

Abkürzungen:

P(ass)

F(ail)



Seite 1 von 29 Prüfbericht - Nr.: 10038030 001 Page 1 of 29 Test Report No.: Auftraggeber: Schneider Electric (Australia) Pty Ltd. Client: 33-37 Port Wakefield Road, Gepps Cross, S.A 5094, Australia Gegenstand der Prüfung: USB Zigbee Interface Test item: Bezeichnung: WHC2 5921, 5200UZI Serien-Nr.: N/A Identification: Serial No .: Wareneingangs-Nr.: TPE75713 Eingangsdatum: 2012/07/26 Receipt No .: Date of receipt: Zustand des Prüfgegenstandes bei Anlieferung: The sample is ok for testing and not damaged Condition of test item at delivery: Prüfort: TÜV Rheinland Taiwan Ltd. Testing location: 11F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei City 105 Taiwan FCC Registration No.: 365730 Prüfgrundlage: FCC CFR47 Part 15: Subpart C Section 15.247 Test specification: KDB 558074 of March 23, 2005 Prüfergebnis: Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). Test Result: The test item passed the test specification(s). Prüflaboratorium: TÜV Rheinland Taiwan Ltd. Testing Laboratory: 11F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei City 105, Taiwan, R.O.C. geprüft/ tested by: kontrolliert/ reviewed by: (Arvin Ho/Section Manager 2012-08-30 2012-08-Rene Charton/Senior Project Manager Datum Name/Stellung Unterschrift Datum Name/Stellung Unterschrift Name/Position Date Signature Date Name/Position Signature Sonstiges/ Other Aspects:

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.

Abbreviations:

P(ass)

F(ail)

N/A

passed

not applicable

failed

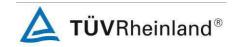
entspricht Prüfgrundlage

nicht anwendbar

nicht getestet

entspricht nicht Prüfgrundlage

This test report relates to the a. m. test item. 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 safety mark on this or similar products.



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TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Passed

5.1.2 PEAK OUTPUT POWER

RESULT: Passed

5.1.3 6DB BANDWIDTH

RESULT: Passed

5.1.4 POWER DENSITY

RESULT: Passed

5.1.5 CONDUCTED SPURIOUS EMISSIONS AND FREQUENCY BAND EDGE MEASURED IN 100KHZ

BANDWIDTH

RESULT: Passed

5.1.6 Spurious Emission

RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS

RESULT: Passed



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1. General Remarks

1.1 Complementary Materials

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

Appendix 1: IUT Photos

(File:10038030APPENDIX1)

Appendix 2: Test Result of Radiated Emissions

(File:10038030APPENDIX2)

Test Specifications

The following standards were applied (in bold: product standards, otherwise: basic standards).

Table 1: Applied Standard and Test Levels

Radio

FCC CFR47 Part 15: Subpart C Section 15.247 KDB 558074 of March 23, 2005

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2. Test Sites

2.1 Test Facilities

TUV Rheinland Taiwan Ltd.

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.

Taipei City 105 Taiwan (R.O.C.)

FCC Registration No.: 365730

2.2 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Туре	S/N	Calibrated until
EMI Test Receiver	R&S	ESCI 7	1166.5950K07- 100797-Pt	9-Nov-12
Bilog Antenna	TESEQ	CBL6111D	29802	1-Oct-12
Pre-Amplifier	HP	8447F	2805A03335	22-Dec-12
Spectrum Analyzer	R&S	FSV 40	100921	12-Oct-12
Horn Antenna (1GHz~18GHz)	COM-POWER	AHA118	701101	27-Dec-12
Horn Antenna (18GHz~25GHz)	COM-POWER	AH840	101031	1-Oct-12
Power meter	R&S	NRVD	100439	27-Mar-13
Power sensor	R&S	NRV-Z1	100013	27-Mar-13
Temp. & Humid. Chamber	Giant Force	GCT-099-40-S	MAF0103-007	13-May-13

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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 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 are $\pm 3dB$.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10 ⁻⁷
RF power, conducted	± 1 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 °C
Humidity	± 10 %



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3. General Product Information

3.1 Product Function and Intended Use

The subject sample is an "USB Zigbee Interface", which is designed to work with Zoolkit software from Schneider Electric. The hardware and software interface allows you to configure, monitor and control a ZigBee network and produces files that are used by C-Bus Toolkit and PICED software programs.

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

3.2 Ratings and System Details

Table 4: Technical Specification of EUT

Technical Specification	Value
Kind of Equipment	USB Zigbee Interface
Brand Name	Schneider Electric (Australia) Pty Ltd.
FCC ID	WZCS1B15258
Type Designation	WHC2_5921, 5200UZI
Operating Frequency	2405MHz~2480MHz
Channel Spacing	5 MHz
Channel number	16
Operation Voltage	5 V (via USB interface)
Modulation	OQPSK
Antenna gain	4.763 dB



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3.3 Independent Operation Modes

The basic operation modes are:

- A. Transmitting
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. Receiving
- C. Standby
- D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Bill of Material
- PCB Layout
- Photo Document
- Technical Description

- Circuit Diagram
- Instruction Manual
- Rating Label

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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

Test operation refers to test setup in chapter 4. All testing were performed according to the procedures in ANSI C63.10: 2009 and KDB 558074 of March 23, 2005.

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:

Kind of Equipment	Manufacturer	Model Name	S/N
Laptop	MSI	MSI4532 (CX420MX)	CX420 MX-233TWK 1008000096

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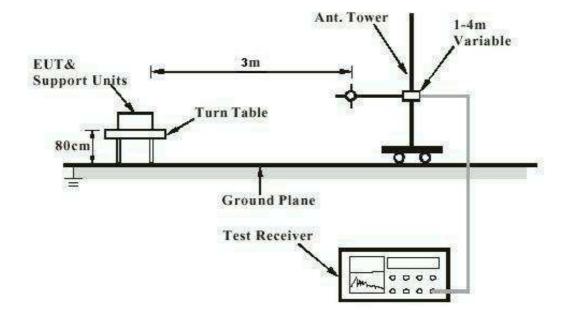
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4.4 Countermeasures to achieve EMC Compliance

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



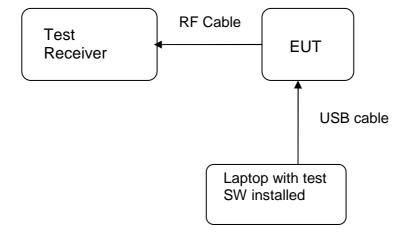


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Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement





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5. Test Results

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5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: Passed

Test date 2012-07-30

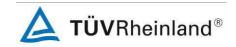
Test standard FCC Part 15.247(b)(4), Part 15.203

Limit the use of antennas with directional gains that do

not exceed 6 dBi

According to the manufacturer declaration, the EUT has an internal antenna with an directional gain of 4.763 dBi, and the antenna is a printed PCB trace with no possibility of replacement. Therefore, the EUT is considered to comply the provision.

Refer to EUT photo for details.



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5.1.2 Peak Output Power

RESULT: Passed

Test date 2012-07-30

Test standard FCC Part 15.247(b)(1)

Basic standard KDB 558074 of March 23, 2005

1 Watt Limit

Kind of test site Shielded room

Test setup

Low/ Middle/ High

Operation Mode :
Ambient temperature :
Relative humidity Α **22**℃ 52% Atmospheric pressure : 102 kPa

Table 5: Test result of Peak Output Power

Channel	Channel Frequency	Peak Output Power		Limit
Orianner	(MHz)	(dBm)	(W)	(W)
Low Channel	2405	7.62	0.0058	1
Middle Channel	2440	7.37	0.0055	1
High Channel	2480	7.13	0.0052	1

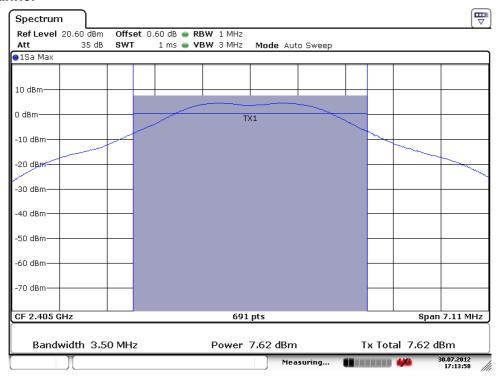


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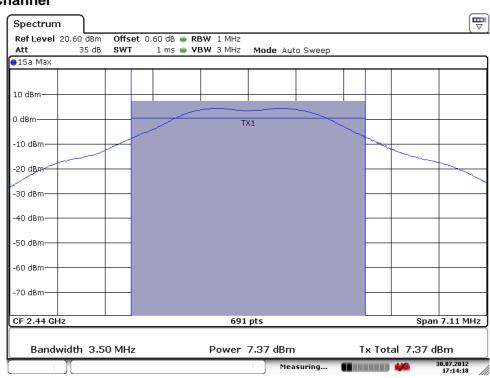
Test Plot of Peak Output Power

Low Channel



Date: 30.JUL.2012 17:13:58

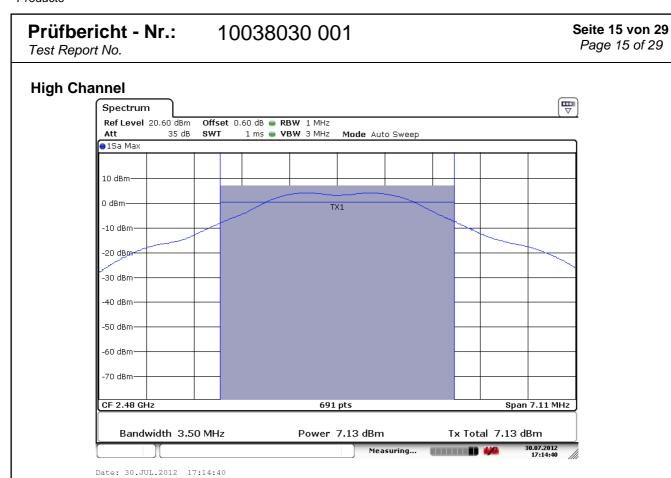
Middle Channel

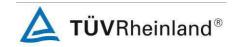


Date: 30.JUL.2012 17:14:18



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5.1.3 6dB Bandwidth

RESULT: Passed

2012-07-30

FCC Part 15.247(a)(1)

Date of testing
Test standard
Basic standard
Kind of test site
: KDB 558074 of March 23, 2005

Shielded room

Test setup

Low/ Middle/ High

Test Channel : Operation Mode : Ambient temperature : Relative humidity : Α **24**℃ 53% Atmospheric pressure : 102 kPa

Table 6: Test result of 20dB Bandwidth

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Limit (MHz)	Result
Low Channel	2405	1661	> 0.5MHz	Pass
Mid Channel	2440	1641	> 0.5MHz	Pass
High Channel	2480	1641	> 0.5MHz	Pass

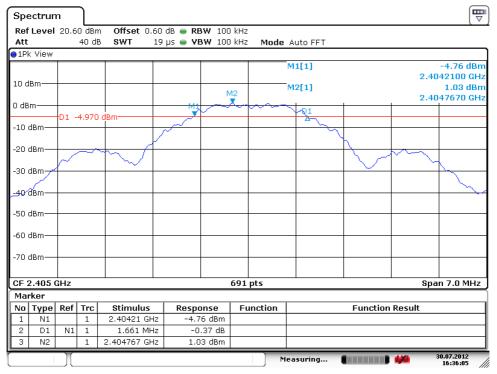


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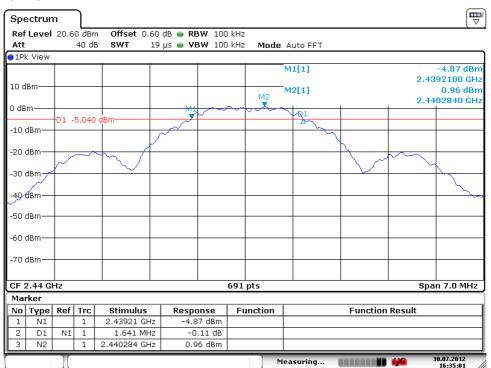
Test Plot of 6dB Bandwidth

Low Channel



Date: 30.JUL.2012 16:36:05

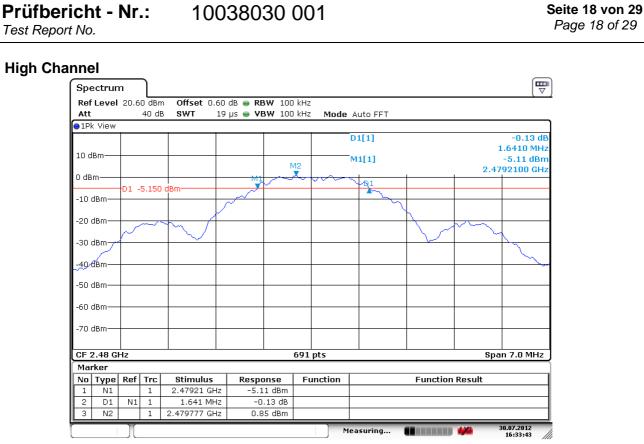
Middle Channel



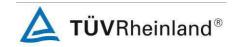
Date: 30.JUL.2012 16:35:01



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Date: 30.JUL.2012 16:33:43



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5.1.4 Power Density

RESULT: Passed

2012-07-30

FCC Part 15.247(e)

Date of testing :
Test standard :
Basic standard :
Kind of test site : KDB 558074 of March 23, 2005

Shielded room

Test setup

Low/ Middle/ High

Test Channel : Operation Mode : Ambient temperature : Relative humidity : Α **24**℃ 53% Atmospheric pressure : 102 kPa

Table 7: Test result of Power Density

Channel	Channel Frequency (MHz)	Peak Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	2402	-9.59	8	Pass
Mid Channel	2442	-9.87	8	Pass
High Channel	2480	-10.89	8	Pass

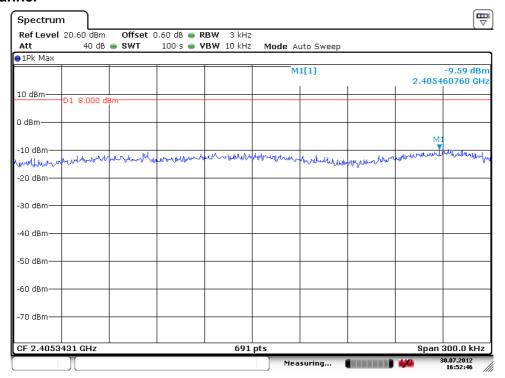


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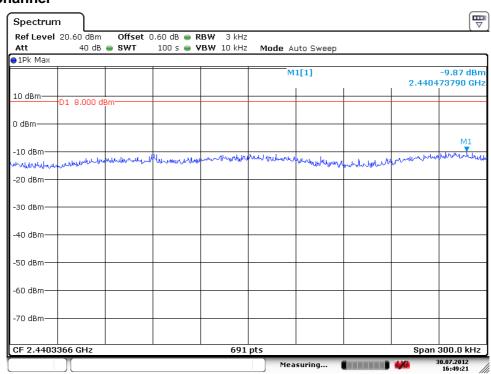
Test Plot of Power Density

Low Channel



Date: 30.JUL.2012 16:52:45

Middle Channel



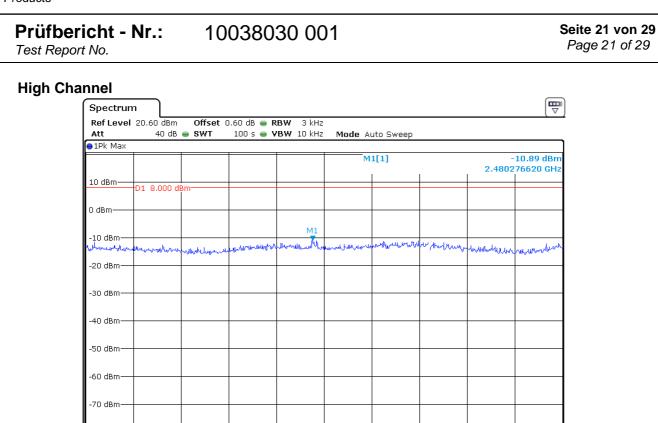
Date: 30.JUL.2012 16:49:21



Span 300.0 kHz

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691 pts

Measuring...

Date: 30.JUL.2012 16:45:24

CF 2.480284 GHz



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5.1.5 Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth

RESULT: Passed

2012-07-30 Date of testing

Test standard FCC part 15.247(d)

Basic standard KDB 558074 of March 23, 2005

Limit 20dB (below that in the 100kHz bandwidth within

the band that contains the highest level of the

desired power)

Kind of test site Shielded room

Test setup

Low/ High Test Channel

Operation mode Ambient temperature **22**℃ Relative humidity 52% Atmospheric pressure : 102 kPa

All emissions are more than 20dB below fundamental, details refer to following test plot, and compliance is achived as well.

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.

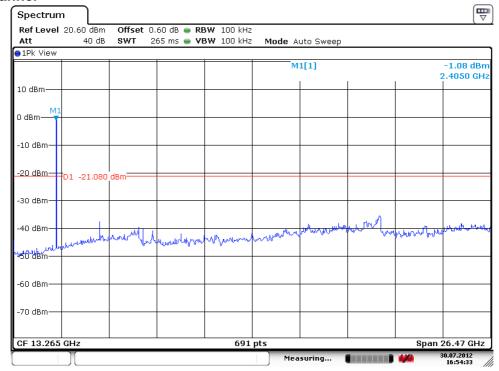


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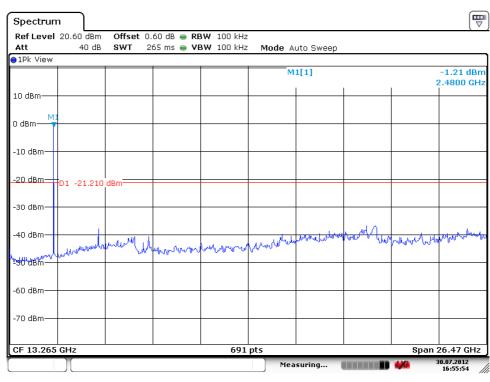
Test Plot of 100kHz Conducted Emissions

Low Channel



Date: 30.JUL.2012 16:54:33

High Channel

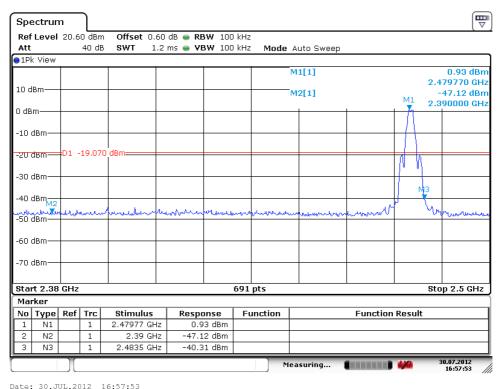


Date: 30.JUL.2012 16:55:54



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High Channel





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5.1.6 Spurious Emission

RESULT: Passed

Date of testing 2012-07-30

Test standard FCC part 15.247(d), FCC 15.205, FCC

15.209

ANSI C63.10: 2009 Basic standard

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

Low/ Middle/ High Test Channel

Operation mode A, C Ambient temperature **24**°C Relative humidity 56% Atmospheric pressure 102 kPa

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic. For details refer to Appendix 2. 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.



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6. Safety Human exposure

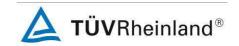
6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT: Passed

Test standard : FCC KDB Publication 447498

Since maximum peak output power of the transmitter is <60/f(GHz)mW, i.e. 5.7810 mW<25(=60/2.4)mW, hence the EUT is exclueded from SAR evaluation according to FCC KDB publication 447498 D01: Mobile Portable RF Exposure.



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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)



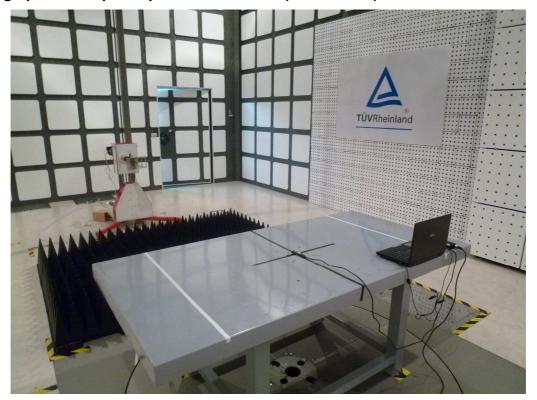


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Photograph 3: Set-up for Spurious Emissions (Back View 2)



Photograph 4: Set-up for Conducted testing





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