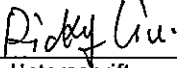
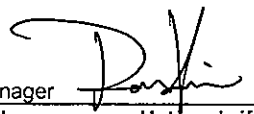


| | | | |
|--|--|--|--|
| Prüfbericht - Nr.: 16010007 001 | | Seite 1 von 31 Page 1 of 31 | |
| <i>Test Report No.:</i> | | | |
| Auftraggeber: <i>Client:</i> | Seikaku Technical Group Limited. Offshore Chambers, P.O. Box. 217 Apia, Samoa | | |
| Gegenstand der Prüfung: <i>Test item:</i> | Wireless Microphone | | |
| Bezeichnung: <i>Identification:</i> | Refer to Model List in Clause 3. | FCC ID: <i>FCC ID</i> | H38-UPUL-MODAU-HM |
| Wareneingangs-Nr.: <i>Receipt No.:</i> | 173028719 | Eingangsdatum: <i>Date of receipt:</i> | 28.12.2007 |
| Prüfört: <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 74 | |
| Prüfgrundlage: <i>Test specification:</i> | ANSI C63.4: 2003 FCC "Rules and Regulations", Part 74: 01, Oct., 1997 Subpart H, Section 74.861 FCC "Rules and Regulations", Part 15: 20, Sep., 2007 Subpart C, section 15.207 | | |
| Prüfergebnis: <i>Test Result:</i> | Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i> | | |
| Prüflaboratorium: <i>Testing Laboratory:</i> | TÜV Rheinland (Guangdong) Ltd. | | |
| geprüft / tested by: | kontrolliert/ reviewed by: | | |
| 27. Mar., 2008 <i>Datum</i> <i>Date</i> | Ricky Liu Project Manager <i>Name/Stellung</i> <i>Name/Position</i> |  <i>Unterschrift</i> <i>Signature</i> | 28. Mar. 2008 <i>Datum</i> <i>Date</i> |
| | | | Dave Xie Project Manager <i>Name/Stellung</i> <i>Name/Position</i> |
| | | |  <i>Unterschrift</i> <i>Signature</i> |
| Sonstiges/ Other Aspects: | | | |
| Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet | | Abbreviations: P(ass) = passed F(ail) = failed 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. <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.:
Test Report No.:

16010007 001

Seite 2 von 31
Page 2 of 31

TEST SUMMARY

5.1 CONDUCTED EMISSION FOR FCC PART 15 PER SECTION 15.207(A)

RESULT: Pass

5.2 POWER OUTPUT MEASUREMENT FOR FCC PART 74 PER SECTION 74.861(E)(1)

RESULT: Pass

5.3 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT FOR FCC PART 74 PER SECTION 74.861(E)(6)(III)

RESULT: Pass

5.4 MODULATION CHARACTERISTICS MEASUREMENT

RESULT: Pass

5.5 OCCUPIED BANDWIDTH FOR FCC PART 74 PER SECTION 74.861(E)(3), 74.861(E)(5) AND 74.861(E)(6)

RESULT: Pass

5.6 FREQUENCY TOLERANCE FOR FCC PART 74 PER SECTION 74.861(E)(4)

RESULT: Pass

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 3 von 31
Page 3 of 31

Contents

| | | |
|------------|--|-----------|
| 1 | GENERAL REMARKS..... | 5 |
| 1.1 | COMPLEMENTARY MATERIALS..... | 5 |
| 2 | TEST SITES..... | 5 |
| 2.1 | TEST FACILITIES..... | 5 |
| 2.2 | LIST OF TEST AND MEASUREMENT INSTRUMENTS..... | 6 |
| 2.3 | TRACE ABILITY..... | 7 |
| 2.4 | CALIBRATION..... | 7 |
| 2.5 | MEASUREMENT UNCERTAINTY..... | 7 |
| 2.6 | LOCATION OF ORIGINAL DATA..... | 7 |
| 2.7 | STATUS OF FACILITY USED FOR TESTING..... | 7 |
| 3 | GENERAL PRODUCT INFORMATION..... | 8 |
| 3.1 | PRODUCT FUNCTION AND INTENDED USE..... | 9 |
| 3.2 | RATINGS AND SYSTEM DETAILS..... | 9 |
| 3.3 | INDEPENDENT OPERATION MODES..... | 10 |
| 3.4 | SUBMITTED DOCUMENTS..... | 10 |
| 4 | TEST SET-UP AND OPERATION MODE..... | 11 |
| 4.1 | PRINCIPLE OF CONFIGURATION SELECTION..... | 11 |
| 4.2 | TEST OPERATION AND TEST SOFTWARE..... | 11 |
| 4.3 | SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT..... | 11 |
| 4.4 | COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE..... | 11 |
| 4.5 | TEST SET-UP..... | 12 |
| 5 | TEST RESULTS EMISSION..... | 15 |
| 5.1 | CONDUCTED EMISSION FOR FCC PART 15 PER SECTION 15.207(A)..... | 15 |
| 5.2 | POWER OUTPUT MEASUREMENT FOR FCC PART 74 PER SECTION 74.861(E)(1)..... | 18 |
| 5.3 | SPURIOUS RADIATION MEASUREMENT FOR FCC PART 74 PER SECTION 74.861(E)(6)(III)..... | 20 |
| 5.4 | MODULATION CHARACTERISTICS MEASUREMENT..... | 23 |
| 5.5 | OCCUPIED BANDWIDTH FOR FCC PART 74 PER SECTION 74.861(E)(3), 74.861(E)(5) AND 74.861(E)(6)..... | 24 |
| 5.6 | FREQUENCY TOLERANCE FOR FCC PART 74 PER SECTION 74.861(E)(4)..... | 26 |

Prüfbericht - Nr.:

16010007 001

Seite 4 von 31

Test Report No.:

Page 4 of 31

| | | |
|---|--------------------------------------|----|
| 6 | PHOTOGRAPHS OF THE TEST SET-UP | 28 |
| 7 | LIST OF TABLES..... | 31 |
| 8 | LIST OF PHOTOGRAPHS..... | 31 |

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 5 von 31
Page 5 of 31

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

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 6 von 31
Page 6 of 31

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 | 05.Dec.2007 | 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 | 02.Apr.2008 | 1 year |
| Two-Line V-Network | ESH3-Z5 | Rohde & Schwarz | 100308 | 02.Apr. 2008 | 1 year |
| Pulse Limiter | ESH3-Z2 | Rohde & Schwarz | 100701 | 01.Mar.2009 | 1 year |

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 7 von 31
Page 7 of 31

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

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 ± 2.51 dB.

Uncertainty for radiated emissions measurements is ± 4.9 dB (30MHz-1GHz), ± 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

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 8 von 31
Page 8 of 31

3 General Product Information

The submitted samples are wireless microphones operating within the frequency range of 740 MHz to 769 MHz. They are powered by 2X "AA" batteries and can be charged by a supplied AC/DC charger while it is not working. Refer to the following table for the list of all the models.

Model List:

| Model Name | | | | | Microphone Pickup |
|------------|----------|---------|----------|---------|-------------------|
| UP-81H | UL-81H | --- | --- | --- | S-100 |
| UP-881H | UL-881H | --- | --- | --- | |
| UP-83H | UL-83H | MOD-16H | MOD-800H | AU-800H | S-600 |
| UP-883H | UL-883H | --- | --- | --- | |
| UP-86H | UL-86H | --- | --- | --- | S-500 |
| UP-886H | UL-886H | --- | --- | --- | |
| UP-87CH | UL-87CH | --- | --- | --- | C-100 |
| UP-887CH | UL-887CH | --- | --- | --- | |
| UP-88CH | UL-88CH | --- | --- | --- | C-200 |
| UP-888CH | UL-888CH | --- | --- | --- | |

All the models in the column 1 of above table use identical circuit design, PCB layout and electronic component.

UP-8 series and UP-88 series in column 1 are identical except minor difference in enclosure and the difference of microphone pickup as showed in the table.

All the models in every same row of above table are identical except model names.

Based on above information, all necessary tests are performed on the UP-83H with Modulation Characteristics tests are performed on UP-81H, UP-83H, UP-86H, UP-87H and UP-88H respectively.

Necessary tests are perform on three operation frequencies of their frequency range, which are low channel 740.125 MHz, mid channel 754.525 MHz and high channel 768.725 MHz.

Prüfbericht - Nr.: 16010007 001
Test Report No.:

Seite 9 von 31
Page 9 of 31

3.1 Product Function and Intended Use

For details, refer to technical document and the user manual.

3.2 Ratings and System Details

| | | |
|-------------------------------|---|---|
| Frequency range | : | 740 – 769 MHz |
| Nominal Operating frequencies | : | Refer to the Frequency List below |
| RF output power | : | 3.34mW |
| Type of antenna | : | Integral antenna |
| FCC ID: | | H38-UPUL-MODAU-HM |
| Power supply | : | DC 3V (battery 2x : “AA” type or rechargeable) |
| Frequency Response | : | 30Hz-15kHz |
| Frequency Stability | : | 0.005% |
| Emission designator | : | 128KF3E |
| Ports | : | Charge port DC 9V |
| Protection Class | : | III |

Frequency Range and Channel List

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

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 10 von 31
Page 10 of 31

3.3 Independent Operation Modes

The basic operation modes are:

Transmitting, Charging

For further information refer to User Manual

3.4 Submitted Documents

Block Diagram
Circuit Diagram
Components List
PCB layout
FCC label
User Manual
Photo document

Prüfbericht - Nr.:

16010007 001

Seite 11 von 31

Test Report No.:

Page 11 of 31

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 Linear AC/DC Adaptor with following rating:

Input : AC 120V 60Hz

Output : DC 9V/ 300mA

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 technical document. No additional measures were employed to achieve compliance.

4.5 Test set-up

Diagram 1 of Measurement Equipment Configuration for Testing Radiated Emission

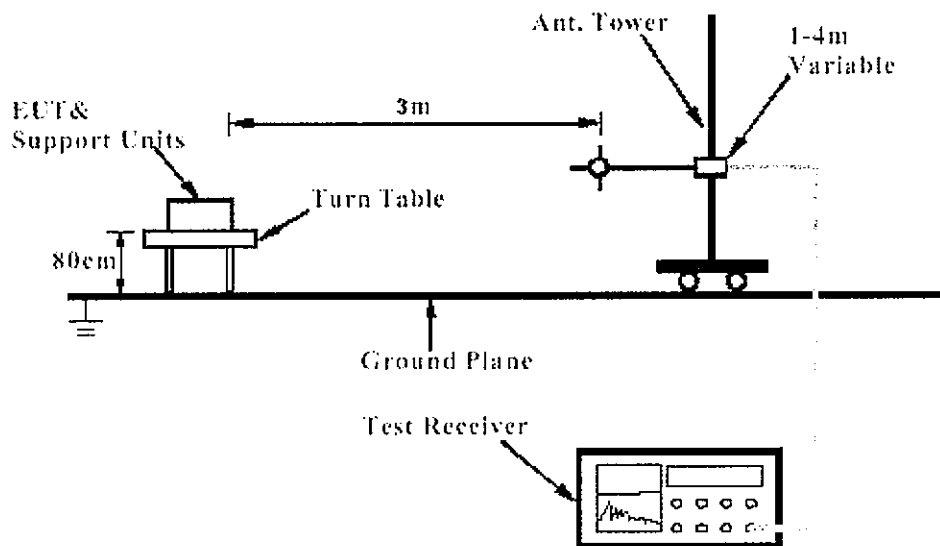


Diagram 2 of Measurement Equipment Configuration for Substitution Method

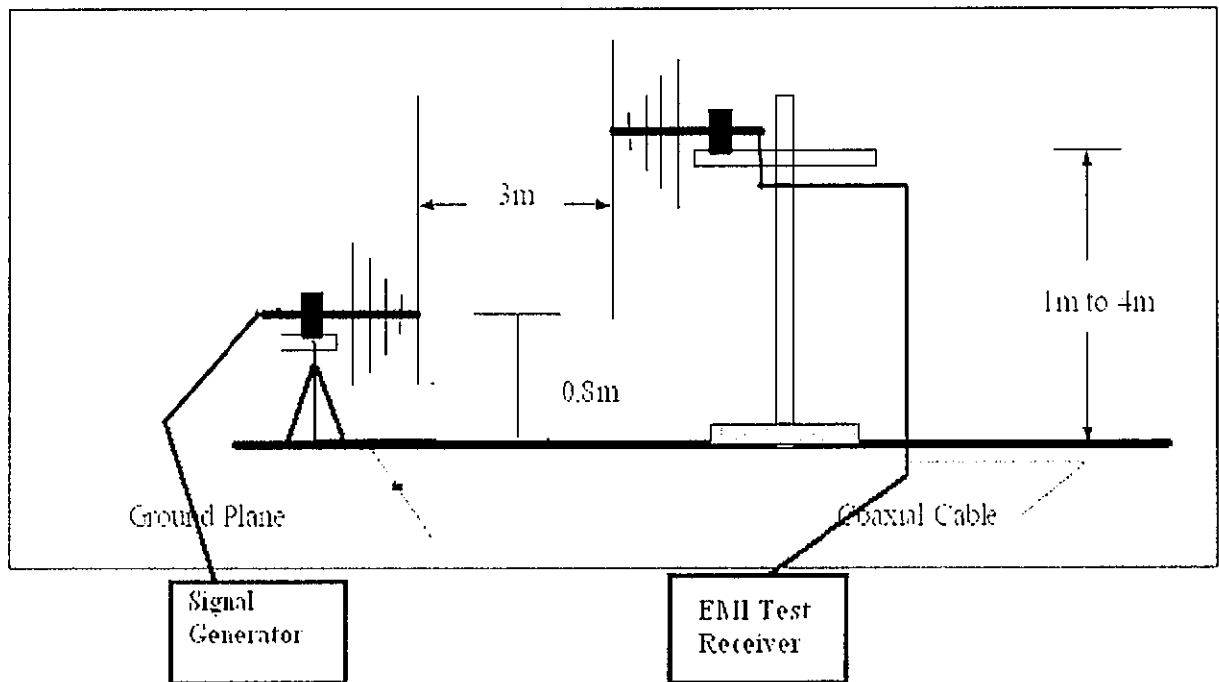


Diagram 3 of Measurement Equipment Configuration for Testing Modulation Characteristics measurement

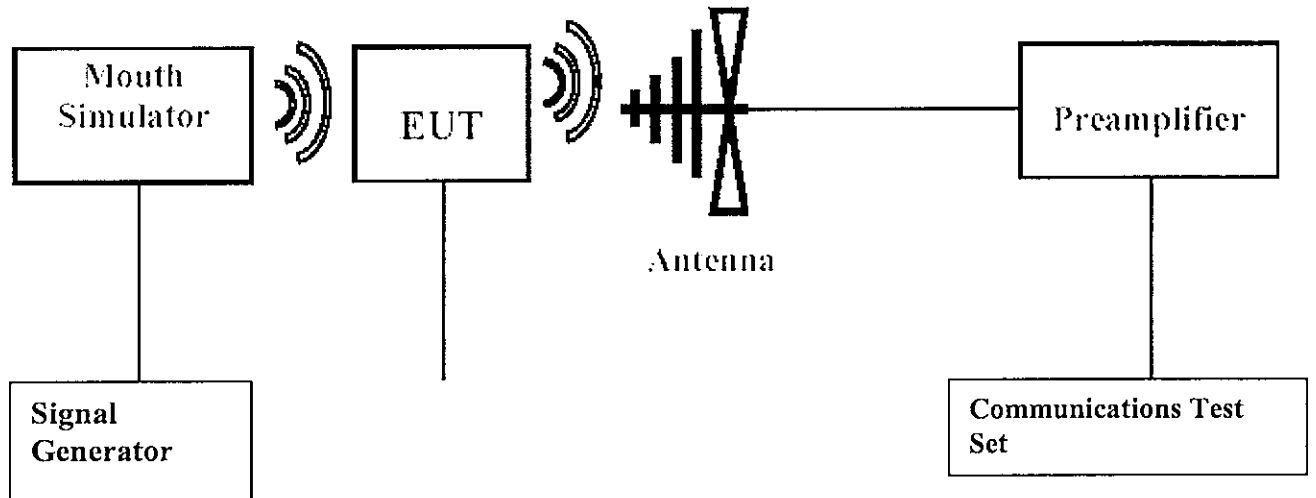
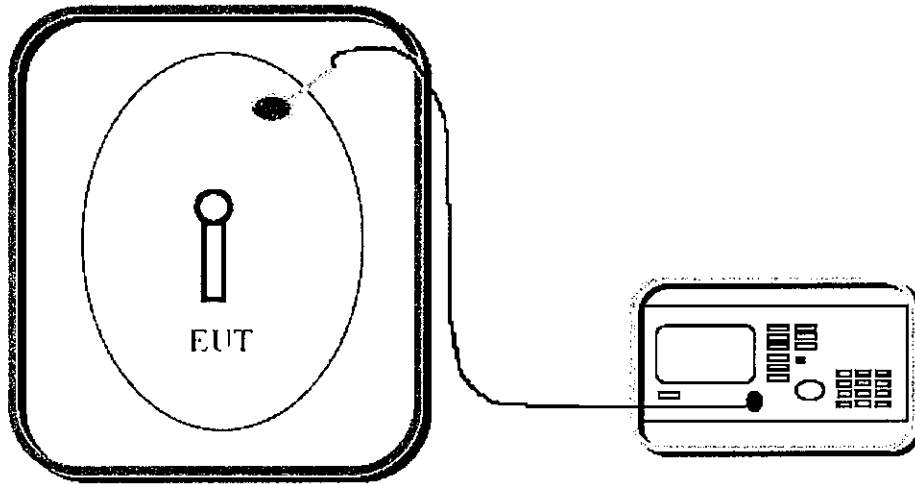
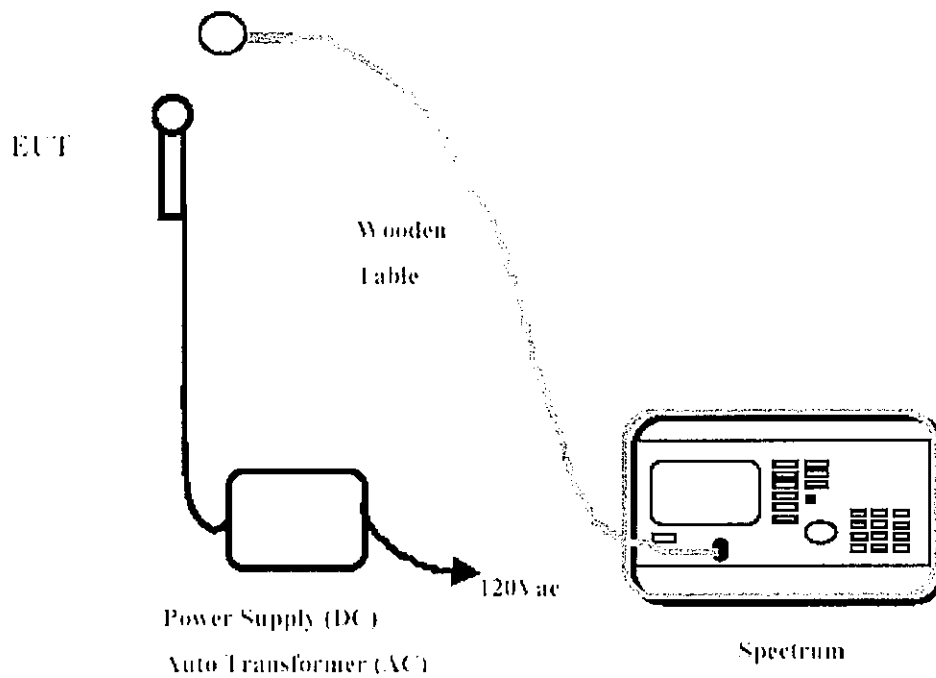


Diagram 4 of Measurement Equipment Configuration for Testing Frequency Tolerance



Chamber

Spectrum



Spectrum

Prüfbericht - Nr.:

16010007 001

Seite 15 von 31

Test Report No.:

Page 15 of 31

5 Test Results EMISSION

5.1 Conducted Emission for FCC Part 15 Per Section 15.207(a)

RESULT:

Pass

| | | |
|--|---|---|
| Date of testing | : | 27.04.2008 |
| Test specification | : | FCC Part 15 Per Section 15.207(a) |
| Limits | : | FCC Part 15 Per Section 15.207(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 | : | B: Charging (AC 120V, 60Hz) |
| Temperature | : | 20°C |
| Humidity | : | 45% |

Measurement 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.

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 16 von 31
Page 16 of 31

Table 2: Disturbance Voltage on AC Mains (L1 line)

Final Measurement Detector 1

| Frequency (MHz) | QuasiPeak (dB µV) | Meas. Time (ms) | Bandwidth (kHz) | Line |
|-----------------|-------------------|-----------------|-----------------|------|
| 0.280000 | 33.1 | 1000.000 | 9.000 | L1 |
| 0.295000 | 32.7 | 1000.000 | 9.000 | L1 |
| 0.585000 | 18.6 | 1000.000 | 9.000 | L1 |
| 1.759700 | 34.2 | 1000.000 | 9.000 | L1 |
| 3.524570 | 20.6 | 1000.000 | 9.000 | L1 |

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

| Frequency (MHz) | Corr. (dB) | Margin (dB) | Limit (dB µV) | Comment |
|-----------------|------------|-------------|---------------|---------|
| 0.280000 | 10.0 | 27.7 | 60.8 | |
| 0.295000 | 10.0 | 27.7 | 60.4 | |
| 0.585000 | 10.0 | 37.4 | 56.0 | |
| 1.759700 | 10.0 | 21.8 | 56.0 | |
| 3.524570 | 10.1 | 35.4 | 56.0 | |

Final Measurement Detector 2

| Frequency (MHz) | Average (dB µV) | Meas. Time (ms) | Bandwidth (kHz) | Line |
|-----------------|-----------------|-----------------|-----------------|------|
| 1.759700 | 18.4 | 1000.000 | 9.000 | L1 |

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

| Frequency (MHz) | Corr. (dB) | Margin (dB) | Limit (dB µV) | Comment |
|-----------------|------------|-------------|---------------|---------|
| 1.759700 | 10.0 | 27.6 | 46.0 | |

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 17 von 31
Page 17 of 31

Table 3: Disturbance Voltage on AC Mains (N line)

Final Measurement Detector 1

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Line |
|-----------------|------------------|-----------------|-----------------|------|
| 0.285000 | 34.1 | 1000.000 | 9.000 | N |
| 0.355000 | 33.0 | 1000.000 | 9.000 | N |
| 0.650000 | 25.3 | 1000.000 | 9.000 | N |
| 1.745710 | 34.7 | 1000.000 | 9.000 | N |
| 3.482610 | 22.6 | 1000.000 | 9.000 | N |

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

| Frequency (MHz) | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|-----------------|------------|-------------|--------------|---------|
| 0.285000 | 10.0 | 26.6 | 60.7 | |
| 0.355000 | 10.0 | 25.9 | 58.8 | |
| 0.650000 | 10.0 | 30.8 | 56.0 | |
| 1.745710 | 10.0 | 21.3 | 56.0 | |
| 3.482610 | 10.1 | 33.4 | 56.0 | |

Final Measurement Detector 2

| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Line |
|-----------------|----------------|-----------------|-----------------|------|
| 0.285000 | 13.7 | 1000.000 | 9.000 | N |
| 0.360000 | 13.3 | 1000.000 | 9.000 | N |
| 1.745710 | 19.2 | 1000.000 | 9.000 | N |

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

| Frequency (MHz) | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|-----------------|------------|-------------|--------------|---------|
| 0.285000 | 10.0 | 37.0 | 50.7 | |
| 0.360000 | 10.0 | 35.5 | 48.7 | |
| 1.745710 | 10.0 | 26.8 | 46.0 | |

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

For disturbance measured with value far below the limit, no final measurement was performed.

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

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 18 von 31
Page 18 of 31

5.2 Power output measurement for FCC part 74 Per Section 74.861(e)(1)

RESULT:

Pass

| | | |
|--|---|--------------------------------------|
| Date of testing | : | 11.04.2007 |
| Test specification | : | FCC Part 2 Per Section 2.1046(a) |
| Limits | : | FCC Part 74 Per Section 74.861(e)(1) |
| Deviations from Standard Test procedures | : | None |
| Kind of test site | : | 3m Anechoic Chamber |
| Operation mode | : | Transmitting (unmodulated) |
| Temperature | : | 20°C |
| Humidity | : | 55% |

Measurement procedure:

1. The EUT was placed on an 80cm high turntable in the anechoic chamber.
2. For radiated power output of the EUT, the measuring antenna was raised and lowered to obtain a maximum reading on the spectrum analyzer with the test antenna polarized vertically and horizontally. The turntable was rotated 360 to further searching the maximum reading on the spectrum analyzer. Then the max value on spectrum was recorded.
3. The EUT was removed and replaced with a substitute dipole antenna. The length of the antenna was adjusted to a half-wave of transmitting frequency measured. The centre of the dipole antenna was placed approximately at the same location as the centre place of the EUT in step 1 and 2.
4. The dipole antenna was connected to a signal generator with a coaxial cable.
5. The signal generator is tuned to the transmitting frequency with the substitute antenna polarized both vertically and horizontally, the output level of the signal generator output was then adjusted to get a maximum reading in the spectrum with the same value recorded in the step 2.
6. The input RF power in the dipole antenna was calculated from the coaxial cable loss and the signal generator output level obtained in step 5. This value was regarded as final result and recorded in following table 2.

Note: While in Step 2, the EUT was placed in 3 orthogonal planes to find a maximum reading.

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 19 von 31
Page 19 of 31

Table 4: Measurement Result of output power on frequencies 740.125MHz, 753.125MHz and 768.725MHz

| Channel | Freq. (MHz) | Polarization (V/H) | Transmit power (dBm) | Transmit power (mW) | Limit (mW) |
|---------|-------------|--------------------|----------------------|---------------------|------------|
| Low | 740.125 | V | -1.597 | 0.69 | 250 |
| | 740.125 | H | 5.004 | 3.17 | 250 |
| Mid | 754.525 | V | 0.689 | 1.17 | 250 |
| | 754.525 | H | 4.820 | 3.03 | 250 |
| High | 768.725 | V | -1.085 | 0.78 | 250 |
| | 768.725 | H | 5.242 | 3.34 | 250 |

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.

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 20 von 31
Page 20 of 31

5.3 Spurious Radiation Measurement for FCC Part 74 Per Section 74.861(e)(6)(iii)

RESULT:

Pass

| | | |
|--|---|---|
| Date of testing | : | 11.04.2007 |
| Test specification | : | FCC Part 2 Per Section 2.1053(a) and 2.1057 |
| Limits | : | FCC Part 74 Per Section 74.861(e)(6)(iii) |
| Deviations from Standard Test procedures | : | None |
| Kind of test site | : | 3m Anechoic Chamber |
| Operation mode | : | Transmitting (unmodulated) |
| Temperature | : | 22°C |
| Humidity | : | 50% |

Measurement 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.
4. The EUT was removed and be replaced with substitute antenna correspondent to the suspected frequency point mentioned in Step 3 (if necessary, characteristic frequency of the antenna is adjusted to a half-wave of the suspected frequency point). The substitute antenna was then connected to a signal generator with a coaxial cable and its center is placed approximately at the same location as the centre place of the EUT in Step 3.
5. The signal generator is tuned to the suspected frequency point mentioned in Step 3 with the substitute antenna polarized both vertically and horizontally, the output level of the signal generator output was then adjusted to get a maximum reading in the spectrum with the same value recorded in the step 3.
6. For each suspected frequency point, the input RF power in the substitute antenna was calculated from the coaxial cable loss, antenna factor and the signal generator output level obtained in step 5. This value was regarded as final result and recorded in following table 4, table 5 and table 6.

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 21 von 31
Page 21 of 31

To determine the Limit for Spurious Emissions the following method was used:

Maximum output power in watts:

Maximum output power in Watt: 0.00334W (see table 2)

The emission must be reduced by:

$$43+10*\text{Log}(0.00334) = 18.237 \text{ dB}$$

Therefore, the Emission Limit equals:

$$10*\text{Log}(0.00334*1000) -18.237\text{dB} = -13\text{dBm}$$

While testing, the EUT was placed in 3 orthogonal planes and the maximum reading was recorded in the following tables.

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.

Table 5: Spurious Emission: EUT operated on Bottom frequency (740.125MHz)

| Freq. (MHz) | Polarization (V/H) | Transmit power (dBm) | Limit (dBm) |
|----------------|-----------------------|-------------------------|----------------|
| 1476.954 | H | -45.51 | -13 |
| 4436.874 | V | -51.08 | -13 |
| 2963.928 | H | -55.23 | -13 |

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 22 von 31
Page 22 of 31

Table 6: Spurious Emission: EUT operated on Bottom frequency (754.525MHz)

| Freq. (MHz) | Polarization (V/H) | Transmit power (dBm) | Limit (dBm) |
|----------------|-----------------------|-------------------------|----------------|
| 1505.010 | H | -43.61 | -13 |
| 1505.010 | V | -54.95 | -13 |
| 4521.042 | H | -44.40 | -13 |
| 4521.042 | V | -44.31 | -13 |
| 6793.587 | H | -42.35 | -13 |
| 3777.555 | H | -50.52 | -13 |

Table 7: Spurious Emission: EUT operated on Bottom frequency (768.725MHz)

| Freq. (MHz) | Polarization (V/H) | Transmit power (dBm) | Limit (dBm) |
|----------------|-----------------------|-------------------------|----------------|
| 3847.659 | H | -50.20 | -13 |
| 3903.807 | V | -54.26 | -13 |
| 6919.839 | H | -45.35 | -13 |

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 23 von 31
Page 23 of 31

5.4 Modulation Characteristics measurement

RESULT:

Pass

| | | |
|--|---|--|
| Date of testing | : | 11.04.2007 |
| Test specification | : | FCC Part 2 Per Section 2.1047(a) and (b) |
| Limits | : | FCC Part 2 Per Section 2.1047(a) and (b) |
| Deviations from Standard Test procedures | : | None |
| Operation mode | : | Transmitting |
| Temperature | : | 22°C |
| Humidity | : | 65% |

Measurement procedure:

Audio frequency response:

- 1) Configure the EUT as shown in Diagram 3.
- 2) Adjust the audio input for 20% of rated system deviation at 1 kHz using this level as a reference (0 dB).
- 3) Vary the Audio frequency from 200 Hz to 20 kHz and record the frequency deviation.

Modulation limit:

- 1). Configure the EUT as shown in Diagram 3, adjust the audio input for 60% of rated system deviation at 1kHz using this level as a reference (0dB) and vary the input level from -30db to +20dB. Record the frequency deviation obtained as a function of the input level.
- 2). Repeat step 1 with input frequency changing to 500Hz, 800Hz, 1kHz, 2.5kHz, 5kHz, 10kHz and 15kHz in sequence.

Refer to appendix 1 for the plotted test result.

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 24 von 31
Page 24 of 31

5.5 Occupied Bandwidth for FCC Part 74 Per Section 74.861(e)(3), 74.861(e)(5) and 74.861(e)(6)

RESULT:

Pass

| | | |
|---|---|--|
| Date of testing | : | 11.04.2007 |
| Test specification | : | FCC Part 2 Per Section 2.1049(c)1 |
| Limits | : | FCC Part 74 Per Section 74.861(e)(3), 74.861(e)(5) and 74.861(e)(6) |
| Deviations from Standard Test procedures | : | None |
| Operation mode | : | Transmitting (modulated) |
| Temperature | : | 22°C |
| Humidity | : | 50% |

Measurement procedure:

1. Connect the EUT as diagram 3.
2. Plot the unmodulated chart shows on spectrum.
3. According to the result of Modulation Characteristics, set the output of the signal generator to 100Hz, 500Hz, 1 kHz, 5 kHz, 10 kHz, increase the amplitude of the signal, until maximum modulation is shown on the spectrum analyzer.
4. The Occupied Bandwidth was measured in appendix 1 of this report.

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 25 von 31
Page 25 of 31

Table 8: Maximum Deviation

| Model Name | UP-81H | UP-83H | UP-86H | UP-87H | UP-88H |
|-------------------|--------|--------|--------|--------|--------|
| Reading: (kHz) | 27.7 | 54.1 | 6.5 | 36.2 | 21.8 |
| Limit: (kHz) | ± 75 | | | | |

Table 9: Operation Bandwidth (Bn)

| Model Name | UP-81H | | UP-83H | | UP-86H | | UP-87H | | UP-88H | |
|---|---------|------|--------|------|--------|-----|--------|------|--------|------|
| Parameter: | M | D | M | D | M | D | M | D | M | D |
| Reading: (kHz) | 10 | 27.7 | 10 | 54.1 | 15 | 1.9 | 10 | 36.2 | 5 | 20.9 |
| Bn: (kHz) | 75.4 | | 128.2 | | 33.8 | | 92.4 | | 51.8 | |
| Max. Bn (kHz) | 128.2 | | | | | | | | | |
| Limit: (kHz) | 200 | | | | | | | | | |
| Emission Designator: | 128KF3E | | | | | | | | | |
| Bn=2M+2D*K Bn: operation bandwidth M: Max. Modulation Frequency D: Peak Frequency Deviation K=1 | | | | | | | | | | |

Refer for appendix 1 for measurements.

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 26 von 31
Page 26 of 31

5.6 Frequency tolerance for FCC Part 74 Per Section 74.861(e)(4)

RESULT:

Pass

| | | |
|--|---|---|
| Date of testing | : | 25.04.2007 |
| Test specification | : | FCC Part 2 Per Section 2.1055 |
| Limits | : | FCC Part 74 Per Section 74.861(e)(4) |
| Deviations from Standard Test procedures | : | None |
| Test procedure | : | Procedure specified in ANSI C63.4 were followed |
| Operation mode | : | Transmitting (unmodulated) |
| Temperature | : | -30°C to 50°C |
| Humidity | : | 50% |

Measurement procedure:

A. Frequency stability versus environmental temperature

1. Setup the configuration as diagram 4 in section 4.5 for frequency measured inside an environment chamber and install new battery in the EUT.
2. Turn on EUT and set spectrum analyzer center frequency to the EUT operating frequency. Set spectrum analyzer Resolution Bandwidth to 1 kHz and Video Resolution Bandwidth to 1 kHz and Frequency Span to 50kHz. Record this frequency as reference frequency.
3. Set the temperature of chamber to 50 . Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
4. Repeat step 2 with a 10 decreased per stage until the lowest temperature -30 is measured, record all measured frequencies on each temperature step.

B. Frequency stability versus input voltage

1. Setup the configuration as diagram 4 for frequencies measurement at temperature range from 15 to 25 . Otherwise, an environment chamber set for a temperature of 20 shall be used.
2. Set spectrum analyzer center frequency to the EUT operating frequency. Set spectrum analyzer Resolution Bandwidth to 1 kHz and Video Resolution Bandwidth to 1 kHz. Record this frequency as reference frequency.
3. Set the supply voltage to the nominal voltage of the EUT.
4. Turn the EUT on and measure the EUT operating frequency
5. Repeat step 4 with decreased supply voltage, record all measured frequencies on each voltage step.
6. Stop the test until the lowest voltage specified by the manufacturer is reached or the EUT case to emission radio signal.

Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 27 von 31
Page 27 of 31

Table 10: the measurement of Frequency tolerance (temperature)

| Test condition | Power supply | Low Frequency (MHz) (740.125) | Mid Frequency (MHz) (754.525) | High Frequency (MHz) (768.725) |
|----------------------------|---------------|-------------------------------------|-------------------------------------|--------------------------------------|
| -30°C | New batteries | 740.1280 | 754.5280 | 768.7280 |
| -20°C | New batteries | 740.1272 | 754.5272 | 768.7274 |
| -10°C | New batteries | 740.1272 | 754.5274 | 768.7272 |
| 0°C | New batteries | 740.1276 | 754.5276 | 768.7276 |
| 10°C | New batteries | 740.1278 | 754.5276 | 768.7278 |
| 20°C | New batteries | 740.1262 | 754.5260 | 768.7264 |
| 30°C | New batteries | 740.1250 | 754.5254 | 768.7252 |
| 40°C | New batteries | 740.1232 | 754.5234 | 768.7232 |
| 50°C | New batteries | 740.1226 | 754.5228 | 768.7226 |
| Frequency Error: | | 0.003 | 0.003 | 0.003 |
| Frequency Error rate: | | 0.0004% | 0.0004% | 0.0004% |
| Frequency Tolerance Limit: | | 0.005% | | |

Table 11: the measurement of Frequency tolerance (supply voltage)

Temperature: 25°C

| Test condition (Power supply) | Low Frequency (MHz) (740.125) | Mid Frequency (MHz) (754.525) | High Frequency (MHz) (768.725) |
|----------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|
| 3.0V | 740.1250 | 754.5250 | 768.7248 |
| 2.8V | 740.1250 | 754.5250 | 768.7250 |
| 2.6V | 740.1250 | 754.5250 | 768.7250 |
| 2.4V | 740.1252 | 754.5250 | 768.7250 |
| 2.3V | 740.1252 | 754.5250 | 768.7250 |
| 2.2V | 740.1250 | 754.5250 | 768.7250 |
| Frequency Error: | 0.0002 | 0.000 | 0.0002 |
| Frequency Error rate: | 0.00003% | 0.0000% | 0.00003% |
| Frequency Tolerance Limit: | 0.005% | | |

The equipment remains on channel when the power source was reduced below the lower extreme test voltage limit until zero. The EUT ceases to function below the voltage at DC 2.1V.

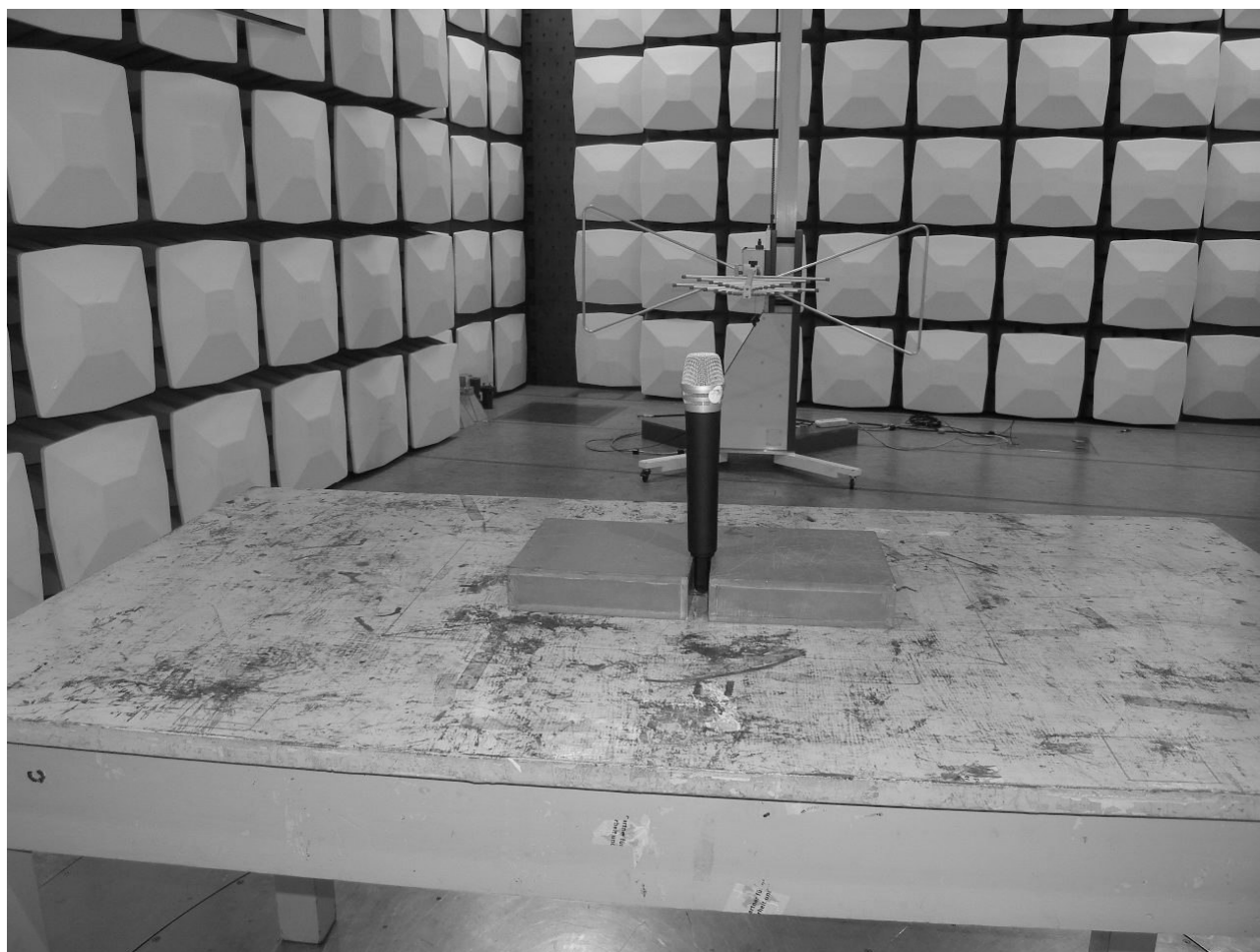
Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 28 von 31
Page 28 of 31

6 Photographs of the Test Set-Up

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



Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 29 von 31
Page 29 of 31

Photograph 2: Set-up for Radiation Measurement above 1GHz

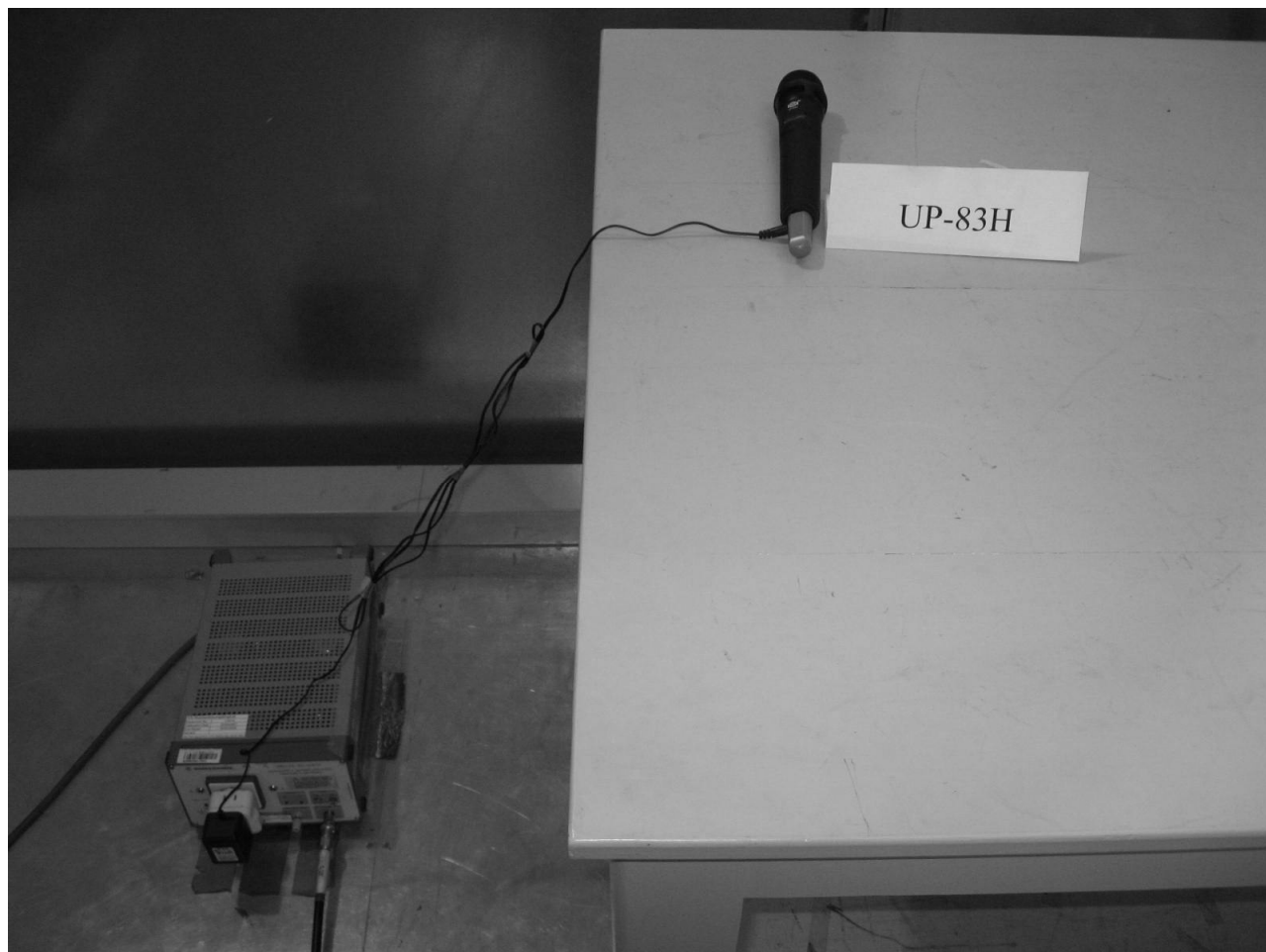


Prüfbericht - Nr.:
Test Report No.:

16010007 001

Seite 30 von 31
Page 30 of 31

Photograph 3: Set-up for Conducted Emission of AC mains



7 List of Tables

| | |
|---|----|
| Table 1: List of Test and Measurement Equipment..... | 6 |
| Table 2: Disturbance Voltage on AC Mains (L1 line)..... | 16 |
| Table 3: Disturbance Voltage on AC Mains (N line)..... | 17 |
| Table 4: Measurement Result of output power on frequencies 740.125MHz, 753.125MHz and 768.725MHz..... | 19 |
| Table 5: Spurious Emission: EUT operated on Bottom frequency (740.125MHz)..... | 21 |
| Table 6: Spurious Emission: EUT operated on Bottom frequency (754.525MHz)..... | 22 |
| Table 7: Spurious Emission: EUT operated on Bottom frequency (768.725MHz)..... | 22 |
| Table 8: Maximum Deviation..... | 25 |
| Table 9: Operation Bandwidth (Bn)..... | 25 |
| Table 10: the measurement of Frequency tolerance (temperature)..... | 27 |
| Table 11: the measurement of Frequency tolerance (supply voltage)..... | 27 |

8 List of Photographs

| | |
|--|----|
| Photograph 1: Set-up for Radiation Measurement Below 1GHz..... | 28 |
| Photograph 2: Set-up for Radiation Measurement above 1GHz..... | 29 |
| Photograph 3: Set-up for Conducted Emission of AC mains..... | 30 |

Prüfbericht - Nr.: 16010007 001

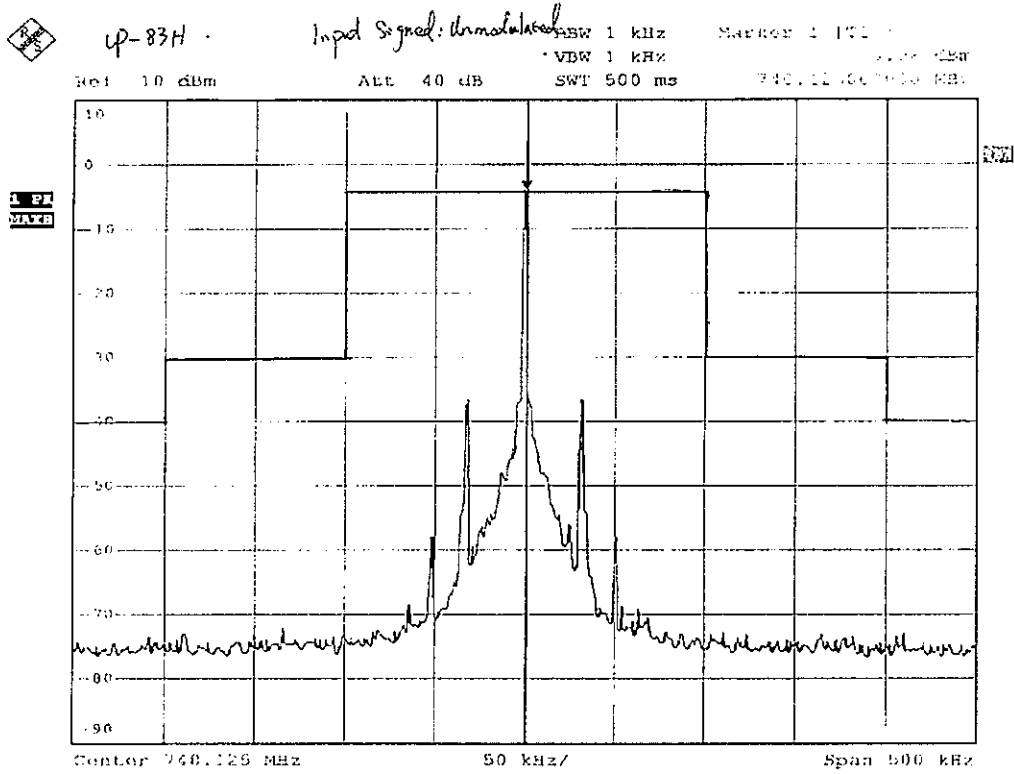
Seite 1 von 32

Test Report no.:

Page 1 of 32

Occupied Bandwidth:

High Channel(Page 1-7), Mid channel(Page 8-14), Low Channel(Page 15-21)



down 3dB

Date: 29.APR.2007 17:10:01

Prüfbericht - Nr.: 16010007 001
Test Report no.:

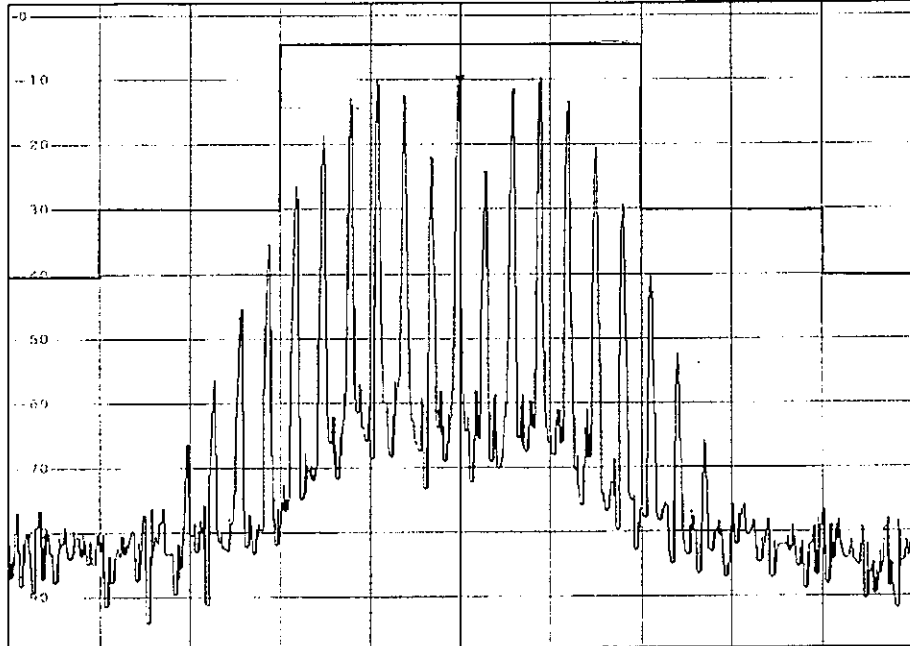
Seite 2 von 32
Page 2 of 32



Input Signal: 15 K

RBW 1 kHz VBW 1 kHz SWT 500 ms
Ref 2 dBm ATT 40 dB

VIEW



Center 740.125 MHz 50 kHz Span 500 kHz

down 3dB

Date: 29.APR.2007 18:05:52

Prüfbericht - Nr.: 16010007 001

Test Report no.:

Seite 3 von 32

Page 3 of 32



Input Signal: 5 k :

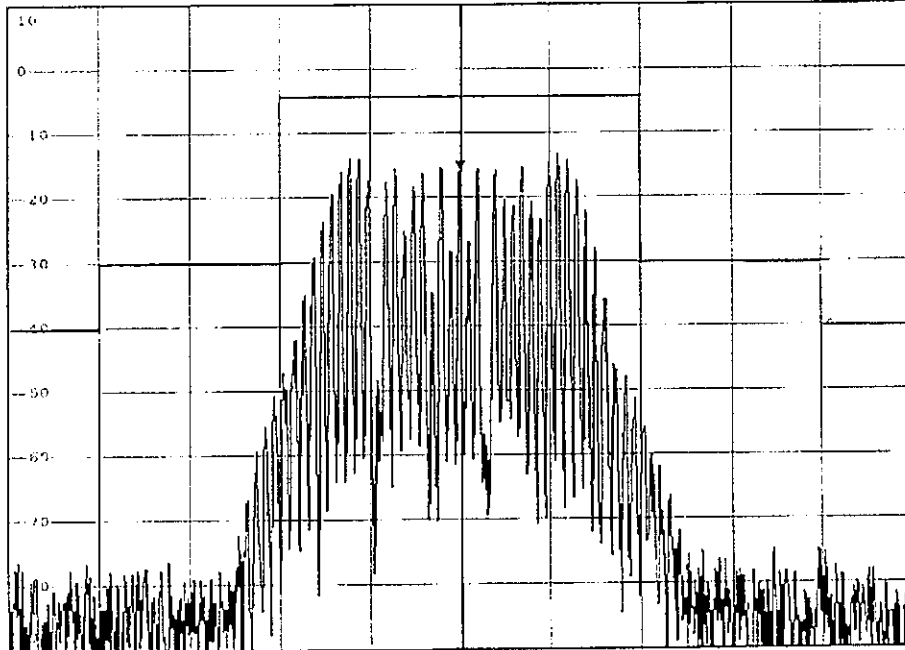
RBW 1 kHz
VBW 1 kHz
SWT 500 ms

Marker: 1
710.125 MHz

Ref 10 dBm

Att 40 dB

1.25
VIEW



Center 710.125 MHz

50 kHz

Span 500 kHz

down 3dB

Date: 29.APR.2007 17:28:05

Prüfbericht - Nr.: 16010007 001

Seite 4 von 32
Page 4 of 32

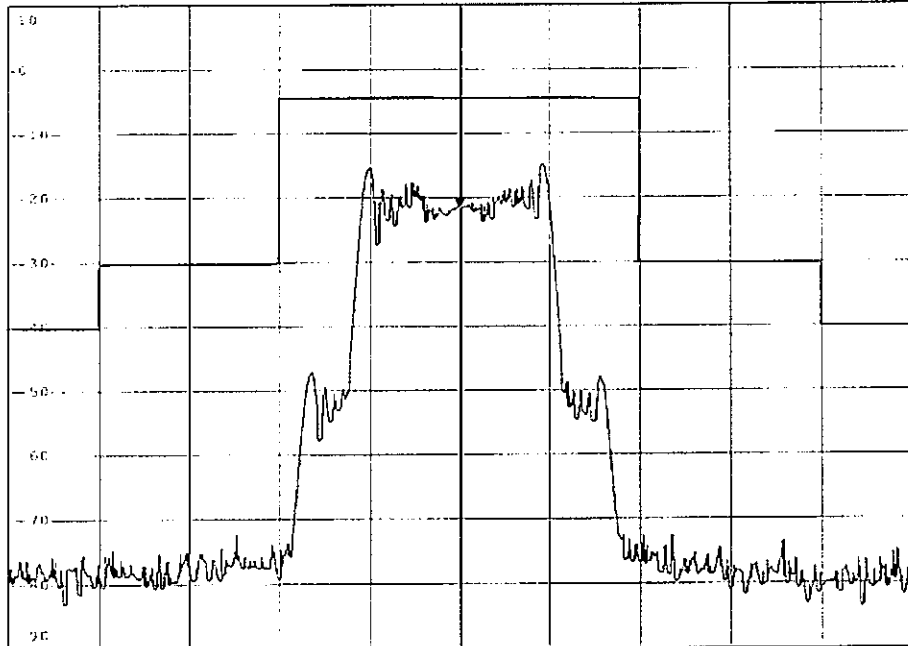
Test Report no.:



Input Signal: 1K

70.1 10 dBm ATT 40 dB RBW 1 kHz VBW 1 kHz SWT 500 ms

1.5K
VIEW



Center: 140.125 MHz 50 kHz/ Span: 500 kHz

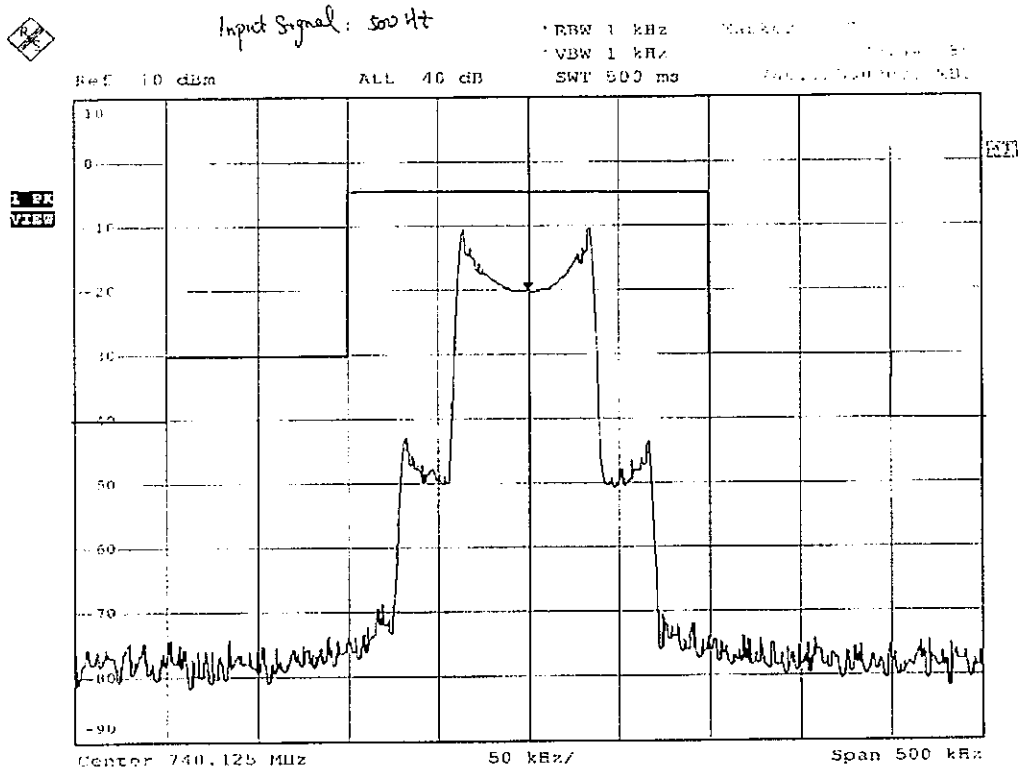
down 20dB

Date: 29.APR.2007 17:30:20

Prüfbericht - Nr.: 16010007 001

Seite 5 von 32
Page 5 of 32

Test Report no.:



down 3dB

Date: 29.APR.2007 17:32:23

8

Prüfbericht - Nr.: 16010007 001

Test Report no.:

Seite 6 von 32

Page 6 of 32

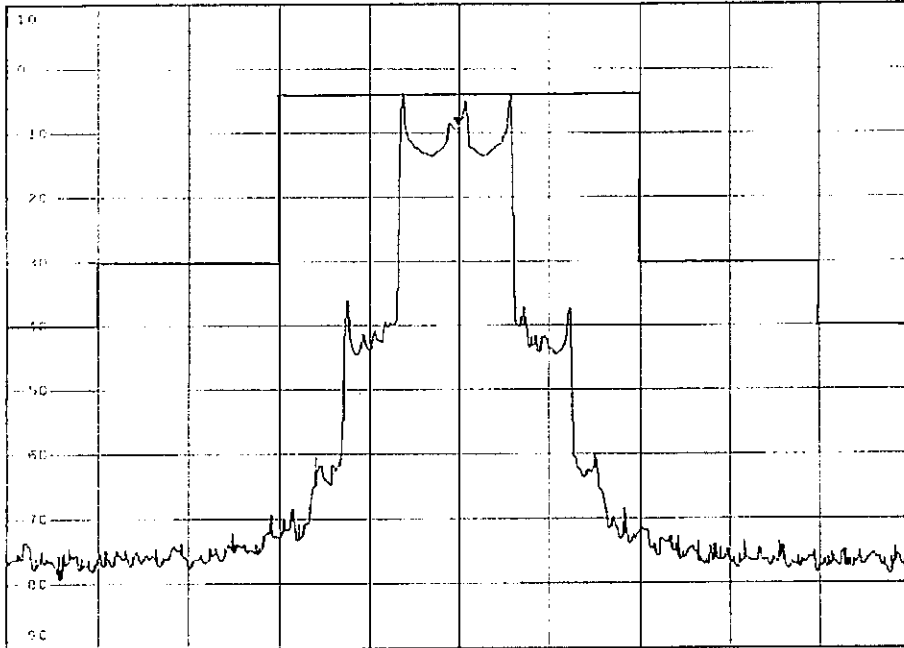


Input signal: 100 Hz

*RBW 1 kHz Marker 1 100.000 MHz
*VBW 1 kHz -10.00 dB
SWT 500 ms 241.175000000 MHz

Ref 10 dBm

Att 40 dB



Center 740.125 MHz

50 kHz

Span 500 kHz

Down 3dB

Date: 29.APR.2007 17:35:15

Prüfbericht - Nr.: 16010007 001

Seite 7 von 32

Test Report no.:

Page 7 of 32



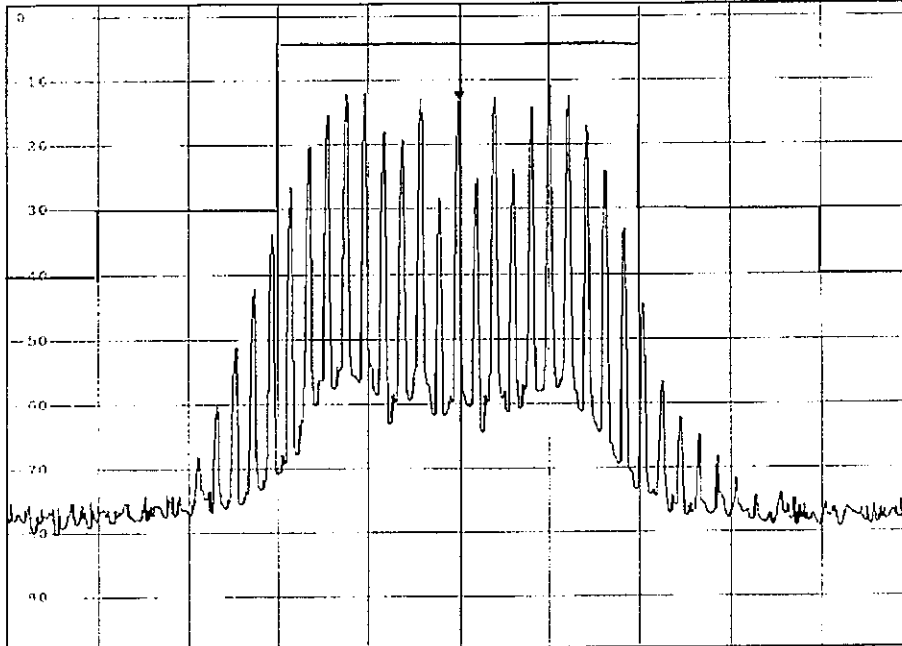
Input signal: 10 K

RBW 1 kHz
VBW 1 kHz
SWT 500 ms

Ref 2 dBm

Att 40 dB

1 PR
VIEW



Center: 740.125 MHz

50 kHz

Span 500 kHz

down 3dB

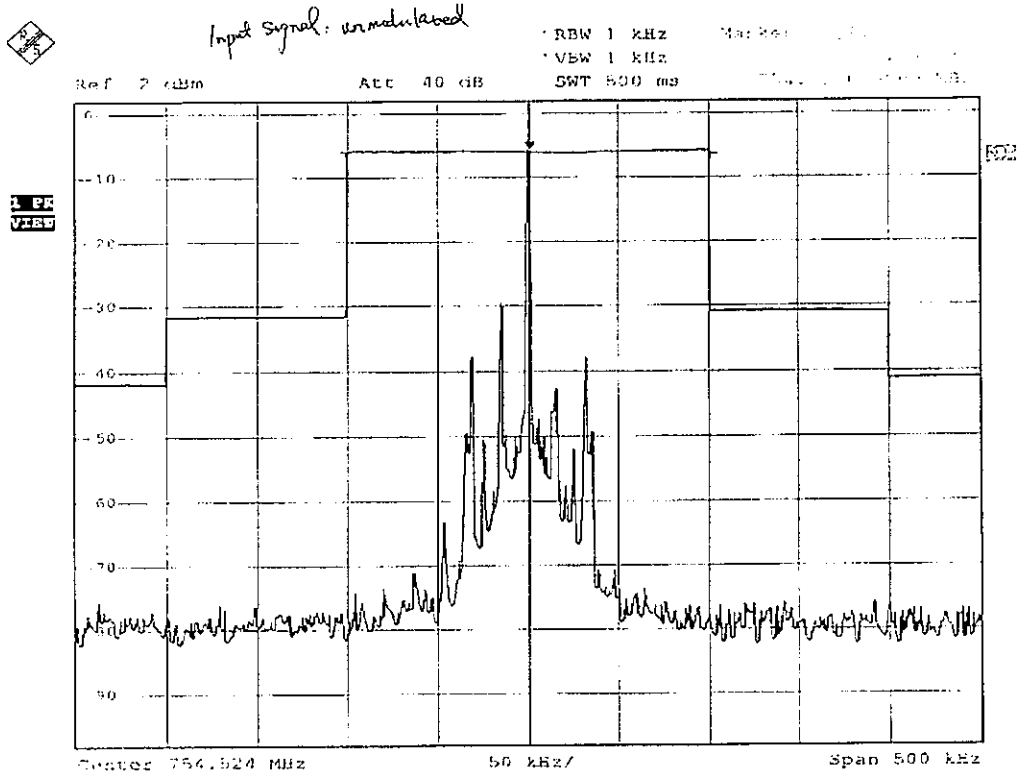
Date: 29.APR.2007 18:05:15

Prüfbericht - Nr.: 16010007 001

Seite 8 von 32

Test Report no.:

Page 8 of 32



down: 3dB

Date: 29.APR.2007 17:45:26

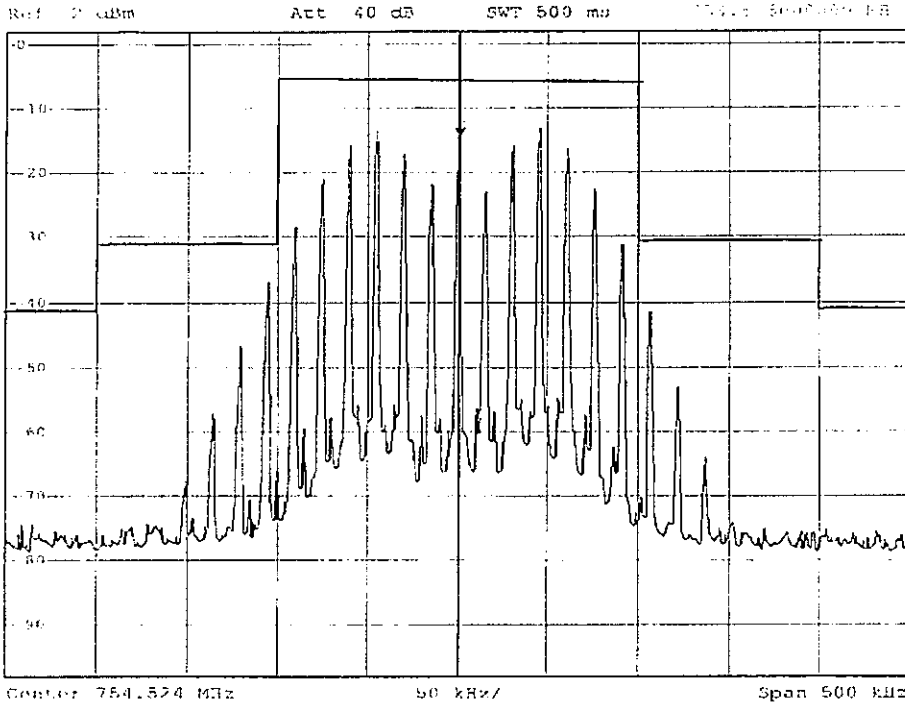
Prüfbericht - Nr.: 16010007 001
Test Report no.:

Seite 9 von 32
Page 9 of 32



Input signal: 15K

· RBW 1 kHz
· VBW 1 kHz
· SWF 500 ms



Cont. 3dB

Date: 29.APR.2007 17:47:17

Prüfbericht - Nr.: 16010007 001

Test Report no.:

Seite 10 von 32

Page 10 of 32



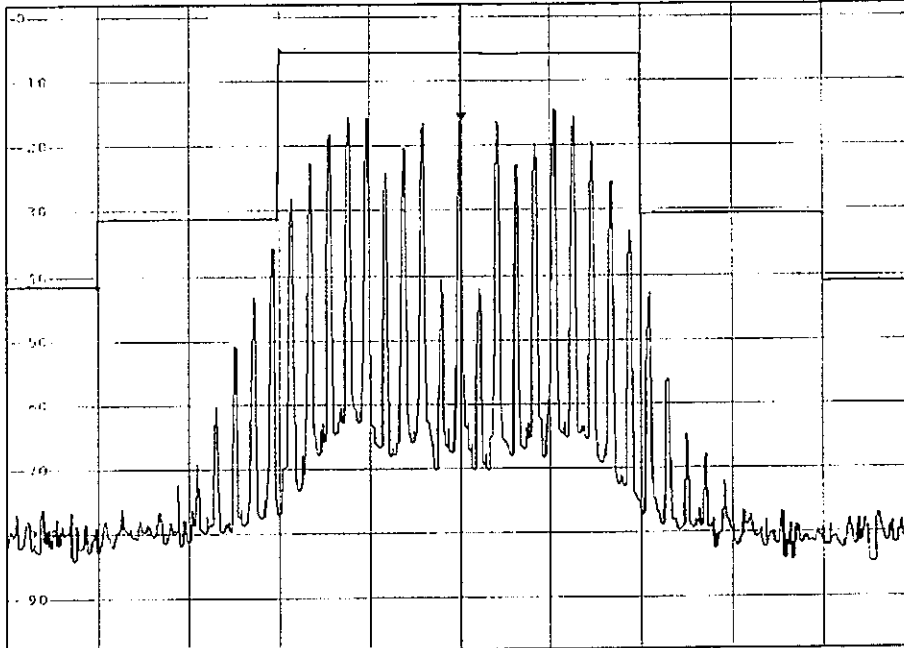
Input signal: 10 V

RBW : 1 kHz
VBW : 1 kHz
SWT 500 ms

Ref 2 dBm

Att. 40 dB

Marker 1 17.000



Center 754.524 MHz

50 kHz

Span 500 kHz

down 3dB

Date: 29.APR.2007 17:57:59

Prüfbericht - Nr.: 16010007 001

Seite 11 von 32

Test Report no.:

Page 11 of 32



Input signal: 5 k

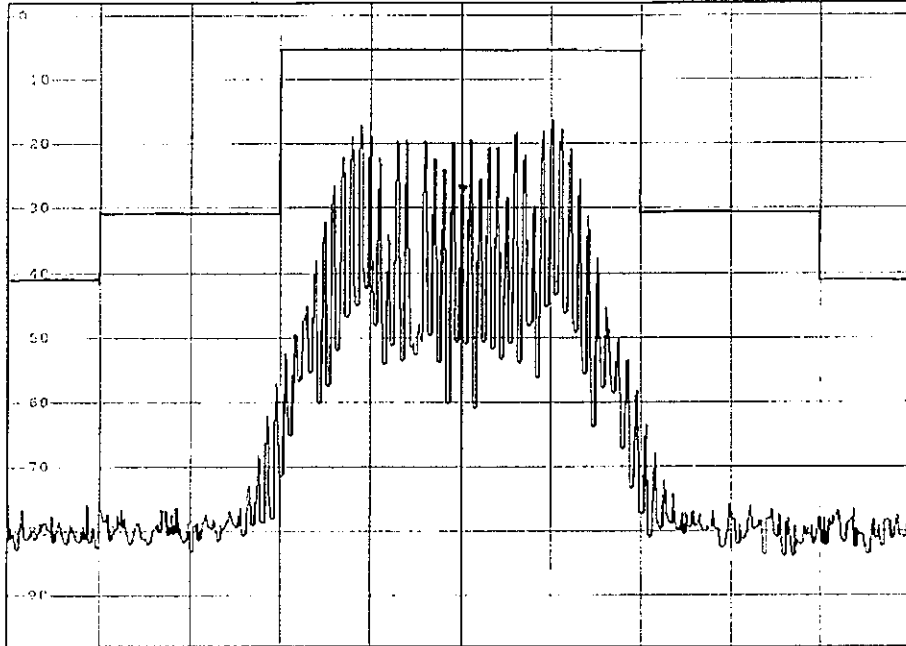
RBW 1 kHz Marker 1 10.1
VBW 1 kHz
SWT 500 ms

Ref 2 dBm

Att 40 dB

10.1

10.1
V180



Center 754.524 MHz

50 kHz

Span 500 kHz

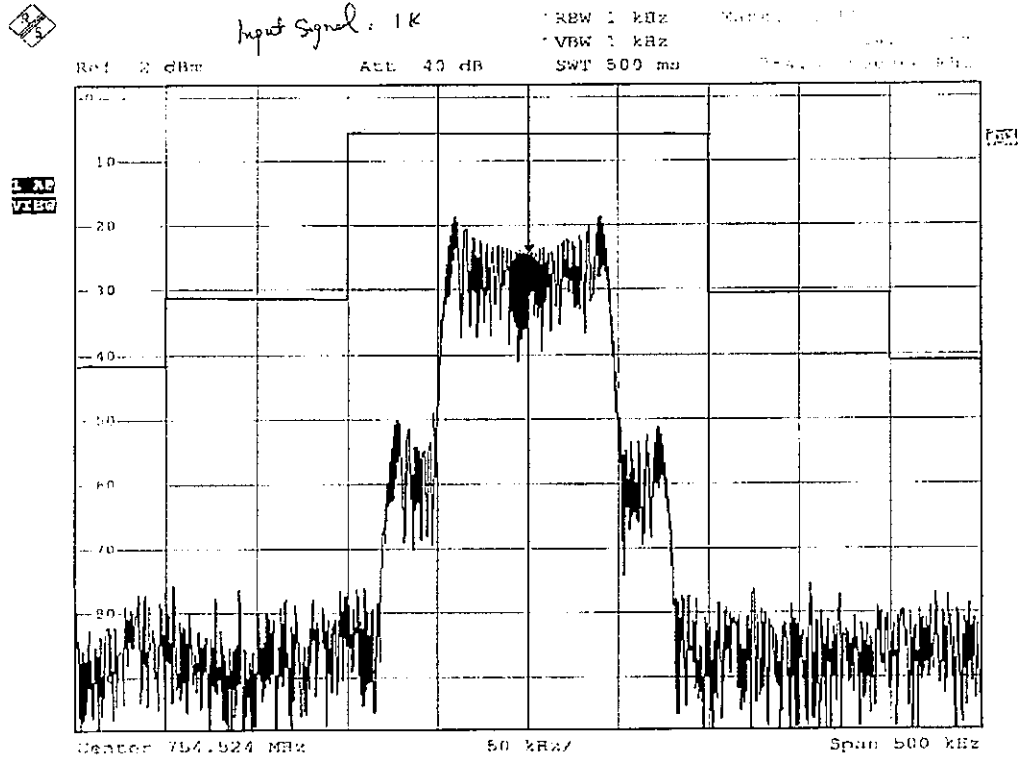
down 3dB

Date: 29.APR.2007 17:59:06

ef

Prüfbericht - Nr.: 16010007 001
Test Report no.:

Seite 12 von 32
Page 12 of 32



Power: 3dB

Date: 29.APR.2007 18:00:03

Prüfbericht - Nr.: 16010007 001

Seite 13 von 32

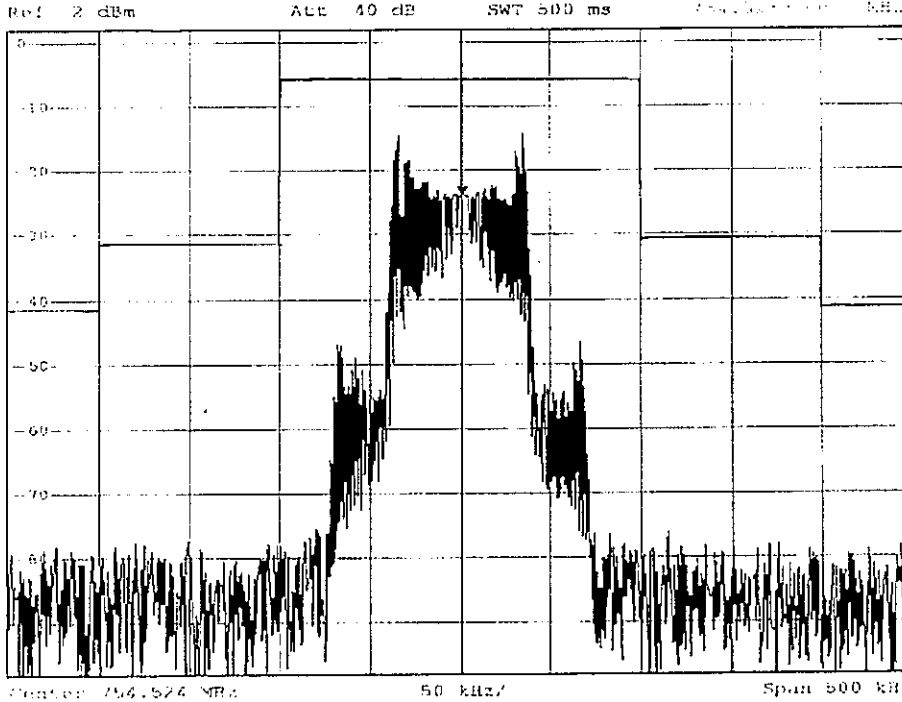
Test Report no.:

Page 13 of 32



Input signal: 500 Hz

RBW 1 kHz
VBW 1 kHz
SWT 500 ms



down 3dB

Date: 29.APR.2007 18:00:35

Prüfbericht - Nr.: 16010007 001

Test Report no.:

Seite 14 von 32

Page 14 of 32

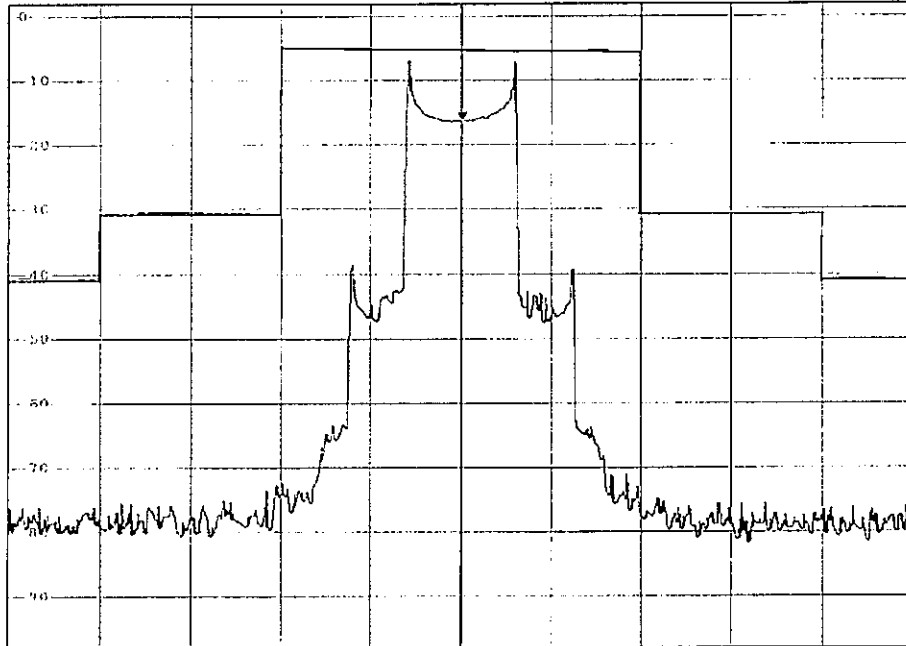


Input Signal: 100 Hz

RBW 1 kHz Marker: [T1]
VBW 1 kHz []
SWT 500 ms []

Ref 2 dBm

Att 40 dB



Center 754.524 MHz

50 kHz/

Span 500 kHz

down: 3dB

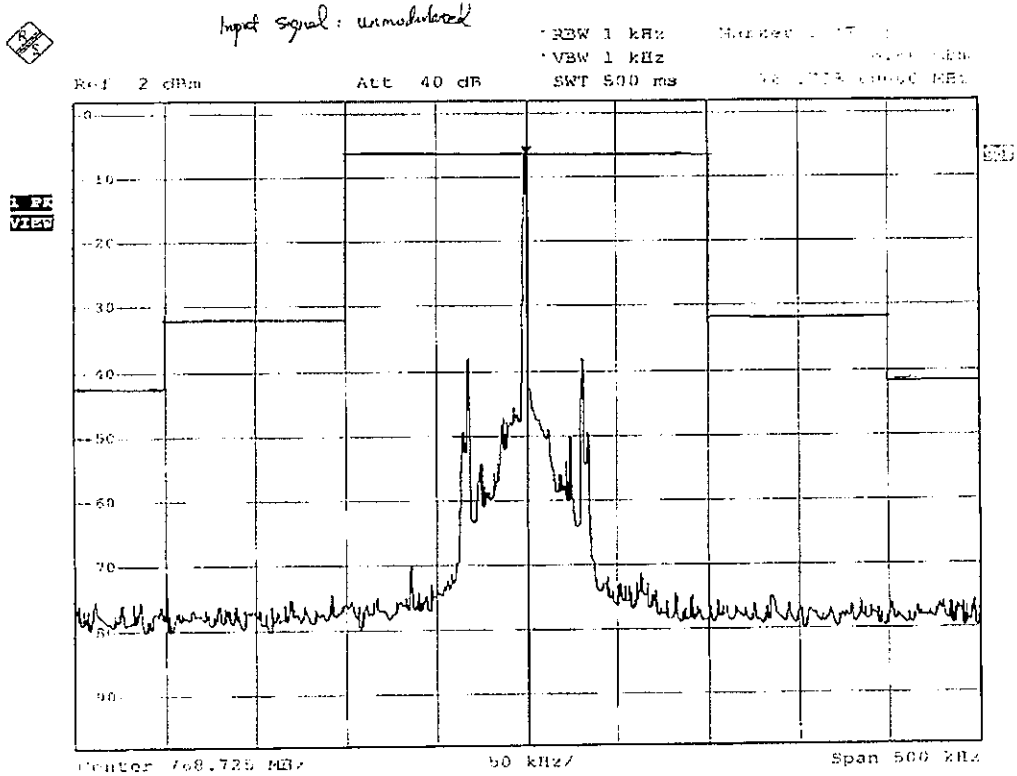
Date: 29.APR.2007 18:02:07

Prüfbericht - Nr.: 16010007 001

Seite 15 von 32

Test Report no.:

Page 15 of 32



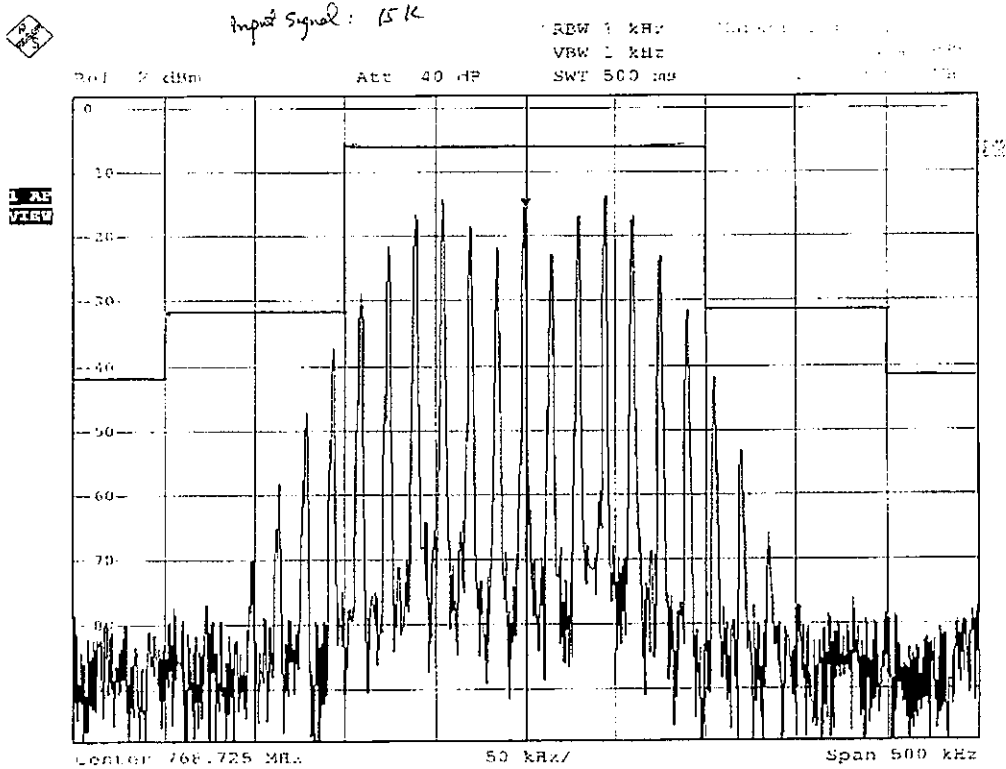
down 3dB

Date: 29.APR.2007 18:09:02

Prüfbericht - Nr.: 16010007 001

Seite 16 von 32
Page 16 of 32

Test Report no.:



down 3dB

Date: 29.APR.2007 18:10:02

Prüfbericht - Nr.: 16010007 001

Seite 17 von 32

Test Report no.:

Page 17 of 32



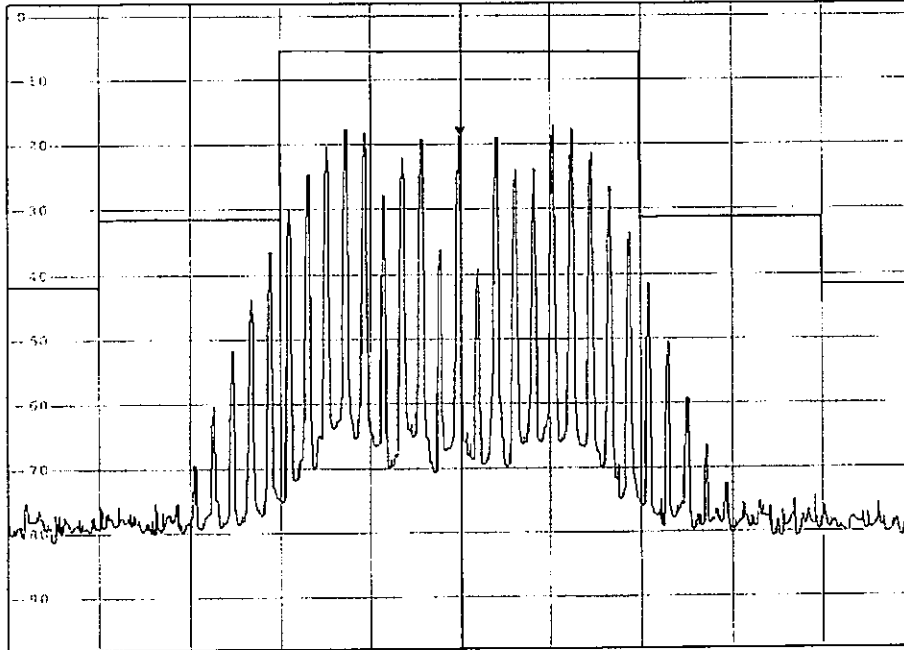
Input Signal: 10¹⁶

RBW 1 kHz
VPW 1 kHz
SWT 500 MHz

Ref 2 dBm

Att 40 dB

PR
V489



Center 760.725 MHz

50 kHz/

Span 500 kHz

down 3dB

Date: 29.APR.2007 18:10:59

Prüfbericht - Nr.: 16010007 001

Seite 18 von 32

Test Report no.:

Page 18 of 32



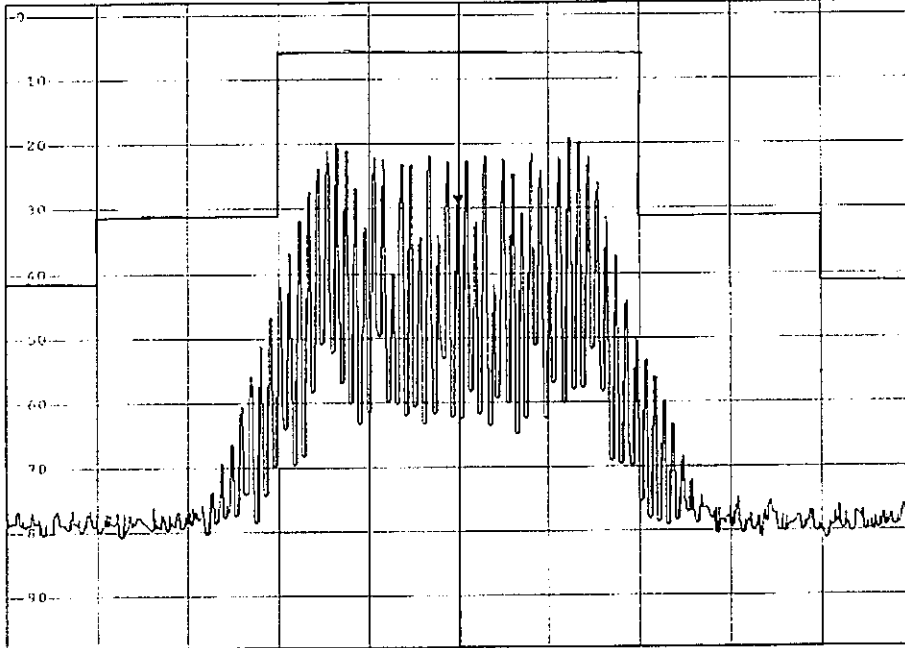
Input Signal: 5 k

RBW 1 kHz Marker 1 (77.1)
VBW 1 kHz Scale 10 dB
SWT 500 ms 76.1173500000 MHz

Ref 2 dBm

Att 40 dB

1 PR
VIEW



Center 768.725 MHz

50 kHz

Span 500 kHz

down 3dB

Date: 29.APR.2007 18:11:43

Prüfbericht - Nr.: 16010007 001

Seite 19 von 32

Test Report no.:

Page 19 of 32



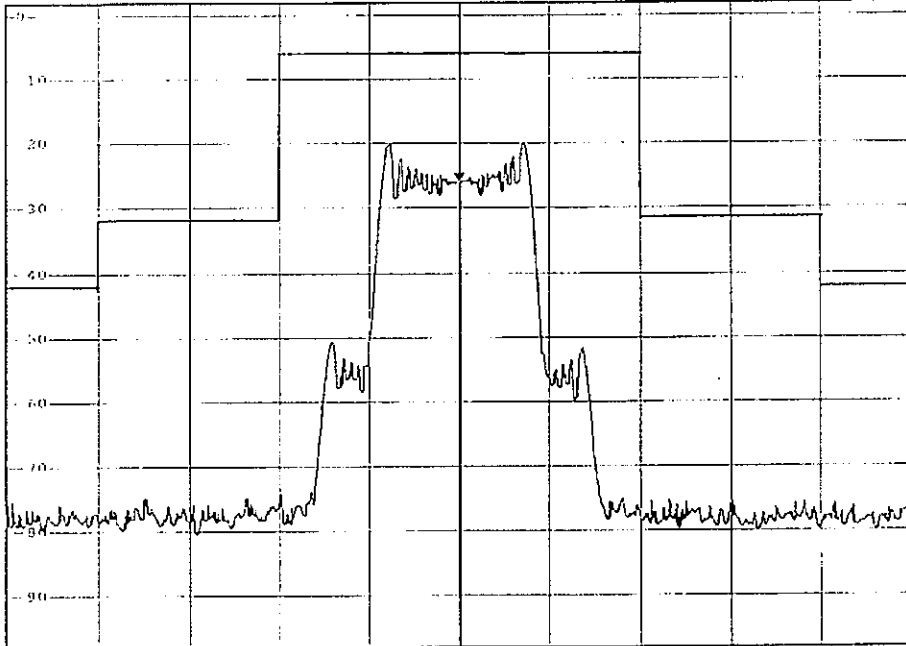
Input Signal: 1 K

RBW 1 kHz Marker 1 (10.0)
 VBW 1 kHz 100.00 kHz
 SWF 500 ms 70.00_500.000 kHz

Ref 2 dBm

Att 40 dB

dB
VdB



Center 768.725 MHz

50 kHz

Span 500 kHz

down 3dB

Date: 29.APR.2007 10:12:29

Prüfbericht - Nr.: 16010007 001

Seite 20 von 32
Page 20 of 32

Test Report no.:



input signal: 500 Hz

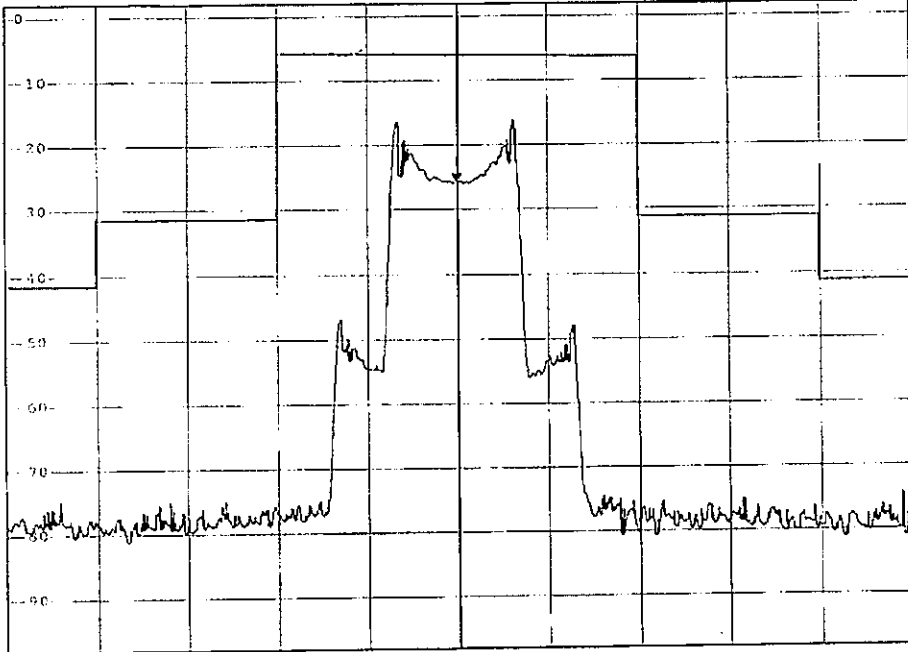
• RBW 1 kHz
• VBW 1 kHz
• SWT 500 ms

Marker 1 [1] :
25.00 dBm
768.725000 MHz

Ref 2 dBm

Att 40 dB

VIEW



Center 768.725 MHz

50 kHz/

Span 500 kHz

Down 3dB

Date: 29.APR.2007 18:13:26

Prüfbericht - Nr.: 16010007 001

Seite 21 von 32

Test Report no.:

Page 21 of 32



Input Signal: com 42

* RBW 1 kHz

MARKER: [7]

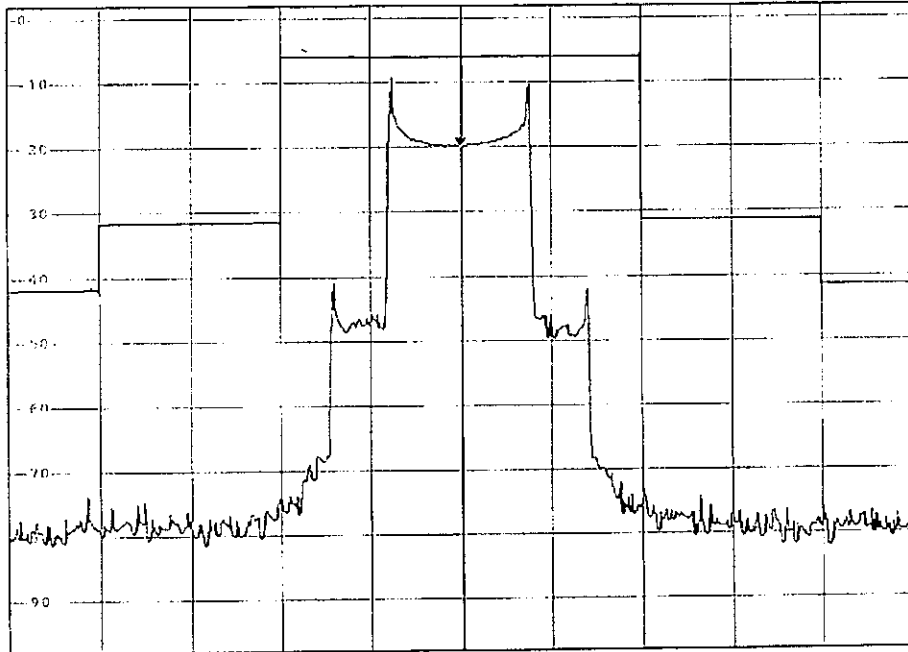
* VBW 1 kHz

* SWF 500 ms

Ref 2 dBm

Att 40 dB

1 PR
VIEW



Center 768.125 MHz

50 kHz/

Span 500 kHz

down: 3dB

date: 29.APR.2007 16:14:09

Prüfbericht - Nr.: 16010007 001

Seite 22 von 32

Test Report no.:

Page 22 of 32

Modulation characteristics:

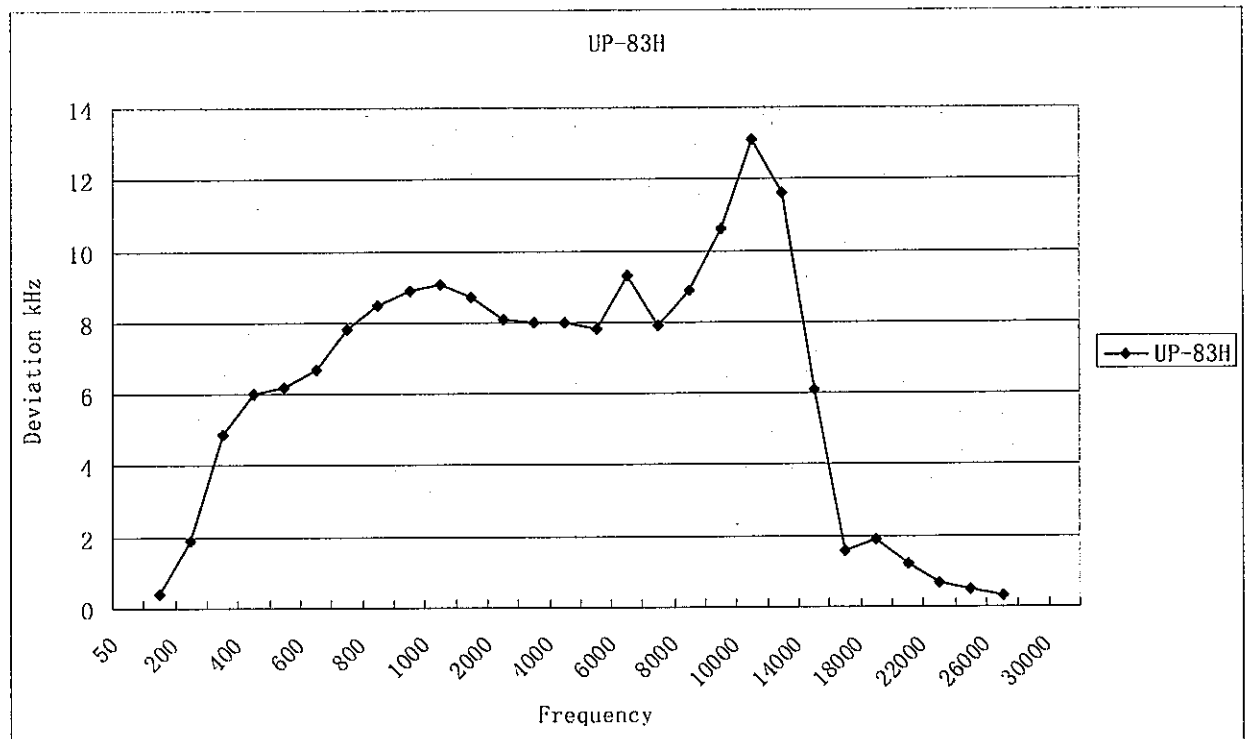
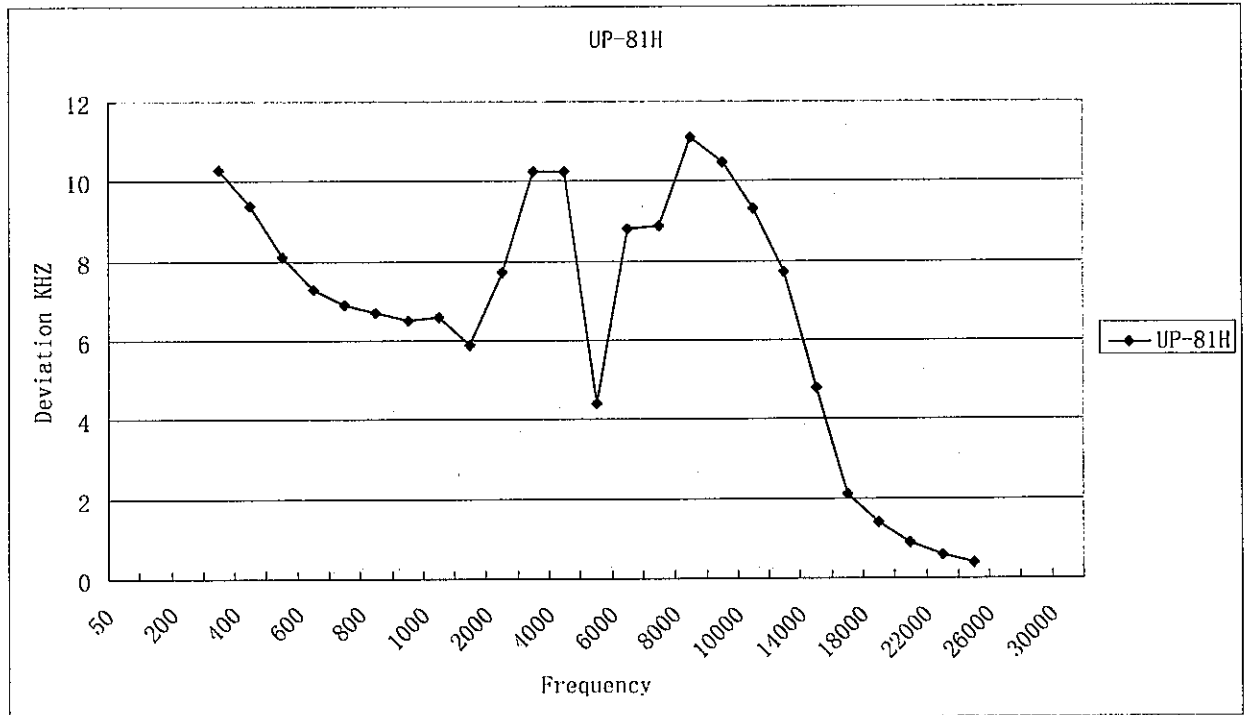
| Frequency (Hz) | Deviation (kHz) | | | | |
|----------------|-----------------|--------|--------|--------|--------|
| | UP-81H | UP-83H | UP-86H | UP-87H | UP-88H |
| 300 | 10.3 | 4.9 | 8.1 | 2.4 | 19.1 |
| 400 | 9.4 | 6.01 | 7.4 | 3.9 | 11.6 |
| 500 | 8.1 | 6.2 | 6.1 | 6.2 | 11.4 |
| 600 | 7.3 | 6.7 | 5.8 | 5.8 | 10.3 |
| 700 | 6.9 | 7.8 | 5.2 | 5.8 | 9.2 |
| 800 | 6.7 | 8.5 | 5.4 | 6.8 | 10.3 |
| 900 | 6.5 | 8.9 | 5.5 | 6.9 | 11.7 |
| 1000 | 6.6 | 9.1 | 5.6 | 7.5 | 11.1 |
| 1500 | 5.9 | 8.7 | 4.9 | 7.7 | 8.4 |
| 2000 | 7.7 | 8.1 | 6.4 | 9.4 | 10.8 |
| 3000 | 10.24 | 8.01 | 6.6 | 6.4 | 14.5 |
| 4000 | 10.24 | 8.01 | 3.7 | 7.5 | 14.5 |
| 5000 | 4.4 | 7.8 | 5.1 | 9.7 | 9.8 |
| 6000 | 8.8 | 9.3 | 6 | 6.6 | 11.8 |
| 7000 | 8.9 | 7.9 | 7.3 | 5.1 | 13 |
| 8000 | 11.1 | 8.9 | 9.1 | 7.5 | 14 |
| 9000 | 10.5 | 10.6 | 8.6 | 6.4 | 17.3 |
| 10000 | 9.3 | 13.1 | 7.7 | 7.5 | 15.3 |
| 12000 | 7.7 | 11.6 | 5.6 | 6.8 | 14.1 |
| 14000 | 4.8 | 6.1 | 4.4 | 2.6 | 11.1 |
| 16000 | 2.1 | 1.6 | 2.1 | 1.7 | 4.8 |
| 18000 | 1.4 | 1.9 | 1.3 | 1.2 | 2.2 |
| 20000 | 0.9 | 1.2 | 0.6 | 0.7 | 0.7 |

Prüfbericht - Nr.: 16010007 001

Seite 23 von 32

Test Report no.:

Page 23 of 32

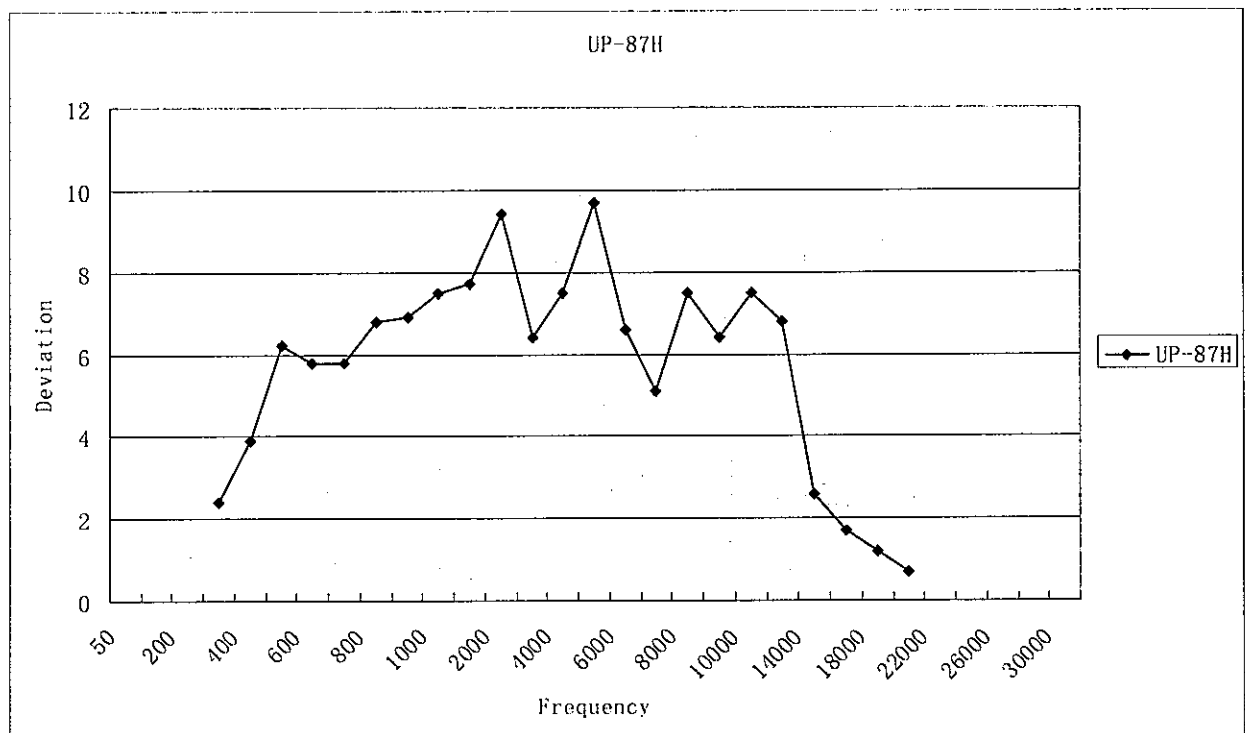
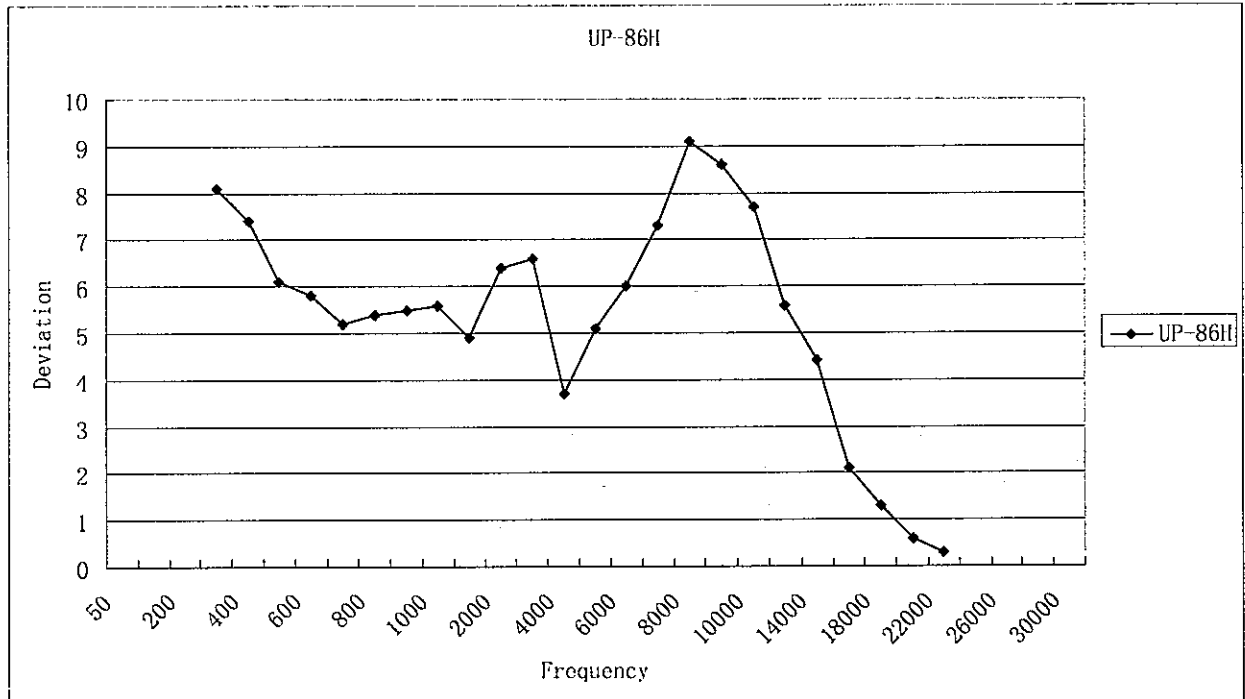


Prüfbericht - Nr.: 16010007 001

Seite 24 von 32

Test Report no.:

Page 24 of 32

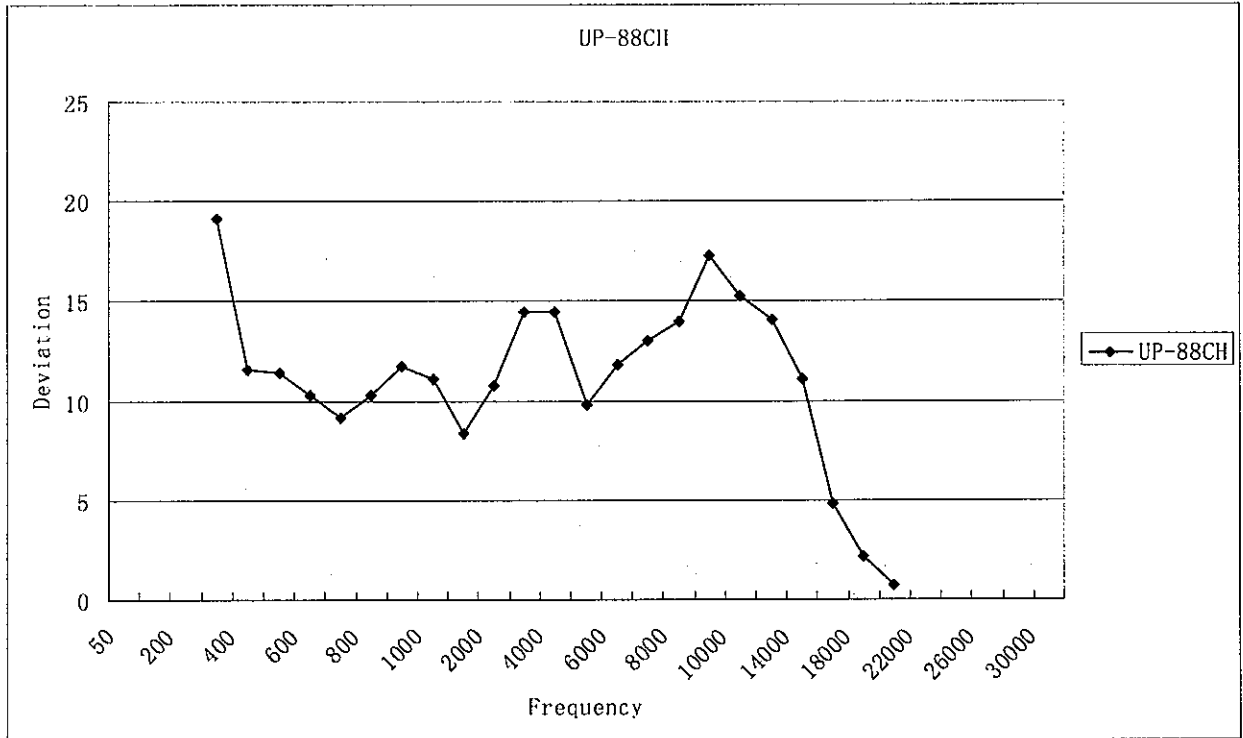


Prüfbericht - Nr.: 16010007 001

Seite 25 von 32

Test Report no.:

Page 25 of 32



Prüfbericht - Nr.: 16010007 001

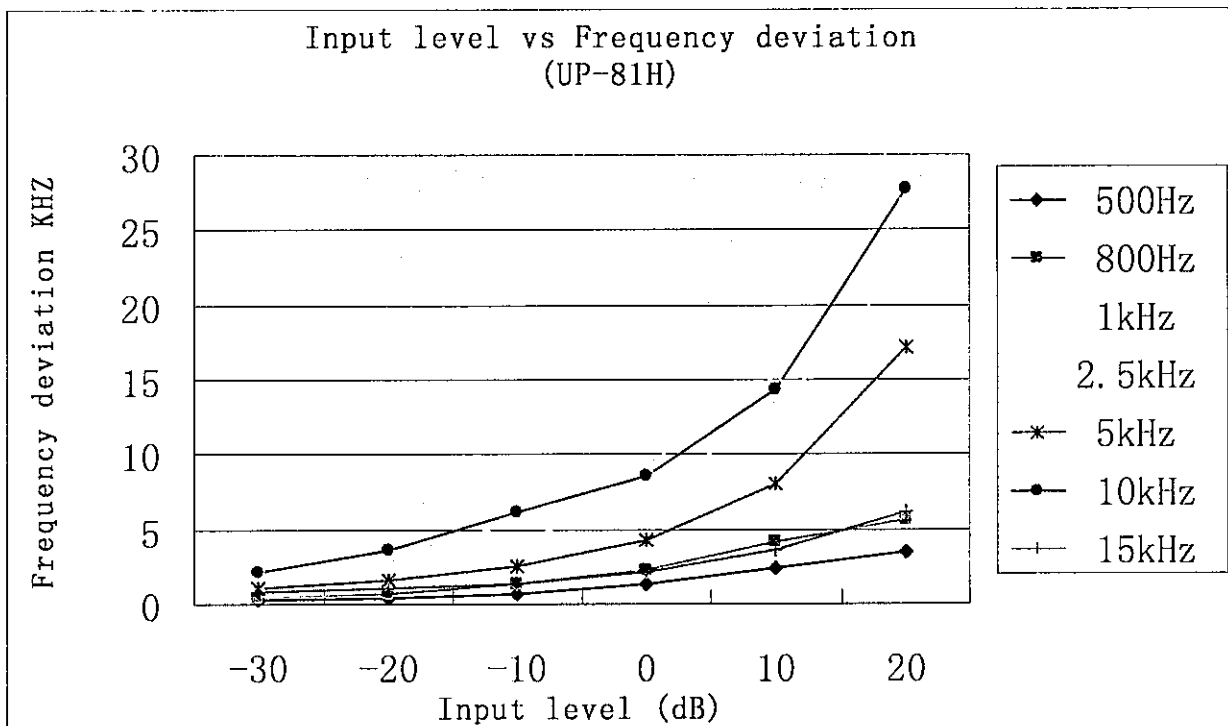
Test Report no.:

Seite 26 von 32

Page 26 of 32

UP-81H:

| Modulation Level | 500Hz | 800Hz | 1kHz | 2.5kHz | 5kHz | 10kHz | 15kHz |
|------------------|-------|-------|------|--------|------|-------|-------|
| -30 | 0.3 | 0.4 | 1.4 | 1.9 | 1.1 | 2.2 | 0.8 |
| -20 | 0.4 | 0.7 | 2.4 | 3.2 | 1.6 | 3.6 | 1.1 |
| -10 | 0.7 | 1.4 | 4.2 | 5.5 | 2.5 | 6.1 | 1.3 |
| 0 | 1.3 | 2.3 | 7.3 | 9.3 | 4.3 | 8.6 | 2.1 |
| 10 | 2.4 | 4.1 | 12.8 | 15.3 | 8.1 | 14.3 | 3.6 |
| 20 | 3.5 | 5.6 | 22.8 | 26.6 | 17.2 | 27.7 | 6.2 |



Prüfbericht - Nr.: 16010007 001

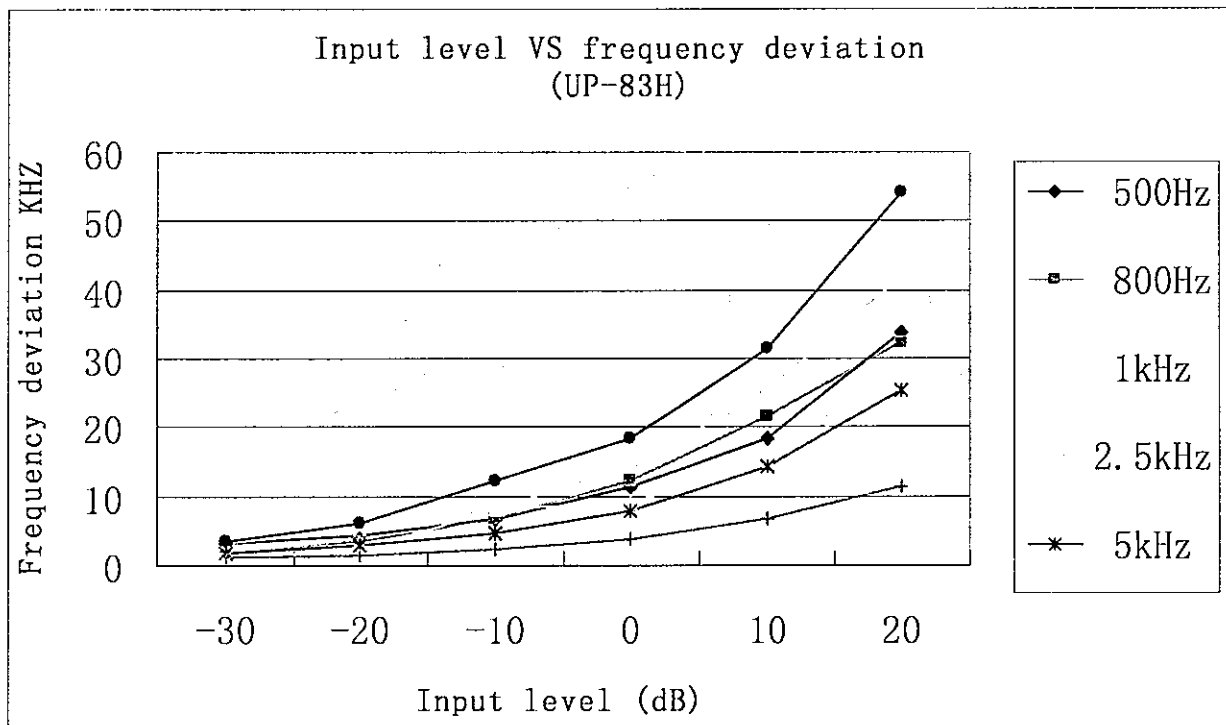
Test Report no.:

Seite 27 von 32

Page 27 of 32

UP-83H:

| Modulation Level | 500Hz | 800Hz | 1kHz | 2.5kHz | 5kHz | 10kHz | 15kHz |
|------------------|-------|-------|------|--------|------|-------|-------|
| -30 | 3.1 | 1.8 | 1.3 | 3.1 | 1.8 | 3.5 | 1.1 |
| -20 | 4.3 | 3.5 | 2.1 | 5.2 | 2.8 | 6.1 | 1.4 |
| -10 | 6.8 | 6.7 | 8.1 | 8.3 | 4.7 | 12.1 | 2.4 |
| 0 | 11.4 | 12.3 | 9.1 | 14.3 | 7.9 | 18.4 | 3.9 |
| 10 | 18.4 | 21.6 | 15.1 | 25.2 | 14.3 | 31.5 | 6.6 |
| 20 | 33.9 | 32.4 | 26.2 | 41.8 | 25.4 | 54.1 | 11.5 |



Prüfbericht - Nr.: 16010007 001

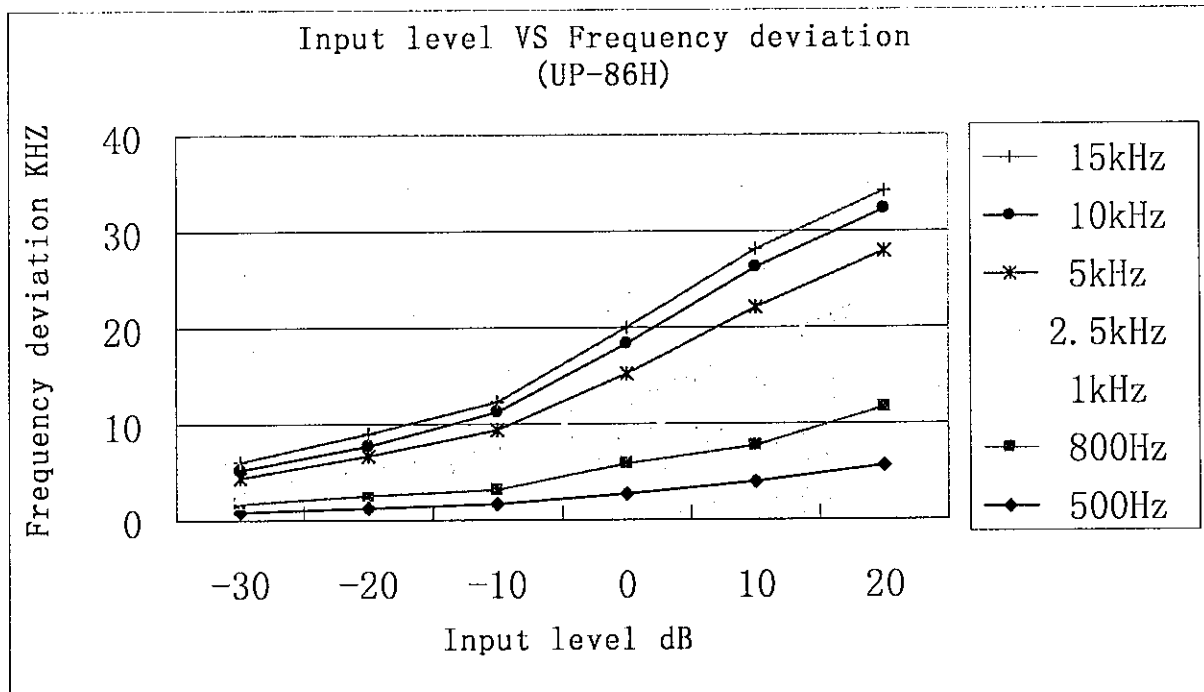
Test Report no.:

Seite 28 von 32

Page 28 of 32

UP-86H:

| Modulation Level | 500Hz | 800Hz | 1kHz | 2.5kHz | 5kHz | 10kHz | 15kHz |
|------------------|-------|-------|------|--------|------|-------|-------|
| -30 | 0.8 | 0.8 | 0.8 | 1 | 0.99 | 0.9 | 0.7 |
| -20 | 1.2 | 1.2 | 1.3 | 1.5 | 1.4 | 1.2 | 1.2 |
| -10 | 1.6 | 1.6 | 2.1 | 2.2 | 1.9 | 1.9 | 1 |
| 0 | 2.7 | 3.1 | 3.1 | 3.3 | 3.1 | 3.1 | 1.5 |
| 10 | 4 | 3.8 | 5.1 | 5.1 | 4.1 | 4.2 | 1.8 |
| 20 | 5.6 | 6.1 | 6.5 | 5.5 | 4.3 | 4.3 | 1.9 |



Prüfbericht - Nr.: 16010007 001

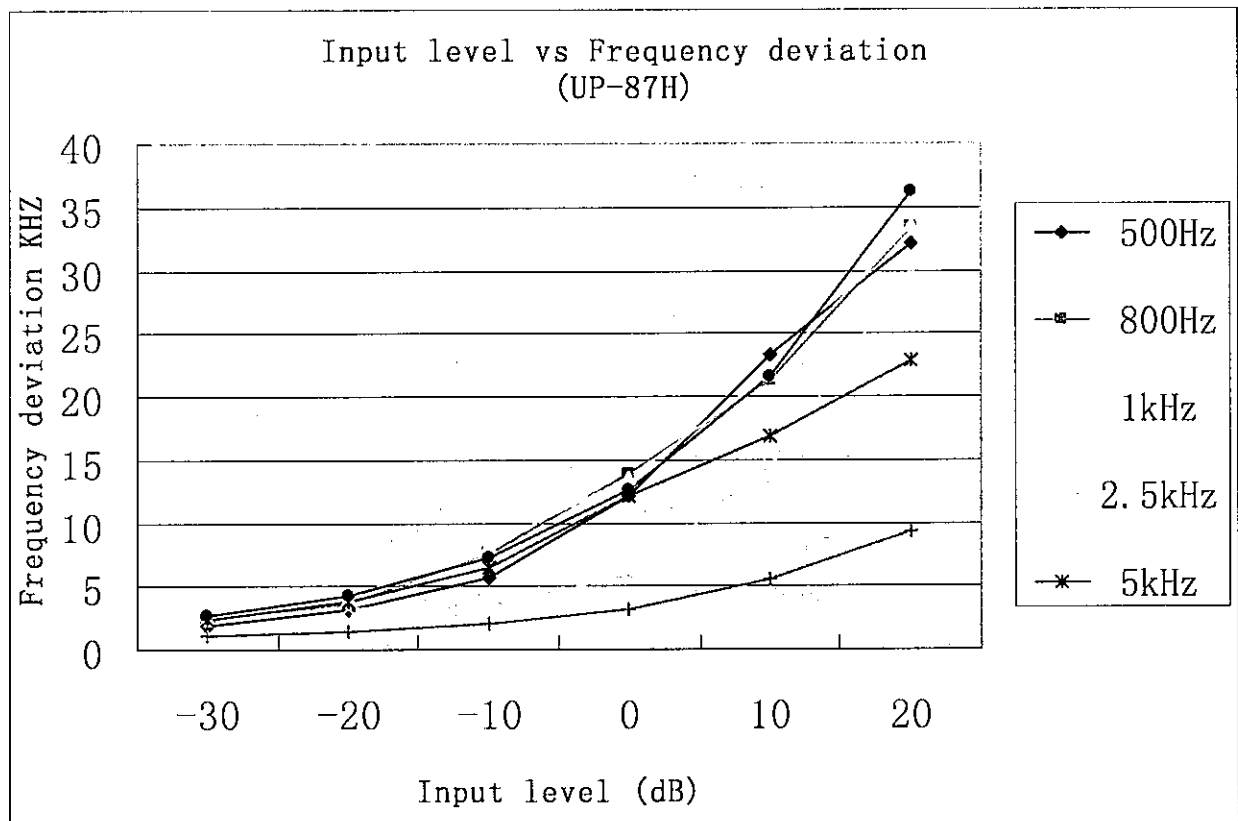
Test Report no.:

Seite 29 von 32

Page 29 of 32

UP-87H:

| Modulation Level | 500Hz | 800Hz | 1kHz | 2.5kHz | 5kHz | 10kHz | 15kHz |
|------------------|-------|-------|------|--------|------|-------|-------|
| -30 | 1.9 | 2.2 | 2.3 | 2.4 | 2.3 | 2.6 | 1.1 |
| -20 | 3.1 | 3.7 | 4.1 | 3.3 | 3.8 | 4.2 | 1.4 |
| -10 | 5.7 | 7.6 | 8.2 | 3.5 | 6.5 | 7.3 | 2.1 |
| 0 | 12.2 | 13.8 | 13.5 | 5.9 | 12.1 | 12.62 | 3.2 |
| 10 | 23.3 | 21.2 | 21.7 | 14.5 | 16.9 | 21.5 | 5.5 |
| 20 | 32.1 | 33.4 | 33.6 | 30.1 | 22.8 | 36.2 | 9.3 |



Prüfbericht - Nr.: 16010007 001

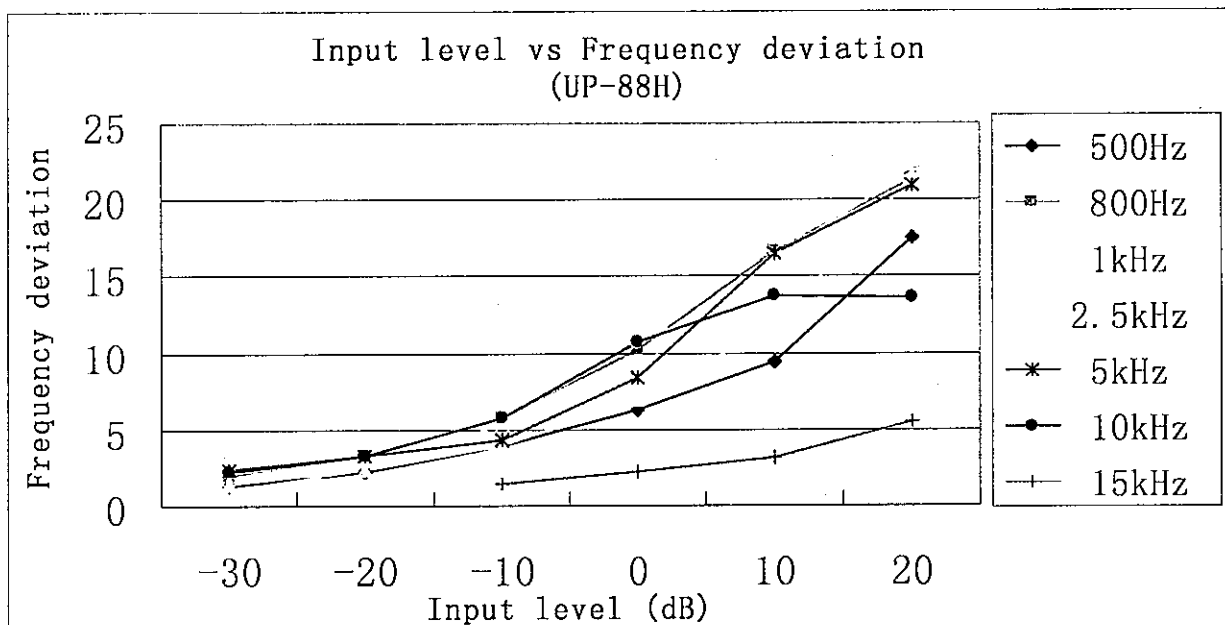
Test Report no.:

Seite 30 von 32

Page 30 of 32

UP-88H:

| Modulation Level | 500Hz | 800Hz | 1kHz | 2.5kHz | 5kHz | 10kHz | 15kHz |
|------------------|-------|-------|------|--------|------|-------|-------|
| -30 | 1.3 | 1.9 | 1.4 | 1.1 | 2.4 | 2.2 | |
| -20 | 2.2 | 3.3 | 2.3 | 2.4 | 3.3 | 3.3 | |
| -10 | 3.9 | 5.7 | 3.9 | 5.4 | 4.3 | 5.7 | 1.4 |
| 0 | 6.3 | 10.2 | 6.9 | 8.9 | 8.4 | 10.7 | 2.2 |
| 10 | 9.4 | 16.6 | 11.8 | 16.2 | 16.5 | 13.7 | 3.1 |
| 20 | 17.6 | 21.4 | 21.5 | 21.8 | 20.9 | 13.6 | 5.5 |



Prüfbericht - Nr.: 16010007 001

Test Report no.:

Seite 31 von 32

Page 31 of 32

Conducted Emission:

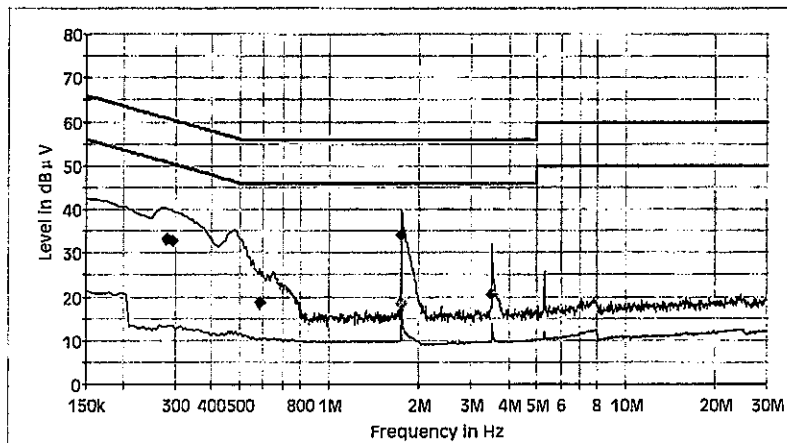
EMC32 Report

Test Information

EUT Name: Wireless Microphone
 Model/Type: UP-83H
 Operating Conditions: B
 Comment: AC 120V 60Hz; L

Hardware Setup: 1phase LISN ESH3-Z5 to ESCS30
 Level Unit: dB μ V

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



2007-4-27

9:45:42

Prüfbericht - Nr.: 16010007 001

Test Report no.:

Seite 32 von 32

Page 32 of 32

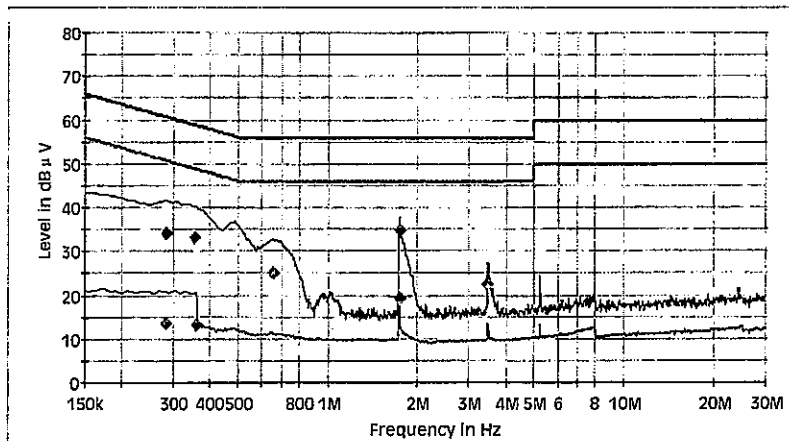
EMC32 Report

Test Information

EUT Name: Wireless Microphone
 Model/Type: UP-83H
 Operating Conditions: B
 Comment: AC 120V 60Hz; N

Hardware Setup: 1phase LISN ESH3-Z5 to ESCS30
 Level Unit: dB μ V

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



2007-4-27

10:04:02