Straubing, Juli 15, 1995

TEST - REPORT

No. 55114-5332

for

Receiver RR 433.9

Applicant: Telecontrolli S.p.a.,

Purpose of testing: To show compliance with
I-ETS 300 220:1993
Short range devices in the 25-1000 MHz frequency range with power levels up to 500 mW

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Administrative Data

Equipment Under Test:	RR 433.9
Options/Accessories:	---
Serial Number:	---
Version of EUT:	As delivered

Applicant: (Full Address)	Telecontrolli S.p.a. Via S. Giovanni de Matha 49/51
Contract Identification:	---
Contact Person:	Mr. Maurizio D'Arrigo
Manufacturer:	Applicant

Receipt of EUT:	01.06.1995
Date of Test:	20.06.1995
Note:	

Responsible for Testing:	J. Roidt
Responsible for Report:	J. Roidt

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Summary

The tested sample fully complies with the requirements set forth in

prI-ETS 300 220:1993

Johann Roidt
Technical Manager

SENTON GmbH · EMV-Prüfzentrum · Äußere Frühlingsstraße 45 · 94315 Straubing · Tel. 09421/42081

List of Measurements

Test	Result	Note
i-ETS 300 220:1993		
Subclause:		
8.1 Receiver spurious emissions - conducted -	Passed	Page 5
8.1 Receiver spurious emissions -radiated-	Passed	Page 6

List of Test Equipment		Page 7
Photographs Additional information supplementary to the report		Page 9 Page 12

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Ambiente temperature: 22 °C Relative humidity 55 %

RECEIVER SPURIOUS EMISSIONS CONDUCTED
SUBCLAUSE 8.1
- Conducted -

SPURIOUS EMISSIONS LEVEL (nW)								
CH 1			CH 2			CH 3		
f (MHz)	Band-width (kHz)	Level (nW)	f (MHz)	Band-width (kHz)	Level (nW)	f (MHz)	Band-width (kHz)	Level (nW)
431.4	120	0.13						
1296	1000	0.01						
1716	1000	0.04						
2144	1000	0.03						
2577	1000	0.16						
3006	1000	0.08						
Measurement Uncertainty			± 3 dB					

LIMITS SUBCLAUSE 8.1.5

Frequencies < 1 GHz	Frequencies > 1 GHz
2 nW (-57 dBm)	20 nW (-47 dBm)

Reference numbers of test equipment used (for reference see test equipment listing):
01,02,12,13,39,41,42,44,45,56,61

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Ambiente temperature: 22 °C Relative humidity 55 %

RECEIVER SPURIOUS EMISSIONS RADIATED
SUBCLAUSE 8.1
- Radiated -

SPURIOUS EMISSIONS LEVEL (nW)								
CH 1			CH 2			CH 3		
f (MHz)	Band-width (kHz)	Level (nW)	f (MHz)	Band-width (kHz)	Level (nW)	f (MHz)	Band-width (kHz)	Level (nW)
431.4	120	0.251						
Measurement Uncertainty			± 3 dB					

LIMITS SUBCLAUSE 8.1.5

Frequencies < 1 GHz	Frequencies > 1 GHz
2 nW (-57 dBm)	20 nW (-47 dBm)

Reference numbers of test equipment used (for reference see test equipment listing):
01,02,12,13,39,41,42,44,45,56,61

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Test Equipment And Ancillaries Used For Tests (Version 02/13/1995)

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No.	Instrument / Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	R 3261 A	Advantest	91720155
02	Spectrum Analyzer	R 3271	Advantest	05050023
03	Test Receiver	ESH 3	Rohde & Schwarz	880112/032
04	Test Receiver	ESHS 10	Rohde & Schwarz	860043/016
05	Test Receiver	ESV	Rohde & Schwarz	881414/009
06	Test Receiver	ESVP	Rohde & Schwarz	881120/024
07	Audio Analyzer	UPA	Rohde & Schwarz	862954
08	Power Meter	NRVS	Rohde & Schwarz	836856/015
09	Power Sensor	NRV-Z52	Rohde & Schwarz	837901/030
10	Power Sensor	NRV-Z4	Rohde & Schwarz	863828/015
11	Preamplifier	ESV-Z3	Rohde & Schwarz	860907/004
12	Preamplifier	R14601	Advantest	13120026
13	Preamplifier	ACX/080-3030	CTT	32640
14	Preamplifier	ACO/180-3530	CTT	32641
15	Signal Generator	SMS	Rohde & Schwarz	872166/039
16	Signal Generator	HP 8673 D	Hewlett Packard	2930A00966
17	Waveform Generator	HP 33120 A	Hewlett Packard	US34005375
18	UHF Attenuator Set	DPU	Rohde & Schwarz	300771/075
19	UHF Attenuator Set	DPU	Rohde & Schwarz	300788/006
20	Pulse Limiter	ESH 3-Z2	Rohde & Schwarz	1144
21	Pulse Limiter	11947 A	Hewlett Packard	3107A00566
22	V-Network	ESH 3-Z5	Rohde & Schwarz	862770/018
23	V-Network	ESH 3-Z5	Rohde & Schwarz	894785/005
24	V-Network	ESH 3-Z5	Rohde & Schwarz	830952/025
25	V-Network	ESH 3-Z6	Rohde & Schwarz	830722/010
26	V-Network	NSLK 8127	Schwarzbeck	8127152
27	V-Network	NNLA 8119	Schwarzbeck	8119148
28	V-Network	SE 01	Senton	01
29	T-Network	ESH 3-Z4	Rohde & Schwarz	890602/011
30	T-Network	ESH 3-Z4	Rohde & Schwarz	890602/012
31	High Impedance Probe	TK 9416	Schwarzbeck	01
32	High Impedance Probe	TK 9416	Schwarzbeck	02
33	Current Probe	ESH 2-Z1	Rohde & Schwarz	863366/18
34	Current Probe	ESV-Z1	Rohde & Schwarz	862553/3
35	Absorbing Clamp	MDS 21	Lüthi	80911
36	Absorbing Clamp	MDS 21	Lüthi	79690

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Test Equipment And Ancillaries Used For Tests (Continued)

No.	Instrument / Ancillary	Type	Manufacturer	Serial No.
37	Loop Antenna	HFH2-Z2	Rohde & Schwarz	882964/1
38	Biconical Antenna	HK 116	Rohde & Schwarz	836239/02
39	Biconical Antenna	3110	Emco	8812-1005
40	Log. Periodic Antenna	HL 223	Rohde & Schwarz	834408/12
41	Log. Periodic Antenna	3147	Emco	9112-1054
42	Horn Antenna	3160-03	Emco	9112-1003
43	Horn Antenna	3160-04	Emco	9112-1001
44	Horn Antenna	3160-05	Emco	9112-1001
45	Horn Antenna	3160-06	Emco	9112-1001
46	Horn Antenna	3160-07	Emco	9112-1008
47	Horn Antenna	3160-08	Emco	9112-1002
48	Horn Antenna	3160-09	Emco	9403-1025
49	Digital multimeter	199	Keithley	463386
50	Multimeter	HP E2373A	Hewlett Packard	2927J03345
51	DC Power Supply	NGSM 32/10	Rohde & Schwarz	203
52	DC Power Supply	NGB	Rohde & Schwarz	2455
53	DC Power Supply	NGA	Rohde & Schwarz	386
54	Temperature Test Chamber	HT4010	Heraeus	07065550
55	Cable	RG214	Senton	1309
56	Cable	200CM_001	Rosenberger	1357
57	Cable	150CM_001	Rosenberger	1479
58	Cable Set EG1	RG214	Senton	1189 - 1191
59	Cable Set Cabine 1	RG214	Senton	
60	Cable Set Cabine 2	RG214	Senton	
61	Cable Set Cabine 3	RG214	Senton	
62	Shielded Room	Nr. 1	Senton	1451
63	Shielded Room	Nr. 2	Senton	1452
64	Semi-anechoic Chamber	Nr. 3	Siemens	1453
65	Shielded Room	Nr. 4	Euroshield	1454
66	Open Area Test Site	EG 1	Senton	1454

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Photographs

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Photo No. 1

Receiver Module - Top view

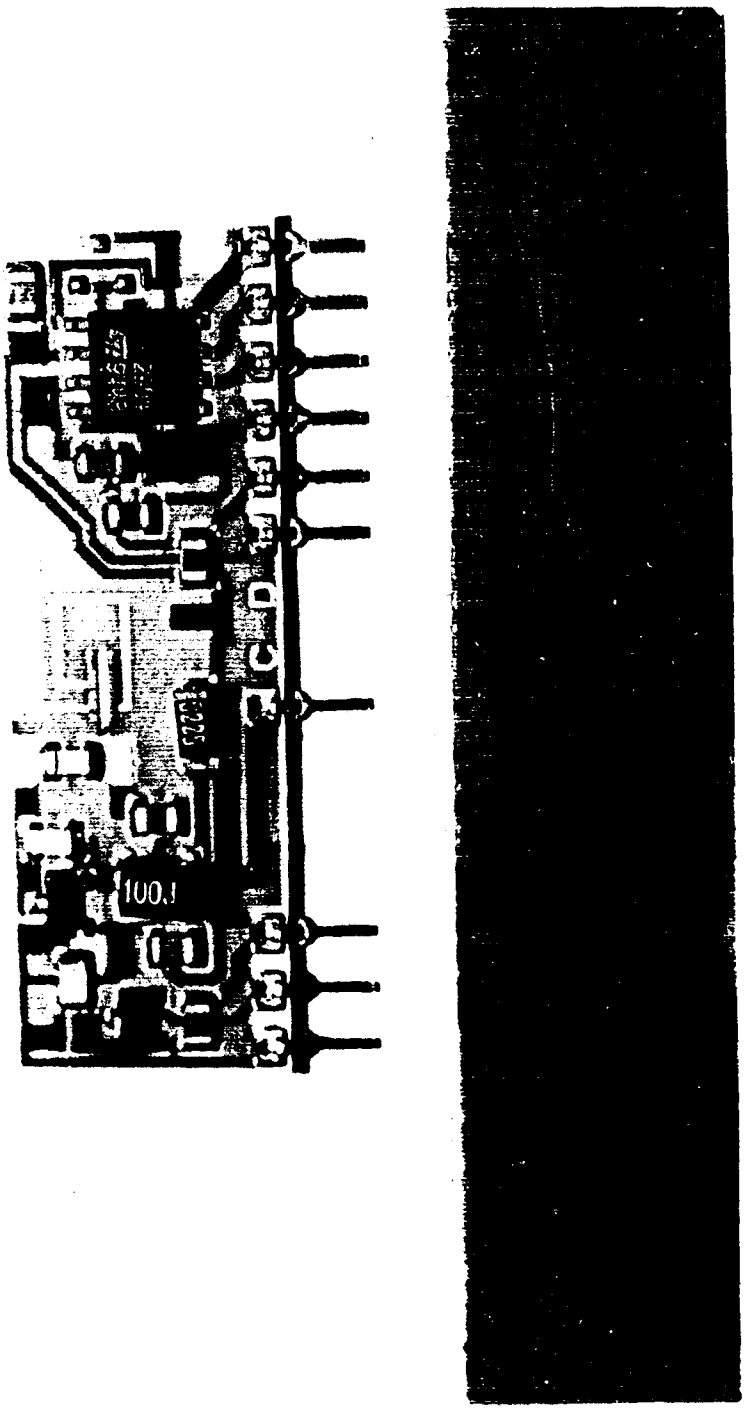

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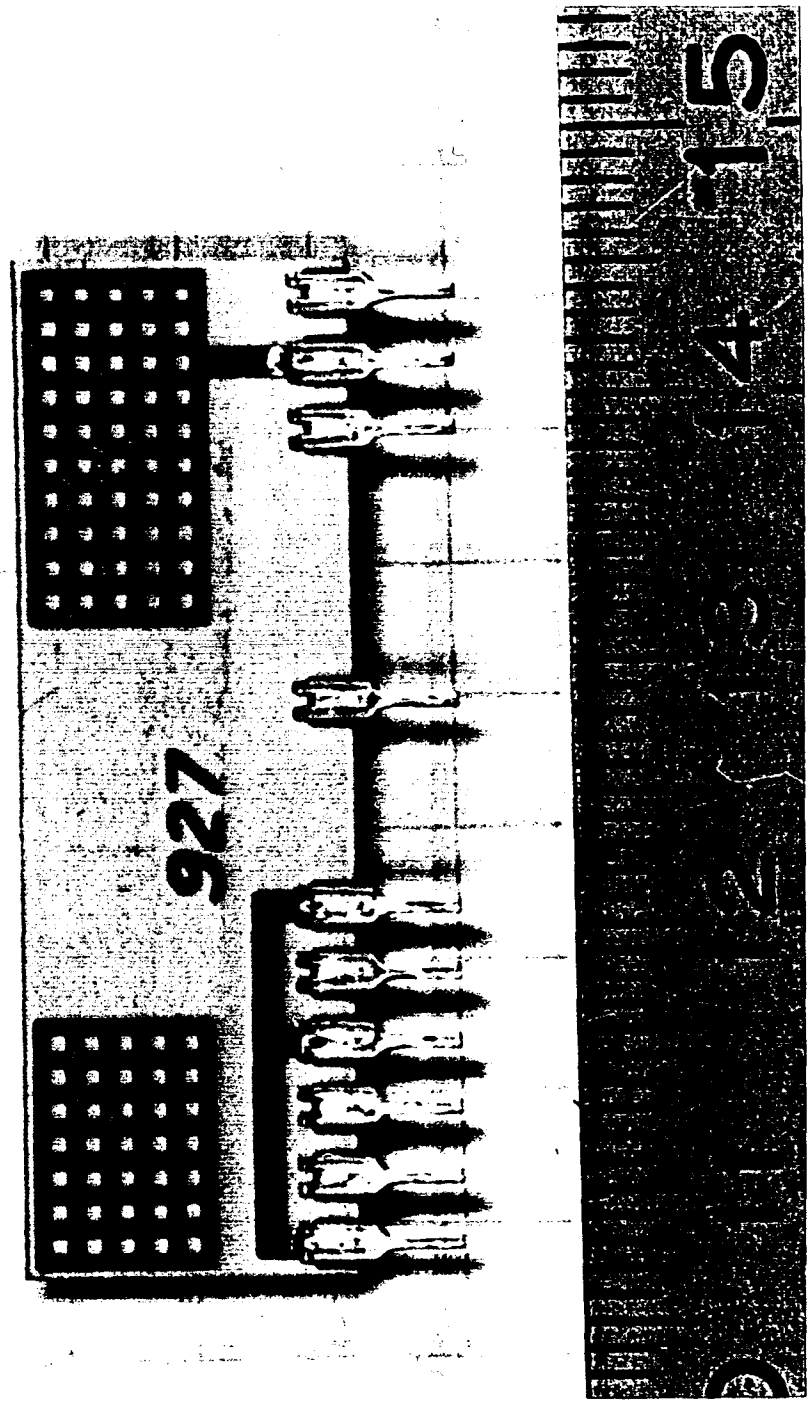
Photo No. 2

Receiver Module - Bottom view



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Additional information supplementary to the test report

Page No.	Title	Clause
13	Conducted emissions 9 kHz - 1 GHz	
14	Conducted emissions 1 - 4 GHz	
15	Radiated emissions 25 - 200 MHz Pol. H	
16	Radiated emissions 25 - 200 MHz Pol. V	
17	Radiated emissions 200- 1000 MHz Pol. H	
18	Radiated emissions 200- 1000 MHz Pol. V	
19	Radiated emissions 1 - 1.7 GHz	
20	Radiated emissions 1.7 - 2.6 GHz	
21	Radiated emissions 2.6 - 4 GHz	
22-25	Technical Documentation	

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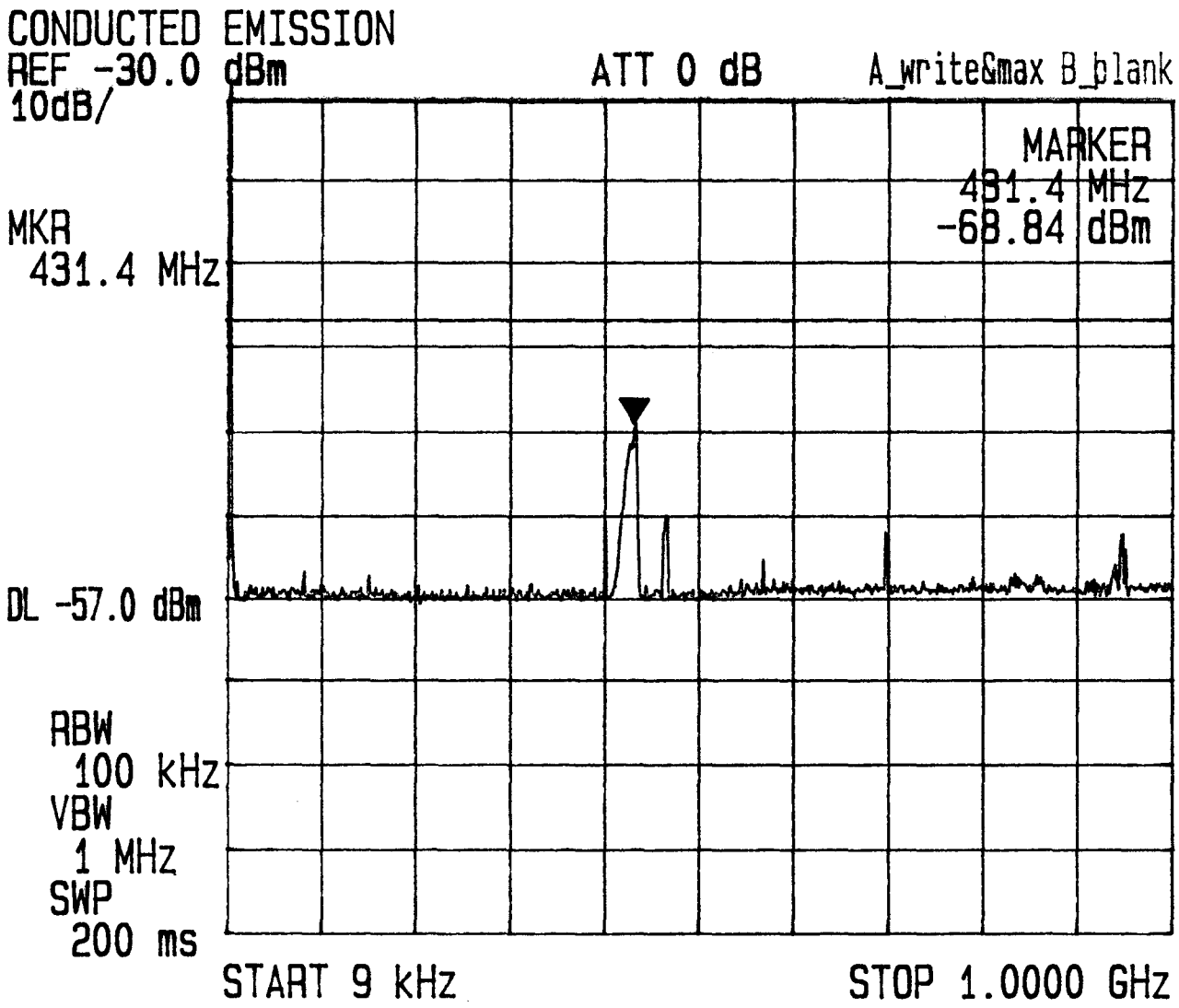

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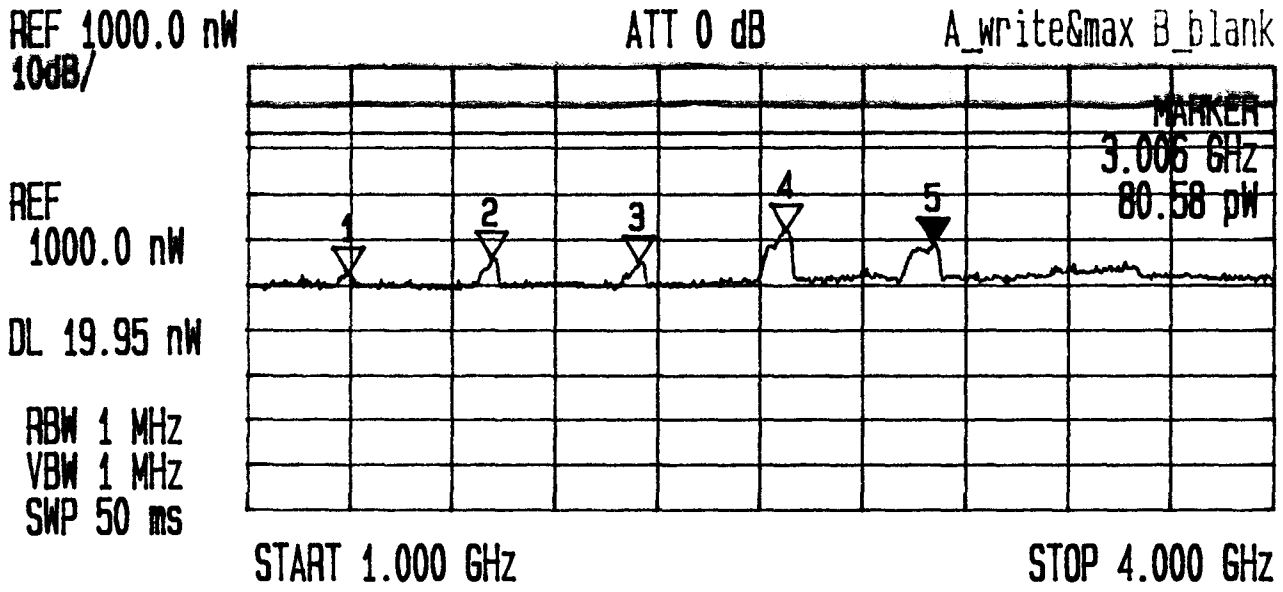

*** Multi Marker List ***

No.1:	1.296 GHz	18.43 pW	A
No.2:	1.716 GHz	41.57 pW	A
No.3:	2.144 GHz	34.72 pW	A
No.4:	2.577 GHz	163.1 pW	A
No.5:	3.006 GHz	80.58 pW	A
No.6:			
No.7:			
No.8:			
Δ:			

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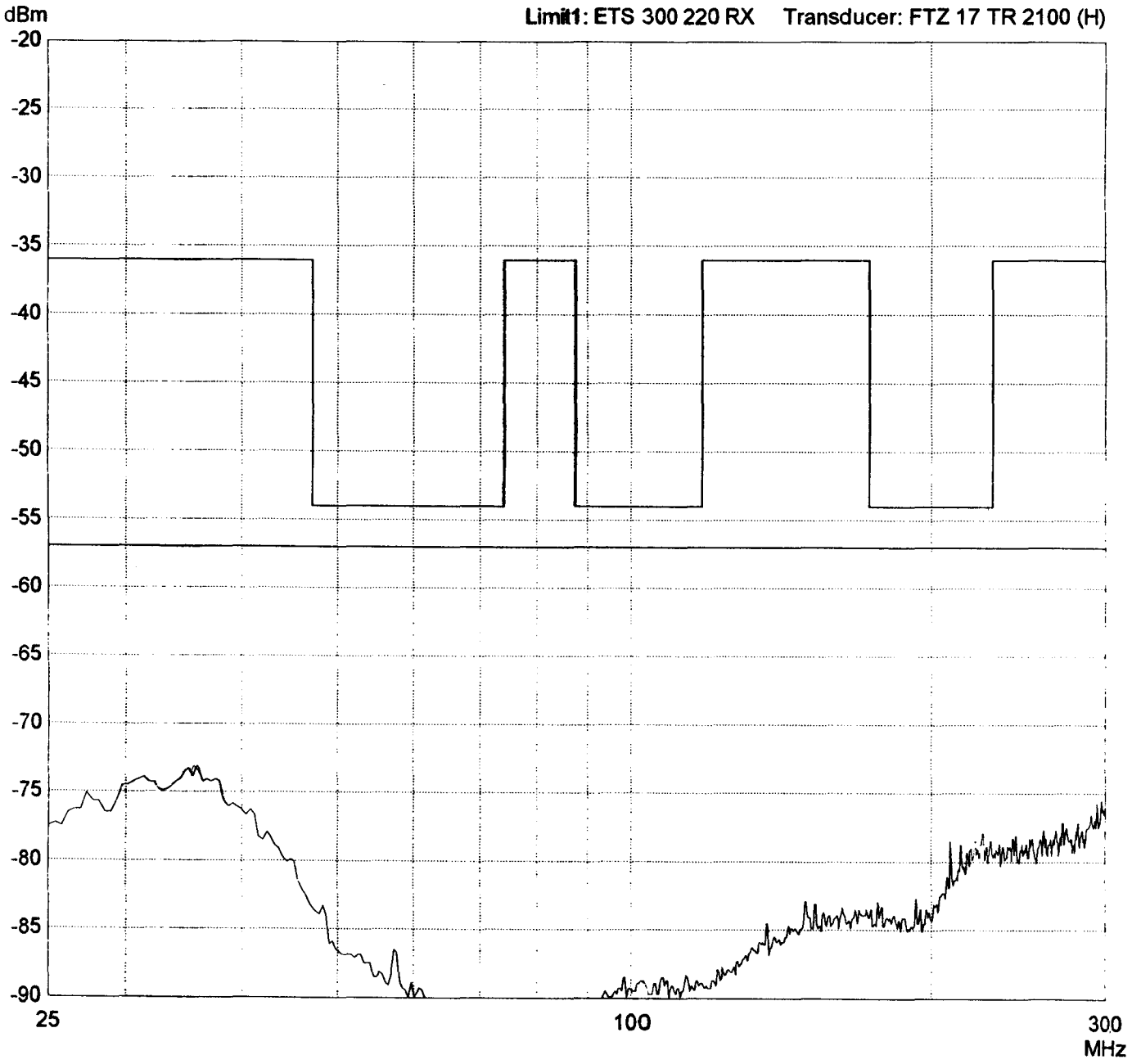
Radiated Power Test 25 MHz - 300 MHz
according to i-ETS 300 220 : 1993

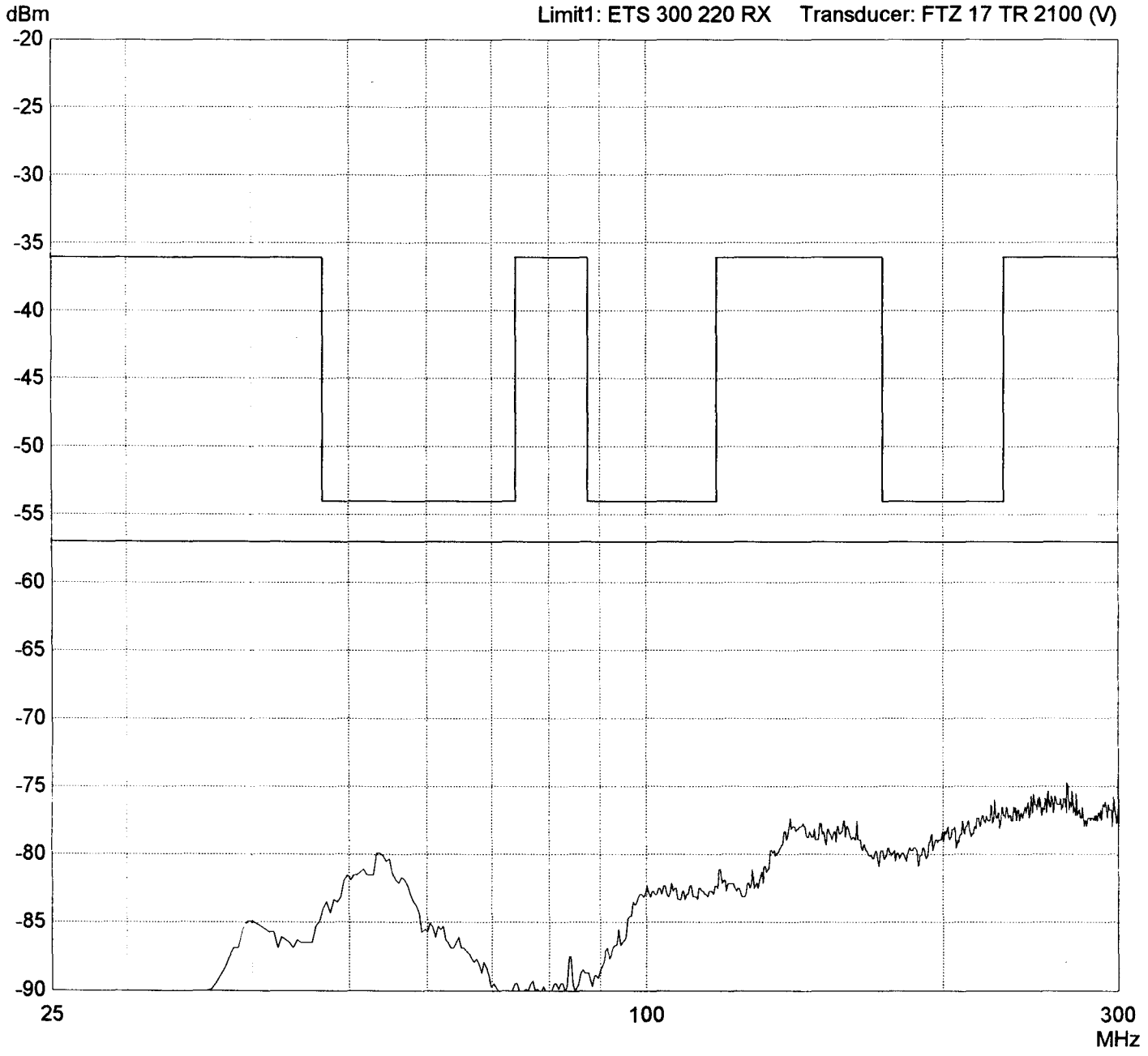
Model: RR 433.9	Mode: Normal operation
Serial No.: —	
Applicant: Telecontrolli S.p.a.	
Test-site: Anechoic chamber	
Tested on: Test distance 3 meters Horizontal polarization	
Date of test: 20/06/1995 — Operator: J. Roidt	
Detector: Peak	List of values: 10 dB Margin — 50 Subranges



Result:	Project-File: 55114-5332 — Page 15 of 15 Pages

Radiated Power Test 25 MHz - 300 MHz
according to i-ETS 300 220 : 1993

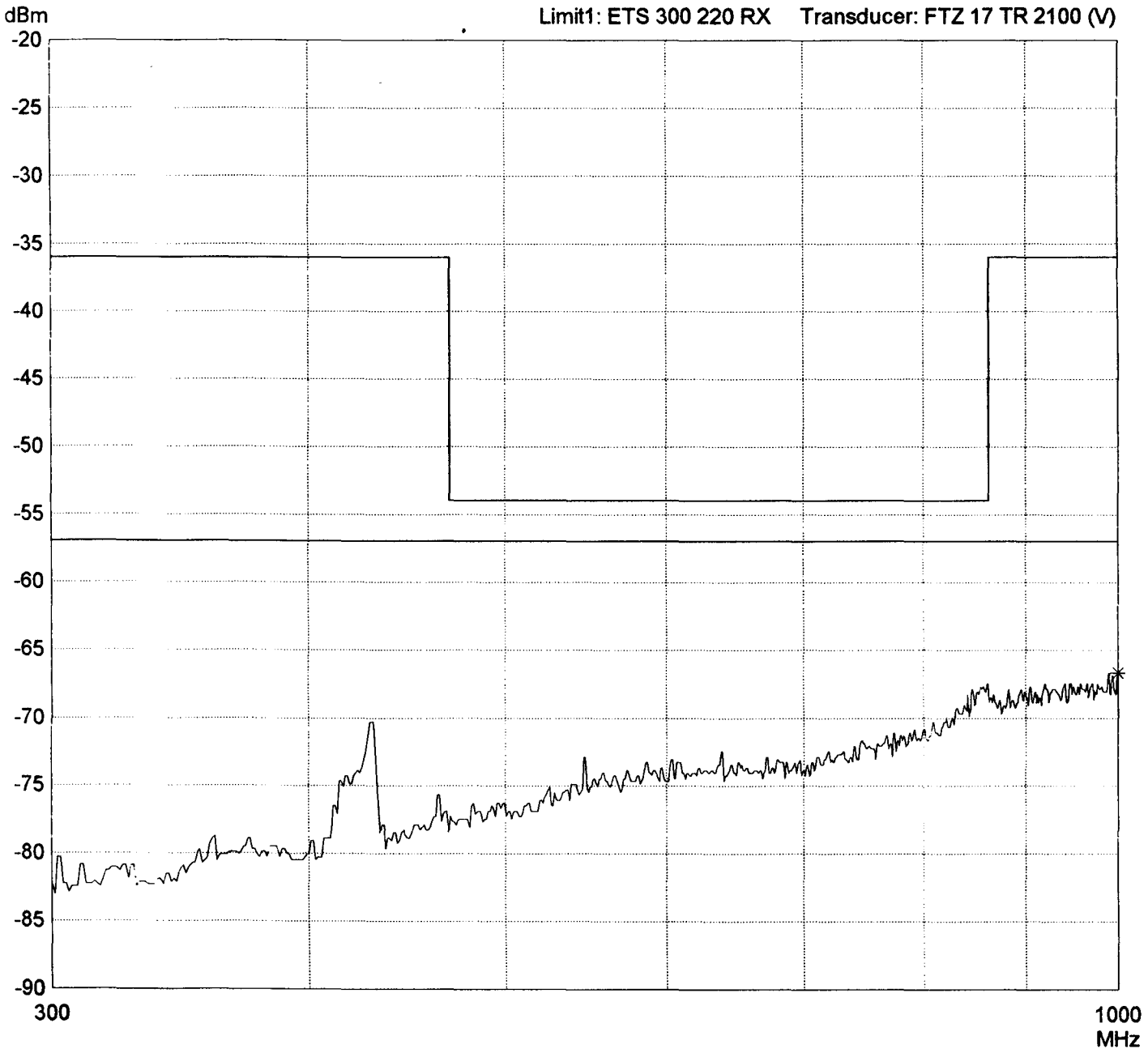
Model: RR 433.9	Mode: Normal operation
Serial No.: ---	
Applicant: Telecontrolli S.p.a.	
Test-site: Anechoic chamber	
Tested on: Test distance 3 meters Vertical polarization	
Date of test: 20/06/1995 — Operator: J. Roidt	
Detector: Peak	List of values: 10 dB Margin — 50 Subranges



Result:	Project-File: 55114-5332 — Page 16 of 25 Pages

Radiated Power Test 300 MHz - 1 GHz
according to i-ETS 300 220 : 1993

Model: RR 433.9	Mode: Normal operation
Serial No.: ---	
Applicant: Telecontrolli S.p.a.	
Test-site: Anechoic chamber	
Tested on: Test distance 10 meters Vertical polarization	
Date of test: 20/06/1995 — Operator: J. Roidt	
Detector: Peak	List of values: 10 dB Margin — 50 Subranges



Result:	Project-File: 55114-5332

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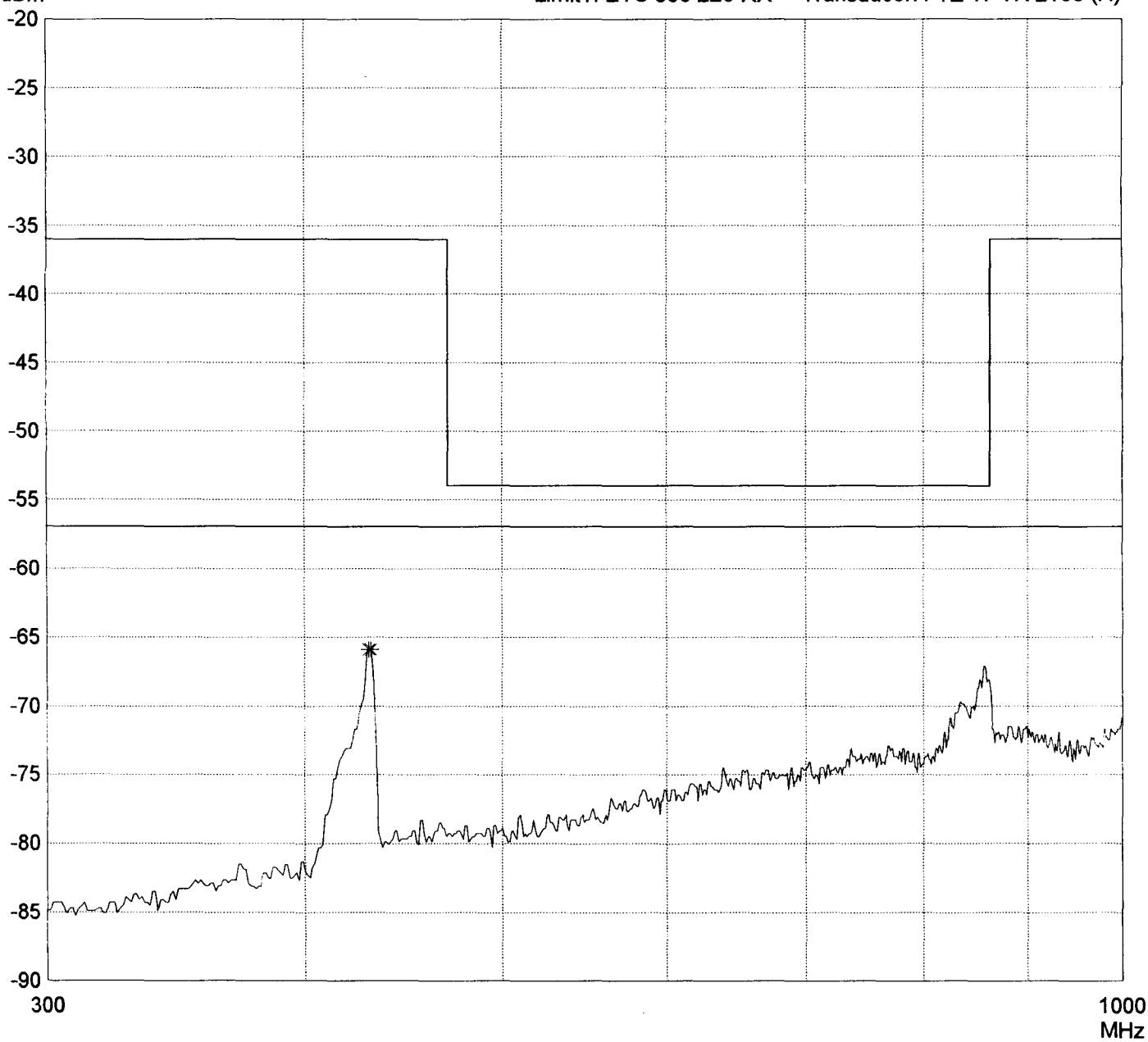
Radiated Power Test 300 MHz - 1 GHz
according to i-ETS 300 220 : 1993

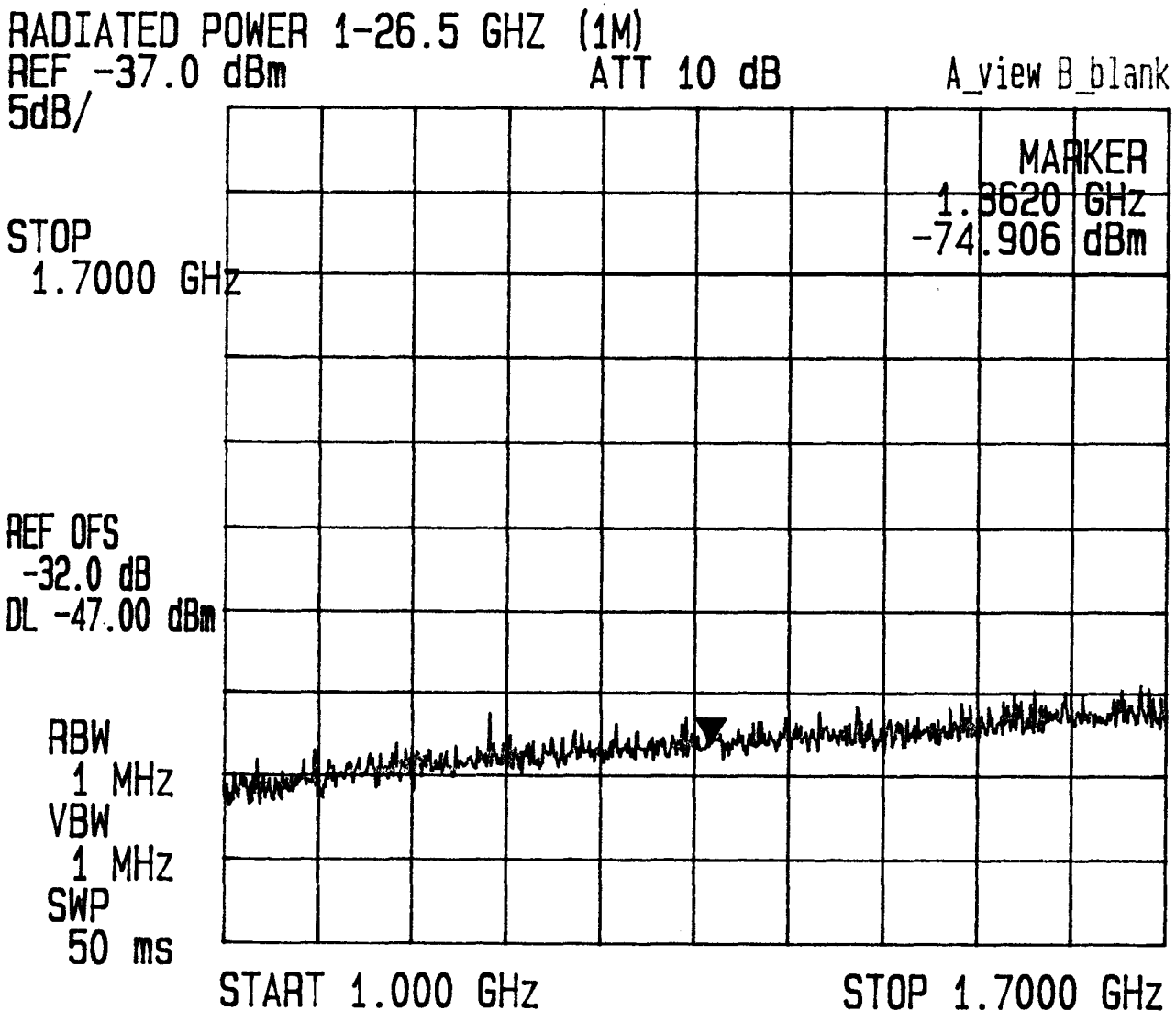
Model: RR 433.9	Mode: Normal operation
Serial No.: ---	
Applicant: Telecontrolli S.p.a.	
Test-site: Anechoic chamber	
Tested on: Test distance 3 meters Horizontal polarization	
Date of test: 20/06/1995 — Operator: J. Roidt	
Detector: Peak	List of values: 10 dB Margin — 50 Subranges

dBm

Limit1: ETS 300 220 RX Transducer: FTZ 17 TR 2100 (H)



Result:	Project-File: 55114-5332 — Page 18 of 25 Pages



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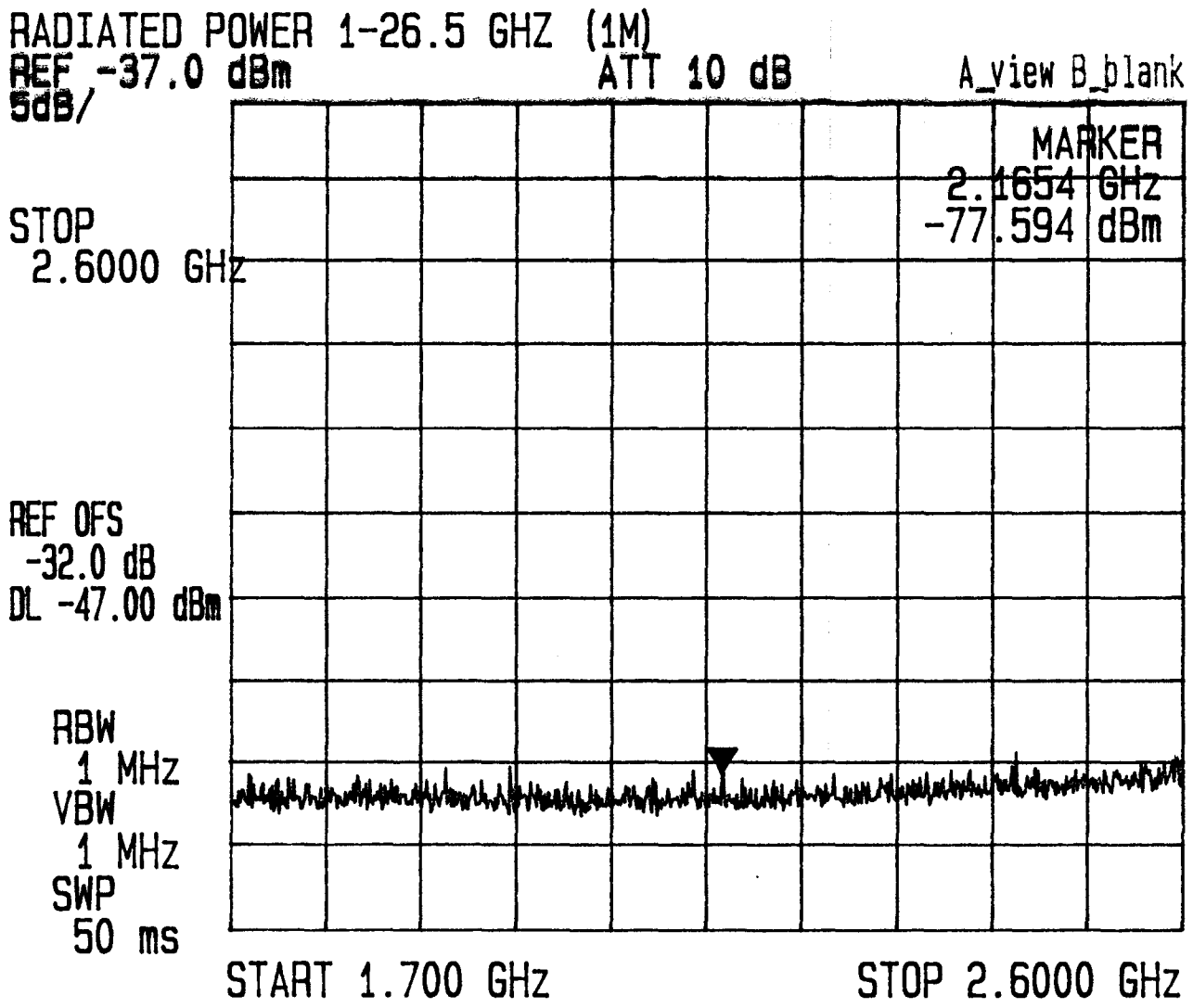

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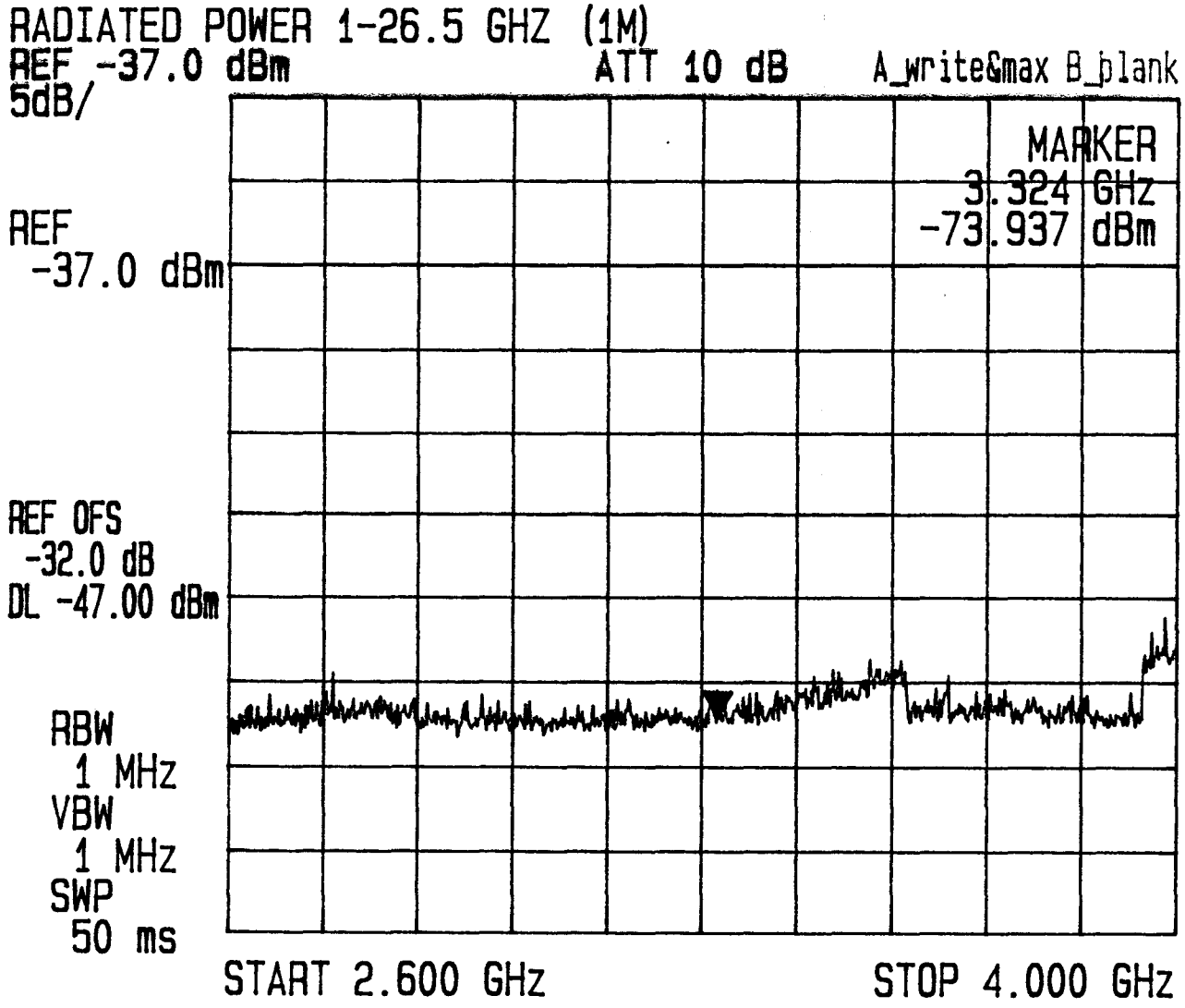

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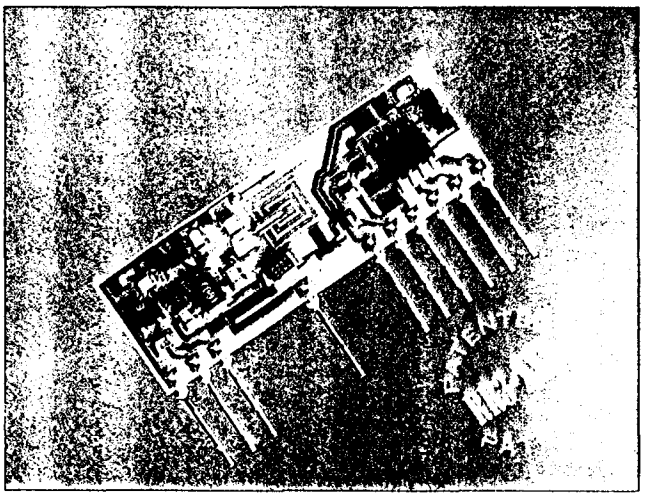
M/25

telecontrolli

RR3 - XXX Super Regenerative Radio Receiver With Laser Trimmed Inductor



XXX : custom-specified working frequency (200-450 MHz)

Standard European and U.S. frequencies (224.5 MHz, 315 MHz, 418 MHz, 433.9 MHz) are readily available from stock.

General description

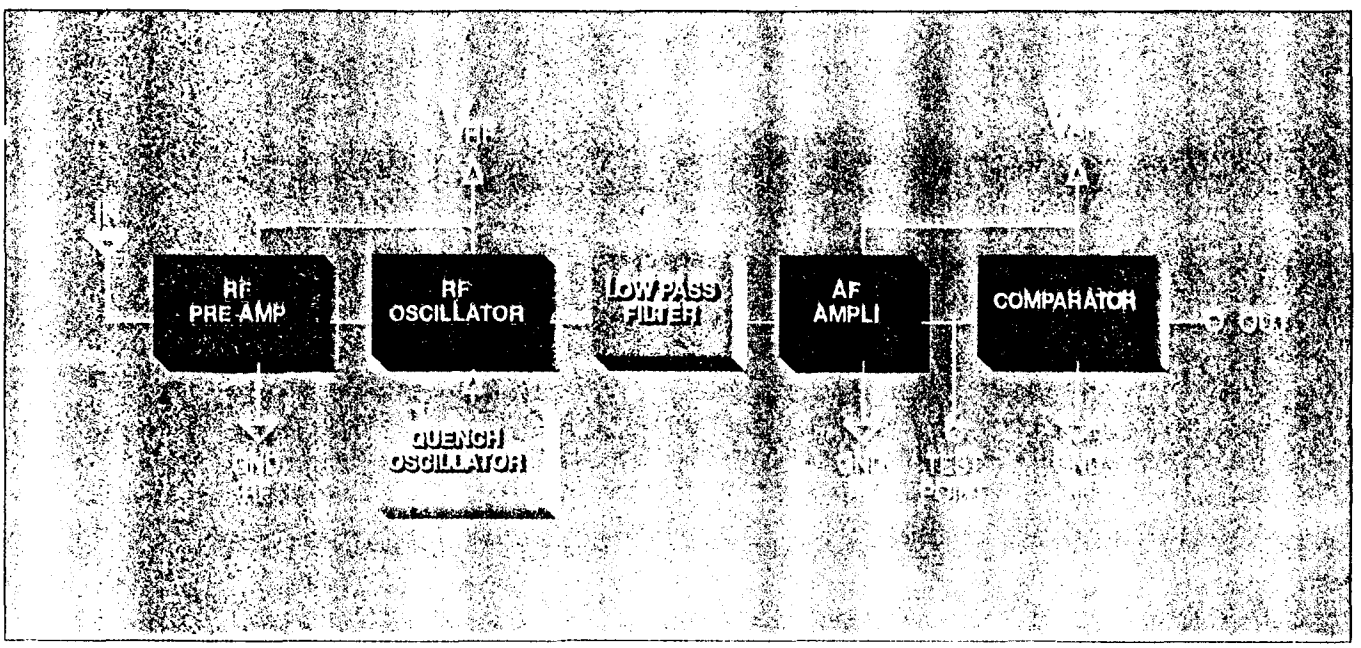
The RR3-...is a super regenerative data receiver. Sensitivity typically exceeds -100dBm (2.2uVrms) when matched to 50 ohm.

It shows high frequency stability also in presence of mechanical vibrations, manual handling and in a wide range of temperature. The frequency accuracy is very high thanks to laser trimming process. PATENTED.

Applications

- Wireless security systems
- Car alarm systems
- Immobilisers
- Garage door openers
- Remote gate controls
- Sensor reporting

BLOCK DIAGRAM



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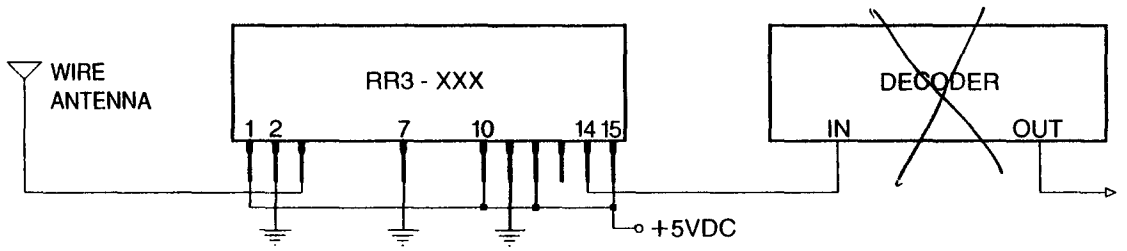
ELECTRICAL CHARACTERISTICS

Ta = 25 °C unless otherwise specified

	CHARACTERISTICS	MIN	TYP	MAX	UNIT
Vrf	RF Supply Voltage	4.5	5	5.5	VDC
Vaf	AF Supply Voltage	4.5	5	5.5	VDC
Is	Supply Current		2.5	3	mA
Fw	Working Frequency	200		450	MHz
	Tuning Tolerance		± 0.2	± 0.5	MHz
Bw	- 3dB Band-Width		± 2	± 3	MHz
	Max Data Rate			2	KHz
	RF Sensitivity (100% AM)	- 100	- 105		dBm
	Level of Emitted Spectrum		- 65	- 60	dBm
ol	Low-Level Output Voltage			0.6	V
Voh	High-Level Output Voltage	4.5			V
Top	Operating Temperature Range	- 25		+ 80	°C
Tstg	Storage Temperature Range	- 30		+ 85	°C

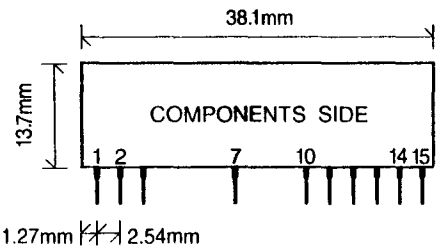
TYPICAL APPLICATION FOR APPROVAL



PIN CONFIGURATIONS

pin 1	RF+Vcc	pin 9	NC
pin 2	RF GND	pin 10	AF +Vcc
pin 3	IN	pin 11	AF GND
pin 4	NC	pin 12	AF +Vcc
pin 5	NC	pin 13	Test Point
pin 6	NC	pin 14	OUT
pin 7	RF GND	pin 15	AF +Vcc
pin 8	NC		

MECHANICAL DIMENSIONS



telecontrolli

UNI EN 29002 CERTIFIED QUALITY SYSTEM

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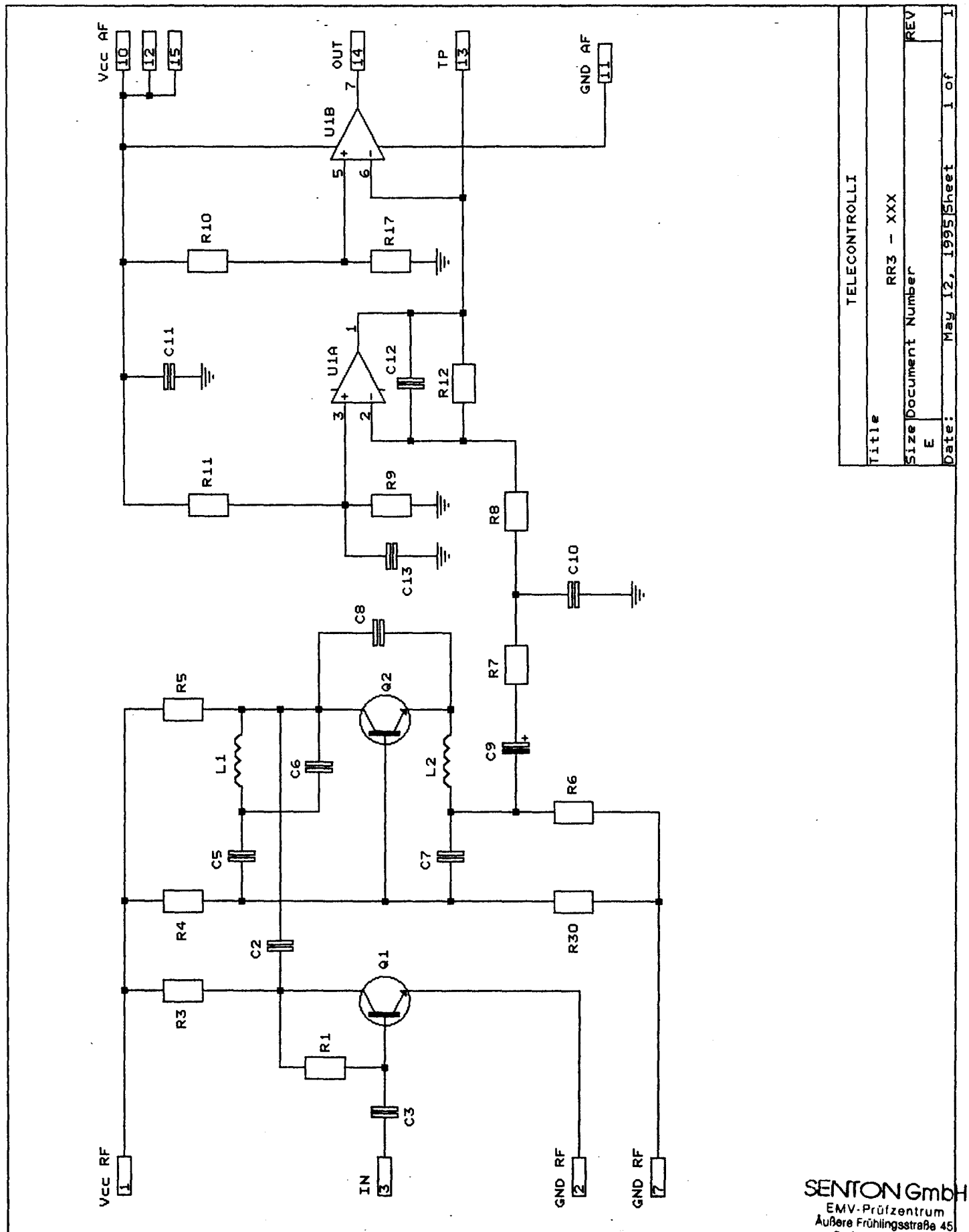
SALES OFFICE — *Via Lodovico Mancini 1, 20129 Milano*
Tel: + 39 2 5516417 Telex: 331604 Fax: + 39 2 55180212



SENTON GmbH
EMV-Prüfzentrum
Äußere Frühlingsstraße 45
94315 Straubing
Telefon 09421/42081

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Super Regenerative Radio Receiver

RR3 - 433.92

Part List

REF		Description		Geometry
R1	78K	+/-2%		
R3	1.5K	+/-2%		
R4	171K	+/-1%		
R5	10K	+/-2%		
R6	5.08K	+/-1%		
R7	4.7K	+/-2%		
R8	1K	+/-2%		
R9	56K	+/-1%		
R10	56K	+/-1%		
R11	56K	+/-1%		
R12	750K	+/-2%		
R17	53.5K	+/-1%		
R30	120K	+/-1%		
C2	1.8pF	+/- 0.25pF	50V	08.05
C3	220pF	+/-5%	50V	08.05
C5	33pF	+/-5%	50V	08.05
C6	3.3pF	+/- 0.25pF	50V	08.05
C7	390pF	+/-5%	50V	08.05
C8	3.9pF	+/- 0.25pF	50V	08.05
C9	2.2uF	+/-20%	7V	CT5E
C10	10nF	+/-10%	50V	08.05
C11	100nF	-20+80%	25V	08.05
C12	33pF	+/-5%	50V	08.05
C13	3.3nF	+/-10%	50V	08.05
L2	10uH	+/-10%		3.2X2.5
T1		BFS17P		SOT 23
T2		BFS17P		SOT 23
IC1		LM 2904		SO8

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