

Prüfbericht-Nr.: <i>Test report no.:</i>	60360049 001	Auftrags-Nr.: <i>Order no.:</i>	238134136	Seite 1 von 20 Page 1 of 20
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	22-Jan-2020	
Auftraggeber: <i>Client:</i>	Axis Communications AB Emdalavägen 14, SE-223 69 Lund, Sweden			
Prüfgegenstand: <i>Test item:</i>	Security Radar			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	AXIS D2110-VE			
Auftrags-Inhalt: <i>Order content:</i>	NCC LP0002 Test report			
Prüfgrundlage: <i>Test specification:</i>	NCC Low-power Radio-frequency Devices Technical Regulations LP0002(2018) Section 3.10.2			
Wareneingangsdatum: <i>Date of sample receipt:</i>	19-Feb-2020			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A001065458-003			
Prüfzeitraum: <i>Testing period:</i>	13-Mar-2020 – 01-Apr-2020			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Laboratory Taipei			
Prüflaboratorium: <i>Testing laboratory:</i>	TUV Rheinland Taiwan Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
überprüft von: <i>reviewed by:</i>	genehmigt von <i>authorized by:</i>			
Datum: 10-Apr-2020 <i>Date: (Report Date)</i>			Datum: 10-Apr-2020 <i>Date:</i>	
Stellung / Position:	Mars Y.J. Lin/Project Manager		Stellung / Position:	Arvin Ho/Vice General Manager
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient 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. <i>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.</i>				

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TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Passed

5.1.2 FIELD STRENGTH OF FUNDAMENTAL

RESULT: Passed

5.1.3 SPURIOUS EMISSION

RESULT: Passed

5.2.1 MAINS CONDUCTED EMISSIONS

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 internal view
(File Name: 60360049 001 APPENDIX P)

Appendix D: Test Result of Radiated Emissions
(File Name: 60360049 001 APPENDIX D)

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 Laboratory

TUV Rheinland Taiwan Ltd.

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

2.2 Test Facility

TUV Rheinland Taiwan Ltd.

AC Mains Conduction:
11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)
FCC Registration No.: 180491
IC Canada Registration No.: 9465A

Conducted/ Radiated Test:
No. 458-18, Sec 2, Fenliao., Linkou Dist.
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 226631
IC Canada Registration No.: 25563

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

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESR7	102109	2019/04/17	2020/04/16
Spectrum Analyzer	R&S	FSV40	101112	2019/10/15	2020/10/15
Pre-Amplifier	Agilent	8447D	2727A05146	2020/02/17	2021/02/16
Pre-Amplifier	EMCI	EMC051845SE	980635	2020/02/11	2021/02/10
Pre-Amplifier	EMCI	EMC184045SE	980656	2020/02/11	2021/02/10
Bilog Antenna	SCHWARZBECK	VULB-9168	00950	2020/01/20	2021/01/19
Horn Antenna	ETS-Lindgren	3117	00218929	2019/11/27	2020/11/26
Horn Antenna	SCHWARZBECK	BBHA 9170	00890	2019/04/12	2020/04/11
Loop Antenna	EMCI	LPA600	287	2019/12/20	2020/12/19
Test Software	Audix	e3	Ver. 9	N/A	N/A
Test Cable	HUBER+SUHNER	SUCOFLEX 104EA	800057/4EA	2019/04/11	2020/04/10
Test Cable	HUBER+SUHNER	SUCOFLEX 104	802244/4	2019/04/11	2020/04/10
Test Cable	HUBER+SUHNER	SUCOFLEX 104	MY37203/4	2019/04/11	2020/04/10
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA	800897/2EA	2019/04/11	2020/04/10
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA	800902/2EA	2019/04/11	2020/04/10
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA	801026/2EA	2019/04/11	2020/04/10
Spectrum Analyzer	Keysight	N9010A	MY52221334	2020/02/10	2021/02/09
Harm. Mixer, 40-60 GHz	OML	WR-19	1601 1801	2019/07/01	2020/06/30
Harm. Mixer, 50-75 GHz	Keysight / VDI	N9029AV15	US54250104	2019/07/01	2020/06/30
Harm. Mixer, 75-110 GHz	Keysight / VDI	N9029AV10	US53250005	2019/07/01	2020/06/30

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 in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular schedule using in house standards or comparisons.

2.6 Measurement Uncertainty

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

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 0.1 ppm
RF power/RF Exposure(MPE), conducted	± 1.5 dB
RF power density, conducted	± 3 dB
spurious emissions, conducted	± 3 dB
all emissions, radiated	± 6 dB
Temperature	± 1 °C
Humidity	± 5 %
DC and low frequency voltages	± 3 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a 24 GHz surveillance radar short range device (SRD), Intended use is perimeter surveillance of areas around offices and industrial buildings. Product detects movement of humans, and objects such as cars, trucks, busses etc. Detected movement can be used as an alarm, for triggering different events.

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	Security Radar
Type Identification	AXIS D2110-VE
Brand Name	Axis Communications

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	24.15 GHz (24.05 to 24.25 GHz)
Channel number	1
Operation Voltage	24Vdc
Modulation	FMCW
Antenna gain	8.5dBi

3.3 Independent Operation Modes

Basic operation modes are:

- A. Transmitting
 - 1. 24.15 GHz
- B. Receiving
 - 1. 24.15 GHz

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: EUT is modified by manufacturer at a test mode firmware. It can transmit and receive continuously when powered on.

The samples were used as follows:
A001065458-003

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:

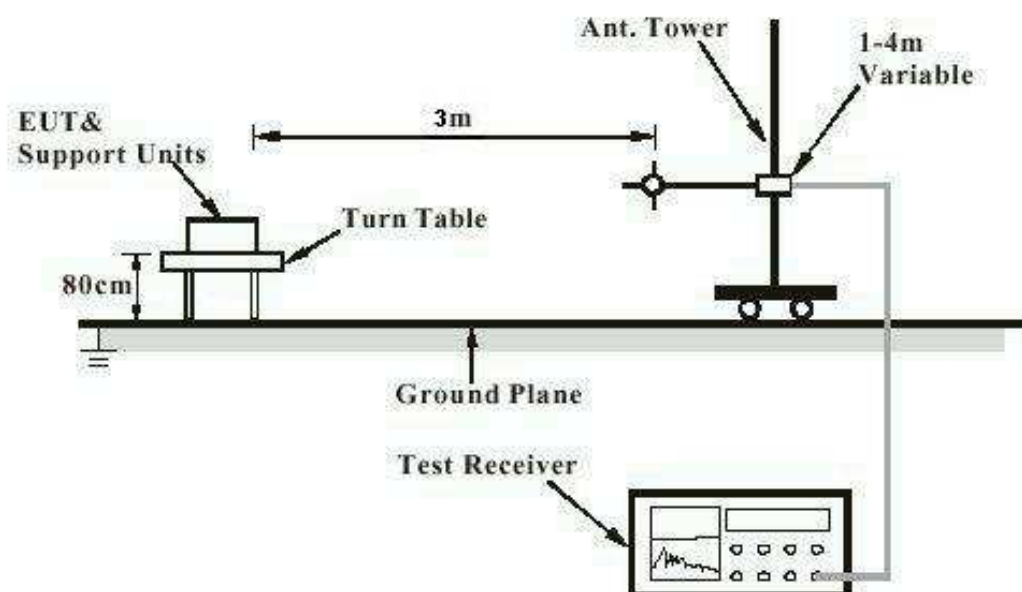
Description	Manufacturer	Model No.
Notebook (Setup)	Lenovo	TP00048A
AC Adapter	AXIS COMMUNICATIONS	FSP040-DAAN2

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.

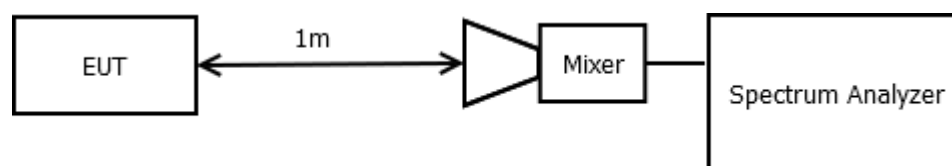
4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



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

40G-110G spurious emissions measurement:



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Passed**

Test standard : LP0002(2018): 2.2

Requirement : Low-power radio frequency transmitter or transceiver(receiver) shall utilize a permanently, semi-permanently attached antenna or uses a unique coupling of the antenna and at any cable connector between the transmitter and the antenna. The antenna shall be an omni-directional type. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector or other than authorized is prohibited. Such standard connectors are for example: BNC, F type, N type, M type, UG type, RCA, SMA, SMB, and other standard type antenna connectors.

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 8.5dBi. The antenna is a a PCB Array 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 Field strength of fundamental

RESULT:**Passed**

Test standard	:	LP0002(2018) 3.10.2.2
Basic standard	:	LP0002(2018)
Kind of test site	:	Shielded room

Test setup

Test Channel	:	24.15GHz
Operation Mode	:	A
Ambient temperature	:	20-24 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

For details refer to Appendix D.

5.1.3 Spurious Emission

RESULT:
Passed

Test standard : LP0002(2018): 2.8
 Basic standard : LP0002(2018)
 Limits : LP0002(2018) 3.10.2.2, 2.8
 Kind of test site : 3m Semi-Anechoic Chamber
 Semi-Anechoic Shielded Room (40GHz to 110 GHz)

Test setup

Test Channel : 24.15GHz
 Operation mode : A, B

 Ambient temperature : 20-24 °C
 Relative humidity : 50-65 %
 Atmospheric pressure : 100-103 kPa

For the Spurious emissions 9kHz to 40GHz please refer to Appendix D.

Table 6: Test result for 40GHz to 110GHz

Frequency (GHz)	Measurement Distance (m)	Measured Power (dBm)	Rx Antenna Gain (dBi)	EIRP (dBm)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
45.8	1	-79.75	21	-35.09	69.71	83.54	-13.83	Peak
45.8	1	-88.14	21	-43.48	61.32	63.54	-2.22	Average
66.77	1	-92.46	21	-44.53	60.27	83.54	-23.27	Peak
66.77	1	-102.48	21	-54.55	50.25	63.54	-13.29	Average
81.37	1	-92.39	21	-42.74	62.06	83.54	-21.48	Peak
81.37	1	-102.03	21	-52.38	52.42	63.54	-11.12	Average

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5.2 Mains Emissions

5.2.1 Mains Conducted Emissions

RESULT:**Passed**

Test standard	:	LP0002(2018):2.3
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

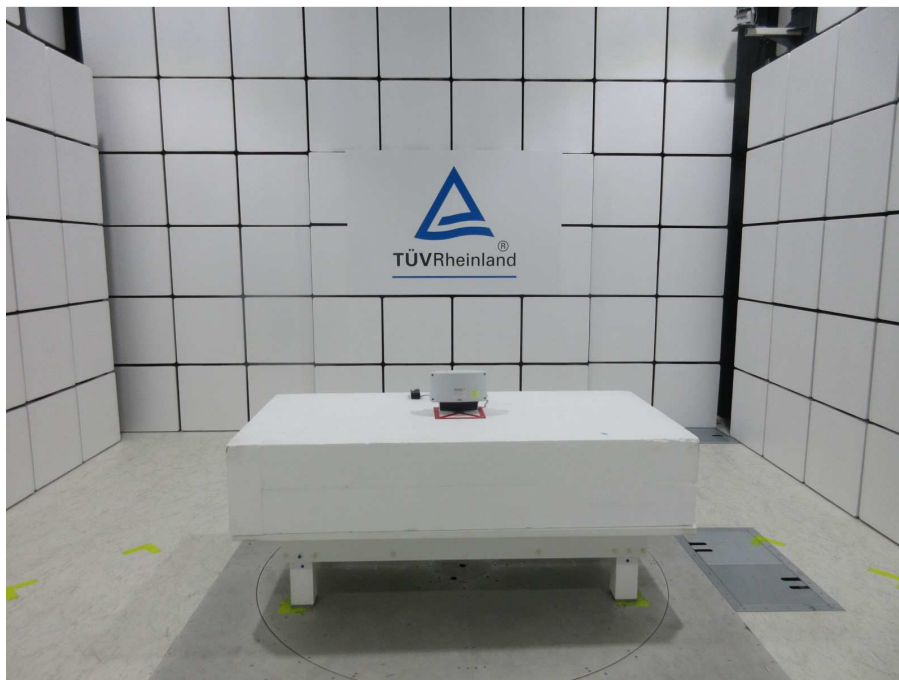
Test Channel	:	Normal Operation
Operation mode	:	Normal Operation

Ambient temperature	:	20-24 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

Remark: For details refer to Appendix D.

6. Photographs of the Test Set-Up

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



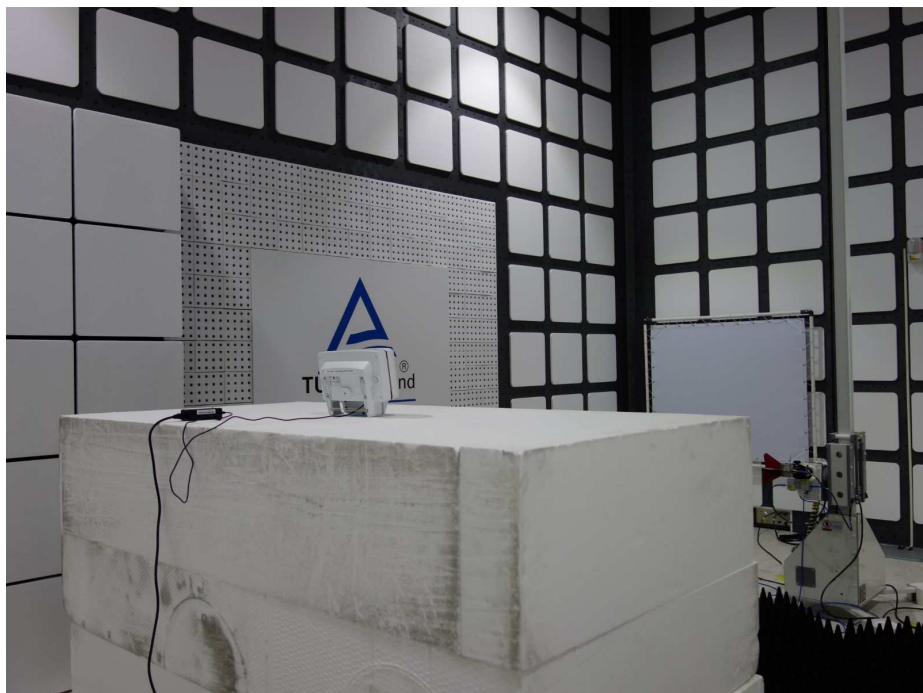
Photograph 2: Set-up for Spurious Emissions (Front View 2)



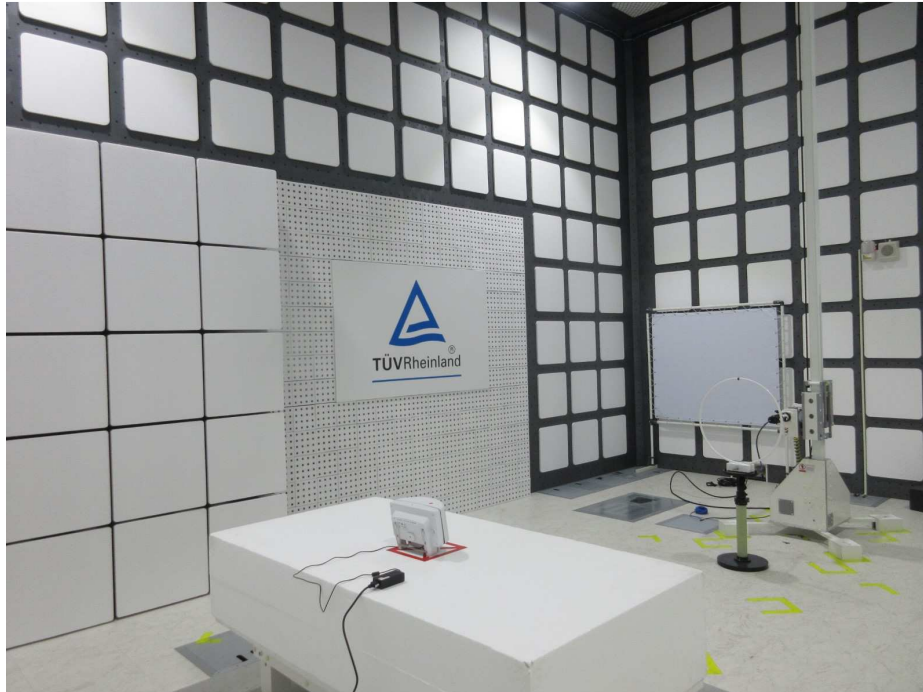
Photograph 3: Set-up for Spurious Emissions (Back View 1)



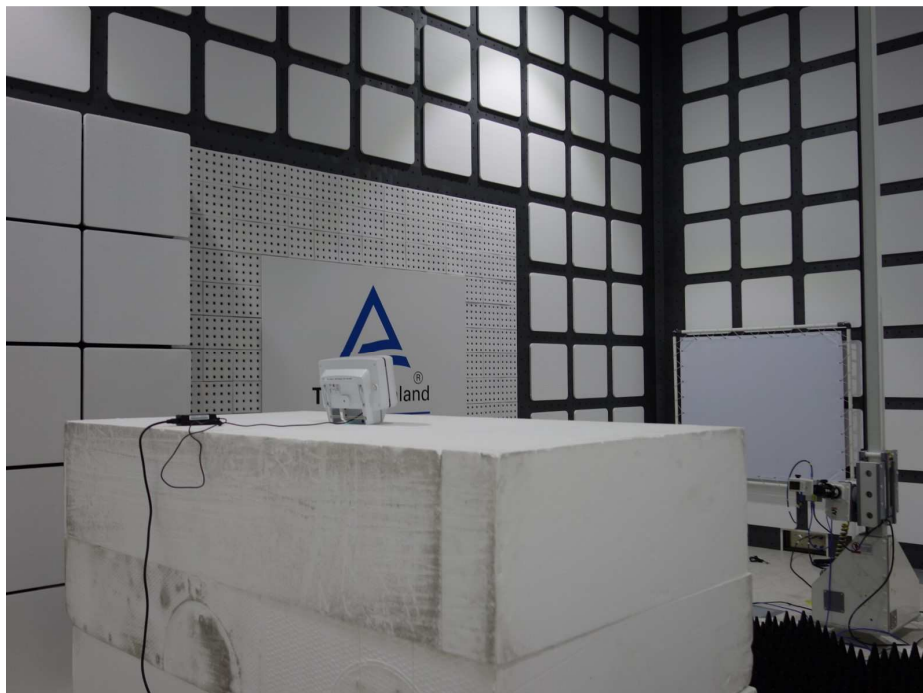
Photograph 4: Set-up for Spurious Emissions (Back View 2)



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



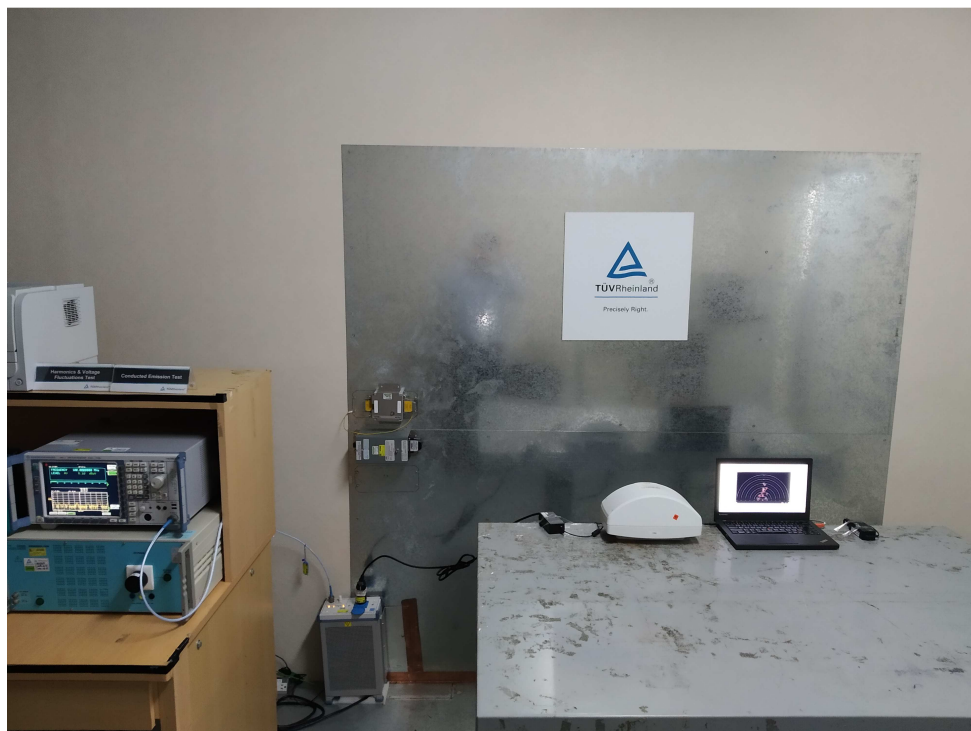
Photograph 6: Set-up for Spurious Emissions (Back View 4)



Photograph 7: Set-up for for Mains Conducted testing Back



Photograph 8: Set-up for for Mains Conducted testing Front



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