

DIVERSIFIED

T.E.S.T.

TECHNOLOGIES, INC.

4675 Burr Drive • Liverpool, NY 13088 • 1-800-724-6452 • FAX: 315-457-0428 • 315-457-0245

October 21, 2014

James Midyette
Genie Company
One Door Drive
Mt. Hope, OH 44660

Dear Mr. Midyette:

Enclosed is the test report for the Single Button Remote Control 360 MHz garage door opener transmitter models 1116633601 tested at our facility, located at 4675 Burr Drive in Liverpool, NY. This facility is on file with the Federal Communications Commission (FCC) per 47 CFR 2.948 (Site File Number 306552) and Industry Canada Site# 3034a-1.

We have completed our testing of Emissions to the FCC per 47 CFR Part 15 Class B and Part 15.231 Class C for intentional radiators and IC RSS 210 for Industry Canada Radio Standards Specification.

Thank you for selecting Diversified T.E.S.T. Technologies, Inc. for your testing needs. We look forward to working with you on future projects. Should you have any questions or concerns regarding this report, contact me at 315-457-0245. Please feel free to visit our website at www.dttlabs.com.

Sincerely,


Michael Hagin
Technical Associate

<i>DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT</i>	
Genie Company Single Button Remote Control	Project Number: 6488-1

Test Report – Table of Contents

DIVERSIFIED	1
TEST INFORMATION	3
EQUIPMENT UNDER TEST (EUT) TESTING OPERATION MODE	5
TEST SETUP PHOTOGRAPHS	6
1.1 RADIATED EMISSIONS / OCCUPIED BANDWIDTH	6
1.2. RADIATED EMISSIONS ABOVE 1 GHZ	7
EMISSIONS TESTING CONDITIONS	8
TRANSMISSION REQUIREMENTS	9
MINIMUM STANDARD:	9
RATIONALE FOR COMPLIANCE WITH TRANSMISSION REQUIREMENTS	10
DEACTIVATION TIME	11
RADIATED EMISSIONS 15.231 (B)	12
DUTY CYCLE CORRECTION	14
OCCUPIED BANDWIDTH	18
RESTRICTED BANDS OF OPERATION.....	19
SPURIOUS EMISSIONS	20
RADIATED EMISSION LIMITS 15.109	20
RADIATED EMISSIONS TEST DATA 15.109	21

DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT	
Genie Company Single Button Remote Control	Project Number: 6488-1

Test Information

<u>Laboratory</u>	<u>Manufacturer</u>
Diversified TEST Technologies, Inc.	Genie Company
4675 Burr Drive	One Door Drive
Liverpool, NY 13088	Mt. Hope, OH 44660

Report Issue Date: October 21, 2014
Report Number: 6488-1-102114- 15.231 (Edition 1)
Project Number: 6488-1

Date Received: July 21, 2014
Date Tested: July 21, 2014 – October 20, 2014

Product Single Button Remote Control 360 MHz
Model: 1116633601

Traceability: Reference standards of measurement have been calibrated by a competent body using standards traceable to NIST.


The testing performed by Diversified TEST Technologies, Inc. has shown that the product referenced above complies with the electromagnetic compatibility requirements according to the FCC per 47 CFR Part 15.231. The results in this test report apply only to the Single Button Remote Control 360 MHz, Model: 1116633601.

It is the responsibility of the manufacturer to ensure that the product identification and labeling are in compliance with the applicable standards requirements. The manufacturer is also responsible for ensuring that additional units are manufactured with identical mechanical and electrical characteristics.

The equipment listed above conforms to the specified requirements of the test standards listed in the Test Regulations section of this report.

Compiled by:
Signature: 
Michael Hagin
Technical Lab Manager

Date: October 21, 2014

Authorized by:
Signature: 
Tom Sims
President

Date: October 21, 2014

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Genie Company Single Button Remote Control		Project Number: 6488-1

Test Regulations

The tests were performed according to the following standards:

<input checked="" type="checkbox"/> FCC Part 15.231	<input type="checkbox"/> Class A	<input checked="" type="checkbox"/> Class C
<input checked="" type="checkbox"/> FCC Part 15	<input type="checkbox"/> Class A	<input checked="" type="checkbox"/> Class B

☒ Certification
☐ Verification

Summary of Test Data

Name of Test	Paragraph Number	Results
Transmission Requirements	15.231 (a)	Complies
Radiated Emissions	15.231 (b)	Complies
Occupied Bandwidth	15.231 (c)	Complies
Frequency Tolerance	15.231 (d)	N/A
Alternate Field Strength Requirements	15.231 (e)	N/A
Power line Conducted Emissions	15.207	N/A

Note:

- 1.) The Device does not operate between 40.66 to 40.70 MHz
- 2.) The Device does not operate at a periodic rate
- 3.) The Device is battery powered

DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT	
Genie Company Single Button Remote Control	Project Number: 6488-1

Equipment under Test (EUT) Testing Operation Mode

The EUT was operated under the following conditions during testing:

- ☐ Standby
- ☒ Normal Operating Mode
- ☐ Practice Operation

Description / Configuration of the EUT:

The Single Button Remote Control is a remote garage door opener transmitter. It operates at 360 MHz for the use of opening garage doors. The transmitter utilizes OOK Modulation techniques.

The EUT was powered with a 12 V battery during the collection of data included within this report.

Rationale for EUT setup / configuration:

ANSI C63.4 (2003) / FCC Part 15.231

Modifications:

None

Technical Contact:

James Midyette
Genie Company
One Door Drive
Mt. Hope, OH 44660

DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT

Genie Company
Single Button Remote Control

Project Number:
6488-1

Test Setup Photographs

1.1 Radiated Emissions / Occupied Bandwidth



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Genie Company
Single Button Remote Control

Project Number:
6488-1

1.2. Radiated Emissions above 1 GHz



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Genie Company Single Button Remote Control	Project Number: 6488-1

Emissions Testing Conditions

Radiated Emissions

The Radiated Emissions measurements, in the frequency range of 1 MHz – 6000 MHz, were tested in a horizontal and vertical polarization at the following test location:

- ☒ Diversified TEST Technologies, Inc. Open Area Test Site
☐ Diversified TEST Technologies, Inc. Lab

at a test distance of:

- ☒ 3 meters
☐ 10 meters
☐ 30 meters

Measurements above 1 GHz were made at a test distance of 1 Meter

DTT uses automated data reductions to determine product compliance to Radiated Emissions regulations. The product's signal data is compared to a current ambient scan. The frequencies that are of significant amplitude are sorted and are brought out to be further analyzed and maximized.

Test equipment used:

Manufacturer	Model	Description	Serial #	Last Cal	Cal Due
Hewlett Packard	8596E	Spectrum Analyzer	3235A00144	5/16/14	5/16/15
Agilent	E4405B	EMC Analyzer	US40520846	10/3/13	10/3/14
Electro-Metrics	LPA25	Log Periodic Antenna	1242	7/10/13	7/10/14
Electro-Metrics	RGA60	Ridge Horn Antenna	2981	12/9/13	12/9/14
Hewlett Packard	7550A	Plotter	2407A00476	N/A	N/A
	MFR-57500	Blue low-loss transmit cable	337	N/A	N/A
		Non-conductive wooden turntable		N/A	N/A
		10-meter open field test range, grounded with 1/4" x 1/4" hardware cloth		N/A	N/A

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<i>DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT</i>	
Genie Company Single Button Remote Control	Project Number: 6488-1

Transmission Requirements

Minimum Standard:

15.231 (a): Continuous transmissions such as voice, video, or data transmissions are not permitted.

15.231 (a) (1): A Manually operated transmitter shall employ a switch that will automatically deactivate within not more than 5 seconds after being released.

15.231 (a) (2): A transmitter activated automatically shall cease transmission within 5 seconds of activation.

15.231 (a) (3): Periodic Transmission at regular predetermined intervals are not permitted. However, polling or supervisory transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.

15.231 (a) (4): Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life when activated to signal an alarm, may operate during the pendency of the alarm.

Test Results: Complies

Test Data: Compliance was determined by verification of technical specifications and functional tests on the equipment.

DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT	
Genie Company Single Button Remote Control	Project Number: 6488-1

Rationale for Compliance with Transmission Requirements

15.231 (a) (1)	<input checked="" type="checkbox"/> Manual Activation	Tx deactivation time:
15.231 (a) (2)	<input type="checkbox"/> Automatic Activation	
15.231 (a) (3)	<input type="checkbox"/> Regular, predetermined transmissions <input type="checkbox"/> Polling or supervisory transmissions	Tx rate and duration
15.231 (a) (4)	<input type="checkbox"/> Alarm device operating during the pendency of alarm condition <input checked="" type="checkbox"/> Non-Alarm Device	

<i>DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT</i>	
Genie Company Single Button Remote Control	Project Number: 6488-1

Deactivation Time

Test Data: Deactivation Time 360 MHz

Test Results: Complies, see attached data

03: 15: 54 AUG 21, 2014

GENIE#6488, DEACTIATION T 1116633601 MKR Δ 100.00 msec

REF 80.0 dB μ V

#AT 0 dB

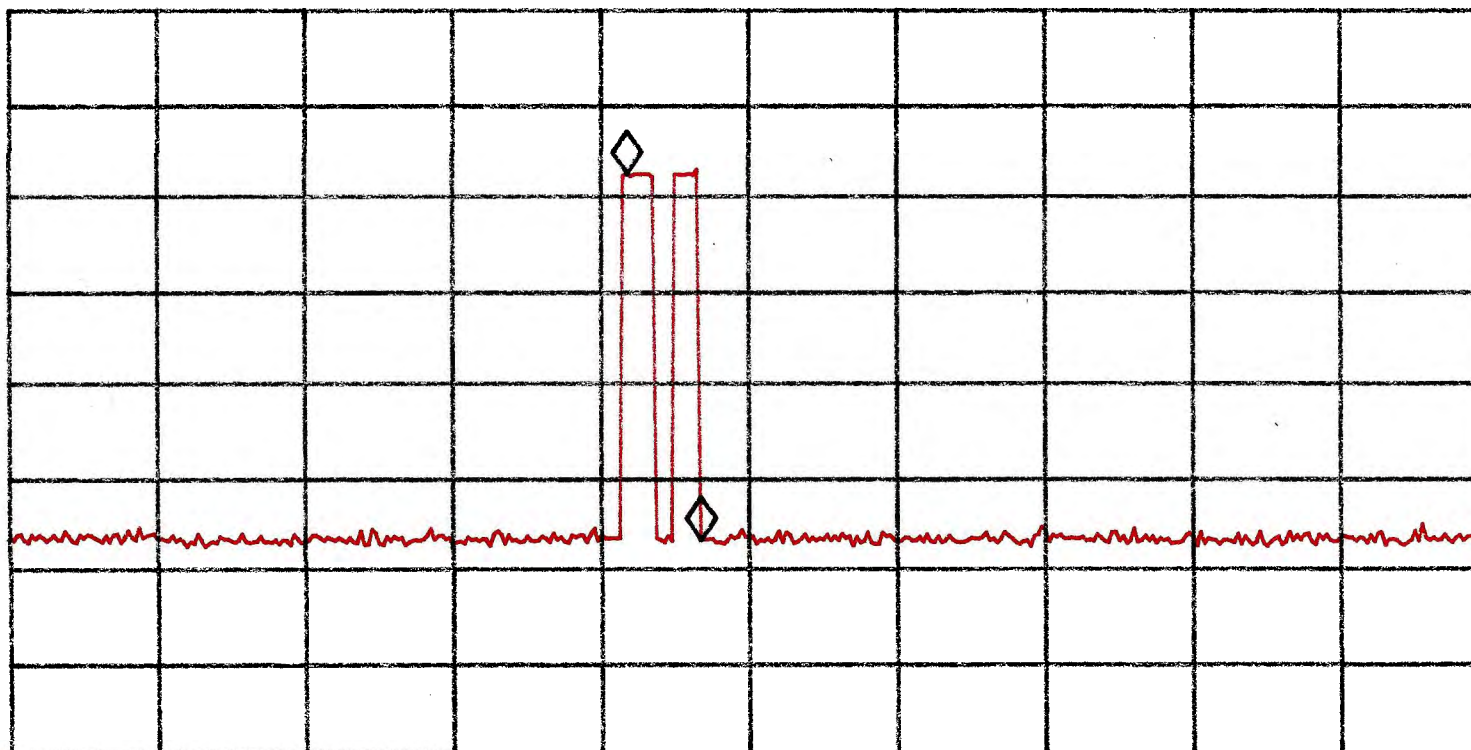
-39.14 dB

PEAK

LOG

10

dB/



Marker	Trace	Type
1:	(B)	Δ Time
2:	(B)	Δ Ref
3:	Inactive	
4:	Inactive	

Freq / Time	Amplitude
100.00 mS	-39.14 dB
835.00 mS	62.43 dBuV

CENTER 360.000 MHz

#RES BW 1.0 MHz

SPAN 0 Hz

#VBW 100 kHz

#SWP 2.00 sec

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Genie Company Single Button Remote Control	Project Number: 6488-1

Radiated Emissions 15.231 (b)

Minimum Standard:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

Any emissions that fall within the restricted bands of 15.205 shall not exceed the following limits:

Frequency (MHz)	Field Strength (μV/m @ 3m)	Field Strength (dB @ 3m)
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

Test Result: Complies, see table on next page.

Above 1 GHz a spectrum analyzer is used to measure emission levels. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was set to 1 MHz.

DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT

Genie Company
Single Button Remote Control

Project Number:
6488-1

Test Data: Radiated Emissions

Freq. (MHz)	Antenna Polarization	Meter Reading (dBuV)				LESS Duty Factor (dB)	ADD Cable Factor (dB)	ADD Antenna Factor (dB)	LESS 1 m to 3 m Distance Factor (dB)	Corrected Reading (dBuV/m)	FCC Spec Limit (dBuV/m)	Margin (dB)	Result	Comments
		X	Y	Z	Max									
360	H	55.0	45.6	49.6	55.0	-8.0	8.6	15.3	0.0	70.9	78.0	-7.1	Pass	
	V	39.7	51.0	52.2	52.2	-8.0	8.6	15.3	0.0	68.2	78.0	-9.8	Pass	
720	H	27.8	24.6	23.2	27.8	-8.0	14.4	22.1	0.0	56.3	58.0	-1.7	Pass	
	V	22.7	22.9	25.9	25.9	-8.0	14.4	22.1	0.0	54.5	58.0	-3.5	Pass	
1080	H	28.3	29.9	25.9	29.9	-8.0	0.2	24.4	-9.5	37.0	54.0	-17.0	Pass	Noise Floor
	V	27.6	31.1	32.2	32.2	-8.0	0.2	24.4	-9.5	39.3	54.0	-14.7	Pass	
1440	H	26.7	30.4	27.1	30.4	-8.0	0.4	25.7	-9.5	39.0	54.0	-15.0	Pass	Noise Floor
	V	28.3	30.3	29.3	30.3	-8.0	0.4	25.7	-9.5	38.9	54.0	-15.1	Pass	Noise Floor
1800	H	27.7	31.5	27.8	31.5	-8.0	0.1	27.6	-9.5	41.7	58.0	-16.3	Pass	
	V	31.6	33.5	33.2	33.5	-8.0	0.1	27.6	-9.5	43.7	58.0	-14.3	Pass	
2160	H	28.4	33.2	29.0	33.2	-8.0	0.2	28.9	-9.5	44.8	58.0	-13.2	Pass	
	V	30.2	31.4	29.6	31.4	-8.0	0.2	28.9	-9.5	43.0	58.0	-15.0	Pass	
2520	H	30.7	32.2	29.8	32.2	-8.0	0.3	29.3	-9.5	44.2	58.0	-13.8	Pass	
	V	30.9	31.1	31.7	31.7	-8.0	0.3	29.3	-9.5	43.7	58.0	-14.3	Pass	
2880	H	32.0	34.8	31.6	34.8	-8.0	0.3	30.2	-9.5	47.8	54.0	-6.2	Pass	
	V	31.5	31.5	32.4	32.4	-8.0	0.3	30.2	-9.5	45.4	54.0	-8.6	Pass	
3240	H	33.4	34.4	36.0	36.0	-8.0	0.3	31.3	-9.5	50.1	58.0	-7.9	Pass	
	V	30.7	32.1	32.5	32.5	-8.0	0.3	31.3	-9.5	46.5	58.0	-11.5	Pass	
3600	H	33.9	34.6	36.7	36.7	-8.0	0.4	32.4	-9.5	51.9	54.0	-2.1	Pass	
	V	31.6	34.0	33.3	34.0	-8.0	0.4	32.4	-9.5	49.3	54.0	-4.7	Pass	

The EUT was tested on all three axis

The EUT was tested with fresh batteries

The spectrum was searched from 30 MHz to 6 GHz

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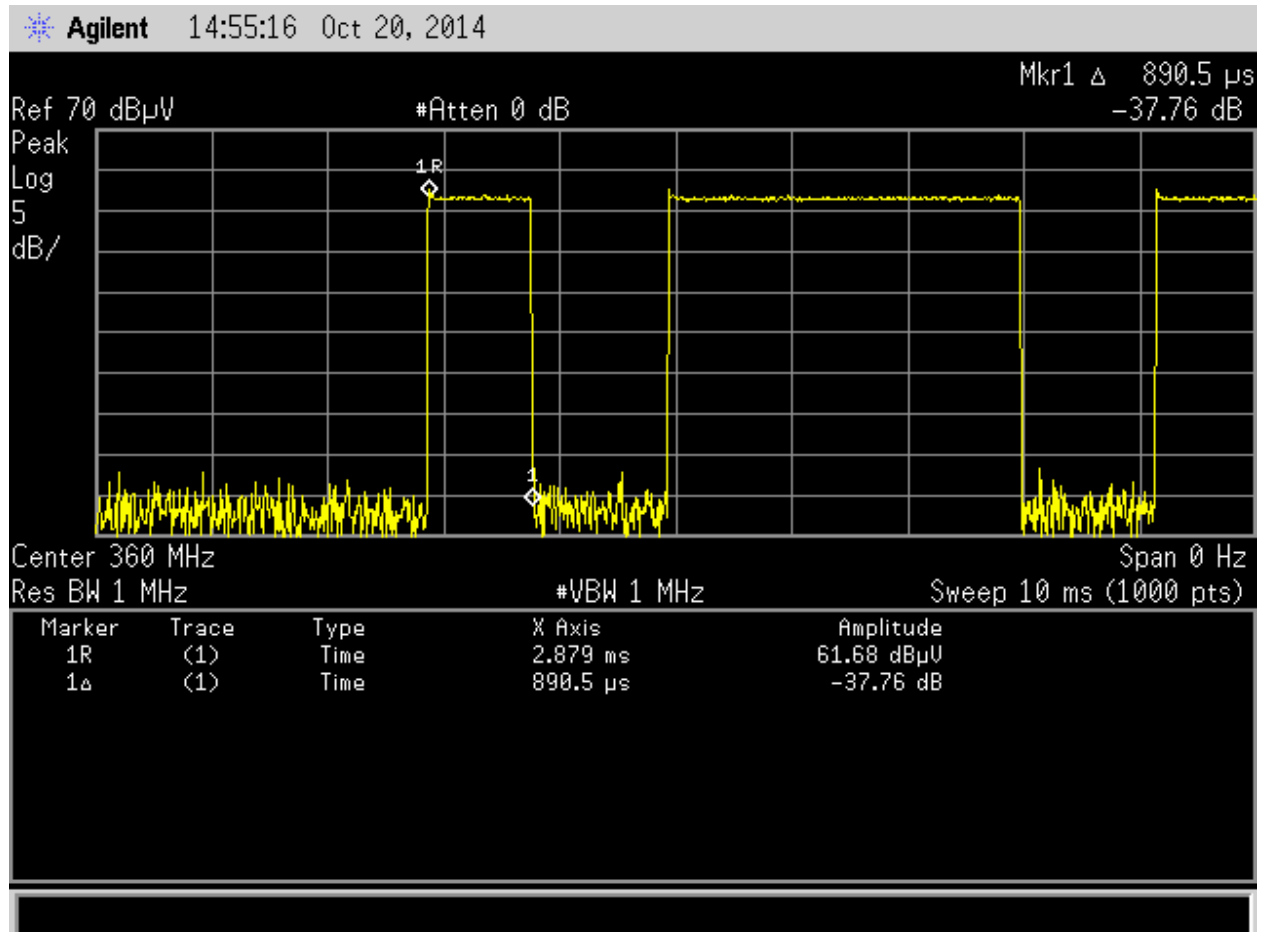
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Genie Company
Single Button Remote Control

Project Number:
6488-1

Duty Cycle Correction

Narrow Pulses



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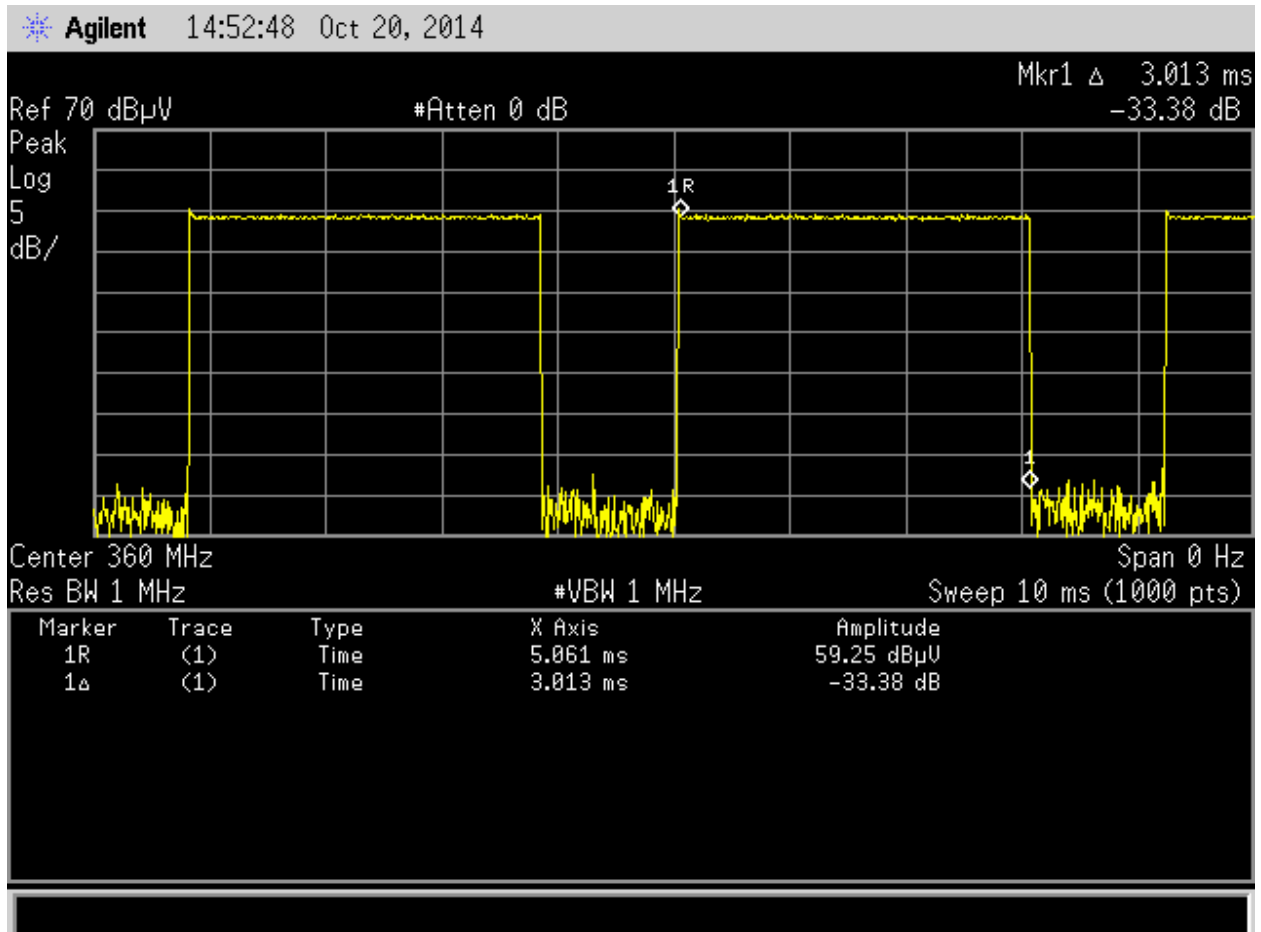
DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT

Genie Company
Single Button Remote Control

Project Number:
6488-1

Duty Cycle Correction

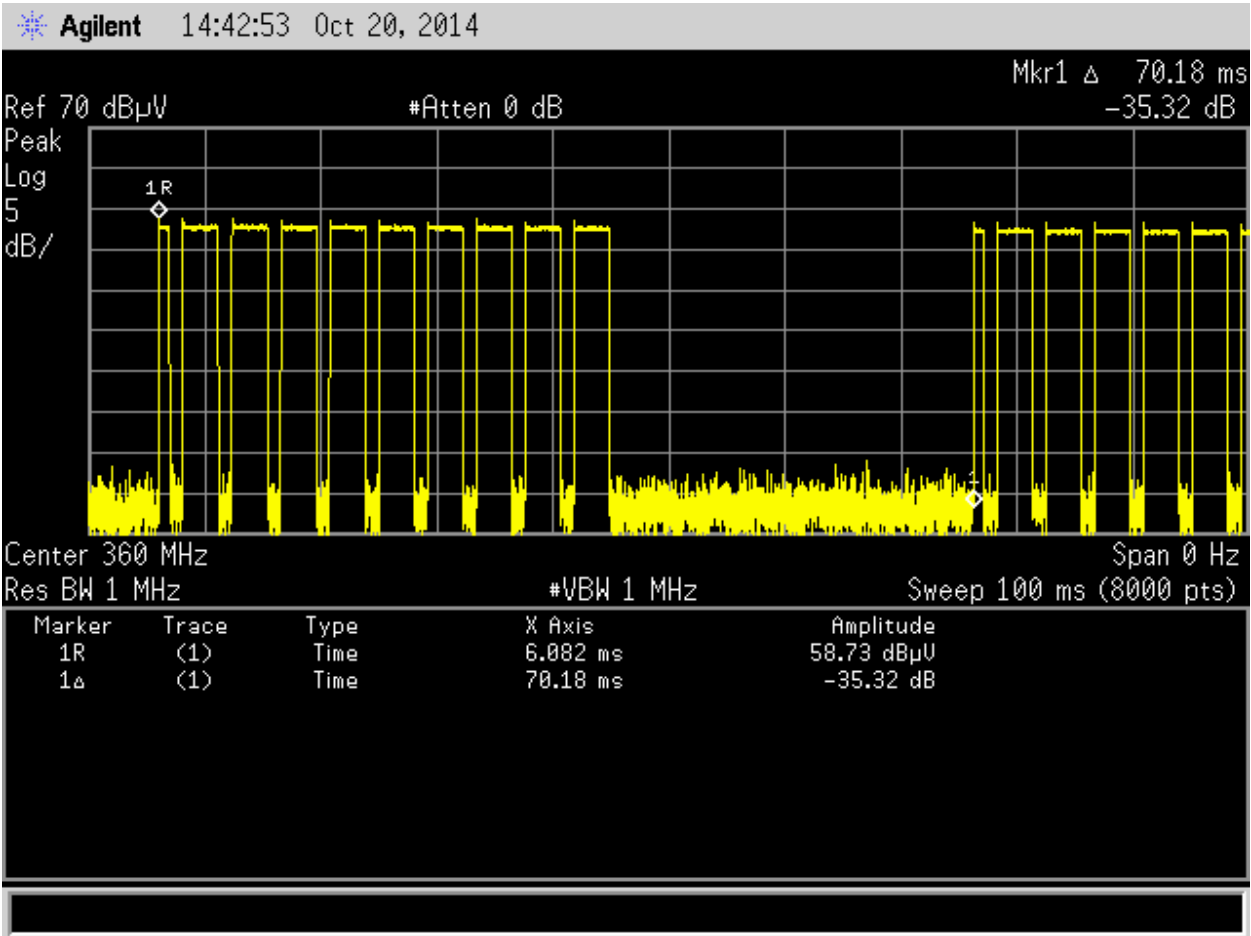
Wide Pulses



<i>DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT</i>	
Genie Company Single Button Remote Control	Project Number: 6488-1

Duty Cycle Correction

100 ms



<i>DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT</i>	
Genie Company Single Button Remote Control	Project Number: 6488-1

Duty Cycle Correction

360TR1 Worst Case Duty Cycle Correction

9 wide pulses (t = 27 ms)

1 narrow pulse (t = 0.9 ms)

Total Time On = 27.9 ms

Pulse Train Time = 70 ms

$20 \cdot \log(27.9/70) = -8.0 \text{ dB}$

Note: The device was tested using the worst case duty cycle.

<i>DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT</i>	
Genie Company Single Button Remote Control	Project Number: 6488-1

Occupied Bandwidth

Minimum Standard:

15.231 (c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Data - Occupied Bandwidth 360 MHz

Test Results: Complies, see attached data

00: 18: 37 AUG 15, 2014

GENIE#6488 11166333601, OCCUPIED BANDWIDTH Δ 52.5 KHz

REF 80.0 dB μ V

#AT 0 dB

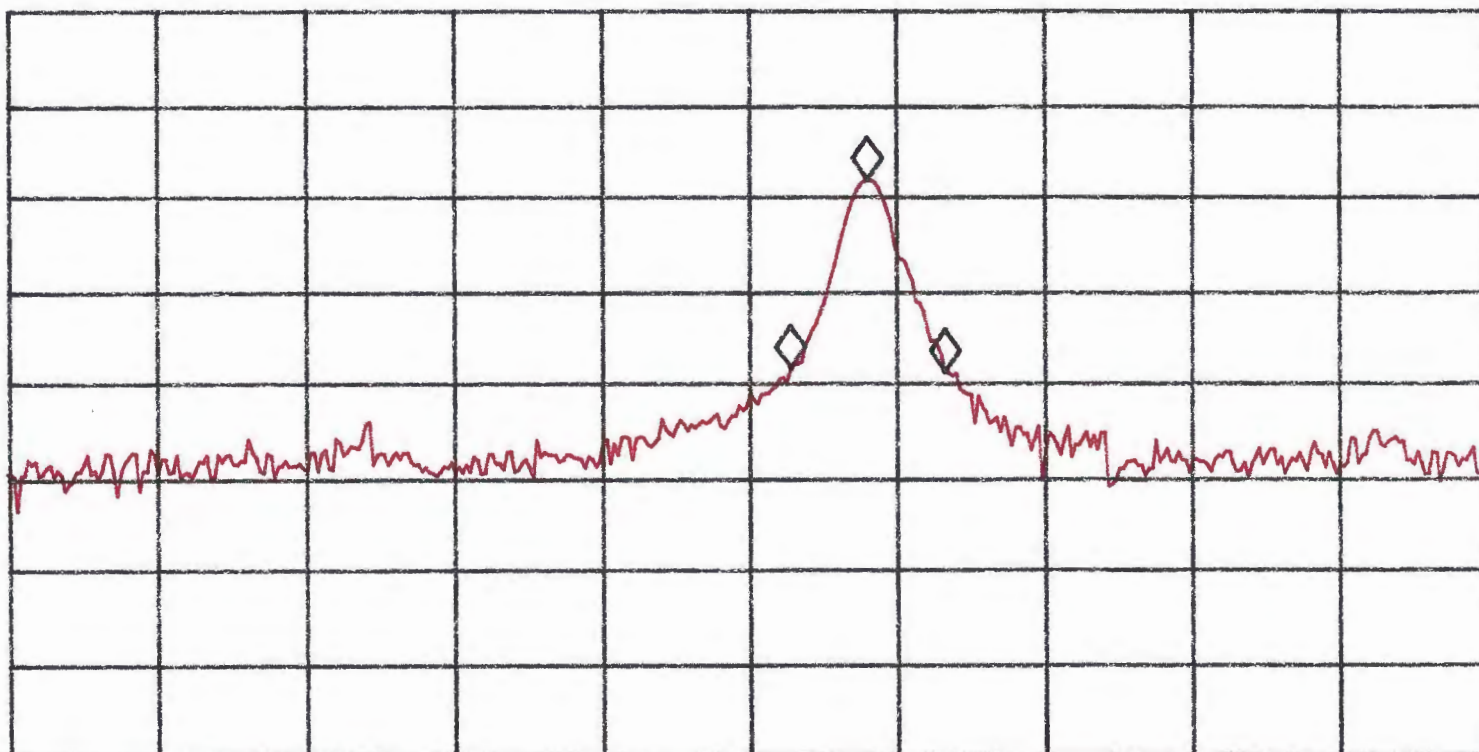
-.42 dB

PEAK

LOG

10

dB/



Marker	Trace	Type	Freq / Time	Amplitude
1:	(B)	Δ Freq	0.0525 MHz	-0.42 dB
2:	(B)	Δ Ref	360.1788 MHz	41.67 dBuV
3:	(B)	Freq	360.2050 MHz	61.91 dBuV
4:		Inactive		

CENTER 360.1650 MHz

#RES BW 10 KHz

SPAN 500.0 KHz

VBW 10 KHz

SWP 30.0 msec

DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT	
Genie Company Single Button Remote Control	Project Number: 6488-1

Restricted Bands of Operation

15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

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Genie Company Single Button Remote Control	Project Number: 6488-1

Spurious Emissions

Minimum Requirements:

Radiated emission limits 15.109

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (microvolts/meter)
30-88	100
88-216	150
216-960	200
Above 960	500

Test Result: Complies; highest spurious emission level recorded from 1 MHz - 6 GHz is 19.27 dBuV at 654.0 MHz.

15.209 Radiated emission limits; general requirements. (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:		
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

<i>DIVERSIFIED T.E.S.T. TECHNOLOGIES, INC. TEST REPORT</i>	
Genie Company Single Button Remote Control	Project Number: 6488-1

Radiated Emissions Test Data 15.109

Test Result: Complies, see attached data.

00: 30: 22 AUG 06, 2014

GENIE#6488, 1116633601'R: ON, 3M, ANT: VERT MKR 654.0 MHz

REF 80.0 dB μ V

#AT 0 dB

37.80 dB μ V

PEAK

LOG

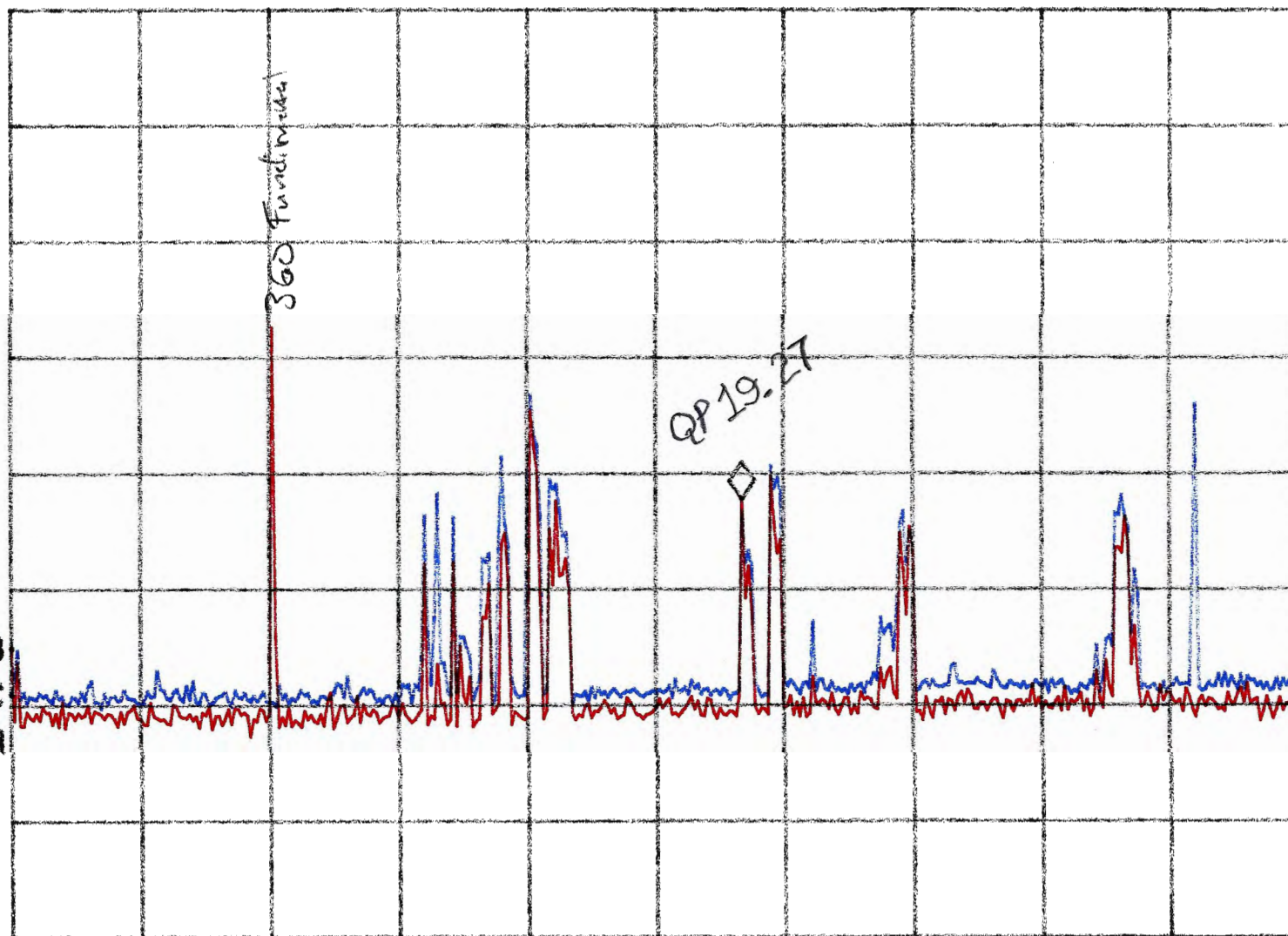
10

dB/

VA VB

SC FC

CORR



START 200.0 MHz

#RES BW 120 KHz

VBW 300 KHz

STOP 1.0000 GHz

SWP 167 msec

01: 15: 04 AUG 06, 2014

HP GENIE#6488, 1116633601'R: ON, 3M, ANT: HOR. MKR 752.0 MHz

REF 80.0 dBμV

#AT 0 dB

27.60 dBμV

PEAK

LOG

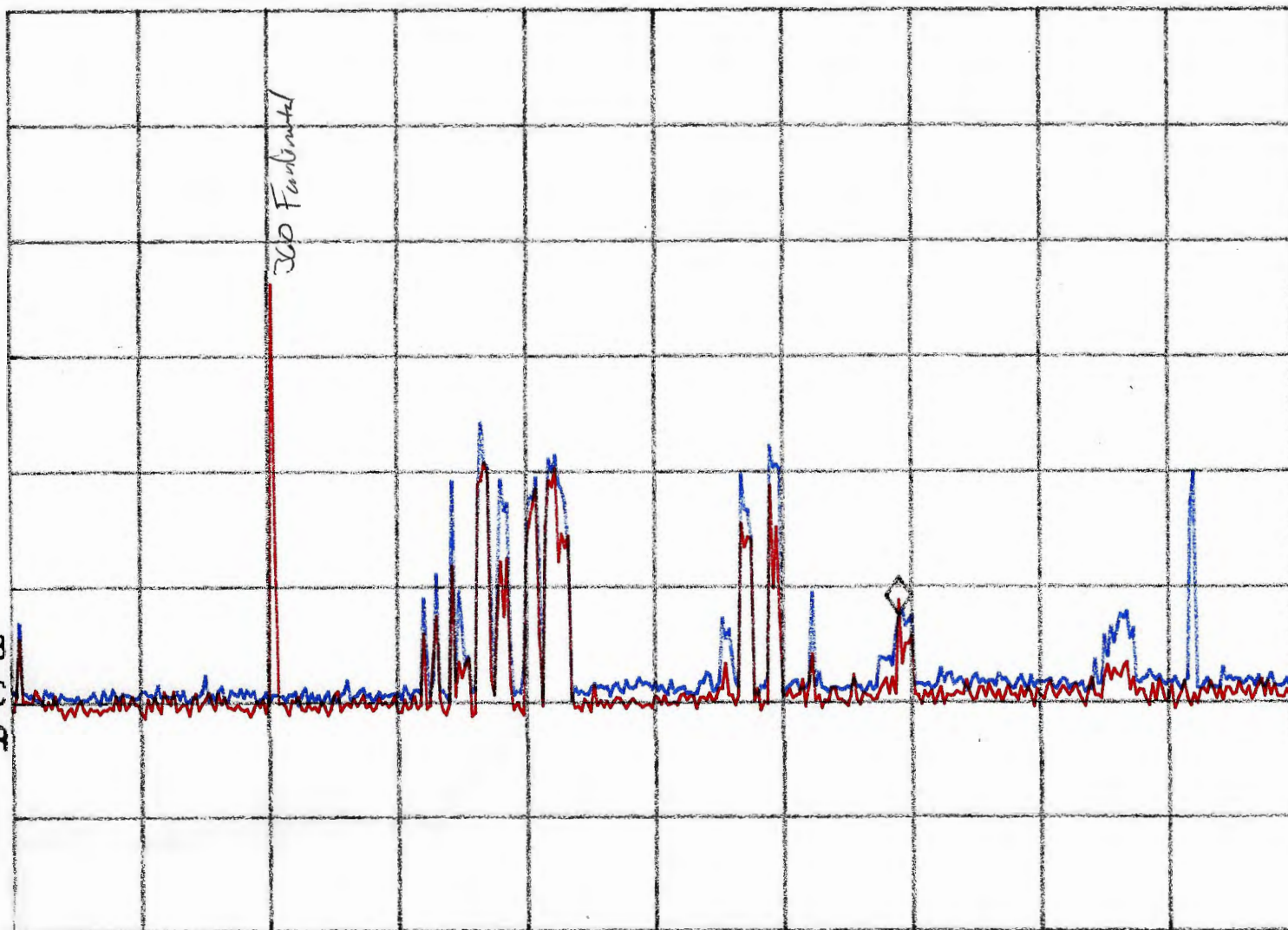
10

dB/

VA VB

SC FC

CORR



START 200.0 MHz

#RES BW 120 KHz

STOP 1.0000 GHz

VBW 300 KHz

SWP 167 msec

03:34:13 AUG 06, 2014

GENIE#6488, 1116633601, R: ON, 3M, ANT: VERT. MKR 131.2 MHz

REF 80.0 dBμV

#AT 0 dB

26.77 dBμV

PEAK

LOG

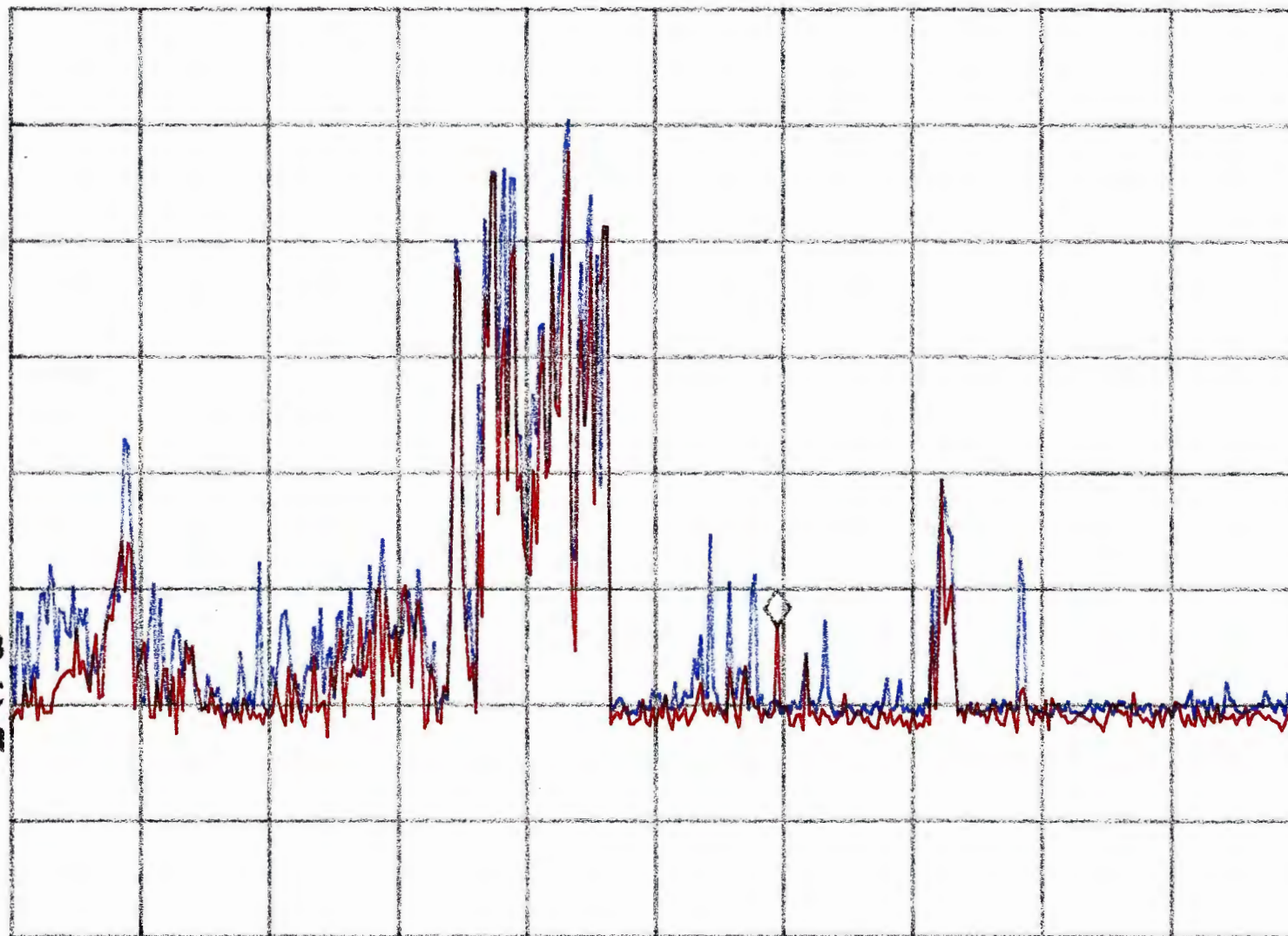
10

dB/

VA VB

SC FC

CORR



START 30.0 MHz

#RES BW 120 kHz

STOP 200.0 MHz

VBW 300 kHz

SWP 35.4 msec

03: 17: 36 AUG 06, 2014

~~HP~~ GENIE#6488, 1116633601, R: ON, 3M, ANT: HOR.

REF 80.0 dB μ V #AT 0 dB

PEAK

LOG

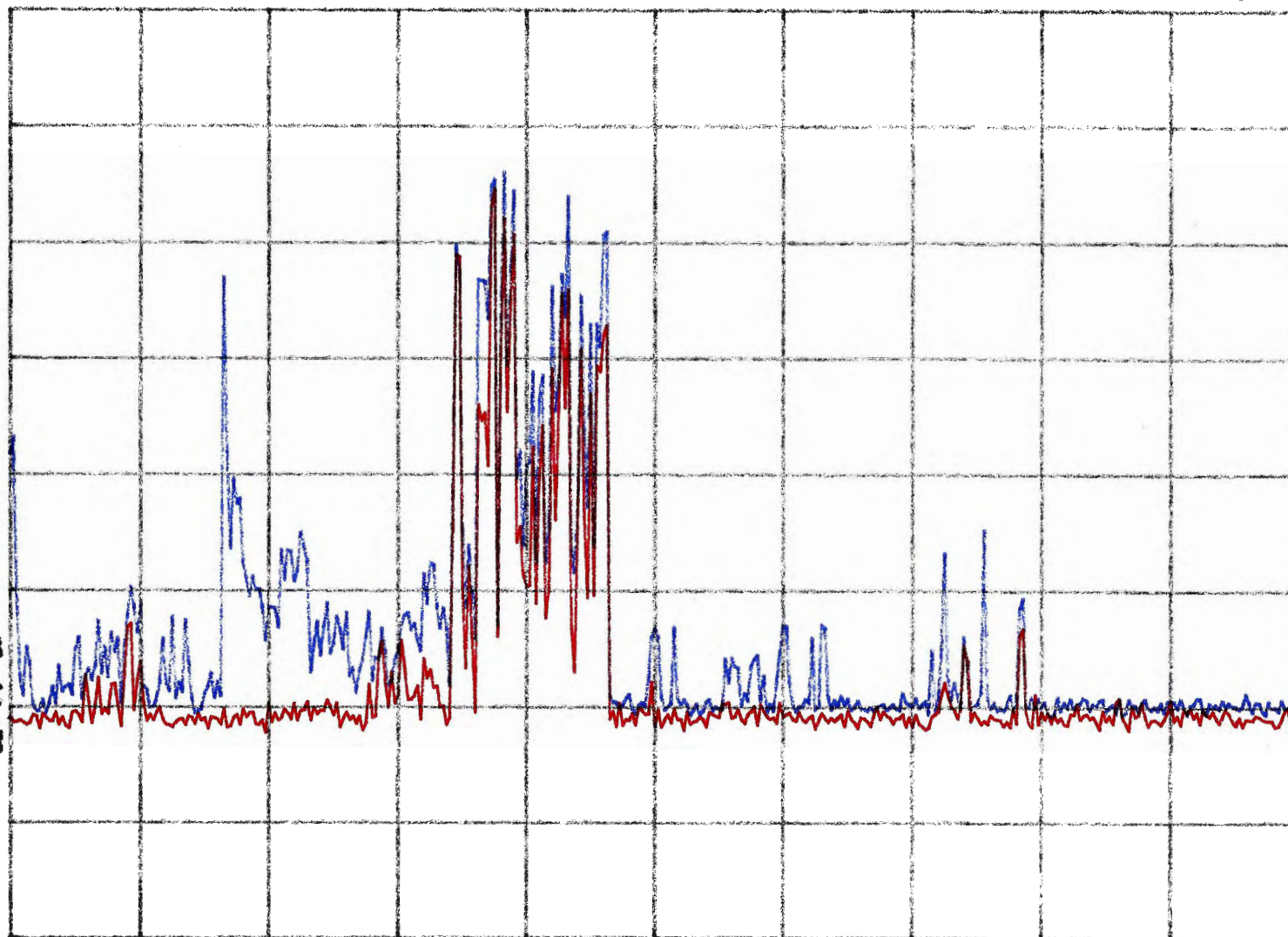
10

dB/

VA VB

SC FC

CORR



START 30.0 MHz

#RES BW 120 kHz

VBW 300 kHz

STOP 200.0 MHz

SWP 35.4 msec

05:30:14 AUG 07, 2014

GENIE#6488, 3M, R: ON, 11133601, ANT: HOR.

MKR 4.335 GHz

REF 80.0 dBμV

#AT 0 dB

33.69 dBμV

PEAK

LOG

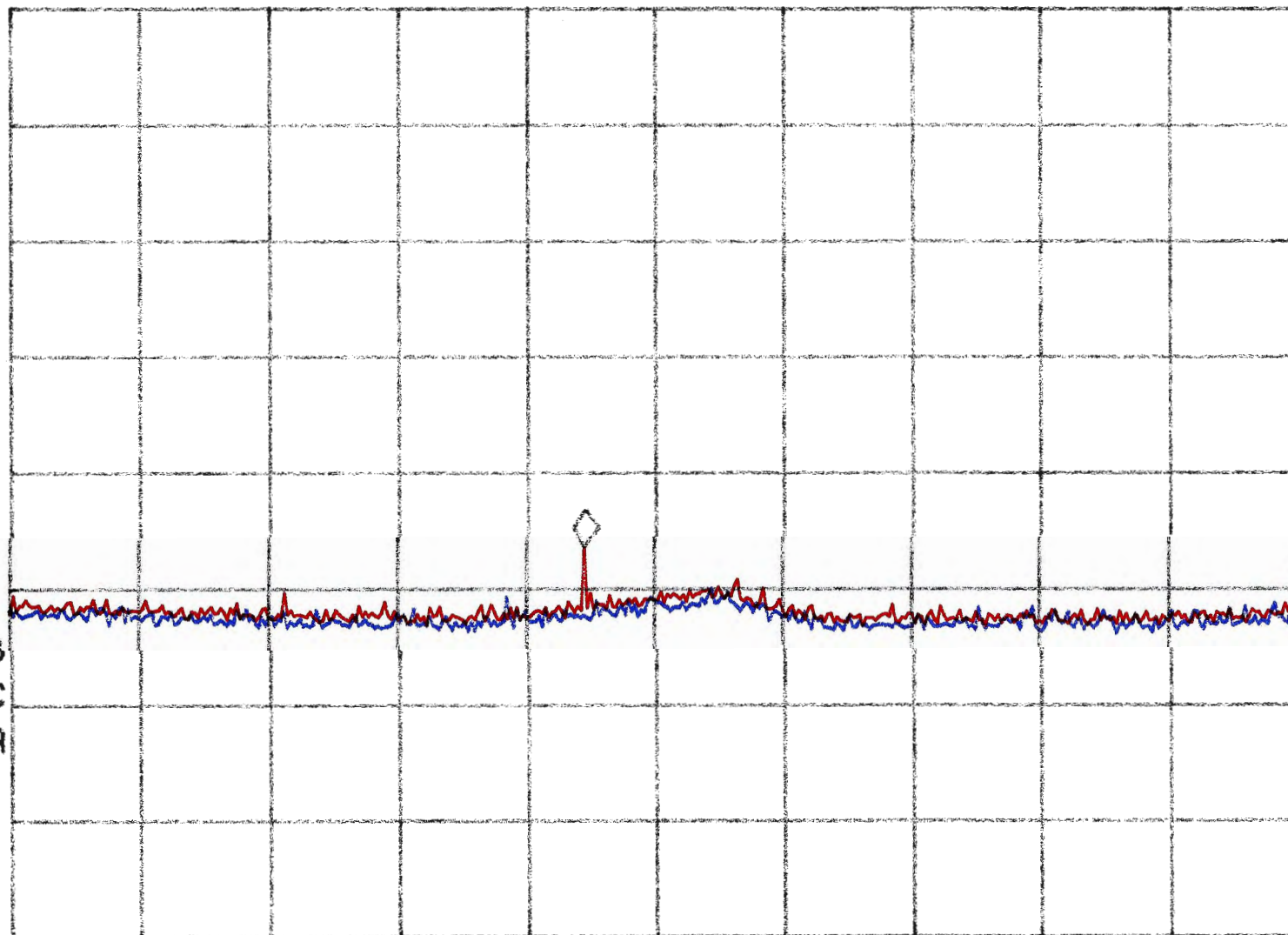
10

dB/

VA VB

SC FC

CORR



START 3.000 GHz

#RES BW 1.0 MHz

STOP 6.000 GHz

#VBW 300 kHz

#SWP 100 msec

05:26:01 AUG 07, 2014

HP GENIE#6488, 3M, R: ON, 11133601, ANT: VERT.

MKR 4.335 GHz

REF 80.0 dB μ V

#AT 0 dB

33.07 dB μ V

PEAK

LOG

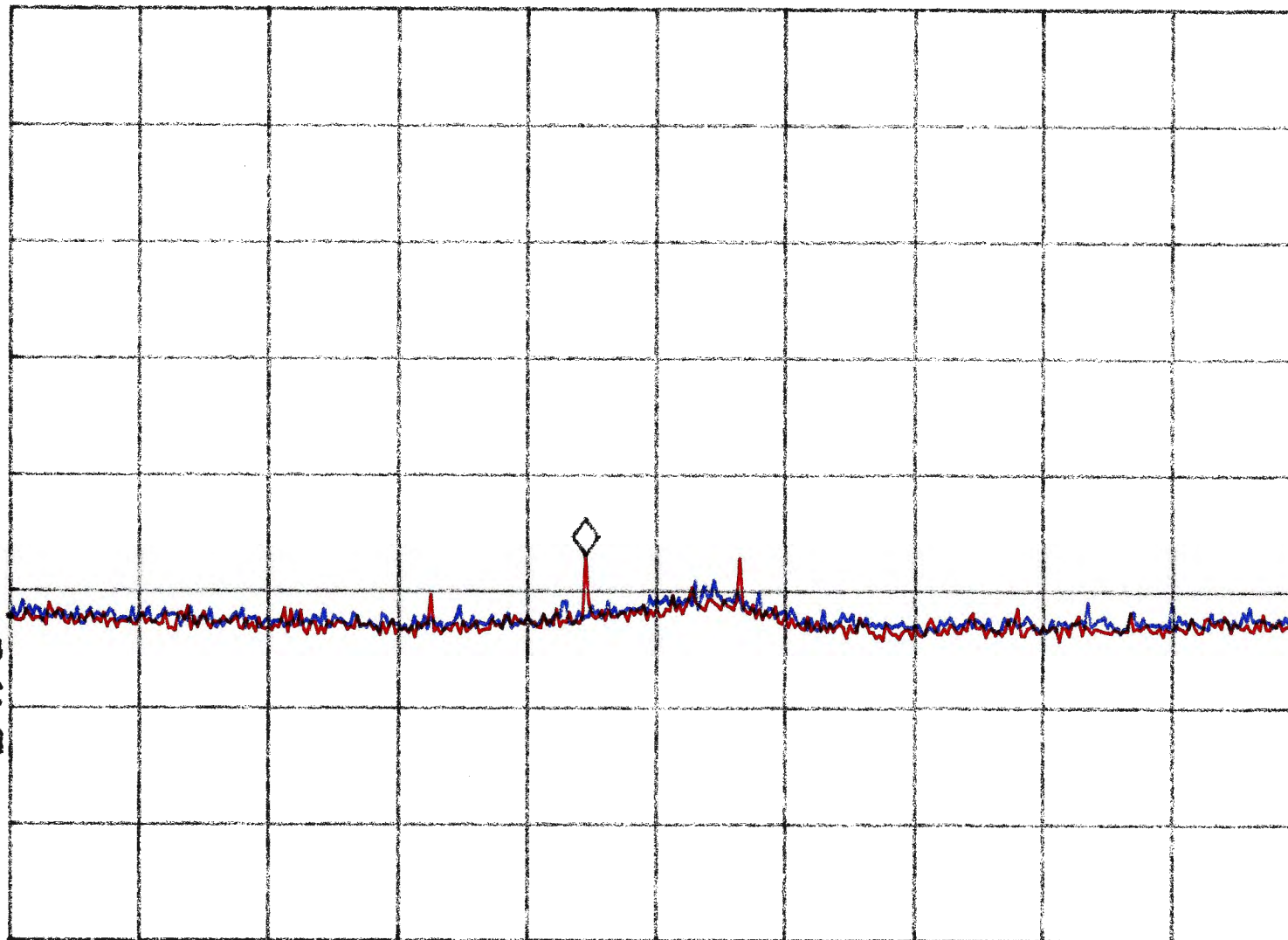
10

dB/

VA VB

SC FC

CORR



START 3.000 GHz

STOP 6.000 GHz

#RES BW 1.0 MHz

#VBW 300 kHz

#SWP 100 msec

04:06:51 AUG 07, 2014

GENIE#6488, 3M, R: ON, 11133601, ANT: HOR.

MKR 2.330 GHz

REF 80.0 dBμV #AT 0 dB

32.74 dBμV

PEAK

LOG

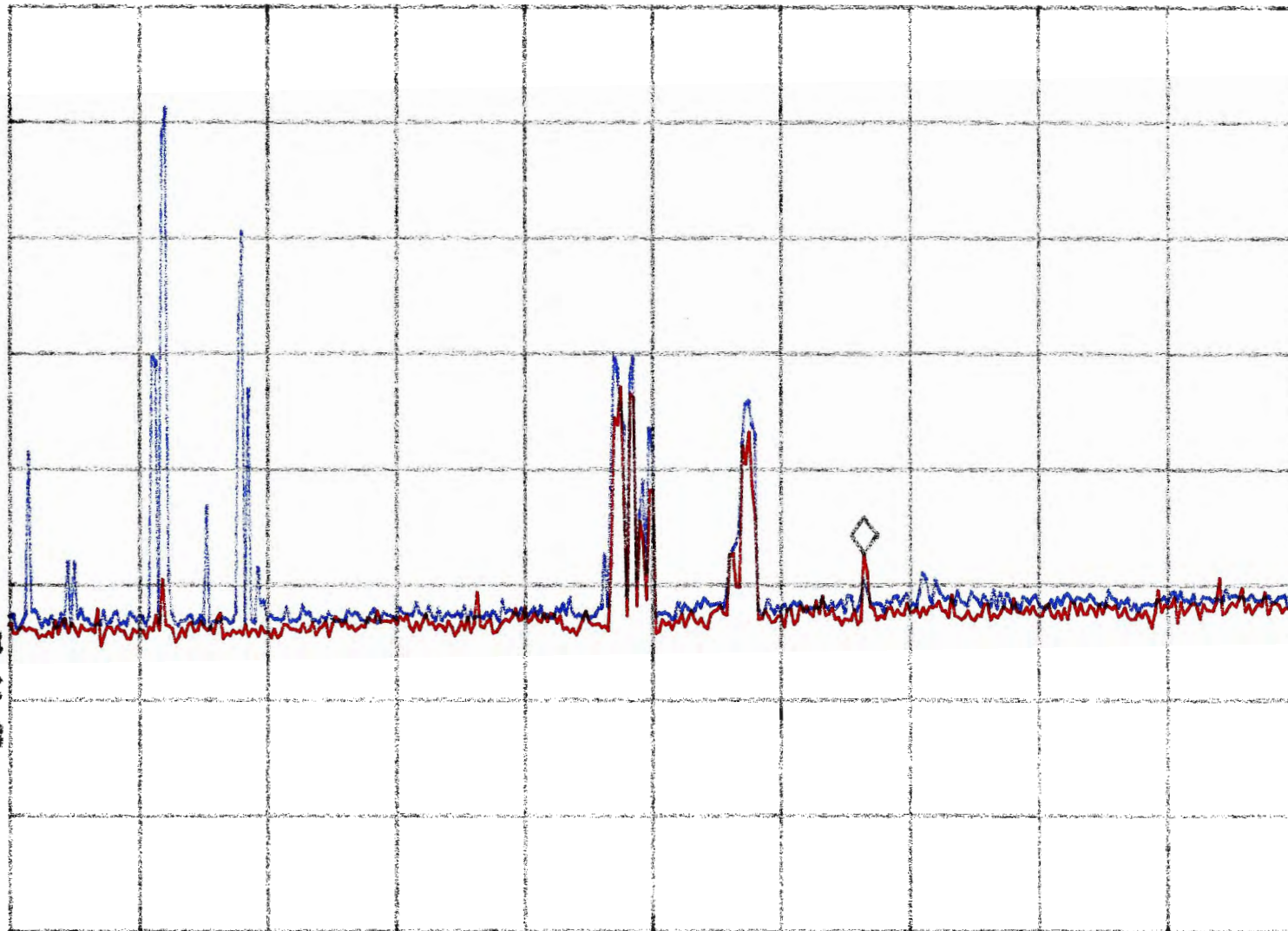
10

dB/

VA VB

SC FC

CORR



START 1.000 GHz

#RES BW 1.0 MHz

STOP 3.000 GHz

#VBW 300 kHz

#SWP 58.4 msec

05:09:34 AUG 07, 2014

GENIE#6488, 3M, R: ON, 11133601, ANT: VERT.

MKR 1.220 GHz

REF 80.0 dB μ V

#AT 0 dB

36.84 dB μ V

PEAK

LOG

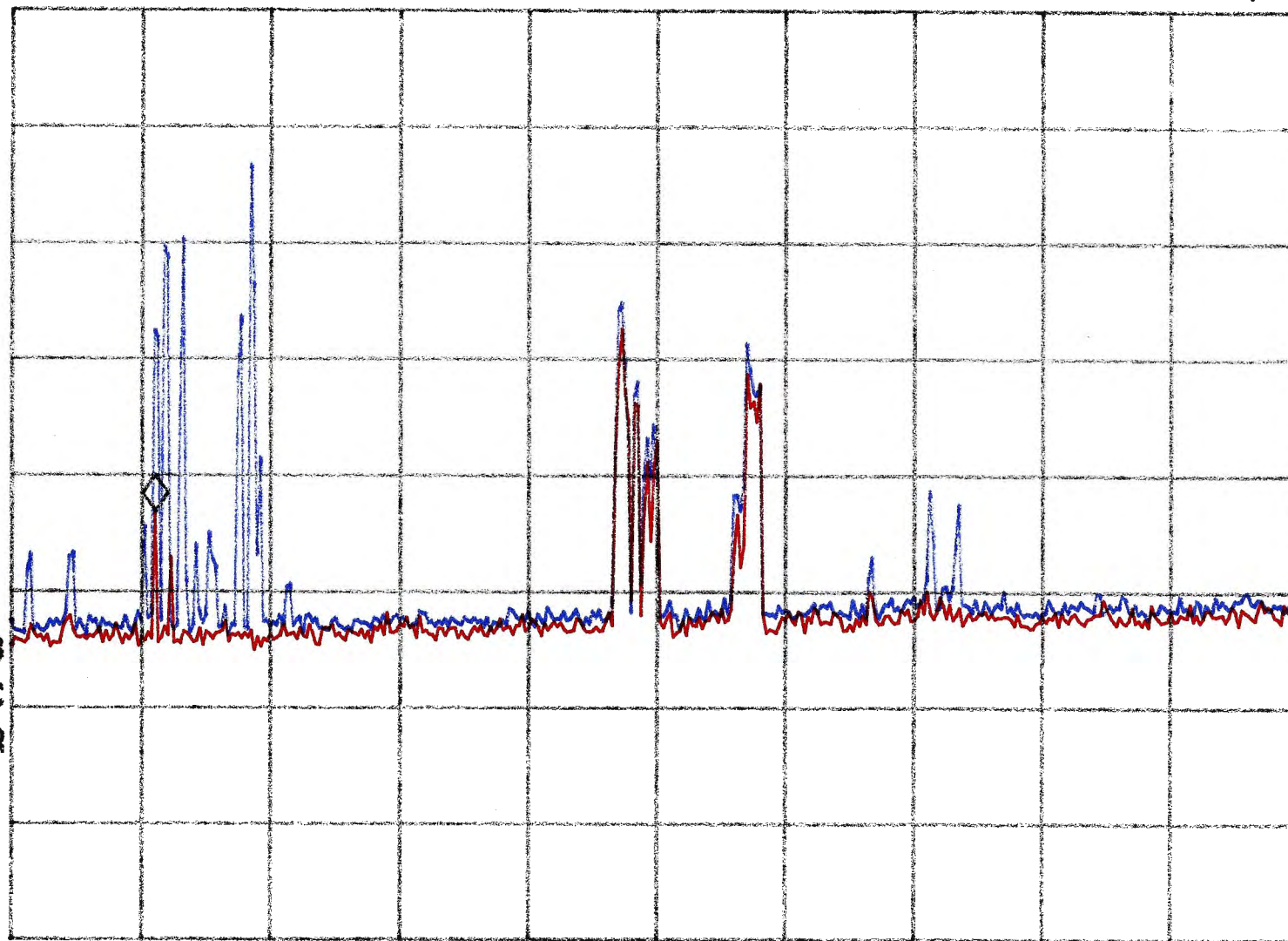
10

dB/

VA VB

SC FC

CORR



START 1.000 GHz

#RES BW 1.0 MHz

STOP 3.000 GHz

#VBW 300 kHz

#SWP 58.4 msec