

EMC EMISSION - TEST REPORT

UNITED STATES STANDARD 47 CFR PART 15, SUBPART E

Test Report File No.	:	SC106727-06	Date of Issue:	11 October 2001
			Revision Date:	<u>22 March 2002 (Rev. 1.2)</u>
Model / Serial No.	:	40400-XX¹ / ENGR UNIT #1		
Product Type	:	UNII Radio FCC ID: HZB-US58-B60²		
Applicant	:	WESTERN MULTIPLEX CORPORATION		
Manufacturer	:	WESTERN MULTIPLEX CORPORATION		
License holder	:	WESTERN MULTIPLEX CORPORATION		
Address	:	1196 Borregas Avenue		
	:	Sunnyvale, CA 94089		
Test Result	:	☒ Positive³ ☐ Negative		
Test Project Number	:			
Reference(s)	:	<u>SC106727-06</u>		
Total pages - Test Report	:	<u>176</u>		

- (1) 40400-25 (20 megabytes) and 40400-65 (20 to 60 megabytes)
 (2) References to HZB-U58-B60 in the report should be HZB-US58-B60.
 (3) See General Remarks.

NOTE: All test equipment used during testing is calibrated and traceable to NIST.

TÜV Product Service reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV Product Service, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV Product Service, Inc. issued reports.

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EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to the following regulations:

- ☐ - EN 50081-1 / 1991
- ☐ - EN 55011 / 1998
 - ☐ - Group 1
 - ☐ - Class A
- ☐ - EN 55014 / 1993
 - ☐ - Group 2
 - ☐ - Class B
- ☐ - EN 55022 / 1987
 - ☐ - Household appliances and similar
 - ☐ - Portable tools
 - ☐ - Semiconductor devices
- ☐ - EN 55022 / 1998
 - ☐ - Class A
 - ☐ - Class B
- ☐ - VCCI
 - ☐ - Class A
 - ☐ - Class A ITE
 - ☐ - Class B
 - ☐ - Class B ITE
- - 47 CFR Part 15, Subpart E
 - - 15.407 (a)
 - - 15.407 (a) (5)
 - - 15.407 (a) (6)
 - - 15.407 (b)
 - - 15.205
 - - 15.207
 - - 15.209
 - - 15.407 (c)
- ☐ - AS/NZS 3548: 1995
 - ☐ - Class A
 - ☐ - Class B
- ☐ - CISPR 11 (1997)
 - ☐ - Group 1
 - ☐ - Class A
 - ☐ - Group 2
 - ☐ - Class B
- ☐ - CISPR 22 (1997)
 - ☐ - Class A
 - ☐ - Class B

Environmental Conditions In The Laboratory:

	<u>Actual</u>
Temperature:	: 23 °C
Relative Humidity:	: 50 %
Atmospheric Pressure:	: 100.0 kPa

Power Supply Utilized:

Power supply system : 115 V / 60 Hz / 1 ϕ

Symbol Definitions:

- - Applicable
- - Not Applicable

Emissions Test Conditions: Output Power

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
HP8900D	802	Peak Power Meter	Hewlett Packard	3607U00653	04/02

Result :

■ - Pass

☐ - Fail

Remarks: _____

Emissions Test Conditions: 26 dB Bandwidth

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

■ - Western Multiplex Test Facility

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
E4404B	--	Agilent Spectrum Analyzer ESA-E Series 9kHz-6.7GHz	Agilent Technologies	US41191299	06/02

Result :

■ - Pass

☐ - Fail

Remarks: Tested at customer's test facility. For calculation purpose.

Emissions Test Conditions: Power Density

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

■ - Western Multiplex Test Facility

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
E4404B	--	Agilent Spectrum Analyzer ESA-E Series 9kHz-6.7GHz	Agilent Technologies	US41191299	06/02

Result :

■ - Pass

☐ - Fail

Remarks: Tested at customer's test facility.

Emissions Test Conditions: The Ratio of the Peak Excursion of the Modulation Envelope to the Peak Transmit Power

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

■ - TR-2, Test Room

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
HP8566B	407	Spectrum Analyzer 100Hz-22GHz with Display	Hewlett Packard	2311A02209 2542A12099	02/02

Result :

■ - Pass

☐ - FailRemarks: _____

Emissions Test Conditions: Out of Band Antenna Conducted Emission

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

■ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
HP8566B	407	Spectrum Analyzer 100Hz-22GHz with Display	Hewlett Packard	2311A02209 2542A12099	02/02
HP8900D	802	Peak Power Meter	Hewlett Packard	3607U00653	04/02
HP8445B	809	Automatic Preselector	Hewlett Packard	1442A01127	11/01
HP84811A	801	Power Sensor	Hewlett Packard	3318A05185	04/02
AA-190-10.00.0	655	10' Cable	United	--	09/02
AWT-18505	6358	PreAmp 6GHz-18GHz	Microwave Avantek	F12863 8447	--
HP11870K	652	Mixer 18-26.5 GHz	Hewlett Packard	3003A05400	--
HP11970A	653	Mixer 26.5-40 GHz	Hewlett Packard	3003A07466	--
HP11975A	716	Amplifier 2-8 GHz	Hewlett Packard	2517A00639	03/02
HP8481A	726	Power Sensor	Hewlett Packard	1926A27528	08/02
HP437A	572	Power Meter	Hewlett Packard	3125U19308	04/02

Result :

■ - Pass

☐ - Fail

Remarks: _____

Emissions Test Conditions: Band Edge Antenna Conducted Emission

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

■ - Western Multiplex Test Facility

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
E4404B	--	Agilent Spectrum Analyzer ESA-E Series 9kHz-6.7GHz	Agilent Technologies	US41191299	06/02

Result :

■ - Pass

☐ - FailRemarks: Tested at customer's test facility.

Emissions Test Conditions: Radiated Emission in Restricted Bands

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

- - Roof (Small Open Area Test Site) (Calibration Due Date: 16 July 2002)
- - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber

Testing was performed at a test distance of :

- - 3 meters
- - 1 meter

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
8566B	823	Spectrum Analyzer	Hewlett Packard	2332A02751	07/02
AMF-5D-010180-35-10P	719	PreAmp, 2GHz-20GHz	TUV PS	549460	04/02
3115	251	Antenna, Horn	Electro Mechanics Co	2595	10/02
HP8586B	407	Spectrum Analyzer	Hewlett Packard	2311A02209	02/02
HP11970K	652	Mixer	Hewlett Packard	3003A05400	--
12A18115300	6377	Antenna, Horn 18GHz-26 GHz	MI Technologies	21554MB	--

Result :

- - Pass
- ☐ - Fail

Remarks: No signals were measurable at 3 meters. EUT moved to 1 meter distance. Special limit adjusted for 1 meter.

Emissions Test Conditions: AC Conducted Emission

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
9252-50-R-24-BNC	458	LISN, 50 μ H /250 μ H/50 Ω / 0.25 μ F	Solar Electronics Co.	941719	04/02
ESHS 30	459	EMI Test Receiver	Rohde & Schwarz	832354/004	11/01
CAT-20	602	20 dB Attenuator	Mini-Circuits	--	09/02

Result :

■ - Pass

☐ - FailRemarks: _____

Emissions Test Conditions: Radiated Emission from Digital Part

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

■ - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego (Calibration Due Date: 12 July 2002)

Testing was performed at a test distance of :

■ - 3 meters

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
LPB 2520/A	739	Antenna Bilog	Antenna Research	1170	04/02
ESVS 30	427	EMI Test Receiver	Rohde & Schwarz	830350/006	11/01

Result :

■ - Pass

☐ - Fail

Remarks:

Emissions Test Conditions: Radiated Emission from Receiver L.O.

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

- - Roof (Small Open Area Test Site) (Calibration Due Date: 16 July 2002)
- - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego (Calibration Due Date: 12 July 2002)

Testing was performed at a test distance of :

- - 3 meters

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
LPB 2520/A	739	Antenna Bilog	Antenna Research	1170	04/02
ESVS 30	427	EMI Test Receiver	Rohde & Schwarz	830350/006	11/01
8566B	823	Spectrum Analyzer	Hewlett Packard	2332A02751	07/02
HP8445B	809	Automatic Preselector	Hewlett Packard	1442A01127	11/01
AFD3-0208-40-ST	367	PreAmp, 2GHz-8 GHz	Miteq Inc	155382	--
3115	251	Antenna, Horn	Electro Mechanics Co	2595	10/02
3146	244	Antenna	Electro Mechanics Co	1063	02/02
3115	453	Double Ridge Antenna 1GHz-18 GHz	EMCO	9412-4364	10/02

Result :

- - Pass
- ☐ - Fail

Remarks: _____

Emissions Test Conditions: Automatically Discontinue Transmission

The *EMISSIONS* measurements were performed at the following test location:

☐ - Test not applicable

■ - See Client Statement in Technical Documentation.

Result :

■ - Pass

☐ - Fail

Remarks: _____

Equipment Under Test (EUT) Test Operation Mode - Emissions Tests :

The equipment under test was operated under the following conditions during emissions testing:

- ☐ - Standby
- ☐ - Test Program (H - Pattern)
- ☐ - Test Program (Color Bar)
- ☐ - Test Program (Customer Specified)
- ☐ - Practice Operation
- ☒ - Normal Operating Mode
- ☐ - _____

Configuration of the equipment under test:

- ☐ - See Constructional Data Form in Appendix B - Page B2
- ☒ - See Product Information Form(s) in Appendix B - Page B2

The following peripheral devices and interface cables were connected during the testing:

- | | |
|---|----------------|
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - unshielded power cable | |
| ☐ - unshielded cables | |
| ☐ - shielded cables | MPS.No.: _____ |
| ☐ - customer specific cables | |
| ☐ - _____ | |

GENERAL REMARKS:

NOTE: All photographs are representative of setup for maximum emissions.

(*) The following tests were performed by the customer at the customer's test site: 20 dB Bandwidth; Power Density; Out of Band Antenna Conducted Emission; 15.407(c) (automatically discontinue transmission). See customer's statements of conformity in Technical Documentation appendix.

(*) Radiated Emission in Restricted Bands - no signals were measurable at 3 meters. EUT moved to 1 meter distance. Special limit adjusted for 1 meter.

SUMMARY:

All tests according to the regulations cited on page 3 were

■ - Performed*

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 3.*

□ - **Does not** fulfill the general approval requirements cited on page 3.

Statement of Measurement Uncertainty

The data and results referenced in this document are true and accurate. The measurement uncertainty is calculated to be ± 2 dB for conducted emissions and ± 4 dB for radiated emissions.

Equipment Received Date: 24 September 2001

Testing Start Date: 24 September 2001

Testing End Date: 04 October 2001

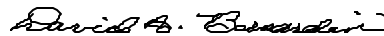
- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:



Jim Owen
(EMC Chief Engineer)

Responsible Engineer:



Dave Bernardin
(EMC Engineer)

Technical Documentation

Test Data Sheets
and
Test Setup Drawing(s)

QAM 16 Modulation				
Frequency MHz	Output Power mW	Output Power dBm	EIRP Limit dBm	Max Gain dBi
Ch 5 5809.56	49.7	17.0	36	19.0
Ch 2 5768.06	49.3	16.9	36	19.1
Ch 0 5740.40	48.8	16.9	36	19.1

QAM 8 Modulation				
Frequency MHz	Output Power mW	Output Power dBm	EIRP Limit dBm	Max Gain dBi
Ch 5 5809.56	49.7	17.0	36	19.0
Ch 2 5768.06	49.3	16.9	36	19.1
Ch 0 5740.40	48.8	16.9	36	19.1

QPSK 3/4 Modulation				
Frequency MHz	Output Power mW	Output Power dBm	EIRP Limit dBm	Max Gain dBi
Ch 5 5809.56	49.7	17.0	36	19.0
Ch 2 5768.06	49.3	16.9	36	19.1
Ch 0 5740.40	48.8	16.9	36	19.1

10/29/2001 17:44 5627333003

WIRELESSHOME CORP

PAGE 02

On October 4, 2001 the 26-dB bandwidth test per FCC 15.407(a) was performed at Western Multiplex, Inc., 3780 Kilroy Airport Way, Suite 500, Long Beach, CA 90806.
Model UNII Radio FCC ID: HZB-U58-B60 was tested and passed all tests.
See data and test equipment attached.



Don Leimer, V.P. Engineering

Western Multiplex
3780 Kilroy Airport Way
Suite 500
Long Beach, CA 90806
562-733-3000
562-733-3003

CUSTOMER: Western Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: 26 dB Bandwidth Part 15.407(a)

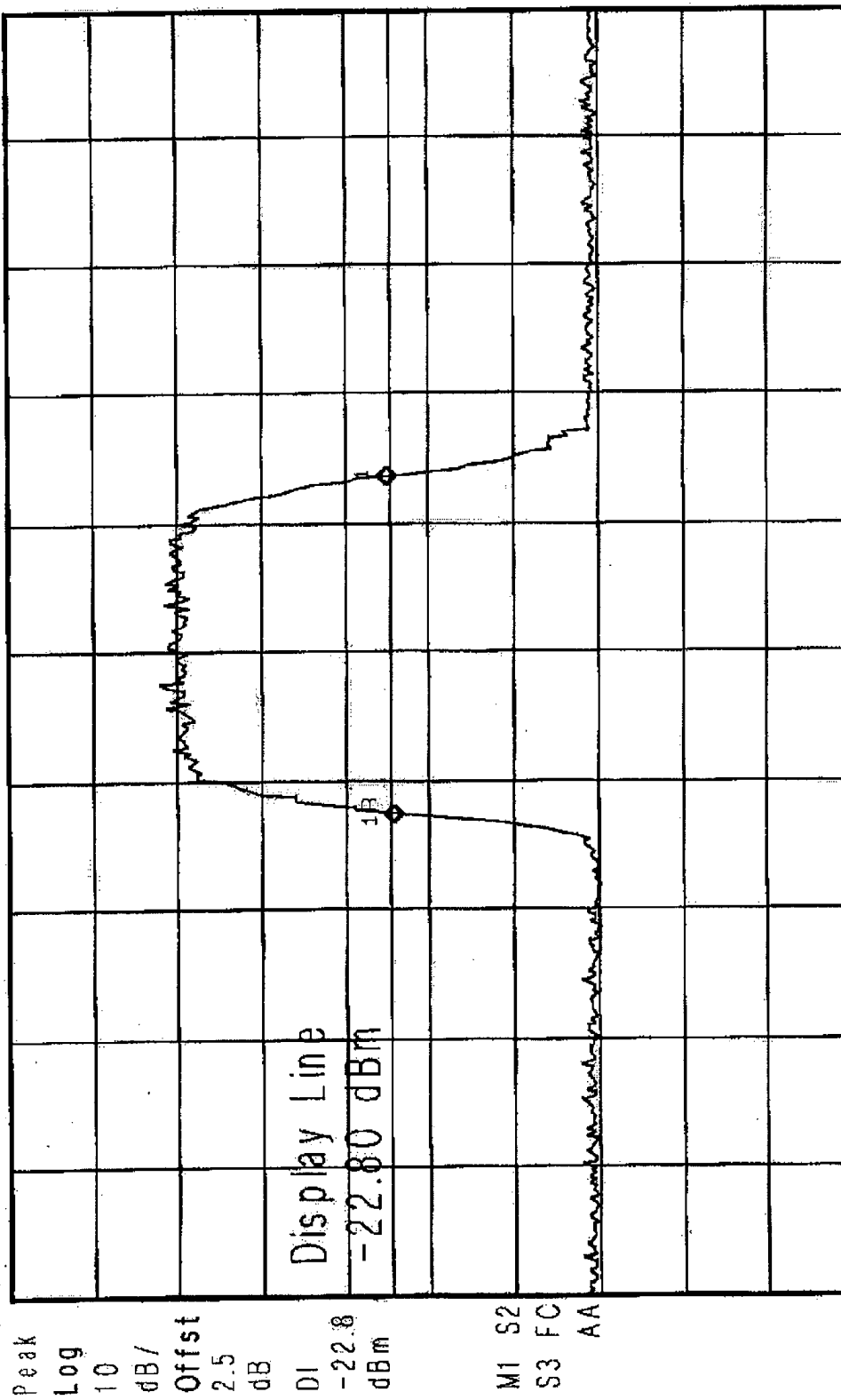
Report No. SC106727

Mode: *QAM16*
Highband CF

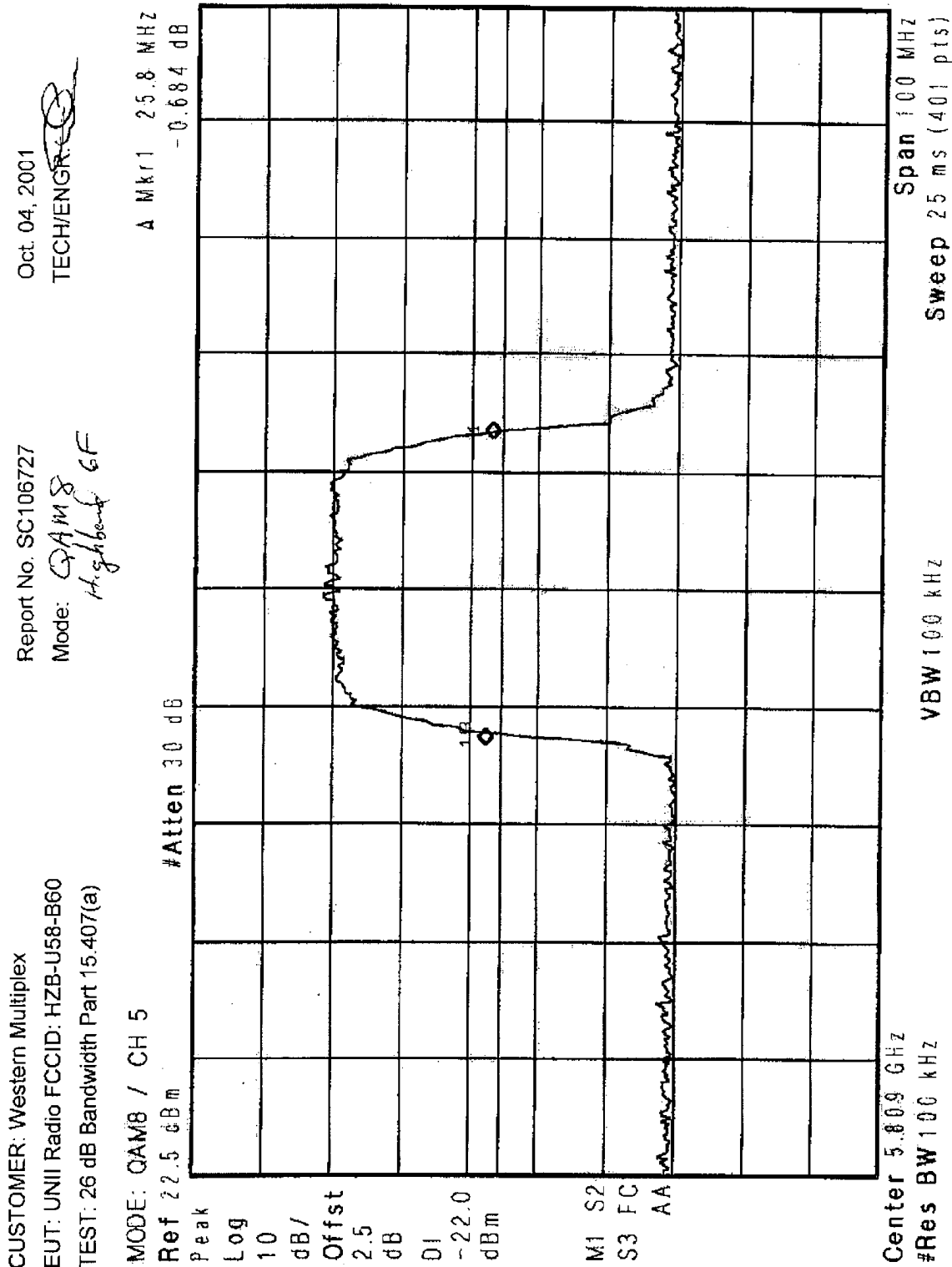
Oct. 04, 2001

TECH/ENGR: *[Signature]*

MODE: *QAM16* / CH 5
Ref 22.5 dBm
#Atten 30 dB
Δ Mkr1 26.3 MHz
0.846 dB



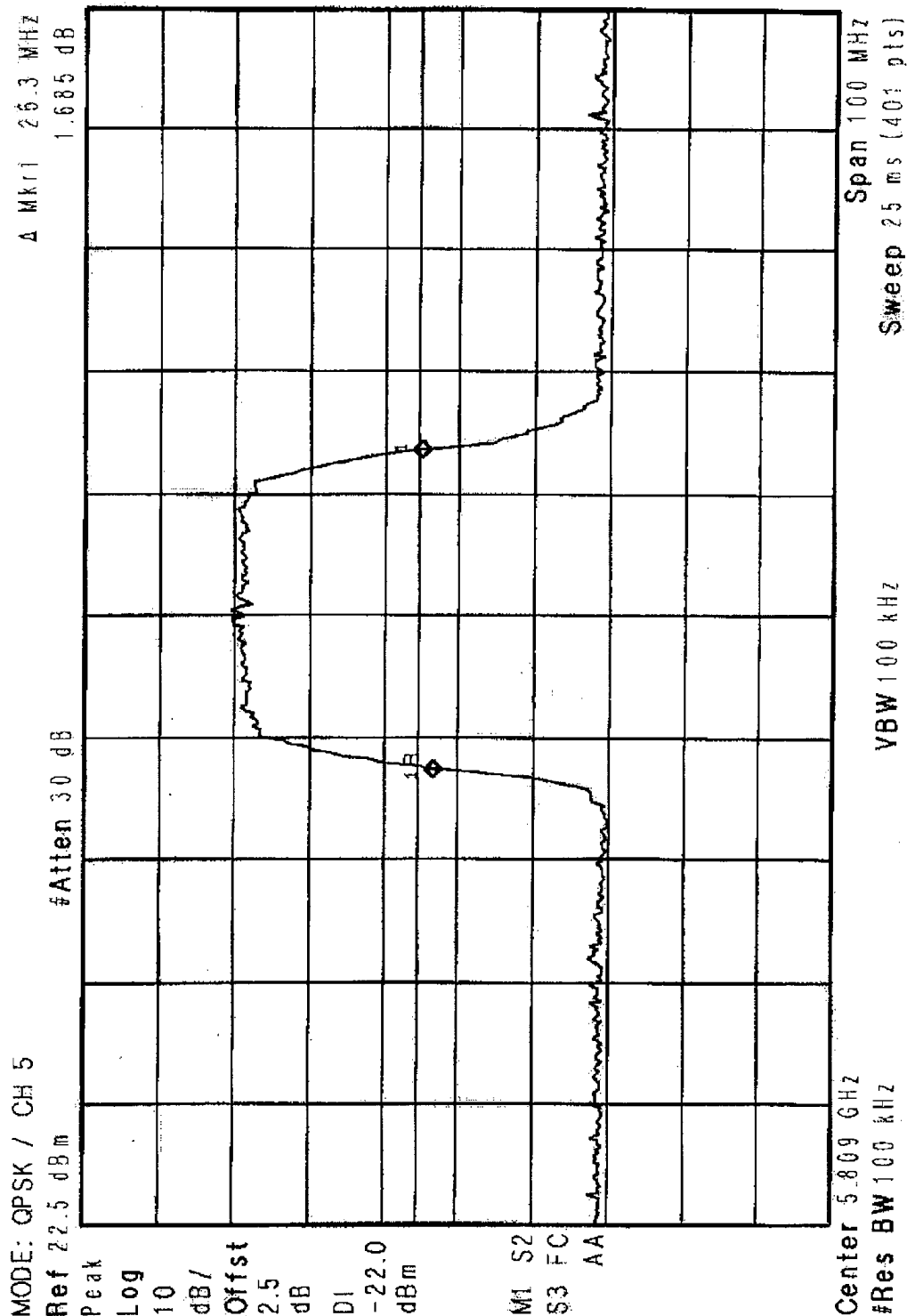
Center 5.809 GHz
#Res BW 100 kHz
VBW 100 kHz
Sweep 25 ms (401 pts)
Span 100 MHz



CUSTOMER: Western Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: 26 dB Bandwidth Part 15.407(a)

Report No. SC106727
Mode: *GPS K Highband 6F*

Oct. 04, 2001
TECH/ENGR *[Signature]*



On October 4, 2001 the Power Density test per FCC 15.407 (a) (5) was performed at Western Multiplex, Inc. 3780 Kilroy Airport Way, Suite 500, Long Beach, CA 90806.

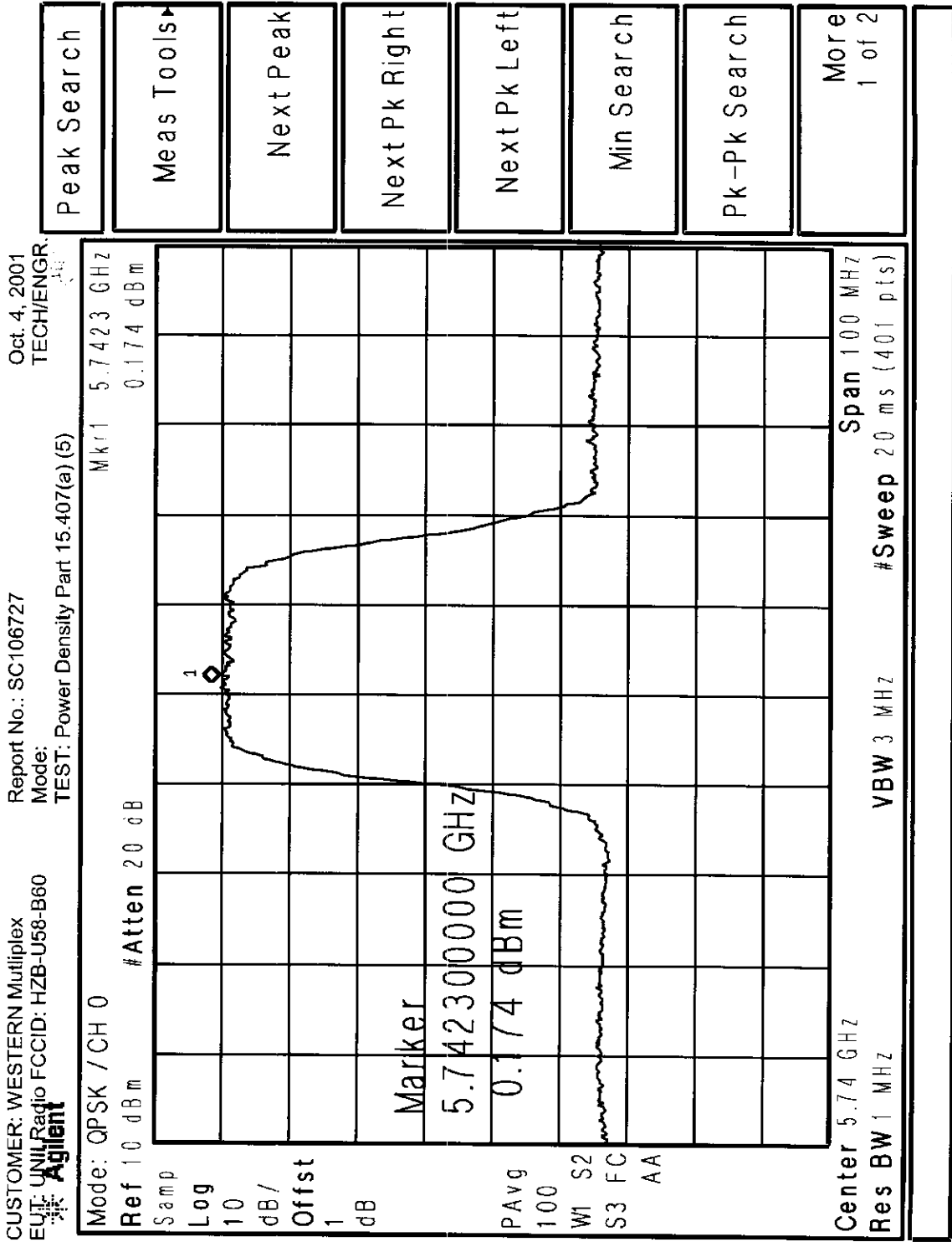
Model UNII Radio FCC ID: HZB-U58-B60 was tested and passed all tests.

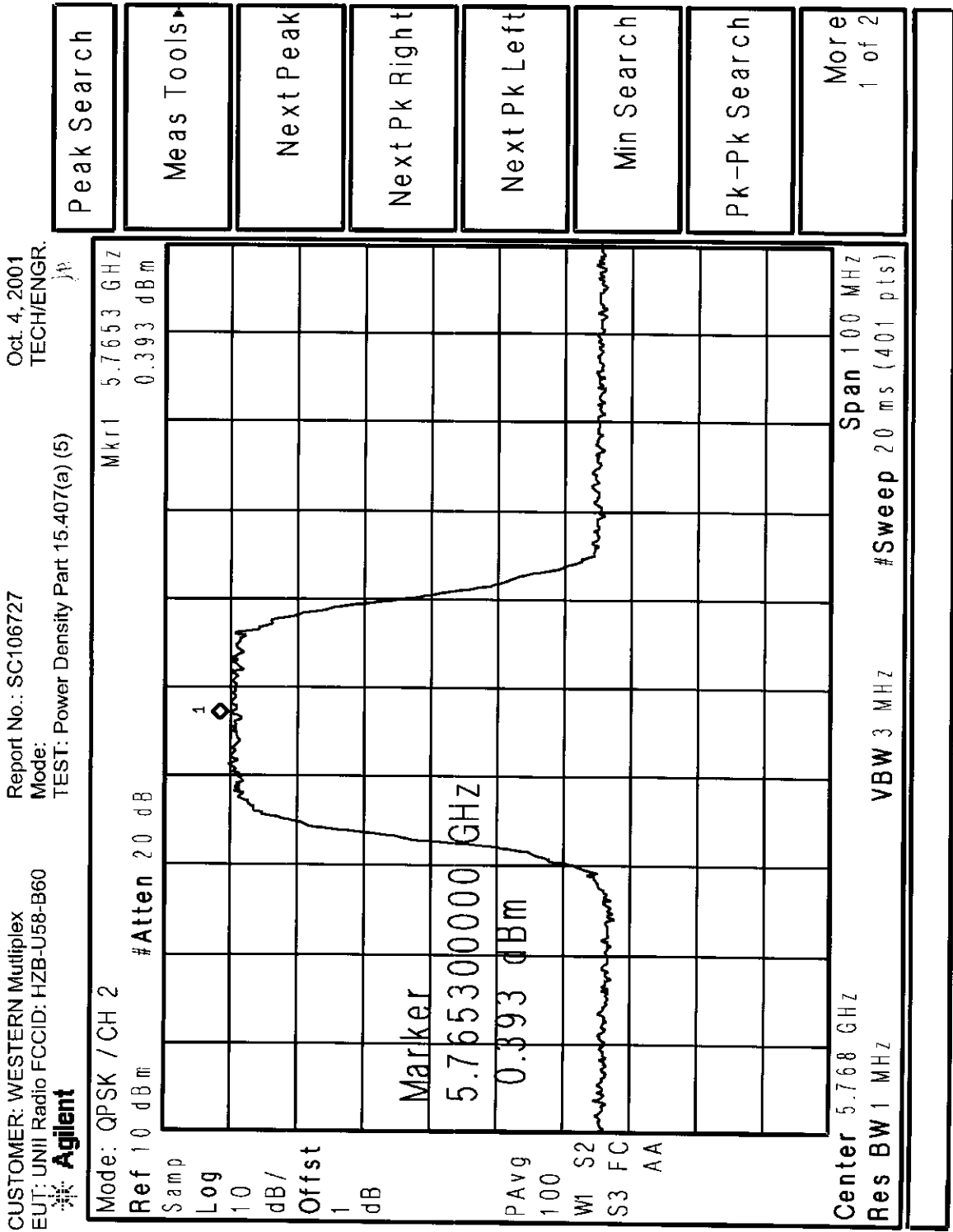
See data and test equipment attached.

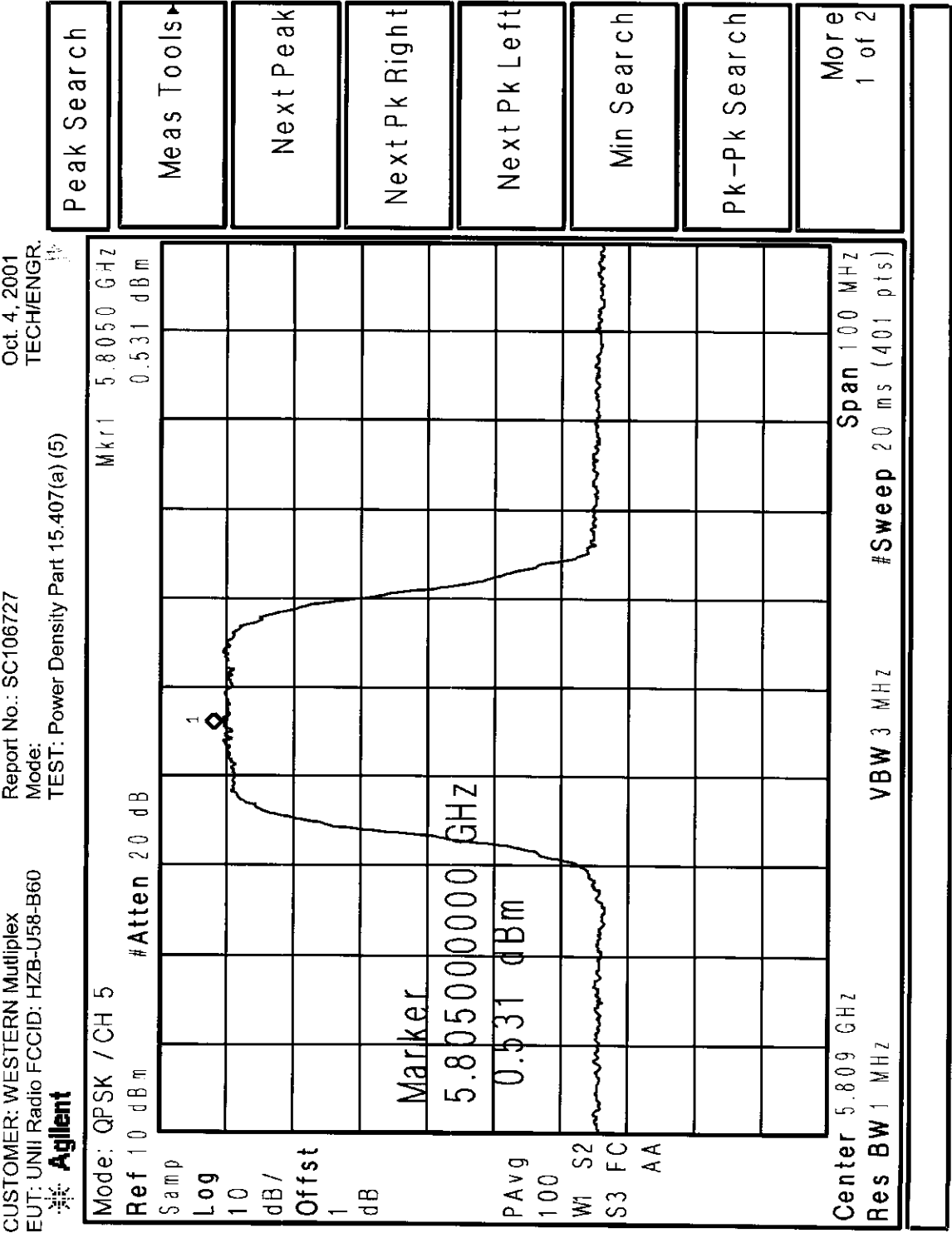


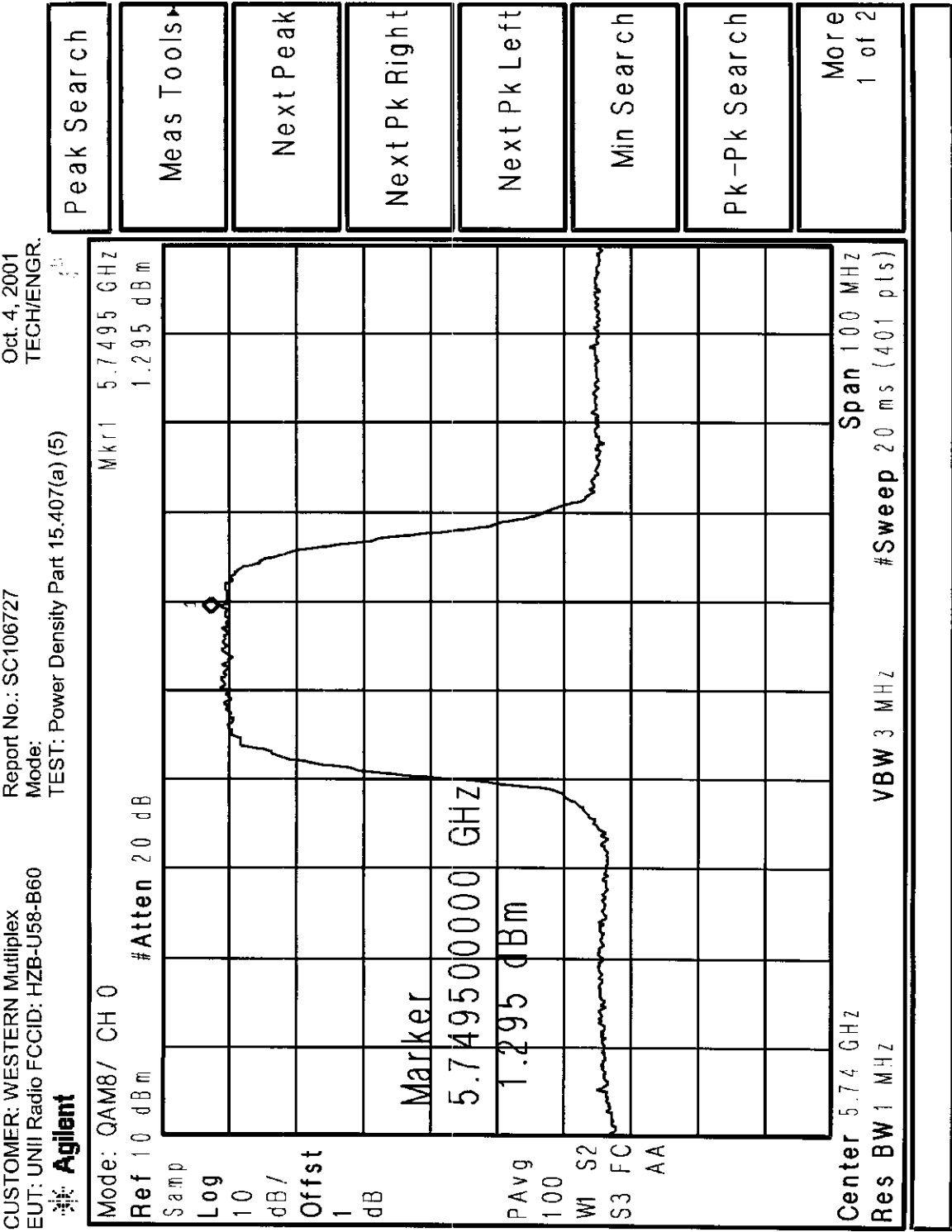
Don Leimer, V.P. Engineering

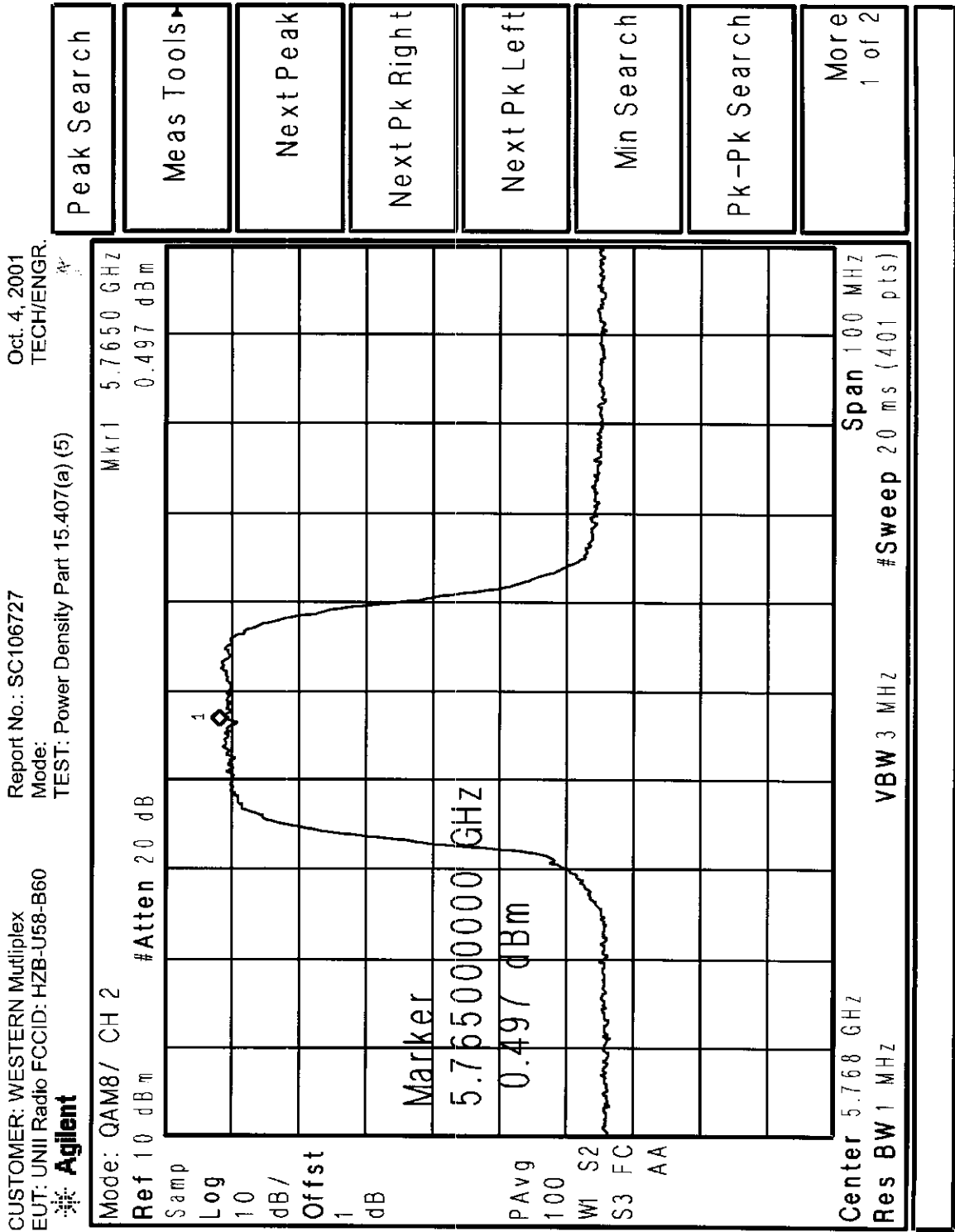
Western Multiplex
3780 Kilroy Airport Way
Suite 500
Long Beach, CA 90806
562-733-3007
562-733-3003

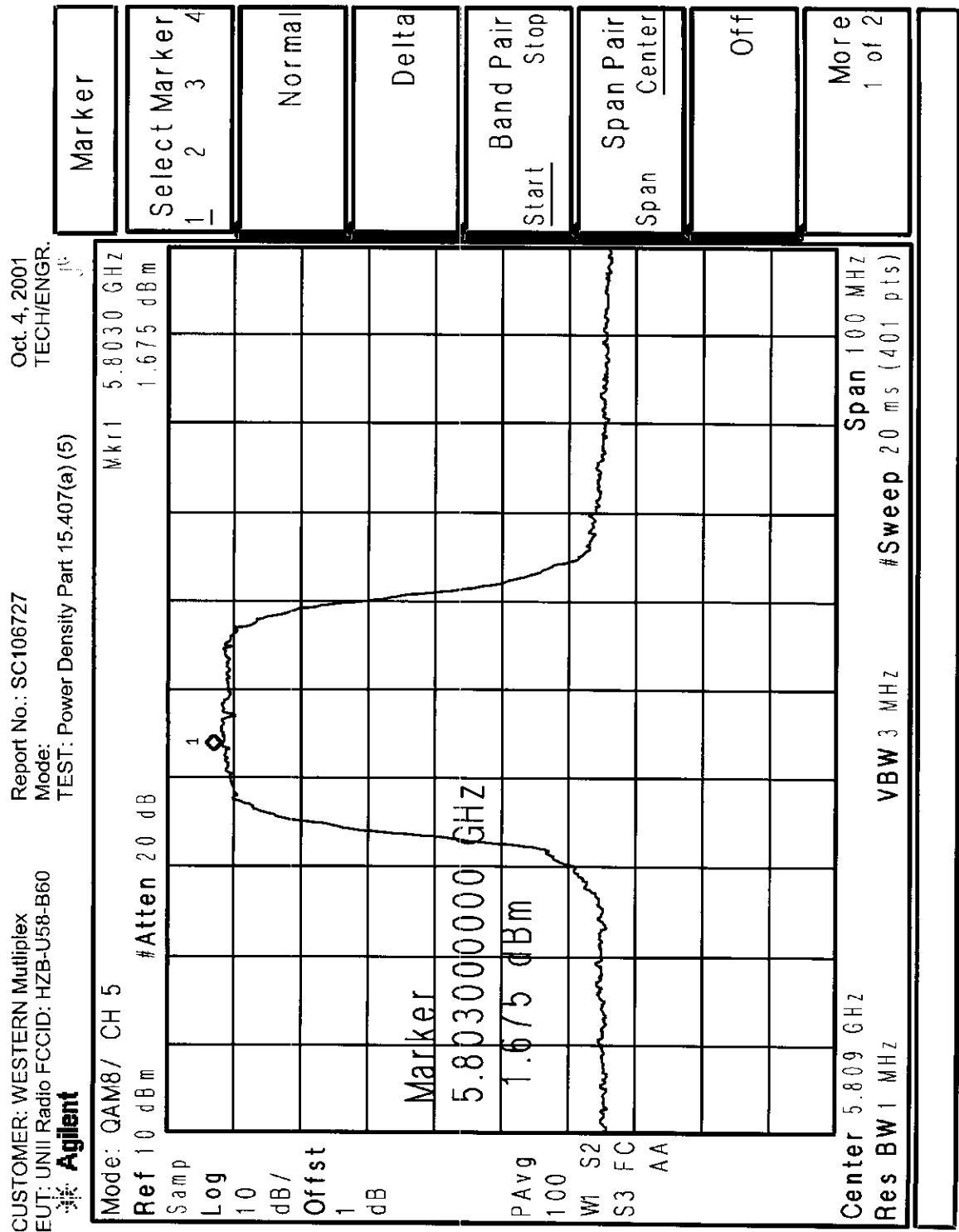


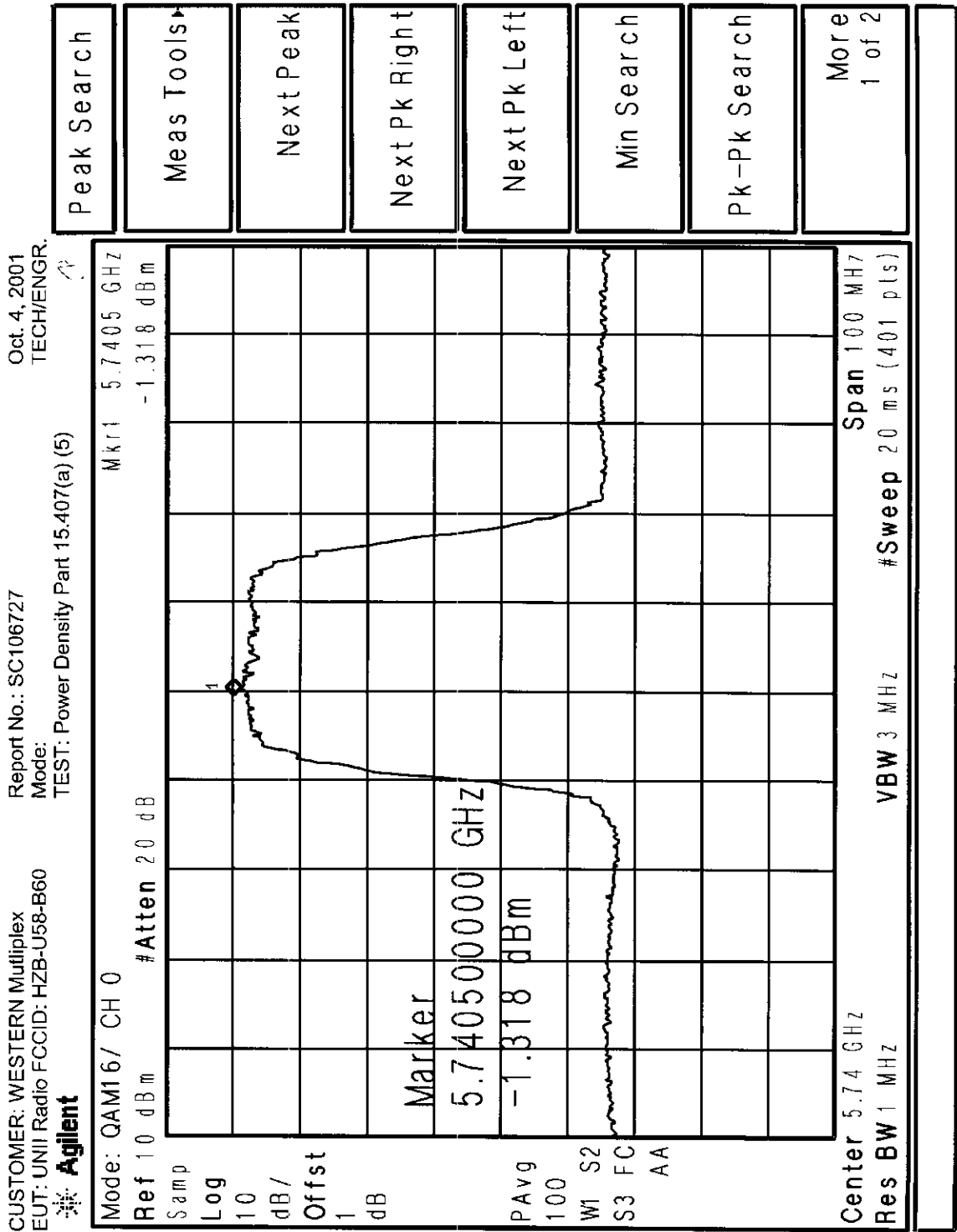


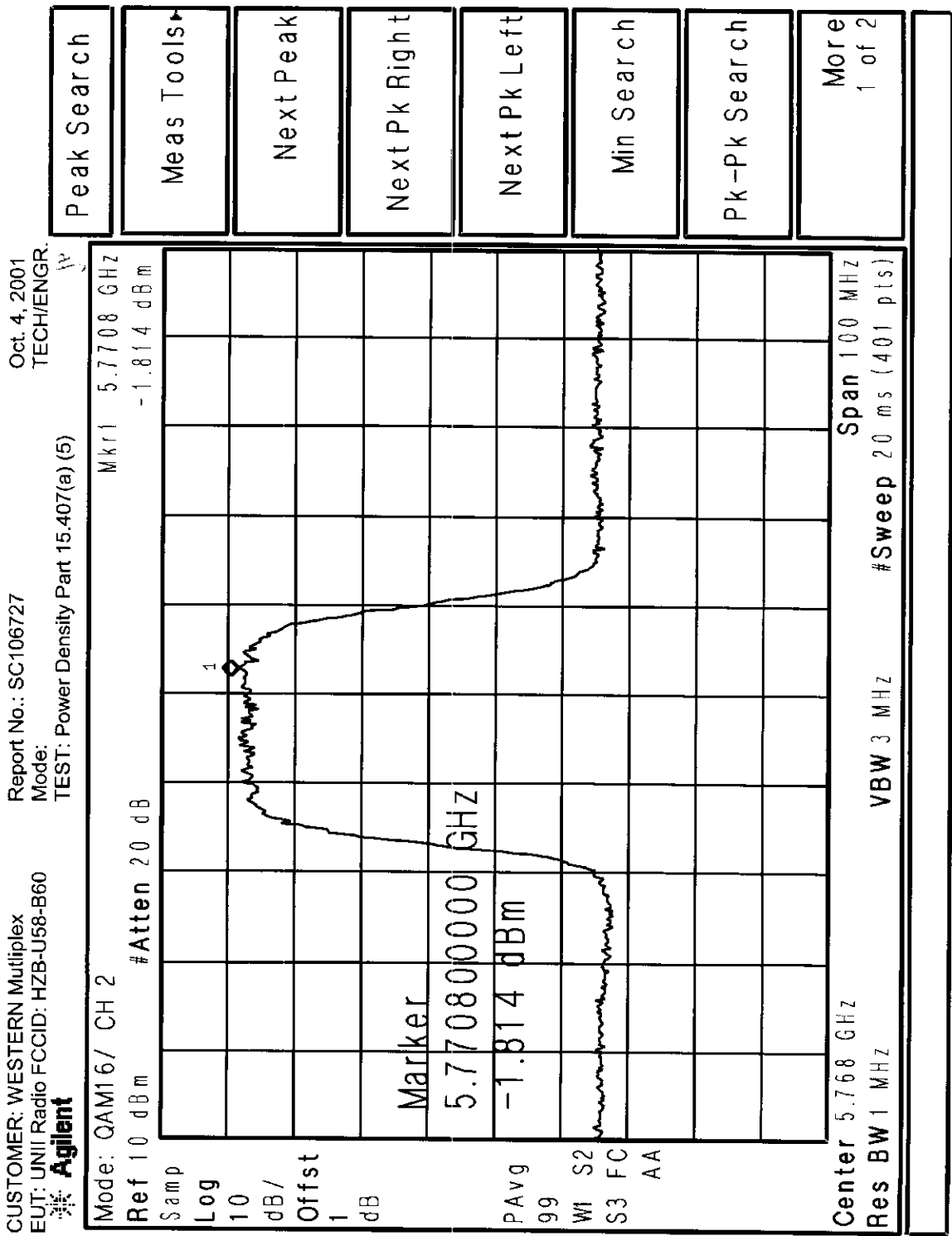


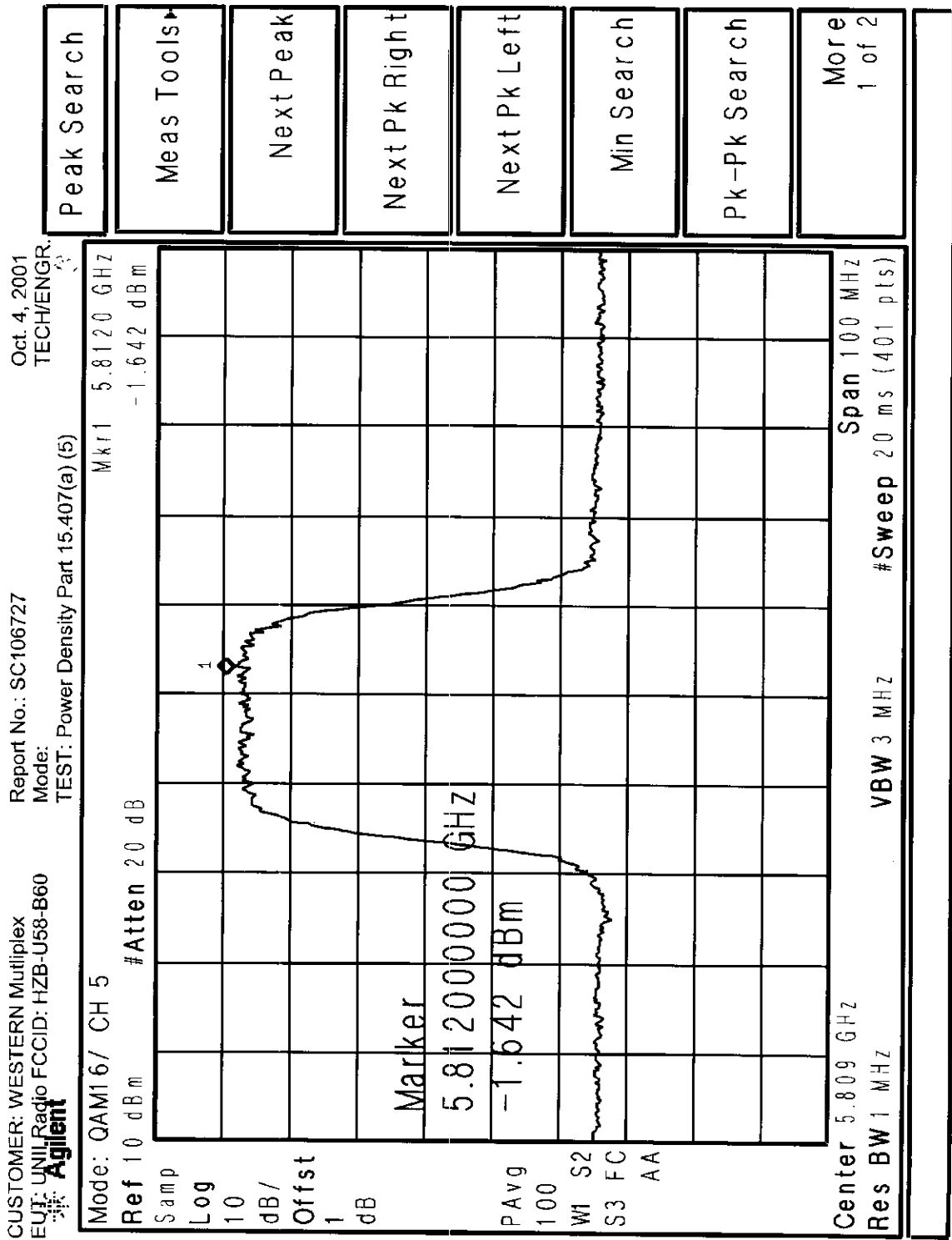


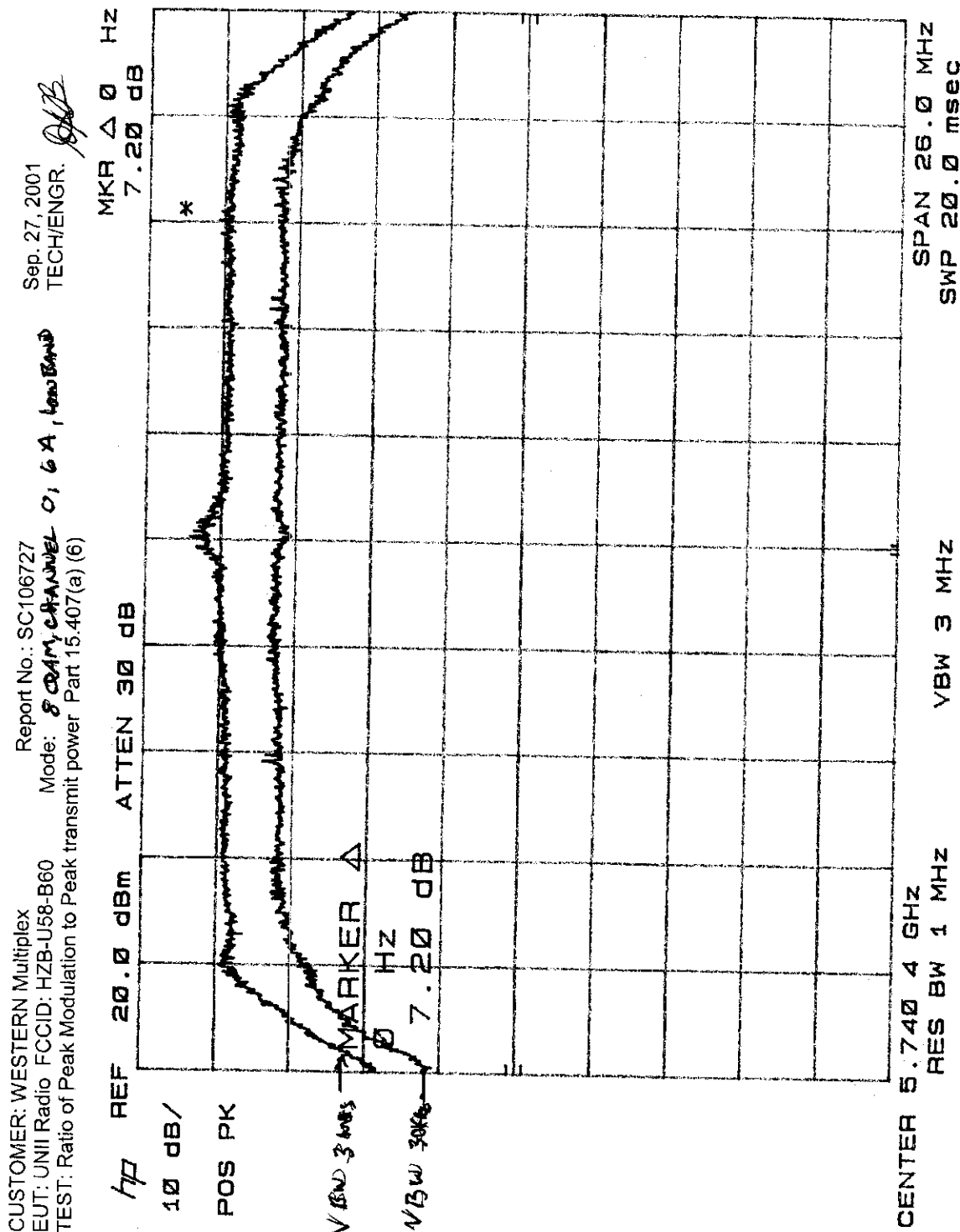


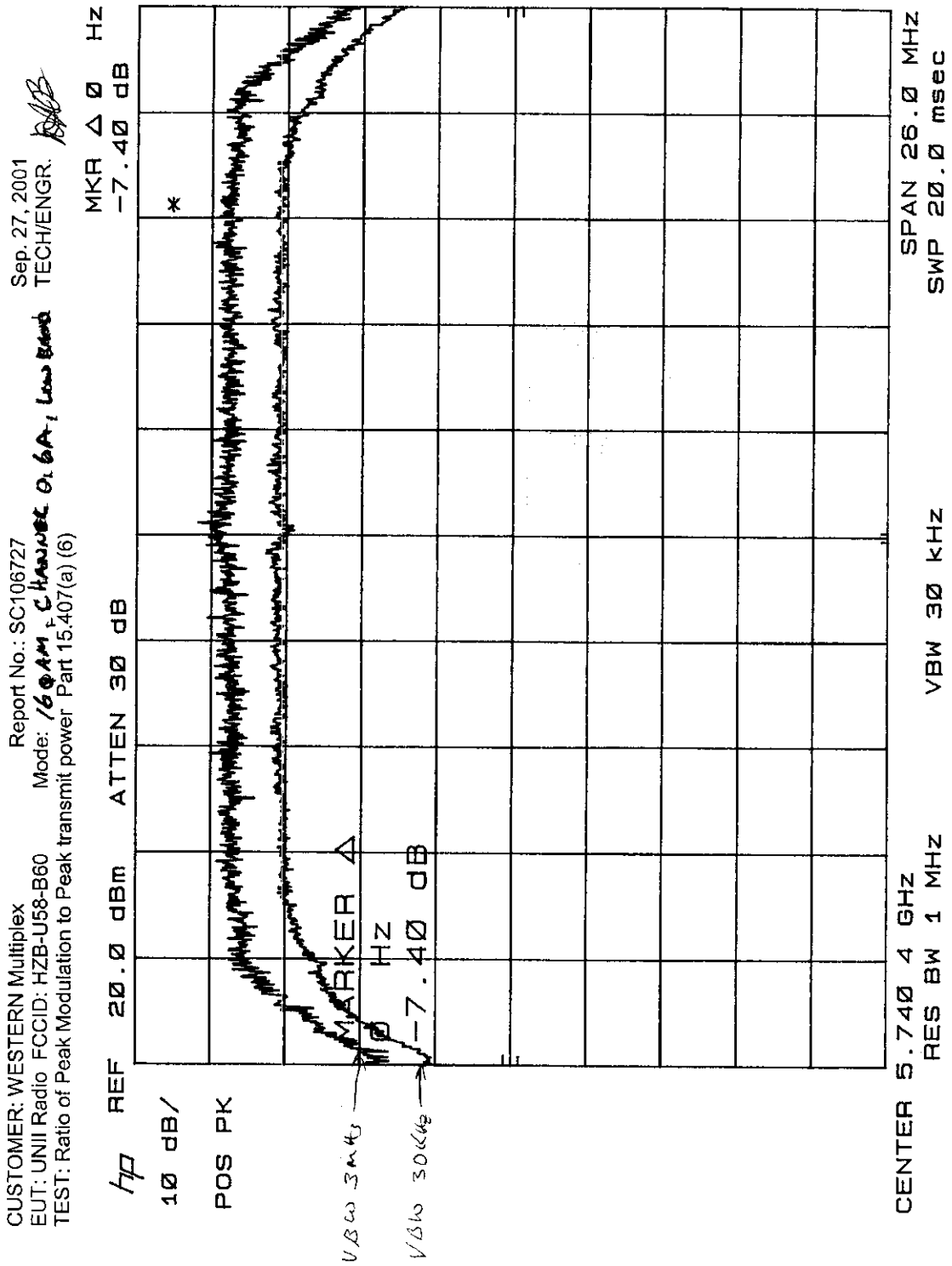


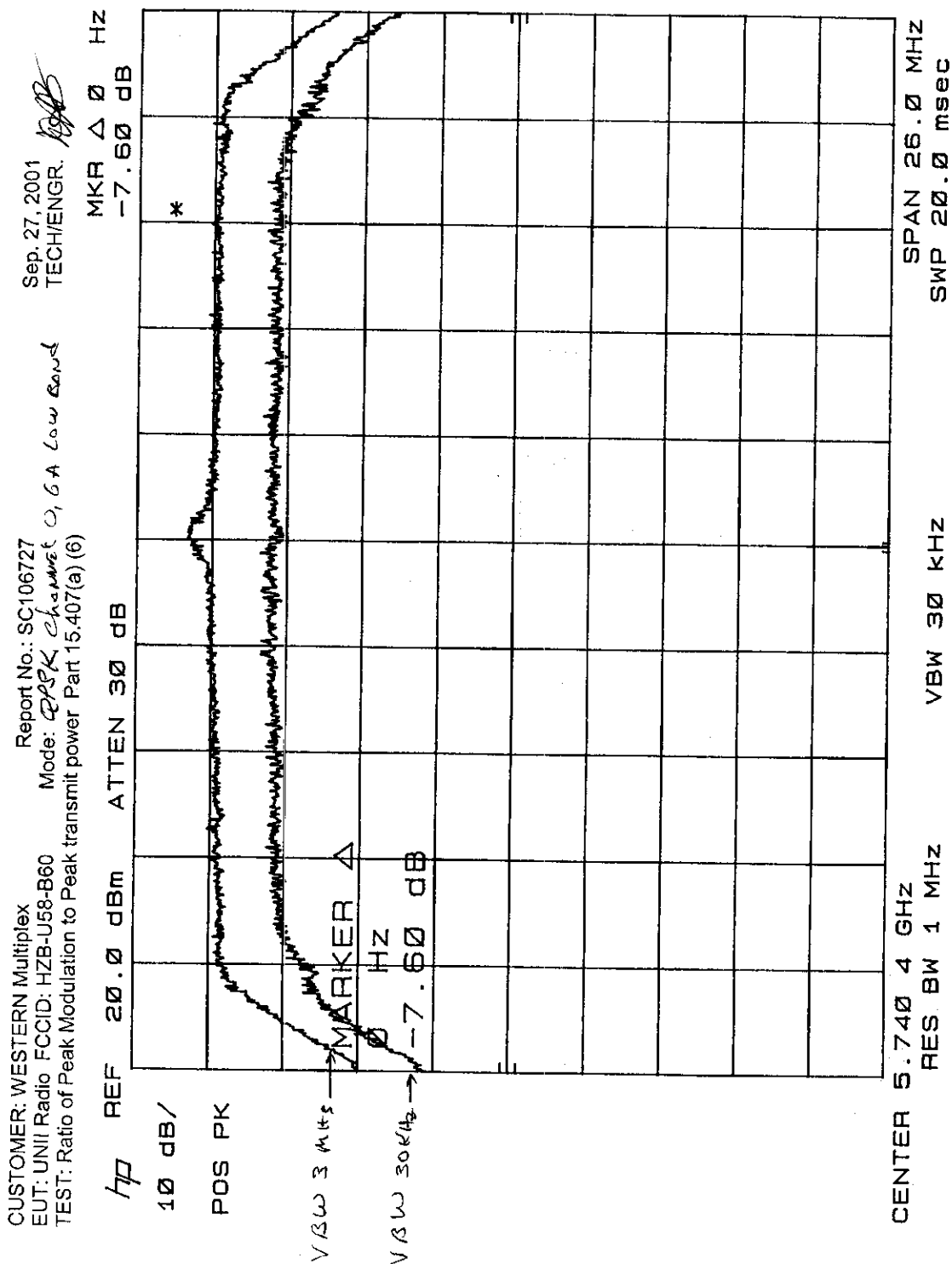


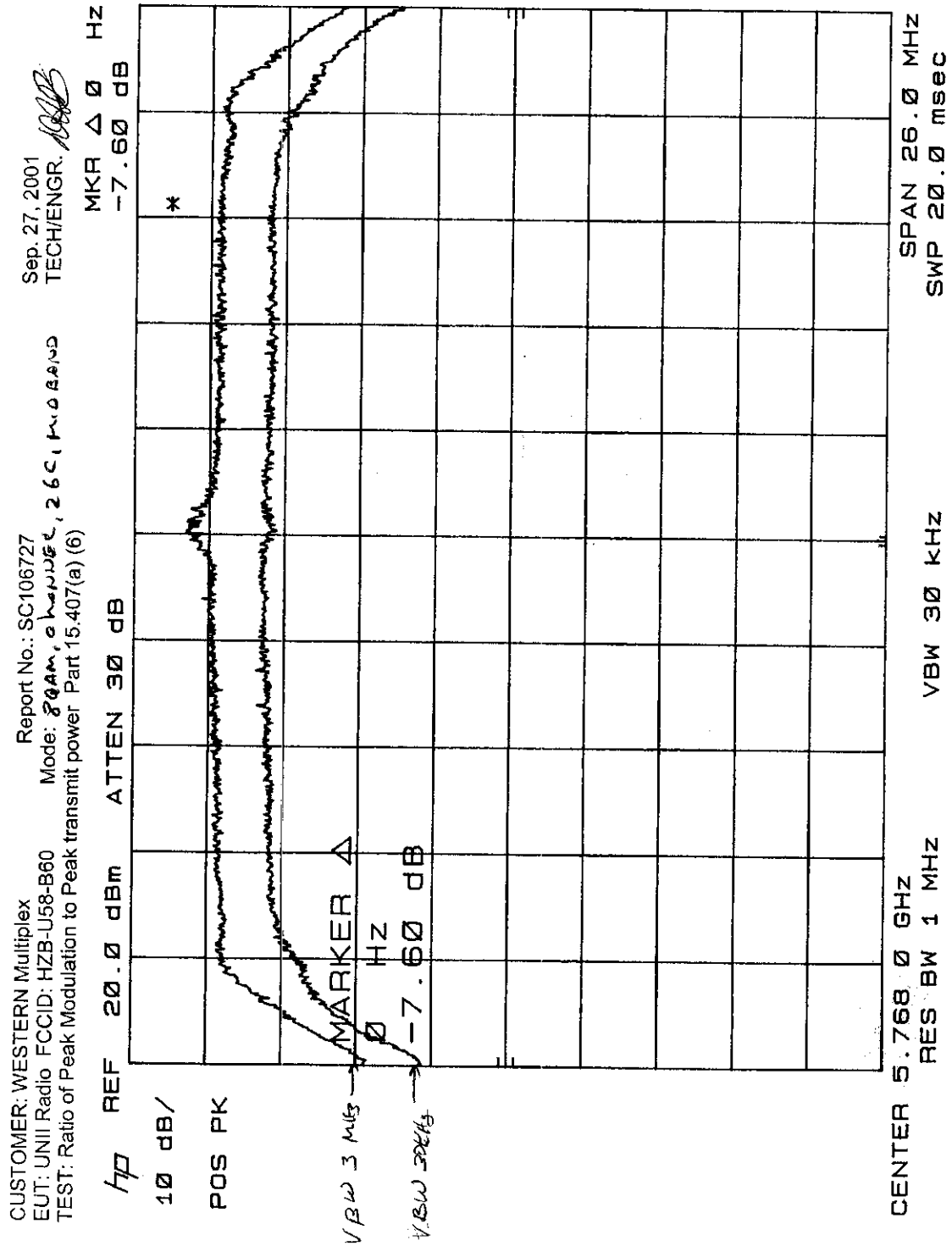


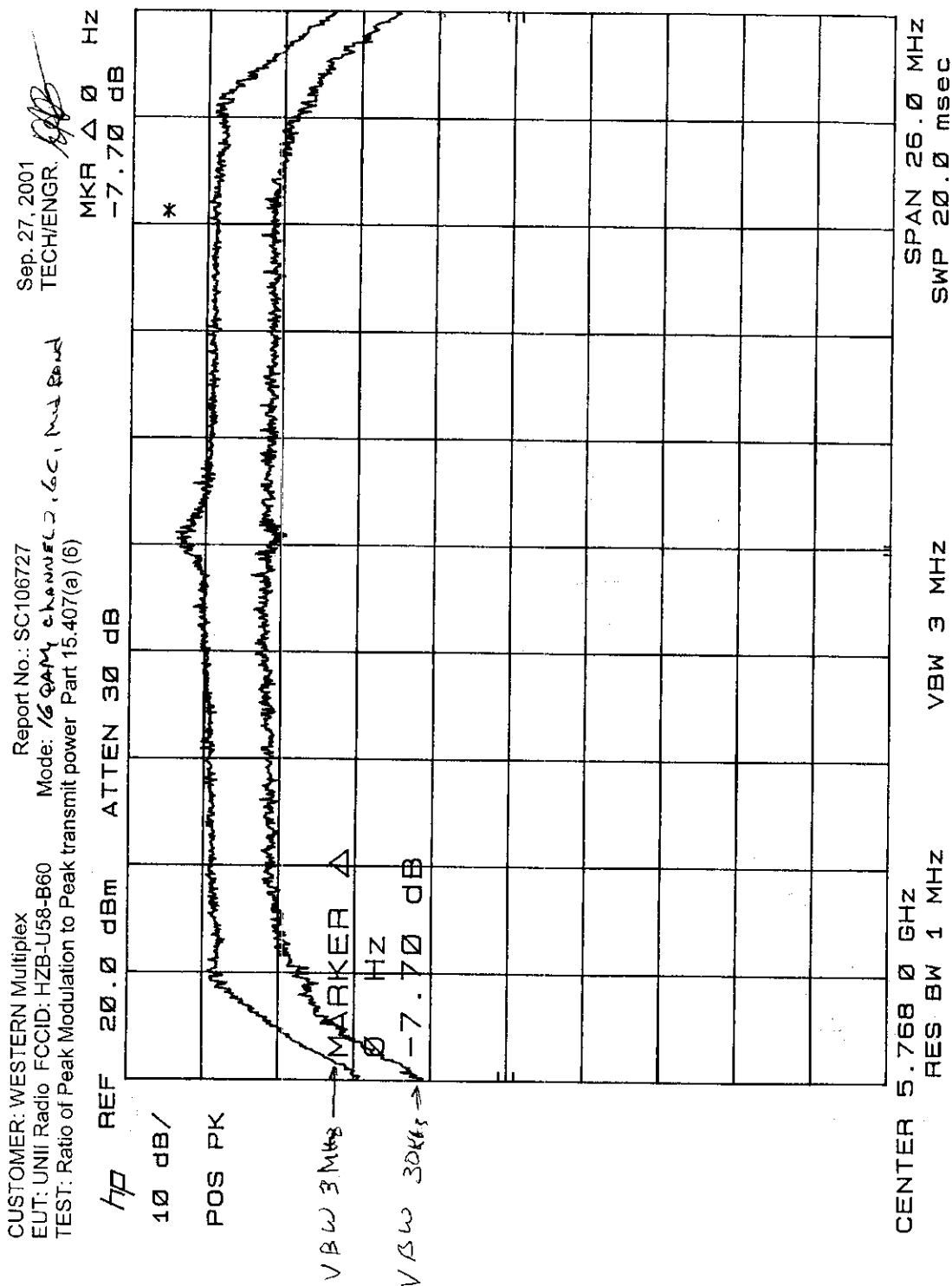


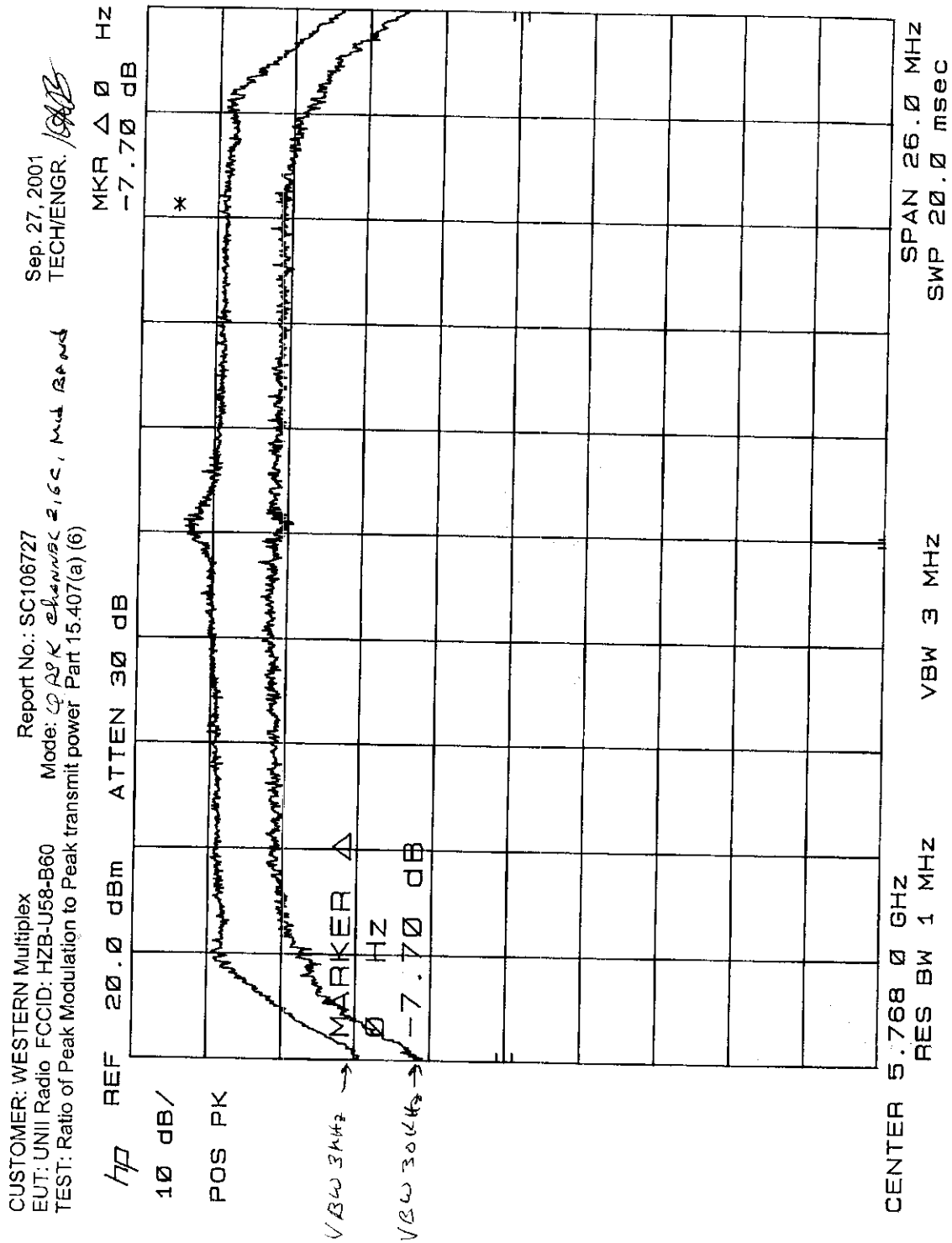


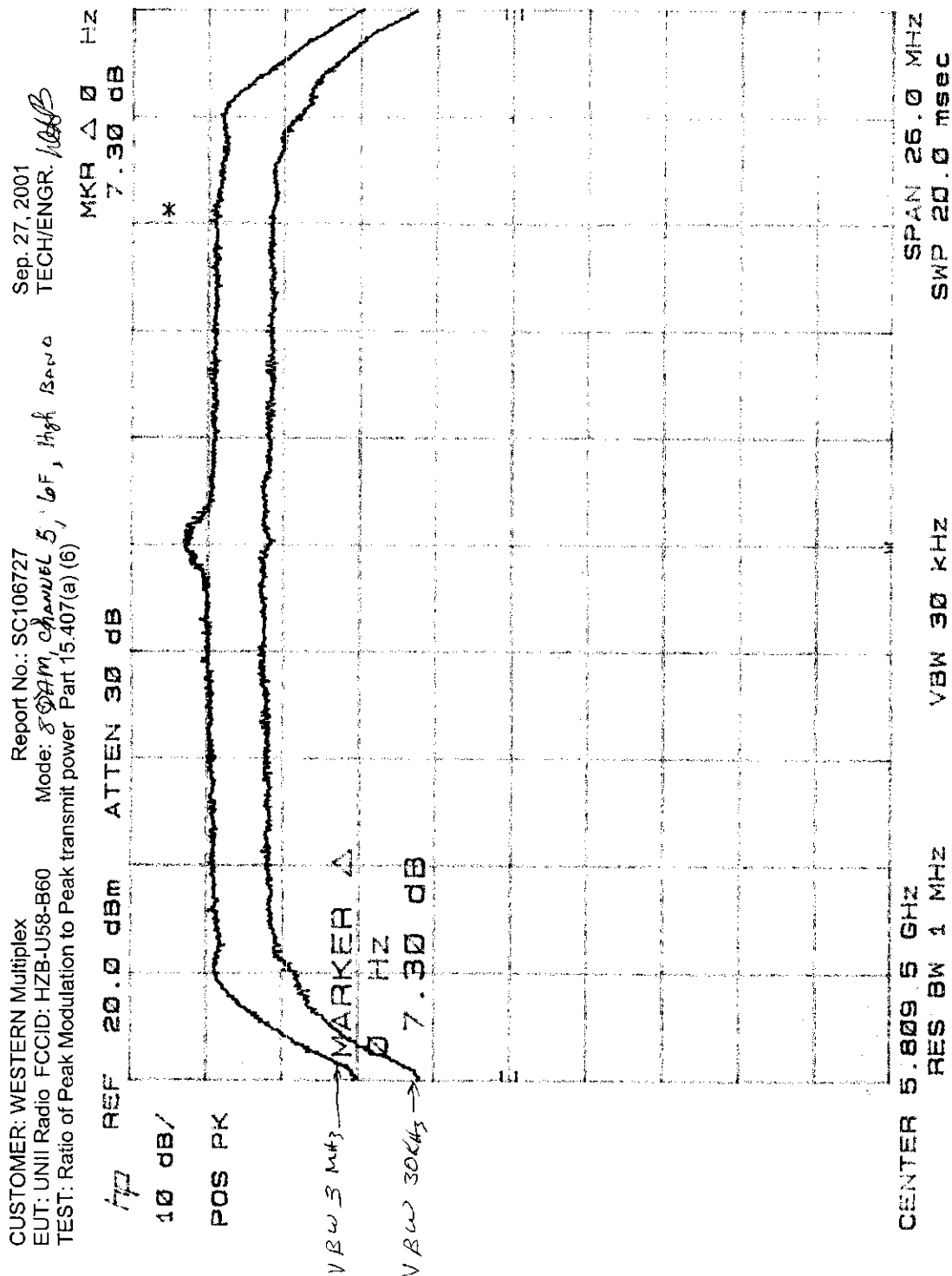


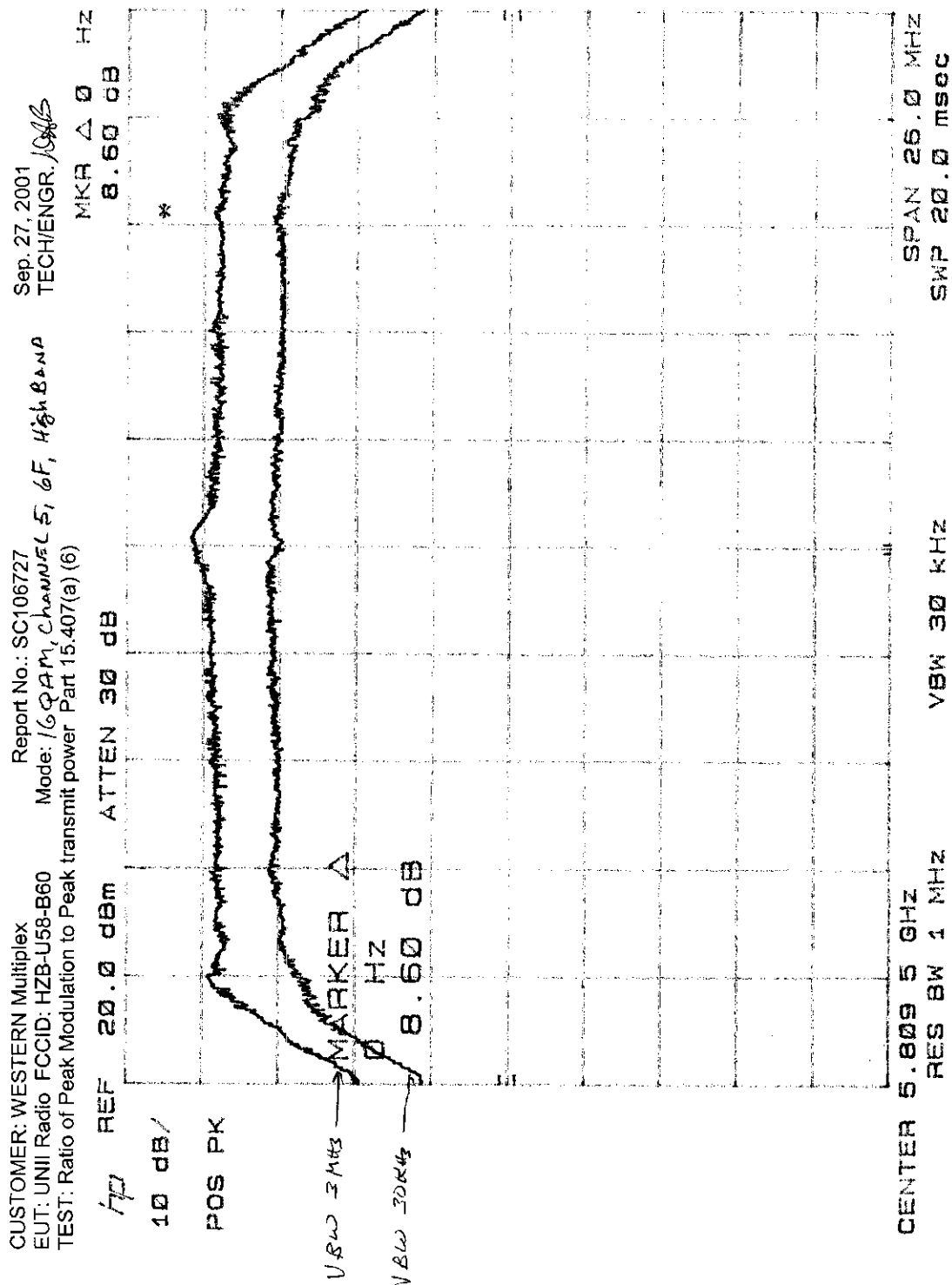






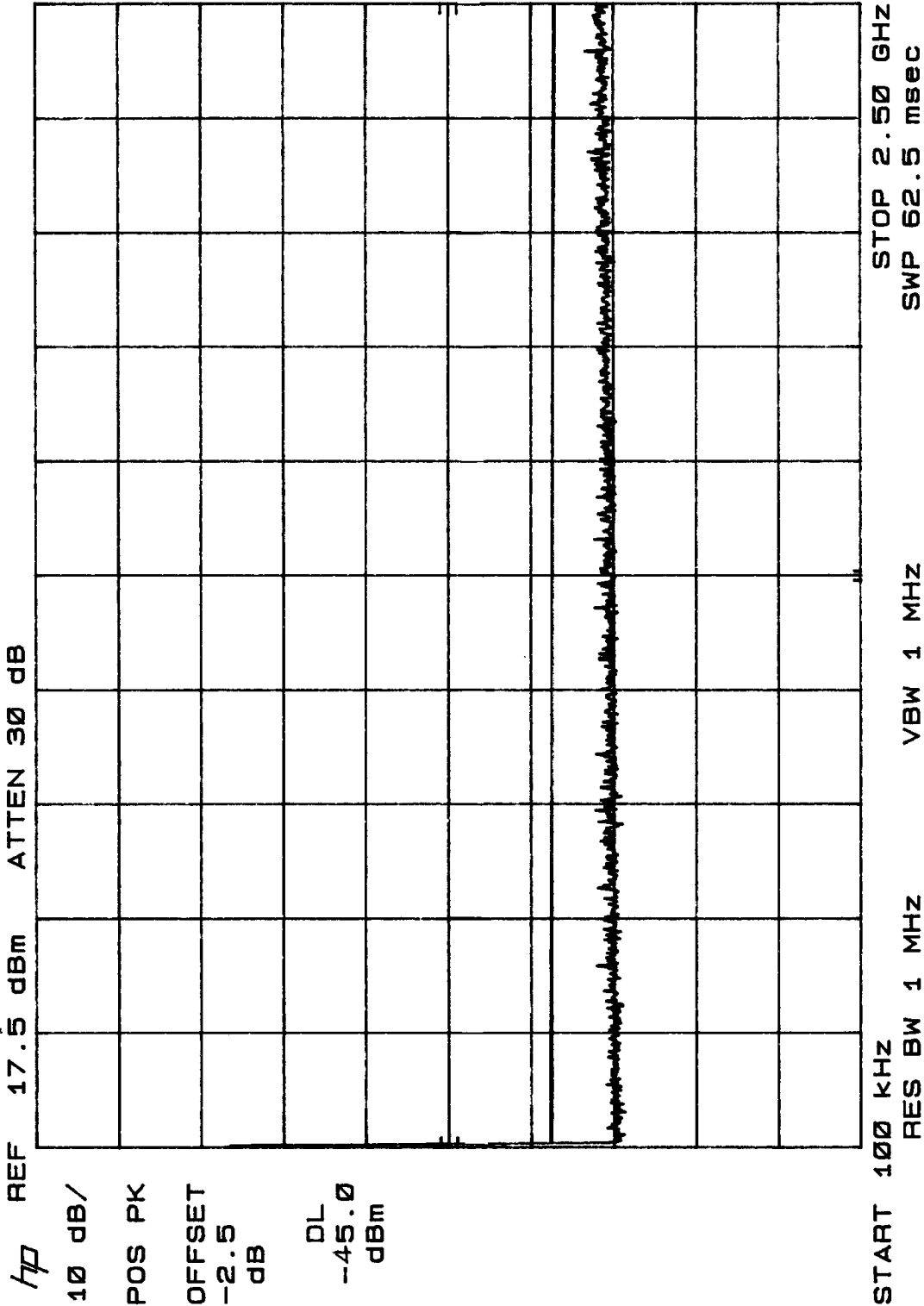






CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

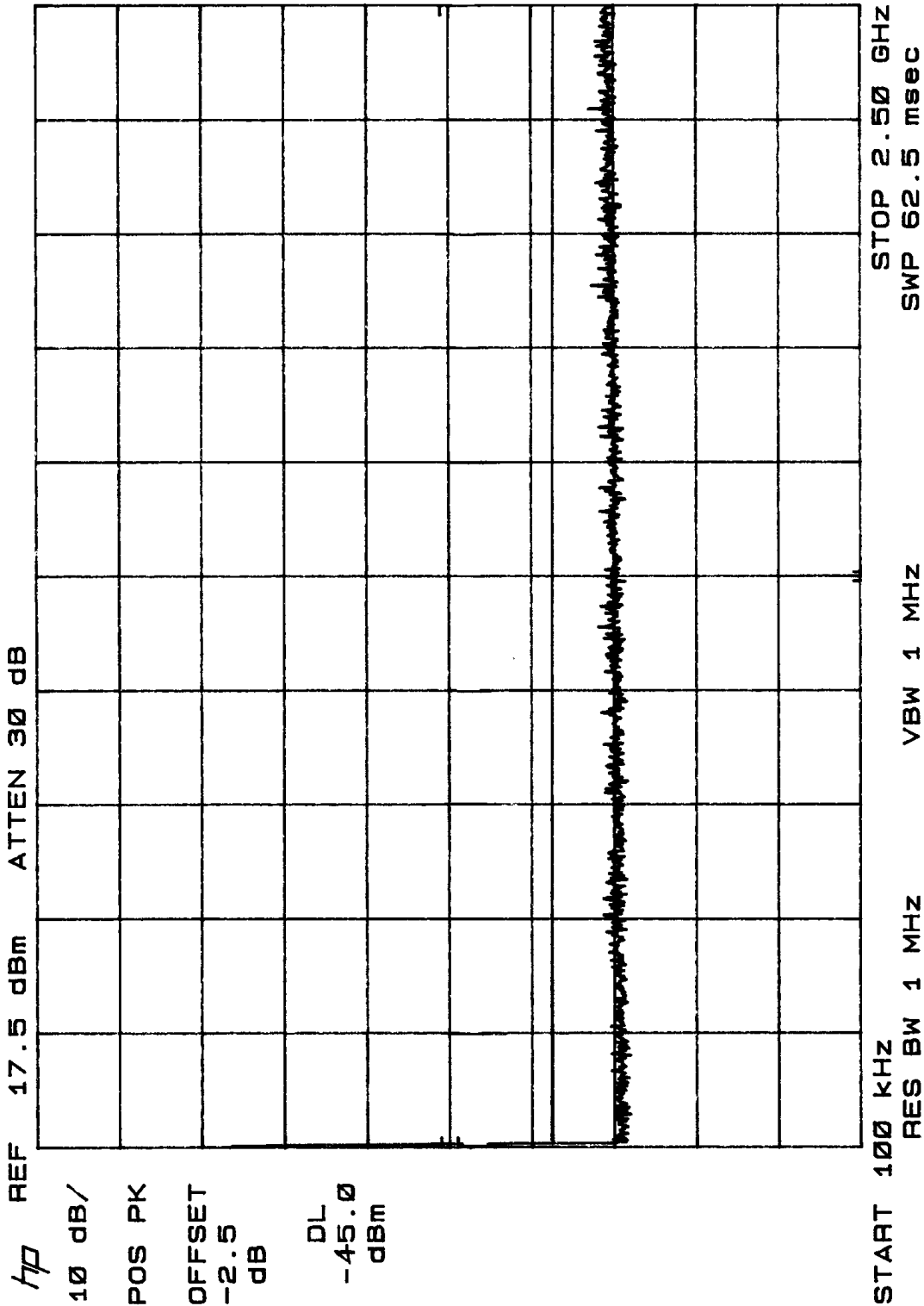
Report No.: SC106727
Mode: *QPSK 3/4 Channel*
Sep. 25, 2001
TECH/ENGR. *JSB*



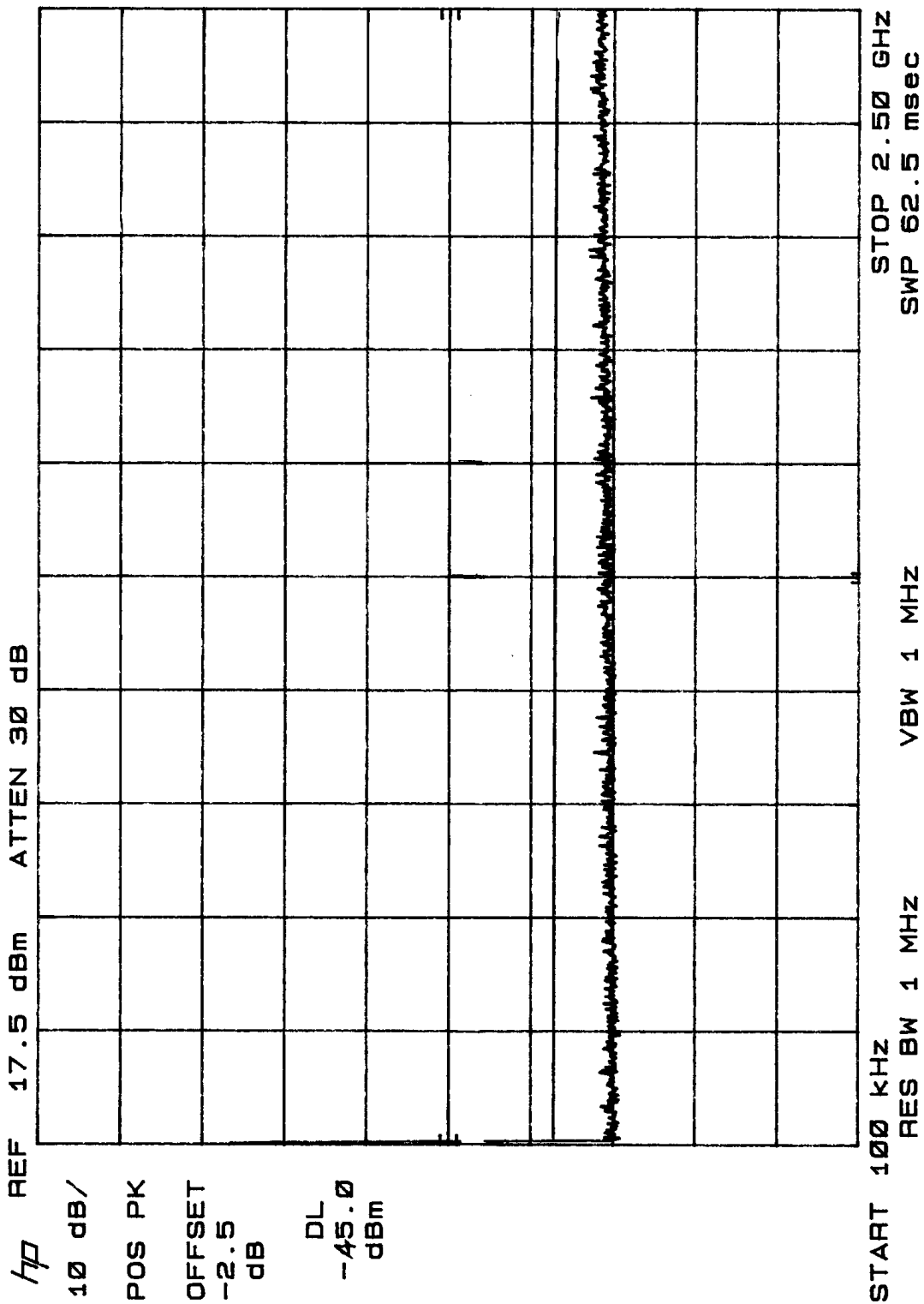
Sep. 25, 2001
TECH/ENGR. *GAJ*

Report No.: SC106727
Mode: 16 QAM Channel 10

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)



CUSTOMER: WESTERN Multiplex
 EUT: UNII Radio FCCID: HZB-U58-B60
 TEST: Out of Band Antenna Conducted Part 15.407(b)
 Report No.: SC106727
 Mode: 2 QAM Channel, 0
 Sep. 25, 2001
 TECH/ENGR. *EdL*

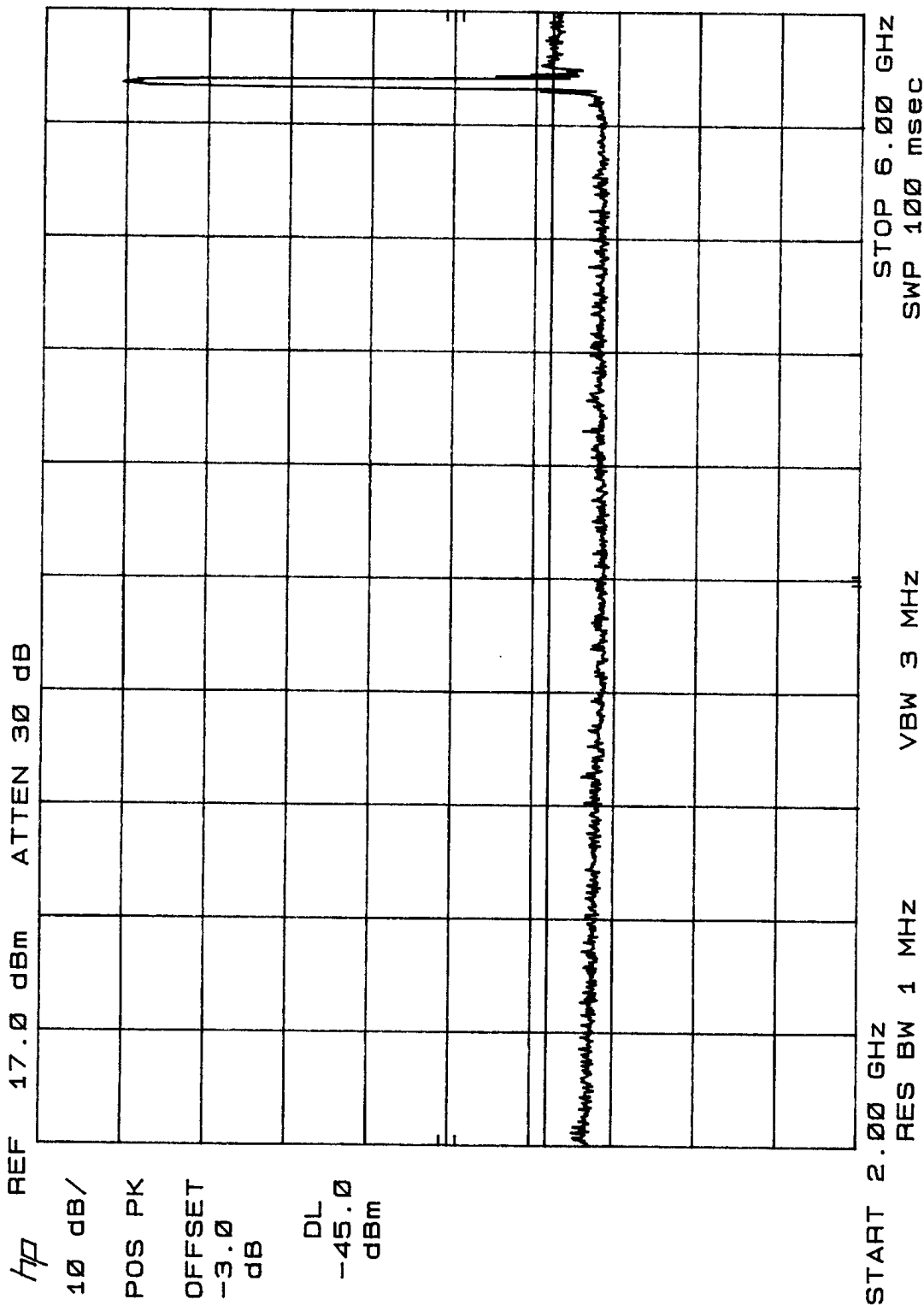


Sep. 27, 2001
TECH/ENGR. *[Signature]*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

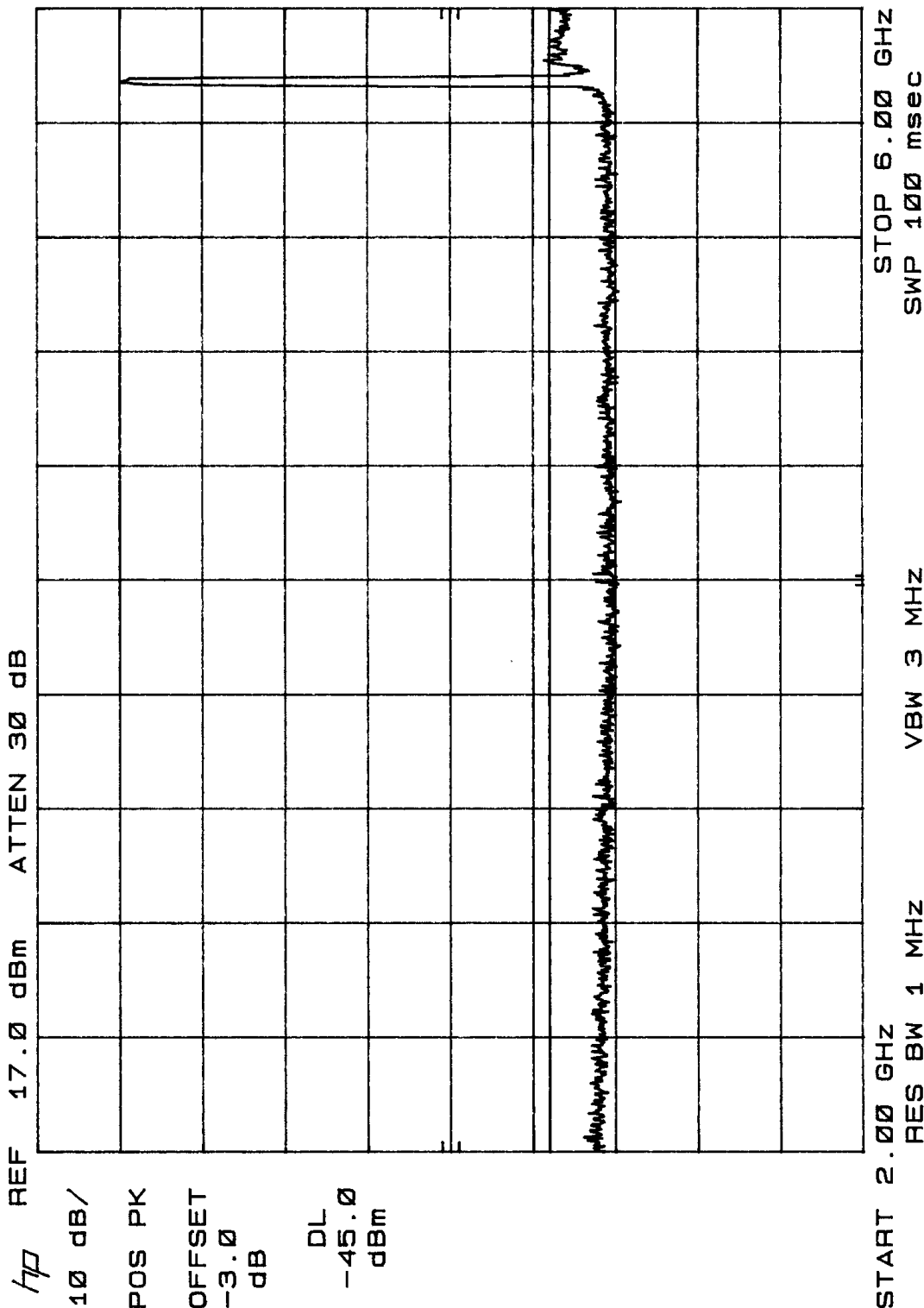
Report No.: SC106727

Mode: *Out of Band*



Sep. 27, 2001
TECH/ENGR. *[Signature]*

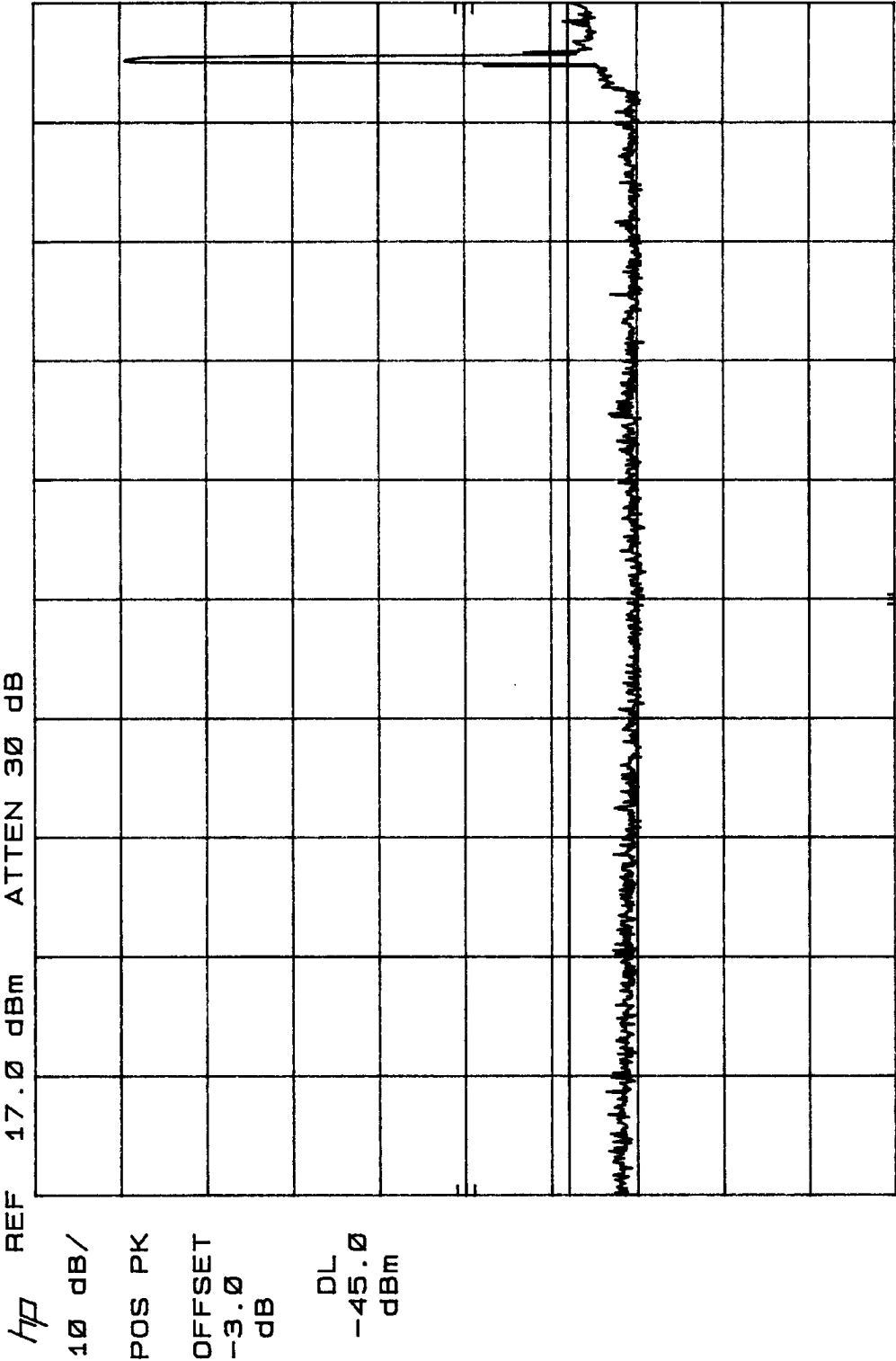
CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)
Report No.: SC106727
Mode: *QAM 8, 10, 16, 32, 64, 128, 256*



Sep. 27, 2001
TECH/ENGR. *DLB*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

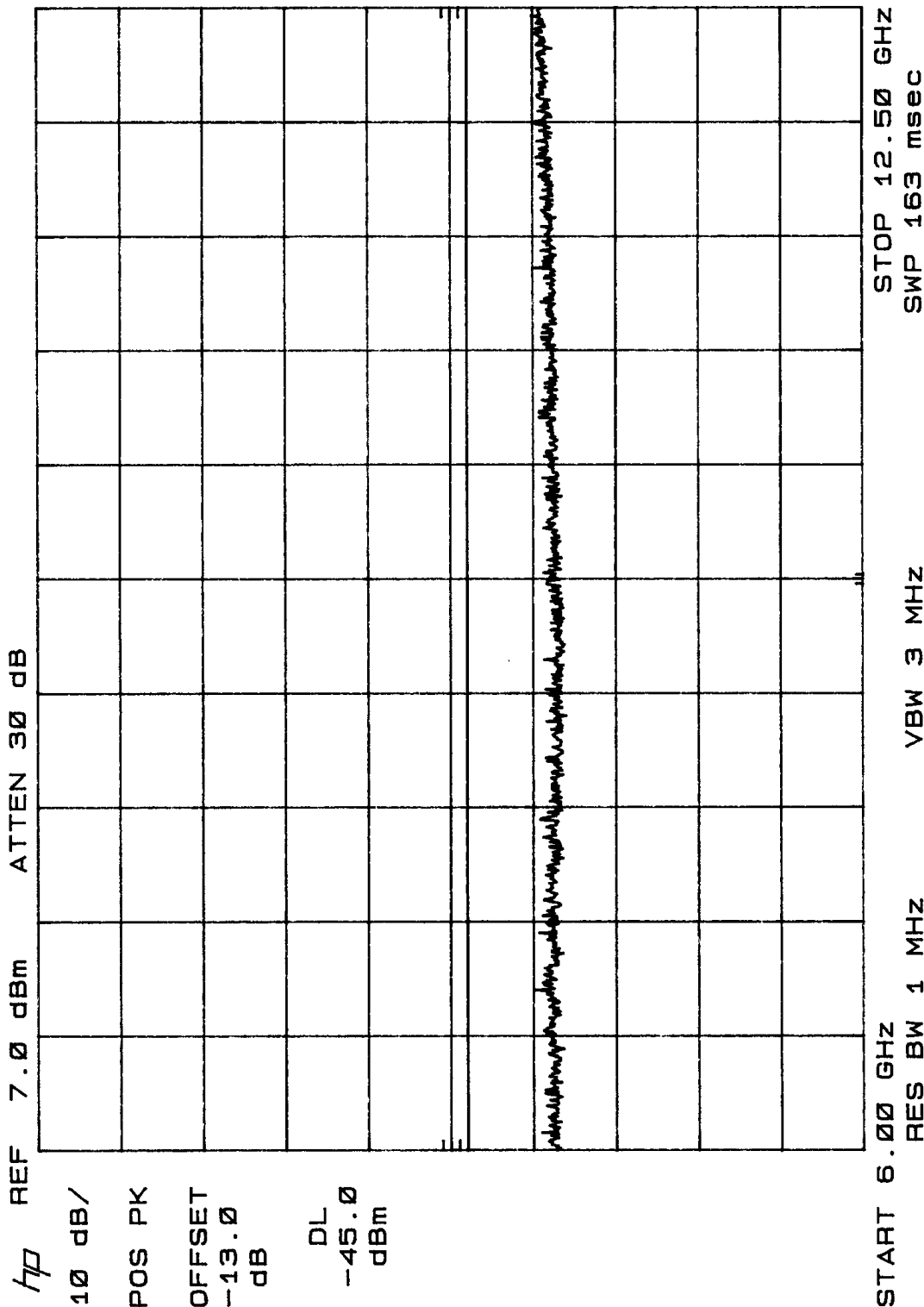
Report No.: SC106727
Mode: *Channel 0*



CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

Report No.: SC106727
Mode: QAM16, Channel 6

Sep. 27, 2001
TECH/ENGR. *YGB*



hP

10 dB/

POS PK

OFFSET -10.0 dB

DL -45.0 dBm

TH -83.0 dBm

START 12.00 GHz

RES BW 1 MHz

VBW 3 MHz

STOP 18.00 GHz

SWP 150 msec

ATTEN 30 dB

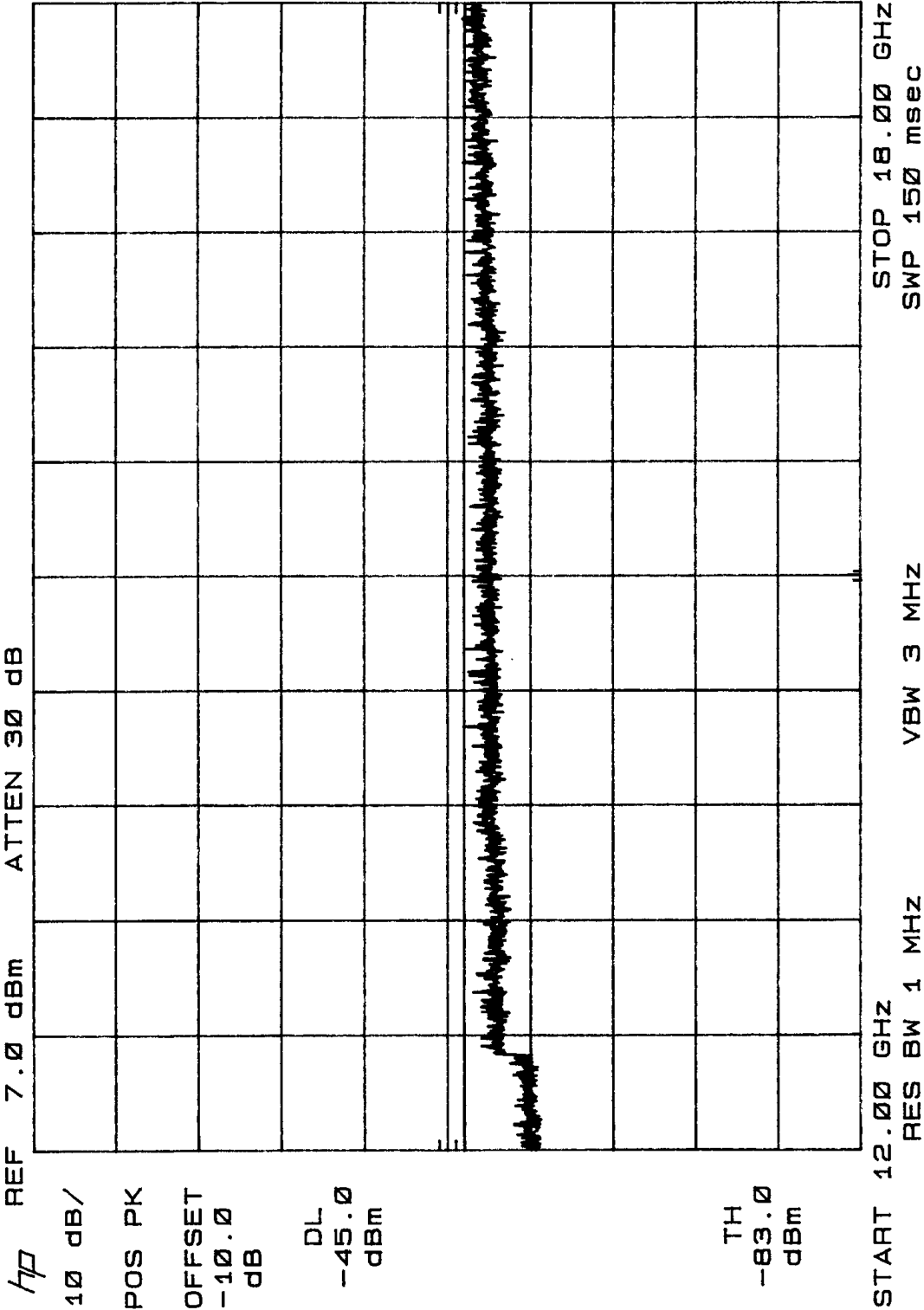


Sep. 27, 2001
TECH/ENGR. *GB*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b) *Off-air, 15.407(b) 100 MHz*

Report No.: SC106727

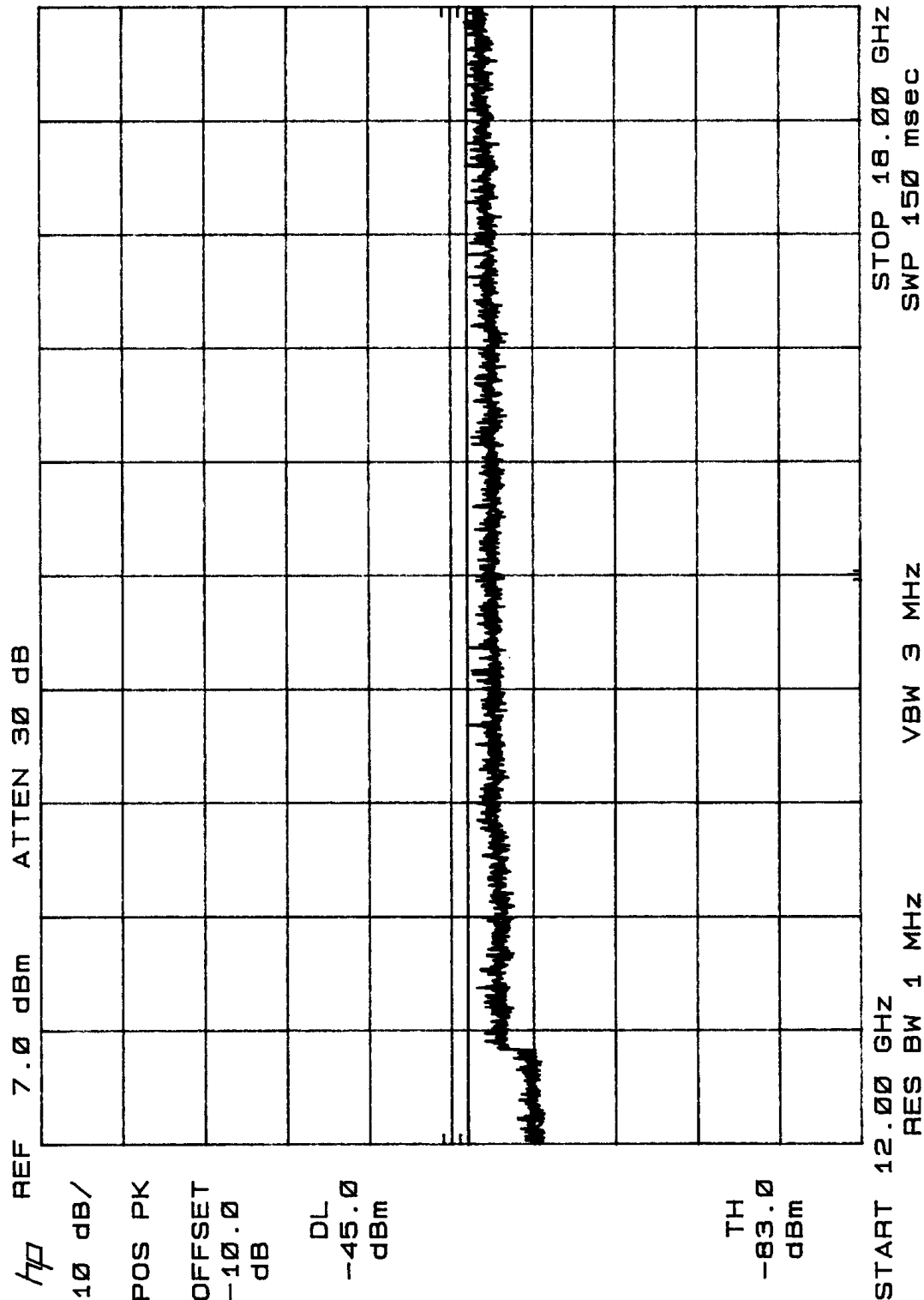
Mode: *Off-air, 15.407(b)*





Sep. 27, 2001
TECH/ENGR. *[Signature]*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b) *QAM & Intermod*
Report No.: SC106727
Mode: *QAM & Intermod*



Sep. 26, 2001
TECH/ENGR. *GB*

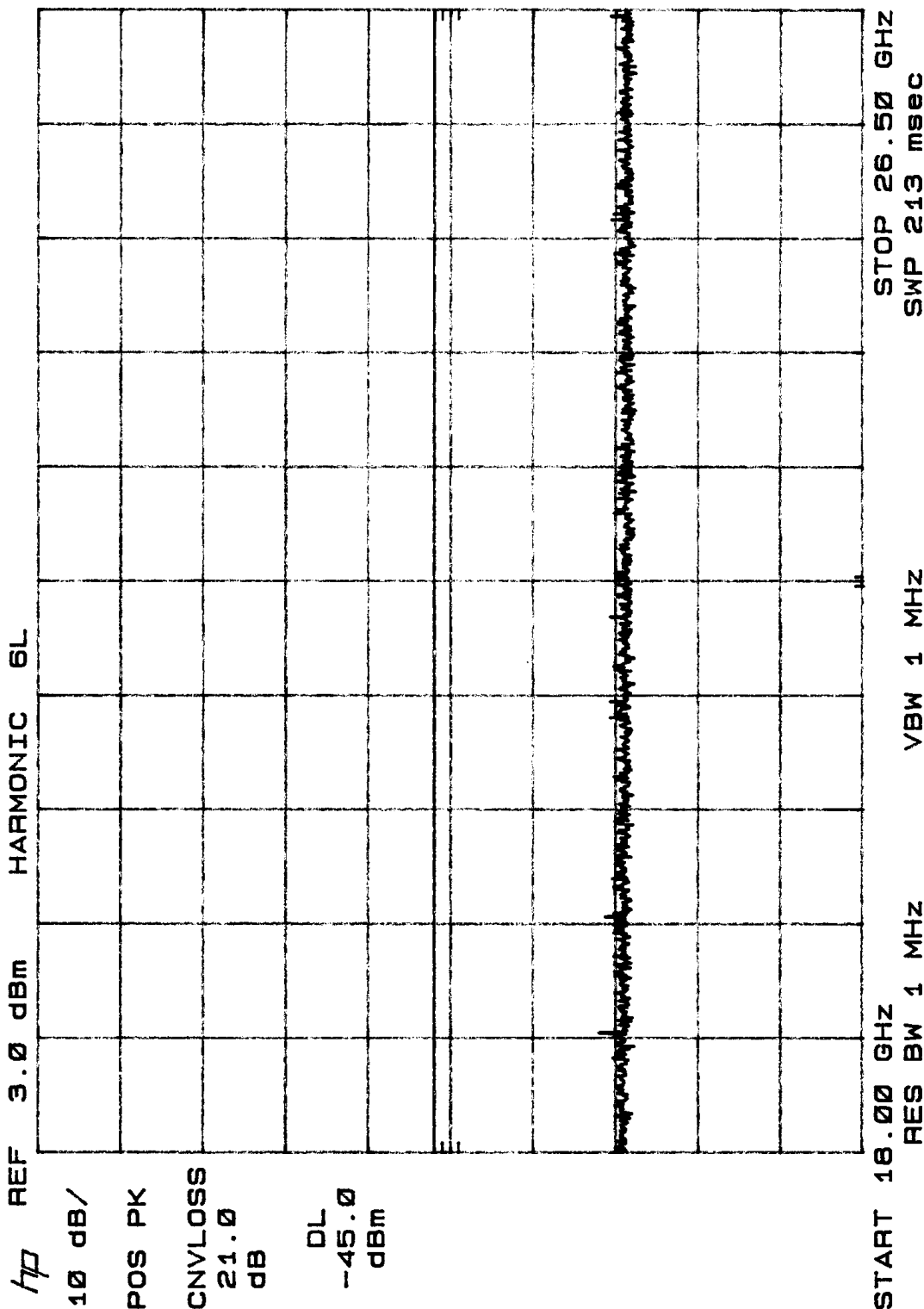
Report No.: SC106727

Mode: *QPSK 3.0 dBm*

CUSTOMER: WESTERN Multiplex

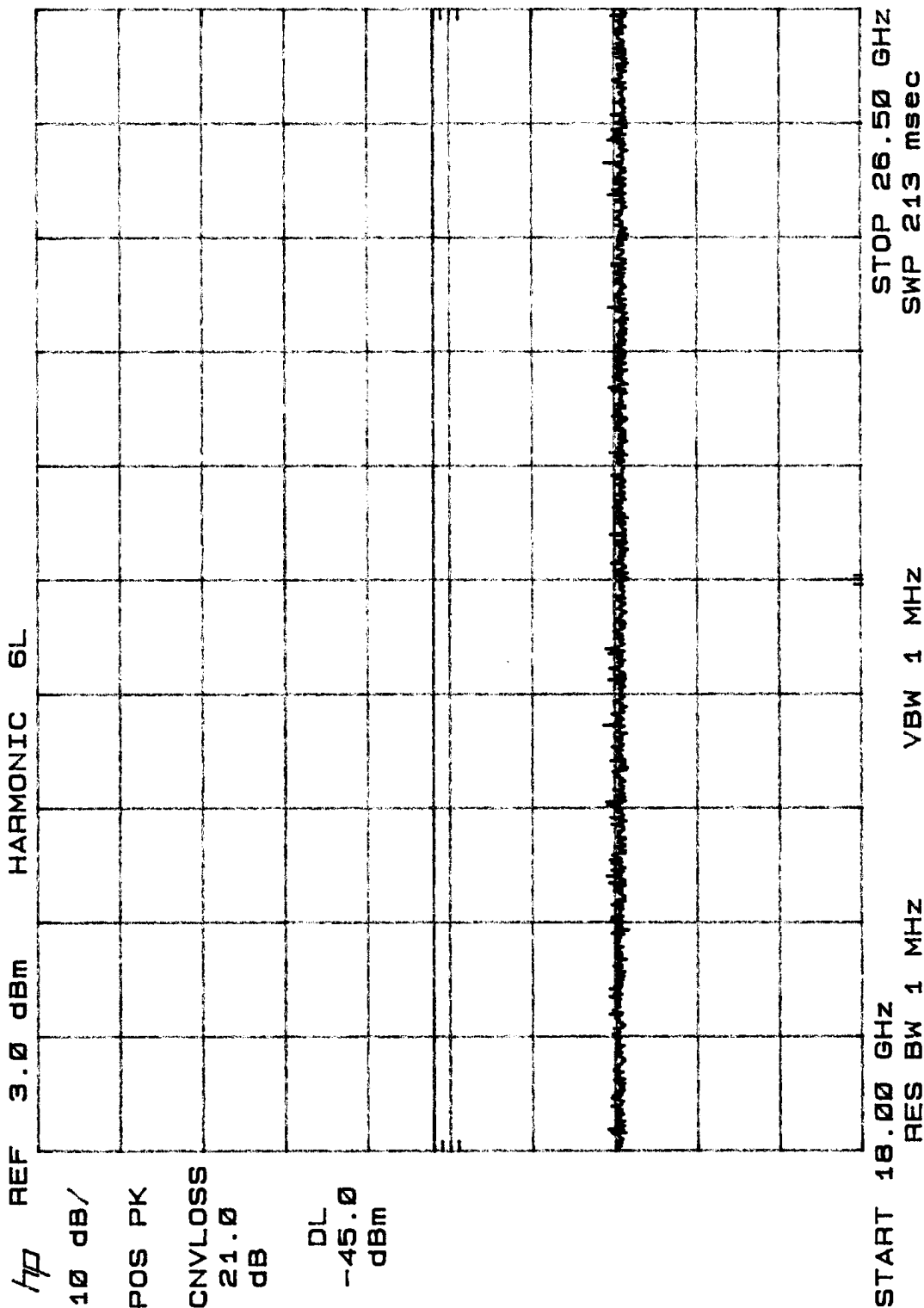
EUT: UNII Radio FCCID: HZB-U58-B60

TEST: Out of Band Antenna Conducted Part 15.407(b)



Sep. 26, 2001
TECH/ENGR. *[Signature]*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)
Report No.: SC106727
Mode: *[Handwritten: 15.407(b)]*

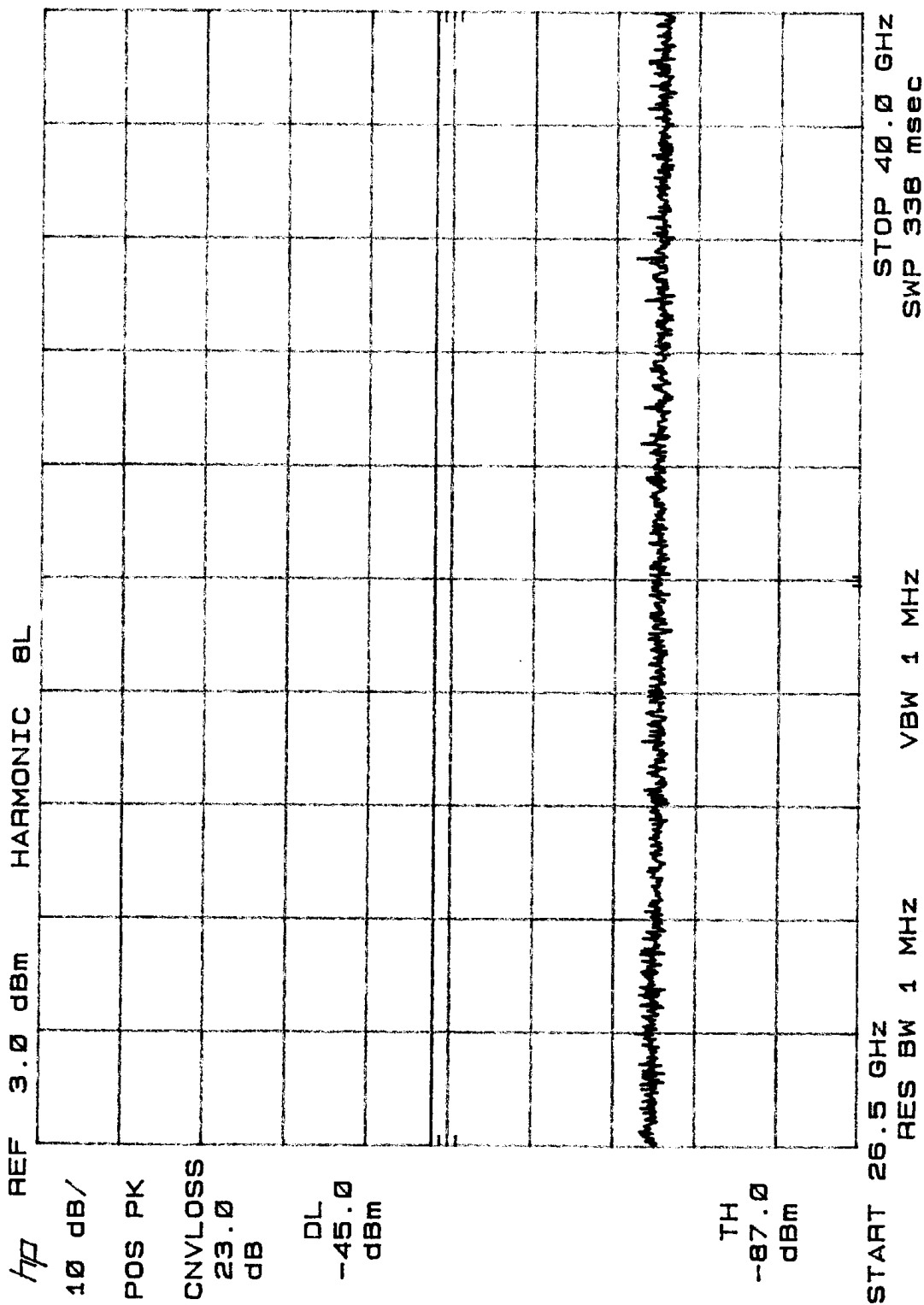


Sep. 26, 2001
TECH/ENGR. *LAB*

Report No.: SC106727

Mode: *2004M channel 1*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

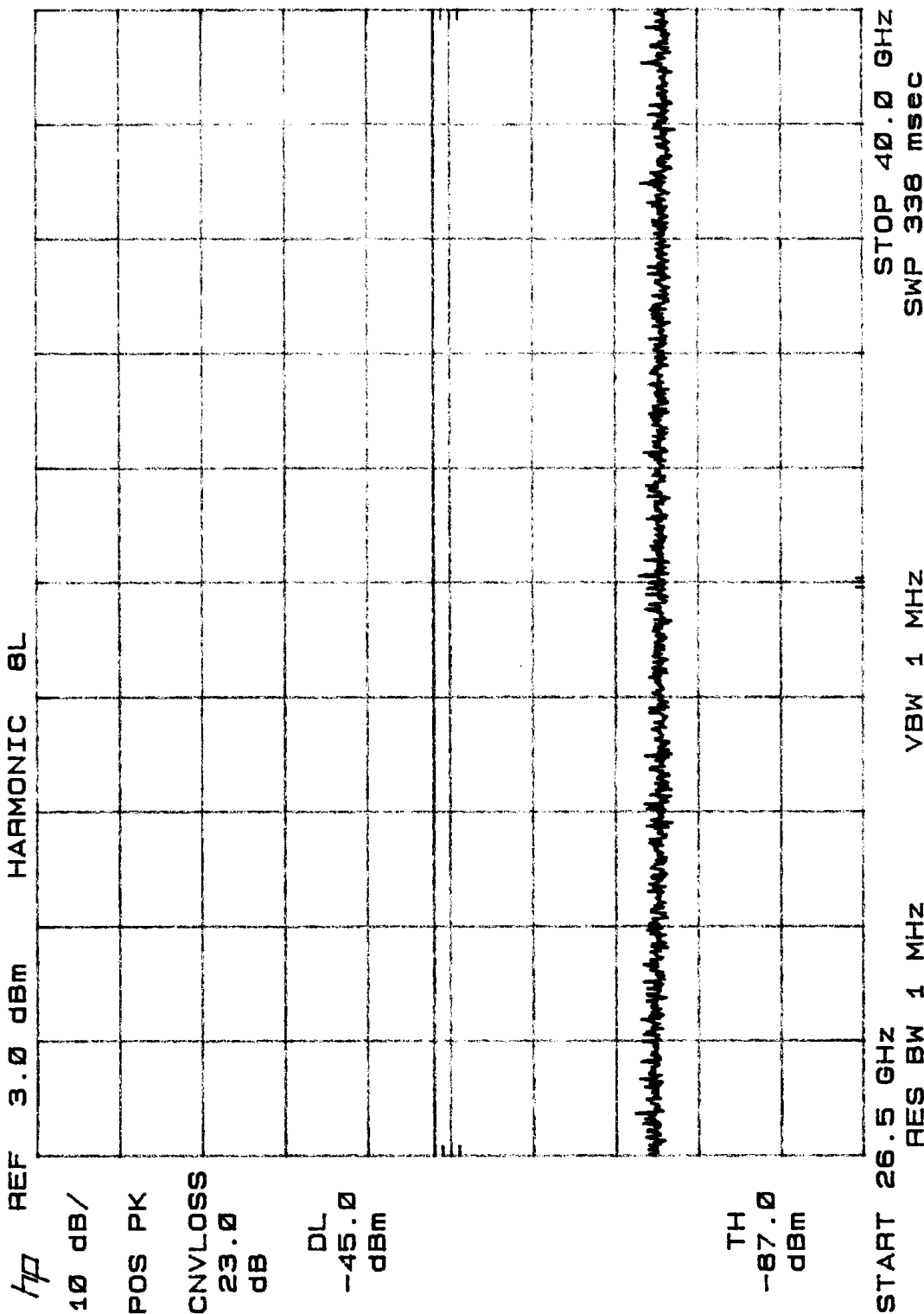


Sep. 26, 2001
TECH/ENGR. *[Signature]*

Report No.: SC106727

Mode: *100.0 MHz, 0*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

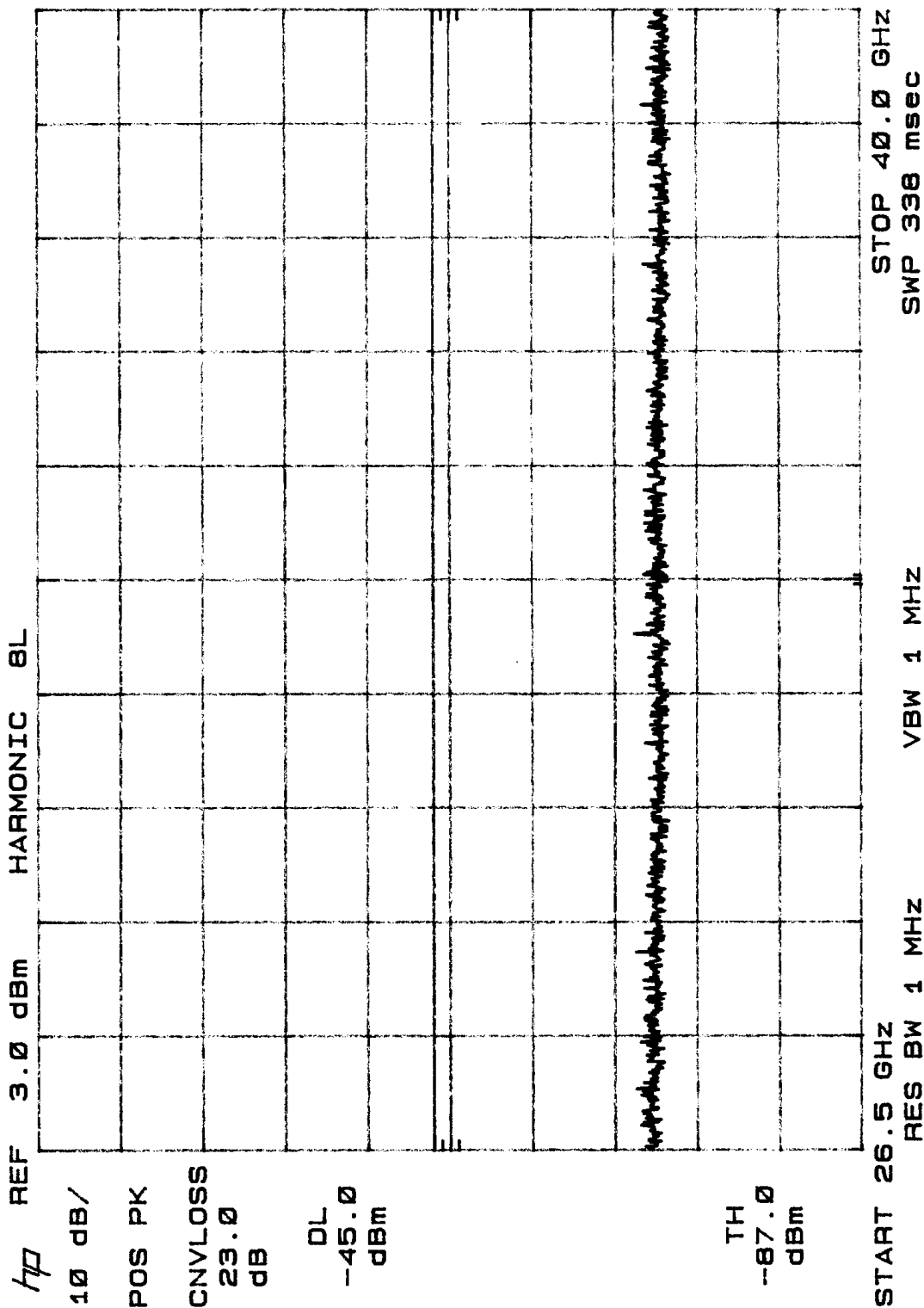


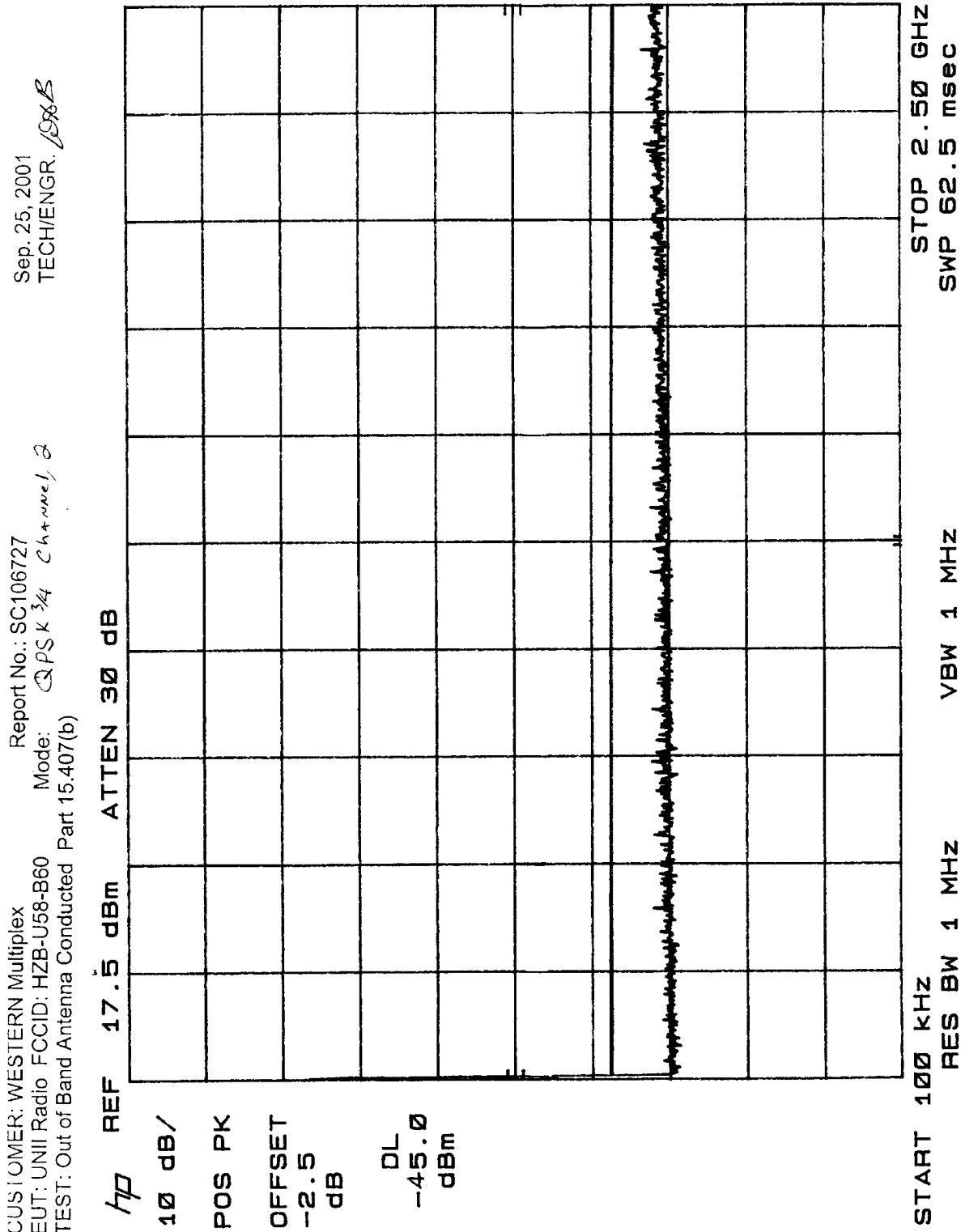
Sep. 26, 2001
TECH/ENGR. *DLB*

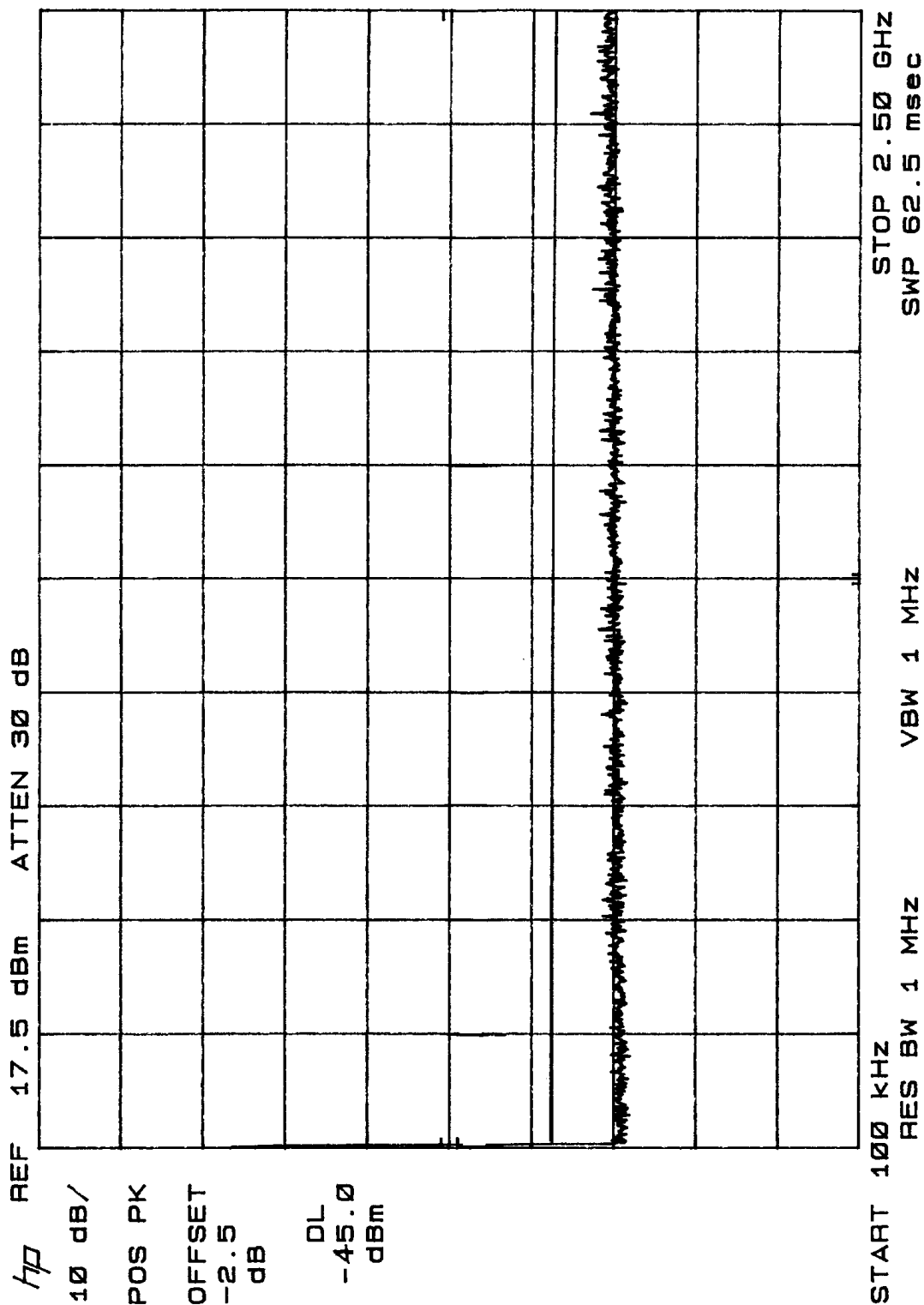
Report No.: SC106727

Mode: *GPS K 3/4 channel D₁*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)



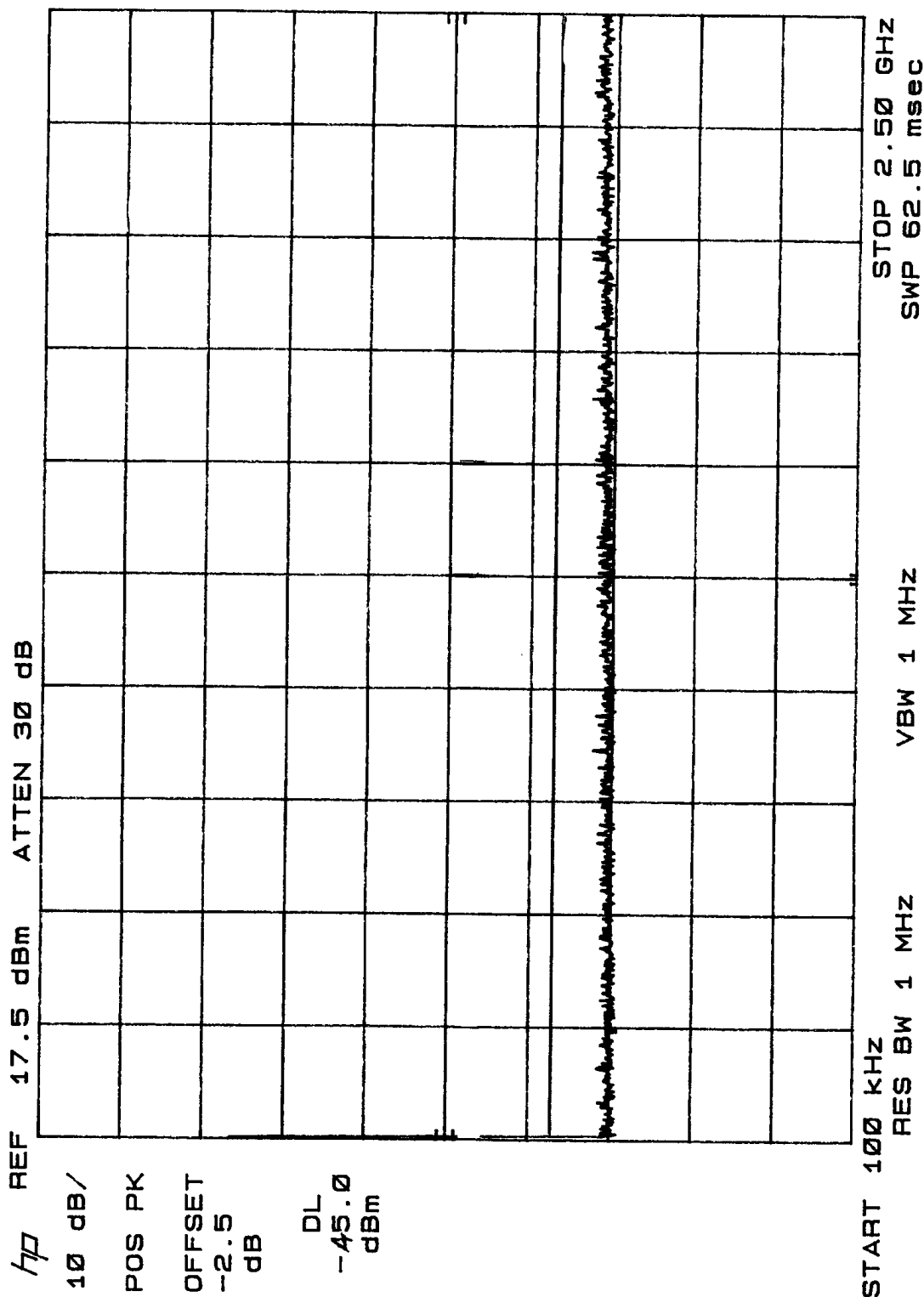


TECH/ENGR. *DAZ*

CUSTOMER: WESTERN Multiplex
 EUT: UNII Radio FCCID: HZB-U58-B60
 TEST: Out of Band Antenna Conducted Part 15.407(b)

Report No.: SC106727
 Mode: 8QAM Channel 2

Sep. 25, 2001
 TECH/ENGR. *DBB*

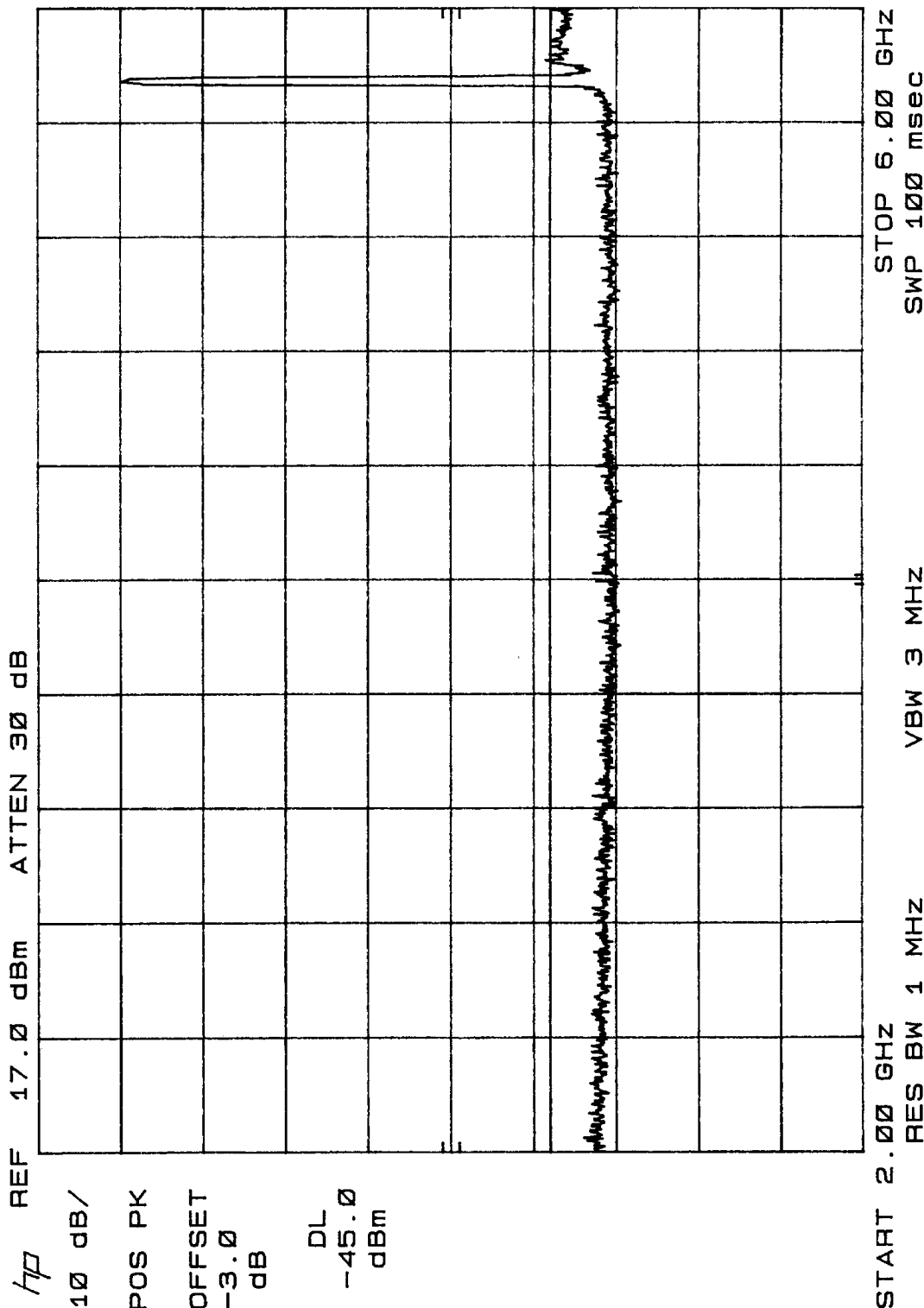


Sep. 27, 2001
TECH/ENGR. *DB*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

Report No.: SC106727

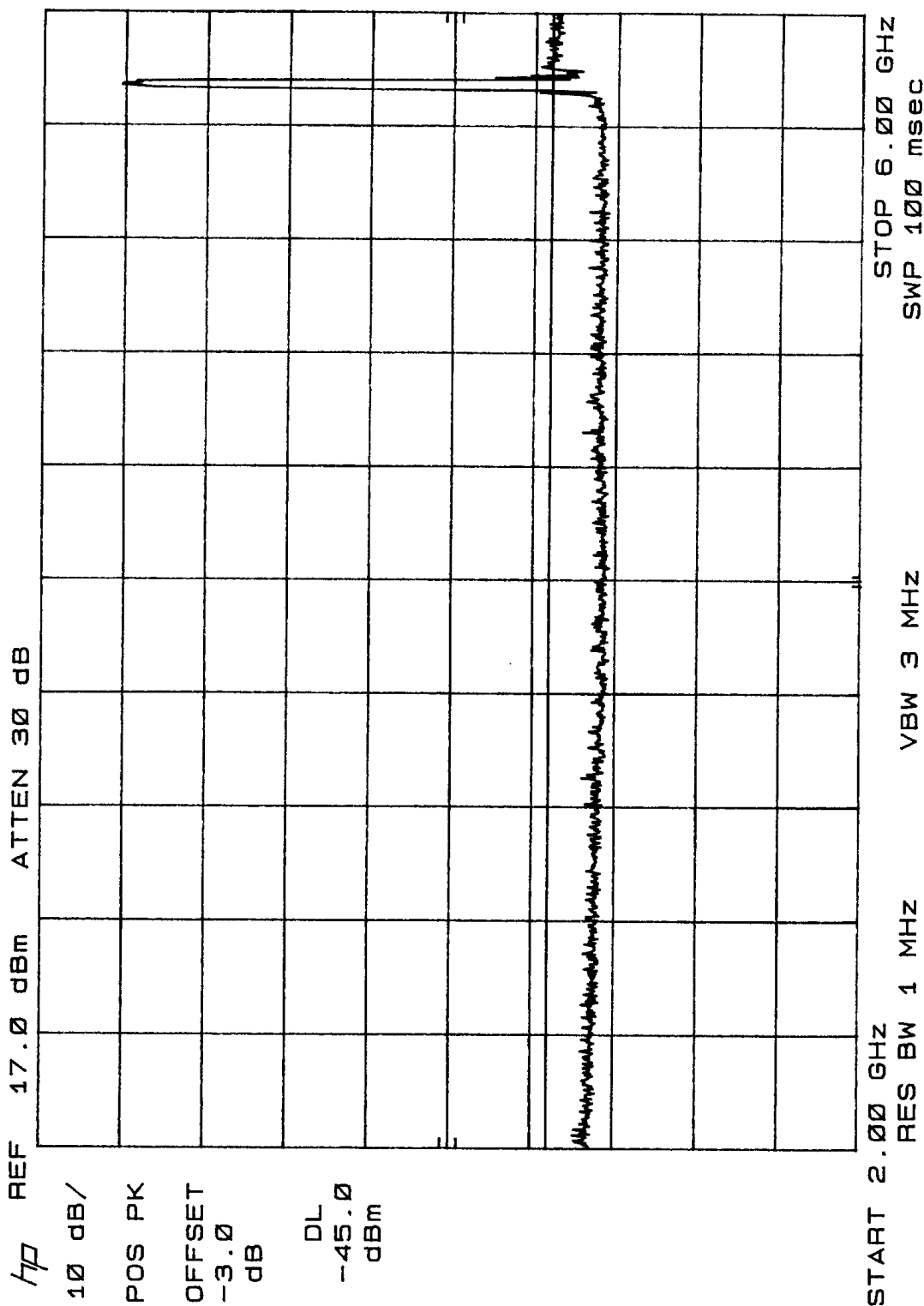
Mode: *QAM 8, channel 2*



CUSTOMER: WESTERN Multiplex
 EUT: UNII Radio FCCID: HZB-U58-B60
 TEST: Out of Band Antenna Conducted Part 15.407(b)

Report No.: SC106727
 Mode: QAM 16, channels, 2

Sep. 27, 2001
 TECH/ENGR. 1088

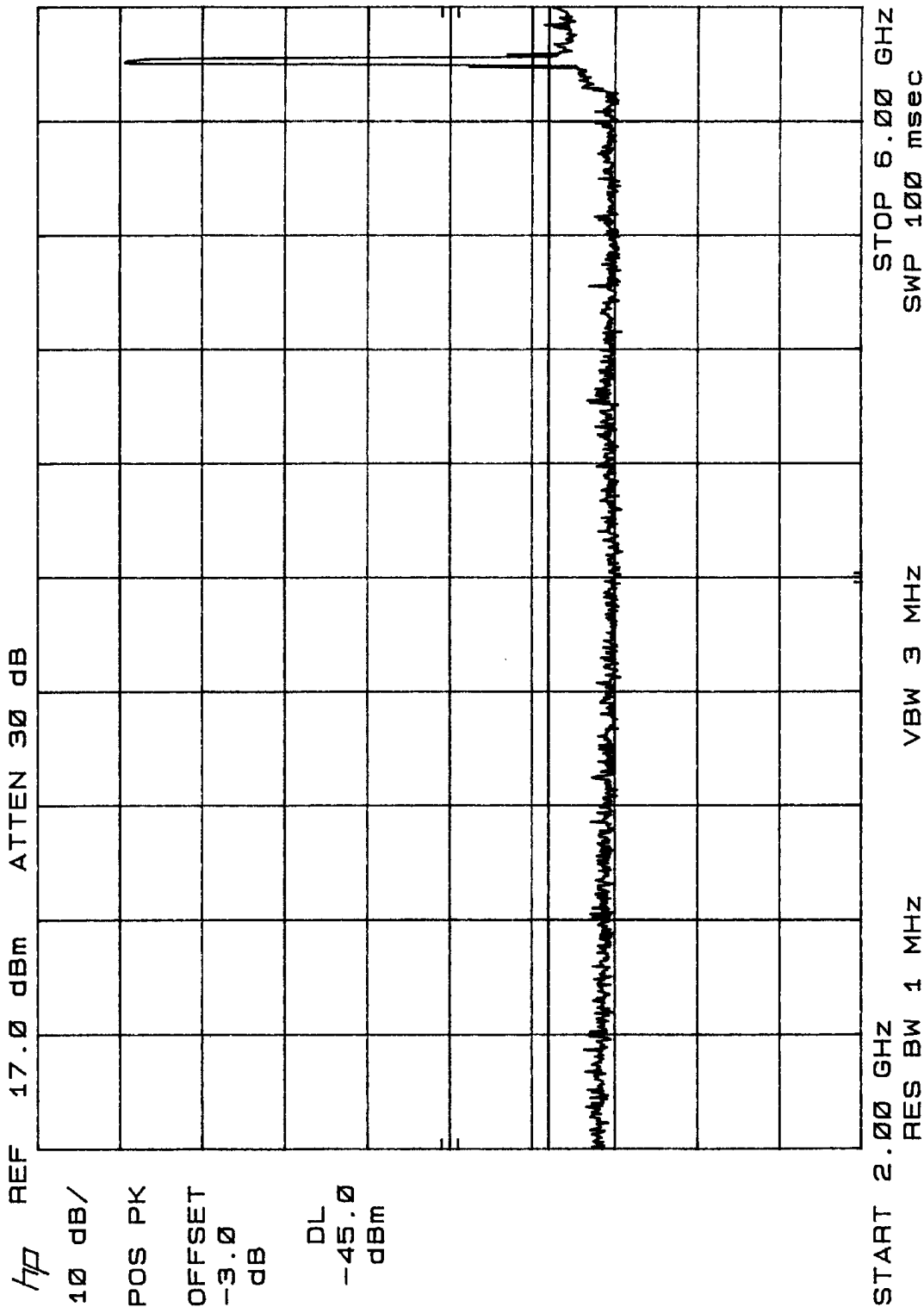


Sep. 27, 2001
TECH/ENGR. *pat*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

Report No.: SC106727

Mode: *QPSK 34, channel 8, 2*

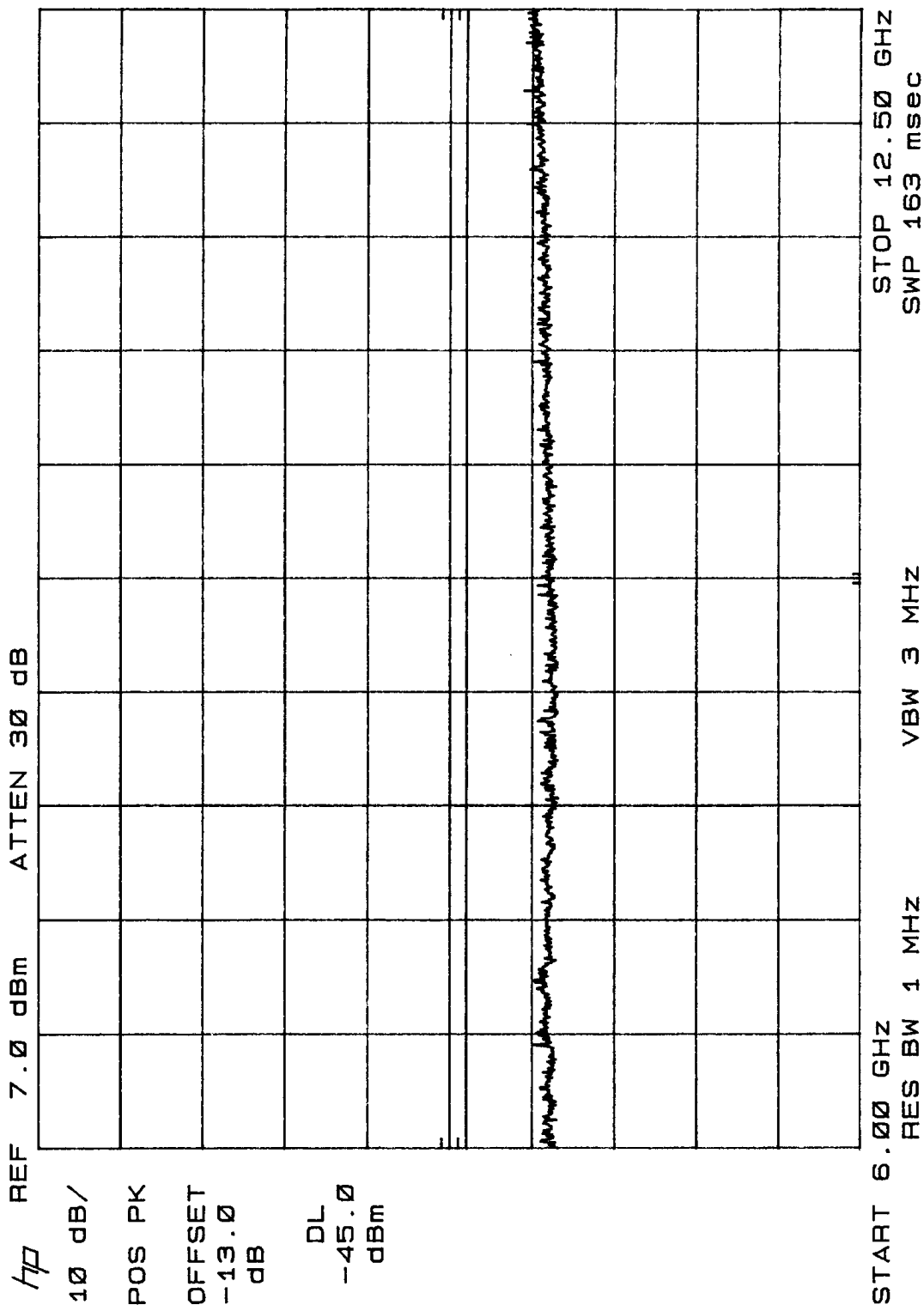


CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted

TEST: Out of Band Antenna Conducted

5.407(b)

TECH/ENGR.

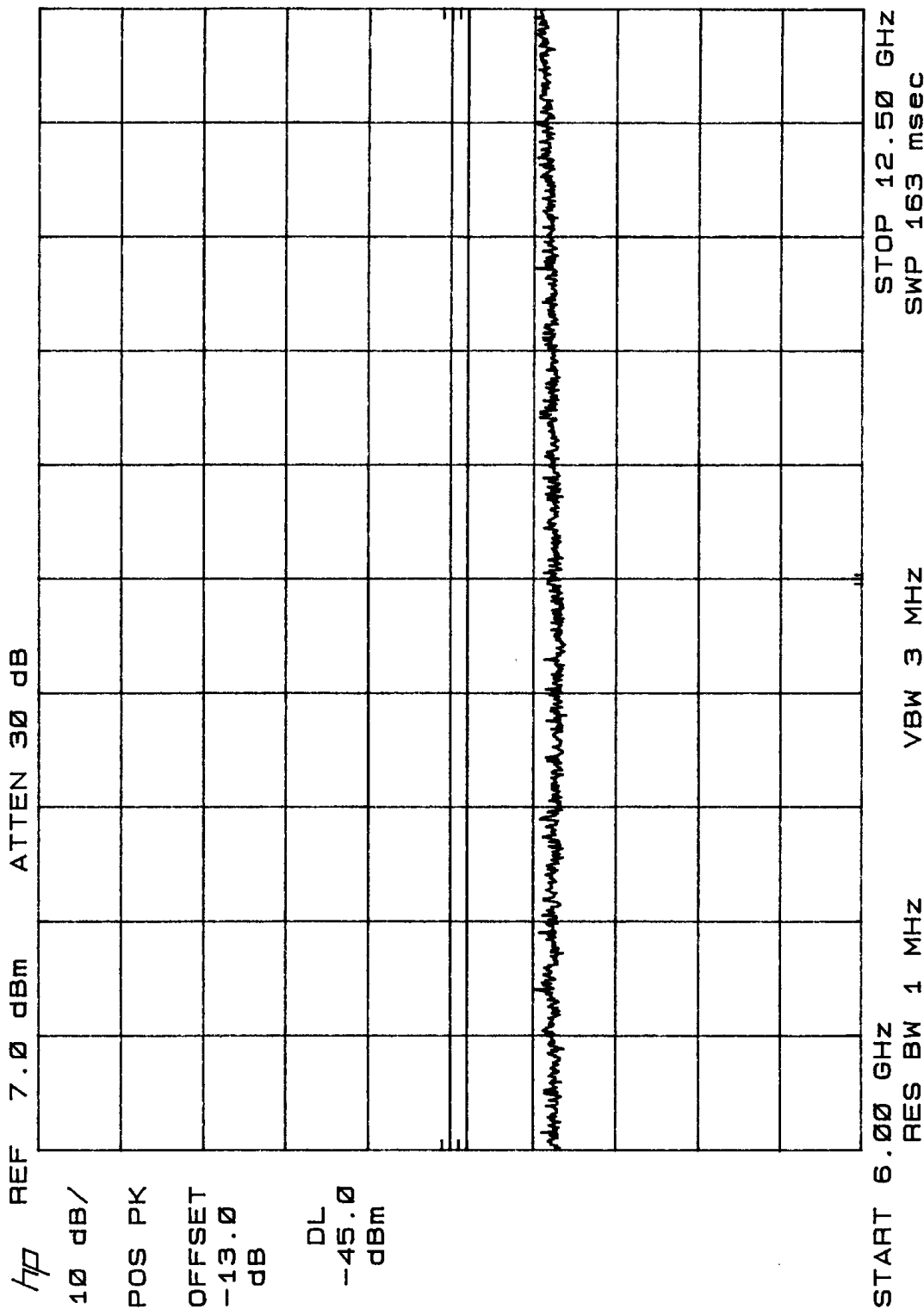


Sep. 27, 2001
TECH/ENGR. *gbc*

Report No.: SC106727

Mode: *QAM16, Channel 12*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

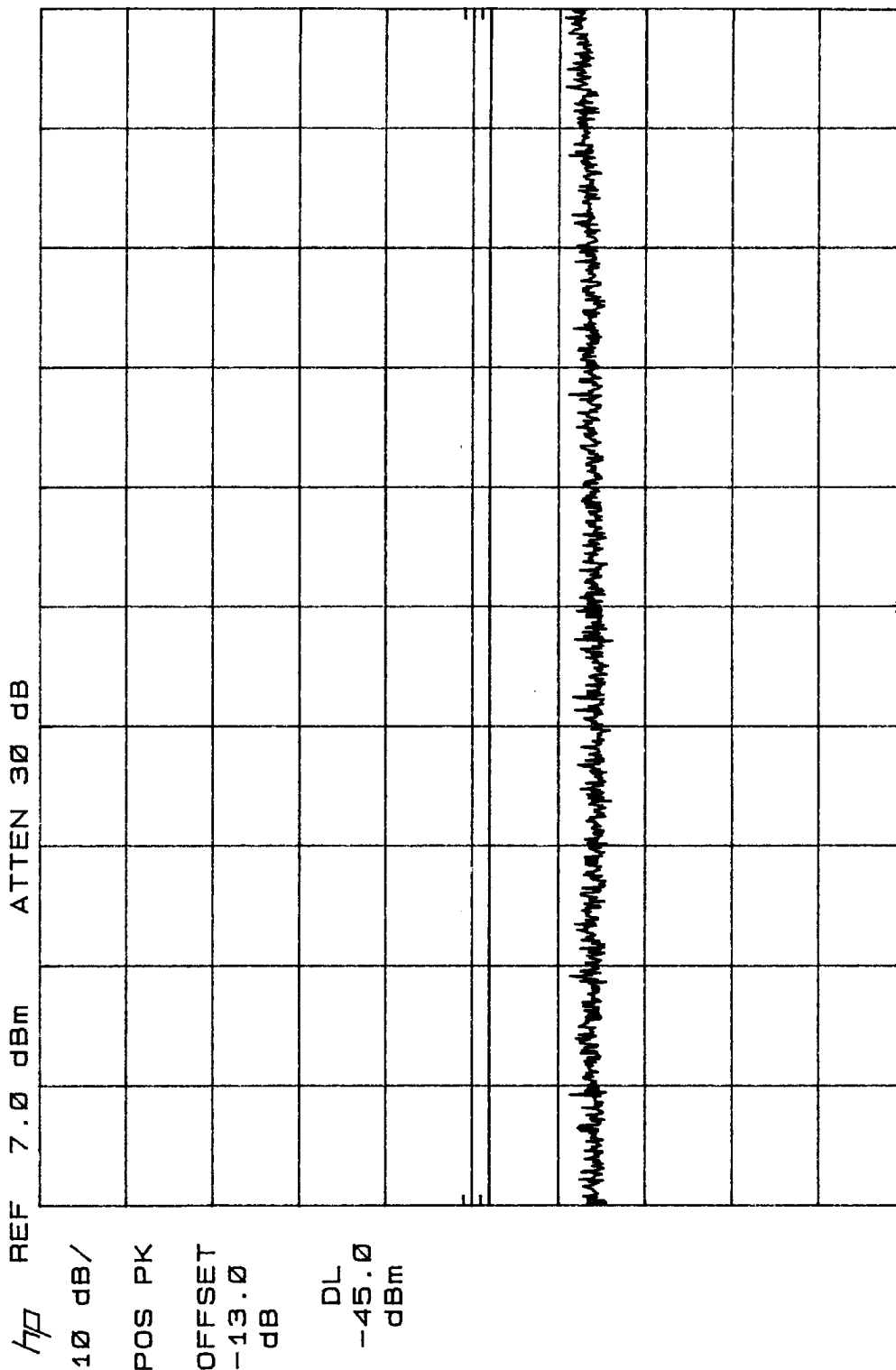


Sep. 27, 2001
TECH/ENGR. *[Signature]*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b) *w/ Per. Sup. of Pro-B. Station*

Report No.: SC106727

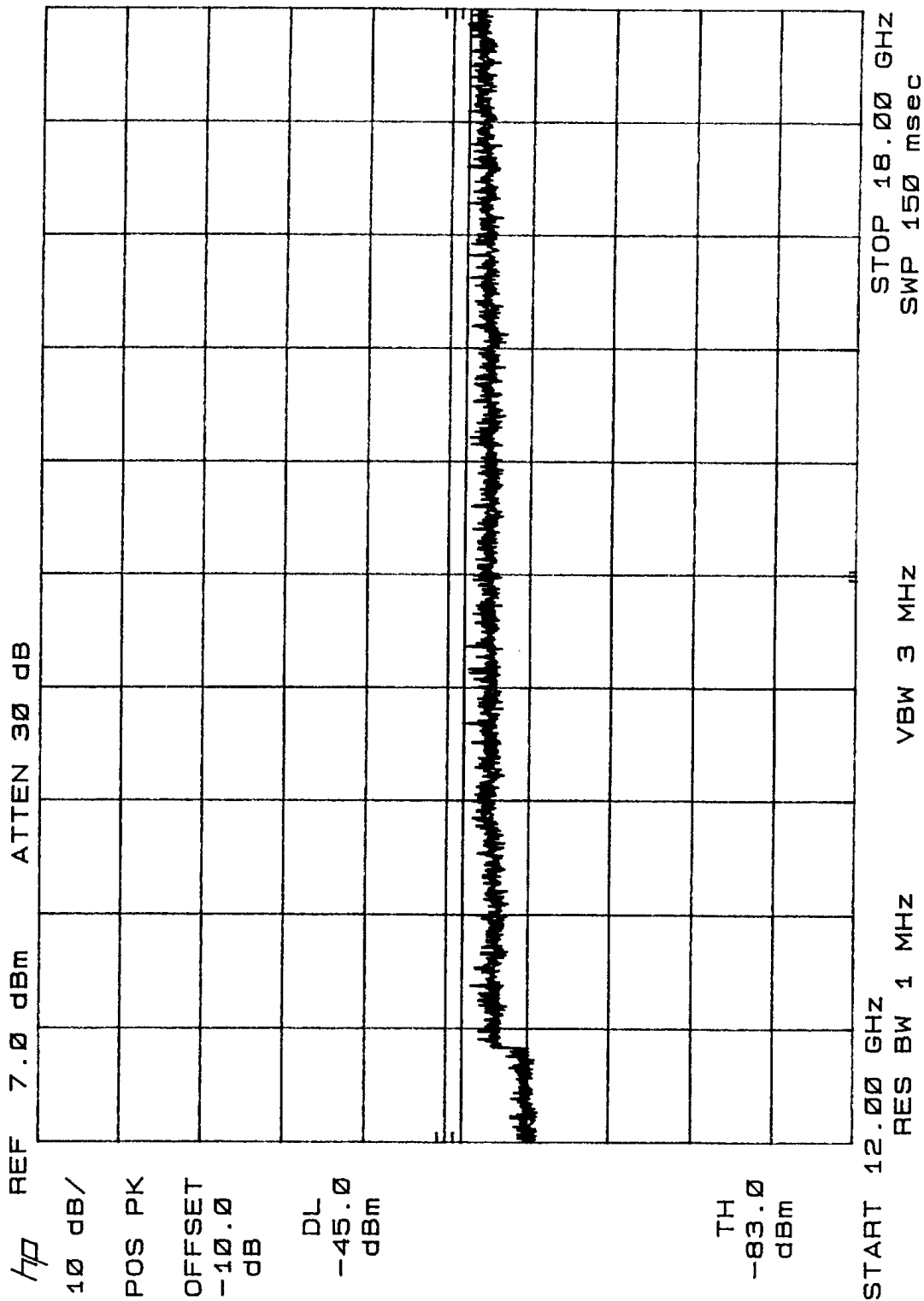
Mode: *CHSK 3/4, channel 2*



Sep. 27, 2001
TECH/ENGR. *gfb*

Report No.: SC106727
Mode: *QPSK 3/4, Channel 1, 2*
w/ Rec. Amp & Pre-Sense

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

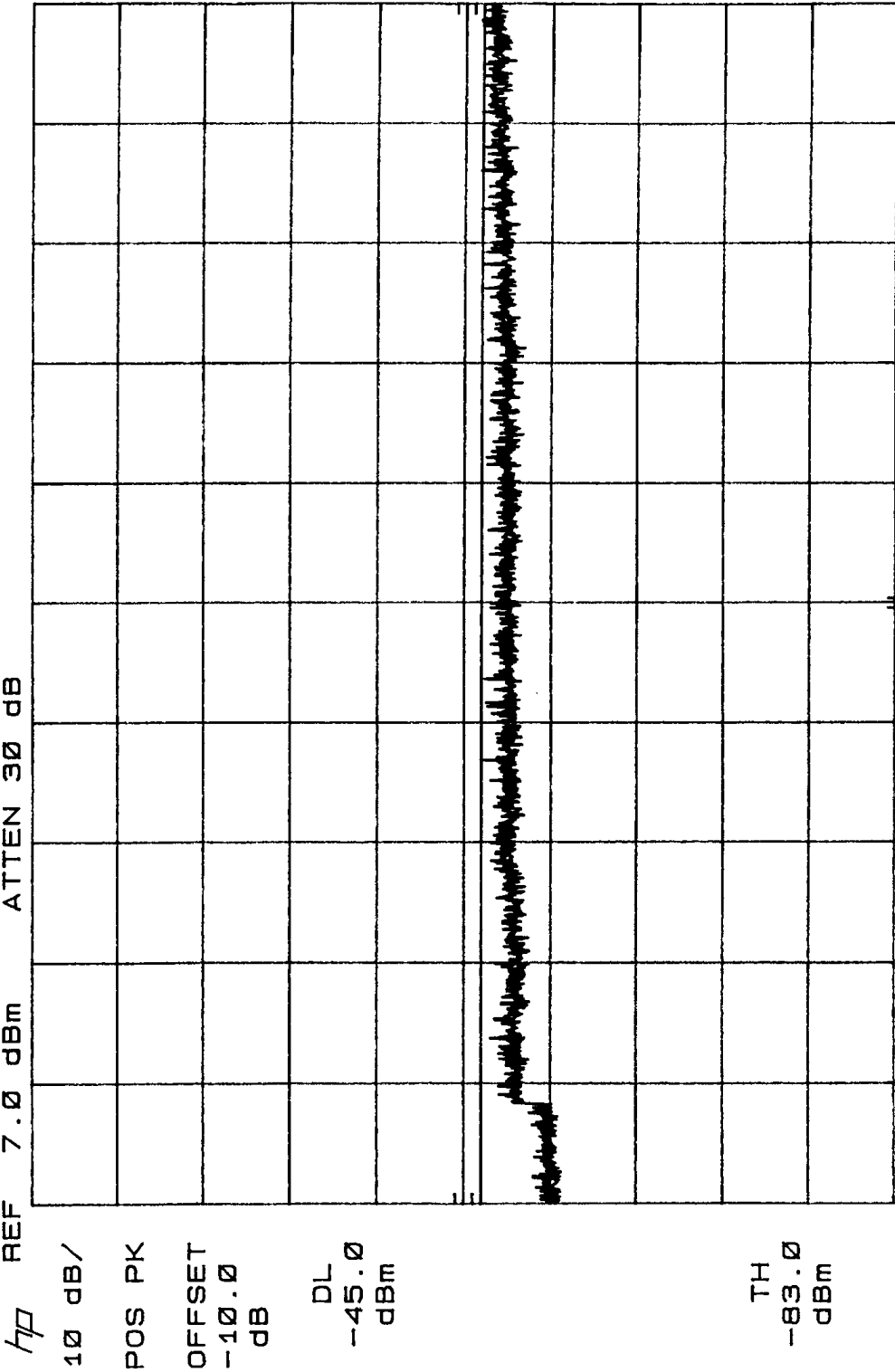




Sep. 27, 2001
TECH/ENGR. *GPB*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b) *20m 16, Channel 2*
Mode: *20m 16, Channel 2*
W/Pre-Amp if Pre-Selected

Report No.: SC106727



hpf REF 7.0 dBm ATTEN 30 dB TH -83.0 dBm
START 12.00 GHz RES BW 1 MHz VBW 3 MHz STOP 18.00 GHz SWP 150 msec

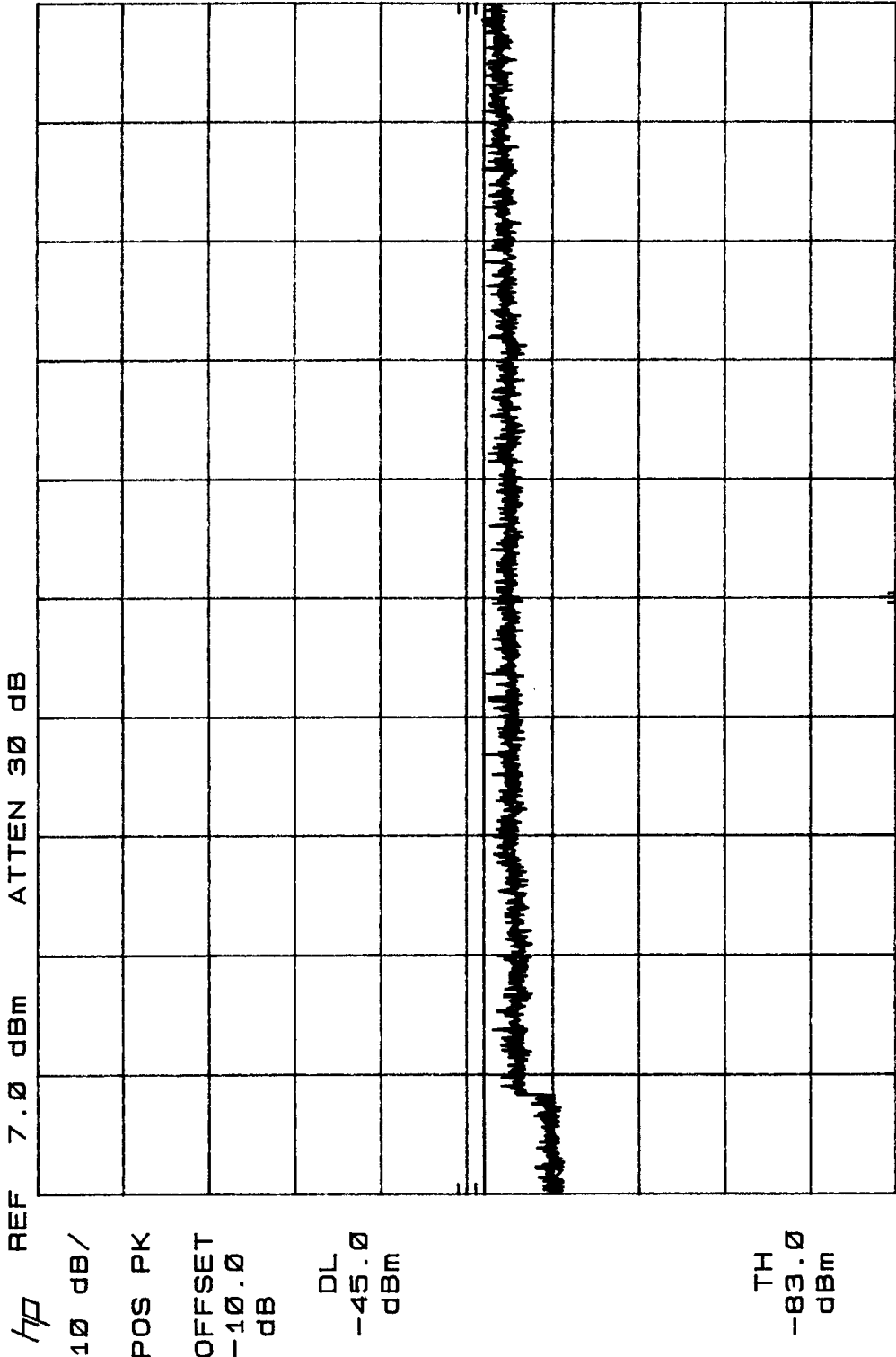


Sep. 27, 2001
TECH/ENGR. *DB*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b) with 0.1 dBm of pre-selector

Report No.: SC106727

Mode: *QAM 8, channel 2*

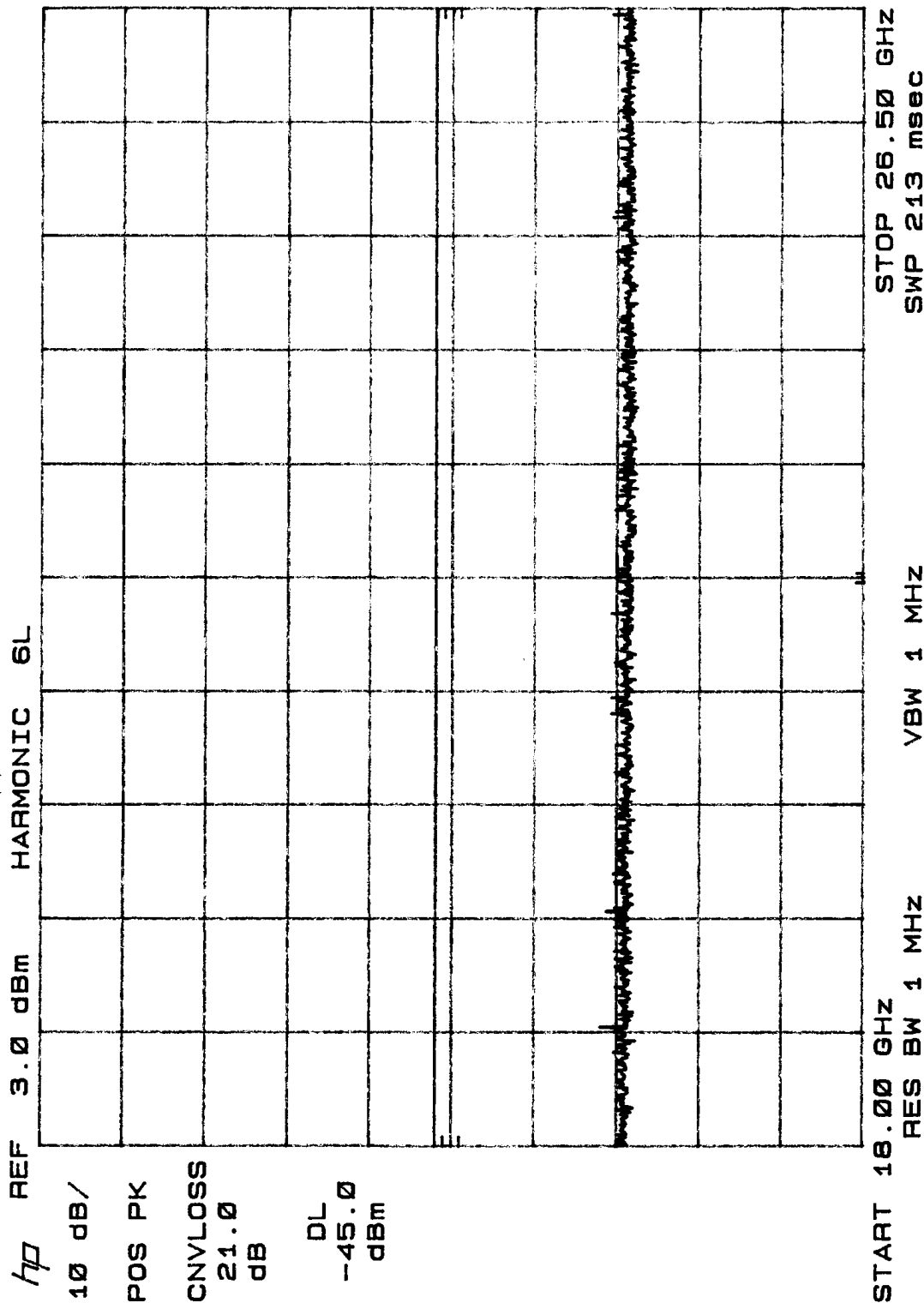


START 12.00 GHz RES BW 1 MHz VBW 3 MHz STOP 18.00 GHz SWP 150 msec

Sep. 26, 2001
TECH/ENGR. *MB*

Report No.: SC106727
Mode: *QPSK 3/4 Channel 2*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

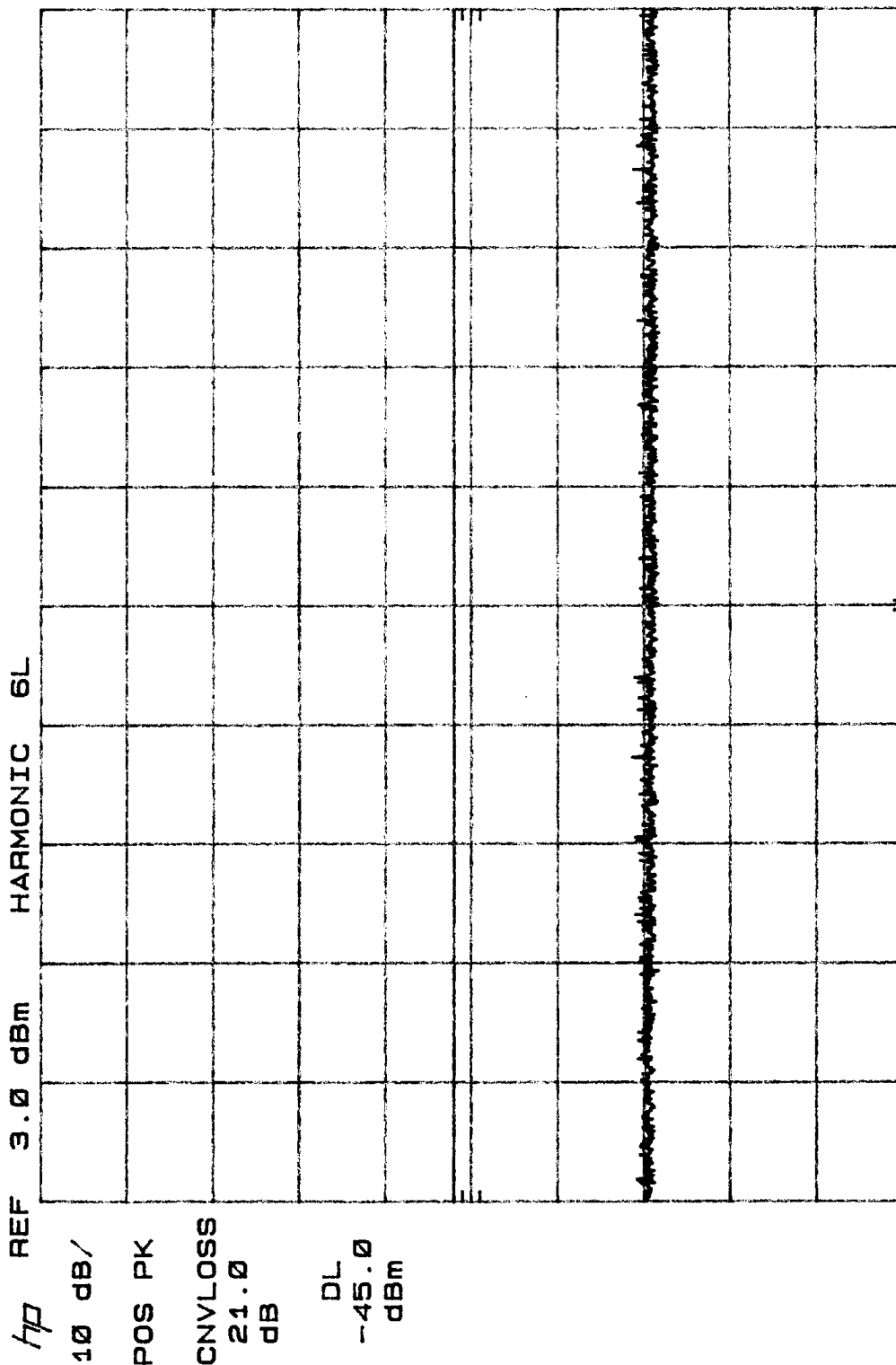


Sep. 26, 2001
TECH/ENGR. *[Signature]*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

Report No.: SC106727

Mode: 16QAM channel 12

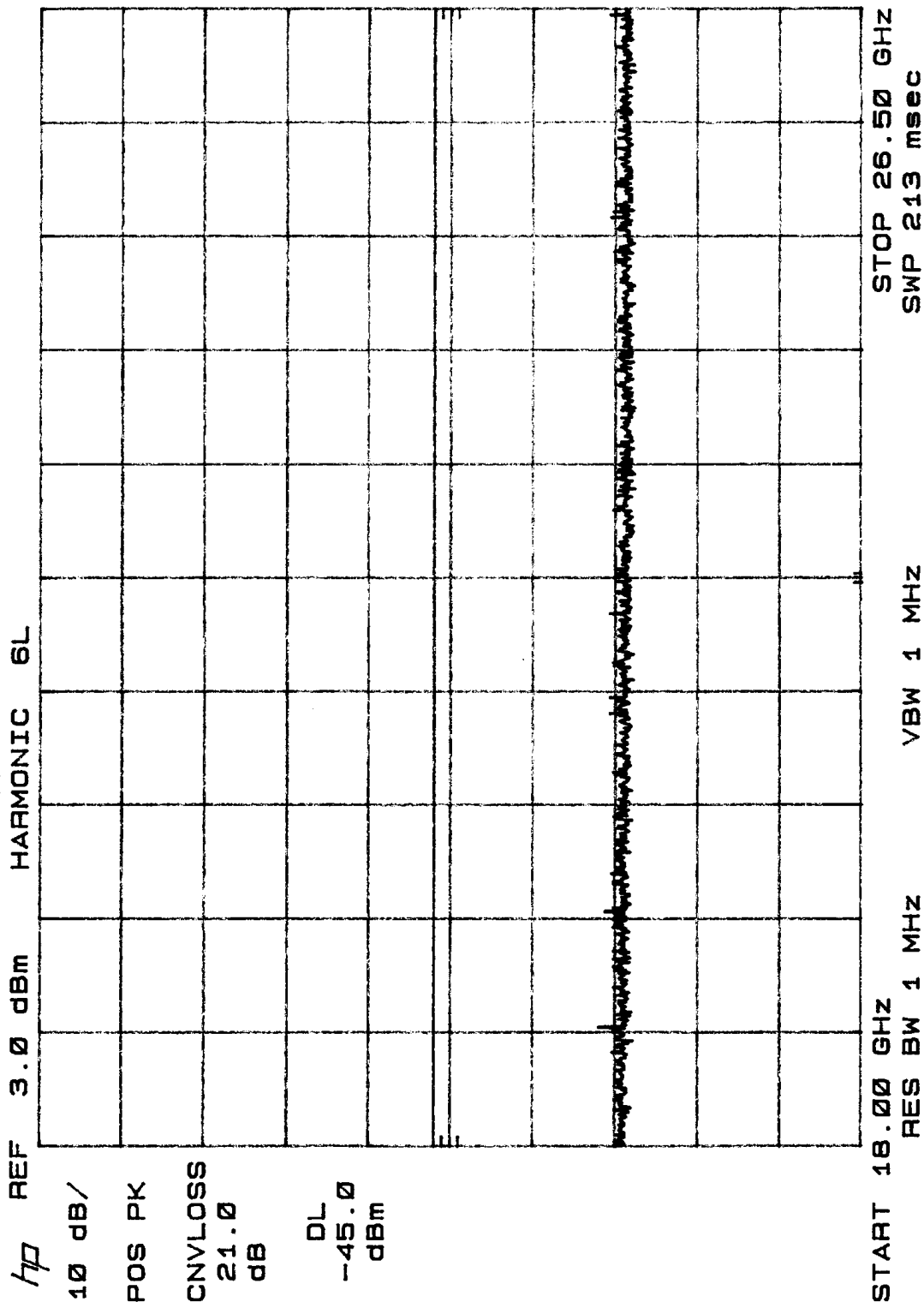


START 18.00 GHz RES BW 1 MHz VBW 1 MHz STOP 26.50 GHz SWP 213 msec

Sep. 26, 2001
TECH/ENGR. *MB*

Report No.: SC106727
Mode: *QPSK 3/4 Channel 2*

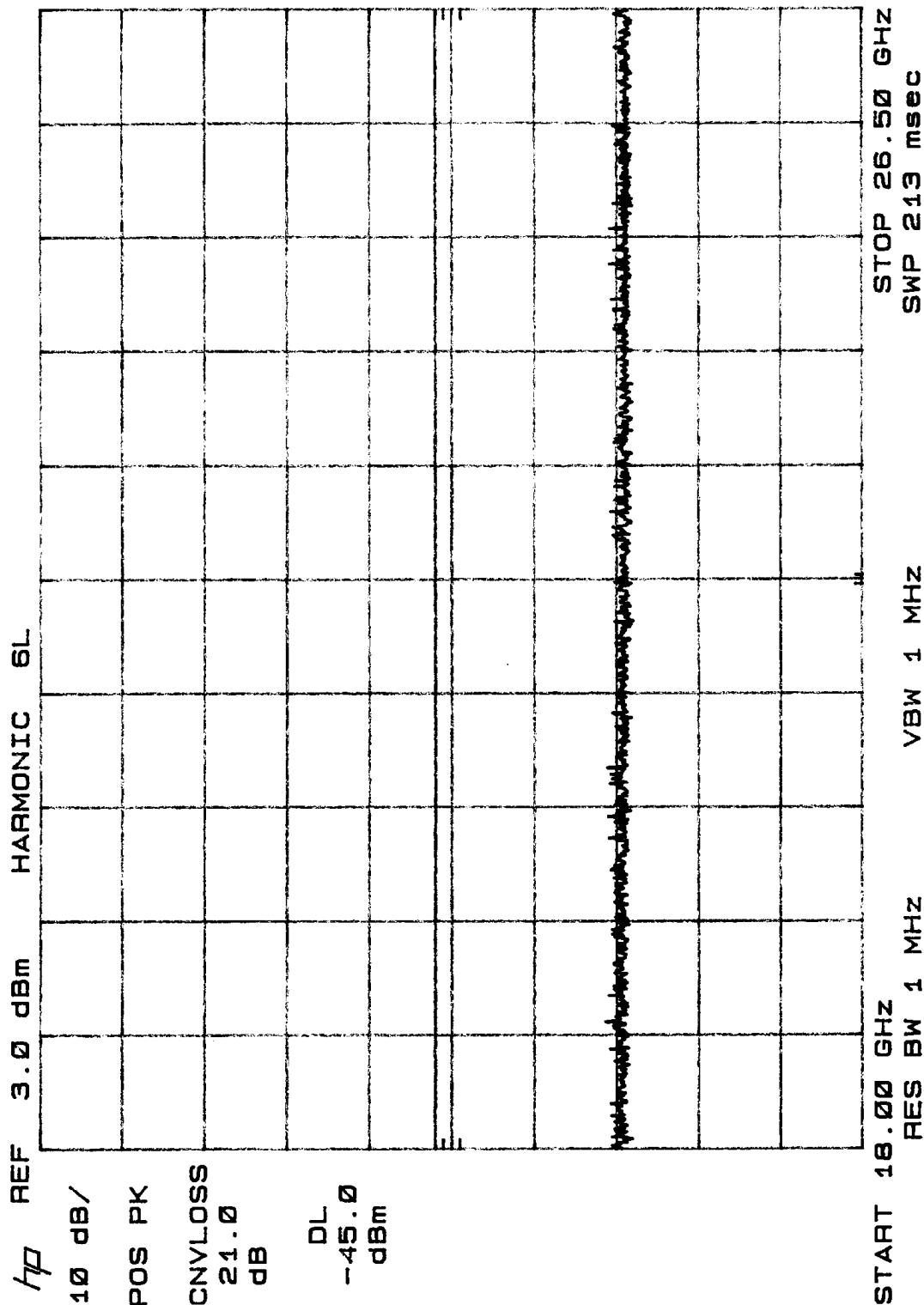
CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)



Sep. 26, 2001
TECH/ENGR. *[Signature]*

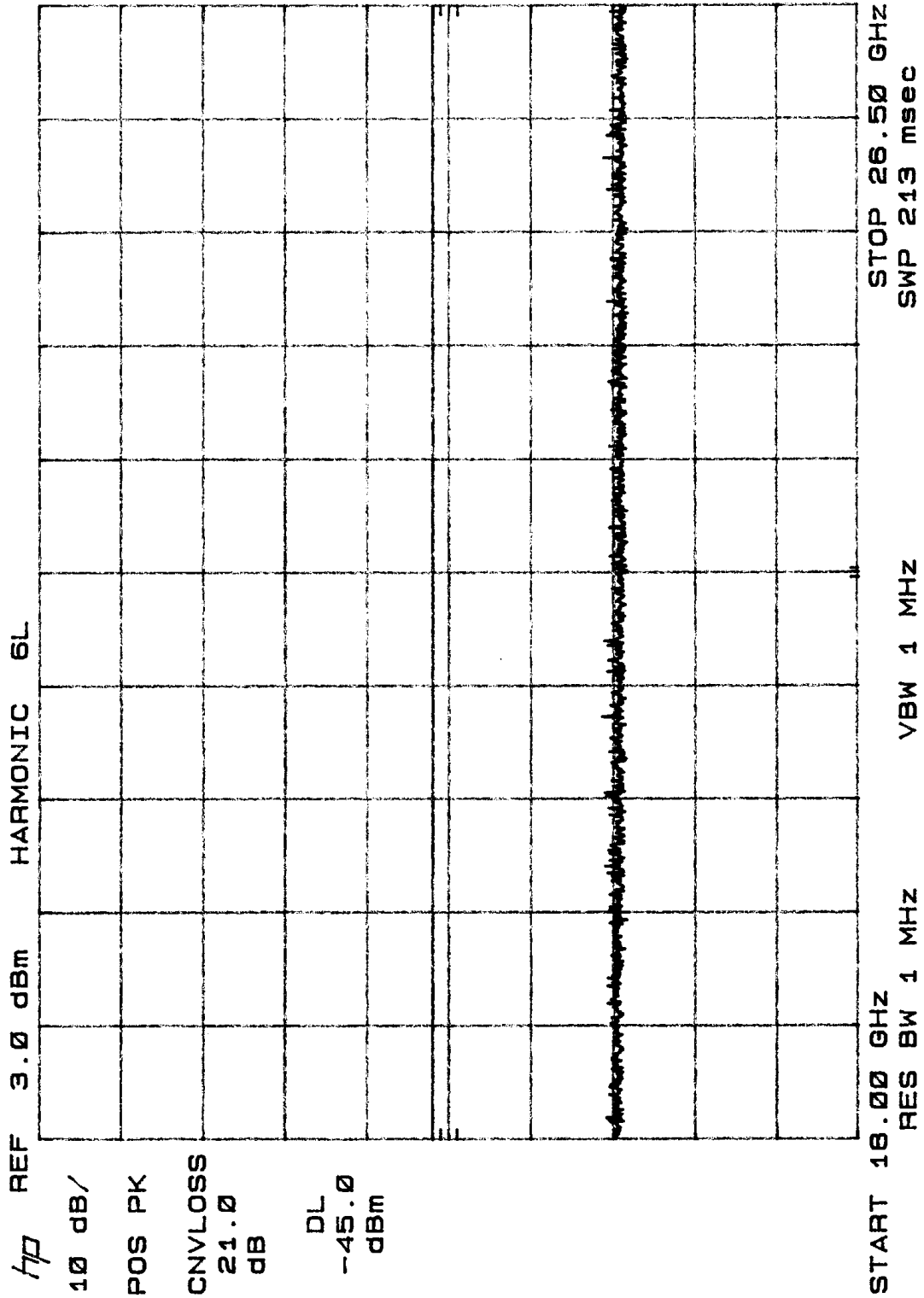
Report No.: SC106727
Mode: *OT-115, 1000, 12*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)



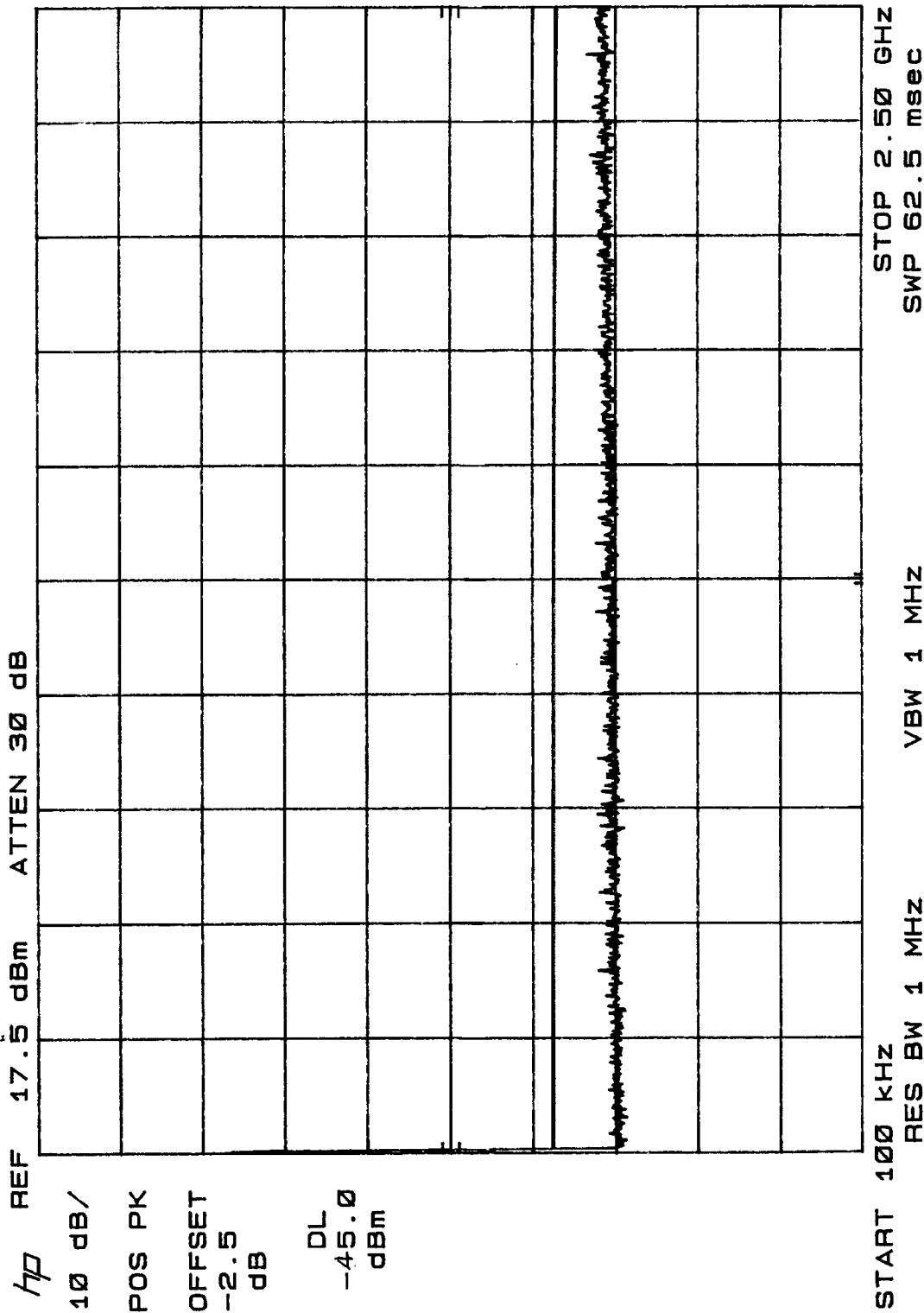
Sep. 26, 2001
TECH/ENGR. *[Signature]*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)
Report No.: SC106727
Mode: *16QAM 64Kbps, 2*



CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

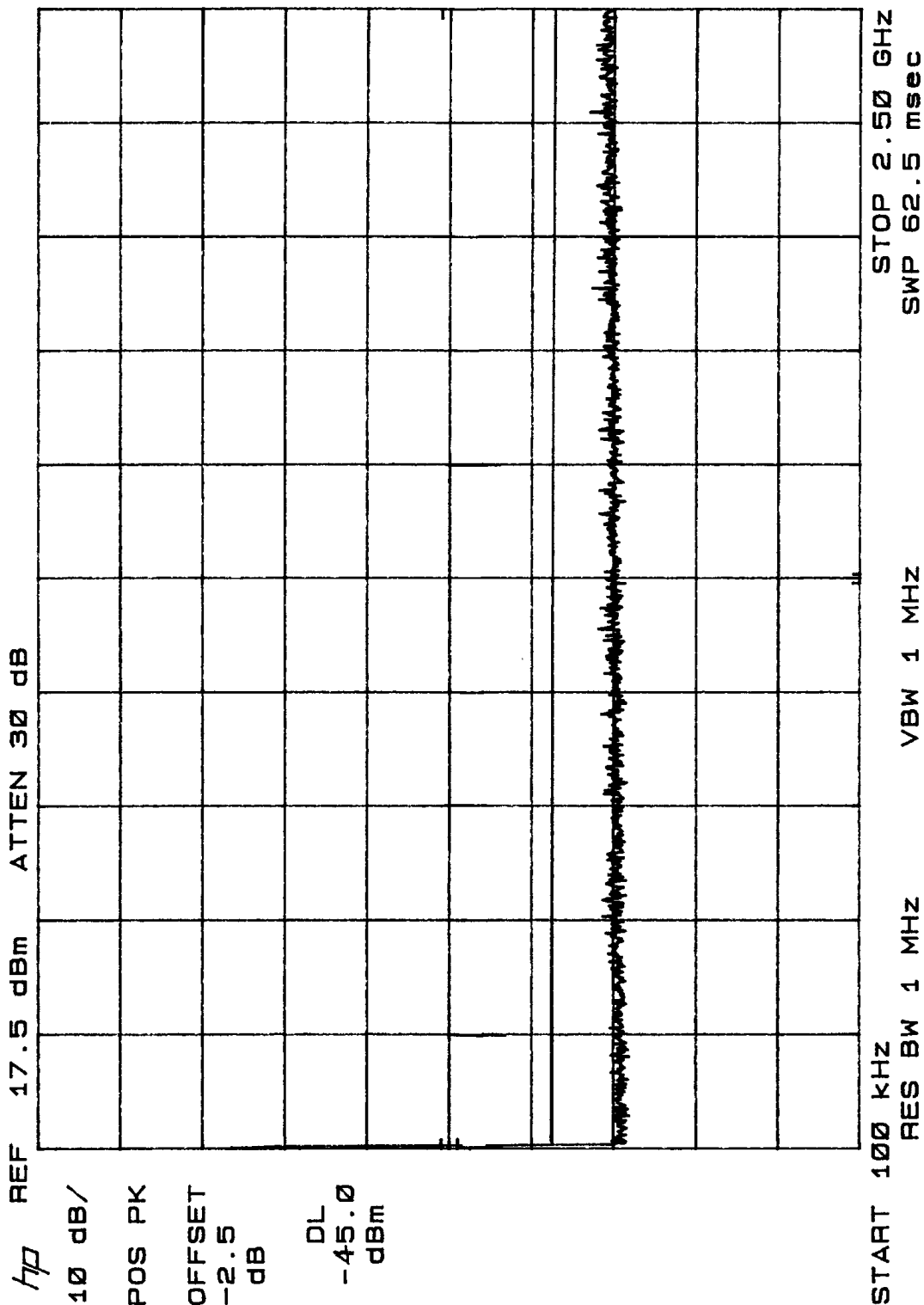
Report No.: SC106727
Mode: *QPSK 3/4 Channel, 5*
Sep. 25, 2001
TECH/ENGR. *DBB*



CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

Report No.: SC106727
Mode: 16QAM Channel, 5

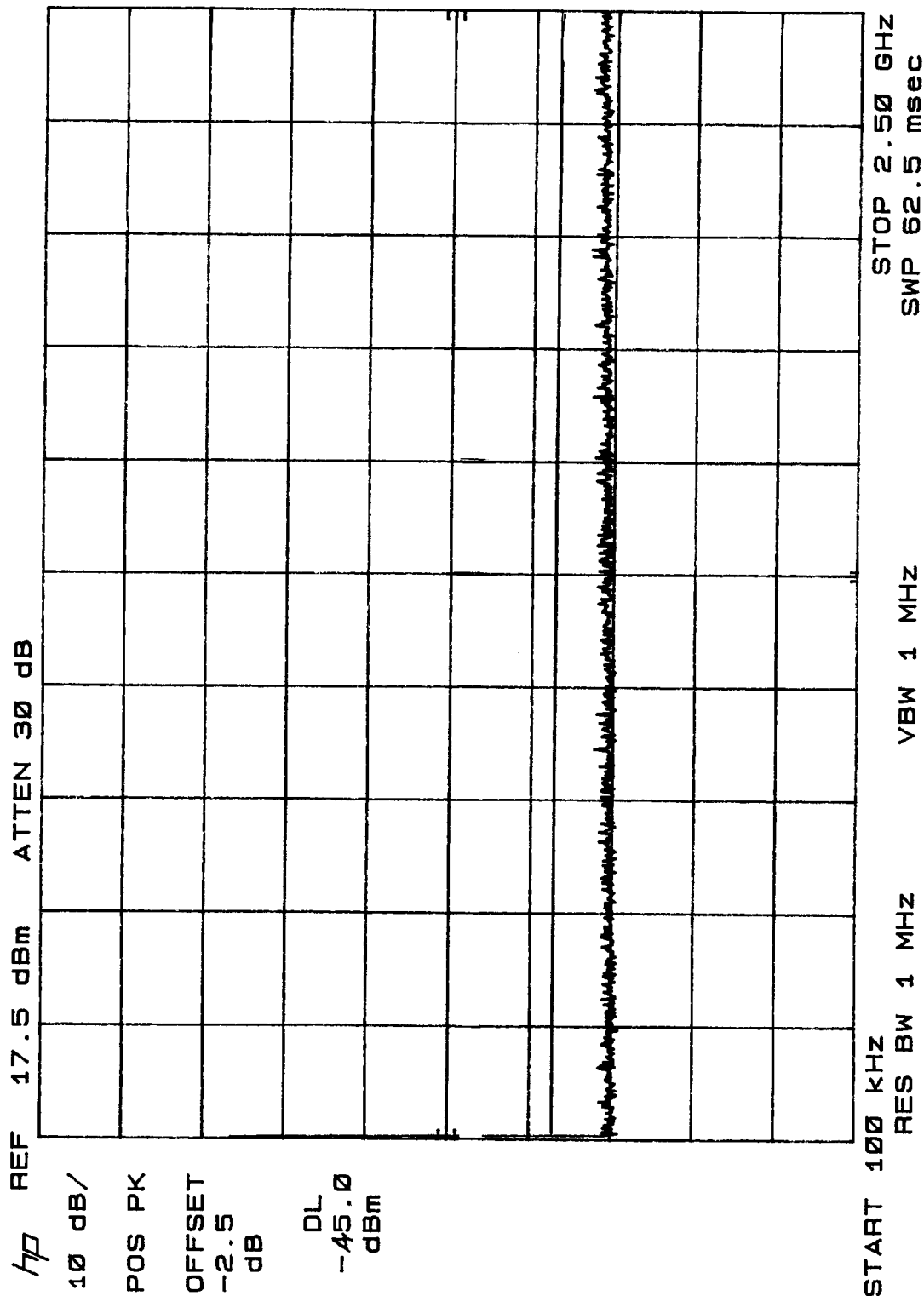
Sep. 25, 2001
TECH/ENGR. *DAZ*



CUSTOMER: WESTERN Multiplex
 EUT: UNII Radio FCCID: HZB-U58-B60
 TEST: Out of Band Antenna Conducted Part 15.407(b)

Report No.: SC106727
 Mode: 8 QAM Channel 1, 5

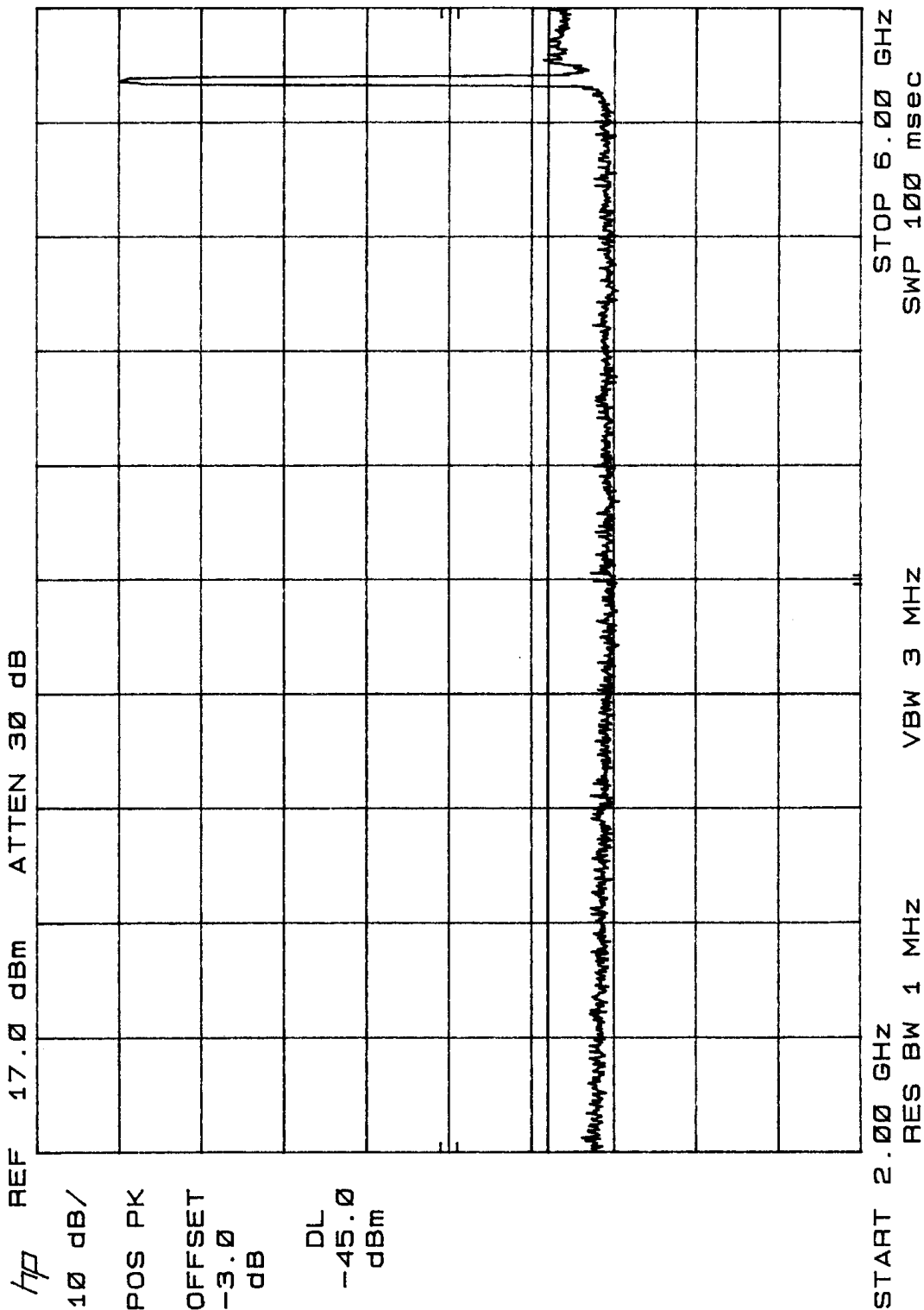
Sep. 25, 2001
 TECH/ENGR. *DBB*



CUSTOMER: WESTERN Multiplex
 EUT: UNII Radio FCCID: HZB-U58-B60
 TEST: Out of Band Antenna Conducted Part 15.407(b)

Report No.: SC106727
 Mode: QAM 8, channel, 5

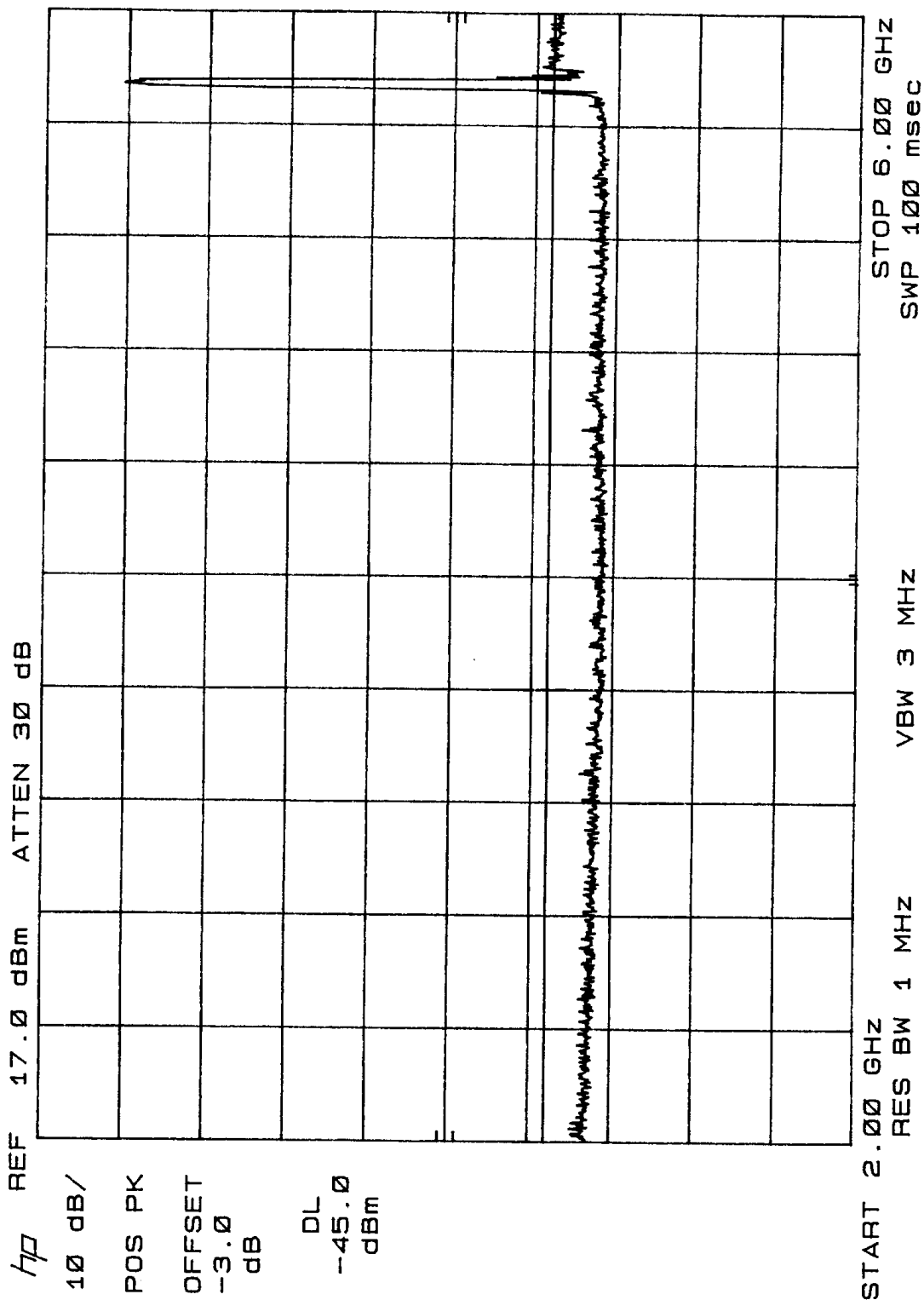
Sep. 27, 2001
 TECH/ENGR. *DB*



Sep. 27, 2001
TECH/ENGR. *10/83*

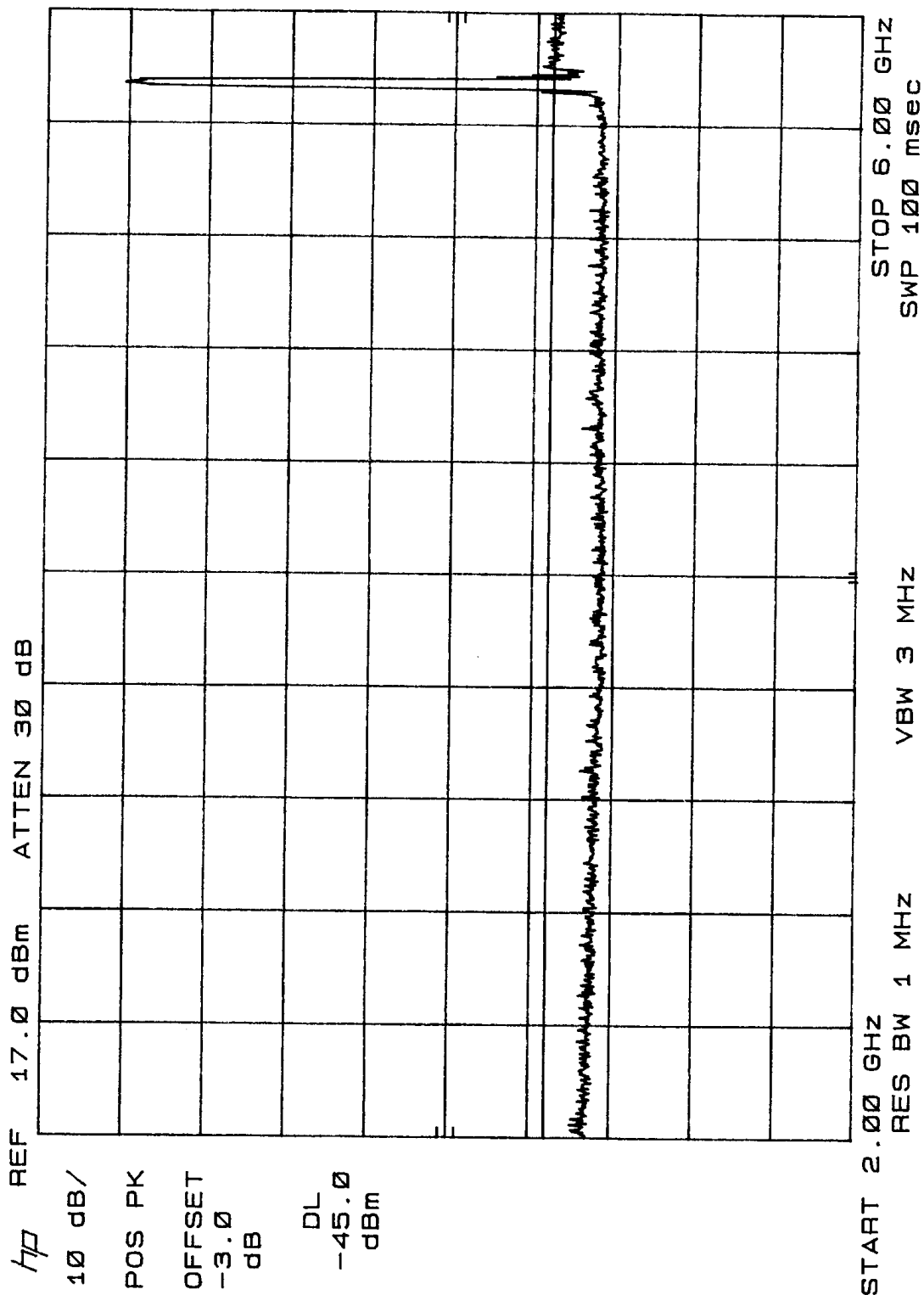
Report No.: SC106727
Mode: *QAM16, channels, 5*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)



CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)

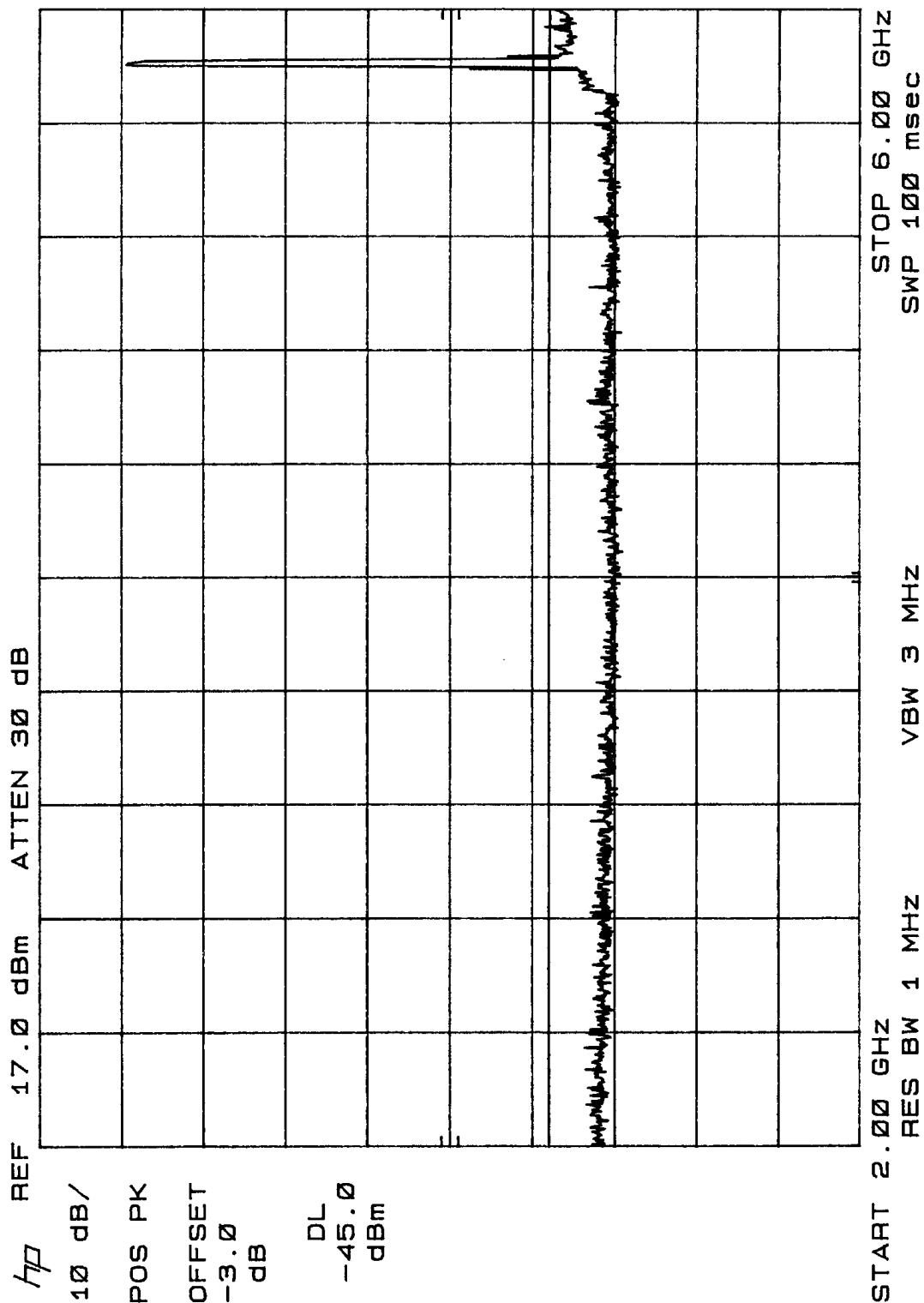
Report No.: SC106727
Mode: QAM16, channels, 5
Sep. 27, 2001
TECH/ENGR. 10003



CUSTOMER: WESTERN Multiplex
 EUT: UNII Radio FCCID: HZB-U58-B60
 TEST: Out of Band Antenna Conducted Part 15.407(b)

Report No.: SC106727
 Mode: QPSK 34, Channel 5

Sep. 27, 2001
 TECH/ENGR *RB*



CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted

hp REF 7.0 dBm ATTN 30 dB STOP 12.50 GHz
10 dB/ SWP 163 msec
POS PK
OFFSET
-13.0
dB
DL
-45.0
dBm
START 6.00 GHz RES BW 1 MHz VBW 3 MHz

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted

hp REF 7.0 dBm ATTN 30 dB

10 dB/

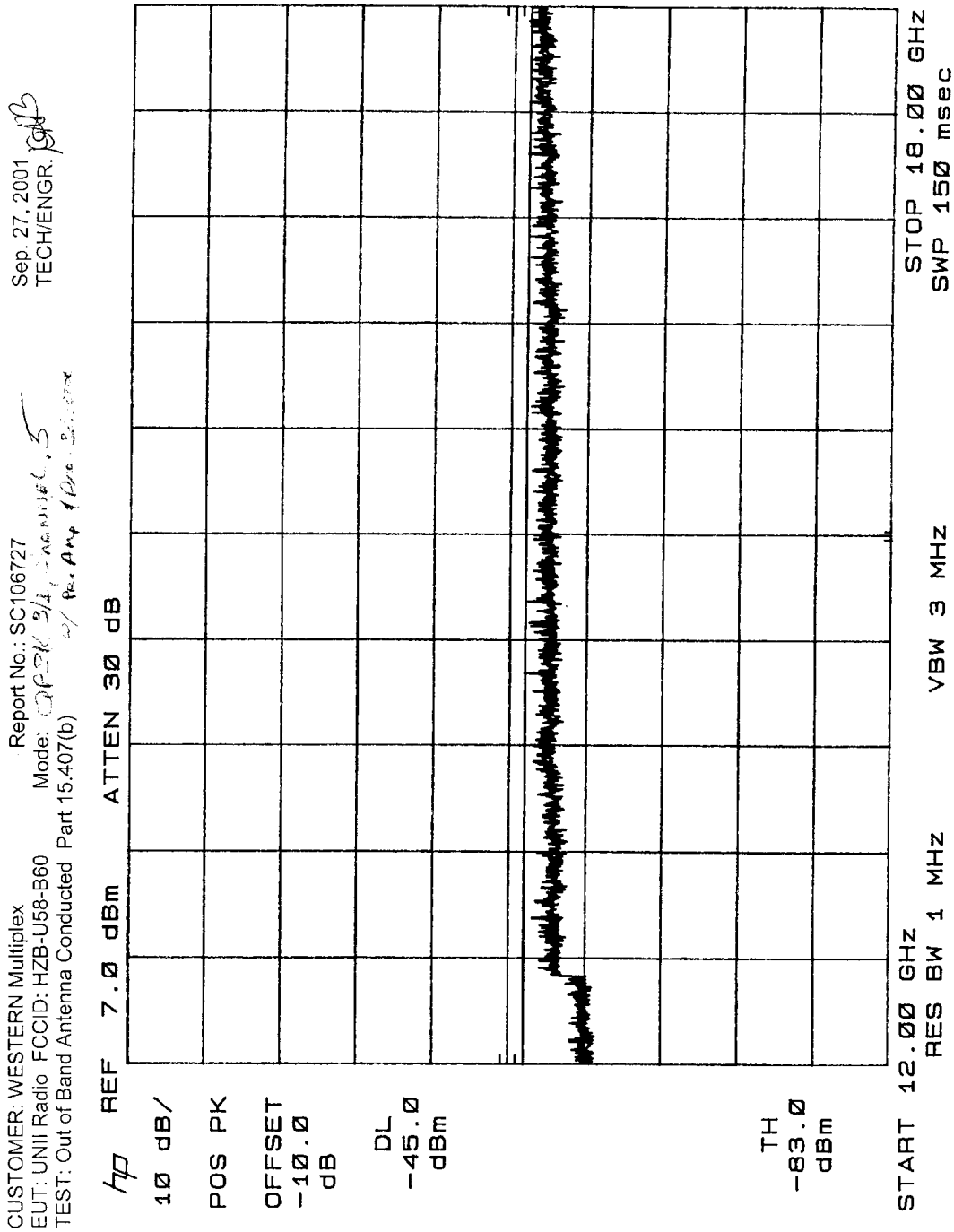
POS PK

OFFSET
-13.0
dB

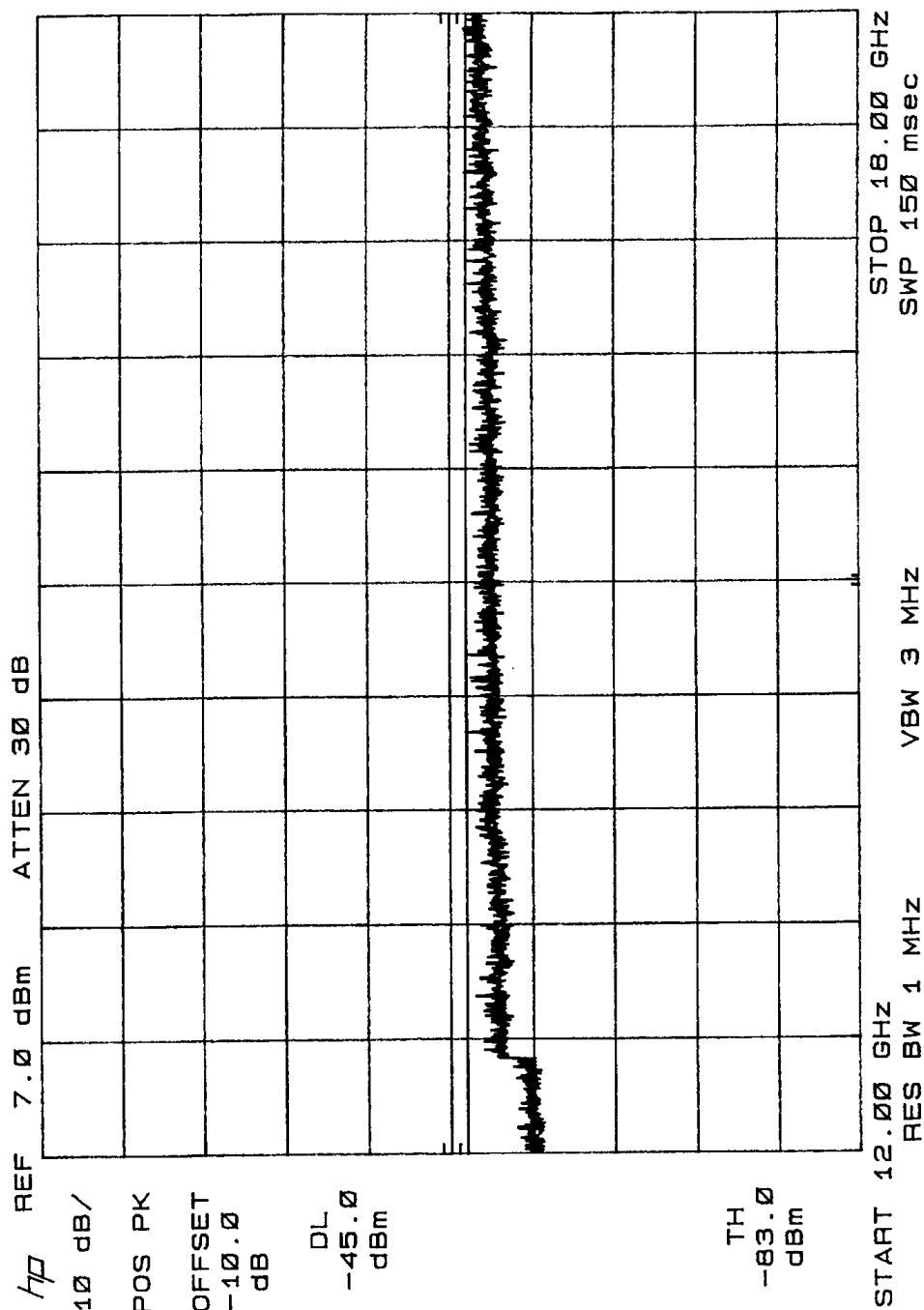
DL
-45.0
dBm

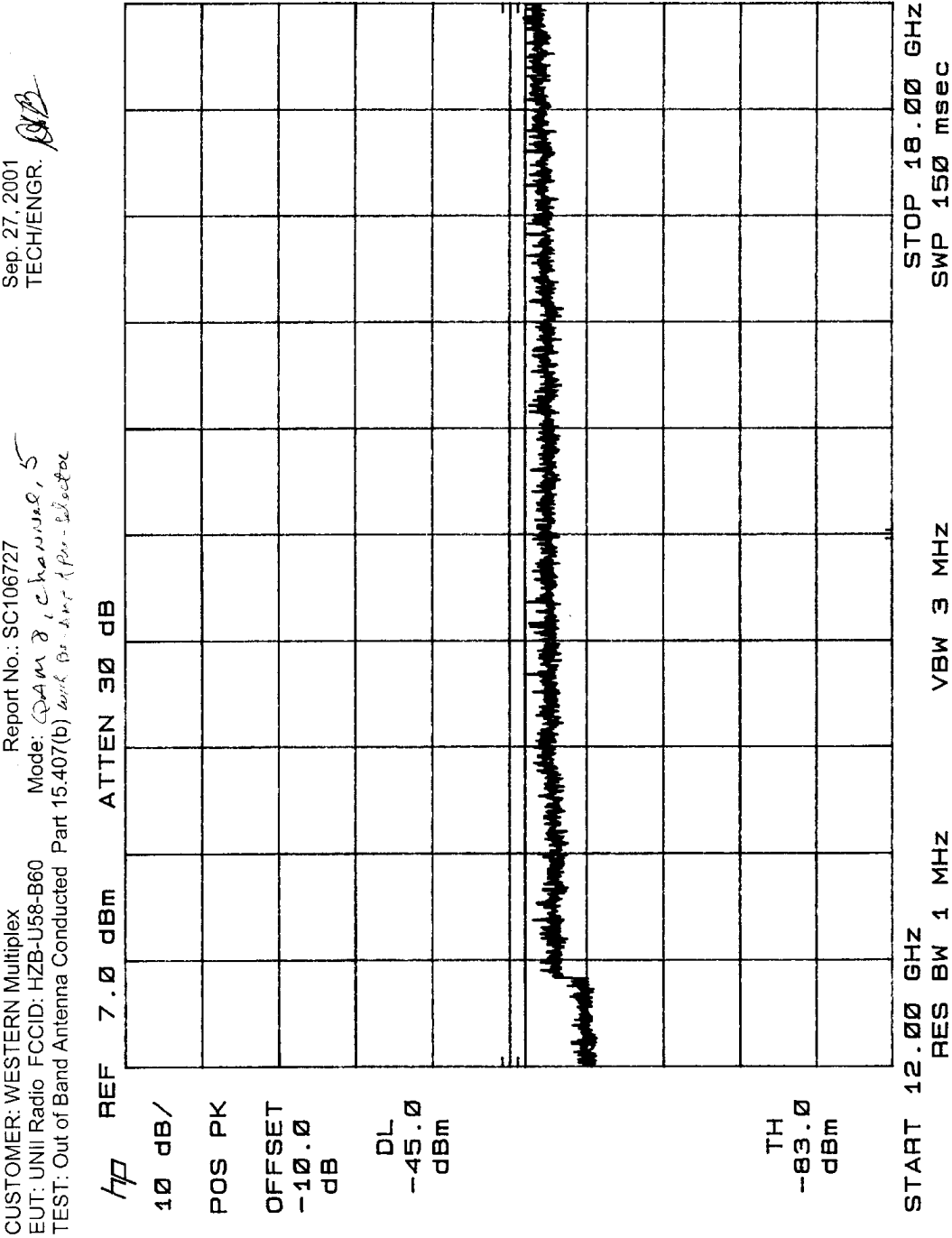
START 6.00 GHz RES BW 1 MHz STOP 12.50 GHz SWP 163 msec

VBW 3 MHz



CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted



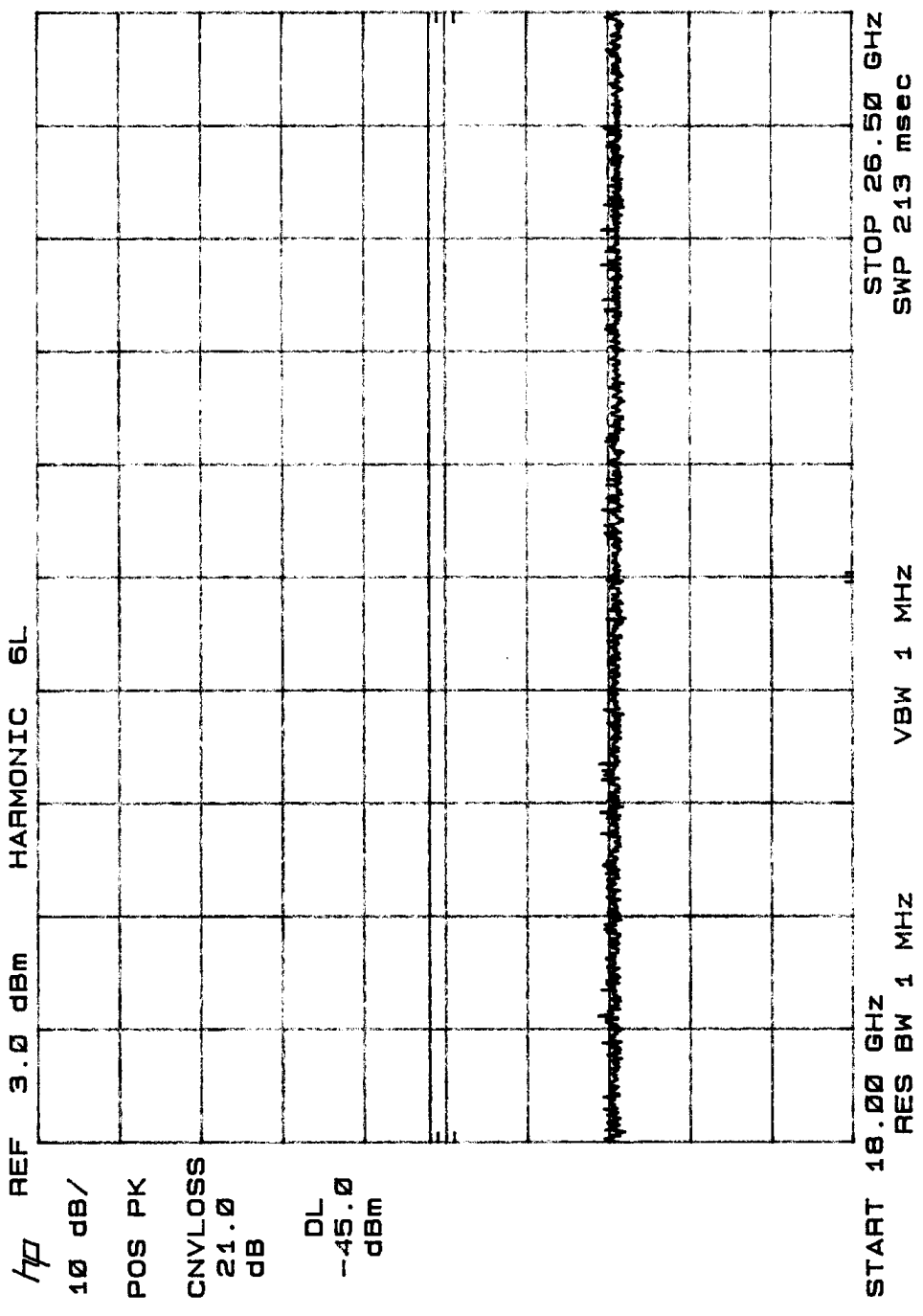


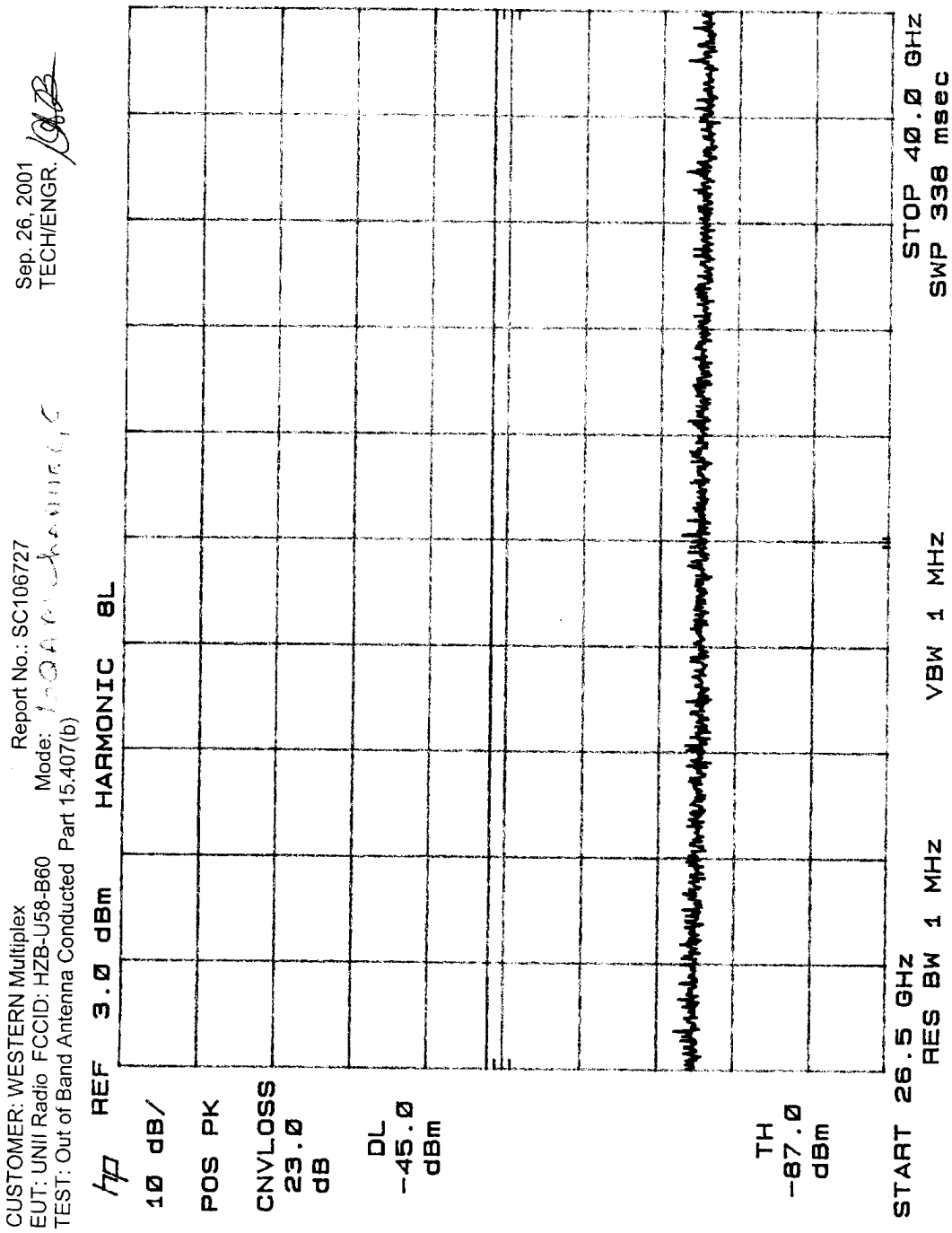


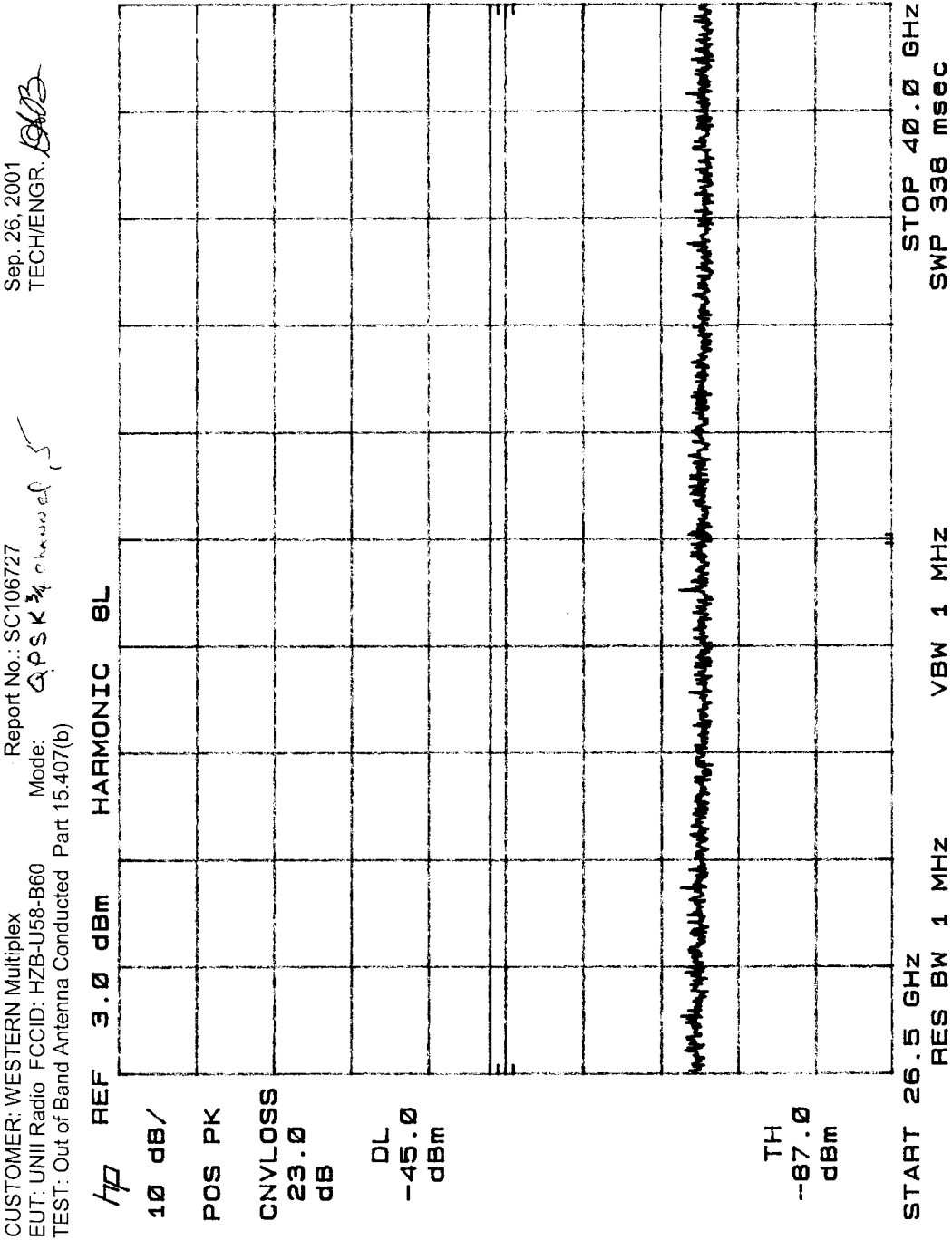
Sep. 26, 2001
TECH/ENGR. *LB*

Report No.: SC106727
Mode: *15*

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)







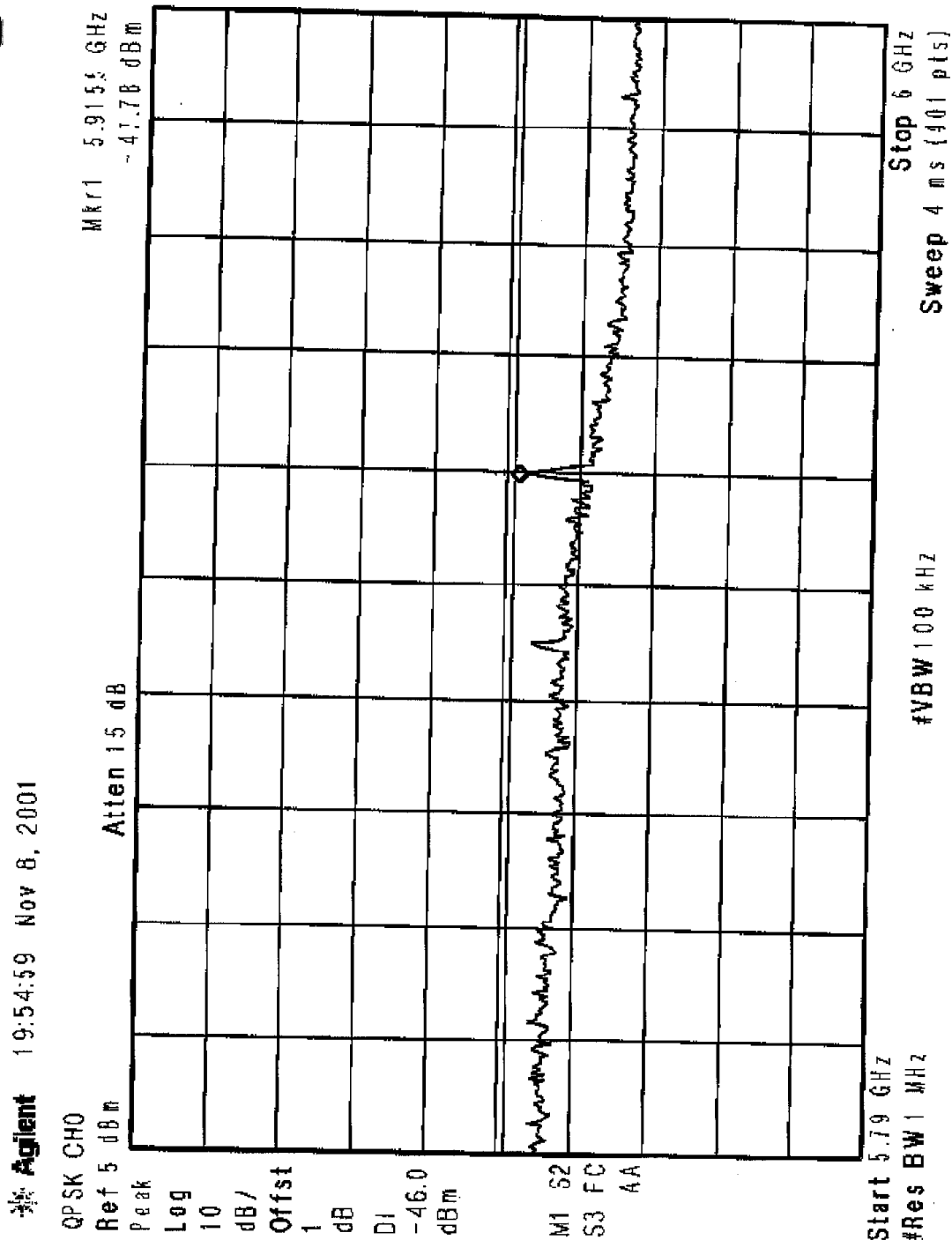
Note: The following are additional plots intended to show compliance with the out-of-band emission requirements in the band from highest band-edge frequency (for channels 0, 2, and 5) to 6 GHz.

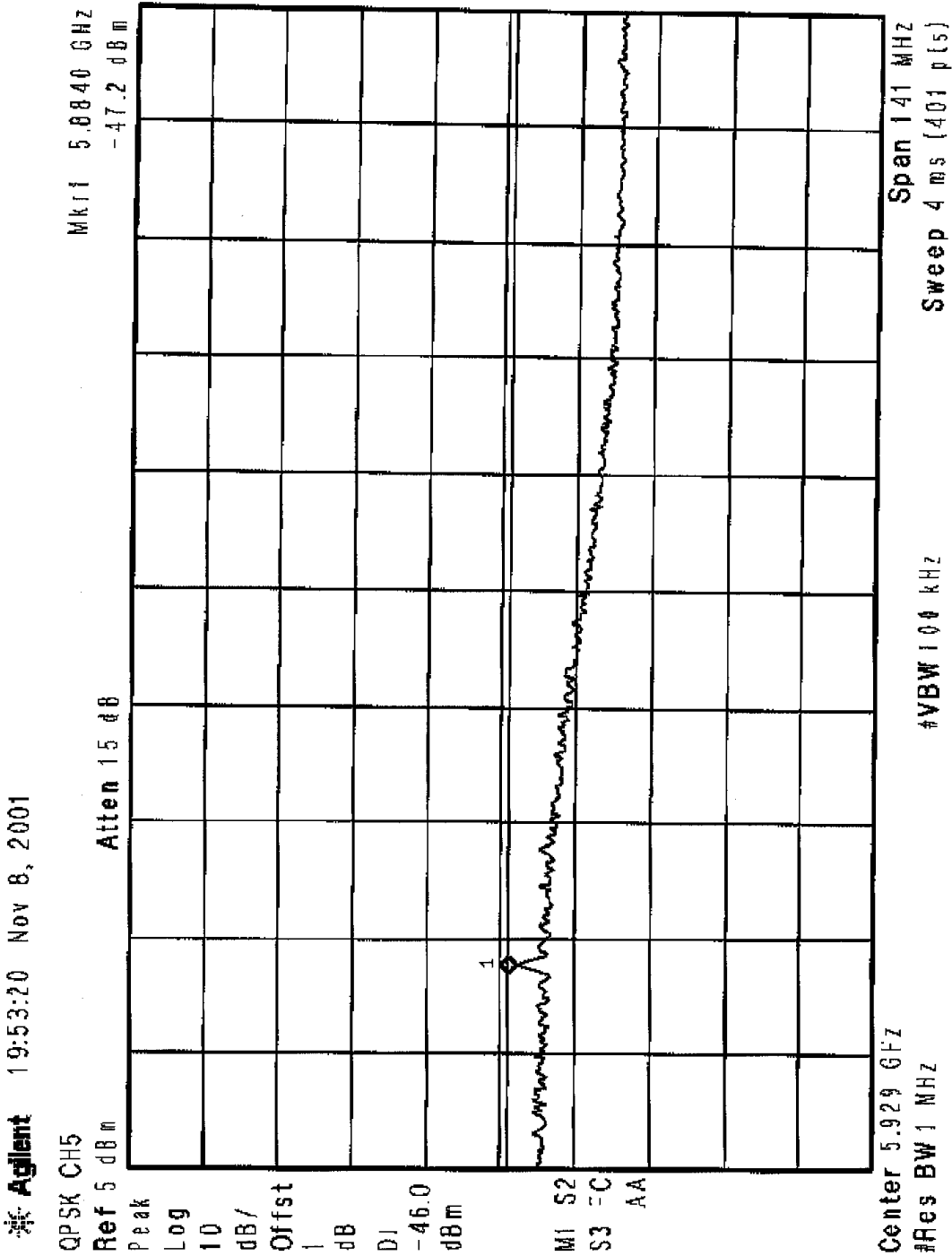
* * * Test data provided by Western Multiplex Corporation. * * *

11/08/2001 20:02 5627333003

WIRELESSHOME CORP

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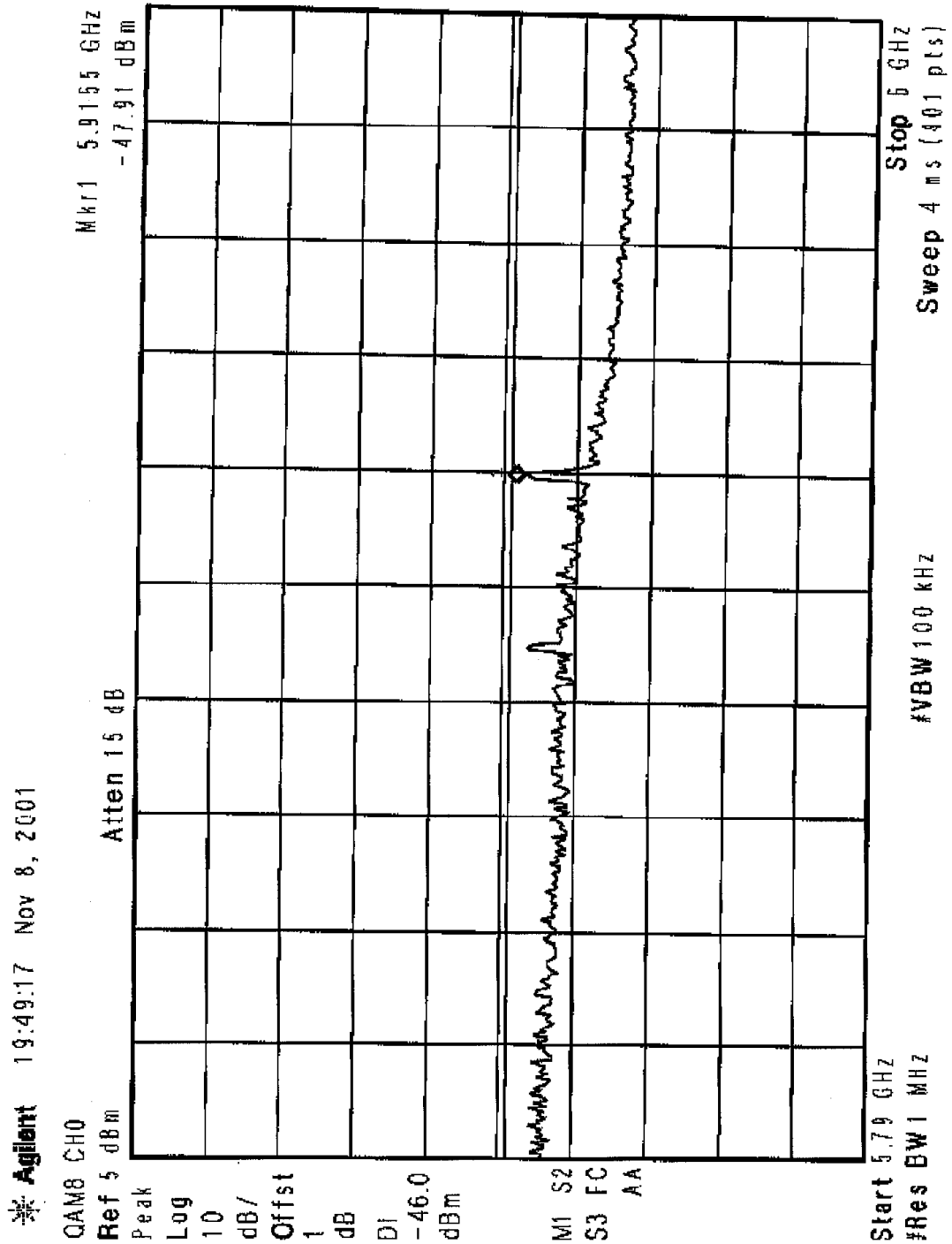


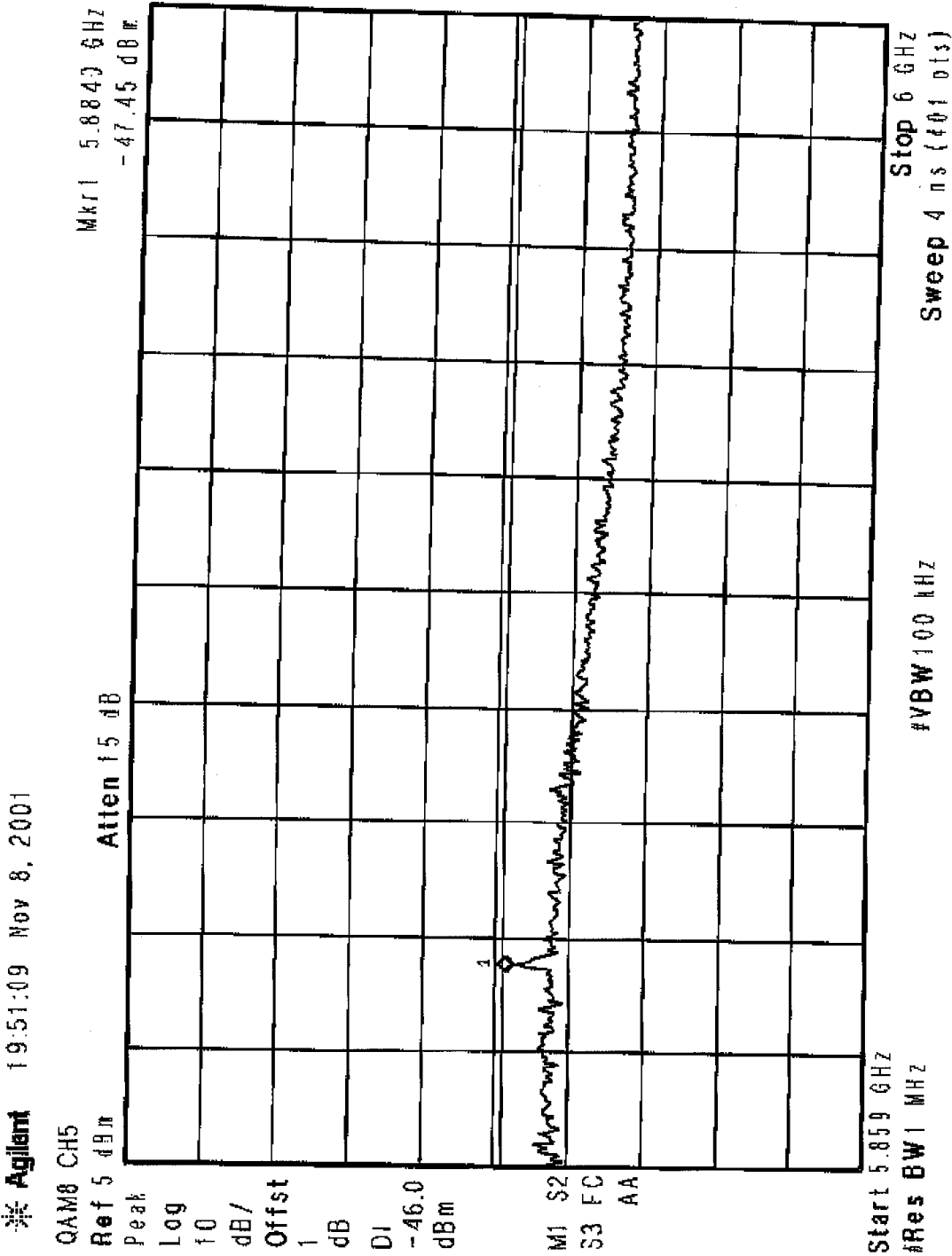


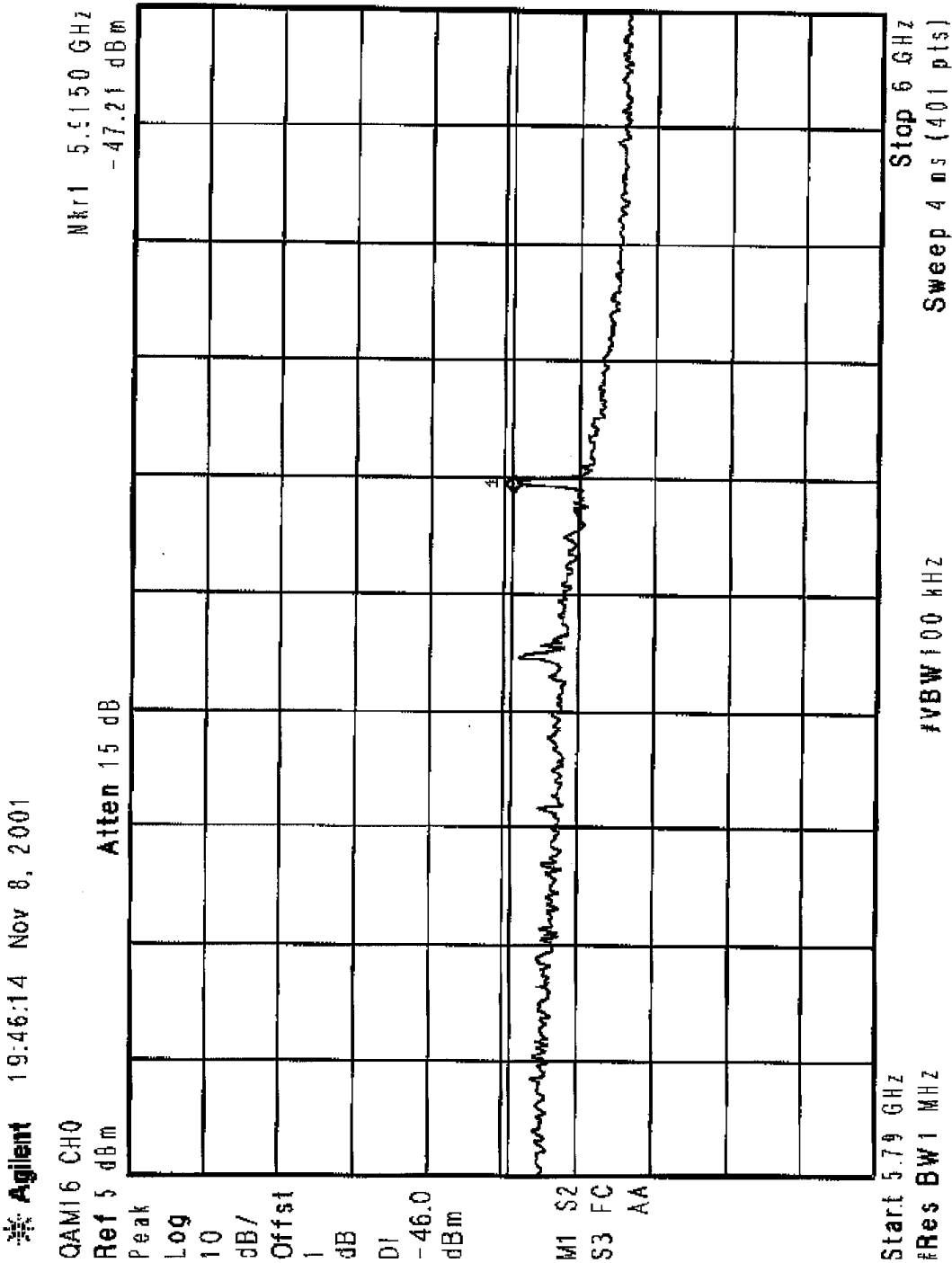
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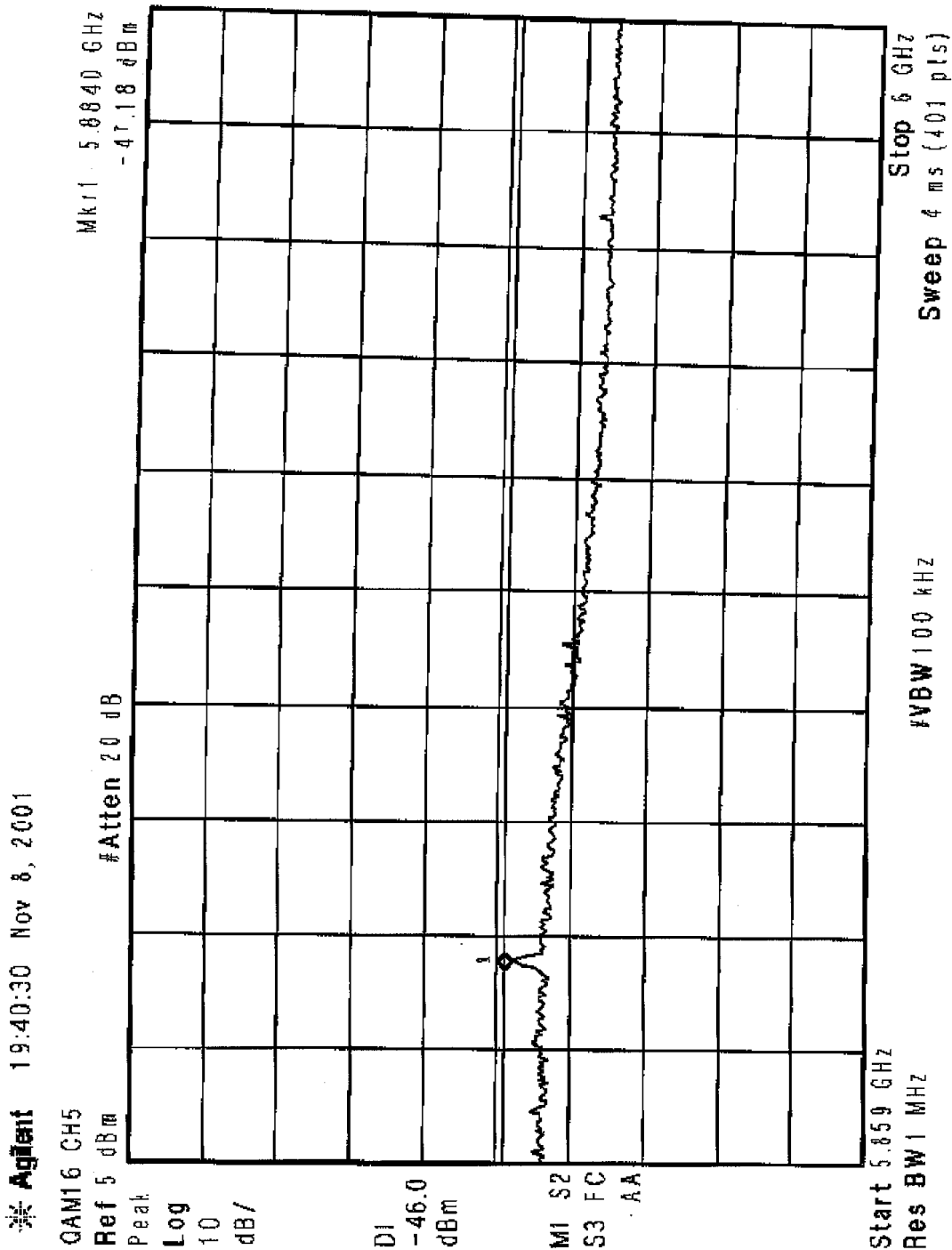
WIRELESSHOME CORP

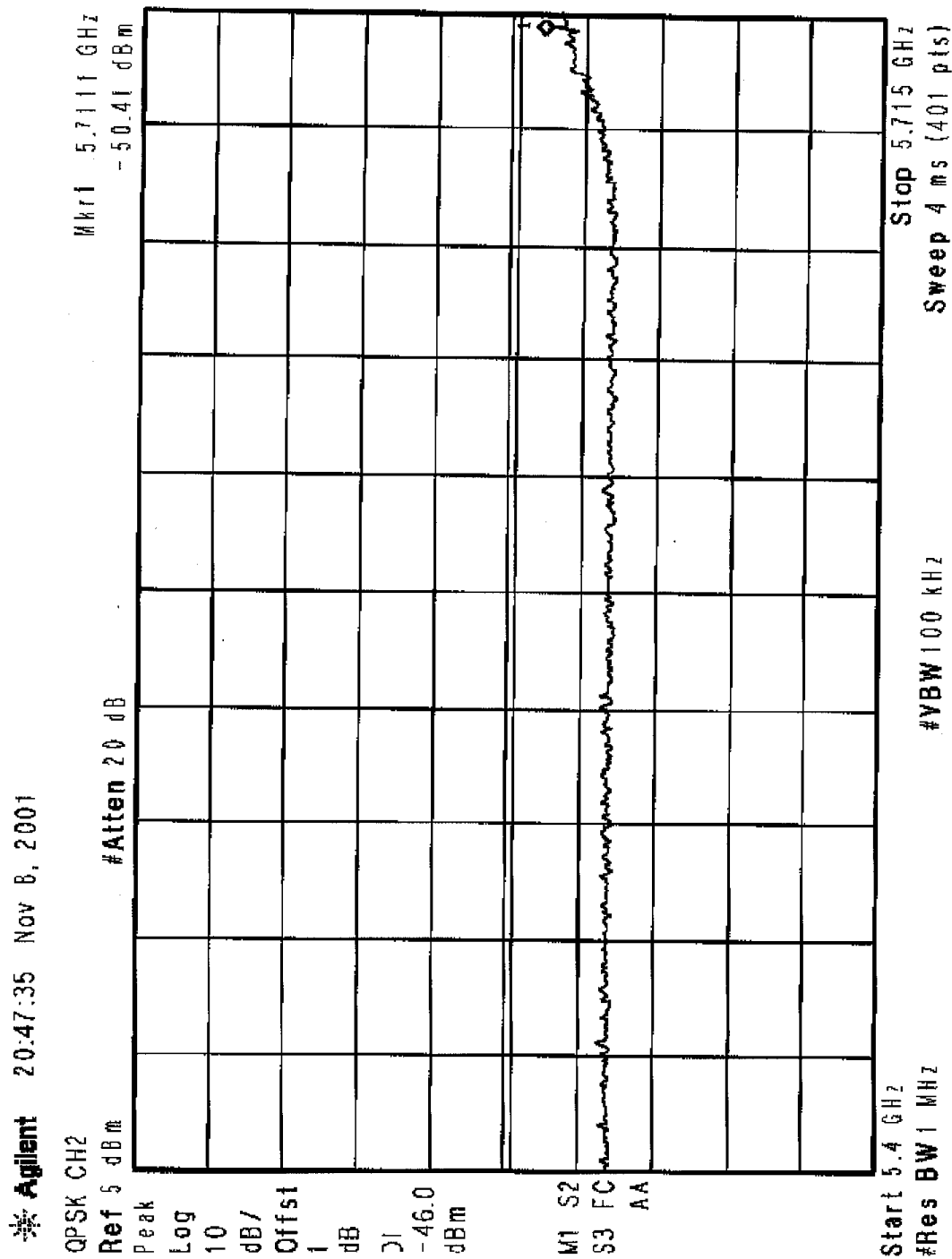
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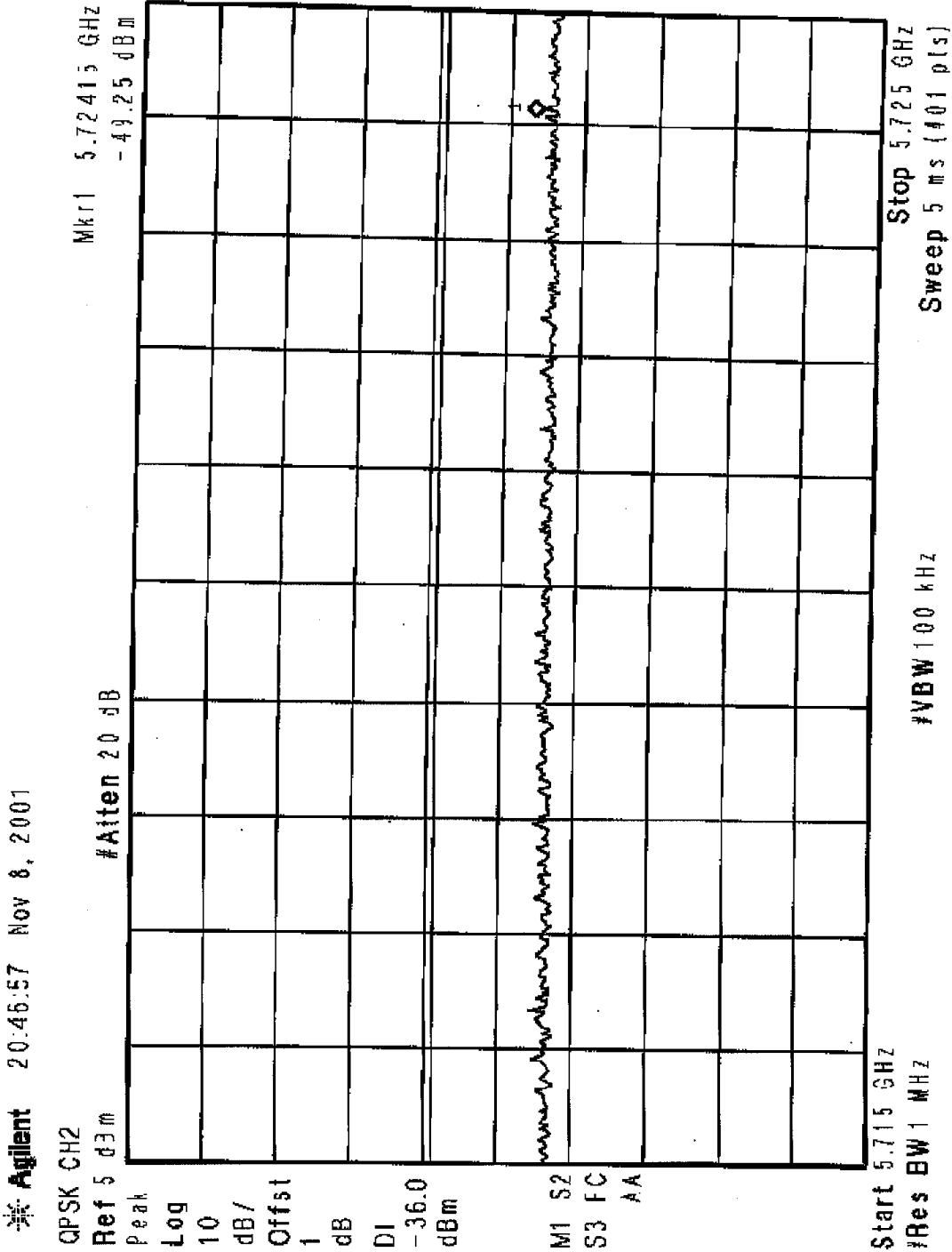


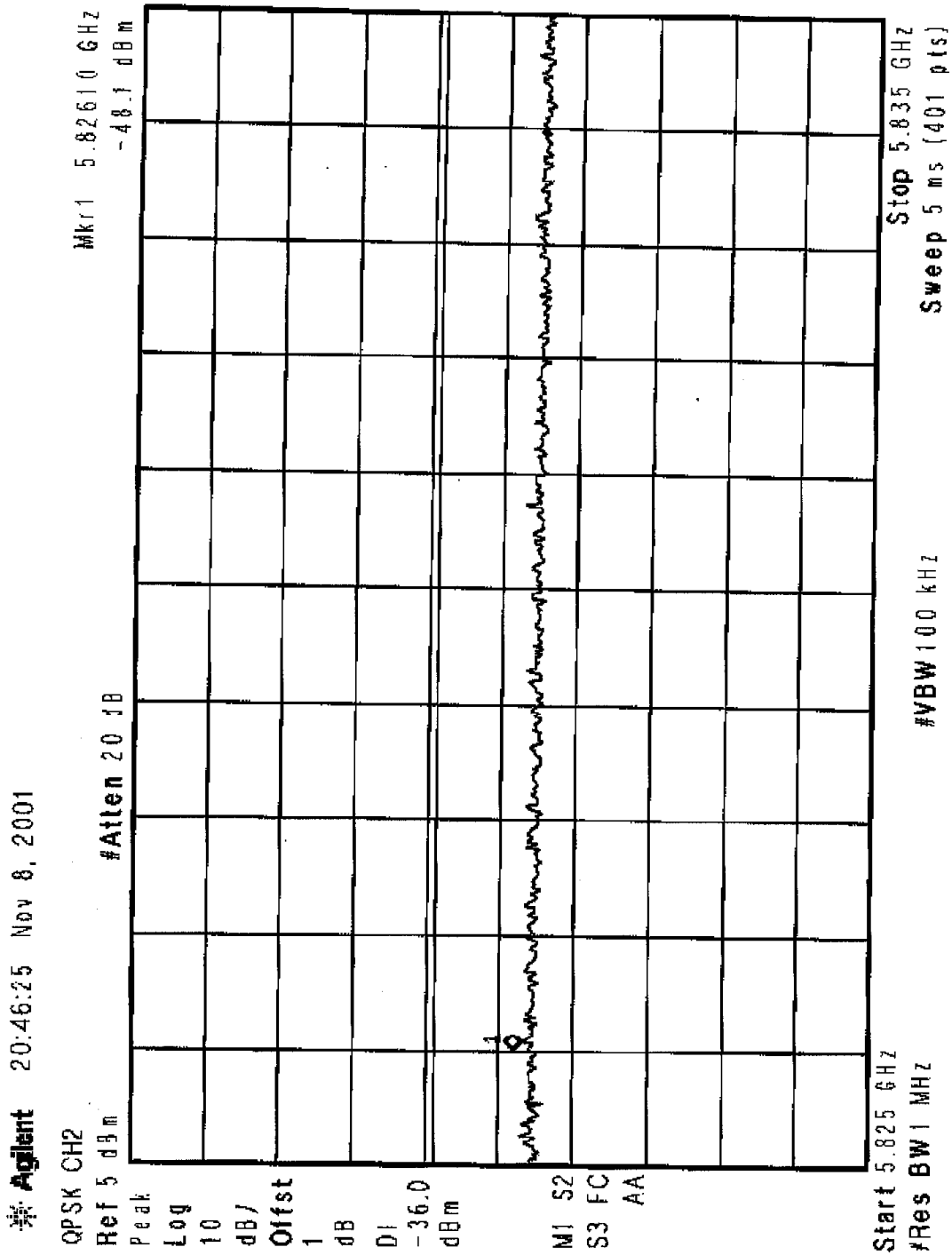








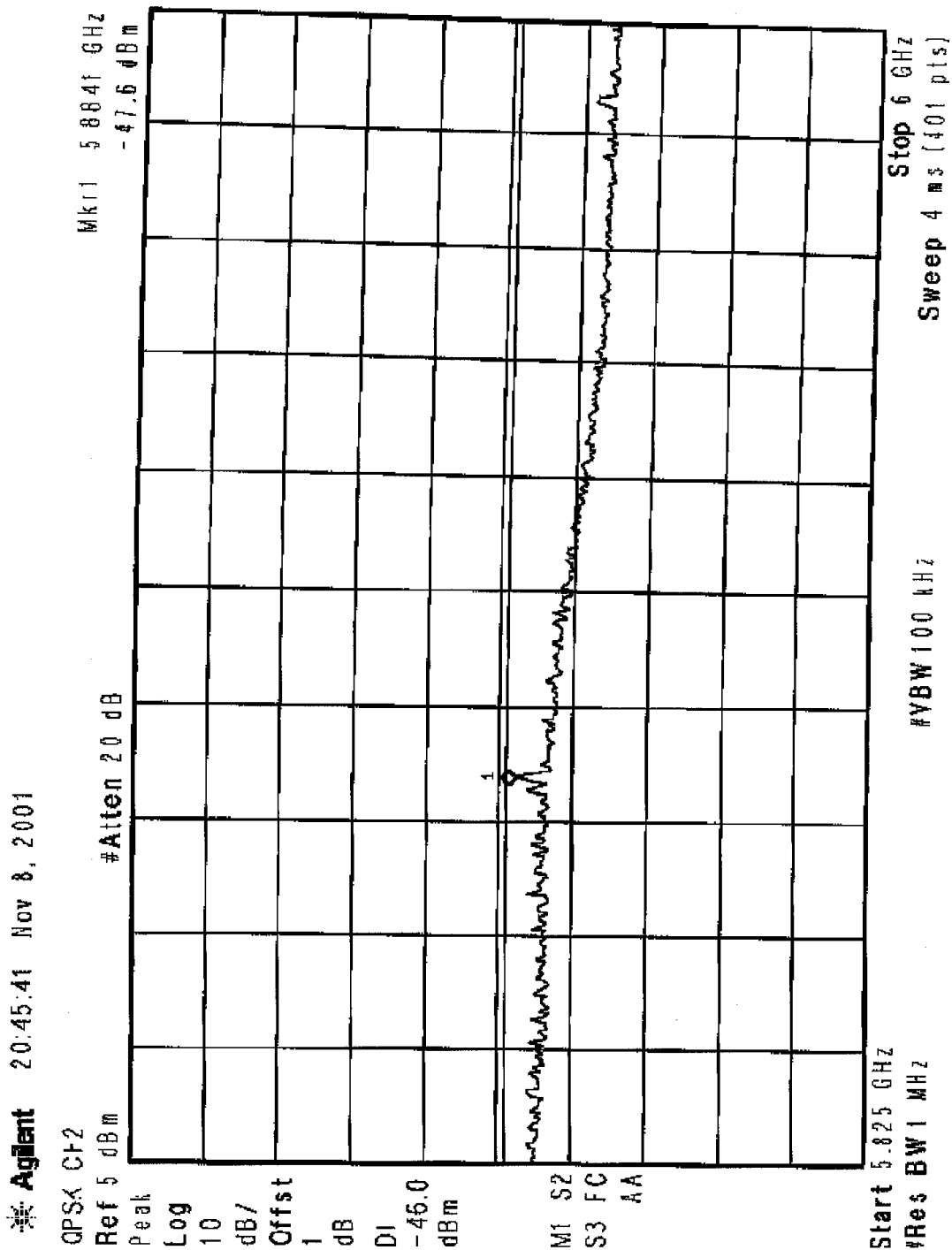


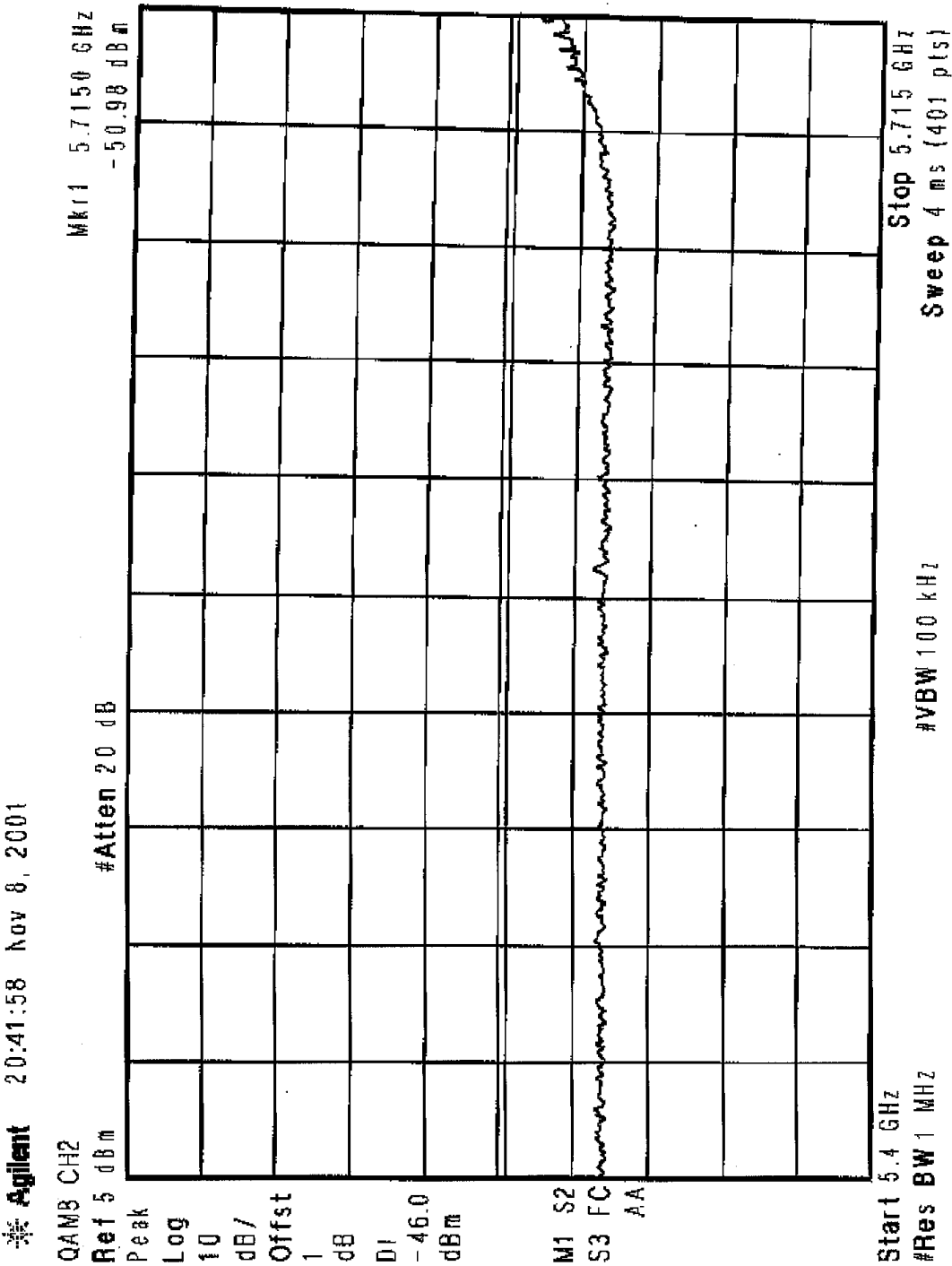


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WIRELESSHOME CORP

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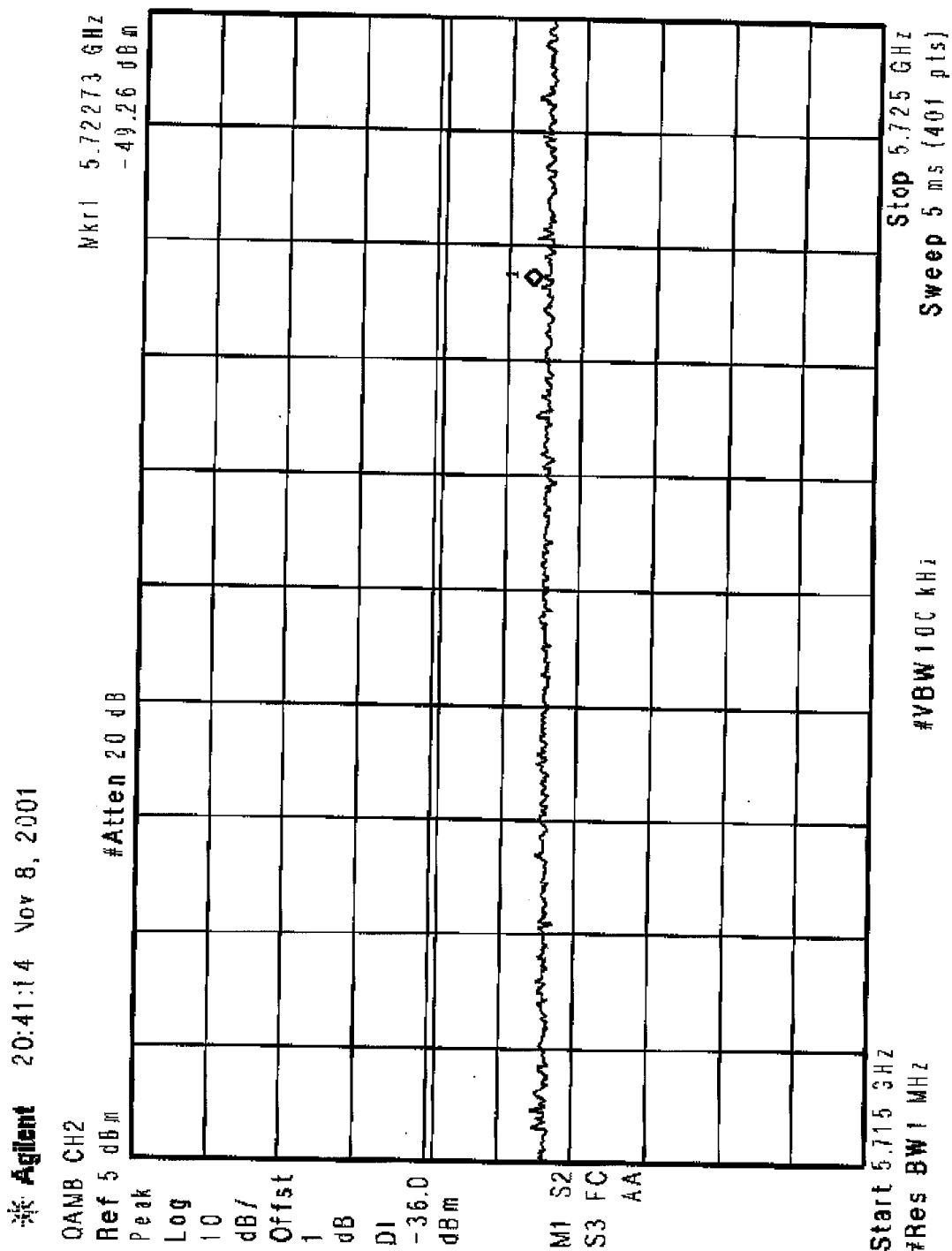




11/08/2001 20:02 5627333003

WIRELESSHOME CORP

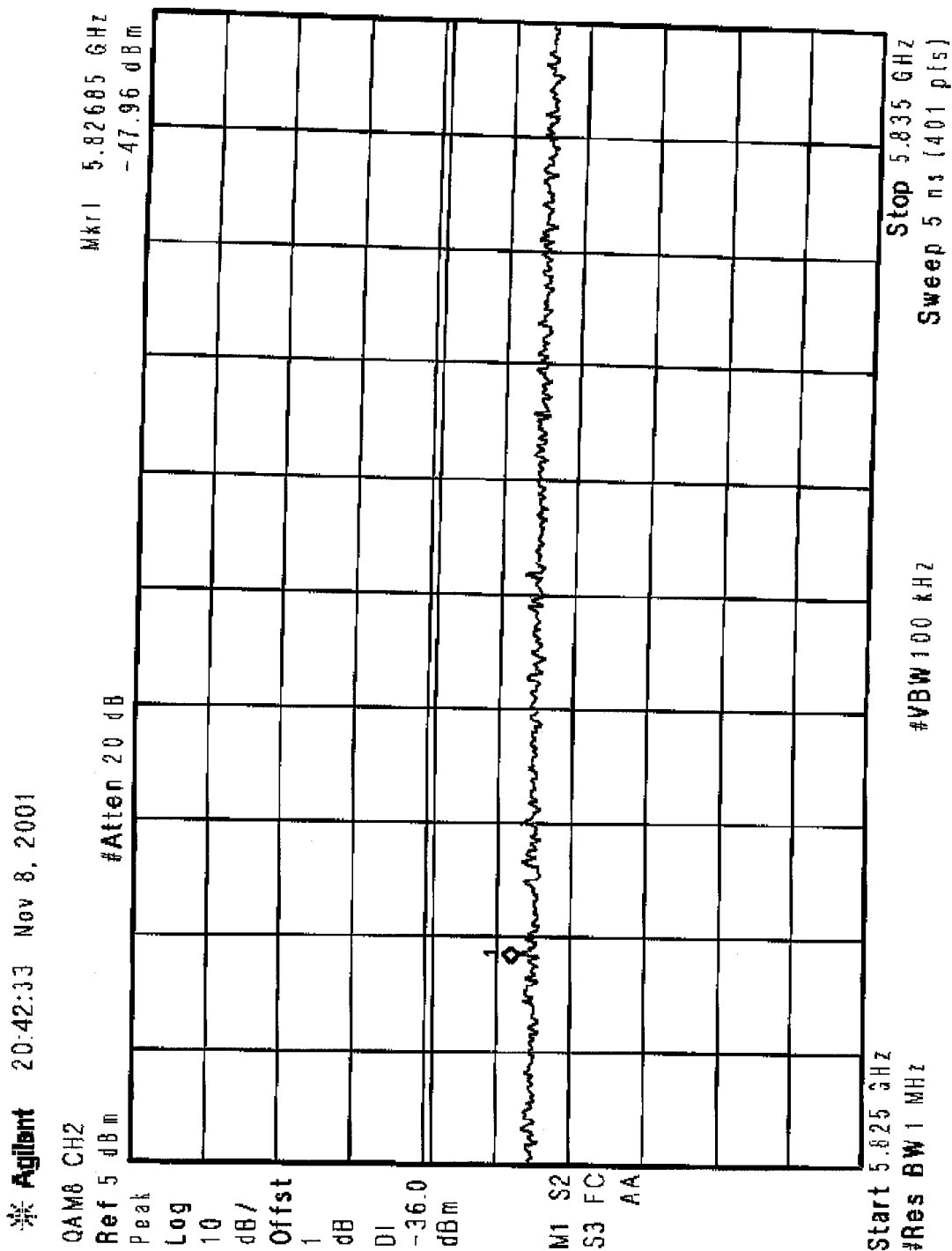
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WIRELESSHOME CORP

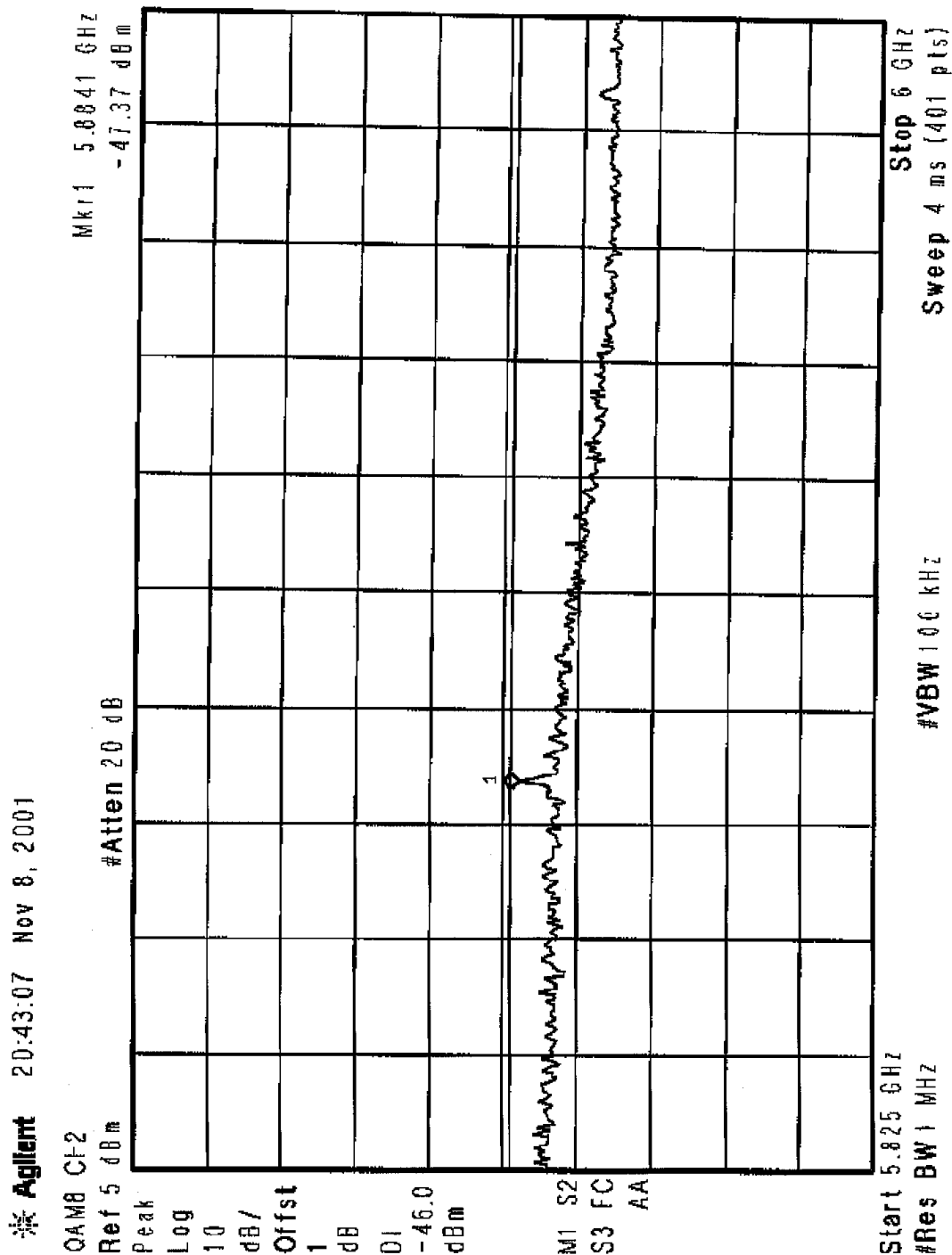
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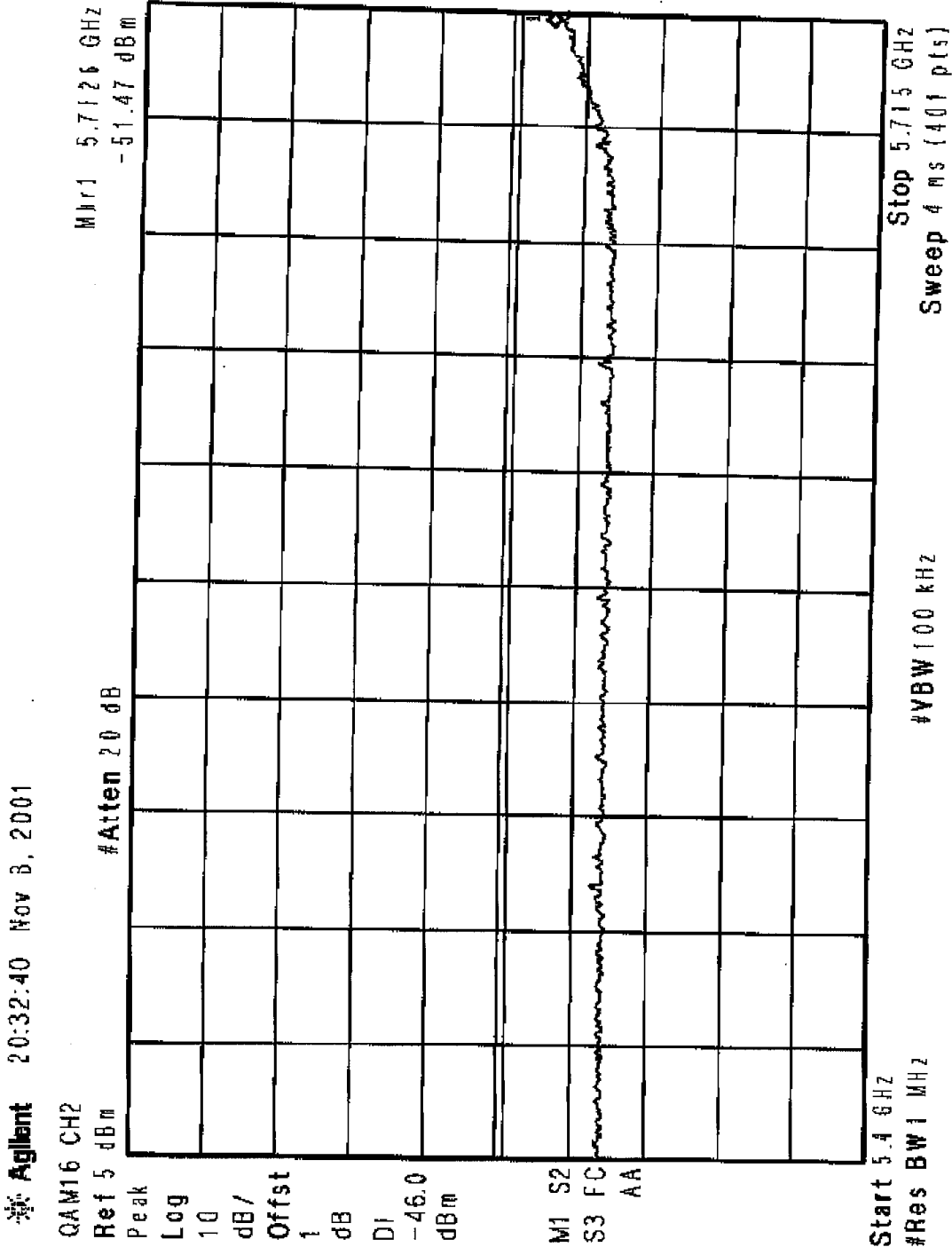


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WIRELESSHOME CORP

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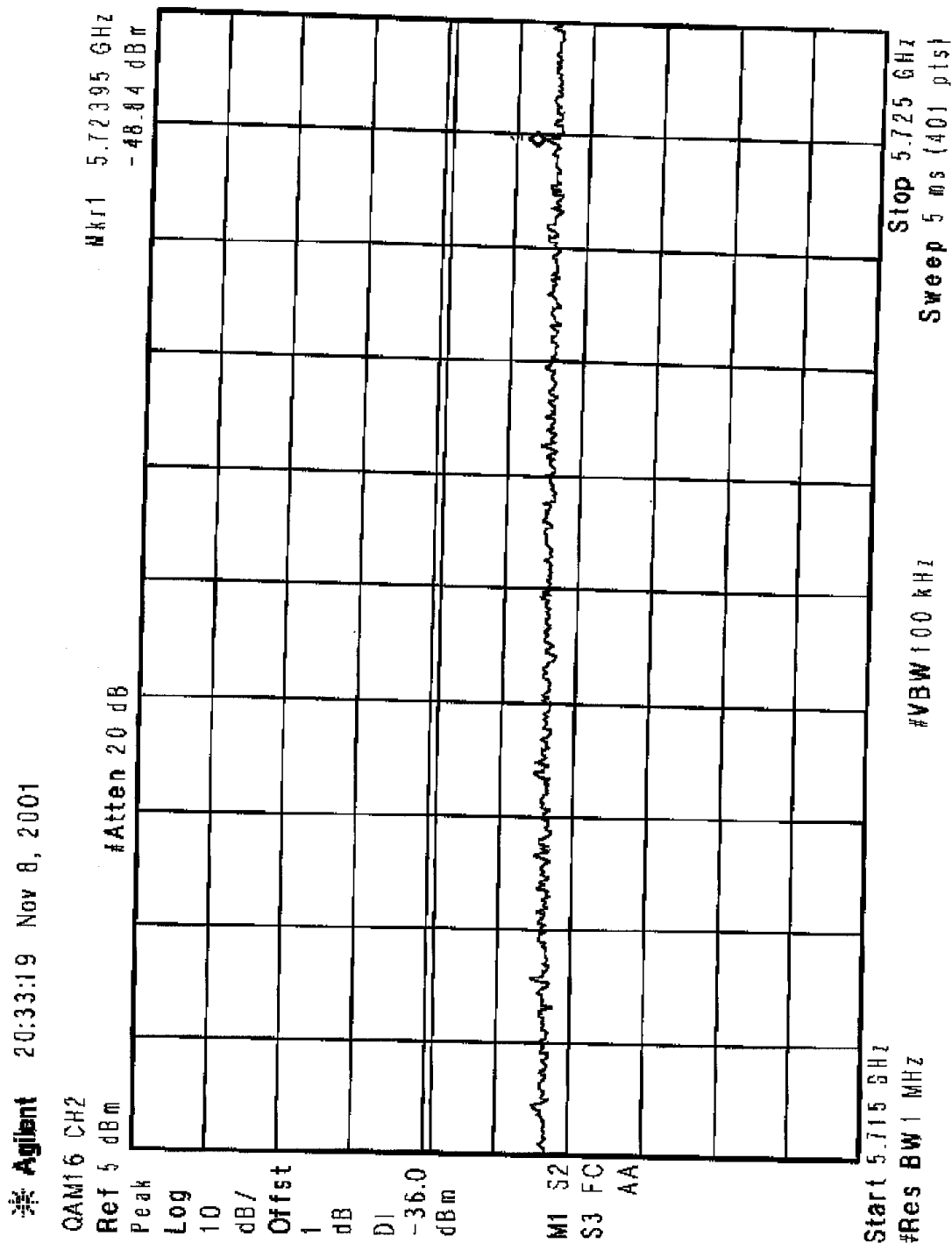




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WIRELESSHOME CORP

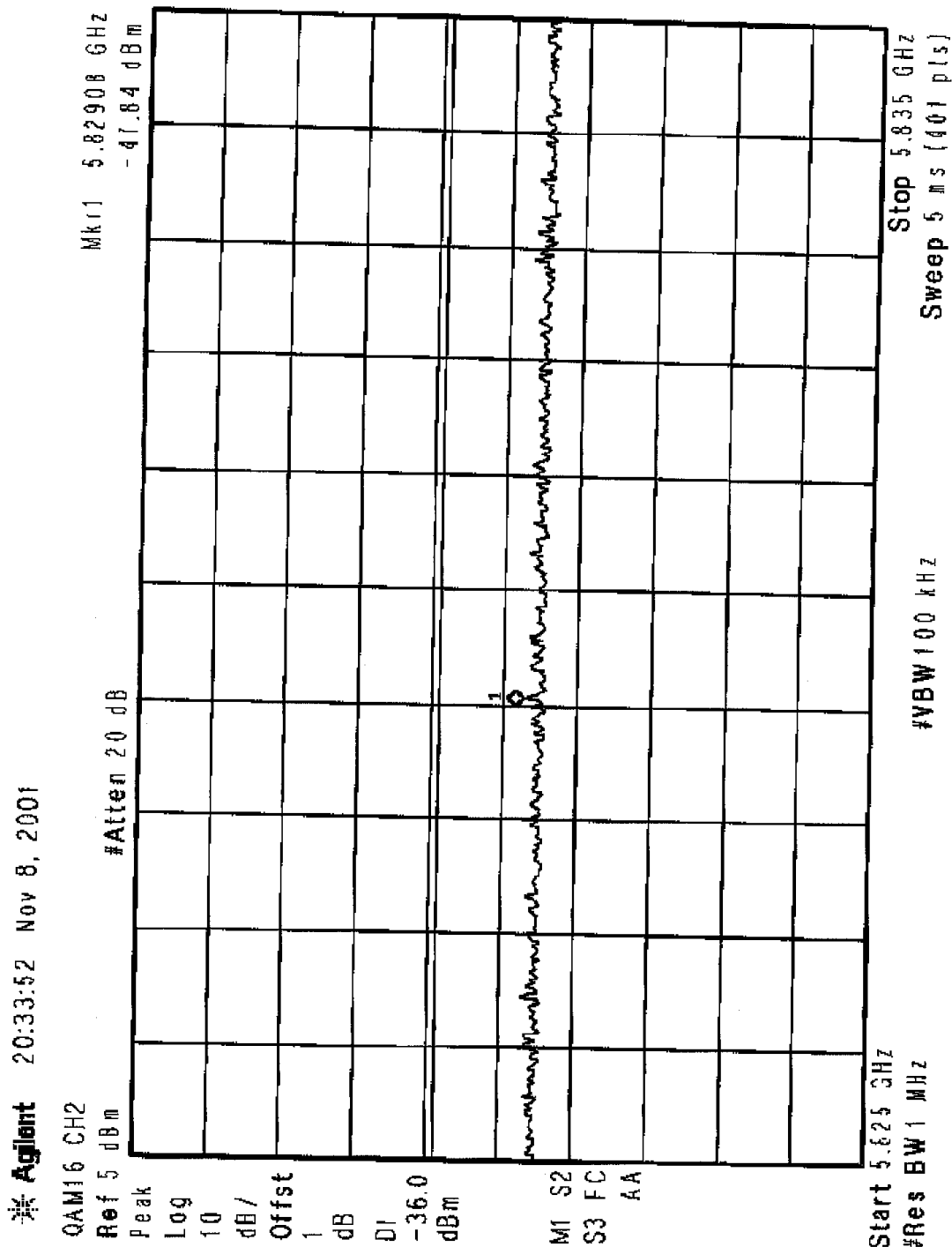
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WIRELESSHOME CORP

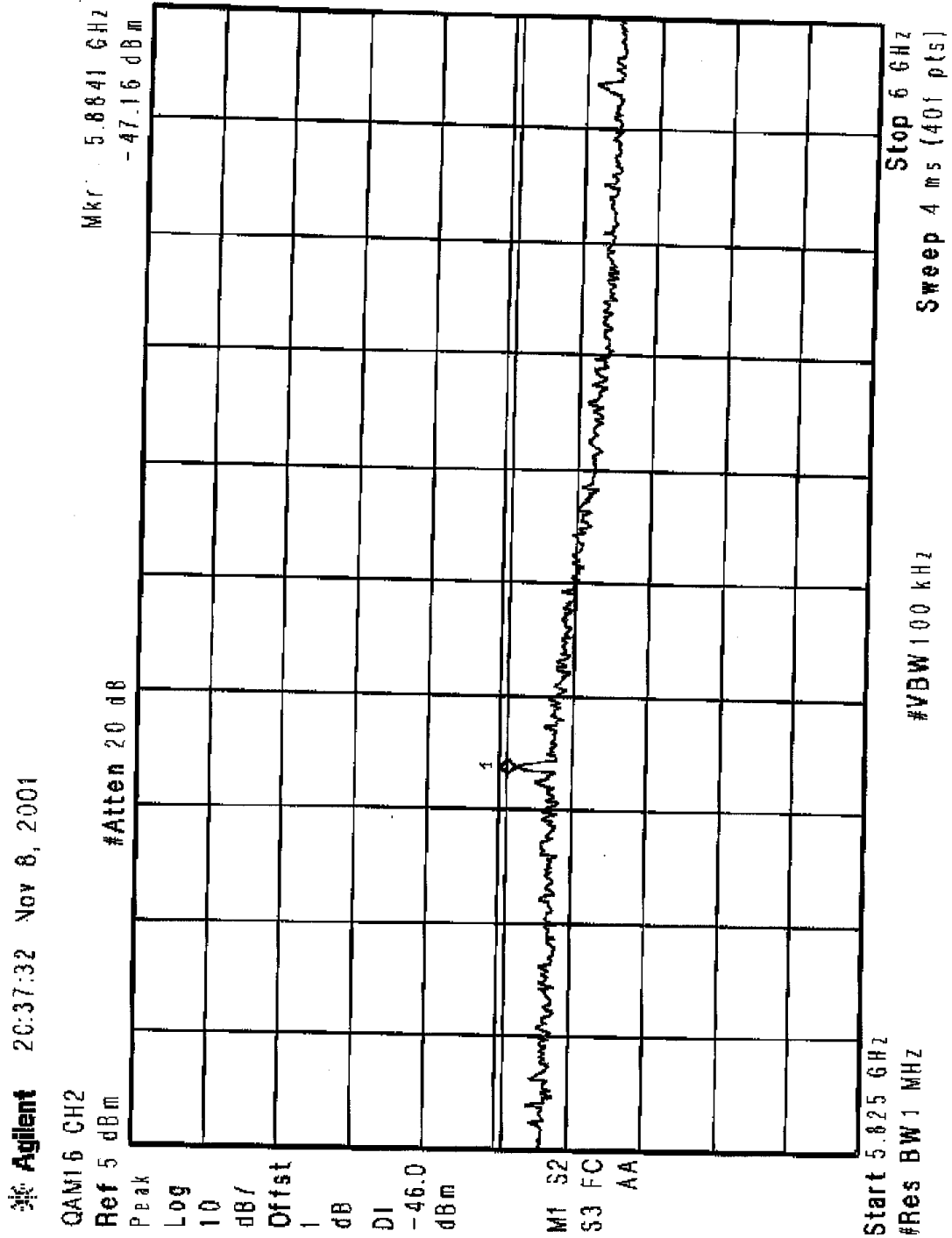
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WIRELESSHOME CORP

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On October 4, 2001 the Undesirable Emission Limits test per FCC 15.407 (b) was performed at Western Multiplex, Inc. 3780 Kilroy Airport Way, Suite 500, Long Beach, CA 90806.
Model UNII Radio FCC ID: HZB-U58-B60 was tested and passed all tests.
See data and test equipment attached.

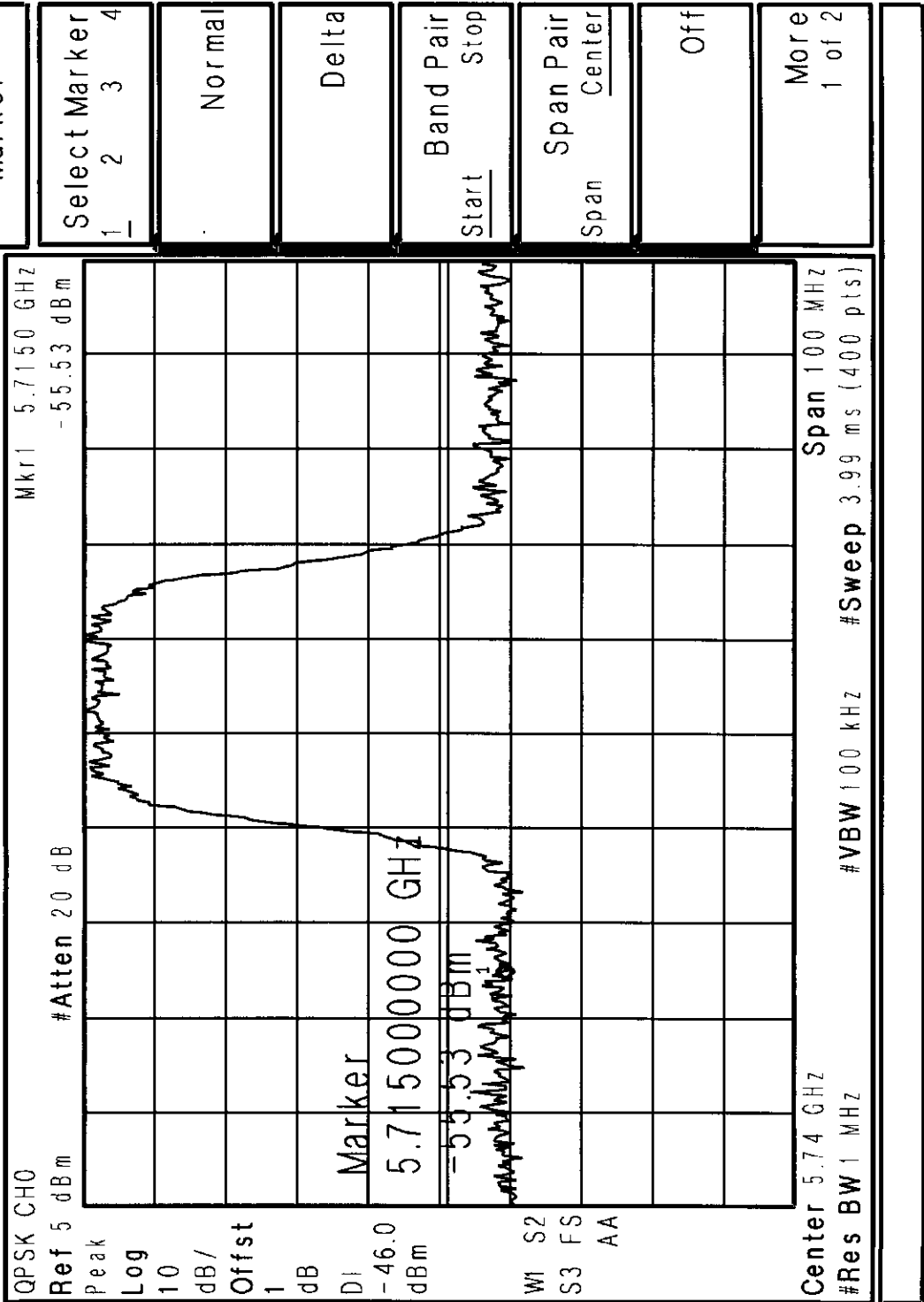


Don Leimer, V.P. Engineering

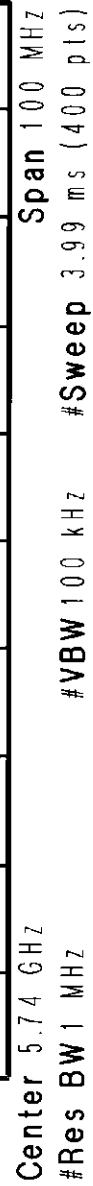
Western Multiplex
3780 Kilroy Airport Way
Suite 500
Long Beach, CA 90806
562-733-3007
562-733-3003



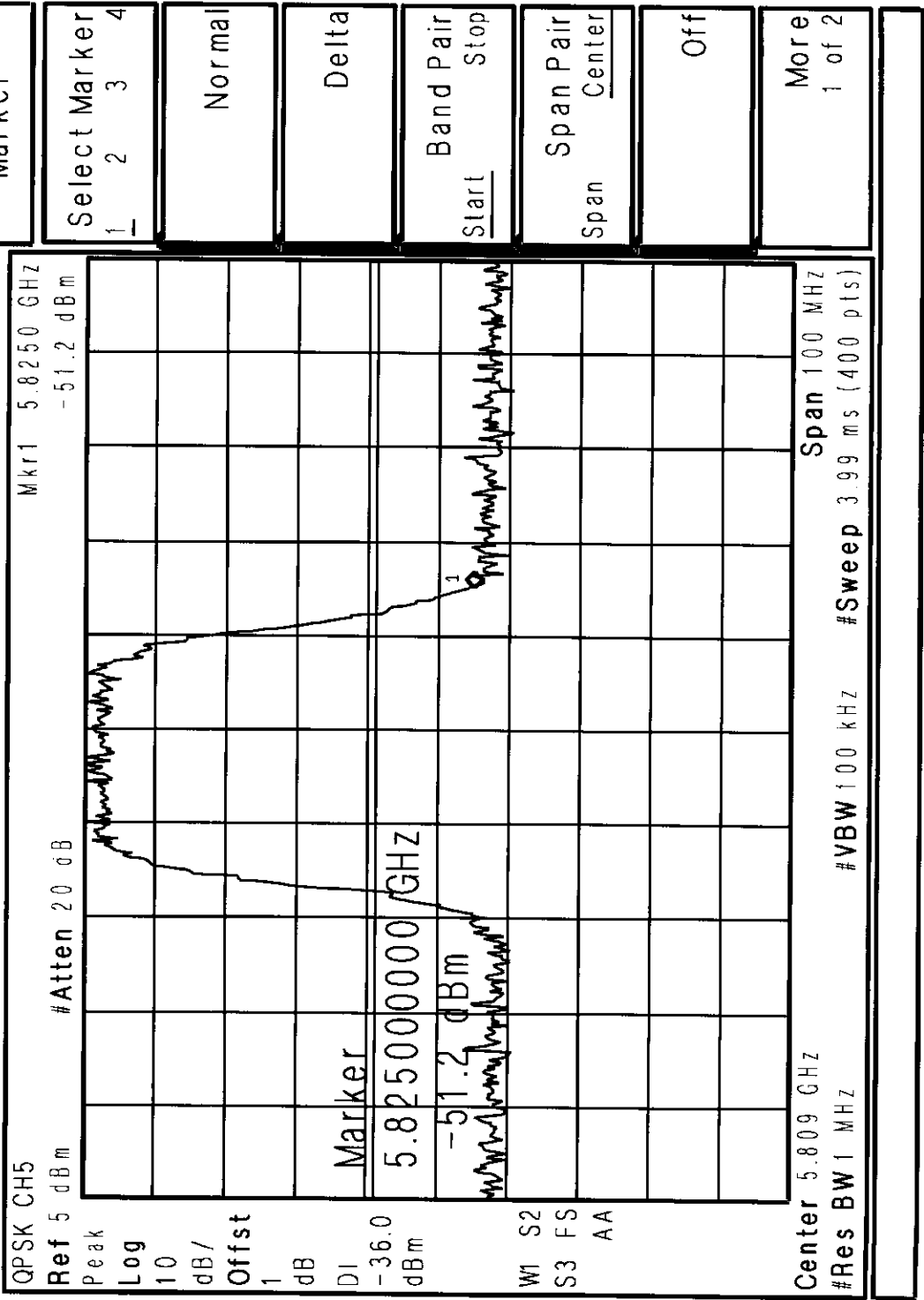
CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
Report No.: SC106727
Mode: TECH/ENGR
TEST: Out of Band Antenna Conducted Part 15.407(b)



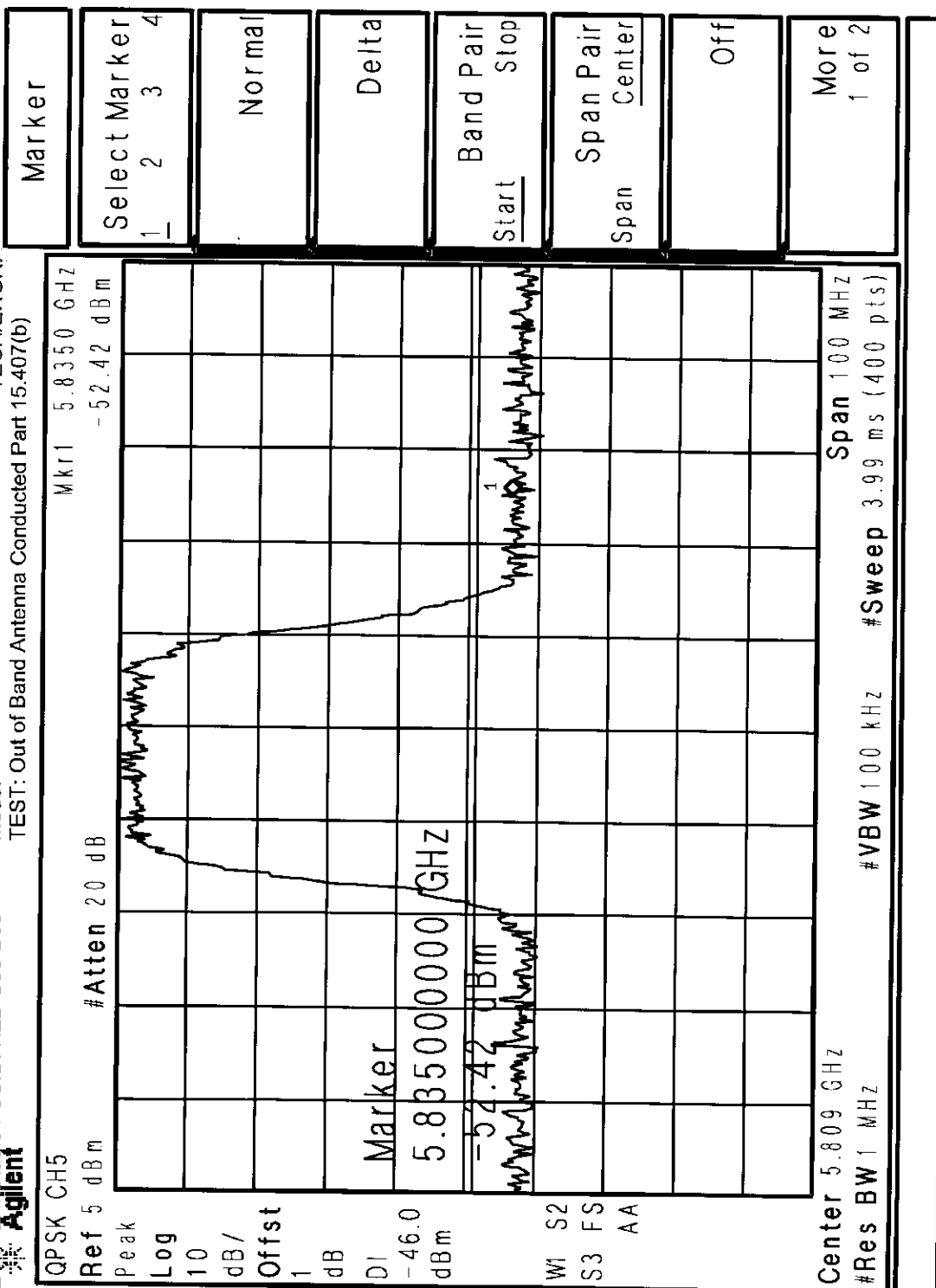
Agilent

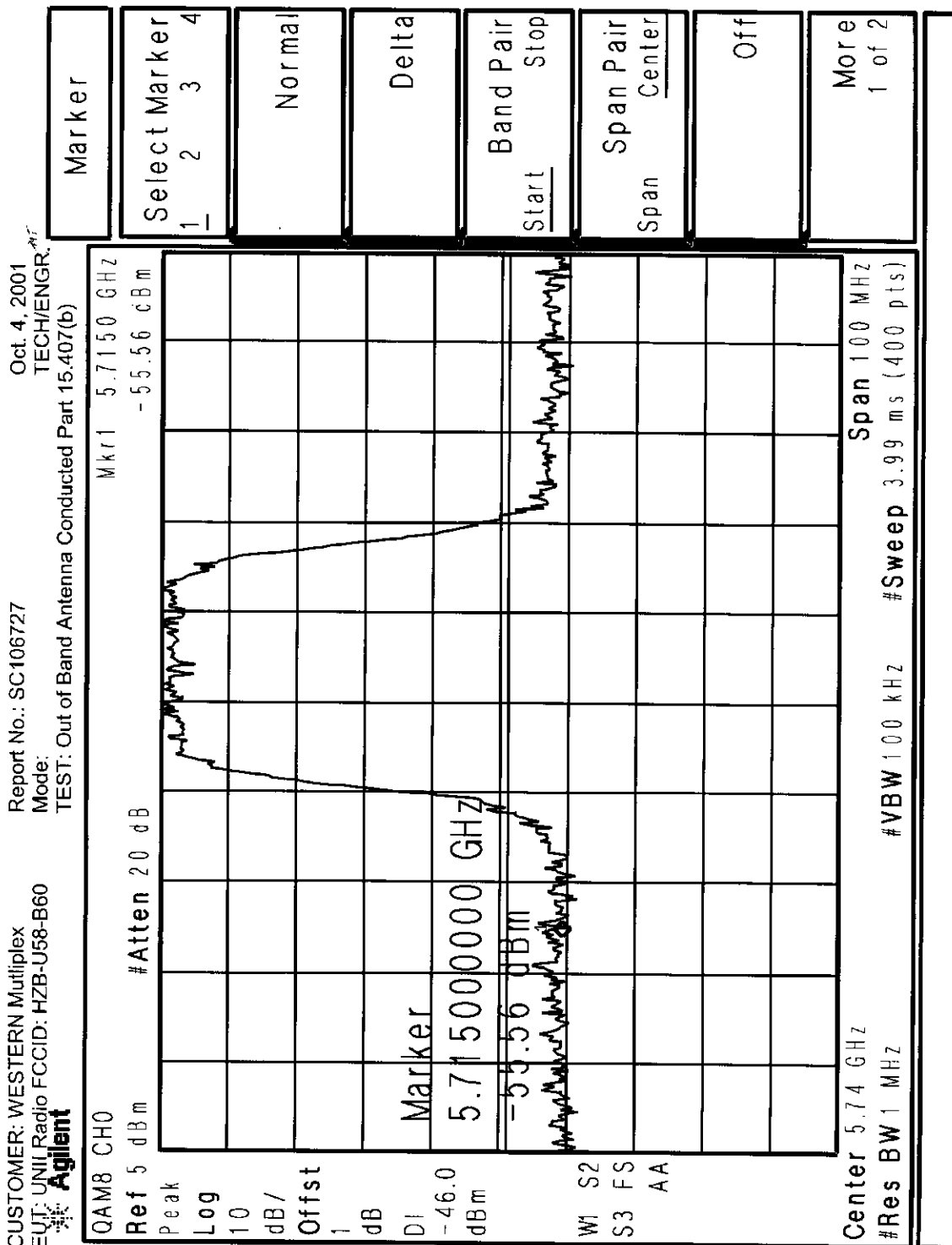


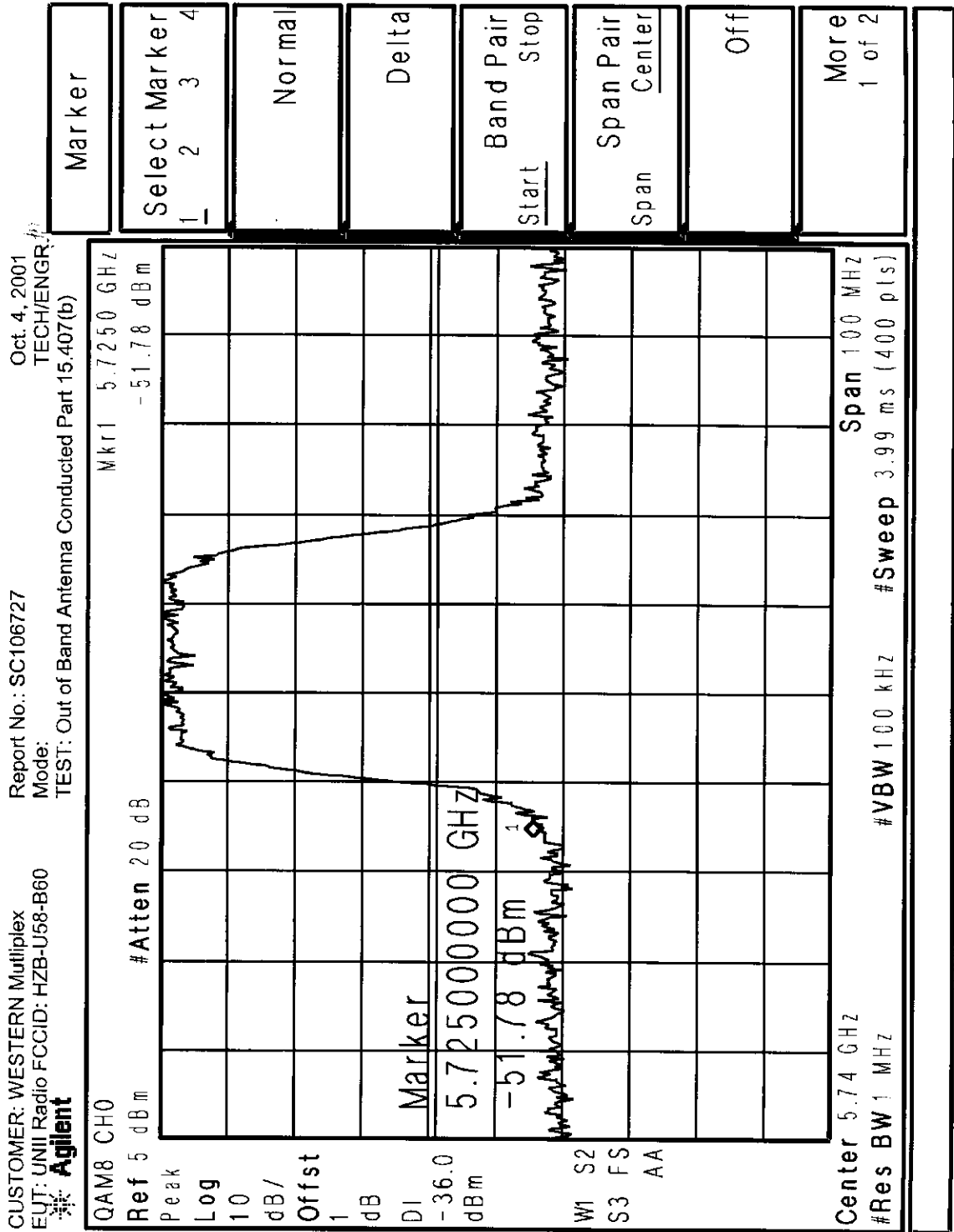
CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
Report No.: SC106727
Mode: TECH/ENGR
TEST: Out of Band Antenna Conducted Part 15.407(b)

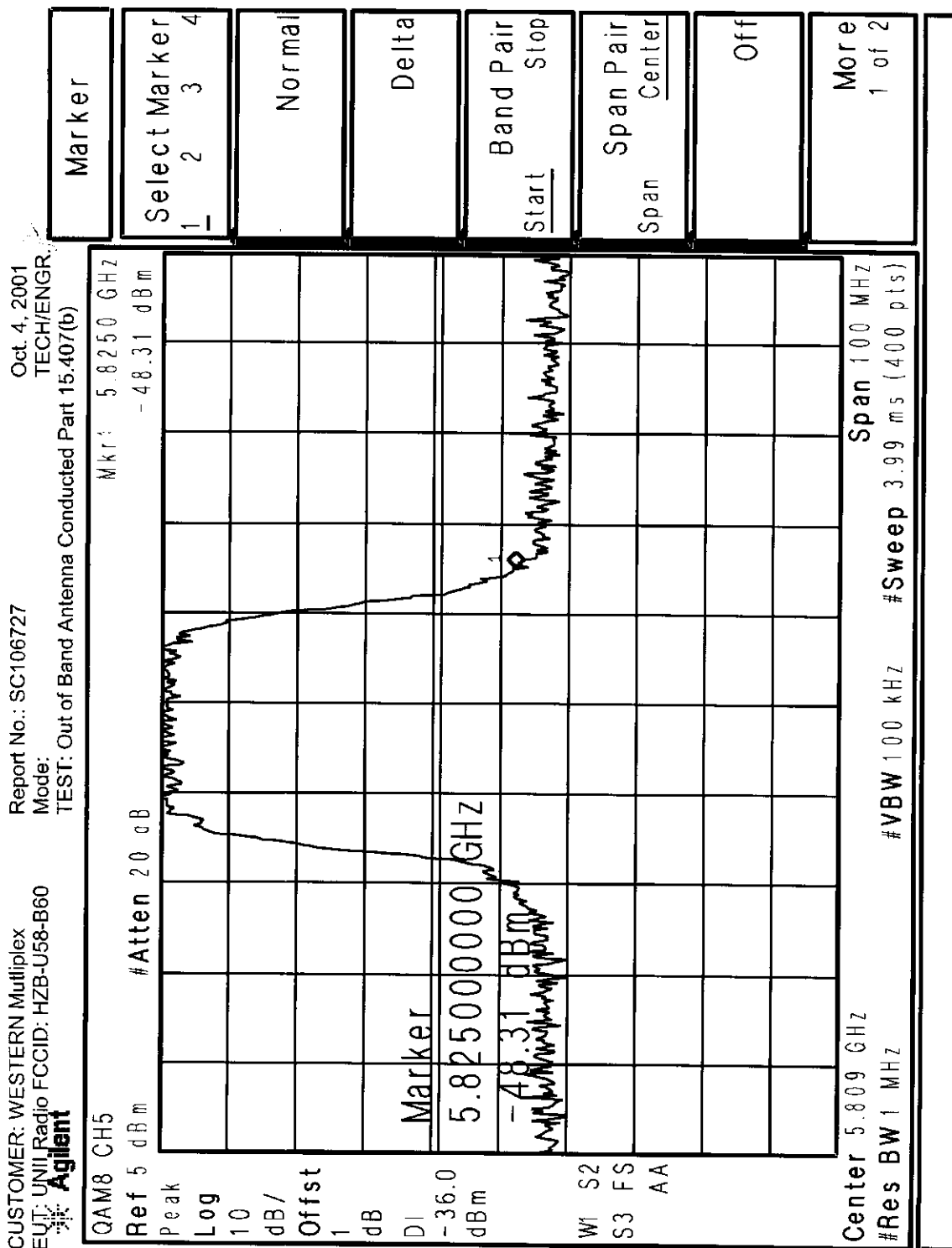


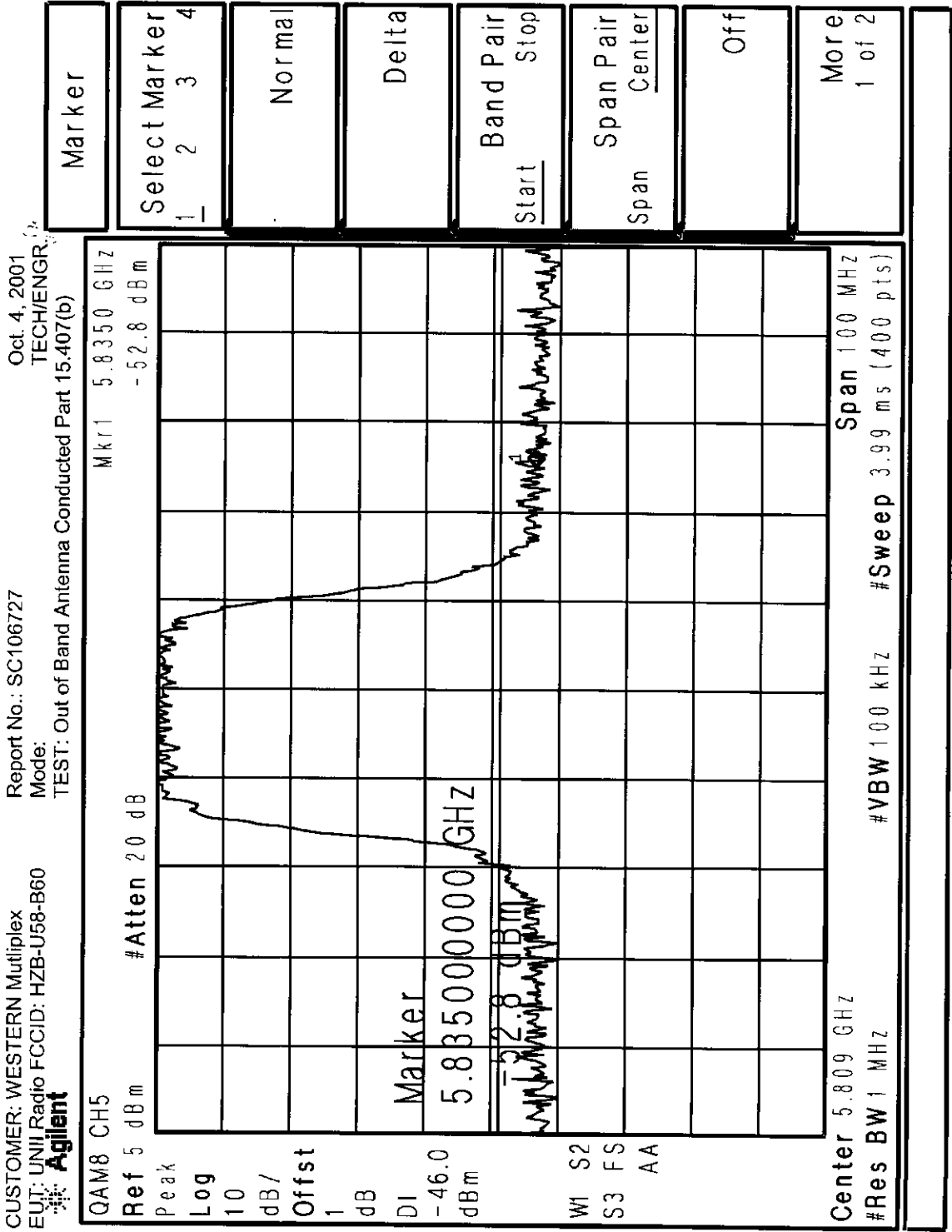
CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
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TEST: Out of Band Antenna Conducted Part 15.407(b)

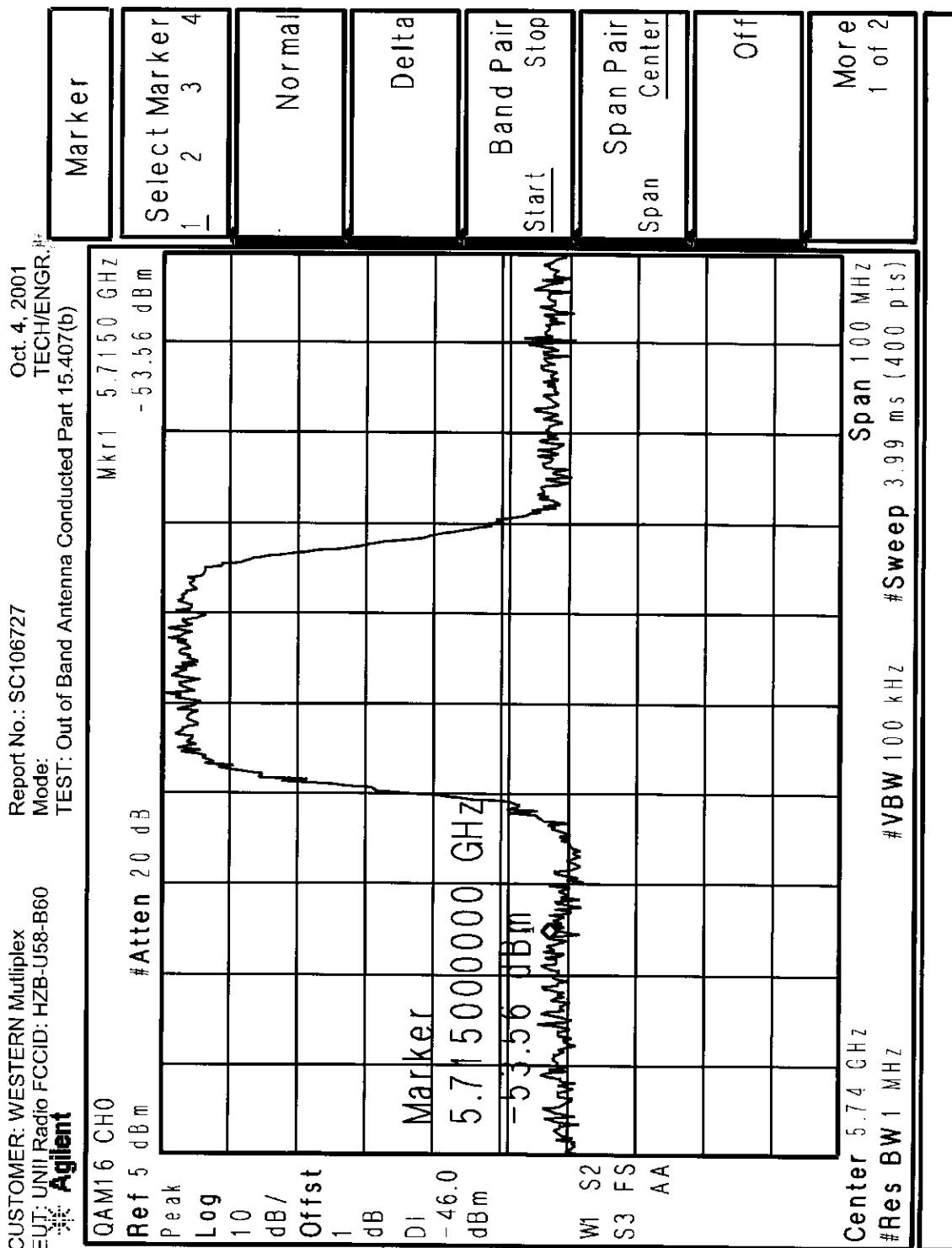


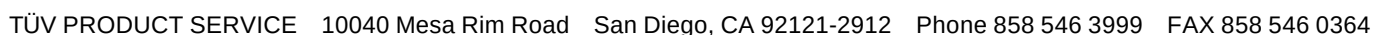




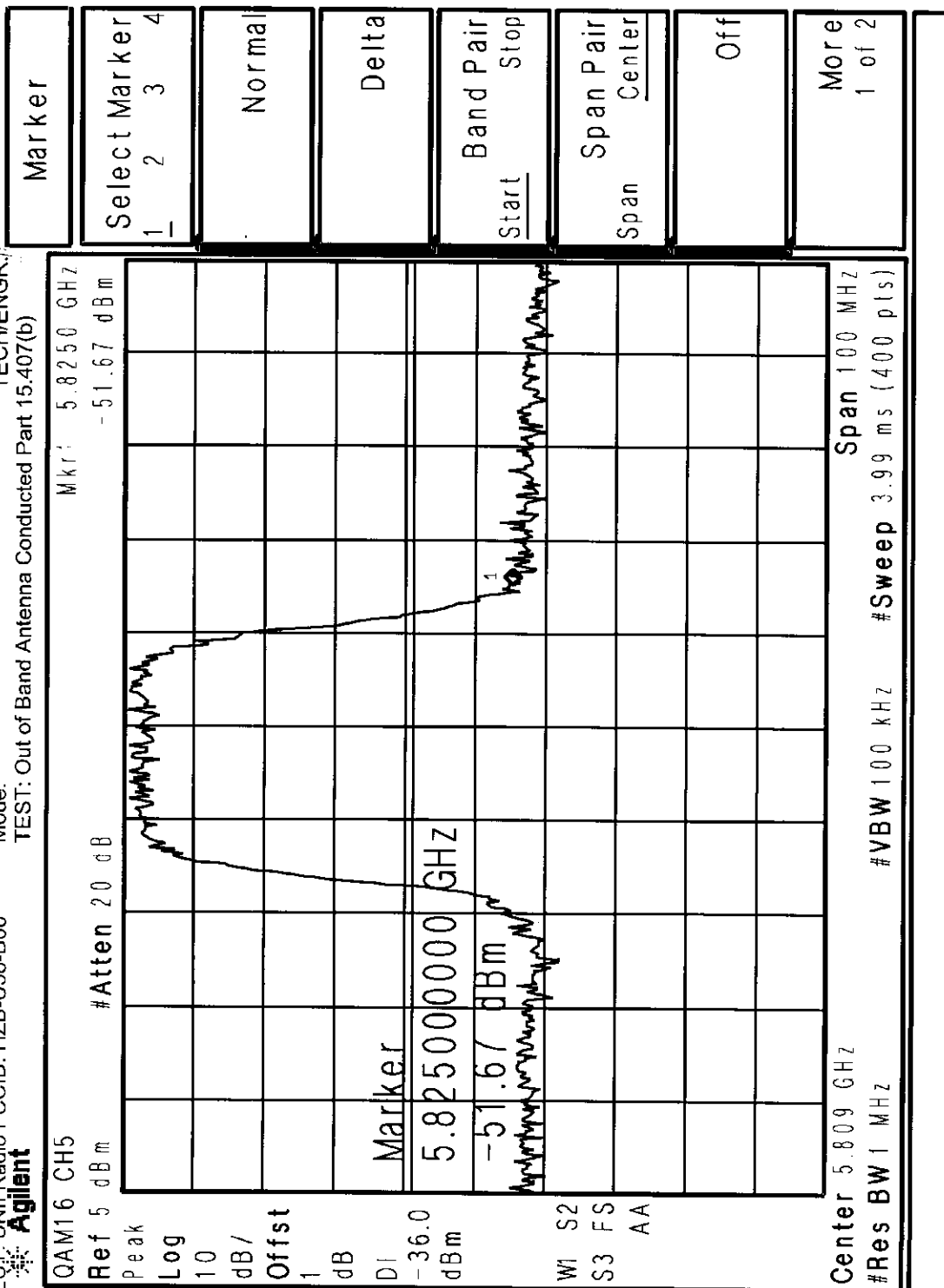




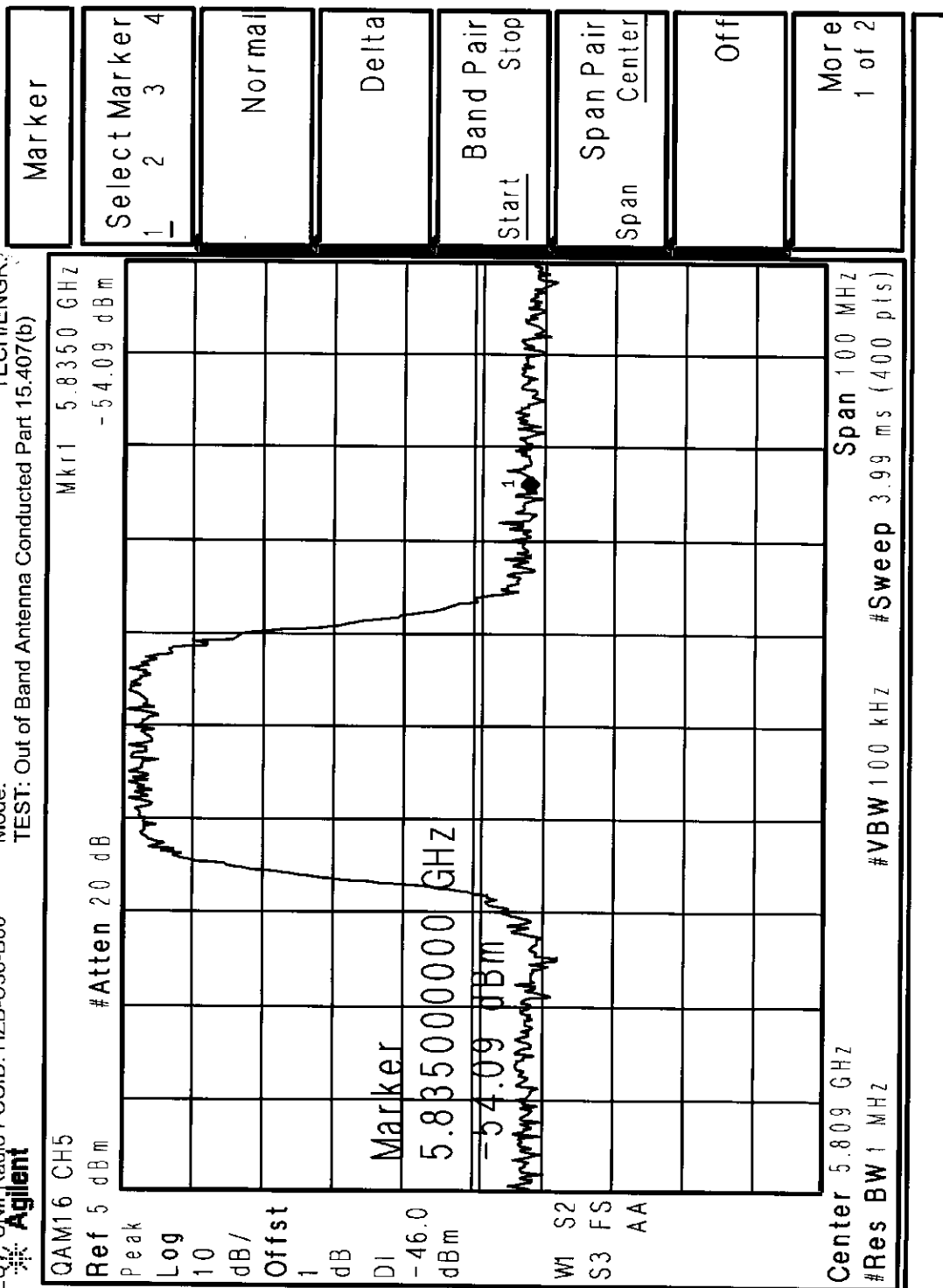




CUSTOMER: WESTERN Multiplex
EUT: UNIL Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode: TECH/ENGR
TEST: Out of Band Antenna Conducted Part 15.407(b)



CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode: TECH/ENGR
TEST: Out of Band Antenna Conducted Part 15.407(b)
Oct. 4, 2001



REPORT NO: SC106727 TESTER: Dave Benard SPEC: FCC 15.209a1/15.205
 CUSTOMER: Western Nalplex TEST DIST: 2 Meters
 EUT: LMR Radio FCCID: H2B-US8-B60 TEST SITE: Roof
 EUT MODEL: H2B-US8-B60 EFFICIENCY: N/A
 DATE: Oct 04, 2001 LOG: N/A
 NOTES: DUT Output: 100m OTHER: 0

Above Table: REW & VSW 1MHz for F1, REW 1MHz and VSW 10Hz for AVG
 Below Table: REW & VSW 10Hz for F1, REW 10Hz and VSW 10Hz for AVG
 CF = Antenna Factor + Cable Loss - Propagation Gain

FREQ (MHz)	VERT (dBm) pt	AVG	HORIZ (dBm) pt	AVG	CF (dBm)	MAX LEVEL (dBm) pt	AVG	SPEC LIMIT (dBm) pt	AVG	MARGIN (dB) pt	AVG	EUT Rotation	Antenna Height	Notes
1440.0	42.3	31.2	42.1	31.1	15.6	54.8	46.8	74	54	-15.1	-7.21	0	1.5	8QAM
11838.14	42.3	31.2	43.4	31.2	15.5	58.3	48.7	74	54	-15.1	-7.26	0	1.2	8QAM Ch 0, 8A
11812.14	42.8	30.7	43.1	30.6	15.4	58.5	48.1	74	54	-15.5	-7.88	0	1	8QAM Ch 0, 8A
1440.0	44.3	31.2	42.5	31.1	15.6	58.7	48.8	74	54	-14.8	-7.21	0	1.5	16QAM
11838.14	42.4	31.1	43.6	31.2	15.5	58.1	48.7	74	54	-15.8	-7.26	0	1.2	16QAM Ch 2, 8C
11812.14	42.6	30.7	43	30.6	15.4	58.4	48.1	74	54	-15.8	-7.88	0	1	16QAM Ch 2, 8C
1440.0	40.8	31.1	41.5	31.1	15.5	57.1	47.1	74	54	-16.5	-7.31	0	1.5	QPSK
11838.14	42.3	31.2	42.3	31.1	15.5	57.8	48.7	74	54	-16.2	-7.26	0	1.2	QPSK Ch 0, 8F
11812.14	42.1	30.6	42.3	30.7	15.4	57.7	48.1	74	54	-16.3	-7.88	0	1	QPSK Ch 0, 8F

Test Report #: SC106727 Test Area: SR5 Date: 4-Oct-01

Test Method: FCC15.205(b) Restricted bands of operation

EUT Model #: UNII Radio EUT POWER: 115 Vdc/60 Hz Temperature: 23 °C
 Air Pressure: 100.1 kPa
 Relative Humidity: 48 %

EUT Description: FCC ID: HZB-U58-B60

NOTES: Mode: Receiver/Transmit Normal Mode
 No signals were measurable at 3 meters. The EUT was moved to one meter distance.
 SPEC LIMIT was adjusted for one meter.

FREQ (MHz)	VERTICAL (dBuV)		HORIZONTAL (dBuV)		CORRECTION FACTOR (dB/m)	MAX LEVEL (dBuV/m)		SPEC LIMIT (dBuV/m)		MARGIN (dB)		EUT Rotation °	Antenna Height	Notes
	pk	av	pk	av		pk	av	pk	av	pk	av			
22961	31.5	19.8	31.5	19.8	32.92	64.42	52.72	84	64	-19.58	-11.28	0	1	8QAM CH 0, 6A
22961	32.4	19.9	32.4	19.9	32.92	65.32	52.82	84	64	-18.68	-11.18	0	1	16QAM CH 0, 6A
22961	31.5	19.8	31.5	19.8	32.92	64.42	52.72	84	64	-19.58	-11.28	0	1	QPSK 3/4 CH 0, 6A
23072	29.6	19.4	29.6	19.4	32.92	62.52	52.32	84	64	-21.48	-11.68	0	1	8QAM CH 2, 6C
23072	29.7	19.4	29.7	19.4	32.92	62.62	52.32	84	64	-21.38	-11.68	0	1	16QAM CH 2, 6C
23072	30.5	19.5	30.5	19.5	32.92	63.42	52.42	84	64	-20.58	-11.58	0	1	QPSK 3/4 CH 2, 6C
23244	29.6	19.4	29.6	19.4	32.96	62.56	52.36	84	64	-21.44	-11.64	0	1	8QAM CH 5, 6F
23244	29.4	19.4	29.4	19.4	32.96	62.36	52.36	84	64	-21.64	-11.64	0	1	16QAM CH 5, 6F
23255	29.8	19.5	29.8	19.5	32.96	62.76	52.46	84	64	-21.24	-11.54	0	1	QPSK 3/4 CH 5, 6F

Test Equipment Used:

Model Number	Prop. #	Description	Manufacturer	Serial No.	Cal. Date
hp8588B	407	Spectrum Analyzer	Howlett Packard	2311A02209	2/15/02
hp11975A	719	Amplifier	Howlett Packard	2517A00639	not req't.
hp11970K	852	Mixer	Howlett Packard	3003A05400	not req't.
12A18 115300	0006377	Horn Antenna 18-26 GHz	MI Technologies	21554MB	not req't.

Tested: Dave Bernardin

Reviewed by: Alan Laudani

[Signature]
 Signature

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 Signature

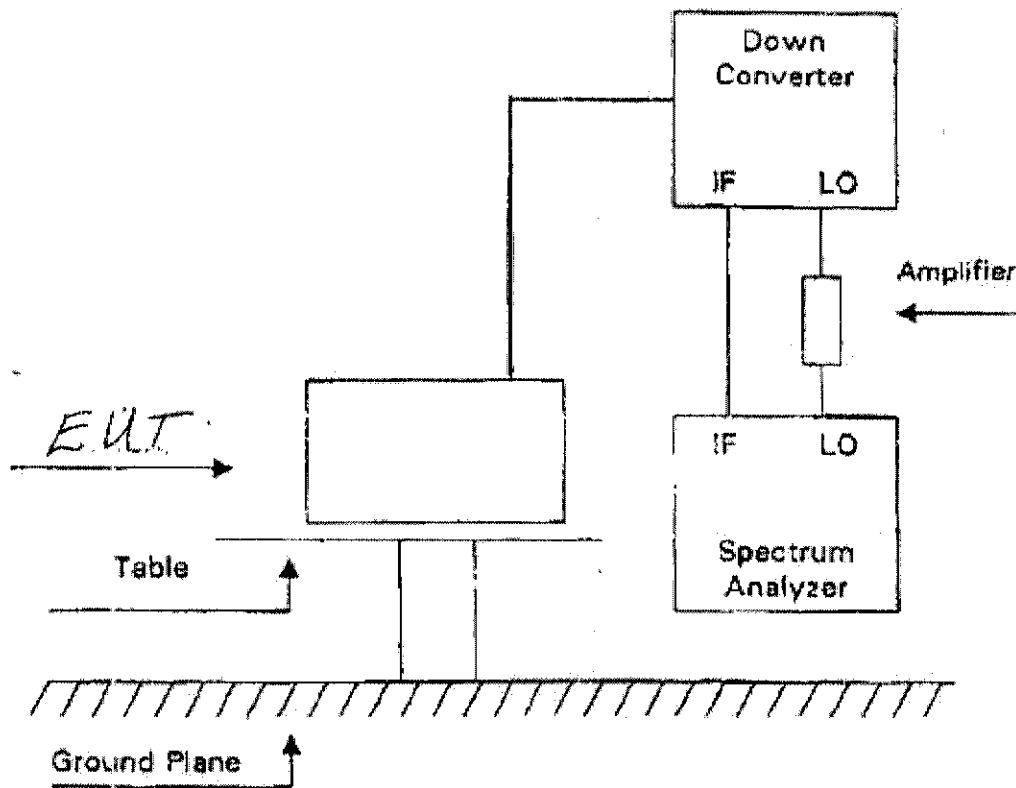
Test setup for Output Power



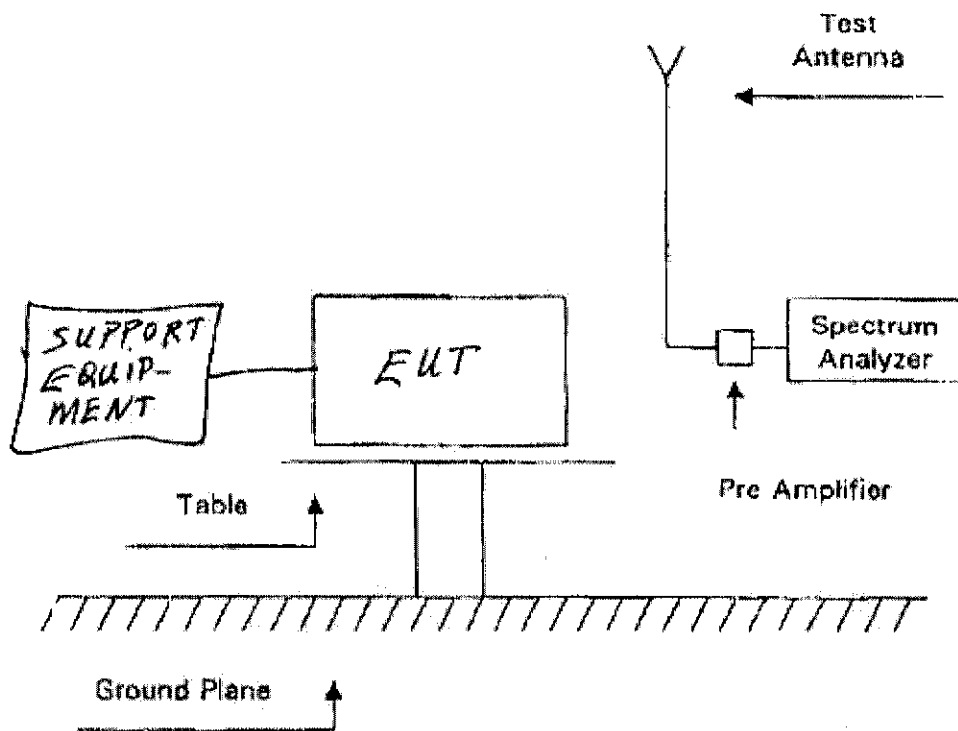
Test setup for 26dB Bandwidth, Power Density, The Ratio of the Peak Excursion of the Modulation Envelope to the Peak Transmit Power, Out of Band Antenna Conducted Emission and Band Edge Antenna Conducted Emission.



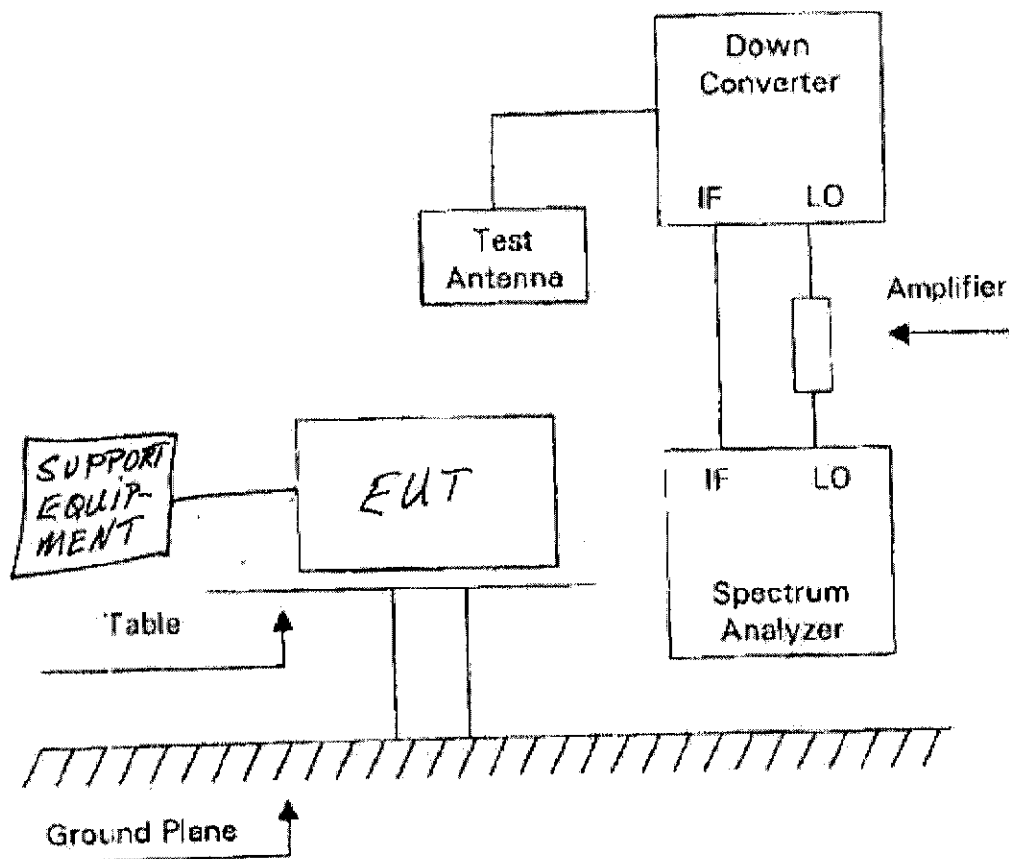
Test setup for Out of Band Antenna Conducted Emission.



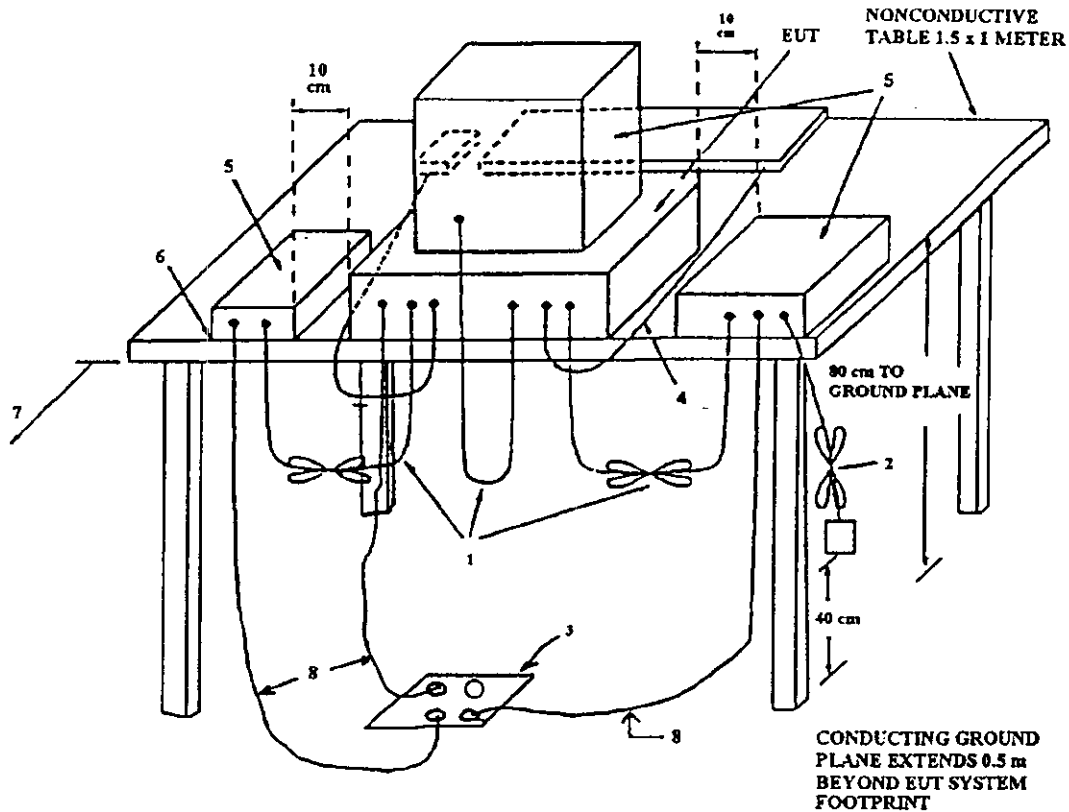
Test setup for Radiated Emission in Restricted Bands and Radiated Emission from Receiver L.O.



Test setup for Radiated Emission in Restricted Bands



Radiated Emissions Test Setup, 30 to 1000 MHz



LEGEND:

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables that are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.
3. If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground plane with the receptacle flush with the ground plane.
4. Cables of hand-operated devices, such as keyboards, mouses, etc., have to be placed as close as possible to the controller.
5. Non-EUT components of EUT system being tested.
6. The rear of all components of the system under test shall be located flush with the rear of the table.
7. No vertical conducting wall used.
8. Power cords drape to the floor and are routed over to receptacle.