# Laboratory Test Report

## Class II Permissive Change

On the

## TBAK2 Base Station Transceiver

In accordance with

FCC 47 CFR Parts 22 and 90

Report Revision: 1
Issue Date: 24-October-2007
FCC ID: CASTBA7K2

PREPARED BY: Marcus Ludwig _____
Test Technician

CHECKED & APPROVED BY: S A Crompton _____
Laboratory Manager



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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# Revision History

| Date | Revision | Comments |
|---|---|---|
| 24-October-2007 | 1 | Initial Report |
| | | |
| | | |

## Introduction

This is a Class II Permissive Change to report number 2113 dated November 2004 and confirms performance of Tait Simulcast Modulation (TSM) capability of the TBAK2 Base Station Transceiver, in accordance with:
**FCC CFR 47 Parts 22 & 90**

## Report Prepared For

Tait Electronics Ltd
PO Box 1645
558 Wairakei Rd
Christchurch
New Zealand

## Description of Sample

Equipment: Base Station Transceiver

Manufacturer: Tait Electronics Limited
PO Box 1645
558 Wairakei Road
Christchurch
New Zealand

Type Code: TBAK2

Module Details:

| Reciter | Frequency Range | Serial Number | Software Revisions |
|---|---|---|---|
| TBA40K4-PA0 | 762-869 MHz | 18041159 | HW: 0.07<br>FW: 3.10 |

| Power Amplifier | Range | Serial Number | Software Revisions |
|---|---|---|---|
| TBA70K2-0000 | 760-870 MHz | 18022881 | HW: 00.01<br>FW: 03.00 |

| Power Management Unit | Subrack | Serial Number | Software Revisions |
|---|---|---|---|
| TBA30A4-4400 | TBA2327-A000<br>S/N: 18019053 | 18005551 | HW: 00.01<br>FW: 02.01 |

# MODULATION TYPES AND EMISSION DESIGNATORS

**Modulation Types:**

| | | |
|---|---|---|
| F1E, F7E | Digital Voice C4FM | (9600 bps) |
| F1D, F7D | Digital Data C4FM | (9600 bps) |

**Channel Spacings:**

12.5 kHz

**Emission Designators:**

| | | |
|---|---|---|
| TSM | 6K10F1E | Digital Voice Open/Encoded TSM |
| | 6K10F7E | Digital Voice/Data TSM |
| | 6K10F1D | Data TSM |
| | 6K10F7D | Dual Data TSM |

## Statement of Compliance

The TBAK2 Base Station transceiver as tested in this report was found to conform to the following standards:

**FCC CFR 47 Parts 22, 90**

## Test Conditions

All testing was performed at the following conditions.

| | |
|---|---|
| Ambient Temperature | 15°C → 30°C |
| Relative Humidity | 20% → 75% |
| Standard Test Voltage | 120 Vac |

## 99 % Bandwidth Measurement Results

| 5 W PA | Channel Spacing | Power | 99% BW TSM |
|---|---|---|---|
| 765.9875 MHz | 12.5 kHz | 5 W | 5.64 kHz |
| | 12.5 kHz | 1 W | 5.65 kHz |
| 861.5125 MHz | 12.5 kHz | 5 W | 5.64 kHz |
| | 12.5 kHz | 1 W | 5.67 kHz |
| 868.9875 MHz | 12.5 kHz | 5 W | 5.71 kHz |
| | 12.5 kHz | 1 W | 5.75 kHz |

## Emission Designators

| | | |
|---|---|---|
| TSM | 6K10F1E | Digital Voice Open/Encoded TSM |
| | 6K10F7E | Digital Voice/Data TSM |
| | 6K10F1D | Data TSM |
| | 6K10F7D | Dual Data TSM |

# Test Results

## SIDEBAND SPECTRUM

SPECIFICATION: FCC 47 CFR 2.1049 (c)

GUIDE: TIA/EIA-603C 2.2.11

MEASUREMENT PROCEDURE:

1. Refer Annex A for Equipment Set up.
   For TSM Data measurements: The EUT was modulated with an internally generated pseudo random bit sequence at the appropriate Baud rate using the Conformance 1011 Hz test pattern.
2. The Sideband Spectrum was measured on the Spectrum Analyser, with bandwidth settings as follows.

   Emission Mask B – Resolution bandwidth = 300Hz, Video Bandwidth = 3 kHz

MEASUREMENT RESULTS:
See the plots on the following pages for 12.5 kHz channel spacings.

LIMIT CLAUSE: FCC 47 CFR 90.210

EMISSION MASKS

| | | |
|---|---|---|
| Emission Mask B | 12.5 kHz Channel Spacing | TSM |

DATA SPEED

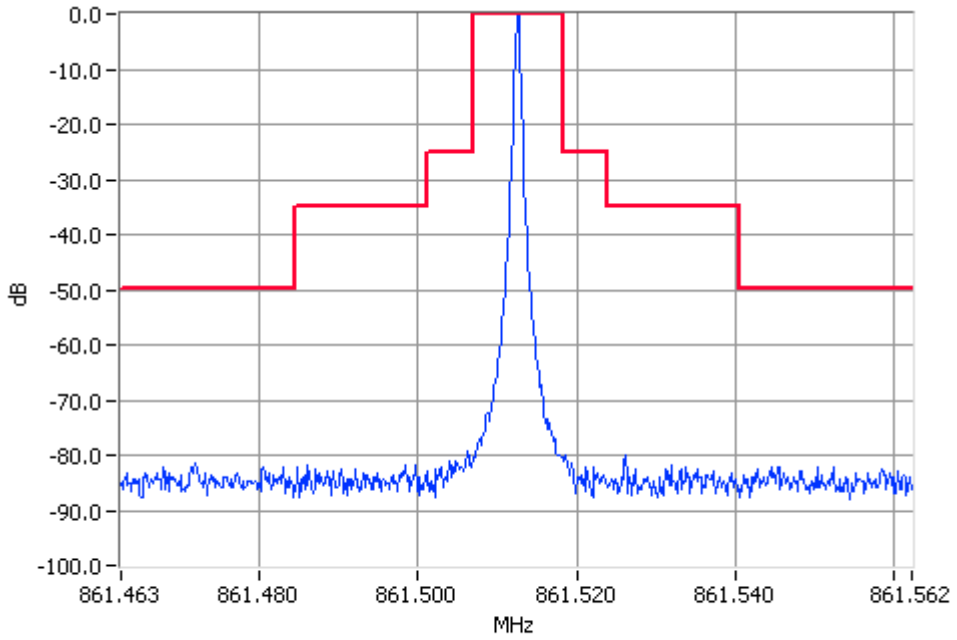
| | | |
|---|---|---|
| Digital Voice/Data | 9600 bps | 12.5 kHz Channel Spacing |

# SIDEBAND SPECTRUM

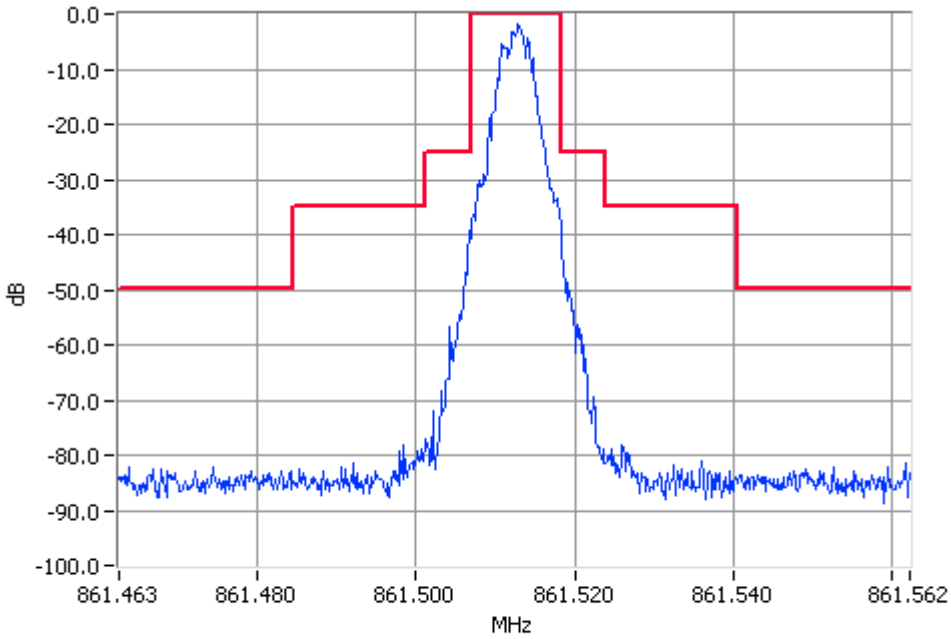
## TSM

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 861.5125 MHz 5 W 12.5 kHz Channel Spacing




Unmodulated 861.5125MHz Mask B 5W Pass
RBW=300Hz VBW=3000Hz



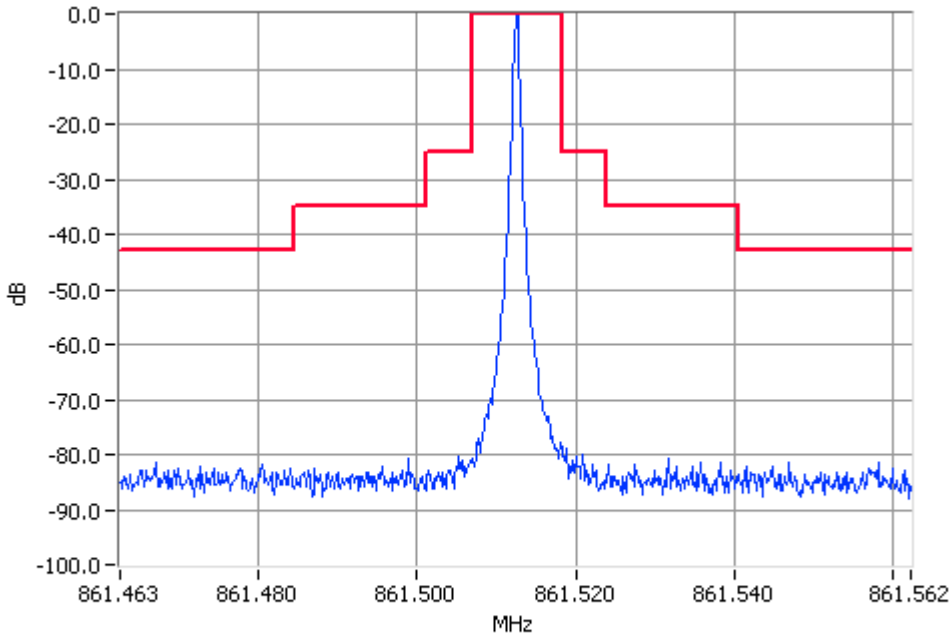

TSM 861.5125MHz Mask B 5W Pass
RBW=300Hz VBW=3000Hz

# SIDEBAND SPECTRUM

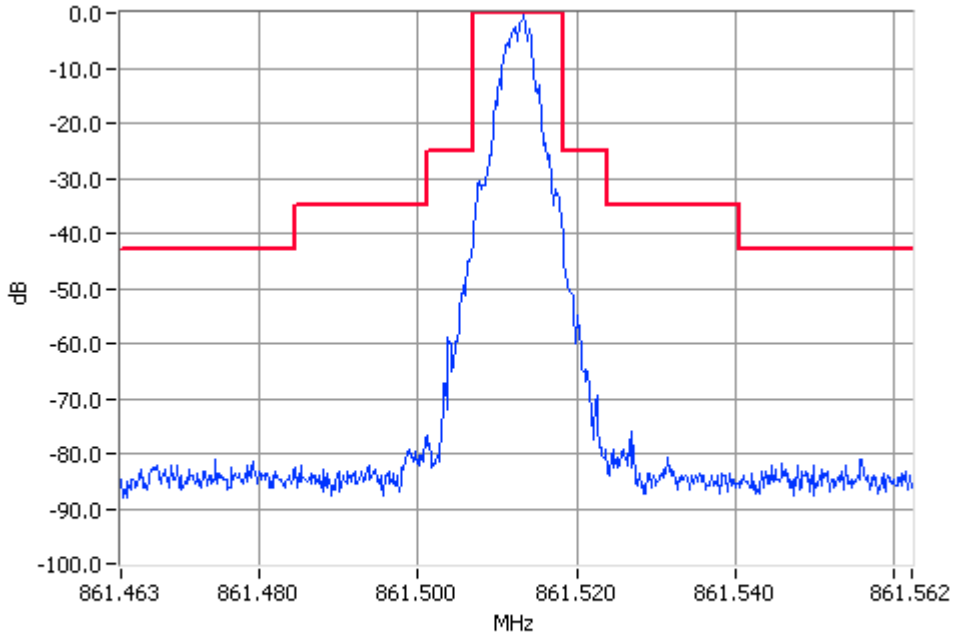
## TSM

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 861.5125 MHz 1 W 12.5 kHz Channel Spacing




Unmodulated 861.5125MHz Mask B 1W Pass
RBW=300Hz VBW=3000Hz



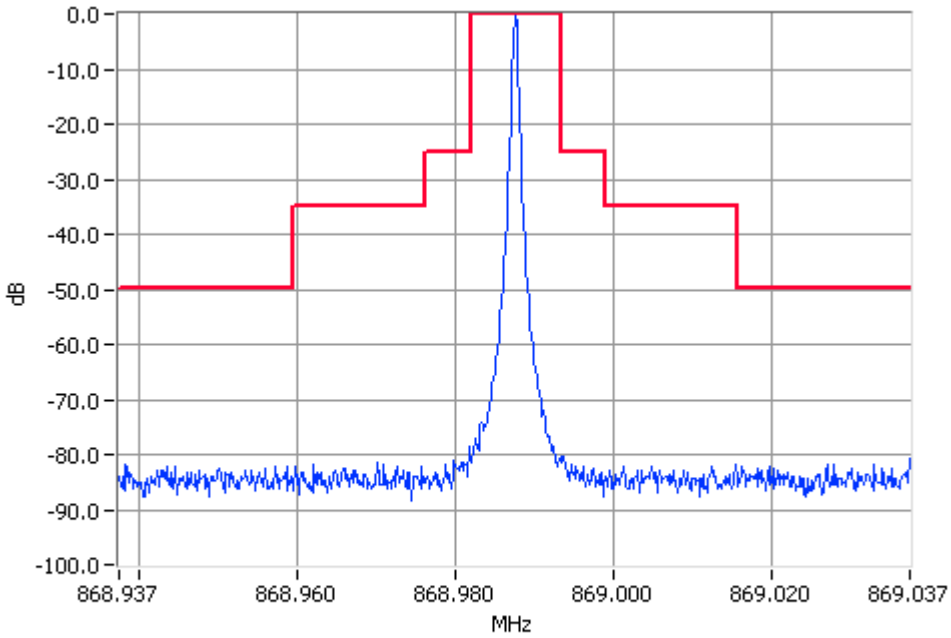

TSM 861.5125MHz Mask B 1W Pass
RBW=300Hz VBW=3000Hz

# SIDEBAND SPECTRUM

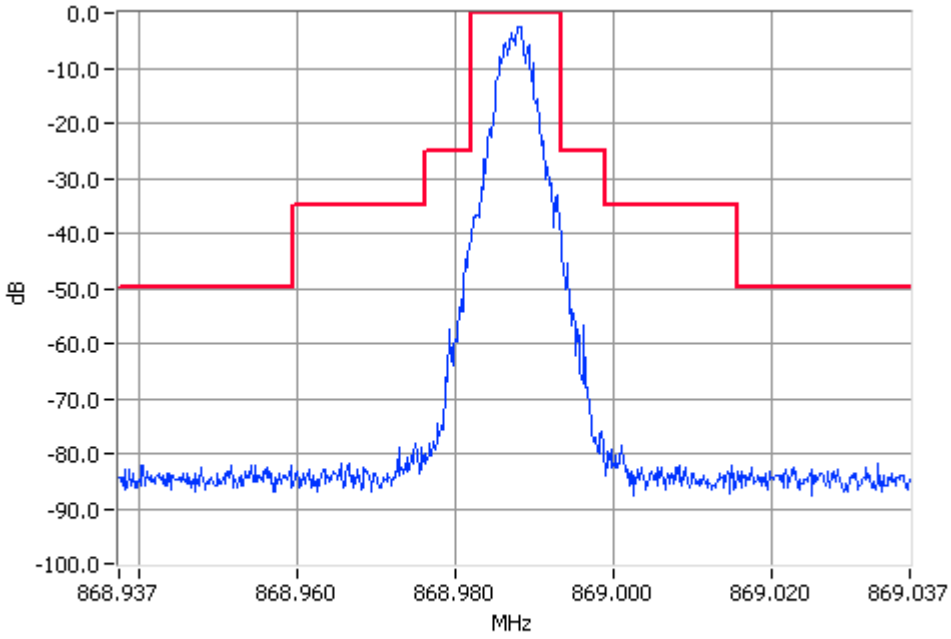
## TSM

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 868.9875 MHz 5 W 12.5 kHz Channel Spacing




Unmodulated 868.9875MHz Mask B 5W Pass
RBW=300Hz VBW=3000Hz



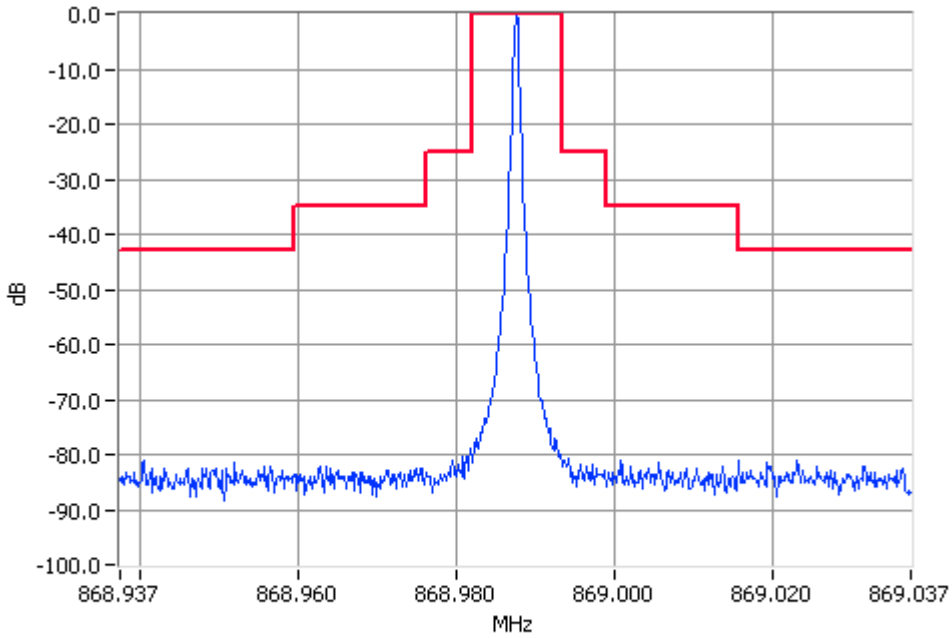

TSM 868.9875MHz Mask B 5W Pass
RBW=300Hz VBW=3000Hz

# SIDEBAND SPECTRUM

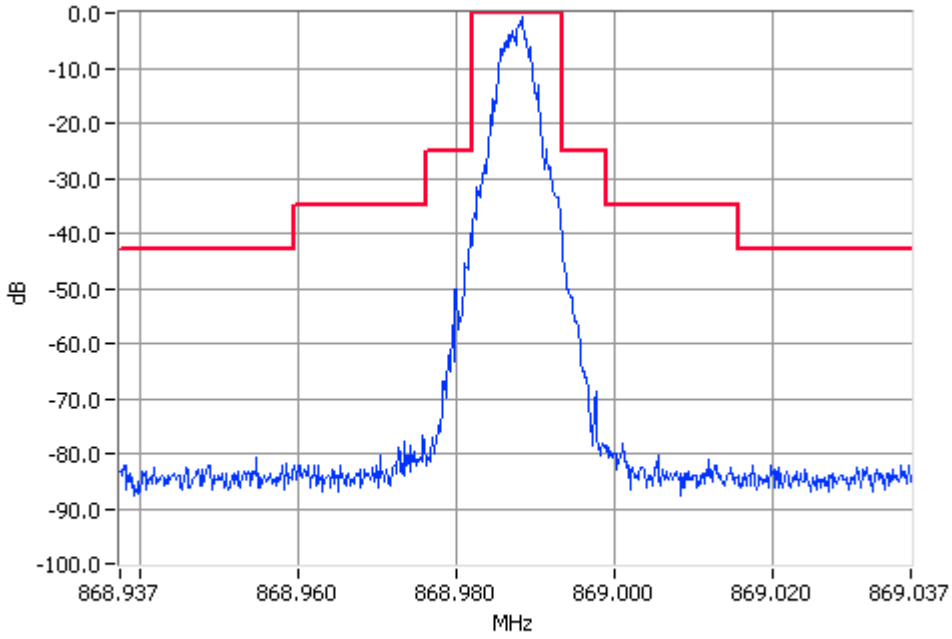
## TSM

SPECIFICATION: FCC CFR 2.1049 (c)

Tx FREQUENCY: 868.9875 MHz 1 W 12.5 kHz Channel Spacing




Unmodulated 868.9875MHz Mask B 1W Pass
RBW=300Hz VBW=3000Hz




TSM 868.9875MHz Mask B 1W Pass
RBW=300Hz VBW=3000Hz

# ADJACENT CHANNEL POWER

SPECIFICATION: FCC 47 CFR 90.543

MEASUREMENT PROCEDURE:
1. Refer Annex A for equipment set up.
2. The transmitter is modulated with the standard test pattern Conformance 1011 for TSM.
3. The test is performed in accordance with 47 CFR 90.543

LIMIT CLAUSE: FCC 47 CFR 90.543

MEASUREMENT RESULTS:

## TSM

Tx FREQUENCY: 765.9875 MHz 5 W 12.5 kHz Channel Spacing

| Frequency Offset | Measurement Bandwidth | ACP Measured Lower (dBc) | ACP Measured Upper (dBc) | Maximum ACP (LIMIT) (dBc) |
|---|---|---|---|---|
| 9.375 kHz | 6.25 kHz | -49.4 | -51.8 | -40 |
| 15.625 kHz | 6.25 kHz | -74.4 | -74.8 | -60 |
| 21.875 kHz | 6.25 kHz | -76.0 | -75.9 | -60 |
| 37.5 kHz | 25 kHz | -70.9 | -71.0 | -60 |
| 62.5 kHz | 25 kHz | -74.3 | -74.4 | -65 |
| 87.5 kHz | 25 kHz | -77.7 | -77.6 | -65 |
| 150 kHz | 100 kHz | -75.3 | -75.5 | -65 |
| 250 kHz | 100 kHz | -82.0 | -82.1 | -65 |
| 350 kHz | 100 kHz | -86.0 | -86.1 | -65 |
| >400 kHz to 12 MHz | 30 kHz (swept) | -85.8 | -86.3 | -80 |
| 12 MHz to paired receive band | 30 kHz (swept) | -89.6 | | -80 |
| In the paired receive band | 30 kHz (swept) | -105.3 | | -100 |

Tx FREQUENCY: 765.9875 MHz 1 W 12.5 kHz Channel Spacing

| Frequency Offset | Measurement Bandwidth | ACP Measured Lower (dBc) | ACP Measured Upper (dBc) | Maximum ACP (LIMIT) (dBc) |
|---|---|---|---|---|
| 9.375 kHz | 6.25 kHz | -50.8 | -53.1 | -40 |
| 15.625 kHz | 6.25 kHz | -73.9 | -73.8 | -60 |
| 21.875 kHz | 6.25 kHz | -75.0 | -75.3 | -60 |
| 37.5 kHz | 25 kHz | -70.9 | -70.8 | -60 |
| 62.5 kHz | 25 kHz | -74.0 | -74.1 | -65 |
| 87.5 kHz | 25 kHz | -77.6 | -77.6 | -65 |
| 150 kHz | 100 kHz | -74.9 | -75.3 | -65 |
| 250 kHz | 100 kHz | -81.7 | -82.0 | -65 |
| 350 kHz | 100 kHz | -85.8 | -86.0 | -65 |
| >400 kHz to 12 MHz | 30 kHz (swept) | -86.2 | -86.5 | -80 |
| 12 MHz to paired receive band | 30 kHz (swept) | -93.9 | | -80 |
| In the paired receive band | 30 kHz (swept) | -105.5 | | -100 |

# TEST EQUIPMENT USED

| No# | Equipment | Manufacturer | Model No | Serial No# | Tait ID | Cal Due |
|---|---|---|---|---|---|---|
| 66 | RF Attenuator 25W | Weinschel | 33-20-33 | BD5871 | E3673 | 31-Oct-07 |
| 114 | Signal Generator | Rohde & Schwarz | SML03 1090.3000.13 | 100597 | E4050 | 1-Nov-07 |
| 123 | Spectrum Analyser | Agilent | E4445A | MY42510072 | E4139 | 17-Jul-08 |

# Annex A

TEST SETUP DETAILS

All testing is performed using the **T**eltest **R**adio **EVA**luation system (TREVA), which is configured as shown below.