FCC Part 15 Subpart C

EMI TEST REPORT

of

E.U.T. : Universal FM Hands Free ~ Easy - Talk (Transmitter)

FCC ID. : OYL0122

MODEL : PRO_FM1

Working Frequency : 96.0 MHz

for

APPLICANT : PROGREX INTERNATIONAL CO., LTD.
ADDRESS : 1F. NO. 7, LANE 26, CHIEN KONG STREET, SHIN LIN, TAIPEI, 11154, TAIWAN, R.O.C.

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN
NO. 8 LANE 29, WENMIMG ROAD,
LOSHAN TSUN, KWEISHAN HSIANG,
TAOYUAN, TAIWAN, R.O.C.

Tel:(03)3276170-3276174
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Report Number : ET89S-03-084

TEST REPORT CERTIFICATION

Applicant : PROGREX INTERNATIONAL CO., LTD.
1F. NO. 7, LANE 26, CHIEN KONG STREET, SHIN LIN,
TAIPEI, 11154, TAIWAN, R.O.C.

Manufacturer : PROGREX INTERNATIONAL CO., LTD.
1F. NO. 7, LANE 26, CHIEN KONG STREET, SHIN LIN,
TAIPEI, 11154, TAIWAN, R.O.C.

Description of EUT :

a) Type of EUT	: Universal FM Hands Free ~ Easy - Talk)
b) Trade Name	: --
c) Model No.	: PRO_FM1
d) FCC ID	: OYL0122
e) Working Frequency	: 96.0 MHz
f) Power Supply	: DC 12V Battery

Regulation Applied : FCC Rules and Regulations Part 15 Subpart C (1998)

I HEREBY CERTIFY THAT; The data shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note : 1. The results of the testing report relate only to the items tested.
2. The testing report shall not be reproduced except in full, without the written approval of ETC.

Test Date : Mar. 30, 2000

Test Engineer : Rick Hu

Approve & Authorized Signer : Win-Po Tsai

Win-Po Tsai, Supervisor, NVLAP Signatory
EMC Dept. of ELECTRONICS
TESTING CENTER, TAIWAN

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1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : Universal FM Hands Free ~ Easy - Talk
b) Trade Name : --
c) Model No. : PRO_FM1
d) FCC ID : OYL0122
e) Working Frequency : 96.0 MHz
f) Power Supply : DC 12V Battery

1.2 Characteristics of Device:

It allows users to hear phone conversation through the car audio system (stereo). Its audio frequency is FM 96.0MHz. When the phone ring and the signal effective, the car audio system immediately stop to become the phone ring voice. The sound volume transfer from the car speaker. When the phone conversation terminated, the car audio system reverts to the origin within 15 seconds.

1.3 Test Methodology

Radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4. The equipment under test was operated continuously in its normal operating mode for the purpose of the measurements.

The receiving antenna was varied from 1 to 4 meters and the wooden turntable was rotated through 360 degrees to obtain the highest reading on the field strength meter or on the display of the spectrum analyzer. And also, each emission was to be maximized by changing the orientation of the equipment under test.

1.4 Test Facility

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kweishan Hsiang, Taoyuan, Taiwan, R.O.C.
This site has been accreditation as a FCC filing site.

2. DEFINITION AND LIMITS

2.1 Definition

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.25
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3360-4400	Above 38.6
13.36-13.41			

Remark "**" : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2.3 Limitation

(1) Conducted Emission Limits :

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the conducted limit is the following:

Frequency (MHz)	Emission (μV)	Emission (dBμV)
0.45 - 30.0	250	48.0

(2) Radiated Emission Limits :

According to 15.239(b) , operation in the band 88-108 MHz, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental	
	μV/meter	dBμV/meter
88 – 108	250*	48*

*Use average detector, and the provisions in Section 15.35(b) for limiting peak emissions apply.

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209,as following table:

Other Frequencies (MHz)	Field Strength of Fundamental	
	μV/meter	dBμV/meter
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

(3) Band Width Limits :

According to 15.239(a), emissions from the intentional radiator shall be confined within a band 200kHz wide centered on the operating frequency. The 200kHz band shall lie wholly within the frequency range of 88-108 MHz.

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3. RADIATED EMISSION MEASUREMENT

3.1 Applicable Standard

For operation in the band 88-108 MHz,, the radiated emission shall comply with §15.239(b).

3.2 Measurement Procedure

1. Setup the configuration per figure 1 for frequencies measured below 1 GHz respectively. Turn on EUT and make sure that it is in normal function.

2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a semi-anechoic chamber to determine the accurate frequencies of higher emissions and then each selected frequency is precisely measured.

3. For emission measured below 1 GHz, set the spectrum analyzer on a 120 kHz resolution bandwidth respectively for each frequency measured in step 2.

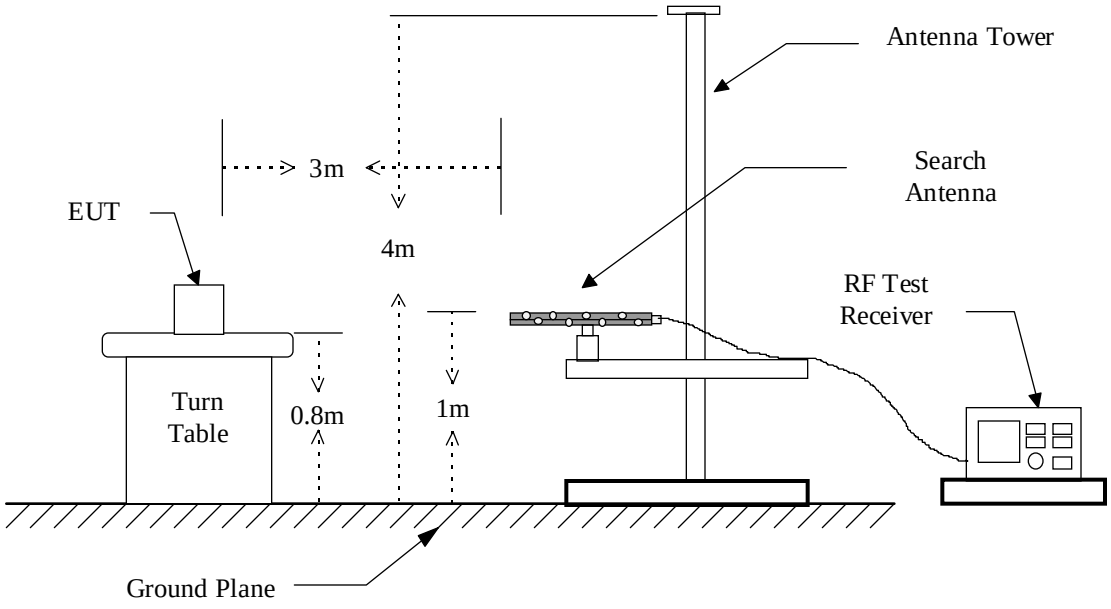
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from $0^\bullet$ to $360^\bullet$ with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.

5. Repeat step 4 until all frequencies that need to be measured were complete.

6. Repeat step 5 with search antenna in vertical polarized orientations.

7. Check the frequencies of highest emission with varying the placement of cables (if any) associated with EUT to obtain the worse case and record the result.

Figure 1 : Frequencies measured below 1 GHz configuration



3.3 Test Data

Temperature : 18 •
Humidity : 65 •
Operated mode : Transmitting
Test Date : Mar. 30, 2000

a. Fundamental:

Frequency (MHz)	Ant Pol H/V	Reading (dBuV) Peak	Reading (dBuV) AVG	Correct Factor (dB)	Result @3m (dBuV/m) Peak	Result @3m (dBuV/m) AVG	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) AVG	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
96.000	H	25.8	23.6	9.6	35.4	33.2	68.0	48.0	-14.8	180	1.9
96.000	V	27.1	25.6	9.6	36.7	35.2	68.0	48.0	-12.8	210	1.8

b. Frequency outside of the fundamental:

Frequency (MHz)	Ant Pol H/V	Reading (dBuV) QP	Correct Factor (dB)	Result @3m (dBuV/m) QP	Limit @3m (dBuV/m) QP	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
192.000	H	7.8	12.3	20.1	43.5	-23.4	20	3.6
192.000	V	10.1	12.3	22.4	43.5	-21.1	25	1.0
288.000	H	7.7	16.5	24.2	46.0	-21.8	40	2.0
288.000	V	14.1	16.5	30.6	46.0	-15.4	0	1.0
384.000	H	9.5	20.6	30.1	46.0	-15.9	60	1.5
384.000	V	8.5	20.6	29.1	46.0	-16.9	50	1.0
480.000	V	0.9	22.3	23.2	46.0	-22.8	80	1.0
480.000	H	---	22.3	---	46.0	----	---	---
576.000	H/V	---	24.9	---	46.0	---	---	---
672.000	H/V	---	26.1	---	46.0	---	---	---
768.000	H/V	---	27.9	---	46.0	---	---	---
854.000	H/V	---	28.6	---	46.0	---	---	---
960.000	H/V	---	30.2	---	46.0	---	---	---

Note :

1."---" means the noise is too low to be measured.

2.If the measured frequencies fall in the restricted frequency band, the limit employed is §15.209 general requirement when frequencies are below or equal to 1 GHz. And the measuring instrument is set to quasi peak detector function, no duty factor applied.

3.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + CORR. FACTOR

where CORR. FACTOR = Antenna FACTOR + Cable FACTOR

Assume a receiver reading of 22.5 dB•V is obtained. The Antenna Factor of 14.5 and a Cable Factor of 1.5 is added . The total of field strength is 38.5 dB•V/m.

RESULT = 22.5 + 14.5 + 1.5 = 38.5 dB•V/m
Level in •V/m = Common Antilogarithm[(38.5 dB•V/m)/20]
= 84.14 •V/m

3.5 Radiated Test Equipment

The following instrument are used for radiated emissions measurement :

Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
EMI Test Receiver	Hewlett-Packard	8546A	3411A00192	Nov. 04, 2000
BiconiLog Antenna	SCHWARZBECK	9160	3059	Oct. 29, 2000

Note: The standards used to perform this calibration are traceable to NML/ROC, NIST/USA and NPL.

3.6 Measuring Instrument Setup

Explanation of measuring instrument setup in frequency band measured is as following :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	EMI Test Receiver	Quasi Peak	120 kHz	300 kHz
	EMI Test Receiver	Peak	120 kHz	300 kHz
	EMI Test Receiver	Average	120 kHz	300 kHz

3.7 Radiated Measurement Photos

Please see Test Setup Photos files : “RE01.jpg” and “RE02.jpg”.

4. BANDWIDTH OF EMISSION

4.1 Applicable Standard Plot Graphic of Bandwidth

According to 15.239(a), emissions from the intentional radiator shall be confined within a band 200kHz wide centered on the operating frequency. The 200kHz band shall lie wholly within the frequency range of 88-108 MHz.

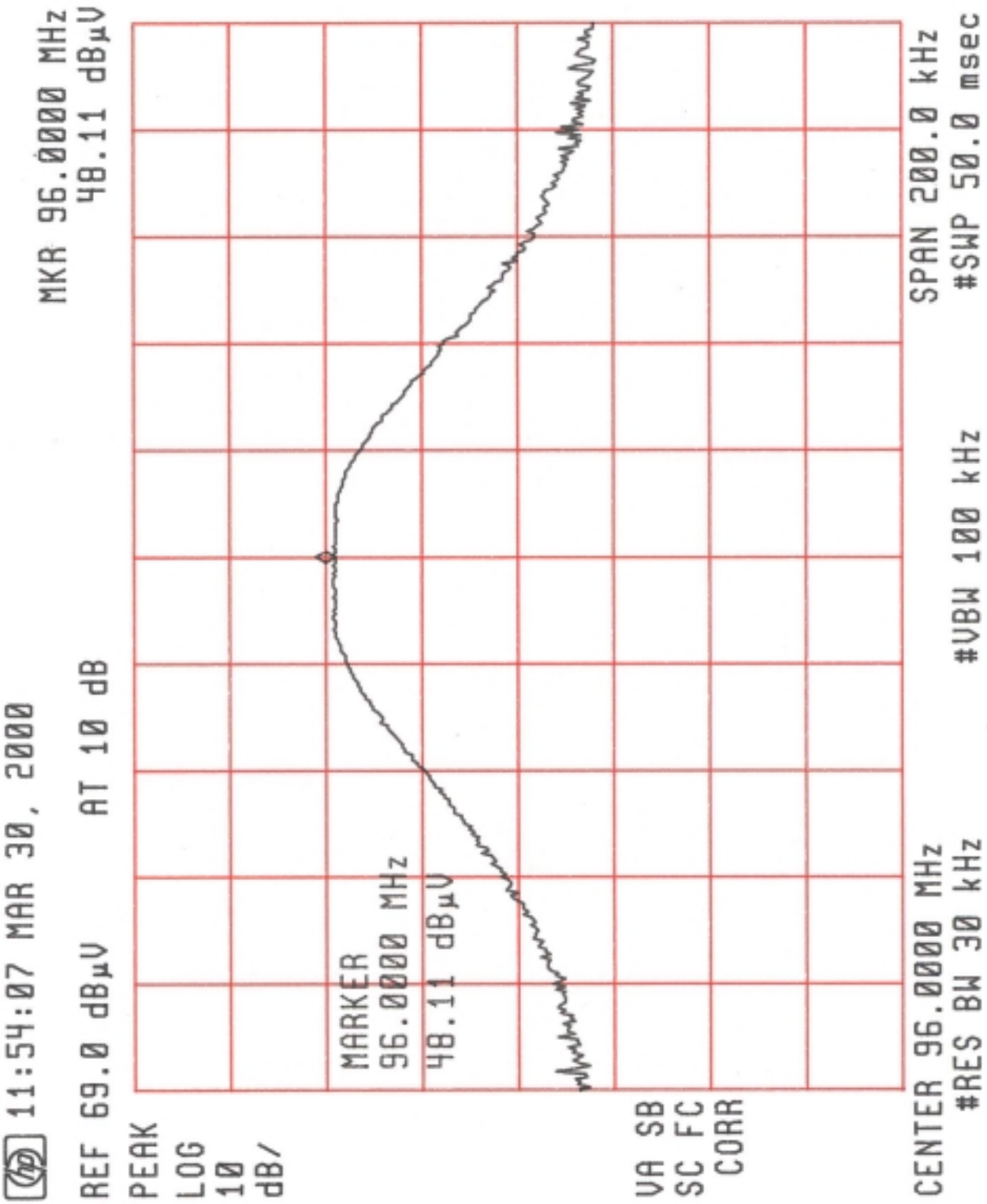
4.2 Bandwidth Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Test Receiver	Hewlett-Packard	8546A	Jan. 21, 2001
Plotter	Hewlett-Packard	7550A	N/A

4.3 Plot Graphic of Bandwidth

The emission bandwidth limit for this transmitter is : 200kHz
Test result : 127.5 KHz

Plotted graphics please see next two pages.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48.11 dBµV
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AT 10 dB
PEAK
LOG
10
dB/
MARKER
96.0000 MHz
48.11 dBµV
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SC FC
CORR
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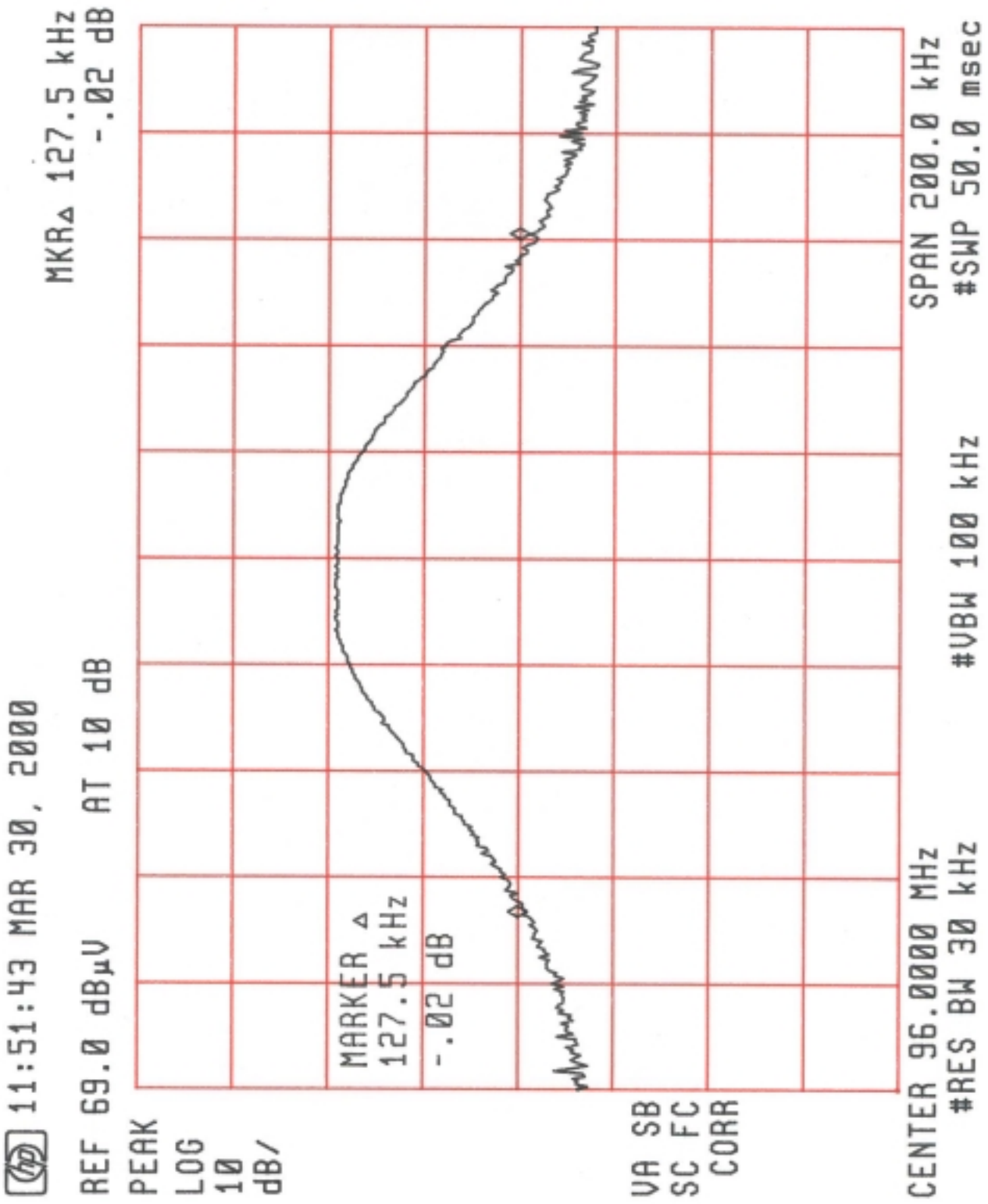
#VBW 100 kHz
CENTER 96.0000 MHz
#RES BW 30 kHz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-.02 dB
REF 69.0 dBµV
AT 10 dB
PEAK
LOG
10
dB/
MARKER Δ
127.5 kHz
-.02 dB
VA SB
SC FC
CORR
SPAN 200.0 kHz
#SWP 50.0 msec
#VBW 100 kHz
CENTER 96.0000 MHz
#RES BW 30 kHz

5. CONDUCTED EMISSION MEASUREMENT

5.1 Standard Applicable

This EUT is excused from investigation of conducted emission, for it is powered by battery only. According to §15.207 (d), measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.