

<b>Prüfbericht - Nr.:</b> 16012339 001 <i>Test Report No.:</i>		Seite 1 von 20 <i>Page 1 of 20</i>	
<b>Auftraggeber:</b> <i>Client:</i>		Seikaku Technical Group Limited. Offshore Chambers, P.O. Box. 217 Apia, Samoa	
<b>Gegenstand der Prüfung:</b> Wireless Microphone Receiver <i>Test item:</i>			
<b>Bezeichnung:</b> <i>Identification:</i>	UP-82DR, UR-82DR	<b>FCC ID:</b> <i>FCC ID</i>	H38UPUR-82DR
<b>Wareneingangs-Nr.:</b> <i>Receipt No.:</i>	173028719	<b>Eingangsdatum:</b> <i>Date of receipt:</i>	18.02.2008
<b>Prüfört:</b> <i>Testing location:</i>	TÜV Rheinland (Guangdong) Ltd. EMC Laboratory  Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650,  P. R. China	Listed test laboratory according to FCC rules section 2.948 for measuring devices under Parts 15	
<b>Prüfgrundlage:</b> <i>Test specification:</i>	ANSI C63.4:2003  FCC Part 15: 20, Sep. 2007  Subpart B section 15.107, 15.109 and 15.121		
<b>Prüfergebnis:</b> <i>Test Result:</i>	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>		
<b>Prüflaboratorium:</b> <i>Testing Laboratory:</i>	TÜV Rheinland (Guangdong) Ltd.		
<b>geprüft/ tested by:</b>		<b>kontrolliert/ reviewed by:</b>	
08. Apr. 2008	Ricky Liu /Project Manager	08. Apr. 2008	Liangdong Xie /Project Manager
<i>Datum</i> <i>Date</i>	<i>Name/Stellung</i> <i>Name/Position</i>	<i>Unterschrift</i> <i>Signature</i>	<i>Unterschrift</i> <i>Signature</i>
<b>Sonstiges/ Other Aspects:</b>			
<b>Abkürzungen:</b>		<b>Abbreviations:</b>	
P(ass) = entspricht Prüfgrundlage		P(ass) = passed	
F(ail) = entspricht nicht Prüfgrundlage		F(ail) = failed	
N/A = nicht anwendbar		N/A = not applicable	
N/T = nicht getestet		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 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>			

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## TEST SUMMARY

**5.1 CONDUCTED EMISSION FOR FCC PART 15 PER SECTION 15.107(A)**

*RESULT: Pass*

**5.2 RADIATED EMISSION FOR FCC PART 15 PER SECTION 15.109(A)**

*RESULT: Pass*

**5.3 38 dB REJECTION SIGNAL FROM CELLULAR FREQUENCY BAND 15.121(B)**

*RESULT: Pass*

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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: Test result

## **2 Test Sites**

### **2.1 Test Facilities**

**TÜV Rheinland (Guangdong) Ltd. EMC Laboratory**

Guangzhou Auto Market, Yuan Gang Section of Guangshan Road  
Guangzhou 510650

P. R. China

## 2.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

Kind of Equipment	Type	Manufacturer	S/N	Calibrated until	Calibrated Interval
EMI Test Receiver	ESCI-3	Rohde & Schwarz	100216	26.Nov.2008	1 year
Spectrum Analyzer	FSP30	Rohde & Schwarz	100286	24.Aug.2008	1 year
Trilog-Broadband Antenna	VULB9168	SCHWARZBECK MESS-ELEKTRONIK	210	08.May.2009	2 year
Double-Ridged Waveguide Horn Antenna	HF906	Rohde & Schwarz	100385	18.Jul.2009	2 year
Double-Ridged Waveguide Horn Antenna	HF906	Rohde & Schwarz	100407	08.May.2009	2 year
Pre-amplifier	AFS42- 00101800- 25-S-42	MITEQ	1101599	31.Jul.2009	2 year
Band Reject Filter	BRM50702	Micro-Tronics	023	15.Feb.2010	2 year
Standard Gain Horn Antenna	3160-09	EMCO	21642	N/A	2 year
Standard Gain Horn Antenna	3160-09	EMCO	21645	N/A	2 year
Pre-amplifier	AFS33- 18002650- 30-8P-44	MITEQ	1108282	31.Jul.2009	2 year
3m Anechoic Chamber	N/A	Albatross Project GmbH	N/A	16.Apr.2008	2 year
EMI Test Receiver	ESCS30	Rohde & Schwarz	100316	27.Mar.2009	1 year
Two-Line V-Network	ESH3-Z5	Rohde & Schwarz	100308	27.Mar.2009	1 year
Pulse Limiter	ESH3-Z2	Rohde & Schwarz	100701	01.Mar.2009	1 year

## 2.3 Trace ability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations

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## 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 for conducted emissions measurements is  $\pm 2.51$  dB.

Uncertainty for radiated emissions measurements is  $\pm 4.9$  dB (30MHz-1GHz),  $\pm 4.84$  dB (>1GHz).

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 TUV Rheinland (Guangzhou) file for certification follow-up purposes.

## 2.7 Status of facility used for testing

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory; Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650, P. R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements, the register no. 833845

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### 3 General Product Information

The submitted samples are wireless microphones receivers operating within the frequency range of 740 MHz to 769 MHz. They are powered by AC/DC adaptor.

Two identical receiving RF modules are installed in one sample, thus the receiving frequency can be selected manually or auto-tuned at two frequency points at any time as the table “Frequency Range and Channel List” showed.

There are 2 models in this report in total. They are **UR-82DR** and **UP-82DR**

**UR-82DR** is identical to **UP-82DR** except the appearance of the front panel is different.

Please refer to Technical Documentation and User Manual for further details.

Based on above mentioned information, all necessary tests are performed on **UP-82DR** only.

#### 3.1 Product Function and Intended Use

For details, refer to User Manual.

#### 3.2 Ratings and System Details

Frequency range	:	740 – 769 MHz
Nominal Operating frequencies	:	Refer to the Frequency List below
Type of antenna	:	Dedicate antenna with specified interface
FCC ID:		H38UPUR-82DR
Power supply	:	DC 15V, 1000mA from AC/DC adaptor;
Ports	:	DC power input
Protection Class	:	III

### Frequency Range and Channel List

	Group1	Group2	Group3	Group4	Group5	Group6	Group7	Group8	Group9	Group10	Group11	Group12
<b>1</b>	740.125	740.325	740.525	740.725	740.925	741.125	741.325	741.525	741.725	741.925	742.125	742.325
<b>2</b>	742.525	742.725	742.925	743.125	743.325	743.525	743.725	743.925	744.125	744.325	744.525	744.725
<b>3</b>	744.925	745.125	745.325	745.525	745.725	745.925	746.125	746.325	746.525	746.725	746.925	747.125
<b>4</b>	747.325	747.525	747.725	747.925	748.125	748.325	748.525	748.725	748.925	749.125	749.325	749.525
<b>5</b>	749.725	749.925	750.125	750.325	750.525	750.725	750.925	751.125	751.325	751.525	751.725	751.925
<b>6</b>	752.125	752.325	752.525	752.725	752.925	753.125	753.325	753.525	753.725	753.925	754.125	754.325
<b>7</b>	754.525	754.725	754.925	755.125	755.325	755.525	755.725	755.925	756.125	756.325	756.525	756.725
<b>8</b>	756.925	757.125	757.325	757.525	757.725	757.925	758.125	758.325	758.525	758.725	758.925	759.125
<b>9</b>	759.325	759.525	759.725	759.925	760.125	760.325	760.525	760.725	760.925	761.125	761.325	761.525
<b>10</b>	761.725	761.925	762.125	762.325	762.525	762.725	762.925	763.125	763.325	763.525	763.725	763.925
<b>11</b>	764.125	764.325	764.525	764.725	764.925	765.125	765.325	765.525	765.725	765.925	766.125	766.325
<b>12</b>	766.525	766.725	766.925	767.125	767.325	767.525	767.725	767.925	768.125	768.325	768.525	768.725

Refer to the technical document and user manual for further information.

### 3.3 Independent Operation Modes

The basic operation modes are:

- Receiving with freq. adjustable manually
- Receiving with auto scanning frequency

For further information refer to User Manual

### 3.4 Submitted Documents

- Block Diagram
- Circuit Diagram
- PCB Layout
- FCC Label
- User Manual
- Photo Document



## **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**

The product has been tested together with the following linear AC/DC adaptor:

Adaptor:

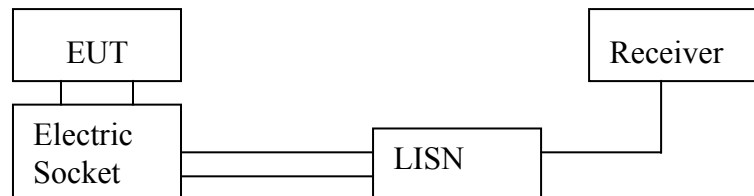
Input : AC 120V, 60Hz  
Output : DC 15V / 1000mA  
Protection class : II

### **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 document. No additional measures were employed to achieve compliance.



**Diagram 3 of Equipment Configuration for Testing Conducted Emission**



**Diagram 4 of Equipment Configuration for Testing Radiated Emission**



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## 5 Test Results EMISSION

### 5.1 Conducted Emission for FCC Part 15 Per Section 15.107(a)

**RESULT:**

**Pass**

Date of testing	:	03.02.2008
Test specification	:	FCC Part 15 Per Section 15.107(a)
Limits	:	FCC Part 15 Per Section 15.107(a)
Test procedure	:	Procedure specified in ANSI C63.4 were followed
Deviations from Standard Test procedures	:	None
Kind of test site	:	Shielded room
Operation mode	:	Receiving (powered by linear AC/DC adaptor)
Temperature	:	20°C
Humidity	:	45%

**Test procedure:**

1. Place the EUT as specified in ANSI C63.4 Clause 7.2.1
2. Plug the LISN to a correct power source (pay attention to: AC/DC, voltage, frequency).
4. Connect the EUT to LISN and choose N or L1 on the LISN.
5. Connect ESCS30 and LISN via a 50-ohm coaxial cable and a pulse limiter then begin exploratory measurement as specified in ANSI C63.4 Clause 7.2.3
6. Make final measurement as specified in ANSI C63.4 Clause 7.2.4
7. Switch to the other line on the LISN and repeat step 4 to 6.

If the result of the measurement with the Quasi Peak detector is below the Average limit, the measurement with Average Detector may be omitted.

The spectral diagrams in Appendix 1 display the exploratory measurement of un-weighted peak values and average values.

\* ) Disturbances other than those mentioned below are small or not detectable.

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**Table 2: Disturbance Voltage on AC Mains of UP-82DR (L1 line)**

**Final Measurement Detector 1**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.330000	39.9	1000.000	9.000	L1
0.365000	37.1	1000.000	9.000	L1
1.135000	15.9	1000.000	9.000	L1
1.380000	16.5	1000.000	9.000	L1
2.110000	12.5	1000.000	9.000	L1
2.185000	12.4	1000.000	9.000	L1
7.995000	14.3	1000.000	9.000	L1
22.820000	14.8	1000.000	9.000	L1

(continuation of the "Final Measurement Detector 1" table from column 6 ...)

Frequency (MHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.330000	10.1	19.5	59.5	
0.365000	10.1	21.5	58.6	
1.135000	10.1	40.1	56.0	
1.380000	10.2	39.5	56.0	
2.110000	10.1	43.5	56.0	
2.185000	10.1	43.6	56.0	
7.995000	10.5	45.7	60.0	
22.820000	11.4	45.2	60.0	

**Final Measurement Detector 2**

Frequency (MHz)	Average (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.345000	21.0	1000.000	9.000	L1
0.400000	12.2	1000.000	9.000	L1
1.460000	9.5	1000.000	9.000	L1
4.910000	9.7	1000.000	9.000	L1
7.920000	10.9	1000.000	9.000	L1
25.000000	12.1	1000.000	9.000	L1

(continuation of the "Final Measurement Detector 2" table from column 6 ...)

Frequency (MHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.345000	10.1	28.1	49.1	
0.400000	10.1	35.6	47.9	
1.460000	10.1	36.5	46.0	
4.910000	10.3	36.3	46.0	
7.920000	10.5	39.1	50.0	
25.000000	11.5	37.9	50.0	

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**Table 3: Disturbance Voltage on AC Mains of UP-82DR (N line)**

**Final Measurement Detector 1**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.340000	43.3	1000.000	9.000	N
0.365000	42.2	1000.000	9.000	N
0.755000	30.7	1000.000	9.000	N
0.880000	32.1	1000.000	9.000	N
1.440000	23.7	1000.000	9.000	N
2.115000	16.1	1000.000	9.000	N
2.295000	17.7	1000.000	9.000	N
3.925000	12.5	1000.000	9.000	N

(continuation of the "Final Measurement Detector 1" table from column 6 ...)

Frequency (MHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.340000	10.1	15.9	59.2	
0.365000	10.1	16.5	58.6	
0.755000	10.1	25.3	56.0	
0.880000	10.1	23.9	56.0	
1.440000	10.1	32.3	56.0	
2.115000	10.1	39.9	56.0	
2.295000	10.2	38.3	56.0	
3.925000	10.3	43.5	56.0	

**Final Measurement Detector 2**

Frequency (MHz)	Average (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line
0.350000	22.1	1000.000	9.000	N
0.375000	21.6	1000.000	9.000	N
0.900000	12.0	1000.000	9.000	N
4.925000	9.7	1000.000	9.000	N
7.940000	11.0	1000.000	9.000	N
24.775000	12.0	1000.000	9.000	N

(continuation of the "Final Measurement Detector 2" table from column 6 ...)

Frequency (MHz)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.350000	10.1	26.8	49.0	
0.375000	10.1	26.8	48.4	
0.900000	10.1	34.0	46.0	
4.925000	10.3	36.3	46.0	
7.940000	10.5	39.0	50.0	
24.775000	11.5	38.0	50.0	

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## 5.2 Radiated Emission for FCC Part 15 Per Section 15.109(a)

### RESULT:

Pass

Date of testing	:	04.02.2008
Test specification	:	FCC Part 15 Per Section 15.109(a)
Limits	:	FCC Part 15 Per Section 15.109(a)
Test procedure	:	Procedure specified in ANSI C63.4 were followed
Deviations from Standard Test procedures		
	:	None
Kind of test site	:	3m Semi-anechoic chamber
Operation mode	:	Receiving
Temperature	:	20°C
Humidity	:	45%

### Test procedure:

1. The EUT was turned on and placed on the top of a rotatable table 0.8 meters above the ground with 3-orthogonal XYZ direction and be kept close enough to the measurement receiving antenna (especially for the measurement frequency range above 1 GHz). The table was then 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 then recorded together with the suspected emission frequency points above-mentioned.
2. The EUT was then set 3 meters away from the receiving antenna, which was mounted on a variable-height antenna tower.
3. For each suspected emission frequency point recorded in step 1, the EUT was arranged to its worst case that the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to read the maximum emission.

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**Table 4: Radiated Emission of UP-82DR**

Frequency	QP	AV	PK	Corr. Factor	Polarity	Limit		
						QP	AV	PK
[MHz]	[dB $\mu$ V/m]			(dB)	(H/V)	[dB $\mu$ V/m]		
*)---								

\*) Disturbances are far below the limit. Please refer to the Appendix 1 for the noise floor measured maximum among high, mid and low receiving channel.

The final measurement for frequencies below 1000MHz is performed with Quasi Peak detector; the final measurement for frequencies above 1000MHz is performed with Average and Peak detector.

The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz at frequency below 1GHz.

The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz at frequency above 1GHz.



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### 5.3 38 dB rejection signal from Cellular Frequency band

**RESULT:**

**Pass**

Date of testing : 04.02.2008  
Test specification : FCC Part 15 Per Section 15.121(b)  
Limit : FCC Part 15 Per Section 15.121(b)  
Operation mode: Receiving with auto scanning activated  
Kind of test site : Shielded room  
Test signal : RF signal FM at 1kHz audio

**Test procedure:**

1. Set the wanted signal to establish reference sensitivity (12dB SINAD), the level of wanted signal input was recorded as reference level.
2. Inject unwanted cellular signal into the EUT and increase the unwanted signal lever until the SINAD is reached 12dB or its level is 41dB (add 3dB margin with the 38dB rejection) higher than the reference level recorded in step 1.
3. Record the level of the unwanted mobile signal relative to the reference in step 1. The result is the rejection level in dB.
4. Repeat test steps 2-3 for other cellular frequencies.

**Table 5: 38 dB Rejection**

Injection frequency(Cellular) in MHz	Rejection in dB	Limit in dB
824.04	>41	38
836.00	>41	38
848.97	>41	38
869.04	>41	38
881.00	>41	38
893.97	>41	38

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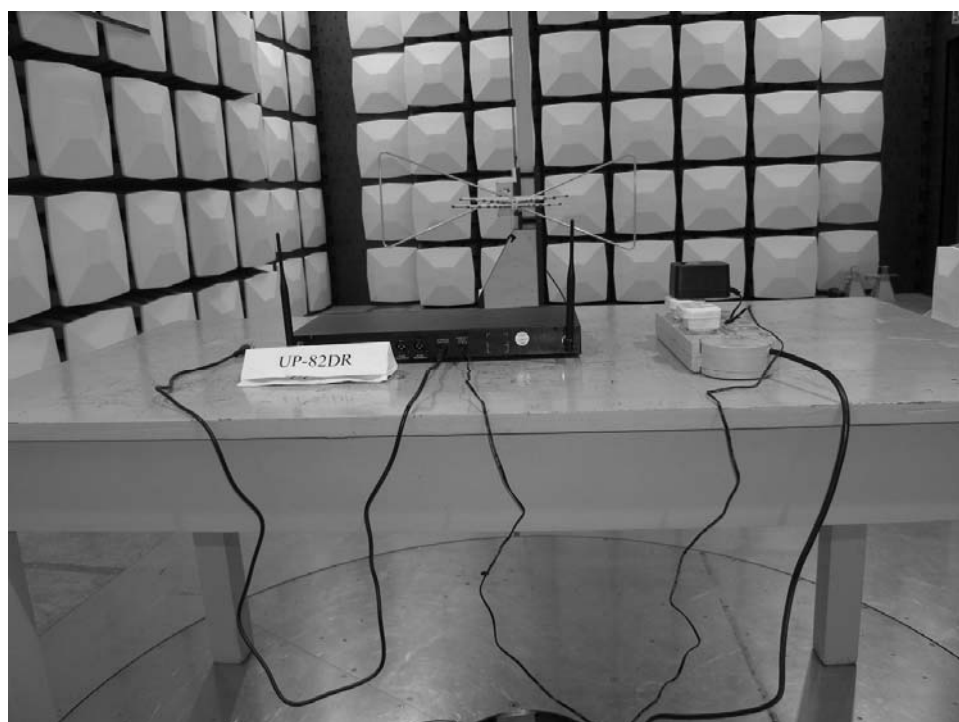
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## 6 Photographs of the Test Set-Up

**Photograph 1: Set up for Conducted Emission on AC Mains**



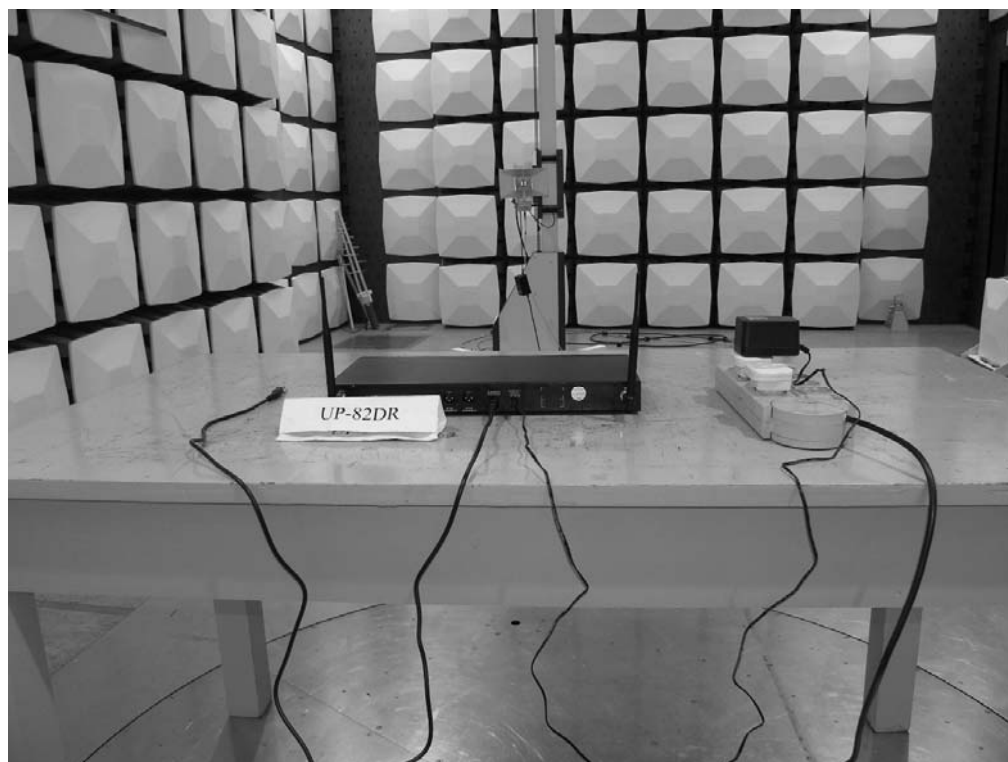
**Photograph 2: Set-up for Radiation Measurement Below 1GHz**



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**Photograph 3: Set-up for Radiation Measurement Above 1GHz**



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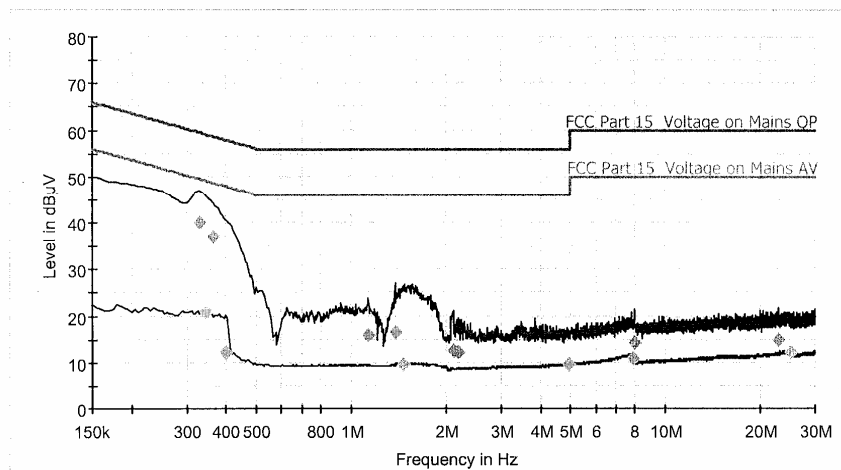
## EMC32 Report

### Test Information

Manufacturer Name: SEKAKU  
Model Number: UP-82DR  
Operating Conditions: On  
Comment: AC 110V 60Hz; L1

Hardware Setup: 1phase LISN ESH3-Z5 to ESCS30  
Level Unit: dB  $\mu$  V

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



**Prüfbericht - Nr.:**  
*Test Report no.*

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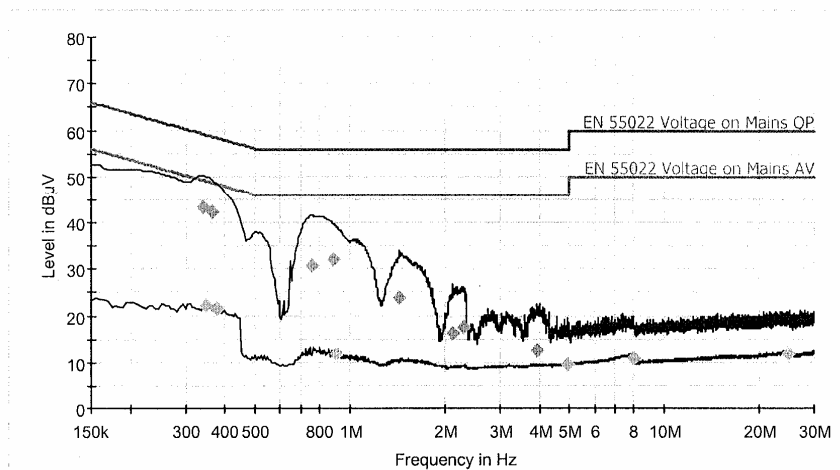
## EMC32 Report

### Test Information

Manufacturer Name: SEKAKU  
Model Number: UP-82DR  
Operating Conditions: On  
Comment: AC 110V 60Hz; N

Hardware Setup: 1phase LISN ESH3-Z5 to ESCS30  
Level Unit: dB  $\mu$  V

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



**Prüfbericht - Nr.:**  
*Test Report no.*

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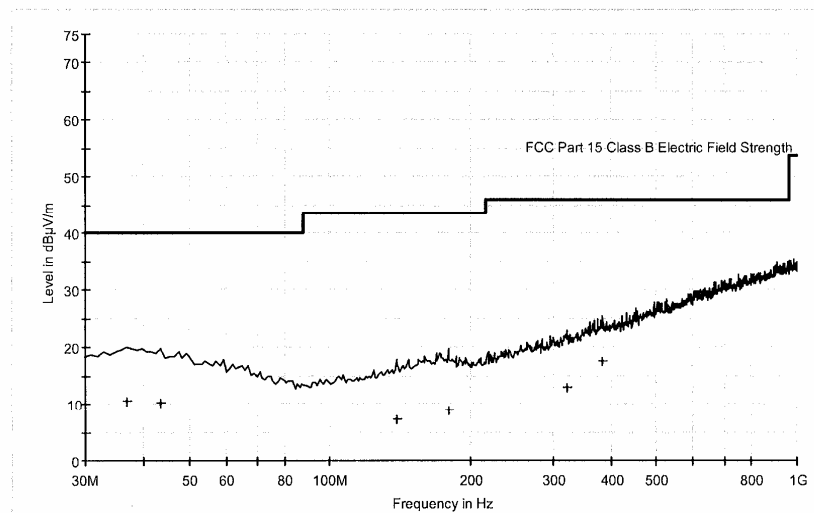
## EMC32 Report

### Test Information

Manufacturer Name:	SEKAKU
Model Number:	UP-82DR
Operating Conditions:	On
Comment:	Horizontal

#### Subrange 1

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



**Prüfbericht - Nr.:**  
*Test Report no.*

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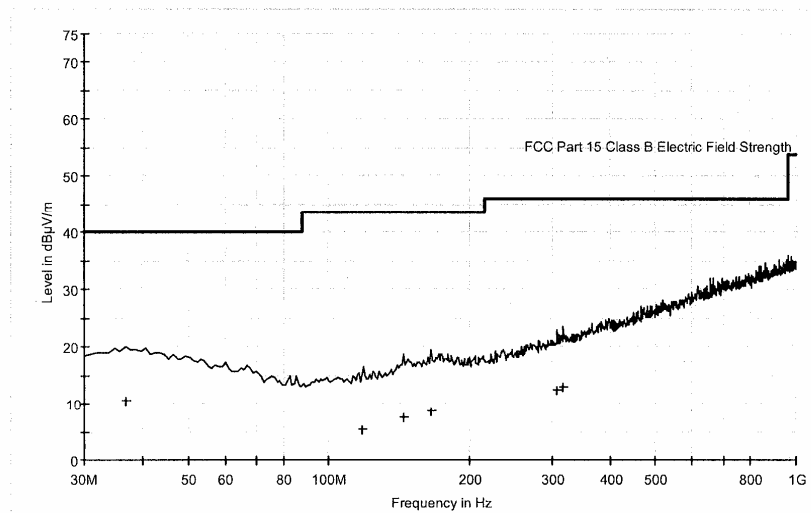
## EMC32 Report

### Test Information

Manufacturer Name:	SEKAKU
Model Number:	UP-82DR
Operating Conditions:	On
Comment:	Vertical

#### Subrange 1

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





**Prüfbericht - Nr.:**  
*Test Report no.*

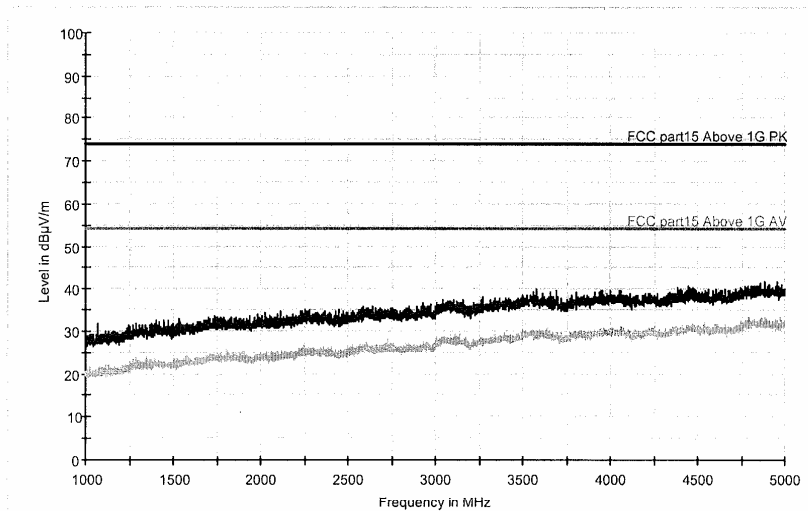
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**Test Information**

Manufacturer Name: SEKAKU  
Model Number: UP-82DR  
Operating Conditions: On  
Comment: Horizontal,

Subrange 1  
Frequency Range: 1GHz - 5GHz  
Receiver: TUV FSP 30  
Transducer: TUV SAC HF906 / TUV FSP 30-TUV SAC HF906



**Prüfbericht - Nr.:**  
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**Test Information**

Manufacturer Name: SEKAKU  
Model Number: UP-82DR  
Operating Conditions: On  
Comment: Vertical

Subrange 1  
Frequency Range: 1GHz - 5GHz  
Receiver: TUV FSP 30  
Transducer: TUV SAC HF906 / TUV FSP 30-TUV SAC HF906

