



1250 Peterson Dr., Wheeling, IL 60090

Company: Cambium Networks  
Model Tested: C050900P12A  
Report Number: 19129  
Project No. 5941

FCC Rules and Regulations / Unintentional Radiators

Class B Digital Devices

Part 15, Subpart B, Sections 15.107a & 15.109a

**THE FOLLOWING MEETS THE ABOVE TEST SPECIFICATION**

Formal Name: Avenger AP  
Kind of Equipment: Point-to-Multipoint Transceiver  
Test Configuration: Stand-alone (Tested at 120 Vac, 60 Hz)  
Model Number: C050900P12A  
Model Tested: C050900P12A  
Serial Numbers: 000456C005E4, 000456C005DE  
Date of Tests: June 13 and 17, 2013  
Test Conducted For: Cambium Networks  
3800 Golf Road, Suite 360  
Rolling Meadows, IL 60008

**NOTICE:** "This test report relates only to the items tested and must not be used by the client to claim product endorsement by NVLAP, NIST, or any agency of the U.S. Government". Please see the "Additional Description of Equipment Under Test" page listed inside of this report.

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United States Department of Commerce  
National Institute of Standards and Technology



## Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

**D.L.S. Electronic Systems, Inc.**  
Wheeling, IL

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for:*

### **ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2012-10-01 through 2013-09-30

*Effective dates*



*For the National Institute of Standards and Technology*

NVLAP-01C (REV. 2009-01-28)



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## 1.0 SUMMARY OF TEST REPORT

It was found that the Avenger AP, Model C050900P12A **meets** the radio interference Power Line Conducted and Radiated emission requirements of FCC "Rules and Regulations," Part 15, Subpart B, Sections 15.107a & 15.109a for Unintentional Radiators, Class B digital devices.

## 2.0 INTRODUCTION

On June 13 and 17, 2013, a series of radio frequency interference measurements was performed on Avenger AP, Model C050900P12A, Serial Nos. 000456C005E4, and 000456C005DE. All tests were performed according to the procedures of the FCC as stated in the American National Standards Institute, ANSI C63.4-2009. These test procedures were performed by personnel of D.L.S. Electronic Systems, Inc.

## 3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency emission requirements of the FCC Rules and Regulations, Part 15, Subpart B, Sections 15.107a & 15.109a for Unintentional Radiators, Class B digital devices.

## 4.0 TEST FACILITY

All emission tests were performed at D.L.S. Electronic Systems, Inc. according to the American National Standards Institute, ANSI C63.4-2009.

D.L.S. Electronic Systems, Inc. is a full service EMC Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at <http://www.dlsemc.com/certificate>. Our facilities are registered with the FCC, Industry Canada, and VCCI.

## 5.0 TEST EQUIPMENT

A list of the test equipment used can be found in Table 1. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.



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## 6.0 POWER LINE CONDUCTED EMISSION MEASUREMENTS

Power Line Conducted emissions were measured in accordance with the American National Standards Institute, ANSI C63.4-2009. Plots and tabular data can be viewed in Appendix A of this test report.

Line Conducted emissions: Emissions measurements include all system transducers and are compared against the appropriate limit requirement as per the sample calculation below.

$$\begin{array}{lcl} \text{Equations: } \underline{\text{Level(dB}\mu\text{V)}} & = & \underline{\text{Raw Level(dB}\mu\text{V)}} + \underline{\text{System Loss(dB)}} + \underline{\text{LISN Factor(dB)}} \\ \text{Sample: } & 30.14 & = 18.44 \quad + 11.24 \quad + 0.46 \end{array}$$

$$\begin{array}{lcl} \underline{\text{Margin(dB)}} & = & \underline{\text{Limit(dB}\mu\text{V/m)}} - \underline{\text{Level(dB}\mu\text{V/m)}} \\ & 15.86 & = 46 \quad - 30.14 \end{array}$$

## 7.0 RADIATED EMISSION MEASUREMENTS

All tests were performed according to the procedures of ANSI C63.4-2009. Plots and tabular data can be viewed in Appendix B of this test report.

FCC Part 15.33b states that measurements shall be made up to the 5th harmonic of the highest clock or timing frequency of the EUT. The highest timing frequency in the Avenger AP is 40 MHz. Therefore measurements were made up to 30000 MHz.

Radiated emissions: Emissions measurements include all system transducers and are compared against the appropriate limit requirement as per the sample calculation below.

$$\begin{array}{lcl} \text{Equation: } \underline{\text{Total Level(dB}\mu\text{V/m)}} & = & \underline{\text{Level(dB}\mu\text{V)}} + \underline{\text{System Loss(dB)}} + \underline{\text{Antenna Factor(dB}\mu\text{V/m)}} \\ \text{Sample: } & 24.6 & = 35.51 \quad + (-22.1) \quad + 11.20 \end{array}$$

$$\begin{array}{lcl} \underline{\text{Margin(dB)}} & = & \underline{\text{Limit(dB}\mu\text{V/m)}} - \underline{\text{Total Level(dB}\mu\text{V/m)}} \\ & 15.4 & = 40 \quad - 24.6 \end{array}$$



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## 8.0 DESCRIPTION OF TEST SAMPLE:

8.1 DESCRIPTION: Point-to-Multipoint 802.11 fixed outdoor transceiver.

## 8.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 8.5" x Width: 3" x Height: 1"

## 8.3 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies: 292 kHz, 940-1000 kHz, 4 MHz

Clock Frequencies: 25 MHz, 40 MHz

## 8.4 LINE FILTER: NA

## 8.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

AP PCB	84009654001
External 17dBi antenna w/1dB cables	85009324001
Antenna assembly	P005135

## 9.0 MODIFICATIONS MADE TO EUT FOR EMC COMPLIANCE:

There were no additional descriptions noted at the time of test.

## 10.0 CONCLUSION

It was found that the Avenger AP, Model Number(s) C050900P12A **meets** the radio interference Power Line Conducted and Radiated emission requirements of FCC Rules and Regulations, Part 15, Subpart B, Sections 15.107a & 15.109a for Unintentional Radiators, Class B digital devices.



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## 11.0 PHOTO INFORMATION AND TEST SET-UP

- Item 0 Avenger AP  
Model C050900P12A Serial Nos. 000456C005E4 and 000456C005DE
- Item 1 Panel Antenna, Model 85009324001, Rev AA
- Item 2 Ethernet Cable, 20 m long

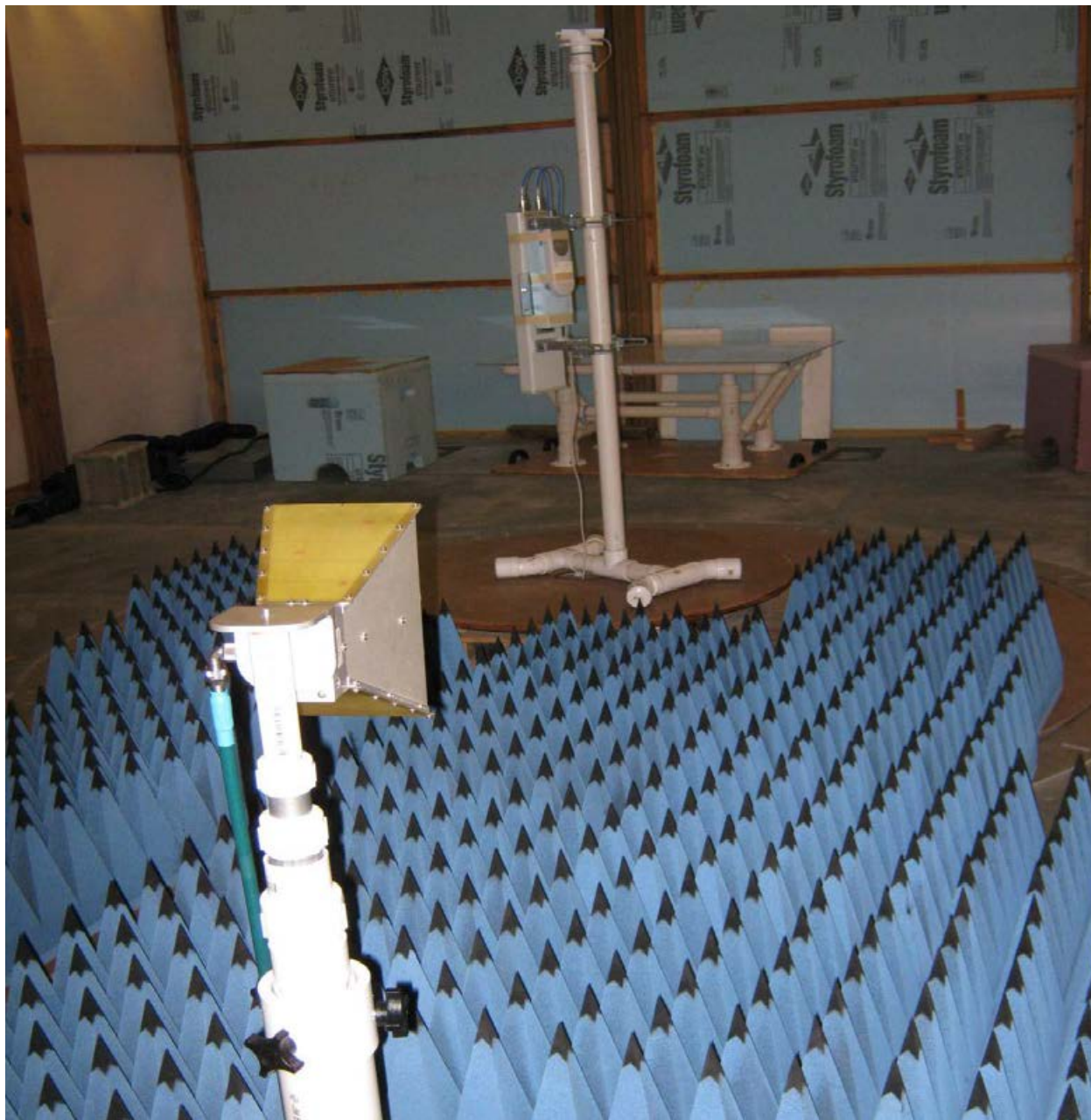




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## 12.0 RADIATED PHOTO TAKEN DURING TESTING: Above 1 GHz





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## 12.0 RADIATED PHOTO TAKEN DURING TESTING: Below 1 GHz Front





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## 12.0 RADIATED PHOTO TAKEN DURING TESTING: Below 1 GHz Back







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### 13.0 POWER LINE CONDUCTED PHOTO TAKEN DURING TESTING





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Table 1 – Equipment List

## TEST EQUIPMENT LIST

### AC LINE CONDUCTED TEST (Screen Room)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Date	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	1-3-13	1-3-14
LISN	Solar	9252-50-R-24-BNC	961019	9 kHz – 30 MHz	5-24-13	5-24-14
Filter- High-Pass	SOLAR	7930-120	090702	120 kHz – 30 MHz	1-7-13	1-7-14
Limiter	Electro-Metrics	EM-7600	706	9 kHz – 30 MHz	1-7-13	1-7-14

### 30 – 1000 MHz (Site 3)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Date	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	7-23-12	7-23-13
Preamplifier	Rohde & Schwarz	TS-PR10	032001/005	9 kHz – 1 GHz	1-10-13	1-10-14
Antenna	EMCO	3104C	97014785	20 MHz – 200 MHz	8-22-12	8-22-14
Antenna	EMCO	3146	97024895	200 MHz – 1 GHz	9-6-12	9-6-14

### 1-18 GHz (G1)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Date	Cal Due Dates
Preamp	Miteq	AMF-7D-01001800-22-10P	1809602	1GHz-18GHz	5-29-13	5-29-14
Horn Antenna	EMCO	3115	9502-4451	1-18GHz	3-18-13	3-18-15
Filter- High-Pass	Q-Microwave	100462	2	4.2GHz-18GHz	5-28-13	5-28-14

### 18-30 GHz (G1)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Date	Cal Due Dates
Preamp	Miteq	AMF-8B-180265-40-10P-H/S	438727	18GHz-26GHz	8-13-12	8-13-13
Horn Antenna	ETS Lindgren	3116	00062917	18 – 40GHz	10-4-11	9-23-13
High Pass Filter	Planar	CL22500-9000-CD-SS	PF1229/0728	15-40 GHz	8-13-12	8-13-13

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.



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Appendix A:	Conducted Emissions Data

## APPENDIX A

### CONDUCTED EMISSIONS DATA

### AND

### CHARTS TAKEN DURING TESTING

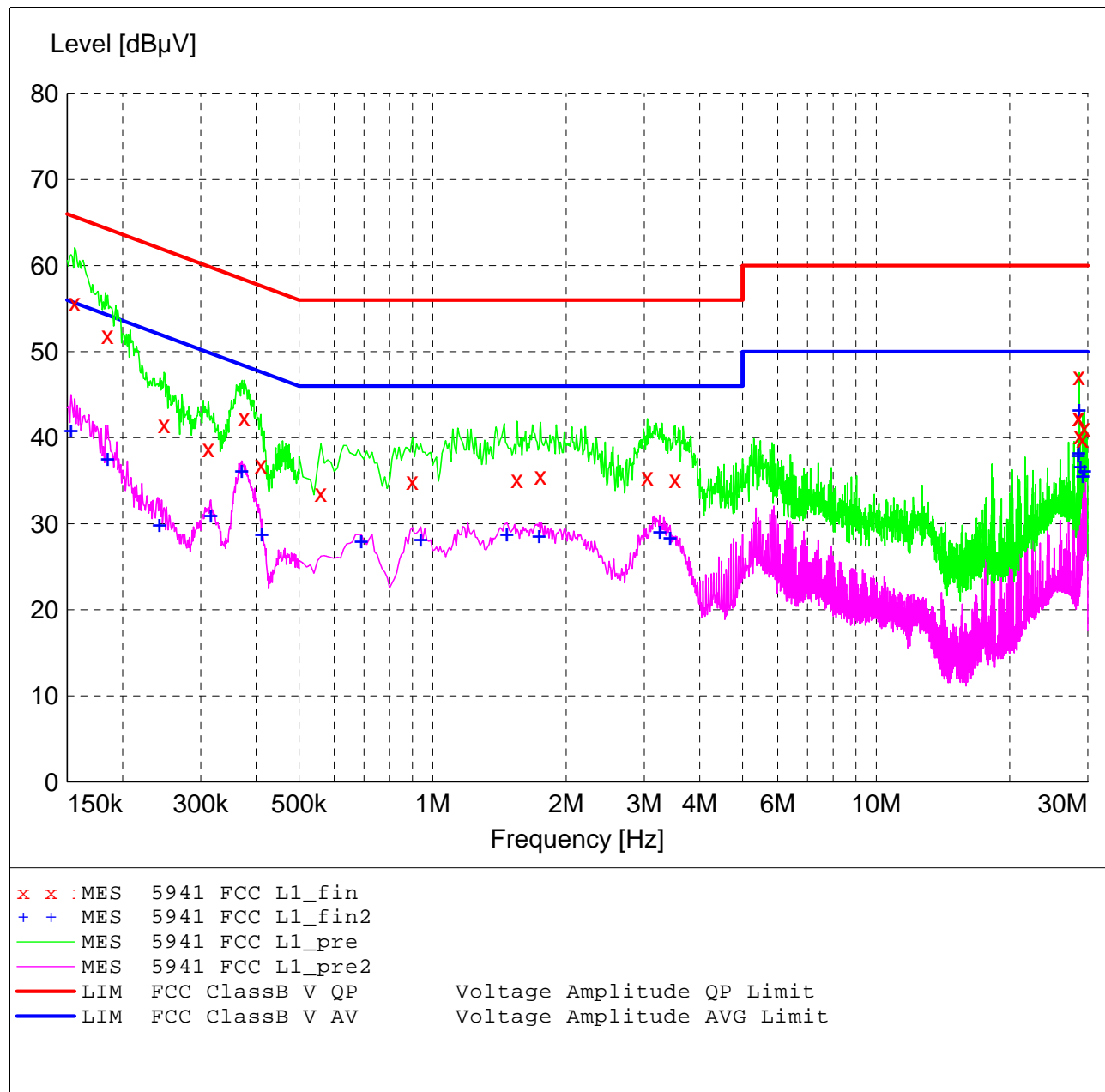
# FCC Part 15 Class B

## Voltage Mains Test

EUT: Avenger AP Radio 5.7GHz  
Manufacturer: Cambium Networks  
Operating Condition: 70 deg. F, 34% R.H.  
Test Site: DLS O.F. Screen Room  
Operator: Jim O/Lillian Li  
Test Specification: 120V, 60Hz  
Comment: Continious TX; Line 1  
6-17-2013

### SCAN TABLE: "Line Cond SR Final"

Short Description:		Line Conducted Emissions					Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.		
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak	5.0 s	9 kHz	LISN DLS#128	
CISPR AV							



**MEASUREMENT RESULT: "5941 FCC L1\_fin"**

6/17/2013 9:06AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.156000	55.70	13.6	66	10.0	QP
0.185000	51.90	12.9	64	12.4	QP
0.248000	41.50	12.1	62	20.3	QP
0.312000	38.80	11.8	60	21.1	QP
0.376000	42.40	11.5	58	16.0	QP
0.410000	36.90	11.4	58	20.7	QP
0.560000	33.60	11.1	56	22.4	QP
0.900000	35.00	10.7	56	21.0	QP
1.550000	35.20	10.6	56	20.8	QP
1.750000	35.60	10.6	56	20.4	QP
3.050000	35.50	10.7	56	20.5	QP
3.520000	35.20	10.7	56	20.8	QP
28.565000	42.30	11.7	60	17.7	QP
28.625000	42.40	11.7	60	17.6	QP
28.685000	47.10	11.7	60	12.9	QP
28.745000	40.20	11.7	60	19.8	QP
29.240000	39.90	11.8	60	20.1	QP
29.480000	41.20	11.8	60	18.8	QP

**MEASUREMENT RESULT: "5941 FCC L1\_fin2"**

6/17/2013 9:06AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.153000	41.00	13.7	56	14.8	CAV
0.185000	37.70	12.9	54	16.6	CAV
0.242000	30.00	12.2	52	22.0	CAV
0.316000	31.10	11.8	50	18.7	CAV
0.371000	36.30	11.5	49	12.2	CAV
0.412000	28.90	11.4	48	18.7	CAV
0.690000	28.10	10.8	46	17.9	CAV
0.940000	28.30	10.7	46	17.7	CAV
1.470000	28.90	10.6	46	17.1	CAV
1.740000	28.70	10.6	46	17.3	CAV
3.250000	29.20	10.7	46	16.8	CAV
3.430000	28.50	10.7	46	17.5	CAV
28.565000	38.10	11.7	50	11.9	CAV
28.625000	38.30	11.7	50	11.7	CAV
28.685000	43.30	11.7	50	6.7	CAV
28.865000	36.80	11.7	50	13.2	CAV
29.240000	35.70	11.8	50	14.3	CAV
29.480000	36.30	11.8	50	13.7	CAV



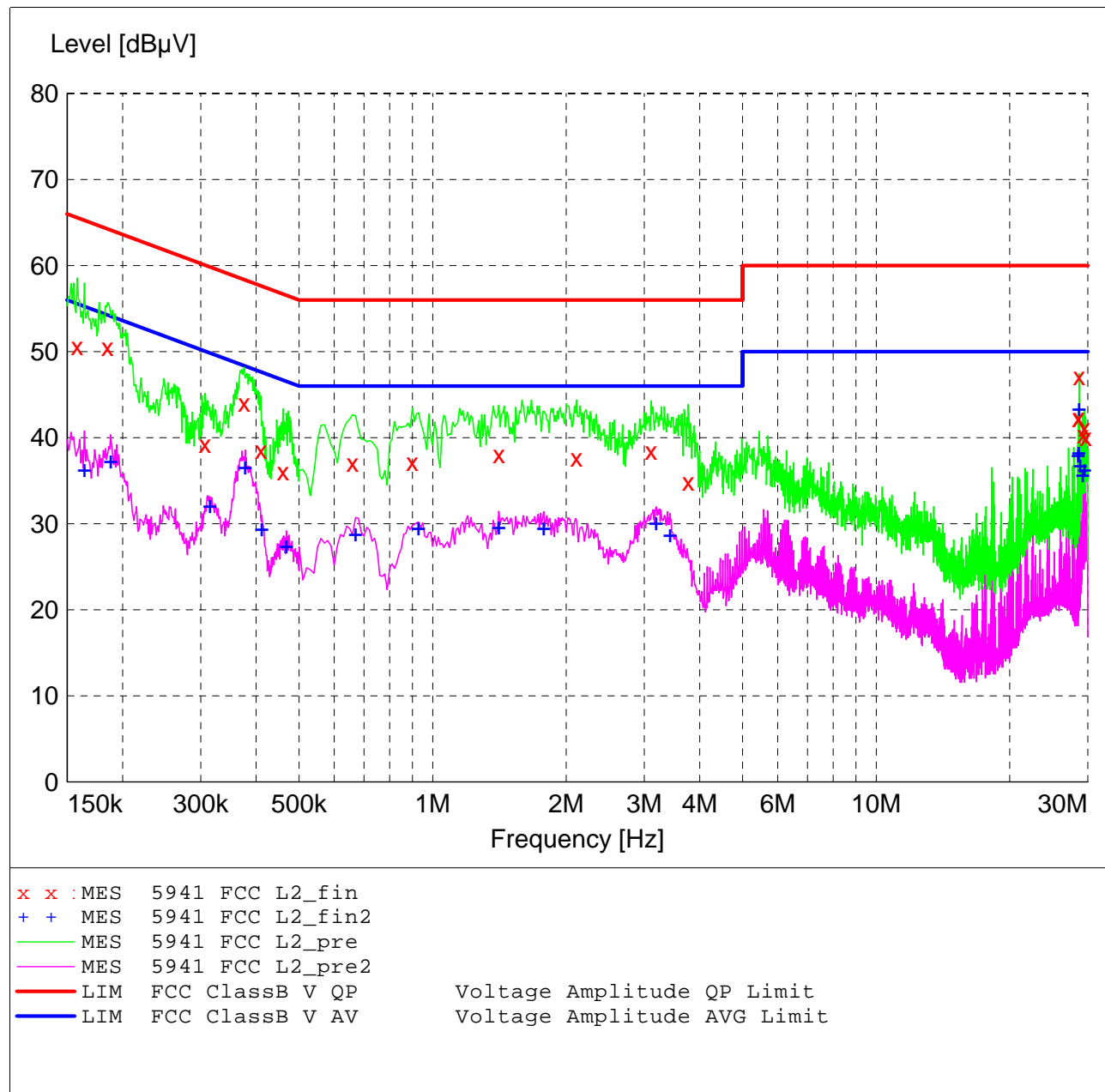
# FCC Part 15 Class B

## Voltage Mains Test

EUT: Avenger AP Radio 5.7GHz  
Manufacturer: Cambium Networks  
Operating Condition: 70 deg. F, 34% R.H.  
Test Site: DLS O.F. Screen Room  
Operator: Jim O/Lillian Li  
Test Specification: 120V, 60Hz  
Comment: Continious TX; Line 2  
6-17-2013

### SCAN TABLE: "Line Cond SR Final"

Short Description:			Line Conducted Emissions				
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer	
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak	5.0 s	9 kHz	LISN DLS#128	
			CISPR AV				



**MEASUREMENT RESULT: "5941 FCC L2\_fin"**

6/17/2013 9:17AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector
0.158000	50.60	13.6	66	15.0	QP
0.185000	50.50	12.9	64	13.8	QP
0.307000	39.30	11.8	60	20.8	QP
0.376000	44.00	11.5	58	14.4	QP
0.410000	38.60	11.4	58	19.0	QP
0.460000	36.10	11.3	57	20.6	QP
0.660000	37.10	10.9	56	18.9	QP
0.900000	37.20	10.7	56	18.8	QP
1.410000	38.10	10.6	56	17.9	QP
2.110000	37.60	10.6	56	18.4	QP
3.110000	38.50	10.7	56	17.5	QP
3.770000	34.90	10.7	56	21.1	QP
28.565000	42.20	11.7	60	17.8	QP
28.625000	42.30	11.7	60	17.7	QP
28.685000	47.10	11.7	60	12.9	QP
29.240000	40.30	11.8	60	19.7	QP
29.480000	41.10	11.8	60	18.9	QP
29.660000	40.00	11.8	60	20.0	QP

**MEASUREMENT RESULT: "5941 FCC L2\_fin2"**

6/17/2013 9:17AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector
0.164000	36.40	13.4	55	18.9	CAV
0.188000	37.40	12.9	54	16.7	CAV
0.315000	32.20	11.8	50	17.6	CAV
0.378000	36.70	11.5	48	11.6	CAV
0.412000	29.50	11.4	48	18.1	CAV
0.468000	27.50	11.3	47	19.0	CAV
0.670000	28.90	10.8	46	17.1	CAV
0.930000	29.60	10.7	46	16.4	CAV
1.410000	29.70	10.6	46	16.3	CAV
1.780000	29.60	10.6	46	16.4	CAV
3.190000	30.20	10.7	46	15.8	CAV
3.430000	28.80	10.7	46	17.2	CAV
28.565000	38.10	11.7	50	11.9	CAV
28.625000	38.30	11.7	50	11.7	CAV
28.685000	43.40	11.7	50	6.6	CAV
28.865000	36.90	11.7	50	13.1	CAV
29.240000	35.80	11.8	50	14.2	CAV
29.480000	36.40	11.8	50	13.6	CAV



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Appendix B:	Radiated Emissions Data

APPENDIX B

RADIATED EMISSIONS DATA

AND

CHARTS TAKEN DURING TESTING

## **FCC Part 15 Class B**

### **Electric Field Strength**

EUT: 5.7 GHz Avenger AP  
Manufacturer: Cambium Networks  
Operating Condition: 73 deg. F; 64% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig B  
Test Specification: 29.5 V DC (POE); L, M, and H channels  
Comment: 20 & 40 MHz ch BW's; both chains active at 20 dBm, MCS15  
Date: 06-13-2013

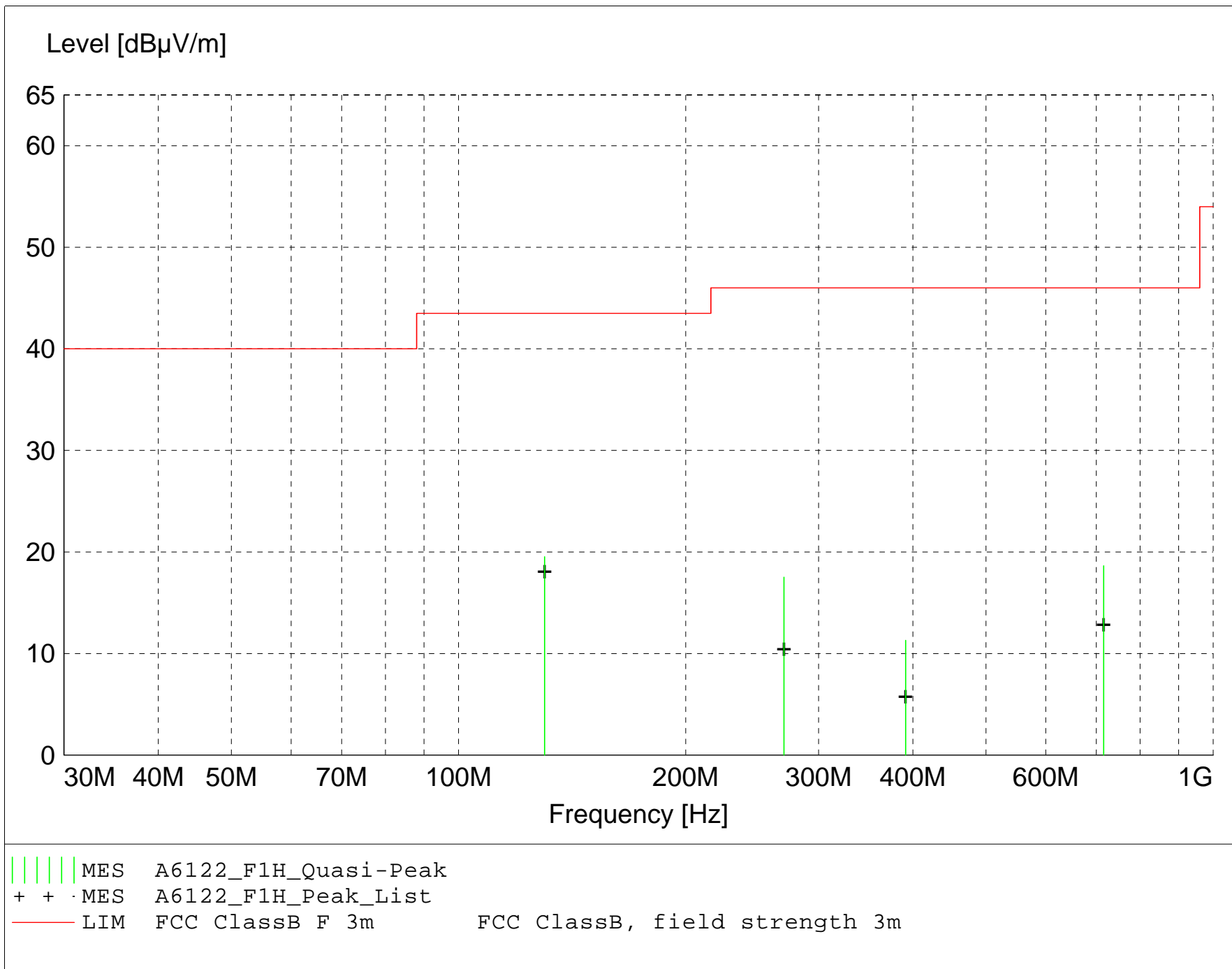
### **TEXT: "Horz 3 meters"**

Short Description: Test Set-up

Test Set-up: EUT Measured at 3 Meters with HORIZONTAL Antenna Polarization

Equations: 
$$\text{Total Level(dB}\mu\text{V/m)} = \text{Level(dB}\mu\text{V)} + \text{System Loss(dB)} + \text{Antenna Factor(dB}\mu\text{V/m)}$$
$$\text{Margin(dB)} = \text{Limit(dB}\mu\text{V/m)} - \text{Total Level(dB}\mu\text{V/m)}$$

Graph Markers: + Frequency marker (Level of marker not related to final level)  
| Final maximized level using Quasi-Peak detector  
X Final maximized level using Average detector  
# Final maximized level using Peak detector



**MEASUREMENT RESULT: "A6122\_F1H\_Final"**

6/13/2013 10:03AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
130.000000	29.07	12.90	-22.4	19.5	43.5	24.0	1.30	250	QUASI-PEAK	broadband
715.970000	16.37	21.04	-18.8	18.6	46.0	27.4	1.50	45	QUASI-PEAK	noise floor
269.970000	25.44	13.40	-21.3	17.5	46.0	28.5	3.10	290	QUASI-PEAK	None
391.250000	16.10	15.83	-20.6	11.3	46.0	34.7	1.00	0	QUASI-PEAK	noise floor

## **FCC Part 15 Class B**

### **Electric Field Strength**

EUT: 5.7 GHz Avenger AP  
Manufacturer: Cambium Networks  
Operating Condition: 73 deg. F; 64% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig B  
Test Specification: 29.5 V DC (POE); L, M, and H channels  
Comment: 20 & 40 MHz ch BW's; both chains active at 20 dBm, MCS15  
Date: 06-13-2013

### **TEXT: "Vert 3 meters"**

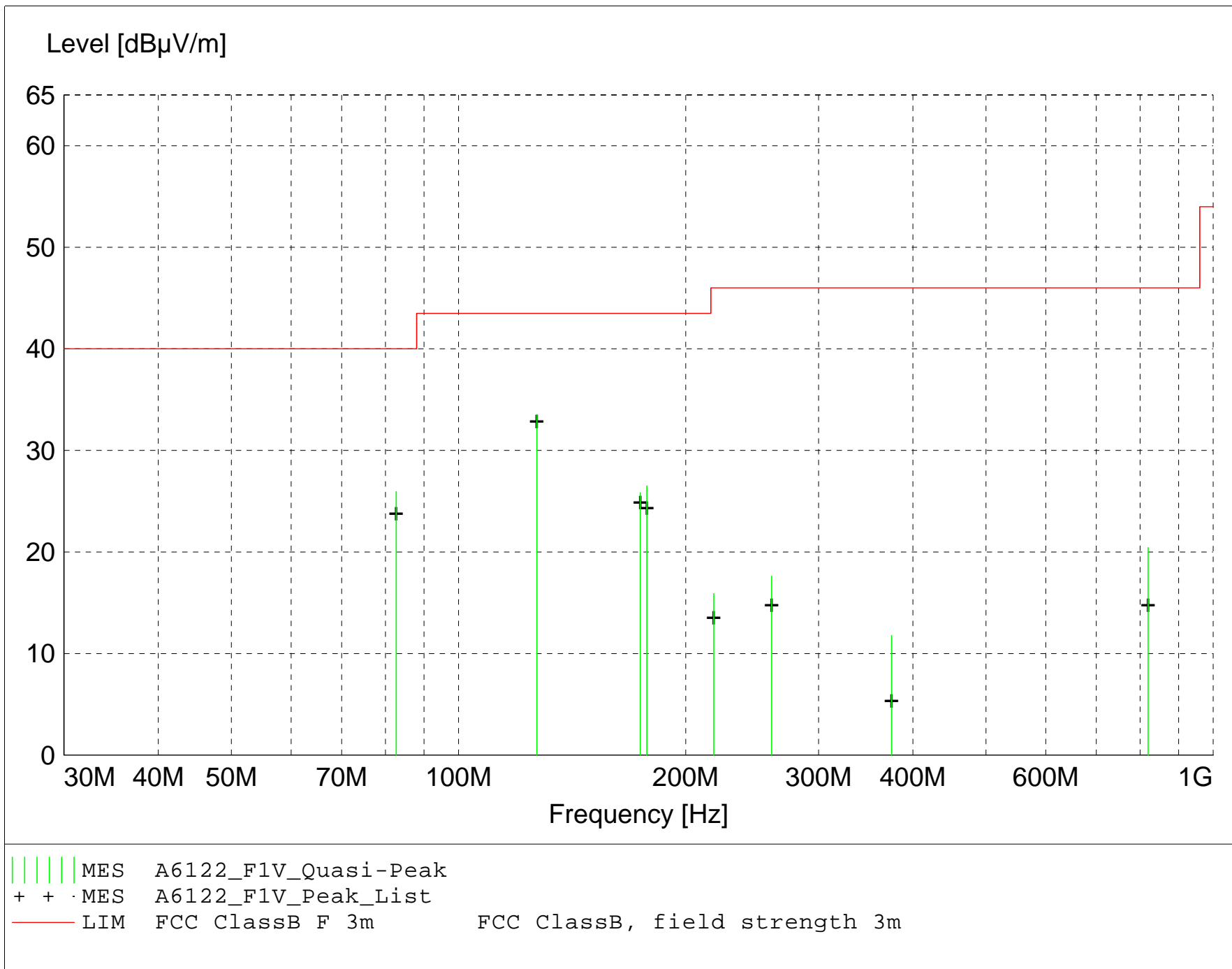
Short Description: Test Set-up

Test Set-up: EUT Measured at 3 Meters with VERTICAL Antenna Polarization

Sample Equations: 
$$\begin{array}{rclclcl} \text{Total Level(dB}\mu\text{V/m)} & = & \text{Level(dB}\mu\text{V)} & + & \text{System Loss(dB)} & + & \text{Antenna Factor(dB}\mu\text{V/m)} \\ 24.6 & & = & 35.51 & + & (-22.1) & + & 11.20 \end{array}$$

$$\begin{array}{rclcl} \text{Margin(dB)} & = & \text{Limit(dB}\mu\text{V/m)} & - & \text{Total Level(dB}\mu\text{V/m)} \\ 15.4 & = & 40 & - & 24.6 \end{array}$$

Graph Markers: +      Frequency marker (Level of marker not related to final level)  
                  |      Final maximized level using Quasi-Peak detector  
                  X      Final maximized level using Average detector  
                  #      Final maximized level using Peak detector





**MEASUREMENT RESULT: "A6122\_F1V\_Final"**

6/13/2013 10:09AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
127.005000	42.95	13.00	-22.5	33.5	43.5	10.0	1.00	260	QUASI-PEAK	broadband
82.675000	42.46	6.67	-23.2	25.9	40.0	14.1	1.20	315	QUASI-PEAK	broadband
177.640000	32.58	16.03	-22.1	26.5	43.5	17.0	1.00	290	QUASI-PEAK	broadband
174.135000	32.44	15.51	-22.1	25.8	43.5	17.7	1.00	270	QUASI-PEAK	broadband
819.980000	16.54	22.30	-18.4	20.4	46.0	25.6	1.00	0	QUASI-PEAK	noise floor
260.000000	26.13	13.00	-21.5	17.6	46.0	28.4	2.00	90	QUASI-PEAK	None
217.860000	26.11	11.54	-21.8	15.9	46.0	30.1	2.20	90	QUASI-PEAK	boradband
374.820000	17.14	15.29	-20.7	11.8	46.0	34.2	1.00	0	QUASI-PEAK	noise floor

## **FCC Part 15 Class B**

### **Electric Field Strength**

EUT: 5.7 GHz Avenger AP  
Manufacturer: Cambium Networks  
Operating Condition: 72 deg. F; 55% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig B  
Test Specification: 29.5 V DC (POE)  
Comment: Digital device emissions  
Date: 06-13-2013

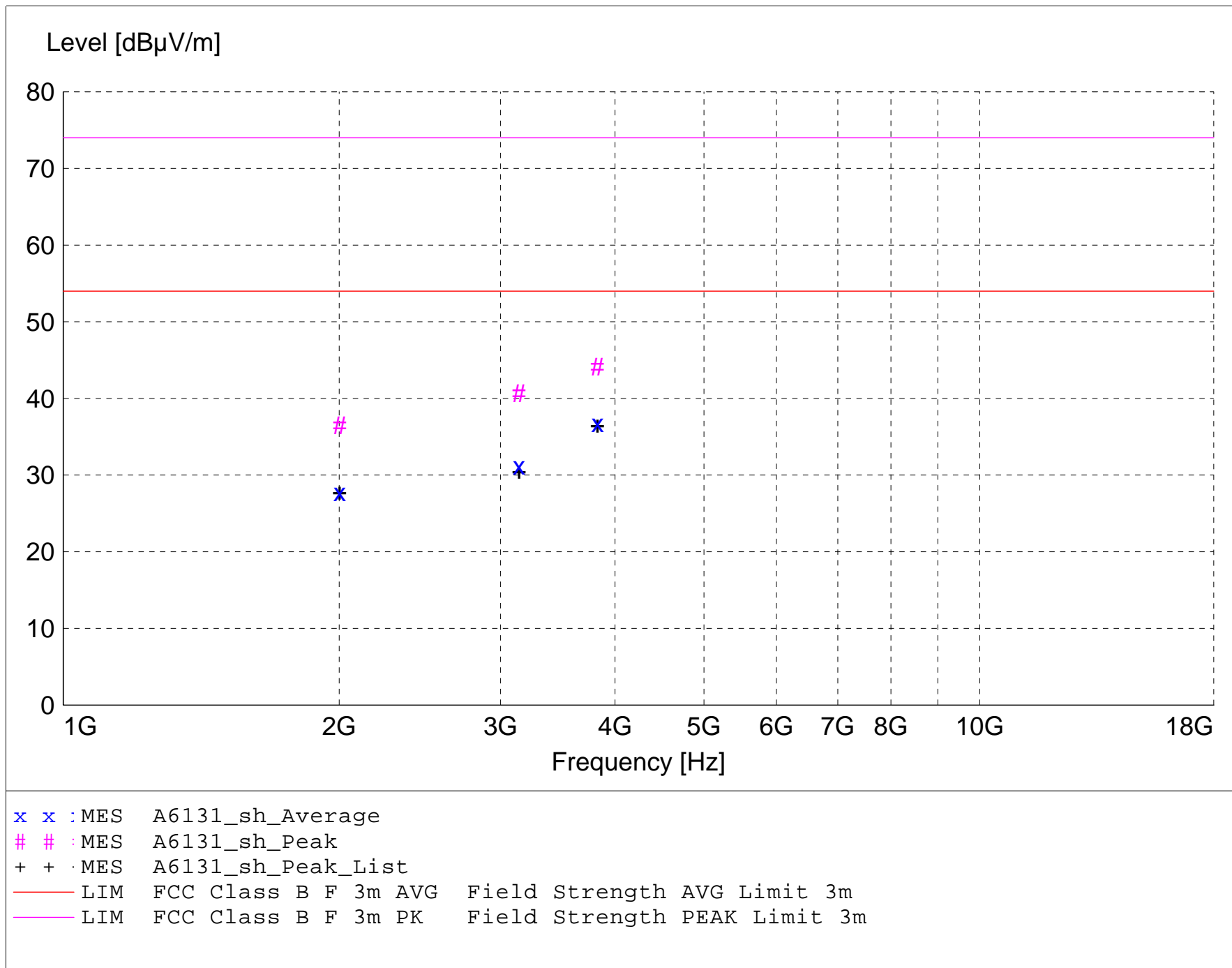
### **TEXT: "Horz 3 meters"**

Short Description: Test Set-up

Test Set-up: EUT Measured at 3 Meters with HORIZONTAL Antenna Polarization

Equations: 
$$\text{Total Level(dB}\mu\text{V/m)} = \text{Level(dB}\mu\text{V)} + \text{System Loss(dB)} + \text{Antenna Factor(dB}\mu\text{V/m)}$$
$$\text{Margin(dB)} = \text{Limit(dB}\mu\text{V/m)} - \text{Total Level(dB}\mu\text{V/m)}$$

Graph Markers: + Frequency marker (Level of marker not related to final level)  
| Final maximized level using Quasi-Peak detector  
X Final maximized level using Average detector  
# Final maximized level using Peak detector



**MEASUREMENT RESULT: "A6131\_sh\_Final"**

6/13/2013 1:24PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
3826.650000	61.03	32.91	-57.2	36.8	54.0	17.2	1.00	150	AVERAGE	None
3142.650000	57.33	31.01	-57.1	31.2	54.0	22.8	1.10	135	AVERAGE	None
2002.500000	57.13	27.64	-57.0	27.8	54.0	26.2	2.00	225	AVERAGE	None
3826.650000	68.41	32.91	-57.2	44.2	74.0	29.8	1.00	150	MAX PEAK	None
3142.650000	66.79	31.01	-57.1	40.7	74.0	33.3	1.10	135	MAX PEAK	None
2002.500000	65.85	27.64	-57.0	36.5	74.0	37.5	2.00	225	MAX PEAK	None

## **FCC Part 15 Class B**

### **Electric Field Strength**

EUT: 5.7 GHz Avenger AP  
Manufacturer: Cambium Networks  
Operating Condition: 72 deg. F; 55% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig B  
Test Specification: 29.5 V DC (POE)  
Comment: Digital device emissions  
Date: 06-13-2013

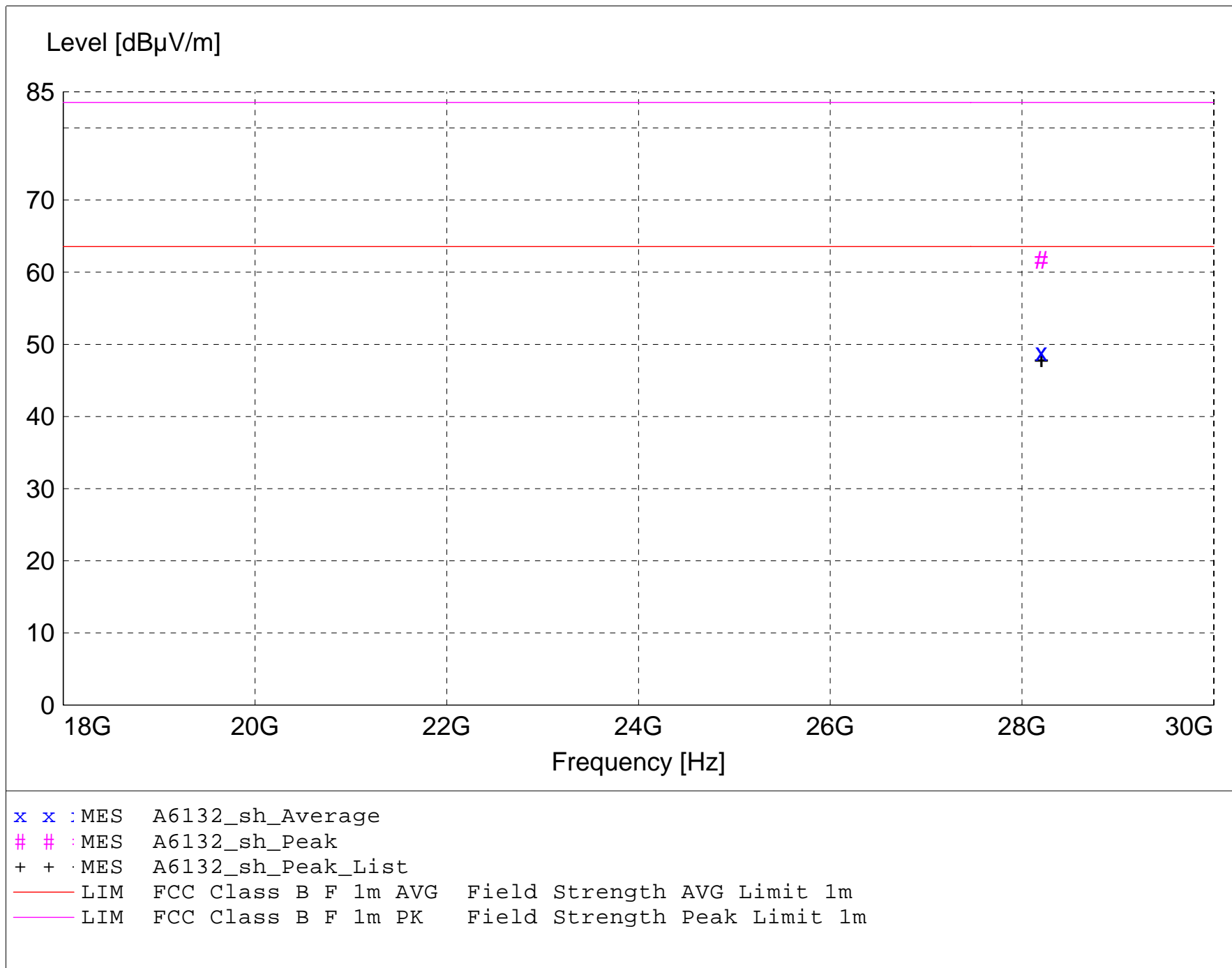
### **TEXT: "Horz 1 meters"**

Short Description: Test Set-up

Test Set-up: EUT Measured at 1 Meters with HORIZONTAL Antenna Polarization

Equations: 
$$\text{Total Level(dB}\mu\text{V/m)} = \text{Level(dB}\mu\text{V)} + \text{System Loss(dB)} + \text{Antenna Factor(dB}\mu\text{V/m)}$$
$$\text{Margin(dB)} = \text{Limit(dB}\mu\text{V/m)} - \text{Total Level(dB}\mu\text{V/m)}$$

Graph Markers: + Frequency marker (Level of marker not related to final level)  
| Final maximized level using Quasi-Peak detector  
X Final maximized level using Average detector  
# Final maximized level using Peak detector



**MEASUREMENT RESULT: "A6132\_sh\_Final"**

6/13/2013 2:27PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
28201.800000	46.34	46.44	-43.9	48.9	63.5	14.6	1.00	180	AVERAGE	noise floor
28201.800000	59.16	46.44	-43.9	61.7	83.5	21.8	1.00	180	MAX PEAK	noise floor

## **FCC Part 15 Class B**

### **Electric Field Strength**

EUT: 5.7 GHz Avenger AP  
Manufacturer: Cambium Networks  
Operating Condition: 72 deg. F; 55% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig B  
Test Specification: 29.5 V DC (POE)  
Comment: Digital device emissions  
Date: 06-13-2013

### **TEXT: "Vert 3 meters"**

Short Description: Test Set-up

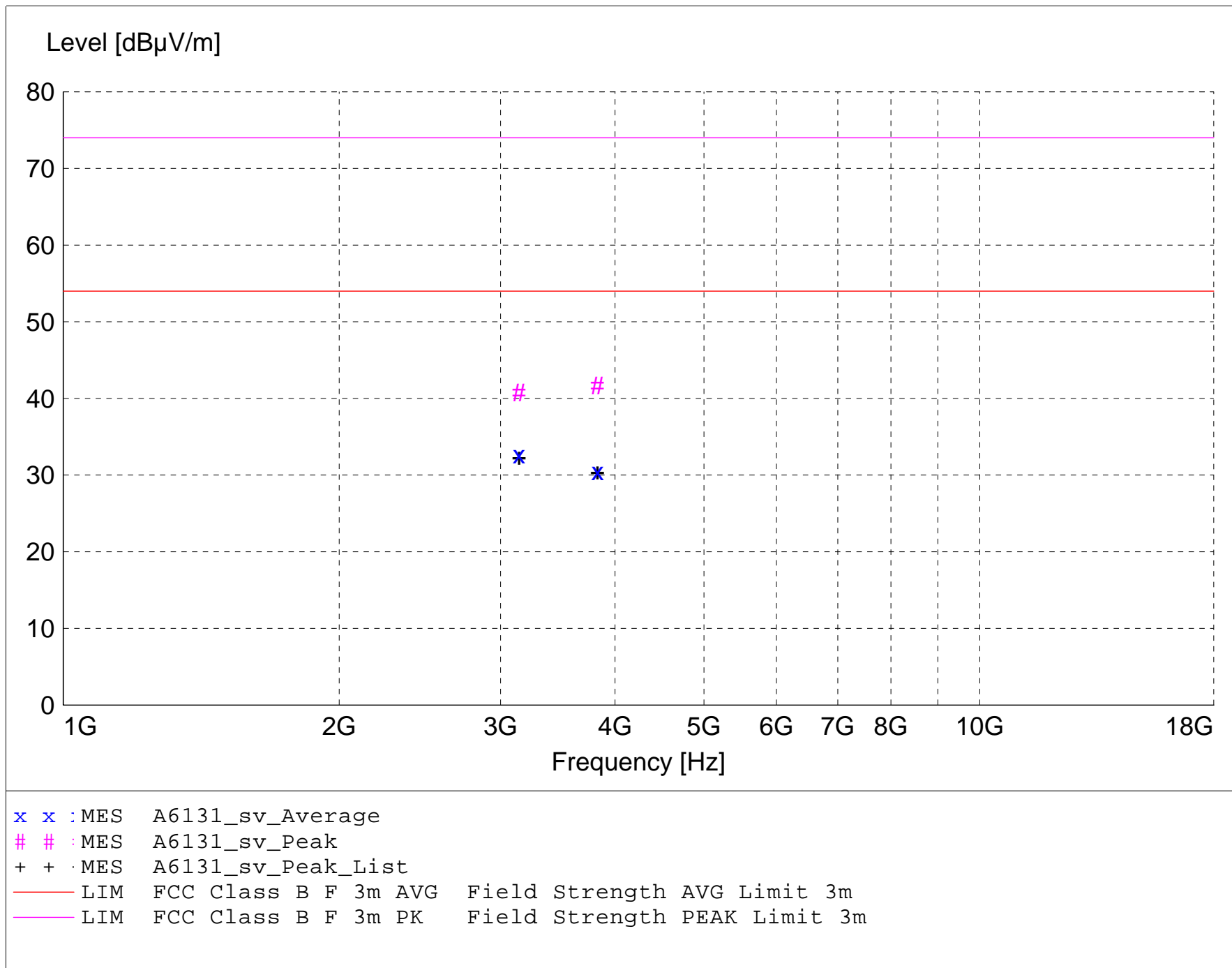
Test Set-up: EUT Measured at 3 Meters with VERTICAL Antenna Polarization

Sample Equations: 
$$\begin{array}{rclclcl} \text{Total Level(dB}\mu\text{V/m)} & = & \text{Level(dB}\mu\text{V)} & + & \text{System Loss(dB)} & + & \text{Antenna Factor(dB}\mu\text{V/m)} \\ 24.6 & & = & 35.51 & + & (-22.1) & + & 11.20 \end{array}$$

$$\begin{array}{rclcl} \text{Margin(dB)} & = & \text{Limit(dB}\mu\text{V/m)} & - & \text{Total Level(dB}\mu\text{V/m)} \\ 15.4 & = & 40 & - & 24.6 \end{array}$$

Graph Markers: + Frequency marker (Level of marker not related to final level)  
| Final maximized level using Quasi-Peak detector  
X Final maximized level using Average dector  
# Final maximized level using Peak detector





**MEASUREMENT RESULT: "A6131\_sv\_Final"**

6/13/2013 1:11PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
3142.650000	58.75	31.01	-57.1	32.6	54.0	21.4	1.40	180	AVERAGE	None
3826.650000	54.77	32.91	-57.2	30.5	54.0	23.5	1.30	120	AVERAGE	None
3826.650000	65.98	32.91	-57.2	41.7	74.0	32.3	1.30	120	MAX PEAK	None
3142.650000	66.93	31.01	-57.1	40.8	74.0	33.2	1.40	180	MAX PEAK	None

## **FCC Part 15 Class B**

### **Electric Field Strength**

EUT: 5.7 GHz Avenger AP  
Manufacturer: Cambium Networks  
Operating Condition: 72 deg. F; 55% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig B  
Test Specification: 29.5 V DC (POE)  
Comment: Digital device emissions  
Date: 06-13-2013

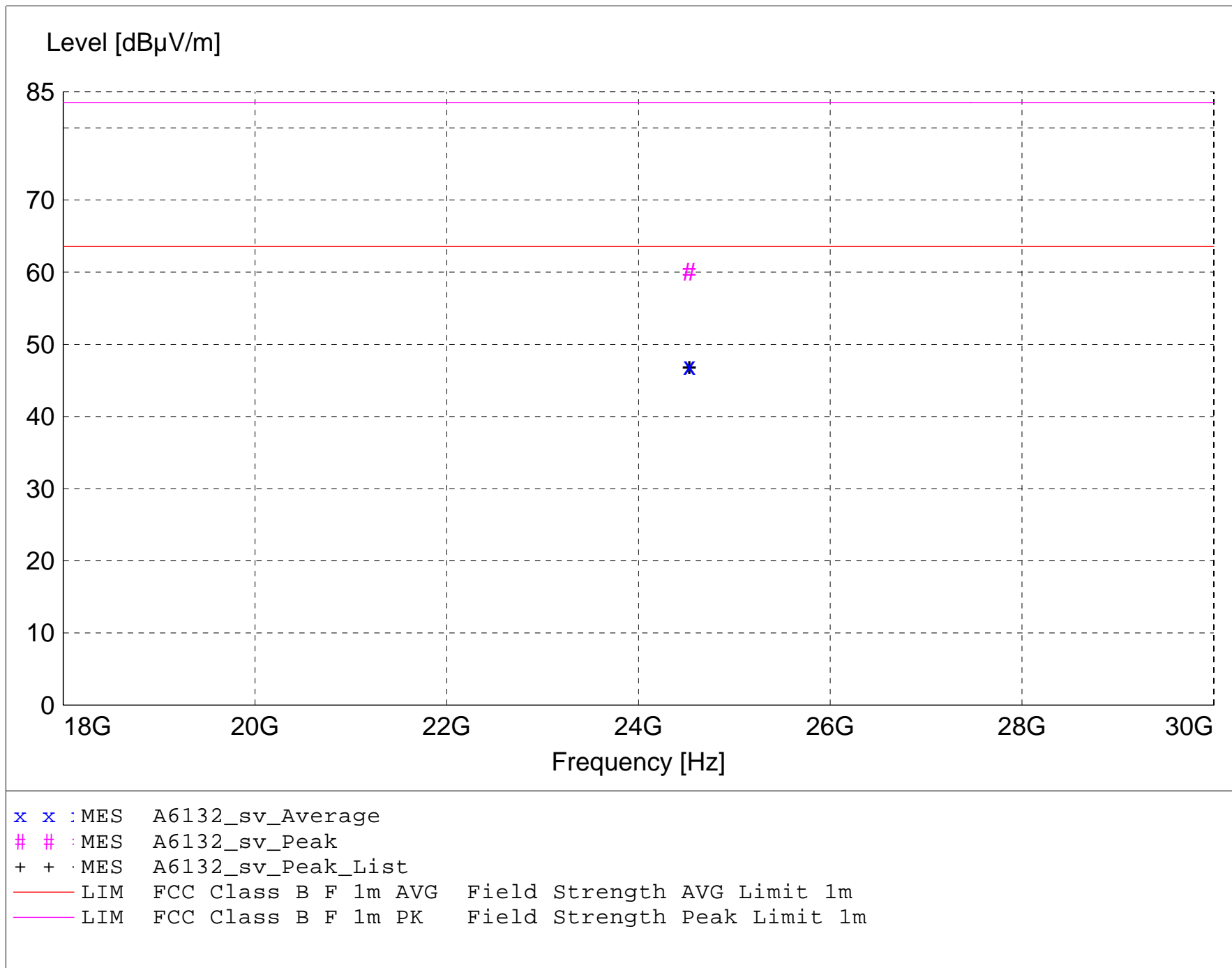
### **TEXT: "Vert 1 meters"**

Short Description: Test Set-up

Test Set-up: EUT Measured at 1 Meters with VERTICAL Antenna Polarization

Sample Equations: 
$$\begin{aligned} \text{Total Level(dB}\mu\text{V/m)} &= \text{Level(dB}\mu\text{V)} + \text{System Loss(dB)} + \text{Antenna Factor(dB}\mu\text{V/m)} \\ 24.6 &= 35.51 + (-22.1) + 11.20 \end{aligned}$$
$$\begin{aligned} \text{Margin(dB)} &= \text{Limit(dB}\mu\text{V/m)} - \text{Total Level(dB}\mu\text{V/m)} \\ 15.4 &= 40 - 24.6 \end{aligned}$$

Graph Markers: + Frequency marker (Level of marker not related to final level)  
| Final maximized level using Quasi-Peak detector  
X Final maximized level using Average detector  
# Final maximized level using Peak detector



**MEASUREMENT RESULT: "A6132\_sv\_Final"**

6/13/2013 2:12PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
24530.800000	47.18	46.12	-46.3	47.0	63.5	16.5	1.00	0	AVERAGE	noise floor
24530.800000	60.19	46.12	-46.3	60.0	83.5	23.5	1.00	0	MAX PEAK	noise floor