

FCC ID: E9MGB40



EMISSION -- TESTREPORT

Testreport file no. : **T 20986-1-00 NF** Date : Sept. 09, 2001
of issue

Model : GB40 (WMS 40)

Type : Wireless Microphone System, Guitar Bug

Applicant : AKG Acoustics, U.S.

Manufacturer : Vtech Communications Ltd.

Licence holder : AKG Acoustics, U.S.

Address : 914 Airpark Center Dr.

Nashville, TN 37217, U.S.A.

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

:

POSITIV

This testreport with appendix consists of 44 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.

DIRECTORY

	Page
<u>A) Documentation</u>	
Directory	_____ 2
Test regulations	_____ 3
General information	_____ 4-5
Discovery of worst case condition	_____ 6
Equipment under Test	_____ 18
Summary	_____ 19
<u>B) Test data</u>	
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
<u>Attachment</u>	
A Test data	_____ A1-A14
D) List of Test Equipment	_____ B1-B2
C Photos of the test setup	_____ C1-C2
D Technical description of the test sample (e.g. CDF, Declaration)	_____ D1-D3
E Photos of the EUT	_____ E1-E4

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)

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 battery DC 1.5V

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 guitar bug transmitter GB 40 is used to transmit the audio signals from a guitar to an adequate receiver. The GB 40 is fixed at the guitar by a 6mm plug. There 3 different version are available: US54 (710.4 MHz) / US58 (734.6 MHz) and KR4 (750.9 MHz).

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 ± 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 GB 40 consists of 3 different versions (each working on a fixed frequency) US54, US58, and KR4. The 3 versions are technically identical except the following items:

- 3 different operating frequencies
- PCB. The boards are similar with differences only in the output filter. The filters on the PCB have the same configuration but have different combinations of resistors, coils and capacitors. 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 at the operating frequency of the 3 versions. This measurement have been performed in order to find out the transmitter with the maximum fieldstrength.
- Measurement of the radiated spurious emissions of the 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 the 3 versions. This measurement has been performed in order to find out, whether the modulation limiting data have different results at the different operating frequencies .
- Checking the occupied bandwidth with the maximum input level for the guitar bug on each version of the guitar bug at the operating frequency.

SUMMARIZING:

=> maximum fieldstrength: US58 (difference US58-KR4: 1.5 dB)
=> maximum spurious emission: KR4 (difference KR4-US58: 9.2 dB)
=> 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: KR4. This testresults are documented in the following sections of the testreport.

■ - Test not applicable

```

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

```

Description of Measurement

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

Testresult

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

File No. **T 20986-1-00 NF** , Page 7 of 19

FCC ID: E9MGB40

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 B: _____

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

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**☐ - Test not applicable☒ - Open-site 1☐ - Open-site 2☒ - 3 meters☐ - 10 meters☐ - 30 meters

For TEST EQUIPMENT USED please refer to ATTACHMENT B: 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

Testresult

The requirements are

■ - MET

○ - NOT MET

Min. limit margin > 40.0 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.

$P_{\text{max-KR4}} = 21.8 \text{ mW} \rightarrow 26.4 \text{ dB att. Max. field strength in}$

OATS: 84.4 dBμV/m. For plot see page .

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 B: SER3

Description of Measurement

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

FCC ID: E9MGB40

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 dBµV	+25.7	-41.7	-16	40 dBµV

Testresult

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

> 3.5 dB at 1.497 GHz

Max. limit exceeding

dB at GHz

Remarks: The limits are met. The measurement has been performed in Peak-mode.

Testresult in detail:

Frequency GHz	L: Peak dBµV	L: AV dBµV	Correct.	L: Peak dBµV/m	L: AV dBµV/m	Limit dBµV/m
1.497	96.2	--	-15.1	81.1	--	84.4
2.255	91.7	--	-11.1	80.6	--	84.4
2.627	58.1	--	-10.3	47.8	--	84.4
3.006	75.3	--	-9.7	65.6	--	84.4
3.756	68.0	--	-6.8	61.2	--	84.4
4.505	54.6	--	+0.1	54.7	--	84.4
5.258	50.4	--	-0.2	50.2	--	84.4
6.757	47.7	--	+0.4	51.7	--	84.4

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 B: _____

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

☐ - 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 B: 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 μ 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: GB 40 Version: KR4 working on 750.9 MHz

Input audio level/dBµV	$f_{\text{mod}} = 50 \text{ Hz}$		$f_{\text{mod}} = 7.5 \text{ kHz}$		$f_{\text{mod}} = 15 \text{ kHz}$	
	PFD/kHz	NFD/kHz	PFD/kHz	NFD/kHz	PFD/kHz	NFD/kHz
20	0.106	0.106	0.109	0.109	0.110	0.110
30	0.112	0.112	0.126	0.126	0.130	0.130
40	0.116	0.116	0.550	0.550	0.690	0.690
50	0.150	0.150	0.760	0.790	1.220	1.210
60	0.510	0.450	1.170	1.170	2.120	2.090
70	0.700	0.720	1.810	1.900	3.700	3.660
80	1.210	1.130	3.290	3.260	6.450	6.410
90	2.070	2.020	5.780	5.720	11.350	11.150
100	3.640	3.560	10.200	10.100	20.300	19.900
110	6.500	6.400	18.400	17.800	36.090	35.300
120	11.580	11.340	33.300	32.200	40.450	39.600
130	20.900	20.500	41.600	39.700	40.700	39.600
135	27.500	26.400	41.500	40.040	40.350	39.080
140	31.900	31.900	41.500	39.930	40.030	38.550

Remarks: The limit of $\pm 75 \text{ kHz}$ 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:

KR 4 working on 750.9 MHz:Max. measured frequency deviation: $\pm 41.6 \text{ kHz}$ 50% of the maximum deviation: $\pm 20.8 \text{ kHz}$ Audio input level (ail) to get $\pm 20.8 \text{ kHz}$: $L = 112.0 \text{ dB}\mu\text{V}$ $L + 16 \text{ dB}\mu\text{V} = 128.0 \text{ dB}\mu\text{V} \Rightarrow$ Level for testing the occupied bandwidthOccupied bandwidth:

version of EUT	KR4		KR4		KR4	
audio test level	$L = 128 \text{ dB}\mu\text{V}/1\text{kHz}$		$L = 128 \text{ dB}\mu\text{V}/7.5\text{kHz}$		$L = 128 \text{ dB}\mu\text{V}/15\text{kHz}$	
shape of emission mask	$\pm 50\text{-}100\%$ [dB]	$\pm 100\text{-}250\%$ [dB]	$\pm 50\text{-}100\%$ [dB]	$\pm 100\text{-}250\%$ [dB]	$\pm 50\text{-}100\%$ [dB]	$\pm 100\text{-}250\%$ [dB]
min. limit margin/dB	> 5	> 10	> 5	> 10	> 5	> 10

Remarks: The limit is kept. For plot see pages A9-A14.

FREQUENCY ERROR

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 B: 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		KR4					
Temperature/°C	DC supply voltage/V	Frequency error/kHz	Frequency error/kHz	Frequency error/kHz	Frequency error/kHz	Frequency error/kHz	Frequency error/kHz
-30	1.5	8.15	750.90815				
	1.2	7.83	750.90783				
-20	1.5	9.95	750.90995				
	1.2	9.31	750.90931				
-10	1.5	9.81	750.90981				
	1.2	9.19	750.90919				
0	1.5	7.88	750.90788				
	1.2	7.27	750.90727				
+10	1.5	5.31	750.90531				
	1.2	4.70	750.90470				
+20	1.5	1.43	750.90143				
	1.2	1.04	750.90104				
+30	1.5	-1.96	750.89804				
	1.2	-2.36	750.89764				
+40	1.5	-2.08	750.89792				
	1.2	-5.46	750.89454				
+50	1.5	-7.29	750.89271				
	1.2	-7.70	750.89230				

Remarks: The most strict limit for this frequency range is: 37.54 kHz
 (0.005% of 750.9 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 B: 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		KR4		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 92 dBµV	1.5	> 5	> 10				
	1.1	> 5	> 10				
15 kHz 92 dBµV	1.5	> 5	> 10				
	1.1	> 5	> 10				
20 kHz 92 dBµV	1.5	> 5	> 10				
	1.1	> 5	> 10				
1 kHz 50 mV	1.5	> 5	> 10				
	1.1	> 5	> 10				
10 kHz 50 mV	1.5	> 5	> 10				
	1.1	> 5	> 10				
20 kHz 50 mV	1.5	> 5	> 10				
	1.1	> 5	> 10				

Remarks: The limit is kept. The attenuation is related to the un-
 modulated carrier. For plot see page A3-A14.

EQUIPMENT UNDER TEST

Operation - mode of the EUT.:

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

- ☐ - Standby
- ☐ - Testprogram (H - Pattern)
- ☐ - Testprogram (color bar)
- ☐ - Testprogram (customer specific)
- ☒ - Transmit (unmodulated for radiated measurements and frequency error)
- ☒ - Transmit (modulated for bandwidth under extreme conditions
measurements)
- ☐ - _____

Configuration of the equipment under test: see appendix

Following periphery devices and interface cables were connected during the measurement:

- | | |
|-------------------------------|--------------|
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
-
- ☐ - unshielded power cable
 - ☐ - unshielded cables
 - ☐ - shielded cables
 - ☐ - customer specific cables
 - ☒ - no cables
 - ☐ - _____

MPS.No.:

S U M M A R Y

GENERAL REMARKS:

The product GB 40, version KR4 has been tested at the operating frequency
750.9 MHz

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

US54 (710.4 MHz)

US58 (734.6 MHz)

KR4 (750.9 MHz)

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

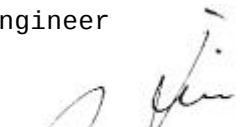
Testing Start Date : August 13, 2001

Testing End Date : August 31, 2001

- MIKES BABT PRODUCT SERVICE GmbH -

Test-engineer


Günter Mikes
Dipl.-Ing.(FH)


Nikolaus Fischer

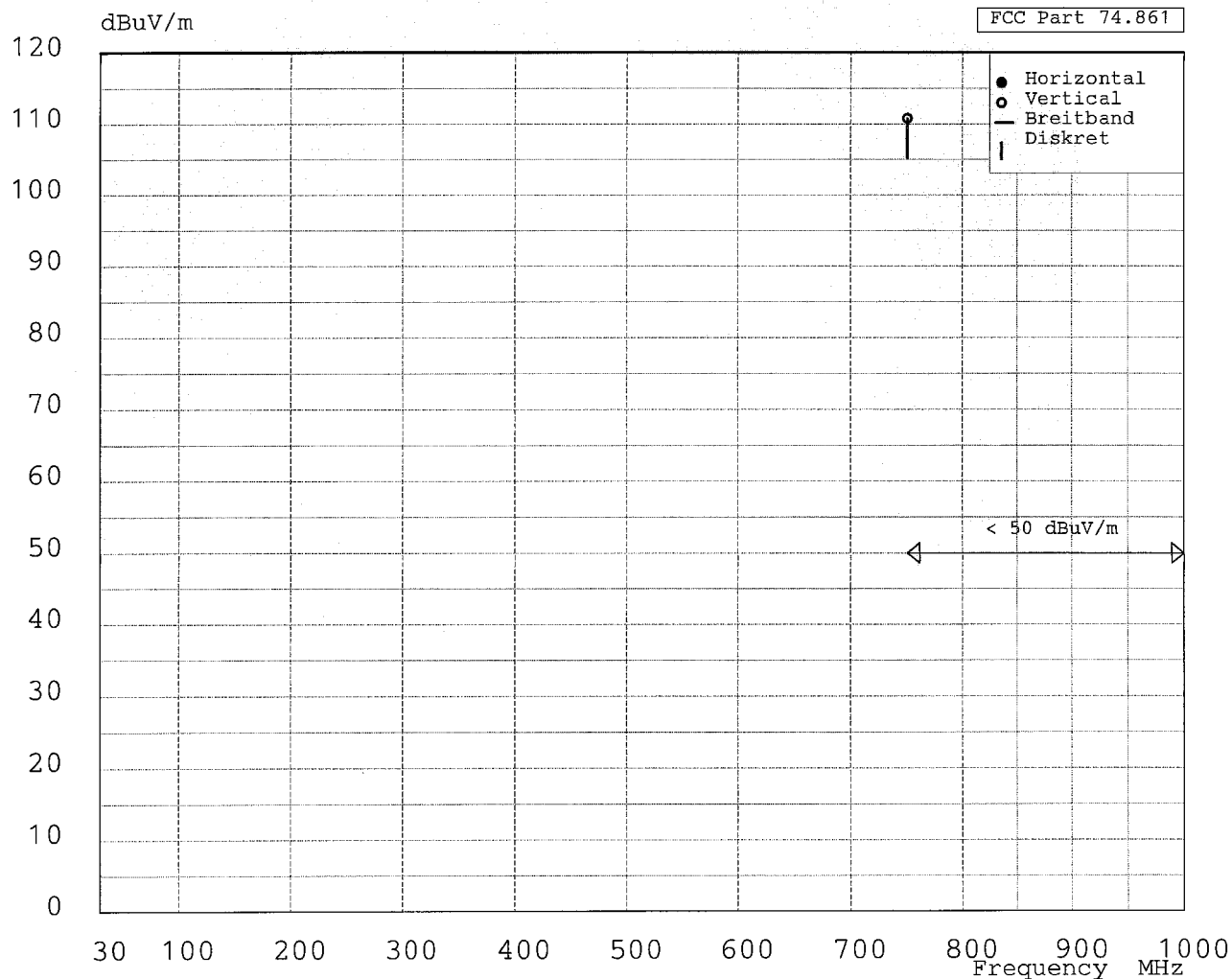
Radiation-Test

FCC ID: E9MGB40

accdg. 74.861

Typ: GB 40
Manufacturer: AKG
Client: AKG
Regulation: FCC
Order No.: 74.861
Operation Mode: T 20986-1-00
Remarks: TX-Mode

Testdistance: 3 m
Testreceiver: ESVP
Antenna: VULB
Testengineer: SUBP.H
Date: N.Fischer



Radiation-Test

accdg. 74.861

Typ: GB 40
Manufacturer: AKG
Client: AKG
Regulation: FCC
Order No.: 74.861
Operation Mode: T 20986-1-00
Remarks: TX-Mode

Testdistance: 3 m
Testreceiver: ESVP
Antenna: VULB
Testengineer: SUBP.H
Date: N.Fischer

Result	Frequency [MHz]	Reading [dBuV/m]	Korr [dB]	Final [dBuV/m]	Limit [dBuV/m]	DLimit [dB]	Polarisation	Noise
	750.90	78.67	32.13	110.80	120.00	9.20	Vertical	Diskret

Calculation of the max. power based on the fieldstrength measured in a distance of 3m.

GB 40, Version KR4

Fieldstrength E (LOG) = 110.8 dB μ V/m

Fieldstrength E (LIN) = 0.346 V/m

$$P = (E \times D)^2 / 49.5$$

$$P = (0.346 \text{ V/m} \times 3\text{m})^2 / 49.5 = 0.0217 \text{ W} = 21.7 \text{ mW}$$

Fri 2001 Aug 31 12:19

REF 0.0 dBm

MKR 750.8995 MHz

10dB/

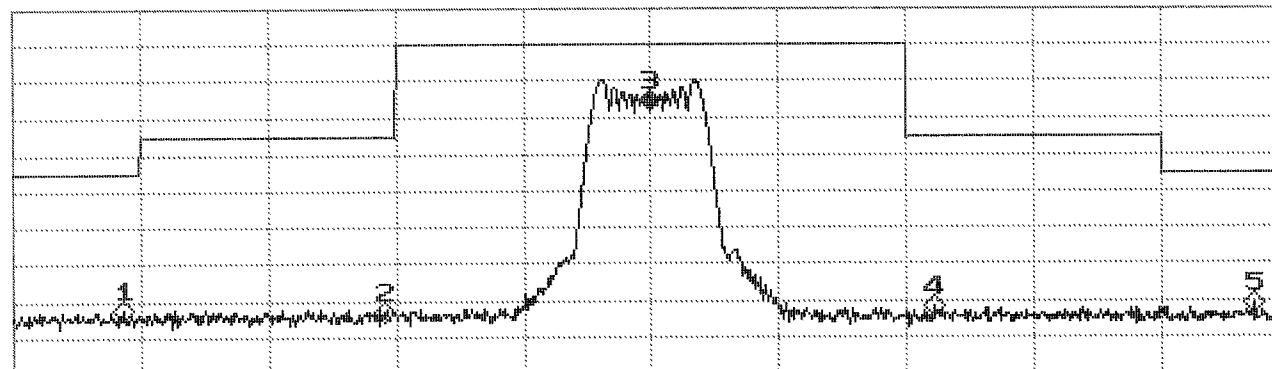
View

Posi

B_B1 ank

Norm

-25.12 dBm



CENTER 750.9000 MHz

SPAN 500.0 kHz

李 强 王 强

ClC1(Cl)CCCC(Cl)(Cl)C1Cl

SWP 1.0 S

ATT 10dB

Multi Marker List

1:	750.6930 MHz	-82.26 dBm
2:	750.7955 MHz	-82.79 dBm
3:	750.8995 MHz	-25.12 dBm
4:	751.0110 MHz	-81.89 dBm
5:	751.1360 MHz	-80.68 dBm
6:		
7:		
8:		
9:		
10:		
4:		

[illegible]

A3/A4

TX
RX
TRX

☐ A _____
☐ R _____
☐ M _____
☐ Info _____
☐ _____

☐ HE
☐ CPC
☐ CPR
☐ MFD
☐ ACP
☒ MB
☐ SEC
☐ SER
☐ FS
☐ DC

Fri 2001 Aug 31 12:21

REF 0.0 dBm

MKR 750.8985 MHz

10dB/

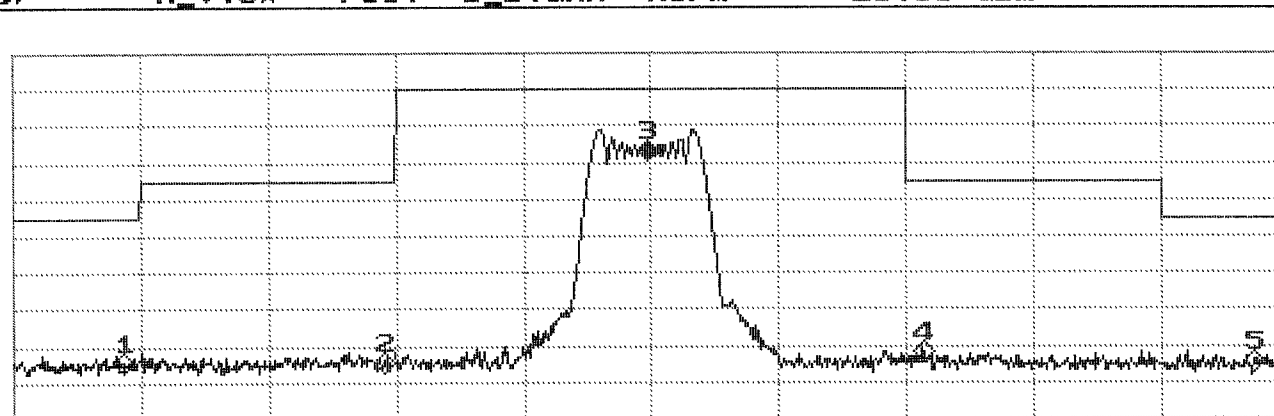
View

Pos i

001ank

Norm

-26.93 dBm



CENTER 750.9000 MHz

SPAN 500.0 kHz

Abstract

#VEM 1 KHZ

SWP 1.0 S

ATT 10dB

Multi Marker List

1:	750.6930 MHz	-84.70 dBm
2:	750.7955 MHz	-84.37 dBm
3:	750.8985 MHz	-26.93 dBm
4:	751.0065 MHz	-82.02 dBm
5:	751.1360 MHz	-84.21 dBm
6:		
7:		
8:		
9:		
10:		
4:		

[illegible]

A4/A14

☒ TX
☐ RX
☐ TRX

☐ **A** _____
☐ **R** _____
☐ **M** _____
☐ **Info** _____

☐ HE
☐ CPC
☐ CPF
☐ MFD
☐ ACF
☒ MB
☐ SEC
☐ SER
☐ FS
☐ DC

REF 0.0 dBm

10dB/

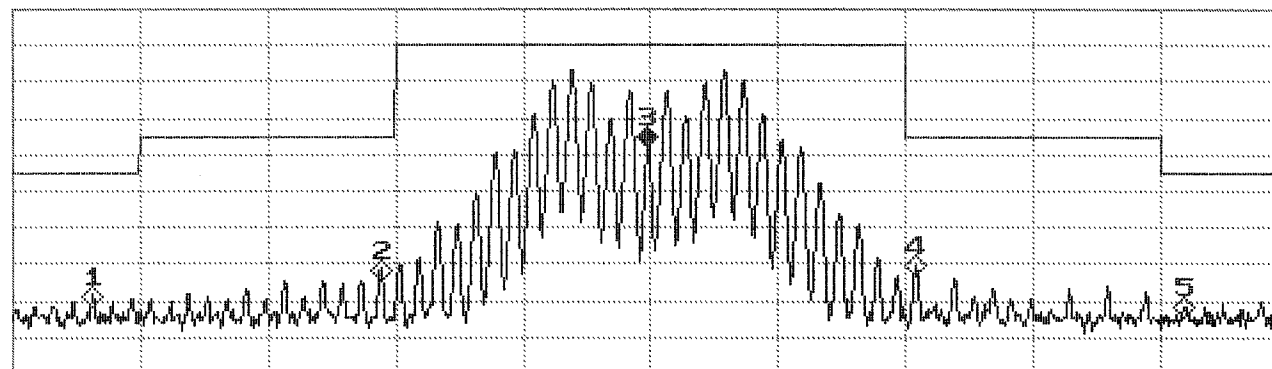
A_View

Posi

B_Blank

Norm

-35.39 dBm



CENTER 750.9000 MHz

SPAN 500.0 kHz

all REW 1 kHz

*VBW 1 KHZ

SWP 1.0 s

ATT 10dB

Multi Marker List

1:	750.6815 MHz	-78.83 dBm
2:	750.7945 MHz	-71.72 dBm
3:	750.8990 MHz	-35.39 dBm
4:	751.0040 MHz	-70.28 dBm
5:	751.1090 MHz	-81.52 dBm
6:		
7:		
8:		
9:		
10:		
4:		

Auftragsnr.: 7 20 186

Kunde: **AKG**

Gerät: *WHS, GUITAR BUG*

Modell: **G840**

Ser.Nr.: 116-KR4

Norm: FCC, SUBPART H

Unterpunkt: 74.867

Messung: CC. BANDWIDTH

Bemerkung: $+20^{\circ}\text{C} / +1.5\text{ VDC}$

Alt: 128 MB, 7.5 kHz

[illegible]

A5/A14

TX
RX
TRX

☐ A ☐ R ☐ M ☐ Info

☐ FE
☐ CPC
☐ CPR
☐ MED
☐ ACP
☒ MB
☐ SEC
☐ SER
☐ FS
☐ DC
☐ _____

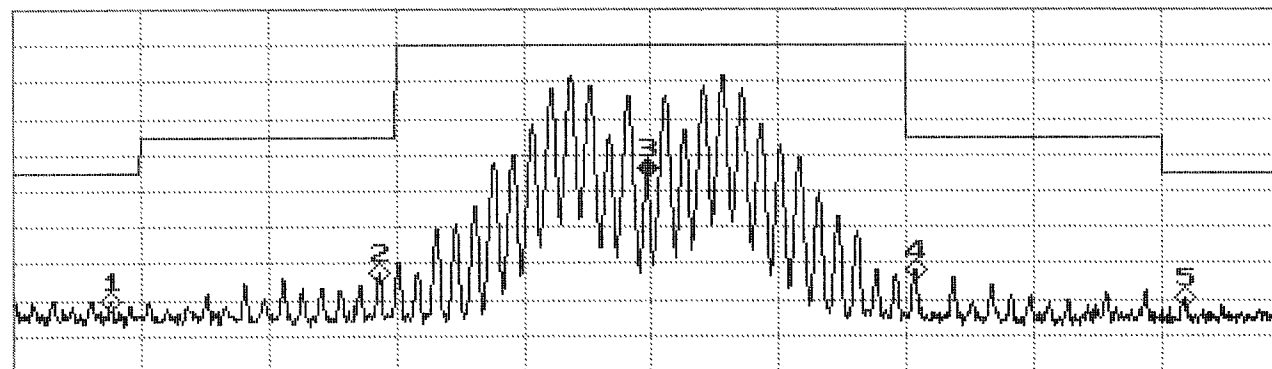
Fri 2001 Aug 31 12:52

REF 0.0 dBm

MKR 750.8980 MHz

10dB/ A_View Posi B_Blank Norm

-43.73 dBm



CENTER 750.9000 MHz

SPAN 500.0 kHz

```
*RBW 1 kHz
```

#VEW 1 kHz

SWP 1.0 S

ATT 10dB

Multi Marker List

1:	750.6885 MHz	-80.53 dBm
2:	750.7930 MHz	-72.73 dBm
3:	750.8980 MHz	-43.73 dBm
4:	751.0035 MHz	-71.93 dBm
5:	751.1085 MHz	-79.81 dBm
6:		
7:		
8:		
9:		
10:		
4:		

Auftragsnr.: **T 20986**

Kunde: **AKG**

Gerät: WTS, GUITAR BUG

Modell: **GB40**

Ser.Nr.: 116-KR4

Norm: FCC, SUBPART H

Unterpunkt: 74.867

Messung: OC, RANDWIDTH

Bemerkung: $+20^{\circ}\text{C}$, 1.7 V D

AIC: 128 dBmV, 7.5 KHz

[illegible]

A6 / A14

☒	TX
☐	RX
☐	TRX
☐	

☒ A ☐ R ☐ M ☐ Info ☐

☐ FE
☐ CPC
☐ CPF
☐ MFT
☐ ACF
☒ MB
☐ SEC
☐ SER
☐ FS
☐ DC
☐ _____

Fri 2001 Aug 31 13:18

REF 0.0 dBm

MKR 750.9005 MHz

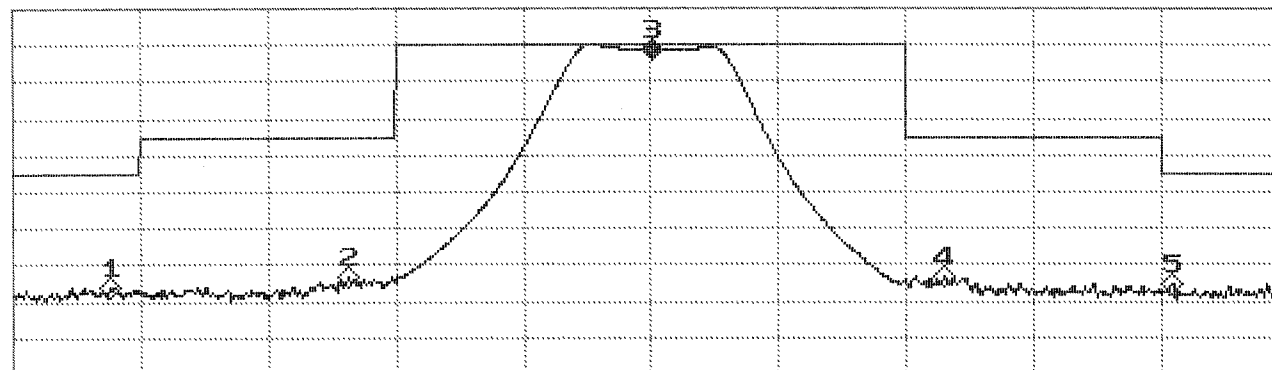
10dB/

View

Pos i B_Blank

Norm

-11.51 dBm



CENTER 750.9000 MHz

SPAN 500.0 kHz

#RBW 10 kHz

VIEW 10 kHz

SWP 20 ms

ATT 10dB

Multi Marker List

1:	750.6885 MHz	-75.96 dBm
2:	750.7815 MHz	-73.36 dBm
3:	750.9005 MHz	-11.51 dBm
4:	751.0150 MHz	-73.45 dBm
5:	751.1040 MHz	-75.10 dBm
6:		
7:		
8:		
9:		
10:		
4:		

Auftragsnr.: T 20 986

Kunde: **AKG**

Gerät: WMS, GUITAR BUG

Modell: **GB 40**

Ser.Nr.: 116-KR4

Norm: *FCC, SUBPART H*

Unterpunkt: 116-KR4

Messung: *EMISSION MASK*

Bemerkung: $+20^{\circ}\text{C}$, 1.5 VDC

Air: 4230 mV, 1 kHz

[illegible]

☒ TX
☐ RX
☐ TRX
☐ _____

☒ A ☐ R ☐ M ☐ Info

☐ HE
☐ CPC
☐ CPR
☐ MFD
☐ ACP
☒ MB
☐ SEC
☐ SER
☐ FS
☐ DC
☐ _____

A9/A14

Fri 2001 Aug 31 13:25

REF 0.0 dBm

10dB/

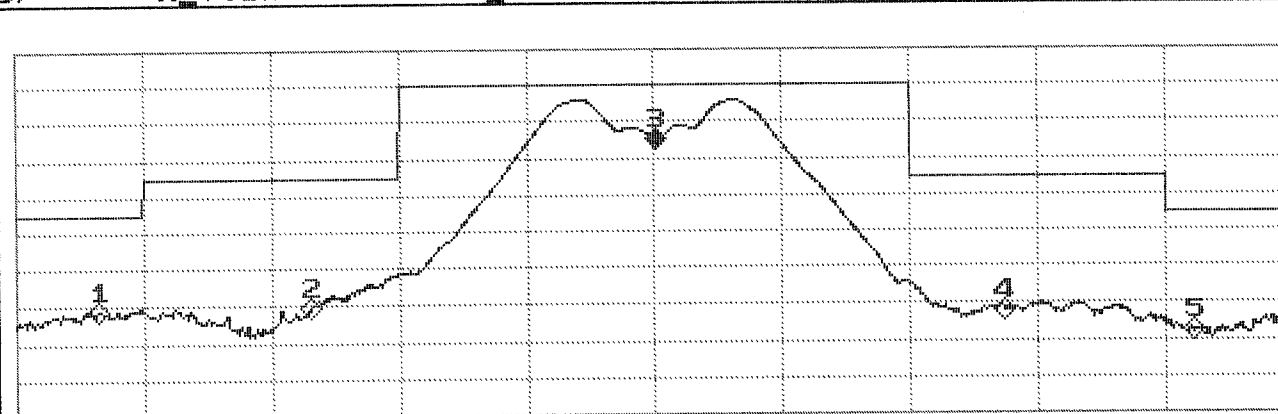
A View

Pos i B_Blank

Norm

MKR 750.9005 MHz

-24.87 dBm



CENTER 750.9000 MHz

SPAN 500.0 kHz

*RBW 10 KHz

VIEW 10 KHZ

SWP 20 ms

ATT 10dB

Multi Marker List

1:	750.6820 MHz	-71.12 dBm
2:	750.7655 MHz	-70.67 dBm
3:	750.9005 MHz	-24.87 dBm
4:	751.0370 MHz	-71.48 dBm
5:	751.1105 MHz	-77.20 dBm
6:		
7:		
8:		
9:		
10:		
4:		

Auftragsnr.: T 20986

Kunde: **AKG**

Gerät: *WHS, GUITAR BOG*

Modell: 6840

Ser.Nr.: 116-KR4

Norm: *FCL, SUBPART H*

Unterpunkt: 74. PG

Messung: *Emission Task*

Bemerkung: $+20^{\circ}\text{C} / -1.5^{\circ}\text{C}$

A1L: 4230mV, 7.5kHz

[illegible]

Am/474

TX	RX	TRX
■	□	□
□	□	□
□	□	□
□	□	□

☒ **A** ☐ **R** ☐ **M** ☐ **Info**

☐ FE
☐ CPC
☐ CPR
☒ MFD
☐ ACP
☐ MB
☐ SEC
☐ SER
☐ FS
☐ DC
☐ _____

Fri 2001 Aug 31 13:29

REF 0.0 dBm

MKR 750.8995 MHz

10dB/

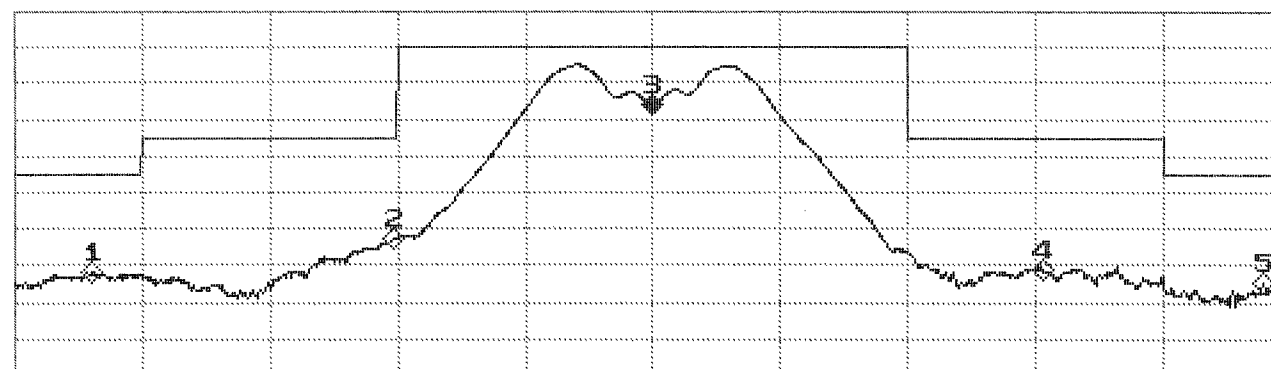
A View

Pos i

B_Blank

Norm

-26.30 dBm



CENTER 750.9000 MHz

SPAN 500.0 kHz

*RBW 10 kHz

VBW 10 kHz

SWP 20 ms

ATT 10dB

Multi Marker List

1:	750.6805 MHz	-72.13 dBm
2:	750.7980 MHz	-62.95 dBm
3:	750.8995 MHz	-26.30 dBm
4:	751.0525 MHz	-71.28 dBm
5:	751.1385 MHz	-74.93 dBm
6:		
7:		
8:		
9:		
10:		
4:		

Auftragsnr.: 7 20 986

Kunde: AKG

Gerät: *WMS, GUITAR BUG*

Modell: **GB 40**

Ser.Nr.: 126-KR4

Norm: FCC, SUBPART H

Unterpunkt: 74-86-1

Messung: *ERLICHSON HASSE*

Bemerkung: $+20^{\circ}\text{C}$, 1.2VDC

AIL: 4230 mV, 7.5 kHz

[illegible]

A12/A14

TX
RX
TRX

☐ **A** _____
☐ **R** _____
☐ **M** _____
☐ **Info** _____
☐ _____

☐ FE
☐ CPC
☐ CPR
☐ MFD
☐ ACP
☒ MB
☐ SEC
☐ SER
☐ FS
☐ DC

Fri 2001 Aug 31 13:33

REF 0.0 dBm

10dB/

View

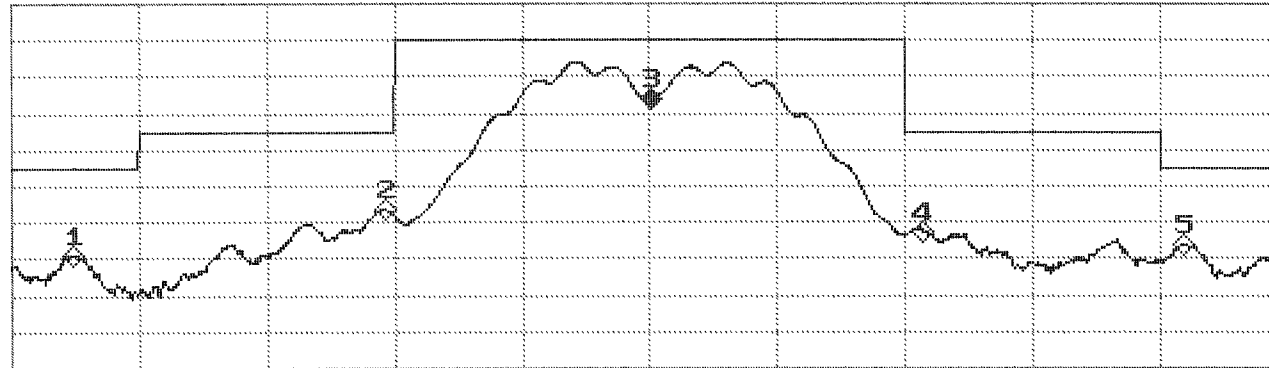
Posi

Blank

Norm

MKR 750.9005 MHz

-25.95 dBm



CENTER 750.9000 MHz

SPAN 500.0 kHz

#RBW 10 kHz

VBW 10 kHz

SAP 20 ms

ATT 10dB

Multi Marker List

1:	750.6745 MHz	-69.15 dBm
2:	750.7965 MHz	-56.28 dBm
3:	750.9005 MHz	-25.95 dBm
4:	751.0070 MHz	-62.38 dBm
5:	751.1090 MHz	-65.98 dBm
6:		
7:		
8:		
9:		
10:		
4:		

Auftragsnr.: 7 20 986

Kunde: **AKG**

Gerät: WHS, GUITAR BUG

Modell: 6840

Ser.Nr.: *ME-KR4*

Norm: FCC, SUBPART H

Unterpunkt: 74.867

Messung: *EMISSION MASK*

Bemerkung: $+20^{\circ}\text{C} / 1.5\text{V DC}$

A1L: 4230 mV, 15 kHz

Frequ. (MHz)	Ablw. (dBm)	Pol. (v,h)	Korr.F (dB)	Erg. (dBm)	Limit (dBm)
-----------------	----------------	---------------	----------------	---------------	----------------

☐ FE
☐ CPC
☐ CPR
☐ MFD
☐ ACP
☒ MB
☐ SEC
☐ SER
☐ FS
☐ DC
☐ _____

☒ A ☐ R ☐ M ☐ Info ☐

TX	RX	TRX
☒	☐	☐
☐	☐	☐

A13/A74

☐ FE
☐ CPC
☐ CPR
☐ MFD
☐ ACP
☒ MB
☐ SEC
☐ SER
☐ FS
☐ DC
☐ _____

Attachment : B

FCC ID: E9MGB40

List of Test Equipment

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

Test Report No: T 20986-1-00 NF

Beginning of Testing: 13-August-2001

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
CPR2	HCC	Controller Ant.-Mast	Rohde & Schwarz München	04-07/59-97-001
	RG 214 U	Antenna cable 2 m	Huber+Suhner	04-07/60-89-463
	HF 7/8 inch	Antenna cable 13 m	Huber+Suhner	04-07/60-99-001
	HF 7/8 inch	Antenna cable 20 m	Huber+Suhner	04-07/60-99-002
	HF 7/8 inch	Antenna cable 40 m	Huber+Suhner	04-07/60-99-003
	KR - 200	Coax Antenna Switch	Rosenberger HF-Technik	04-07/60-99-004
	VULB - 9165	Super-Broadband-Anten	Schwarzbeck G.	04-07/62-00-001
	ESVP	Test Receiver	Rohde & Schwarz München	04-07/63-89-008
	ESVP-EZM	Spectrum Monitor	Rohde & Schwarz München	04-07/74-86-016
	Antennenmast	Antenna mast	Rohde & Schwarz München	04-07/92-97-001
EM	LMV-1817	Noise meter	Leader	04-07/31-86-025
	SINOISE-1	Sinusgenerator	Fischer Metallbau	04-07/48-95-277
	CCIR-559	Filter	Ing.-Büro Rohrbacher	04-07/60-96-364
	UHF	Telescopic Rod Antenna	Conrad Elektronik GmbH	04-07/62-01-008
	UHF	Telescopic Rod Antenna	Conrad Elektronik GmbH	04-07/62-01-009
	CMS-54	Com. Receiver	Rohde & Schwarz München	04-07/63-94-052
	R 3162	Spectrum Analyzer	Advantest	04-07/74-00-001
FE	UHF	Telescopic Rod Antenna	Conrad Elektronik GmbH	04-07/62-01-008
	R 3162	Spectrum Analyzer	Advantest	04-07/74-00-001
	VLK 04/300	Climatic chamber	Heraeus -Vötsch GmbH	04-10/90-89-001
MLD	LMV-1817	Noise meter	Leader	04-07/31-86-025
	SINOISE-1	Sinusgenerator	Fischer Metallbau	04-07/48-95-277
	CCIR-559	Filter	Ing.-Büro Rohrbacher	04-07/60-96-364
	UHF	Telescopic Rod Antenna	Conrad Elektronik GmbH	04-07/62-01-008
	UHF	Telescopic Rod Antenna	Conrad Elektronik GmbH	04-07/62-01-009
	CMS-54	Com. Receiver	Rohde & Schwarz München	04-07/63-94-052
	R 3162	Spectrum Analyzer	Advantest	04-07/74-00-001
SER2	HCC	Controller Ant.-Mast	Rohde & Schwarz München	04-07/59-97-001
	RG 214 U	Antenna cable 2 m	Huber+Suhner	04-07/60-89-463
	HF 7/8 inch	Antenna cable 13 m	Huber+Suhner	04-07/60-99-001
	HF 7/8 inch	Antenna cable 20 m	Huber+Suhner	04-07/60-99-002

Test Report No: T 20986-1-00 NF

FCC ID: E9MGB40

Beginning of Testing: 13-August-2001

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
SER2	HF 7/8 inch	Antenna cable 40 m	Huber+Suhner	04-07/60-99-003
	KR - 200	Coax Antenna Switch	Rosenberger HF-Technik	04-07/60-99-004
	VULB - 9165	Super-Broadband-Anten	Schwarzbeck G.	04-07/62-00-001
	ESVP	Test Receiver	Rohde & Schwarz München	04-07/63-89-008
	ESVP-EZM	Spectrum Monitor	Rohde & Schwarz München	04-07/74-86-016
	Antennenmast	Antenna mast	Rohde & Schwarz München	04-07/92-97-001
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
	AWT-4534	Microwave-Amplifier	TransTech Hochfrequenztechn	04-07/66-90-217
	AMF-4B-040130-25P	Microwave-Amplifier	TransTech Hochfrequenztechn	04-07/66-97-001
	FSEM 30	Spectrum Analyser	Rohde & Schwarz München	04-07/74-97-001

CONSTRUCTIONAL DATAFORM FOR TESTING OF RADIO EQUIPMENT

Licence holder:	AKG Acoustics, U.S.		
Address:	914 Airpark Center Dr., Nashville, TN 37217, U.S.A.		
Manufacturer:	Vtech Communications Ltd		
Address:	Vtech Science Park, Xia Ling Bei Management Zone, Liabou, Dongguan Guangdong 523411		
Type:	GB40		
Model:			
Serial-No.:		Protection class:	

Additional informations to the above named model:

Antenna: transmitter:	Type: wire		
	Length/size: lambda/4		
	Type:		
	Length/size:		
Power supply of the transmitter: Type:	1 AAA Cell or NiCd	nominal voltage:	1.5 V
		lowest voltage:	1.05 V
		highest voltage:	1.6 V
		current consumption	~75mA@1.2V
Power supply of the receiver: Type:		nominal voltage:	V
		current consumption	A

Ancillary equipment:

Description: _____	Type: _____	Serial-no.: _____
Description: _____	Type: _____	Serial-no.: _____
Description: _____	Type: _____	Serial-no.: _____

Extreme temperature range in which the approval test should be performed:

O Category I: General (-20°C to +55°C)

X Category II: Portable (-10°C to +55°C)

O Category III: Equipment for normal indoor use (0°C to +55°C)

Connectable cables:

Name of the cable	Digital	Length/m	shielded
	O yes O no		O yes O no
	O yes O no		O yes O no
	O yes O no		O yes O no
	O yes O no		O yes O no
	O yes O no		O yes O no

O If applicable, if necessary complete overleaf**Page D1**

Applicant: _____ AKG _____ Model-name: _____ GB40 _____

Type designation:
GB40**Name and type designation of individual units comprising the radio equipment:****Type of equipment:**

- | | | | |
|---|--|---|-------------------------------|
| ☐ Radiotelephone equipment | ☐ Remote-control equipment | ☐ Radiomaritime equipment | ☐ LPD |
| ☐ One-way radiotelephone equipment | ☐ Inductive loop system | ☐ Inland waterways equipment | ☐ RLAN |
| ☐ Personal paging system | ☐ Radio-relay system | ☐ Radionavigation equipm. | X wireless microphone |
| ☐ Satellite earth station | ☐ CB radiotelephone equipment | ☐ Antenna | ☐ |
| ☐ Data transmission equipment | ☐ Movement detector | ☐ Aeronautical equipment | ☐ |

Technical characteristics:

	Transmitter-receiver	Transmitter	Receiver
Frequency range		710.4..750.9MHz FCC (710.4..864.375 Europe)	
Maximum no. of channels			
Channel spacing		200k	
Class of emission (type of modulation)		200KF3E	
Maximum RF output power			
Maximum effective radiated power (ERP)		4mW+-3dB	
Output power variable		no	
Channel switching frequency range		1 channel	
Method of frequency generation	☐ Synthesizer X Crystal ☐ 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	4.23Vrms for 60% of maximum deviation at 1kHz audio bandwidth 50Hz-15kHz; input impedance 370kOhm		
Modes of operation	☐ Duplex mode ☐ Semi-duplex mode X Simplex mode		
Power source	☐ Mains ☐ Vehicle-regulated x Integral		
Antenna socket	☐ BNC ☐ TNC ☐ N ☐ M ☐ UHF ☐ Adapter X None ☐		

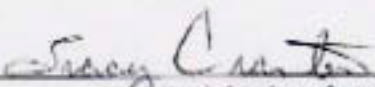
Test specifications:**FCC Part 74, Part 90.265****O If applicable, if necessary complete overleaf****Page D 2**

FCC ID: E9MGB40

Declarations:

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

Nashville, 13.9.01
place of issue, date


Seal and signature of applicant

issued: Peter Tiefenthaler
Vice President, Market Development
AKG Acoustics, U.S.