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 One Button Remote Control 312 MHz garage door opener transmitter model 312TR1 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

Test Report – Table of Contents

Test Information

Laboratory	Manufacturer
Diversified T.E.S.T. 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: 6502-2-102114- 15.231 (Edition 1)
Project Number: 6502-2

Date Received: August 4, 2014
Date Tested: August 4, 2014 - October 20, 2014

Product One Button Remote Control 312 MHz
Model: 312TR1

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

The testing performed by Diversified T.E.S.T. 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 One Button Remote Control 312 MHz, Model: 312TR1.

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: October 21, 2014
Prasanna Gautam
Technical Associate

Reviewed by:
Signature: _____ Date: October 21, 2014
Steve Frierson
Technical Lab Manager

Authorized by:
Signature: _____ Date: October 21, 2014
Annelle Frierson
Vice-President

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

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 One Button Remote Control is a remote garage door opener transmitter. It operates at 312 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

Test Setup Photographs

1.1 Radiated Emissions / Occupied Bandwidth

1.2. Radiated Emissions above 1 GHz

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 T.E.S.T. Technologies, Inc. Open Area Test Site
☐ Diversified T.E.S.T. 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

Diversified T.E.S.T. Technologies, Inc. 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	10/29/15
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		

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

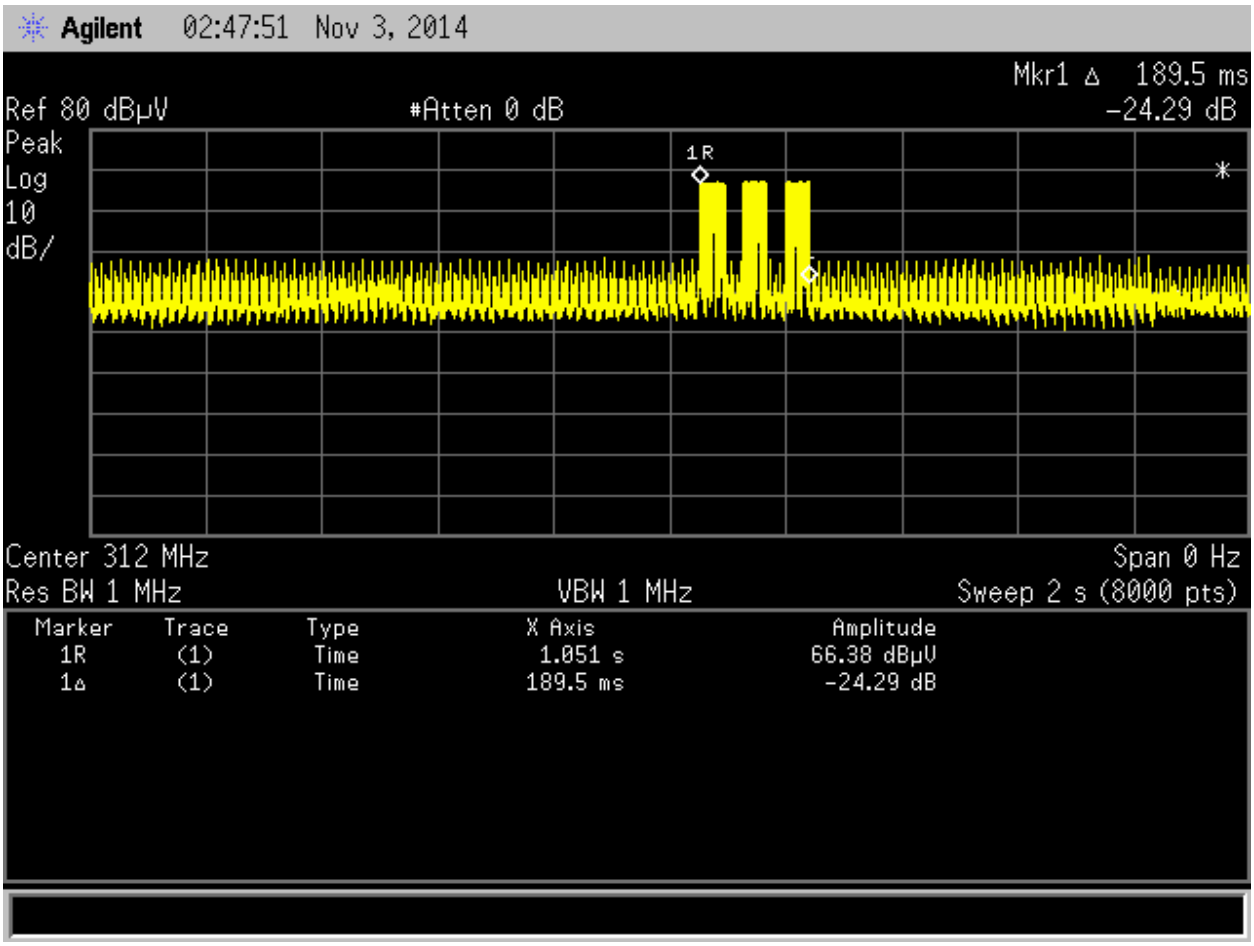
Test Data: Compliance was determined by verification of technical specifications and functional tests on the equipment.

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	

Deactivation Time

Test Data: Deactivation Time 2 seconds, 312 MHz



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.

Test Data: Radiated Emissions

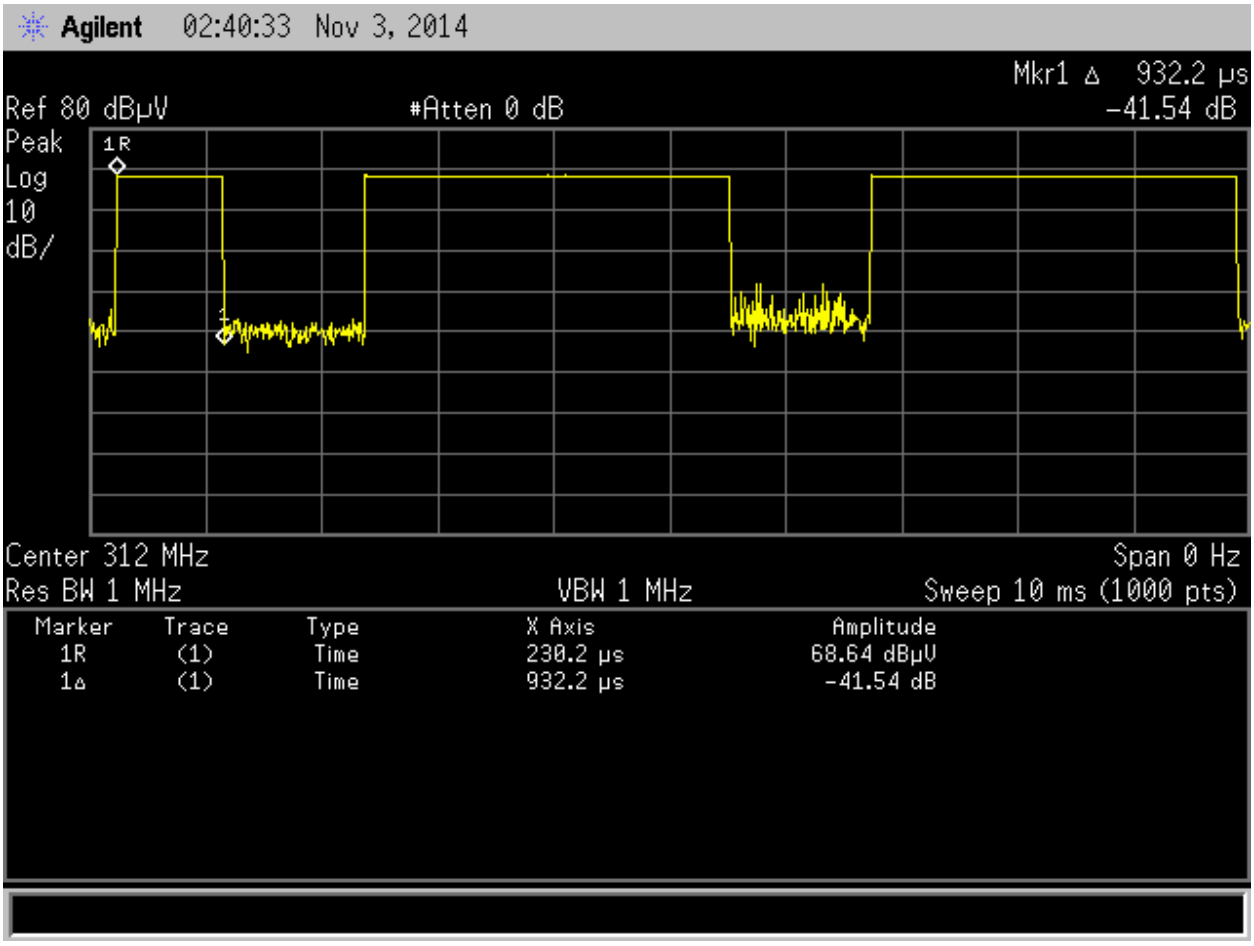
Freq. (MHz)	Antenna Polarization	Meter Reading (dBuV)				LESS Duty Factor (dB)	ADD Cable Factor (dB)	ADD Antenna Factor (dB)	LESS 1 m to 3 m Distance Factor (dB)	Corrected Reading (dBuV/m)	FCC Spec Limit (dBuV/m)	Margin (dB)	Results	Comments
		X	Y	Z	Max									
312	H	59.3	48.8	48.4	59.3	-7.9	7.1	15.1	0.0	73.6	75.4	-1.9	Pass	
	V	38.6	56.8	55.2	56.8	-7.9	7.1	15.1	0.0	71.0	75.4	-4.5	Pass	
624	H	21.8	21.9	21.2	21.9	-7.9	12.3	20.3	0.0	46.6	55.4	-8.8	Pass	
	V	22.5	21.1	21.0	22.5	-7.9	12.3	20.3	0.0	47.2	55.4	-8.2	Pass	
936	H	21.1	21.5	21.1	21.5	-7.9	17.4	24.4	-9.5	45.9	55.4	-9.5	Pass	Noise Floor
	V	20.9	21.7	21.2	21.7	-7.9	17.4	24.4	-9.5	46.1	55.4	-9.3	Pass	Noise Floor
1248	H	30.7	31.9	28.9	31.9	-7.9	0.3	25.0	-9.5	39.8	54.0	-14.2	Pass	
	V	30.0	33.5	34.6	34.6	-7.9	0.3	25.0	-9.5	42.4	54.0	-11.6	Pass	
1560	H	31.3	33.4	29.3	33.4	-7.9	0.5	26.2	-9.5	42.7	54.0	-11.3	Pass	
	V	32.3	34.5	37.0	37.0	-7.9	0.5	26.2	-9.5	46.2	54.0	-7.8	Pass	
1872	H	28.8	31.2	32.7	32.7	-7.9	0.4	28.0	-9.5	43.6	55.4	-11.8	Pass	
	V	30.3	31.9	32.3	32.3	-7.9	0.4	28.0	-9.5	43.2	55.4	-12.2	Pass	
2184	H	29.4	32.2	33.4	33.4	-7.9	0.2	28.9	-9.5	45.0	55.4	-10.4	Pass	
	V	30.8	32.0	31.6	32.0	-7.9	0.2	28.9	-9.5	43.6	55.4	-11.8	Pass	
2496	H	32.7	39.9	36.0	39.9	-7.9	0.3	29.2	-9.5	52.0	54.0	-2.0	Pass	
	V	31.9	36.5	36.4	36.5	-7.9	0.3	29.2	-9.5	48.6	54.0	-5.4	Pass	
2808	H	33.4	39.8	31.8	39.8	-7.9	0.2	30.0	-9.5	52.5	54.0	-1.5	Pass	
	V	32.7	34.3	36.7	36.7	-7.9	0.2	30.0	-9.5	49.4	54.0	-4.6	Pass	
3120	H	35.7	38.9	36.3	38.9	-7.9	0.4	30.9	-9.5	52.8	55.4	-2.6	Pass	
	V	35.1	34.3	35.1	35.1	-7.9	0.4	30.9	-9.5	49.0	55.4	-6.4	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

Duty Cycle Correction

Narrow Pulses

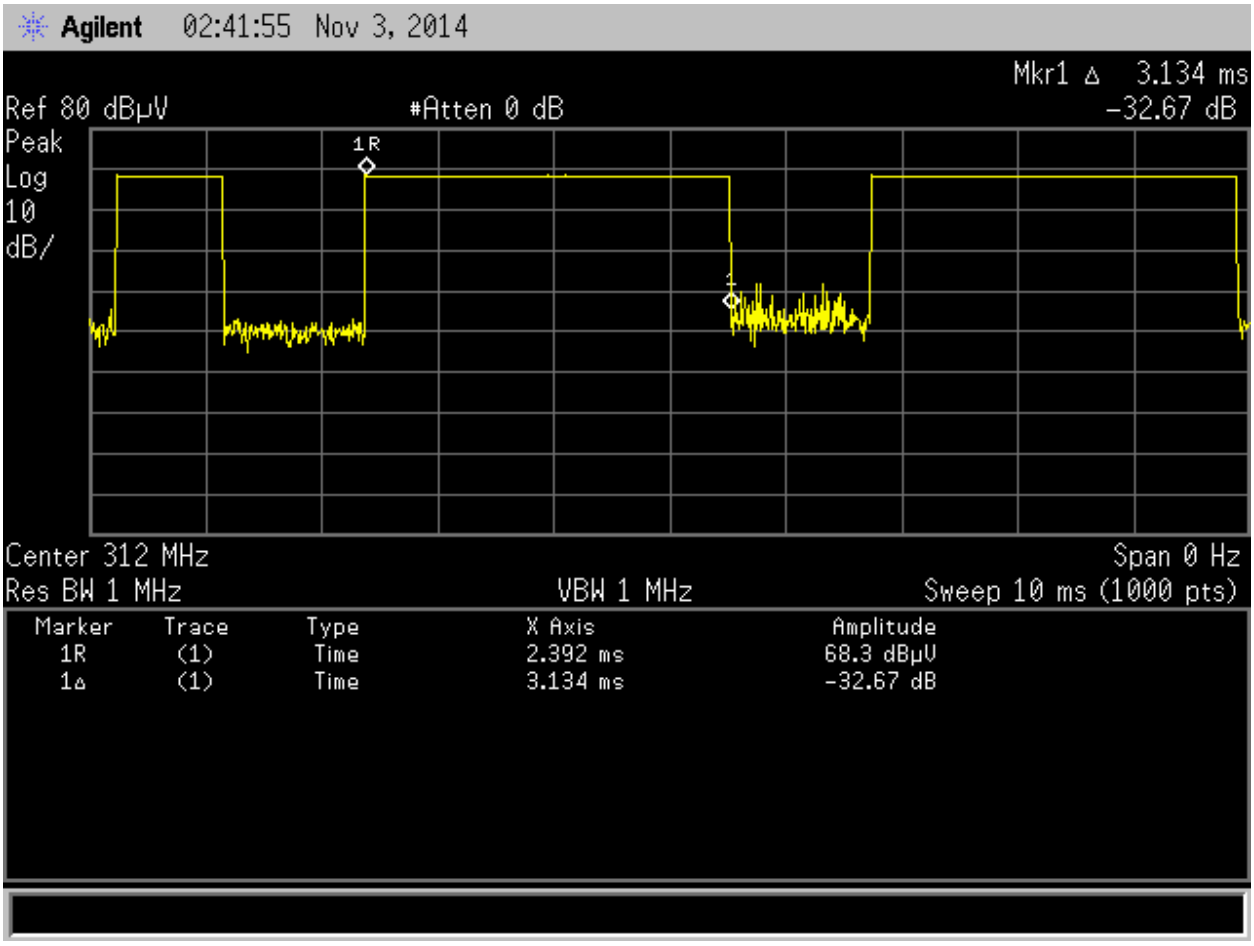
312 MHz



Duty Cycle Correction

Wide Pulses

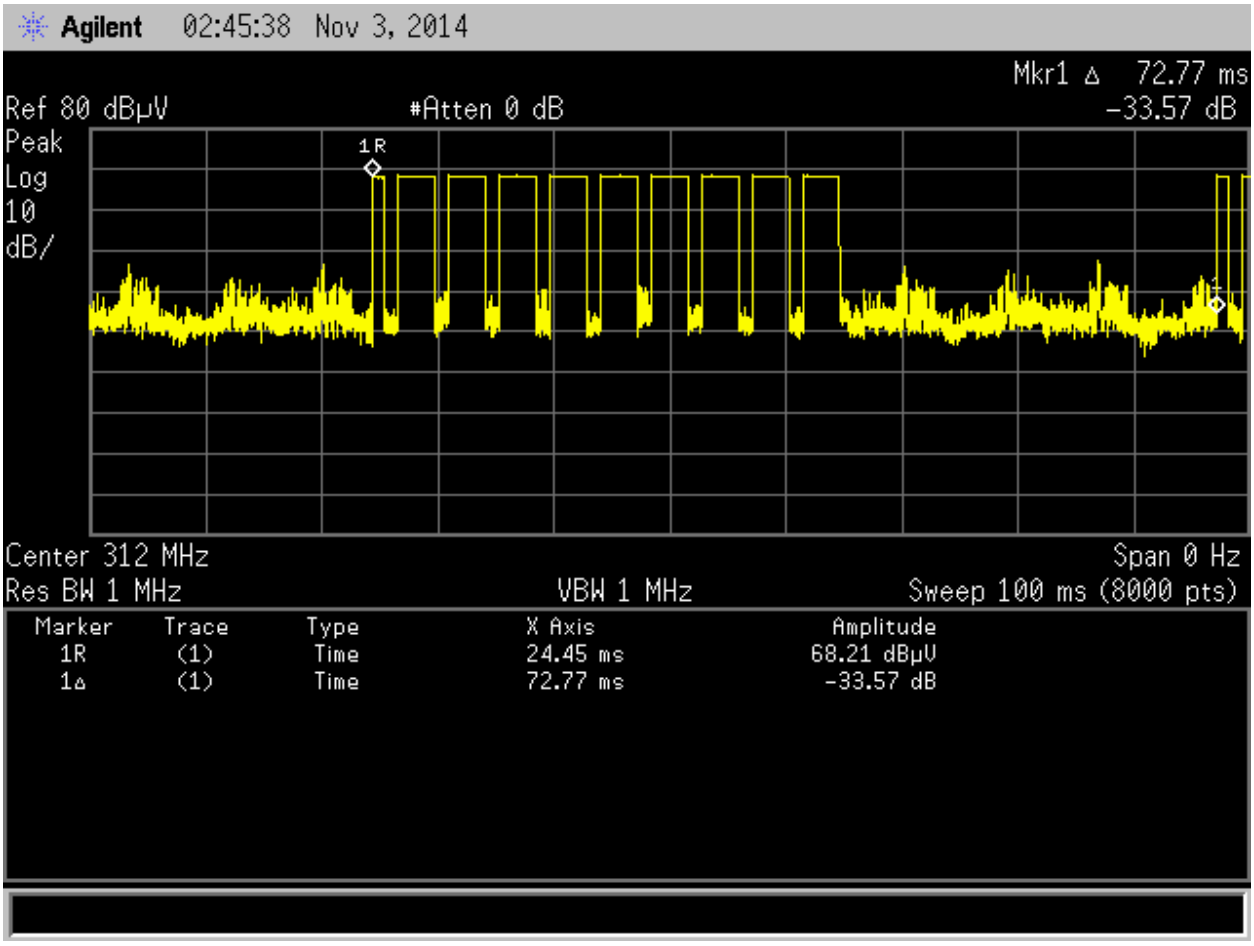
312 MHz



Duty Cycle Correction

100 ms

312 MHz



Duty Cycle Correction

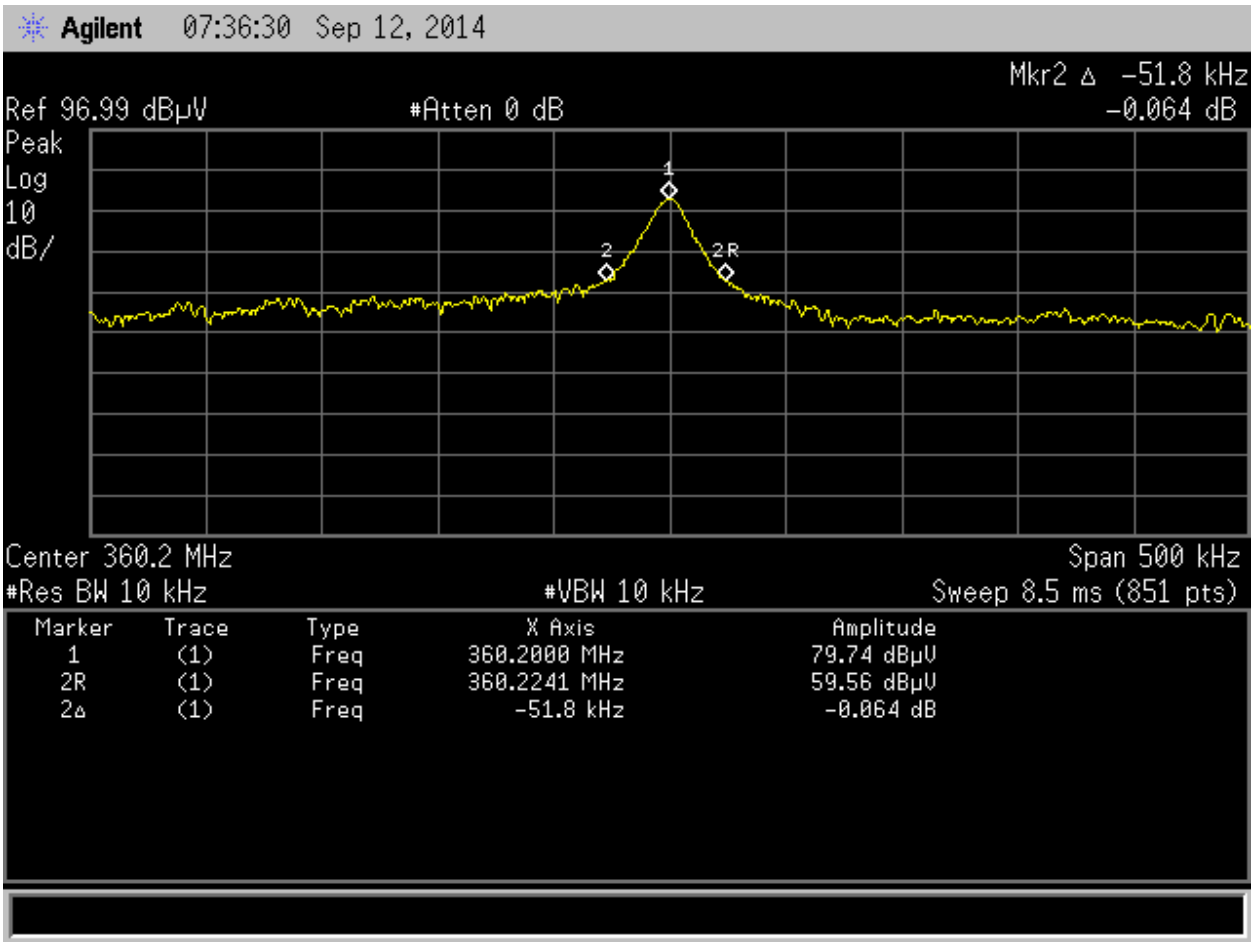
312TR1 Worst Case Duty Cycle Correction
9 wide pulses (t = 28.3 ms)
1 narrow pulse (t = 0.9 ms)
Total Time On = 29.2 ms
Pulse Train Time = 72.8 ms
20*log(29.2/72.8) = -7.9 dB
Note: The device was tested using the worst case duty cycle.

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



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

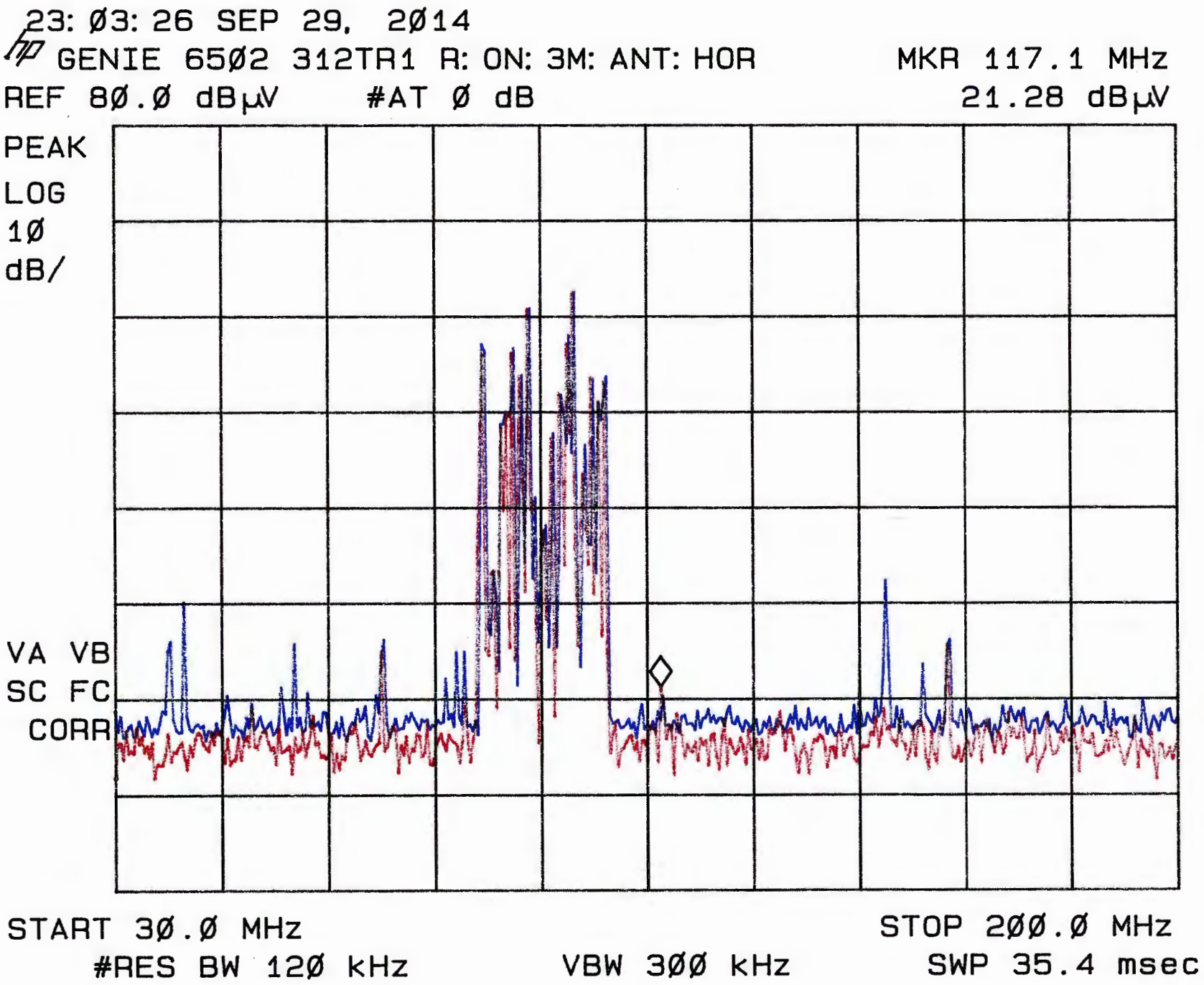
Test Result: Complies; highest spurious emission level recorded from 30 MHz - 6 GHz is 40.3 dBuV at 2.475 GHz.

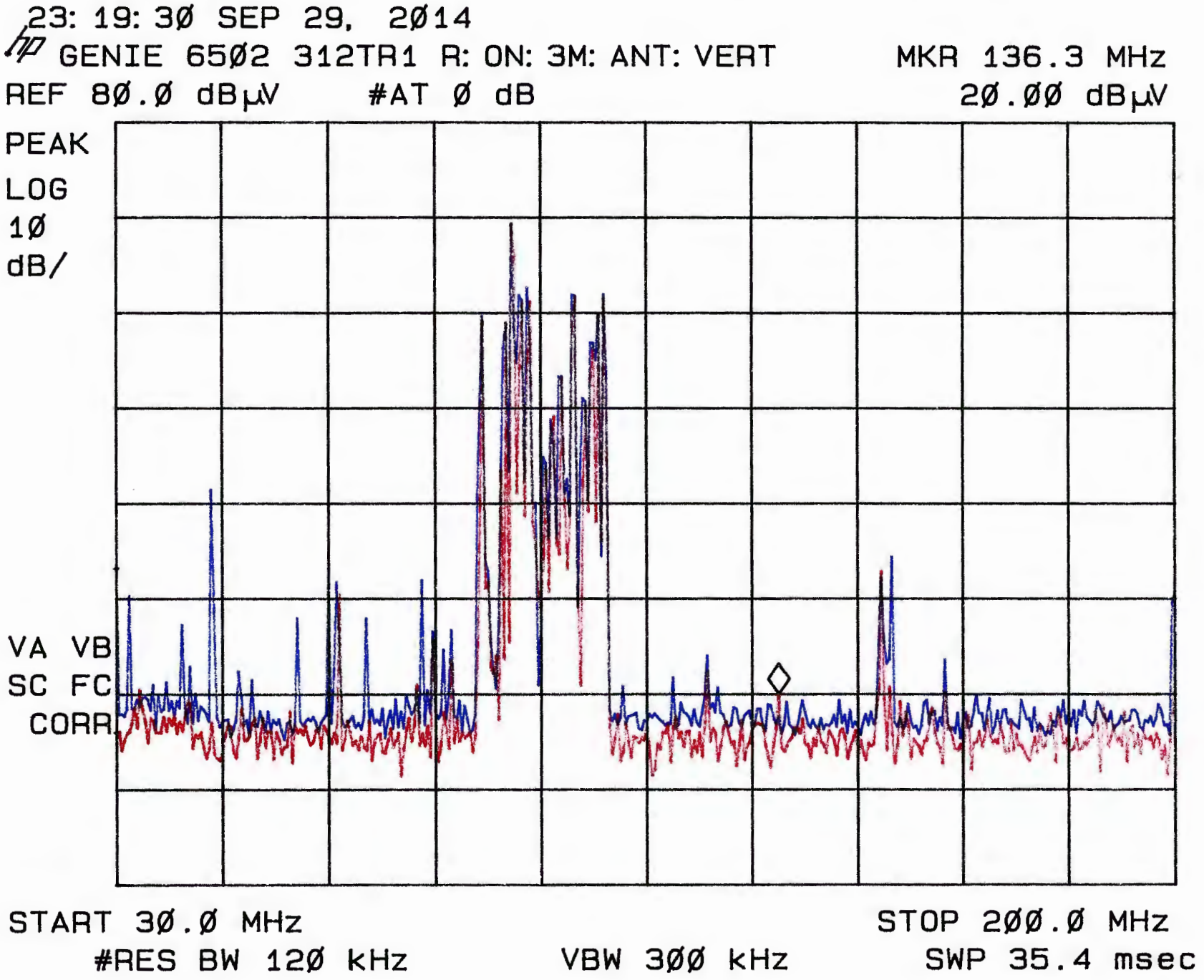
15.209 Radiated emission limits; general requirements.
(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

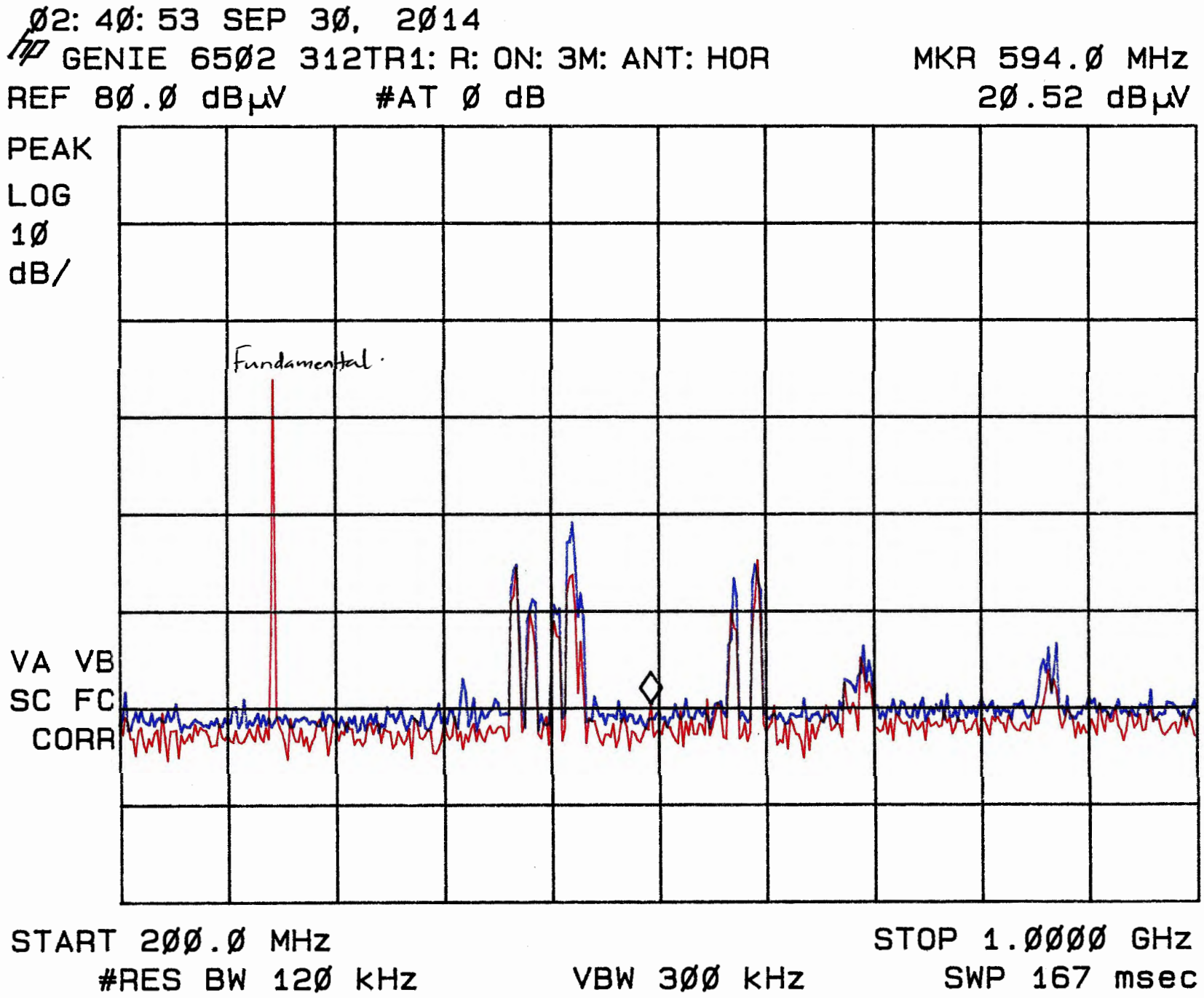
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

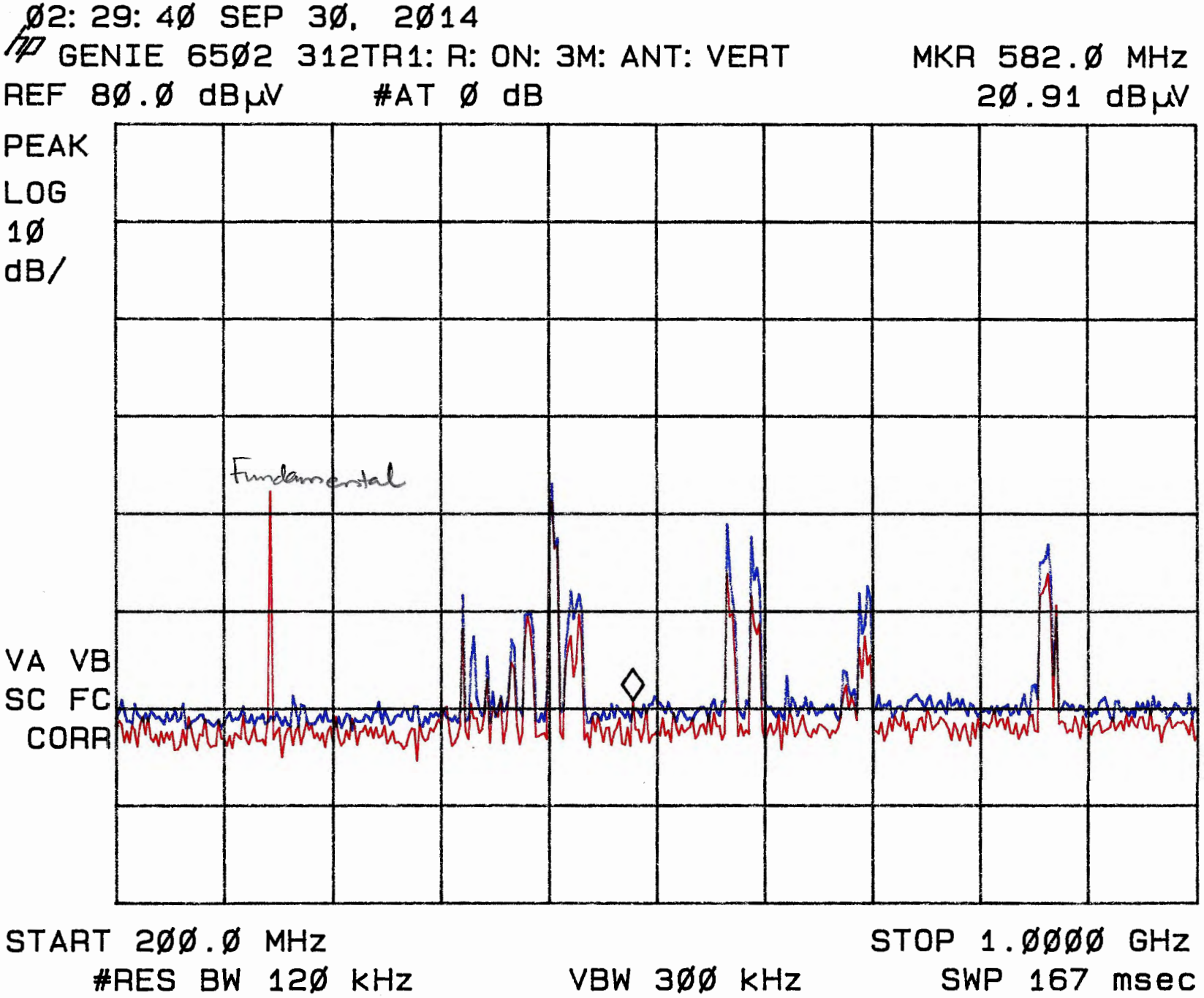
Radiated Emissions Test Data 15.109

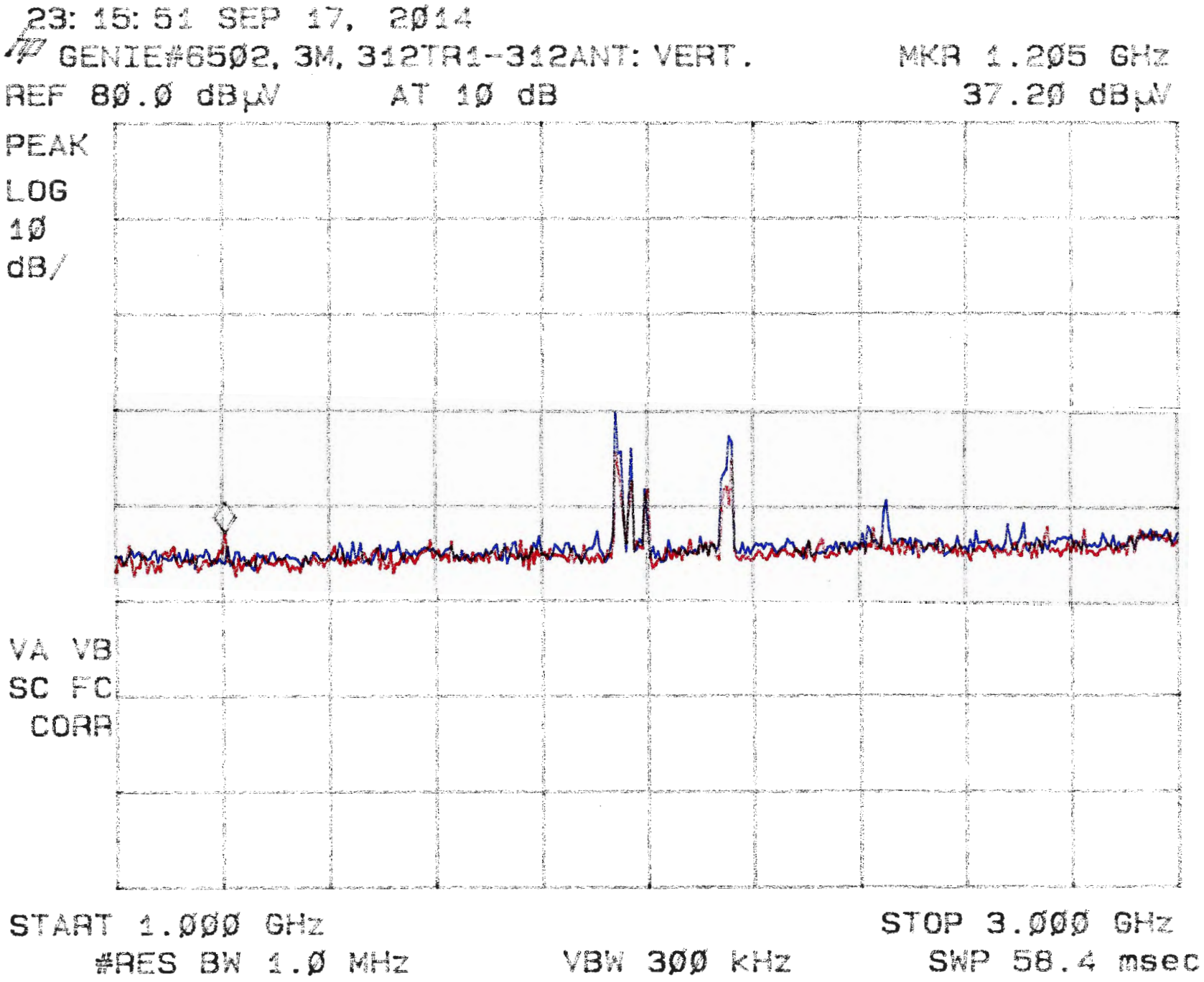
Test Result: Complies, see attached data.

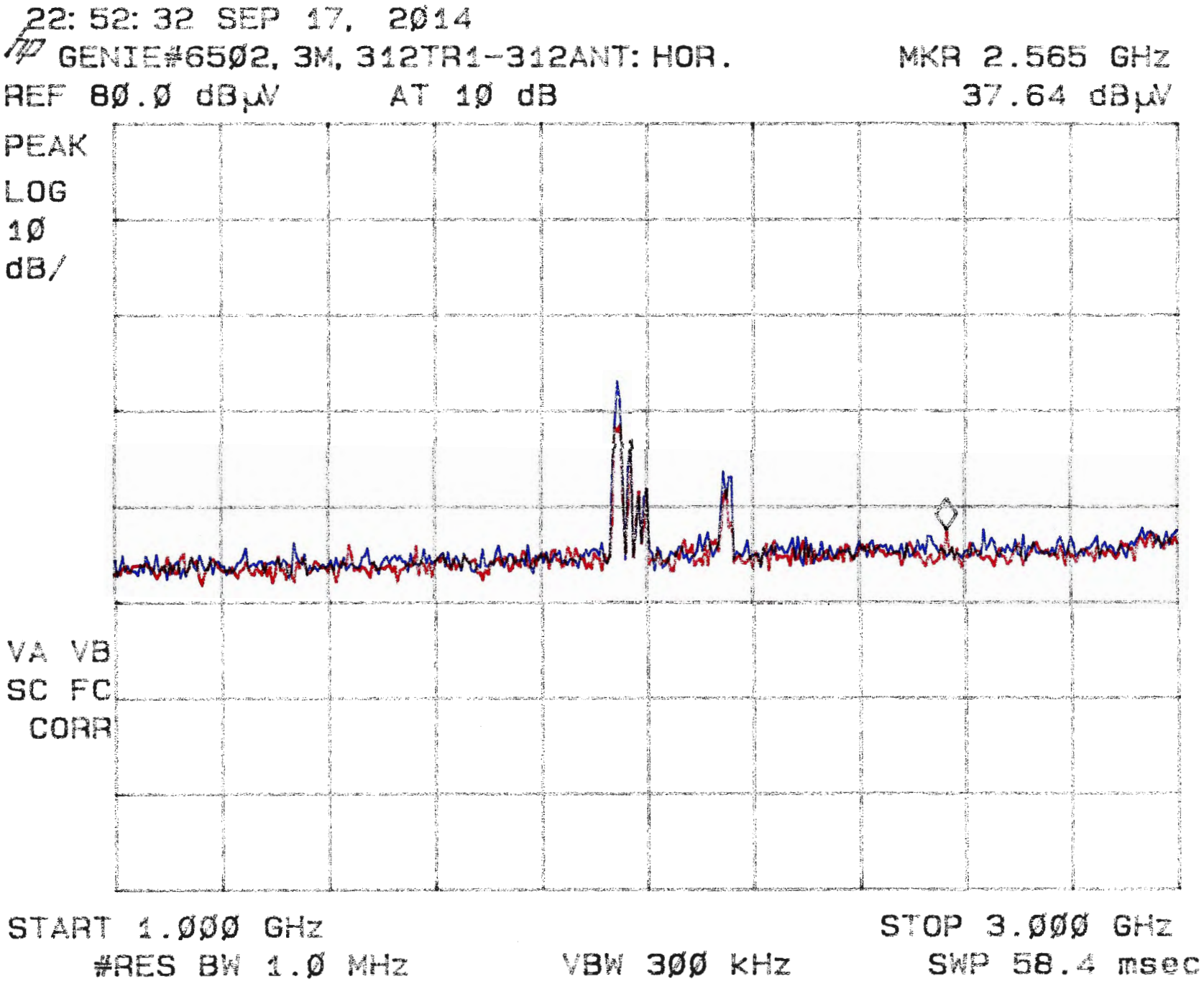

23: Ø3: 26 SEP 29, 2Ø14
GENIE 65Ø2 312TR1 R: ON: 3M: ANT: HOR
MKR 117.1 MHz
REF 8Ø.Ø dBµV
#AT Ø dB
21.28 dBµV
PEAK
LOG
1Ø
dB/
VA VB
SC FC
CORR
START 3Ø.Ø MHz
STOP 2ØØ.Ø MHz
#RES BW 12Ø kHz
VBW 3ØØ kHz
SWP 35.4 msec

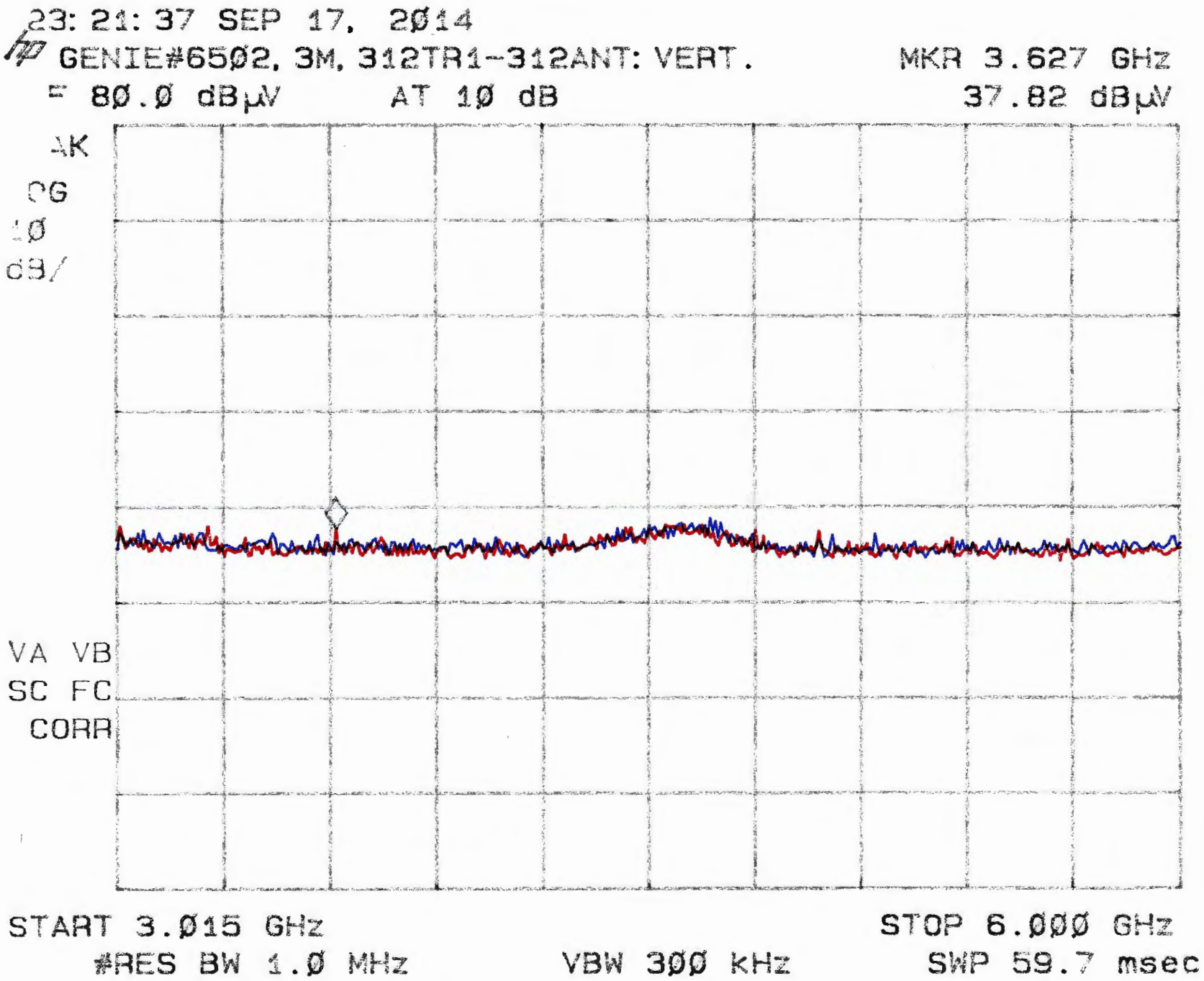

23: 19: 3Ø SEP 29, 2Ø14
GENIE 65Ø2 312TR1 R: ON: 3M: ANT: VERT
MKR 136.3 MHz
REF 8Ø.Ø dBµV
#AT Ø dB
2Ø.ØØ dBµV
PEAK
LOG
1Ø
dB/
VA VB
SC FC
CORR
START 3Ø.Ø MHz
STOP 2ØØ.Ø MHz
#RES BW 12Ø kHz
VBW 3ØØ kHz
SWP 35.4 msec

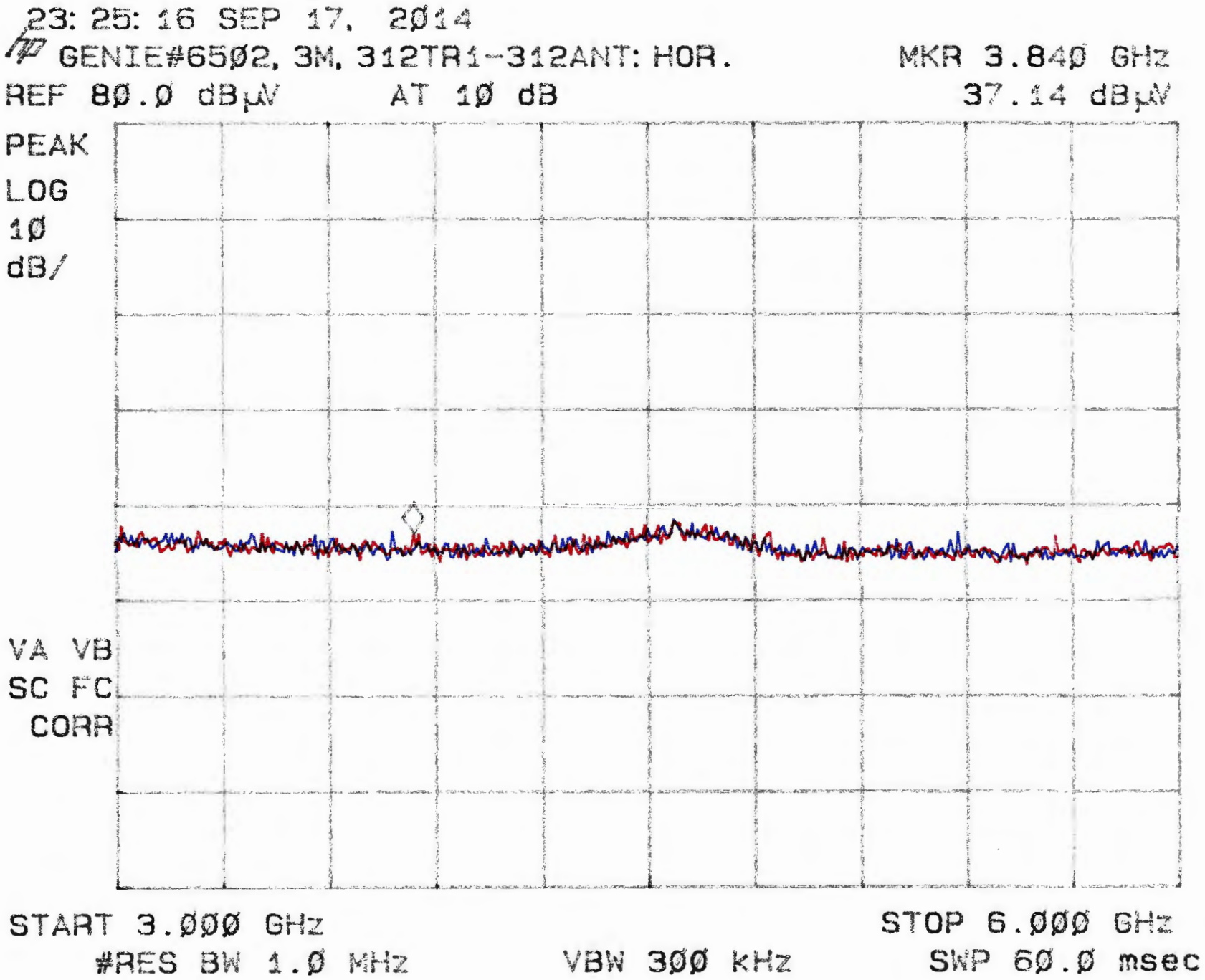

Ø2: 4Ø: 53 SEP 3Ø, 2Ø14
GENIE 65Ø2 312TR1: R: ON: 3M: ANT: HOR
MKR 594.Ø MHz
REF 8Ø.Ø dBµV
#AT Ø dB
2Ø.52 dBµV
PEAK
LOG
1Ø
dB/
Fundamental
VA VB
SC FC
CORR
START 2ØØ.Ø MHz
#RES BW 12Ø kHz
VBW 3ØØ kHz
STOP 1.ØØØØ GHz
SWP 167 msec


Ø2: 29: 4Ø SEP 3Ø, 2Ø14
GENIE 65Ø2 312TR1: R: ON: 3M: ANT: VERT
MKR 582.Ø MHz
REF 8Ø.Ø dBµV
#AT Ø dB
2Ø.91 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


23: 15: 51 SEP 17, 2014
GENIE#6502, 3M, 312TR1-312ANT: VERT.
MKR 1.205 GHz
REF 80.0 dBµV
AT 10 dB
37.20 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


22: 52: 32 SEP 17, 2014
GENIE#65Ø2, 3M, 312TR1-312ANT: HOR.
MKR 2.565 GHz
REF 8Ø.Ø dBµV
AT 1Ø dB
37.64 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


23: 21: 37 SEP 17, 2Ø14
GENIE#65Ø2, 3M, 312TR1-312ANT: VERT.
MKR 3.627 GHz
8Ø.Ø dBµV
AT 1Ø dB
37.82 dBµV
AK
CG
1Ø
dB/
VA VB
SC FC
CORR
START 3.Ø15 GHz
STOP 6.ØØØ GHz
#RES BW 1.Ø MHz
VBW 3ØØ kHz
SWP 59.7 msec


23: 25: 16 SEP 17, 2014
GENIE#6502, 3M, 312TR1-312ANT: HOR.
MKR 3.840 GHz
REF 80.0 dBµV
AT 10 dB
37.14 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