Compliance Testing, LLC
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FCC CFR47 Part 22/24/27
Test Report

Prepared for: Vertu Ltd

Model: CONSTELLATION T, Type: RM-681V

Description: GSM and WCDMA Cellular Telephone with BT and WLAN

To

Federal Communications Commission

Rule Part 22/24/27

Date of Issue: July 8, 2011

On the behalf of the applicant:	**Vertu Ltd.** **Beacon Hill Road** **Church Crookham, Hampshire, UK GU52 8DY**
Attention of:	**Mark Pope, Certification & Compliance Manager** **Ph: +44 1252 611135** **Fax: +44 1252 611302** **E-mail: mark.pope@vertu.com**

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Project No: p1160008

Greg Corbin

Greg Corbin
Project Test Engineer

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	July 8, 2011	Greg Corbin	Original Document

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ILAC / A2LA

Compliance Testing, LLC, has been 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 Communiqué dated January 2009)

The tests results contained within this test report all fall within our scope of accreditation, unless noted in the table below

Please refer to http://www.compliancetesting.com/labscope.html for current scope of accreditation.

Testing Certificate Number: **2152.01**

FCC OATS Reg, #933597

IC Reg. #2044A-1

Non-accredited tests contained in this report:
N/A

The Applicant has been cautioned as to the following:

15.21: **Information to the 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 an 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.

Sub-part
2.1033(c) (14): **Test and Measurement Data**

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II, Part 2, Sub-part J, Sections 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1079, 2.1051, 2.1053, 2.1055, 2.1057, and the following individual Parts: 22/24/27.

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, 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**
35.8 deg C	36 %	966.5 mbar

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

Test Result Summary

Specification	Test Name	Pass, Fail, N/A	Comments
2.1053	Field Strength of Spurious Radiation	Pass	
RSS_GEN (6.1)	Receiver Spurious Emissions	Pass	

Accessories:

Qty	Type / Description	Make, Model	Manufacturer	S/N
1	Battery	BP-6FV	N/A	
1	Headset, stereo	WH-1V	N/A	
1	AC – DC Adapter	AC-31	N/A	
1	USB Cable	CA-101V	N/A	
1	Desk Stand	DDK-7V	N/A	

Field Strength of Spurious Radiation

Name of Test: Field Strength of Spurious Radiation

Specification: 2.1053 **Engineer:** Greg Corbin

Test Equipment Utilized: i00103, i00177, i00364, i00379 **Test Date:** 7/6/2011

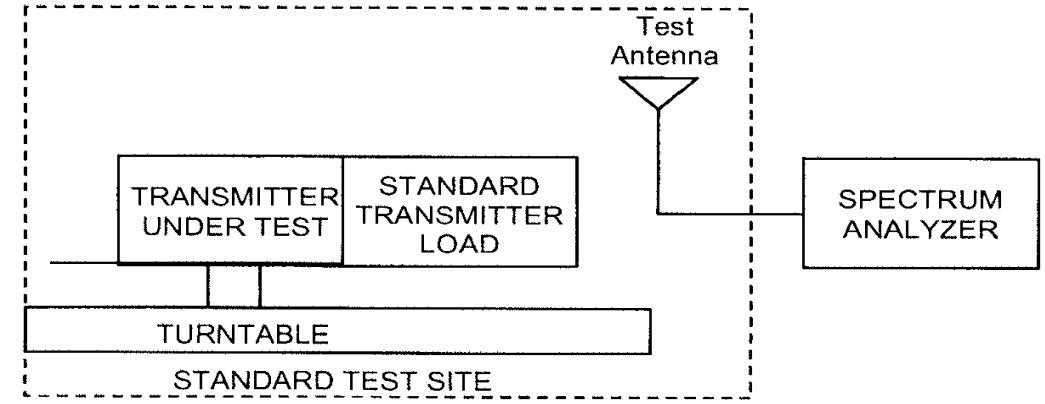
Test Procedure

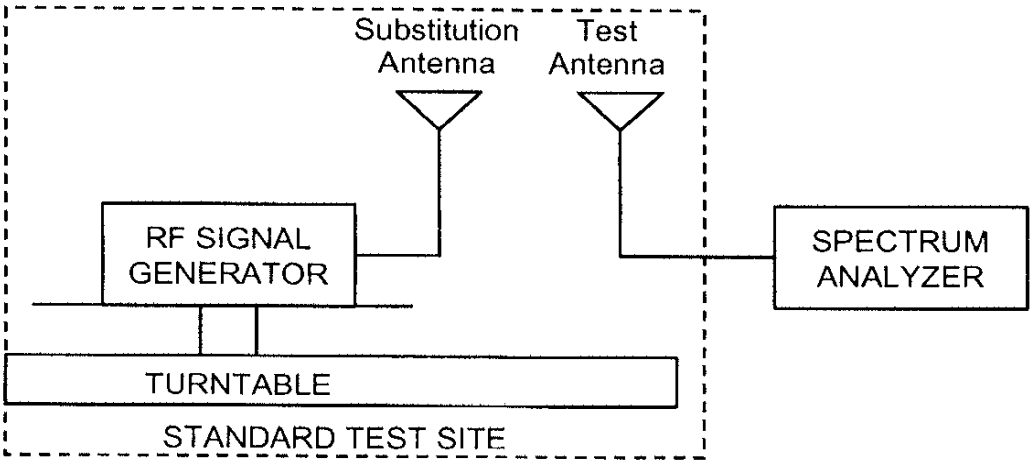
A) Connect the equipment as illustrated
B) Adjust the spectrum analyzer for the following settings:
    1) Resolution Bandwidth 100 kHz (< 1 GHZ), 1 MHZ (> 1GHz)
    2) Video Bandwidth ≥ 3 times Resolution Bandwidth, or 30 kHz
    3) Sweep Speed ≤2000 Hz/second
    4) Detector Mode = Mean or Average Power
C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non- radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.
D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to ± the test bandwidth (see section 1.3.4.4).
E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.
G) Reconnect the equipment as illustrated.
H) Keep the spectrum analyzer adjusted as in step B).
I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.
J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
K) Repeat step J) with both antennas vertically polarized for each spurious frequency.
L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB = $10\log_{10}$ (TX power in watts/0.001) – the levels in step I)

NOTE: It is permissible that the other antennas provided can be referenced to a dipole.

Test Setup


Test
Antenna
TRANSMITTER
UNDER TEST
STANDARD
TRANSMITTER
LOAD
SPECTRUM
ANALYZER
TURNTABLE
STANDARD TEST SITE


Substitution
Antenna
Test
Antenna
RF SIGNAL
GENERATOR
SPECTRUM
ANALYZER
TURNTABLE
STANDARD TEST SITE

824.2 GSM Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
1648.4	-59.8	29.8	-30.0	-13	Pass
2472.6	-62.7	33.5	-29.2	-13	Pass
3296.8	-63.8	36.1	-27.7	-13	Pass

836.6 GSM Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
1673.2	-60.9	29.9	-31.0	-13	Pass
2509.8	-60.6	33.6	-27.0	-13	Pass
3346.4	-60.8	36.2	-24.6	-13	Pass

848.8 GSM Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
1697.6	-61.3	30.1	-31.2	-13	Pass
2546.4	-61.9	33.8	-28.1	-13	Pass
3395.2	-62.4	36.3	-26.1	-13	Pass

824.2 EGPRS Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
1648.4	-60.7	29.8	-30.9	-13	Pass
2472.6	-61.5	33.5	-28.0	-13	Pass
3296.8	-61.9	36.1	-25.8	-13	Pass

836.6 EGPRS Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
1673.2	-61.7	29.9	-31.8	-13	Pass
2509.8	-60.8	33.6	-27.2	-13	Pass
3346.4	-59.8	36.2	-23.6	-13	Pass

848.8 EGPRS Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
1697.6	-61.6	30.1	-31.5	-13	Pass
2546.4	-61.0	33.8	-27.2	-13	Pass
3395.2	-61.9	36.3	-25.6	-13	Pass

826.4 WCDMA Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
1648.4	-61.6	29.8	-31.8	-13	Pass
2472.6	-62.6	33.5	-29.1	-13	Pass
3296.8	-62.2	36.1	-26.1	-13	Pass

836.6 WCDMA Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
1673.2	-62.0	29.9	-32.1	-13	Pass
2509.8	-62.0	33.6	-28.4	-13	Pass
3346.4	-62.2	36.2	-26.0	-13	Pass

846.6 WCDMA Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
1697.6	-61.0	30.0	-31.0	-13	Pass
2546.4	-61.5	33.7	-27.8	-13	Pass
3395.2	-60.8	36.3	-24.5	-13	Pass

1712.4 WCDMA Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3424.8	-59.2	36.8	-22.4	-13	Pass
5137.2	-60.0	40.7	-17.5	-13	Pass
6849.6	-57.9	43.4	-14.5	-13	Pass

1732.4 WCDMA Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3464.8	-59.2	36.8	-22.4	-13	Pass
5197.2	-60.0	41.0	-19.0	-13	Pass
6929.6	-57.4	43.5	-13.9	-13	Pass

1752.6 WCDMA Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3505.2	-59.9	37.1	-22.8	-13	Pass
5257.8	-61.7	41.2	-20.5	-13	Pass
7010.4	-58.3	43.7	-14.6	-13	Pass

1850.2 GSM Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3700.4	-61.4	36.7	-24.7	-13	Pass
5550.6	-61.3	40.4	-20.9	-13	Pass
7400.8	-59.9	44.2	-15.7	-13	Pass

1880 GSM Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3760	-60.8	36.8	-24.0	-13	Pass
5640	-60.2	40.5	-19.7	-13	Pass
7520	-59.8	44.5	-15.3	-13	Pass

1909.8 GSM Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3819.6	-62.1	36.8	-25.3	-13	Pass
5729.4	-62.8	40.6	-22.2	-13	Pass
7639.2	-59.5	44.7	-14.8	-13	Pass

1850.2 EGPRS Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3700.4	-59.0	36.7	-22.3	-13	Pass
5550.6	-59.6	40.4	-19.2	-13	Pass
7400.8	-58.9	44.2	-14.7	-13	Pass

1880 EGPRS Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3760	-59.2	36.8	-22.4	-13	Pass
5640	-59.9	40.5	-19.4	-13	Pass
7520	-58.7	44.5	-14.2	-13	Pass

1909.8 EGPRS Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3819.6	-58.7	36.8	-21.9	-13	Pass
5729.4	-58.4	40.6	-17.8	-13	Pass
7639.2	-58.6	44.7	-13.9	-13	Pass

1852.4 WCDMA Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3704.8	-59.1	36.7	-22.4	-13	Pass
5557.2	-60.4	40.5	-19.9	-13	Pass
7409.6	-58.7	44.2	-14.5	-13	Pass

1880 WCDMA Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3760	-59.5	36.8	-22.7	-13	Pass
5640	-60.3	40.5	-19.8	-13	Pass
7520	-58.5	44.5	-14.0	-13	Pass

1907.6 WCDMA Test Results

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm) ERP/EIRP	Result
3815.2	-61.0	36.8	-24.2	-13	Pass
5722.8	-61.3	40.5	-20.8	-13	Pass
7630.4	-59.4	44.7	-14.7	-13	Pass

No other emissions were detected. All emissions were less than –13 dBm.

Receiver Spurious Emissions

Name of Test: Receiver Spurious Emissions

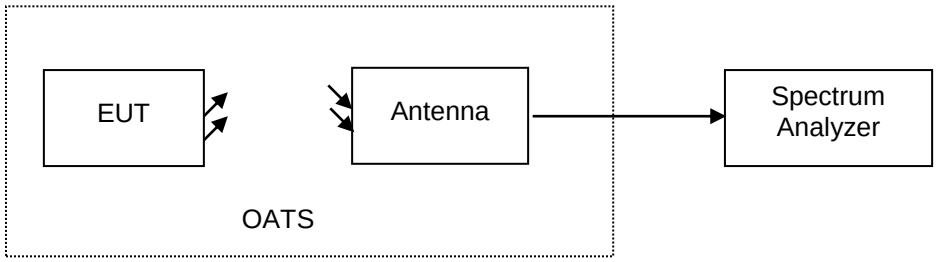
Specification: RSS-GEN-6(b) **Engineer:** Greg Corbin

Test Equipment Utilized: i00033, i00103, i00349, i00379 **Test Date:** 7-7-2011

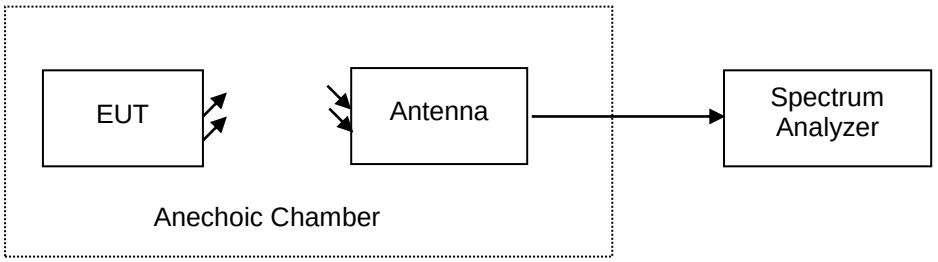
Test Procedure

The EUT was set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Receiver Spurious Emissions. The EUT was tested by rotating it 360° with the antenna in both the vertical and horizontal orientation to ensure the signal levels were maximized.

30 – 1000 MHz Test Setup



1 – 7.5 GHz Test Setup



Settings:
For 30 – 1000 MHz, a Quasi-Peak detector and 120 KHz RBW was used.
For 1 – 7.5 GHz, an Average detector and 1 MHz RBW was used.
Correction Factors = Antenna CF + Cable insertion loss
The correction factors were input to the spectrum analyzer before recording receiver spurious emissions.

Receiver Spurious Emissions Summary

Frequency Range MHz	Frequency MHz	Recorded Measurement uV/m	Specification Limit uV/m	Result
30 – 88	50.034	21.1	100	Pass
88 - 216	172.060	21.4	150	Pass
216 - 960	826.890	94.4	200	Pass
960 - 7500	2983	24.8	500	Pass

Test Equipment Utilized

Description	MFG	Model Number	CT Asset Number	Last Cal Date	Cal Due Date
EMI Receiver	HP	8546A	i00033	12/3/10	12/3/11
Horn Antenna	EMCO	3115	i00103	11/5/10	11/5/12
Monopole Antenna Set	Ailtech	DM-105A-T1,T2,T3	i00142,147,148	Verify When	Use
High-pass Filter	Trilithic	4HX3400-3-KK	i00177	NCR	NCR
Signal Generator	R&S	SMT-03	i00266	NCR	NCR
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	11/11/10	11/11/11
Bi-Log Antenna	Schaffner	CBL 6111D	i00349	5/25/11	5/25/13
Humidity / Temp Meter	Control Company	4189CC	i00355	1/26/11	1/26/12
Tunable Notch Filter	Eagle	TNF240MFMF	i00364	NCR	NCR
Spectrum Analyzer	Agilent	E7405A	i00379	11/22/10	11/22/11

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