

FCC ID: E9MTM40



EMISSION -- TESTREPORT

Testreport file no. : **T23829-00-00KJ** Date : October 30, 2003
of issue

Model : Transmitter module for microphones

Type : TM40

Applicant : AKG Acoustics , U.S.

Manufacturer : Vtech Communications Ltd / AKG Acoustics

Licence holder : AKG Acoustics, U.S.

Address : 914 Airpark Center Drive, Nashville TN 37217

United States of America

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

POSITIVE

This testreport with appendix consists of **85** 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	<u>2</u>
Test regulations	<u>3</u>
General information	<u>4-5</u>
Discovery of worst case condition	<u>6</u>
Equipment under Test	<u>24</u>
Summary	<u>25</u>
<u>B) Testdata</u>	
Conducted emissions 10/150 kHz - 30 MHz	<u>7</u>
Spurious emissions (magnetic field) 10 kHz - 30 MHz	<u>8</u>
Spurious emissions (electric field) 30 MHz - 1000 MHz	<u>9-10</u>
Spurious emissions (electric field) 1 GHz - 18 GHz	<u>11-12</u>
Field strength of the fundamental wave	<u>13-15</u>
Conducted power of the fundamental wave measured on the antenna terminals	<u>16</u>
Modulation limiting data	<u>17-20</u>
Frequency error	<u>21</u>
Keeping the requirements of the emission mask	<u>22-23</u>
<u>Attachment</u>	
A) Test data	<u>A1-A48</u>
B) List of test equipment	<u>B1</u>
C) Photos of the test setup	<u>C1-C4</u>
D) Technical description of the test sample (e.g. CDF, Declaration)	<u>D1-D3</u>
E) External photos of the EuT	<u>E1-E2</u>
Internal photos of the EuT	<u>E3-E4</u>

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 1.5 V

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 TM40 is a WMS 40 microtools series miniature transmitter module specifically designed for direct connection to the D 880^M, D 3700^M, D 3800^M, C 900^M, and C 5900^M microphones.

The TM40 operates on a single fixed, quartz stabilized carrier frequency.

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

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.

MEASUREMENT PROTOCOL FOR FCC, VCCI AND AUSTEL

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 TM40 consists of 10 different versions US54, US54B, US58, US58B, KR3, US60A, KR4, US60B, EU62 and EU62B.

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

All the 10 versions are technically identical except the following items:

- 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:

The complete measurement was performed on 3 versions:

- US54 working on 710.400 MHz (lowest channel of the frequency band)
- US60B working on 751.550 MHz (middle channel of the frequency band)
- EU62B working on 805.100 MHz (highest channel of the frequency band)

TEST RESULT**CONDUCTED EMISSIONS - 10/150 kHz - 30 MHz**

■ - Test not applicable

Testlocation :

o - Shielded room no.

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: _____

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

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

o - Test not applicable

- - Landshuter Straße 211a, D-94315 Straubing
- - 3 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

Testresult

EuT: TM40 (Set US 54 working on 710.400 MHz)

Frequency [MHz]	Reading Vert. [dB μ V]	Reading Hor. [dB μ V]	Correct. Vert. [dB]	Correct. Hor. [dB]	Level Vert. [dB μ V/m]	Level Hor. [dB μ V/m]	Limit [dB μ V/m]	Dlimit [dB]
30 - 1000	-	-	-	-	<35	<35	84.4	49.4

The requirements are

■ - MET

o - NOT MET

Min. limit margin

> 49.4 dB at 30-1000 MHz

Max. limit exceeding

_____ dB at _____ MHz

Remarks: The emissions have to be att. 43+10log(P in W) below the carrier.P_{max, CH F} = 3.22 mW --> 18.08 dB att. Max. field strength inOATS: 84.42 dB μ V/m.

EuT: TM40 (Set US 60 B working on 751.550 MHz)

Frequency [MHz]	Reading Vert. [dBµV]	Reading Hor. [dBµV]	Correct. Vert. [dB]	Correct. Hor. [dB]	Level Vert. [dBµV/m]	Level Hor. [dBµV/m]	Limit [dBµV/m]	Dlimit [dB]
30 - 1000	-	-	-	-	<35	<35	84.4	49.4

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

> 49.4 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. $P_{\text{max. CH F}} = 1.85 \text{ mW} \rightarrow 15.67 \text{ dB att. Max. field strength in}$

OATS: 84.43 dBµV/m.

EuT: TM40 (Set EU 62 B working on 805.100 MHz)

Frequency [MHz]	Reading Vert. [dBµV]	Reading Hor. [dBµV]	Correct. Vert. [dB]	Correct. Hor. [dB]	Level Vert. [dBµV/m]	Level Hor. [dBµV/m]	Limit [dBµV/m]	Dlimit [dB]
30 - 1000	-	-	-	-	<35	<35	84.4	49.4

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

> 49.4 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. $P_{\text{max. CH F}} = 2.48 \text{ mW} \rightarrow 16.94 \text{ dB att. Max. field strength in}$

OATS: 84.46 dBµV/m.

SPURIOUS EMISSION 1 GHz - 18 GHz

o - Test not applicable

Testlocation :

- - Full compact chamber
- - 3 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.

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

EuT: TM40 (Set US 54 working on 710.400 MHz)

Frequency [MHz]	Reading Vert. [dB μ V]	Reading Hor. [dB μ V]	Correct. Vert. [dB]	Correct. Hor. [dB]	Level Vert. [dB μ V/m]	Level Hor. [dB μ V/m]	Limit [dB μ V/m]	Dlimit [dB]
1068	43.2	44.4	-6.8	-6.8	36.4	37.6	84.4	46.8
1424	41.0	40.9	-5.3	-5.3	35.7	35.6	84.4	48.8
1780	38.7	40.0	-3.6	-3.6	35.1	36.4	84.4	48.0
2132	53.2	57.2	-2.3	-2.3	50.9	54.9	84.4	29.5
2488	40.5	41.2	-1.1	-1.1	39.4	40.1	84.4	44.3
2844	38.4	38.3	0.6	0.6	39.0	38.9	84.4	45.4
3200	38.3	38.5	1.9	1.9	40.2	40.4	84.4	44.0

The requirements are

■ - MET

O - NOT MET

Min. limit margin

29.5 dB at 2.132 GHz

Max. limit exceeding

_____ dB at _____ GHz

EuT: TM40 (Set US 60 B working on 751.550 MHz)

Frequency [MHz]	Reading Vert. [dBµV]	Reading Hor. [dBµV]	Correct. Vert. [dB]	Correct. Hor. [dB]	Level Vert. [dBµV/m]	Level Hor. [dBµV/m]	Limit [dBµV/m]	Dlimit [dB]
1128	42.4	44.3	-6.5	-6.5	35.9	37.8	84.4	46.6
1504	39.4	43.1	-4.9	-4.9	34.5	38.2	84.4	46.2
1904	38.4	39.5	-3.0	-3.0	35.4	36.5	84.4	47.9
2256	46.8	49.4	-1.9	-1.9	44.9	47.5	84.4	36.9
2632	41.6	43.2	-0.5	-0.5	41.1	42.7	84.4	41.7
2928	38.1	39.6	1.0	1.0	39.1	40.6	84.4	43.8

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

36.9 dB at 2.256 GHz

Max. limit exceeding

 dB at GHz

EuT: TM40 (Set EU 62 B working on 805.100 MHz)

Frequency [MHz]	Reading Vert. [dBµV]	Reading Hor. [dBµV]	Correct. Vert. [dB]	Correct. Hor. [dB]	Level Vert. [dBµV/m]	Level Hor. [dBµV/m]	Limit [dBµV/m]	Dlimit [dB]
1612	42.3	44.2	-4.4	-4.4	37.9	39.8	84.4	44.6
2016	38.7	40.5	-2.6	-2.6	36.1	37.9	84.4	46.5
2416	50.7	54.7	-1.4	-1.4	49.3	53.3	84.4	31.1
3628	41.4	43.4	3.3	3.3	44.7	46.7	84.4	37.7

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

31.1 dB at 2.416 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.

FIELD STRENGTH OF THE FUNDAMENTAL WAVE

o - Test not applicable

Testlocation :

- - Landshuter Straße 211a, D-94315 Straubing
- - 3 meters

For TEST EQUIPMENT USED please refer to ATTACHMENT D: CPR2

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

Example of calculation of the max. power based on the fieldstrength measured in a distance of 3 m:

Fieldstrength E (LOG) = 109.6 dBµV/m
 Fieldstrength E (LIN) = 0.302 V/m

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

$$P = (0.302 \text{ V/m} \times 3 \text{ m})^2 / 49.5 = 0.0169 \text{ W} = \underline{\underline{16.6 \text{ mW}}}$$

TestresultEuT: TM40 (Set US 54 working on 710.400 MHz)

Frequency [MHz]	Reading Vert. [dBµV]	Reading Hor. [dBµV]	Correct. Vert. [dB]	Correct. Hor. [dB]	Level Vert. [dBµV/m]	Level Hor. [dBµV/m]	Limit [dBµV/m]	Dlimit [dB]
710.406	77.3	63.5	25.2	25.2	102.5	88.7	121.4	18.9

P = 3.22 mW

The requirements are

■ - MET**O - NOT MET**

Min. limit margin

18.9 dB at 710.406 MHz

Max. limit exceeding

 dB at MHzEuT: TM40 (Set US 60 B working on 751.550 MHz)

Frequency [MHz]	Reading Vert. [dBµV]	Reading Hor. [dBµV]	Correct. Vert. [dB]	Correct. Hor. [dB]	Level Vert. [dBµV/m]	Level Hor. [dBµV/m]	Limit [dBµV/m]	Dlimit [dB]
751.560	74.3	57.8	25.8	25.8	100.1	83.6	121.4	21.3

P = 1.85 mW

The requirements are

■ - MET**O - NOT MET**

Min. limit margin

21.3 dB at 751.560 MHz

Max. limit exceeding

 dB at MHz

EuT: TM40 (Set EU 62 B working on 805.100 MHz)

Frequency [MHz]	Reading Vert. [dBµV]	Reading Hor. [dBµV]	Correct. Vert. [dB]	Correct. Hor. [dB]	Level Vert. [dBµV/m]	Level Hor. [dBµV/m]	Limit [dBµV/m]	Dlimit [dB]
805.105	74.6	58.6	26.8	26.8	101.4	85.4	121.4	20.0

P = 2.48 mW

The requirements are

■ - MET**○ - NOT MET**

Min. limit margin

20.0 dB at 805.105 MHz

Max. limit exceeding

 dB at MHzRemarks: The limits are met.

CONDUCTED POWER OF THE FUNDAMENTAL WAVE MEASURED ON THE ANTENNA TERMINALS

■ - Test not applicable

Testlocation :

o - Shielded room no.

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

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								

The requirements are

O - MET

O - NOT MET

Remarks: _____ Not applicable.

MODULATION LIMITING DATA

o - Test not applicable

Testlocation :

■ - Shielded room no. 5

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 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

EuT: TM40 (Set US 54 working on 710.400 MHz)

Input audio level/dB μ V	$f_{\text{mod}} = 50 \text{ Hz}$		$f_{\text{mod}} = 1 \text{ kHz}$		$f_{\text{mod}} = 20 \text{ kHz}$	
	PFD/kHz	NFD/kHz	PFD/kHz	NFD/kHz	PFD/kHz	NFD/kHz
20	1.2	1.2	1.2	1.3	1.7	1.8
30	1.1	1.2	1.2	1.3	3.1	3.1
40	1.2	1.2	1.5	1.5	5.3	5.4
50	1.7	1.6	2.0	2.0	8.9	9.2
60	2.5	2.6	3.2	3.3	15.9	16.0
70	4.5	4.5	5.6	5.7	28.9	28.9
80	8.0	8.0	10.0	10.0	44.5	44.5
90	14.3	14.3	17.6	17.9	45.7	45.8
100	26.3	26.1	32.0	32.4	45.7	45.7
109.6	39.6	40.5	42.2	47.9	45.4	45.5

The requirements are

■ - MET

○ - NOT MET

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:

EuT: TM40 (Set US 54 working on 710.400 MHz)

Max. measured frequency deviation: $\pm 47.9 \text{ kHz}$ 50% of the maximum deviation: $\pm 23.9 \text{ kHz}$ Audio input level (ail) to get $\pm 23.9 \text{ kHz}$: $L = 95.3 \text{ dB}\mu\text{V}$ $L + 16 \text{ dB}\mu\text{V} = 111.3 \text{ dB}\mu\text{V} \Rightarrow$ Level for testing the occupied bandwidth**Occupied bandwidth:**

version of EUT	US 54		US 54		US 54		US 54	
audio test level	L = 111.3 dB μ V 1 kHz		L = 111.3 dB μ V 7.5 kHz		L = 111.3 dB μ V 15 kHz		L = 111.3 dB μ V 20 kHz	
shape of emission mask	± 50 -100% [dB]	± 100 -250% [dB]	± 50 -100% [dB]	± 100 -250% [dB]	± 50 -100% [dB]	± 100 -250% [dB]	± 50 -100% [dB]	± 100 -250% [dB]
min. limit margin/dB	> 25	> 30	> 15	> 30	> 15	> 25	> 10	> 25

Remarks: The limit is kept. For plot see pages A1-A4

Testresult

EuT: TM40 (Set US 60 B working on 751.550 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	0.8	0.8	0.8	0.9	1.1	1.1
30	0.8	0.7	0.8	0.9	1.9	1.9
40	0.8	0.7	0.8	0.9	1.8	1.9
50	1.0	1.0	1.3	1.3	5.5	5.5
60	1.5	1.6	2.1	2.1	9.5	9.5
70	2.6	2.6	3.6	3.7	16.8	17.0
80	4.6	4.7	6.4	6.4	28.9	29.0
90	8.5	8.4	11.2	11.6	30.9	31.0
100	15.1	15.1	20.2	20.6	31.1	31.1
109.6	24.9	24.9	30.1	30.1	31.1	31.1

The requirements are

■ - MET

○ - NOT MET

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:

EuT: TM40 (Set US 60 B working on 751.550 MHz)

Max. measured frequency deviation: ± 31.1 kHz50% of the maximum deviation: ± 15.6 kHzAudio input level (ail) to get ± 15.6 kHz: L = 68.6 dBμV

L + 16 dBμV = 84.4 dBμV => Level for testing the occupied bandwidth

Occupied bandwidth:

version of EUT	US 60 B		US 60 B		US 60 B		US 60 B	
audio test level	L = 84.4 dBμV 1 kHz		L = 84.4 dBμV 7.5 kHz		L = 84.4 dBμV 15 kHz		L = 84.4 dBμV 20 kHz	
shape of emission mask	±50-100% [dB]	±100-250% [dB]	±50-100% [dB]	±100-250% [dB]	±50-100% [dB]	±100-250% [dB]	±50-100% [dB]	±100-250% [dB]
min. limit margin/dB	> 35	> 30	> 35	> 30	> 25	> 30	> 20	> 30

Remarks: The limit is kept. For plot see pages A5-A8

Testresult

EuT: TM40 (Set EU 62 B working on 805.100 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	1.0	1.0	1.0	1.0	1.5	1.5
30	0.9	0.9	1.0	1.0	2.4	2.4
40	0.9	1.0	1.1	1.2	4.0	4.1
50	1.1	1.2	1.6	1.6	6.9	6.9
60	1.8	1.9	2.6	2.6	11.8	12.0
70	3.2	3.1	4.5	4.6	21.5	21.7
80	5.6	5.7	8.0	8.0	35.7	35.9
90	10.0	10.3	14.4	14.4	37.6	37.7
100	18.3	18.3	25.3	25.8	37.7	37.7
109.6	30.8	30.8	37.3	38.1	37.7	37.8

The requirements are

■ - MET

○ - NOT MET

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:

EuT: TM40 (Set EU 62 B working on 805.100 MHz)

Max. measured frequency deviation: ± 38.1 kHz50% of the maximum deviation: ± 19.05 kHzAudio input level (ail) to get ± 19.05 kHz: L = 94.8 dBμV

L + 16 dBμV = 110.8 dBμV => Level for testing the occupied bandwidth

Occupied bandwidth:

version of EUT	EU 62 B		EU 62 B		EU 62 B		EU 62 B	
audio test level	L = 110.8 dBμV 1 kHz		L = 110.8 dBμV 7.5 kHz		L = 110.8 dBμV 15 kHz		L = 110.8 dBμV 20 kHz	
shape of emission mask	±50-100% [dB]	±100-250% [dB]	±50-100% [dB]	±100-250% [dB]	±50-100% [dB]	±100-250% [dB]	±50-100% [dB]	±100-250% [dB]
min. limit margin/dB	> 30	> 30	> 20	> 30	> 15	> 30	> 10	> 25

Remarks: The limit is kept. For plot see pages A9-A12

FREQUENCY ERROR

o - Test not applicable

Testlocation :

- - Test location 1
- - 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:

Frequency range of equipment		US 54 710.400 MHz	US 60 B 751.550 MHz	EU 62 B 805.100 MHz	
Temperature/°C	DC supply voltage/V	Frequency error/kHz	Frequency error/kHz	Frequency error/kHz	Frequency error/kHz
-30	1.6	-2.7	3.9	4.0	
	1.05	-2.9	3.4	3.9	
-20	1.6	2.4	6.1	6.3	
	1.05	2.3	5.9	6.1	
-10	1.6	3.6	8.0	7.6	
	1.05	3.3	7.6	7.6	
0	1.6	3.0	5.6	6.4	
	1.05	3.0	5.4	6.3	
+10	1.6	1.7	2.9	3.3	
	1.05	1.4	2.9	3.1	
+20	1.6	-1.0	-1.3	-1.4	
	1.05	-0.9	-1.1	-1.6	
+30	1.6	-3.1	-3.3	-3.7	
	1.05	-3.3	-3.3	-4.0	
+40	1.6	-5.0	-5.7	-6.6	
	1.05	-5.0	-6.7	-6.9	
+50	1.6	-6.1	-8.4	-9.1	
	1.05	-6.4	-9.0	-9.6	

The requirements are

■ - MET

o - NOT MET

Remarks: The most strict limit for this frequency range is: 35.52 kHz (0.005% of 710.400 MHz)

KEEPING THE REQUIREMENTS OF THE EMISSION MASK

o - Test not applicable

Testlocation :

■ - Shielded room no. 5

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

Frequency range of equipment		US 54 710.400 MHz	
input modulation	DC supply voltage [V]	±50-100% [dB]	±100-250% [dB]
1 KHz	1.6	> 25	> 30
111.3 dBµV	1.1	> 25	> 30
15 KHz	1.6	> 15	> 25
111.3 dBµV	1.1	> 15	> 25
20 KHz	1.6	> 10	> 25
111.3 dBµV	1.1	> 10	> 25
1 KHz	1.6	> 30	> 30
300 mV	1.1	> 30	> 30
15 KHz	1.6	> 15	> 25
300 mV	1.1	> 15	> 25
20 KHz	1.6	> 10	> 25
300 mV	1.1	> 10	> 25

Frequency range of equipment		US 60 B 751.550 MHz	
input modulation	DC supply voltage [V]	±50-100% [dB]	±100-250% [dB]
1 KHz	1.6	> 35	> 30
84.4 dBµV	1.1	> 35	> 30
15 KHz	1.6	> 25	> 30
84.4 dBµV	1.1	> 25	> 30
20 KHz	1.6	> 20	> 30
84.4 dBµV	1.1	> 20	> 30
1 KHz	1.6	> 35	> 30
300 mV	1.1	> 35	> 30
15 KHz	1.6	> 25	> 30
300 mV	1.1	> 25	> 30
20 KHz	1.6	> 20	> 25
300 mV	1.1	> 20	> 25

Remarks: For plot see page A13-A24

Remarks: For plot see page A25-A36

Frequency range of equipment		EU 62 B 805.100 MHz	
input modulation	DC supply voltage [V]	±50-100% [dB]	±100-250% [dB]
1 KHz 110.8 dBµV	1.6	> 30	> 30
	1.1	> 35	> 30
15 KHz 110.8 dBµV	1.6	> 15	> 25
	1.1	> 15	> 25
20 KHz 110.8 dBµV	1.6	> 10	> 25
	1.1	> 10	> 25
1 KHz 300 mV	1.6	> 30	> 30
	1.1	> 35	> 30
15 KHz 300 mV	1.6	> 10	> 25
	1.1	> 15	> 25
20 KHz 300 mV	1.6	> 10	> 25
	1.1	> 10	> 25

Remarks: For plot see page A37-A48

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

Remarks: The limit is kept. The attenuation is related to the un-
modulated carrier.

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: 20 kHz, 300 mV)(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 MPS.No.:

☐ - customer specific cables (wireless microphone)

☒ - no cables _____

☐ - _____

S U M M A R Y

GENERAL REMARKS:

The product TM40, has been tested on the following frequency:

US 54: 710.400 MHz

US 60 B: 751.550 MHz

EU 62 B: 805.100 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.

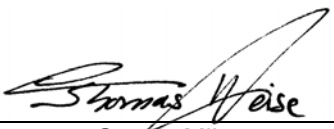
o - **Does not** fulfill the general approval requirements cited on page 3.

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

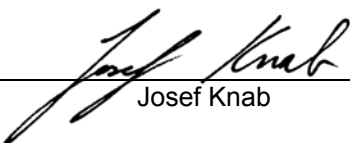
Testing Start Date : September 03, 2003

Testing End Date : October 18, 2003

Checked by:

i. A. 
Günter Mikes
Dipl.Ing.(FH)

Tested by:


Josef Knab

FCC ID: E9MTM40

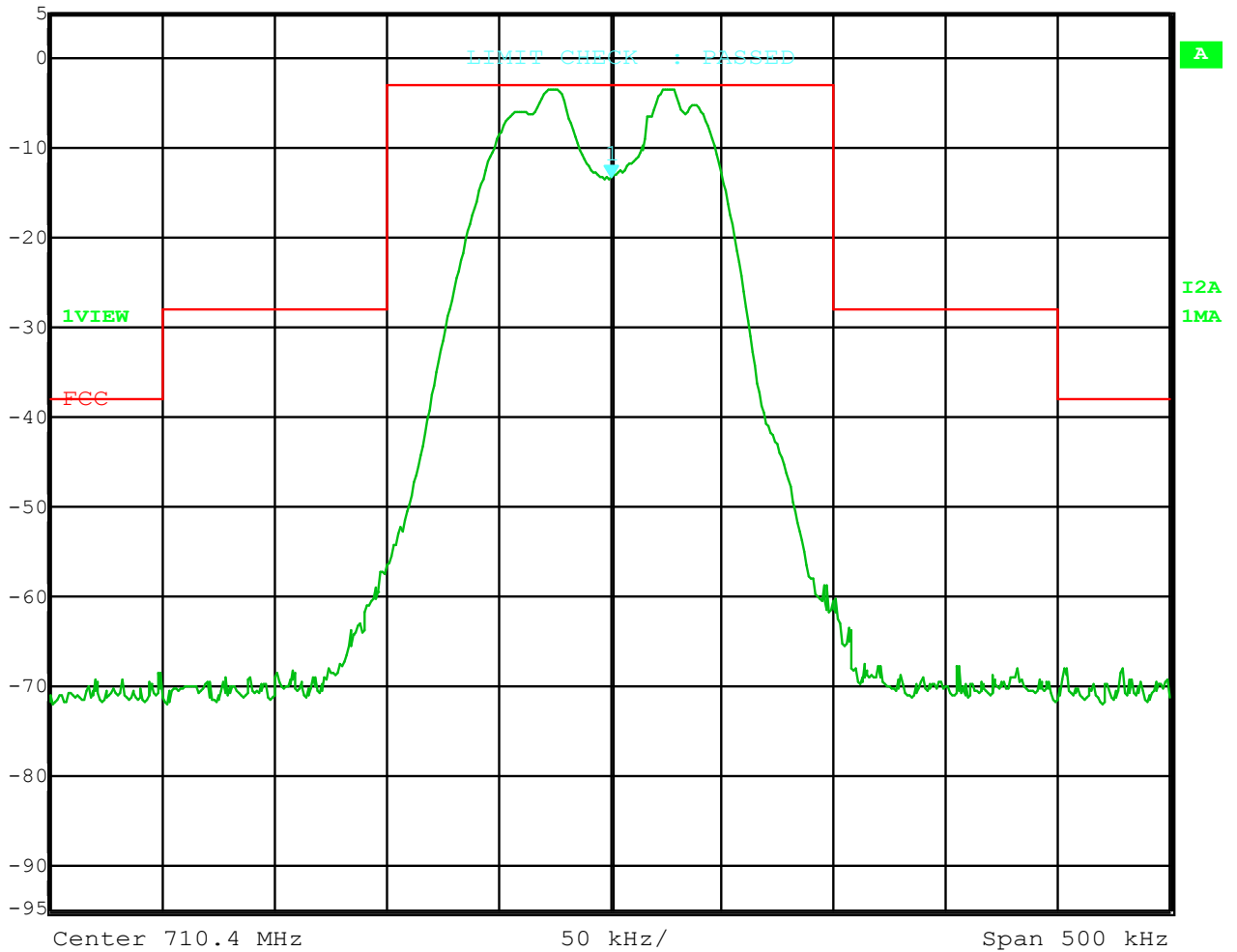
OCCUPIED BANDWIDTH

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-13.36 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:56:04

Audio test level: 111.3 dB μ V / 1 kHz
DC supply voltage: 1.5 V

FCC ID: E9MTM40

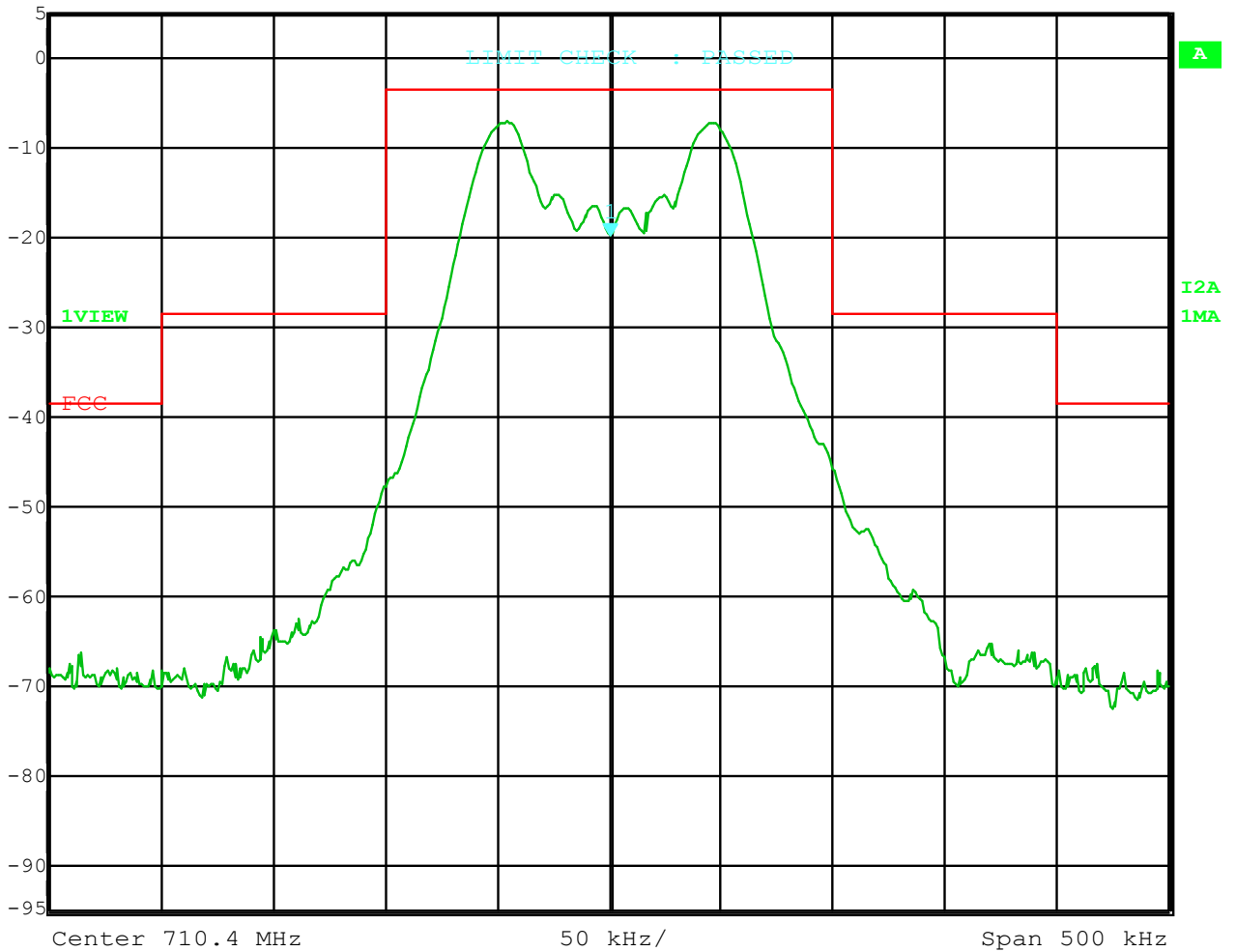
OCCUPIED BANDWIDTH

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-19.77 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:09:07

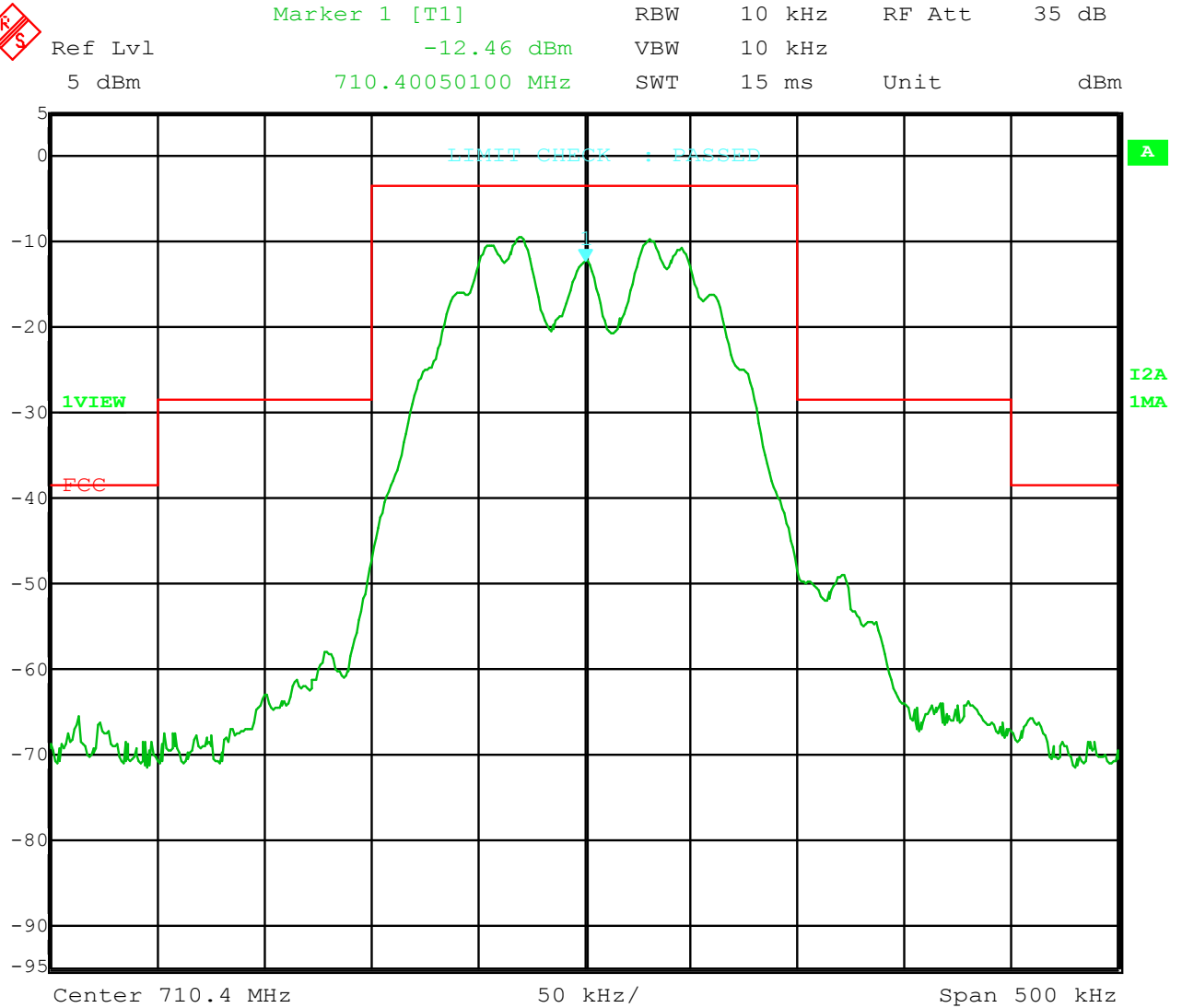
Audio test level: 111.3 dB μ V / 7.5 kHz
DC supply voltage: 1.5 V

FCC ID: E9MTM40

OCCUPIED BANDWIDTH

TM40

Set US 54 working on 710.400 MHz



Date: 16.OCT.2003 09:10:37

Audio test level: 111.3 dB μ V / 15 kHz
DC supply voltage: 1.5 V

File No. T23829-00-00KJ , Page A 3 of A 48

FCC ID: E9MTM40

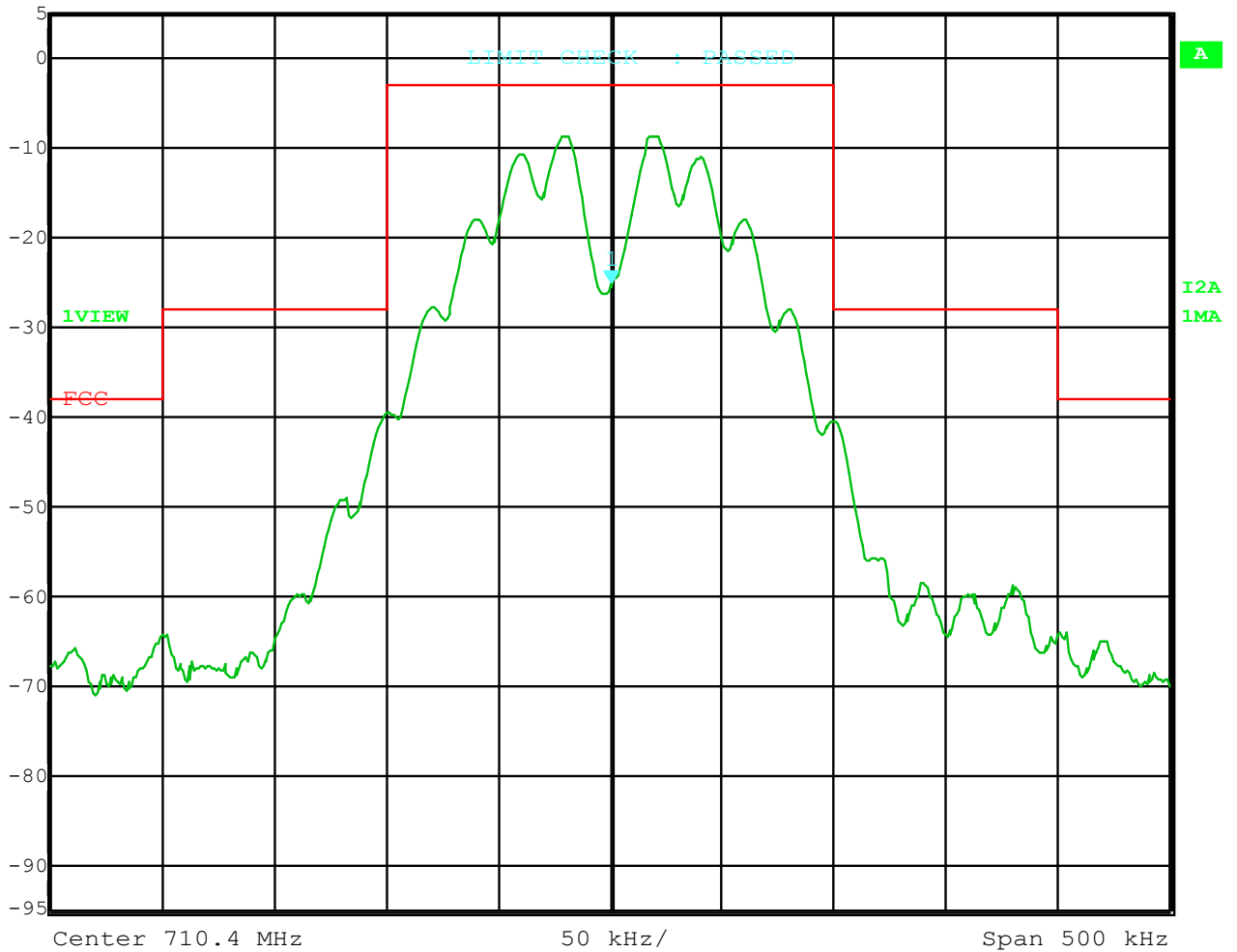
OCCUPIED BANDWIDTH

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-25.12 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:25:16

Audio test level: 111.3 dB μ V / 20 kHz
DC supply voltage: 1.5 V

FCC ID: E9MTM40

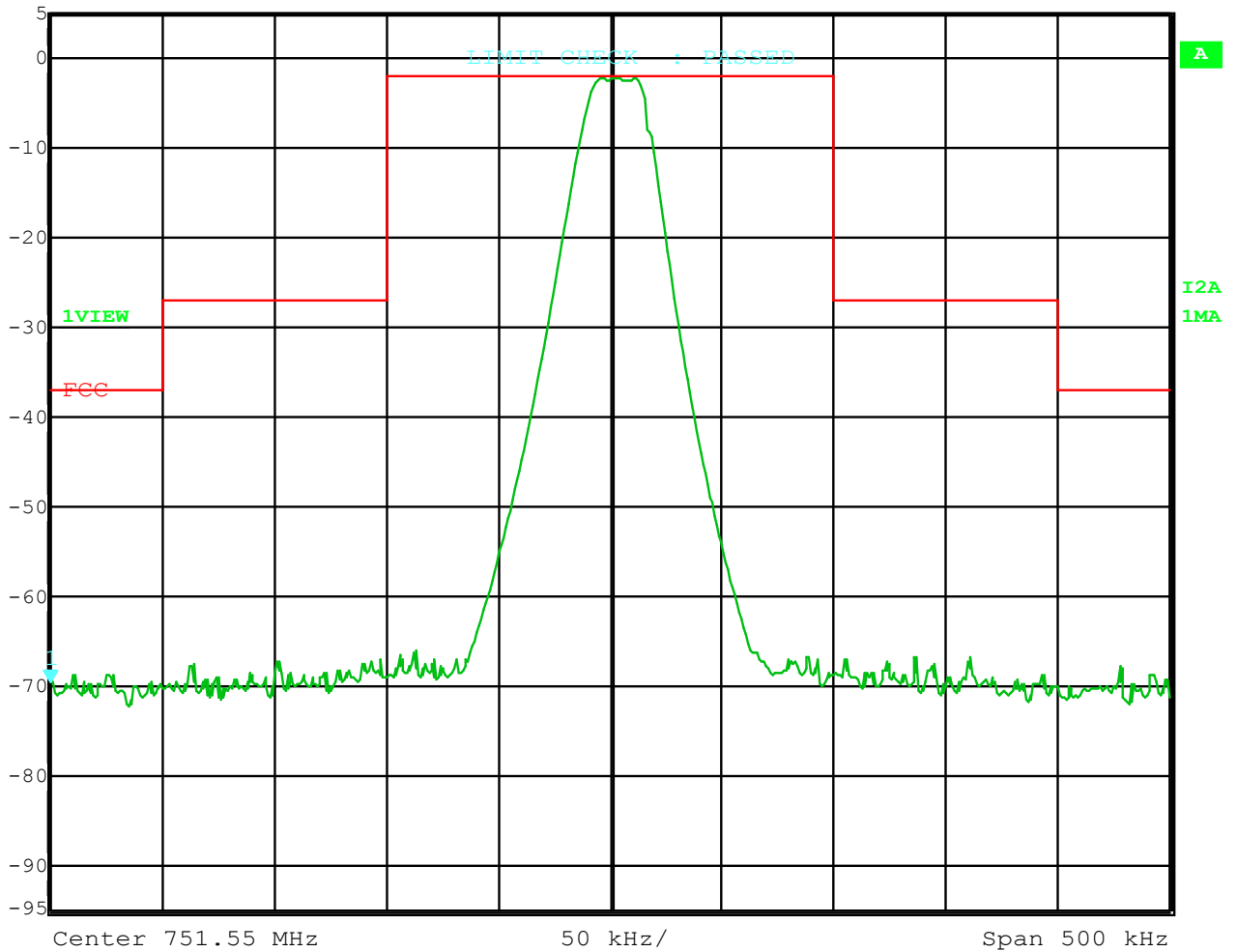
OCCUPIED BANDWIDTH

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-69.66 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 07:52:53

Audio test level: 84.4 dB μ V / 1 kHz
DC supply voltage: 1.5 V

FCC ID: E9MTM40

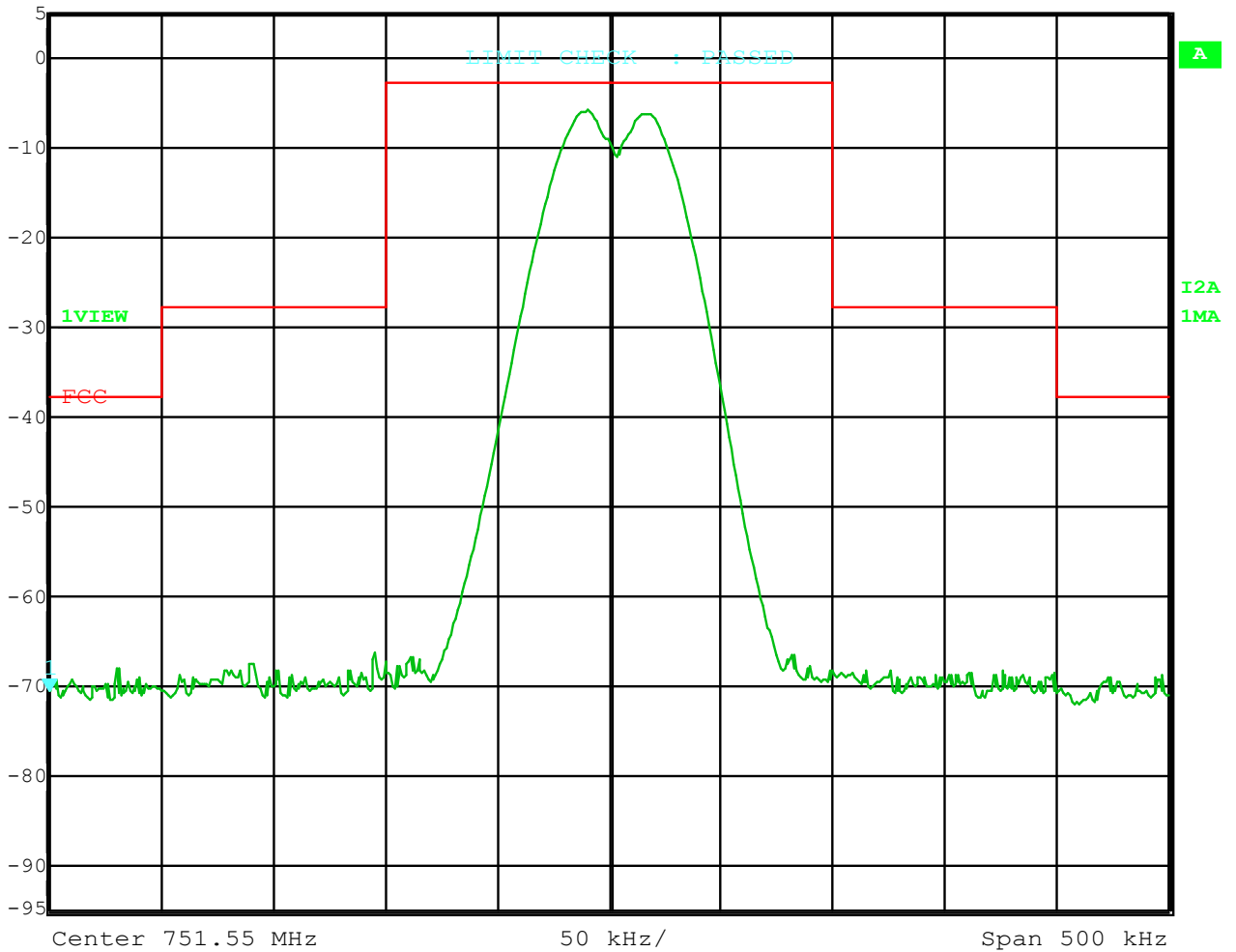
OCCUPIED BANDWIDTH

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-70.63 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:07:53

Audio test level: 84.4 dB μ V / 7.5 kHz
DC supply voltage: 1.5 V

FCC ID: E9MTM40

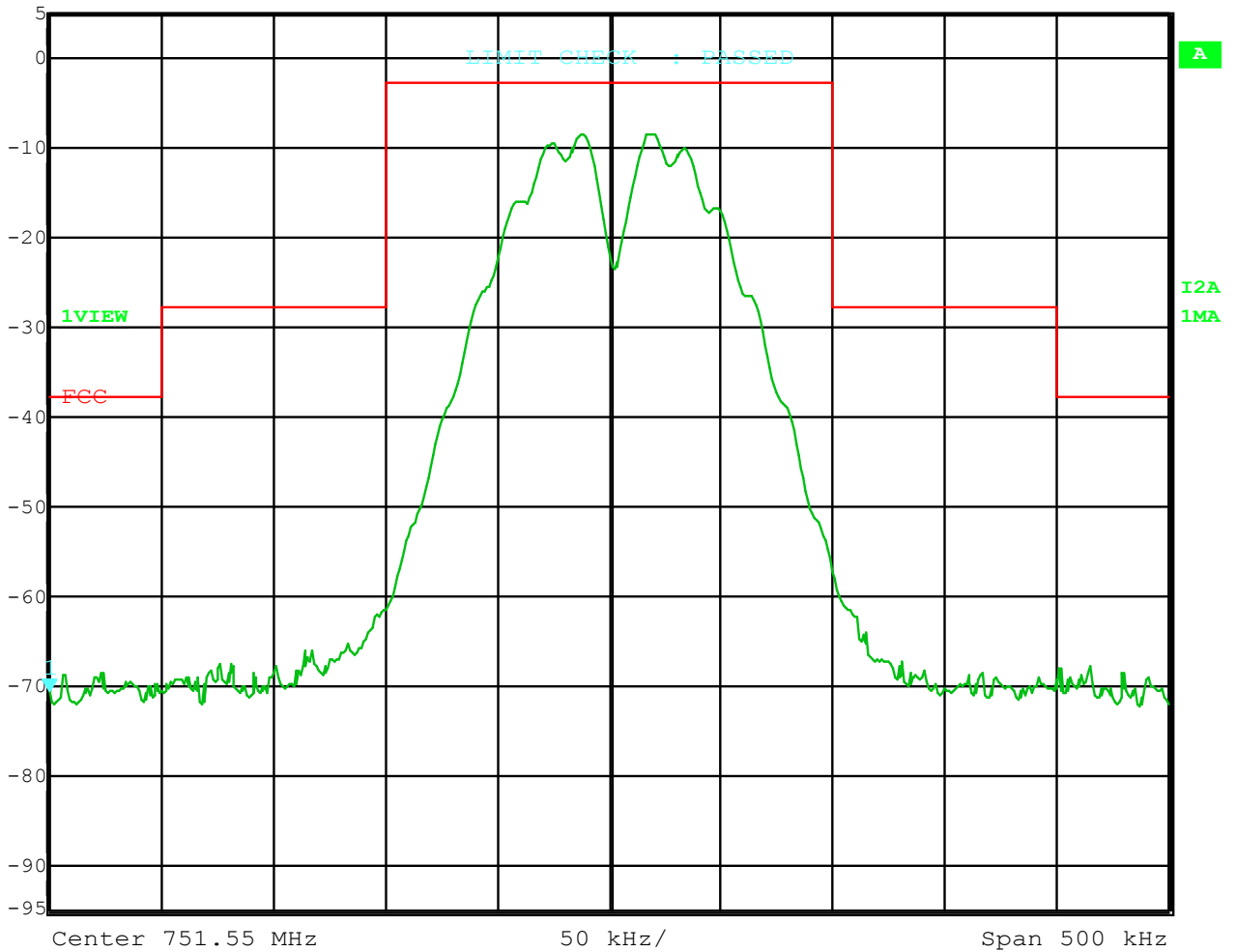
OCCUPIED BANDWIDTH

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-70.66 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:08:53

Audio test level: 84.4 dB μ V / 15 kHz
DC supply voltage: 1.5 V

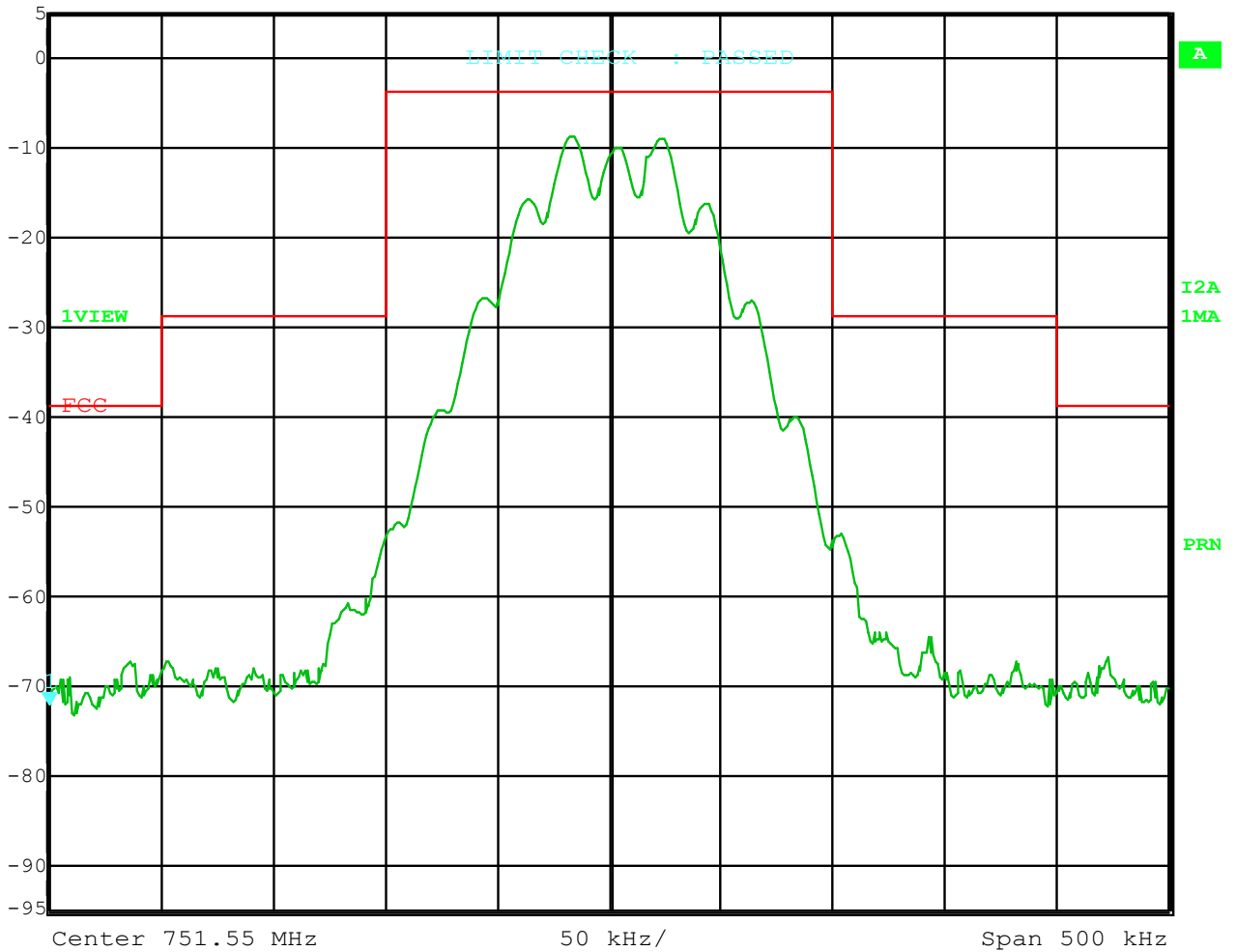
OCCUPIED BANDWIDTH

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-72.19 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:22:12

Audio test level: 84.4 dBμV / 20 kHz
DC supply voltage: 1.5 V

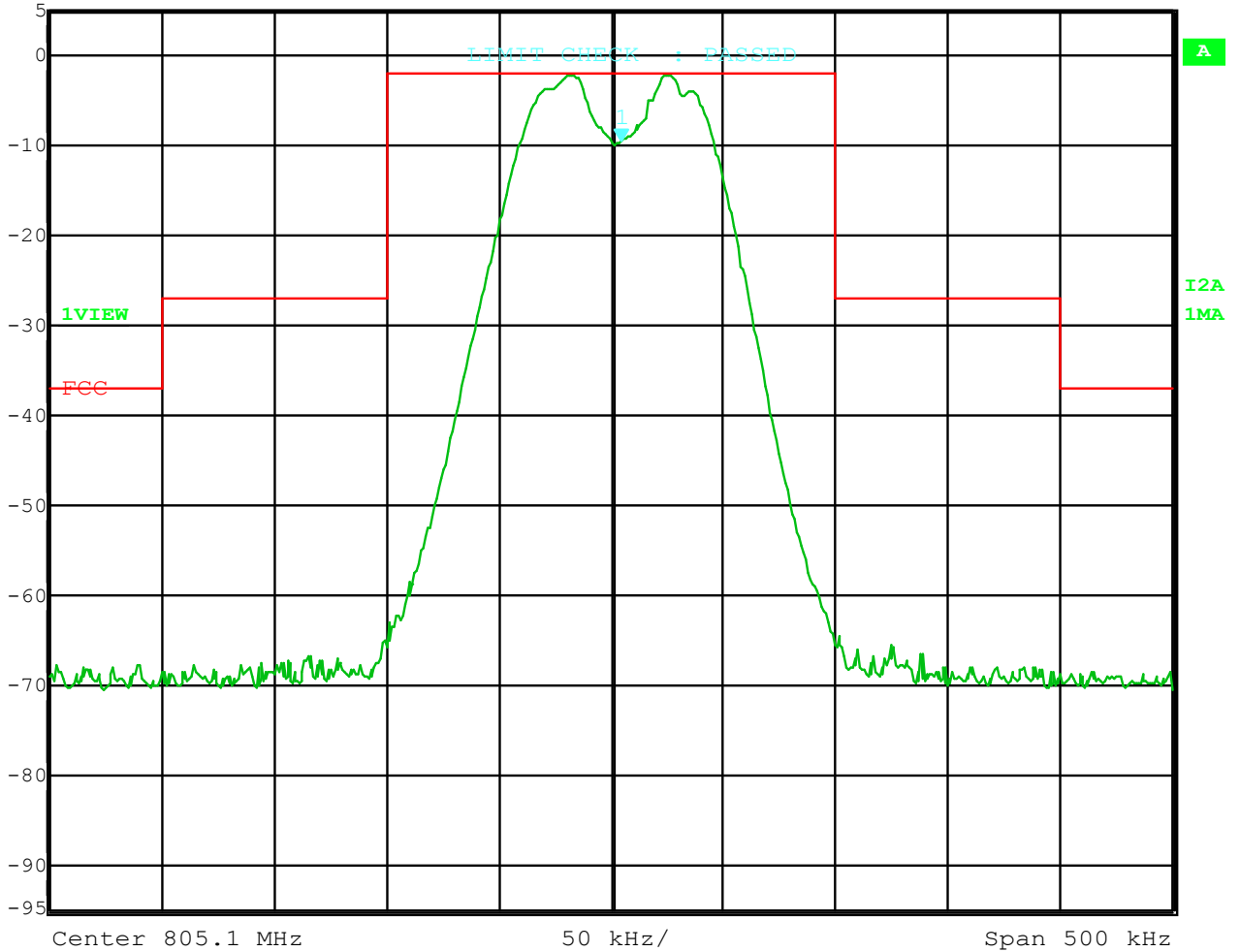
OCCUPIED BANDWIDTH

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-9.63 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 13:32:33

Audio test level: 110.8 dBμV / 1 kHz
DC supply voltage: 1.5 V

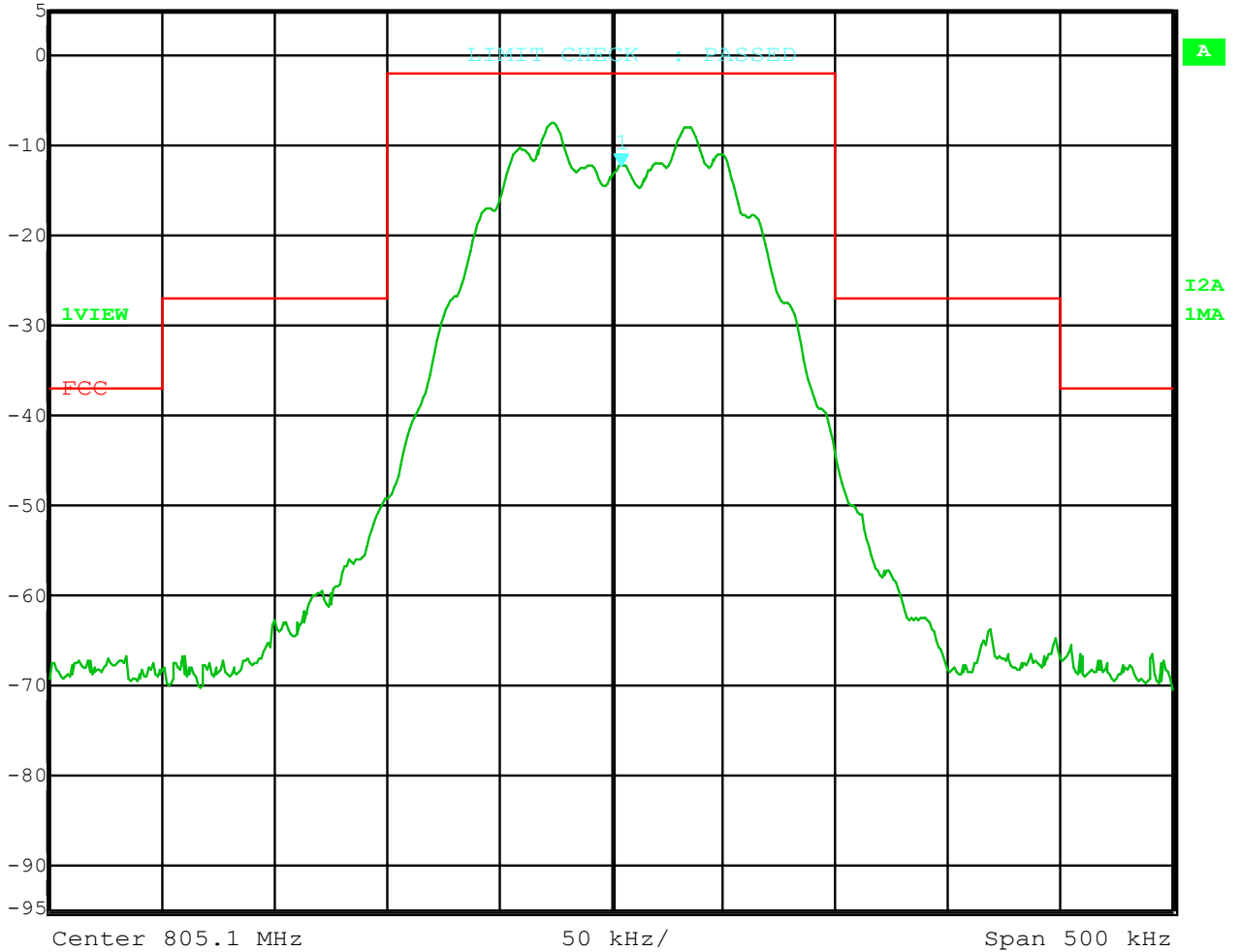
OCCUPIED BANDWIDTH

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-12.30 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 14:04:29

Audio test level: 110.8 dBμV / 15 kHz
DC supply voltage: 1.5 V

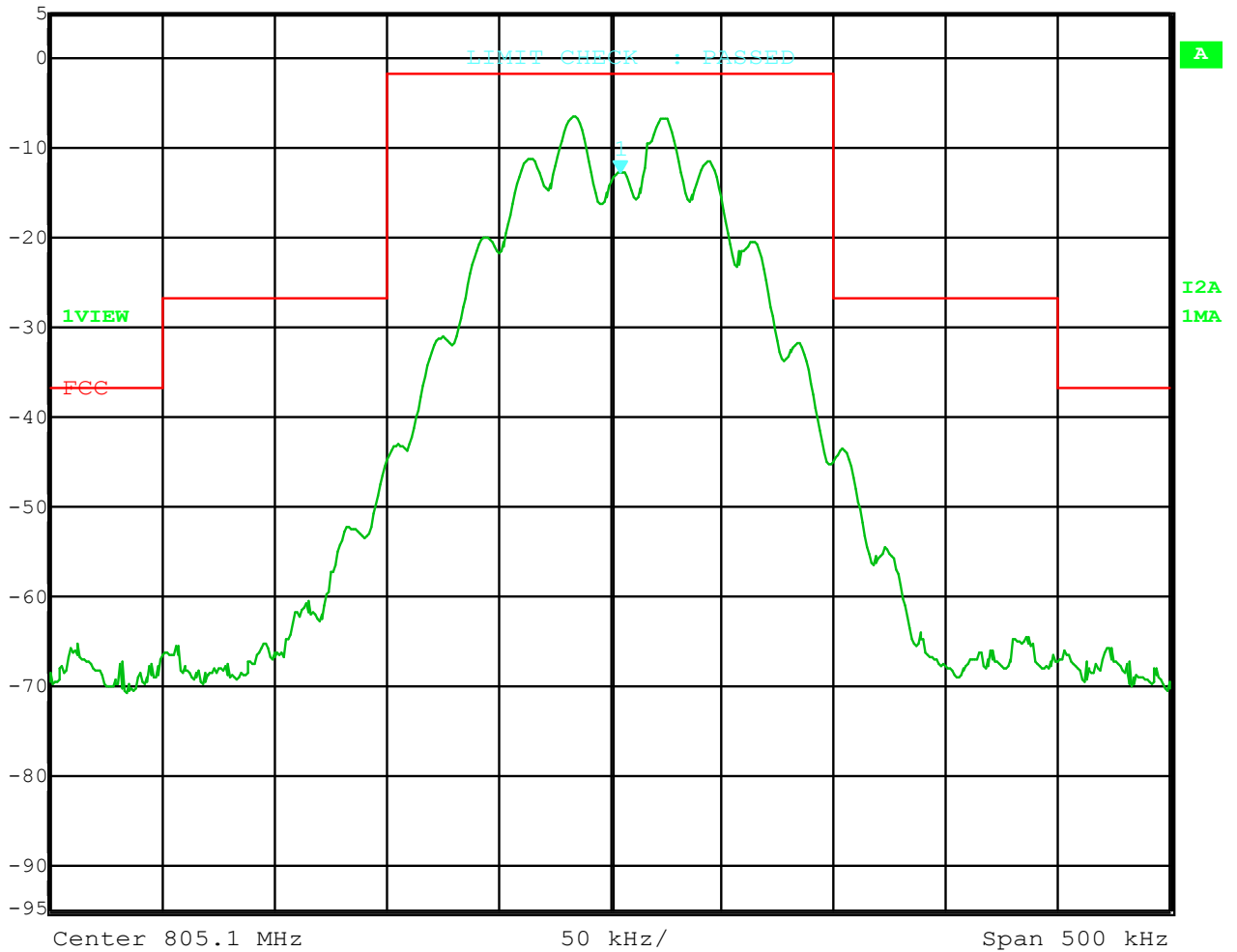
OCCUPIED BANDWIDTH

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-12.76 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 14:37:55

Audio test level: 110.8 dB μ V / 20 kHz
DC supply voltage: 1.5 V

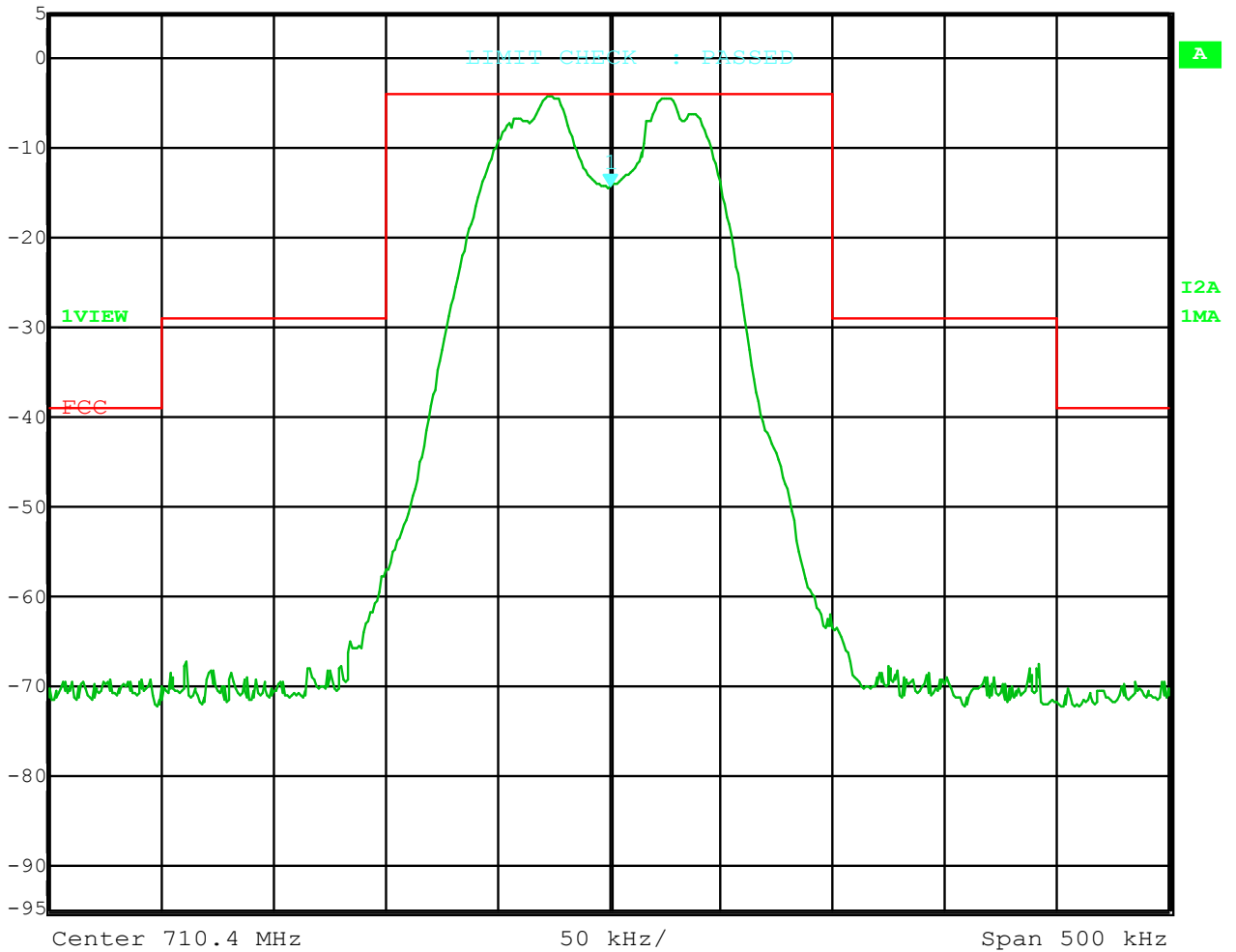
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-14.28 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:05:07

Audio test level: 111.3 dBμV / 1 kHz
DC supply voltage: 1.1 V

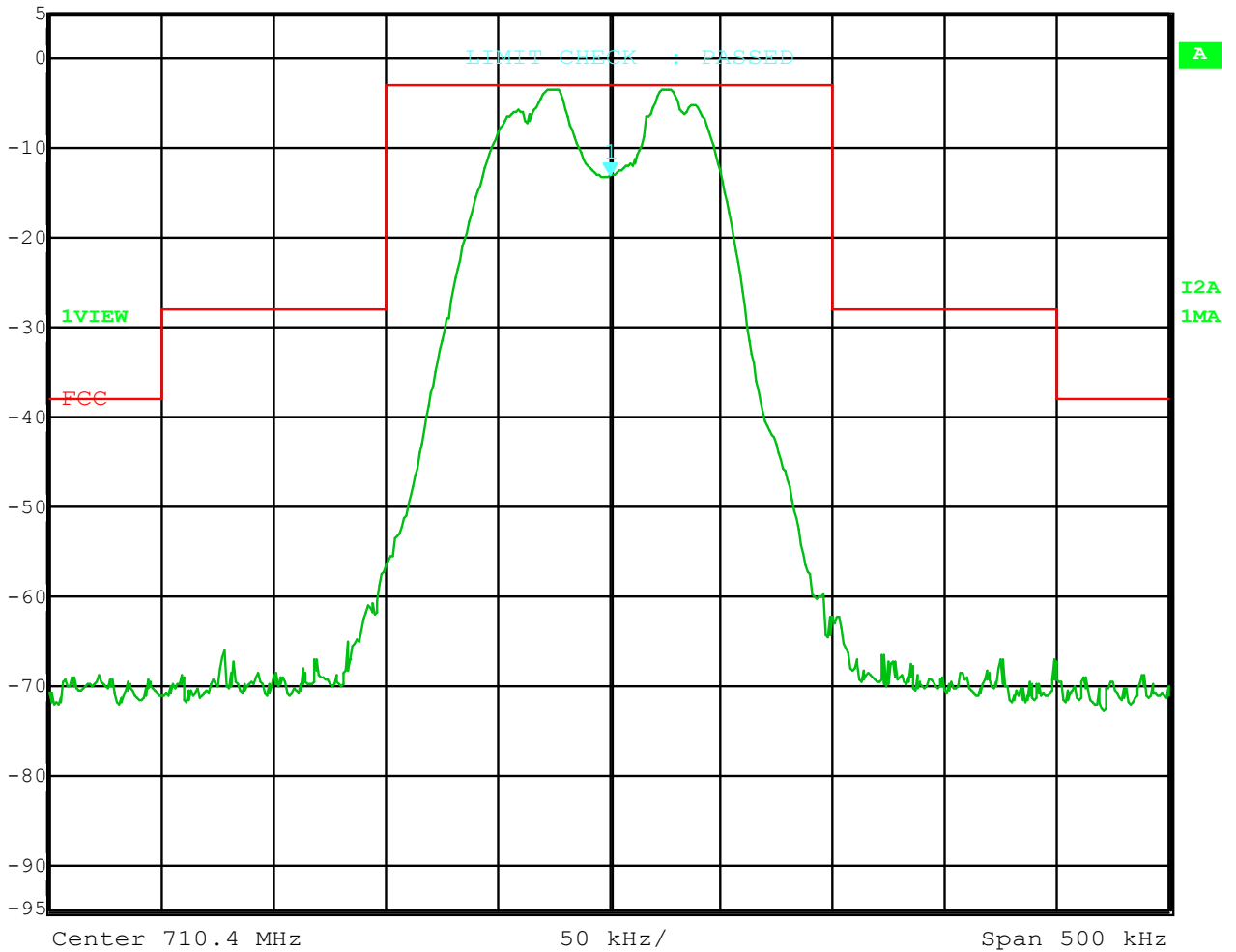
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-13.23 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:58:48

Audio test level: 111.3 dBμV / 1 kHz
DC supply voltage: 1.6 V

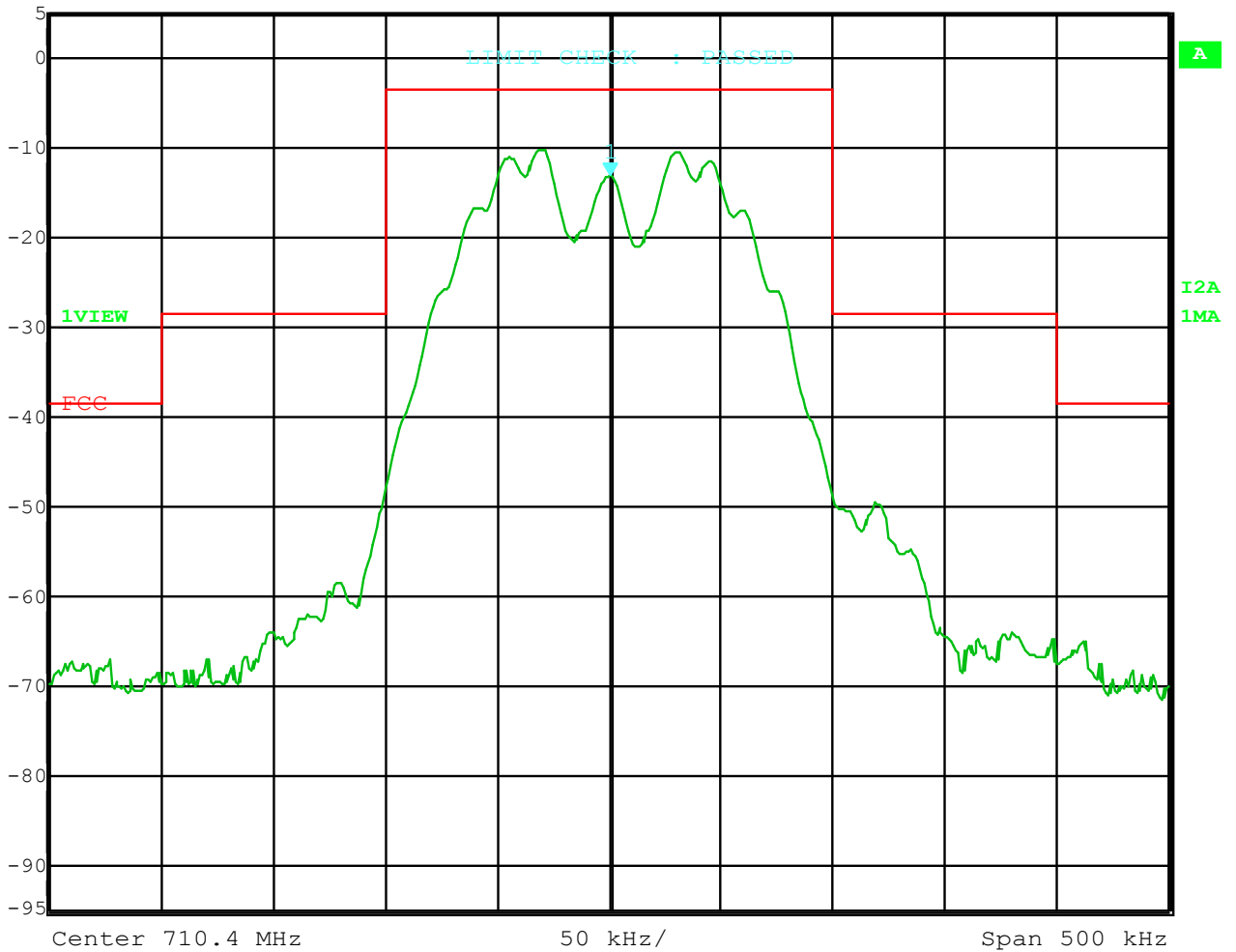
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-13.22 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:19:57

Audio test level: 111.3 dBμV / 15 kHz
DC supply voltage: 1.1 V

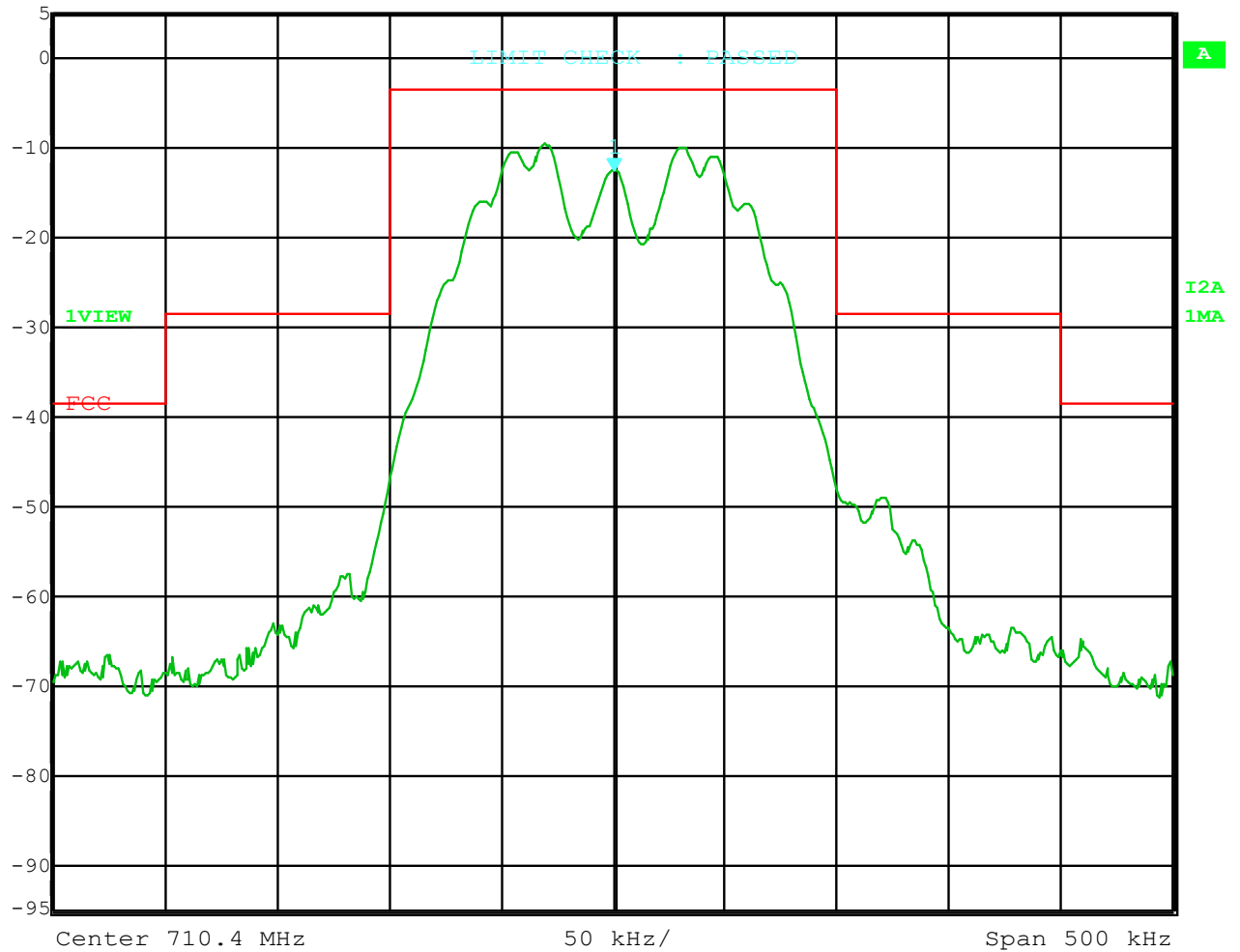
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-12.50 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:13:48

Audio test level: 111.3 dBμV / 15 kHz
DC supply voltage: 1.6 V

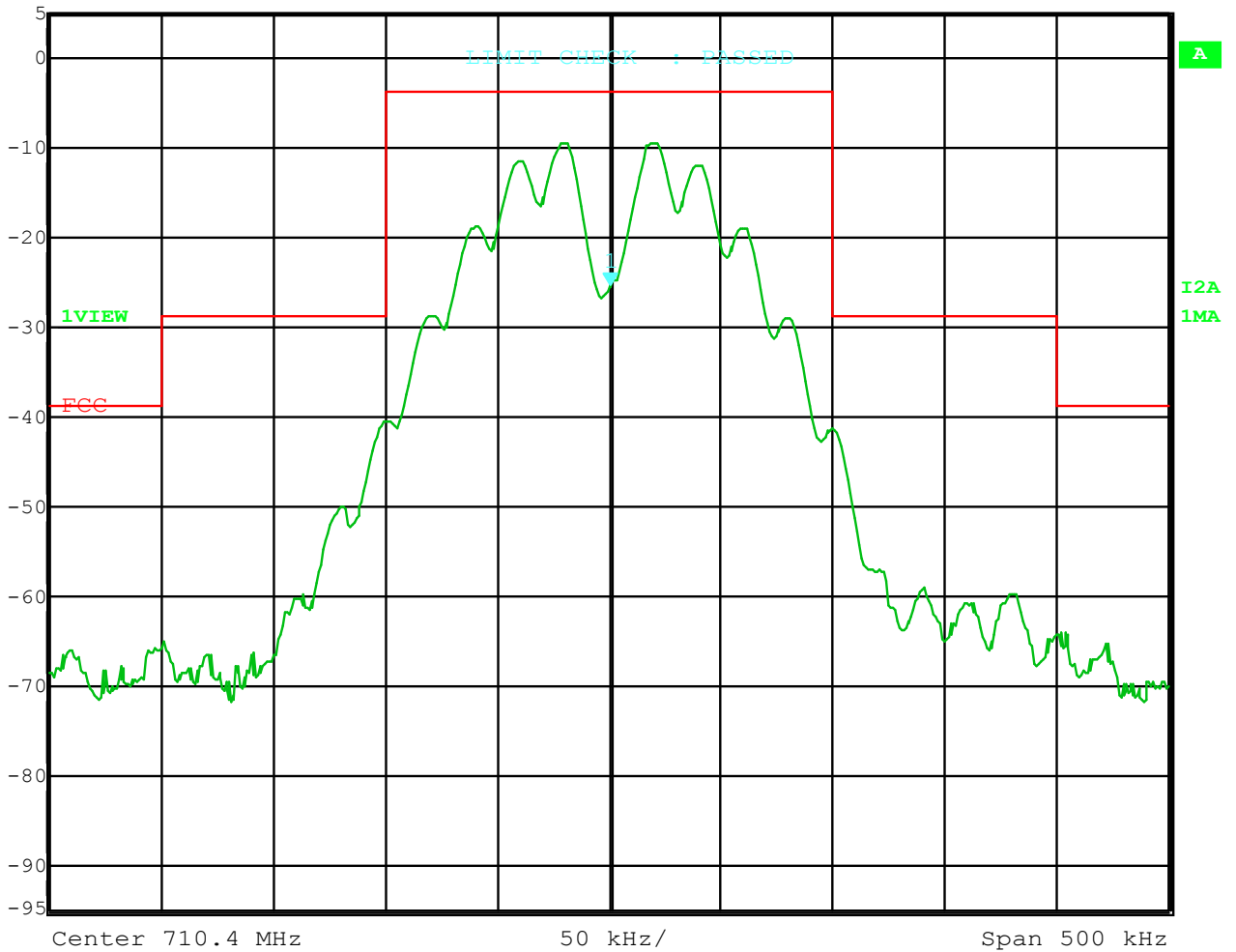
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-25.26 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:37:19

Audio test level: 111.3 dBμV / 20 kHz
DC supply voltage: 1.1 V

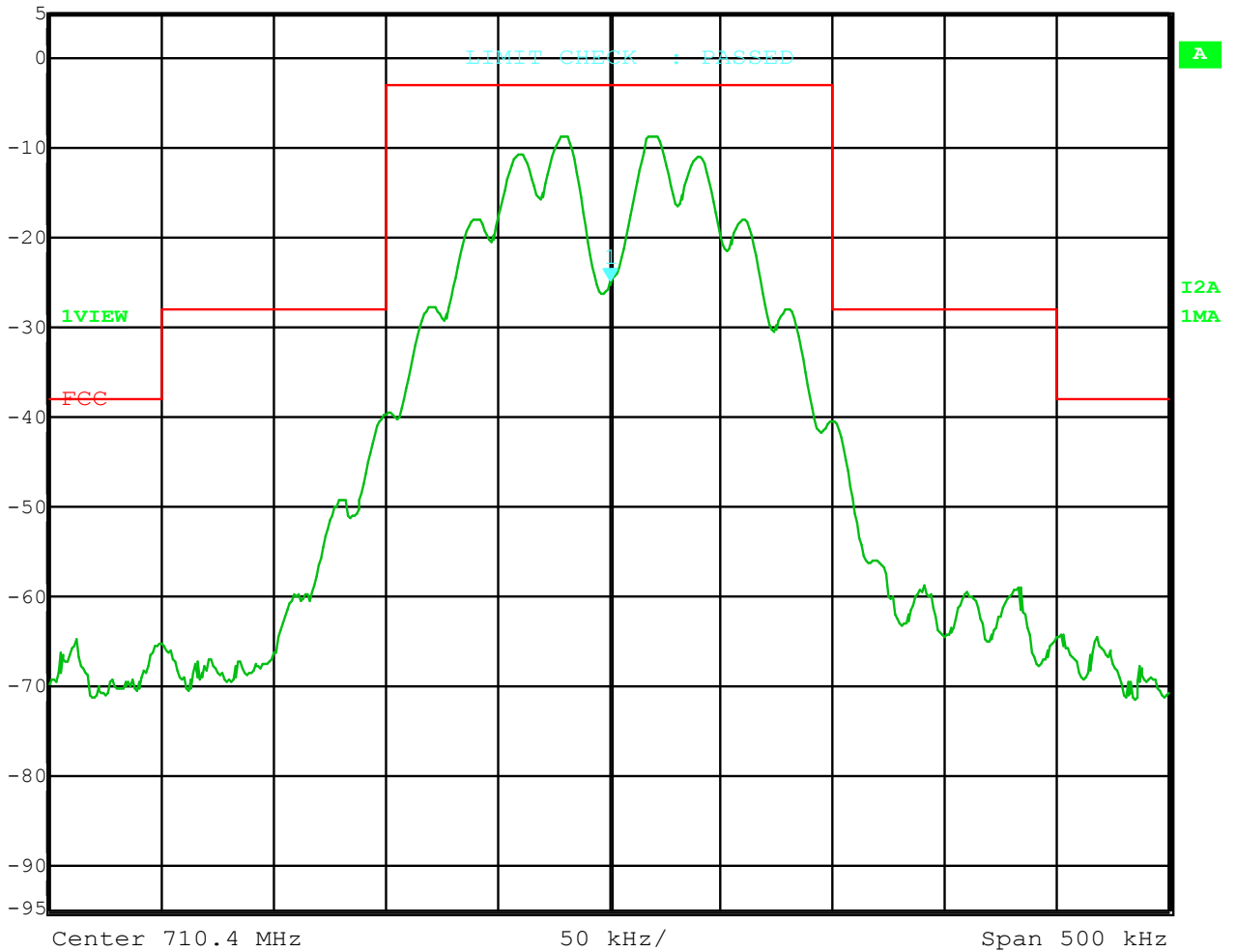
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-24.99 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:27:23

Audio test level: 111.3 dBμV / 20 kHz
DC supply voltage: 1.6 V

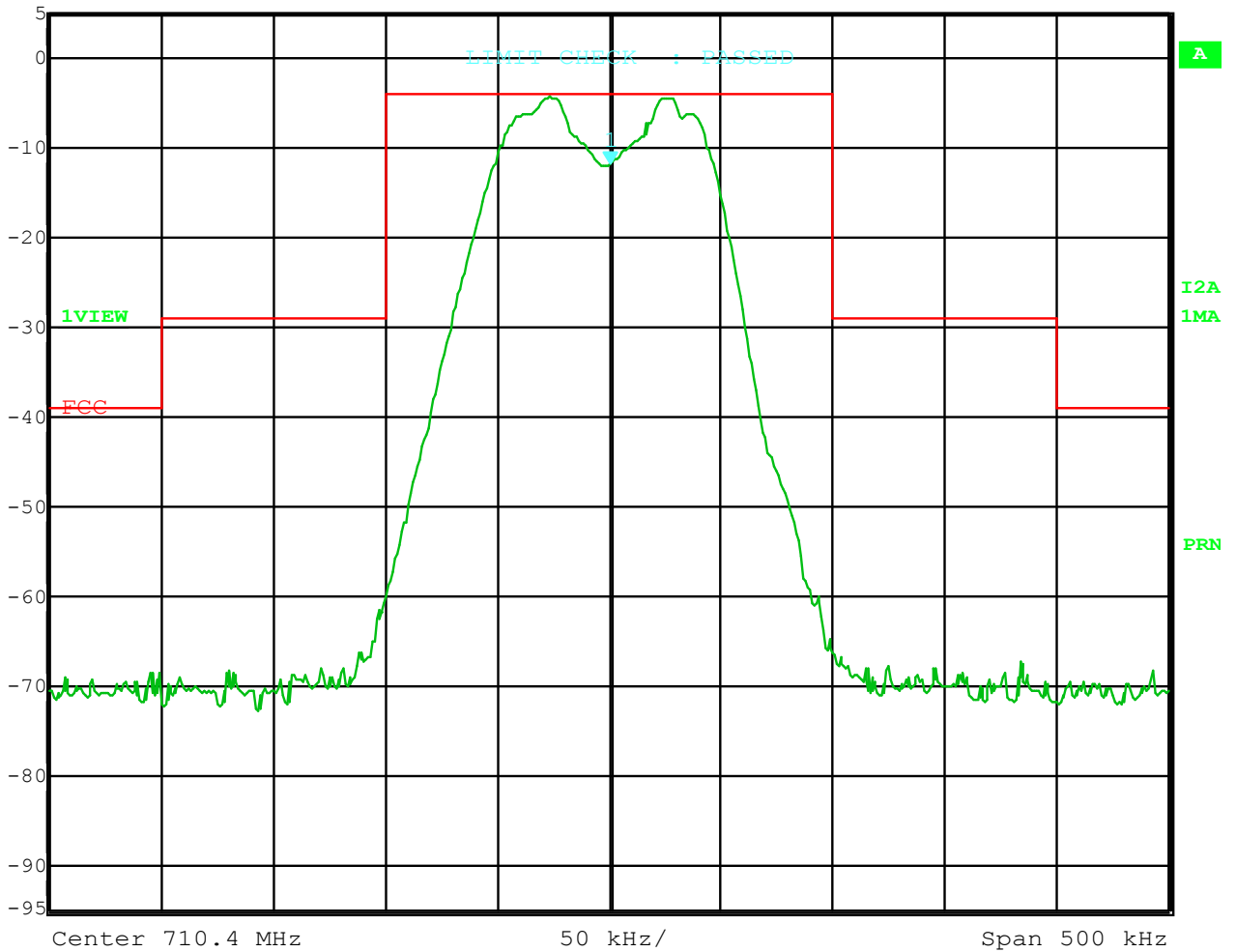
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-11.81 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:06:37

Audio test level: 300 mV / 1 kHz
DC supply voltage: 1.1 V

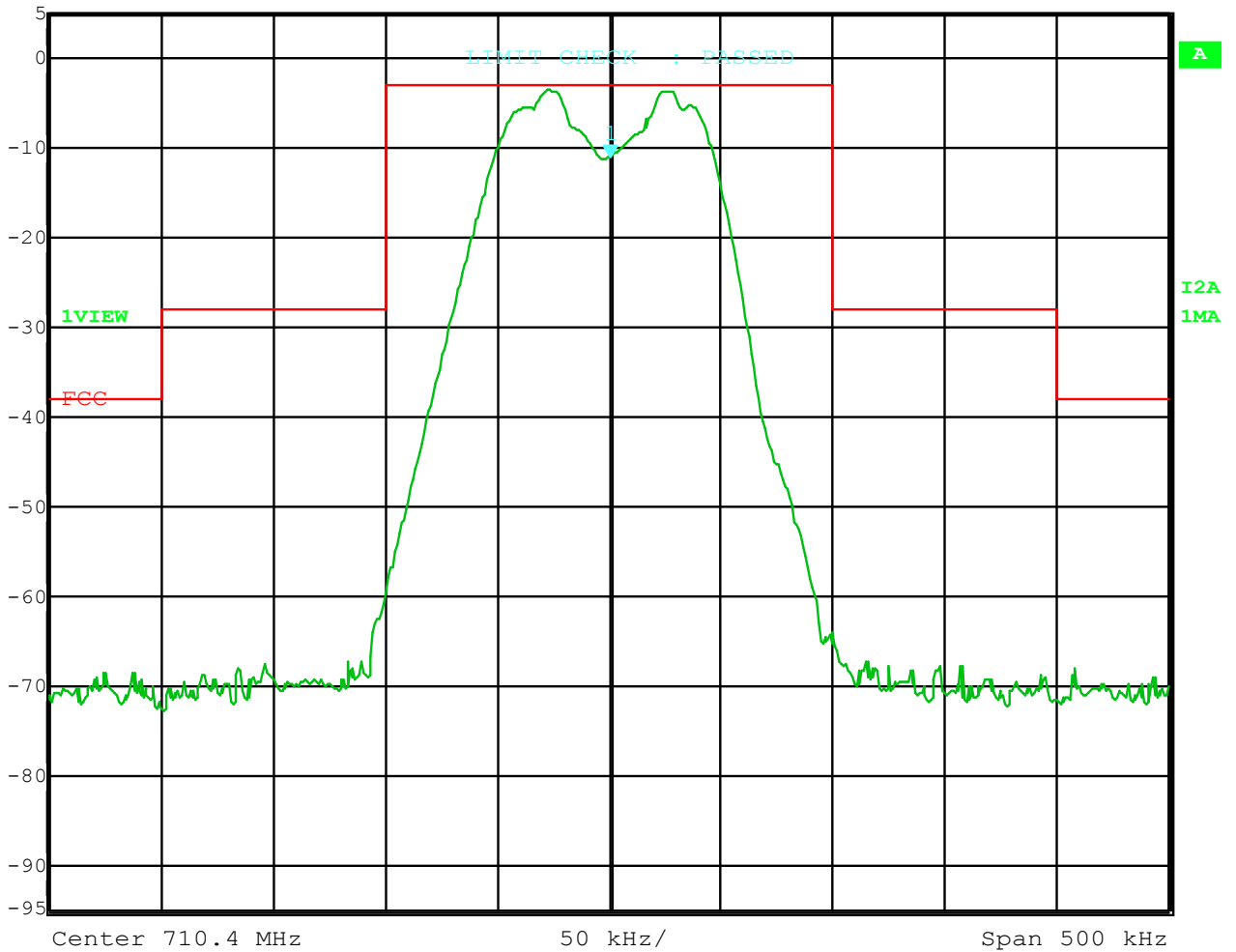
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-11.06 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:03:43

Audio test level: 300 mV / 1 kHz
DC supply voltage: 1.6 V

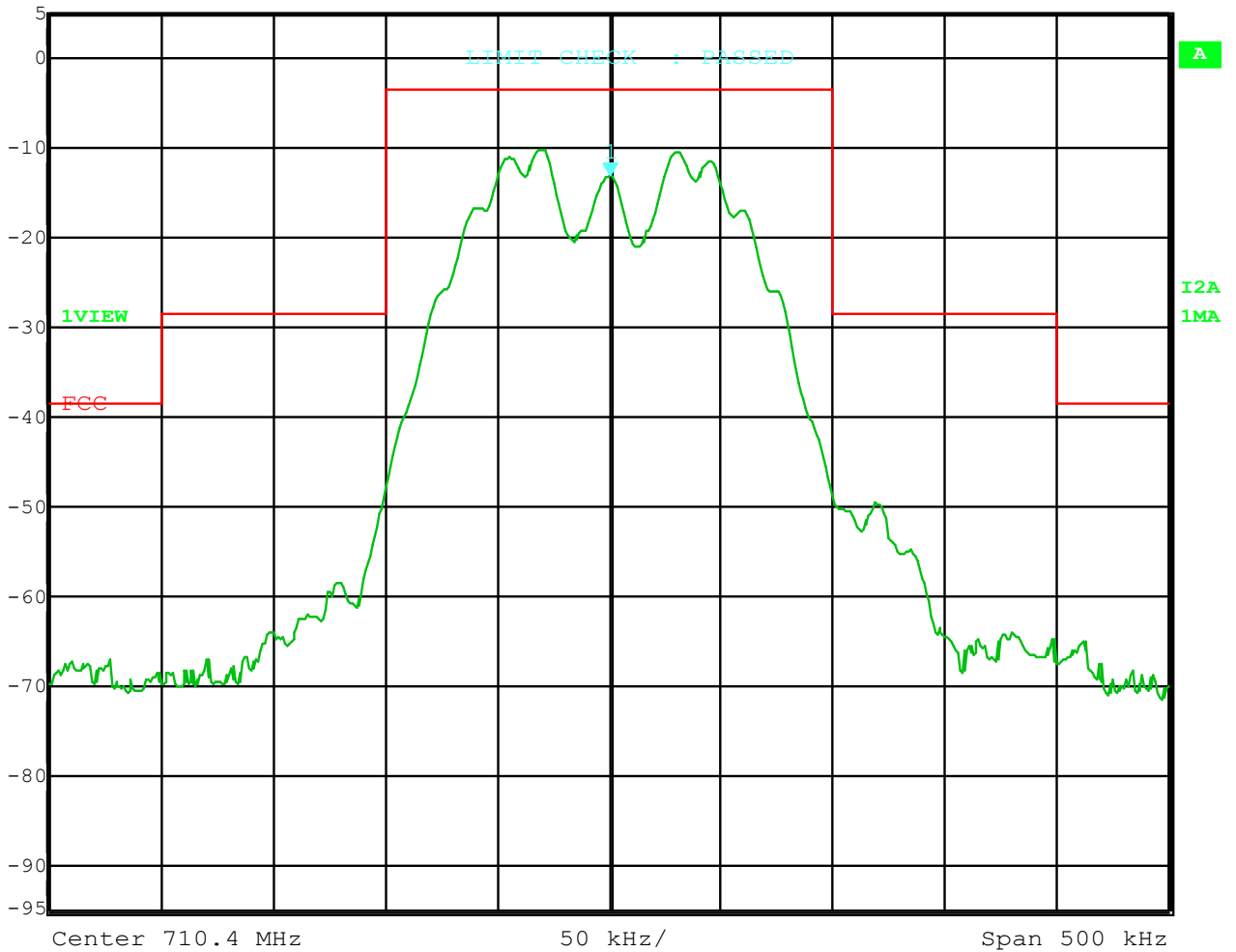
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-13.22 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:19:57

Audio test level: 300 mV / 15 kHz
DC supply voltage: 1.1 V

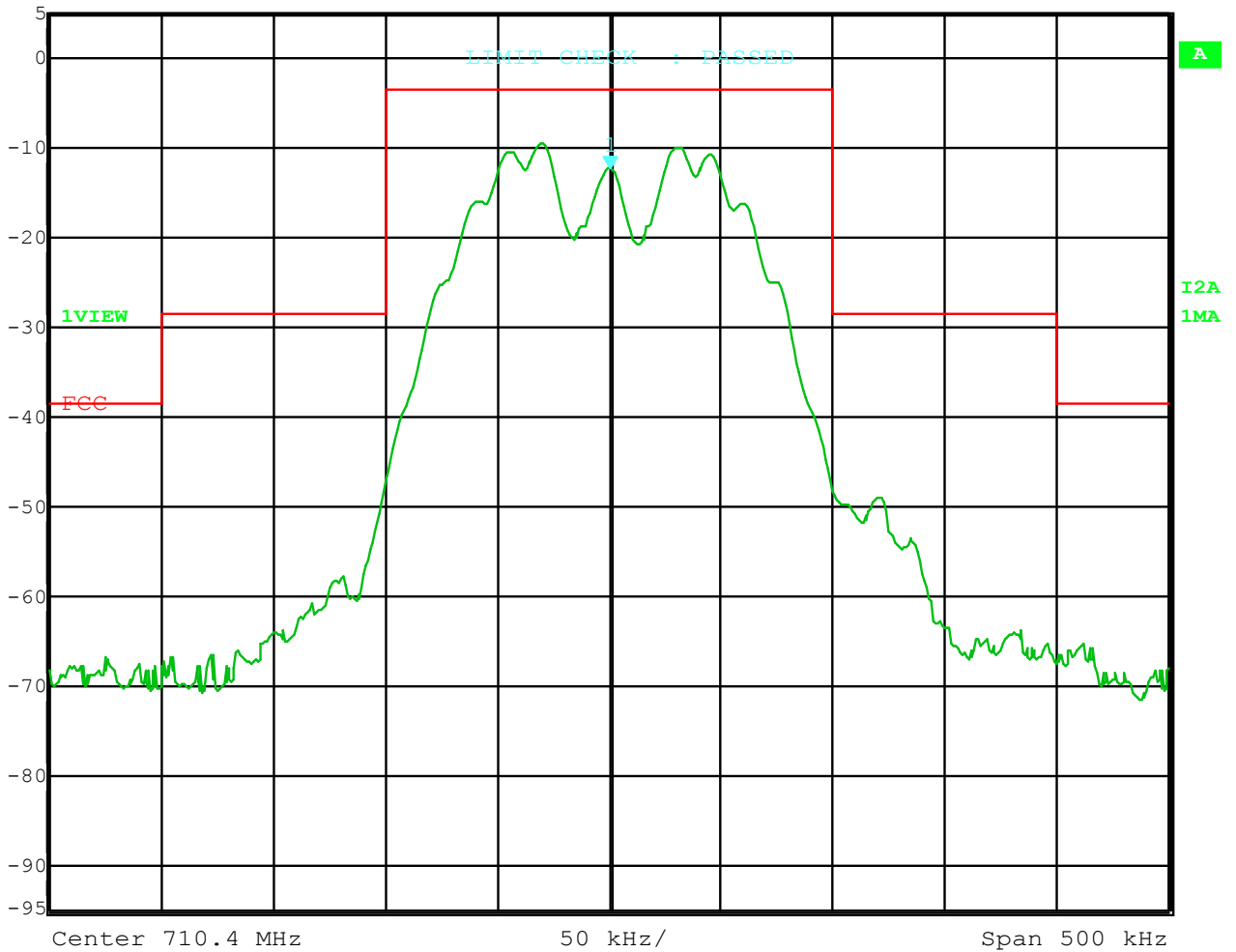
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-12.42 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



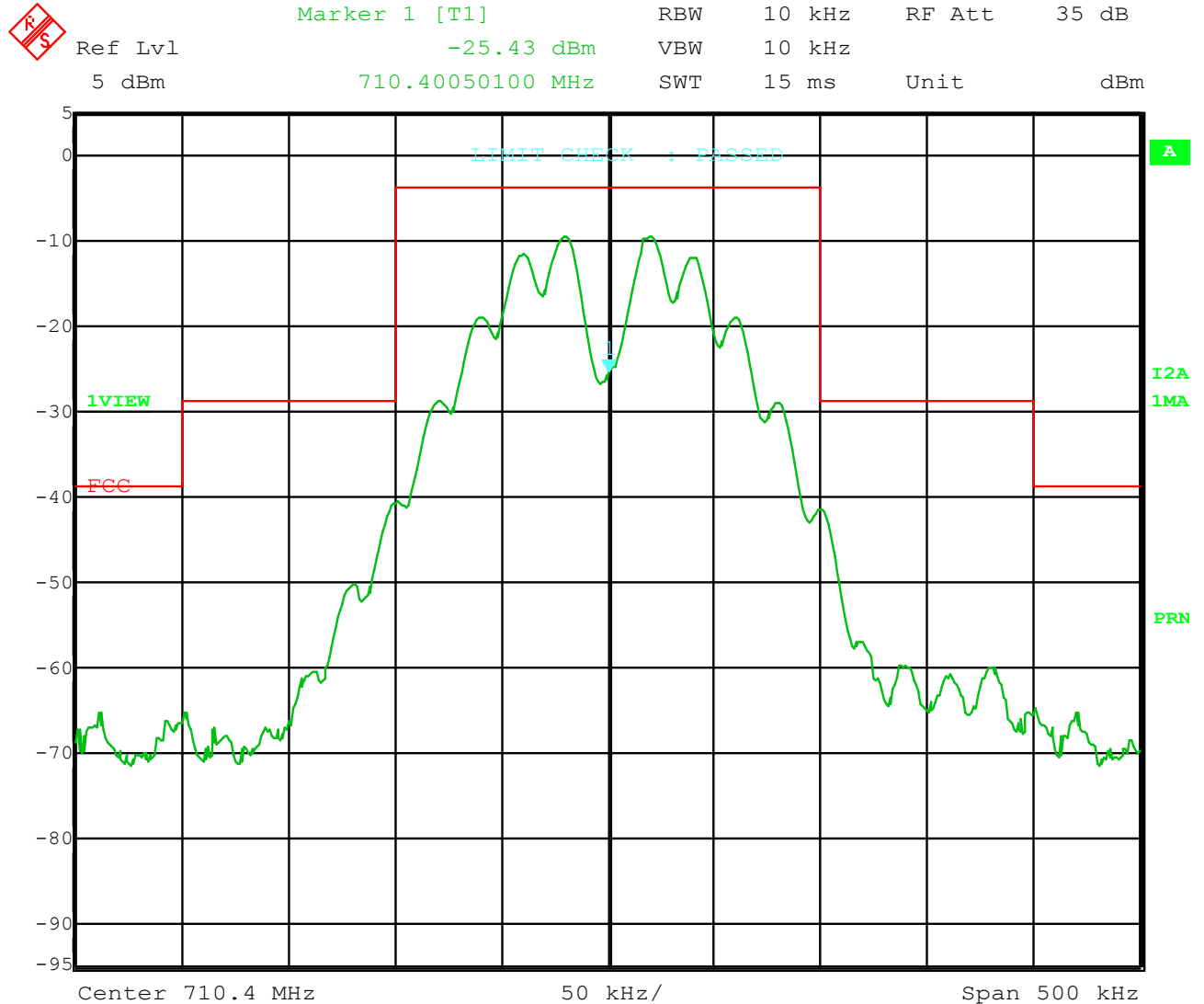
Date: 16.OCT.2003 09:16:10

Audio test level: 300 mV / 15 kHz
DC supply voltage: 1.6 V

KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Date: 16.OCT.2003 09:38:00

Audio test level: 300 mV / 20 kHz
DC supply voltage: 1.1 V

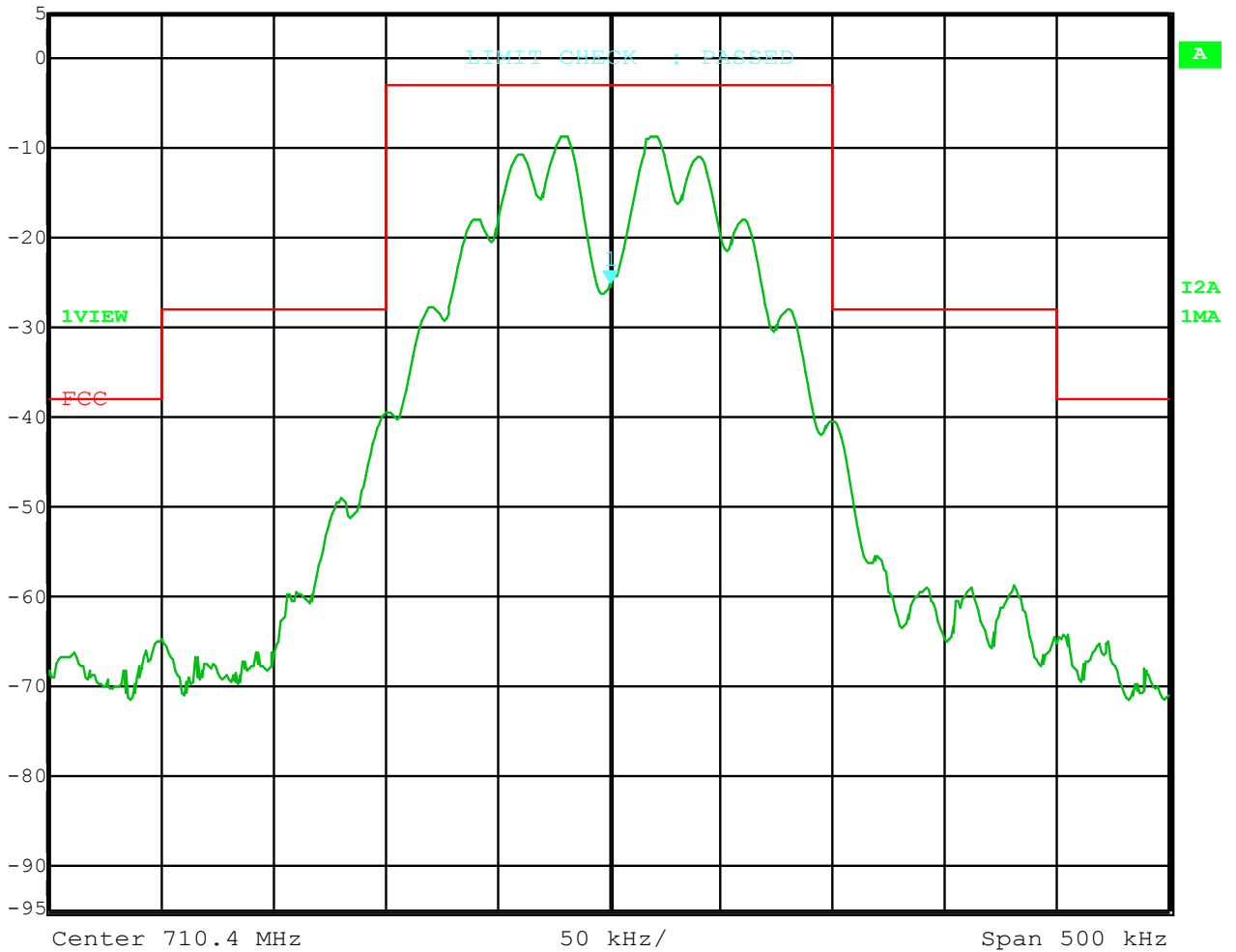
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 54 working on 710.400 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-25.06 dBm	VBW	10 kHz		
	710.40050100 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 09:35:00

Audio test level: 300 mV / 20 kHz
DC supply voltage: 1.6 V

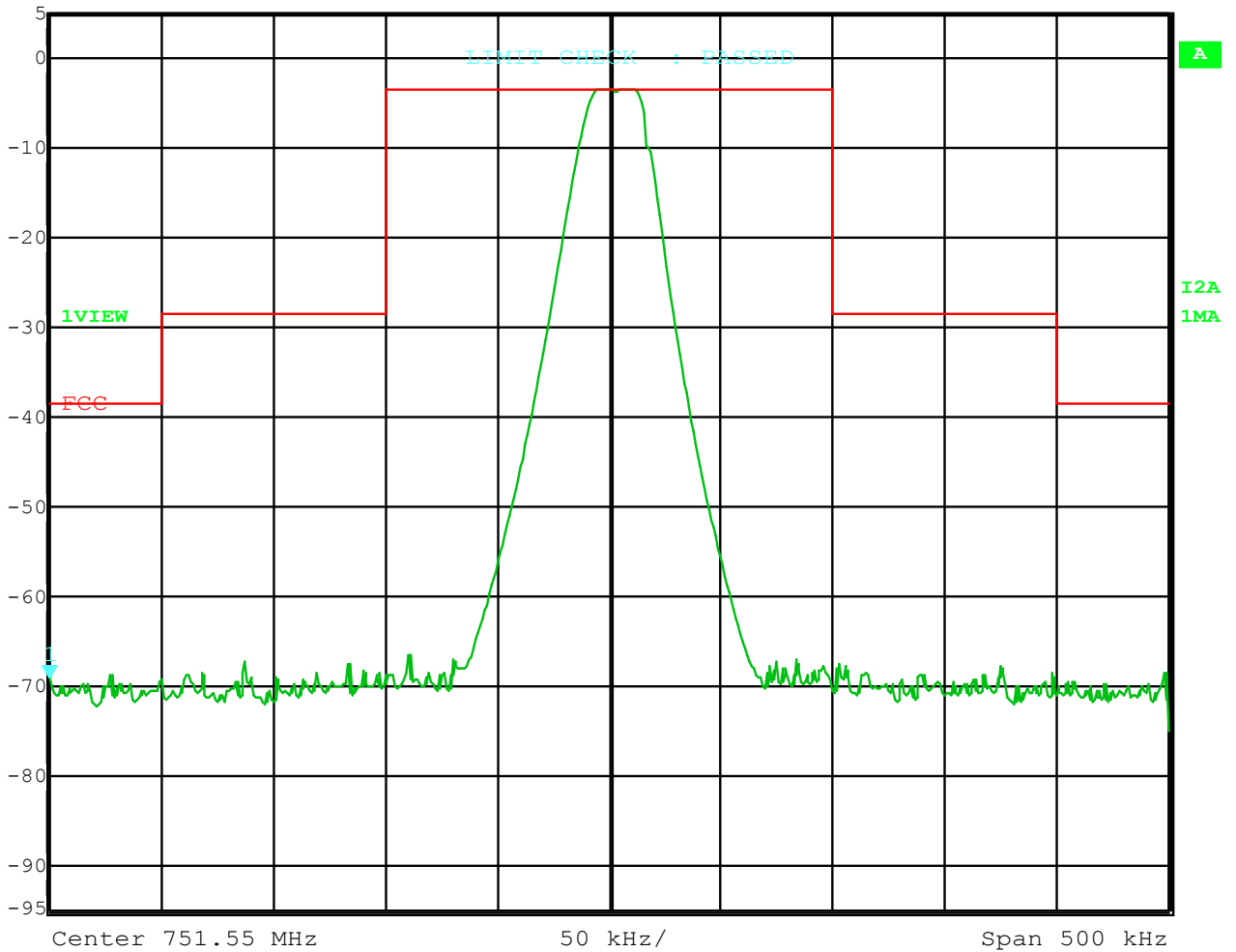
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-69.23 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:02:41

Audio test level: 84.4 dBμV / 1 kHz
DC supply voltage: 1.1 V

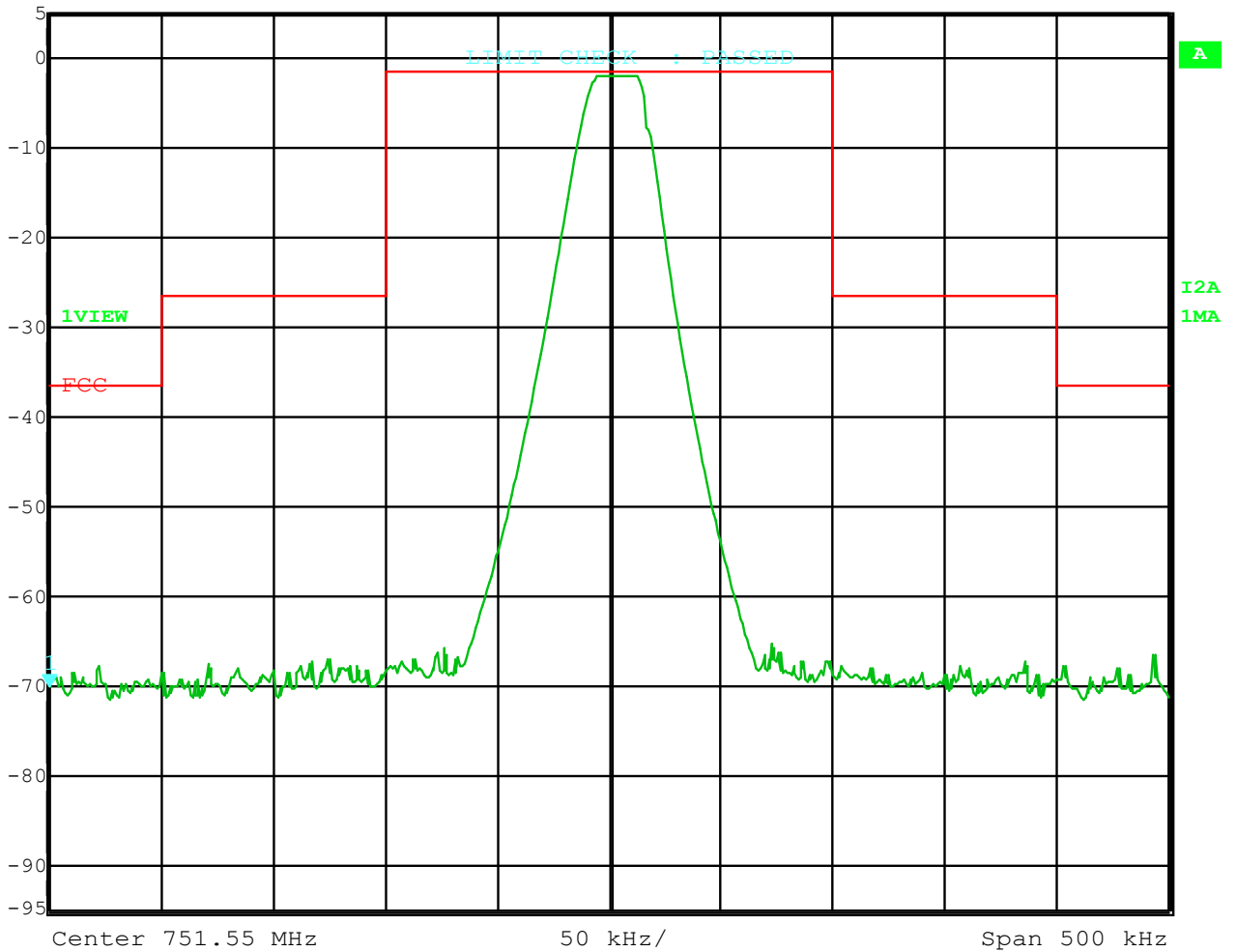
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-70.04 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



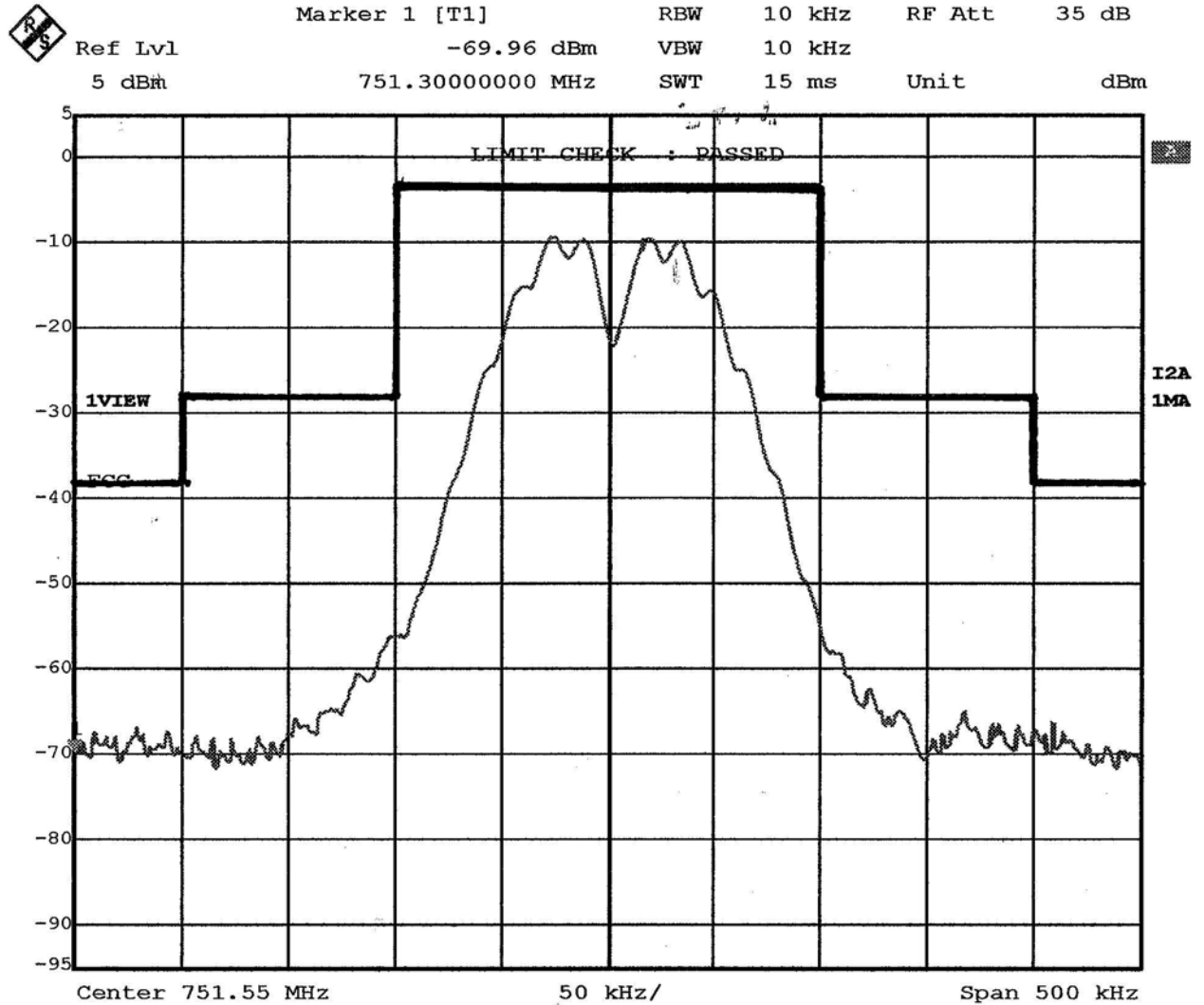
Date: 16.OCT.2003 07:56:40

Audio test level: 84.4 dBμV / 1 kHz
DC supply voltage: 1.6 V

KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Date: 16.OCT.2003 08:15:21

Audio test level: 84.4 dBuV / 15 kHz
DC supply voltage: 1.1 V

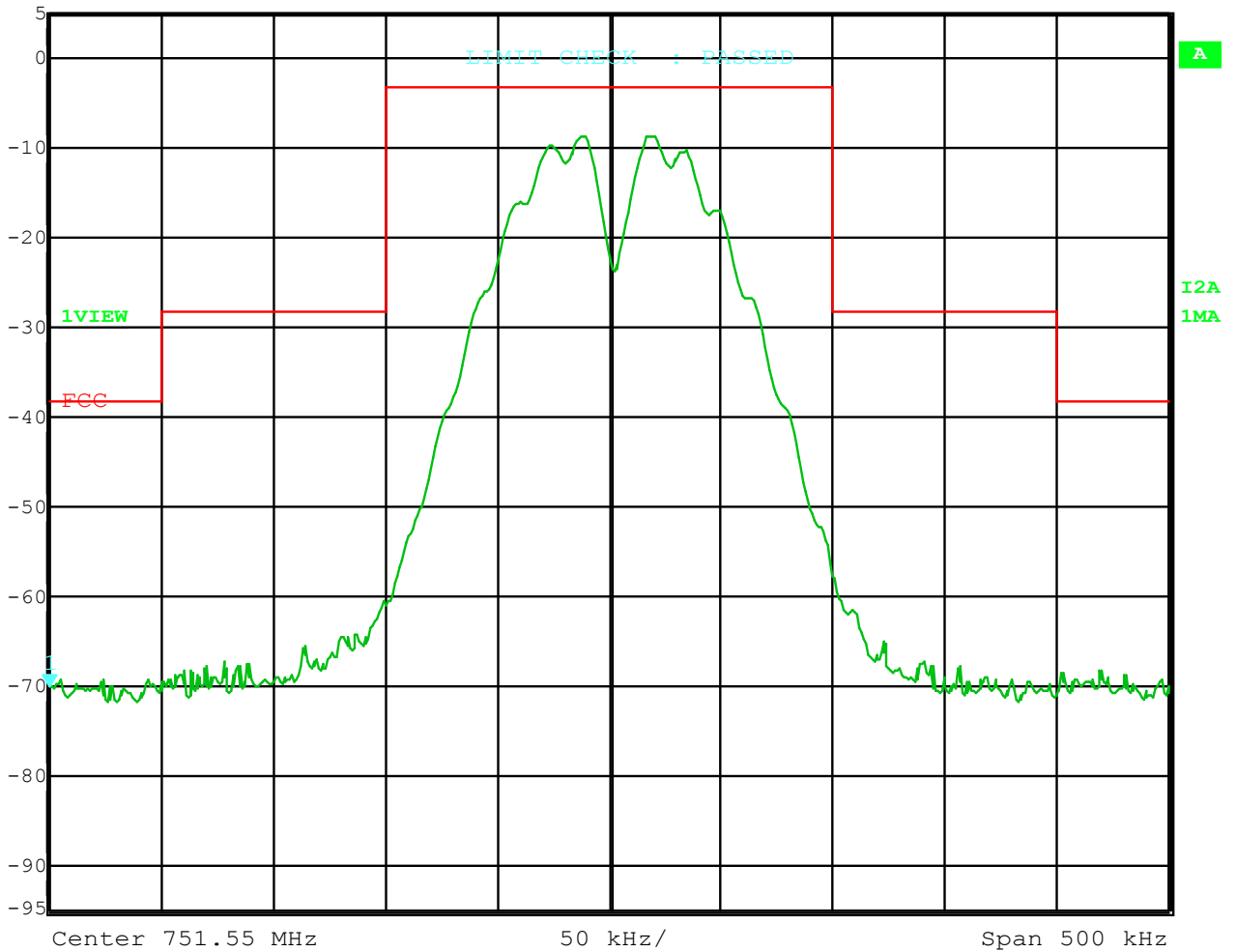
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-70.11 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:12:48

Audio test level: 84.4 dBμV / 15 kHz
DC supply voltage: 1.6 V

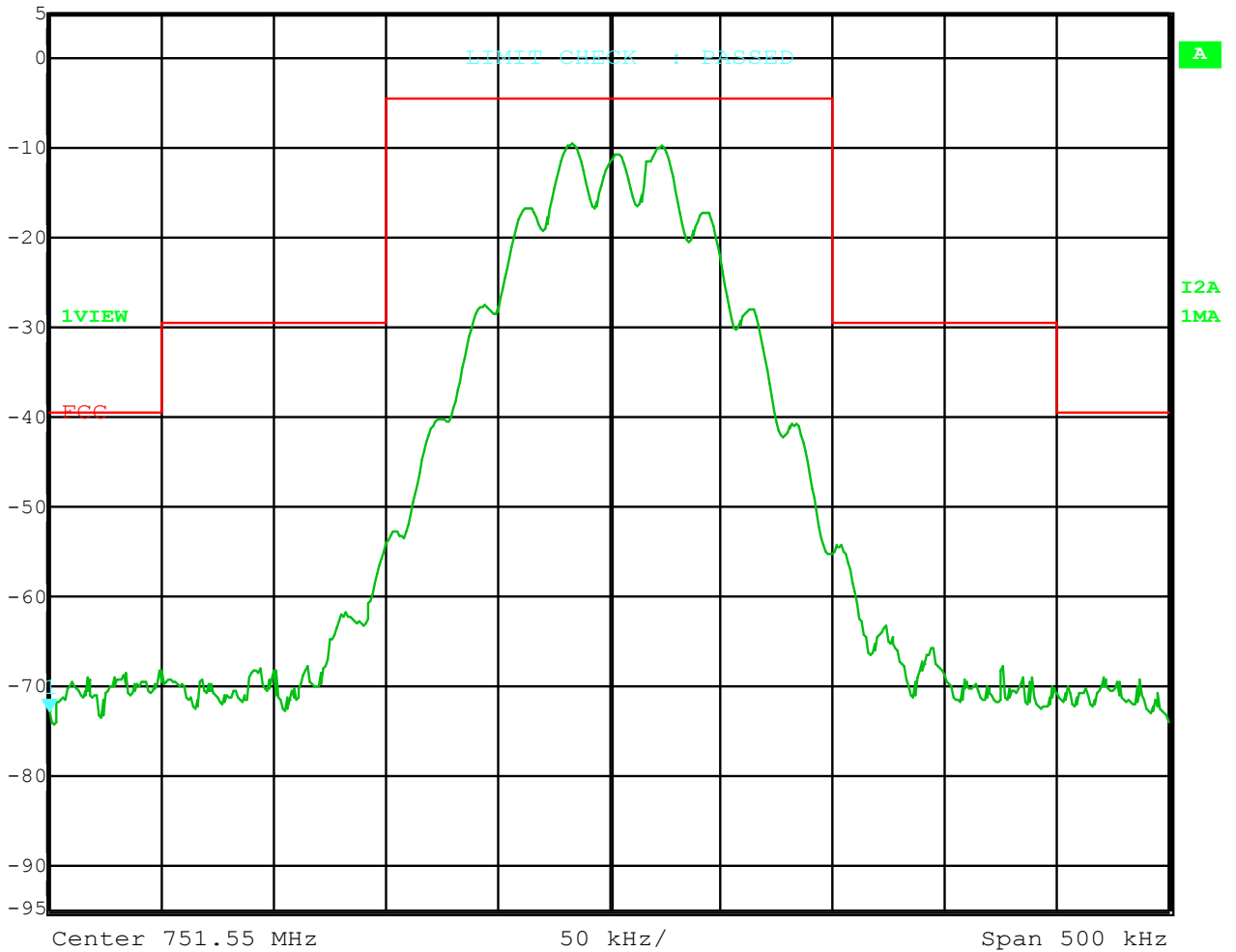
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-72.83 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:36:16

Audio test level: 84.4 dBμV / 20 kHz
DC supply voltage: 1.1 V

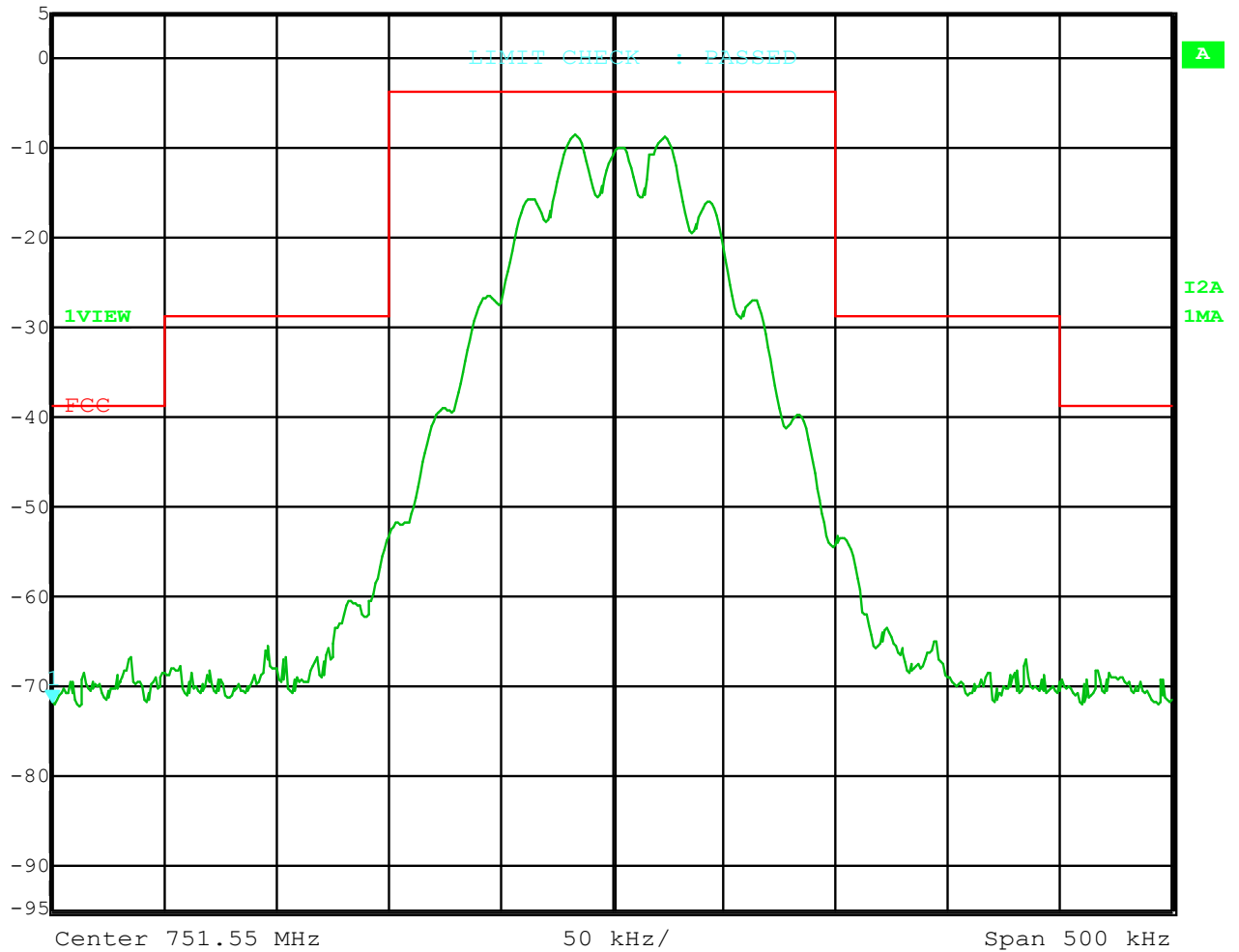
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-71.76 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:30:35

Audio test level: 84.4 dBμV / 20 kHz
DC supply voltage: 1.6 V

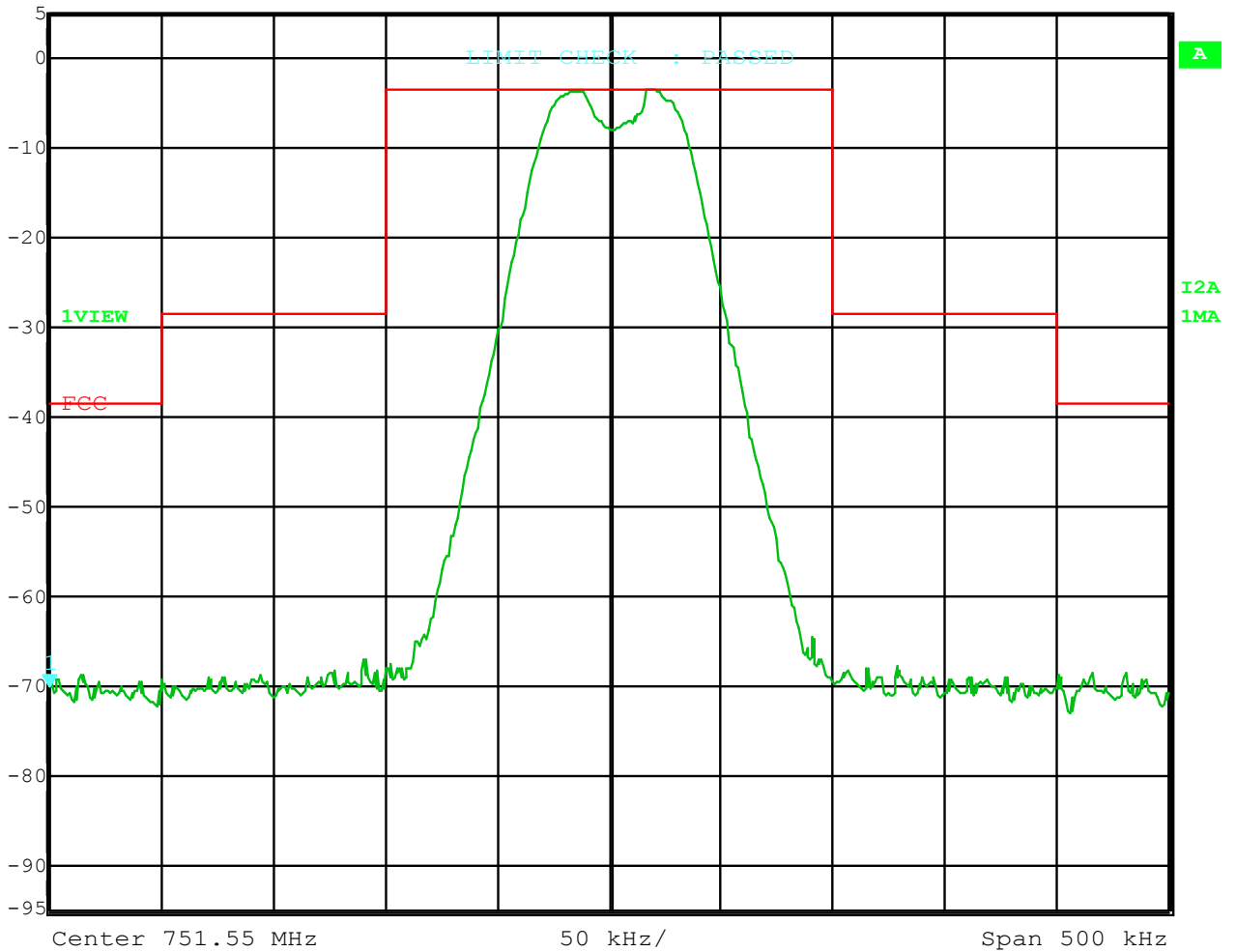
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-70.01 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:03:45

Audio test level: 300 mV / 1 kHz
DC supply voltage: 1.1 V

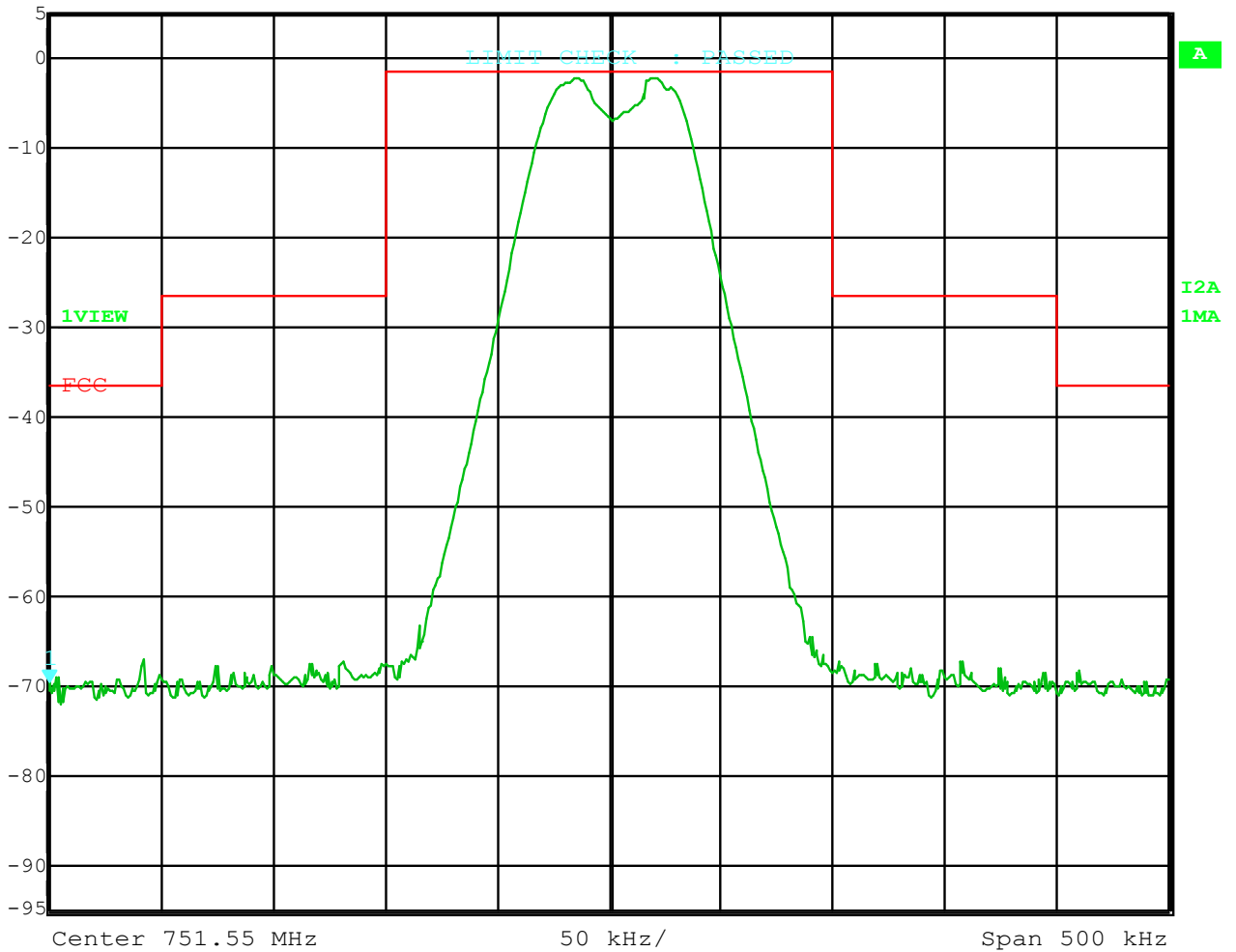
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-69.71 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 07:58:58

Audio test level: 300 mV / 1 kHz
DC supply voltage: 1.6 V

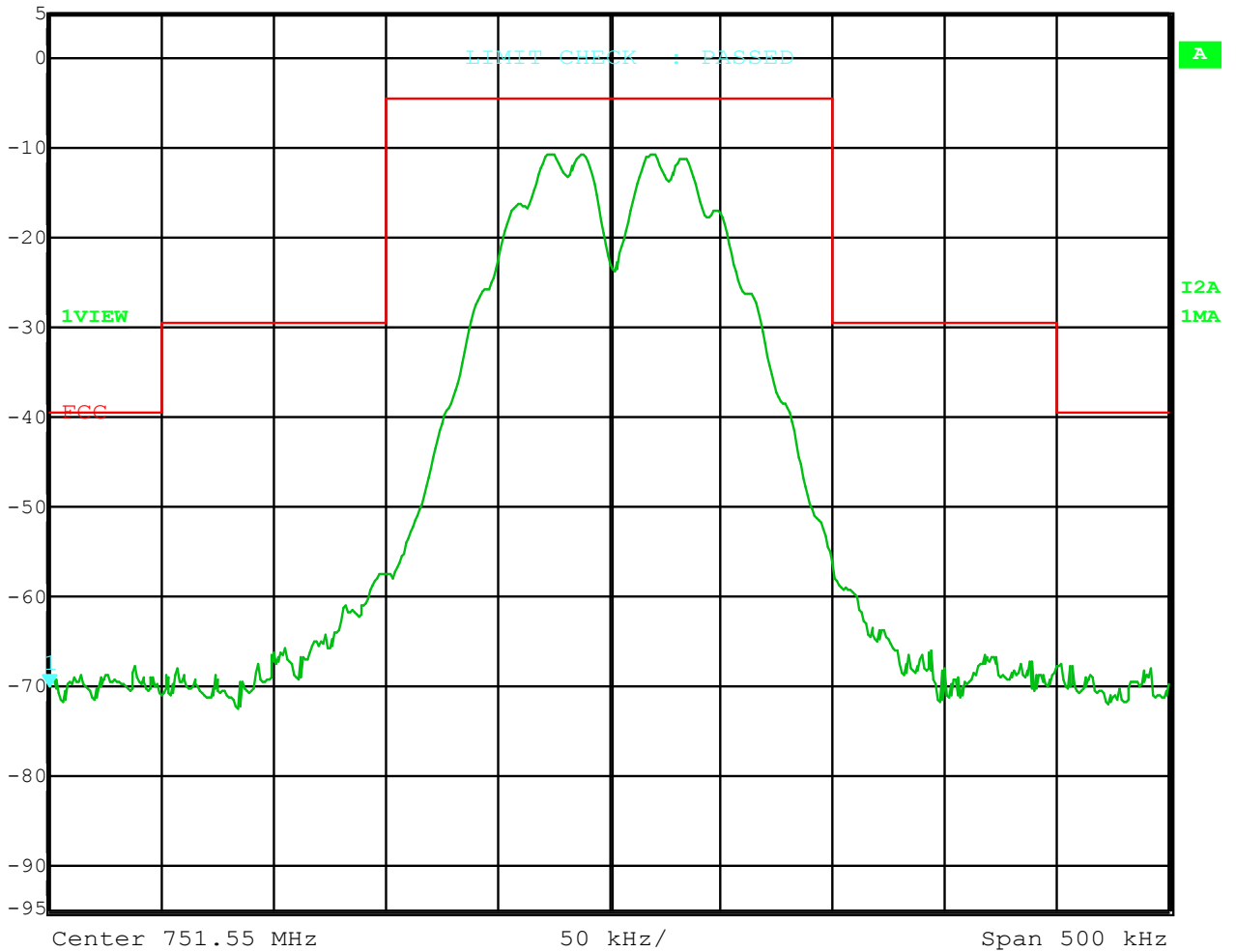
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-70.09 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:20:09

Audio test level: 300 mV / 15 kHz
DC supply voltage: 1.1 V

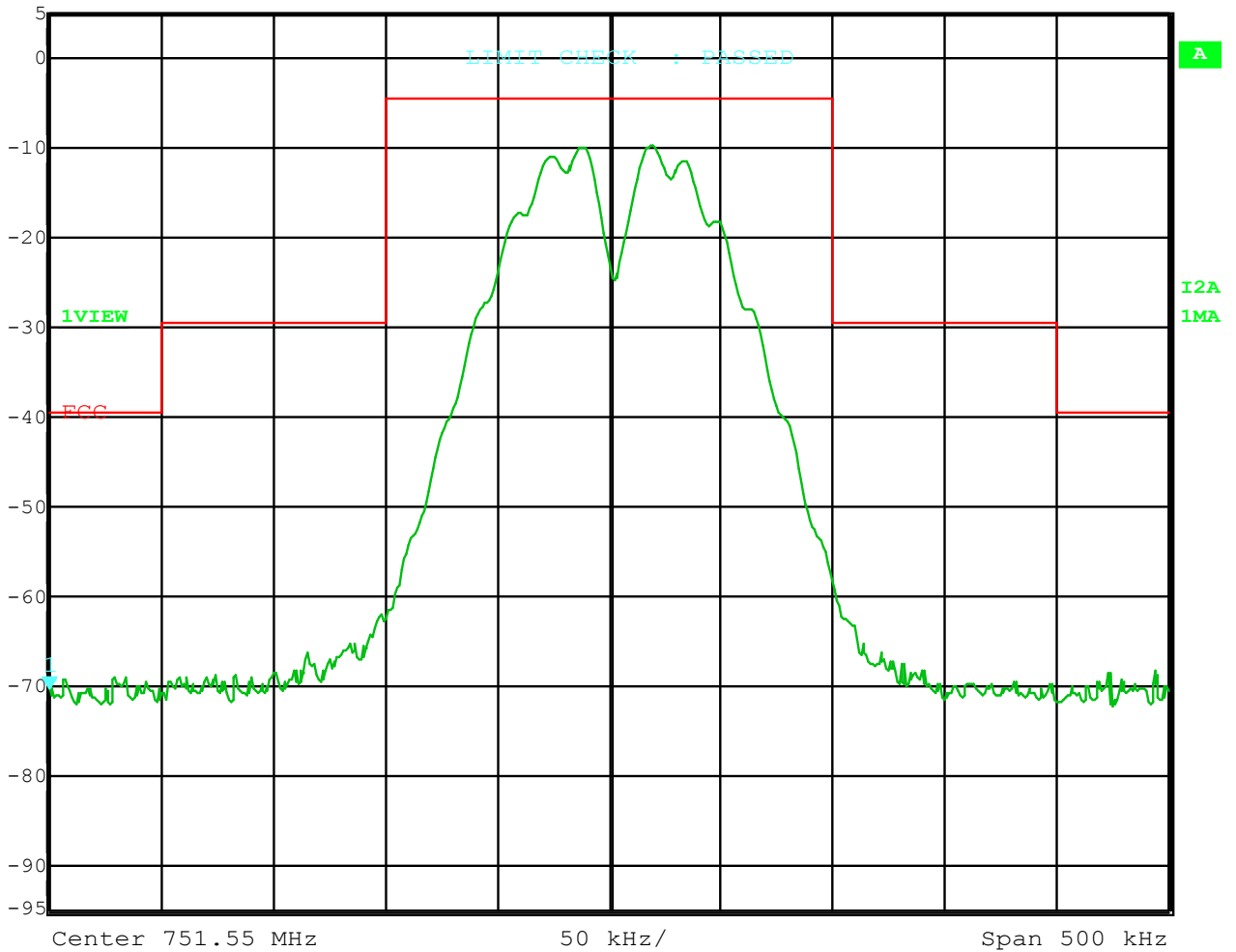
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-70.47 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:18:27

Audio test level: 300 mV / 15 kHz
DC supply voltage: 1.6 V

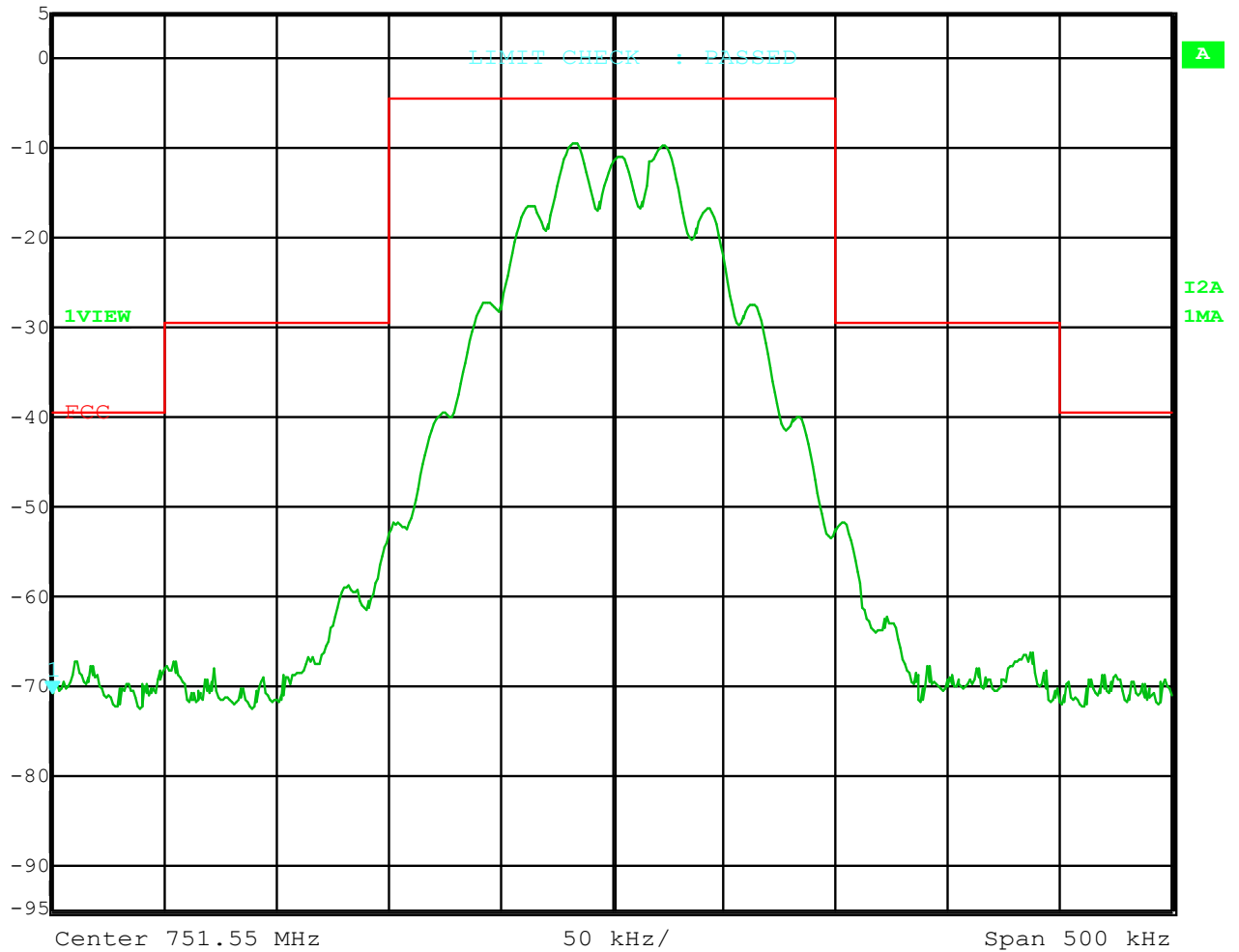
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-70.76 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:37:07

Audio test level: 300 mV / 20 kHz
DC supply voltage: 1.1 V

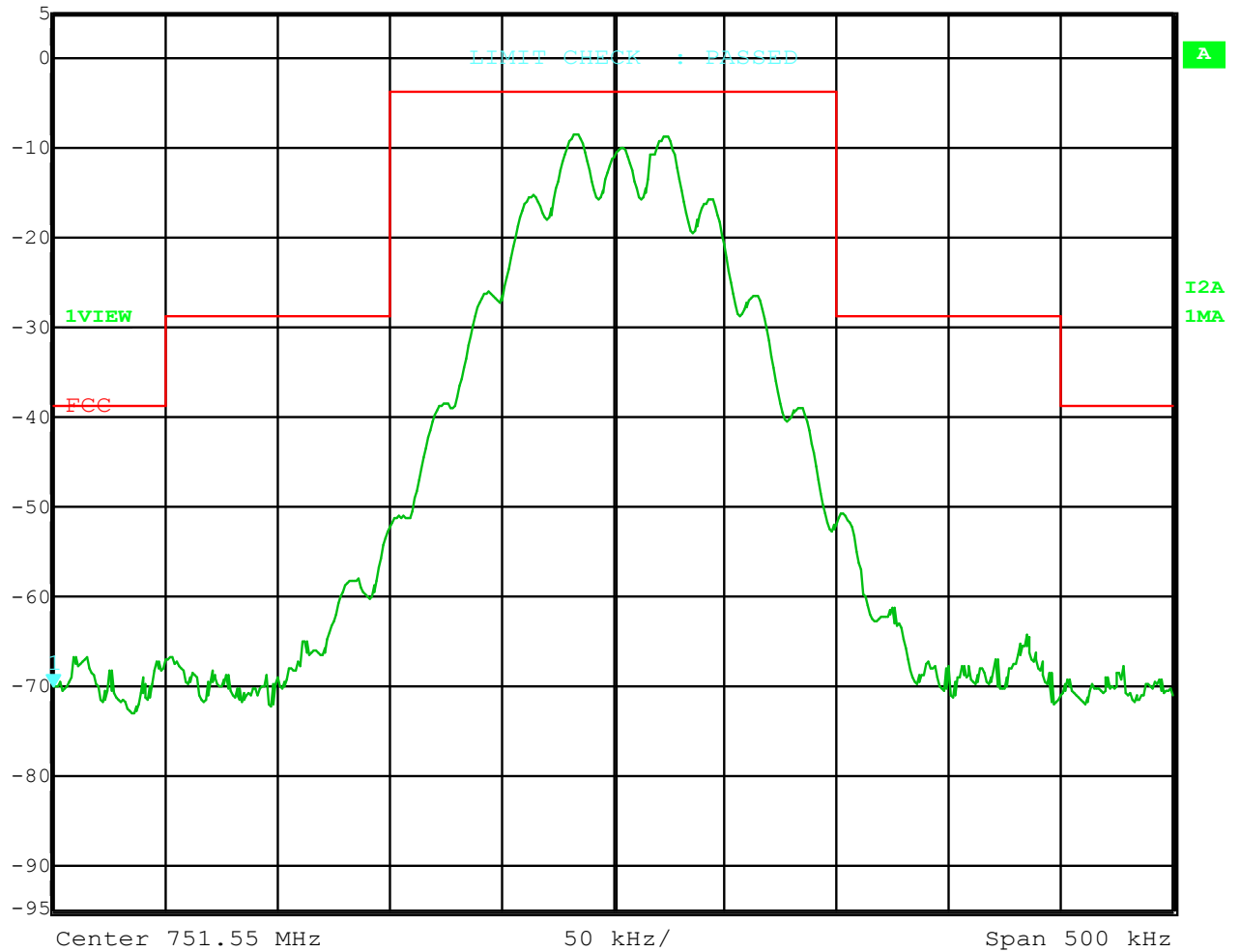
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set US 60 B working on 751.550 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-70.22 dBm	VBW	10 kHz		
	751.3000000 MHz	SWT	15 ms	Unit	dBm



Date: 16.OCT.2003 08:31:30

Audio test level: 300 mV / 20 kHz
DC supply voltage: 1.6 V

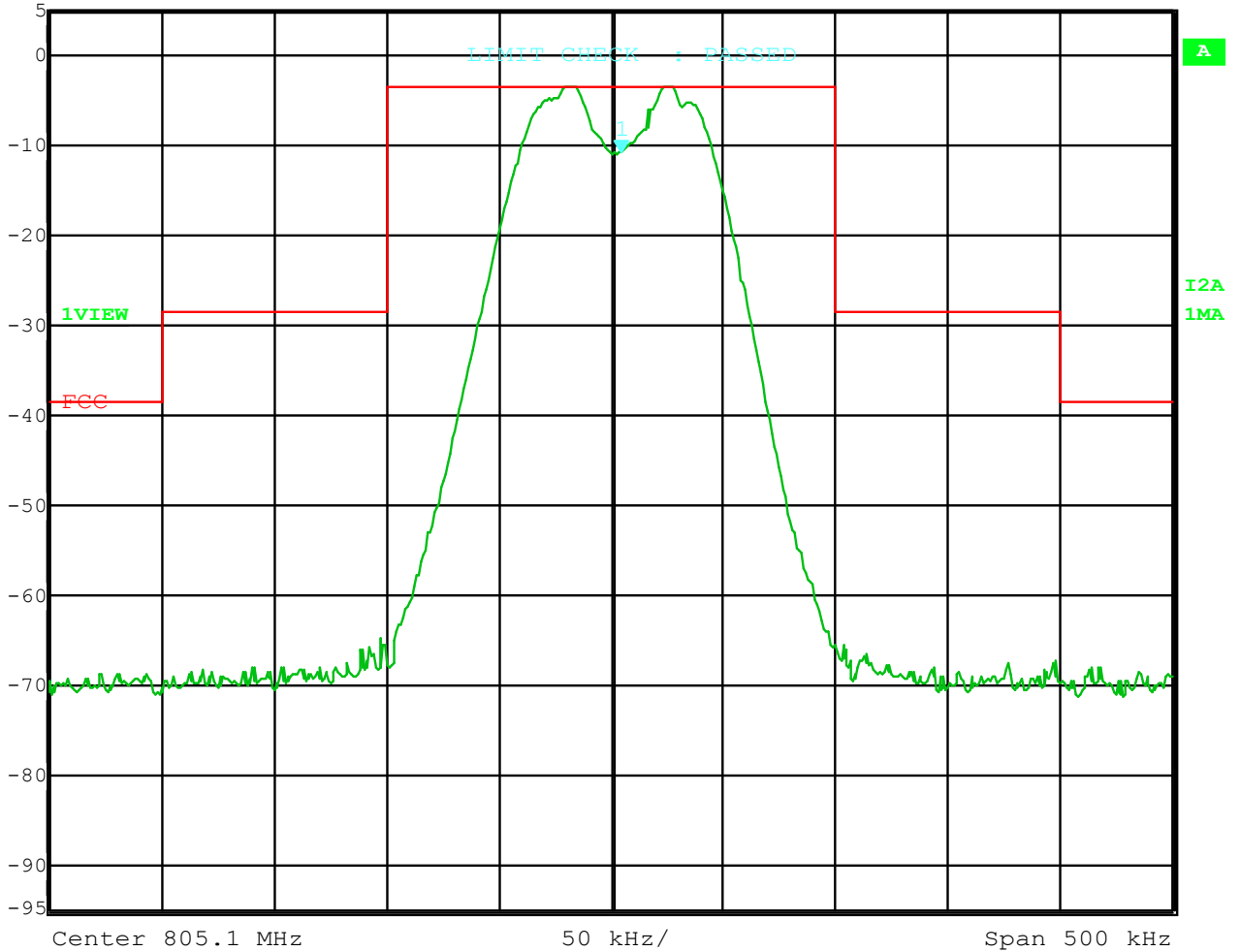
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-10.81 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 13:51:54

Audio test level: 110.8 dBμV / 1 kHz
DC supply voltage: 1.1 V

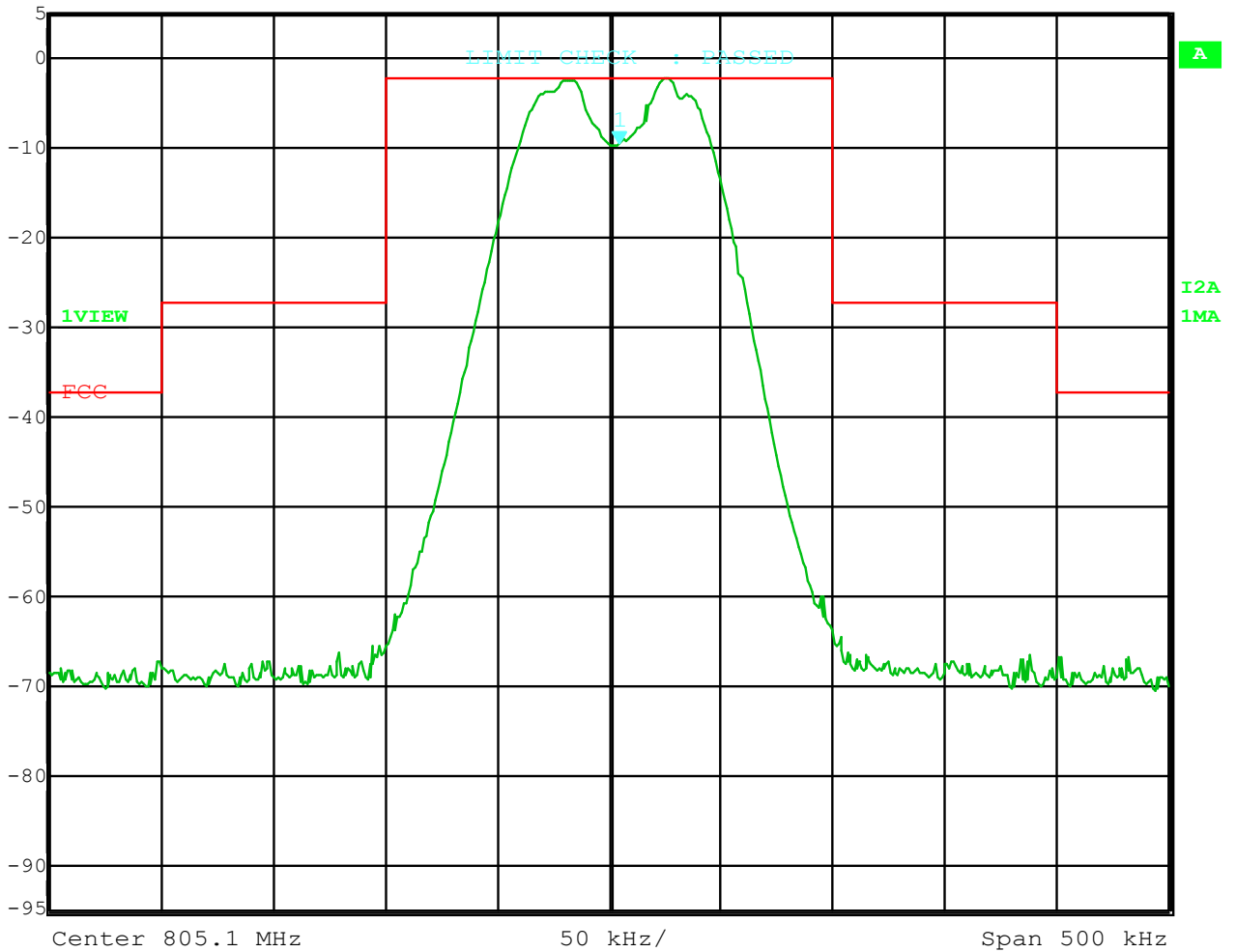
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-9.60 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 13:39:16

Audio test level: 110.8 dBμV / 1 kHz
DC supply voltage: 1.6 V

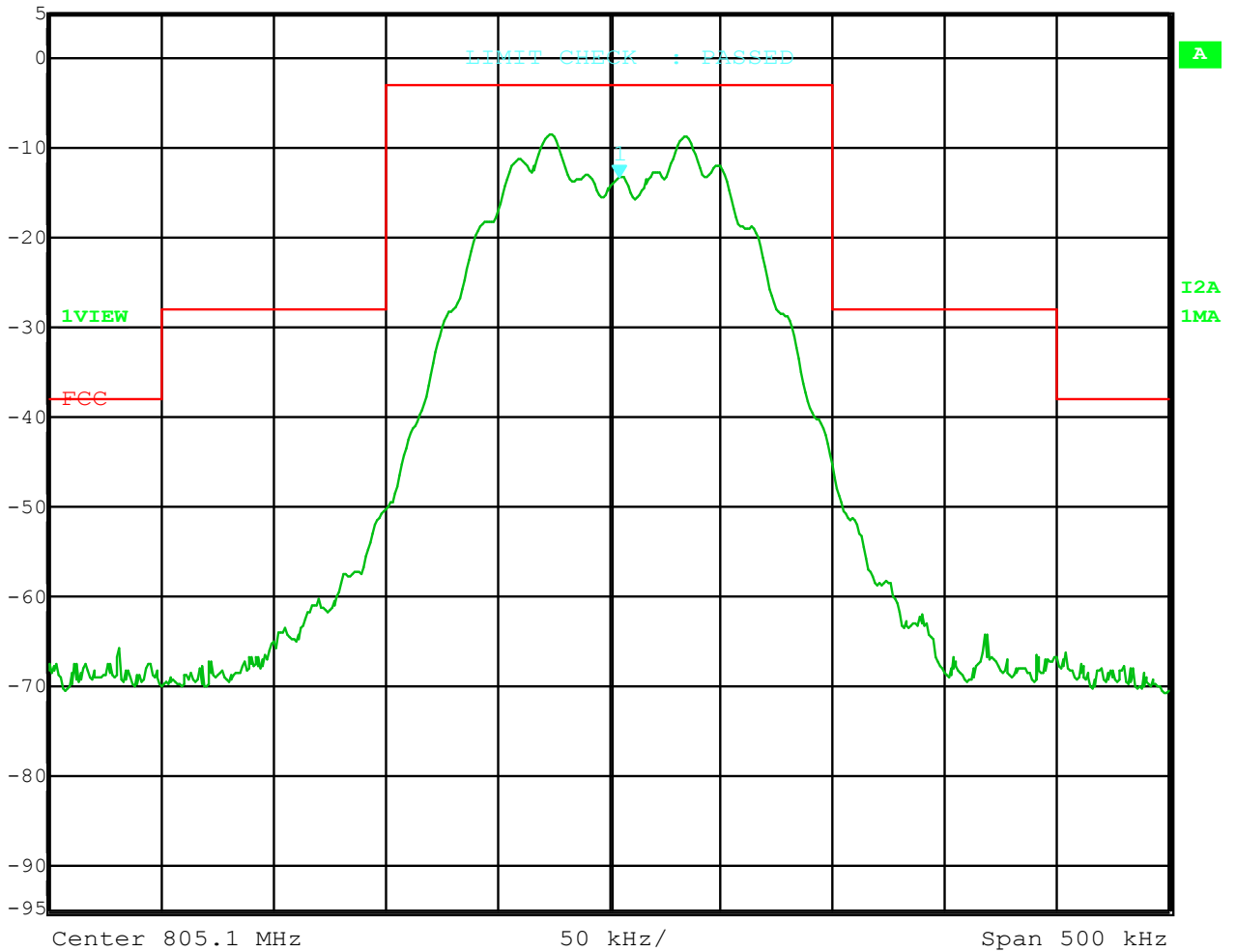
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-13.39 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 14:16:34

Audio test level: 110.8 dBμV / 15 kHz
DC supply voltage: 1.1 V

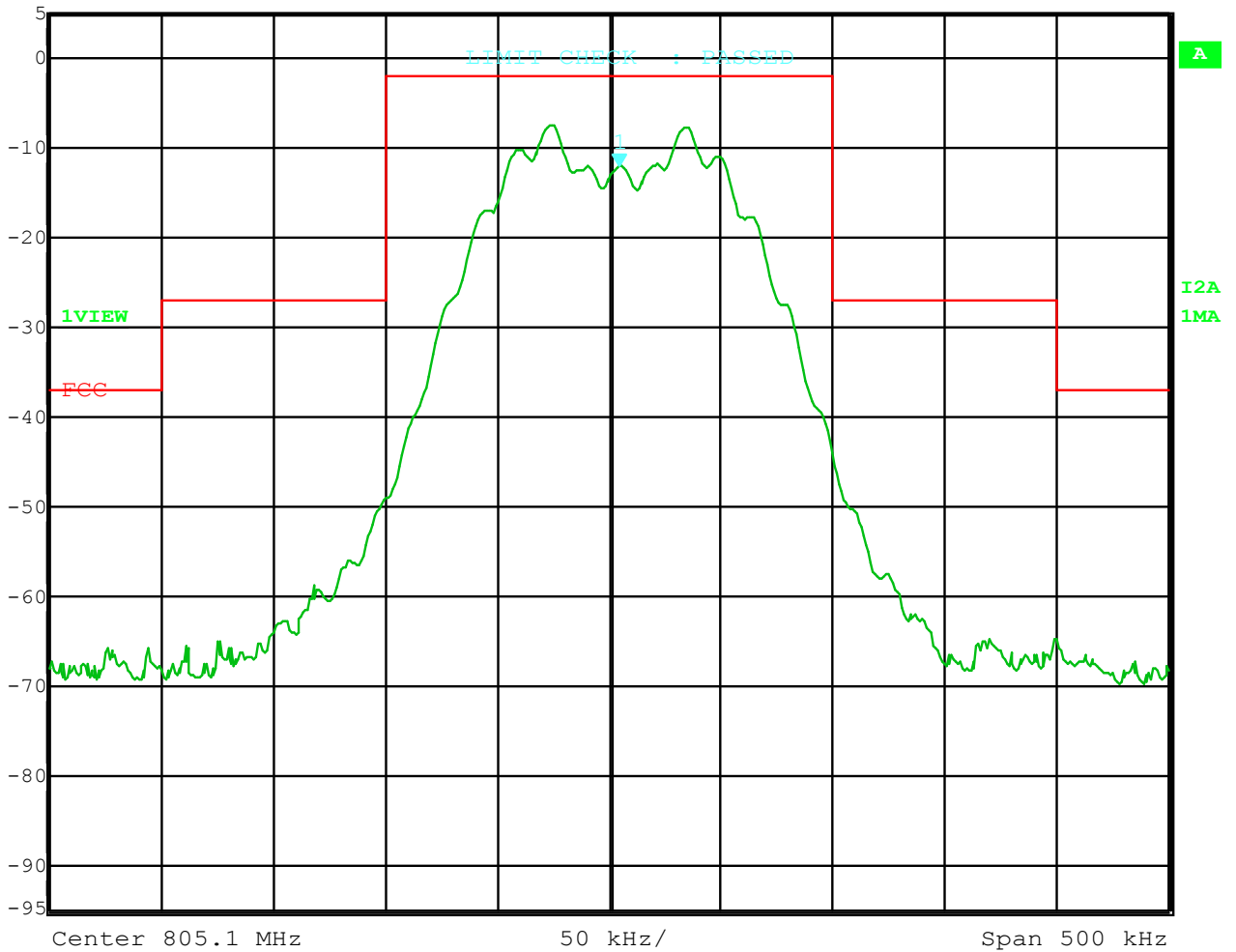
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-12.22 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 14:08:22

Audio test level: 110.8 dBμV / 15 kHz
DC supply voltage: 1.6 V

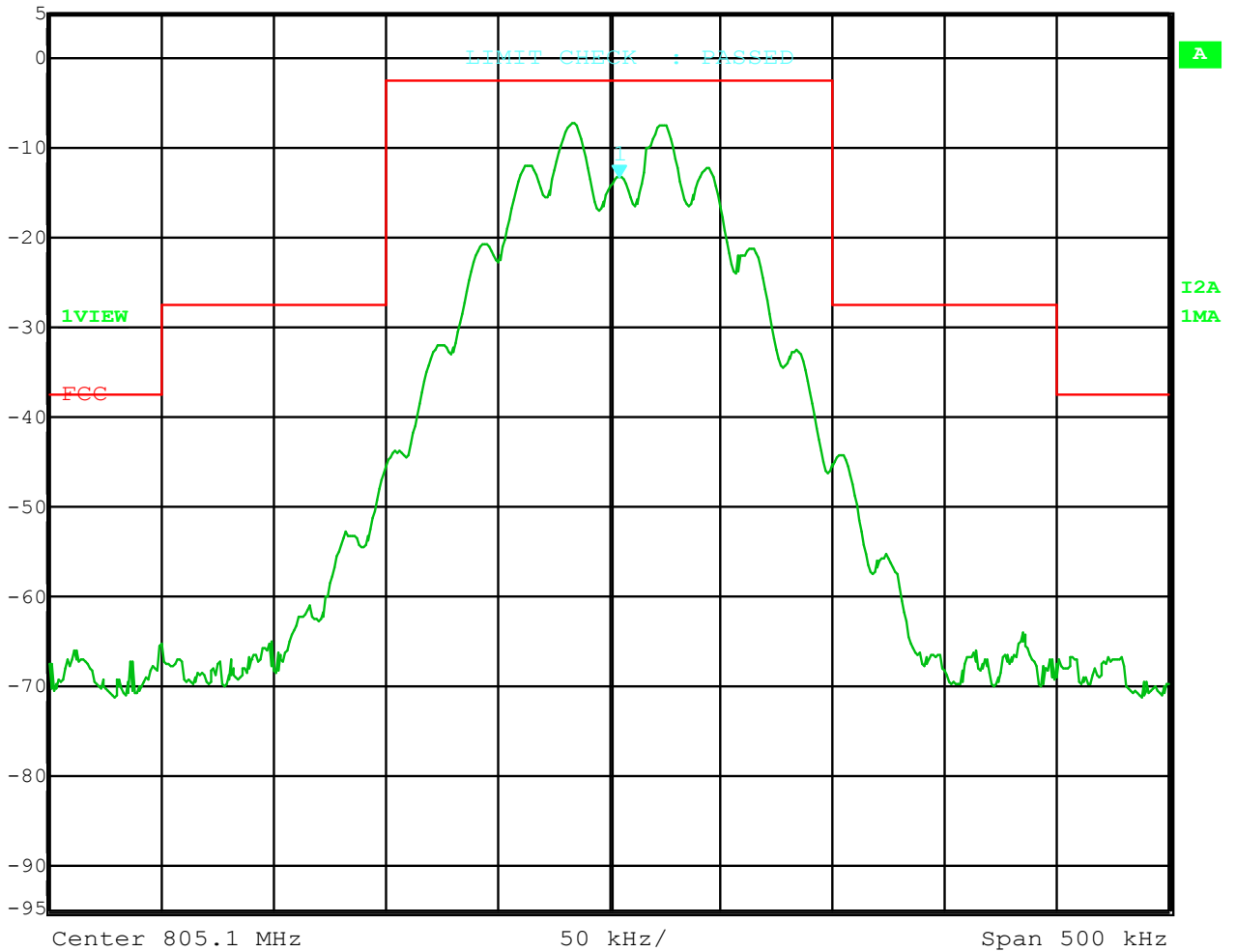
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-13.32 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 14:48:57

Audio test level: 110.8 dBμV / 20 kHz
DC supply voltage: 1.1 V

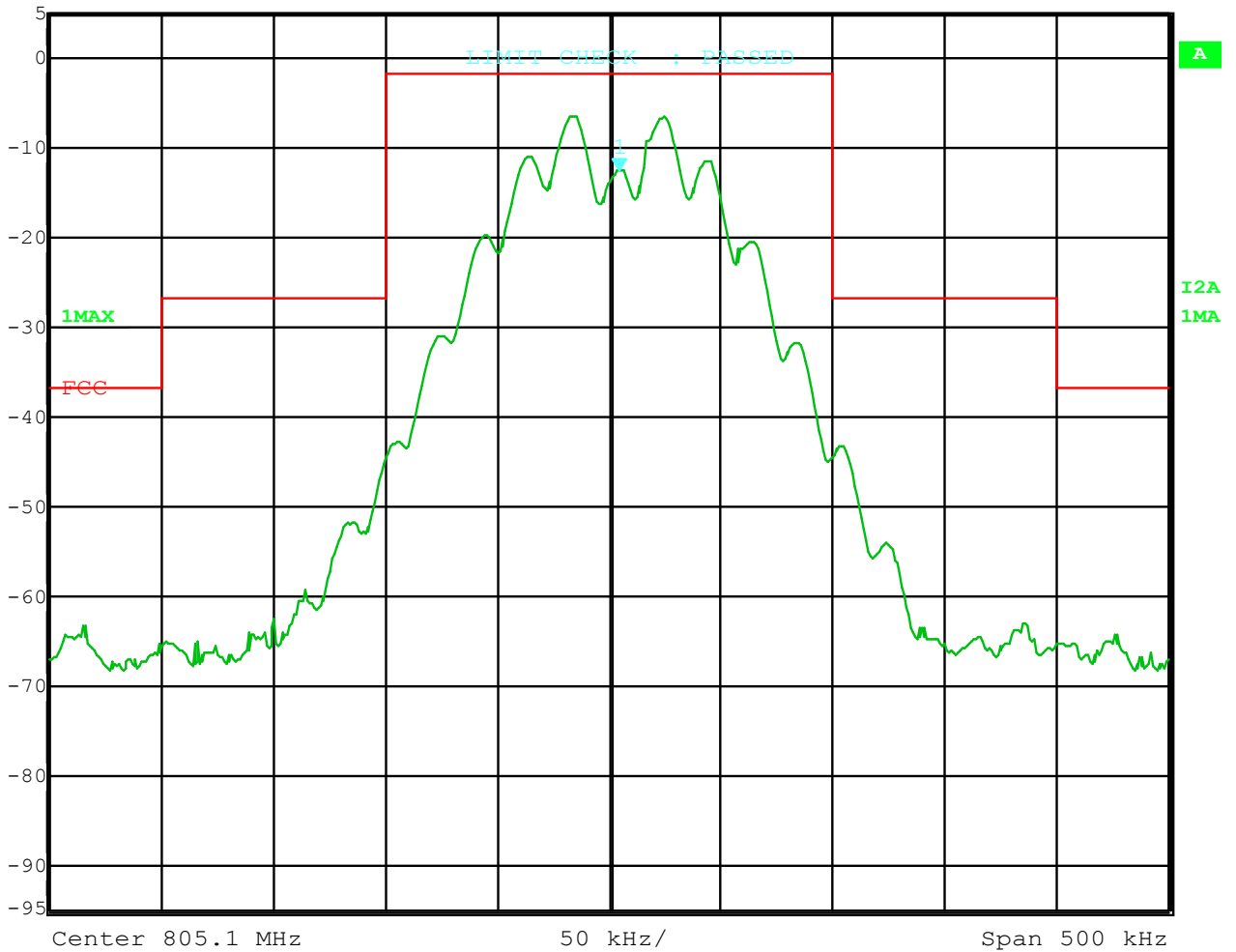
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-12.62 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 14:43:18

Audio test level: 110.8 dBμV / 20 kHz
DC supply voltage: 1.6 V

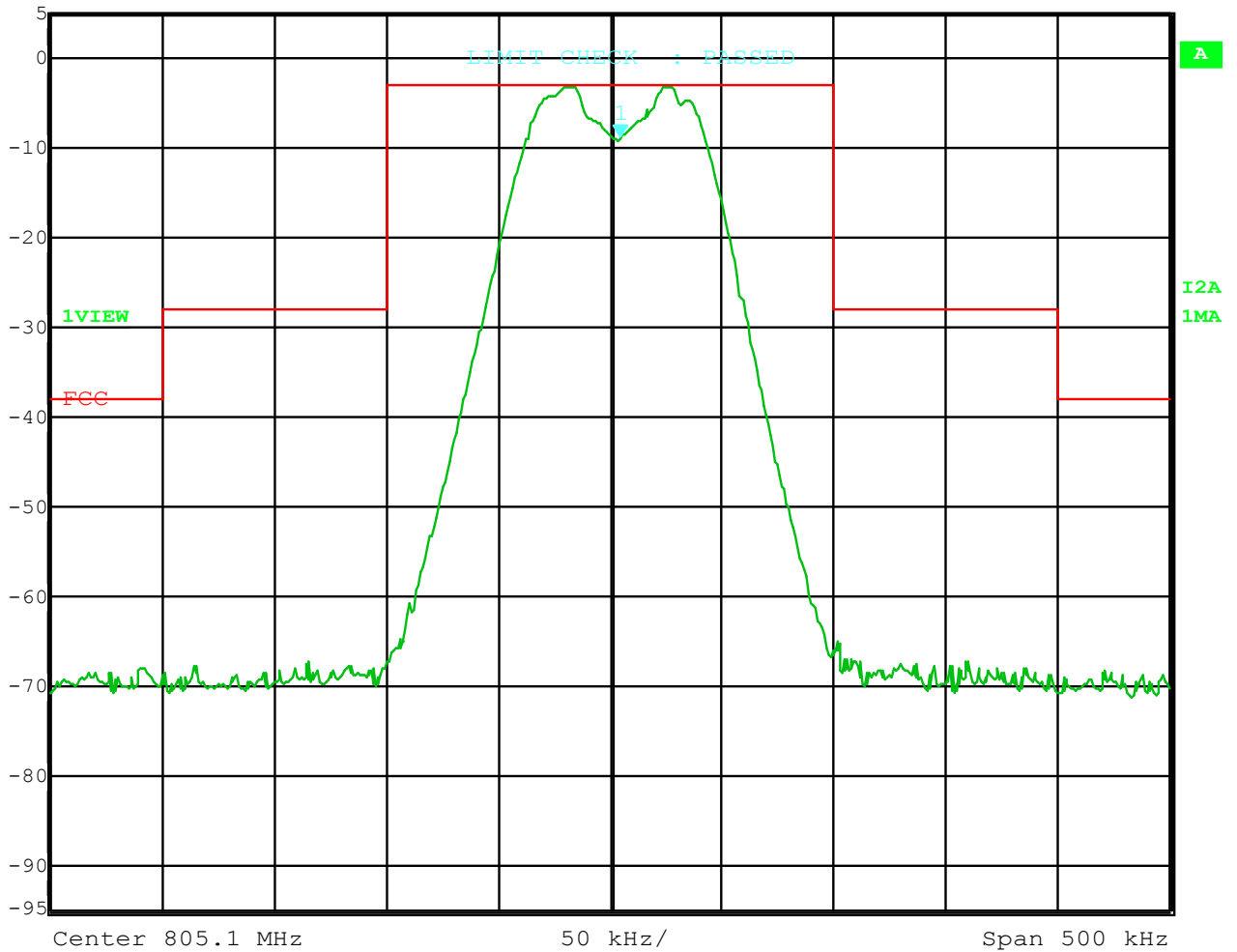
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-8.95 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 13:57:55

Audio test level: 300 mV / 1 kHz
DC supply voltage: 1.1 V

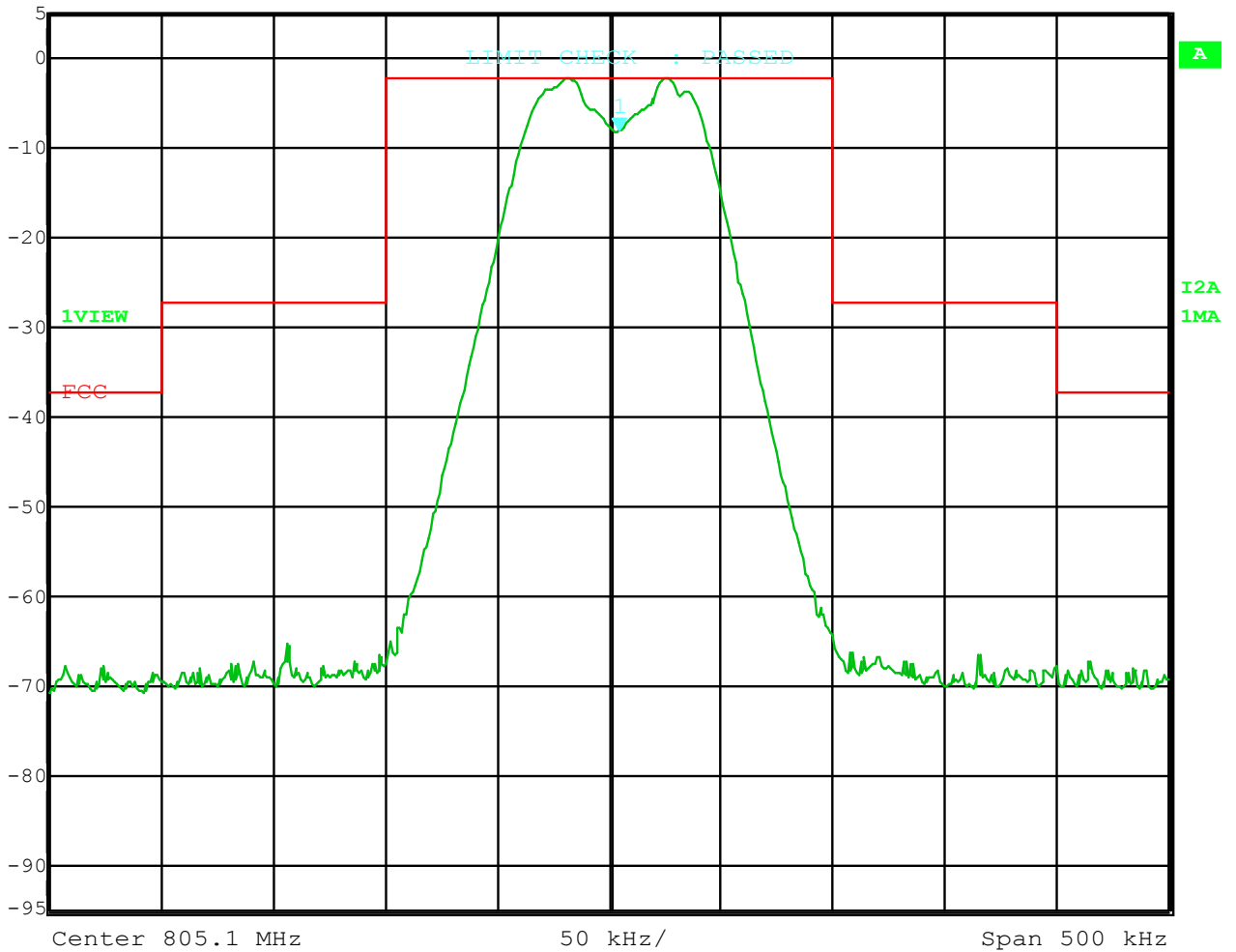
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-8.19 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 13:45:25

Audio test level: 300 mV / 1 kHz
DC supply voltage: 1.6 V

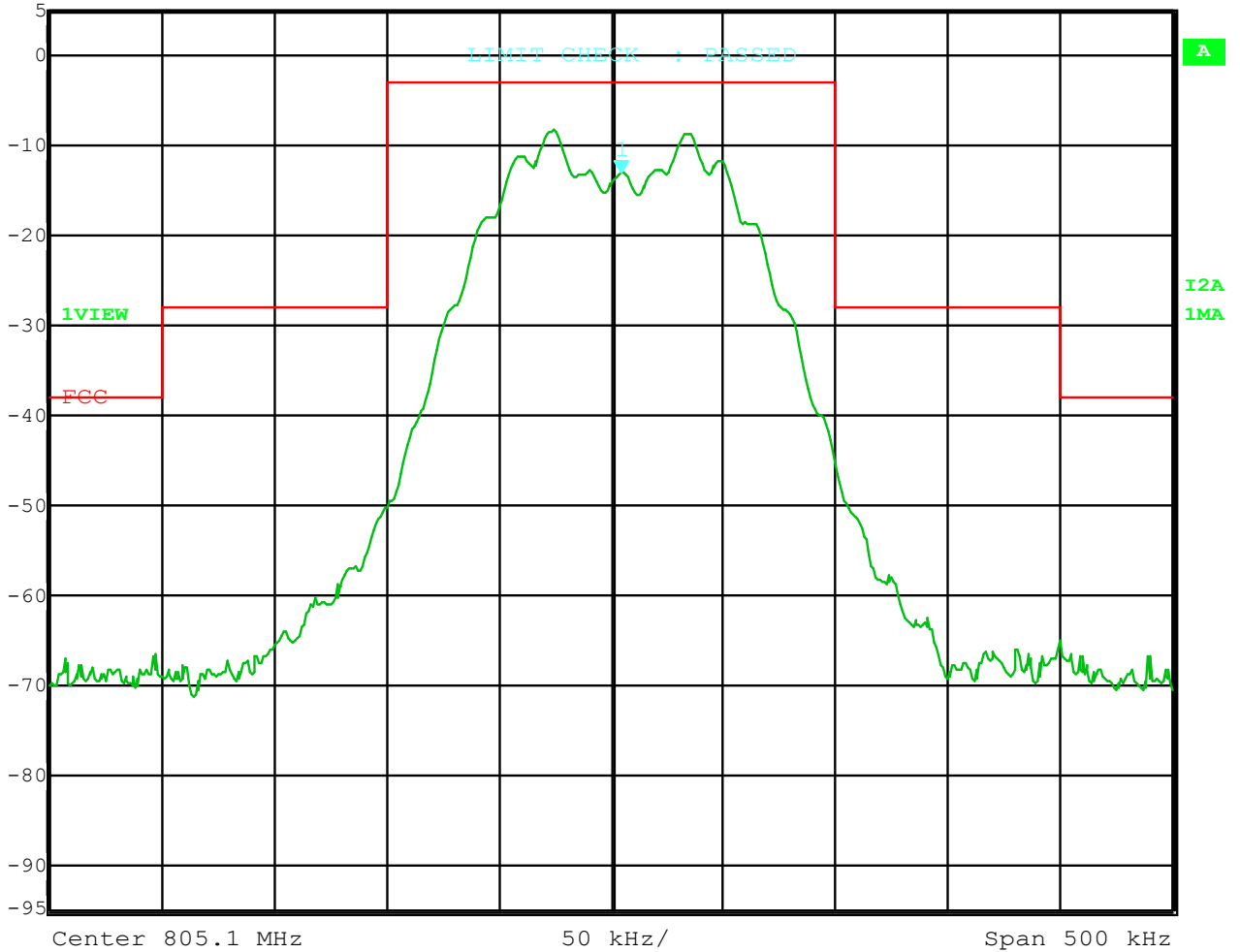
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-13.22 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 14:26:46

Audio test level: 300 mV / 15 kHz
DC supply voltage: 1.1 V

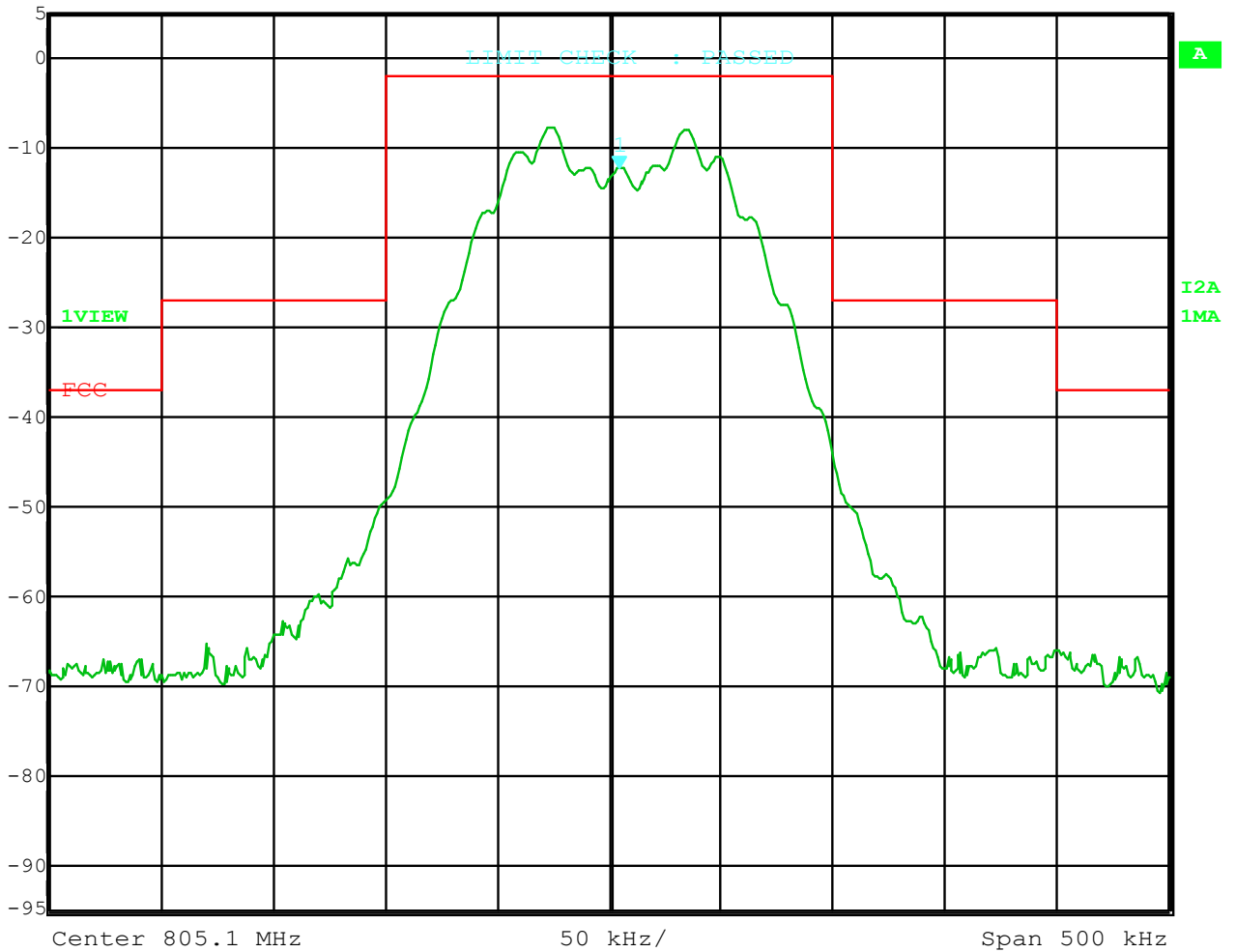
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-12.36 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 14:12:12

Audio test level: 300 mV / 15 kHz
DC supply voltage: 1.6 V

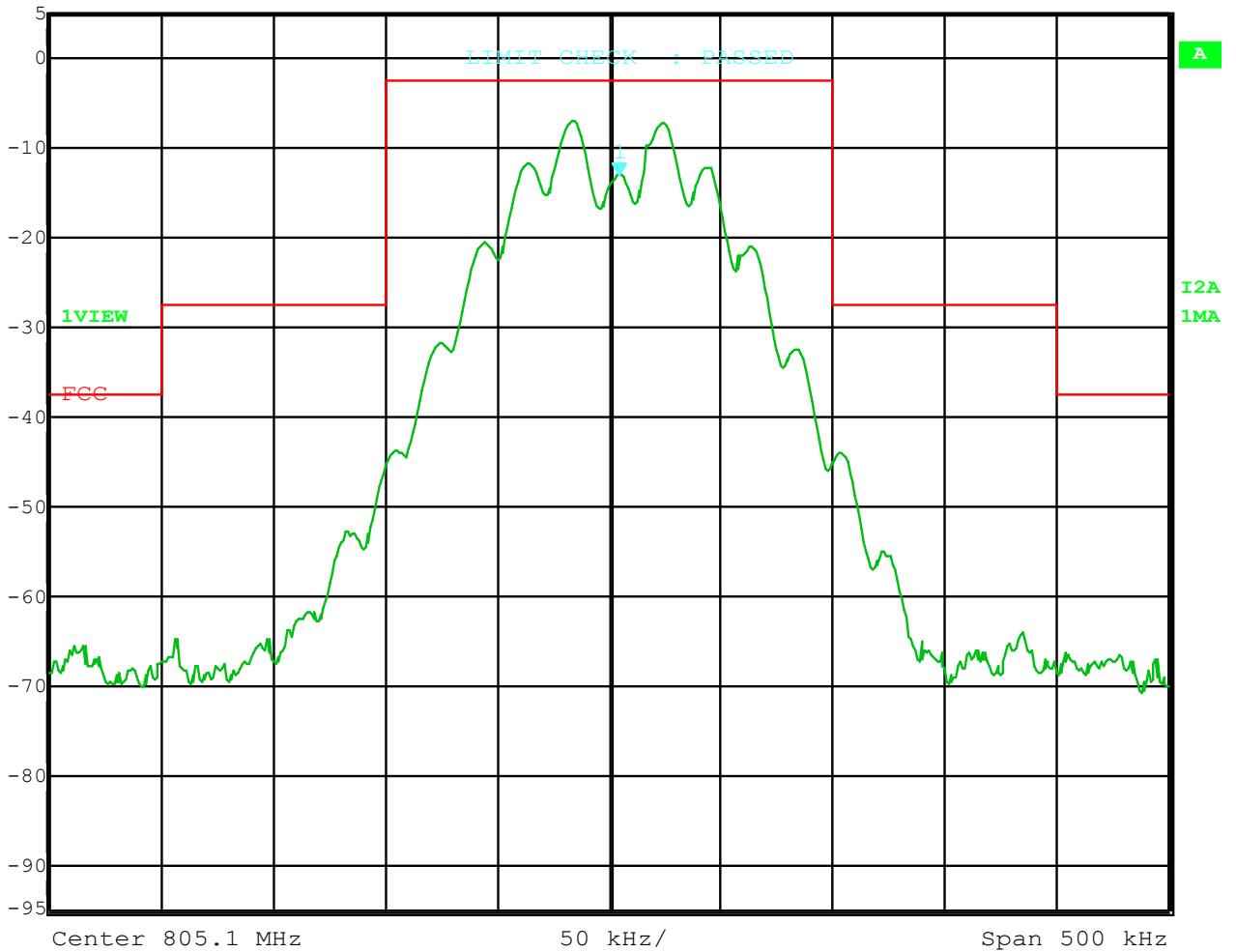
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-13.11 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 14:52:33

Audio test level: 300 mV / 20 kHz
DC supply voltage: 1.1 V

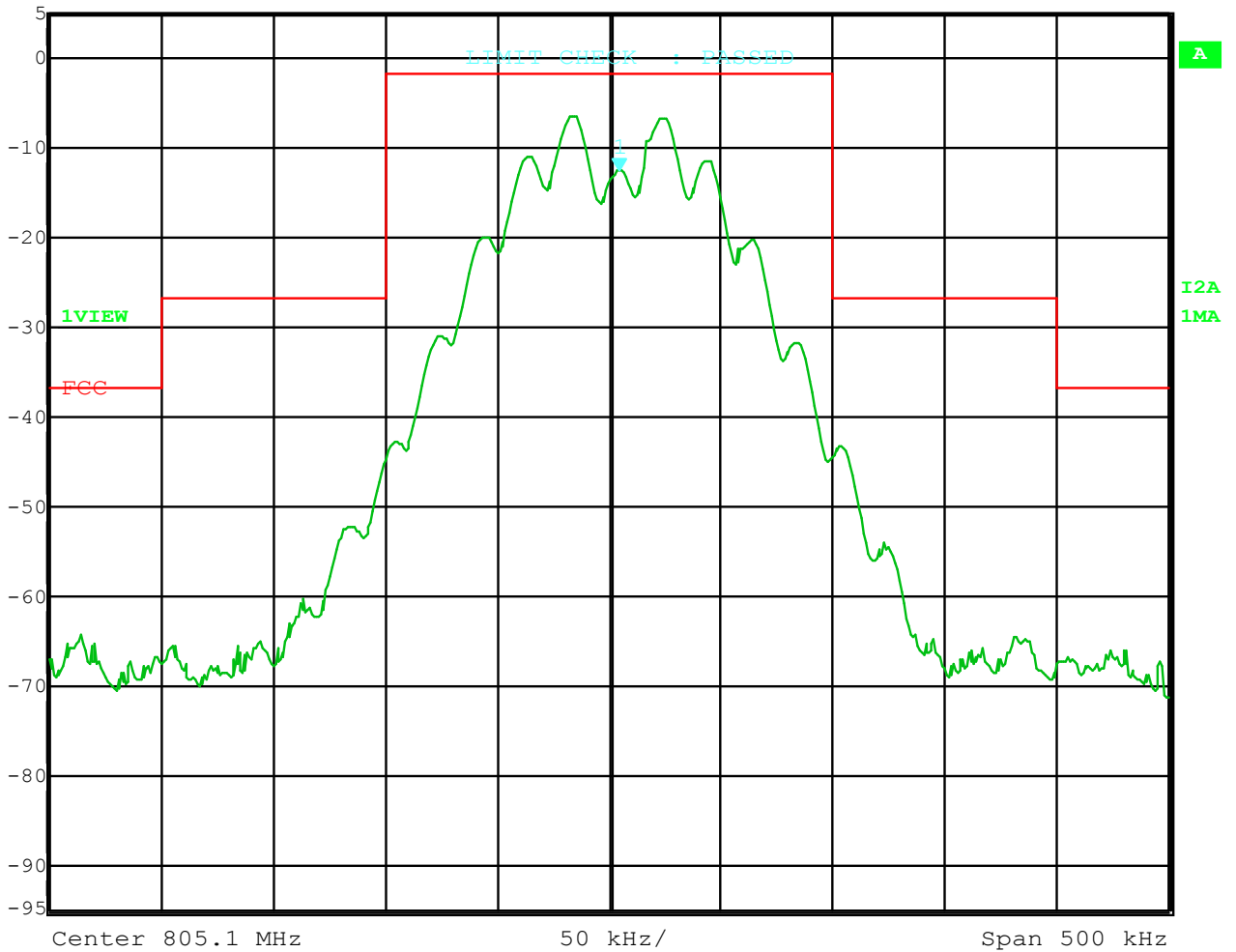
KEEPING THE REQUIREMENTS OF THE EMISSION MASK

TM40

Set EU 62 B working on 805.100 MHz



Ref Lvl	Marker 1 [T1]	RBW	10 kHz	RF Att	35 dB
5 dBm	-12.62 dBm	VBW	10 kHz		
	805.10450902 MHz	SWT	15 ms	Unit	dBm



Date: 15.OCT.2003 14:45:55

Audio test level: 300 mV / 20 kHz
DC supply voltage: 1.6 V

FCC ID: E9MPT4000

Attachment B:

Test Report No: T23829-00-00KJ
Beginning of Testing: 03 September 2003
End of Testing: 18 October 2003

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

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
CPR2	RG 217	RF-Cable	Rosenberger HF-Technik	99-07/60-03-016
	RG 214	RF-Cable	Rosenberger HF-Technik	99-07/60-03-017
	VULP 9163	Antenna	Schwarzbeck Mess-Elektronik	99-07/62-03-002
	ESVP	Test Receiver	Rohde & Schwarz München	99-07/63-03-002
EM	THS 730A	Handheld Scope	Tektronix GmbH	04-07/38-02-001
	Peaktech 6015 A	DC Power Supply	BÜRKLIN	04-07/49-03-003
	ESIB- 40	Test Receiver	Rohde & Schwarz München	04-07/63-03-002
	CMS-54	Com. Receiver	Rohde & Schwarz München	04-07/63-94-052
FE	THS 730A	Handheld Scope	Tektronix GmbH	04-07/38-02-001
	Peaktech 6015 A	DC Power Supply	BÜRKLIN	04-07/49-03-003
	CMS-54	Com. Receiver	Rohde & Schwarz München	04-07/63-94-052
	R 3361 A	Spectrum Analyser	Advantest	04-07/74-01-001
MLD	THS 730A	Handheld Scope	Tektronix GmbH	04-07/38-02-001
	Peaktech 6015 A	DC Power Supply	BÜRKLIN	04-07/49-03-003
	ESIB- 40	Test Receiver	Rohde & Schwarz München	04-07/63-03-002
	CMS-54	Com. Receiver	Rohde & Schwarz München	04-07/63-94-052
SER2	RG 217	RF-Cable	Rosenberger HF-Technik	99-07/60-03-016
	RG 214	RF-Cable	Rosenberger HF-Technik	99-07/60-03-017
	VULP 9163	Antenna	Schwarzbeck Mess-Elektronik	99-07/62-03-002
	ESVP	Test Receiver	Rohde & Schwarz München	99-07/63-03-002
SER3	Sucoflex 102	Rf-Cable 40 GHz	Huber+Suhner	04-07/60-03-023
	Sucoflex 102	Rf-Cable 40 GHz	Huber+Suhner	04-07/60-03-024
	model 3115	Horn Antenna	EMCO Elektronik GmbH	04-07/62-03-003
	AF S4-01000400-10-10P-4	RF Amplifier 1-4 GHz	PARZICH GMBH	04-07/66-03-001
	AMF-4F-04001200-15-10P	1-12 GHz Amplifier	PARZICH GMBH	04-07/66-03-006
	R 3162	Spectrum Analyser	Advantest	04-07/74-00-001

Attachment D: 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 or AKG Acoustics		
Address:	Vtech Science Park, Xia Ling Bei Management Zone, Liabou, Dongguan Guangdong 523411		
Type:	TM40		
Model:			
Serial-No.:		Protection class:	

Additional informations to the above named model:

Antenna: transmitter:	Type: dipole (integral)		
	Length/size: lambda/4		
receiver:	Type:		
	Length/size:		
Power supply of the transmitter: Type: 1 AAA Cell or NiMH	nominal voltage:	1.5	V
	lowest voltage:	1.1	V
	highest voltage:	1.6	V
	current consumption	~75mA@1.25V	
Power supply of the receiver: Type:	nominal voltage:	V	
	current consumption	A	

Ancillary equipment:

Description:	Charging unit	Type:	CU40	Serial-no.:	
Description:		Type:		Serial-no.:	
Description:	Microphones	Type:	D880M, D3700M, D3800M, C900M, C5900M	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
	☐ yes ☐ no		☐ yes ☐ no
	☐ yes ☐ no		☐ yes ☐ no
	☐ yes ☐ no		☐ yes ☐ no
	☐ yes ☐ no		☐ yes ☐ no
	☐ yes ☐ no		☐ yes ☐ no

Attachment D: Constructional dataform for testing of radio equipment

Type designation: TM40			
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 transmitter module for microphones
☐ Satellite earth station	☐ CB radiotelephone equipment	☐ Antenna	☐
☐ Data transmission equipment	☐ Movement detector	☐ Aeronautical equipment	☐
Technical characteristics:			
	Transmitter-receiver	Transmitter	Receiver
Frequency range		710.4-805.1MHz	
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	☒ 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	Impedance 220kOhm, audio bandwidth 50Hz-20kHz 300mW RMS for nominal deviation 15kHz		
Modes of operation	☐ Duplex mode	☐ Semi-duplex mode	☒ Simplex mode
Power source	☐ Mains	☐ Vehicle-regulated	☒ Integral
Antenna socket	☐ BNC ☐ M ☒ None	☐ TNC ☐ UHF ☐	☐ N ☐ Adapter ☐
Test specifications: FCC Part 74,			

Attachment D: Constructional dataform for testing of radio equipment

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, _____ date 27.8.03
place of issue

Douglas W. MacCallum
Seal and signature of applicant
Vice President & General Manager
issued: Peter Tiefenthaler