

Progress Energy's BPL Test ProjectFrom: Freeman, Doug [doug.freeman@pgnmail.com]
Sent: Monday, May 24, 2004 1:43 PM
To: John Kennedy
Cc: Oja, Matt; Godwin, Bill; Furnari, Chris; Len Anthony
Subject: Progress Energy's BPL Test Project

On May 20, 2004, Progress Energy Carolinas, Inc. ("Progress") sent to you by U.S. mail two letters pertaining to Progress' Broadband over Power Lines test project. One letter notified the FCC of Progress' release of its experimental license (Call Sign WD2XCAand File No. 0011-EX-PL-2003) for this test project. The second letter included a copy of the supplemental report to Progress' most recent status report under its experimental license.

Since the mailing of these two letters, Progress has determined some pages of the supplemental report were inadvertently excluded and some were inadvertently added. Upon receipt of the hard copy of the letter containing the supplemental report sent by U.S. mail, please discard that copy and replace it with the attached copy.

If you have questions concerning this matter, please do not hesitate to call me.

Thank you.

<<Progress Energy - Amperion Radiated Emissions Testing.doc>> <<Cover Letter Submitting Emissions Testing Report.doc>>

Douglas A. Freeman
Sr. Regulatory Affairs Analyst
Regulatory Affairs-Carolinas
Phone: (919) 546-6723
FAX: (919) 546-2694



Progress Energy

May 20, 2004

Mr. John Kennedy
Federal Communications Commission
Office of Engineering and Technology
Experimental Licensing Branch, MS 1300E1
445 12th Street SW
Washington DC 20554

SUBJECT: Submission of Data Associated with Experimental License Status Report

Dear Mr. Kennedy:

Progress Energy Carolinas, Inc. ("Progress") operated its original Broadband over Power Lines (BPL) test project under an experimental license (Call Sign WD2XCA and file number 0011-EX-PL-2003) issued by the FCC on February 10, 2003.

Progress is required by the experimental license to submit a status report every six months. Progress would like to supplement its most recent six month status report with radiated emissions test results that were taken earlier this year at our deployment site in Raleigh, North Carolina. We believe that the report that is being submitted today is of far more relevance and value because the data was taken more recently and the testing was performed entirely on Progress' BPL network. The test data also provides key insights to addressing one of the most important issues in the BPL industry, emissions created by the equipment, which are still compliant with FCC Part 15 regulations.

Sincerely,

Len S. Anthony
Deputy General Counsel - Regulatory Affairs

LSA: daf

Enclosure

215324



Document : Test Report
Revision : A
Author : G Durling

Test Report

Progress Energy Radiated Emissions Testing

Modification History

Rev	Date	Originator	Comment
A	1/22/2004	G Durling	Released to Progress Telecom

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1 Introduction

1.1 Purpose

On January 14th and 15th, 2004, a review of the radiated emissions specifically caused by Amperion BPL equipment Installed in Raleigh NC was conducted.

These tests were intended to verify the compliance of Amperion MV 1000 Griffin and Lynx products with FCC Part 15 Rules.

1.2 Results Summary

No emissions were detected that were in excess of Part 15 limits. For the frequency range from 2.5 MHz to 30.0 MHz, the limits for intentional radiators specified in FCC Part 15, section 15.209.

2 Test Description

2.1 Device Under Test

Amperion MV 1000 Griffin Injector, Part # 890-0040-01

Amperion MV 1000 Griffin Extractor, Part # 890-0040-02

Amperion 25 KV insulated Coupler, Part # 890-0044-01

Amperion MV 1000 Lynx Injector, Part # 890-0007-01

Amperion MV 1000 Lynx Extractor, Part # 890-0007-02

Amperion 3 Inch Underground Coupler, Part # 890-0011-00

2.2 Test Setup

2.2.1 Equipment Needed

Spectrum Analyzer, Rhode & Schwarz FSH3, S/N 101121

Powered magnetic loop antenna A-H Systems SAS-563B, S/N 327

Biconical antenna A-H Systems SAS-542, S/N 776

10 Meter RG-214 Cable, A-H Systems SAC-211-10



Kalibrierschein **Calibration Certificate**

Nummer 1330101121
Number

Gegenstand
Item Handheld Spectrum Analyzer with
Tracking Generator

Hersteller
Manufacturer ROHDE & SCHWARZ

Typ
Type FSH3

Sach-Nr.
Stock No. 1145.5850.13

Serien-Nr.
Serial No. 101121

Auftraggeber
Customer

Bestellung Nr.
Order No.

Ort u. Datum d. Kalibrierung
Place and date of calibration PEMSTAR Almelo, 2003-04-15

Umfang der Kalibrierung
Scope of calibration Standard-Calibration

Eingangsprüfung
Performance on receipt

Kalibrierergebnis
Result of calibration Measurement Results in
Specifications

Umfang des Kalibrierscheins
Extent of the certificate 2 Pages

Dieser Kalibrierschein dokumentiert, daß der ge-nannte Gegenstand nach festgelegten Vorgaben geprüft und gemessen wurde. Die Meßwerte lagen im Regelfall mit einer Wahrscheinlichkeit von annähernd 95% im zugeordneten Wertesintervall (Erweiterte Meßunsicherheit mit $k = 2$).

Die Kalibrierung erfolgte mit Meßmitteln und Normale, die direkt oder indirekt durch Ableitung mittels anerkannter Kalibriertechniken rückgeführt sind auf Normale der PTB/DKD oder anderer nationaler/internationaler Standards zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem internationalen Einheitensystem (SI). Wenn keine Normale existieren, erfolgt die Rückführung auf Bezugsnormale der PEMSTAR Laboratorien.

Grundsätze und Verfahren der Kalibrierung entsprechen ISO / IEC 17025. Das Bestätigungssystem für die verwendeten Meßmittel entspricht DIN ISO 10012-1. Das angewandte Qualitätsmanagement-System ist zertifiziert nach DIN EN ISO 9001.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Kalibrierscheine ohne Signifizierungen sind ungültig.

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents, that the named item is tested and measured against defined specifications. Measurement results are located usually in the corresponding interval with a probability of approx. 95% (coverage factor $k=2$).

Calibration is performed with test equipment and standards directly or indirectly traceable by means of approved calibration techniques to the PTB/DKD or other national/international standards, which realize the physical units of measurement according to the International System of Units (SI). In all cases where no national standards are available, measurements are referenced to standards of the PEMSTAR laboratories.

Principles and methods of calibration correspond with ISO / IEC 17025. The metrological confirmation system for the measuring equipment used is in compliance with DIN ISO 10012-1.

The applied quality system is certified to DIN EN ISO 9001.

This calibration certificate may not be reproduced other than in full. Calibration certificates without signatures are not valid.

The user is obliged to have the object recalibrated at appropriate intervals.

Ausstellungsdatum
Date of issue

Laborleitung
Head of laboratory

Bearbeiter
Person responsible

2003-04-15

T. H. H. H. H.

T. H. H. H. H.



A.H. Systems Inc.

9710 Cozycroft Ave. Chatsworth, CA 91311

Phone (818) 998-0223 Fax (818) 998-6892

E-mail: Info@A.H.Systems.com

Web site: <http://www.AHSystems.com>

Certificate Number: 4852RB

Certificate of Calibration

The Antenna(s) has been individually calibrated using the following standard procedure(s):
IEEE 291, IEEE 302, SAE-ARP-958D and/or ANSI-C63.5-1998

Calibration Traceability: All measurement instrumentation traceable to the National Institute of
Standards and Technology (NIST)

Our "Calibration Measurement Procedures" are in complete
compliance with MIL-STD-45662A/ANSI Z540

NIST Numbers: DCV 811/24944-92, ACV 521/234615, Ω 811/250891
Dimensional 821/253616-94, WWW Boulder, CO

Calibration Uncertainty: ± 1 dB

Environment: Temperature: 76 Degrees Fahrenheit
Humidity: 29% (non-condensing)

Manufacturer	Model Number	Serial Number	Date of Calibration
A.H. Systems Inc.	SAS-563B	327	07-Aug-03

Re-certification Date: 1 year from calibration date

Calibration equipment used

Model Number	Serial Number	Calibration Due Date		Model Number	Serial Number	Calibration Due Date
HP-8563E	3551A04250	12-Feb-04	☐	HP-85620A	01282	14-Feb-04
HP-85644A	3407A00209	12-Feb-04	☒	HP-3325A	1625A00598	8-May-04
HP-8673D	2747A00701	14-Feb-04	☐	HP-8620C	1604A00368	8-May-04

Antenna Condition

Pre Calibration:

In tolerance ☐
Out of tolerance ☐
Repair required ☐
Repair performed ☐

Post Calibration:

Meets all specs ☒
Limited specs ☐
Other ☐

Special Limitations: _____

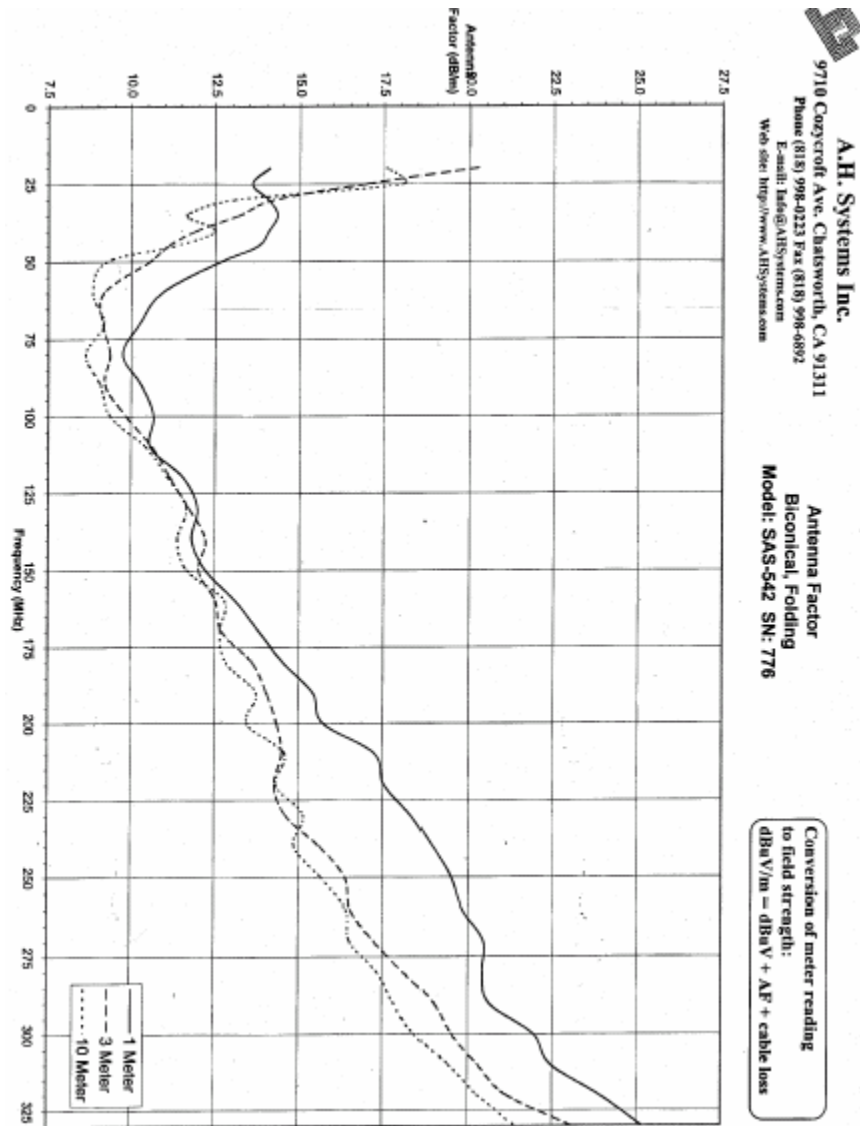
Manny Monzon

RF Technician

Travis P. Samuels

Quality Control Manager

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A.H. Systems Inc.

9710 Cozycroft Ave. Chatsworth, CA 91311

Phone (818) 998-0223 Fax (818) 998-6892

E-mail: Info@A.H.Systems.com

Web site: <http://www.AHSystems.com>

Certificate Number: 4852EA

Certificate of Calibration

The Antenna(s) has been individually calibrated using the following standard procedure(s):
ARP-958 and/or IEEE 291 and/or ANSI C63.5

Calibration Traceability: All measurement instrumentation traceable to the National Institute of Standards and Technology (NIST)

Our "Calibration Measurement Procedures" are in complete compliance with MIL-STD-45662A/ANSI Z540

NIST Numbers: DCV 811/24944-92, ACV 521/234615, Ω 811/250891
Dimensional 821/253616-94, WWW Boulder, CO

Calibration Uncertainty: +/- 1 dB

Environment: Temperature: 76 Degrees Fahrenheit
Humidity: 29% (non-condensing)

Manufacturer	Model Number	Serial Number	Date of Calibration
A.H. Systems, inc.	SAS-510-4	128	07-Aug-03
A.H. Systems Inc.	SAS-542	776	07-Aug-03

Re-certification Date: 1 year from calibration date

Calibration equipment used

Model Number	Serial Number	Calibration Due Date		Model Number	Serial Number	Calibration Due Date
☒ HP-8563E	3551A04250	12-Feb-04	☐	HP-85620A	01282	14-Feb-04
☒ HP-85644A	3407A00209	12-Feb-04	☐	HP-3325A	1625A00598	8-May-04
☐ HP-8673D	2747A00701	14-Feb-04	☐	HP-8620C	1604A00368	8-May-04

Antenna Condition

Pre Calibration:

In tolerance ☐
Out of tolerance ☐
Repair required ☐
Repair performed ☐

Post Calibration:

Meets all specs ☒
Limited specs ☐
Other ☐

Special Limitations:

Manny Monzon
RF Technician

Travis P. Samuels
Quality Control Manager

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A.H. Systems Inc.
9710 Cozycroft Ave. Chatsworth, CA 91311
Phone (818) 998-0223 Fax (818) 998-6892
E-mail: Info@AHSystems.com
Web site: <http://www.AHSystems.com>

Calibration, Active 12" Loop, Battery Powered

Model: SAS-563B Serial Number: 327 Date: 07-Aug-03

Frequency	Antenna Factor (dB/m)
1 KHz	101.6
2 KHz	93.8
5 KHz	84.9
10 KHz	78.7
20 KHz	73.3
50 KHz	66.3
100 KHz	60.0
200 KHz	54.6
500 KHz	46.4
1 MHz	40.7
2 MHz	33.5
5 MHz	26.2
10 MHz	4.0
13 MHz res	-15.9
15 MHz	9.9
20 MHz	12.4
25 MHz	19.5
30 MHz	22.5

Conversion Formulas: $\text{dBuV/m} = \text{dBuV} + \text{AF}$
 $\text{dBuA/m} = \text{dBuV/m} - 51.5 \text{ dB}$

Rev. A

**A.H. Systems Inc.****9710 Cozycroft Ave. Chatsworth, CA 91311****Phone (818) 998-0223 Fax (818) 998-6892****E-mail: Info@AHSystems.com****Web site: <http://www.AHSystems.com>**

Calibration, 10 Meter RG-214 N-N cable

Model: SAC-211-10

Serial Number: --

Date: 28-Aug-0

Frequency (MHz)	Cable Loss (dB)
10	0.3
20	0.4
30	0.4
40	0.5
50	0.5
60	0.6
70	0.7
80	0.7
90	0.8
100	0.9
200	1.3
500	1.8
700	2.0
1000	2.5
1300	2.9
1500	3.2
1700	3.5
1800	3.7
2000	4.0
3000	5.3
4000	6.4
5000	7.5
6000	8.7
7000	9.5
8000	11.0
9000	11.7
10000	13.5

Typical overhead test set-up (Woodchase) ;





Typical underground test set-up (Whitehurst)





2.2.2 Cautions

No MV wiring areas were accessed during this testing.

2.3 Assumptions

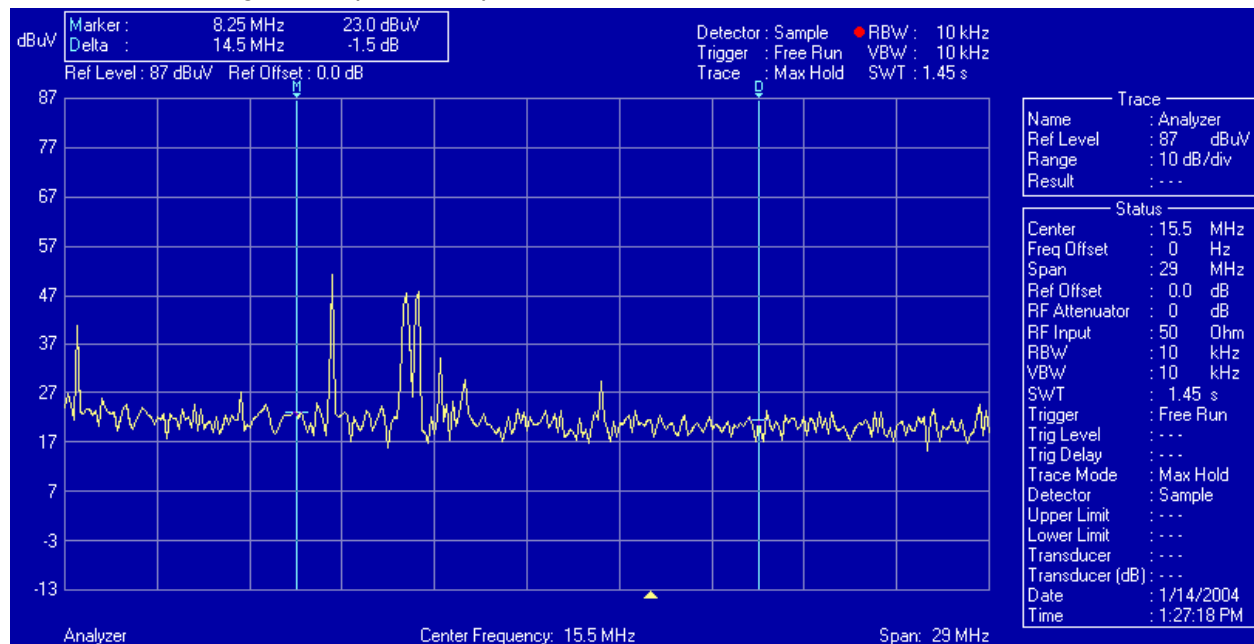
Only BPL specific frequencies were tested. Previous OATS and field test have indicated Amperion MV1000 product complies with part 15 Class B radiated emissions limits above 30 MHz.

3 Test Data

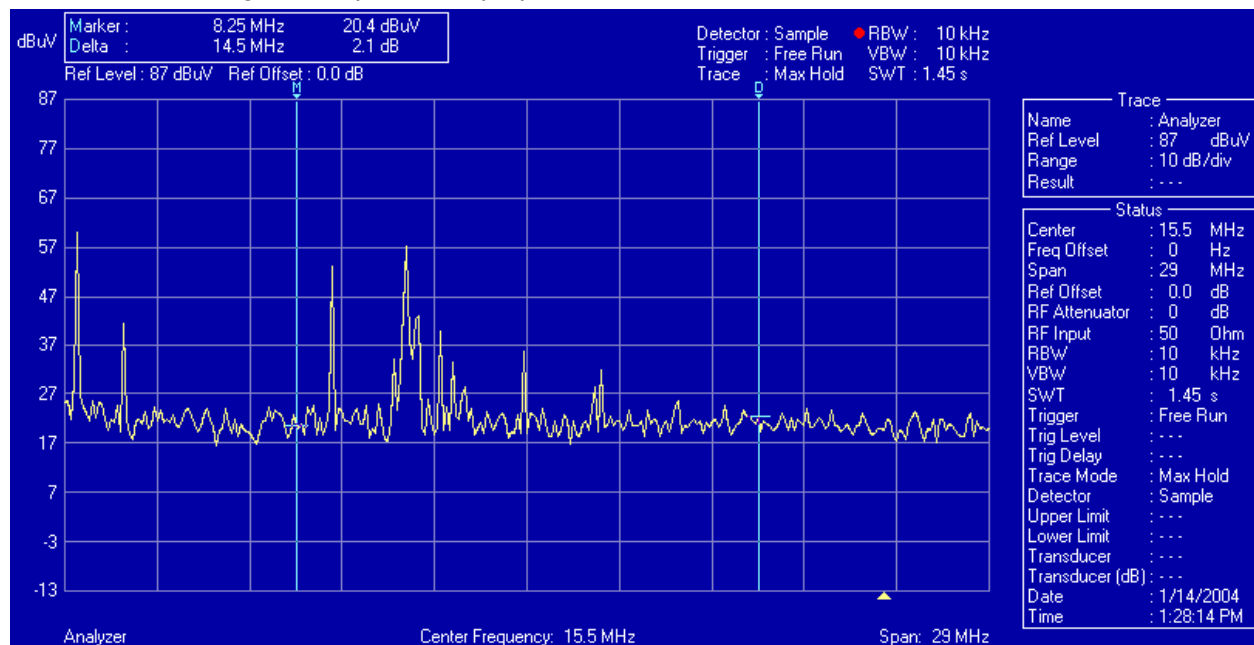
3.1 Woodchase Overhead Deployment

At Injector, Upstream (US) center frequency 28.8 MHz, Downstream (DS) center frequency 23.8 MHz

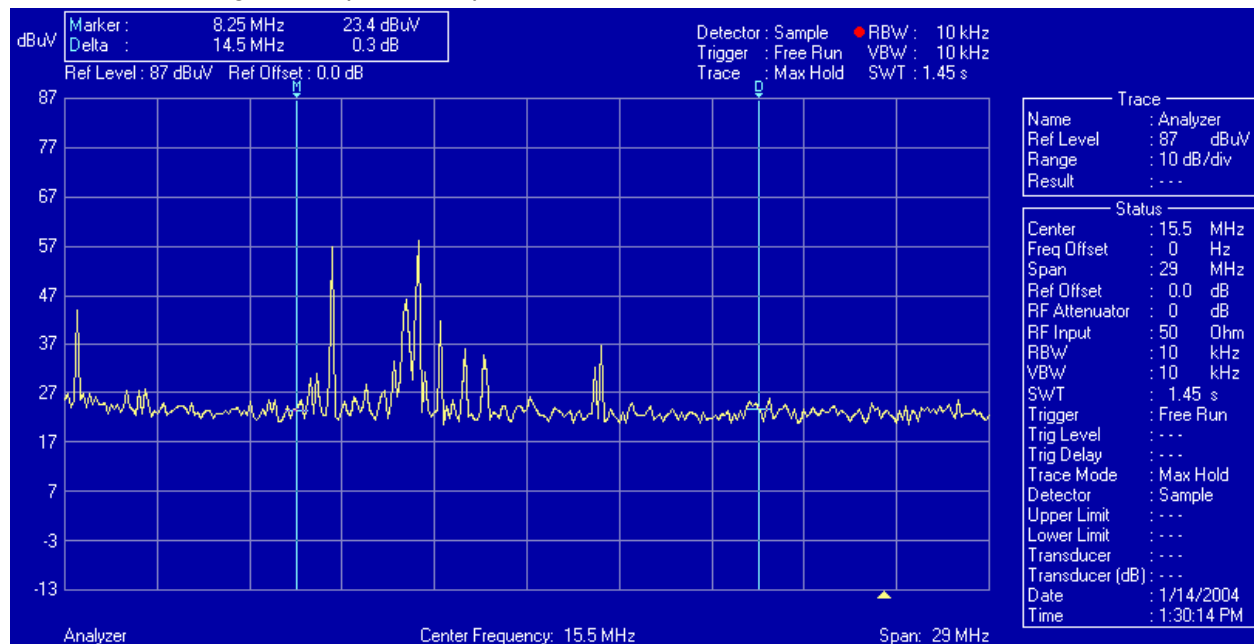
PLC Shutdown, Magnetic loop antenna parallel 10M from MV wire



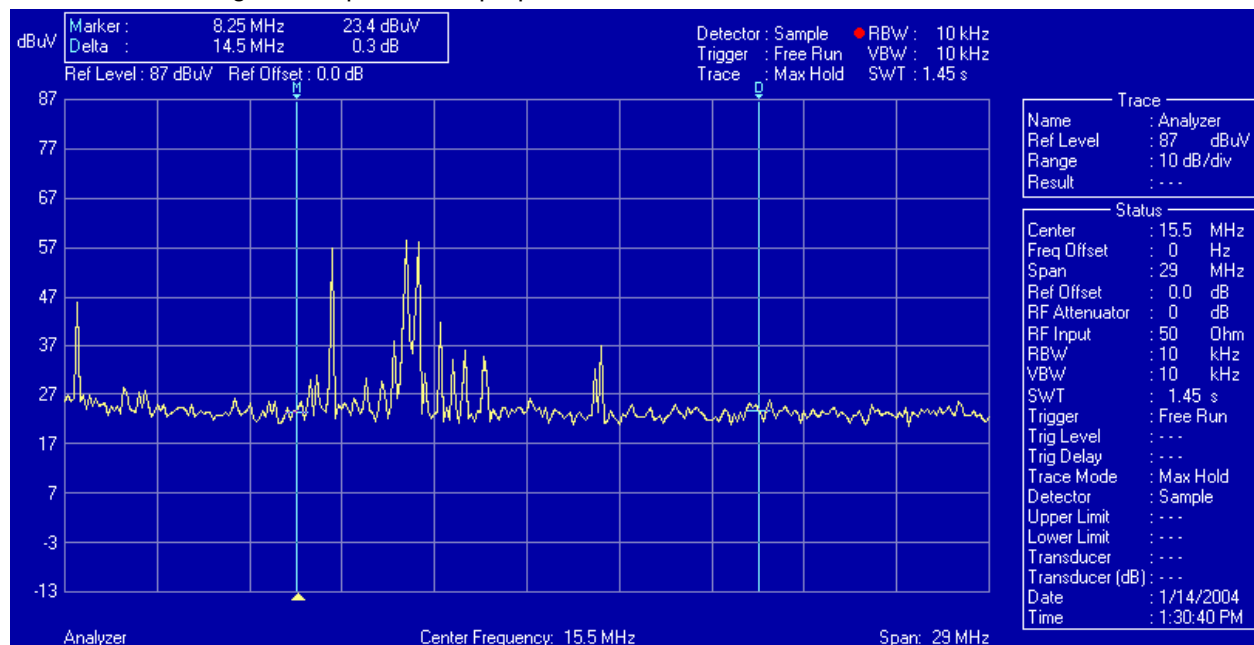
PLC Shutdown, Magnetic loop antenna perpendicular 10M from MV wire



PLC Activated, Magnetic loop antenna parallel 10M from MV wire



PLC Activated, Magnetic loop, antenna perpendicular 10M from MV wire



Summary;

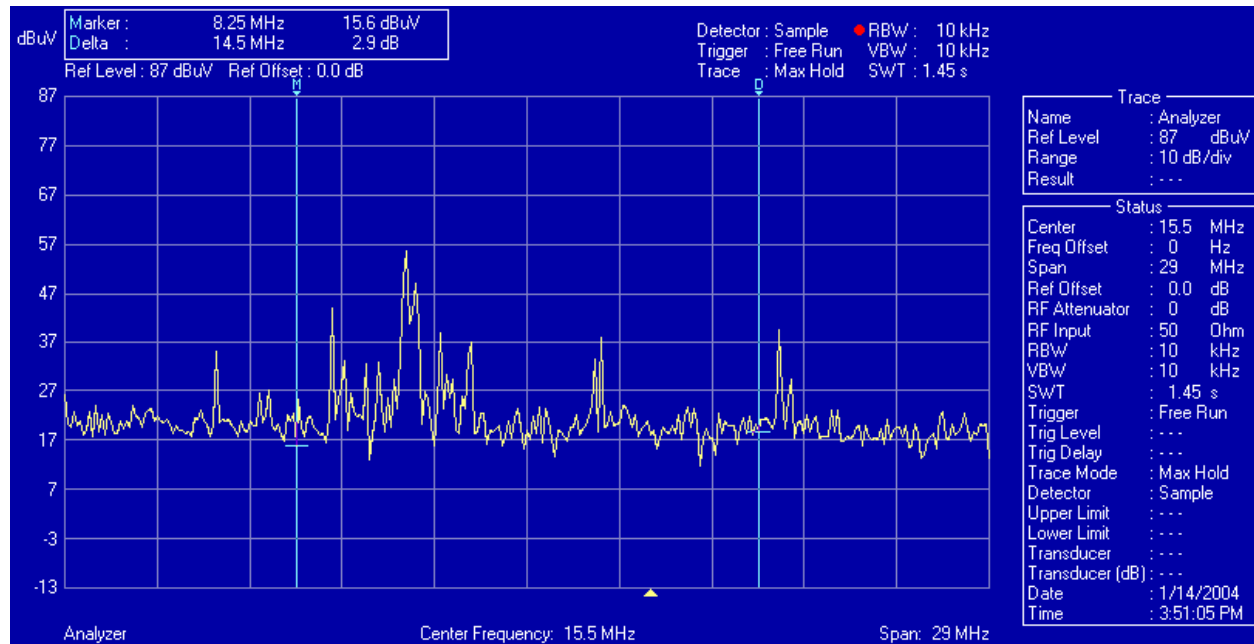
Maximum PLC signal amplitude noted (24.75 MHz) 24dBuV + 19.5 (AF)= 43.5 dBuV/M

Limit = 49.5 dBuV/M

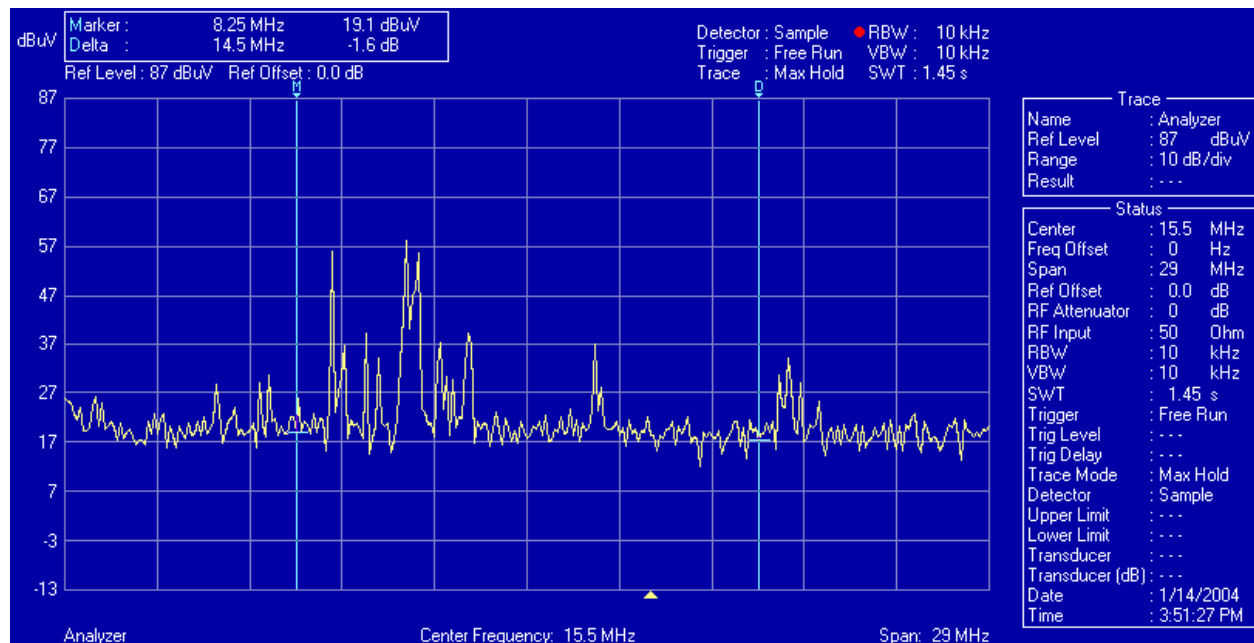
3.2 Holland Meadows Overhead Deployment

Injector, Upstream (US) center frequency 16.8 MHz, Downstream (DS) center frequency 20.8 MHz

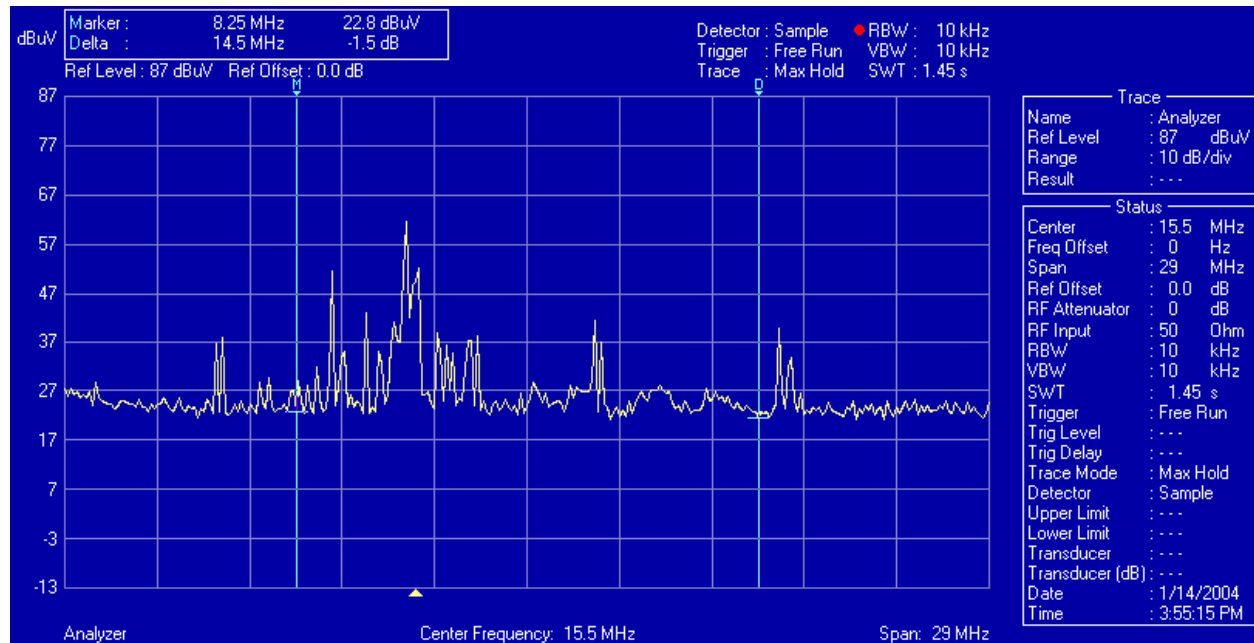
PLC Shutdown, Magnetic loop antenna parallel 10M from MV wire



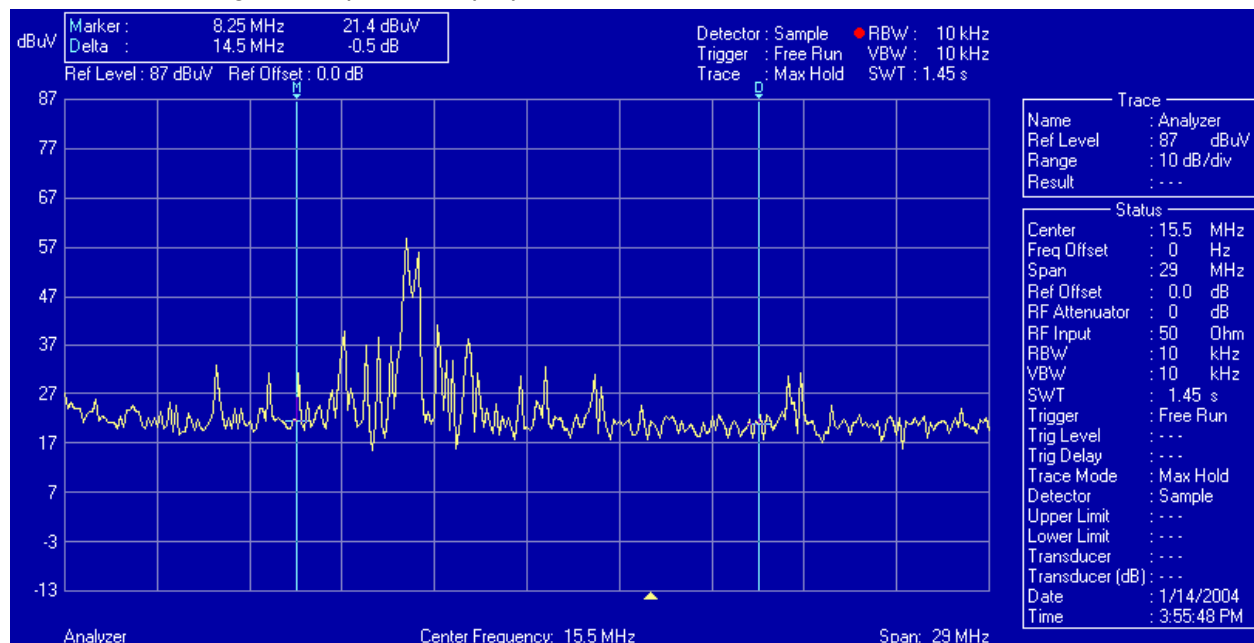
PLC Shutdown, Magnetic loop antenna perpendicular 10M from MV wire



PLC Activated, Magnetic loop antenna parallel 10M from MV wire



PLC Activated, Magnetic loop antenna perpendicular 10M from MV wire



Summary;

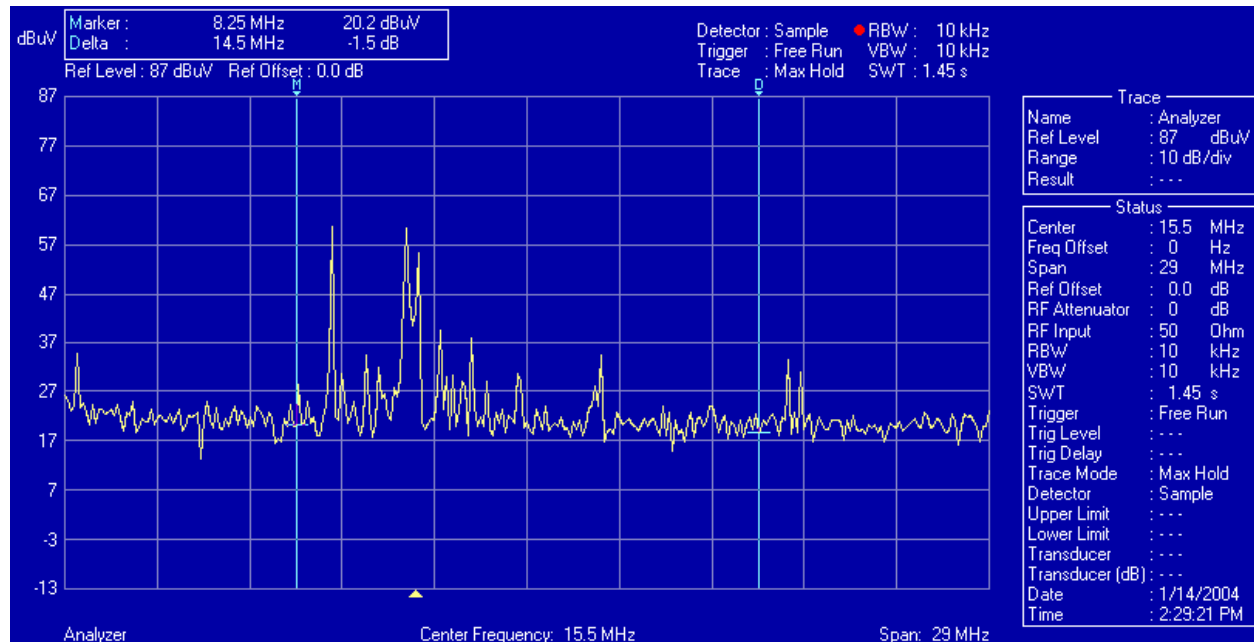
Maximum PLC signal amplitude noted (21.5 MHz) 27.2dBuV + 14 (AF)= 41.2 dBuV/M

Limit = 49.5 dBuV/M

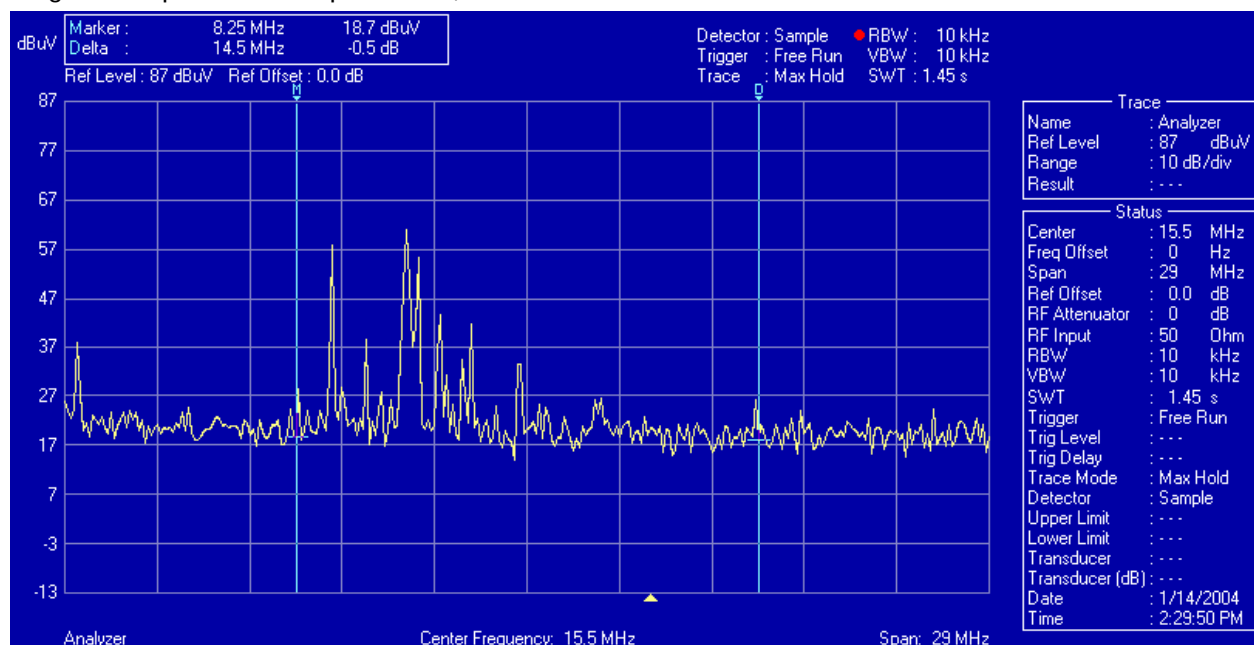
3.3 Whitehurst Underground Deployment

Injector, Upstream (US) center frequency 21MHz, Downstream (DS) center frequency 26 MHz

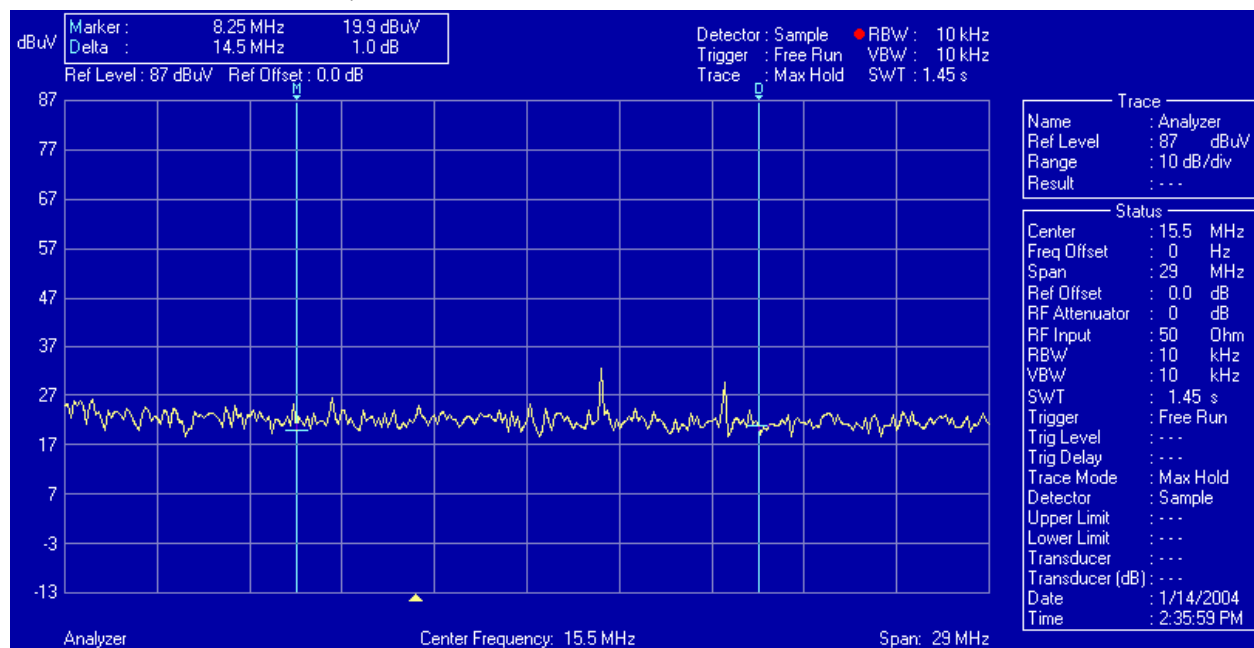
Magnetic loop antenna Parallel, 3M from EUT



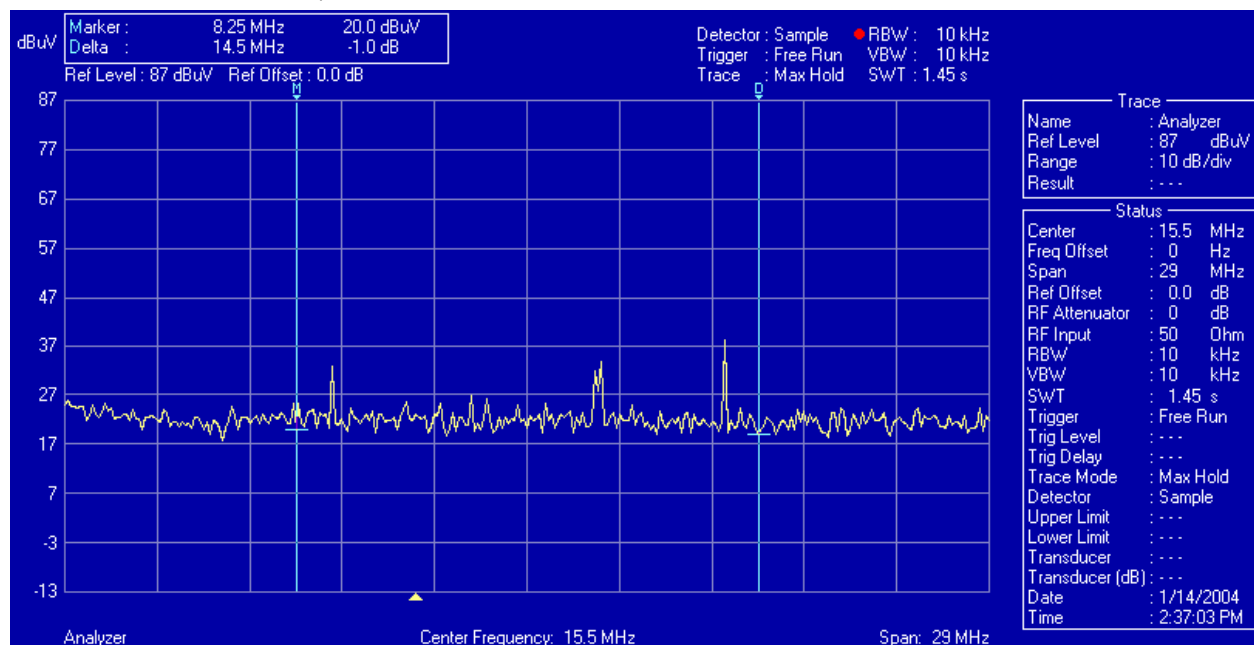
Magnetic loop antenna Perpendicular, 3M from EUT



Biconical antenna Horizontal, 3M from EUT



Biconical antenna Vertical, 3M from EUT



No PLC specific emissions could be identified.

4 Test Operation

Raleigh NC

Normal OFDM operation

Power levels optimized for network performance

William Godwin (Progress Telecom) and Gerrett Durling (Amperion) in attendance.

5 Results Summary

5.1 Pass / Fail Table

Test number	Test Name	Pass/Fail
1	Woodchase Overhead Deployment	Pass
2	Holland Meadows Overhead Deployment	Pass
3	Whitehurst Underground Deployment	Pass

5.2 Exceptions

Not all Installation locations were tested. Locations were selected based on accessibility and are typical of the installation.

5.3

Notes

In the case of all overhead measurements, the antenna was positioned 10M from the Medium Voltage conductor carrying the BPL signal.