EMC TEST REPORT

Manufacturer: Fidelity TeleAlarm, LLC
Equipment Under Test: **S37 Wrist Pendant**

Test Report No.: **160827 X**
Purchase Order No.: **01-288**

DOCUMENT HISTORY

Revision	Issue Date	Affected Page(s)	Description of Modifications	Revised By	Approved By
0	29 July 2002		Initial release		
REV A	29 July 2002	8	Section 7.2 Operating mode		
REV A	29 July 2002	10	Section 8.4 Duty Cycle Correction Factors		
REV A	29 July 2002	17	Correction Factors		

TEST REPORT NO. 160827 X
From
Laird Technologies
World Compliance Center

Test for
Fidelity TeleAlarm, LLC
S37 Wrist Pendant

Written By — Bridget A. Keesser, EMC Sales Representative — Date: 29 July 2002

Reviewed By — Grant Metzgar Sr. EMC Technician — Date: 29, JULY 2002

Authorized By — J. Fred Gardner, EMC Quality Assurance — Date: 29 July 2002

TEST PERSONNEL – Laird Technologies

Grant Metzgar Sr. EMC Technician	15 July 2002
Anthony A. Soffera, EMC Technician	10, 11 July 2002

EUT RECEIPT/DISPOSITION INFORMATION

Date of Receipt of Equipment Under Test (EUT)	10 July 2002
Disposition of EUT	Retained by Manufacturer

Test Facility	Laird Technologies
Address	Shielding Way
City, State Zip Code	Delaware Water Gap, PA 18327
Phone	(570) 424-8510 ext. 1216
Fax	(570) 421-4227

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1 INTRODUCTION

This report documents the results of a series of EMI/EMC measurements performed on the EUT described in Section 3 of this report. The purpose of this series of tests was to demonstrate compliance to the radiated emission requirements of FCC Part 15 for intentional transmitters. This report contains a report of the measurements only. The manufacture must also comply with other requirements of the FCC rules such as labeling requirements in order to market the device. Addition information such as the operators manual, block diagrams, schematics and internal photos, which are not included in this report, must be provided to the FCC or appropriate authorities upon request.

Testing was performed by the Laird Technologies at the Delaware Water Gap, Pennsylvania World Compliance Center. Tests were performed using the test set-ups of the relevant standards for tests performed in laboratory conditions.

1.1 Description Of World Compliance Center

Laird Technologies World Compliance Center is an independent EMC test laboratory offering interference control testing for FCC, MIL-STD-461, EMC Directive, Medical Devices Directive, Product Safety, and other requirements, as well as, consulting, design engineering, and compliance seminars.

The World Compliance Center is accredited by NVLAP (LAB CODE: 200076-0) for FCC Part 15, IEC/CISPR 22 AS/NZS 3548 and CNS 13438 for emissions measurements and the IEC 61000 series for immunity tests. The test lab is also assessed by the Civil Aviation Authority for measurements to the EMC Directive for aeronautical equipment. The open area test site and measurement facility used to collect the radiated data is filed with the FCC and accepted in a letter dated 11 August 2000 (Registration Number 90682) and Industry Canada file number IC 3147. Laird Technologies is registered by SGS Yarsley International Certification Services, LTD. to ISO 9001.

All personnel work under the supervision of NARTE approved engineers and technicians.

1.2 Summary of Work Done

Equipment Model Name	S37 Wrist Pendant
U. S. Federal Regulations	47 CFR Chapter 1

1.2.1 Summary of EMC Emission Tests

Specification Name	***Test Name***	***Limit***	***Judgement***
FCC Part 15	Radiated Emissions	Paragraph 15.231 of FCC Part 15	passed by 6.95 dB

1.2.2 Summary Conclusion / Declaration

The EUT as described and reported within this document, meets FCC Part 15 requirements for intentional transmitters as tested in accordance with ANSI C63.4-1992 without any modifications.

2 CLIENT INFORMATION

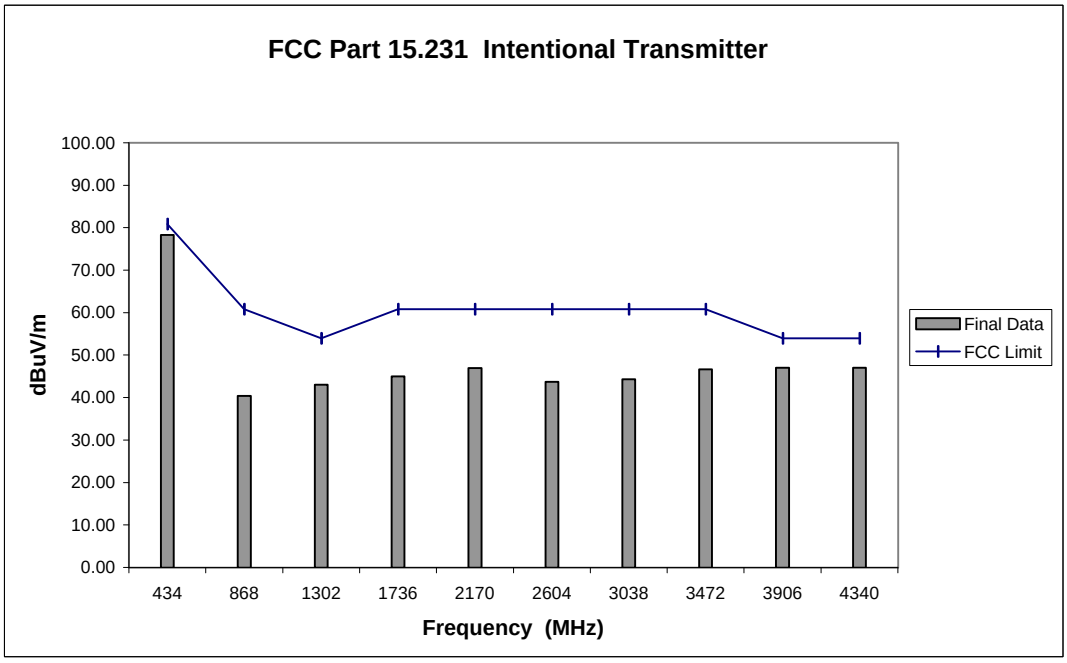
Company Name	Fidelity TeleAlarm, LLC
Division	A Fidelity Group Company
Address	2501 Kutztown Road
City, State Zip Code	Reading, PA 19605-2961
Contact Name	Jack D. Gulati
Title	Chairman and CEO
Phone	610-929-4200
Fax	610-929-6861

FCC Part 15 Subpart C Section 15.231
Radiated Emissions @ 3 Meters
Data Sheet

Date : 11-Jul-02
Customer Fidelity Technologies
Order #: 160827 X
EUT : S37 Transmitter
Tech : Anthony A. Soffera

	Frequency (MHz)	Measured Level (dBuV)	Antenna Factor +(dB)	Cable Loss +(dB)	Preamp Gain -(dB)	Corrected Level (dBuV/m)	Spec Limit (dBuV/m)	Polarity (V/H)	Delta to Limit	Restricted Bands
1	434	78.3	17.3	4.4	32	68.00	80.83	V	-12.53	No
2	868	40.4	23	7.6	32	39.00	60.83	V	-21.83	No
3	1302	43.9	26.27	3	30.17	43.00	53.97	V	-10.97	Yes
4	1736	44.1	27.4	3.17	29.66	45.01	60.83	V	-15.82	No
5	2170	44.2	28.44	3.33	29	46.97	60.83	V	-13.86	No
6	2604	40.5	29.01	3.33	29.17	43.67	60.83	V	-17.16	No
7	3038	37.1	30.72	4.17	27.66	44.33	60.83	V	-16.50	No
8	3472	34.8	31.69	5.33	25.17	46.65	60.83	V	-14.18	No
9	3906	33.5	32.67	5.50	24.67	47.00	53.97	V	-6.97	Yes
10	4340	33.2	33.32	5.50	25.00	47.02	53.97	V	-6.95	Yes

Duty Cycle Correction Factor : 0
Duty Cycle Correction Factor not applied



3 EQUIPMENT UNDER TEST (EUT)

3.1 Identification of EUT

S37 Wrist Pendant

3.2 Description of System

S37 Wrist Pendant is a transmitter used in the NurseCall 2 system to alert staff to a call for help that may be patient-initiated or staff-initiated and provide a means to reset (cancel) the alarm.

3.3 Table: Components of the EUT

The EUT was tested as a stand-alone system.

3.4 Table: Cabling of the EUT

There is no associated cabling with the EUT.

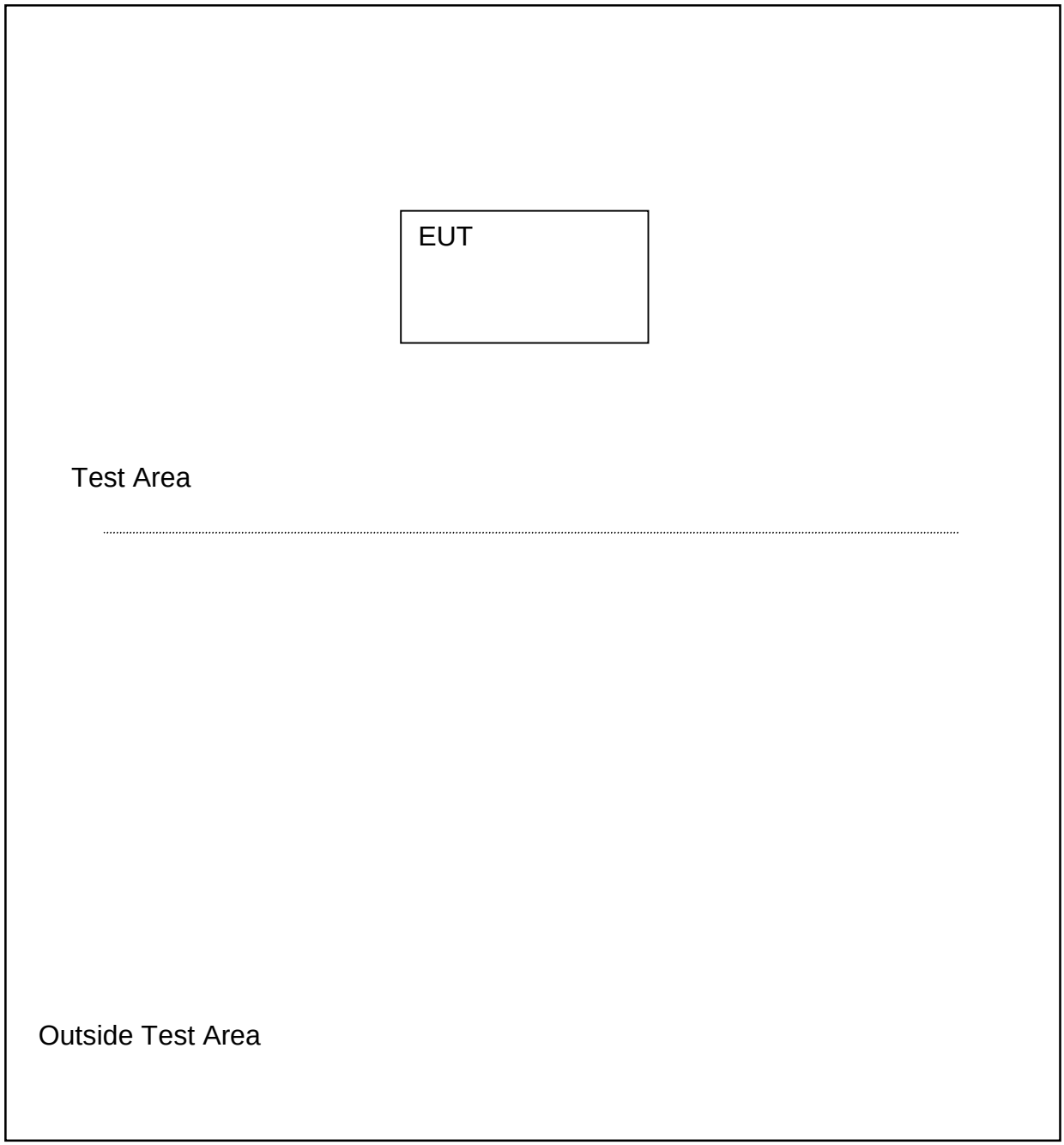
3.5 Accessory/Peripheral Equipment

The EUT was tested as a stand-alone system.

3.6 Modifications Incorporated in the EUT

No modifications were made to the EUT as a result of the EMC testing.

3.7 Configuration of Tested System



4 PRODUCT LABELING

Labels are to follow the existing size requirements in that they must contain letters, numbers and symbols that are visible and readable without the use of magnification.

When the device is so small or for such use that is not practicable to place the statement specified on the label, such as for a CPU board or a plug-in circuit board peripheral device, the text associated with the logo may be placed in a prominent location in the instructional manual or pamphlet supplied to the user. However, the unique identification (trade name and model number) and the logo must be displayed on the device.

All warning statements regarding interference potential are to be placed in the user manual, rather than on the label as is currently required. The user manual contains general operating instruction on the use of a device, and, according to the FCC, placing the warning statements in the user manual would better serve the consumer. The requirement that an informational statement be included in the user's manual regarding actions the user can take to resolve any interference that may occur from use of the device is still required.

The label showing the equipment identification data may be combined with a label showing other information (serial numbers, other government requirements, etc.), if desired. Compliance statements, when required, may be shown on the same label or a separate label.

County of Origin – US Customs and the Federal Trade Commission regulations require all equipment produced in foreign countries to be marked with the country of origin. Questions concerning marking of equipment with the country of origin should be directed to these agencies.

4.1 Location of Label on EUT

The label indicating the FCC ID will be located on the device.

The following label requirements of Section 2.925/2.926 and 15.19 will be placed in the operation manual:

This device complies with Part 15 of the FCC rules and regulations. 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.

5 TEST SPECIFICATION, METHODS & PROCEDURES

5.1 Intentional Radiators

Test Specification	Date	Title
47 CFR Chapter 1	10-1-01	Part 15 – Radio Frequency Devices Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Chapter 1 (10-1-01 Edition). Part 15, Subpart C- Intentional Radiators: Paragraph 15.203 – Antenna requirement, : Paragraph 15.205– restricted bands of operation, Paragraph 15.209 – Radiated emission limits; general requirements, Paragraph 15.231 – Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

6 DEVIATIONS, EXCLUSIONS FROM THE TEST SPECIFICATION

6.1 Deviations

The measurements were performed in accordance with the requirements of the test specification and the basic standards.

6.2 Exclusions

There were no exclusions from the test specification.

7 OPERATION OF EUT DURING TESTING

7.1 Operational Environment

The EUT is powered from an internal battery and was tested as a portable device using an artificial hand in accordance with ANSI C63.4. The EUT transmit frequency was 434 MHz.

7.2 Operating Mode(s)

The EUT was tested for radiated emissions and spurious harmonics with the EUT modified to provide a continuous CW signal.

In normal operation the unit is restricted to periodic operation in accordance with FCC Part 15 paragraph 15.231. The transmitter once activated automatically ceases transmission within 3 seconds after activation.

7.3 Related Submittal Grants

The following transmitters are related submittal grants: FCC ID: MIY S36-10 and FCC ID: MIY S36-9.

8 DETAILED TEST RESULTS

8.1 Antenna Requirements

There is no external antenna or customer replaceable antenna and therefore meets the requirements of FCC Part 15, paragraph 15.203.

8.2 Radiated Emissions

Testing was performed according to the procedures in ANSI C63.4-1992. Radiated testing was performed at an EUT to antenna distance of 3 meters. The following data lists the significant emission frequencies, measured levels, correction factor (includes cable, preamplifier and antenna corrections), the corrected reading, plus the limit. Spectrum analyzer plots, additional tabulated data and environmental ambient conditions are included in the Appendices of this document.

8.2.1 FCC Part 15 Radiated Emissions Test Results

8.2.1.1 FCC Part 15, Paragraph 15.209 Radiated Emissions Limits, general requirements.

Frequency Range MHz	***3 meter Limit dB(µV/m)***
30 – 88	40.0
88 – 216	43.52
216 – 960	46.02
960 and above	53.97

8.2.1.2 FCC Part 15, Paragraph 15.231 Periodic operation in the band 40.66-40.70 MHz and above 70 MHz

Fundamental Frequency	***Field strength of fundamental***	***Field strength of spurious emissions***
434 MHz	80.83 dBµV/M	60.83 dBµV/m

8.2.1.3 Table: Judgement

EUT	S37 Wrist Pendant
Judgement	Passed by 6.95 dB*

* average measurements not applied

8.2.1.4 Table: Summary of Highest Radiated Emissions Levels

Frequency MHz	***Polarity V/H***	***Antenna Height cm***	***Antenna Azimuth deg***	***Correction Factor dB(1/m)***	***Limit dB(µV/m)***	***Corrected Reading dB(µV/m)***	***Margin dB***
4340	V	100	270	13.82	53.97	47.02	-6.95
3906	V	100	270	13.50	53.97	47.00	-6.97
1302	V	100	270	-0.90	53.97	43.00	-10.97
2170	V	100	270	2.77	60.83	46.97	-13.86
3472	V	100	270	11.85	60.83	46.65	-14.18
1736	V	100	270	0.91	60.83	45.01	-15.82

Measurements were made in peak detection with an IF bandwidth of 120 kHz, along with a 100 ms sweep time. Measurements above 1 GHz were made with a 1MHz IF bandwidth. A video filter was not used.

8.2.2 Measurement Uncertainty

The measurement uncertainty (with a confidence level of 95%) for this test was: +/- 5.59 dB

8.2.3 Measured Calculation

Voltage measurements from FCC requirements were converted to logarithmic values using:
$dB\mu V = 20_{10} \log (V/1x10^{-6})$

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:

FS=RA + AF + CF – AG

where:

FS = field strength - dB(μV/m)
RA = receiver amplitude - dB(μV)
AF = antenna factor - dB/m
CF = cable attenuation factor - dB
AG = amplifier gain - dB

Example: Assume a receiver reading of 52.5 dB(μV) is obtained. The antenna factor of 7.4 and cable factor of 1.1 is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB(μV/m.)

8.3 Occupied Bandwidth

8.3.1 FCC Part 15, Paragraph 15.231 (C)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

8.3.2 Judgement

The EUT complies with the occupational bandwidth requirements. See the supplemental data for plots of the bandwidth measurements.

8.4 Duty Cycle Correction Factor

All signals were measured in a peak detection and no duty cycle correction factors were applied to the measurements. During the CW measurements the pulse train consisted of an on time of 116 μ sec and an off time of 104 μ sec per pulse. This corresponds to 52.66 m sec on time and 47.21 m sec off time over a 100 m second period. The percent on time is 52.66 m sec divided by 100 m sec or 0.5266 percent. This corresponds to a –5.6 dB reduction or 20 log 0.5266. In a similar manor the duty cycle over 100 m sec is presented for the modulated waveform.

Plots of the duty cycle measurements can be found in Section 12.

9 TEST EQUIPMENT

The absolute performance calibration of equipment requiring calibration is performed on an as needed basis in accordance with MIL-STD 45662. However, calibration periods do not exceed one (1) year except for the E-Field sensors which have a two (2) year calibration interval. The test equipment is capable of making measurements within tolerances of at least +/- 2 dB amplitude and +/- 2% frequency deviation. Equipment certifications showing traceability to NIST (National Institute of Standards and Technology) are maintained on file at Laird Technologies Corporate offices in Delaware Water Gap, PA.

9.1 Radiated Emissions

Mfgr./Model	Description	Serial	Calibration Due
CHA/CBL6111A	(30 MHz – 1 GHz) bilog	1822	4/9/03
EMCO 3155	(1 – 18 GHz) double ridge guide antenna	2485	11/15/02
HP/8572A	(100 Hz – 22 GHz) EMI receiver sys #1	3010A01163	7/1/03
HP/8574B	(100 Hz – 1.5 GHz) EMI receiver sys #3	3010A01136	8/24/02
HP/85879A	EMI Radiated Emissions Measurement software	VA 02.01	Calibration Not Required

10 DESCRIPTION OF TEST METHODS

10.1 Radiated Emissions Test Procedure

Test Specification: FCC Part 15

Test Location: The elevated open area test site (OATS) used to collect the radiated data is located at the Laird Technologies test facility in Delaware Water Gap, Pennsylvania. This site has been fully described in a report submitted to the Federal Communication Commission (31040/SIT 1300F2). The OATS meets the ANSI C63.4: 1992, normalized site attenuation requirements at three (3) and ten (10) meters.

Test Setup: The EUT was setup on the OATS in a typical installation configuration. The EUT was configured for continuos CW operation. The EUT was set up in the following manner:

Table-top Equipment: The EUT was placed 80 centimeters above the ground plane on a non-conductive tabletop 1.0 meter wide x 1.5 meters long. The amplitude level of the emissions were maximized by varying the configuration of the EUT and peripherals.

Test Procedure: Measurements were performed in accordance with ANSI C63.4: 1992. The radiated emissions were measured using a receiver system that meets the fundamental characteristics of CISPR Publication 16. The measurements were performed with a quasi-peak adapter bandwidth of 120 kHz, unless otherwise noted on the data sheet. The measurement antennas are calibrated in accordance with ANSI C63.5: 1988.

A suspect frequency list was compiled with the following information:

B) Preliminary radiated scan – performed in a shielded enclosure
B) List of crystal oscillators installed in EUT and auxiliary equipment

The highest emissions were maximized by rotating the turntable 360 degrees and varying the antenna height 1 to 4 meters. The frequency range of 30 MHz to 1000 MHz was measured using a Bilog antenna. Measurements above 1 GHz were made using a double ridge wave guide antenna. Measurements were made in vertical and horizontal antenna polarizations. The peak measurements within 5 dB of the specification limits were re-measured with the receiver in either quasi-peak or average detection as required. Amplitude levels were recorded in dBµV/m.

10.2 Occupied Bandwidth

Occupied bandwidth measurements were made with the EUT operated in a CW continuous mode. The receiver bandwidth was set for 100 kHz and peak measurements were made at 20 dB down from the peak measurement. Due to the short duration of the pulse modulated measurements were not possible. However, preliminary data indicted that the occupied bandwidth would not be significantly larger with the modulation.

11 PHOTOGRAPHS OF TEST ARRANGEMENTS

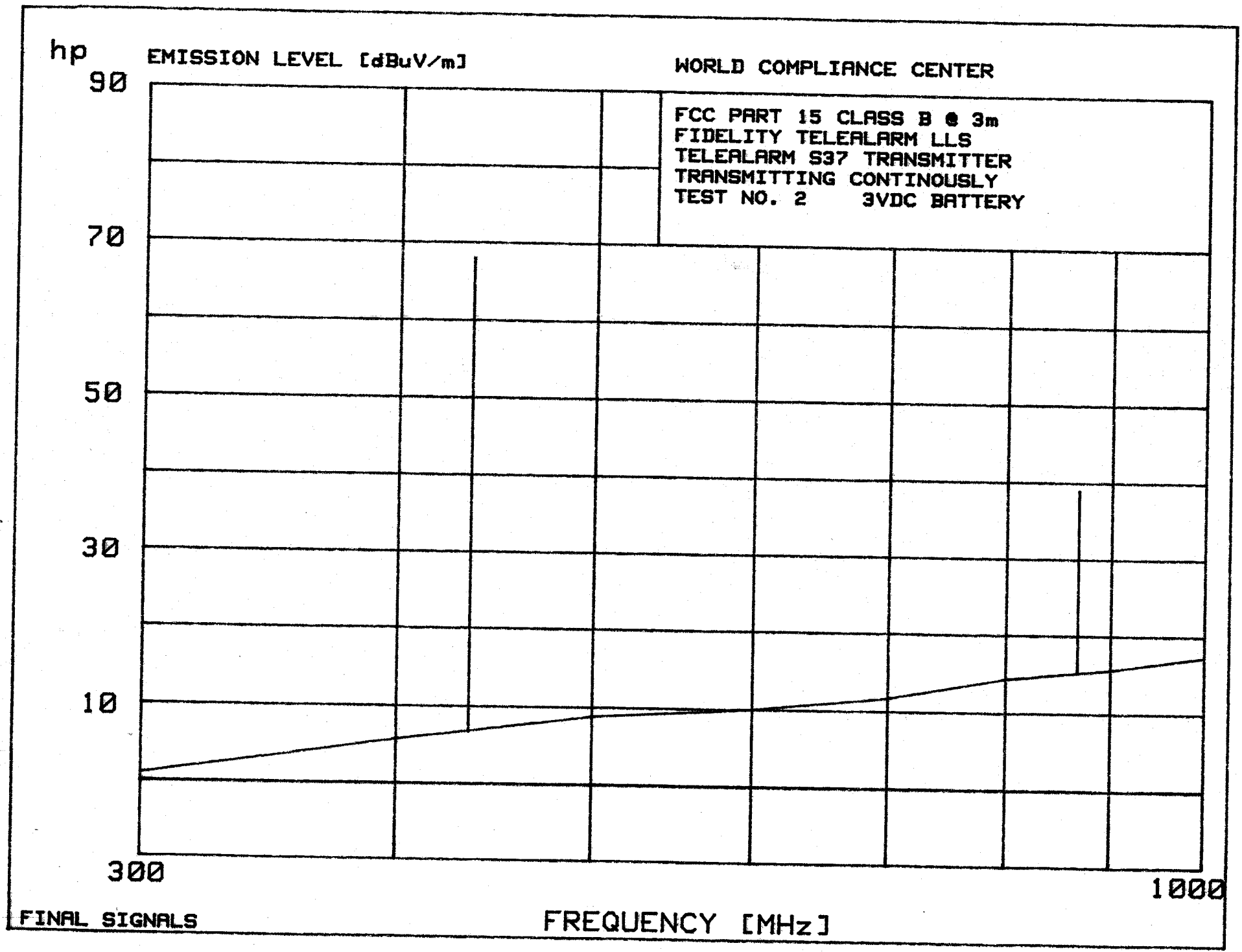
Photo Layout	***Test Type***	***Basic Standard***	***Page No.***
Top	Radiated Emissions	FCC Part 15	13
Bottom	Radiated Emissions	FCC Part 15	

Class B radiated emissions at 3 meters

Class B radiated emissions at 3 meters

12 SUPPLEMENTAL DATA

Test Type	***Specification***	***Comments***	***Data Format***	***Page No.***
Radiated Emissions	FCC Part 15	Radiate measurement below 1 GHz	plotted tabulated	15 16
		Radiated measurements 434 MHz to 4340 MHz	tabulated	17
		Bandwidth Fundamental	Plotted	18
Duty Cycle	FCC Part 15.231	CW duty cycle on time	Plotted	19
Duty Cycle	FCC Part 15.231	CW duty cycle off time	Plotted	20
Duty Cycle	FCC Part 15.231	Modulated duty cycle over 100 m sec	Plotted	21


hp
EMISSION LEVEL [dBuV/m]
WORLD COMPLIANCE CENTER
90
70
50
30
10
300
1000
FCC PART 15 CLASS B @ 3m
FIDELITY TELEALARM LLS
TELEALARM S37 TRANSMITTER
TRANSMITTING CONTINOUSLY
TEST NO. 2 3VDC BATTERY
FINAL SIGNALS
FREQUENCY [MHz]

LAIRD TECHNOLOGIES
WORLD COMPLIANCE CENTER
TEST DATA

REPORT No.: 160827 DATE: 11 JULY 2002 TEST No.: 2
TITLE OF TEST: FCC PART 15 CLASS B @ 3 METERS
CUSTOMER: FIDELITY TELEALARM LLS
EUT DESCRIPTION: S37 TRANSMITTER
TEST MODE: TRANSMITTING CONTINUOUSLY
SERIAL No.: 3671 H1237L8
FREQUENCY RANGE: 30 - 1000 MHz SENOSOR LOCATION/POLARIZATION: WORSE CASE
INPUT POWER: 3 VDC TEMP: 69.3 f HUM: 43.0 % BAR: 30.25 "
TEST PERFORMED BY: ANTHONY A. SOFFERA
TEST RESULTS: UNDER LIMIT
TEST CONDITIONS: TABLE TOP ARRANGEMENT.
TESTED WITH ARTIFICIAL HAND.

PRODUCT EMISSIONS

FCC PART 15 CLASS B @ 3m Data File: TEST NO. 2 11 JULY 02

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORR FACTOR dB	COMMENTS
1	434.036		68.0		PK	V	122	270	-10.3	
2	868.031		39.0		PK	V	122	270	-1.4	

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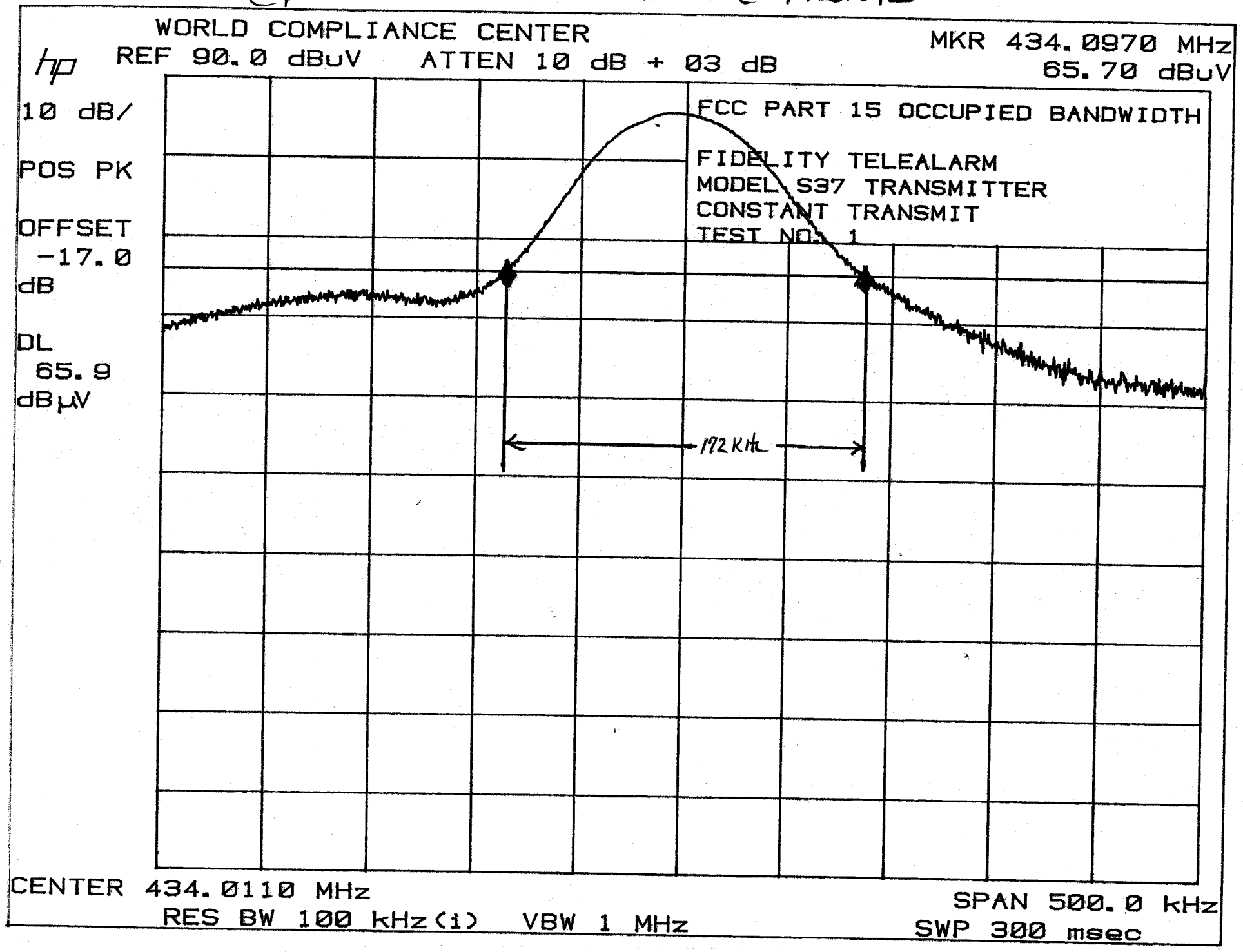
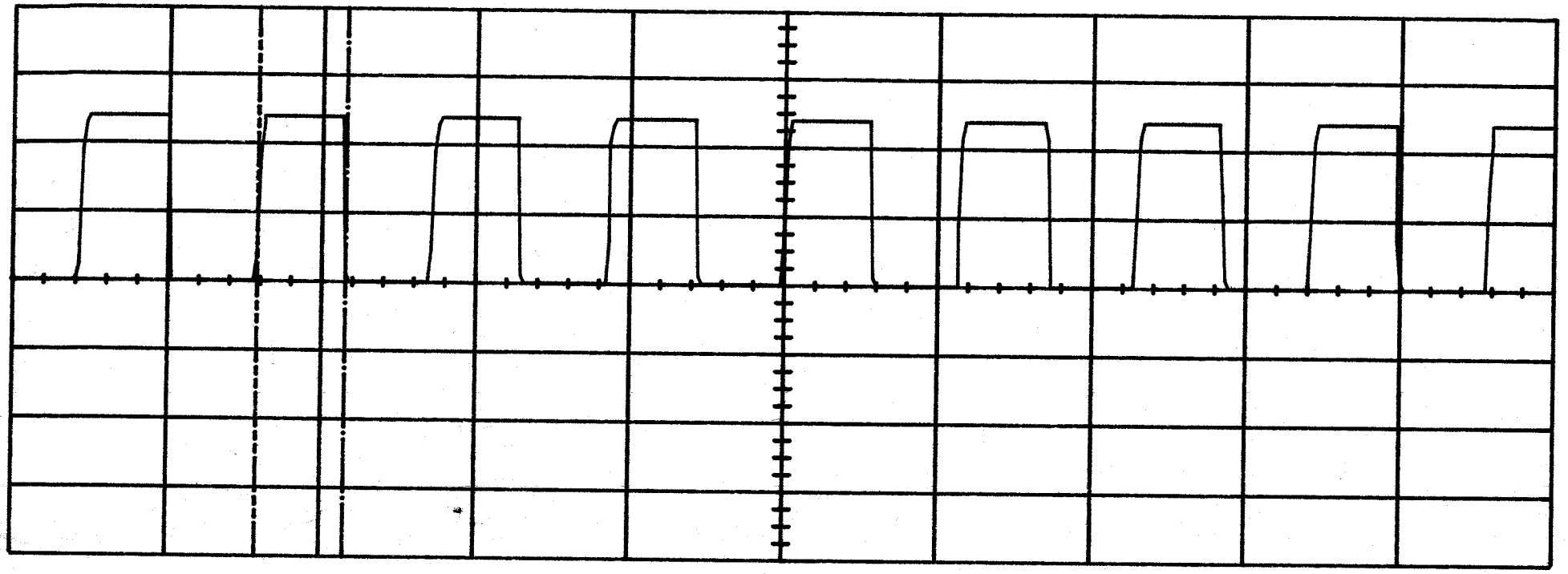
15 JULY 02

S37 TRANSMITTER OCCUPIED BANDWIDTH 20dB down

MEASURED @ 172 KHz





	Timebase	Delay/Pos	Reference	Mode	Markers	
Main	200 us/div	0.00000 s	Center	Realtime (NORMAL)	stop	= -568.000 us
					start	= -684.000 us
	Sensitivity	Offset	Probe	Coupling	delta t	= 116.000 us
Channel 1	1.00 V/div	0.00000 V	10.00 : 1	dc (1M ohm)	1/delta t	= 8.62069 kHz

Trigger mode : Edge
On Positive Edge Of Chan1
Trigger Level
Chan1 = 1.00000 V (noise reject OFF)
Holdoff = 120.000 ns

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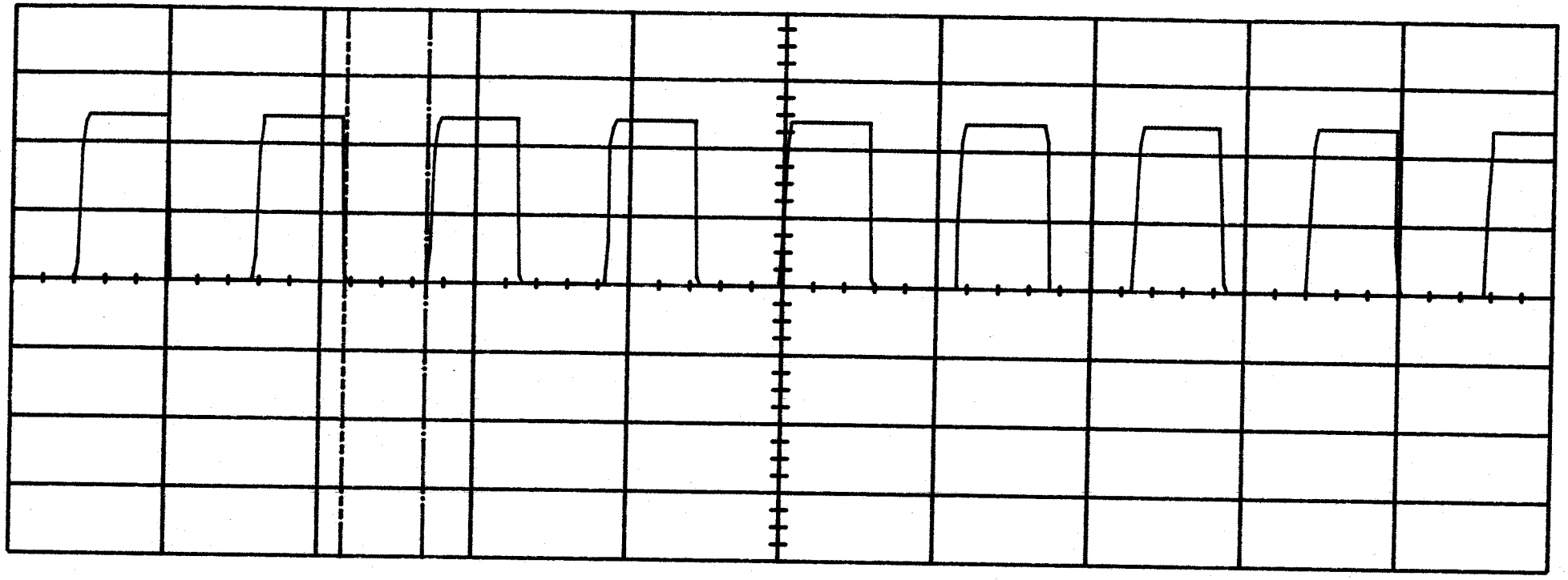

	Timebase	Delay/Pos	Reference	Mode	Markers	
Main	200 us/div	0.00000 s	Center	Realtime (NORMAL)	stop	= -464.000 us
					start	= -568.000 us
	Sensitivity	Offset	Probe	Coupling	delta t	= 104.000 us
Channel 1	1.00 V/div	0.00000 V	10.00 : 1	dc (1M ohm)	1/delta t	= 9.61538 kHz

Trigger mode : Edge
On Positive Edge Of Chan1
Trigger Level
  Chan1 = 1.00000 V (noise reject OFF)
Holdoff = 120.000 ns

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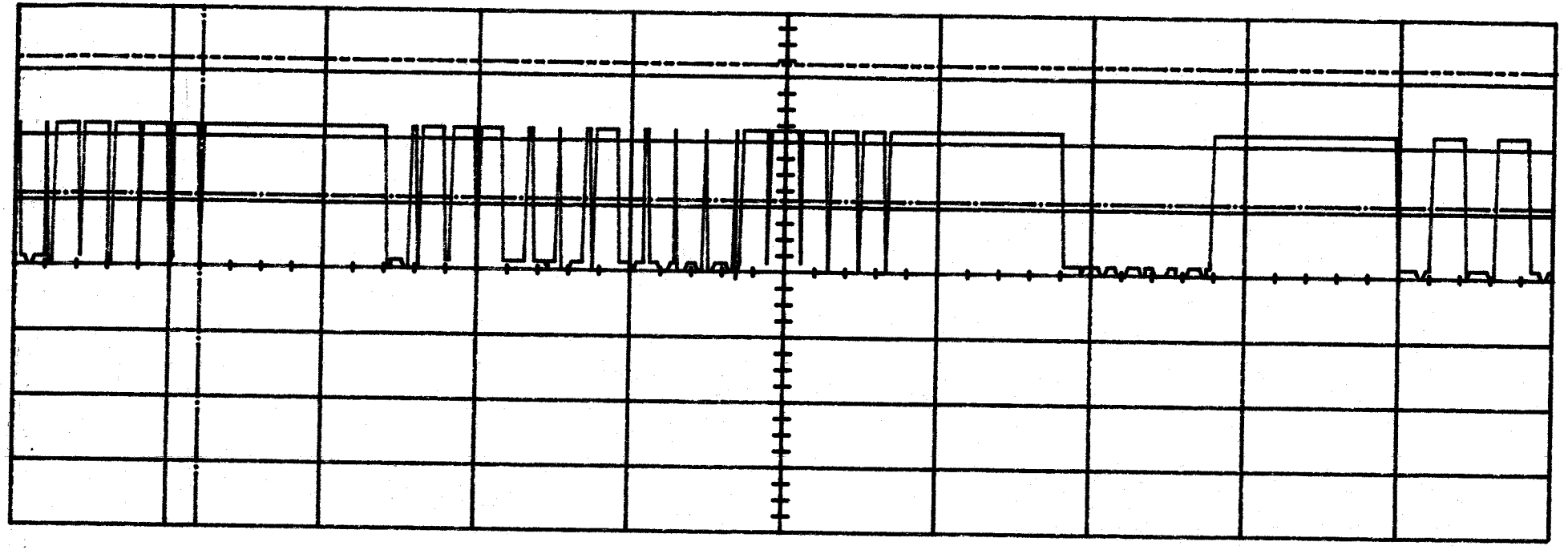

	Timebase	Delay/Pos	Reference	Mode
Main	10.0 ms/div	-10.0000 ms	Left	Realtime (NORMAL)
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	1.00 V/div	0.00000 V	10.00 : 1	dc (1M ohm)

Trigger mode : Edge
On Negative Edge Of Chan1
Trigger Level
Chan1 = 5.000 mV (noise reject OFF)
Holdoff = 2 Events

Markers
Vmarker2 (c1) = 320.000 mV
Vmarker1 (c1) = 109.375 mV
delta V (c1) = 210.625 mV

stop = 2.00000 ms
start = -12.4000 ms
delta t = 14.4000 ms
1/delta t = 69.4444 Hz

2/8/21