Sulis Consultants
CE Marking and Product Approvals

Temperature Stability Test Report:

Altiostar DENEB AWS-3 LTE iRRH

FCC ID: NXP-4451E400-3

SC_TR_260_A

Prepared for:

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1 Revision History

Revision	Originator	Date	Comment
A	C Blackham	16 June 2017	1st release

2 Purpose

This document details the Altiostar DENEB AWS-3 LTE iRRH (intelligent Remote Radio Head), model number iRM4451E400-3, designed to transmit in the 2110-2180 MHz band.

3 Reference Documents

[Ref 1]	47CFR2	Title 47 Code of Federal Regulations Part 2: frequency allocations and radio treaty matters; general rules and regulations
[Ref 2]	47 CRF27	Title 47 Code of Federal Regulations Part 27: Miscellaneous Communications Services
[Ref 3]	TIA-603-D	Land Mobile FM or PM – Communications Equipment – Measurement and Performance Standards

4 Test configuration

The iRM4451E400-3 was configured to transmit a test waveform at 2x20MHz TM3.1 with 70MHz IBW at full power on all channels. The carriers were at 2120MHz and 2170MHz. The test monitored the 64QAM EVM of the carrier at 2120MHz and recorded the frequency error.

The iRM4451E400-3 had a GPS timing reference supplied from a distribution box. A GPS receiver and oscillator module was used to provide an independent 10MHz for the signal analyser.

Two test cycles were carried out. One set the DC supply at -48V and, with the unit left continually transmitting, measured the frequency error at stabilised chamber temperatures in the range -45°C to +65°C in 10°C steps. The other was with the chamber set at 35°C and the DC supply set at -40.5, -48 and -57V. Note that the chamber uplift was -10°C so that a chamber temperature of 35°C is equivalent to a lab still air temperature of 25°C. All channels were transmitting with one channel being monitored.

At each measurement point the average and worst case frequency error was recorded from a set of 100 EVM measurements.

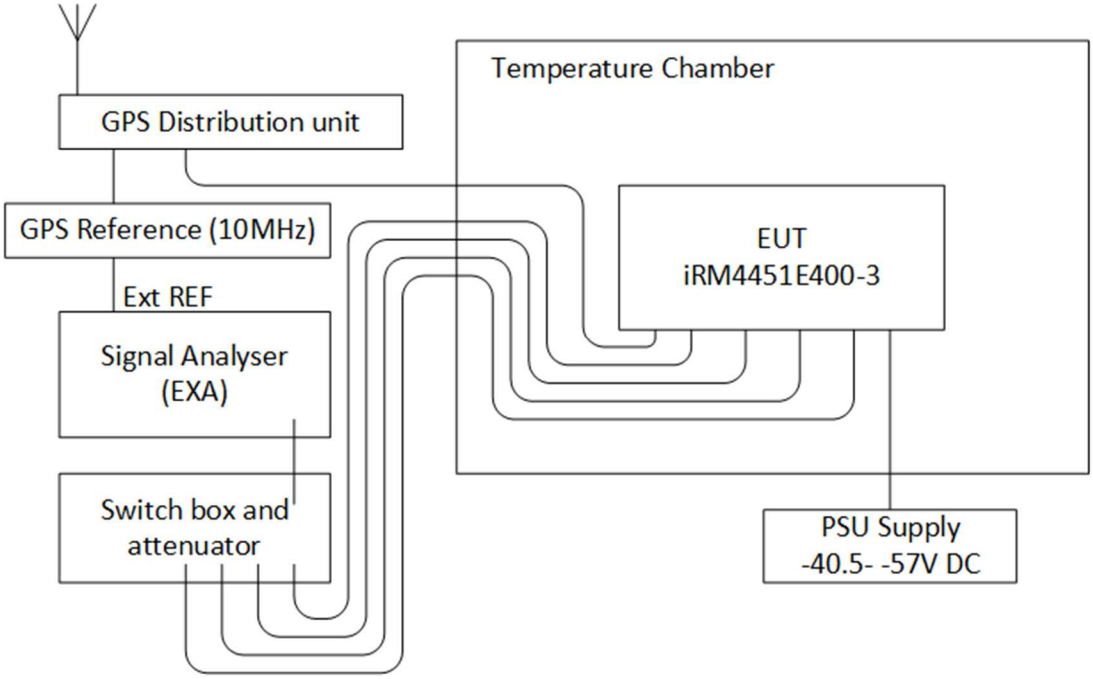

Figure 1 Test Configuration

4.1 Test sample and Operating mode

The equipment under test (EUT) was:

Manufacturer	Name	Model Number	Serial Number
Altiostar	Deneb AWS-3	iRM4451E400-3	TEW07170002

Table 1: Equipment under test

5 Test Results

Chamber temperature (°C)	Average Frequency Error (Hz)	Absolute worst case Frequency error (Hz)	Absolute worst case Frequency error (ppm)
65	10.578	26.299	0.012
55	10.245	26.355	0.012
45	10.460	25.264	0.012
35	11.723	29.748	0.014
25	12.293	33.302	0.016
15	10.764	28.677	0.014
5	11.318	27.586	0.013
-5	9.180	23.001	0.011
-15	11.805	30.491	0.014
-25	11.398	29.117	0.014
-35	12.222	29.015	0.014
-45	12.004	28.360	0.013

Table 2: Frequency Error over temperature for carrier frequency 2120MHz

Supply Voltage (V)	Average Frequency Error (Hz)	Absolute worst case Frequency error (Hz)	Absolute worst case Frequency error (ppm)
-40.5	9.749	28.623	0.014
-48	9.233	29.545	0.015
-57	9.532	25.703	0.013

Table 3: Frequency Error at supply voltage extremes at room temperature for carrier frequency 2120MHz

6 Test equipment and location

Testing was performed between 27th and 30th May 2017 at:

Altiostar Networks UK Ltd
No 1 the Heights
Brooklands
Weybridge
KT13 0NY

Description	Manufacturer	Name	Serial Number	Calibration certificate
EXA Signal Analyser	Keysight	N9010A	MY54200197	1-7032980367-1
GPS ref	Spectratime	iSync_GXClok_500	G00895	N/A
Switch box	Mini-circuits	ZT-110	002	N/A for frequency measurements
RF cable	Times Microwave	SLU18-SMNM-01.75m		
Power supply	Keysight	N8737A	US14C3870M	

Table 4: Test Equipment