

# FCC ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT CERTIFICATION TO FCC PART 15 REQUIREMENTS

for

## INTENTIONAL RADIATOR

of

### Car Alarm Transmitter

**FCC ID Number** : NJQLTX67C

**Trade Name** : WINTEC

**Model Number** : ZQ67C

**Agency Series** : N/A

**Report Number** : 02E0284-D

**Date** : June 08, 2002

Prepared for :

### Wintecronics Co., Ltd.

No. 716, 11F-3, Jung Jeng Rd., Chung Ho City 235,  
Taipei Hsien, Taiwan, R. O. C.

Prepared by :

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## TABLE OF CONTENTS

<b>1. VERIFICATION OF COMPLIANCE.....</b>	<b>3</b>
<b>2. PRODUCT DESCRIPTION.....</b>	<b>4</b>
<b>3. TEST FACILITY.....</b>	<b>4</b>
<b>4. MEASUREMENT STANDARDS.....</b>	<b>4</b>
<b>5. TEST METHODLOGY .....</b>	<b>4</b>
<b>6. MEASUREMENT EQUIPMENT USED .....</b>	<b>5</b>
<b>7. POWERLINE RFI LIMIT.....</b>	<b>5</b>
<b>8. RADIATED EMISSION LIMITS.....</b>	<b>6</b>
<b>9. SYSTEM TEST CONFIGURATION.....</b>	<b>6</b>
<b>10. TEST PROCEDURE .....</b>	<b>7</b>
<b>11. EQUIPMENT MODIFICATIONS .....</b>	<b>8</b>
<b>12. TEST RESULT.....</b>	<b>9</b>
<b>12.1. MAXIMUM MODULATION PERCENTAGE(M%) .....</b>	<b>9</b>
<b>12.2. THE EMISSIONS BANDWIDTH.....</b>	<b>9</b>
<b>APPENDIX 1 PHOTOGRAPHS OF EUT .....</b>	<b>10</b>
<b>APPENDIX 2 TEST DATA.....</b>	<b>14</b>

## 1. VERIFICATION OF COMPLIANCE

COMPANY NAME : Wintecronics Co., Ltd.  
No. 716, 11F-3, Jung Jeng Rd., Chung Ho City 235,  
Taipei Hsien, Taiwan, R. O. C.

CONTACT PERSON : Ray Ho / Asst. Manager R&D Dept

TELEPHONE NO. : (886-2) 8227-3601

EUT DESCRIPTION : Car Alarm Transmitter

MODEL NAME/NUMBER : ZQ67C

FCC ID : NJQLTX67C

DATE TESTED : July 2, 2002 & July 4, 2002

REPORT NUMBER : 02E0284

TYPE OF EQUIPMENT	SECURITY EQUIPMENT (UNINTENTIONAL RADIATOR)
EQUIPMENT TYPE	433.92 MHz SUPERREGENERATE RECEIVER
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992
LIMIT TYPE	CERTIFICATION
FCC RULE	CFR 47, PART 15

The above equipment was tested by C&C LABORATORY, CO., LTD. for compliance with the requirements set forth in the FCC CFR 47, PART 15. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. **Warning:** This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Engineering Services, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Engineering Services, Inc. will constitute fraud and shall nullify the document.



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James Chan / Manager

C&C Laboratory, Co., Ltd.

## 2. PRODUCT DESCRIPTION

Fundamental Frequency	<b>433.92 MHz</b>
Power Source	<b>2.2~3V Battery</b>
Transmitting Time	<b>Periodic <math>\leq</math> 0.5 seconds</b>
Associated Receiver	<b>Model: NJQTR68B (FCC DoC)</b>

## 3. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at No. 199, Chung Sheng Road, Hsin Tien City, Taipei, Taiwan R.O.C. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 4. MEASUREMENT STANDARDS

The site is constructed and calibrated in conformance with the requirements of ANSI C63.4/1992.

## 5. TEST METHODOLOGY

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (CFR 47 Section 15.33)

## 6. MEASUREMENT EQUIPMENT USED

Manufacturer	Model Number	Description	Cal Due Date
ROHDE & SCHWARZ	DSAI-D 804.8932.52	EMI Test Display	10/2002
ROHDE & SCHWARZ	ESBI-RF/1005.43 00.52	EMI Test RF Unit	10/2002
H.P.	8595EM	Spectrum Analyzer (9KHz – 6.5GHz)	02/2003
EMCO	3115	Antenna (1-18GHz)	02/2003
SCHWARZBECK	VULB 9160	Antenna (30-2000 MHz)	05/2003
H.P.	8447D	Amplifier	05/2003
H.P.	8449B	Amplifier (1-26.5GHz)	10/2002

## 7. POWERLINE RFI LIMIT

CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 450 kHz TO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NO REQUIRED.

## 8. RADIATED EMISSION LIMITS

GENERAL REQUIREMENTS	SECTION 15.209
RESTRICTED BANDS OF OPERATION	SECTION 15.205
PERIODIC OPERATION IN THE BAND 40.66 -40.70 MHz AND ABOVE 70 MHz.	SECTION 15.231

## 9. SYSTEM TEST CONFIGURATION

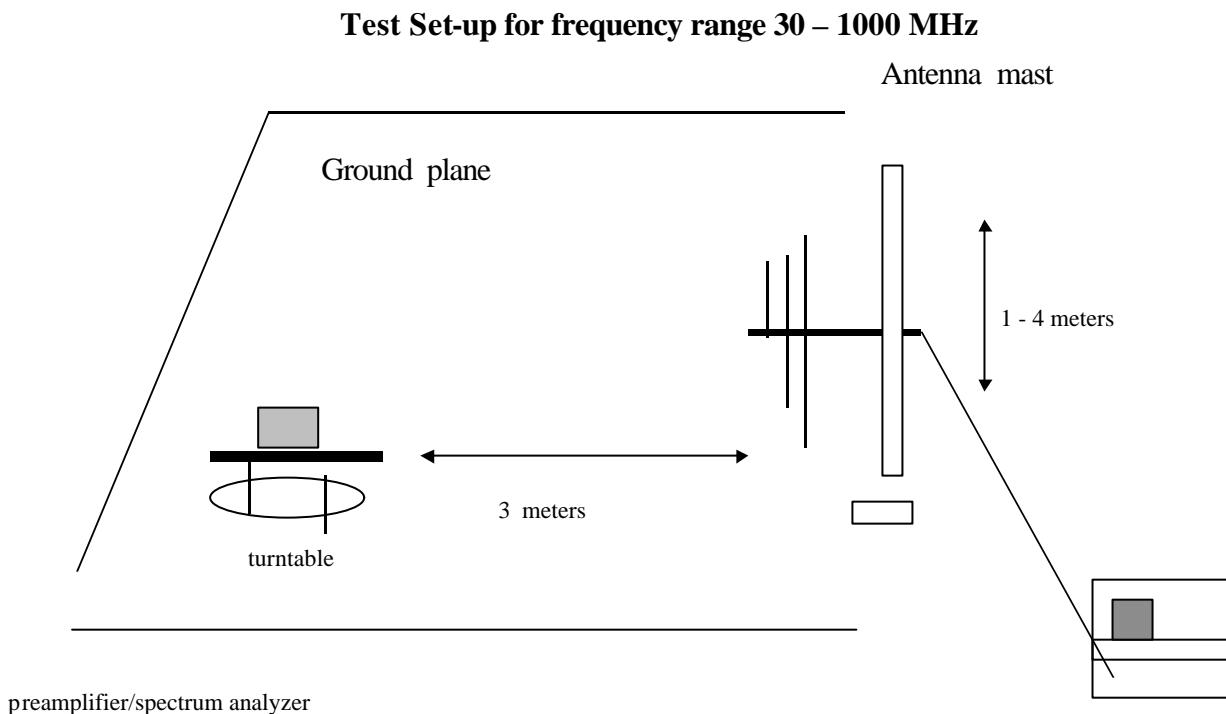
Use a block of foam and combined it with EUT wrapping rubber band around it. This way it can test X, Y, and Z axis. To activate continuous transmission, place a small plastic block between rubber band and EUT push button.



**Radiated Open Site Test Set-up**

## 10. TEST PROCEDURE

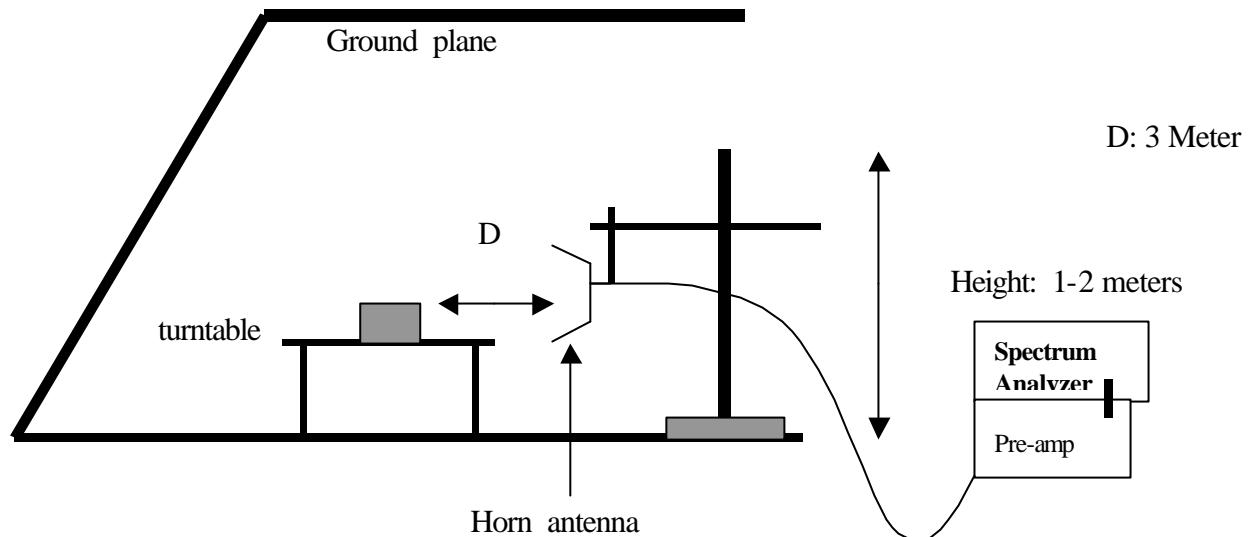
### Radiated Emissions, 15.231(4)(b)



**Fig. 1**

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3-meters from the EUT.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

### Test set-up for measurements above 1GHz



**Fig. 2**

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 1-meters from the EUT. The EUT antenna was mounted vertically as per normal installation.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

### 11. Equipment Modifications

To achieve compliance to FCC Section 15.231 technical limits, the following change(s) were made during compliance testing:

**NONE**

## 12. TEST RESULT

Powerline RFI Class B	Eut	Radiated Emission Limits	Eut
SECTION 15.207		SECTION 15.209	X
SECTION 15.205, 15.209, 15.221, 15.223, x 15.225 OR 15.227		SECTION 15.205	
BATTERY POWER	X	SECTION 15.231 (b)	X
		SECTION 15.231 (e)	

### 12.1 Maximum Modulation Percentage (M%)

#### CALCULATION:

$$\text{Average Reading} = \text{Peak Reading (dBuV/m)} + 20\log_{10}(\text{Duty Cycle})$$

In order to determine possible Maximum Modulation percentage, alternations are made to the EUT. We measured:

WHERE 1 Period = 53.777 mS  
 Long pulse = 0.8889 mS  
 Middle pulse = 0.4222 mS  
 Short pulse = 0.1778 mS  
 No of Long pulse = 6  
 No of Middle pulse = 20  
 No of Short pulse = 44

$$\text{Duty Cycle} = (N_1L_1 + N_2L_2 + \dots + N_{n-1}L_{n-1} + N_nL_n) / 100 \text{ or } T$$

$$\text{Duty Cycle} = ((6 \times 0.8889) + (20 \times 0.4222) + (44 \times 0.1778)) / 53.777 = 0.4017 = 40.17 \% \text{ or } -7.922 \text{ dB}$$

### 12.2 The Emissions Bandwidth

The bandwidth of the emissions were investigated per 15.231(c)

Center Frequency	Measured	Limits
433.92 MHz	384.4 kHz < (refer to plot)	433.92 MHz $\times 0.25\% = 1084.8$ kHz

## **APPENDIX 2**

### **TEST DATA**

C & C Laboratory CO., LTD.

FCC, VCCI, CISPR, CE, AUSTEL, NZ  
UL, CSA, TUV, BSMI, DHHS, NVLAP

No. 199 Chung Sheng Road  
Hsin Tien City, Taipei, Taiwan, R.O.C.  
PHONE: 02-2217-0894 FAX: 02-2217-1254

*Project #:* 02E0248  
*Report #:* 0248D2  
*Date & Time:* 2002/07/02  
*Test Engr.:* CLIFF LAI

<i>Company:</i>	WINTECRONICS CO.,LTD.
<i>EUT Description:</i>	ZQ67C (Alarm TX / 433.92 MHz)
<i>Test Configuration :</i>	EUT ONLY
<i>Type of Test:</i>	FCC 15.231(b)
<i>Mode of Operation:</i>	NORMAL MODE

© P-Site

E-Site

$$M\% = ((t_1+t_2+t_3+\dots)/T) * 100\% = 40.17\%$$

Ay Reading = Pk Reading + 20\*log(M%)

$$20 \cdot \log(M\%) = -7.922$$

C & C Laboratory CO., LTD.

FCC, VCCI, CISPR, CE, AUSTEL, NZ  
UL, CSA, TUV, BSMI, DHHS, NVLAP

No. 199 Chung Sheng Road  
Hsin Tien City, Taipei, Taiwan, R.O.C.  
PHONE: 02-2217-0894 FAX: 02-2217-1254

Project #: 02E0248  
Report #: 0248D1  
Date & Time: 2002/07/02  
Test Engr: CLIFF LAI

<i>Company:</i>	WINTECRONICS CO.,LTD.
<i>EUT Description:</i>	ZQ67C (Alarm TX / 433.92 MHz)
<i>Test Configuration :</i>	EUT ONLY
<i>Type of Test:</i>	FCC 15.231(b)
<i>Mode of Operation:</i>	NORMAL MODE

© D-Site

© E-Site

$$M\% = ((t_1+t_2+t_3+\dots)/T) * 100\% = 40.17\%$$

Av Reading = Pk Reading + 20\*log(M%)

$$20 \cdot \log(M\%) = -7.922$$

# C&C Laboratory CO., LTD.

FCC, VCCI, CISPR, CE, AUSTEL, NZ  
UL, CSA, TUV, BSMI, DHHS, NVLAP

No. 199 Chung Sheng Road  
Hsin Tien City, Taipei, Taiwan, R.O.C.  
PHONE: 02-2217-0894 FAX: 02-2217-1254

Project #: 02E0248  
Report #: 0284B  
Date& Time: 2002/07/04  
Test Engr: BILL HUANG

**Company:**  
**EUT Description:**  
**Test Configuration :**  
**Type of Test:**  
**Mode of Operation:**

WINTECRONICS CO.,LTD.  
ZQ67C (Alarm TX / 433.92 MHz)  
EUT ONLY  
FCC 15.231(b)/FCC 15.209  
NORMAL MODE

D-Site     E-Site    6 Worst Data    Descending

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark
1302	60.46	52.54	24.9	3.6	37.07	43.93	54.0	-10.07	3mV	0	1.0	A
1735	60.73	52.81	26.4	4.4	36.47	47.14	60.8	-13.66	3mV	0	1.0	A
2170	58.41	50.49	27.7	4.5	36.07	46.66	60.8	-14.14	3mV	0	1.0	A
2603	48.80	40.88	28.8	5.7	36.02	39.32	60.8	-21.48	3mV	0	1.0	A
3037	50.76	42.84	30.4	5.8	36.06	42.97	60.8	-17.83	3mV	0	1.0	A
3471	52.46	44.54	31.3	6.1	35.64	46.28	60.8	-14.52	3mV	0	1.0	A
1302	66.27	58.35	24.9	3.6	37.07	49.74	54.0	-4.26	3mH	0	1.0	A
1735	69.16	61.24	26.4	4.4	36.47	55.57	60.8	-5.23	3mH	0	1.0	A
2170	62.77	54.85	27.7	4.5	36.07	51.02	60.8	-9.78	3mH	0	1.0	A
2603	51.23	43.31	28.8	5.7	36.02	41.75	60.8	-19.05	3mH	0	1.0	A
3037	56.67	48.75	30.4	5.8	36.06	48.88	60.8	-11.92	3mH	0	1.0	A
3471	58.10	50.18	31.3	6.1	35.64	51.92	60.8	-8.88	3mH	0	1.0	A

\* No other emission were found within 20dB under the limits upto 5 GHz.

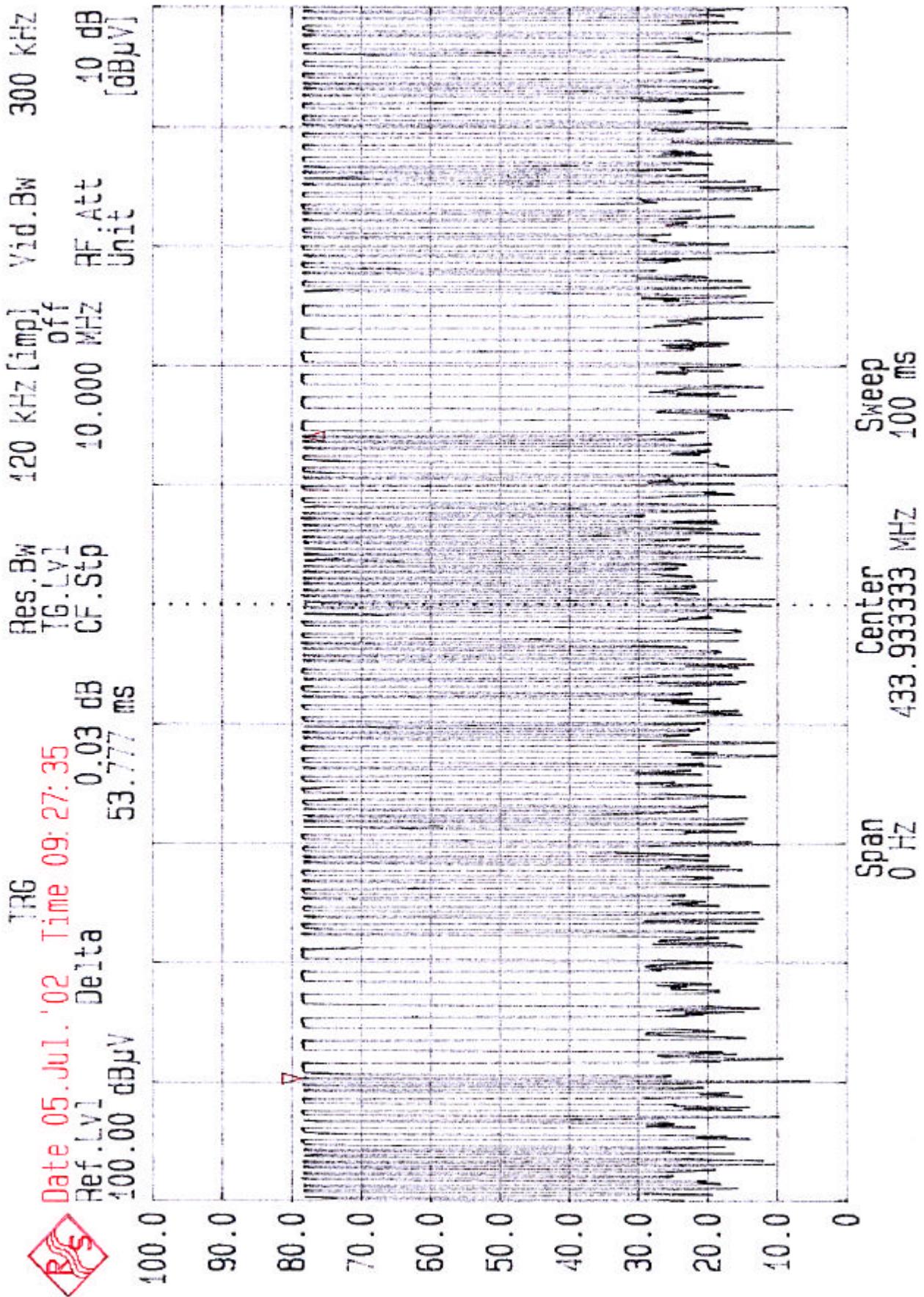
Total data #:12  
V.2d

P(Peak): RBW=VBW=1MHz  
A(Average): Pk Reading -7.922dB



TRG

Date 05.Jul. '02 Time 09:27:35  
Ref. LV1 Delta 0.03 dB  
100.00 dB $\mu$ V 53.777 ms





Date 05. Jul. '02 TR6

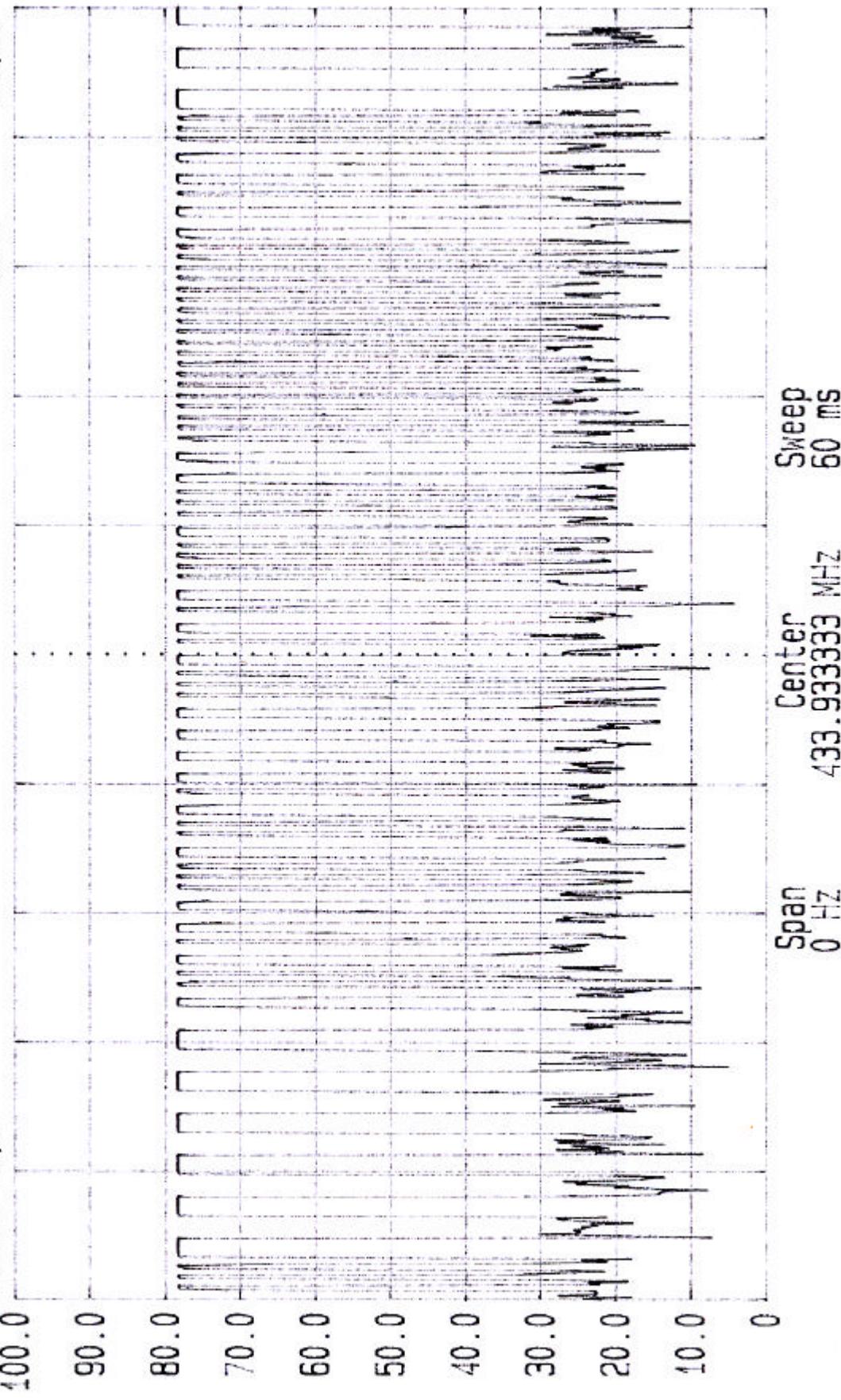
Ref. LV1 400.00 dB $\mu$ V

Res.BW 120 kHz [impl]

TG LV1 Off

CF. Stp 10.000 MHz

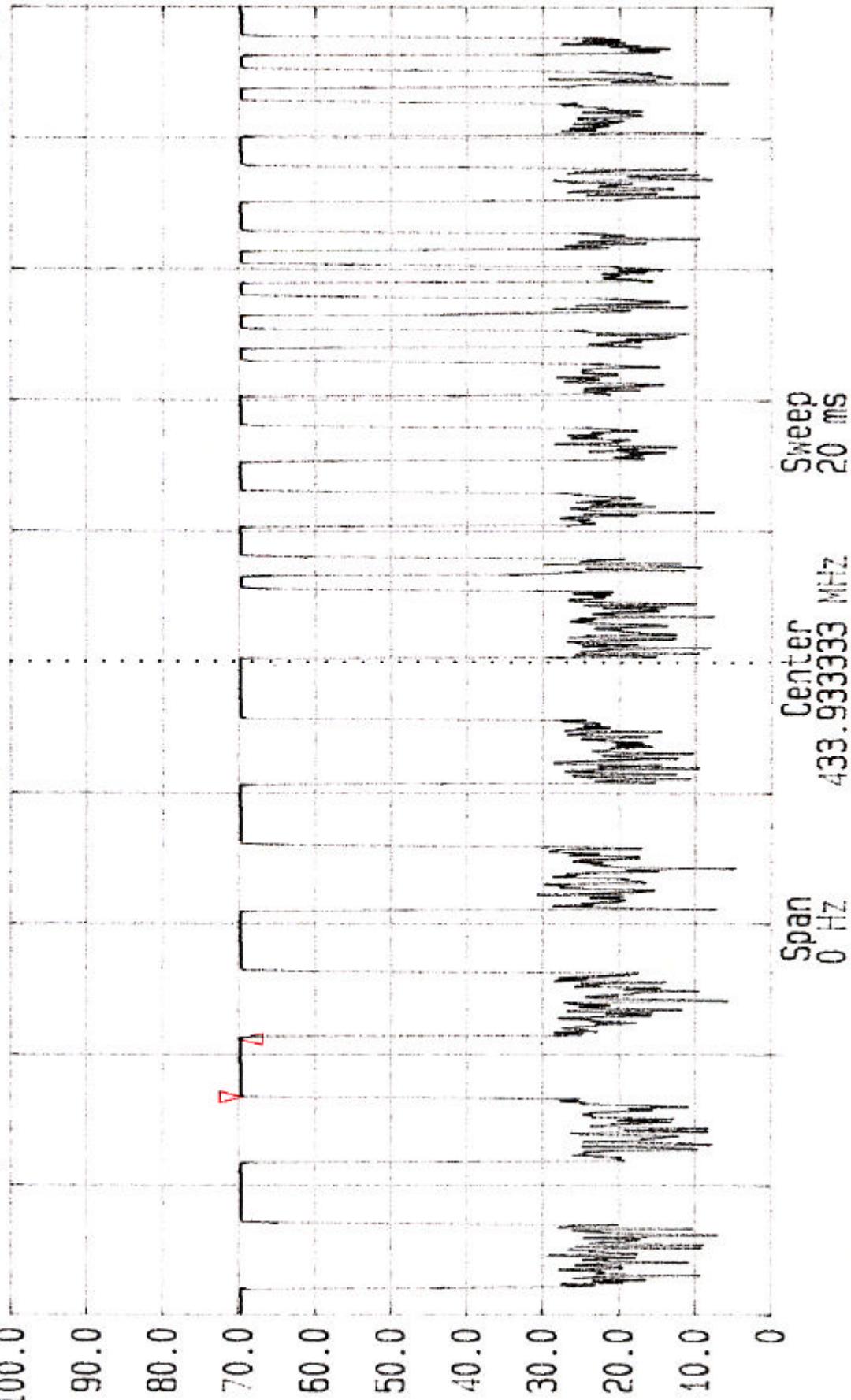
RF:Att Unit





THG

Date 05.Jul. '02 Time 09:37:47  
Ref.Lvl 100.00 dBuV  
Ref.Lvl 100.00 dBuV  
Delta 888.889  $\mu$ s  
TG.Lvl 0.43 dB  
CF.Stp 10.000 MHz  
Res.BW 120 kHz [imp] off  
Vid.BW 300 kHz





TAG

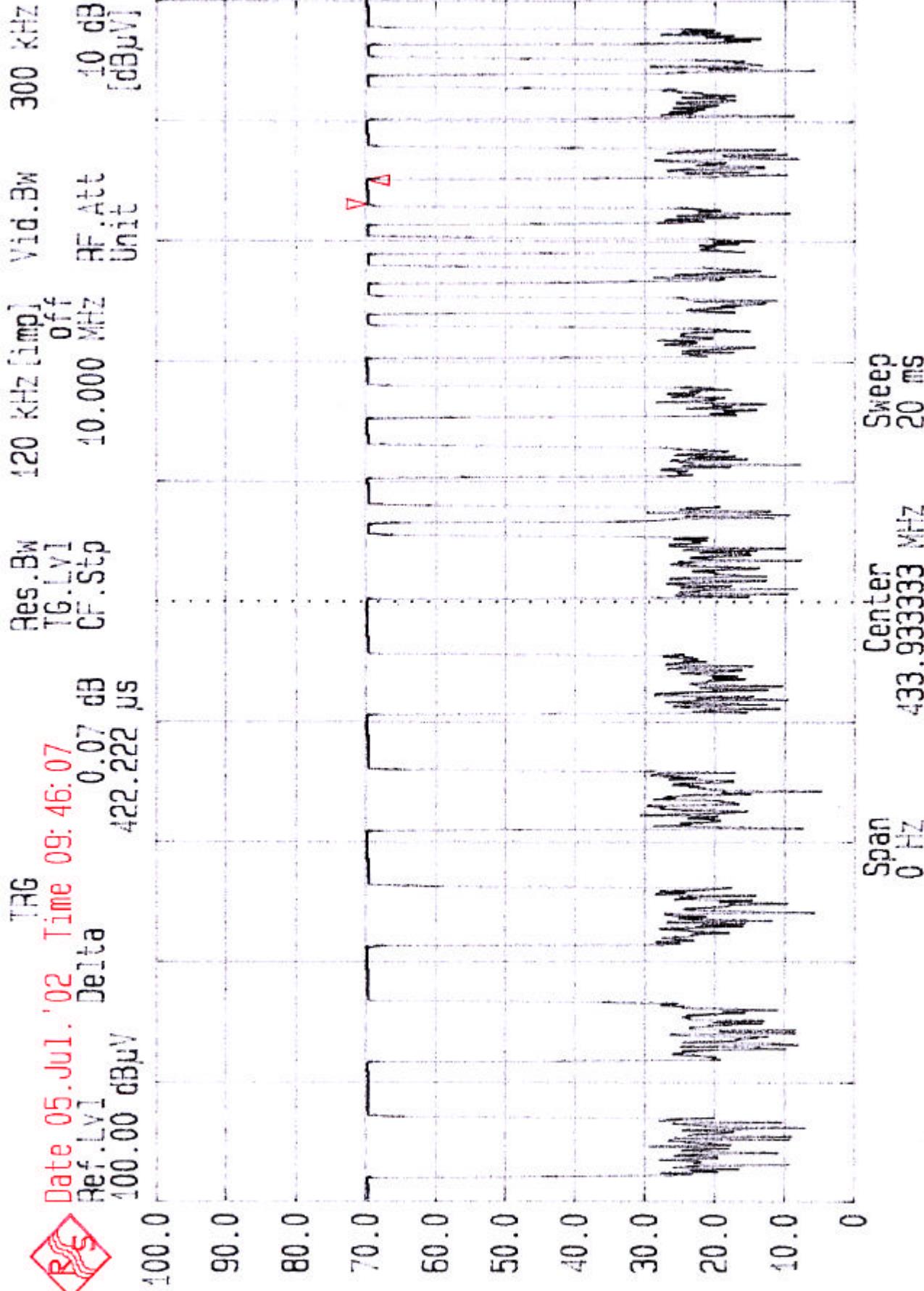
Date 05.Jul. '02

Time 09:46:07

Ref. LV1  
100.00 dBµV

Res. BW  
TG. LV1  
CF. Stp

Delta  
422.222 µs



TRG

Time 09:41:44

Res. Bw  
TG. Ly1  
CF. Sto

120 kHz [imp.] 10.000 MHz Vid.BW 100 kHz 300 kHz 10 dBV 10 dBV

90.0

70.0

50.0

20.0

8

Span  
0.47

Center 433-933333

Sweep  
20 ms



Date 05-Jul-02 Time 09:53:10

Re: LV1  
90.00 dBW

**RS** Date 05.Jul.'02 Time 09:53:10  
 Res.BW 120 kHz [imp] 300 kHz  
 TG.Lv1 0.54 40 dB  
 CF.Stp 10.000 MHz 10 dB  
 Delta 0.08 dB 10 dB  
 384.4 kHz [dBµV] 10 dB  
 90.00 dBµV 10 dB

