DIVERSIFIED
T.E.S.T.
TECHNOLOGIES, INC.
4675 Burr Drive ● Liverpool, NY 13088 ● 1-800-724-6452 ● FAX: 315-457-0428 ● 315-457-0245

November 19, 2014

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

Dear Mr. Midyette**:**

Enclosed is the test report for the Four Button Remote Control 390 MHz garage door opener transmitter model 390TR4 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.dttlab.com.

Sincerely,

Prasanna Gautam
Technical Associate

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Test Information

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

Report Issue Date: November 19, 2014
Report Number: 6510-1-111914- 15.231 (Edition 1)
Project Number: 6501-3

Date Received: September 16, 2014
Date Tested: September 16, 2014 – November 19, 2014

Product Four Button Remote Control 390 MHz
Model: 390TR4

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 Four Button Remote Control 390 MHz, Model: 390TR4.

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: _____ Date: November 19, 2014
Prasanna Gautam
Technical Associate

Reviewed by:
Signature: _____ Date: November 19, 2014
Steve Frierson
Technical Lab Manager

Authorized by:
Signature: _____ Date: November 19, 2014
Annelle Frierson
Vice-President

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Test Regulations

The tests were performed according to the following standards:

☒ FCC Part 15.231	☐ Class A	☒ Class C
☒ FCC Part 15	☐ Class A	☒ 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

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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 Four Button Remote Control is a remote garage door opener transmitter. It operates at 315/390 MHz for the use of opening garage doors. The transmitter utilizes OOK Modulation techniques.

The EUT was powered with a 3 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

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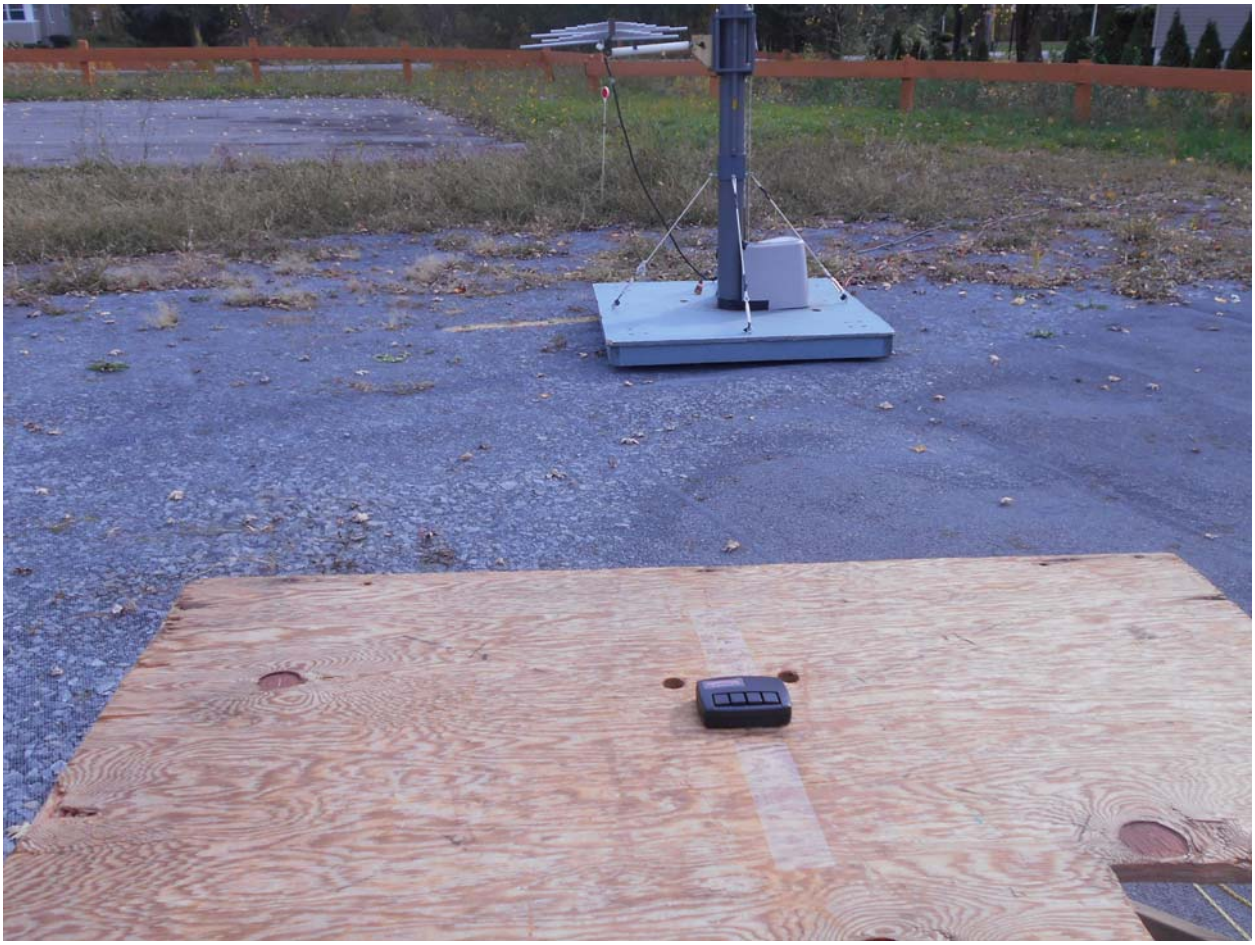
Test Setup Photographs

1.1 Radiated Emissions / Occupied Bandwidth



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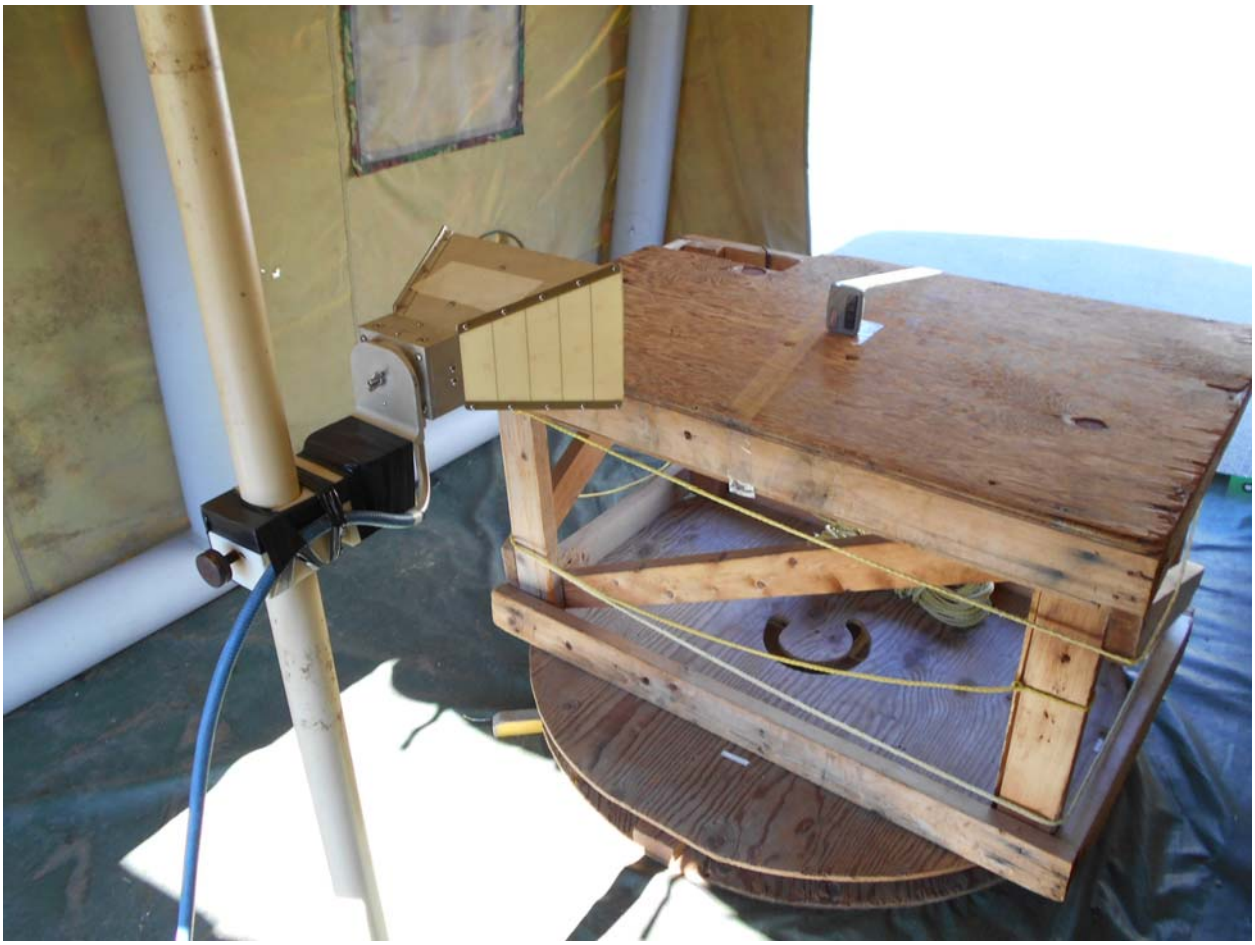
1.2. Radiated Emissions above 1 GHz



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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 #	Due Date
Hewlett Packard	8596E	Spectrum Analyzer	3235A00144	5/16/15
Agilent	E4405B	EMC Analyzer	US40520846	10/30/15
Hewlett Packard	7550A	Plotter	2407A00476	N/A
Electro-Metrics	BIA-25	Biconical Antenna, 20-220 MHz	001	10/30/14
Electro-Metrics	LPA-25	Log Periodic Antenna 200-1000 MHz	1242	7/8/15
Electro-Metric	RGA-60	Horn Antenna	2981	12/9/14
		Co-ax Cable, 100-foot RG 8/U, 20-foot RG 223/U		
		10-meter open field test range, grounded with 1/4” x 1/4” hardware cloth		
		AC supply cord, 100-foot, grounded		
		100-foot signal cable for remote testing,		
		Wooden turn table, 0.8 meters high		

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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.

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Rationale for Compliance with Transmission Requirements

15.231 (a) (1) 15.231 (a) (2)	☒ Manual Activation ☐ Automatic Activation	Tx deactivation time:
15.231 (a) (3)	☐ Regular, predetermined transmissions ☐ Polling or supervisory transmissions	Tx rate and duration
15.231 (a) (4)	☐ Alarm device operating during the pendency of alarm condition ☒ Non-Alarm Device	

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Deactivation Time

Test Data: Deactivation Time 2 seconds, 390 MHz

Test Results: Complies, see attached data

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Ø3: 38: 45 NOV 18, 2Ø14

GENIE#651Ø 39ØTR4 DEACTIVATION TIME MKR 1.Ø6ØØ sec

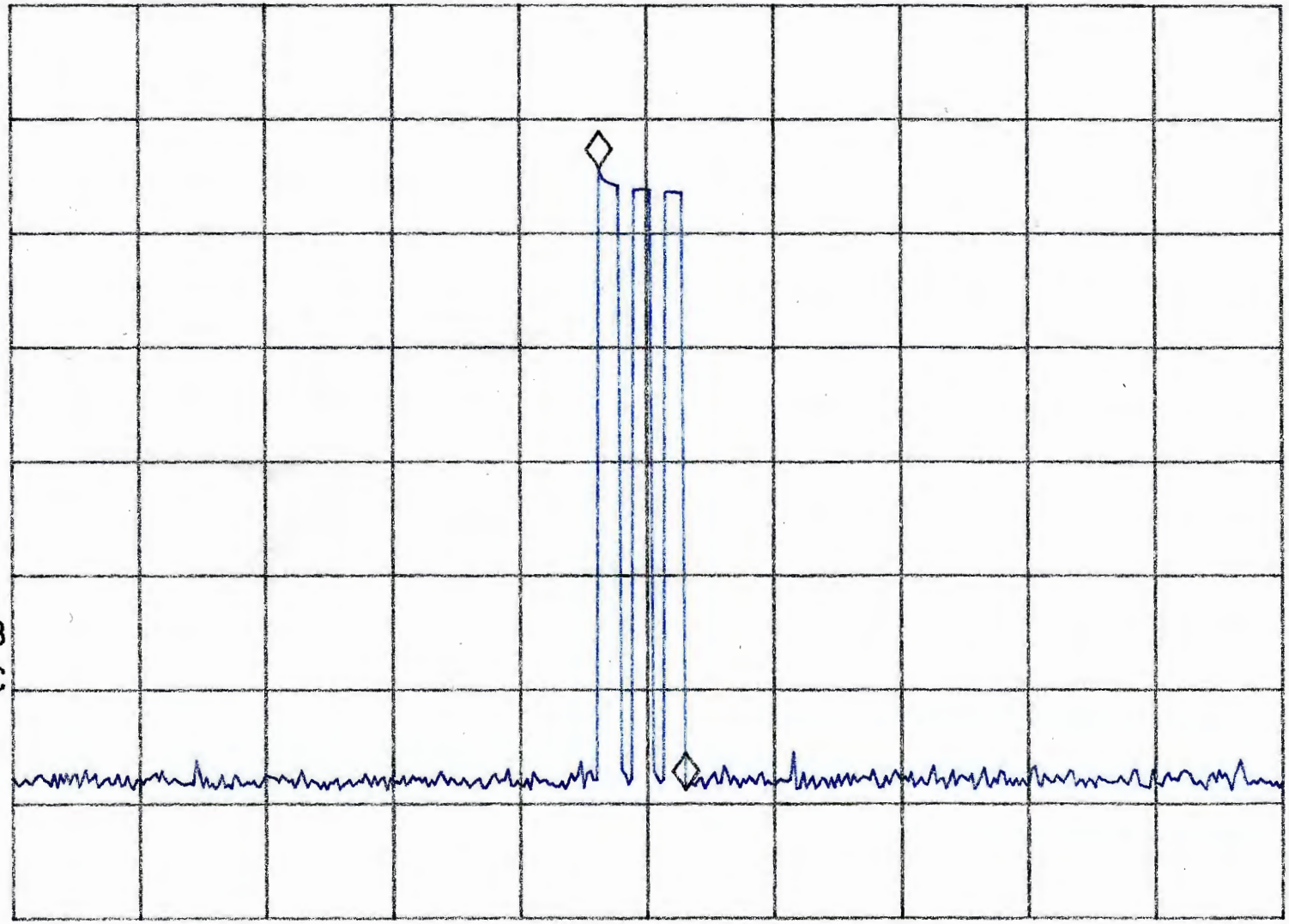
REF 97.Ø dBμV #AT Ø dB 28.3Ø dBμV

PEAK

LOG

1Ø

dB/



VA SB

SC FC

CENTER 39Ø.ØØØ MHz SPAN Ø Hz

#RES BW 1.Ø MHz VBW 3ØØ kHz #SWP 2.ØØ sec

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.

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Test Data: Radiated Emissions

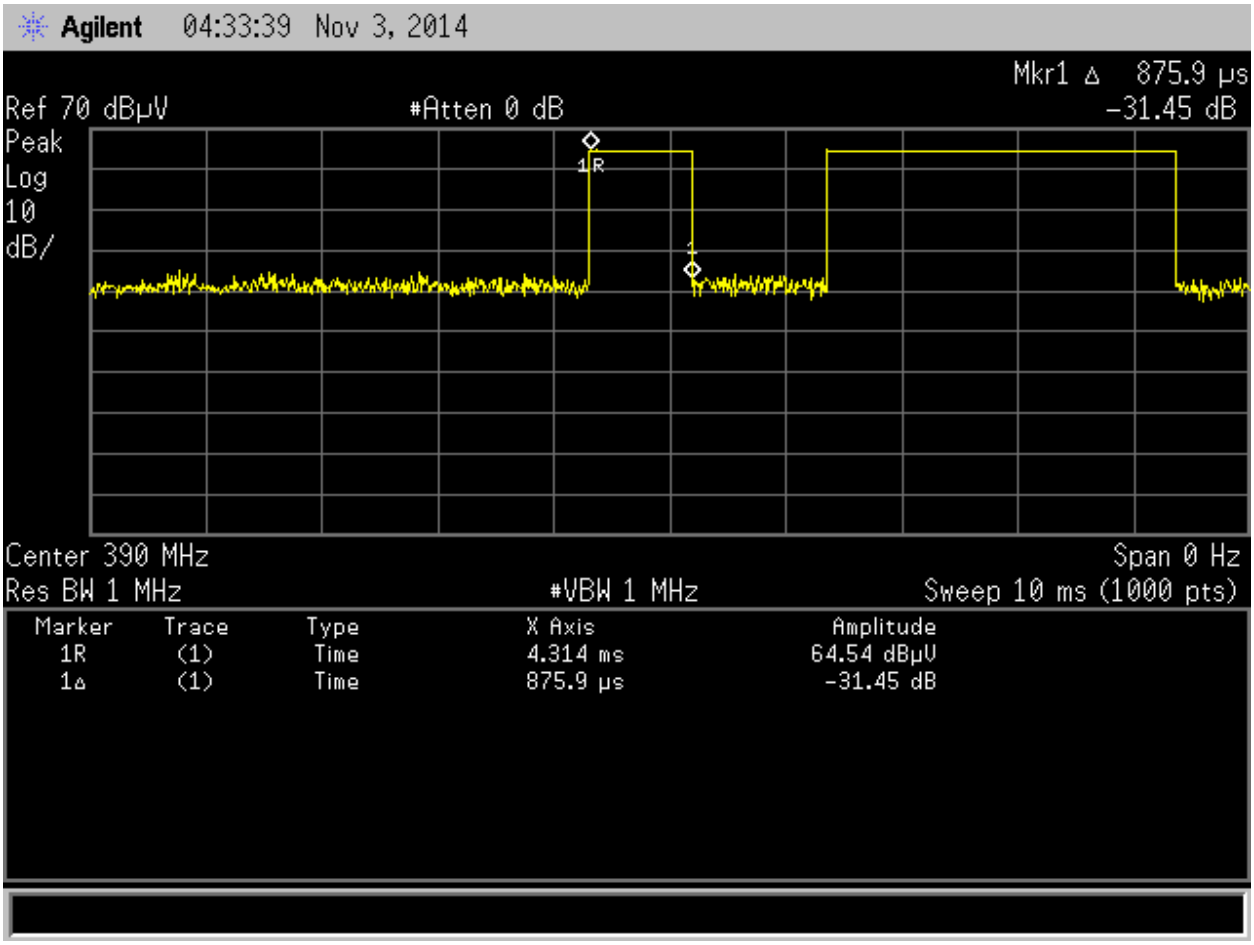
Freq. (MHz)	Antenna Polarization	Meter Reading (dBuV)				LESS Duty Factor (dB)	ADD Cable Factor (dB)	ADD Antenna Factor (dB)	LESS 1 m to 3 m Distance Factor (dB)	Corrected Reading (dBuV/m)	FCC Spec Limit (dBuV/m)	Margin (dB)	Result	Comments
		X	Y	Z	Max									
390	H	55.34	46.87	45.6	55.3	-7.9	9.5	15.8	0.0	72.7	79.2	-6.5	Pass	
	V	40.38	49.69	53.6	53.6	-7.9	9.5	15.8	0.0	70.9	79.2	-8.3	Pass	
780	H	21.74	18.6	20.7	21.7	-7.9	17.0	21.6	0.0	52.4	59.2	-6.8	Pass	
	V	18.55	21.87	19.6	21.9	-7.9	17.0	21.6	0.0	52.5	59.2	-6.7	Pass	
1170	H	34.56	34.53	31.9	34.6	-7.9	0.3	24.5	-9.5	41.9	54.0	-12.1	Pass	
	V	32.26	33.09	39.5	39.5	-7.9	0.3	24.5	-9.5	46.8	54.0	-7.2	Pass	
1560	H	31.08	31.59	30.3	31.6	-7.9	0.5	26.0	-9.5	40.6	54.0	-13.4	Pass	
	V	31.27	34.65	37.6	37.6	-7.9	0.5	26.0	-9.5	46.5	54.0	-7.5	Pass	
1950	H	39.35	41.24	41.2	41.2	-7.9	0.5	28.4	-9.5	52.7	59.2	-6.5	Pass	Noise Floor
	V	42.43	41.39	41.4	42.4	-7.9	0.5	28.4	-9.5	53.9	59.2	-5.3	Pass	Noise Floor
2340	H	31.31	32.76	32.2	32.8	-7.9	0.3	29.3	-9.5	44.9	54.0	-9.1	Pass	
	V	31.28	32.24	32.0	32.2	-7.9	0.3	29.3	-9.5	44.3	54.0	-9.7	Pass	
2730	H	30.72	34.86	31.7	34.9	-7.9	0.2	29.6	-9.5	47.2	54.0	-6.8	Pass	
	V	31.46	30.26	34.7	34.7	-7.9	0.2	29.6	-9.5	47.0	54.0	-7.0	Pass	
3120	H	31.48	34.56	35.8	35.8	-7.9	0.4	30.5	-9.5	49.2	59.2	-10.0	Pass	
	V	33.13	32.24	33.3	33.3	-7.9	0.4	30.5	-9.5	46.8	59.2	-12.4	Pass	
3510	H	32	36.37	35.4	36.4	-7.9	0.4	32.2	-9.5	51.5	54.0	-2.5	Pass	
	V	32.97	33.63	34.9	34.9	-7.9	0.4	32.2	-9.5	50.1	54.0	-3.9	Pass	
3900	H	30.09	30.7	32.8	32.8	-7.9	0.1	32.8	-9.5	48.2	54.0	-5.8	Pass	
	V	30.83	30.35	30.3	30.8	-7.9	0.1	32.8	-9.5	46.3	54.0	-7.7	Pass	Noise Floor

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

Duty Cycle Correction

Narrow Pulses

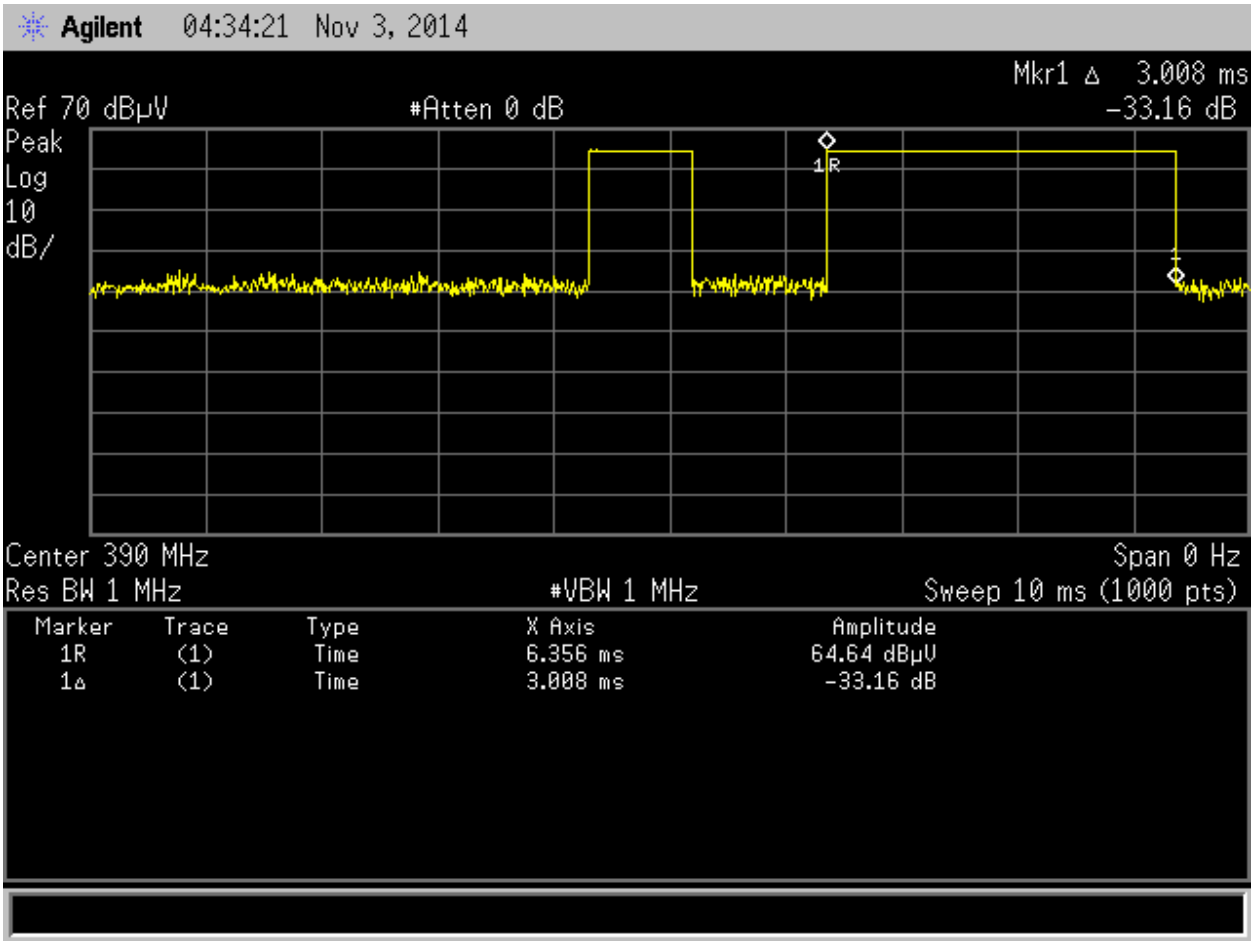
390 MHz



Duty Cycle Correction

Wide Pulses

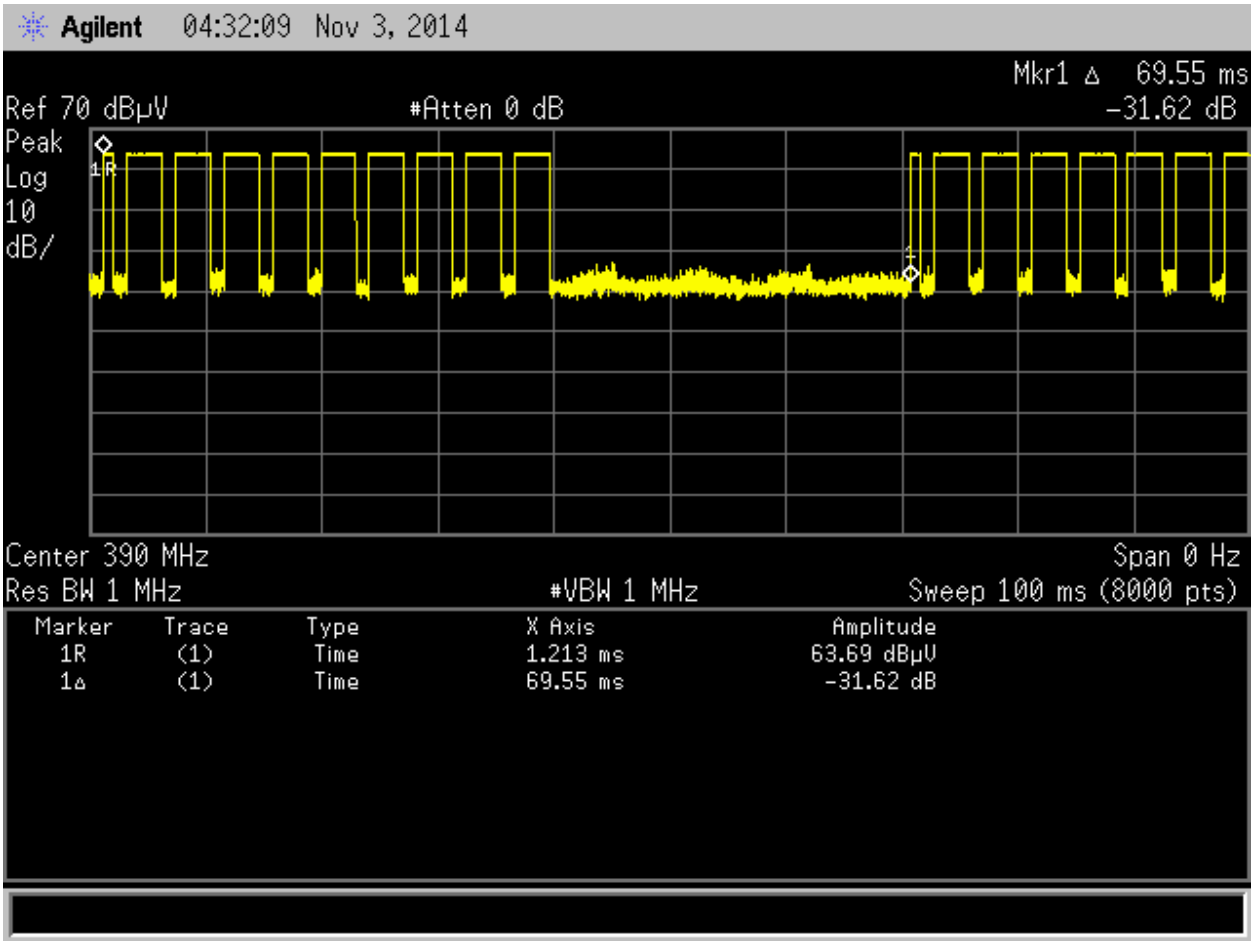
390 MHz



Duty Cycle Correction

100 ms

390 MHz



Duty Cycle Correction

390TR4 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 = 69.5 ms
20*log(27.9/69.5) = -7.9 dB

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

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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 390 MHz

Test Results: Complies, see attached data

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Ø4: 18: Ø5 NOV 19, 2Ø14

GENIE 651Ø 39ØTR4 OCCUPIED BW

MKR Δ 43.8 kHz

REF 8Ø.Ø dBμV #AT Ø dB

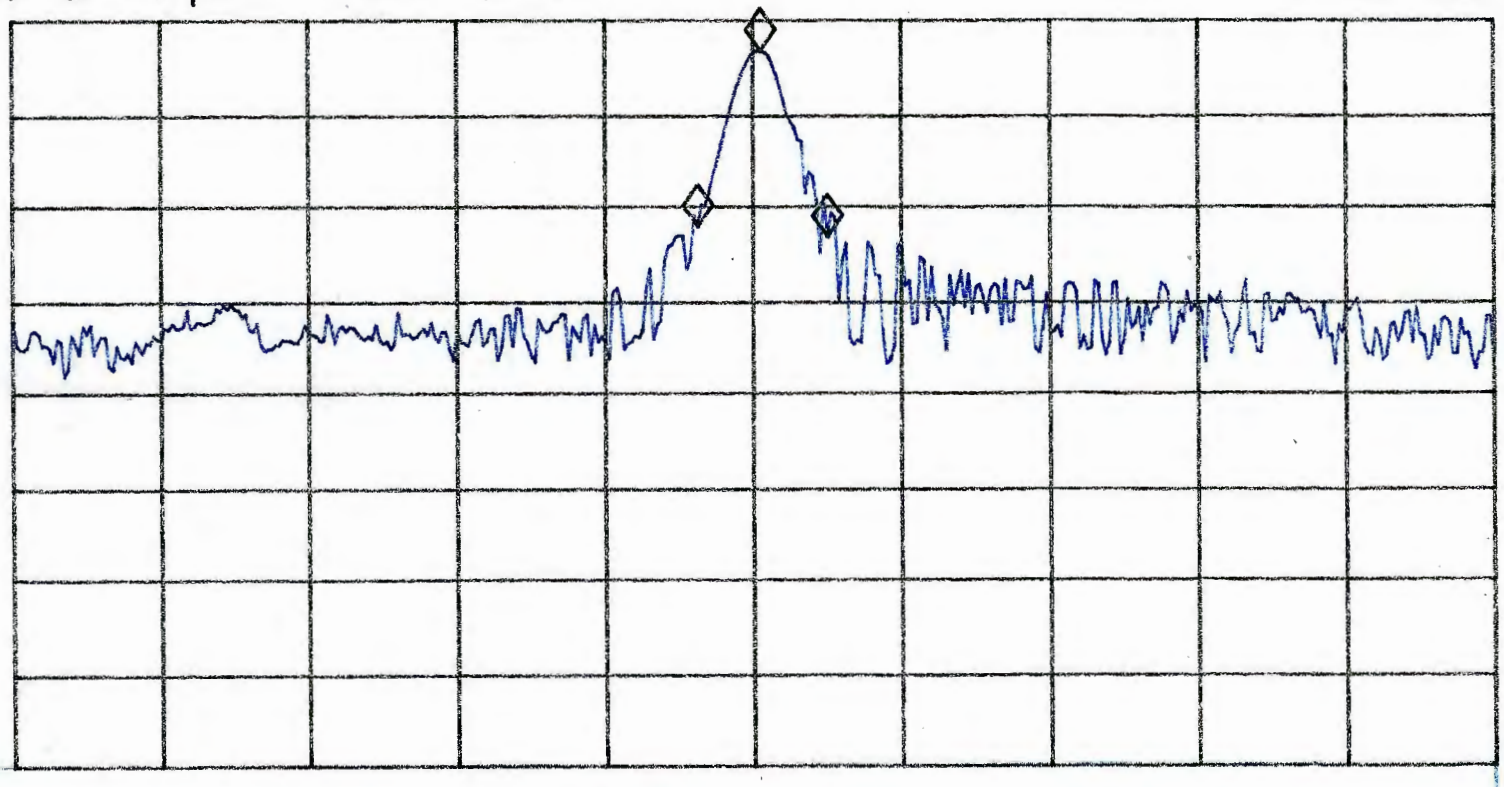
-1.12 dB

PEAK

LOG

1Ø

dB/



Marker	Trace	Type	Freq / Time	Amplitude
1:	(A)	ΔFreq	Ø.Ø437 MHz	-1.12 dB
2:	(A)	Δ Ref	39Ø.2Ø63 MHz	57.87 dBuV
3:	(A)	Freq	39Ø.2275 MHz	76.72 dBuV
4:	Inactive			

CENTER 39Ø.225Ø MHz

SPAN 5ØØ.Ø kHz

#RES BW 1Ø kHz

VBW 1Ø kHz

#SWP 3Ø.Ø msec

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			

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 30 MHz - 6 GHz is 27.63 dBuV at 3.330 GHz.

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

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Radiated Emissions Test Data 15.109

Test Result: Complies, see attached data.

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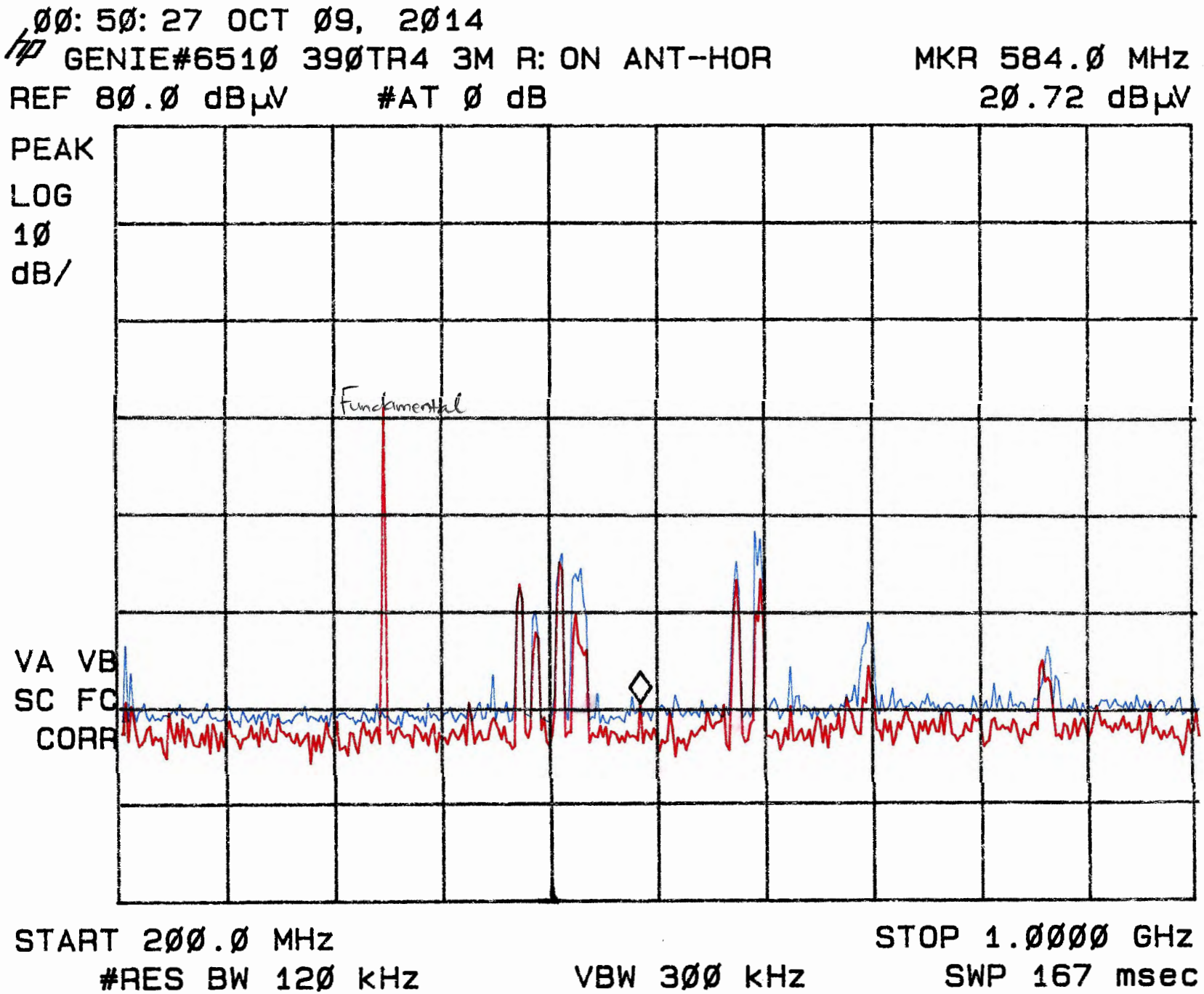

ØØ: 5Ø: 27 OCT Ø9, 2Ø14
GENIE#651Ø 39ØTR4 3M R: ON ANT-HOR
MKR 584.Ø MHz
REF 8Ø.Ø dBµV
#AT Ø dB
2Ø.72 dBµV
PEAK
LOG
1Ø
dB/
Fundamental
VA VB
SC FC
CORR
START 2ØØ.Ø MHz
STOP 1.ØØØØ GHz
#RES BW 12Ø kHz
VBW 3ØØ kHz
SWP 167 msec

22: 45: Ø7 OCT 19, 2Ø14

GENIE 651Ø 39ØTR4 3M R: ON ANT-HOR

MKR 1.17Ø GHz

REF 8Ø.Ø dBμV #AT Ø dB

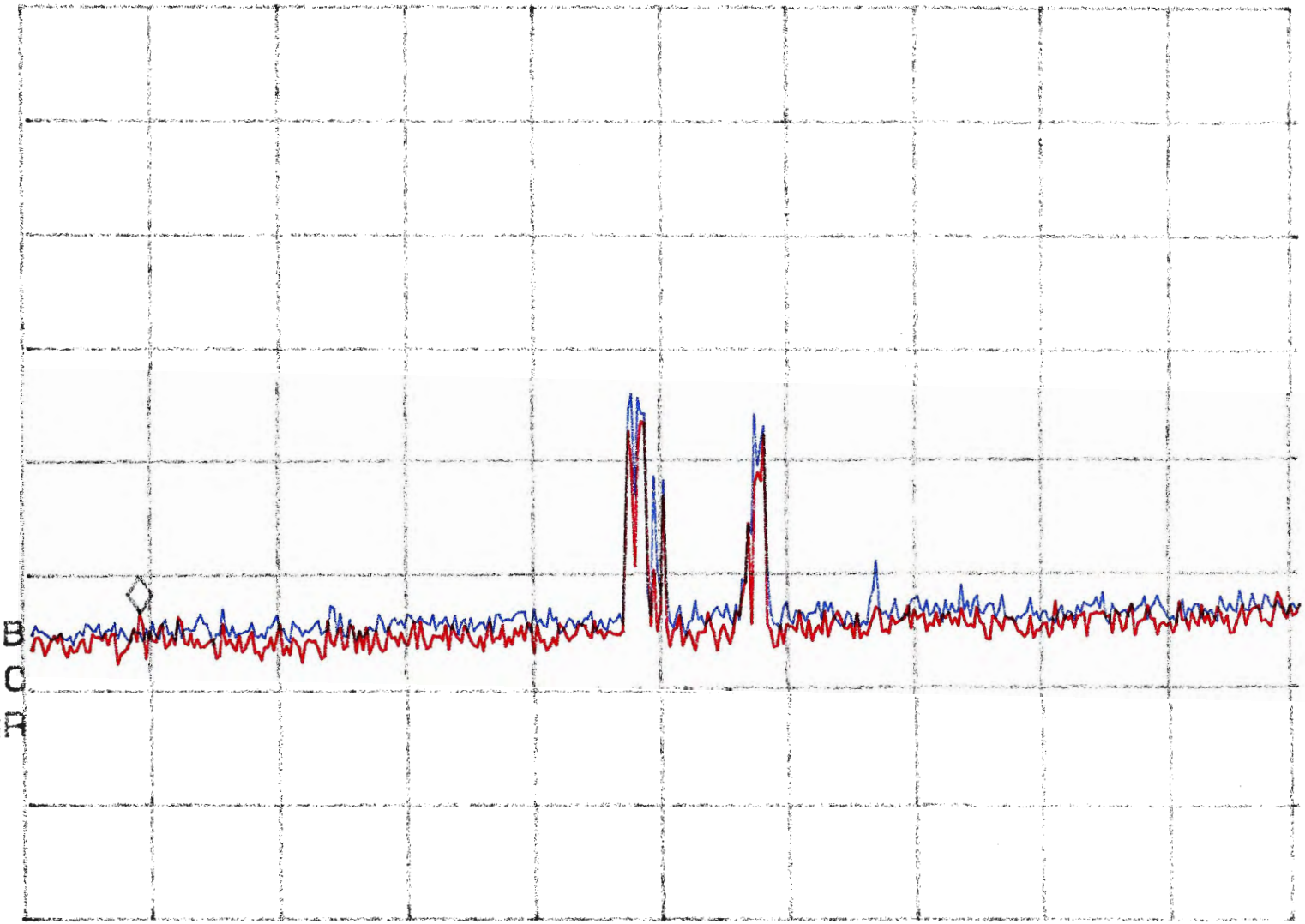
26.67 dBμV

PEAK

LOG

1Ø

dB/



VA VB

SC FC

CORR

START 1.ØØØ GHz

STOP 3.ØØØ GHz

#RES BW 1.Ø MHz

VBW 3ØØ kHz

SWP 58.4 msec

22: 52: 59 OCT 19, 2014

GENIE 6510 390TR4 3M R: ON ANT-HOR

MKR 3.330 GHz

REF 80.0 dBμV #AT 0 dB

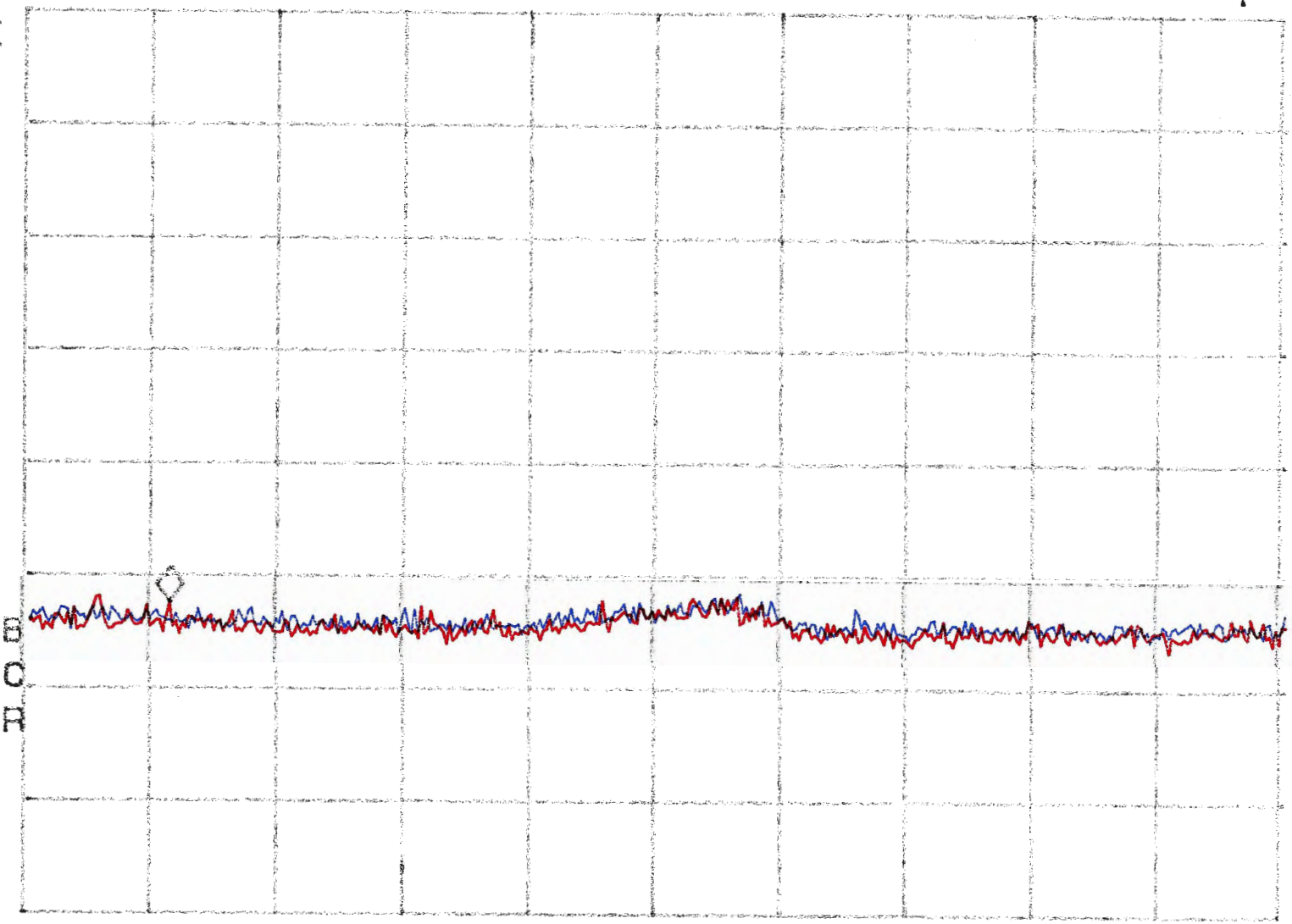
27.63 dBμV

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 60.0 msec

22: 57: 12 OCT 19, 2014

GENIE 6510 390TR4 3M R: ON ANT-VERT

MKR 4.020 GHz

REF 80.0 dBμV #AT 0 dB

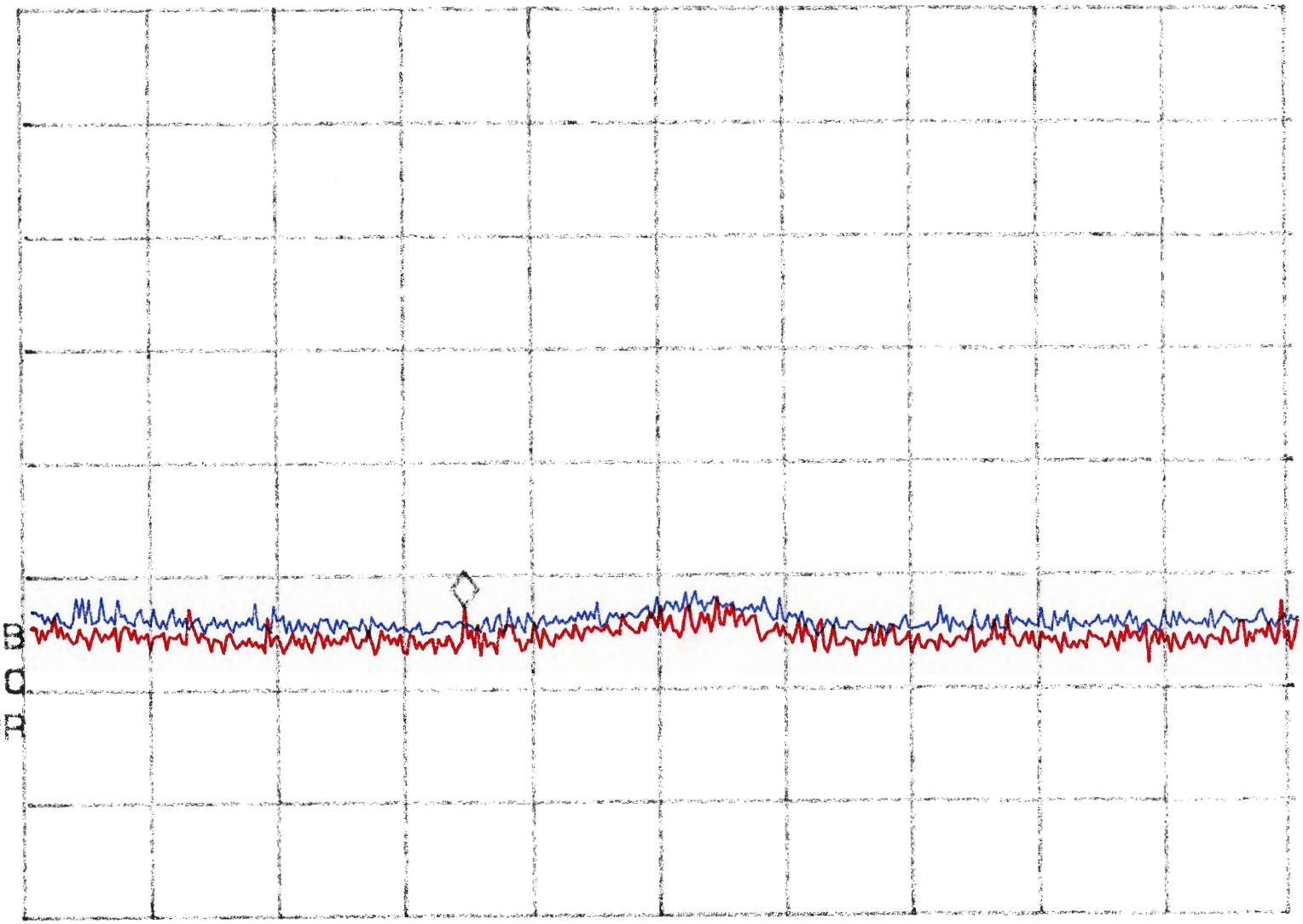
27.21 dBμV

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 60.0 msec

23: 02: 16 OCT 19, 2014

GENIE 6510 390TR4 3M R: ON ANT-VERT

MKR 1.560 GHz

REF 80.0 dBμV #AT 0 dB

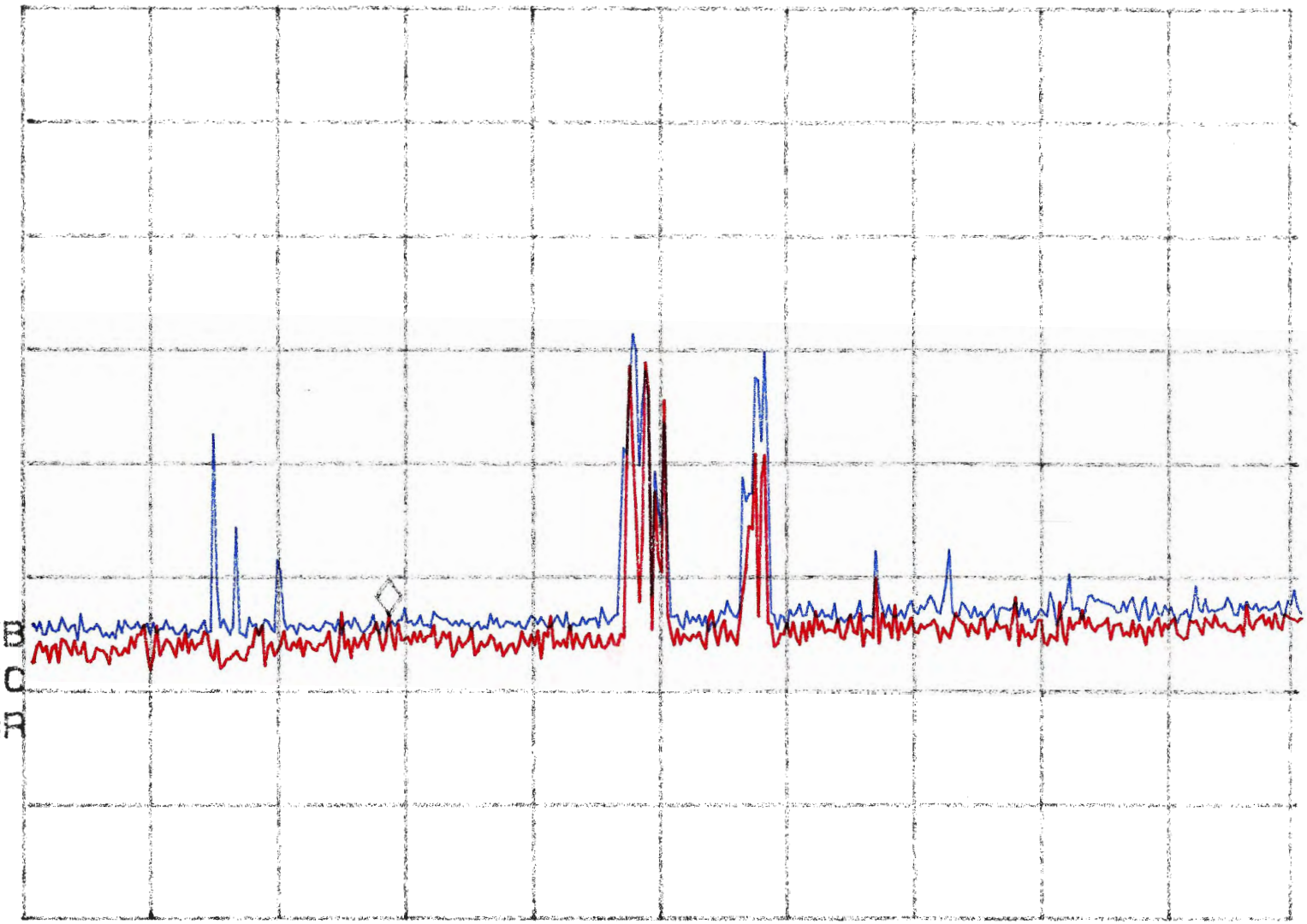
26.66 dBμV

PEAK

LOG

10

dB/



VA VB

SC FC

CORR

START 1.000 GHz

STOP 3.000 GHz

#RES BW 1.0 MHz

VBW 300 kHz

SWP 58.4 msec

23: 08: 02 OCT 16, 2014

GENIE 6510 390TR4 3M R: ON ANT-VERT MKR 406.0 MHz

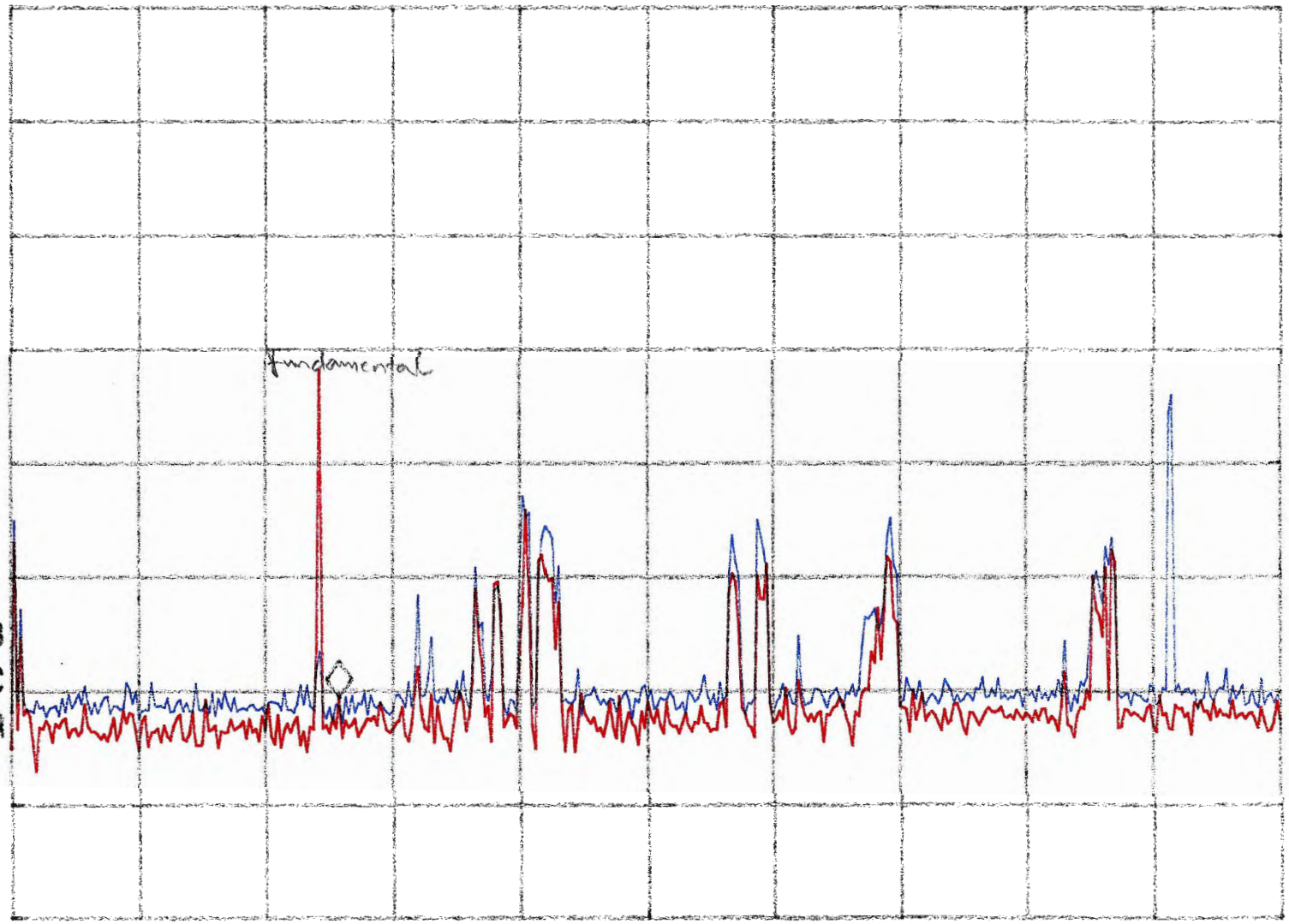
REF 80.0 dBμV #AT 0 dB 19.41 dBμV

PEAK

LOG

10

dB/



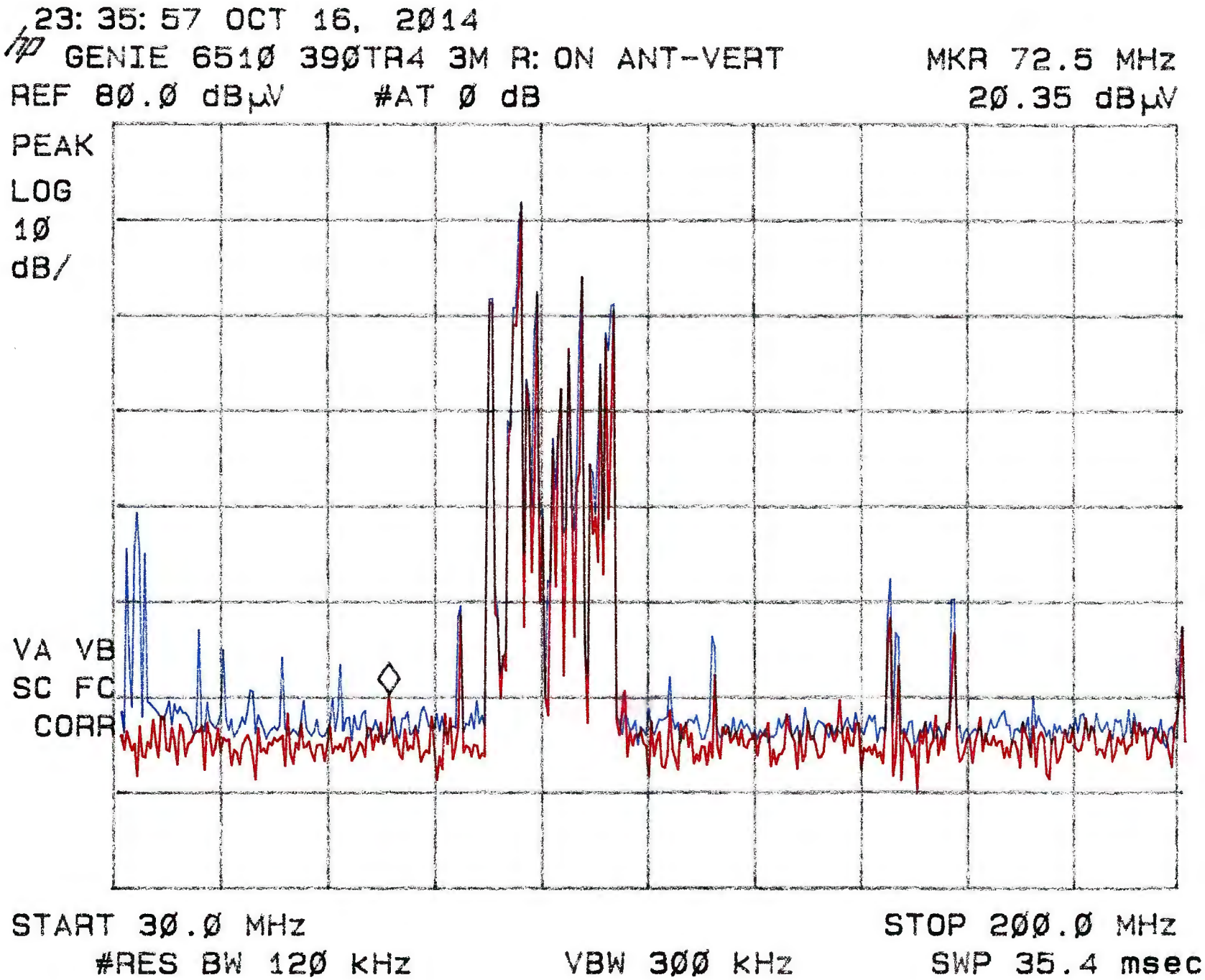
VA VB

SC FC

CORR

START 200.0 MHz STOP 1.0000 GHz

#RES BW 120 kHz VBW 300 kHz SWP 167 msec


23: 35: 57 OCT 16, 2014
GENIE 651Ø 39ØTR4 3M R: ON ANT-VERT
MKR 72.5 MHz
REF 8Ø.Ø dBμV
#AT Ø dB
2Ø.35 dBμV
PEAK
LOG
1Ø
dB/
VA VB
SC FC
CORR
START 3Ø.Ø MHz
STOP 2ØØ.Ø MHz
#RES BW 12Ø kHz
VBW 3ØØ kHz
SWP 35.4 msec

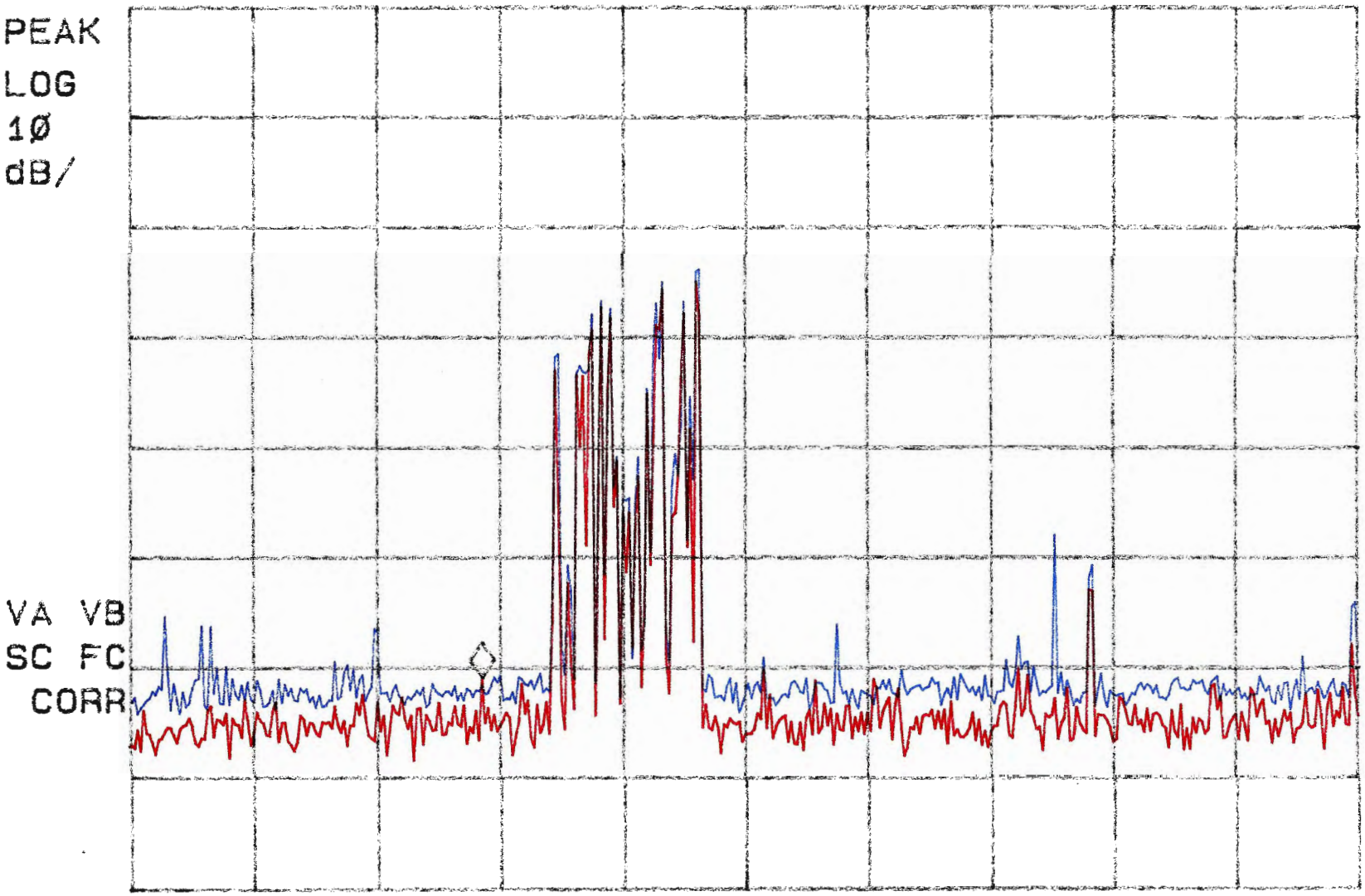
23: 22: 53 OCT 16, 2014

hp GENIE 6510 390TR4 3M R: ON ANT-HOR

MKR 78.5 MHz

REF 80.0 dBμV #AT 0 dB

19.07 dBμV



START 30.0 MHz

STOP 200.0 MHz

#RES BW 120 kHz

VBW 300 kHz

SWP 35.4 msec