Prüfbericht-Nr.: *Test Report No.:*	16060046 001	**Auftrags-Nr.:** *Order No.:*	174020628	Seite 1 von 15 *Page 1 of 1515*
Kunden-Referenz-Nr.: *Client Reference No.:*	352690	**Auftragsdatum:** *Order date.:*	30.Mar.2014	
Auftraggeber: *Client:*	Seikaku Technical Group Limited Offshore Chambers, P.O. Box 217 Apia, Samoa.			
Prüfgegenstand: *Test item:*	USB Digital Wireless System			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	RXD1	**FCC ID:** *FCC ID*	CCRRXD1	
Auftrags-Inhalt: *Order content:*	TUV Rheinland - EMC service			
Prüfgrundlage: *Test specification:*	Conducted Emission limits describes at FCC 47 CFR Part 15 (October 1, 2013) Subpart B section 15.107 (a) Radiated Emission limits describes at FCC 47 CFR Part 15 (October 1, 2013) Subpart B section 15.109 (a) Test method was quoted from ANSI C63.4:2009.			
Wareneingangsdatum: *Date of receipt:*	10.Apr.2014			
Prüfmuster-Nr.: *Test sample No.:*	N/A			
Prüfzeitraum: *Testing period:*	Refer to the test report			
Ort der Prüfung: *Place of testing:*	Refer to section 2.1			
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Guangdong) Ltd.			
Prüfergebnis*: *Test result*:*	Pass			

geprüft von / *tested by:*			**kontrolliert von** / *reviewed by:*		
14.May.2014	Frank Du/ Project Manager		14.May.2014	Liangdong Xie/Project Manager	
Datum *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 P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar	5 = mangelhalt N/T = nicht getestet
Legend:	1 = very good P(ass) = passed a.m. test specifications(s)	2 = good	3 = satisfactory F(ail) = failed a.m. test specifications(s)	4 = sufficient N/A = not applicable	5 = poor N/T = not tested

TEST SUMMARY

5.1 CONDUCTED EMISSION FOR FCC 47 CFR PART 15 SECTION 15.107(A)
RESULT: Pass

5.2 RADIATED EMISSION FOR FCC 47 CFR PART 15 SECTION 15.109(A)
RESULT: Pass

Contents

1 General Remarks

When basic standards are applied in this test report, the latest amendments are always included.

1.1 Complementary Materials

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

Appendix 1: Test Result

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory

No.102, 1F of Southwest Warehouse Building,No.767 TianYuan Road,
Tianhe District, Guangzhou,P.R.China, 510650

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Last Calibrated	Calibration Interval
TÜV Rheinland (Guangdong) Ltd. EMC Laboratory					
EMI Test Receiver	Rohde & Schwarz	ESCS30	100316	16.03.2014	1 year
EMI Test Receiver	Rohde & Schwarz	ESCI-3	100216	16.03.2014	1 year
Spectrum Analyser	Rohde & Schwarz	FSP30	100286	16.03.2014	1 year
Bi-log Antenna	Schwarzbeck	VULB9168	209	16.03.2014	1 year
Horn Antenna	Rohde & Schwarz	HF906	100385	16.03.2014	1 year
Artificial Mains Network	Rohde & Schwarz	ESH2-Z5	100114	16.03.2014	1 year
1-18GHz Amplifier	MITEO	AFS42-0101800-25-S-42	1101599	16.03.2014	1 year
3m Semi Anechoic Chamber	Albatross Projects	---	---	16.03.2014	1 year

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

Uncertainty of conducted emissions measurements 2.68 dB
Uncertainty of radiated emissions measurements 5.16dB (30-1000 MHz)
The reported expanded uncertainty is based on a standard uncertainty multiply by a coverage factor k=2, providing a level of confidence of approximately 95%.

2.6 Location of original data

The original copies of all test data taken during actual testing were attached at Appendix 1 of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Guangdong) file for certification follow-up purposes.

2.7 Status of facility used for testing

TÜV Rheinland (Guangdong) Ltd. is listed on the US Federal Communications Commission list of facilities approved to perform measurements, whose registration number is 833845.

3 General Product Information

The submitted sample RXD1 is a wireless receiver, it operates with transmitter HXD1. It uses digital modulation technics and operates in 2400 frequency band.

For details refer to the User Manual and Circuit Diagram.

3.1 Product Function and Intended Use

Refer to Technical Documentation and User Manual.

3.2 Ratings and System Details

Type Designation	:	RXD1
Frequency range	:	2404.0 MHz –2476.0MHz
Number of employed channels	:	5 channels
Channel Spacing	:	2MHz
Modulation Type	:	GFSK
Type of antenna	:	Integral antenna
Power supply	:	DC5.0V(USB powered)
Equipment type	:	Portable Equipment
Protection Class	:	III

Refer to the Technical Documentation for further information.

3.3 Independent Operation Modes

The basic operation modes are:
A. receiving

Refer to user manual for further information.

3.4 Submitted Documents

Construction Drawing
Circuit Diagram
PCB Layout
Parts List
Rating Label
User Manual

4 Test Set-up and Operation Mode

4.1 Principle of Configuration Selection

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

Refer to Test set-up in chapter 5.

4.3 Special Accessories and Auxiliary Equipment

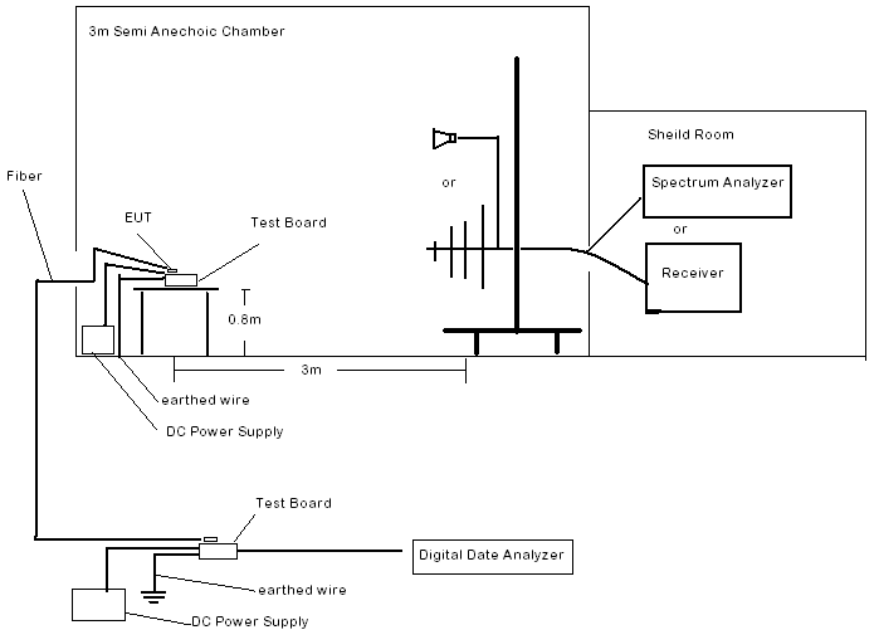
1. Notebook PC IBM X60 S/N: SIN L3-CB426

4.4 Countermeasures to achieve EMC Compliance

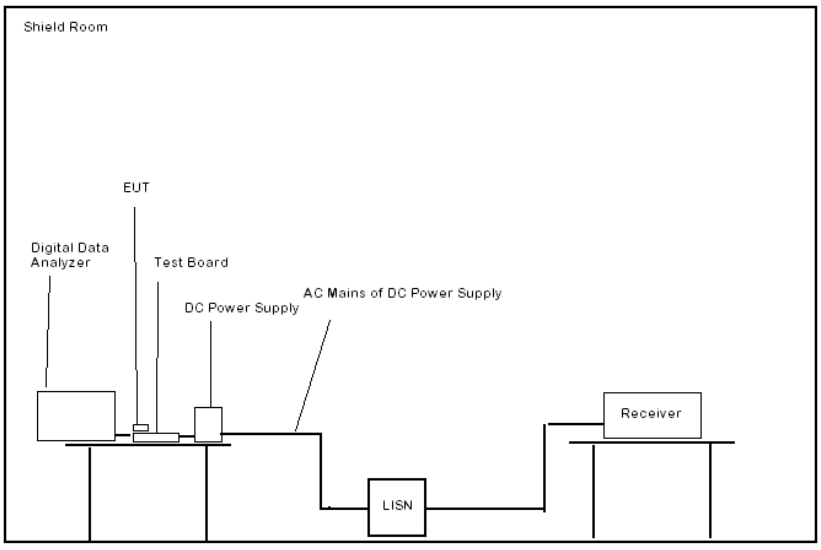
No additional countermeasures to the submitted test sample(s) were employed to achieve compliance.

4.5 Test set-up

Radiated Emission Setup



Conducted Emission Setup



5 Test Results of Emissions

5.1 Conducted Emission for FCC 47 CFR Part 15 Section 15.107(a)

RESULT: **Pass**

Date of testing	:	15.04.2014
Test procedure	:	ANSI C63.4:2009, Clause 7.2
Equipment class	:	B
Limits	:	FCC 47 CFR Part 15 Subpart B Section 15.107 (a), limit for Class B equipment.

Test Setup

Input voltage	:	AC120V, 60Hz
Operation mode	:	A. Receiving
Temperature	:	20℃
Humidity	:	50%

Test procedure:

For tabletop device, the EUT and its peripherals were placed on a wooden table, 0.8cm above the horizontal reference plane and 40cm away from vertical reference plane in a shielded room. For floor-standing device, the EUT shall be placed either directly on the reference ground plane or on insulating material as described in ANSI C63.4 Clause 6.3.2.1. The EUT was connected to input power source through a line impedance stabilization network (LISN).The excess length of the power cord between the EUT and the LISN shall be folded back and forth at the center of the lead to form a bundle not exceeding 40cm in length.
The EUT was tested in a typical model of operation in accordance with ANSI C63.4:2009, Pre-test was performed in peak and average detection mode. final measurement was performed using quasi-peak and average detection on the live and neutral lines with the worst case.
The test software Rohde & Schwarz EMC32 was used during the test.
If the result of the measurement with the Quasi Peak detector is below the Average limit, the measurement with Average Detector may be omitted.

Refer to appendix 1 for test result.

5.2 Radiated Emission for FCC 47 CFR Part 15 Section 15.109(a)

RESULT: **Pass**

Date of testing	:	15.04.2014
Test procedure	:	ANSI C63.4:2009, Clause 8.3
Equipment class	:	B
Limits	:	FCC 47 CFR Part 15 Subpart B section 15.109 (a), limit for Class B equipment.

Test Setup

Input voltage	:	AC120V, 60Hz
Operation mode	:	A. Receiving
Temperature	:	20℃
Humidity	:	50%

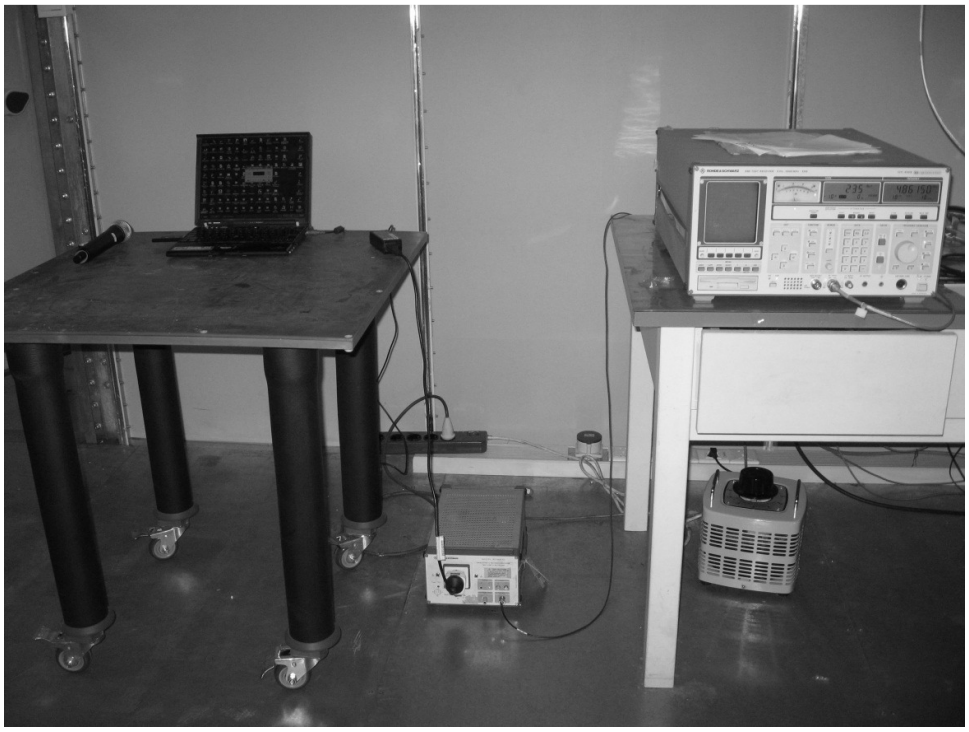
Test procedure:

For tabletop device, the and its peripherals were placed on a wooden table,80cm above ground plane in semi-anechoic chamber. For floor-standing equipment, the EUT and all cables shall be insulated, if required, from the ground plane by up to 12mm of insulating material in semi-anechoic chamber.
The EUT was set 3 meters away from the receiving antenna, which was mounted on a variable-height antenna tower. Test shall be made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height shall be varied from 1m to 4m. The table was rotated 360 degrees to detect the suspected emission frequency points. The position of the worst radiation case with both horizontal and vertical receiving antenna polarization was recorded together with the suspected emission frequency points above-mentioned.
The EUT was tested in a typical model of operation in accordance with ANSI C63.4:2009, Pre-test was performed in peak detection mode. Finial measurement was performed using quasi-peak detection with the worst case.
The test software Rohde & Schwarz EMC32 was used during the test.

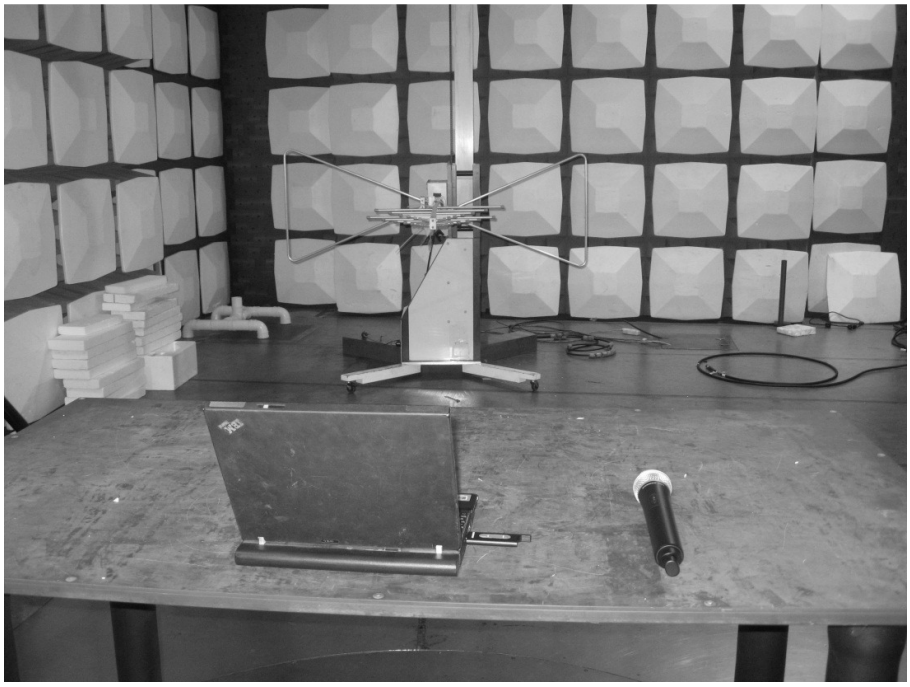
Refer to appendix 1 for test result. The highest frequency of the internal sources of the EUT is less than 108MHz. The measurement shall only be made up to 1000MHz.

6 Photographs of the Test Set-Up

Photograph 1: Set-up for Conducted Emission



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



7 List of Tables

8 List of Photographs

Prüfbericht - Nr.: 16060046 001
Test Report No.

TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

EMC Test Record (EMISSION)

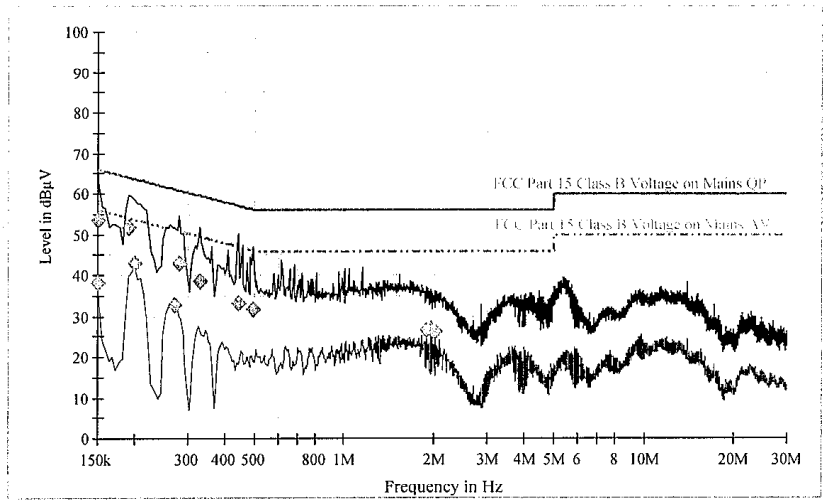
Common Information

Manufacturer:	Seikaku
Test Item:	Wireless receiver
Identification:	RXD1 ~~& HXD1~~
Test Standard:	FCC Part 15. 107
Test Detail:	Conducted Emission
Operation Mode:	A
Climate Condition:	20°C; 50%RH; 101kPa.
Test Voltage/ Freq.:	AC 120 V/ 60 Hz
Port / Line:	AC Mains(L1+N)
Receipt No.:	174020628
Report No.:	16060046 001
Result:	Pass
	/

YJX 2014-04-17 Checked

Hardware Setup:	1phase LISN ESH3-Z5 to ESS
Level Unit:	dBµV

Subrange	Detectors	IF Bandwidth	Step Size	Meas. Time	Receiver
150kHz - 30MHz	Peak, Average	9kHz	4.5kHz	10ms	ESS



Sign-off T

YJX 2014-04-17 Checked

WTV 2014-04-18 Checked

4/15/2014, 10:37:55 Tested by: _____ Reviewed by: _____

TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	53.3	2000.0	10.000	GND	L1	10.1	12.7	66.0	
0.190500	51.6	2000.0	10.000	GND	L1	10.0	12.4	64.0	
0.280500	43.1	2000.0	10.000	GND	N	10.0	17.7	60.8	
0.330000	38.6	2000.0	10.000	GND	N	10.1	20.9	59.5	
0.442500	33.1	2000.0	10.000	GND	N	10.1	23.9	57.0	
0.496500	31.5	2000.0	10.000	GND	N	10.2	24.6	56.1	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	38.2	2000.0	10.000	GND	L1	10.1	17.8	56.0	
0.199500	42.9	2000.0	10.000	GND	L1	10.0	10.7	53.6	
0.271500	32.7	2000.0	10.000	GND	L1	10.0	18.4	51.1	
1.887000	26.5	2000.0	10.000	GND	N	10.2	19.5	46.0	
1.954500	26.9	2000.0	10.000	GND	N	10.1	19.1	46.0	
2.022000	26.2	2000.0	10.000	GND	N	10.2	19.8	46.0	

Sign-off Test Data

YJX 2014-04-17 Checked

WIV 2014-04-18 Checked

4/15/2014, 10:37:55 Tested by: _____ Reviewed by: _____

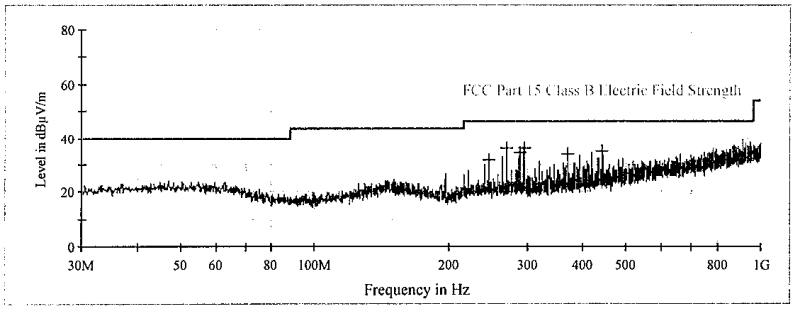
TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

EMC Test Record (Emission)

Common Information

Manufacturer:	Seikaku
Test Item:	Wireless receiver
Identification:	RXD1
Test Standard:	FCC Part 15.109
Test Detail:	RE
Operation Mode:	A
Climate Condition:	23℃ ; 50 %RH; 101 kPa.
Test Voltage/ Freq:	AC 120 V/ 60 Hz
Receipt No:	174020628
Report No:	16060046 001
Result:	Pass
Comment:	Test distance is 3m, Horizontal

Subrange 1	
Frequency Range:	30M-1GHz
Receiver:	TUV ESCI
Transducer:	TUV SAC UVLB 9168/ TUV ESCI -TUV SAC UVLB 9168



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
245.700000	31.4	1000.0	120.000	H	14.1	14.6	46.0
270.300000	35.9	1000.0	120.000	H	15.0	10.1	46.0
288.250000	34.2	1000.0	120.000	H	15.7	11.8	46.0
294.950000	35.7	1000.0	120.000	H	15.8	10.3	46.0
368.650000	33.7	1000.0	120.000	H	17.8	12.3	46.0
442.350000	34.7	1000.0	120.000	H	19.7	11.3	46.0

Sign-off Test Data

YJX 2014-04-17 Checked

WIV 2014-04-18 Checked

Date: 4/15/2014 - Time: 1:08:30 Tested by: _____ Reviewed by: _____

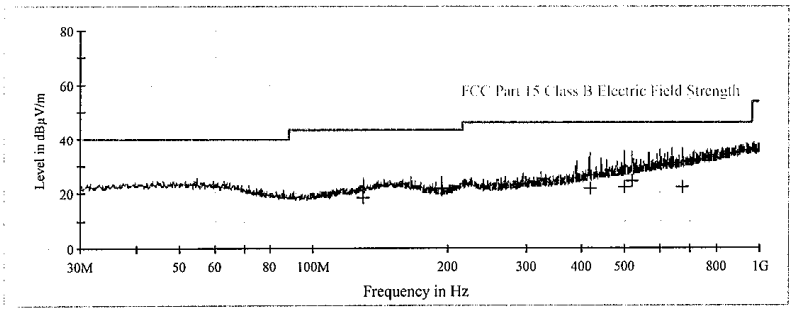
TUV Rheinland (Guangdong) Ltd. EMC Test Service Hotline: +86-20-28391188

EMC Test Record (Emission)

Common Information

Manufacturer:	Seikaku
Test Item:	Wireless receiver
Identification:	RXD1
Test Standard:	FCC Part 15.109
Test Detail:	RE
Operation Mode:	A
Climate Condition:	23℃ ; 50 %RH; 101 kPa.
Test Voltage/ Freq:	AC 120 V/ 60 Hz
Receipt No:	174020628
Report No:	16060046 001
Result:	Pass
Comment:	Test distance is 3m, Vertical

Subrange 1	
Frequency Range:	30M-1GHz
Receiver:	TUV ESCI
Transducer:	TUV SAC UVLB 9168/ TUV ESCI -TUV SAC UVLB 9168



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
129.900000	18.4	1000.0	120.000	V	13.8	25.1	43.5
194.900000	21.5	1000.0	120.000	V	12.8	22.0	43.5
416.550000	21.9	1000.0	120.000	V	19.0	24.1	46.0
499.100000	22.1	1000.0	120.000	V	20.7	23.9	46.0
519.350000	24.7	1000.0	120.000	V	21.2	21.3	46.0
671.900000	22.5	1000.0	120.000	V	24.0	23.5	46.0

Sign-off Test Data

YJX 2014-04-17 Checked

WIV 2014-04-18 Checked

Date: 4/15/2014 - Time: 1:13:18 Tested by: _____ Reviewed by: _____