Prüfbericht-Nr.: *Test report no.:*	**CN23ZEGF 001**	**Auftrags-Nr.:** *Order no.:*	**168413053**	Seite 1 von 21 *Page 1 of 21*
Kunden-Referenz-Nr.: *Client reference no.:*	**N/A**	**Auftragsdatum:** *Order date:*	2023-02-07	
Auftraggeber: *Client:*	**SKYWORTH OPTICAL-ELECTRONIC CO., LTD..** 3rd Floor-4th Floor, Mould Factory, Skyworth Technology Park, Tangtou Community, Shiyan Street, Baoan District, Shenzhen, Guangdong Province, China.			
Prüfgegenstand: *Test item:*	WIFI Module IEEE 802.11 a/b/g/n/ac 2T/2R			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	DCT1ER2611			
Auftrags-Inhalt: *Order content*:	Test Report			
Prüfgrundlage: *Test specification:*	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209	RSS-247 Issue 2 RSS-Gen Issue 5		

Wareneingangsdatum: *Date of sample receipt:*	2023-01-04	Refer to photo documentation
Prüfmuster-Nr.: *Test sample no:*	T230104005-Y01/01	
Prüfzeitraum: *Testing period:*	2023-01-04 to 2023-03-09	
Ort der Prüfung: *Place of testing:*	Shenzhen Central Standard International Center Co., Ltd.	
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.	
Prüfergebnis*: *Test result*:*	Pass	

geprüft von: *tested by:*	X Hardy Suo	**genehmigt von:** *authorized by:*	X Lin Lin
Datum: *Date:* 2023-03-31		**Ausstellungsdatum:** *Issue date:* 2023-03-31	
Stellung / *Position:*	Engineer	**Stellung** / *Position:*	Reviewer

Sonstiges / *Other:*

FCC ID: 2BAD6-8METZIFPD
IC: 30102-8METZIFPD
HVIN: DCT1ER2611

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.
V05

Test Summary

5.1.1 Antenna Requirement

RESULT: Pass

5.1.2 Maximum Conducted Output Power

RESULT: Pass

5.1.3 Conducted Power Spectral Density

RESULT: Pass

5.1.4 6dB Bandwidth

RESULT: Pass

5.1.5 99% Bandwidth

RESULT: Pass

5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: Pass

5.1.7 Radiated Spurious Emission

RESULT: Pass

5.1.8 Conducted Emission on AC Mains

RESULT: Pass

Contents

Test Summary 2

1 General Remarks 4

1.1 Complementary Materials 4

2 Test Sites 5

2.1 Test Facilities 5

2.2 List of Test and Measurement Instruments 5

2.3 Traceability 6

2.4 Calibration 6

2.5 Measurement Uncertainty 6

2.6 Location of Original Data 6

2.7 Status of Facility Used for Testing 6

3 General Product Information 7

3.1 Product Function and Intended Use 7

3.2 Ratings and System Details 7

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 10

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 Maximum Conducted Output Power 14
5.1.3 Conducted Power Spectral Density 15
5.1.4 6dB Bandwidth 16
5.1.5 99% Bandwidth 17
5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth 18
5.1.7 Radiated Spurious Emission 19
5.1.8 Conducted Emission on AC Mains 20

6 Photographs of the Test Set-Up 21

7 List of Tables 21

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results of Wi-Fi 802.11 b/g/n

2 Test Sites

2.1 Test Facilities

Shenzhen Central Standard International Center Co., Ltd.

Room 201, Building 1, Mogen Fashion Industrial Park, No. 10, Shilongzai Road, Xinshi Community, Dalang Street, Longhua District, Shenzhen.

CNAS No.: L11671

A2LA No.: 6426.01

FCC Registration No.: 0031378433

IC CAB identifier No.: CN0051

The tests at the test sites have been conducted under the supervision of a TÜV engineer.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
Spectrum Analyzer	Agilent	N9020A	MY50200391	Jun. 13, 2023
Power sensor	KEYSIGHT	U2021XA	MY55080015	Jun. 13, 2023
Power sensor	KEYSIGHT	U2021XA	MY54250016	Jun. 13, 2023
Power sensor	KEYSIGHT	U2021XA	MY54250020	Jun. 13, 2023
Power sensor	KEYSIGHT	U2021XA	MY54210030	Jun. 13, 2023
Vector Signal Generator	Agilent	N5182A	MY50140130	Jun. 13, 2023
Signal generator	Agilent	SML03	100925	Jun. 13, 2023
Power sensor Box	MWRFtest	N/A	N/A	N/A
RF Switch Box	MWRFtest	MW100-RFCB	N/A	N/A
MTS 8310	MWRFtest	V 2.0.0.0		
Unwanted Emission Testing				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
Spectrum Analyzer	Agilent	N9020A	MY50200391	Jun. 13, 2023
Bilog Antenna	Schwarzbeck	VULB9168	VULB9168-250	Jul. 25, 2025
Horn Antenna	AARONIAAG	Powerlog 70180	3980	Jul. 04, 2025
Horn Antenna	A-INFOMW	LB-180400-KF	J211020657	Sep. 26, 2023
Loop Antenna	Schwarzbeck	FMZB1519B	00023	Nov. 15, 2023
Amplifier	HP	8447F	2634A02050	Jun. 13, 2023
Amplifier	Agilent	8449B	4035A00116	Jun. 13, 2023
3M Chamber	Maor	9*6*6	--	Jul. 26, 2023

Conducted Emission				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
EMI Test Receiver	R&S	ESRP3	101936	Jun. 13, 2023
LISN	R&S	ENV216	100002	Jun. 13, 2023
Shelding Room	Maor	8*4*3	--	May. 03, 2023
EZ-EMC	Fara	V 3.1		

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 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.

2.5 Measurement Uncertainty

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

Table 2: Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 2.7 \times 10^{-5}$
RF Power (conducted)	±0.66 dB
Radiated Emission of Transmitter, valid up to 26.5 GHz	±5.08 dB
Radiated Emission of Receiver, valid up to 26.5 GHz	±5.08 dB
Conducted Emission, (150kHz to 30MHz)	± 3.26 dB
Radiated Emission (3m SAC), 30MHz to 1000MHz	± 4.58 dB
Radiated Emission (3m SAC), above 1000MHz	± 5.10 dB
Temperature	±2 °C
Humidity	±5 %
Voltage (DC)	±5 %
Voltage (AC, <10kHz)	±5 %

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

Shenzhen Central Standard International Center Co., Ltd.

Room 201, Building 1, Mogen Fashion Industrial Park, No. 10, Shilongzai Road, Xinshi Community, Dalang Street, Longhua District, Shenzhen

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a RF Module which supports 2.4G Wi-Fi 802.11 b/g/n, 5G Wi-Fi 802.11a/n/ac wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

Note: This report is for 2.4GHz Wi-Fi 802.11 b/g/n mode only.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	WIFI Module IEEE 802.11 a/b/g/n/ac 2T/2R
Type Designation	DCT1ER2611
FCC ID	2BAD6-8METZIFPD
IC	30102-8METZIFPD
HVIN	DCT1ER2611
Operating Voltage:	DC 3.3V
Technical Specification of Wi-Fi 802.11 b/g/n	
Operating Frequency	2412 - 2462 MHz for 802.11b/g/n(HT20) 2422 - 2452 MHz for 802.11n(HT40)
Type of Modulation	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM)
Data Rate	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS15 for 802.11n
Channel Number	11 channels for 802.11b/g/n(HT20) 7 channels for 802.11n(HT40)
Channel Separation	5 MHz
Antenna Type	PIFA antenna
Gain of 2.4G Wi-Fi	ANT1: 2.08 dBi ANT2: 2.00 dBi

Table 4: RF Channel and Frequency of Wi-Fi 802.11 b/g/n

RF Channel	802.11 b/g/n
	Frequency (MHz)
01	**2412**
02	2417
03	**2422**
04	2427
05	2432
06	**2437**
07	2442
08	2447
09	**2452**
10	2457
11	**2462**

Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20);

lowest channel: 2422 MHz, middle channel: 2437 MHz and highest channel: 2452 MHz for 802.11n(HT40)

3.3 Independent Operation Modes

The basic operation modes are:

A. On, Wi-Fi 802.11 b/g/n wireless transmitting mode

1) Low Channel
2) Middle Channel
3) High Channel

B. On, Normal operation with Wi-Fi mode

C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- Block Diagram
- Schematics
- FCC/IC Label and Location Info
- Photo Document
- User Manual

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013 and ANSI C63.4: 2014.

4.3 Special Accessories and Auxiliary Equipment

Table 5: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Notebook	DELL	Vostro 3400	N/A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

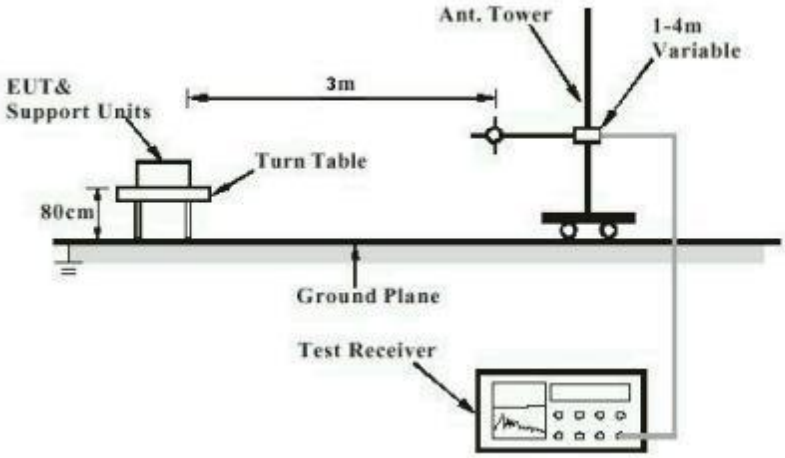


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

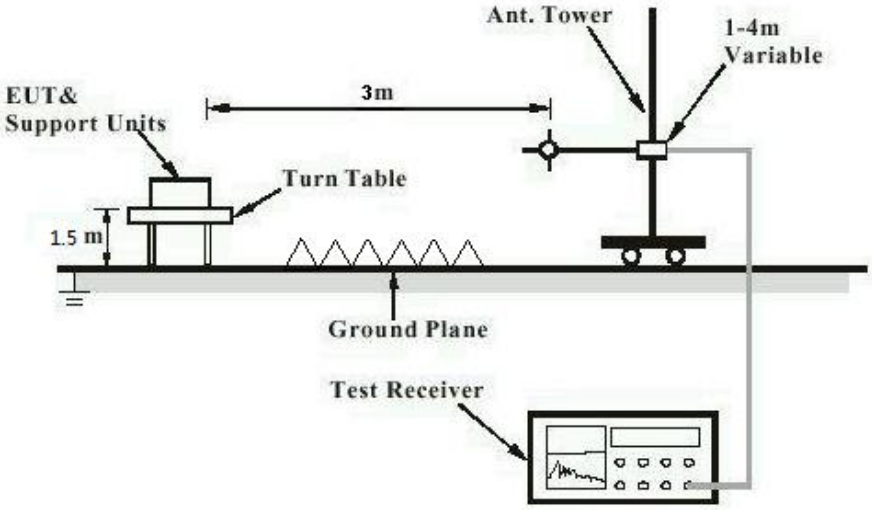


Diagram of Measurement Configuration for Mains Conduction Measurement

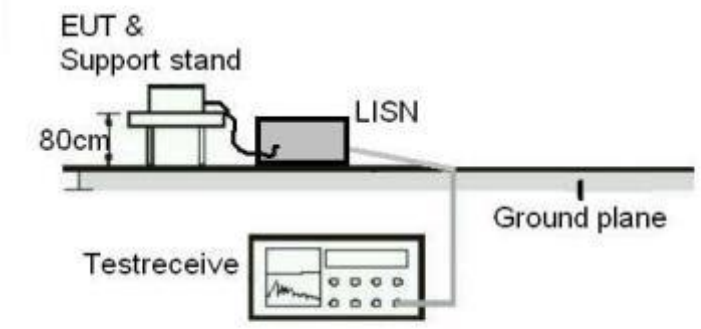
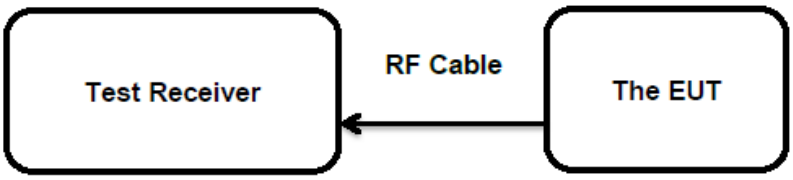


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203

According to the manufacturer declared, the EUT has two PIFA antenna, ANT1 and ANT2 are unrelated, the directional gain of antenna is 2.08 dBi(ANT1) and 2.00 dBi(ANT2), 2.08dBi(MIMO), and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore, the EUT is considered sufficient to comply with the provision.

Therefore, the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Conducted Output Power

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(b)(3)
		RSS-247 Clause 5.4(d)
Basic standard	:	ANSI C63.10: 2013
Limits	:	1.0 Watts
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-01-04 – 2023-02-08
Input voltage	:	DC 3.3V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Table 6: Test Result of Maximum Conducted Output Power, Wi-Fi 802.11 b/g/n

Test Mode	Test Channel (MHz)	Measured Average Power (dBm)			Measured Average Power (W)	Limit (W)
		Ant1	Ant2	Total		
802.11b	2412	15.485	14.560	-	0.0354	< 1.0
	2437	14.968	14.206	-	0.0314	
	2462	15.008	14.099	-	0.0317	
802.11g	2412	15.865	16.130	-	0.0410	
	2437	15.630	16.728	-	0.0471	
	2462	15.769	16.754	-	0.0474	
802.11n (HT20)	2412	16.183	16.174	19.189	0.0830	
	2437	15.809	16.622	19.245	0.0840	
	2462	15.869	16.714	19.322	0.0855	
802.11n (HT40)	2422	16.231	16.244	19.248	0.0841	
	2437	16.939	18.001	20.513	0.1125	
	2452	16.078	16.881	19.508	0.0893	
Maximum Measured Value		20.513			0.1125	

Note:
1) The cable loss is taken into account in results.
2) Antenna gain(G) of 802.11 b/g/n: 2.08 dBi(ANT1) and 2.00 dBi(ANT2), 2.08 dBi(MIMO)
   e.i.r.p.=$P_{(Peak\ power)}$+ G, which is far below the 4 W
3) Antennas 1 and 2 are uncorrelated, and MIMO antenna gain is the maximum of the two antennas.

5.1.3 Conducted Power Spectral Density

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(e)
		RSS-247 Clause 5.2(b)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 8 dBm / 3kHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-01-04 – 2023-03-01
Input voltage	:	DC 3.3V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

5.1.4 6dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(2)
		RSS-247 Clause 5.2(a)
Basic standard	:	ANSI C63.10: 2013
Limits	:	> 500 KHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-01-04 – 2023-03-09
Input voltage	:	DC 3.3V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

5.1.5 99% Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)
		RSS-Gen Clause 6.7
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-01-04 – 2023-03-09
Input voltage	:	DC 3.3V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) RSS-247 Clause 5.5
Basic standard	:	ANSI C63.10: 2013
Limits	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-01-04 – 2023-03-08
Input voltage	:	DC 3.3V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix B.

5.1.7 Radiated Spurious Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3
Basic standard	:	ANSI C63.10: 2013
Limits	:	Refer to 15.209(a) of FCC part 15.247(d) RSS-Gen Table 5
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	2023-01-04 – 2023-03-07
Input voltage	:	DC 3.3V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	23.6 ℃
Relative humidity	:	61 %
Atmospheric pressure	:	101 kPa

Remark:
Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst-case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix B.

5.1.8 Conducted Emission on AC Mains

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.207(a) RSS-Gen Clause 8.8
Basic standard	:	ANSI C63.10: 2013
Frequency range	:	0.15 – 30MHz
Limits	:	FCC Part 15.207(a) RSS-Gen Table 3
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2023-01-04 – 2023-03-07
Input voltage	:	AC 120V, 60Hz
Operation mode	:	B
Earthing	:	Not connected
Ambient temperature	:	23.1 ℃
Relative humidity	:	60 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

7 List of Tables

Table 1: List of Test and Measurement Equipment 5
Table 2: Measurement Uncertainty 6
Table 3: Technical Specification of EUT.....7
Table 4: RF Channel and Frequency of Wi-Fi 802.11 b/g/n.....8
Table 5: Test Result of Maximum Peak Conducted Output Power, Wi-Fi 802.11 b/g/n 14