



Prüfbericht - Nr.: 17016532 001		Seite 1 von 21	
<i>Test Report No.:</i>		<i>Page 1 of 21</i>	
Auftraggeber:		Primax Electronics Ltd.	
<i>Client:</i>		No. 669, Ruey Kuang Rd. Neihu, Taipei 114, Taiwan	
Gegenstand der Prüfung: Dynex Wireless Optical Mouse			
<i>Test item:</i>			
Bezeichnung:	DX-WLMSE2	Serien-Nr.:	n.a.
<i>Identification:</i>		<i>Serial No.:</i>	
Wareneingangs-Nr.:	163063187	Eingangsdatum:	2010-05-06
<i>Receipt No.:</i>		<i>Date of receipt:</i>	
Prüfart:	TÜV Rheinland (Guangdong) Ltd.		
<i>Testing location:</i>	EMC Laboratory		
	Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou, P.R. China		
	FCC Registration No.: 833845 Test site Industry Canada No.: 2932C-1		
Prüfgrundlage:	FCC CFR47 Part 15: Subpart C Section 15.227		
<i>Test specification:</i>	RSS-310 Issue 2 June 2007 RSS Gen Issue 2 June 2007 RSS-102 Issue 2 November, 2005		
Prüfresultat:	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).		
<i>Test Result:</i>	<i>The test item passed the test specification(s).</i>		
Prüflaboratorium:	TÜV Rheinland (Shenzhen) Co., Ltd.		
<i>Testing Laboratory:</i>			
geprüft/ tested by:		kontrolliert/ reviewed by:	
			
2010-07-07	Winnie Hou/ Project Engineer	2010-07-15	Sam Lin / Technical Certifier
<i>Datum</i>	<i>Name/Stellung</i>	<i>Unterschrift</i>	<i>Datum</i>
<i>Date</i>	<i>Name/Position</i>	<i>Signature</i>	<i>Date</i>
Sonstiges/ Other Aspects:			
Abkürzungen:	P(ass) = entspricht Prüfgrundlage	Abbreviations:	P(ass) = passed
	F(ail) = entspricht nicht Prüfgrundlage		F(ail) = failed
	N/A = nicht anwendbar		N/A = not applicable
	NT = nicht getestet		NT = 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 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 safety mark on this or similar products.</i>			

Prüfbericht - Nr.: 17016532 001*Test Report No.***Seite 2 von 21***Page 2 of 21*

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT*RESULT: Passed***5.1.2 FIELD STRENGTH WITHIN BAND***RESULT: Passed***5.1.3 OUT-OF-BAND EMISSION***RESULT: Passed***6.1.1 ELECTROMAGNETIC FIELDS***RESULT: Passed*

Contents

1.	GENERAL REMARKS	4
1.1	COMPLEMENTARY MATERIALS.....	4
2.	TEST SITES.....	4
2.1	TEST FACILITIES	4
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.....	8
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS.....	8
3.5	SUBMITTED DOCUMENTS.....	8
4.	TEST SET-UP AND OPERATION MODES.....	9
4.1	PRINCIPLE OF CONFIGURATION SELECTION	9
4.2	TEST OPERATION AND TEST SOFTWARE	9
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	9
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE	9
4.5	TEST SETUP DIAGRAM	10
5.	TEST RESULTS	12
5.1	TRANSMITTER REQUIREMENT & TEST SUITES.....	12
<i>5.1.1</i>	<i>Antenna Requirement.....</i>	<i>12</i>
<i>5.1.2</i>	<i>Field strength within band</i>	<i>13</i>
<i>5.1.3</i>	<i>Out-of-band emission</i>	<i>15</i>
6.	SAFETY HUMAN EXPOSURE	19
6.1	RADIO FREQUENCY EXPOSURE COMPLIANCE	19
<i>6.1.1</i>	<i>Electromagnetic Fields</i>	<i>19</i>
7.	PHOTOGRAPHS OF THE TEST SET-UP	20
8.	LIST OF TABLES.....	21
9.	LIST OF PHOTOGRAPHS.....	21

1. General Remarks

1.1 Complementary Materials

None.

2. Test Sites

2.1 Test Facilities

TÜV Rheinland (Guangdong) Ltd.
EMC Laboratory
Guangzhou Auto Market,
Yuan Gang Section of Guangshan Road,
Guangzhou, P.R. China
FCC Registration No.: 833845
Test site Industry Canada No.: 2932C-1

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
Spurious emission and Radiated emission				
EMI Test Receiver	Rohde & Schwarz	ESCI-3	100216	2010-11-26
Spectrum Analyzer	Rohde & Schwarz	FSP30	100286	2010-08-24
Trilog-Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	209	2010-11-07
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF906	100385	2010-08-18
Pre-amplifier	MITEQ	AFS42-00101800-25-S-42	1101599	2010-07-31
Standard Gain Horn Antenna	EMCO	3160-09	21642	N/A
Pre-amplifier	MITEQ	AFS33-18002650-30-8P-44	1108282	2010-07-31
3m Anechoic Chamber	Albatross Project GmbH	N/A	N/A	2011-04-16
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100111	2010-12-11

2.3 Traceability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, 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 basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are $\pm 3\text{dB}$.

2.6 Location of Original Data

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

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Guangdong) Ltd. test facility located at Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou, P.R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a wireless optical mouse used together with personal computer via USB interface.

The whole system is composed of one mouse (DX-WLMSE2) and one receiver (DX-WLMSE2A).

For details refer to the User Manual, technical description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Rating of EUT

Kind of Equipment:	Dynex Wireless Optical Mouse
Type Designation:	DX-WLMSE2
FCC ID	EMJMMORFEVUO

Table 3: Technical Specification of EUT

Technical Specification	Value
Operating Frequency	27.045 MHz
Channel separation	100kHz
Extreme Temperature Range	-10°C to 45°C
Operation Voltage	DC 1.5V (via AA size battery)
Modulation	FSK
Antenna Type	Internal Antenna, Non-User Replaceable
Antenna Gain	2dBi
RF Output Power	0.00006W (-12.4dBm)
External Ports	None

3.3 Independent Operation Modes

The basic operation modes are:

- A. Transmitting
- B. Standby
- C. 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

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 5. All testing were performed according to the procedures in ANSI C63.4: 2003.

4.3 Special Accessories and Auxiliary Equipment

None.

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

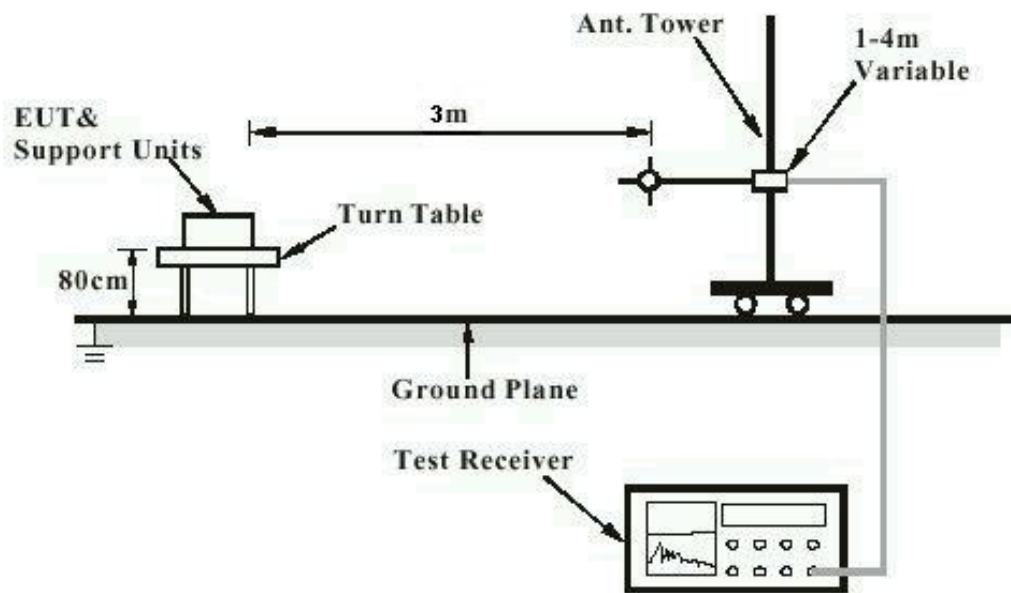


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement

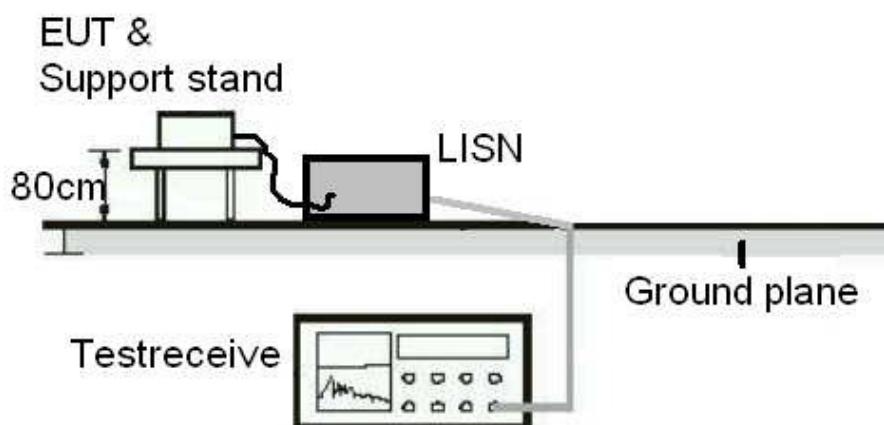
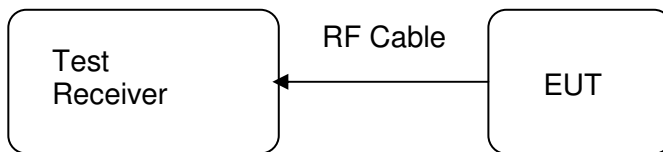


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Passed**

Test date	:	2010-06-20
Test standard	:	FCC Part 15.203 RSS Gen 7.1.4
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 2dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply the provision.

Refer to EUT photo for details.

5.1.2 Field strength within band

RESULT:
Passed

Test date : 2010-06-20
 Test standard : FCC Part 15.227(a)
 Clause 3.8 of RSS-310
 Basic standard : ANSI C63.4: 2003
 Limit : 10 mV/m
 Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Operation Mode : A
 Ambient temperature : 21°C
 Relative humidity : 50%
 Atmospheric pressure : 101 kPa

Table 4: Test result of Field strength within band

Channel Frequency (MHz)	Average			peak		
	Reading (dBuV/m)	Reading (mV/m)	Limit (mV/m)	Reading (dBuV/m)	Reading (mV/m)	Limit (mV/m)
27.045MHz	38.4	0.083	10	43.7	0.153	100

Remark: The test was applied on both horizontal and vertical orientation, the highest value was found on vertical orientation.

Test Plot of Field strength within band

TUV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

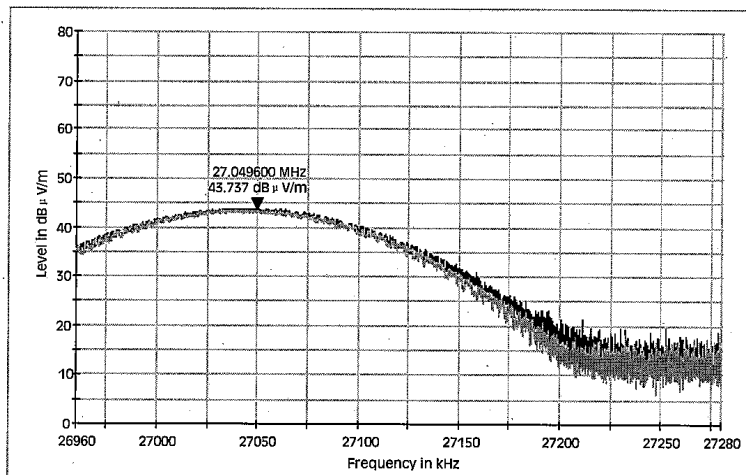
EMC Test Record (EMISSION)

Test Information

Manufacturer:	Primax Electronic & Telecommunication Products Ltd.
Test Item:	Wireless optical NB mouse with Dongle
Identification:	DX-WLMSE2
Test Standard:	FCC Part 15
Test Detail:	RE
Operation Mode:	A
Climate Condition:	21 °C; 50%RH; 101 kPa.
Test Voltage / Freq.:	DC1.5V
Receipt No.:	163063187 200
Report No.:	/
Result:	Pass
Comment:	Vertical

Subrange 1

Frequency Range:	26MHz – 28MHz
Receiver:	TUV ESCI 3
Transducer:	TUV SAC Active Loop Antenna HFH2-Z2 / TUV ESCI3 -TUV SAC Active Loop Antenna HFH2-Z2



Result Table Single

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Polarization	Corr (dB)
27.049000	43.7	38.4	V	19.7

Date: 6/20/2010 - Time: 5:08:29 PM

Tested by:



Reviewed by:



5.1.3 Out-of-band emission

RESULT:**Passed**

Date of testing : 2010-06-20
Test standard : FCC part 15.227(b)
Clauwe 3.8 of RSS-310
Basic standard : ANSI C63.4: 2003
Limits : Refer to FCC part 15.227(b) and 15.209(a)
Refer to RSS-310 Table 2
Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Operation mode : A
Ambient temperature : 21°C
Relative humidity : 50%
Atmospheric pressure : 101 kPa

Remark: Testing was carried out within frequency range 9kHz to 1GHz. The test was applied on both horizontal and vertical orientation, the highest value was found on vertical orientation.

Test Plot of Spurious emission – (9kHz – 30MHz)

TÜV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

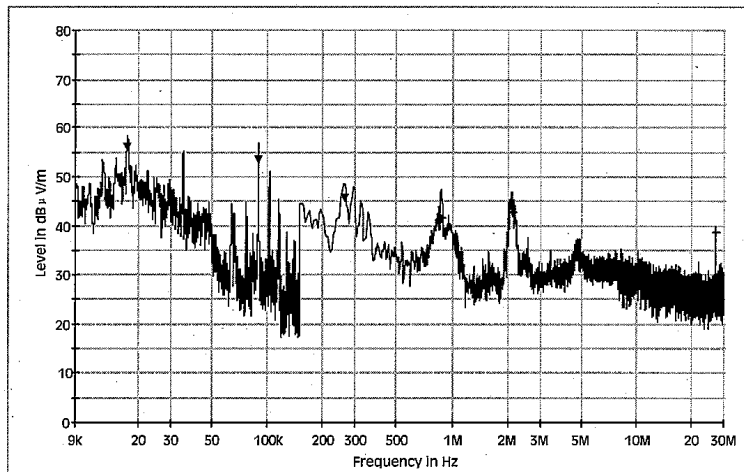
EMC Test Record (EMISSION)

Test Information

Manufacturer:	Primax Electronic & Telecommunication Products Ltd.
Test Item:	Wireless optical NB mouse with Dongle
Identification:	DX-WLMSE2
Test Standard:	FCC Part 15
Test Detail:	RE
Operation Mode:	A
Climate Condition:	21 °C; 50%RH; 101 kPa.
Test Voltage / Freq.:	DC1.5V
Receipt No.:	163063187 200
Report No.:	/
Result:	Pass
Comment:	/

Subrange 1

Frequency Range:	9kHz - 30MHz
Receiver:	TUV ESCI 3
Transducer:	TUV SAC Active Loop Antenna HFH2-Z2 / TUV ESCI3 -TUV SAC Active Loop Antenna HFH2-Z2



Frequency (MHz)	QuasiPeak (dB μV/m)	Average (dB μV/m)	Meas. Time (ms)	Bandwidth (kHz)
0.017320	---	56.1	1000.000	0.200
0.089320	---	53.5	1000.000	0.200
0.262000	---	45.5	1000.000	9.000
0.870000	41.5	---	1000.000	9.000
2.118000	42.6	---	1000.000	9.000
27.050000	38.6	---	1000.000	9.000

Date: 6/20/2010 - Time: 4:24:21 PM

Tested by:



Reviewed by:



Test Plot of Spurious emission – Horizontal (30MHz – 1GHz)

TÜV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

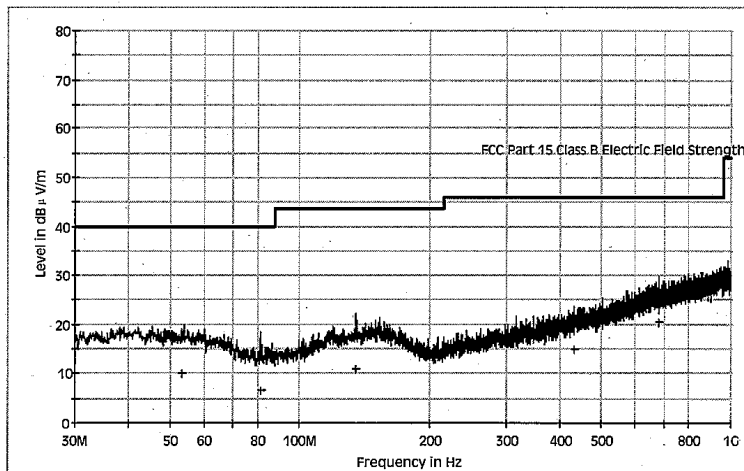
EMC Test Record (EMISSION)

Test Information

Manufacturer:	Primax Electronic & Telecommunication Products Ltd.
Test Item:	Wireless optical NB mouse with Dongle
Identification:	DX-WLMSE2
Test Standard:	FCC Part 15
Test Detail:	RE
Operation Mode:	A
Climate Condition:	21 °C; 50%RH; 101 kPa.
Test Voltage / Freq.:	DC 1.5 V
Receipt No.:	163063187 200
Report No.:	/
Result:	Pass
Comment:	/

Subrange 1

Frequency Range:	30MHz - 1GHz
Receiver:	TUV ESCI 3
Transducer:	TUV SAC UVLB 9168 / TUV ESCI3 -TUV SAC UVLB 9168



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Polarity
53.150000	10.0	30.0	40.0	H
81.050000	6.7	33.3	40.0	H
135.250000	10.9	32.6	43.5	H
432.050000	14.9	31.1	46.0	H
682.450000	20.5	25.5	46.0	H

Date: 6/20/2010 - Time: 4:43:29 PM

Tested by:



Reviewed by:



Test Plot of Spurious emission – Vertical (30MHz – 1GHz)

TÜV Rheinland (Guangdong) Ltd.

EMC Test Service Hotline: +86-20-28391188

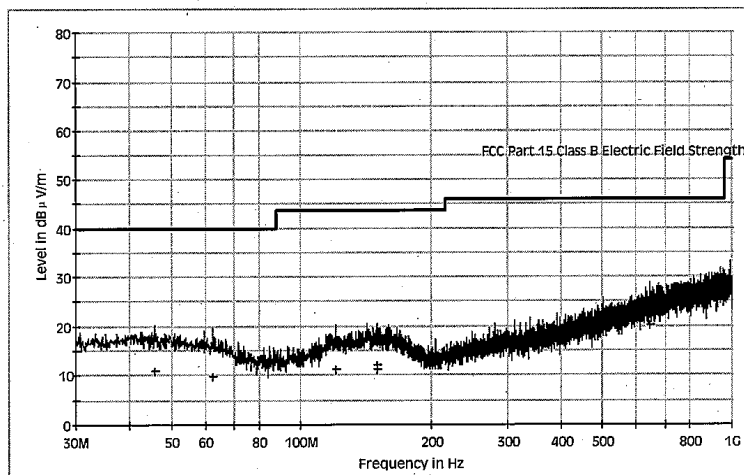
EMC Test Record (EMISSION)

Test Information

Manufacturer:	Primax Electronic & Telecommunication Products Ltd.
Test Item:	Wireless optical NB mouse with Dongle
Identification:	DX-WLMSE2
Test Standard:	FCC Part 15
Test Detail:	RE
Operation Mode:	A
Climate Condition:	21 °C; 50%RH; 101 kPa.
Test Voltage / Freq.:	DC 1.5 V
Receipt No.:	163063187 200
Report No.:	/
Result:	Pass
Comment:	/

Subrange 1

Frequency Range:	30MHz - 1GHz
Receiver:	TUV ESCI 3
Transducer:	TUV SAC UVLB 9168 / TUV ESCI3 -TUV SAC UVLB 9168


Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB μV/m)	Margin (dB)	Limit (dB μV/m)	Polarity
45.650000	11.1	28.9	40.0	V
62.350000	9.7	30.3	40.0	V
120.350000	11.2	32.3	43.5	V
149.900000	12.3	31.2	43.5	V
149.900000	11.2	32.3	43.5	V
645.850000	20.2	25.8	46.0	V

Date: 6/21/2010 - Time: 3:50:21 PM

Tested by:



Reviewed by:



6. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Passed**

The measured peak output power of the transmitter is only 0.06mW (-12.4dBm). According to RSS-102 Issue 2 November 2005 clause 2.5, from 3 kHz up to 1 GHz inclusively and if the output power (i.e. the higher of the conducted or effective isotropic radiated power (e.i.r.p.) source-based time-averaged output power) is less than, or equal to 200 mW for General Public Use and 1000 mW for Controlled Use, then the transmitters are exempt from routine SAR and RF exposure evaluations, therefore the EUT is deemed to fulfill the requirement without additional test.

7. Photographs of the Test Set-Up

Photograph 1: Set-up for Emissions (9kHz - 30MHz)



Photograph 2: Set-up for Emissions (30MHz-1GHz)



8. List of Tables

Table 1: List of Test and Measurement Equipment.....	5
Table 2: Rating of EUT	7
Table 3: Technical Specification of EUT	8
Table 4: Test result of Field strength within band.....	13

9. List of Photographs

Photograph 1: Set-up for Emissions (9kHz - 30MHz).....	20
Photograph 2: Set-up for Emissions (30MHz-1GHz).....	20