TEST REPORT

0.0 **Summary of Test Results**

X Wire - MODEL: XT905H
FCC ID: NH491699MX95

TEST	REFERENCE	RESULTS
Radiated Emission	15.249	Complies
Conducted Emission	15.207	Complies
Antenna Requirement	15.203	Complies

Test Engineer: Ollie Moyrong Date: May 30, 98

Team Leader: David Chernomordik Date: 5/30/98
David Chernomordik

1.0 General Description

1.1 Product Description

The XT905 transmiter takes an analog audio input from a musical instrument through a 1/4" input jack. The signal is then converted to digital information and put into an information packet via an FPGA device controlled by a microprocessor. The data is then transmitted on a carrier frequency in the 902-928 MHz ISM band using FSK. The transmission baud rate is 1.3 MHz and the 5 different transmission frequencies are 905, 910, 915, 920, and 925 MHz maximum RF output power is .5 mW.

1.2 Related Submittal(s) Grants

This is an Application for Certification of a low power transmitter. One transmitter is included in this Application. This specific report details the emission characteristics of transmitter.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is Site 1. This test facility and site measurement data have been fully placed on file with the FCC and NVLAP accredited.

2.0 System Test Configuration

2.1 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions.

For the measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power without modulation.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Detector function is in peak mode. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

2.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

2.3 System Test Configuration

2.3.1 Support Equipment

Not applicable, the unit under test is a stand alone device.

2.3.2 Block Diagram of Test Set up

Not applicable, the unit under test is a stand alone unit.

2.4 Equipment Modification

Any modifications installed previous to testing by X Wire will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services.

2.5 Additions, deviations and exclusions from standards

No additions, deviations or exclusion have been made from standard.

3.0 Emission Results

AC line conducted emission measurements were performed from 0.45 MH to 30 MHz. Analyzer resolution is 10 kHz or greater.

Radiated emission measurements were performed from 30 MHz to 5000 MHz. Analyzer resolution is 100 kHz or greater for 30 MHz to 1000 MHz, 1 MHz for >1000 MHz.

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV)
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB/m
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:-

FS = RR + LF

where FS = Field Strength in dB(μV/m)
RR = RA - AG in dB(μV)
LF = CF + AF in dB

Assume a receiver reading of 52.0 dB(μV) is obtained. The antenna factor of 7.4 dB/m and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB(μV/m). This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dB(μV) AF = 7.4 dB/m
RR = 23.0 dB(μV) CF = 1.6 dB
LF = 9.0 dB AG = 29.0 dB

FS = RR + LF
FS = 23 + 9 = 32 dB(μV/m)

Level in μV/m = Common Antilogarithm {[32 dB(μV/m)]/20} = 39.8 μV/m

3.3 Radiated Emission Data

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Results:	**Passed** by 1.1 dB at 905 MHz

Note: a) All emissions not reported are at least 20 dB below the limits

INTERTEK TESTING SERVICES

Company:	X Wire	Project #:	J98009272
EUT:	Hand Held Wireless Microphone	Date of Test:	4/15/98
Model:	XT905H	Test Site #:	1
Test Mode:	Tx @ 905 MHz	Engineer:	Ollie Moyrong

FCC Part 15.249 Radiated Emissions

Detector QP/A/P	Frequency (MHz)	Antenna Location (m)	Antenna Polariz. (H=0/V=1)	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	
QP	905.0	3.0	0	69.1	23.3	0.0	0.0	0.5	92.9	94.0	-1.1	
A	1810.0	1.0	1	24.3	27.7	0.0	-9.5	2.3	44.8	54.0	-9.2	
P	1810.0	1.0	1	33.7	27.7	0.0	-9.5	2.3	54.2	74.0	-19.8	
A	2715.0	1.0	1	37.8	28.1	-28.5	-9.5	3.0	30.9	54.0	-23.1	
P	2715.0	1.0	1	48.4	28.1	-28.5	-9.5	3.0	41.5	74.0	-32.5	
A	3620.0	1.0	1	37.9	31.5	-28.1	-9.5	3.6	35.4	54.0	-18.6	
P	3620.0	1.0	1	47.5	31.5	-28.1	-9.5	3.6	45.0	74.0	-29.0	
A	4525.0	1.0	1	35.3	32.2	-27.6	-9.5	4.1	34.5	54.0	-19.5	
P	4525.0	1.0	1	44.0	32.2	-27.6	-9.5	4.1	43.2	74.0	-30.8	
A	5430.0	1.0	0	32.6	34.4	-27.8	-9.5	4.6	34.3	54.0	-19.7	
P	5430.0	1.0	0	42.7	34.4	-27.8	-9.5	4.6	44.4	74.0	-29.6	
A	6332.0	1.0	1	28.3	34.0	-28.2	-9.5	5.0	29.6	54.0	-24.4	
P	6332.0	1.0	1	37.2	34.0	-28.2	-9.5	5.0	38.5	74.0	-35.5	
A	7240.0	1.0	1	27.9	35.8	-28.5	-9.5	5.8	31.5	54.0	-22.5	
P	7240.0	1.0	1	37.7	35.8	-28.5	-9.5	5.8	41.3	74.0	-32.7	
A	8129.0	1.0	1	27.5	37.0	-29.1	-9.5	6.0	31.9	54.0	-22.1	*
P	8129.0	1.0	1	36.9	37.0	-29.1	-9.5	6.0	41.3	74.0	-32.7	*
A	9050.0	1.0	1	27.1	37.8	-29.5	-9.5	6.3	32.2	54.0	-21.8	*
P	9050.0	1.0	1	36.8	37.8	-29.5	-9.5	6.3	41.9	74.0	-32.1	*

Note: Negative signs (-) in the Margin column signify levels below the limit.
Readings proceeded with a '*' are noise floor readings.
All other readings are Peak measurements.

INTERTEK TESTING SERVICES

Company: X Wire
EUT: Hand Held Wireless Microphone
Model: XT905H
Test Mode: Tx @ 915 MHz

Project #: J98009272
Date of Test: 4/15/98
Test Site #: 1
Engineer: Ollie Moyrong

FCC Part 15.249 Radiated Emissions

Detector QP/A/P	Frequency (MHz)	Antenna Location (m)	Antenna Polariz. (H=0/V=1)	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	
QP	915.0	3.0	0	67.6	23.3	0.0	0.0	0.5	91.4	94.0	-2.6	
A	1830.0	1.0	1	25.3	27.7	0.0	-9.5	2.3	45.8	54.0	-8.2	
P	1830.0	1.0	1	34.8	27.7	0.0	-9.5	2.3	55.3	74.0	-18.7	
A	2745.0	1.0	1	39.5	28.1	-28.5	-9.5	3.0	32.6	54.0	-21.4	
P	2745.0	1.0	1	47.8	28.1	-28.5	-9.5	3.0	40.9	74.0	-33.1	
A	3660.0	1.0	1	45.5	31.5	-28.1	-9.5	3.6	43.0	54.0	-11.0	
P	3660.0	1.0	1	52.7	31.5	-28.1	-9.5	3.6	50.2	74.0	-23.8	
A	4575.0	1.0	1	34.3	32.2	-27.6	-9.5	4.1	33.5	54.0	-20.5	
P	4575.0	1.0	1	44.0	32.2	-27.6	-9.5	4.1	43.2	74.0	-30.8	
A	5490.0	1.0	1	31.8	34.4	-27.8	-9.5	4.6	33.5	54.0	-20.5	
P	5490.0	1.0	1	41.4	34.4	-27.8	-9.5	4.6	43.1	74.0	-30.9	
A	6405.0	1.0	1	29.9	34.0	-28.2	-9.5	5.0	31.2	54.0	-22.8	
P	6405.0	1.0	1	38.7	34.0	-28.2	-9.5	5.0	40.0	74.0	-34.0	
A	7320.0	1.0	1	29.7	35.8	-28.5	-9.5	5.8	33.3	54.0	-20.7	
P	7320.0	1.0	1	38.6	35.8	-28.5	-9.5	5.8	42.2	74.0	-31.8	
A	8235.0	1.0	1	27.2	37.0	-29.1	-9.5	6.0	31.6	54.0	-22.4	*
P	8235.0	1.0	1	36.4	37.0	-29.1	-9.5	6.0	40.8	74.0	-33.2	*
A	9150.0	1.0	1	27.2	37.8	-29.5	-9.5	6.3	32.3	54.0	-21.7	*
P	9150.0	1.0	1	36.1	37.8	-29.5	-9.5	6.3	41.2	74.0	-32.8	*

Note: Negative signs (-) in the Margin column signify levels below the limit.
Readings proceeded with a '*' are noise floor readings.
All other readings are Peak measurements.

INTERTEK TESTING SERVICES

Company:	X Wire	Project #:	J98009272
EUT:	Hand Held Wireless Microphone	Date of Test:	4/15/98
Model:	XT905H	Test Site #:	1
Test Mode:	Tx @ 925 MHz	Engineer:	Ollie Moyrong

FCC Part 15.249 Radiated Emissions

Detector QP/A/P	Frequency (MHz)	Antenna Location (m)	Antenna Polariz. (H=0/V=1)	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	
QP	925.0	3.0	0	68.0	23.4	0.0	0.0	0.5	91.9	94.0	-2.1	
A	1850.0	1.0	1	24.9	27.7	0.0	-9.5	2.3	45.4	54.0	-8.6	
P	1850.0	1.0	1	33.6	27.7	0.0	-9.5	2.3	54.1	74.0	-19.9	
A	2775.0	1.0	1	39.4	28.1	-28.5	-9.5	3.0	32.5	54.0	-21.5	
P	2775.0	1.0	1	48.8	28.1	-28.5	-9.5	3.0	41.9	74.0	-32.1	
A	3700.0	1.0	1	46.1	31.5	-28.1	-9.5	3.6	43.6	54.0	-10.4	
P	3700.0	1.0	1	54.8	31.5	-28.1	-9.5	3.6	52.3	74.0	-21.7	
A	4625.0	1.0	1	37.0	32.2	-27.6	-9.5	4.1	36.2	54.0	-17.8	
P	4625.0	1.0	1	42.8	32.2	-27.6	-9.5	4.1	42.0	74.0	-32.0	
A	5550.0	1.0	0	32.1	34.4	-27.8	-9.5	4.6	33.8	54.0	-20.2	
P	5550.0	1.0	0	38.9	34.4	-27.8	-9.5	4.6	40.6	74.0	-33.4	
A	6475.0	1.0	1	31.9	34.0	-28.2	-9.5	5.0	33.2	54.0	-20.8	
P	6475.0	1.0	1	40.1	34.0	-28.2	-9.5	5.0	41.4	74.0	-32.6	
A	7400.0	1.0	1	29.8	35.8	-28.5	-9.5	5.8	33.4	54.0	-20.6	
P	7400.0	1.0	1	37.6	35.8	-28.5	-9.5	5.8	41.2	74.0	-32.8	
A	8325.0	1.0	1	27.9	37.0	-29.1	-9.5	6.0	32.3	54.0	-21.7	*
P	8325.0	1.0	1	37.1	37.0	-29.1	-9.5	6.0	41.5	74.0	-32.5	*
A	9250.0	1.0	1	27.7	37.8	-29.5	-9.5	6.3	32.8	54.0	-21.2	*
P	9250.0	1.0	1	37.1	37.8	-29.5	-9.5	6.3	42.2	74.0	-31.8	*

Note: Negative signs (-) in the Margin column signify levels below the limit.
Readings proceeded with a '*' are noise floor readings.
All other readings are Peak measurements.

INTERTEK TESTING SERVICES

Company:	X Wire	Project #:	J98009272
EUT:	Hand Held Wireless Microphone	Date of Test:	4/15/98
Model:	XT905H	Test Site #:	1
Test Mode:	Normal	Engineer:	Ollie Moyrong

FCC Part 15.109 Class B Radiated Emissions

Frequency (MHz)	Antenna Location (m)	Antenna Polariz. (H=0/V=1)	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Correction Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3 m (dBuV/m)	Margin (dB)
224.0	3.0	0	45.2	11.9	-27.8	0.0	0.5	29.8	46.0	-16.2
240.0	3.0	0	43.5	12.2	-27.8	0.0	0.5	28.4	46.0	-17.6
256.0	3.0	0	51.1	13.3	-27.8	0.0	0.5	37.1	46.0	-8.9
272.0	3.0	0	45.5	13.1	-27.9	0.0	0.5	31.2	46.0	-14.8
288.0	3.0	0	49.6	13.6	-27.9	0.0	0.5	35.8	46.0	-10.2
304.0	3.0	0	49.0	14.6	-27.7	0.0	0.5	36.4	46.0	-9.6
336.0	3.0	0	36.1	15.6	-27.8	0.0	0.5	24.4	46.0	-21.6
384.0	3.0	0	28.6	16.3	-27.8	0.0	0.5	17.6	46.0	-28.4
416.0	3.0	1	35.4	16.8	-28.0	0.0	0.5	24.7	46.0	-21.3

Note: Negative signs (-) in the Margin column signify levels below the limit.
Readings proceeded with a '*' are Quasi-Peak measurements.
All other readings are Peak measurements.

3.4 AC conducted Emission Configuration Photograph

Not applicable, the unit under test is battery powered.

3.5 Conducted Emission Data

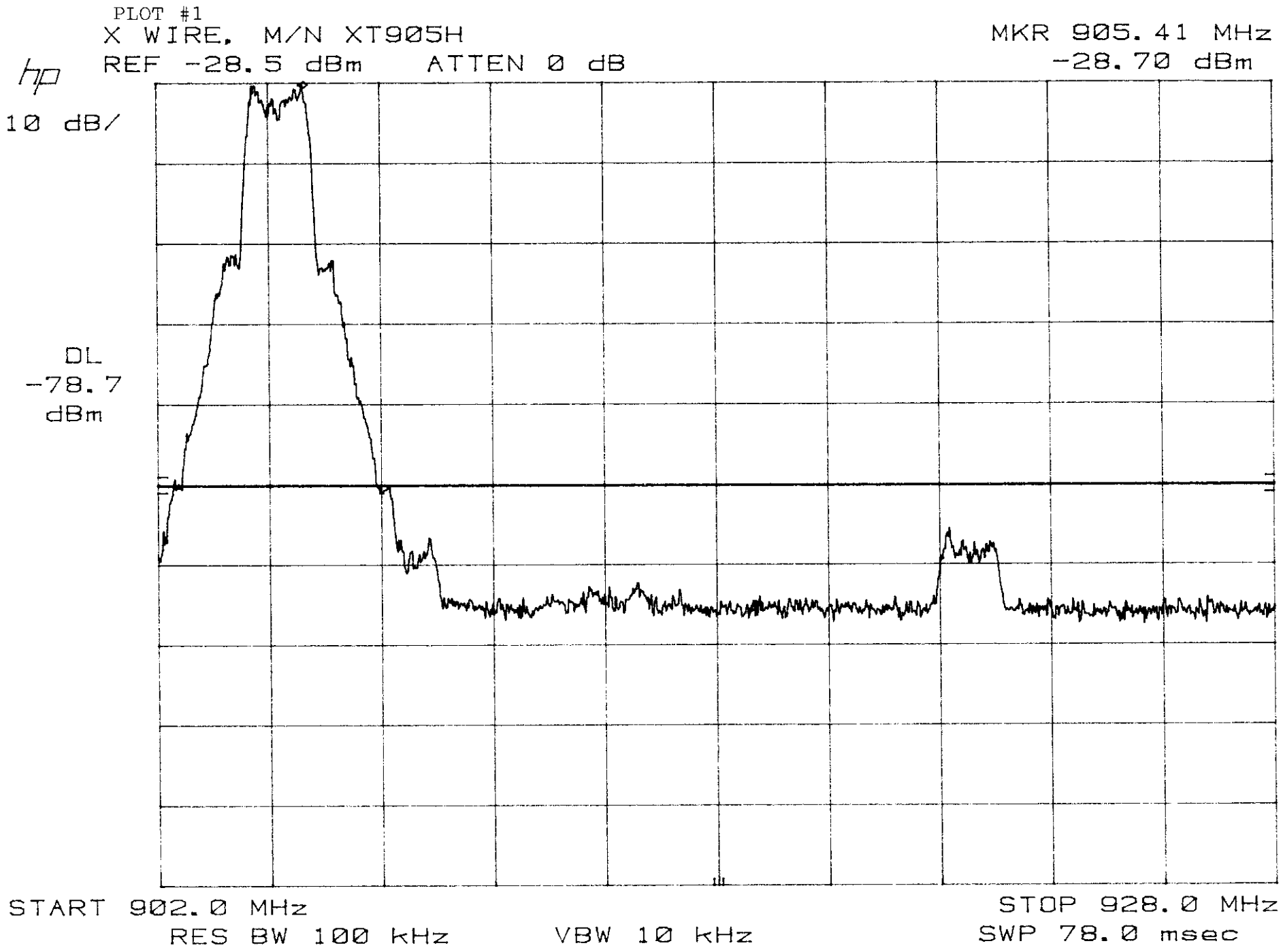
The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Results:	Not applicable, the unit under test is battery powered.

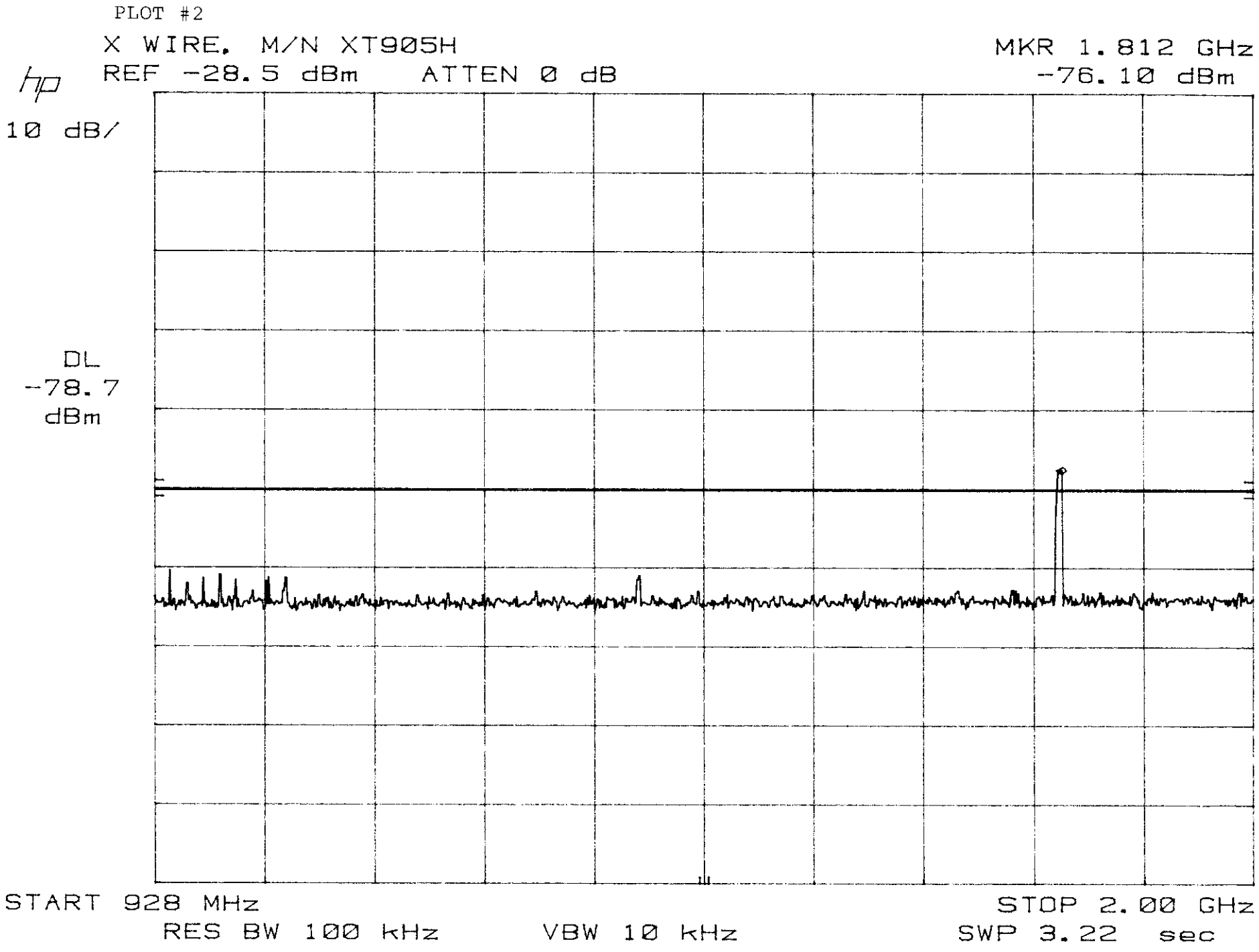
4.0 Out of Band Emission Plot

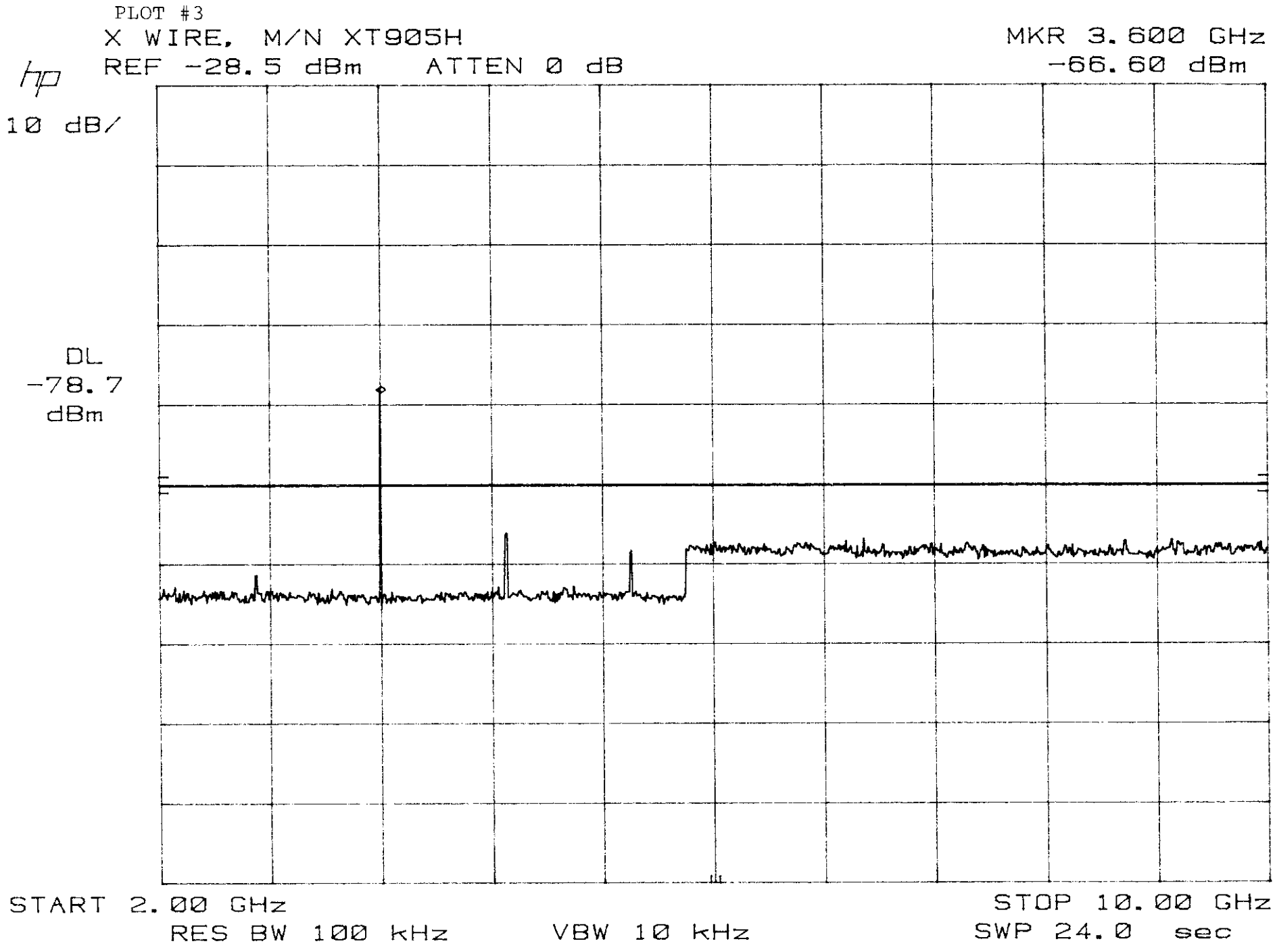
The following plots show the relative spurious emission level of the transmitter.

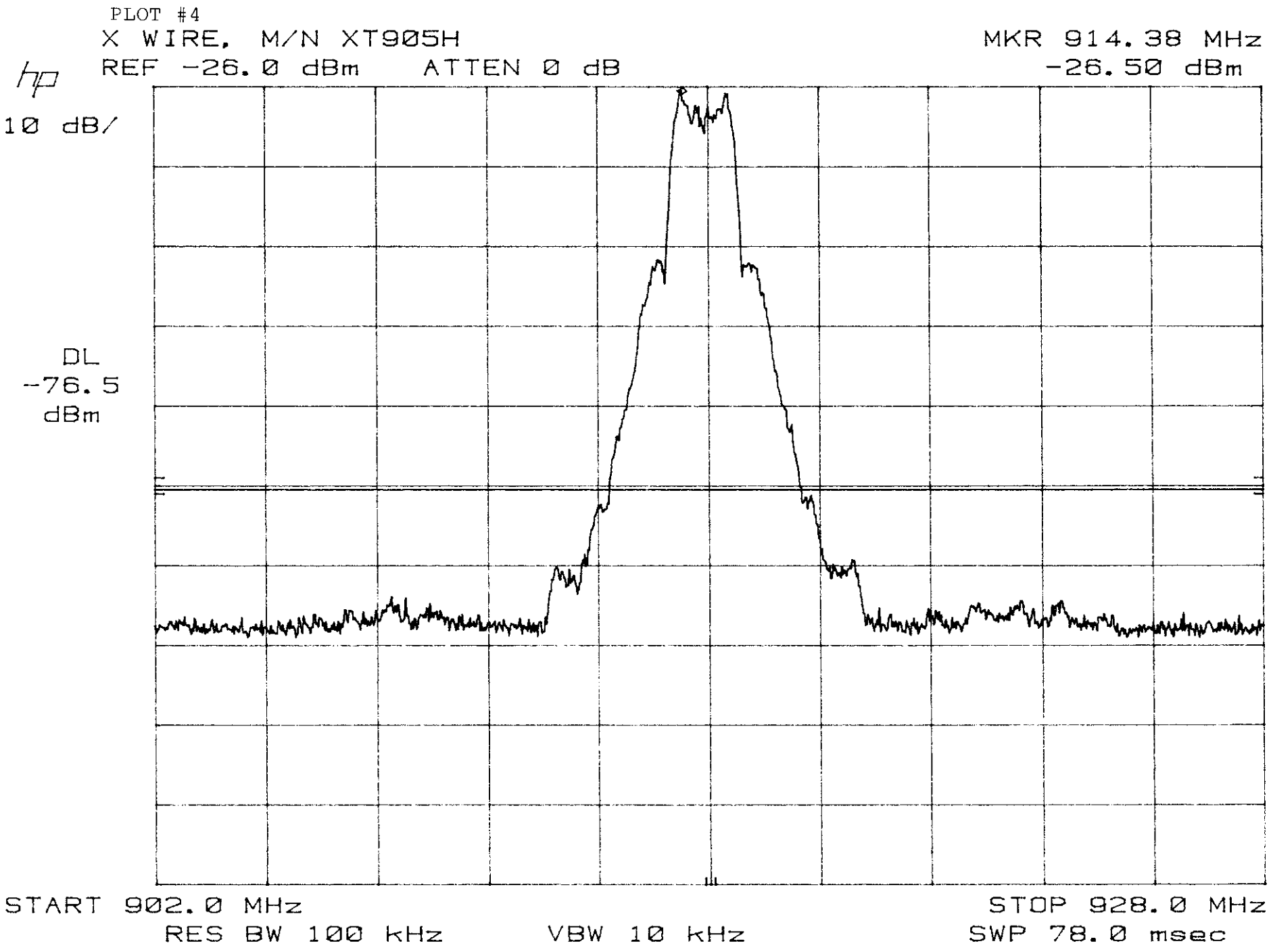
Plot #	Description
1	Low channel, scan 902-928 MHz
2	Low channel, scan 928 MHz -2 GHz
3	Low channel, scan 2-10 GHz
4	Middle channel, scan 902-928 MHz
5	Middle channel, scan 928 MHz - 2 GHz
6	Middle channel, scan 2-10 GHz
7	High channel, scan 902 - 928 MHz
8	High channel, scan 928 MHz - 2 GHz
9	High channel, scan 2 - 10 GHz


PLOT #1
X WIRE, M/N XT905H
REF -28.5 dBm ATTEN 0 dB
MKR 905.41 MHz
-28.70 dBm
10 dB/
DL
-78.7
dBm
START 902.0 MHz
RES BW 100 kHz
VBW 10 kHz
STOP 928.0 MHz
SWP 78.0 msec

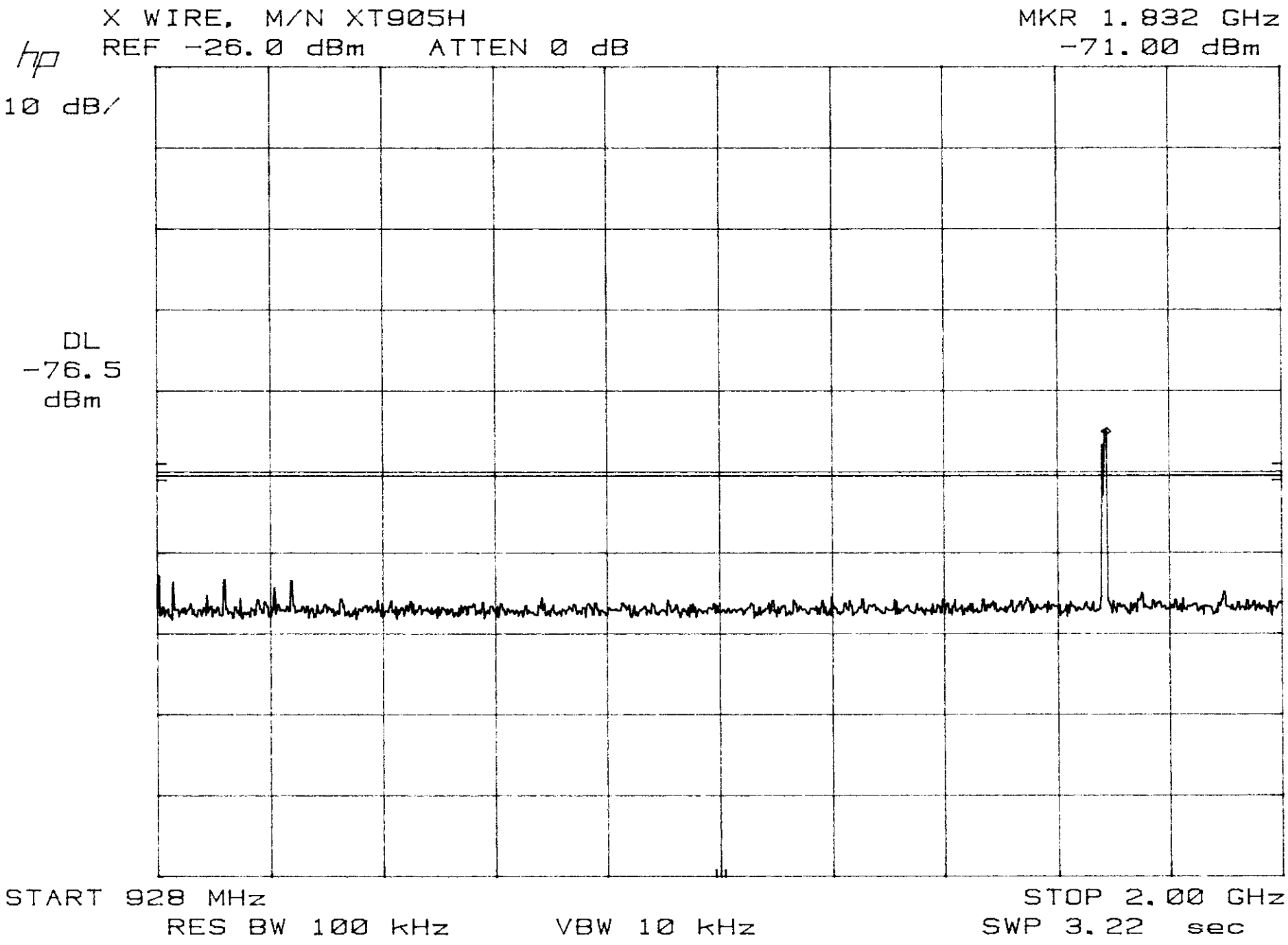
PLOT #2

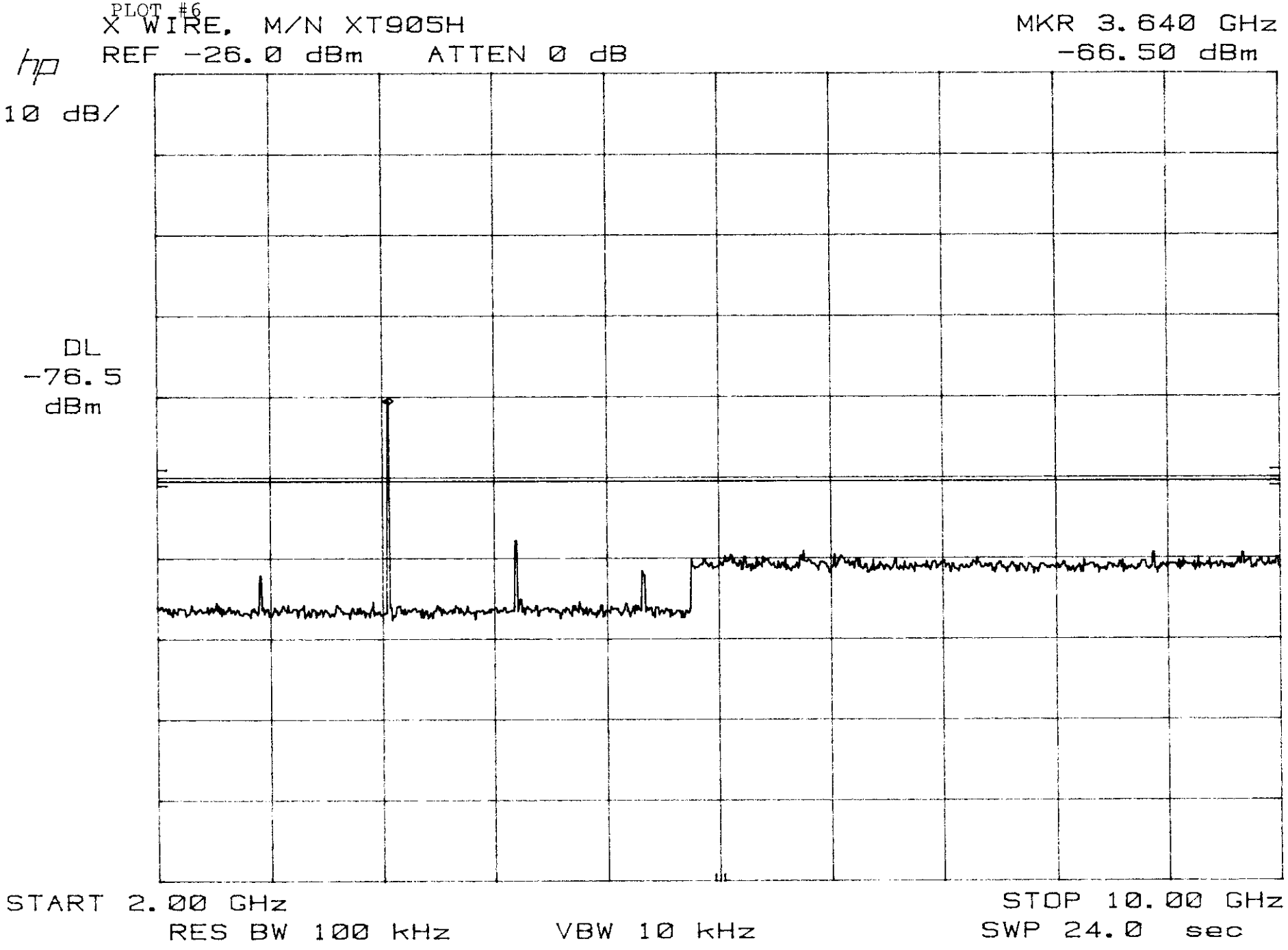

X WIRE. M/N XT905H
MKR 1.812 GHz
REF -28.5 dBm
ATTEN 0 dB
-76.10 dBm
10 dB/
DL
-78.7
dBm
START 928 MHz
STOP 2.00 GHz
RES BW 100 kHz
VBW 10 kHz
SWP 3.22 sec

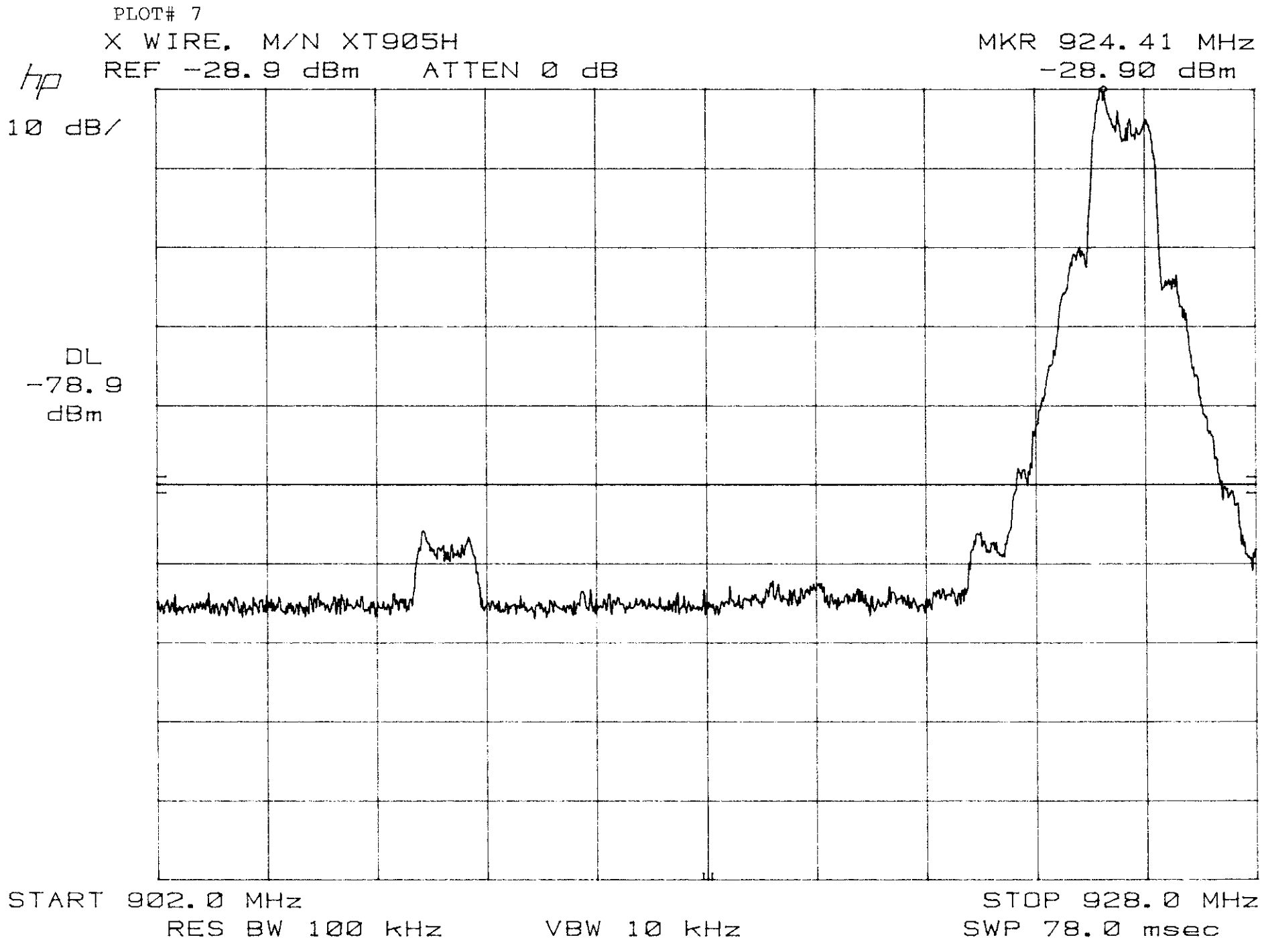

PLOT #3
X WIRE, M/N XT905H
MKR 3.600 GHz
REF -28.5 dBm ATTEN 0 dB
-66.60 dBm
hp
10 dB/
DL
-78.7
dBm
START 2.00 GHz
STOP 10.00 GHz
RES BW 100 kHz
VBW 10 kHz
SWP 24.0 sec

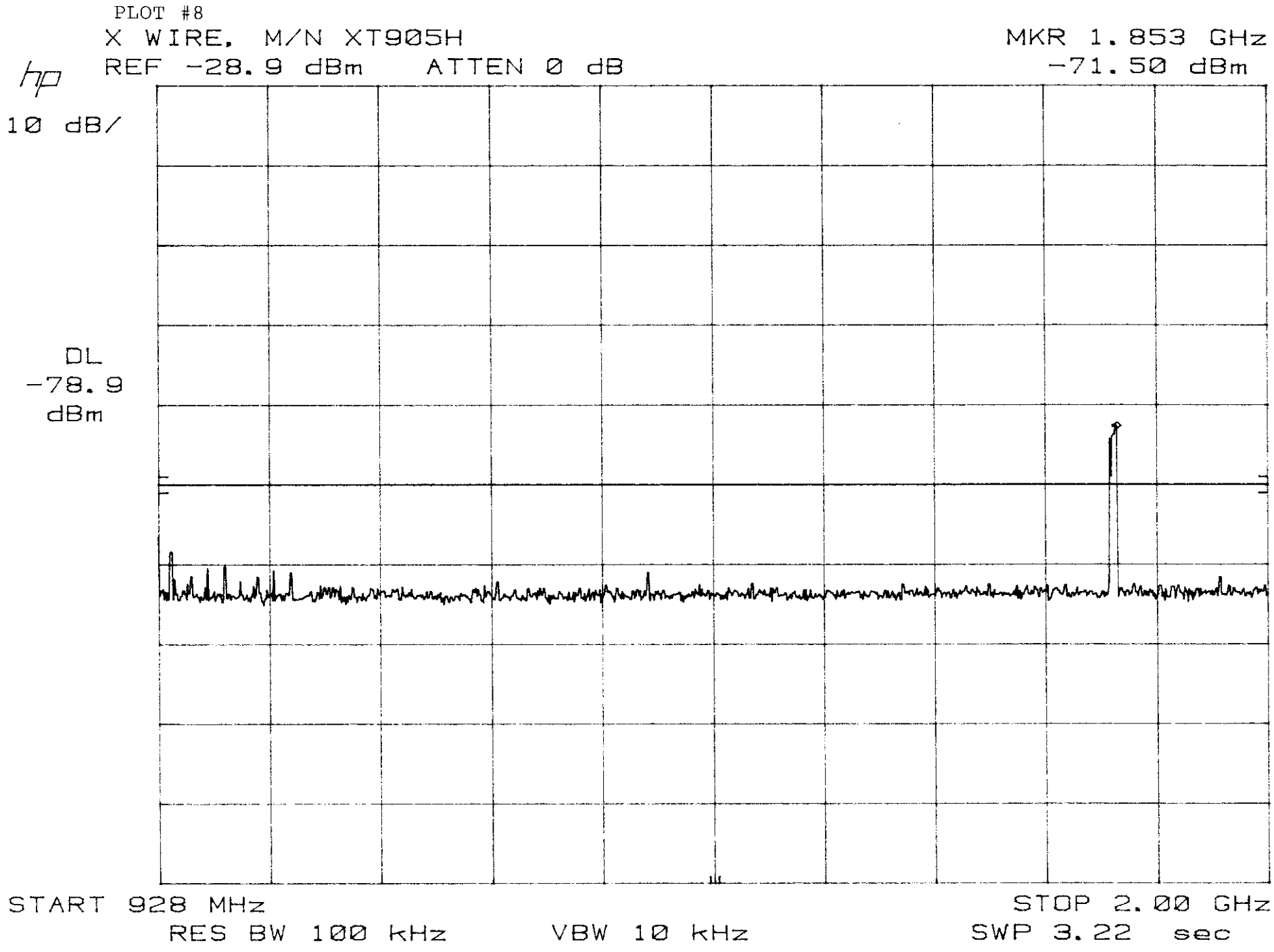

PLOT #4
X WIRE, M/N XT905H
MKR 914.38 MHz
REF -26.0 dBm ATTEN 0 dB
-26.50 dBm
hp
10 dB/
DL
-76.5
dBm
START 902.0 MHz
STOP 928.0 MHz
RES BW 100 kHz
VBW 10 kHz
SWP 78.0 msec

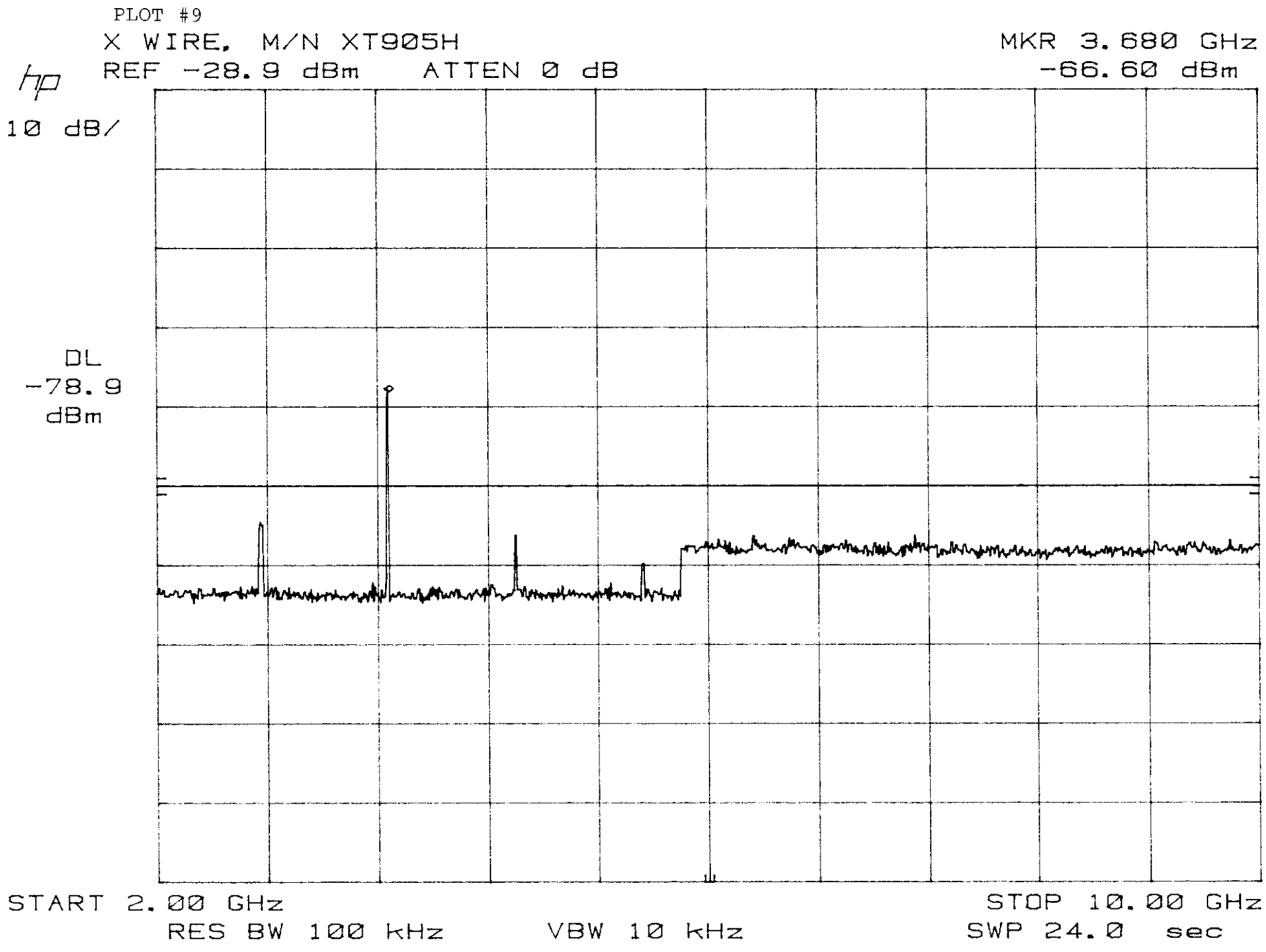
PLOT #5


X WIRE, M/N XT905H
MKR 1.832 GHz
REF -26.0 dBm
ATTEN 0 dB
-71.00 dBm
10 dB/
DL
-76.5
dBm
START 928 MHz
STOP 2.00 GHz
RES BW 100 kHz
VBW 10 kHz
SWP 3.22 sec


PLOT #6
X WIRE, M/N XT905H
REF -26.0 dBm ATTEN 0 dB
MKR 3.640 GHz
-66.50 dBm
10 dB/
DL
-76.5
dBm
START 2.00 GHz
STOP 10.00 GHz
RES BW 100 kHz
VBW 10 kHz
SWP 24.0 sec


PLOT# 7
X WIRE. M/N XT905H
MKR 924.41 MHz
REF -28.9 dBm ATTEN 0 dB
-28.90 dBm
10 dB/
DL
-78.9
dBm
START 902.0 MHz
STOP 928.0 MHz
RES BW 100 kHz
VBW 10 kHz
SWP 78.0 msec


PLOT #8
X WIRE, M/N XT905H
MKR 1.853 GHz
REF -28.9 dBm
ATTEN 0 dB
-71.50 dBm
10 dB/
DL
-78.9
dBm
START 928 MHz
STOP 2.00 GHz
RES BW 100 kHz
VBW 10 kHz
SWP 3.22 sec


PLOT #9
X WIRE, M/N XT905H
MKR 3.680 GHz
REF -28.9 dBm ATTEN 0 dB
-66.60 dBm
10 dB/
DL
-78.9
dBm
START 2.00 GHz
STOP 10.00 GHz
RES BW 100 kHz
VBW 10 kHz
SWP 24.0 sec

5.0 Antenna Requirement

✔	The transmitter uses a permanently connected antenna.
	The antenna is affixed to the EUT using a unique connector which allows for replacement of a broken antenna, but does NOT use a standard antenna jack or electrical connector.
	The EUT requires professional installation. Please refer to the attached documentation for details).

6.0 Equipment Photographs

Photographs of the EUT are attached.

Total number of photos	3