



Engineering and Testing for EMC and Safety Compliance

## TYPE CERTIFICATION REPORT

**VEGA Grieshaber KG**  
Am Hohenstein 113  
77761 Schiltach  
Germany

**MODELS: VEGAPULS 61 & VEGAPULS 62 & VEGAPULS 63**  
**FCC ID: O6QPULS616263**  
**IC: 3892A-PS616263**

**July 30, 2005**

Standards Referenced for this Report	
Part 2: 2001	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 15: 2001	Radio Frequency Devices - §15.209: Radiated Emissions Limits
RSS-210	Low Power License-Exempt Radio Communication Devices (All Frequency Bands)
ANSI C63.4-2003	Standard Format Measurement/Technical Report Personal Computer and Peripherals

Frequency Range	Output Power (W) Conducted	Frequency Tolerance (ppm)	Emission Designator
26 GHz		N/A	2G3P0N

**REPORT PREPARED BY TEST ENGINEER: DESMOND FRASER**

*Document Number: 2005169/QRTL05-304*

*No part of this report may be reproduced without the full written approval of Rhein Tech Laboratories, Inc.*

360 Herndon Parkway  
Suite 1400  
Herndon, VA 20170  
Phone: 703-689-0368 Fax: 703-689-2056

## Table of Contents

---

---

1	General Information .....	6
1.1	Test Facility .....	6
1.2	Related Submittal(s)/Grant(s).....	6
2	Conformance Statement .....	7
3	Exercising the EUT .....	8
4	Conducted Limits - §15.207 .....	9
4.1	Conducted Emission Limits Test Data.....	9
5	Radiated Emission Limits - §15.209; IC RSS-210 Issue 6 Section 2.6. General Field Strength Level.....	10
5.1	Radiated Emission Limits Test Procedure.....	10
5.2	Field Strength Calculation.....	10
5.3	Duty Cycle Calculation.....	10
5.4	Radiated Emission Limits Test Data.....	11
5.5	Test Equipment Used for Testing.....	13
6	Tested System Details .....	14
7	Test Plots .....	15
8	Conclusion .....	21

### Table of Tables

Table 4-1: Conducted Emissions Limits Test Data – Neutral Conductor.....	9
Table 4-2: Conducted Emissions Limits Test Data – Phase Conductor.....	9
Table 5-1: Field Strength of Carrier with 19.5 dBi Rod Antenna with Plastic Housing.....	11
Table 5-2: Field Strength of Carrier with 21.2 dBi Rod Antenna with Plastic Housing.....	11
Table 5-3: Field Strength of Carrier with 19.0 dBi Horn Antenna with Plastic Housing.....	11
Table 5-4: Field Strength of Carrier with 24.7 dBi Horn Antenna with Plastic Housing.....	11
Table 5-5: Field Strength of Carrier with 33 dBi Parabolic Antenna with Plastic Housing – 26.0 GHz.....	12
Table 5-6: Field Strength of Carrier with 33 dBi Parabolic Antenna with Plastic Housing – 0.009-110 GHz.....	12
Table 5-7: Field Strength of Carrier with All Antennas with Plastic Housing.....	12
Table 5-8: Radiated Spurious Emissions Test Equipment.....	13
Table 6-1: Equipment Under Test (EUT).....	14

### Table of Plots

Plot 7-1: EUT 19.5 dBi Rod Antenna 100% Duty Cycle Mode.....	15
Plot 7-2: EUT 19.0 dBi Horn Antenna 100% Duty Cycle Mode.....	16
Plot 7-3: EUT 21.2 dBi Rod Antenna 100% Duty Cycle Mode.....	17
Plot 7-4: EUT 24.7 dBi Horn Antenna 100% Duty Cycle Mode.....	18
Plot 7-5: EUT 33 dBi Parabolic Antenna 100% Duty Cycle Peak Mode H Pol.....	19
Plot 7-6: EUT 33 dBi Parabolic Antenna 100% Duty Cycle Peak Mode V Pol.....	20

### Table of Figures

Figure 6-1: Configuration of Tested System.....	14
---	----

### Table of Appendices

Appendix A: Agency Authorization.....	23
Appendix B: Confidentiality Request.....	24
Appendix C: Operational Description.....	25
Appendix D: Label and Location.....	26
Appendix E: Schematics.....	28
Appendix F: Block Diagram.....	29
Appendix G: Manual.....	30
Appendix H: Test Configuration Test Photographs.....	31
Appendix I: External Photographs.....	43
Appendix J: Internal Photographs.....	67

### Table of Photographs

Photograph 1:	FCC ID/IC ID Label Sample for Model VEGAPULS 61 .....	26
Photograph 2:	FCC ID/IC ID Label Sample for Model VEGAPULS 62 .....	26
Photograph 3:	FCC ID/IC ID Label Sample for Model VEGAPULS 63 .....	27
Photograph 4:	FCC ID/IC ID Label Location .....	27
Photograph 5:	Conducted Emissions Front View .....	31
Photograph 6:	Conducted Emissions Rear View .....	32
Photograph 7:	Radiated Emissions Front View 33 dBi Parabolic Antenna .....	33
Photograph 8:	Radiated Emissions Rear View 33 dBi Parabolic Antenna .....	34
Photograph 9:	Radiated Emissions Front View 19 dBi Horn Antenna .....	35
Photograph 10:	Radiated Emissions Rear View 19 dBi Horn Antenna .....	36
Photograph 11:	Radiated Emissions Front View 19.5 dBi Rod Antenna .....	37
Photograph 12:	Radiated Emissions Rear View 19.5 dBi Rod Antenna .....	38
Photograph 13:	Radiated Emissions Front View 24.7dBi Horn Antenna .....	39
Photograph 14:	Radiated Emissions Rear View 24.7dBi Horn Antenna .....	40
Photograph 15:	Radiated Emissions Front View 21.2dBi Horn Antenna .....	41
Photograph 16:	Radiated Emissions Rear View 21.2dBi Horn Antenna .....	42
Photograph 17:	EUT Plastic Housing Front View .....	43
Photograph 18:	EUT Plastic Housing Inside View .....	44
Photograph 19:	EUT Plastic Housing Fitting .....	45
Photograph 20:	EUT Aluminum Housing .....	46
Photograph 21:	EUT Aluminum Housing Front View .....	47
Photograph 22:	EUT Double Aluminum Chamber Housing Fitting .....	48
Photograph 23:	EUT Double Aluminum Housing Fitting Front View .....	49
Photograph 24:	EUT Double Aluminum Chamber Housing Rear View .....	50
Photograph 25:	EUT Stainless Steel Housing Fitting .....	51
Photograph 26:	EUT Stainless Steel Housing Front View .....	52
Photograph 27:	EUT Stainless Steel Housing Top View .....	53
Photograph 28:	EUT with 19 dBi Horn Antenna .....	54
Photograph 29:	19 dBi Horn Antenna .....	55
Photograph 30:	EUT with 21.2 dBi Rod Antenna .....	56
Photograph 31:	21.2 dBi Rod Antenna .....	57
Photograph 32:	EUT with 19.5 dBi Rod Antenna .....	58
Photograph 33:	19.5 dBi Rod Antenna .....	59
Photograph 34:	EUT with 24.7 dBi Horn Antenna .....	60
Photograph 35:	24.7 dBi Horn Antenna .....	61
Photograph 36:	EUT with 33 dBi Parabolic Antenna .....	62
Photograph 37:	33 dBi Parabolic Antenna Front View .....	63
Photograph 38:	33 dBi Parabolic Antenna Top View .....	64
Photograph 39:	33 dBi Parabolic Antenna Side View .....	65
Photograph 40:	EUT Antenna Port .....	66
Photograph 41:	EUT LCD Display Top View .....	67
Photograph 42:	EUT LCD Display Bottom View .....	68
Photograph 43:	EUT LCD Display Inside View .....	69
Photograph 44:	EUT LCD Display-PCB Bottom View .....	70
Photograph 45:	EUT LCD Display-PCB Bottom View .....	71
Photograph 46:	EUT Module-Antenna Port View .....	72
Photograph 47:	EUT Module Top View .....	73
Photograph 48:	EUT Module Front View .....	74
Photograph 49:	EUT Module Rear View .....	75

Photograph 50:	EUT Module Inside View .....	76
Photograph 51:	EUT Module Parts Inside View .....	77
Photograph 52:	EUT Module Parts Side View .....	78
Photograph 53:	Module Parts PCB1 Top View .....	79
Photograph 54:	Module Parts PCB1 Bottom View .....	80
Photograph 55:	Module Parts PCB2 Top View .....	81
Photograph 56:	Module Parts PCB2 Bottom View .....	82
Photograph 57:	Module RF PCB With Port Top View .....	83
Photograph 58:	Module RF PCB Without Port Top View .....	84
Photograph 59:	Module RF PCB Without Port Bottom View .....	85
Photograph 60:	Module RF PCB Shield Top View .....	86
Photograph 61:	Module RF PCB Shield Bottom View .....	87

## **1 General Information**

The following Type Certification Report is prepared on behalf of Vega Grieshaber KG in accordance with the Federal Communications Commission and Industry Canada Rules and Regulations. The Equipment Under Test (EUT) were Models VEGAPULS 61, VEGAPULS 62, and VEGAPULS 63; FCC ID: O6QPULS616263. The test results reported in this document relate only to the items tested.

All measurements contained in this application were conducted in accordance with FCC Rules and Regulations CFR 47, Industry Canada RSS-210, and ANSI C63.4 Methods of Measurement of Radio Noise Emissions, 2003. The instrumentation utilized for the measurements conforms to the ANSI C63.4 standard for EMI and Field Strength Instrumentation. Calibration checks are performed regularly on the instruments, and all accessories including high pass filter, coaxial attenuator, preamplifier and cables.

### **1.1 Test Facility**

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, Inc., 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report dated March 3, 2000, submitted to and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 2003).

### **1.2 Related Submittal(s)/Grant(s)**

This is an original application report.

## 2 Conformance Statement

Standards Referenced for This Report	
Part 2: 2001	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 15: 2001	Radio Frequency Devices - §15.209: Radiated Emissions Limits
RSS-210	Low Power License-Exempt Radio Communication Devices (All Frequency Bands)
ANSI C63.4-2003	Standard Format Measurement/Technical Report Personal Computer and Peripherals

Frequency Range	Output Power (W) Conducted	Frequency Tolerance (ppm)	Emission Designator
26 GHz		N/A	N/A

We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this attached test record. No modifications were made to the equipment during testing in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to, or exclusions from, the above standards for Certification methodology.

Signature: 

Date: July 30, 2005

Typed/Printed Name: Desmond Fraser


Position: President

Signature: 

Date: July 30, 2005

Typed/Printed Name: Desmond Fraser

Position: Test Engineer

 Accredited by the National Voluntary Accreditation Program for the specific scope of accreditation under Lab Code 200061-0.

**Note: This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.**

### 3 Exercising the EUT

The EUT was configured to continuously transmit at 100% duty cycle in measurement mode where the device maintains its full power.

The normal operating measurement mode is a radar pulse with a duty cycle less than 1: 100. By configuring the unit to transmit continuously in the continuous measurement mode desensitization factor was not required. This approach was used because the EUT produces extremely low output power. The EUT was setup at an antenna to EUT test distance of **0.03 m** in order to achieve sufficient dynamic range including the use of harmonic mixer as a result of the carrier low output power. The unit's spurious emissions were also investigated and tested in the restricted and non restricted band from 9 KHz to 110GHz. The tests were performed with the EUT polarized horizontally and vertically in order to determine worst-case emissions. The EUT supports only one channel at 26.0 GHz.



#### 4 Conducted Limits - §15.207

Conducted emissions were performed on the EUT using an off-the-shelf 24 volt power supply. The general conducted limit under Part 15.207 was applied. The EUT was investigated and tested with four housings, namely Stainless Steel, Aluminum, Double Chamber Aluminum, and Plastic. The Plastic housing configuration demonstrated the worst case results. The data below is for the worst case configuration of the four antenna configurations.

##### 4.1 Conducted Emission Limits Test Data

**Table 4-1: Conducted Emissions Limits Test Data – Neutral Conductor**

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	CISPR A QP Limit (dBuV)	CISPR A QP Margin (dBuV)	CISPR A AV Limit (dBuV)	CISPR A AV Margin (dBuV)	Pass/Fail
0.270	Pk	53.6	1.3	54.9	61.1	-6.2	51.1	3.8	Pass
1.220	Pk	47.7	1.0	48.7	56.0	-7.3	46.0	2.7	Pass
2.600	Pk	42.2	1.5	43.7	56.0	-12.3	46.0	-2.3	Pass
7.850	Pk	34.0	2.5	36.5	60.0	-23.5	50.0	-13.5	Pass
21.460	Pk	32.9	4.0	36.9	60.0	-23.1	50.0	-13.1	Pass
22.600	Pk	34.6	4.1	38.7	60.0	-21.3	50.0	-11.3	Pass
29.340	Pk	28.6	4.5	33.1	60.0	-26.9	50.0	-16.9	Pass

**Table 4-2: Conducted Emissions Limits Test Data – Phase Conductor**

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	CISPR A QP Limit (dBuV)	CISPR A QP Margin (dBuV)	CISPR A AV Limit (dBuV)	CISPR A AV Margin (dBuV)	Pass/Fail
0.240	Pk	41.9	1.4	43.3	62.1	-18.8	52.1	-8.8	Pass
1.220	Pk	37.2	1.0	38.2	56.0	-17.8	46.0	-7.8	Pass
2.720	Pk	42.6	1.5	44.1	56.0	-11.9	46.0	-1.9	Pass
3.490	Pk	38.9	1.6	40.5	56.0	-15.5	46.0	-5.5	Pass
7.850	Pk	32.7	2.5	35.2	60.0	-24.8	50.0	-14.8	Pass
22.480	Pk	36.3	4.1	40.4	60.0	-19.6	50.0	-9.6	Pass

#### TEST PERSONNEL:

Desmond Fraser  
 Test Engineer

  
 \_\_\_\_\_  
 Signature

January 6, 2005  
 Date of Test

## **5 Radiated Emission Limits - §15.209; IC RSS-210 Issue 6 Section 2.6 General Field Strength Level**

### **5.1 Radiated Emission Limits Test Procedure**

Radiated Spurious Emissions applies to harmonics and spurious emissions that fall in the restricted and non-restricted bands were investigated from 0.009 kHz to 110 GHz, C63.4 2003 was the standard used for the test. The restricted bands are listed in Part 15.205. The maximum permitted average field strength for the restricted band is listed in Part 15.209. The EUT was tested in three orthogonal planes namely X, Y, and Z. The test antenna was horizontally and vertically polarized during testing. The general limit under part 15.209 was applied for all frequencies 0.009 kHz to 110 GHz per FCC 15.209. There was no spurious noise detected from 0.009 kHz to 110 GHz except the carrier at 26 GHz. The EUT was investigated and tested with four housings namely: Stainless Steel, Aluminum, Double Chamber Aluminum, and Plastic. The Plastic housing configuration demonstrated the worst case results. The data below is for the worst case configuration and four antenna configurations.

### **5.2 Field Strength Calculation**

The field strength is calculated by adding the antenna factor and cable factor from the measured Spectrum Analyzer reading.

Spectrum Analyzer Level Corrected (dBuV/m) = Spectrum Analyzer Level (dBuV/m) + AF (dB/m) + CL (dB)

AF = antenna factor  
CL = cable loss

### **5.3 Duty Cycle Calculation**

Pulse width = 600 pS  
Pulse period = 280 nS

Duty Cycle =  $20 \cdot \log 0.6/280 = 53.4\text{dB}$

#### 5.4 Radiated Emission Limits Test Data

**Table 5-1: Field Strength of Carrier with 19.5 dBi Rod Antenna with Plastic Housing**

Frequency (GHz)	Detector	Antenna POL	Spectrum Analyzer Level (dBuV)	Cable Loss (dB)	Antenna Gain	Spectrum Analyzer Level Corrected (dBuV/m)	FCC Limit (dBuV)	Margin (dB)
26	Peak		5.20 <sup>(1,2,3)</sup>	1	16.8		74.0	
26	Avg	H	5.20 <sup>(1,2,3)</sup>	1	16.8	23.0	54.0	-31.0

Note 1: Corrected by -40dB due to 3 centimeters antenna test distance

Note 2: The mixer conversion loss is factored within the Spectrum Analyzer level reading

Note 3: Duty cycle correction was not used in the final calculation

**Table 5-2: Field Strength of Carrier with 21.2 dBi Rod Antenna with Plastic Housing**

Frequency (GHz)	Detector	Antenna POL	Spectrum Analyzer Level (dBuV)	Cable Loss (dB)	Antenna Gain	Spectrum Analyzer Level Corrected (dBuV/m)	FCC Limit (dBuV)	Margin (dB)
26	Peak		11.4 <sup>(1,2,3)</sup>	1	16.8	29.2	74.0	
26	Avg	V	11.4 <sup>(1,2,3)</sup>	1	16.8	29.2	54.0	-24.8

Note 1: Corrected by -40dB due to 3 centimeters antenna test distance

Note 2: The mixer conversion loss factor is within the Spectrum Analyzer level reading

Note 3: Duty cycle correction was not used in the final calculation

**Table 5-3: Field Strength of Carrier with 19.0 dBi Horn Antenna with Plastic Housing**

Frequency (GHz)	Detector	Antenna POL	Spectrum Analyzer Level (dBuV)	Cable Loss (dB)	Antenna Gain	Spectrum Analyzer Level Corrected (dBuV/m)	FCC Limit (dBuV)	Margin (dB)
26	Peak		6.20 <sup>(1,2,3)</sup>	1	16.8	24.0	74.0	
26	Avg	H	6.20 <sup>(1,2,3)</sup>	1	16.8	24.0	54.0	-34.0

Note 1: Corrected by -40dB due to 3 centimeters antenna test distance

Note 2: The mixer conversion loss is factored within the Spectrum Analyzer level reading

Note 3: Duty cycle correction was not used in the final calculation

**Table 5-4: Field Strength of Carrier with 24.7 dBi Horn Antenna with Plastic Housing**

Frequency (GHz)	Detector	Antenna POL	Spectrum Analyzer Level (dBuV)	Cable Loss (dB)	Antenna Gain	Spectrum Analyzer Level Corrected (dBuV/m)	FCC Limit (dBuV)	Margin (dB)
26	Peak		12.5 <sup>(1,2,3)</sup>	1	16.8	30.3	74.0	-43.7
26	Avg	H	12.5 <sup>(1,2,3)</sup>	1	16.8	30.3	54.0	-23.7

Note 1: Corrected by -40dB due to 3 centimeters antenna test distance

Note 2: The mixer conversion loss is factored within the Spectrum Analyzer level reading

Note 3: Duty cycle correction was not used in the final calculation

**Table 5-5: Field Strength of Carrier with 33 dBi Parabolic Antenna with Plastic Housing – 26.0 GHz**

Frequency (GHz)	Detector	Antenna POL	Spectrum Analyzer Level (dBuV)	Cable Loss (dB)	Antenna Gain dB/m	Spectrum Analyzer Level Corrected (dBuV/m)	FCC Limit (dBuV)	Margin (dB)
26.0	Peak	H	25.2 <sup>(1,3)</sup>	1	16.8	42.0	74.0	-32.0
26.0	Avg	H	-28.2 <sup>(1,2)</sup>	1	16.8	-11.4	54.0	-65.4
26.0	Peak	V	5.2 <sup>(1,3)</sup>	1	16.8	23.0	74.0	-51.0
26.0	Avg	V	-48.2 <sup>(1,2)</sup>	1	16.8	-30.4	54.0	-84.4

Note 1: The mixer conversion loss plus cable loss is factored within the Spectrum Analyzer level reading shown on plot.  
 Note 2: 53.4 dB duty cycle correction factor is used in the final calculation found in the table above.  
 Note 3: The plot data is corrected by 20 dB from 20Log 0.3/3 test distance to limit distance ratio in the table above.

**Table 5-6: Field Strength of Carrier with 33 dBi Parabolic Antenna with Plastic Housing – 0.009-110 GHz**

Frequency (GHz)	Detector	Antenna POL	Spectrum Analyzer Level (dBuV)	Cable Loss (dB)	Antenna Gain	Spectrum Analyzer Level Corrected (dBuV/m)	FCC Limit (dBuV)	Margin (dB)
0.009-110	Peak	-(4)-	---	1	16.8		74.0	
0.009-110	Avg	-(4)-	---	1	16.8	--	54.0	---

Note 4: No emission above the noise floor detected.


**Table 5-7: Field Strength of Carrier with All Antennas with Plastic Housing**

Frequency (GHz)	Detector	Antenna POL	Spectrum Analyzer Level (dBuV)	Cable Loss (dB)	Antenna Gain	Spectrum Analyzer Level Corrected (dBuV/m)	FCC Limit (dBuV)	Margin (dB)
0.009-110	Peak	-(4)-	---	1	16.8	---	74.0	---
0.009-110	Avg	-(4)-	---	1	16.8	---	54.0	---

Note 4: No emission above the noise floor detected

**TEST PERSONNEL:**

Desmond Fraser  
 Test Engineer

  
 \_\_\_\_\_  
 Signature

January 6 & June 18,  
2005  
 Date of Test

## 5.5 Test Equipment Used for Testing

**Table 5-8: Radiated Spurious Emissions Test Equipment**

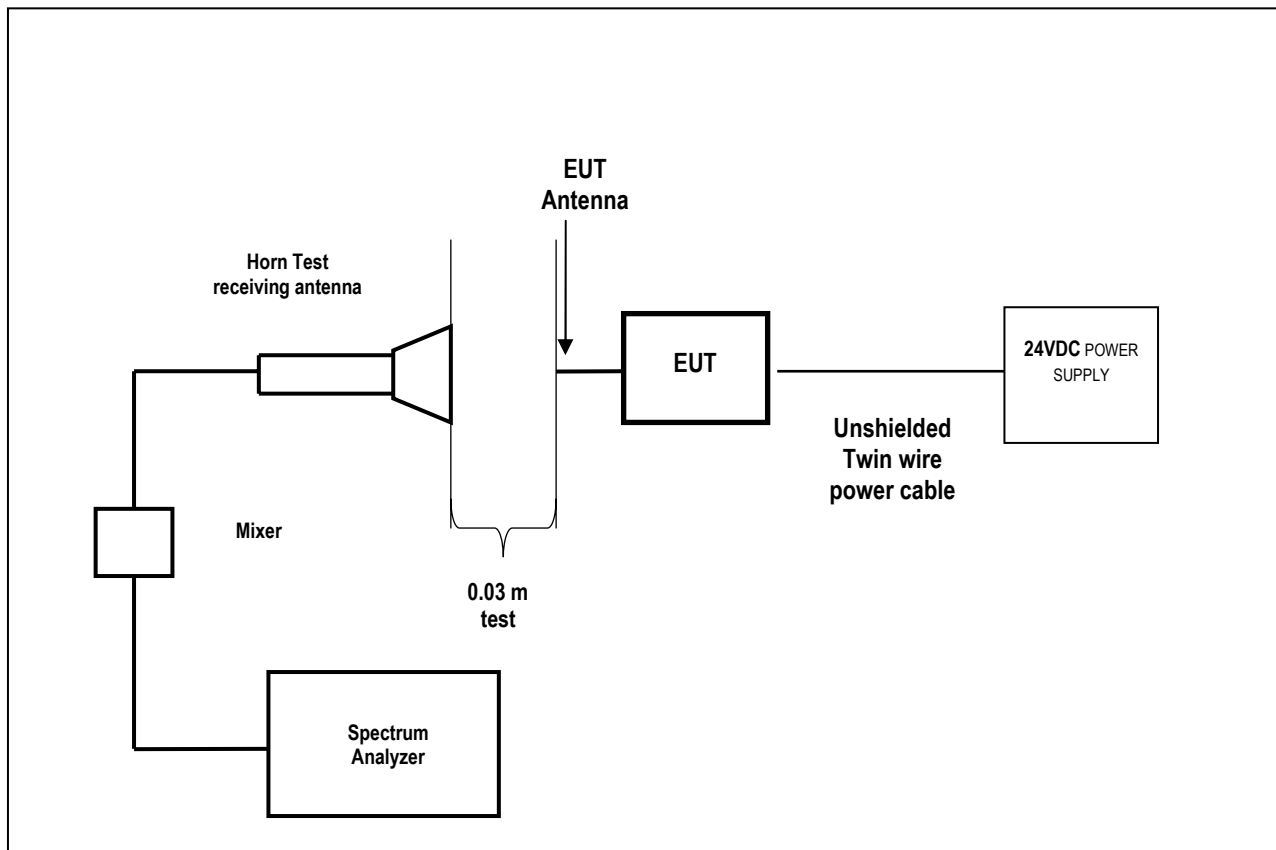
RTL ASSET #	MANUFACTURER	MODEL	PART TYPE	SERIAL NUMBER	Calibration Due Date
900717	Hewlett Packard	11970U	Harmonic Mixer (40 - 60 GHz)	2332A01110	2/19/06
901218	EMCO	3160-09	Horn Antenna (18 - 6 GHz)	960281-003	6/14/06
900392	Hewlett Packard	1197OK	Harmonic Mixer (18 - 26 GHz )	3525A00159	2/01/06
900715	Hewlett Packard	11970V	Harmonic Mixer (50 - 75 GHz)	2521A00512	7/19/05
900716	Hewlett Packard	11970W	Harmonic Mixer (75 - 110 GHz)	2521A00710	6/08/06
900126	Hewlett Packard	11970A	Harmonic Mixer (26 - 40 GHz)	2332A01199	6/08/06
900056	ATM	19-443-6	Horn Antenna (40 – 60 GHz)	8041704-01	6/08/06
901218	EMCO	3160-09	Horn Antenna (25 - 40 GHz)	960452-007	6/08/06
900826	ATM	08-443-6	Horn Antenna (90 – 140 GHz)	8041904-01	6/08/06
900719	ATM	05-443-6	Horn Antenna (140 – 220 GHz)	50685	6/08/06
90066	ATM	10-443-6	Horn Antenna (75 – 110 GHz)	805 1905-1	6/08/06
901262	EMCO	3160-9	Horn Antenna (1 – 18 GHz)	6748	2/04/06
900723	Hewlett Packard		Amplifier (1 GHz – 26 GHz)	NA	6/08/06
900744	Olsen	Mixer	90 - 220 GHz	F80814-1	1/04/06
900744	Olsen	Mixer	140 - 220 GHz	G80814-1	1/04/06
900444	Miteq	Amplifier	30 – 1000 MHz	PR1040	6/08/06
900791	Schaffner-Chase	CBL6112	Antenna (25 MHz - 2 GHz)	2099	7/07/05
900151	Rohde & Schwarz	HFH2-Z2	9 kHz - 30 MHz loop antenna	827525	8/09/05
900772	EMCO	3161-02	2 – 4 GHz	9804-1044	7/08/05
900321	EMCO	3161-03	4 - 8.2 GHz	9508-1020	7/08/05
900323	EMCO	3161-07	8.2 – 12 GHz	9508-1054	7/08/05

## 6 Tested System Details

Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

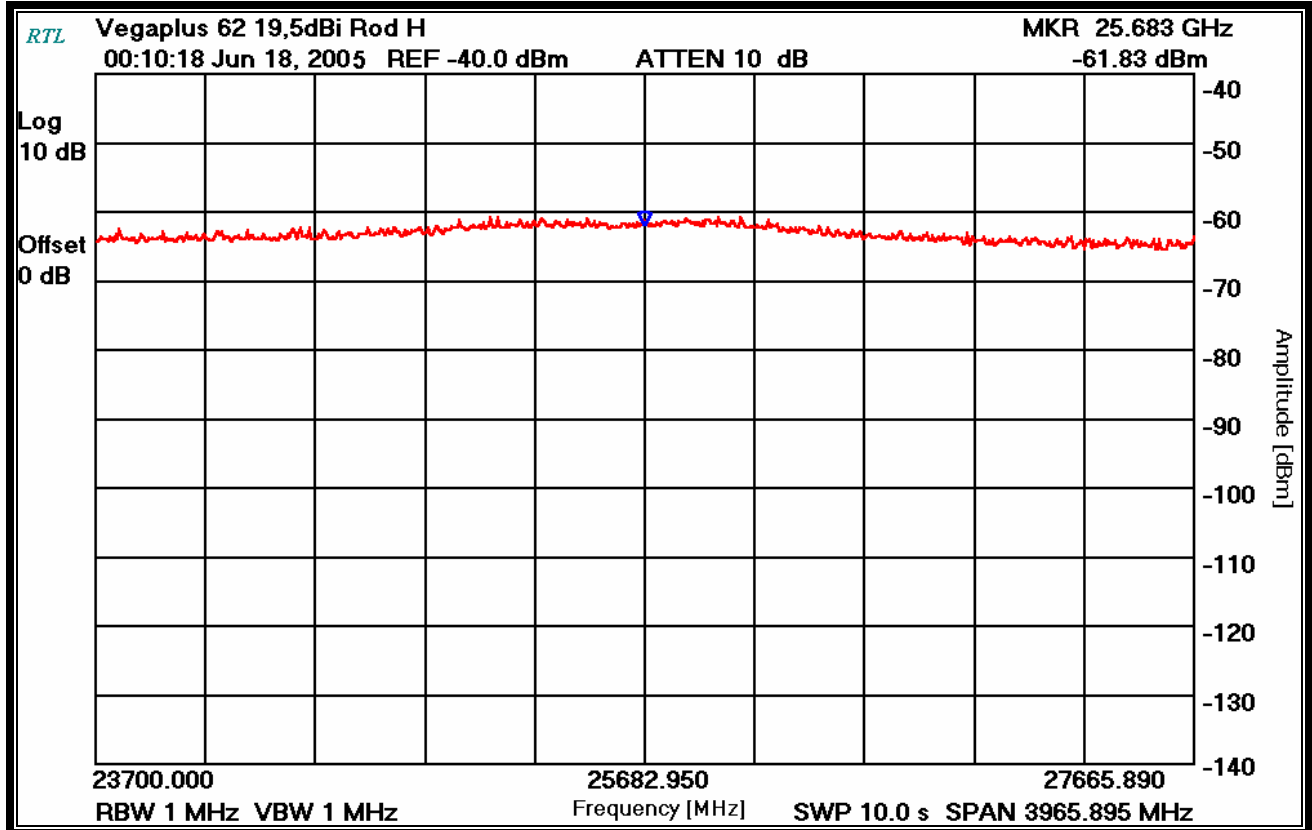
**Table 6-1: Equipment Under Test (EUT)**

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	FCC ID	CABLE DESCRIPTIONS	RTL BAR CODE
Transmitter (EUT)	VEGA Grieshaber	VEGAPULS61/62/63	N/A	O6QPULS616263	Unshielded	15198
Antenna	Vega Grieshaber	19.5 dBi Rod	N/A	N/A	N/A	15316
Antenna	Vega Grieshaber	21.2 dBi Rod	N/A	N/A	N/A	15197
Antenna	Vega Grieshaber	19.0 dBi Horn	N/A	N/A	N/A	15165
Antenna	Vega Grieshaber	24.7 dBi Horn	N/A	N/A	N/A	15425
Antenna	VEGA Grieshaber	33 dBi Parabolic	N/A	N/A	N/A	N/A

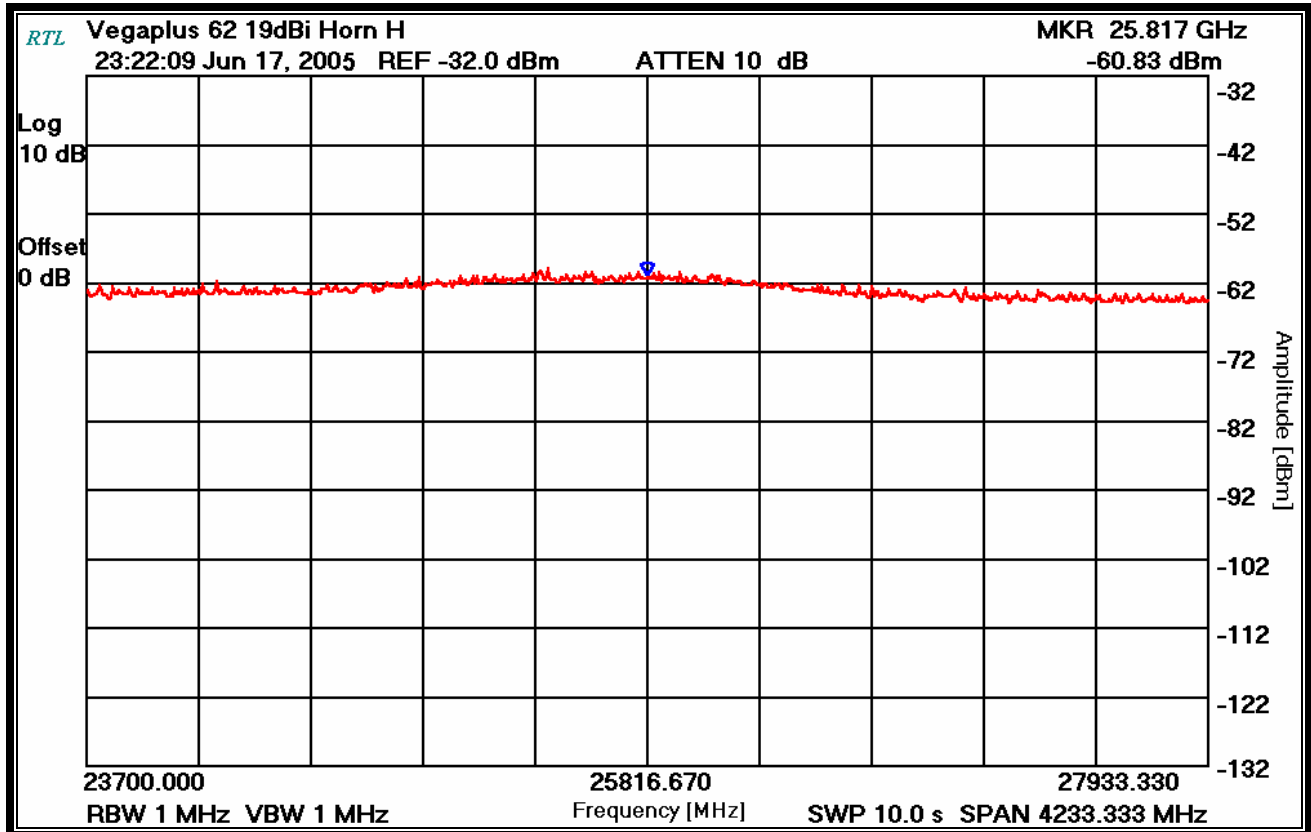


**Figure 6-1: Configuration of Tested System**

### 7 Test Plots

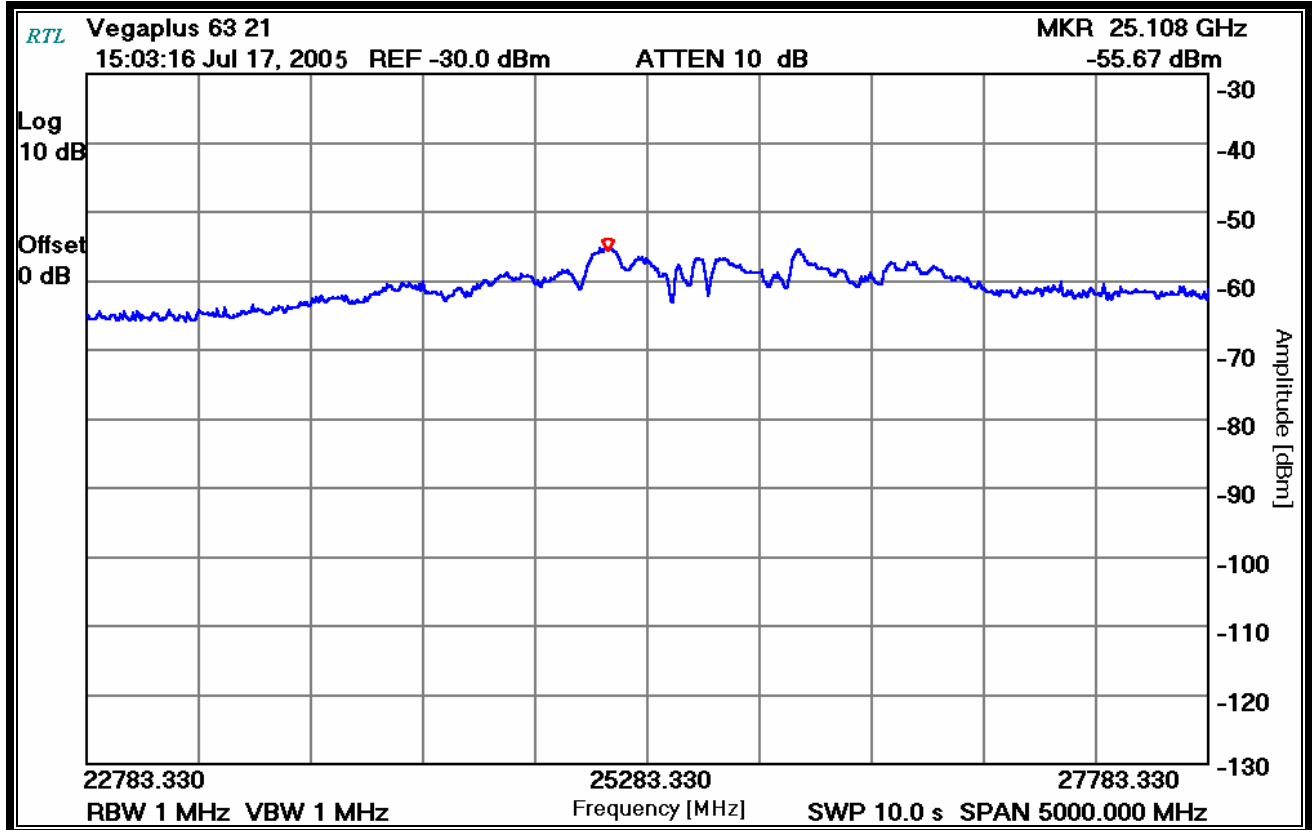


Plot 7-1: EUT 19.5 dBi Rod Antenna 100% Duty Cycle Mode

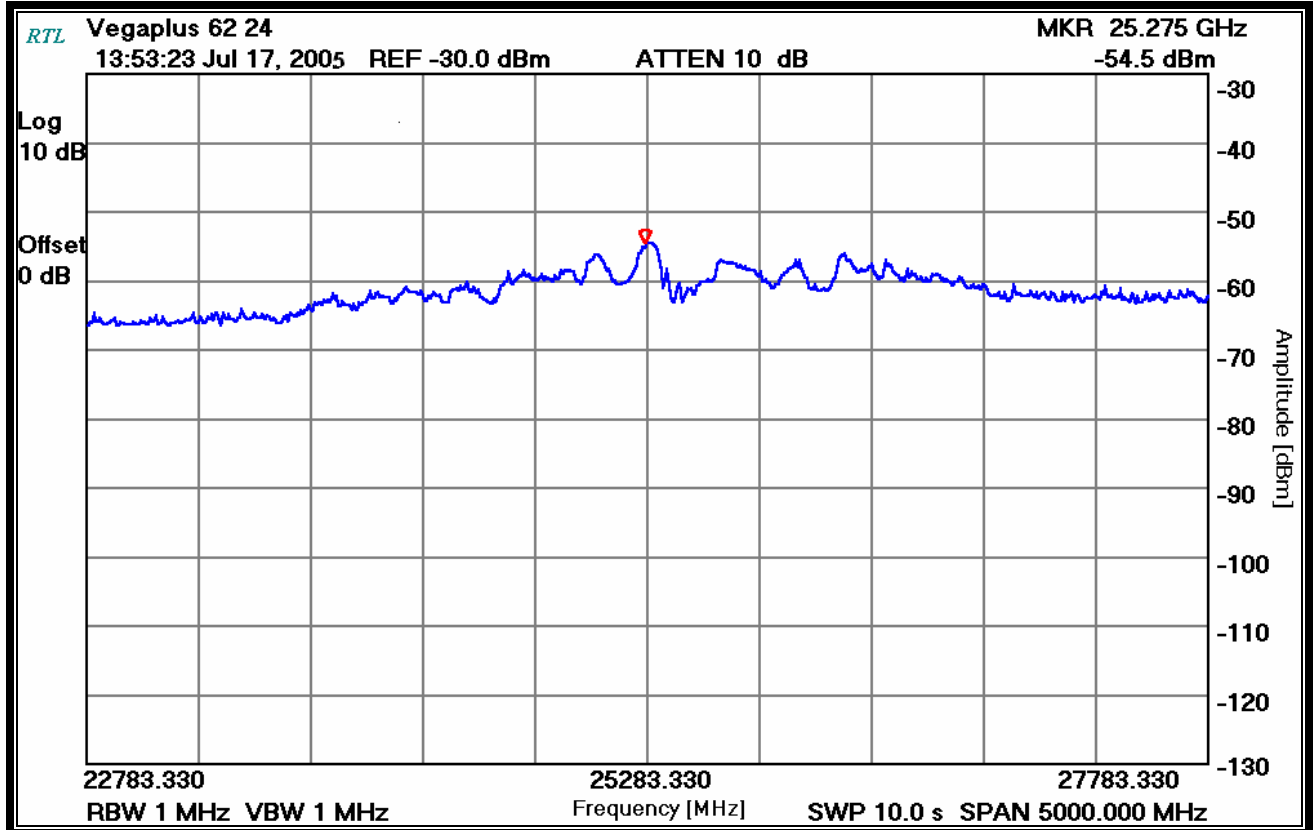


Plot 7-2: EUT 19.0 dBi Horn Antenna 100% Duty Cycle Mode

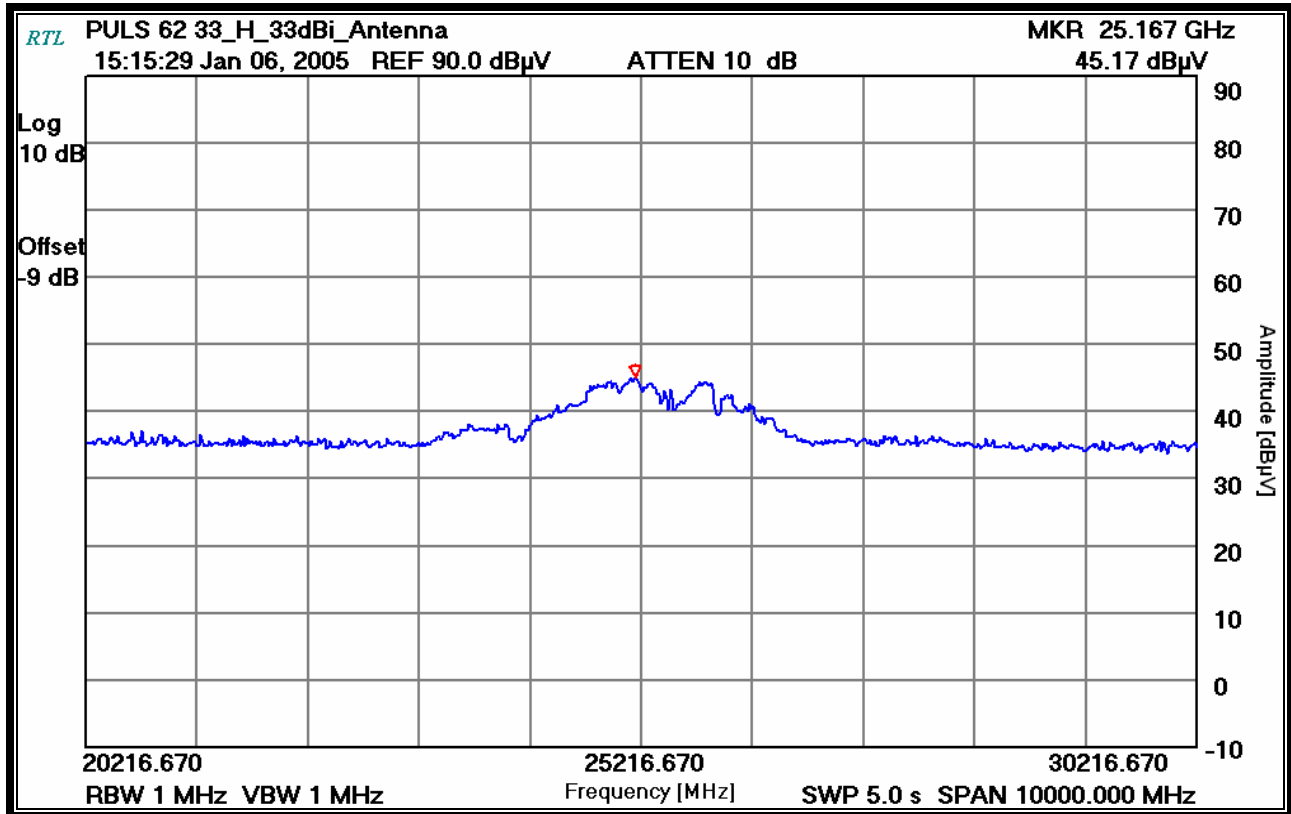




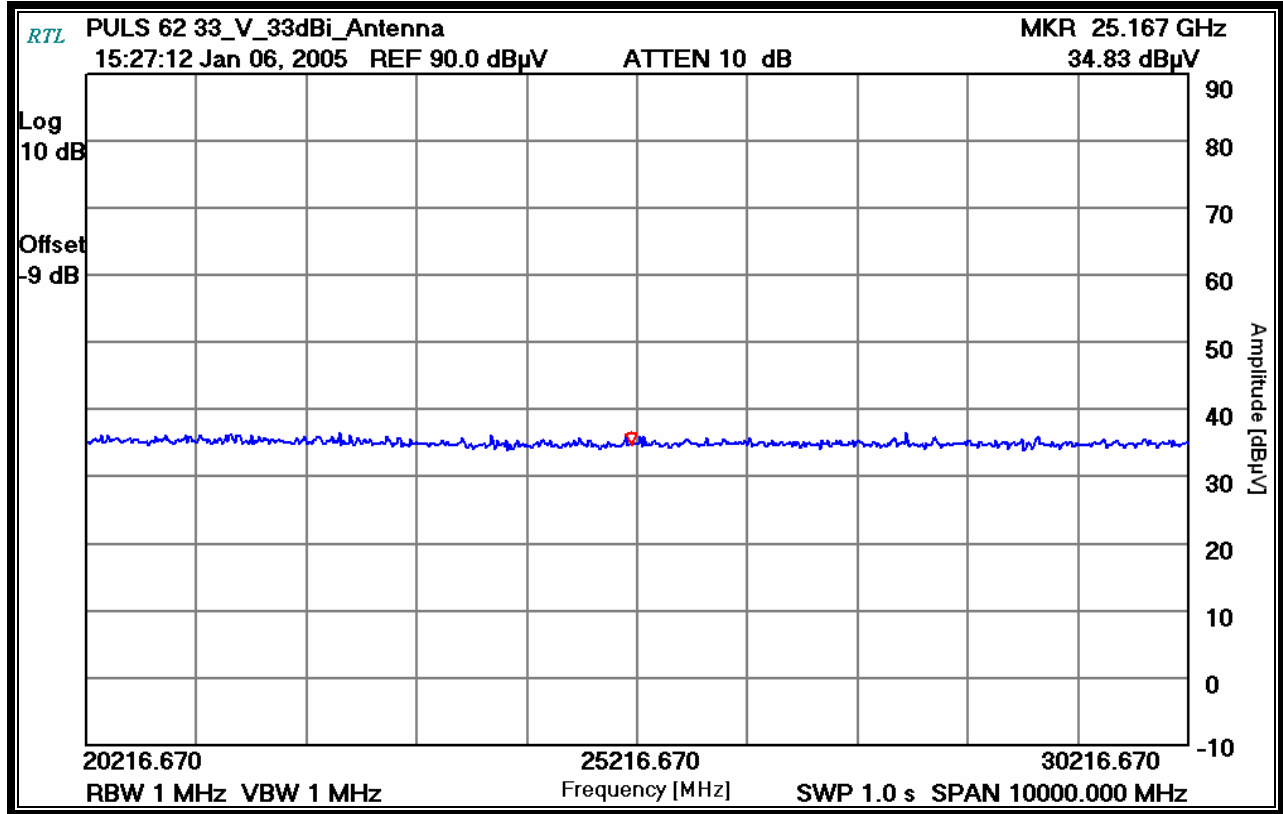
Plot 7-3: EUT 21.2 dBi Rod Antenna 100% Duty Cycle Mode



Plot 7-4: EUT 24.7 dBi Horn Antenna 100% Duty Cycle Mode



Plot 7-5: EUT 33 dBi Parabolic Antenna 100% Duty Cycle Peak Mode H Pol



Plot 7-6: EUT 33 dBi Parabolic Antenna 100% Duty Cycle Peak Mode V Pol

## **8 Conclusion**

The data in this measurement report shows that the Vega Grieshaber KG, Inc., Models VEGAPULS61/62/63, FCC ID: O6QPULS616263, complies with all the requirements of Parts 2, and 15 of the FCC Rules and Regulations, and Industry Canada RSS-210.