# 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: | 22 March 2002 (Rev. 1.2) |
| Model / Serial No. | : **40400-XX[1] / ENGR UNIT #1** | | |
| Product Type | : UNII Radio FCC ID: HZB-US58-B60[2] | | |
| Applicant | : WESTERN MULTIPLEX CORPORATION | | |
| Manufacturer | : WESTERN MULTIPLEX CORPORATION | | |
| License holder | : WESTERN MULTIPLEX CORPORATION | | |
| Address | : 1196 Borregas Avenue | | |
| | : Sunnyvale, CA 94089 | | |
| Test Result | : ■ **Positive**[3] ☐ **Negative** | | |
| Test Project Number Reference(s) | : **SC106727-06** | | |
| Total pages - Test Report | : 176 | | |

(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 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

# DIRECTORY - EMISSIONS
## Test Report



## Technical Documentation



## Appendices





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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 ☐ - Group 2
☐ - Class A ☐ - Class B

☐ - EN 55014 / 1993 ☐ - Household appliances and similar
☐ - Portable tools
☐ - Semiconductor devices

☐ - EN 55022 / 1987 ☐ - Class A ☐ - Class B

☐ - EN 55022 / 1998 ☐ - Class A ☐ - Class B

☐ - VCCI ☐ - Class A ITE ☐ - 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 ☐ - Group 2
☐ - Class A ☐ - Class B

☐ - CISPR 22 (1997) ☐ - Class A ☐ - Class B



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## Environmental Conditions In The Laboratory:

| | Actual |
|---|---|
| Temperature: | : 23 °C |
| Relative Humidity: | : 50 % |
| Atmospheric Pressure: | : 100.0 kPa |

## Power Supply Utilized:

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

## Symbol Definitions:

■ - Applicable
☐ - Not Applicable



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## 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: _____



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## 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.



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## 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.



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## 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<br>2542A12099 | 02/02 |

**Result :**

■ - Pass ☐ - Fail

Remarks: _____



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## 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 Microwave | -- | 09/02 |
| AWT-18505 | 6358 | PreAmp 6GHz-18GHz | 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 ☐ - Fail

Remarks: Tested at customer's test facility.



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## 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.



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## 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 µH /250 µH/50 Ω/ 0.25 µF | 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 ☐ - Fail

Remarks: _____



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## 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: _____



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## 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: _____



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## 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: _____



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## 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 : _____

☐ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables MPS.No.: _____

☐ - customer specific cables

☐ - _____



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## 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

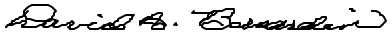
Testing End Date: 04 October 2001

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:

Jim Owen
(EMC Chief Engineer)

Responsible Engineer:



Dave Bernardin
(EMC Engineer)



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# Technical Documentation

Test Data Sheets

and

Test Setup Drawing(s)



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

| 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 |



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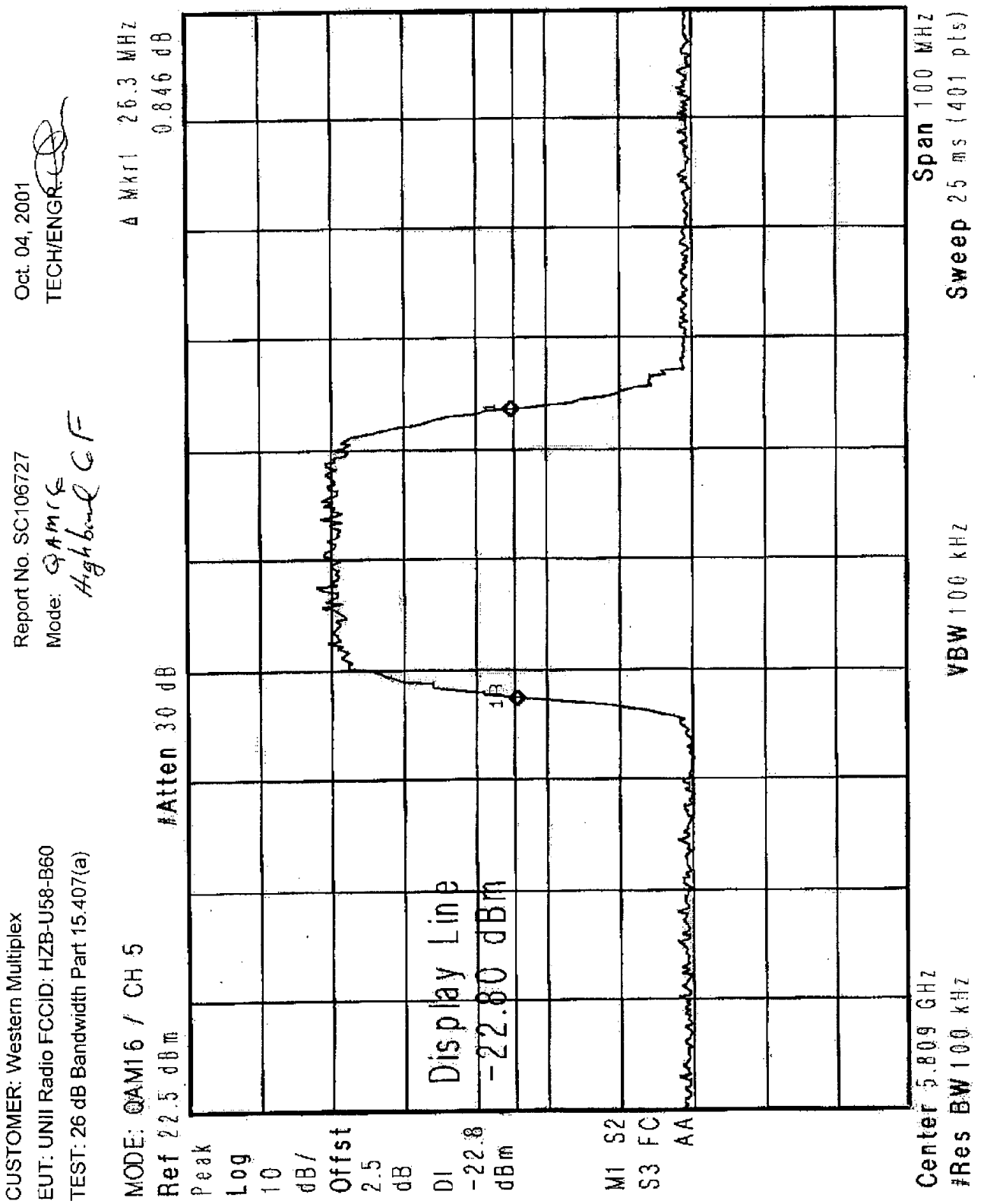
10/29/2001 17:44 5627333003 WIRELESSHOME CORP PAGE 02

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



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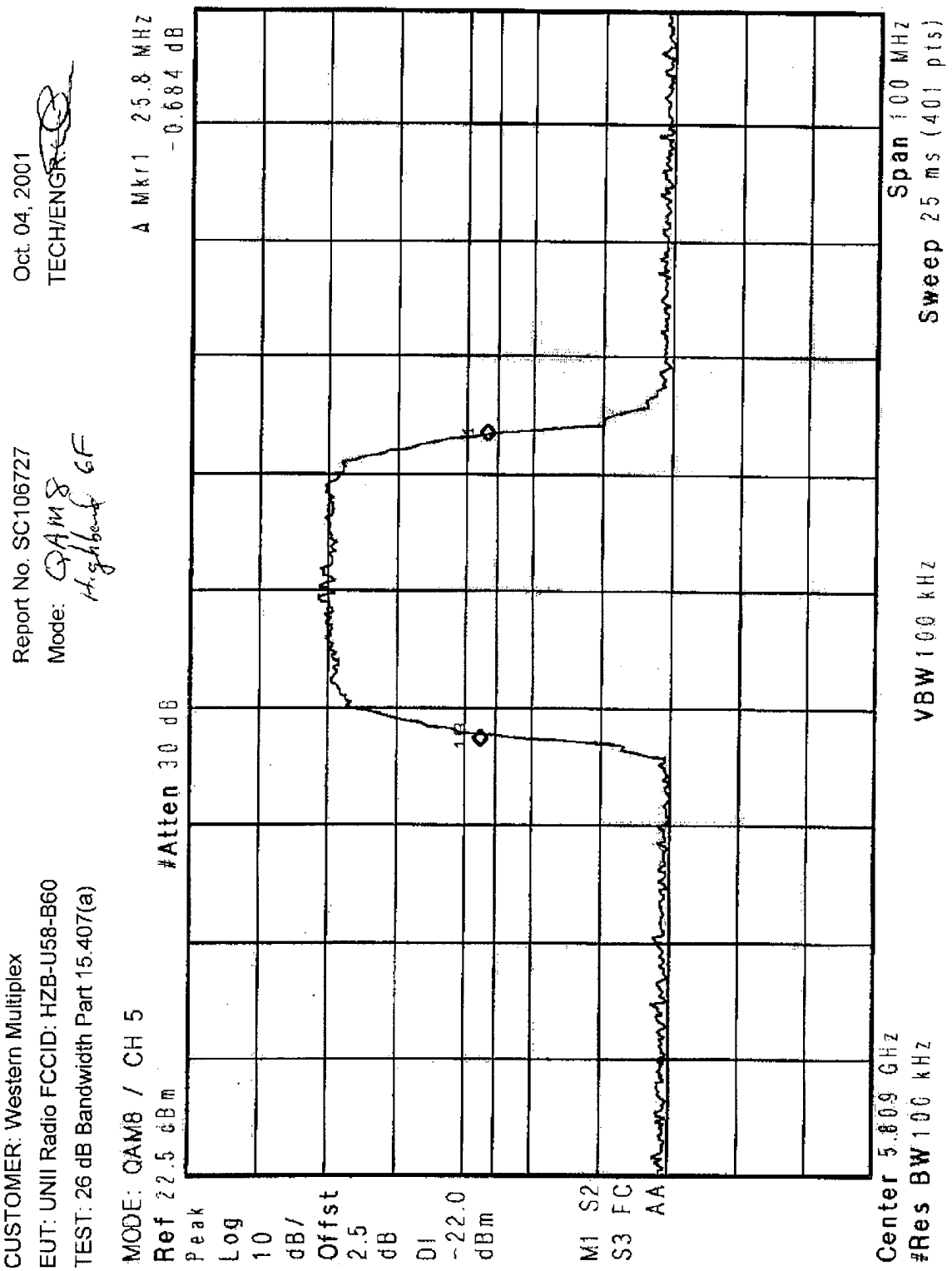




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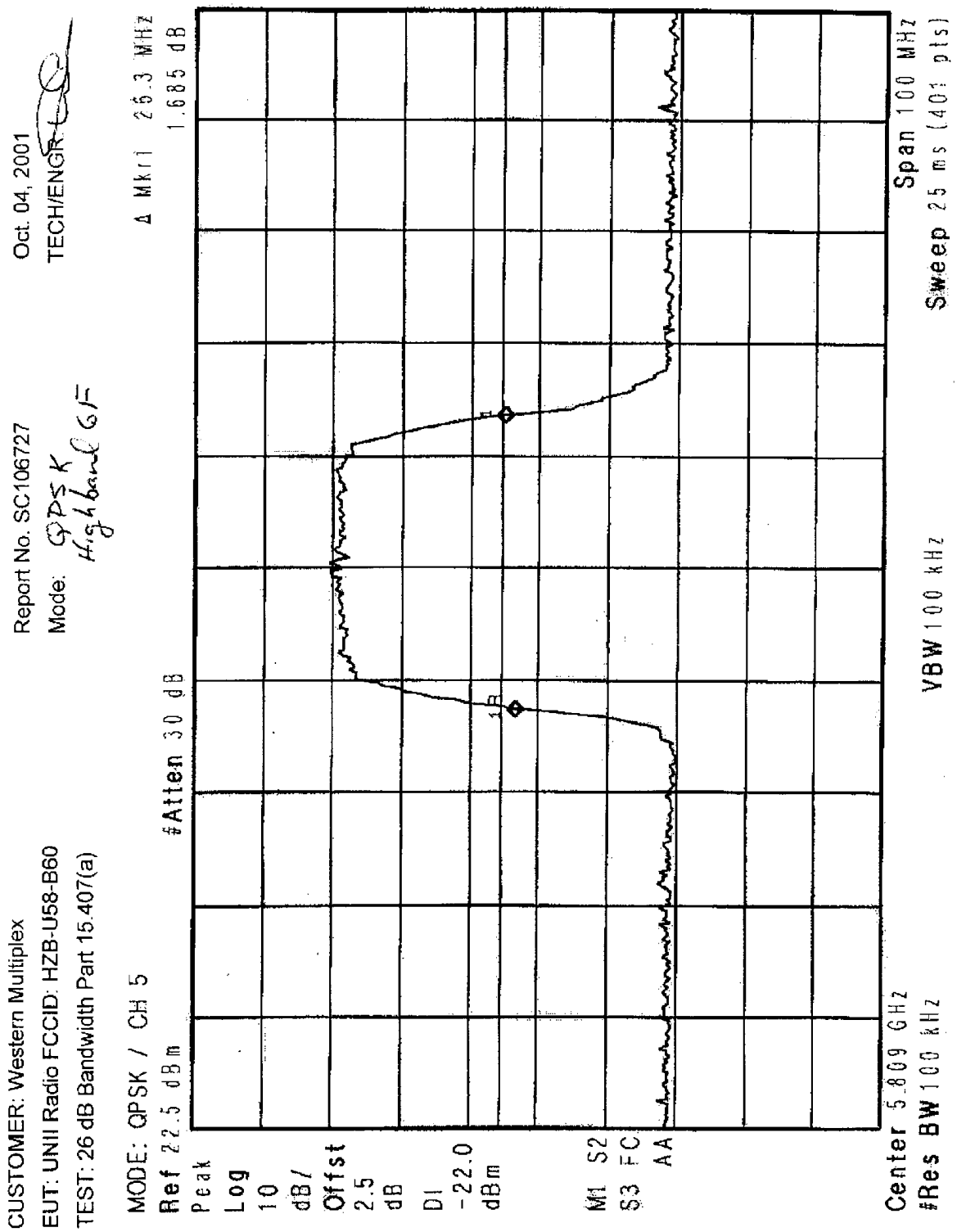
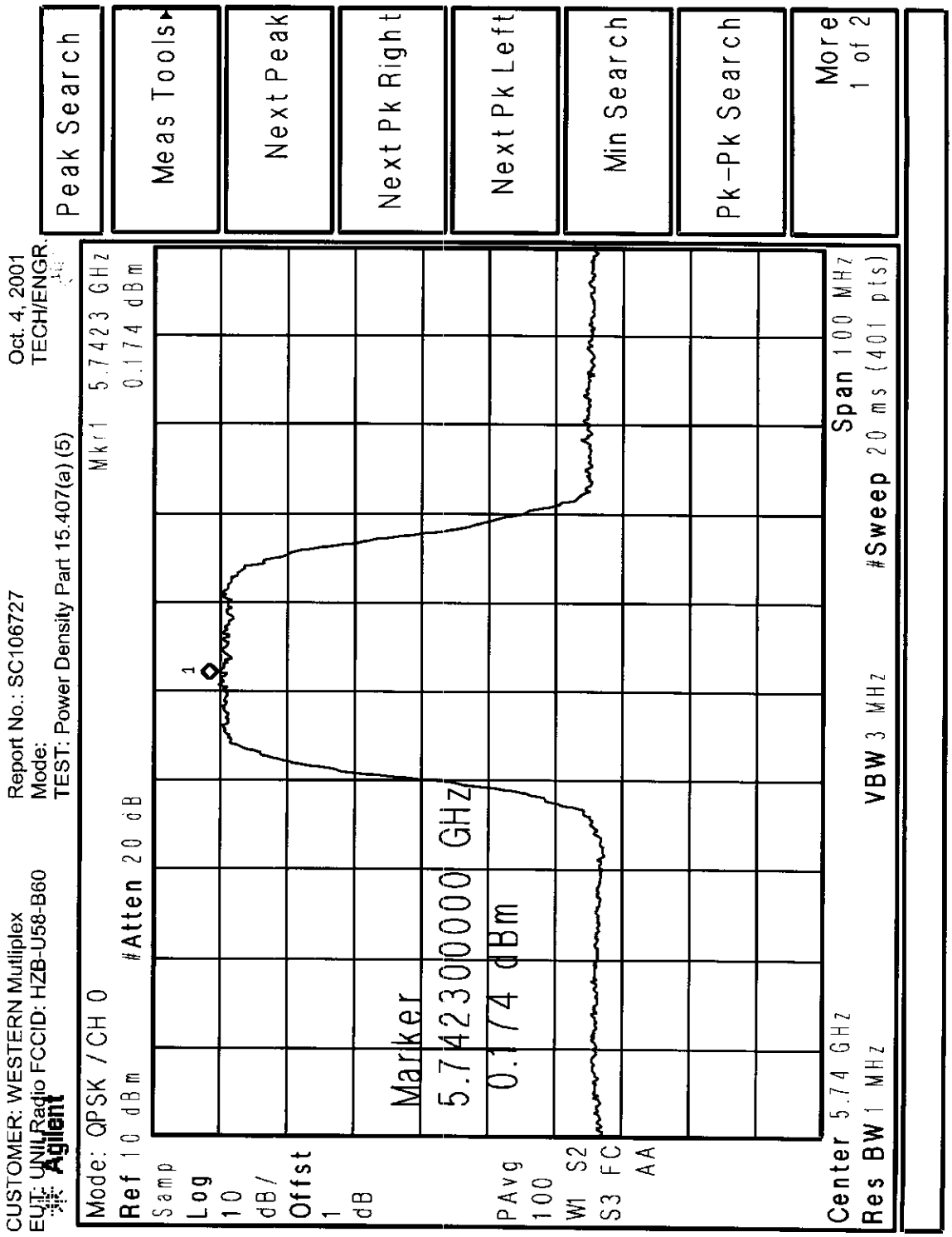

CUSTOMER: Western Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: 26 dB Bandwidth Part 15.407(a)
Report No. SC106727
Oct. 04, 2001
Mode: QPSK High band CH
TECH/ENGR
MODE: QPSK / CH 5
Ref 22.5 dBm
#Atten 30 dB
Peak
Log
10
dB/
Offst
2.5
dB
D1
-22.0
dBm
M1 S2
S3 FC
AA
Δ Mkr1 26.3 MHz
1.685 dB
1R
Center 5.809 GHz
#Res BW 100 kHz
VBW 100 kHz
Span 100 MHz
Sweep 25 ms (401 pts)

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



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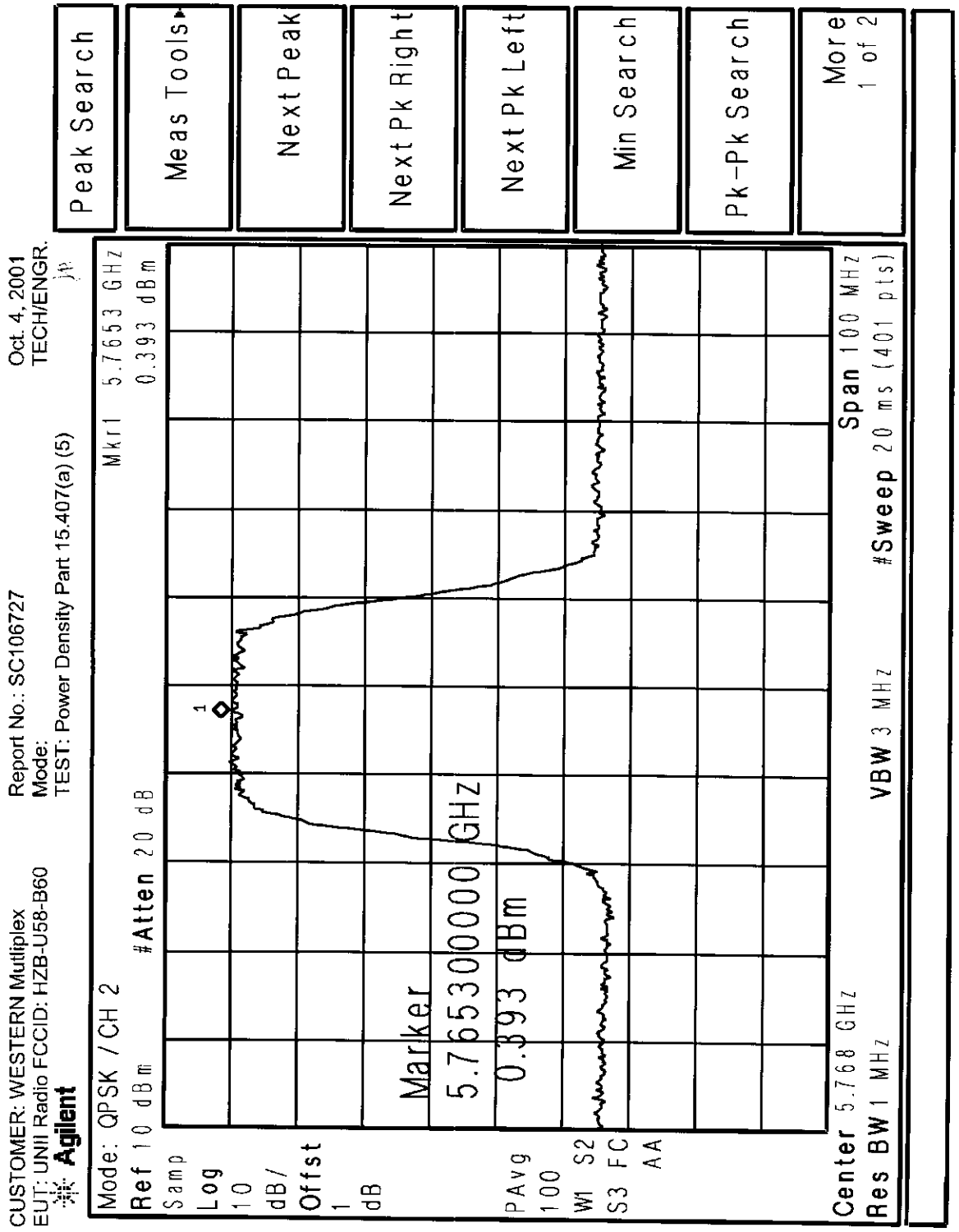
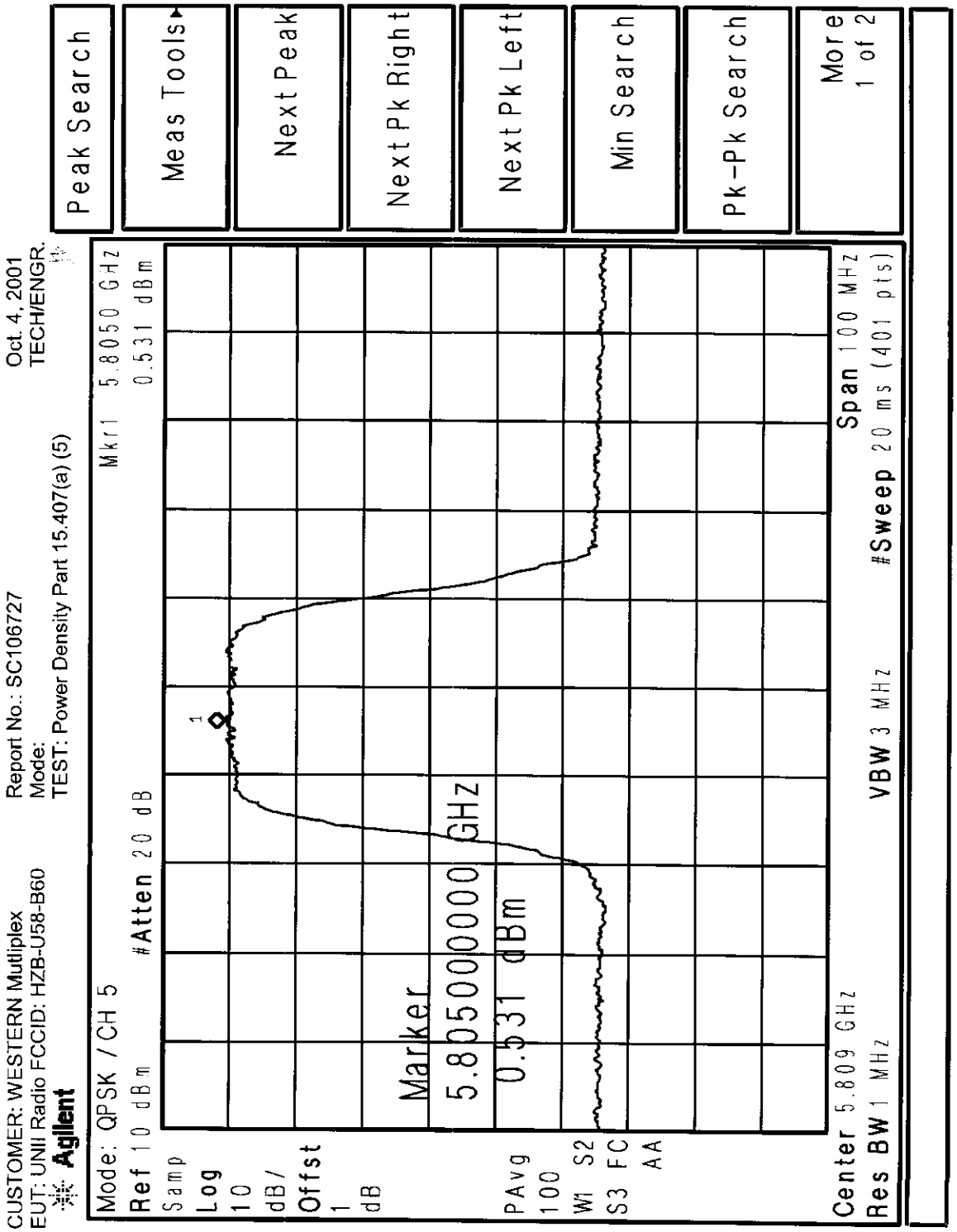
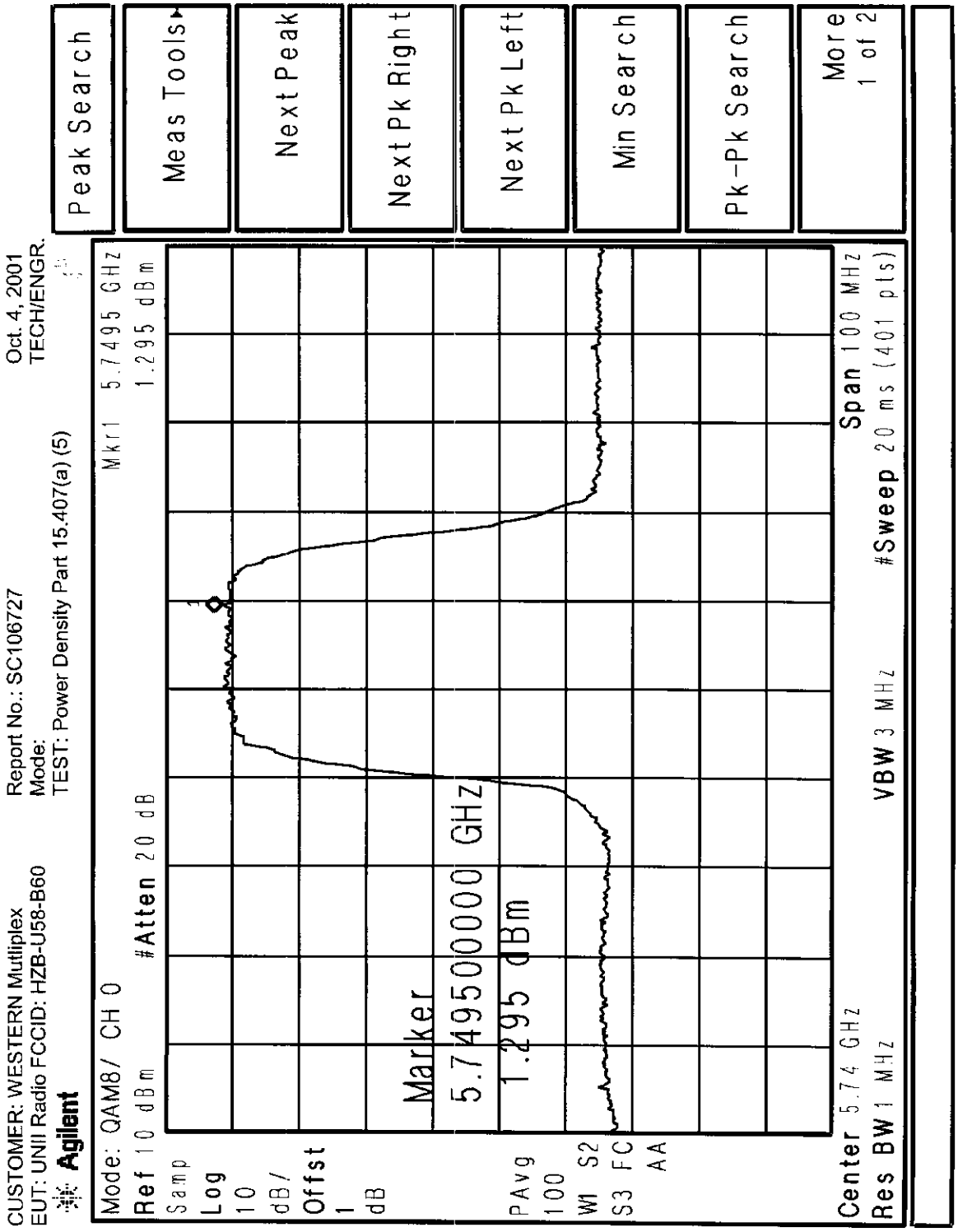
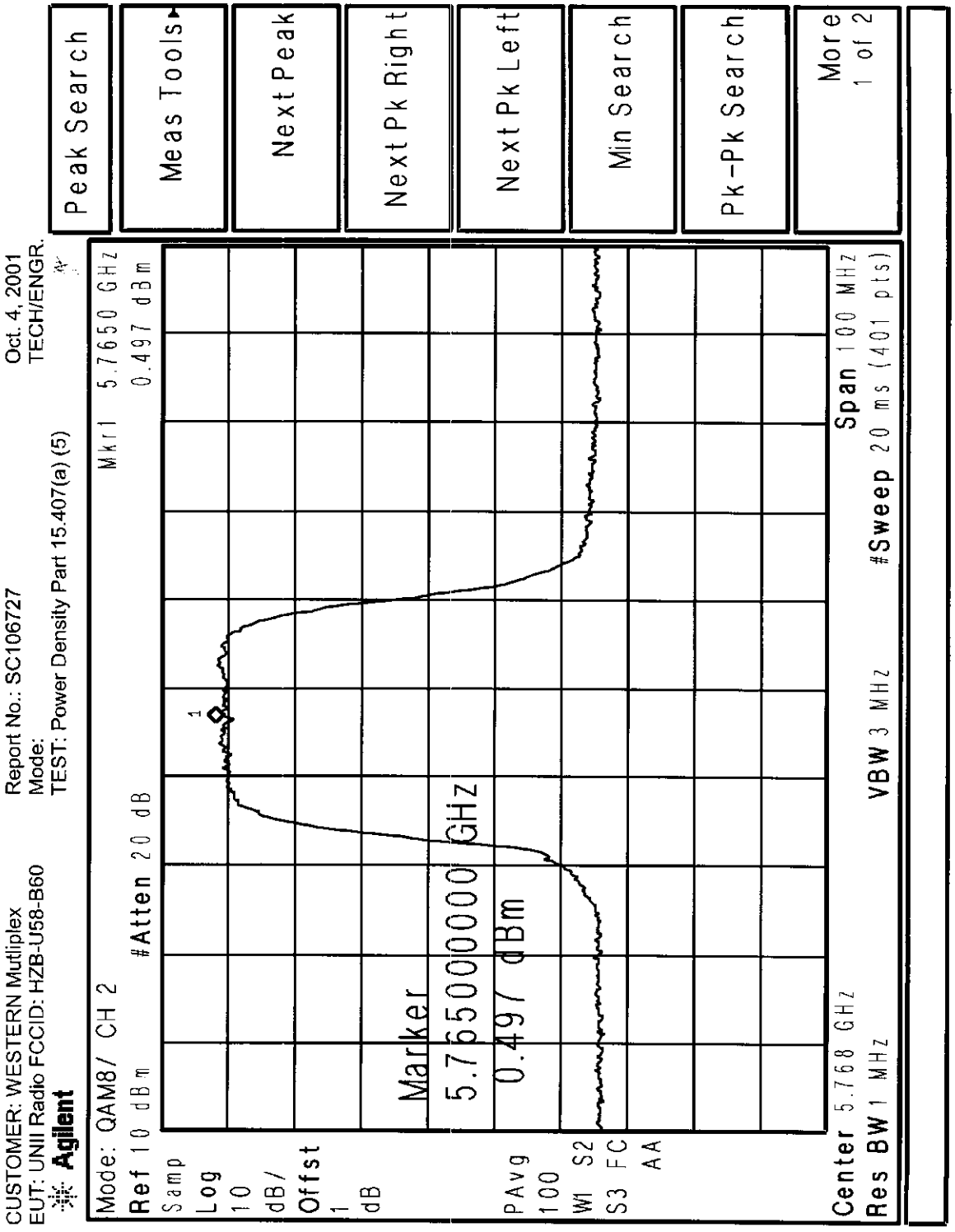
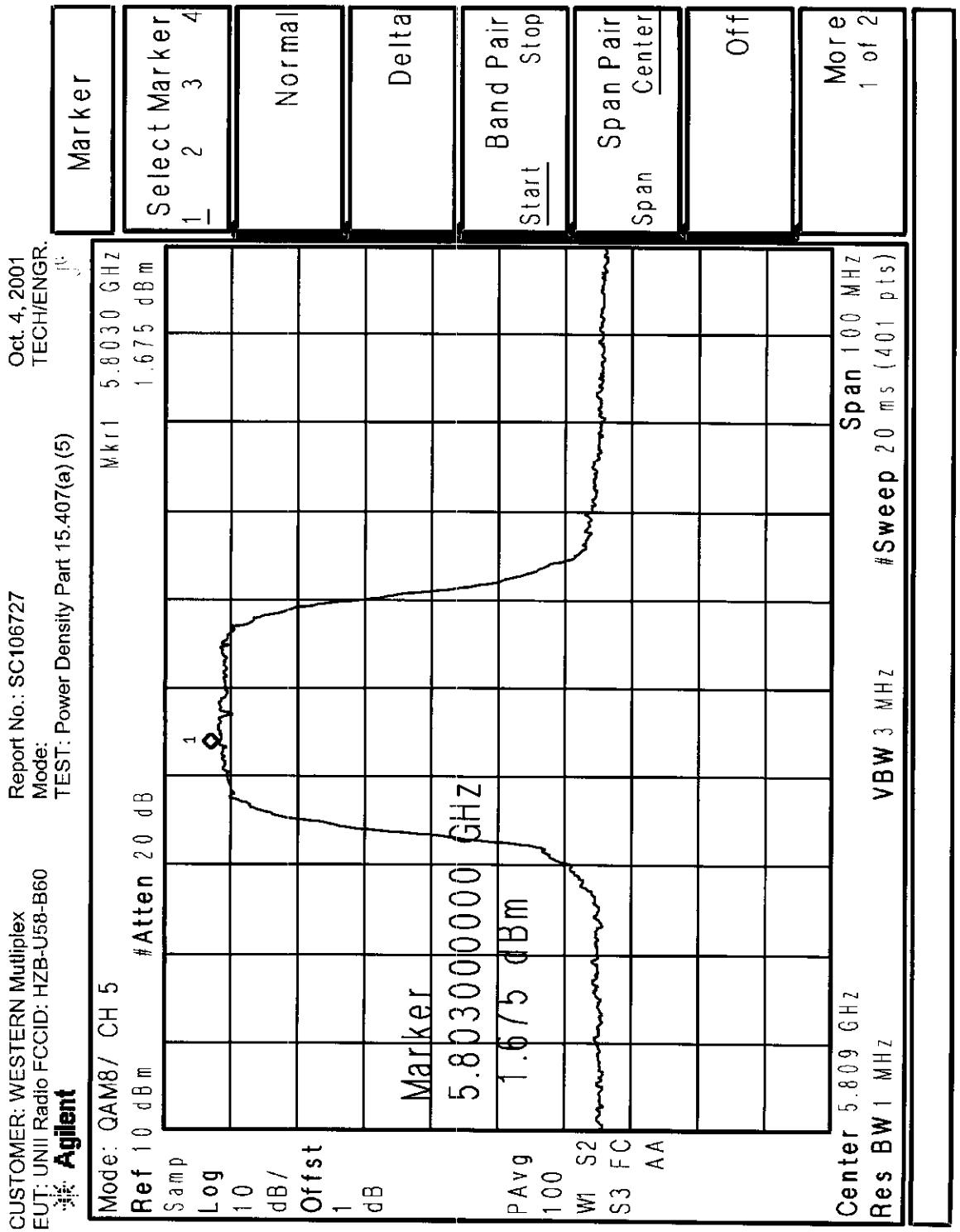
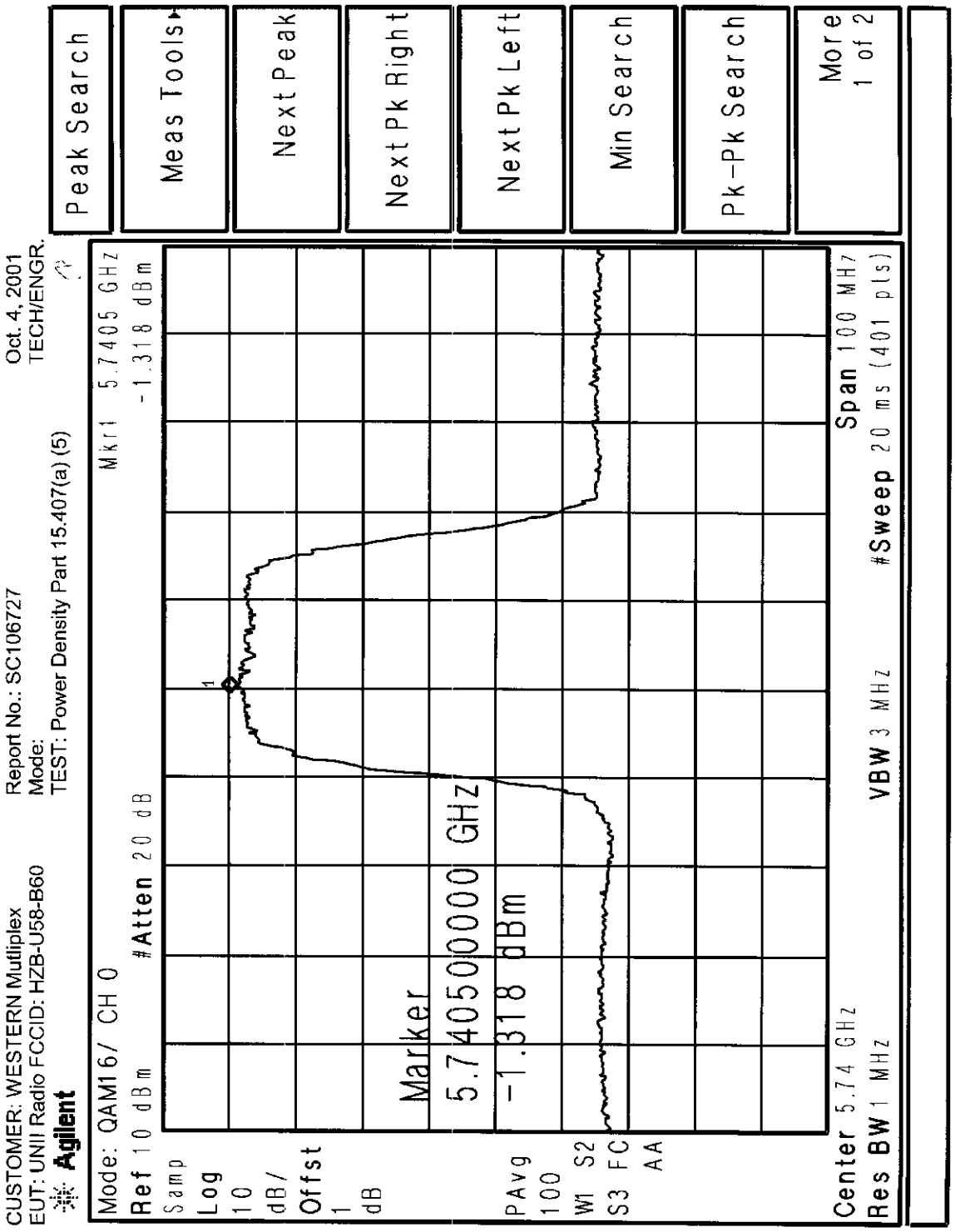

CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Power Density Part 15.407(a) (5)
Oct. 4, 2001
TECH/ENGR.
jp
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More 1 of 2
Mode: QPSK /CH 2
#Atten 20 dB
Mkr1 5.7653 GHz
0.393 dBm
Ref 10 dBm
Samp
Log
10
dB/
Offst
1
dB
PAvg
100
W1 S2
S3 FC
AA
Marker
5.765300000 GHz
0.393 dBm
Center 5.768 GHz
Res BW 1 MHz
VBW 3 MHz
#Sweep 20 ms (401 pts)
Span 100 MHz

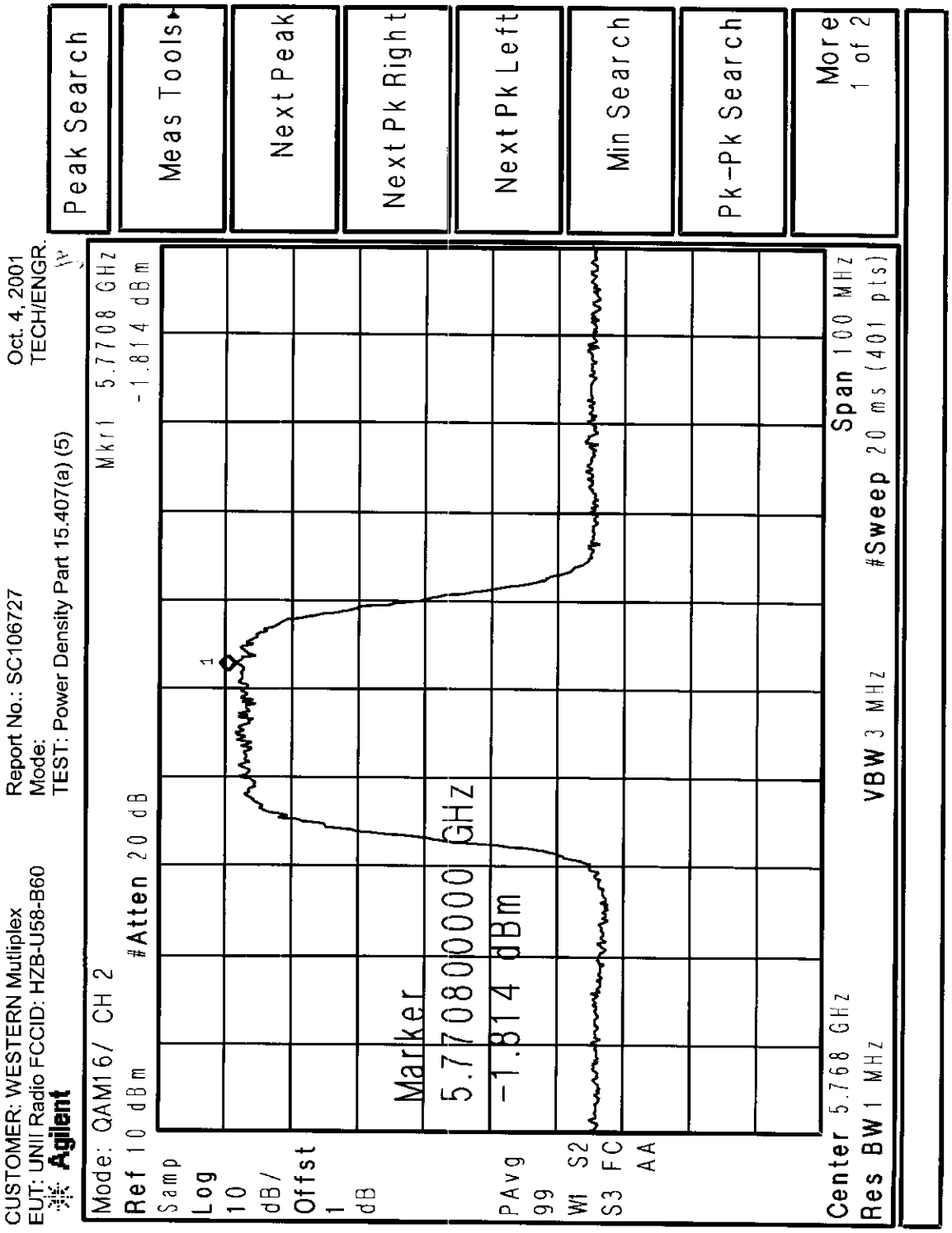

CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Power Density Part 15.407(a) (5)
Oct. 4, 2001
TECH/ENGR.
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More 1 of 2
Mode: QPSK / CH 5
#Atten 20 dB
Mkr1 5.8050 GHz
0.531 dBm
Ref 10 dBm
Samp
Log
10
dB/
Offst
1
dB
Marker
5.805000000 GHz
0.531 dBm
PAvg
100
W1 S2
S3 FC
AA
Center 5.809 GHz
Res BW 1 MHz
VBW 3 MHz
#Sweep 20 ms (401 pts)
Span 100 MHz

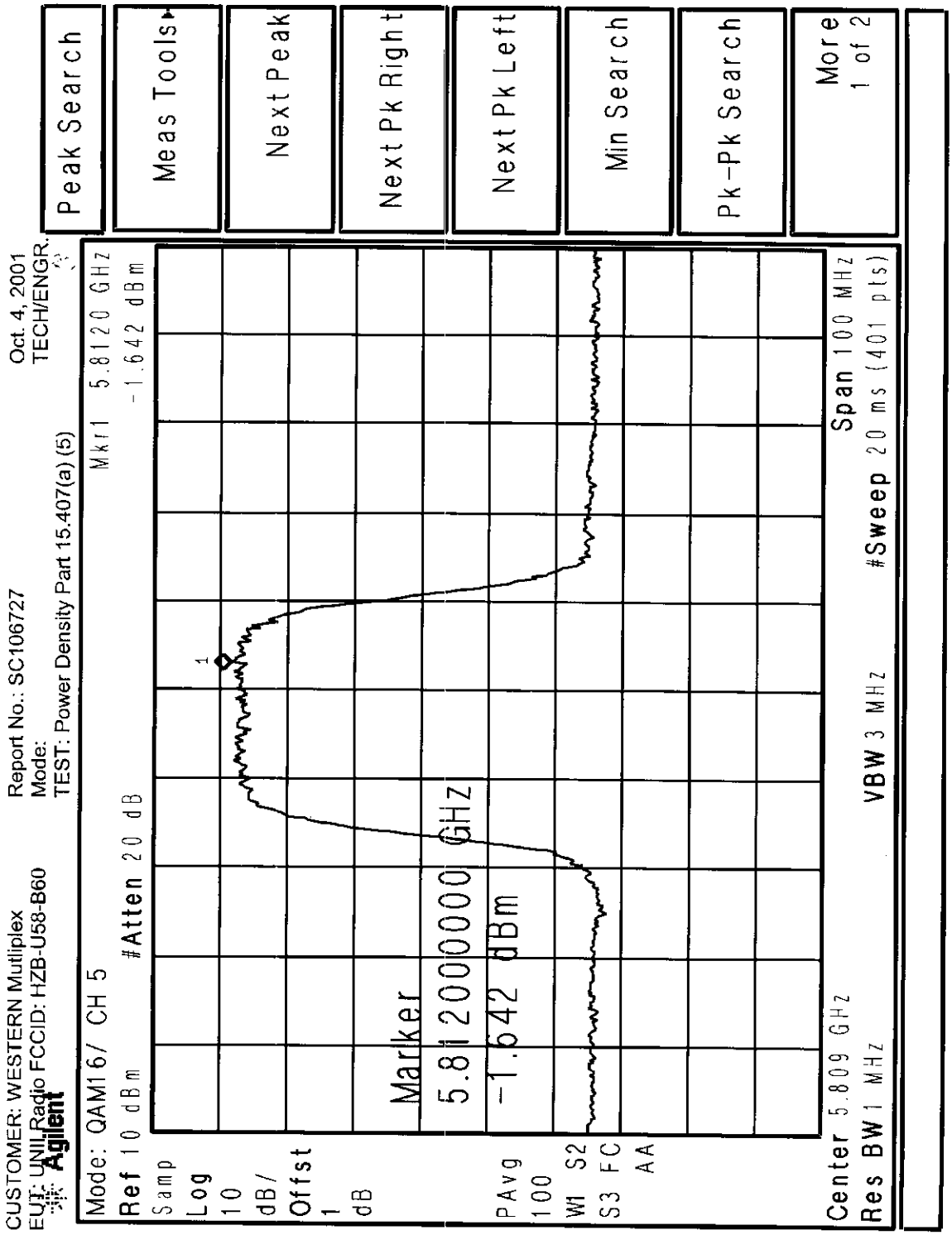

CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Power Density Part 15.407(a) (5)
Oct. 4, 2001
TECH/ENGR.
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More 1 of 2
Mode: QAM8/ CH 0
#Atten 20 dB
Mkr1 5.7495 GHz
1.295 dBm
Ref 10 dBm
Samp
Log
10
dB/
Offst
1
dB
PAvg
100
W1 S2
S3 FC
AA
Marker
5.749500000 GHz
1.295 dBm
Center 5.74 GHz
Res BW 1 MHz
VBW 3 MHz
Span 100 MHz
#Sweep 20 ms (401 pts)

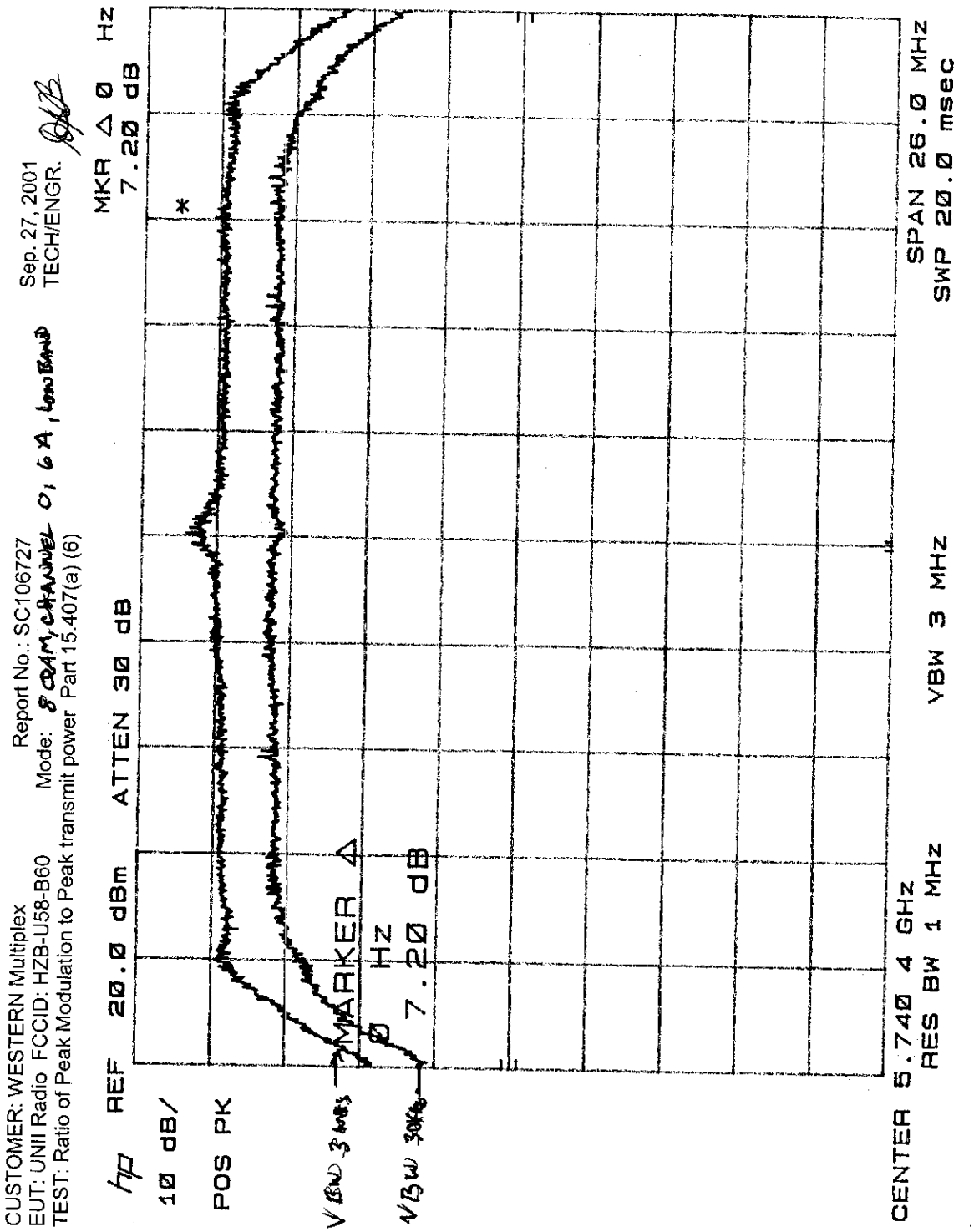

CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Power Density Part 15.407(a) (5)
Oct. 4, 2001
TECH/ENGR.
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More 1 of 2
Mode: QAM8/ CH 2
Ref 10 dBm
#Atten 20 dB
Mkr1 5.7650 GHz
0.497 dBm
Samp
Log
10
dB/
Offst
1
dB
PAvg
100
W1 S2
S3 FC
AA
Marker
5.765000000 GHz
0.497 dBm
Center 5.768 GHz
Res BW 1 MHz
VBW 3 MHz
Span 100 MHz
#Sweep 20 ms (401 pts)


CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Power Density Part 15.407(a) (5)
Oct. 4, 2001
TECH/ENGR.
Mode: QAM8/ CH 5
#Atten 20 dB
Mkr1 5.8030 GHz
1.675 dBm
Ref 10 dBm
Samp
Log
10
dB/
Offst
1
dB
Marker
5.803000000 GHz
1.675 dBm
PAvg
100
W1 S2
S3 FC
AA
Center 5.809 GHz
Res BW 1 MHz
VBW 3 MHz
#Sweep 20 ms (401 pts)
Span 100 MHz
Marker
Select Marker
1 2 3 4
Normal
Delta
Band Pair
Start
Stop
Span Pair
Span
Center
Off
More
1 of 2


CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Power Density Part 15.407(a) (5)
Oct. 4, 2001
TECH/ENGR.
Mode: QAM16/ CH 0
Mkr1 5.7405 GHz
-1.318 dBm
Ref 10 dBm
#Atten 20 dB
Samp
Log
10
dB/
Offst
1
dB
Marker
5.740500000 GHz
-1.318 dBm
PAvg
100
W1 S2
S3 FC
AA
Center 5.74 GHz
Res BW 1 MHz
VBW 3 MHz
#Sweep 20 ms (401 pts)
Span 100 MHz
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2


CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Power Density Part 15.407(a) (5)
Oct. 4, 2001
TECH/ENGR.
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More 1 of 2
Mode: QAM16/ CH 2
Mkr1 5.7708 GHz
-1.814 dBm
Ref 10 dBm
#Atten 20 dB
Samp
Log
10
dB/
Offst
1
dB
Marker
5.770800000 GHz
-1.814 dBm
PAvg
99
Wt S2
S3 FC
AA
Span 100 MHz
#Sweep 20 ms (401 pts)
Center 5.768 GHz
Res BW 1 MHz
VBW 3 MHz


CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Power Density Part 15.407(a) (5)
Oct. 4, 2001
TECH/ENGR:
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More 1 of 2
Mode: QAM16/ CH 5
Ref 10 dBm
#Atten 20 dB
Mkr1 5.8120 GHz
-1.642 dBm
Samp
Log
10
dB/
Offst
1
dB
PAvg
100
W1 S2
S3 FC
AA
Marker
5.812000000 GHz
-1.642 dBm
Center 5.809 GHz
Res BW 1 MHz
VBW 3 MHz
Span 100 MHz
#Sweep 20 ms (401 pts)



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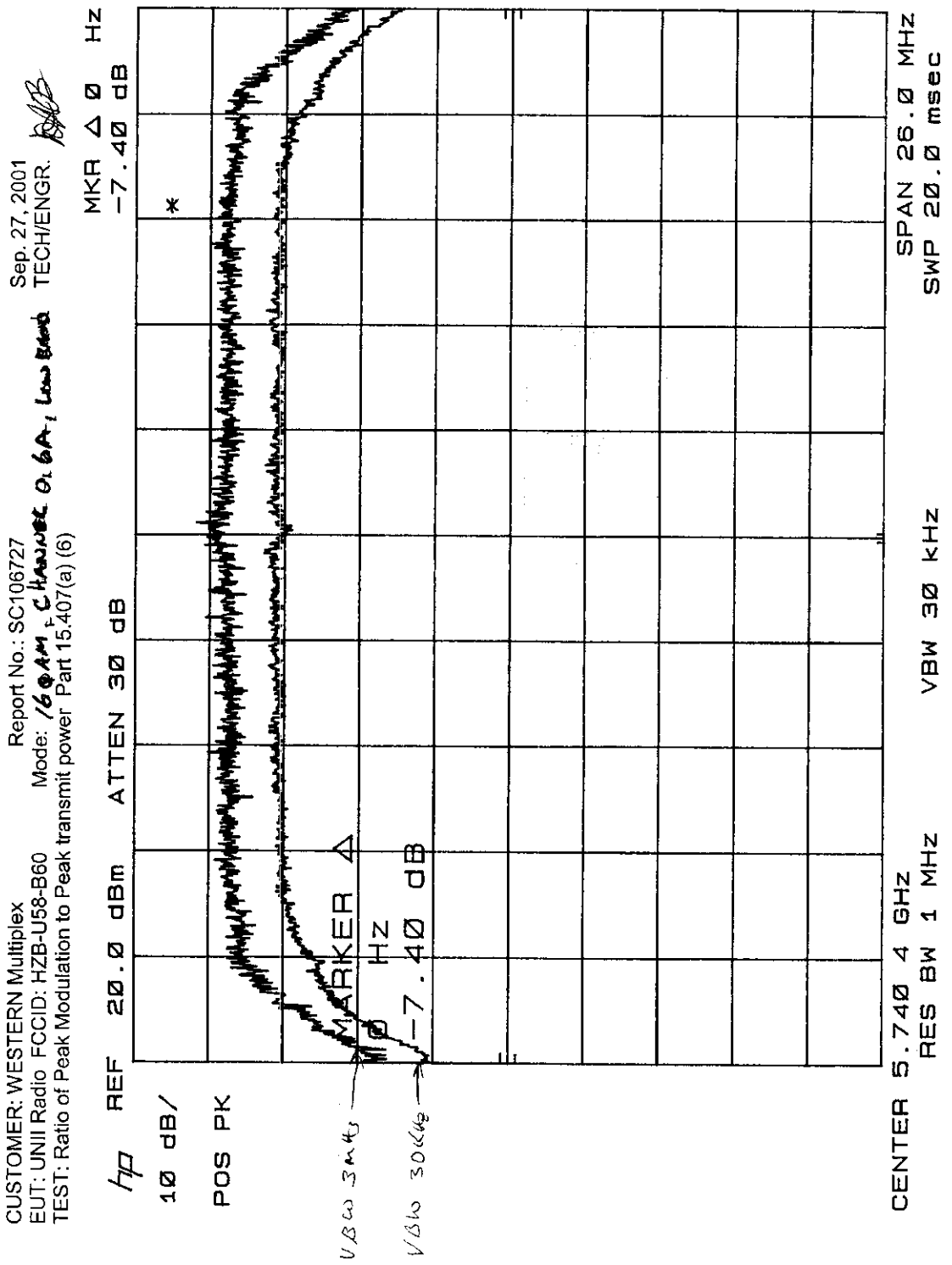
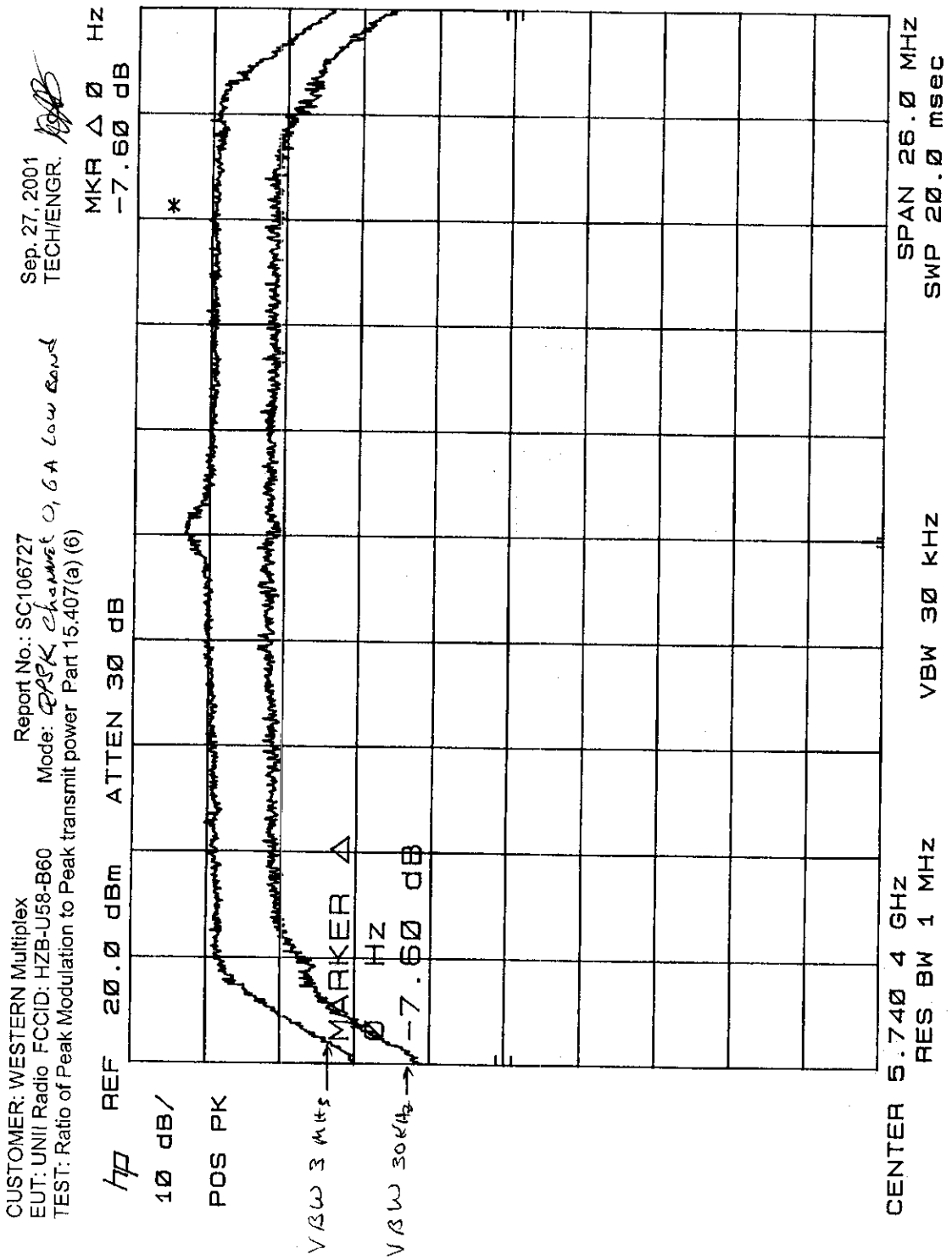
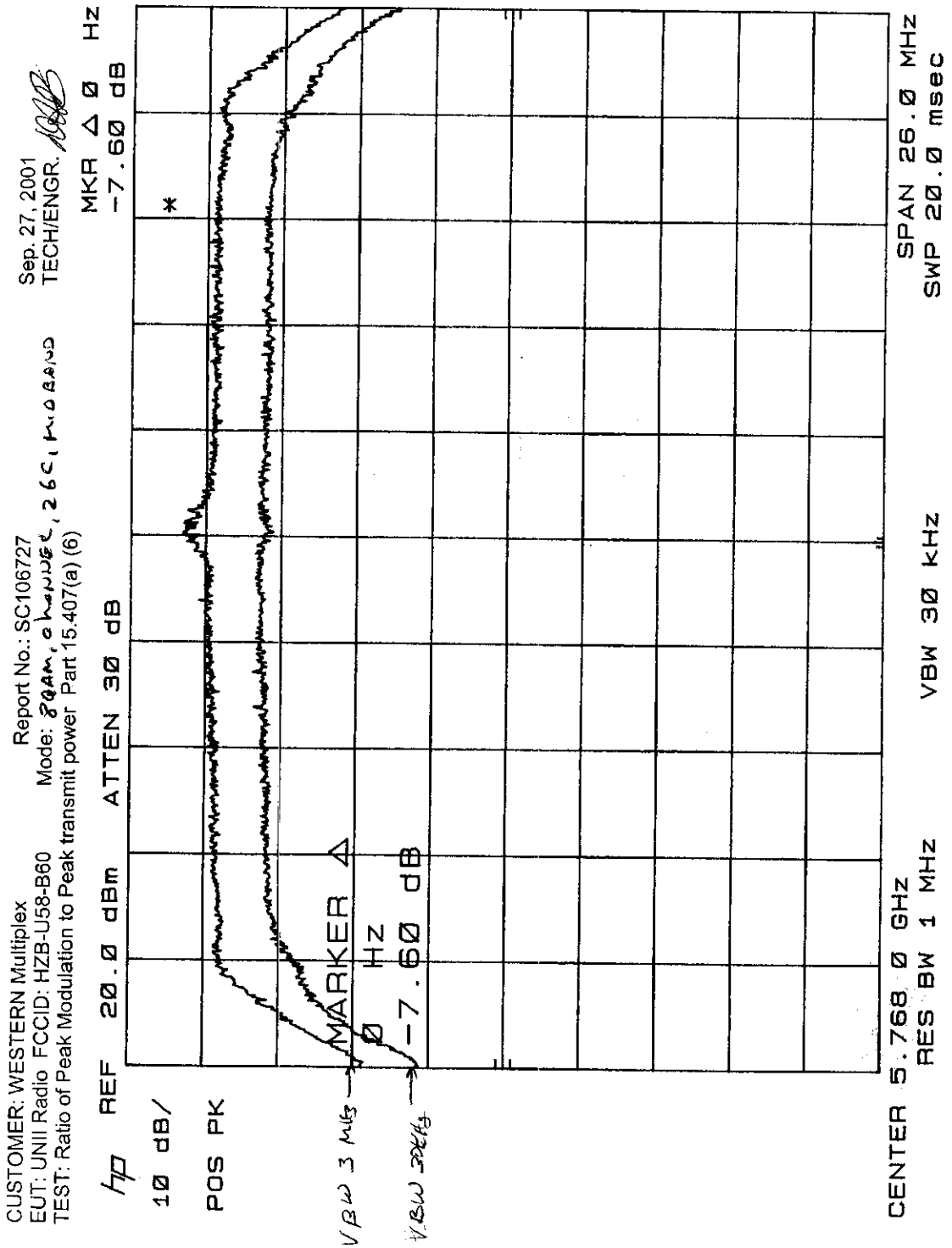

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Ratio of Peak Modulation to Peak transmit power Part 15.407(a) (6)
Report No.: SC106727
Mode: 16QAM, Channel 01, 6A-1, Low Band
Sep. 27, 2001
TECH/ENGR.
MKR Δ 0 Hz
-7.40 dB
REF 20.0 dBm
ATTEN 30 dB
10 dB/
POS PK
MARKER Δ
0 Hz
-7.40 dB
VBW 3MHz
VBW 30KHz
CENTER 5.740 4 GHz
RES BW 1 MHz
VBW 30 kHz
SPAN 26.0 MHz
SWP 20.0 msec


CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Ratio of Peak Modulation to Peak transmit power Part 15.407(a) (6)
Report No.: SC106727
Mode: QPSK channel 0, 6A Low Band
Sep. 27, 2001
TECH/ENGR.
REF 20.0 dBm
ATTEN 30 dB
10 dB/
POS PK
MKR Δ 0 Hz
-7.60 dB
MARKER Δ
0 Hz
-7.60 dB
VBW 3 MHz
VBW 300kHz
CENTER 5.740 4 GHz
RES BW 1 MHz
VBW 30 kHz
SPAN 26.0 MHz
SWP 20.0 msec



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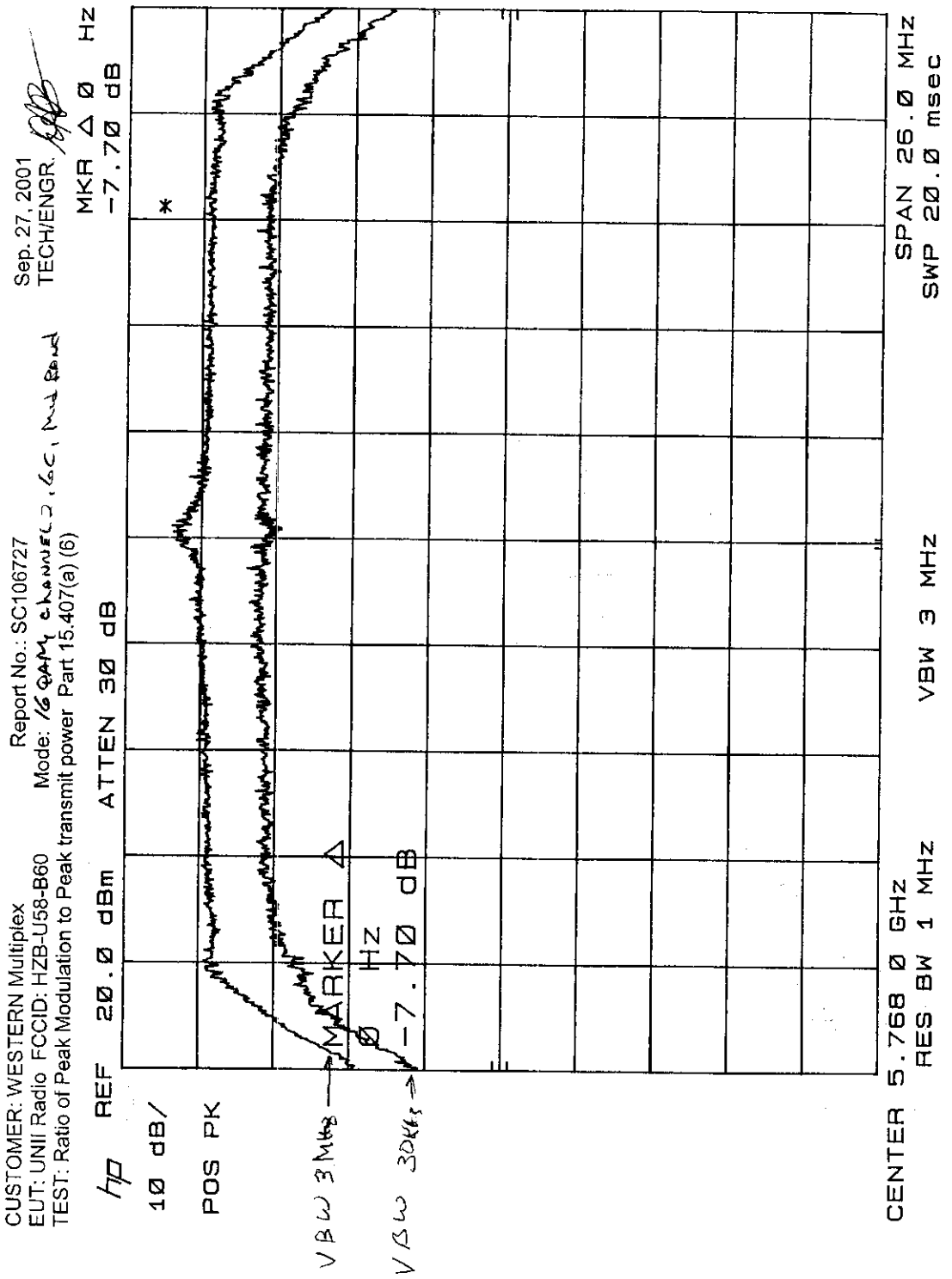




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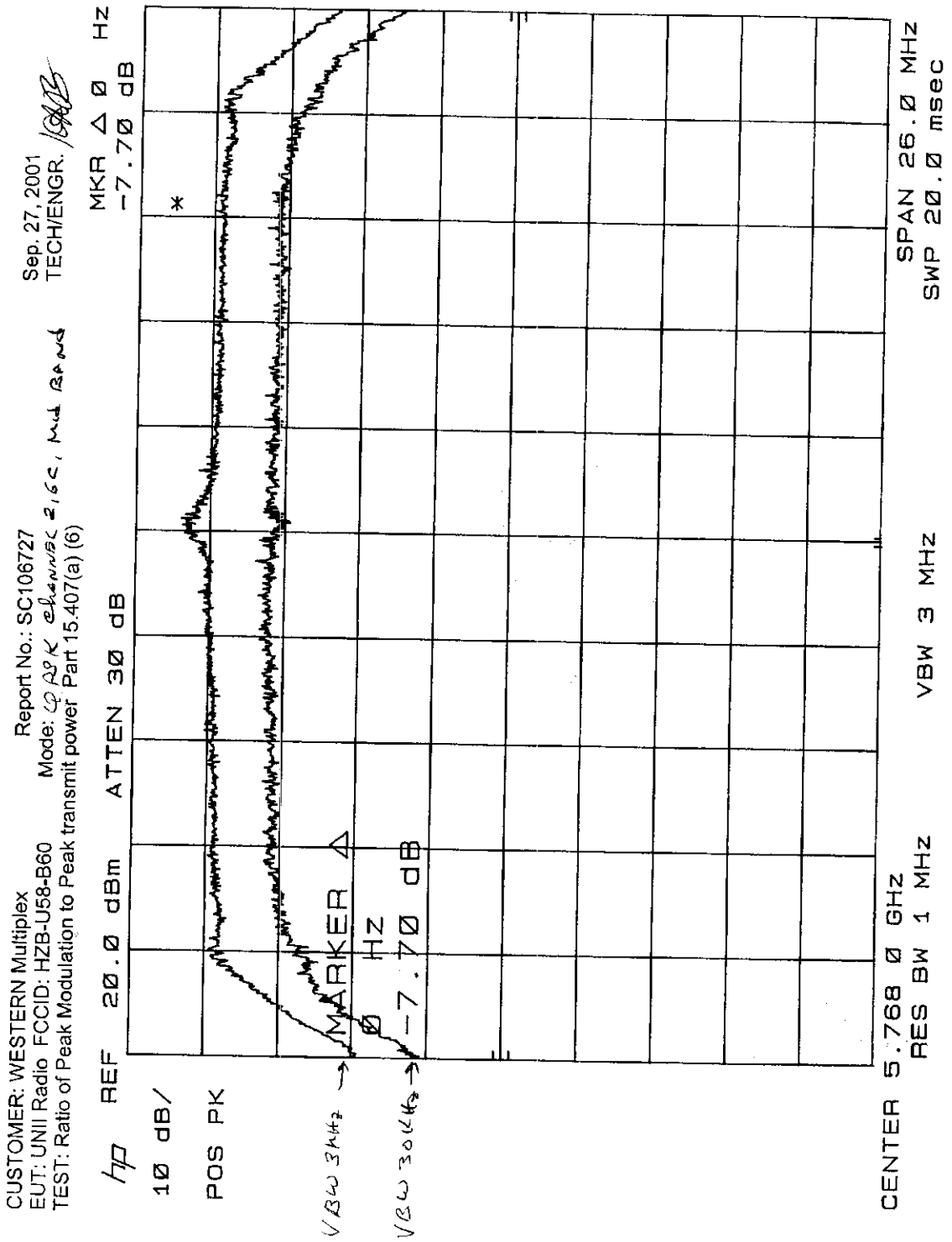




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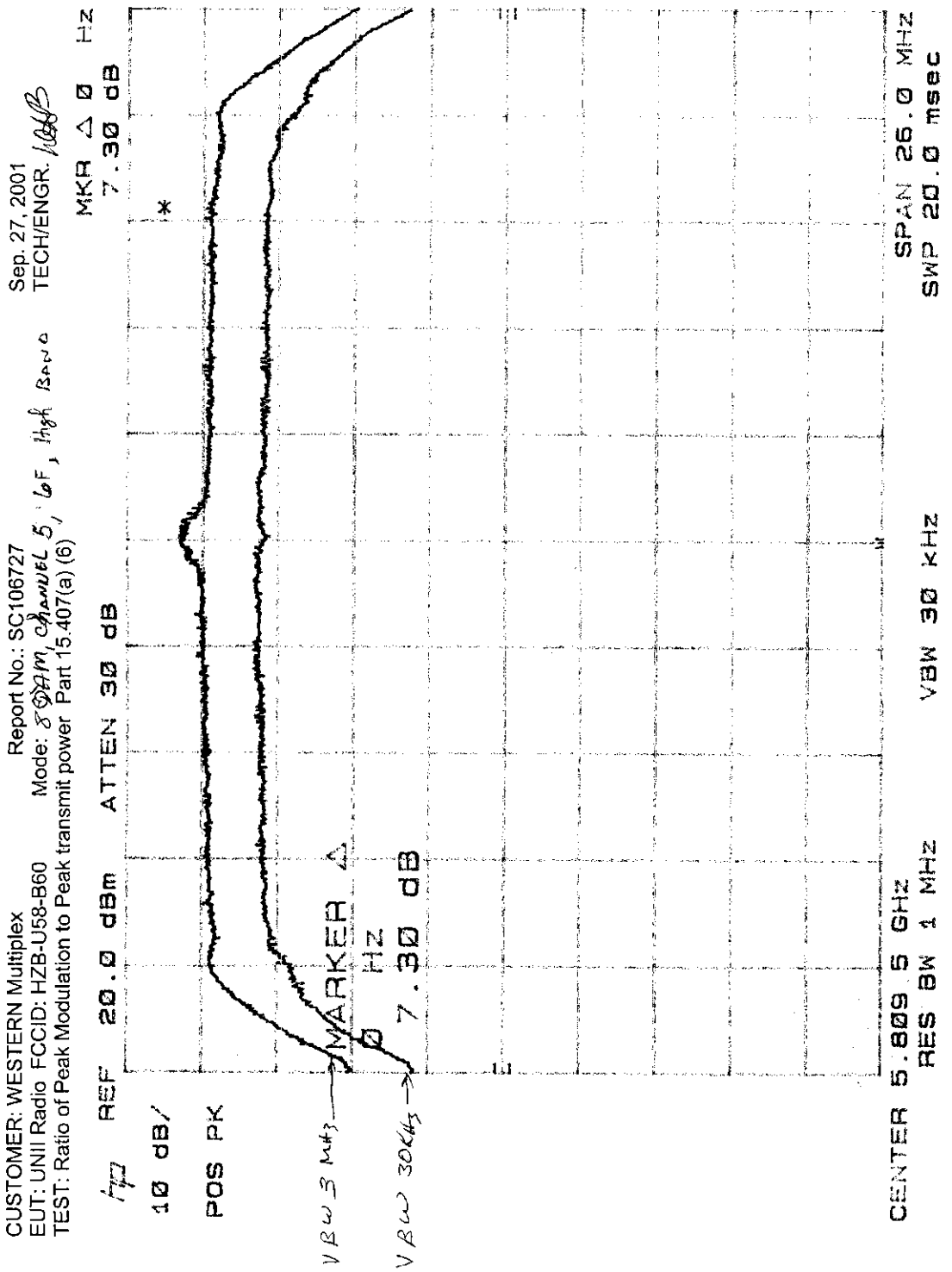
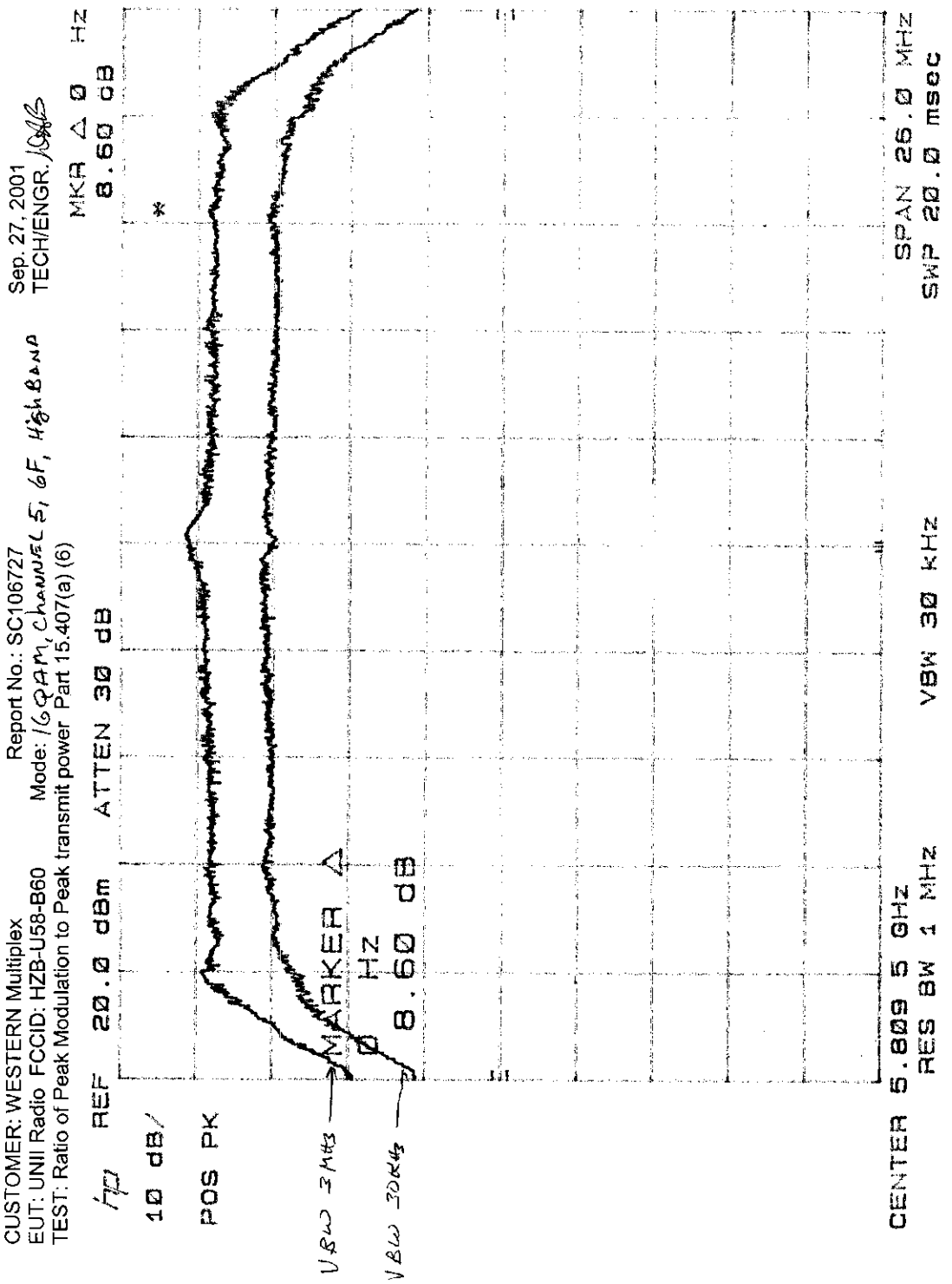

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Ratio of Peak Modulation to Peak transmit power Part 15.407(a) (6)
Report No.: SC106727
Mode: 8DPSK Channel 5, LOF, High Band
Sep. 27, 2001
TECH/ENGR.
REF 20.0 dBm
ATTEN 30 dB
MKR Δ 0 Hz
7.30 dB
10 dB/
POS PK
MARKER Δ
0 Hz
7.30 dB
VBW 3 MHz
VBW 300kHz
CENTER 5.809 5 GHz
RES BW 1 MHz
VBW 30 kHz
SPAN 26.0 MHz
SWP 20.0 msec



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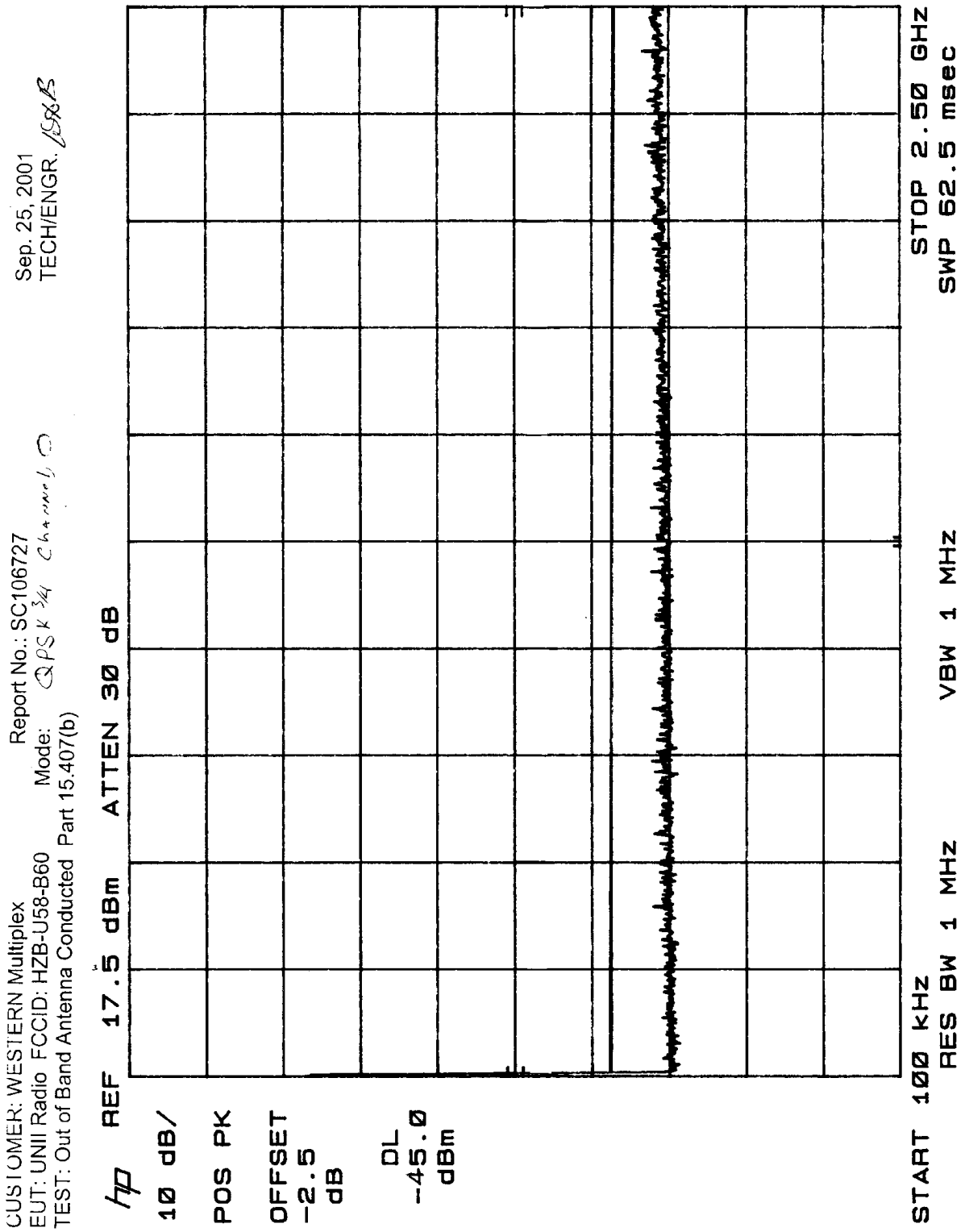




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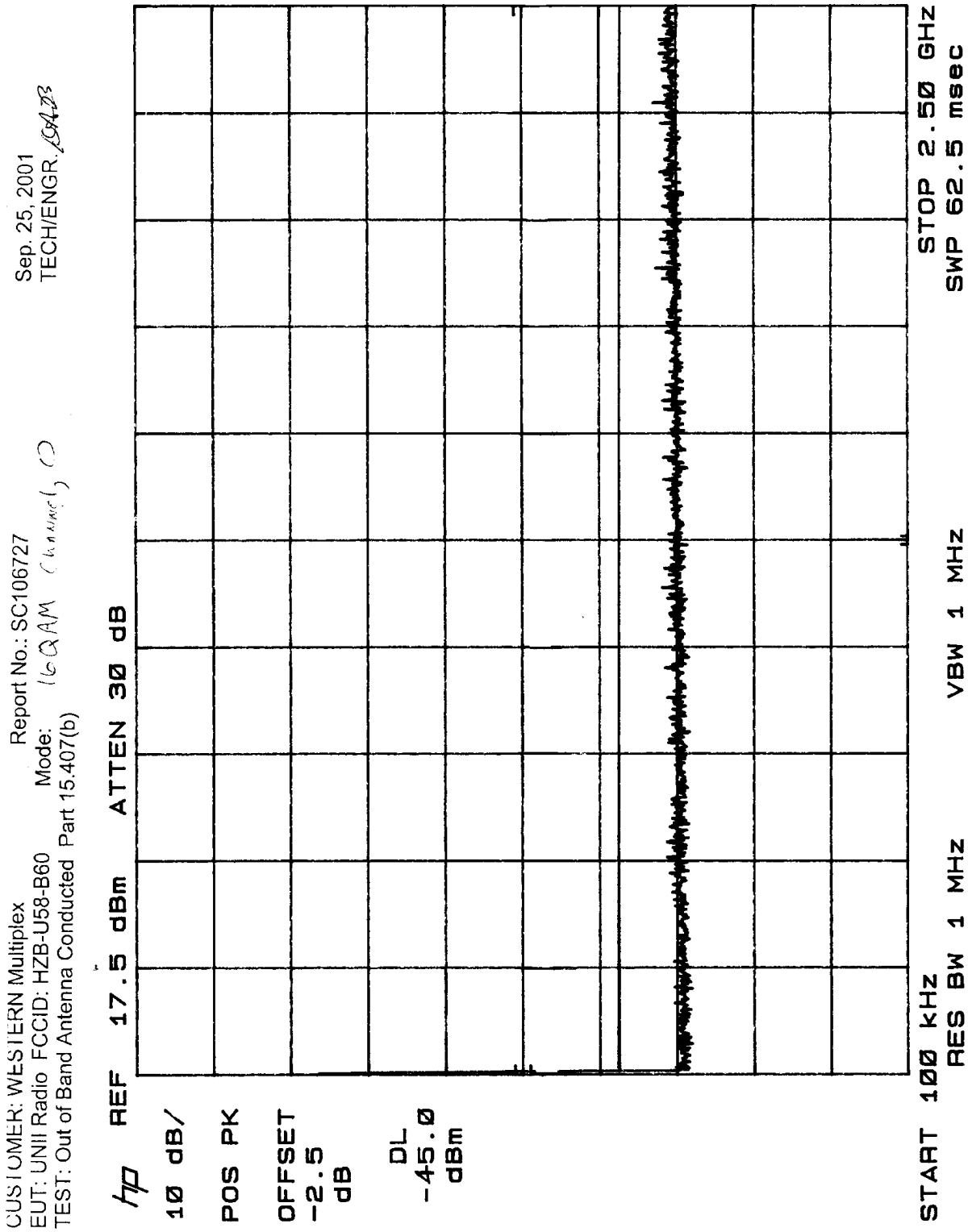




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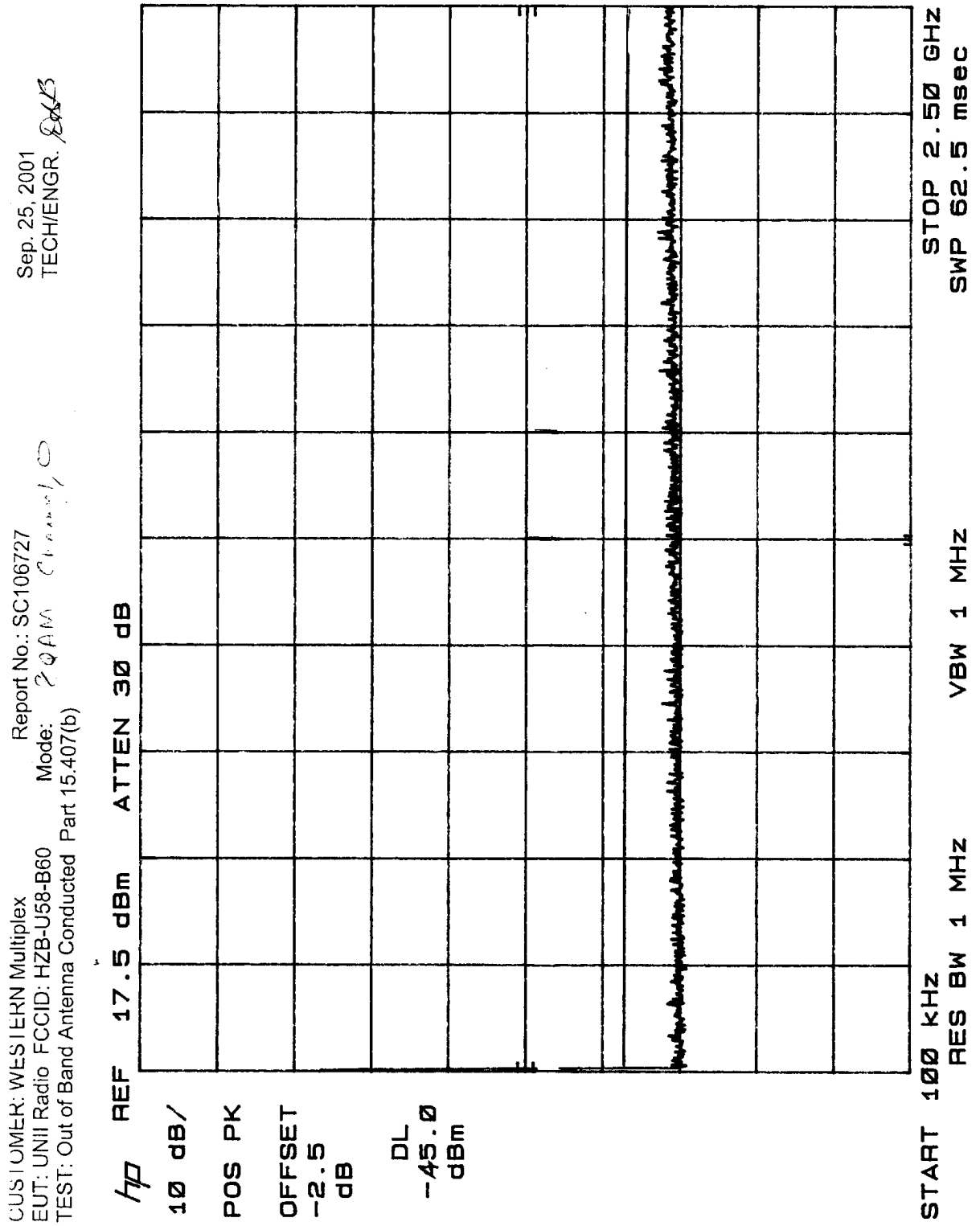




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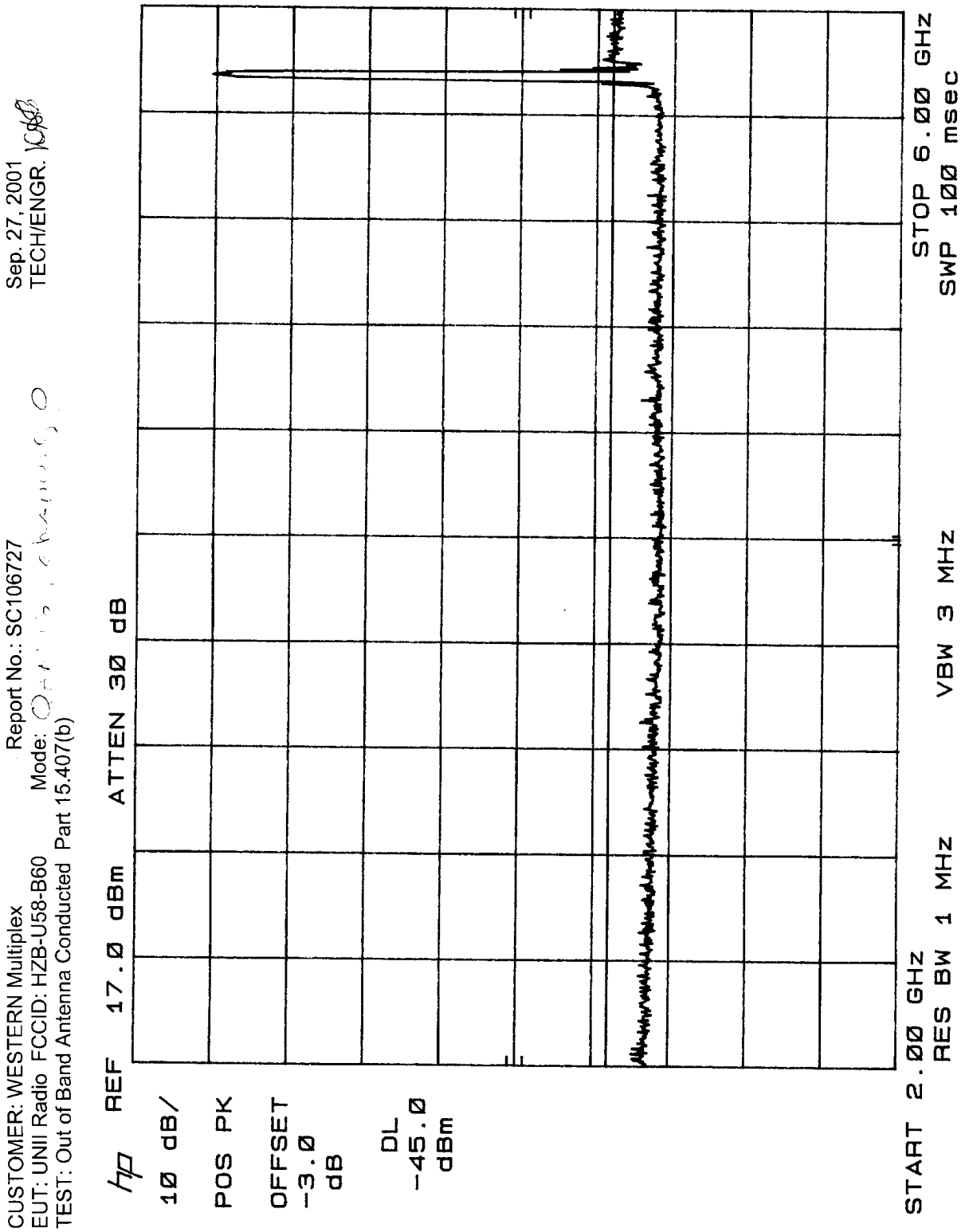




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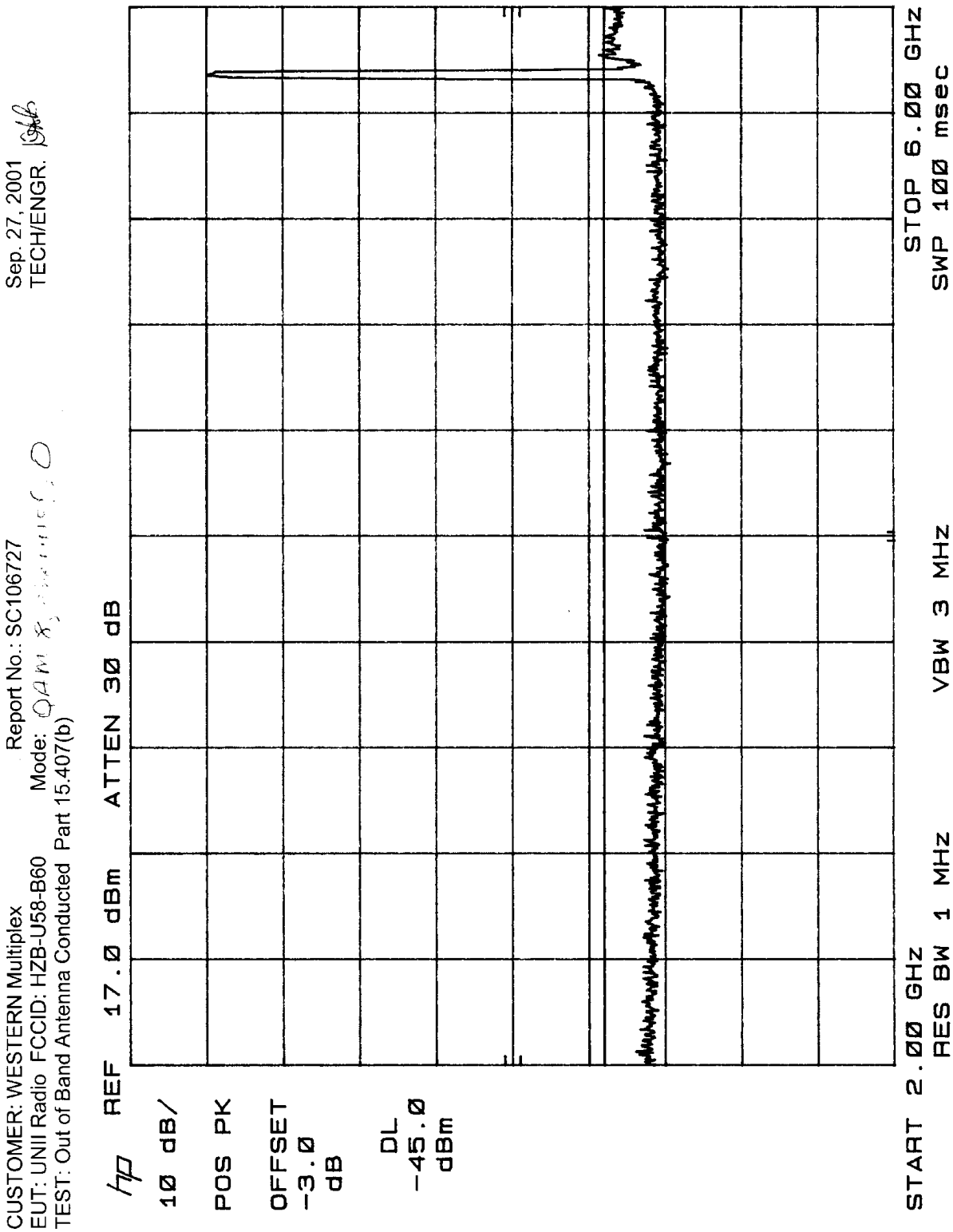




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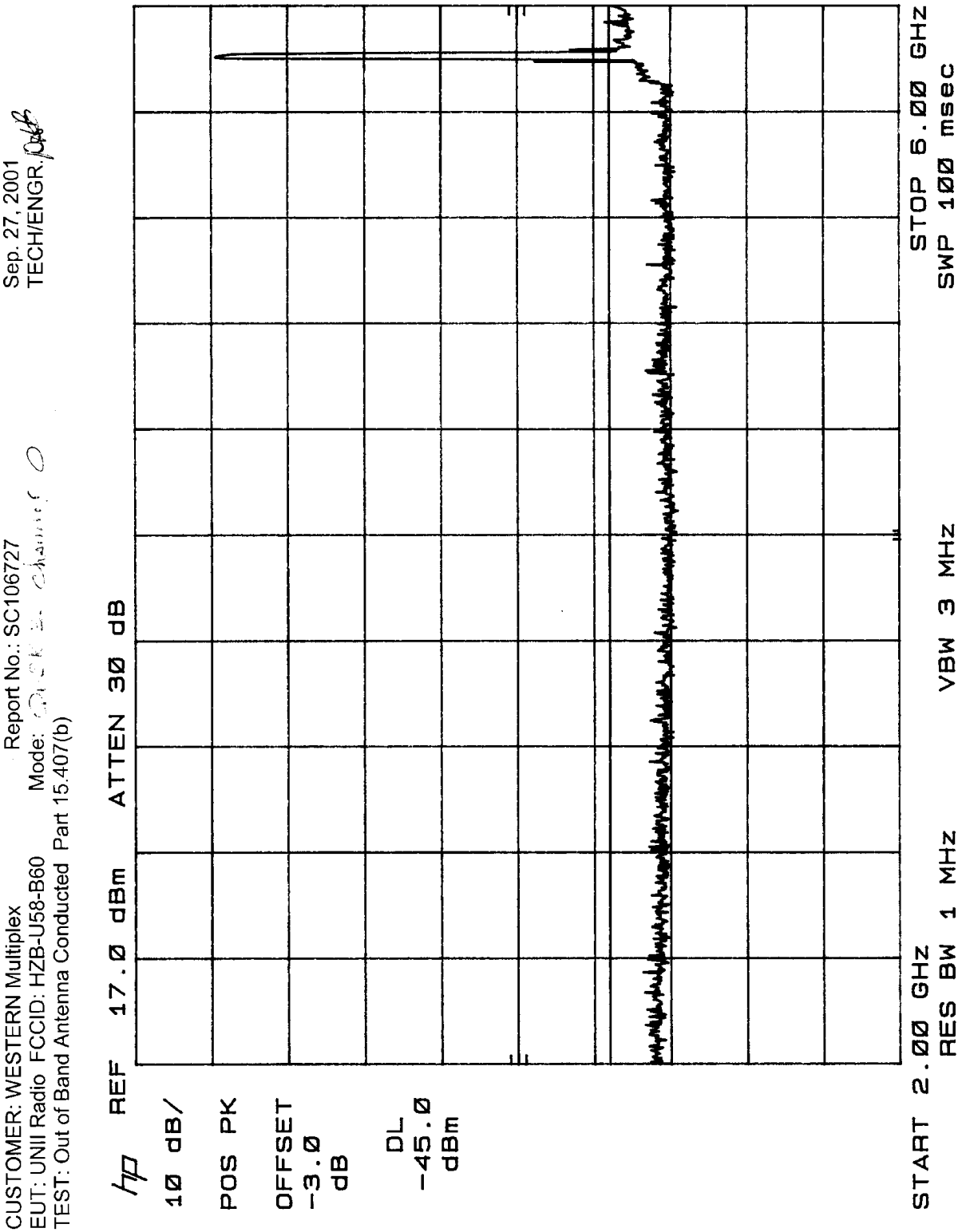




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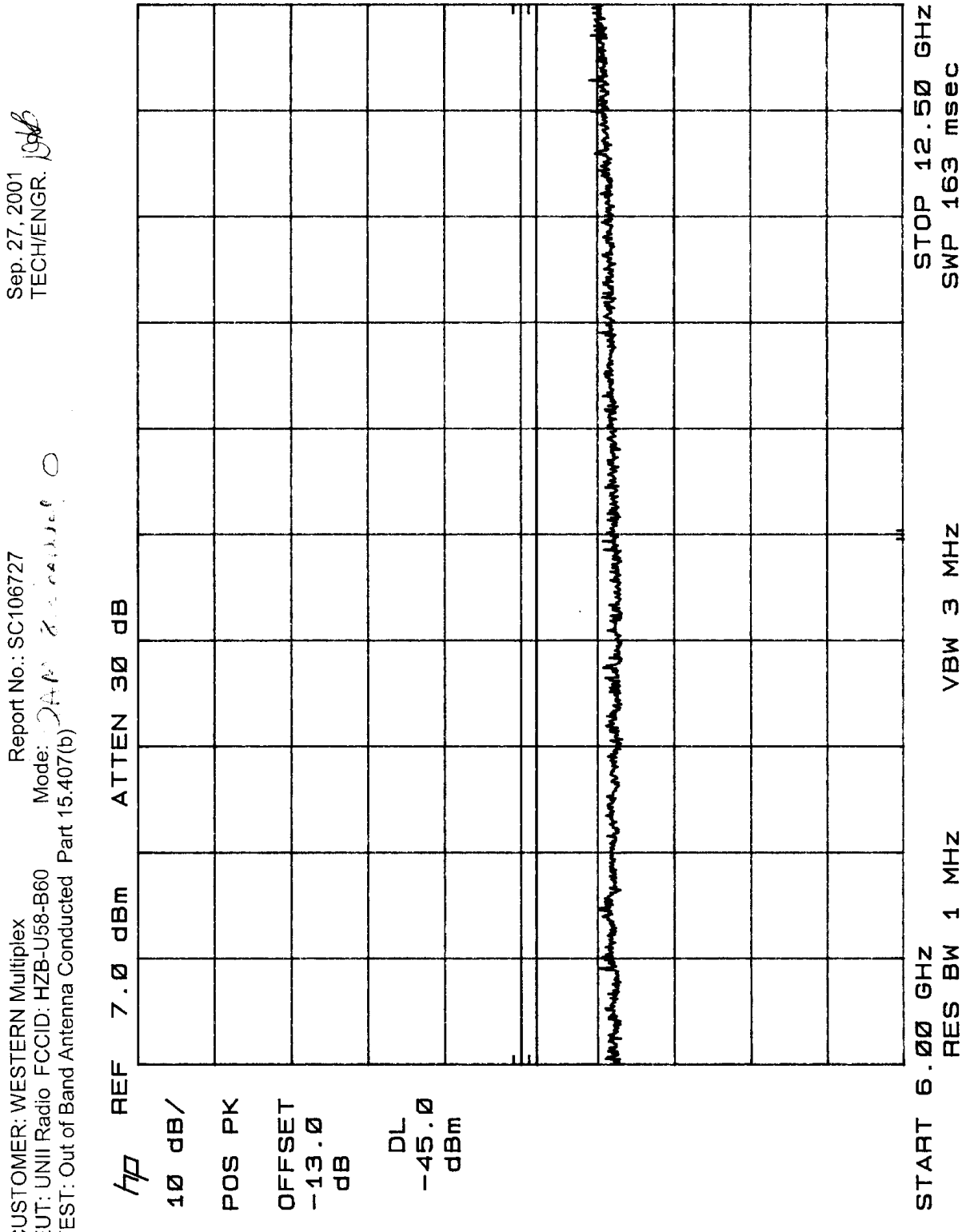




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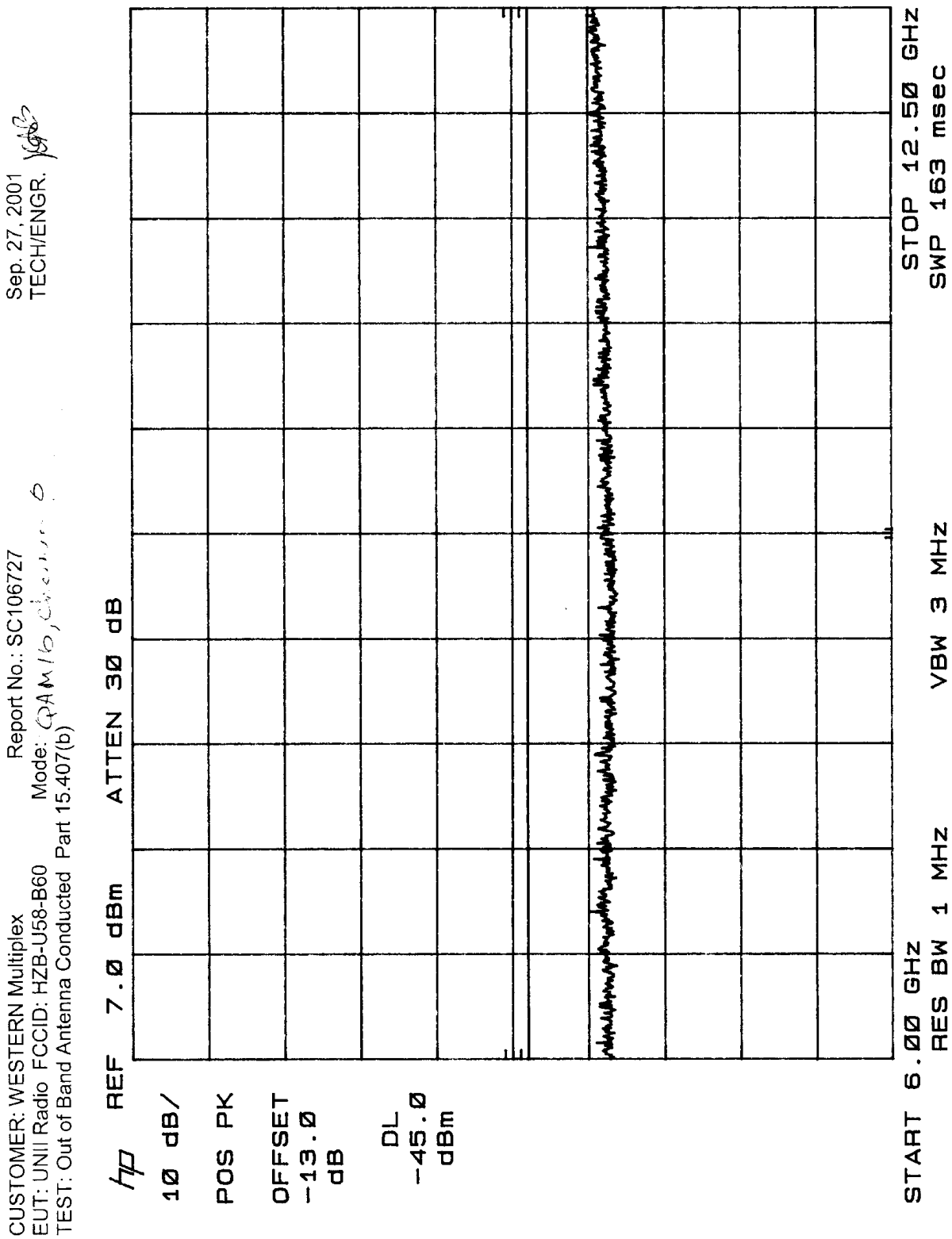




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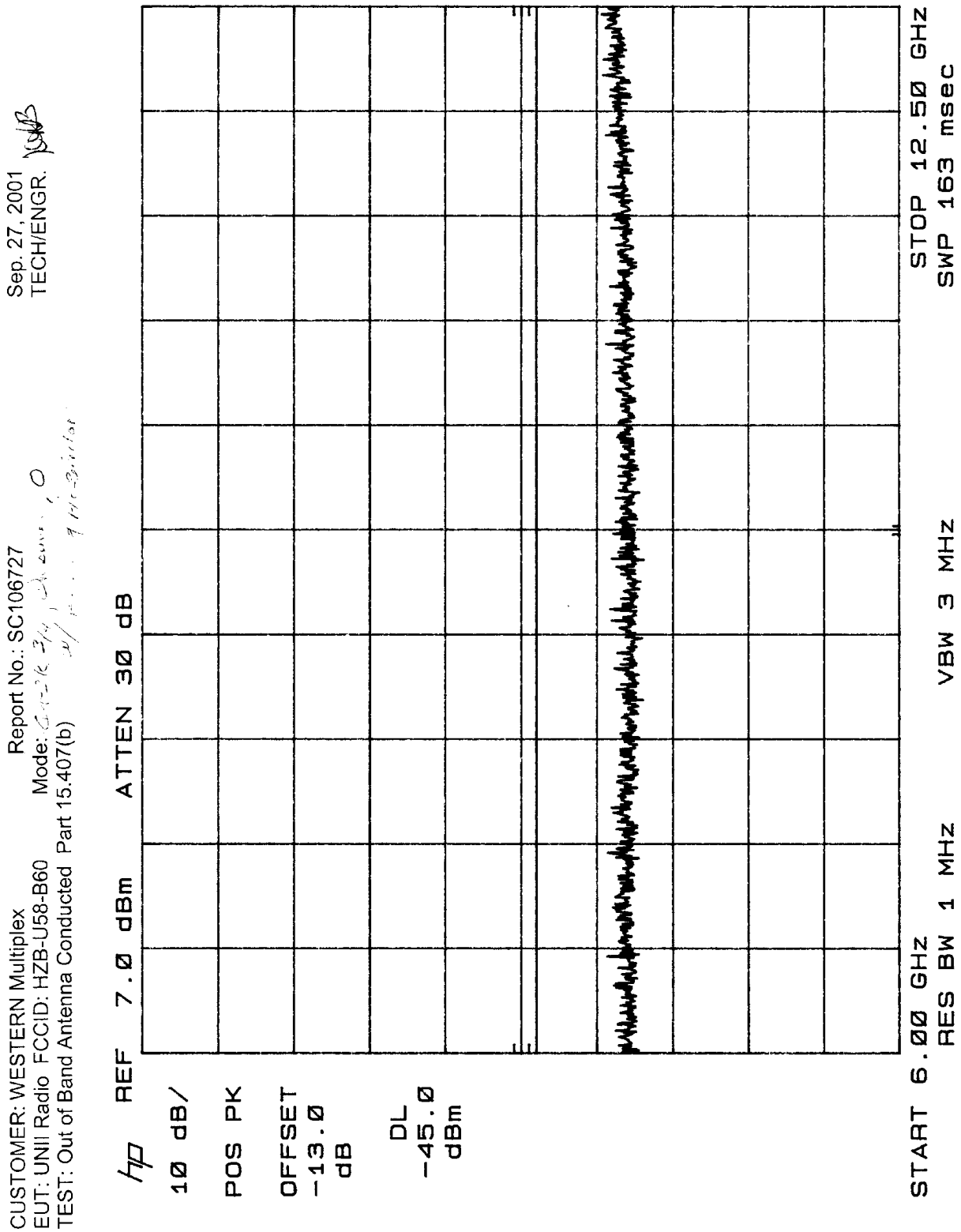
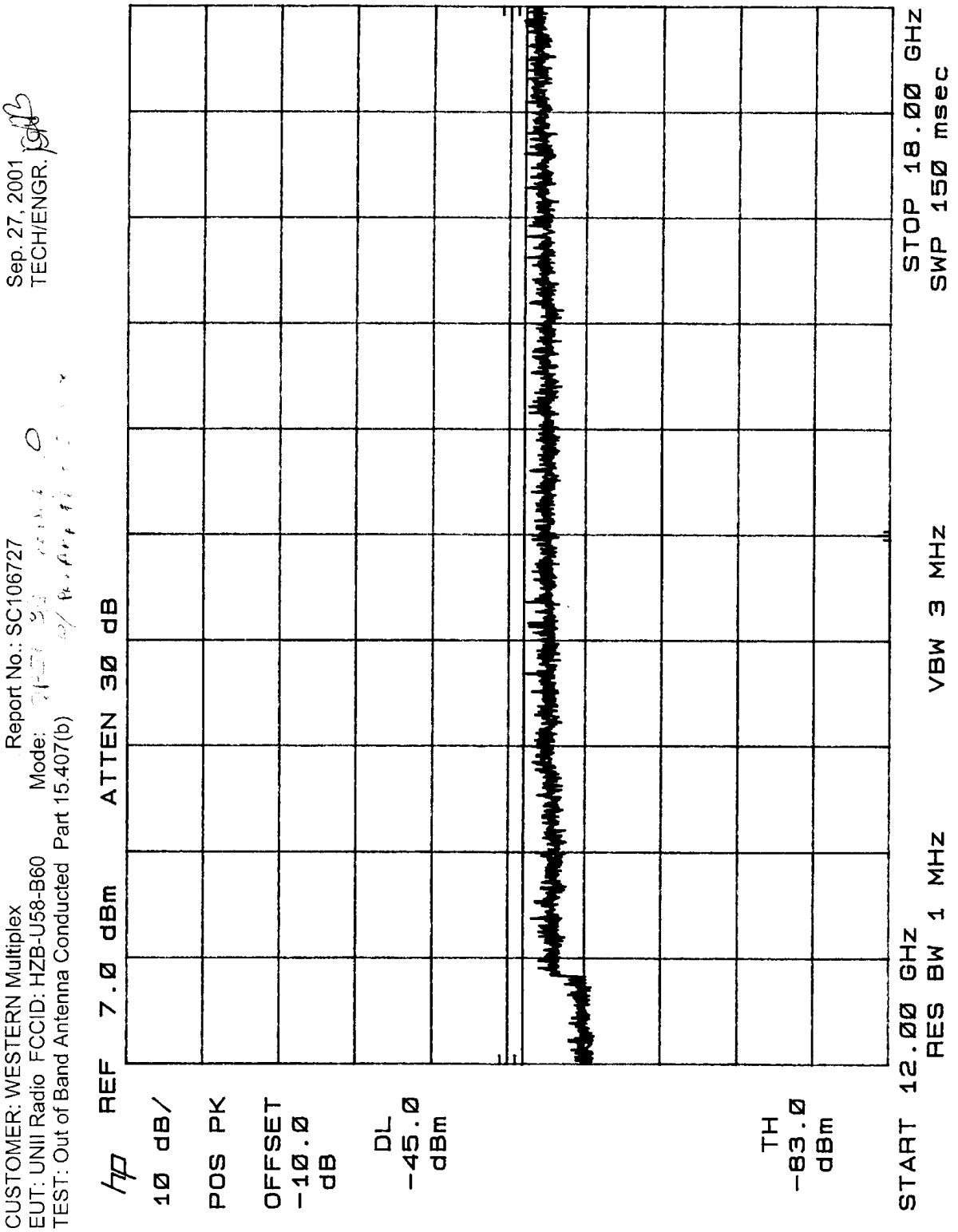

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)
Report No.: SC106727
Mode:
Sep. 27, 2001
TECH/ENGR.
REF 7.0 dBm
ATTEN 30 dB
10 dB/
POS PK
OFFSET
-13.0
dB
DL
-45.0
dBm
START 6.00 GHz
RES BW 1 MHz
VBW 3 MHz
STOP 12.50 GHz
SWP 163 msec



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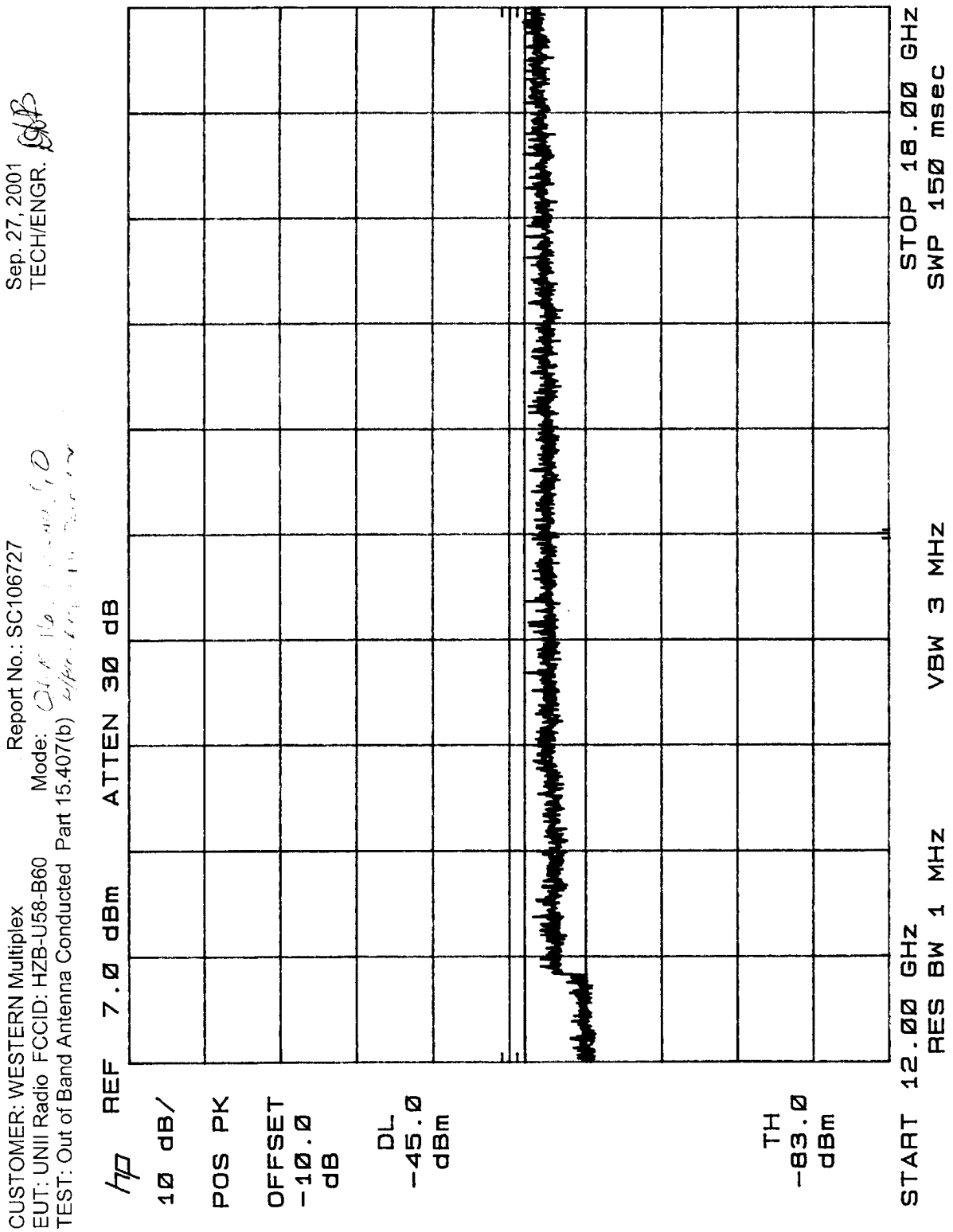




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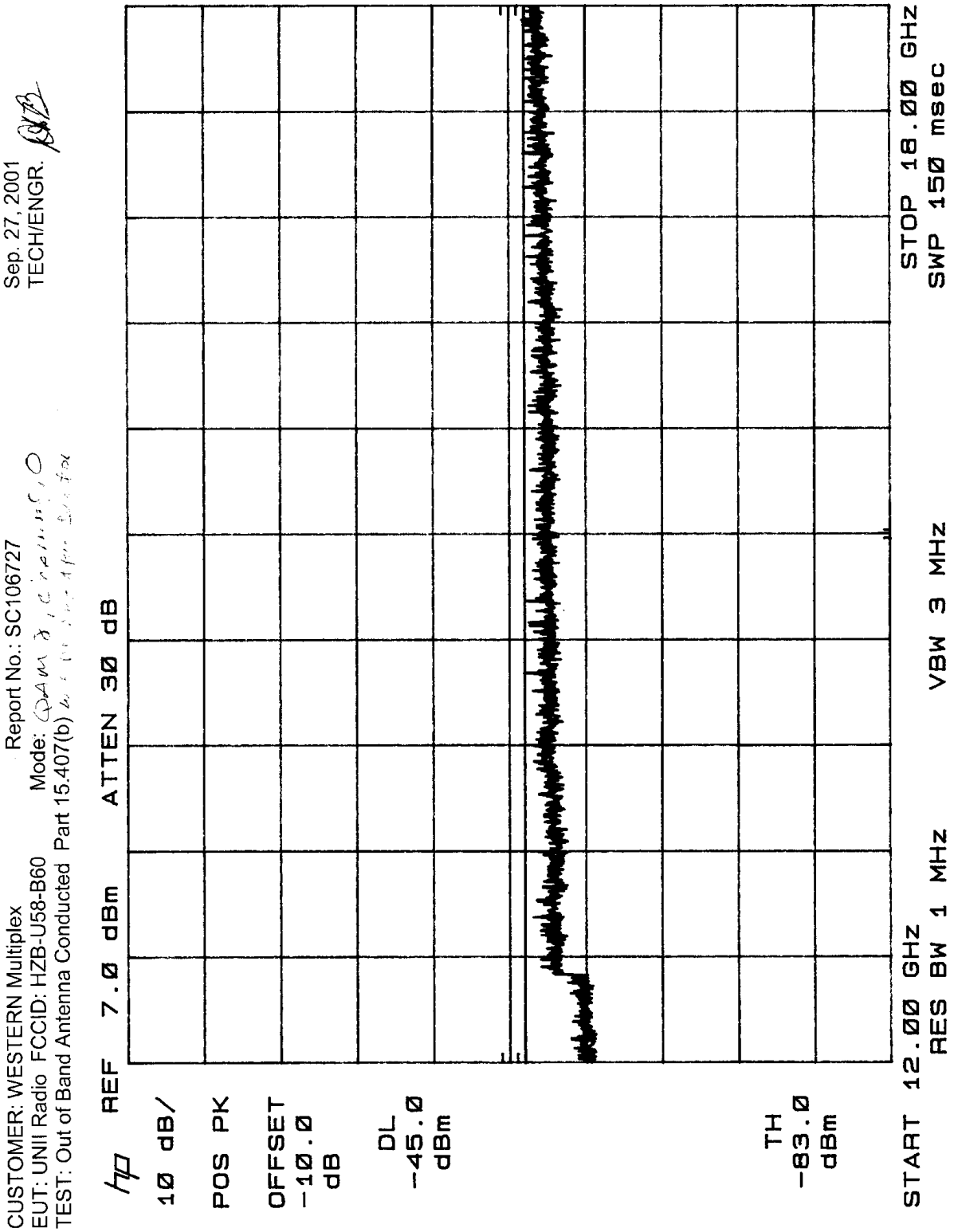




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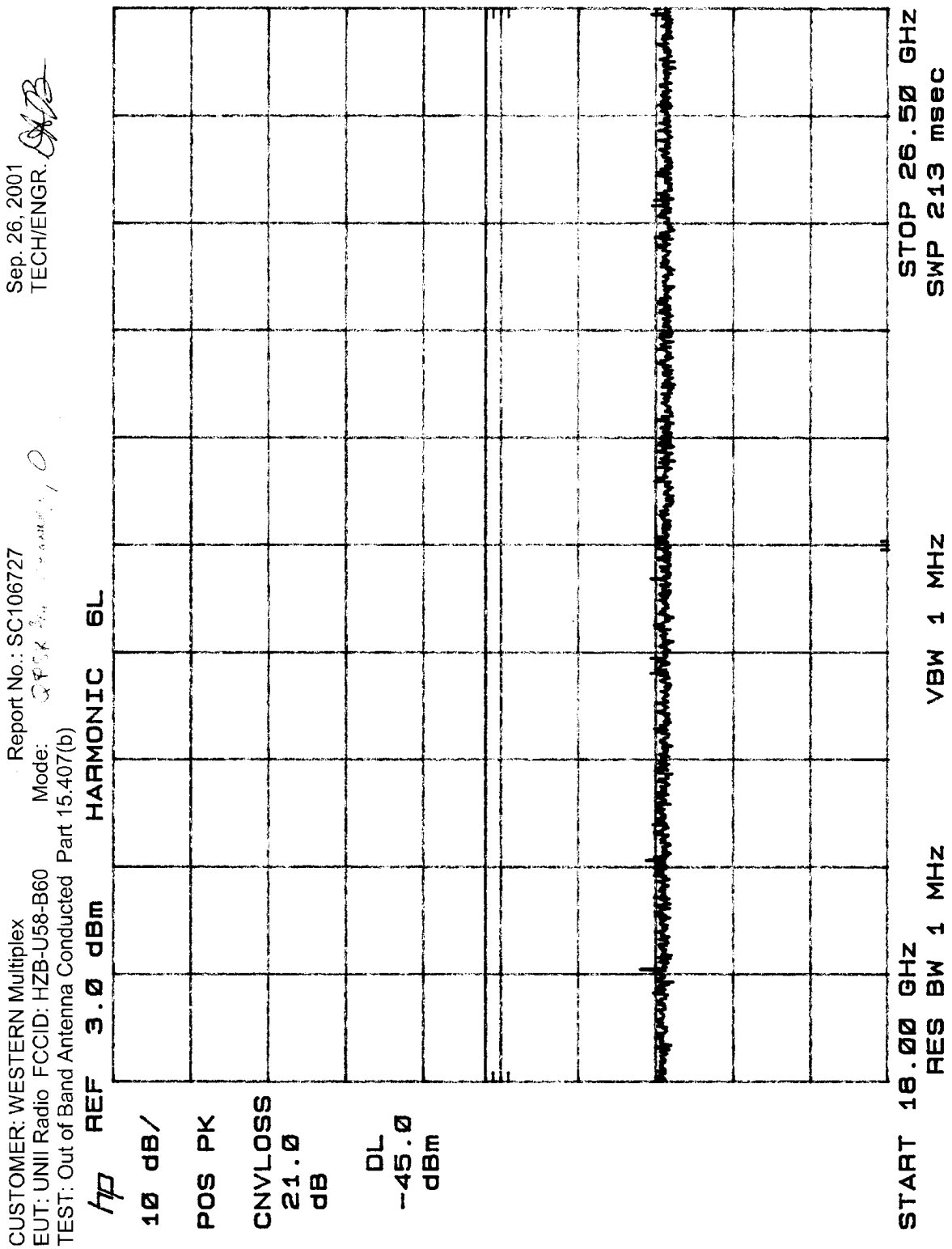




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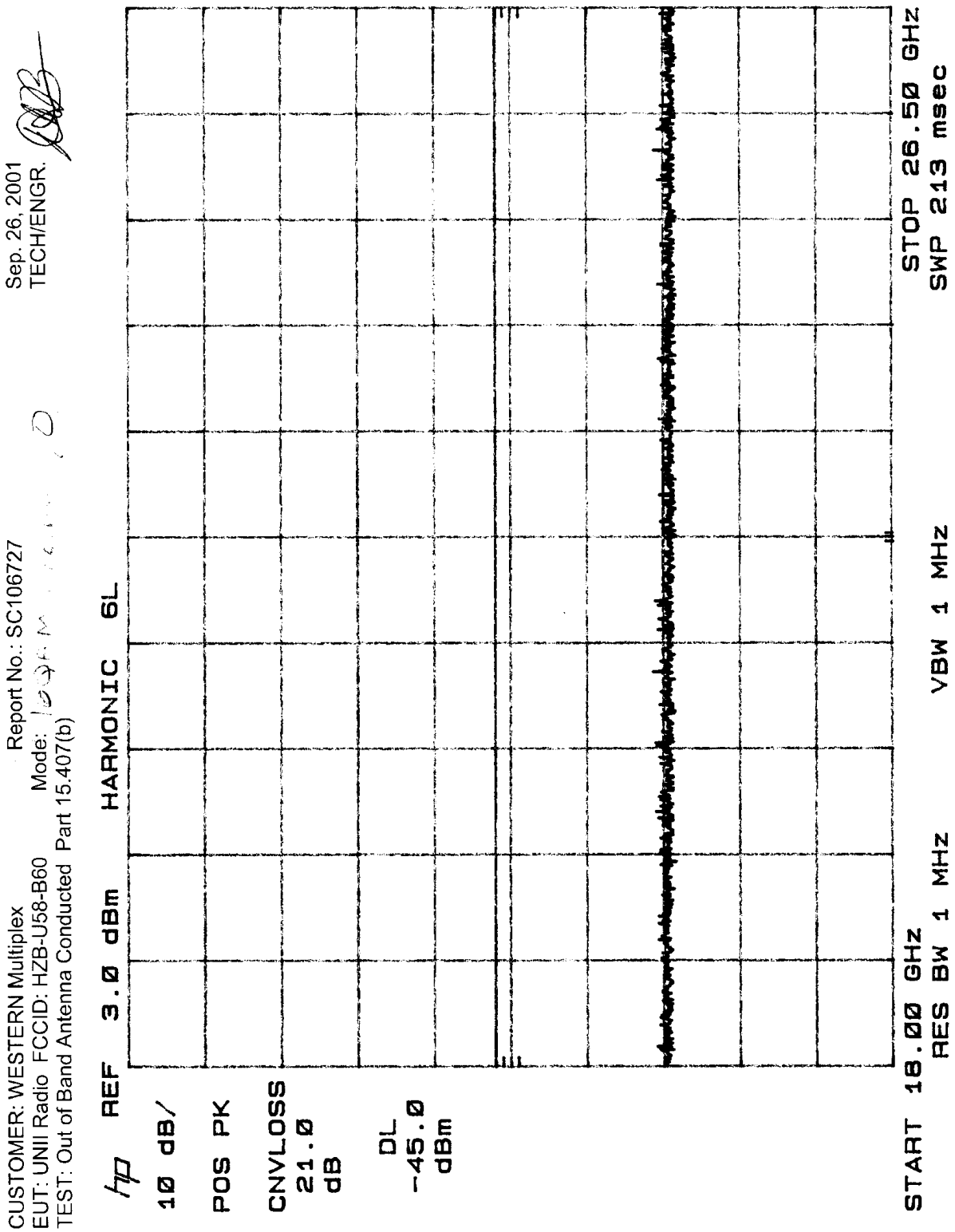
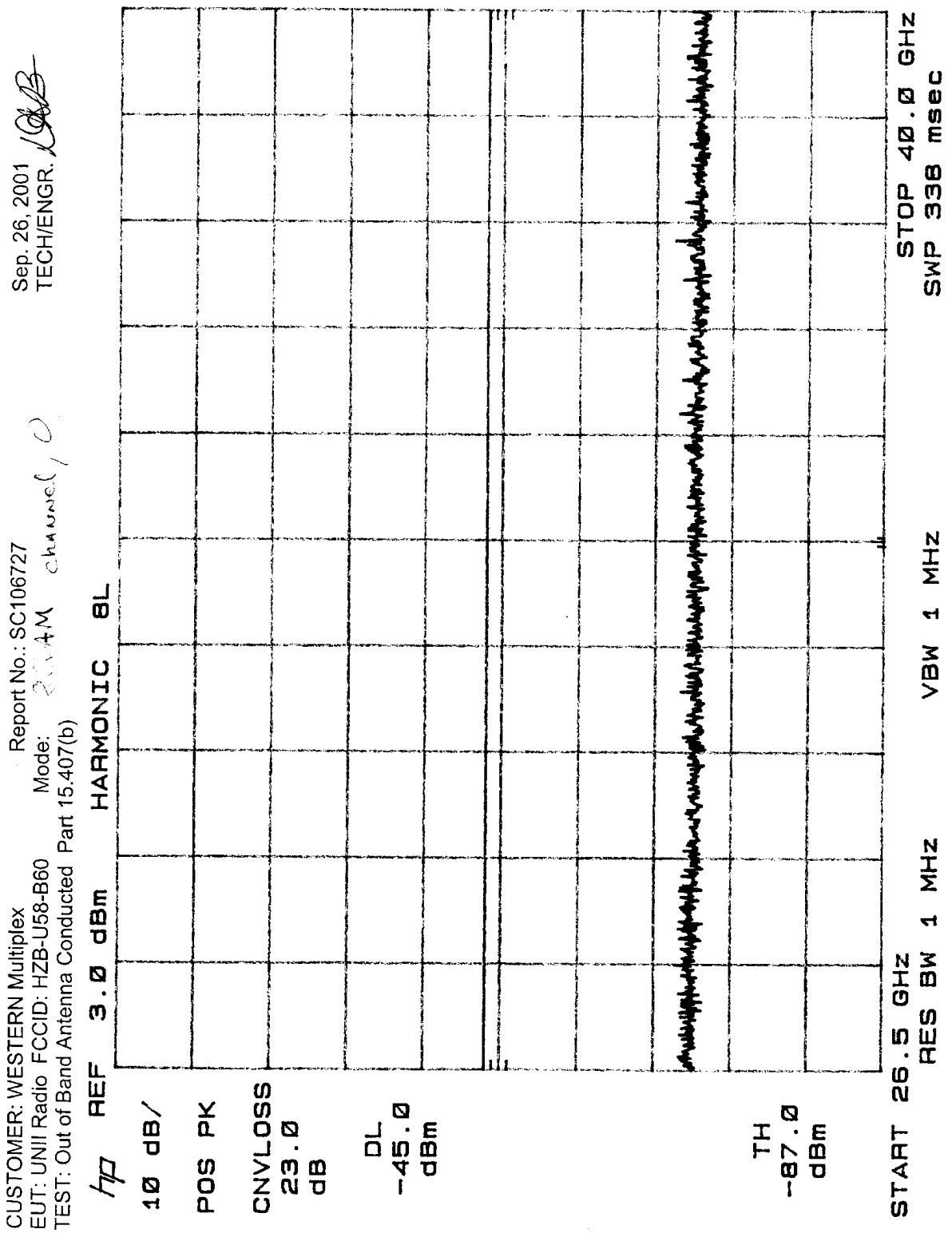

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)
Report No.: SC106727
Mode:
Sep. 26, 2001
TECH/ENGR.
REF 3.0 dBm
HARMONIC 6L
10 dB/
POS PK
CNVLOSS
21.0
dB
DL
-45.0
dBm
START 18.00 GHz
RES BW 1 MHz
VBW 1 MHz
STOP 26.50 GHz
SWP 213 msec



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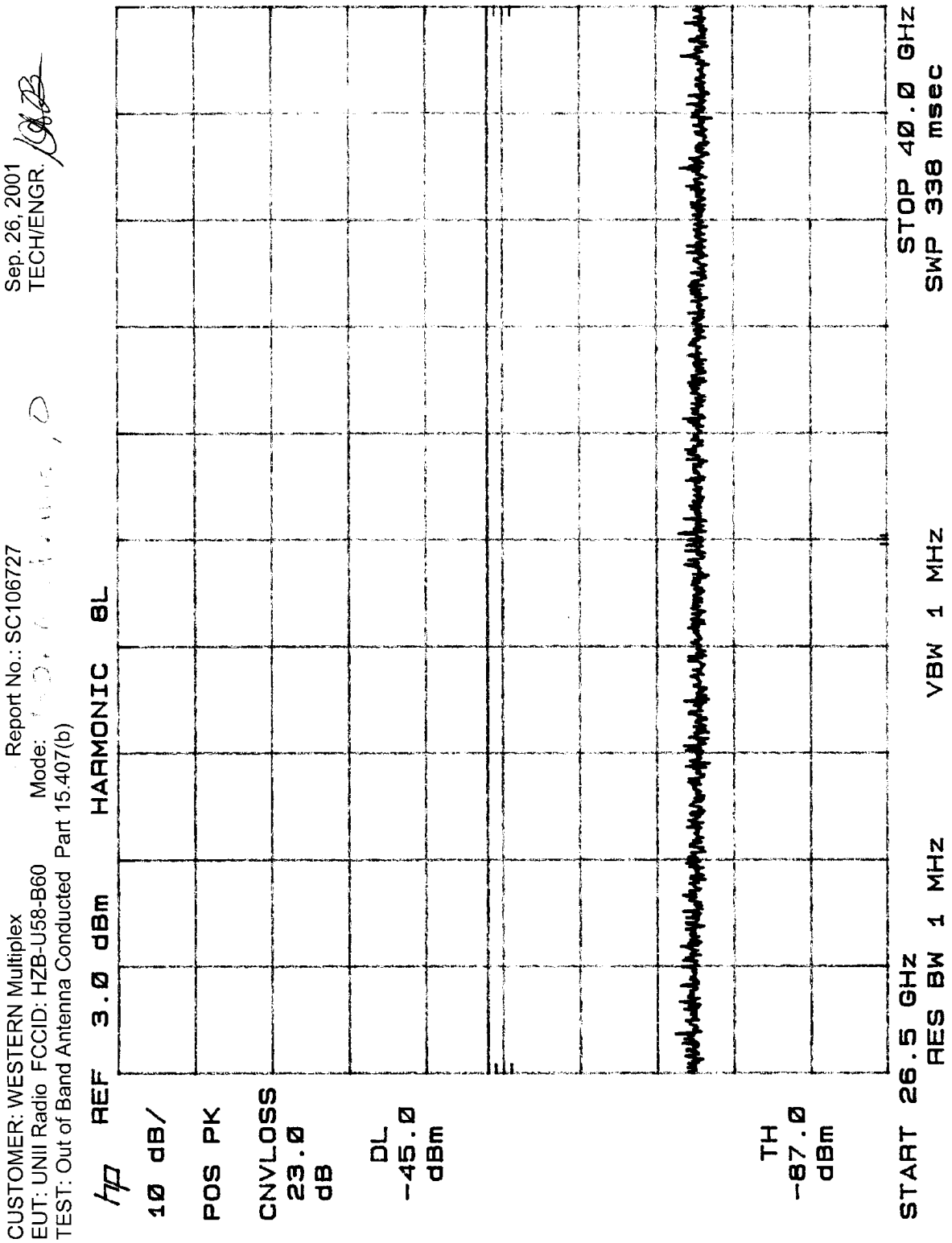




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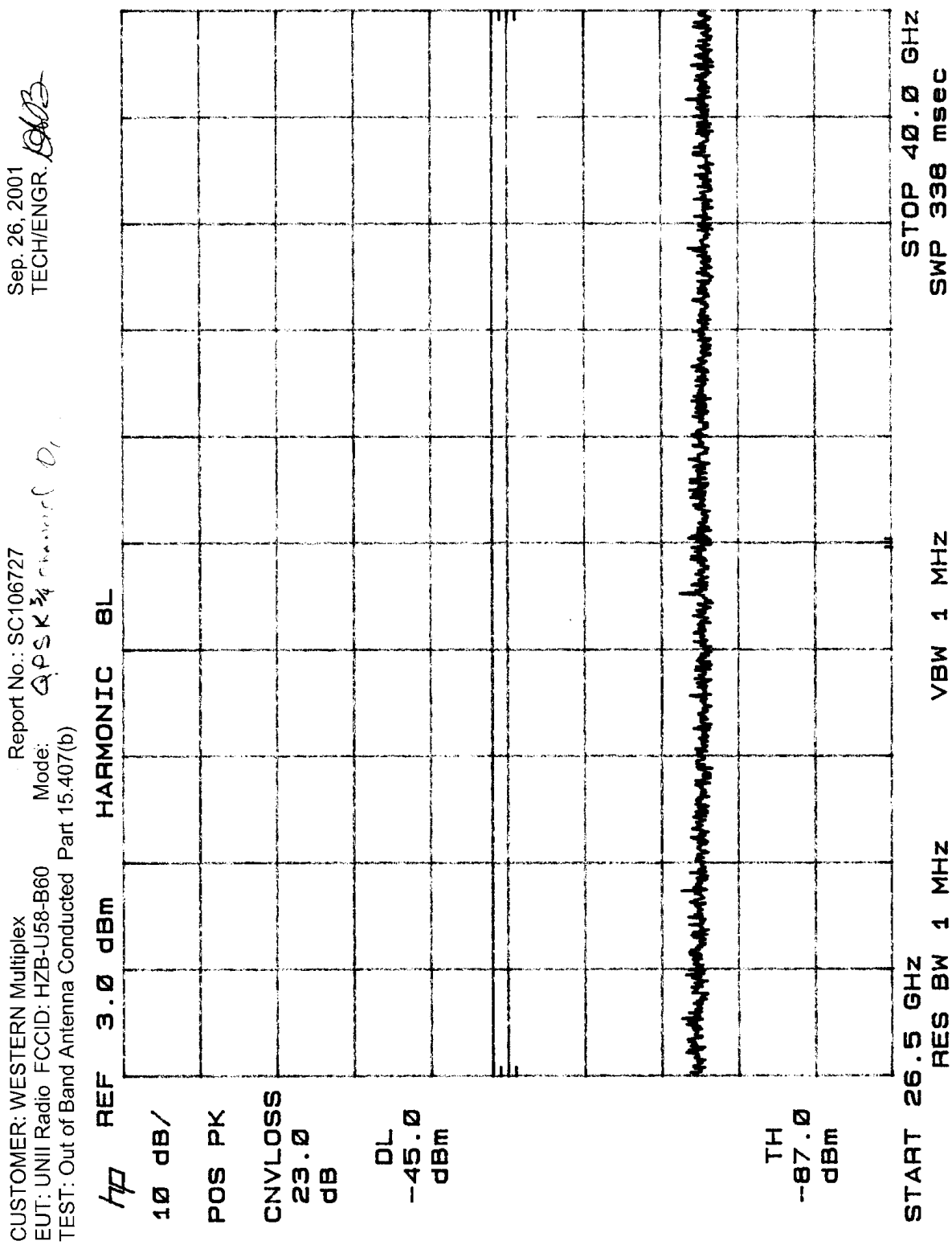




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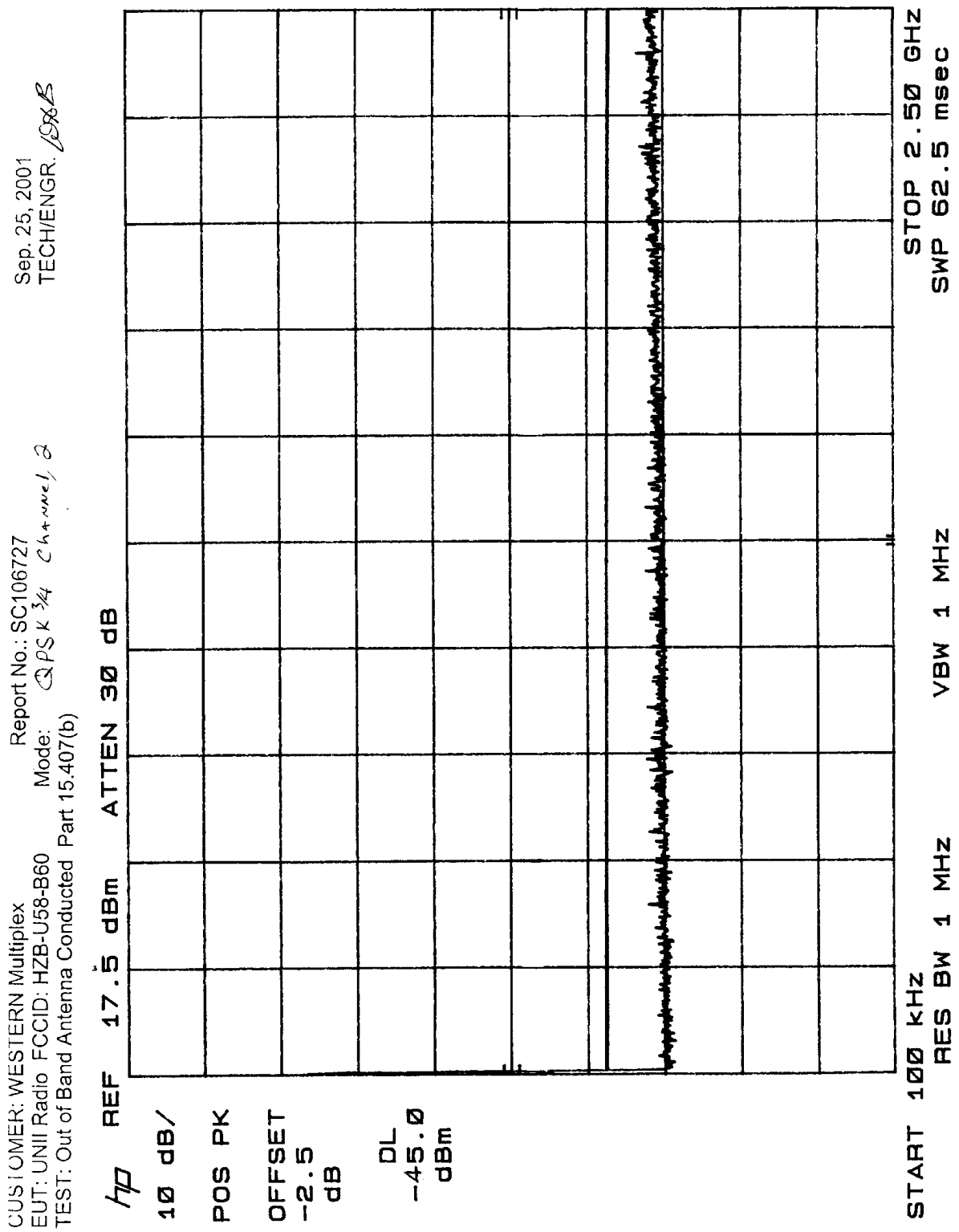
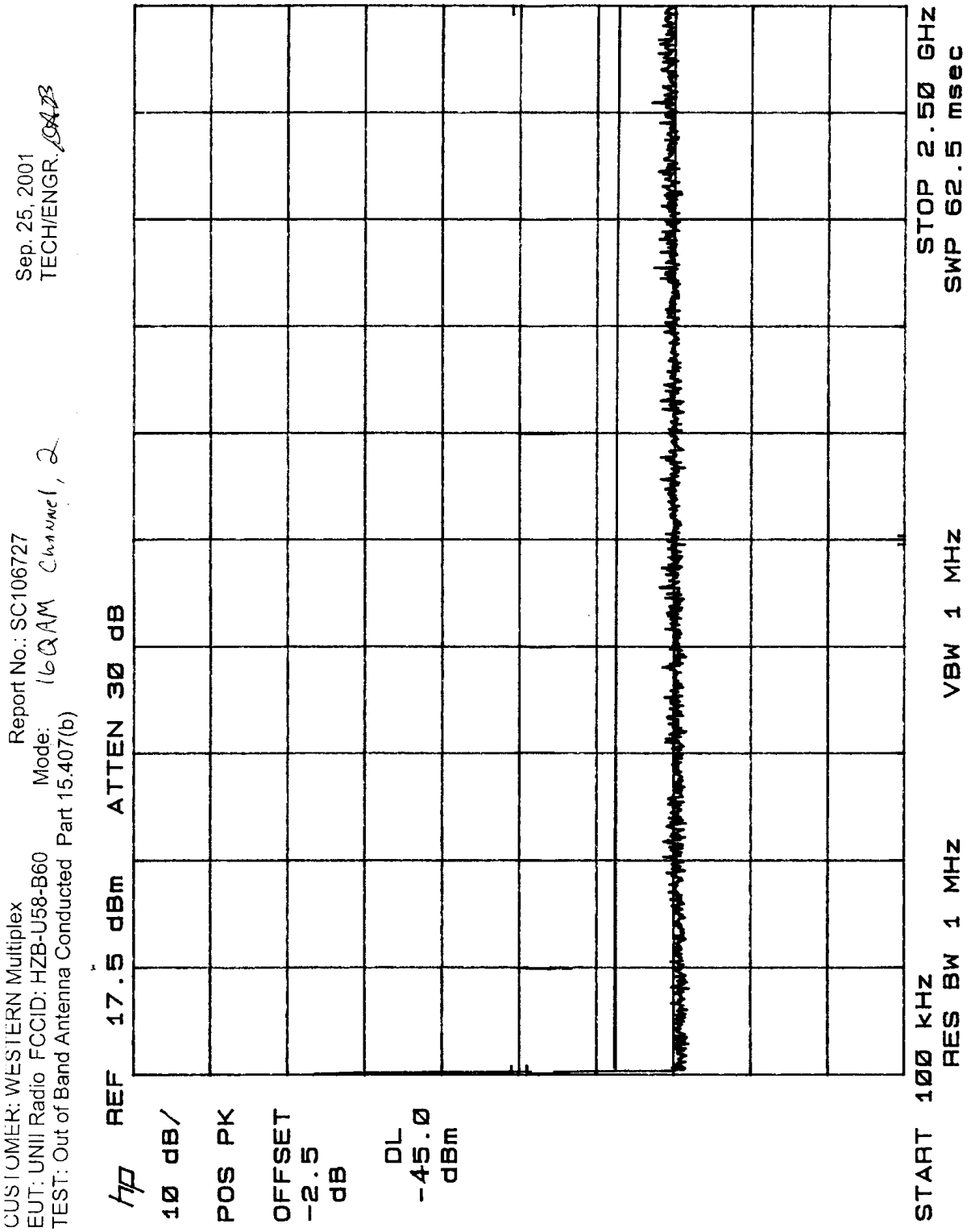

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)
Report No.: SC106727
Mode: QPSK 34 Channel 3
Sep. 25, 2001
TECH/ENGR.
hp
REF 17.5 dBm
ATTEN 30 dB
10 dB/
POS PK
OFFSET
-2.5
dB
DL
-45.0
dBm
START 100 kHz
RES BW 1 MHz
VBW 1 MHz
STOP 2.50 GHz
SWP 62.5 msec



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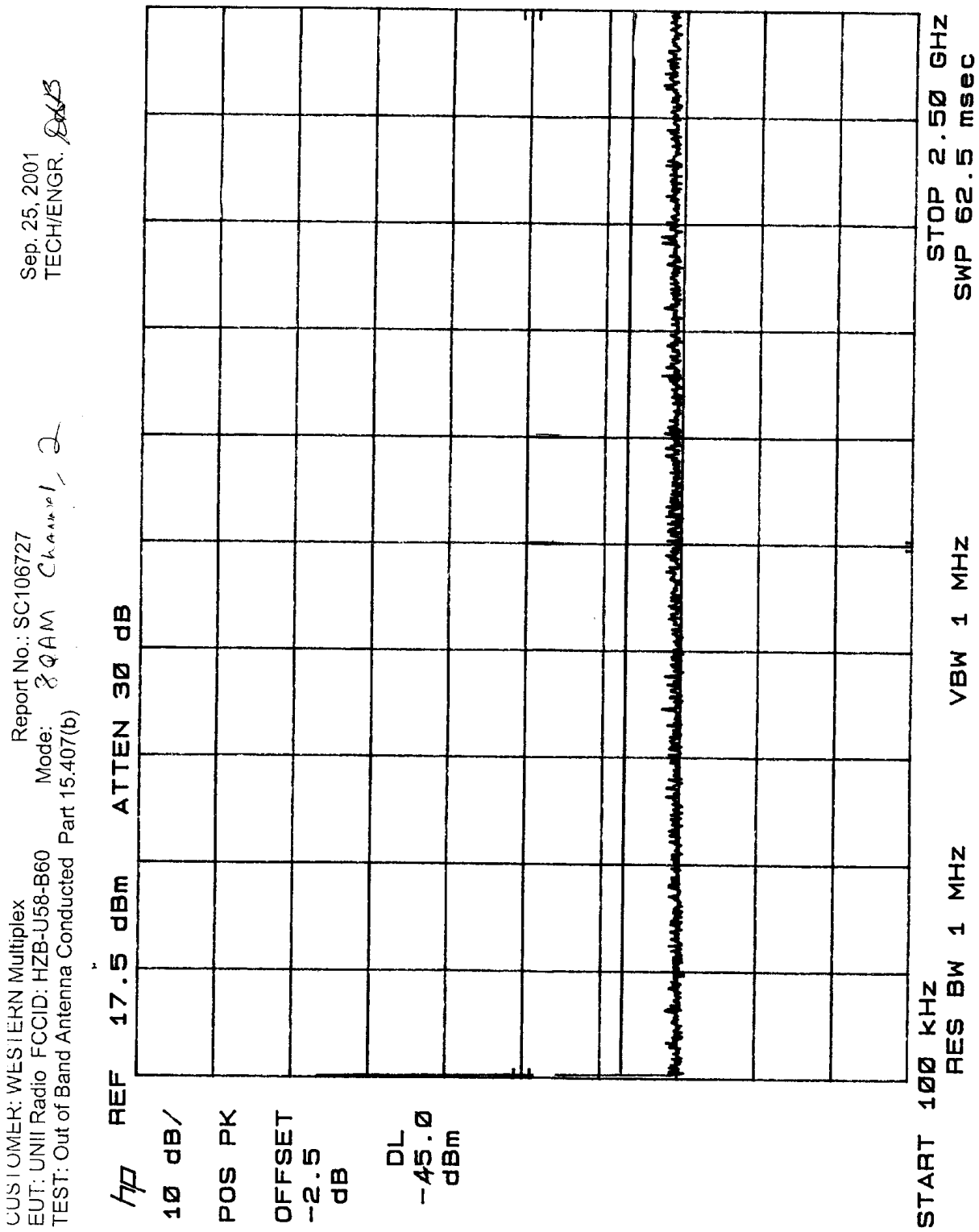




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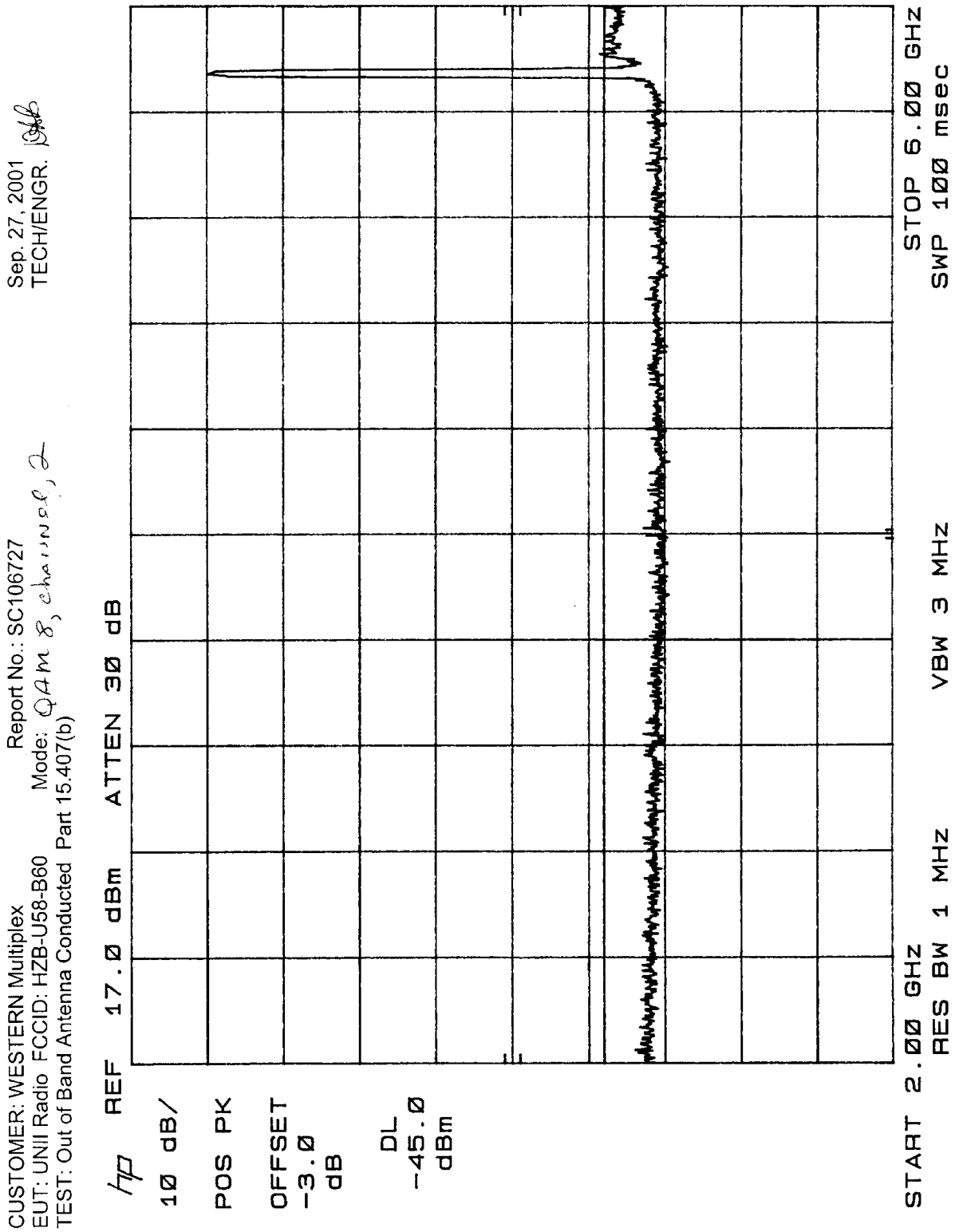
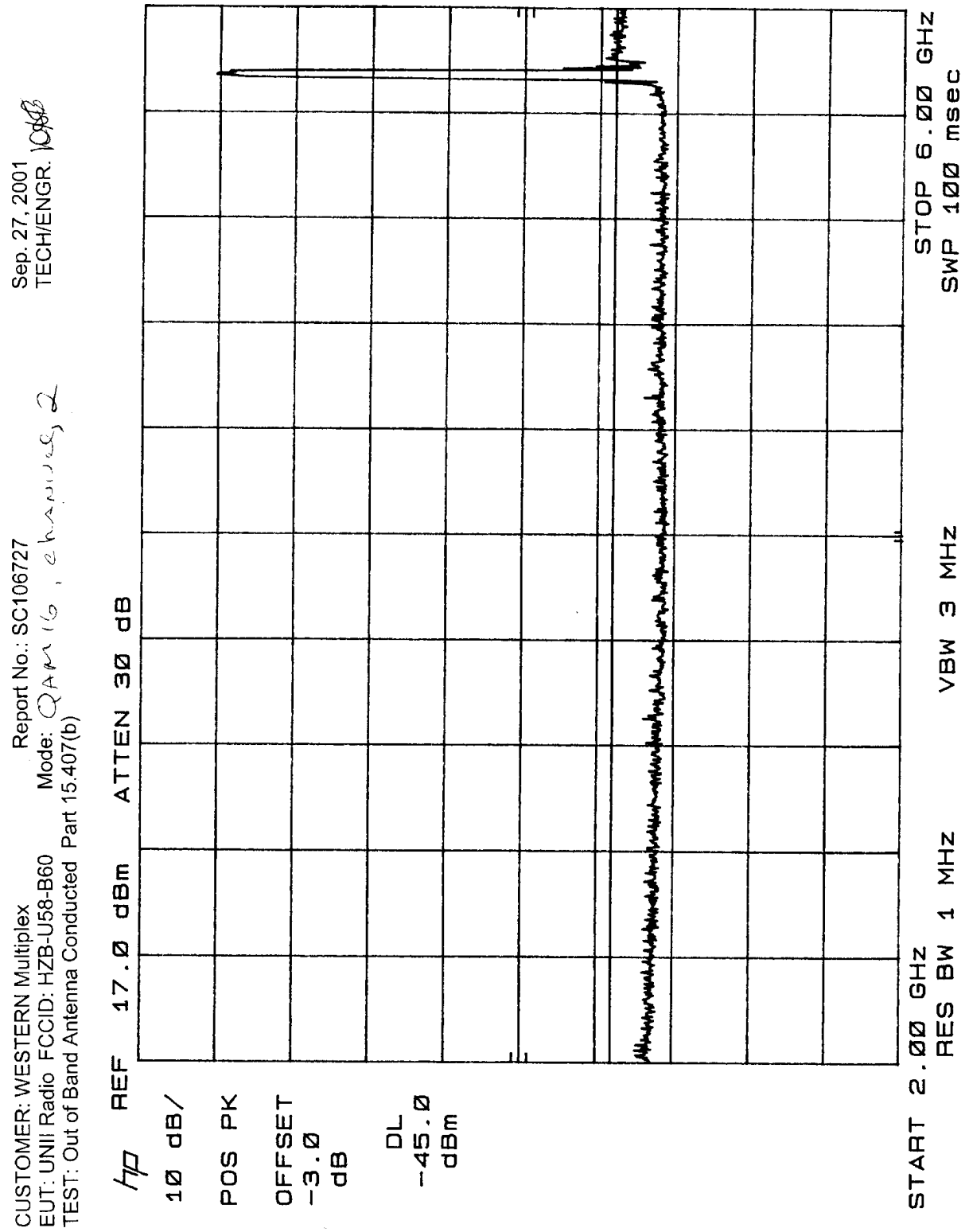


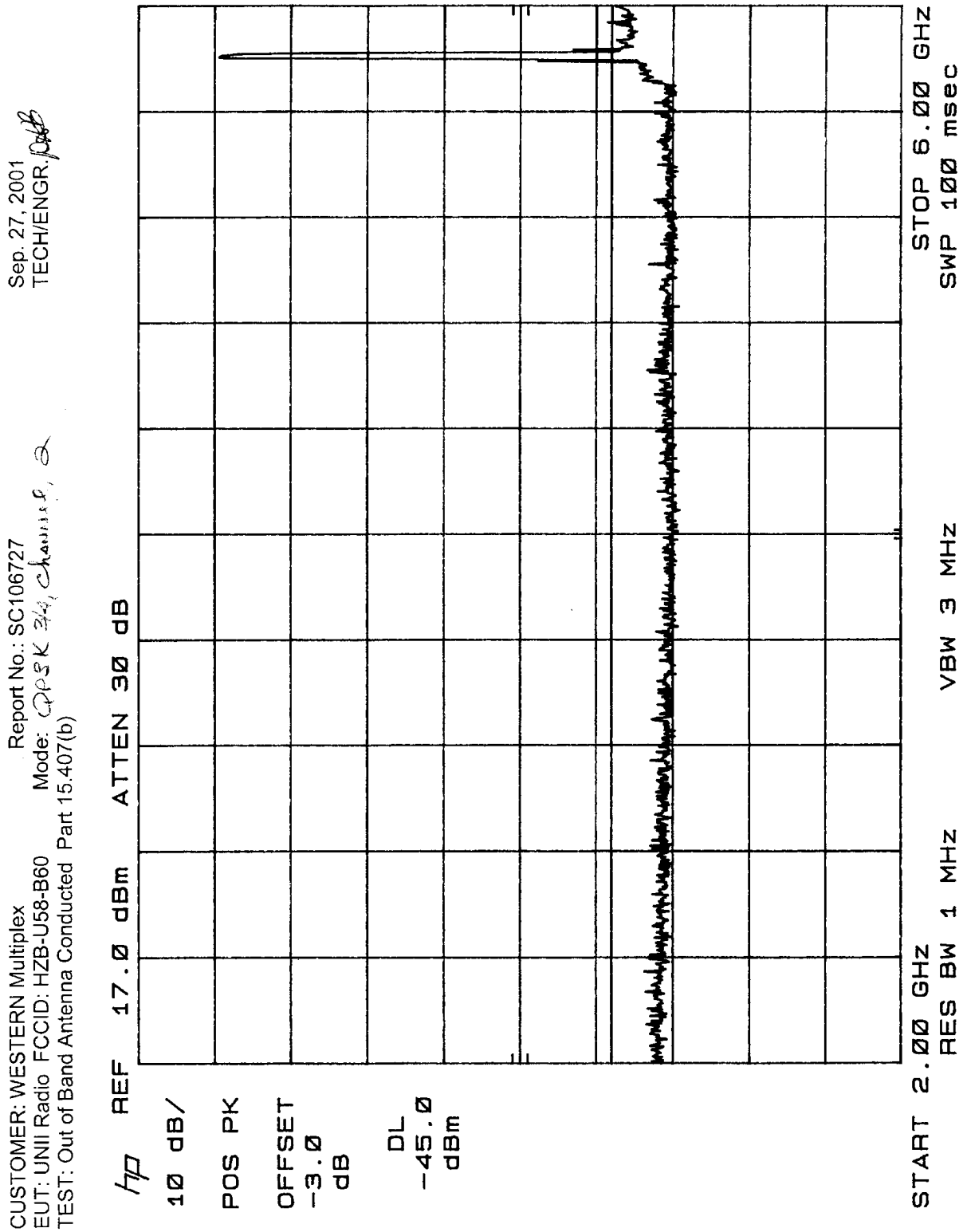



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364






TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364



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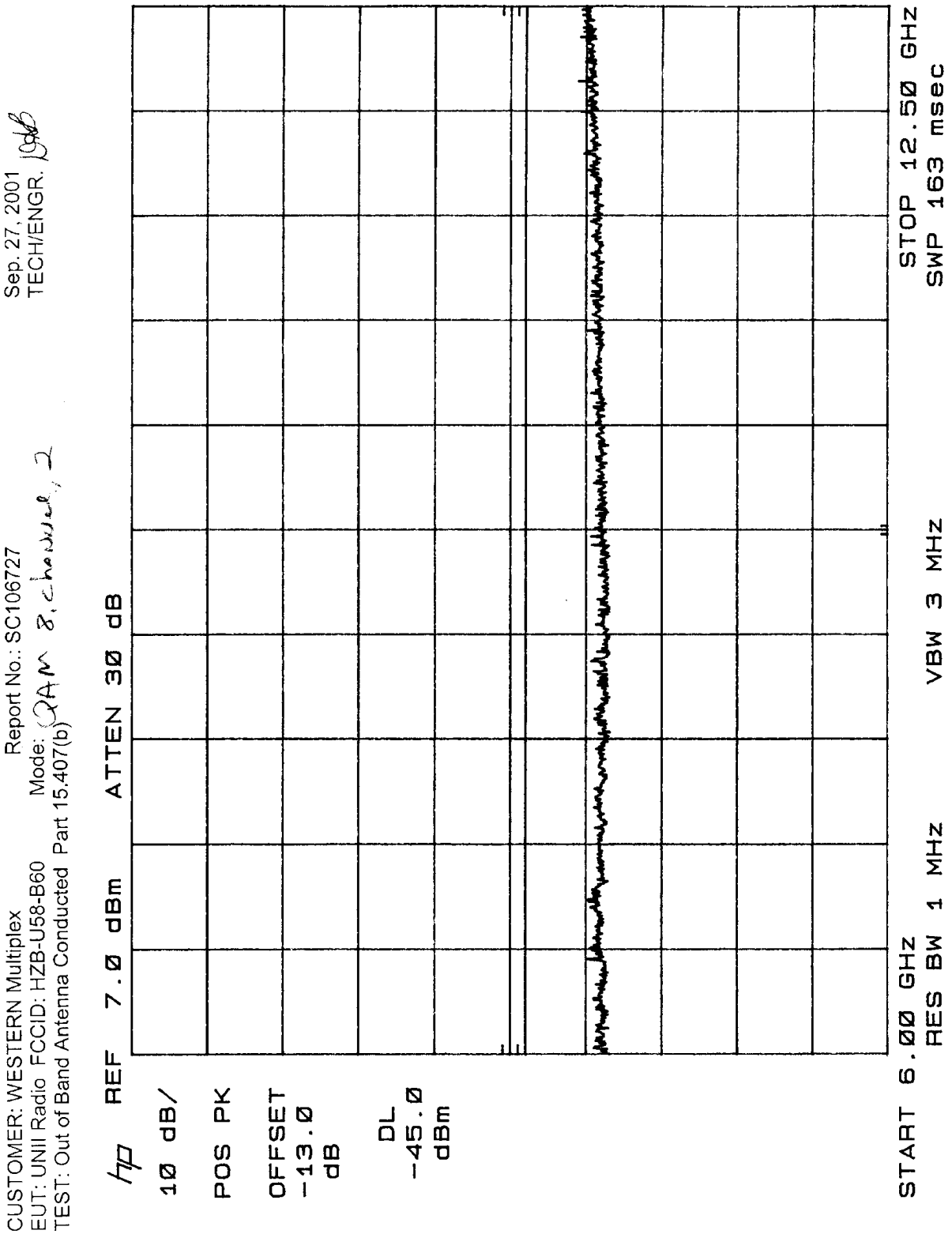




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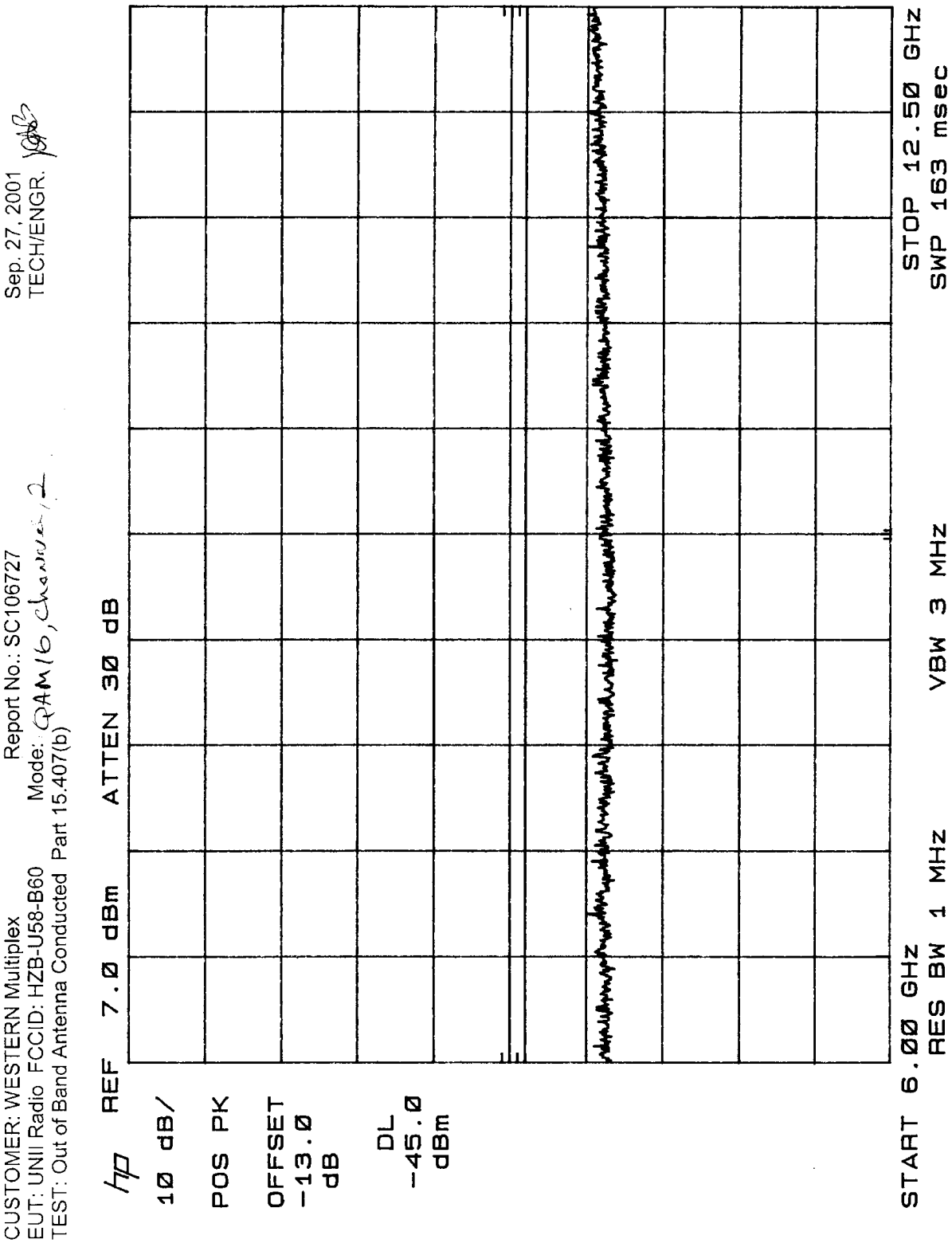




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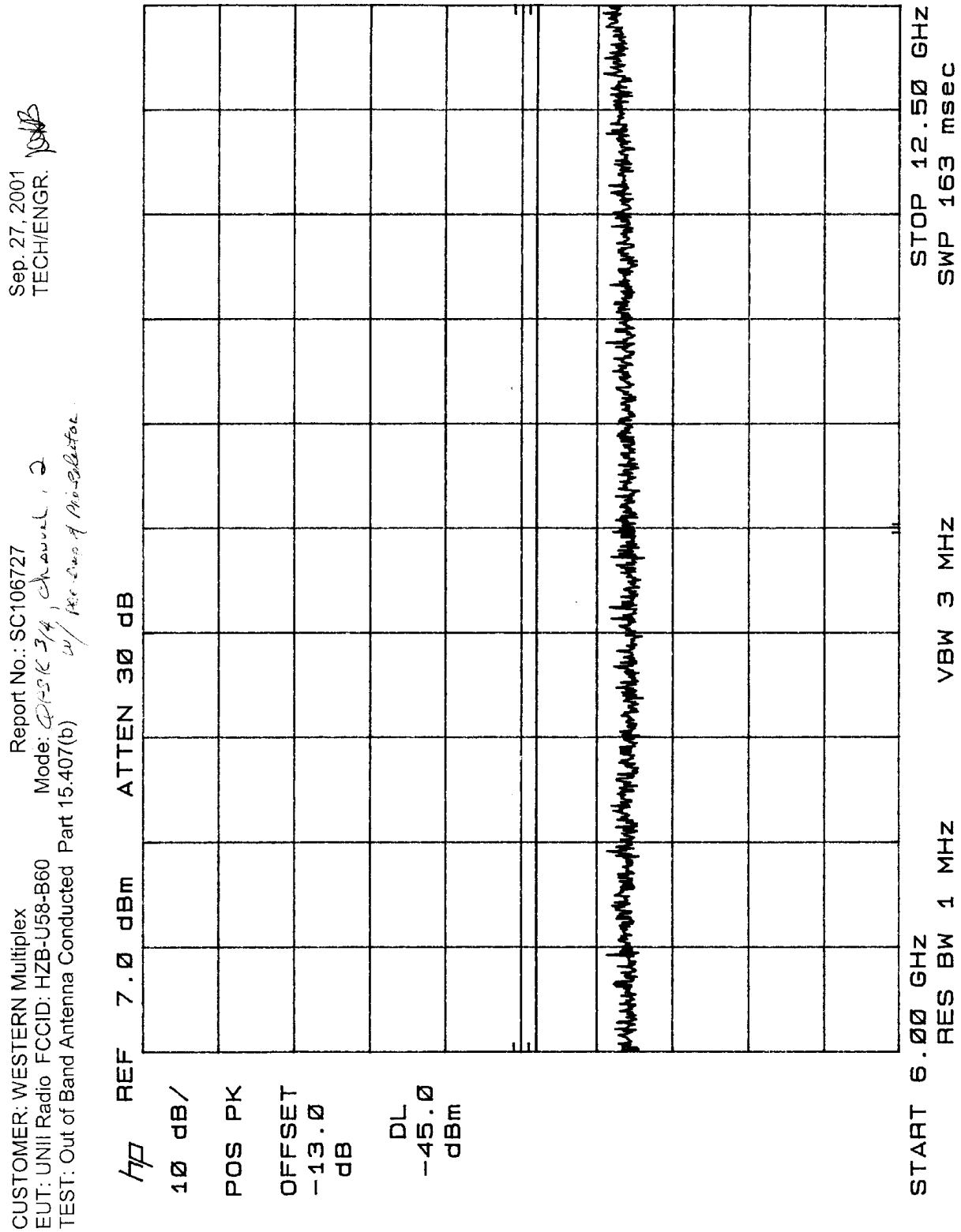




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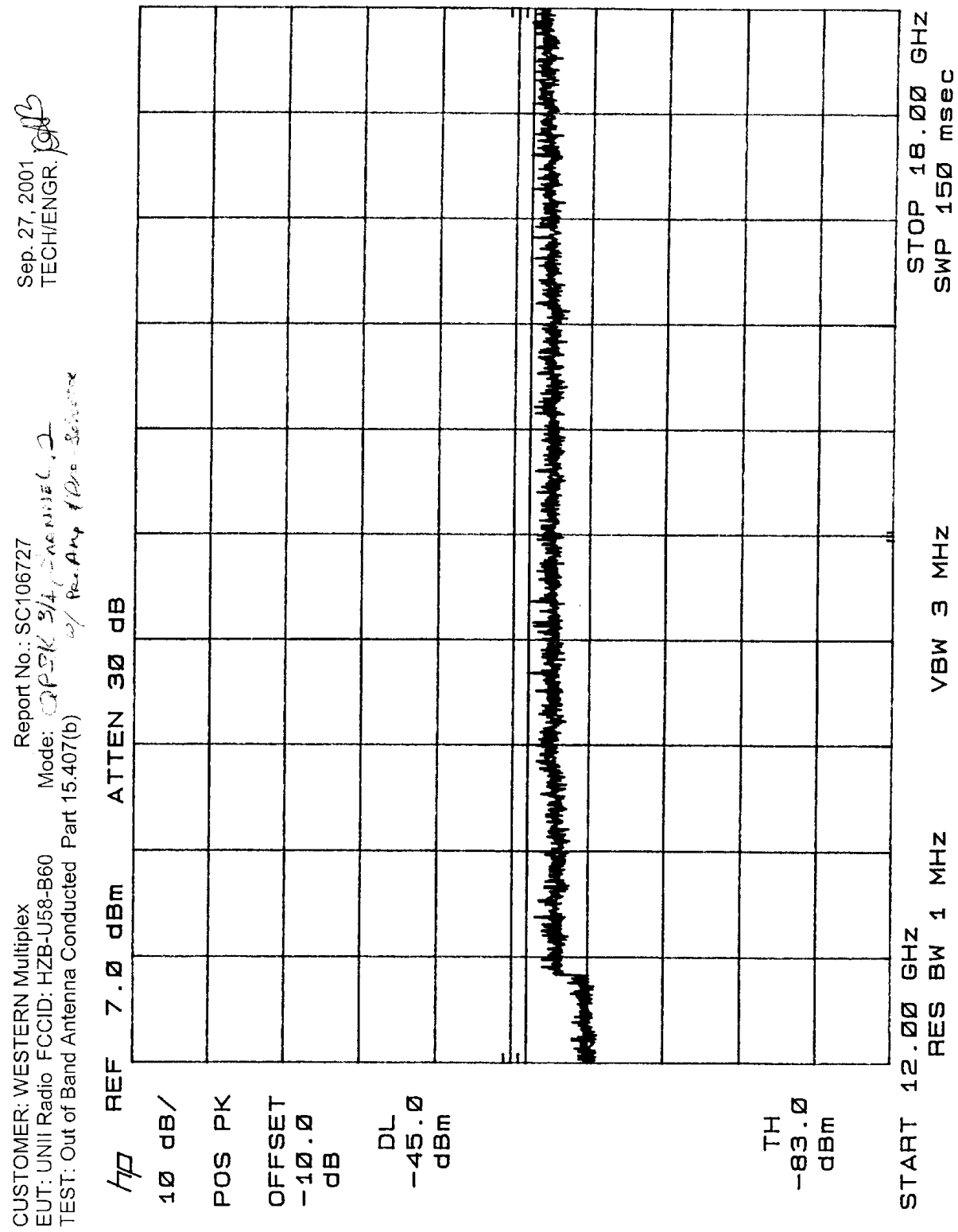




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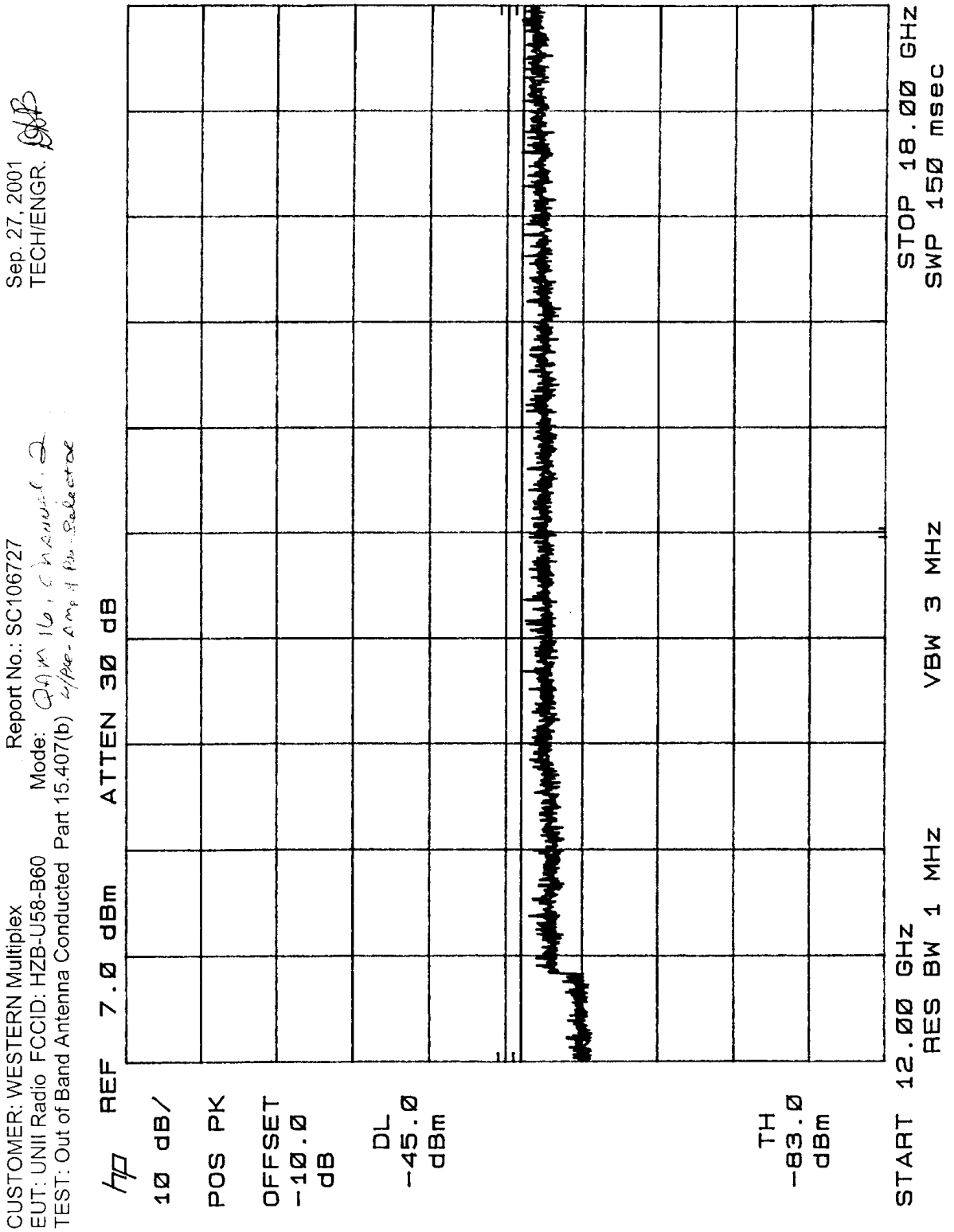




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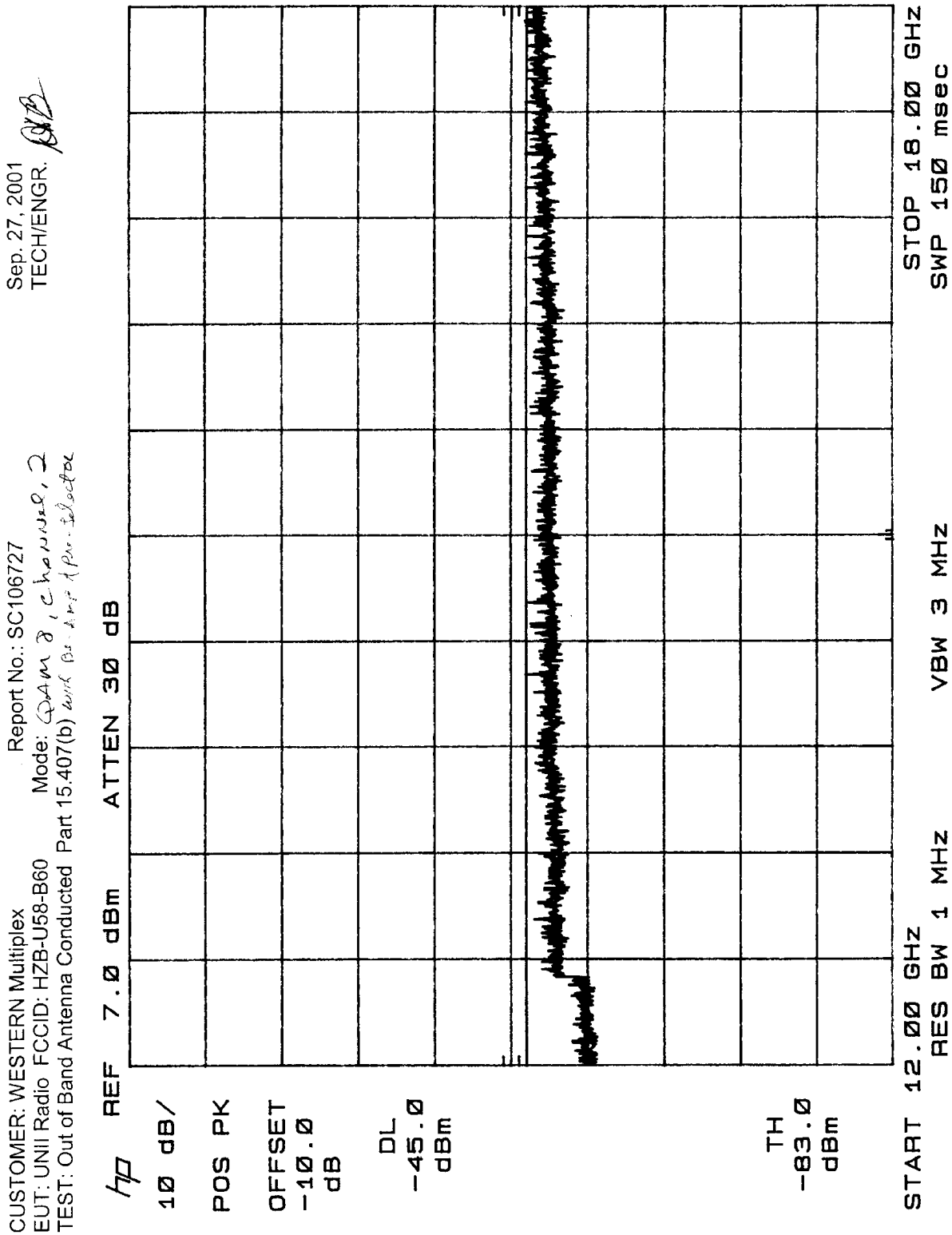




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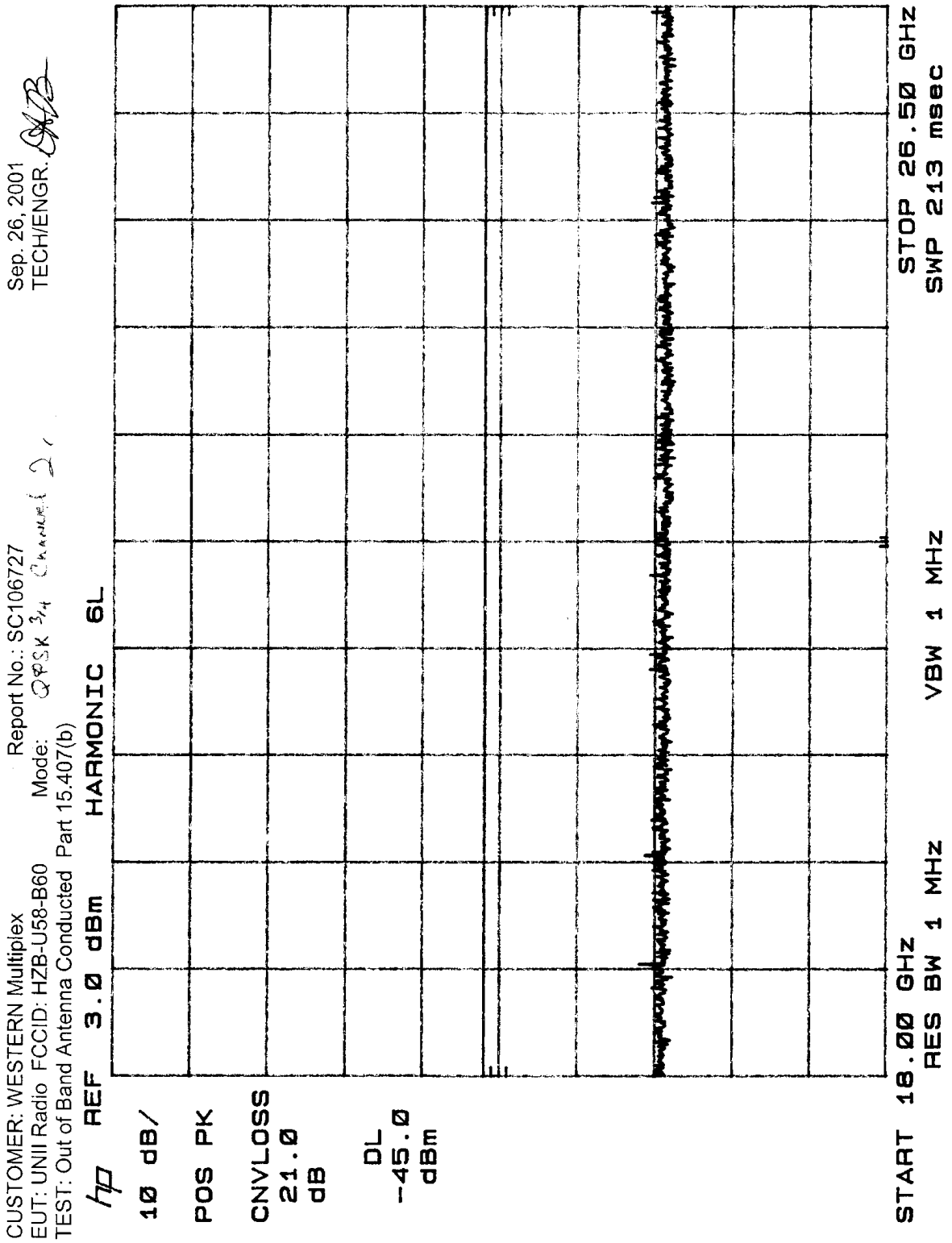




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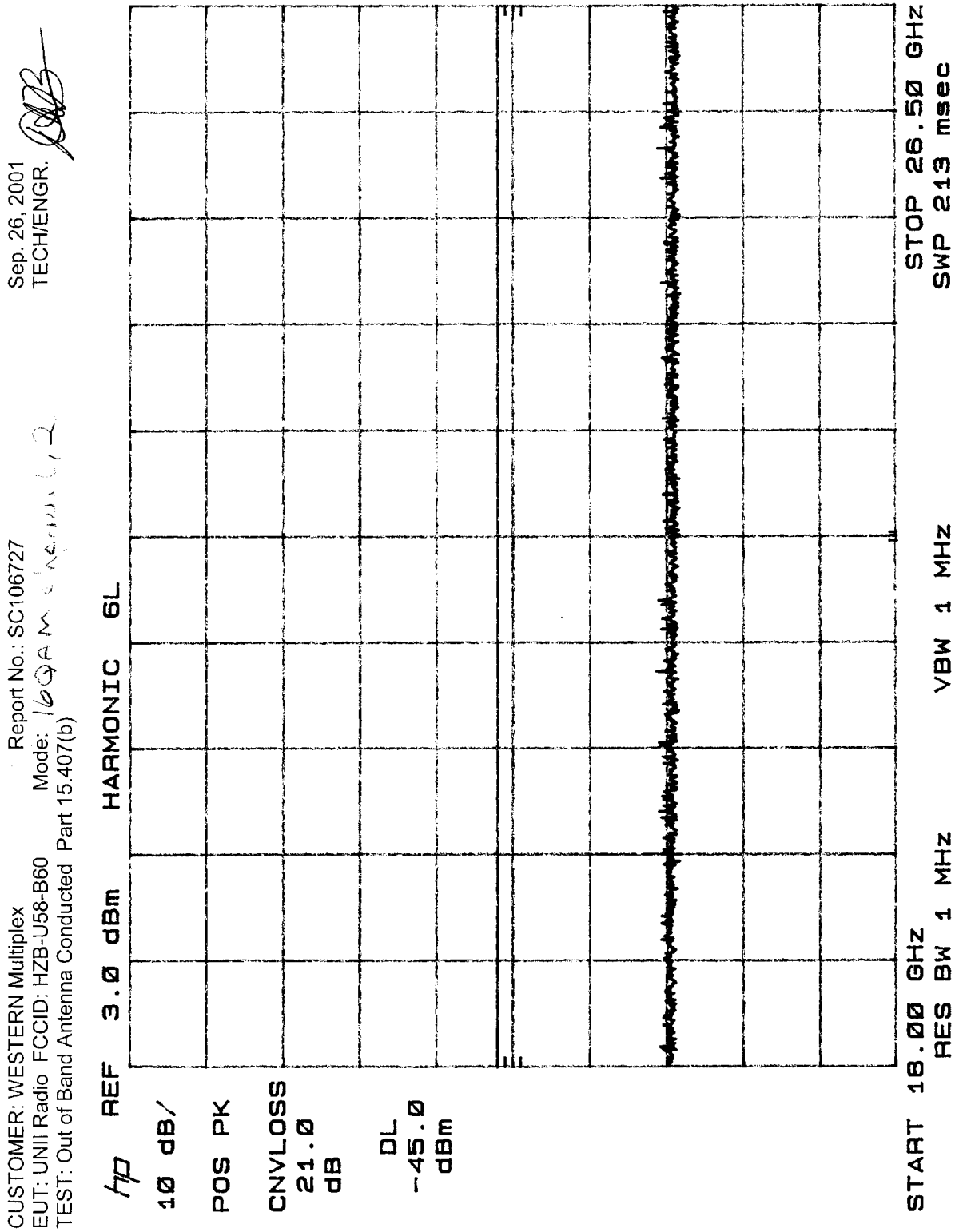




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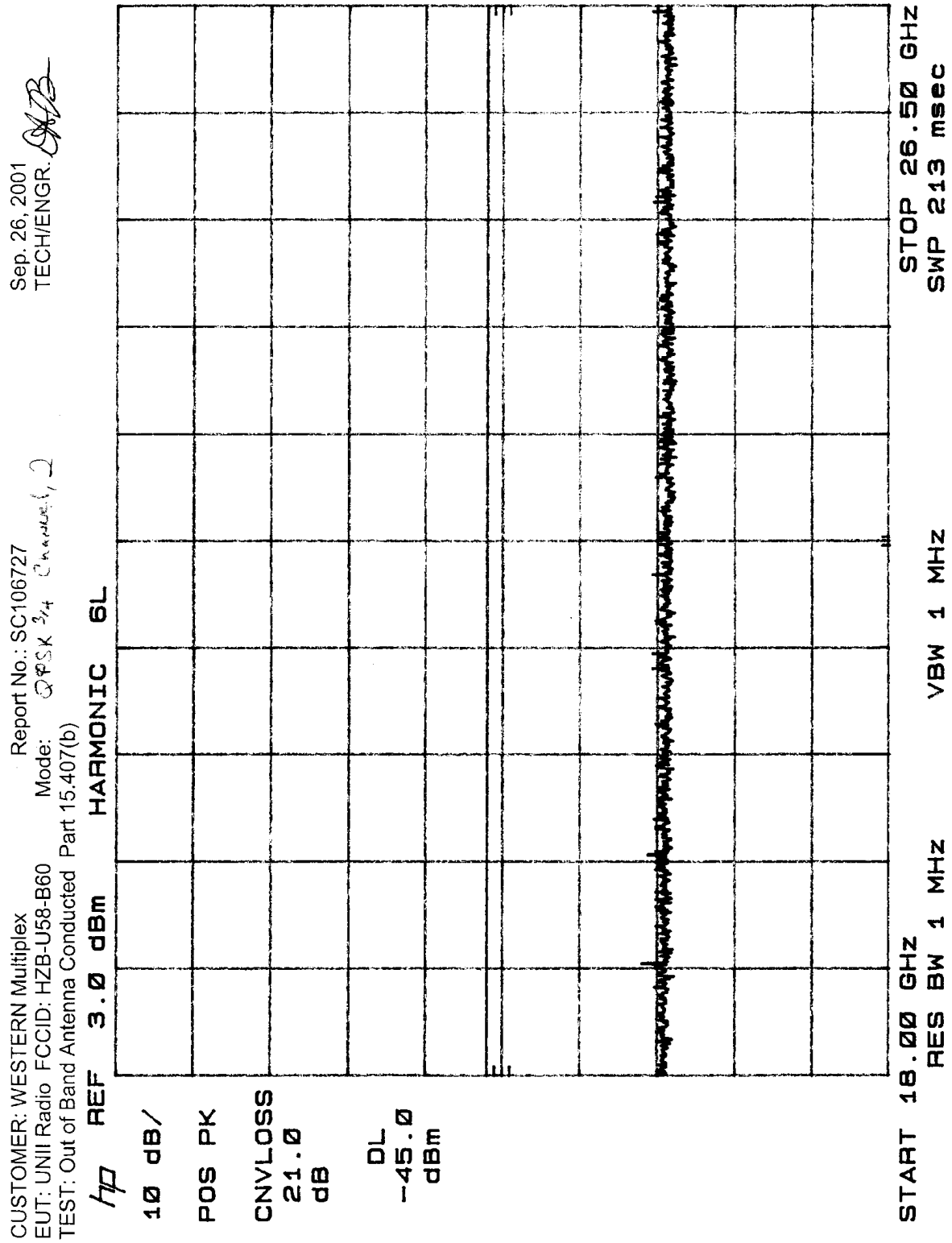




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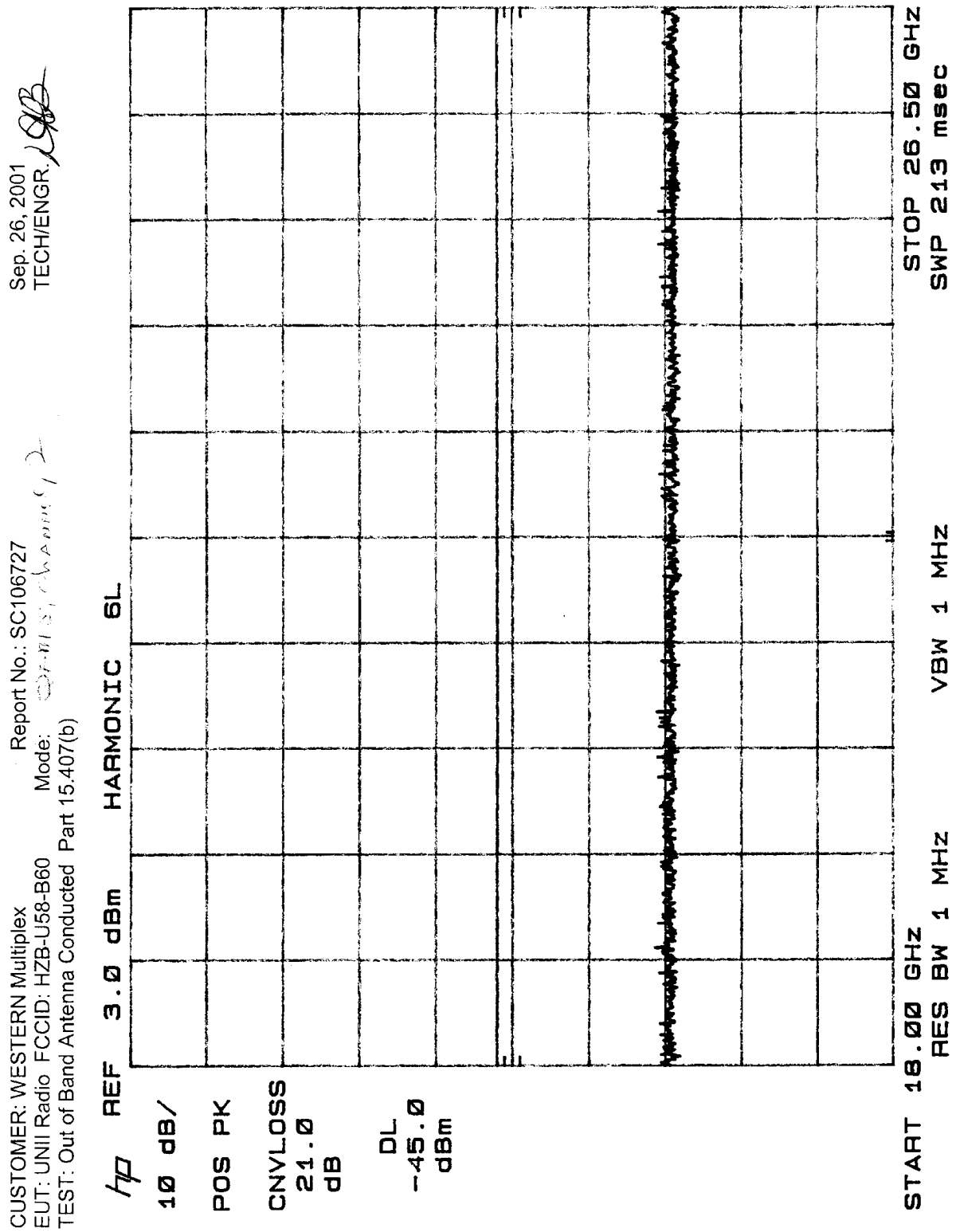




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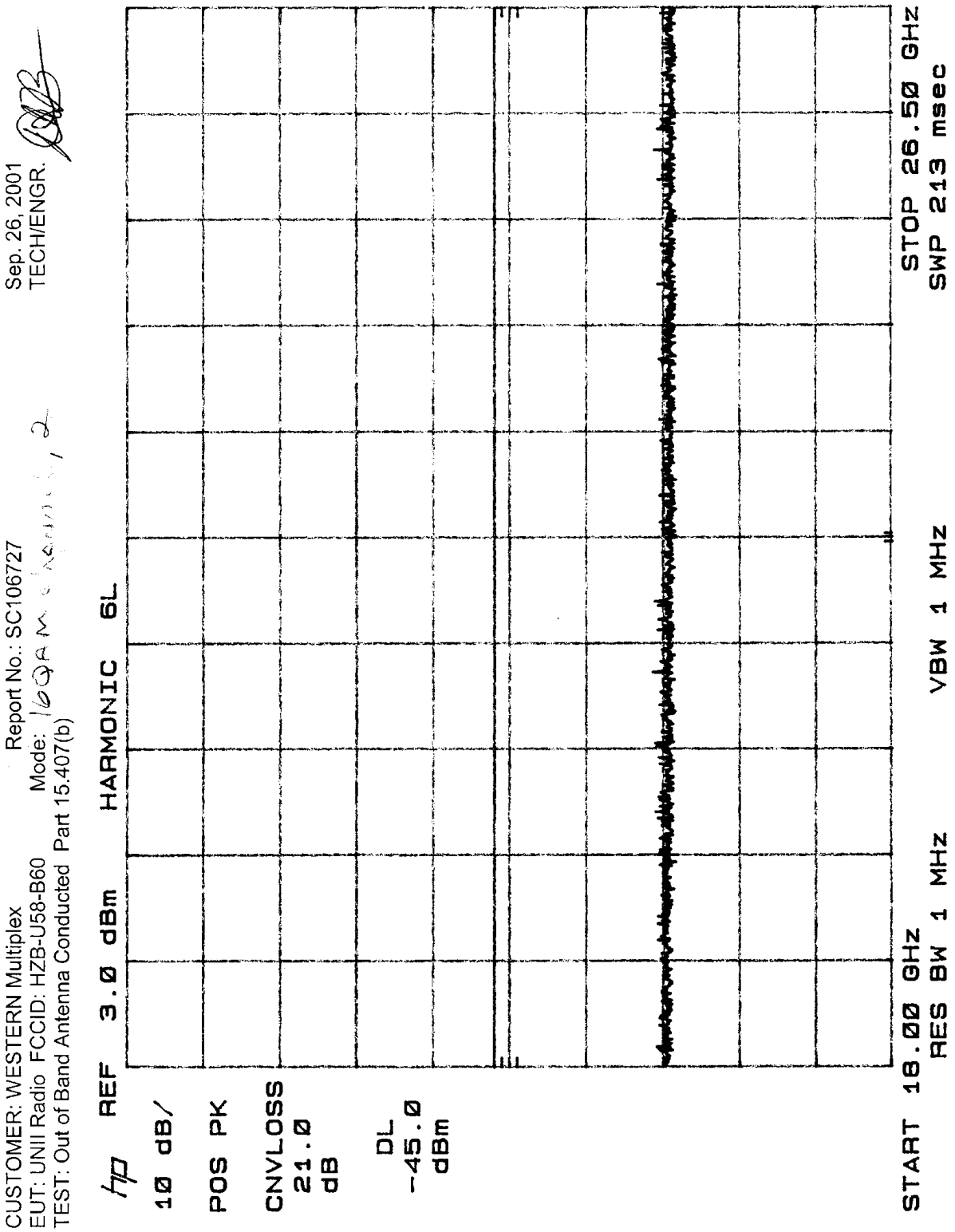
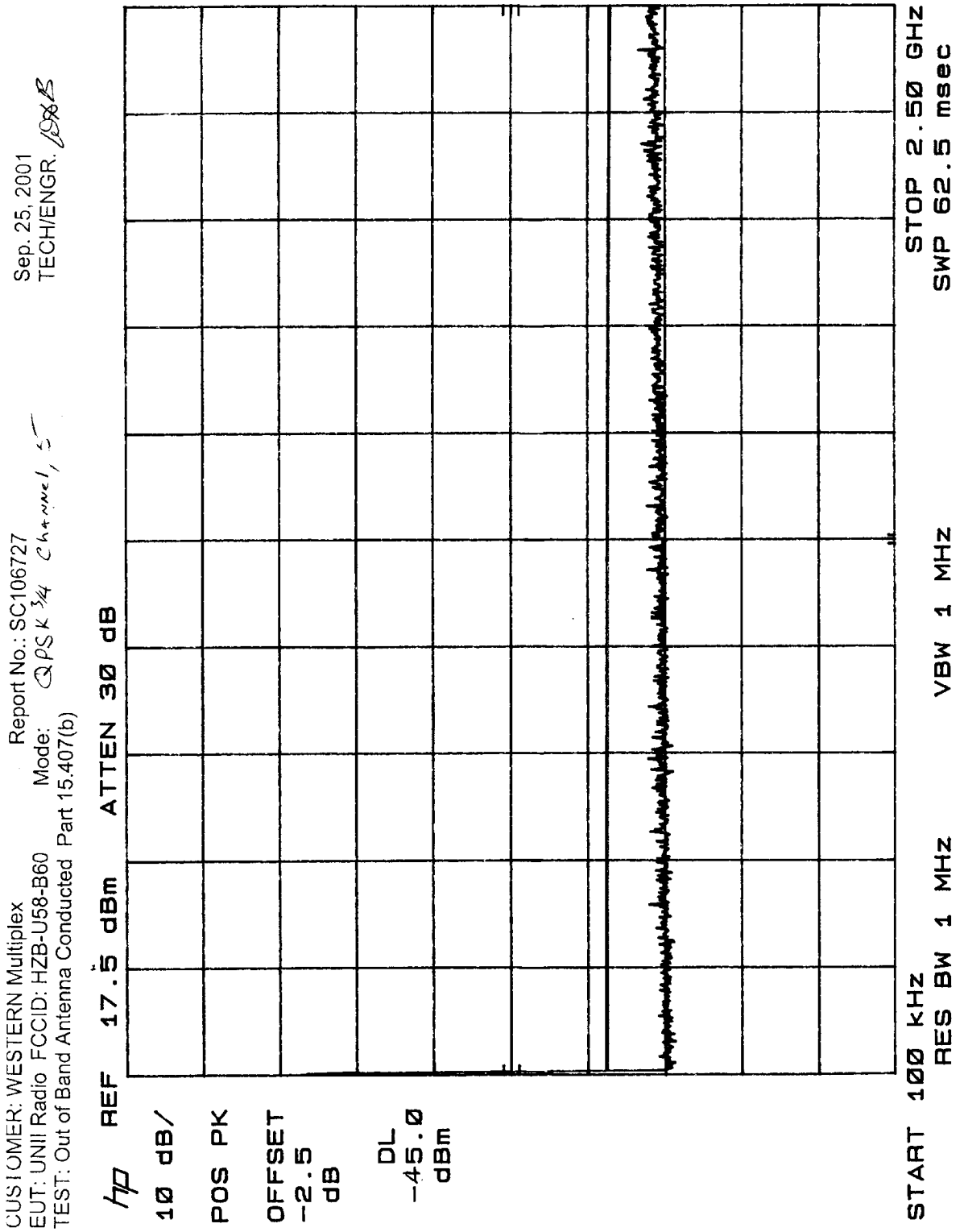

CUSTOMER: WESTERN Multiplex
EUT: UNII Radio FCCID: HZB-U58-B60
TEST: Out of Band Antenna Conducted Part 15.407(b)
Report No.: SC106727
Mode: 16QAM
Sep. 26, 2001
TECH/ENGR.
REF 3.0 dBm
HARMONIC 6L
10 dB/
POS PK
CNVLOSS
21.0
dB
DL
-45.0
dBm
START 18.00 GHz
RES BW 1 MHz
VBW 1 MHz
STOP 26.50 GHz
SWP 213 msec



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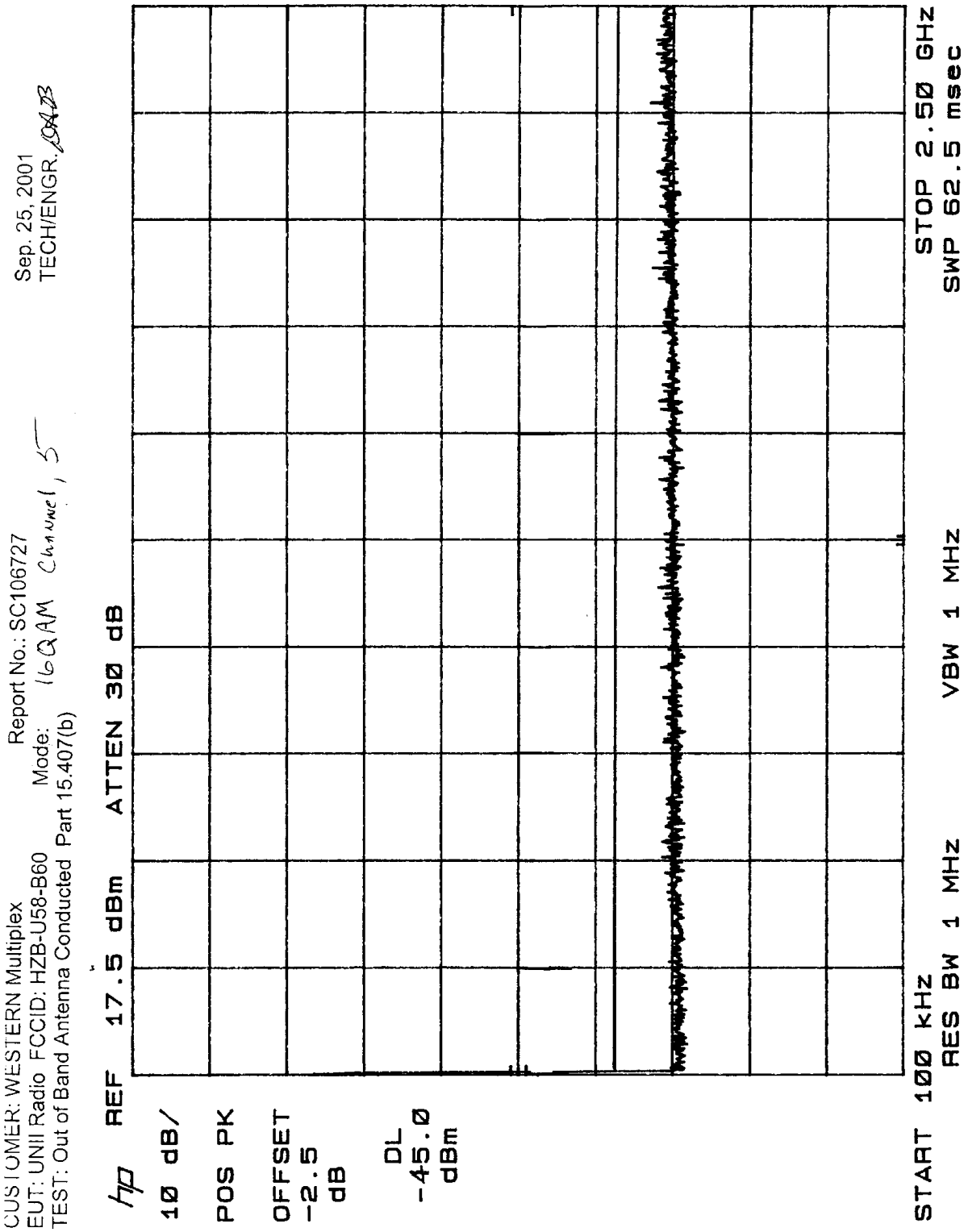




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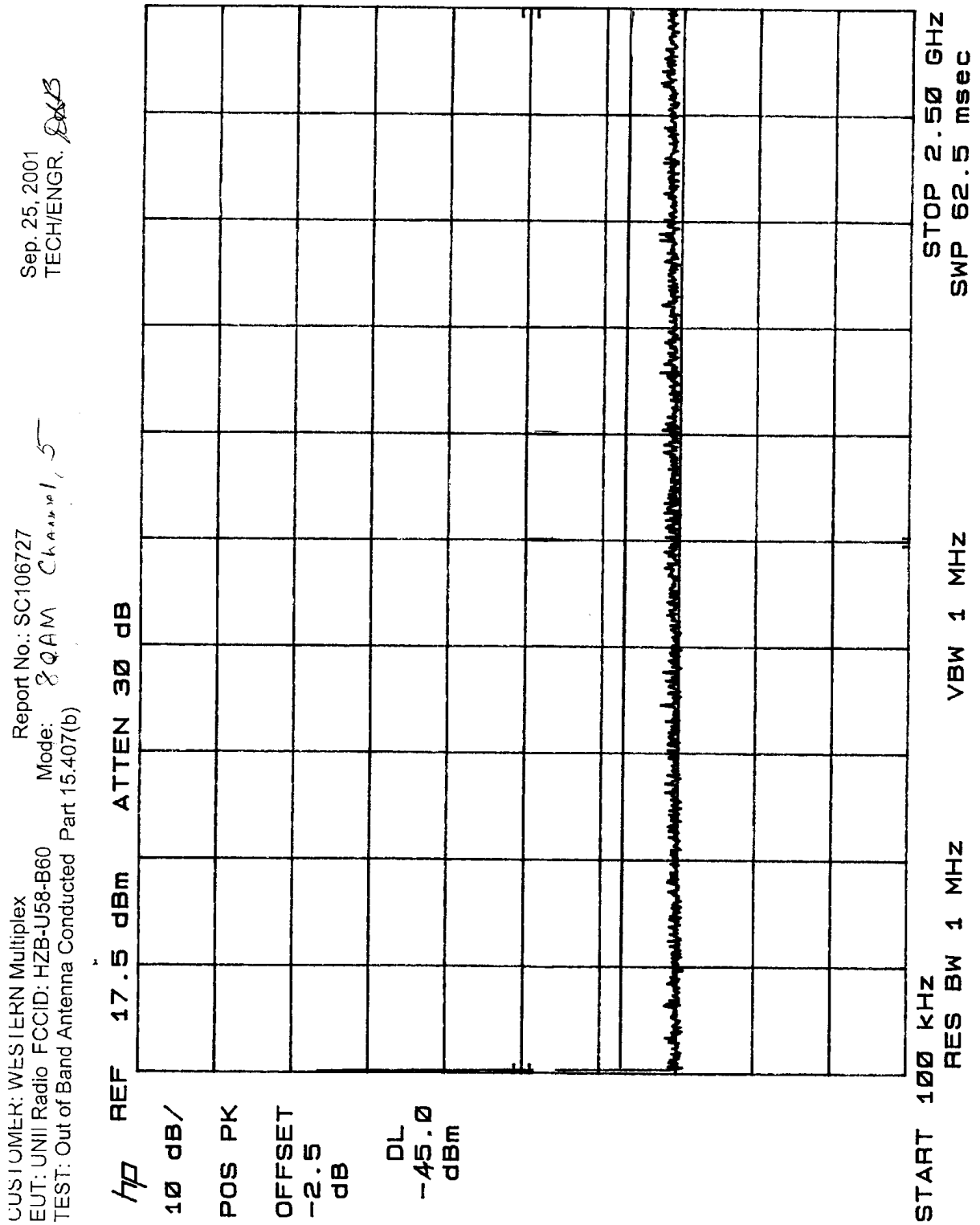




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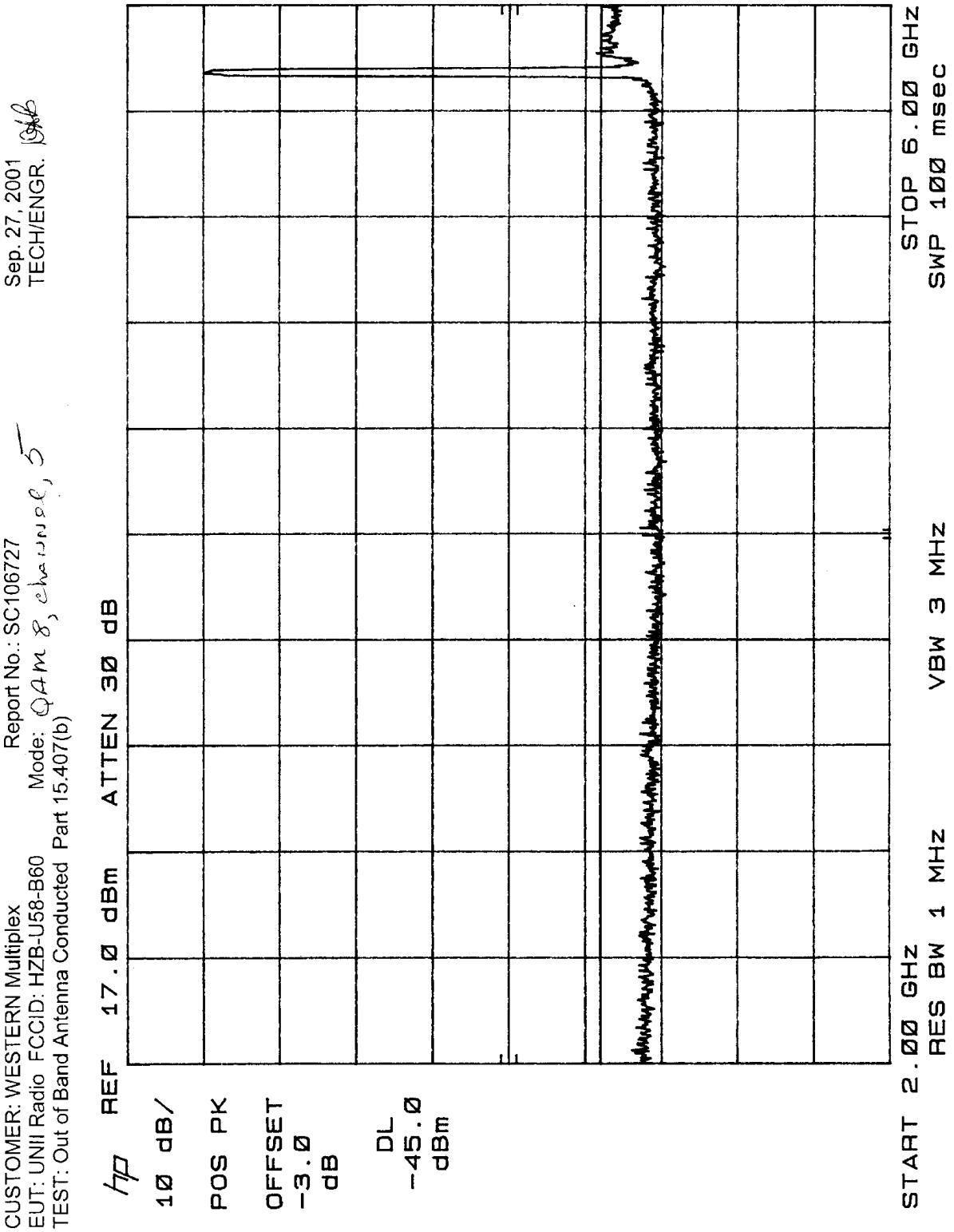




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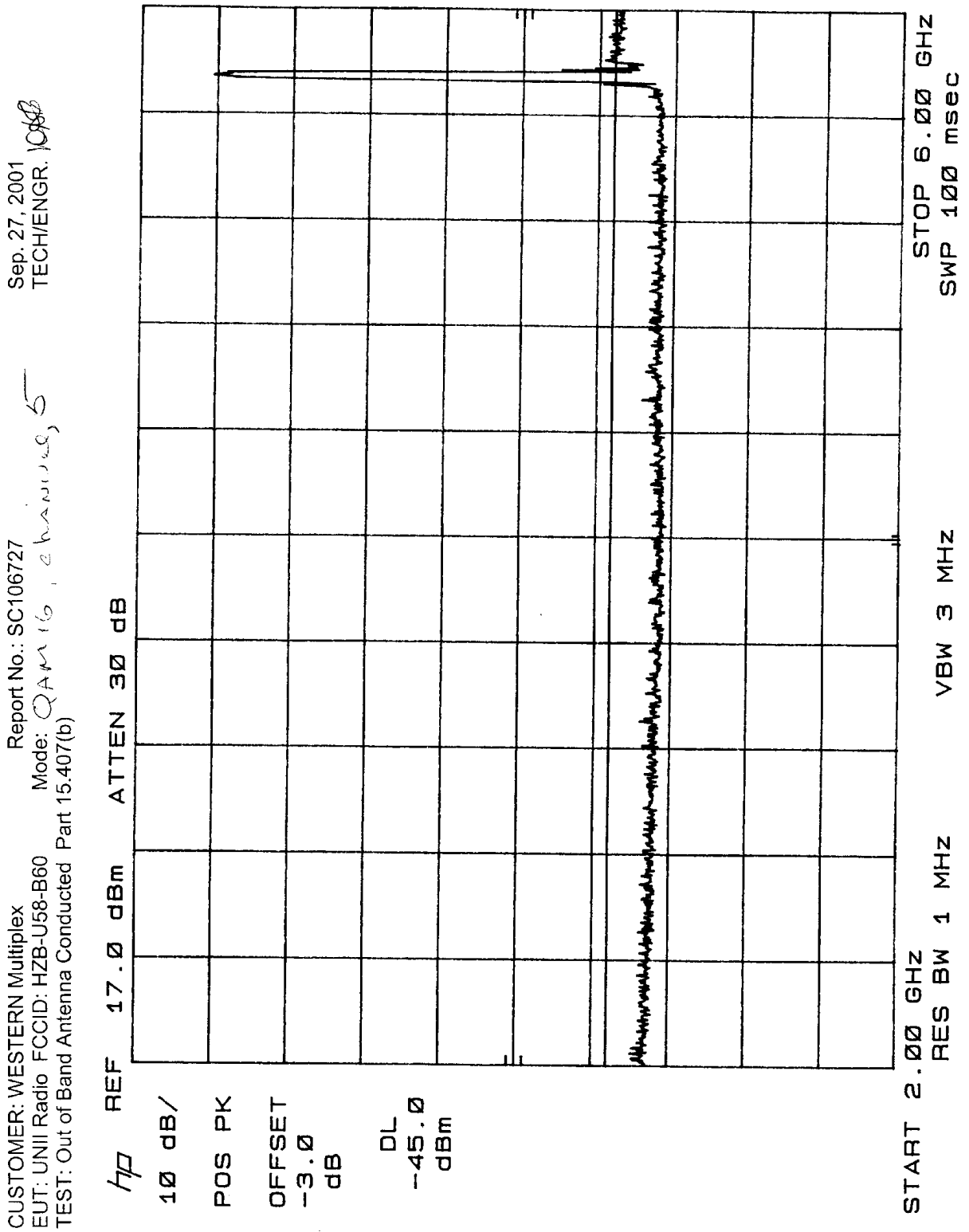




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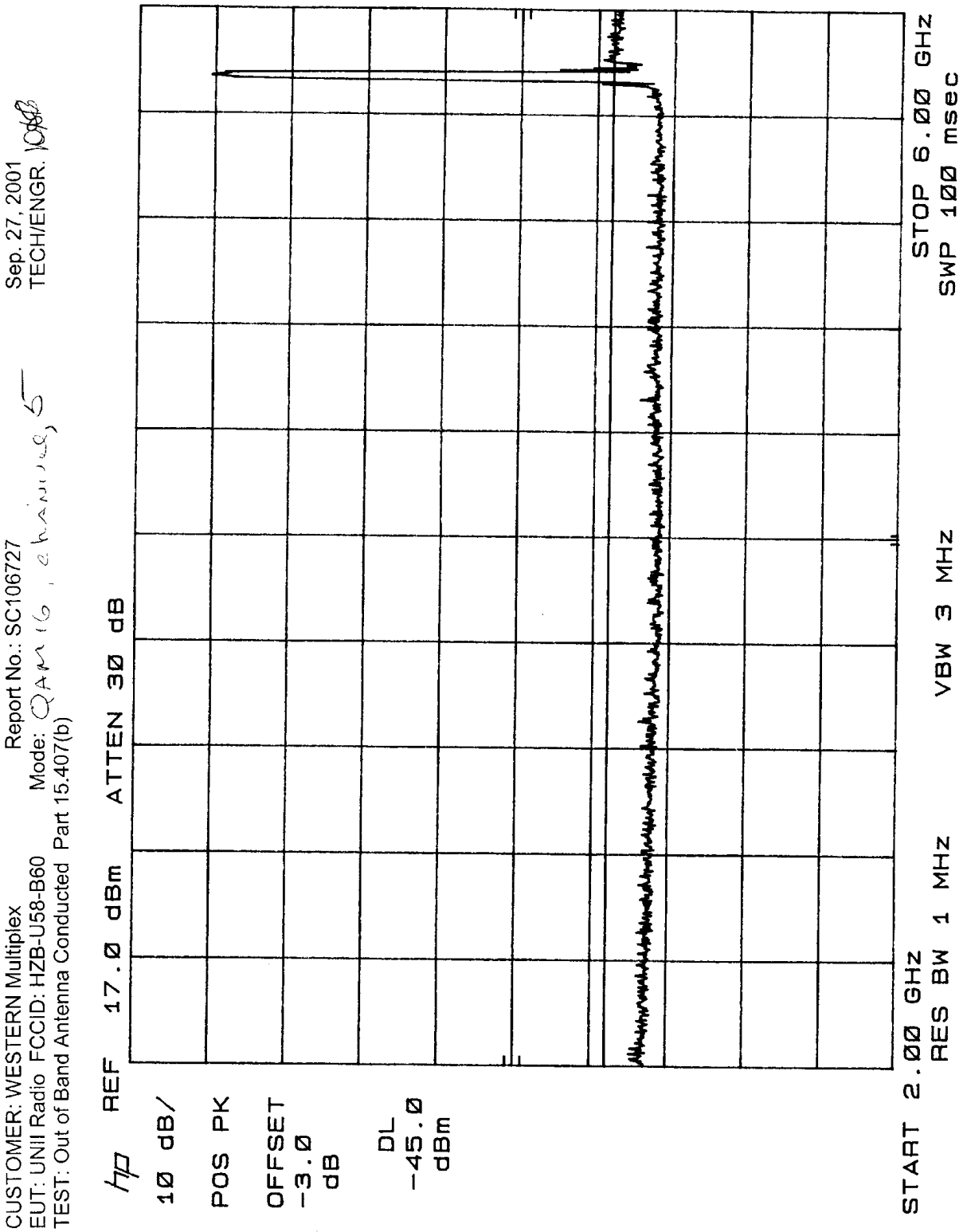




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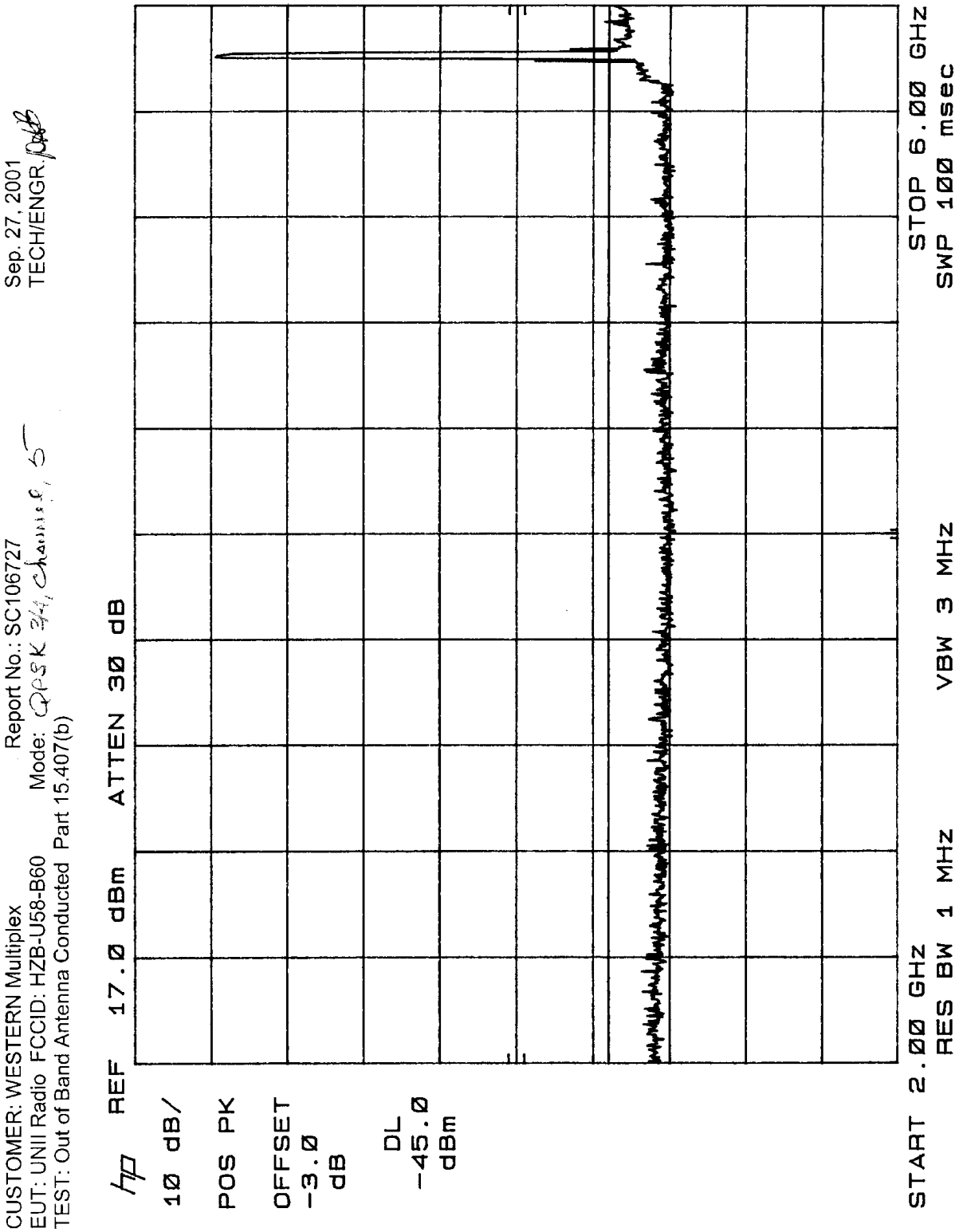




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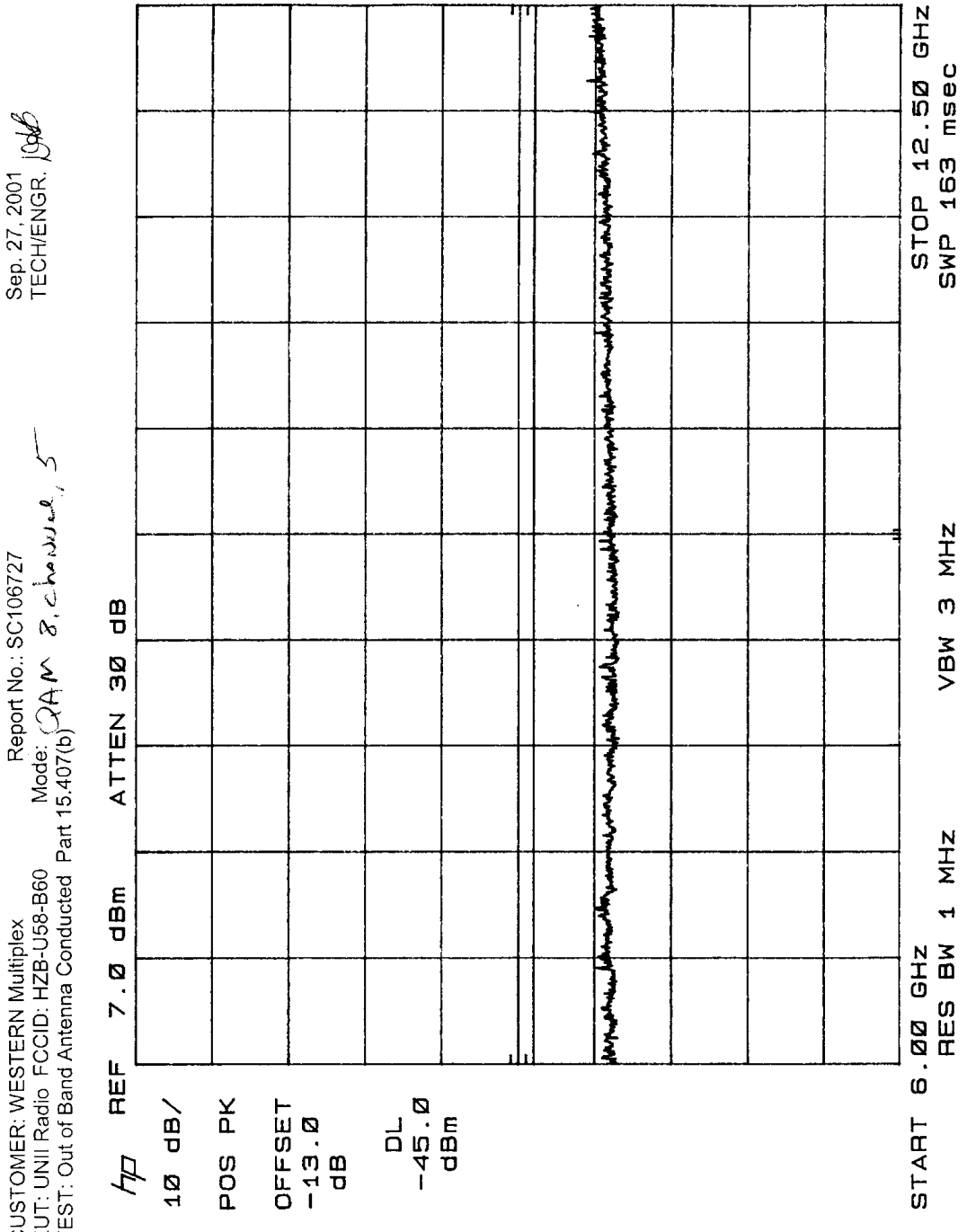
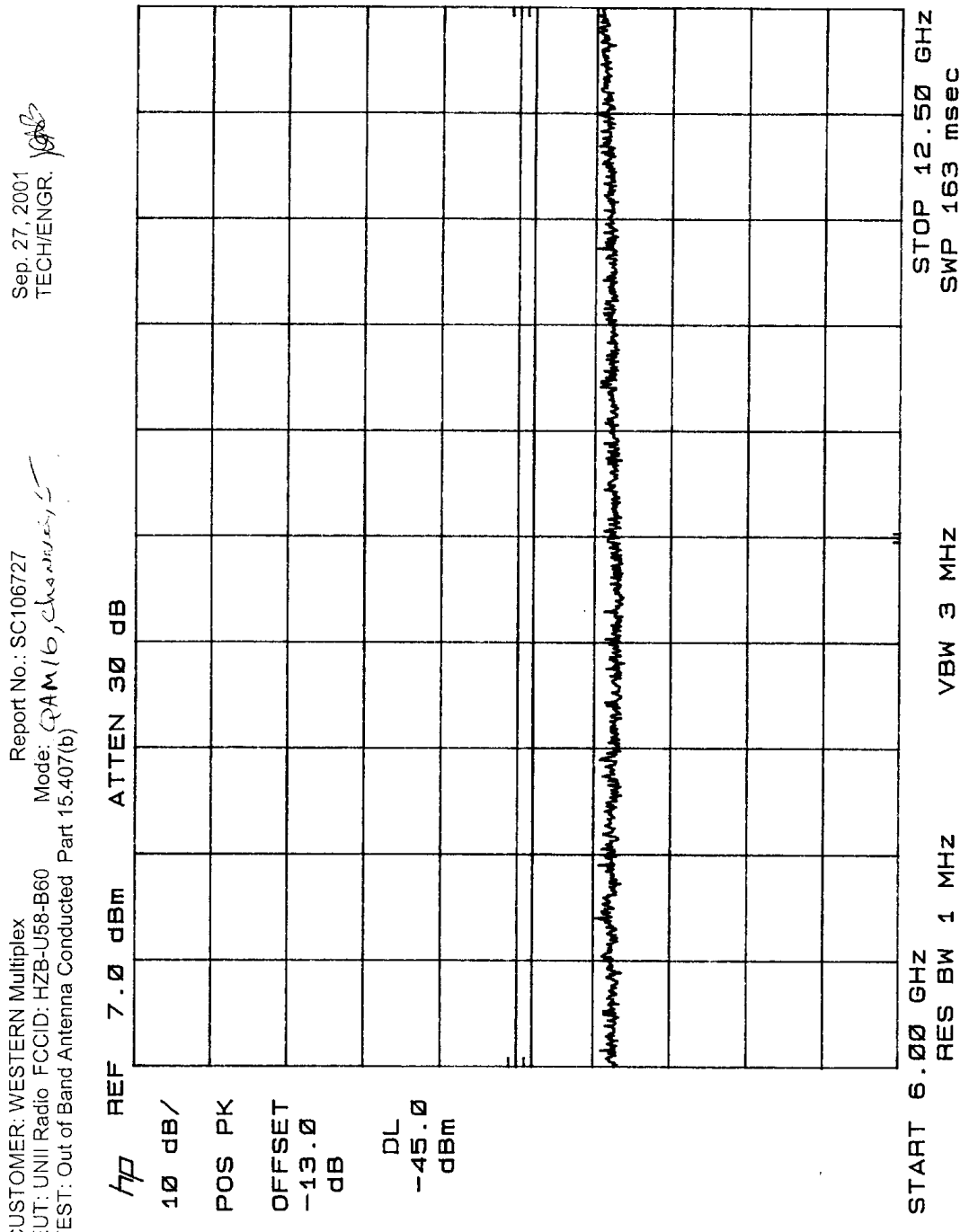
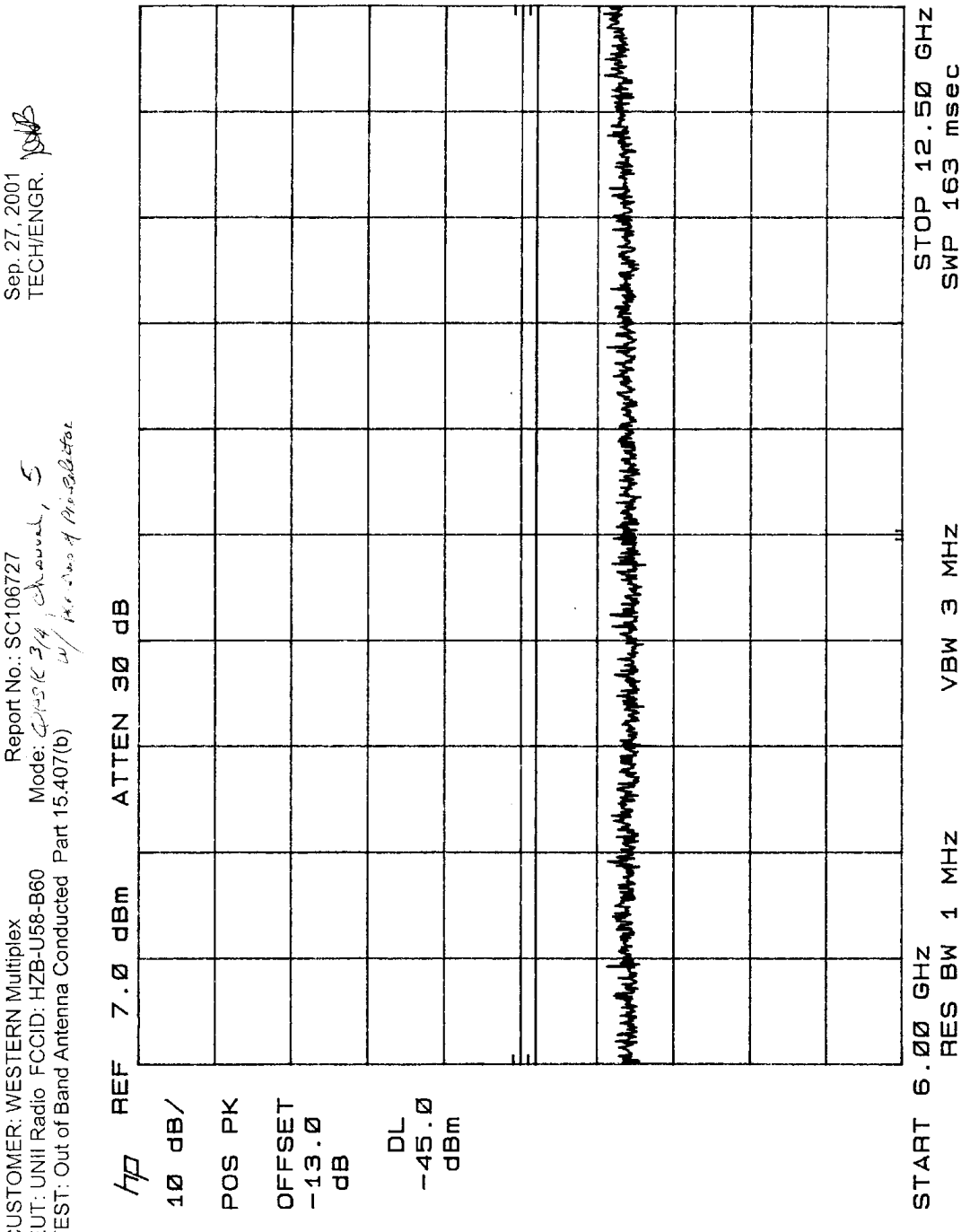





TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364


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 5
Sep. 27, 2001
TECH/ENGR.
REF 7.0 dBm
ATTEN 30 dB
10 dB/
POS PK
OFFSET
-13.0
dB
DL
-45.0
dBm
START 6.00 GHz
RES BW 1 MHz
VBW 3 MHz
STOP 12.50 GHz
SWP 163 msec



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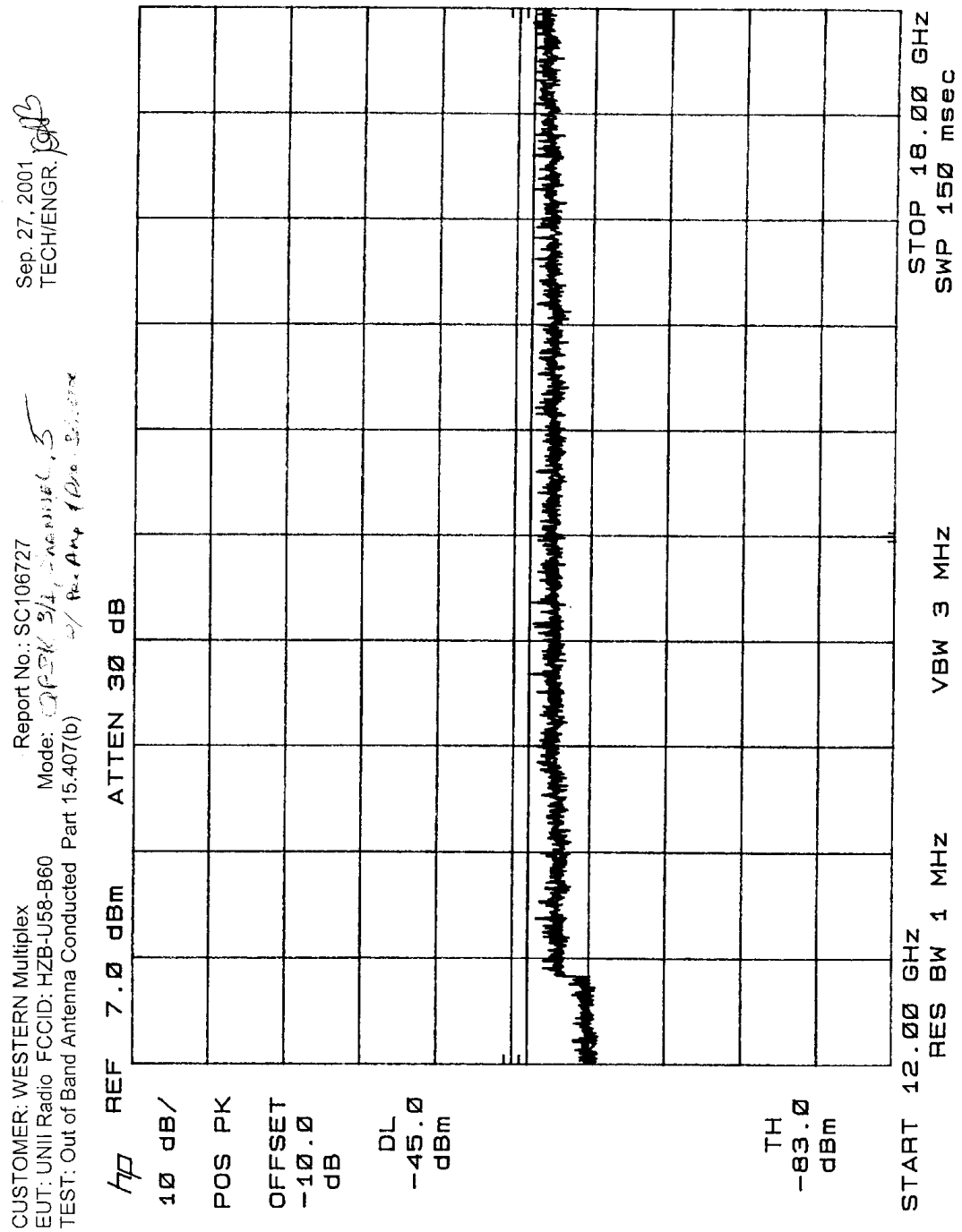




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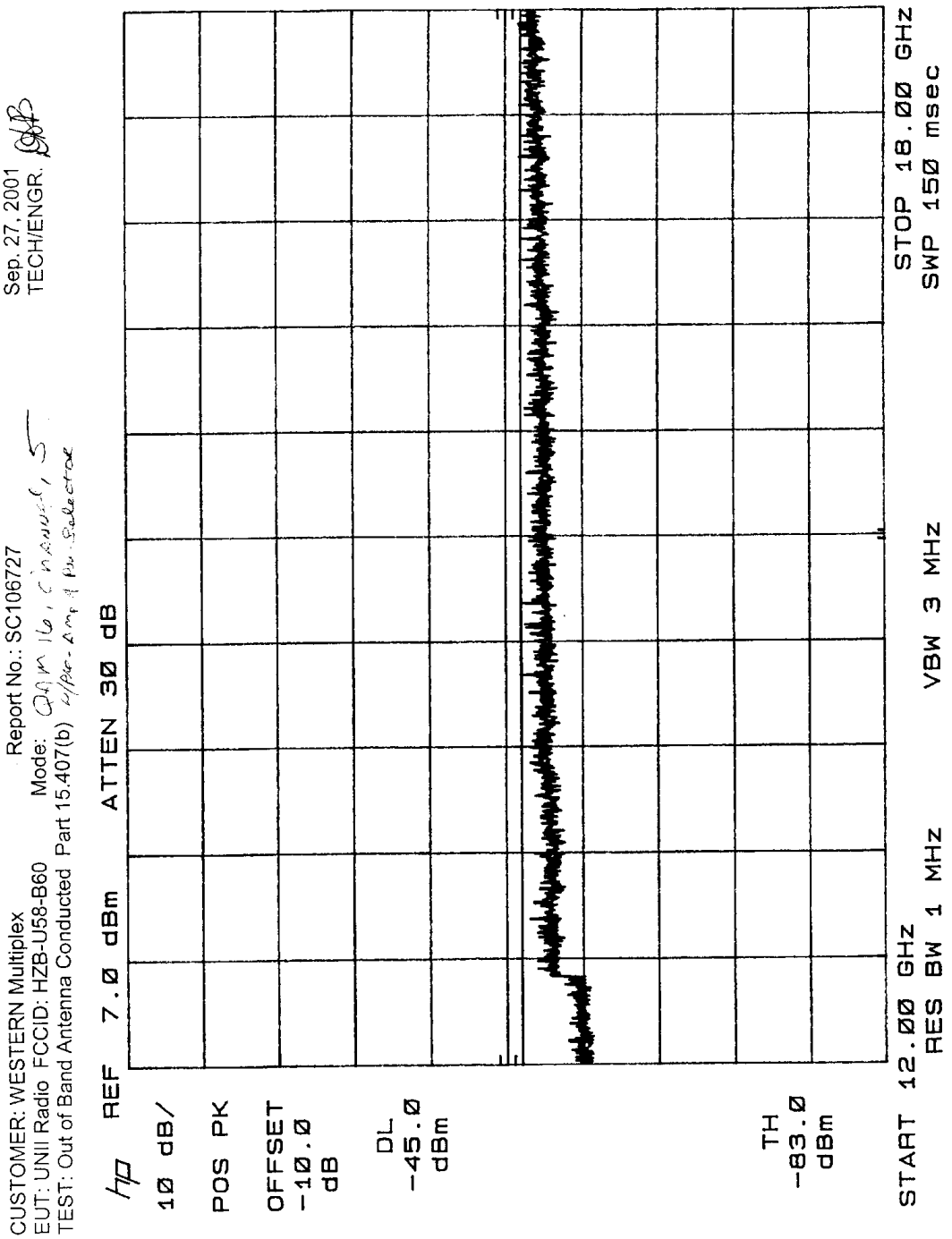




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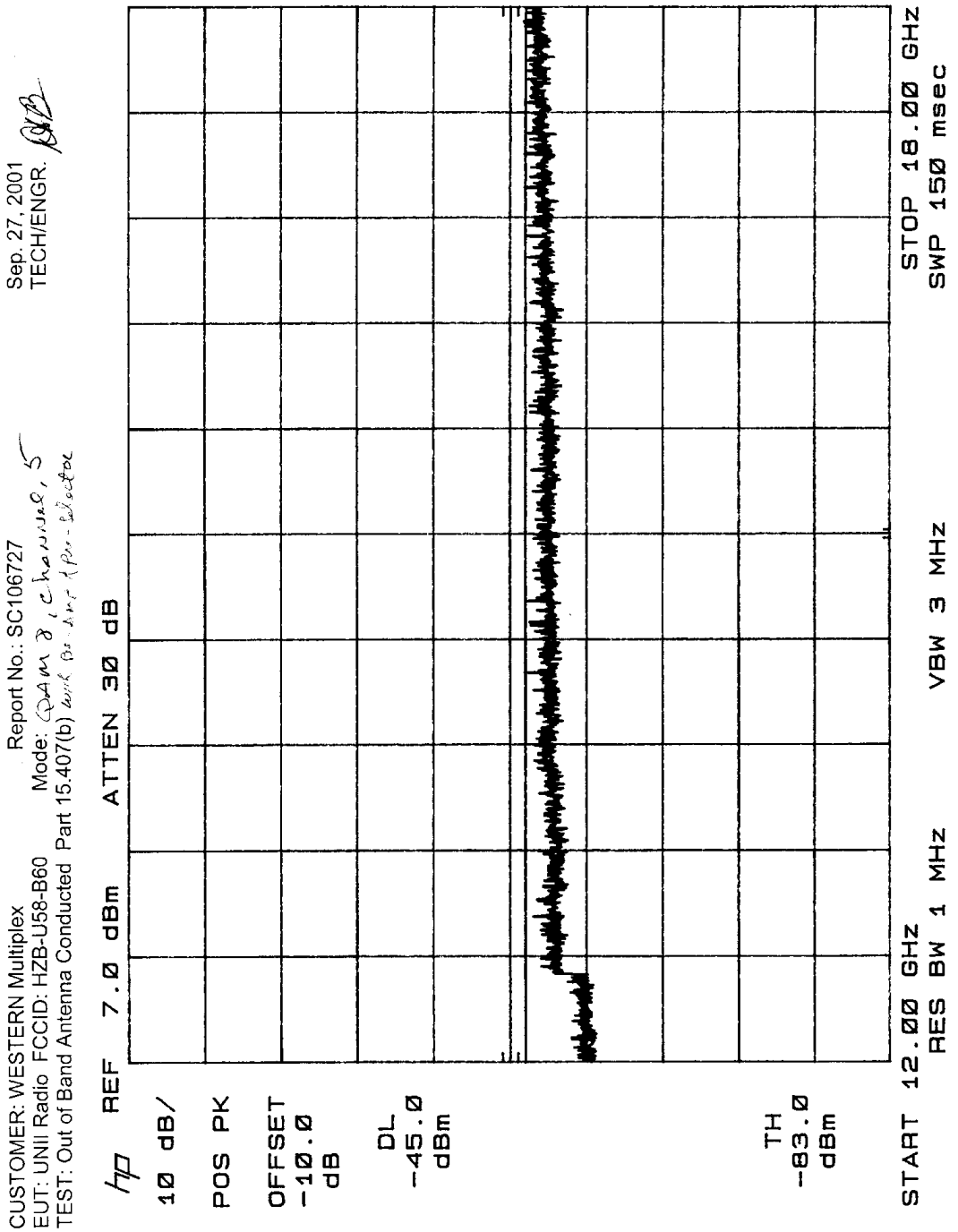




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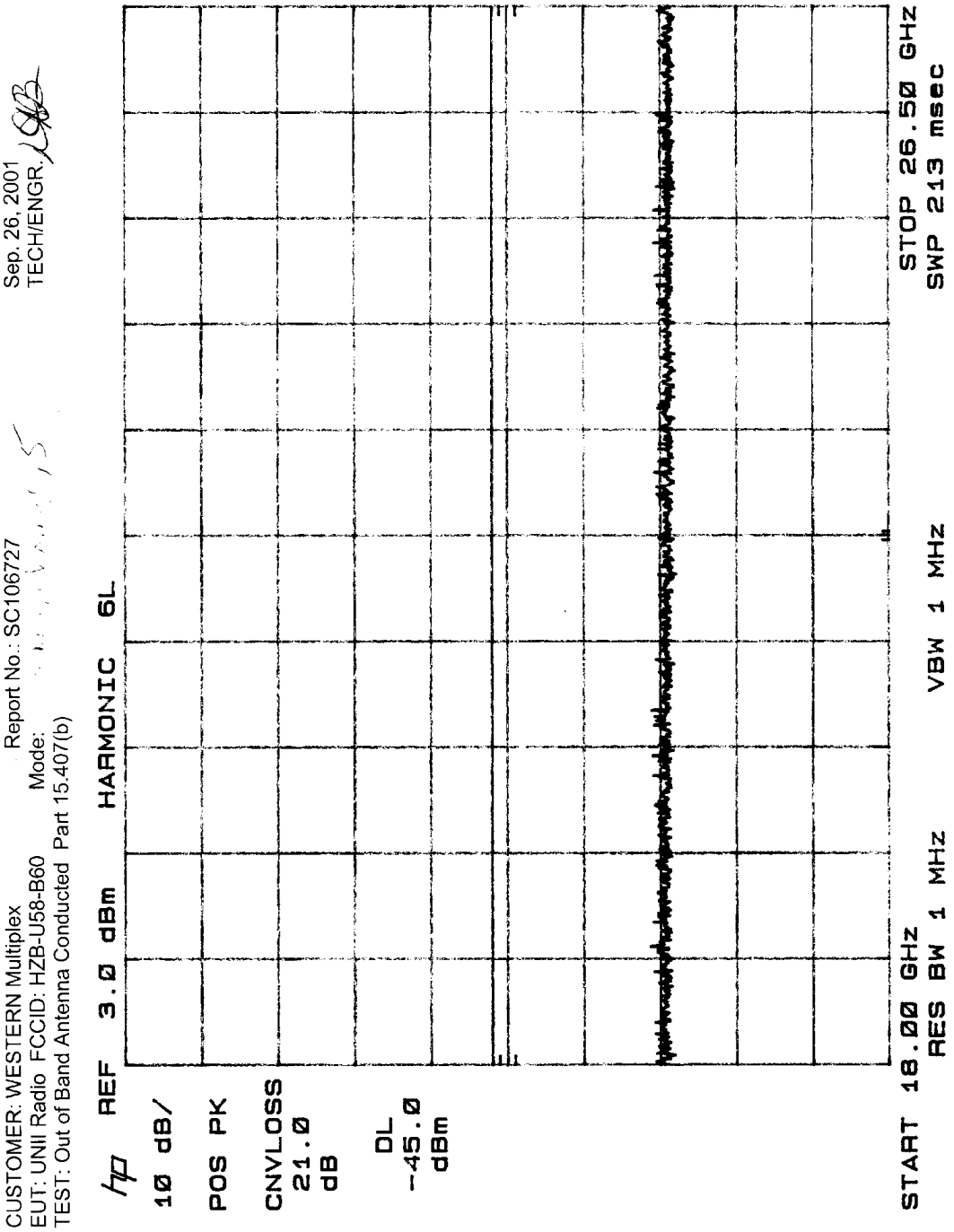




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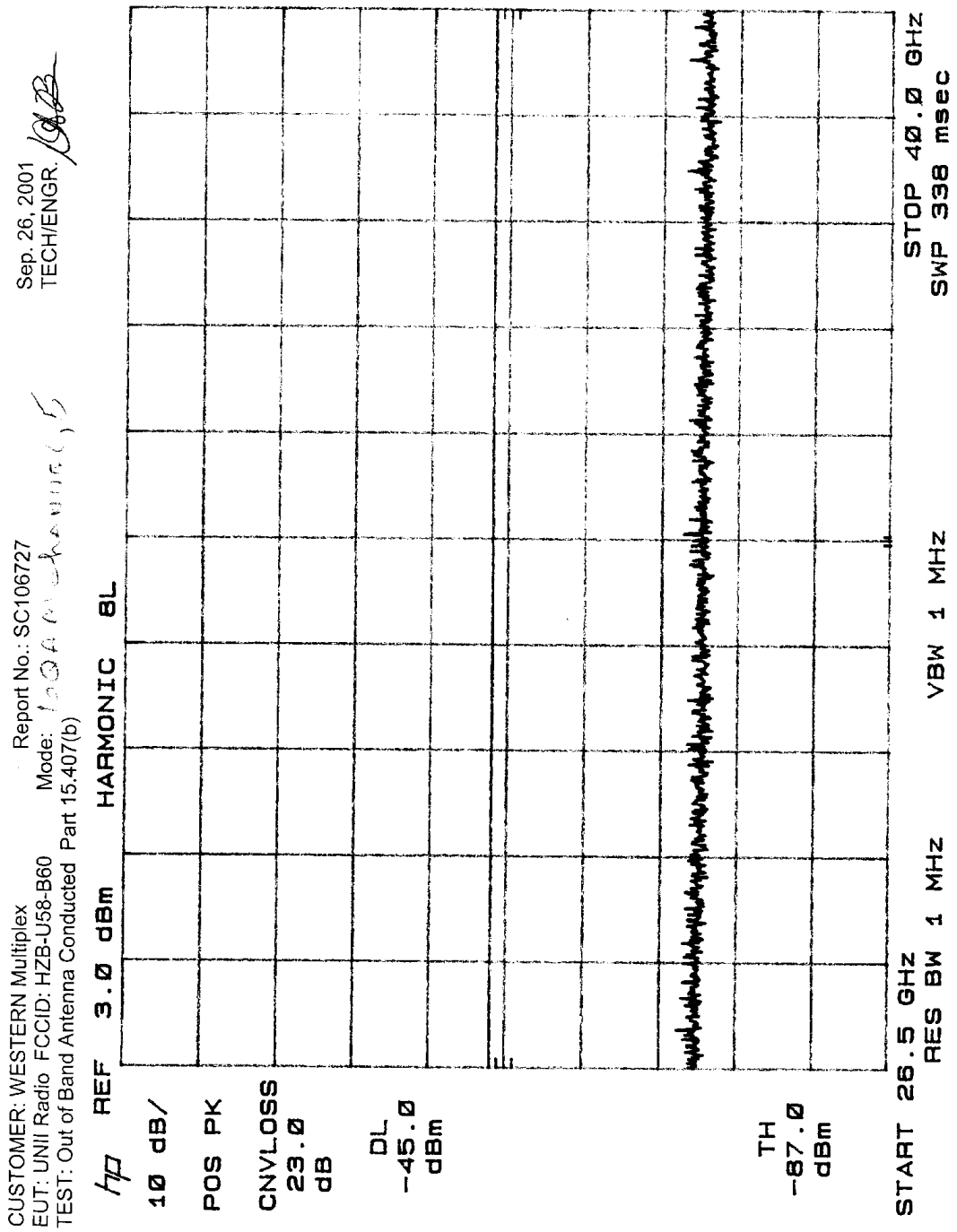




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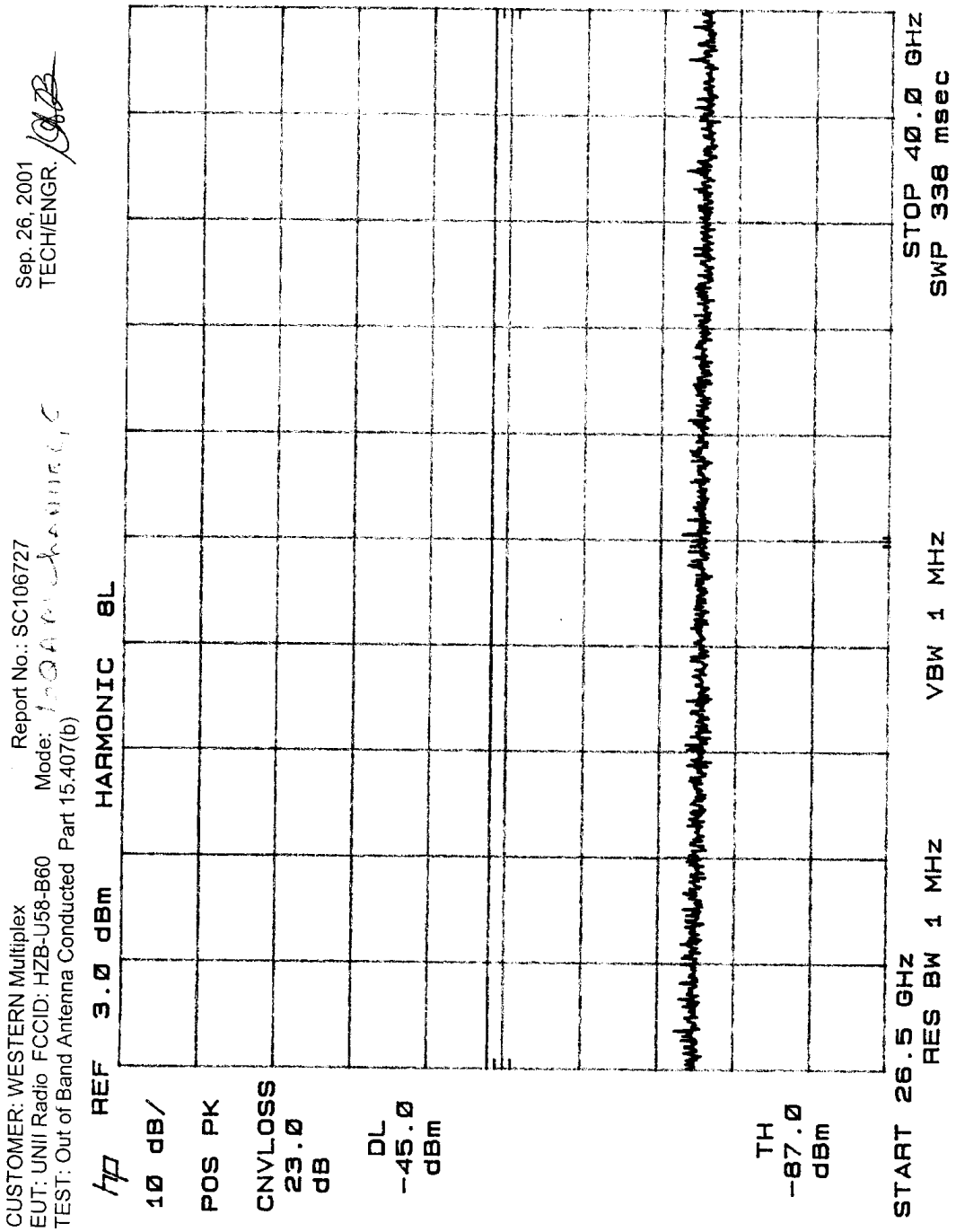




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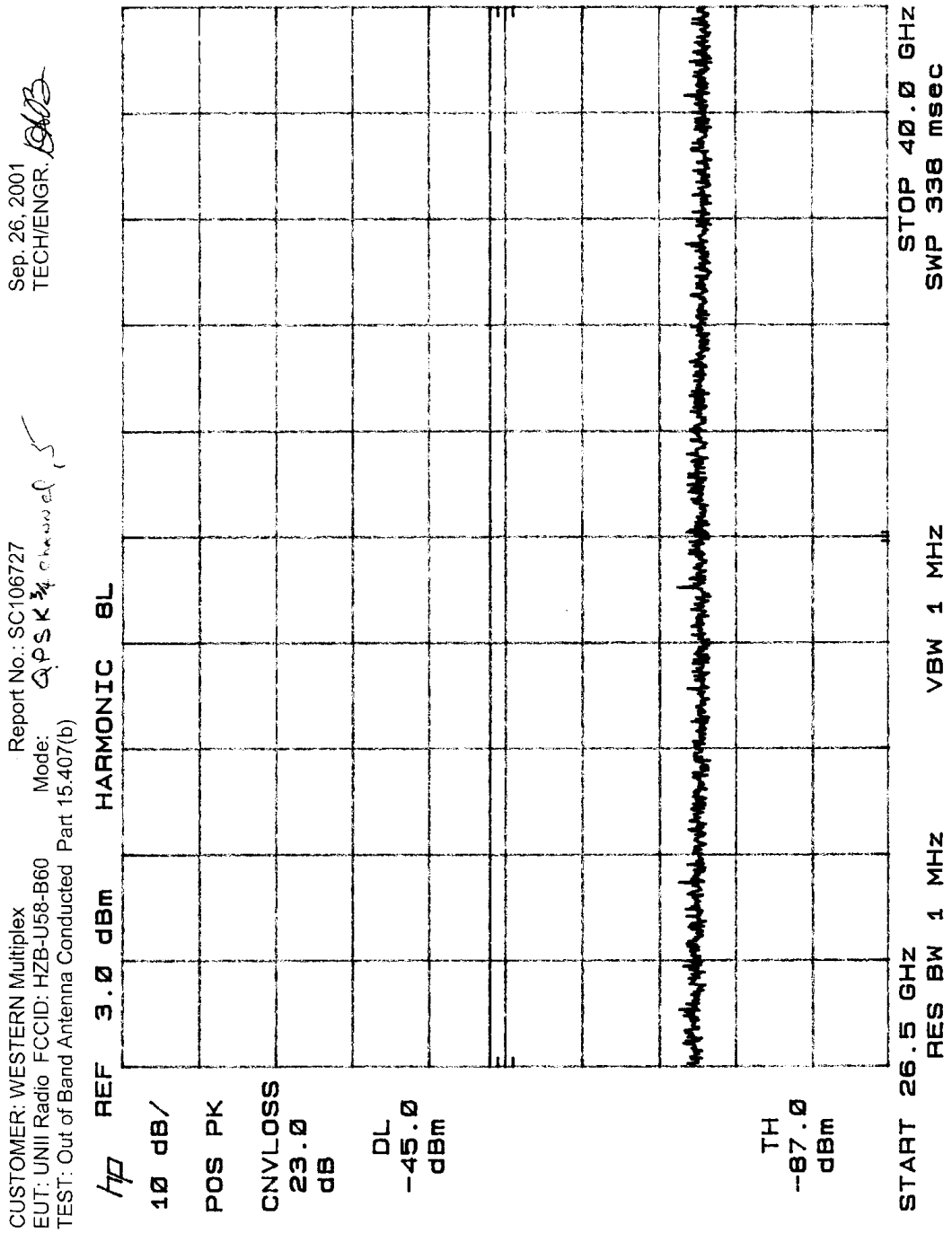




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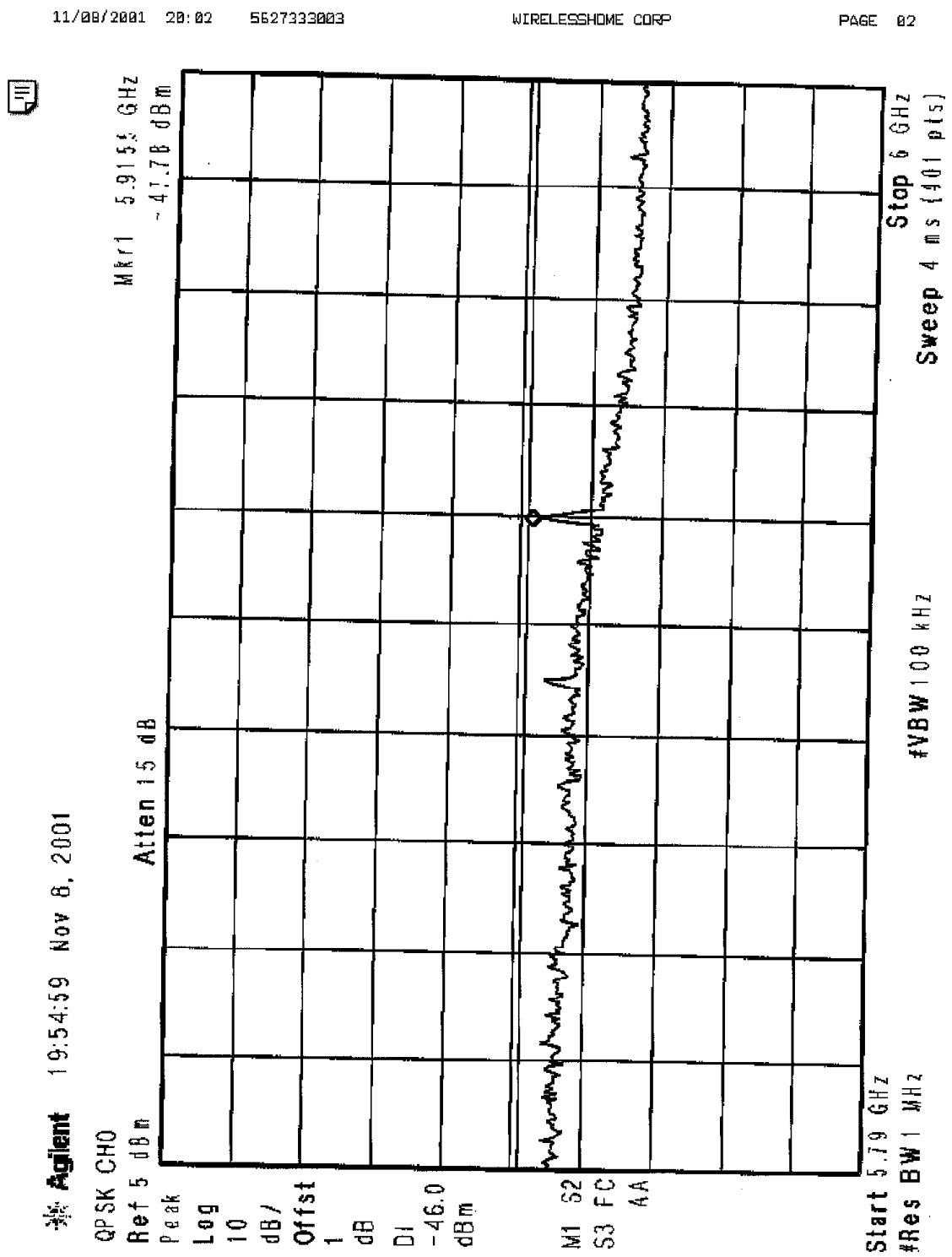
Note: The following are additional plots intended to show compliance with the out-of-band emission requirements in the band from highest band-edge frequency (for channels 0, 2, and 5) to 6 GHz.

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



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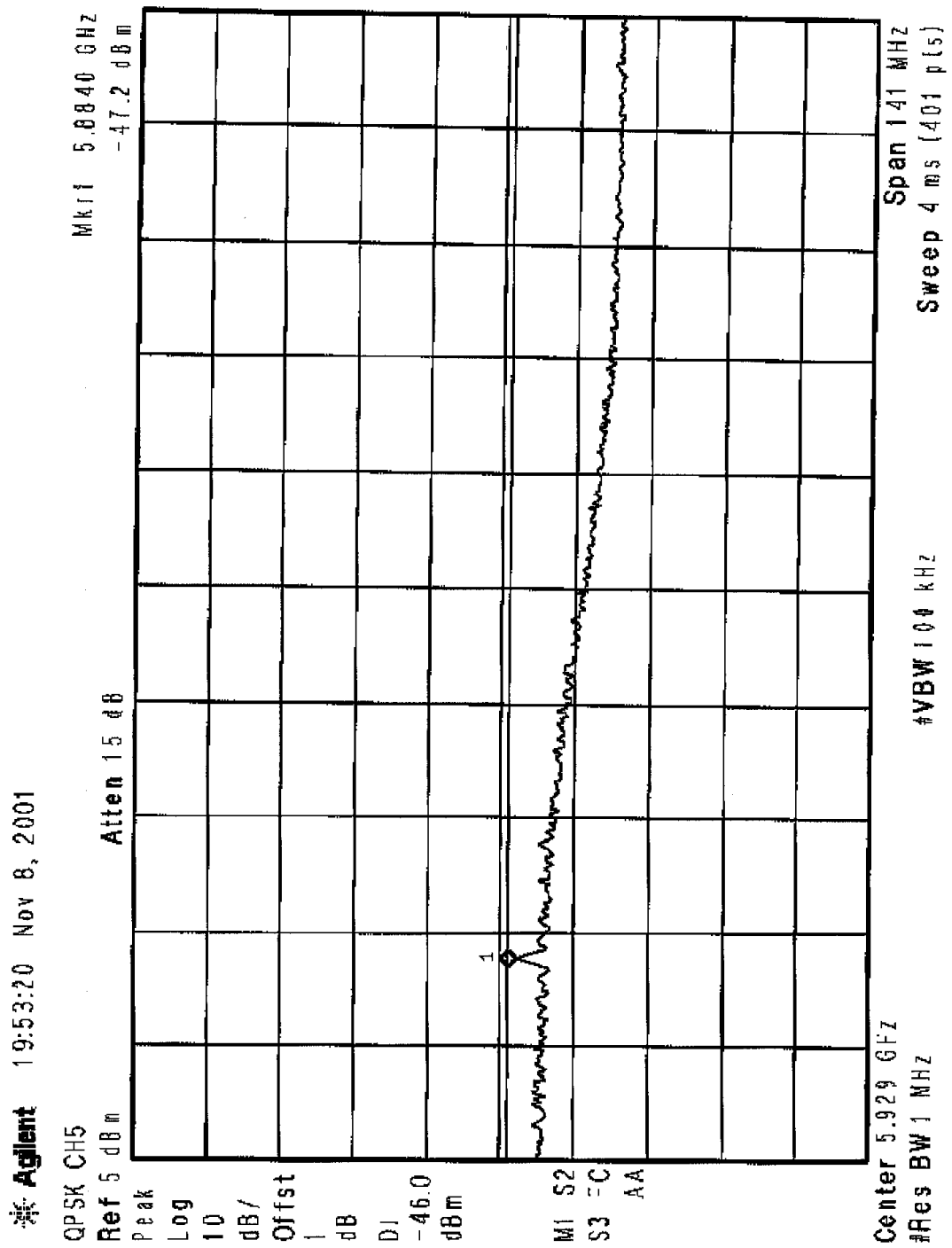
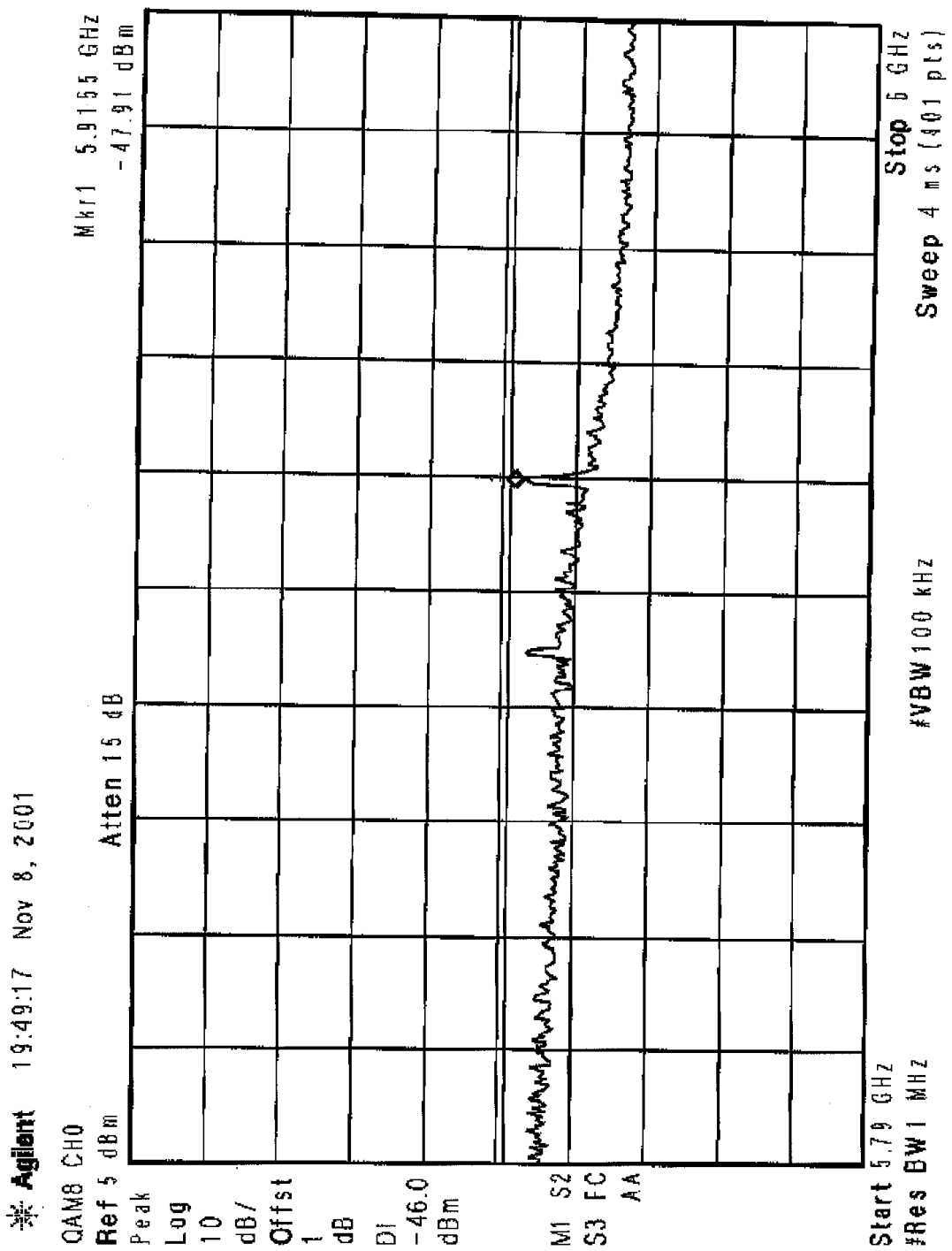
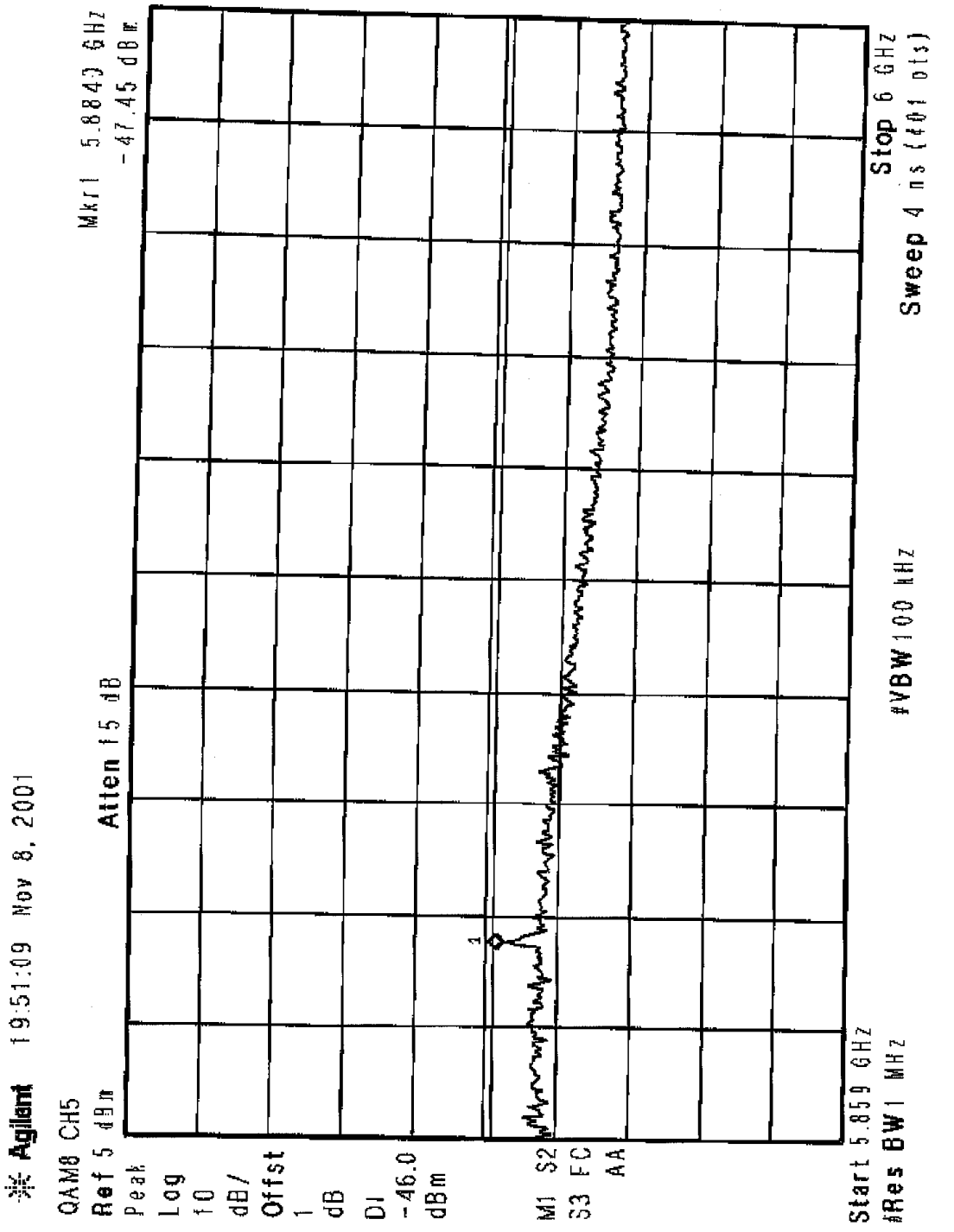
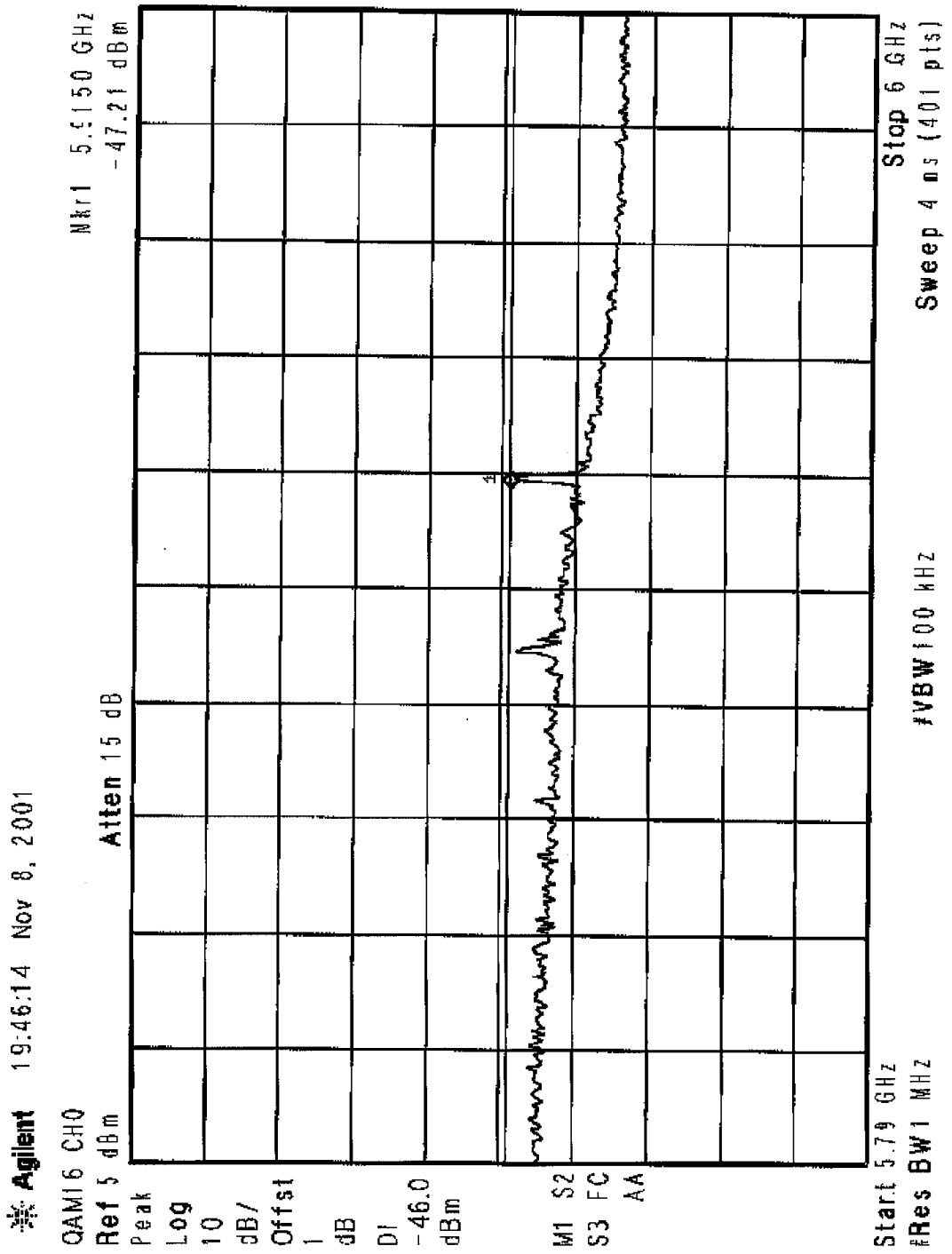
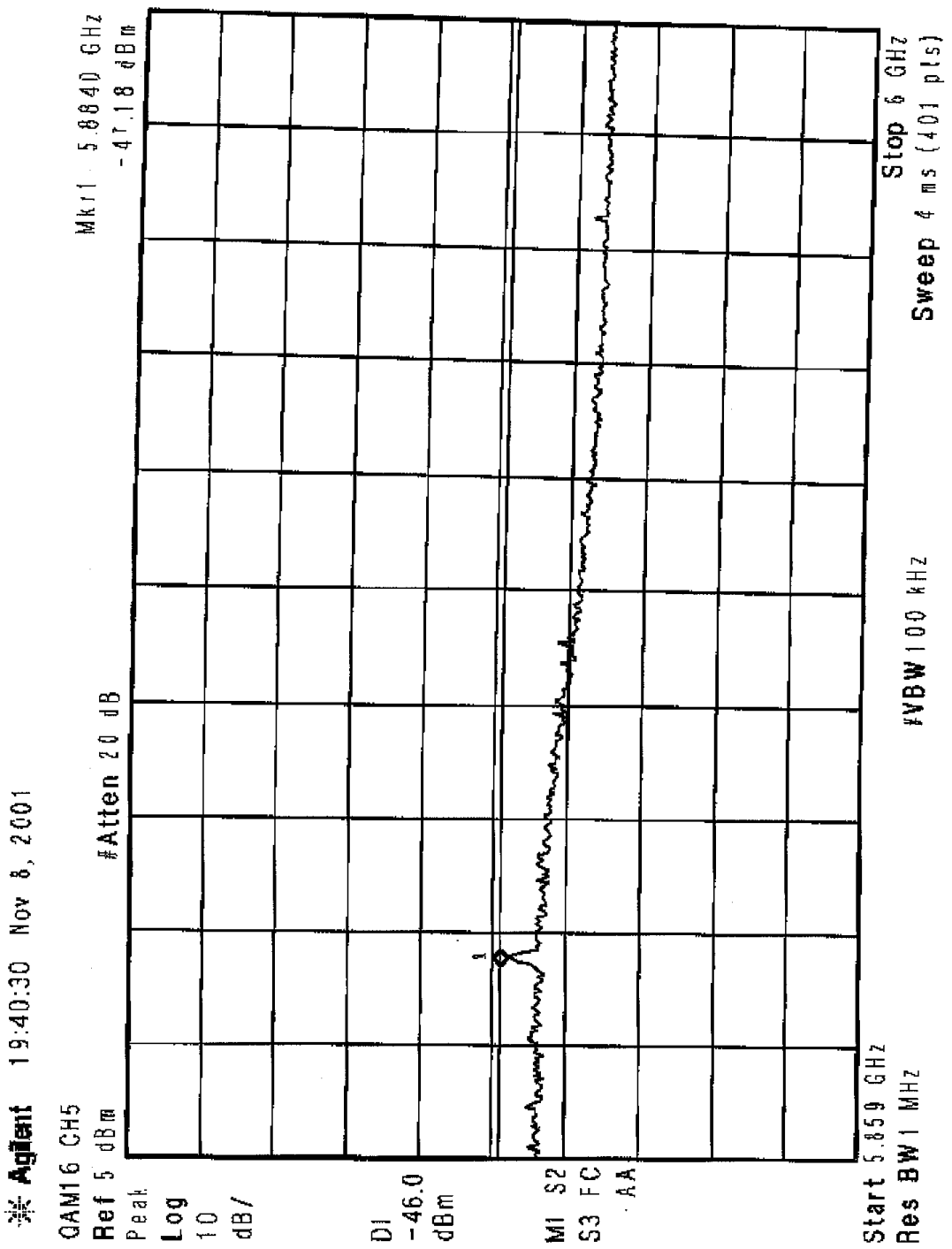
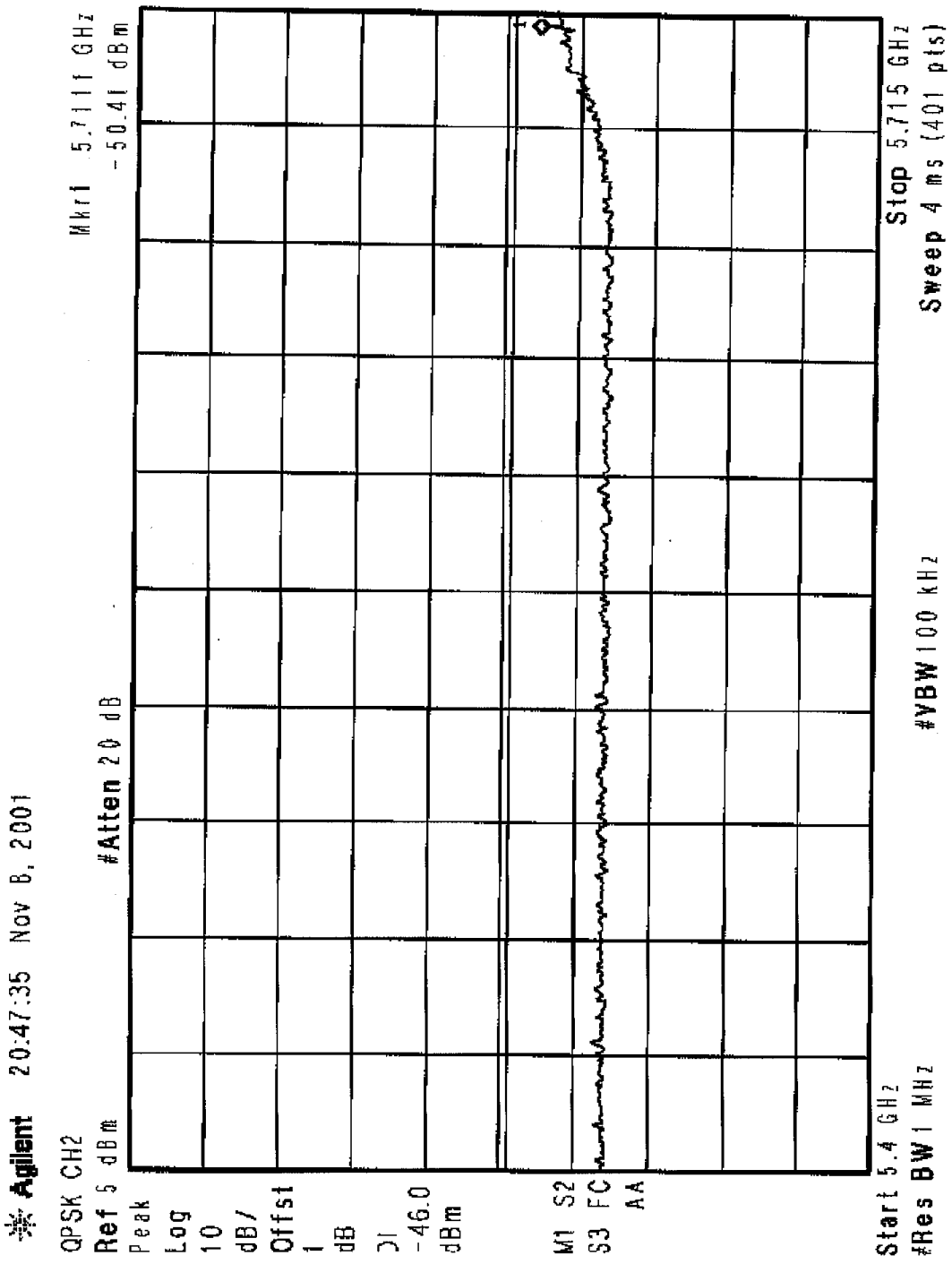

Agilent 19:53:20 Nov 8, 2001
QPSK CH5
Ref 5 dBm
Peak
Log
10
dB/
Offst
1
dB
D1
-46.0
dBm
Atten 15 dB
Mkr1 5.0840 GHz
-47.2 dBm
M1 S2
S3 FC
AA
Center 5.929 GHz
#Res BW 1 MHz
#VBW 100 kHz
Span 141 MHz
Sweep 4 ms (401 pts)

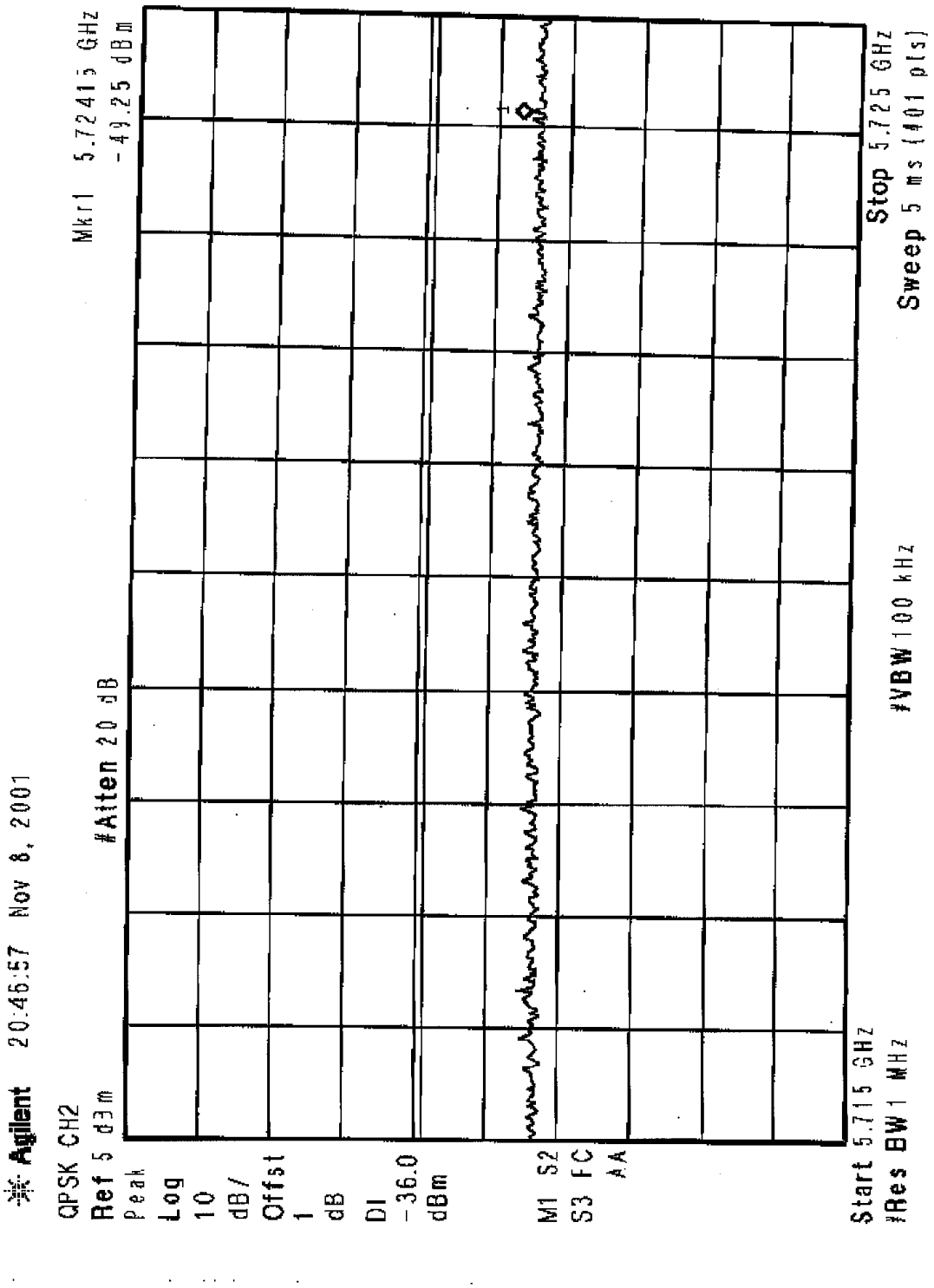

Agilent 19:49:17 Nov 8, 2001
QAM8 CH0
Ref 5 dBm
Atten 15 dB
Mkr1 5.9155 GHz
-47.91 dBm
Peak
Log
10
dB/
Offst
1
dB
Dl
-46.0
dBm
M1 S2
S3 FC
AA
Start 5.79 GHz
#Res BW 1 MHz
#VBW 100 kHz
Stop 6 GHz
Sweep 4 ms (401 pts)

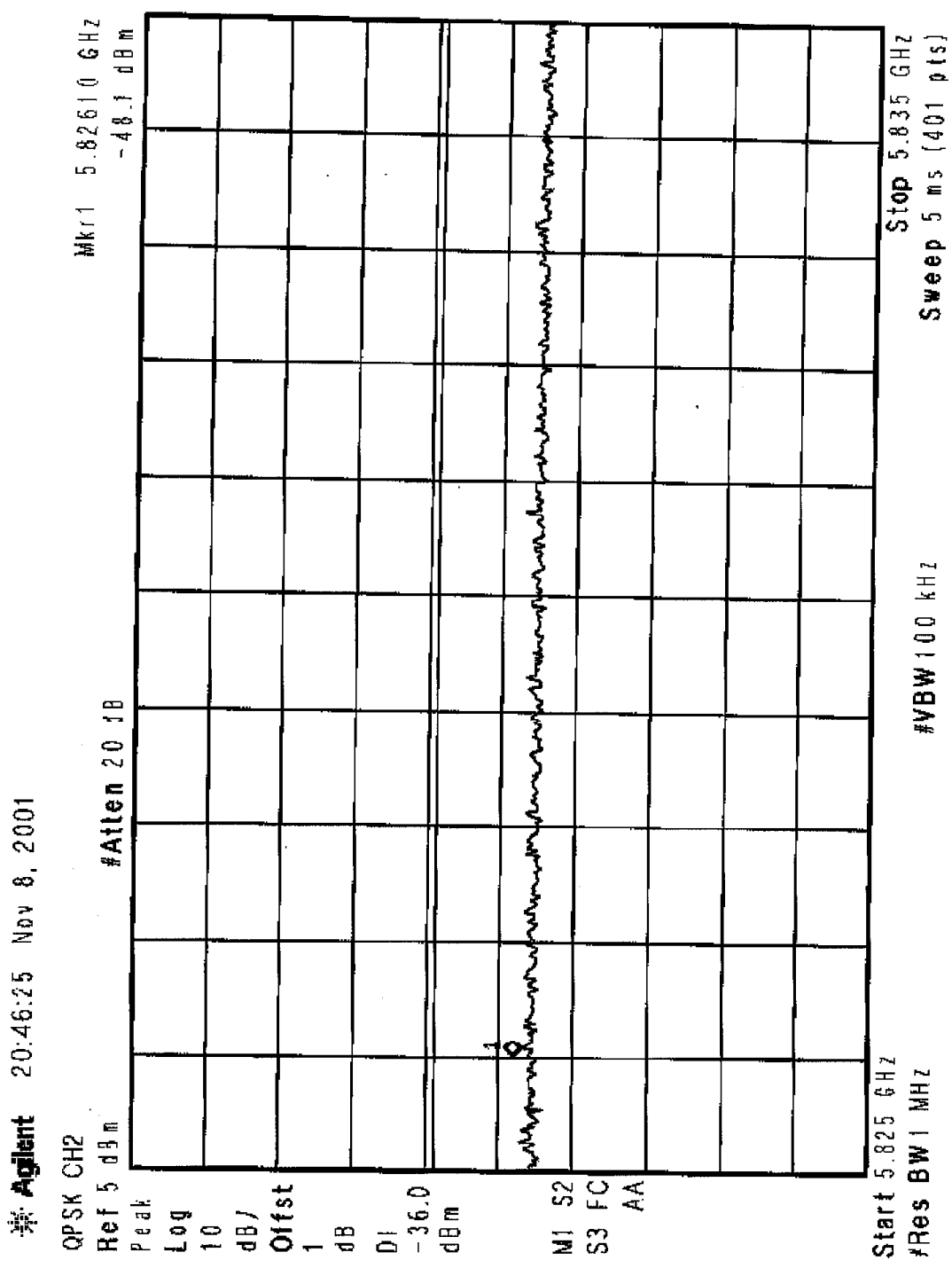

Agilent 19:51:09 Nov 8, 2001
QAM8 CH5
Ref 5 dBm
Peak
Log
10
dB/
Offst
1
dB
D1
-46.0
dBm
Atten 15 dB
Mkr1 5.8843 GHz
-47.45 dBm
M1 S2
S3 FC
AA
Start 5.859 GHz
#Res BW 1 MHz
#VBW 100 kHz
Stop 6 GHz
Sweep 4 ns (401 pts)


Agilent 19:46:14 Nov 8, 2001
QAM16 CHQ
Ref 5 dBm
Atten 15 dB
Peak
Log
10
dB/
Offst
1
dB
D1
-46.0
dBm
Mkr1 5.5150 GHz
-47.21 dBm
M1 S2
S3 FC
AA
Start 5.79 GHz
#Res BW 1 MHz
#VBW 100 kHz
Stop 6 GHz
Sweep 4 ms (401 pts)

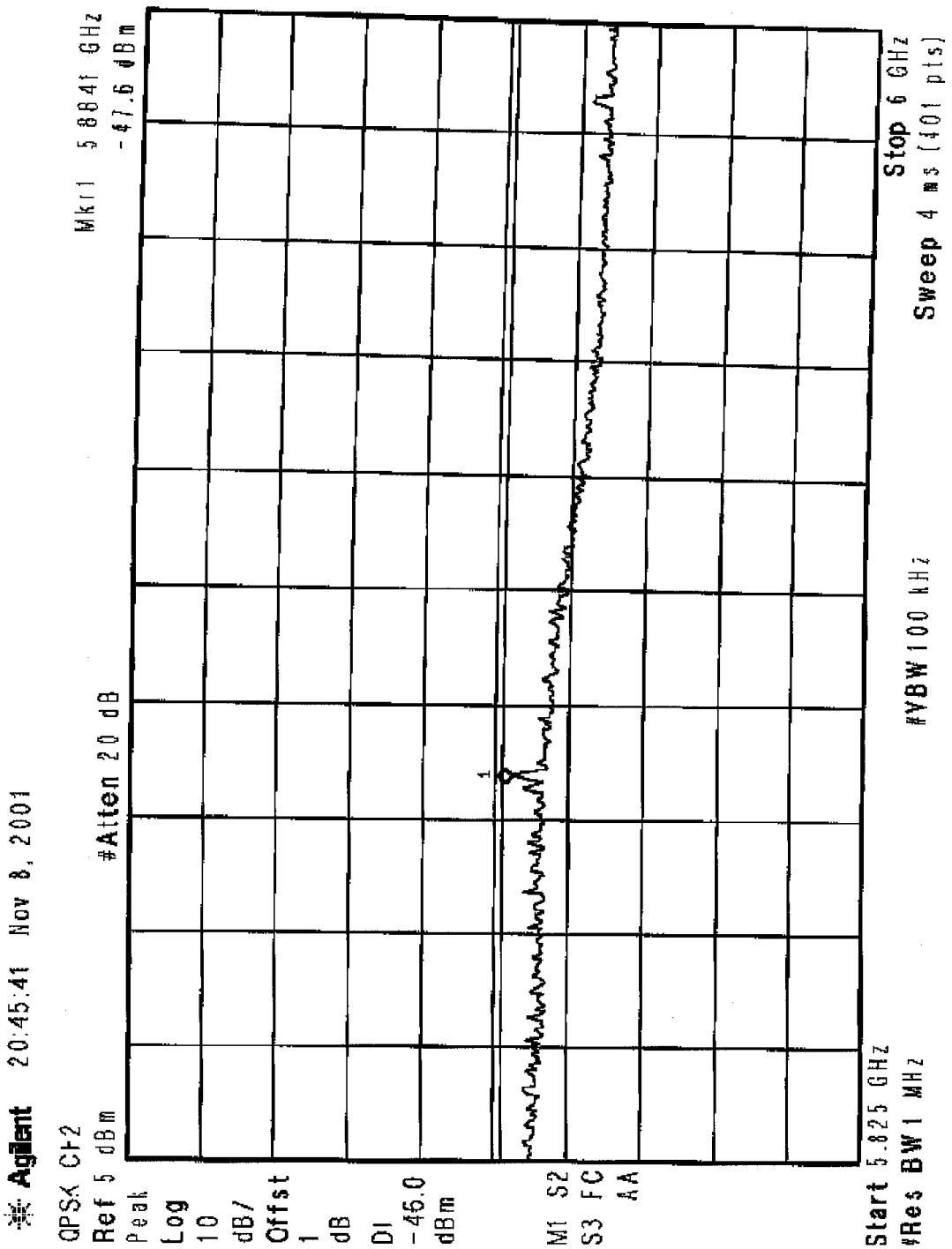

Agilent 19:40:30 Nov 8, 2001
CAM16 CH5
Ref 5 dBm
#Atten 20 dB
Peak
Log
10
dB/
Mkr1 5.8840 GHz
-47.18 dBm
D1
-46.0
dBm
M1 S2
S3 FC
AA
Stop 6 GHz
Sweep 4 ms (401 pts)
#VBW 100 kHz
Start 5.859 GHz
Res BW 1 MHz


Agilent 20:47:35 Nov 8, 2001
QPSK CH2
Ref 5 dBm
#Atten 20 dB
Peak
Log
10
dB/
Offst
1
dB
Mkr1 5.7111 GHz
-50.41 dBm
Stop 5.715 GHz
Sweep 4 ms (401 pts)
#VBW 100 kHz
M1 S2
S3 FC
AA
Start 5.4 GHz
#Res BW 1 MHz


Agilent 20:46:57 Nov 8, 2001
QPSK CH2
Ref 5 dBm
#Atten 20 dB
Peak
Log
10
dB/
Offst
1
dB
Dl
-36.0
dBm
Mkr1 5.72415 GHz
-49.25 dBm
M1 S2
S3 FC
AA
Start 5.715 GHz
#Res BW 1 MHz
#VBW 100 kHz
Stop 5.725 GHz
Sweep 5 ms (401 pts)


Agilent 20:46:25 Nov 8, 2001
QPSK CH2
Ref 5 dBm
#Atten 20 dB
Peak
Log
10
dB/
Offst
1
dB
D1
-36.0
dBm
Mkr1 5.82610 GHz
-48.1 dBm
M1 S2
S3 FC
AA
Start 5.825 GHz
#Res BW 1 MHz
#VBW 100 kHz
Stop 5.835 GHz
Sweep 5 ms (401 pts)

11/08/2001 20:02 5627333003 WIRELESSHOME CORP PAGE 11



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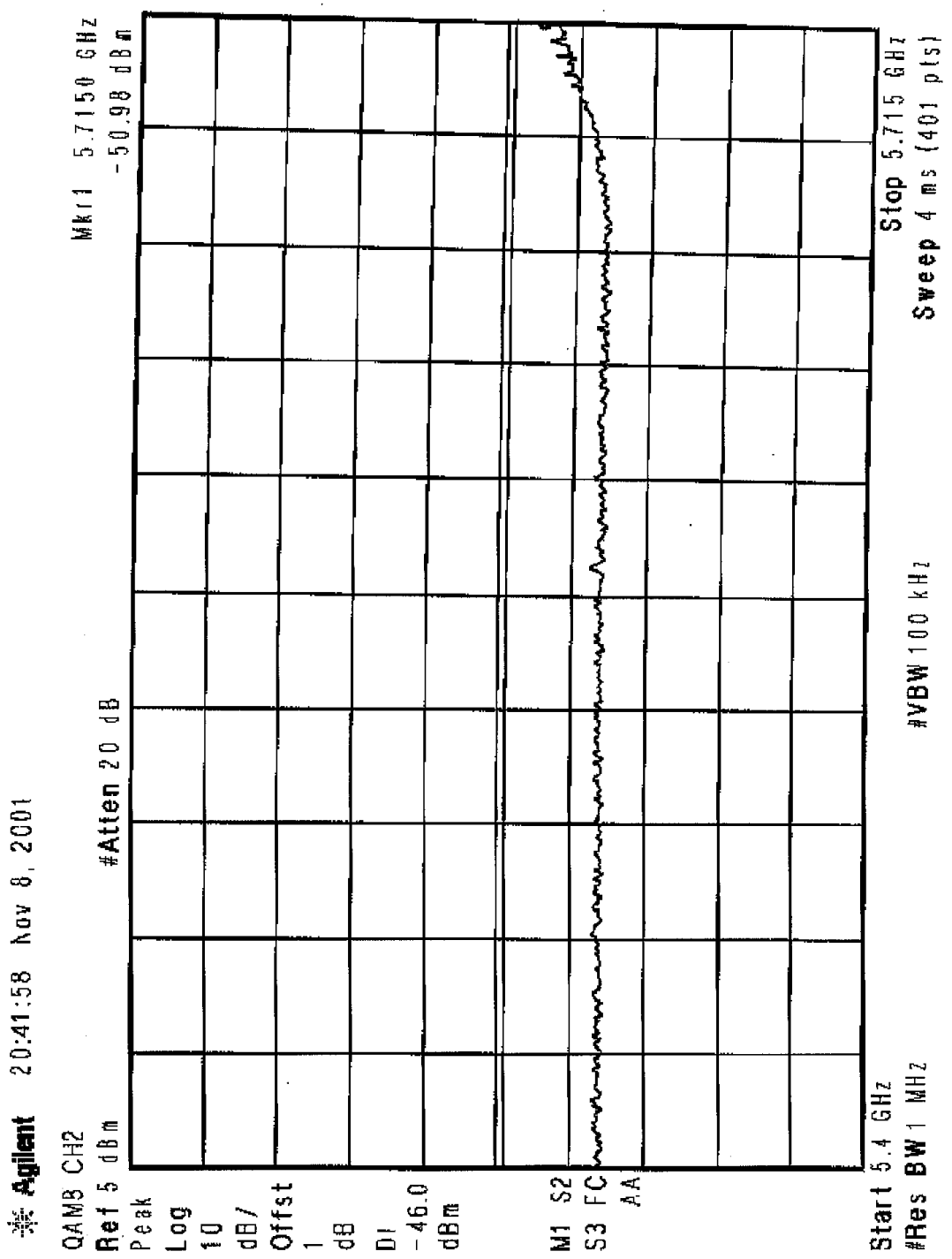
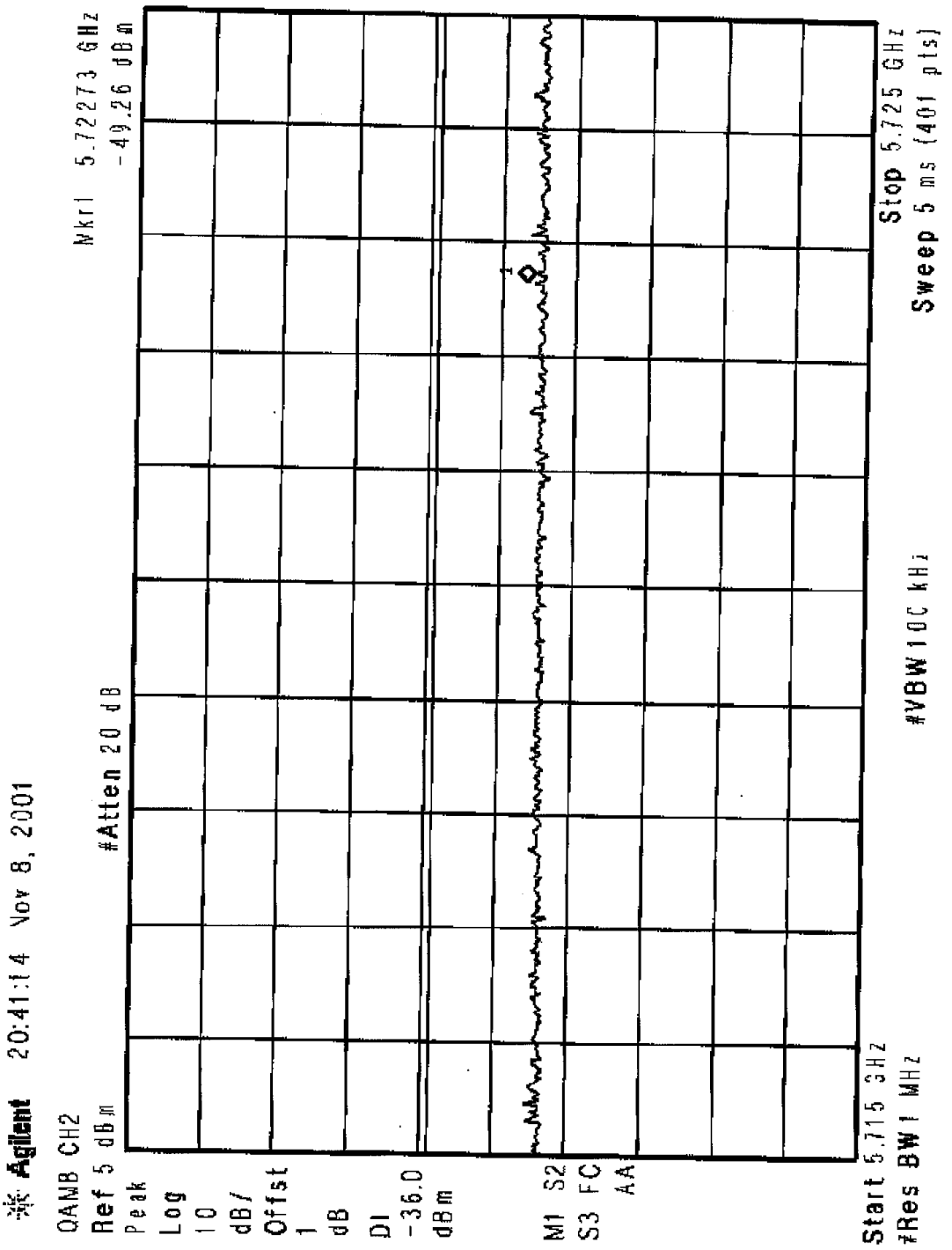
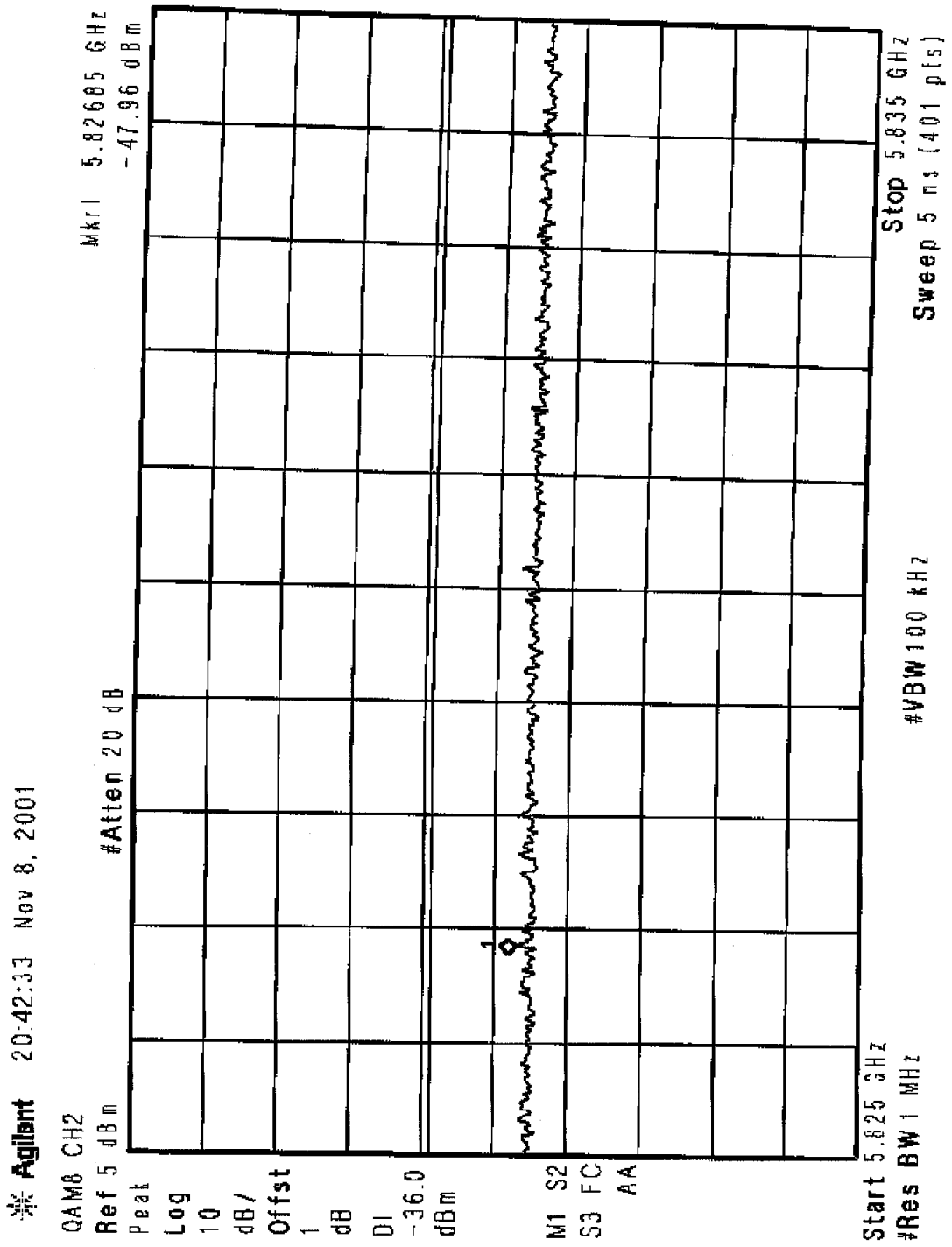
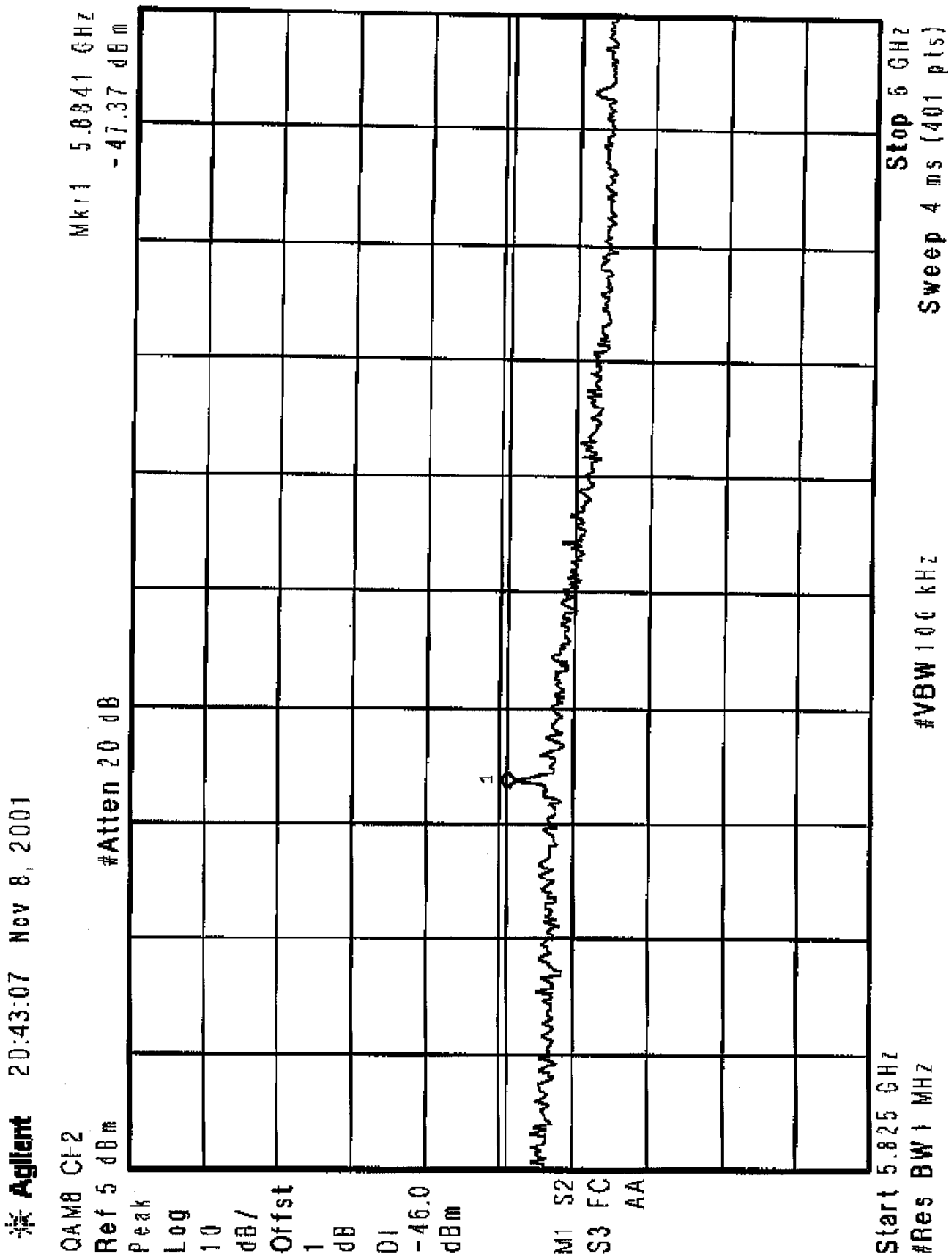
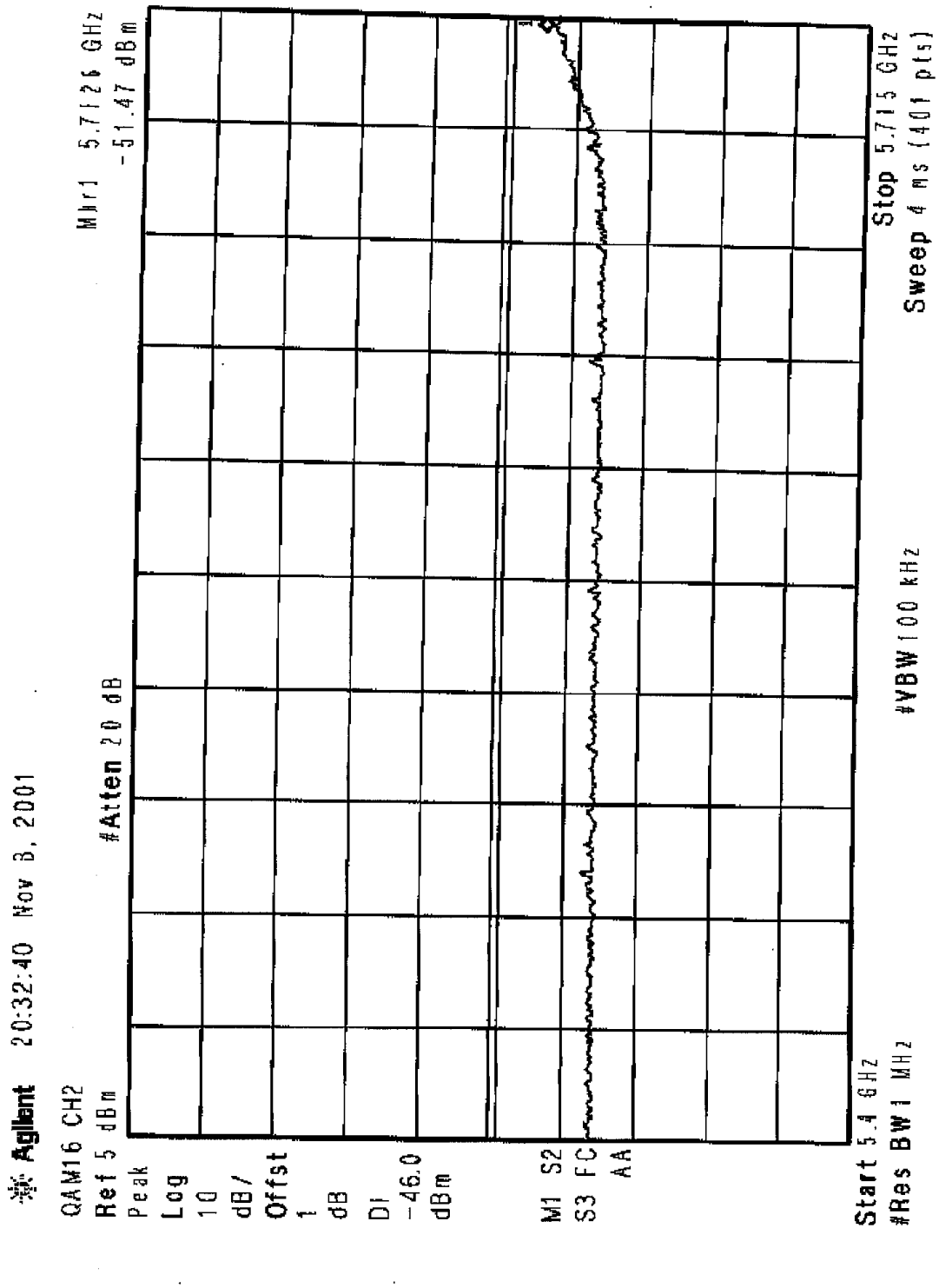
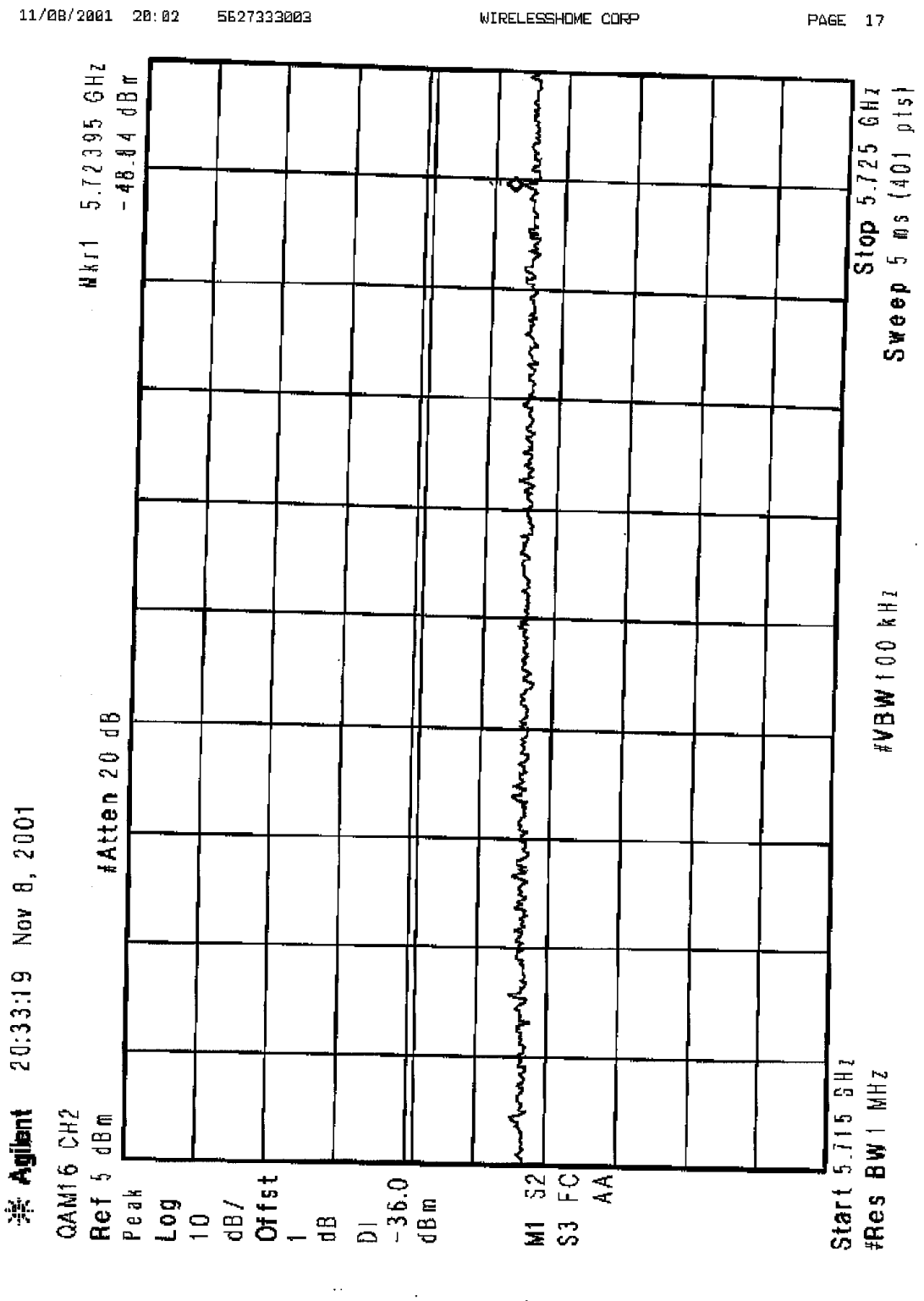

Agilent 20:41:58 Nov 8, 2001
QAM3 CH2
Ref 5 dBm
#Atten 20 dB
Peak
Log
10
dB/
Offst
1
dB
D1
-46.0
dBm
Mkr1 5.7150 GHz
-50.98 dBm
M1 S2
S3 FC
AA
Start 5.4 GHz
#Res BW 1 MHz
#VBW 100 kHz
Stop 5.715 GHz
Sweep 4 ms (401 pts)


Agilent 20:41:14 Nov 8, 2001
QAMB CH2
Ref 5 dBm
Peak
Log
10
dB/
Offst
1
dB
Dl
-36.0
dBm
#Atten 20 dB
Mkr1 5.72273 GHz
-49.26 dBm
M1 S2
S3 FC
AA
#VBW 100 kHz
Start 5.715 GHz
#Res BW 1 MHz
Stop 5.725 GHz
Sweep 5 ms (401 pts)


Agilent 20:42:33 Nov 8, 2001
QAM8 CH2
Ref 5 dBm
#Atten 20 dB
Peak
Log
10
dB/
Offst
1
dB
Dl
-36.0
dBm
Mkr1 5.82685 GHz
-47.96 dBm
M1 S2
S3 FC
AA
Start 5.825 GHz
#Res BW 1 MHz
#VBW 100 kHz
Stop 5.835 GHz
Sweep 5 ms (401 pts)


Agilent 20:43:07 Nov 8, 2001
QAM8 Ch2
Ref 5 dBm
Peak
Log
10
dB/
Offst
1
dB
D1
-46.0
dBm
#Atten 20 dB
Mkr1 5.8041 GHz
-47.37 dBm
M1 S2
S3 FC
AA
#VBW 100 kHz
Stop 6 GHz
Sweep 4 ms (401 pts)
Start 5.825 GHz
#Res BW 1 MHz


Agilent 20:32:40 Nov 3, 2001
QAM16 CH2
Ref 5 dBm
Peak
Log
10
dB/
Offst
1
dB
D1
-46.0
dBm
#Atten 20 dB
Mkr1 5.7126 GHz
-51.47 dBm
M1 S2
S3 FC
AA
#VBW 100 kHz
Start 5.4 GHz
#Res BW 1 MHz
Stop 5.715 GHz
Sweep 4 ms (401 pts)



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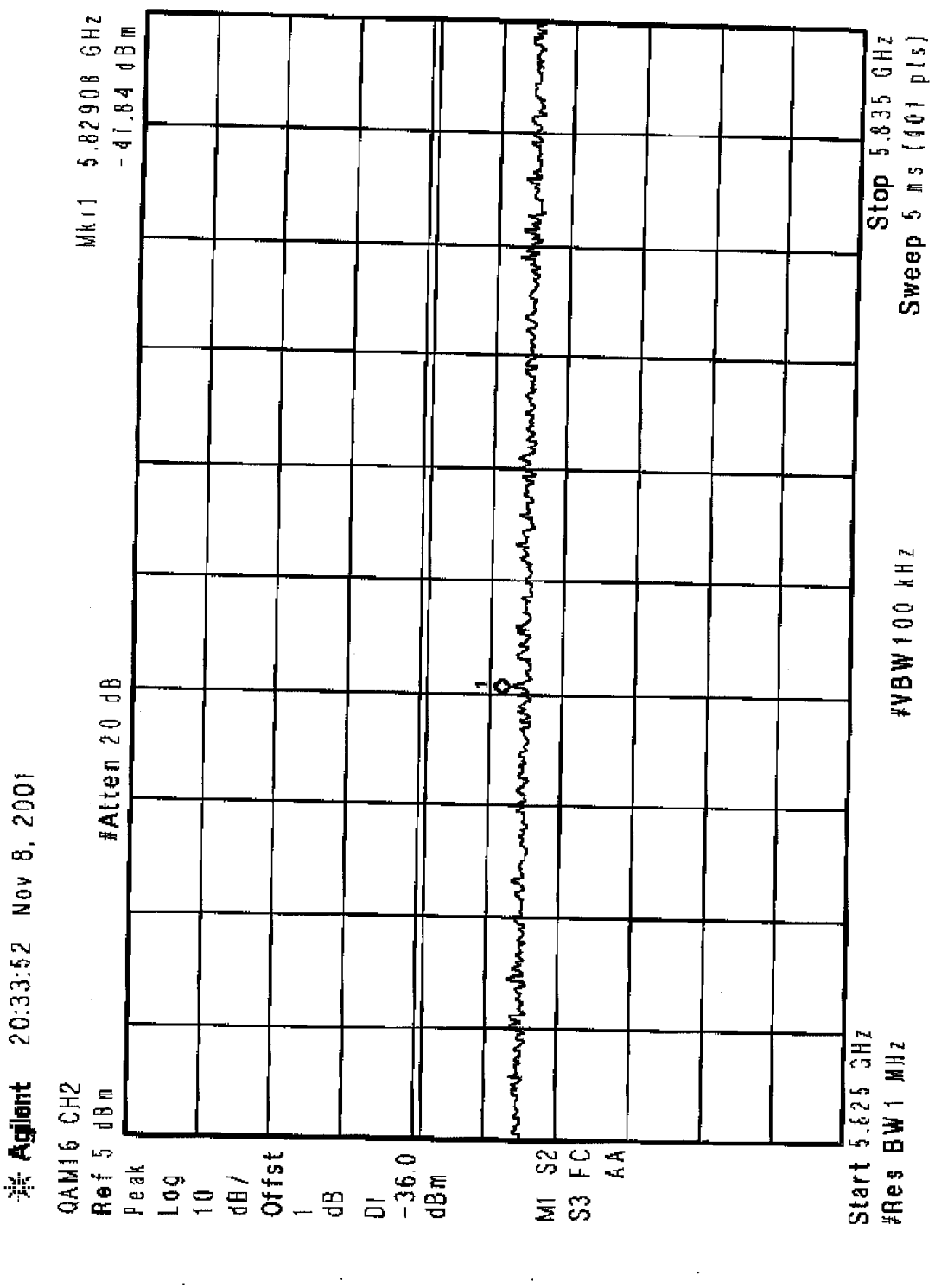
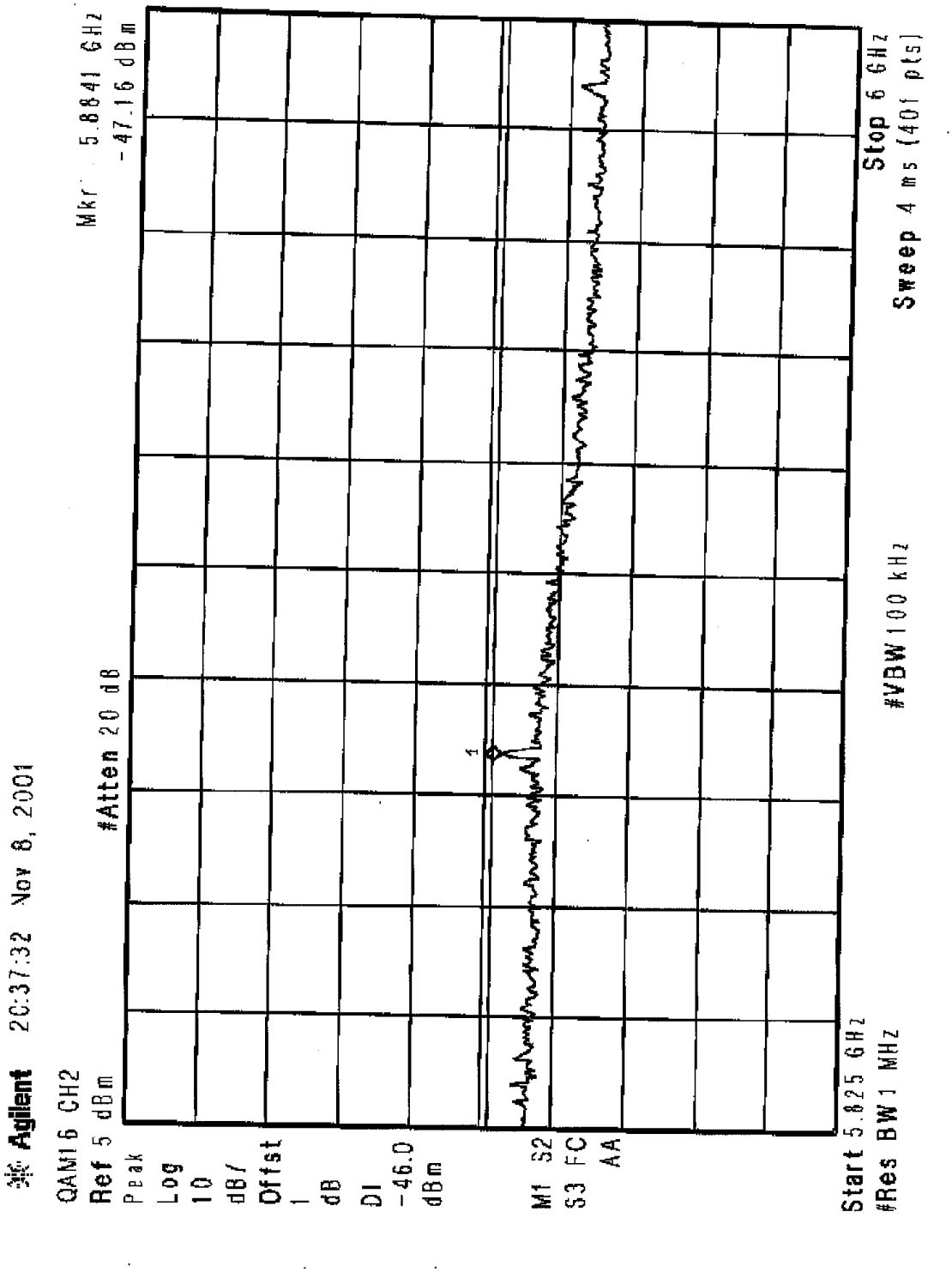
11/08/2001 20:02 5627333003 WIRELESSHOME CORP PAGE 18

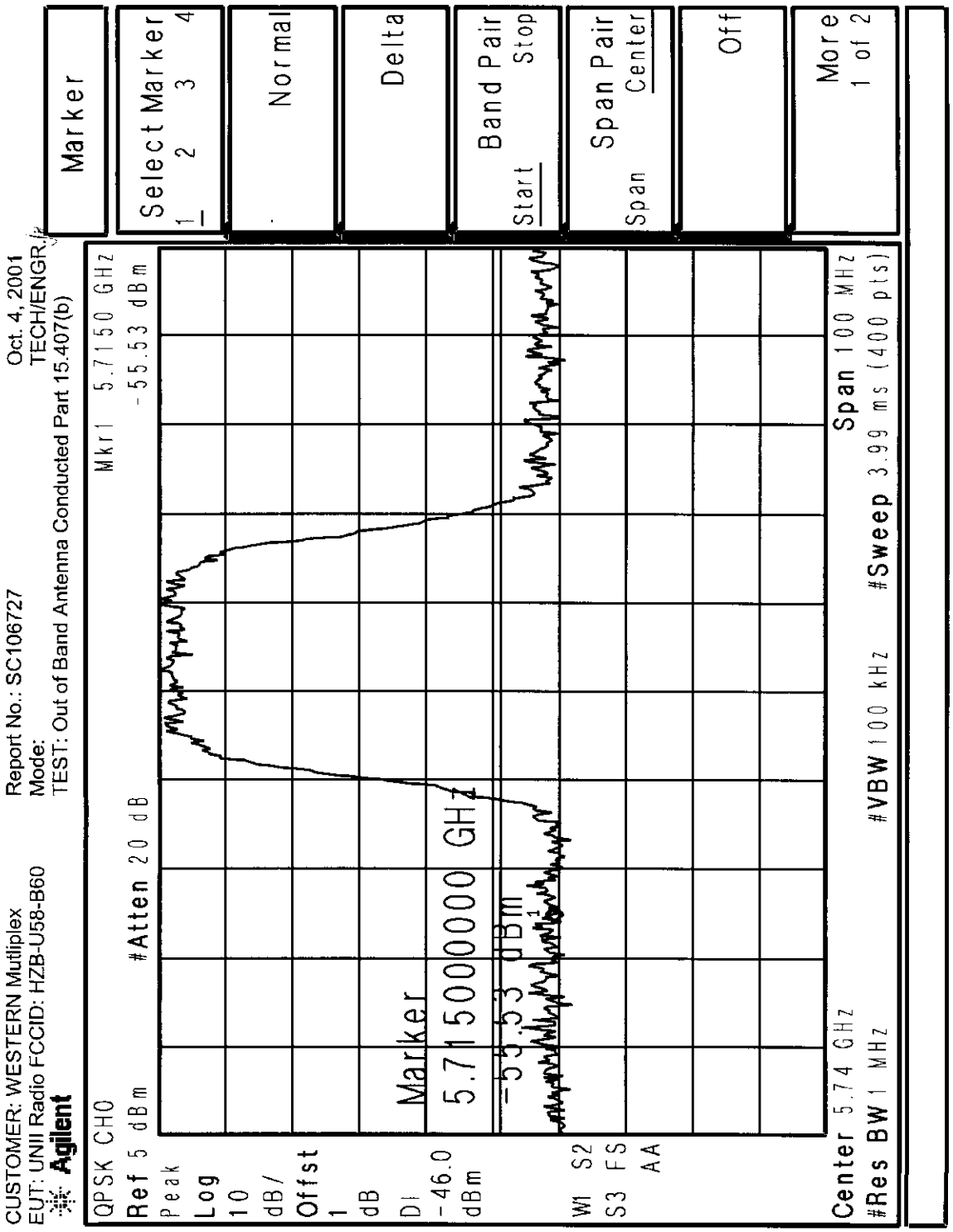


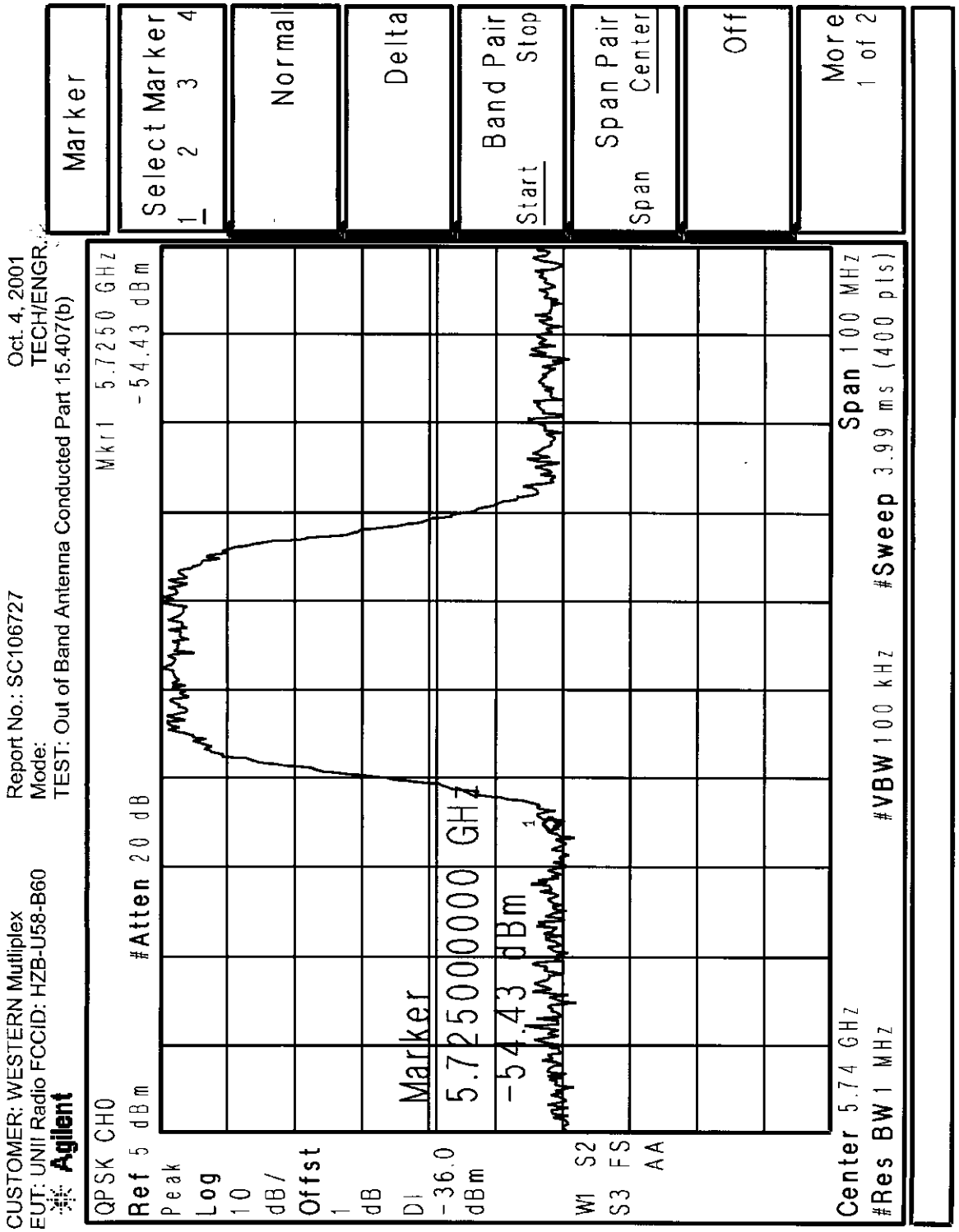

Agilent 20:37:32 Nov 8, 2001
QAM16 CH2
Ref 5 dBm
Peak
Log
10
dB/
Offst
1
dB
D1
-46.0
dBm
#Atten 20 dB
Mkr 5.8841 GHz
-47.16 dBm
M1 S2
S3 FC
AA
Start 5.825 GHz
#Res BW 1 MHz
#VBW 100 kHz
Stop 6 GHz
Sweep 4 ms (401 pts)

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 Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Out of Band Antenna Conducted Part 15.407(b)
Oct. 4, 2001
TECH/ENGR.
QPSK CH0
Ref 5 dBm
#Atten 20 dB
Mkr1 5.7150 GHz
-55.53 dBm
Peak
Log
10
dB/
Offst
1
dB
D1
-46.0
dBm
Marker
5.715000000 GHz
-59.53 dBm
W1 S2
S3 FS
AA
Center 5.74 GHz
#Res BW 1 MHz
#VBW 100 kHz
#Sweep 3.99 ms (400 pts)
Span 100 MHz
Marker
Select Marker
1 2 3 4
Normal
Delta
Band Pair
Start
Stop
Span Pair
Span
Center
Off
More
1 of 2



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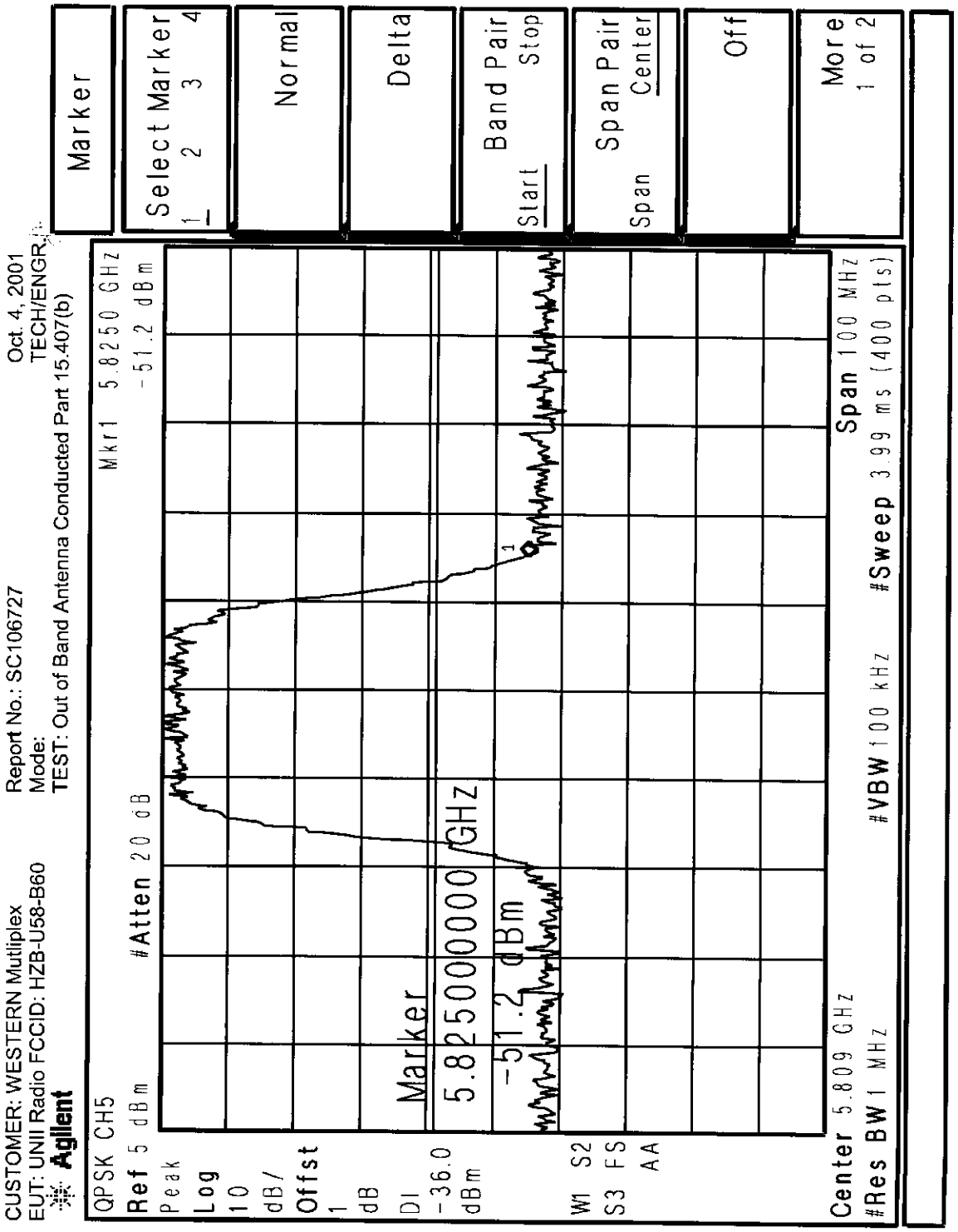
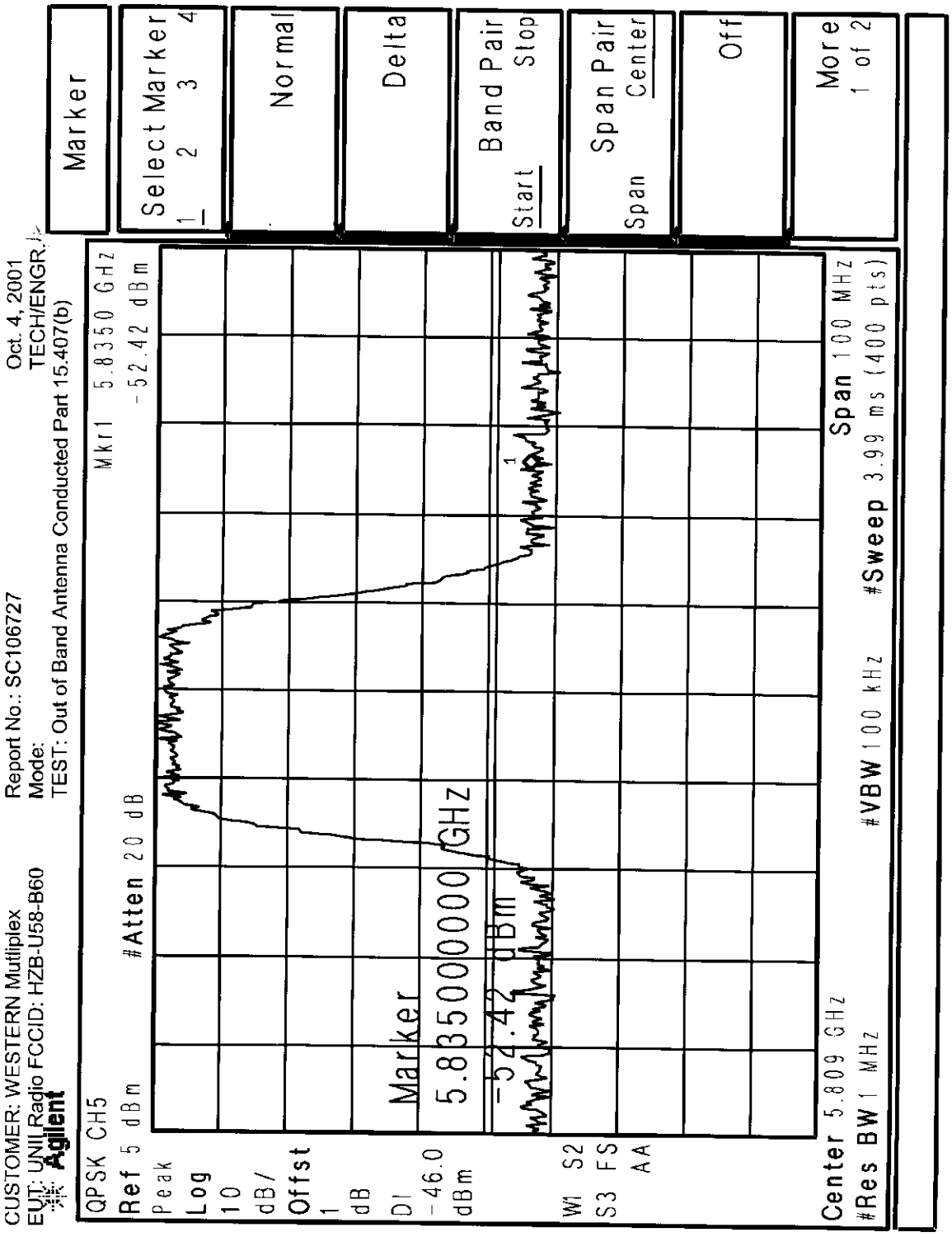
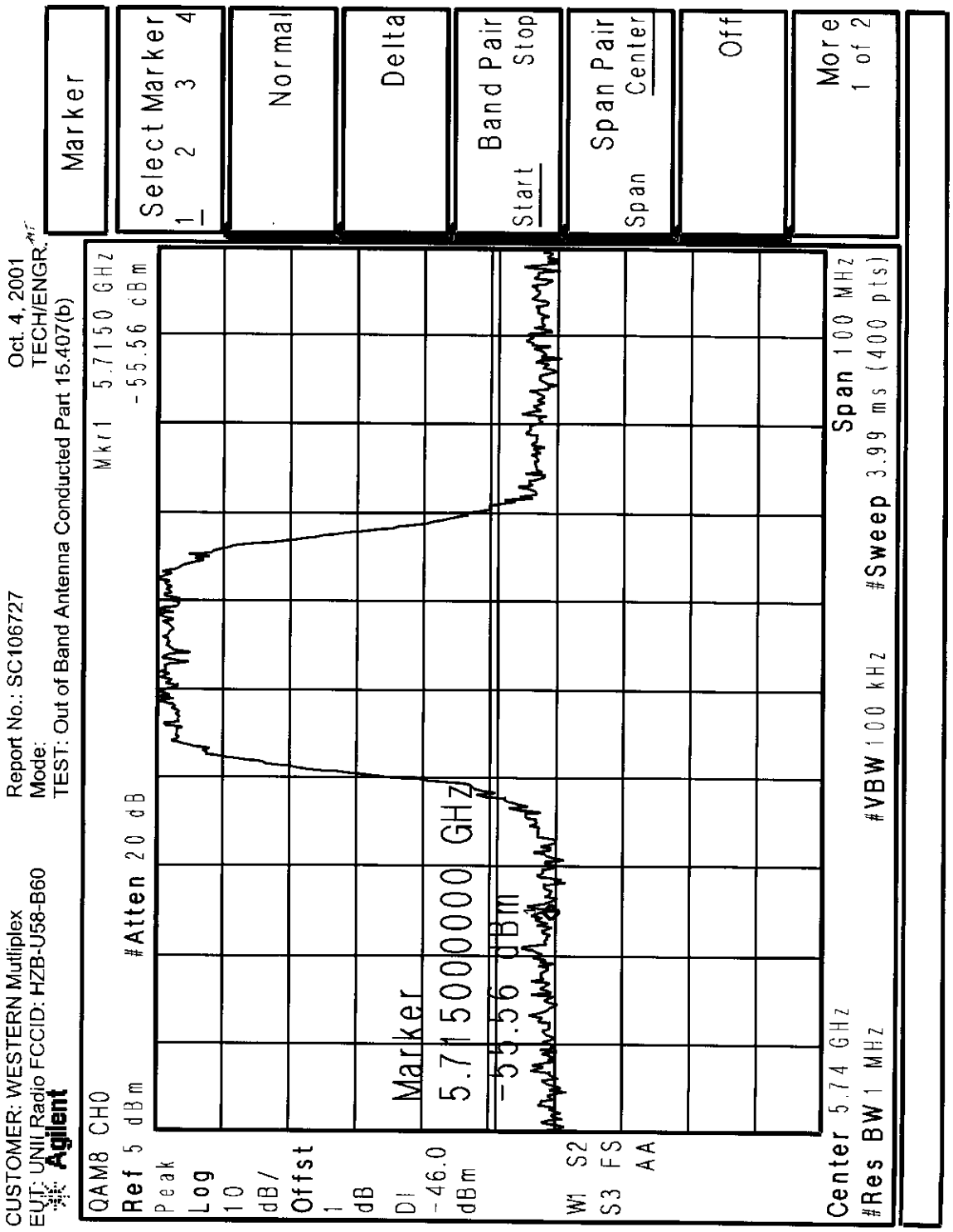

CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
Oct. 4, 2001
TECH/ENGR:
TEST: Out of Band Antenna Conducted Part 15.407(b)
Marker
Select Marker
1 2 3 4
Normal
Delta
Band Pair
Start Stop
Span Pair
Span Center
Off
More
1 of 2
QPSK CH5
Ref 5 dBm
Peak
Log
10
dB/
Offst
1
dB
#Atten 20 dB
Mkr1 5.8250 GHz
-51.2 dBm
Marker
5.825000000 GHz
-51.2 dBm
Center 5.809 GHz
#Res BW 1 MHz
#VBW 100 kHz
Span 100 MHz
#Sweep 3.99 ms (400 pts)


CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Out of Band Antenna Conducted Part 15.407(b)
Oct. 4, 2001
TECH/ENGR:
QPSK CH5
Ref 5 dBm
#Atten 20 dB
Mkr1 5.8350 GHz
-52.42 dBm
Peak
Log
10
dB/
Offst
1
dB
D1
-46.0
dBm
Marker
5.835000000 GHz
-52.42 dBm
W1 S2
S3 FS
AA
Center 5.809 GHz
#Res BW 1 MHz
#VBW 100 kHz
#Sweep 3.99 ms (400 pts)
Span 100 MHz
Marker
Select Marker
1 2 3 4
Normal
Delta
Band Pair
Start
Stop
Span Pair
Span
Center
Off
More
1 of 2



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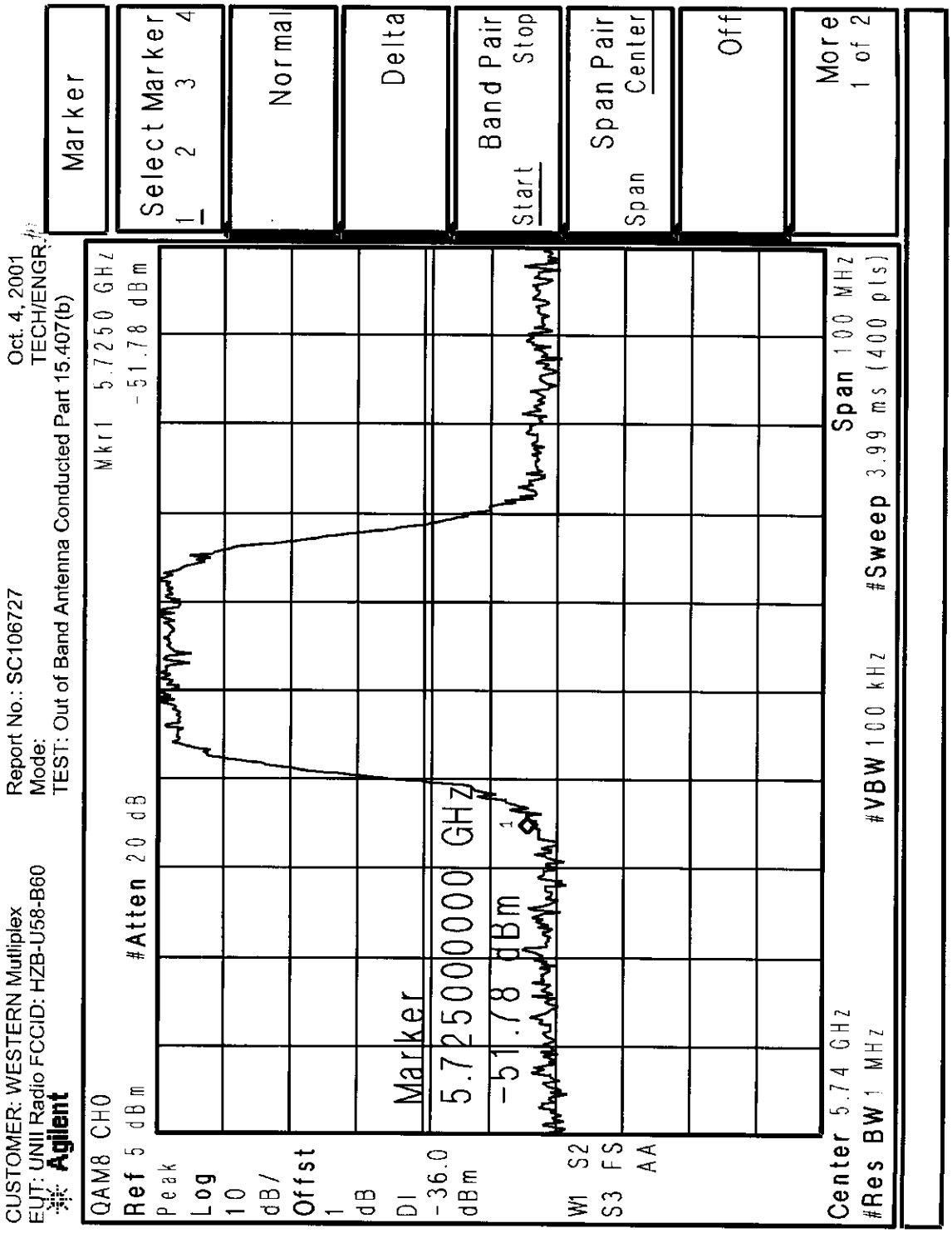
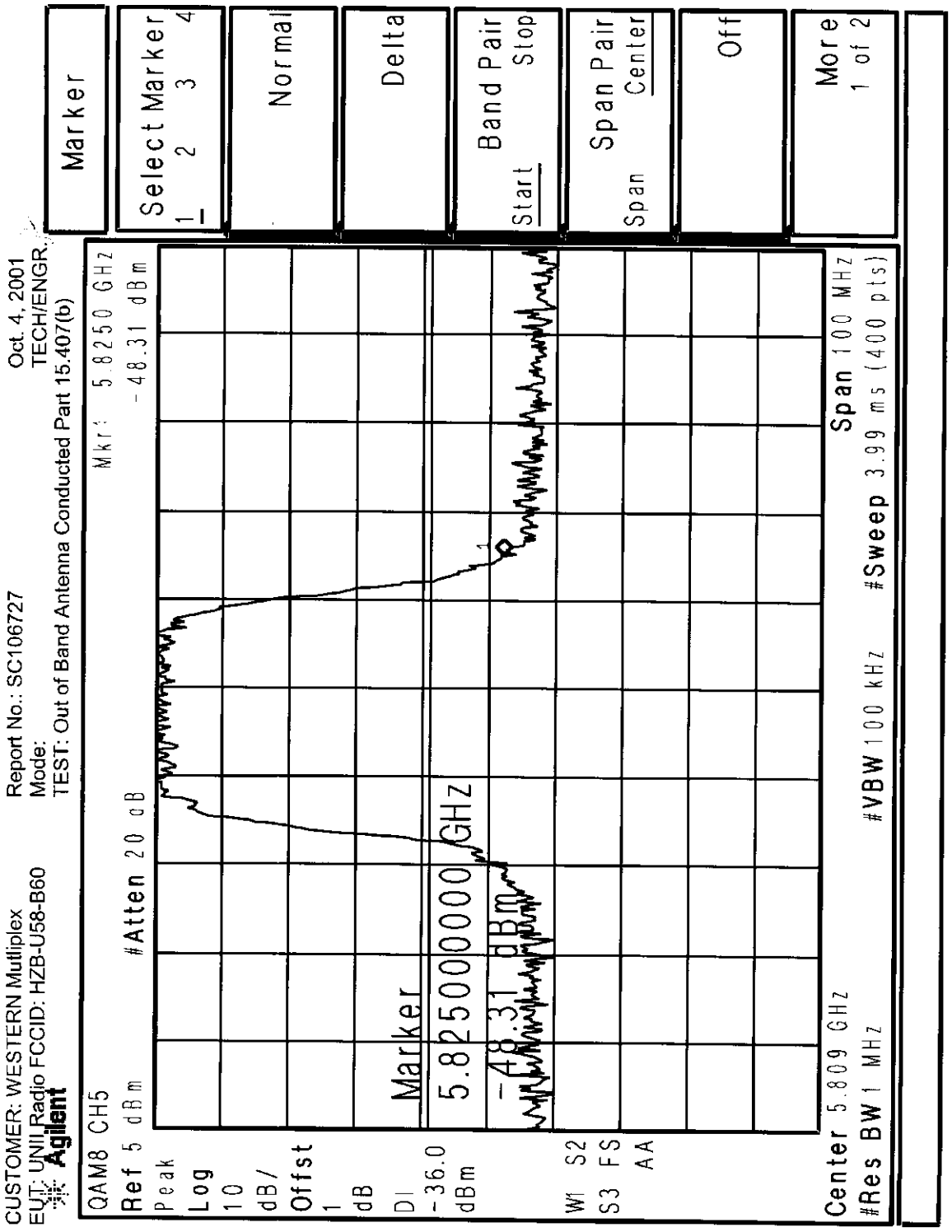

CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Out of Band Antenna Conducted Part 15.407(b)
Oct. 4, 2001
TECH/ENGR:
QAM8 CH0
Ref 5 dBm
#Atten 20 dB
Mkr1 5.7250 GHz
-51.78 dBm
Peak
Log
10
dB/
Offst
1
dB
Marker
5.725000000 GHz
-51.78 dBm
-36.0
dBm
Center 5.74 GHz
#Res BW 1 MHz
#VBW 100 kHz
Span 100 MHz
#Sweep 3.99 ms (400 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Band Pair
Start
Stop
Span Pair
Span
Center
Off
More
1 of 2



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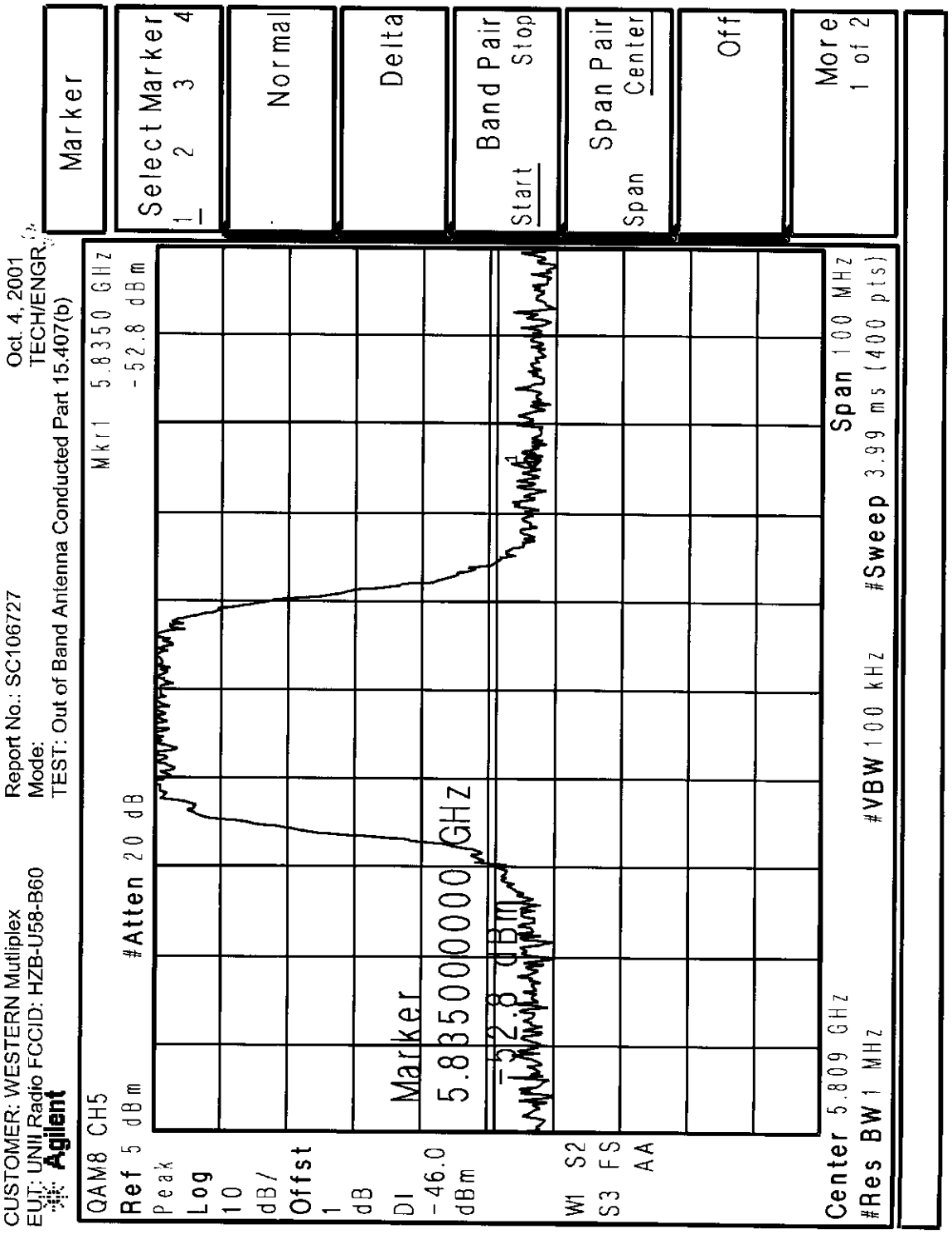




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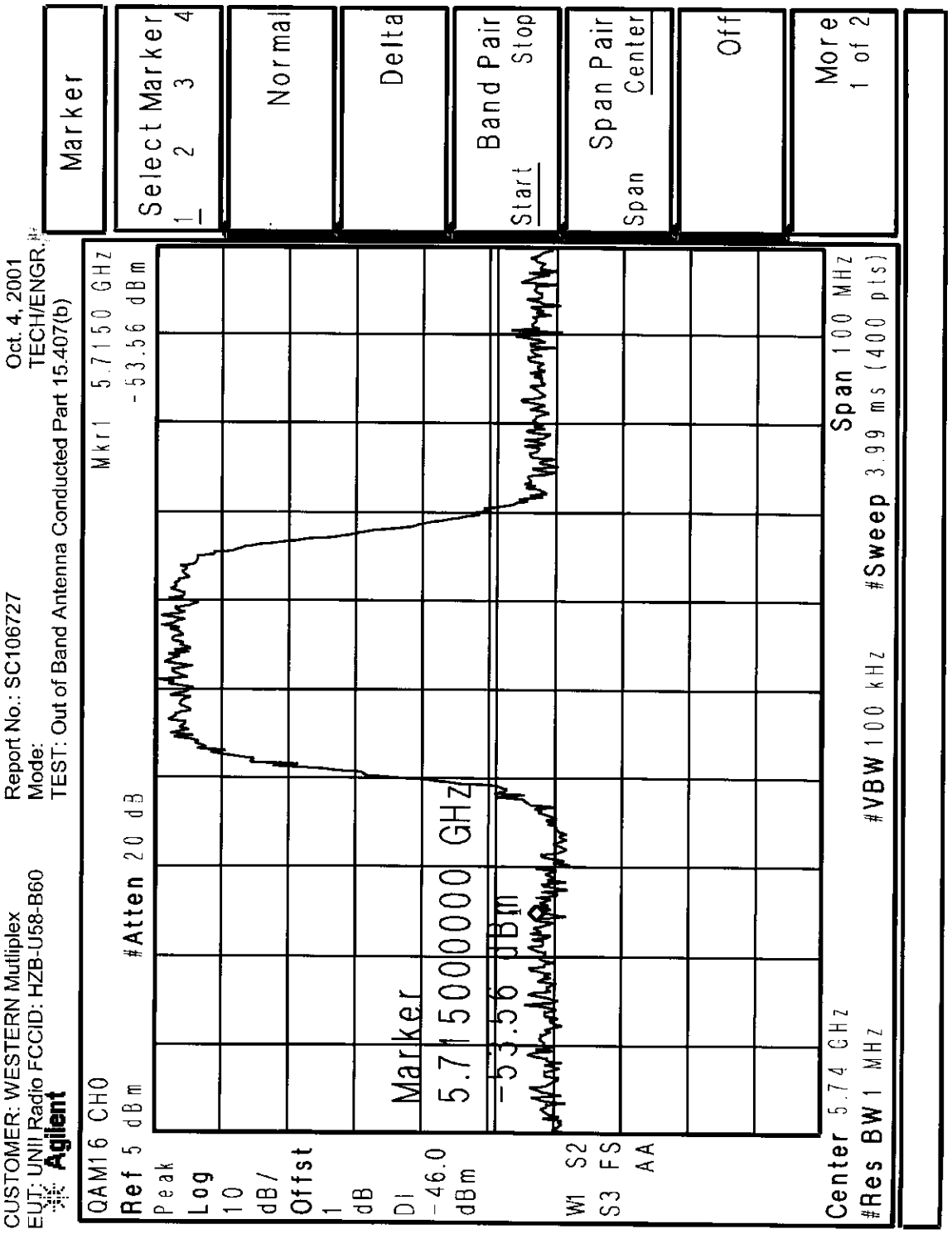




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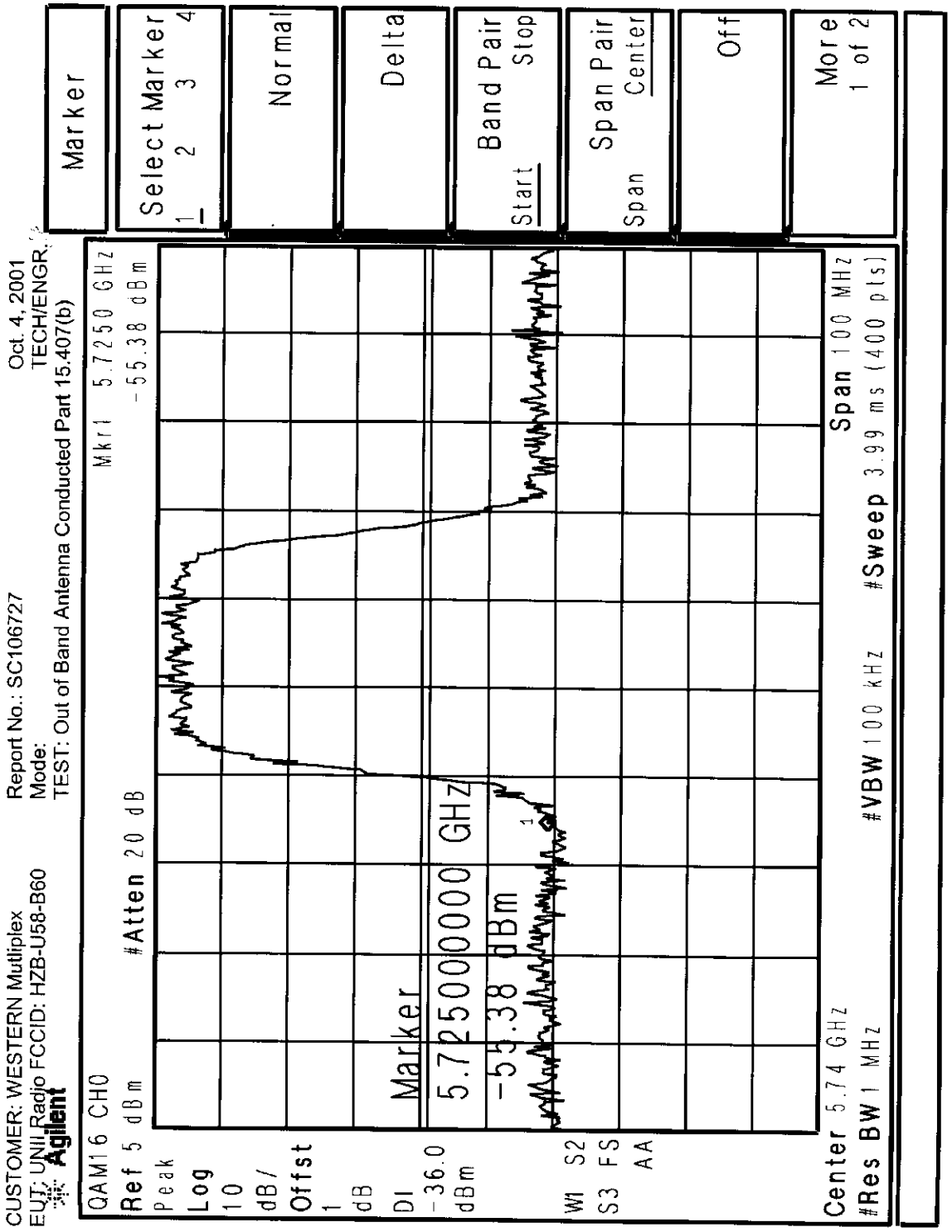
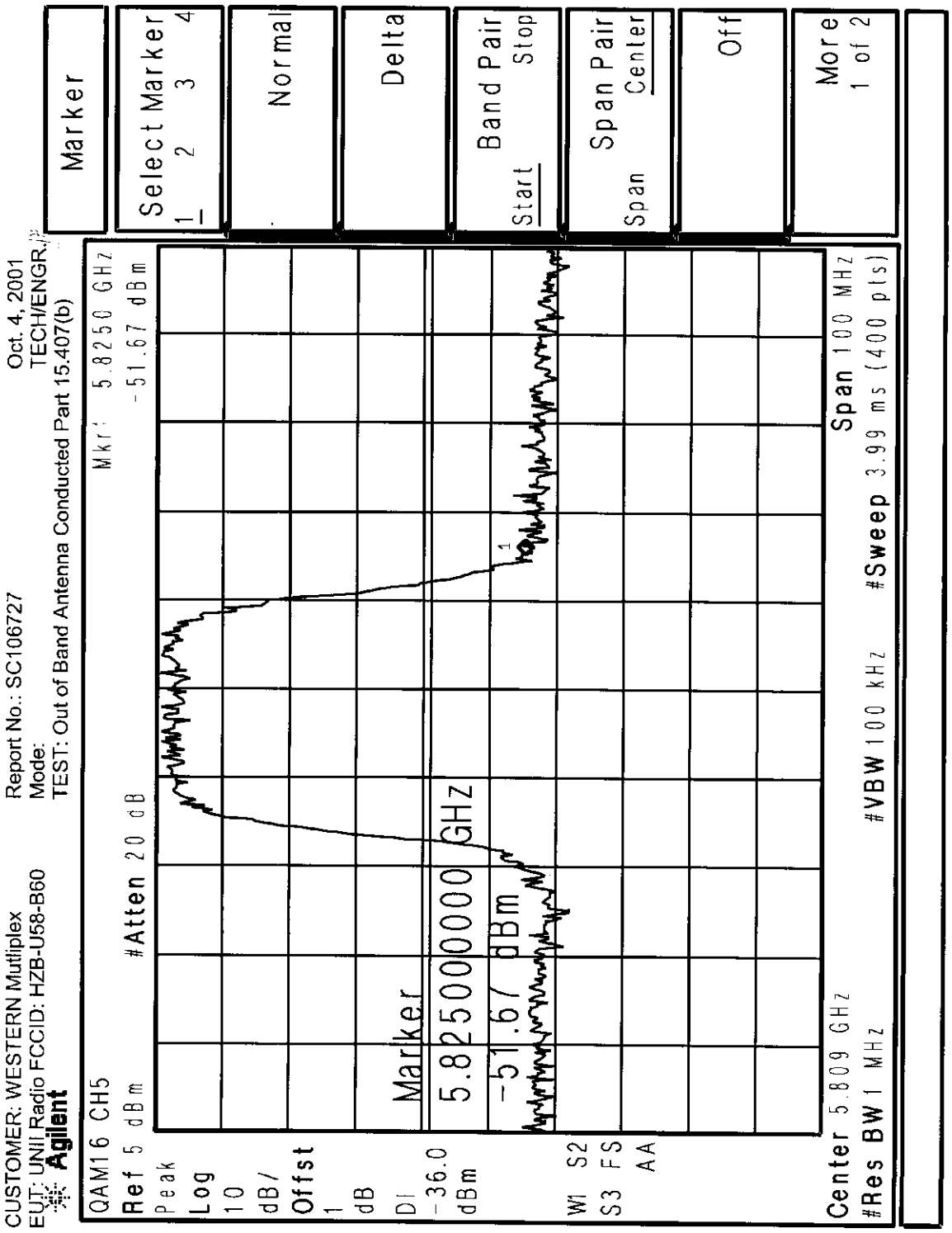
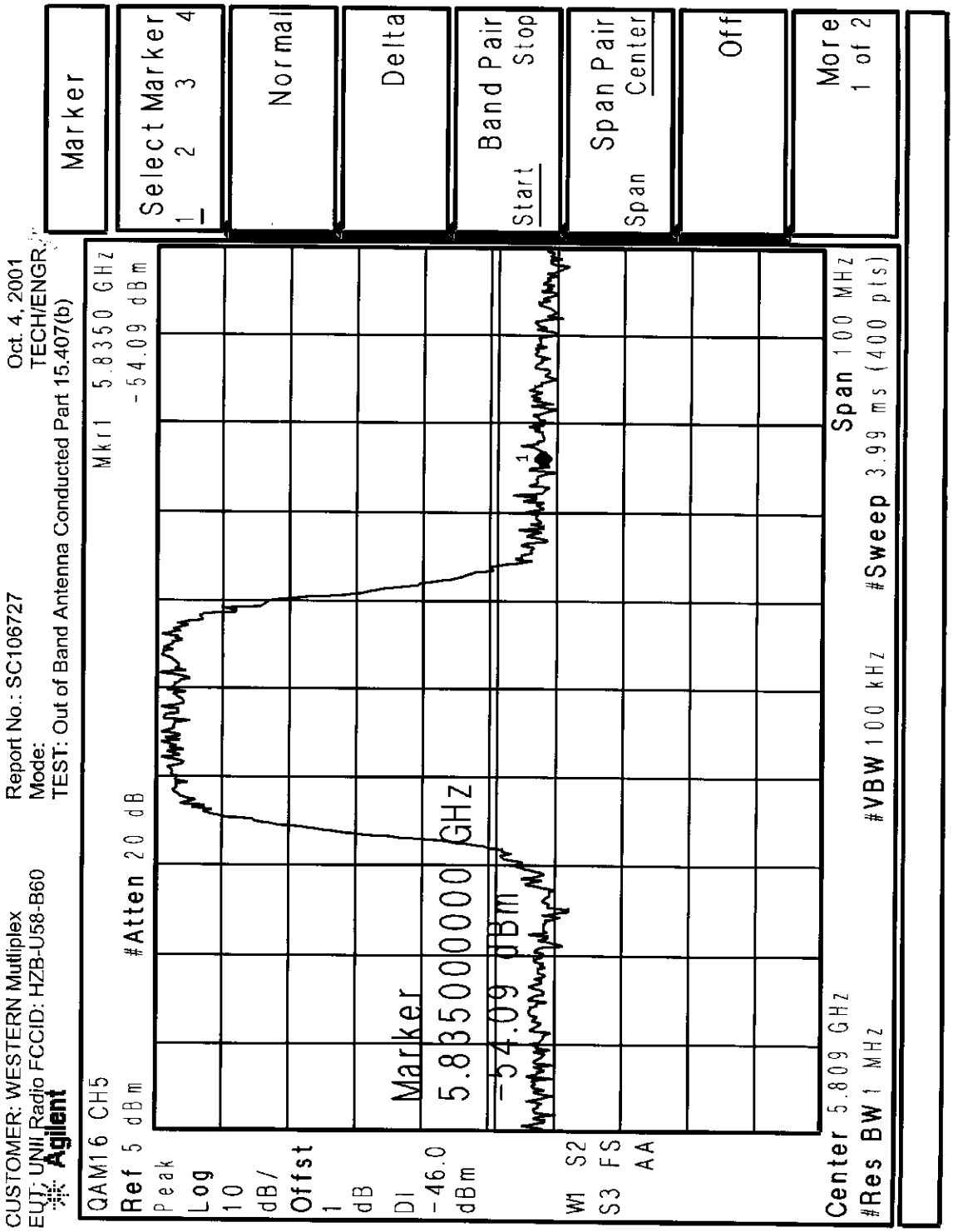

CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Out of Band Antenna Conducted Part 15.407(b)
Oct. 4, 2001
TECH/ENGR.
QAM16 CH0
Ref 5 dBm
#Atten 20 dB
Mkr1 5.7250 GHz
-55.38 dBm
Peak
Log
10
dB/
Offst
1
dB
D1
-36.0
dBm
Marker
5.725000000 GHz
-55.38 dBm
W1 S2
S3 FS
AA
Center 5.74 GHz
#Res BW 1 MHz
#VBW 100 kHz
#Sweep 3.99 ms (400 pts)
Span 100 MHz
Marker
Select Marker
1 2 3 4
Normal
Delta
Band Pair
Start
Stop
Span Pair
Span
Center
Off
More
1 of 2


CUSTOMER: WESTERN Mutliplex
EUT: UNII Radio FCCID: HZB-U58-B60
Agilent
Report No.: SC106727
Mode:
TEST: Out of Band Antenna Conducted Part 15.407(b)
Oct. 4, 2001
TECH/ENGR.:
QAM16 CH5
Ref 5 dBm
#Atten 20 dB
Mkr1 5.8250 GHz
-51.67 dBm
Peak
Log
10
dB/
Offst
1
dB
Marker
5.825000000 GHz
-51.67 dBm
-36.0
dBm
W1 S2
S3 FS
AA
Center 5.809 GHz
#Res BW 1 MHz
#VBW 100 kHz
#Sweep 3.99 ms (400 pts)
Span 100 MHz
Marker
Select Marker
1 2 3 4
Normal
Delta
Band Pair
Start
Stop
Span Pair
Span
Center
Off
More
1 of 2



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REPORT No: SC106727 TESTER: Dave Bernardin SPEC: FCC 15.209&a)//15.205

CUSTOMER: Viasam Multiplex TEST DIST: 3 Meters

E.U.T: UNII Radio FCC ID: HZB-U58-850 TEST SITE: Roof

EUT MODE: Normal Operation/Transmit ENVIRONM.: N/A

DATE: Oct. 04,2001 LOC: N/A

NOTES: Duty Cycle= 100% OTHER: 0

Above 1GHz: RBW & VBW = 1 MHz for Pk; RBW 1MHz and VBW 10Hz for AVG

Below 1GHz: RBW & VBW 100 kHz for Pk; RBW 100kHz and VBW 10kHz for AVG

CF = Antenna Factor + Cable Loss - Preamplifier Gain

Version 8.3

| FREQ (MHz) | VERT (dBuV) pk | VERT (dBuV) av | HORIZ (dBuV) pk | HORIZ (dBuV) av | CF (dB/m) | MAX LEVEL (dBuV/m) pk | MAX LEVEL (dBuV/m) av | SPEC LIMIT (dBuV/m) pk | SPEC LIMIT (dBuV/m) av | MARGIN (dB) pk | MARGIN (dB) av | EUT Rotation | Antenna Height | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11490.8 | 43.3 | 31.2 | 42.1 | 31.1 | 15.6 | 58.9 | 46.8 | 74 | 54 | -15.1 | -7.21 | 0 | 1.5 | 8QAM Ch 0, 6A |
| 11538.14 | 42.3 | 31.2 | 43.4 | 31.2 | 15.5 | 58.9 | 46.7 | 74 | 54 | -15.1 | -7.26 | 0 | 1.2 | 16QAM Ch 0, 6A |
| 11612.14 | 42.6 | 30.7 | 43.1 | 30.8 | 15.4 | 58.5 | 46.1 | 74 | 54 | -15.5 | -7.88 | 0 | 1 | QPSK 3M Ch 0, 6A |
| 11490.8 | 44.1 | 31.2 | 42.5 | 31.1 | 15.6 | 59.7 | 46.8 | 74 | 54 | -14.3 | -7.21 | 0 | 1.5 | 8QAM Ch 2, 6C |
| 11538.14 | 42.4 | 31.1 | 43.8 | 31.2 | 15.5 | 59.1 | 46.7 | 74 | 54 | -15.9 | -7.26 | 0 | 1.2 | 16QAM Ch 2, 6C |
| 11612.14 | 42.6 | 30.7 | 43 | 30.8 | 15.4 | 58.4 | 46.1 | 74 | 54 | -15.6 | -7.88 | 0 | 1 | QPSK 3M Ch 2, 6C |
| 11490.8 | 40.8 | 31.1 | 41.5 | 31.1 | 15.6 | 57.1 | 46.7 | 74 | 54 | -16.9 | -7.31 | 0 | 1.5 | 8QAM Ch 5, 6F |
| 11538.14 | 42.3 | 31.2 | 42.3 | 31.1 | 15.5 | 57.8 | 46.7 | 74 | 54 | -16.2 | -7.26 | 0 | 1.2 | 16QAM Ch 5, 6F |
| 11612.14 | 42.1 | 30.6 | 42.5 | 30.7 | 15.4 | 57.7 | 46.1 | 74 | 54 | -16.3 | -7.88 | 0 | 1 | QPSK 3M Ch 5, 6F |

8QAM Ch 0 Ch 2 Ch 5

16QAM Ch 0 Ch 2 Ch 5

QPSK Ch 0 Ch 2 Ch 5



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

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

Test Method FCC15.205(b) Restricted bands of operaton

EUT Model #: UNII Radio EUT POWER: 115 Vac/60 Hz

Temperature 23 C
Air Pressure: 100.1 kPa
Relative Humidity: 48 %

EUT Description FCC ID: HZB-U58-B60

NOTES: Mode: Receive/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) pk | VERTICAL (dBuv) av | HORIZONTAL (dBuv) pk | HORIZONTAL (dBuv) av | CORRECTION FACTOR (dB/m) | MAX LEVEL (dBuV/m) pk | MAX LEVEL (dBuV/m) av | SPEC LIMIT (dBuV/m) pk | SPEC LIMIT (dBuV/m) av | MARGIN (dB) pk | MARGIN (dB) av | EUT Rotation | Antenna Height | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
|---|---|---|---|---|---|
| hp8586B | 407 | Spectrum Analyzer | Hewlett Packard | 2311A02209 | 2/15/02 |
| hp11975A | 719 | Amplifier | Hewlett Packard | 2517A00639 | not req'r. |
| hp11970K | 652 | Mixer | Hewlett Packard | 3003A05400 | not req'r. |
| 12A18 115300 | 0006377 | Horn Antenna 18-26 GHz | MI Technologies | 21554MB | not req'r. |

Tested Dave Bernardin

Signature

Reviewed by: Alan Laudani

Signature

Test setup for Output Power




TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

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.




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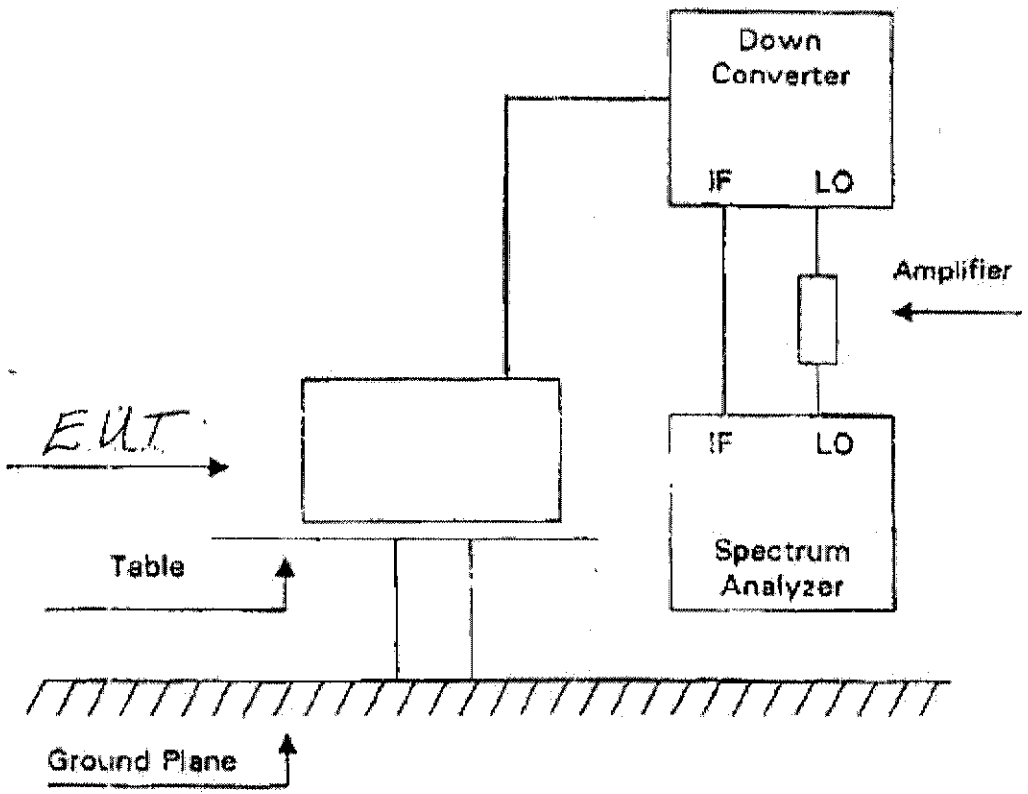
Test setup for Out of Band Antenna Conducted Emission.



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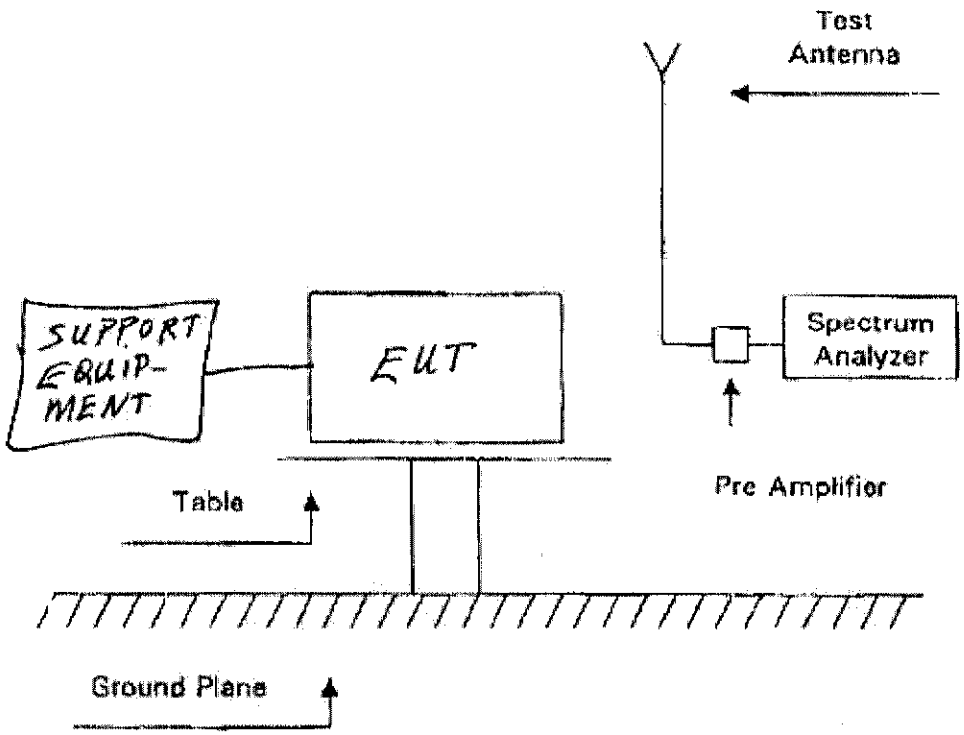
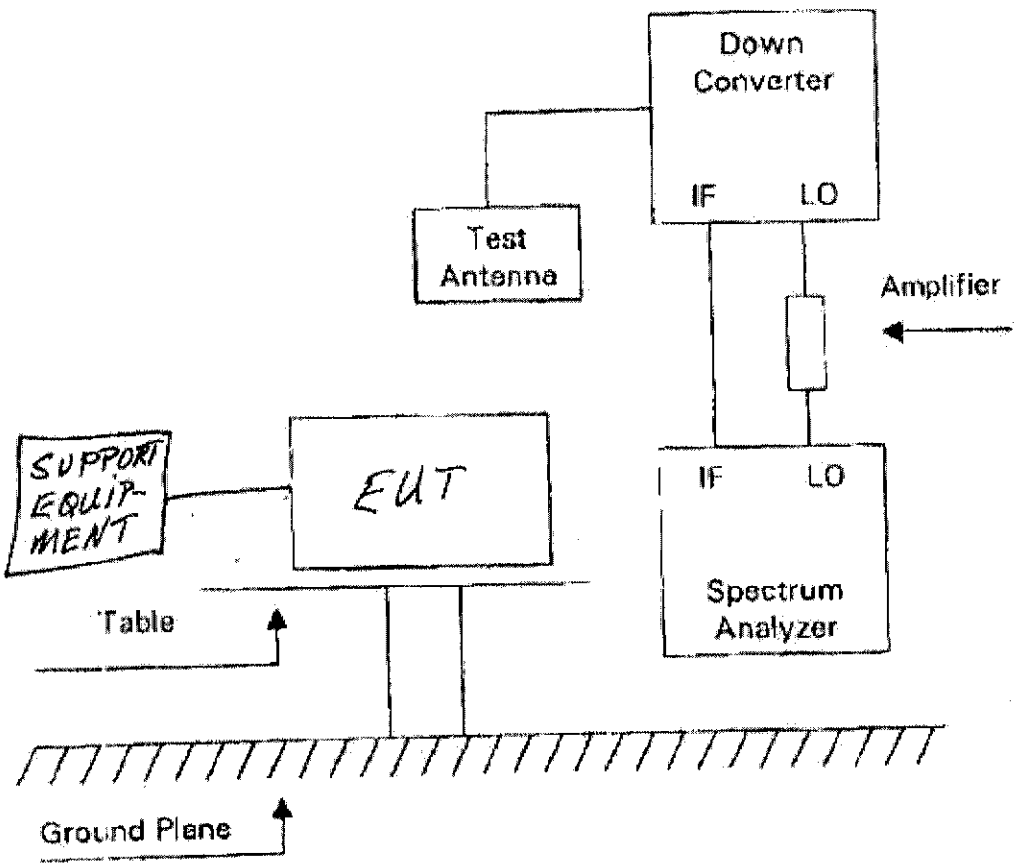
Test setup for Radiated Emission in Restricted Bands and Radiated Emission from Reciver L.O.






TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

Test setup for Radiated Emission in Restricted Bands



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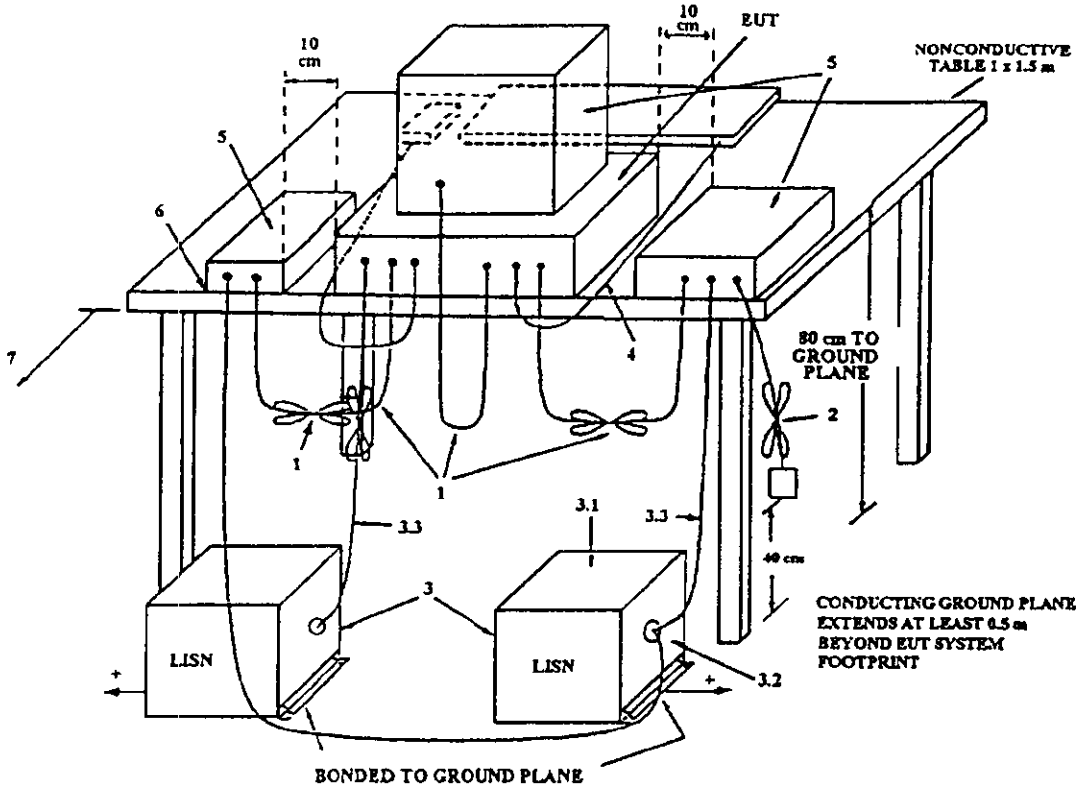
Conducted Emissions Test Setup, 0.15 to 30 MHz

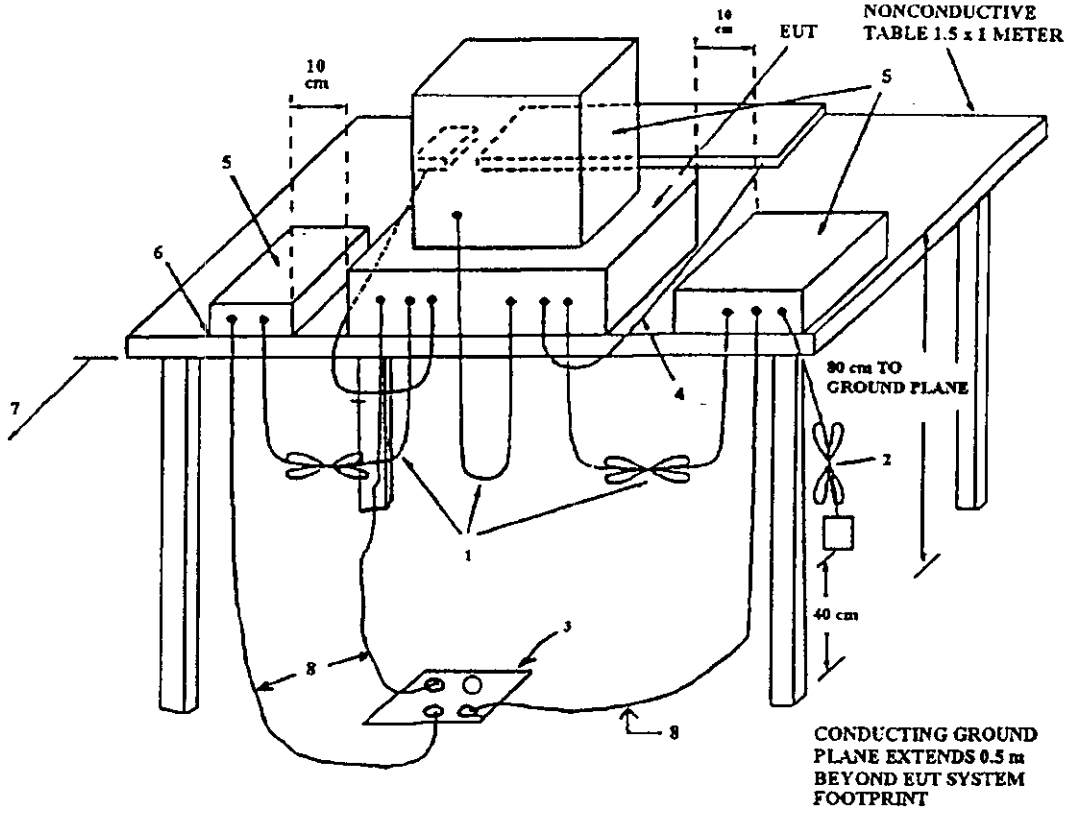
ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9 kHz to 40 GHz




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. EUT connected to one LISN. Unused LISN connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, ground plane.
   - 3.1 All other equipment powered from second LISN.
   - 3.2 Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
   - 3.3 LISN at least 80 cm from nearest part of EUT chassis.
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 being tested.
6. Rear of EUT, including peripherals, shall be all aligned and flush with rear of tabletop.
7. Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the floor ground plane.

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.



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