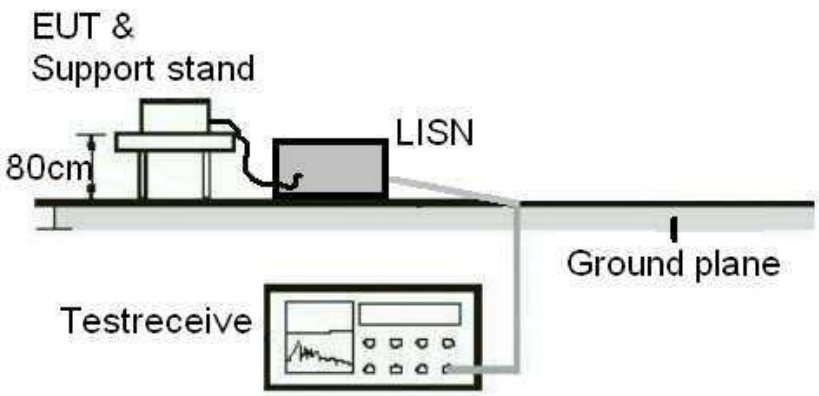
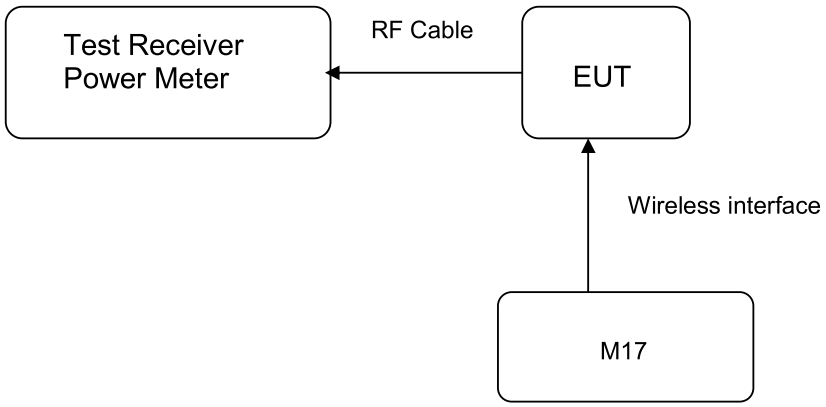


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Test standard	:	LP0002(2018): 2.2, 3.10.1,3, 3.10.1.4 FCC Part 15.247(b)(4), Part 15.203 and RSS-Gen 8.3
Requirement	:	use of approved antennas only with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 2.14dBi. The antenna is Wire antenna 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 Spurious Emission

RESULT: **Passed**

Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-247 5.5 and RSS-Gen 8.9 LP0002(2018): 3.10.1.5
Basic standard	:	ANSI C63.10: 2009
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-Gen i4, 8.9 (Table 6), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-Gen i4, 8.9 (Table 4 and 5). Radiated emissions which fall in the restricted bands, as defined in LP0002(2018): 2.7 , must comply with the radiated emission limits specified in LP0002(2018): 2.8 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), RSS-Gen i4, 8.9 (Table 4 and 5) and RSS-210 A2.9(a). Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in LP0002(2018): 2.8
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Middle
Operation mode	:	A

Ambient temperature	:	18-25°C
Relative humidity	:	50-65 %

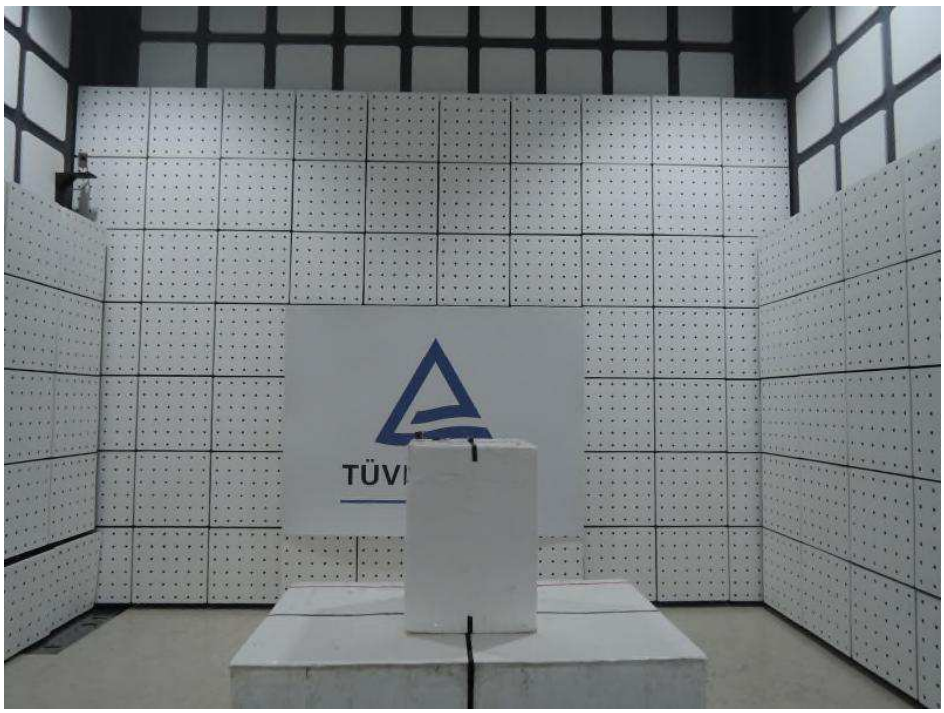
For details refer to Appendix D.

6. Photographs of the Test Set-Up

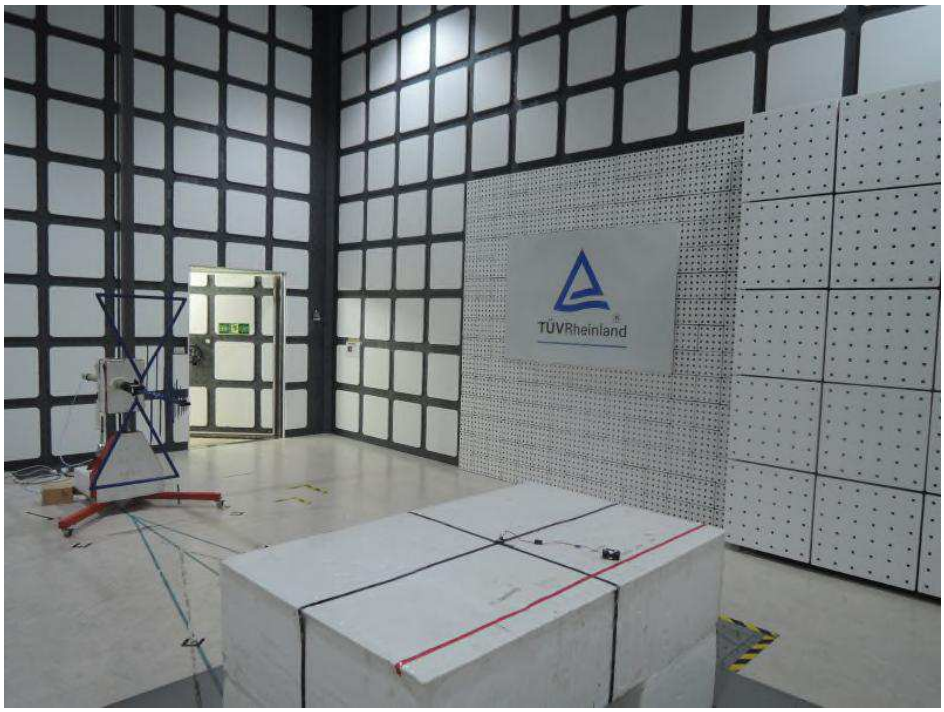
Photograph 1: Set-up for Spurious Emissions (Front View 1)



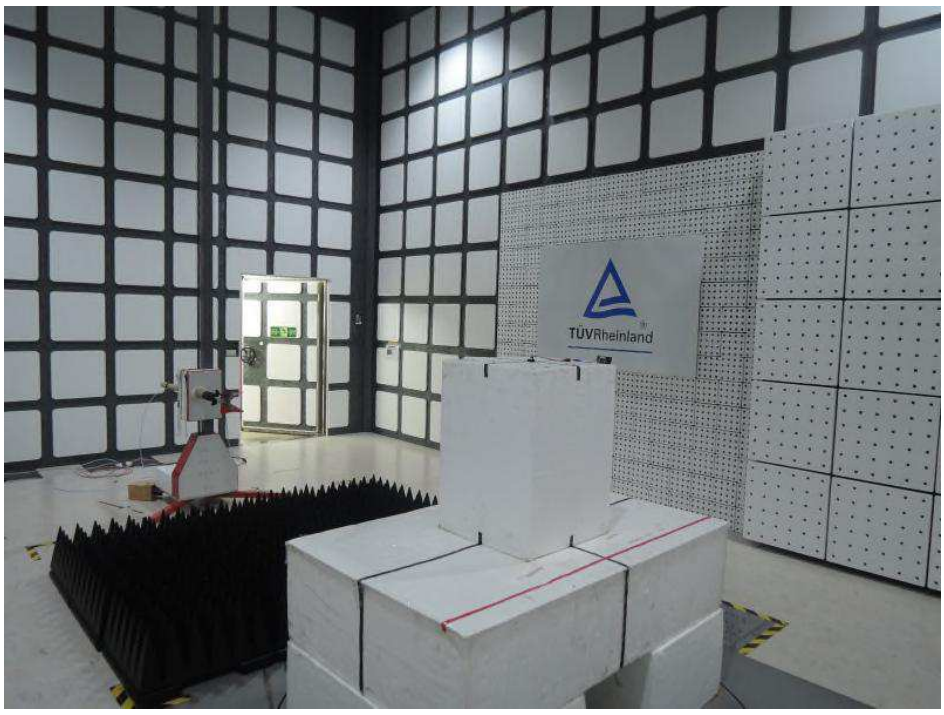
Photograph 2: Set-up for Spurious Emissions (Front View 2)



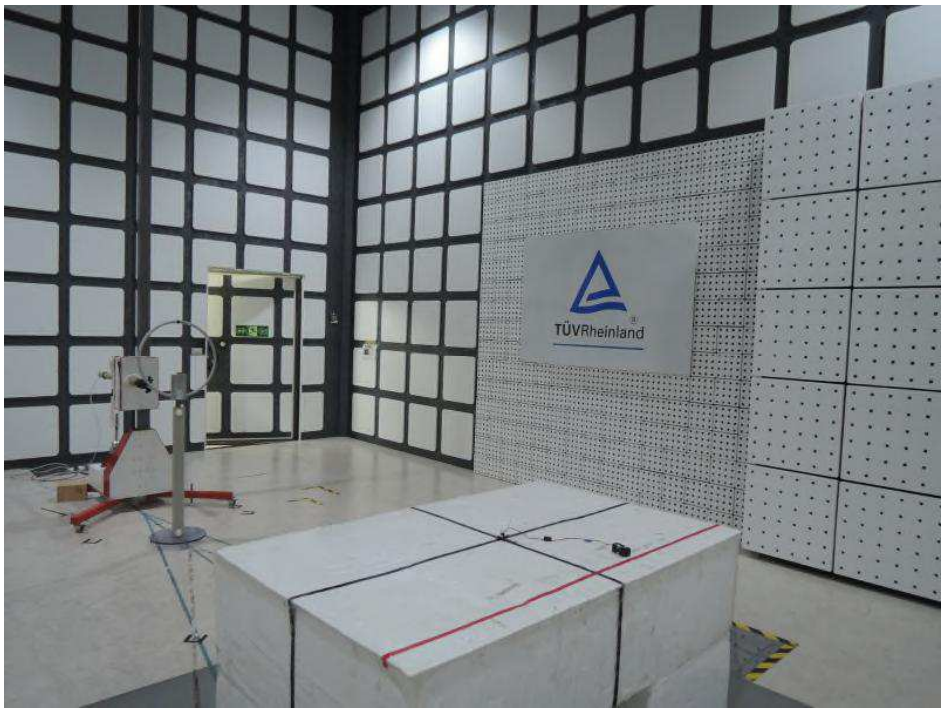
Photograph 3: Set-up for Spurious Emissions (Back View 1)



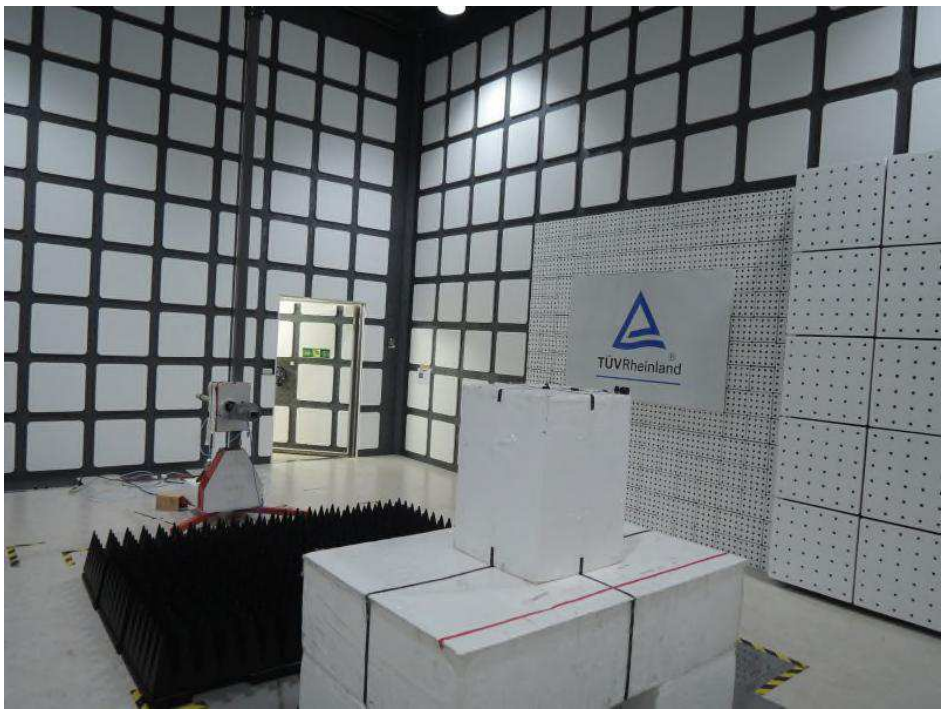
Photograph 4: Set-up for Spurious Emissions (Back View 2)



Photograph 5: Set-up for Spurious Emissions (Back View 3)



Photograph 6: Set-up for Spurious Emissions (Back View 4)



7. List of Tables

Table 1: Applied Standard and Test Levels 4
Table 2: List of Test and Measurement Equipment 6
Table 3: Emission Measurement Uncertainty....7
Table 4: Basic Information of EUT 8
Table 5: Technical Specification of EUT 8

8. List of Photographs

Photograph 1: Set-up for Spurious Emissions (Front View 1)....15
Photograph 2: Set-up for Spurious Emissions (Front View 2)....15
Photograph 3: Set-up for Spurious Emissions (Back View 1)....16
Photograph 4: Set-up for Spurious Emissions (Back View 2)....16
Photograph 5: Set-up for Spurious Emissions (Back View 3)....17
Photograph 6: Set-up for Spurious Emissions (Back View 4)....17