

FCC Part 15 Subpart C
EMI TEST REPORT
of

E.U.T. : Universal FM Hands Free ~ Easy Talk

FCC ID. : OYL 8899

MODEL : PRO-FMNEW

Working Frequency : 96.100 MHz

for

APPLICANT : PROGREX INTERNATIONAL CO., LTD.

ADDRESS : 1F, NO. 7, LANE 26, CHIEN KONG STREET,
TAIPEI, 11157, 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)3276170~4

Fax:(03)3276188

Report Number : ET90S-03-167

TEST REPORT CERTIFICATION

Applicant : PROGREX INTERNATIONAL CO., LTD.
1F, NO. 7, LANE 26, CHIEN KONG STREET, TAIPEI, 11157,
TAIWAN, R.O.C.

Manufacturer : PROGREX INTERNATIONAL CO., LTD.
1F, NO. 7, LANE 26, CHIEN KONG STREET, TAIPEI, 11157,
TAIPEI, 11154, TAIWAN, R.O.C.

Description of EUT :

a) Type of EUT	: Universal FM Hands Free ~ Easy Talk
b) Trade Name	: WELLMIKE
c) Model No.	: PRO-FMNEW
d) FCC ID	: OYL 8899
e) Working Frequency	: 96.100 MHz
f) Power Supply	: DC 12V Battery/100mA

Regulation Applied : FCC Rules and Regulations Part 15 Subpart C (1996)

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. 28, 2001

Test Engineer : 

Approve & Authorized
Signer :



Joseph Lu, Supervisor, NVLAP Signatory
EMC Dept. of ELECTRONICS
TESTING CENTER, TAIWAN

Table of Contents

Page

1. GENERAL INFORMATION	1
1.1 PRODUCT DESCRIPTION	1
1.2 CHARACTERISTICS OF DEVICE:.....	1
1.3 TEST METHODOLOGY	1
1.4 TEST FACILITY	1
2. DEFINITION AND LIMITS	2
2.1 DEFINITION.....	2
2.2 RESTRICTED BANDS OF OPERATION.....	2
2.3 LIMITATION.....	2
2.4 LABELING REQUIREMENT.....	3
2.5 USER INFORMATION	3
3. RADIATED EMISSION MEASUREMENT.....	4
3.1 APPLICABLE STANDARD	4
3.2 MEASUREMENT PROCEDURE.....	4
3.3 TEST DATA	6
3.4 FIELD STRENGTH CALCULATION	7
3.5 RADIATED TEST EQUIPMENT	7
3.6 MEASURING INSTRUMENT SETUP.....	8
3.7 RADIATED MEASUREMENT PHOTOS.....	8
4. BANDWIDTH OF EMISSION.....	9
4.1 APPLICABLE STANDARD PLOT GRAPHIC OF BANDWIDTH.....	9
4.2 BANDWIDTH TEST EQUIPMENT.....	9
4.3 PLOT GRAPHIC OF BANDWIDTH	9
5. CONDUCTED EMISSION MEASUREMENT.....	12
5.1 STANDARD APPLICABLE	12

1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT	: Universal FM Hands Free ~ Easy Talk
b) Trade Name	: WELLMIKE
c) Model No.	: PRO-FMNEW
d) FCC ID	: OYL 8899
e) Working Frequency	: 96.100 MHz
f) Power Supply	: DC 12V Battery/100mA

1.2 Characteristics of Device:

It allows you to hear phone conversation through the car audio system (stereo). Its audio frequency is FM 96.1MHz. All you have to do is to insert the plug into the car lighter and set your car radio channel to FM96.1 MHz.

When the phone ring and the signal effective, upon acceptance of the phone call, the radio will stop for the receipt of the incoming call. The sound will be heard through the speakers in the vehicle.

1.3 Test Methodology

Radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4. The Universal FM Hands Free ~ Easy Talk under test was operated continuously in its normal operating mode for the purpose of the measurements. In order to secure the continuous operation of the device under test, rewiring in the circuit was done by the manufacturer so as to affect its intended operation.

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 Universal FM Hands Free ~ Easy Talk 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 (μ V)	Emission (dB μ V)
0.45 - 30.0	250	48.0

(2) Radiated Emission Limits :

As shown in 15.239,

- (a) The field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts/meter at 3 meters (average detector).
- (b) The field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emission limit in 15.209.

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

(3) Limit of band width

As shown in 15.239,

Emissions from the intentional radiator shall be confined within a band 200kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range 88-108MHz.

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

As shown in 15.239(b), the field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts/meter at 3 meters (average detector).

As shown in 15.239(c), the field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emission limit in 15.209.

3.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 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. As the same purpose, for emission measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz 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° to 360° 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

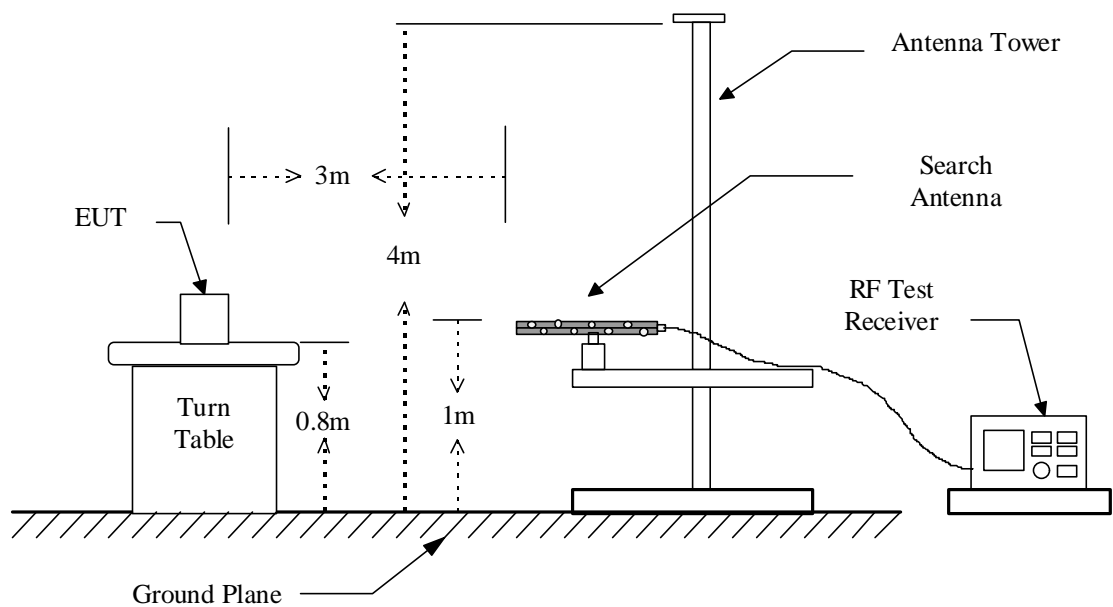
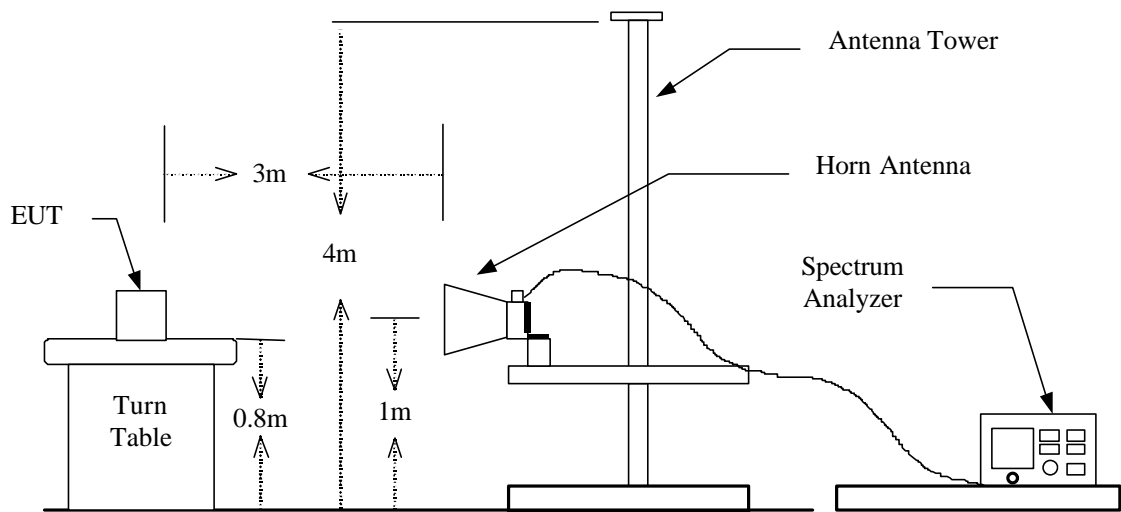


Figure 2 : Frequencies measured above 1 GHz configuration



3.3 Test Data

Temperature : 18
 Humidity : 65 %
 Operated mode : Transmitting
 Test Date : Mar. 28, 2001

Frequency (MHz)	Ant Pol H/V	Reading (dBuV) Peak	Correct Factor (dB)	Result @3m (dBuV/m) Peak	Limit @3m (dBuV/m) AVG	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
96.100	H	32.7	9.6	42.3	48.0	-5.7	343	3.2
96.100	V	28.0	9.6	37.6	48.0	-10.4	79	3.2
192.200	H	---	12.3	---	43.5	---	---	---
192.200	V	---	12.3	---	43.5	---	---	---
288.300	H	---	16.5	---	46.0	---	---	---
288.300	V	---	16.5	---	46.0	---	---	---
384.400	H	---	20.6	---	46.0	---	---	---
384.400	V	---	20.6	---	46.0	---	---	---
480.500	H	---	22.3	---	46.0	---	---	---
480.500	V	---	22.3	---	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:

$$\text{RESULT} = \text{READING} + \text{CORR. FACTOR} - \text{Amplifier Gain}$$

where CORR. FACTOR = Antenna FACTOR + Cable FACTOR

Assume a receiver reading of 22.5 dB μ 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 μ V/m.

$$\text{RESULT} = 22.5 + 14.5 + 1.5 = 38.5 \text{ dB } \mu \text{ V/m}$$

$$\begin{aligned} \text{Level in } \mu \text{ V/m} &= \text{Common Antilogarithm}[(38.5 \text{ dB } \mu \text{ V/m})/20] \\ &= 84.14 \text{ } \mu \text{ V/m} \end{aligned}$$

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	43054403-001	May 07, 2001
Horn Antenna	EMCO	3115	9107-3729	May 16, 2001
BiconiLog Antenna	SCHWARZBECK	9160	13057310-001	Sep. 18, 2001

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

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	N/A
	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	Auto

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	RF Test Receiver	Quasi Peak	120 kHz	N/A
	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz

3.7 Radiated Measurement Photos

Please see Test Setup Photos files : “TX_SET+.jpg” and “TX_SET-.jpg”.

4. BANDWIDTH OF EMISSION

4.1 Applicable Standard Plot Graphic of Bandwidth

As shown in 15.239, emissions from the intentional radiator shall be confined within a band 200kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range 88-108MHz.

4.2 Bandwidth Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Test Receiver	Hewlett-Packard	8542E	Nov. 06, 2001
Plotter	Hewlett-Packard	7470A	N/A

4.3 Plot Graphic of Bandwidth

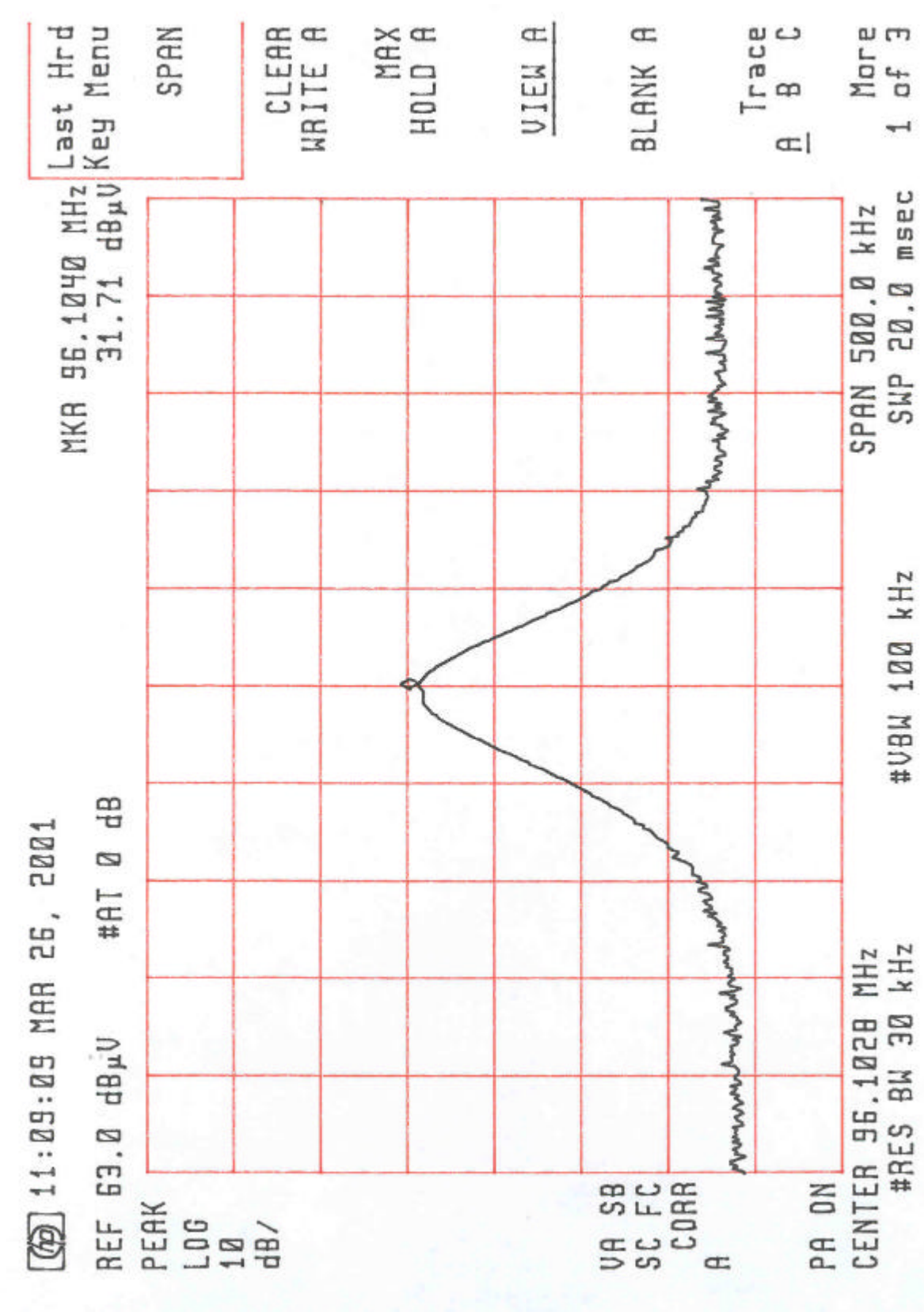
The emission bandwidth limit for this transmitter is

(a) Limit = 200 KHz

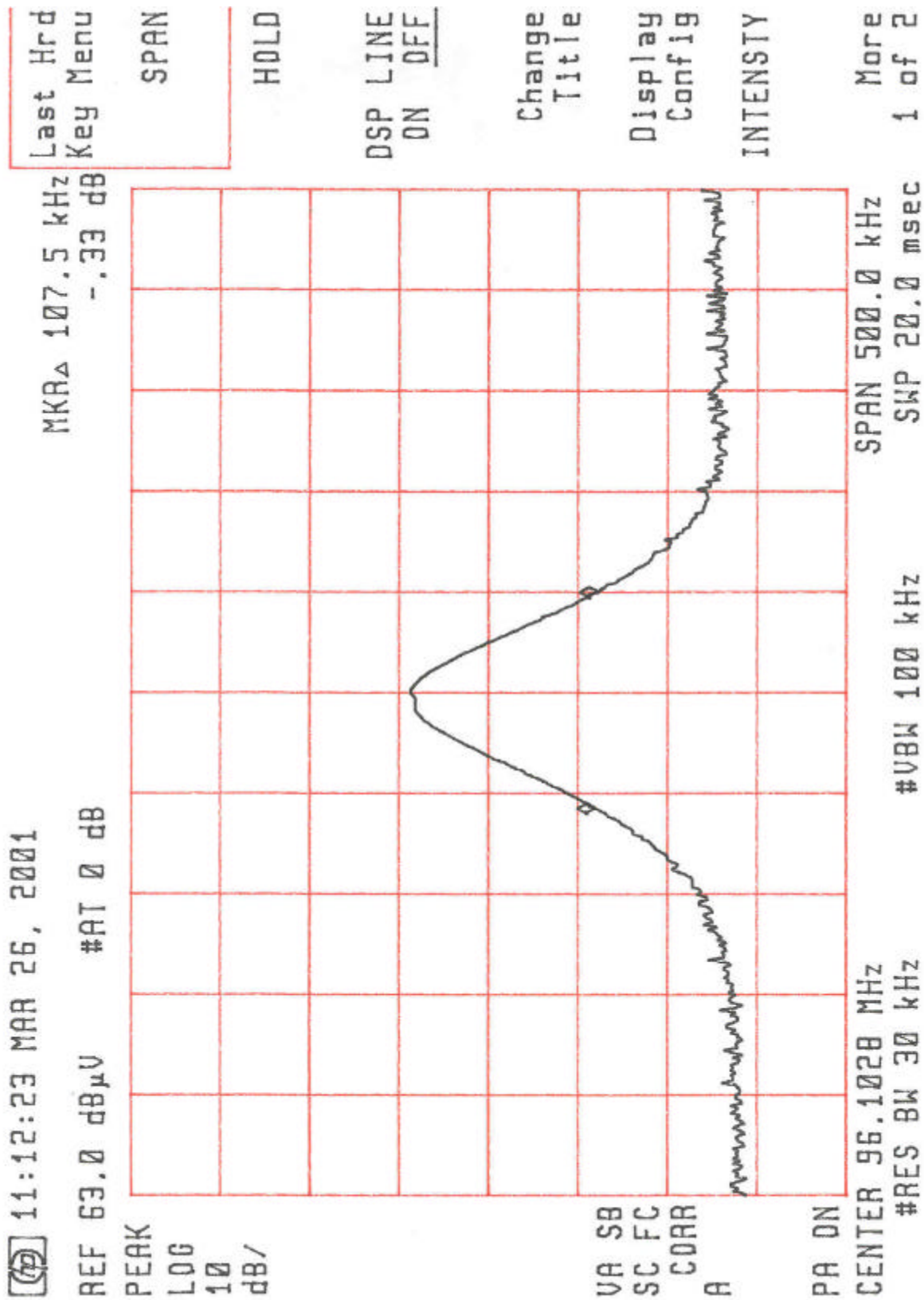
(b) Test Result = **107.5 kHz**

*. Plotted graphics please see next pages.

Bandwidth Pic.1



Bandwidth Pic.2



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.