**Compliance Testing, LLC**
Previously Flom Test Lab
EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268
fax: (480) 926-3598
http://www.ComplianceTesting.com
info@ComplianceTesting.com

| | |
|---|---|
| Date: | 1/6/2011 |
| Applicant: | Technology Solutions (UK) Ltd<br>Suite C,<br>Loughborough Technology Centre,<br>Epinal Way,<br>Loughborough,<br>Leicestershire,<br>United Kingdom<br>LE11 3GE |
| Attention of: | Dr. David Evans, Managing Director<br>Ph: +44 (0) 1509 238248<br>Fax: +44 (0) 1509 220020<br>E-mail: david.evans@tsl.uk.com |
| Equipment: | UHF RFID Reader |
| FCC ID: | S6J-1116 |
| FCC Rules: | 15.247 |

Enclosed please find your copy of the Engineering Test Report for which you are subject to the restrictions as listed on the attached summary.
This report may not be reproduced, except in full, without written permission from Compliance Testing, LLC. Please retain a copy of this report for your archival purposes.

Once a Telecommunication Certification Body (TCB) issues a Grant the Federal Communication Commission (FCC) has 30 days to review the application and request added information. It is your decision whether or not to market the equipment subject to a possible recall before the end of the 30 days.

If your equipment is still retained by us, it will be returned to you 30 days after approval is achieved.
Our invoice for services has been directed to your Accounts Payable Department.

For any additional information please contact us.

Sincerely,

Compliance Testing

**Compliance Testing, LLC**
Previously Flom Test Lab
EMI, EMC, RF Testing Experts Since 1963

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# Test Report

for

**FCC ID:** S6J-1116

**Model:** 1116

**Description:** UHF RFID Reader

to

**Federal Communications Commission**

**Rule Part(s) 15.247**

**Date of Report:** January 6, 2011

**On the Behalf of the Applicant**: Technology Solutions (UK) Ltd
Suite C,
Loughborough Technology Centre,
Epinal Way,
Loughborough,
Leicestershire,
United Kingdom
LE11 3GE

**Attention of:** Dr. David Evans, Managing Director
Ph: +44 (0) 1509 238248
Fax: +44 (0) 1509 220020
E-mail: david.evans@tsl.uk.com

**By**
**Compliance Testing, LLC**
**3356 N. San Marcos Place, Suite 107**
**Chandler, Arizona 85225-7176**
**(866) 311-3268 phone, (480) 926-3598 fax**

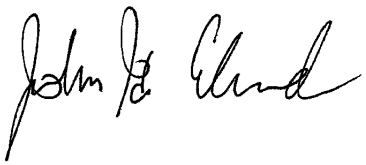
# Revision History

| Revision | Date | Revised By | Reason for revision |
|---|---|---|---|
| 1.0 | January 6, 2011 | J. Erhard | Original Document |
| 2.0 | January 13, 2011 | Karen Springer | Corrected FCC ID |
| | | | |
| | | | |

# Testimonial and Statement of Certification

**This is to certify that**:

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.
2. **That** the technical data supplied with the application was taken under my direction and supervision.
3. **That** the data was obtained on representative units, randomly selected.
4. **That**, the facts set forth in the application and accompanying technical data are true and correct to the best of my knowledge and belief.



Certifying Engineer: John Erhard: Engineering Manager

**The applicant has been cautioned as to the following:**

15.21 Information to User

The user's manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) Special Accessories

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

# Table of Contents

## List of General Information Required For Certification

In Accordance with FCC Rules and Regulations, Volume II, Part 2 and to 15.247

**Sub-Part 2.1033**
(B)(1):

(b)(1): **Name and Address of Applicant:** Technology Solutions (UK) Ltd
Suite C,
Loughborough Technology Centre,
Epinal Way,
Loughborough,
Leicestershire,
United Kingdom
LE11 3GE

(b)(2): **FCC ID**: S6J-1116

**Model Number**: 1116

(b)(3): **Instruction Manual(s)**:

Please See Exhibits

(b)(4): **Theory of Operation**:

Please See Exhibits

(b)(5): **Block Diagram**:

Please See Exhibits

(b)(6): **Test Report**:

Contained Herein

(b)(7): **Test Setup Photos**:

Please See Exhibits

15.203: **Antenna Requirement**:

| | |
|---|---|
| X | The antenna is permanently attached to the EUT |
| | The antenna uses a unique coupling |
| | The EUT must be professionally installed |
| | The antenna requirement does not apply |

## Test and Measurement Data

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2 and the following individual Parts: 15.247 Operation within bands 902-928, 2400-2483.5, 5725-5850 MHz

## Standard Test Conditions and Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-2009, ANSI C63.10-2009, FCC DA 00-705, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

| Environmental Conditions | | |
|---|---|---|
| **Temperature** | **Humidity** | **Pressure** |
| 17.6 Degrees Centigrade | 25.6 % | 30.5 Inches of Mercury |

Measurement results, unless otherwise noted, are worst-case measurements.

## A2LA

"A2LA has accredited Compliance Testing, LLC in Chandler, AZ for technical competence in the field of Electrical testing. The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO 17025:2005 'General Requirements for the Competence of Testing and Calibration Laboratories' and any additional program requirements in the identified field of testing."

Please refer to www.a2la.org for current scope of accreditation.

Certificate number: 2152.01

ACCREDITED
TESTING CERT# 2152.01

**FCC OATS Reg. #933597**

**IC O.A.T.S. Number: 2044A-1**

## Test Results Summary

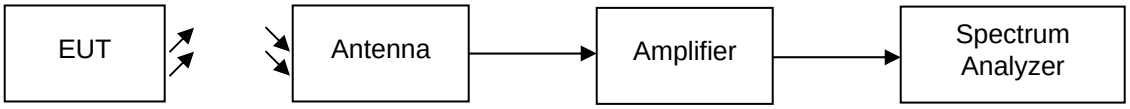
| Specification | Test Name | Pass, Fail, N/A | Comments |
|---|---|---|---|
| 15.247(d), 15.209(a), 15.205 | Radiated Spurious Emissions | Pass | |
| 15.247(d), 15.209(a), 15.205 | Emissions At Band Edges | Pass | |

**Name of Test**: Radiated Spurious Emissions
**Specification**: 15.247(d), 15.209(a), 15.205 **Engineer: J. Erhard**
**Test Equipment Utilized:** i00033, i00103 **Test Date: 1/5/2011**

## Test Procedure

The EUT was tested on an open area test site (OATS) set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Spurious Emissions. The antenna and cable correction factors were summed and input into the spectrum analyzer as an offset to ensure accurate readings. The spectrum for each tuned frequency was examined to the 10th harmonic.

## Test Setup




| Detector Settings | RBW | VBW |
|---|---|---|
| Peak | 1 MHz | 3 MHz |
| Average | 1 MHz | 3 MHz |

### 40X40 Antenna Radiated Spurious Emissions

| Tuned Freq (MHz) | Emission Freq (MHz) | Peak Monitored Level (dBuV/m) | Peak Limit (dBuV/m) | Average Monitored Level (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|
| 902.75 | 1805.50 | 51.69 | 74.0 | 46.76 | 54.0 | Pass |
| 902.75 | 2708.25 | 67.00 | 74.0 | 52.76 | 54.0 | Pass |
| 902.75 | 3611.00 | 68.44 | 74.0 | 50.79 | 54.0 | Pass |
| 902.75 | 4513.75 | 57.25 | 74.0 | 48.69 | 54.0 | Pass |

| Tuned Freq (MHz) | Emission Freq (MHz) | Peak Monitored Level (dBuV/m) | Peak Limit (dBuV/m) | Average Monitored Level (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|
| 915.25 | 1830.50 | 56.53 | 74.0 | 52.93 | 54.0 | Pass |
| 915.25 | 2745.75 | 62.86 | 74.0 | 52.95 | 54.0 | Pass |
| 915.25 | 3661.00 | 71.42 | 74.0 | 51.46 | 54.0 | Pass |
| 915.25 | 4576.25 | 55.34 | 74.0 | 48.03 | 54.0 | Pass |

| Tuned Freq (MHz) | Emission Freq (MHz) | Peak Monitored Level (dBuV/m) | Peak Limit (dBuV/m) | Average Monitored Level (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|
| 927.25 | 1854.50 | 55.05 | 74.0 | 51.61 | 54.0 | Pass |
| 927.25 | 2781.75 | 58.78 | 74.0 | 52.44 | 54.0 | Pass |
| 927.25 | 3709.00 | 69.32 | 74.0 | 50.42 | 54.0 | Pass |
| 927.25 | 4636.25 | 62.18 | 74.0 | 53.10 | 54.0 | Pass |

No other emissions were detectable. All emissions were greater than –20 dBc.

**79X79 Antenna Radiated Spurious Emissions**

| Tuned Freq (MHz) | Emission Freq (MHz) | Peak Monitored Level (dBuV/m) | Peak Limit (dBuV/m) | Average Monitored Level (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|
| 902.75 | 1805.50 | 53.46 | 74.0 | 47.89 | 54.0 | Pass |
| 902.75 | 2708.25 | 65.17 | 74.0 | 52.65 | 54.0 | Pass |
| 902.75 | 3611.00 | 66.62 | 74.0 | 52.36 | 54.0 | Pass |
| 902.75 | 4513.75 | 64.03 | 74.0 | 51.87 | 54.0 | Pass |

| Tuned Freq (MHz) | Emission Freq (MHz) | Peak Monitored Level (dBuV/m) | Peak Limit (dBuV/m) | Average Monitored Level (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|
| 915.25 | 1830.50 | 55.38 | 74.0 | 51.44 | 54.0 | Pass |
| 915.25 | 2745.75 | 62.86 | 74.0 | 52.65 | 54.0 | Pass |
| 915.25 | 3661.00 | 67.10 | 74.0 | 51.75 | 54.0 | Pass |
| 915.25 | 4576.25 | 62.89 | 74.0 | 52.99 | 54.0 | Pass |

| Tuned Freq (MHz) | Emission Freq (MHz) | Peak Monitored Level (dBuV/m) | Peak Limit (dBuV/m) | Average Monitored Level (dBuV/m) | Average Limit (dBuV/m) | Result |
|---|---|---|---|---|---|---|
| 927.25 | 1854.50 | 55.60 | 74.0 | 51.84 | 54.0 | Pass |
| 927.25 | 2781.75 | 58.86 | 74.0 | 52.37 | 54.0 | Pass |
| 927.25 | 3709.00 | 67.35 | 74.0 | 52.75 | 54.0 | Pass |
| 927.25 | 4636.25 | 57.33 | 74.0 | 49.11 | 54.0 | Pass |

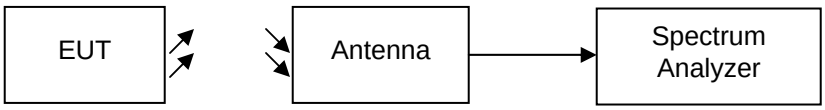
No other emissions were detectable. All emissions were greater than –20 dBc.

**Name of Test**: Emissions At Band Edges
**Specification**: 15.247(d), 15.209(a), 15.205 **Engineer: J. Erhard**
**Test Equipment Utilized**: i00267, i00379 **Test Date: 1/5/2011**

## Test Procedure

The EUT was tested on an open area test site (OATS) set 3m from the receiving transducer. A spectrum analyzer was used to verify that the EUT met the requirements for band edge. The cable and antenna correction factors were input into the analyzer to ensure accurate readings were obtained.

## Test Setup



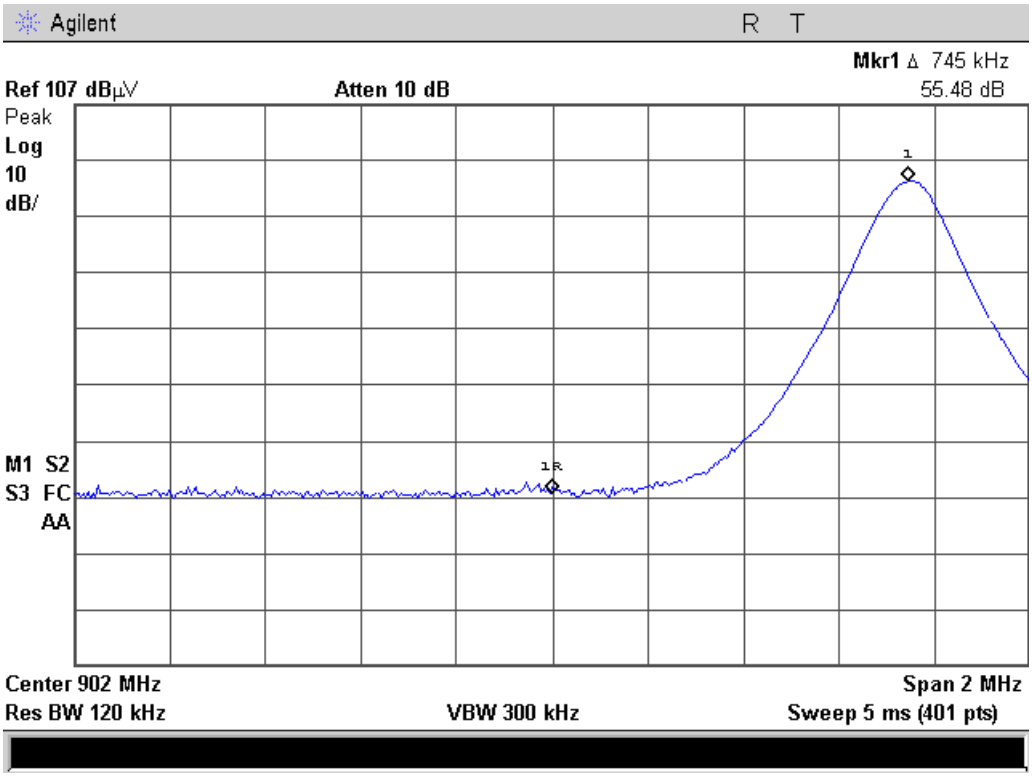

### 40X40 Antenna Band Edge Emissions Summary

| Tuned Freq (MHz) | Emission Freq (MHz) | Monitored Level (dBc) | Detector | Limit | Result |
|---|---|---|---|---|---|
| 902.75 | 902.0 | -55.48 | Peak | -20 dBc | Pass |
| 927.25 | 928.0 | -57.45 | Peak | -20 dBc | Pass |

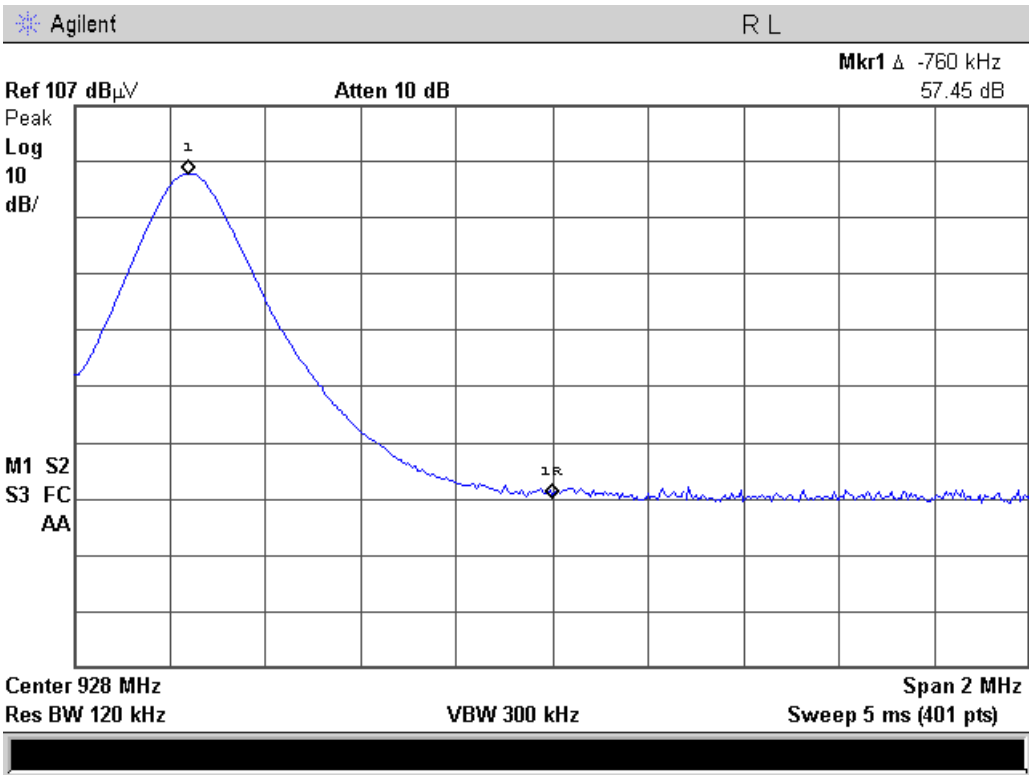
### 79X79 Antenna Band Edge Emissions Summary

| Tuned Freq (MHz) | Emission Freq (MHz) | Monitored Level (dBc) | Detector | Limit | Result |
|---|---|---|---|---|---|
| 902.75 | 902.0 | -52.34 | Peak | -20 dBc | Pass |
| 927.25 | 928.0 | -52.52 | Peak | -20 dBc | Pass |

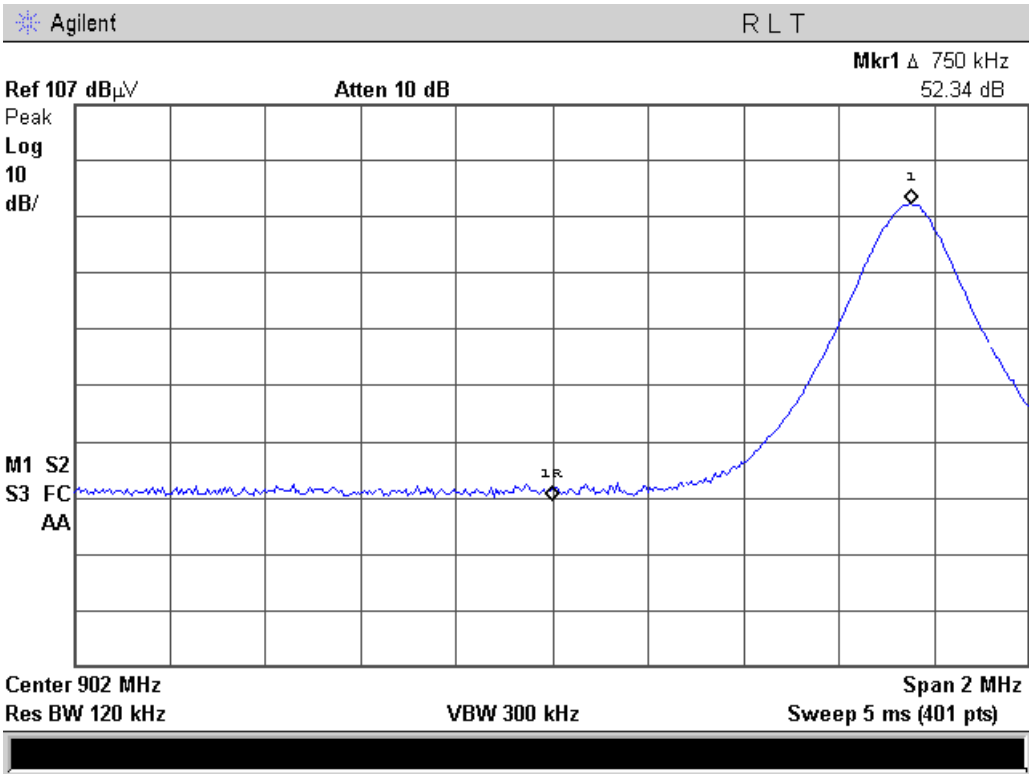
**40X40 Antenna Band Edge 902 MHz**



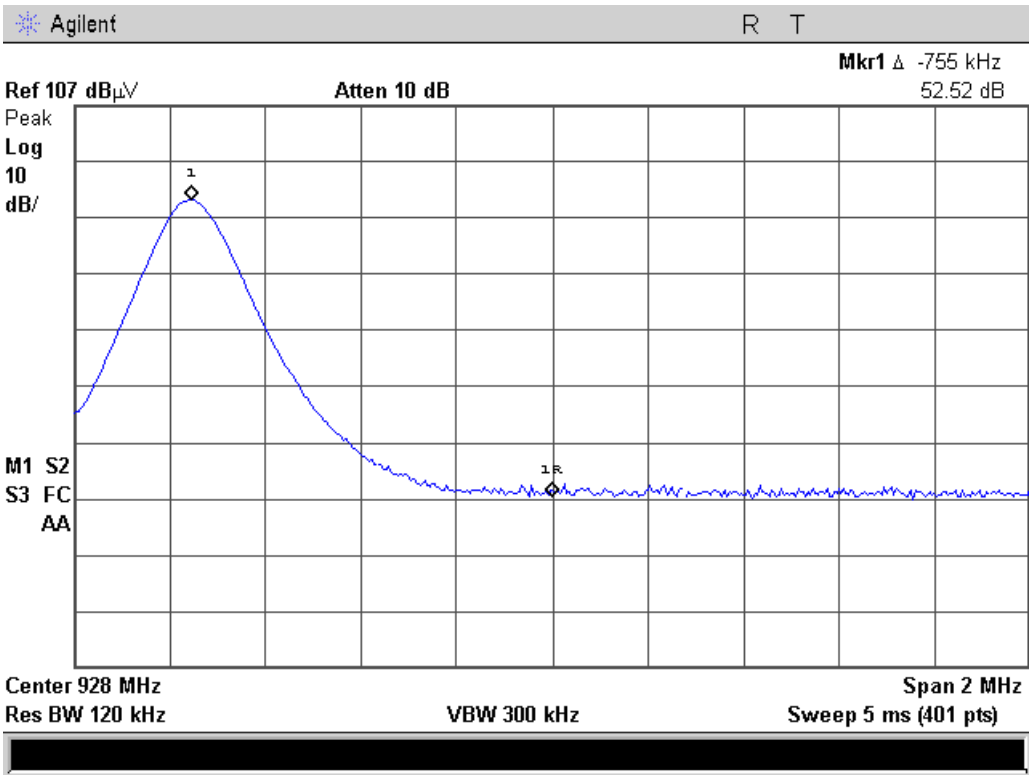

**40X40 Antenna Band Edge 928 MHz**



## 79X79 Antenna Band Edge 902 MHz




## 79X79 Antenna Band Edge 928 MHz



**Test Equipment Utilized**

| Description | MFG | Model Number | CT Asset Number | Last Cal Date | Cal Due Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | HP | 8546A | i00033 | 10/3/2010 | 10/3//2011 |
| Horn Antenna | EMCO | 3115 | i00103 | 11/5/2010 | 11/5/2012 |
| Bilog Antenna | Schaffner | CBL6111C | i00267 | 11/21/2009 | 11/21/2011 |
| Spectrum Analyzer | Agilent | E7405A | i00379 | 11/22/2010 | 11/22/2011 |

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT