

FCC ID: E9MPT40



## EMISSION -- TESTREPORT

Testreport file no. : T17591-1-01 KJ Date : March 08, 2000  
of issue

Model : Pocket microphone transmitter

Type : PT 40

Applicant : AKG Acoustics GmbH

Manufacturer : WAGOL Industrial Co. LTD

Licence holder : AKG Acoustics GmbH

Address : 1449 Donelson Pike, Nashville TN 37217

United States of America

**Test result** accrdg.  
to the regulation(s) :  
at page 3

**POSITIV**

This testreport with appendix consists of 46 pages.  
The testresult only responds to the tested sample. It is not allowed to copy  
this report even partly without the allowance of the testlaboratory.

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**TEST REGULATIONS**

The tests were performed according to following regulations :

- o - EN 50081-1 / 2.1991
- o - EN 50081-2 / 7.1993

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- o - EN 55011 / 3.1991

- o - Group 1
- o - class A

- o - Group 2
- o - class B

- o - EN 55014 / 4.1993

- o - Household appliances and similar
- o - tools
- o - Semiconductor devices

- o - EN 55014 / A2:1990
- o - EN 55104 / 5.1995

Category:

- o - EN 55015 / A1:1990
- o - EN 55015 / 12.1993

- o - EN 55022 / 5.1995

- o - class A

- o - class B

- o - prEN 55103-1/ 3.1995
- o - prEN 50121-3-2 / 3.1995
- o - EN 60601-1-2 / 4.1994

- o - VCCI

- o - class 1

- o - class 2

- - 47 CFR Part 74 Subpart H (74.861)

**ADDRESS OF THE TEST LABORATORY**

- - MIKES BABT PRODUCT SERVICE GmbH  
Ohmstrasse 2-4  
D - 94342 Strasskirchen

o - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**ENVIRONMENTAL CONDITIONS**

Temperature: 15-35 ° C

Humidity 45-60 %

Atmospheric pressure 860-1060 mbar

**POWER SUPPLY SYSTEM UTILIZED**

Power supply system : Internal batteries DC 3V

**STATEMENT OF MEASUREMENT UNCERTAINTY**

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error of  $\pm 4\text{dB}$ . Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

**SHORT DESCRIPTION OF THE EQUIPMENT UNDER TEST (EUT)**

The pocket transmitter PT 40 is used for e.g. in concerts, theaters and tv or radio studios to transmit audio signals to a receiver who gets back the audio signal from the high frequency signal via a demodulation circuit. The transmitter is processing the input signal which is given by a connectable wired microphone, modulating it on a carrier (frequency modulation) and amplifying it. This signal will be feeded through filters to the antenna and then radiated. The microphones exist in 3 different version: US54 / US58 / EU62. Additional to the base version PT 40, this transmitter will transmit additional the battery status of the integral battery. For detailed difference please see technical data.

Number of received/tested samples: **3 / 1**

**DEFINITIONS FOR SYMBOLS USED IN THIS TEST REPORT**

- - Black box indicates that the listed condition, standard or equipment is applicable for this Report.
- o - Blank box indicates that the listed condition, standard or equipment was not applicable for this Report.

**M E A S U R E M E N T P R O T O C O L F O R F C C , V C C I  
A N D A U S T E L**

**Test Methodology**

Conducted and radiated emission testing is performed according to the procedures in International Special Committee on Radio Interference (CISPR) Publication 22 (1993), European Standard EN 55022 and Australian Standard AS 3548 (which are based on CISPR 22).

The Japanese standard, "Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines, Technical Requirements" is technically equivalent to CISPR 22 (1993). For official compliance, a conformance report must be sent to and accepted by the VCCI.

In compliance with FCC Docket 92-152, "Harmonization of Rules for Digital Devices Incorporate International Standards", testing for FCC compliance may be done following the ANSI C63.4-1992 procedures and using the FCC limits or the CISPR 22 Limits.

**Measurement Error**

The test system for conducted emissions is defined as the LISN, tuned receiver and coaxial cable. The test system for spurious emissions is defined as the antenna, the pre-amplifier, the tuned receiver and the coaxial cable. These test systems have an expected error of  $\pm 3$  dB. The equipment comprising the test systems are calibrated on an annual basis.

**Justification**

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

**General Standard Information**

The test methods used comply with CISPR Publication 22 (1993), EN 55022 (1987) and AS 3548 (1992) - "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment" and with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

For detailed description of each measurement please refer to section testresults.

**DISCOVERY OF WORST CASE MEASUREMENT CONDITION:**

The model PT 40 consists of 3 different versions US54, US58 and EU62.

For the exact frequency range of this models please refer to the frequency plan in the technical documentation set.

All the 3 versions are technically identical except the following items:

- 3 different programmed frequency ranges
- PCB. The boards are similar with differences only in the output filter. On the PCB, the values of some resistors, coils and capacitors are different. For more detailed information, please see technical documentation set. Due to the different output filter, the PCB's have different names.

To find out the worst case channel for the complete measurement the following tests have been performed:

- Measurement of the radiated fieldstrength of the operating frequency on all 3 versions. This measurement have been performed in order to find out the maximum transmitted fieldstrength of the transmmmitter.
- Measurement of the radiated spurious emissions of all 3 versions. This measurement have been performed in order to find out the maximum spurious emissions of the transmmmitter.
- Measurement of the modulation limiting data of all 3 versions, on the center channel of the frequency range. This measurement has been performed in order to find out, whether the modulation limiting data have different results in the different frequency ranges.
- Checking the occupied bandwidth with the maximum input level for the microphone (Audio frequency: 20 kHz; Audio input level: 30 mV) on each version of the microphones on the center channel of the assigned frequency band.

**SUMMARIZING:**

=> maximum fieldstrength: EU62  
=> maximum spurious emission: EU62  
=> modulation limiting data: no essential differences on the 3 versions  
=> occupied bandwidth: no essential differences on the 3 versions

Based on this testresults, the measurements have been performed completely on the version: EU62. This testresults are documented in the following sections of the testreport.

**T E S T R E S U L T****CONDUCTED EMISSIONS - 10/150 kHz - 30 MHz**

|                                |
|--------------------------------|
| <p>■ - Test not applicable</p> |
|--------------------------------|

**Testlocation :**

- o - Shielded room no. 1
- o - Shielded room no. 2
- o - Shielded room no. 3
- o - Shielded room no. 4
- o - Shielded room no. 5
- o - Shielded room no. 6
- o - Shielded room no. 7
- o - Anechoic chamber
- o - Full compact chamber

For TEST EQUIPMENT USED please refer to ATTACHMENT D: \_\_\_\_\_

**Description of Measurement**

The final level, expressed in dB $\mu$ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC Limit or to the CISPR limit, which is equivalent to the Australian AS 3548 limit.

To convert between dB $\mu$ V and  $\mu$ V, the following conversions apply:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasipeak detection, and a Line Impedance Stabilization Network (LISN), with 50 $\Omega$  /50  $\mu$ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasipeak and average detection and recorded on the data sheets.

**Testresult**

The requirements are

**0 - MET**

**0 - NOT MET**

Min. limit margin \_\_\_\_\_ dB at \_\_\_\_\_ MHz

Max. limit exceeding \_\_\_\_\_ dB at \_\_\_\_\_ MHz

Remarks: EUT is not having a mains connection. Operated by a internal  
battery.

**SPURIOUS EMISSION**

Spurious emissions from the EUT are measured in the frequency range of 30 to 10 times the highest used frequency using a tuned receiver and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasipeak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection, remeasurement of results which may be critical will be repeated in average mode. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna was positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

#### **SPURIOUS EMISSION (MAGNETIC FIELD) 10 kHz - 30 MHz**

##### **■ - Test not applicable**

- o - in a shielded room
- o - at a non - reflecting open-site
- and
- o - in a testdistance of 3 meters.
- o - in a testdistance of 30 meters.

For TEST EQUIPMENT USED please refer to ATTACHMENT D: \_\_\_\_\_

#### **Description of Measurement**

The final level, expressed in dB $\mu$ V/m, is arrived at by taking the reading from the EMI receiver (Level dB $\mu$ V) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has to be compared with the relevant FCC limit.

Example:

|                    |                       |   |                |   |                         |                         |   |               |
|--------------------|-----------------------|---|----------------|---|-------------------------|-------------------------|---|---------------|
| Frequency<br>(MHz) | Level<br>(dB $\mu$ V) | + | Factor<br>(dB) | = | Level<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | = | Delta<br>(dB) |
| 1.705              | 5                     | + | 20             | = | 25                      | 30                      | = | 5             |

**Testresult**

The requirements are

**0 - MET****0 - NOT MET**

Min. limit margin

\_\_\_\_\_

dB

at

\_\_\_\_\_ MHz

Max. limit exceeding

\_\_\_\_\_

dB

at

\_\_\_\_\_ MHz

Remarks: Not applicable.**SPURIOUS EMISSIONS (electric field) 30 MHz - 1000 MHz****0 - Test not applicable**

- - Open-site 1
- o - Open-site 2
- - 3 meters
- o - 10 meters
- o - 30 meters

For TEST EQUIPMENT USED please refer to ATTACHMENT D: SER2**Description of Measurement**

The final level, expressed in dBµV/m, is arrived by taking the reading from the EMI receiver (Level dBµV) and adding the correction factors and cable loss factor (Factor dB) to it. This is done automatically in the EMI receiver, where the correction factors are stored. This result then has the FCC or CISPR limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets at page 24 - 25. The CISPR 22 limit is equivalent to the Australian AS 3548 limit.

Example:

|                    |                 |   |                |   |                   |                   |   |               |
|--------------------|-----------------|---|----------------|---|-------------------|-------------------|---|---------------|
| Frequency<br>(MHz) | Level<br>(dBµV) | + | Factor<br>(dB) | = | Level<br>(dBµV/m) | Limit<br>(dBµV/m) | = | Delta<br>(dB) |
| 719                | 75              | + | 32.6           | = | 107.6             | 110               | = | -2.4          |

**Testresult**

The requirements are

**■ - MET****0 - NOT MET**

Min. limit margin

> 27 dBat 30-1000 MHz

Max. limit exceeding

         dBat          MHzRemarks: The emissions have to be att.  $43+10\log(P \text{ in W})$  below the carrier. $P_{\text{max.}} = 3.7 \text{ mW} \rightarrow 21 \text{ dB att. Max. field strength in}$ OATS: 82.1 dB $\mu$ V/m. For plot see page B1-B2.**SPURIOUS EMISSION 1 GHz - 18 GHz**

|                         |
|-------------------------|
| 0 - Test not applicable |
|-------------------------|

**Testlocation :**

- o - Open-site 1
- o - Open-site 2
- - Anechoic chamber
- o - Full compact chamber

- o - 1 meters
- - 3 meters
- o - 10 meters

For TEST EQUIPMENT USED please refer to ATTACHMENT D: SER3**Description of Measurement**

The final level, expressed in dB $\mu$ V/m, is arrived by taking the reading from the Spectrumalyzer in dB $\mu$ V and adding the correction factors of the test setup incl. cables.

Example of the correction value at 1.8236 GHz

| Level reading at 1.5 GHz | correction EMC0 3115 | correction Amplifier AWT 8035 + cable | correction factor (summarized) | corrected level |
|--------------------------|----------------------|---------------------------------------|--------------------------------|-----------------|
| 56 dBµV                  | +25.7                | -41.7                                 | -16                            | 40 dBµV         |

### Testresult

The requirements are

■ - MET

0 - NOT MET

Min. limit margin

> 28 dB at 1-8 GHz

Max. limit exceeding

         dB at          GHz

Remarks: The limits are met.

### Testresult in detail:

| Frequency GHz | L: Peak dBµV | L: AV dBµV | Correct. | L: Peak dBµV/m | L: AV dBµV/m | Limit dBµV/m |
|---------------|--------------|------------|----------|----------------|--------------|--------------|
| 1.204         | --           | 61.1       | -15.6    | --             | 45.5         | 82.1         |
| 1.601         | --           | 62.6       | -14.8    | --             | 47.8         | 82.1         |
| 2.004         | --           | 61.5       | -11.8    | --             | 49.7         | 82.1         |
| 2.407         | --           | 59.5       | -10.7    | --             | 48.8         | 82.1         |
| 2.810         | --           | 61.5       | -10.1    | --             | 51.4         | 82.1         |
| 3.212         | --           | 56.2       | -9.3     | --             | 46.9         | 82.1         |
| 3.615         | --           | 61.2       | -7.6     | --             | 53.6         | 82.1         |
| 4.012         | --           | 52.3       | 2.1      | --             | 54.4         | 82.1         |
| 4.413         | --           | 48.2       | 0.9      | --             | 49.1         | 82.1         |
| 4.818         | --           | 48.2       | -0.3     | --             | 47.9         | 82.1         |
| 5.218         | --           | 48.9       | -0.5     | --             | 48.4         | 82.1         |

**CONDUCTED POWER OF THE FUNDAMENTAL WAVE MEASURED  
ON THE ANTENNA TERMINALS**

■ - Test not applicable

**Testlocation :**

- o - Shielded room no. 1
- o - Shielded room no. 2
- o - Shielded room no. 3
- o - Shielded room no. 4
- o - Shielded room no. 5
- o - Shielded room no. 6
- o - Shielded room no. 7
- o - Anechoic chamber
- o - Full compact chamber
- o - Climatic test chamber VLK

For TEST EQUIPMENT USED please refer to ATTACHMENT D: \_\_\_\_\_

**Description of Measurement**

The conducted power of the fundamental wave measured on the antenna terminals in a climatic test chamber. The antenna jack was connected to the input of a communication test receiver. The internal batteries have been removed also and a variable DC power supply was used instead. The measurements have been made with the EUT unmodulated. During the test the supply voltage and the temperature were varied and applied simultaneously. The lower supply voltage was given by the manufacturer. In case the equipment was switching off before, the switch off voltage was used instead.

**Testresult**

The requirements are

**0 - MET**

**0 - NOT MET**

| Frequency range of equipment |                     |           |           |           |           |           |           |           |
|------------------------------|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Temperature/°C               | DC supply voltage/V | Power/dBm | Power/dBm | Power/dBm | Power/dBm | Power/dBm | Power/dBm | Power/dBm |
| -30                          |                     |           |           |           |           |           |           |           |
| -20                          |                     |           |           |           |           |           |           |           |
| -10                          |                     |           |           |           |           |           |           |           |
| 0                            |                     |           |           |           |           |           |           |           |
| +10                          |                     |           |           |           |           |           |           |           |
| +20                          |                     |           |           |           |           |           |           |           |
| +30                          |                     |           |           |           |           |           |           |           |
| +40                          |                     |           |           |           |           |           |           |           |
| +50                          |                     |           |           |           |           |           |           |           |

Remarks: \_\_\_\_\_

## **MODULATION LIMITING DATA**

|                         |
|-------------------------|
| 0 - Test not applicable |
|-------------------------|

### **Testlocation :**

- o - Shielded room no. 1
- o - Shielded room no. 2
- o - Shielded room no. 3
- - Shielded room no. 4
- o - Shielded room no. 5
- o - Shielded room no. 6
- o - Shielded room no. 7
- o - Anechoic chamber
- o - Full compact chamber
- - Climatic test chamber VLK

For TEST EQUIPMENT USED please refer to ATTACHMENT D: MLD

## **Description of Measurement**

The modulation limiting data were measured on the antenna terminals for EUT's with external connector. Other EUT's are tested via an adequate coupling device with antenna jack. The antenna jack was connected to the input of a communication test receiver. The internal batteries of the EUT, have been removed also and an external DC power supply was used instead. The data have been taken by feeding the connectors used for connecting the microphone with different audio frequencies. These frequencies are generated in the communication test receiver. The level was varied in 10 dB steps from 20 dB $\mu$ V to the maximum audio input level specified by the manufacturer. The frequency deviation at this levels have been recorded.

PFD: Positive frequency deviation

NFD: Negative frequency deviation

For the occupied bandwidth plot the value of 50 % of the maximum frequency deviation was calculated. The level on the audio input was increased until this 50 % frequency deviation was achieved. To this level 16 dB have been added and a plot was made as described in the next chapter under section occupied bandwidth.

**Testresult**

The requirements are

■ - MET

0 - NOT MET

EUT: PT 40 Version: EU62 working on 802.525 MHz

| Input audio level/dBμV | f <sub>mod</sub> = 30 Hz |         | f <sub>mod</sub> = 10 kHz |         | f <sub>mod</sub> = 20 kHz |         |
|------------------------|--------------------------|---------|---------------------------|---------|---------------------------|---------|
|                        | PFD/kHz                  | NFD/kHz | PFD/kHz                   | NFD/kHz | PFD/kHz                   | NFD/kHz |
| 20                     | 0.1                      | 0.1     | 0.1                       | 0.1     | 0.1                       | 0.1     |
| 30                     | 0.1                      | 0.1     | 0.2                       | 0.2     | 0.2                       | 0.2     |
| 40                     | 0.1                      | 0.1     | 0.8                       | 0.8     | 1.0                       | 0.9     |
| 50                     | 0.4                      | 0.4     | 1.4                       | 1.4     | 2.1                       | 2.1     |
| 60                     | 0.6                      | 0.6     | 2.5                       | 2.4     | 4.2                       | 4.2     |
| 70                     | 1.1                      | 1.0     | 4.4                       | 4.4     | 7.7                       | 7.7     |
| 80                     | 1.9                      | 1.8     | 7.7                       | 7.6     | 13.5                      | 13.3    |
| 90                     | 3.3                      | 3.3     | 13.8                      | 13.4    | 36.4                      | 23.8    |
| 100                    | 5.9                      | 5.8     | 24.5                      | 23.6    | 36.5                      | 35.7    |
| 110                    | 10.8                     | 10.6    | 41.3                      | 38.3    | 37.0                      | 36.0    |
| 118                    | 17.2                     | 17.1    | 45.0                      | 40.5    | 37.0                      | 36.0    |

Remarks: The limit of  $\pm 75$  kHz is kept.

(PFD=Positive frequency deviation; NFD=Negative Frequency deviation)

Judging the requirements of the emission mask with the data from the modulation limiting data:

EU62 working on 802.525 MHz:Max. measured frequency deviation:  $\pm 45.0$  kHz50% of the maximum deviation:  $\pm 22.5$  kHzAudio input level (ail) to get  $\pm 22.5$  kHz: L = 98.3 dBμV

L + 16 dBμV = 114.3 dBμV =&gt; Level for testing the occupied bandwidth

**Occupied bandwidth:**

| version of EUT         | EU62                |                      | CH                   |                      | CH                   |                      |
|------------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| audio test level       | L = 114.3 dBμV/1kHz |                      | L = 114.3 dBμV/15kHz |                      | L = 114.3 dBμV/20kHz |                      |
| shape of emission mask | $\pm 50$ -100% [dB] | $\pm 100$ -250% [dB] | $\pm 50$ -100% [dB]  | $\pm 100$ -250% [dB] | $\pm 50$ -100% [dB]  | $\pm 100$ -250% [dB] |
| min. limit margin/dB   | > 5                 | > 10                 | > 5                  | > 10                 | > 5                  | > 10                 |

Remarks: The limit is kept. For plot see pages B3-B5 and B9-11.

**FREQUENCY ERROR**

|                         |
|-------------------------|
| o - Test not applicable |
|-------------------------|

**Testlocation :**

- o - Shielded room no. 1
- o - Shielded room no. 2
- o - Shielded room no. 3
- - Shielded room no. 4
- o - Shielded room no. 5
- o - Shielded room no. 6
- o - Shielded room no. 7
- o - Anechoic chamber
- o - Full compact chamber
- - Climatic test chamber VLK

For TEST EQUIPMENT USED please refer to ATTACHMENT D: FE

**Description of Measurement**

The frequency error was measured on the antenna terminals for EUT's with external connector. Other EUT's are tested via an adequate coupling device with antenna jack in a climatic test chamber. The antenna jack was connected to the input of a communication test receiver. The internal batteries have been removed also and a variable DC power supply was used instead. The measurements have been made with the EUT unmodulated. During the test the supply voltage and the temperature were varied and applied simultaneously. The lower supply voltage was given by the manufacturer. In case the equipment was switching off before, the switch off voltage was used instead. The frequency error is defined as the deviation of the transmitting frequency from the nominal frequency.

**Testresult:**

The requirements are

■ - MET

0 - NOT MET

| Frequency range of equipment |                     | CHF                 |                     |                     |                     |                     |                     |                     |
|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Temperature/°C               | DC supply voltage/V | Frequency error/kHz | Frequency error/kHz | Frequency error/kHz | Frequency error/kHz | Frequency error/kHz | Frequency error/kHz | Frequency error/kHz |
| -30                          | 1.9                 | 10.7                |                     |                     |                     |                     |                     |                     |
|                              | 3.5                 | 10.7                |                     |                     |                     |                     |                     |                     |
| -20                          | 1.9                 | 11.9                |                     |                     |                     |                     |                     |                     |
|                              | 3.5                 | 11.9                |                     |                     |                     |                     |                     |                     |
| -10                          | 1.9                 | 10.8                |                     |                     |                     |                     |                     |                     |
|                              | 3.5                 | 10.7                |                     |                     |                     |                     |                     |                     |
| 0                            | 1.9                 | 5.0                 |                     |                     |                     |                     |                     |                     |
|                              | 3.5                 | 5.1                 |                     |                     |                     |                     |                     |                     |
| +10                          | 1.9                 | -0.8                |                     |                     |                     |                     |                     |                     |
|                              | 3.5                 | -0.8                |                     |                     |                     |                     |                     |                     |
| +20                          | 1.9                 | -1.6                |                     |                     |                     |                     |                     |                     |
|                              | 3.5                 | -1.6                |                     |                     |                     |                     |                     |                     |
| +30                          | 1.9                 | -10.2               |                     |                     |                     |                     |                     |                     |
|                              | 3.5                 | -10.2               |                     |                     |                     |                     |                     |                     |
| +40                          | 1.9                 | -14.3               |                     |                     |                     |                     |                     |                     |
|                              | 3.5                 | -14.3               |                     |                     |                     |                     |                     |                     |
| +50                          | 1.9                 | -17.7               |                     |                     |                     |                     |                     |                     |
|                              | 3.5                 | -17.7               |                     |                     |                     |                     |                     |                     |

Remarks: The most strict limit for this frequency range is: 40.1 kHz

(0.005% of 802.525 MHz)

**KEEPING THE REQUIREMENTS OF THE EMISSION MASK**

0 - Test not applicable

**Testlocation :**

- o - Shielded room no. 1
- o - Shielded room no. 2
- o - Shielded room no. 3
- - Shielded room no. 4
- o - Shielded room no. 5
- o - Shielded room no. 6
- o - Shielded room no. 7
- o - Anechoic chamber
- o - Full compact chamber
- o - Climatic test chamber VLK

For TEST EQUIPMENT USED please refer to ATTACHMENT D: EM

**Description of Measurement**

The requirements of the emission mask were measured with different input signals on the antenna terminals for EUT's with external connector. Other EUT's are tested via an adequate coupling device with antenna jack. The antenna jack was connected to the input of a spectrum analyzer. The spectrum analyzer was set up as following:

- video and resolution bandwidth: 10 kHz
- attenuation: automatic, low noise
- center frequency: nominal transmit frequency
- frequency span: 500 kHz

The reference level was set to the maximum value of the unmodulated carrier. The internal batteries have been removed also and a variable DC power supply was used instead. The measurements have been made with a modulation frequency and voltage accdg. to the specification of the manufacturer. The audio frequency was provided by a communication test receiver. During the test the supply voltage and the temperature were varied and applied simultaneously. The lower supply voltage was given by the manufacturer. In case the equipment was switching off before, the switch off voltage was used instead.

**Testresult**

The requirements are

■ - MET

○ - NOT MET

The **requirements** are as following:

Attenuation on any frequencies removed from the transmit frequency

between 50 and 100 % of the authorized bandwidth: at least 25 dB

between 100 and 250 % of the authorized bandwidth: at least 35 dB

more than 250 % of the authorized bandwidth: see spurious emissions

The following table is showing the minimal margin to the required attenuations:

| Frequency range of equipment |                      | EU62          |                | CH            |                | CH            |                |
|------------------------------|----------------------|---------------|----------------|---------------|----------------|---------------|----------------|
| input modulation             | DC supply voltage /V | ±50-100% [dB] | ±100-250% [dB] | ±50-100% [dB] | ±100-250% [dB] | ±50-100% [dB] | ±100-250% [dB] |
| 1 kHz                        | 1.9                  | > 5           | > 10           |               |                |               |                |
| 114.3 dBµV                   | 3.5                  | > 5           | > 10           |               |                |               |                |
| 10 kHz                       | 1.9                  | > 5           | > 10           |               |                |               |                |
| 114.3 dBµV                   | 3.5                  | > 5           | > 10           |               |                |               |                |
| 20 kHz                       | 1.9                  | > 5           | > 10           |               |                |               |                |
| 114.3 dBµV                   | 3.5                  | > 5           | > 10           |               |                |               |                |
| 1 kHz                        | 1.9                  | > 5           | > 10           |               |                |               |                |
| 30 mV                        | 3.5                  | > 5           | > 10           |               |                |               |                |
| 10 kHz                       | 1.9                  | > 5           | > 10           |               |                |               |                |
| 30 mV                        | 3.5                  | > 5           | > 10           |               |                |               |                |
| 20 kHz                       | 1.9                  | > 5           | > 10           |               |                |               |                |
| 30 mV                        | 3.5                  | > 5           | > 10           |               |                |               |                |

Remarks: The limit is kept. The attenuation is related to the unmodulated carrier. For plot see page B3-B14.

**EQUIPMENT UNDER TEST**

**Operation - mode of the EUT.:**

The equipment under test was operated during the measurement under following conditions:

- o - Standby
- o - Testprogram (H - Pattern)
- o - Testprogram (color bar)
- o - Testprogram (customer specific)
- - Transmit (unmodulated)(for radiated measurements and frequency error)
- - Transmit (modulated: 20 kHz, 30 mV)(for bandwidth under extreme  
conditions measurements)
- o - \_\_\_\_\_

**Configuration of the equipment under test:** see appendix  
**Following periphery devices and interface cables were connected during the measurement:**

- o - \_\_\_\_\_ Type : \_\_\_\_\_
- o - \_\_\_\_\_ Type : \_\_\_\_\_
- o - \_\_\_\_\_ Type : \_\_\_\_\_
- o - \_\_\_\_\_ Type : \_\_\_\_\_
- o - \_\_\_\_\_ Type : \_\_\_\_\_
- o - \_\_\_\_\_ Type : \_\_\_\_\_
- o - unshielded power cable
- o - unshielded cables
- o - shielded cables MPS.No.: \_\_\_\_\_
- - customer specific cables (wireless microphone)
- - no cables
- o - \_\_\_\_\_

**SUMMARY**

**GENERAL REMARKS:**

The product PT 40, version EU62 has been tested on the following frequency:  
802.525 MHz

This version was defined as the worst condition model of all 3 versions:

US54

US58

EU62

**FINAL JUDGEMENT:**

The requirements according to the technical regulations and tested operation modes are

■ - met.

o - **not** met.

The equipment under test

■ - **Fulfills** the general approval requirements cited on page 3.

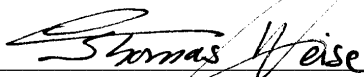
o - **Does not** fulfill the general approval requirements cited on page 3.

Date of receipt of test sample : accdg. to storage record

Testing Start Date : December 12, 1998

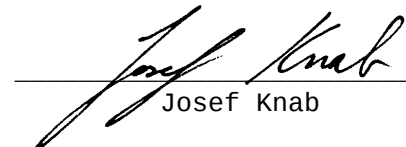
Testing End Date : January 29, 1999

- MIKES BABT PRODUCT SERVICE GmbH -



Günter Mikes  
Dipl.-Ing.(FH)

Test-engineer



Josef Knab

**CONSTRUCTIONAL DATAFORM FOR TESTING OF RADIO EQUIPMENT**

|                 |                                                                                    |                   |  |
|-----------------|------------------------------------------------------------------------------------|-------------------|--|
| Licence holder: | AKG Acoustics U.S.                                                                 |                   |  |
| Address:        | 1449 Donelsen Pike, Nashville TN 37217, USA                                        |                   |  |
| Manufacturer:   | WAGOL Industrial Co. LTD                                                           |                   |  |
| Address:        | No. 85 Chang Hsing First Street, Tai Tzu Village Jen-TeHsian, Tainan Hsien, Taiwan |                   |  |
| Type:           | PT 40                                                                              |                   |  |
| Model:          |                                                                                    |                   |  |
| Serial-No.:     |                                                                                    | Protection class: |  |

**Application for getting**

- ☒ national approval in the following countries: GB,D,NL,B  
☐ EC-type examination

**Additional informations to the above named model:****Antenna:**

transmitter:

Type: integral

Length/size: 9.5 cm

Receiver:

Type:

Length/size:

Power supply of the transmitter:

2 AA cells

Type:

nominal voltage:

3 V

lowest voltage:

1.9 V

highest voltage:

3.5 V

Power supply of the receiver:

Type:

nominal voltage:

V

**Ancillary equipment:**

Description: Microphone

Type: C577WL

Serial-no.:

Description:

Type:

Serial-no.:

Description:

Type:

Serial-no.:

**Extreme temperature range in which the approval test should be performed:**
☐ Category I: General (-20°C to +55°C)
 ☐ Category II: Portable (-10°C to +55°C)

☐ Category III: Equipment for normal indoor use (0°C to +55°C)
**Connectable cables:**

| Name of the cable | Digital                                                             | Length/m | shielded                                                            |
|-------------------|---------------------------------------------------------------------|----------|---------------------------------------------------------------------|
| Microphone/audio  | <input type="checkbox"/> yes <input checked="" type="checkbox"/> no | 1.5 m    | <input checked="" type="checkbox"/> yes <input type="checkbox"/> no |
|                   | <input type="checkbox"/> yes <input type="checkbox"/> no            |          | <input type="checkbox"/> yes <input type="checkbox"/> no            |
|                   | <input type="checkbox"/> yes <input type="checkbox"/> no            |          | <input type="checkbox"/> yes <input type="checkbox"/> no            |
|                   | <input type="checkbox"/> yes <input type="checkbox"/> no            |          | <input type="checkbox"/> yes <input type="checkbox"/> no            |
|                   | <input type="checkbox"/> yes <input type="checkbox"/> no            |          | <input type="checkbox"/> yes <input type="checkbox"/> no            |

☐ If applicable, if necessary complete overleaf

Page A1 of A3

Applicant: AKG Acoustics U.S.

Model-name: PT 40

|                                                                                      |                                                                                                                                                                                                                                                                                |                                                     |                                                         |
|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------|
| <b>Type designation:</b><br>PT 40                                                    |                                                                                                                                                                                                                                                                                |                                                     |                                                         |
| <b>Name and type designation of individual units comprising the radio equipment:</b> |                                                                                                                                                                                                                                                                                |                                                     |                                                         |
| <b>Type of equipment:</b>                                                            |                                                                                                                                                                                                                                                                                |                                                     |                                                         |
| <input type="checkbox"/> Radiotelephone equipment                                    | <input type="checkbox"/> Remote-control equipment                                                                                                                                                                                                                              | <input type="checkbox"/> Radiomaritime equipment    | <input type="checkbox"/> LPD                            |
| <input type="checkbox"/> One-way radiotelephone equipment                            | <input type="checkbox"/> Inductive loop system                                                                                                                                                                                                                                 | <input type="checkbox"/> Inland waterways equipment | <input type="checkbox"/> RLAN                           |
| <input type="checkbox"/> Personal paging system                                      | <input type="checkbox"/> Radio-relay system                                                                                                                                                                                                                                    | <input type="checkbox"/> Radionavigation equipm.    | <input checked="" type="checkbox"/> wireless microphone |
| <input type="checkbox"/> Satellite earth station                                     | <input type="checkbox"/> CB radiotelephone equipment                                                                                                                                                                                                                           | <input type="checkbox"/> Antenna                    | <input type="checkbox"/>                                |
| <input type="checkbox"/> Data transmission equipment                                 | <input type="checkbox"/> Movement detector                                                                                                                                                                                                                                     | <input type="checkbox"/> Aeronautical equipment     | <input type="checkbox"/>                                |
| <b>Technical characteristics:</b>                                                    |                                                                                                                                                                                                                                                                                |                                                     |                                                         |
|                                                                                      | Transmitter-receiver                                                                                                                                                                                                                                                           | Transmitter                                         | Receiver                                                |
| Frequency range                                                                      |                                                                                                                                                                                                                                                                                | 710.4 – 806.0 MHz                                   |                                                         |
| Maximum no. of channels                                                              |                                                                                                                                                                                                                                                                                |                                                     |                                                         |
| Channel spacing                                                                      |                                                                                                                                                                                                                                                                                | 200k                                                |                                                         |
| Class of emission (type of modulation)                                               |                                                                                                                                                                                                                                                                                | 200KF3E                                             |                                                         |
| Maximum RF output power                                                              |                                                                                                                                                                                                                                                                                |                                                     |                                                         |
| Maximum effective radiated power (ERP)                                               |                                                                                                                                                                                                                                                                                | 12 mW (3mW +- 3 dB)                                 |                                                         |
| Output power variable                                                                |                                                                                                                                                                                                                                                                                | No                                                  |                                                         |
| Channel switching frequency range                                                    |                                                                                                                                                                                                                                                                                | 1 channel                                           |                                                         |
| Method of frequency generation                                                       | <input type="checkbox"/> Synthesizer <input checked="" type="checkbox"/> Crystal <input type="checkbox"/> Other                                                                                                                                                                |                                                     |                                                         |
| Frequency generation TX                                                              | Crystal/multiplier                                                                                                                                                                                                                                                             |                                                     |                                                         |
| Frequency generation RX                                                              |                                                                                                                                                                                                                                                                                |                                                     |                                                         |
| IF                                                                                   | 1st IF                                                                                                                                                                                                                                                                         | 2nd IF                                              | 3rd IF                                                  |
| Integral selective calling                                                           | no                                                                                                                                                                                                                                                                             |                                                     |                                                         |
| Audio-frequency interface level at external data socket                              | 40 kOhm on audio socket, max deviation at 300 mV (low) or 30 mV (high)<br>frequency response: 30 Hz to 20 kHz                                                                                                                                                                  |                                                     |                                                         |
| Modes of operation                                                                   | <input type="checkbox"/> Duplex mode <input type="checkbox"/> Semi-duplex mode <input checked="" type="checkbox"/> Simplex mode                                                                                                                                                |                                                     |                                                         |
| Power source                                                                         | <input type="checkbox"/> Mains <input type="checkbox"/> Vehicle-regulated <input checked="" type="checkbox"/> Integral                                                                                                                                                         |                                                     |                                                         |
| Antenna socket                                                                       | <input type="checkbox"/> BNC <input type="checkbox"/> TNC <input type="checkbox"/> N<br><input type="checkbox"/> M <input type="checkbox"/> UHF <input type="checkbox"/> Adapter<br><input checked="" type="checkbox"/> None <input type="checkbox"/> <input type="checkbox"/> |                                                     |                                                         |
| <b>Type approval specifications:</b><br>ETS 300 422                                  |                                                                                                                                                                                                                                                                                |                                                     |                                                         |

O If applicable, if necessary complete overleaf

Page A2 of A3

Applicant: AKG Acoustics U.S.

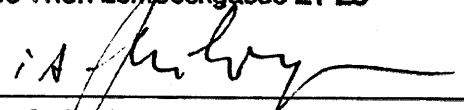
Model-name: PT 40

**Declarations:**

- We declare that the above information are correct and the named model was supplied with the maximum configuration to the accredited test laboratory.

**AKG Acoustics GmbH**  
A-1230 Wien Leopoldgasse 21-25Strasskirchen

place of issue

, date 27. 1. 2000  
Seal and signature of applicant

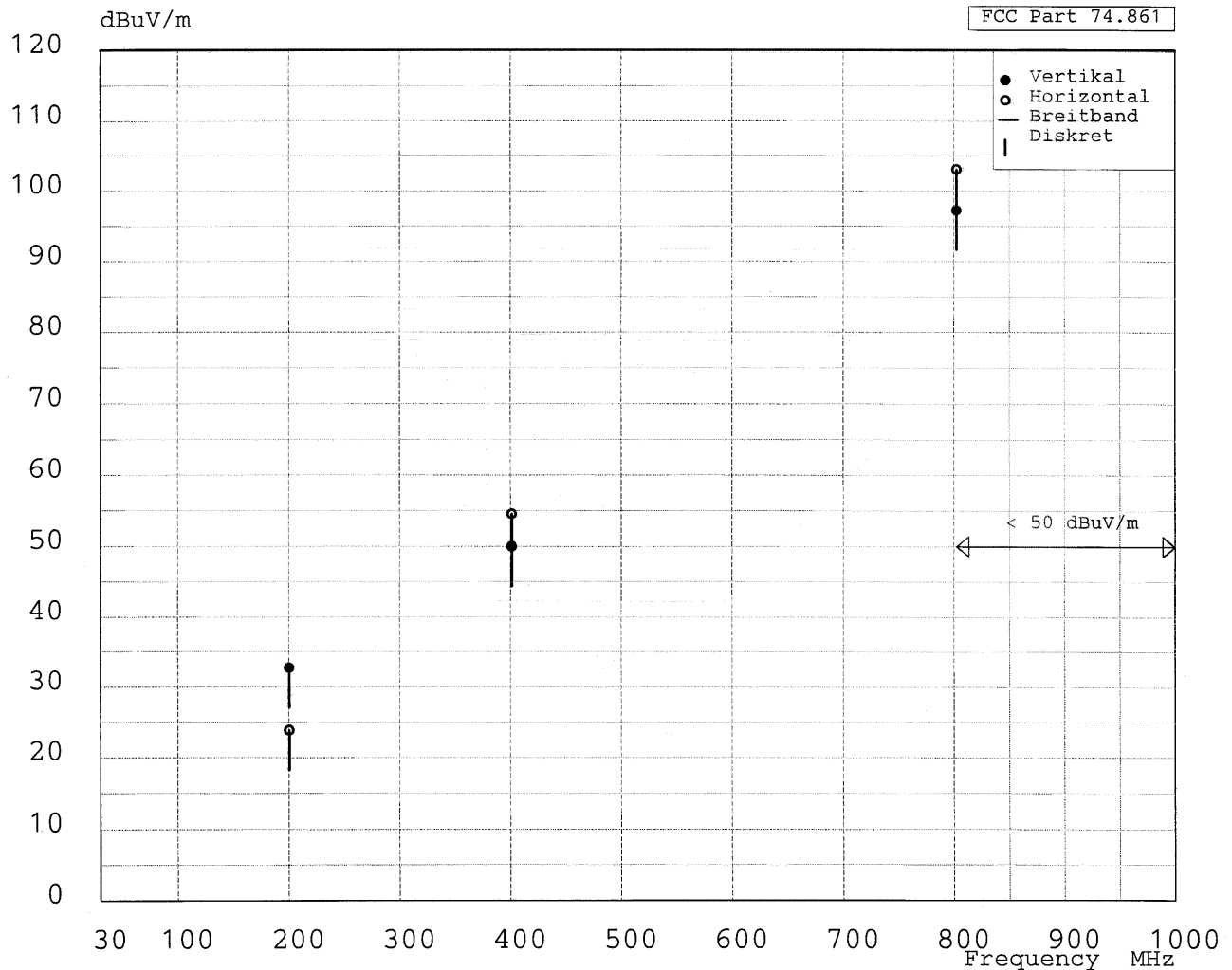
FCC ID: E9MPT40

# Radiation-Test

accdg. 74.861

Typ: PT 40  
Manufacturer: WAGOL  
Client: AKG  
Regulation: FCC Part 74.861  
Order No.: T17591-1-01KJ  
Operation Mode: Permanent transmit  
Remarks: The limits are met!

Testdistance: 3 m  
Testreceiver: ESVP  
Antenna: BBA/UHALP  
Testengineer: KJ  
Date: 08-02-2000



FCC ID: E9MPT40

# Radiation-Test

accdg. 74.861

Typ: PT 40  
 Manufacturer: WAGOL  
 Client: AKG  
 Regulation: FCC Part 74.861  
 Order No.: T17591-1-01KJ  
 Operation Mode: Permanent transmit  
 Remarks: The limits are met!

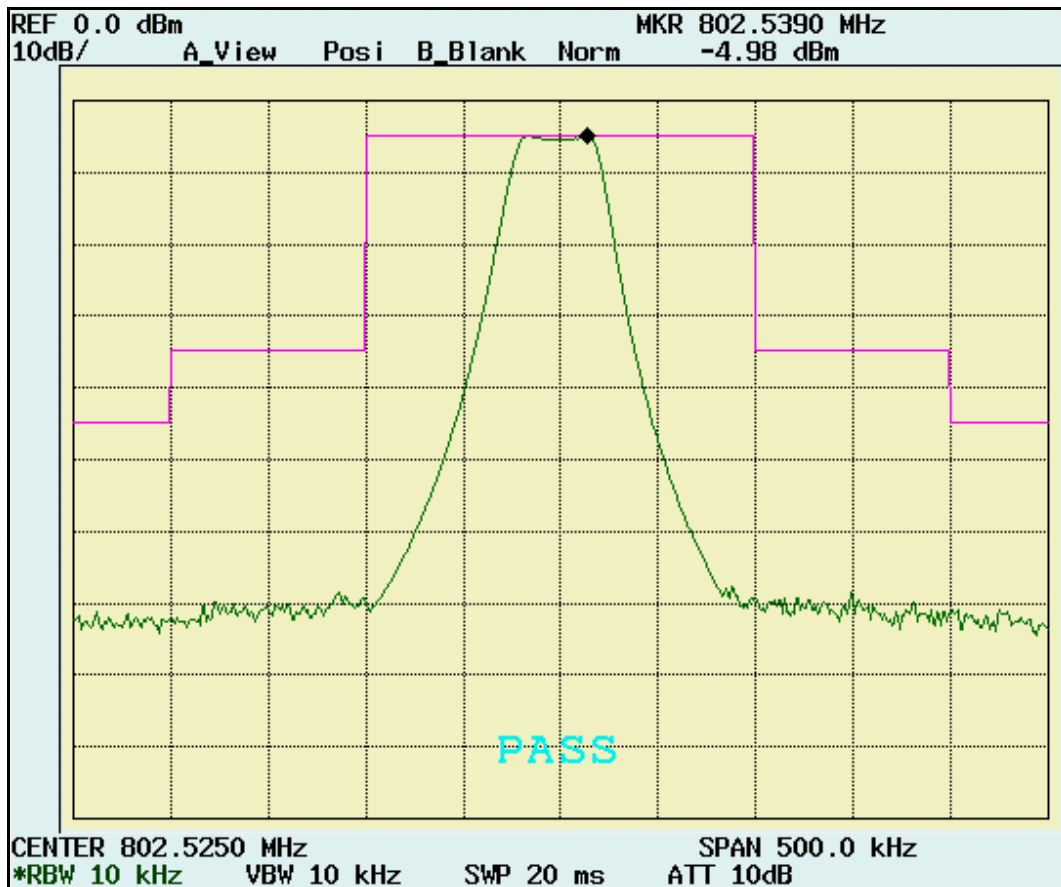
Testdistance: 3 m  
 Testreceiver: ESVP  
 Antenna: BBA/UHALP  
 Testengineer: KJ  
 Date: 08-02-2000

| Result | Frequency<br>[MHz] | Reading<br>[dBuV/m] | Korr<br>[dB] | Final<br>[dBuV/m] | Limit<br>[dBuV/m] | DLimit<br>[dB] | Polarisation | Noise   |
|--------|--------------------|---------------------|--------------|-------------------|-------------------|----------------|--------------|---------|
|        | 200.63             | 3.30                | 20.54        | 23.84             | 120.00            | 96.16          | Horizontal   | Diskret |
|        | 200.63             | 12.20               | 20.54        | 32.74             | 120.00            | 87.26          | Vertikal     | Diskret |
|        | 401.27             | 27.60               | 22.33        | 49.93             | 120.00            | 70.07          | Vertikal     | Diskret |
|        | 401.27             | 32.20               | 22.33        | 54.53             | 120.00            | 65.47          | Horizontal   | Diskret |
|        | 802.53             | 70.20               | 32.87        | 103.07            | 120.00            | 16.93          | Horizontal   | Diskret |
|        | 802.53             | 64.40               | 32.87        | 97.27             | 120.00            | 22.73          | Vertikal     | Diskret |

## Calculation for the maximum power with the measured fieldstrength in 3 meter distance

$$P = (E \cdot D)^2 / 49.2$$

$$P = (0.142V/m \cdot 3m)^2 / 49.2 = 3.7 \text{ mW}$$



**Bandwidth Plot according FCC Part 74.861**

Type: PT 40  
Frequency: 802.525 MHz  
Client: AKG

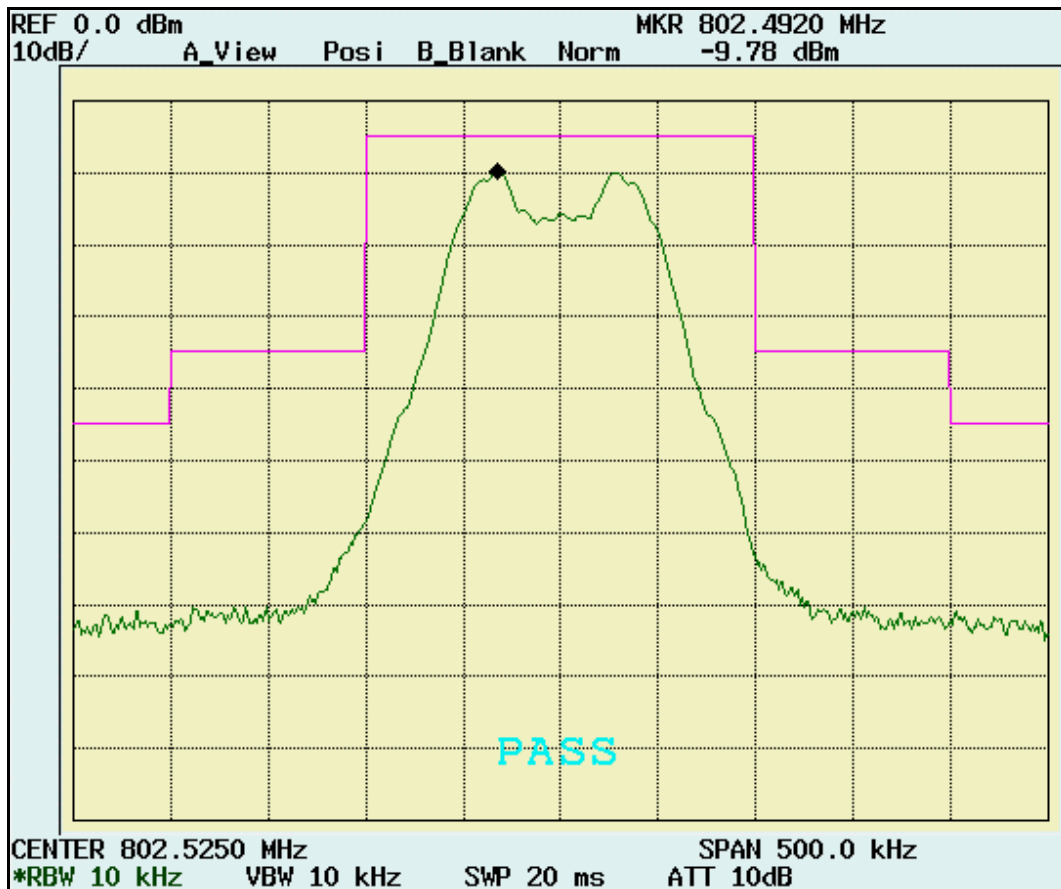
Input Signal: 1 kHz / 114.3 dBμV  
Temperature: 20 °C  
Supply Voltage: 3.5 Volt

Resolution Bandwidth: 10 kHz  
Video Bandwidth: 10 kHz

**Marker Value (Carrier unmodulated)**

Resolution Bandwidth: 1 kHz  
Video Bandwidth: 1 kHz

Power Level: -4.9 dBm



**Bandwidth Plot according FCC Part 74.861**

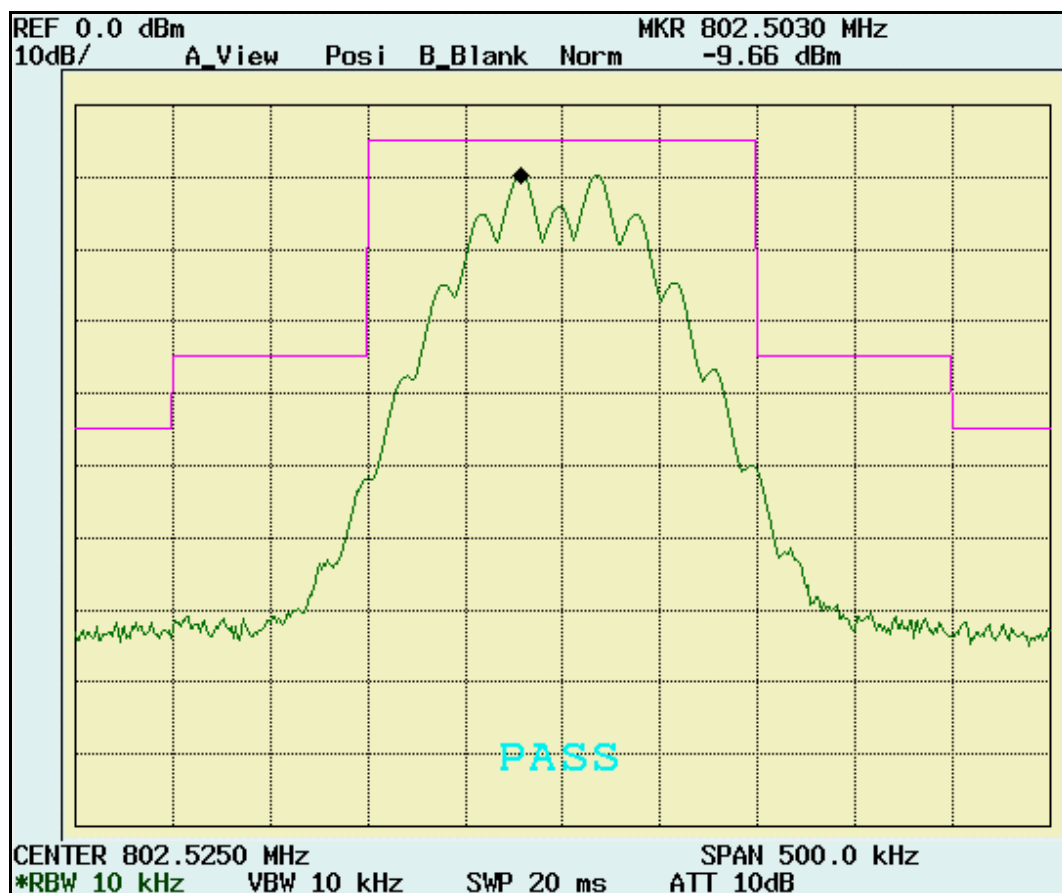
Type: PT 40  
Frequency: 802.525 MHz  
Client: AKG  
  
Input Signal: 10 kHz / 114.3 dBμV  
Temperature: 20 °C  
Supply Voltage: 3.5 Volt

Resolution Bandwidth: 10 kHz  
Video Bandwidth: 10 kHz

**Marker Value (Carrier unmodulated)**

Resolution Bandwidth: 1 kHz  
Video Bandwidth: 1 kHz

Power Level: -4.9 dBm



### Bandwidth Plot according FCC Part 74.861

Type: PT 40  
 Frequency: 802.525 MHz  
 Client: AKG

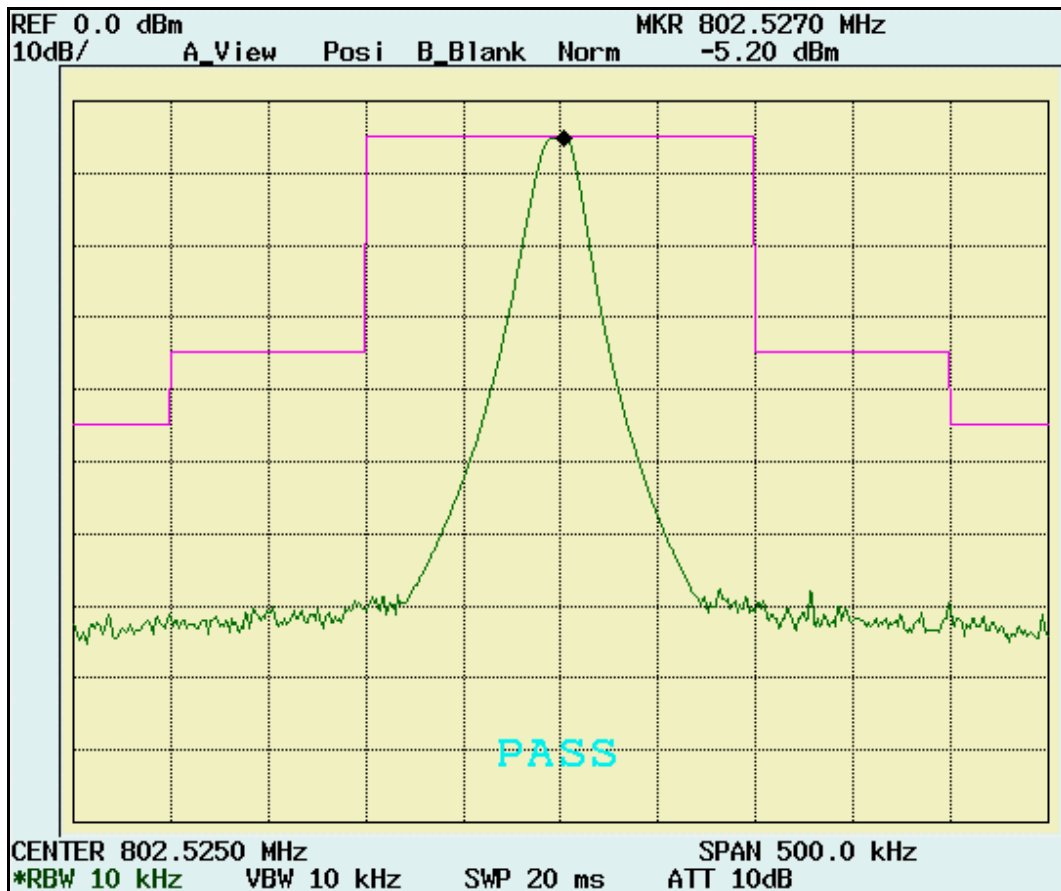
Input Signal: 20 kHz / 114.3 dB $\mu$ V  
 Temperature: 20 °C  
 Supply Voltage: 3.5 Volt

Resolution Bandwidth: 10 kHz  
 Video Bandwidth: 10 kHz

### Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz  
 Video Bandwidth: 1 kHz

Power Level: -4.9 dBm



**Bandwidth Plot according FCC Part 74.861**

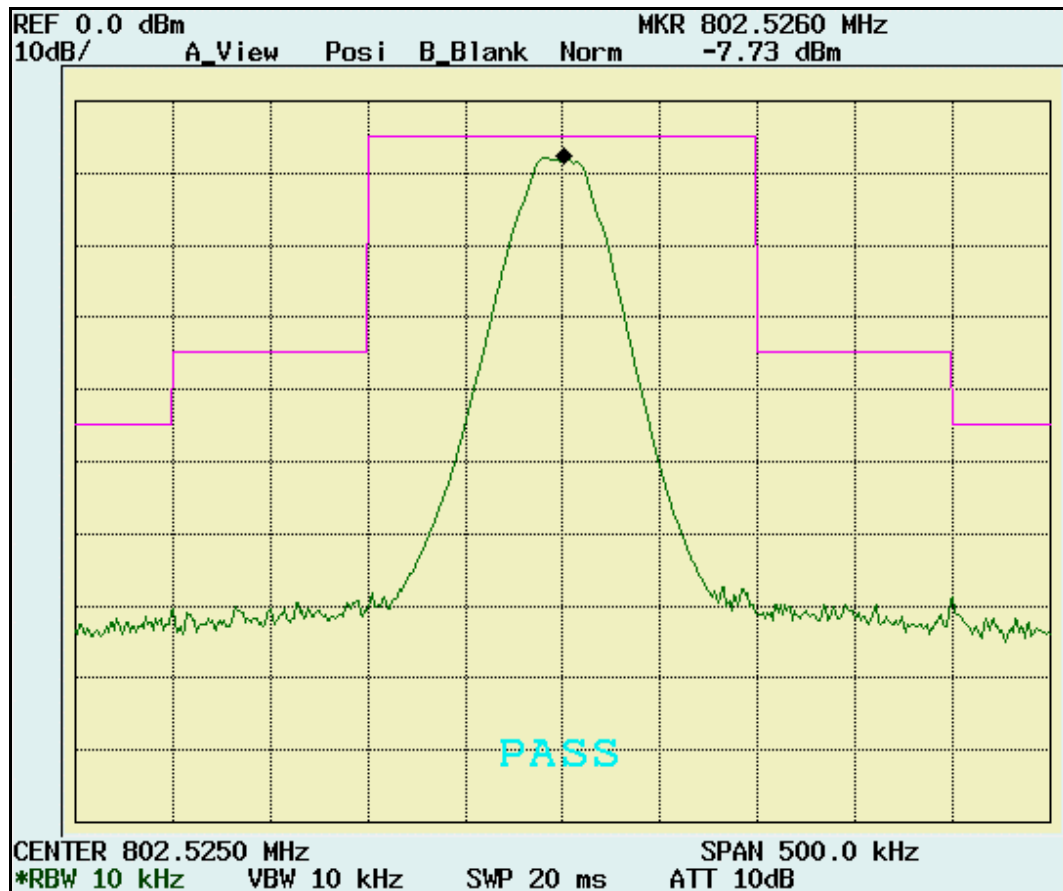
Type: PT 40  
Frequency: 802.525 MHz  
Client: AKG  
  
Input Signal: 1 kHz / 30 mV  
Temperature: 20 °C  
Supply Voltage: 3.5 Volt

Resolution Bandwidth: 10 kHz  
Video Bandwidth: 10 kHz

**Marker Value (Carrier unmodulated)**

Resolution Bandwidth: 1 kHz  
Video Bandwidth: 1 kHz

Power Level: -4.9 dBm



**Bandwidth Plot according FCC Part 74.861**

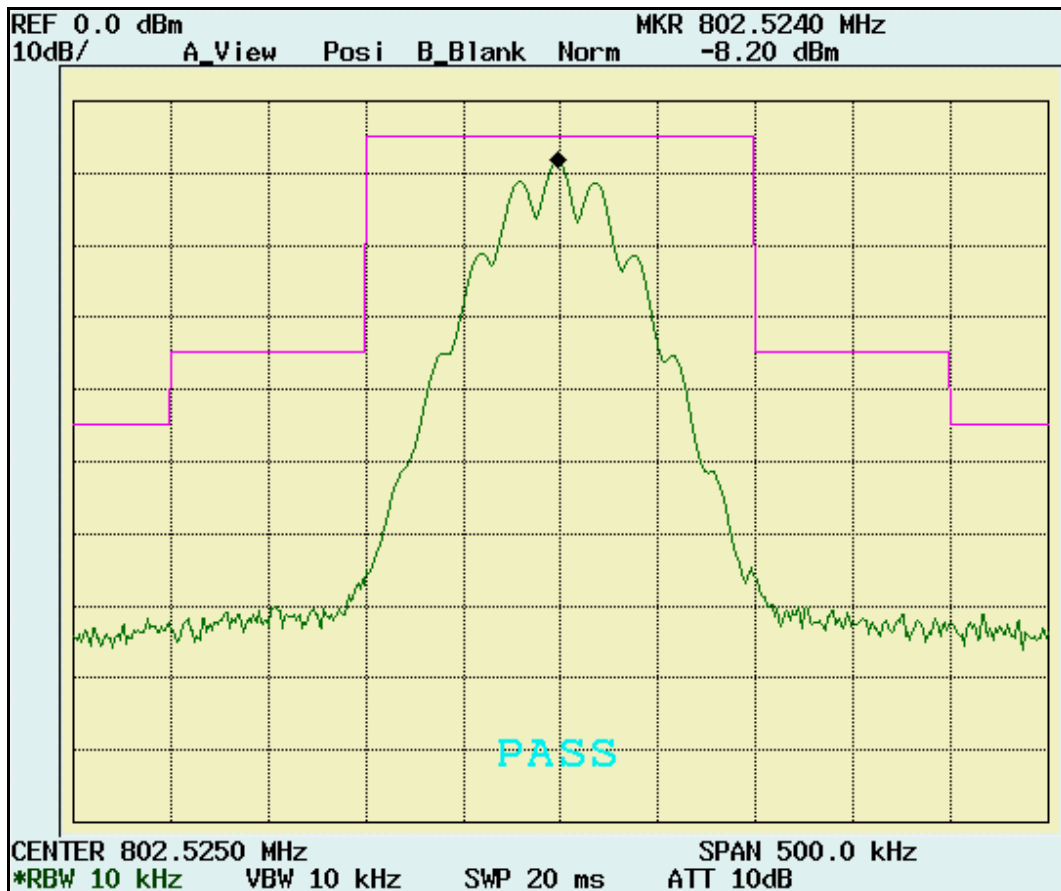
Type: PT 40  
Frequency: 802.525 MHz  
Client: AKG  
  
Input Signal: 10 kHz / 30 mV  
Temperature: 20 °C  
Supply Voltage: 3.5 Volt

Resolution Bandwidth: 10 kHz  
Video Bandwidth: 10 kHz

**Marker Value (Carrier unmodulated)**

Resolution Bandwidth: 1 kHz  
Video Bandwidth: 1 kHz

Power Level: -4.9 dBm



**Bandwidth Plot according FCC Part 74.861**

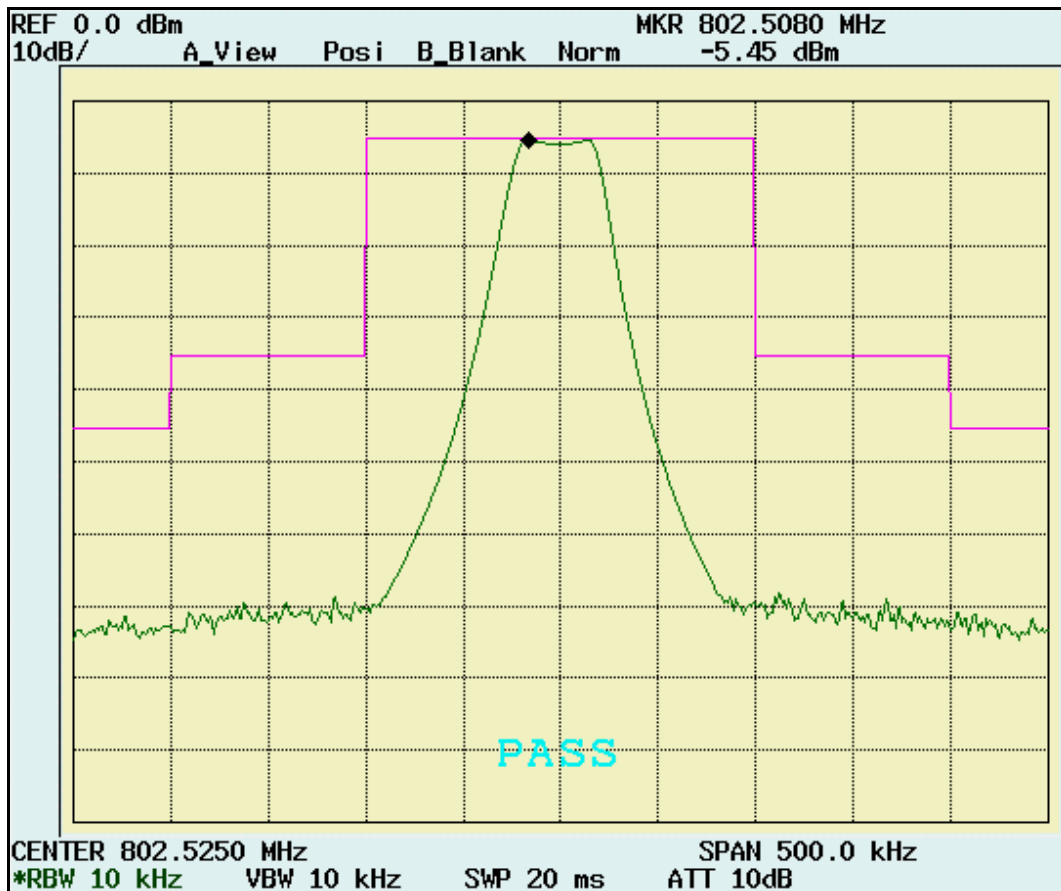
Type: PT 40  
Frequency: 802.525 MHz  
Client: AKG  
  
Input Signal: 20 kHz / 30 mV  
Temperature: 20 °C  
Supply Voltage: 3.5 Volt

Resolution Bandwidth: 10 kHz  
Video Bandwidth: 10 kHz

**Marker Value (Carrier unmodulated)**

Resolution Bandwidth: 1 kHz  
Video Bandwidth: 1 kHz

Power Level: -4.9 dBm



**Bandwidth Plot according FCC Part 74.861**

Type: PT 40  
Frequency: 802.525 MHz  
Client: AKG

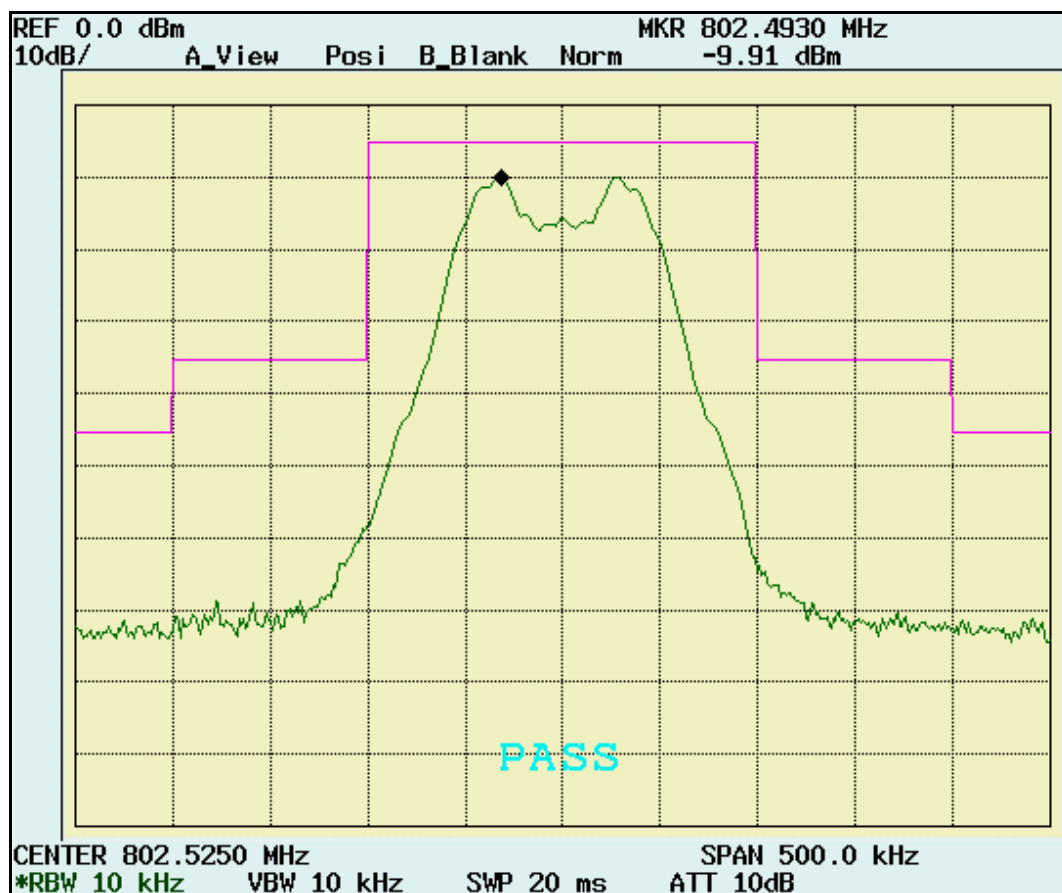
Input Signal: 1 kHz / 30 mV / 114.3 dBμV  
Temperature: 20 °C  
Supply Voltage: 1.9 Volt

Resolution Bandwidth: 10 kHz  
Video Bandwidth: 10 kHz

**Marker Value (Carrier unmodulated)**

Resolution Bandwidth: 1 kHz  
Video Bandwidth: 1 kHz

Power Level: -5.3dBm



### Bandwidth Plot according FCC Part 74.861

Type: PT 40  
Frequency: 802.525 MHz  
Client: AKG

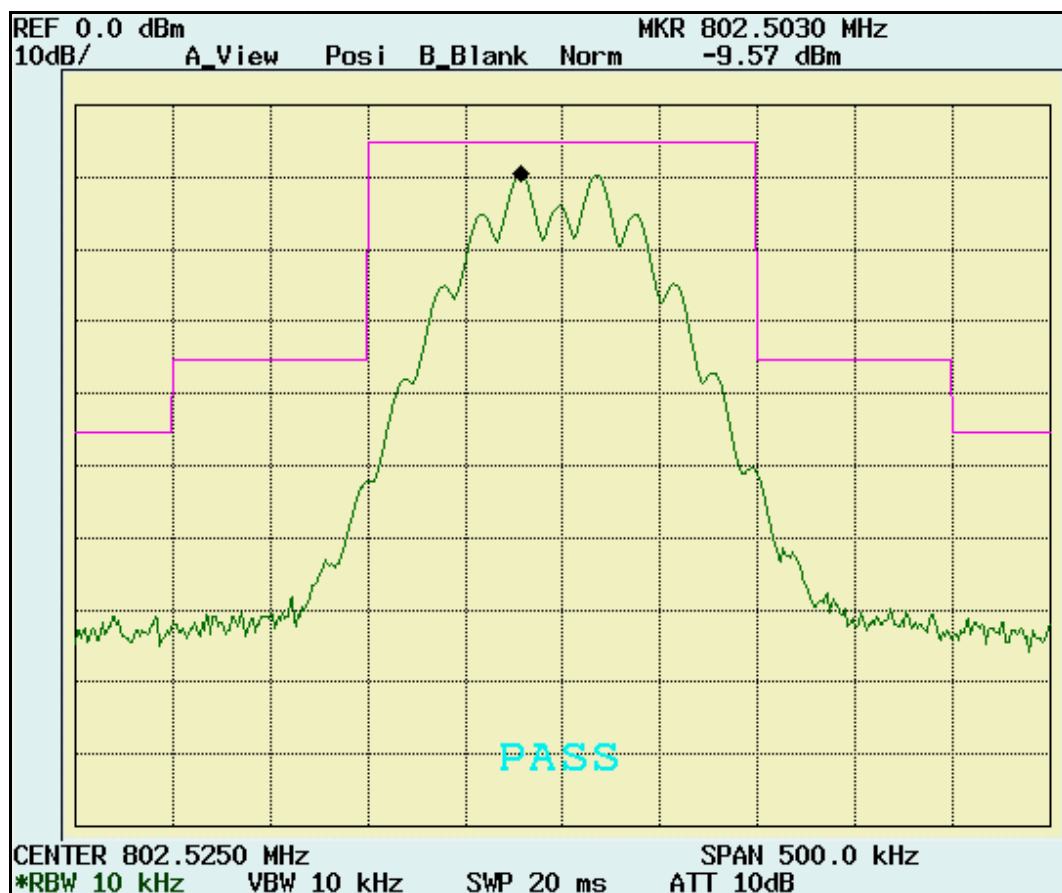
Input Signal: 10 kHz / 114.3 dB $\mu$ V  
Temperature: 20 °C  
Supply Voltage: 1.9 Volt

Resolution Bandwidth: 10 kHz  
Video Bandwidth: 10 kHz

### Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz  
Video Bandwidth: 1 kHz

Power Level: -5.3 dBm



### Bandwidth Plot according FCC Part 74.861

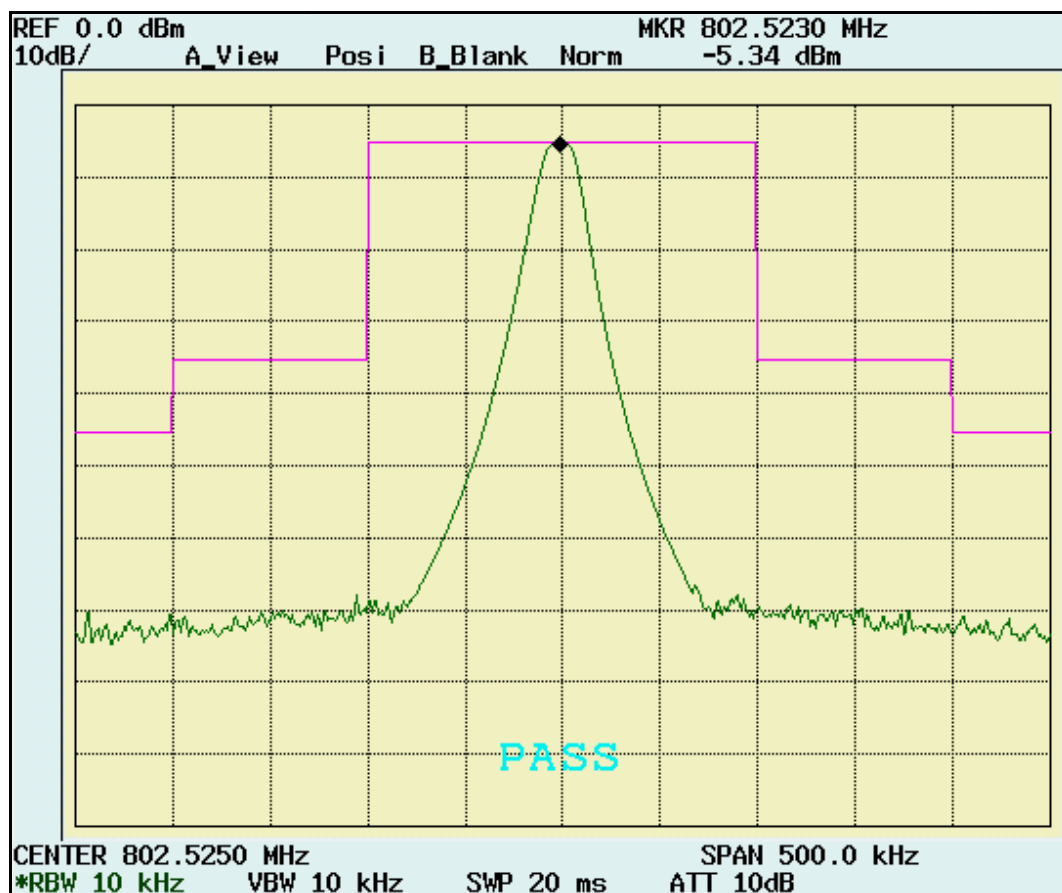
Type: PT 40  
 Frequency: 802.525 MHz  
 Client: AKG  
 Input Signal: 120 kHz / 114.3 dBμV  
 Temperature: 20 °C  
 Supply Voltage: 1.9 Volt

Resolution Bandwidth: 10 kHz  
 Video Bandwidth: 10 kHz

### Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz  
 Video Bandwidth: 1 kHz

Power Level: -5.3 dBm



### Bandwidth Plot according FCC Part 74.861

Type: PT 40  
Frequency: 802.525 MHz  
Client: AKG

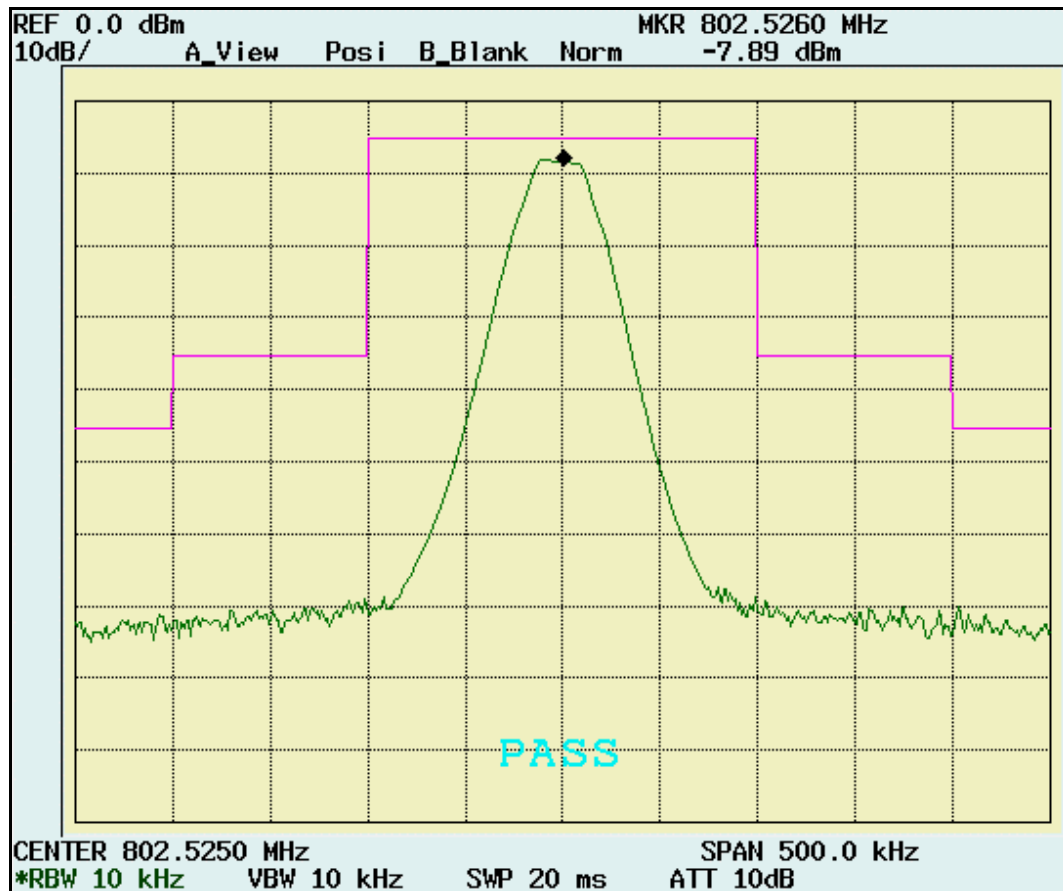
Input Signal: 1 kHz / 30 mV  
Temperature: 20 °C  
Supply Voltage: 1.9 Volt

Resolution Bandwidth: 10 kHz  
Video Bandwidth: 10 kHz

### Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz  
Video Bandwidth: 1 kHz

Power Level: -5.3 dBm



**Bandwidth Plot according FCC Part 74.861**

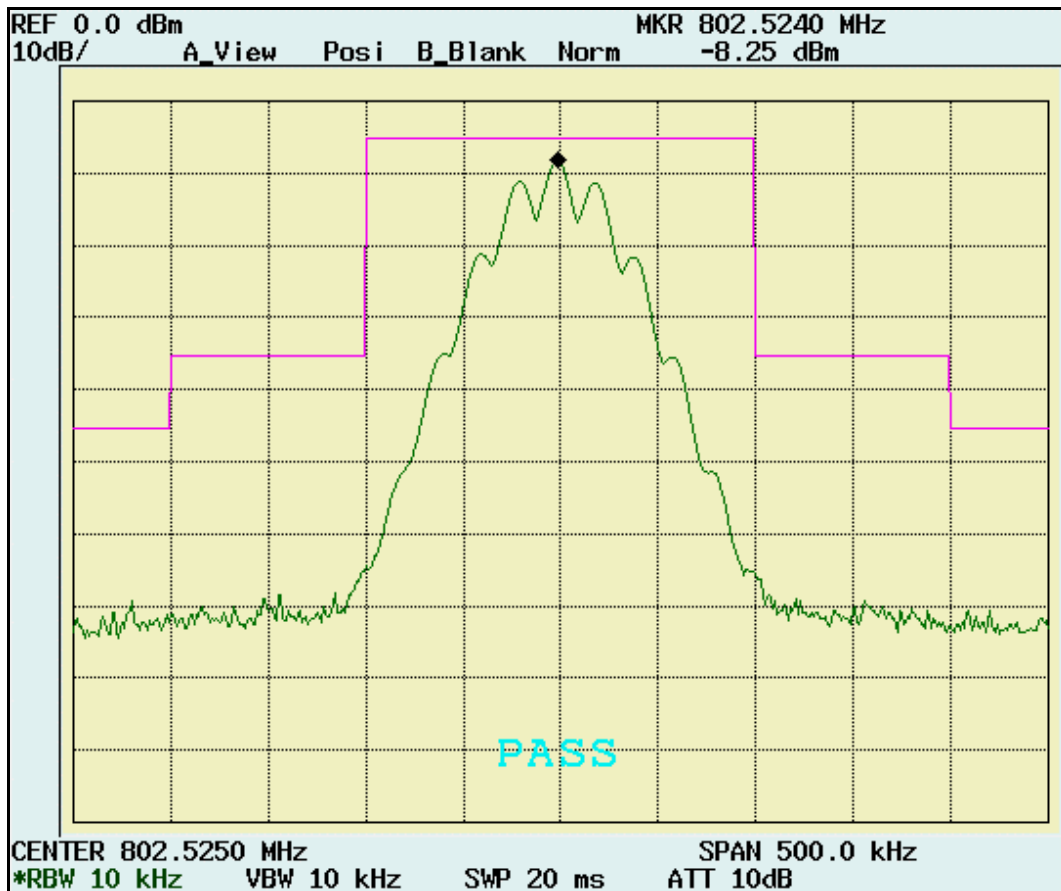
Type: PT 40  
Frequency: 802.525 MHz  
Client: AKG  
  
Input Signal: 10 kHz / 30 mV  
Temperature: 20 °C  
Supply Voltage: 1.9 Volt

Resolution Bandwidth: 10 kHz  
Video Bandwidth: 10 kHz

**Marker Value (Carrier unmodulated)**

Resolution Bandwidth: 1 kHz  
Video Bandwidth: 1 kHz

Power Level: -5.3 dBm



**Bandwidth Plot according FCC Part 74.861**

Type: PT 40  
Frequency: 802.525 MHz  
Client: AKG  
  
Input Signal: 20 kHz / 30 mV  
Temperature: 20 °C  
Supply Voltage: 1.9 Volt

Resolution Bandwidth: 10 kHz  
Video Bandwidth: 10 kHz

**Marker Value (Carrier unmodulated)**

Resolution Bandwidth: 1 kHz  
Video Bandwidth: 1 kHz

Power Level: -5.3 dBm

## Attachment: D

## List of Test Equipment

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

Test Report No: T 17591-1-01 KJ

Beginning of Testing: 27-Januar-2000

| Test ID | Model Type        | Kind of Equipment   | Manufacturer                | Equipment No.   |
|---------|-------------------|---------------------|-----------------------------|-----------------|
| EM      | 433 MHz-Antenna   | Rod Antenna         | MIKES PRODUCT SERVICE       | 04-07/62-97-002 |
|         | CMS-54            | Com. Receiver       | Rohde & Schwarz             | 04-07/63-94-052 |
|         | R 3162            | Spectrum Analyzer   | Advantest                   | 04-07/74-00-001 |
| FE      | 433 MHz-Antenna   | Rod Antenna         | MIKES PRODUCT SERVICE       | 04-07/62-97-002 |
|         | CMS-54            | Com. Receiver       | Rohde & Schwarz             | 04-07/63-94-052 |
|         | R 3162            | Spectrum Analyzer   | Advantest                   | 04-07/74-00-001 |
| MLD     | 433 MHz-Antenna   | Rod Antenna         | MIKES PRODUCT SERVICE       | 04-07/62-97-002 |
|         | CMS-54            | Com. Receiver       | Rohde & Schwarz             | 04-07/63-94-052 |
|         | R 3162            | Spectrum Analyzer   | Advantest                   | 04-07/74-00-001 |
| SER2    | BBA-9106          | Antenna             | Schwarzbeck G.              | 04-07/62-92-048 |
|         | UHALP-9108A       | Antenna             | Schwarzbeck G.              | 04-07/62-97-009 |
|         | ESVP              | Test Receiver       | Rohde & Schwarz             | 04-07/63-89-008 |
| SER3    | Sucoflex 104, SMA | RF-cable 2 m        | Huber+Suhner                | 04-07/60-97-485 |
|         | Sucoflex 104, N   | RF-cable 3 m        | Huber+Suhner                | 04-07/60-97-492 |
|         | Model 3115        | Hornantenna         | EMCO Elektronik GmbH        | 04-07/62-96-458 |
|         | AMT-12435         | Microwave-Amplifier | TransTech Hochfrequenztechn | 04-07/66-89-219 |
|         | AWT-4534          | Microwave-Amplifier | TransTech Hochfrequenztechn | 04-07/66-90-217 |
|         | FSEM 30           | Spectrum Analyser   | Rohde & Schwarz             | 04-07/74-97-001 |