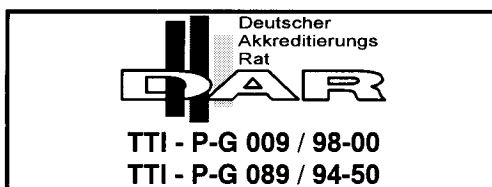


FCC ID: E9MHT60 A



EMISSION -- TESTREPORT

Testreport file no. : **T15941-1-00 TW** Date : Feb. 10, 1999
of issue

Model : Handheld microphone transmitter

Type : HT 61: Version: EUS12

Applicant : AKG Acoustics GmbH, A-1230 Wien/Austria

Manufacturer : AKG Acoustics GmbH, A-1230 Wien/Austria

Licence holder : AKG Acoustics U.S.

Address : 1449 Donelson Pike, Nashville TN 37217

United States of America

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

: ☒ Positive ☐ Negative

This testreport with appendix consists of 45 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.

FCC ID: E9MHT60A

DIRECTORY

Page

A) Documentation

Directory	2
Testregulations	3
General information	4-5
Discovery of worst case condition	6
Equipment under Test	18
Summary	19

B) Testdata

Conducted emissions 10/150 kHz - 30 MHz	7
Spurious emissions (magnetic field) 10 kHz - 30 MHz	8-9
Spurious emissions (electric field) 30 MHz - 1000 MHz	9-10
Spurious emissions (electric field) 1 GHz - 18 GHz	10-11
Conducted power of the fundamental wave measured on the antenna terminals	12
Modulation limiting data	13-14
Frequency error	15
Keeping the requirements of the emission mask	16-17

Attachment

A) Technical description of the test sample (e.g.CDF, Declaraton)	A1-A3
B) Testdata	B1-B14
C) Photodocumentation	
CI) Photos of the test setup	CI 1-4
CII) Photos of the EuT	CII 1-5
D) List of Test Equipment	D1-D1

FCC ID: E9MHT60A

TEST REGULATIONS

The tests were performed according to following regulations :

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

-
- 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)

FCC ID: E9MHT60 A

ADDRESS OF THE TEST LABORATORY

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

- - _____

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 ± 4 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 HT 61 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 8 different version: EUS7, EUS8a, EUS8b, EUS11, EUS12, EUS9, EUS10, EUS13. Additional to the base version HT 60, this transmitter will transmit additional the battery status of the integral battery. For detailed difference please see technical data.

Number of received/tested samples: 8 / 1

DEFINITIONS FOR SYMBOLS USED IN THIS TEST REPORT

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

File No. T15941-1-00 TW , Page 4 of 19

FCC ID: E9MHT60A

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 ± 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 it's 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 HT 61 consists of 8 different versions (each with 15 switchable channels) EUS7, EUS8a, EUS8b, EUS11, EUS12, EUS9, EUS10, EUS13.

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

All the 8 versions are technically identical except the following items:

- 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 versions, each one measured in 3 different channels, lowest channel, middle channel and high end channel of the frequency bands. This measurement have been performed in order to find out the maximum transmitted fieldstrength of the transmmitter.
- Measurement of the radiated spurious emissions of all versions, each one measured in 3 different channels, lowest channel, middle channel and high end channel of the frequency bands. This measurement have been performed in order to find out the maximum spurious emissions of the transmmitter.
- Measurement of the modulation limiting data of all 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: 50 mV) on each version of the microphones on the center channel of the assigned frequency band.

SUMMARIZING:

=> maximum fieldstrength:	EUS12 on Channel 8
=> maximum spurious emission:	EUS12 on Channel 8
=> modulation limiting data:	no essential differences on all versions
=> occupied bandwidth:	no essential differences on all versions

Based on this testresults, the measurements have been performed completely on the version: EUS12 on Channel 1. This testresults are documented in the following sections of the testreport.

FCC ID: E9MHT60 A

TEST RESULT

CONDUCTED EMISSIONS - 10/150 kHz - 30 MHz

● - 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

For TEST EQUIPMENT USED please refer to ATTACHMENT D: _____

Description of Measurement

The final level, expressed in dB μ 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 μ V and μ 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 Ω /50 μ 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

O - MET

O - 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 μ V/m, is arrived at by taking the reading from the EMI receiver (Level dB μ 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 (MHz)	Level (dB μ V)	+	Factor (dB)	=	Level (dB μ V/m)	Limit (dB μ V/m)	=	Delta (dB)
1.705	5	+	20	=	25	30	=	5

FCC ID: E9MHT60 A

Testresult

The requirements are

	O - MET		O - 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

☐ - Test not applicable

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

For TEST EQUIPMENT USED please refer to ATTACHMENT D: SER2

Description of Measurement

The final level, expressed in dB μ V/m, is arrived by taking the reading from the EMI receiver (Level dB μ V) 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 (MHz)	Level (dB μ V)	+	Factor (dB)	=	Level (dB μ V/m)	Limit (dB μ V/m)	=	Delta (dB)
719	75	+	32.6	=	107.6	110	=	-2.4

FCC ID: E9MHT60 A

Testresult

The requirements are	● - MET	O - NOT MET
Min. limit margin	> 45 dB	at 30-1000 MHz
Max. limit exceeding	_____ dB	at _____ MHz

Remarks: The emissions have to be att. $43+10\log(P \text{ in W})$ below the carrier.

$P_{\text{max. CH 1}} = 0.53 \text{ mW} \rightarrow 10 \text{ dB att. Max. field strength in}$

OATS: 74.5 dB μ V/m. For plot see page B1-B2.

SPURIOUS EMISSION 1 GHz - 18 GHz

☐ - Test not applicable

Testlocation :

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

- ☐ - 1 meters
- - 3 meters
- ☐ - 10 meters

For TEST EQUIPMENT USED please refer to ATTACHMENT D: SER3

Description of Measurement

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

FCC ID: E9MHT60 A

Example of the correction value at 1.8236 GHz

Level reading at 1.5 GHz	correction EMCO 3115	correction Amplifier AWT 8035 + cable	correction factor (summarized)	corrected level
56 dB μ V	+25.7	-41.7	-16	40 dB μ V

Testresult

The requirements are

● - MET

○ - NOT MET

Min. limit margin

> 30 dB at 1-8 GHz

Max. limit exceeding

_____ dB at _____ GHz

Remarks: The limits are met. The measurement has been performed in Peak-
mode. For critical results, the measurement would be repeated
in average mode.

Testresult in detail:

Frequency GHz	L: Peak dB μ V	L: AV dB μ V	Correct.	L: Peak dB μ V/m	L: AV dB μ V/m	Limit dB μ V/m
CH 1: 2.580	50.0	--	-13.0	37.0	--	74.5
CH 1: 2.790	50.0	--	-12.0	38.0	--	74.5

FCC ID: E9MHT60A

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

● - Test not applicable

Testlocation :

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

O - MET

O - 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

<input type="radio"/> - Test not applicable

Testlocation :

- ☐ - Shielded room no. 1
- ☐ - Shielded room no. 2
- ☐ - Shielded room no. 3
- - Shielded room no. 4
- ☐ - Shielded room no. 5
- ☐ - Shielded room no. 6
- ☐ - Shielded room no. 7
- ☐ - Anechoic chamber
- ☐ - 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 dBμV 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.

FCC ID: E9MHT60 A

Testresult

The requirements are

● - MET

○ - NOT MET

EUT: HT 61 Version: EUS12 working on 204.2 MHz

Input audio level/dBμV	f _{mod} = 50 Hz		f _{mod} = 1 kHz		f _{mod} = 20kHz	
	PFD/kHz	NFD/kHz	PFD/kHz	NFD/kHz	PFD/kHz	NFD/kHz
20	3.9	3.9	4.1	4.1	4.3	4.2
30	3.9	3.9	4.3	4.2	4.8	4.8
40	4.0	4.2	4.6	4.5	6.2	6.1
50	4.9	5.0	5.5	5.4	8.6	8.6
60	6.7	6.5	7.4	7.3	13.1	13.0
70	9.8	9.6	11.1	10.9	21.4	21.4
80	19.8	20.0	17.1	17.2	39.0	38.5
90	25.1	23.3	27.8	27.9	58.9	58.7
100	28.9	30.2	31.6	31.7	62.7	61.2
110	34.3	35.5	42.3	47.4	64.6	61.8
114	38.8	40.6	43.8	55.3	65.0	62.0

Remarks: The limit of ± 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:

EUS12 CH 1 working on 204.2 MHz:

Max. measured frequency deviation: ± 65.0 kHz

50% of the maximum deviation: ± 32.5 kHz

Audio input level (ail) to get ± 32.5 kHz: L = 76.0 dBμV

L + 16 dBμV = 92.0 dBμV => Level for testing the occupied bandwidth

Occupied bandwidth:

version of EUT	EUS12 CH 1		CH 1		CH 1	
audio test level	L = 92.0 dBμV/1kHz		L = 92.0 dBμV/15kHz		L = 92.0 dBμV/20kHz	
shape of emission mask	± 50 -100% [dB]	± 100 -250% [dB]	± 50 -100% [dB]	± 100 -250% [dB]	± 50 -100% [dB]	± 100 -250% [dB]
min. limit margin/dB	> 5	> 10	> 5	> 10	> 5	> 10

Remarks: The limit is kept. For plot see pages B9-B14.

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.

FCC ID: E9MHT60A

Testresult:

The requirements are

● - MET

○ - NOT MET

Frequency range of equipment		CH 1						
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	2.2	-6.2						
	3.0	-6.2						
-20	2.2	-5.5						
	3.0	-5.5						
-10	2.2	-4.0						
	3.0	-4.0						
0	2.2	-3.7						
	3.0	-3.7						
+10	2.2	-3.3						
	3.0	-3.3						
+20	2.2	-3.3						
	3.0	-3.3						
+30	2.2	-3.5						
	3.0	-3.5						
+40	2.2	-3.5						
	3.0	-3.5						
+50	2.2	-3.5						
	3.0	-3.5						

Remarks: The most strict limit for this frequency range is: 10.2 kHz

(0.005% of 204.2 MHz)

KEEPING THE REQUIREMENTS OF THE EMISSION MASK

○ - Test not applicable

Testlocation :

- - Shielded room no. 1
- - Shielded room no. 2
- - Shielded room no. 3
- - Shielded room no. 4
- - Shielded room no. 5
- - Shielded room no. 6
- - Shielded room no. 7
- - Anechoic chamber
- - Full compact chamber
- - 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		EUS12 CH 1		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	2.2	> 5	> 10				
92 dBμV	3.0	> 5	> 10				
15 kHz	2.2	> 5	> 10				
92 dBμV	3.0	> 5	> 10				
20 kHz	2.2	> 5	> 10				
92 dBμV	3.0	> 5	> 10				
1 kHz	2.2	> 5	> 10				
50 mV	3.0	> 5	> 10				
10 kHz	2.2	> 5	> 10				
50 mV	3.0	> 5	> 10				
20 kHz	2.2	> 5	> 10				
50 mV	3.0	> 5	> 10				

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

FCC ID: E9MHT60A

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, 50 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.:
 - o - customer specific cables (wireless microphone)
 - - no cables
 - o - _____

FCC ID: E9MHT60A

SUMMARY**GENERAL REMARKS:**

The product HT 61, version EUS12 has been tested on the following frequency:
CH 1: 204.2 MHz

This channel was defined as the worst condition channel of all 8 versions:
EUS7, EUS8a, EUS8b, EUS11, EUS12, EUS9, EUS10, EUS13

FINAL JUDGEMENT:

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

- - met.
- - not met.

The equipment under test

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

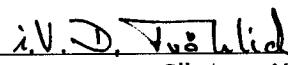
Date of receipt of test sample : accdg. to storage record

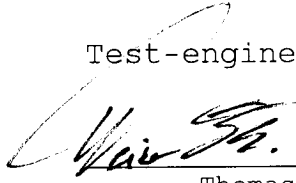
Testing Start Date : December 12, 1998

Testing End Date : January 29, 1999

- MIKES PRODUCT SERVICE GmbH -

Test-engineer -


Günter Mikes
Dipl.-Ing. (FH)


Thomas Weise
Dipl.-Ing. (FH)

CONSTRUCTIONAL DATAFORM FOR TESTING OF RADIO EQUIPMENT

Licence holder: AKG Acoustics US
 Address: Donelson Pike, Nashville Tennessee, USA
 Manufacturer: AKG Acoustics GmbH
 Address: Lembëchgasse 21-25 A 1230 Wien, Austria
 Type: HT61
 Model: _____
 Serial-No.: _____ Protection class: _____

Application for getting

☒ national approval in the following countries: USA
☐ EC-type examination

Additional informations to the above named model:

Antenna:

transmitter: HT61 Type: integrated (head + set case)

Length/size:

receiver: Type:

Length/size:

Power supply of the transmitter:

Type: DC nominal voltage: 3 V
 lowest voltage: 2,1 V
 highest voltage: 3,4 V

Power supply of the receiver:

Type: _____ nominal voltage: V

Ancillary equipment:

Description: microphone heads Type: DBS0WL, CSF00WL 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: none

Name of the cable	Digital	Length/m	shielded
	<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
	<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> yes <input type="checkbox"/> no

☐ If applicable, if necessary complete overleaf

FCC ID: E9MHT60A

Applicant: AKG Model-name: HT 61

Type designation:

HT 61

Name and type designation of individual units comprising the radio equipment:

Type of equipment:

- | | | | |
|---|--|---|---|
| <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 (VHF) |
| <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"/> |

Technical characteristics:

	Transmitter-receiver	Transmitter	Receiver
Frequency range		138,25 ... 248,6 M	
Maximum no. of channels		15 + off	
Channel spacing		200 kHz	
Class of emission (type of modulation)		200 kHz F3e	
Maximum RF output power			
Maximum effective radiated power (ERP)		3 mW ± 3 dB	
Output power variable		no	
Channel switching frequency range		max 3 kHz	

Method of frequency generation	<input checked="" type="checkbox"/> Synthesizer	<input type="checkbox"/> Crystal	<input type="checkbox"/> Other
Frequency generation TX	SYNTH, PLL		
Frequency generation RX			
IF	1st IF	2nd IF	3rd IF

Integral selective calling	none
----------------------------	------

Audio-frequency interface level at external data socket	nom. 17 mV at mic. head in / 20 mV eff ± 3 dB / 1 kHz (at 1 Pa / 1 kHz) limiting frequency
---	--

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"/> M <input checked="" type="checkbox"/> None	<input type="checkbox"/> TNC <input type="checkbox"/> UHF <input type="checkbox"/>	<input type="checkbox"/> N <input type="checkbox"/> Adapter <input type="checkbox"/>

Type approval specifications:

FCC / part 24

O If applicable, if necessary complete overleaf

Page A 2

FCC ID: E9M HT60A

Applicant: AKG Model-name: HT61

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-Lambeckgasse 21-25

Wien
place of issue

,date 9.12.1998

1A. [Signature]
Seal and signature of applicant

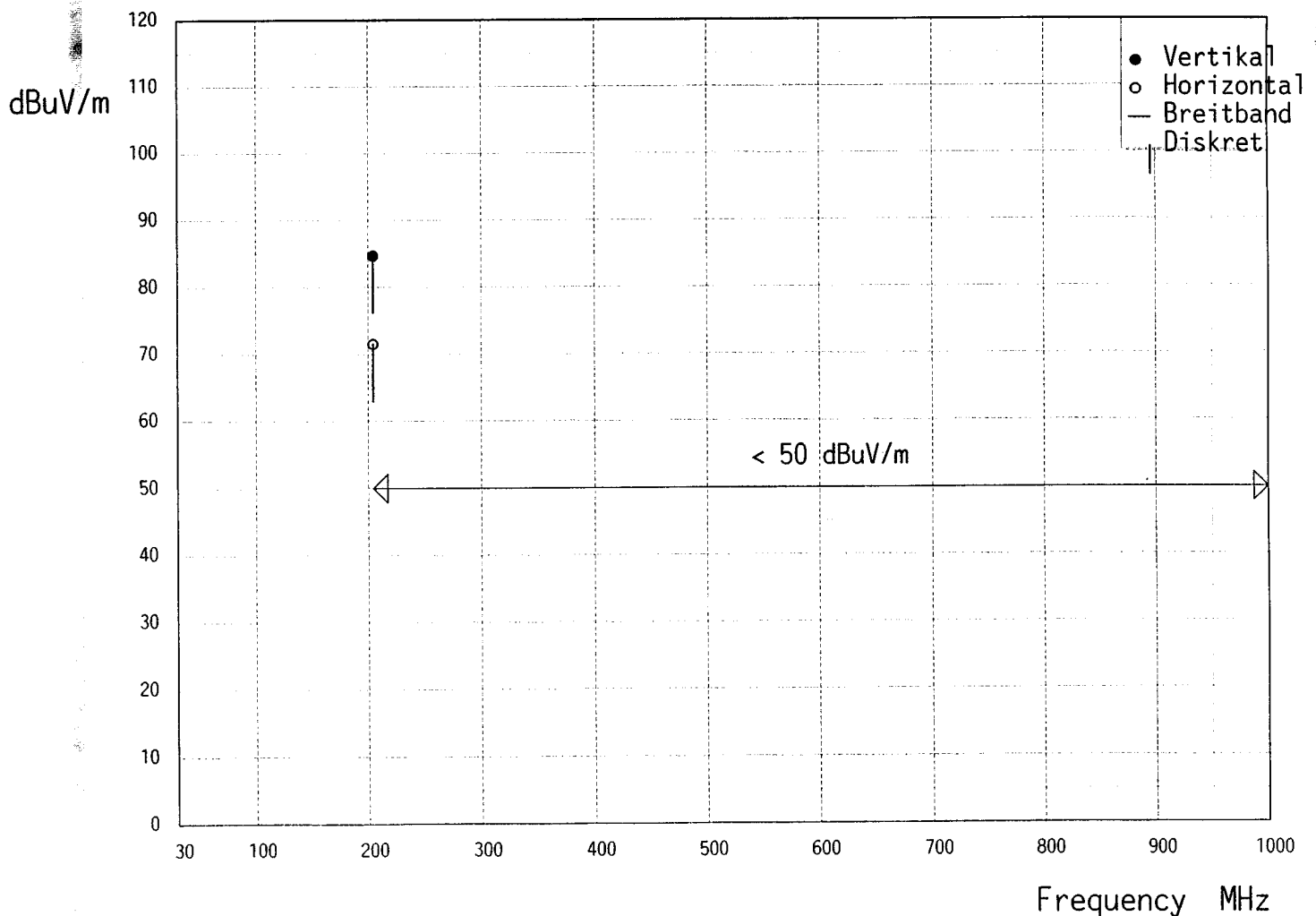
Radiation-Test

accdg. 74.861

Typ: HT61
Manufacturer:
Client: AKG
Regulation: FCC Part 74.861
Order No.: T15941
Operation Mode: permanent transmit
Remarks: The limits are met.

Testdistance: 3 m
Testreceiver: ESVP
Antenna: BBA/UHALP
Testengineer: Weise
Date: 08-02-1999

FCC Part 74.861



Radiation-Test

accdg. 74.861

Typ: HT61
 Manufacturer:
 Client: AKG
 Regulation: FCC Part 74.861
 Order No.: T15941
 eration Mode: permanent transmit
 Remarks: The limits are met.

Testdistance: 3 m
 Testreceiver: ESVP
 Antenna: BBA/UHALP
 Testengineer: Weise
 Date: 08-02-1999

Result	Frequency [MHz]	Reading [dBuV/m]	Korr [dB]	Final [dBuV/m]	Limit [dBuV/m]	DLimit [dB]	Polarisation	Noise
	204.20	50.1	21.4	71.5	120.0	48.5	Horizontal	Diskret
	204.20	63.3	21.4	84.7	120.0	35.3	Vertikal	Diskret

204.20 MHz - 1000 MHz < 50 dBuV/m

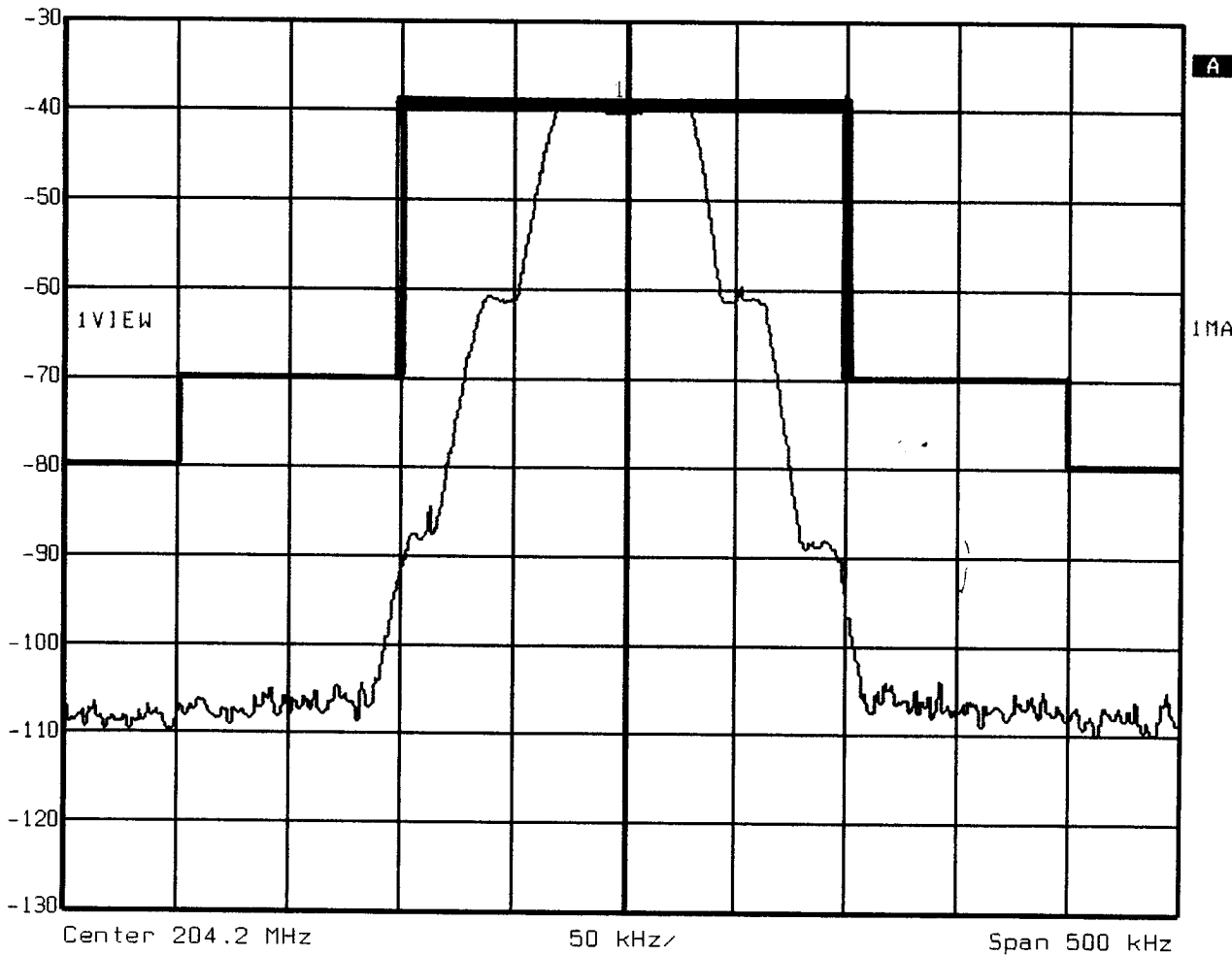
Calculation for the maximum power with the measured fieldstrength in 3 meter distance

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

$$\text{Channel 1: } P = (0.017\text{V/m} \cdot 3\text{m})^2 / 49.2 = \cancel{0.53\text{ mW}} \\ .053\text{ mW}$$



Marker 1 [T1] RBW 10 kHz RF Att 0 dB
 Ref Lvl -40.39 dBm VBW 10 kHz
 -30 dBm 204.19749499 MHz SWT 15 ms Unit dBm



Date: 28.JAN.99 16:40:02

Bandwidth Plot according FCC Part 74.861

Type: HT61/EUS12
 Frequency: 204.2 MHz
 Client: AKG
 Input: Signal: ① 20 kHz / 50 mV
 Temperature: 20°C
 Supply Voltage: ②.2 / 3.0 Volt

Resolution Bandwidth: 10 kHz
 Video Bandwidth: 10 kHz

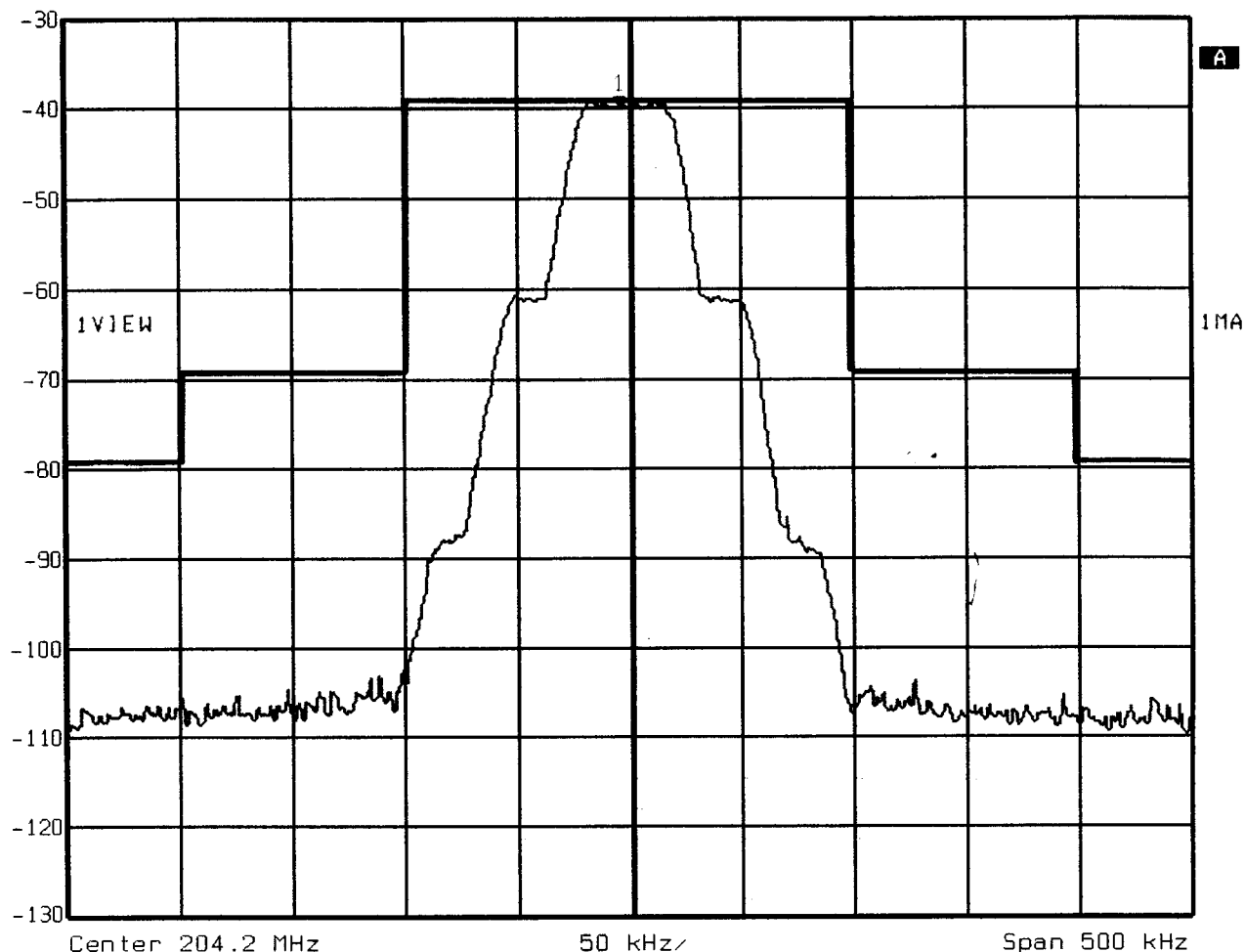
Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz
 Video Bandwidth: 1 kHz

Power Level: -40 dBm



Marker 1 [T1] RBW 10 kHz RF Att 0 dB
 Ref Lvl -39.83 dBm VBW 10 kHz
 -30 dBm 204.19649299 MHz SWT 15 ms Unit dBm



Date: 29.JAN.99 13:51:29

Bandwidth Plot according FCC Part 74.861

Type: HT61 / EUS12
 Frequency: 204.2 MHz
 Client: AKG
 Input Signal: ① 10 / 20 kHz / 50 mV
 Temperature: 20 °C
 Supply Voltage: 2.2 / ③ 3.0 Volt

Resolution Bandwidth: 10 kHz
 Video Bandwidth: 10 kHz

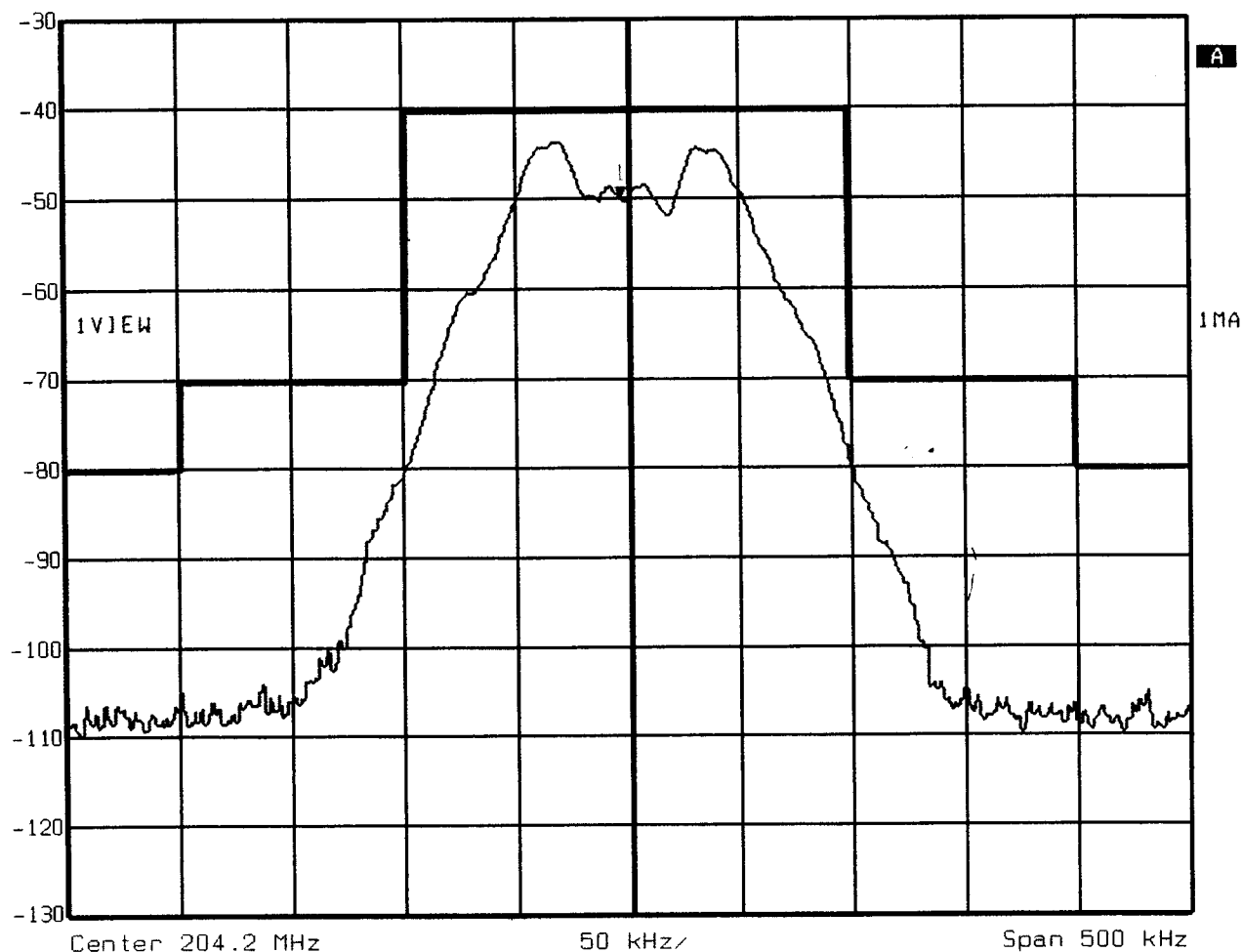
Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz
 Video Bandwidth: 1 kHz

Power Level: -39 dBm



Marker 1 [T1] RBW 10 kHz RF Att 0 dB
 Ref Lvl -49.88 dBm VBW 10 kHz
 -30 dBm 204.19749499 MHz SWT 15 ms Unit dBm



Date: 28.JAN.99 16:42:23


Bandwidth Plot according FCC Part 74.861

Type: HT 61/EUS 12
 Frequency: 204,2 MHz
 Client: AKG
 Input: Signal: 1/(10/20) kHz / 50 mV
 Temperature: 20°C
 Supply Voltage: (2.2)/ 3.0 Volt
 Resolution Bandwidth: 10 kHz
 Video Bandwidth: 10 kHz

Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz
 Video Bandwidth: 1 kHz

Power Level: -40 dBm



Ref Lvl
-30 dBm

Marker 1 [T1]
-47.16 dBm
204.19649299 MHz

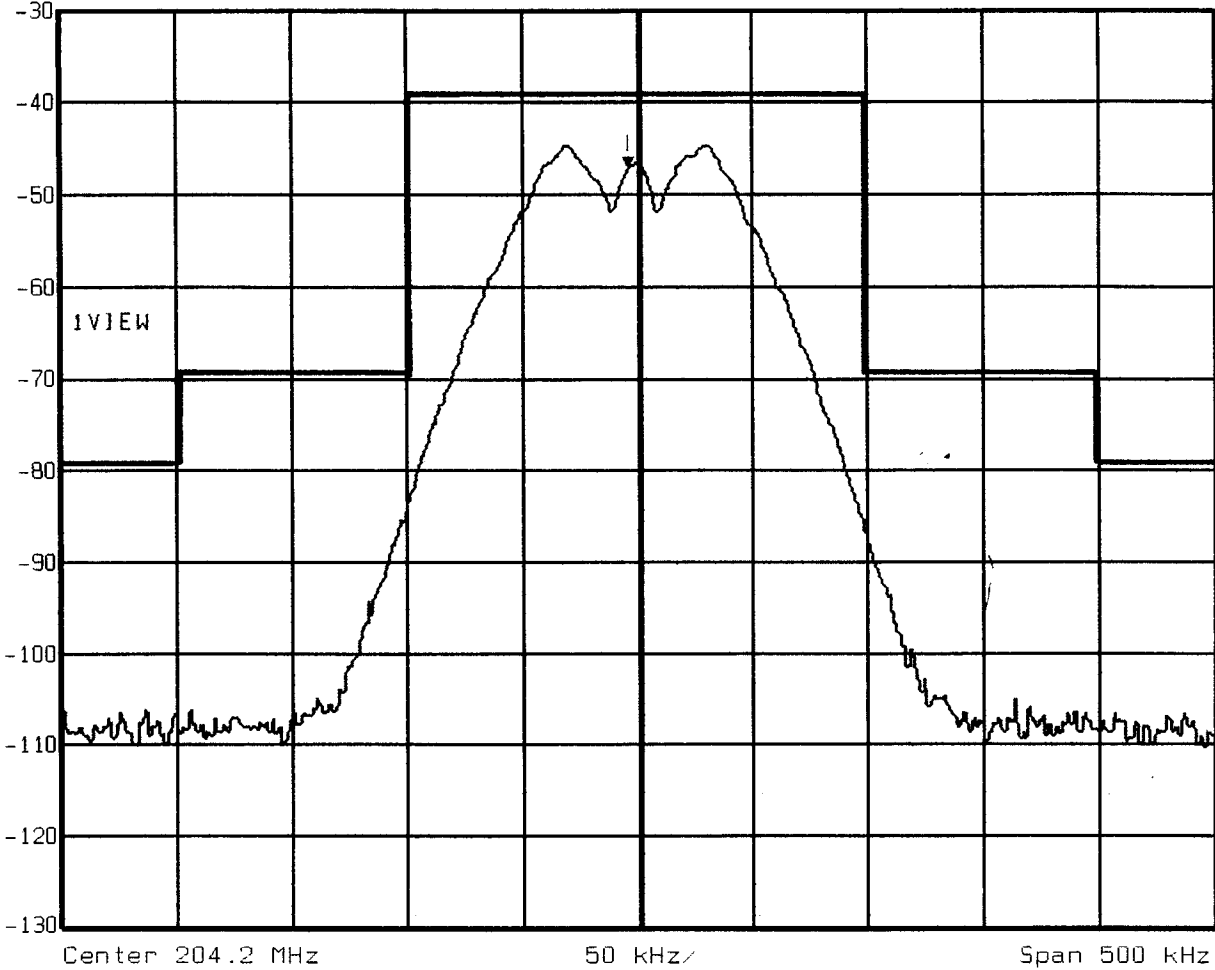
RBW
10 kHz

VBW
10 kHz

SWT
15 ms

RF Att
0 dB

Unit
dBm



Date: 29.JAN.99 13:48:49

Bandwidth Plot according FCC Part 74.861

Type:

Frequency

Client:

HT61/EUS12
204,2 MHz
AKG

Input Signal:

Temperature:

Supply Voltage:

1 / (10) / 20 kHz / 50 mV
20 °C
2.2 / (3.0) Volt

Resolution Bandwidth:

Video Bandwidth:

10 kHz
10 kHz

Marker Value (Carrier unmodulated)

Resolution Bandwidth:

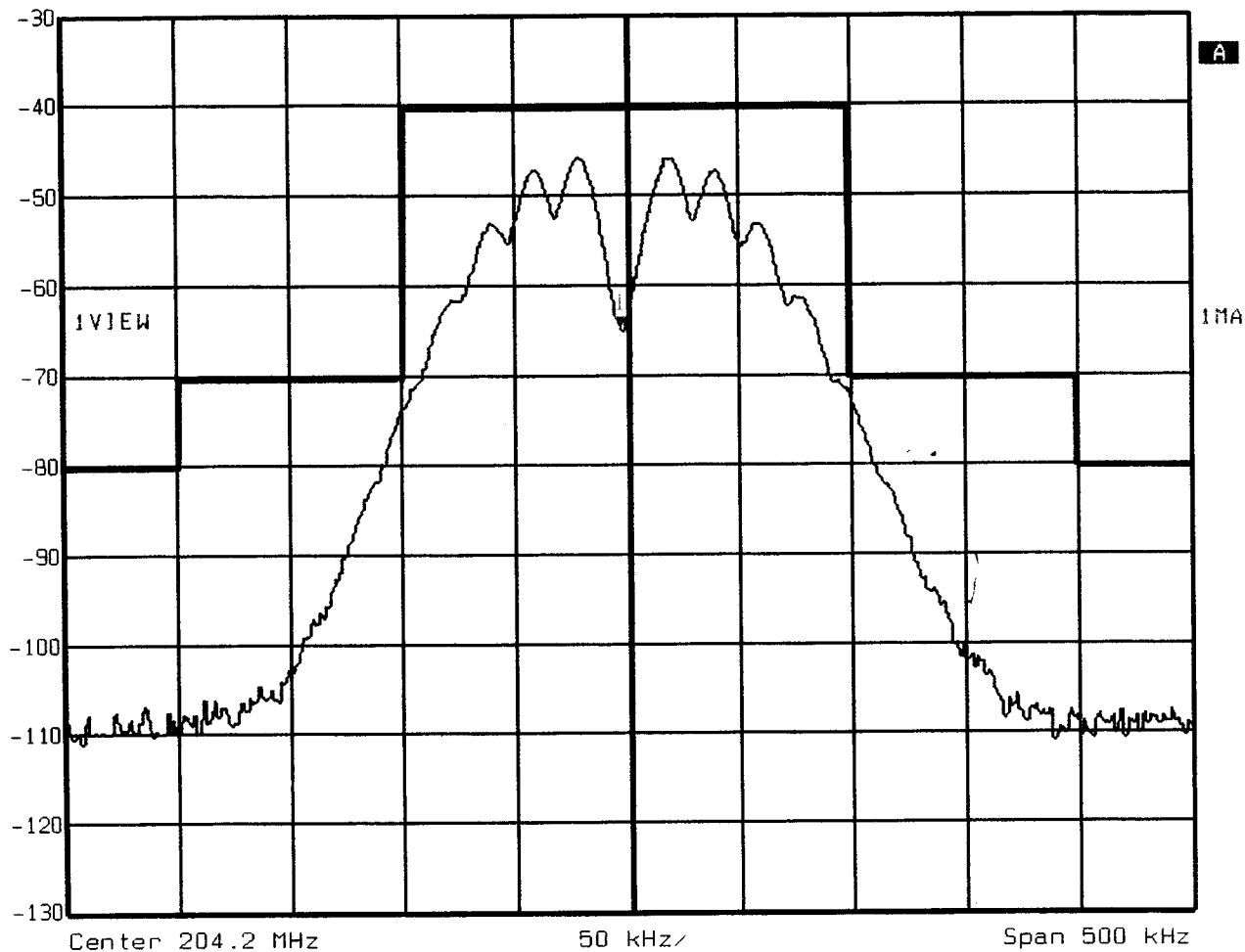
Video Bandwidth:

Power Level:

1 kHz
1 kHz
-39 dBm



Marker 1 [T1] RBW 10 kHz RF Att 0 dB
 Ref Lvl -64.60 dBm VBW 10 kHz
 -30 dBm 204.19749499 MHz SWT 15 ms Unit dBm



Date: 28.JAN.99 16:46:21

Bandwidth Plot according FCC Part 74.861

Type: HT61/EUS12
 Frequency: 204.2 MHz
 Client: AKG
 Input: Signal: 1 / 10 / (20) kHz / 50 mV
 Temperature: 20°C
 Supply Voltage: (2.2) / 3.0 Volt
 Resolution Bandwidth: 10 kHz
 Video Bandwidth: 10 kHz

Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz
 Video Bandwidth: 1 kHz
 Power Level: -40 dBm



Ref Lvl
-30 dBm

Marker 1 [T1]

-54.51 dBm
204.19649299 MHz

RBW

10 kHz

RF Att

0 dB

VBW

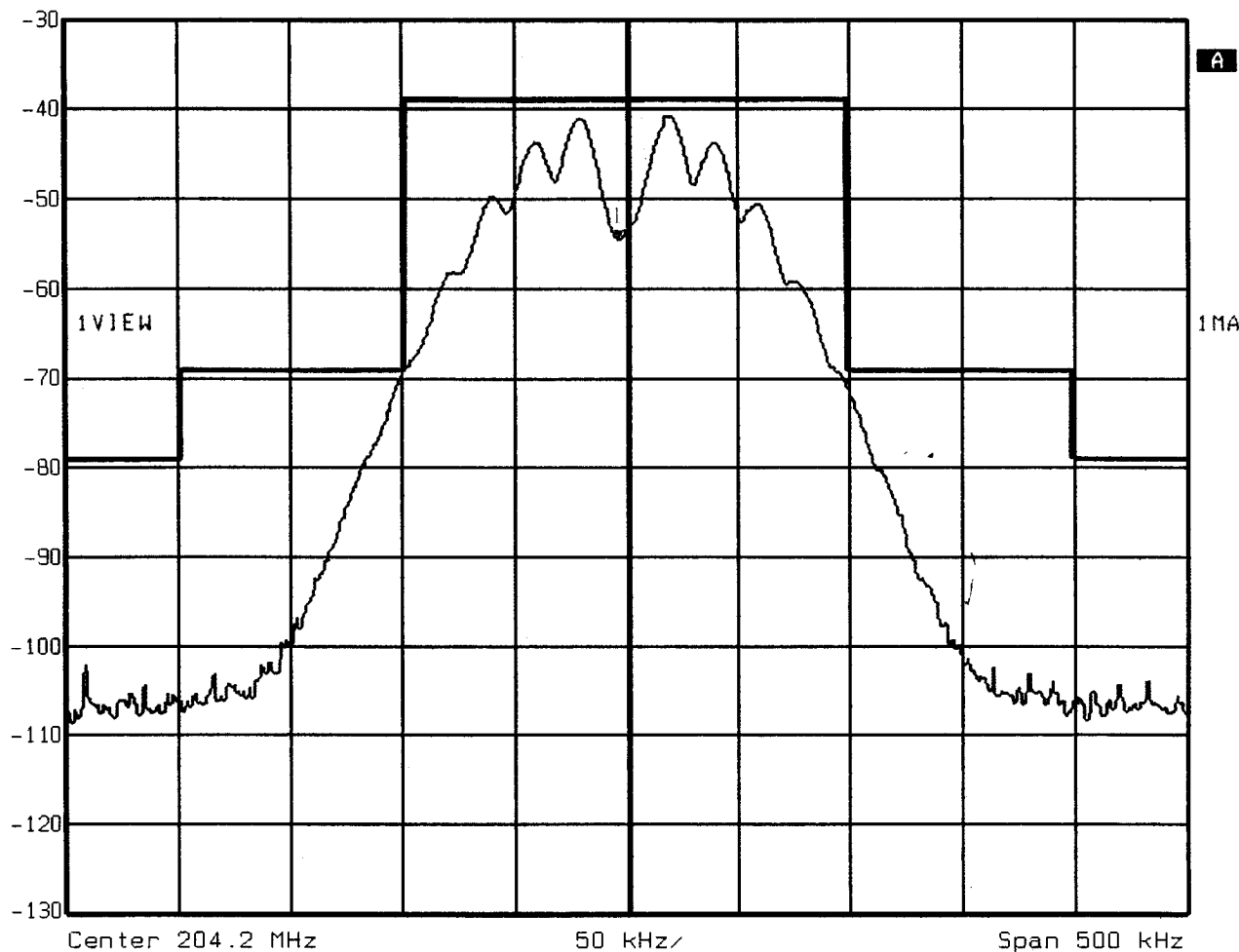
10 kHz

SWT

15 ms

Unit

dBm



Date: 29.JAN.99 13:46:24

Bandwidth Plot according FCC Part 74.861

Type: HT61/EUS12
Frequency: 204.2 MHz
Client: AKG

Input Signal: 1 / 10 / 20 kHz / 50 mV
Temperature: 20 °C
Supply Voltage: 2.2 / 3.0 Volt

Resolution Bandwidth: 10 kHz
Video Bandwidth: 10 kHz

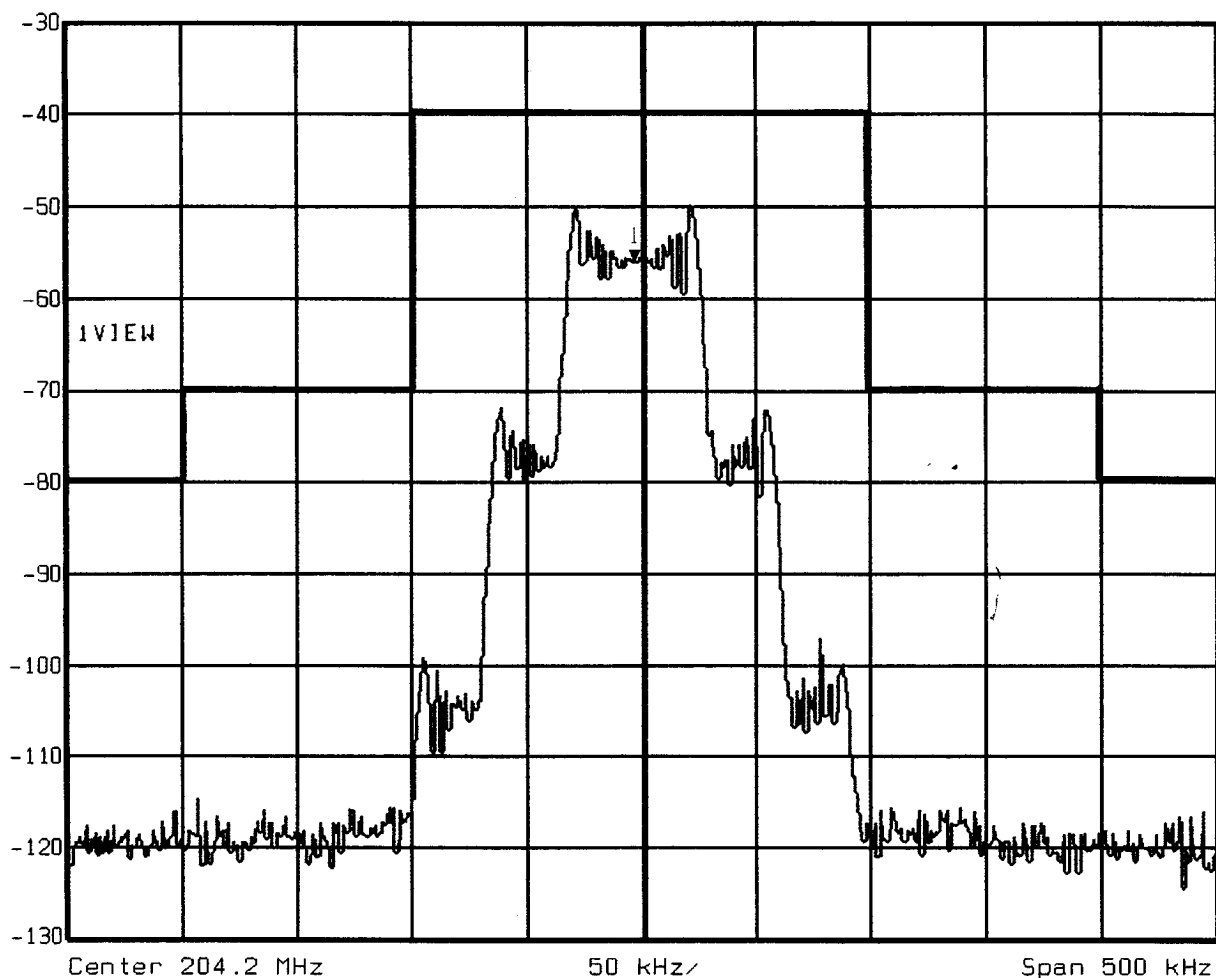
Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz
Video Bandwidth: 1 kHz

Power Level: -39 dBm



Marker 1 [T1] RBW 1 kHz RF Att 0 dB
 Ref Lvl -55.97 dBm VBW 1 kHz
 -30 dBm 204.19749499 MHz SWT 1.25 s Unit dBm



Date: 28.JAN.99 16:37:47

Bandwidth Plot according FCC Part 74.861

Type: HT61/EUS 12
 Frequency: 204,2 MHz
 Client: AKG
 Input: Signal: ①/ 15 / 20 kHz / 92 dBμV
 Temperature: 20°C
 Supply Voltage: ②.2/ 3.0 Volt

Resolution Bandwidth: 1 kHz
 Video Bandwidth: 1 kHz

Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz
 Video Bandwidth: 1 kHz

Power Level: -40 dBm



Ref Lvl
-30 dBm

Marker 1 [T1]

-52.69 dBm
204.19649299 MHz

RBW

1 kHz

RF Att

0 dB

VBW

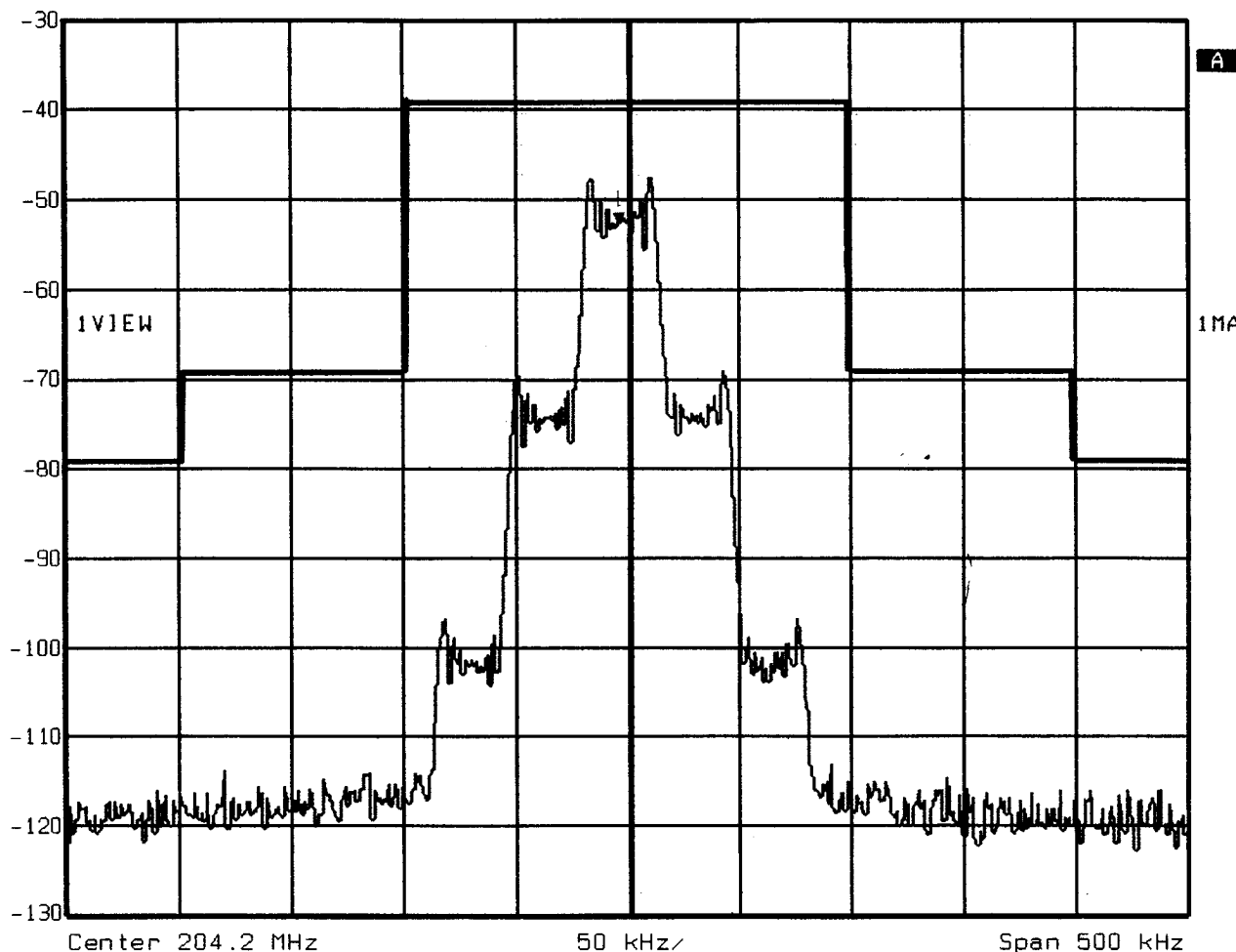
1 kHz

SWT

1.25 s

Unit

dBm



Date: 29.JAN.99 13:54:07

Bandwidth Plot according FCC Part 74.861

Type:

HT61 / EUS 12

Frequency:

204.2 MHz

Client:

AKG

Input: Signal:

① 15 / 20 kHz / 92 dBμV

Temperature:

20°C

Supply Voltage:

2.2 / ③ 3.0 Volt

Resolution Bandwidth:

1 kHz

Video Bandwidth:

1 kHz

Marker Value (Carrier unmodulated)

Resolution Bandwidth:


1 kHz

Video Bandwidth:

1 kHz

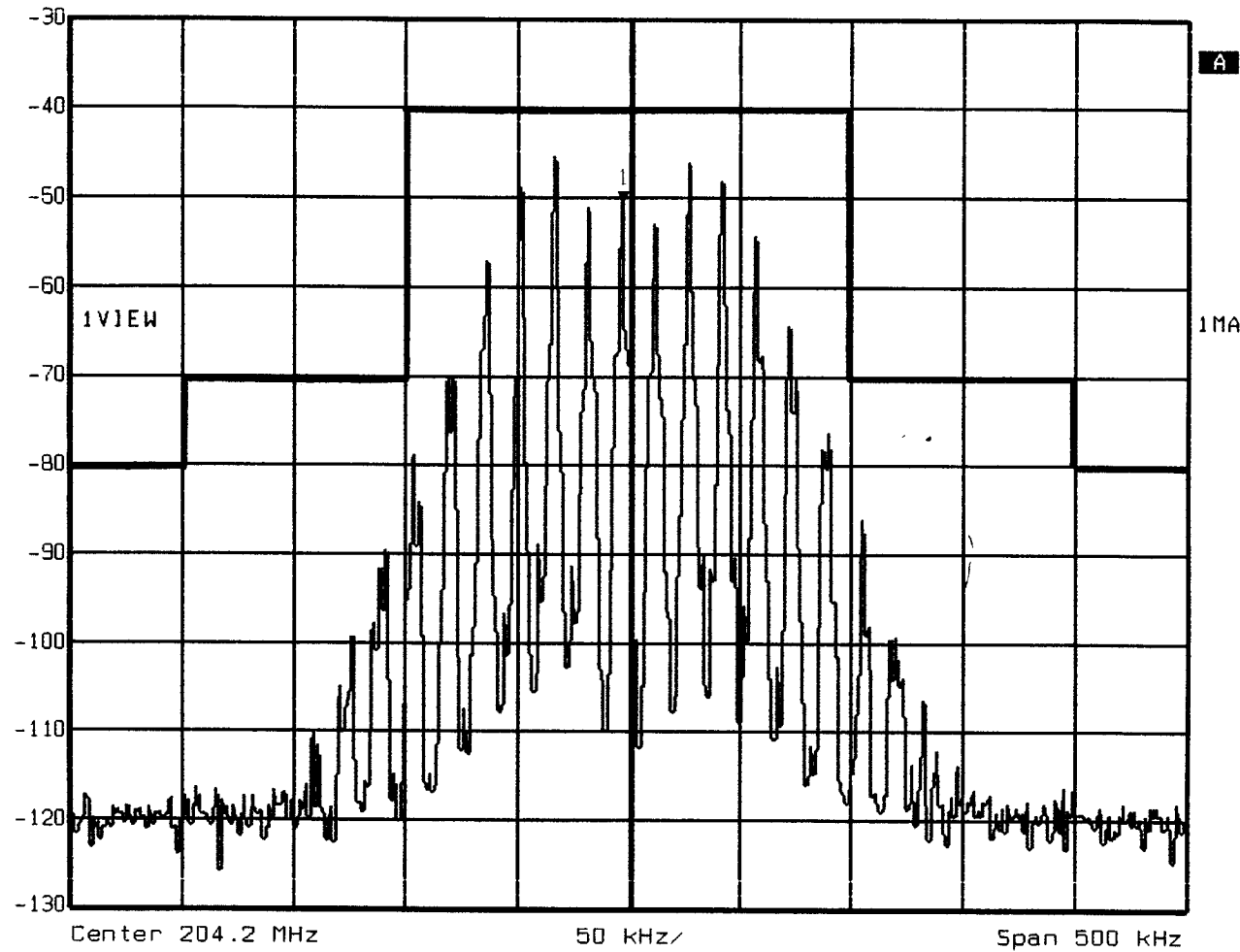
Power Level:

- 39 dBm

Marker 1 [T1]
Ref Lvl -30 dBm
204.19749499 MHz

RBW 1 kHz
VBW 1 kHz
SWT 1.25 s

RF Att 0 dB
Unit dBm



Date: 28.JAN.99 16:35:14

Bandwidth Plot according FCC Part 74.861

Type: HT61/EUS12

Frequency: 204.2 MHz

Client: AKG

Input: Signal: 1 / (15) 20 kHz / 92 dBμV

Temperature: 20°C

Supply Voltage: (2.2) / 3.0 Volt

Resolution Bandwidth: 1 kHz

Video Bandwidth: 1 kHz

Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz

Video Bandwidth: 1 kHz

Power Level: -40 dBm



Ref Lvl
-30 dBm

Marker 1 [T1]

-56.57 dBm
204.19649299 MHz

RBW

1 kHz

RF Att

0 dB

VBW

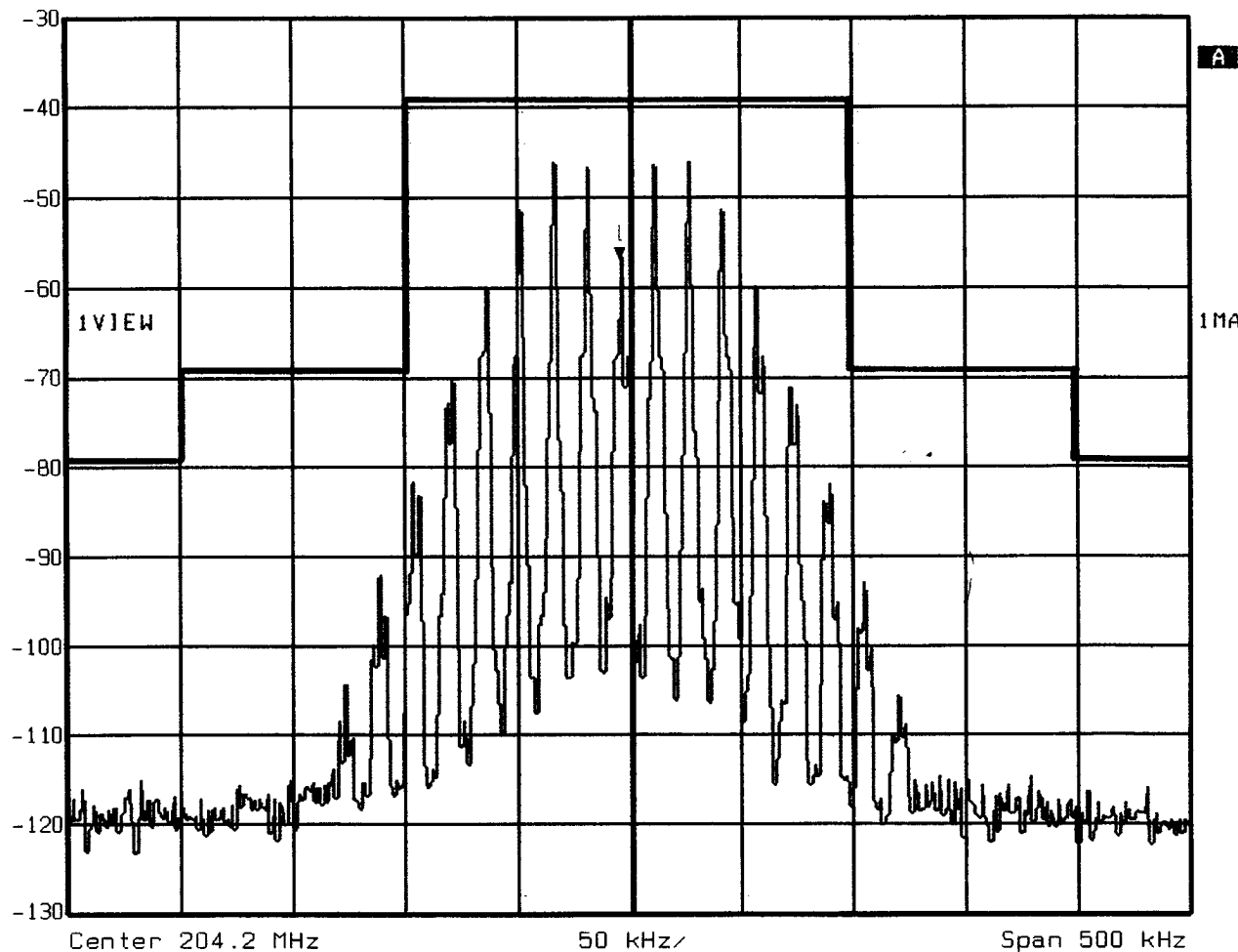
1 kHz

SWT

1.25 s

Unit

dBm



Date: 29.JAN.99 13:58:39

Bandwidth Plot according FCC Part 74.861

Type:

AK HT 61/EUS 12

Frequency:

204,2 MHz

Client:

AKG

Input: Signal:

1 / (15) 20 kHz / 92 dBμV

Temperature:

20°C

Supply Voltage:

2.2 / (3.0) Volt

Resolution Bandwidth:

1 kHz

Video Bandwidth:

1 kHz

Marker Value (Carrier unmodulated)

Resolution Bandwidth:

1 kHz

Video Bandwidth:

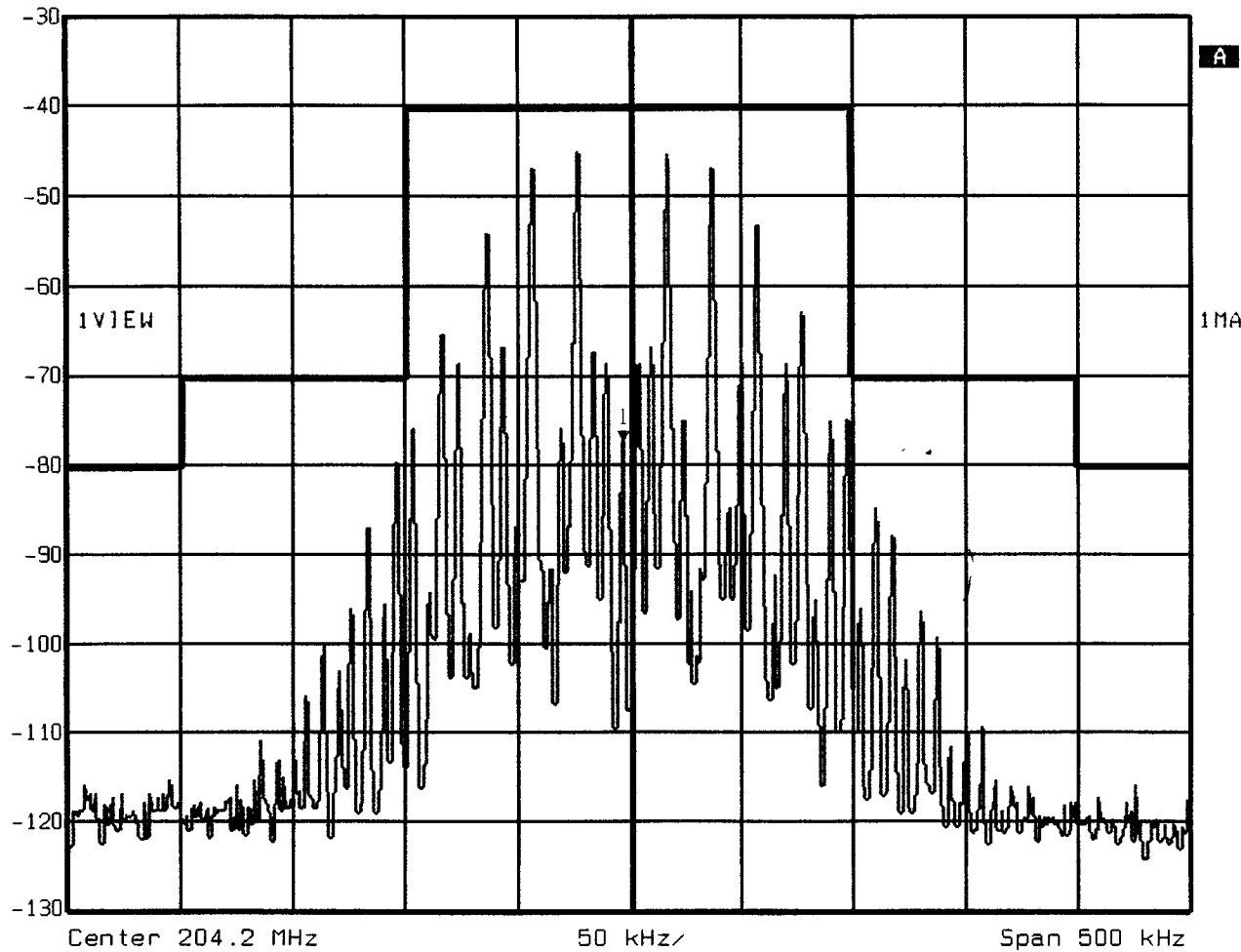
1 kHz

Power Level:

-39 dBm



Marker 1 [T1] RBW 1 kHz RF Att 0 dB
 Ref Lvl -77.44 dBm VBW 1 kHz
 -30 dBm 204.19749499 MHz SWT 1.25 s Unit dBm



Date: 28.JAN.99 16:32:25

Bandwidth Plot according FCC Part 74.861

Type: HT61/EUS 12
 Frequency: 204.2 MHz
 Client: AKG
 Input: Signal: 1 / 15 (20) kHz / 92 dBμV
 Temperature: 20°C
 Supply Voltage: (2.2) / 3.0 Volt

Resolution Bandwidth: 1 kHz
 Video Bandwidth: 1 kHz

Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz
 Video Bandwidth: 1 kHz

Power Level: -40 dBm



Ref Lvl
-30 dBm

Marker 1 [T1]

-55.84 dBm
204.19649299 MHz

RBW

1 kHz

RF Att

0 dB

VBW

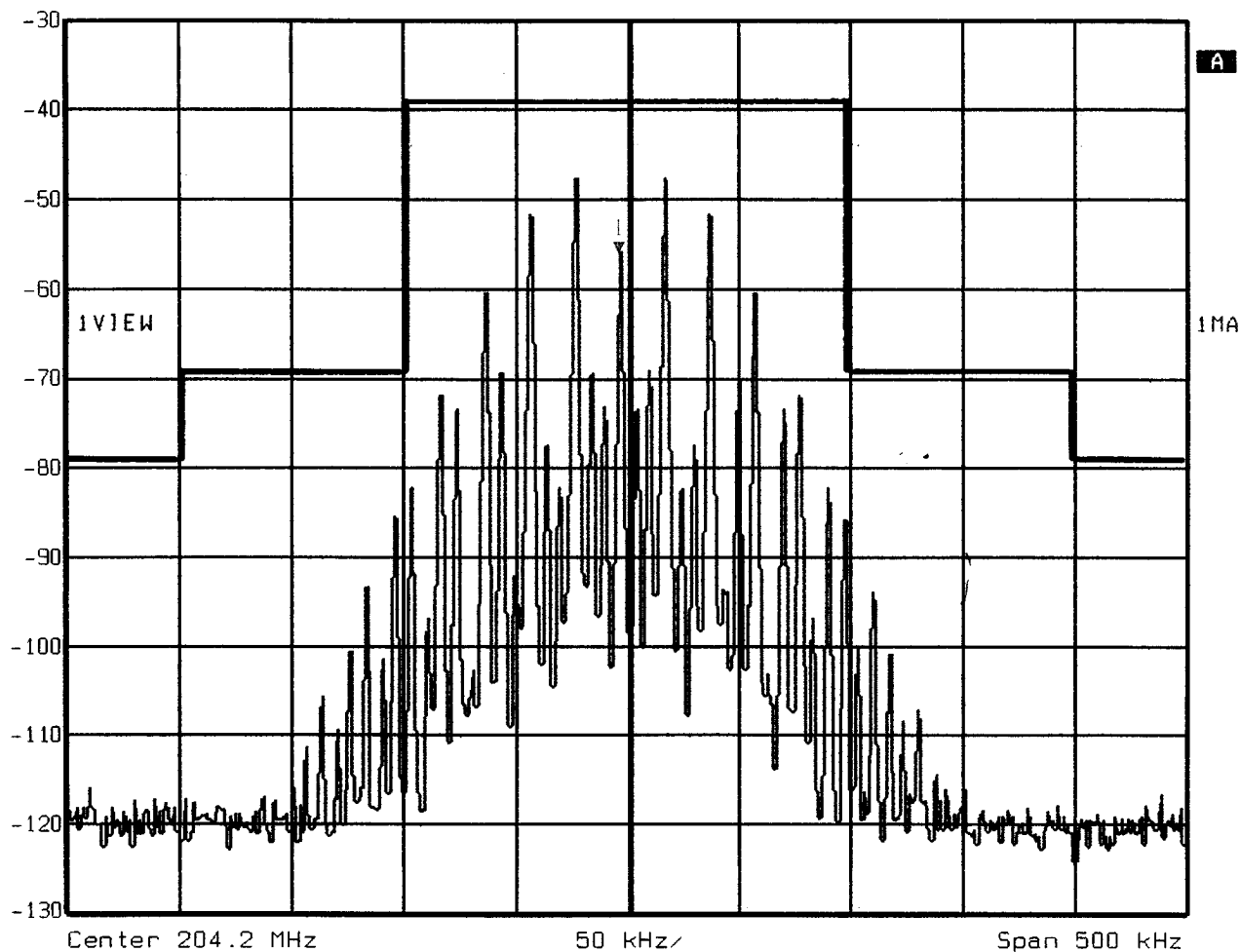
1 kHz

SWT

1.25 s

Unit

dBm



Date: 29.JAN.99 14:01:04

Bandwidth Plot according FCC Part 74.861

Type: HT61/EUS 12
Frequency: 204.2 MHz
Client: AKG

Input: Signal: 1 / 15 / (20) kHz / 92 dBμV
Temperature: 20°C
Supply Voltage: 2.2 / (3.0) Volt

Resolution Bandwidth: 1 kHz
Video Bandwidth: 1 kHz

Marker Value (Carrier unmodulated)

Resolution Bandwidth: 1 kHz
Video Bandwidth: 1 kHz

Power Level: -39 dBm

FCC ID: E9MHT60 A

Test-Setup:

Radiated emission 30 MHz - 1000 MHz (front view)



FCC ID: E9MHT60 **A**

Test-Setup:

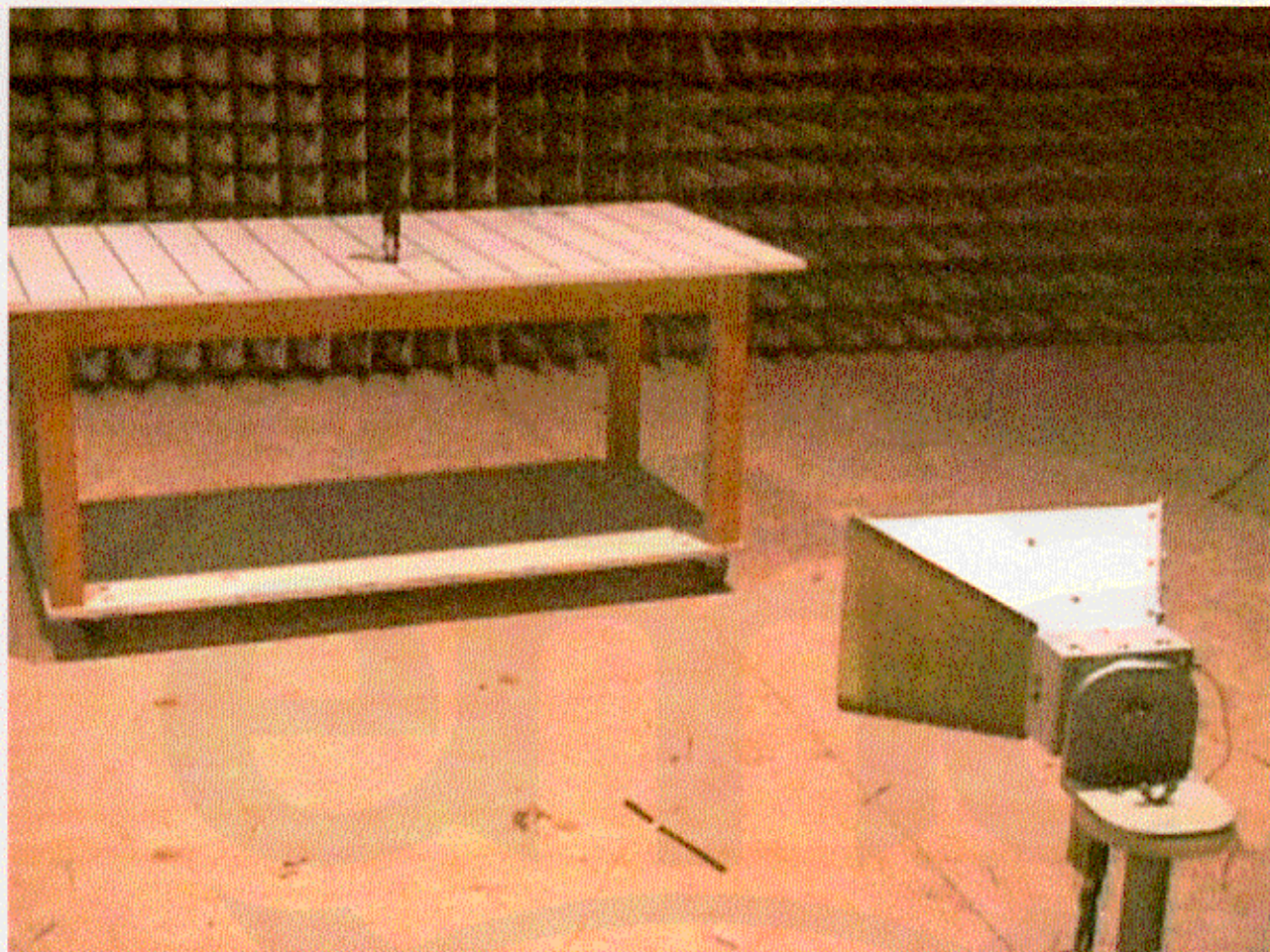
Radiated emission 30 MHz - 1000 MHz (back view)



FCC ID: E9MHT60 A

Test-Setup:

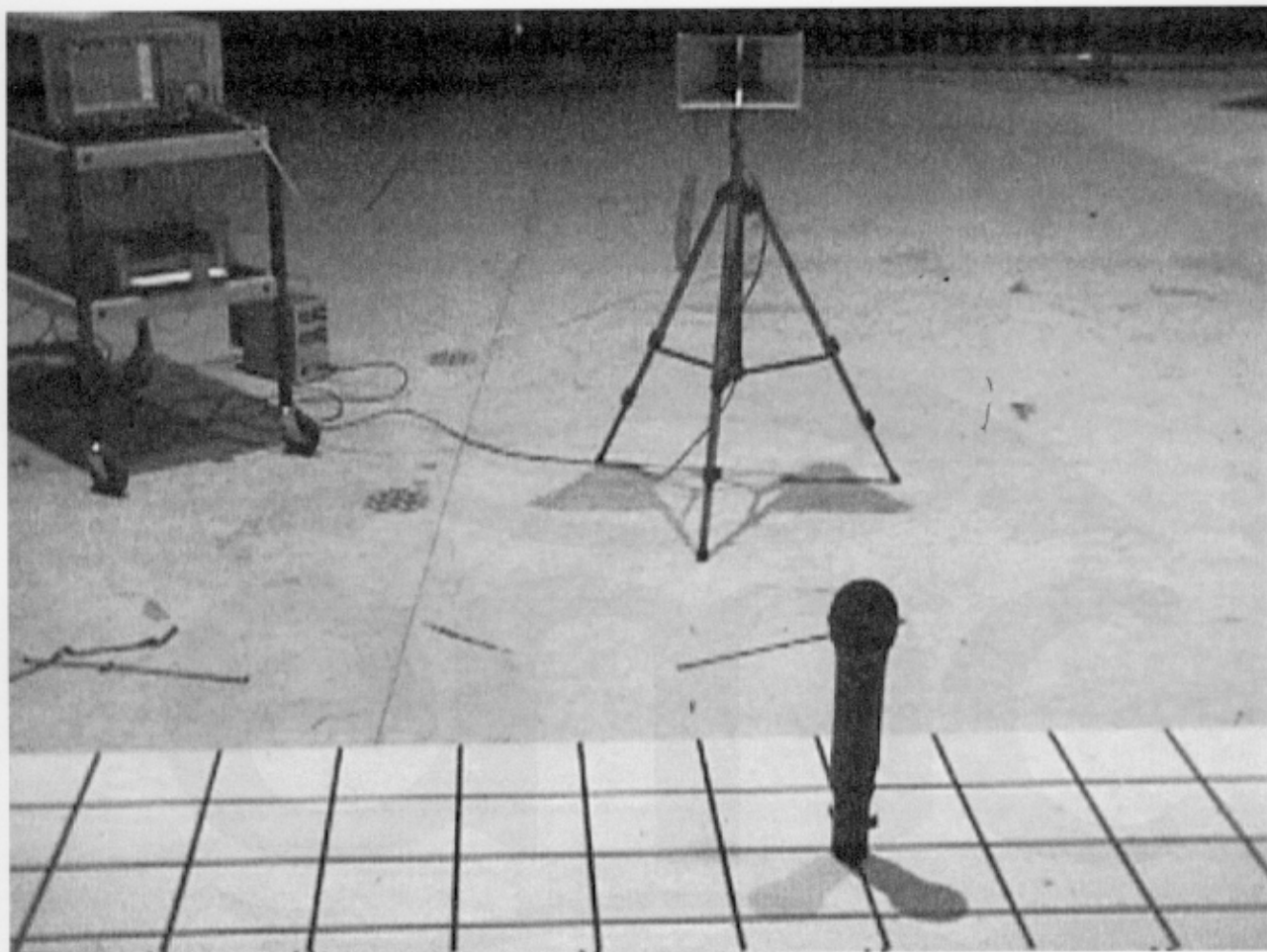
Radiated emission 1000 MHz - 10th harmonic of the fundamental wave (front view)



FCC ID: E9MHT60 A

Test-Setup:

Radiated emission 1000 MHz - 10th harmonic of the fundamental wave (back view)



ATTACHMENT: D

List Of Test Equipment

All used test instruments as well as the test accessories are calibrated and verified regularly.

Test Report No: T 15941-1-00 TW

Begin of Testing: 16.12.1998

Test ID	Model Type	Kind of equipment	Manufacturer	Equipment No.
EM	Drahtwendel-Antenne	Rod-Antenna	MIKES PRODUCT SERVICE	04-07/62-97-002
	CMS-54	Com. Receiver	Rohde & Schwarz	04-07/63-96-062
	FSEM - 30	Spectrum Analyser	Rohde & Schwarz	04-07/74-97-001
FE	Drahtwendel-Antenne	Rod-Antenna	MIKES PRODUCT SERVICE	04-07/62-97-002
	CMS-54	Com. Receiver	Rohde & Schwarz	04-07/63-96-062
	FSEM - 30	Spectrum Analyser	Rohde & Schwarz	04-07/74-97-001
MLD	Drahtwendel-Antenne	Rod-Antenna	MIKES PRODUCT SERVICE	04-07/62-97-002
	CMS-54	Com. Receiver	Rohde & Schwarz	04-07/63-96-062
	FSEM - 30	Spectrum Analyser	Rohde & Schwarz	04-07/74-97-001
SER2	UHALP-9107	Antenna	Schwarzbeck G.	04-07/62-92-047
	BBA-9106	Antenna	Schwarzbeck G.	04-07/62-92-048
	ESVP	Test Receiver	Rohde & Schwarz	04-07/63-89-008
SER3	Sucoflex 104	RF-cable 2m	Huber+Suhner	04-07/60-90-231
	BBHA-9120	Hornantenna	Schwarzbeck G.	04-07/62-88-212
	AMT-8035	Microwave-Amplifier	TransTech Hochfrequenztechni	04-07/66-89-218
	AMT-12435	Microwave-Amplifier	TransTech Hochfrequenztechni	04-07/66-89-219
	AWT-4534	Microwave-Amplifier	TransTech Hochfrequenztechni	04-07/66-90-217
	FSEM - 30	Spectrum Analyser	Rohde & Schwarz	04-07/74-97-001