Product Safety Engineering, Inc
12955 Bellamy Brothers Blvd.
Dade City, FL 33525
352-588-2209

Testing Certification # 1367-01

TEST REPORT

13F128
08/23/2013

Applicant:

Commercial Wireless Systems International LLC
10798 NW 53rd Street
Sunrise, Fl 33351

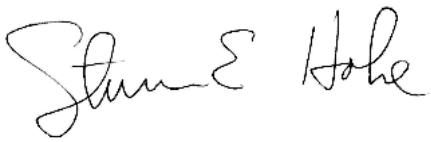
Product:
Model - WRA3
Wireless Control Panel and Repeater

In Accordance with FCC Part 15.247

Test dates:
07/11/2013 - 07/23/2013

Receive Date:
06/27/2013

Prepared by: Steven E. Hoke - EMC Site Manager



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Test Procedures

Product description: The system utilizes FHSS type transmitters. The CWSI alarm panel and remote monitor are comprised of models CP3000 and WAR-3 respectively. The model CP3000 is a Control panel with transceiver and the WAR-3 consists of the identical transceiver as included in the CP3000 but does have any control circuitry.

Powerline conducted interference: The AC powerline conducted emissions were measured.

20 dB Bandwidth: The EUT had its hopping function disabled while modulated. The spectrum analyzer span was set to (2-3) times the (20) dB bandwidth. The spectrum analyzer was placed in peak hold mode and the upper and lower points of the waveform were measured at a level that was (20) dB down from the peak amplitude. This was repeated for a low, mid and high frequency channel.

Channel Separation: The EUT had its hopping function enabled. The span on the spectrum analyzer was set wide enough to capture at least (2) adjacnet channels. The channel separation was determined by measuring the peak frequency of (2) adjacent channels.

Description of frequency hopping system: The system utilizes 37 channels from 902.7 MHz to 926.1MHz in the ISM band. The RF Unit hops though each of these channels at a rate of 375ms per channel, for a total hopping loop of 13.875 seconds. The system initiates data transmissions completely asynchronously from the hopping system which creates a random distribution of data for each channel. All messages are also acknowledged, which provides significant bandwidth throttling (i.e. messages can not be sent continuously) which limits duty cycle per transmitter about 50%. Due to system limitations such as a maximum payload size of 32bytes, 5khz bit rate, and a fixed 7 bytes packet overhead, the longest time a RF transmitter can be active is 78ms. All channels are used all of the time. There are not any facilities to detect jammed or undesirable channels and remove them from the hopping system.

Receiver bandwidth: The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Number of hopping frequencies: With the spectrum analyzer in peak hold, we stored an image of all the channels operating and then produced a plot of the analyzer. We manually counted each channel to determine the number.

Dwell time: The EUT had its hopping function enabled. The average time of occupancy was first determined by measuring the width of a single channel with the spectrum analyzer in a zero span mode and then with the analyzer in a peak hold mode, a (10) second sweep was then performed to determine how many single channels occupied a (10) second period of time.

RF Exposure Compliance Requirements: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. Computations included in test report.

Peak output power: The EUT had a direct connection to the measuring equipment.

Conducted output power: The conducted output power was measured with a direct connection between the EUT and the spectrum analyzer.

Operation with directional antenna gains greater than 6 dBi: Not applicable

Spurious emissions: All spurious emissions were measured up to the tenth harmonic per ANSI C63.4:2003.

Restricted Band Compliance: All emissions were measured per ANSI C63.4:2003 and compared to the restricted band list.

Other conditions of operation per 15.247

15.247 (a) (1) - The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter.

Each transmitter hops over a pseudo-random list of 36 distinct hopping frequencies. Transmitters will remain in a frequency for 398 ms (hop period). Transmitters will hop into each frequency in the list (and remain at that frequency for the hop period) until each frequency has been "hopped into" once (hop cycle). Transmitters will start a new hop cycle once the previous one completes.

15.247 (g) - Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The system does not make use of continuous data streams. All communication is achieved via short messages (less than 40 milliseconds) sent during a transmit opportunity within a hop. Messages can be transmitted or received on any hopping channel/frequency. Messages are not transmitted more than once within the same hop.

15.247 (h) - The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

The system does not implement any intelligence that permits it to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels. The system does not coordinate in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

Test Methodology - FCC publication FCC Public Notice DA 00-705 Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems, March 2000:

Test Summary

Name of Test	Paragraph No.	Specification	Measurement	Result
Powerline Conducted Emissions	15.207(a)	Table 15.207(a)	>30 dB margin	Complies
Channel Separation	15.247(a)(1)	Greater of 25 kHz or 20 dB bandwidth	625 kHz	Complies
Pseudo-random Hopping Algorithm	15.247(a)(1)	See Page 4	Not applicable	Complies
Hopping Frequencies	15.247(a)(1)(i)	at least 25	37	Complies
Dwell Time	15.247(a)(1)(ii)	<0.4 sec in 10 sec	0.075 sec in 10 sec	Complies
20 dB Occupied Bandwidth	15.247(a)(1)	>250 kHz <500 kHz	374 - 413 kHz	Complies
Peak Output Power	15.247(b)	0.25 Watts	0.0046 Watts	Complies
Spurious Emissions (Conducted / Radiated)	15.247(d)	-20 dBc (peak) -30 dBc (avg)	> - 40 dBc	Complies
Spurious Emissions (Radiated)	15.247(d)	54.0 dBuV/m per Table 15.209(a)	31.1 dBuV/m	Complies

Test: Output Power per 15.247(b)(2)

Date: 07/19/2013

Requirement: The maximum peak conducted output power of the intentional radiator shall not exceed 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels

Result: Peak Output Power = (4.6) mW
See Page A13-A15.

RBW: (1) MHz
VBW: (3) MHz

Direct measurement between EUT connector and input of spectrum analyzer.

Channel	dBm	Watts mW
low	6.5	4.5
Mid	6.0	4.0
high	6.6	4.6

Test Equipment:

Manufacturer	Model	Description	Serial Number	Cal Due
Hewlett Packard	8566B	Spectrum Analyzer	2421A00526	011/04/13

Test: Powerline conducted interference per 15.207

Date: 07/20/2013

Requirement: An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table:

Freq (MHz)	Quasi-peak dBuV	Average dBuV
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Result: The EUT had a margin of (8) dB.

RBW: (9) kHz
VBW: (10) kHz

See Pages A1 - A4.

Test Equipment:

Manufacturer	Model	Description	Serial Number	Cal Due
Electrometrics	EMC-30	EMI Receiver	191	07/09/14

Test: 20 dB Bandwidth

Date:07/19/2013

Requirement: The 20 dB bandwidth is required for other technical requirements.

Result: The 20 dB bandwidth was measured at the low, mid and high frequency of operation. The bandwidths are listed below:

Frequency (MHz)	Channel	Measured 20dB bandwidth
904.3	Low	413 kHz
915.3	Mid	412 kHz
926.3	High	374 kHz

See Page A5-7

Span:1 MHz

RBW: (10) kHz

VBW: (30) kHz

Channel: Low, mid and high

Test Equipment:

Manufacturer	Model	Description	Serial Number	Cal Due
Hewlett Packard	8566B	Spectrum Analyzer	2421A00526	011/04/13

Test: Carrier Frequency Separation per 15.247(a)(1)

Date: 07/19/2013

Requirement: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Result: The 20 dB bandwidth was measured at the mid frequency of operation as (413) kHz. The separation was found to be (652) kHz..

See Page A8

RBW: (100) kHz

VBW: (1) MHz

Test Equipment:

Manufacturer	Model	Description	Serial Number	Cal Due
Hewlett Packard	8566B	Spectrum Analyzer	2421A00526	011/04/13

Test: Number of hopping frequencies per 15.247(a)(1)(i)

Date: 02/20/2007

Requirement: If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies

Result: The 20 dB bandwidth was measured for low, middle and high frequency operation and the bandwidth was found to be between (374 - 413) kHz. We observed 37 hopping frequencies.

See Page A9-10.

RBW: (100) kHz

VBW: (300) MHz

Test Equipment:

Manufacturer	Model	Description	Serial Number	Cal Due
Hewlett Packard	8566B	Spectrum Analyzer	2421A00526	011/04/13

Test: Dwell time per 15.247(a)(1)(i)

Date:02/20/2007

Requirement: The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period when the 20 dB bandwidth of the hopping channel is greater than 250 kHz.

Result: The analyzer was placed in a peak hold mode for greater than (10) seconds. The dwell time was measured and found to be (75) mSec which is less than the (400) mSec allowed..

Note: The 20 dB bandwidth was measured for low, middle and high frequency operation and the maximum bandwidth was found to be between (374 - 413) kHz

See Pages A10 - A11.

Span: Zero

RBW: (300) kHz

VBW: (1) MHz

Test Equipment:

Manufacturer	Model	Description	Serial Number	Cal Due
Hewlett Packard	8566B	Spectrum Analyzer	2421A00526	011/04/13

Test: Spurious emissions per 15.247(d)

Date: 07/20/2013

Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Result: The spurious emissions were measured up to the tenth harmonic. The highest spurious emission was found to be (1.831) GHz at (-39.9) dBm. The highest inband level measured was (6.6) dBm at (926) MHz. The limit for out of band emissions is (-13.4) dBm. The worst case out of band emission measured was (20.3) dB below the limit.

See Page A16 - A27

RBW: (1) MHz

VBW: (3) MHz

Channel: Low, mid and high.

Additional Requirement: Emissions which fall in the restricted bands, as defined by in 15.205(a), must also comply with the radiated emissions limits specified in 15.209.

Result: Spurious emissions found in restricted bands did not exceed the limit as shown on Page A28.

Test Equipment:

Manufacturer	Model	Description	Serial Number	Cal Due
Hewlett Packard	8566B	Spectrum Analyzer	2421A00526	011/04/13
Hewlett Packard	8447D	Preamp 0.1 - 1,000 MHz	2944A06832	02/17/14
Hewlett Packard	8449B	Preamp 1 - 26.5 GHz	3008A00320	05/20/14
Eaton	96005	Log Periodic Antenna	01099	01/02/14
Electro-Mechanics	3117	Double Ridge Guide Ant	3810	02/12/14

RF Exposure - Power Density Compliance Calculation

15.247(I) - Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

Compliance is based upon section CFR 47 section 1.1310, Table (1) Limits for Maximum Permissible Exposure (MPE), (b) Limits for General Population/Uncontrolled Exposure. The stated limit is (1.0) mW/cm2 and compliance was calculated using the following formula:

$$S=(P\ G) / (4\ \pi\ r^2)$$

Where:

S = Power density in mW/cm2

P = Power in mW

G = Numerical antenna gain

r = Distance in cm

Maximum output power = (4.6) mW

Antenna gain (numeric) = (1.78) dB

Distance = (20) cm

$S = (4.6 * 1.78) / (12.57 * 400)$

$S= (8.19) / (5{,}028)$

$S= (0.0016)$ mW / cm^2

Limit = (1.0) mW / cm^2

Antenna Specifications

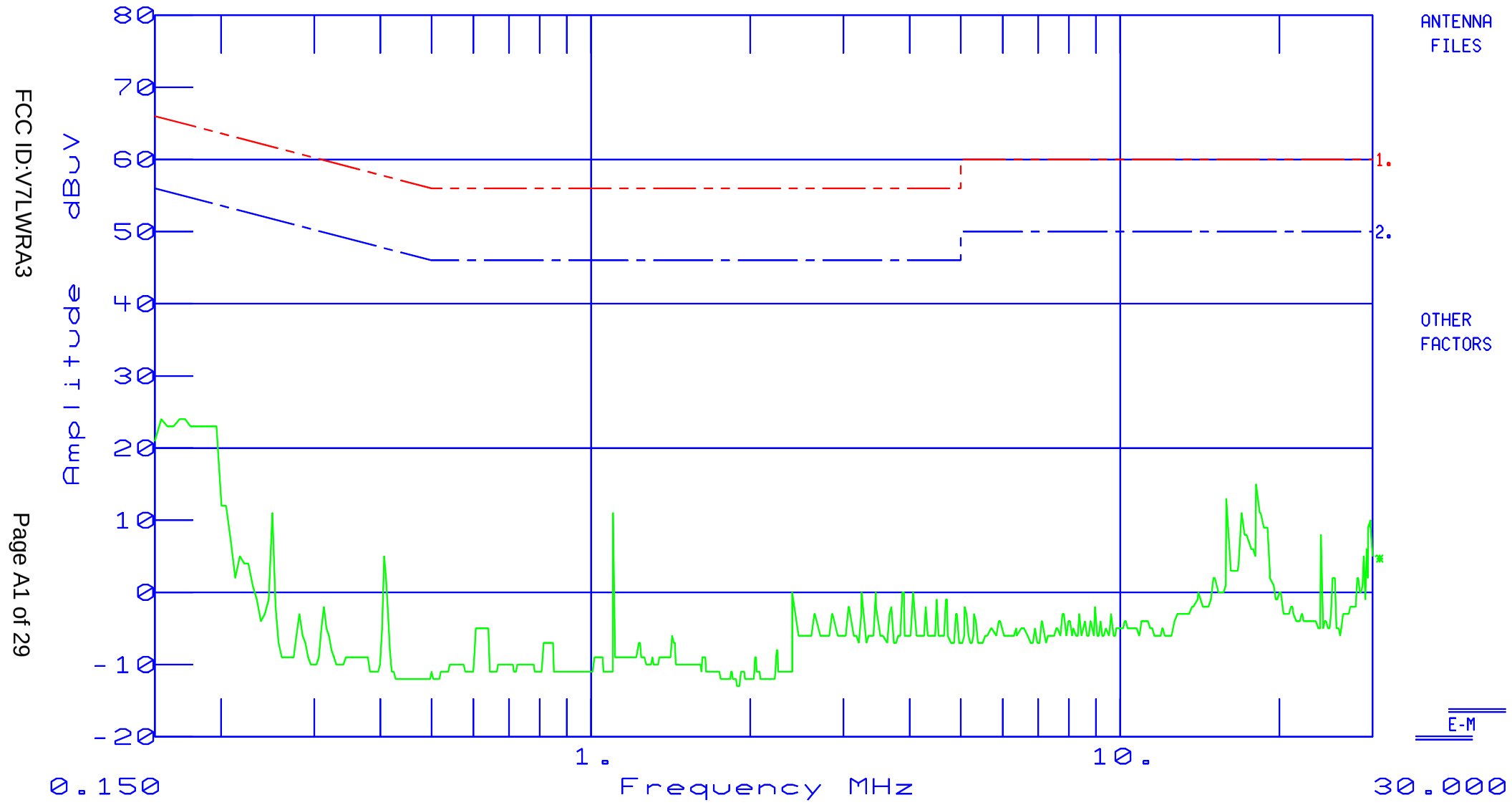
This EUT uses a single external antenna. The specifications are listed in page A29. The highest isotropic gain of all the antennas is (2.5) dBi.

Product Safety Engineering

CWSI

Date :	06/28/13	Time :	15:15:19.83	EMC-30 SETTINGS	SPECS
Technician :	CHIP FOERSTNER	Test Equip. :	EMC-30	Detector QuasiPeak	1) CISPR 22 Quasi Peak
Test Method :	FCC CLASS B	Test Number :	1	Bandwidth CISPR	2) CISPR 22 AVG
Equipment :	ANNUNCIATOR	Sensor Loc. :	LINE	Dump/DwellN/A	3)
Mode of Op. :	NORMAL	Sensor Pol. :		RF Atten. 10 dB	4)
Serial No. :	ID 68006E	Ext. Atten. :	0 dB	IF Atten. 10 dB	

Comment : 120 VAC / 60 HZ



FCC ID:V7LWRA3

TEST TITLE: CWSI			PAGE 1
DATA FILE : 13128_L.D30			Freq.(MHz)
Amplitude Units : dBuV		Threshold -33 dB	0.1500

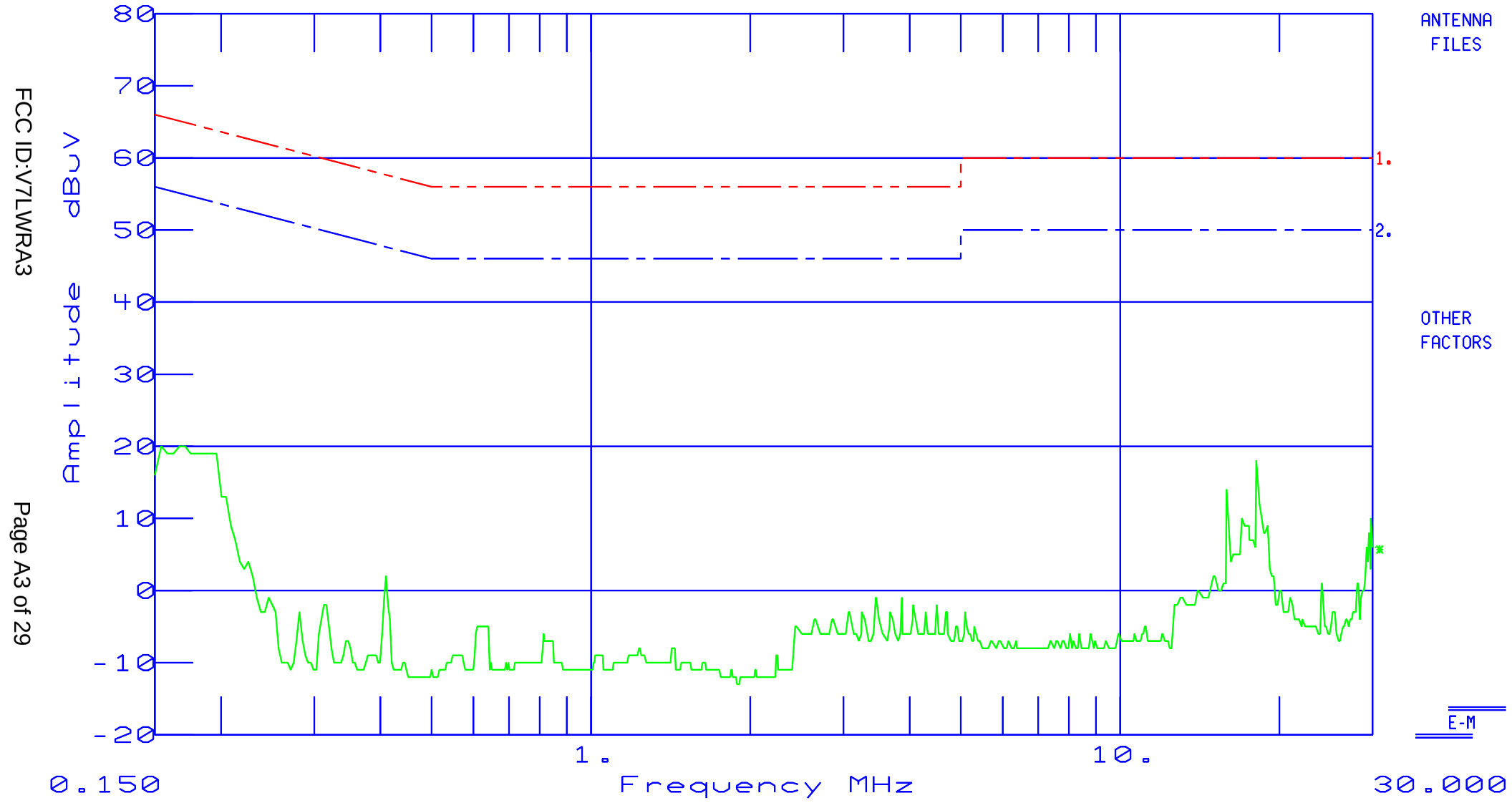
Freq(MHz)	Amp	C22BQP.S30 vs Spec(dB)	C22BAVG.S30 vs Spec(dB)
0.1542	24.0		-31.771 *
0.1583	23.0		-32.553 *
0.1625	23.0		-32.335 *
0.1670	24.0		-31.108 *
0.1711	24.0		-30.907 *
0.1752	23.0		-31.710 *
0.1794	23.0		-31.513 *
0.1836	23.0		-31.321 *
0.1878	23.0		-31.133 *
0.1920	23.0		-30.950 *
0.1961	23.0		-30.774 *

Product Safety Engineering

CWSI

Date :	06/28/13	Time :	14:14:26.02	EMC-30 SETTINGS	SPECS
Technician :	CHIP FOERSTNER	Test Equip. :	EMC-30	Detector QuasiPeak	1) CISPR 22 Quasi Peak
Test Method :	FCC CLASS B	Test Number :	1	Bandwidth CISPR	2) CISPR 22 AVG
Equipment :	ANNUNCIATOR	Sensor Loc. :	NEUTRAL	Dump/DwellN/A	3)
Mode of Op. :	NORMAL	Sensor Pol. :		RF Atten. 10 dB	4)
Serial No. :	ID 68006E	Ext. Atten. :	0 dB	IF Atten. 10 dB	

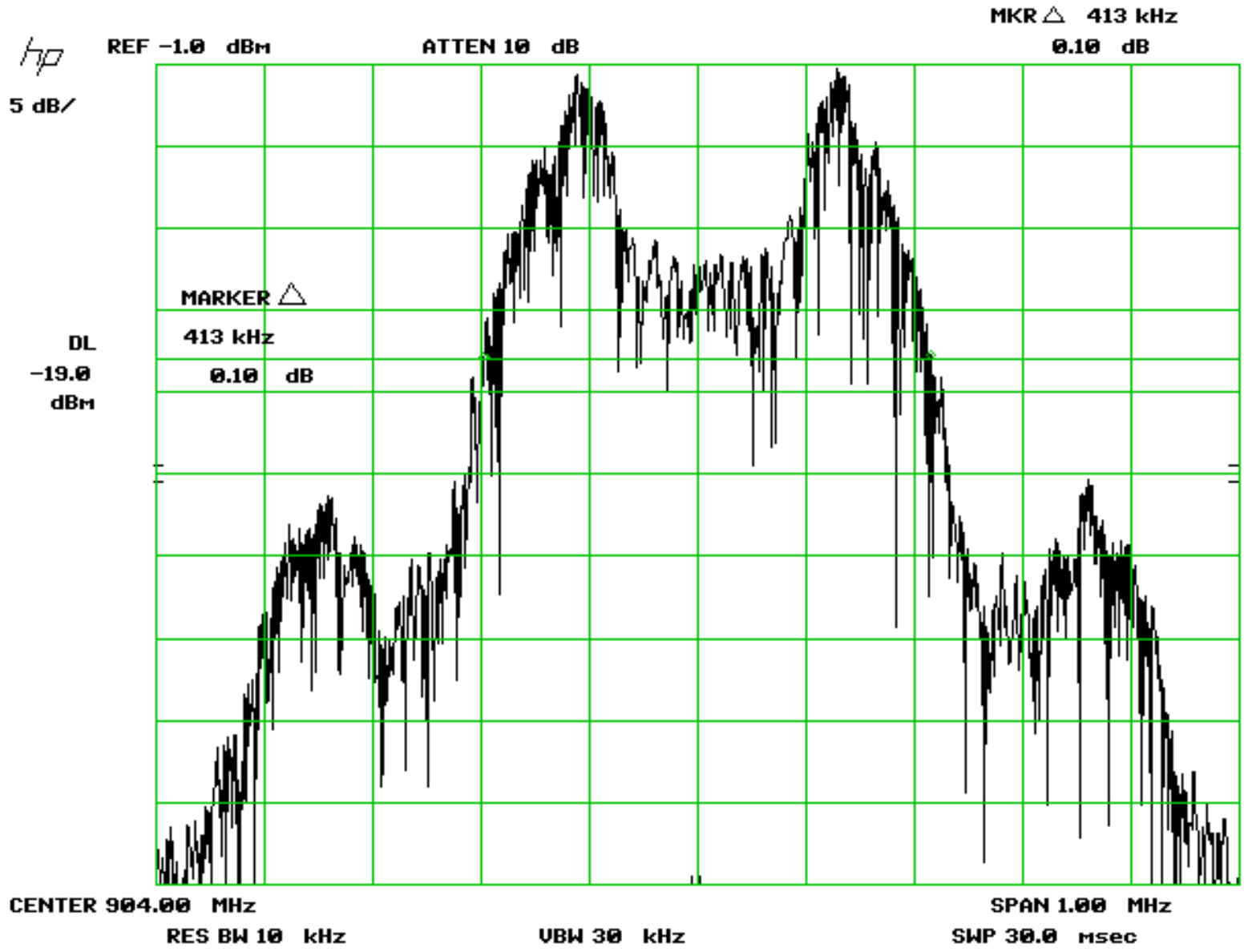
Comment : 120 VAC / 60 HZ

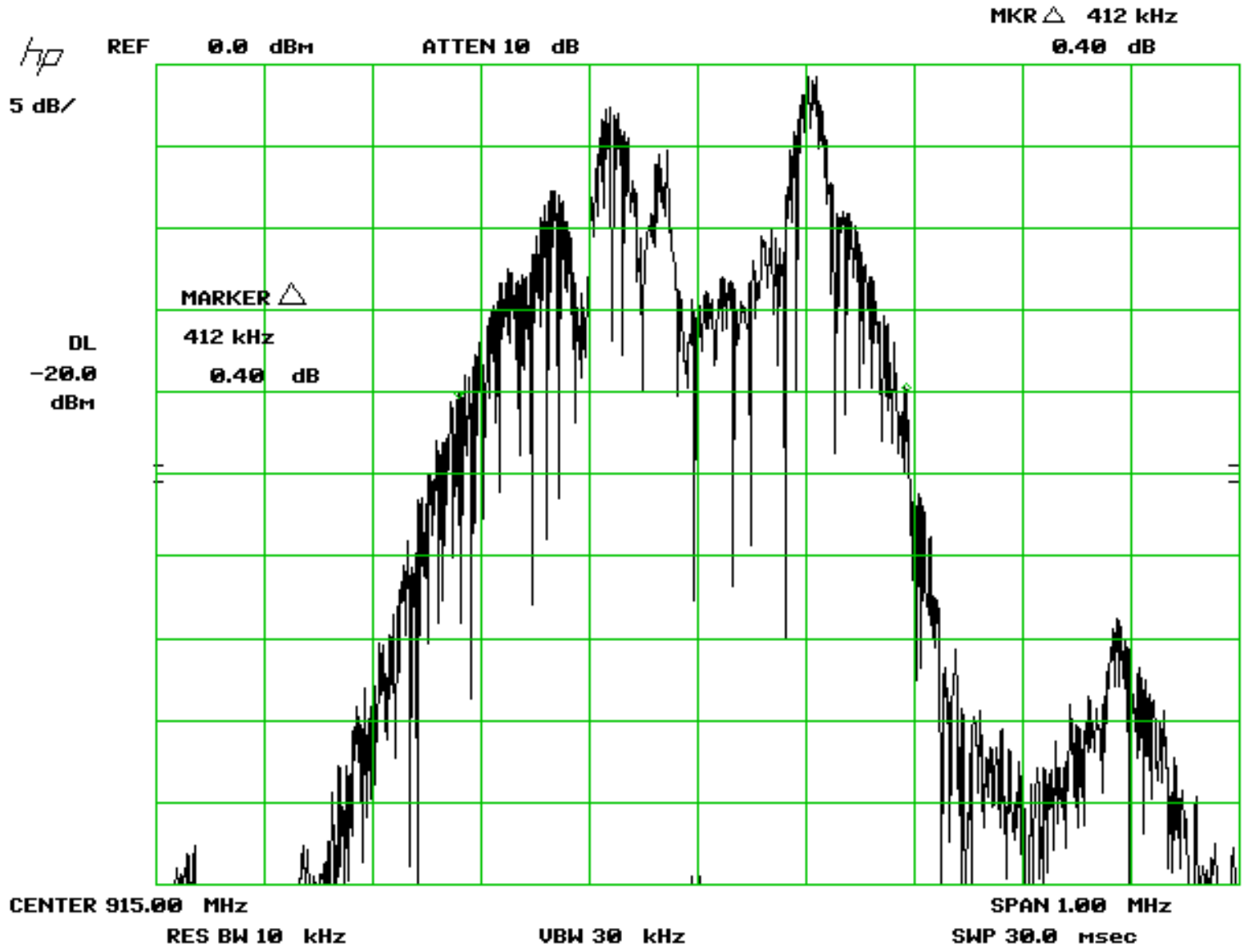


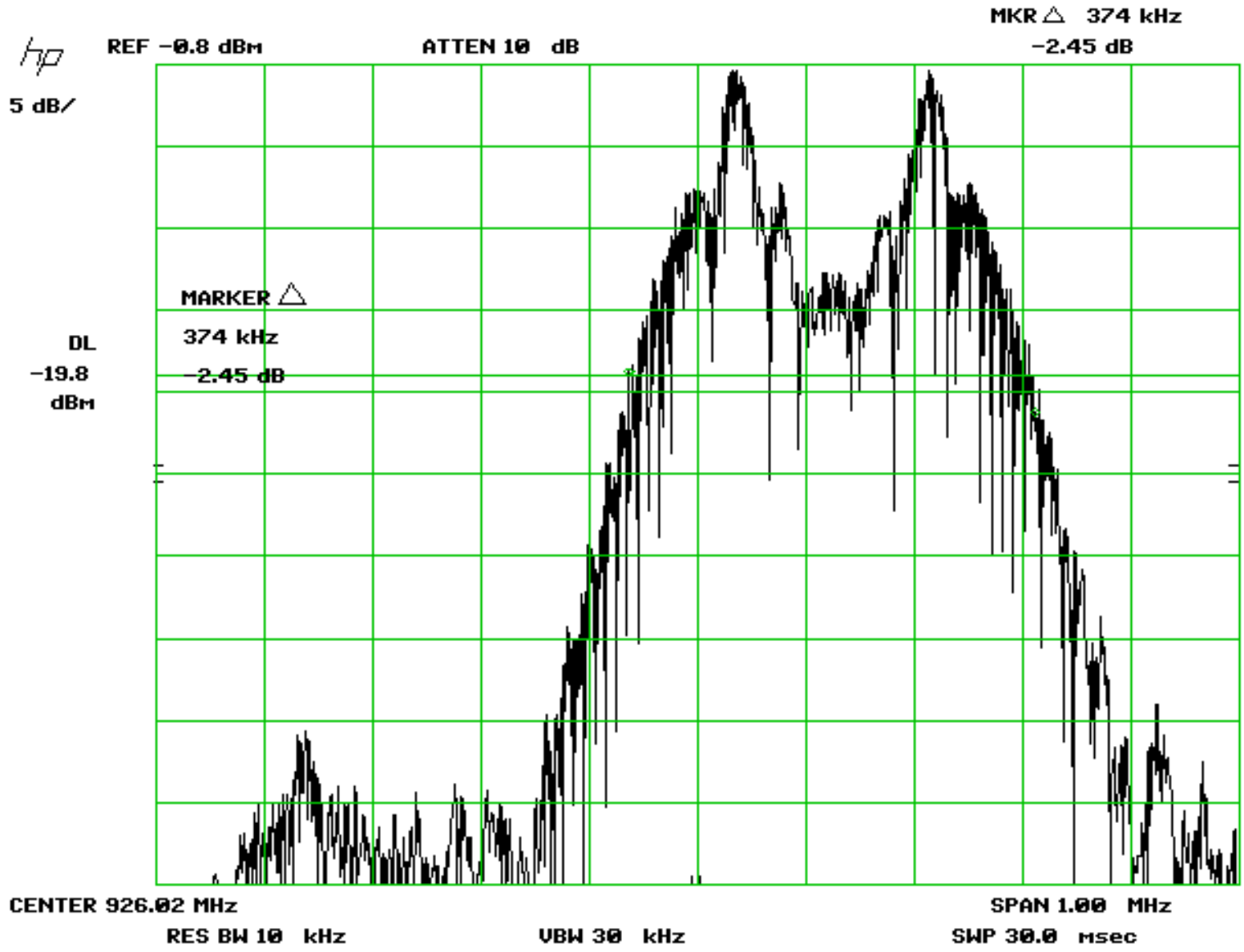
FCC ID:V7LWRA3

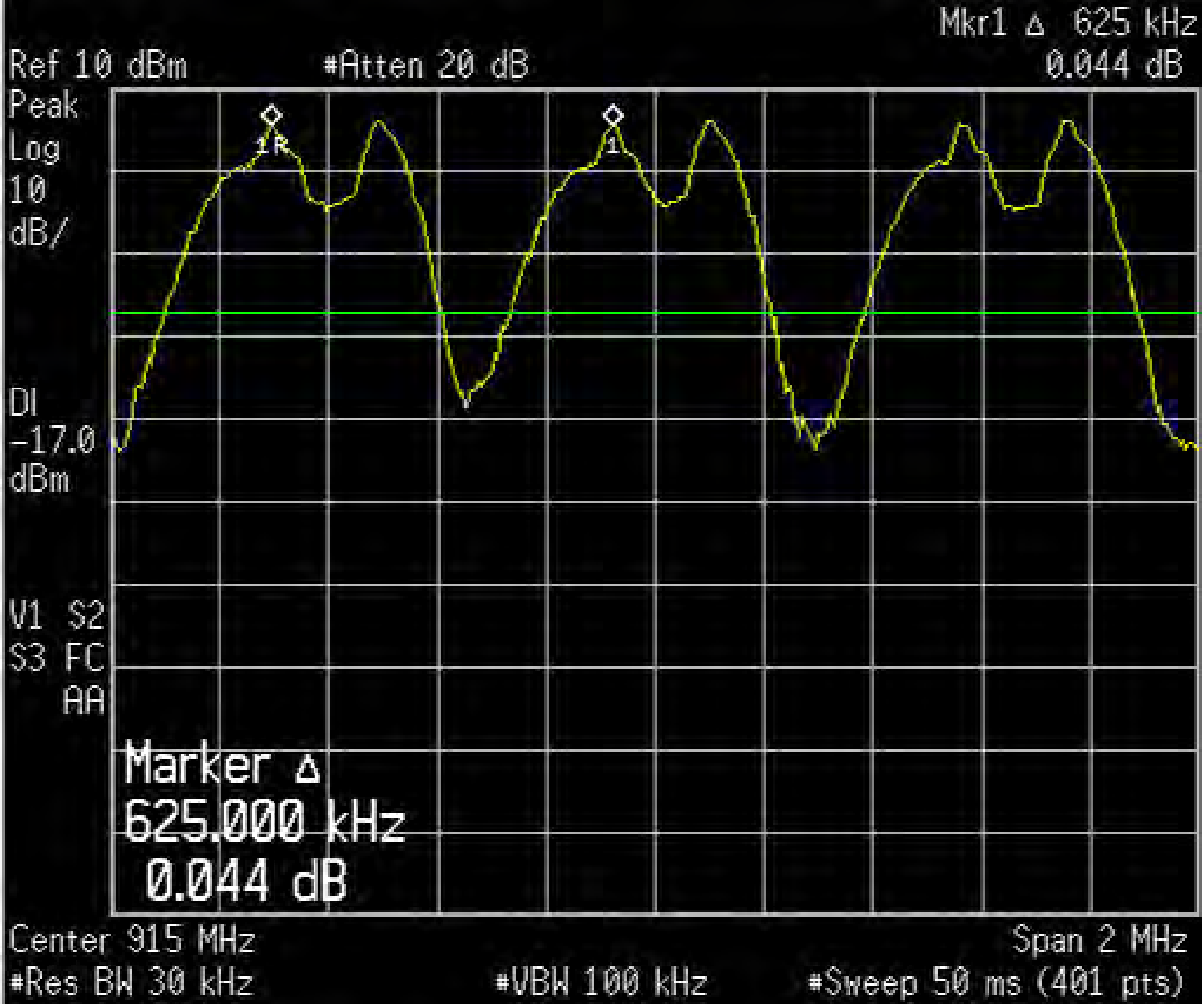
TEST TITLE: CWSI			PAGE 1
DATA FILE : 13128_N.D30			Freq.(MHz)
Amplitude Units : dBuV		Threshold -37 dB	0.1500

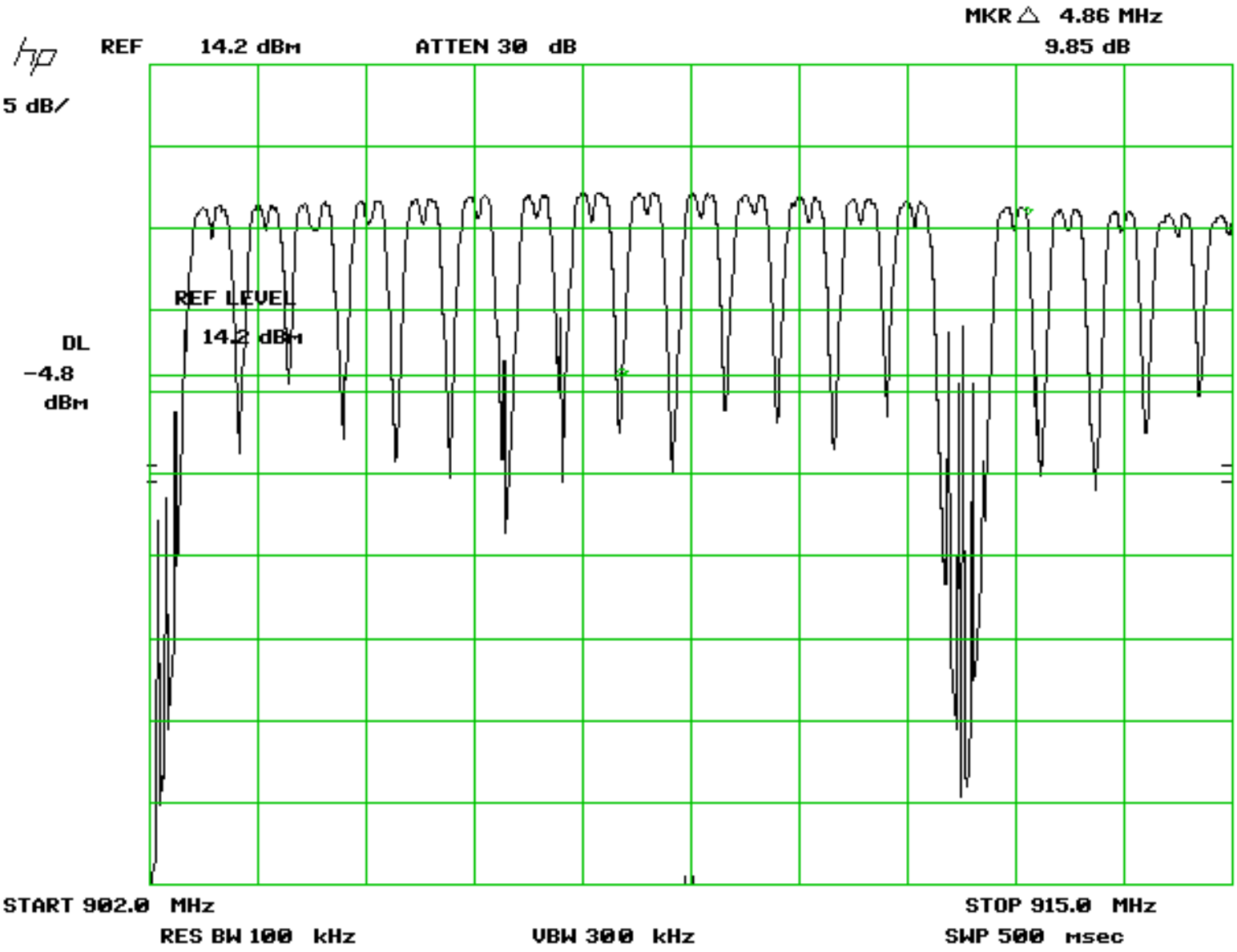
Freq(MHz)	Amp	C22BQP.S30 vs Spec(dB)	C22BAVG.S30 vs Spec(dB)
0.1542	20.0		-35.771 *
0.1583	19.0		-36.553 *
0.1625	19.0		-36.335 *
0.1670	20.0		-35.108 *
0.1711	20.0		-34.907 *
0.1752	19.0		-35.710 *
0.1794	19.0		-35.513 *
0.1836	19.0		-35.321 *
0.1878	19.0		-35.133 *
0.1920	19.0		-34.950 *
0.1961	19.0		-34.774 *
15.8752	14.0		-36.000 *
18.0769	18.0		-32.000 *

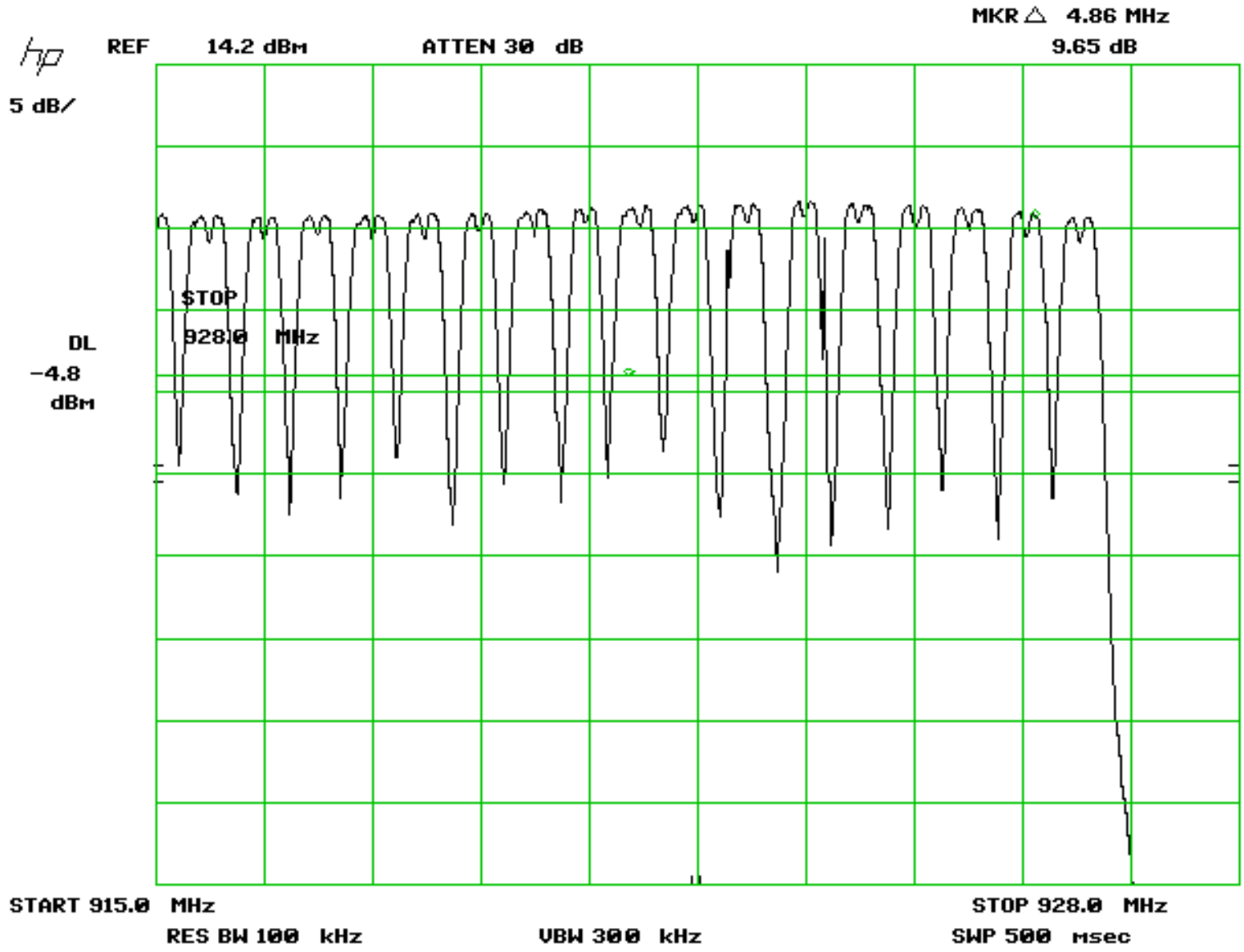

MKR △ 413 kHz
REF -1.0 dBm
ATTEN 10 dB
0.10 dB
5 dB/
MARKER △
413 kHz
0.10 dB
DL
-19.0
dBm
CENTER 904.00 MHz
SPAN 1.00 MHz
RES BW 10 kHz
VBW 30 kHz
SWP 30.0 msec

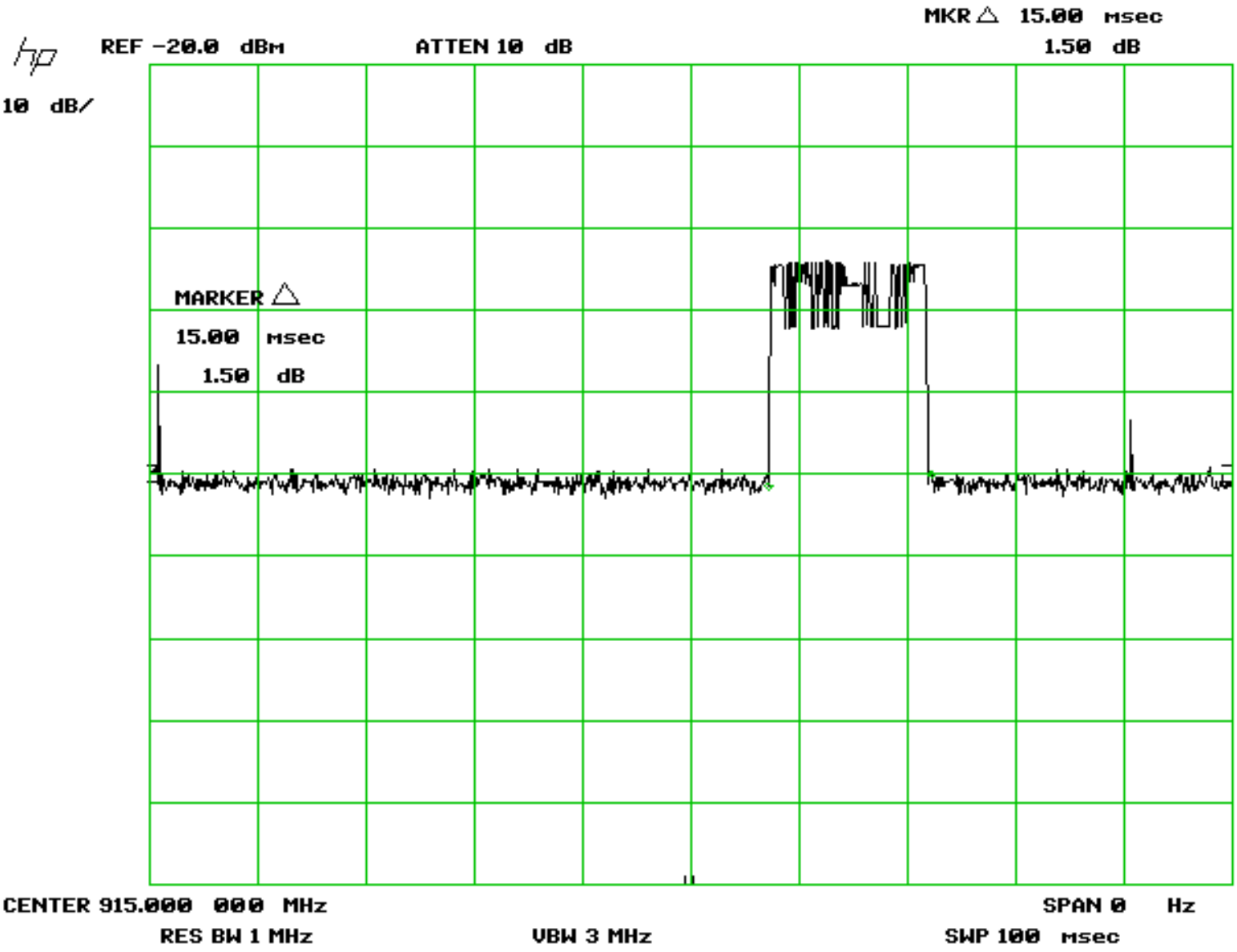

MKR △ 412 kHz
REF 0.0 dBm
ATTEN 10 dB
0.40 dB
5 dB/
MARKER △
412 kHz
0.40 dB
DL
-20.0
dBm
CENTER 915.00 MHz
SPAN 1.00 MHz
RES BW 10 kHz
VBW 30 kHz
SWP 30.0 msec

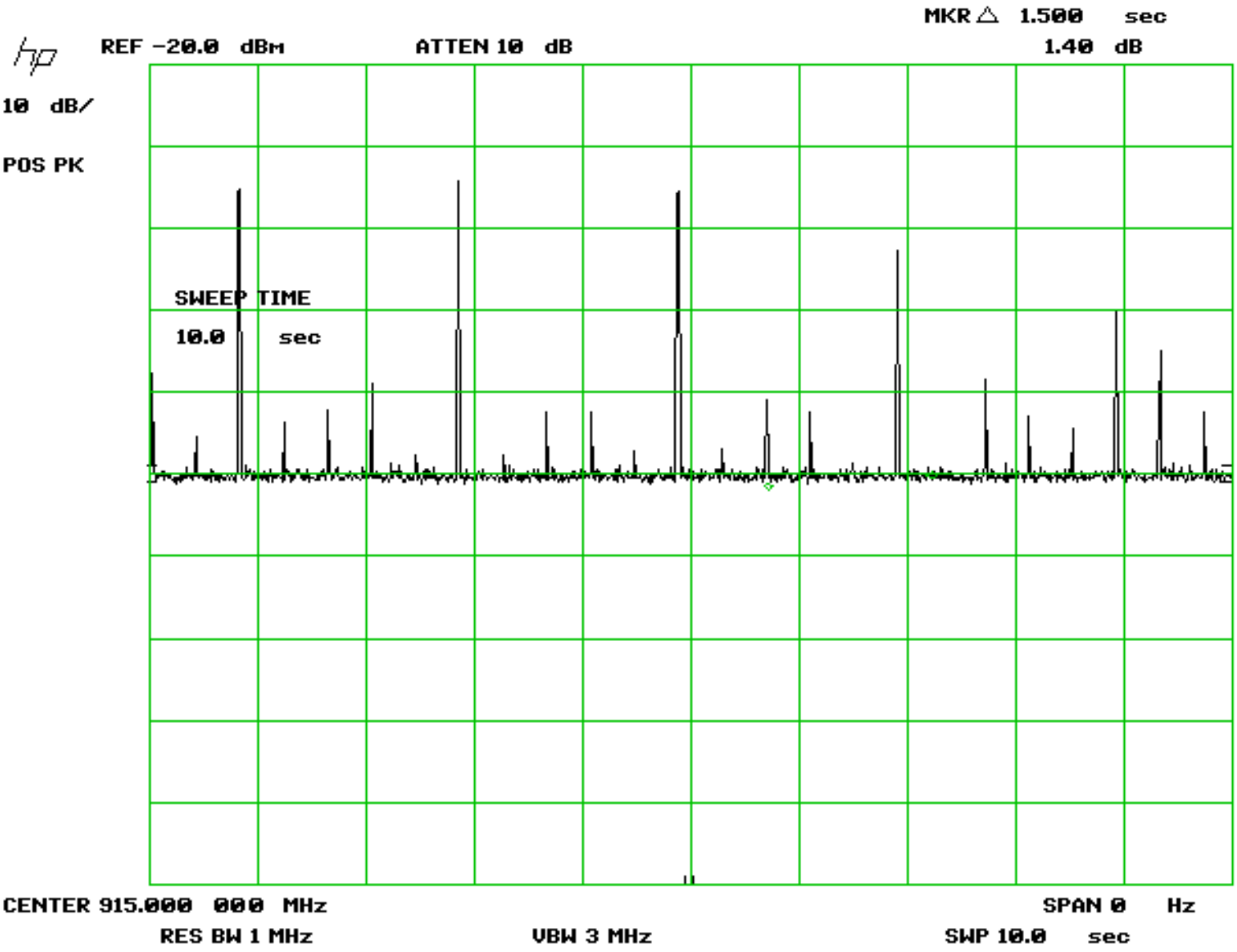

MKR △ 374 kHz
REF -0.8 dBm
ATTEN 10 dB
-2.45 dB
5 dB/
MARKER △
374 kHz
-2.45 dB
DL
-19.8
dBm
CENTER 926.02 MHz
SPAN 1.00 MHz
RES BW 10 kHz
VBW 30 kHz
SWP 30.0 msec

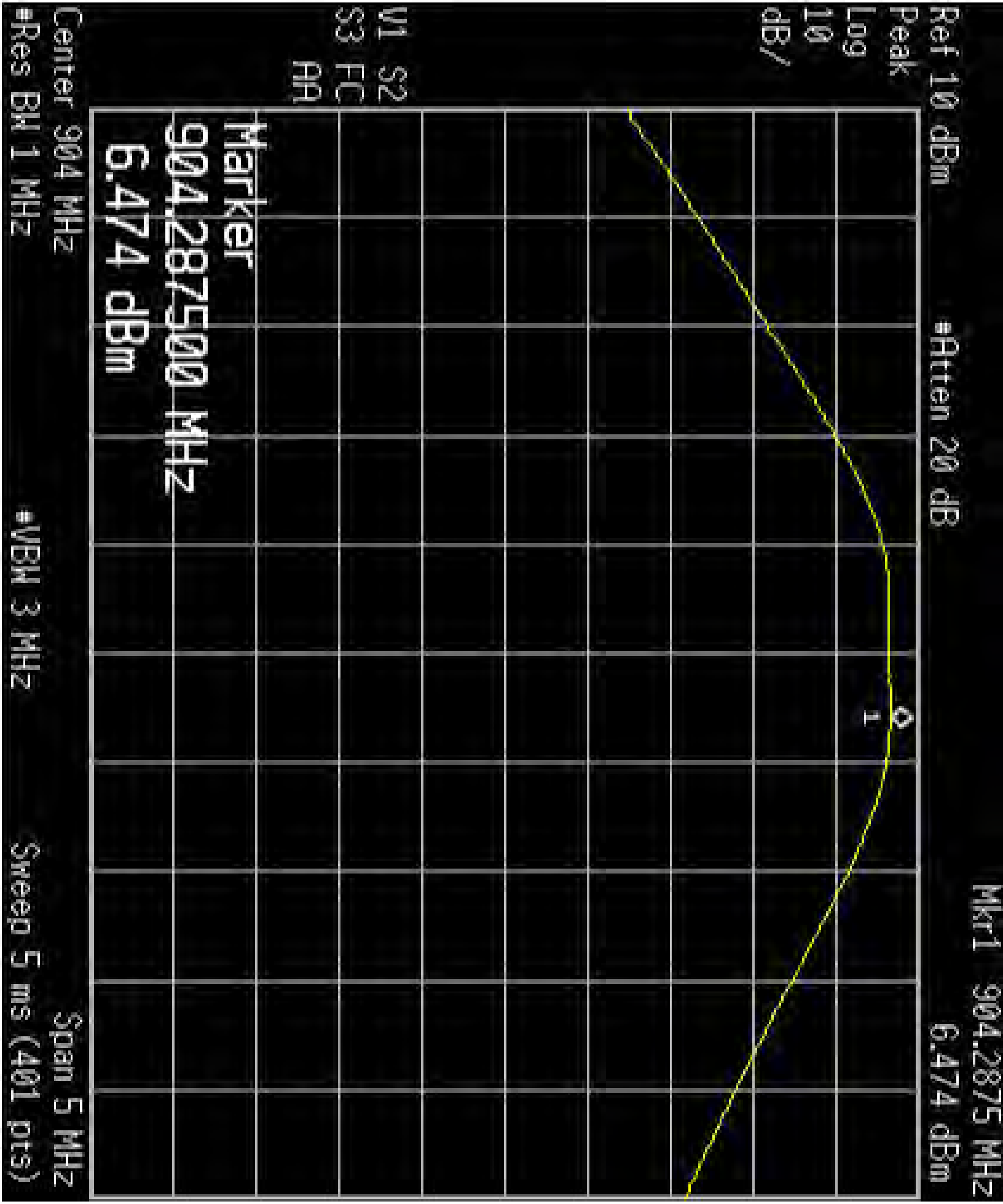

Mkr1 Δ 625 kHz
0.044 dB
Ref 10 dBm
#Atten 20 dB
Peak
Log
10
dB/
1R
1
Dl
-17.0
dBm
V1 S2
S3 FC
AA
Marker Δ
625.000 kHz
0.044 dB
Center 915 MHz
Span 2 MHz
#Res BW 30 kHz
#VBW 100 kHz
#Sweep 50 ms (401 pts)


MKR △ 4.86 MHz
REF 14.2 dBm
ATTEN 30 dB
9.85 dB
5 dB/
REF LEVEL
14.2 dBm
DL
-4.8
dBm
START 902.0 MHz
STOP 915.0 MHz
RES BW 100 kHz
VBW 300 kHz
SWP 500 msec

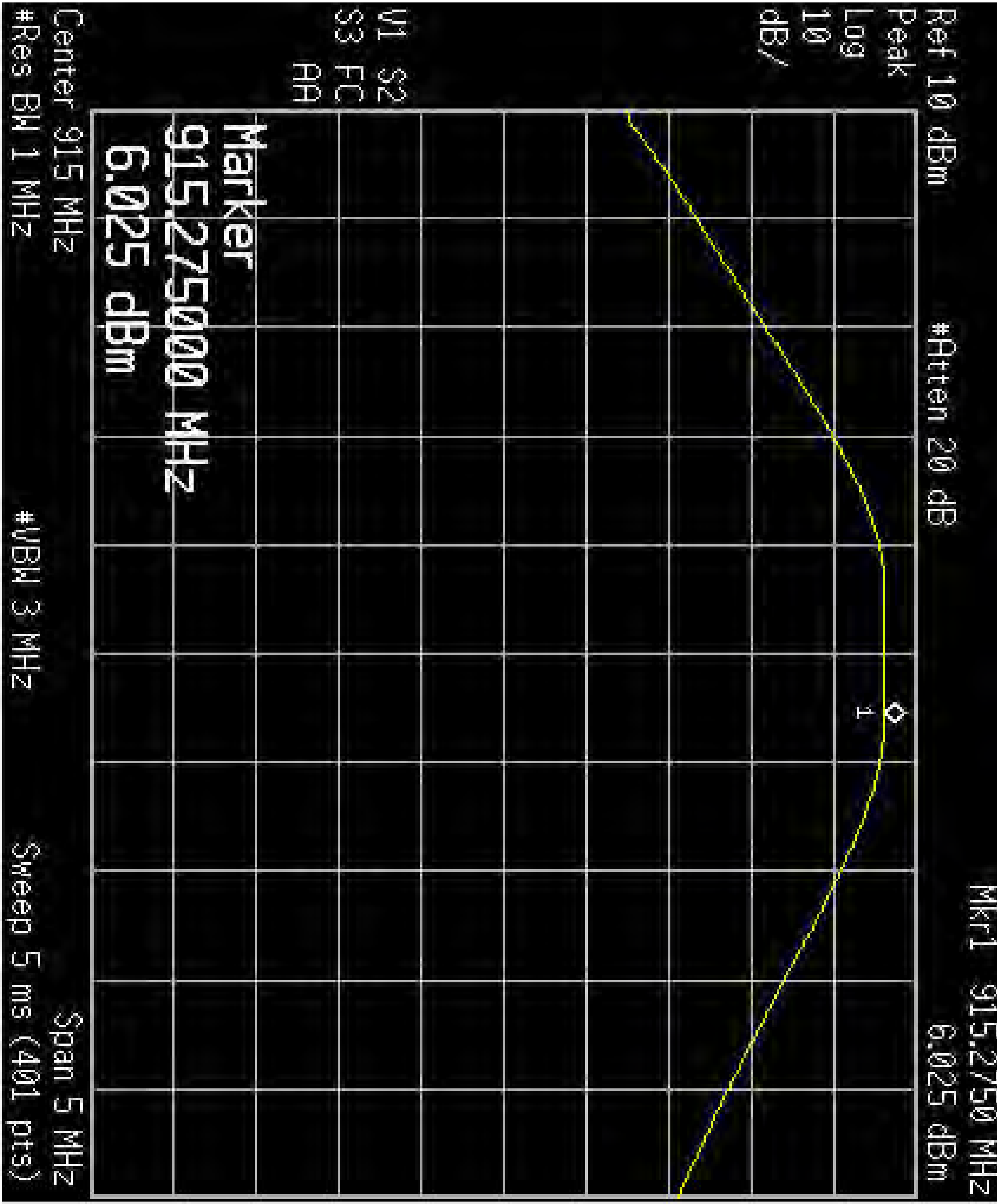

MKR △ 4.86 MHz
REF 14.2 dBm
ATTEN 30 dB
9.65 dB
5 dB/
STOP
928.0 MHz
DL
-4.8
dBm
START 915.0 MHz
STOP 928.0 MHz
RES BW 100 kHz
VBW 300 kHz
SWP 500 msec

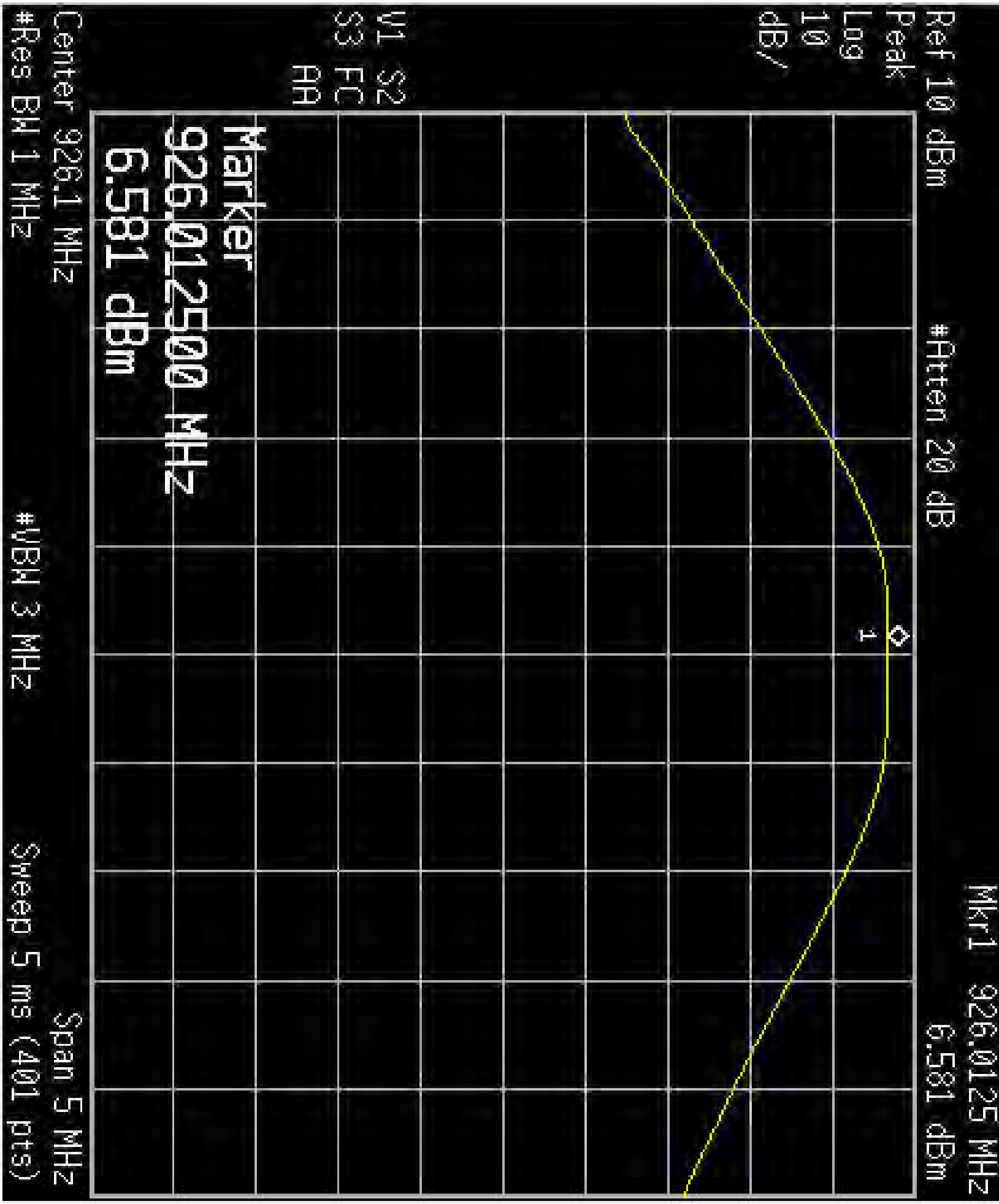

MKR △ 15.00 msec
REF -20.0 dBm
ATTEN 10 dB
1.50 dB
10 dB/
MARKER △
15.00 msec
1.50 dB
CENTER 915.000 000 MHz
SPAN 0 Hz
RES BW 1 MHz
VBW 3 MHz
SWP 100 msec

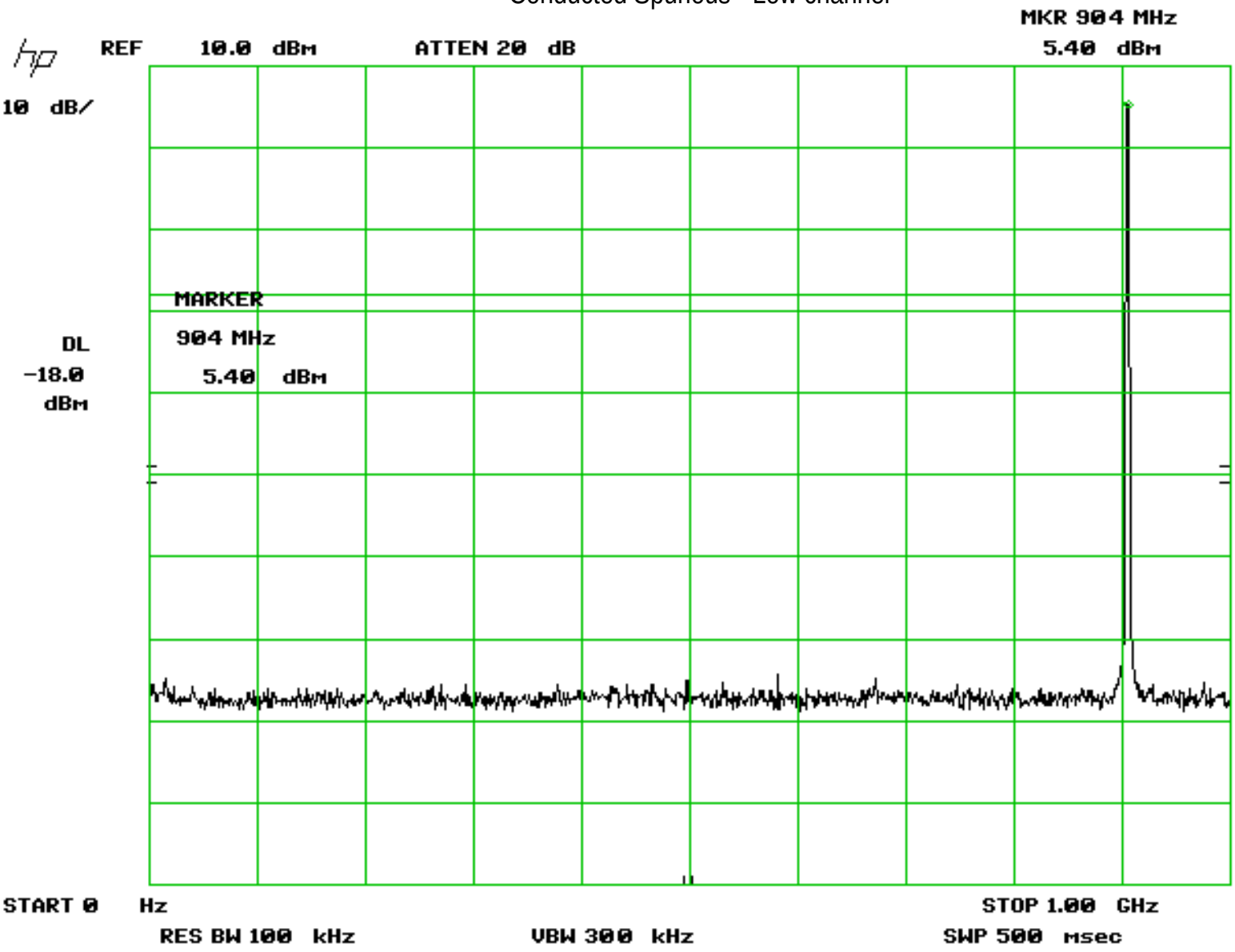

MKR △ 1.500 sec
REF -20.0 dBm
ATTEN 10 dB
1.40 dB
10 dB/
POS PK
SWEEP TIME
10.0 sec
CENTER 915.000 000 MHz
SPAN 0 Hz
RES BW 1 MHz
VBW 3 MHz
SWP 10.0 sec

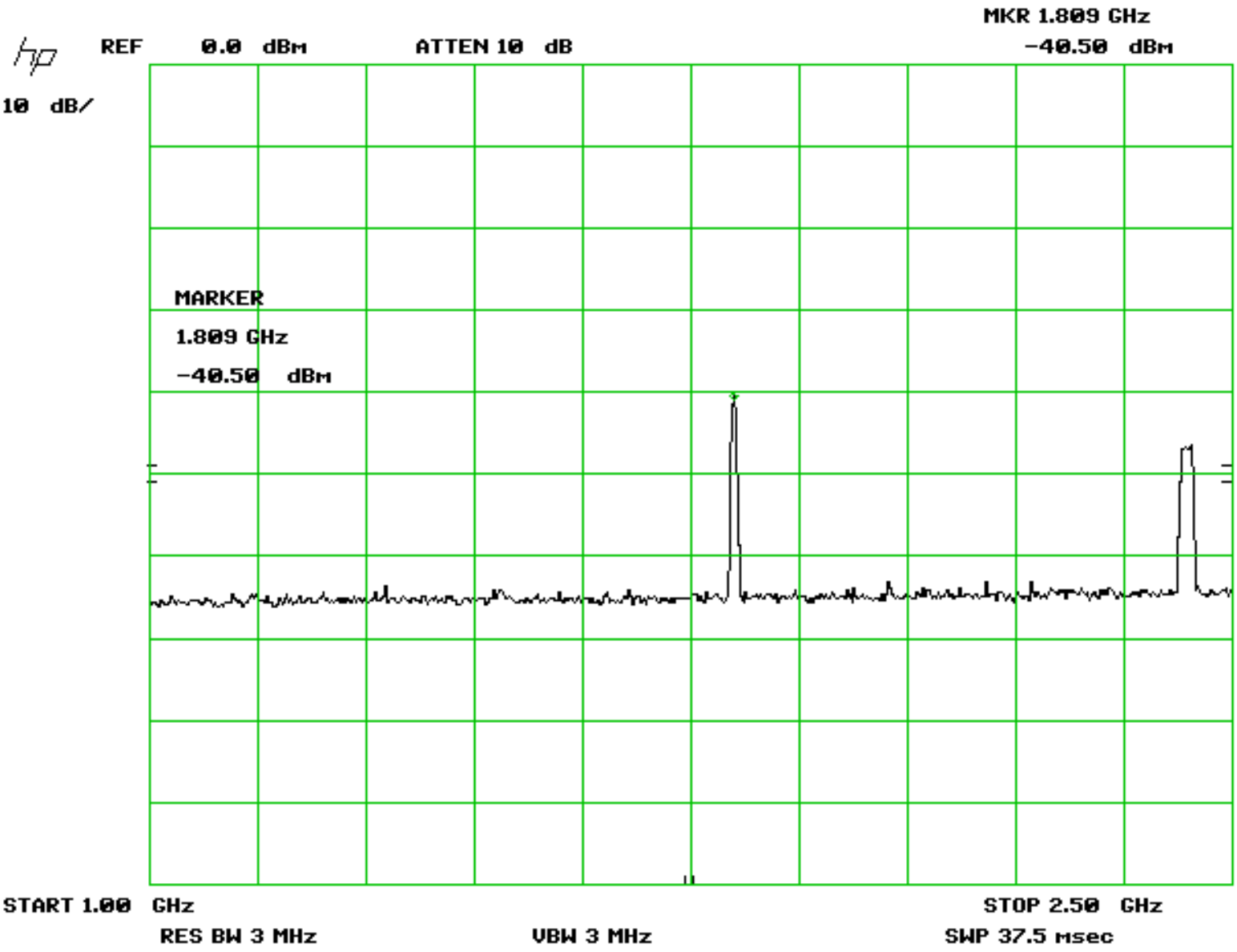

Ref 10 dBm
#Atten 20 dB
Mkr1 904.2875 MHz
6.474 dBm
Peak
Log
1.0
dB/
VA S2
S3 FC
AA
1
Marker
904.2875000 MHz
6.474 dBm
Center 904 MHz
#Res BW 1 MHz
#VBW 3 MHz
Span 5 MHz
Sweep 5 ms (401 pts)

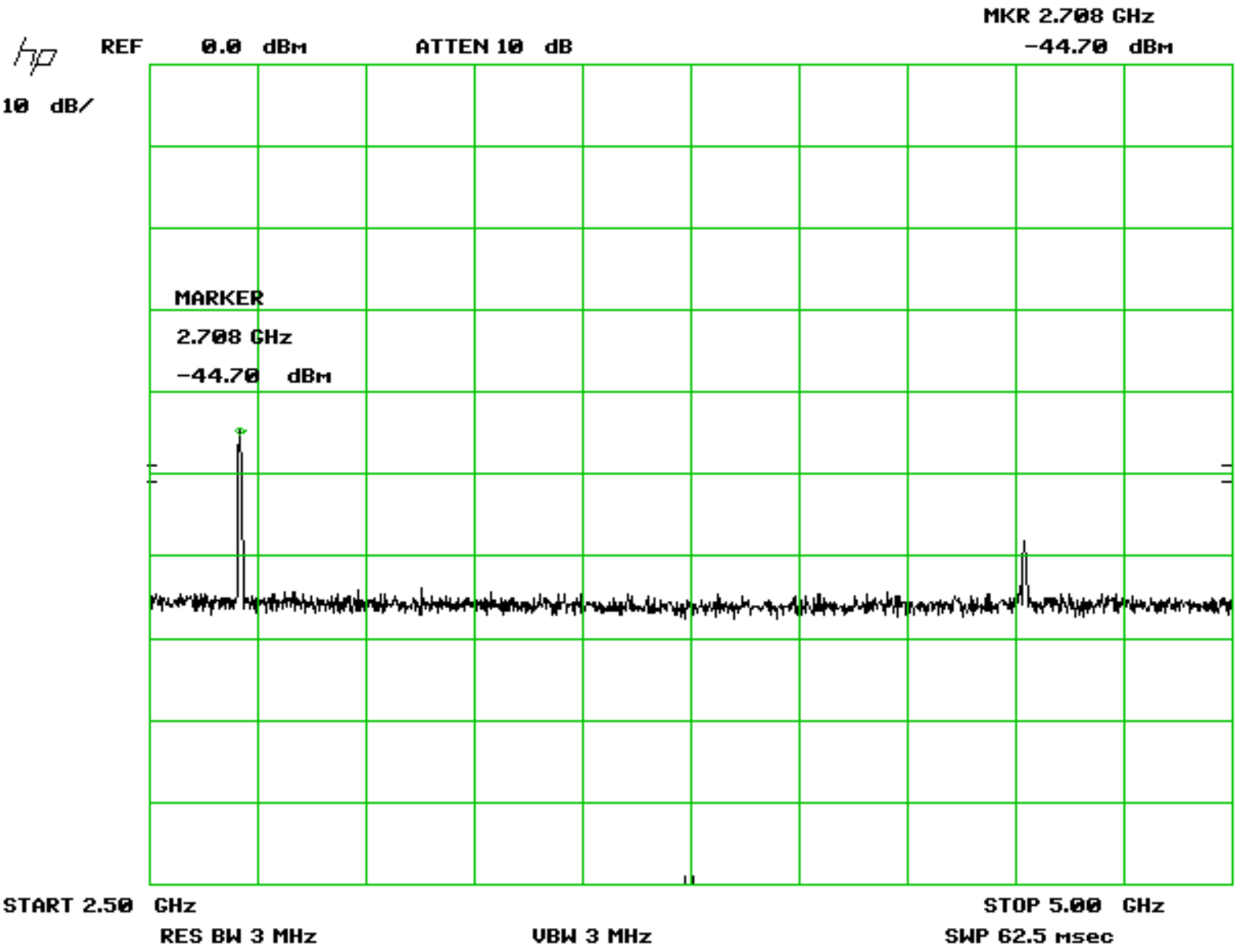
Output Power - middle channel

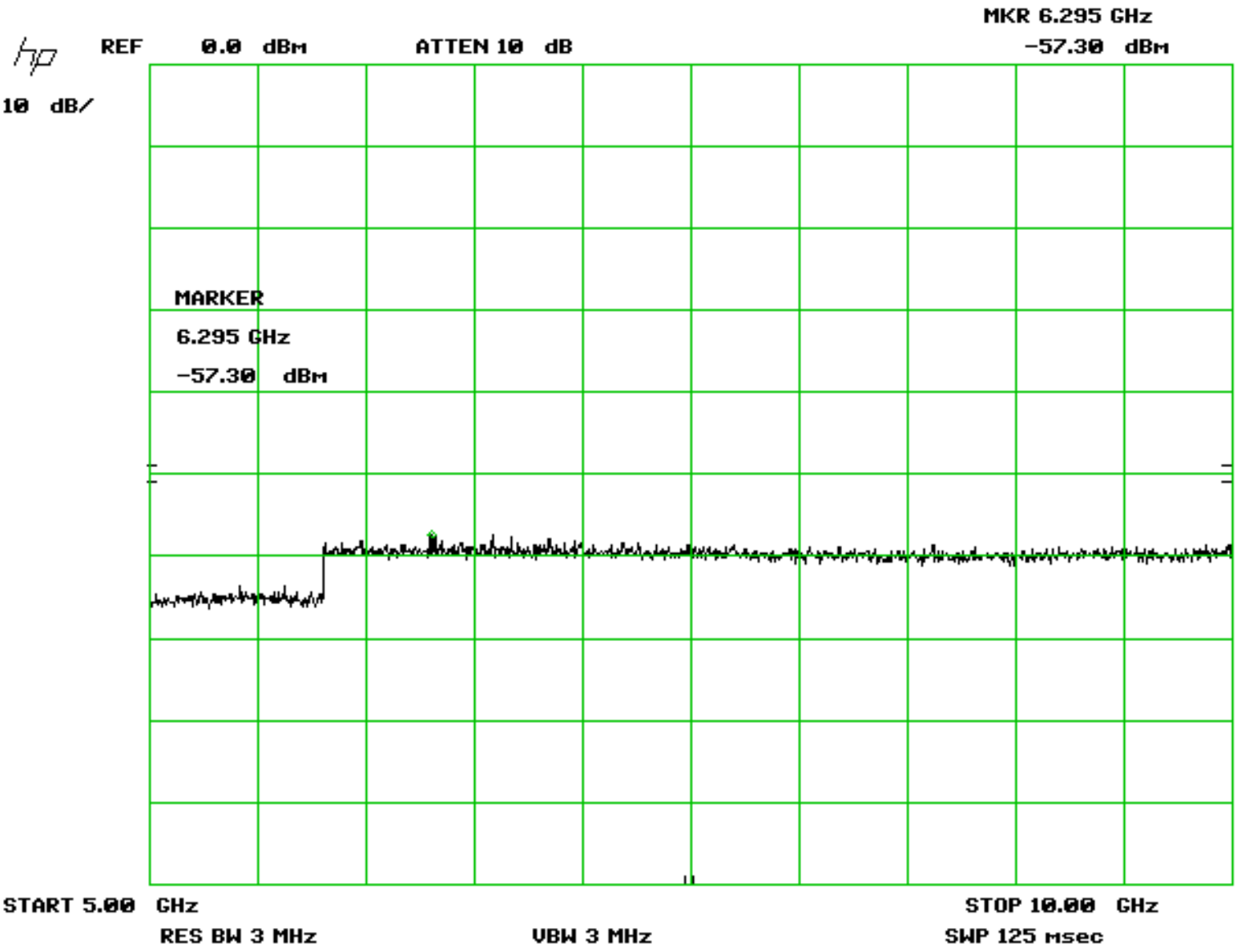


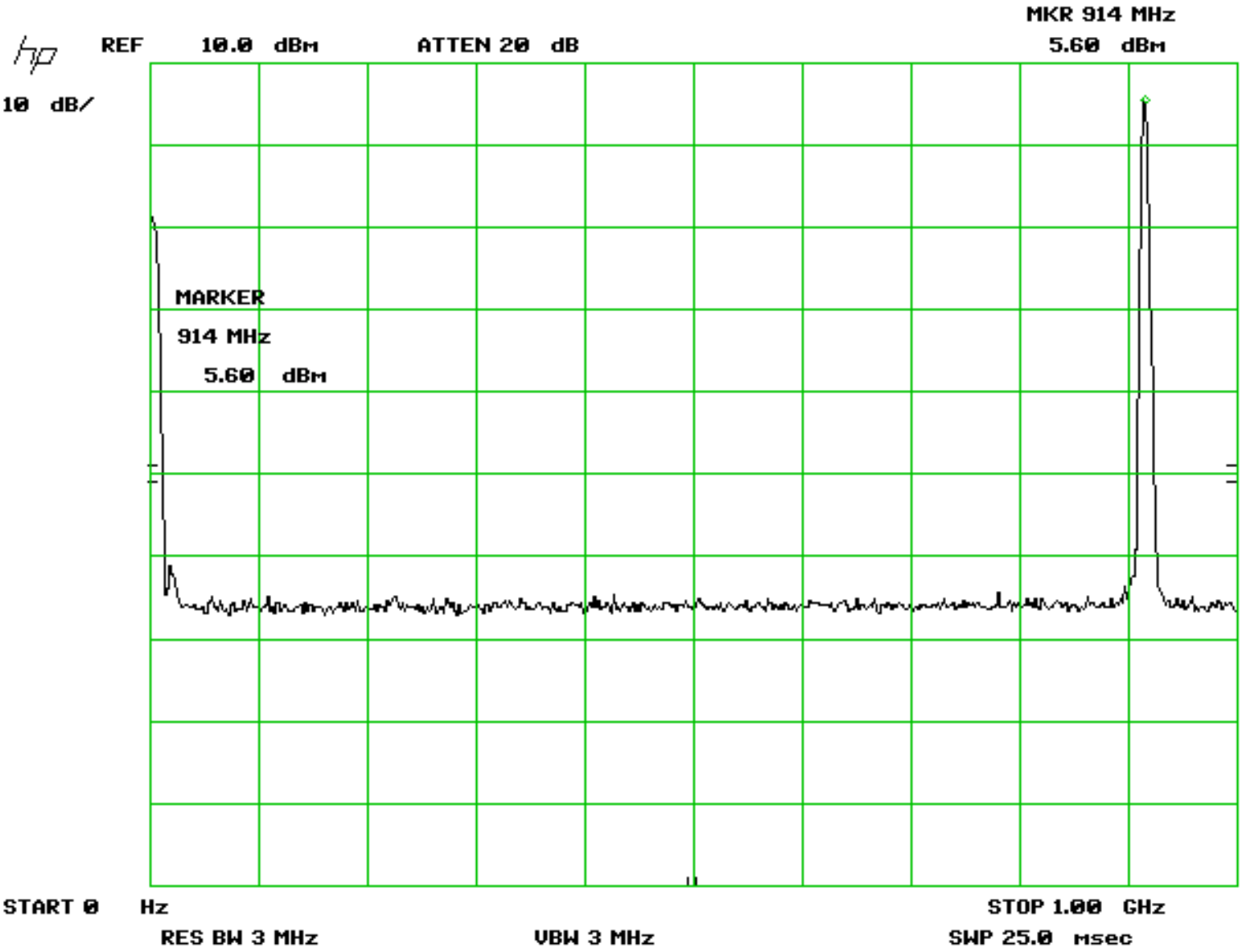

Ref 10 dBm
#Atten 20 dB
Mkr1 926.0125 MHz
6.581 dBm
Peak
Log
10
dB/
Tr1 S2
S3 FC
RB
Marker
926.0125000 MHz
6.581 dBm
Center 926.1 MHz
#Res BW 1 MHz
#VBW 3 MHz
Span 5 MHz
Sweep 5 ms (401 pts)

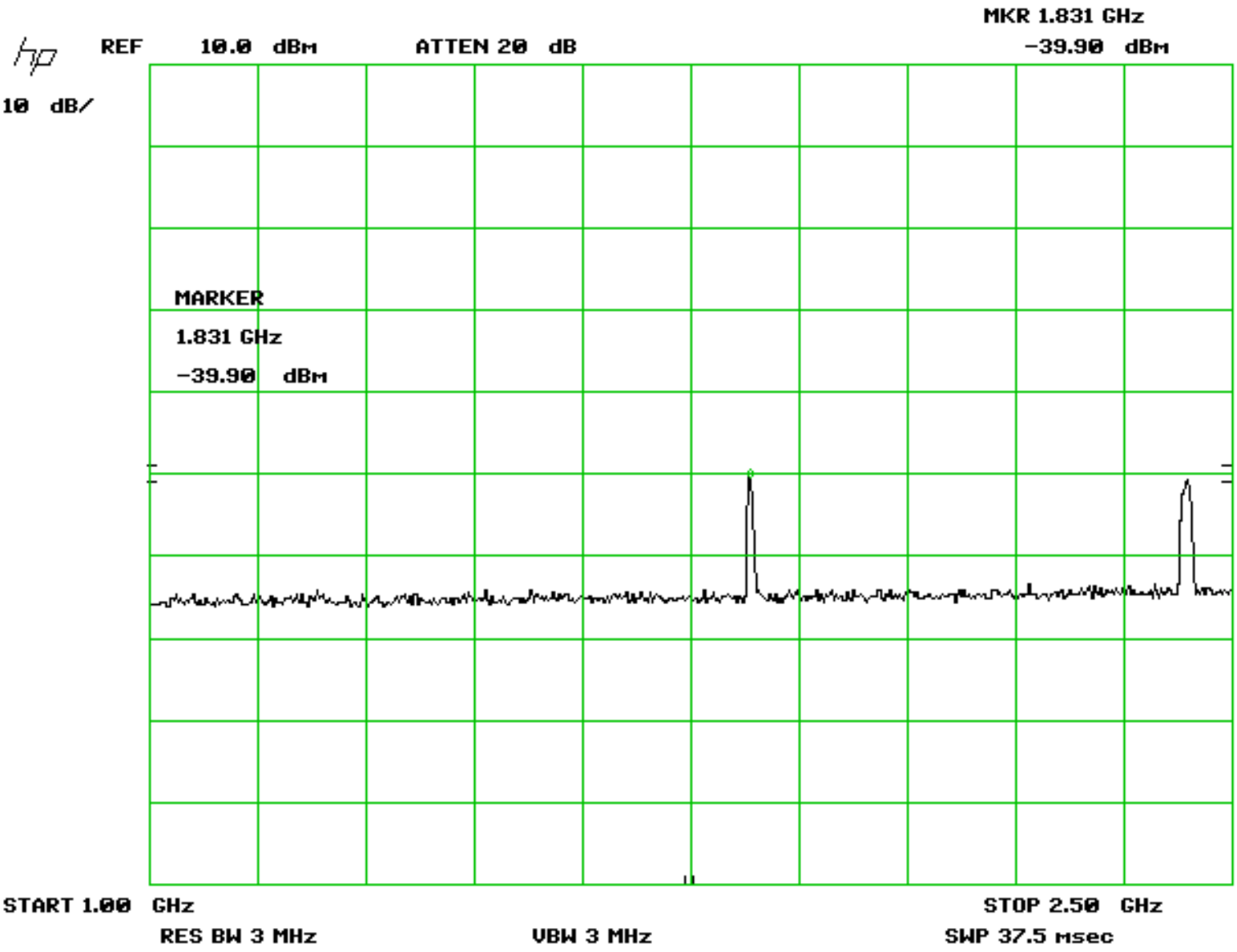

MKR 904 MHz
REF 10.0 dBm
ATTEN 20 dB
5.40 dBm
10 dB/
MARKER
904 MHz
5.40 dBm
DL
-18.0
dBm
START 0 Hz
STOP 1.00 GHz
RES BW 100 kHz
VBW 300 kHz
SWP 500 msec

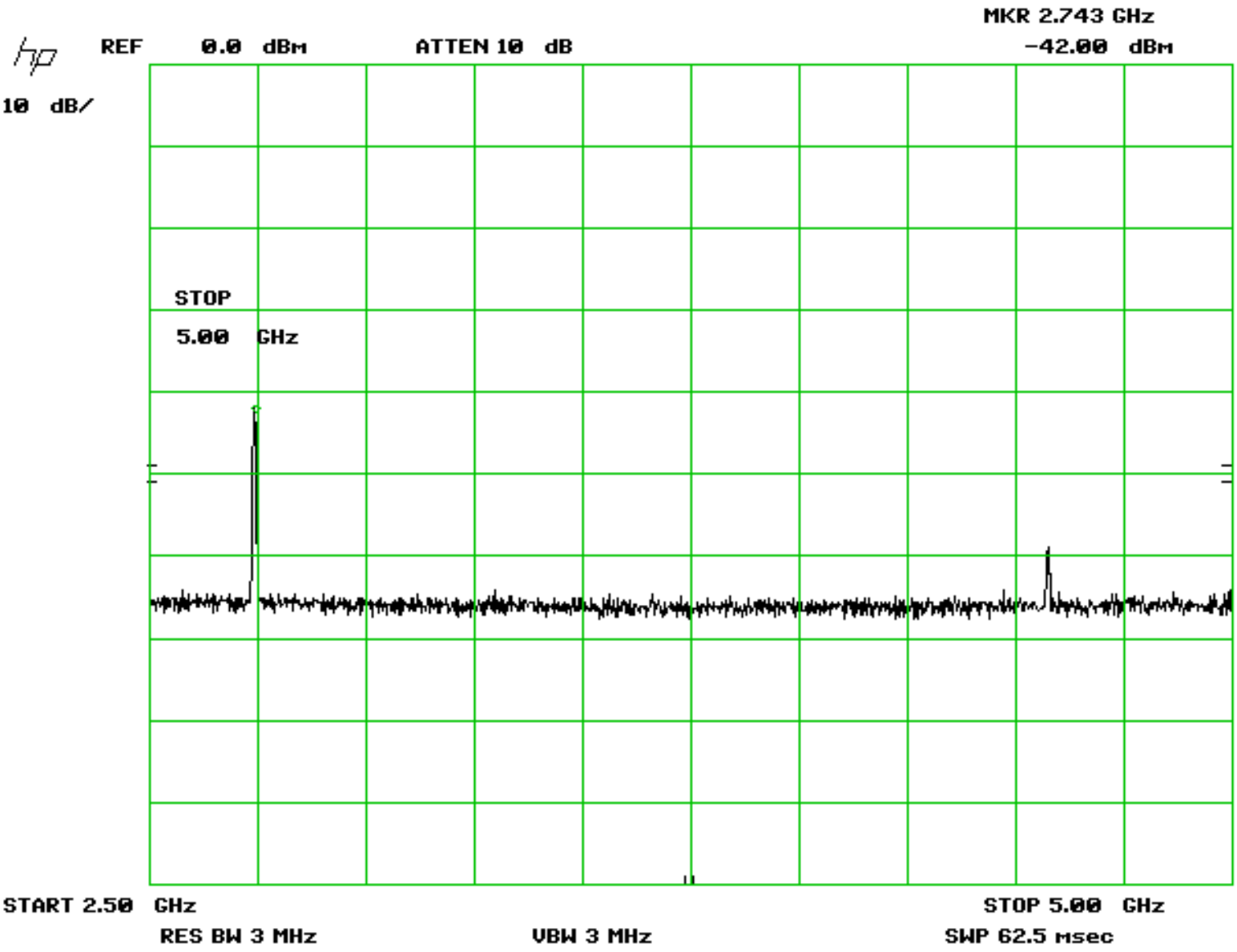

MKR 1.809 GHz
REF 0.0 dBm
ATTEN 10 dB
-40.50 dBm
10 dB/
MARKER
1.809 GHz
-40.50 dBm
START 1.00 GHz
STOP 2.50 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 37.5 msec

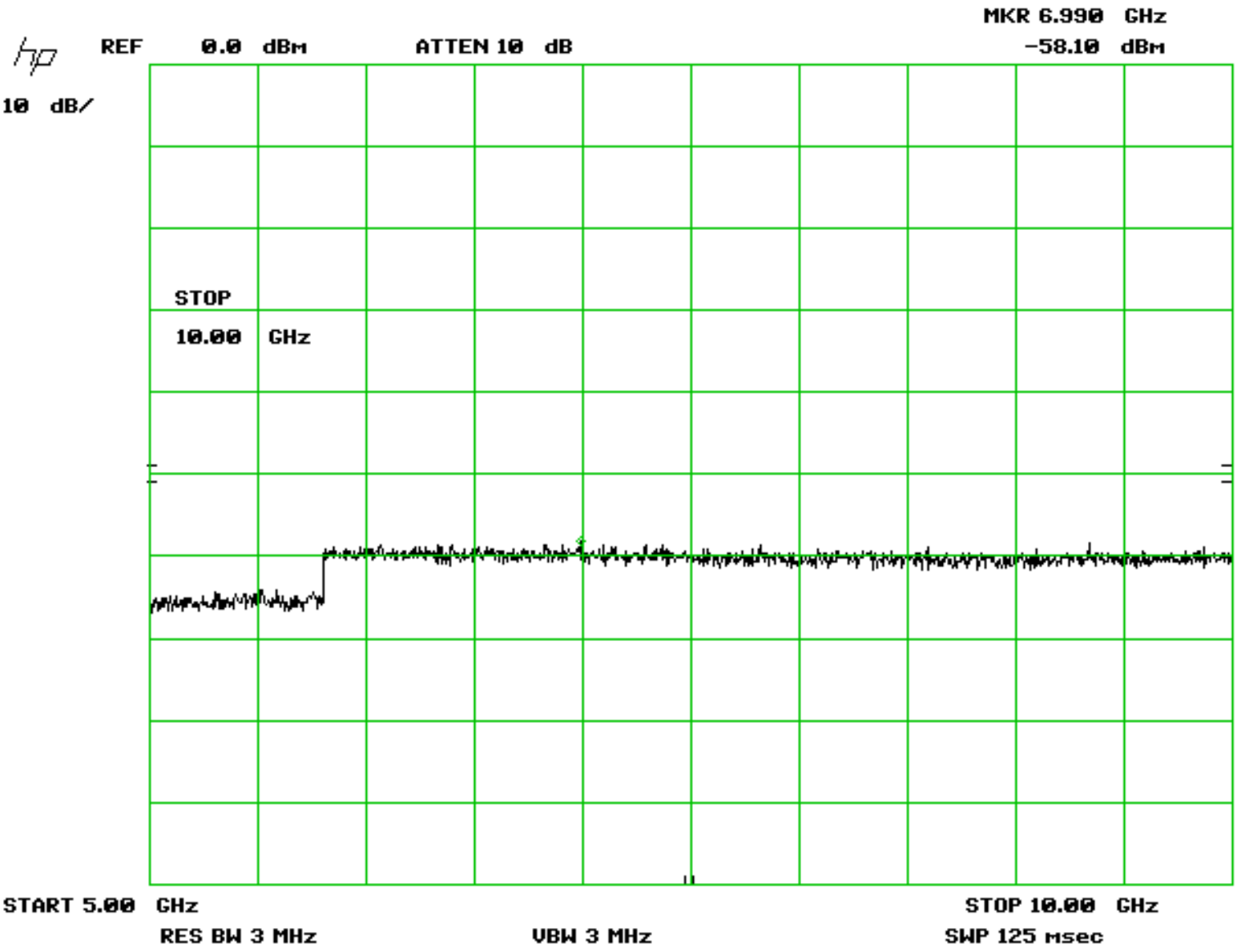

MKR 2.708 GHz
REF 0.0 dBm
ATTEN 10 dB
-44.70 dBm
10 dB/
MARKER
2.708 GHz
-44.70 dBm
START 2.50 GHz
STOP 5.00 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 62.5 msec

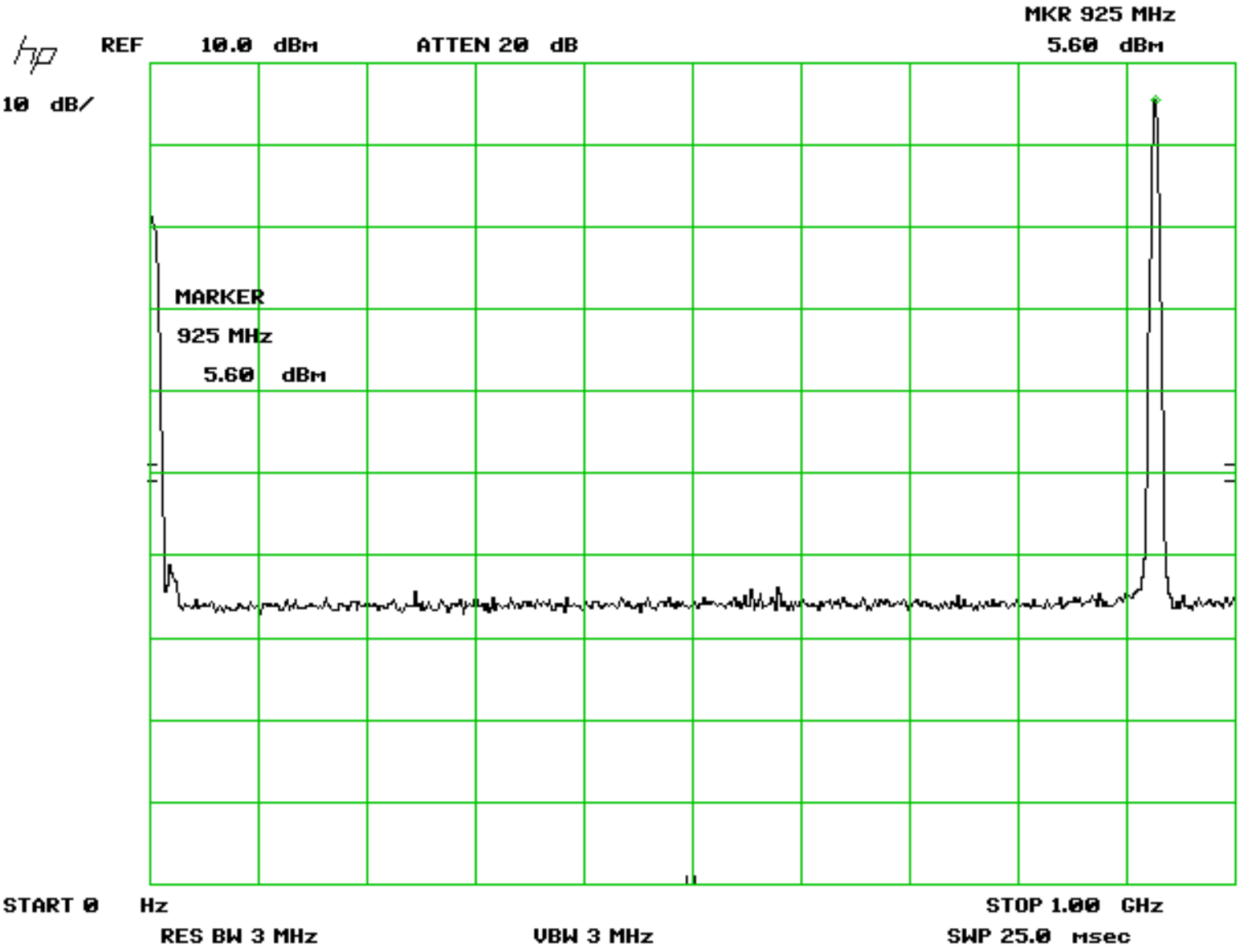

MKR 6.295 GHz
REF 0.0 dBm
ATTEN 10 dB
-57.30 dBm
10 dB/
MARKER
6.295 GHz
-57.30 dBm
START 5.00 GHz
STOP 10.00 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 125 msec

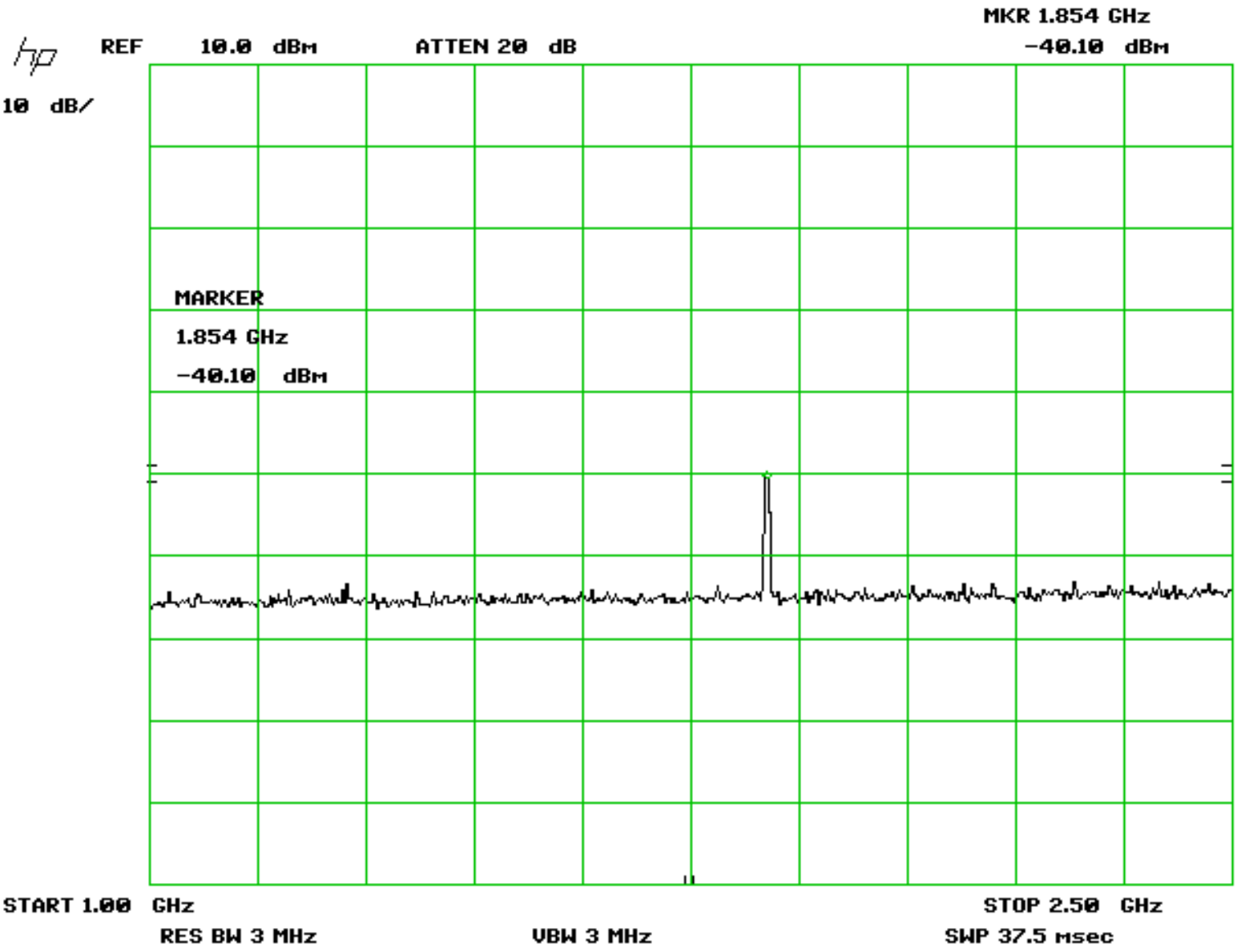

MKR 914 MHz
REF 10.0 dBm
ATTEN 20 dB
5.60 dBm
10 dB/
MARKER
914 MHz
5.60 dBm
START 0 Hz
STOP 1.00 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 25.0 msec

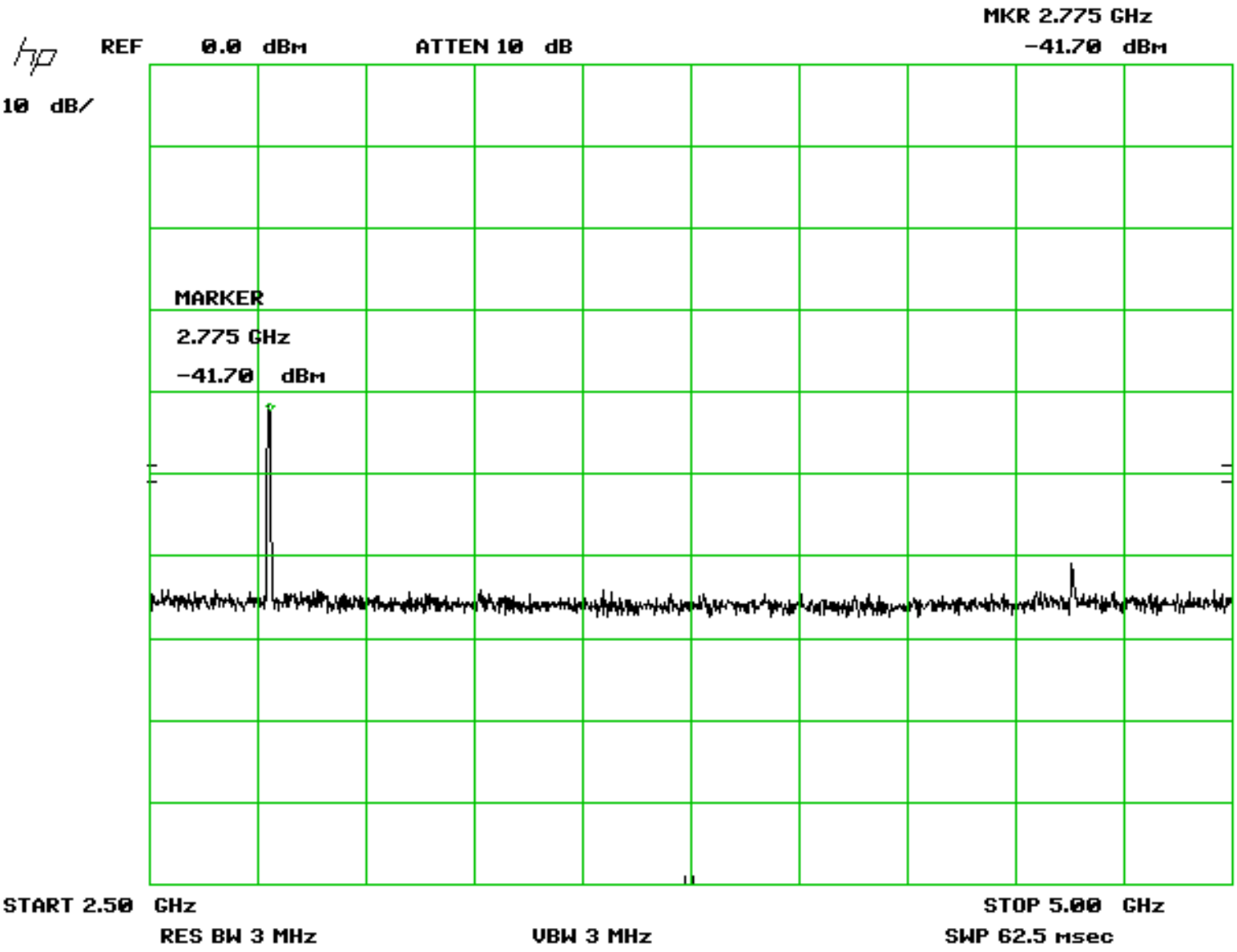

MKR 1.831 GHz
REF 10.0 dBm
ATTEN 20 dB
-39.90 dBm
10 dB/
MARKER
1.831 GHz
-39.90 dBm
START 1.00 GHz
STOP 2.50 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 37.5 msec

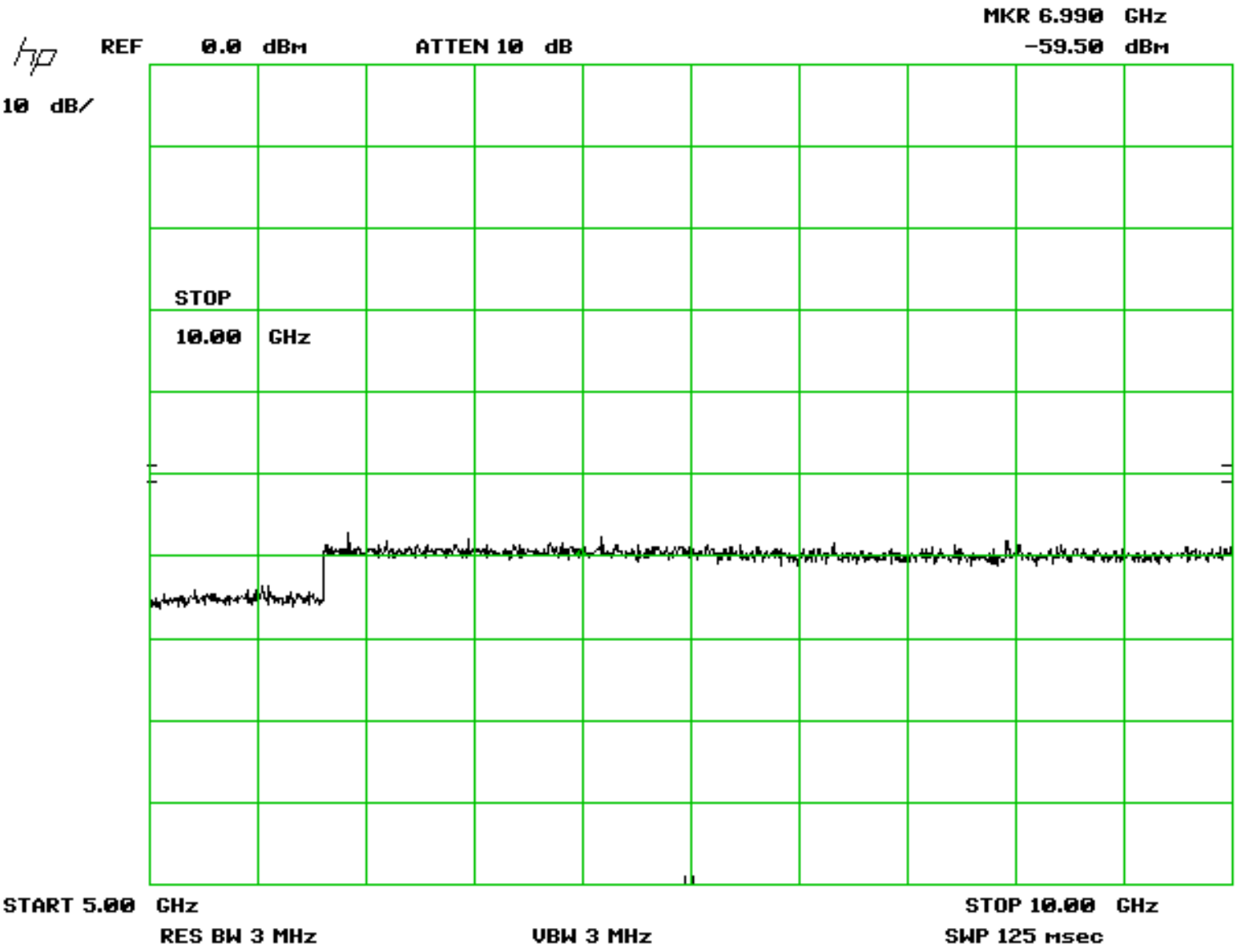

MKR 2.743 GHz
REF 0.0 dBm
ATTEN 10 dB
-42.00 dBm
10 dB/
STOP
5.00 GHz
START 2.50 GHz
STOP 5.00 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 62.5 msec


MKR 6.990 GHz
REF 0.0 dBm
ATTEN 10 dB
-58.10 dBm
10 dB/
STOP
10.00 GHz
START 5.00 GHz
STOP 10.00 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 125 msec


MKR 925 MHz
REF 10.0 dBm
ATTEN 20 dB
5.60 dBm
10 dB/
MARKER
925 MHz
5.60 dBm
START 0 Hz
STOP 1.00 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 25.0 msec


MKR 1.854 GHz
REF 10.0 dBm
ATTEN 20 dB
-40.10 dBm
10 dB/
MARKER
1.854 GHz
-40.10 dBm
START 1.00 GHz
STOP 2.50 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 37.5 msec


MKR 2.775 GHz
REF 0.0 dBm
ATTEN 10 dB
-41.70 dBm
10 dB/
MARKER
2.775 GHz
-41.70 dBm
START 2.50 GHz
STOP 5.00 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 62.5 msec


MKR 6.990 GHz
REF 0.0 dBm
ATTEN 10 dB
-59.50 dBm
10 dB/
STOP
10.00 GHz
START 5.00 GHz
STOP 10.00 GHz
RES BW 3 MHz
VBW 3 MHz
SWP 125 msec

	Spurious Radiated Emissions										
				904 MHz							
Freq. MHz	Peak Measured @ 3 m dBuV		ACF dBuV/m	CL dB	PA Gain dB	Adj Peak dBuV/m	Peak Limit dBuV/m	Delta PEAK dB	Average Measured @ 3 m dBuV/m	AVG Limit dBuV/m	Delta AVG dB
1808	45.5		30.7	8	30	54.2	74	-19.8	31.1	54	-22.9
2712	43.3		32.4	8.3	30	54	74	-20	28.1	54	-25.9
3616	29.8		33.3	10	30	43.1	74	-30.9	18.4	54	-35.6
4520	30		34.1	12.2	30	46.3	74	-27.7	16.2	54	-37.8
5424			34.5		30	4.5	74	-69.5		54	-54
6328			35.5		30	5.5	74	-68.5		54	-54
7232			35.6		30	5.6	74	-68.4		54	-54
8136			35.7		30	5.7	74	-68.3		54	-54
9040			36.3		30	6.3	74	-67.7		54	-54
				915							
Freq. MHz	Peak Measured @ 3 m dBuV		ACF dBuV/m	CL dB	PA Gain dB	Adj Peak dBuV/m	Peak Limit dBuV/m	Delta PEAK dB	Average Measured @ 3 m dBuV/m	AVG Limit dBuV/m	Delta AVG dB
1830	41.1		30.7	8	30	49.8	74	-24.2	26.2	54	-27.8
2745	44.2		32.4	8.3	30	54.9	74	-19.1	28.4	54	-25.6
3660	29		33.3	10	30	42.3	74	-31.7	17.9	54	-36.1
4575	30		34.1	12.2	30	46.3	74	-27.7	16.2	54	-37.8
5490			34.5		30	4.5	74	-69.5		54	-54
6405			35.5		30	5.5	74	-68.5		54	-54
7320			35.6		30	5.6	74	-68.4		54	-54
8235			35.7		30	5.7	74	-68.3		54	-54
9115			36.3		30	6.3	74	-67.7		54	-54
				926.17							
Freq. MHz	Peak Measured @ 3 m dBuV		ACF dBuV/m	CL dB	PA Gain dB	Adj Peak dBuV/m	Peak Limit dBuV/m	Delta PEAK dB	Average Measured @ 3 m dBuV/m	AVG Limit dBuV/m	Delta AVG dB
1852.34	42.7		30.7	8	30	51.4	74	-22.6	25.3	54	-28.7
2778.51	49.7		32.4	8.3	30	60.4	74	-13.6	29.9	54	-24.1
3704.68	29.4		33.3	10.1	30	42.8	74	-31.2	18	54	-36
4630.85	30		34.1	12.3	30	46.4	74	6.2	16.2	54	-37.8
5557.02			34.5		30	4.5	74	-69.5		54	-54
6483.19			35.5		30	5.5	74	-68.5		54	-54
7409.36			35.6		30	5.6	74	-68.4		54	-54
8335.53			35.7		30	5.7	74	-68.3		54	-54
9261.78			36.3		30	6.3	74	-67.7		54	

P/N	S161AM−915

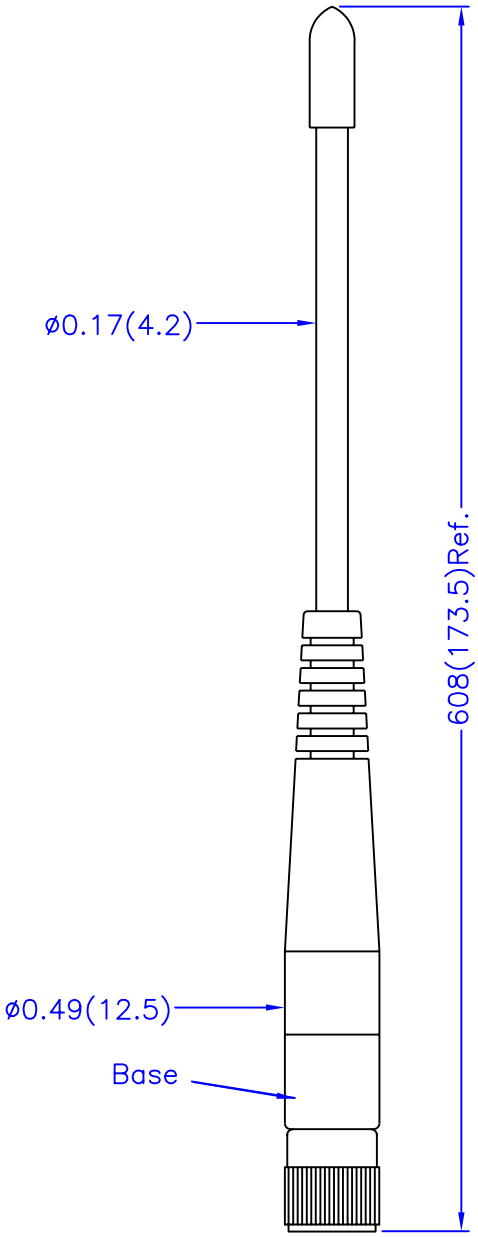
Alternative Connectors

.SMA Reverse Polarity Plug(female)

P/N: S161AH−915

.SMA Reverse Thread Plug(male)

P/N: S161AT−915



Electrical Properties:

Frequency Range:	902~928 MHz
Impedance:	50Ω nominal
VSWR:	<2.0:1
Gain:	2.5 dBi
Radiation:	Omni
Polarization:	Vertical
Wave:	½wave loaded

Mechanical Properties:

Connector:	SMA Plug
Material:	
Whip:	Wire (Black)
Base:	Polyacetal(Black)
Connector:	Brass with nickel plating(Black)
Operation Temp.:	−20°C to +65°C
Storage Temp.:	−30°C to +75°C

FCC ID:V7LWRA3

TOLERANCE		TITLE	900MHz ISM Band Antenna−161 Model	DATE	SHEET
.X					1 OF 1
.XX		UNIT	DWG. NO. S161AM−915		A4
.XXX		in.(mm)			
ANGLE		SCALE	NEARSON		
		1 : 1			